



VEHICLE OVERHAUL INSTRUCTION

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PB/VI2133

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PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES

Issue: 5

APPROVAL AND AUTHORISATION

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2. INTRODUCTION

2.1 Purpose

This instruction describes the following overhauls (also known as Classified Repairs):

- C4
- C4X
- C4E
- C3M
- C6

These overhauls relate to Mark 3A and 3B Locomotive Hauled Coaching Stock (LHCS - day cars and catering cars) and High Speed Train (HST) trailer stock. The instruction does not apply to NMT Test Cars.

C4, C4X and C4E overhauls are planned on a mileage-run basis. C3M and C6 overhauls are planned on a calendar period basis.

2.1.1 C4 Overhaul

A C4 overhaul comprises overhaul of the bogies and parts of the braking system, cleaning and examination of the air conditioning module and attention to areas where Level 4 depots cannot encompass either the scheduled work or the level of arising work, e.g. doors and gangways.

2.1.2 C4X Overhaul

The C4X overhaul comprises the whole content of a C4 overhaul plus a full overhaul of the exterior doors. There are a small number of other jobs which are carried out at C4X but not at C4, such as NDT checks on vehicle underframe and more extensive work on vehicle buffers.

2.1.3 C4E Overhaul


The C4E overhaul comprises the whole content of a C4X overhaul plus safety-critical elements of the former C3 overhaul.

2.1.4 C3M Overhaul

The C3M overhaul comprises the residual content of the former C3 overhaul which has not been carried out at C4E. This is primarily aesthetic and asset-protection works.

2.1.5 C6 Overhaul

A C6 overhaul comprises date-dependant attention to vehicle braking and electrical systems, invasive corrosion checks, and attention to vehicle customer environment.

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2.2 Scope

Vehicle types covered by this instruction

Type	Vehicle number ranges
Mark 3A LHCS day cars, comprising:	
FO - First Open	11005 - 11060
TSO - Tourist Standard Open	12004 - 12172
TSOD – Tourist Standard Open with BRB Disabled Toilet	See Section 5.9 for vehicle numbers
Mark 3A LHCS catering cars, comprising:	
RFM - Restaurant First Modular	10200 - 10260
TSOB – Tourist Standard Open with Buffet	10401 – 10406
Mark 3B LHCS day cars, comprising:	
BFO - Brake First Open	17173 - 17175
FO - First Open	11064 – 11101
FOD – First Open, Disabled Toilet	See Section 5.9 for vehicle numbers
HST trailer day cars, comprising:	
TF - Trailer First	41xxx vehicles
TFD – Trailer First with disabled toilet. Note that there are several types of disabled toilet in use	See Section 5.9 for vehicle numbers
TFE – Trailer First End	See Section 5.9 for vehicle numbers.
TS - Trailer Standard	42xxx vehicles
TSD – Trailer Standard with disabled toilet. Note that there are several types of disabled toilet in use	See Section 5.9 for vehicle numbers
TGS - Trailer Guard Standard	44xxx vehicles
HST trailer catering cars, comprising:	
TSB – Trailer Standard Buffet (HST TS converted 2009 with servery at No.1 end)	401xx vehicles
TRFB - Trailer Restaurant First Buffet (large kitchen)	407xx vehicles
TBRF –Trailer Buffet RIO First (converted from 404xx), large kitchen	408xx vehicles
TCC – Trailer Composite Caterer (converted from Mark 3 LHCS)	45xxx vehicles

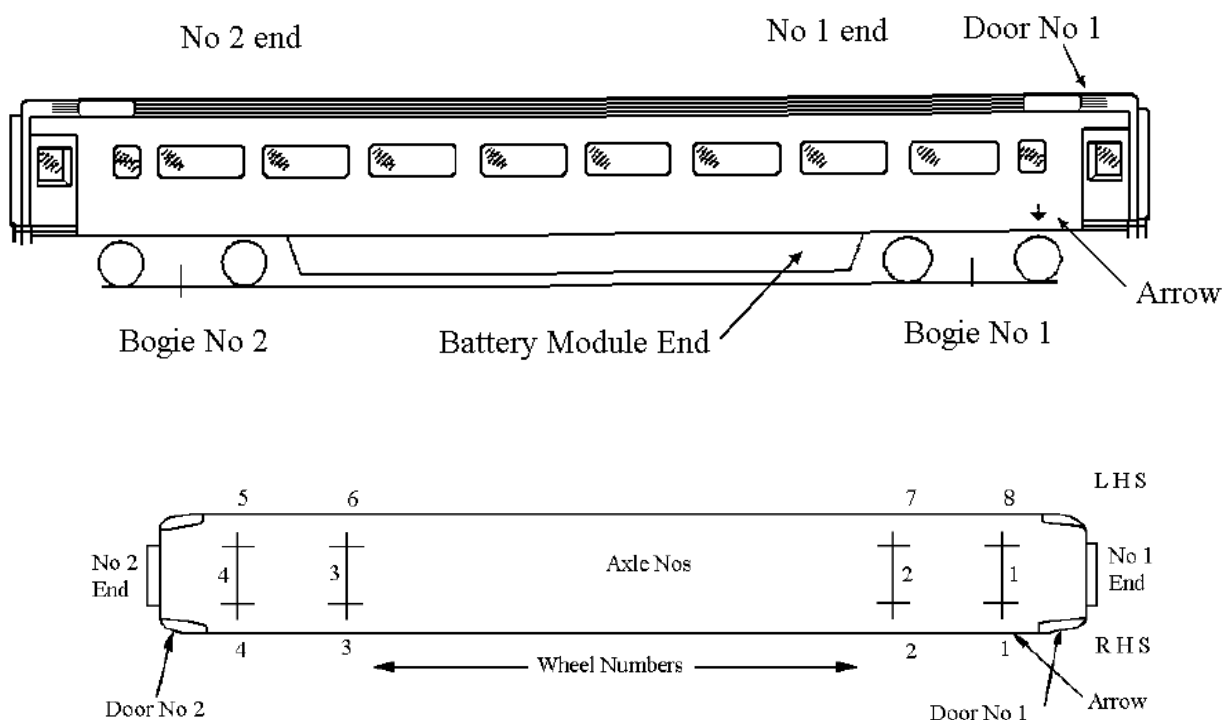
2.2.1 Restrictions on Bogies

There are restrictions on what type of BT10 bogie may be fitted to vehicles. Refer to Job No. UF 6301 for further details.

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2.2.2. Vehicle Nomenclature


In general, the nomenclature applicable to HST Trailer and Mark 3 coaches is as follows:



The Brake Module (where fitted – see Section 5.9) is to be found at No.2 end, and may be identified by the distributor release handle protruding through the skirts.

In general, the vehicle Control End is as follows:


- HST Vehicles – Control End No.2 end.
- HST Vehicles converted from Mark 3 LHCS (see Section 5.9 for details) – Control End No.1 end. However, this cannot be relied on to identify vehicle ends, and must be treated with caution (for example, TCC vehicles have control end at No.2 end)
- Mark 3a LHCS vehicles have control end at No.1 end (except RFM vehicles where the control end is at No.2 end).
- Mark 3b LHCS vehicles have control end at No.2 end

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2.3 Standard Definitions

Within this document, any of the terms used from the following list must be regarded as having the definition stated.

TERM	DEFINITION
CAUTION	Means that negligence may result in material damage.
CHANGE	Remove the original and fit a new or overhauled part or assembly in its place.
CHECK	Determine a particular nominated condition before, during or after repair, e.g. completeness, security, position.
CLEAN	Take off all dirt and deposits.
DEFECT/ DEFECTIVE	Any fault or faults in a component or assembly, which may prevent the component or assembly from fulfilling its designed purpose.
DISMANTLE	Take to pieces.
THE ENGINEER	Reference within this and all related documents to the Engineer must identify the authorised agents of the Engineering Director of Porterbrook Leasing Company Limited, (sometimes referred to as the Contracts Manager).
EXAMINE	Determine general condition before repair, e.g. wear, cracks, splits, leaks, scoring, corrosion, distortion, looseness.
GAUGE	Determine a nominated dimension by using suitable measuring equipment, e.g. ruler, micrometer, calipers, feeler gauge, or Go/No-Go gauge.
INSPECT	Determine conformity to required standards during and after repair.
NOTE	Means that special attention is being drawn to some technical point because it might not be obvious even to skilled technicians. However, observance of other notes on transport, assembly, operation and maintenance, as well as the technical data (in the operating instructions and in the product documentation) is equally indispensable to avoid malfunctions, which could cause serious injury or material damage directly or indirectly.
OVERHAUL	Do what is necessary to make a component re-usable, i.e. dismantle, strip, clean, examine, fit new parts, repair, re-assemble, test and inspect as required (does not include rewinding or renewal).

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TERM	DEFINITION
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RE-ASSEMBLE	Put together.
-------------	---------------

RECORD	Put down in writing the result of any specified examination, test or inspection.
--------	--

RECTIFY	To set right (does not include rewinding or renewal).
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REFIT	Put back and reconnect.
-------	-------------------------

REMOVE	Disconnect and take off.
--------	--------------------------

RENEW	Remove and scrap the original part and provide a new specified part in its place.
-------	---

REPAIR	Restore an original part to the required condition, e.g. by hand tooling, machining, building up, welding, patching, bending and setting, heat treating, re-securing, etc. (does not include rewinding or renewal).
--------	---

REPORT	Convey to the Supervisor the condition of the item examined.
--------	--

STRIP	Take off covering, e.g. paint, polish, fabric.
-------	--

SUPPLIER	Reference within this and any related documents to the Supplier must identify an organisation which is contracted to one of the Porterbrook Leasing Company Limited and their authorised agents for the purpose of undertaking a specified task.
----------	--

TEST	Prove correct operation by specified trial.
------	---

WARNING	Means that negligence may result in injury to personnel or death.
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NOTE 1: Where in the job description the phrase "Repair or Renew" is referred to, it means that the cheaper of the alternatives must be adopted.

2.4 Categories of Work and Costing

Work which is carried out will fall into one of three categories.

Scheduled Work is that work which is defined within the Specification as being required.

Arising Work is that work defined within the Specification, as being required in order to complete the Scheduled Work. The item numbers of the parts correspond, e.g. the work to be done to rectify a fault in item 2 of Scheduled Work will be found in item 2 of Arising Work.

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Additional Authorised Work is that which is required to be carried out to rectify damage resulting from fire, collision, derailment, vandalism, or other extraordinary cause, and is not defined within the Scheduled Work. Additional charges may be raised for this work, but must be authorised by the Customer prior to commencement. See the Contract terms and conditions for further **information**.

2.5 Supplier's Responsibilities

Safety

When working to this specification, it is the responsibility of the Supplier to check that all relevant local and mandatory safety instructions are strictly followed. This will include, where applicable, adherence to Industry Standards, Railway Group Standards and legislation.

Protection of Vehicles and Components

Any damage caused to vehicles and components whilst they are within a Contractors Works is entirely the responsibility of the Contractor and will not be treated as arising work.

The Contractor must check that frost and snow precautions appropriate to the weather (actual and forecast) are implemented whenever vehicles and components are subjected to wintry conditions (see Section 13 of this document for further guidance).

Condition on Release


The condition of the vehicle and all components and systems on completion of overhaul and repairs will be such that the safety of public and staff alike is not endangered and that any risk has been fully assessed and minimised to become as low as reasonably practicable. If any doubt exists remedial action must be taken by the Supplier.

Railway Group Standards

All applicable Railway Group Standards must be adhered to, irrespective of whether they are specifically referenced in this document. The Supplier must advise the Engineer if any requirement of a Railway Group Standard conflicts with any requirement of this document or any subsidiary document.

Initial Examination

A detailed initial examination of the vehicle may be undertaken by The Engineer. Any work that is necessary due to defective or missing material/equipment or damage/vandalism (whether or not this is considered to be within the scope of this instruction) must be brought to the attention of The Engineer. A decision will then be made, whilst the evidence still exists, as to where this work is to be done and who finances it.

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Materials and Components

It is the responsibility of the Supplier to check that all repaired components and systems conform to the standards authorised and agreed for the specific contractual use. If the Supplier becomes aware that the contractual issue of a document is not the latest issue, he must advise the Engineer who will determine whether the revised issue is to be implemented for the contract.

The Supplier must not carry out any design changes or change any processes or materials detailed in this prescriptive specification without the approval of the Engineer. Requests for changes will be managed in accordance with ACOP/EC/01006.

Where a component is required to be cleaned, unless otherwise stated, it is the responsibility of the Supplier to identify the most suitable method, which will check that the component is not in any way damaged.


Whenever it is necessary to remove or isolate a defective or redundant cable the work must be carried out in accordance with Technical Procedure CR/TP1084.

It is clearly stated where certain jobs permit only the fitment of new (i.e. newly-manufactured) components, otherwise overhauled items may be used.

Asbestos

It is possible that there may be Asbestos Containing Material (ACM) within the Porterbrook Mark 3 and HST Trailer Cars and Catering Cars, as described in Section 5.10 of this overhaul instruction.

The Contractor will be responsible for ensuring that all statutory requirements relating to this work, including the disposal of waste, are met. If there are statutory requirements for Porterbrook Leasing Company Limited to issue any notification in respect of such work, the Contractor will draft the necessary documents and pass them to The Engineer for authorisation. The Contractor will check that the work covered by the notices does not commence, or continue, until the necessary documents have been issued and any required period of notice expired, and will indemnify Porterbrook Leasing Company Limited, its Officers and servants against any failure to meet these requirements. Ownership of, and responsibility, for the asbestos containing material must pass to the Contractor as soon as it is removed from the vehicle.

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Facilities

In order to carry out this maintenance plan, the following minimum level of facilities are required, appropriate to the jobs being undertaken:

- Clean, dry, covered accommodation for dealing with wheelset, bearings, electrical components etc.
- Access for staff to examine the underside of bogies underframe mounted equipment e.g. pitted road.
- Access for staff to examine roof mounted equipment.
- Adequate illumination for inspection of components, bogies and vehicle underframes.
- Cleaning facilities which will not cause damage to the components.
- Lifting or jacking facilities for raising the vehicle to remove the bogies and permit examination and repair work to be carried out to the underframe.
- Handling facilities for removal and refitting of components such as traction and underframe mounted equipment, bodyside doors and buffing and drawgear components.
- Protection from the weather of vulnerable areas of the vehicle and its components.
- Facilities for undertaking NDT.

Any specific requirements additional to those listed are identified in the applicable job description.


Competence

All work must be carried out by staff assessed as competent in accordance with the principles of ORR Railway Safety Publication 1 "Developing and Maintaining Staff Competence" March 2007.

Non-destructive Testing

All NDT personnel, facilities, equipment and test procedures must comply with the requirements of RIS-2701-RST when NDT of rail vehicles including their associated components is carried out. The supplier or sub-supplier must declare any NDT procedures being used.

All NDT shall be to current recognised International standards. The Supplier shall state the standards and specifications to be used and shall provide documentary evidence to cover the NDT procedures, systems and processes.

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Sequence of Test

If a fault is identified during testing then it must be rectified and the test repeated to confirm that the rectification work has been successful and has not created any other faults.

When the test is repeated it must start from an appropriate point earlier in the sequence to include all of the testing affected by the rectification work. If a suitable point earlier in the sequence cannot be determined then the test must be repeated from the start.

Renewal of Fasteners

All split cotter pins, star washers, locking tabs, spring washers and torque prevailing nuts removed during maintenance or overhaul **MUST BE RENEWED**. Unless otherwise specified all other fasteners removed during this overhaul must be renewed if found to be defective in any way.

Tightening of Threaded Fasteners


Where a torque loading is specified, nuts must only be tightened by means of a calibrated torque wrench. If the Supplier considers that any joint where torque loadings are not specified is critical, he must consult the Engineer. Except where otherwise specified, threads are not to be lubricated but a thin film of corrosion inhibitor can remain on the threads.

It is essential to check that all bolts, in a multi-hole fixing, carry their allocated proportion of the load. Unless otherwise specified, they must first be tightened in a staggered pattern from the centre outwards and subsequently re-tightened in the same sequence. This second tightening is necessary since bolts may lose tension when adjacent bolts are tightened.

Unless otherwise specified, slotted or castellated nuts must subsequently be over tightened if necessary to align the next slot to allow for the insertion of split cotter pins. Under no circumstances must nuts be eased back.

Prevailing Torque Nuts

Where prevailing torque nuts of the bent beam type or nylon insert type are used, at least two complete threads of the bolt must protrude through the nut. However, under no circumstances may a nylon insert type nut be used on a bolt that is cross-drilled in threaded section.

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Protection of Components

When disconnected and out of service, all electrical, hydraulic and pneumatic connections must be sealed to prevent ingress of foreign matter.

Pipes must be protected from ingress of dirt during cutting, bending, welding or installing. Threaded fittings must be checked for burrs or metal slivers, which must be removed if found, before fitting into pipe bores.

Rubber components must be protected from contamination with cleaning agents when cleaning is undertaken. They must not be contaminated with lubricants or rust inhibitors.


Joint faces must be clean and free from damage or burrs before assembly.

No PTFE thread sealing tape may be used within the components or in any test stand pipework that is not protected by adequate filtration. Alternative sealing material for pipework is Loctite 572 or Loctite 542. It is preferred that no PTFE thread sealing tape is used in air supply pipework to test rigs.

Condition of Components on Arrival at Supplier's Works

The component drawings and specifications provided to the Supplier are believed by the Engineer to represent the current state of the components, subject to normal wear and tear in service.

Any component be found not to drawing, or to have any non-standard or additional components fitted, the Supplier must immediately advise the Engineer, who will determine whether the component is to be returned to standard.

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3. SUMMARY OF JOBS BY T&RS CODE

3.1 Primary Codes and Systems

Code	Description
A	AIR SYSTEM (excluding brake equipment)
B	BRAKES -AIR
C	BODYWORK (excluding interior trim)
E	BATTERY/CONTROL SYSTEMS
F	FLOORS
H	HEATING/AIR CONDITIONING
I	INTERIOR TRIM/FITTINGS
K	CATERING EQUIPMENT (including fixtures)
M	MACHINES - ELECTRICAL ROTATING
O	DOORS
U	UNDERFRAME/BOGIES
W	TOILETS
Z	FIRE PROTECTION/EMERGENCY EQUIPMENT/MISCELLANEOUS

3.2 General Instructions


Whilst carrying out the work specified in this document the following specific requirements must be complied with:

Topic	Details specified in:
Use/reuse of Threaded Fasteners	Section 2
Defective/redundant Cables	CR/TP1084

3.3 Sequence Of Attention

The following sequences are recommended:

Sequence for:	Page No(s).
Bodyside Door Attention	15 – 17
Vehicle Testing	25

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3.4 Summary of Jobs

NOTE : Throughout the following list of jobs, where the code BM or NBM appears in the vehicle applicability column it shall have the following meaning.

BM = Vehicle fitted with Brake Modules

NBM = Vehicle not fitted with Brake Modules


Section 5.9 identifies specifically which vehicles are, or are not, fitted with Brake Modules.

AIR SYSTEM

Scheduled Work

Job Title	Job No	Repair Code					Vehicles Applicable	Notes
		C4	C4X	C4E	C3M	C6		
Air Suspension Reservoir - Examine	AR 0112			*		*	NBM	1
Charging Valve - Overhaul	AV 3303			*		*	NBM	1


NOTE 1: For vehicles fitted with a Brake Module (see Section 5.9 for details), these components are located within the Brake Module and will receive attention whilst performing Job No. BN 0100 at C4E and C6 Overhauls.

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BRAKES - AIR

Scheduled Work

Job Title	Job No	Repair Code					Vehicles Applicable	Notes
		C4	C4X	C4E	C3M	C6		
Distributor Insensitivity - Test	BD 0100	*	*	*		*	NBM	1,2,3
		*	*				BM	1,2,3
Brake Distributor and Variable	BD 3000	*	*	*		*	NBM	3
Load Valve – Examine and Date		*	*				BM	3
Check								
Release Handle Assembly -	BD 3516			*		*	NBM	3
Examine								
Passenger Emergency Valve -	BE 0006				*	*	All	
Overhaul								
Passenger Communication System	BE 0111			*	*	*	All	
- Full Test								
Gauges, Duplex Main Reservoir	BG 3317			*		*	BFO	
and Brake Pipe - Change								
Parking Brake Control Unit -	BH 0119					*	BFO	5
Change								
Hydraulic Parking Brake Pressures	BH 0141	*	*	*		*	BFO	5
- Adjust								
Hydraulic Parking Brake - Test	BH 0305	*	*	*		*	BFO	5
Hydraulic Parking Brake - Bleed	BH 0310	*	*	*		*	BFO	5
Hydraulic Brake Pipework (Body	BH 0316					*	BFO	5
Mounted) - Flush								
Brake Equipment Module -	BN 0100			*		*	BM	
Overhaul								
End Cocks and Hose Ends - Clean	BP 0077	*	*	*			All	
and Paint								
Pipework and Fittings - Examine	BP 3003		*	*		*	All	
Hoses, Body to Module - Renew	BP 7204			*		*	BM	
Body to Bogie Hoses - Examine	BP 7205	*	*	*			All	
Auxiliary Reservoir - Examine	BR 3309			*		*	NBM	3
Brake Pipe Limiting Valve -	BV 0129	*	*	*		*	NBM LHCS	3,4
Change		*	*				BM LHCS	3,4
Brake Pipe Limiting Valve – Test	BV 0137	*	*	*		*	LHCS	2,4
Brake Auto Drain Valve - Change	BV 0330	*	*	*		*	NBM	3
		*	*	*		*	BM	3
Strainer Check Valve and Choke -	BV 3106			*		*	NBM	3
Change								
Guard's Application Valve - Test	BV 3110			*		*	BFO	1
Air System Schrader Test	BV 3111	*	*	*		*	NBM	1,3
Connectors - Examine		*	*				BM	1,3

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BRAKES – AIR (Cont'd)

Scheduled Work

Job Title	Job No	Repair Code					Vehicles Applicable	Notes
		C4	C4X	C4E	C3M	C6		
Strainer Check Valve and Choke - Examine	BV 3305	*	*				All	3
Averaging Relay Valve - Overhaul	BV 3320			*		*	NBM	3
Main Reservoir Isolating Cock - Examine	BV 4284			*		*	NBM	3
Air Coupling Cocks and Hoses - Test	BV 5320	*	*	*			All	1
Air and Brake System (Part 1) - Test	BZ 3001	*	*	*	*	*	All	1
Air and Brake System (Part 2) - Test	BZ 3002	*	*	*	*	*	All	1

Arising Work

Distributor Pipe Bracket - Examine	BDA3512						NBM	3
Air Reservoir - Overhaul	BRA3004						NBM	3


NOTE 1: These jobs must be done in the order specified on Page 25.

NOTE 2: Job BD 0100 to be done wherever BPLV (Job BV 0137) is either not fitted or isolated.

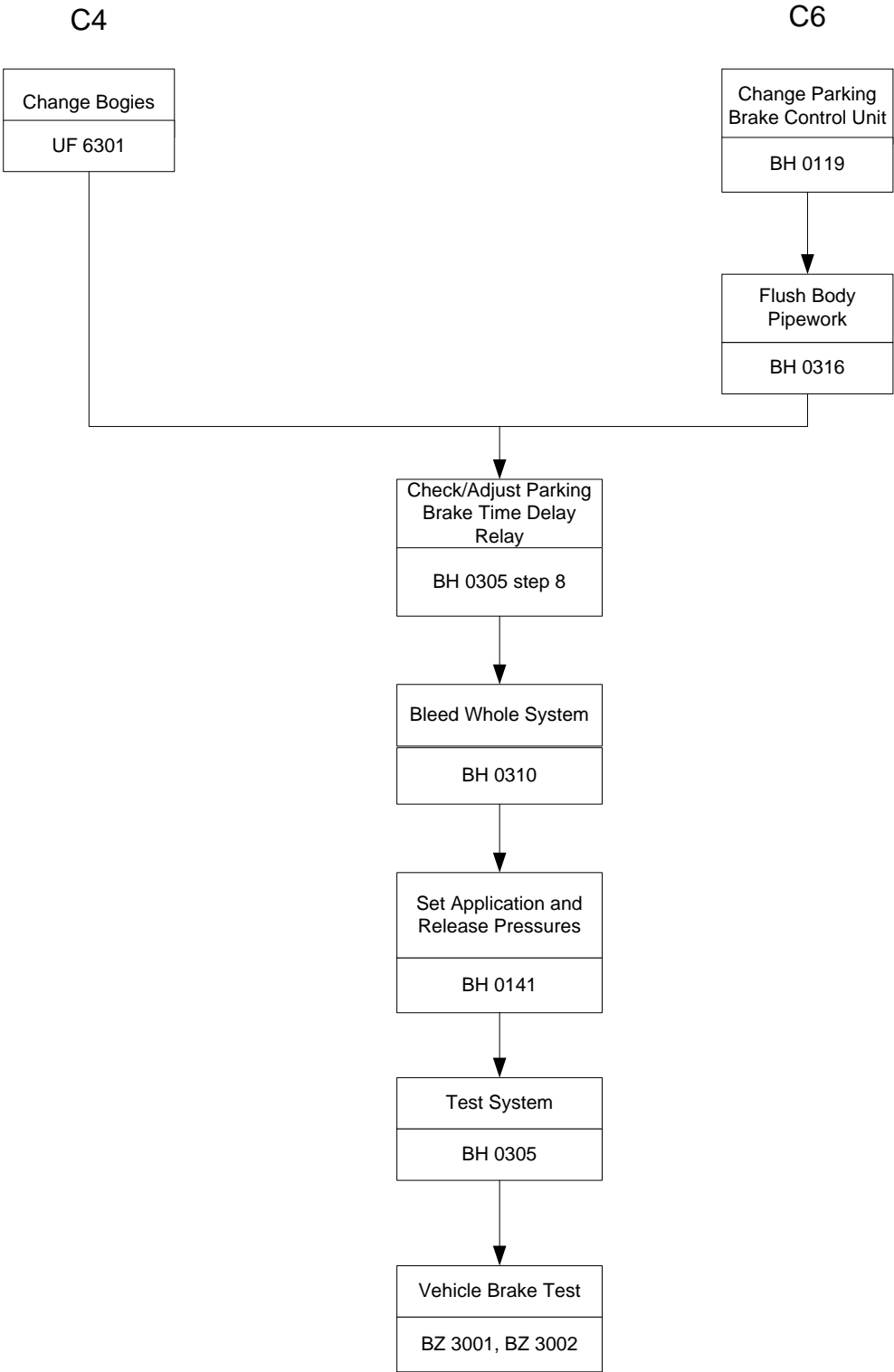
NOTE 3: For vehicles fitted with a Brake Module (see Section 5.9 for details), these components are located within the Brake Module and will receive attention whilst performing Job No. BN 0100 at C4E and C6 Overhauls.


NOTE 4: Jobs BV 0129 and BV 0137 shall be carried out on LHCS which are fitted with operational Brake Pipe Limiting Valves (BPLV's). These valves are not fitted to HST, and have been removed or decommissioned on many LHCS vehicles. The valves are located within the Brake Module on those vehicles fitted with a Brake Module (see Section 5.9 for details).

NOTE 5: These jobs apply to BFO vehicles and shall be carried out in the order specified on the following page:

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SEQUENCE CHART FOR OVERHAUL AND TESTING OF HYDRAULIC PARKING BRAKES



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BODYWORK

Scheduled Work


Job Title	Job No	Repair Code					Vehicles Applicable	Notes
		C4	C4X	C4E	C3M	C6		
Bodyside, Ends, Roof and Skirt - Paint	C* 6015				*	*	All	
Body Exterior - Examine	CA 0632	*	*	*			All	
Vehicle Bodyside Panels and Structure - Examine	CA 6001				*	*	All	
Trolley Store - Examine	CC 6442				*	*	See Note	1
Roof Panel (GRP or ABS) Body End - Examine	CG 6005				*	*	All	
Droplight - Examine	CM 0607	*					All	
Droplight - Overhaul	CM 6615		*	*			All	
Overhaul Code and Date - Paint	CN 0105	*	*	*	*	*	All	
Panels, Roof (Other than removable) - Example	CR 6002				*	*	All	
Panels, Roof Removable - Examine	CR 6003				*	*	All	
Guttering - Examine	CR 6004				*	*	See Note	2
Footsteps - Examine	CS 0101	*	*				All	
Commode, Handle - Examine	CS 6017				*	*	All	
Gangway Interior Panels - Examine	CV 0102	*	*	*			All	
Gangway Faceplate - Examine	CV 0103	*	*	*			All	
Diaphragm - Examine	CV 0104	*	*	*			All	
Flexitor Linkage - Examine	CV 0105	*	*	*			All	
Bodyside Lights and Frames - Examine	CW 6013				*	*	All	

Arising Work

Roof - Repair	CRA0104						All
Gangway Flexible Panel - Renew	CVA0114						All
Gangway Diaphragm - Renew	CVA0116						All
Gangway Flexitor Linkage - Overhaul	CVA0117						All
Window Frame - Remove/Refit	CWA0119						All
Window Frame Fastenings – Renew	CWA0121						All
Glazing Unit - Remove/Refit	CWA0127						All

NOTE 1: This job applies to TRFB, TBRF and also the trolley stores created from toilets in certain TGS and TF vehicles – see Section 5.9 for details.

NOTE 2: Applies to all vehicles built as HST vehicles and some LHCS. Hence some HST vehicles converted from LHCS may not be fitted.

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	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	

BATTERY and CONTROL SYSTEMS

Scheduled Work

Job Title	Job No	Repair Code					Vehicles Applicable	Notes
		C4	C4X	C4E	C3M	C6		
Battery Module - Change	EB 0006				*	*	All	
Battery Charger Transformer and Choke Asbestos Label – Check	EB 0606				*	*	HST	
Pressure Switch - Test	EH 5203	*	*				All	
Pressure Switch - Change	EH 5206			*		*	See Note	4
RCH Jumpers – Renew	EJ 1014	*	*	*			See Note	5
Conduits – Examine	EK 5603				*	*	All	
Lighting Controller Suppression - Renew	EL 0125	*	*	*			See Note	5
Driver Guard Communication Equipment – Test	EP 0536				*	*	BFO, TGS and TRFB	
Public Address System - Test	EP 5053				*	*	All	
Call For Aid System – Test	EP 5220					*	See Note	2
Switch, Catering Isolation – Examine/Test	ES 2029	*	*	*		*	All Catering	
Switch, Vehicle Isolation - Examine/Test	ES 5028	*	*	*		*	All	
Catering Convertor – Date Check	EU 0592				*	*	HST Caterers	
Cable Insulation – Examine/Test	EW 5004			*		*	All	
WSP Body to Bogie Flexibles – Examine	EY 0146	*	*	*			See Note	1
Wheelslide Prevention Equipment – Test	EY 0303	*	*	*			See Note	1
Westinghouse WSP – Wheel size update	EY1005	*	*	*			See Note	3
Electrical System - Functional Test	EZ 1006			*	*	*	All	

Arising Work


Luggage Rack Light - Repair	ELA1016	Mark 3A, Mark 3B and RFM (Where fitted)
Table Lamp - Repair	ELA1017	Mark 3A, Mark 3B and RFM (Where fitted)

NOTES:

NOTE 1: Jobs EY 0146 and EY 0303 apply to vehicles fitted with Westinghouse, BR WSP and coach powered Girling WSP only (see Section 5.9 for details).

NOTE 2: Job EP 5220 applies to vehicles fitted with disabled toilets (see Section 5.9 for details).


BATTERY and CONTROL SYSTEMS (Cont'd)

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NOTE 3: Job EY1005 applies only to vehicles fitted with Westinghouse WSP (see Section 5.9 for details).

NOTE 4: Job EH 5206 applies to vehicles that are Not Fitted with a Brake Module (see Section 5.9). For vehicles fitted with a Brake Module, these pressure switches are addressed as part of the Brake Module Overhaul in Job No BN 0100 at C4E and C6 Overhauls.

NOTE 5: Applies to vehicles operating in TDM controlled push-pull mode

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FLOORS

Scheduled Work

Job Title	Job No	Repair Code					Vehicles Applicable	Notes
		C4	C4X	C4E	C3M	C6		
Luggage Compartment Floor - Examine	FF 6238				*	*	BFO and TGS	
Fixed Gangway Treadplate - Examine	FM 0114	*	*	*			All	
Floor - Examine	FX 0100				*	*	All	
Kitchen Floor & Solebar - Examine	FX 0101				*	*	RFM, TBRF, TRFB, TSOB	

Arising Work

Vehicle Floor - Repair	FTA0100						All	
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HEATING and AIR CONDITIONING

Scheduled Work

Job Title	Job No	Repair Code					Vehicles Applicable	Notes
		C4	C4X	C4E	C3M	C6		
Air Conditioning Module - Examine	HA 0109	*	*	*			All	
Air Conditioning Ducts and Grilles, Bodyside - Clean	HD 6170				*	*	All	
Air Conditioning (Ceiling) Grilles - Clean	HD 6193				*	*	All except Mark 3B	
Air Conditioning Ducts (Flexible & Fixed) - Clean and Examine	HD 8002	*	*	*			All	
Bodyside Heater and Grilles - Clean and Examine	HH 8018			*		*	Mark 3B	
Fan, Toilet - Clean and Examine	HM 0111				*	*	Mark 3A & HST Vehicles converted from Mark 3A LHCS	
Fan, Extraction (230v AC) – Renew	HM 0820				*	*	TCC Only	
Fan, Toilet/Vestibule Ventilation - Change	HM 5035				*	*	Mark 3B, HST	
Fan, Extraction - Change	HM 5111				*	*	All Catering excluding TSOB, TSB & TCC	
Fan, Supply - Change	HM 5113				*	*	All Catering excluding TSOB, TSB & TCC	
Switch, ETS Interlock - Examine/Test	HS 5039	*	*	*		*	All	
Air Conditioning Sequence Test	HZ 0102				*	*	LHCS & HST vehicles converted from LHCS	
Air Conditioning - Test	HZ 8003	*	*	*			All	


NOTE 1: The following job is called up by Jobs HM 5035, HM 5111 and HM 5113.

A C Fan Motor – Overhaul HM 0112

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Arising Work


AMBISTAT Thermostat - Adjust	HTA8206	LHCS & HST vehicles converted from LHCS
Electronic Thermostat - Change	HTA8401	LHCS & HST vehicles converted from LHCS
Electronic Thermostat Saloon Sensor – Change	HTA8402	LHCS & HST vehicles converted from LHCS

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INTERIOR TRIM and FITTINGS

Scheduled Work

Job Title	Job No	Repair Code					Vehicles Applicable	Notes
		C4	C4X	C4E	C3M	C6		
Panels, GRP (Vestibule) – Examine	IE 6175				*	*	All	
Panels, GRP, Bar Public Area – Examine	IE 6177				*	*	All Catering	
Kitchen Door Treadplate – Examine	IF 0140				*	*	TSOB	
Gangway Floor Mats – Examine	IF 6033	*	*	*			All	
Vestibule floor covering – Examine	IF 6105				*	*	All	
Toilet Floor Covering - Clean/Examine	IF 6109				*	*	All except TRFB, TBRF	
Guard Compartment Floor Covering - Clean/Examine	IF 6407				*	*	BFO, TGS	
Floor Covering, Public Area and Staff Compartment - Clean/Examine	IF 6422				*	*	All Catering	
Catering Area Floor Covering - Examine	IF 6453				*	*	All Catering	
Carpets - Clean/Examine	IF 6504				*	*	All	
Conductors Compartment Fittings - Examine	IF 6623				*	*	BFO, TGS	


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CATERING EQUIPMENT

Scheduled Work

Job Title	Job No	Repair Code					Vehicles Applicable	Notes
		C4	C4X	C4E	C3M	C6		
Catering and Bar Area Joint Sealant - Examine	KI 0110				*	*	All Catering	
Bar Wooden Surface - Revarnish	KI 6428				*	*	Catering, where fitted	
Catering area Working Surfaces - Examine	KI 6439				*	*	All Catering	
Shelves - Examine	KI 6441				*	*	All Catering	
Public Area Fittings – Examine	KI 6443				*	*	TSOB and TSB	


NOTE: Vehicles are to be returned from overhaul with the water systems drained.

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MACHINES – ELECTRICAL ROTATING

Scheduled Work


Job Title	Job No	Repair Code					Vehicles Applicable	Notes
		C4	C4X	C4E	C3M	C6		
Motor Alternator Set – Examine, Mounts - Renew	MO 4029	*	*	*			All except HST	
Motor Alternator Control Unit FM2 - Check/Test	MO 5017		*	*			Mark 3A except RFM and TSOB	
Motor Alternator Control/Battery Charger Unit - Check/Test	MO 5018		*	*			Mark 3B, RFM (Nos. 1 and 2 Positions) and TSOB	
Motor Alternator Choke - Examine	MO 5019		*	*			All except HST	
Motor Alternator and Control Unit Function - Check	MO 5022	*	*	*			All except HST	

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DOORS


Scheduled Work

Job Title	Job No	Repair Code					Vehicles Applicable	Notes
		C4	C4X	C4E	C3M	C6		
Vestibule Door Pressure Reducing Valve – Check	OC 0617				*	*	All	
Disabled Persons Toilet Door - Test	OI 0105				*	*	See Note	3
Gangway End Door - Examine	OI 0625				*	*	All (where fitted)	
Disabled Persons Toilet Door Header Assembly Overhaul	OI 6232				*	*	See Note	4, 5
Automatic Vestibule Doors System – Examine and Test	OJ 0138			*	*	*	All	
Vestibule Door System Filter - Check	OJ 0165				*	*	See Note	4
Disabled Persons Toilet Door Air Filter and Silencer - Renew	OJ 0639	*	*	*			See Note	5
Single Leaf Vestibule Door System Filter – Check	OJ 0651				*	*	See Note	6
Double Leaf Vestibule Door – Examine	OJ 6101				*	*	See Note	7
Double Leaf Vestibule Door - Test	OJ 6102				*	*	See Note	7
Brake Pipe Dump Valve – Renew	OK 0005			*		*	All	
CDL Control Panel - Change	OK 0010			*		*	All	
CDL Bolt - Renew	OK 0115			*		*	All	
CDL Jumper Cable and Plug - Renew	OK 0120			*		*	All	
CDL Receptacle - Renew	OK 0121			*		*	All	
CDL Dummy Receptacle - Renew	OK 0122			*		*	All (where fitted)	
CDL Air Supply Module - Change	OK 0133			*		*	All	
CDL Emergency Egress Device - Renew	OK 0146			*		*	All	

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Job Title	Job No	Repair Code					Vehicles Applicable	Notes
		C4	C4X	C4E	C3M	C6		
CDL Emergency Access Device - Overhaul	OK 0147			*		*	All	
CDL Striker Plate - Examine	OK 0148	*	*	*			All	
CDL Air Pipes - Check	OK 0149			*		*	All	
CDL Cable - Insulation Test	OK 0150			*		*	All	
CDL Strainer and Check Valves – Overhaul	OK 0151			*		*	All	
CDL Interface Unit - Change	OK 0152			*		*	TGS and BFO	
CDL - Test	OK 5000	*	*		*		All	
CDL - Full Test	OK 5001			*		*	All	
External Door Budget Lock - Examine	OL 0112	*	*	*			All	
Small Luggage Door Bolt Assembly - Examine	OL 0127	*	*	*			TGS and BFO	1,2
External Door Lock and Handle - Change	OL 0137	*	*	*			All	1,2
External Door (After Refitting) - Test	OL 0140		*	*			All	2
External Door (After repair in-situ) - Test	OL 0141	*					All	1
External Door Striking Plate - Examine	OL 6202	*					All	1
Door Top Draught Excluder - Renew	OO 0124		*	*			All	2
Lock Edge Draught Excluder - Renew	OO 0125		*	*			All	2
Door Boot Draught Excluder - Renew	OO 0126		*	*			All	2
Bodyside Door Stand Pillar and Striking Plate - Change/Examine	OO 6110		*	*			All	2
External Door - Examine	OP 0109	*					All	1
External Door Structure and Fittings - Check	OP 0116	*					All	1
External Outward Opening Door - Overhaul	OP 0118		*	*			All	2
External Door Hinge Pins and Bearings - Renew	OP 0120	*					All	1
Emergency Door - Overhaul	OQ 6428		*	*			HST Catering (except TSB & TCC)	
Small External Luggage Door - Examine	OY 6479	*	*	*			BFO, TGS	1,2

DOORS (Cont'd)

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NOTE 1: These jobs must be carried out in accordance with the (C4 overhaul) sequence chart on the following pages.

NOTE 2: These jobs must be carried out in accordance with the (C4X or C4E overhaul) sequence chart on the following pages.

NOTE 3: Applies to all vehicles fitted with disabled toilets (see Section 5.9 for details).

NOTE 4: Applies to vehicles fitted with Driessen disabled toilets (see Section 5.9 for details).


NOTE 5: Applies to vehicles fitted with Temoinsa disabled toilets (see Section 5.9 for details).

NOTE 6: Applies to vehicles fitted with BRB-MML disabled toilets (see Section 5.9 for details).

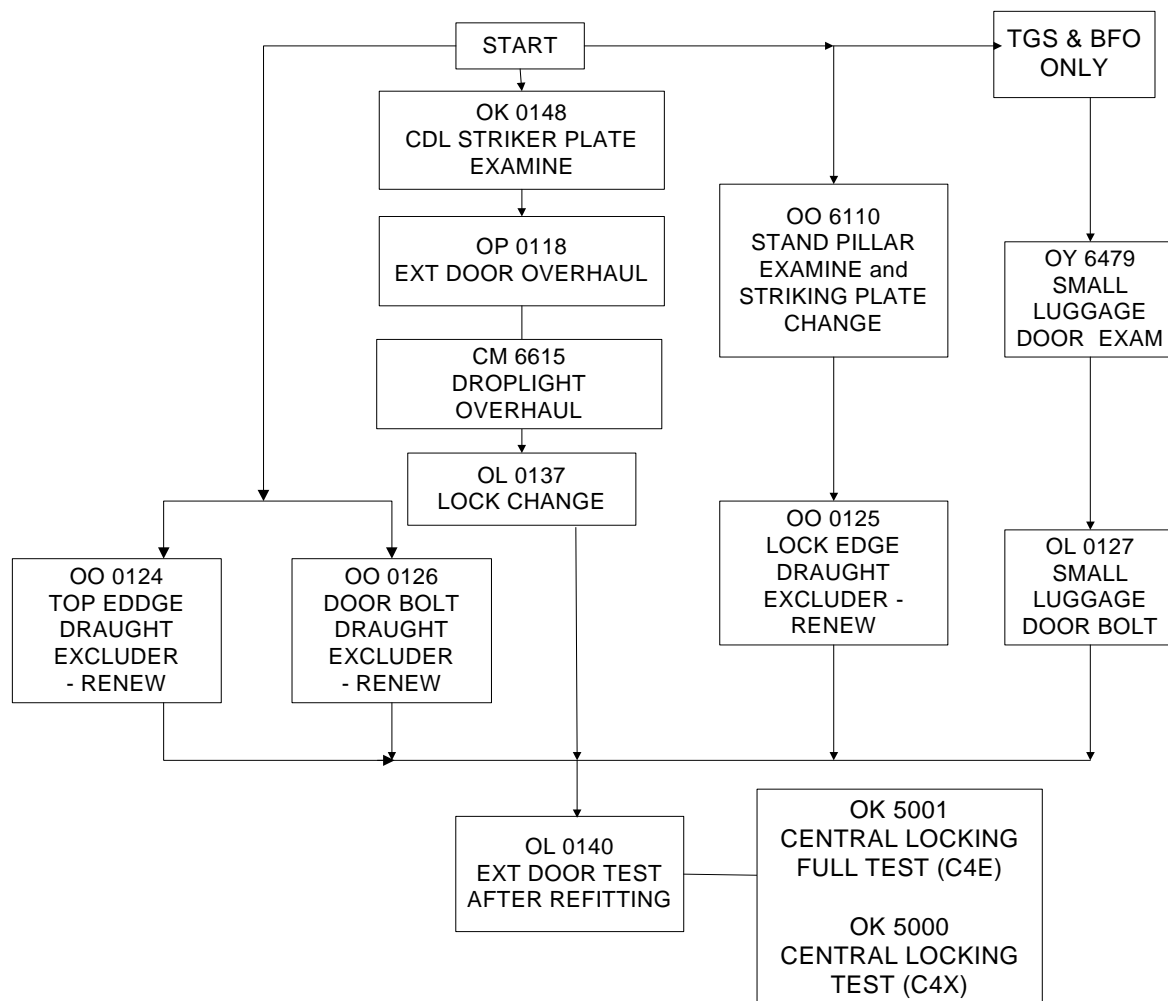
NOTE 7: Applies to vehicles fitted with BRB disabled toilets (see Section 5.9 for details).

Arising Work

Job Title	Job No	Repair Code					Vehicles Applicable	Notes
		C4	C4X	C4E	C3M	C6		
Disabled Persons Toilet Door – Adjust	OIA6049						See Note	4
Pressure Regulator and Pressure Switch - Test	OKA0110						All	
CDL Bolt - Adjust	OKA0116						All	
D.C.-D.C. Converter - Change	OKA0124						All	
CDL Striker Plate/Tapping Plate - Renew	OKA0128						All	
CDL Tapping Plate Blind Fasteners - Repair	OKA0129						All	
CDL Striker Plate/Tapping Plate (Tapped Holes) - Repair	OKA0130						All (where fitted)	
CDL Bolt Fastening - Repair	OKA0131						All	
CDL - Fault Finding	OKA0139						All	

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SEQUENCE CHART FOR C4X or C4E OVERHAUL




NOTES:

NOTE 1: The striking plate must be fitted after door and lock fitted (see Job No. OO 6110).

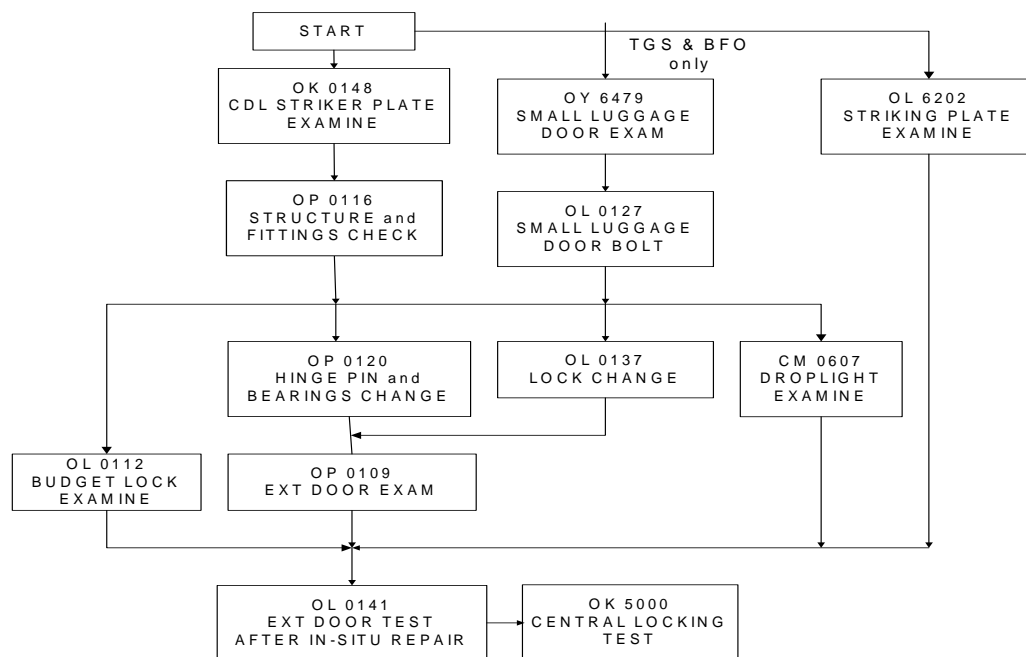
NOTE 2: OL 0140 must be carried out on completion of all work.

NOTE 3: The striking plates on TGS and BFO vehicles' luggage doors must be changed and their fixings treated in accordance with Job No. OO 6110.

NOTE 4: The small luggage door on TGS and BFO vehicles must be examined (OY 6479 and OL 0127) and all repairs completed before the larger corner door is tested – see Job No. OL 0140.

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SEQUENCE CHART FOR C4 OVERHAUL



NOTES:

NOTE 1: By doing Job OP 0116 first, the general condition of the door is established, so that a decision to renew the door can be made before further attention is given.


NOTE 2: Job OP 0120 must be done next as the following aspects require sound hinges:

- clearance between door and surround (OP 0109)
- interaction between lock and striking plate (OL 0141)
- action of budget lock tongue (OL 0141)

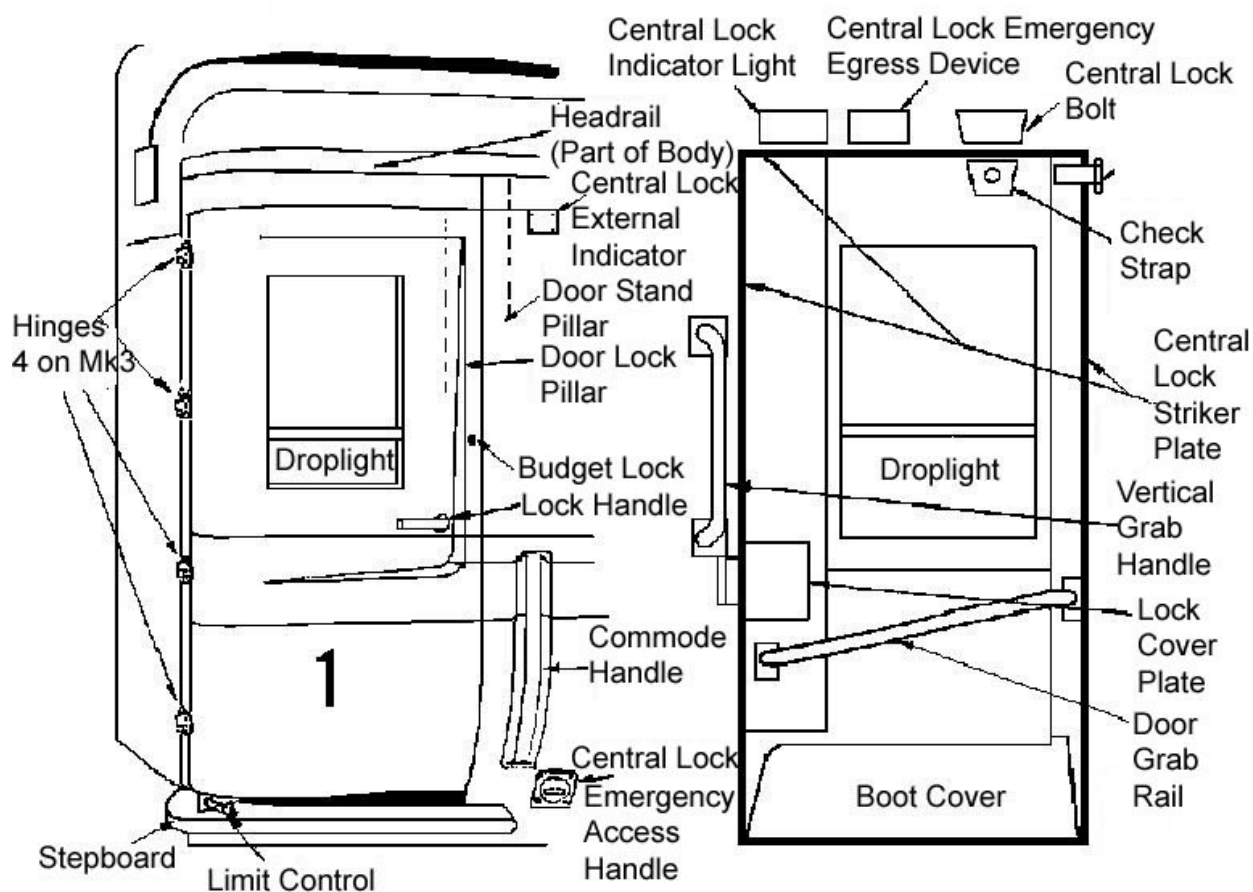
NOTE 3: The lock can be changed (OL 0137) as soon as it has been decided that the door is not to be changed.

NOTE 4: OL 0141 must be carried out on completion of all work.

NOTE 5: The small luggage door on TGS and BFO vehicles must be examined (OY 6479 and OL 0127) and all repairs completed before the large corner door is examined.

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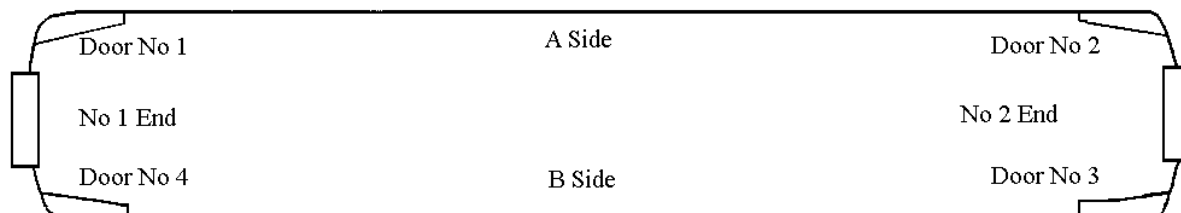
EXTERNAL DOORS : TERMINOLOGY



VIEW FROM OUTSIDE VEHICLE
(LEFT HAND DOOR SHOWN)


VIEW FROM INSIDE VEHICLE

VIEW LOOKING DOWNWARDS SHOWING DOOR NUMBERS,
POSITIONS ON VEHICLE AND ORDERING DESCRIPTION



FOR ORDERING PURPOSES NOS. 2 AND 4 ARE AS DRAWN (I.E. HINGES ON THE LEFT AS VIEWED FROM OUTSIDE)


NOS. 1 and 3 ARE OPPOSITE HAND (I.E. HINGES ON THE RIGHT) AS VIEWED FROM OUTSIDE

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UNDERFRAME/BOGIES

Scheduled Work

Job Title	Job No	Repair Code					Vehicles Applicable	Notes
		C4	C4X	C4E	C3M	C6		
Underframe Mounted Equipment - Security Check	U* 0105	*	*	*			All	
Buffer Saddles and Chains - Examine	UB 6022	*	*	*			All except HST	
Buffer Assembly – Overhaul	UB 6025		*	*			All except HST	
Buffer Assembly – Examine	UB 6026	*					All except HST	1
Coupler Pivot Pin – Examine	UC 0124	*	*	*			All except HST	
Drawbar Pivot Pin – Examine	UC 0135	*	*	*			All	
Drawgear End Stops – Examine	UC 0670	*	*	*			All	
Drawgear Side Control Assembly – Examine	UC 1004	*	*	*			All	
Drawbar Tailpin - Renew	UC 1007	*	*	*			All	
Coupler Release Chain and Guide – Examine	UC 4027	*	*	*			All except HST	
Rubber Springs - Examine/Gauge	UC 4038	*	*	*			All	
Drawgear Followers - Examine	UC 6081	*	*	*			All	
Coupler Support Pin - Examine	UC 6082	*	*	*			All except HST	
Drawgear Dividing and End Plates - Examine	UC 6083	*	*	*			All	
Centre Pin - Examine	UC 6084	*	*	*			All	
Coupler and Drawgear - Dismantle	UC 9025	*	*	*			All	
Coupler and Drawgear - Overhaul	UC 9026	*	*	*			All	
Coupler and Drawgear – Re-assemble and Test	UC 9027	*	*	*			All	
Earth Bonds - Examine/Test	UE 5001	*	*	*			All	
Bogie - Change	UF 6301	*	*	*			All	
Underskirt Interior - Clean	UI 6017	*	*	*			All	
Centre Pivot Casting - Examine	UM 6029	*	*	*			All	
Centre Pivot Casting – Crack Detect	UM 6030		*	*			All	
Side Bearer Blocks - Examine	UM 6106	*	*	*			All	
Vehicle Height - Adjust	US 6004	*	*	*			All	
Underframe Panels - Examine	UU 0110	*	*	*			All	
Underframe Skirt Fixed Panels, Access Panels and Framings - Examine	UU 0139				*	*	All	
Lifting Loops - Examine	UU 0161	*	*				All	
Headstock and Underframe End Structure - Examine	UU 3020	*	*	*			All	
Bolster Welds – Crack Detect	UU 3021		*	*			All	
Headstock Wearing Pad - Examine	UU 6021	*	*	*			All	


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UNDERFRAME/BOGIES (Cont'd)

Arising Work

Job Title	Job No	Repair Code					Vehicles Applicable	Notes
		C4	C4X	C4E	C3M	C6		
Centre Pivot Casting - Repair	UMA6037						All	

NOTE 1: UB 6026 will be done as directed by the Engineer on little-used buffers on the inner ends of LHCS vehicles which are formed into fixed formation push-pull trains.

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TOILETS

Scheduled Work

Job Title	Job No	Repair Code					Vehicles Applicable	Notes
		C4	C4X	C4E	C3M	C6		
Water System Components – Renew	WH 0108				*	*	See Note	1
Toilet Water Heater - Overhaul	WH 6532				*	*	See Note	2
Drain Pipes – Examine	WP 6708				*	*	All	
Toilet Chute - Examine	WW 6719	*	*	*			See Note	2
Toilet Water System - Test	WZ 6201				*	*	See Note	2

NOTE 1: To be done on vehicles fitted with Temoinsa disabled toilets (see Section 5.9).

NOTE 2: To be done on all vehicles fitted with non disabled toilets – this is all vehicles except TBRF, TRFB and FGW TGS with trolley store vice toilet.

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MISCELLANEOUS


Scheduled Work

Job Title	Job No	Repair Code					Vehicles Applicable	Notes
		C4	C4X	C4E	C3M	C6		
Toilet Water System – Drain	ZY 0116	*	*	*	*	*	All (fitted with toilets)	1
Toilet Pan Snow Melting Fluid – Apply	ZY 0148	*	*	*	*	*	All (fitted with toilets)	1
Kitchen Fans Switch Off/Isolate	ZY 0149	*	*	*	*	*	Catering Vehicles	2, 3
Kitchen Water Tank and Boiler – Drain	ZY 0150	*	*	*	*	*	All Catering Vehicles	1
Heating, Doors and Windows – Check	ZY 0151	*	*	*	*	*	All	2
Brake Rigging – De-Icing Fluid – Apply	ZY 0152	*	*	*	*	*	All	2

NOTE 1: Vehicles are to be released drained of water.

NOTE 2: Vehicles released between 1st November and 31st March when snow is forecast, or has fallen on vehicles.

NOTE 3: This job does not apply to HST TCC, TSB and LHCS TSOB vehicles.

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RECOMMENDED TEST SEQUENCE

	C4	C4X & C4E	C6
Cable insulation			EW 5004 OK 0150
Motor Alternator	MO 5022 (3)	MO 5022 (3)	MO 5022 (3)
Vehicle Rebogied	UF 6301	UF 6301	UF 6301
External Doors – Test	OL 0141	OL 0140	
Air and Brake Tests			
Parking Brake	BH 0305 (2)	BH 0305 (2)	BH 0305 (2)
Deflated or Part 1	BZ 3001	BZ 3001	BZ 3001
Vehicle Height Adjust	US 6004	US 6004	
Inflated or Part 2	BZ 3002	BZ 3002	BZ 3002
Guard's Valve			BV 3110 (2)
BPLV or	BV 0137 or	BV 0137 or	BV 0137 or
Distributor Insensitivity	BD 0100	BD 0100	BD 0100
Passenger Communication			BE 0111
Air Coupling Cocks	BV 5320	BV 5320	
Schraders	BV 3111	BV 3111	BV 3111
Electrical Tests			
Electrical System		EZ1006 (C4E only)	EZ 1006
Public Address			EP 5053
Driver Guard			EP 0536 (4)
Catering Isolation Switch	ES 2029 (1)	ES 2029 (1)	ES 2029 (1)
Vehicle Isolation Switch	ES 5028	ES 5028	ES 5028
ETH Interlock Switch	HS 5039	HS 5039	HS 5039
Air Conditioning	HZ 8003	HZ 8003	HZ 0102
WSP	EY 0303	EY 0303	
Water Heater			WZ 6201 (5)
Central Door Locking	OK 5000	OK 5000 (C4X only) OK 5001 (C4E only)	OK 5001

NOTES:


NOTE 1: Catering only

NOTE 2: BFO only – see sequence chart on page 6. Job BH 0305 shall be complete before doing the brake tests (BZ 3001 and BZ 3002).

NOTE 3: Not HST

NOTE 4: BFO or TGS only

NOTE 5: Not HST TRFB, TBRF or TGS with trolley store vice toilet.

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	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	

Air Suspension Reservoir – Examine

AR 0112

Reference Documents		
Item	Document No.	Title
1	CR/PE0102	Repainting of Rail Vehicles

APPLIES TO: All Vehicles. These items are located in the Brake Module on vehicles that are fitted with a Brake Module (see Section 5.9).

QUANTITY PER VEHICLE: 1


Scheduled Work

1. Read and record the date on the reservoir test label.
2. Examine the reservoir for corrosion. Pay particular attention to the area around and beneath the label.
3. Clean the mounting straps and the mounting point on the underframe.
4. Check the areas between the reservoir and its support straps, in situ, for evidence of sealing compound.
5. Check that the nuts securing the straps to the underframe are secure and undamaged and there is no evidence of nut or washer movement.
6. Examine the fittings and support straps.
7. Paint in accordance with the specified document (see Reference Documents item 1).

NOTE: Carry out a leakage test in accordance with Job No. BZ 3001.

Arising Work

- 1,2,4. If the test date is more than 7 years ago, no test date is evident, no sealing compound is evident, or the reservoir is defective, change and overhaul the reservoir in accordance with Job No. BRA3004.
- 1,2,4. Renew any defective or out of date air suspension reservoir which cannot be overhauled. A new reservoir to be fitted in accordance with Job No. BRA3004, Part 2.
5. Remove the reservoir and refit in accordance with Job No. BRA3004 Part 2.
6. Repair defective fittings and straps.

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Charging Valve – Overhaul

AV 3303

Reference Documents		
Item	Document No.	Title
1	PB/CI2175	Component Overhaul Instruction Mk3 Coach Brake Module

APPLIES TO: All Vehicles. These items are located in the Brake Module on vehicles that are fitted with a Brake Module (see Section 5.9).


QUANTITY PER VEHICLE: 1

Scheduled Work

1. Remove the charging valve (in line feeding air suspension reservoir).
2. Overhaul and test the valve in accordance with the specified document (see Reference Documents item 1, Job No. AV 3303).
3. Refit the valve

Arising Work

See Reference Documents item 1.

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Distributor Insensitivity – Test

BD 0100

APPLIES TO: HST Vehicles and any LHCS Vehicles not fitted with BPLV or with BPLV isolated or decommissioned. These items are located in the Brake Module on vehicles that are fitted with a Brake Module.

Scheduled Work


NOTE 1: This test is to follow Job No. BZ 3002, which covers equipment and connections required.

NOTE 2: Record the results on the form provided, (see Section 5).

1. Move the brake valve into the RELEASE position and check that the air brake pipe pressure rises to 5.4 Bar and remains steady. Leave the handle in this position for not less than 30 seconds.
2. Return the brake valve to the RUNNING position (taking care not to overshoot beyond RUNNING - this would require the test to be re-started).
3. Check that the air brake pipe pressure falls slowly to the RUNNING pressure (5 Bar) over a time of approximately 90 seconds and that the brake cylinder pressure remains at zero.

Arising Work

3. Change the Westinghouse distributor and VLV if a brake cylinder pressure greater than zero is observed.
3. Change the D&M distributor if a brake cylinder pressure greater than zero is observed.

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Brake Distributor and Variable Load Valve - Examine and Date Check

BD 3000

Materials			
Item	Description	Qty/Veh	Cat No.
1	Gasket (Westinghouse Part Nos. J74647/1)	1	070/006403
2	'O' Rings (Westinghouse Part No. J72050/17)	4	070/003435
3	Gasket (D&M Part No. AB12-2)	1	070/012698

Reference Documents		
Item	Document No.	Title
1	CR/CI0597	Davies and Metcalfe Est4f/AL2b/S/HBG, AB13-T5 and Est4f/AL2b/S/D/HBG, AB13-T18 Distributors
2	CR/CI0598	Westinghouse P4a Distributor and Variable Load Valve Overhaul For HST Trailer Vehicles

APPLIES TO: All Vehicles. These items are located in the Brake Module on vehicles that are fitted with a Brake Module (see Section 5.9).

Scheduled Work

1. Check the date stamp fixed to the distributor to see whether the overhaul is due within the next 3 years (9 year overhaul periodicity).
2. Check that the distributor and variable load valve are secure and there is no evidence of nut or washer movement.

Arising Work


- 1.1 If Westinghouse, change the distributor and variable load valve as follows:

NOTE 1: Westinghouse distributors and variable load valves must be changed as matched pairs and overhauled and tested in accordance with the specified document (see Reference Documents item 2). This matching is indicated by the presence of a red spot painted on each item.

- 1.1.1 Remove the distributor from the pipe bracket by taking off three nuts and washers (see Figure 1 item 2 in Job BDA3512).
- 1.1.2 Remove the variable load valve by taking off four nuts and washers.
- 1.1.3 Carry out Job BDA3512 Part 1.
- 1.1.4 Fit a new gasket (3) (see Materials item 1) to the distributor face of the pipe bracket.

Brake Distributor and Variable Load Valve - Examine and Date Check

BD 3000

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1.1.5 Fit an overhauled distributor of the same type removed at step 1.1.1 in accordance with Table 2.

1.1.6 Renew four 'O' rings (see Materials item 2) on variable load valve face of pipe bracket.

1.1.7 Fit an overhauled variable load valve in accordance with Table 1.

1.2 If Davies and Metcalfe distributor, change as follows:

1.2.1 Remove the distributor from the pipe bracket by taking off three nuts and washers (see Figure 1 item 2 in Job BDA3512).

1.2.2 Carry out Job BDA3512 Part 2.

1.2.3 Fit new gasket (see Materials item 3).

1.2.4 Fit an overhauled distributor of the same type (removed at step 1.2.1) in accordance with Table 1.

NOTE 2: The distributor is tested in Job Nos. BZ 3001 and 3002.


NOTE 3: Overhaul D&M distributors in accordance with the specified document (see Reference Documents item 1).

2. Renew all fastenings in accordance with Table 1 below:

Drawing	Components not Required on Reassembly	New Fasteners		Torque (Nm)
		Description	Cat. No.	
C-S-009757 C-S-018402	Spring washer	Screw M20x60 Grade 8.8 Washer M20 Nut M20 Grade 8	035/101442 003/190940 See Note 2 below	476

Table 1: Brake Distributor and Variable Load Valve Securing Arrangement

NOTE 4: Refer to Job No. U* 0105 for details of nuts.

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Brake Distributor and Variable Load Valve - Examine and Date Check

BD 3000

Item	Colour Band	Vehicles Applicable	Cat. No.
Davies and Metcalfe Distributor	Yellow	HST and LHCS Ferodo 3204F or Becorit 922-1U	070/070431
Westinghouse Distributor	Yellow	HST Ferodo 3204F or Becorit 922-1U	070/070430
Westinghouse Variable Load Valve	N/A	HST Ferodo 3204F or Becorit 922-1U	070/070719
Davies and Metcalfe Dump Valve Distributor	Blue Band on Black Body	HST and LHCS Ferodo 3204F or Becorit 922-1U	070/024029
Westinghouse Dump Valve Distributor	Blue Band on Black Body	HST Ferodo 3204F or Becorit 922-1U	070/024028

Table 2: Details of Distributors and Variable Load

NOTE 5: Distributors which are to be fitted to vehicles with Ferodo 3204F or Becorit 922-1U brake pads (i.e. yellow band distributors) must have their pressure limiting valves set to give a nominal maximum output figure of 55psi (3.80 bar) with the variable load valve being adjusted accordingly to achieve the desired Brake Cylinder Pressures (see Jobs BZ 3001 and BZ 3002).

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Distributor Pipe Bracket – Examine

BDA3512

Materials			
Item	Description	Qty/Veh	Cat No.
1	Grease, Molykote 33	As Req'd	027/002195
2	Grease, Renolit SI 300 M	As Req'd	-
3	Ironside 'A' Blend	As Req'd	027/004331

APPLIES TO: All Vehicles. These items are located in the Brake Module on vehicles that are fitted with a Brake Module (see Section 5.9).

QUANTITY PER VEHICLE: 1

Scheduled Work


Part 1 - Westinghouse Part No. J75108/498

Scheduled Work

NOTE 1: The number in brackets refer to the item numbers in Figure 1.

1. Remove and scrap the distributor mounting gasket (3), whenever the distributor is changed.
2. Clean the pipe bracket body (1) and filter bulb (6).
3. Examine the pipe bracket.
4. Remove the four bolts and washers (7) and separate the filter bulb (4 to 6) from the body.
5. Scrap the strainer disc (5) and 'O' ring (4).
6. Remove any dirt from the filter bulb and the ports in the pipe bracket.
7. Lightly grease a new 'O' ring (4) (see Materials item 1, 2 or 3 or equivalent grease). Fit the 'O' ring into the groove in the filter bulb (6).
8. Fit a new strainer disc (5) into the filter bulb (6) with the rough side uppermost (toward the pipe bracket).
9. Secure the filter bulb assemblies (4 to 6) to the pipe bracket body (1) using the four bolts and washers (7).
10. Seal the ports in the distributor mounting face of the pipe bracket until just before fitting a distributor.

NOTE 2: A leakage test is carried out as part of Job BZ 3001.

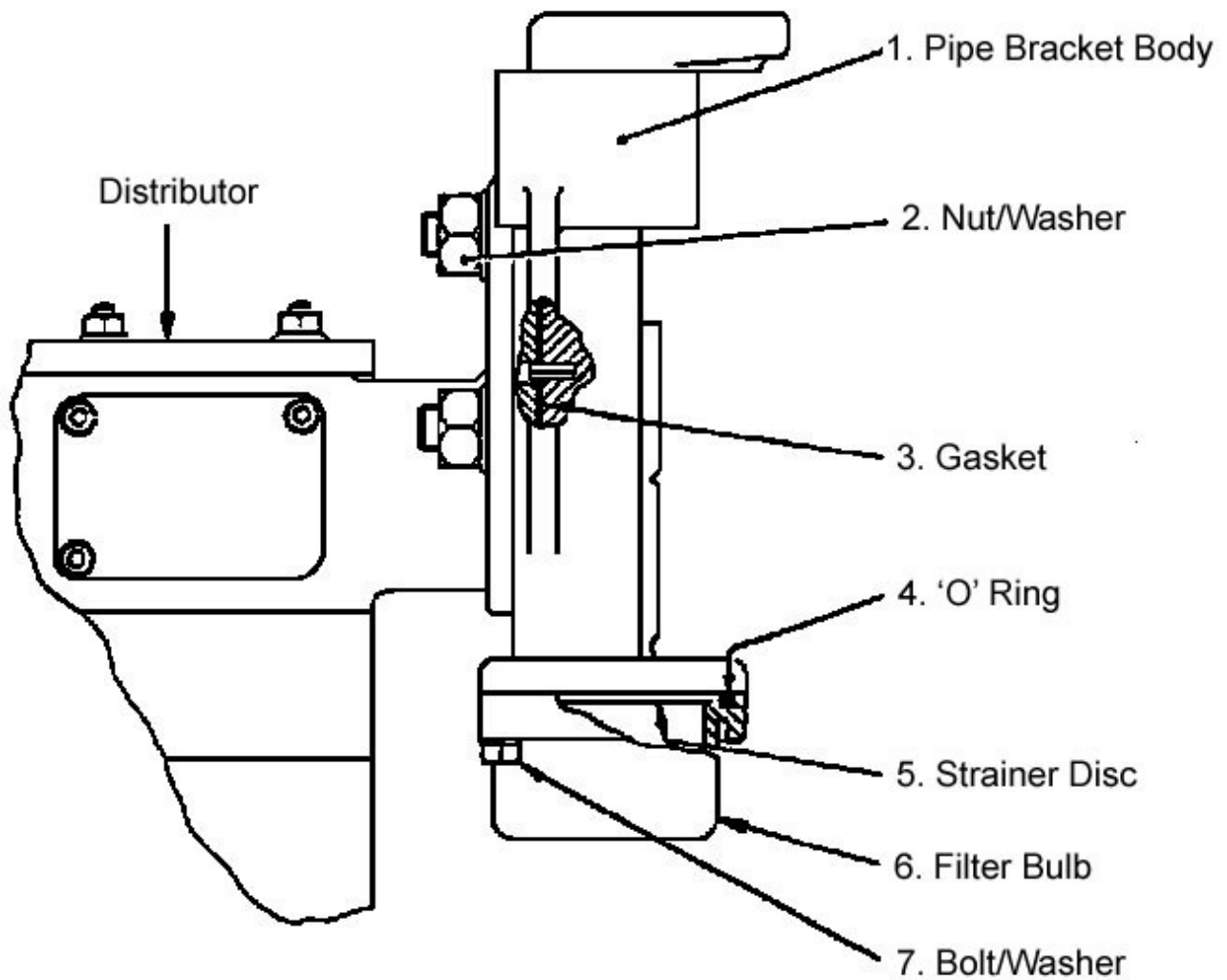
	VEHICLE OVERHAUL INSTRUCTION	PB/VI2133
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Distributor Pipe Bracket – Examine


BDA3512

Arising Work

3. Change a defective pipe bracket.



**Figure 1: Distributor Pipe Bracket
Westinghouse Part No. J75108/498**

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Distributor Pipe Bracket – Examine

BDA3512

Part 2 - Davies and Metcalfe Type S4 (D and M Part No. AB503-OV2)

NOTE 3: The numbers in brackets refer to the item numbers in Figure 2.

Scheduled Work

1. Remove and scrap the distributor mounting gasket (5) whenever the distributor is changed.
2. Clean the pipe bracket body (6).
3. Examine the pipe bracket body (6).
4. Remove the cap nut (3) and withdraw the spring (2) and strainer (6).
5. Clean and examine the strainer (6).
6. Clean the strainer housing.
7. Examine the gasket (4) fitted between the bracket (1) and the cap nut (3).
8. Refit the strainer (6) into the housing.
9. Place the spring (2) on the cap nut (3) spigot and secure the cap nut in the carrier bracket.

NOTE 4: A leakage test is carried out as part of Job BZ 3001.

Arising Work

3. Change defective pipe bracket (6).
5. Renew strainer if defective (1).
7. Renew gasket if defective (4).



Distributor Pipe Bracket – Examine

BDA3512

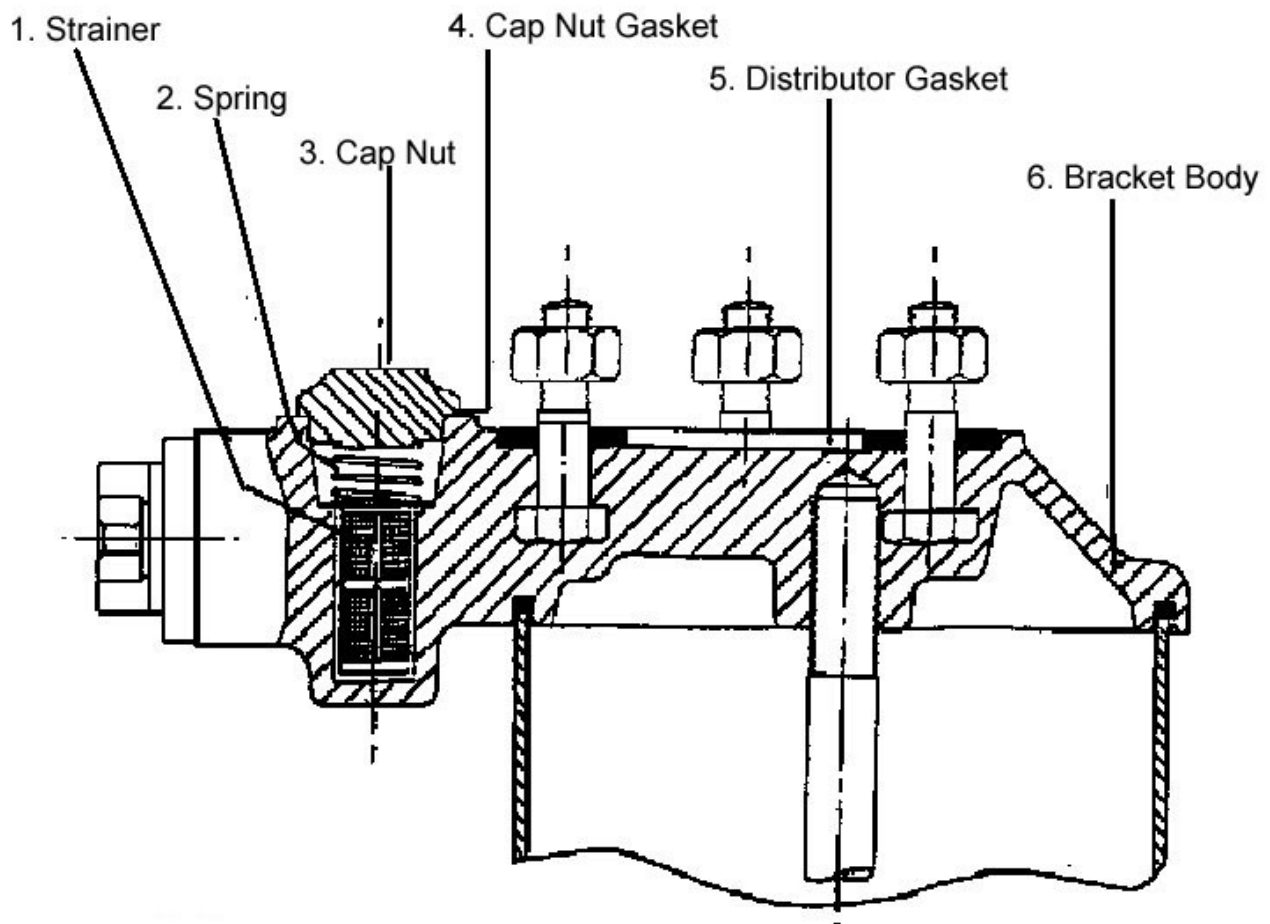



Figure 2: Distributor Pipe Bracket
Davies and Metcalfe Type S4
(D and M Part No. AB503-OV2)

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Release Handle Assembly – Examine

BD 3516

Materials			
Item	Description	Qty/Veh	Cat No.
1	Grease		
	150kg container	As Req'd	027/001351
	3kg barrel		027/001353
	12.5kg barrel		027/001354
	50kg barrel		027/001356
	180kg barrel		027/001357
	400g cartridge		027/001358

APPLIES TO: All Vehicles. These items are located in the Brake Module on vehicles that are fitted with a Brake Module (see Section 5.9).


Scheduled Work

- Examine the distributor release handle and rods. Check that the assembly is secure and that all screwed fastenings are tight. Check that the distributor release rods are straight and the handle guide plates situated at the top portion of the handle are not bent or misshaped. Check that the pull rod springs are undamaged.
- Lightly grease the pull rod springs, pull rod bushes and pull rod joints using grease (see Materials item 1) and check that the rod moves freely.

Test in accordance with Job No. BZ 3001.

Arising Work

- Renew defective parts.
- Rectify defects.

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Passenger Emergency Valve – Overhaul

BE 0006

Reference Drawings		
Item	Drawing No.	Title
1	ATC-CO-2209465	Pneumatic Schematic Davies and Metcalfe Brake Equipment (HST)
2	ATC-CO-2209466	Pneumatic Schematic Davies and Metcalfe Brake Equipment Westinghouse Suspension and WSP Equipment (HST)
3	PB-CO-2111112	Pneumatic Schematic Davies and Metcalfe Brake Equipment Knorr Bremse WSP Equipment (LHCS)


Torque Figures			
Item	Description	Size	Torque (Nm)
1	Nut	M8	10

APPLIES TO: All Vehicles

NOTE: This valve is referred to as an 'Exhaust Valve with Whistle' on the pneumatic schematics (see Reference Drawings items 1, 2 and 3). This should not be confused with the Emergency Application Valve.

Scheduled Work (See Figure 1)

1. Remove the cover (9), which retains the spring (8) under pressure.
2. Remove the spring and diaphragm assembly, comprising retaining nut (2), support plate (4), diaphragm (5) and piston (6).
3. Hold the retaining nut (2) in the protected jaws of a vice and unscrew the M6 Allen screw (7).
4. Discard the seal (3) and diaphragm (5).
5. Clean all other components.
6. Examine all components.
7. Check that the orifice 'O' in the support plate is clear.
8. Reassemble the diaphragm assembly with a new seal (3) and diaphragm (5).
9. Refit the diaphragm assembly into the body checking that the diaphragm is located correctly.
10. Refit the cover (9) ensuring that the spring is located correctly.
11. Tighten the M8 nuts (see Torque Figures item 1).

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Passenger Emergency Valve – Overhaul **BE 0006**

Arising Work

6. Renew damaged stud.
6. Renew damaged components.
7. Clear orifice.

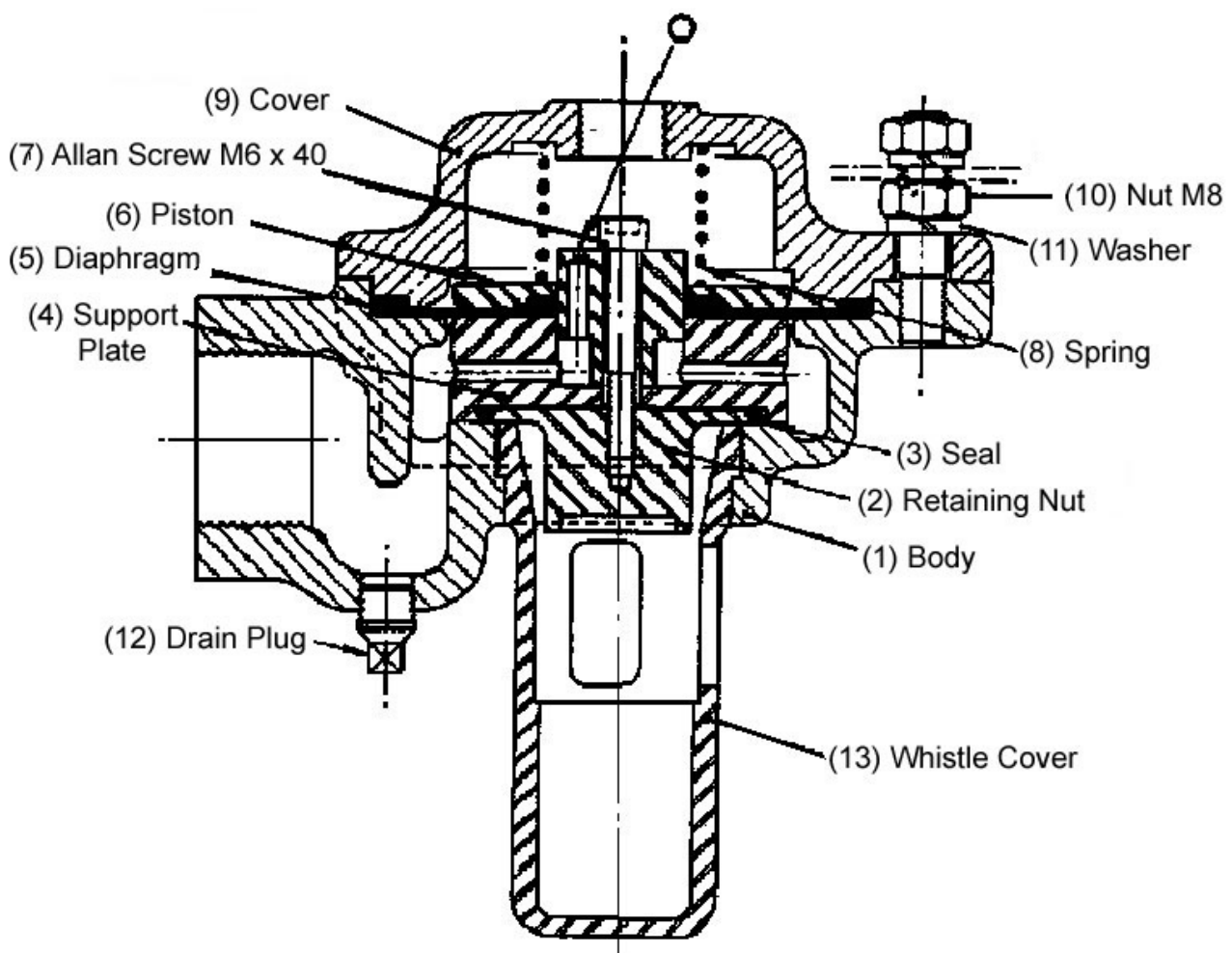



Figure 1: Davies and Metcalfe Passenger Communication Valve (BR Cat No. 070/070572)

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Passenger Communication System - Full Test

BE 0111

Materials			
Item	Description	Qty/Veh	Cat No.
1	Valve, Exhaust with Whistle (D&M)	As Req'd	070/070752
2	Valve, Emergency Application with Whistle (Westinghouse)	As Req'd	070/022346

APPLIES TO: All Vehicles

Scheduled Work

NOTE 1: This test is to be carried out following Job No. BZ 3001 whilst the brake test trolley is still attached.


NOTE 2: Record the results on the form provided, (see Section 5).

1. Check the brake pipe is fully charged to 5 Bar.
2. In each vehicle pull passenger communication handles located as follows:

Vehicle	Saloon	Toilets	Other
RFM	4	1	-
TRFB 407XX	2	-	1 in kitchen
TBRF 408XX	2	-	1 in corridor by kitchen 1 in anteroom
TSOB	4	1	
Saloon Vehicles except FOD	4	2	-
FOD	3	2	1 in vestibule opposite disabled toilet
TSD (Not Cross Country)	4	2	
TSD (Cross Country)	3	1	
TGS	3	1	One in Guard's compartment
BFO	3	1	1 in corridor 1 in Train Managers Office
TCC	4	1	
TFD (Cross Country)	3	1	
TSB 401xx	3	1	1 in kitchen

Check that:

- 2.1 The handle locks in the out position.
- 2.2 The brake pipe pressure falls to 3.8 bar maximum.
- 2.3 The audible warning from the emergency application valve (behind the skirt panel "H") can be heard.
3. Reset the valve handle and then check that the brake pipe recharges to 5 bar (the valve is reset by using a standard BR carriage key).

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Passenger Communication System - Full Test

BE 0111

Arising Work


2.1 Change the passenger communication handle assembly.

NOTE 3: The passenger communication valve may have been overhauled in accordance with Job No. BE 0006.

2.2 Pull another handle on the opposite side of the vehicle. If the second handle works, change the handle assembly. If the second handle also fails, change the passenger communication valve (see Materials item 1 for D&M type or Materials item 2 for Westinghouse type).

2.3 If the audible warning cannot be heard, check if another device has caused the BP pressure to fall, otherwise change the passenger communication valve (see Materials item 1 for D&M type or Materials item 2 for Westinghouse type).

3. If a valve will not reset, check for defective pipework and repair, change the passenger communication valve (see Materials item 1 for D&M type or Materials item 2 for Westinghouse type).

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Gauges, Duplex Main Reservoir and Brake Pipe – Change **BG 3317**

Reference Documents		
Item	Document No.	Title
1	WOSS 690/4	Pressure Gauges

APPLIES TO: BFO


QUANTITY PER VEHICLE: 1

Scheduled Work

1. Change.
2. Overhaul in accordance with the specified document (see Reference Documents item 1).
3. When fitted, test the gauge against master gauges (permitted error ± 0.1 bar) (see Job No. BZ 3001 for equipment required).

Arising Work

2. Renew Duplex MR and BP gauge which cannot be overhauled.
3. Change any gauge which is out of tolerance.

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Parking Brake Control Unit – Change

BH 0119

Materials			
Item	Description	Qty	Part/Cat No.
1	Approved Cleaning Agent	As Req'd	Local Supply
2	Shell Tellus T15	As Req'd	027/013279
3	Molykote 33 Grease	As Req'd	027/002195
4	Filler Strainer	1	-
5	Spring (38)	1	-
6	Strainer Disc	2	-
7	Bonded Seal (34)	4	-
8	Seal (36)	1	-
9	Strainer (37)	1	-
10	Bonded Seal (39)	1	-
11	Pump Motor	1	070/022880
12	Pump	1	070/023515
13	Selector Valve	1	070/023628
14	'O' Ring (154)	4	-
15	Solvent	As Req'd	-
16	Bonded Seal (170)	2	-
17	Fine Emery Cloth	As Req'd	001/106133
18	Liquid Metal Polish	As Req'd	007/053080
19	Spring (171)	2	-
20	Bonded Seal (162)	1	-
21	Spring (163)	1	-
22	3/8" Dia Ball Bearing (166)	1	-
23	Application Relief Valve (16) (Set at 90 to 100 Bar)	1	-
24	Release Relief Valve (17) (Set at 75 to 85 Bar)	1	-

Torque Figures		
Torque Value/Nm	Description of Fixings	Section in this Job
24.5	M8 screw and tab washer	Part D, 6.6
3	M6 nut	Part I 6.4


Reference Documents		
Item	Document No.	Title
1	PB/MP1991	FGW MK3 BFO Parking Brake Instruction
2	PB/MP1233	Engineering Change Reduction of Hydraulic Parking Brake Application Pressure on Mark 3 DVT Vehicles

APPLIES TO: BFO

NOTE 1: BFO vehicles have had the parking brake control units replaced with items recovered from Mark 3 DVTs in accordance with PB/MP1991 (see Reference Documents item 1). The Cat No. for the complete unit is 070/023491.

Parking Brake Control Unit – Change

BH 0119

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NOTE 2: The application and release pressures on the BFO application differ from those used on DVTs (which had the pressures amended in accordance with PB/MP1233) (see Reference Documents item 2).

NOTE 3: During disconnection and reconnection of any hydraulic hoses/components care must be taken to ensure that the open ends of the hoses/components are suitably protected at all times to prevent dirt, swarf or similar matter entering the vehicle hydraulic system.

NOTE 4: Refer to the star chart in Section 3 for the correct order in which to carry out the parking brake jobs.

This job is divided into the following parts:

Part	Title	Starts on Page
A	Preparation and Removal	4
B	Tank and Strainer	4
C	Pump Motor	5
D	Hand Pump	6
E	Selector Valve	8
F	Multi-Valve	8
G	Relays, Terminal Blocks, Capacitor and Wiring	11
H	Indicator	12
I	Magnet Valve	17
J	Time Delay Relay	22
K	Control Unit Cleaning and Reassembly	22
L	Testing and Refitting	23



VEHICLE OVERHAUL INSTRUCTION

PB/VI2133

PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES

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Parking Brake Control Unit – Change

BH 0119

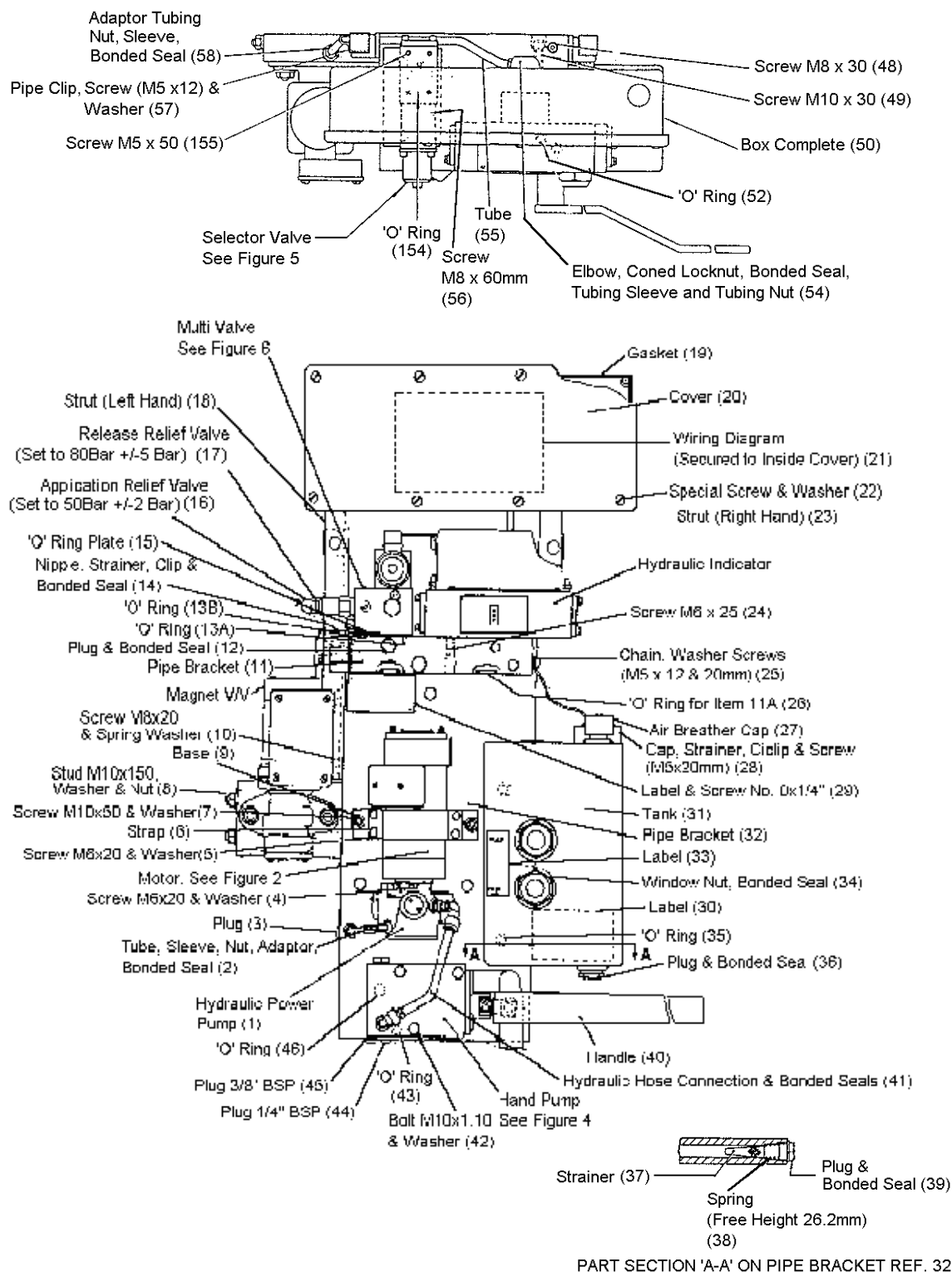



Figure 1: Hydraulic Parking Brake Control Unit - General Arrangement

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Parking Brake Control Unit – Change

BH 0119

PART A - Preparation and Removal


Scheduled Work

1. Drain all hydraulic fluid from the unit.
2. Disconnect electrical and piped connections. Stow wires safely and seal exposed pipes and connections.
3. Remove the control unit.

PART B - Tank and Strainer

Scheduled Work

1. Remove the tank from the pipe bracket by unscrewing the two socket cap screws (49).
2. Remove the two 'O' rings (35), from the recesses in the back of the tank and scrap them.
3. Unscrew the hex head screw (25) to release the chain of the filler cap (28) from the pipe bracket.
4. Dismantle the tank and wash all parts with a suitable solvent, e.g. deodorised white spirit (see Materials item 1), and dry them with a jet of clean, dry, low pressure compressed air.
5. Discard the filler strainer.
6. Examine the tank (31) and touch-up or repaint outside surfaces according to level of damage.
7. Clean the windows.
8. Renew the four bonded seals (34) (see Materials item 7) for the oil level windows and seal (36) for the drain plug.
9. Reassemble the tank. Fit new filler strainer (see Materials item 4).
10. Unscrew plug (39) with its bonded seal, remove the spring (38), take out the strainer (37), which is in the pipe bracket, adjacent to the lower fluid connection to the tank. Discard the strainer (37), spring (38) and bonded seal (39).
11. Fit a new strainer (37) (see Materials item 9) and a new spring (38) (see Materials item 5).
12. Refit the parts in the pipe bracket, using a new bonded seal (39) (see Materials item 10).
13. Unscrew two nipples (14) from the small pipe bracket (11).

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Parking Brake Control Unit – Change


BH 0119

14. Wash the nipples and the strainer discs within the nipples in a suitable solvent. Discard the strainer discs.
15. Refit the nipples complete with new strainer discs (see Materials item 6) into the pipe bracket.

PART C - Pump Motor

Scheduled Work

1. Remove the motor and pump as follows:
 - 1.1 Disconnect the two pipe connections from the pump and the supply leads from the motor.
 - 1.2 Unscrew the two socket cap bolts (7) securing the motor to the pipe bracket and remove the unit from the bracket.
 - 1.3 Remove the two hex head screws (4) securing the motor to the pump and separate the two assemblies.
 - 1.4 Remove the Oldhams coupling which connects the motor to the pump.
2. Despatch the pump motor and pump for overhaul in accordance with a procedure to be agreed with the Engineer.
3. Obtain a new or overhauled pump motor (see Materials item 11) and pump (see Materials item 12).
4. Refit the pump motor and pump as follows:
 - 4.1 Refit the Oldhams coupling which connects the motor to the pump.
 - 4.2 Re-assemble the two assemblies and refit the two hex head screws (4) securing the motor to the pump.
 - 4.3 Refit the motor to the unit and secure in place with the bracket. Refit the two socket cap bolts (7) securing the motor to the pipe bracket.
 - 4.4 Reconnect the two pipe connections to the pump and the supply leads from the motor.

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Parking Brake Control Unit – Change

BH 0119

PART D - Hand Pump

Scheduled Work

1. Remove the hand pump as follows: (see Figure 2).
 - 1.1 Remove the pump handle.
 - 1.2 Remove the pipe connection and unscrew the three hex head bolts (42) securing the pump to the unit pipe bracket.
 - 1.3 Remove the pump from the bracket, retrieving the 'O' rings (43 and 46) from the recesses in the back.
 - 1.4 Discard the 'O' rings.
2. Dismantle the pump as follows: (see Figure 2).
 - 2.1 Remove the split pin and washer (126) and push out pin (126) to release the piston (137) from link (132).
 - 2.2 Mark the position of the end cover (125) relative to the body (136).
 - 2.3 Remove the four screws (124) and take off the end cover and associated parts.
 - 2.4 Withdraw the piston and remove all sealing rings and anti extrusion rings and discard.
 - 2.5 Unscrew the plug (110) with seal (109) and empty out the balls (107, 105 and 103).
 - 2.6 Remove the two screws (105) and seals (104).
 - 2.7 Unscrew the spring adjuster (113) and take out the valve (119) and other parts.
 - 2.8 Remove all sealing rings from the valve.
 - 2.9 Discard all seals and sealing rings.
3. Wash all metal parts in suitable solvent and dry them with a jet of clean, dry compressed air.
4. Renew the following items:
 - Seal washers (104 and 109)
 - 'O' rings (116, 117, 120 and 123)
 - Backing rings (115, 118, 121 and 122)
 - Wiper ring (135)
 - Strainer (134)
 - All split pins.

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5. Examine the following items:

Item	Rejection Criteria
Cylinder relief valve boxes, 'O' ring grooves	Scoring which might permit fluid leakage passed the seals.
Relief valve (119)	Damage to conical seat
Balls (103, 106 and 107)	Pitting
Relief valve disc springs (114)	Damage and Flattening

6. Assemble the pump in the reverse order to that shown in Section 2, and as follows:

- 6.1 Lubricate all 'O' rings and backing rings and the cylinder and relief valve bores in the body, with a little Shell Tellus T15 (see Materials item 2).
- 6.2 The wiper ring (135) and the extension of the piston that passes through it should be very lightly smeared with grease (see Materials item 3).
- 6.3 Lightly grease the handle link pins.
- 6.4 The six relief valve disc springs (114) should be stacked as shown in Figure 2.
- 6.5 The adjusting screw (113) should be screwed in until the resistance of the springs is felt; this screw and the dog point set screw (112) will be finally positioned on test.
- 6.6 Tighten the four screws (124) to 24.5Nm using a torque wrench.

Arising Work

5. Renew damaged or defective parts.

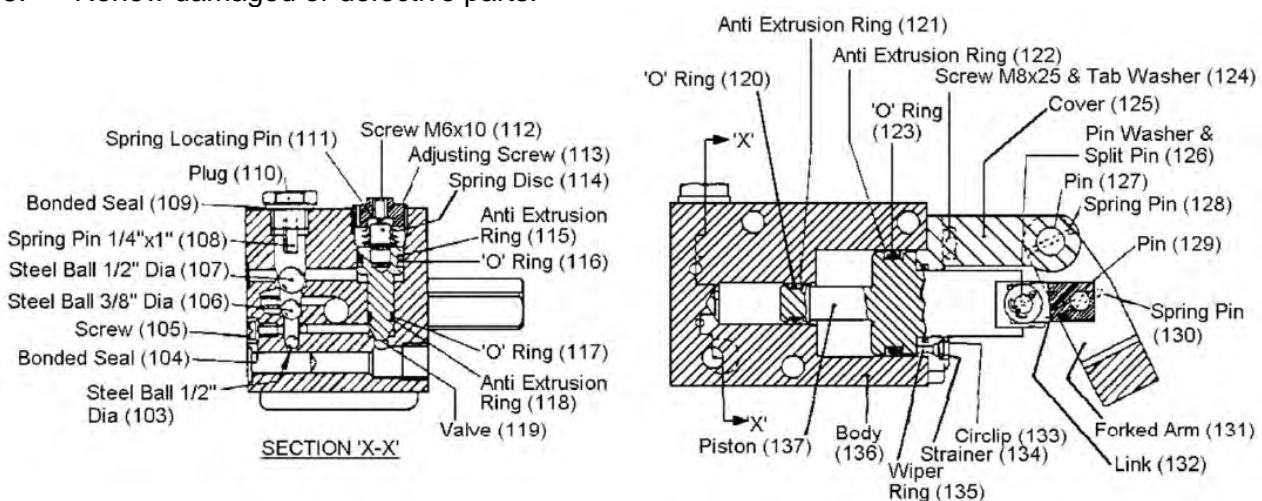



Figure 2: Hand Pump

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PART E - Selector Valve


Scheduled Work

1. Remove the selector valve as follows:
 - 1.1 Refer to Figure 1. The selector valve is mounted on the multi-valve which, in turn, is mounted on the horizontal pipe bracket (11) (see Figure 1).
 - 1.2 Disconnect the selector valve wiring, unscrew the four socket cap screws (155) shown in Figure 1 and separate the selector valve from the multi-valve,.
 - 1.3 Remove the four 'O' rings (154) from the recesses in the base of the selector valve.
2. Obtain a new selector valve (see Materials item 13).
3. Refit the selector valve as follows (see Figure 1):
 - 3.1 Fit four new 'O' rings (154) (see Materials item 14) to the recesses in the base of the selector valve.
 - 3.2 Fit the selector valve to the multi-valve and secure with the four socket cap screws (155) (see Figure 1).
 - 3.3 Reconnect the selector valve wiring.

PART F – Multi-Valve

Scheduled Work

1. Remove the multi-valve as follows: (see Figure 1)
 - 1.1 Unscrew the three screws (56) securing the multi-valve to the horizontal pipe bracket (11),
 - 1.2 Lift off the valve complete with the relief valves (16 and 17) and remove the seal plate (15) and the 'O' rings (13a and 13b).
 - 1.3 Discard the 'O' rings.
 - 1.4 The relief valves shall be overhauled or renewed.
2. Dismantle the unlocking valve as follows: (see Figure 3 Section AA)
 - 2.1 Remove the screwed plug (169) and bonded seal (170) from each end of the valve body (168).

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- 2.2 Take out the two springs (171) and washers (172) and the spool (173).
3. Wash the parts in clean solvent (see Materials item 15) and dry them with a jet of clean, dry, low pressure compressed air.
4. Renew the bonded seals (170) (see Materials item 16).
5. Examine the parts as follows:
 - 5.1 The cylindrical surface of the spool and the bore of the body in which it runs should have a fine surface finish. Any light score marks on these surfaces may be polished out with very fine emery cloth (see Materials item 17) and then finished with liquid metal polish, (see Materials item 18), removing the minimum amount of metal.
 - 5.2 Examine the springs for corrosion and damage. Check that the free height is between 28.0 and 29.0mm.
 - 5.3 Check that the holes in the washers are clear.

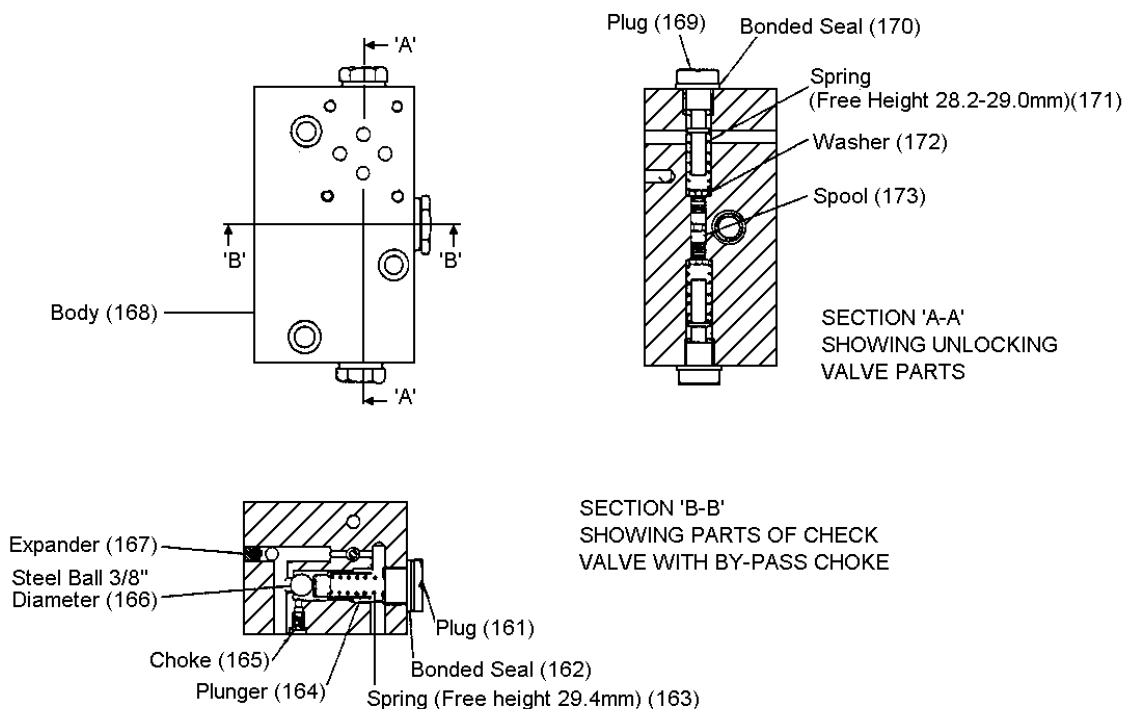



Figure 3: Hydraulic Parking Brake Control Unit - Multi Valve

6. Reassemble the unlocking valve in reverse order to Section 2.
7. Dismantle the check valve as follows: (see Figure 3 Section BB).

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- 7.1 Unscrew the cap (161) and take out the spring (163), plunger (164) and ball (166).
- 7.2 Remove the bonded seal (162) from the cap and discard.
8. Wash the parts in clean solvent (see Materials item 15) and dry them with a jet of clean, dry, low pressure compressed air.
9. Renew the bonded seal (162) (see Materials item 20).
10. Examine the parts as follows:

Part	Rejection Criteria
Spring (163)	Corrosion, damage, free height less than 29.0mm (see Materials item 21)
Ball (166)	Pitting or other marks (see Materials item 22)
Other Parts	Damage, wear


11. Check that the holes in the body of the multi-valve are clear.
12. Reassemble the valve, lubricating all moving parts with a little Shell Tellus T15 (see Materials item 2).

NOTE 5: The Application relief valve (16) and the Release relief valve (17), (see Figure 1), are screwed into the side of the multi valve body, one behind the other with the application valve in front.

13. Check that the relief valves (16 and 17) have been set to the correct pressure. The application and relief pressures shall be recorded. The relief valves are not to be disturbed unless a valve is malfunctioning; in this event a new valve (see Materials item 23 or 24) should be fitted ensuring that it is complete with a new 'O' ring above the thread.

Arising Work

- 5.1 Renew any item having marks which cannot be removed by polishing.
- 5.2 Renew springs outside limits or damaged (see Materials item 19).
- 5.3 Clear holes.
10. Renew defective parts.
11. Clear holes, but only soft stranded wire may be used to remove dirt from the small hole in the choke (165).

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PART G - Relays, Terminal Blocks, Capacitor and Wiring

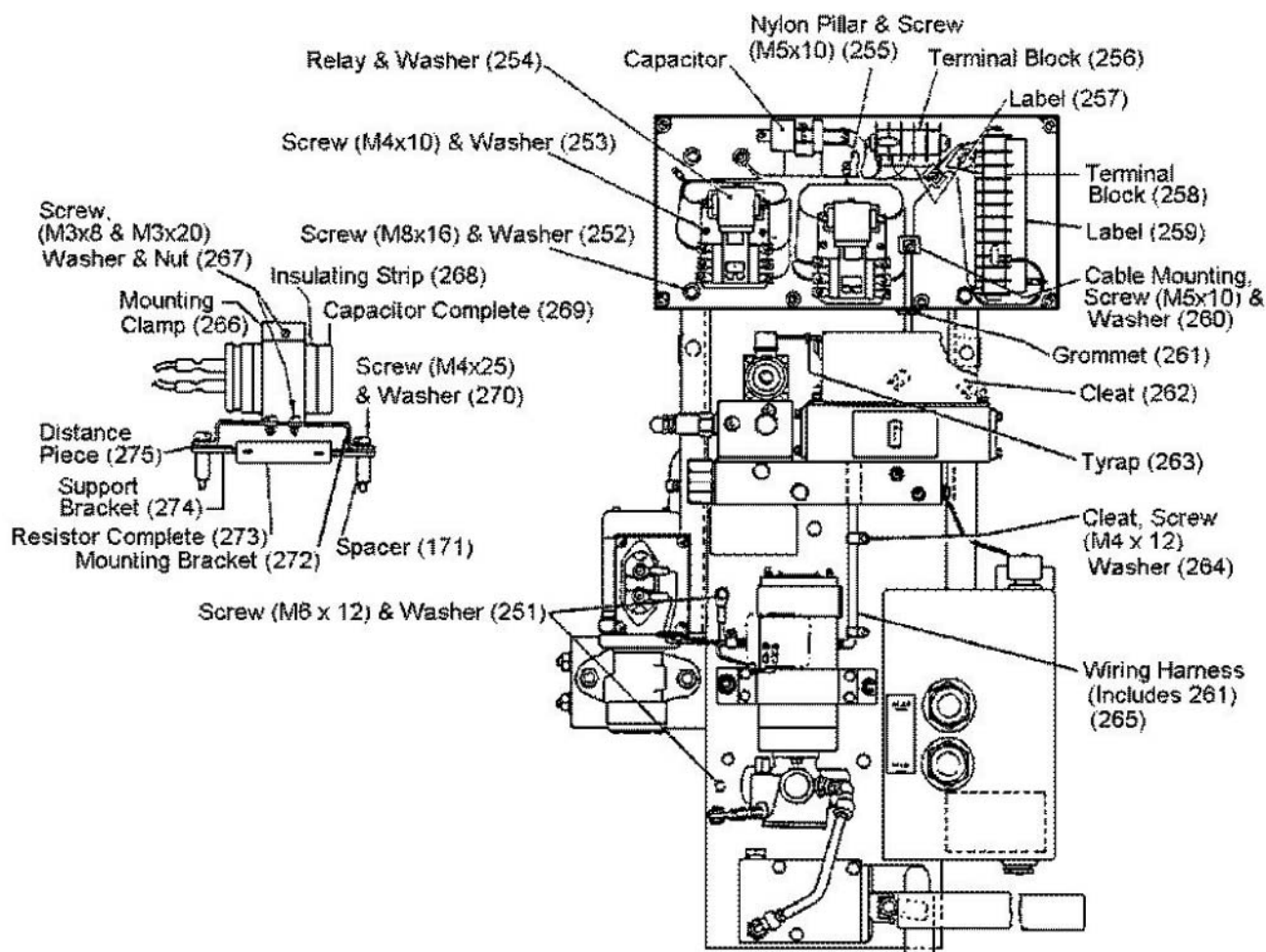
Scheduled Work

1. Referring to Figure 1, unscrew the eight screws (22) and remove the terminal box cover (20).
2. Using a clean cloth, wipe over the inside of the terminal box, the terminal blocks, relays, capacitor and associated wiring to remove dust and oily deposits (see Figure 4).
3. Examine the components for insecurity and signs of overheating.
4. Check that all terminal screws and cable terminations are tight and undamaged.
5. Check that all cable cleats are secure and effective.
6. Refit the terminal box cover (20).


Arising Work

3. Renew any item which is damaged.
- 3,4,5. Retighten any loose screws.
5. Remake any defective cable termination.
5. Renew any damaged or missing cable cleat.

NOTE 6: A wiring diagram is fitted on the back of the terminal box cover (20).

**Parking Brake Control Unit – Change****BH 0119****Figure 4: Hydraulic Parking Brake Control Unit - Terminal Block and Wiring****PART H - Indicator****Scheduled Work**

1. Remove the indicator as follows: (see Figure 1).
 - 1.1 Disconnect the electrical wiring and piping (55) from the parking brake indicator.
 - 1.2 Unscrew the four socket cap screws (24) and separate it from the pipe bracket.
 - 1.3 Discard the three 'O' rings fitted in the recesses in the mounting face.
 - 1.4 If another indicator is not being fitted immediately, blank the open ports of the pipe bracket and the indicator.

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2. Dismantle the indicator as follows: (see Figure 5).
 - 2.1 Unscrew the four screws (31), take off the switch cover (34).
 - 2.2 Note the positions in which the four switches (35) are mounted.
 - 2.3 Undo the four screws (45) with nuts (41), and remove the switches together with the six spacers (43) and the insulating barrier (44).
 - 2.4 Unscrew the four screws with washers (32) and remove the bracket (36).
 - 2.5 Take the cam (15) off the pin (56).
 - 2.6 Unscrew the four screws (38) securing the Perspex cover (39) and the window (22) and remove these items.
 - 2.7 Remove the indicator flag (23), take out the plunger spring (24) and withdraw the plunger (2) from the slide (21).
 - 2.8 Unscrew the socket set screw (57) and withdraw the pin (56) from the slide.
 - 2.9 Unscrew the three bleeder screws (37).
 - 2.10 Unscrew the eight screws with washers (19) and take off the two end covers (18) and 'O' rings (20).
 - 2.11 Push out of the bore in the body (1), the two pistons (29), the two springs (25), the sleeve (26) and the slide (21).
 - 2.12 Remove the 'O' rings (28) and anti-extrusion rings (27) from the pistons.
 - 2.13 Unscrew the four bolts (50a and b) that secure the cover plate (8), and remove the cover plate 'O' ring (7), spring (10), valve (6) and valve stem (12).
 - 2.14 Unscrew the two bolts (50c) that secure the valve body (11) to the body (1) and carefully separate these parts, catching the spring (53) which will be loose inside.
 - 2.15 Remove the 'O' ring (54) and detent plate (55) from the body (1), and withdraw the piston (48) from the valve body (11).
 - 2.16 Separate from the piston, the 'O' ring (47), anti-extrusion ring (46), circlip (51), plug (49) and 'O' ring (52).
 - 2.17 Prise the self-locking circlip (4) out of the recess in the valve body and remove the filter disc (5).



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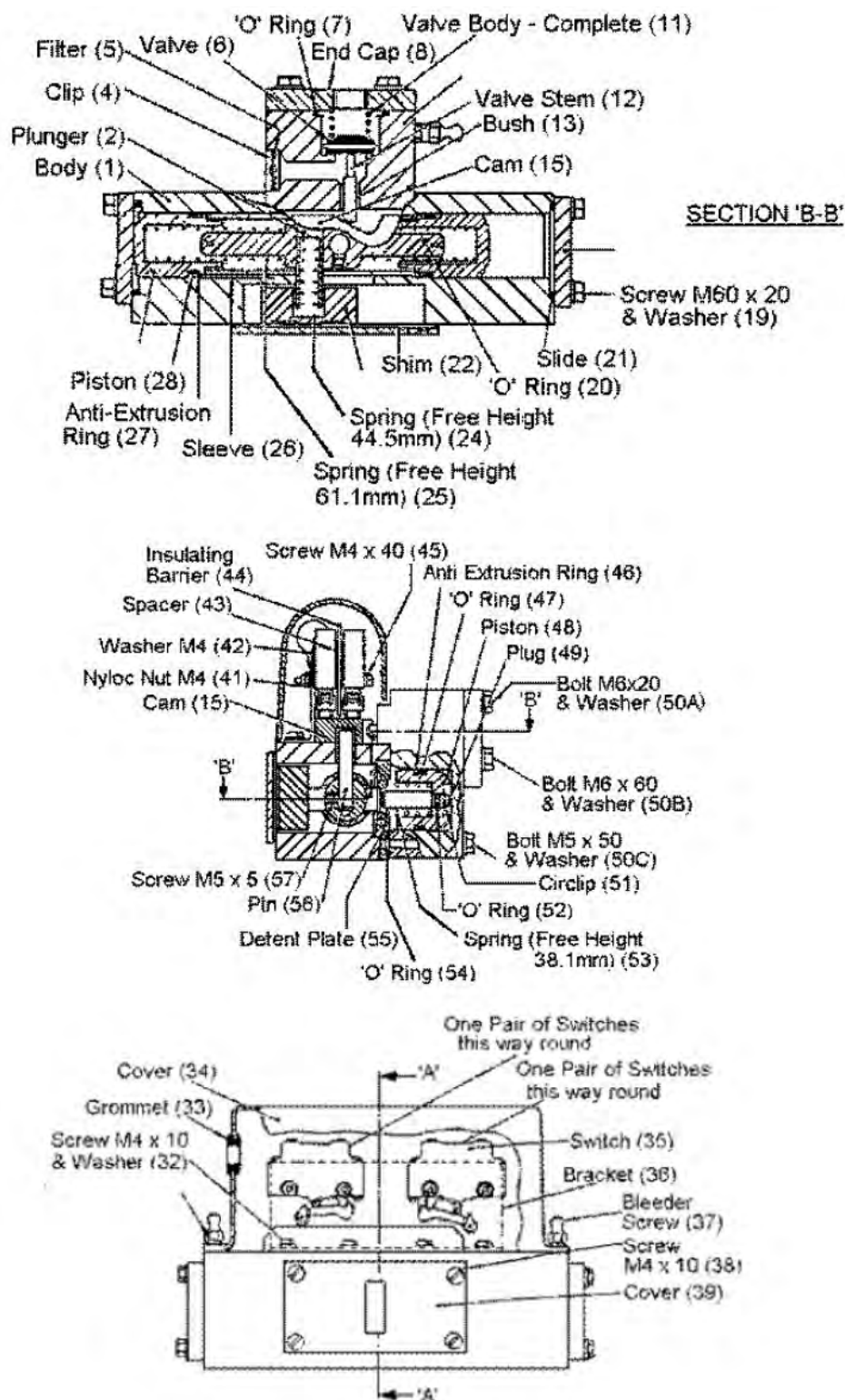



Figure 5: Parking Brake Indicator - Component Parts

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3. Renew the following components: (see Figure 5).

Fig 5 Ref. No.	Qty	Item
4	1	Circlip
6	1	Valve
7	1	'O' ring
20	2	'O' ring
27	2	Anti-extrusion ring
28	2	'O' ring
35	4	Switches
46	1	Anti-extrusion ring
47	1	'O' ring
51	1	Circlip
52	1	'O' ring
54	1	'O' ring

4. Cleaning.

4.1 All other parts that are entirely of metal should be washed in a suitable solvent and dried with a jet of clean, dry, compressed air.

4.2 Clean the following plastic parts with soap and water:


- Perspex cover (39)
- Indicator Flag (23)
- Cam (15)

5. Examine the parts for excessive wear and damage, paying particular attention to the following:

5.1 The components listed below should have a fine surface finish.

Component	Location of fine surface
Body (1) (Aluminium)	Bores and 'O' ring grooves
Valve body (11) (Aluminium)	Bores and 'O' ring grooves
Stainless steel sleeve (26)	Inner and outer surfaces
Slide (21)	Cylindrical surface (runs within item 26)
Unlocking piston (48)	Outer surfaces and
2 Pistons (29)	O ring grooves

Any light marks in these bores can be polished out using liquid metal polish, but if there are any scores in the areas where the 'O' rings seat that are too deep to be removed by this treatment, the item concerned must be renewed.

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- 5.2 Examine the springs for corrosion and damage. Check that their free heights are as follows:

Item No.	Free Height (mm)
10	19.5-21
24	43.5-45
25	60-61.5
53	37-38.5

- 5.3 Treat the plastic parts as follows:

5.3.1 Examine for damage.

5.3.2 Remove any marks on the cover (39) with metal polish, and then polish with a soft cloth.

5.3.3 The lettering on the flag is engraved and should be touched up with red and green paint where damaged.

- 5.4 Examine the filter discs (5) for cracks.

6. Assemble the indicator in reverse order to that given in Section 2, and as follows:

6.1 All parts must be clean in readiness for assembly.

6.2 Referring to Figure 5, smear the 'O' ring (7) with a thin film of Osmolin Arctic grease, or equivalent, and remove any surplus.

6.3 All other parts associated with the pneumatic vent valve assembly do not require lubrication and should be assembled dry.


6.4 Lubricate the piston bores in the bodies (1) and (11), the pistons (29 and 48) and the associated 'O' rings and seals, with a little Shell Tellus T15 (see Materials item 2).

6.5 Fit the 'O' rings (28 and (47) and the associated anti-extrusion rings (27) and (46) into the pistons, making sure that the anti-extrusion rings are fitted on the non-pressure side of the 'O' rings (see Figure 5).

6.6 Roll the 'O' rings gently into position and ensure that they are properly located in their grooves as if they are pinched or damaged during assembly, leakage or incorrect operation will result.

6.7 Assemble the four switches (35) in the positions that were noted during dismantling.

6.8 Apply anti-seize compound to all screws that screw directly into aluminium.

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- 6.9 Fit the disc filter (5) into the body (11) with its shiny side facing outwards.
- 6.10 If the indicator is not to be assembled to a parking brake unit or pipe bracket immediately after assembly, close all ports and openings with thread protectors or adhesive tape. Also cover the mounting face with adhesive tape.


Arising Work

- 5.1 Renew any item where polishing has not removed marks.
- 5.2 Renew any springs out of limits or damaged.
- 5.3.1 Renew cracked or damaged plastic items.
- 5.4 Renew the filter disc if defective.

PART I - Magnet Valve

Scheduled Work

1. Remove the magnet valve as follows:
 - 1.1 Take off terminal box lid and disconnect external wiring and withdraw from the box.
 - 1.2 Refit the lid.
 - 1.3 Remove the two nuts and washers (34), securing the valve to its pipe bracket.
 - 1.4 Withdraw the complete valve together with the three 'O' rings in the recesses in the valve mounting face from the mounting studs.
 - 1.5 Discard the 'O' rings.
 - 1.6 Blank the open ports of the pipe bracket with adhesive tape if another valve is not being fitted immediately.
 - 1.7 Blank the open ports of the valve with adhesive tape.
2. Dismantle the magnet valve as follows: (see Figure 6).
 - 2.1 Unscrew the four socket head screws (37) and separate the magnet portion from the pneumatic valve portion.

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- 2.2 The moving core (10) is connected to the pneumatic valve portion and is centred by the guide ring (9) and so the magnet portion must be held straight as it is lifted off this item.
- 2.3 Retrieve the spring (13) which may drop out.
- 2.4 Unscrew the two screws (17) and remove the cap (18) from the magnet portion.
- 2.5 Undo the four screws (43) and take off the cover (42).

NOTE 7: The fixed core (14) is screwed into the body of the encapsulated coil (12) and is secured in position by a locking plug (16) and a socket set screw (15). It will not normally be necessary to disturb the core unless it, or the encapsulated coil is to be renewed.

- 2.6 Unscrew the four socket head screws (1), remove the cover (2), then hold the inner nut (3) and undo the other nut.
- 2.7 Hold the moving core (10), undo the inner nut (3), and remove the washer (4), follower (30), guide (8), diaphragm (7), valve support (29) and valve (5) from the stem (28).
- 2.8 At this stage withdraw the moving core (10) with the stem and other parts from the valve body (25), and remove the distance piece (6), the upper valve (5), valve support (29), diaphragm (7) and guide (8) from the stem.
- 2.9 The moving core (10), stem (28), washer (11) and pin (24), comprise a complete assembly which must not be dismantled.

3. Renew the following components.

Ref. No.	Qty	Item
5	2	Valve
7	2	Diaphragm
8	2	Diaphragm Guide
32	3	'O' Ring
35	1	Grommet

4. Clean the remaining components as follows:

- 4.1 The magnet portion should be wiped with a clean cloth.
- 4.2 Other metal parts should be washed in suitable solvent and dried with a jet of clean dry, compressed air.
- 4.3 Make sure that the gauzes (19) and (31) in covers (18) and (2) are clear.



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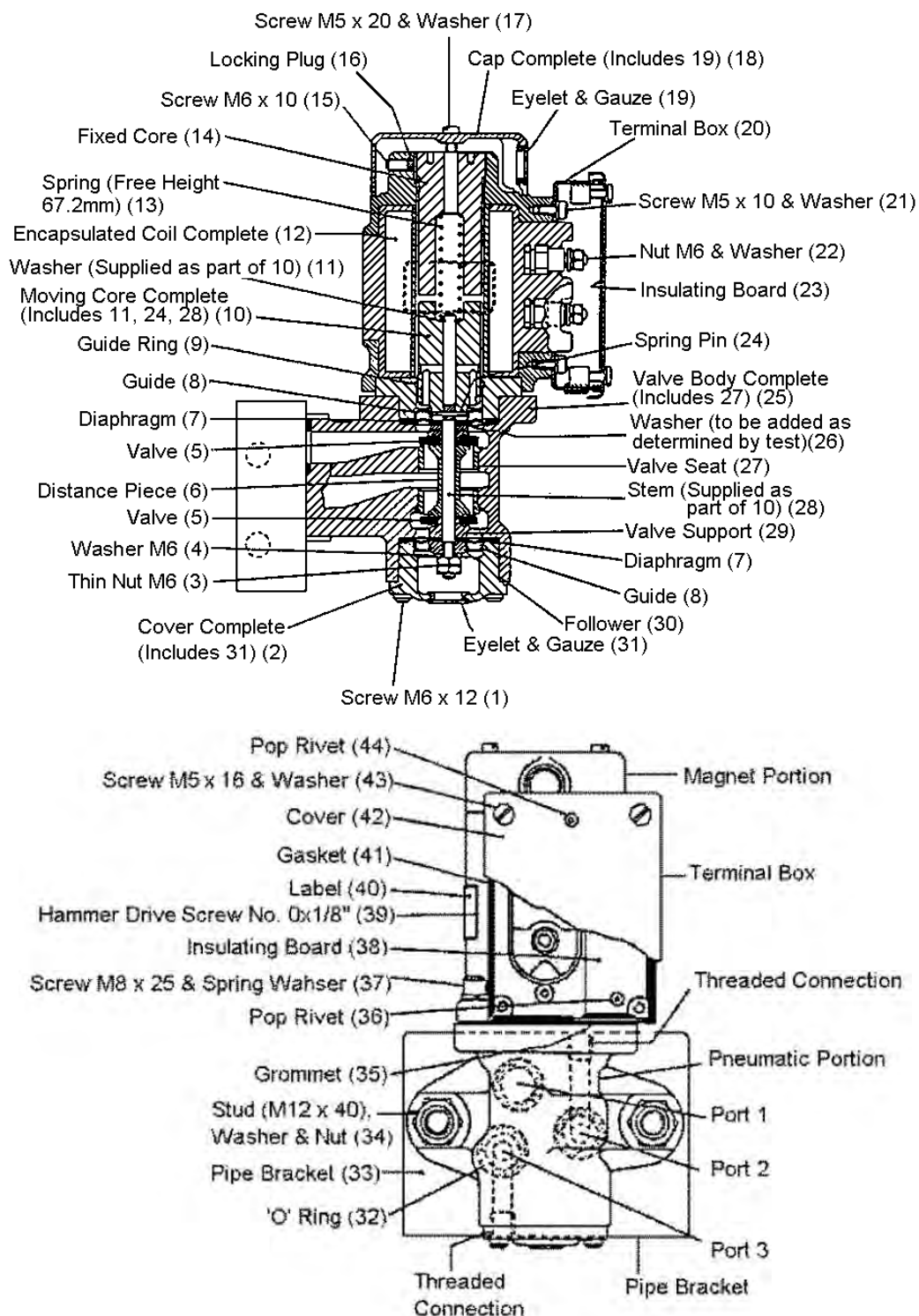




Figure 6: Direct Acting Magnet Valve

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5. Examine the components for signs of wear and damage and pay particular attention to the following:
 - 5.1 The moving core (10) is hard chromed and polished. Check that the plating is not worn through and that the drillings are not blocked. There must be no signs of surface corrosion. The stem (28) must be parallel with the outside diameter of the core and concentric with it within 0.05mm total indicator reading over its unscrewed length.
 - 5.2 Check the end of fixed core (14) (which is plated) for signs of corrosion.
 - 5.3 Check the resistance of the coil (12) which should be within 5% of the value given on the label.
 - 5.4 If this is satisfactory, check the insulation resistance of the coil by connecting a 1,000 volt Megger or similar insulation tester between the coil housing and one of the terminals. The reading should be not less than 10MΩ.
 - 5.5 Examine both valve seats (27) for scoring and damage.
6. Assemble the magnet valve in reverse order to that shown in Section 2, and as follows:
 - 6.1 All parts except the fixed core shall be clean and dry.
 - 6.2 Ensure that the inside of the coil is wiped dry after the core is screwed in.
 - 6.3 Check that the guides (8) and diaphragms (7) are assembled with their beads the correct way up, (see Figure 6). There are bead grooves in the magnet body and the bottom cover to accommodate them.
 - 6.4 When all components have been assembled to the stem (28), hold the moving core (10) and screw on and tighten one nut (3) to a torque of 3Nm.
 - 6.5 Screw on the second nut (3) finger tight, then hold the first nut and tighten the second one third of a turn to lock it.
7. Test the magnet valve on a test ring.
 - 7.1 If the fixed core (14) has been renewed it is set in position during testing and must then be locked. Apply a little thread locking fluid such as Loctite 241 (colour coded blue), or equivalent, to the threads of screw (15) before fitting it. Wipe off any surplus fluid immediately with a clean cloth.
 - 7.2 Finally, blank off all openings of the valve with adhesive tape to prevent the entry of dirt.


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Arising Work

- 5.1 Renew the complete moving core and stem if any fault is found.
- 5.2 Renew the fixed core as follows:
 - Slacken off the socket set screw (15). This screw is treated with thread locking compound.
 - The core has two holes in its top face to accept a suitable peg spanner.
 - When unscrewing the core, note the number of threads by which it is engaged.
 - Screw in the replacement by the same amount, after putting a light smear of Osmolin Arctic grease, or similar, on its thread.
 - Fit a new locking plug (16) and screw in the set screw (15) just enough to hold the core.
 - Final positioning and locking is done on test.
- 5.3, 5.4 If the coil resistance is not within approximately 5% of the value given on the label or the insulation resistance is less than 10MΩ fit a new coil (12) complete with guide ring (9).
- 5.5 If either of the valve seats (27) shows signs of slight pitting it may be lapped with metal polish, preferably using a dolly with a suitably shaped profile. If a seat is too badly pitted to be rectified by this treatment, or it is scored or otherwise damaged, it should be renewed. Spare bushes are supplied complete with a label giving fitting instructions.

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PART J – Time Delay Relay

Scheduled Work

NOTE 8: This item is located behind the electrical controls for the parking brake unit in the guard's compartment.

1. Remove and discard the Time Delay Relay unit.
2. Fit a new Time Delay Relay unit. This new relay shall be adjusted to give a delay of 25 to 35 seconds.


PART K - Control Unit Cleaning and Reassembly

Scheduled Work

1. With the various component parts removed from the parking brake control, flush the pipe bracket out to remove any sediment.
2. The component parts should be refitted using the reverse procedure to that given for removal.
3. Check that the application relief valve is set to 90 to 100 bar and the release relief valve is set to 75 to 85 bar.
4. Ensure new 'O' rings, seals, and other items are fitted as follows:

Item	Description	Qty	Location
13A, 13B	'O' ring	2	Multi-valve
26	'O' ring	1	Pipe bracket
35	'O' ring	2	Tank
43	'O' ring	1	Hand pump
46	'O' ring	1	
52	'O' ring	3	Indicator
	'O' ring	3	Magnet valve

5. Fit a new warranty label stating :
 - Warranty Expiry Date
 - Serial Number
 - Mod Status

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PART L – Testing and Refitting

NOTE 9: Refer to Section 3 page 7 for details, including sequence, if other jobs to be carried out on the hydraulic parking brake system.

1. Refit and reconnect the unit.
2. Refill with Shell Tellus T15 oil (see Materials item 2).

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Hydraulic Parking Brake Pressures – Adjust

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Special Tools			
Item	Tool Description	Tool Pt No.	Where used in this Job
1	Hydraulic pressure gauges (reading up to 150Bar)	-	1→11

APPLIES TO: BFO


Scheduled Work

NOTE: Refer to the star chart in Section 3 for the correct order in which to carry out the parking brake jobs.

- On the hydraulic parking brake control unit located in the guard's compartment, remove the blanking plugs and fit suitable test gauges into the application and release line test points.
- Depress the parking brake "On" pushbutton in the conductor's compartment and check that the pump on the parking brake control unit begins to run and the application line hydraulic pressure as indicated on the appropriate test gauge begins to rise. Note the pressure on the gauge as the parking brake indicator changes to ON. This pressure should be 90-100 bar. With the pushbutton still depressed, note the maximum pressure indicated on the gauge with the pump running continuously.
- With the parking brake applied, depress the parking brake "Off" pushbutton and check that the Release line hydraulic pressure as indicated on the appropriate test gauge begins to rise. Note the pressure on the gauge as the parking brake indicator changes to "OFF". This pressure should be in the range of 75 to 85 bar. Note also the maximum pressure that is attained with the pump running continuously. Record the values.
- At the conclusion of the setting up procedures remove the two test gauges and refit the plugs into the two test points. Apply and release the parking brake and ensure that no hydraulic fluid leaks from either test point plug.

Arising Work


- If the pressure cannot be achieved, carry out the following:
 - Locate the application line pressure relief valve on the left hand side of the multi valve assembly at the top of the control unit beneath the electrical control panel. The application and release relief valves are side by side but the application valve is towards the front of the control unit.

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Hydraulic Parking Brake Pressures – Adjust

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- 2.2 Release the adjusting spindle locknut on the relief valve and, using a suitable Allen key turn the spindle by one complete turn in an anti-clockwise direction. Depress the “On” pushbutton again and, with the pump running continuously, note the maximum pressure that is indicated on the test gauge connected to the application line test point. Adjust the pressure as needed by means of the adjustment screw until, with the pump running continuously, the application pressure is 90 to 100 bar. When the pressure has been adjusted, tighten the locknut and check once more that the maximum pressure with the application button depressed is 90 to 100 bar.
- 2.3 Release the parking brake by depressing and releasing the parking brake “Off” pushbutton.
- 2.4 Turn the adjusting spindle on the application line pressure relief valve in a clockwise direction by approximately ½ turn. Depress the parking brake “On” pushbutton and note the pressure in the application line at which the parking brake indicator changes to “On”. Keep the “On” pushbutton depressed and note the maximum Application line pressure that is attained. This pressure should not exceed 100 bar.
- 2.5 If necessary, release the parking brake and re-adjust the application line pressure relief valve spindle until the maximum pressure in the application line is 100 bar with the hydraulic pump running continuously. Once this pressure has been attained, tighten the adjusting spindle locknut, ensuring that the spindle is not rotated during this operation.
- 2.6 Release and then re-apply the parking brake noting the pressure at which the parking brake indicator changes to “On”. Record the figure. With the parking brake “On” pushbutton depressed and the hydraulic pump running continuously, record the maximum pressure attained in the parking brake application line. This should be between 90 and 100 bar.
3. If the pressure is outside this range, adjust the setting of the release line pressure relief valve as indicated above for the application line valve. The pressure at which the release line indicator changes to “Off” should be set to 80 bar, and the maximum pressure attained with the control unit pump running continuously should not exceed 85 bar.

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	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	

Hydraulic Parking Brake – Test

BH 0305

Materials			
Item	Description	Qty	Part/Cat No.
1	Shell Tellus T15 Oil	As Req'd	027/013279

Reference Documents		
Item	Document Number	Document Title
1	ISO 4406	Hydraulic Fluid Power – Fluids – Method for Coding the Level of Contamination by Solid Particles

APPLIES TO: BFO

Scheduled Work


NOTE 1: Record the results on the form provided, (see Section 5).

NOTE 2: Refer to the star chart in Section 3 for the correct order in which to carry out the parking brake jobs.


1. Fit test gauges able to read up to 150 bar to the test points on the application and release lines at the parking brake control unit.
2. Check that the parking brake indicator in the guard's compartment shows OFF and the indicator on the parking brake control unit shows OFF.
3. Check that all brake pads are clear of the discs.
4. Apply the parking brake by means of the hand pump and note that the brake unit indicator moves almost immediately to NEUTRAL.
5. Continue pumping and record the number of pump strokes required to move the indicator from OFF to ON. This should not exceed 12.
6. Check that the brake pads are hard on discs adjacent to all wheels.
7. Check that the hydraulic fluid is above the **MIN** mark.
8. Release the brake by means of the button in the guard's compartment. Note that the hydraulic release pressure is set to 75 to 85 bar. Check that the pump motor continues to run for approximately 25 to 35 seconds after the button is released.
9. Check that the guard's compartment and control unit indicators show OFF.
10. Re-apply the brake by means of the button in the guard's compartment and check that the guard's compartment and control unit indicators change to ON within 10 seconds. Note that the maximum hydraulic application pressure with the pump on the parking brake control unit running continuously is 90 to 100 bar.

Hydraulic Parking Brake – Test

BH 0305

	VEHICLE OVERHAUL INSTRUCTION	PB/VI2133 Issue : 5 Section: 4 Page : 2 of 4
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11. Release the brake by means of the hand pump and note that the brake unit indicator moves almost immediately to NEUTRAL.
12. Continue pumping and record the number of pressure strokes required to move the indicator from ON to OFF. This should not exceed 4.
13. Check that the brake pads are free from the discs adjacent to all wheels.
14. Remove the test gauges and seal the test points.
15. Test the interlock valve as follows:
 - 15.1 Connect an air brake test trolley to the vehicle and charge the main reservoir pipe to 6.75 to 7.15 bar and, with the test trolley air brake valve in the RUNNING position, charge the brake pipe to 4.9 to 5.1 bar.
 - 15.2 Apply the parking brake by means of the button in the guard's compartment.
 - 15.3 Check that the brake pipe pressure (indicated on the gauge in the guard's compartment) falls to less than 3 bar.
 - 15.4 Release the parking brake and check that the brake pipe pressure is restored to the original value.
16. With the test trolley still coupled to the vehicle, test the anti-compound valves as follows:
 - 16.1 Slacken off the brake cylinder air pipe connection at one parking brake actuator on each bogie.
 - 16.2 Move the driver's automatic air brake valve handle on the test trolley to the EMERGENCY position and check that air escapes from each of the previously slackened air connections.
 - 16.3 Apply the parking brake by means of the button in the guard's compartment.
 - 16.4 Check that air ceases to escape from the brake actuator air connections.
 - 16.5 Release the parking brake and check that air escapes from the brake actuator connections once more.
 - 16.6 Tighten the brake actuator air connections.
17. Examine exposed hydraulic pipes, hoses and fittings for signs of leakage.

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Hydraulic Parking Brake – Test

BH 0305

Arising Work

5. If the number of strokes exceeds 12, bleed the system in accordance with Job No. BH 0310.
6. If no pads apply (check all wheels), check that the pressure is being created on the application line gauge. If no pressure, investigate the hand pump. If pressure has been created, check that all connections have been made correctly.

If individual pads have not applied at any wheel (check all wheels) apply the air brake repeatedly. Reapply the parking brake. If the pads still do not apply, change the defective actuator.
7. If below the **MIN** mark, top up with Shell Tellus T15 oil (see Materials item 1), that has been pre-filtered to an oil Cleanliness Code 15/13/10 or cleaner (Reference Documents item 1).
8. If the release pressure is outside limits, adjust in accordance with Job BH 0141.
8. Reset the parking brake release time delay relay as follows:
 - 8.1 Locate the Parking Brake Time Delay Relay (PBTDR) in the guard's compartment behind the electrical controls for the parking brake.
 - 8.2 Using the stopwatch, check the time between momentarily pressing the sprung coil plunger on the top of TDR and the point at which the relay is heard to click (this indicates the time-delay has expired).
 - 8.3 Using a small, flat bladed screwdriver, adjust the time-delay by turning the time adjustment screw (at the bottom of PBTDR) approximately. a quarter of a turn clockwise, to increase the time, anticlockwise to reduce the time.
 - 8.4 Repeat step 8.3 and check that the new time-delay is between 25 and 35 seconds. Note that slight further adjustments of the time adjustment screw may be required to achieve this time delay. Record the value achieved on the sheet in Section 5.8.
10. If the application pressure is outside limits, adjust in accordance with Job BH 0141.
12. If the number of strokes exceeds 4, bleed the system in accordance with Job No. BH 0310.
13. If any pads are not free, report to the team leader.
16. Tighten loose fittings. Renew leaking components and repeat Job No. BH 0310.



Hydraulic Parking Brake – Test

BH 0305

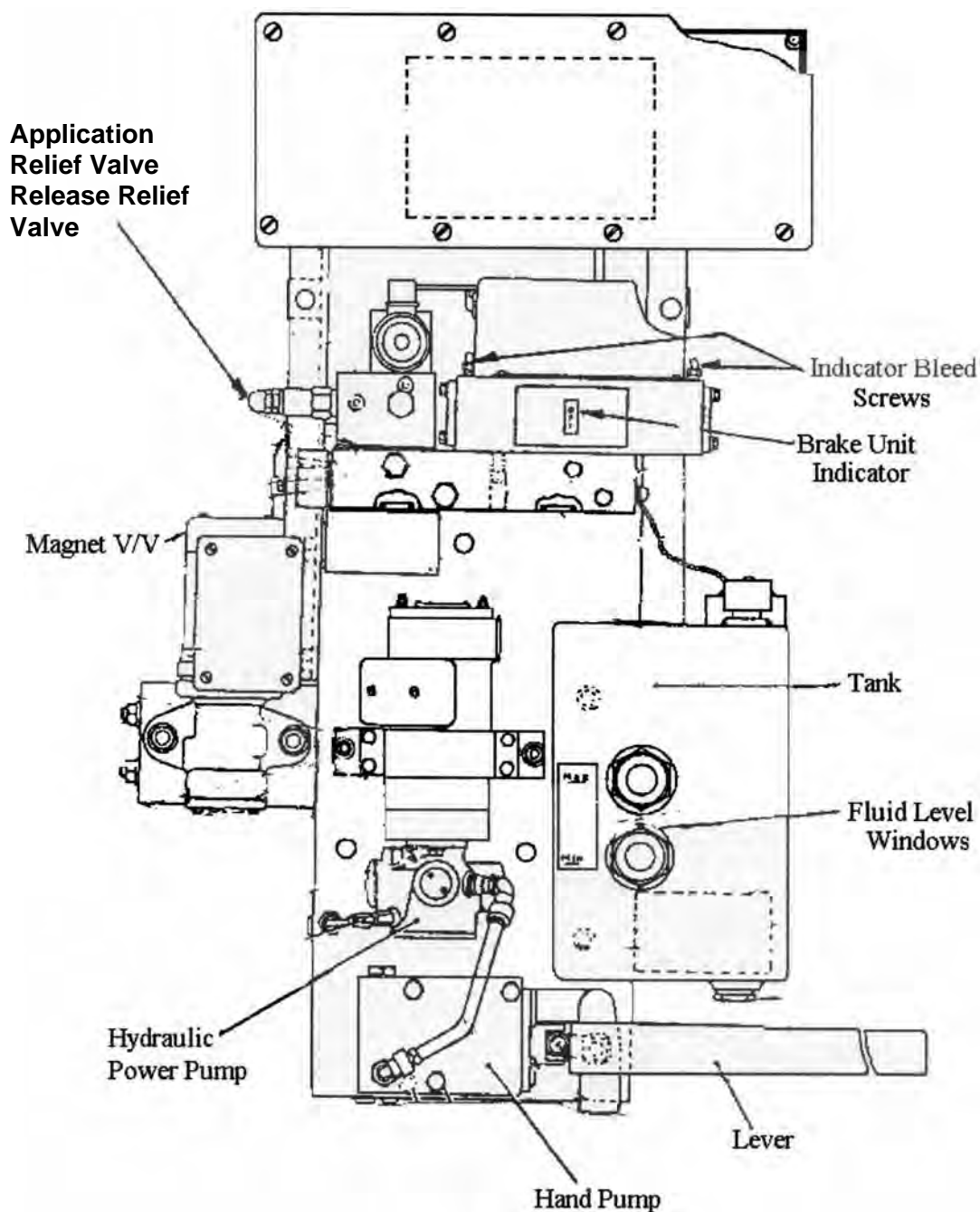



Figure 1: Arrangement of Hydraulic Parking Brake Control Unit

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Hydraulic Parking Brake – Bleed

BH 0310

Materials			
Item	Description	Qty	Part/Cat No.
1	Shell Tellus T15 Oil	As Req'd	027/013279

Reference Documents		
Item	Document Number	Document Title
1	CR/CI0555	CAU2 Brake Actuator

APPLIES TO: BFO

Scheduled Work

NOTE 1: It is important that during the following bleeding procedures an adequate level of clean and non-aerated hydraulic fluid is maintained in the tank on the parking brake control unit. Frequent checking must be carried out to ensure that the level of the oil in the tank does not fall below **Minimum**. Shell Tellus T15 oil (see Materials item 1) must be used.


NOTE 2: The BFO has a stand-by hand pump in addition to a power pump, both pumps must be operated initially in order to ensure that they are primed and that their connecting pipes are free of air. There after, either pump may be used for bleeding the system. If the hand pump is used at least 25 operations are needed during actuator bleeding to ensure that adequate oil is pumped.

NOTE 3: Any hydraulic fluid displaced from the vehicle parking brake system during the bleeding procedure must not be re-used and shall be disposed of in accordance with local depot and environmental procedures.

NOTE 4: Refer to the star chart in Section 3 for the correct order in which to carry out the parking brake jobs.

NOTE 5: Prior to carrying out the following procedures, ensure that the Parking Brake Release Time Delay Relay (TDR) has been checked and adjusted if necessary in accordance with task BH0305 to ensure that the parking brake pump motor does not operate excessively during the bleeding of the Release hydraulic pipework.


1. Obtain a length of clean and clear nylon tubing approximately 500mm long that has an internal diameter such that it is a push fit over the heads of the bleed nipples on the parking brake control unit and the air/hydraulic interlock valves.
2. Locate the air/hydraulic interlock valves in the vehicle underskirt.
3. On the upper of the two interlock valves proceed as follows.
 - 3.1 Locate the bleed nipple on the side of the valve and wipe off any dirt that may be present on the nipple.

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Hydraulic Parking Brake – Bleed

BH 0310


- 3.2 Push one end of the nylon tubing over the bleed nipple and suspend the other end of the tube over a clean container.
- 3.3 Slacken off the bleed nipple by approximately half a turn and run the pump on the parking brake control unit by pressing the parking brake “ON” pushbutton in the guard’s compartment. Check that hydraulic fluid flows through the nylon tube into the container. Continue to run the pump until it is evident that there are no bubbles of air in the fluid flowing through the tube. When it is evident that no more air is present, stop the pump and immediately tighten the bleed nipple.
- 3.4 Remove the nylon tube from the bleed nipple and allow any hydraulic fluid in the tube to drain into the container.
4. Repeat the procedures at item 3 on the lower interlock valve.
5. Proceed to the hydraulic parking brake actuator adjacent to the No.5 wheel.
 - 5.1 Locate the application line hydraulic pipe connection on the actuator. This is the pipe that is connected to the outer end of the actuator body.
 - 5.2 Thoroughly clean the pipe in the vicinity of its connection to the actuator and release the coupling nut adjacent to the connection nipple at the actuator. Remove the pipe and align it so that it can discharge into a clean container.
 - 5.3 Press the parking brake “ON” pushbutton in the guard’s compartment to run the motor driven pump on the parking brake control unit. Check that hydraulic fluid flows from the disconnected pipe at the parking brake actuator. Observe the fluid coming from the pipe and, when it is evident that no bubbles of air are present in the fluid, stop the pump and immediately re-connect the pipe to the actuator.
6. Repeat item 5 on the other seven hydraulic parking brake actuators, moving progressively from the No.2 end of the vehicle to the No.1 end..
7. Return to the parking brake actuator adjacent to the No.5 wheel and carry out the following:
 - 7.1 Locate the release line hydraulic pipe connection on the actuator. This is the pipe that is connected to the mid position on the actuator body.
 - 7.2 Thoroughly clean the pipe in the vicinity of its connection to the actuator and release the coupling nut adjacent to the connection nipple at the actuator. Remove the pipe and align it so that it can discharge into a clean container.

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Hydraulic Parking Brake – Bleed

BH 0310

- 7.3 Press the parking brake “OFF” pushbutton in the guard’s compartment to run the motor driven pump on the parking brake control unit. Check that hydraulic fluid flows from the disconnected pipe at the parking brake actuator. Observe the fluid coming from the pipe and, when it is evident that no bubbles of air are present in the fluid, stop the pump and immediately re-connect the pipe to the actuator.
8. Repeat step 7 on the other seven hydraulic parking brake actuators, moving progressively from the No.2 end of the vehicle to the No.1 end.
9. Return to the parking brake actuator adjacent to the No.5 wheel and carry out the following:
 - 9.1 On the actuator, remove the Wedgelock screw (see item 166 in Reference Documents item 1) and Sealing washer (see item 167 in Reference Documents item 1). Using a 4mm AF hex socket key, unscrew the stop screw (see item 169 in Reference Documents item 1) by two complete turns.
 - 9.2 Press the parking brake “ON” pushbutton in the conductor's compartment to run the motor driven pump on the parking brake control unit. Run the pump until no air bubbles are visible at the stop screw.
 - 9.3 Tighten the stop screw, renew the sealing washer and refit the Wedgelock screw.
10. Repeat step 9 on the other seven hydraulic parking brake actuators, moving progressively from the No.2 end of the vehicle to the No.1 end.
11. Proceed to the parking brake control unit in the van area.
12. Place a length of nylon tubing similar to that used at step 3 over the application line bleed nipple on the indicator block located at the top of the parking brake unit beneath the electrical control panel. The bleed nipple is at the left hand side of the indicator block. Place the other end of the tubing into a clean container.
13. Slacken off the bleed nipple by approximately half a turn and press the parking brake “ON” pushbutton. Check that hydraulic fluid flows through the nylon tubing. Observe the fluid and keep the pushbutton depressed until it is evident that there are no bubbles of air in the fluid flowing through the tube. When it is evident that no more air is present, stop the pump and immediately tighten the bleed nipple. Remove the nylon tubing.
14. Repeat steps 12 and 14 at the unlocking valve bleed nipple located at the rear of the indicator block.
15. Place the nylon tubing over the release line bleed nipple located on the right hand side of the indicator block.

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Hydraulic Parking Brake – Bleed


BH 0310

16. Slacken off the bleed nipple by approximately half a turn and press the parking brake “OFF” pushbutton. Check that hydraulic fluid flows through the nylon tubing. Observe the fluid and keep the pushbutton depressed until it is evident that there are no bubbles of air in the fluid flowing through the tube. When it is evident that no more air is present, stop the pump and immediately tighten the bleed nipple. Remove the nylon tubing.
17. Apply and release the parking brake three times and check all the pipe connections that have been disturbed during the bleeding procedures together with the bleed nipples. Check that there are no oil leaks.
18. With the parking brake released depress the parking brake “ON” pushbutton in the conductor's compartment and note the time from the pressing of the button to the parking brake indicator changing to “ON”. This time should not exceed 9 seconds.
19. Depress and release the parking brake “OFF” pushbutton and note the time from the pressing of the button to the parking brake indicator changing to “OFF”. This time should not exceed 4 seconds.

Arising Work

17. Rectify all leaks and retest.

NOTE 6: If it is necessary for any pipes to be disconnected, the bleeding procedure from the particular location must be repeated.

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Hydraulic Brake Pipework (Body Mounted) – Flush

BH 0316

Materials			
Item	Description	Qty/Veh	Cat No.
1	Shell Tellus T15	As Req'd	027/013279

Reference Documents		
Item	Document No.	Document Title
1	ISO 4406	Hydraulic Fluid Power – Fluids – Method for Coding the Level of Contamination by Solid Particles

APPLIES TO: BFO

NOTE 1: During disconnection and reconnection of any hydraulic hoses/components care must be taken to ensure that the open ends of the hoses/components are suitably protected at all times to prevent dirt, swarf or similar matter entering the vehicle hydraulic system.


NOTE 2: The flushing trolley shall meet the following minimum technical requirements:

- 2.5 micron filtration unit
- Sufficient velocity to cause turbulent flow in the pipes. Using Tellus T15 oil at 25°C, the minimum flow rate for a 9mm bore pipe is 45 litres/minute.

NOTE 3: Refer to the star chart in Section 3 for the correct order in which to carry out the parking brake jobs.

Scheduled Work

- Connect the output from the flushing trolley to the No. 2 (van) end application body-bogie flexible hose and a return pipe from the No. 2 (van) end release flexible hose to the flushing trolley.
- At the No. 1 bogie position connect the application and the release flexible hoses together using a suitable adaptor which shall allow unrestricted oil flow.
- Fit temporary oil tight plugs to the application and release pipes adjacent to the parking brake control unit location.
- Operate the flushing pump. Take samples of the oil, via the flushing unit return line sampling port, during the flushing process until an oil Cleanliness Code 15/13/10 or cleaner (see Reference Document item 1) has been achieved.
- Check that all connections are oil tight.
- Stop the flushing pump. Remove the temporary connection between the application and release flexible hoses. Check that the self sealing couplings close.
- At the parking brake control unit location remove the plugs and fit a temporary pipe connection between the application and release pipes.

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Hydraulic Brake Pipework (Body Mounted) – Flush

BH 0316

8. Operate the flushing pump. Take samples of the oil, via the flushing unit return line sampling port, during the flushing process until an oil Cleanliness Code 15/13/10 or cleaner (see Reference Documents item 1) has been achieved.
9. Check that all connections are oil tight.
10. Stop the flushing pump and disconnect the trolley. Remove the temporary pipe connection and immediately connect the pipework to the parking brake control unit.
11. Fill the parking brake control unit with clean Tellus T15 oil, (see Materials item 1) that has been pre-filtered to an oil Cleanliness Code 15/13/10 or cleaner (see Reference Documents item 1).
12. Operate the hand pump and the motor driven pump to prime both pumps.
13. With one pair of body-bogie application and release flexibles connected together with the adaptor, operate either pump to pressurise the application line.
14. Continue pumping until the oil returning to the reservoir via the release pipe is free of entrapped air.
15. As required fill the header tank to maintain the oil level with clean Tellus T15 oil, (see Materials item 1) that has been pre-filtered to an oil Cleanliness Code 15/13/10 or cleaner (see Reference Documents item 1).
16. Check for the presence of leaks including the couplings on the non connected flexible hoses.
17. When the oil returning to the reservoir is free of air, stop the pump and separate the connected application and release flexibles.
18. Connect together the other pair of flexibles and repeat the above bleeding process until the oil is free of air.
19. Top up the reservoir to the maximum level with clean Tellus T15 oil, (see Materials item 1) that has been pre-filtered to an oil Cleanliness Code 15/13/10 or cleaner (see Reference Documents item 1).
20. Separate the second pair of flexible hoses.
21. Drain the oil from the system. Dispose of in accordance with local depot and environmental procedures.
22. Fill the system with new oil. (see Materials item 1).
23. Repeat steps 1 to 20 and flush the system for a second time.
24. Fit temporary covers to all the couplings to prevent contamination.


Hydraulic Brake Pipework (Body Mounted) – Flush

BH 0316

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Arising Work

5,9,16 Renew defective couplings.
Rectify all other leaks and retest.

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Brake Equipment Module – Overhaul

BN 0100

Reference Drawings		
Item	Drawing No.	Title
1	DD85723/001	WSP Control Unit (Midland Mainline)
2	PB-C0-2101522	WSP Equipment and Flexible Conduit Arrangement
3	PB-C0-2101519	WSP Equipment Mounting Brackets Details
4	PB-C0-2101509	WSP Equipment Connection Box Modification Assemblies
5	PB-C1-2101512	WSP Control Unit Mounting Bracket Assembly
6	PB-C0-2101521	WSP Equipment and Suspension Brackets Arrangement
7	PB-C0-2101508	Cable Assemblies for WSP Equipment
8	PB-C0-2101511	Wiring Diagram for WSP Equipment, Westinghouse System
9	PB-C0-2101507	Flexible Harness Assemblies for WSP Equipment
10	PB-C0-2110703	Knorr Bremse WSP conduit and installation (ex BR vehicles) – sheet 1 of 2
11	PB-C0-2110723	Knorr Bremse WSP conduit and installation (ex BR vehicles) – sheet 2 of 2
12	PB-C0-2110704	Knorr Bremse WSP conduit and installation (ex Girling vehicles) – sheet 1 of 2
13	PB-C0-2110705	Knorr Bremse WSP conduit and installation (ex Girling vehicles) – sheet 2 of 2

Reference Documents		
Item	Document No.	Title
1	PB/CI2175	Component Overhaul Instruction Mk3 Coach Brake Module


APPLIES TO: Vehicles fitted with Brake Modules (see Section 5.9).

Scheduled Work

1. Disconnect the distributor release rod from fixed underskirt.
2. Disconnect air connections (electrical if fitted) and remove the module.
3. Blank off the ends of all exposed air pipes to exclude dirt.

NOTE 1: Distributors now have an overhaul periodicity of 9 years, as detailed in Interfleet letter report '20100907-LET-PLCL' (Assignment T25550).

4. Overhaul the module in accordance with the specified document (see Reference Documents item 1).
5. Refit the module and reconnect air and electrical connections.
6. Re-assemble the distributor release rods.
7. Test the operation of the distributor release from fixed underskirt side.

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Brake Equipment Module – Overhaul

BN 0100

Arising Work

7. Rectify defects.

NOTE 2: See Section 5.9 for a list of vehicles fitted with Westinghouse WSP equipment. The modules on these vehicles are not readily interchangeable with those fitted with BR WSP. (see Reference Drawings items 2 to 9) for drawings relevant to Westinghouse WSP.

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End Cocks and Hose Ends - Clean and Paint

BP 0077


Reference Documents		
Item	Document No.	Title
1	CR/PE0102	Repainting of Rail Vehicles

APPLIES TO: All Vehicles

Scheduled Work

NOTE: This job must be undertaken upon completion of Job No. BV 5320.

1. Prepare the surface and apply red paint as a colour code to the air brake pipe cocks including the handle and the air brake coupling head, in accordance with the specified document (see Reference Documents item 1).
2. Prepare the surface and apply yellow paint as a colour code to the main reservoir pipe cocks including the handle and the coupling head, in accordance with the specified document (see Reference Documents item 1).
3. In both jobs, check no damage occurs to the sealing washers valve seating and no particles of scale or rust are allowed to remain in the hoses fittings. Also check that the coupling head sealing washers star valves and cocks vent holes are free from paint contamination.

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Pipework and Fittings – Examine

BP 3003

Reference Documents		
Item	Document No.	Title
1	CR/PE0102	Repainting of Rail Vehicles

Reference Drawings		
Item	Drawing No.	Title
1	9040599	Pipe Colour Chart

APPLIES TO: All Vehicles

NOTE 1: This job addresses all pipework both inside and outside the fixed skirts except pipework within the Brake Module on vehicles fitted with a Brake Module (see Section 5.9).


Scheduled Work

1. Examine brake pipework and fittings.
2. Check saddles and clips for security.
3. Paint in accordance with the specified document (see Reference Documents item 1) and drawing (see Reference Drawings item 1).

NOTE 2: Test in accordance with Job Nos. BZ 3001 and BZ 3002.

Arising Work

1. Renew defective/damaged pipework unions and fittings.
2. Resecure or renew saddles and clips.

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Hoses, Body to Brake Module – Renew

BP 7204


Reference Drawings		
Item	Drawing No.	Title
1	C-A0-010276	Arrgt of Pipework & Flexible Connections Local to Brake Module

APPLIES TO: Vehicles fitted with Brake Modules (see Section 5.9).

Scheduled Work

1. Renew all body to Brake Module hoses (items 1 to 6) as shown on the specified drawing (see Reference Drawings item 1).

NOTE: Test in accordance with Job No. BZ 3001.

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Body to Bogie Hoses – Examine

BP 7205

Materials			
Item	Description	Qty/Veh	Cat No.
1	Aluminium Label	As Req'd	019/004168

Reference Drawings		
Item	Drawing No.	Title
1	M-A3-9005452	Bonded Seals

Reference Documents		
Item	Document No.	Title
1	MT106	Flexible Hose Assemblies for use on Traction and Rolling Stock

APPLIES TO: All Vehicles

NOTE 1: This job also applies to hydraulic hoses on BFO vehicles.

Scheduled Work

- Clean.
- Check that the date on the hose clip is less than 5 years old.
- Check that hoses are not cut, holed or frayed or in contact with any item of underframe equipment.
- Check that all hose connections and clamps are secure.
- Renew all 'O' rings and bonded seals on any pipe connection which is broken during the course of the repair.


NOTE 2: Fit only bonded seals as indicated (see Reference Drawings item 1).

Arising Work

- Renew all body/bogie hoses which are damaged, undated or more than 5 years old. Assemble new hoses in accordance with the specified document (see Reference Documents item 1).

Ensure that an aluminium label (see Materials item 1) stamped with the month and year of fitting and depot code number is affixed to each hose at the top end of the rubber portion such that the date is clearly visible.

- Resecure loose hose connections and clamps.

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Air Reservoir – Overhaul

BRA3004

Materials			
Item	Description	Qty/Veh	Cat No.
1	Arboseal Sealing Compound	As Req'd	028/022202

Reference Documents		
Item	Document No.	Title
1	PB/TP1487	Overhaul of Air Reservoirs
2	BR7	Painting Schedule for Interior Surfaces of Air Reservoirs
3	CR/PE0102	Repainting of Rail Vehicles

APPLIES TO: All Vehicles. These items are located in the Brake Module on vehicles that are fitted with a Brake Module (see Section 5.9).

Scheduled Work

Part 1 - Overhaul


1. Thoroughly clean the reservoir externally.
2. Examine the external surface of the reservoir paying particular attention to areas beneath the support straps and labels.
3. Clean the reservoir internally using an approved process. Recommended processes are steam cleaning alone or steam cleaning and the use of 'M' cleaner as detailed (see Reference Documents item 1).
4. Carry out an internal examination in accordance with the specified document (see Reference Documents item 1).
5. Check that the loss of wall thickness through corrosion does not exceed 1mm.
6. Test the reservoir in accordance with the specified document (see Reference Documents item 1) after completing the arising work.
7. Fit a metal label securely to a boss on the reservoir. The following information must be stamped or embossed on the label (see Section 6 for details of labels).

Overhaul/Test date

Location

Design Pressure

8. Paint the reservoir in accordance with the specified document (see Reference Documents item 2) for the interior and the specified document (see Reference Documents item 3) for the exterior. Fit temporary plugs to the opening until refitted to the vehicle.

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Air Reservoir – Overhaul

BRA3004

Arising Work

4. Carry out preparation of reservoir interior for repainting using acid washing or shot blasting, as required (see Reference Documents item 1).
4. Remove/refit reservoir ends as required (see Reference Documents item 1).
- 2,5. Renew reservoir if more than 1mm of wall thickness is lost.
6. Renew reservoir if it fails pressure test.

Part 2 - Refitting Reservoir to Vehicle


Scheduled Work

1. When the reservoir is fitted to a vehicle a strip of nitrile rubber measuring 600mm x 50mm x 5mm is to be inserted between each support strap and the external surface of the reservoir. Ensure that the rubber is fitted evenly around the straps and that there is no protrusion beyond the edges of the straps either at the sides or the areas where the straps and the reservoir separate.
2. Using a suitable applicator, apply Arboseal sealing compound (see Materials item 1), and completely seal all the joints between the support straps and the reservoir to prevent ingress of moisture, giving particular attention to the section at about the mid point of the reservoir where the straps and the reservoir separate.
3. Secure reservoirs in accordance with the following table.

Drawing	Components not Required on Reassembly	New Fasteners		Torque (Nm)
		Description	Cat. No.	
C-S-15885	Thin Nut	Nut M12 Grade 8	See Note 1 below	38
		Washer M12	003/190932	

NOTE: Refer to page 2 of Job No. U* 0105 for details of nuts.

4. Refit the automatic drain valve or drain cock.

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Auxiliary Reservoir – Examine

BR 3309

Reference Documents		
Item	Document No.	Title
1	CR/PE0102	Repainting of Rail Vehicles

APPLIES TO: All Vehicles. These items are located in the Brake Module on vehicles that are fitted with a Brake Module (see Section 5.9).

QUANTITY PER VEHICLE: 1


Scheduled Work

1. Read and record the date on reservoir the test label.
2. Examine the reservoir for corrosion. Pay particular attention to the area around and beneath the label.
3. Clean the mounting straps and mounting point on the underframe.
4. Check the areas between the reservoir and its support straps, in situ, for evidence of sealing compound.
5. Check that the nuts securing the straps to the underframe are secure and undamaged and there is no evidence of nut or washer movement.
6. Examine the fittings and support straps.
7. Paint in accordance with the specified document (see Reference Documents item 1).

NOTE: Carry out leakage test in accordance with Job No. BZ 3001.

Arising Work

- 1,3,4. If test date is more than 7 years ago, no test date is evident, no sealing compound is evident, or auxiliary reservoir is defective, change and overhaul the reservoir in accordance with Job No. BRA3004.
- 1,3,4. Renew a defective or out of date auxiliary reservoir which cannot be overhauled. A new reservoir to be fitted in accordance with Job No. BRA3004, Part 2.
5. Remove the reservoir and refit in accordance with Job No. BRA3004 Part 2.
6. Repair defective fittings and straps.

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Brake Pipe Limiting Valve – Change

BV 0129

Materials			
Item	Description	Qty/Veh	Cat No.
1	Valve Limiting Check Assembly	1	064/071452
2	SMC Type ARP40K-F04-3 Pressure Regulator	1	070/070926
3	Washer Sealing ½" Steel	1	008/151553
4	Loctite 542 Sealant	As Req'd	007/060301

Reference Drawings		
Item	Drawing No.	Title
1	VT-C1-2506582	Brake Pressure Limiting Valve Installation (Typical)

Reference Documents		
Item	Document No.	Title
1	PB/MP1771	Mk3 Coaching Stock Vehicles Removal of Check Valve from Brake Pipe Pressure Limiting Valve Assembly
2	PB/MP1993	Mk3 Vehicles Removal of Check Valve from Brake Pipe Pressure Limiting Valve
3	ITL/MP0518	Fitting Replacement Brake Pipe Pressure Limiting Valves to Mk3 Sleeping Cars

APPLIES TO: LHCS Vehicles where fitted. These items are located in the Brake Module on vehicles that are fitted with a Brake Module (see Section 5.9).


NOTE 1: If directed by the Engineer, these valves must be isolated and decommissioned in accordance with the specified document (see Reference Documents item 1) or removed and pipework installed in accordance with the specified document (see Reference Documents item 2).

NOTE 2: Some vehicles have had the original Brake Pipe Limit Valve and Check Valve removed and have been modified by fitting a SMC ARP40K-F04-3 Brake Pipe Limit Valve (see Figure 1) in accordance with the specified document (see Reference Documents item 3). This may be recognised by the absence of a separate check valve. This valve can either be overhauled in accordance with a procedure agreed with the Engineer or renewed in accordance with Part 2 of this job.

Scheduled Work

Part 1 – Original Design BPLV and Check Valve Assembly

1. Renew the BPLV and check valve assembly (see Materials item 1). For additional details refer to the specified Drawing and Figure (see Reference Drawings item 1 and Figure 1).
2. Test the assembly in accordance with Job No. BV 0137.

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Brake Pipe Limiting Valve – Change

BV 0129

Part 2 – Modified Design BPLV Assembly

1. Release the coupling nuts on the vehicle pipework that retain the pressure regulator (BPLV) assembly onto the vehicle and remove the assembly.
2. Remove the fittings from either side of the pressure regulator (BPLV) assembly that has been removed and retain.
3. Obtain a new type ARP40K-F04-3 pressure regulating valve (see Materials item 2) .
4. Identify the air flow directional arrow on the regulator valve body and with the valve secured in a soft jawed vice, screw adaptor/reducer assemblies into the outlet port of the valve using a new ½" sealing washer (see Materials item 3).
5. Apply Loctite 542 sealant (see Materials item 4) to the threads of the pipe assembly end that fits in the inlet port and screw this end of the tube into the inlet port on the regulating valve. Do not screw the pipe into the valve by more than 15 to 18 mm.
6. Ensure that the directional arrow on the pressure regulating valve is pointing towards the vehicle distributor and fit the completed pressure regulator (BPLV) assembly onto the vehicle and secure it by means of the coupling nuts on the vehicle pipework. The regulator should be orientated so that the test plug on the regulator body is readily accessible.
7. Test the assembly in accordance with Job No. BV 0137.

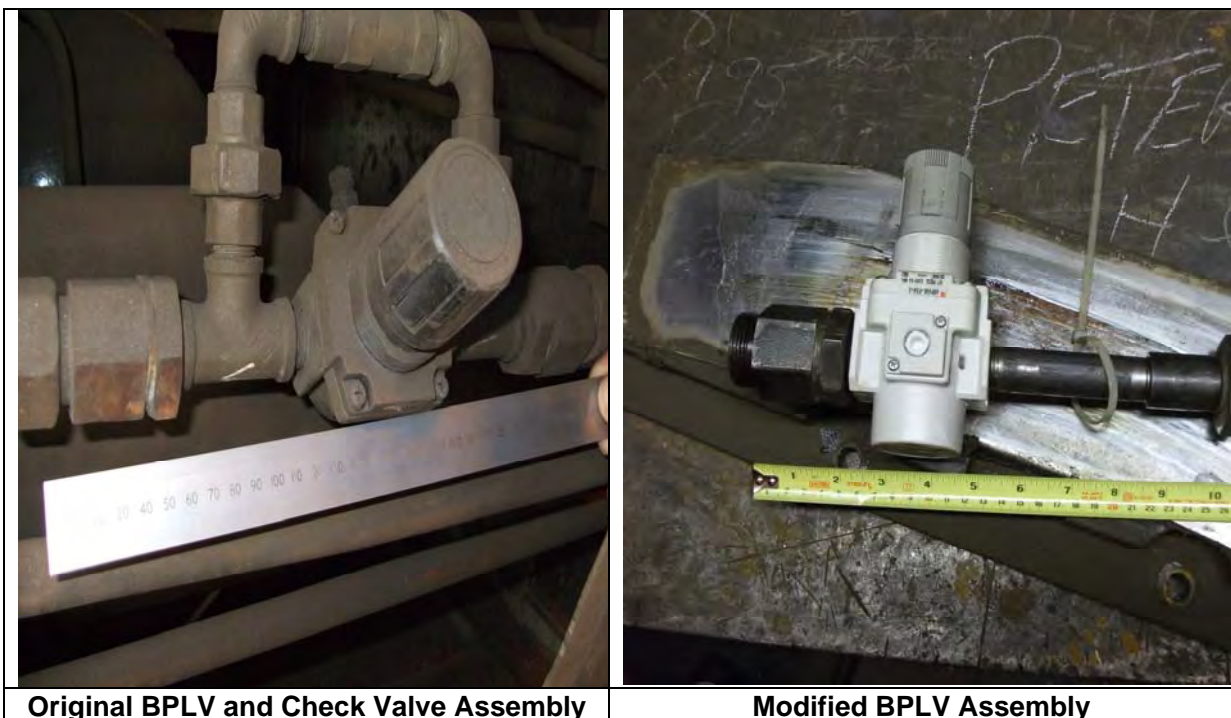



Figure 1: Original and Modified BPLV Arrangements

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Brake Pipe Limiting Valve - Test

BV 0137

Reference Documents		
Item	Document No.	Title
1	PB/MP1771	Mk3 Coaching Stock Vehicles Removal of Check Valve from Brake Pipe Pressure Limiting Valve Assembly
2	PB/MP1993	Mk3 Vehicles Removal of Check Valve from Brake Pipe Pressure Limiting Valve

APPLIES TO: LHCS Vehicles where fitted. These items are located in the Brake Module on vehicles that are fitted with a Brake Module (see Section 5.9).

NOTE 1: If directed by the Engineer, these valves must be isolated and decommissioned in accordance with the specified document (see Reference Documents item 1) or removed and pipework installed in accordance with the specified document (see Reference Documents item 2).

NOTE 2: Some vehicles have had the original Brake Pipe Limit Valve and Check Valve removed and have been modified by fitting a SMC ARP40K-F04-3 Brake Pipe Limit Valve (see Job No. BV 0129). This valve is tested in accordance with Part 2 of this job.


Scheduled Work

NOTE 3: A brake test trolley is required for this job.

NOTE 4: Record the results on the form provided, (see Section 5 for both the original arrangement and for the modified arrangement).

Part 1 – Testing the Original Design BPLV and Check Valve Assembly

- After ensuring that no air pressure is present on the valve, remove the grub screw from the pressure test point on the side of the regulating valve body opposite to where the sensitivity choke is located and attach a suitable gauge connection and a test gauge or electronic pressure measuring device to the test point.
- Attach an air brake test trolley to the vehicle and charge the main reservoir pipe to 85 to 100 psi (5.90 to 7.00 bar) and by moving the brake valve handle to the RUNNING position, charge the brake pipe to 72 to 73 psi (4.95 to 5.05 bar).
- Check that air is discharging from the porous matrix at the end of the sensitivity choke.
- Move the test trolley brake valve handle to a position between INITIAL and FULL SERVICE and, when the brake pipe pressure has stabilised, back to the RUNNING position. When the brake pipe pressure has again stabilised, move the valve handle to the RELEASE position and check that the brake pipe pressure rises to 77.5 to 79.5 psi (5.35 to 5.50 bar).

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Brake Pipe Limiting Valve - Test


BV 0137

5. Record the pressure on the test gauge which must be between 72.5 to 73.5 psi (5.00 to 5.10 bar). If the pressure is between 72.5 to 73.5 psi (5.00 to 5.10 bar), repeat items 4 and 5 twice and check that each time when the test trolley brake valve handle is moved back to the RELEASE position, the test gauge indicates a pressure of 72.5 to 73.5 psi (5.00 to 5.10 bar).
6. Move the test trolley brake valve handle to the EMERGENCY position and check that the brake pipe pressure falls to zero.
7. Detach the test gauge and pipe connections from the valve body and refit the grub screw into the pressure test point on the valve body, ensuring it is properly secured.
8. Pull the distributor release valve handle on the vehicle and check that air is exhausted from the distributor control chamber.
9. Move the test trolley brake valve handle to the RUNNING position and check that no air leaks are present at the grub screw fitted to the valve test point.
10. Wait four minutes and move the brake valve handle to the INITIAL position. Check that the brake applies and that all the brake pads are applied firmly to the discs.
11. Move the brake valve handle to the RUNNING position and then, when the brake pipe pressure has stabilised, move the handle to the RELEASE position.
12. After 30 seconds, move the brake valve handle to a position mid-way between the INITIAL and FULL SERVICE positions and, when the brake pipe pressure has stabilised, move the handle back to the RUNNING position.
13. Check that the brake releases and that all brake pads are free from the discs.
14. Move the test trolley brake valve handle to the EMERGENCY position and check that the brake pipe pressure falls to zero.

Arising Work

3. If air is not discharging, examine the porous matrix. Clean if blocked.
4. Attempt to tighten any leaking pipe connections. If unsuccessful, change the valve in accordance with Job No. BV 0129.

If the valve is leaking from other than the porous matrix, change the valve in accordance with Job No. BV 0129.
5. If the pressure is outside these limits, change the valve in accordance with Job No. BV 0129.
10. If the brakes fail to apply, change the valve in accordance with Job No. BV 0129.

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Brake Pipe Limiting Valve - Test

BV 0137

13. If the brakes fail to release, change the valve in accordance with Job No. BV 0129.


Part 2 – Testing the Modified Design BPLV Assembly

NOTE 5: Throughout the following tests, check that brake pads are applied or released to the brake discs accordingly.

1. Check that no air pressure is present on the valve.
2. Unscrew and remove the test plug from the body of the pressure regulator and insert a suitable test gauge.
3. Pull back the locking cap on the pressure regulator and, if possible, rotate the cap by two full turns in an anti-clockwise direction.
4. Charge the main reservoir pipe on the vehicle to 6.95 to 7.05 bar and the brake pipe to 4.90 to 5.10 bar. Check that there are no air leaks from any of the pipework that has been disturbed around the BPLV. Rectify any leaks as appropriate.
5. Check that the pressure indicated on the test gauge is less than 4.50 bar. If the gauge indicates a pressure greater than 4.50 bar rotate the locking cap/adjuster on the regulator in an anti-clockwise direction until the gauge pressure falls below this figure.
6. Increase the brake pipe pressure to 5.35 to 5.50 bar.
7. Rotate the adjuster on the pressure regulator slowly in a clockwise direction and check that the pressure on the test gauge begins to increase. As the pressure rises above 4.70 bar, pause occasionally to allow the test gauge pressure to stabilise. Continue to rotate the adjuster until the pressure indicated on the test gauge is exactly 5.05 bar. If the pressure rises above this figure turn the adjuster in an anti-clockwise direction to reduce the test gauge pressure to 4.7 bar or less and then increase the pressure again. It is important that the output pressure from the regulator is set on rising input pressure. Check that there are no air leaks from any of the pipework that has been disturbed around the BPLV.
8. When a test gauge pressure of 5.05 bar has been attained reduce the brake pipe pressure to 3.40 to 3.50 bar and check that the brake cylinder pressure on the vehicle rises to 3.25 to 3.45 bar.
9. Increase the brake pipe pressure to 4.90 to 5.10 bar and check that the pressure as indicated on the test gauge rises to at least 4.85 bar and the brake cylinder pressure on the vehicle falls to zero.
10. Increase the brake pipe pressure to 5.35 to 5.50 bar and check that the test gauge pressure does not rise above 5.10 bar.

Brake Pipe Limiting Valve - Test

BV 0137

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11. Push back the locking cap on the pressure regulator until it clicks into place and check that the test gauge pressure remains unchanged.
12. Reduce the brake pipe pressure to 3.40 to 3.50 bar and check that the brake cylinder pressure on the vehicle rises to 3.25 to 3.45 bar.
13. Increase the brake pipe pressure to 4.90 to 5.10 bar and check that the pressure as indicated on the test gauge rises to at least 4.85 bar and the brake cylinder pressure on the vehicle falls to zero.
14. Reduce the brake pipe pressure to zero and unscrew and remove the test gauge connection from the regulating valve. Refit the blanking plug to the regulating valve test point connection.
15. Increase the brake pipe pressure to 4.90 to 5.10 bar and check that no air escapes from the test point blanking plug.
16. Apply a coat of white gloss paint to the steel tube and pipe socket that form part of the BPLV assembly to prevent corrosion.
17. If no other jobs need to be performed, refit panel F to the Brake Module.

Arising Work

4,7 Attempt to tighten any leaking pipe connections. If unsuccessful, change the valve in
15 accordance with Job No. BV 0129.

4 -15 If the pressure is outside these limits, change the valve in accordance with Job No.
BV 0129.

If brakes fail to apply or release, change the valve in accordance with Job No. BV 0129.

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Brake Auto Drain Valve – Change

BV 0330

Reference Documents		
Item	Document No.	Title
1	PB/CI2175	Component Overhaul Instruction Mk3 Coach Brake Module

APPLIES TO: All Vehicles. These items are located in the Brake Module on vehicles that are fitted with a Brake Module (see Section 5.9).


QUANTITY PER VEHICLE: 2

Scheduled Work

1. Change auto drain valves.
2. Overhaul in accordance with the specified document (see Reference Documents item 1, Job No. AI 0050).

Arising Work

2. Renew valves which cannot be overhauled.

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Strainer, Check Valve and Choke – Change

BV 3106

Reference Documents		
Item	Document No.	Title
1	PB/CI2175	Component Overhaul Instruction Mk3 Coach Brake Module

APPLIES TO: All Vehicles. These items are located in the Brake Module on vehicles that are fitted with a Brake Module (see Section 5.9).

QUANTITY PER VEHICLE: 2


Scheduled Work

1. Change.
2. Overhaul in accordance with the specified document (see Reference Documents item 1, Job No. BV 4310).

NOTE: Carry out a leakage test in accordance with Job No. BZ 3001.

Arising Work

2. Renew a defective strainer, check valve and choke which cannot be overhauled.

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Guards Application Valve – Test

BV 3110

APPLIES TO: BFO (In Conductors Compartment)

QUANTITY PER VEHICLE: 1

NOTE 1: The vehicle must be connected to an air supply with 5 bar registered in the brake pipe before the test is carried out.

NOTE 2: Record the results on form provided, (see Section 5).


Scheduled Work

1. With the brake pipe charged to 5 bar, operate the guard's application valve in the Conductors Compartment.
2. Check that the brake pipe pressure falls rapidly to zero (maximum allowable pressure 0.5 bar).
3. Return the valve to the normal position and check that the brake pipe pressure is restored to 5 bar.

Arising Work

- 2,3. Renew a defective Guards Application Valve.

NOTE 3: A leakage test is carried out in Job No. BZ 3001.

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Air System Schrader Test Connectors – Examine

BV 3111

APPLIES TO: All Vehicles. These items are located in the Brake Module on vehicles that are fitted with a Brake Module (see Section 5.9).

NOTE: Record the results on the form provided, (see Section 5).

This job is in two parts:

Part 1 Applies to Mark 3B vehicles and must be carried out prior to the brake test BZ 3001.

Part 2 Applies to all vehicles and must be done at the conclusion of all the brake tests.

Scheduled Work

Part 1 Applies to Mark 3B


- 1.1 Examine the cover, checking that the rubber sealing washer is fitted.
- 1.2 Check that the cover pivots freely and that it closes under action of spring.
- 1.3 Trial fit a Schrader test probe.

Part 2 Applies to All Vehicles

- 2.1 Remove the test probes from Schrader test connectors.
- 2.2 Apply the vehicle brakes.
- 2.3 Apply a soap solution to test connectors and check for inflating bubbles.
- 2.4 Vent the brake pipe, main reservoir, auxiliary reservoir and operate distributor release handle to vent cylinder pressure.
- 2.5 Remove all the remaining test equipment.

Arising Work

- 1.1 Renew the rubber washer.
- 1.1 Renew the cover complete.
- 1.2 Lubricate a stiff pivot with oil and operate until free.
- 1.2 Renew a defective spring.
- 1.3 Renew the Schrader connector.
- 2.3

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Strainer Check Valve and Choke – Examine

BV 3305

Reference Documents		
Item	Document No.	Title
1	PB/CI2175	Component Overhaul Instruction Mk3 Coach Brake Module

APPLIES TO: All Vehicles. These items are located in the Brake Module on vehicles that are fitted with a Brake Module (see Section 5.9).

NOTE 1: There are two of these valves per vehicle. The one associated with the air suspension is a Westinghouse, to which Part 1 applies.
The other valve is associated with the auxiliary reservoir system, and could be a D&M valve, see Part 2, or a Westinghouse. Refer to Section 5.9 for types of vehicles.


Scheduled Work

Part 1 - Westinghouse Part No. J75555/1 or 9

The valve is identified by the number 2-32. This indicates a pressure differential of 0.2 bar and a choke size of 3.2mm.

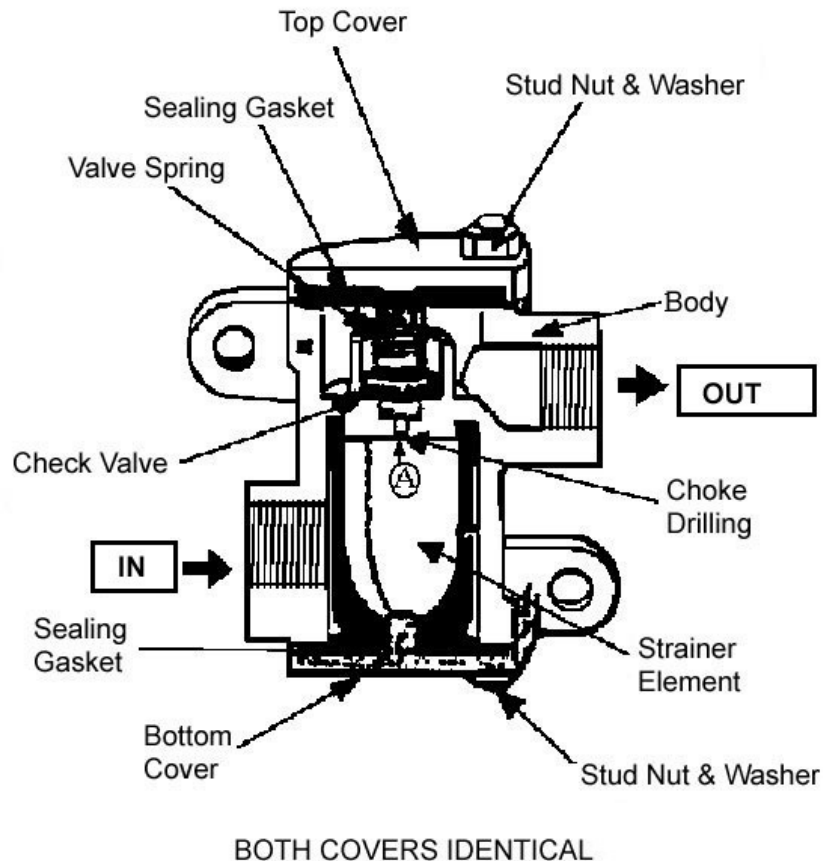
The numbers in brackets refer to the item numbers in Figure 1.

- 1.1 Examine.
- 1.2 Remove the nut and washers (7) and remove bottom cover (6).
Remove the cover sealing gasket (5) from the bottom cover (6).
- 1.3 Take out the strainer element and examine.

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Strainer Check Valve and Choke – Examine


BV 3305



**Figure 1: Strainer, Check Valve and Choke Unit
Westinghouse Part No. J75555/9**

- 1.4 Wipe clean the inside of cover (6).
Clean the strainer element (2) by applying air pressure in the reverse direction to the normal air flow.
Clean out the body and check that the choke drilling is clear. Soft stranded wire may be passed through the choke drilling for cleaning purposes but wire which may tend to increase the size of the way through must **not** be used.
- 1.5 Refit the strainer and cover using new sealing gaskets (5).

NOTE 2: Test in accordance with Job Nos. BZ 3001-2.

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Strainer Check Valve and Choke – Examine

BV 3305

Arising Work

- 1.1 Remove a defective valve. Overhaul in accordance with the specified document (see Reference Documents item 1), Job No. BV 4310 and refit.
- 1.3 Renew defective items.

Part 2 - Davies and Metcalfe Part No. AB 542-OV2

Scheduled Work


Figures in brackets refer to items in Figure 2.

- 2.1 Examine.
- 2.2 Release the screw cap (6) and remove the Dowty seal (7) and strainer (8). Scrap the seal.
- 2.3 Examine the strainer (8).
- 2.4 Clean the strainer (8) by shaking it and directing a jet of air onto the outside of the strainer, to flow in the opposite direction to normal.
- 2.5 Place the strainer (8) on the screw cap (6), renew the Dowty seal (7) and screw into the body (1).

NOTE 3: Test in accordance with Job Nos. BZ 3001-2.

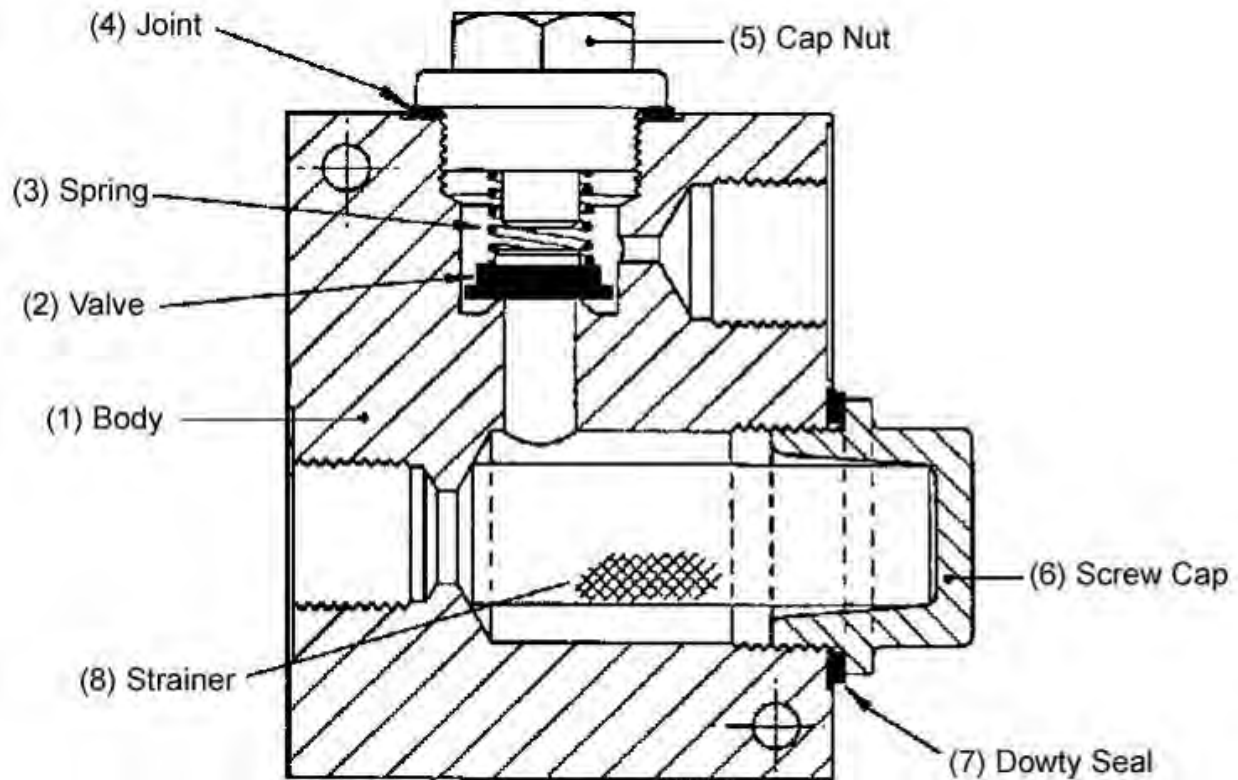
Arising Work

- 2.1 Remove the defective valve. Overhaul in accordance with the specified document (see Reference Documents item 1, Job No. BV 4310).
- 2.2 Renew the strainer if damaged, oily or if it cannot be cleaned economically.


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Strainer Check Valve and Choke – Examine

BV 3305



**Figure 2: Strainer Check Valve and Choke Limit
Davies and Metcalfe Part No. AB542-OV2**

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Averaging Relay Valve – Overhaul

BV 3320

Reference Drawings		
Item	Drawing No.	Title
1	A1-A1-9024549	Schematic Diagram of Pneumatic Brakes and Suspension Equipment for MK3B

Reference Documents		
Item	Document No.	Title
1	PB/CI2175	Component Overhaul Instruction Mk3 Coach Brake Module

APPLIES TO: All Vehicles. These items are located in the Brake Module on vehicles that are fitted with a Brake Module (see Section 5.9).


QUANTITY PER VEHICLE: 1

Scheduled Work

1. Remove the averaging relay valve (item 11 on brake schematic, Reference Drawings item 1).
2. Overhaul and test the valve in accordance with Reference Documents item 1, Job No. BV 3320.
3. Refit to the vehicle.

Arising Work

2. See Reference Documents item 1, Job No. BV 3320.

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Main Reservoir Isolating Cock – Examine

BV 4284

Materials			
Item	Description	Qty/Veh	Cat No.
1	Reservoir Isolating Cock	As Req'd	073/002157 or equivalent

Reference Documents		
Item	Document No.	Title
1	CR/PE0102	Repainting of Rail Vehicles

APPLIES TO: All Vehicles. These items are located in the Brake Module on vehicles that are fitted with a Brake Module (see Section 5.9).


Scheduled Work

1. Examine for defects and damage.
2. Check for freedom of operation.
3. Paint in accordance with the specified document (see Reference Documents item 1).
4. Check that the cock is sealed in the open position.

NOTE: Test in accordance with Job No. BZ 3001.

Arising Work

- 1,2. Change defective main reservoir isolating cock (see Materials item 1) for replacement.

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Air Coupling Cocks and Hoses – Test

BV 5320

Materials			
Item	Description	Qty/Veh	Cat No.
1	Loctite Jointing Paste	As Req'd	007/060327
2	Hose Assembly, MRP (Mark 3A, 3B and RFM) 635mm	As Req'd	070/009642
3	Hose Assembly, ABP (Mark 3A, 3B and RFM) 660mm	As Req'd	070/005751
4	Hose Assembly, MRP (HST) 455mm	As Req'd	070/014261
5	Hose Assembly, ABP (HST) 530mm	As Req'd	070/014262
6	Hose Assembly, MRP, Spiroband Wrapped (HST) 455mm	As Req'd	070/070942
7	Hose Assembly, ABP, Spiroband Wrapped (HST) 530mm	As Req'd	070/070943
8	Hose Assembly, MRP, Nylon Reinforced (HST) 455mm	As Req'd	070/070952
9	Hose Assembly, ABP, Nylon Reinforced (HST) 530mm	As Req'd	070/070953
10	Aluminium Label	As Req'd	019/004168
11	Coupling Cock, Westinghouse Lockable Type (RH)	As Req'd	070/022016
12	Coupling Cock, Westinghouse Lockable Type (LH)	As Req'd	070/022017

Reference Documents		
Item	Document No.	Title
1	IB/C10265	Component Overhaul Instruction: Inter-vehicle Air Brake Hoses


APPLIES TO: All Vehicles

NOTE 1: A certificated test trolley, as per Job No. BZ 3001, is to be used for this job.

NOTE 2: Record the results on the form provided, (see Section 5).

Scheduled Work

- Examine the coupling cocks for damage and defects. Refer to Figure 2 which shows what type of cock is fitted in each position.
- Ensure that the coupling cocks are of the lockable type with trigger release. During the tests check that the locks operate correctly.
- Examine the main reservoir hoses and the brake pipe hoses.
- Check that the dates of fitting to the vehicle stamped on the main reservoir and brake pipe hose date tags are not more than 5 years old.
- Test the main reservoir pipe coupling cocks and hoses as follows:
 - Charge the main reservoir pipe to 7 bar from a test trolley. Check that no air escapes from the coupling heads.

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Air Coupling Cocks and Hoses – Test

BV 5320

- 5.2 Fit blanking pieces to the coupling head(s) at the remote end. Open the coupling cock(s). Check that no air escapes from the coupling head(s) of the vehicle.
- 5.3 Close the coupling cock(s) at the remote end and check that the air in the hose is vented via the hole in the cock body.
- 5.4 Remove the blanking pieces from coupling head(s) and re-open the coupling cock(s). Check that no air escapes from the coupling head star valve.
- 5.5 Close the coupling cock(s). Fit loose coupling head(s) to the hoses thereby opening the star valves. Check that no air escapes from the cock(s) or from the open end of the coupling head(s). Remove the loose coupling heads.
- 5.6 Close the test trolley main reservoir pipe isolating cock.
- 5.7 Close the main reservoir pipe coupling cock at the end of the vehicle which is attached to the test trolley and check that the air in the hose is vented via the hole in the cock body.
- 5.8 Uncouple the main reservoir pipe between the vehicle and the test trolley and re-open the coupling cock on the vehicle. Check that no air escapes from the coupling head star valve.
- 5.9 Close the coupling cock again and fit the loose coupling head to the coupling head on the pipe and check that no air escapes from the coupling cock or from the open end of the coupling head. Remove the loose coupling head.

HST Vehicles only

- 5.10 Couple the test trolley main reservoir pipe to the hose on the opposite side of the vehicle. Open the test trolley main reservoir pipe isolating cock and the corresponding coupling cock on the vehicle and allow the system to charge. Check no air escapes from the coupling heads.
- 5.11 Close the test trolley main reservoir pipe isolating cock.
- 5.12 Close the main reservoir pipe coupling cock at the end of the vehicle which is attached to the test trolley and check that the air in the hose is vented via the hole in the cock body.
- 5.13 Uncouple the main reservoir pipe between the vehicle and the test trolley and re-open the coupling cock on the vehicle. Check that no air escapes from the coupling head star valve.
- 5.14 Close the coupling cock again and fit the loose coupling head to the coupling head on the pipe and check that no air escapes from the coupling cock or from the open end of the coupling head. Remove the loose coupling head.

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Air Coupling Cocks and Hoses – Test

BV 5320

6. Test ABP coupling cocks and hoses as follows:

- 6.1 Charge the ABP to 5 bar from a test trolley. Check no air escapes from the coupling head.
- 6.2 Fit blanking pieces to the coupling head(s) at the remote end. Open the coupling cock(s). Check that no air escapes from the coupling heads.
- 6.3 Close the coupling cock(s) and check that the air in the hose is vented via the hole in the cock.
- 6.4 Remove the blanking pieces from the coupling head(s) and check that no air escapes from the coupling cock or the open coupling head.
- 6.5 Close the test trolley air brake pipe isolating cock.
- 6.6 Close the air brake pipe coupling cock at the end of the vehicle which is attached to the test trolley and check that the air in the hose is vented via the hole in the cock body.
- 6.7 Uncouple the air brake pipe between the vehicle and the test trolley and check that no air escapes from the coupling cock or the open coupling head on the hose.

HST Vehicles only

- 6.8 Couple the test trolley air brake pipe to the hose on the opposite side of the vehicle. Open the test trolley air brake pipe isolating cock and the corresponding coupling cock on the vehicle and allow the system to charge. Check no air escapes from the coupling head.
- 6.9 Close the test trolley air brake pipe isolating cock.
- 6.10 Close the corresponding air brake pipe coupling cock and check that the air in the hose is vented via the hole in the cock body.
- 6.11 Remove the blanking piece from the coupling head and check that no air escapes from the coupling cock or the open coupling head on the hose.


Arising Work

1. Change defective coupling cocks as follows:

- a) Remove the air brake hose pipe from the defective coupling cock.
- b) Remove a defective coupling cock from headstock air pipe connection.
- c) Remove any existing PTFE tape or any other type of jointing compound from threads on headstock air pipe connection and apply Loctite jointing paste (see Materials item 1) to threads.

Air Coupling Cocks and Hoses – Test

BV 5320

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- d) Ensure protective covers/dust caps are removed from the replacement cock (see Materials item 11 or 12) and check that there are no potential obstructions. Screw onto headstock air pipe connection.

NOTE 3: Ensure 'lockable' coupling cocks are used when replacing defective brake pipe coupling cocks.

- e) Remove any existing PTFE tape or any other type of jointing compound from the male thread on the air hose. Hold the hose to be fitted up to the light and check that the pipe is free from any obstructions. Apply Loctite jointing paste (see Materials item 1) to threads.
- f) Screw hose into coupling cock until it 'bottoms'.
- g) Unscrew the hose connection where necessary to obtain the correct angle at the outer end of the hose to enable the coupling heads to be easily mated.
- h) Lock the hose connection in this position using the locknut on the cock.
- i) Any new hose that is fitted must have an aluminium label (see Materials item 10) stamped with the month and year of fitting and location code, fitted at the top end of the rubber portion so that the details show to the front.

2. Change a non-lockable type coupling cock for a lockable type coupling cock (see Materials item 11 or 12) (see Figure 1 to confirm hand of each coupling cock and Figure 2 for hand of coupling cock fitted at each position).

- 3,4,5.1,5.2 } Change main reservoir hose assembly:
5.4,5.8 } (see Materials item 2 for Mark 3A, 3B and RFM).
5.10,5.13 } (see Materials item 4, 6 or 8 for HST (see NOTE 4 below)).


NOTE 4: Consult the Engineer to confirm which type of MRP hose must be fitted.

- 3,4,6.1 } Change sealing washer or brake pipe hose assembly:
6.2,6.8 } (see Materials item 3 for Mark 3A, 3B and RFM).
} (see Materials item 5, 7 or 9 for HST (see NOTE 5 below)).

NOTE 5: Consult the Engineer to confirm which type of ABP hose must be fitted.

NOTE 6: The maximum storage life allowed for air hoses in a cool dark place before being fitted to a vehicle is 5 years.

NOTE 7: Hose assemblies to be overhauled in accordance with the specified document (see Reference Documents item 1).

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Air Coupling Cocks and Hoses – Test

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Figure 1: Identification of Coupling Cocks

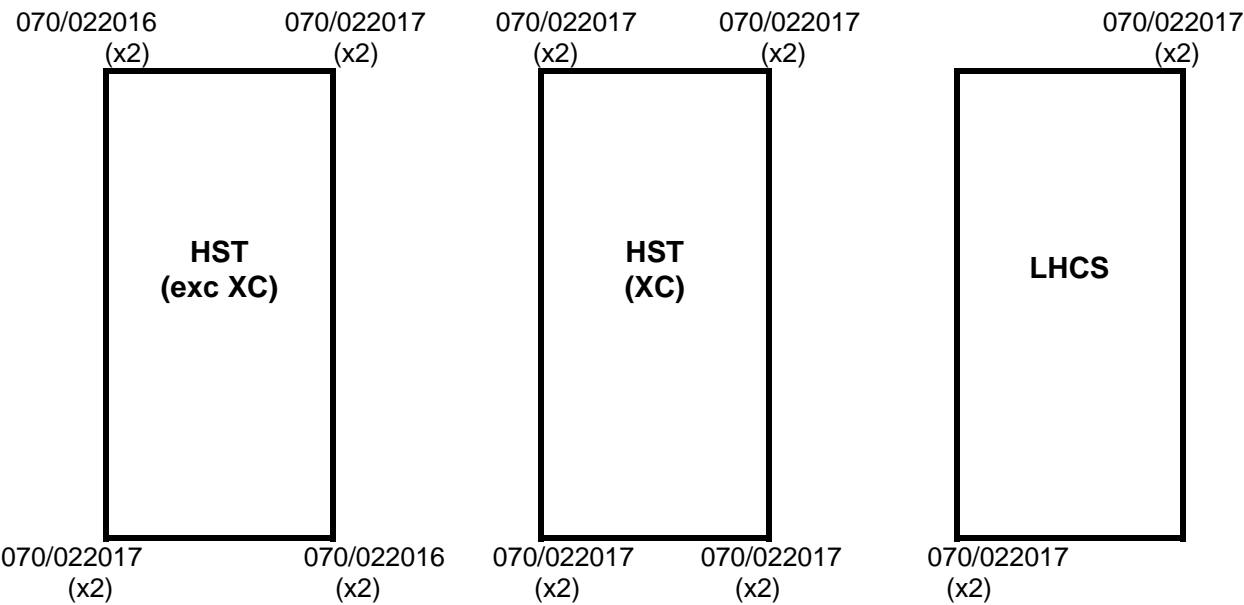



Figure 2: Location of Coupling Cocks

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Air and Brake System (Part 1) – Test

BZ 3001

Reference Documents		
Item	Document No.	Title
1	BS 837-1	Pressure Gauges. Bourdon Tube Pressure Gauges. Dimensions, Metrology, Requirements and Testing

APPLIES TO: All Vehicles

RECORD THE RESULTS ON THE FORM PROVIDED, (SEE SECTION 5 - EQUIPMENT REQUIRED):

- i. Calibrated air pressure test gauges, 0 to 10 bar. Either Bourdon Tube type gauges which conform to BS 837-1, accurate to 0.03 bar at 5 bar, or an approved type of digital pressure gauge may be used. Five gauges will be required.
- ii. A certified air brake test trolley of an approved type incorporating a standard driver's air brake valve capable of regulating the air brake pipe pressure. The standard BR trolley which incorporates a Westinghouse M6AT is preferred but alternatives may be considered.

The principle performance features are:

- a. Stable and accurate pressures in RELEASE, RUNNING, INITIAL and FULL SERVICE.
- b. Correct bleed down rate from RELEASE to RUNNING (at the Test Valve rate, not the standard locomotive rate).
- c. Air flow restriction in the RUNNING position.


The trolley must have an in date calibration certificate.

The trolley must be supplied with dry clean air at a pressure of 7 bar ± 0.4 bar. If the local air supply does not meet these requirements a filter/water separator/pressure regulator must be fitted in the air supply to the trolley.

The Mark 3 LHCS vehicles are to be tested using a brake valve with a RUNNING brake pipe pressure of nominally 5.0 bar (4.95 to 5.05 bar).

The Mark 3 HST vehicles are to be tested using a brake valve with a RUNNING brake pipe pressure of nominally 5.1 bar (5.05 to 5.15 bar).

- iii. A calibrated stop watch.
- iv. Brake pipe coupling heads, for air brake pipe and main reservoir pipe, with passages which are blanked off but are provided with through gauge connections.
- v. A main reservoir pipe coupling head.
- vi. Suitable hardware for making gauge connections.

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Air and Brake System (Part 1) – Test

BZ 3001

Scheduled Work

- On all vehicles check that the air suspension is deflated. On BFO vehicles check that the parking brake indicator on the hydraulic pump unit shows OFF, see Job No. BH 0310.
- Fit test gauges to the following positions:

Brake cylinder pressure test point.

Air suspension pressure test point.

Air brake pipe (fit to a blanked off coupling head to go at the end of the vehicle not connected to the test trolley).

Main reservoir pipe (fit to a blanked off coupling head to go at the end of the vehicle not connected to the test trolley).


Auxiliary reservoir (fit to the drain plug boss after first draining and clearing any debris. If the reservoir is not fitted with a separate boss or is fitted with an auto drain valve, it will be necessary to fit a temporary tee piece to accommodate both a vent cock and a test gauge connection).
- Couple the air brake test trolley to the air brake pipe and main reservoir pipe headstock hoses at one end of the vehicle. Ensure the trolley isolating cocks on both the air brake pipe and main reservoir pipe are closed.

Open the vehicle coupling cocks at the end connected to the test trolley.

Note that the test trolley has positions referred to as RELEASE, RUNNING, INITIAL, FULL SERVICE and EMERGENCY.

The normal position to take the brake off is the RUNNING position. Do not use the RELEASE position unless specifically called for in the test procedure.

When making brake applications, the brake valve handle must be moved quickly and directly between the RUNNING and INITIAL positions.

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Air and Brake System (Part 1) – Test


BZ 3001

4. Ensure the gauges fitted to both the air brake pipe and the main reservoir pipe headstock hoses are at the other end of the vehicle and the coupling cocks are open.
5. Ensure that the distributor isolating handle (ICD) is in the vertical (non-isolated) position and that the main reservoir pipe isolating cock (ICR; main reservoir pipe to auxiliary reservoir supply) is closed.
6. Close the two air suspension isolating cocks.
7. On HST vehicles with duplicated air brake pipe and main reservoir pipe hoses, close the cocks on the hoses which are not connected to the test trolley or fitted with blanking couplings and gauges.

The following sequence must be followed.

8. Air Suspension Charging Valve/Averaging Valve Check

- 8.1 Remove the air suspension reservoir automatic drain valve. Clear any debris.
- 8.2 Open the main reservoir pipe cock on the test trolley and when the pressure reaches 5.80 to 6.30 bar, check that air escapes from the air suspension reservoir, indicating that the charging valve has opened.
- 8.3 Reduce the pressure in the main reservoir pipe and check that, when the pressure has fallen to 5.0 bar, no air escapes from the air suspension reservoir, indicating that the charging valve has closed.
- 8.4 Close the main reservoir isolating cock on the test trolley. Refit the automatic drain valve to the air suspension reservoir.
- 8.5 Open the main reservoir pipe cock on the test trolley and charge the main reservoir to 7 bar.
- 8.6 Check that the air suspension test point pressure reads zero bar.

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Air and Brake System (Part 1) – Test


BZ 3001

9. Main Reservoir Pipe Leakage Test

- 9.1 Close the test trolley main reservoir pipe cock. Wait for one minute. Note the pressure in the main reservoir pipe.
- 9.2 Wait for another 5 minutes and note the second pressure. Check that the pressure drop in the main reservoir pipe is not more than 0.15 bar.
- 9.3 Check that no air pressure exists in the auxiliary reservoir.
- 9.4 Open the ICR. Open the test trolley main reservoir pipe cock. Wait for 5 minutes. Check the pressure in the air brake pipe remains at zero.
- 9.5 Close the test trolley main reservoir pipe cock. Move the distributor isolating cock handle to the isolate position to blow down the auxiliary reservoir and vent the main reservoir pipe. Return the distributor isolating handle to the normal operating position.

10. Air Brake pipe Leakage Test

- 10.1 Open the air brake pipe cock on the test trolley and with the brake valve handle in RUNNING charge the brake pipe to 4.95 to 5.05 bar (LHCS); 5.05 to 5.15 bar (HST). Wait for at least 6 minutes, to allow the auxiliary reservoir to charge.
- 10.2 Close the test trolley air brake pipe cock. Wait for one minute. Note the pressure in the air brake pipe.
- 10.3 Wait for another 5 minutes. Check the pressure in the air brake pipe.
 - a) On vehicles not fitted with brake pipe limiting valves, the pressure fall since the first reading must not be more than 0.15 bar.
 - b) On vehicles with brake pipe limiting valves fitted with sensitivity bleed chokes, the pressure fall since the first reading must not be more than 0.50 bar.
- 10.4 Check that the main reservoir pipe pressure remains at zero bar.

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Air and Brake System (Part 1) – Test


BZ 3001

11. Auxiliary Reservoir and Brake Cylinder Leakage Test

- 11.1 Make an EMERGENCY brake application and record the auxiliary reservoir pressure.
- 11.2 Wait for 5 minutes. Check the pressure in the auxiliary reservoir. The pressure fall since the first reading must not be more than 0.15 bar.

12. Control Reservoir Releasing, Charging/Single Pipe Test

- 12.1 Check that the colour coding of the distributor and brake pads fitted (see Job BD 3000) are in accordance with Customer requirements.
- 12.2 With the air brake pipe pressure still at zero, operate the distributor release valve for about 5 seconds and then let it return to its normal position.
- 12.3 Check that the brake cylinder pressure falls to zero and air eventually ceases discharging.
- 12.4 Place the test trolley brake valve in RUNNING and check that the air brake pipe pressure rises to 4.95 to 5.05 bar (LHCS); 5.05 to 5.15 bar (HST).. Wait for 4 minutes.
- 12.5 On LHCS vehicles only move the brake valve smartly to FULL SERVICE and check that the brake cylinder pressure rises to 3.05 to 3.50 bar
- 12.6 Return the brake valve to RUNNING and allow the brake cylinder pressure to fall to zero. Check that the air brake pipe pressure rises to 4.95 to 5.05 bar (LHCS); 5.05 to 5.15 bar (HST).

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Air and Brake System (Part 1) – Test

BZ 3001


13. Control Reservoir Leakage Test

- 13.1 Use the brake valve to reduce the air brake pipe pressure to 3.8 bar, moving quickly to INITIAL and then slowly to achieve the required pressure: do not touch the brake valve handle any further.
- 13.2 Wait for one minute, then record the air brake pipe pressure has not changed and record the brake cylinder pressure.
- 13.3 Wait for another 5 minutes. Check the air brake pipe pressure has not changed and record the brake cylinder pressure. Check that the brake cylinder pressure since the first reading has not fallen more than 0.2 bar.

If the air brake pipe pressure has changed by more than 0.2 bar, the brake valve in the test trolley is not operating correctly and requires servicing.

Arising Work

- 8.2 If air escapes from reservoir drain, change air suspension charging valve.
- 8.6 If air suspension test point pressure not zero, change the averaging relay valve.
- 9.2 If leakage outside limits, check pipework and fittings - rectify defects.
- 9.3 If air pressure in auxiliary reservoir change ICR.
- 9.4 If air pressure in air brake pipe change distributor (see Note 2). If fault persists change check valves in the feeds to central door locking system.
- 9.5 If defective change distributor (see Note 2).
- 10.3 If leakage outside limits, check pipework and fittings - rectify defects.

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Air and Brake System (Part 1) – Test

BZ 3001

10.4 If air pressure in MRP change strainer check valve and choke unit. If fault persists change check valves in the feeds to central door locking system.

11. If leakage outside limits check pipework, fitting and actuators - rectify defects.

12.1 If defective change distributor (see Note 2).


12.5 If outside limits - change distributor (see Note 2).

If fitted with Westinghouse distributor - no action.

13. If air brake pipe pressure drifts, rectify defects to trolley. If brake cylinder pressure drifts, change distributor (see Note 2).

NOTE 1: If any rectification work is undertaken the brake test procedure must be repeated.

NOTE 2: Distributors are to be changed in accordance with Arising Work in Job BD 3000, except where distributors have already been changed during the overhaul, in which case Job BDA3512 need not be carried out.

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Air and Brake System (Part 2) – Test

BZ 3002

APPLIES TO: All Vehicles

Scheduled Work

EQUIPMENT REQUIRED: See Air and Brake System (Part 1) - Test

RECORD THE RESULTS ON THE FORM PROVIDED, (SEE SECTION 5).

NOTE 1: Catering Vehicles are defined as those carrying running numbers in the series 407xx, 408xx and 102xx.

1. Preparation

- 1.1 The following tests are to be conducted on the vehicle after completing Air and Brake System (Part 1) Test, Job No. BZ 3001 and Vehicle Height Adjust Job No. US 6004.
- 1.2 Check that the test gauges and brake test trolley are connected as for Brake System (Part 1) Test and that both test trolley cocks are open. Check that the brake valve is at RUNNING.
- 1.3 Check that the air suspension isolating cocks are open and the vehicle is inflated to the Tare condition.

2. Air Suspension Leakage Checks


- 2.1 Close the main reservoir isolating cock on the trolley. Wait for one minute and record the pressure in the main reservoir pipe.
- 2.2 Wait for another 5 minutes. Check that the pressure drop in the main reservoir pipe is not more than 0.3 bar.
- 2.3 Open the main reservoir isolating cock on the test trolley.
- 2.4 Record the air suspension test point pressure.

3. Brake Cylinder Pressure (Tare)

- 3.1 Move the brake valve smartly into FULL SERVICE position. Check that the brake cylinder pressure rises to:

Vehicle Type	Ferodo 3204F or Becorit 922-1U
Day Coaches (HST and LHCS)	3.05 to 3.50 bar
Catering vehicles	3.25 to 3.70 bar

Table 1: Full Service (Tare) Pressures

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Air and Brake System (Part 2) – Test

BZ 3002

- 3.2 Return the brake valve to RUNNING to charge the air brake pipe to 4.95 to 5.05 bar (LHCS); 5.05 to 5.15 bar (HST) and allow the brake cylinder pressure to fall to zero.

4. Brake Application Time and Emergency Brake Cylinder Pressure (Tare)

- 4.1 Move the brake valve smartly into the EMERGENCY position. Check that the time from the movement of the handle, until the brake cylinder pressure rises to the pressure in Table 2, is 1.5 to 2.5 seconds.

Vehicle Type	Ferodo 3204F or Becorit 922-1U
Day Coaches (HST and LHCS)	2.8
Catering vehicles	3.0

Table 2: Pressures for Application Time


- 4.2 Check that the brake cylinder pressure is steady at the pressure recorded at step 4.1. Record the pressure.

5. Brake Release Time (Tare)

Return the brake valve to the FULL SERVICE position and pause while the pressure stabilises. Move the brake valve smartly into the RUNNING position. Check that the time for the brake cylinder pressure to fall to 0.35 bar is 15 to 20 seconds.

6. Brake Application in Initial (Tare)

- 6.1 Move the brake valve smartly into the INITIAL position and check that the air brake pipe pressure falls to 4.5 to 4.65 bar and remains steady.
- 6.2 Record the brake cylinder pressure and check that it is not less than 0.60 bar and that all brake pads are applied firmly to the discs.
- 6.3 Wait for three minutes. Check that the air brake pipe pressure is still in the range 4.5 to 4.65 bar. (If this is not achieved the test trolley is defective and requires attention before this test can be completed).
- 6.4 Record the brake cylinder pressure and check that it has not fallen by more than 0.15 bar from its previous value. Check that the pads are still applied to the discs.
- 6.5 Return the brake valve to RUNNING and allow the brake cylinder pressure to fall to zero.

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Air and Brake System (Part 2) – Test

BZ 3002

7. Proportionality Test (Tare)

- 7.1 Reduce the air brake pipe pressure to FULL SERVICE in accordance with Table 3, 4 or 5, depending on type of vehicle being tested, and check the brake cylinder pressure at each stage. Return to RUNNING checking the brake cylinder pressures at the intermediate stages shown in Table 3, 4 or 5.

Brake Pipe Pressure (Bar)		Day Coaches		Catering Vehicles	
		Brake Cylinder Pressure (Bar)		Brake Cylinder Pressure (Bar)	
		Minimum	Maximum	Minimum	Maximum
Running	4.95 to 5.05	0.00	0.00	0.00	0.00
Step 3	4.05 to 4.15	1.80	2.50	2.00	2.70
Full Service	3.20 to 3.50	3.05	3.50	3.25	3.70
Step 3	4.05 to 4.15	1.80	2.50	2.00	2.70
Running	4.95 to 5.05	0.00	0.00	0.00	0.00

Table 3: Proportionality Test, LHCS Vehicles that are operated with a Mk3 DVT


Brake Pipe Pressure (Bar)		Day Coaches		Catering Vehicles	
		Brake Cylinder Pressure (Bar)		Brake Cylinder Pressure (Bar)	
		Minimum	Maximum	Minimum	Maximum
Running	4.95 to 5.05	0.00	0.00	0.00	0.00
Step 3	3.95 to 4.05	2.00	2.70	2.20	2.90
Full Service	3.20 to 3.50	3.05	3.50	3.25	3.70
Step 3	3.95 to 4.05	2.00	2.70	2.20	2.90
Running	4.95 to 5.05	0.00	0.00	0.00	0.00

Table 4: Proportionality Test, LHCS Vehicles that are not operated with a Mk3 DVT

Brake Pipe Pressure (Bar)		Day Coaches		Catering Vehicles	
		Brake Cylinder Pressure (Bar)		Brake Cylinder Pressure (Bar)	
		Minimum	Maximum	Minimum	Maximum
Running	5.05 to 5.15	0.00	0.00	0.00	0.00
Step 3	4.05 to 4.15	2.00	2.70	2.20	2.90
Full Service	3.20 to 3.50	3.05	3.50	3.25	3.70
Step 3	4.05 to 4.15	2.00	2.70	2.20	2.90
Running	5.05 to 5.15	0.00	0.00	0.00	0.00

Table 5: Proportionality Test, HST Vehicles

- 7.2 Check that all the pads are fully released and there is a nominal 2 to 3mm pad disc clearance.

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Air and Brake System (Part 2) – Test

BZ 3002

8. Brake Application Time and Emergency Brake Cylinder Pressure (Laden)

8.1 Set the secondary suspension to the laden condition as follows:

- i) Place blocks between the bolster and bogie solebar on the No. 2 bogie controlling the signal to the variable load valve, to prevent the body rising when simulating the laden condition.
- ii) Disconnect the linkage between the left hand levelling valve actuating lever and the spring plank by removing the lower 6mm link pin. (The levelling valve is positioned on the left hand side of the No. 2 bogie when viewing the vehicle from the headstock.
- iii) Rotate the levelling valve actuating lever upwards to increase the air suspension pressure to 4.3 bar. Secure the levelling valve actuating lever so that the air suspension pressure is steady.

8.2 Move the brake valve smartly into the EMERGENCY position. Using an analogue test gauge, check that the time for the brake cylinder pressure to rise to 3.5 bar is 1.5 to 2.5 seconds.

NOTE 2: The timing is to be taken from the moment the brake cylinder pressure begins to rise.

8.3 Check that the final brake cylinder pressure is steady at 3.6 to 4.0 bar. Record the pressure.

9. Brake Release Time (Laden)

9.1 Return the brake valve to the FULL SERVICE position and pause while the pressure stabilises.

9.2 Move the brake valve smartly into the RUNNING position. Check that the time for the brake cylinder pressure to fall to 0.35 bar is 15 to 20 seconds.


9.3 Rotate the levelling valve actuating lever downwards to lower the air suspension pressure. Reconnect the levelling valve operating arm and remove the blocks between the bolster and the bogie solebar.

10. Distributor Dump Valve Test (Where Fitted, seek advice from Engineer)

10.1 With the brake valve handle in the RUNNING position check that the brake pipe pressure is 4.95 to 5.05 bar (LHCS); 5.05 to 5.15 bar (HST).

10.2 Move the brake valve handle to the EMERGENCY position and allow the brake pipe pressure to fall to zero. When the pressure has fallen to zero, wait for one minute.

10.3 Move the brake valve handle to set the brake pipe pressure to 4.30 to 4.40 bar. Check that the brake cylinder pressure is not less than 0.4 bar.

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Air and Brake System (Part 2) – Test

BZ 3002

10.4 Move the brake valve handle to the INITIAL position and check that the brake pipe pressure rises to 4.50 to 4.65 bar. Check that the brake cylinder pressure falls to zero. If the brake pipe pressure is at the lower end of the tolerance band, it may be necessary to move the brake valve handle from INITIAL to give a brake pipe pressure between 4.58 and 4.65 bar, before the brake cylinder pressure will fall to zero.

10.5 Move the brake valve handle to the RUNNING position and check that the brake pipe pressure rises to 5 bar.

10.6 After 30 seconds move the brake valve handle to the INITIAL position and check that the brake pipe pressures falls to 4.50 to 4.65 bar. Check that the brake cylinder pressure is 0.6 to 1.1 bar.

11. Removal of Test Equipment

11.1 On completion of all testing, remove the brake test trolley, all test gauges and any temporary tee pieces used to accommodate vent cocks and test gauges.

Arising Work

2.2 If outside the limits, check the pipework and fittings - rectify any defects.

3,4,5 If outside the limits, change the distributor and/or variable load valve (Westinghouse) (see Note 2).

6. If the air brake pipe pressure is outside the limits rectify any defects and trolley. If the brake cylinder pressure is outside the limits change the distributor, and/or variable load valve (Westinghouse) (see Note 2). If any pads are not applied rectify defective calipers/actuators.

7.1 If the brake cylinder pressure is outside the limits change the distributor and/or variable load valve (Westinghouse) (see Note 2).


7.2 If any pads are still applied rectify defective calipers/actuators.

8,9. If outside the limits, change the distributor and/or variable load valve (Westinghouse) (see Note 2).

10.3 If the brake cylinder pressure is less than 0.4 bar, change the distributor (not the Westinghouse variable load valve) (see Notes).

10.4 If the brake cylinder pressure does not fall to zero, change the distributor. (Not the Westinghouse variable load valve) (see Notes).

10.6 If the brake cylinder pressure is less than 0.6 bar, change the distributor. (Not the Westinghouse variable load valve) (see Notes).


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Air and Brake System (Part 2) – Test

BZ 3002

NOTE 3: If any rectification work is undertaken the brake test procedure must be repeated.

NOTE 4: Distributors are to be changed in accordance with Arising Work in Job BD 3000, except where distributors have already been changed during the overhaul, in which case Job BDA3512 need not be carried out.


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Bodyside, Ends, Roof and Skirt – Paint

C* 6015

Reference Drawings		
Item	Drawing No.	Title
1	A1-2481002	HST Trailer Livery TF/TS/TGS/TRSB Virgin X Country
2	A1-2681003	Mark 3 Loco Hauled Trailer Livery – Virgin W Coast
3	PB-C0-2109715	Livery Diagrams Mark 3 Coaches Virgin Trains
4	PB-C0-2109716	Livery Diagrams Mark 3 Coaches Virgin Trains
5	PB-C0-2109717	Livery Diagrams Mark 3 Coaches Virgin Trains
6	PB-C0-2109718	Livery Diagrams Mark 3 Coaches Virgin Trains
7	TF-TS-803126	Midland Mainline Livery Diagram Mark 3 (TGS)
8	TF-TS-803123	Midland Mainline Livery Diagram Mark 3 (TS and TF)
9	TF-TS-803132	Midland Main Line Livery Diagram Mark 3 (TRFB)
10	PB-C0-2105987 (TF)	Painting and Livery Diagram HST TF Coach East Midlands Trains
11	PB-C0-2105988 (TS)	Painting and Livery Diagram HST TS Coach East Midlands Trains
12	PB-C0-2105989 (TGS)	Painting and Livery Diagram HST TGS Coach East Midlands Trains
13	PB-C0-2105992 (TRFB)	Painting and Livery Diagram HST TRFB Coach East Midlands Trains
14	CR-C0-2301111 (TRFB) (RFM)	Livery Diagram HST, TRFB East Coast
15	CR-C0-2301002 (TS) (TSO)	Livery Diagram HST, HST East Coast
16	CR-C0-2301003 (TF) (FO)	Livery Diagram HST, TF/TF(D) East Coast
17	PB-C0-2111132 (TSO)	Abellio Livery Drawing
18	PB-C0-2111133 (FO)	Abellio Livery Drawing
19	PB-C0-2111134 (RFM)	Abellio Livery Drawing
20	PB-C0-2110685 (TSOB)	Abellio Livery Drawing
21	PB-C0-2301479	CrossCountry Livery Diagram HST Power Car
22	PB-C0-2301480	CrossCountry Livery Diagram HST, TS Power Car
23	PB-C0-2301481	CrossCountry Livery Diagram HST, TFD Power Car
24	PB-C0-2301482	CrossCountry Livery Diagram HST, TSD Power Car
25	PB-C0-2301483	CrossCountry Livery Diagram HST, TCC Power Car
26	PB-C0-2301484	CrossCountry Livery Diagram HST, TGS Power Car
27	S1-C0-8008012	Positioning Of Overhead Warning Lines Eqpt Warning Lines For I.C. Coaching Stock
28	PB-C0-2111791	Porterbrook Generic Data Panel
29	(See NOTE 1 Below)	First Great Western Livery Diagrams

NOTE1: FGW Livery details are contained in Supersine Duramark Document No. 300770 Rev 2.

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Bodyside, Ends, Roof and Skirt – Paint


C* 6015

APPLIES TO: All Vehicles

Scheduled Work

1. Repaint bodysides, ends, roof and skirt in accordance with the Procedure agreed with the Engineer and the following diagrams.

Operator And Vehicle Types	Livery and Diagram	Paint System	Last Painted and Where
Former Virgin XC HST	Virgin Red, FM Design (see Reference Drawing item 1)	BR Spec 81	Alstom Eastleigh at C3X
Former Virgin WC Mark 3 LHCS	Virgin Red, FM Design (see Reference Drawing item 2)	Two pack system.	ADtranz Derby at C3X.
Virgin WC Mark 3 LHCS (WB64)	Virgin, drawings (see Reference Drawings items 3 to 6)	DuPont Stadox two-pack paint system	Painted at Wabtec, Doncaster at refurb in 2009.
East Midlands Trains (MML Livery)	New MML, drawings (see Reference Drawings items 7 to 9)	Decals over two pack paint system.	Decals applied at C6. Vehicles painted by ADtranz Derby at C3X.
East Midlands Trains (EMT Livery)	EMT, drawings (see Reference Drawings items 10 to 13)	Two-pack paint system.	Painted at Neville Hill
First Great Western Mark 3 LHCS	First Great Western, drawings (see Reference Drawings item 29).	PPG two-pack	Painted at Railcare Wolverton during refurb.
First Great Western HST trailer (post CSO)	First Great Western, drawings (see Reference Drawings item 29).	Two-pack paint system.	Painted at Bombardier, Litchurch Lane, during CSO.
First Great Western HST trailer (post CSO) – vehicles ex EC64 plus refurbished catering vehicles and LHCS to HST conversions	First Great Western, drawings (see Reference Drawings item 29).	Two-pack paint system.	Painted at Brush Barclay, Kilmarnock during CSO.
First Great Western unrefurbished catering vehicles	First Great Western, drawings (see Reference Drawings item 29)	Decals over MML RIO decals over BR81 paint system.	Painted at Wessex Traincare, Eastleigh, during C3X.
NXEC/GNER HST vehicles post CSO	GNER livery drawings TBC NX livery drawings (see Reference Drawings items 14, 15 and 16).	DuPont Stadox two-pack paint system	Painted at Wabtec, Doncaster at CSO.

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Bodyside, Ends, Roof and Skirt – Paint

C* 6015


Operator And Vehicle Types	Livery and Diagram	Paint System	Last Painted and Where
Cross Country Trains	Livery drawings (see Reference Drawings items 21, 22, 23, 24 25 and 26)	DuPont Standox two-pack paint system	Painted at Wabtec, Doncaster at CSO.
Greater Anglia (Abellio) RFM	Livery drawing (see Reference Drawings item 17)	Two-pack paint system.	Wabtec Doncaster @ C3 (10229 at C6)
Greater Anglia (Abellio) TSO	Livery drawing (see Reference Drawings item 18)	Two-pack paint system.	Bombardier Litchurch Lane @ C3
Greater Anglia (Abellio) FO	Livery drawing (see Reference Drawings item 19)	Two-pack paint system.	Bombardier Litchurch Lane @ C3
Greater Anglia (Abellio) TSOB	Livery drawing (see Reference Drawings item 20)	Two-pack paint system.	Bombardier Litchurch Lane @ C3

Table 1

- Any vehicle not listed above is to be painted in accordance with the instructions of the Engineer.
- Where not shown on painting diagrams, paint an orange line to drawing (see Reference Drawings item 27).

NOTE 2: The Supplier must populate the data panel with the relevant vehicle details.

- Fit Vehicle Data panels in accordance with the specified drawing (see Reference Drawings item 28).

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Body Exterior – Examine

CA 0632

Reference Documents		
Item	Document No.	Title
1	CR/PE0102	Repainting of Rail Vehicles


APPLIES TO: All Vehicles

Scheduled Work

1. Examine the body for punctured skin, outward body distortion and structural damage.
2. Examine the body for areas of rust, and chipped or flaking paintwork.

Arising Work

1. Repair damage in accordance with Job No. CA 6001, Arising work.
2.
 - a) Check type of paint applied (see Table 1 in Job C* 6015).
 - b) If it is a BR81 painted vehicle, repair or repaint in accordance with the specified document (see Reference Documents item 1).
 - c) If it is a 2-pack painted vehicle, repair or repaint using a procedure which is compatible with the existing paint system and which has been approved by the Engineer.
- 2.1 Clean down and repair damaged areas in accordance with procedure determined in 2a), 2b) and 2c) above. If paintwork damage is extensive and/or widespread, the whole affected area is to be cleaned down, abraded and re-painted, working to natural breaks such as livery stripes, recesses or window breaks in order that a visual patchwork effect can be avoided.
- 2.2 Carry out complete re-paint in the event that touch-in re-painting will not restore the vehicle to satisfactory condition. See Job No. C* 6015 for painting diagrams.

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Vehicle Bodyside Panels and Structure – Examine

CA 6001

Reference Documents		
Item	Document No.	Title
1	SERCO/TCS/VA1927/001	Serco Technical Consulting Services Report - HST Trailer Car Bodyshell Structural Analysis

APPLIES TO: All Vehicles

Scheduled Work

NOTE 1: The scope of this examination is to be agreed between the Engineer and the Supplier.

1. Examine all bodyside and end panels from the exterior.

Arising Work


NOTE 2: In the event major interior or structural work is to be carried out such that the stub pillars below the windows is exposed, certain welds should be Non Destructively Tested as described in the specified document (see Reference Documents item 1). Similarly, certain welds in the area of the door portal should also be Non Destructively Tested if exposed.

1. Minor surface indentations not exceeding 200cm² in area or 6mm depth, which have not holed the surface or cracked any welds are to be filled using materials consistent with the paint system being used.
1. Minor surface corrosion which has not caused pitting must be removed by lightly rubbing down, and treated with corrosion inhibiting primer consistent with the paint system being used. Interior surfaces must be finish painted prior to refitting interior trim panels.
1. Repair damaged or corroded panels or frames or cracked welds. The repair method is to be approved by the Engineer prior to work being commenced.

It is necessary that coach bodies are adequately supported at both sides, by rigid support under the solebars when repair work is being carried out on the body frame and/or exterior panels. The support is to be applied before any work takes place on the body frame/panels and must be such that, using a taut wire line between bolsters of the vehicle as a datum, the body must be given 3mm extra camber (measured on the longitudinal centre of vehicle) prior to commencement of work and held in that position until all work is completed.

Following repairs to the body structure, any affected internal cavities must be protected from corrosion using a corrosion protection system which is compatible with existing corrosion protection systems on the vehicles and which has been approved by the Engineer. Under no circumstances must repaired cavities be injected with expanding foam.

All new metal and welds must be prepared and treated with corrosion inhibiting primer consistent with the paint system being used. Interior surfaces must be finish painted prior to refitting interior trim panels.

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Trolley Store and Service Points – Examine

CC 6442


APPLIES TO: HST Catering Vehicles, some TGS and TF (where the toilet has been replaced by a catering store) and TFE vehicles. Refer to Section 5.9 for list of vehicles.

Scheduled Work

1. Examine the interior of the compartment and door.
2. Examine the shelves, checking that they are secure (where fitted).
3. Test the door lock.
4. Clean.
5. Examine the trolley retention belts as follows:
 - 5.1 Examine the reel.
 - 5.2 Check the security of the reel and belt.
 - 5.3 Check that the retention belt may be fully extended to working position and then when released, fully retracts.
 - 5.4 Test the catch operation.
6. Check the trolley retaining catches for correct operation.

Arising Work

- 1,2. Repair defects.
3. Renew the lock.
- 5.2 Resecure any loose items.
- 5.1, 5.2, 5.3, 5.4 Renew the belt and reel assembly if defective.
6. Repair defects

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Roof Panel (GRP or ABS) Body End – Examine

CG 6005

APPLIES TO: All Vehicles

Scheduled Work

1. Examine, including the joint between GRP or ABS and metal surfaces.

Arising Work

1. Remove the GRP or ABS roof panel if damaged, or if any evidence of water ingress or corrosion is evident on the body structure. Examine all exposed areas of the body end structure. Renew the GRP body end panel.

The joint between the GRP and metal surfaces must be sealed as follows:

Thoroughly abrade the area using a coarse grit cloth. Blow off all surface dust. Apply 3 laminates of approximately 100mm wide glass fibre tape, and a suitable resin, with a ratio of 1½-2 parts resin to 1 part glass.

NOTE: Repair corroded or damaged body structure in accordance with Job No. CA 6001 arising work.

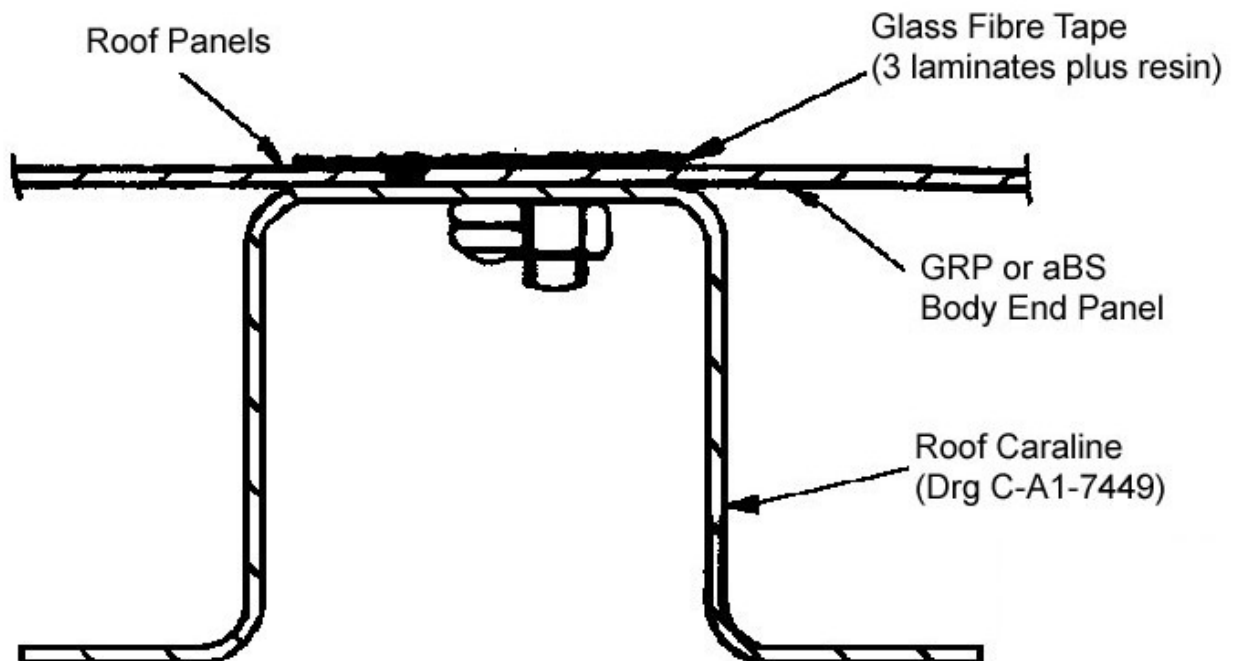



Figure 1: Joint Sealing

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Droplight – Examine

CM 0607


APPLIES TO: All Vehicles

Scheduled Work

1. Examine the glass.
2. Gently nudge the droplight downwards several times. Check that the droplight moves easily to the new position but does not run out of control.
3. Check that the finger pull is secure.
4. Gently nudge the droplight upwards several times. Check that the droplight moves easily to the new position but does not run out of control.
5. Check that no gap exists when the droplight is closed.

Arising Work

- 1-5. Overhaul the droplight in accordance with Job No. CM 6615.

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Droplight – Overhaul

CM 6615


Materials			
Item	Description	Qty/Veh	Cat No
1	Screw, 6 x ½" Self Tapping, Slotted Csk Hd, Type B, Thread Forming, Flat End, Hardened Steel, EZP	As Req'd	035/098122
2	Adsil	As Req'd	027/001905
3	Grease	150kg container 3kg barrel 12.5kg barrel 50kg barrel 180kg barrel 400g cartridge	As Req'd 027/001351 027/001353 027/001354 027/001356 027/001357 027/001358
4	Channels	As Req'd	063/070036
5	Guide	As Req'd	064/003040
6	Kautex	As Req'd	010/054060
7	Handle Top Locking 18. ⁷ / ₁₆ " long	As Req'd	018/009927
8	Wooden Mounting Block	As Req'd	063/001294
9	Screw, No10 x 1 ½", Stainless Steel Self Tapping	As Req'd	Local Supply

APPLIES TO: All Vehicles

NOTE 1: Some HST catering vehicles have had their droplights at the No.1 end (ante-room) permanently locked in the closed position. These droplights must be overhauled and then locked in the closed position.

Scheduled Work

1. Remove the droplight as follows:
 - 1.1 Remove the access panel to the droplight mechanism.
 - 1.2 Secure the droplight in the closed position.
 - 1.3 Remove top split pins (see Figure 1 item B) connecting the TenVee (see Figure 1 item C) to the bottom of the droplight frame.
 - 1.4 Release the TenVee and balance mechanism by removing the two self tapping screws securing it to base of door, remove assembly.
 - 1.5 With the droplight in the closed position, peel away the flock sprayed lining or felt from the back of one of the guide channels (see Figure 1 item D). Remove the exposed self tapping screws securing the guide channel to the frame. Push the lining back into the guide channel.

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Droplight – Overhaul

CM 6615

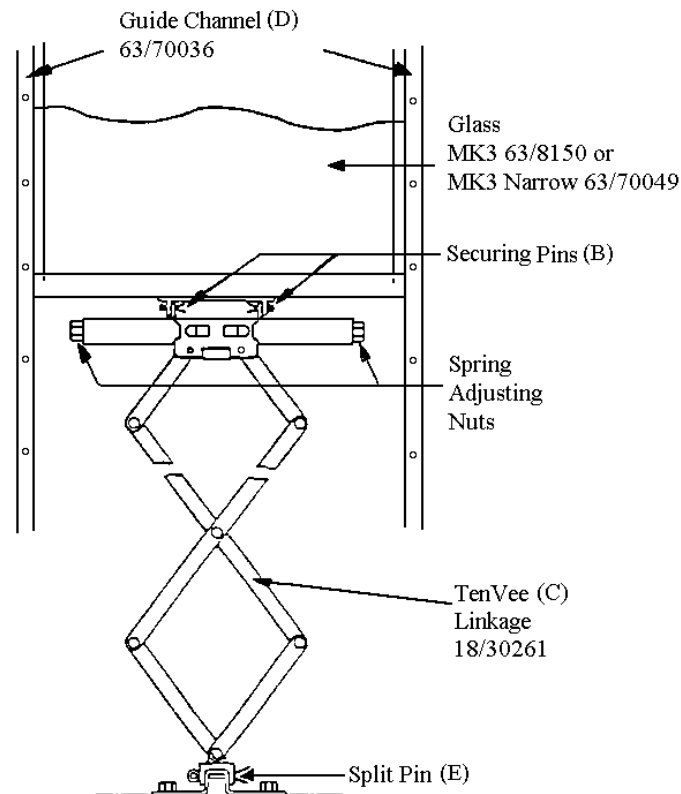



Figure 1: Balance Mechanism

- 1.6 Place the droplight in the fully open position. Peel away the lining and remove the remaining screws in the guide channel. Discard the lining.
- 1.7 Disconnect the droplight mechanism if not already disconnected. Ensure that force in the springs is released safely.
- 1.8 Withdraw the droplight window and released guide channel from the rebate.
- 1.9 Remove the remaining guide channel, remove and discard linings.
2. Examine components as follows:
 - 2.1 Check the condition of the door in area of guide channels for signs of frame corrosion. Check that the frame is sufficiently sound to give a firm screw fixing at all fixing positions.
 - 2.2 Examine the bump stops.
 - 2.3 Examine the metal guide channels.
 - 2.4 Examine the droplight glass.

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Droplight – Overhaul

CM 6615

2.5 Check that the wooden mounting block located in the bottom of the door (to which the linkage mechanism lower bracket attaches to) is present, in good condition and secure.

3. Refit the droplight as follows:

3.1 Refit one guide channel into rebate with self tapping screws (see Materials item 1).

3.2 Check that the new felt lining is a push-fit it into the guide.

3.3 Secure the felt lining to the guide channel with suitable rivets at top and bottom.

3.4 Fit the second metal guide channel with felt lining to the edge of the window. Position this sub-assembly in the rebate.

3.5 Place the droplight in the fully open position. Peel away the felt lining from the back of the unsecured guide, starting at the upper end.

3.6 Secure the guide channel with self tapping screws. Push the lining back into the channel.

3.7 Close the droplight, peel away the lower portion of lining, insert remaining self tapping screws and push the lining back into the guide channel.

3.8 Secure the felt lining to the guide channel with suitable rivets at top and bottom.

NOTE 2: The lining must cover the fixing screw heads. Ensure the guides are not pinched or damaged during installation.

3.9 Lubricate the felt guides with Adsil (see Materials item 2).

3.10 Check that the droplight falls freely from the closed to the fully open position.

4. Remove all debris and clear drain holes in the door boot.


5. Reassemble the TenVee and balance mechanism as follows:

5.1 Clean and examine the TenVee steel levers and pivots for damage, wear, distortion and corrosion.

5.2 Secure the droplight in the closed position.

5.3 Fix the TenVee and balance mechanism to the base of door with 2 No 10 x 38mm Stainless Steel Type Z self tapping screws.

5.4 Fit new top split pins (see Figure 1 item B) connecting the TenVee (see Figure 1 item C) to the bottom of the droplight frame.

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Droplight – Overhaul

CM 6615

- 5.5 If the existing balance mechanism is being refitted renew the bottom securing split pin (see Figure 1 item E).
- 5.6 Ensure split pins are the correct diameter and length.
- 5.7 Open out pin halves fully and protect with a coating of grease.
- 5.8 Lubricate the mechanism with grease (see Materials item 3).
6. Operate the droplight top check that it is "in balance", ie: it will remain in any required position but can be moved easily to another position, as follows:
 - 6.1 If the door has been removed from the vehicle check that it is held vertical.
 - 6.2 Fully open the window and gently nudge it upwards until it is fully closed.
 - 6.3 Check that the window moves easily to the new position but does not run out of control.
 - 6.4 Examine the finger pull and check that no draught causing gaps exist when the droplight is fully closed.
 - 6.5 Gently nudge the window downwards until it is fully open.
 - 6.6 Check that the window moves easily to its new position but does not run out of control.
7. Refit the droplight access panel.

Arising Work

- 2.1 Renew the door. (see Job No. OP 0118).
- 2.2 Repair the bump stop.
- 2.3 Renew the guide channels (see Materials items 4 and 5).
- 2.4 Renew broken or defaced glass.
- 2.5 Resecure if loose or renew if missing or defective (see Materials item 8) and secure using new steel self tapping screws (see Materials item 9).
- 5.1 Renew the TenVee assembly with a new or reconditioned unit.

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Droplight – Overhaul

CM 6615

6. Adjust the balance of the TenVee assembly as follows:

NOTE 3: The mechanism is "overbalanced" if excessive force for opening or no force for closing is required. If the opposite conditions apply the mechanism is "underbalanced".

Correct the balance mechanism by altering the spring compression, turning both nuts (see Figure 2 item A) by equal amounts in small increments. Turn anti-clockwise to correct for overbalance and clockwise to correct an underbalanced condition.

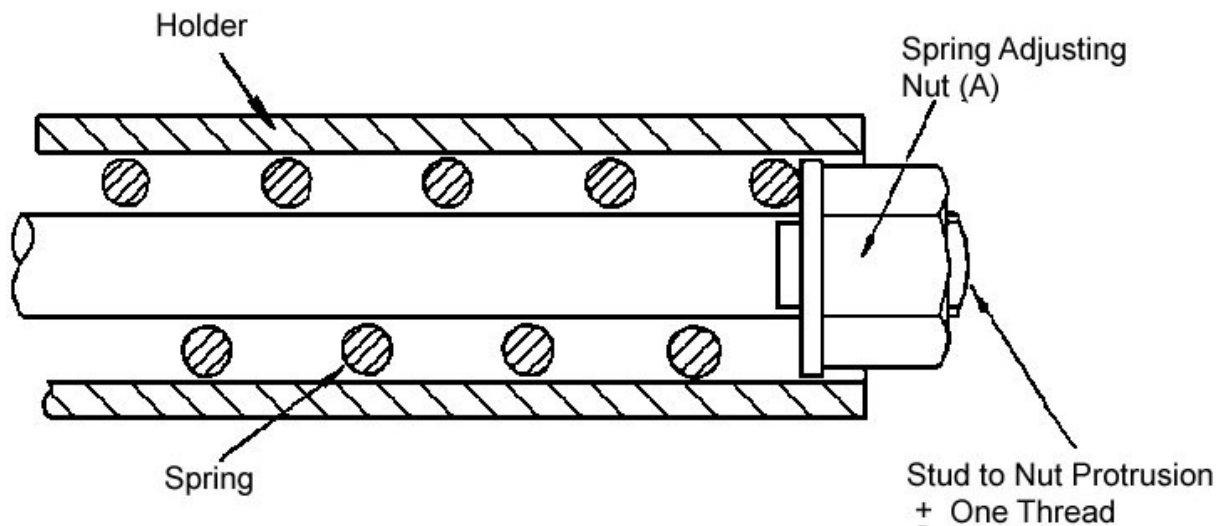



Figure 2: Section of Spring Holder

6.4 Renew the finger catch as follows:

- 6.1 Push the window down to its stops.
- 6.2 Gently tap off the defective finger pull using a soft hammer.
- 6.3 Clean the newly exposed strip of glass to prepare for replacement.
- 6.4 Lay the strip of Kautex (see Materials item 6) centrally along the top of the glass.
- 6.5 Lay the replacement finger pull mechanism (see Materials item 7) along the top of the Kautex and gently tap with a soft hammer until home.
- 6.6 Check the operation of the droplight and finger pull in accordance with step 6.

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Overhaul Code and Date – Paint

CN 0105

APPLIES TO: All Vehicles

Scheduled Work

1. Paint the following information below the coach data panel.

Overhaul Code – C4, C4X, C4E, C3M or C6.


Date - completion date of painting.

Contractor's Code to be agreed with the Engineer.

Paint Code - describes the method of painting and type of paint used. To be agreed with the Engineer.

Swing Link Code - Apply one of the following codes according to the type of swing links fitted to the BT10 bogies on the vehicle.

LSL Long Swing Link
SSL Short Swing Link

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Roof – Repair

CRA0104

Materials			
Item	Description	Qty/Veh	Cat No.
1	Insert Roof Panel	As Req'd	063/003259

Reference Drawings		
Item	Drawing No.	Title
1	B1-A0-9013735	Roof End Panel

Reference Documents		
Item	Document No.	Title
1	WPS MG713	Welding Procedure Specification
2	WPS MG714	Welding Procedure Specification

APPLIES TO: All Vehicles

Scheduled Work

1. Heavy Corrosion/Holes - Width exposing less than 250mm of carline (see Figure 1).

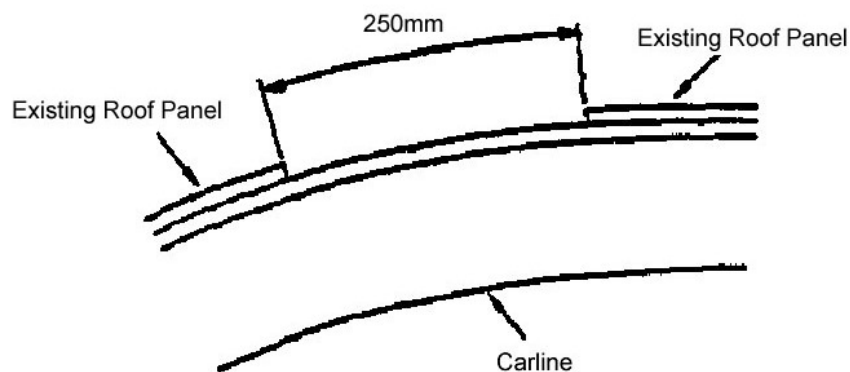



Figure 1: Repairs Width Exposing 250mm of Carline

- 1.1 Remove all corroded/damaged metal to form a rectangular hole.
- 1.2 Examine any exposed areas of carlines for corrosion.
- 1.3 Remove 'Colset' bituminous coating from the underside of the remaining panel and carlines for a distance of 25mm from the edge of the hole (fire precaution when welding see Figure 2).

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Roof – Repair

CRA0104

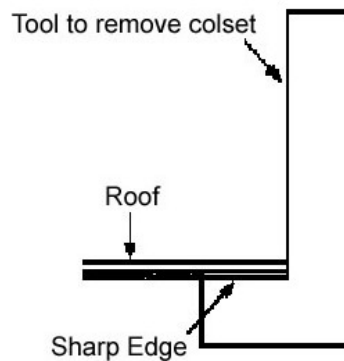


Figure 2: Tool to remove Colset

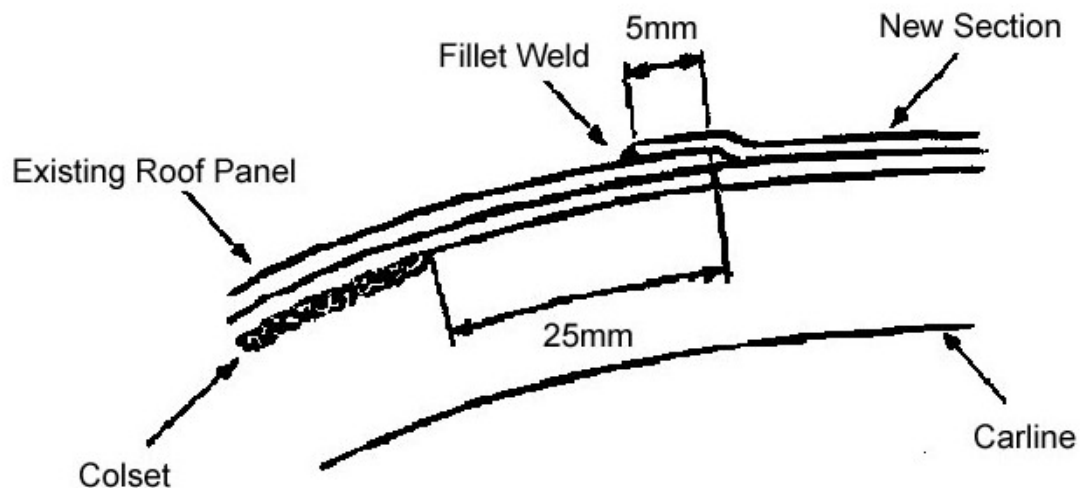



Figure 3: Local Shaping of New Roof Panel to fit Carline

- 1.4 Manufacture a new panel to overlap the existing panel all round by 5mm. If hole extends over a roof corrugation, the panel is to be shaped to suit (see Figure 3).
- 1.5 Fillet weld new panel to roof section in accordance with the specified document (see Reference Documents item 1).
- 1.6 All accessible new metal and welds must be prepared and treated with corrosion inhibiting primer consistent with paint system being used. Accessible interior surfaces must be finish painted prior to refitting interior trim panels.

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Roof – Repair

CRA0104

2. Heavy Corrosion/Holes - Width exposing more than 250mm of carline (See Figure 1).

2.1 Remove all corroded/damaged metal to form a rectangular hole.

NOTE: An individual hole must not exceed 1300mm in length (the length over 3 carlines) and 500mm width. Care must be taken when cutting out corroded/damaged roof panels to minimise damage to carlines.

2.2 Examine exposed areas of carlines for corrosion.

2.3 Remove 'Colset' bituminous coating from the underside of the remaining panel and carlines for a distance of 25mm from the edge of the hole (fire precaution when welding see Figure 2).

2.4 Manufacture a new panel in sections to overlap the hole by 5mm all round, with a 2mm gap at carlines for plug welding the two adjacent sections to the carline (see Figure 4).

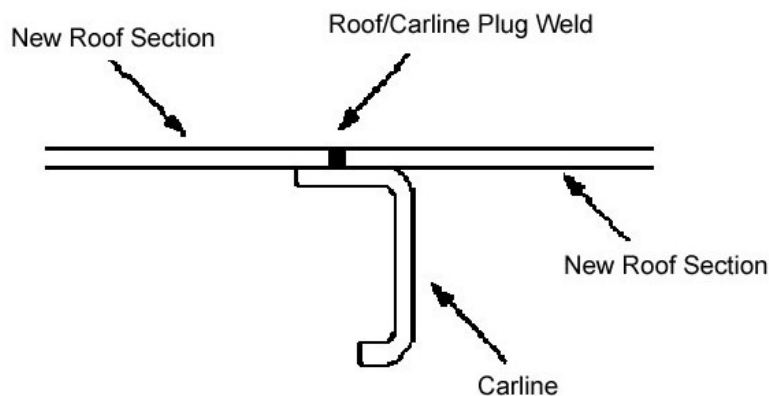


Figure 4: Roof to Carline Plug Weld

- 2.5 Inserts for corrugations to be manufactured as required to the specified drawing (see Reference Drawings item 1 and 5), (see Materials item 1) and fillet welded to carlines in line with the corrugations.
- 2.6 Panels to be shaped so that the edges overlap the existing roof panels and to be fillet welded in position.
- 2.7 Plug weld the 2mm gap between the two adjacent panels to the carline (see Figures 3, 4 and 5).
- 2.8 Fillet welds to be carried out in accordance with the specified Welding Procedure Specification (see Reference Documents item 1) and butt welds in accordance with the specified Welding Procedure (see Reference Documents item 2).



Roof – Repair

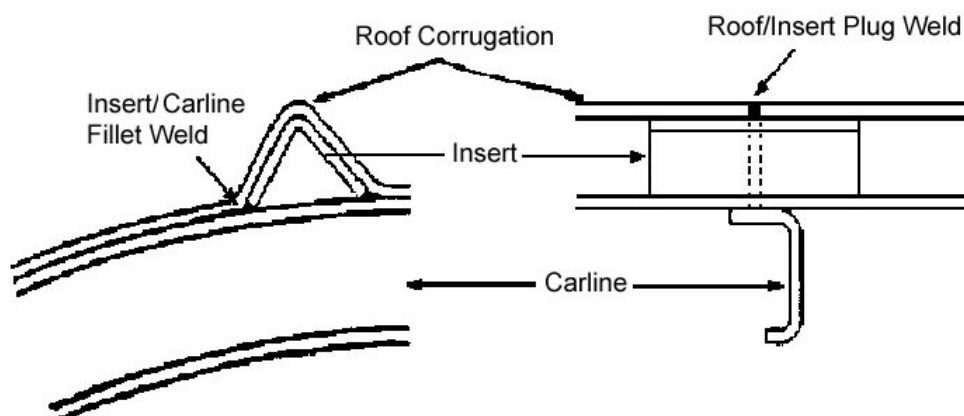
CRA0104

Figure 5: Fitting and Welding of Roof Sections at Carline/Corrugation

- 2.9 All accessible new metal and welds must be prepared and treated with corrosion inhibiting primer consistent with paint system being used.
- 2.10 Accessible interior surfaces must be finish painted prior to refitting interior trim panels.

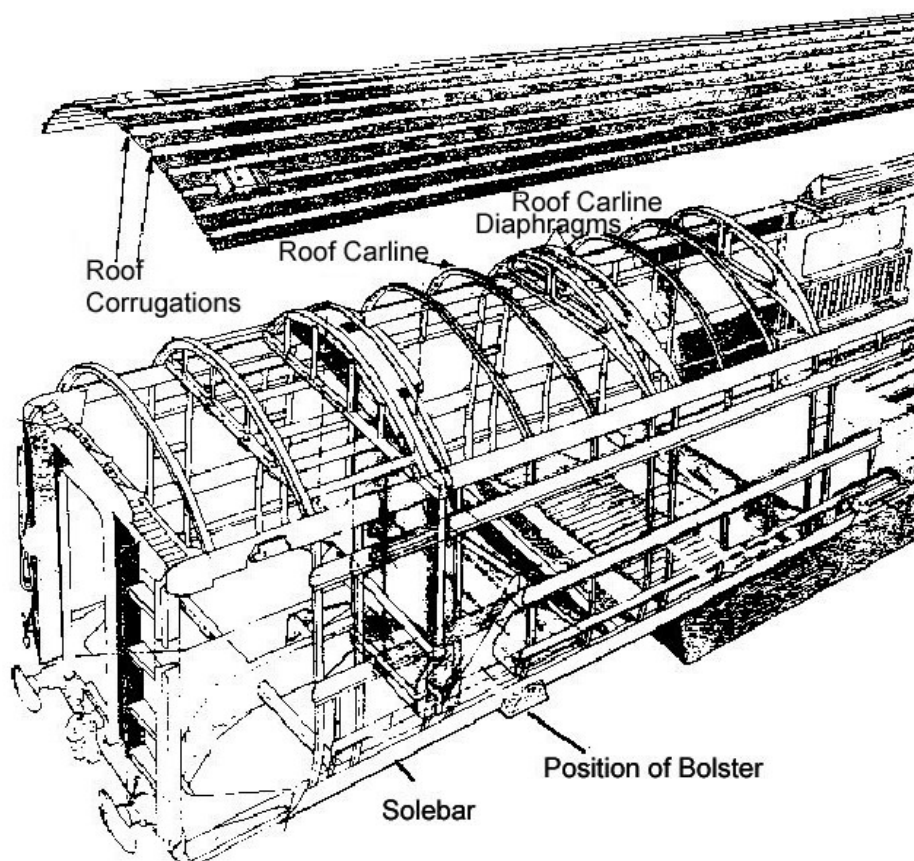




Figure 6: Sectional Drawing (Showing roof carlines)

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Roof – Repair

CRA0104


3. Corrosion or damage to roof structure (carlines), cracked welds or heavy corrosion/holes in roof panels where methods 1 and 2 are not suitable.
 - 3.1 The repair method is to be approved by the Customer prior to work being commenced.
 - 3.2 It is necessary that coach bodies are adequately supported at both sides, by rigid support under the solebars when repair work is being carried out on the roof frame and/or exterior panels in excess of the units in sections 2 and 3.
 - 3.3 The support is to be applied before any work takes place on the roof frame/panels and must be such that, using a taut wire line between bolsters of the vehicle as a datum, the body must be given 3mm extra camber (measured longitudinal centre of vehicle) prior to commencement of work and held in that position until all work is completed (see Figure 6).
 - 3.4 All accessible new metal and welds must be prepared and treated with corrosion inhibiting primer consistent with paint system being used.
 - 3.5 Accessible interior surfaces must be finish painted prior to refitting interior trim panels.

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Panels, Roof (Other than removable panels) – Examine

CR 6002

Materials			
Item	Description	Qty/Veh	Cat No.
1	Roof Ventilator, Roovac TW50	6	018/009406
2	Screw, No. 12, Self Tapping, Pan Hd, Type B, EZP	14 per Materials item 1	035/055775
3	Washer, M6, Lock	14 per Materials item 1	003/196715
4	Roof Cowl, Heating and Air Conditioning	As Req'd	093/056390
5	Screw, M8 x 16, Hex Hd, Grade 8.8, EZP	28 per Materials item 4	035/100632
6	Washer, M8, Spring, Square Section, EZP	28 per Materials item 4	003/195110
7	Roof Cowl, Extraction Duct, 475 x 475 x 55 For Air Conditioning	As Req'd	063/004530
8	Roof Cowl, Intake Fan, 720 x 680 x 80 For Air Conditioning	As Req'd	063/003825
9	Intake Fan Cap, 720 x 783 x 80 AEA Technology Part No. 14288-01	As Req'd	-
10	Screw, M6 x 16, Hex Hd, Gde 8.8, EZP	10 per Materials item 7, 14 per Materials items 8 and 9	035/100502
11	Washer, M6, Spring, Square Section, EZP	10 per Materials item 7, 14 per Materials items 8 and 9	003/195108
12	Washer, M6, Form C	10 per Materials item 7, 14 per Materials items 8 and 9	003/190924

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Panels, Roof (Other than removable panels) – Examine

CR 6002

Torque Figures			
Item	Description	Size	Torque (Nm)
1	Screw	M8	20
2	Screw	M6	8

Reference Drawings		
Item	Drawing No.	Title
1	A1-A0-8500522	Installation Of Air Extraction Over Cooking Equipment In Kitchen TRUK To RFM
2	B1-S-9014024	Roof Panel With Extraction Fan Support And Cowl
3	B1-A1-9016621	Cap For Extraction Duct Over Grill And Toaster
4	C-A1-10034	Arrangement Of 'Roevac' Vents In Roof Panel
5	C-A1-13228	Cap, Intake Fans RSB & RUK Mk3 Standard Carriage
6	C-S-12126	Arrangement Of Air Extractor Over Oven
7	C-S-12127	Arrangement Of Air Extractor Over Grill
8	C-S-13139	Sect Through Airmax 12" Fan & Plenum Chamber In RUK Vehicles Mk3 Standard Carriage
9	C-S-13140	Sect Through Woods 15" Fan & Plenum Chamber In RSB & RUK Vehicles Mk3 Standard Carriage
10	C-S-17672	Arrangement Of Air Extraction Fans & Duct Above Micro-Aire Oven Mk3 RUB
11	C-S-17673	Arrangement Of Air Extraction Fans & Duct Above Micro-Wave Oven Mk3 RUB
12	PB-C0-2108373	Catering Area Extract Fan Installation (TCC)
13	SU-C0- 013996	Assembly Of Plenum Chamber TRSB To TBRF Conversion (Project Rio)
14	SU-C0-014288	Intake Fan Cap Detail TRSB To TBRF Conversion (Project Rio)


Reference Documents		
Item	Document No.	Title
1	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables

NOTE 1: Attention to the various fan motors located beneath the cowls examined in this job is covered in Job Numbers HM 0111, HM 0820, HM 5035, HM 5111 and HM 5113.

APPLIES TO: All Vehicles

Scheduled Work

NOTE 2: For parts 1 and 2 of this job, test corroded surfaces harshly with sharp tool. No holes are permitted.

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Panels, Roof (Other than removable panels) – Examine **CR 6002**

1. Examine fixed roof panelling from exterior.
2. When removable panels have been removed, (see Job No. CR 6003), examine the roof panelling and structure from the interior.
3. Examine the roof cowls and ventilators as follows:


NOTE 3: Some Cross Country Trains HST vehicles are converted from Mk3A vehicles and may have cowls and ventilators to the Mk3A design still fitted.

Mk3A vehicles – both ends (see Figure 1 and Reference Drawings item 4).

Examine the three ventilators in-situ for corrosion, any other defects and check they are securely fastened to the roof with all fasteners present.



Figure 1: Three Roof End Ventilators Mk 3A (quantities/vehicles are confirmed more accurately in the text)

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Panels, Roof (Other than removable panels) – Examine CR 6002

Mk3B and HST vehicles – both ends except kitchen/buffet ends on vehicles with a catering area (see Figure 2 and Reference Drawings item 2)

Remove the roof cowl.


Examine the box structure supporting the cowl and check it is securely attached to the vehicle roof structure.

Check that the cowl fixing holes are not corroded or enlarged.

Examine the cowl for defects.



Figure 2: Roof End Cowl Mk 3B and HST (quantities/vehicles are confirmed more accurately in the text)

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Panels, Roof (Other than removable panels) – Examine

CR 6002

All vehicles with a catering area (see Figure 3)

HST TCC see Reference Drawings items 3, 6 and 12

HST, TSB see Reference Drawings items 3, 6, 7, 10 and 11

HST TBRF see Reference Drawings items 3, 5, 6, 7, 8, 9, 10 and 11

HST TRFB also see Reference Drawings items 3, 6, 7, 10, 11, 13 and 14

Mk3 RFM, TSOB see Reference Drawings items 1, 3, 10, 11

Remove all roof cowl.

Examine the box structure supporting each cowl and check it is securely attached to the vehicle roof structure.


Check that the cowl fixing holes for each cowl are not corroded or enlarged.

Examine each cowl for defects.



Figure 3: Catering Area Roof Cows on HST TBRF

4. Certain vehicles, in particular catering vehicles and those formerly fitted with payphones, have redundant antennae on the roof. These redundant antennae, along with attendant wiring, must be removed, with the roof apertures sealed, in accordance with a procedure to be agreed with the Engineer. Defective or redundant cabling must be dealt with in accordance with the specified document (see Reference Documents item 1).
5. Clean plenum chambers.

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Panels, Roof (Other than removable panels) – Examine **CR 6002**

NOTE 4: Prior to refitting the roof cowls, ensure that all fan motor attention is complete – see Job Nos. HM0111, HM0820, HM5035, HM5111 and HM5113.

6. Refit roof cowls as follows:

Mk3B and HST vehicles – both ends except kitchen/buffet ends on vehicles with a catering area

Check that the abutment faces on the cowl and box structure supporting the cowl are clean. Refit roof cowl and secure using new fasteners (see Material items 5 and 6). Tighten the screws (see Torque Figures item 1) ensuring the spring washers are fully compressed.

All vehicles with catering area

Check that the abutment faces on the cowl and box structure supporting the cowl are clean. Refit roof cowl and secure using new fasteners (see Materials items 10, 11 and 12). Tighten the screws (see Torque Figures item 2) ensuring the spring washers are fully compressed.

NOTE 5: Test in accordance with Job No. HZ 8003.

Arising Work

1,2, Where corrosion has not caused pitting, clean, prepare and treat with corrosion inhibiting
3. primer consistent with the paint system being used.


1,2, Repair corrosion damage in accordance with Job No. CRA0104.
3.

3. **Mk3A vehicles**

Resecure ventilators if loose (see Reference Drawing item 4).

Repair defective ventilator to as new condition (see Reference Drawings item 4) or renew ventilators if heavily corroded or defective and secure using new fasteners (see Materials items 1, 2 and 3).

Renew or fit any defective or missing fasteners (see Materials items 2 and 3).

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Panels, Roof (Other than removable panels) – Examine

CR 6002

Mk3B and HST vehicles – both ends except kitchen/buffet ends on vehicles with a catering area

Repair defective box structure supporting the cowl to as new condition (see Reference Drawings item 2).

Repair defective or enlarged fixing holes and replace rivnuts as required.


Repair defective roof cowl to as new condition (see Reference Drawings item 2) or renew any which cannot be repaired (see Materials item 4).

All vehicles with a catering area

Repair defective box structure supporting the cowl to as new condition (see Reference Drawings items 1, 6, 7, 8, 9, 10, 11, 12 and 13).

Repair defective or enlarged fixing holes and replace rivnuts as required.

Repair defective roof cowl to as new condition (see Reference Drawings items 3, 5 and 14) or renew any which cannot be repaired (see Materials items 7, 8 and 9).

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Panels, Roof Removable – Examine

CR 6003

Reference Drawings		
Item	Drawing No.	Title
1	A1-CO-9013374	Removable Roof Hatch Mounting Frame
2	B1-S-9014043	Arrangement and Details of Removable Panel Above Roof Water Tank


APPLIES TO: All Vehicles

Scheduled Work

1. Remove the panel.
2. Examine the panels from both sides. Check on underside for evidence of rust or holes. Where corrosion is found, test surfaces harshly with sharp tool. **No holes are permitted.**
3. Prepare and treat sound metal with corrosion inhibiting primer consistent with paint system being used.
4. Examine captive nuts.
5. Refit panel, using new seal and bolts.

Arising Work

2. Patch repair the panel. All welding must be continuous to avoid leaks. All accessible new metal and welds must be prepared and treated with corrosion inhibiting primer consistent with paint system being used.
2. Renew defective removable panels which cannot be repaired (see Reference Drawings item 1 and 2).
4. Renew captive nuts.

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Guttering – Examine

CR 6004

Reference Drawings		
Item	Drawing No.	Title
1	C-A1-14558	Detail of Gutter Over Door, Mark 3 Coach
2	C-A1-14580	Arrangement of Guttering Over Corner Door, Mark 3 Standard Carriage

APPLIES TO: HST, Mark 3b and Mark 3a (where fitted)

NOTE 1: Mark 3a vehicles were not fitted with gutters as-built, but some vehicles have been subsequently fitted.


NOTE 2: HST vehicles converted from Mark 3 LHCS may not be fitted with gutters.

Scheduled Work

- Clean out debris.
- Examine (see Reference Drawings items 1 and 2).
- Check security.

Arising Work

- Rectify defects in situ using a procedure that has been agreed by the Engineer.
- Renew damaged, badly corroded or missing guttering using a procedure that has been agreed by the Engineer.
- Resecure loose guttering using a procedure that has been agreed by the Engineer.
- 2,3. All new metal and welds must be prepared using a procedure that has been agreed by the Engineer and treated with corrosion inhibiting primer consistent with paint system being used.

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Footsteps – Examine

CS 0101

Materials			
Item	Description	Qty/Veh	Cat No.
1	Step Lower (comprising Items 5, 6 and 7)	As Req'd	063/008151
2	Flange	As Req'd	063/002128
3	Web Support (As Drawn)	As Req'd	063/002129
4	Web Support (Opp Hand)	As Req'd	063/002130
5	Side Plate (As Drawn)	As Req'd	063/002131
6	Side Plate (Opp Hand)	As Req'd	063/002132
7	Step Channel	As Req'd	063/002133
8	Bolt, M12 x 40, Hex Head, Grade 8.8	As Req'd	003/100692
9	Washer, M12, Form C, EZP	As Req'd	003/191710
10	Nut, M12, Slotted, Steel, Grade 8, EZP	As Req'd	003/175510
11	Split Pin M3 x 28	As Req'd	029/000058

Reference Drawings		
Item	Drawing No.	Title
1	B1-A0-9013634	Arrangement of Lower Steps
2	B1-A0-9019788	Details of Lower Steps

APPLIES TO: All Vehicles


NOTE: Footsteps are fitted on diagonally opposite corners (No 2 and 4 positions) of the vehicle.

Scheduled Work

1. Examine the footsteps for defects.
2. Check that the footstep fasteners are present and secure.
3. Check that the anti-slip material on the top of each step is in a satisfactory condition.

Arising Work

1. Repair any defective footstep using a procedure agreed with the Engineer. If damaged beyond repair, renew the main footstep assembly (see Materials items 1). If the components mounted to the vehicle are defective, repair or renew the defective item (see Materials items 2 to 4).
2. Renew any loose or missing fasteners (see Materials items 8 to 11).
3. Renew coating in accordance with the specified drawing (see Reference Drawings item 2).

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Commode, Handle – Examine

CS 6017

Materials			
Item	Description	Qty/Veh	Cat No.
1	Commode Handle (coated)	As Req'd	063/001003
2	Screw, M6 x 20, Slotted Raised Countersunk Hd, EZP, Grade 4.8	16	035/105609


APPLIES TO: All Vehicles

Scheduled Work

1. Remove external commode handles and discard the fasteners.
2. Examine commode handles for corrosion and any other defects.
3. Clean the abutment faces on both the vehicle and commode handle.
4. Refit the commode handle and secure using new fasteners (see Materials item 2). Tighten fasteners until the commode handle flange is in full contact with the vehicle. Do not overtighten.

Arising Work

2. Repair or renew defective or missing commode handle (see Materials item 1) and paint to match the colour on the appropriate livery drawing, see Job No C* 6015.

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Gangway Interior Panels – Examine

CV 0102

Materials			
Item	Description	Qty/Veh	Cat No.
1	Washer Taper. 25 Square x 10.5 ID x 20 For Gangway Inner Panel	As Req'd	063/008228

Torque Figures			
Item	Description	Size	Torque (Nm)
1	Nut	M8	20

APPLIES TO: All Vehicles

QUANTITY PER VEHICLE: 4

Scheduled Work


- Examine hinged panels (see Figure 2 item 27).
- Check that hinges (9) are secure. If flexible link still fitted, eliminate in accordance with Arising Work item 2.
- Check that hinges operate freely.
- Examine flexible panels (item 15).
- Check that gaps between the flexible panels (15) and the cover strips (item 12 on Figure 2) are within the limits 1.5 to 2.5mm.
- Check that the flexible panel rollers (item 11) are free to rotate.
- Check that the panel is tensioned by the action of the rubber torsion spring (item 10).
- Examine the ceiling panel (item 25) and ceiling strip (item 24) (see Job No. CV 0103 Figure 2 for locations).

NOTE 1: The panels are re-tested after the coupler has been refitted (see Job No. UC 9027).

Arising Work

NOTE 2: In the event that it is necessary to repair or renew an interior panel, then the repaired or renewed interior panel must be painted to match the current vehicle décor.

- Repair hinged panel.
- Renew hinged panel.

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Gangway Interior Panels – Examine

CV 0102

2. Eliminate flexible link as follows:
 - 2.1 Remove the hinge.
 - 2.2 Remove and scrap the flexible link.
 - 2.3 Drill the hinge as shown in Figure 1.
 - 2.4 Assemble the hinge to the panel as shown in Figure 1 (i.e. the other way round).
 - 2.5 Add taper washer (see Materials item 1) and M8 slotted nut.
 - 2.6 Tighten nut (see Torque Figures item 1) and further tighten to align split pin hole.
 - 2.7 Fit split pin and open out legs.

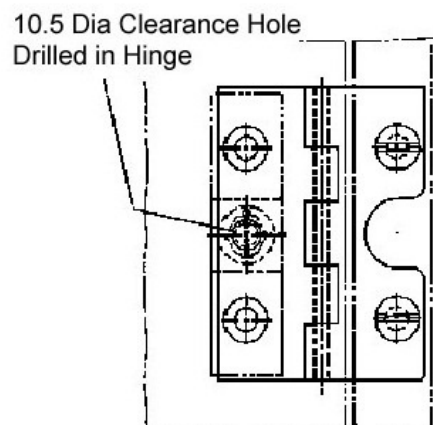
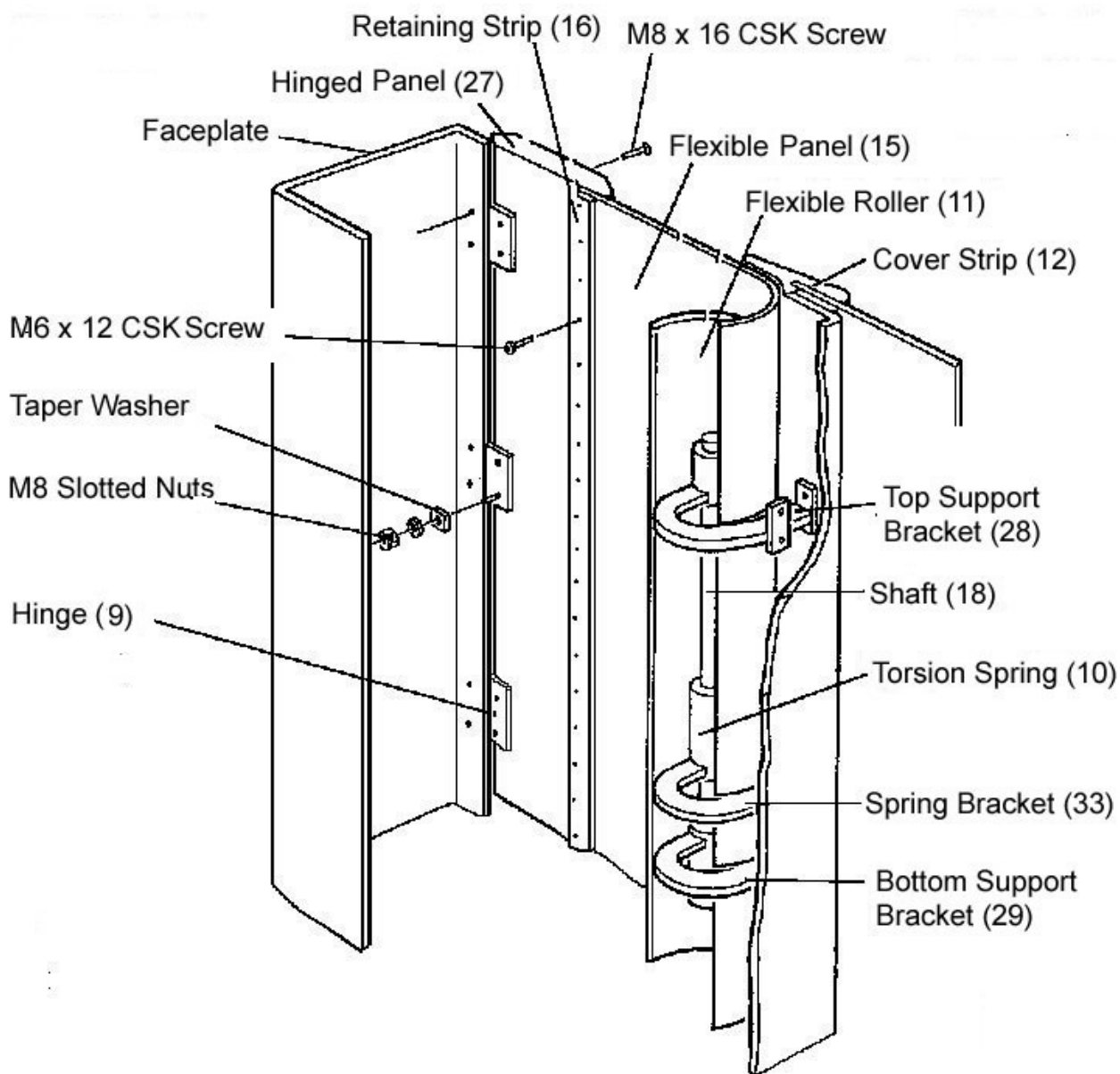



Figure 1

2. Resecure loose hinge.
3. Lubricate and free seized hinges.
3. Renew hinge.
4. Renew flexible panel in accordance with Job No. CVA0114.
5. Remove or insert packing under cover strip (see Figure 3 item 12) to obtain correct clearance.

**Gangway Interior Panels – Examine****CV 0102****Figure 2: Gangway Interior Panels**

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Gangway Interior Panels – Examine

CV 0102

PLAN VIEW

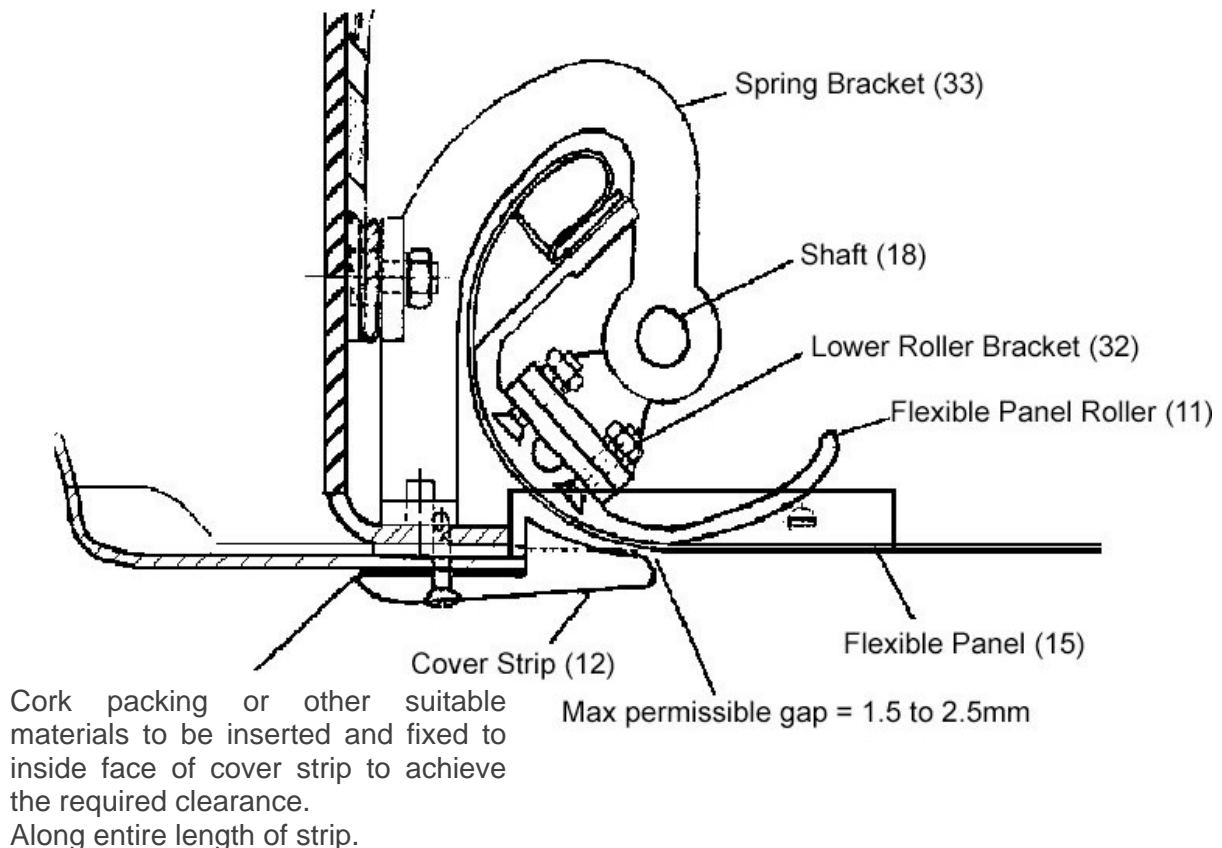



Figure 3: Method of applying packing behind the cover strip to achieve the required gap between the flexible panel/cover strip

6. Lubricate and free the seized shaft.

7. Renew the rubber torsion spring if bond of torque nut has failed, as follows:

Remove gangway flexible panel in accordance with Job No. CVA0114, items 1 to 3, and 3.2.
Re-assemble with new torsion spring in accordance with Job No. CVA0114, items 4, and 6 to 9.

8. Renew the ceiling panel.

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Gangway Faceplate – Examine

CV 0103

Materials			
Item	Description	Qty/Veh	Cat No.
1	Spherical Rubber Bush	2	097/006576
2	Hood, Gangway, Neoprene Coated Canvas	As Req'd	063/008491
3	Strap, Aluminium	As Req'd	063/008292

Reference Drawings		
Item	Drawing No.	Title
1	C-S-13819	Faceplate – Arch Outer Cover

Reference Documents		
Item	Document No.	Title
1	PB/TP1139	Repair to Fatigue Crack on Mark 3 Coach Gangway Faceplate
2	CR/TP1482	Magnetic Particle Testing of Ferromagnetic Steel Components Using Hand Held AC Electromagnetic Yokes


APPLIES TO: All Vehicles

QUANTITY PER VEHICLE: 2

Scheduled Work

NOTE: Certain gangway faceplates (No2 end on the vehicles listed below) have been modified and strengthened in the area shown in Figure 1. If a faceplate is removed, the faceplate that is refitted must be similarly modified. Contact the Engineer for specific details relating to details or repairs of modified faceplates.

Vehicle Numbers	
11066	11075
11067	11076
11068	11077
11069	11080
11070	11081
11072	11082
11073	11091

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Gangway Faceplate – Examine

CV 0103

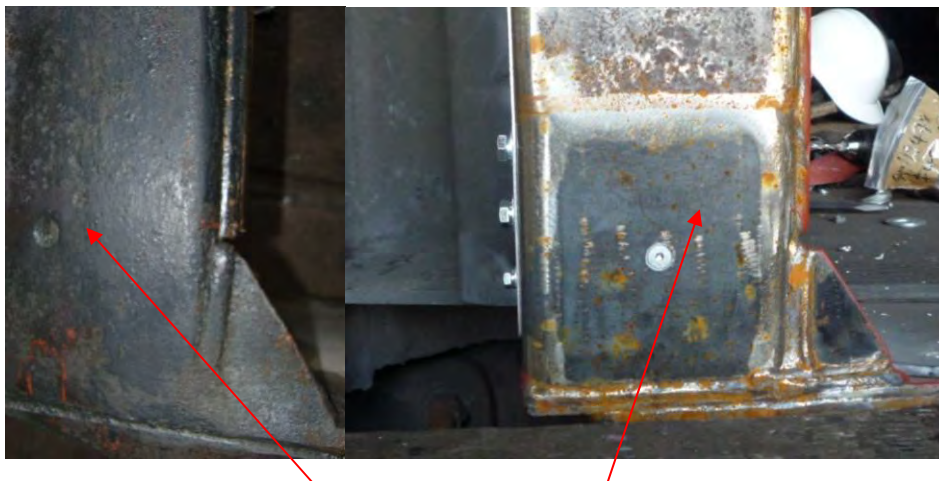



Figure 1: The left hand photo shows the standard arrangement not strengthened, the right hand photo shows the area strengthened.

1. Check faceplate for visible distortion.
Maximum allowable distortion in any plane 3.0mm.
2. Examine for damage. Check particularly for fractures in the area around the transition from gangway treadplate into vertical side members. This area must be subjected to crack detection using Magnetic Particle Inspection technique described in the specified document (see Reference Documents item 2), using the specified document (see Reference Documents item 1) Section 6. The maximum permissible crack length is 20mm.
3. Examine the fibre wear plates. There must be a minimum of 2mm of wear plate material above the height of the rivet heads.
4. Examine fibre treadplate (item 35 on Figure 2) on faceplate.
5. Renew the spherical rubber bush (item 34 on Figure 2) (see Materials item 1).
6. Thoroughly clean the housing to remove all traces of dirt and fit a new spherical rubber bush (see Materials item 1).
7. Examine seals (item 19 on Figure 2).
8. Examine the canvas arch cover (item 1 on Reference Drawings item 1) for tears, cuts and abrasive wear, including around the fastening holes under the aluminium retention straps.
9. Examine the aluminium retention straps (item 4 on Reference Drawings item 1) for distortion, fractures, corrosion, wear/erosion and security.


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Gangway Faceplate – Examine

CV 0103

Arising Work

1. Remove the faceplate and straighten in accordance with a procedure approved by the Engineer.
2. Remove the faceplate and repair in accordance with the specified document (see Reference Documents item 1) or where this is not applicable, a procedure approved by the Engineer.
3. Renew fibre wear plate if worn to within 2mm of rivet heads.
4. Renew fibre treadplate.
4. Resecure loose fibre treadplate.
8. Renew seals if damaged or worn.
10. Renew the canvas arch cover (see Materials item 2).
11. Remove the aluminium retention straps and straighten. Renew the straps if they cannot be rectified (see Materials item 3). Resecure the straps and canvas arch cover (see Reference Drawings item 1 for details).

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Gangway Faceplate – Examine

CV 0103

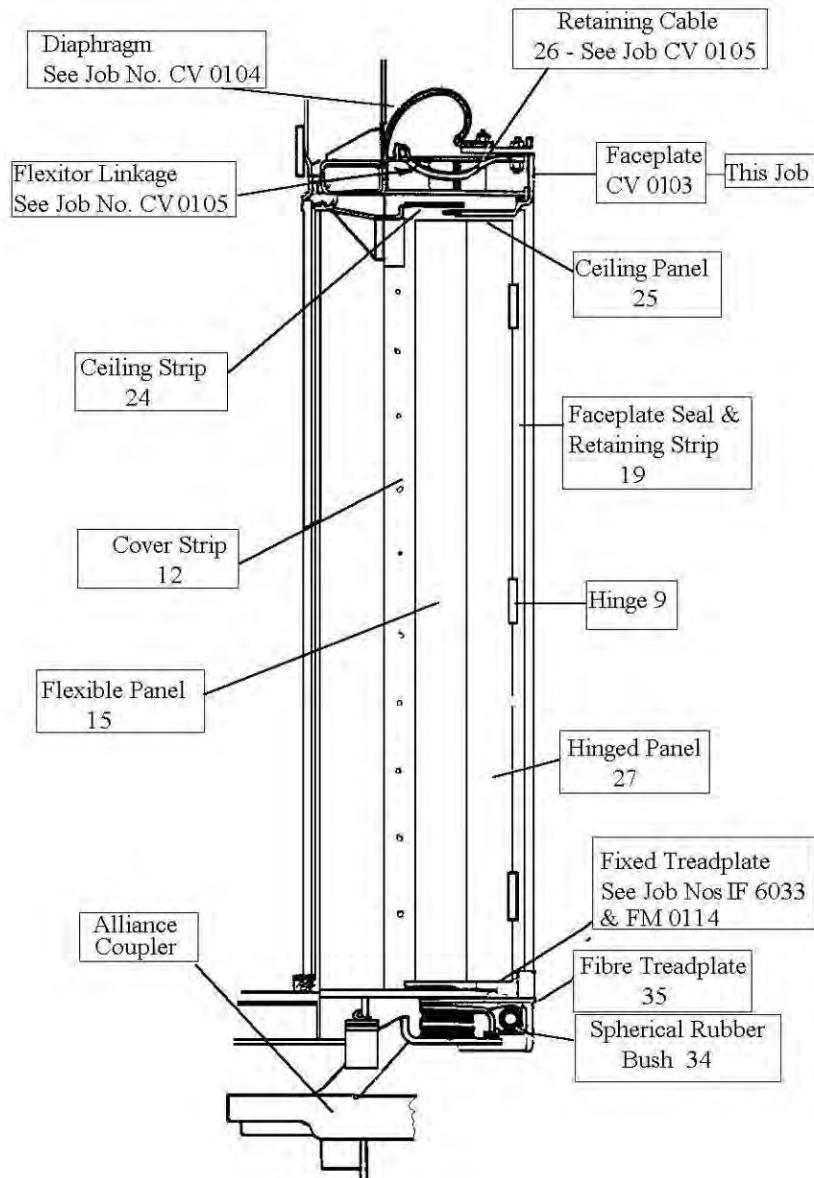



Figure 2: Side Elevation of Gangway

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Diaphragm – Examine

CV 0104

Materials			
Item	Description	Qty/Veh	Cat No.
1	Diaphragm	As Req'd	063/003274
2	Hubner Diaphragm	As Req'd	063/009208

APPLIES TO: All Vehicles

QUANTITY PER VEHICLE: 2

Scheduled Work – Original Design

1. Examine diaphragm (see Materials item 1) for tears and wear.

Arising Work

1. Renew diaphragm in accordance with Job No. CVA0116.

NOTE 1: If both the flexitor linkages and the diaphragm are to be removed then the gangway faceplate assembly will be free to be taken off. Hence Job No. CVA0116 comprises an assembly sequence for the whole gangway.


Scheduled Work – Hubner Design

1. Examine diaphragm (see Materials item 2) for tears and wear.

Arising Work

1. Renew diaphragm in accordance with Job No. CVA0116.

NOTE 2: If both the flexitor linkages and the diaphragm are to be removed then the gangway faceplate assembly will be free to be taken off. Hence Job No. CVA0116 comprises an assembly sequence for the whole gangway.

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Flexitor Linkage – Examine

CV 0105

APPLIES TO: All Vehicles

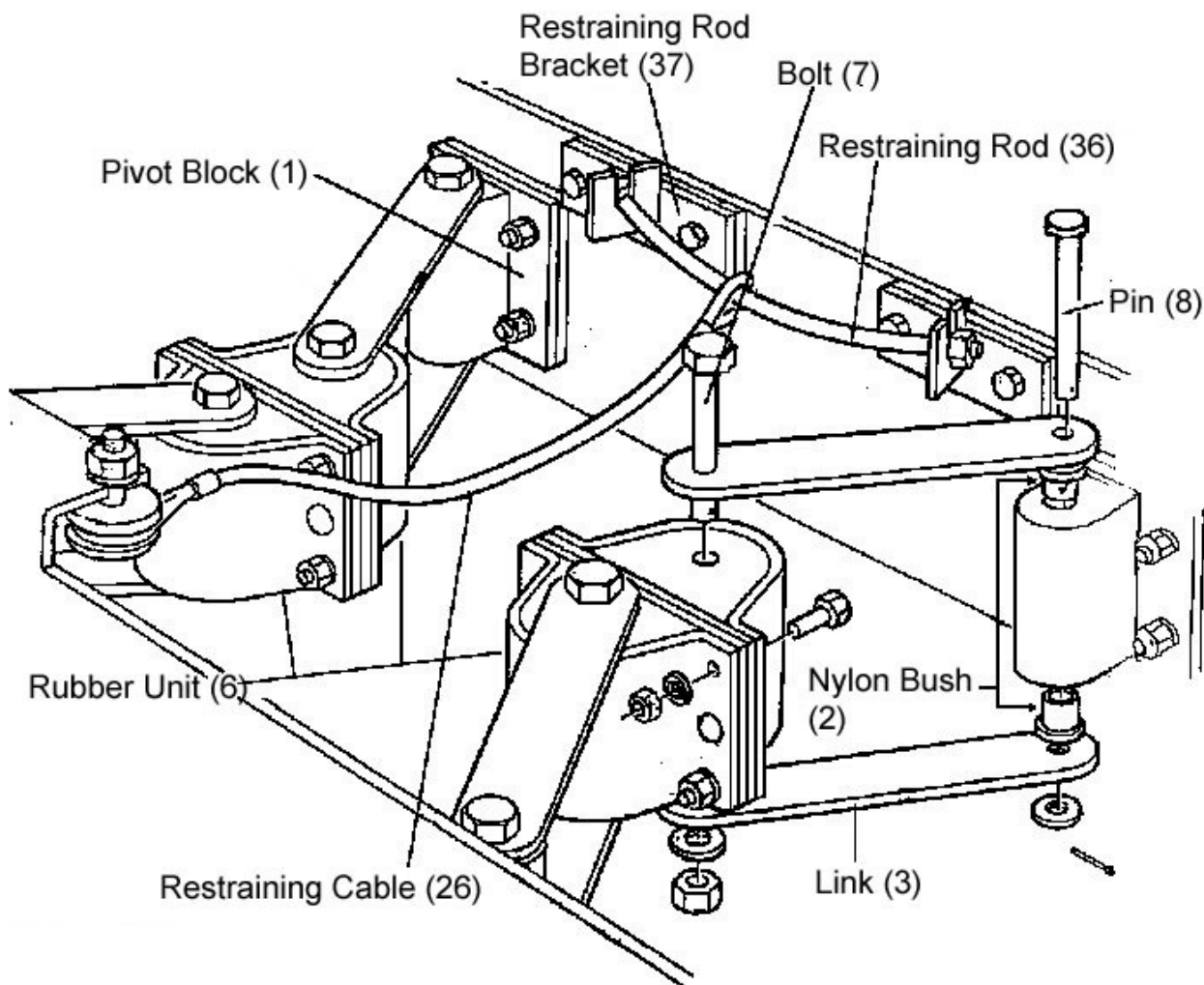
QUANTITY PER VEHICLE: 2


Scheduled Work

1. Examine the linkage for security, damage and that the links have been fitted in the correct orientation as shown in Figure 1.
2. Check that the retaining bolts (7) and pins (8) are fitted from the top (see Figure 1). If the nuts are fitted at the top, there is a risk of damaging the rubber diaphragm.
3. Check that there is no free play in linkages.
4. Examine rubber units without dismantling for obvious signs of splits or bond failure.
5. Examine restraining cable (26) (item 26 Figure 1).
6. Examine restraining rod (36) (item 36 Figure 1). Check that it is secure, with 2 nuts at each end, one each side of the bracket.

Arising Work

1. Resecure loose items, otherwise carry out Job No. CVA0117.
2. Remove and refit bolt or pin in the correct orientation.
- 3,4. Carry out Job No. CVA0117.
5. Renew restraining cable.
6. Renew or resecure restraining rod.

**Flexitor Linkage – Examine****CV 0105****Figure 1: Arrangement of Flexitor Linkage**

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Gangway Flexible Panel – Renew

CVA0114


Materials			
Item	Description	Qty/Veh	Cat No.
1	Flexible Panel (As Drawn)	2	063/008815 (See Note)
2	Flexible Panel (Opposite Hand)	2	063/008814 (See Note)

APPLIES TO: All Vehicles

Scheduled Work (see Figures 1 and 2 on pages 3 and 4)

NOTE: Renewed flexible panels must be painted (if necessary) to match the current vehicle décor.

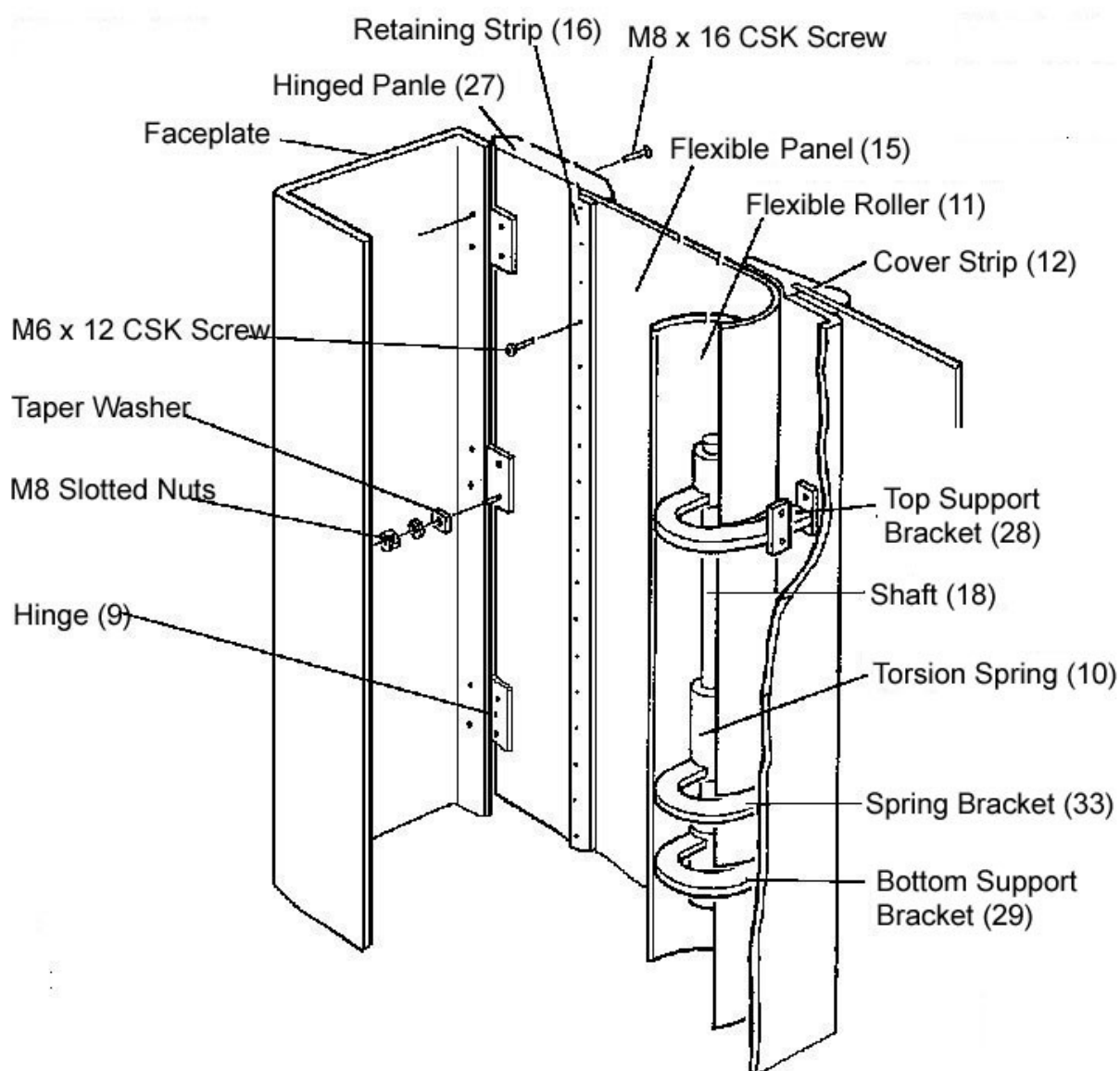
1. Release the screws, M8 x 16, securing the hinges (9) to the faceplate. When the hinges are free, the torsion spring (10) will cause the inner panel rollers (11) to rotate until bottom of the clearance slots come into contact with the support brackets (28) and (29). To release the tension on the torque unit hold the torque nut (13) (24 A/F), remove the split pin (14) and then allow the unit to rotate to its free position.
2. The inner panel rollers (11) must be free to pivot without having excessive clearance of the shaft (18). Such clearance may be due to wear of the nylon bushes (30) pressed into the upper (28) and lower (29) support brackets (maximum permissible clearance 2.0mm). Renew bushes (30) if clearance more than this.
3. Release the screws, M8 x 15, and nuts, M8, securing the torque unit support brackets (28) and (29) to the body end. Remove the torque unit and inner panel assembly. If further dismantling of this assembly is required then proceed as follows:
 - 3.1 If fitted remove profile extension piece from roller.
 - 3.2 Release the screws, M6 x 12, securing the flexible panel retaining strips (16) to the roller (11) and hinged panel (15). Remove the retaining strips and the flexible panel.
 - 3.3 Remove the split pins securing the upper (31) and lower (32) roller brackets to the shaft (18). When the shaft is withdrawn the complete torque unit assembly will split into its component parts.
4. Reassemble new flexible panels (see Materials items 1 and 2) to roller and hinged panel as follows:
 - 4.1 Lay the new flexible panel flat, and secure plain end to hinged panel (15) and end with 3 cut outs to the roller (11) with retaining strips (16) and M6 x 12 screws.
 - 4.2 If originally fitted, refit profile extension piece to roller with 5 of No. 8 x 25 long CSK head self tapping screws.

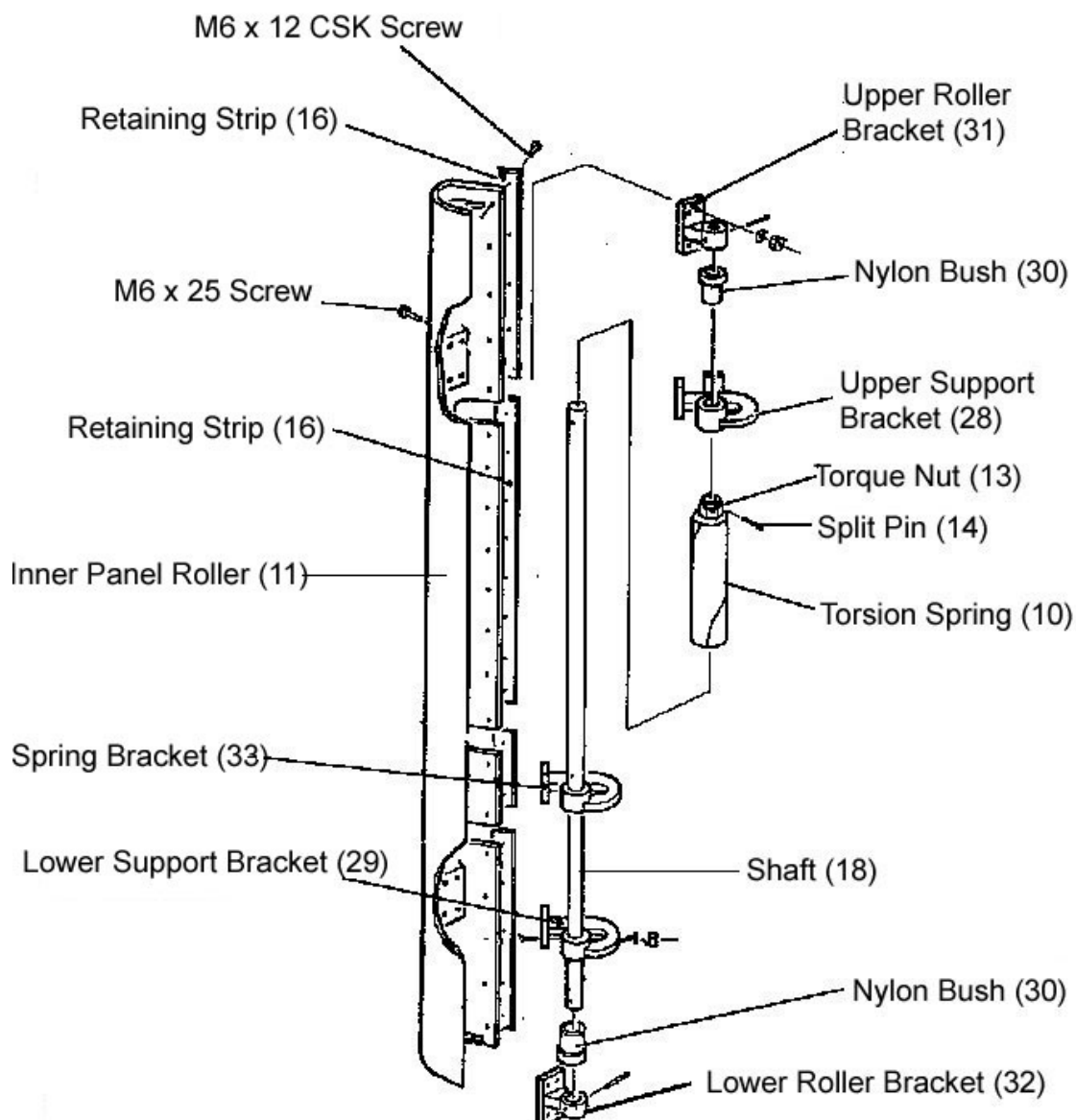
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Gangway Flexible Panel – Renew

CVA0114

- 4.3 Ensure that the lower support bracket (29), the spring bracket (33) and the upper support bracket (28) are threaded on shaft (18) and the right way round.
- 4.4 Reassemble roller (11) to shaft (18) and secure upper (31) and lower (32) roller brackets to shaft with split pins.
- 4.5 Check that the 3 cut outs in panel will provide clearance for the support (28, 29) and spring brackets (33).
5. Attach the support brackets (28, 29) to the body end with screws M8 x 16 and nuts M8.
6. If right hand side, allow the roller to rotate fully clockwise i.e. until the bottom of the clearance slots come into contact with the support brackets. Rotate the torque nut (13) approximately 189° anti-clockwise to line up with the split pin hole in the shaft. Secure the torque nut in this position with M5 split pin (14).
7. If left hand side, the directions of rotation are reversed.
8. Gently pull on the hinged panel and check that the roller unwinds and on releasing, winds-in the flexible panel.
9. Secure both cover strips (12) to the body end. Adjust thickness of the packing behind the strips so that the gap between the flexible panel (15) and the strip is within limits 2 to 3mm (see Figure 3).
10. Press on the end of the hinged panel and check that the roller still rotates.

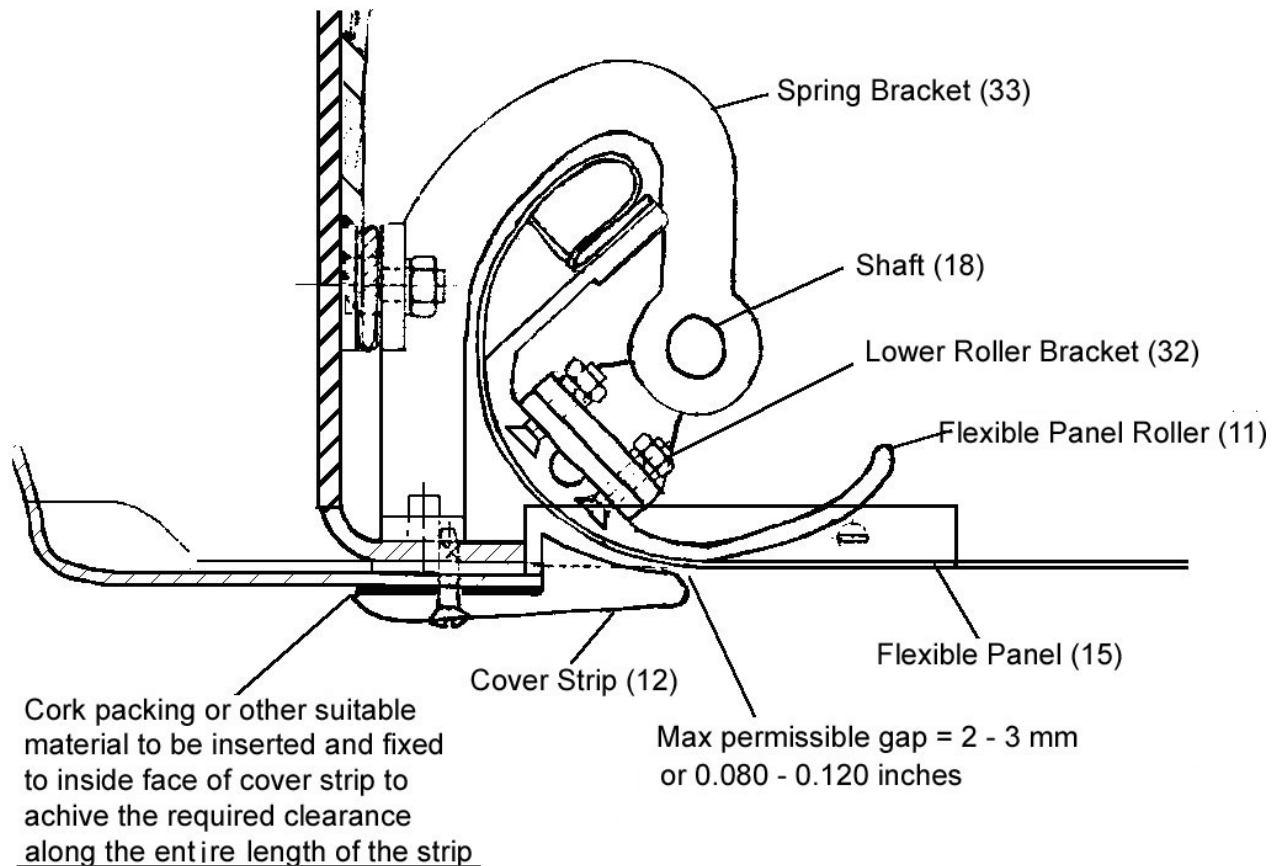
**Gangway Flexible Panel – Renew****CVA0114****Figure 1: Gangway Inner Panel Assembly R/H**

**Gangway Flexible Panel – Renew****CVA0114****Figure 2: Gangway Inner Panel Torque Unit**

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Gangway Flexible Panel – Renew

CVA0114




PLAN VIEW

Figure 3: Method of applying packing behind the cover strip to achieve the required gap between the flexible panel/cover strip

Arising Work

1. Renew rubber torsion spring if bond of torque nut has failed.
2. Lubricate and free seized shaft.
2. Renew bushes (30) if clearance more than 2.0mm.

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Gangway Diaphragm – Renew

CVA0116

Materials			
Item	Description	Qty/Veh	Cat No.
1	Texaco Rustproof Compound L	As Req'd	027/004601
2	Silicone Sealant	As Req'd	007/060344

Torque Figures			
Item	Description	Size	Torque (Nm)
1	Nut	M20	100

APPLIES TO: All Vehicles

Part 1 – Original Design


Scheduled Work (See Figure 1)

1. Removal
 - 1.1 Remove self tapping and woodscrews securing ceiling panel (25) to gangway faceplate.
 - 1.2 Remove the flexible panel (15) and rollers (11) in accordance with Job No. CVA0114, items 1 to 3, and 3.2.
 - 1.3 Take the load off the restraining cable (26) and remove restraining rod (36).
 - 1.4 Remove the brackets (37) for the restraining rod from the body end.
 - 1.5 Remove the M6 x 25 screws, flat washers, spring washers and nuts securing the retaining strips (38) and diaphragm to the gangway arch.
 - 1.6 Remove the M6 nuts and flat washers from the body mounted studs securing the retaining strips (38) and diaphragm to the body end.

2. Refitting

NOTE 1: This sequence includes all gangway components.


- 2.1 Lay out the new rubber diaphragm on the floor.
- 2.2 Use both halves of the securing strip to mark out the holes for securing to the vehicle and also to trim the excess length from the diaphragm legs.
- 2.3 The holes must be marked out as close as possible to the edge of the new diaphragm.
- 2.4 If this is not done the diaphragm will stretch and be pulled out of shape when attached to the faceplate.
- 2.5 Secure the diaphragm to the body end using retaining strips (38) and M6 nuts and flat washers.

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Gangway Diaphragm – Renew

CVA0116

- 2.6 Secure the flexitor pivot blocks (1) and linkage assemblies to the body end using M8 nuts and washers.
- 2.7 If required, trim off excess length on the diaphragm leg so that it rests on the headplate.
- 2.8 Secure the faceplate assembly to the flexitor pivot blocks using M8 x 25 screws.
- 2.9 If a drawbar is fitted to the vehicle, connect the faceplate to the drawbar with a centre pin, and tighten M20 nut to 100Nm.
- 2.10 Refit the brackets (37) for the restraining rod (36) to the body end.
- 2.11 Refit flexible inner panels in accordance with Job No. CVA0114 items 5-10.
- 2.12 Place the diaphragm in position and secure to the gangway arch using retaining strips (38) and M6 x 25 countersunk screws, flat washers, spring washers and nuts.
- 2.13 After tightening, crop the bolts to leave between one and two threads protruding.
- 2.14 Coat the exposed ends of the bolts with Texaco Rustproof Compound L (see Materials item 1).
- 2.15 Press the faceplate towards the body end and connect the restraining cable (26) to faceplate and restraining rod (36).
- 2.16 If a centre pin connecting the gangway to the coupler has been fitted, secure the hinged panel to the gangway faceplate with M8 x 16 screws. Insert a thin wedge between the cover strip (12) and the panel (15) to hold the panel in the correct position whilst securing the hinges.
- 2.17 If centre pin is not connected, it will be done as part of Job No. UC 9027.
- 2.18 Fit a weather seal on vehicle "fixed tread plate" to form a good seal against the diaphragm.
- 2.19 Refit the ceiling panel (25) to the gangway faceplate using self tapping and wood screws.

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Gangway Diaphragm – Renew

CVA0116

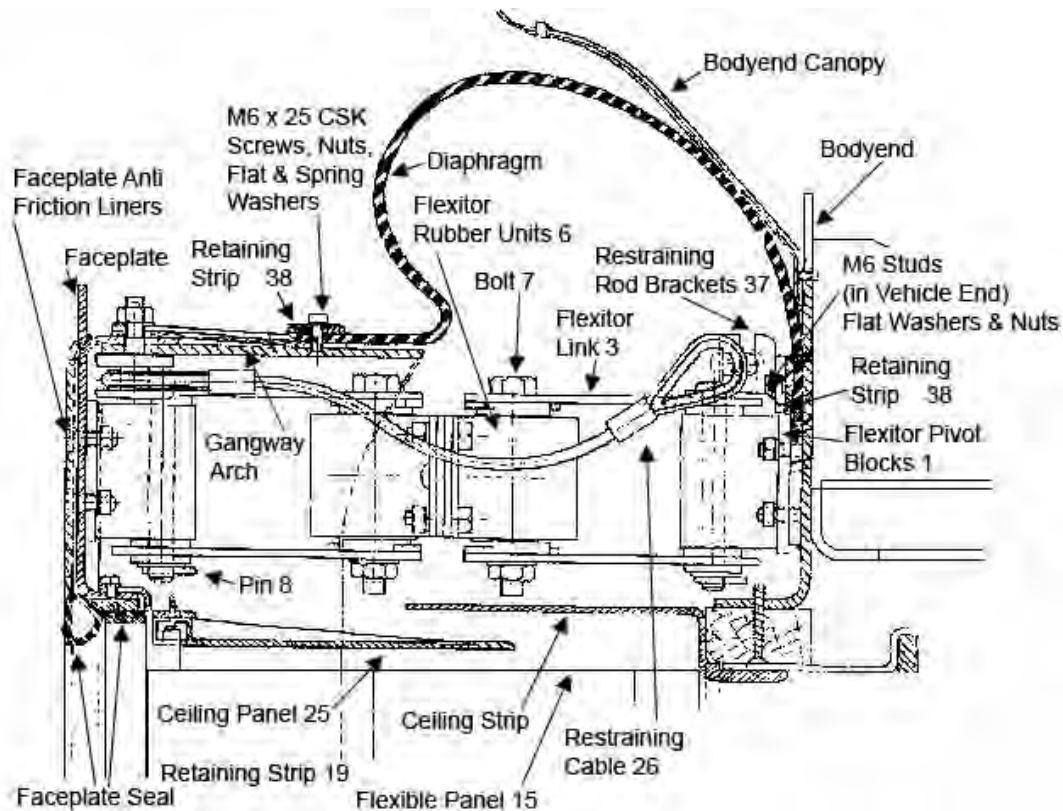



Figure 1: Cross Section of Gangway at top showing Original Diaphragm and Flexitor Linkage

Part 2 – Hubner Design

NOTE 2: The main difference between the original and Hubner design diaphragm is that the Hubner design has the retaining strips moulded into the diaphragm edges, as opposed to separate strips with the original design.

Scheduled Work (See Figure 2)

1. Removal
 - 1.1 Remove self tapping and woodscrews securing the ceiling panel (25) to the gangway faceplate.
 - 1.2 Remove the flexible panel (15) and rollers (11) in accordance with Job No. CVA0114, steps 1 to 3, and 3.2.
 - 1.3 Take the load off the restraining cable (26) and remove the restraining rod (36).
 - 1.4 Remove the brackets (37) for the restraining rod from the body end.

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Gangway Diaphragm – Renew


CVA0116

- 1.5 Remove the M6 x 25 screws, flat washers, spring washers and nuts securing the diaphragm to the gangway arch.
- 1.6 Remove the M6 nuts and flat washers from the body mounted studs securing the diaphragm to the body end.

2. Refitting

NOTE 3: This sequence includes all gangway components.

- 2.1 Remove any loose paint, dirt or corrosion from the body end and gangway arch, at the interfaces with the gangway diaphragm. Apply a generous bead of silicon sealant (see Materials item 2) in a snake type pattern to the body end, at the interface with the gangway diaphragm (i.e. following the line of the M6 studs).
- 2.2 Secure diaphragm to the body end studs using M6 nuts and flat washers, ensuring that the sealant applied in step 2.1 is compressed along the full length of the joint.
- 2.3 Secure the flexitor pivot blocks (1) and linkage assemblies to the body end using M8 nuts and washers.
- 2.4 If required, trim off excess length on the diaphragm leg so that it rests on the treadplate.
- 2.5 Secure the faceplate assembly to the flexitor pivot blocks using M8 x 25 screws.
- 2.6 If drawbar fitted to vehicle, connect faceplate to drawbar with centre pin, and tighten M20 nut (see Torque Figures item 1).
- 2.7 Refit the brackets for the restraining rod to the body end.
- 2.8 Refit the flexible inner panels in accordance with Job No. CVA0114 items 5-10.
- 2.9 Apply a light bead of silicone sealant (see Materials, item 2) to the diaphragm, following the line of the M6 screw holes that attach it to the gangway arch. Place the diaphragm in position and secure to the gangway arch using M6 x 25 countersunk screws, flat washers, spring washers and nuts.
- 2.10 After tightening, crop the bolts to leave between one and two threads protruding.
- 2.11 Coat the exposed ends of the bolts with Texaco Rustproof Compound L (see Materials item 1).
- 2.12 Press the faceplate towards the body end and connect the restraining cable (26) to faceplate and restraining rod.

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Gangway Diaphragm – Renew

CVA0116

- 2.13 If a centre pin connecting the gangway to the coupler has been fitted, secure the hinged panel to the gangway faceplate with M8 x 16 screws. Insert a thin wedge between cover strip (12) and the panel (15) to hold the panel in the correct position whilst securing the hinges.
- 2.14 If a centre pin is not connected, it will be done as part of Job No. UC 9027.
- 2.15 Fit a weather seal on vehicle "fixed tread plate" to form a good seal against the diaphragm.
- 2.16 Refit the ceiling panel (25) to the gangway faceplate using self tapping and wood screws.

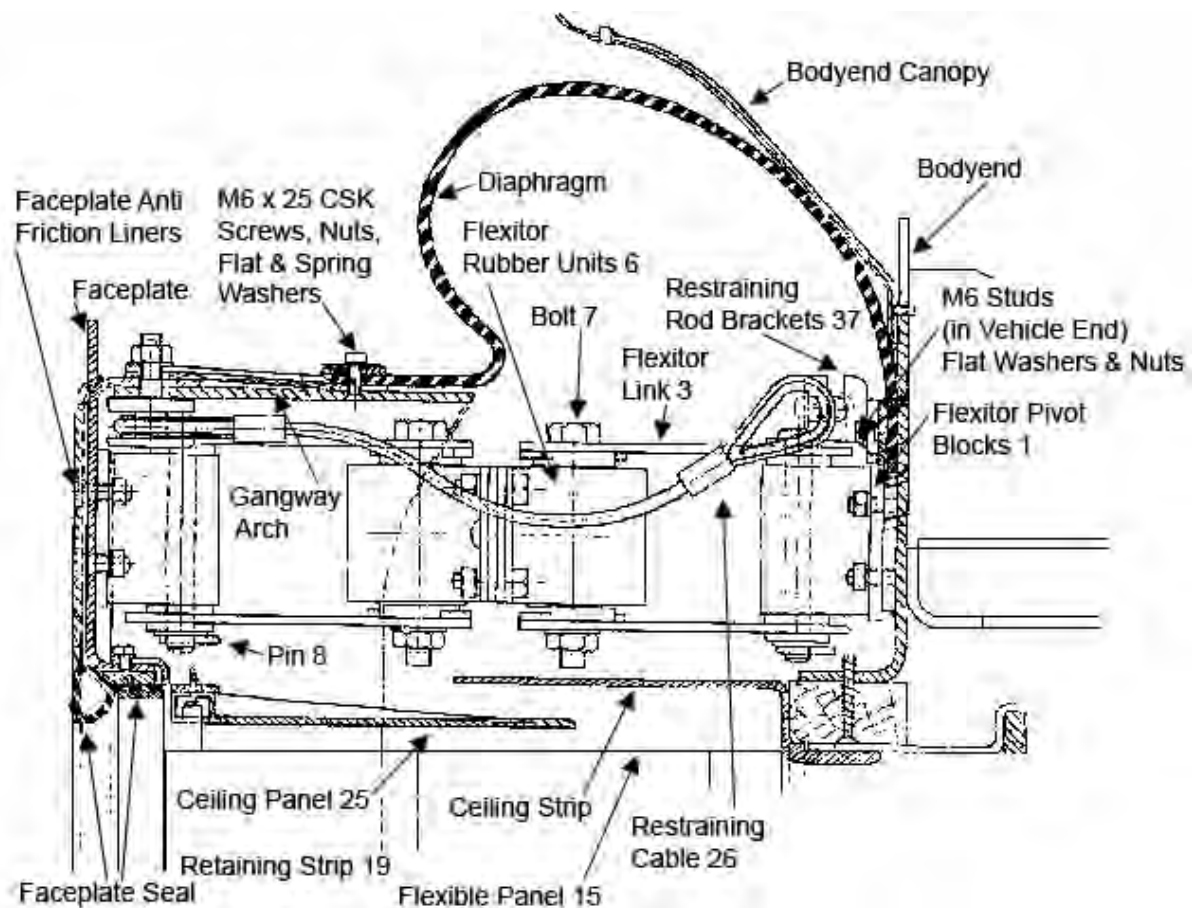



Figure 2: Cross Section of Gangway at top showing Hubner Diaphragm and Flexitor Linkage

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Gangway Flexitor Linkage – Overhaul

CVA0117

Materials			
Item	Description	Qty/Veh	Cat No.
1	Bolt Flexitor Linkage	As Req'd	063/007742
2	Flexitor Linkage, Gangway	As Req'd	063/007737
3	Nylon Bush	As Req'd	063/005386
4	Pin	As Req'd	063/007741
5	Rubber Units (Set of 4)	As Req'd	063/007989


Torque Figures			
Item	Description	Size	Torque (Nm)
1	Nut	M12	35

Reference Drawings		
Item	Drawing No.	Title
1	B1-A2-9015694	Flexitor Link Pin and Bolt

APPLIES TO: All Vehicles

Scheduled Work

1. Remove pins (8) securing links to pivot blocks (1) (see Figure 1).
2. Remove bolts (7) securing links to rubber units (6).
3. Examine the links (3), and check the following:
 - 3.1 that the holes are not visibly worn (maximum allowable \varnothing 13.5mm).
 - 3.2 that the welded on blocks are secure, not worn or burred.
4. Check the bore of nylon bushes (2) in pivot blocks (1) for wear.(Maximum allowed 12.5 mm).
5. Examine bolts (7) for wear (Minimum allowed \varnothing 11.5mm)
6. Examine pin (8) for wear (Minimum allowed \varnothing 12.0mm).
7. Examine rubber units (6).
The following conditions are unacceptable:
 - 7.1 Bond failure longer than 6mm.
 - 7.2 Surface cracks deeper than 1mm.
 - 7.3 Damage.
 - 7.4 Deformed or softened rubber.

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Gangway Flexitor Linkage – Overhaul

CVA0117

7.5 Worn slots in centre tube.

8. Trial fit links to rubber units. Investigate cause of any free movement.

NOTE: It is important that the retaining bolts (7) and pins (8) are fitted from the top (see Figure 1). If the nuts are fitted at the top, there is a risk of damaging the rubber diaphragm.

9. Assemble links to rubber units using special bolts (7) (see Materials item 1) fitted from the top and M12 spring washers and nuts fitted from the underside (see Figure 1). Tighten in accordance with Torque Figures item 1. The links are handed and must be assembled as shown in Figure 2.

10. Check free length of assembly in accordance with Figure 3.

11. Lubricate pins (8) with graphite grease and assemble links to pivot blocks using these pins. Ensure flats on pins and links engage correctly and secure with new split pins.

Arising Work

3. Repair the links (see Reference Drawings item 1), or renew (see Materials item 2).

4. Renew nylon bush (2) (see Materials item 3).

5. Renew bolt (7) (see Materials item 1).

6. Renew pin (8) (see Materials item 4).

6,8, Renew all 4 rubber units if any one is found defective (see Materials item 5).

10.

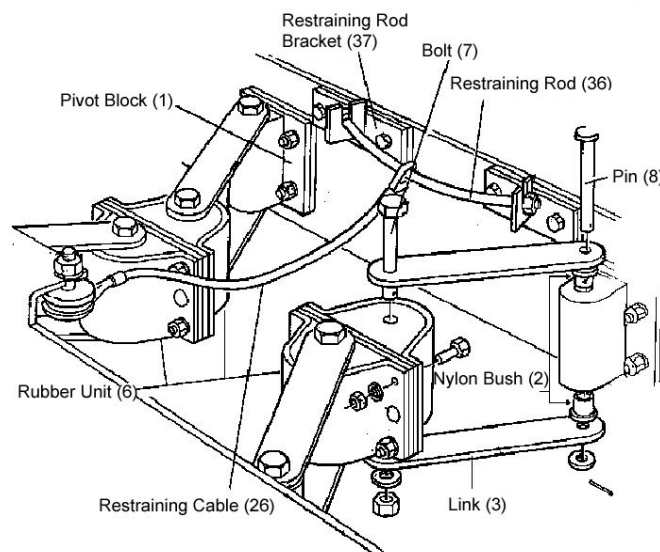


Figure 1: Arrangement of Flexitor Linkage



Gangway Flexitor Linkage – Overhaul

CVA0117

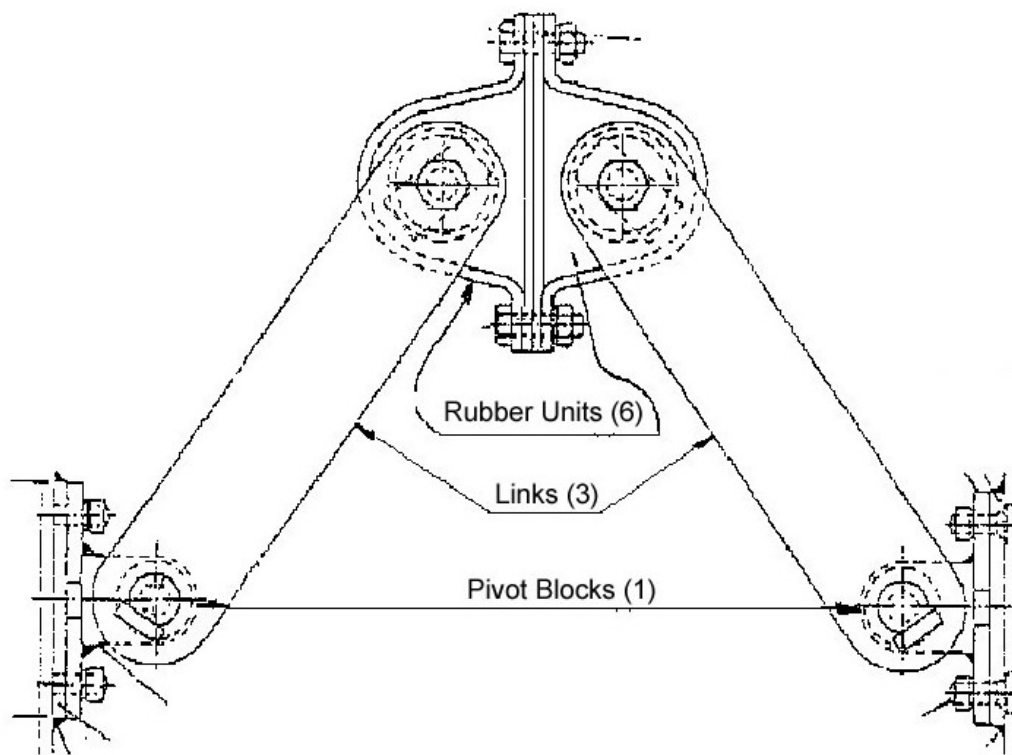


Figure 2: Assembly of Flexitor Links

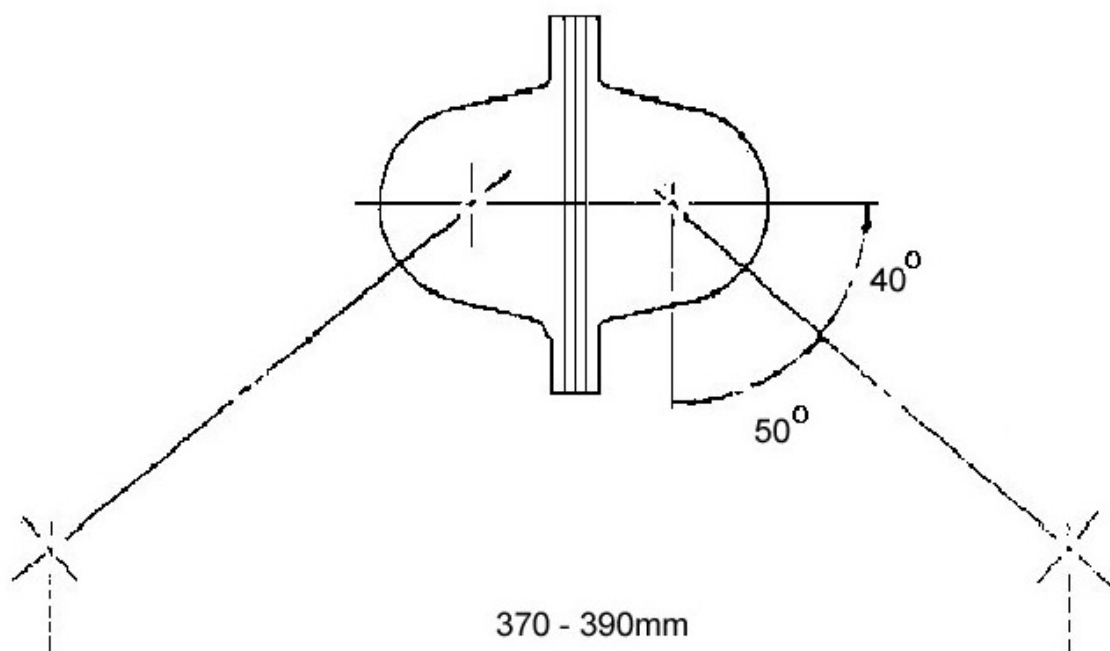



Figure 3: Checking Free Length of Linkage

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Window Frame - Remove/Refit


CWA0119

Materials			
Item	Description	Qty/Veh	Cat No.
1	Matrix 500 or Sikaflex 221	As Req'd	007/005002
2	Avdelok ¼" Steel Countersink Fasteners	As Req'd	030/044525
3	¼" Collar	As Req'd	030/043718

APPLIES TO: All Vehicles

Scheduled Work

1. Remove the interior window panel in accordance with Job CW 6013 item 4 (if still in place).
2. Remove all fasteners and release the window frame from the bodyside.
3. Remove all traces of the original bedding compound and loose paint deposits from the window frame.
4. Examine both sides of the bodyside window aperture and remove loose paint, rust and other debris with a wire brush or emery cloth.
5. Carry out necessary repairs to the bodyside panelling and structure. (Procedure to be agreed with the Engineer).
6. Check the bodyside window aperture with a straight edge for deformation and straighten as required.
7. Enlarge 4 existing holes to 6.6mm evenly spaced in the window frame and countersink, diameter 12mm x 90 degrees. Offer the window frame to the bodyside and using these 4 holes, drill through the bodyside. Using 4 fasteners, locate the frame to the bodyside, and re-drill all existing holes.
8. Remove the window frame and countersink the drilled holes diameter 12mm x 90 degrees.
9. De-burr all the drilled holes in the window frame and bodyside, clean off drilling swarf and degrease.
10. Renew fibreglass insulation if water ingress is evident.
11. Apply a coat of QD Touch - in primer/undercoat to both sides of the bodyside around the window aperture allowing 4 hours to dry.
12. Apply two 6mm continuous ribbons of suitable adhesive – Matrix 500 or Sikaflex 221 (see Materials item 1) around the bodyside window aperture.

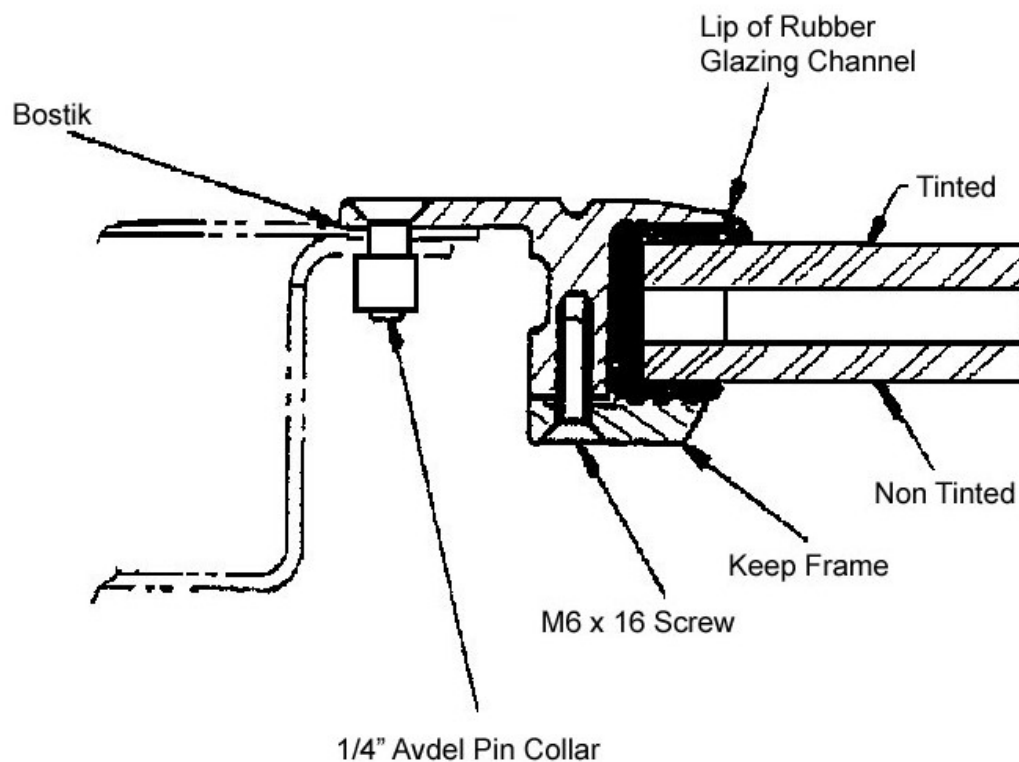
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Window Frame - Remove/Refit

CWA0119


13. Relocate and re-secure the window frame to the bodyside window aperture using Avdelok ¼" steel countersink fasteners (see Materials item 2) with ¼" Collar (see Materials item 3) to the Manufacturer's instructions.
14. Clean off excess sealant (to be flush with bodyside). If any gaps are found apply more sealant and smooth off.
15. Paint fastener heads and any surrounding damage to the window frame with corrosion inhibiting primer consistent with paint system being used.

EXTERIOR



INTERIOR

Figure 1: Sketch of Window Frame

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Window Frame Fastenings – Renew

CWA0121

Materials			
Item	Description	Qty/Veh	Cat No.
1	¼" Countersunk (6.4mm) fastenings	As Req'd	030/044525
2	Collar	As Req'd	030/043718
3	Bostik 2639	As Req'd	007/005803
4	Sikaflex 221	As Req'd	007/005002
5	¼" Avdel Monobolts	As Req'd	035/152001


APPLIES TO: All Vehicles

Part 1 - With Rear Access

1. All missing, loose or defective $\frac{3}{16}$ " fastenings must be replaced with ¼" countersunk (6.4mm) fastenings (see Materials item 1) with collar to (see Materials item 2). Renew fastenings as follows:
 - 1.1 Remove loose and defective fastenings.
 - 1.2 Re-drill holes diameter 6.6mm and counter to diameter 12mm x 90 degrees.
 - 1.3 De-burr drilled holes, clean window frame and bodyside mating surfaces of all drilling swarf, loose paint, old sealant and degrease.
 - 1.4 Insert Bostik 2639 (see Materials item 3.) or Sikaflex 221 (see Materials item 4) sealant into the corner gaps and any gaps round the window frame periphery.
 - 1.5 Fit with ¼" countersunk fasteners (see Materials item 1), and ¼" collars (see Materials item 2) according to the Manufacturer's instructions.
 - 1.6 Remove excess mastic, (to be flush with bodyside). If any gaps are still present insert more mastic and smooth off.
 - 1.7 Paint fastener heads and any surrounding damage to the glazing frame and bodyside with corrosion inhibiting primer consistent with paint system being used.

Part 2 - Without Rear Access


- 2.1 In cases where it is not possible to gain access to the inner side of the window frame assembly due to the need to remove additional equipment i.e.
 - i) Luggage area windows
 - ii) Guards window
 - iii) Catering vehicle (all positions **except** saloon and toilet compartment).
- 2.2 Closely check bodywork around and below the window frame for evidence of corrosion. If structural corrosion is found, carry out Job No. CWA0119.

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Window Frame Fastenings – Renew

CWA0121

- 2.3 If bodywork and fasteners are sound, then clean and degrease the area where the window frame and the bodyside panels meet. If any gaps exist at the sides, top or bottom of the frame, or gaps at the corners exceed 3mm, carry out Job No. CWA0119.
- 2.4 If loose or missing rivets are found but the structure is sound proceed as follows:
 - 2.4.1 Remove loose defective fasteners.
 - 2.4.2 Drill hole diameter 6.6mm and countersink to diameter 10mm x 100 degrees.
 - 2.4.3 Clean drilling swarf, loose paint and degrease where the window frame and the bodyside panels meet.
 - 2.4.4 If gaps are present round the window frame but not exceeding 3mm insert Bostik 2639 (see Materials item 3) or Sikaflex (see Materials item 4).
 - 2.4.5 Rivet frame with ¼" Avdel Monobolts (see Materials item 5) to manufacturers instructions. Check the security of each fastener after installation.
 - 2.4.6 Clean off excess mastic (to be flush with bodyside). If any gaps are found apply more mastic and smooth off.
- 2.5 Paint fastener heads and any surrounding damage to the window frame and bodyside with corrosion inhibiting primer consistent with paint system being used.

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Glazing Unit - Remove/Refit

CWA0127

Materials			
Item	Description	Qty/Veh	Cat No.
1	Unit, Laminating Glazing, with 7.5mm Heat Strengthened Inner	As Req'd	009/000004

APPLIES TO: All Vehicles

NOTE: Operators have pursued different policies with regard to the fitment of toughened or laminated sidelights. Therefore, care must be taken to check that the correct type of sidelight is fitted.

Scheduled Work

1. Removal

- 1.1 Remove set screws that hold the keep frame to the main window frame. Remove the keep frame and store in a safe place.
- 1.2 Push the glazing unit gently at the corners from outside the vehicle until it is released complete with glazing rubber channel. Remove glazing rubber channel and glazing unit and store in a safe place.


2. Refitting

- 2.1 Check the window frame with a straight edge for deformation. Straighten with a hide hammer. Check fasteners and sealing after straightening. Fasteners that are found loose must be renewed in accordance with Job No. CWA0121.
- 2.2 Examine the tapped holes in the frame for wear, stripped threads and broken screws. If the number of defective holes exceed the criteria in the table below, the window frame must be renewed in accordance with Job No. CWA0119.

WINDOW TYPE	TOTAL DEFECT IN WHOLE FRAME	TOTAL DEFECTIVE IN EACH FRAME EDGE		TOTAL DEFECTIVE NEXT TO EACH OTHER		
		Top or Bottom Row	Either Side	Top or Bottom Row	Either Side	Any Corner
Passenger Area	10	6	3	3	2	3
Toilet	5	3	3	2	2	3
Catering Area	5	3	-	3	-	3

Total in whole frame must not exceed figure in column 2.

- 2.3 Clean dirt, paint, water contamination, corrosion and other debris from the window frame aperture.

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Glazing Unit - Remove/Refit

CWA0127

- 2.4 Clean dirt water stains and other debris from the glazing unit periphery.
- 2.5 Examine the screw heads and threads for wear and rust. Renew where defective.
- 2.6 Examine the glazing rubber channel for deformation, cuts and perishing. Pay particular attention to the sealing lip. Renew the glazing rubber channel if any of the above is found.
- 2.7 Fit the rubber glazing channel to the window with the lip to the tinted side of the glass and the joint at the top.
- 2.8 Install the glazing unit (see Materials item 1) at the bottom of the window frame and push into the frame gently, ensuring the glazing rubber does not move out of position and the lip is located over window frame periphery. Ensure the glazing unit is fitted the correct way round. The tinted side to the outside of the vehicle. This may be confirmed by checking that the word "inside" (under the British Standard Kite Mark) is to the inside of the vehicle.
- 2.9 Offer the keep frame to the window frame and fit all the set screws loosely (lightly grease screws prior to fixing). Tighten set screws evenly working from the centre and diagonally until fully tighten.

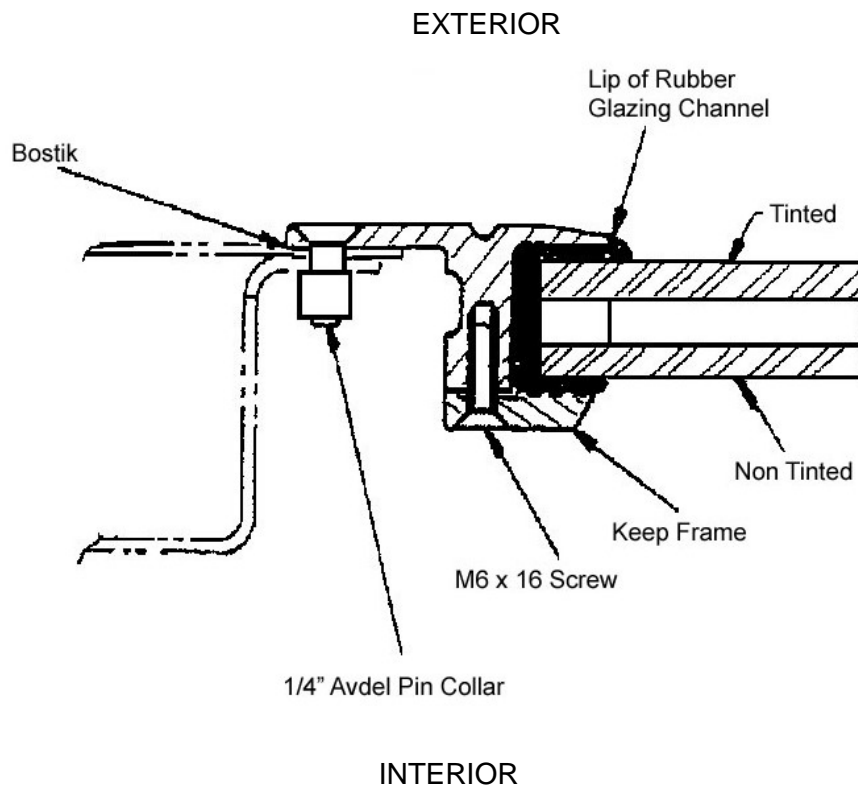



Figure 1: Sketch of Window Frame

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Bodyside Lights and Frames - Examine


CW 6013

Materials			
Item	Description	Qty/Veh	Cat No.
1	Bostik 2639	As Req'd	007/005803
2	Sikaflex 221	As Req'd	007/005002
3	¼" Countersunk Fasteners	As Req'd	030/044525
4	Collars	As Req'd	030/043718

APPLIES TO: All Vehicles

Scheduled Work

1. Examine the window frame for damage.
2. Check the exterior for loose or missing fasteners. Fasteners that have cracked or missing filler from the heads, must be tapped to check they are not fractured or corroded.
3. Check that no gaps exist between the frame and bodyside.
4. Remove the interior window panels as follows:
 - 4.1 Remove seat cushions.
 - 4.2 Remove the two set screws that hold the GRP seat base to the back, recline the seat back to clear the window panel.
 - 4.3 Remove the PVC infill strip from the waist rail.
 - 4.4 Turn the two visible slotted screws anti-clockwise.
 - 4.5 Remove the GRP window panel by pulling the bottom out and lowering. Store in a safe place.
 - 4.6 Where luggage racks are fitted remove top shelf, rear panel and release frame at the 6 fixing points.
5. Examine interior for corroded body structure and ingress of water (a tell tail sign of water ingress is wet fibreglass insulation and water staining on the Colset).
6. Examine the frame fasteners. The following are not acceptable:
 - Threaded fasteners.
 - Blind rivets, e.g. monobolts or those without collars.
 - Any with corrosion.
 - Any which have broken.

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	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	


Bodyside Lights and Frames - Examine

CW 6013

7. Check the rubber glazing channel for perishing and being fitted correctly. The glazing rubber must be fitted with the lip to the outside of the vehicle (see Figure 1).
8. Check the window is fitted the correct way round. The tinted side to the outside of the vehicle. This may be confirmed by checking that the word "inside" (under the British Standard Kite Mark) is to the inside of the vehicle.
9. Refit the internal window panel (and luggage racks) (steps 4.1 to 4.6 in reverse order). Ensure the window rubber seal strip is fitted correctly on the GRP window panel.

Arising Work

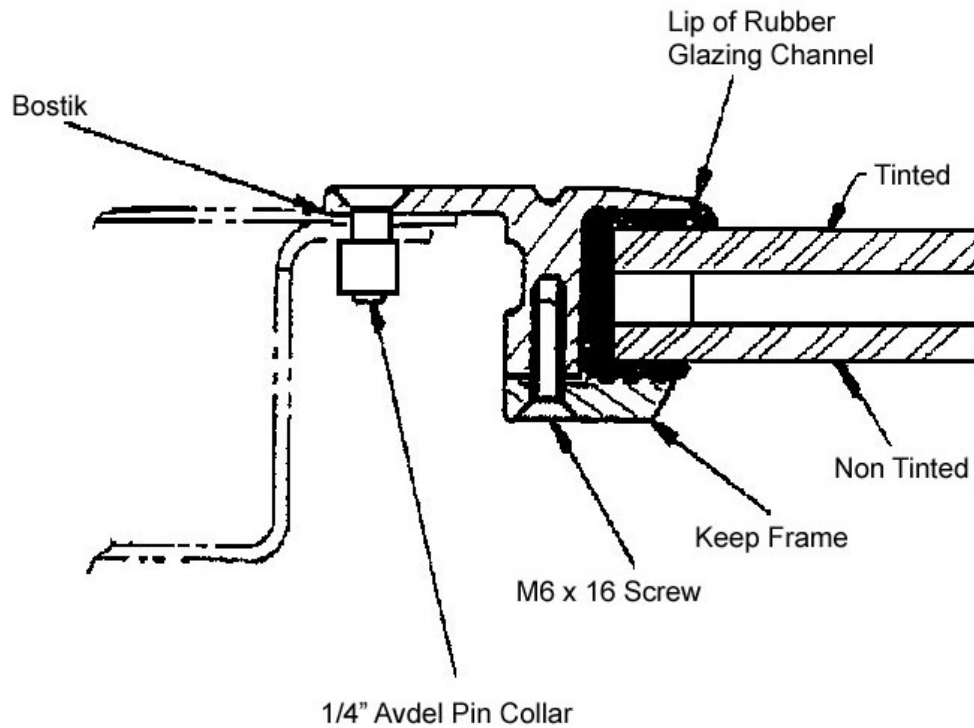
1. Renew the window frame if damaged, in accordance with Job Nos CWA0119 and CWA0127.
2. All missing, loose or defective $\frac{3}{16}$ " fasteners must be replaced with $\frac{1}{4}$ " countersunk (6.4mm) fasteners, following steps 3.2 to 3.6.
3. If gaps exist at the sides, top or bottom of the frame, or gaps at the corners exceed 3mm carry out Job No. CWA0119. If gaps exist only at the corners, and do not exceed 3mm proceed as follows:
 - 3.1 Remove fasteners nearest the gaps.
 - 3.2 Re-drill holes to diameter 6.6mm and countersink to diameter 12mm x 90 degrees.
 - 3.4 Insert Bostik 2639 (see Materials item 1) or Sikaflex 221 (see Materials item 2) sealant into the corner gaps and any gaps around the window frame periphery.
 - 3.5 Fit with new $\frac{1}{4}$ " countersunk fasteners (see Materials item 3) and collars (see Materials item 4) according to the manufacturer's instructions
 - 3.6 Remove excess mastic, (to be flush with bodyside). If any gaps are still present insert more mastic and smooth off.
5. If the bodyside is corroded, or if water is present in the fibreglass insulation or evidence of water is found, carry out Job No. CWA0119.
6. Renew defective fasteners with $\frac{1}{4}$ " (6.4mm) fasteners. following steps 3.2 to 3.6. Above fasteners to be fitted in accordance with the Manufacturer's instructions.
7. Renew the rubber glazing channel if it is fitted incorrectly, perished or deformed. The glazing rubber must be fitted with the lip to the outside of the vehicle. Refit in accordance with Job No. CWA0127.
8. Remove and refit glazing units that are fitted incorrectly in accordance with Job No. CWA0127.

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Bodyside Lights and Frames - Examine


CW 6013

EXTERIOR



INTERIOR

Figure 1: Sketch of Window Frame

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Battery Module – Change

EB 0006

Materials			
Item	Description	Qty/Veh	Cat No.
1	Bearing - Skefko cylindrical roller Type NJ 206 or equivalent	As Req'd	043/104030
2	Roller - Drg. C-A0-17542 item 5	As Req'd	063/009178
3	Spacer Drg. C-A0-17542 item 4	As Req'd	063/009179
4	Bearing Pin - Drg. C-A0-17542 item 3	As Req'd	063/009180
5	Plug interior (LPA Part No. B24979/WIS/BR)	As Req'd	054/082018
6	Complete Plug (LPA Part No. B535/23032/BR)	As Req'd	054/084451

Reference Drawings		
Item	Drawing No.	Title
1	C-A0-17542	Detail of Underframe Strengthening and Module Rolling Mechanism Mark 3 Loco Hauled and HST
2	C-A1-15940	Assembly of Battery Box Front Securing (Device) HST RUB
3	C-A1-15939	Assembly of Battery Box Rear Securing Device HST RUB
4	C-A1-18555	Assembly of Battery Box Rear Securing Device Loco Hauled RUB

Reference Documents		
Item	Document No.	Title
1	TE/TP0257	LHCS and HST Trailer Car Lead Acid Battery Maintenance
2	PB/CI2110	Component Overhaul Instruction Mark 3/HST Battery Module
3	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables

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Battery Module – Change


EB 0006

APPLIES TO: All Vehicles

Main Vehicle and Module Type	Sections of Job EB 0006			
	Removal of Module	Examination of vehicle mounted equipment and overhaul	Refitting of Module	Type of Electrical Connection
Mark 3A and some RFMs (Fixed tray)	1.1	1.2	1.3	Plug/Socket
HST except, 407xx and 408xx catering vehicles (Fixed tray)	1.1	1.2	1.3	Plug/Socket
40700-21 (Short HST modules)	2.1	2.3	2.4	Plug/Socket
40722-57 and some RFMs (Sliding tray)	2.1	2.3	2.4	Plug/Socket
40801-3/5/8/9/11 (Fixed tray)	2.1	2.3	2.4	Plug/Socket
40804/6/7/10 (Sliding tray)	2.1	2.3	2.4	Plug/Socket
Mark 3B (Sliding tray)	2.2	2.3	2.5	Hard Wired

NOTES: 401xx and 45xxx catering vehicles are fixed tray.
Some HST trailers are ex Mark 3a LHCS, and must be treated as per Mark 3a. Refer to Section 5.9 for previous vehicle numbers.
For any vehicles not listed above, refer to Section 5.9 for previous numbers and types, or seek advice from the Engineer.

Table 1: Sections of Job EB 0006 Related to Vehicle Types

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Battery Module – Change

EB 0006

PART 1 - APPLIES TO: Fixed Tray modules

Scheduled Work – PART 1

- 1.1 Remove the module as follows:
 - 1.1.1 Remove the plug from the socket at the rear of the module.
 - 1.1.2 Remove the the earth connection and the 2 securing pins from the front panel.
 - 1.1.3 Fit the handle to the square end (22mm across flats) of the winding screw.
 - 1.1.4 Operate the handle to wind out the module.
 - 1.1.5 Using suitable equipment take the weight of the module, taking care not to damage protruding drain tubes.
 - 1.1.6 Remove the two retaining straps on the trunnion holder (see Figure 1).
 - 1.1.7 Remove the stops on the ends of the roller support channels.
 - 1.1.8 Withdraw the module from the vehicle and remove the cells.

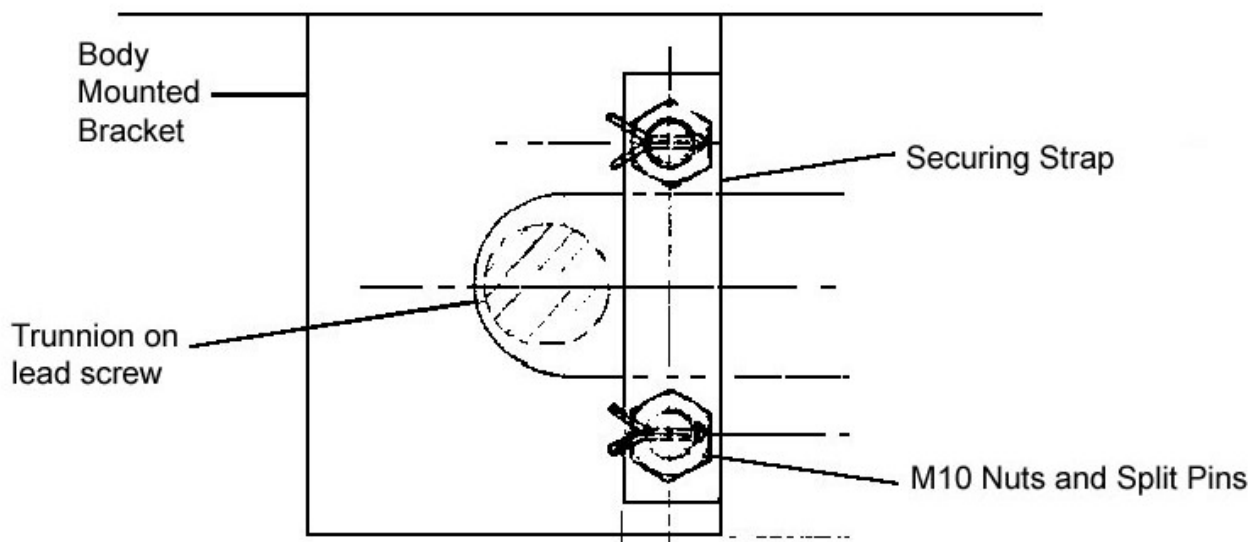



Figure 1: Screw Attachment to Vehicle Module


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Battery Module – Change

EB 0006

1.2 Examine or overhaul the equipment as follows:

- 1.2.1 Overhaul the battery in accordance with the specified document (see Reference Documents item 1).
- 1.2.2 Overhaul the module in accordance with the specified document (see Reference Documents item 2).
- 1.2.3 Examine the support plates and gussets fitted to the vehicle structure. Check that the welds are not cracked.
- 1.2.4 Examine the rollers (see Figure 2) as follows:
 - a) Clean the rollers and supports.
 - b) Check that the rollers rotate freely.
 - c) Examine the rollers for flats and damage.
 - d) Check that the M24 slotted nut securing each bearing pin is tight and secured by a split pin.
- 1.2.5 Clean and examine the dirt excluders at the sides of the module aperture.
- 1.2.6 Examine the vehicle mounted cable:
 - a) Check that the flexible conduit is intact.
 - b) Check that it is secure at both ends.
- 1.2.7 Examine the 3 pole plug as follows:
 - a) Check that the body and guard ring including threads are free from damage.
 - b) Check that the pins are not corroded, damaged or burnt.
 - c) Check that the interior is not fractured, distorted or showing signs of tracking.
 - d) Check that all screws are tight.
 - e) Check that the cable gland is tight and grips the cable.

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Battery Module – Change

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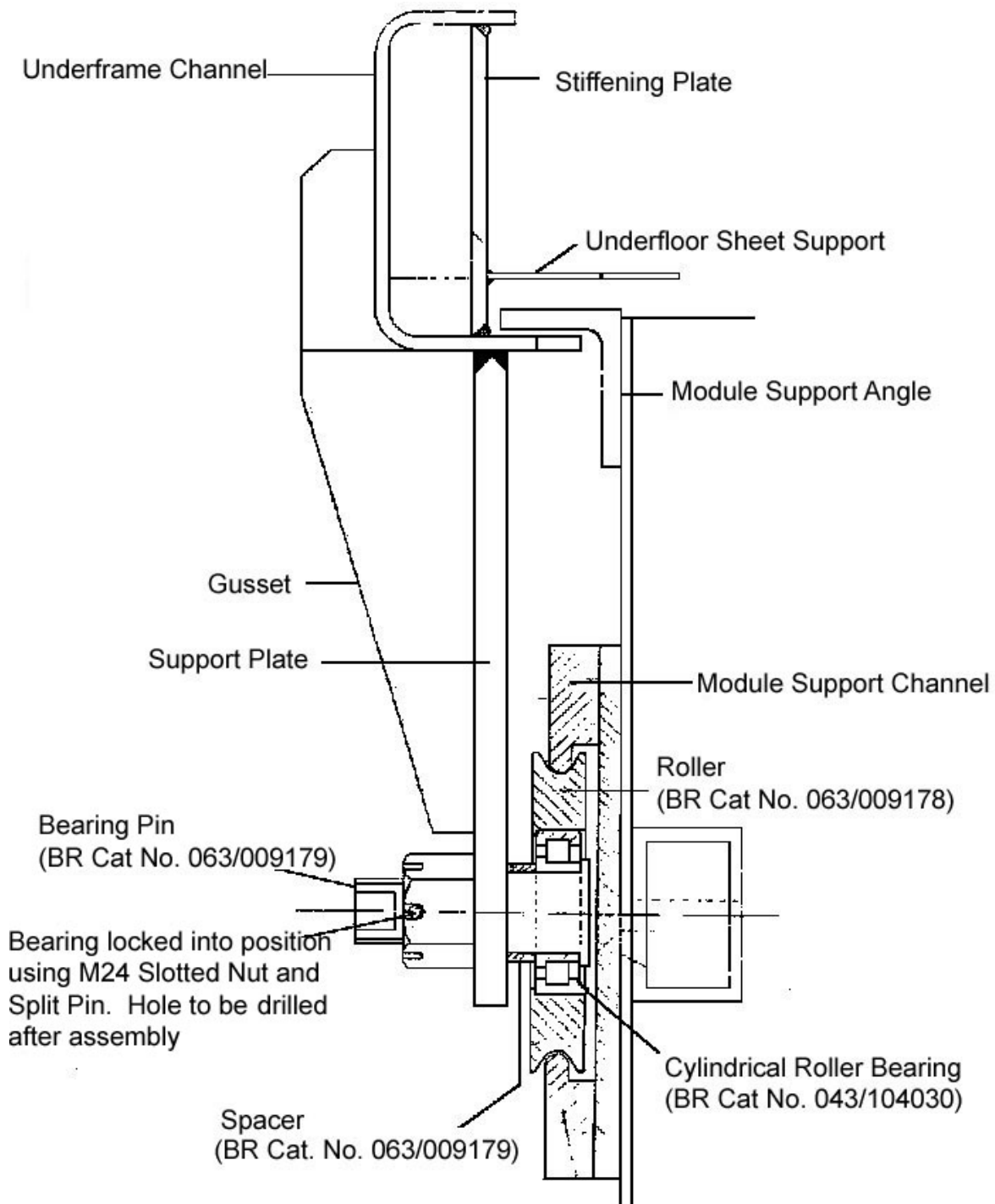



Figure 2: Battery Module Rollers and Supports

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Battery Module – Change

EB 0006

1.3 Refit equipment as follows:

- 1.3.1 If cells are not fitted to modules, fit in accordance with the specified document (see Reference Documents item 2) (see Section 7.3).
- 1.3.2 Remove the stops from the ends of the roller support channels.
- 1.3.3 Using suitable equipment, align the support channels with the rollers on the vehicle.
- 1.3.4 Rotate the leadscrew until the trunnion enters the trunnion holder.
- 1.3.5 Secure the trunnion in the holder with two retaining straps (see Figure 1).
- 1.3.6 Secure the retaining straps with four M10 nuts and split pins.
- 1.3.7 Operate the leadscrew to wind in the module and secure the module with two cotters (see Figure 3).
- 1.3.8 Refit the earth connection.
- 1.3.9 Refit the stops on the ends of the roller support channels.

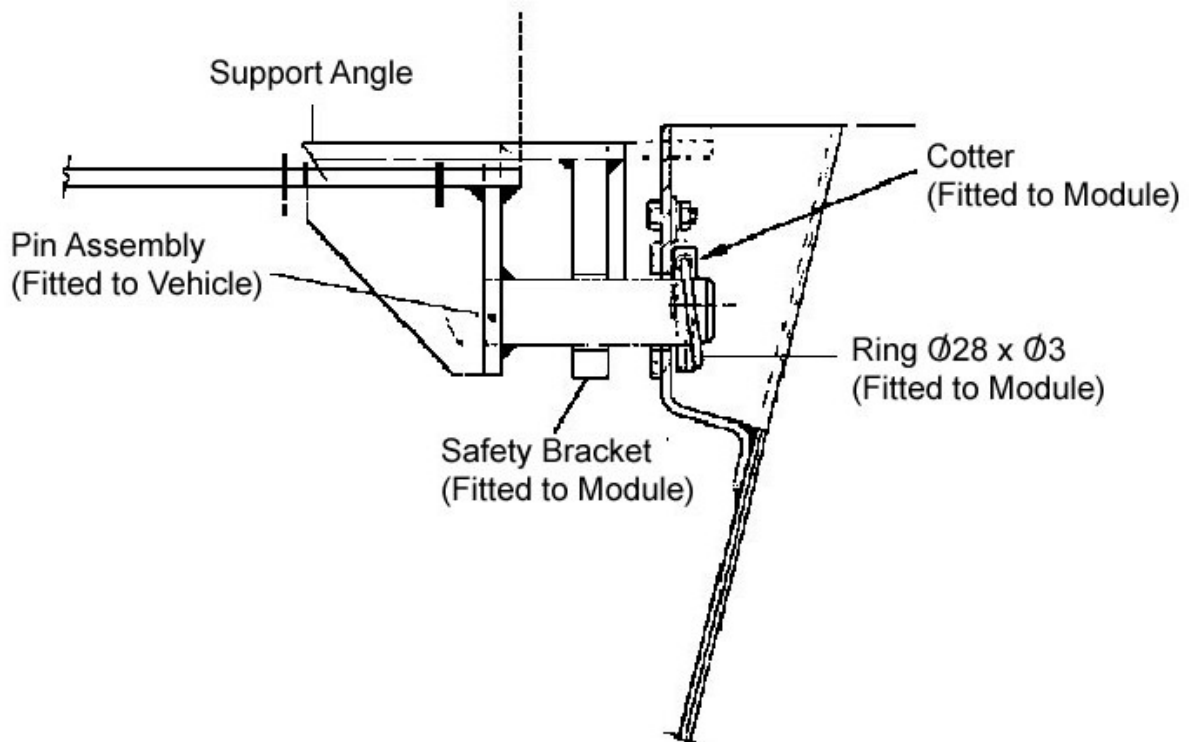



Figure 3: Securing Devices on Fixed Tray Modules

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Battery Module – Change

EB 0006

Arising Work – PART 1

1.2.3 Repair support plates and gussets in accordance with the procedure prepared by the Contractor and agreed with the Engineer.

1.2.4 Remove the split pin and M24 nut. Examine components for defects. Renew if defective.

Bearing - Skefko cylindrical roller Type NJ 206 or equivalent (see Materials item 1).
Roller (see Materials item 2) - Drg. C-A0-17542 item 5 (see Reference Drawings item 1).

Spacer (see Materials item 3) - Drg. C-A0-17542 item 4 (see Reference Drawings item 1).

Bearing Pin (see Materials item 4) - Drg. C-A0-17542 item 3 (see Reference Drawings item 1).

Reassemble using M24 slotted nut. Gently tighten. Drill hole for split pin after assembly and fit new split pin.

1.2.5 Renew the dirt excluder (KEZ Super Seal Type D, 32 deep).

1.2.6 Renew any defective cable.

Renew plug interior -


(LPA Part No. B24979/WIS/BR (see Materials item 5)) or

Renew complete plug -

(LPA Part No. B535/23032/BR (see Materials item 6)).

Tighten loose screws.

NOTE 1: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 3).

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Battery Module – Change

EB 0006

PART 2 - APPLIES TO: Short HST and Sliding Tray modules

Scheduled Work – PART 2

- 2.1 Remove the module **with its plug and socket** (RFM and HSTs) as follows:
 - 2.1.1 Remove the plug from the socket at the rear of the module.
 - 2.1.2 Remove the earth cable and position suitable lifting equipment to take the weight of the modules.
 - 2.1.3 Remove the M12 nuts from securing studs at the rear.
 - 2.1.4 Remove the M5 locking screws and M30 securing screws at the front.
 - 2.1.5 Carefully draw the module away from the vehicle, ensuring that the whole weight of the module is taken by the lifting equipment.
 - 2.1.6 Remove the cells from the module.

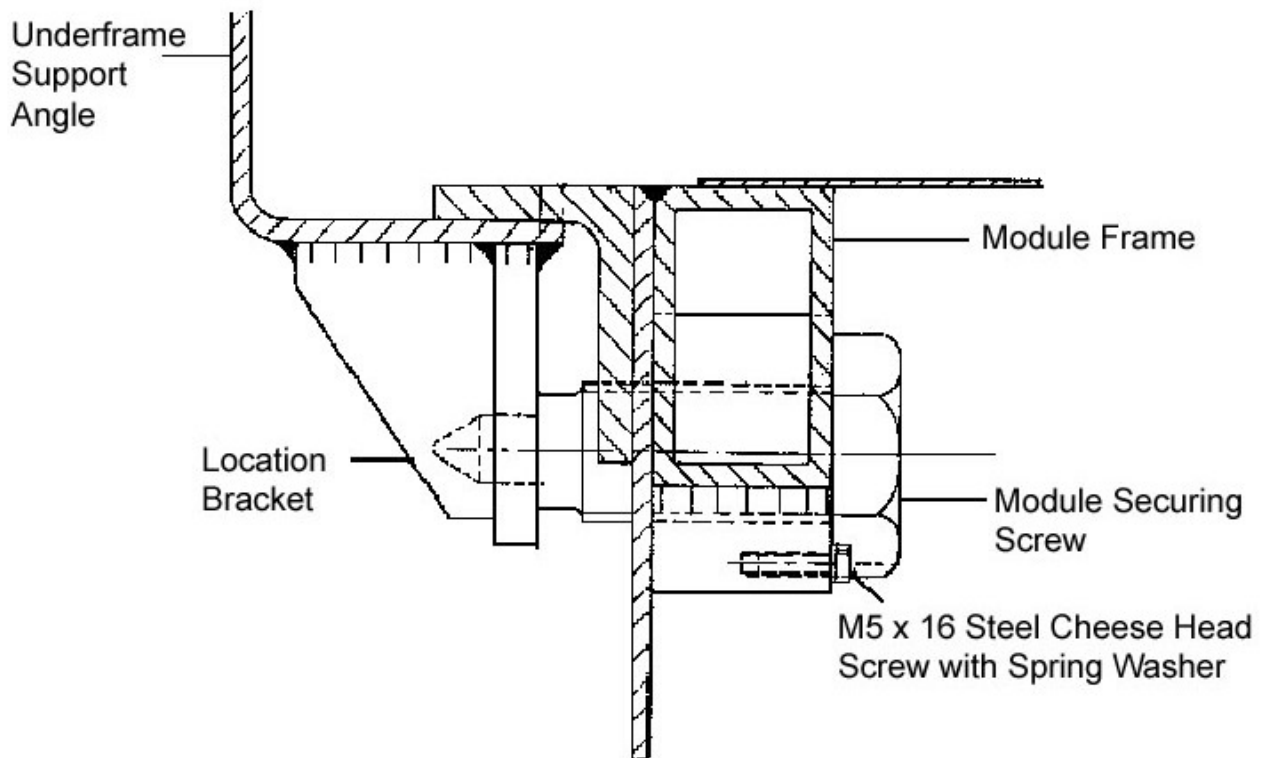



Figure 4: Front Securing Arrangement

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Battery Module – Change


EB 0006

2.2 Remove module **which is hard wired** (Mark 3B) as follows:

- 2.2.1 Fit a handle to the hexagonal socket (24mm across flats).
- 2.2.2 Remove the ball-lock pip pin.
- 2.2.3 With a square key, unlock eight budget locks.
- 2.2.4 Wind-out the battery tray to fullest extent.
- 2.2.5 Disconnect and remove the cells.
- 2.2.6 Remove the thin nut securing the conduit to the rear panel, and ease conduit away from module.
- 2.2.7 Disconnect the earth cable.
- 2.2.8 Position suitable lifting equipment to take the weight of the modules.
- 2.2.9 Remove the M12 nuts from securing studs at rear.
- 2.2.10 Remove the M5 locking screws and M30 securing screws at the front.
- 2.2.11 Carefully draw the module away from the vehicle, ensuring that the whole weight of the module is taken by the lifting equipment.

2.3 Overhaul or examine the equipment as follows:

- 2.3.1 Overhaul the battery in accordance with the specified document (see Reference Documents item 1).
- 2.3.2 Overhaul the module in accordance with the specified document (see Reference Documents item 2).
- 2.3.3 Examine the module support and securing features including welds on the vehicle underframe.
- 2.3.4 Examine two module securing screws (see Figure 4).
- 2.3.5 Clean and examine the dirt excluders at the sides of the module aperture and the rubber seal at the rear.

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Battery Module – Change

EB 0006

2.3.6 Where fitted examine the vehicle mounted cable as follows:

- a) Check that the flexible conduit is intact.
- b) Check that it is secure at both ends.

2.3.7 Where fitted examine vehicle 3 pole plug as follows:

- a) Check that the body and guard ring including threads are free from damage.
- b) Check that the pins are not corroded, damaged or burnt.
- c) Check that the interior is not fractured, distorted or showing signs of tracking.
- d) Check that all the screws are tight.
- e) Check that the cable gland is tight and grips the cable.

2.4 On Modules **with electrical sockets** refit equipment as follows:

2.4.1 If cells are not fitted to the module, fit in accordance with the specified document (see Reference Documents item 2) (see Section 7.3).

2.4.2 Using suitable equipment, lift the module, align support angles with those on underframe and push back until fully home.

2.4.3 Fit an M30 special module securing screw to each side at the front of the module (see Figure 4).

2.4.4 Gently tighten and position the head of each M30 screw so that it can be locked in place with M5 x 16 steel cheese head screw and new spring washer (see Figure 4).

2.4.5 Fit one M12 plain nut and one M12 thin nut to each stud at the module rear securing bracket. (Note: the relevant drawings (see Reference Drawings items 3 and 4) show nuts fitted in the wrong order).

2.4.6 Refit the plug into the socket at the rear of the module or reconnect the main cables to the batteries.


2.4.7 Refit the earth cable.

2.5 Refit the module which **is hard wired** as follows:

2.5.1 Using suitable equipment, lift the module, align support angles with those on the underframe and push back until fully home.

2.5.2 Fit an M30 special module securing screw to each side at the front of the module (see Figure 4).

2.5.3 Gently tighten and position the head of each M30 screw so that it can be locked in place with M5 x 16 steel cheese head screw and new spring washer (see Figure 4).

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Battery Module – Change


EB 0006

- 2.5.4 Fit one M12 plain nut and one M12 thin nut to each stud at the module rear securing bracket. (Note: the relevant drawings (see Reference Drawings items 3 and 4) show nuts fitted in the wrong order).
- 2.5.5 Resecure the conduit to the rear of the module.
- 2.5.6 Refit floor packings, cells and centre spacer.
- 2.5.7 Fit the cell block connectors, cables and secure with cleats.
- 2.5.8 Wind in the battery trays to the fullest extent.
- 2.5.9 Secure the front panel to the frame by operating 8 budget locks and fit ball-lock pip pin.
- 2.5.10 Check the budget lock indicators all point up at the top and down at the bottom.

Arising Work - PART 2

- 2.3.3 Repair defects. Any welding to be done in accordance with procedure prepared by Contractor and agreed with the Engineer.
- 2.3.4 Renew securing screws if damaged to the specified drawing (see Reference Drawings item 2).
- 2.3.5 Renew the dirt excluder (KEZ Super Seal Type D, 32 deep) and a rubber seal.
- 2.3.6 Renew defective cable.
Renew the plug interior (LPA Part No. B24979/WIS/BR (see Materials item 5)) or
Renew the complete plug (LPA Part No. B535/23032/BR (see Materials item 6))
Tighten loose screws.

NOTE 1: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 3).

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Battery Charger Transformer and Choke – Asbestos Label Check

EB 0606

Materials			
Item	Description	Qty/Veh	Cat No.
1	Battery Charger Transformer	As Req'd	064/003001
2	Choke	As Req'd	064/000781

APPLIES TO: All HST Vehicles


NOTE: This job applies to the battery charger transformer (see Materials item 1) and the choke (see Materials item 2) which have been found to have white asbestos in their lids.

Scheduled Work

1. Check that the battery charger transformer and choke are fitted with asbestos warning labels.

Arising Work

1. Fit asbestos warning label.

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Pressure Switch – Test

EH 5203

Materials			
Item	Description	Qty/Veh	Cat No.
1	Fresh Air Damper Pressure Switch, Square D Type ACW (set to close at 1.2 ± 0.1 bar rising and open at 0.8 ± 0.1 bar falling)	1	064/004940
2	Brake Pipe Pressure Switch, Square D Type ACW (set to close at 1.2 bar rising and open at 0.9 bar falling)	See Table 1	064/004939
3	Low BSR Pressure Switch, Westinghouse Type (Set to close at 4.5 – 4.7 bar rising and open at 4.1 – 4.2 falling pressure)	See Table 1	064/007322
4	Bonded Seal (Westinghouse Pt no. 7769306)	1	070/022796

Torque Figures			
Item	Description	Size	Torque (Nm)
1	Self-Locking Nut	M6	10

APPLIES TO: All Vehicles. These items are located in the Brake Module on vehicles that are fitted with a Brake Module (see Section 5.9).

QUANTITY PER VEHICLE: Refer to the specified information (see Materials Table).


NOTE: This job applies to fresh air damper pressure switches (FADS) on all vehicles and WSP pressure switches (dependant on system fitted) as shown in Table 1.

System	WSP Pressure Switches Fitted
Girling	None
BR	1 Brake Pipe Pressure Switch (see Materials item 2)
Westinghouse (modified FGW & NXEA)	1 Brake Pipe Pressure Switch (see Materials item 2) 1 Low BSR Pressure Switch (see Materials item 3)
Westinghouse (other)	1 Brake Pipe Pressure Switch (see Materials item 2)

Table 1: Arrangements of WSP Pressure Switches

Scheduled Work


1. Check that all air pressure is vented and all electrical supplies isolated.
2. Remove the pressure switch as follows: (see Figure 1)
 - 2.1 Remove four screws (5) and remove cover (4) and gasket (3) from pressure switch (1).
 - 2.2 Note the terminal positions of each wire and disconnect wires from the snap-action switch (14). Refit terminal fixings.

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Pressure Switch – Test

EH 5203

- 2.3 Prise out and collect the cable gland U-shaped locking clip (11).
- 2.4 Unscrew the cable gland (12) from the pressure switch (1) and withdraw the wires from the cable entry hole.
- 2.5 Retain the fibre washer (13) for re-use.
- 2.6 Disconnect the union nut (8) from the stud connector (7).
- 2.7 Remove the two M6 self locking nuts (16) and plain washers (15), withdraw screws (2) and lift the switch off the vehicle.
- 2.8 Loosely re-assemble the gasket (3) and cover (4) to the switch.
- 2.9 Remove the stud connector (7), remove and discard the bonded seal (6).
3. Test the pressure switch as follows:
 - 3.1 Connect pressure switch to air supply capable of varying pressure values. This must be monitored by a calibrated pressure gauge.
 - 3.2 Remove the cover from the pressure switch by unscrewing four screws (5).
 - 3.3 Connect a continuity tester/multimeter across the terminals inside the pressure switch.
 - 3.4 Increase pressure slowly and check that the pressure switch contacts close when the pressure reaches 1.3 to 1.5 bar for WSP pressure switch (Square D Type), 4.5 to 4.7 bar for WSP pressure switch (Westinghouse Type) or 1.1 to 1.3 bar for FADS.
 - 3.5 Decrease the pressure slowly and check that the pressure switch contacts open when the pressure reaches 1.0 to 0.8 bar for WSP pressure switch (Square D Type), 4.1 to 4.2 bar for WSP pressure switch (Westinghouse Type), or 0.9 to 0.7 bar for FADS.
 - a) If pressure values are incorrect remove the cover (19) by unscrewing the cover screws (20).
 - b) Using a spanner loosen the nut (17).
 - c) The pressure setting can then be altered by adjusting the setting screw (18).
 - d) Tighten the nut (17). Refit the cover (19) and secure with screws (20).
 - 3.6 Remove the test meter and refit the cover using screws (5).
 - 3.7 Drain and disconnect the air supply to the pressure switch.

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Pressure Switch – Test

EH 5203

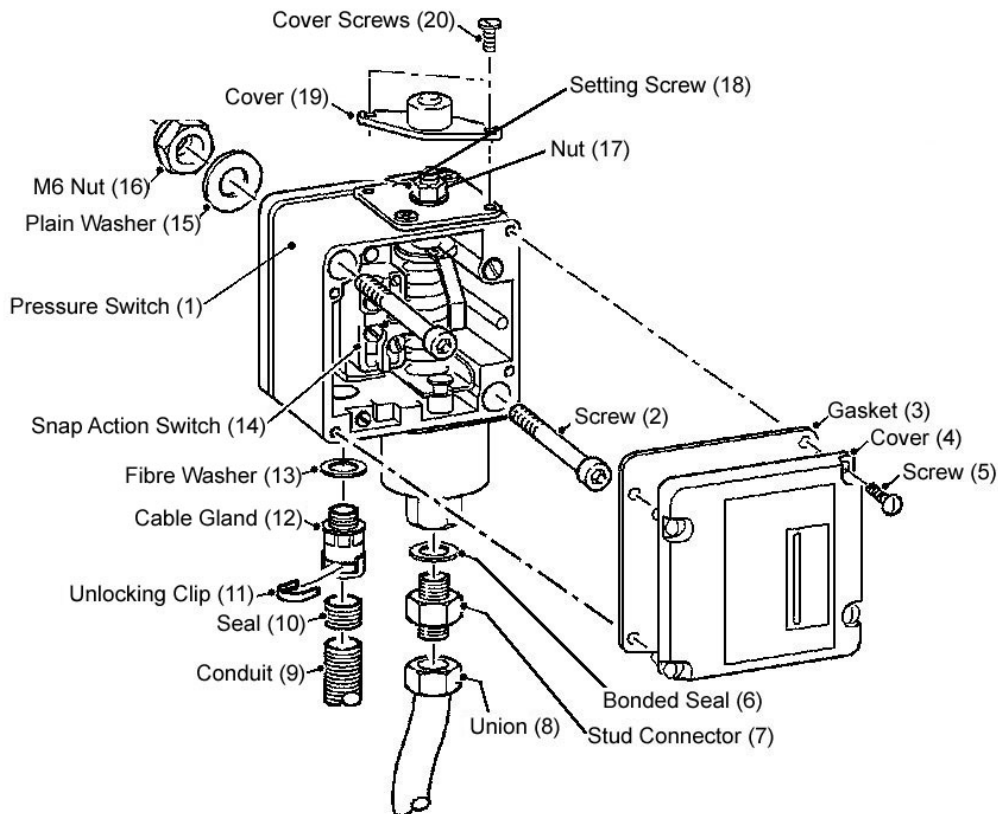



Figure 1: Typical View of Pressure Switch

4. Refit the calibrated pressure switch as follows:
 - 4.1 Tighten the stud connector (7) into the pressure switch (1) using a new bonded seal (6) (see Materials item 4).
 - 4.2 Remove the pneumatic port protection.
 - 4.3 Remove the four screws (5) and remove the cover (4) from the switch. Retain the gasket (3).
 - 4.4 Locate the switch in position in the module and loosely connect the union nut (8).
 - 4.5 Secure the switch in position with two new M6 self-locking nuts (16), plain washers (15) and screws (2). Tighten in accordance with Torque Figures item 1.
 - 4.6 Fully tighten the union nut (8) but do not strain the pipework.
 - 4.7 Check the fibre washer (13) is in position and thread the wires into the switch case through the cable entry hole.

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Pressure Switch – Test

EH 5203

- 4.8 Referring to notes made at removal, connect the wires to their correct positions on the snap-action switch (14).
- 4.9 Screw the cable gland (12) into the case.
- 4.10 Check that the conduit (9) and seal (10) are pushed fully into the cable gland (12) and lock with the U-shaped clip (11).
- 4.11 Reassemble the gasket (3) and cover (4) to the switch, securing with four screws (5).
5. Check for leaks at disturbed connections during Job No.BZ 3001.
6. Carry out Job No. EY 0303 Part D to check the function of the pressure switch.

Arising Work

- 3.5. If the pressure switch is defective or cannot be correctly adjusted, renew the pressure switch (see Materials items 1 to 3).

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Pressure Switches – Change

EH 5206


Materials			
Item	Description	Qty/Veh	Cat No.
1	Fresh Air Damper Pressure Switch, Square D Type ACW (set to close at 1.2 ± 0.1 bar rising and open at 0.8 ± 0.1 bar falling)	1	064/004940
2	Brake Pipe Pressure Switch, Square D Type ACW (set to close at 1.2 bar rising and open at 0.9 bar falling)	See Table 1 in Job EH 5206 in PB/CI2175	064/004939
3	Low BSR Pressure Switch, Westinghouse Type (Set to close at 4.5 – 4.7 bar rising and open at 4.1 – 4.2 falling pressure)	See Table 1 in Job EH 5206 in PB/CI2175	064/007322

Reference Documents		
Item	Document No.	Title
1	PB/CI2175	Component Overhaul Instruction Mk3 Coach Brake Module

APPLIES TO: All Vehicles. These items are located in the Brake Module on vehicles that are fitted with a Brake Module (see Section 5.9).

Scheduled Work

1. Change the fresh air damper (FAD) pressure switch (see Materials Item 1) and the WSP pressure switch(es) in accordance with Job No EH 5206 in the specified document (see Reference Documents item 1).

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RCH Jumpers – Renew

EJ 1014


Materials			
Item	Description	Qty/Veh	Cat No.
1	RCH Jumper, 711mm	4	800/571702
2	Arbosil Sealing Compound	As Req'd	028/022209
3	Base Terminal Assembly	As Req'd	052/002331
4	Rubber Gasket	4	063/000099
5	Jumper Retaining Chain	As Req'd	052/008540

Special Tools		
Item	Description	Cat No.
1	Wire Brush	-
2	Applicator for Abro Sealing Compound	-
3	TDM Transmission Line Test Unit	-
4	Combined Locomotive/Coach RCH Continuity Checker	-
5	RCH Test Box	-

APPLIES TO: Vehicles operating in TDM controlled push-pull mode.

Scheduled Work

1. Remove the seven bolts holding the pan plate to the vehicle body and release the jumper retaining chain that connects between the jumper and gangway.
2. Disconnect the RCH cables, noting where each coloured core terminates.
3. Check the jumper retaining chain for defects and check that all 8 links, 2 rings and the "S" link are present.
4. Fit new RCH jumpers (see Materials item 1), taking care to connect the cores to the correct terminals.
5. Check and refit pan plate as follows:
 - 5.1 Check the circular base terminal assembly for damage.
 - 5.2 Brush clean all areas within the body. Check that all the terminals are clean.
 - 5.3 Check the terminals for security.
 - 5.4 Remove the rubber seal from the rear of the pan plate cover and clean the area with a wire brush (see Special Tools item 1).
 - 5.5 Fit a new rubber gasket (see Materials item 4) to the rear of the pan plate cover and apply Arbosil sealing compound (see Materials item 2) generously around the edge of the internal surface of the pan plate cover using an applicator (see Special Tools item 2). Fill the cable entry with sealing compound.

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RCH Jumpers – Renew

EJ 1014

- 5.6 Apply sealing compound around the corresponding area on the vehicle body.
- 5.7 Fit the pan plate cover on to the vehicle body and refit the securing bolts. Remove excess sealant.
- 5.8 If a delta resistor network is fitted behind the pan plate cover paint a white triangle (side length approx. 100mm) on the pan plate.

6. Carry out a continuity test of all new jumpers as follows:

NOTE 1: The preferred equipment for this test is the TDM transmission line test unit (see Special Tools item 3). If this equipment is not available, either the combined locomotive/coach RCH continuity checker (see Special Tools item 4) or the RCH test box (see Special Tools item 5) defined in Figures 1 and 2 may be used. The combined locomotive/coach RCH continuity checker must be set to the C or coach position and must be tested annually in accordance with Procedure A contained within this job.

6.1 Using TDM Transmission Line Test Unit (Special Tools item 3):

- 6.1.1 Turn the train lights on or off. If the lights do not change along whole the length of the train, then the RCH wiring between the vehicles affected should be investigated for wiring defects. This can be achieved by dividing all the RCH cables in the set and eliminating each vehicle in turn by trying the lights on and off until they work correctly.

NOTE 2: This check is made by using the vehicle lighting controller. If a lighting controller is stuck, this will not allow the lights to be turned off (if on) or on (if off). This can affect the TDM signal and the PA system may also be affected.


- 6.1.2 Disconnect all RCH jumpers between adjacent vehicles.

- 6.1.3 Plug the TDM transmission line test unit into the jumper to be tested. Turn it on and check that the green battery indicator illuminates. If it does not illuminate, change both batteries. Set the mode selector switch to “coach”.

- 6.1.4 Pull and twist the jumper while observing the red and yellow LED's. If either or both the LED's flicker or does not illuminate the jumper must be changed.

- 6.1.5 Repeat steps 6.1.3 to 6.1.4 for all other RCH jumpers on the train.

- 6.1.6 Record all the results and repairs carried out.

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RCH Jumpers – Renew

EJ 1014

6.2 Using Other Equipment (Special Tools item 4 or 5):

6.2.1 Turn the train lights on.

6.2.2 Disconnect all RCH jumpers along the train.

6.2.3 Plug the RCH test box or checker into one of the RCH jumpers.

6.2.4 Turn the test box 'ON' and check that the green LED lights.

6.2.5 Pull and twist the RCH jumper cable:

- If red LED flickers or does not light line 2 is at fault.
- If yellow LED flickers or does not light line 1 is at fault.
- If both red and yellow LED's flicker simultaneously or both fail to light, and green LED stays lit, there is a fault on line 3.

6.2.6 Repeat steps 6.2.3 to 6.2.5 on all other jumpers on the train.

6.2.7 Turn train lights OFF if not required.

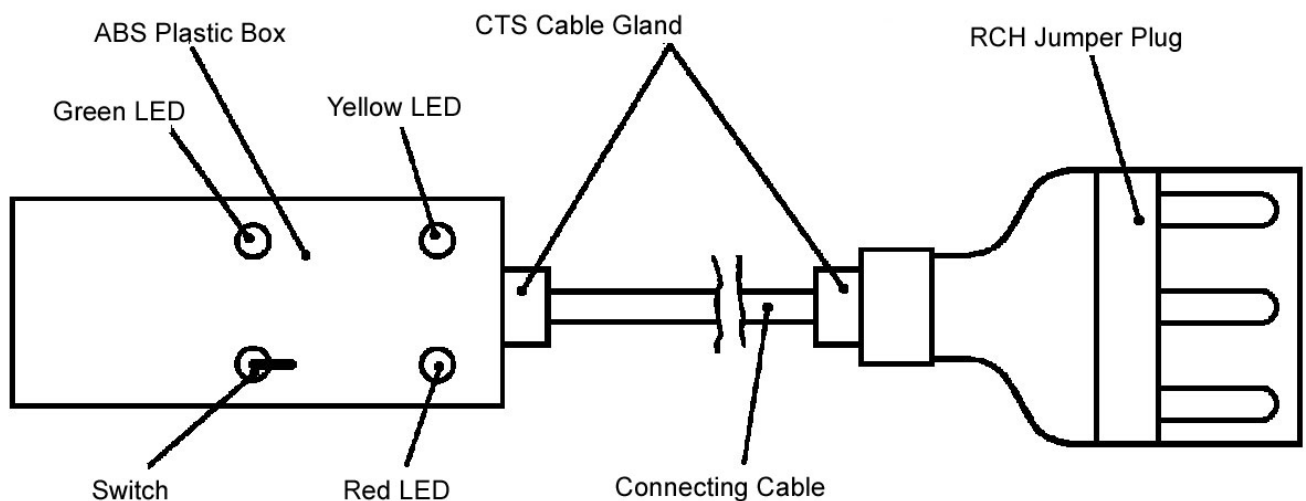



Figure 1: Layout of RCH Jumper Test Box

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RCH Jumpers – Renew

EJ 1014

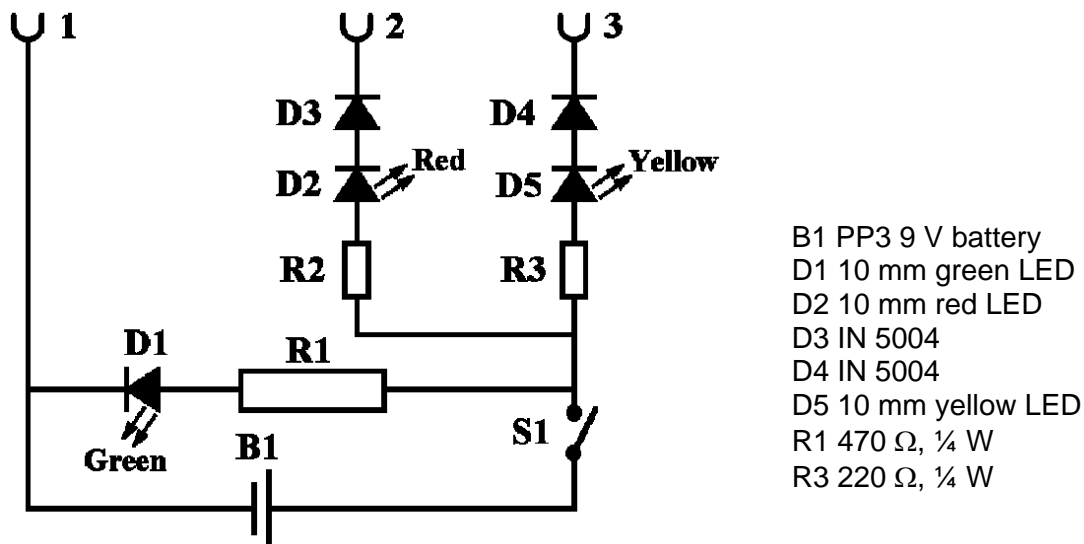



Figure 2: Circuit Diagram for RCH Jumper Test Box

Arising Work

3. Repair or renew the jumper retaining chain (see Materials item 5).
- 5.1. If damaged, fit a new base terminal assembly (see Materials item 3).
- 5.2. Clean the terminals.
- 5.3. Tighten any loose terminals.
- 5.7. Renew any missing or defective bolts.
- 6.1.4 Investigate cause and rectify. If defective, renew the RCH jumper again (see Materials item 1) in accordance with steps 1 to 5. Retest the jumper in accordance with step 6.
- 6.2.4 If it does not light then check the vehicle battery voltage.
- 6.2.5 Investigate the cause and rectify. If defective, renew the RCH jumper again (see Materials item 1) in accordance with steps 1 to 5. Retest the jumper in accordance with step 6.

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RCH Jumpers – Renew

EJ 1014


Procedure A - Test Procedure for Combined Loco/Coach RCH Continuity Checker

Scheduled Work

1. Check the main box, with LEDs, and the dummy head, with crocodile clip, for signs of mechanical damage.
2. Turn the main box on and ensure the green power LED lights.
3. Turn the box to the 'coach' or 'C' position.
4. Using a piece of wire check the following:
 - a) Short pin 3 to pin 1 on RCH jumper head - yellow LED lights.
 - b) Short pin 3 to pin 2 on RCH jumper head - red LED lights.
5. Turn the box to the 'loco' or 'L' position.
6. Using a piece of wire check the following:
 - a) Short pin 2 to pin 1 on RCH jumper head - yellow LED lights
 - b) Short pin 2 to pin 3 on RCH jumper head - red LED lights
7. With the box still turned on and the 'loco' or 'L' position still selected connect the dummy RCH jumper directly to the main box.
8. Check that both the red and yellow LEDs light.
9. Disconnect the dummy RCH head from the main unit.
10. Check the continuity between pin 3 on the dummy head and the crocodile clip.

Arising Work

2. If not, change the battery.
- 4, 6, If LEDs do not light as expected, investigate the cause and rectify.
8. If necessary renew dummy RCH head.

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Conduits – Examine

EK 5603

Reference Documents		
Item	Document No.	Title
1	CR/PE0102	Repainting of Rail Vehicles

Reference Drawings		
Item	Drawing No.	Title
1	9040599	Pipe Colour Chart

APPLIES TO: All Vehicles


NOTE: This job addresses all conduits both inside and outside the fixed skirts except conduits within the Air Conditioning Module, the battery module and the Brake Module (where fitted).

Scheduled Work

1. Examine the conduit and fittings for damage, corrosion and being insecure.

Arising Work

1. Renew any length of conduit which is damaged or is heavily corroded.
1. Treat all light corrosion and bare metal in accordance with the specified document (see Reference Documents item 1) and drawing (see Reference Drawings item 1).
1. Resecure any loose clips or saddles.
1. Renew any damaged or missing components.

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Lighting Controller Suppression – Renew

EL 0125

Materials			
Item	Description	Qty/Veh	Cat No.
1	Resistor, 47Ω 2.5W	2	026/155053
2	Capacitor, 0.068μf	2	026/111572
3	Varistor	2	054/089381
4	Crimp, M5, Red	2	054/119387

NOTE 1: Additional Material information is given in the Technical Specification contained within this job and the construction of the network is shown in Figure 2.

NOTE 2: There are two suppressor networks fitted per vehicle, connected at the rear of the lighting controller at the control end of the vehicles.

APPLIES TO: Vehicles operating in TDM controlled push-pull mode

Scheduled Work

1. Trip MCB TLCD to 'OFF' and place the auxiliaries switch to 'OFF'.
2. Open the cupboard that houses the through lighting controller. This is located at the No.1 end of the vehicle.
3. Check the operation of the lighting controller. If found to be defective see Arising Work.
4. Remove the four screws securing the lighting controller front panel. Withdraw the front panel.
5. With the lighting control panel removed, it will be observed that three terminals are present (see Figure 1).

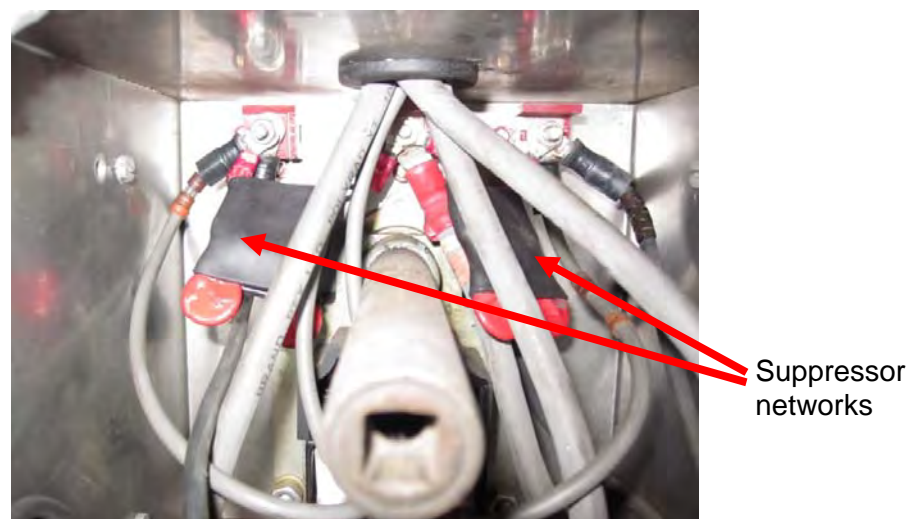



Figure 1: Terminal Connections

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Lighting Controller Suppression – Renew

EL 0125

6. Note the positions of the wiring and remove the three nuts from the terminals at the rear of the box.
7. Remove the wiring to enable the removal of the suppression networks. Remove and discard the two suppression networks.
8. Refit the wiring onto the correct terminals at rear of box. If terminals are broken see Arising Work.
9. Fit the two new suppression networks (see Materials items 1 to 4) in the rear of the box as follows and as shown in Figure 1:
 - Left hand suppression network assembly
Connect one crimp to the left hand terminal post and the other to the centre terminal post.
 - Right hand suppression network assembly
Connect one crimp to the right hand terminal post and the other to the centre terminal post.
10. Fit the nuts and tighten until the connections are secure.
11. Refit the lighting controller front panel and secure with the four screws.
12. Close and lock the yellow cupboard door.
13. Reset TLCB and place the auxiliaries switch in the AUX./AIR COND position.
14. Check the operation of the train lights. If the operation is incorrect see Arising Work.

Arising Work

3. Change the complete lighting controller.
8. Fit new terminals or change the complete lighting controller.
14. Remove the lighting controller front panel and check the wiring on the three rear terminals.

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Lighting Controller Suppression – Renew

EL 0125

Specification For Varistor (Mickey Mouse) Lighting Controller Suppression Network


Technical Specification

The following components or the exact equivalent shall be used in the construction of the Network:

Resistors:	Resistance	47Ω
	Tolerance	5% Power
Suggested components:	Rating	2.5W Limiting
	Element Voltage	100V
	Type	Vitreous enamel
	R S Components stock number	152-397
	Catalogue number	026/155053
Capacitors:	Type	Metalized Polyester
	Tolerance	20%
Suggested components:	Capacitance	0.068μf
	Working voltage	400 VDC (160 VAC)
	Ashcroft Electronics	B1A 680 04A
	Catalogue number	026/111572
Varistors:	Energy transient (10/1000μ)	6J Max
	continuous DC voltage	26V Max
Suggested components:	clamping voltage	64V
	Variable voltage at 1mA	
	R S Components stock number	649-100
	Catalogue number	054/089381
Crimps:	Colour	Red
	Size	M5
Suggested components:	Voltage Rating	1000V
	Terminal material	Copper
	R S Components stock number	447-875
	Catalogue number	054/119387

Construction

The construction of the network will be as shown in Figure 2. The leads of the resistor and capacitor will protrude through the crimps by 3mm. The leads will then be soldered as shown in Figure 2. The crimps will also be crimped using the correct crimp tool.

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Lighting Controller Suppression – Renew

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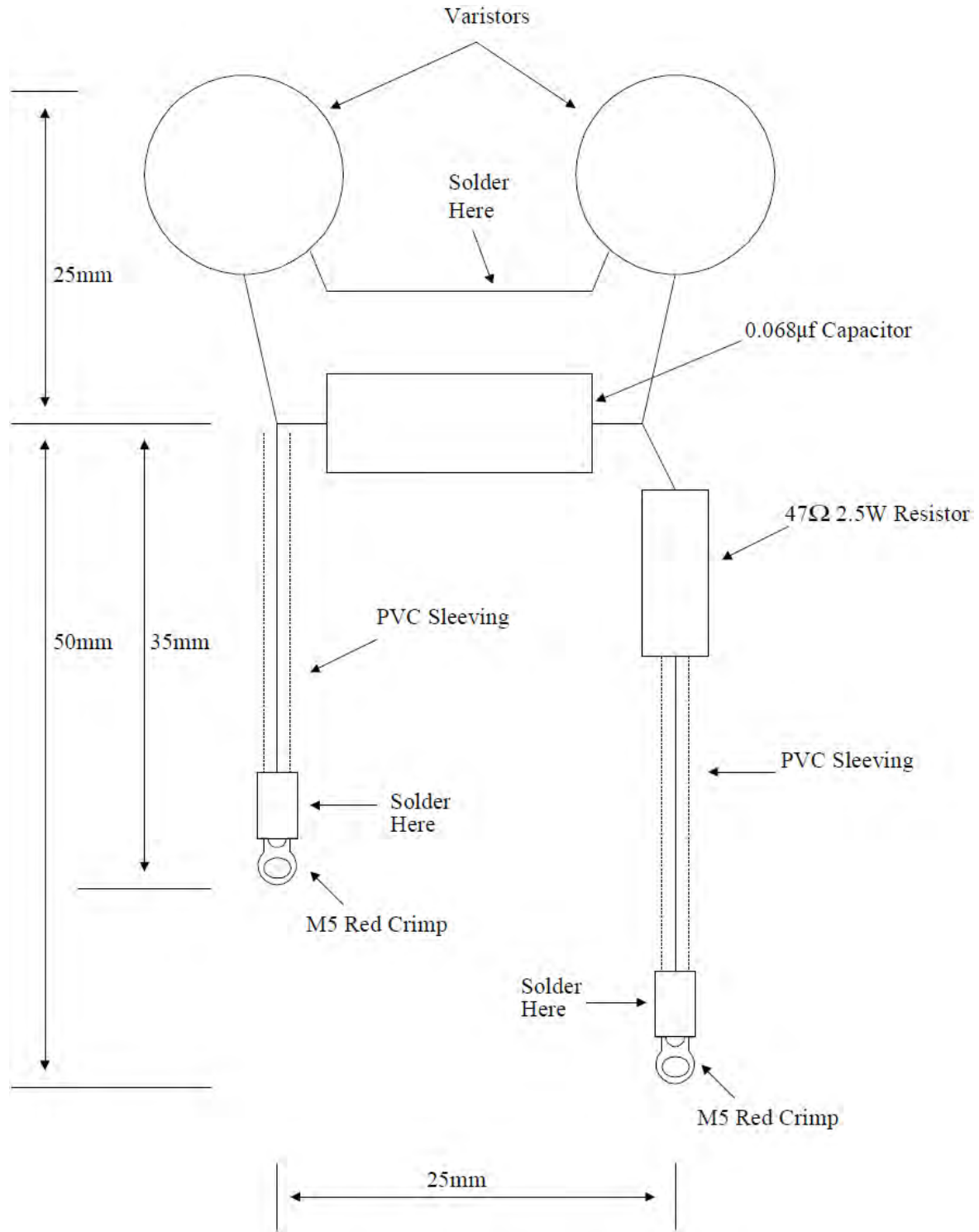



Figure 2: Varistor (Mickey Mouse) Suppression Network

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Luggage Rack Light – Repair

ELA1016

Materials			
Item	Description	Qty/Veh	Cat No.
1	Lamp (GE-F8W/29 4W, 300mm Warm White)	As Req'd	-
2	Inverter Atlas Pt. No. 15R3933/110	As Req'd	-

APPLIES TO: Mark 3A, Mark 3B and RFM (Where fitted)

PART 1 - Lamp Removal

- 1.1 Check the electrical supply to luggage rack is switched off.
- 1.2 Locate the holes in the top surface of the luggage rack, turn both budget locks anti-clockwise whilst supporting the bezel on the underside, and allow to open.
- 1.3 Remove a defective lamp by pushing against the spring at one end, and easing the other end clear of the lamp holder.
- 1.4 Fit a new lamp (see Materials item 1) by carefully locating one end into the lamp holder. Gently press against the spring and ease the other end into the holder.
- 1.5 Swing up the bezel and secure by operating both budget locks.
- 1.6 Switch on supply, and at switch.
- 1.7 Check that the lamp illuminates. If not, see Part 2.

PART 2 - Inverter Renewal

- 2.1 Check the electrical supply to the luggage rack is switched off.
- 2.2 Remove the access cover on top of the luggage rack nearest to the defective lamp.
- 2.3 Unplug the wiring loom from the inverter.
- 2.4 Remove nuts and washers securing the inverter.
- 2.5 Renew the inverter (see Materials item 2).
- 2.6 Refit the inverter and reconnect the wires.
- 2.7 Switch on the supply and at the switch.
- 2.8 Check that lamps illuminates. If not, renew the switch and/or investigate the fault on the power supply.


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Table Lamp – Repair

ELA1017

APPLIES TO: Mark 3A, Mark 3B and RFM (Where fitted)

1. Remove the lamp shade by loosening two M5 socket headed bolts with an Allen key (see Figure 1).

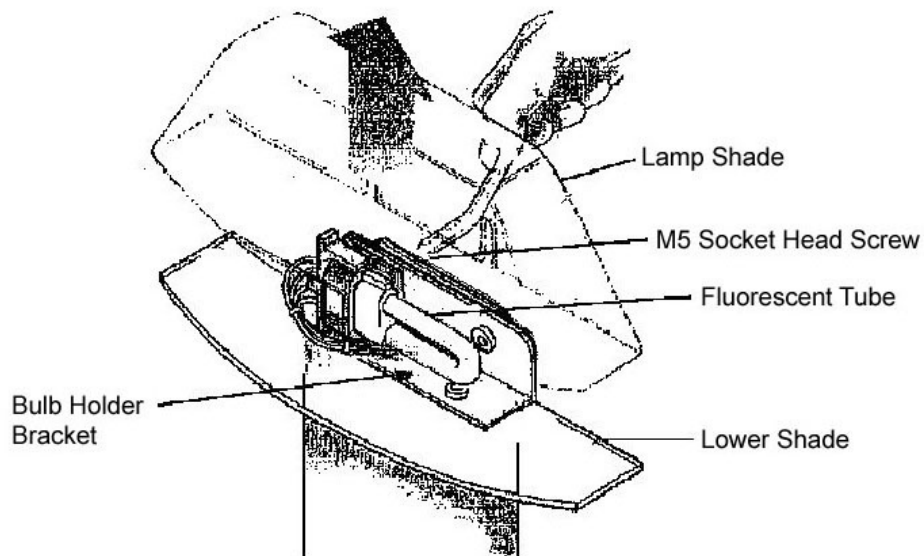


Figure 1: Removal of Lamp Shade

2. Lift the shade away from the bracket.
3. Hold the tube at the two points indicated on Figure 2, and remove.

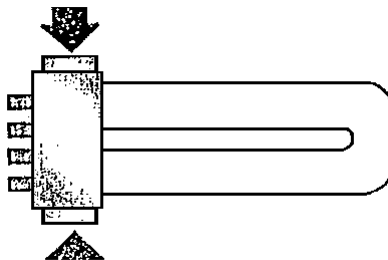



Figure 2: Holding Fluorescent Tube

4. Fit a new tube, again holding as in Figure 2, and press into the holder until it clicks.
5. Fit a lamp shade by aligning the slots with the screws, and tightening the screws with the Allen key.
6. Switch on the lamp and check that it lights.
7. If the lamp does not light, test that an electrical supply is present and/or renew the switch.

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Driver Guard Communication Equipment – Test

EP 0536

Reference Documents		
Item	Document No.	Title
1	TEE/E/82/M/33	Crew Communication Equipment Type C117
3	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables

APPLIES TO: BFO, TGS and TRFB


PART A – Applies to Vehicles with Ripper or DAC/Gai-tronics.

PART B – Applies to Vehicles with the “Joyce Loebel” Public Address System.

PART A – Applies to Vehicles with Ripper or DAC/Gai-tronics

Scheduled Work

1. Prepare the vehicles as follows:
 - 1.1 If the vehicle is a TGS or TRFB fitted with DAC equipment (see Section 5.9 for list) and a power car is available, then carry out steps 3 to 7 using the equipment on these vehicles.
 - 1.2 Otherwise connect a Driver/Guard Communication Unit to wires 106 (Lights ON) and 107 (Lights OFF) at one of the RCH couplers or wires 34 and 35 on HST vehicles at one of the through control receptacles.
2. Close the circuit breaker CCB. Move the auxiliary switch to the AUX position.
3. Check that undistorted speech can be transmitted in both directions.
4. Check that the call button on the test unit operates the call buzzer in the Guards or Staff Compartment and the Luggage Area.
5. Press the call button located in the Staff or Guards Compartment and check that the call buzzer sounds in the Staff or Guards Compartment (and Luggage Area TGS/BFO only).
6. For TRFB vehicles only, press the call button on the test unit for 4 seconds and check that the driver alarm message sounds on the vehicle PA system.
7. Move the auxiliary switch to the ‘OFF’ position and remove the test unit.

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Driver Guard Communication Equipment – Test

EP 0536

Arising Work For Part A

- 3-6. Vehicles with DAC equipment - Change the defective Driver/Guard communication unit (see Note 2).
3. Other vehicles - Change the defective amplifier, and overhaul in accordance with the specified document (see Reference Documents item 1).
3. Renew the defective amplifier which cannot be overhauled.
3. Change the defective handset.
- 4-5. Renew the signal buzzer or signal button.

NOTE 1: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Referenced Documents item 2).


NOTE 2: Gai-tronics are the successor to DAC. Equipment may be branded with either name but must be returned to Gai-tronics for repair.

PART B - Applies to Vehicles with the “Joyce Loebel” Public Address System

APPLIES TO: Whole rake, with power cars attached.

Scheduled Work

1. Check that two way communications can be established between the power car drivers cab at the TGS end and all other crew stations on the rake including the power car at the far end.
2. Press the driver-guard buzzer pushbutton in the drivers cab at the TGS end repeatedly and check that the buzzer sounds in the TGS and both power cars.
3. Check that two-way communications can be established between the luggage van at the TGS end and all other crew stations on the rake including the power car at the far end.
4. Press the driver-guard buzzer pushbutton in the luggage van at the TGS end repeatedly and check that the buzzer sounds in the TGS and both power cars.

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Driver Guard Communication Equipment – Test

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5. Check that two-way communications can be established between the TGS and all other crew stations on the rake including both power cars.
6. Press the driver-guard buzzer pushbutton in the TGS repeatedly and check that the buzzer sounds in the TGS and both power cars.
7. Check that two-way communications can be established between the Coach C and all other crew stations on the rake including both power cars.
8. Check that two-way communications can be established between the buffet car and all other crew stations on the rake including both power cars.
9. Check that two-way communications can be established between the luggage van at the First Class end and all other crew stations on the rake including the power car at the far end.
- B10. Press the driver-guard buzzer pushbutton in the luggage van at the First Class end repeatedly and check that the buzzer sounds in the TGS and both power cars.
- B11. Check that two way communications can be established between the Drivers Cab at the First Class end and all other crew stations on the rake including the power car at the far end.
- B12. Press the driver-guard buzzer pushbutton in the Drivers Cab at the First Class end repeatedly and check that the buzzer sounds in the TGS and both power cars.

Arising Work For Part B

- 1-12. If any two crew stations fail to communicate then call another crew station from one of them to determine which crew station is faulty. Change the faulty crew station.

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Public Address System - Test

EP 5053

Special Tools		
Item	Description	Cat No.
1	Public Address System Test Unit (Chime Tester)	870/008001

Reference Documents		
Item	Document No.	Title
1	TEE/E/86/M/003	Public Address Receiving Amplifier C176A
2	TEE/E/82/M/033	Crew Communication Equipment Type C117
3	TEE/E/87/M/033	Transmitting Amplifier C115/MA
4	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables
5	502-25-0081-001	Crew Communications System Midland Mainline Technical And Operating Manual GTC DAC

APPLIES TO: All Vehicles


NOTE 1: For details of equipment fitted (see Section 5.9).

NOTE 2: Part A applies to Vehicles fitted with Ripper systems.
Part B applies to those fitted with Joyce Loebel systems.
Part C applies to those fitted with DAC (now Gai-tronics) system.
Part D applies to Vehicles fitted with Gai-tronics system and operated by CrossCountry Trains.

Part A – Applies to Vehicles fitted with Ripper systems

Scheduled Work

1. Connect the output of a suitable oscillator and a digital voltmeter across wires 106 and 107 for LHCS and 34 and 35 for HST.
2. Set the oscillator to give 1kHz at 500 milli-volts rms.
3. Close the circuit breaker CCB. Move the auxiliary switch to the AUX position.
4. By placing a sound level meter at 90° to, and at 25mm from, the loudspeaker grille, check that the output from the loudspeaker is between 90 to 96 dB(A).
5. Repeat for all other loudspeakers in the vehicle.
6. Disconnect the oscillator and voltmeter.

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Public Address System - Test


EP 5053

7. Connect the Electric Train Supply and move the Auxiliary Switch to the AUX and AIR COND position.
8. Switch on the vehicle lights.
9. By placing a sound level meter at 90° to an at 25mm from the loudspeaker grille, check that the interference is less than 90 dB(A)
10. On the following:

All Catering Vehicles, BFO and TGS.

Carry out a system function test on the train set, with all 36 way jumpers connected once the train supply energised as follows:

- 10.1 Obtain a public address system test unit (chime tester) (see Special Tools item 1).
- 10.2 On the public address system test unit turn the rotary switch to position 1. Check that the green LED is lit.
- 10.3 On the public address system test box turn the rotary switch to position 2. The green LED will extinguish.
- 10.4 At the first location (e.g. TGS or catering vehicle) insert the handset of the transmitter into the unit, ensuring that the mouthpiece is centrally positioned on the rubber aperture surround. The test chime tone must be audible at the unit.
- 10.5 Close the test unit lid ensuring that the handset cable is located in the slot provided and that one of the springs on the inside of the lid operates the "press to talk button" on the handset.
- 10.6 Switch the public address transmitter unit. The test chime must now be transmitted over the public address system on all vehicles.
- 10.7 Walk through each coach listening to the clarity of the chime tone. Make a note on the repair sheet of any coaches, which have distorted sound excessive crackling or simply produce no announcement.
- 10.8 After walking through each coach return to the test unit switch off the transmitter amplifier remove the handset from the test unit and switch the test unit off.
- 10.9 At each subsequent transmitter amplifier location set the test unit rotary switch to position 2 place the transmitter handset into the unit and close the lid ensuring that the "press to talk" button on the handset is operated.
- 10.10 Switch on the transmitter amplifier and listen to the clarity of the chime in one adjacent coach. Any difference in quality must be noted.

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Public Address System - Test

EP 5053

10.11 When each transmitter amplifier has been tested reset the test unit rotary switch to the 'OFF' position.

11. Move the auxiliary switch to the 'OFF' position.

Arising Work

4. Change the defective amplifier and overhaul in accordance with the specified document (see Reference Documents item 1 and 2).

4. Renew the defective amplifier which cannot be overhauled.

4. Renew defective speakers.

9. Identify the lighting inverter causing interference and renew.

10.2 If the LED is not lit, renew the test unit battery (type pp6), located in the base.

10.4 If the chime tone is not generated when the rotary switch is at position 2 and with a good battery, arrange for the test unit to be repaired.

10.6 If no output from any coach, check that the transmitter amplifier is receiving 110v supply.

10.7.1 If no chime in one coach:

a) Check that the aux switch is set in the aux + A/C position and that CCB is set. Check the state of the battery by switching on the lights.

b) Check the receiver amplifier is receiving 110v supply. If not, investigate wiring fault or loose connections.


c) If receiver amplifier is receiving 110v supply change receiver.

10.7.2 If chime is distorted in the whole of one coach change receiver amplifier.

10.7.3 If chime is distorted in the whole of the train, check that only one transmitter amplifier is switched on.

10.7.4 If approximately one third of speakers are silent in one coach, check the electrical supply to each speaker (note speakers are wired in groups of 3). Renew speaker or repair wiring defect.

10.7.5 If the speaker produces excessive crackling, renew the speaker.

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10.7.6 If crackling from all speakers in one coach move the auxiliary switch to aux only. If crackling stops carry out Job No. HA 0109, step 4. If crackling continues investigate cause and rectify.

10.7.10 If no output from any coach see Arising Work item 10.6. If the chime is distorted in the whole train (see Arising Work item 10.7.3).

10. Change defective transmit amplifier and overhaul in accordance with the specified documents (see Reference Documents item 3 and 2).

NOTE 3: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 4).


Part B -Applies to those fitted with Joyce Loebel systems, see Chapter 5.9 for vehicles fitted

NOTE 4: This job is to be carried out with the 36 way control jumpers connected, with the vehicles supplied with 415V electric train supply.

NOTE 5: The crew stations are located as follows:

- TGS coach (Guards compartment)
- Coach C (luggage stack)
- TBRF coach (kitchen/buffet partition)
- 45xxx vehicle staff area

1. Examine each amplifier, crew station and auto announcer earth bond. Check that the cable is not damaged and the connections at both ends are tight.
2. Check that 110V dc supplies are available on all coaches and power cars. Check that the status indicators are illuminated on all crew stations and no other indicators are lit.
3. Put the PA system into test mode by pressing the test button on the TGS crew station.
4. Check that the test tone can be heard at every loudspeaker in every coach.
5. Cancel the test tone by re-pressing the test button at any crew station.
6. At the TGS crew station, press 'First' and make an announcement and check that it can be heard in the First Class only and that it is preceded by a 'Bong' warning tone.
7. At the TGS crew station, press 'Standard' and make an announcement and check that it can be heard in the Standard Class only and that it is preceded by a 'Bong' warning tone.
8. At the TGS crew station, press 'Both' and make an announcement and check that it can be heard in all coaches and that it is preceded by a 'Bong' warning tone.

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9. Press the test button in Coach C and check that the test tone can be heard in that coach. Cancel the test tone.
10. At the Coach C crew station, press 'First' and make an announcement and check that it can be heard in the First Class only and that it is preceded by a 'Bong' warning tone.
11. At the Coach C crew station, press 'Standard' and make an announcement and check that it can be heard in the Standard Class only and that it is preceded by a 'Bong' warning tone.
12. At the Coach C crew station, press 'Both' and make an announcement and check that it can be heard in all coaches and that it is preceded by a 'Bong' warning tone.
13. Press the test button in the buffet car and check that the test tone can be heard in that coach. Cancel the test tone.
14. At the buffet car crew station, press 'First' and make an announcement and check that it can be heard in the First Class only and that it is preceded by a 'Bong' warning tone.
15. At the buffet car crew station, press 'Standard' and make an announcement and check that it can be heard in the Standard Class only and that it is preceded by a 'Bong' warning tone.

At the buffet car crew station, press 'Both' and make an announcement and check that it can be heard in all coaches and that it is preceded by a 'Bong' warning tone.

Arising Work

- B1. Renew damaged earth bonds. Tighten loose connection.
- B2. Change any crew station with incorrect indications.
- B4-15 Investigate, rectify defects and retest.

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Part C – Applies to Vehicles fitted with DAC (now Gai-tronics system)


Scheduled Work

1. Connect the output of a suitable oscillator and a digital voltmeter across wires 106 and 107 for LHCS and 34 and 35 for HST.
2. Set the oscillator to give 1kHz at 6V RMS.
3. Close the circuit breaker CCB. Move the auxiliary switch to the AUX position.
4. By placing a sound level meter at 90° to, and at 25mm from, the loudspeaker grille, check that the output from the loudspeaker is between 83 to 89 dB(A).
5. Repeat for all other loudspeakers in the vehicle.
6. Disconnect the oscillator and voltmeter.
7. Connect the Electric Train Supply and move the auxiliary switch to the AUX and AIR COND position.
8. Switch on the vehicle lights.
9. By placing a sound level meter at 90° to an at 25mm from the loudspeaker grille, check that the interference is less than 90 dB(A).
10. Carry out a system function test on the train set as follows, with all the 36 way jumpers connected and the train supply energised.

Catering Vehicles, BFO and TGS Only. Also on FGW vehicles:

- TS Coach D and spare vehicle 42294 – No.1 end vestibule
- TF with trolley store vice toilet (see Section 5.9) – unit in trolley store.

- 10.1 At the first transmitters unit, switch the PA transmitter unit on. Check that the status indicator light shows GREEN.
- 10.2 Press the zone selection buttons A and D for 43 seconds; this will enable the test mode. Check that the status indicator now shows AMBER.
- 10.3 For the TGS and TRFB staff compartments check, a PA jingle, an audio voice counting from 1 to 30 and then a final jingle will be heard over the PA system on all vehicles.
- 10.4 For the TRFB catering area check, a PA jingle, an audio voice for the driver alarm and a final jingle must be heard over the PA system on all vehicles.

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- 10.5 Walk through each vehicle listening to the clarity of the audio voice. Make a note of any vehicles, which have distorted sound, excessive crackling, are very quiet or silent.

NOTE 6: Each saloon has seven speakers, with one in each vestibule.

- 10.6 After walking through each vehicle, return to the PA transmitter and press the PTT (Push to Talk) Button on the hand set to cancel the test mode. Check that the status indicator returns from AMBER to GREEN.
- C10.7 Press the zone selection button D and check LEDs 1, 2 and 3 all illuminate.
- 10.8 Check that a jingle sound can be heard. Press the PTT button and check that the status indicator shows a FLASHING GREEN.
- 10.9 Make an announcement using the handset and check the audio is broadcast locally.
- 10.10 Release the PTT and check that the status indicator shows STEADY GREEN, and that the microphone is disabled.
- C10.11 Press the PTT again and continue with the announcement.
- 10.12 Finish the announcement and release the PTT. Check that the zone LEDs extinguish 10 seconds later.
- 10.13 Press the zone selection button A and check that the zone LEDs 1 and 3 are illuminated.
- 10.14 Press the PTT again and make an announcement.
- 10.15 Check that a jingle sounds and the audio is broadcast on each first class vehicle and the catering vehicle and no other.
- 10.16 Finish the announcement and release the PTT. Check that the zone LED 2 is illuminated.
- 10.17 Press the zone selection button B and check that the zone LED 2 is illuminated.
- 10.18 Press the PTT and make an announcement.
- 10.19 Check the jingle sounds and the audio is broadcast on each standard class vehicle and no other.
- 10.20 Finish the announcement and release the PTT. Check that the zone LED extinguishes.
- 10.21 Switch off the transmitter, and check that all the indicators are off.

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10.22 Repeat the above (except that the sound quality must be checked for one adjacent coach, noting any differences in quality) for all the transmitters fitted to the train set.

11. Move the Auxiliary Switch to the OFF position.

Arising Work

4. Change the defective amplifier and/or return to Gai-tronics (see Note 8).
4. Renew the defective amplifier which cannot be overhauled.
4. Renew the defective speakers.
9. Identify the lighting inverter causing interference and renew.
10. Investigate any fault, change defective items and retest. Return defective items to Gai-tronics (see Note 8).

If a new amplifier unit is required due to failure, check the new unit is programmed for the particular zone as follows:

First Class vehicles - Zone 1
Standard Class vehicles - Zone 2
Catering vehicles - Zone 3

Information about programming units and other aspects of the system can be found in Crew Communications System Midland Mainline Technical and Operating Manual (see Reference Documents item 5).


NOTE 7: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 4).

NOTE 8: Gai-tronics are the successor to DAC. Equipment may be branded with either name but must be returned to Gai-tronics for repair.

Part D - Applies to Vehicles fitted with Gai-tronics system and operated by CrossCountry Trains

NOTE 9: This job is to be carried out with the 36 way control jumpers connected, with the vehicles supplied with 415V electric train supply

NOTE 10: Trailer vehicles are fitted with GAI-tronics equipment.

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NOTE 11: The crew stations are located as follows:

- TGS coach (Guard's compartment)
- TCC (Catering area)


Scheduled Work

1. On each coach set the auxiliary switch to the Auxiliaries/Air Conditioning position.
2. Check that 110V dc supplies are available on all coaches. Check that the status indicators are illuminated on all crew stations and no other indicators.
3. Put the PA system into test mode by pressing zonal PA buttons 'A' and 'D' for 3 seconds on the TGS crew station.
4. Check that the PA broadcast can be clearly heard without crackling or distortion at every loudspeaker in every coach.
5. At the TGS crew station, press any one of the zonal PA buttons and make an announcement and check that it can be heard throughout the entire rake and that it is preceded by a 'Bing Bong' jingle warning tone.
6. At the TCC crew station, press any one of the zone PA buttons and make an announcement and check that it can be heard throughout the entire rake and that it is preceded by a 'Bing Bong' jingle warning tone.

Arising Work

2. Change any crew station with incorrect indications.
- 4, 5, 6. Investigate and rectify defects.

NOTE 12: It is likely that the public address system output will vary from transmitter to transmitter. This is acceptable provided the output remains undistorted and easily audible.

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Call For Aid System – Test

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APPLIES TO: Vehicles with Disabled Toilets (see Section 5.9 for details), as follows:


- PART 1 – Applies to FOD Vehicles (Driessen Toilet)
- PART 2 – Applies to Vehicles with BRB Design Disabled Toilets (TSOD and TFD)
- PART 3 – Applies to TSD Vehicles (Temoinsa Toilet)
- PART 4 – Applies to TSD and TFD Vehicles with Gai-tronics PA System

PART 1 – Applies to FOD Vehicles

- NOTE 1: Where possible this test must be conducted with the FOD in formation with an RFM.
- NOTE 2: There are four 'Call for Aid' (CFA) switches in the FOD; one is located at each wheelchair position and two are located in the Disabled Persons Toilet.
- NOTE 3: The CFA unit can be found in the cupboard to the left of the Disabled Persons Toilet on the back on the electrical control panel.

Scheduled Work

1. Clean and examine the unit, removing any accumulated debris.
2. Check that the cable entry gland or connector is tight.
3. Test the unit as follows:
 - 3.1 Check there is power to the CFA unit by checking that the four CFA buttons in the saloon and toilet are lit.
 - 3.2 Check that the system is in the normal condition (no CFA switches isolated).
 - 3.3 Press one of the four CFA buttons and check that the 3 second call tone is transmitted over the Public Address (PA) system in the buffet car and adjacent vehicles.
 - 3.4 Check that after a pause of about 5 seconds following the end of the call tone there are 4 successive tones followed by a 30 second gap on a repeating cycle.
 - 3.5 Momentarily isolate the CFA and apply power again by operating the switch on the CFA unit box. Check that the call tone ceases.
 - 3.6 Repeat steps 3.3 to 3.5 for the other three CFA buttons.
 - 3.7 Operate the CFA saloon isolation switch and check that the saloon CFA buttons have no effect when pressed. Reset the isolation switch.

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- 3.8 Operate the CFA toilet isolation switch and check that the toilet CFA buttons have no effect when pressed. Reset the isolation switch.
- 3.9 If an RFM vehicle is available in the set, make a PA announcement from the RFM staff compartment and whilst the call is in progress operate a CFA button in the FOD.
- 3.10 Check that the crew call is terminated and that the call tone is broadcast over the PA system. Reset the CFA.
- 3.11 Repeat steps 3.9 and 3.10 for the other three CFA buttons.

Arising Work For Part 1

- 3. If there is no power to the CFA unit check the connections between the transmitter and the power supply, and that the supply voltage is within the range 96 to 110 volts dc. Repair any defects.
- 3.3 Renew the defective button.
- 3.3 If the call tone is not transmitted check the connections between the transmitter and the lighting control circuit. Check continuity of lighting control circuits between the vehicles where the transmission is lost.
- 3.3- If the auto-announcer is not activated after pressing all four CFA.
- 3.6 buttons, renew the auto-announcer. If the auto-announcer fails to be activated by one CFA button but is activated by the other CFA buttons, change the defective button.
- 3.7- Investigate and repair defects.
- 3.8
- 3.9- If the CFA is activated and the PA announcement is not interrupted then investigate and
- 3.11 repair defects in the auto-announcer or PA system on the RFM.

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PART 2 – Applies to Vehicles with BRB Design Disabled Toilets (TSOD and TFD)

Scheduled Work


1. Clean and examine the unit removing any accumulated debris.
2. Check that the units cable entry gland/connector is tight.
3. Test the Disabled Toilet Unit as follows:
 - 3.1 On each connected vehicle, check the auxiliary switch is in the AUX position.
 - 3.2 Check that the PA status indicator is green.
 - 3.3 Press the Call for Aid button.
 - 3.4 Check that a 3 second call tone is transmitted on the driver-guard communications channel and that the sounder on other transmitters connected to the system is activated.
 - 3.5 Check that after a pause of about 5 seconds following the end of the call tone, a message is broadcast over the PA requesting assistance.
 - 3.6 Repeat steps 3.2.to 3.5, but this time do not release the Call for Aid button.
 - 3.7 Check that the message is broadcast for as long as the button is held in.

Arising Work For Part 2

3. Change the Call for Aid unit. Return DAC units to Gai-tronics.

PART 3 – Applies to TSD Vehicles

1. Seek the Engineers advice regarding action to be taken.

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Call For Aid System – Test

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PART 4 – Applies to TSD and TFD Vehicles with Gai-tronics PA System


NOTE 4: This test must be carried out on a complete rake including power cars.

NOTE 5: Call for Aid buttons are located at the following positions:

Vehicle	Wheelchair Space	Disabled Persons Toilet
TSD	2	2
TFD	1	2

Scheduled Work


1. Check that the system is in the normal condition (all CFA switches reset).
2. Check that all the Call for Aid (CFA) switches are illuminated.
3. Test the CFA operation in the TSD as follows:
 - 3.1 Press CFA switch one at the wheelchair space and check that the emergency call message is relayed over the PA loudspeakers throughout the entire rake.
 - 3.2 Reset the CFA switch.
 - 3.3 Repeat step 3.1 to 3.2 for the other three CFA switches in the TSD.
 - 3.4 Isolate CFA switch one using a carriage key and check that the illumination of CFA switch one is extinguished and the switch has no effect when pressed.
Re-enable CFA switch one.
 - 3.5 Isolate CFA switch two using a carriage key and check that the illumination of CFA switch two is extinguished and the switch has no effect when pressed.
Re-enable CFA switch two.
 - 3.6 Make a crew call from the drivers cab at the TGS end and whilst the call is in progress, operate a CFA switch in the TSD.
 - 3.7 Check that when the call has finished the emergency tone is broadcast over the PA system. Reset the CFA.
 - 3.8 Make a crew call from the luggage van at the TGS end and whilst the call is in progress, operate a CFA switch in the TSD.
 - 3.9 Check that when the crew call has finished the emergency tone is broadcast over the PA system. Reset the CFA.

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- 3.10 Make a PA announcement from the TGS crew station and whilst the announcement is in progress, operate a CFA switch.
- 3.11 Check that when the PA announcement is finished the emergency tone is broadcast over the PA system. Reset the CFA.
- 3.12 Make a crew call from the TGS and whilst the call is in progress, operate a CFA switch.
- 3.13 Check that when the crew call has finished the emergency tone is broadcast over the PA system. Reset the CFA.
- 3.14 Repeat steps 3.10 to 3.13 using the crew station in the TCC.
- 3.15. Make a crew call from the drivers cab at the First Class end and whilst the call is in progress, operate a CFA switch in the TSD.
- 3.16 Check that when the crew call has finished the emergency tone is broadcast over the PA system. Reset the CFA.
- 3.17 Make a crew call from the luggage van at the First Class end and whilst the call is in progress, operate a CFA switch in the TSD.
- 3.18 Check that when the crew call has finished the emergency tone is broadcast over the PA system. Reset the CFA.
4. Test CFA operation in the TFD as follows:
 - 4.1 Press CFA switch one at the wheelchair space and check that the emergency call message is relayed over the PA loudspeakers throughout the entire rake.
 - 4.2 Reset the CFA switch.
 - 4.3 Repeat steps 4.1 to 4.2 for the other CFA switch in the TFD.
 - 4.4 Isolate CFA switch one using a carriage key and check that the illumination of CFA switch one is extinguished and the switch has no effect when pressed.
Re-enable CFA switch one.
 - 4.5 Isolate CFA switch two using a carriage key and check that the illumination of CFA switch two is extinguished and the switch has no effect when pressed.
Re-enable CFA switch two.
 - 4.6 Make a crew call from the drivers cab at the TGS end and whilst the call is in progress, operate a CFA switch in the TFD.
 - 4.7 Check that when the crew call has finished the emergency tone is broadcast over the PA system. Reset the CFA.

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- 4.8 Make a crew call from the luggage van at the TGS end and whilst the call is in progress, operate a CFA switch in the TFD.
- 4.9 Check that when the crew call has finished the emergency tone is broadcast over the PA system. Reset the CFA.
- 4.10 Make a PA announcement from the TGS crew station and whilst the announcement is in progress, operate a CFA switch.
- 4.11 Check that when the PA announcement has finished the emergency tone is broadcast over the PA system. Reset the CFA.
- 4.12 Make a crew call from the TGS and whilst the call is in progress, operate a CFA switch.
- 4.13 Check that when the crew call has finished the emergency tone is broadcast over the PA system. Reset the CFA.
- 4.14 Repeat steps 4.10 to 4.13 using the crew station in the TCC.
- 4.15. Make a crew call from the driver's cab at the First Class end and whilst the call is in progress, operate a CFA switch in the TFD.
- 4.16 Check that when the crew call has finished the emergency tone is broadcast over the PA system. Reset the CFA.
- 4.17 Make a crew call from the luggage van at the First Class end and whilst the call is in progress, operate a CFA switch in the TFD.
- 4.18 Check that when the crew call has finished the emergency tone is broadcast over the PA system. Reset the CFA.
5. Renew the defective switch.

Arising Work

- 3.1 to 3.3 If the CFA PA unit is not activated after pressing all four CFA switches, renew 4.1 to 4.3 the CFA PA unit. If the CFA PA unit fails to be activated by one CFA switch, but is activated by the other CFA switches, change the defective switch.
- 3.4,3.5 Investigate and repair defects.
- 4.4,4.5
- 3.6 to 3.18 If Call for Aid is activated and no emergency tone is broadcast after a PA 4.6 to 4.18 announcement or crew call, then change the CFA PA unit.

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Switch, Catering Isolating - Examine/Test

ES 2029

Reference Documents		
Item	Document No.	Title
1	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables

APPLIES TO: All Catering Vehicles incl. TCC, TSB and TSOB

Scheduled Work


NOTE 1: This switch is not designed to break a load current. Step 4 must be carried out in the sequence stated to check that a load current is not broken.

1. Examine the switch for damage and defects.
2. Check the security of all cable terminations.
3. Examine the cable insulation for signs of overheating or damage.
4. Test the operation of the switch as follows:
 - 4.1 Close the catering isolation switch, then connect the electric train supply (415V 3 phase for HST; 800/1000V for RFM).
 - 4.2 Check that all the catering equipment will operate.
 - 4.3 Switch off all the catering equipment individually.
 - 4.4 Open the catering isolating switch.
 - 4.5 Switch on all catering equipment and check that NONE energises.
 - 4.6 Remove the train supply then close the catering isolation switch and leave it closed.

Arising Work

- 1,4. Renew defective components.
- 1,4. Renew the defective switch.
2. Tighten loose terminals. Renew loose or defective cable terminations.
3. Rectify damage or renew defective cables.

NOTE 2: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 1).

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Switch, Vehicle Isolating - Examine/Test

ES 5028

Reference Documents		
Item	Document No.	Title
1	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables


APPLIES TO: All Vehicles

Scheduled Work

NOTE 1: This switch is located within the underskirt (not the vestibule).

NOTE 2: This switch is not designed to break a load current. Step 10 must be carried out in the sequence stated to check that a load current is not broken.

1. Remove the cover from switch.
2. Examine the switch and fuses for damage, defects and correct operation.
3. Check the security of all cable terminations.
4. Examine the cable insulation for signs of overheating or damage.
5. Check the security of the box.
6. Examine the cover weatherstrip seal.
7. Clean the box interior.
8. Examine the box cover fasteners for security or damage.
9. Refit the cover and check the warning label is fitted and it is legible.
10. Test the operation of the switch as follows:
 - 10.1 Close the Vehicle Isolation Switch (VIS), then connect electric train supply (415V 3 phase for HST; 800/1000V for Mark 3 and RFM).
 - 10.2 Check that the battery charger operates on HSTs, and with auxiliaries switch at AUX or AUX + Air Cond., the motor alternator set runs on LHCS.
 - 10.3 Switch off the electric train supply and open the VIS.
 - 10.4 Switch on the electric train supply and check that neither the battery charger nor the motor alternator start up.
 - 10.5 Switch off and disconnect the ETS and move the VIS to "normal".

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Switch, Vehicle Isolating - Examine/Test

ES 5028

Arising Work

2. Renew defective components.
- 2,10. Renew defective switch.
3. Tighten loose terminals. Renew loose or defective cable terminations.
4. Renew defective cables.
5. Secure box.
6. Renew weatherstrip seal.
8. Renew box cover fasteners.
9. Renew warning label.
10. Rectify defects.

NOTE 3: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 1).

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Catering Convertor – Date Check

EU 0592

Reference Documents		
Item	Document No.	Title
1	TI/TP0229	NEI Catering Voltage Converter Test Procedure

APPLIES TO: All HST Catering Vehicles (see Note 1)

NOTE 1: If a defective convertor unit is found on a TCC or TSB vehicle, refer to the Engineer for the action to be taken.

Scheduled Work

NOTE 2: This job does not apply to I-power units. These carry Manufacturers plates identifying them as I-power, and rated at 6kVA (transformer) and 5kw (converter). Seek advice from the Engineer in the event of a defective I-power unit.

NOTE 3: The converters and transformers are interchangeable only in sets, i.e. an NEI converter can only work with an NEI transformer.

NOTE 4: For fault finding on NEI converters see the specified document (see Reference Documents item 1).

1. Remove the relevant vehicle skirt panels to gain access to the three catering convertors.
2. Check the dates of any Powernetics convertors fitted.


NOTE 5: Powernetics convertors can be identified by their black colour. The alternative, NEI-RR convertors are white.

3. Refit skirt panels.

Arising Work

2. Overhaul any Powernetics convertors which are more than 4 years old or which are undated. The overhaul specification is to be agreed with the Engineer and must include sufficient attention for the units to operate without further maintenance for 6 years.

Check overhauled units are dated when refitted and record date and serial number. Refer to Job No. U* 0105 for fastener details.

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Cable Insulation - Examine/Test

EW 5004


Special Tools		
Item	Description	Cat No
1	Megger, 1000V	-
2	Megger, 500V	-

Reference Documents		
Item	Document No.	Title
1	WOSS 560/3	Cable Repairs
2	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables

APPLIES TO: All Vehicles

Scheduled Work


1. Before starting, check that the battery is disconnected, and all jumpers removed.
2. Examine all exposed cables, clamps and ties.
3. Check the security of clamps and ties.
4. Check the cable terminations for security.
5. Set all switches and circuit breakers to ON. Set the air conditioning and auxiliaries switch to AIR CON and AUX.
6. Short out the terminals of the electronic equipment shown on Table 1.
7. Disconnect the negative earth link.
8. Loop across the heating and motor alternator contactors.
9. Using a 1000 Volt Megger (see Special Tools item 1), make the following insulation tests:
 - 9.1 The electric train supply main circuits to frame. Minimum acceptable reading 5MΩ (per phase on HST).
 - 9.2 Between the electric train supply main and interlock circuits. Minimum acceptable reading 10MΩ.
 - 9.3 The 415 volt circuits to (other than main ETS on HST) frame. Minimum acceptable reading 5MΩ.
10. Using a 500 Volt megger (see Special Tools item 2), make the following insulation tests:
 - 10.1 The 110 volt circuits to frame. Minimum acceptable reading 2MΩ.

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Cable Insulation - Examine/Test

EW 5004


11. Remove all shorting wire.
12. Reconnect the earth link.
13. Reconnect the battery if required.

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Cable Insulation - Examine/Test

EW 5004

	HST		LHCS			
	TS,TGS, TF, TFD, TSB, TSD	TRFB, TBRF, TCC	Mark 3A	RFM	TSOB	Mark 3B
ETS Bridge Rectifier	-	-	✓	✓	✓	✓
No Volt Relay Unit	-	-	✓	✓	✓	✓
Motor Alternator AVR/Control Unit	-	-	✓	(2)	✓	✓
Battery Charger Control Unit	✓	✓		✓	✓	✓
Lighting Inverters	✓	✓	✓	✓	✓	✓
Low Voltage Detection Unit	Some	Some	-	✓	✓	✓
Wheel Slide Protection Equipment (Not self powered Girling)	For vehicles with BR or Westinghouse, see Section 5.9					
Public Address Transmitter	TGS and Some TS see Job EP 5053	✓	-	✓	✓	BFO only
Receiver Amplifiers	✓	✓	✓	✓	✓	✓
Driver/Guard Communication Equipment	TGS and Some TS see Job EP 5053	TRFB	-	✓	-	BFO only
Public Address Voltage Dropper Unit	✓	✓	✓	✓	✓	✓
Call for Aid Unit (Fitted to Disabled Toilets)	See Section 5.9	-	See Section 5.9	-	-	FOD
RCD Sockets	-	✓	-	✓	✓	-
CDL Door Panels	✓	✓	✓	✓	✓	✓
Table Lamps	-	-	FO only	Some	-	✓
Luggage Rack Lights	Most TF's	-	FO only	✓	-	✓
Air Conditioning Thermostat	-	-	✓	✓	✓	✓
Microwave Ovens	-	✓	-	✓	✓	-
UV Steriliser	TSB	✓	-	✓	✓	-
Train Phone and Cell Phone	Some	✓	-	✓	-	Some
Laptop Power Supply Unit	Some	Some	-	-	-	-
WiFi Equipment	Some	Some	-	-	-	-
Vestibule Door Power Supply Unit (with Single Leaf Door)	Some TFD	-	-	-	-	-
Toilet Vent Fan Voltage Convertor	Ex-LHCS TS	-	-	-	-	-

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Cable Insulation - Examine/Test

EW 5004


	HST		LHCS			
	TS,TGS, TF, TFD, TSB, TSD	TRFB, TBRF, TCC	Mark 3A	RFM	TSOB	Mark 3B
Volo TV Power Supply Unit	Some TS		-	-	-	-
Passenger Counting Equipment	Some TGS	-	-	-	-	-
Smoke Detector PSU	-	TCC	-	-	-	-
Refrigerators		✓	-	✓	-	-
Boilers		✓	-	✓	-	-
Hand Wash Heater	-	TCC	-	-	-	-
Ethernet Jumpers	Some	Some	-	-	-	-
CCTV Digital Video Recorder	Some TGS TSD	Some TRFB	-	-	-	-
CCTV Video Combining Unit	Some TF TFD TS	-	-	-	-	-
Smoke Detector PSU	-	TCC	-	-	-	-
Coffee Machine Panini Grill	TSB	-	-	-	-	-
Vestibule Door Sensor	TSB	-	-	-	-	-
Catering Convertors	TSB	✓	-	-	-	-

Table 1: List of Electronic Equipment

Arising Work

2. Renew defective clamps and ties.
3. Resecure loose clamps and ties.
4. Renew loose cable terminations if no overheating damage. Repair heating damage in accordance with the specified document (see Reference Documents item 1) and reconnect.
- 2,9, 10. Repair damaged cables in accordance with the specified document (see Reference Documents item 1).
- 2,9, 10. Renew damaged cables which cannot be repaired.
- 9,10. If the reading is below minimum acceptable, disconnect the air conditioning module and repeat test.

If the reading is now acceptable, investigate the fault on the air conditioning module or change module (see Job No. HA 0109).

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Cable Insulation - Examine/Test


EW 5004

9,10 (All except HST vehicles). If reading is below minimum acceptable with air conditioning module disconnected, isolate the motor alternator set.

If the reading is now acceptable change the motor alternator set.

9,10 Locate the defective cable.

NOTE 1: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 2).

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WSP Body to Bogie Flexibles – Examine

EY 0146

Reference Drawings		
Item	Drawing No.	Title
1	PB-C0-2101508	Cable Assemblies for WSP Equipment
2	PB-C0-2101511	Wiring Diagram for WSP Equipment, Westinghouse System

Reference Documents		
Item	Document No.	Title
1	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables

APPLIES TO: Vehicles fitted with BR WSP, Westinghouse WSP and Girling coach powered WSP (See Section 5.9 for vehicle numbers).


Scheduled Work

1. With the vehicle removed from the bogies, examine flexibles for damage, defects and security.

Arising Work

1. Resecure loose flexibles.
1. Renew damaged or defective flexibles. For Westinghouse equipment refer to the specified drawings (see Reference Drawings items 1 and 2).

NOTE 1: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 1).

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Wheelslide Prevention Equipment – Test

EY 0303

Reference Documents		
Item	Document No.	Title
1	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables
2	TE/TP0071	Full Test of BR WSP System using Automatic Test Equipment
3	TI/TP0430	Full Test of Girling WSP System using Test Set Type 69042349
4	TEE/E/86/M/064	Mark 2 WSP Equipment (19" Rack) (Cat No. 064/007161)
5	TEE/E/90/M/006	Mark 2 WSP Equipment (19" Rack) (Cat No. 064/004855)
6	DT/MNTX/9001	User Guide for Diagnostic Tool Westinghouse WSP

Special Tools		
Item	Description	Cat No
1	Blakell Test Equipment (BR WSP)	098/070009
2	SABWABCO test set (Part No. 69042349) (Girling WSP)	-
3	Westinghouse Diagnostic Tool (Westinghouse WSP)	-

APPLIES TO: Vehicles fitted with BR WSP, Westinghouse WSP and Girling coach powered WSP (See Section 5.9 for vehicle numbers).

NOTE 1: Certain vehicles with BR WSP have had 064/004855 racks upgraded to 090/070669. Such vehicles shall be tested in accordance with Reference Document 5. Any defective racks shall be replaced with the same type of rack.

Part A - Vehicles with BR WSP.


Part B - Vehicles with coach powered Girling which is energised from a pressure switch (See Section 5.9 for list of vehicles).

Part C - Vehicles with coach powered Girling which is energised from Train wire 12 (See Section 5.9 for list of vehicles).

Part D - Vehicles with Westinghouse WSP (see page 2) (See Section 5.9 for list of vehicles).

NOTE 2: This job must be done after the vehicle has been bogied and electrical systems tested.

NOTE 3: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 1).

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Wheelslide Prevention Equipment – Test

EY 0303

Scheduled Work

Part A

1. Test system in accordance with the specified document (see Reference Documents item 4 or 5) using Blakell test equipment (see Special Tools item 1).

Part B

1. Use a brake test trolley to charge brake pipe to "RUNNING" pressure.
2. Test the system on one axle in accordance with the specified document (see Reference Documents item 3) using SABWABCO test set Part No. 69042349 (see Special Tools item 2).
3. Repeat steps 1 and 2 for other 3 axles.

Part C

1. Energise train wire 12 with 110V supply at 36 way receptacle.
2. Test the system on each axle in accordance with the specified document (see Reference Documents item 3) using SABWABCO test set Part No. 69042349 (see Special Tools item 2).


NOTE 4: In low temperatures, the alternator resistance may be lower than specified. In such conditions, it is permissible to measure the alternator resistance between unit terminals. The resistance must be between 6.8 and 9.2Ω. Do not measure between unit plug terminals as this will give false readings.

3. Remove 110V supply from train wire 12.

Part D - Westinghouse Equipment

Scheduled Work

1. Charge the brake pipe to 4.0 bar and check that the battery is connected and circuit breakers set.
2. At the Wheelslide Control Unit (see Figure 1) use the scroll buttons on the keypad to bring up "tEst" in the display, then press the 'Enter' key to initiate the test.
3. The green LED at the keypad will flash for the duration of the test, approximately five minutes. The vehicle must not be moved during this period.
4. During the test check that the correct brake callipers release on each wheelset as the system operates each dump valve.

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Wheelslide Prevention Equipment – Test

EY 0303


5. On completion of the test the green LED will stop flashing.
6. If the green LED is permanently lit the unit is healthy. If the red LED at the keypad illuminate the unit has failed the test (See step 7).
7. Disconnect each probe in turn and check that the correct code (e.g. for probe number 'X' the code is FLtX) is shown on the display.
8. Check that the fault indicator lamp in the vestibule is extinguished, indicating that the SFR relay is working satisfactory.
9. Reset the SFR relay and check that the fault indicator lamp in the vestibule illuminates.
10. If the red LED at the keypad is illuminated use the scroll Up or Down (arrow) buttons on the control unit keypad to fault find the unit.
11. The display will indicate whether the fault lies in the control unit, a particular dump valve or a particular speed probe.
12. Refer to Table 1 for possible causes and remedies.
13. If the display indicates faults in both control unit and other items, rectify the faults in the other items before attempting to rectify control unit faults.
14. If it proves necessary to further diagnose the unit, this can be achieved using the diagnostic tool (see Special Tools item 3). Refer to the user guide (see Reference Document item 6).

NOTE 5: In the event that it is necessary to change a WSP control unit, care must be taken to check that the replacement control unit is fully compatible with the system configuration on the vehicle in question.

Arising Work

All items - Rectify defects in accordance with instructions below and re-test.

Part A – (See Reference Documents item 4 or 5).

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Wheelslide Prevention Equipment – Test

EY 0303

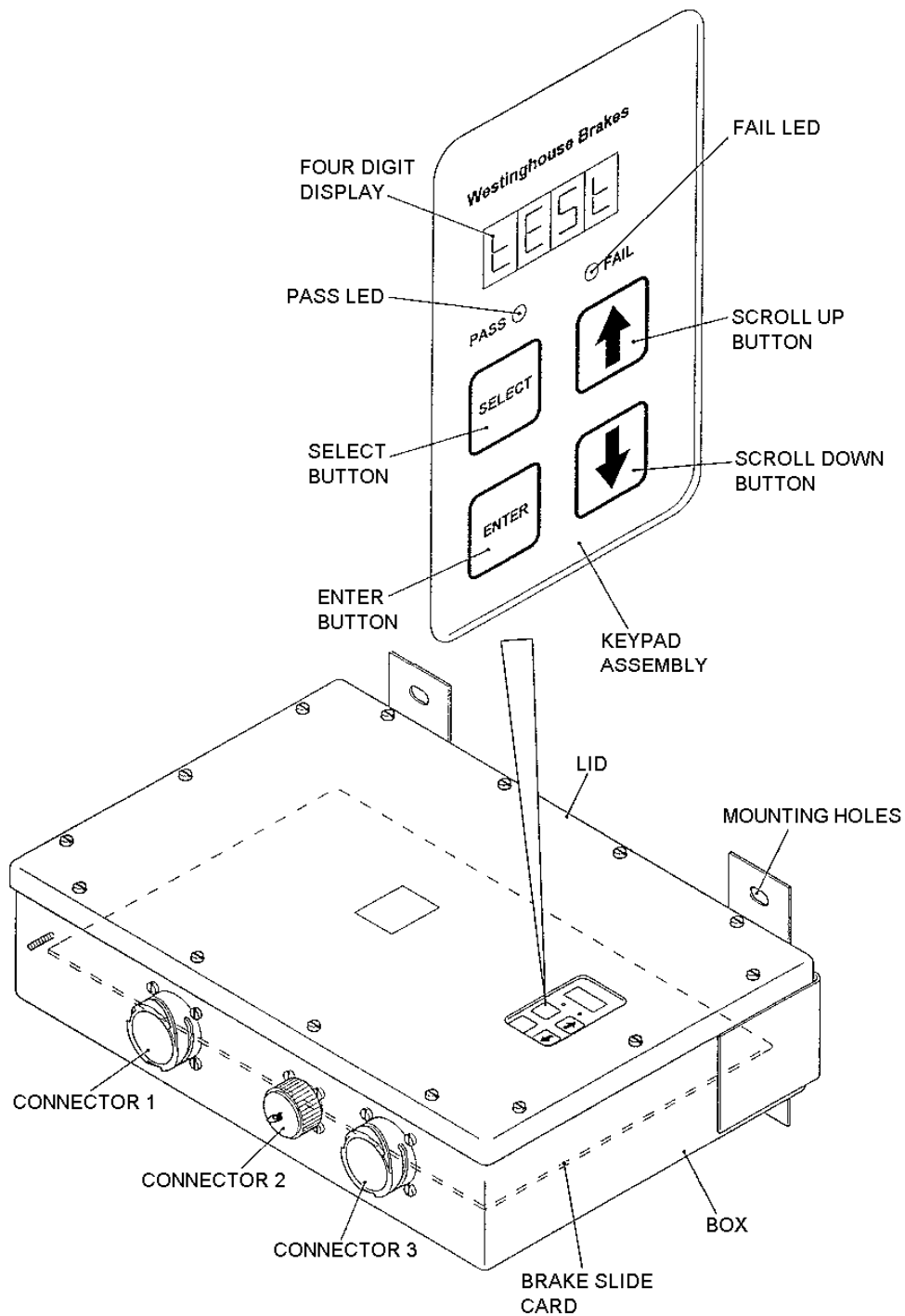



Figure 1: Westinghouse WSP Control Unit Keypad


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Wheelslide Prevention Equipment – Test

EY 0303

Display	Possible Cause	Remedy
TAC# FLt1	Tacho signal open circuit during self-test – Tacho sensor faulty or power supply failed	Renew probe Check harness Reinstate Power Supply
TAC# FLt2	Excessive out of range errors have been detected from the tacho by the run-time tacho signal processing	Renew probe
VAL# FLt1	No current feedback from dump valve # solenoid coil – Open circuit in supply to dump valve or within dump valve	Test harness, renew or repair Change dump valve Change control unit (o/c output)
Ctrl Flt1	The monitored voltage feedback from dump valve does not correspond to the requested valve state – possible short circuit in dump valve # circuitry	Test harness and renew or repair Change dump valve
Ctrl Flt2	Valve timer did not time out within expected period for HOLD or VENT	Change Wheelslide Control Unit
Ctrl Flt3	Valve not returned to inlet state after time out	Change Wheelslide Control Unit
Ctrl Flt4	The operation of the output stages does not correspond to the emergency input state (if implemented)	Change Wheelslide Control Unit
Ctrl Flt6	Monitored input and requested output states of the miscellaneous relays do not correspond	Change Wheelslide Control Unit
Ctrl Flt7	Error detected in power-up or background RAM tests	Change Wheelslide Control Unit
Ctrl Flt8	Error detected in background ROM checksum test	Change Wheelslide Control Unit
Display Blank	Loss of 24V supply Control Unit faulty	Reinstate supply Change Wheelslide Control Unit

Table 1: Fault Indications for Westinghouse WSP

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Westinghouse WSP Wheel Size – Update

EY 1005

APPLIES TO: Vehicles with Westinghouse WSP (See Section 5.9 for list of vehicles).

Scheduled Work

1. Charge the brake pipe to 4.0 bar, check that the battery is connected and the circuit breakers are set.
2. Check that a self-test has been completed (see EY 0303 part D).
3. Press any button on the keypad, TEST will be shown on the display (see Figure 1).
4. Press the down arrow button twice, SIZE will be displayed.
5. Press the ENTER button to display the currently-stored wheel size (four digits with a leading zero).
6. Use the up and down arrow buttons as required to increase or decrease the size of the displayed figure (full-size wheel diameter is 914mm).
7. When the desired figure is displayed, press the ENTER button to store that value as the calibrated wheel size (sizes outside a pre-defined range will not be accepted). If the figure is not to be stored, press the SELECT button to return to the top level menu (SIZE displayed).
8. If the process was successful, SIZE will be displayed. If unsuccessful, -Err will be displayed. If unsuccessful, press the SELECT button to display SIZE and repeat the process.
9. When all operations are complete, press the SELECT button to return to the top level menu on the display.

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Westinghouse WSP Wheel Size – Update

EY 1005

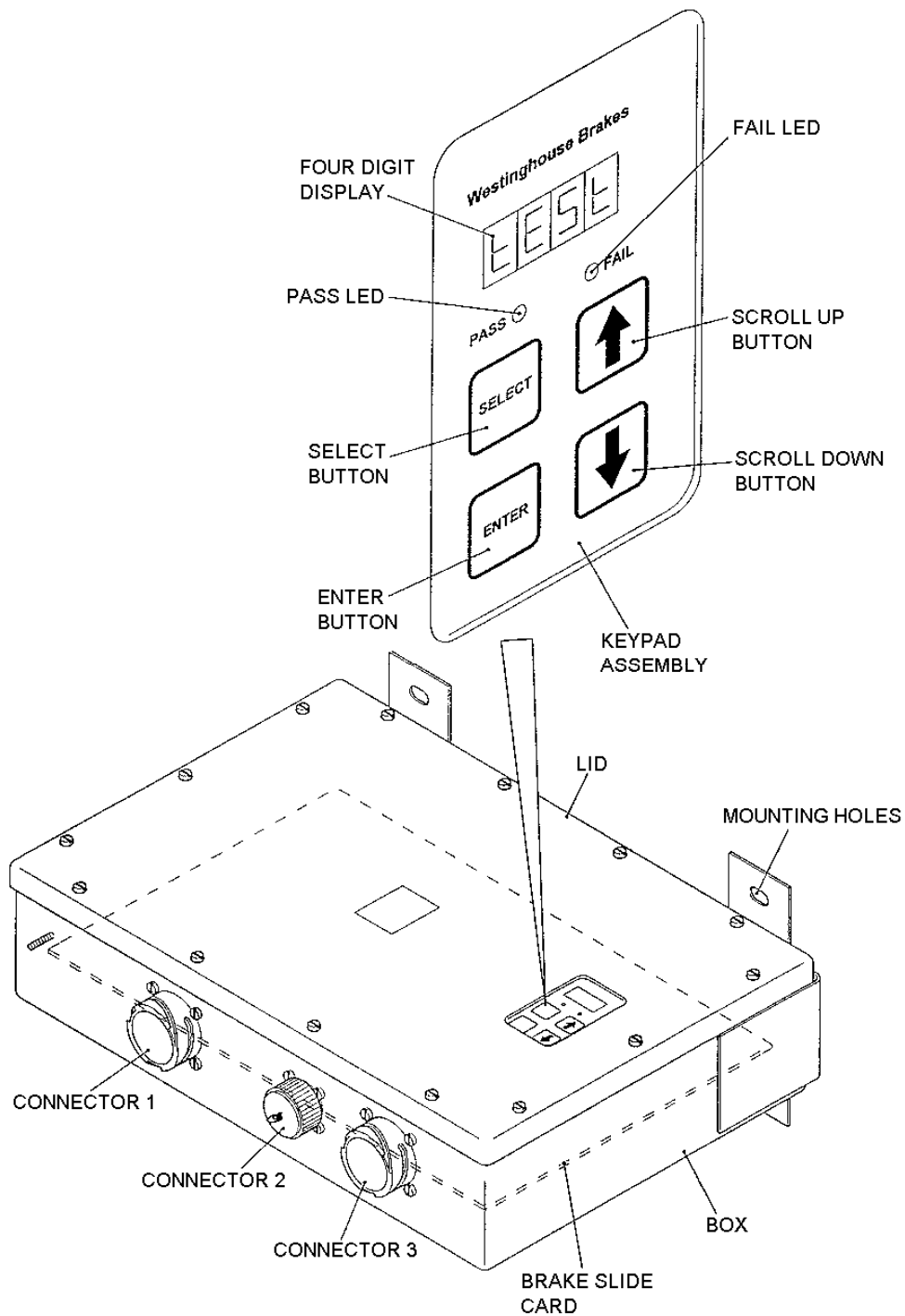



Figure 1: Westinghouse WSP Control Unit Keypad

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Electrical System - Functional Test

EZ 1006

Reference Documents		
Item	Document No.	Title
1	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables
2	BS EN 60081:1998, Annex D	Double-capped Fluorescent Lamps – Performance Specifications

APPLIES TO: All Vehicles

Scheduled Work

When the vehicle is complete, test the following electrical systems to check that the components function correctly and safety.

1. Continuity

NOTE1: Check that the coach is disconnected from shore supplies and that the auxiliary switch is in the off position.

Using a continuity tester make the following tests:


- 1.1 Between the power circuit of each ETS/train supply jumper plug and the opposite end receptacle. Correct any open circuit.
- 1.2 Check that the interlock circuit is continuous with both jumper plugs in their dummy receptacles and that it is broken by removing each jumper plug in turn.
- 1.3 (HST vehicles only) - Check that wires 7 and 8 are crossed between each 36 way through control receptacle. Check continuity, end to end, of remaining train wires ensuring that no further crossed connections have been made.

2. Lighting

Before commencing the following tests connect vehicle to a 3ph 415V (HST) or 800/1000V LH shore supply.

2.1 Mark 3A (TSO, TSOB and FO) and HST

- 2.1.1 Trip the circuit breaker LCCB and move the auxiliary switch to the OFF position.
- 2.1.2 Connect a 200 ohm rheostat (see Section 9 for details) between wires 153 and 154.

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Electrical System - Functional Test

EZ 1006

- 2.1.3 Connect a voltmeter (see Special Tools item 1) between wires 154 (+ve) and 115 (-ve).
- 2.1.4 Close the circuit breaker LCCB.
- 2.1.5 Close the lighting contactor by operating the ON lighting relay.
- 2.1.6 Reduce the voltage by means of the rheostat until the lighting contactor drops out.
- 2.1.7 Adjust the Lighting Relay Resistor (LRE) to give a drop out voltage of 80 ± 2 volts.
- 2.1.8 Trip the circuit breaker LCCB and remove the rheostat and voltmeter.
- 2.1.9 Close circuit breakers TLCCB, LCCB, LCB1-4 and LSCB. Move the auxiliary switch to the AUX position.
- 2.1.10 (Not HST) Operate the train lights ON switch. Check that Pin 1 on one of the RCH Couplers is energised whilst the switch is operated.
- 2.1.11 (Not HST) Operate the train lights OFF switch. Check that Pin 2 on one of the RCH Couplers is energised whilst the switch is operated.
- 2.1.12 Operate the local lights ON pushbutton. Check that all lights in the vehicle are illuminated including toilet emergency lights and table lamps on FO vehicles (where fitted).
- 2.1.13 Check the operation of all light switches including those on luggage racks and table lamps on FO vehicles (where fitted).
- 2.1.14 Operate the local lights OFF pushbutton. Check that all lights in the vehicle are extinguished.
- 2.1.15 Using an 18 volt battery tapping, check that the lighting ON and OFF relays operate.
- 2.1.16 Move the auxiliary switch to the OFF position.

2.2 Mark 3A (RFM)


- 2.2.1 Close circuit breakers TLCCB, LCCB, LSCB and LCB1-4.
- 2.2.2 Press the Control Set Button Switch (CSBS). Check that the Control Indicator Lamp (CIL) is illuminated.
- 2.2.3 Move the auxiliary switch to the AUX position.

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Electrical System - Functional Test

EZ 1006

- 2.2.4 Operate the train lights ON switch. Check that Pin 1 on one of the RCH Couplers is energised whilst the switch is operated.
- 2.2.5 Operate the train lights OFF switch. Check that Pin 2 on one of the RCH Couplers is energised whilst the switch is operated.
- 2.2.6 Operate the local lights ON pushbutton. Check that all lights in the vehicle are illuminated including those on luggage racks and table lamps (where fitted).
- 2.2.7 Check the operation of all light switches including table lamps and luggage rack lights (where fitted).
- 2.2.8 Check that the low voltage detection unit picks up at 86 volts and drops out at 81 volts.
- 2.2.9 Set the Battery Control Relay (BCR) to its minimum setting (3 minutes).
- 2.2.10 Trip circuit breaker BCB. Check that BCR drops out and that after 3 minutes lighting contactor LC1 drops out.
- 2.2.11 Reset BCR to 30 minutes.
- 2.2.12 Operate the local lights OFF pushbutton. Check that all lights in the vehicle are extinguished.
- 2.2.13 Using an 18 volt battery tapping, check that the lighting ON and OFF relays operate.
- 2.2.14 Move the auxiliary switch to the OFF position.
- 2.2.15 Press the Control Trip Button Switch (CBTS). Check that CIL is extinguished.
- 2.3 Mark 3B (FO, FOD and BFO)
 - 2.3.1 Close circuit breakers TLCD, LCCB, LSCB, LCB1-4 and GLCB (BFO only). Move the auxiliary switch to the AUX position.
 - 2.3.2 Operate the train lights ON switch. Check that Pin 1 on one of the RCH Couplers is energised whilst the switch is operated.
 - 2.3.3 Operate the train lights OFF switch. Check that Pin 2 on one of the RCH Couplers is energised whilst the switch is operated.
 - 2.3.4 Operate the local lights ON pushbutton. Check that all lights in the vehicle are illuminated including table lamps (where fitted).

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Electrical System - Functional Test

EZ 1006

- 2.3.5 Check the operation of all light switches including those on luggage racks and table lamps (where fitted).
- 2.3.6 Check that the low voltage detection unit picks up at 86 volts and drops out at 81 volts.
- 2.3.7 Set the Battery Control Relay (BCR) to its minimum setting (3 minutes).
- 2.3.8 Trip circuit breaker BCB. Check that BCR drops out and that after 3 minutes lighting contactor LC1 drops out.
- 2.3.9 Reset BCR to 30 minutes.
- 2.3.10 Operate the local lights OFF pushbutton. Check that all lights in the vehicle are extinguished.
- 2.3.11 Check the operation of the train lights controls in the guards compartment (BFO only).
- 2.3.12 Using an 18 volt battery tapping, check that the lighting ON and OFF relays operate.
- 2.3.13 Move the auxiliary switch to the OFF position.

Arising Work

- 1. Rectify defects in-situ.
- 2. Rectify defects which require the component to be changed.


NOTE 2: See the following jobs.

2.1.12, Defective fluorescent luggage rack lights (where fitted)
2.2.6, Job No. ELA1016.
2.3.4

2.1.12 Defective table lamps (where fitted)
2.2.6, Job No. ELA1017.
2.3.4

NOTE 3: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Document item 1).

NOTE 4: The colour of all fluorescent tubes fitted must be "Warm White" as defined in the specified document (see Reference Documents item 2).

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Luggage Compartment Floor – Examine

FF 6238

APPLIES TO: BFO and TGS


Scheduled Work

1. Remove the metal floor plate.
2. Examine the floor thus exposed.
3. Examine the metal floor plate.
4. Examine the floor covering.
5. Refit the metal floor plate.

Arising Work

2. Repair the floor in accordance with Job No. FTA0100.
3. Renew the floor plate.
4. Renew any floor covering which is damaged. The replacement floor covering must match the current installation, and the material to be used must be agreed by the Engineer prior to fitting.

Any floor exposed to be treated in accordance with Job No. FTA0100.

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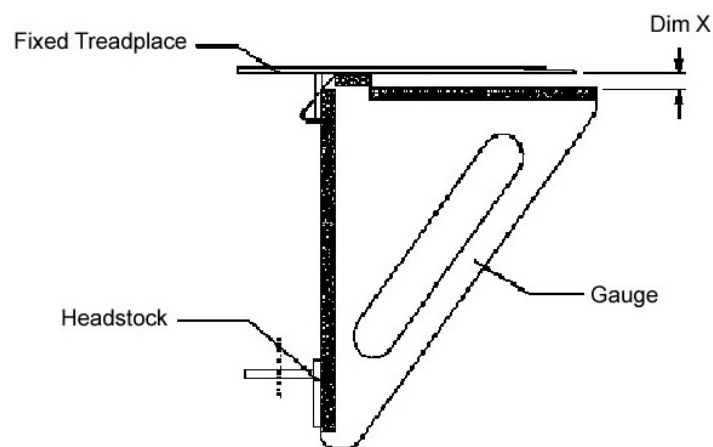
Fixed Gangway Treadplate – Examine

FM 0114

APPLIES TO: All Vehicles

Scheduled Work

1. Examine the gangway treadplates fixed to the ends of the vehicle.
2. Check with a suitable gauge or set square that the treadplate is flat and at right angles to the headstock in five positions (see Figures 1 and 2).



Dimension X = 19-21mm

Figure 1: Side Elevation with Gauge Held Against Headstock

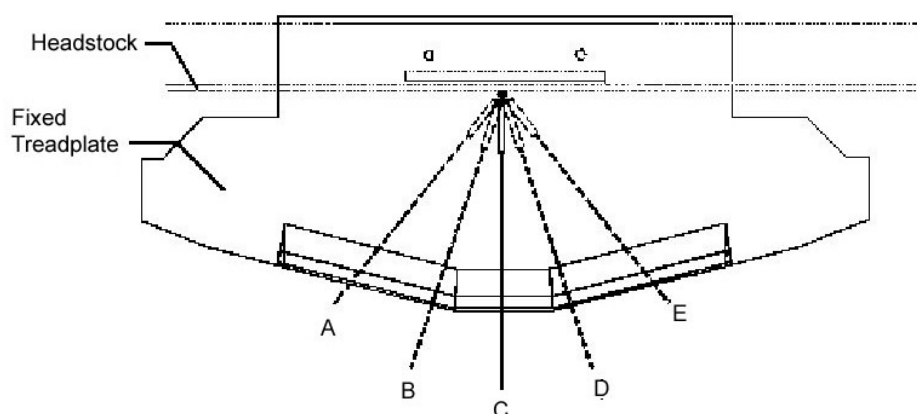



Figure 2: Plan View of Fixed Treadplate Showing Gauging Positions

Arising Work

- 1,2. Repair or straighten the treadplate.

NOTE: See Job No. IF 6033 for attention to rivets securing brass strip.

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Vehicle Floor – Repair

FTA0100

Reference Documents		
Item	Document No.	Title
1	CR/PE0102	Repainting of Rail Vehicles

APPLIES TO: All Vehicles

Scheduled Work

1. Remove rotten or damaged wooden floor panels, and any wooden panels with evidence of water ingress and discard. Examine the exposed steelwork.
2. Clean and paint the exposed steelwork in accordance with the specified document (see Reference Documents item 1).
3. Renew the wooden floor panels removed at step 1.


Arising Work

1. Repair damaged or corroded steel panels, frames or cracked welds. The repair method is to be approved by the Engineer prior to work being commenced.

If any steel frame is to be renewed the Engineer is to be consulted as to whether it is necessary to support the vehicle body to prevent distortion.

The corrugated steel floor is made up of panels up to 2200mm by 800mm. No more than two of these panels are to be removed from the vehicle at any time.

All new metal and welds must be prepared and treated with corrosion inhibiting primer in accordance with the specified document (see Reference Documents item 1). Interior surfaces must be finish painted prior to fitting wooden floor panels.

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Floor – Examine

FX 0100

APPLIES TO: All Vehicles


Scheduled Work

1. Stand in the centre of the vestibule, toilet floor areas and trolley store areas which were converted from toilet areas, and check that the floors do not noticeably deflect under a persons weight.

Arising Work

1. If the floor deflects under weight, remove covering and examine the floor panel. If the panel is damp or rotten remove and examine steel floor beneath.

Repair the floor in accordance with Job No. FTA0100 and renew the floor covering. The replacement floor covering must match the current installation, and the material to be used must be agreed by the Engineer prior to fitting.

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Kitchen Floor and Solebar – Examine

FX 0101


APPLIES TO: RFM, TBRF, TRFB, TSOB

Scheduled Work

1. Remove the cover to gain access to the boiler compartment beneath the working surfaces in the kitchen.
2. Check for signs of water leakage from the boiler, and corrosion arising from these leaks.
3. If fitted, remove the drip tray.
4. Examine the area previously covered by the drip tray, including visible areas of the floor, floor supports, solebars, and solebar closure plates for corrosion and water damage.
5. Refit the drip tray. If the vehicle is not fitted with a drip tray, seek advice from the Engineer.

Arising Work

- 2, 4. If significant corrosion or other damage is found, seek advice from the Engineer.

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Air Conditioning Module – Examine

HA 0109

Materials			
Item	Description	Qty/Veh	Cat No.
1	Oil, ICI Emkarate RL68S 1 litre	As Req'd	027/017019
2	Oil, Castrol Icematic SW 68 5 litres 25 litres	As Req'd	027/025022 027/025013

Reference Documents		
Item	Document No.	Title
1	TI/TS0594	Performance Specification for the Overhaul of Air Conditioning Module for Mark 3 Coaches
2	PB/CI0675	Mark 3 and HST Trailer Air Conditioning Module Overhaul Specification
3	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables

APPLIES TO: All Vehicles

Scheduled Work

NOTE 1: Some vehicles may be fitted with modules overhauled by Sea Container Refrigeration Services. For such vehicles, seek the advice from the Engineer.


NOTE 2: Vehicles operated by Cross Country Trains (overhauled by Wabtec in 2008 and 2009) are fitted with an upgraded 26kW Wabtec module. These modules must not be interchanged for other types.

NOTE 3: East Coast HST vehicles are to be fitted with new-build Knorr Bremse modules from 2013. For such vehicles, seek the advice from the Engineer.

1. Check the date of last overhaul.
2. Remove the module from the vehicle.
3. Module - General examination (see Figure 1 on Stones UP31 and Figure 2 on Wabtec Vapor–Stone):
 - 3.1 Check exposed refrigerant pipework, connections, compressor and condenser for leakage of refrigerant indicated by the presence of oil.
 - 3.2 Clean the module, ensuring that the evaporator and condenser fins are not damaged or bent (obstructing the air flow).

After cleaning, the airflows for a Wabtec module must be:


- Evaporator – 3300 cubic metres per hour @ 380 Pascal.
- Condenser – 9000 cubic metres per hour @ 380 Pascal.

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Air Conditioning Module – Examine

HA 0109


- 3.3 Examine filter housing framework (Stones Modules).
- 3.4 Examine filter access cover fixings for security (Temperature and Wabtec Vapor-Stone Modules).
- 3.5 Fit new filters.
- 3.6 Examine framework and panels for damage or missing parts i.e. brush welts etc.
4. Examine the d.c. ventilation fan motor (where fitted) as follows:
 - 4.1 Remove the ventilation fan motor commutator cover to gain access to the brushgear.
 - 4.2 Examine the commutator and brushgear for defects.
 - 4.3 Remove any grease or carbon dust with a dry fluff free cloth.
 - 4.4 Remove each brush and check that it is not chipped or broken and that the pigtails are not damaged.
 - 4.5 Check that the length of each brush is 17mm or more.
 - 4.6 Check that all electrical connections are secure.
 - 4.7 Check that the motor mountings are secure.
 - 4.8 Check that the fan motor runs smoothly and that commutation is satisfactory.
 - 4.9 Examine and refit the commutator cover.
5. Examine the a.c. ventilation fan motor (where fitted), and the condenser fan motor as follows:
 - 5.1 Check that all electrical connections are secure.
 - 5.2 Check that the motor mountings are secure.
 - 5.3 Check and examine the impellers.
 - 5.4 Check that the impellers are secure on the motor shafts.
 - 5.5 Rotate the assemblies by hand and check for free and noiseless movement.

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Air Conditioning Module – Examine

HA 0109

6. Test heater elements:
 - 6.1 For continuity. Acceptable range is 72 to 88ohms.
 - 6.2 Test heater elements for resistance to earth. Minimum acceptable is 0.5Mohms.
7. Check the compressor oil level as follows:
 - 7.1 Check that the compressor has not run for at least ten minutes.
 - 7.2 Check that the compressor oil is between $\frac{1}{2}$ and $\frac{3}{4}$ way up the sight glass.
8. Check the refrigeration level as follows:
 - 8.1 Connect a 415V 3 phase supply and run the compressor by wedging in the cooling test button.
 - 8.2 On Wabtec Vapor-Stones modules, run the system for 15 minutes and check at the liquid line sight glass/moisture indicator.
 - 8.2.1 There is no excessive flashing.
 - 8.2.2 The moisture indictor is green.
 - 8.3 On Stones modules, check that the refrigerant level is just below the top of the bottom sight glass on the liquid receiver.
 - 8.4 On the Temperature modules:
 - 8.4.1 Blank off the condenser.
 - 8.4.2 Check that the high pressure gauge reading increases to 150 to 180psi, and the low pressure gauge reading is approximately 38psi.
 - 8.4.3 If there is no continuous flashing in the refrigerant sight glass, the level is correct.
 - 8.4.4 Remove the blank from the condenser.
 - 8.5 Remove the wedge from the cooling test button.
9. Examine and test the dampers as follows:
 - 9.1 Examine low-level damper and linkage. Test for freedom of movement.
 - 9.2 Examine fresh air damper and linkage. Test for freedom of movement.
 - 9.3 Apply 110V between terminal 78 and negative and check that the low-level damper operates.

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Air Conditioning Module – Examine

HA 0109

9.4 Apply 110V between terminal 67 and negative and check that the fresh air damper operates.

10. Test the over-temperature thermostats as follows:

NOTE 4: The operating limits for these over-temperature thermostats are listed below:

ST1: This thermostat is the first stage protection. When activated it will isolate the control circuit thus preventing all operations, this is with the exception of the vent fan motor.

Cut-out 116°C
Cut-in 93°C

ST2: This thermostat is back up protection in case of failure of ST1 and acts as a shunt trip across MCB1. When activated it will operate MCB1 isolating all AC power to the module and preventing all systems from functioning. This requires a manual reset.

Cut-out 177°C
Cut-in 160°C

10.1 Remove panelling to gain access to thermostats (see Figures 2 and 3).

10.2 Loosen the fasteners for the thermostats and place the tip of the thermocouple between the thermostat and the bracket.

10.3 Tighten the fasteners so that the thermocouple is clamped between thermostat and thermostat frame (the purpose of doing this is to prevent the thermocouple being in direct contact with the heat source from the heat gun; this is because the thermocouple has a much lower thermal mass than the thermostat and frame and will register incorrectly if in direct contact with the airflow).

10.4 Apply a suitable heat source (hot air gun) and check that the thermostat opens. Make a note of the temperature at which it opens. This may usually take 2 or 3 cycles to allow the frame to thermally balance with the thermocouple to improve the accuracy of the reading.


10.5 Allow the thermostat to cool to an ambient temperature.

10.6 Check that the thermostat closes.

10.7 Loosen the fasteners, remove the thermocouple then retighten fasteners.

10.8 Refit all disturbed panelling.

11. Refit module to vehicle.

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Air Conditioning Module – Examine

HA 0109

Arising Work

NOTE 5: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 3).

NOTE 6: All work involving refrigerant gas must be carried out by suitably trained staff, with refrigeration handling certificates, etc, in accordance with f-gas regulations.

1. Change a Stones or Temperature air conditioning module if it is more than 6 years since last contract overhaul, and overhaul in accordance with the specified document (see Reference Documents item 1). See Section 5.9 for interchangeability.

1. Change a Wabtec Vapor-Stone module if it is 6 or more years old. Overhaul module in accordance with the specified document (see Reference Documents item 2).

3.1 If oily deposits are found on pipework, or if refrigerant level is low:
& 8

- locate leaks with a leak detector
- remove refrigerant
- carry out a pressure test
- repair leaks
- recharge with correct amount of refrigerant, (see Table 1).

NOTE 7: Only suitably trained staff with refrigerant handling certificates etc, are to be employed on this work, in accordance with f-gas regulations.

NOTE 8: A system must not be returned to full charge until all leaks are rectified.

NOTE 9: Use only the correct recovery/recharging machine for R134a refrigerant.

Make	Capacity (kg)
Stones	12.2
Temperature	14.6
Vapor Stone	12.3


Table 1: System Capacities

3.3 Repair filter housing.

3.4 Renew filter access cover fixings.

3.6 Repair frame and panels. Paint any exposed metal surfaces.

3.6 Renew missing parts.

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4.2 Repair minor faults on brushgear.

4.4 If brushes are damaged, examine the commutator for high bars or proud mica. If any found, change motor.

4.2, 4.8 Change the ventilation fan motor.

4.5 Renew brushes.

4.6 Resecure loose connections.

4.7 Resecure motor mountings.

5.1 Resecure loose connections.

5.2 Resecure motor mountings.

5.5 Change ventilation fan motor or condenser fan motor as applicable.

6. Renew element.

7. Top up compressor oil as follows:

- Stones and Temperature - ICI EMKARATE RL68S, or equivalent (see Materials item 1).
- Wabtec Vapor Stone modules Castrol ICEMATIC SW 68 (see Materials item 2).


NOTE 10: Original oil change (capacity).

Compression Type	Oil Capacity (Litres)
Carrier	4.55
Dunham Bush	6

9.1, 9.2 Repair defects. If stiff, lubricate sparingly and operate manually till free.

9.3, 9.4 Renew solenoid.

10.4, 10.6 Renew defective thermostat.

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Air Conditioning Module – Examine

HA 0109

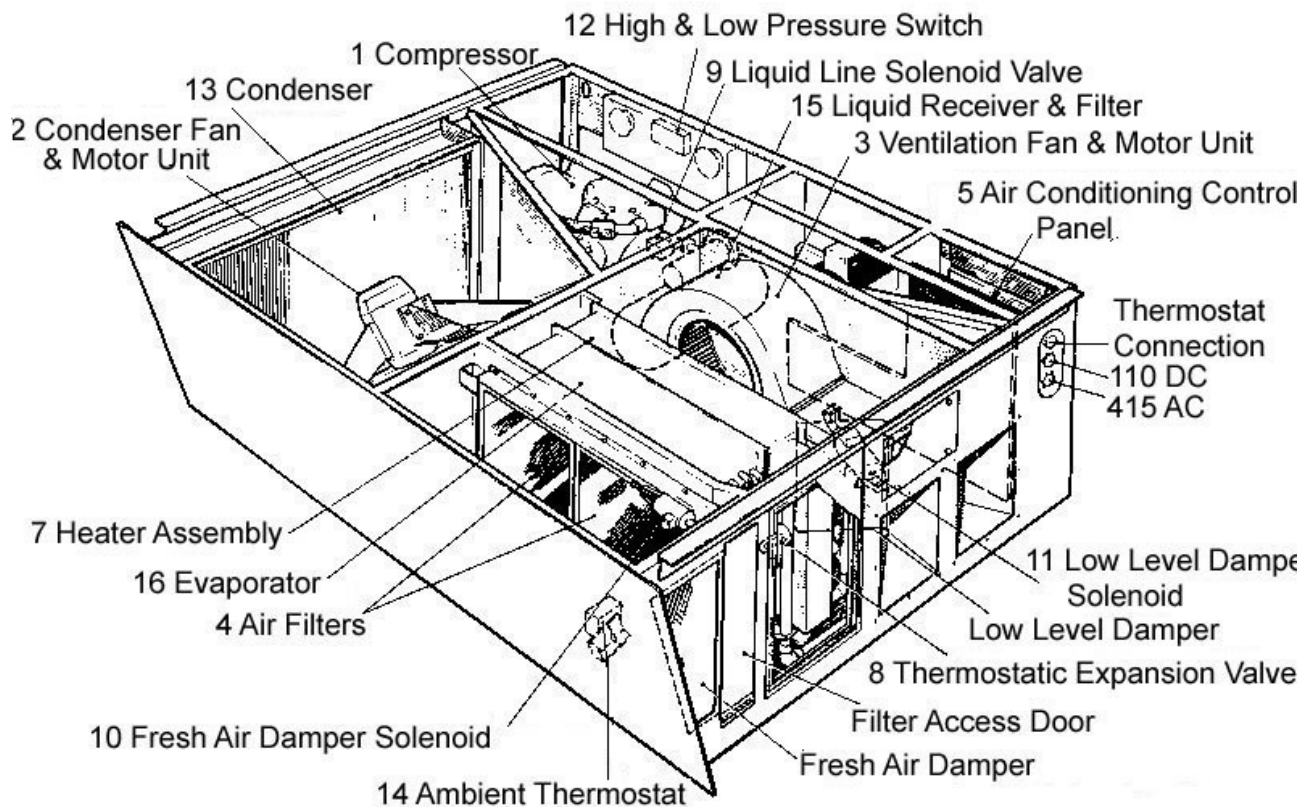



Figure 1: Stones UP31 Air Conditioning Module

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Air Conditioning Module – Examine

HA 0109

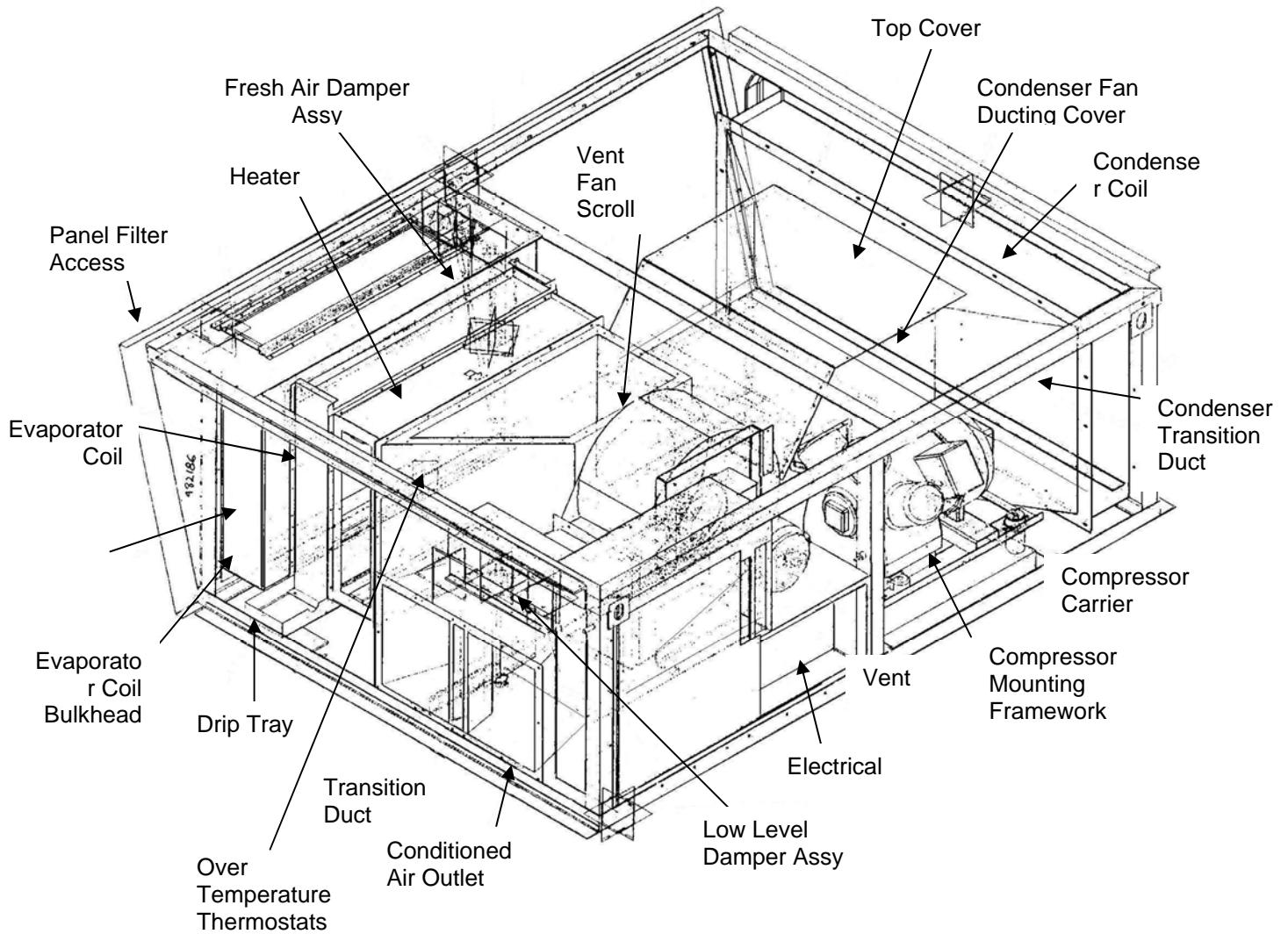



Figure 2: Wabtec Vapor Stone Air Conditioning Module


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Air Conditioning Module – Examine

HA 0109



Figure 3: Typical View of Over-Temperature Thermostats in Situ

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Air Conditioning Ducts and Grilles (Bodyside) – Clean

HD 6170

Reference Documents		
Item	Document No.	Title
1	AT/MP0400	Bodyside Grille Modification and Installation HST Trailer Vehicles

Reference Drawings		
Item	Drawing No.	Title
1	2200000	Bodyside Grille Support Extrusion HST Trailers
2	2200001	Bodyside Grille Support Extrusion Details HST Trailers
3	2200002	Bodyside Grille Support Extrusion Assemblies and Details
4	2200003	Infill Tube HST Trailers
5	2200004	Dirt Deflectors, Baffle Plates and Aperture Adjusting Tool Detail

APPLIES TO: All Vehicles

Scheduled Work

1. Check to see if recirculation grilles have been modified such that they can be removed without need to remove vehicle seating (see Reference Documents item 1 and Reference Drawings items 1 to 5). If grilles are modified, carry out items 2 to 5.


If grilles have not been modified, then advise the Engineer.

If grilles have not been modified and the vehicle seats are removed for any reason, then carry out items 2 to 5.

2. Remove bodyside grilles.
3. Clean the grilles, the ducts as far as possible, the area behind the ducts and the area behind the grilles.
4. Examine the grilles.
5. Refit the grilles.

Arising Work

4. Renew damaged grilles.

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Air Conditioning (Ceiling) Grilles – Clean

HD 6193

APPLIES TO: All except Mark 3B

NOTE 1: Revised ceiling lighting gondolas may complicate this task. Seek advice from the Engineer for vehicles fitted with revised ceiling gondolas.

NOTE 2: This job can disturb debris in the ducting. To protect customers, temporary filters in the air outlets shall be fitted. Removal of the filters shall be agreed between the vehicle owner and operator.

Scheduled Work

1. Remove ceiling grilles and clean. (See Figure 1).
2. Examine grilles.
3. Clean ducts as far as access permits.
4. Refit ceiling grilles.

Arising Work

2. Re-anodise grilles which do not clean satisfactorily (refit in vehicle sets).
2. Renew damaged grilles.

Place hand into diffuser aperture, reach toward air ventilation panel and locate nuts (1). Loosen until trim/retaining strips are lowered sufficiently to swing slightly toward centre of carriage (as arrow 'C'). Ease ventilation panel outwards and down until edge is clear of trim, pull towards centre and remove (as arrow 'D').

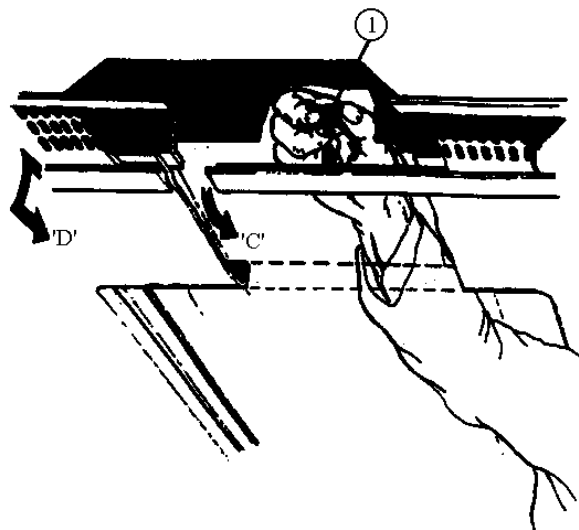



Figure 1: Removal of Ceiling Grille

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Air Conditioning Ducts (Flexible & Fixed) - Clean and Examine

HD 8002

Reference Drawings		
Item	Drawing No.	Title
1	A1-A0-9019176	Details of Hot & Cold Air Duct Bend into Air Conditioning Module Mark 3 Vehicles
2	A1-A0-9019179	Arrangement & Details of Flexible Connections Between Air Conditioning Ducts & Module Mark 3 Vehicles
3	C-A0-5115	Arrangement of Hot & Cold Air Ducting Adjacent to Air Conditioning Module Mark 3 Coach
4	C-A0-9750	Details of Hot Air Ducting Adjacent to Air Conditioning Module Mark 3 Vehicles

APPLIES TO: All Vehicles


Scheduled Work

Whilst air conditioning module is removed:

1. Examine flexible ducts (3 per vehicle) for security and defects.
2. Check that all flexible duct fixings are secure and holding the duct in position securely.
3. Examine fixed ducts and insulation accessible within the underskirt for security and defects.
4. Check that all fixed duct fixings are secure and holding the duct in position securely.
5. Clean flexible ducts.
6. Clean accessible fixed ducts.

Arising Work

1. Renew damaged flexible ducts (see Reference Drawings item 2).
2. Renew defective or missing fixings (see Reference Drawings item 2).
3. Renew damaged fixed ducts (see Reference Drawings items 1, 3 and 4).
3. Repair or renew missing or defective insulation (see Reference Drawings items 1, 3 and 4).
4. Renew defective or missing fixings (see Reference Drawings items 1, 3 and 4).

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Air Conditioning Ducts (Flexible & Fixed)

- Clean and Examine

HD 8002



Figure 1: Typical View of Air Conditioning Fixed and Flexible Ducts in the Underskirt

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Bodyside Heater and Grilles - Clean and Examine

HH 8018

Reference Documents		
Item	Document No.	Title
1	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables

Reference Drawings		
Item	Drawing No.	Title
1	A1-A1-9019809	Wiring Diagram Saloon Bodyside Heaters

APPLIES TO: Mark 3B

Scheduled Work


1. Remove bodyside grilles.
2. Remove heater element terminal connection box covers, examine connections and check terminal security. Refit covers.
3. Clean all elements, grilles and the area behind the grille.
4. Examine grilles and heater elements.
5. Check that heater elements are not open circuit or short circuit.
6. Refit grilles.

NOTE 1: Test heaters in accordance with Job No. HZ 8003.

Arising Work

2. Repair overheated or damaged connections (see Reference Drawings item 1).
2. Resecure loose terminal.
- 4,5. Renew defective element.
4. Renew defective grille.

NOTE 2: Defective or redundant cables must be removed or isolated in accordance with the specified documents (see Reference Documents item 1).

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Fan, Toilet - Clean and Examine

HM 0111

Materials			
Item	Description	Qty/Veh	Cat No.
1	Fan, Extractor	4 (2 per toilet)	064/003900

Reference Documents		
Item	Document No.	Title
1	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables

APPLIES TO: Mark 3A and HST Vehicles converted from Mark 3A LHCS.

NOTE 1: These fans are retained at the kitchen end of the TSB and in trolley store areas converted from former toilet areas on TF, TFE and TGS vehicles (see Section 5.9).

NOTE 2: Examination of the roof cowls and their associated mounts are covered in Job No. CR 6002.

Scheduled Work


1. Remove grille in toilet ceiling.
2. Remove and examine both fans.
3. Examine grille and clean.
4. Clean housing and ducting.
5. Refit grille.

NOTE 3: Test in accordance with Job No. HZ 8003 step 3.

Arising Work

2. Renew fan unit (see Materials item 1).
3. Renew grille.

NOTE 4: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 1).

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A C Fan Motor – Overhaul

HM 0112

Materials			
Item	Description	Qty/Veh	Cat No.
1	Grease	As Req'd	150kg container 027/001351
	3kg barrel		027/001353
	12.5kg barrel		027/001354
	50kg barrel		027/001356
	180kg barrel		027/001357
	400g cartridge		027/001358

Special Tools		
Item	Description	Cat No.
1	Megger, 1000V	-
2	Induction Tester	-


APPLIES TO: (See Jobs HM 5035/5111/5113)

Scheduled Work

1. Dismantle the fan and motor assembly.

NOTE 1: Component parts must not be interchanged between different assemblies.

2. Clean the components using a high pressure hot water detergent spray or other approved method.
3. Rinse all components.
4. Dry the components by stoving for 6 hours minimum at 100°C.
5. Protect exposed parts of the shaft with a coat of SDC fluid or approved equivalent.
6. Examine the fan impeller.
7. Allow the stator to cool to 60°C and test the insulation of the windings to earth using a 1000 volt megger (see Special Tools item 1). Where it is possible to disconnect inter-phase connections, the insulation between phases is also to be tested. Stators with readings below 20MΩ are to be examined for defective insulation and renewed or rewound.
8. Examine the stator for signs of overheating. If these are evident, test the stator windings for short circuits using an induction tester (see Special Tools item 2).
9. Examine surfaces on edges of spigots for damage.
10. Check that internal cable leads are firmly secured.

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A C Fan Motor – Overhaul

HM 0112

11. Check that connections to the terminal box are secure and legibly indented and terminals are fitted with the appropriate fasteners for external connections.
12. Check that the terminal box cover(s) fit correctly.
13. Check that the end shields are not distorted.
14. Check that the bearing is not loose in its housing.
15. Examine the rotor bearing seatings for damage or wear. (If any defect will result in the bearing being loose on the shaft, then the rotor is to be renewed). Light score marks may be blended out, but this must not result in the bearing being loose on the shaft.
16. Examine the rotor shaft for defects or fractures.
17. Examine any thrust faces for wear or damage.
18. Check splines for fretting or wear.
19. Gauge keyways for wear using a new key. The key must be a light interference fit.
20. Examine rotor for damaged bars.
21. Renew any loose or overheated rotor slot wedges.
22. Renew any loose rotor banding.
23. Renew all locking devices and fasteners, irrespective of condition.
24. Check security of any balance weights fitted.
25. Renew bearings (to be identical or equivalent).

NOTE 2: Bearings are to be protected against moisture and dust at all times: they must be handled with care and with clean dry hands.

26. Fit new shaft seals.
27. Pack the grease face of the bearing inner and outer caps with grease (see Materials item 1) over three quarters of the circumference, to a depth which will ensure close contact with the rolling elements.
28. With the bearing assembled on the shaft, pack grease between the rolling elements.
29. Grease pipes must be flushed with clean, fresh grease of the correct grade.
30. Check that on assembly all bolts are tight and fitted with the correct locking devices.

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A C Fan Motor – Overhaul

HM 0112

31. Check that internal cables do not foul the motor and that the rotor rotates freely.
32. Check the insulation resistance to earth using a 1000 Volt megger (see Special Tools item 1). 20M Ohm or above is acceptable.
33. Run the motor for 15 minutes, during this period monitor that the fielded carcass does not become excessively hot. If the temperature at the bearing housings exceeds 65°C the motor is to be dismantled for investigation.
34. Whilst running, check the motor for vibration.

Arising Work

6. Repair the fan impeller.
6. Renew the fan impeller.
8. Renew stator.
9. Dress any damaged surfaces.
10. Secure internal cables.
11. Secure cable terminations.
13. Renew end shields.
14. If clearance is less than 0.07mm, refit the bearings using Loctite 641.
- 15,34. Renew rotor.
15. Blend out the light score marks.
18. Dress the splines.
- 16,18. Renew the rotor shaft.
20. Repair damaged rotor bars.
24. Secure balance weights.
- 31,32. Rectify defects.
31. Rebalance rotor.

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Fan, Extraction (230V AC single-phase) – Renew

HM 0820

Materials			
Item	Description	Qty/Veh	Cat No.
1	Extractor Fan (Part No. R2E250-AX47-11 supplied by ebm-papst)	1	-


APPLIES TO: TCC only

NOTE 1: Removal, attention and refitting of the roof cowls and their associated mounts are covered in Job No. CR 6002.

Scheduled Work

1. Gain access to the two extractor fans and remove.
2. Clean all accessible ducting chambers.
3. Renew both extractor fans (see Materials item 1).

NOTE 2: Test in accordance with Job No. HZ 8003.

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Fan, Toilet/Vestibule Ventilation – Change

HM 5035

Materials			
Item	Description	Qty/Veh	Cat No.
1	Fan Motor (Mk 3B)	See below	064/070424
2	Fan Motor (HST)	See below	064/000537 or 064/072076

Reference Documents		
Item	Document No.	Title
1	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables

APPLIES TO: Mark 3B, HST

QUANTITY PER VEHICLE:

1 per toilet, incl. store areas converted from original toilet areas on TF, TFE and TGS vehicles. Refer to Section 5.9 for list of vehicles.

1 at kitchen end of TSB vehicles

1 on HST 402xx, 407xx, 408xx caterer


Not fitted to non-BRB disabled toilet vehicles

For XCT HST vehicles converted from Mk3 LHCS, seek advice from the Engineer regarding the fan motor type.

NOTE 1: Removal, attention and refitting of the roof cowls and their associated mounts are covered in Job No CR 6002.

Scheduled Work

1. Disconnect and remove the fan motor.
2. Change the fan motor (see Materials items 1 and 2) for a new item or for one overhauled in accordance with Job No. HM 0112.
3. Remove all vestibule end ceiling panels to gain access to remove the vestibule duct grill.
4. Remove the toilet ceiling panel to gain access to remove the toilet duct grill by drilling out pop rivets with an angle drill.
5. Clean the roof plenum chamber with a dust brush and/or wire brush.
6. Fit the hood into the roof plenum chamber, connect the hood to Hoover flexible hose. Connect the Hoover to 415 volt shop supply and switch on.
7. Fit the blanking plate to the toilet plenum duct.
8. Fit a one metre flexible nylon nozzle to the air gun. Connect to shop airline supply and switch on. Manoeuvre nozzle into the vestibule plenum duct to start cleaning operation for about one minute.

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Fan, Toilet/Vestibule Ventilation – Change


HM 5035

9. Remove the blanking plate from the toilet plenum duct.
10. Fit the blanking plate to the vestibule plenum duct.
11. Manoeuvre a one metre flexible nylon nozzle into the toilet plenum duct to start cleaning operation for about one minute.
12. Remove the blanking plate from the vestibule plenum duct.
13. Remove the hood from the roof plenum duct and from the Hoover flexible hose.
14. Use the Hoover flexible hose and do a final clean in the roof plenum duct.
15. Check and examine wiring and termination in the roof plenum duct.
16. Refit and connect an overhauled fan motor.
17. Clean both the toilet and the vestibule duct grilles.
18. Refit the toilet grille and ceiling panel.
19. Refit the vestibule grille and all vestibule panels.

Arising Work

15. Repair damaged wiring.
Tighten loose connections.
Renew defective terminations.

NOTE 2: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 1).

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Fan, Extraction – Change

HM 5111

Materials			
Item	Description	Qty/Veh	Cat No.
1	Fan AF748F 7 Extractor	RFM – 4 per vehicle. Others – as req'd.	064/000581

Reference Documents		
Item	Document No.	Title
1	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables

APPLIES TO: All Catering Vehicles except TSOB, TSB. Extractor fan on TCC is covered by job HM 0820

NOTE 1: Removal, attention and refitting of the roof cowls and their associated mounts are covered in Job No CR 6002.


Scheduled Work

1. Remove and overhaul extractor fan motor in accordance with Job No. HM 0112.
2. Clean plenum chambers.

NOTE 2: Test in accordance with Job No. HZ 8003.

Arising Work

NOTE 3: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 1).

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Fan, Supply – Change

HM 5113

Materials			
Item	Description	Qty/Veh	Cat No.
1	Fan D71 'S' 15" Intake	RFM – 2 per vehicle. Others – as req'd.	064/000580

APPLIES TO: All Catering Vehicles except TSOB, TSB, TCC

NOTE 1: Removal, attention and refitting of the roof cowls and their associated mounts are covered in Job No. CR 6002.


Scheduled Work

1. Change and overhaul the supply fan motor in accordance with Job No. HM 0112.
2. Remove the plenum chamber, clean and examine mineral wool insulation.
3. Refit the plenum chamber.
4. Renew filters.
5. From within the kitchen, examine the budget locks securing the ceiling panels as follows:
 - 5.1 Check that the locks and striking plates are free from damage and secure.
 - 5.2 Check that the lock tongues engage fully in the striking plates.
 - 5.3 Check that the lock tongues are held firmly in the locked position by spring action.

NOTE 2: Test in accordance with Job No. HZ 8003.

Arising Work

2. Renew mineral wool insulation.
5. Renew any defective lock or striking plate. Resecure any loose items.

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Switch, ETS Interlock - Examine/Test

HS 5039

Reference Documents		
Item	Document No.	Title
1	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables

APPLIES TO: All Vehicles


Scheduled Work

1. Remove the glass from interlock switch (in vestibule, one per coach plus one in TCC catering area).
2. Examine the glass, which must be scored but not cracked.
3. Test the switch for correct operation as follows:
 - 3.1 Place interlock switch in "normal" position.
 - 3.2 Connect and switch on electric train supply (415v 3ph on HST, 800/1000v for LHCS.
 - 3.3 On LHCS, place auxiliaries switch in AUX or AUX + Air Cond.
 - 3.4 On LHCS wait 30 seconds for MA set to start and run.
 - 3.5 Move interlock switch to isolate position.
 - 3.6 Check that motor alternator runs down (LHCS) and battery charger and other 3 phase equipment stops working on HST's.
 - 3.7 Place interlock switch in normal position and restore or remove train supply as other work requires.
4. Refit the glass.

Arising Work

2. Renew damaged glass cover.
3. Renew defective switch.
3. Investigate and rectify defective interlock wiring.

NOTE: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 1).

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AMBISTAT Thermostat – Adjust

HTA8206

APPLIES TO: All except HST. NOTE – SOME Vehicles converted to HST from Mark 3 LHCS retain the electronic thermostat, and therefore this job is applicable. See Section 5.9 for details.


NOTE: The replacement electronic thermostat incorporates an ambient sensor which monitors the external air temperatures. Because of this ‘intelligence’, and the accuracy that the new thermostat provides, saloon temperatures can be very accurately controlled (as determined by the Return Air Temperatures).

Although the Trafag thermostat has been replaced by the electronic thermostat, the Ambistat is still operational. Thus, when the ambient temperature falls below about 8°C, the Ambistat links Stage 1 and Stage 3 heaters together. Under these conditions, while the electronic thermostat may be calling for a single 8kW stage of heating, two stages, (16kW) are switched by the Ambistat and therefore too much heat is added to the saloon. By the time the warm air reaches the saloon sensor, the saloon air is too warm and the electronic thermostat may call for cooling. Unstable temperatures are thus caused within the saloon.

To eliminate this instability, it is necessary to adjust the Ambistat to the minimum setting, following the procedure below.

PROCEDURE

1. Remove the panel immediately in front of the air filter on the air conditioning module.
 - On the **Temperature** units, the Ambistat is located in the compartment to the left of the air filter.
 - On the **Stones** units, the Ambistat is located immediately in front of the air filter.
2. Remove the front cover of the Ambistat.
3. Turn the dial to the minimum setting.
4. Replace the Ambistat cover.
5. Replace the air conditioning filter panel.

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Electronic Thermostat – Change

HTA8401


APPLIES TO: All except HST. NOTE – SOME Vehicles converted to HST from Mark 3 LHCS retain the electronic thermostat, and therefore this job is applicable. See Section 5.9 for details.

NOTE 1: For vehicles fitted with "Xcel" electronic thermostats, a procedure for the functional testing of the thermostat shall be agreed with the Engineer. See Section 5.9 for vehicles fitted with "Xcel" thermostats.

1. Turn 'OFF' LCCB circuit breaker in the lighting control box, and check that the AUX switch is in the 'OFF' position.
2. Gain access to the electronic thermostat located in the under-skirt frame in the clean air compartment, adjacent to the A/C module.
3. Remove the front cover from the thermostat, thus exposing the electrical connections.
4. Disconnect all cables from the M4 terminals at the base of the thermostat, noting the cable locations, which are as follows:
 - A1 Common supply of output relays.
 - A2 Heater 3 and Fresh air damper.
 - A3 Heater 2.
 - A4 Heater 1.
 - A5 Low level damper.
 - A6 Cooling.
 - 0V Supply 0Vdc.
 - 110Vdc Supply 110Vdc.
5. At the top right of the thermostat, identify the saloon sensor cable, identified by a screen, (green), and a red and a white cable. Disconnect the external connecting wire.

NOTE 2: The ambient sensor is fixed to the internal surface of the thermostat housing, and is not re-settable. If a fault occur with this sensor, the thermostat is to be removed as described here.

6. Undo the cable conduit locking nut and remove the conduit from the thermostat.
7. Release the four fixing screws retaining the thermostat to the mounting frame, and remove the thermostat
8. Refitting the thermostat is a reversal of the above procedures.
9. Once the installation is complete, turn LCCB circuit breaker in the lighting control box to 'ON'. check the AUX switch is in the 'ON' position.
10. Confirm the sensor and the thermostat are functioning correctly by carrying out Job No. HZ 0102.
11. Return faulty thermostat to the Manufacturer.

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Electronic Thermostat Saloon Sensor – Change

HTA8402


APPLIES TO: All except HST. NOTE – SOME Vehicles converted to HST from Mark 3 LHCS retain the electronic thermostat, and therefore this job is applicable. See Section 5.9 for details.

NOTE: For vehicles fitted with "Xcel" electronic thermostats, a procedure for the functional testing of the thermostat shall be agreed with the Engineer. See Section 5.9 for vehicles fitted with "Xcel" thermostats.

1. Turn 'OFF' LCCB circuit breaker in the lighting control box, and check that the auxiliary switch is in the 'OFF' position.
2. Identify the location of saloon sensor. (Located where original Trafag was located, adjacent to the saloon centre partition).
3. If necessary, remove the seat frame and then remove the terminal cover, which is adjacent to the centre partition.
4. Remove coach wiring from the terminal block.
5. The terminal block is mounted to a plate retained by 4 off 2BA setscrews. Remove these screws and then carefully draw the terminal block mounting plate and sensor retaining bracket assembly towards the partition and then remove completely.
6. Remove the sensor cable connections from the terminal block.
7. Loosen the sensor locknut and cut the tie wraps holding the sensor cable. Slide the sensor from its mounting bracket.
8. Reconnect the new sensor termination's, and check the screen, (Green wire), is connected to the screen terminal.

The red and white terminals may be connected to their respective terminals in any order.

9. Slide the new sensor body into the mounting bracket, and retie the cable in position. Lock the sensor to its bracket.
10. Refit the terminal block mounting plate and sensor retaining bracket assembly. Reconnect coach wiring.
11. Replace the bodyside grille, terminal cover and seat.
12. Turn LCCB circuit breaker in the lighting control box to 'ON'. Check the auxiliary switch is in the 'ON' position.
13. Confirm the sensor and the thermostat are functioning correctly by carrying out Job No. HZ 0102.

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Air Conditioning Sequence Test

HZ 0102

Reference Documents		
Item	Document No.	Title
1	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables

APPLIES TO: All except HST. NOTE – SOME Vehicles converted to HST from Mark 3 LHCS retain the electronic thermostat, and therefore this job is applicable. See Section 5.9 for details.

Preparatory Work

NOTE 1: The following sequence tests assume the diagnostic test box (see Figure 1) is being used. It is not possible to conduct these tests without this apparatus.

- a) Gain access to the electronic thermostat located on the under-frame in the clean air compartment, adjacent to the A/C module.
- b) Remove the dust cover from the Litton socket on the top right of the thermostat box and attach the plug from the diagnostic test box into the socket, ensuring that a firm connection is made.
- c) Couple and switch on the 800/1000v train supply and switch on the coach air conditioning at the vestibule switch.


SENSORS TEST

The diagnostic test box displays the actual temperatures as sensed by the ambient and the saloon sensors. If there is an open or short-circuit on the sensors, the diagnostic test box will give incorrect readings.

- If an open circuit, (sensor damaged), the display will indicate a very high value.
- If a short circuit is present, the display will indicate a very low value.

NOTE 2: The ambient sensor is fixed to the inside wall of the thermostat unit and is factory fitted. See Job No. HTA8402 for changing sensor.

1. Ambient sensor test procedures
 - 1.1 Switch the Function Switch (FS) to the ambient sensor's position.
 - 1.2 Switch the Ambient Temperature Switch (ATS) to the 'OFF' position.
 - 1.3 The display will then indicate the ambient temperature present at the ambient sensor.

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Air Conditioning Sequence Test

HZ 0102

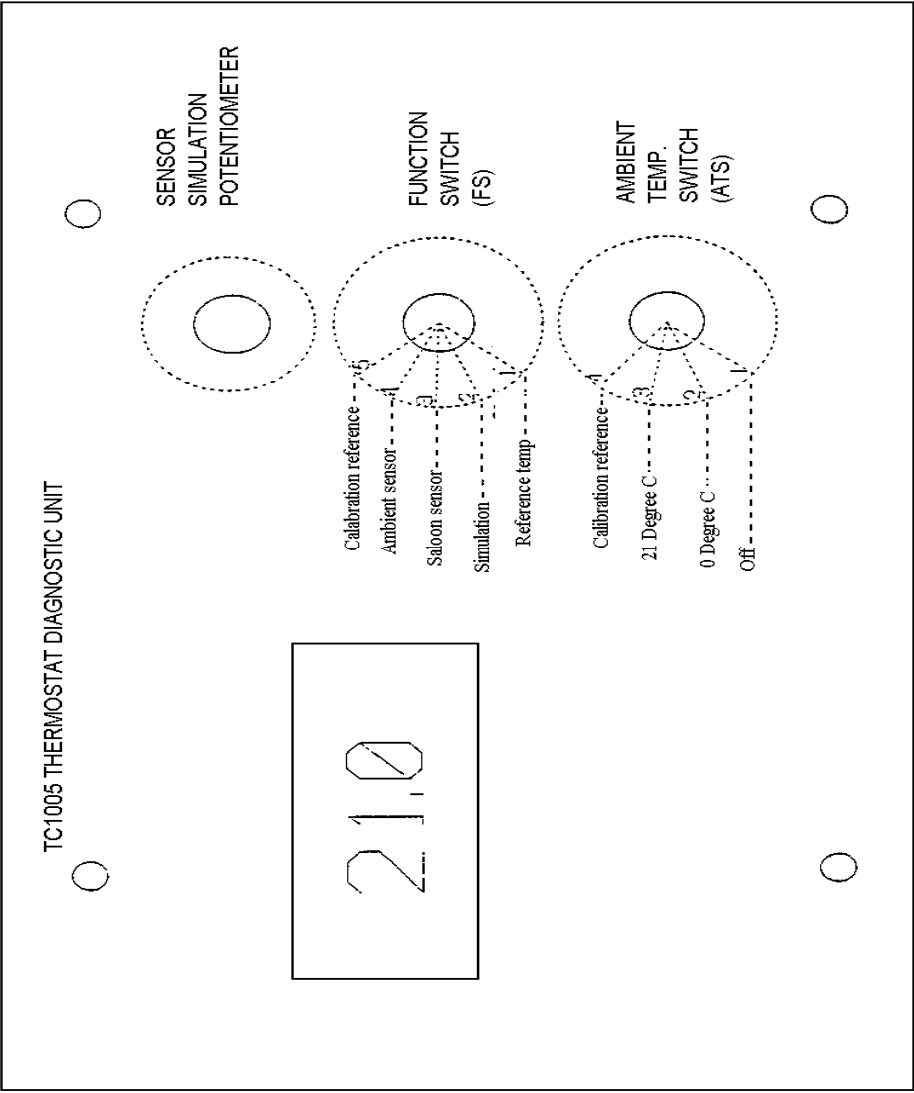



Figure 1: TC 1005 Thermostat Diagnostic Unit

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Air Conditioning Sequence Test

HZ 0102

2. Saloon sensor test procedures

- 2.1 Switch the FS to the saloon sensor's position.
- 2.2 Switch the ATS to the 'OFF' position.
- 2.3 The display will indicate the saloon temperature present at the saloon sensor.

Test Procedure

1. LOW AMBIENT TEST - i.e. winter condition assumes ambient temperature is at 0°C.

1.1 Full Heat Test - Saloon Temp Rising.

- 1.1.1 Switch the FS to sensor simulator's position.
- 1.1.2 Switch ATS to 0°C position.
- 1.1.3 Adjust the sensor simulation potentiometer on the diagnostic test box to indicate a temperature lower than 17°C.
 - 1.1.3.1 Check that the ventilation fan is running.
 - 1.1.3.2 Fresh Air Damper Solenoid (FADS) is energised and damper on A/C module is closed.
 - 1.1.3.3. Compressor and condenser fan are stopped.
 - 1.1.3.4 Heat 1, 2, 3 LEDs on thermostat are illuminated.

1.2 Two stage Bank Heat Test - Saloon Temp Rising.


Slowly adjust the Sensor Simulator Potentiometer (SSP) to raise the indicated temperature until Heater 3 is switched off at $18.5^{\circ}\pm 0.5^{\circ}\text{C}$.

- 1.2.1 Check that the FADS damper has opened.
- 1.2.2 Heat 1, 2 LEDs are illuminated.

1.3 Reduced Heat Test - Saloon Temp Rising.

Adjust the SSP clockwise to increase the saloon temperature until Heater 2 is switched off at $20.8^{\circ}\pm 0.5^{\circ}\text{C}$.

- 1.3.1 Heat 1 LED remains illuminated.

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Air Conditioning Sequence Test

HZ 0102

1.4 Ventilation Test - Saloon Temp Rising

Adjust the SSP clockwise until Heater 1 is switched off at $21^{\circ}\pm 0.5^{\circ}\text{C}$.

1.4.1 Heat 1 LED goes out.

1.4.2 Low Level Damper Solenoid (LLDS) LED is illuminated.

1.4.3 Check that the vent fan is still running and air is entering saloon only via ceiling grilles.

1.5 Cooling Test - Saloon Temp Rising.

Adjust the SSP clockwise until Cool is switched 'ON' at $23^{\circ}\pm 0.5^{\circ}\text{C}$.

1.5.1 Low Level Damper Solenoid (LLDS) LED remains illuminated.

1.5.2 Cool LED is illuminated.

1.5.3 Check that the vent fan continues to run.

1.5.4 Check that the compressor is running.

1.6 Ventilation Test - Saloon Temp Falling.

Adjust the SSP anti-clockwise until Cool is switched 'OFF' at $22^{\circ}\pm 0.5^{\circ}\text{C}$.

1.6.1 Adjust the SSP to give an indicated temp of $22^{\circ}\text{C}\pm 0.5^{\circ}\text{C}$.

1.6.2 Cool LED goes out and LLDS illuminates.

1.6.3 Wait for the compressor and the condenser fan to stop after pumping down.


1.6.4 Vent fan runs and air enters the saloon only at ceiling level.

1.7 Reduced Heat Test - Saloon Temp Falling

Adjust the SSP anti-clockwise until LLDS is switched 'OFF' at $21^{\circ}\text{C}\pm 0.5^{\circ}\text{C}$.

1.7.1 Check LLDS LED goes out and H1 LED remains illuminated. Warm air enters saloon at both ceiling and floor level.

NOTE 3: If Ambistat is operating, H3 will also be energised although electronic thermostat indicates H1 only is energised. It is recommended that the Ambistat is adjusted to the minimum possible setting. See job HTA8206.

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Air Conditioning Sequence Test

HZ 0102

1.8 Two Bank Heat Test - Saloon Temp Falling.

Adjust the SSP anti-clockwise until Heater 2 is switched 'ON' at $19.8^{\circ}\text{C} \pm 0.5^{\circ}\text{C}$.

1.8.1 H1 and H2 LEDs illuminate.

1.9 Full Heat Test - Saloon Temp Falling.

Adjust the SSP anti-clockwise until Heater 3 and FADS is switched 'ON' at $17.5^{\circ} \pm 0.5^{\circ}\text{C}$.

1.9.1 Heat 1, H2 and H3 LEDs illuminate.

2. High Ambient Test - i.e. summer condition assumes ambient temperature is at 21°C .

2.1 Full Heat Test - Saloon Temp Falling.

2.1.1 Switch the FS to sensor simulation position.

2.1.2 Switch ATS to 21°C position.

2.1.3 Adjust the sensor simulation potentiometer on the test box to indicate a temperature lower than 16°C .

2.1.3.1 Check that the ventilation fan is running.

2.1.3.2 Fresh Air Damper Solenoid (FADS) is energised and damper on A/C module is closed.

2.1.3.3. Compressor and condenser fan are stopped.

2.1.3.4 Heat 1, 2, 3 LEDs on thermostat are illuminated.

2.2 Two Bank Heat Test - Saloon Temp Rising.

Slowly adjust the Sensor Simulator Potentiometer (SSP) clockwise to raise the indicated temperature to $17.3^{\circ} \pm 0.5^{\circ}\text{C}$.


2.2.1 Check that the FADS damper has opened.

2.2.2 Heat 1, 2 LEDs are illuminated.

2.3 Reduced Heat Test - Saloon Temp Rising.

Adjust the SSP clockwise until Heater 2 is switched 'OFF' at $19.5^{\circ} \pm 0.5^{\circ}\text{C}$.

2.3.1 Heat 1 LED remains illuminated.

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Air Conditioning Sequence Test

HZ 0102

2.4 Ventilation Test - Saloon Temp Rising.

Adjust the SSP clockwise until Heater 1 is switched 'OFF' at $20.5^{\circ}\pm 0.5^{\circ}\text{C}$.

2.4.1 Heat 1 LED goes out.

2.4.2 Low Level Damper Solenoid (LLDS) LED is illuminated.

2.4.3 Check that vent fan is still running and air is entering saloon only via ceiling grilles.

2.5 Cooling Test - Saloon Temp Rising.

Adjust the SSP clockwise until Cool is switched 'ON' at $21.7^{\circ}\pm 0.5^{\circ}\text{C}$.

2.5.1 Low Level Damper Solenoid (LLDS) LED remains illuminated.

2.5.2 Cool LED is illuminated.

2.5.3 Check that the vent fan continues to run.

2.5.4 Check that the compressor is running.

2.6 Ventilation Test - Saloon Temp Falling.

Adjust the SSP anti-clockwise until Cool is switched 'OFF' at $20.7^{\circ}\pm 0.5^{\circ}\text{C}$.

2.6.1 Cool LED goes out.

2.6.3 LLDS remains illuminated.


2.6.3 Wait for Compressor and condenser fan to stop after pumping down.

2.6.4 Vent fan runs and air enters the saloon only at ceiling level.

2.7 Reduced Heat Test - Saloon Temp Falling.

Adjust the SSP anti-clockwise until Heater 1 is switched 'ON' at $20.5^{\circ}\pm 0.5^{\circ}\text{C}$.

2.7.1 LLDS LED goes out and H1 LED illuminates. Warm air enters saloon at ceiling and floor level.

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Air Conditioning Sequence Test

HZ 0102

2.8 Two Bank Heat Test - Saloon Temp Falling.

Adjust the SSP anti-clockwise until Heater 2 is switched 'ON' at $18.5^{\circ}\pm 0.5^{\circ}\text{C}$.

2.8.1 H1 and H2 LEDs are illuminated.

2.9 Full Heat Test - Saloon Temp Falling.

Adjust the SSP anti-clockwise until Heater 3 and FAD's are switched 'ON' at $16.3^{\circ}\pm 0.5^{\circ}\text{C}$.

2.9.1 Heat 1, H2, H3 and FADS LEDs illuminate.

3. Rectify any faults found. See jobs HTA8401 and HTA8402.

4. Completion Of Test

4.1 Remove the Litton Plug from the Electronic Thermostat and replace the dust cover.

4.2 Close and lock the skirt access panels.

4.3 Switch off at the auxiliary and A/C switch.

IMPORTANT

Because the electronic thermostat has no control over the AMBISTAT, which is located within the A/C module, it is still possible under ambient temperatures of less than 8°C . and with the electronic thermostat calling only for HEAT 1, (and indicated as such), for the Ambistat to link HC3 to HC1. When this occurs two stages will in fact be energised. In this instance, FADS will remain unaffected.


Furthermore, at ambient temperatures of less than 2°C the Ambistat will link HC1 and HC2, even if the electronic thermostat is calling for a single stage of heating.

With the Ambistat switching more than one heater bank at a time, accurate control is lost and the saloon will tend to overheat.

The effects of the Ambistat can be minimised by adjusting the Ambistat to its lowest setting. See Job No. HTA8206.

NOTE 4: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 1).

NOTE 5: All work involving refrigerant gas must be carried out by suitably trained staff with refrigeration handling certificates, etc, in accordance with f-gas regulations.

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Air Conditioning – Test

HZ 8003

Reference Documents		
Item	Document No.	Title
1	WOSS 850/10	Overhaul of Trafag Thermostats
2	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables

Reference Drawings		
Item	Drawing No.	Title
1	A1-A1-9019809	Wiring Diagram Saloon Bodyside Heaters

APPLIES TO: All Vehicles.

Scheduled Work

1. General

Check that all bodyside doors, droplights and gangway doors are closed and remain closed throughout the test.


The following work must have been completed before undertaking the functional test.

- a) All coach interior work.
- b) Jobs HA 0109 and HD 8002.
- c) Job HH 8018 (Mk3b vehicles only)

If a vehicle fails any part of this test the fault must be rectified and the equipment retested.

2. Functional Test - All

- 2.1 Check the compressor oil level, which must be between $\frac{1}{2}$ and $\frac{3}{4}$ way up the sight glass.
- 2.2 Connect the vehicle to the electric train supply (nominal 850 Volts AC/DC LH and 415v 3ph HST) and to an air supply of 7 bar.
- 2.3 Connect a brake test trolley to the vehicle and charge the brake pipe to "RUNNING" pressure.
- 2.4 Close circuit breakers:
 - LH - ACB1, ACB2 and FCB (Mark 3B BFO).
 - HST - ACB1, ACB2
 - Move the auxiliary switch to the AIR COND and AUX position.
- 2.5 Depress the cooling test button and lock it in the ON position (use a suitable wedge).

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Air Conditioning – Test

HZ 8003

- 2.6 On Wabtec Vapor-Stones modules, run the system for 15 minutes and check at the liquid line sight glass/moisture indicator.
 - 2.6.1 There is no excessive flashing.
 - 2.6.2 The moisture indicator is green.
 - 2.6.3 On Stones R134a modules: level must be just below the top of the bottom sight glass of the liquid received.
 - 2.6.4 Temperature Systems:
 - a) Block off the condenser.
 - b) Check that the high pressure gauge reading increases to 150 to 180psi and the low pressure gauge reading is approximately 38psi.
 - c) If there is no continuous flashing in the refrigerant sight glass the level is correct.
 - d) Remove the blank from the condenser.
- 2.7 Remove the wedge from the cooling test button.
- 2.8 Press Heating Test Button and observe that:
 - a) Heater test light illuminates.
 - b) Ventilation fan runs.
 - c) All heater contactors energise.
 - d) Warm air flows from both the floor and ceiling outlets.
(Note delay until elements become warm).

On Mk3b, warm air will flow only from roof outlets, as bodyside heaters are not energised.

 - e) Fresh air damper shuts.
- 2.9 Press cooling test button and observe that:
 - a) Cooling test light illuminates.
 - b) All heater contactors de-energise.
 - c) Cold air flows from the ceiling outlet only.
 - d) Fresh air damper opens when the internal saloon temperature reaches 18°C.
 - e) Condenser fan runs in the correct rotation.

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Air Conditioning – Test

HZ 8003

2.10 Using brake test trolley, make a brake application and check that when the train pipe pressure reduces to 3.9 bar:

- a) Timing relay energises.
- b) Fresh Air Damper Solenoid (FADS) energises – low-level damper closes.
- c) The timing relay operates after the correct time interval (2 minutes).
- d) The Fresh Air Damper Solenoid is then de-energised – low-level damper opens.

2.11 Increase brake pipe pressure and check that pressure switch cuts out at 4 bar on rising pressure.

2.12 Using an anemometer, check that there is a positive airflow at each recirculation grille and check there are no leaks around the module ducting.

2.13 Using an anemometer, check that there is a positive airflow over the saloon control thermostat sensor, which has a minimum velocity of 0.6m/sec.

2.14 Thermostat Functional Test - (Trafag Thermostats only) For LHCS and HST ex LHCS see job HZ 0102.

2.14.1 Switch off air conditioning.

2.14.2 Remove seat adjacent to Trafag (saloon) thermostat, remove skirting panels, and place a calibrated thermometer or thermometer probe onto the recirculation duct grille adjacent to the Trafag probe. The probe must not contact the grille.

2.14.3 Place 3 additional thermometers or thermometer probes at the centre and ends of the coach, at a height of 1200mm.

2.14.4 Connect air conditioning test equipment into the Trafag as indicated in Figures 1 and 2 (or connect to module test socket if available).


2.14.5 Switch on air conditioning, switch air conditioning test box to cooling until the coach interior temperature is below 17°C. Allow coach temperature to naturally rise and again repeat the exercise three times. (This allows the control thermostat to settle for this test). Switch off air conditioning test box.

NOTE 1: For vehicles fitted with "Xcel" electronic thermostats, a procedure for the functional testing of the thermostat shall be agreed with the Engineer. See Section 5.9 for vehicles fitted with "Xcel" thermostats.

2.15 Check that when temperature is below 17°C.

- a) The unit is in the full recirculation mode.
- b) All heater contactors are energised.

Mk3b only: Check bodyside heater contactors HC4 and HC5 are energised.

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Air Conditioning – Test

HZ 8003

- c) Warm air flows from both ceiling and floor outlets.
- d) The cooling relay is de-energised.
- e) FADS is energised and low-level damper is closed.

2.16 Check that when temperature rises to 18°C +/- 0.5°C.

- a) The first heater bank (or HC3) de-energises.

Mk3b only: Check vehicle bodyside heater contactors HC4 and HC5 are energised.

- b) Warm air flows from both ceiling and floor outlets.
- c) FADS de-energised and low-level damper open.

2.17 Check that when temperature rises to 19°C +/- 0.5°C.

- a) The second heater bank (or HC2) de-energises.

Mk3b only: Module heater bank de-energised, vehicle bodyside heater contactor HC4 is energised, vehicle bodyside heater HC5 is de-energised.

- b) Warm air flows from both ceiling and floor outlets.
- c) FADS de-energised and low-level damper open.

2.18 Check that when temperature rises to 21°C +/- 0.5°C.

- a) Third heater bank (or HC1) de-energises.

Mk3b only: Module heater bank de-energised, vehicle bodyside heater contactors HC4 and HC5 are de-energised.

- b) FADS energises and low-level damper is closed..
- c) Unheated air flows from the ceiling outlets only.


Mark 3B (BFO) ONLY - Check that the corridor fan heater stops at 21°C.

Mark 3B (BFO) ONLY - Switch on the Guard's Fan Heater Switch (GHS) and check the operation of the Guard's Fan Heater.

2.19 Check that when temperature rises to 22°C +/- 0.5°C.

- a) Cooling Relay (or CR) energises.
- b) Cold air flows from the ceiling ducts only.

2.20. Enter all results on record sheet. See Figure 3.

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Air Conditioning – Test

HZ 8003

3. Extractor Fans

3.1 HST and Mark 3B Vestibules/Toilets/Trolley Store

- 3.1.1 Check that both vestibule fans are extracting air. If not extracting on HST, check the 3 phase supply for correct phase rotation before altering the motor connections.

3.2 Mark 3A LHCS

- 3.2.1 Check that the two fans located in each toilet ceiling are extracting air.

3.3 HST converted from Mark 3 LHCS

- 3.3.1 Check that the two fans located in each toilet ceiling are extracting air. If defective, check the output from the toilet fan power supply unit (TFPSU) is 24v DC. If there is no output, renew TFPSU.


4. Kitchen and Waste Disposal Compartment Fans

4.1 HST TRFB

- 4.1.1 Close circuit breaker FCB1 and close the fan isolating switch FS1.
- 4.1.2 Check that 2 extract and 2 supply fans are running satisfactorily and blowing in the correct direction (extract out of kitchen area and supply in).
- 4.1.3 Close circuit breaker FCB2 and check that the other 2 extract fans in the kitchen and the waste disposal compartment fan are running satisfactorily and blowing in the correct direction, i.e. out.
- 4.1.4 Open FS1 and check that 2 extract and 2 supply fans stop running.
- 4.1.5 Close FS1.
- 4.1.6 Trip FCB1 and FCB2 and check that all fans stop running.

4.2 RFM


- 4.2.1 Close Fan Main Circuit breaker FCB1.
- 4.2.2 Close Fan Circuit breaker FCB2 and Fan isolating switch FS1.
- 4.2.3 Check that 2 Extractor Fans and 1 Supply Fan are running satisfactorily and are blowing in the correct direction (i.e. extract out, supply in).
- 4.2.4 Close Fan Circuit breaker FCB2 and Fan isolating switch FS2.

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Air Conditioning – Test

HZ 8003

- 4.2.5 Check that the other two extractor fans and the other supply fan are running satisfactorily and are blowing in the correct direction, i.e. extract out, supply in.
- 4.2.6 Close Fan Circuit Breaker FCB4 and that the toilet extractor fan runs correctly and are blowing in the correct direction, i.e. out.
- 4.2.7 Trip FCB1 and check that all fans stop running.
- 4.2.8 Close FCB1.
- 4.2.9 Open FCB4 and check that toilet extract fan stop running.
- 4.2.10 Open FS2 (isolating sw) and check that 2 extract and 1 supply fan stop running.
- 4.2.11 Close FS2.
- 4.2.12 Trip FCB3 and check that 2 extract and 1 supply fan stop running.
- 4.2.13 Open FS1 (isolating sw) and check that the other two extract and 1 supply fan stop.
- 4.2.14 Close FS1.
- 4.2.15 Trip FCB2 and check that 2 extract and 1 supply fan stop running.
- 4.3 HST TBRF
 - 4.3.1 Close circuit breaker FCB and close the fan isolating switch.
 - 4.3.2 Check that 3 extract and 2 supply fans are running satisfactorily and blowing in the correct direction (extract out of kitchen areas and supply in).
 - 4.3.3 Open the fan isolating switch and check that 2 extract fans stop running.
 - 4.3.4 Check that one extract fan continues to run.
 - 4.3.5 Open FCB and check that the remaining fan stops running.
- 4.4 HST TCC
 - 4.4.1 Close circuit breaker CFCB. Move the auxiliary switch to “Aux+Air Con” position and confirm that CFC contactor is closed.
 - 4.4.2 Check that the fan runs satisfactorily
 - 4.4.3 Move the auxiliary switch to “Off” and check that the fan stops running.

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Air Conditioning – Test

HZ 8003

Arising Work

Rectify any defects.

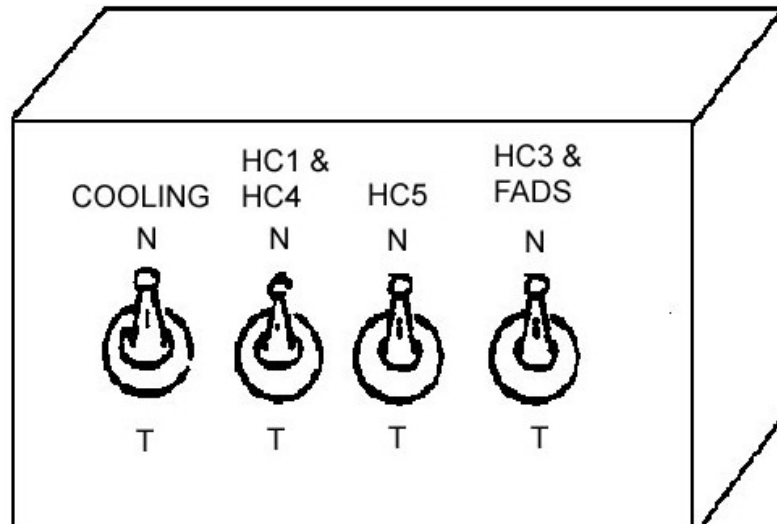
2.15- Change the Trafag thermostat and overhaul in accordance with the specified document (see 2.19 Reference Documents item 1)

NOTE 2: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 2).

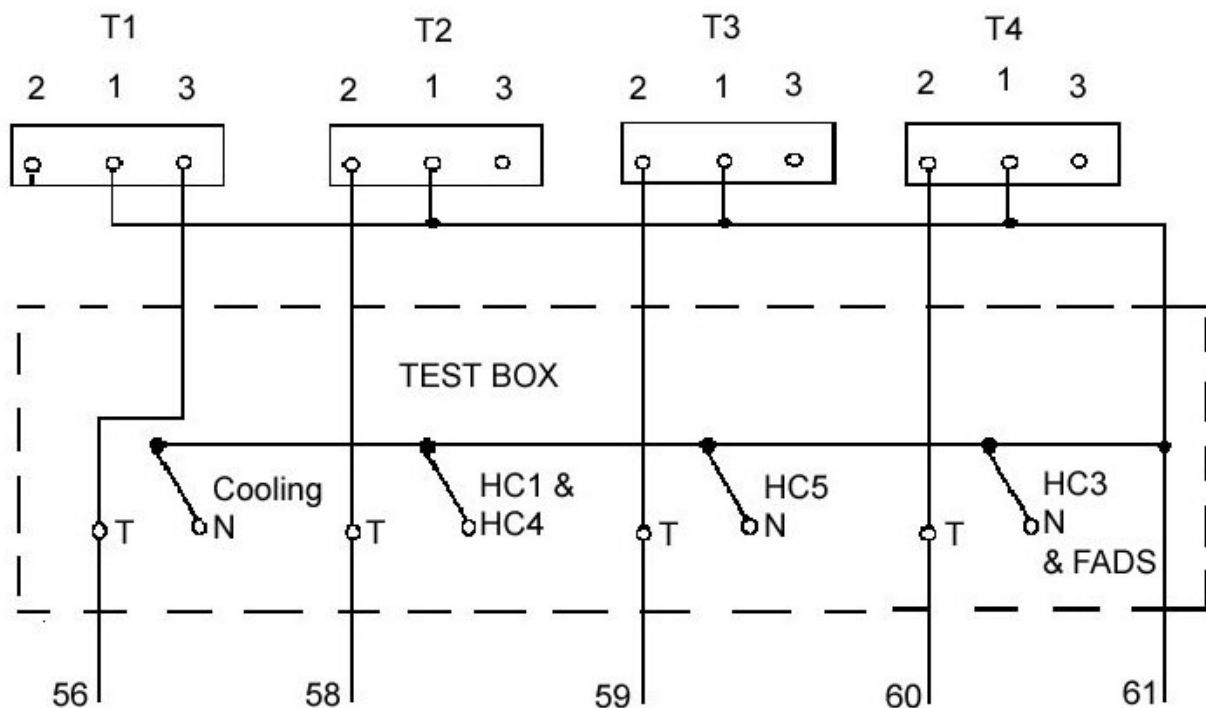
NOTE 3: All work involving refrigerant gas must be carried out by suitably trained staff with refrigeration handling certificates, etc.

Air Conditioning – Test

HZ 8003



Air Conditioning Testbox Electrical Circuit



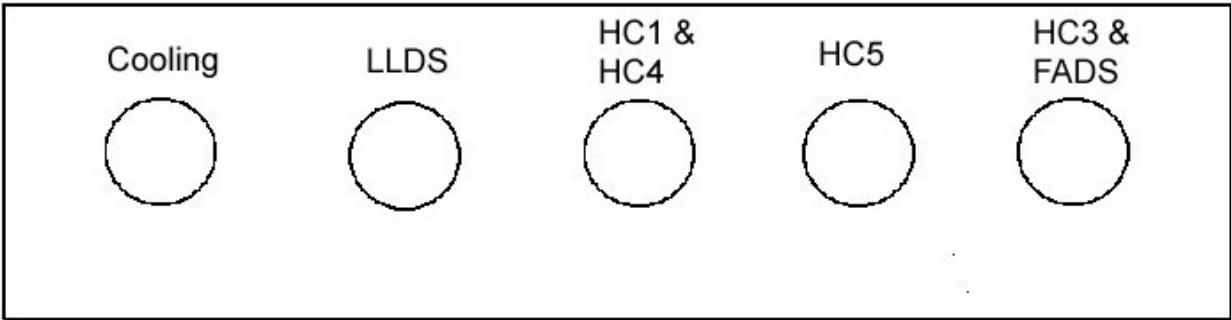
Coach Wire Numbers

N- Normal
T - Test

Figure 1: Air Conditioning Test Box

Air Conditioning – Test

HZ 8003



Indicator Light Unit Electrical Connections

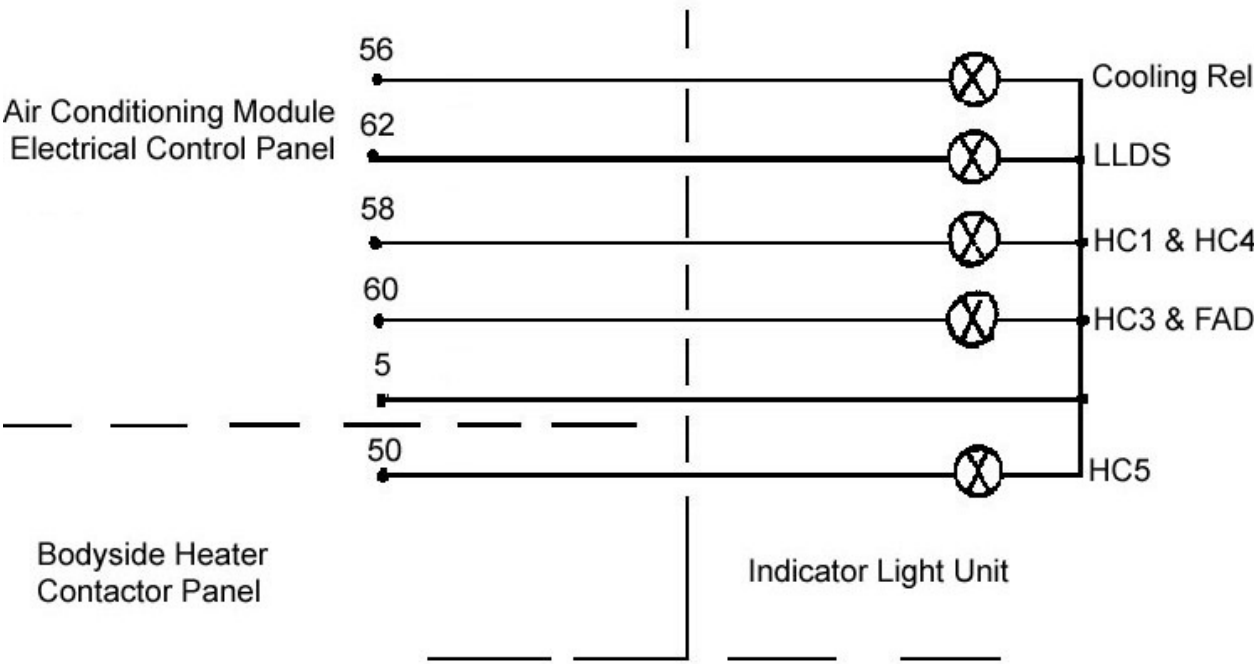



Figure 2: Indicator Light Unit


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Air Conditioning – Test

HZ 8003

Supplier/Location:		Date:		
Repair Code:		Vehicle No.		
MODE	TEMPERATURE CHART °C THERMOMETER POSITION IN SALOON			
	THERMOSTAT	CONTROL END	CENTRE	NON-CONTROL END
HC1 energises @				
HC2 energises @				
HC3 energises @				
CR1 energises @				
(Mk3b only) HC4 energises @				
(Mk3b only) HC4 energises @				

Figure 3: Air Conditioning Record Sheet

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Panels, GRP (Vestibule) – Examine

IE 6175

APPLIES TO: All Vehicles

Scheduled Work

1. Clean the panels.
2. Examine panels. The following conditions are unacceptable.
 - * Patchy discoloration, graffiti, marks etc which cannot be completely removed by non-abrasive cleaning.
 - * Worn areas affecting surface finish or allowing base material to show through.
 - * Surface damage (including visible strands of fibre).
 - * Structural damage (i.e. cracked or holed).

Arising Work


NOTE: In the event that it is necessary to repair or renew an interior panel, then the repaired or renewed interior panel must be painted/decalled to match the current vehicle décor.

2. Repair minor surface damage by filling.
2. Renew defective panel which cannot be repaired:

Examine exposed structure and panels for corrosion and signs of water ingress.

Rectify corrosion damage in accordance with Job No. CA 6001 Arising Work.

Ensure that source of any water leaks is identified and rectified.

	VEHICLE OVERHAUL INSTRUCTION	PB/VI2133 Issue : 5 Section: 4 Page : 1 of 1
	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	

Panels, Catering Vehicle Public Areas – Examine

IE 6177

APPLIES TO: All Catering Vehicles

NOTE 1: This job applies to all wall panelling in public-accessible areas of catering vehicles, including the bar areas, bar fronts, bodyside panels opposite bar/kitchen areas and corridors beside kitchen areas. It applies to both GRP and stainless-steel clad panels.

Scheduled Work

NOTE 2: Kitchen and bar areas of catering vehicles are subject to the following statutory regulations:

- a) The General Food Regulation 2004 – SI 2004 No 3279
- b) The Food Hygiene (England) Regulations 2006 – SI 2006 No 14
- c) The Food Hygiene (England) (Amendment) Regulations 2012

All cleaning and other processes used in these areas must check that the vehicles comply with these regulations after completion of the overhauls.

1. Clean panels.
2. Examine panels. The following conditions are unacceptable:
 - * Patchy discoloration, graffiti, marks etc which cannot be completely removed by non-abrasive cleaning.
 - * Worn areas affecting surface finish or allowing base material to show through.
 - * Surface damage (including visible strands of fibre on GRP panels).
 - * Structural damage (i.e. cracked or holed).


Arising Work

2. Repair minor surface damage by filling.
2. Renew defective panel which cannot be repaired.
2. Refinish defective panel. Process to be approved by the Engineer.
2. With panels removed, examine exposed structure for corrosion.

Rectify corrosion damage in accordance with Job No. CA 6001 arising work.

Ensure that source of any water leaks is identified and rectified.

NOTE 3: When it is necessary to refinish or renew one or more panels, the appearance of all panels in the public area must match. If due to fading or different finishes that do not match, all panels in the public area must be refinished or renewed, and the serviceable items retained for fitting to subsequent vehicles.

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Kitchen Door Treadplate – Examine

IF 0140

APPLIES TO: TSOB

Scheduled Work


1. Examine the treadplate (see Figure 1). The following conditions are unacceptable:
 - Damage which leaves sharp edges or gaps between the treadplate and the floor covering either side.
 - Damage or loose fixings which allow movement between any parts or the floor on either side.

Arising Work

1. Resecure loose treadplate.
1. Repair minor damage or renew.



Figure 1: Kitchen Door Treadplate

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Gangway Floor Mats – Examine

IF 6033

Materials			
Item	Description	Qty/Veh	Cat No.
1	Rubber Matting	As Req'd	063/003278
2	Brass Strip	As Req'd	063/005294

APPLIES TO: All Vehicles

QUANTITY PER VEHICLE: 2

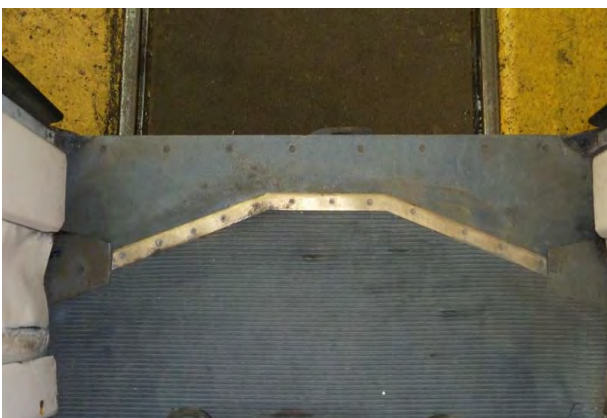
Scheduled Work

NOTE: There are potentially two types of treadplate that could be fitted to a vehicle (see Figure 1).
The differing types are not unique to one type of vehicle and it is believed that as the type of treadplate with the narrower profile and side wings has succumbed to corrosion, it has been replaced with the wider profile. On some vehicles it has been noted that the differing types are fitted at each end.
It is believed that on HST vehicles, only the wider, without-wings, profile is fitted.

1. Examine rubber covering on gangway fixed treadplate (see Figure 2).
2. Examine brass protection strip.

Arising Work

1. Renew rubber if defective (see Materials item 1).
2. Renew strip if defective (see Materials item 2).




Narrow Profile Treadplate with Side Wings



Wider Profile Treadplate

Figure 1: Details of the two Designs of Treadplate

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Gangway Floor Mats – Examine

IF 6033

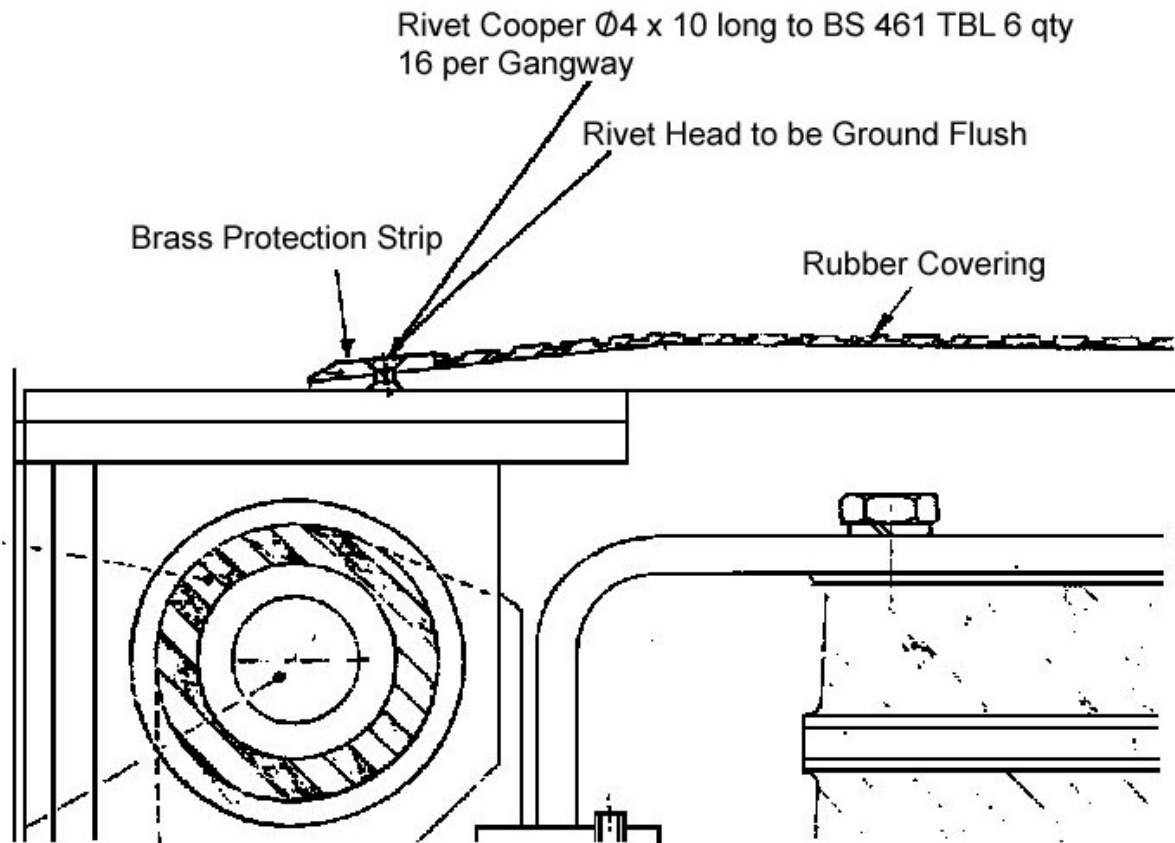



Figure 2: Detail of Fixed Treadplate

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Vestibule floor covering – Examine

IF 6105

Materials			
Item	Description	Qty/Veh	Cat No.
1	Stepfix Nora	As Req'd	036/132528

Reference Documents		
Item	Document No.	Title
1	TI/TP0461	Improved Method of Retaining Coir Matting in Coach Vestibule

Reference Drawings		
Item	Drawing No.	Title
1	ATC-C0-2210634	Installation of vestibule carpet

APPLIES TO: All Vehicles

Scheduled Work

NOTE 1: Job No. FX 0100 must be completed before this one.


NOTE 2: Jobs OJ 6102 or OJ 0138 as applicable are to be carried out before this one.

NOTE 3: Check with the Engineer for the applicability of Reference Documents item 1 or Reference Drawings item 1 before using.

1. Clean covering.
2. Examine vestibule floor covering. The following are unacceptable:
 - a) the covering is worn thin
 - b) there is evidence of the covering 'lifting'
 - c) the edges are frayed
 - d) the covering cannot be effectively cleaned.

Arising Work

2. Secure the covering using an adhesive agreed with the Engineer. Reference Document item 1, Reference Drawing item 1 and Materials item 1 provide alternatives.
2. Renew any covering which is damaged. The replacement covering must match the current installation, and the material to be used must be agreed by the Engineer prior to fitting. Secure the matting using an adhesive agreed with the Engineer. Reference Document item 1, Reference Drawing item 1 and Materials item 1 provide alternatives.

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Toilet Floor Covering - Clean/Examine

IF 6109

APPLIES TO: All except TRFB, TBRF. Also applies to trolley store areas converted from toilet areas.


Scheduled Work

NOTE: Job No. FX 0100 must be completed before this one.

1. Clean the floor covering.
2. Examine floor covering for wear, tears and lifting.

Arising Work

2. Renew any floor covering which is damaged or will not clean satisfactorily. The replacement floor covering must match the current installation, and the material to be used must be agreed by the Engineer prior to fitting.

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Guards Compartment Floor Covering - Clean/Examine

IF 6407

APPLIES TO: BFO, TGS


Scheduled Work

1. Clean.
2. Examine the floor covering.
3. Examine metal strips.

Arising Work

- 1,2. Renew any floor covering which is damaged or will not clean satisfactorily. The replacement floor covering must match the current installation, and the material to be used must be agreed by the Engineer prior to fitting.
3. Renew damaged alloy strips.

Any areas of floor thus exposed to be treated in accordance with Job No. FTA0100.

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Floor Covering, Public Area and Staff Compartment - Clean/Examine

IF 6422

APPLIES TO: All Catering Vehicles

Scheduled Work

NOTE 1: Kitchen and bar areas of catering vehicles are subject to the following statutory regulations:

- a) The General Food Regulation 2004 – SI 2004 No 3279
- b) The Food Hygiene (England) Regulations 2006 – SI 2006 No 14
- c) The Food Hygiene (England) (Amendment) Regulations 2012

All cleaning and other processes used in these areas must check that the vehicles comply with these regulations after completion of the overhauls.

NOTE 2: There is no staff compartment on TSOB or TSB vehicles.

NOTE 3: The catering area floor covering on TCC vehicles is covered by Job No. IF 6453.


1. Test the whole area of the floor for deflection by standing on it.
2. Clean the floor covering.
2. Examine floor covering for wear, tears and lifting.

Arising Work

1. If the floor deflects, remove the covering and examine the floor panels. If a panel is damp or rotten, remove and examine the steel floor beneath.

Repair the floor in accordance with Job No. FTA0100, and renew the covering.

3. Renew any floor covering which is damaged or will not clean satisfactorily. The replacement floor covering must match the current installation, and the material to be used must be agreed by the Engineer prior to fitting.

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Catering Area Floor Covering – Examine

IF 6453

Reference Documents		
Item	Document No.	Title
1	TI/TP0624	Repair of Altro Safety Flooring in Catering Vehicles

APPLIES TO: All Catering Vehicles

Scheduled Work

NOTE: Kitchen and bar areas of catering vehicles are subject to the following statutory regulations:

- a) The General Food Regulation 2004 – SI 2004 No 3279
- b) The Food Hygiene (England) Regulations 2006 – SI 2006 No 14
- c) The Food Hygiene (England) (Amendment) Regulations 2012

All cleaning and other processes used in these areas must check that the vehicles comply with these regulations after completion of the overhauls.

1. Test the whole area of the floor for deflection by standing on it.
2. Clean the floor covering.
3. Examine the floor covering.
The following conditions are unacceptable:


Burns, holes, tears or previous patch repair joins which are not level.

Arising Work

1. If the floor deflects, remove the covering and examine the floor panels. If a panel is damp or rotten, remove and examine the steel floor beneath.

Repair the floor in accordance with Job No. FTA0100 and renew the floor covering in accordance with the specified document (see Reference Documents item 1) (for Altro floor coverings) or the Manufacturers instructions for other coverings.

3. Resecure and reseal loose but undamaged floor covering in accordance with the specified document (see Reference Documents item 1) (for Altro floor coverings) or Manufacturers instructions for other coverings.
3. Remove defective Altro floor coverings and renew complete areas in accordance with the specified document (see Reference Documents item 1) (for Altro floor coverings) or Manufacturers instructions for other coverings.

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Carpets - Clean/Examine

IF 6504

APPLIES TO: All Vehicles


Scheduled Work

1. Check that the carpet is not damaged, holed, or worn through to the backing.
2. Vacuum clean carpets to remove light debris and dirt deposits.
3. Carry out heavy cleaning by means of a carpet cleaning machine.
4. Examine carpet after cleaning.

NOTE: Ensure that the carpet is left undisturbed during the drying process.

Arising Work

- 1,3,4. Renew any carpet which is damaged, holed or will not clean satisfactorily. The replacement carpet specification and design to be used must be agreed by the Engineer prior to fitting.

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Conductors Compartment Fittings – Examine

II 6623


APPLIES TO: BFO and TGS

Scheduled Work

1. Examine the desk, drawers and cupboards for defects.

Arising Work

- | | |
|----|--|
| 1. | Repair any defects identified and cap the damaged edges and corners. |
|----|--|

	VEHICLE OVERHAUL INSTRUCTION	PB/VI2133 Issue : 5 Section : 4 Page : 1 of 2
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Catering and Bar Area Joint Sealant – Examine

KI 0110

Materials			
Item	Description	Qty/Veh	Cat No.
1	Silicone Sealant (Arbosit1081) Translucent White Black Available from: Adshead Ratcliffe & Co Ltd, Derby Road, Belper, Derbyshire. Tel: 01773 826661	As Req'd	028/022208 028/022209 028/022210

APPLIES TO: All Catering Vehicles


Scheduled Work

NOTE: Kitchen and bar areas of catering vehicles are subject to the following statutory regulations:

- a) The General Food Regulation 2004 – SI 2004 No 3279
- b) The Food Hygiene (England) Regulations 2006 – SI 2006 No 14
- c) The Food Hygiene (England) (Amendment) Regulations 2012

All cleaning and other processes used in these areas must check that the vehicles comply with these regulations after completion of the overhauls.

1. Examine the sealant in all joints and interfaces between wall panels, wall panel joint trims, work surfaces, work surface upstands, shelves, fixed items of catering equipment, bar surfaces etc, where grease or dirt could accumulate. The following conditions are unacceptable.
 - 1.1 Sealant missing.
 - 1.2 Gaps in sealant.
 - 1.3 Sealant not adhering to both surfaces along its full length.
 - 1.4 Surface of sealant not smooth and flush.
 - 1.5 Dirt, grease etc adhering to surface of sealant or embedded in sealant.


	VEHICLE OVERHAUL INSTRUCTION	PB/VI2133 Issue : 5 Section : 4 Page : 2 of 2
	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	

Catering and Bar Area Joint Sealant – Examine

KI 0110

Arising Work

1. Renew sealant as follows:
 - 1.1 Remove the fixings as necessary.
 - 1.2 Part the joint or interface by easing the front component or surface away.
 - 1.3 Remove all existing sealant.
 - 1.4 Clean the interface areas thoroughly and wipe dry.
 - 1.5 Apply a run of sealant (see Materials item 1) to both surfaces using a gun, immediately prior to the surfaces being brought together.
 - 1.6 Refit the fixings and secure the joint.
 - 1.7 Remove excess sealant before it cures, making certain that no gaps exist and that the sealant provides a smooth finish.

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Bar Wooden Surface – Revarnish

KI 6428

Reference Documents		
Item	Document No.	Title
1	CR/TS0591	Performance Specification for Timber Bar Counter Varnish

APPLIES TO: Catering Vehicles with varnished wooden bar surfaces.

Scheduled Work

NOTE 1: Kitchen and bar areas of catering vehicles are subject to the following statutory regulations:

- a) The General Food Regulation 2004 – SI 2004 No 3279
- b) The Food Hygiene (England) Regulations 2006 – SI 2006 No 14
- c) The Food Hygiene (England) (Amendment) Regulations 2012

All cleaning and other processes used in these areas must check that the vehicles comply with these regulations after completion of the overhauls.

1. Remove bar surfaces including portion on the door (HST only).
2. Examine bar surfaces for deep scratches and damage which will not clean up.
3. Remove the old surface finish from the entire surface area, with dry sand paper.
4. Apply a varnish finish which meets the specified document requirements (see Reference Documents item 1).


If the product is an acrylic co-polymer water borne varnish, proceed as follows:

- 4.1 Apply a sealing coat, thinned by 50% clean water, and allow to dry.
- 4.2 Apply three coats of full strength varnish. Rub down after first and second coat.
5. Refit bar surfaces to vehicle.

Arising Work

2. Renew damaged bar counter that cannot be restored to as new condition.

NOTE 2: Renewal must be made using material to the original specification.

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Catering Area Working Surfaces – Examine

KI 6439

APPLIES TO: All Catering Vehicles

Scheduled Work

NOTE: Kitchen and bar areas of catering vehicles are subject to the following statutory regulations:


- a) The General Food Regulation 2004 – SI 2004 No 3279
- b) The Food Hygiene (England) Regulations 2006 – SI 2006 No 14
- c) The Food Hygiene (England) (Amendment) Regulations 2012

All cleaning and other processes used in these areas must check that the vehicles comply with these regulations after completion of the overhauls.

1. Examine the surfaces.
2. Clean the surfaces.

Arising Work

1. Repair damaged surfaces.
1. Renew surfaces which cannot be restored to a satisfactory condition.

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Shelves – Examine

KI 6441

APPLIES TO: All Catering Vehicles

NOTE 1: This job covers all shelving in the non-public area of the vehicle, including those in kitchen areas and those in the bar areas.

Scheduled Work

NOTE 2: Kitchen and bar areas of catering vehicles are subject to the following statutory regulations:


- a) The General Food Regulation 2004 – SI 2004 No 3279
- b) The Food Hygiene (England) Regulations 2006 – SI 2006 No 14
- c) The Food Hygiene (England) (Amendment) Regulations 2012

All cleaning and other processes used in these areas must check that the vehicles comply with these regulations after completion of the overhauls.

1. Clean the shelves.
2. Examine shelving units (including support brackets, panels, rubber bump strips and all other fittings). The following conditions are unacceptable:
 - * Patchy discoloration, graffiti, marks etc which cannot be completely removed by non-abrasive cleaning.
 - * Worn or scratched areas affecting surface finish or allowing base material to show through.
 - * Structural damage (i.e. cracked or holed).

Arising Work

2. Renew defective shelf.
2. Renew defective support brackets and panel.

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Public Area Fittings – Examine

KI 6443

APPLIES TO: TSOB, TSB

NOTE 1: TSB does not have shelves nor litter bin, but does have a newspaper rack. Photographs show TSOB.

Scheduled Work

NOTE 2: Kitchen and bar areas of catering vehicles are subject to the following statutory regulations:

- a) The General Food Regulation 2004 – SI 2004 No 3279
- b) The Food Hygiene (England) Regulations 2006 – SI 2006 No 14
- c) The Food Hygiene (England) (Amendment) Regulations 2012

All cleaning and other processes used in these areas must check that the vehicles comply with these regulations after completion of the overhauls.


1. Clean the shelves, tubular rails, litter bin housing (see Figure 1 and 2) and newspaper rack (where fitted).



Figure 1: Bodyside Shelf Unit



Figure 2: Litter Bin and Shelf Unit

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Public Area Fittings – Examine

KI 6443

2. Examine the handrails, foot rest and tubular support (where fitted).
 - 2.1 Check that they are secure.
 - 2.2 Check that the plastic covering is undamaged with no sharp edges.
3. Examine the shelves, including the edging (TSOB only).
 - 3.1 Check that they are secure.
 - 3.2 Examine the surfaces (see Note 2).
4. Examine the litter bin housing (TSOB only).
 - 4.1 Examine the visible surfaces (see Note 2).
 - 4.2 Check that the flap is free to open and close.
 - 4.3 Check that the door is secure on its hinges.
 - 4.4 Check that the catch is effective.


NOTE 3: The following conditions are unacceptable:

- Patchy discoloration, graffiti, marks etc which cannot be completely removed by non-abrasive cleaning.
- Worn or scratched areas affecting surface finish or allowing base material to show through.
- Structural damage (i.e. cracked or holed).

5. Examine the newspaper rack (TSB only).
 - 5.1 Check that the rack is secure and undamaged.

Arising Work

- 2.1, Resecure loose items. Renew missing fixings.
- 3.1
- 2.2, Renew plastic coating.
- 3.2
- 3.2, Repair to restore original strength and appearance, otherwise renew.
- 4.1
- 4.2, Repair defects, renewing missing or defective items.
- 4.3,
- 4.4,
- 5.

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	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	

Motor Alternator Set – Examine, Mounts - Renew

MO 4029

Materials			
Item	Description	Qty/MA Set	Cat No.
1	Screws, M8 x 30mm Hex Head EZP Grade 8.8	8	035/100662
2	Nuts, M8 Bent Beam Type Grade 8	8	003/180320
3	Screws, M10 x 30mm Hex Head Grade 8.8	8	035/100810
4	Nuts, M10 Bent Beam Type Grade 8	8	003/180325
5	Bolts, M16 x 130mm Hex Head Grade 8.8	4	003/100990
6	Nuts, M16 Bent Beam Type (Plain) Grade 8	4	003/180340
7	Nuts, M16 Bent Beam Type (EZP) Grade 8		003/180342
8	Electro Quick Clean	As Req'd	007/007186
9	Flexible Mountings	4	064/000400

Torque Figures			
Item	Description	Size	Torque (Nm)
1	Bent Beam Nut	M8	28
2	Bent Beam Nut	M10	56
3	Bent Beam Nut	M16	105


Special Tools		
Item	Description	Part No.
1	Gauge	850/417201

Reference Drawings		
Item	Drawing No.	Title
1	A1-A2-8504172	Gauge For Checking Mark 7 and Mark 12 MA Set Flexible Mountings

Reference Documents		
Item	Document No.	Title
1	PB/CI0739	Motor Alternator Overhaul Instruction Mk7 Alternators
2	PB/CI0740	Motor Alternator Overhaul Instruction Mk12 Alternators
3	PB/TP1372	Corrosion Repairs to the Fixed Skirt of Mk3 Coaches

APPLIES TO: All except HST

QUANTITY PER VEHICLE: 1, except RFM which has 2.

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	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	

Motor Alternator Set – Examine, Mounts - Renew

MO 4029


NOTE 1: Motor Alternators (M/A sets) are fitted to the LHCS fleet only. The types of M/A sets fitted are as follows:

Vehicle Type	M/A Type	Cat. No.
Mark 3A TSO and FO	Mark 7	064/000407
Mark 3B FO and BFO	Mark 12	064/004478
Mark 3A RFM	2 off Mark 12a	064/004478
Mark 3A TSOB	Mark 12a	064/004478

NOTE 2: The MA junction box internal Perspex panels fitted to machines on TSOBs are unique to those vehicles. This panel must be transplanted if an MA is removed from a TSOB and is not to be refitted to the same vehicle.

Scheduled Work

1. Remove the commutator cover and clean.
2. Examine the cover seal and fastenings.
3. Visually examine within the machine for carbon fragments, thrown solder, flashover damage, water ingress, copper drag and foreign matter between commutator segments, damaged vee-ring insulation or signs of overheating.
4. Withdraw brushes from the brush box and examine each brush. Check that the length is 32mm or more on the longest side.
5. Remove the tensator spring from the brush holder to the limit allowed by the retaining pin.
6. Extend the spring as far back as possible and wipe clean with a lint free cloth moistened in "Electro Quick Clean" (see Materials item 8).
7. Carefully return the spring to its original position (ensuring that it does not recoil under its own force) and replace the spring unit into the brush box.
8. Clean the brush box insulators and vee-ring using a lint free cloth moistened in "Electro Quick Clean" (see Materials item 8).
9. Check all loose dirt and particles are wiped or brushed out from the commutator chamber.
10. Refit the commutator cover.
11. Remove the drain plug, clean out and renew the felt plug.


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12. Refit the drain plug.
13. Examine the air intake hose and adaptor box for damage.
14. Support the weight of the MA set by positioning a suitable hydraulic table on the underside of the unit.
15. Renew each mounting arrangement in turn by removing and scrapping all M8 or M10 bolts, M16 bolts, nut, washers and mounts and carrying out the following:
 - 15.1 Obtain and gauge the new flexible mountings (see Materials item 9) using the gauge (see Special Tools item 1), (see Reference Drawings item 1 and Figure 2) and a straight edge (see Figure 3). The straight edge is placed on the bottom of the mount, and must lie within the 12mm diameter length of the gauge.
 - 15.2 Clean and examine mating surfaces of the mounting and the motor alternator set bracket.
 - 15.3 If the support frame has 8mm diameter holes for the flexible mounting bolts, refit the flexible mountings to the support frame with new M8 x 30mm hex head bolts (see Materials item 1) and new M8 bent beam type nuts (see Materials item 2).
 - 15.4 Torque tighten the M8 nuts in accordance with Torque Figures item 1.
 - 15.5 If the support frame has 10mm diameter holes for the flexible mounting bolts, refit the flexible mountings to the support frame with new M10 x 30mm hex head bolts (see Materials item 3) and M10 bent beam type nuts (see Materials item 4).
 - 15.6 Torque tighten the M10 nuts in accordance with Torque Figures item 2.
 - 15.7 Check that the dimensions of the M16 x 130mm hex head bolts (see Materials item 5) are as shown in Figure 1.
 - 15.8 Refit the motor alternator using new M16 x 130mm bolts and new M16 bent beam type nuts (Plain) (see Materials item 6) or (EZIP) (see Materials item 7).

NOTE 3: Under **NO** circumstances must any washers or packing be used under the bolt head or nut.
 - 15.9 Torque tighten the M16 nuts in accordance with Torque Figures item 3.
16. Repeat steps 3 to 15 on the second M/A set fitted to RFM vehicles.

Arising Work

2. Renew the seal or fastening.

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3. Remove minor flashover damage.
3. Change M/A set and fit new fasteners as described in step 15 of this job. Overhaul MA set in accordance with the specified documents (see Reference Documents items 1 or 2). Refit and secure the underframe removable panel in accordance with the specified document (see Reference Documents item 3).
4. Renew all brushes.
13. Renew the defective components.
- 15.1 Reject any defective new mountings.
- 15.2 Remove any projections from mating surfaces.
- 15.7 Reject any bolts which do not comply with Figure 1.

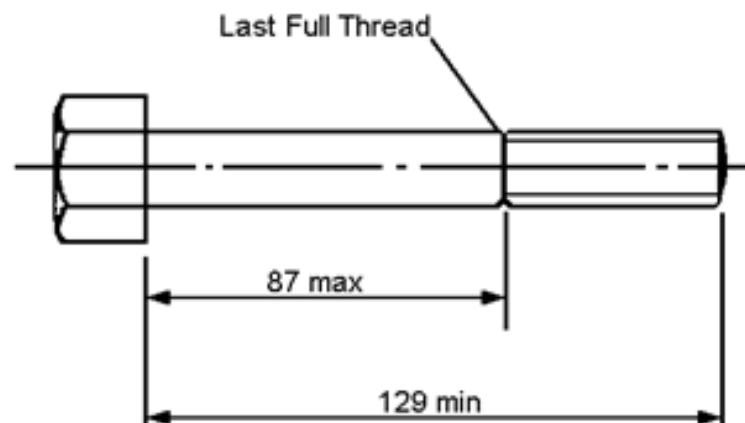


Figure 1



VEHICLE OVERHAUL INSTRUCTION

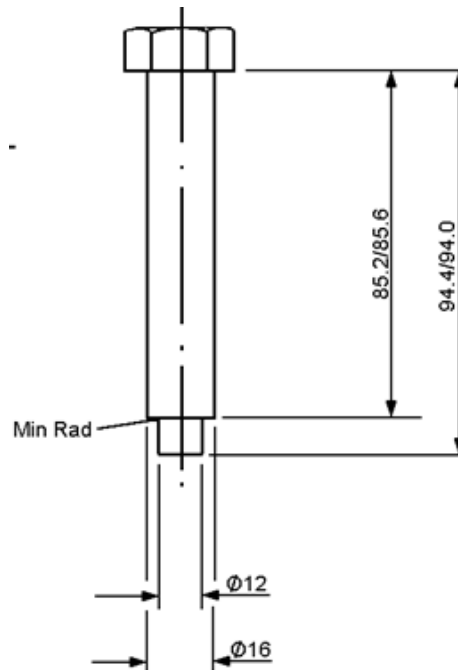
PORTERBROOK MARK 3 LOCO HAULED
COACHING STOCK AND HST TRAILER VEHICLES

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Motor Alternator Set – Examine, Mounts - Renew

MO 4029



For full details see Drawing A1-A2-8504172
BR Cat. No. 850/417201

Figure 2

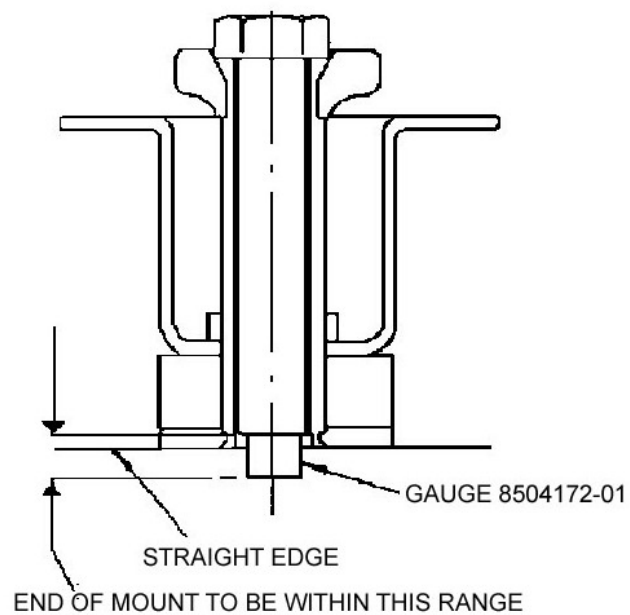



Figure 3

	VEHICLE OVERHAUL INSTRUCTION	PB/VI2133 Issue : 5 Section: 4 Page : 1 of 1
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Motor Alternator Control Unit FM2 - Check/Test

MO 5017

Reference Documents		
Item	Document No.	Title
1	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables

APPLIES TO: Mark 3A except RFM and TSOB

Scheduled Work

- Clean the mountings.
- Check that the unit is secure and undamaged and there is no evidence of nut or washer movement.

NOTE 1: Test in accordance with Job No. MO 5022 Part 1.


Arising Work

- Remove and discard all fasteners and refit as follows:

Drawing	Components not Required on Reassembly	New Fasteners		Torque (Nm)
		Description	Cat. No.	
C-A0-9755	Split Pins Slotted Nut Spring Washer	Nut M10 Grade 8	See Note 2 below	22
		Washer M10	003/190930	

NOTE 2: See Page 2 of Job No. U* 0105 for details of nuts.

NOTE 3: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 1).

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Motor Alternator Control/Battery Charger Unit - Check/Test

MO 5018

Reference Documents		
Item	Document No.	Title
1	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables

APPLIES TO: Mark 3B, RFM (No. 1 and No.2 positions) and TSOB

Scheduled Work

1. Check that each unit is secure and undamaged and there is no evidence of nut or washer movement.

NOTE 1: Test all except RFM No.2 position in accordance with Job No. MO 5022 Part 2.
Test RFM No.2 position in accordance with Job No. MO 5022 Part 3.


Arising Work

1. Remove and discard all fasteners and refit as follows:

Drawing	Components Not Required on Reassembly	New Fasteners		Torque (Nm)
		Description	Cat. No.	
Mark 3B 9018690 (FO) 9025852 (BFO)	Split Pin Slotted Nut	Nut M10 Grade 8	See Note 2 below	22
		Washer M10	003/190930	
RFM No.1 and No.2 machines C-A0-18516	Split Pin Slotted Nut Spring washer	Nut M10 Grade 8	See Note 2 below	22
		Washer M10	003/190930	
TSOB PB-CO-2104932	-	As Drawing		

NOTE 2: See Page 2 of Job No. U* 0105 for details of nuts.

NOTE 3: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 1).

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Motor Alternator Choke – Examine

MO 5019

Reference Documents		
Item	Document No.	Title
1	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables

APPLIES TO: All except HST

QUANTITY PER VEHICLE: Mark 3A, Mark 3B (1) TSOB (1)
RFM (2)

Scheduled Work

1. Check that the unit is secure and undamaged and there is no evidence of bolt, nut or washer movement.

NOTE 1: Test in accordance with Job No. MO 5022.


Arising Work

1. Remove and discard all fasteners and refit as follows:

Drawing	Components Not Required on Reassembly	New Fasteners		Torque (Nm)
		Description	Cat. No.	
C-A0-9732 (Mark 3A) except TSOB C-A0-13053 (RFM)	Spring Washer	Screw M10x40 Grade 8.8 Washer M10 Nut M10 Grade 8	035/100822 003/190930 See Note 2 below	56
C-A0-22076 (Mark 3B)		As Drawing (Slide in Mounting)		
PB-C0-2104929 TSOB (Vehicle 10401)		As Drawing		
PB-C0-2105281 TSOB (Vehicles 10402-6)	-	As Drawing		

NOTE 2: See Page 2 of Job No. U* 0105 for details of Nuts.

NOTE 3: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 1).

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Motor Alternator and Control Unit Function – Check

MO 5022

Materials			
Item	Description	Qty/Veh	Cat No.
1	NVR Mk 7	As Req'd	064/010938
2	NVR Mk 12	As Req'd	064/010937

Reference Documents		
Item	Document No.	Title
1	TS/TRS-004/TIC	Specification for Technical Specification for Motor Alternator Equipment Fault Finding Guide Mark 7 Motor Alternator FM2 Control Unit
2	TE/TP0179	Fault Finding Guide for Mark 12A 3 phase MA Unit as used on Mark 3A (RF) and Mark 3B Coaching Stock
3	TE/TP0181	Technical Procedure for Motor Alternator Equipment Fault Finding Guide for Mark 12a Single Phase (1PH) Motor Alternator Set Fitted to Mark 3a (RF) Catering Coaches
4	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables


APPLIES TO: All except HST

QUANTITY PER VEHICLE: Mark 3A (1 machine per vehicle) see Part 1.
Mark 3B and TSOB (1 machine per vehicle) see Part 2.
RFM (2 machines per vehicle) see parts 2 and 3.

Scheduled Work

Part 1 Mark 3A (except TSOB)


- 1.1 Put the auxiliary switch into the OFF position. Open the Vehicle Isolating Switch.
- 1.2 Connect a digital voltmeter of at least 0.5% accuracy, between wires 10 (battery +ve) and 5 (battery -ve) in the motor alternator fuse box (Voltmeter 1).
- 1.3 Connect a digital voltmeter of at least 0.5% accuracy, between wires 13 (CT Rectifier +ve) and 12 (CT rectifier -ve) in the Control Unit (Voltmeter 2).
- 1.4 Connect a frequency meter between wires 4 (alternator phase B output at 240 volts) and 5L (battery -ve) on the Control Unit backboard terminals.
- 1.5 Connect a clip-on ammeter at wire 120 (battery +ve) in the battery box (Ammeter 1).
- 1.6 Connect the electric train supply. Check that the train supply fault indicators (in the vestibule end) are not illuminated.
- 1.7 Close the Vehicle Isolating Switch. Close circuit breaker MACCB and move the auxiliary switch to the AUX position.

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Motor Alternator and Control Unit Function – Check

MO 5022

- 1.8 Check that the timing relay (TDR) operates in accordance with the timing plate fitted.
 - 1.9 Check that light emitting diode LD1 is OFF (located on the NVR card in the Control Unit). This indicates that the unit is not in current limit.
 - 1.10 Ensure that the saloon lights are OFF and record ammeter 1 reading. Check that voltmeter 2 reads in volts the current measured divided by 10 (e.g. 3.2 ± 0.2 volts d.c. equals 32 amps).
 - 1.11 Check that the frequency is 50 ± 0.5 Hz. Adjust if necessary using potentiometer RV1 on the "Speed Card" in the Control Unit.
 - 1.12 Check that the d.c. voltage reading is 110 ± 0.3 volts d.c. Adjust as necessary using potentiometer RV2 on the NVR Card in the Control Unit.
 - 1.13 Check that the train supply earth fault indicators are both illuminated and of equal brightness.
 - 1.14 Press the train supply earth fault test button and check that the Indicators remain at equal brightness. Release the button.
 - 1.15 Check that the motor alternator line voltages are between 400 and 430 volts.
 - 1.16 Check that the motor alternator phase voltages are between 230 and 250 volts.
 - 1.17 Move the auxiliary switch to the AUX and AIR COND position.
 - 1.18 With the air conditioning equipment running, recheck the frequency, line and phase voltages.
 - 1.19 Reduce the electric train supply and check that the No Volt Relay (NVR) disconnects the vehicle supply at 600 ± 30 volts.
- NOTE 1:** In the event that a variable ETS supply is not available, then this task may be carried out by removing the NVR board from the vehicle and arranging for its calibration such that it disconnects the supply to the vehicle if the ETS voltage drops below 600 ± 30 volts.
- 1.20 Switch off the electric train supply. Move the auxiliary switch to OFF. Open the Vehicle Isolating Switch and remove all meters.

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Motor Alternator and Control Unit Function – Check

MO 5022

Part 2 Mark 3B, TSOB and RFM (No 1 Machine)

- 2.1 Put the auxiliary switch into the OFF position. Open the Vehicle Isolating Switch.
- 2.2 Connect a digital voltmeter of at least 0.5% accuracy, between wires 25 (+ve) and 5 (-ve) in the Control Unit.
- 2.3 Move the auxiliary switch to the AUX position and apply a 110 volt d.c. supply to cable 95. Check that timing relay TDR1 picks up.
- 2.4 Check that after the time indicated below, timing relay TDR2 and motor contactors MC1 and MC2 are energised:

Mark 3B (FO)	10 ± 1 seconds
Mark 3B (BFO)	14 ± 1 seconds
Mark 3A (RFM)	5 ± 1 seconds
- 2.5 Check that 5 ± 1 seconds after the energisation of TDR2 that motor contactor MC3 is energised.
- 2.6 Move the auxiliary switch to OFF and disconnect the 110 volt feed from cable 95.
- 2.7 Connect the electric train supply. Check that the train supply fault indicators (in the vestibule end) are not illuminated.
- 2.8 Close the vehicle isolating switch. Close circuit breaker MACCB (MACCB1 on RFM) and move the auxiliary switch to the AUX position.
- 2.9 Check that light emitting diode LD4 is OFF and that LD6 is ON (located on the battery charge PCB in the control unit). This indicates that the unit is not in current limit.
- 2.10 Check that the d.c. voltage reading is 110 ± 0.3 volts d.c. Adjust if necessary using potentiometer RV1 on the battery charge control PCB.
- 2.11 Check that the train supply earth fault indicators are both illuminated and of equal brightness.
- 2.12 Press the train supply earth fault test button and check that the Indicators remain at equal brightness. Release the button.
- 2.13 Check that the motor alternator line voltages are between 375 and 450 volts.
- 2.14 Check that the motor alternator phase voltages are between 216 and 260 volts.
- 2.15 Move the auxiliary switch to the AUX and AIR COND position.

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Motor Alternator and Control Unit Function – Check

MO 5022

- 2.16 With the air conditioning equipment running, recheck the frequency, line and phase voltages.
- 2.17 Reduce the electric train supply and check that the No Volt Relay (NVR) disconnects the vehicle supply at 600 ± 30 volts.


NOTE 2: In the event that a variable ETS supply is not available, then this task may be carried out by removing the NVR board from the vehicle and arranging for its calibration such that it disconnects the supply to the vehicle if the ETS voltage drops below 600 ± 30 volts.

- 2.18 Check the battery charging sockets for correct polarity.
- 2.19 Switch off the electric train supply. Move the auxiliary switch to OFF. Open the vehicle isolating switch and remove all meters.

Part 3 RFM No 2 Machine (Catering)

- 3.1 Put the auxiliary switch into the OFF position. Open the vehicle isolating switch.
- 3.2 Move the auxiliary switch to the AUX position and close the Low Load Switch (LLS). Apply a 110 volt d.c. supply to cable 216 on the coil of timing relay TDR3. Check that TDR3 picks up.
- 3.3 Check that after a period of 8 ± 1 seconds timing relay TDR4 and motor contactors MC4 and MC5 are energised.
- 3.4 Check that 5 ± 1 seconds after the energisation of TDR4 that motor contactor MC6 is energised.
- 3.5 Move the auxiliary switch to the OFF position and disconnect the 110 volt feed from cable 216.
- 3.6 Connect the electric train supply. Close the vehicle isolating switch and the catering isolating switch. Close circuit breaker MACCB2. Move the auxiliary switch to the AUX position.
- 3.7 Check that 240 volts appears between terminals 225 and 5.
- 3.8 Reduce the electric train supply and check that the No Volt Relay (NVR) disconnects the vehicle supply at 600 ± 30 volts.

NOTE 3: In the event that a variable ETS supply is not available, then this task may be carried out by removing the NVR board from the vehicle and arranging for its calibration such that it disconnects the supply to the vehicle if the ETS voltage drops below 600 ± 30 volts.

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Motor Alternator and Control Unit Function – Check

MO 5022

- 3.9 Switch off the electric train supply. Move the auxiliary switch to OFF. Open the vehicle isolating switch and the catering isolating switch.

Arising Work

1,2,3 Trace and rectify defects in accordance with fault finding documents as follows:

Mark 3A except TSOB (see Reference Documents item 1)


Mark 3B, RFM (No.1), TSOB (see Reference Documents item 2)

RFM (No. 2) (see Reference Documents item 3)

NOTE 4: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 4).

NOTE 5: Vehicles operated by East Anglia franchise or which were upgraded as part of WB64 in 2009 (see Section 5.9 for details) are fitted with FM2 unit control cards which have been upgraded for enhanced reliability. Standard control cards MUST NOT be fitted to these vehicles. Consult the Engineer for details if necessary.

2.17 Change AVR if defective (see Materials items 1 or 2).

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Vestibule Door Pressure Reducing Valve – Check

OC 0617

Special Tools		
Item	Description	Cat No
1	Druck Gauge	-

APPLIES TO: All Vehicles

Scheduled Work

Part 1 – Reducing Valves Located in Underskirt (see Figure 1)


1.1 Open underskirt access doors as follows:

HST	Door P (or Door H for vehicles fitted with a BFG design disabled toilet)
Mark 3A	Door H
Mark 3B	Door K
RFM	Door J

1.2 With a suitable air supply connected to the main reservoir pipe (at a pressure where the following pressure settings can be checked, i.e. greater than the expected pressure settings required below) test the pressure setting of the reducing valve is as follows:

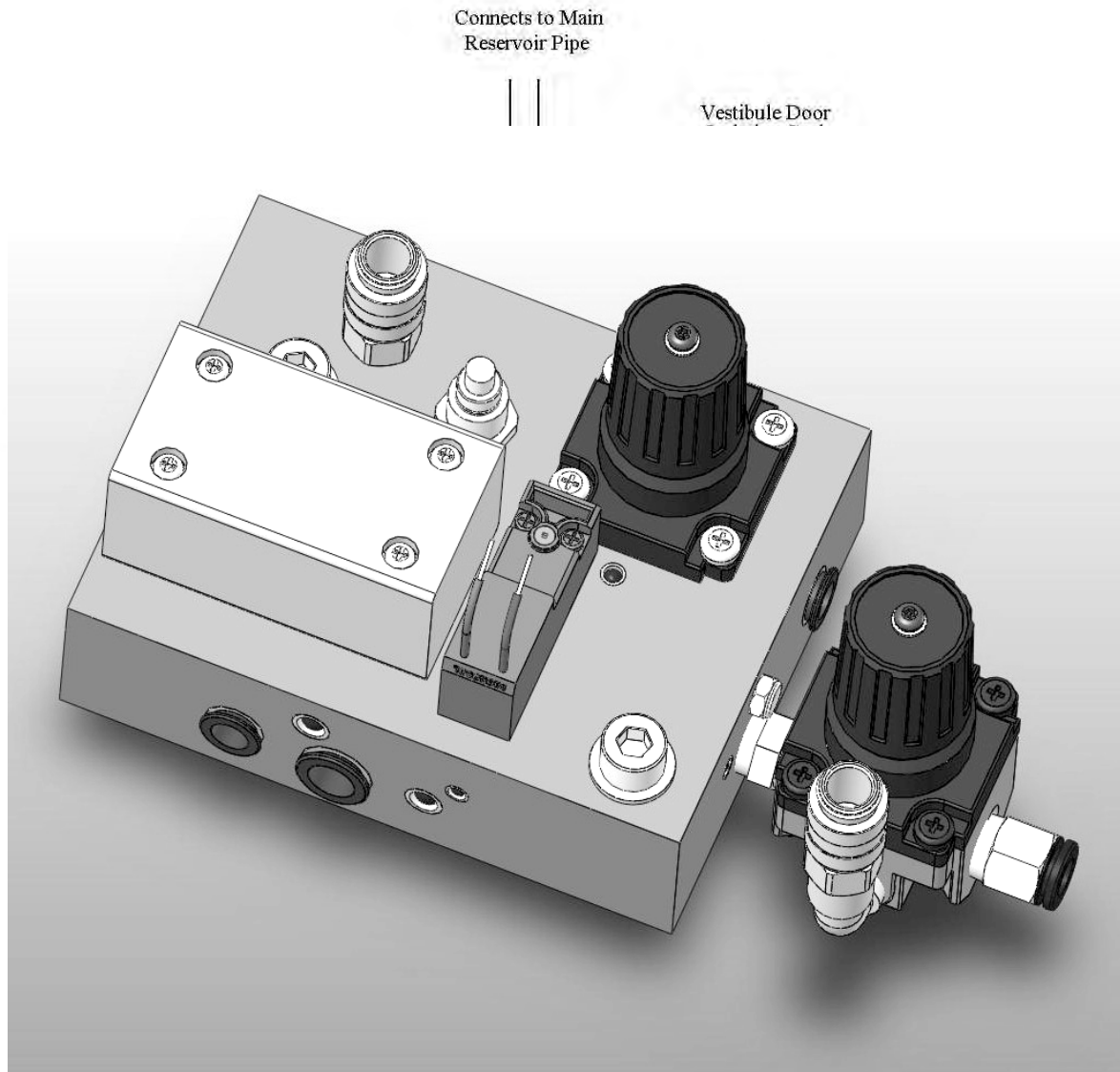
HST, Mark 3A, RFM, TSOB without additional regulator in vestibule or pneumatic toilet flush.	1.5 to 1.9 bar
HST with pneumatic toilet flush	5.0 to 7.0 bar
HST with Wabtec Rail pneumatic vestibule door panels	3.8 to 4.0 bar
HST with Temoinsa disabled persons toilet – see Section 5.9 for details	4.9 to 5.0 bar
HST with BFG design disabled persons toilet – see Section 5.9 for details	7.5 bar
Mark 3B, FO	2.0 bar
Mark 3B, BFO	3.5 bar
Mark 3B FOD	2.0 bar

Table 1: Underskirt Pressure Reducing Valve Settings

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Vestibule Door Pressure Reducing Valve – Check

OC 0617



Arising Work

- 1.2 Adjust the valve to correct setting on rising pressure.
- 1.2 Increase the pressure to the higher limit.
- 1.2 If still below the limit, investigate cause e.g. overhaul strainer check valve.
- 1.2 Renew the regulator if it will not give the correct pressure.

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Vestibule Door Pressure Reducing Valve – Check

OC 0617

Part 2 – Reducing Valves Located in Vestibules

NOTE: These checks are to be carried out after Part 1 with 7 bar supply connected.

Scheduled Work

2.1 Check the following located in BFO vehicle:

- 2.1.1 (BFO only) Test the pressure at the secondary filter regulator unit located in the vestibule electrical control cupboard, (bottom left hand side). This must be 1.7 bar.
- 2.1.2 (BFO only) Test the pressure at the secondary filter unit on the bottom of the door equipment control panel located in the small cupboard adjacent to the vestibule door. This must be 3.0 bar.

Arising Work

- 2.1.1, Adjust the valve to give the correct setting on rising pressure.
- 2.1.2

Scheduled Work

2.2 Check the following located in FOD vehicles.


- 2.2.1 Test the pressure at the balancing regulator which feeds the vestibule door at No.2 end. The pressure must be 1.7bar.

Arising Work

- 2.2.1 Carry out Job No. OJ 0138 Part 2 checking that there are no obstructions. If the timings are outside limits and the flow regulator adjustment is ineffective, adjust the pressure to give the required timings as follows:

Remove the screw from the regulator and lift the knob. Turn out anti clockwise to increase pressure and door speed, or clockwise to slow it down. Adjust progressively, half a turn at a time, and test the door each time the pressure is altered. When speeds are correct press the knob and lock with the screw.

Check that the holding or closing force is not excessive.

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Vestibule Door Pressure Reducing Valve – Check

OC 0617

Scheduled Work

2.3 Check the following located in HST vehicles fitted with pneumatic toilet flush (unmodified type).

2.3.1 Check the output of the reducing valve in each vestibule is between 1.5 to 1.7 bar.

Arising Work

2.3.1 Adjust the valve to give the correct setting on rising pressure.

Scheduled Work

2.4 Check the following located in HST vehicles fitted with pneumatic toilet flush (modified type).

2.4.1 Using a Druck gauge (see Special Tools item 1) or similar, check the pressure at the CPR test point (see Figure 2) (closing pressure) is 0.5 bar.

2.4.2 Using the same gauge, check the pressure at the DPR test point (see Figure 2) (opening pressure) is 2 bar.


Arising Work

2.4.1 Remove the tamper proof screw from the CPR with the Torx T2 driver, and lift the knob to unlock it, set the pressure to 0.5 bar.

2.4.2 Remove the tamper proof screw from the DPR with the Torx T2 driver, and lift the knob to unlock it, set the pressure shown on the gauge to 2 bar.

2.4.1, When the door is operating satisfactorily, lock both regulators by depressing the operating

2.4.2 knob and re-install tamper proof screws with a Torx T2 driver.

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Vestibule Door Pressure Reducing Valve – Check

OC 0617

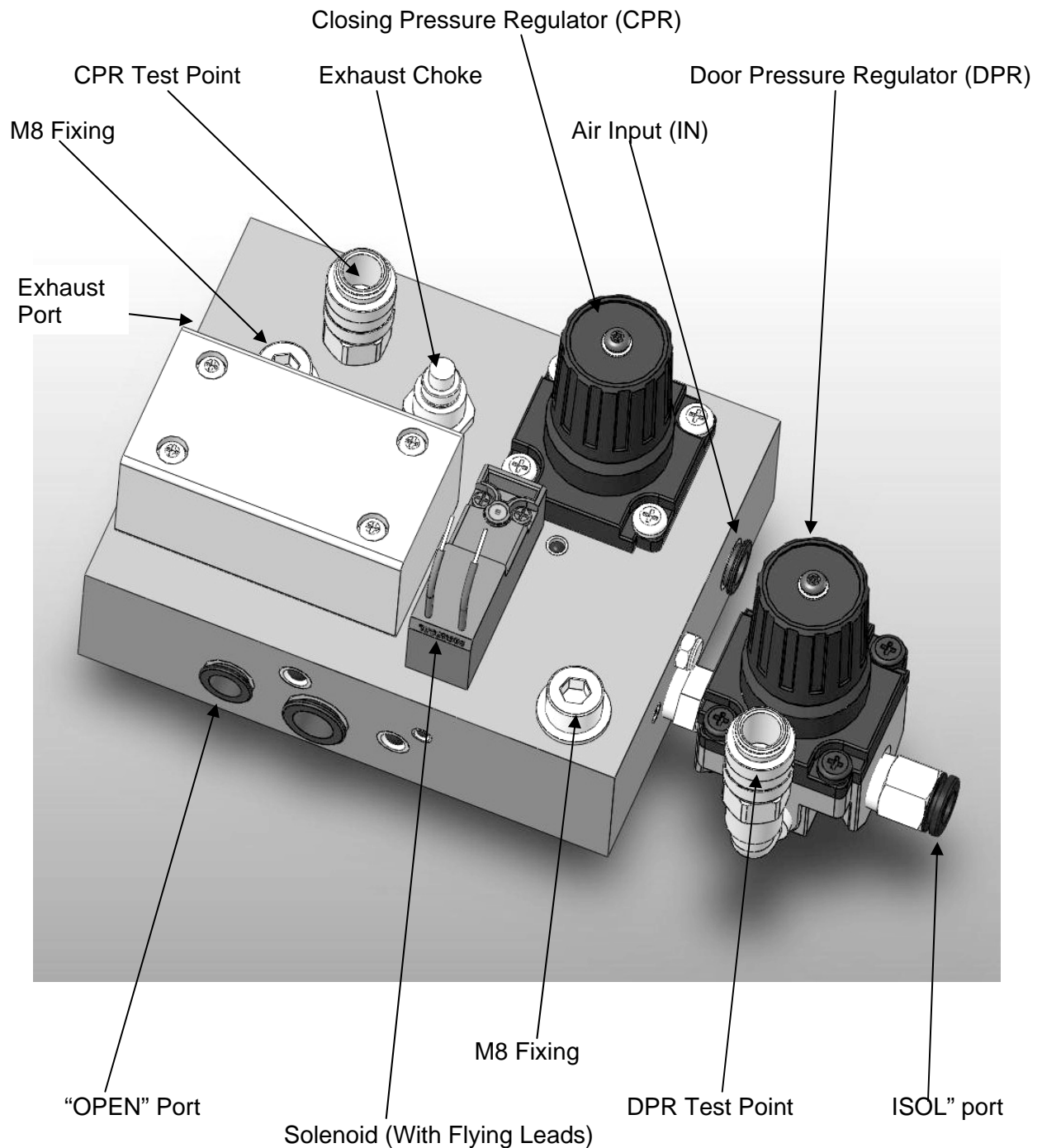



Figure 2: Modified Type Door Control Module

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Disabled Persons Toilet Door – Test

OI 0105

Materials			
Item	Description	Qty/Veh	Cat No.
1	Actuator	As Req'd	064/004259
2	Filter Regulator 'G'	As Req'd	064/004263
3	Lock Cylinder	As Req'd	064/004262

Reference Drawings		
Item	Drawing No.	Title
1	A1-A0-8501438	Control Panel General Arrangement Disabled Person Lav
2	PB-A0-2100142	Arrangement of Door Control Panel No. 2 End
3	A1-A1-8501435	Pneumatic Equipment Panel and Schematic (Disabled Persons Toilet)
4	A1-A1-8501408	Assy Of Micro Switches Lav Door Disabled Persons Lav

APPLIES TO: Part 1 – Vehicles fitted with “BRB design” disabled toilets – see Section 5.9 for details.

Part 2 – Vehicles fitted with Temoinsa disabled toilets – see Section 5.9 for details (starts on page 11)

Part 3 – Vehicles fitted with Driessen disabled toilets – see Section 5.9 for details (starts on page 16)

Part 4 – Vehicles fitted with BFG disabled toilets – see Section 5.9 for details (starts on page 17)


NOTE 1: Air supply required on main reservoir pipe for Parts 1 to 3, auxiliary switch at AUX or AUX and COND.

NOTE 2: Job No. OC 0617 must be completed before carrying out this job.

PART 1 – Vehicles Fitted with BRB Toilets

Scheduled Work

1. Turn the auxiliary switch to 'OFF'.
2. Check that the door is free to move by hand.
3. Return the Auxiliary switch to the 'ON' position. Check the door is in the CLOSED position.
4. Press the external 'OPEN' button and check that the door opens in 4 to 5 seconds.
5. Press the external 'CLOSE' button and check that the door closes in 4 to 5 seconds.


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Disabled Persons Toilet Door – Test

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PART 1 – Vehicles Fitted with BRB Toilets

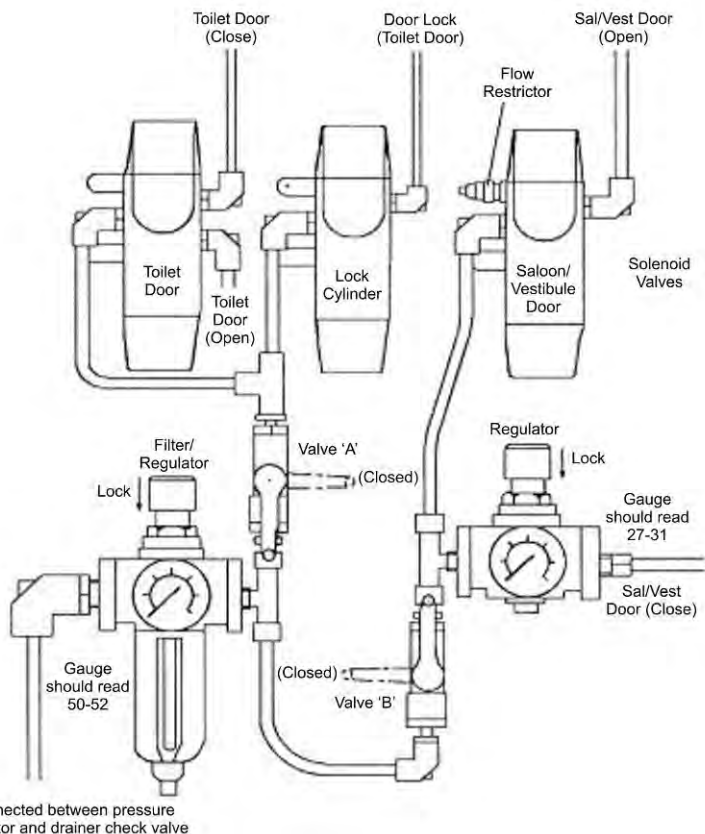
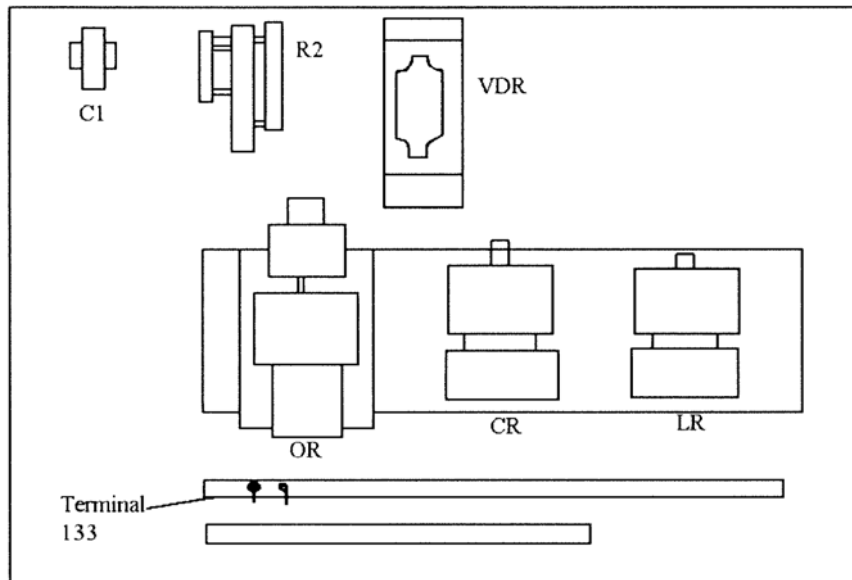
6. Press the external 'OPEN' button:
 - i) start timing from the moment the button is pressed.
 - ii) leave the door open and enter the toilet.
 - iii) check that the door automatically re-closes after being left open for 60 seconds.
 - iv) (HST only) check that the 'LOCK' pushbutton illuminates for 30 seconds after the door has closed.
7. Press the internal 'OPEN' pushbutton. Check that the door opens.
8. Press the internal 'CLOSE' pushbutton. Check that:
 - i) the door closes.
 - ii) when the door has closed the 'LOCK' pushbutton illuminates and remains illuminated.
9. Press the 'LOCK' pushbutton and check that:
 - i) the door has locked.
 - ii) the 'LOCK' pushbutton is no longer illuminated.
 - iii) the 'TOILET ENGAGED' indicator in the vestibule is illuminated.
 - iv) the 'TOILET ENGAGED' indicator in the saloon above the doorway is illuminated.

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Disabled Persons Toilet Door – Test


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PART 1 – Vehicles Fitted with BRB Toilets



For more details of
Electrical Control Panel
(see Reference
Drawings item 1)
(LHCS)
or
(see Reference
Drawings item 2) (HST)
and Pneumatic Control
Panel (see Reference
Drawings item 3).

Figure 1: Electrical (Top) and Pneumatic Control panels Disabled Person's Toilet Door and Associated Two Leaf Vestibule Door – LHCS Installation

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Disabled Persons Toilet Door – Test

OI 0105

PART 1 – Vehicles Fitted with BRB Toilets

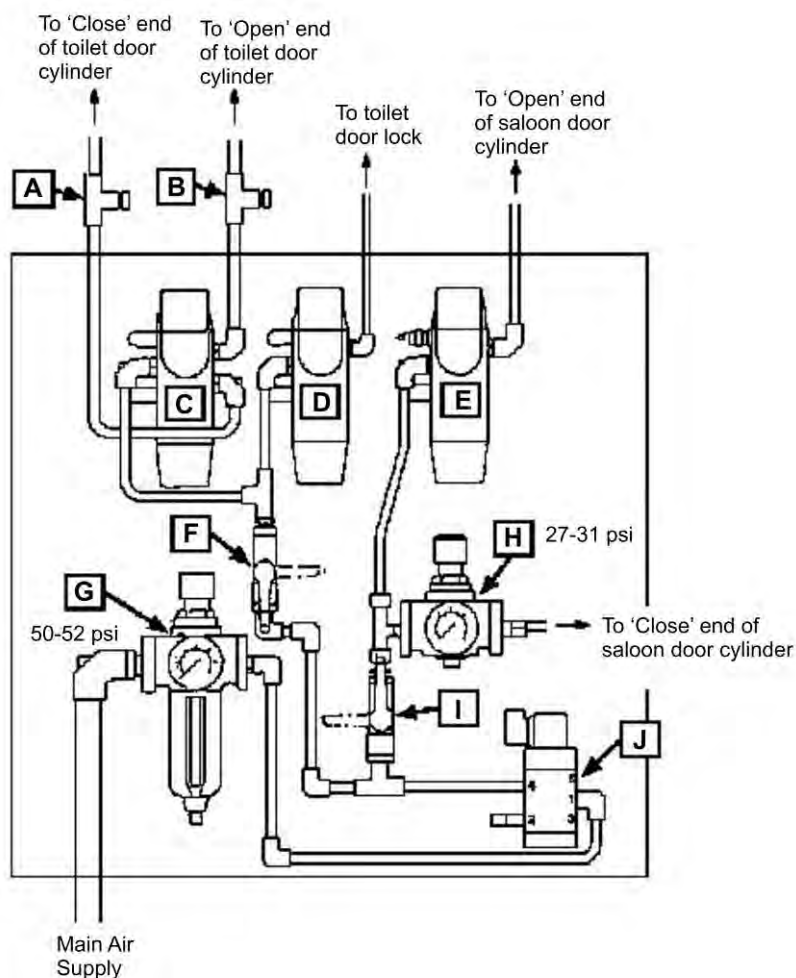



Figure 2: Lower Pneumatic Panel - HST Vehicles

(Located in vestibule, inside cupboard behind fire extinguisher, to right of saloon/vestibule door)

A	Flow regulator (toilet door open speed)	F	Isolating cock
B	Flow regulator (toilet door close speed)	G	Filter/regulator
C	Open valve (toilet door)	H	Pressure regulator
D	Lock valve (toilet door)	I	Isolating cock
E	EP valve (vestibule door)	J	Vent valve

NOTE 3: Valve 'J' not fitted to LHCS vehicles.

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Disabled Persons Toilet Door – Test

OI 0105

PART 1 – Vehicles Fitted with BRB Toilets

10. Press the internal 'OPEN' pushbutton and check that the door unlocks and opens.
11. Re-close the toilet door using the internal 'CLOSE' pushbutton.
12. Exit the toilet and close the door.


Arising Work

Before investigating further, check that:

- i) The auxiliary switch is in neither the 'ON' or the 'AUX AND COND.' position.
 - ii) 110v is present on terminal 133 in the control cupboard.
 - iii) Both isolating cocks in the control cupboard are in their normal operating positions (i.e. in line with the pipe).
 - iv) There are no obvious air leaks.
2. Toilet door is not free to move by hand when auxiliary switch is in 'OFF' position.
- a) Check that the door is not obstructed or jammed by debris in door pocket etc. Clean as necessary.
 - b) Check that the lock is not defective as follows:
 - i) Turn isolating cock 'F' in the control cupboard (see Figure 2) to remove air pressure from both the door lock and the door actuator.

On East Midlands Trains HST vehicles only, proceed as follows:

- ii) Locate the door lock emergency release, a hole above the right hand side of the door adjacent to the ceiling with a rubber bung of approximately Ø12mm.
- iii) Remove the rubber bung and insert a small diameter rod. Push to release the door lock.
- iv) Slide the toilet door open manually.
- v) Check whether the vestibule door is free to move by hand.
If the vestibule door also cannot be moved freely by hand, the vent valve or its wiring is defective. Renew vent valve (item 'J' in Figure 2, Adtranz Part No. 400-0707-85).

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Disabled Persons Toilet Door –Test

OI 0105

PART 1 – Vehicles Fitted with BRB Toilets

- d) If the vestibule door moves freely by hand, the toilet door actuator is defective. Change the actuator (see Materials item 1).

4. External 'OPEN' pushbutton:

a) Pushbutton does not open door at all.

Does the internal 'OPEN' pushbutton open the door? (This may be determined by using the auxiliary switch to gain access to the toilet).

YES: External 'OPEN' pushbutton or its wiring is defective (see Table 1).

NO: The following checks must be done whilst the external 'OPEN' pushbutton is pressed.

Is 110V present on terminal 831 on HST, or terminal 201 on LHCS?

NO: External 'CLOSE' pushbutton or its wiring is defective (see Table 1).

YES: Is 110V present on terminal 832 on HST, or terminal 201A on LHCS?

NO: Lock Relay or its wiring is defective (see Table 2).

YES: Is 110V present on terminal 833 on HST, or terminal 206 on LHCS?

NO: Open Relay or its wiring is defective (see Table 2).

YES: Open Valve or its wiring is defective (see Table 3).

or

Door actuator is defective. Change actuator (see Materials item 1).

b) Door opens too fast or too slow.

Check that filter regulator 'G' is set to between 50 and 52 psi.

If regulator defective - change (see Materials item 2).

Adjust flow regulator 'A' until door opens in 4 to 5 seconds

5. External 'CLOSE' pushbutton.

a) Door does not close at all.

Does the internal 'CLOSE' pushbutton operate?

YES: External 'CLOSE' pushbutton or its wiring is defective (see Table 1).


NO: Is 110V present on terminal 837 on HST, or terminal 204 on LHCS?

YES: Open Relay or its wiring is defective (see Table 2 for HST or Table 4 for LHCS).

NO: Open Valve or its wiring is defective (see Table 3).

or

Door actuator is defective. Change actuator (see Materials item 1).

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Disabled Persons Toilet Door –Test

OI 0105

PART 1 – Vehicles Fitted with BRB Toilets

b) Door closes too fast or too slow.

Check that filter/regulator 'G' is set to between 50 and 52 psi.
If regulator defective - change (see Materials item 2).
Adjust flow regulator 'B' until door closes in 4 to 5 seconds.

6. Automatic door re-close.

i) Door does not automatically re-close after 60 seconds.

Check that Timer Relay TR (HST) or delay contacts of OR relay on LHCS is set to 60 seconds; adjust if required.

or

Timer Relay or its wiring is defective; see Table 2 HST, Timer element/relay on LHCS (see Table 4).

(ii) 'LOCK' pushbutton does not illuminate for 30 seconds after door closes (HST only).

Check that Timer Relay RT-TL1 is set to 60 seconds; adjust if required.

or

Timer Relay RT-TL1 or its wiring is defective (see Table 2).

7. Internal 'OPEN' pushbutton does not open the door.

Does the external 'OPEN' pushbutton open the door? (This may be determined by using the auxiliaries switch to gain access to the vestibule).

YES: Internal 'OPEN' pushbutton or its wiring is defective (see Table 1).

NO: The following checks must be done whilst the internal 'OPEN' pushbutton is pressed.


Is 110V present on terminal 831 on HST, or terminal 201 on LHCS?

NO: External 'CLOSE' pushbutton or its wiring is defective (see Table 1).

YES: Is 110V present on terminal 832 on HST, or terminal 201A on LHCS?

NO: Lock Relay or its wiring is defective (see Table 2 for HST or Table 4 for LHCS).

YES: Is 110V present on terminal 833 on HST, or terminal 202 on LHCS?

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Disabled Persons Toilet Door –Test

OI 0105

PART 1 – Vehicles Fitted with BRB Toilets

NO: Internal 'CLOSE' pushbutton or its wiring is defective (see Table 1).

YES: Is 110V present on terminal 837 on HST, or terminal on LHCS?

NO: Open Relay or its wiring is defective (see Table 2 HST or Table 4 LHCS).

YES: Open Valve or its wiring is defective (see Table 3).

or

Door actuator is defective. Change actuator (see Materials item 1).

8. Internal 'CLOSE' pushbutton.

i) Door does not close at all.

Does the external 'CLOSE' pushbutton operate?

YES: Internal 'CLOSE' pushbutton or its wiring is defective (see Table 1).

NO: Is 110V present on terminal 837 on HST, or terminal on LHCS?

YES: Open Relay or its wiring is defective (see Table 2 for HST or Table 4 for LHCS).

NO: Open Valve or its wiring is defective (see Table 3).

ii) 'LOCK' pushbutton does not illuminate when door has been closed by internal 'CLOSE' pushbutton.

Is 110V present on terminal 835 on HST, or terminal 204 on LHCS?

NO: Internal 'OPEN' pushbutton or its wiring is defective (see Table 1).

YES: Is 110V present on terminal 836 for HST, or 204 on LHCS when internal 'CLOSE' pushbutton is pressed?

NO: Internal 'CLOSE' pushbutton or its wiring is defective (see Table 1).


YES: Is 110V still present on terminal 836 when internal 'CLOSE' pushbutton is released on HST or 205 on LHCS?

NO: Close Relay or its wiring is defective (see Table 2 HST or Table 4 LHCS).

YES: Is 110V present on terminal 838 (HST) or terminal 207 (LHCS)?

NO: Door limit switch DLS1 or its wiring is defective (see Reference Drawings item 4).

YES: Is 110V still present on terminal 838A, (HST) after 30 seconds has elapsed from pressing internal 'CLOSE' pushbutton?

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Disabled Persons Toilet Door –Test

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PART 1 – Vehicles Fitted with BRB Toilets

NO: Close Relay or its wiring is defective (see Table 2 for HST).
YES: Is 110V present on terminal 840A (HST)?

NO: Open Relay or its wiring is defective (see Table 2).
YES: Is 110V present on terminal 840?

NO: Lock Relay or its wiring is defective (see Table 2).
YES: Indicator bulb is defective.

9. Lock pushbutton.

i) Door does not lock.

Is 110V present on terminal 838 (HST) or terminal 207 (LHCS)?

NO: Door Limit Switch DLS1 or its wiring is defective. Renew microswitch (see Reference Drawings item 4).

YES: Is 110V present on terminal 839 HST or 210 LHCS?

NO: Close Relay or its wiring is defective (see Table 2 for HST or Table 4 for LHCS).
YES: Is 110V present on terminal 842 HST or 211 LHCS when 'LOCK' pushbutton is pressed?

NO: Lock pushbutton or its wiring is defective (see Table 1).
YES: Lock Valve or its wiring is defective (see Table 3).
or
Lock cylinder is defective. Change (see Materials item 2).

ii) 'LOCK' pushbutton illumination does not extinguish after button is pressed.

Is 110V present on terminal 842 (HST) or 209 (LHCS) of Lock Relay when 'LOCK' pushbutton is pressed?

YES: Lock Relay or its wiring is defective (see Table 2 for HST or Table 4 for LHCS).
NO: Lock pushbutton or its wiring is defective (see Table 1).

iii) Vestibule or saloon 'TOILET ENGAGED' indicator does not and iv) illuminate.


Does the other 'TOILET ENGAGED' indicator illuminate?

YES: Indicator bulb or its wiring is defective.

NO: Is 110V present on terminal 842 of Lock Relay (HST) or terminal 205 of close relay (LHCS)?

YES: Lock Relay or its wiring is defective (see Table 2 HST or close relay LHCS, see Table 4).

NO: 'LOCK' pushbutton or its wiring is defective (see Table 1 HST).

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Disabled Persons Toilet Door –Test

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PART 1 – Vehicles Fitted with BRB Toilets

10. Door does not unlock when internal ‘OPEN’ pushbutton is pressed.

Is 110V present on terminal 839 (HST) or terminal 211 (LHCS)?

NO: Lock Valve is defective (see Table 3).

or

Lock Cylinder is defective. Renew (see Materials item 3).

YES: Is 110V present on terminal 835 (HST) or terminal 204 (LHCS)?

YES: Internal ‘OPEN’ pushbutton or its wiring is defective (see Table 1).

NO: Close Relay or its wiring is defective (see Table 2 for HST or Table 4 for LHCS).

Location	Function	Part No.	Cat. No.
Inside Toilet	Unlock/Open	BMAC 2434	064/004425
	Lock	BMAC 24406	064/004423
	Call for Aid	BMAC 2431R	064/004422
Outside	Open	BMAC 2433	064/004424
	Close	BMAC 2433	064/004424

Table 1: Details of Push Buttons

Symbol	Function	Adtranz Part No. (BR)	Cat. No.
OR	Open Relay	400-0549-91	-
CR	Close Relay	400-0549-90	-
LR	Lock Relay	400-0549-91	-
TR	Timer Relay (Door re-close)	400-0706-26	-
RT-TL1	Timer Relay (Lock indicator)	400-0833-42	-

Table 2: Details of Relays (HST)

NOTE 4: Adtranz part nos. 400-0549-90 and 400-0549-91 are now obsolete and have been superseded by Bombardier Part no. 400-549-92.

Symbol	Function	Adtranz Part No. (BR)	Cat. No.
VV	Vent Valve	400-0707-85	-
OV	Open Valve	Schrader Bellows 19114 and 19701	054/080161
LV	Lock Valve		
EP	EP Valve (vestibule doors)		

Table 3: Details of Solenoid Valves

Disabled Persons Toilet Door –Test

OI 0105

PART 1 – Vehicles Fitted with BRB Toilets

See WOSS 643/2 for overhaul of filter regulator, flow regulator, solenoid valve.

Symbol	Function	Adtranz Part No.	Cat. No.
OR	Open Relay	DEO 42	064/000078
CR	Close Relay	DO 42	090/007274
LR	Lock Relay	DO 22	072/000761

Table 4: Details of Relays (LHCS)

Part 2 –Vehicles fitted with Temoinsa Toilets

Scheduled Work

- Using a square key open the exterior panel to access the pneumatic control panel.

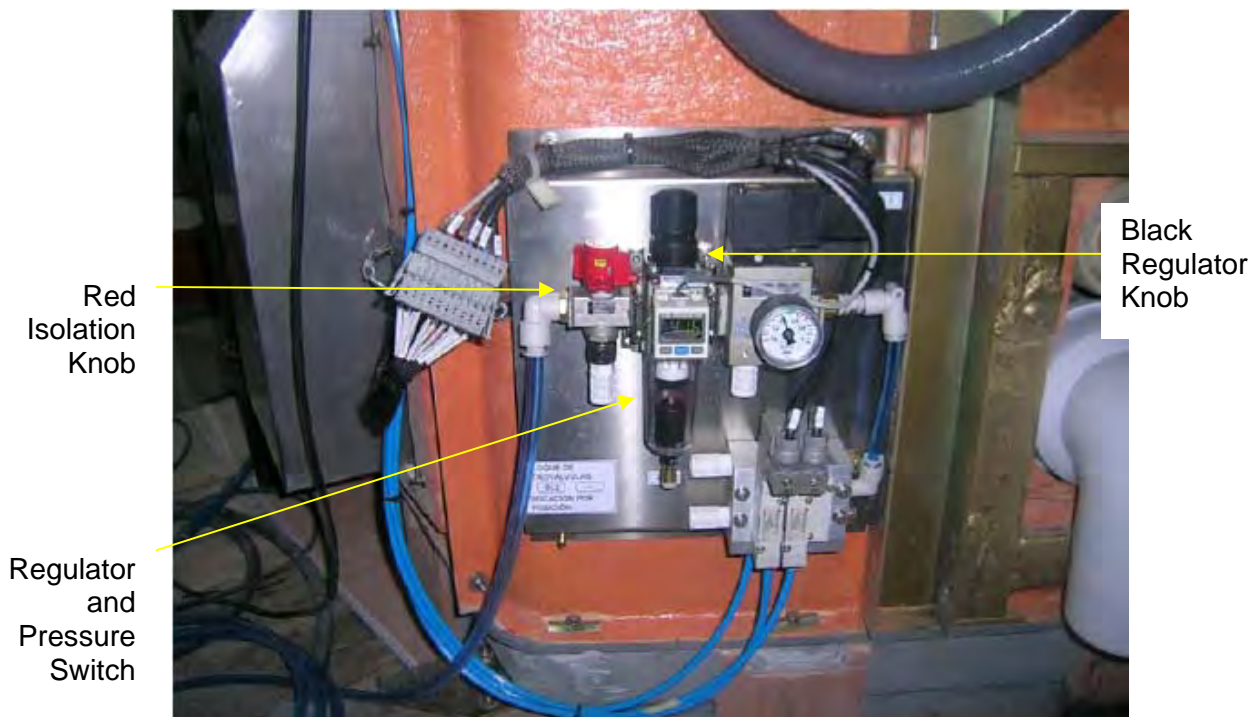



Figure 1: Pneumatic Control Panel

- Isolate the door by turning the red isolation knob through 90° (see Figure 1).
- Manually lock the door by using the manual locking bolt (see Figure 2) and check the following:

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Disabled Persons Toilet Door –Test

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Part 2 –Vehicles fitted with Temoinsa Toilets

- 3.1 Check the door is locked and cannot be opened manually. Check that the exterior out of service light is illuminated (see Figure 3).
- 3.2 Unlock the door by releasing the bolt.

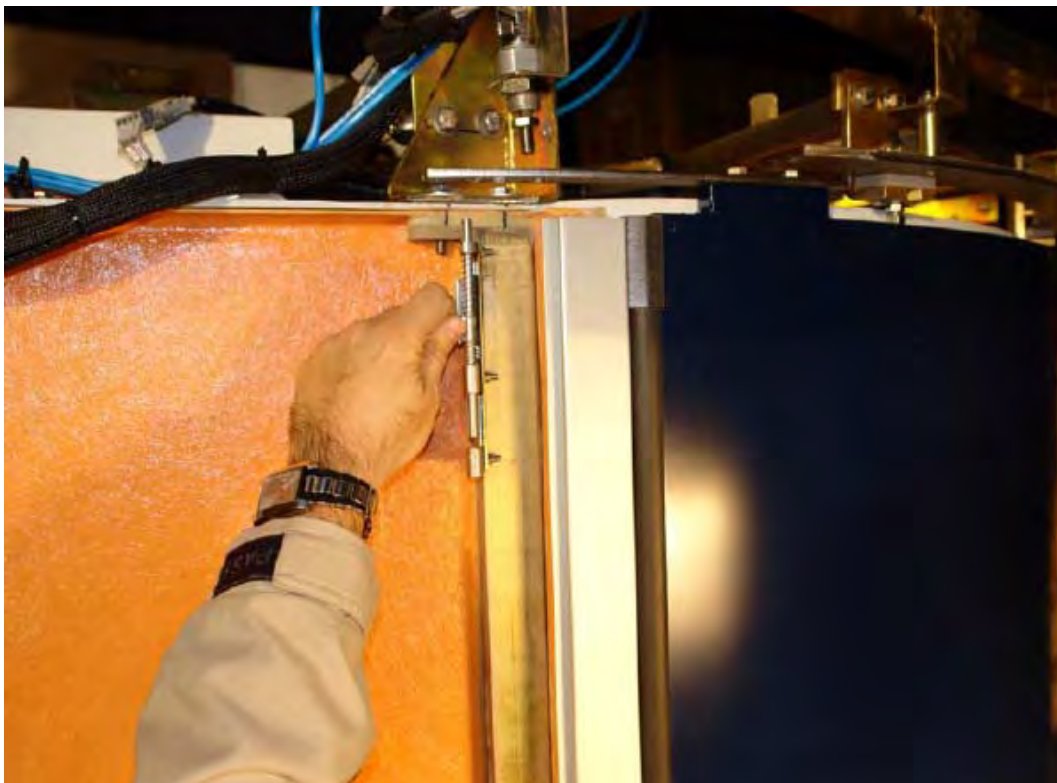



Figure 2: Manual Locking Bolt

4. Examine the door leaf as follows:
 - 4.1 When in the closed position check that the door leaf seal is against the frame and it is not possible to see into the toilet compartment.
 - 4.2 Check the door leaf for security on its mountings.
 - 4.3 Check for defects including scratches that indicate it has been fouling during travel within the door portal.
 - 4.4 Manually push the door open, check it travels smoothly without binding.
 - 4.5 Check the condition and security of the seal.

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Part 2 –Vehicles fitted with Temoinsa Toilets

- 4.6 Manually close the door leaf.
5. Enable the door by turning the red isolation knob (see Figure 1) back to the “In-Line” position.
 - 5.1 Check that the pressure gauge is reading 4 to 4.2 bar.
 - 5.2 Adjust the pressure if required, by lifting and turning the black knob on top of the regulator. Press knob back into position once pressure is set.

NOTE 5: If the pressure is incorrect the pressure switch (see Figure 1) will automatically isolate the door system.
 - 5.3 Check the control panel for air leaks.
 - 5.4 Close and lock exterior access panel.
6. Test the power operation of the door as follows:
 - 6.1 Press the external “open” pushbutton (see Figure 3).

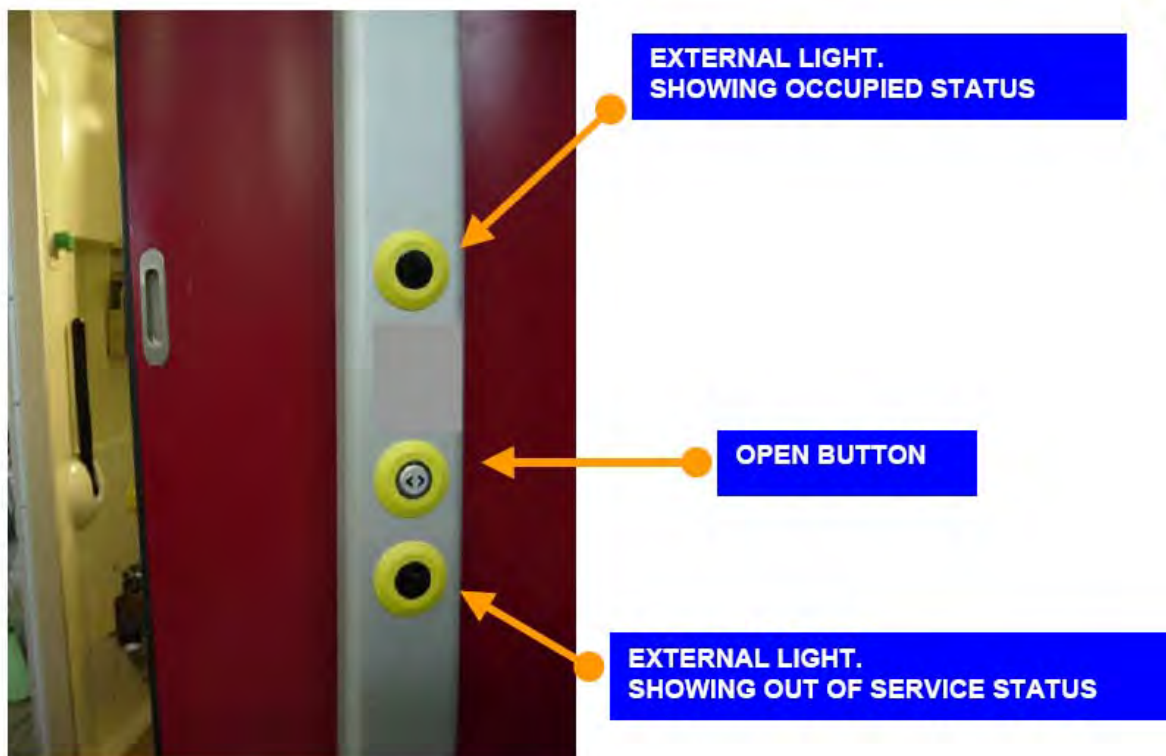



Figure 3: External Pushbutton and Indicators

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Part 2 –Vehicles fitted with Temoinsa Toilets

- 6.2 Check that the door opens smoothly without binding, in a time of 2 to 3 seconds.
- 6.3 Check that after 30 to 35 seconds the door closes automatically.
- 6.4 Press the door “open” button again. Step inside the toilet compartment and press the door “close” pushbutton (see Figure 4) and allow the door to close.

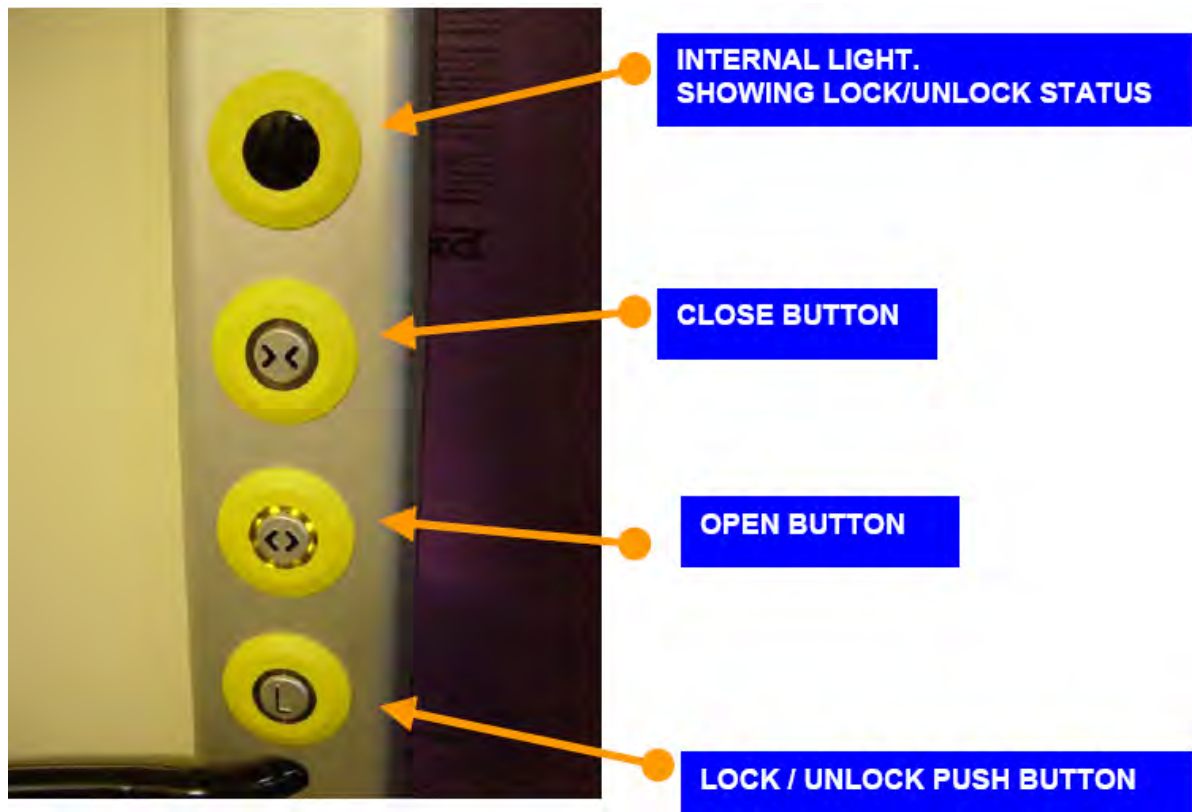



Figure 4: Internal Pushbuttons and Indicators

- 6.5 Press the “lock” pushbutton and check that:
 - 6.5.1 The internal “locked” light illuminates.
 - 6.5.2 The external “engaged” light illuminates.

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Part 2 –Vehicles fitted with Temoinsa Toilets

6.5.3 The saloon “engaged” light illuminates.

6.5.4 The external “open” pushbutton is disabled.

6.5.5 Manually attempt to push the door leaf open to check the automatic lock bolt is engaged.

NOTE 6: To perform step 6.5 will require the aid of an assistant.

6.6 Press the internal “open” pushbutton and check that the door unlocks and opens.

6.7 Check the obstacle detection mechanism as follows:

6.7.1 Allow the door to start to close and at approx. mid travel, obstruct the door closing.

6.7.2 Check that the door stops and re-opens.

NOTE 7: If the obstruction is not removed the door will attempt to close three times after which the door system will automatically shut down and the out of service light will illuminate.

If the door is obstructed during the open cycle the door system will also automatically shut down.

Arising Work

3.1 Adjust the door leaf or manual locking bolt.

4.1 Adjust the door leaf. (Refer to Job No. OIA6049).

4.2 Resecure the door mounting fasteners.

4.3 Repair minor damage in situ. Renew defective seal.


4.4 Investigate and rectify the cause of door leaf binding.

4.5 Resecure loose seal. Renew defective seal.

5.3 Rectify air leaks.

6. Renew defective lock.

6. Adjust the door control with laptop PC or hand held programmer.

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Disabled Persons Toilet Door –Test

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Part 3 –Vehicles fitted with Driessen Toilets

Scheduled Work

1. Examine the door leaf for any defects and damage, checking seals and condition of the door frame.
2. Test power-operated door for correct operation, freedom of movement, security and correct operation as follows:
 - 2.1 Press the door OPEN push button and allow the door to open.
 - 2.2 Check that the door open time is 2 to 3 seconds.
 - 2.3 Check that after 45 to 48 seconds the door closes automatically.
 - 2.4 Press the door OPEN pushbutton again and allow the door to open.
 - 2.5 Press the door CLOSE pushbutton before the door closes automatically, check that the pushbutton operates correctly.
 - 2.6 Press the door OPEN pushbutton again, step inside the toilet compartment and press the door CLOSE pushbutton.
 - 2.7 Allow the door to close and check that the “halo” around the LOCK pushbutton illuminates.
 - 2.8 Press the LOCK pushbutton, check that the lock operates and that the door is secure.
 - 2.9 Check that the “Toilet Engaged” saloon indicator (red light) has illuminated and that the “Toilet Engaged” pictogram on the toilet module wall has also illuminated.
 - 2.10 Press the door OPEN pushbutton and check that the door unlocks and opens.
 - 2.11 Check that the “Toilet Vacant” saloon indicator (green light) has illuminated and that the “Toilet Engaged” pictogram on the toilet module wall has extinguished.
 - 2.12 Check that the door retracts when obstructed.
 - 2.13 Check that the door header assembly is secure on the partition and to the door leaf.

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Disabled Persons Toilet Door –Test

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Part 3 –Vehicles fitted with Driessen Toilets


Arising Work (Part 3)

1. Repair localised damage in-situ. If removal is necessary see Job OIA6049 Part A for adjustment after fitting.
2. Renew defective pushbuttons and lamps.
Adjust the door control unit with laptop PC or hand-held programmer.
1. If it is necessary to remove the door or to rectify defects on the header assembly, see Job OIA6232.

PART 4 – Vehicles Fitted with BFG Disabled Toilets

Materials			
Item	Description	Qty/Veh	BFG Part No.
1	Nylon Wheel, Complete	As Req'd	50104753
2	Belt Wheel	As Req'd	50104150
3	Door Seal	As Req'd	-
4	Door Rail, Floor	As Req'd	W 136 C001
5	Adhesive Plexus MA420	As Req'd	-
6	Teflon Guide	As Req'd	-
7	24V dc Supply Unit	As Req'd	-
8	Door Open Push Button	As Req'd	-
9	Door Close Push Button	As Req'd	-
10	Door Lock Switch	As Req'd	-
11	Door Lock Unit	As Req'd	-
12	Door Control Unit	As Req'd	85103025
13	Relay	As Req'd	850227
14	Micro Switch	As Req'd	850079

Reference Documents		
Item	Document No.	Title
1	237302	Ferro International – Maintenance Manual for BFG International Ltd of Bombardier Transportation Mark 3 HST (Disabled Persons Toilet)
2	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of New Cables

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Disabled Persons Toilet Door –Test


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PART 4 – Vehicles Fitted with BFG Disabled Toilets

Scheduled Work

1. Turn the auxiliary switch to 'OFF'.
2. Remove access panels covering the door mechanism.
3. Examine the following:
 - 3.1 Check that the gear motor is secure and movement on its rubber mounting is not excessive.
 - 3.2 Examine the belt for cracks, chafing and signs of distress.
 - 3.3 Examine visible areas of the wheels, checking for wear and excessive movement on the bearings.
 - 3.4 Examine the door seal and check that it is secure.
 - 3.5 Check that the door is secure on its mountings.
 - 3.6 Examine the door leaf and curved track, check for scratches and bright spots which indicate binding.
 - 3.7 Check that at the bottom of the door lateral movement is not excessive.
4. Move the door by hand, and check the following:
 - 4.1 Check that the door moves freely, taking into account the resistance of the motor being driven through the reduction gearbox.
 - 4.2 Check that there is no lost movement in the gearbox/motor unit when the door is moved to and fro.
 - 4.3 When in the closed position, check that the door leaf seal is firmly against the frame and it is not possible to see into the toilet compartment.
5. Turn the auxiliary switch to 'ON' and test the door as follows, checking that the door slows down for the last 10% of its travel in each movement.

NOTE 8: When powered up the door will start in an automatic sequence. If open, it will close. If closed it will remain closed, but during the first sequence obstruction detection is not active.


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Disabled Persons Toilet Door –Test

OI 0105

PART 4 – Vehicles Fitted with BFG Disabled Toilets

- 5.1 Press the external "door open" button, check the door fully opens and the internal and external 'door close' button lights illuminate. The door must open smoothly and quietly without jarring and within 2 to 3 seconds.
- 5.2 Enter toilet and press the internal 'door close' button. Check the door fully closes and the 'door lock' button light illuminates. The door must close smoothly and quietly without jarring and within 2 to 3 seconds.
- 5.3 Press the 'door lock' button and check that the door locks, the internal 'door open' indicator light illuminates, attempt to open the door manually and check that the door cannot be opened against the lock.
- 5.4 Press the internal 'door open' button, check that all indicator lights extinguish, the door fully opens and the internal and external 'door close' button lights illuminate.
- 5.5 Press the external 'door close' button, check that all indicator lights extinguish, the door closes fully and the external 'door open' button illuminates.
- 5.6 Press the external open button and check that the door closes automatically after 40-50 seconds.

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Disabled Persons Toilet Door –Test

OI 0105

PART 4 – Vehicles Fitted with BFG Disabled Toilets

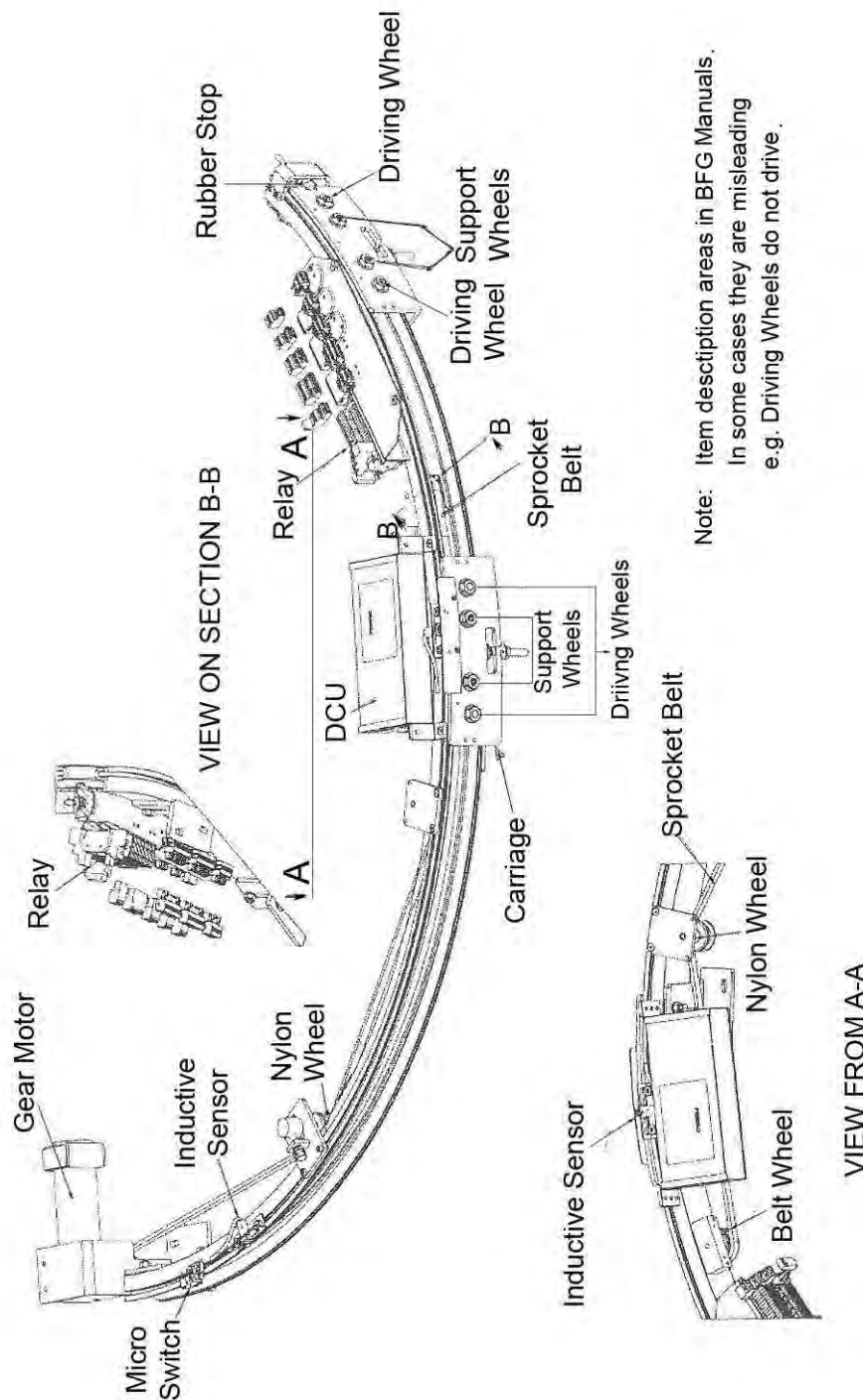



Figure 1: BFG Door Mechanism

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Disabled Persons Toilet Door –Test

OI 0105

PART 4 – Vehicles Fitted with BFG Disabled Toilets

6. Test the obstruction detection features as follows:

- 6.1 During an opening movement, obstruct the door before it is 90% open and check that the door opening force is reduced.
- 6.2 Remove the obstruction and check that the door continues to open.
- 6.3 During an opening movement, obstruct the door after it is 90% open, check that the door stops and then closes after a short time delay.
- 6.4 During a closing movement, obstruct the door before it is 90% closed, check that the door switches to open. Check that door attempts to re-close after a time delay.

NOTE 9: If 5 failed attempts to open or close are registered, an LED on the DCU flashes.


7. Turn the auxiliary switch to OFF, unless requires for other work.

8. Refit any access panels which have been removed.

Arising Work

NOTE 10: Further details e.g. electrical schematic can be found in BFG publication No. 237302 (see Reference Documents item 1).

- 3.1 Tighten the fixings, and/or renew rubber mountings. If necessary change the gear motor in accordance with Procedure E.
- 3.2 Renew the belt in accordance with Procedure A.
- 3.3 Renew defective parts. See Procedure D for renewal of driving and support wheels (see Materials items 1 to 2 for other wheels).
- 3.4 Renew the seal (see Materials item 3).
- 3.5 Tighten the fixings using a 17mm spanner. Apply a thread locking product to the nuts.
- 3.6 Repair door leaf in accordance with procedure agreed with the Engineer.
- 3.6 Resecure or renew curved track which is glued to the GRP floor (see Materials items 4 and 5).
- 3.7 Remove door leaf and renew Teflon guides (see Materials item 6).
- 4.1 Check for points of contact. If required raise door on suspension bolts.


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Disabled Persons Toilet Door –Test

OI 0105

PART 4 – Vehicles Fitted with BFG Disabled Toilets

- 4.2 Adjust tension in accordance with Procedure B.
- 4.3 Adjust suspension bolts to align door to frame or adjust position of stops in accordance with Procedure F.
5. (General) If no response, check that 24V dc is available at DCU. If not check incoming supplies to 24V dc supply. If necessary, change 24V dc supply unit (see Materials item 7).
- 5.1- Check for defective wiring. Remove or repair damaged wires (see Reference Documents item 2). Retest.
- 5.5
- 5.1- Renew defective push buttons and lights and retest (see Materials items 8-10).
- 5.5
- 5.1 & Adjust opening and closing times on DCU and retest.
- 5.2
- 5.1- If door does not slow down for the last 10% of its travel, check inductive sensors for visible damage and integrity of wiring. Check gap at tip is 2 to 4mm. Renew in accordance with Procedure C and retest.
- 5.5
- 5.3 If door lock does not operate, check wiring. If lock operates but does not hold door, or is defective renew lock unit (see Materials item 11). Repeat steps 5.1 to 5.6.
- 5.6 Adjust time delay on DCU (see Materials item 12) and re-test.
6. Change the DCU after checking all other components and wiring are functional and re-test.
- 6.3 & Adjust time delay feature on the DCU and re-test.
- 6.4

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Disabled Persons Toilet Door –Test

OI 0105

Procedure A – Sprocket Belt-Renew

Materials			
Item	Description	Qty/Veh	BFG Part No.
15	Sprocket Belt	As Req'd	830013

1. Loosen the locknut and M8 screw with an 13mm spanner.
2. Release the clamps securing the belt to the carriages.
3. Remove the belt from all the guide wheels.
4. Thread the new belt (see Materials item 15) onto the guide wheels.
5. Secure the belt to the carriages with the clamps.
6. Locate the belt on the tension wheel.
7. Adjust the tension in accordance with Procedure B.

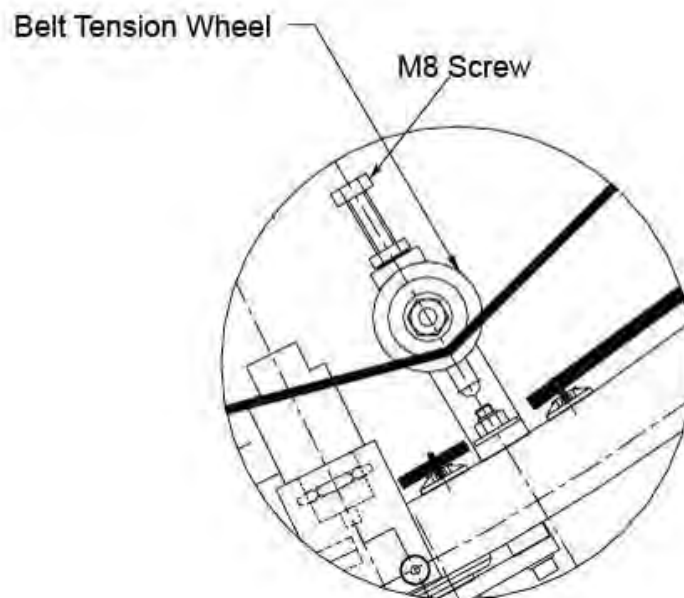



Figure 2: Sprocket Belt Tensioner

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Disabled Persons Toilet Door –Test

OI 0105

Procedure B – Belt Tension - Adjust

Special Tools		
Item	Description	Part No.
1	Measuring Tool	BFG 51104107
2	Gates Tension Tester	Gates 7401-0076

1. Place the door in the open position. This is because tension varies according to door position.
2. Locate the measuring tool (see Special Tools item 1) in the area of section AA of Figure 1, and in accordance with Figure 3, as close to the brush as possible.
3. Place the Gates tension tester (see Special Tools item 2) on the centre line of the measuring tool, and push until the belt touches the measuring tool.
4. The position of the rubber ring on the tension tester shows the tension, which must be between 1 and 3kg.
5. If outside limits, adjust the tension using the M8 screw (see Figure 2, Procedure A) and lock with the nut.

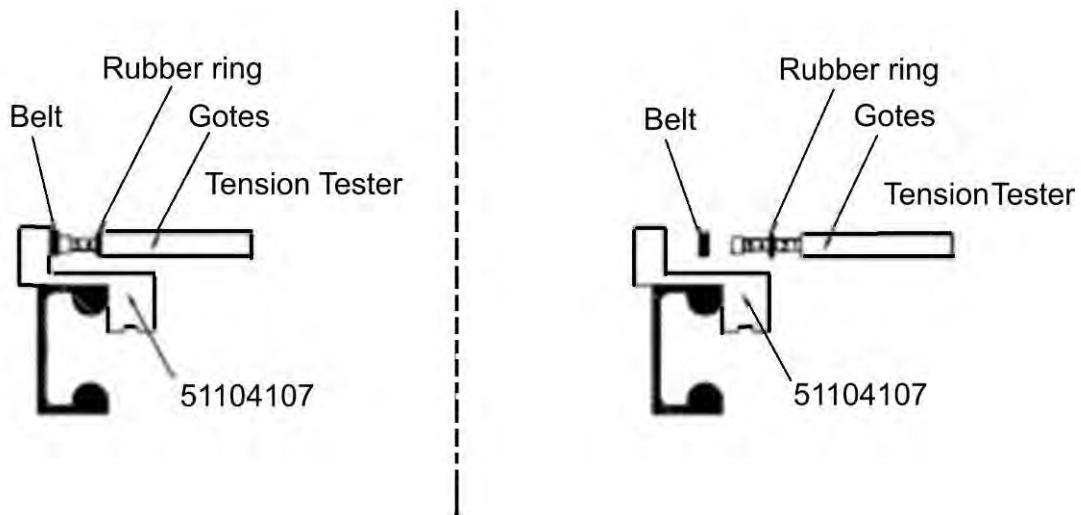



Figure 3: Use of Gates Tension Tester

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Disabled Persons Toilet Door –Test

OI 0105

Procedure C – Inductive Sensor Renew

Materials			
Item	Description	Qty/Veh	BFG Part No.
16	Inductive Sensor	As Req'd	85104033

1. Move the carriages away from the sensor position.
2. Note the route of the wires and positions of the wire straps.
3. Disconnect the plug at the sensor, cutting off any wire straps as required.
4. Remove one of the screws, and loosen the other, until it is possible to remove the sensor.
5. Refit the sensor (see Materials item 16) setting the gap between the tip and the steel detection plate to be within limits of 2 to 4mm.
6. Connect the sensor at the plug.
7. Locate the wiring as noted at step 2, and renew any wire straps removed.

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Disabled Persons Toilet Door –Test

OI 0105

Procedure D – Driving or Support Wheel Renew

Materials			
Item	Description	Qty/Veh	BFG Part No.
17	Driving Wheel	As Req'd	50104751
18	Support Wheel	As Req'd	50104750

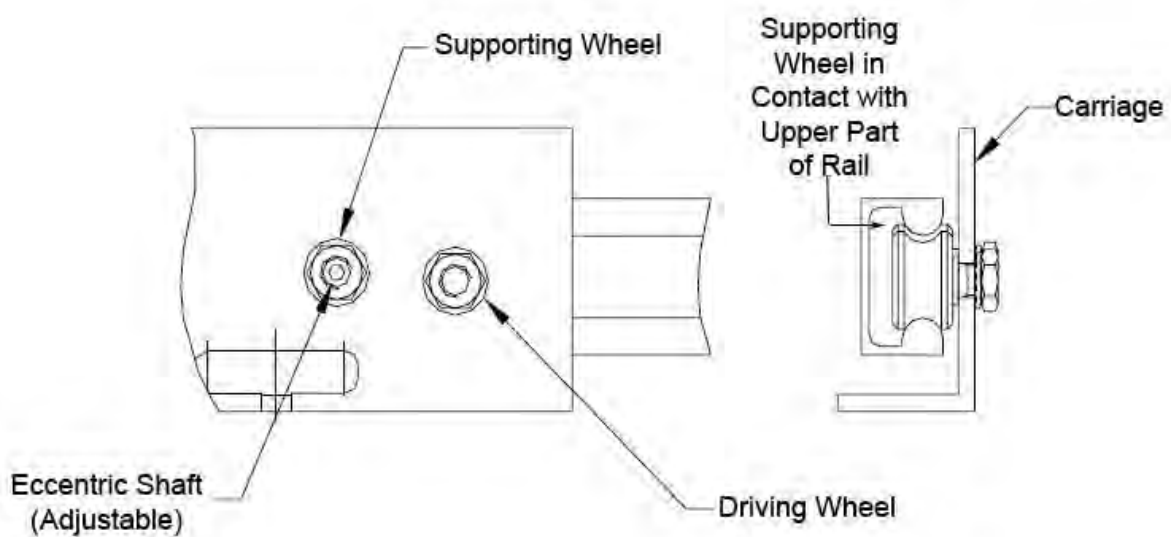



Figure 4: Driving and Support Wheels


1. Remove the door leaf with an open ended 17mm spanner.
2. Remove the complete mechanism as follows:
 - 2.1 Disconnect all plugs from the mechanism.
 - 2.2 Remove six bolts from the five suspension points.
 - 2.3 Lift the mechanism clear and carefully lower to convenient height and move to suitable bench.
3. Remove the sprocket belt in accordance with Procedure A.
4. Remove the bracket for the rubber stop with a 6mm Allen key.
5. Pull the carriages out of the curved rail at the end where the rubber stop was removed.
6. Remove the nuts from the wheels to be renewed and remove the wheels.

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Disabled Persons Toilet Door –Test

OI 0105

7. Fit the new wheels (see Materials items 17 and 18) and secure with nuts, to which a thread locking product has been applied.
8. Reassemble the carriage to the curved rail.
9. Adjust the position of the supporting wheel so that it contacts the upper part of the rail.
 - 9.1 Adjust the eccentric shaft a 5mm Allen key and lock in position with a 19mm open ended spanner.
10. Move the carriages along the rail, checking that:
 - 10.1 The supporting wheels are in contact with the upper part of the rail and rotate when the carriage is moved.
 - 10.2 The driving wheel are in contact with the lower part of the rail and rotate when the carriage is moved.
 - 10.3 The carriages move easily, without noise or binding along the entire length of the rail.
11. Refit the bracket for the rubber stop, using a 6mm Allen key.
12. Refit the sprocket belt and check the tensions in accordance with Procedures A and B.
13. Refit the complete mechanism to the toilet module (six bolts in five suspension points).
14. Refit the door leaves and secure with nuts to which thread locking product has been applied. Tighten with a 17mm spanner.
15. Repeat steps 4.1, 4.3, 5.1 to 5.6 and 6.1 to 6.4.

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Disabled Persons Toilet Door –Test

OI 0105

Procedure E – Gear Motor Renew

Materials			
Item	Description	Qty/Veh	BFG Part No.
19	Gear Motor	As Req'd	50104989

1. Disconnect the wires at the multi-way plug.
2. Twist the sprocket belt off at the tension wheel.
3. Remove the motor using a 4mm Allen key to remove the screw.
4. Position a new or overhauled motor (see Materials item 19) and locate with screws to which a thread locking product has been applied.
5. Tighten the screws with an Allen key.
6. Fit the sprocket belt over the motor drive wheel.
7. Fit the sprocket belt onto the tension wheel by twisting.
8. Reconnect the wires with the multi-way plug.
9. Repeat steps 4.1, 4.3, 5.1 to 5.6 and 6.1 to 6.4.

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Disabled Persons Toilet Door –Test

OI 0105

Procedure F – Rubber Stop Renew

Materials			
Item	Description	Qty/Veh	BFG Part No.
20	Rubber Stop	As Req'd	50104839

1. Move the carriage away from the rubber stop.
2. Release the stop by removing the nut on the threaded stud.
3. Assemble the new rubber stop (see Materials item 20) to the bracket but do not fully tighten.
4. Move the door to its fully open or closed position and adjust the position of the rubber stop so that the door lightly impacts the door frame.
5. Fully tighten the nut and repeat step 4.

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	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	

Gangway End Door – Examine

OI 0625

Reference Drawings		
Item	Drawing No.	Title
1	B1-A0-9014585	Details for Lobby Doors Mk3 Vehicles
2	B1-S-9015700	Arrangement of Lobby Doors Mk3 Stock

APPLIES TO: All Vehicles EXCEPT Vehicles which have had these doors removed.


QUANTITY PER VEHICLE: 4

Scheduled Work

1. Examine doors. The following are unacceptable:
 - * Surface damage (including visible strands of fibre).
 - * Structural damage (i.e. cracked or holed).
2. Check the security of pivots and locks.
3. Check the operation of locking devices.
4. Examine glass.
5. Check that doors open and close fully.
6. Check that the metallic vertical sealing strip that covers the gap between the two doors is present, secure and not damaged.
7. Check that when the doors are in the closed position, they cover the gap between the two doors.
8. Check that the brush strips mounted to the bottom of the doors are present, secure and not damaged.
9. Check that budget locks engage freely and fully.
10. Check that the mortice lock engages freely and fully.
11. Check that french pins are present and fully engage.
12. Lubricate hinges.

Arising Work

NOTE 1: Refer to Reference Drawings items 1 and 2 for replacement Material items.


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Gangway End Door – Examine

OI 0625

| NOTE 2: In the event that it is necessary to repair or renew a gangway end door, then the repaired or renewed door must be painted to match the current vehicle décor. |

1. to Rectify defects or renew any defective fittings.
11. If the door is damaged structurally or if fittings cannot be secured report to the Engineer.

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Disabled Persons Toilet Door Header Assembly – Overhaul **OI 6232**

Materials			
Item	Description	Qty/Veh	Cat No.
1	Door Arm Bearings Temoinsa Part Number 900015978	2	-
2	Door Cylinder Front Lozenge Temoinsa Part Number CS 95-50	1	-
3	Door Cylinder Back Hinge Temoinsa Part Number 900027484	1	-

APPLIES TO: Part A Applies to Temoinsa Toilet (see Section 5.9 for vehicle numbers)
Part B Applies to Driessen Toilet (see Section 5.9 for vehicle numbers)

Scheduled Work

Part A - Applies to Temoinsa Toilet

1. Open the external wall panel to allow access to the pneumatic control panel.
2. Isolate the air supply by turning the red isolation knob (see Figure 1).

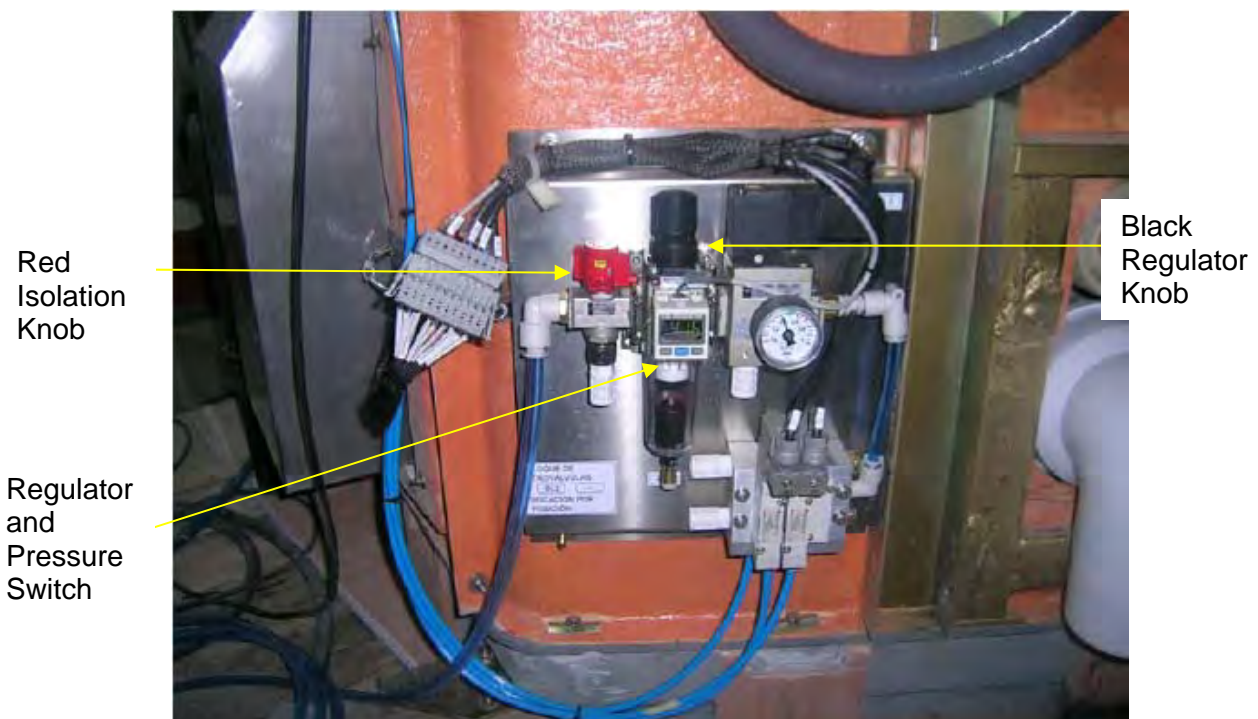



Figure 1: Pneumatic Control Panel

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Disabled Persons Toilet Door Header Assembly – Overhaul **OI 6232**

3. Renew the door arm bearings as follows:
 - 3.1 Open the ceiling panels to gain access to the door header and operating cylinder.
 - 3.2 Remove the door leaf by removing the fasteners A and B (see Figure 2).

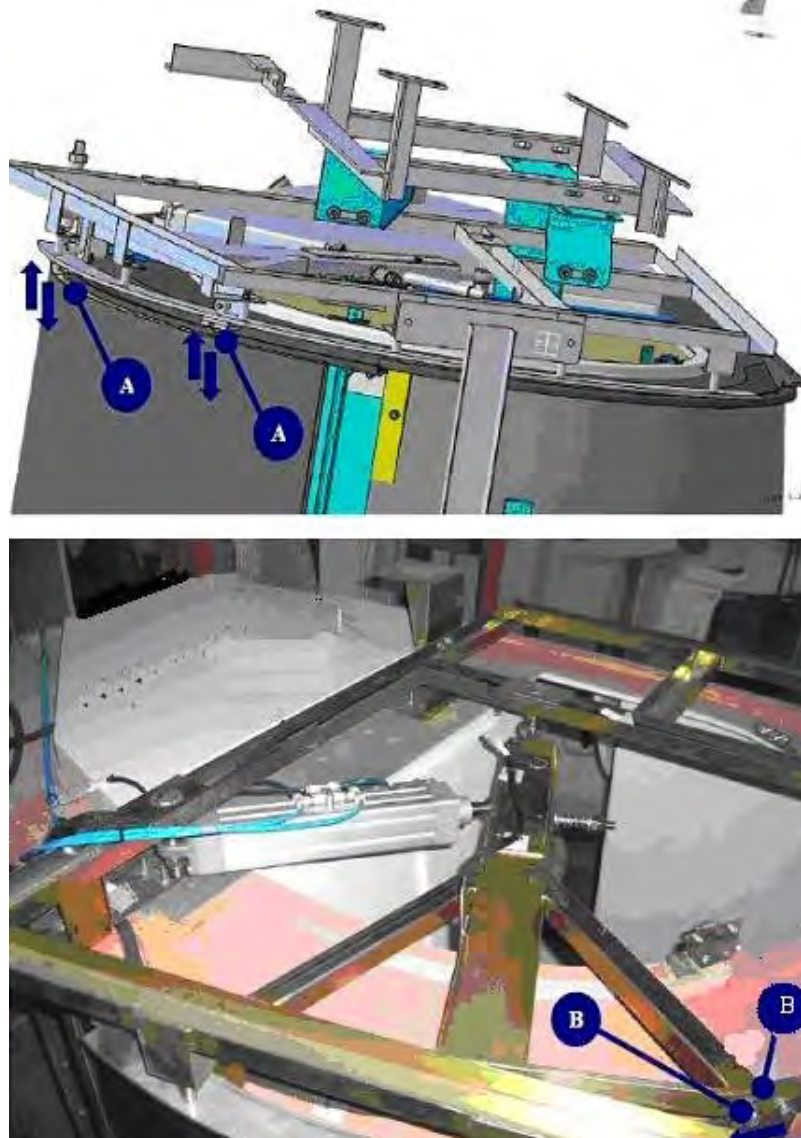



Figure 2: Door Leaf Mounting Fasteners

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Disabled Persons Toilet Door Header Assembly – Overhaul **OI 6232**

- 3.3 Remove the door arm bearing retaining fasteners and remove and discard the door arm bearings (see Figure 3).

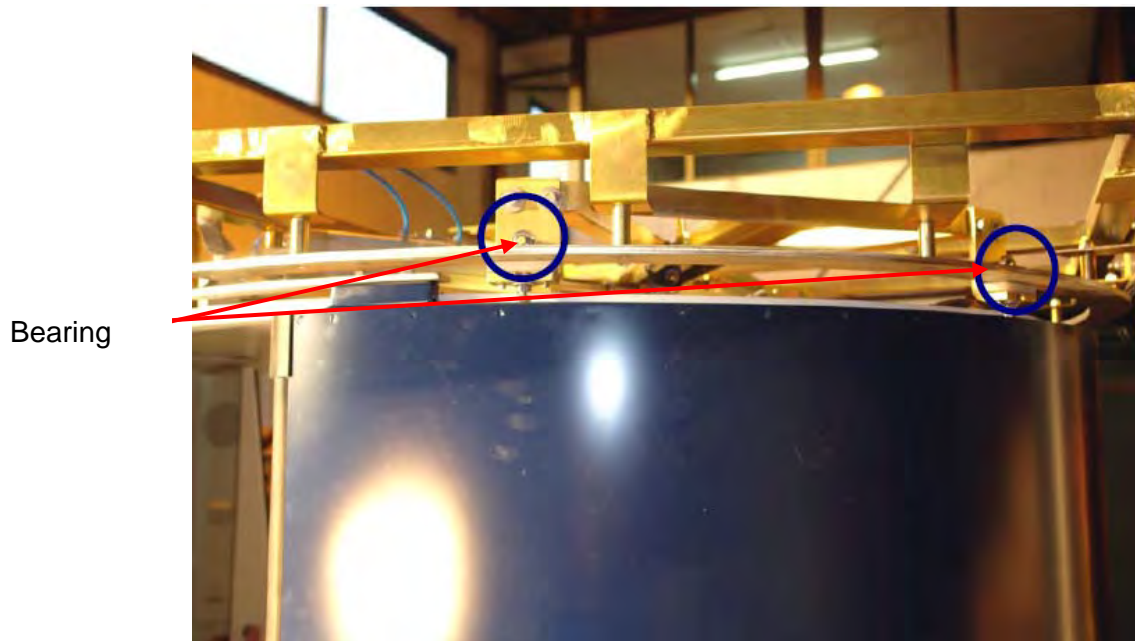



Figure 3: Door Arm Bearings

- 3.4 Fit new door arm bearings (see Materials item 1) and fit the bearing retaining fastener.
- 3.5 Refit the door leaf and check the following:
- 3.5.1 The door moves along the door track smoothly without binding on the track or floor.
 - 3.5.2 The door fully open width is a minimum of 850mm. Adjust the door as required.
 - 3.5.3. When closed the seal is tight against the frame. Adjust the door closed position as required.
4. Renew the door cylinder mountings as follows:
- 4.1 Make a note of the pneumatic connections to the door cylinder. Disconnect the connections (see Figure 4).

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Disabled Persons Toilet Door Header Assembly – Overhaul **OI 6232**

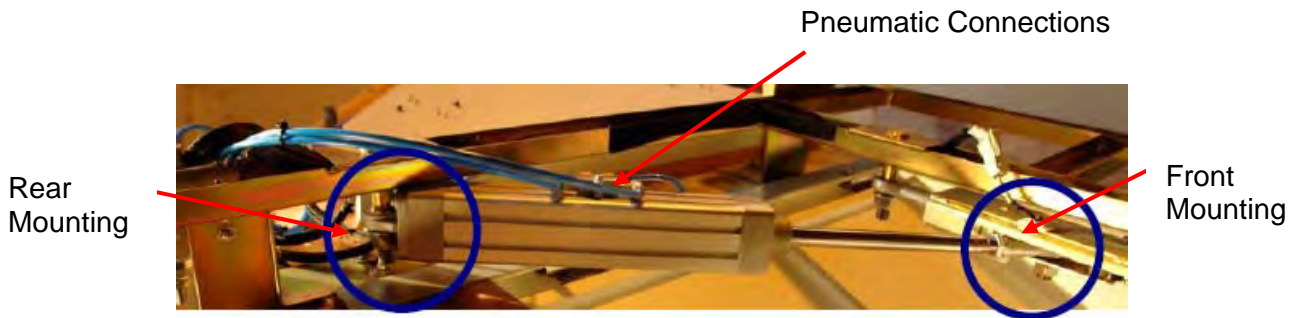



Figure 4: Door Cylinder Mountings

- 4.2 Support the door cylinder and remove the front and rear mounting fasteners.
- 4.3 Remove the cylinder and examine for defects as follows:
 - 4.3.1 Check that the piston is free to move in and out of the cylinder bore along the full length of its stroke.
 - 4.3.2 Check the piston rod for scratches and wear that could lead to a deterioration of the cylinder seals.
 - 4.3.3 Check for evidence that the cylinder seals are leaking.
- 4.4 Remove and discard the front and rear mounting joints.
- 4.5 Fit new front and rear mounting joints (see Materials items 2 and 3) to the door cylinder.
- 4.6 Refit the door cylinder to the ceiling support and reconnect the front and rear mounting joints. Fully tighten fasteners.
- 4.7 Using the notes taken in step 4.1 reconnect the pneumatic connections.
5. Open the air supply and check that pressure is set at 4 to 4.2 bar.
6. Close and lock the external access and ceiling panels.
7. Test the door system in accordance with Job No. OI 0105.

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Disabled Persons Toilet Door Header Assembly – Overhaul **OI 6232**

Arising Work

- 4.3. Renew defective door cylinder.
5. Adjust air pressure to 4 to 4.2 bar by lifting and turning the black knob on top of the regulator. Press knob back into position once pressure is set.

Part B Applies to Driessen Toilet

1. Remove the door leaf.
2. Loosen the motor mountings and disconnect the cable, noting the position of each wire.
3. Loosen the door mechanism fixings.
4. Remove the sled and lift the mechanism up. Slide the sled wheels out and insert new. Pull the drive belt protection out and renew.
5. Renew the drive belt wheels.
6. Refit the doorstop.
7. Thread a new driving belt on, secure a new motor and adjust the driving belt as follows:
 - 7.1. Move the attachment to the drive belt wheel towards or away from the sled.
8. Fit the door mechanism fixings.
9. Refit the door guiding pins at the bottom of the sliding door.
10. Refit door and adjust in accordance with Job No. OJA6049 Part B.

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Disabled Persons Toilet Door – Adjust

OIA6049

APPLIES TO: Part A Applies to Temoinsa toilet
Part B Applies to Driessen toilet

Scheduled Work

Part A - Applies to Temoinsa Toilet

1. Adjust the vertical clearance of the door leaf to the floor step plate by using the vertical adjustment screws (see Figure 1). The adjustment screws are identified as item A on the figure.
2. When the vertical clearance is adjusted and set, fully tighten fasteners.
3. Adjust the door close position and fully open dimension by using the screws identified as item B on Figure 1, as follows.

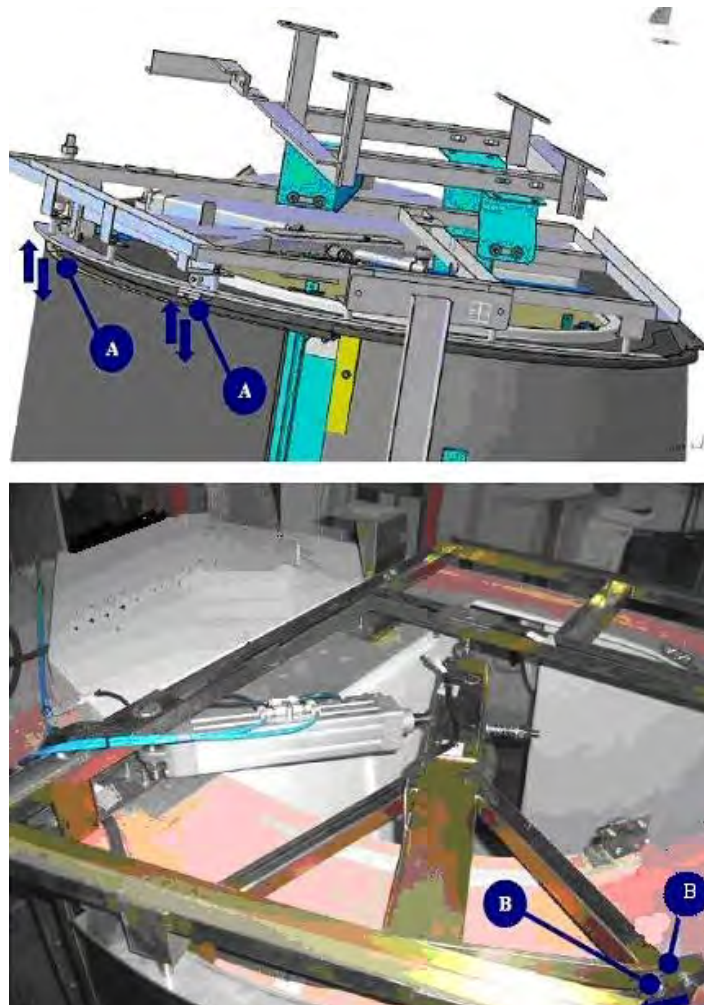



Figure 1: Door Leaf Adjustment

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Disabled Persons Toilet Door – Adjust

OIA6049

A3.1 Adjust the door position to check that when closed there is no gap between the door seal and the frame.

A3.2 Adjust the door to check that the door open width is a minimum of 850mm.

A4. When the door is adjusted and set, fully tighten fasteners.

A5. The door leaf can be removed by removing the fasteners shown on Figure 1.

Part B - Applies to Driessen Toilet

B1. Set door parallel to the aluminium strip in between the black double p-seal and exactly in the middle of the black double p-seal.


B2. Loosen the bracket with the magnet to slide in the slotted holes.

B3. Move the door system (rotary) switch to position 1 (out of use/lock mode).

B4. Let the door close.

B5. Put the door switch in position 1.

B7. Secure the bracket with the magnet.

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Automatic Vestibule Doors System – Examine and Test

OJ 0138

Materials			
Item	Description	Qty/Veh	Cat No.
1	Lithium Base No. 2 Molybdenum Di-sulphide Grease	As Req'd	027/004151 or 027/004152
2	Polycarbonate Window	As Req'd	064/007467
3	Window Rubbers	As Req'd	064/007466
4	Locking Strip	As Req'd	064/007465
5	Nylon Block	As Req'd	018/023912
6	Nosing Rubber	As Req'd	010/056399

Torque Figures			
Item	Description	Size	Torque (Nm)
1	Countersunk Screw	M6	10
2	Bolt	M10	55
3	Ball Joint Locknut	-	28
4	Screw	M5	8

Reference Drawings		
Item	Drawing No.	Title
1	C-A1-10920	Wiring Diagram for Vestibule Doors
2	A1-A2-9019533	Wiring Diagram Control Panel
3	A1-A2-9019534	Wiring Diagram Control Panel

Reference Documents		
Item	Document No.	Title
1	TI/TP0461	Improved Method of Retaining Core Matting in Coach Vestibule
2	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables

SAFETY CONDITION SC1

APPLIES TO: All Vehicles

Part 0 – Applies to all doors addressed in Parts 1 – 6 below.


Pages 2 – 3

Part 1 – Applies to HST and Mark 3A Vehicles, 2 per vehicle, except:
Catering Vehicles, 1 per vehicle (at non-catering end)
TGS Vehicles, 1 per vehicle (at non-guard area end)
Vehicles with a disabled toilet, 1 per vehicle (at non-disabled toilet end) – see Section 5.9 for details

Pages 4 – 7

Part 2 – Applies to Mark 3B FO Vehicles, 2 per vehicle
Mark 3B FOD Vehicles, 1 per vehicle (at non-disabled toilet end) – see Section 5.9 for details
Mark 3B BFO Vehicles, 1 per vehicle (at non-guard area end)

Page 8

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Automatic Vestibule Doors System – Examine and Test

OJ 0138

Part 3 – Applies to Mark 3B BFO Vehicles, 1 per vehicle (at non-guard area end)	Pages 9 – 13
Part 4 – Applies to Mark 3B FOD Vehicles fitted with a Driessen disabled toilet, 1 per vehicle – see Section 5.9 for details	Pages 14 – 16
Part 5 – Applies to HST Vehicles fitted with a Temoinsa disabled toilet, 1 per vehicle – see Section 5.9 for details	Pages 17 – 18
Part 6 – Applies to Vehicles fitted with a BRB-MML disabled toilet, 1 per vehicle – see Section 5.9 for details	Pages 19 – 21
Part 7 – Applies to HST Vehicles fitted with a BFG disabled toilet, 1 per vehicle – see Section 5.9 for details	Pages 22 – 24

NOTE 1: Job OC 0617 must be completed before doing this job.

Part 0 – Applies to all doors addressed in Parts 1 to 6


Scheduled Work

Referring to Figures 1 and 2,

- 0.0 Examine the burst through polycarbonate windows for cracks, burns and damage.
- 0.1 Without disturbing the cover, check that the rubber key strip (beading) is in place along the visible length of the door seal (see Figure 1).

Check the emergency lift covers as follows:

- 0.2 Check for signs of tampering.
- 0.3 Check the cover is undamaged.
- 0.4 Check that the cover is sitting flat against the door.
- 0.5 Check that the legend on the cover is readable.
- 0.6 Without disturbing the cover, check if the green tab has been pulled, by checking if it visibly protrudes from under the cover.

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Figure 1: Break Through Panel Emergency Cover (typical design)



Figure 2: Break Through Panel Pull Tab (typical design)

Arising Work

- 0.0 Renew polycarbonate window if damaged (see Materials item 2).
- 0.1 If window rubbers are damaged, renew rubbers (see Materials item 3) and locking strip (see Materials item 4).
- 0.2 If green tab has been tampered with, or locking strip is not in place, then report to the Supervisor.
- 0.6

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Part 1 - Applies to HST and Mark 3A Vehicles (vestibule doors both ends), except:
Catering vehicles (vestibule door at non-catering end only)
TGS vehicles (vestibule door at non-guard area end only)
Vehicles fitted with disabled toilet (vestibule door at non-disabled toilet end only).

Scheduled Work

- 1.1 Switch the auxiliary switch to Aux and Air Con position and connect air supply to the main reservoir pipe. Check that the door isolation switch is in the 'ON' position, (square key operated on refurbished vehicles).
- 1.2 Check that the door opens smoothly and fully without jarring on to the backstop in 2 to 3 seconds after pressure is applied to the mat switch.
- 1.3 Stand on every part of the mats switch for 4 seconds and check that the door opens or does not close.
- 1.4 When the pressure is released from the mat switch check that there is a delay of 1 to 2 seconds (BR design) or 3 to 5 seconds (Wabtec Rail Panel) before beginning to re-close automatically.
- 1.5 Check that the door always closes automatically after it has opened, irrespective of how briefly the mat switch has been pressed.
- 1.6 Check that the door closes smoothly and fully without jarring the jamb pillar in 5 to 6 seconds (BR design) or 3.5 to 4.5 seconds (Wabtec Rail Panel) from the time it begins to move.
- 1.7 Check that the keeper plate on the top part of the door edge fits flush against the magnet strip on the door jamb.
- 1.8 Check that the 'door open' and 'door closed' EP valves are de-energised at the fully open and fully closed door positions.
- 1.9 With the door closed and without standing on the pressure mat check that there is no residual closing air pressure by pushing the door open.
- 1.10 Switch the door isolation switch to the 'UP' position, or 'isolated' position and check on RFM vehicles that the door opens.
- 1.11 On all other vehicles check that the door no longer operates when pressure is applied to the mat switch.

Arising Work

- 1.2, Change mat switch in accordance with the specified document (see Reference Documents
- 1.3 item 1).

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- 1.4 (BR design) If the door takes less than 2 seconds or more than 3 seconds to open, adjust the screw on the flow regulator, turning clockwise to speed it up, or anticlockwise for slowing it down. For Wabtec panels see Procedure W.
- 1.5 Repair connections to base of door relay DR3.
- 1.6 If the delay is less than 1 second or greater than 2 seconds repair or adjust electrical control system, see electrical schematic (see Reference Drawings item 1).
- 1.7 Remove or add cork packing to give full contact.
- 1.8 (BR design) If the door takes less than 2 seconds or more than 6 seconds to close, adjust the screw on the flow regulator, turning it clockwise for speeding up, or anticlockwise for slowing down. For Wabtec panels see Procedure W.
- 1.9 Adjust proximity switches (see Figure 3).
- 1.10 Investigate fault and correct.
- 1.11 Renew isolation switch.

NOTE 2: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 2).

PROCEDURE W - Adjustment of Door Pressure Regulating Valves for Wabtec Rail Control Panels

1. Check that Job No. OC 0617 has been carried out (input pressure must be 3.8 to 4.0 bar).
2. Isolate the air supply cock on the vestibule door control panel and check the air is vented.
3. Remove the Allen screws from both the regulators (see Figure 4) and fit air pressure gauges (Norgren 18-013-990 0 to 4 bar). Retain the screws in a safe location for re-fitting.
4. Turn the air supply back on and adjust the No. 1 regulator to 1.75/2.00 bar then adjust No. 2 regulator to 0.75/1.00 bar.
5. Remove gauges and refit Allen screws.

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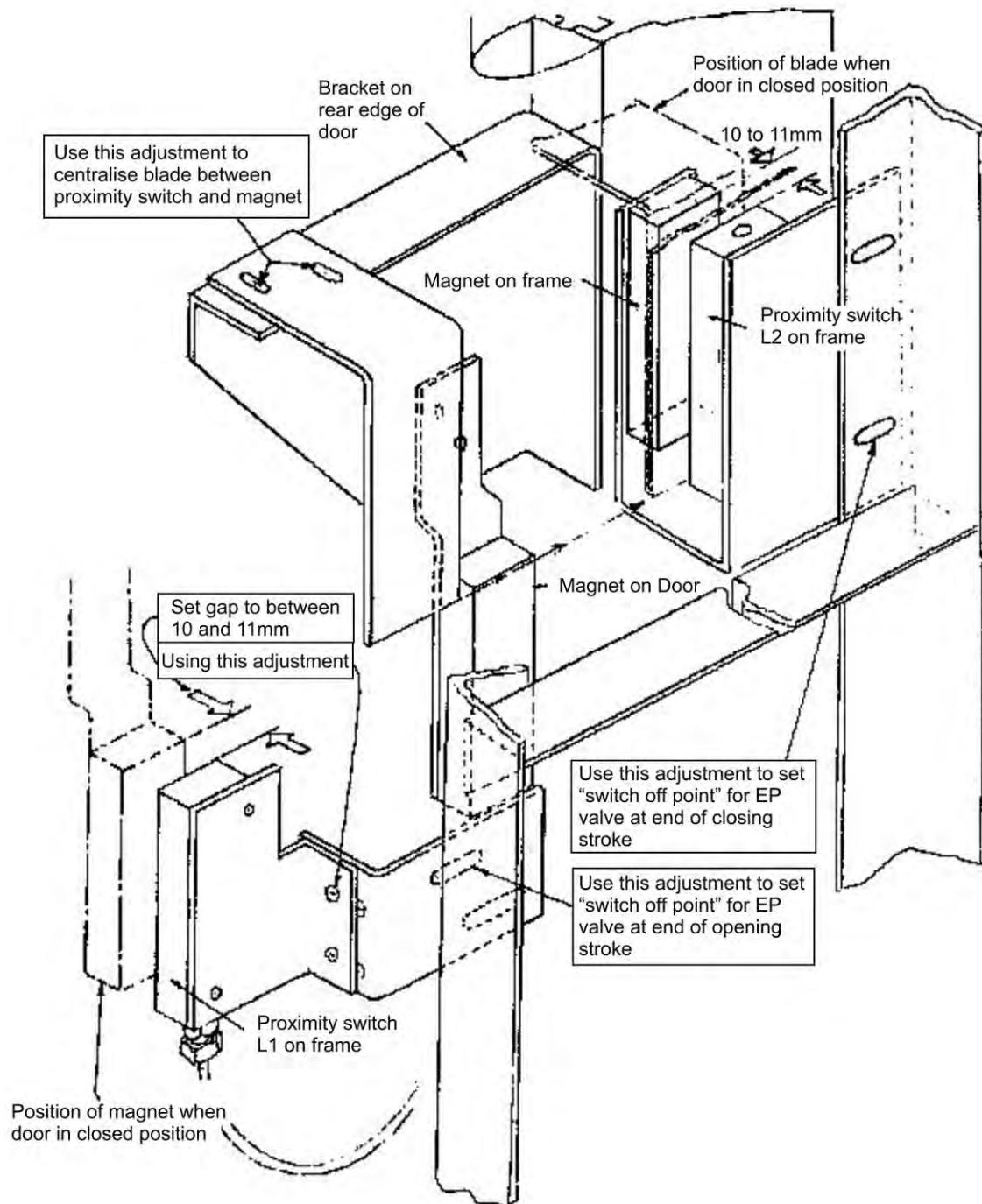



Figure 3: Adjustment of Proximity Switches and Magnets

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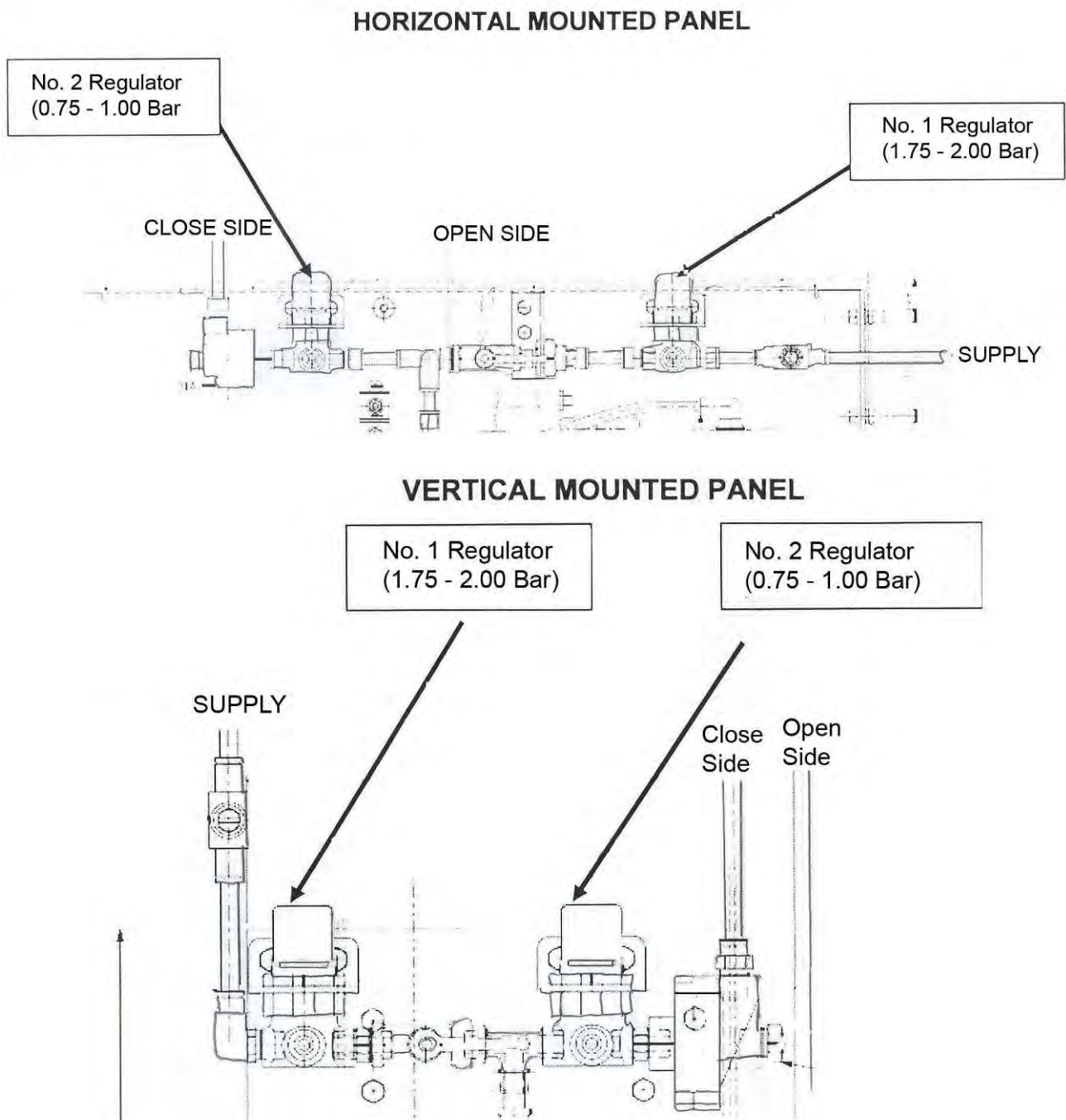



Figure 4: Door Pressure Regulator Valves for Wabtec Rail Control Panel

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Part 2 - Applies to Mark 3B FO (both ends), Mark 3B BFO (control No.1 end) and Mark 3B FOD (Non Control No.2 End)


Scheduled Work

- 2.1 Move the auxiliary switch to the AUX ONLY or AUX and AIR COND position.
- 2.2 Place the door isolating switch in the 'OFF' position.
- 2.3 Check that the door opens and no longer operates when pressure is applied to the mat switch.
- 2.4 Place the door isolating switch in the 'ON' position.
- 2.5 Apply pressure to the mat switch and check that the door opens fully with a smooth action without jarring on to the backstop in 2 to 3 seconds.
- 2.6 Release the pressure from the mat switch and check that the door begins to close.
- 2.7 Check that the door closes fully without jarring the door jamb in 5 to 6 seconds from the time it begins to move.
- 2.8 Move the auxiliary switch to the 'OFF' position and disconnect the air supply.

Arising Work

- 2.3, Rectify defects, see electrical schematics.
- 2.5 No. 1 end (see Reference Drawings item 2).
No. 2 end (see Reference Drawings item 3)
- 2.7 Adjust the flow regulator (located above the door aperture), turning it clockwise for speeding up, or anti-clockwise for slowing down.

NOTE 3: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 2).

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Part 3 - Applies to Mark 3B BFO (No.2 end vestibule door adjacent to Senior Conductor's Office)

Scheduled Work

- 3.1 Check that the door is running without excessive resistance to the rail by disconnecting the air supply to the system, connect a force measurement gauge tot the door handle, and measuring the resistance by opening and closing the door. Maximum force in either direction is 25N (see Figure 5).
- 3.2 Move the auxiliary switch to the AUX ONLY or AUX and AIR COND position.
- 3.3 Check that the shut off valve located on the bottom of main pneumatic control panel (see item B, Figure 5) when placed in the 'OFF' position the door closes, and that in the 'ON' position the door opens.
- 3.4 With the door closed, attempt to open the door by using the handle and check that the door opens smoothly and without juddering in 1 to 2 seconds.



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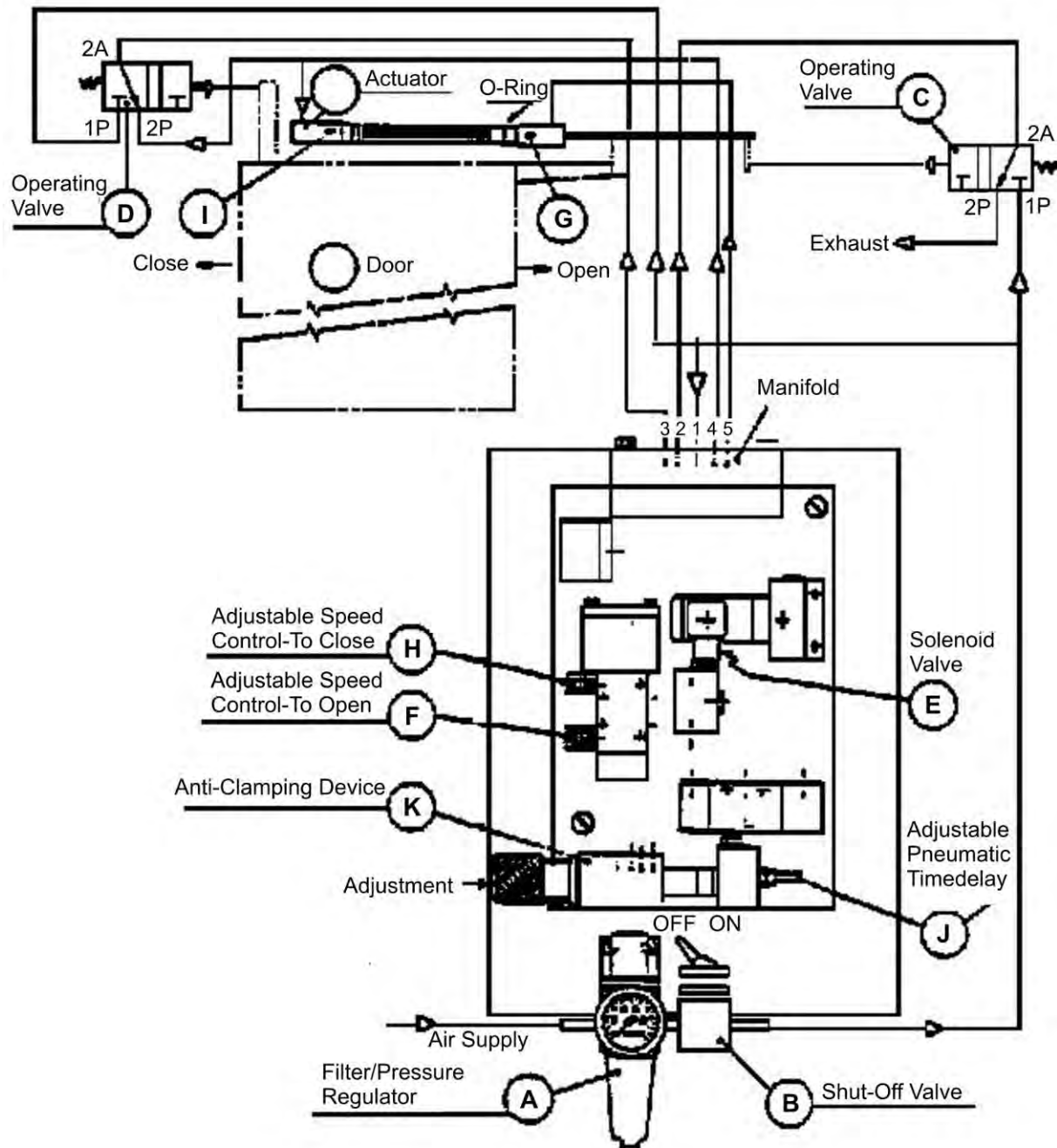



Figure 5: Tebel System

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- 3.5 Check that the speed of the door slows gradually during the last part of the open movement until the door stops without slamming and the operating valve plunger (see item C Figure 5) has been reached.
- 3.6 Check that the door starts to close automatically 10 to 15 seconds after reaching the open position.
- 3.7 Check the time taken to close is 3 to 5 seconds.
- 3.8 Check that the closing speed reduces during the last part of the closing movement until the door stops without slamming and the operating valve plunger (see item D Figure 5), has been reached.
- 3.9 Place an object approximately 120mm wide between the door jamb and the door. Allow the door to close on to the object and check that the door opens in 1 to 2 seconds. (This is equivalent to a stalling force of 100 to 150 N).
- 3.10 Isolate the door air supply by putting the shut off valve (see item B Figure 5) switch to the 'OFF' position and check that the door opens and closes freely. Return the switch to the 'ON' position.

Arising Work

- 3.1 Clean and re-grease the rail using Lithium base No. 2 Molybdenum Di-sulphide grease (see Materials item 1).
If the door operation still defective, then check the guide rail and/or actuator installation:

Door Guide Rail

The guide rail is secured to the vehicle with two M10 bolts one on each end of the rail, these also secure the end stops for the opening and closing position. In addition there are also four M6 x15 countersunk socket head securing screws along the length of the rail (see Figure 6). Check the horizontal deflection over the length of the guide rail. If the deflection exceeds 1mm add or remove shims behind each of the four M6 x 15 hexagon screws along the length of the rail, so that the deflection is less than 1mm (see Figure 6). After adjustment, tighten the M6 countersunk screws (see Torque Figures item 1) and the M10 bolts (see Torque Figures item 2).

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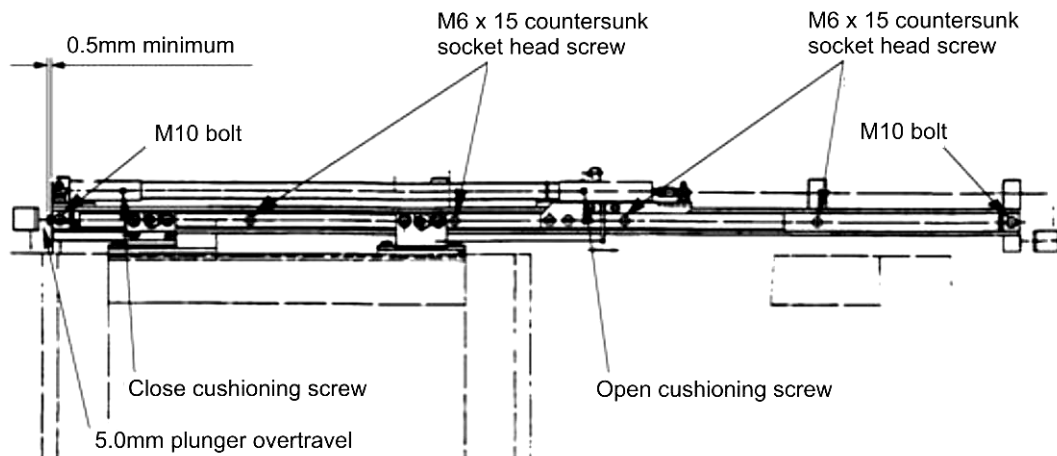


Figure 6: Door Guide Rail

3.1 Check Actuator

One end of the actuator is mounted on a stud on the guide rail and the other end is mounted on a stud on the door slider.

To prevent wear on the piston and seal, the stroke of the actuator must be adjusted so that in both the open and the closed position the end stop is cushioned by the stops located on the guiding rail and not by the piston hitting the seal at either end of the actuator.

Adjustment is made through lengthening or shortening the piston rod by means of the ball joint connection. After adjustment of the ball joint the locknut must be torque tightened (see Torque Figures item 3) (see Figure 5).

Close the door and check the clearance between the 'O' ring seal and the support (minimum 0.5mm) (see Figure 6).

Open the door and lubricate with Down Corning 55M.

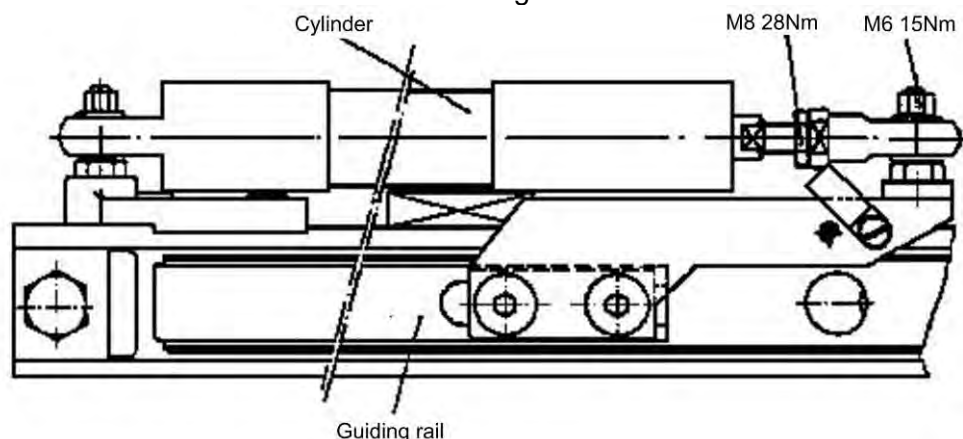



Figure 7: Cylinder Connection

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- 3.4 The open speed can be adjusted with the speed adjustment screw (see item F Figure 5). Turn to the left = slower, turn to the right = faster.

NOTE 4: Door speed and cushioning are related and have to be balanced to achieve proper adjustment. If the door slams to the open position, the plunger valve will be operated and the door will close immediately.

- 3.5 Adjust cushioning with the screw in the right hand cylinder end cap (see item G Figure 5 and reference Figure 6). Screw the adjuster in (clockwise) and give $\frac{1}{8}$ th turn to the left.

Isolate the air supply from the system (shut off valve) (see item B Figure 5) and close the door by hand. Adjust the valve by hand so there is 5mm over travel left on the plunger, see Figure 6. Tighten the M5 fastening screws (see Torque Figures item 4).

- 3.6 Adjust closing time delay valve screw (see item J Figure 5).


- 3.7 The closing speed can be adjusted with the close speed adjustment screw (see item H Figure 5) turn to the left = slower, turn to the right = faster.

NOTE 5: Door speed and cushioning are related and have to be balanced to achieve proper adjustment. If the door slams closed the plunger valve will be operated and the door will open immediately.

- 3.8 Adjust cushioning with screw in the left hand cylinder end cap (see item I Figure 5 and reference Figure 6). Screw the adjuster in (clockwise) and then give $\frac{1}{8}$ th turn to the left.

- 3.9 Adjust anti-clamping device (see item K Figure 5) to increase time, turn anti-clockwise and to decrease time turn clockwise

NOTE 6: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 2).

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Part 4 - Applies to Mark 3B FOD Vehicles fitted with a Driessen disabled toilet (No. 1 end vestibule door adjacent to the disabled toilet only) – see Section 5.9 for details.

Scheduled Work

- 4.1 Move the auxiliary switch to the AUX ONLY or AUX and AIR COND position, and connect air supply to main reservoir pipe.
- 4.2 Check for debris in the door tracks.
- 4.3 Place the door isolating switch in the 'OFF' position (see Figure 8).

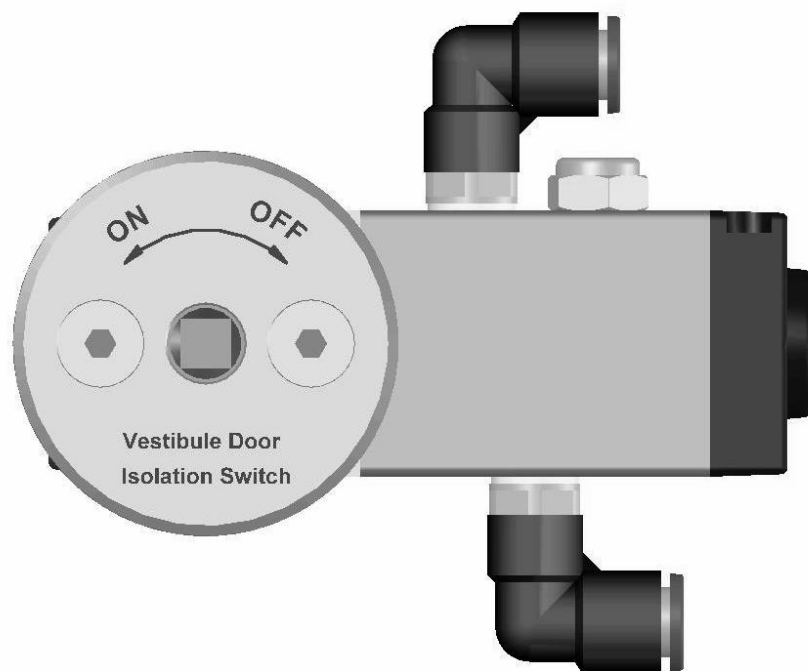



Figure 8: Vestibule Door Isolation Switch (FOD No.1 end only)

- 4.4 Check that the door opens and no longer operates when pressure is applied to the mat switch.
- 4.5 Place the door isolating switch in the 'ON' position.
- 4.6 Connect a Druck gauge (or equivalent) and adaptor to the Door Pressure Regulator (DPR) test point (see Figure 9).
- 4.7 Check that the pressure is 4.0 to 4.2bar.
- 4.8 Remove the Druck gauge and adaptor and connect to the door Closing Pressure Regulator (CPR) test point (see Figure 9).

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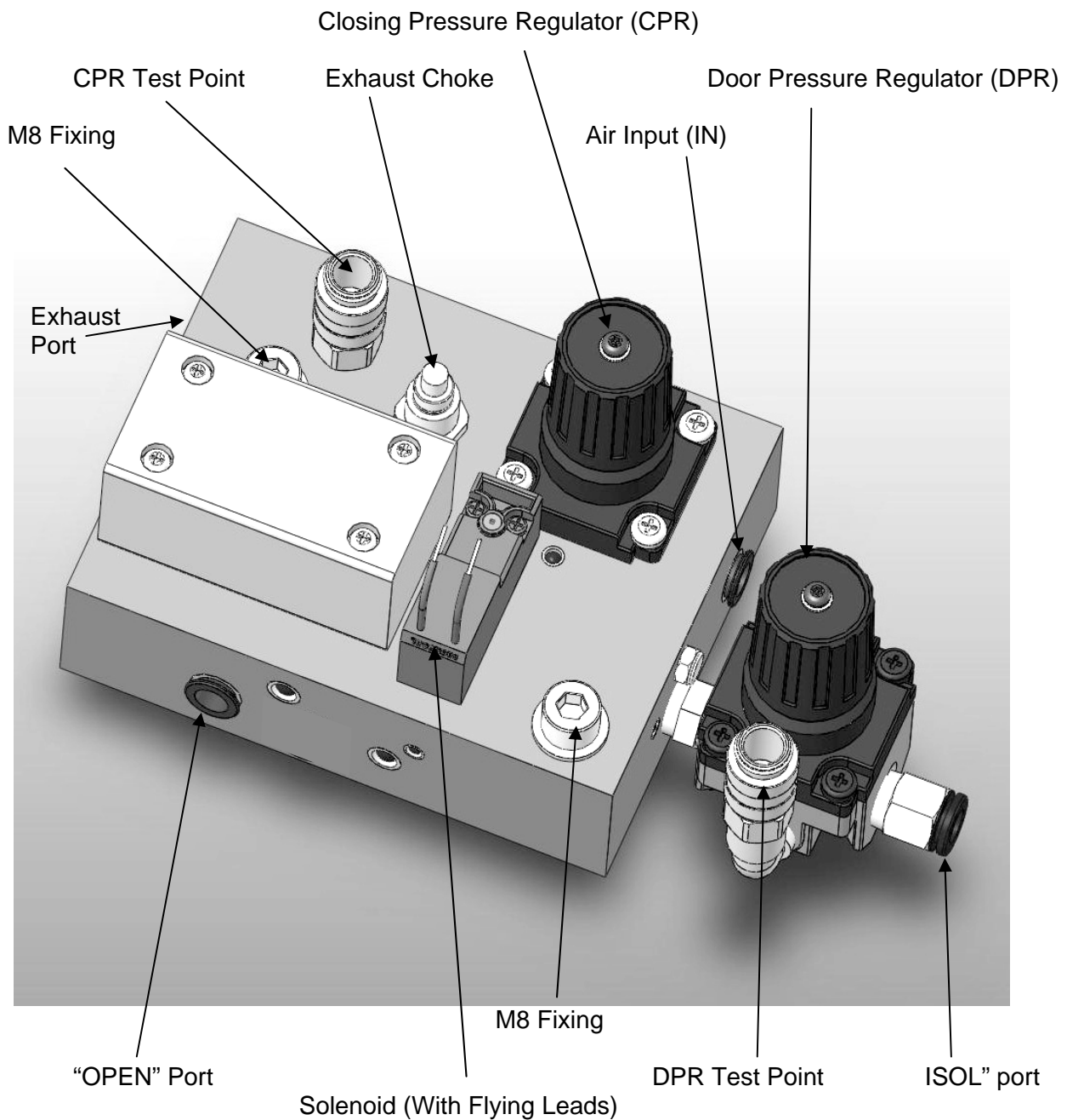



Figure 9: Door Control Pneumatic Module

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- 4.10 Apply pressure to one mat switch and check that the door opens fully with a smooth action without jarring on to the backstop in 6 to 7 seconds.
- 4.11 Release the pressure from the mat switch and check that the door begins to close.
- 4.12 Check that the door closes fully without jarring the door jamb in 11 to 12 seconds from the time it begins to move.
- 4.13 Repeat steps 4.10 to 4.12 using the other mat switch.
- 4.14 Move the Aux switch to the 'OFF' position and if required disconnect the air supply.

Arising Work

NOTE 7: This door is fitted with a rodless cylinder. The exhaust choke must be wound out to its anti-clockwise limit. All speed control can be achieved with the two regulators.

- 4.3 Investigate the reason for the door not opening. Rectify and re-test.
- 4.7 Remove the tamper proof screw from the DPR with the Torx T2 driver, and lift the knob to unlock it, set the pressure shown on the gauge to 4bar.
- 4.9 Remove the tamper proof screw from the CPR with the Torx T2 driver, and lift the knob to unlock it, set the pressure to 1bar.
- 4.10 If the door opens too quickly, the CPR valve requires adjustment. Attach the pressure gauge and reduce the pressure from 1bar to 0.9bar. Operate the door and time the open cycle.
- 4.10 If it is too slow, raise the pressure in 0.1bar increments between 1 and 1.5bar. Follow this method until a satisfactory performance is attained.
- 4.10 When the door is operating satisfactorily, lock both regulators by depressing the operating knob and re-install tamper proof screws with a Torx T2 driver.
- 4.12 knob and re-install tamper proof screws with a Torx T2 driver.

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Part 5 - Applies to HST Vehicles fitted with a Temoinsa disabled toilet (No.1 end vestibule door adjacent to the disabled toilet only) – see Section 5.9 for details.

Scheduled Work

- 5.1 With the door in the closed position check that it is hanging correctly and that the door edge rubber strip is contacting the jamb pillar along most of its full length, with no point being further than 6mm away from the pillar.
- 5.2 Check that the door pocket is clear of litter or other debris which may obstruct the door. This can be viewed at the bottom of the door and also from within the adjacent control cupboard.
- 5.3 Close and open the door and check that:
 - 5.3.1 The force required to move the door is reasonable. If the force required is considered excessive, disconnect the piston and move the door.
 - 5.3.2 The guides and rubber bars are secure, (by trying to move the door at right angles to the direction of travel must be less than 5mm at floor level).
- 5.4 Check the following:
 - 5.4.1 The auxiliary switch is in the 'AUX ONLY' or 'AUX + AIR COND' position.
 - 5.4.2 Sufficient main reservoir pressure is available (minimum 4.9 bar).
 - 5.4.3 The door air supply is not isolated.
- 5.5 Check that the door opens smoothly and fully without jarring in 3 to 4 seconds when pressure is applied to the mat switch.
- 5.6 Check that the door remains open for the duration that someone stands on the mat switch.
- 5.7 When the mat switch pressure is released, check that there is a three to five second delay before the door begins to automatically close.
- 5.8 Check that the door closes smoothly and fully without jarring in 6.5 to 7.5 seconds.
- 5.9 Examine all items on the control panel for security of the mountings and connections.
- 5.10 Examine all the pipework and cabling for wear and damage.
- 5.11 Examine the cable connections for tightness and any evidence of overheating.


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Arising Work

- 5.1 If the door is misaligned, adjust the angle of the door by placing aluminium shims as required under one of the two fixings to the carrier bracket above the door.
 - 5.2 Clear any debris from the runner.
 - 5.3 Check the security and alignment of the door and the runner bars. Renew defective or missing guides.
 - 5.4 Correct electrical and pneumatic supplies.
 - 5.5 Adjust the door open speed on the control panel. Fit a pressure gauge to the Door Pressure Regulator (DPR) test point (see Figure 9). Remove the Torx tamper proof screw. Lift the regulator knob to release the lock. Adjust the pressure to 2.0 bar. Press down the regulator lock. Recheck the pressure. Refit the Torx tamper proof screws. Remove the pressure gauge.
 - 5.6 Renew either or both mat switches as necessary.
 - 5.7 Adjust the delay on the control panel.
 - 5.8 Adjust the closing speed on the control panel. Fit a pressure gauge to the Closing Pressure Regulator (CPR) (see Figure 9). Remove the Torx tamper proof screw. Lift the regulator knob to release the lock. Adjust the pressure to 0.5 bar. Press down the regulator lock. Recheck the pressure. Refit the Torx tamper proof screw. Remove the pressure gauge.
 - 5.9 Re-secure the panel and components, renewing defective items.
 - 5.10 Repair as necessary, and retest.
 - 5.11 Renew defective items and retest.
- 5.10, Faulty or redundant cables must be removed or isolated in accordance with Reference
5.11 Documents item 2.

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Part 6 - Applies to Vehicles fitted with a BRB-MML disabled toilet (No.2 end single leaf vestibule door adjacent to the disabled toilet only) – see Section 5.9 for details.

Scheduled Work

- 6.1 Isolate the door by isolating the air supply and opening the hinged fuse which is mounted on the power supply module rail.
- 6.2 Examine the rubber door nosing for signs of perishing and damage.
- 6.3 Examine the door frames for rigidity and security of fixing.
- 6.4 With the door in the closed position check that the door leaf nosing rubber is contacting the jamb pillar along all of its length.
- 6.5 Visually check the door pocket for litter or other debris which may obstruct the door; this may be viewed at the bottom of the door.
- 6.6 Check that the bottom of the door is located on the 'T' section nylon runner block located on the floor within the door pocket.
- 6.7 Power up the door so that it will function in its normal operating mode (electrically and pneumatically).
- 6.8 From the vestibule side of the door, walk under the ceiling mounted PIR sensor and check that the door opens fully onto the backstop, smoothly and without jarring in a timely manner. Check that after a delay of approximately 4 to 5 seconds, the door closes fully, smoothly and without jarring.
- 6.9 Repeat step 6.8 from the saloon side of the door.
- 6.10 Check that the door obstacle deflector is functioning correctly by placing a suitable object in the path of the closing door and check that the door fully opens immediately.

Arising Work

- 6.2 If the door nosing rubber is defective, renew (see Materials item 6).
 - 6.4 If the door leaf is not upright, investigate cause and rectify.
 - 6.5 Clear out the door pocket.
 - 6.6 Determine the cause and rectify.
- Renew defective 'T' Section runner Nylon block (see Materials item 5).
- 6.8, Isolate and de-isolate the door as required using the isolation switch (see Figure 10) as and
 - 6.9 when required to carry out each of the following tasks.

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Figure 10: Door Isolation Switch

6.8, **Setting the Opening Speed**

6.9

Free the locking nut on the opening speed adjustment screw (see Figure 11).

Turn the adjustment screw anti-clockwise to give the fastest possible opening speed, but not so much that the screw may come loose.

Tighten the locking nut by hand only.


6.8, **Setting the Closing Speed**

6.9

Free the locking nut on the closing speed adjustment screw (see Figure 11).

Turn the adjustment screw clockwise until, when triggered by the sensor, the door does not close at all. Then turn the adjustment screw anti-clockwise again until the door closes slowly but fully.

Tighten the locking nut by hand only.

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6.10 Setting the Obstruction Detection

Release the grub screw (do not completely remove) on the Obstruction Detection Adjuster (see Figure 11).

Adjust the screw or knob (depending upon adjuster type fitted) in the clockwise direction until the door obstruction detection is so sensitive that the door bounces off the opposite door frame instead of closing. Then turn the screw or knob back slightly so that the door closes properly but opens as quickly as possible when an obstruction is present.

Tighten the grub screw.

6.8 PIR Sensor angle adjustment

Remove the lens from the overhead infra-red sensor in the first class saloon.

Loosen the retaining screws (there may be two or four) until the black sensor 'ball' can be adjusted.

Check that the position of the sensor is such that with the plastic ridge running across the carriage, the LED lights are at the same side of the vehicle as the wheelchair space.

Adjust the tilt of the sensor so that the flat surface of the ball meets the metal frame near the red LED (see Figure 11).

Tighten all screws and refit the lens.

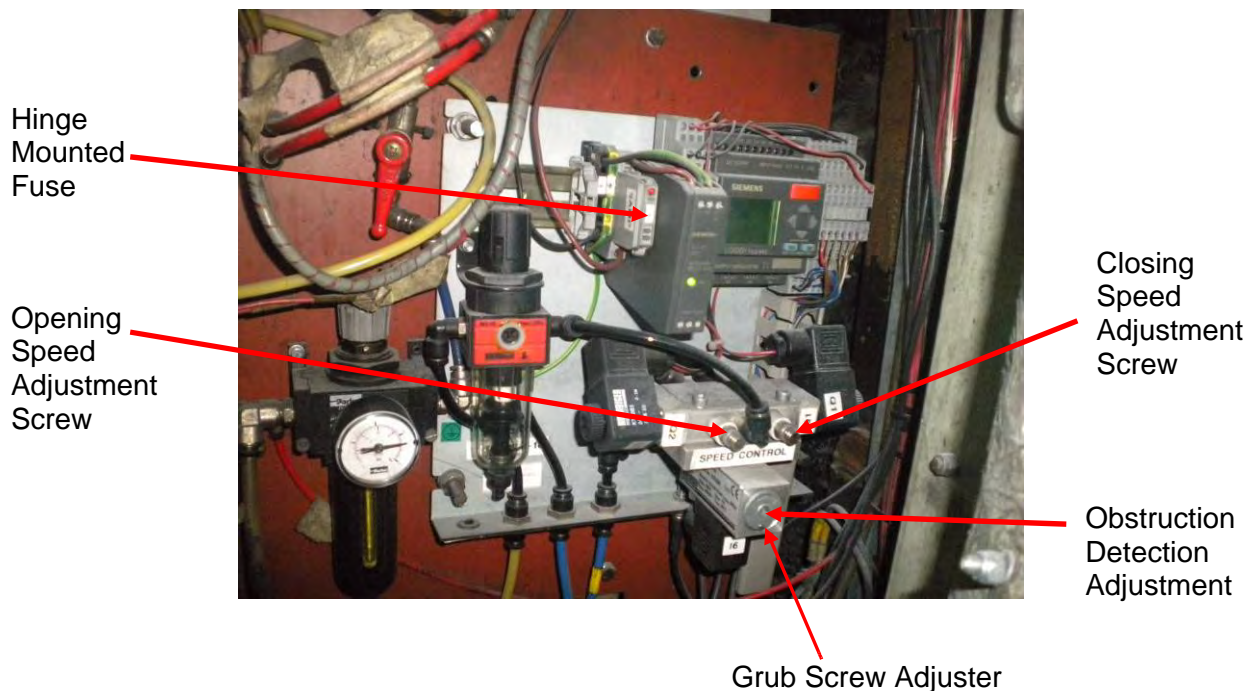



Figure 11: General Layout of Power Supply Module

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Part 7 - Applies to HST Vehicles fitted with a BFG design disabled toilet (No.1 end vestibule door adjacent to the disabled toilet only) – see Section 5.9 for details.

Scheduled Work

- 7.1 Check for signs of debris in the door tracks. Clean if necessary.
- 7.2 Energise the vehicle air and electrical systems.
- 7.3 Check the open and close cycle operation of the door gear by operating the tread mat. The cycle should be 6 to 7 seconds to open, and 11 to 12 seconds to close. Make sure that both opening and closing operations are smooth.
- 7.4 Check both pressure mats are functioning correctly; i.e. check that the door opens when the pressure mats are operated (both mats).
- 7.5 With the door closed isolate the door system (see Figure 12). Check the door returns to the open position when there is still power present.
- 7.6 Report all defects to the team leader in order that appropriate action is taken prior to the vehicle(s) being released back into traffic.



Figure 12: Door System Isolating Valve

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Arising Work

7.1 Clean debris out of door track.

7.3 Ensure the air regulator which governs the incoming main reservoir air (skirt access door H) is wound anti-clockwise until the pressure at the test point adjacent to the regulator is at 7.50 bar. Adjust as necessary using a calibrated Druck pressure gauge with a Schrader connector.

Using the calibrated Druck brake pressure tester, and the adapter, connect to the Door Pressure Regulator (DPR) test point (see Figure 13). Check that the pressure is 4.50 bar.

Connect the Druck gauge and adapter to the Closing Pressure Regulator (CPR) test point (see Figure 13). Remove the tamper proof screw from the CPR with the Torx T2 driver, and lift the knob to unlock it, set the pressure to 1 bar. Adjust the Exhaust Choke (see Figure 13) to set door closing time. Screw in to slow the close operation.

If the door is still not satisfactory. Remove the tamper proof screw from the DPR with the Torx T2 driver, and lift the knob to unlock it, set the pressure shown on the gauge to 4 bar.

If the door opens too quickly the CPR valve requires adjustment. Attach the pressure gauge to the CPR test point and reduce the pressure from 1 bar to 0.9 bar, using the operating knob. Operate the door and time the open cycle.

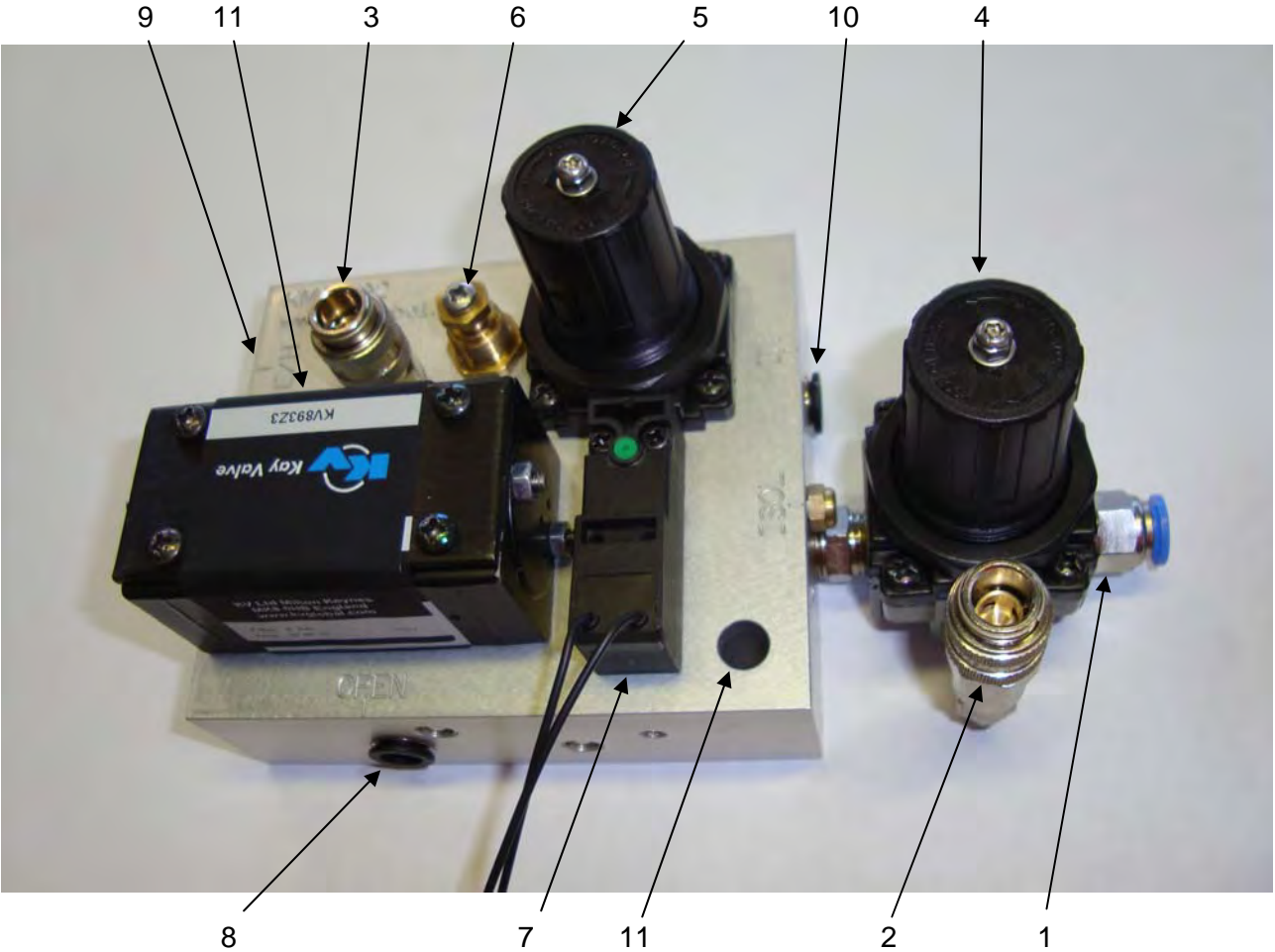
If it is too slow, raise the pressure in 0.1 bar increments between 1 and 1.5 bar. Follow this method until a satisfactory performance is attained. When the door is operating satisfactorily, lock both regulators by depressing the operating knob and reinstall tamper proof screws with a Torx T2 driver.

NOTE 8: When using the Automatic Vestibule Door System (AVDS) with a rodless cylinder the exhaust choke must be wound out to its anti-clockwise limit. All speed control can be achieved with the two Regulators.

7.5 Investigate and rectify if the door does not return to its open position.


Automatic Vestibule Doors System – Examine and Test

OJ 0138



Item	Description	Item	Description
1	'ISOL' port	7	Solenoid (with flying leads)
2	CPR Test Point	8	'OPEN' Port
3	DPR Test Point	9	Exhaust Port
4	Closing Pressure Regulator (CPR)	10	Air Input
5	Door Pressure Regulator (DPR)	11	M8 Fastener
6	Exhaust Choke		

Figure 13: Door Control Pneumatic Module (DCPM) (Cat No. 064/008096)

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Vestibule Door System Filter – Check

OJ 0165


APPLIES TO: FOD (Vestibule Door next to Disabled Persons Toilet)

Scheduled Work

1. Gain access to the filter by opening the access door next to the disabled toilet at No.1 end.
2. With the aid of a torch check that there is no water or dirt in the transparent sections of both bowls. The first bowl is an automatic drain and the second is a manual one.
3. Trigger the manual drain on the second filter bowl by pressing the black pushbutton at its base and check that any water flows freely to drain and secure.
4. Close the access door.

Arising Work

2. If any water is present in the first bowl, check the drain that leads away from the base of the filter is clear and that the water can flow freely away down the pipe and out of the vehicle.
2. If the drain is clear, renew the filter assembly as follows:
 - 2.1 Isolate the air supply to the vehicle. Drain the air remaining in the system.
 - 2.2 Remove the supply air and filtered air pipes from the filter assembly, taking care to note pipe routes and connections. Remove the old assembly by undoing the two M6 fixings holding it to its mounting position.
 - 2.3 Attach a new filter assembly with the same M6 fixings removed in 2.2 but using new locking washers.
 - 2.4 Insert air supply pipe into the input side of the filter assembly (the side with the auto-drain attached). Insert the filtered air pipe into the other side of the filter.
 - 2.5 Isolate the door using the isolation valve (turn clockwise through 90° using a carriage key). This prevents the door moving without warning when the air supply is reactivated.
 - 2.6 Reinstall the air supply to the vehicle.
 - 2.7 De-isolate the door with the isolation valve (turn anti-clockwise through 90°).
 - 2.8 Check the door is operating correctly by operating both pressure mats.

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Disabled Persons Toilet Door Air Filter & Silencer – Renew **OJ 0639**

Materials			
Item	Description	Qty/Veh	Cat No.
1	Filter Element (40µm) Temoinsa Part Number 900011833	1	-
2	Silencer ¼" Temoinsa Part Number AN203-02	4	-

APPLIES TO: Applies to Temoinsa toilet (see Section 5.9 for vehicle numbers)

Scheduled Work

1. Open the external wall panel to allow access to the pneumatic control panel.
2. Isolate the pneumatic supply by turning the red isolation knob (see Figure 1).

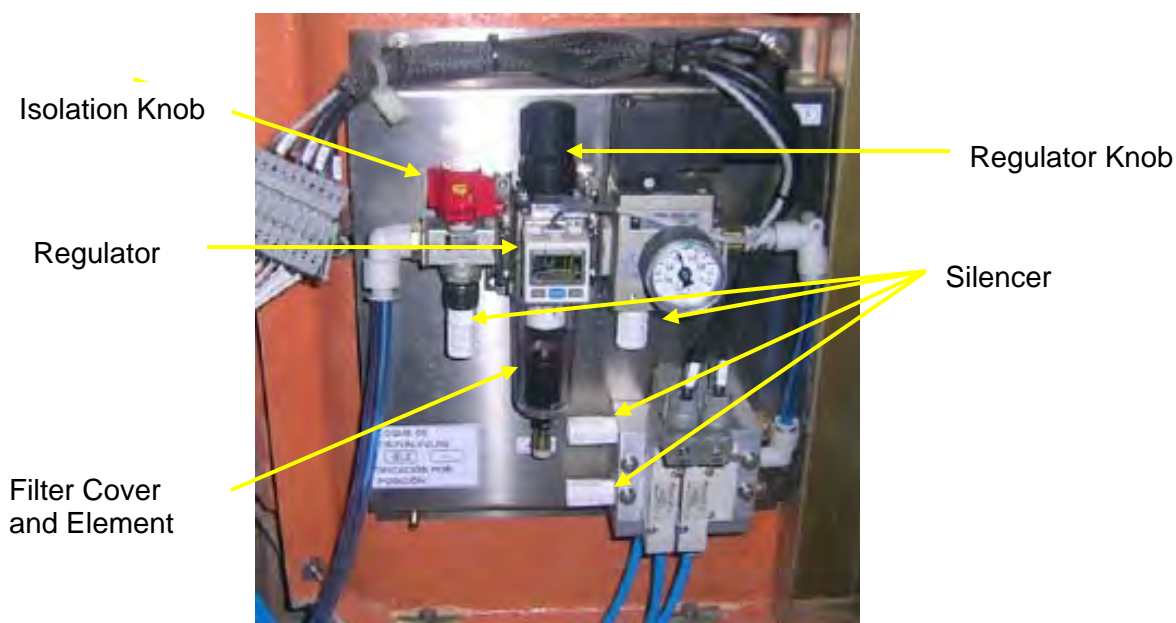



Figure 1: Pneumatic Control Panel

3. Renew the air filter element as follows:
 - 3.1 Remove the filter cover by unscrewing it from the underside of the regulator.
 - 3.2 Remove the filter element from the cover and discard the filter element.


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Disabled Persons Toilet Door Air Filter & Silencer – Renew **OJ 0639**

- 3.3 Fit a new filter element (see Materials item 1) and refit the element and cover to the regulator. Fully tighten.
4. Renew four silencers as follows:
 - 4.1 Remove the silencers from the base of the isolation valve, gauge valve, and solenoid valves and discard (see Figure 1).
 - 4.2 Fit new silencers (see Materials item 2).
5. Open the air supply by turning the red isolation knob.
6. Check for leaks and that pressure is set at 4 to 4.2 bar.
7. Close and lock the external access panel.

Arising Work

6. Rectify leaks. Adjust pressure to 4 to 4.2 bar, by lifting and turning the black knob on top of the regulator. Press the knob back down into position once the pressure is set.

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Single Leaf Vestibule Door System Filter – Check

OJ 0651


APPLIES TO: HST Vehicles fitted with a BRB disabled toilet (No.2 end single leaf vestibule door adjacent to the disabled toilet only) – see vehicles identified as “BRB-MML” in Section 5.9 for details.

Scheduled Work

1. Gain access to the filter by opening the access door adjacent to the disabled toilet at No.2 end.
2. With the aid of a torch check that there is no water or dirt in the transparent section of the bowl. The bowl has an automatic drain.
3. Close the access door.

Arising Work

2. If any water is present in the bowl, check the drain that leads away from the base of the filter is clear and that the water can flow freely away down the pipe and out of the vehicle.
2. If the drain is clear, renew the filter assembly (Part Number not available yet) as follows:
 - 2.1 Isolate the air supply to the vehicle. Drain the air remaining in the system.
 - 2.2 Remove the supply air and filtered air pipes from the filter assembly, taking care to note the pipe routes and connections. Remove the old assembly by releasing the locknut holding it to its mounting bracket.
 - 2.3 Fit a new filter assembly and secure to the mounting bracket using the locknut.
 - 2.4 Insert the air supply pipe into the input side of the filter assembly and insert the filtered air pipe into the output side of the filter.
 - 2.5 Isolate the door to prevent the door moving without warning when the air supply is reactivated.
 - 2.6 Re-instate the air supply to the vehicle.
 - 2.7 De-isolate the door with the isolation valve.
 - 2.8 Check the door infra red PIR sensors are operating correctly from both sides of the door, by walking under each ceiling mounted sensor (see Figure 1), and checking that the door opens.


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Single Leaf Vestibule Door System Filter – Check

OJ 0651



Figure 1: Ceiling Mounted PIR Sensor

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Double Leaf Vestibule Door – Examine


OJ 6101

Materials			
Item	Description	Qty/Veh	Cat No.
1	Door Nosing Rubber, 1885mm long (Pt No. 8501393-05)	As Req'd	010/055738
2	Door Leaf (Pt No. 8501393-02 (Leading Leaf), 8501393-03 (Trailing Leaf))	As Req'd	-
3	Perspex Window (PT No. 8501393-04 (Leading Leaf), 8501393-08 (Trailing Leaf))	As Req'd	009/117344
4	Glazing Rubber	As Req'd	010/056159
5	Washers, M8 Form C	As Req'd	003/191706
6	Roller Bearing	As Req'd	043/030019
7	Leading Door Runner Bar (Adtranz Pt No. 116-0528-07)	As Req'd	-
8	Roller Bracket Assembly (Adtranz Pt No. 400-0707-78)	As Req'd	-
9	Trailing Door Rear Runner Bracket (Adtranz Pt No. 116-0528-04)	As Req'd	-
10	Trailing Door Rear Runner Nylon Block (Adtranz Part No. 116-0528-03)	As Req'd	-
11	Door Guide on Floor of Door Pocket	As Req'd	018/002068
12	Toothed Belt	As Req'd	098/009108 and 098/009109
13	Door Gear Assembly (Schrader Bellows Part No. 44918A)	As Req'd	8501389-01

Reference Drawings		
Item	Drawing No.	Title
1	A1-A0-8501404	Vestibule Sliding Door Installation Disabled Person Access
2	A1-A0-8501389	Door Gear Assembly (Double Door) (Disabled Persons Lavatory) Access
3	A1-A2-8501392	Vestibule-Saloon Sliding Double Door MKS and Qty's Disabled Persons Lavatory Access
4	A1-A0-8501393	Vestibule-Saloon Sliding Double Door Disabled Persons Lavatory Access
5	PB-A0-2100387	Installation of Vestibule Sliding Door Assembly
6	A1-A0-8501405	DTLS Vestibule Sliding Door Disabled Lavatory and Access
7	A1-A1-8501411	DTLS for Lavatory Door Disabled Persons Lavatory

APPLIES TO: Vehicles fitted with a BRB disabled toilet (No.2 end two leaf vestibule door adjacent to the disabled toilet only) – see Section 5.9 for details.

NOTE: Vehicles identified as “BRB-MML” in Section 5.9 have single-leaf vestibule doors fitted for which Job No. OJ 0138 Parts 0 and 6 apply.

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Double Leaf Vestibule Door – Examine


OJ 6101

Scheduled Work

1. Place the auxiliaries switch to the OFF position.
2. Examine the rubber door nosing for signs of perishing and damage.
3. Examine the door frames for rigidity and security of fixing.
4. Examine the Perspex windows for cracks, burns and damage.
5. With the door in the closed position check that the leaves are hung correctly and that the nosing rubber is contacting the jamb pillar along most of its lengths.
6. Check the door pocket for litter or other debris which may obstruct the door; this may be viewed at the bottom of the door and also from within the control cupboard.
7. Close and open the door by hand. Check that:
 - 7.1 The force required is reasonable.
 - 7.2 The guides and runner bars are secure by attempting to move the doors at right angles to the direction of travel.
 - 7.3 The leading door travels at twice the speed of the trailing door and they overlap by approximately 20mm.
 - 7.4 The bottom of the leading door (with handle) is located by means of 2 nylon blocks sliding on a runner bar.
 - 7.5 The bottom of the trailing door is located by means of a runner bar fitted to the trailing edge of the door, sliding in a nylon guide secured to the floor.

Arising Work

2. If the door nosing rubber is defective, renew (see Materials item 1).
3. If any joints in the door frame have become loose, repair or renew door leaf (see Materials item 2).
4. If the Perspex window or window rubbers are damaged, renew the Perspex window (see Materials item 3). If damaged renew the glazing rubber (see Materials item 4).
5. If the door leaves are not parallel or upright, investigate cause. If only adjustment required, set up door in accordance with the specified document (see Reference Documents item 2). Add or remove the large M8 washers Form C (see Materials item 5) from between the door and hanger brackets.


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Double Leaf Vestibule Door – Examine

OJ 6101

5. Renew damaged components; (see Reference Drawings items 2, 3, 4 and 5).
6. Clear out the door pocket.
- 7.1 Check that the auxiliaries switch is set to “OFF”, then check the pressure reading on gauge ‘H’ (see Figure 2 of Job No. OJ 6102).
- 7.1 Investigate reason for stiffness, if necessary disconnect the piston rod to move doors independently (see Reference Drawing item 3). Check that the bearing is fitted and free to turn. Renew the roller bearing (see Materials item 6). Reconnect the piston rod.
- 7.2, If the runner bars, guides or other equipment are loose, re-secure loose fasteners. If damaged or missing, renew the door runners or track.

Leading door runner bar	(see Materials item 7)
Roller bracket assembly	(see Materials item 8)
Trailing door rear runner bracket	(see Materials item 9)
Trailing door rear runner nylon block	(see Materials item 10)
Door guide on floor of door pocket	(see Materials item 11)
- 7.3 Renew the toothed belt (see Materials item 12). Renew the door gear assembly (see Materials item 14).
- 7.4 Renew the guide blocks - see items 5 and 6 on the specified drawing (see Reference Drawings item 6).
- 7.4 Renew the runner bar – see item 06 and 07 (see Reference Drawings item 7).
- 7.5 Renew the nylon guide item 04 (see Reference Drawing item 6).

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Double Leaf Vestibule Door – Test

OJ 6102

Materials			
Item	Description	Qty/Veh	Cat No.
1	EP Valve (Schrader Bellows Part Nos. 19114 and 19701)	As Req'd	098/072734
2	Door Gear Assembly (Schrader Bellows Part No. 44918A)	As Req'd	8501389-01
3	Vestibule Door Relay	As Req'd	064/000495
4	Filter Regulator	As Req'd	064/004263

Reference Drawings		
Item	Drawing No.	Title
1	A1-A0-8501440	Wiring Diagram Disabled Persons Lavatory Mark 3A FO
2	A1-A1-8501438	Control Panel General Arrangement (Disabled Persons Toilet)

Reference Documents		
Item	Document No.	Title
1	TI/TP0461	Improved Method of Retaining Core Matting in Coach Vestibule
2	WOSS 643/2	Vestibule Auto Doorgear Associated with Invalid Toilet Auto Doorgear

SAFETY CONDITION SC1


APPLIES TO: Vehicles fitted with a BRB disabled toilet (No.2 end two leaf vestibule door adjacent to the disabled toilet only) – see Section 5.9 for details.

NOTE 1: Vehicles identified as “BRB-MML” in Section 5.9 have single-leaf vestibule doors fitted for which Job No. OJ 0138 Parts 0 and 6 apply.

NOTE 2: Air supply required on the main reservoir pipe, auxiliaries switch at ‘AUX’ or ‘AUX + AIR COND’, vestibule door isolation switch at ‘ON’ position.

Scheduled Work

- Stand on the mat switch and check that the door opens smoothly in 3 to 4 seconds without jarring.
- Tread on every part of the mat switch for 8 seconds and check that the door stays open.
- Stand clear of the mat switch and check that the door closes smoothly in 7 to 8 seconds.
- Repeat steps 1 to 3 for the mat switch on the other side of the doorway.

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Double Leaf Vestibule Door – Test

OJ 6102

Arising Work

1. a) Door does not open all.

Open the control cupboard door on the opposite side of the vestibule to the toilet (behind the fire extinguisher) and check the following:

- i) In the lower (pneumatic) control box (see Figure 2), check that:

- isolating cock 'I' is in the normal operation position, i.e. in line with the pipe.
- pressure is showing on both gauges.

Gauge 'G' (left hand side, filter/regulator)	50-52 psi
Gauge 'H' (right hand side, regulator only)	27-31 psi

- ii) In the upper (electrical) control box (see Figure 1) check the following whilst standing on one of the mat switches:

Is 110V present on terminal 133?

NO: Investigate power supply fault.

YES: Is 110V present on terminal 846? (check VDIS is turned ON).

NO: Vestibule Door Isolation Switch or its wiring is defective.

YES: Is 110V present on terminal 169?

YES: EP Valve is defective. Renew EP valve (see Materials item 1).

or

Door is obstructed, jammed or door gear is defective. See Job No. OJ 6101 - examination of double leaf vestibule door.


If no fault found, renew or repair door gear assembly, (see Materials item 2).

NO: Does the mat switch on other side of the door operate?

YES: Mat Switch or its wiring is defective, renew the mat switch in accordance with the specified document (see Reference Documents item 1).

NO: Vestibule Door Relay or its wiring is defective; see below.

Renew the vestibule door relay (see Materials item 3). Refer to the specified drawing (see Reference Drawings item 1).

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Double Leaf Vestibule Door – Test

OJ 6102

Other useful information:

Investigate and rectify the wiring fault. Useful Cat. Nos.:

Capacitor C1	1000 μ F	064/000496
Resistor R1	100 Ω	064/000137
Resistor R2	300 Ω	064/001028

For overhaul of the following components, refer to the specified document (see Reference Documents item 2):

Filter Regulator (see Materials item 4)
Solenoid Valve (shown as ISO valve in Part C)
Door Track
Actuator

- b) Door opens too quickly or too slowly.

In the lower (pneumatic) control cupboard (see Figure 2), check that the pressure gauges read:

Gauge 'G' (left hand side filter/regulator)	50-52 psi
Gauge 'H' (right hand side, regulator only)	27-31 psi

Reset if outside these limits.

2. Door does not stay open.


Check the operation of the mat switch on the other side of the door.

If only one side fails to hold the door open, that Mat Switch or its wiring is defective. Renew in accordance with the specified document (see Reference Documents item 1).

If both sides fail to hold the door open, there may be a fault on both mat switches or on the door open circuit; see item 1a) above.

3. a) If door fails to close at all:

- i) In the lower (pneumatic) control box (see Figure 2), check that:

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Double Leaf Vestibule Door – Test

OJ 6102

- the isolating cock 'I' is in the normal operating position, i.e. in line with the pipe.
- the pressure is showing on both gauges:

Gauge 'G' (left hand side, filter/regulator)	50-52 psi
Gauge 'H' (right hand side, regulator only)	27-31 psi

ii) In the upper (electrical) control cupboard:

Is 110V present on terminal 169 on LHCS?

NO: Door is damaged or jammed in some other way.
or
Door gear is defective. Renew or repair (see Materials item 2) (see above).
or
EP Valve or its wiring is defective. See above (see Materials item 1).
YES: Mat Switch or its wiring is defective (see Reference Documents item 1) and note above.
or
Vestibule Door Relay or its wiring is defective; see Page 2.


b) Door closes too fast or too slow.

In the lower (pneumatic) control cupboard, check that the pressure gauges read:

Gauge 'G' (left hand side, filter/regulator)	50-52 psi
Gauge 'H' (right hand side, regulator only)	27-31 psi

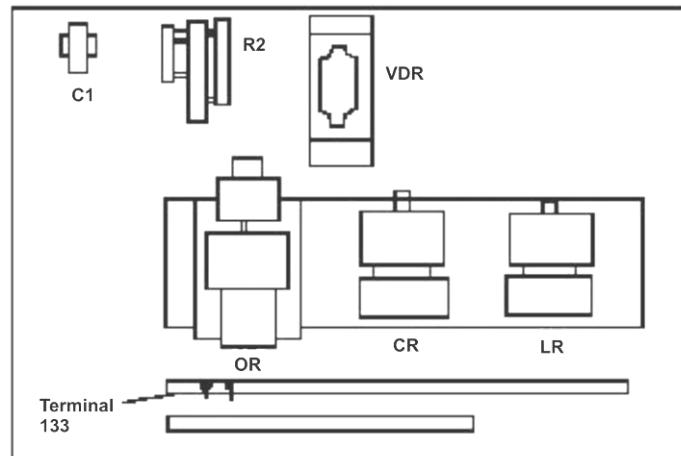
Reset if outside these limits.

Adjustment of the door closing time is also provided by the flow restrictor on valve 'E'.

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Double Leaf Vestibule Door – Test

OJ 6102



For more details of Electrical Control Panel, refer to the specified drawing (see Reference Drawings item 2).

Figure 1: Upper Electrical Control Panel

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Double Leaf Vestibule Door – Test

OJ 6102

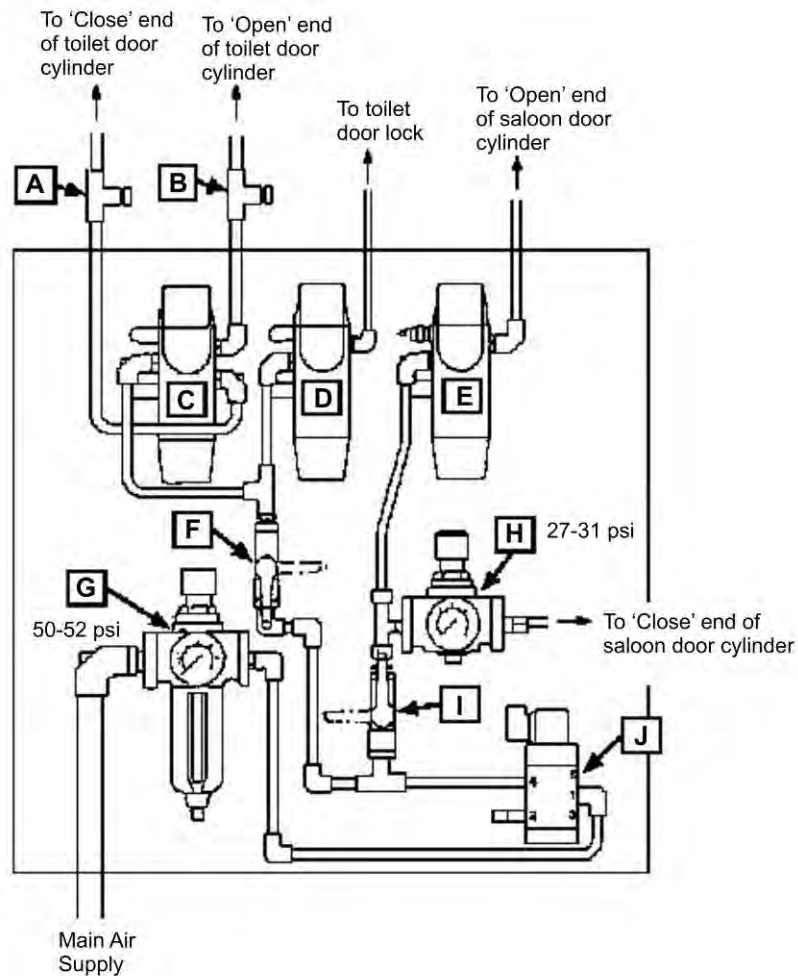



Figure 2: Lower Pneumatic Panel

(Located in vestibule, inside cupboard behind fire extinguisher, to right of saloon/vestibule door)

A	Flow regulator (toilet door open speed)	F	Isolating cock
B	Flow regulator (toilet door close speed)	G	Filter/regulator
C	Open valve (toilet door)	H	Pressure regulator
D	Lock valve (toilet door)	I	Isolating cock
E	EP valve (vestibule door)	J	Vent valve

NOTE 3: Valve 'J' not fitted.

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Brake Pipe Dump Valve – Renew

OK 0005


Materials			
Item	Description	Qty/Veh	Cat No.
1	Dump Valve	2	052/004264

APPLIES TO: All Vehicles

NOTE: A brake pipe dump valve is fitted at each end of all vehicles except the TGS, TRFB and TBRF vehicles which do not have these valves fitted at the non-CDL door end.

Scheduled Work

1. Check that the central locking air system and brake pipe are vented. If in doubt operate the control panel isolator in the isolation cupboard.
2. Remove the pilot valve pneumatic connections from the top and side of the brake pipe dump valve. Each connection is removed by pulling back the collar on the fitting and then pulling the nylon pipe out of the fitting.
3. Remove the two pneumatic 1¼" BSP brake pipe connections and remove the brake pipe dump valve.
4. Position a new brake pipe dump valve (see Materials item 1) and refit 1¼" BSP brake pipe connections, ensuring that the valve is correctly orientated (see Figure 1).
5. Examine the nylon air piping in accordance with Job No. OK 0149.
6. Refit the pilot valve pneumatic connections at the top and side of the brake pipe dump valve by pushing the nylon pipes into the fittings. Check that each pipe is secure.
7. Test the dump valve in accordance with Job No. OK 5001.

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Brake Pipe Dump Valve – Renew

OK 0005

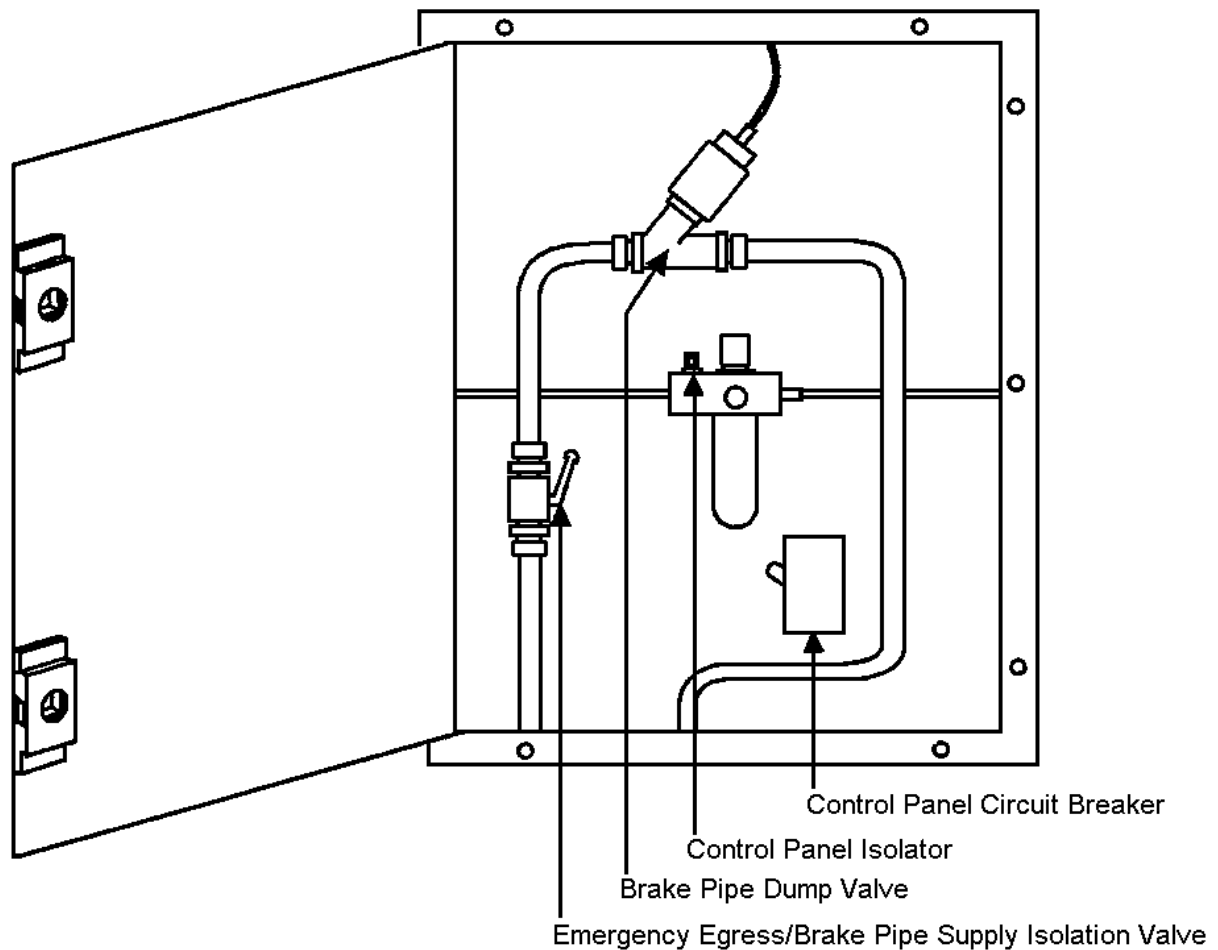



Figure 1: Location of Brake Pipe Dump Valve

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CDL Control Panel – Change

OK 0010

Materials			
Item	Description	Qty/Veh	Cat No.
1	Control Panel Standard (Type 1)	See Table 1	052/004249
2	Control Panel Standard (SDO) (Type 1)	See Table 1	064/009519
3	Control Panel No Pushbuttons (Type 2)	See Table 1	052/004251
4	Control Panel No Air Connections (Type 3)	See Table 1	052/004250

Vehicle Type	Quantities per Vehicle		
	Type 1	Type 2	Type 3
Fully seated vehicles e.g. TS, TF, TSO, TSD, TCC, TSOB, TSB, FO & FOD	2	0	0
BFO	1 (No 1 end) 2 (No 2 end)	0	0
TGS	1	0	2
TRFB, TBRF	1	0	0
RFM	1	1	-

Table 1: Quantities Per Vehicle Type


APPLIES TO: All Vehicles

NOTE 1: Selective Door Opening (SDO) panels are fitted to vehicles operated by FGW and XCT.

Scheduled Work

- Electrically isolate the central door locking system by unplugging both CDL jumpers at both ends of the vehicle. Move the MCB or rotary switch located in the isolation cupboard to the 'Off' position at both ends of the vehicle.
- On control panels types 1 and 2 pneumatically isolate the panel by operating the control panel isolator in the adjacent isolation cupboard.
- Open the control panel cover fully.
- Support the control panel and remove the eight M6 slotted pan head screws from the periphery of the panel.
- Unclip the retaining catch and unplug the multi-way connector at the top of the panel.
- Remove the earth connection from the panel.

NOTE 2: Prior to removing the pneumatic connections make a note of their positions and, if necessary, label them to assist with reconnection later.

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CDL Control Panel – Change

OK 0010

7. Examine the nylon air piping in accordance with Job No. OK 0149 (types 1 and 2 only).
8. Remove the eight pneumatic connections from the pneumatic module at the bottom of the control panel (types 1 and 2 only). These connections are removed by pulling back the collar on the fitting and then pulling the nylon pipe out of the fitting.
9. Remove the control panel.
10. Check that the overhauled control panel is of the correct type (see Materials items 1 to 4).

NOTE 3: Ensure that the overhauled panel has been subject to enhanced water-proofing modifications before fitting. Check for liberal layers of clear silicone sealant on the top of the panel, over both fuse holders, identify panel rivets, and around the edge of the casing/cover joints. Where necessary apply clear silicone sealant liberally over these areas before fitting.

11. Position the overhauled panel and make the eight pneumatic connections to the pneumatic module by pushing the nylon pipe into the appropriate fitting (control panels types 1 and 2 only). Check that the correct connections are made to each port, these being numbered 1 to 8 and that each connection is secure (see Figure 1).

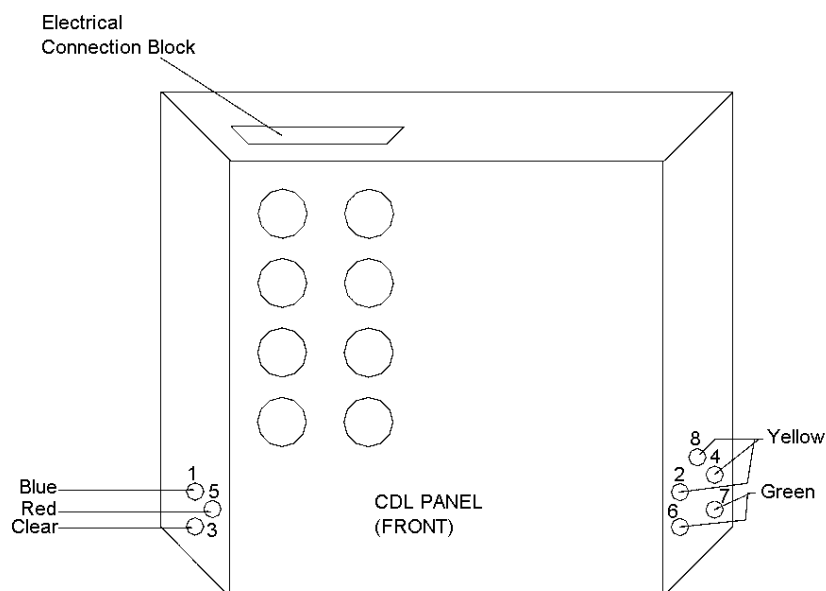



Figure 1: Air Pipe Connections to Central Door Locking Control Panel


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CDL Control Panel – Change

OK 0010

NOTE 4: Check that the electrical connector harness has been wrapped with self-amalgamating tape to a length of approximately 600mm from the connector body. This is to reduced water ingress into the connector gland. Where necessary, re-apply the self-amalgamating tape, starting at the cable entry gland at the connector end of the harness, stretching it until becomes half its normal width, and ensuring that the tape is overlapped at each turn. Continue until the cable harness is covered to a length of 600mm.

12. Plug the multi-way connector into the socket at the top of the control panel and engage the retaining clip. Check that the connector is secure.
13. Reconnect the earth connection.
14. Secure the panel with eight M6 slotted pan head screws around the periphery of the panel.
15. Mark the date of fitting on a visible portion of the panel, or attach a suitable label.
16. On control panels types 1 and 2 operate the control panel isolator in the adjacent isolation cupboard to remove the isolation.
17. Connect the CDL jumpers and move the MCB or rotary switch to the 'On' position.
18. Test the control panel in accordance with Job Nos. OK 5000 at C4, C4X, C3M or OK 5001 at C4E or C6.

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	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	

CDL Bolt – Renew

OK 0115

Materials			
Item	Description	Qty/Veh	Cat No.
1	Central Lock Bolt	4 (see Note 1)	052/004295
2	Washer, M6, Spring, Steel, EZP	16	003/195108
3	Nut, M6, Bent Beam, Steel, Grade 8, EZP	8	003/180317


Torque Figures			
Item	Description	Size	Torque (Nm)
1	Hexagonal Head Screw	M6	6

APPLIES TO: All Vehicles

NOTE 1: A CDL bolt is fitted to each door (4 per vehicle) on all vehicles except the HST TGS and TRFB/TBRF vehicles which do not have these fitted at the non-CDL door end (2 per vehicle).

Scheduled Work

1. Remove the central lock bolt as follows:
 - 1.1 Check that the central locking air system is vented. If in doubt operate the control panel isolator in the adjacent isolation cupboard.
 - 1.2 Remove the four screws at the top and the five screws at the bottom of the door header panel and remove the panel. The emergency egress handle break glass and door unlocked indicator light assembly will remain attached to the panel.
 - 1.3 Remove the two pneumatic connections from the central lock bolt. These connections are removed by pulling back the collar on the fitting and then pulling the nylon pipe out of the fitting.
 - 1.4 Check that the locking bolt is securely fitted i.e. there is no movement of the housing on the bracket, or the bracket on the cantrail closure plate.
 - 1.5 Note the quantity and thickness of the packing pieces between the adjusting plate and the bottom of the mounting bracket. Remove the two M8 hexagon head screws, bent beam nuts and washers securing the adjusting plate to the bottom of the mounting bracket. Retain the packing pieces and discard the bent beam nuts.
 - 1.6 Remove the two M6 bent beam nuts and washers securing the adjusting plate to the rear of the mounting bracket. Discard the bent beam nuts.
 - 1.7 Carefully remove the adjustment plate, complete with central lock bolt, from the mounting plate. Note the quantity and thickness of the packing pieces between the adjusting plate and the rear of the mounting bracket. Retain the packing pieces.

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CDL Bolt – Renew


OK 0115

- 1.8 Remove the four M6 hexagon socket head screws and spring washers securing the central lock bolt to the adjusting plate. Remove and discard the central lock bolt. Discard the spring washers.
2. Examine the nylon air piping in accordance with Job No. OK 0149.
3. Fit the new central lock bolt as follows:
 - 3.1 Position the new central lock bolt (see Materials item 1) on the adjustment plate and secure using four M6 hexagon head screws and new spring washers (see Materials item 2). Tighten the screws (see Torque Figures item 1).
 - 3.2 Check that the packing pieces are fitted in the same positions as noted in step 1.6 and loosely secure the adjustment plate to the rear of the mounting bracket using two new M6 bent beam nuts (see Materials item 3), and washers.
 - 3.3 Fit the packing pieces between the bottom of the adjustment plate and the mounting bracket in the same positions as noted in step 1.4. Secure the adjustment plate to the bottom of the mounting bracket using two M8 hexagon head screws, washers and new bent beam nuts.
 - 3.4 Fully tighten the two M6 bent beam nuts securing the adjustment plate to the rear of the mounting bracket.
 - 3.5 Make the two pneumatic connections to the central lock bolt by pushing the nylon pipe into the appropriate fitting. Check that the correct connections are made to each port and that each connection is secure.
 - 3.6 Refit and secure the door header panel.
4. Check the alignment of the striker plate and locking bolt in accordance with Job No. OKA0116. (See also Job No. OK 0148).

NOTE 2: The central lock bolt function will be tested in Job No. OK 5001.

Arising Work

- 1.4 Renew fixings in accordance with Job No. OKA0131.

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CDL Jumper Cable and Plug – Renew

OK 0120

Materials			
Item	Description	Qty/Veh	Cat No.
1	Jumper Cable Assembly (LPA Part. No. 39066/A)	2	052/070123
2	Termination Box	2	052/004260

Special Tools		
Item	Description	Cat No.
1	Crimp Tool	039/008126

Reference Drawings		
Item	Drawing No.	Title
1	1153218	Arrangement of Jumper Equipment Secondary Locking System U/F End Mk3 LHCS
2	1153897	Arrangement of Jumper Equipment Secondary Locking System U/F End Mk3 HST Coach

APPLIES TO: All Vehicles

NOTE 1: Job No. OK 0121 must be done at the same time as this job. See step 17.

NOTE 2: Some vehicles operated by FGW are modified with an alternative design jumper, which uses one jumper between a receptacle on vehicle (no dummy receptacles are used). Seek the Engineer's advice for requirements on such vehicles.

NOTE 3: Some vehicles operated by East Coast are modified with an alternative Glenaire design jumper, which uses one jumper between a receptacle on each vehicle (no dummy receptacles are used). Seek the Engineer's advice for requirements on such vehicles.

NOTE 4: For Anglia vehicles, the CDL jumpers are also used to convey Wi-Fi signals. Jumpers must be installed and connected in accordance with the current TOC VMI Task OKA0120.


NOTE 5: For additional information on the components and assembly, refer to Reference Drawings items 1 or 2.

Scheduled Work

1. Clean the exterior of the terminal box to prevent debris getting in.
2. Remove the termination box lid by removing 4-off M6 hex head captive screws.

CDL Jumper Cable and Plug – Renew

OK 0120


	VEHICLE OVERHAUL INSTRUCTION	PB/VI2133 Issue : 5 Section: 4 Page : 2 of 4
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3. Remove the 9-off M5 nuts and fan disc washers securing cables SL01 to SL08 and SCN to the terminal bars in the termination box. Discard the fan disc washers and any damaged or corroded nuts.
4. Record the cable positions and remove SL01 to SL08 and SCN for both jumper cable and receptacle. Leave the vehicle wiring in place.
5. Where fitted remove the jumper co-axial cable from the co-axial 'T' connector.
6. Withdraw the jumper cable through the termination box gland.
7. Remove the 2-off bent beam M8 nuts and washers securing the cable cleat to the side of the dummy receptacle mounting bracket. Discard the bent beam nuts.
8. Remove the jumper cable and plug and discard.
9. Examine the termination box. Any damage or corrosion which could allow water entry is unacceptable.
10. Check that the M6 hex head captive screws are undamaged.
11. Check the jumper cable termination box mounting bracket for defects and security.
12. Obtain a new jumper cable assembly (see Materials item 1).
13. Check that the cable identification sleeves on the jumper cable cores are in accordance with Table 1:

WIRE NUMBER	PIN
SL01	1
SL02	2
SL03	3
SL04A/4B	4
SL05	5
SL06	6
SL07	7
SL08	8

Table 1: Cable Identification Sleeves

14. Remove 5 to 6mm length of insulation from each jumper cable core and crimp on 9-off M5 ring terminals using crimp tool (see Special Tools item 1).
15. Insert the jumper cable free end through the termination box gland.
16. Place the M5 ring terminations of the cable on the correct terminals in the termination box, i.e. SL01 to SL08 etc., except wires SL05 and SL06 (near and far unlock) which must be crossed as detailed in Table 2. Secure using 9-off nuts and new fan disc washers.

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	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	

No.1 end			No.2 end		
Vehicle Wire to No.2 end	Wire to receptacle	Wire to jumper	Vehicle Wire to No.1 end	Wire to receptacle	Wire to jumper
SL05	SL05	SL06	SL05	SL06	SL05
SL06	SL06	SL05	SL06	SL05	SL06

Table 2: Cable Termination

NOTE 6: At the No. 1 end of the vehicle the Jumper Cable will have wires SL05 and SL06 crossed in the termination box. At No.2 the receptacle will have wires SL05 and SL06 crossed in the termination box. Care must be taken to check correct wiring at the vehicle end terminal boxes to check that the correct doors unlock. See Figure 1 for identification of vehicle ends.

17. Locate the spare terminal and connect the spare cable to the post.
18. Renew the CDL receptacle in accordance with Job No. OK 0121.

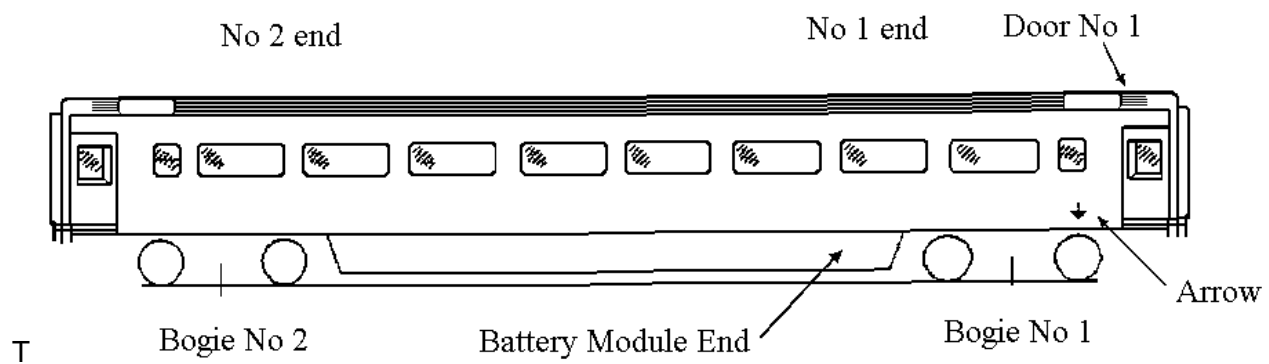



Figure 1: Location of Vehicle Features

NOTE 7: Recent conversions of Mark 3 LHCS to HST vehicles have made the use of “control end” and “Non control end” inconsistent and potentially confusing as a guide to vehicle orientation. To identify No.1 end, refer to Figure 1.

19. Renew the seal on the termination box lid.
20. Refit the termination box lid and secure using 4-off M6 hex head captive screws.
21. Secure the jumper cable to the side of the dummy receptacle mounting bracket using the cable cleat and 2-off M8 new bent beam nuts and washers.
22. Secure the jumper cable plug in the dummy receptacle of the vehicle, or the receptacle on the adjacent vehicle, as appropriate.

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CDL Jumper Cable and Plug – Renew

OK 0120

23. Test the new jumpers in accordance with Job No. OK 0150.

Arising Work

9. Repair the termination box so that it is waterproof. If any doubt exists renew the box (see Materials item 3).
10. Renew any damaged M6 hex head captive screws.
11. Repair or renew defective termination box mounting brackets and fit in accordance with Reference Drawings items 1 or 2.
11. If a termination box mounting bracket fastener is found to be loose, remove each fastener one at a time and fit new fasteners in accordance with Reference Drawings items 1 or 2.

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CDL Receptacle – Renew

OK 0121

Materials			
Item	Description	Qty/Veh	Cat No.
1	Receptacle (LPA Part No. 39232/A)	2	052/070124
2	Base Sealing Gasket (LPA Part No 29265)	2	-
3	Screw, M5 x 25, Hex Head, Grade 8.8, EZP	8	003/106315
4	Washer, Form A, Steel, EZP	8	003/190922
5	Nut, M5, Prevailing Torque, EZP	8	003/180312

Torque Figures			
Item	Description	Size	Torque (Nm)
1	Nuts	M5	6.5

Special Tools		
Item	Description	Cat No.
1	Crimp Tool	039/008126

Reference Drawings		
Item	Drawing No.	Title
1	1153218	Arrangement of Jumper Equipment Secondary Locking System U/F End Mk3 LHCS
2	1153897	Arrangement of Jumper Equipment Secondary Locking System U/F End Mk3 HST Coach

APPLIES TO: All Vehicles

Scheduled Work

NOTE 1: This job is to be done at the same time as Job No. OK 0120, i.e. step 1 of this job follows step 17 of Job No. OK 0120.


NOTE 2: In addition to renewing the receptacle, the cable to the terminal box is also renewed.

NOTE 3: Some vehicles operated by East Coast are modified with an alternative Glenaire design jumper, which uses one jumper between a receptacle on each vehicle (no dummy receptacles are used). Seek the Engineer's advice for requirements on such vehicles.

NOTE 4: For Anglia vehicles, the CDL receptacles are also used to convey Wi-Fi signals. Receptacles must be installed and connected in accordance with the current TOC VMI Task OKA0121.

NOTE 5: For additional information on the components and assembly, refer to Reference Drawings items 1 or 2.

1. Remove the 4-off M5 socket head screws and fan disc washers securing the receptacle case to the bracket.

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CDL Receptacle – Renew

OK 0121

2. Remove the receptacle case, complete with hinged cover from the bracket on the vehicle.
3. Remove the 42mm locking nut securing the armoured conduit and receptacle base.
4. Discard the receptacle.
5. Check the jumper cable main receptacle mounting bracket for defects and security.
6. Obtain a new receptacle (see Materials item 1).

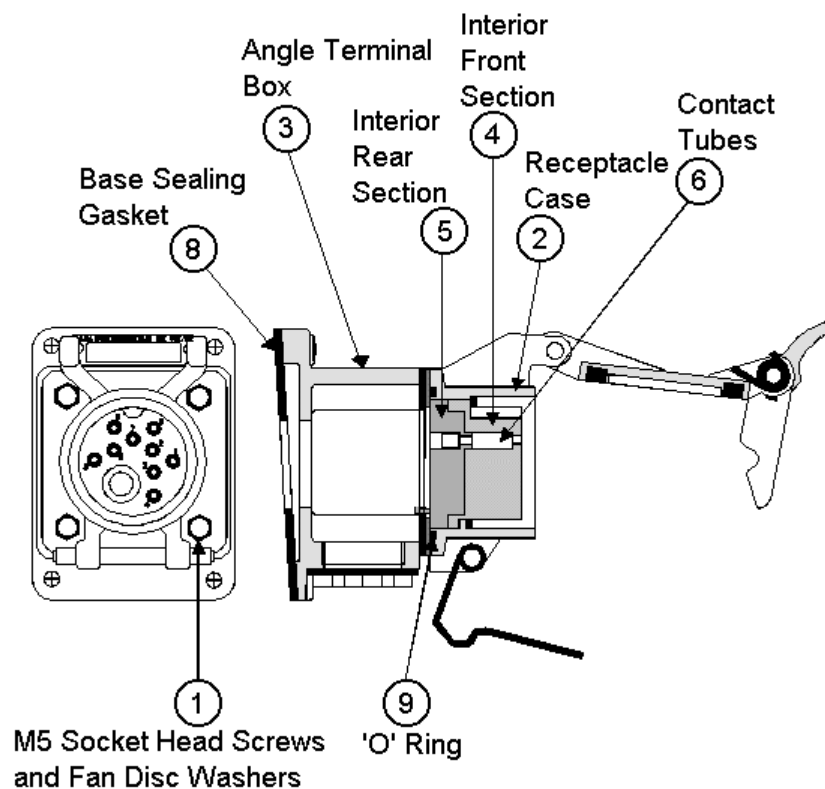



Figure 1: CDL Receptacle

7. Remove the 4-off M5 socket head screws and washers securing the receptacle case to the base.
8. Check that a new base sealing gasket is in place (see Materials item 2), and using the 42mm locking nut, secure the armoured conduit to receptacle base.
9. Feed the cables attached to the receptacle through the conduit to the terminal box.
10. Secure the receptacle to the mounting bracket using 4-off new M5 hex head screws, washers and nuts (see Material items 3, 4 and 5). Tighten in accordance with Torque Figures item 1.

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CDL Receptacle – Renew

OK 0121

11. Remove 5 to 6mm length of insulation from each cable core and crimp on 9-off M5 ring terminals using crimp tool (see Special Tools item 1).
12. Place the M5 ring terminations of cable SL01 to SL08 on the correct terminals in the termination box (as per OK0120 step 15). Locate spare terminal and connect spare cable to post. Secure using 9-off nuts and new washers as in Job No. OK 0120 step 16.
13. Refit the terminal box lid in accordance with Job No. OK 0120 steps 19 and 20.
14. Test the receptacle in accordance with Job No. OK 0150.

Arising Work

- 5 Repair or renew the defective mounting brackets and fit in accordance with Reference Drawings items 1 or 2.
- 5 If a mounting bracket fastener is found to be loose, remove each fastener one at a time and fit new fasteners in accordance with Reference Drawings items 1 or 2.

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CDL Dummy Receptacle – Renew

OK 0122

Materials			
Item	Description	Qty/Veh	Cat No.
1	Dummy Receptacle (LPA Part. No. 39223)	2	052/070121
2	Base Sealing Gasket (LPA Part No 29265)	2	-
3	Screw, M5 x 25, Hex Head, Grade 8.8, EZP	8	003/106315
4	Washer, Form A, Steel	8	003/190922
5	Nut, M5, Prevailing Torque, EZP	8	003/180312

Torque Figures			
Item	Description	Size	Torque (Nm)
1	Nuts	M5	6.5

Special Tools		
Item	Description	Cat No.
1	Crimp Tool	039/008126


Reference Drawings		
Item	Drawing No.	Title
1	1153218	Arrangement of Jumper Equipment Secondary Locking System U/F End Mk3 LHCS
2	1153897	Arrangement of Jumper Equipment Secondary Locking System U/F End Mk3 HST Coach

APPLIES TO: All Vehicles EXCEPT some FGW which have had these receptacles removed.

Scheduled Work

NOTE: This job does not apply to vehicles fitted with Glenaire CDL jumpers. Some vehicles have been modified with an alternative Glenaire design jumper, which uses one jumper between a receptacle on each vehicle (no dummy receptacles are used).

1. Remove and discard the 4-off M5 hex head screws, washers and bent beam nuts securing the dummy receptacle to its mounting bracket.
2. Remove the base sealing gasket between the dummy receptacle and mounting bracket and discard.
3. Check the jumper cable dummy receptacle mounting bracket for defects and security.
4. Fit a new base sealing gasket (see Materials item 2), and position the new dummy receptacle (see Materials item 1) to the mounting bracket.
5. Secure the receptacle to mounting bracket using 4-off new M5 hex head screws, washers and nuts (see Material items 3, 4 and 5). Tighten in accordance with Torque Figures item 1.


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CDL Dummy Receptacle – Renew

OK 0122

Arising Work

3. Repair or renew the defective mounting brackets and fit in accordance with Reference Drawings items 1 or 2.
3. If a mounting bracket fastener is found to be loose, remove each fastener one at a time and fit new fasteners in accordance with Reference Drawings items 1 or 2.

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CDL Air Supply Module – Change

OK 0133

Materials			
Item	Description	Qty/Veh	Cat No.
1	Air Supply Module (KV Part No. KPC 1652)	2 except HST TGS, TRFB & TBRF which have 1 at the CDL-protected door end	052/004265
2	Regulator, Filter Assembly for CDL System	As Req'd	052/070141
3	Kit, Mounting Filter Regulator for 052/070141	As Req'd	052/070140

APPLIES TO: All Vehicles

Scheduled Work


1. Remove the Air Supply Module as follows:
 - 1.1. Check that the vehicle air supply system is vented to zero pressure.
 - 1.2. Remove 2-off pneumatic connections from the Air Supply Module. One connection is removed by pulling back the collar on the fitting and then pulling the nylon pipe out of the fitting, the other being a screwed union.
 - 1.3. Remove 4-off M4 slotted head screws securing the Air Supply Module to the vehicle structure.
 - 1.4. Remove the Air Supply Module.

NOTE 1: If the module can be overhauled in accordance with a procedure agreed with the Engineer.

NOTE 2: If a module to the more recent design (see Materials item 2) is already fitted, the mounting feet (see Materials item 3) should not be changed unless found to be defective.

NOTE 3: If it becomes necessary to fit a module to the more recent design (see Materials item 2) then is already fitted, the label advising operational staff of the isolation procedure must also be changed as agreed with the Engineer.

2. Renew the module (see Materials item 1 or 2 and 3).
3. Examine the nylon air piping in accordance with Job No. OK 0149.
4. Fit the new or overhauled module as follows.
 - 4.1 Secure the Air Supply Module body to the vehicle structure using 4-off M4 slotted head screws.

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CDL Air Supply Module – Change

OK 0133

- 4.2 Make 2-off pneumatic connections to the Air Supply Module by pushing the nylon pipe into the appropriate fitting, and reconnecting the screwed union.
- 4.3 Re-pressurise the vehicle air supply system.
5. Test the Air Supply Unit as follows:
 - 5.1 Plug a test gauge into the connector on the front of the air fitter regulator.
 - 5.2 Check that the gauge is reading 4.6 to 4.8 bar.
 - 5.3 Remove the gauge and close the isolation cupboard door.

Arising Work

- 5.2 Reset the pressure regulator as follows:
 - a) Remove the locking circlip from the regulator knob.
 - b) Turn the regulator knob until the correct pressure is recorded.
 - c) The regulator must be set to 4.7 bar with the pressure rising.
 - d) Refit the locking circlip.

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CDL Emergency Egress Device – Renew

OK 0146

Materials			
Item	Description	Qty/Veh	Cat No
1	Transparent Cover	2	052/004288

SAFETY CONDITION SC1


APPLIES TO: See Table 1 below.

TF, TFD, TFE, TS & TSD	4 per vehicle
TCC & TSB	4 per vehicle
TGS, TBRF, & TRFB	2 per vehicle
TSO, TSOB, TSOD, FO & FOD	4 per vehicle
RFM	4 per vehicle
BFO	4 per vehicle

Table 1: Applicability and Quantity Information

Scheduled Work

1. Remove the egress device as follows:
 - 1.1 Check that the central locking air system is vented. If in doubt operate the control panel isolator and the emergency egress/brake pipe supply isolation valve in the isolation cupboard.
 - 1.2. Remove the two M4 socket head screws securing the emergency egress handle cover (including glazed panel) in position and remove cover. Check that the spring remains attached to the cover.
 - 1.3 Remove the four M4 slotted head screws securing the emergency egress valve body to the vehicle structure and pull the body forward.
 - 1.4 Unscrew and remove the pneumatic pipe from the valve at the rear of the emergency egress valve.
 - 1.5 Remove the emergency egress valve assembly.
2. Examine the nylon air piping in accordance with Job No. OK 0149.
3. Fit a new egress device as follows:

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CDL Emergency Egress Device – Renew

OK 0146

- 3.1 Refit the pneumatic pipe to the valve at the rear of the new emergency egress device (KV Part No. KPC 1653) by pushing the nylon pipe into the fitting. Check that the pipe is secure by attempting to pull the pipe out of the fitting.
- 3.2 Refit the emergency egress device body to the vehicle structure using four M4 slotted head screws.
4. Test the Emergency Egress Device in accordance with Job No. OK 5001.
5. Examine the transparent cover.
6. Refit the cover with the break-off tab at the bottom edge and check that the spring remains attached.

Arising Work

5. Renew the transparent cover if missing or damaged (see Materials item 1). If renewing the cover, check that the correct label is affixed.

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CDL Emergency Access Device – Overhaul

OK 0147


Materials			
Item	Description	Qty/Veh	Cat No.
1	Grease (Ironsides Blend A)	As Req'd	027/004331
2	Gasket	2	052/004287

Reference Drawings		
Item	Drawing No.	Title
1	1153201	Installation of Emergency Access for Mk3 HST and LHCS

APPLIES TO: All Vehicles (2 per vehicle, diagonally opposite corners) except TGS, TRFB and TBRF (2 per vehicle, each side at CDL-protected end) and BFO (1 per vehicle at No.1 End).

Scheduled Work

1. Remove the Emergency Access Device from the vehicle as follows:
 - 1.1 Remove the four M4 socket head screws securing the cover.
 - 1.2 Remove the cover and discard the gasket.
 - 1.3 Remove the four M4 slotted head screws securing the device to the bodyside and pull the device forward.
 - 1.4 Examine the nylon pipe in accordance with Job No. OK 0149.
 - 1.5 Unscrew and remove the nylon pipe from the valve at the rear of the device.
 - 1.6 Remove the emergency access device.
2. Overhaul the emergency access device as follows: (see Figure 1).
 - 2.1 Remove the pneumatic valve and discard.
 - 2.2 Remove the T handle from the housing.

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CDL Emergency Access Device – Overhaul

OK 0147

- 2.3 Remove the cover plate from the detent plunger.
- 2.4 Remove the plunger and spring.
- 2.5 Examine all parts for wear and damage.
- 2.6 Check that all corrosion protection is undamaged.
- 2.7 Lubricate all moving parts with grease (see Materials item 1).
- 2.8 Reassemble the detent plunger, spring and cover plate.
- 2.9 Refit the T handle and secure.
- 2.10 Operate the T handle and check that the detent mechanism operates correctly.
- 2.11 Fit a new pneumatic valve (KV Part No. KVL 2643Z1).
- 2.12 Check that the backing plate is free from corrosion or distortion.

3. Refit the Emergency Access Device to the vehicle as follows:

- 3.1 Refit the pneumatic pipe to the valve at the rear of the overhauled device by pushing the nylon pipe into the fitting. Check that the pipe is secure by attempting to pull the pipe out of the fitting.
- 3.2 Refit the overhauled device to the vehicle bodyside with four M4 slotted screws.
- 3.3 Test the Emergency Access Device in accordance with Job No. OK 5001.
- 3.4 Refit the cover with a new gasket (see Materials item 2) and secure with four M4 socket head screws.


Arising Work

NOTE: For additional information refer to Reference Drawings item 1.

- 2.5) Renew any defective parts.
- 2.6)

2.10 Investigate the cause and rectify.

2.12 Clean as necessary or repair/renew if defective.

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CDL Emergency Access Device – Overhaul

OK 0147

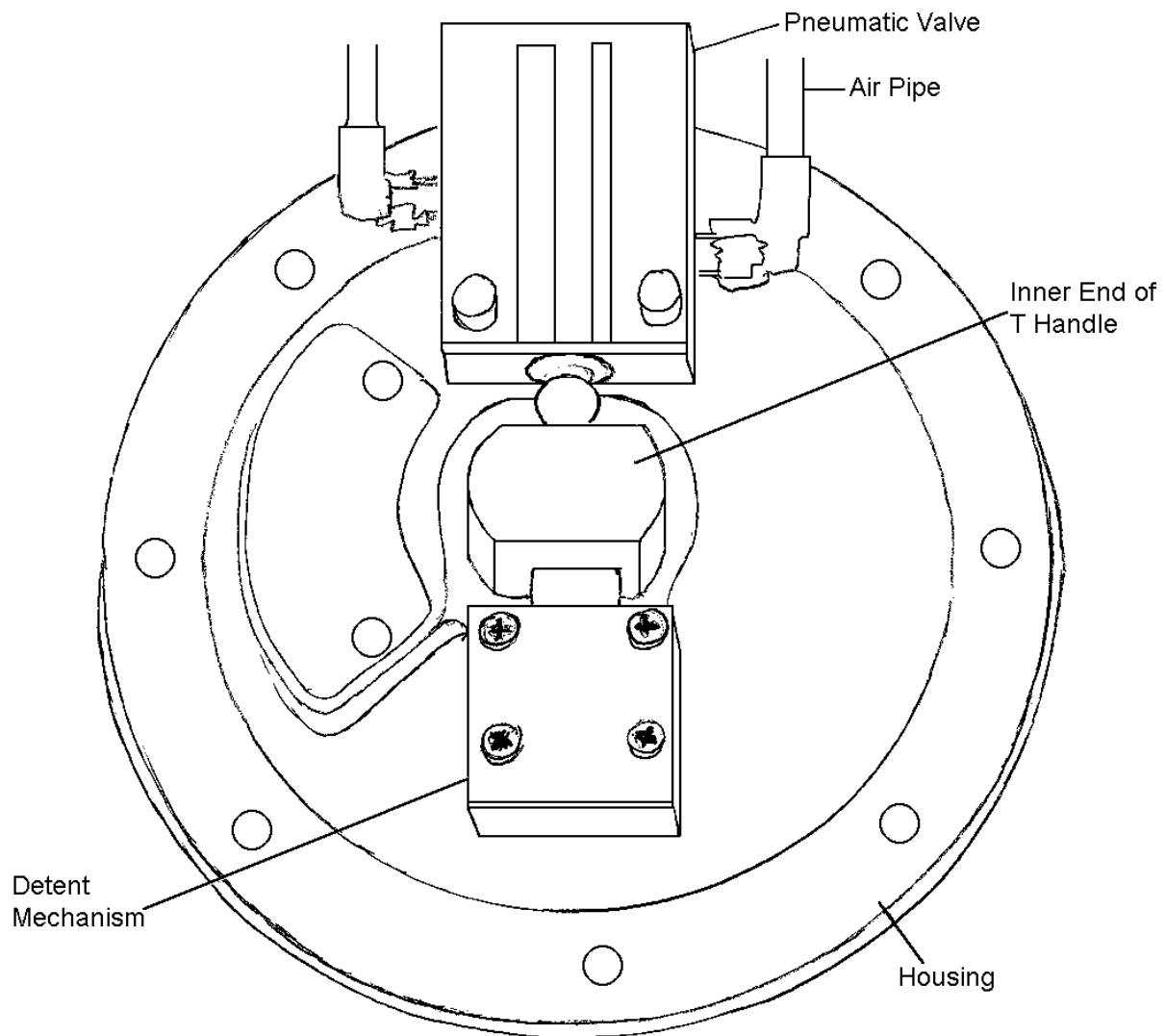



Figure 1: Rear View of Emergency Access Device

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CDL Striker Plate – Examine

OK 0148

Materials			
Item	Description	Qty/Veh	Cat No.
1	Screw, M8 x 40, Hex Head, Grade 8.8, EZP	4	035/100672
2	Washer, M8, Spring, Single Coil, Type A, EZP	4	003/195110
3	Flag Viewing Window	As Req'd	052/070125

Torque Figures			
Item	Description	Size	Torque (Nm)
1	Hexagonal Head Screw	M8	11

Reference Drawings		
Item	Drawing No.	Title
1	Adtranz/Bombardier 1132735	Shims

Reference Documents		
Item	Document No.	Title
1	TI/TI0024	Repair of Loco-hauled Coaching Stock, HST and Class 488 Outward Opening Bodyside Passenger Doors and Door Locks


APPLIES TO: See Table 1 below.

TF, TFD, TFE, TS & TSD	4 per vehicle
TCC & TSB	4 per vehicle
TGS, TBRF, & TRFB	2 per vehicle
TSO, TSOB, TSOD, FO & FOD	4 per vehicle
RFM	4 per vehicle
BFO	4 per vehicle

Table 1: Applicability and Quantity Information

NOTE 1: Step 2 of this job must be carried out on receipt of the vehicles, with air and battery supplies available. If this is not possible, the Supplier may carry out the work with the door removed (see Job No. OP 0118) using a method to be agreed with the Engineer, however, see NOTE 2.

NOTE 2: Parts 1 and 2 of this job are not required if the door has been condemned as a result of failing the criteria in Job Nos. OP 0116 or OP 0118.


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	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	

CDL Striker Plate – Examine

OK 0148

Scheduled Work

1. If required, operate the central locking system as follows:
 - 1.1 Open one control panel with a gated carriage key.
 - 1.2 At the panel, check that the green 'Panel Available' lamp is illuminated.
 - 1.3 Insert a central locking key in the keyswitch and turn to the 'Train' position. Check that the 'Power On' lamp (yellow) illuminates.
 - 1.4 Press the 'Train Doors Lock' pushbutton (blue) for approximately 2 seconds.
 - 1.5 Turn the keyswitch to the 'Off' position and remove the key.
2. Check the security of the striker plate on the door as follows:
 - 2.1 At each door being tested, check that the central lock bolt is in the extended position.
 - 2.2 Keeping one hand on the vertical grab rail, move the primary lock handle as far as it will go and push against the door.
 - 2.3 Check for movement of the striker plate on the door, particularly at the plate securing the striker plate to the door.
 - 2.4 Check for movement of the CDL bolt on its mountings. Note that the bolts will move within their guidance bushes by between ± 0.25 to ± 0.5 mm.
 - 2.5 Check that the door will not open more than 10mm.
3. Clean the striker plate as follows:
 - 3.1 Remove 4-off cross head screws securing the cover plate to the striker plate body casting.
 - 3.2 Remove the cover plate.
 - 3.3 Clean all parts of the striker plate mechanism ensuring that all dirt is removed from the interior of the body, and the top of the body casting in the recess surrounding the striker plate flag actuator.

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CDL Striker Plate – Examine

OK 0148

4. Examine the striker plate as follows:
 - 4.1 Check that there is no visible distortion, damage, wear or corrosion.
 - 4.2 With one finger, depress the striker plate flag actuator (see Figure 1), and check that the flag changes from yellow to black freely and without binding.
 - 4.3 Release the actuator and check that the spring returns the flag to yellow smoothly and quickly.
5. If required by the Engineer, renew the powder coating to an agreed specification.
6. Examine the cover plate, checking that the flag viewing window is fitted, with the blanking portion at the top.
7. Refit the cover plate and secure to the body with 4 cross head screws.
8. After Job No. OK 0115 has been carried out, check the alignment of the striker plate and locking bolt in accordance with Job No. OKA0116.

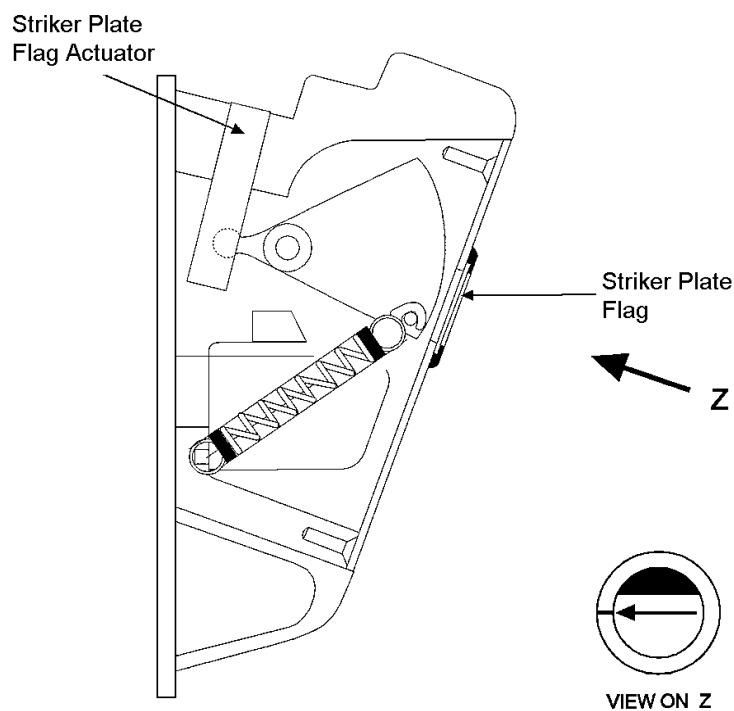



Figure 1: Cross Section of Striker Plate

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CDL Striker Plate – Examine

OK 0148

Arising Work

2.3, Remove the striker plate as follows:

2.5,

- & 4. a) Remove 4-off cross head screws securing the cover plate to the Striker Plate body casting.
b) Remove the cover plate.
c) Remove the 4 off M8 hex head screws securing the body casting to the door.
d) Remove the body casting, retaining the packing pieces behind the body casting.
e) Examine the striking plate to identify how it is secured to the door, and whether the tapped holes are damaged.

Using Table 2 decide the action to be taken.

Fixing Plate secured to door by:	Fixing Plate loose or distorted.	Threads damaged.
Blind Rivets (Doors built prior to 1993/94).	Renew loose rivets in accordance with Job No. OKA0129.	Renew fixing plate in accordance with Job No. OKA0128.
Welding (Doors built post 1993/94).	Renew door in accordance with the specified document Procedure M (see Reference Documents item 1)	Fit helicoil inserts in accordance with Job No. OKA0130.


Table 2: Repair Methods for Striker Plate Fixing Plate

- f) Fit a new or original striker plate body casting to the door, with the packing pieces in position between the body casting and the tapping plate.
- g) Secure using 4 off M8 hex head screws and spring washers (see Materials items 1 and 2). Tighten in accordance with Torque Figures item 1.
- h) Check that there is a gap between the door trim and body casting of 0.5 to 1.0mm. The body casting must not be tightened down onto the door interior trim.

If the clearance is incorrect, fit additional shims to achieve a 0.5 to 1.0mm clearance. Shims to be manufactured to Adtranz Drawing 05 or 10 (see Reference Drawings item 1).

2.4 If the CDL door bolt housing (i.e. not the bolt) moves, renew fixings in accordance with Job No. OKA0131.

6. Reposition the blanking portion at the top. Renew the flag viewing window (see Materials item 3).

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CDL Air Pipes – Examine

OK 0149


APPLIES TO: All Vehicles

Scheduled Work

1. Examine all visible lengths of the nylon pipes as follows:
 - 1.1 Check that the lengths of pipes, where they are connected to equipment, are satisfactory, in so far that:
 - 1.2 they are neither too long or too short.
 - 1.3 are not forced into sharp bends.
 - 1.4 are not rubbing on sharp edges.
 - 1.5 there is no visible damage.
2. Examine the fittings, checking that they are complete and free from damage.

Arising Work

- 1,2. Shorten the pipes if this will solve the problem.
Re-route or re-secure if possible.
Otherwise renew the sections of pipe using the following materials:
Nylon Tube 6mm OD.
Nylon Tube 4mm OD.

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CDL Cable Insulation Test

OK 0150

Special Tools		
Item	Description	Cat No.
1	Megger, 500V	-

Reference Documents		
Item	Document No.	Title
1	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of New Cables

APPLIES TO: All Vehicles

NOTE 1: This job is to be carried out after the following:

OK 0120 CDL Jumper Cable and Plug Renew
OK 0121 CDL Receptacle Renew

and when the vehicles are prepared in accordance with Job No. EW 5004 steps 1 to 8.


Scheduled Work

1. On TGS vehicles only, move the isolation switch on the CDL interface unit in the guards compartment to the ISOLATE position.
2. Check continuity between the jumper and receptacle at each end of the vehicle.
3. Check continuity between the jumpers.
4. Check continuity between all control panel multi-way connectors and the nearest jumper.
5. Using a 500 Volt Megger (see Special Tools item 1), test insulation of all Central Locking Circuits to frame. Minimum acceptable reading 10M Ohms.
6. Continue with Job No. EW 5004.
7. On completion of testing move the isolation switch mentioned in step 1 to the ON position.

Arising Work

- 2-4. Investigate any open circuits, correct and retest.
5. Identify the location of low insulation. Renew defective cables and retest.

NOTE 2: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 1).

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CDL Strainer Valves and Check Valves – Overhaul

OK 0151

Materials			
Item	Description	Qty/Veh	Cat No.
1	Non-Return Valve (IMI Norgren S522) ½" BSP	2	018/027757
2	Filter (Fairy Micro-Filtrex Ltd, Part No. MO94173-12-003)	As Req'd	-
3	Loctite 572	As Req'd	007/060325
4	Strainer (Complete)	As Req'd	052/004302
5	Strainer Element	As Req'd	052/004293

APPLIES TO: See Table 1 below.


TF, TFD, TFE, TS & TSD	2 sets per vehicle	behind headstock, corners 3 and 4
TCC & TSB	2 sets per vehicle	behind headstock, corners 3 and 4
TGS, TBRF, & TRFB	1 set per vehicle	behind headstock, corner 3
TSO, TSOB, TSOD, FO, FOD & RFM	2 sets per vehicle	centrally behind headstock, both ends
BFO	2 sets per vehicle	centrally behind headstock, both ends

Table 1: Applicability, Quantity and Location Information

NOTE: This job applies to the assemblies of pneumatic equipment located under each headstock.

Scheduled Work

1. Check that the vehicle air supply system is vented to zero pressure.
2. Dismantle the pipework and connections to separate the following items:
 - 2.1 Clean the pipework, strainers and valves to minimise the risk of dirt entering the system.
 - 2.2 Strainer in pipework from main reservoir pipe.
 - 2.3 Check the valve in the pipework from the main reservoir pipe.
 - 2.4 Check the valve in the pipework from the brake pipe.
 - 2.5 Filter in the pipework from the brake pipe (if fitted).

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CDL Strainer Valves and Check Valves – Overhaul

OK 0151

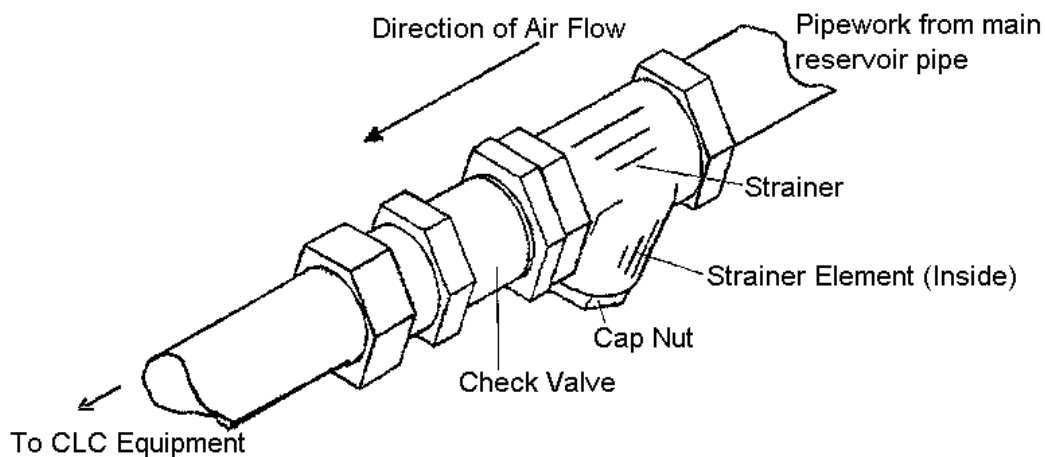



Figure 1: Central Locking Strainer and Check Valve

3. Renew the check valves (see Materials item 1).
4. Overhaul the strainer as follows:
 - 4.1 Examine the strainer body for damage.
 - 4.2 Remove the cap nut at the bottom of the strainer (20mm across flats) and remove the strainer element from the strainer body.
 - 4.3 Clean the strainer element using safe equipment.
 - 4.4 Examine the strainer element for damage.
 - 4.5 Refit the strainer element in the strainer body and secure with the cap nut.
5. Renew the filter in the pipework from the brake pipe (see Materials item 2).
6. Reassemble the check valves, strainer and filter (if fitted) to the pipework in accordance with the following:
 - 6.1 The arrows on the check valve bodies must point towards the central locking air supply.
 - 6.2 The air flow arrow on the strainer must match that on the check valve next to it.
 - 6.3 A bonded seal is in place on each connection.

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CDL Strainer Valves and Check Valves – Overhaul

OK 0151

- 6.4 Apply Loctite 572 (see Materials item 3) to the threads of each connection before assembly.
7. The air system must be tested in accordance with Job No. BZ 3001, and the central locking function in accordance with Job No. OK 5001.

Arising Work

- 4.1 Renew the strainer complete (see Materials item 4).
- 4.4 Renew the strainer element (see Materials item 5).

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CDL Interface Unit – Change

OK 0152

Materials			
Item	Description	Qty/Veh	Cat No.
1	Circuit Board (Whole Unit)	1	052/004301

APPLIES TO: TGS and BFO

Scheduled Work

1. Locate the Driver/guard interface unit located in the guards compartments. See Figure 1.
2. Remove the cover.
3. Make note of all connections to the circuit board and disconnect it.
4. Remove the circuit board.
5. Renew the circuit board complete (No details are available) for the whole unit (see Materials item 1).
6. Fit and connect the new circuit board.
7. Refit the cover.
8. When carrying out Job No. OK 5001 on TGS and BFO vehicles check that the Driver Guard signalling buzzer sounds when the signal push button on a CDL panel is pressed.

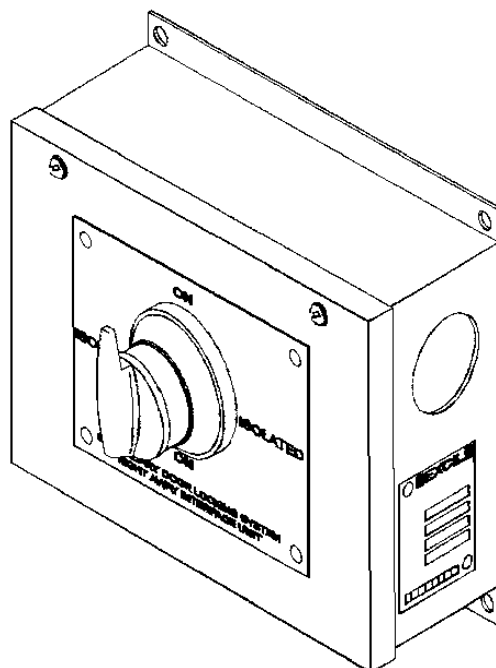



Figure 1: Driver Guard Interface Unit

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CDL – Test

OK 5000

Materials			
Item	Description	Qty/Veh	Cat No.
1	Bulb	As Req'd	054/038044
2	LED Bodyside Indicator	As Req'd	098/072852
3	Bodyside Indicator Gasket	As Req'd	098/005820
4	Grease, Molykote 33	As Req'd	027/002195
5	Lock Cleaner	As Req'd	027/001053

Reference Documents		
Item	Document No.	Title
1	TM/TP0056	Loco Hauled Coaching Stock and HST Outward Opening Door Fault Finding and Repair Procedure
2	CR/TP1084	Removal or Isolation of Defective or Redundant and Provision of Spare Cables

APPLIES TO: All Vehicles

NOTE 1: This job must be carried out in accordance with the sequence shown on Pages 16, 17 and 19 of Section 3.


NOTE 2: This job may be carried out on a single vehicle (see NOTE 3) or on a rake of vehicles. If carried out on a single vehicle separate test boxes must be connected to both the jumper and receptacle at each end of the vehicle. If vehicles are being tested in a rake all the jumper cables between vehicles must be connected and separate test boxes connected to both the jumper and receptacle at each end of the rake.

NOTE 3: Single Vehicle testing cannot be fully carried out on RFM, TRFB or TBRF vehicles. Seek advice from the Engineer if such a test is contemplated.

EQUIPMENT REQUIRED: Test boxes (see Page 7 for recommended test box).

Scheduled Work


1. Connect the test boxes as detailed in NOTE 1 above, and if more than one vehicle is being tested, couple all intermediate jumper cables.
2. Connect an air supply and turn the isolating cocks to the 'NORMAL' position.
3. Connect a 110 Volt battery charging or train supply.
4. Check that the light for Pin 4 is illuminated on each test box.
5. Open one Control Panel cover with a gated carriage key.

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CDL – Test

OK 5000

6. At the panel, check that the green PANEL AVAILABLE light is illuminated.
7. Spray the key switch with Kaba Lock Cleaner 8040 (see Materials item 5) using the tube provided with the aerosol can.
8. Insert the Central Locking Key in the Keyswitch and turn to the TRAIN position or “SELECT ALL DOORS” position for CDL+SDO panels. Check that the POWER ON light (yellow) illuminates.
9. Check that the PANEL AVAILABLE (green) lights are extinguished on both panels of connected vehicles.
10. Check that the lights for Pin 1 on each test box is lit.
11. Press the TRAIN DOORS UNLOCK Pushbuttons (red) simultaneously for approximately three seconds.
12. Check that the light for Pin 6 on the test box on that side of the vehicle is lit and that the lights for Pins 5 and 7 are not lit.
13. Check that the light for Pin 5 on the test box on the opposite side of the vehicle remains lit and that the light for Pin 6 is not lit.
14. Turn the keyswitch to the OFF position and remove the key. Close the control panel cover ensuring that it is secure.
15. Check that each door on the same side as the panel just used can be opened.
16. Check that all external and internal indicator lights are illuminated ON THE SAME SIDE OF THE TRAIN AS THE CONTROL PANEL and that BOTH bulbs are lit in each indicator light unit.
17. Check that no water is visible behind each external indicator light glass.
18. Check that no internal or external indicators have illuminated ON THE OPPOSITE SIDE OF THE TRAIN FROM THE CONTROL PANEL.
19. Press the signal pushbutton and check that it does not sound the sonalert and that the light for Pin 3 on each test box does NOT illuminate.
20. Press the ‘LOCK’ (blue) pushbutton for about two seconds and check that the ‘DOORS LOCKED’ light illuminates.
21. Check that all the door bolts have extended, except the local door bolt adjacent to the control panel.

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CDL – Test

OK 5000

22. Check that all exterior and interior door lights are extinguished on both sides of the vehicle.
23. Check that the light for Pin 7 illuminates on each test box.
24. Press the signal pushbutton and check that the sonalert sounds and that the light for Pin 3 on the test box on the side of the panel operated momentarily illuminates.
25. Turn the key to the 'OFF' position and check that the local door bolt extends.
26. Apply Molykote 33 medium grease (see Materials item 4) to each lock bolt in each of the vehicles being tested. Close each door in turn and check that the Lock Engagement Indicator changes from yellow to black.
27. At each door check that the arrow on the flag is aligned with the line on the aperture ring when locked. (A tolerance of ± 1 mm is permitted when viewing the arrow at 90°, see Figure 1).

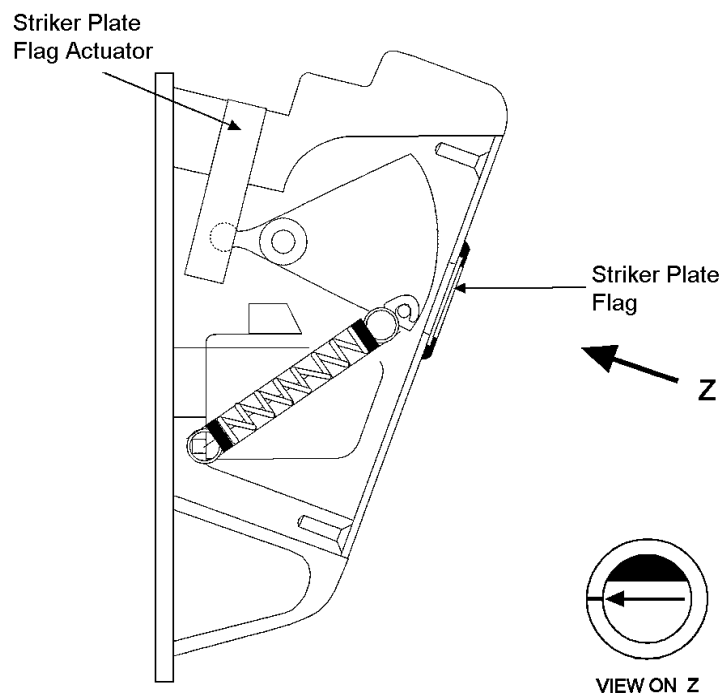



Figure 1: Striker Plate Flag Unit

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CDL – Test

OK 5000

28. Keeping one hand on the vertical grab rail, move the Primary Lock Handle as far as it will go and push against the door. Check that the door will not open more than 10mm measured at the lock edge.
29. Close each door fully and check that the handle has returned to the horizontal position.
30. Turn the Central Locking Key to the 'TRAIN' position or "SELECT ALL DOORS" position for CDL+SDO panels. .
31. Press the 'TRAIN DOORS UNLOCK' (red) pushbuttons for approximately three seconds. Press the 'TRAIN DOORS LOCK' (blue) pushbutton for approximately two seconds.
32. Repeat item 31 twice in order to work the grease into the lock bolts.
33. Press both 'TRAIN DOORS UNLOCK' (red) pushbuttons for approximately three seconds.
34. Turn the Keyswitch to 'OFF' and remove the key from the panel.
35. Check that the 'POWER ON' (yellow) light extinguishes.
36. Repeat items 1 to 35 on the opposite side of the vehicle.

ADDITIONAL WORK ON VEHICLES FITTED WITH CDL-SDO CONTROL PANELS

37. Insert the CDL key to a CDL-SDO panel and turn the CDL key to the 'Selected Doors Ahead' position.
38. Press both 'Train Doors Unlock' buttons simultaneously.
39. Check that the door adjacent to the CDL+SDO panel, and doors ahead of and on the same side of the train as the panel you are facing unlock and that the associated internal and external 'Doors Unlocked' indicators are illuminated.
40. Check that on all other doors the CDL lock bolts remain extended and that the internal and external 'Doors Unlocked' indicators are extinguished.
41. Turn the CDL key to 'SDO Hold', and remove the key. Check that the status of all the doors does not change and that operating the buttons on the CDL+SDO panel has no effect. Check also that all other 'Panel Available' lights are extinguished.
42. Re-insert the CDL key and move it to 'Select Doors Ahead'. Press the 'Doors Lock' button.
43. Check that all internal and external doors unlocked indicators are extinguished, but the door adjacent to the CDL+SDO panel remains unlocked. Walk through the train and check that all other CDL lock bolts are extended.

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CDL – Test

OK 5000

44. Turn the CDL key to the 'Off' position.
45. Check that the CDL lock bolt extends at the door adjacent to the CDL+SDO panel.
46. Turn the CDL key to the 'Select Doors Behind' position.
47. Press both 'Train Doors Unlock' buttons simultaneously.
48. Check that the door adjacent to the CDL+SDO panel, and doors behind and on the same side of the train as the panel you are facing unlock and that the associated internal and external 'Doors Unlocked' indicators are illuminated.
49. Check that on all other doors the CDL lock bolts remain extended and that the internal and external 'Doors Unlocked' indicators are extinguished.
50. Turn the CDL key to 'SDO Hold' and **remove the key**. Check that the status of all the doors does not change and that operating buttons on the CDL+SDO panel has no effect. Check also that all other 'Panel Available' lights are extinguished.
51. Re-insert the CDL key to 'Select Doors Behind' and press the 'Doors lock' button.
52. Check that all internal and external doors unlocked indicators are extinguished, but the door adjacent to the CDL+SDO panel remains unlocked. Walk through the train and check that all other CDL lock bolts are extended.
53. Turn the CDL key to the 'Off' position and check that the CDL lock bolt extend at the door adjacent to the CDL+SDO panel.
54. Repeat steps 37 to 52 for all CDL+SDO panels.

Arising Work

6. If the panel available light is not lit, see Job No. OKA0139, Procedure A.
8. Renew the 'POWER ON' bulb. If the light still does not illuminate, change the Control Panel in accordance with OK 0010.
9. If the green lights have not extinguished, trace and rectify the fault in accordance with Job No. OKA0139 Procedure G.
- 10,12, 13,6, 18,23. Check which test boxes are out of step with the others and trace location of fault in accordance with Job No. OKA0139 Procedure G. See Job Nos. OK 0120, OK 0121 and OK 0122 for renewing jumpers and receptacles.
Repeat steps 4 to 24 if wiring faults were found to check that no faults remain.
14. Repair the defects in the control panel covers.

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CDL – Test

OK 5000

15. If the central lock bolt will not retract, see Job No. OKA0139, Procedure D.

16. Renew the defective bulb or LED bodyside indicator (see Materials items 1 and 2). Examine the gasket.

NOTE 4: Many vehicles are now fitted with LED interior and exterior indicators. Failed units must be renewed for the same type.

17. Renew the gasket (see Materials item 3).

19. If the buzzer sounds, change the control panel in accordance with Job No. OK 0010.

20. Renew the DOORS LOCKED bulb/LED. If the light still does not illuminate, change the control panel in accordance with Job No. OK 0010.

21. If the lock bolt does not extend, see Job No. OKA0139, Procedure E.
25.

22. If the indicators still lit, see Job No. OKA0139, Procedure B.

24. If the buzzer does not sound, change the control panel in accordance with Job No. OK 0010.

26. If the indicator does not change from yellow to black change the striker plate in accordance with Job No. OK 0148.

27. If the arrow and line are misaligned by more than 1.5mm, adjust the striker plate and/or Central Lock Bolt in accordance with Job No. OKA0116. If the misalignment is 9mm or more the door requires attention in accordance with Job No. OP 0109.

28. If the door opens more than 10mm, the bolt requires adjusting in accordance with Job No. OKA0116.

29. If the door handle does not return to the horizontal, see Reference Document item 1 Procedure 1.

37-53 Any anomaly in the operation of the SDO system must be fully investigated and rectified before proceeding. Repeat this job following any repairs. Change the defective door control panels in accordance with Job No. No. OKA0010.

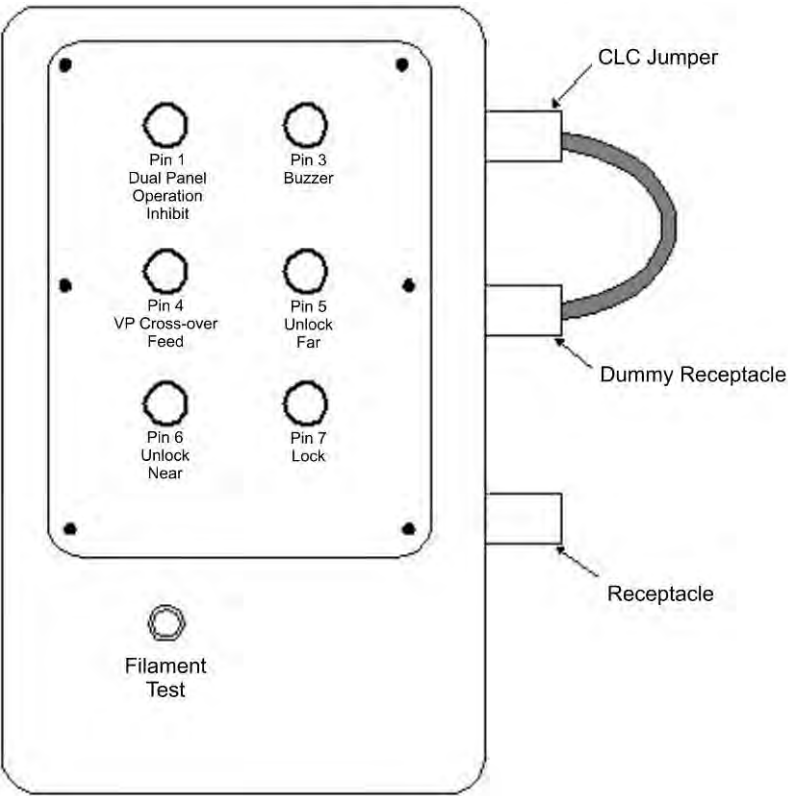
See Job No. OKA0139 to assist in fault finding.

NOTE 5: **Defective or redundant cables**

Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 2).

CDL – Test

OK 5000



NOTE

Plug vehicle jumper into
Test Box receptacle

OR


Plug test box jumper into
vehicle receptacle

NOT BOTH AT ONCE

Figure 1: Suggested Test Box

	Light Colour	Operation
Pin 1	Yellow	Dual Panel Operation Inhibit
Pin 2	-	Spare
Pin 3	White	Buzzer
Pin 4	Green	Vp cross over feed
Pin 5	Red	Unlock - Far
Pin 6	Orange	Unlock - Near
Pin 7	Blue	Lock
Pin 8	-	Return

Table 1: Function of Central Locking Jumper Wires

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CDL – Full Test

OK 5001

Materials			
Item	Description	Qty/Veh	Cat No.
1	Bulb	As Req'd	054/038044
2	LED Bodyside Indicator	As Req'd	098/072852
3	Bodyside Indicator Gasket	As Req'd	098/005820

Reference Documents		
Item	Document No.	Title
1	TM/TP0056	Loco Hauled Coaching Stock and HST Outward Opening Door Fault Finding and Repair Procedure
2	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables

APPLIES TO: All Vehicles

NOTE 1: This job must be carried out in accordance with the sequence shown on Pages 17 and 19 of Section 3.


NOTE 2: This job must be carried out on a single vehicle. If the contractor wishes to test a rake of vehicles, a procedure must be submitted to the Engineer for approval.

NOTE 3: Single Vehicle testing cannot be fully carried out on RFM, TRFB or TBRF vehicles. Seek advice from the Engineer if such a test is contemplated.

EQUIPMENT REQUIRED: Test boxes (see Page 10 for recommended test box).

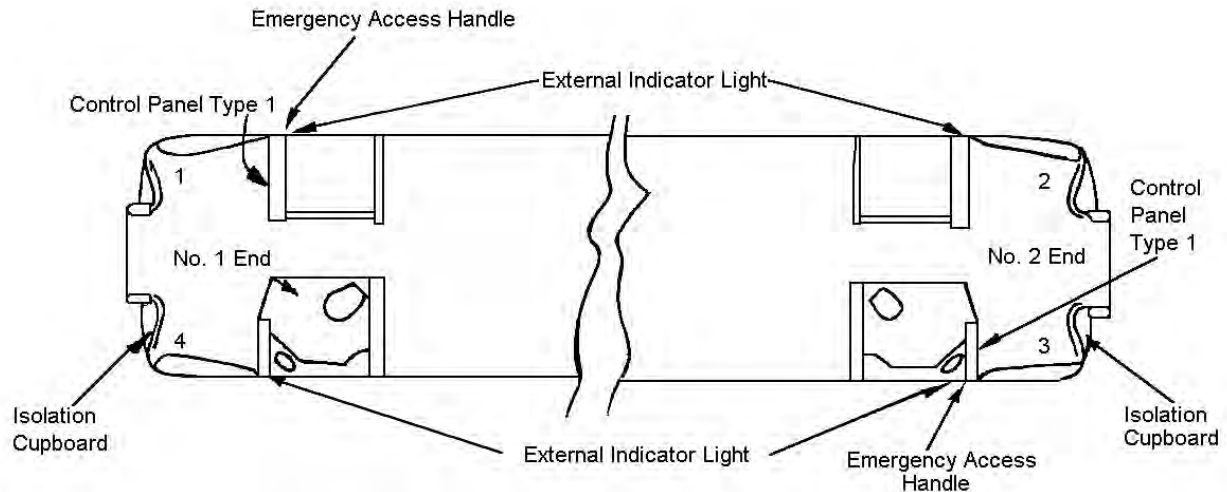
Scheduled Work

1. Connect an air supply and turn the isolating cocks to the 'NORMAL' position.
2. Connect the 110 Volt battery chargers or a train supply.
3. Connect a test box at each end of the vehicle. (Do not connect the inter vehicle jumpers).
4. Check that only the light for Pin 4 is illuminated on each test box.
5. Open one Control Panel cover with a gated carriage key.
6. At the panel, check that the green PANEL AVAILABLE light is illuminated.

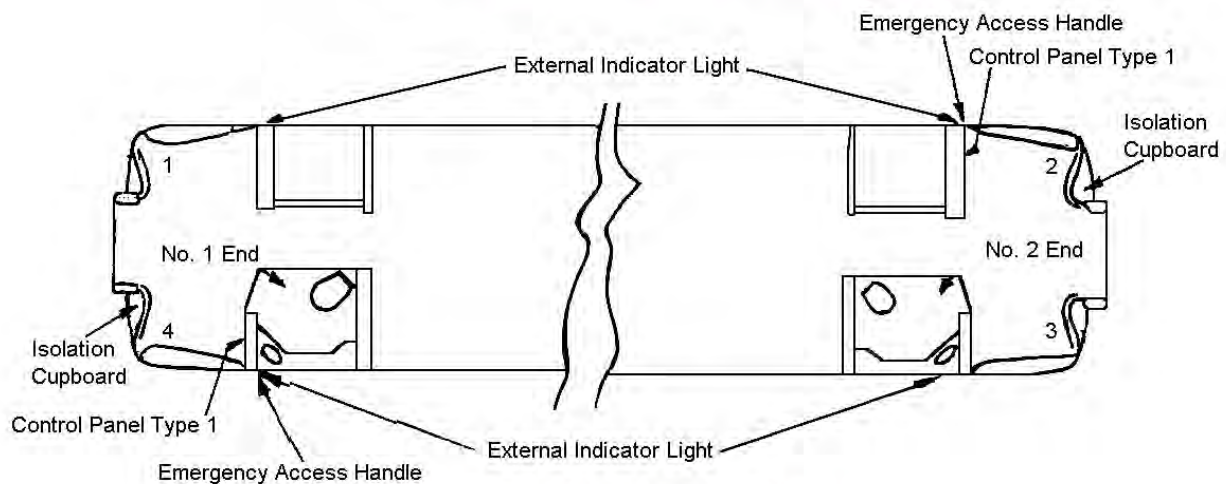
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CDL – Full Test

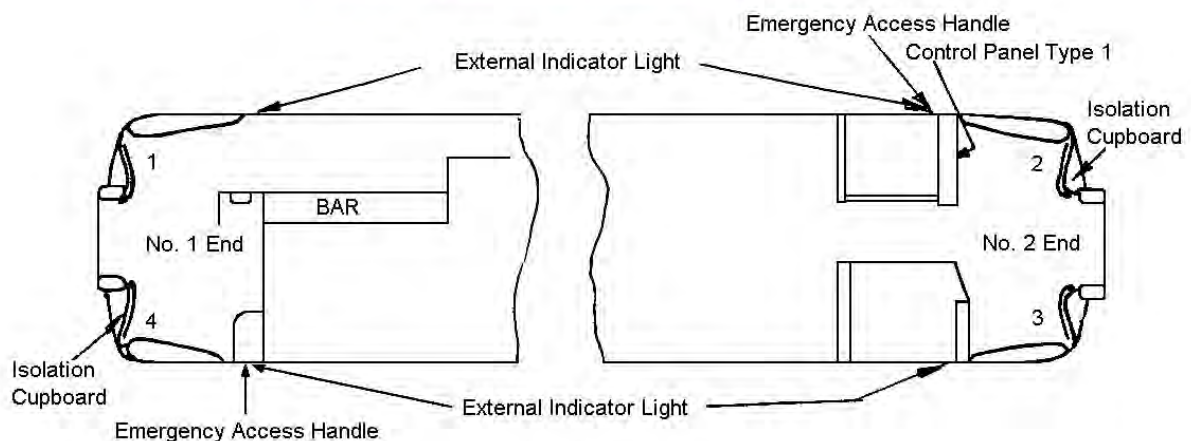
OK 5001




HST VEHICLES - EXCEPT TGS, TRBF & TBRF
(No. 2 ends of TRBF & TBRF are the same as No. 2 end of TF & TS)



LOCO HAULED MK3A AND MK3B
NOTE: BFO's have two Type 1 Panels at No.2 (Van) end



RF VEHICLES

	VEHICLE OVERHAUL INSTRUCTION	PB/VI2133
	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	Issue : 5 Section: 4 Page : 3 of 10

CDL – Full Test

OK 5001

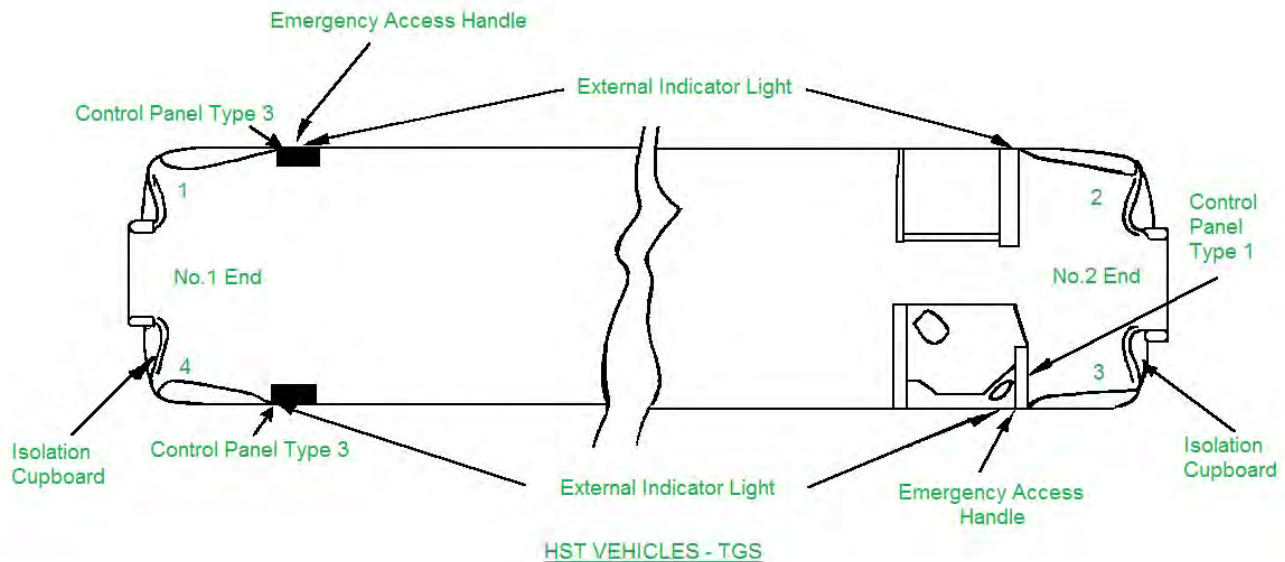



Figure 1: Location of Central Locking Equipment

NOTE 4: No.1 end is the Brake Module end. DO NOT rely on the Control end to indicate vehicle orientation.


7. Check the air pressure as follows:
 - 7.1 Open the adjacent isolation cupboard door with a gated carriage key.
 - 7.2 Plug the test gauge into the connector on the front of the air filter/regulator.
 - 7.3 Check that the gauge is reading 4.6-4.8 bar.
 - 7.4 Close the isolation cupboard door, ensuring that it is secure.
8. Insert the Central Locking Key in the Keyswitch and turn to the TRAIN position or "SELECT ALL DOORS" position for CDL+SDO panels. Check that the POWER ON light (yellow) illuminates.
9. Check that the PANEL AVAILABLE (green) light is extinguished on the other panel.
10. Check that lights 1 and 4 on each test box are illuminated.
11. Press the 'LOCK' (blue) pushbutton for about two seconds.
12. Press the TRAIN DOORS UNLOCK Pushbuttons (red) simultaneously for at least three seconds, whilst steps 13 and 14 are carried out.
13. Check that lights 1, 4 and 5 are illuminated on the far side test box (this end of vehicle).

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14. Check that lights 1, 4 and 6 are illuminated on the near side test box (other end of the vehicle).
15. Turn the keyswitch to the OFF position.
16. Check that each door on the same side as the panel just used can be opened.
17. Check that all external and internal indicator lights are illuminated **ON THE SAME SIDE OF THE VEHICLE AS THE CONTROL PANEL** and that **BOTH** lamps are lit in each indicator light unit.
18. Check that no water is visible behind each external indicator light glass.
19. Check that no internal or external indicators have illuminated **ON THE OPPOSITE SIDE OF THE VEHICLE FROM THE CONTROL PANEL**.
20. Turn the central locking key to the 'TRAIN' position or "SELECT ALL DOORS" position for CDL+SDO panels.
21. Press the signal pushbutton and check that it does not sound the sonalert and that the light for Pin 3 on each test box does **NOT** illuminate.
22. Press the 'LOCK' (blue) pushbutton for about two seconds.
23. Check that all door bolts have extended, except the local door bolt adjacent to the control panel.
24. Check that all exterior and interior door lights are extinguished on both sides of the vehicle.
25. Check that the lights 1, 4 and 7 are illuminated on each test box.
26. Press the signal pushbutton and check that the sonalert sounds and that the light for Pin 3 on the test box on the side of the panel operated momentarily illuminates.
27. Turn the key to the 'OFF' position and check that the local door bolt extends. (Not applicable to Type 3 panels).
28. Test the Emergency Egress Devices and Brake Pipe Dump Valve as follows:
 - 28.1 Fully charge the brake pipe to 5.1 bar using a brake test trolley.
 - 28.2 Remove the two screws holding the cover of one of the emergency egress handles (including glazed panel) and remove cover. Check that the spring remains stuck to the cover.
 - 28.3 Pull the emergency egress handle.

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CDL – Full Test

OK 5001

- 28.4 Check that the air can be heard exhausting from the brake pipe dump valve in the isolation cupboard.
- 28.5 Check that both the central locking bolts have fully retracted at this end of the vehicle.
- 28.6 Using a gated carriage key, reset the emergency egress handle.
- 28.7 Check that the sound of air escaping from the brake pipe dump valve ceases.
- 28.8 Check that both the central lock bolts have extended fully.
- 28.9 Refit the emergency egress handle cover (including glazed panel and spring assembly) ensuring the break tab is pointing downwards.
29. Test the Emergency Access Device (where fitted) as follows:
 - 29.1 Remove the four M4 cross head screws holding the emergency access handle cover (including glazed panel) in place and remove the cover.
 - 29.2 Turn the emergency access handle to the 'Release' position and check that the central locking bolt has retracted fully at the adjacent passenger door.
 - 29.3 Turn the emergency access handle to the 'Normal' position and check that the central locking bolt has extended fully.
 - 29.4 Refit the emergency access handle cover (including glazed panel).
30. Test the BFO Local Door Release as follows:

NOTE 5: There are two door release pushbuttons, one adjacent to the No.2 door and the other adjacent to the No.3 door.

 - 30.1 Press one of the local door release push buttons and check that it releases the door lock on the adjacent door for 15 seconds. Repeat the test for the pushbutton on the other side of the vehicle.
31. Close each door and check that the Lock Engagement Indicator changes from yellow to black.
32. At each door check that the arrow on the flag is aligned with the line on the aperture ring when locked. (A tolerance of ± 1 mm is permitted when viewing the arrow at 90°, see Figure 1).
33. Keeping one hand on the vertical grab rail, move the Primary Lock Handle as far as it will go and push against the door. Check that the door will not open more than 10mm measured at the lock edge.

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CDL – Full Test

OK 5001

34. Close each door fully and check that the handle has returned to the horizontal position.
35. Turn the Central Locking Key to the 'TRAIN' position or "SELECT ALL DOORS" position for CDL+SDO panels.
36. Press both the 'TRAIN DOORS UNLOCK' (red) pushbuttons for approximately three seconds.

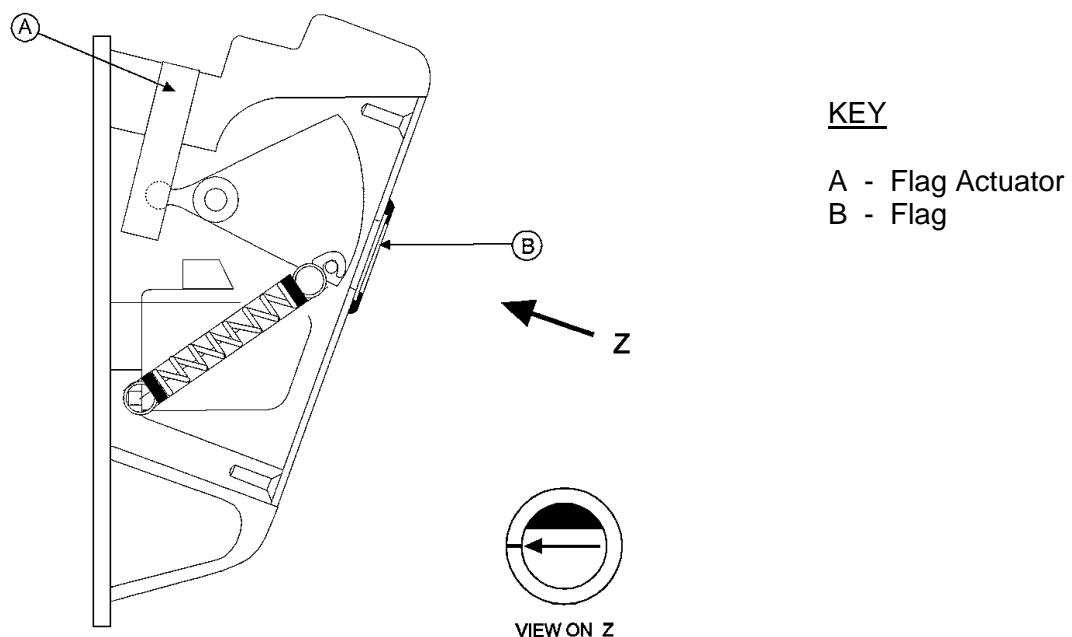



Figure 1: Striker Plate Flag Unit

37. Turn the Keyswitch to 'OFF' and remove the key from the panel.
38. Check that the 'POWER ON' (yellow) light extinguishes.
39. Repeat steps 1 to 38 on the opposite side of the vehicle.

ADDITIONAL WORK ON VEHICLES FITTED WITH CDL-SDO CONTROL PANELS


40. Insert the CDL key to a CDL-SDO panel and turn the CDL key to the 'Selected Doors Ahead' position.
41. Press both the 'Train Doors Unlock' buttons simultaneously.
42. Check that the door adjacent to the CDL+SDO panel, and the doors ahead of and on the same side of the train as the panel you are facing unlock and that the associated internal and external 'Doors Unlocked' indicators are illuminated.

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CDL – Full Test

OK 5001

43. Check that on all the other doors the CDL lock bolts remain extended and that the internal and external 'Doors Unlocked' indicators are extinguished.
44. Turn the CDL key to 'SDO Hold', and **remove the key**. Check that the status of all the doors does not change and that operating the buttons on the CDL+SDO panel has no effect. Check also that all the other 'Panel Available' lights are extinguished.
45. Re-insert the CDL key and move it to 'Select Doors Ahead'. Press the 'Doors Lock' button.
46. Check that all internal and external doors unlocked indicators are extinguished, but the door adjacent to the CDL+SDO panel remains unlocked. Walk through the train and check that all the other CDL lock bolts are extended.
47. Turn the CDL key to the 'Off' position.
48. Check that the CDL lock bolt extends at the door adjacent to the CDL+SDO panel.
49. Turn the CDL key to the 'Select Doors Behind' position.
50. Press both 'Train Doors Unlock' buttons simultaneously.
51. Check that the door adjacent to the CDL+SDO panel, and the doors behind and on the same side of the train as the panel you are facing unlock and that the associated internal and external 'Doors Unlocked' indicators are illuminated.
52. Check that on all the other doors the CDL lock bolts remain extended and that the internal and external 'Doors Unlocked' indicators are extinguished.
53. Turn the CDL key to 'SDO Hold' and **remove the key**. Check that the status of all the doors does not change and that operating buttons on the CDL+SDO panel has no effect. Check also that all the other 'Panel Available' lights are extinguished.
54. Re-insert the CDL key to 'Select Doors Behind' and press the 'Doors Lock' button.
55. Check that all the internal and external doors unlocked indicators are extinguished, but the door adjacent to the CDL+SDO panel remains unlocked. Walk through the train and check that all the other CDL lock bolts are extended.
56. Turn the CDL key to the 'Off' position and check that the CDL lock bolt extend at the door adjacent to the CDL+SDO panel.
57. Repeat steps 39 to 56 for all CDL+SDO panels.

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CDL – Full Test


OK 5001

Arising Work

4. If the pin 4 is not live at both ends, change the DC-DC converter in accordance with Job No. OKA0124.
4. If the pin 4 is not live at one end only investigate the wiring fault.
6. If the panel available light is not lit, see Job No. OKA0139, Procedure A.
- 7.3 Remove the locking circlip from the regulator knob. Turn the regulator knob until the correct pressure is recorded. The regulator must be set to 4.7 bar with the pressure rising. Refit the locking circlip. Change the air filter/regulator if defective.
8. Renew the 'POWER ON' bulb. If the light still does not illuminate, change the Control Panel in accordance with Job No. OK 0010.
9. If the green lights have not extinguished, trace and rectify the fault in accordance with Job No. OKA0139 Procedure G.
- 13, 14,17, 19,25 Check which test boxes are out of step with the others and trace the location of the fault in accordance with Job No. OKA0139 Procedure G. See Job Nos. OK 0120, OK 0121 and OK 0122for renewing the jumpers and receptacles.

Repeat steps 4 to 26 if wiring faults were found to check that no faults remain

15. Repair the defects in the control panel covers.
16. If the central lock bolt will not retract see Job No. OKA0139, Procedure D.
17. Renew the defective bulb or LED bodyside indicator (see Materials items 1 and 2). Examine the gasket.
18. Renew the gasket (see Materials item 3).
21. If the buzzer sounds, change the control panel in accordance with Job No. OK 0010.
22. Renew the DOORS LOCKED bulb. If the light still does not illuminate, change the control panel in accordance with Job No. OK 0010.
- 23,27. If the lock bolts do not extend, see Job No. OKA0139, Procedure E.
24. If the indicators still lit, see Job No. OKA0139, Procedure B.
26. If the buzzer does not sound, change the control panel in accordance with Job No. OK 0010.
- 28.4, 28.7 Check that the brake pipe isolation valve (red handle) is in the normal position, otherwise change the brake pipe dump valve in accordance with Job No. OK 0005.

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CDL – Full Test

OK 5001

28.5, Change the emergency egress device in accordance with Job No. OK 0146.

28.6,
28.7

29.2, Change the emergency access device in accordance with Job No. OK 0147.

29.3

- 30. Determine the cause and rectify.
- 31. If indicator does not change from yellow to black change striker plate in accordance with Job No. OK 0148.
- 32. If the arrow and line are misaligned by more than 1mm, adjust the striker plate and/or Central Lock Bolt in accordance with Job No. OKA0116. If the misalignment is 9mm or more the door requires attention in accordance with Job No. OP 0109.
- 33. If the door opens more than 10mm, the bolt requires adjusting in accordance with Job No. OKA0116.
- 34. If the door handle does not return to the horizontal (see Reference Documents item 1) Procedure1.
- 40-56 Any anomaly in the operation of the SDO system must be fully investigated and rectified before proceeding. Repeat this job following any repairs. Change the defective door control panels in accordance with Job No. OKA0010.

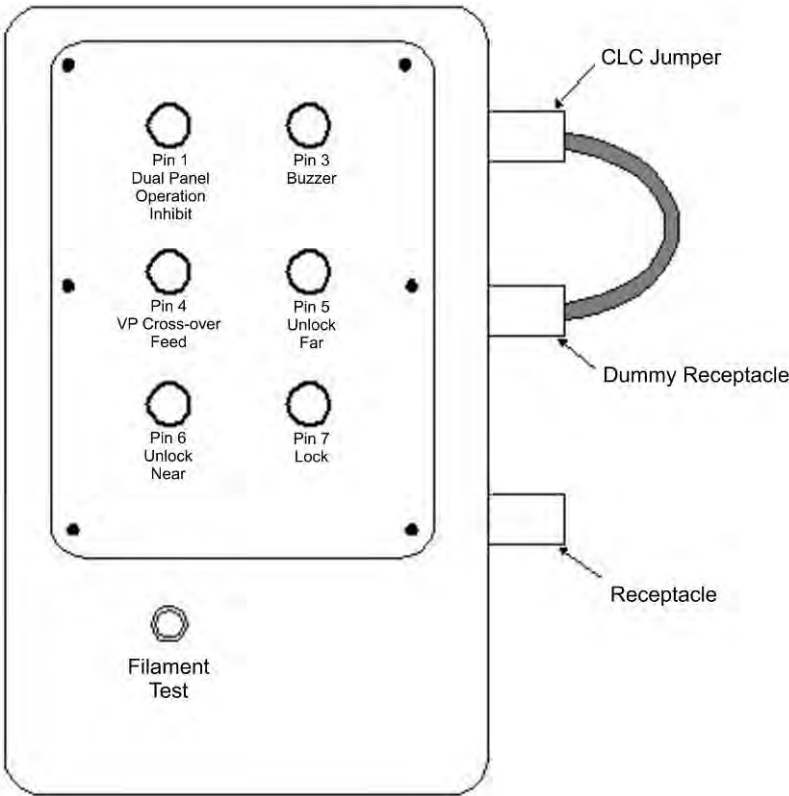
See Job No. OKA0139 to assist in the fault finding.

NOTE 6: Defective or redundant cables must be removed or isolated in accordance the specified document (see Reference Documents item 2).

Repeat the appropriate steps after carrying out any repairs or rectification work.

CDL – Full Test

OK 5001



NOTE

Plug vehicle jumper into
Test Box receptacle

OR


Plug test box jumper into
vehicle receptacle

NOT BOTH AT ONCE

Figure 2: Suggested Test Box

	Light Colour	Operation
Pin 1	Yellow	Dual Panel Operation Inhibit
Pin 2	-	Spare
Pin 3	White	Buzzer
Pin 4	Green	Vp cross over feed
Pin 5	Red	Unlock - Far
Pin 6	Orange	Unlock - Near
Pin 7	Blue	Lock
Pin 8	-	Return

Table 1: Function of Central Locking Jumper Wires

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Pressure Regulator - Setting and Control Panel Pressure Switch - Test **OKA0110**


APPLIES TO: All Vehicles

Scheduled Work

1. Open the Control Panel cover with a gated carriage key.
2. At the panel, check that the green PANEL AVAILABLE Light is illuminated.
3. Move the gangway door away from the vestibule end panel.
4. Open the adjacent isolating cupboard door with a gated carriage key.
5. Plug the test gauge into the connector on the front of the air filter/regulator.
6. Remove the locking circlip from the regulator knob.
7. Check that the gauge is reading 4.6 to 4.8 bar. Turn the regulator knob to achieve this pressure if required.
8. Turn the regulator knob to reduce the pressure slowly. Note the pressure at which the PANEL AVAILABLE light goes out, i.e. the pressure switch has opened. This must occur in the range 1.0 to 1.1 bar.
9. Turn the regulator knob to increase the pressure slowly. Note the pressure at which the PANEL AVAILABLE light illuminates, i.e. the pressure switch has closed. This must occur in the range 1.0 to 1.2 bar.
10. Reset the pressure regulator to 4.6 to 4.8 bar. Refit the locking circlip and disconnect the test gauge.
11. Close the isolation cupboard door, ensuring that it is secure.
12. Secure the gangway door in the normal position.
13. Close the Control Panel cover, ensuring that it is secure.

Arising Work

7. If the correct pressure cannot be achieved, change the air supply module in accordance with Job No. OK 0133.
- 8&9. If the pressure switch is not working correctly, change the central locking Control Panel in accordance with Job No. OK 0010.
- 11&13 Repair the access doors.

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CDL Bolt – Adjust

OKA0116

Materials			
Item	Description	Qty/Veh	Cat No
1	Packings 1mm thick	As Req'd	064/006428
2	Packings 2mm thick	As Req'd	064/006429


APPLIES TO: All Vehicles

Scheduled Work

1. Remove the four screws at the top and the five screws at the bottom of the door header panel and remove the panel.

NOTE: The emergency egress handle break glass and door unlocked indicator light assembly will remain attached to the panel.

2. Check that the central lock bolt is fully extended and the door is closed.
3. Check that the dimension at position 'C' (see Figure 1), is between 1.5mm to 2.0mm. If adjustment is necessary add or remove the packing at position 'B' as follows:
 - 3.1 Slacken the two M8 hexagon head screws, washers and bent beam nuts securing the lock bolt adjustment plate to the bottom of the mounting bracket. Remove the two M5 bent beam nuts and washers securing the lock bolt adjustment plate to the rear of the mounting bracket. Discard the bent beam nuts.
 - 3.2 Fit or remove the packings as necessary. Packings available are 1mm thick (see Materials item 1) and 2mm thick (see Materials item 2).
 - 3.3 Secure the lock bolt adjustment plate to the rear of the mounting bracket using the new M5 bent beam nuts and washers. Do not tighten the bent beam nuts fully.
 - 3.4 Remove the two M8 hexagon head screws, washers and bent beam nuts securing the lock bolt adjustment plate to the bottom of the mounting bracket. Discard the bent beam nuts.
 - 3.5 Check the arrow on the flag is aligned with the line on the aperture ring. Add or remove packing at position 'A' to align the arrow. A 1.0 mm change in packing thickness will move the arrow by 2.4mm. Packings available are 1mm thick (see Materials item 1) and 2mm thick (see Materials item 2).
 - 3.6 Secure the lock bolt adjustment plate to the bottom of the mounting bracket using two M8 hexagon head screws, washers and new bent beam nuts.

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CDL Bolt – Adjust

OKA0116

- 3.7 Fully tighten the 2-off M5 bent beam nuts securing the lock bolt adjustment plate to the mounting bracket.
4. Refit and secure the door header panel.
5. Test the central lock bolt in accordance with Job No. OK 5000 at C4, C4X, C3M overhauls, and OK 5001 at C4E or C6 overhauls.

Arising Work

- 3.7 Repair defective bolt fastenings in accordance with Job No.OKA0131.

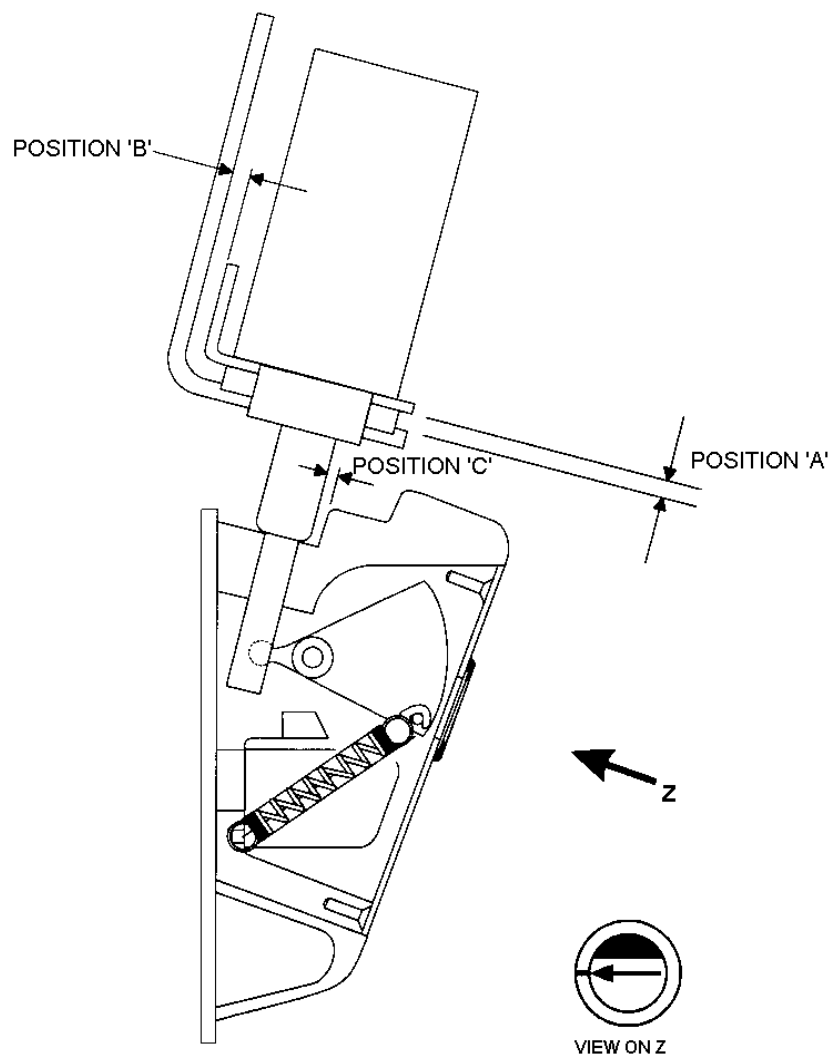



Figure 1: Door Bolt Adjustment

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D.C. - D.C. Converter – Change

OKA0124


Materials			
Item	Description	Qty/Veh	Cat No.
1	D.C - D.C Converter	1	052/004290

APPLIES TO: All Vehicles

Scheduled Work

1. Remove the 6A battery box fuse, located in the battery fuse box.
2. Remove 1-off M6 nut and washer securing the earth cable to the D.C. - D.C. Converter earth stud and remove the cable.
3. Remove the cover from the D.C. - D.C. Converter termination box.
4. Remove 2-off M5 nuts and washers securing the input cables and 2-off M6 nuts and washers securing the output cables to the terminations in the termination box. Remove the cables, noting which cable is on which terminal. Remove the termination box cover from the cables and refit on the D.C. - D.C. Converter.
5. Remove 6-off M6 bent beam nuts and washers securing the D.C. - D.C. Converter to its mounting bracket. Discard the bent beam nuts. Remove the D.C. - D.C. Converter.
6. Secure the new D.C. - D.C. Converter (see Materials item 1) to the mounting bracket using 6-off new bent beam nuts and washers.
7. Remove the cover from the D.C. - D.C. Converter termination box.
8. Feed the input and output cables through the holes in the termination box cover.
9. Refit 4-off input and output cables to the terminals in the termination box, ensuring that the cables are on the correct terminals. Secure using M5 and M6 nuts and washers as appropriate.
10. Secure the termination box cover to the D.C. - D.C. Converter.
11. Refit the earth cable to the D.C. - D.C. Converter earth stud and secure using the M6 nut and washer.
12. Refit the 6A battery box fuse.
13. With no jumpers connected and the auxiliary switch in the AUX or AUX and AIR COND position, check that Pin 4 on one CDL jumper is being supplied at 24 volts.

NOTE: The converter is mounted in the vehicle vestibule except on catering vehicles where they are in the ceiling of the staff compartment.

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CDL Striker Plate/Tapping Plate – Renew

OKA0128

Materials			
Item	Description	Qty/Veh	Cat No.
1	Tapping Plate ABB No. 113-6644-03 L.H. 113-6604-03 R.H	As Req'd As Req'd	- -
2	Fastener (Huck MGL 1100-R8-8)	As Req'd	-

Torque Figures			
Item	Description	Size	Torque (Nm)
1	Hexagonal Head Screw	M8	11

Special Tools		
Item	Description	Cat No.
1	6.6 mm Diameter Drill	-
2	Pneumatic Rivet Gun	-
3	Huck Magna Lok ¼ diameter nose assembly to suit type of Rivet Gun used	-

Reference Drawings		
Item	Drawing No.	Title
1	Adtranz/Bombardier 1132736	Shims

Reference Documents		
Item	Document No.	Title
1	TI/TI0024	Repair of Loco-hauled Coaching Stock, HST and Class 488 Outward Opening Bodyside Passenger Doors and Door Locks


APPLIES TO: All Vehicles

NOTE: The central lock striker plate/tapping plate can only be renewed on the blind fastener type as new doors are supplied with a fully welded tapping design.

The suppliers of the specialised tools and material are:

Bombardier Transportation
Crewe Works
West Street
Crewe
Tel: 01270 538808
(Door reinforcing kit)

Huck International Ltd
Unit C, Stafford Park 7
Telford
Shropshire
Tel: 01952 290459
(Magna Lok Fasteners)


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CDL Striker Plate/Tapping Plate – Renew

OKA0128

Scheduled Work

1. Pneumatically isolate the central locking system in the vestibule by operating the control panel isolator in the adjacent isolation cupboard.
2. Remove 4-off cross head screws securing the outer cover plate to the striker plate body casting and remove the cover plate.
3. Remove 4-off M8 hex head screws securing the body casting to the door and remove the body casting, retaining the packing pieces from behind it.
4. Remove 4-off cross head screws securing the tapping plate cover plate to the door, and remove the cover plate.
5. Drill the heads off the 14 blind fasteners using a 6.6mm drill and punch out the fasteners. Care must be taken to check that the drill does not penetrate through the plate. Note the orientation of the plate and remove it.
6. Examine the exposed steel door framing. The minimum acceptable thickness of sound material is 2mm.
7. Check that the holes in the door frame and angle bracket are not worn or corroded to more than 6.8mm diameter at any point. Mark the door such that any oversize holes can be identified with the new plate in position.
8. Align new tapping plate (see Materials item 1) on the door such that non oversize holes are concentric with the holes in the new plate. Check that the orientation of the tapping plate is as noted.
9. Drill holes 6.6 to 6.8mm diameter through the plate and door frame at all unmarked (i.e. not oversize) hole positions. The relevant number and position(s) of holes to be as shown in Figure 1.
10. Drill new 6.6 to 6.8mm holes through both the tapping plate and sound areas of the door frame to check that at least 14 sound holes are available.

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CDL Striker Plate/Tapping Plate – Renew

OKA0128

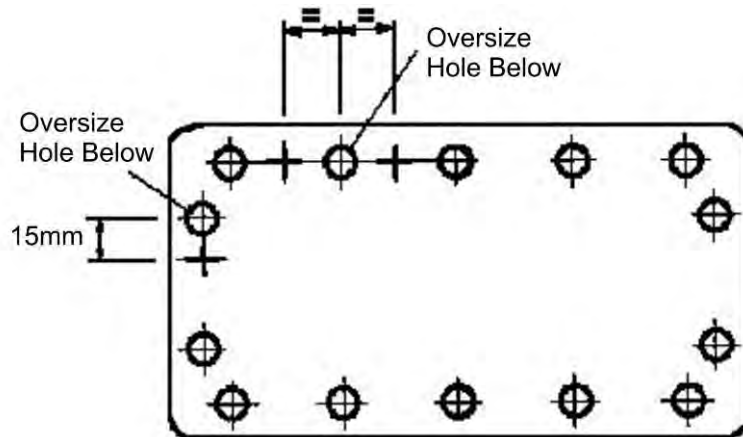



Figure 1: Locations for Remedial Drilling

(NOTE: In this example 15 sound holes will be available).

11. Countersink all holes to 11mm diameter by 100° except at marked position(s).
12. Secure the plate at all unmarked hole positions with Huck Magna Lok MGL 100-R8-8 fasteners (see Materials item 2).
13. Refit the GRP cover plate to the door using new crosshead screws and check that the surface of the tapping plate is flat and in line with the GRP cover.
14. Refit the striker plate body casting to the door, with the retained packing pieces behind it. Secure using 4-off M8 hex head screws. Tighten in accordance with Torque Figures item 1.
15. Check that there is a gap between the door trim and body casting of 0.5 to 1.0mm. The body casting must not be tightened down onto the door interior trim.
16. Fit the cover plate and secure to the body casting using 4-off cross head screws.
17. Operate the control panel isolator to remove the isolation.
18. Check the alignment of the central lock bolt and striker plate in accordance with Job No. OKA0116.

Arising Work


6. Renew the corner door in accordance with the specified document Procedure M (see Reference Documents item 1).

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CDL Striker Plate/Tapping Plate – Renew

OKA0128

13. Fit 25mm x 25mm square section steel packers of a suitable thickness (maximum thickness 3mm), to achieve a flat mounting area level with the GRP cover. Shims to be securing using Loctite 330 or tack welded.
15. Fit additional shims to achieve 0.5 to 1mm clearance. Shims to be manufactured to Adtranz Drawing items 05 or 10 (see Reference Drawings item 1).

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CDL Tapping Plate, Blind Fastener – Repair

OKA0129

Materials			
Item	Description	Qty/Veh	Cat No.
1	Fastener (Huck MGL 100-R8-8)	As Req'd	-

Torque Figures			
Item	Description	Size	Torque (Nm)
1	Hexagonal Head Screw	M8	11

Special Tools		
Item	Description	Cat No.
1	6.6mm Diameter Drill	-
2	Small Angle Grinder	-
3	Rivenut Place Tool KJ28	-
4	Pneumatic Rivet Gun	-
5	Huck Magna Lok ¼ Diameter nose assembly to suit type of Rivet Gun used	-

Reference Drawings		
Item	Drawing No.	Title
1	Adtranz/Bombardier 1132736	Shims


APPLIES TO: All Vehicles

The suppliers of the specialised tools and material are:

ABC Power Tools Unit 5 Macon Park Ind. Est. Crewe Cheshire Tel: 01270 589333 (Tools)	Huck International Ltd Unit C, Stafford Park 7 Telford Shropshire Tel: 0192 290459 (Magna Lock Fasteners)
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Scheduled Work

1. Pneumatically isolate the central locking system in the vestibule by operating the control panel isolator in the adjacent isolation cupboard.
2. Remove 4-off cross head screws securing the outer cover plate to the striker plate body casting and remove the cover plate.
3. Remove 4-off M8 hex head screws securing the body casting to the door and remove the body casting, retaining the packing pieces from behind it.
4. Remove 4-off cross head screws securing the tapping plate cover plate to the door, and remove the cover plate.

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CDL Tapping Plate, Blind Fastener – Repair

OKA0129

5. Check that the tapping plate is not distorted.
6. Drill the heads off any insecure fasteners using a 6.6mm drill and punch out the fasteners. Care must be taken to check that the drill does not penetrate through the plate and fit new Huck Magna Lok fastener/s (see Materials item 1).
7. Refit the GRP cover plate to the door using new crosshead screws and check that the surface of the tapping plate is flat and in line with the GRP cover.
8. Refit the striker plate body casting to the door, with the retained packing pieces behind it. Secure using 4-off M8 hex head screws. Tighten in accordance with Torque Figures item 1.
9. Check that there is a gap between the door trim and body casting of 0.5 to 1.0mm. The body casting must not be tightened down onto the door interior trim.
10. Fit the cover plate and secure to the body casting using 4-off cross head screws.
11. Operate the control panel isolator to remove the isolation.
12. Check the alignment of the central lock bolt and striker plate in accordance with Job No. OKA0116.

Arising Work

5. Renew the distorted tapping plate in accordance with Job No. OKA0128.
9. Fit 25mm x 25mm square section steel packers of a suitable thickness (maximum thickness 3mm), to achieve a flat mounting area level with the GRP cover. Shims to be secured using Loctite 330 or tack welded.
12. Fit additional shims to achieve 0.5 to 1mm clearance. Shims to be manufactured to Adtranz Drawing 05 or 10 (see Reference Drawings item 1).

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	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	

CDL Striker Plate Tapping Plate (Tapped Holes) – Repair **OKA0130**

Materials			
Item	Description	Qty/Veh	Cat No.
1	M8 x ID Helicoil Insert (S103CN)	As Req'd	-

Torque Figures			
Item	Description	Size	Torque (Nm)
1	Hexagonal Head Screw	M8	11

Special Tools		
Item	Description	Cat No.
1	8.3mm Diameter Drill	-
2	M8 Helicoil RUF and FIN taps	-
3	M8 Helicoil Insertion tool	-

Reference Drawings		
Item	Drawing No.	Title
1	Adtranz/Bombardier 1132736	Shims

APPLIES TO: All Vehicles (with fully welded striker plate tapping plates)


NOTE: The central locking striker plate tapping plate is secured to the door frame by one of two methods:

- i) Blind fastening to the door frame and angle brackets - applicable when the existing doors were fitted with central locking retrospectively.
- ii) Fully welded to the door frame - applicable to the door supplied already equipped for central locking.

This procedure cannot be used on doors using method i).

The recommended suppliers of the specialised tools and materials are:

Armstrong Fastenings Ltd
Gibson Lane
Melton
North Ferriby
North Humberside
Tel: 01482 633311

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CDL Striker Plate Tapping Plate (Tapped Holes) – Repair **OKA0130**

Scheduled Work

1. Pneumatically isolate the central locking system in the vestibule by operating the control panel isolator in the adjacent isolation cupboard.
2. Remove 4-off cross head screws securing the cover plate to the striker plate body casting and remove.
3. Remove 4-off M8 hex head screws securing the body casting to the door and remove the body casting, retaining the packing pieces from behind.
4. Remove the door interior trim panel.
5. Drill the damaged fixing hole(s) 8.3mm diameter and tap using the M8 Helicoil RUF and FIN taps (see Special Tools items 1 and 2).
6. Insert M8 x ID Helicoil Insert(s) (see Materials item 1) using Helicoil Insertion Tool (see Special Tools item 3) in accordance with the Manufacturer's instructions. Check the insert is just flush with the front face to the plate.
7. Refit the door interior trim.
8. Refit the striker plate body casting to the door, with the retained packing pieces in position between the body casting and door interior trim; secure using 4-off M8 hex head screws. Tighten in accordance with Torque Figures item 1.
9. Check that there is a gap between the door trim and body casting of 0.5 to 1.0mm. The body casting must not be tightened down onto the door interior trim.
10. Fit the cover plate and secure to the body casting using 4-off cross head screws.
11. Operate the Control Panel isolator to remove the isolation.
12. Check the alignment of the central lock bolt and striker plate in accordance with Job No. OKA0116.

Arising Work

9. Fit additional shims to achieve 0.5 to 1mm clearance. Shims to be manufactured to Adtranz Drawing items 05 or 10 (see Reference Drawings item 1).

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CDL Bolt Fastening – Repair

OKA0131

Materials			
Item	Description	Qty/Veh	Cat No.
1	Rivetnut Fastener (Lintite SM08)	As Req'd	-

Special Tools		
Item	Description	Cat No.
1	Small Angle Grinder	-
2	Rivetnut Placing Tool KJ28	-

Reference Drawings		
Item	Drawing No.	Title
1	PB-C1-2104295	Rectified CDL Bolt Bracket Installation - Mark 3 and HST Coaches
2	PB-C1-2104296	Modified CDL Door Bolt Mounting Bracket and Mounting Bracket
3	ABB 1153149	Installation of Door Bolt

Reference Documents		
Item	Document No.	Title
1	PB/MP1313	Central Door Locking Bolt Mounting Security – Check and Rectification Procedure

APPLIES TO: All Vehicles


NOTE: If the mounting bracket is not securely fitted to the cantrail closure plate, renew the fixings in accordance with the specified document (see Reference Documents item 1), and associated drawings (see Reference Drawings items 1, 2 and 3).

The recommended suppliers of the specialised tools and material are:

ABC Power Tools	Lintite System
Unit 5	PO Box 835
Macon Park Industrial Estate	Longacre
Crewe	Willenhall
Cheshire	West Midlands
Tel: 01270 589333	Tel: 01902 601888
(Rivetnut Placing Tool KJ28)	(Lintite Rivetnut SM08)

Scheduled Work


1. Pneumatically isolate the central locking system in the vestibule by operating the Control Panel isolator in the adjacent isolation cupboard.

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CDL Bolt Fastening – Repair

OKA0131

2. Remove 4-off screws at the top and 5-off screws at the bottom of the door header panel and remove the panel. The emergency egress handle break glass and Door Unlocked indicator light assembly will remain attached to the panel. Care must be taken not to damage the leads to the light assembly.
3. Note the positions of the 2 pneumatic connections to the central lock bolt and remove them. These connections are removed by pushing back the collar on the fitting and then pulling the nylon pipe out.
4. Remove the pneumatic central lock bolt including the adjuster bracket and packers complete, by undoing the four M8 bolts on the large mounting bracket.
5. Remove the damage fastening by carefully grinding off the front face and tapping the fastener body rearwards. Check there is no damage to the vehicle structure.
6. Fit an M8 Lintite rivetnut in place of the damaged fastener.
7. Fit the central lock bolt assembly using the M8 bolts, aligning the centre line of the pneumatic bolt with the centre line of the door mounted striker plate.
8. Make 2-off pneumatic connections to the central lock bolt by pushing the nylon pipe into the appropriate fitting. Check that the correct connection is made to each part. Check that each connection is secure.
9. Operate the control panel isolator to remove the isolation.
10. Check the alignment of the central lock bolt and striker plate in accordance with Job No. OKA0116.
11. Refit and secure the door header panel.
12. Re-test the central lock bolt to confirm that fitting the header panel has not affected the operation of the lock bolt.

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CDL - Fault Finding

OKA0139

Reference Drawings		
Item	Drawing No.	Title
1	1153218	Arrangement of Jumper Equipment Secondary Locking System U/F End Mk3 LHCS
2	1153897	Arrangement of Jumper Equipment Secondary Locking System U/F End Mk3 HST Coach

APPLIES TO: All Vehicles

INSTRUCTIONS

Follow the procedure until END is reached. If the fault was located during testing in accordance with Job No. OK 5000 return to scheduled work and complete the test.

This job contains the following Fault Finding procedures.

PROC NO.	FAULT	PAGE NO.
A	Panel available light not illuminated	2 and 3
B	Indicator does not extinguish on whole or part of train	4
C	Indicator not illuminated on whole or part of train	5
D	Central lock bolt does not retract	6
E	Central Lock bolt does not extend	7 and 8
F	Fault on intervehicle jumpers	9 and 10
G	Location of defective jumpers and control panels	11


NOTE 1: Within the following procedures the test boxes must also indicate a jumper cable fault as the appropriate light will not be lit on the test box.

NOTE 2: Some vehicles operated by FGW are modified with an alternative design jumper, which uses one jumper between a receptacle on the vehicle (no dummy receptacles are used). Seek the Engineer's advice for requirements on such vehicles.

NOTE 3: Some vehicles operated by East Coast are modified with an alternative Glenaire design jumper, which uses one jumper between a receptacle on each vehicle (no dummy receptacles are used). Seek the Engineer's advice for requirements on such vehicles.

CDL - Fault Finding

OKA0139

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NOTE 4: For Anglia vehicles, the CDL jumpers are also used to convey Wi-Fi signals. Jumpers must be installed and connected in accordance with the current TOC VMI Task OKA0120.

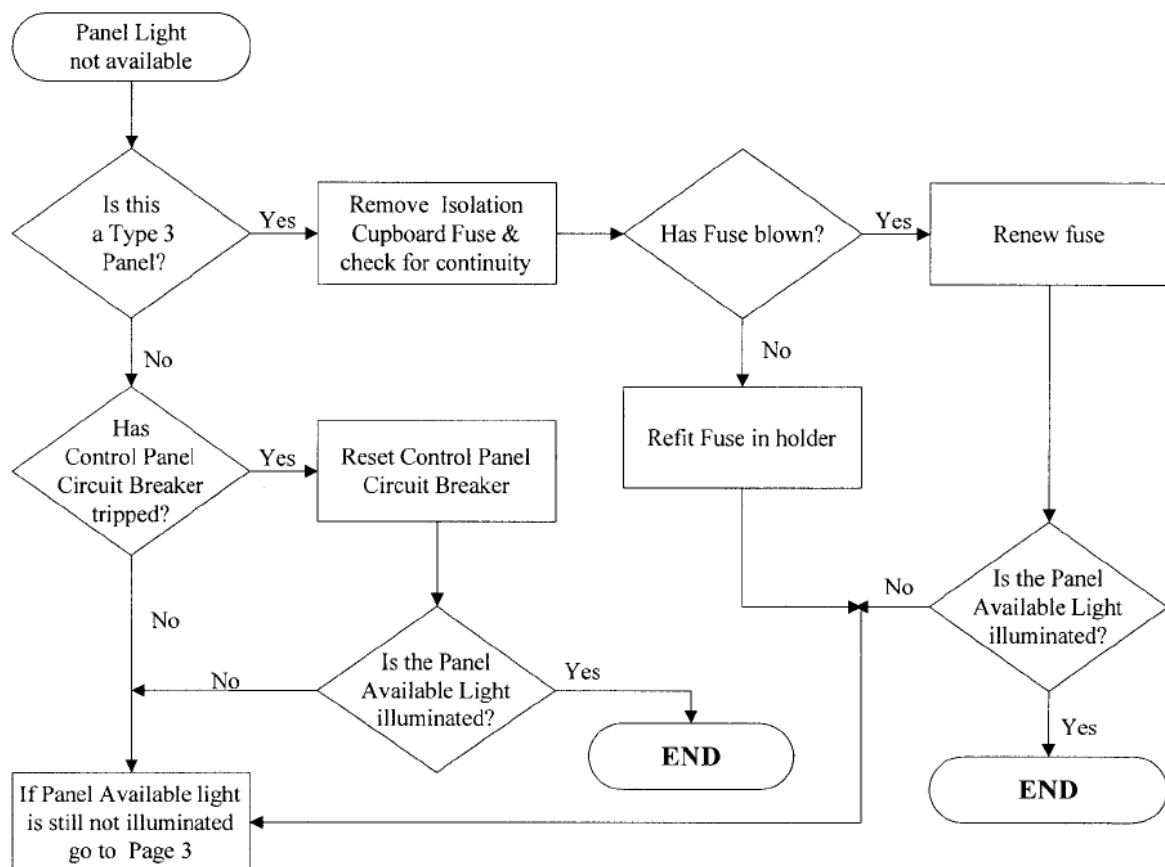
NOTE 5: For additional information on the components and assembly, refer to Reference Drawings items 1 or 2.


PROCEDURE A

PANEL AVAILABLE light is not illuminated.

Carry out the following checks and rectify before proceeding.

- Check that there are no central locking keyswitches in the TRAIN position anywhere on the vehicle/s.
- Check that the panel is not isolated.
- Plug a pneumatic test gauge into the connector on the air filter/regulator and check that the air pressure is between 4.6 and 4.8 bar, if not, carry out Job No. OKA0110.
- If the PANEL AVAILABLE light is still not illuminated, proceed as follows.

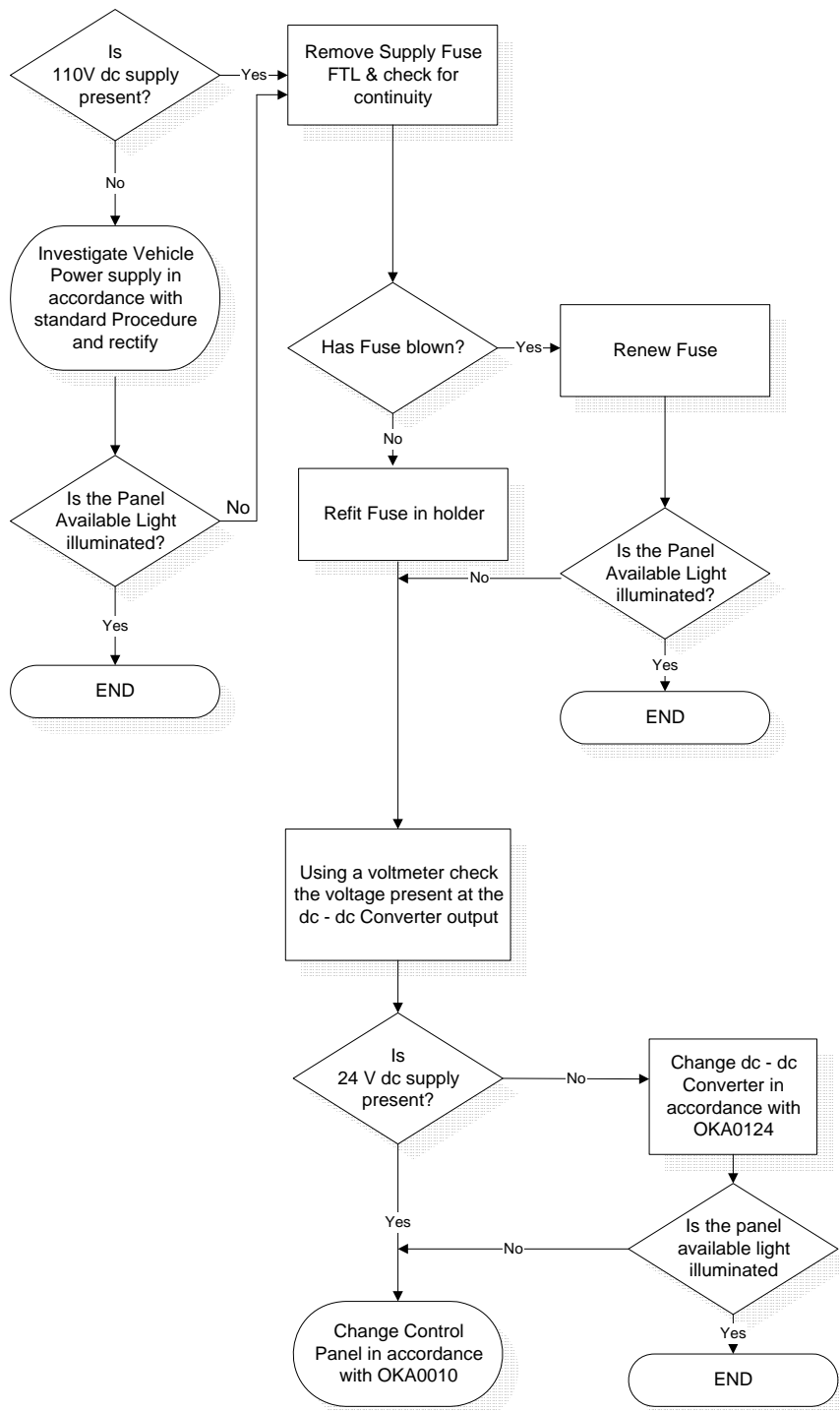


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CDL - Fault Finding

OKA0139

If the Panel Available Light is still not illuminated carry out the following checks before proceeding.



- v Is fuse F1 OK.
- vi Is fuse F2 OK.
- vii Renew LED.
- viii If still not available proceed as follows.

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CDL - Fault Finding

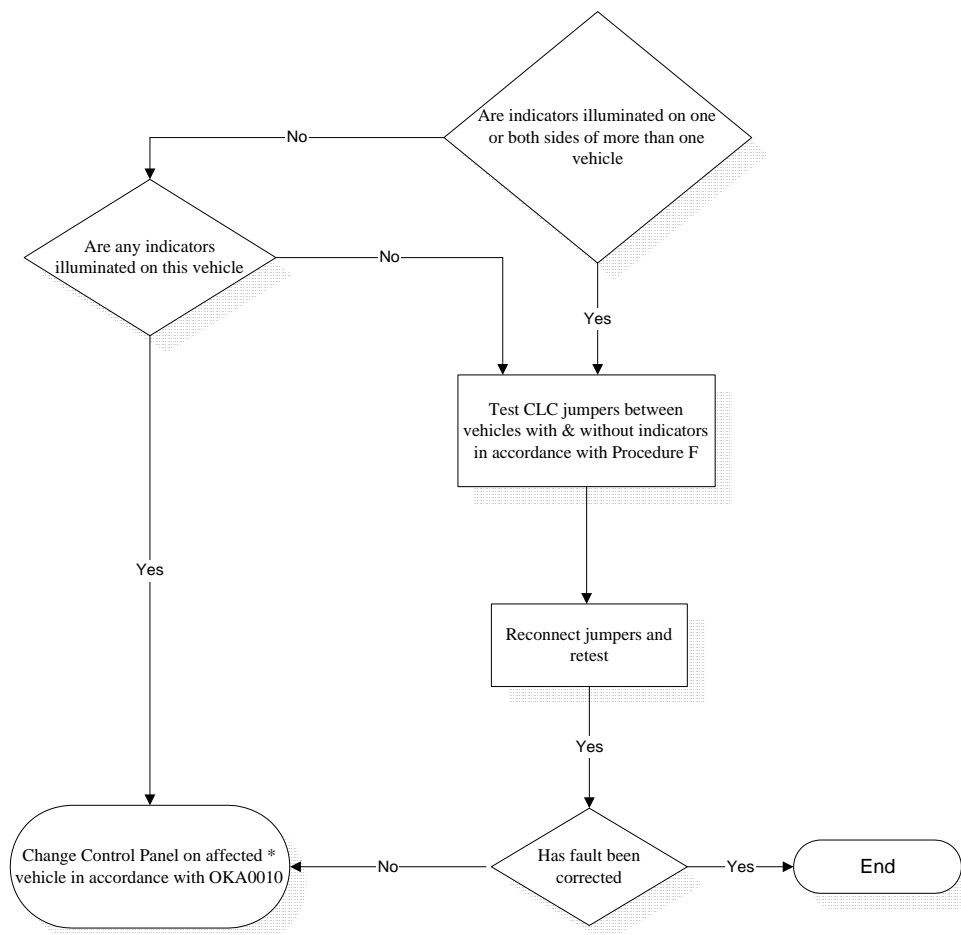
OKA0139

PROCEDURE B


Indicators do not extinguish on the whole or part of the train.

Carry out the following checks and rectify before proceeding.

- Check that the Control panel, PANEL AVAILABLE and POWER ON lights are illuminated.
- Check that the keyswitch is in the TRAIN position.
- Check the train doors unlock PUSHBUTTONS have been pressed for 3 seconds.
- If the Indicators still have not extinguished on the whole or part of the train, proceed as follows:



* If fault on 'Panel available' light, change control panel on panel with key switch energised.

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CDL - Fault Finding

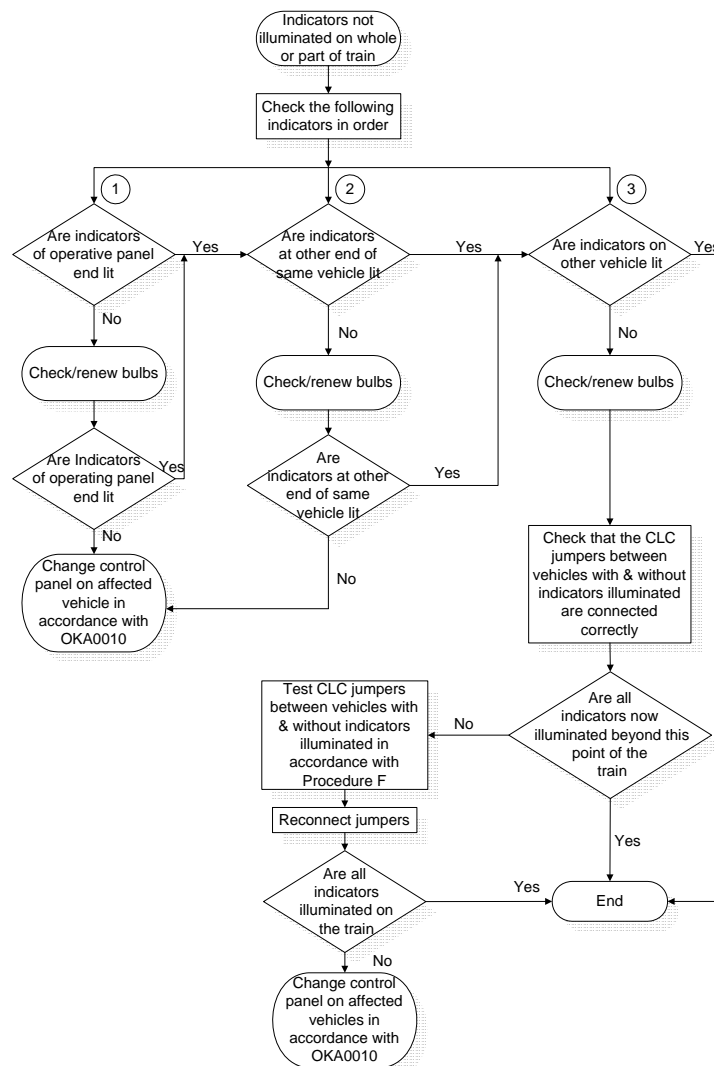
OKA0139

PROCEDURE C

Indicators are not illuminated on whole or part of the train.


Carry out the following check and rectify before proceeding.

- Check that the Control panel, PANEL AVAILABLE and POWER ON lights are illuminated.
- Check that the keyswitch is in the TRAIN position.
- Check the train doors unlock PUSHBUTTONS have been pressed for 3 seconds.
- If the indicators are still not illuminated on whole or part of the train proceed as follows:



NOTE 1: See Procedure G for identification of the defective jumpers/control panels.

NOTE 2: Many vehicles are now fitted with LED interior and exterior indicators. Failed units must be renewed for the same type.

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CDL - Fault Finding

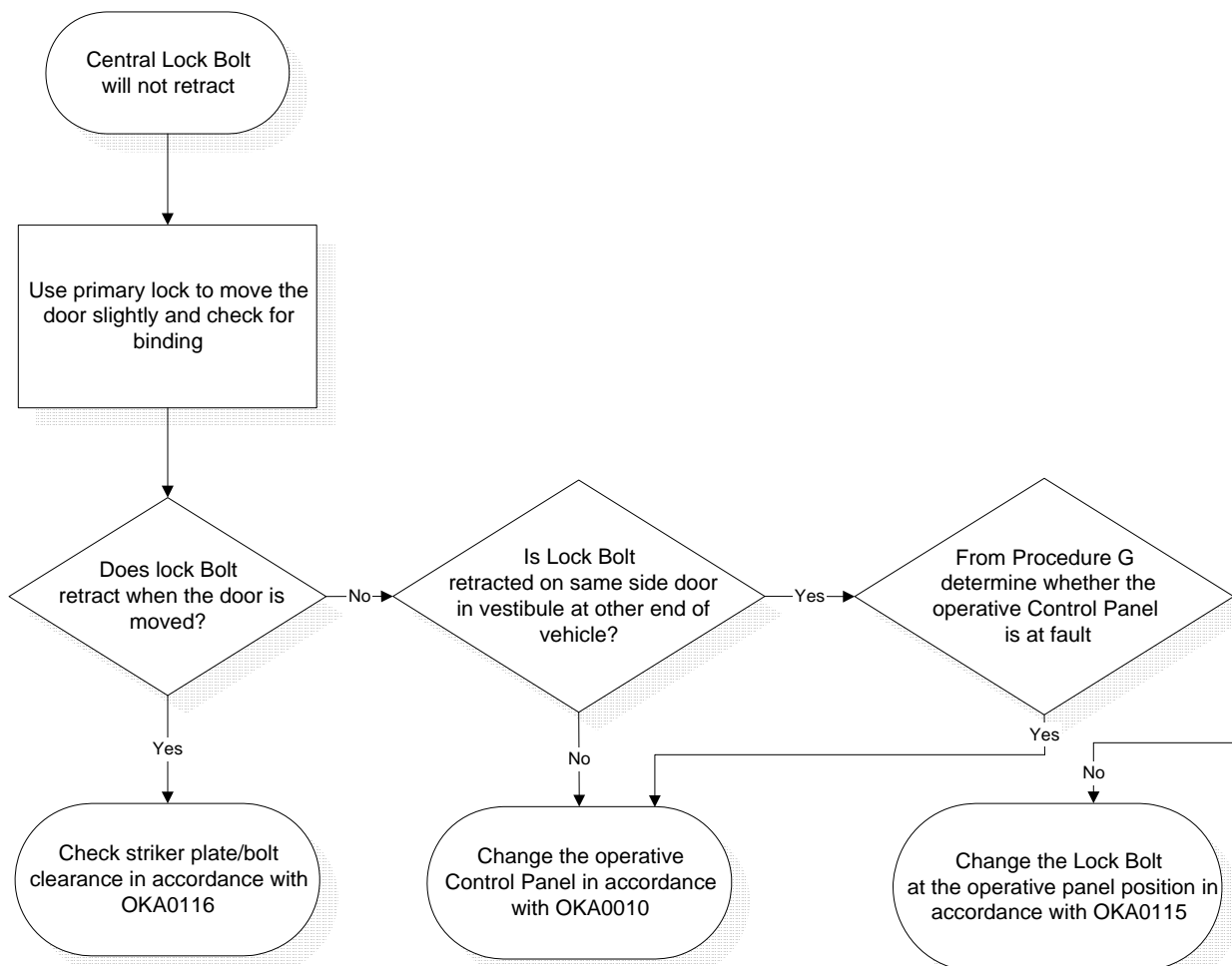
OKA0139

PROCEDURE D


If the Central Lock Bolt will not retract.

Carry out the following check and rectify before proceeding.

- i Check that the control PANEL AVAILABLE and POWER ON lights are illuminated.
- ii Check the keyswitch is in the TRAIN position.
- iii Check the TRAIN DOORS UNLOCK pushbuttons have been pressed for 3 seconds.
- iv Check that the budget lock is in the open position.
- v If the Central Lock Bolt still will not retract carry out the following:



NOTE 3: The term operative control panel is the panel which is being operated to carry out the testing requirements.

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CDL - Fault Finding

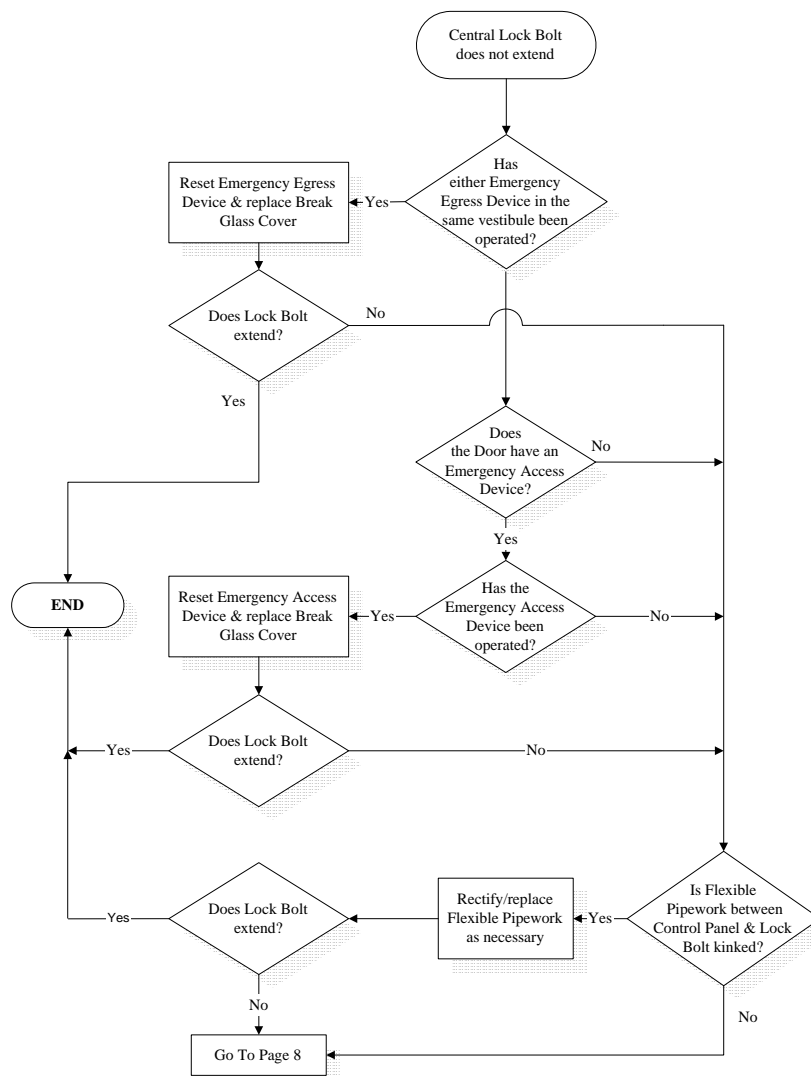
OKA0139

PROCEDURE E


If the Central Lock Bolt does not extend.

Carry out the following checks and rectify before proceeding.

- Check that the Control panel, PANEL AVAILABLE lights are illuminated.
- Check that the TRAIN DOORS LOCK pushbutton has been pressed.
- Check that the keyswitch has been returned to the OFF position.
- If the Central Lock Bolt still does not extend, carry out the following procedure.



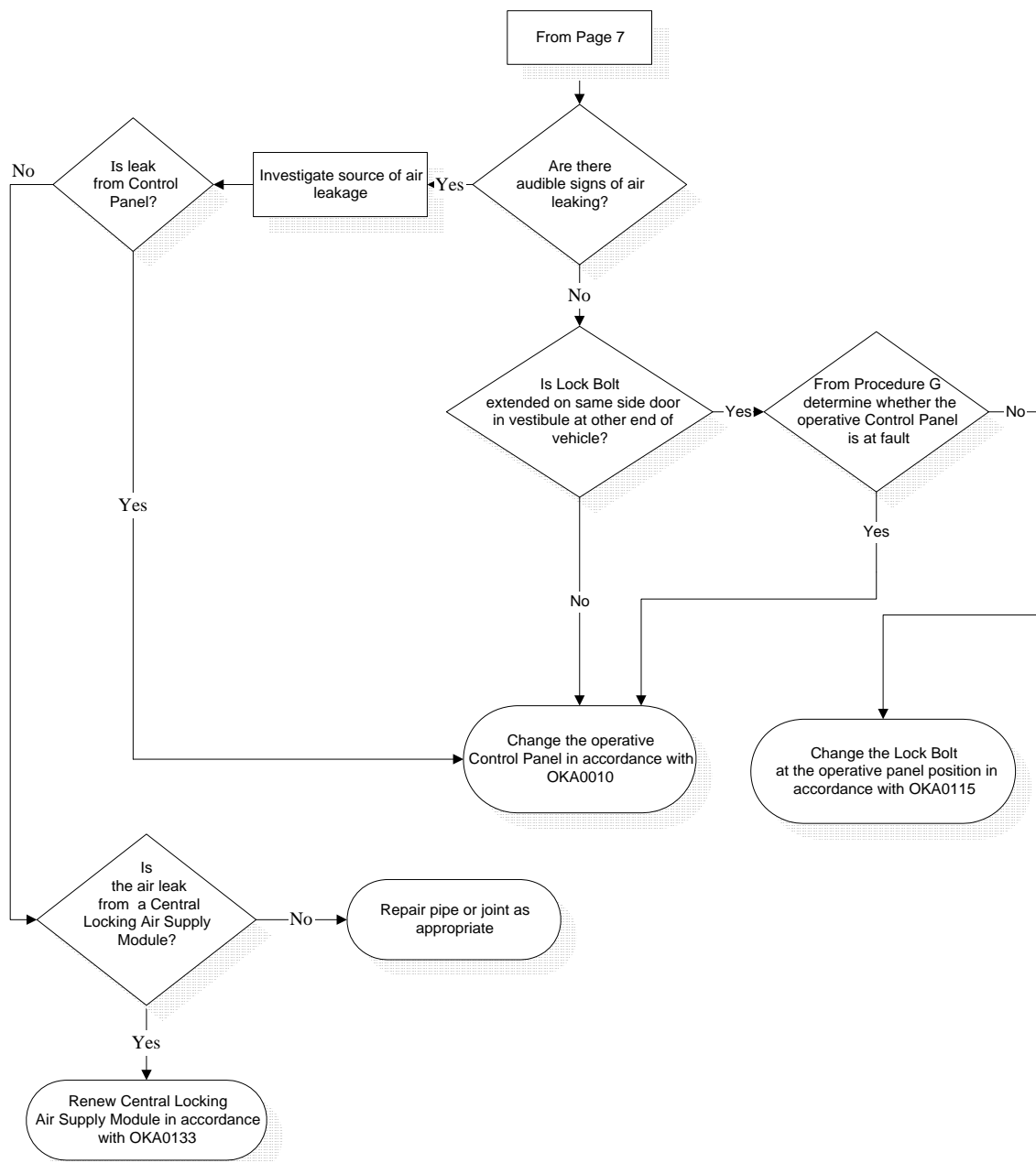
NOTE 4: The term operative control panel is the panel which is being operated to carry out testing requirements.

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CDL - Fault Finding

OKA0139

- v Plug a pneumatic test gauge into the connector on the Air Filter/Regulator and check that the air pressure is between 4.6 and 4.8 bar. If not, carry out Job No. OKA0110
- vi Reset the regulator.
- vii If the central lock bolt still does not extend, proceed as follows:

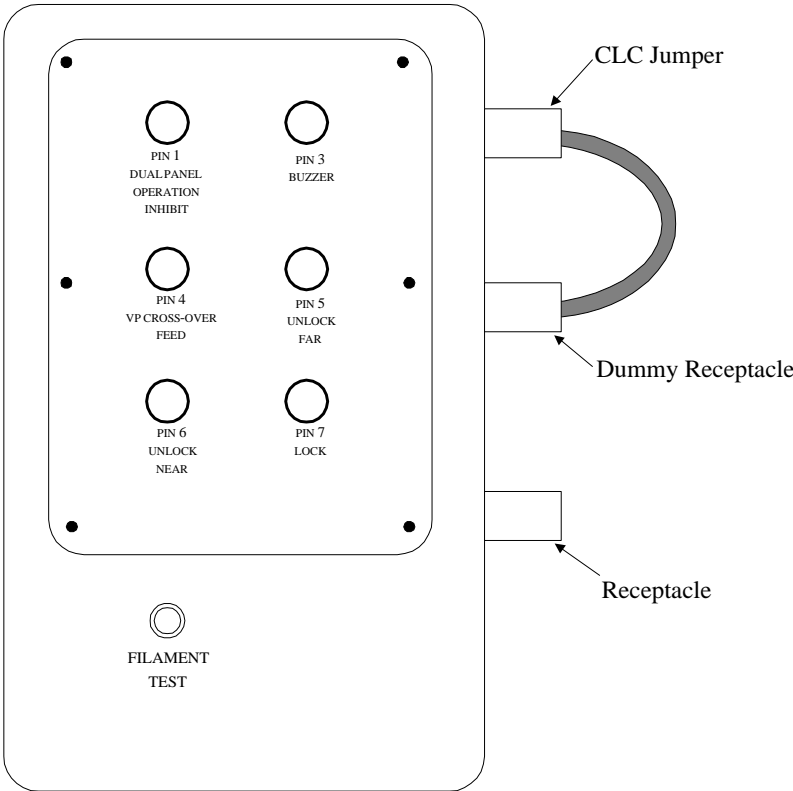


CDL - Fault Finding

OKA0139

PROCEDURE F

Fault on Intervehicle CDL Jumper



NOTE

Plug vehicle jumper into
Test Box receptacle

OR


Plug test box jumper into
vehicle receptacle

NOT BOTH AT ONCE

Figure 1: Suggested Test Box

	Light Colour	Operation
Pin 1	Yellow	Dual Panel Operation Inhibit
Pin 2	-	Spare
Pin 3	White	Buzzer
Pin 4	Green	Vp cross over feed
Pin 5	Red	Unlock - Far
Pin 6	Orange	Unlock - Near
Pin 7	Blue	Lock
Pin 8	-	Return

Table 1: Function of Central Locking Jumper Wires

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CDL - Fault Finding


OKA0139

PROCEDURE F

Fault on Intervehicle CLC Jumper

1. Uncouple both jumpers between the vehicles.
2. Connect the test box in turn to each jumper and live receptacle, energise the faulty circuits by pressing the buttons on the vehicle control panels and observe result.
3. Renew the defective items in accordance with the following Jobs:

Item	Job No.
Jumper Cable and Plug	OKA0120
Receptacle (Live)	OKA0121
Dummy Receptacle	OKA0122

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CDL - Fault Finding

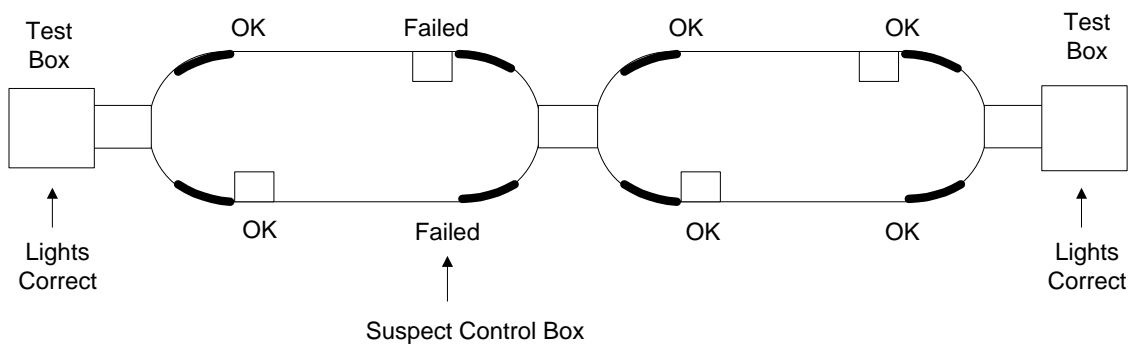
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PROCEDURE G

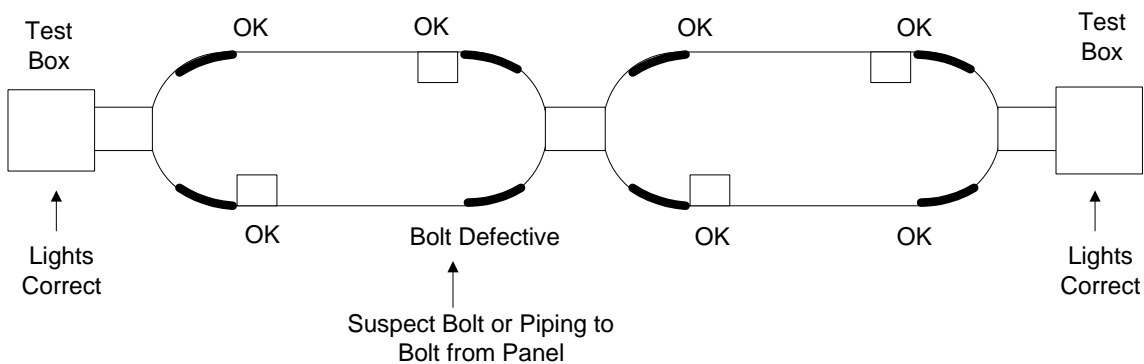
Location of Defective Jumpers and Control Panels

- Operate from the control panels for each side of the train in turn.
- Observe the result.
- Compare with Figures A to C and change suspect units.

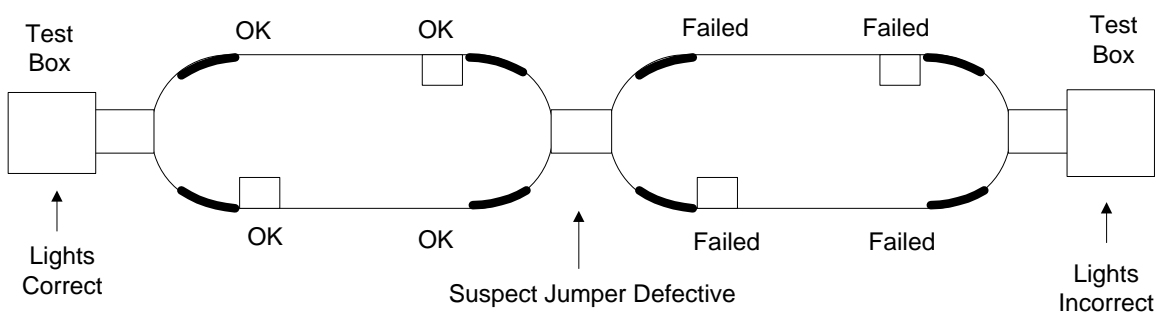
A)




B)



C)



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External Door Budget Lock – Examine

OL 0112

Materials			
Item	Description	Qty/Veh	Cat No.
1	Oil, Multigrade SAE 40 (BR Spec 668)	As Req'd	027/020264


APPLIES TO: All Vehicles

Scheduled Work

1. Check that the budget lock tongue is flush with the lock face when the lock is in the retracted position.
2. Check that the lock tongue moves smoothly to 90° and is held by spring force in both the retracted and locked positions.
3. Lubricate the budget lock with oil (see Materials item 1) and operate the lock mechanism several times.
4. Clean off any excess oil.

Arising Work

- 1,2. Rectify the defects.
- 1,2. Renew the defective budget lock which cannot be repaired.

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Small Luggage Door Bolt Assembly – Examine

OL 0127


APPLIES TO: TGS and BFO

Scheduled Work

NOTE 1: Job No. OY 6479 must be carried out and all defects cleared before starting this job.

NOTE 2: Most doors have been locked out of use. The doors must be unlocked before carrying out Job No. OY 6479 and relocked after completion of this job.

1. With the door closed remove the pivot cover plate from the interior of the door.
2. Check the bolt assembly for freedom of operation, ensuring that the centre links make positive contact with the stops in both directions.
3. Test the tightness of the four stop plate securing screws using a screwdriver.
4. Refit the pivot cover plate.
5. Test the tightness of the top and bottom shoot bolt guide fixing using a screwdriver.
6. Operate the handle and open the door.
7. Check that the bottom shoot bolt locating hole is free from debris.
8. Close and secure the door. Check that the door is pulled in and that the shoot bolts locate positively.
9. Check that the outside handle lies within the red line on the outside of the vehicle.
10. Check that the notice inside is present, legible and that it aligns with the indicating mark on the shoot bolt with door fully closed.
11. Slam the corner door and check that the outside handle does not move upwards.


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Small Luggage Door Bolt Assembly – Examine

OL 0127

Arising Work

2. If the centre link fails to make positive contact renew the centre link.
3. Attempt to tighten the screws. If the screws will not tighten repair the tapped holes.
5. Attempt to tighten the screws. If the screws will not tighten, repair the tapped holes.
6. Investigate the reason. Renew or repair the defective components.
7. Clear the debris from the locating hole.
8. Adjust the positions of the top striking plate and the bottom shoot bolt.
9. Check the handle for free play and distortion. Renew or repair the defective components.
10. Renew the notice if missing or illegible. If the marks do not align investigate cause. Renew or repair the defective components.
11. Investigate the cause. See step 9 above. Renew or repair defective the components e.g. re-bush the enlarged hole.

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External Door Lock and Handle – Change

OL 0137

Materials			
Item	Description	Qty/Veh	Cat No.
1	Body Filler	As Req'd	028/034390
2	LH Lock Set - No. 2 and No. 4 Doors Long Life Lock with Hi-Viz Handle Strip	2	064/070679 064/007291
	Comprising:		
	Escutcheon Cover for Lock	4	064/006403
	Washer 1mm thick Sealing	As Req'd	002/120066
	Washer 2mm thick Sealing	As Req'd	002/120067
	Washer 3mm thick Sealing	As Req'd	002/120068
	Sachet of Silicon Grease	As Req'd	027/001015
	Lock Edge Shims (If Required)	As Req'd	850/111401
3	RH Lock Set - No. 1 and No. 3 Doors Long Life Lock with Hi-Viz Handle Strip	2	064/070680 064/007292
	Comprising:		
	Escutcheon Cover for Lock	4	064/006403
	Washer 1mm thick Sealing	As Req'd	002/120066
	Washer 2mm thick Sealing	As Req'd	002/120067
	Washer 3mm thick Sealing	As Req'd	002/120068
	Sachet of Silicon Grease	As Req'd	027/001015
	Lock Edge Shims (If Required)	As Req'd	850/111401
4	Screw M6 x 20mm Csk Head M/C EZP Finish (Lock Striking Plate Position)	2	035/104706
5	Screw M6 x 30mm Pan Head M/C EZP Finish	2	035/105099
	Screw M6 x 30mm Pan Head M/C EZP Finish (Lock Mounting Lugs Position)	1	
6	Nut M6 Nyloc EZP Finish	3	003/179998
7	Washers M6 EZP Finish	3	003/190924
8	Loctite 242	As Req'd	007/060305

Torque Figures			
Item	Description	Size	Torque (Nm)
1	Countersunk Head Machine Screw	M6	5
2	Lock Edge Fixing Screw	-	5

Special Tools		
Item	Description	Cat No.
1	Box Spanner - Pickersgill Kaye Part No. K2463	039/052226

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External Door Lock and Handle – Change

OL 0137

Reference Documents		
Item	Document No.	Title
1	TI/TI0024	Repair of Loco-hauled Coaching Stock, HST and Class 488 Outward Opening Bodyside Passenger Doors and Door Locks
2	CR/PE0102	Repainting of Rail Vehicles

APPLIES TO: All Vehicles

This job is divided into 3 Parts:

PART A - Determination of Action to be taken
PART B - Removal of Existing Locks
PART C - Fitting of New Locks

PART A – Determination of Action to be taken

Scheduled Work

A1. Check whether the locks require renewal as follows:

A1.1 Check that the existing locks are 'Long Life' by their having the letters 'LL' stamped above the 'IH' identification marks.

A1.2 Check that the engraved dates are not more than 2½ years previous.

A1.3 Check that the Engineer has agreed to the Long Life locks not being renewed.

If any of the conditions A1.1-A1.3 are not met, renew the locks in accordance with Parts B and C.


PART B – Removal of Existing Locks

B1. Remove the lock cover plate from inside of the door.

B2. Unscrew the escutcheon using the special box spanner and slide off over the handle. Box spanner (see Special Tools item 1).

B3. Remove the two screws securing the lock to the edge of the door and discard.

B4. Locate the three lock securing screws which pass through the door from the outside by assessing their approximate position using the new lock for comparison. Remove the paint on the skin in this area with suitable fine abrasive paper to expose witness of the filled holes. Using a small chisel and hammer, remove the body filler at the three positions to expose the screw heads. Check that the minimum amount of material is removed to allow access to the screw heads.

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External Door Lock and Handle – Change

OL 0137

- B5. Unscrew the three lock securing screws from the outside of the door. The nuts are held by the feet of the lock. Carefully remove the lock from the door, retaining any shims fitted between the lock and the door edge and between the lock mounting lugs and inside face of door for possible use with the new lock.
- B6. Discard the lock securing nuts and screws.
- B7. Examine the door outer face where the escutcheon sealing washers are seated.
- B8. Check that the lock fixing holes in the door edge are not damaged, stripped or corroded.
- B9. Check that the lock fixing holes through the door are not damaged or oversize.

Arising Work For Part B

- B7. Any minor pitting may be corrected by the careful use of body filler (see Materials item 1) to provide a flat even surface to enable the escutcheon sealing washers to seal.
- B8. If the screw holes in the door edge are stripped or damaged or fixing screws are broken, the remains of screws to be drilled out and the tapping plate repaired in accordance with the specified document (see Reference Documents item 1 Procedure D Part 3).

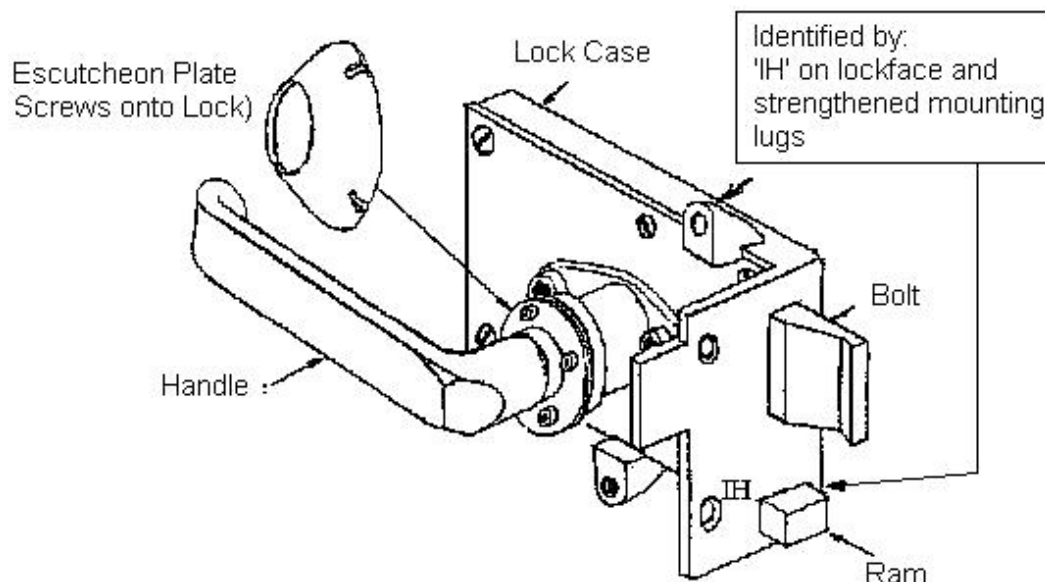



Figure 1: Mark 3 Coach Door Lock with Integral Handle

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External Door Lock and Handle – Change

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PART C – Fitting of New Locks

QUANTITY: 4 for all vehicles except HST catering vehicles with emergency doors which have 2.

NOTE 1: Check that all the locks have integral handles. These locks are identified with the letters “IH” stamped on the front face of the lock and have four spanning notches on the escutcheon.

NOTE 2: Only “Long Life” locks with the revised door handle profile (such that the handle to GRP contact is eliminated) must be fitted.

NOTE 3: For the emergency doors on HST Catering vehicles, see Job No. OQ 6428.

NOTE 4: For the fitting of locks to new door shells, refer to the Engineer for the relevant procedure.

Scheduled Work

C1. Hand engrave the fitting date onto the front face of replacement lock in 3-5mm high characters in the form:

Date e.g. (20th November 1993)
Depot Code e.g. Wolverton

20-11-93
ZN

See Figure 2 for positioning.

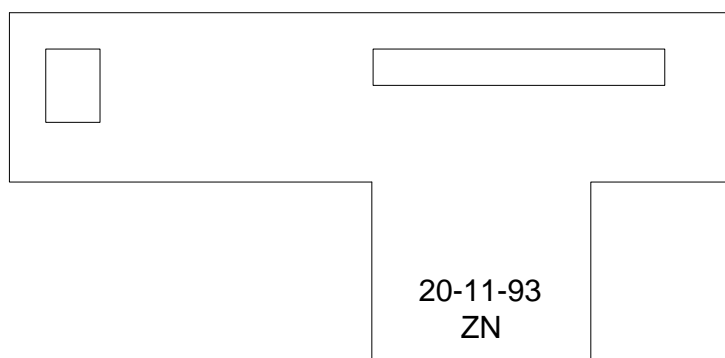



Figure 2: Lock Engraving Detail

C2. Remove the escutcheon and three sealing washer from the handle of the lock and retain for future use.

C3. With the handle depressed such that the lock bolts is in the propped position, pass the handle through the door from the inside.

C4. Place the new lock in position on the door. Check that all fixing holes in the door are in line with the fixing holes in the lock.

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External Door Lock and Handle – Change

OL 0137

- C5. Loosely fix the lock in position using two M6 x 30mm Pan Head M/C Screw EZP Finish and one M6 x 70mm Pan Head M/C Screw EZP Finish through the door with three M6 Nyloc Nuts on the lock lugs.

NOTE 5: Nuts are held by the lock lugs. Tighten the screws from the outside.

- C6. Check that the back edge of the lock striking face seats on the door edge. If this is not the case shim as required to a maximum of 3mm using shims. Check that the lock seats firmly on all three lugs and that the lock body is parallel to the outer skin of the door.
- C7. Fit the two M6 x 30mm Csk Head M/C Screws securing the lock to the door edge-and tighten (see Torque Figures item 1).
- C8. Tighten the three screws through the door.
- C9. Pass the escutcheon over the handle and lightly finger tighten. Select the minimum thickness of the sealing washer to check a tight fit when the escutcheon is finally assembled. More than one washer may be required to achieve this.
- C10. Check that the handle moves freely, that the lock operates smoothly throughout its travel and that there is no resistance to the operation of the bolt.
- C11. Remove the two lock edge fixing screws one at a time, and refit, using thread locking compound 'Loctite 242' (see Materials item 8) and tighten (see Torque Figures item 2).
- C12. Remove the escutcheon. Fill the counterbores over the heads of the through door fixing screws with polyester body filler (see Materials item 1) and sand flush.
- C13. Make good the paintwork in accordance with the specified document (see Reference Documents item 2).
- C14. Make good the fluorescent door edge markings.
- C15. Lightly smear all faces of the selected sealing washers with silicon grease from the sachet provided. Sliding over the handle and place in position around the shaft housing.
- C16. Pass the escutcheon over the handle and, holding it just short of the threaded portion of the shaft housing, completely fill with silicon grease from the sachet provided. All of the grease must be used.
- C17. Screw the filled escutcheon onto the shaft housing and tighten firmly using the special box spanner (see Special Tools item 1). Remove the surplus grease.
- C18. Refit and secure the lock cover plate to the inside of the door.


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External Door Lock and Handle – Change

OL 0137

Arising Work For Part C

- C4. Where the lock fixing holes in the door outer skin have been filled during the door repair: Re-drill through from the inside of the door 7mm diameter using the feet of the lock as a template. Counterbore the outer skin to 12mm diameter down to the steel frame.
- C4. Drill two holes 5mm diameter for lock fixing in the door edge using the lock as a template, and tap M6. Check that the holes are drilled square to the lock face so that the fixing screws seat correctly in the countersinks.
- C6. If the lock does not seat firmly on all three feet or the lock is not parallel with the outside skin of the door, correct by shimming as required under the lock feed to a maximum of 3mm using M6 washers EZP Finish (see Materials item 7).
- C10. If roughness or stiffness in the operation of the lock is noted the lock is to be rejected to the Supplier and a new lock fitted.

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External Door (After re-fitting) - Test

OL 0140

Special Tools		
Item	Description	Cat No.
1	Testing Device	039/073009
2	Gauge	800/543706
3	Gauge	039/028097 or 800/640203
4	Gauge, Handle Angle LH	800/626901
5	Gauge, Handle Angle RH	800/626902

Reference Drawings		
Item	Drawing No.	Title
1	A2-A0-8700100	DTLS of Lock Spring Force Testing Mechanism

APPLIES TO: All Vehicles

Scheduled Work

- With the door fully closed check that the clearance around the door both internally and externally is within the following limits. These tests to be carried out on level track on own bogies and the dimensions are to be taken after all painting has been completed and yellow strips fitted.

Top edge	1-2mm
Outer Lock edge	Nominal 3mm with minimum of 2mm over whole length except in striking plate and lock area where 1mm is permissible.
- Check that there is no more than 5mm variation between the door and the bodyside profiles at any point.
- Check that the hinges are secure and undamaged and that there is a minimum separation of 1mm between the two halves of all the hinges.
- Check that there is no lateral free play in the hinge by closing the door to the safety catch position and alternately pushing and pulling at the bottom of the hinge edge of the door along the length of the vehicle.
- Fully open the door and check that the door opens without binding.
- Check that the draught seal rubbers along stand pillar, top of doorway, door hinge edge and the doorway stepwell are fitted and secure.
- Check that the limit control retains the door at approximately right angles to the vehicle side by checking the measurement shown in Figure 1.

External Door (After re-fitting) - Test

OL 0140

8. With the door open and the lock bolt fully extended check that the door handle maximum variation from horizontal is less than $\pm 12^\circ$. This variation is to be measured by taking up the free movement of the handle in both directions and using the appropriate gauge as follows:

Title	Cat. No.
Handle Angle LH	See Special Tools item 4
Handle Angle RH	See Special Tools item 5

Job No. OL 0140 Figure 1 - Check that the limit control retains the door between 85° - 90° by measurement.

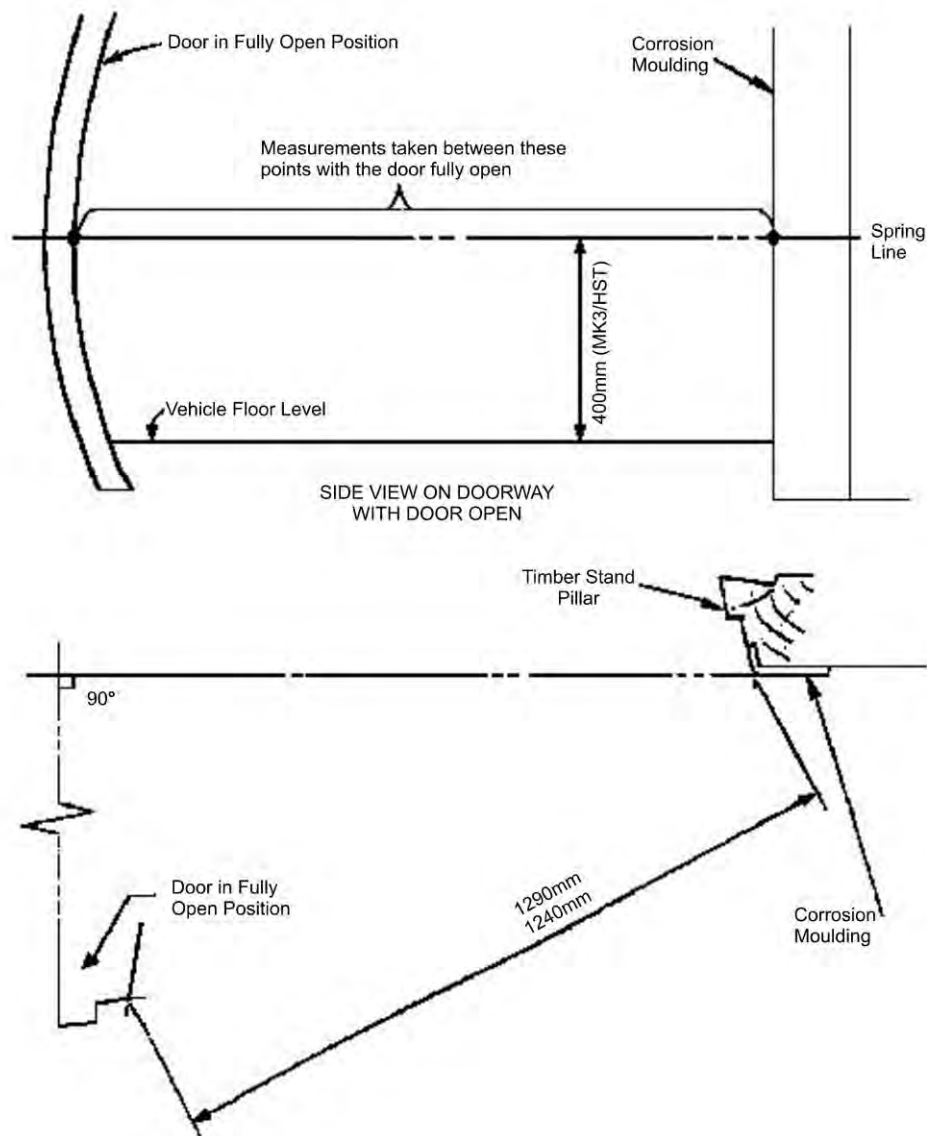



Figure 1: Plan View of Doorway

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External Door (After re-fitting) - Test

OL 0140

9. Check that the handle free play does not exceed 12° using gauge (see Special Tools item 2).
10. Depress the cam of the striking plate and check that the cam springs out.
11. Move the handle towards the fully open position as far as possible checking that the end of the handle does not rub the door skin and fully retracts the lock bolt (i.e. within 1.5mm of the lock face). Depress the ram, release the handle and check that the bolt moves smoothly and quickly to the fully extended position. Repeat five more times.
12. Depress and quickly release the ram checking for smooth action.
13. Turn the handle towards the vertical position as far as it will go and release. Check that the lock bolt is in the nominally “propped” position. This can be determined by attempting to depress the ram. If the lock is propped the ram will not move into the lock case.
14. Close the door to the safety catch position and check that the door is retained in the safety catch position.
15. Check the overlap between the lock bolt and the striking plate cam using gauge to (see Special Tools item 3) (see Figure 2).

NOTE: The overlap must not exceed 7mm.

16. With the door closed to the safety catch position grasp the door lock pillar with one hand and the vertical grab handle with the other and force the door against the safety catch and check that the door does not open.
17. Check that the door closes fully from the safety catch position.
18. Check that the handle has returned to the horizontal position.
19. Attempt to push the door open from the closed position.
20. Check that the door closes fully when slammed three times with varying degrees of force.
21. Check that on each occasion the door handle returns to a horizontal position.

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External Door (After re-fitting) - Test

OL 0140

Job No. OL 0140 Figure 2 - Use of gauges (see Special Tools item 3) to check the overlap between the lock bolt and the striking plate.

Place the gauge over the striking plate cam and bring the lock bolt in the propped position against the striking plate cam.

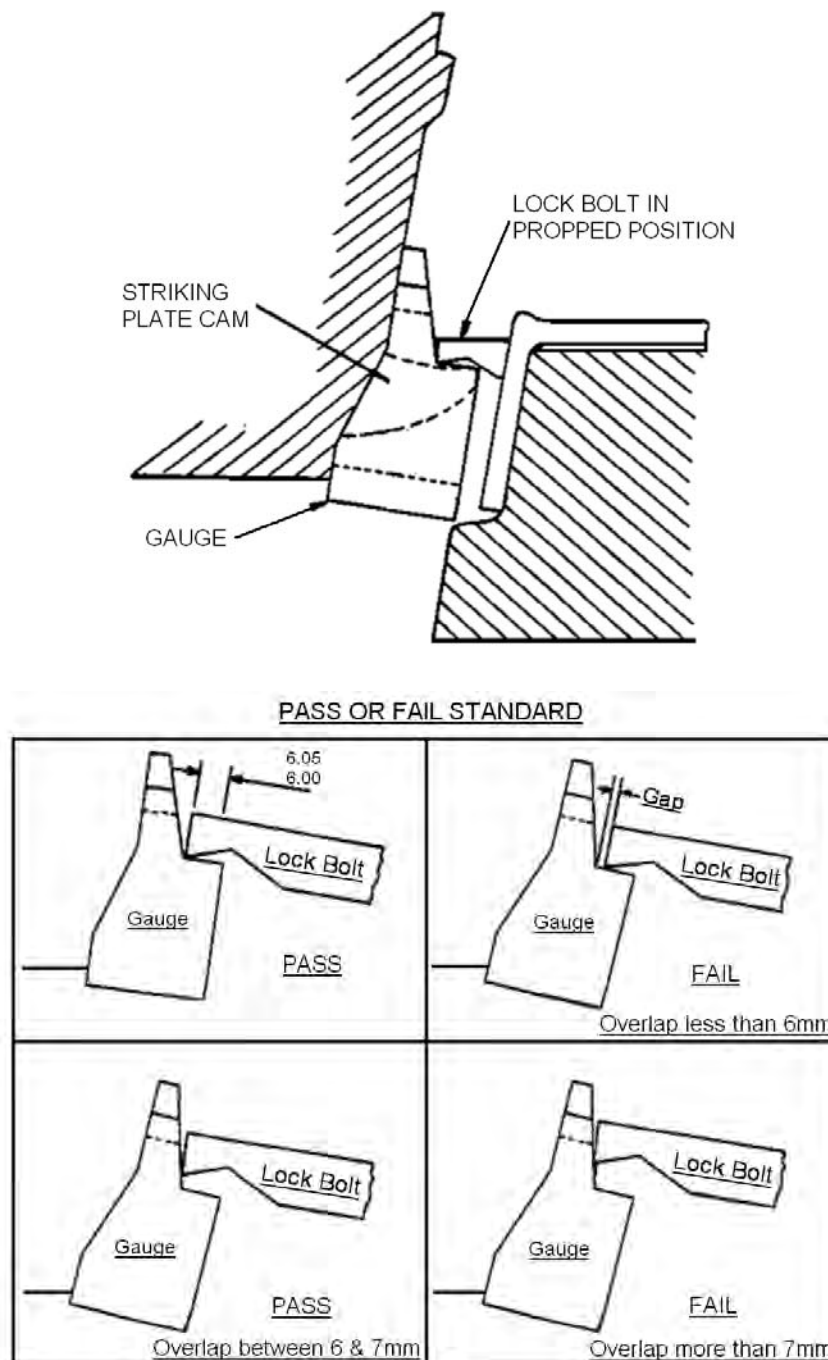




Figure 2: Striking Plate Cam Gauge

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External Door (After re-fitting) - Test

OL 0140

22. Slam the door and check that there is no contact between the door edge and the striking plate, including when the door “bounces in” on its rubber edge seals
23. With the door in the closed position, turn the handle through approximately 30° and release. The lock must fully engage and the handle return to the horizontal position without any closing force being applied to the door.
24. Check the droplight as follows:
 - 24.1 Examine the glass for cracks or damage.
 - 24.2 Gently nudge the droplight downwards several times. Check that the droplight moves easily to the new position but does not run out of control.
 - 24.3 Check that the finger pull is secure.
 - 24.4 Gently nudge the droplight upwards several times. Check that the droplight moves easily to the new position but does not out of control.
 - 24.5 Check that no gap exists when the droplight is closed.
25. Check that the door can be locked out of use by the budget lock and the budget lock bolt moves smoothly through 90°.
26. Check that all the door notices and the door identification numbers are present and in good condition.
27. Check that the fluorescent door edge marking is in good condition.
28. Check from inside the vehicle with the door closed that no light is visible between the door and the surround.
29. Check the lock bolt spring force using the testing device in accordance with the specified drawing (see Reference Drawings item 1), (see Special Tools item 1) and an analogue or digital force measuring gauge reading 0-10kgf in intervals of 0.05kgf, as follows:
 - 29.1 Fully extend the lock bolt.
 - 29.2 Insert the fulcrum of the testing device into the striking plate well and close the door to a position where the notch in the testing device engages with the end of the lock bolt. See Figure 3.
 - 29.3 Connect the gauge to the end of the testing device and pull on the gauge.
 - 29.4 Note the readings on the gauge at the start and finish of the bolt’s travel. The gauge readings must be multiplied by three to give the actual bolt spring force which must be as follows:

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External Door (After re-fitting) - Test

OL 0140

Minimum force to commence actuation

11.0 kgf

Maximum force to complete actuation

21.8 kgf

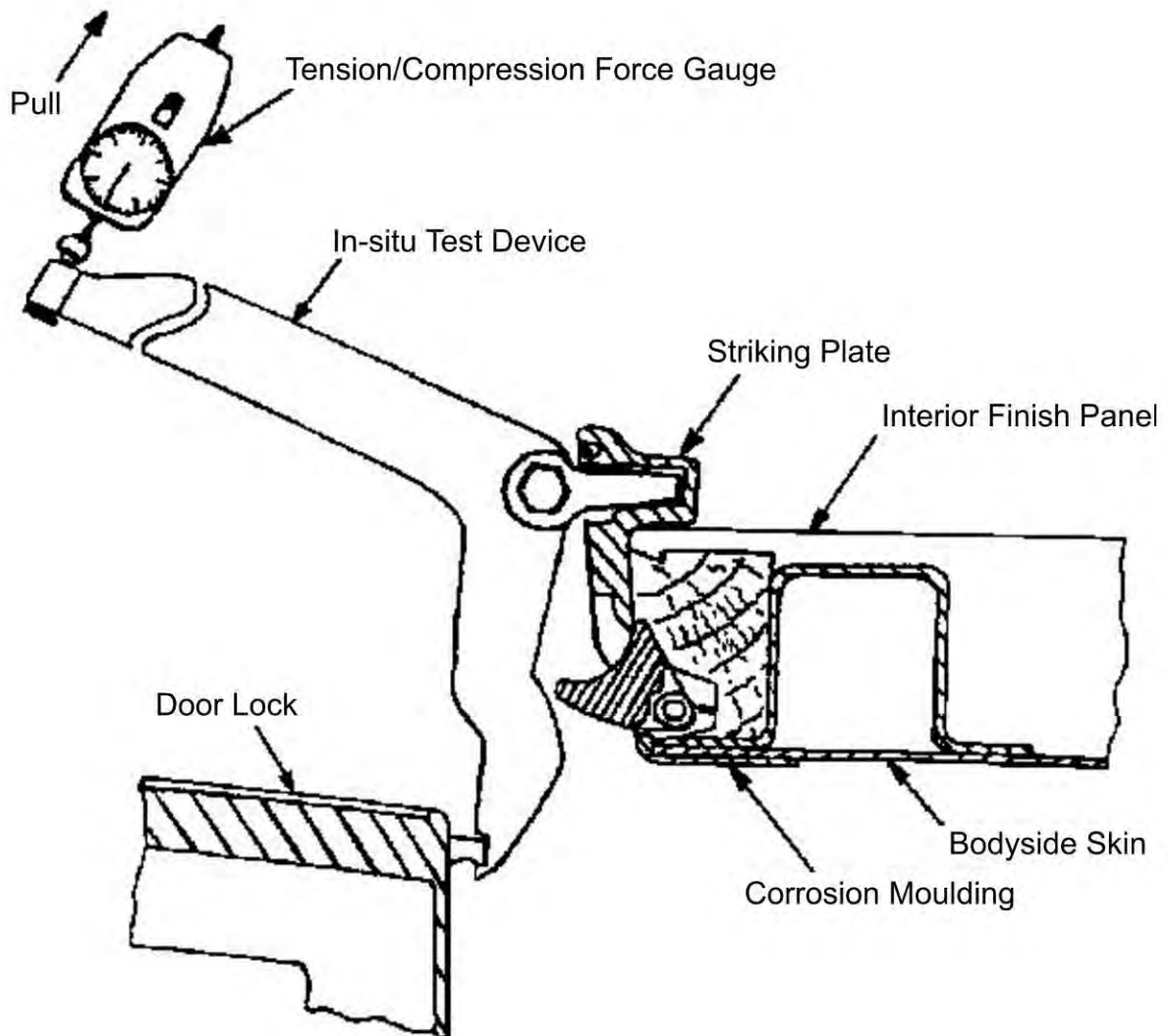



Figure 3: Measuring Lock Bolt Spring Force

Arising Work

1-29. Rectify the defects in accordance with the appropriate procedures and repeat the entire Scheduled Work.

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External Door (After Repair in-situ) – Test

OL 0141

Special Tools		
Item	Description	Cat No.
1	Testing Device	039/073009
2	Gauge	800/543706
3	Gauge	039/028097 or 800/640203
4	Gauge, Handle Angle LH	800/626901
5	Gauge, Handle Angle RH	800/626902

Reference Drawings		
Item	Drawing No.	Title
1	A2-A0-8700100	DTLS of Lock Spring Force Testing Mechanism

APPLIES TO: All Vehicles

Scheduled Work

- With the door open and the lock bolt fully extended check that the door handle maximum variation from horizontal is less than $\pm 12^\circ$. This variation is to be measured by taking up the free movement of the handle in both directions and using the appropriate gauge as follows:

Title	Cat No.
Handle Angle LH	See Special Tools item 4
Handle Angle RH	See Special Tools item 5


- Check that the handle free play does not exceed 12° using the gauge (see Special Tools item 2).
- Move the handle towards the fully open position as far as possible checking that the handle fully retracts the lock bolt (i.e. within 1.5mm of the lock face).

Depress the ram, release the handle and check that the bolt moves smoothly and quickly to the fully extended position. Repeat five more times.

- Depress and quickly release the ram checking for smooth action.
- Turn the handle towards the vertical position as far as it will go and release.

Check that the lock bolt is in the nominally “propped” position. This can be determined by attempting to depress the ram. If the lock is propped the ram will not move into the lock case.

- Close the door to the safety catch position and check that the door is retained in the safety catch position.
- Check the overlap between the lock bolt and the striking plate cam using gauge (see Special Tools item 3) (see Figure 1).

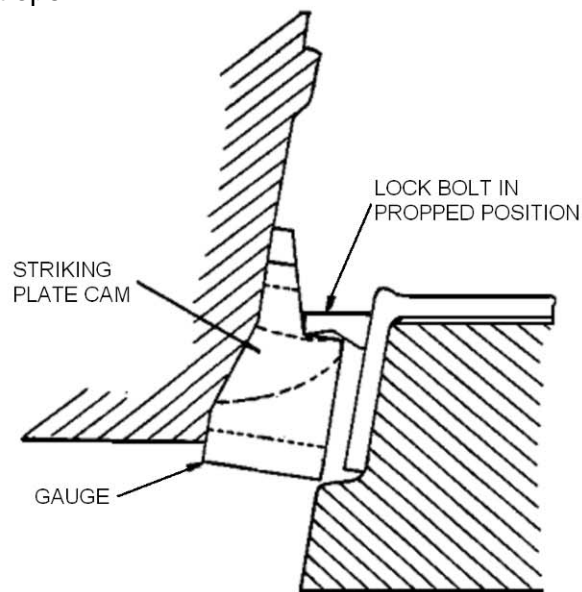
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External Door (After Repair in-situ) – Test

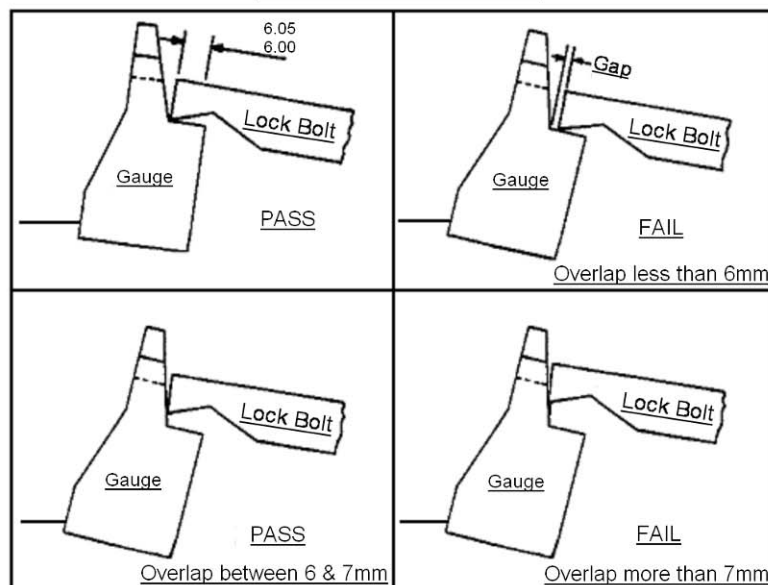
OL 0141

NOTE: The overlap must not exceed 7mm.

8. With the door closed to the safety catch position grasp the door lock pillar with one hand and the vertical grab handle with the other and force the door against the safety catch and check that the door does not open.




PASS OR FAIL STANDARD



Place gauge over striking plate cam and bring lock bolt in propped position against striking plate cam.


Figure 1: Use of gauges (see Special Tools item 3) to check the overlap between lock bolt and striking plate

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External Door (After Repair in-situ) – Test

OL 0141

9. Check that the door closes fully from the safety catch position.
10. Check that the handle has returned to the horizontal position.
11. Attempt to push the door open from the closed position.
12. Check that the door closes fully when slammed three times with varying degrees of force.
13. Check that on each occasion the door handle returns to a horizontal position.
14. Slam the door and check that there is no contact between the door edge and the striking plate, including when the door “bounces in” on its rubber edge seals
15. With the door in the closed position, turn the handle through approximately 30° and release. The lock must fully engage and the handle return to the horizontal position without any closing force being applied to the door.
16. Check that the door can be locked out of use by the budget lock and the budget lock moves smoothly through 90°.
17. Check the lock bolt spring force using the testing device item 08 in accordance with the specified drawing (see Reference Drawings item 1), (see Special Tools item 1) and an analogue or digital force measuring gauge reading 0-10kgf in intervals of 0.05kgf, as follows:
 - 17.1 Fully extend the lock bolt.
 - 17.2 Insert the fulcrum of the testing device into the striking plate well and close the door to a position where the notch in the testing device engages with the end of the lock bolt. See Figure 2.
 - 17.3 Connect the gauge to the end of the testing device and pull on the gauge.
 - 17.4 Note the readings on the gauge at the start and finish of the bolt’s travel. The gauge readings must be multiplied by three to give the actual bolt spring force which must be as follows:

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External Door (After Repair in-situ) – Test

OL 0141

Minimum force to commence actuation

11.0 kgf

Maximum force to complete actuation

21.8 kgf

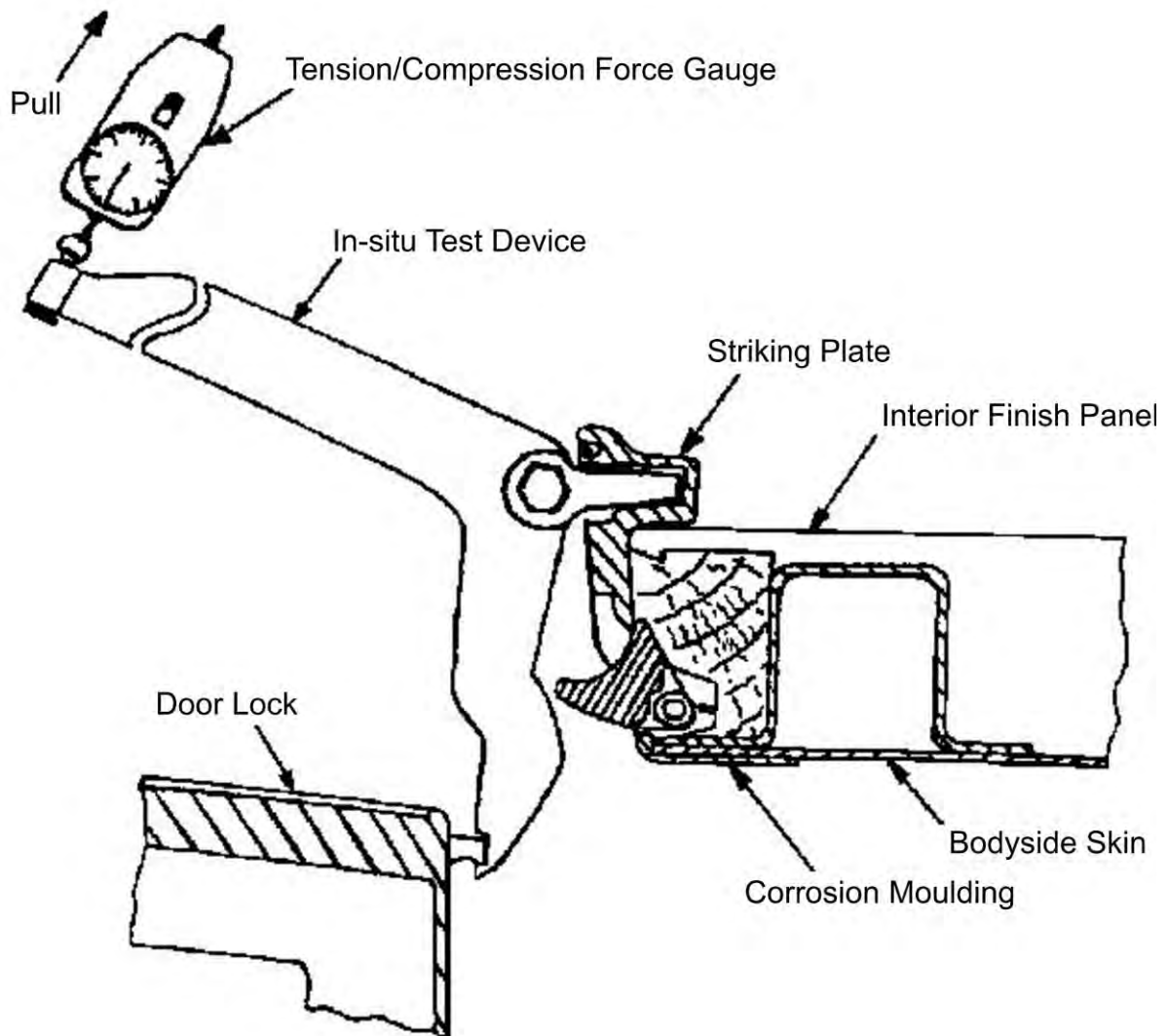



Figure 2: Measuring Lock Bolt Spring Force

Arising Work

1-17. Rectify defects in accordance with the appropriate procedures and repeat entire scheduled work.

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External Door Striking Plate – Examine

OL 6202

Special Tools		
Item	Description	Cat No.
1	Gauge	039/028097 or 800/640203
2	Gauge	800/640201

Reference Documents		
Item	Document No.	Title
1	TI/TI0024	Repair of loco-hauled coaching stock, HST and Class 488 outward opening bodyside passenger doors and door locks
2	TN/TS0403	Overhaul of Bodyside Door Locks, Striking Plates, Handles, Roseplate and Escutcheon Plates


APPLIES TO: All Vehicles

Scheduled Work

1. Check that the striking plate securing screws are tight to the torque value of 5Nm.
2. Remove any debris from the striking plate well.
3. Examine the striking plate for damage and signs of contact other than by the lock bolt or ram.
4. Dress out any burrs in the well.
5. Depress the cam of the striking plate fully and check that on release the cam snaps out to the fully extended position.
6. Check that when depressed, the cam is flush or below the striking plate face.
7. Check that there is no lateral movement in the cam.
8. Check the projection of the cam from the striking plate using gauge (see Special Tools item 1, and Figure 1).

Arising Work

1. Secure the loose striking plate by tightening the screws.
1. Renew the striking plate screw tapping plate in accordance with the specified document (see Reference Documents item 1 Procedure G) when the striking plate cannot be resecured by tightening the screws.

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External Door Striking Plate – Examine

OL 6202

1. Renew the tapping plate in accordance with the specified document (see Reference Documents item 1 Procedure G Part 2) and carry out a patch repair up to 600mm long to stand pillar in accordance with the specified document (see Reference Documents item 1 Procedure J) when striking plate cannot be resecured by tightening screws.
1. Renew the tapping plate and stand pillar in accordance with the specified document (see Reference Documents item 1 Procedure K) where the striking plate cannot be resecured by tightening the screws and where more than 600mm of the stand pillar requires renewal.
- 3,5-8. Change striking plate in accordance with the specified document (see Reference Documents item 1 Procedure E) and overhaul in accordance with the specified Technical Specification (see Reference Documents item 2).

Job No. OL 6202 Figure 1 - Use of gauges (see Special Tools item 1 and 2) to check the projection of cam from the striking plate

Place the gauge firmly over the striking plate cam and test with the straight edge.

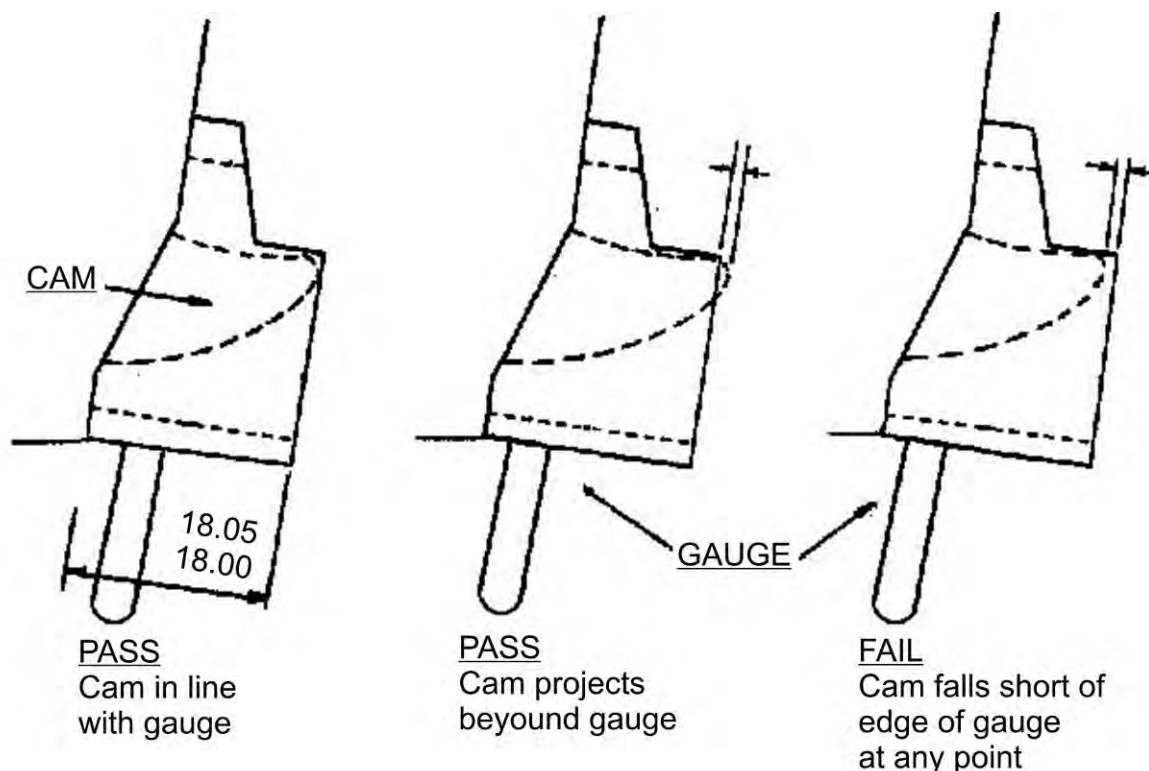



Figure 1: Gauging Striking Plate Cam

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Door Top Draught Excluder – Renew

OO 0124

Materials			
Item	Description	Qty/Veh	Cat No.
1	Draught Excluder	1075mm approx	010/030234
*	Headrail Packing 1 or 3 Door	1	063/002355
*	Headrail Packing 2 or 4 Door	1	063/002354
*	Retaining Strip 1 or 3 Door	1	063/002594
*	Retaining 2 or 4 Door	1	063/002593
	Headrail Packing Fixings, Screws, No. 8 x 25mm Type B Csk Head Self Tapping EZP Finish	10	035/055831
	Retaining Strip Fixings, Woodscrews, No. 6 x 20mm Csk Head Steel EZP Finish	11	035/092220


*NOTE: Only required in Arising Work.

Reference Drawings		
Item	Drawing No.	Title
1	B1-A1-9013724	Doorway Headrail Details

APPLIES TO: All Vehicles (4 per vehicle)

Scheduled Work

- Remove the Retaining Strip (see Figure 1) which is fixed with No. 6 Woodscrews. Discard the screws.
- Remove the existing Draught Excluder and discard.
- Examine the Headrail Packing. Any rotting or damage is unacceptable.
- Cut the new draught excluder (see Materials item 1) to length and notch the flat section to allow the excluder to bend round curve of headrail.
- Examine the Retaining Strip. Any splitting or damage is unacceptable.
- Fit the Draught Excluder and the Retaining Strip in position and fix with thirteen No. 6 x 20mm Csk Head Steel Woodscrews EZP Finish.
- Close the door and check that:
 - The Draught Excluder bear is in contact with the door along its entire length.
 - The Draught Excluder does not trap in the door gap and cause the door to bind.
 - The Draught Excluder does not exert any pressure on the door to prevent closure.

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Door Top Draught Excluder – Renew

OO 0124

Arising Work

3. Renew the head rail packing. See Table for Cat Nos. or produce onsite in accordance with the specified drawing item 1 or 2 (see Reference Drawing item 1). Headrail Packing is fixed in position using ten No. 8 x 25mm Type B Self Tapping Screw EZP Finish.
5. Renew the retaining strip. See the Materials Table.

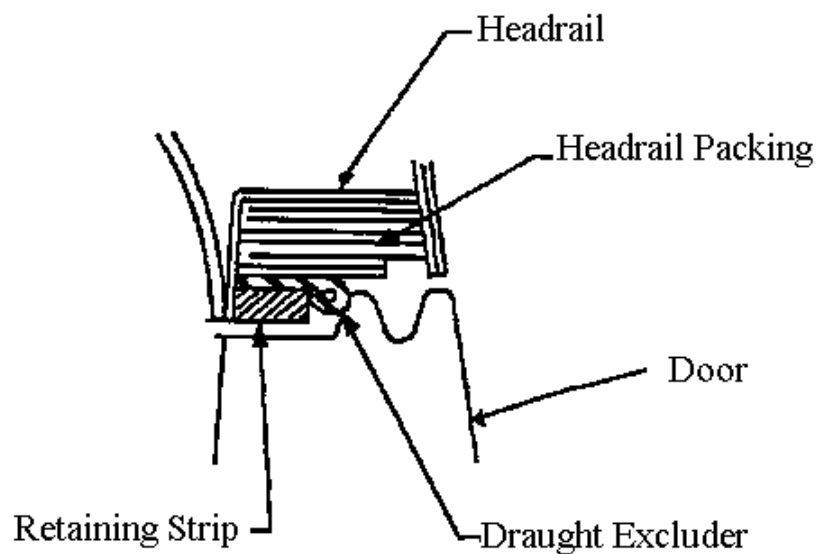



Figure 1: Section Through Top of Door

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Lock Edge Draught Excluder – Renew

OO 0125

Materials			
Item	Description	Qty/Veh	Cat No.
1	Strip Special Shaped Section Canvas Lined on Inner Face with Sponge Insert. In Multiples of 30m	1	010/030000
2*	Moulding Day Coach	1000mm 750mm	063/002573 063/002574
2	Catering Veh's	1000mm 750mm	063/002575 063/002576
3	Fixings Woodscrews No. 6 x 25mm R'sd Csk Head Steel EZP Finish	20	035/092654
4	Adhesive Evode 613	As Req'd	007/003001


*NOTE: Only required in Arising Work.

Reference Drawings		
Item	Drawing No.	Title
1	B1-S-9014263	Arrangement of Corner Doorway

APPLIES TO: All Vehicles (4 per vehicle)

Scheduled Work

- Remove the Moulding from inside of the doorway (see Figure 1) which is fixed with No. 6 Woodscrews. Discard the screws.
- Examine the Moulding. Any splits or damage is unacceptable.
- Remove the existing Draught Excluder and discard.
- Cut the new Draught Excluder (see Materials item 1) to length in two sections, one from the top of the stand pillar to the striking plate and one from the striking plate to the bottom of the stand pillar. Check that the draught excluder is cut closely to the striking plate.
- Position the new Draught Excluder on the stand pillar and retain using adhesive (see Materials item 4). Check that the bead of the Excluder is fitting closely to the corner of the stand pillar along its entire length.
- Fix the Mouldings in (1000mm above Striking Plate, 750mm below Striking Plate) position (see Materials item 2) with No. 6 x 25mm R'sd Csk Head Steel Woodscrews EZP Finish (see Materials item 3).
- Close the door and check that:
 - The Draught Excluder bead is in contact with the door along its entire length.

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Lock Edge Draught Excluder – Renew

OO 0125

7.2 The Draught Excluder does not trap in the door gap and cause the door to bind.

7.3 The Draught Excluder does not exert any pressure on the door to prevent closure.

Arising Work

- Renew the moulding (see Reference Drawings item 1). Section to Drawing B1-S-9014263, items 3 to 6, length cut to suit (1750mm approx).

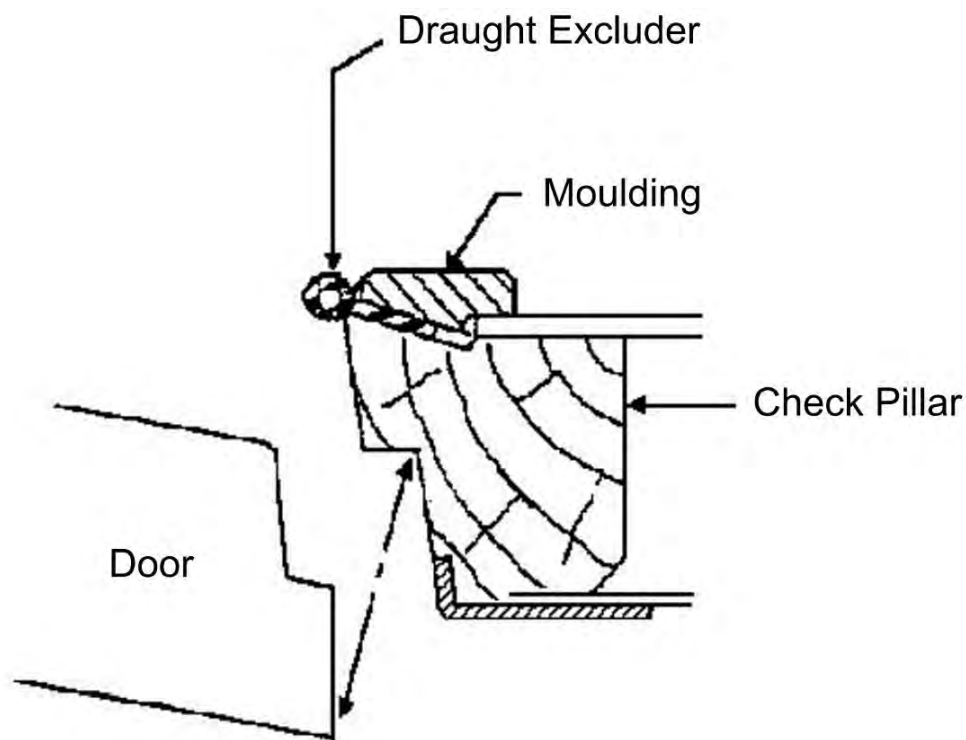



Figure 1: Section Through Stand Pillar

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Door Boot Draught Excluder – Renew

OO 0126

Materials			
Item	Description	Qty/Veh	Cat No.
1	Door Boot Draught Excluder	950mm approx	010/056408
2	Adhesive Evode 613	As Req'd	007/003001

APPLIES TO: All Vehicles (4 per vehicle)

Scheduled Work

1. Remove the threshold strip securing the draught excluder.
2. Remove the existing draught excluder from the recess in the stepwell and discard.
3. Remove any pieces of rubber, dirt and old adhesive from the recess and the threshold strip.
4. Examine the threshold strip for damage.
5. Examine the recess for corrosion and rotting.
6. Cut the excluder (see Materials item 1) to length 950mm approx.

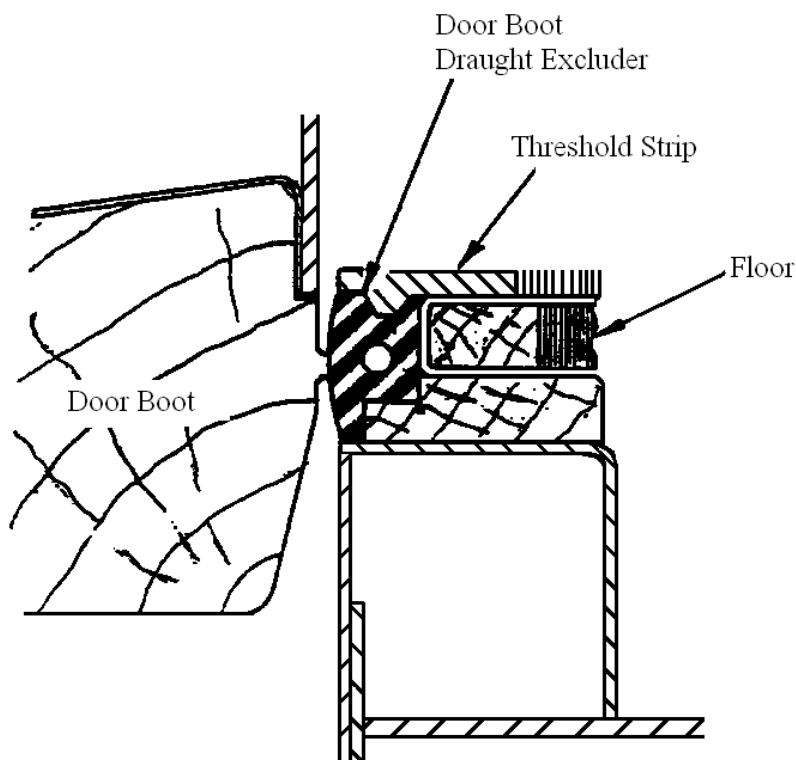



Figure 1: Section Through Stepwell

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Door Boot Draught Excluder – Renew

OO 0126

7. Cut the back of the rubber extrusion to allow the section to bend round the curve in stepwell without buckling. Fix the excluder in position in the recess using the adhesive (see Materials item 2).
8. Refit the threshold strip and check that all the screws tighten.
9. Close the door and check that:
 - 9.1 The Draught Excluder is lightly compressed by the Door Boot. Plane the Door Boot if pressure is excessive.
 - 9.2 The Draught Excluder does not foul on the hinge edge Weather Seal. If this is the case, trim the boot seal to clear, the minimum amount of material to be removed.

Arising Work

4. Renew the threshold strip.
5. Renew the rotten or damaged floor panel.
5. Repair the corroded steelwork in accordance with Job No. FTA0100.
8. Repair.

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	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	

Bodyside Door Stand Pillar and Striking Plate - Change/Examine

OO 6110

Materials			
Item	Description	Qty/Veh	Cat No.
1	Striking Plate (as drawn, No. 2 and No. 4 Doors) Striking Plate (opp hand, No. 1 and No. 3 Doors)	2 2	063/008909 063/008910
2	Striking Plate Shims 1mm thick 2mm thick 3mm thick 4mm thick	As Req'd	800/577117 800/577124 800/577123 800/577125
3	Outer Fixings M6 x 40mm Csk Head M/C Screw EZP Finish	2	035/104734
4	Inner Fixings Screw, M6 x 50mm Csk Head M/C EZP Finish	2	035/104748
5	Thread Locking Compound Loctite Studlock 270	As Req'd	007/060309
6	Plate Mounting (Stamped -1)	As Req'd	800/577119
7	Plate Mounting (Stamped +1)		800/577120
8	Plate Mounting (Stamped +2)		800/577121
9	Plate Mounting (Stamped +3)		800/577122


Torque Figures			
Item	Description	Size	Torque (Nm)
1	Countersunk Head Machine Screw	M6	5

Reference Documents		
Item	Document No.	Title
1	TN/TS0403	Overhaul of Bodyside Door Locks, Striking Plates, Handles, Roseplate and Escutcheon Plates
2	TI/TI0024	Repair of loco-hauled coaching stock, HST and Class 488 outward opening bodyside passenger doors and door locks

APPLIES TO: All Vehicles (4 per vehicle, except BFO and TGS which have 2).

Scheduled Work

1. Remove the four screws securing the striking plate to the door stand pillar and discard.
2. Remove the striking plate and overhaul in accordance with the specified Technical Standard (see Reference Documents item 1).
3. With the striking plate removed, examine the pillar for rotting and splitting.
4. Examine the threads and check for broken screws. Test all the threads with a M6 screw.

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Bodyside Door Stand Pillar and Striking Plate - Change/Examine

OO 6110

5. If the holes are sound place the new or overhauled striking plate in position using new screws (see Materials items 3 and 4) in the stand pillar with the requisite shims to bring the edge of the striking plate into line with the edge of the corrosion moulding. Shims up to a maximum of 8mm in no more than 2 separate shims are to be used (Shim Cat Nos. shown in table).
6. Carefully move the door towards the closed position, and check that the lock and striking plate are in the vertical alignment.
7. Check for signs of contact with the lock other than by the cam.
8. With the door lock in the propped position, close the door to the safety catch position, check that the overlap of the lock bolt against the striking plate is between 6mm and 7mm.
9. Slam the door and check that there is no contact between the door edge and the striking plate, including when the door "bounces in" on its rubber edge seals.
10. Remove one screw at a time and replace using the thread locking compound (see Materials item 5). Tighten the screws (see Torque Figures item 1).
11. Examine the budget lock striking plate.

Arising Work

3. Drill out the broken screws, repair the tapping plate in accordance with the specified document (see Reference Documents item 2 Procedure G Part 2).
5. Patch repair up to 600mm of the door pillar in accordance with the specified document (see Reference Documents item 2 Procedure J).
5. Remove the defective door stand pillar complete, renew and refit in accordance with the specified document (see Reference Documents item 2 Procedure K) where more than 600mm of the pillar requires renewal.
6. If the lock and striking plate out of vertical alignment renew tapping plate and reposition striking plate in accordance with the specified document (see Reference Documents item 2 Procedure G Part 2 and Materials items 6 to 9).
- 8,9 Shim the striking plate to a maximum of 3mm proud of corrosion moulding. Shims up to a maximum of 8mm in no more than 2 separate shims are to be used, (Shim Cat Nos. shown in table).
10. Renew the defective budget lock striking plate.

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External Door – Examine

OP 0109

Materials			
Item	Description	Qty/Veh	Cat No.
1	Check Strap 229mm long	As Req'd	018/024127
2	Check Strap 255mm long	As Req'd	063/000082
3	Check Strap 280mm long	As Req'd	064/070803


Reference Documents		
Item	Document No.	Title
1	TI/TI0024	Repair of loco-hauled coaching stock, HST and Class 488 outward opening bodyside passenger doors and door locks
2	CR/PE0102	Repainting of Rail Vehicles

APPLIES TO: All Vehicles

NOTE 1: Certain doors fitted adjacent to catering vehicle loading points are fitted with stainless steel protective panels to prevent damage occurring to the main panel. In the event a door is condemned, these stainless steel panels must be removed and fitted to the replacement door.

Scheduled Work


1. Check that the door opens without contact occurring between the door and any part of the surround or fittings.
2. Check that the correct door stop is fitted, and not packed with additional door stops, washers, tube etc.
3. Check that there is at least 1mm clearance between the door limit control bracket and the whole width of the stepboard.
4. Examine the check strap/s for damage and secure fastening.
5. Check that the door limit control holds the door at approximately right angles to the vehicle side by checking the measurement shown in Figure 1.
6. With the door fully open check that the check strap is not taut.
7. Examine the draught excluders for wear and damage and check that they are correctly fitted in all positions.
8. Check from inside the vehicle with the door closed that no light is visible between the door and surround.
9. Check from both the inside and outside of the door that the clearance along the whole of the top edge is at least 1mm.

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External Door – Examine

OP 0109

10. Check from both the inside and outside of the door that the clearance along the whole of the lock edge is at least 1mm.
11. Check that all door notices and the door numbers are present and in good condition.
12. Clean and examine the fluorescent strip for damage.
13. With the door closed check that the fluorescent strip is within the bodyside profile i.e. not visible when viewed along the bodyside from the centre of coach.
14. Examine the threshold strip for damage and looseness.

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External Door – Examine

OP 0109

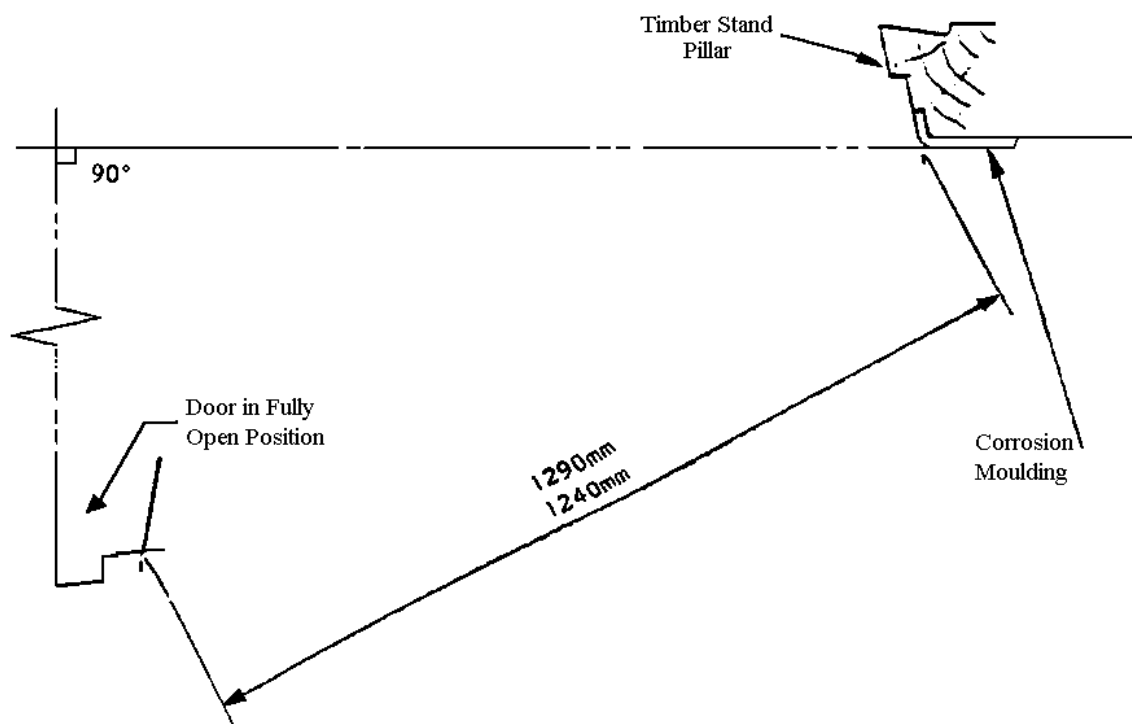
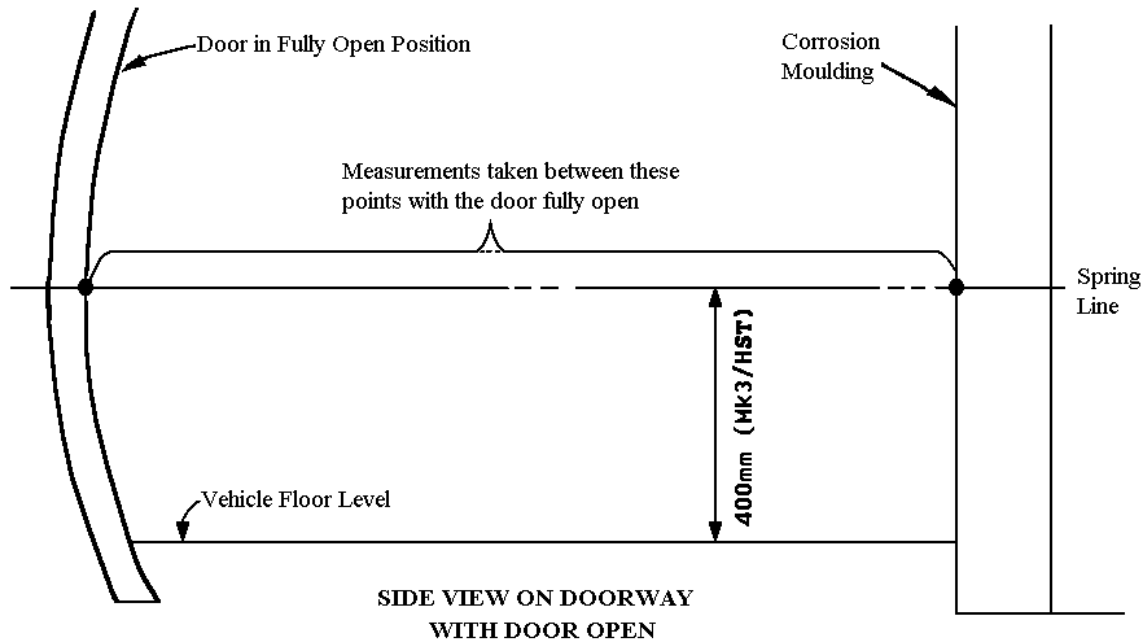



Figure 1: External Door Alignment

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External Door – Examine

OP 0109

Arising Work

NOTE 2: If the door is to be renewed solely due to door damage, AND the hinges pass the criteria of Job Nos. OP 0116 and OP 0120 THEN it is permissible for the body hinge halves to remain fitted to the vehicle.

1&9. Trim the door headrail packing in accordance with the specified document (see Reference Documents item 1 Procedure V).

1,10. Trim the stand pillar in accordance with the specified document (see Reference Documents item 1 Procedure U).

2. Renew the door stop, remove and discard the packing pieces, and adjust the door limit control in accordance with the specified document (see Reference Documents item 1 Procedure W Part 2).

3. Check the security of the limit plate/Banana plate to the door bottom. If loose, resecure.

If the plate is secure, lower the step board by rebating the underside of the stepboard by 1-2mm where it is in contact with the brackets. Paint the bare wood in accordance with the specified document (see Reference Documents item 2) before reaffixing.

4. Resecure the loose check straps.

4. Renew the defective check straps (see Material items 1 to 3). The check strap to be fitted is one that will not allow the door to open beyond 90deg.

5. Adjust the door limit control in accordance with the specified document (see Reference Documents item 1 Procedure W Part 2).


6. Change the check strap for one of the correct length (see Material items 1 to 3). The check strap to be fitted is one that will not allow the door to open beyond 90 degrees. .

7. Renew the door top draught excluder in accordance with Job No. OO 0124.

7. Renew the lock edge draught excluder in accordance with Job No. OO 0125.

7. Renew the hinge edge weather seal in accordance with the specified document (see Reference Documents item 1 Procedure AA Part 2).


7. Renew the door boot draught excluder in accordance with Job No. OO 0126.

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External Door – Examine

OP 0109

- 8,13. If gaps are still visible after attention to hinges and draught excluders, renew door in accordance with the specified document (see Reference Documents item 1 Procedure M Part 2).
11. Renew the notices.
- 12,13 Renew damaged for fluorescent strip or fluorescent strip not positioned 5mm from edge of door as follows:
- i) If the door is already fitted with fluorescent decal remove and discard. If the door has a damaged painted fluorescent strip, abrade lightly.
 - ii) Clean the door edge with industrial methylated spirits making sure the surface is completely free from contamination.
 - iii) Make sure the surface is completely dry.
 - iv) Remove the backing from the fluorescent strip.
 - v) Apply the fluorescent strip along the door edge, 6mm from the front edge.
 - vi) Cut the strip clear of locks.
 - vii) Close the door and repeat items 1, 10 and 13 of Scheduled Work.
13. Renew the distorted door shell (panels and fittings recovered) in accordance with the specified document (see Reference Documents item 1 Procedure M Part 2).
13. Renew the distorted door shell, top panel and apron (fittings recovered) in accordance with the specified document (see Reference Documents item 1 Procedure M Part 2).
13. Renew the distorted door complete with all panels and fittings in accordance with the specified document (see Reference Documents item 1 Procedure M Part 2).
14. Renew or resecure the threshold strip in accordance with Job No. OO 0126.

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External Door Structure and Fittings – Check

OP 0116

Reference Drawings		
Item	Drawing No.	Title
1	ABB Drawing No. 1153993	Installation of Door Reinforcement for Striker (Mark 3 vehicles)


Reference Documents		
Item	Document No.	Title
1	TI/TI0024	Repair of loco-hauled coaching stock, HST and Class 488 outward opening bodyside passenger doors and door locks

APPLIES TO: All Vehicles

NOTE 1: Certain doors fitted adjacent to catering vehicle loading points are fitted with stainless steel protective panels to prevent damage occurring to the main panel. In the event a door is condemned, these stainless steel panels must be removed and fitted to the replacement door.

Scheduled Work

1. Examine the door for splits and cracks, against the following criteria:
 - 1.1 If one side of a split or crack can be moved by hand relative to the other.
 - 1.2 If the gap between the door and surround is being reduced by the split or crack.
 - 1.3 If the surface of the door is lifted more than 5mm above the body profile.
 - 1.4 Cracks up to 200mm long, 3mm wide, not more than 3 splits in one face, at least 60mm apart (tip to tip).
 - 1.5 Other splits or cracks exceeding limits of 1.4.
2. Examine the skin of the door for holes, cracks or damaged GRP.
3. Examine the door limit control for damage and check that the plate attaching the limit control to the door is securely fastened.
4. With the door open check that the hinges are secure and undamaged.
5. Examine internal grab rails for damage.

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External Door Structure and Fittings – Check

OP 0116

Arising Work

NOTE 2: If the door is to be renewed solely due to door damage, and the hinges pass the criteria of this job and OP 0120 THEN it is permissible for the body hinge halves to remain fitted to the vehicle.

- 1.1 } Renew the door shell (panels and fittings recovered) in accordance with the specified document (see Reference Documents item 1 Procedure M Part 2).
- 1.3 } Renew the door shell, top panel and apron (fittings recovered) in accordance with the
- &1.5 } specified document (see Reference Documents item 1 Procedure M Part 2).
- Renew the door complete with all panels and fittings in accordance with the specified document (see Reference Documents item 1 Procedure M Part 2).
- If the vehicle is fitted with central locking, the new door must be fitted with a striker plate. If it is not, the striker plate is to be fitted in accordance with the specified drawings (see Reference Drawings item 1).
- 1.4 Repair the door in accordance with a procedure agreed with the Engineer.
3. Resecure the loose limit control.
3. If the limit control is defective, renew in accordance with the specified document (see Reference Documents item 1 Procedure X Part 2).
4. If any hinge is damaged, renew all the hinges on the door in accordance with the specified document (see Reference Documents item 1 Procedure P).
5. Change the grab rail.

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External Outward Opening Door – Overhaul

OP 0118

Materials			
Item	Description	Qty/Veh	Cat No.
1	Plain Mineral Lubricating Oil (BR Spec 664 Type 150)	As Req'd	027/023052
2	Grease	As Req'd	027/001351
	150kg container		027/001353
	3kg barrel		027/001354
	12.5kg barrel		027/001356
	50kg barrel		027/001357
	180kg barrel		027/001358
	400g cartridge		
3	Check Strap 229mm long	As Req'd	018/024127
4	Check Strap 255mm long	As Req'd	063/000082
5	Check Strap 280mm long	As Req'd	064/070803

Reference Drawings		
Item	Drawing No.	Title
1	ABB Drawing No. 1153993	Installation of Door Reinforcement for Striker (Mark 3 vehicles)

Reference Documents		
Item	Document No.	Title
1	TI/TI0024	Repair of loco-hauled coaching stock, HST and Class 488 outward opening bodyside passenger doors and door locks
2	TM/TP0056	Loco Hauled Coaching Stock and HST Outward Opening Door Fault Finding and Repair Procedure
3	CR/PE0102	Repainting of Rail Vehicles


APPLIES TO: All Vehicles

NOTE 1: All the fixing screws removed are to be discarded and replaced with new. All new fixing screws to be EZP Finish.

NOTE 2: Certain doors fitted adjacent to catering vehicle loading points are fitted with stainless steel protective panels to prevent damage occurring to the main panel. In the event a door is condemned, these stainless steel panels must be removed and fitted to the replacement door.

Scheduled Work


- Check the profile of the door against the bodyside profile with the door in-situ. Maximum acceptable variation between the two profiles is 5mm.
- Remove the door as follows:
 - Remove the check strap and discard the strap and screws.

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External Outward Opening Door – Overhaul

OP 0118


- 2.2 Disconnect the limit control from the bottom of door.
 - 2.3 With the door open and the droplight lowered, support the weight of the door with a forklift or overhead crane, taking the weight under the top rim of the droplight aperture and using padding to prevent damage to the top of the droplight aperture.
 - 2.4 Bend out the lock washer tab at the bottom of each hinge, remove the nut from each hinge and extract the pin and discard.
 - 2.5 Lift the door away from the vehicle.
 3. Examine the door for splits and cracks, against the following criteria:
 - 3.1 If one side of a split or crack can be moved by hand relative to the other.
 - 3.2 If the gap between the door and the surround is being reduced by the split or crack.
 - 3.3 If the surface of the door is lifted more than 5mm above the body profile.
 - 3.4 Cracks up to 200mm long, 3mm wide, not more than 3 splits in one face, at least 60mm apart (tip to tip).
 - 3.5 Other splits or cracks exceeding limits of 3.4.
 4. Remove the dovetail if fitted and scrap. Fill fixing holes with body filler and rub down to a smooth finish.
 5. Remove all items, including the boot and central locking striker plate, if fitted, from the door shell, except the hinge halves, budget lock and hinge edge draught excluder.
- NOTE 3: Identify and retain the packings for the central locking striker plate.
6. Examine the limit control for damage and check that the fixing holes for the limit bracket are not severely corroded and the threads are not damaged.
 7. Treat the lock fixing holes in accordance with the specified document (see Reference Documents item 1 Procedure D Part 3).
 8. Examine the hinge halves on the door and vehicle.
 - 8.1 Check that the hinge halves are secure on the door and vehicle.
 - 8.2 Using a suitable tool remove the balls from the hinge cups and discard.
 - 8.3 Clean the hinge sockets using White Spirit and dry using a lint free cloth.
 - 8.4 Visually examine the hinge halves for damage and the hinge cups for wear or damage.

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External Outward Opening Door – Overhaul

OP 0118

9. Not used.
10. Overhaul the droplight in accordance with Job No. CM 6615.
11. Clean out the drain holes in the bottom of door.
12. Examine the boot for rotting or damage and refit.
13. Examine the door surface for cracks and chips.
14. Examine the grab rail and refit.
15. Examine the hinge edge draught excluder for cuts and scuffing.
16. Renew the check strap (see Material items 3 to 5). The check strap to be fitted is one that will not allow the door to open beyond 90deg.
17. Examine the budget lock as follows:
 - 17.1 Check that the lock tongue is flush with the lock face when in the open position.
 - 17.2 Check that the lock tongue moves smoothly to 90° and is held by spring force in both open and closed positions.
 - 17.3 Lubricate the budget lock with oil (see Materials item 1) and operate several times. Clean off any excess oil.
18. Renew the fluorescent strip, as follows:
 - 18.1 If the door is already fitted with a fluorescent decal remove and discard. If the door has a damaged painted fluorescent strip lightly abrade.
 - 18.2 Clean the door edge with industrial methylated spirits making sure the surface is completely free form contamination.
 - 18.3 Make sure the surface is completely dry.
 - 18.4 Remove the backing from the fluorescent strip.
 - 18.5 Apply the fluorescent strip along the door edge, 6mm from the front edge.
 - 18.6 Cut the strip clear of the locks.
19. Refit the central locking striker plate using the original packings.

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External Outward Opening Door – Overhaul

OP 0118

20. Refit the door to the same position as it was removed from as follows:

- 20.1 Place the door into position using the same lifting arrangement as for removing the door.
- 20.2 Grease the hinge cups, using a spatula and No. 3 Grease (see Materials item 2).
- 20.3 Insert the new balls in lower hinge cups, align the holes vertically. Insert new hinge pins.
- 20.4 Lower the door, checking that all hinges are correctly seated on their respective bearings. A gap of between 1 and 3mm must be noted between the two halves of the hinge. The gap on all hinges on a door must be approximately the same.
- 20.5 Fit the felt washer, plain washer, spring, tab washer and nut onto the lower end of each hinge pin (see Figure 1), tighten the nuts on the hinge pins until the tab washer just contacts the hinge body then turn back one flat, check that the door swings smoothly without binding or any free play in the hinges.

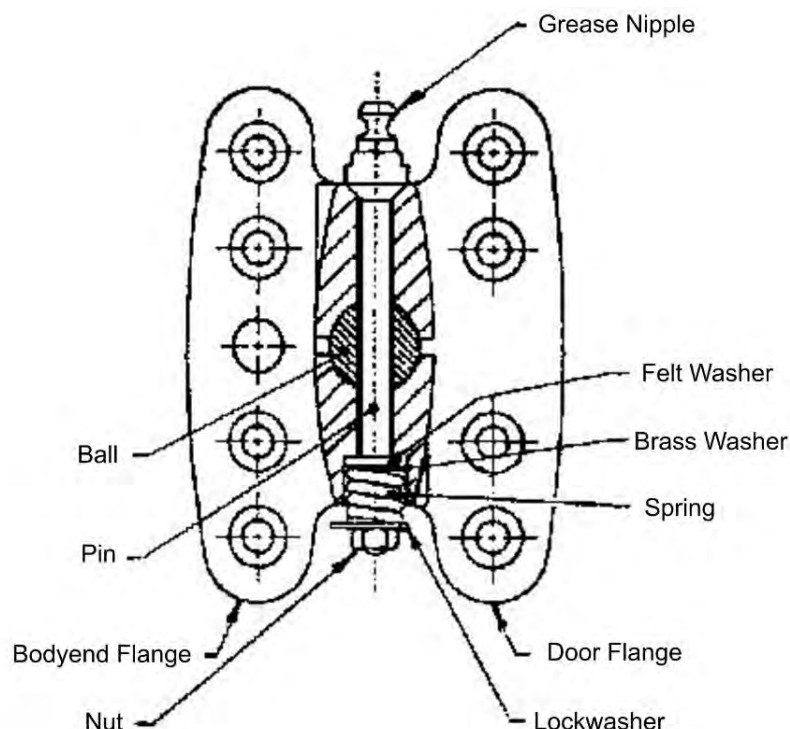



Figure 1: Arrangement of Hinge

- 20.6 Check that there is no movement in the horizontal plane between the two halves of the hinge. This latter can be checked by closing the door to the safety catch position applying a force to the bottom of the door adjacent to the lower hinge along the line of the vehicle.

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External Outward Opening Door – Overhaul

OP 0118

- 20.7 Bend over the tab washer tabs to lock the hinge pin nuts.
- 20.8 Lubricate each hinge using a grease gun with No. 3 grease (see Materials item 2) until new grease appears at the bearing.
21. Reconnect and adjust the door limit control in accordance with the specified document (see Reference Documents item 1 Procedure W), check that there is at least 1mm clearance between the door limit control bracket and the whole width of the stepboard.
22. Connect the check strap and check that with the door fully open the check strap is not taut.
23. Check that the door opens without contact occurring between the door and any part of the surround or fittings.
24. Check from inside the vehicle with the door closed that no light is visible between the door and surround.
25. Check from both the inside and outside of the door that the clearance along the whole of the top edge is between 1mm and 2mm.
26. Check from both the inside and outside of the door that the clearance along the whole of the lock edge is a nominal 3mm with a minimum of 2mm over the whole length except in striking plate and lock area where 1mm is permitted.
27. Check that all door notices and the door numbers are present and in good condition.
28. With the door closed check that the fluorescent strip is within the bodyside profile i.e. not visible when viewed along the bodyside from the centre of the coach.

Arising Work

- 1, 3.1, Renew the door shell (panels and fittings recovered) in accordance with the specified to 3.3, document (see Reference Documents item 1 Procedure M Part 2).
- 3.5 Renew the door shell, top panel and apron (fittings recovered) in accordance with the specified document (see Reference Documents item 1 Procedure M Part 2).
- 28 Renew the door complete with all panels and fittings in accordance with the specified document (see Reference Documents item 1 Procedure M Part 2).
Refer to Job No. OL 0136 Part C for fitting of a new lock.
If the vehicle fitted with central locking, the new door must be fitted with a striker plate. If it is not, striker plate to be fitted in accordance with the specified drawing (see Reference Drawings item 1).
- 3.4 Repair the door in accordance with a procedure agreed with the Engineer.
- 1,3, Renew the door in accordance with the specified document (see Reference Documents item 1).


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External Outward Opening Door – Overhaul

OP 0118

28. Procedure M Part 2). If the vehicle is fitted with central locking the new door must be fitted with a striker plate. If it is not, the striker plate is to be fitted in accordance with the specified drawing (see Reference Drawing item 1). Charge to be difference between the new and overhauled door.
6. Renew the defective limit control in accordance with the specified document (see Reference Documents item 2 Procedure 8).
6. Repair the defective limit bracket fixing holes in accordance with a procedure agreed by with the Engineer.
- 8.1. Renew all the hinges on the door in accordance with the specified document (see Reference 8.4, Documents item 1 Procedure P) where any hinge is worn, damaged or insecure or 19.4, there is evidence of corrosion or movement.
- 19.6
10. Change the damaged, worn, distorted or corroded droplight mechanism.
10. Renew the broken or defaced droplight glass.
10. Renew the droplight finger pull.
10. Renew or adjust the droplight fittings or the mechanism to correct all defects not covered by CMA0002, CMA0106A or CMA0107 above.
12. Renew the rotten or damaged boot.
13. Repair the cracks and chips in the door surface with body filler, and rub down flush to a smooth finish.
14. Change the grab rail.
15. Renew the hinge edge draught excluder in accordance with the specified document (see Reference Documents item 1 Procedure AA Part 2).
17. Renew the budget lock.
21. Check the security of limit plate/Banana plate to the door bottom:
If loose, resecure in accordance with a procedure agreed by with the Engineer. The procedure must ensure that the limit control bracket is secured to the steel door framing, and not to the wooden door boot.


If the plate is secure, lower the stepboard by rebating the underside of the stepboard by 1 to 2mm where it is in contact with the brackets. Paint the bare wood in accordance with the specified document (see Reference Documents item 3) before reaffixing.

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External Outward Opening Door – Overhaul

OP 0118

22. Change the check strap for one of the correct length. For Cat Nos. (see Reference Document item 1 Procedure M Part 2).
23. Trim the door headrail packing in accordance with the specified document (see Reference Documents item 1 Procedure V).
24. Documents item 1 Procedure V).
- 25.
23. Trim the stand pillar in accordance with the specified document (see Reference Document 24&26 item 1) Procedure U).
- 26.
27. Renew as required.
28. If the fluorescent strip is not positioned 5mm from edge of door, repeat Scheduled Work item 18.

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External Door Hinge Pins and Bearings – Renew

OP 0120


Materials			
Item	Description	Qty/Veh	Cat No.
1	Grease	150kg container 3kg barrel 12.5kg barrel 50kg barrel 180kg barrel 400g cartridge	As Req'd 027/001351 027/001353 027/001354 027/001356 027/001357 027/001358

Reference Documents		
Item	Document No.	Title
1	TI/TI0024	Repair of loco-hauled coaching stock, HST and Class 488 outward opening bodyside passenger doors and door locks

APPLIES TO: All Vehicles

Scheduled Work

1. Bend back tab washers and remove the nuts, tab washers, springs, brass washers and felt washers from all hinges and discard.
2. Open the door sufficiently to clear the headrail.
3. Using a suitable lifting method lift the door just sufficient to allow removal of the balls from between the hinge halves (check packing is used to prevent damage to the door during lifting).
4. Remove the hinge pin from one hinge and discard.
5. Using a suitable tool remove the ball from the hinge cup and discard.
6. Clean the hinge sockets using White Spirit and dry using a lint free cloth.
7. Visually examine the hinge cups for wear or damage.
8. Grease the hinge cups, using a spatula and No. 3 Grease (see Materials item 1).
9. Insert the new ball in the lower hinge cup, align the hole vertically.
10. Insert a new hinge pin.
11. Repeat steps 4 to 10 on the remaining hinges.
12. When all bearings are renewed, lower the door, checking that all hinges are correctly seated on their respective bearings. A gap of between 1 and 3mm must be noted between the two halves of the hinge. The gap on all hinges on a door must be approximately the same.

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External Door Hinge Pins and Bearings – Renew

OP 0120

13. Fit the felt washer, plain washer, spring, tab washer and nut on the lower end of each hinge pin (see Figure 1), tighten the nuts on the hinge pins until the tab washer just contacts the hinge body then turn back one flat, check that the door swings smoothly without binding or any free play in the hinges.

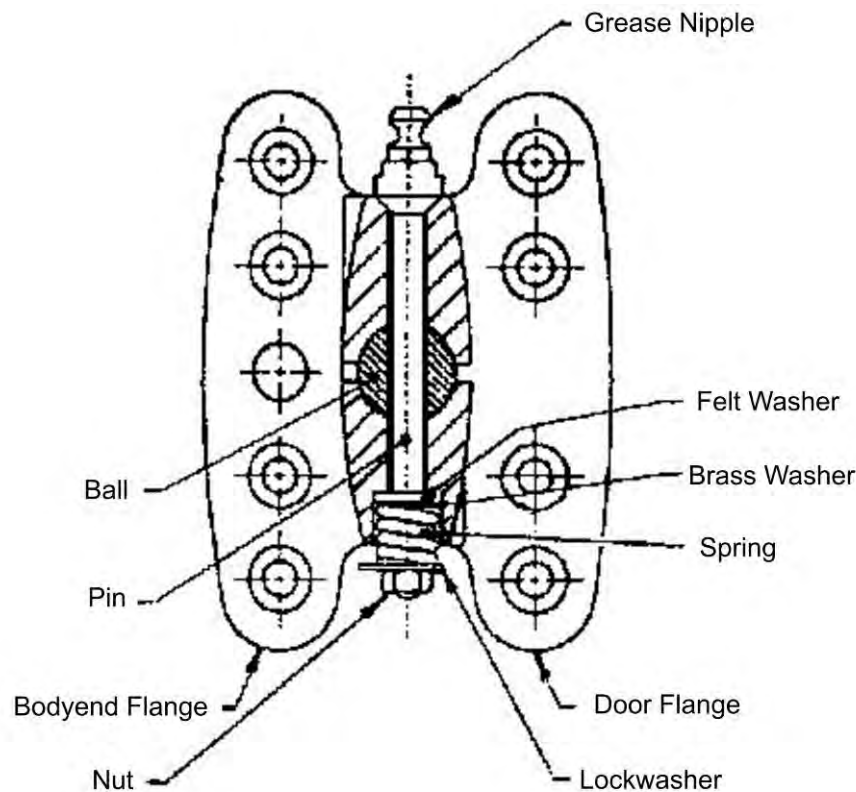



Figure 1: Arrangement of Hinge

14. Check that there is no movement in the horizontal plane between the two halves of the hinge. This latter can be checked by closing the door to the safety catch position and applying a force to the bottom of the door adjacent to the lower hinge along the line of the vehicle.
15. Bend over tab washer tabs to lock the hinge pin nuts.
16. Lubricate each hinge using a grease gun, with No. 3 Grease (see Materials item 1) until new grease appears at the bearing.

Arising Work

12. Renew all hinges at the door position in accordance with the specified document (see
14. Reference Documents item 1 Procedure P).

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Emergency Door – Overhaul

OQ 6428

Materials			
Item	Description	Qty/Veh	Cat No.
1	Door Lock – Left Hand	As Req'd	063/001296
2	Door Lock – Right Hand	As Req'd	063/001297

APPLIES TO: HST Catering Except TSB and TCC

Scheduled Work

NOTE: Kitchen and bar areas of catering vehicles are subject to the following statutory regulations:

- a) The Food Safety (Temperature Control) Regulations 1995.
- b) The Food Safety (General Food Hygiene) Regulations 1995.
- c) The Food Safety (General Food Hygiene) (Amendment) Regulations 2004.

All cleaning and other processes used in these areas must check that the vehicles comply with these regulations after completion of the overhauls.

1. Overhaul the door in accordance with the following jobs:

OP 0118. NOTE 2: If the droplight is sealed or has restricted opening, remove the relevant components to restore full movement. Overhaul the droplight and refit the restraints.

OO 6110
OO 0124
OO 0125
OO 0126

2. Change the door locks as follows:


Left hand	See Materials Item 1
Right hand	See Materials Item 2

Hand engrave the fitting date onto the front face of replacement lock in 3 to 5mm high characters in the form:

Date e.g. (20th November 1993)
Depot Code e.g. Wolverton

20-11-93
ZN

See Figure 1 for positioning.

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Emergency Door – Overhaul

OQ 6428

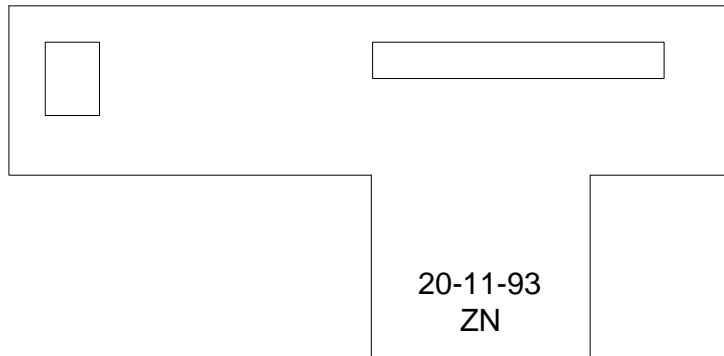



Figure 1: Lock Engraving Detail

3. Overhaul and test the emergency release.
4. Where fitted, test the release cover alarm – check a loud audible tone is heard if the cover is opened.
5. Test the door generally in accordance with Job No. OL 0140.
6. Seal the release handle cover.
7. Enter the date on the record card.

Arising Work

1. See the corresponding jobs.
3. Renew the cable.
4. Renew the defective items including the alarm battery.
5. See Job No. OL 0140.
6. Renew the seal.

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Small External Luggage Door – Examine

OY 6479

Reference Documents		
Item	Document No.	Title
1	TI/TI0024	Repair of Loco-Hauled Coaching Stock, HST and Class 488 Outward Opening Bodyside Passenger Doors and Door Locks


APPLIES TO: BFO and TGS

Scheduled Work

NOTE 1: See Section 3 Pages 16 and 17 for sequence of carrying out work on the luggage doors.

NOTE 2: Most doors have been locked out of use. The doors must be unlocked before carrying out this job and relocked after completion of Job No. OL 0127.

1. Examine the non-hinged edge of the small door for splits and rotting.
2. Examine the skin of the door for holes, cracks and damaged GRP.
3. With the door open, check that the hinges are secure.
4. Renew the hinge pins and bearings in accordance with Job No. OP 0120.
5. Check that the locating dowel at the bottom of the small door on hinge side is fitted.
6. Remove the dovetail if fitted and scrap. Fill the fixing holes with body filler and rub down to a smooth finish.
7. Check that all draught excluders are correctly fitted in all positions.
8. Examine the draught excluders for damage and wear.
9. Check that the door opens without contact occurring between the door and the surround, and that clearance on top edge is at least 1mm.
10. Check from inside the vehicle with the door closed that no light is visible between the door and the surround.
11. Examine the commode rail for damage and security.
12. Examine the plywood interior panels for damage and security.
13. Examine the door buffer stop.
14. Check that the buffer stops make full contact and that the door handle is at least 15mm from the bodyside when the stops are in full contact.


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Small External Luggage Door – Examine

OY 6479

Arising Work

1. Renew the door generally in accordance with the specified document (see Reference Documents item 1 Procedure M), if rotting or door pillars is found.
2. Repair the small dents and holes with body filler.
2. Renew the door generally in accordance with the specified document (see Reference Documents item 1 Procedure M).
3. If the hinges are loose, renew the hinges in accordance with the specified document (see Reference Documents item 1 Procedure P).
5. Renew the locating level.
- 7,8. Renew the top edge draught excluder in accordance with Job No. OO 0124.
- 7,8. Renew the lock edge draught excluder in accordance with Job No. OO 0125.
- 7,8. Renew the door boot draught excluder in accordance with Job No. OO 0126.
9. If contact occurs, or clearance at top is less than 1mm, trim the headrail packing in accordance with the specified document (see Reference Documents item 1 Procedure V).
10. If gaps are still visible after attention to the hinges and draught excluders, shim the door hinges.
11. Resecure the loose commode rail.
11. Renew the damaged commode rail.
12. Resecure or repair the interior panel.
12. Renew the interior panel.
13. Renew the buffer stop.
14. Renew the buffer stop or insert packing behind the stop.

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Underframe Mounted Equipment - Security Check

U* 0105

Materials			
Item	Description	Qty/Veh	Cat No.
1	Anti-Corrosion Paint	As Req'd	028/000150
2	Black Gloss Paint	As Req'd	028/005319

Reference Documents		
Item	Document No.	Title
1	PB/CI2175	Component Overhaul Instruction Mark 3 Coach Brake Module


APPLIES TO: All Vehicles

Scheduled Work

- Clean all of the under body mounted equipment suspension assemblies.
- Examine all of the under body mounted equipment suspension points and check that the suspension arrangements are secure and undamaged and that there is no evidence of bolt, nut or washer movement.
- Check that the builders plates which are located under the stepboard at door positions 1 and 3 are present and secure (see Figure 4)

NOTE 1:

Components covered by specific Jobs	See Job/Doc. No.	Vehicles
Air Reservoirs	AR 0112 and BR 3309	Mark 3B
	(see Reference Documents item 1)	Mark 3A and HST
Distributor	BD 3000	All
Motor Alternator	MO 4020	Mark 3A and Mark 3B
Motor Alternator Control Unit	MO 5017	Mark 3B, RFM (No. 1 Position)
Motor Alternator Control/Battery Charger	MO 5018	Mark 3B, RFM (No. 1 Position) TSOB
Motor Alternator Choke	MO 5019	All except HST
Motor Alternator Control Unit Single Phase	MO 5018	RFM (No. 2 Position)

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Underframe Mounted Equipment - Security Check

U* 0105

Arising Work

2. Repair any damaged under body suspension points.
2. Repair any damaged suspension arrangement. The repair procedure is to be approved by the Engineer before work commences.
2. If any fasteners have evidence of damage or appear to be loose, fit new fasteners at all positions in accordance with the following:


Vehicle	Table No.	Page
Mark 3A FO and TSO	1	5
Mark 3A RFM	2	6
HST (excluding catering)	3	7
HST Catering (excluding TSB and TCC – see below)	4	8
Mark 3B BFO and FO	5	10
Mark 3A TSOB	6 (and Figure 1)	11
HST TSB	7 (and Figure 2)	12
HST TCC	8 (and Figure 3)	13

Note that, in most cases, an improved fastening method is to be used instead of that shown on the drawing.

Requirement for New Fasteners

NOTE 2: References to 'Low' and 'High' nuts as detailed below are in relation to BS 4292. This standard is now superseded by BS EN ISO 7042, but this does not specify low and high type nuts. If BS EN ISO 7042 type nuts are to be used as equivalent parts for BS 4292 type nuts, then this must be agreed by the Engineer.

1. All fasteners to be EZP.
2. On bolts/studs with split pin holes, Nyloc type nuts MUST NOT be used.
3. Nuts must be of the "High" Type, except where this would prevent adequate thread protrusion.
4. Where the thread length is insufficient for "High" type nuts, "Low" type nuts are to be fitted, ensuring 2 full treads protrude after tightening.

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Underframe Mounted Equipment - Security Check

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Details Of Prevailing Torque Nuts

High Type Nuts - Bent Beam

Size	Cat No.	Phildas Part No.
M5	003/180312 and 003/180163	5 MCP /8 EZP
M8	003/180322 and 003/180165	8 MCP /8 EZP
M10	003/180327 and 003/180166	10 MCP /8 EZP
M12	003/180332 and 003/180167	12 MCP /8 EZP
M16	003/180342 and 003/180168	16 MCP /8 EZP
M20	003/180352 and 003/180169	20 MCP /8 EZP


High Type Nuts - Nyloc

Size	Cat No.
M5	003/179992
M8	003/180003
M10	003/180012
M12	003/180022
M16	003/180042
M20	003/180034

Low Type Nuts

Size	Cat No.	Phildas Part No.
M5	-	5 MCI /8 EZP
M8	-	8 MCI /8 EZP
M10	003/180154	10 MCI /8 EZP
M12	003/180156	12 MCI /8 EZP
M16	-	16 MCI /8 EZP
M20	-	20 MCI /8 EZP


3. If a builders plate is found loose or broken, carry out the following. If missing, no further action is required.
 - 3.1 Remove the fasteners that retain the builders plate. Discard the builders plate and fasteners.
 - 3.2 Thoroughly clean the vehicle structure in the area where the builders plate fits to ensure the surface is clean and free from loose corrosion and old paint.

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Underframe Mounted Equipment - Security Check

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- 3.3 Paint the area where the builders plate has been removed from by hand with a thin coat of an approved Anti-corrosive primer (see Materials item 1) thinned by approximately 20%.
- 3.4 Allow to dry for at least one hour then paint with black gloss (see Materials item 2).


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Underframe Mounted Equipment - Security Check

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Equipment	Suspension Arrangement Drawing	Parts shown on Drawing which are not to be used	New Fasteners to be Used on Reassembly (See Details on Page 2)			Torque (Nm)
			Description	Cat. No.		
HT Dist 'tion Fuse Box	Suspending Screws	9027616	Screw M10x40 Grade 8.8	35/100822		56
	Mounting Bracket		Washer M10	3/190930	See Page 2	
Vehicle Isolator Box		9027727	Nut M10 Grade 8	See Page 2		56
			Nut M10 Grade 8	See Page 2		
Battery Charger Choke		C-A0-9732	Screw M8x25 Grade 8.8	35/100652		28
			Washer M8	3/190928	See Page 2	
Battery Fuse Box		C-A0-9746	Nut M8 Grade 8	See Page 2		56
			Screw M10x40 Grade 8.8	35/100822		
MA Fuse Box		C-A0-9755	Washer M10	3/190930	See Page 2	28
			Nut M10 Grade 8	See Page 2		
Lighting and Air Conditioning Control Box		C-A0-9561	Screw M8 x 35 Grade 8.8	35/100 667		56
			Washer M8	3/190928	see Page 2	
			Nut M8 Grade 8	See Page 2		56
			Screw M10x40 Grade 8.8	35/100822	See Page 2	
			Nut M10 Grade 8	See Page 2		56
			Nut M10 Grade 8	See Page 2		

Table 1: Mark 3A FO and TSO


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Underframe Mounted Equipment - Security Check

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Equipment	Suspension Arrangement Drawing	Parts shown on Drawing which are not to be used	New Fasteners to be Used on Reassembly (See Details on Page 2)		Torque (Nm)
			Description	Cat. No.	
Battery Charger Choke	C-A0-9732	Spring Washer	Screw M10x40 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100822 3/190930 See Page 2	56
Battery Charger Rectifier	C-A0-18516	Spring Washer	Screw M10x40 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100822 3/190930 See Page 2	56
MA Resistor No 2 MA set	C-A0-13045	Spring Washer	Screw M10x30 Grade 8 Washer M10 Nut M10 Grade 8	35/100812 3/190930 See Page 2	56
HT Control Box	C-A0-18357	Spring Washer	Screw M10x30 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100812 3/190930 See Page 2	56
WSP Control Box	C-A0-18401	Spring Washer	Screw M8x30 Grade 8.8 Washer M8 Nut M8 Grade 8	35/100622 3/190928 See Page 2	28
Lighting & Air Conditioning Control Unit	C-A0-18549	Spring Washer	Screw M10x35 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100809 3/190930 See Page 2	56
Battery & MA Fuse Box (No. 1 MA Set)	C-A0-18676	Spring Washer	Screw M10x35 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100809 3/190930 See Page 2	56
Battery & MA Fuse Box (No. 2 MA Set)	C-A0-18677	Spring Washer	Screw M10x35 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100809 3/190930 See Page 2	56
MA Resistor (No. 1 MA Set)	C-A0-19123	Split Pin Slotted Nut Spring Washer	Screw M10x25 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100802 3/190930 See Page 2	56

Table 2: Mark 3 RFM


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Underframe Mounted Equipment - Security Check

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Equipment	Suspension Arrangement Drawing	Parts shown on Drawing which are not to be used	New Fasteners to be Used on Reassembly (See Details on Page 2)		Torque (Nm)
			Description	Cat. No.	
Lighting & Air Conditioning Control Box	C-A0-10961	Spring Washer	Screw M10x35 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100809 3/190930 See Page 2	56
Battery Charger Control Unit	C-S-11711	Spring Washer	Washer M10 Nut M10 Grade 8	3/190930 See Page 2	22
Battery Charger Choke		Spring Washer	Screw M10x30 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100812 3/190930 See Page 2	56
Bulk Inverter		Spring Washer	Screw M10x30 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100812 3/190930 See Page 2	56
Battery Charger Transformer		Split Pins Slotted Nut Spring Washer	Screw M12x40 Grade 8.8 Washer M12 Nut M12 Grade 8	35/101082 3/190932 See Page 2	98
3 Phase Control Unit		Spring Washer	Screw M10x30 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100812 3/190930 See Page 2	56
Battery Fuse Box		Spring Washer	Screw M10x30 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100812 3/190930 See Page 2	56
Vehicle Isolating Switch		Spring Washer	Screw M5x16 Grade 8.8 Washer M5 Nut M5 Grade 8	35/100392 3/190922 See Page 2	7

Table 3: HST (excluding catering)


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Underframe Mounted Equipment - Security Check

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Equipment	Suspension Arrangement Drawing	Parts shown on Drawing which are not to be used	New Fasteners to be Used on Reassembly (See Details on Page 2)		Torque (Nm)
			Description	Cat. No.	
NEI Inverter Transformer (Lot 30899) (Slide in Mounting)	8004500	-	Screw M10 x 35 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100809 3/190930 see Page 2	56
Battery Fuse Box (Vehicle Nos. 402XX, 404XX & 408XX)	8004503	-	Screw M10 x 30 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100812 3/190930 see Page 2	56
NEI Inverter Transformer (Vehicle Nos. 402XX and 404XX) (Slide in Mounting)	8004504	-	Screw M10 x 35 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100809 3/190930 see Page 2	56
NEI Inverter (Slide in Mounting)		-	Screw M10 x 35 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100809 3/190930 see Page 2	56
Bulk Inverter	8401164		Screw M10 x 35 Grade 8.8 Nut M10	35/100809 see Page 2	56
Refrigeration Converter			Screw M10 x 35 Grade 8.8 Nut M10	35/100809 see Page 2	56
Refrigeration Transformer	8401316		Screw M10 x 35 Grade 8.8 Nut M10	35/100809 see Page 2	56
Battery Charger Choke (NEI Inverter Modification)		-	Screw M10 x 35 Grade 8.8 Nut M10 Grade 8	35/100809 see Page 2	56
Lighting & Air Conditioning Control Box	C-A0-11667	Spring Washer	Screw M10x35 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100809 3/190930 See Page 2	56
Microwave Voltage Stabiliser (Top Fixings)	C-A0-12741	Spring Washer	Screw M10x35 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100809 3/190930 See Page 2	56
Microwave Voltage Stabiliser (Bottom Fixings)		Spring Washer	Screw M10x35 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100809 3/190930 See Page 2	56

Table 4: HST Catering (excluding TSB and TCC – see below)


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Underframe Mounted Equipment - Security Check

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Equipment	Suspension Arrangement Drawing	Parts shown on Drawing which are not to be used	New Fasteners to be Used on Reassembly (See Details on Page 2)		Torque (Nm)
			Description	Cat. No.	
Battery Charger Control Unit	C-S-11711	Spring Washer	Washer M10 Nut M10 Grade 8	3/190930 See Page 2	22
Battery Charger Choke (Modified Arrangement)		Spring Washer	Screw M10x30 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100812 3/190930 See Page 2	56
Bulk Inverter		Spring Washer	Screw M10x30 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100812 3/190930 See Page 2	56
Battery Charger Transformer		Split Pins Slotted Nut Spring Washer	Screw M12x40 Grade 8.8 Washer M12 Nut M12 Grade 8	35/101082 3/190932 See Page 2	98
3 Phase Control Unit		Spring Washer	Screw M10x30 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100812 3/190930 See Page 2	56
Battery Fuse Box (Vehicle Nos. 407XX)		Spring Washer	Screw M10x30 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100812 3/190930 See Page 2	56
Vehicle Isolating Switch		Spring Washer	Screw M5x16 Grade 8.8 Washer M5 Nut M5 Grade 8	35/100392 3/190922 See Page 2	7

Table 4: HST Catering (Cont'd)


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Underframe Mounted Equipment - Security Check

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Equipment	Suspension Arrangement Drawing	Parts shown on Drawing which are not to be used	New Fasteners to be Used on Reassembly (See Details on Page 2)		Torque (Nm)
			Description	Cat. No.	
Battery Charge Rectifier	9018680	Split Pin Slotted Nut	Screw M12x40 Grade 8.8 Washer M12 Nut M12 Grade 8	35/101082 3/190932 See Page 2	98
ETH Isolator	9018685	Split Pin Slotted Nut Spring Washer	Screw M12x35 Grade 8.8 Washer M12 Nut M12 Grade 8	35/101072 3/190932 See Page 2	98
ETH Distribution Fuse Box		Split Pin Slotted Nut Spring Washer	Screw M10x25 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100802 3/190930 See Page 2	56
MA Fuse Box	9018690 (FO)	Split Pin Slotted Nut	Screw M10x35 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100809 3/190930 See Page 2	56
AVR & DC Power Supply Control	9025852 (BFO)	Split Pin Slotted Nut	Washer M10 Nut M10 Grade 8	3/190930 See Page 2	22
WSP Control	9018695	Spring Washer	Screw M10x35 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100809 3/190930 See Page 2	56
Battery Fuse Box		Spring Washer	Screw M8x35 Grade 8.8 Washer M8 Nut M8 Grade 8	35/100667 3/190928 See Page 2	28
Lighting & Air Conditioning Control (2 off tapped holes)	C-A0-9561	Spring Washer	Screw M10x30 Grade 8.8 Washer M10	35/100812 3/190930	56
Lighting & Air Conditioning Control (2 off through holes)		Spring Washer	Screw M10x40 Grade 8.8 Washer M10 Nut M10 Grade 8	35/100822 3/190930 See Page 2	56

Table 5: Mark 3B BFO and FO


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Underframe Mounted Equipment - Security Check

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Equipment	Suspension Arrangement Drawing	Parts shown on Drawing which are not to be used	New Fasteners to be Used on Reassembly (See Details on Page 2)		Torque (Nm)
			Description	Cat. No.	
Lighting and Air Conditioning Control Box	C-A0-9561	Spring Washer	Nut M10 Grade 8	See Page 2	56
ETS Distribution Fuse Box	PB-C0- 2104926		As Drawing		
Blocking Diode Box	PB-C0- 2104922 for 10401	-	As Drawing		
	PB-C0- 2104923 for 10402 to 6	-	As Drawing		
D.C Power Supply Transformer and Choke	PB-C0- 2104922 for 10401	-	As Drawing		
	PB-C0- 2104923 for 10402 to 6	-	As Drawing		
ETS Isolation Switch Box	PB-C0- 2104917	-	As Drawing		
Battery Fuse Box	PB-C0- 2104917	-	As Drawing		
MA Control and Battery Charge Unit	PB-C0- 2104932	-	As Drawing		

Table 6: Mark 3A TSOB

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Underframe Mounted Equipment - Security Check

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NOTE 3: Only the key fasteners have been included for these checks, conduit clamps etc have been excluded.

Equipment	Suspension Arrangement Drawing	Fasteners to be used on Re-assembly		Torque (Nm)
		Description	Cat No.	
Catering Converter	IB-C0-2302141	Screw M10 x 30 Grade 8.8 Washer M10 Nut M10 Grade 8	035/100812 003/191708 003/180166	56
5kVA Transformer	IB-C0-2302142	Screw M10 x 30 Grade 8.8 Washer M10 Nut M10 Grade 8	035/100812 003/191708 003/180166	56
Battery Charger	IB-C0-2302143	Screw M10 x 35 Grade 8.8 Washer M10 Nut M10 Grade 8	035/100809 003/190930 003/180166	56
Catering Supply Enclosure	IB-C1-2302164	Main Suspension Bracket Screw M10 x 40 Grade 8.8 Washer M10 Nut M10 Grade 8	035/100822 003/190930 003/180166	56
		Angled Support Bracket Screw M8 x 30 Grade 8.8 Washer M8 Nut M8	035/100662 003/190928 003/180165	28
Main Support Frame to Underframe	IB-C0-2302193	3/8" dia Magna Lock Screw M16 x 40 Grade 8.8 Washer M16 Locking Nut M16 Washer Locking	Huck Pt No. MGLP-R12-12 035/101252 Nord-Lock NL16 003/175122 Nord-Lock NL 1688	203
Fuse Enclosure	IB-C1-2302249	Upper Fixings Screw M10 x 25 Grade 8.8 Washer M10 Nut M10	003/100802 003/190930 003/180166	56
		Lower Fixings Screw M10 x 35 Grade 8.8 Washer Large M10 Nut M10	003/106575 003/191708 003/180166	

Table 7: HST TSB

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Underframe Mounted Equipment - Security Check

U* 0105

NOTE 4: Only the key fasteners have been included for these checks, conduit clamps etc have been excluded.

Equipment	Suspension Arrangement Drawing	Fasteners to be used on Re-assembly		Torque (Nm)
		Description	Cat No.	
Lighting Control Box	PB-C0-2109029	<u>Horizontal Support</u> Screw M10 x 40 Gde 8.8 Washer M10 Nut M10	035/100822 003/191708 003/180166	56
		<u>Vertical Support (Innermost)</u> Screw M10 x 40 Gde 8.8 Locking Washer M10	035/100822 Nord-Lock Pt No. NL10	56
		<u>Top Support (Outermost)</u> Screw M10 x 40 Gde 8.8 Washer M10 Nut M10	035/100822 003/191708 003/180166	56
Catering Supply Unit	PB-C0-2108375	<u>Front Bracket (Outermost)</u> Screw M16 x 55 Gde 8.8 Washer M16 Nut M16	035/101282 098/018120 003/180168	244
		<u>Front Bracket (Side)</u> Screw M12 x 40 Gde 8.8 Washer M12 Nut M12	035/101082 003/191710 003/180167	98
		<u>Rear Bracket (Innermost)</u> Screw M6 x 25 Gde 8.8 Washer M6 Nut M6 Screw M16 x 55 Gde 8.8 Washer M16 Nord-Lock	035/100522 003/190924 003/180164 035/101282 Nord-Lock Pt No. NL26sp	12 (M6) and 244 (M16)
		<u>Rear Bracket (Side)</u> Screw M16 x 50 Gde 8.8 Washer M16 Nut M16 Screw M12 x 40 Gde 8.8 Washer M12 Nut M12	035/101272 098/018120 003/180168 035/101082 003/191710 003/180167	98 (M12) 244 (M16)

Table 8: HST TCC


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Underframe Mounted Equipment - Security Check

U* 0105

Equipment	Suspension Arrangement Drawing	Fasteners to be used on Re-assembly			Torque (Nm)
		Description	Cat No.		
Lighting Control Box (LHCS donor Only)	PB-C0-2109022	Rear Bracket (Front) Screw M16 x 55 Gde 8.8 Washer M16 Nut M16	035/101282 098/018120 003/180168	244	
		Support Frame Screw M10 x 40 Gde 8.8 Lock Washer M10	035/100822 Nordlock Pt No. NL10	56	
		Main Support Screw M10 x 40 Gde 8.8 Washer M10 Nut M10	035/100822 003/191708 003/180166	56	
		Support Bracket (Top) Screw M10 x 40 Gde 8.8 Washer M10 Nut M10	035/100822 003/190930 003/180166	56	
Vehicle Isolation Switch Box	PB-C0-2108945	Support Bracket (To Isolation Switch Box) Screw M8 x 25 Gde 8.8 Washer M8 Nut M8	035/100652 003/190928 003/180165	28	
		Support Bracket (To 3 Phase Box) Screw M8 x 25 Gde 8.8 Washer M8 Nut M8	035/100652 003/190928 003/180165	28	
Cleaning Socket Transformer Box	PB-C0-2108938	End Support to Cross Member (Horizontal) Screw M10 x 35 Gde 8.8 Washer M10 Nut M10	035/100809 003/191708 003/180327	56	

Table 8: HST TCC (Cont'd)


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Underframe Mounted Equipment - Security Check

U* 0105

Equipment	Suspension Arrangement Drawing	Fasteners to be used on Re-assembly		Torque (Nm)
		Description	Cat No.	
Brake Module WSP Equipment	PB-CO-2108928	<u>End Support to Cross Member (Vertical)</u> Screw M12 x 40 Gde 8.8 Washer M12 Nut M12	035/101082 003/191710 003/180332	98
		<u>Bearer to End Support</u> Screw M10 x 35 Gde 8.8 Washer M10 Nut M10	035/100809 003/191708 003/180327	56
		<u>Transformer Box to Bearer</u> Screw M10 x 35 Gde 8.8 Washer M10 Nordlock	035/010809 Nordlock NL10	56
		<u>WSP Unit to Support Bracket</u> Screw M10 x 30 Gde 8.8 Washer M10 Nut M10	035/100812 003/190930 003/180327	56
		<u>Support Bracket to Support Angle</u> Screw M8 x 30 Gde 8.8 Washer M8 Nut M8	035/100662 003/190928 003/180322	28
		<u>Support Angle to Frame</u> Screw M8 x 30 Hex Csk Gde 12.9 Washer M8 Nut M8	035/106546 003/190928 003/180322	28
		or at other end Screw M8 x 30 Gde 8.8 Packer(s) Washer M8 Nut M8	035/100662 2108953-05 & 06 003/190928 003/180322	28

Table 8: HST TCC (Cont'd)


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Underframe Mounted Equipment - Security Check

U* 0105

Equipment	Suspension Arrangement Drawing	Fasteners to be used on Re-assembly		Torque (Nm)
		Description	Cat No.	
		Terminal Bar Screw M6 x 20 Gde 8.8 Washer M6 Nut M6	035/200512 003/190924 003/180317	11
		Brake Pipe Pressure Switch to Bracket Screw M6 x 40 Csk Hd Gde 4.8 Washer M6 Nut M6	035/104734 003/190924 003/180317	11
ETS Junction Box	PB-CO-2108913	Junction Box to Support Channel Screw M12 x 40 Gde 8.8 Washer M12 Nut M12	035/101082 003/190932 003/180167	98
Battery Charging Unit (BCU)	PB-CO-2108836	Support Beam to Crossbars Screw M16 x 50 Gde 8.8 Washer M16 Nut M16	035/101272 003/190936 003/180168	244
		BCU Brackets to Supports Screw M16 x 50 Gde 8.8 Washer M16 Nut M16	035/101272 003/190936 003/180168	244
		Or Screw M16 x 50 Gde 8.8 Washer M16 Nord-Lock	035/101272 Nord-Lock Pt No. NL 16sp	244

Table 8: HST TCC (Cont'd)


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Underframe Mounted Equipment - Security Check

U* 0105

Equipment	Suspension Arrangement Drawing	Fasteners to be used on Re-assembly		Torque (Nm)
		Description	Cat No.	
3 Phase Distributor Box	PB-CO-2108412	<u>Angle Bracket to Cross Member</u> Screw M10 x 30 Gde 8.8	035/100812	56
		<u>3 Phase Box to Angle Bracket</u> Screw M10 x 30 Gde 8.8 Washer M10 Nut M10	035/100812 003/190930 003/180166	56
		<u>Lower Mounting Bracket</u> Screw M10 x 30 Gde 8.8 Washer M10 Nut M10	035/100812 003/190930 003/180166	56
Fixed Skirts	PB-CO-2108326	Various Fasteners - Refer to Instruction Drg PB-CO-2102824	Drg 2102824 refers to Drgs 2102825, 2102826 and 2102958 for specific fastener details	-

Table 8: HST TCC (Cont'd)

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Underframe Mounted Equipment - Security Check

U* 0105

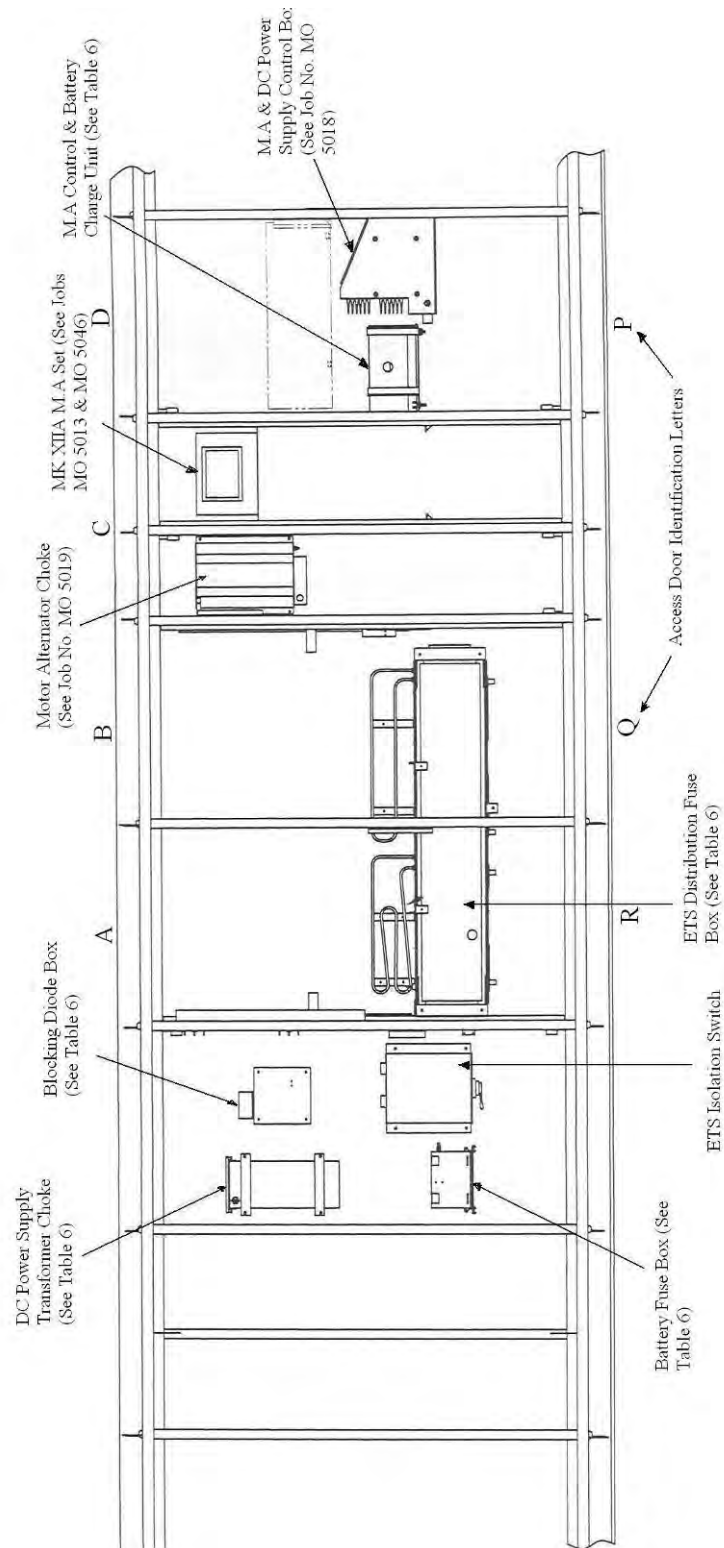



Figure 1: Arrangement of TSOB Underframe Electrical Equipment (Taken from Drawing PB-C0-2104916 (Titles of units from PB-C0-2104301))

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Underframe Mounted Equipment - Security Check

U* 0105

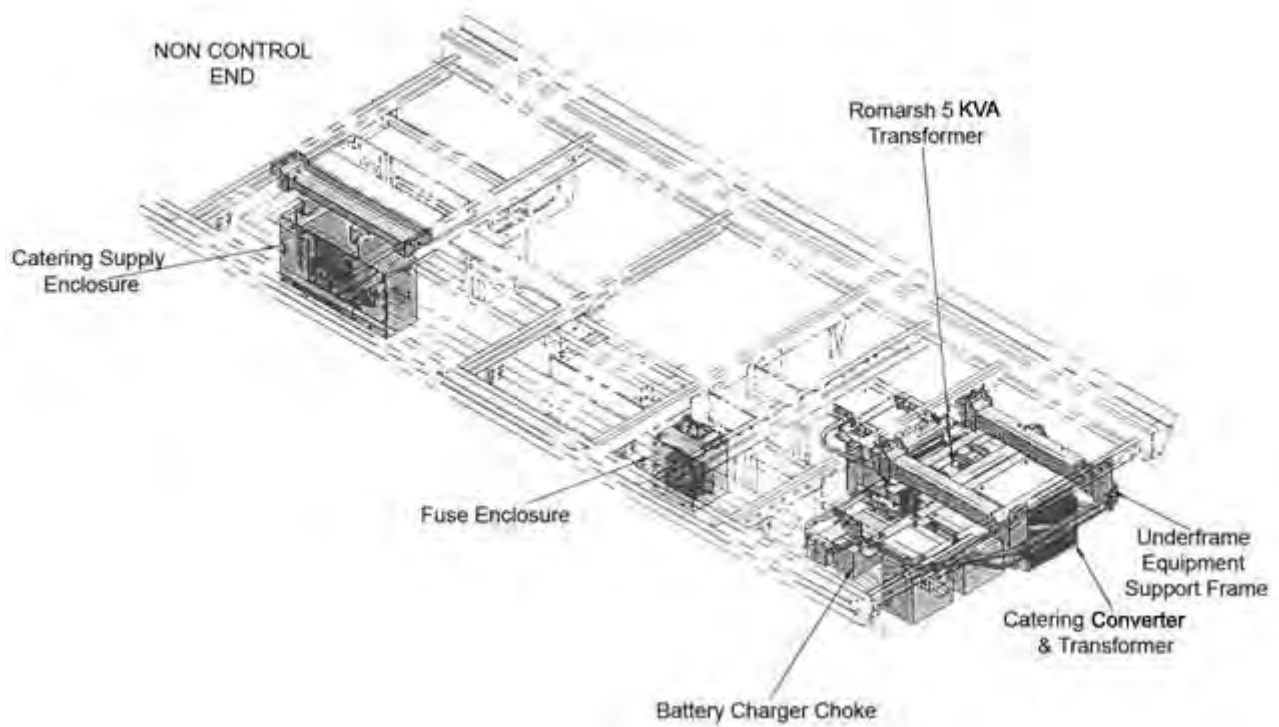



Figure 2: HST TSB Vehicle Underframe Equipment Arrangement

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Underframe Mounted Equipment - Security Check

U* 0105

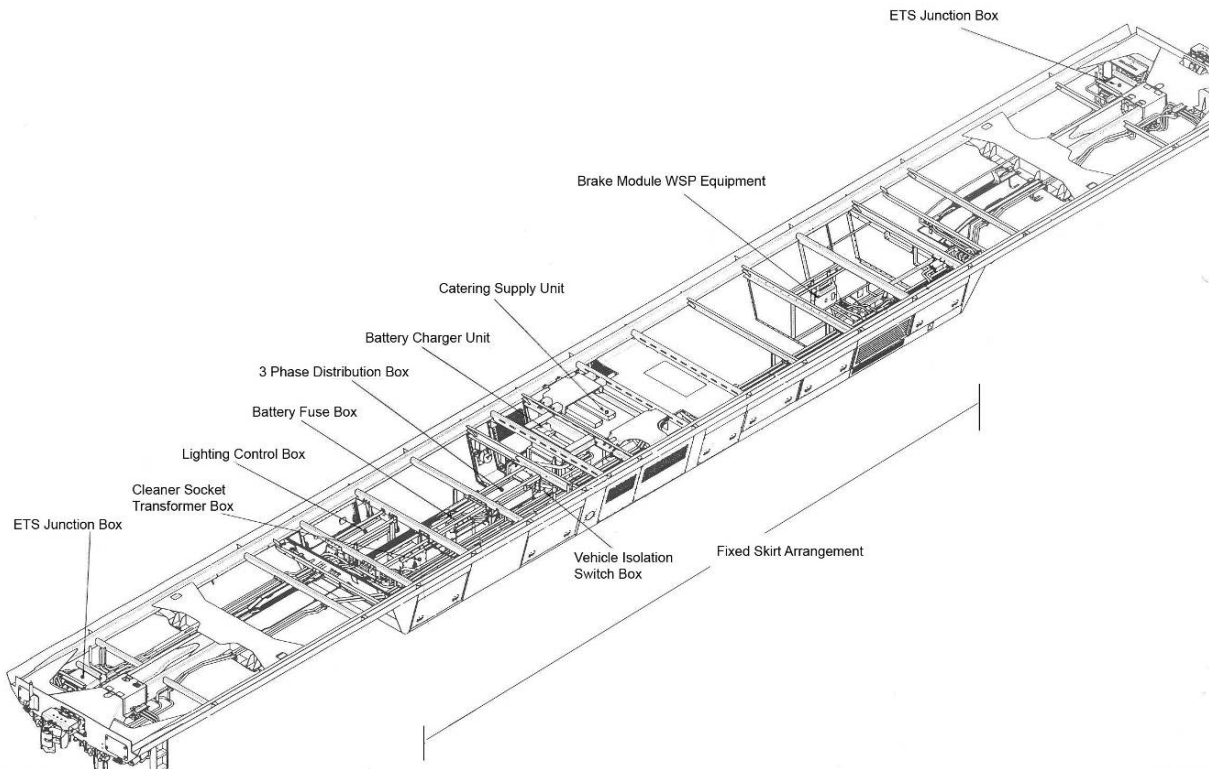



Figure 3: HST TCC Vehicle Underframe General Arrangement



Figure 4: Example of Broken Builders Plate and Location

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	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	

Buffer Saddles and Chains – Examine

UB 6022

Materials			
Item	Description	Qty/Veh	Cat No.
1	Saddle	As Req'd	018/084211
2	Saddle Rest (Support Bracket)	As Req'd	063/000878
3	Wooden Support Block	As Req'd	041/007543
4	Grease	As Req'd	027/001351
	150kg container		027/001353
	3kg barrel		027/001354
	12.5kg barrel		027/001356
	50kg barrel		027/001357
	180kg barrel		027/001358
	400g cartridge		

Reference Drawings		
Item	Drawing No.	Title
1	BI-AO-9009394	Standard Coach Details of Buffer-Corridor and Non-Corridor.


Reference Documents		
Item	Document No.	Title
1	CR/PE0102	Repainting of Rail Vehicles

APPLIES TO: All except HST

QUANTITY PER VEHICLE: 4

Scheduled Work

- Examine the saddle and chain.
- Check that the saddle can be fitted easily to the buffer rod, and be easily removed.
- Check that the saddle, when in position on the buffer rod, does not rotate.
- Check that the headstock mounted saddle rest is securely fastened to the headstock.
- Check that saddle rest is not damaged and that the wooden support block is present and not rotten.
- Lubricate the contact surface with No. 3 grease (see Materials item 4).
- Paint the outer surface in accordance with the specified document (see Reference Documents item 1).

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	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	

Buffer Saddles and Chains – Examine

UB 6022

Arising Work

1,3. Renew the saddle if defective and beyond repair (see Materials item 1).


1. Rectify any small defects, e.g. new chain (see Reference Drawings item 1 for the sub components making up the chain assembly eg: shackle, shackle retaining bolt, links etc).

2,3. Determine the cause and rectify.

4. Resecure if loose

5. Repair the saddle rest if defective or renew if beyond repair (see Materials item 2).

5. Renew the wooden support block if severely damaged or rotten (see Materials item 3).

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Buffer Assembly – Overhaul

UB 6025

Materials			
Item	Description	Qty/Veh	Cat No.
1	Grease	150kg container 3kg barrel 12.5kg barrel 50kg barrel 180kg barrel 400g cartridge	As Req'd 027/001351 027/001353 027/001354 027/001356 027/001357 027/001358

Torque Figures			
Item	Description	Size	Torque (Nm)
1	Torque Prevailing Nut	M24	800

Reference Drawings		
Item	Drawing No.	Title
1	BI-AO-9009391	Standard Coach Details of Buffer-Corridor and Non-Corridor.


APPLIES TO: All except HST

QUANTITY PER VEHICLE: 4

Scheduled Work

Refer to Figure 1.

1. Remove the buffer rod, sleeve, spring guide, springs and dividing plates.
2. Degrease all components.
3. Examine the rubber buffer springs and check that:
 - 3.1 No surface cracking exists which exceeds 2mm in depth.
 - 3.2 Any loss of bonding does not exceed 6mm in depth.
 - 3.3 The free length of each spring is greater than 35.5mm.
4. Examine the buffer rod and check by gauging the following:
 - 4.1 The round section of the buffer rod has not worn to less than 87.5mm diameter at any point.
 - 4.2 The square section has not worn to less than 75mm width at any point.
 - 4.3 The diameter of any flat area on the buffer head is not more than 100mm.

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	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	

Buffer Assembly – Overhaul

UB 6025

- 4.4 That the rod is perpendicular to the buffer head, +/- 1 degree.
5. Examine the buffer sleeve and check by gauging the following at each end:
 - 5.1 The inside contact diameter has not worn to more than 91.5mm at any point.
 - 5.2 The outside diameter has not worn to less than 126mm at any point.
6. Examine the buffer case and check by gauging the following:
 - 6.1 The smaller inside diameter has not worn to more than 130mm at any point.
 - 6.2 The larger inside diameter has not worn to more than 218mm at any point.

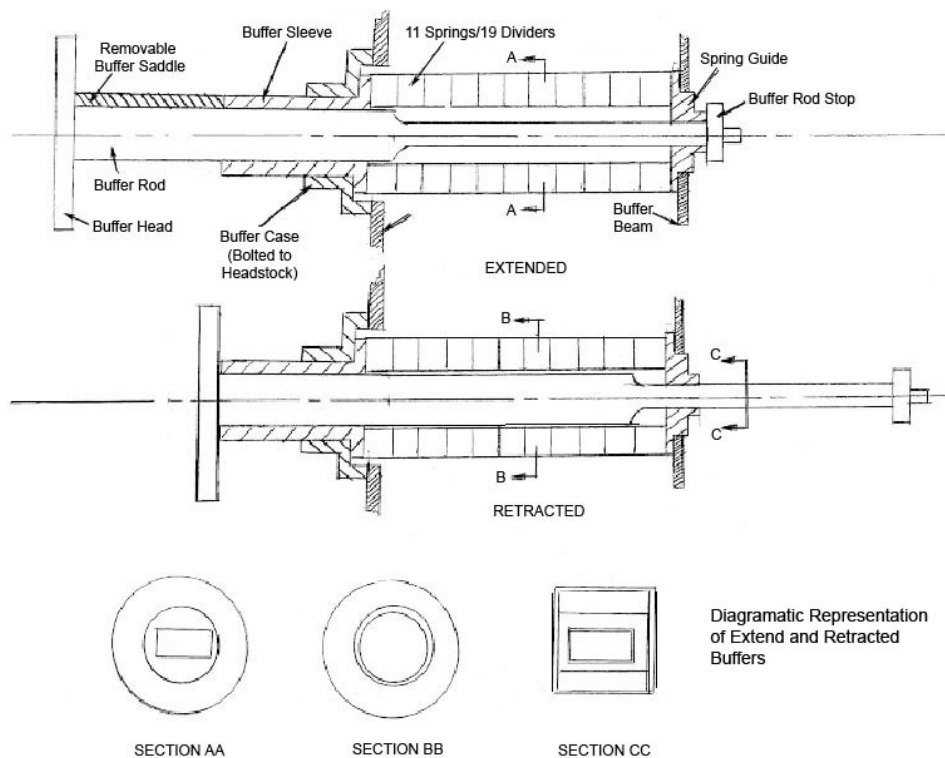



Figure 1: Sectional View of Buffer

7. Examine the rod spring guide and check by gauging that the maximum width of the square section is not more than 80.5mm at any point.
8. Reassemble the side buffer in accordance with the specified drawing (see Reference Drawings item 1), lubricating the buffer rod, sleeve and spring guide using lithium based No. 3 grease (see Materials item 1).

Buffers must be secured to vehicles using grade 8.8 M24 bolts and torque prevailing nuts. The nuts must be tightened in accordance with Torque Figures item 1.

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Buffer Assembly – Overhaul

UB 6025

9. Test the assembly and check the following:
 - 9.1 That the rod moves freely and without binding between the fully retracted and fully extended positions.
 - 9.2 That the saddle fits correctly and can easily be fitted and removed.
 - 9.3 That the maximum rotational movement of the buffer head at the outermost point is not more than 50mm.

Arising Work

3. Renew the defective buffer springs. The use of a jig may be of assistance when inserting the buffer springs.
4. Repair the buffer rod by flash-butt welding a new section. The repair process to be approved by the Engineer.
4. Renew the buffer rod which cannot be repaired.
- 4.4 Straighten the buffer rod, the repair process to be approved by the Engineer.
5. Renew the buffer sleeve.
6. Renew the defective buffer casing.
7. Renew the rod spring guide.
9. Rectify any defects.

	VEHICLE OVERHAUL INSTRUCTION	PB/VI2133 Issue : 5 Section : 4 Page : 1 of 1
	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	

Buffer Assembly – Examine

UB 6026

APPLIES TO: All except HST


QUANTITY PER VEHICLE: 4 (or as directed by the Engineer)

Scheduled Work

1. Examine the buffer assembly and check:
 - 1.1 That the buffer head moves freely and without binding between the fully retracted and fully extended positions.
 - 1.2 That the saddle fits correctly and can be easily fitted and removed.
 - 1.3 That the maximum rotational movement of the buffer head at the outermost point is not more than 50mm.
2. Visually examine the buffer assembly for fractures and other defects.
3. Visually examine the springs and dividing plates. Check that there are no visible defects, and that there is no loss of pre-load on these components.
4. With the buffer in the retracted position, visually examine the buffer rod and stop protruding from the spring guide for fractures and other defects. Check that the split pin is fitted in the nut at the end of the buffer rod, and that the split pin is intact and tight.
5. Check that the buffer rod is perpendicular to the buffer head +/- 1 degree.
6. Check the torque of the buffer mounting bolts (buffer to headstock) is 800Nm.

Arising Work

- 1,2, Remove the buffer assembly from the vehicle and renew any defective components in
- 3,4, accordance with Job No. UB 6025.
- 5,6

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Coupler Pivot Pin – Examine

UC 0124

APPLIES TO: All except HST


NOTE: These pins are removed from the vehicle in Job No. UC 9025 and refitted in Job No. UC 9027.

Scheduled Work

1. Clean.
2. Examine.
3. Check that the diameter at any point is not less than 40.5mm.

Arising Work

- 2,3. Renew worn, corroded or damaged pin.

	VEHICLE OVERHAUL INSTRUCTION	PB/VI2133 Issue : 5 Section : 4 Page : 1 of 1
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Drawbar Pivot Pin – Examine

UC 0135

APPLIES TO: All Vehicles

QUANTITY PER VEHICLE: 2


NOTE: These pins are removed from the vehicle in Job No. UC 9025 and refitted to the vehicle in Job No. UC 9027.

Scheduled Work

1. Clean.
2. Examine for damage.
3. Check that the diameter at any point is not less than 40mm.
4. Refit.

Arising Work

- 2,3. Renew the defective or worn pin.

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	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	

Drawgear End Stops – Examine

UC 0670


APPLIES TO: All Vehicles

Scheduled Work

1. Clean.
2. Examine for defects.
3. Check that the end stop width has not worn to less than 78.5mm.

Arising Work

- 2,3 Renew the end stop.

	VEHICLE OVERHAUL INSTRUCTION	PB/VI2133 Issue : 5 Section : 4 Page : 1 of 1
	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	

Drawgear Side Control Assembly – Examine

UC 1004

Materials			
Item	Description	Qty/Veh	Cat No.
1	Shim (Packer) (Drg 8290184 Item 02)	As Req'd	-
2	Nose Assembly (22mm thick)	As Req'd	063/001652
3	Nose Assembly (38mm thick)	As Req'd	063/007971

APPLIES TO: All Vehicles

Scheduled Work

NOTE 1: This job is to be carried out whilst the drawbar is removed, see Job Nos. UC 9025 to 9027.


1. Examine the rubber for damage, surface cracking and bond failure. The following conditions are unacceptable:
 - 1.1 Surface cracks deeper than 3mm.
 - 1.2 Bond failure longer than 10mm.
2. Examine the nose assembly.
3. Check the distance between the wearing surfaces of the side control unit nose assemblies is between 156 and 162mm.

Arising Work

1. Renew the rubber mounting.
- 2,3. Renew the nose assembly if damaged or if the specified dimensions cannot be achieved by shimming. There are two different size nose assemblies, fit the nose assembly that will minimise the number of shims that are required (see Materials items 2 or 3). Only one size of nose assembly may be fitted at a vehicle end. However, it is permissible for those at opposite ends of a vehicle to be of different sizes.
3. If the dimension is greater than 162mm then shims (see Materials item 1) shall be placed between the rubber side control unit and the vehicle structure to restore the gap to 156mm.

NOTE 2: Shims must be placed in both side control assemblies so that the nose assemblies are equidistant from vehicle centre line.

NOTE 3: The maximum total thickness of shims on either side is 5mm.

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Drawbar Tailpin - Renew

UC 1007

Materials			
Item	Description	Qty/Veh	Cat No.
1	Tailpin	2	018/000479

Reference Drawings		
Item	Drawing No.	Title
1	IC-A1-8014219	Tailpin Assembly and Details


APPLIES TO: All Vehicles

Scheduled Work

NOTE 1: The drawbar tailpin is removed and discarded from, and refitted to, the vehicle in Job Nos. UC 9025 and UC 9027.

NOTE 2: For additional information on the arrangement, refer to the specified drawing (see Reference Drawings item 1).

1. Renew the drawbar tailpin (see Materials item 1).

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Coupler Release Chain and Guide – Examine

UC 4027


APPLIES TO: All except HST (2 assemblies per vehicle)

Scheduled Work

1. Examine the chain for defects.
2. Examine the chain fixings for security.
3. Examine the chain guide.
4. Check that the ETS jumper shields are fitted to the fixed end box.

Arising Work

1. Renew the chain.
2. Renew the fixings.
3. Repair the chain guide.
3. Renew the chain guide.
4. Fit the ETS jumper shield (see Figure 1).

	VEHICLE OVERHAUL INSTRUCTION	PB/VI2133
	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	Issue : 5 Section : 4 Page : 2 of 2

Coupler Release Chain and Guide – Examine

UC 4027

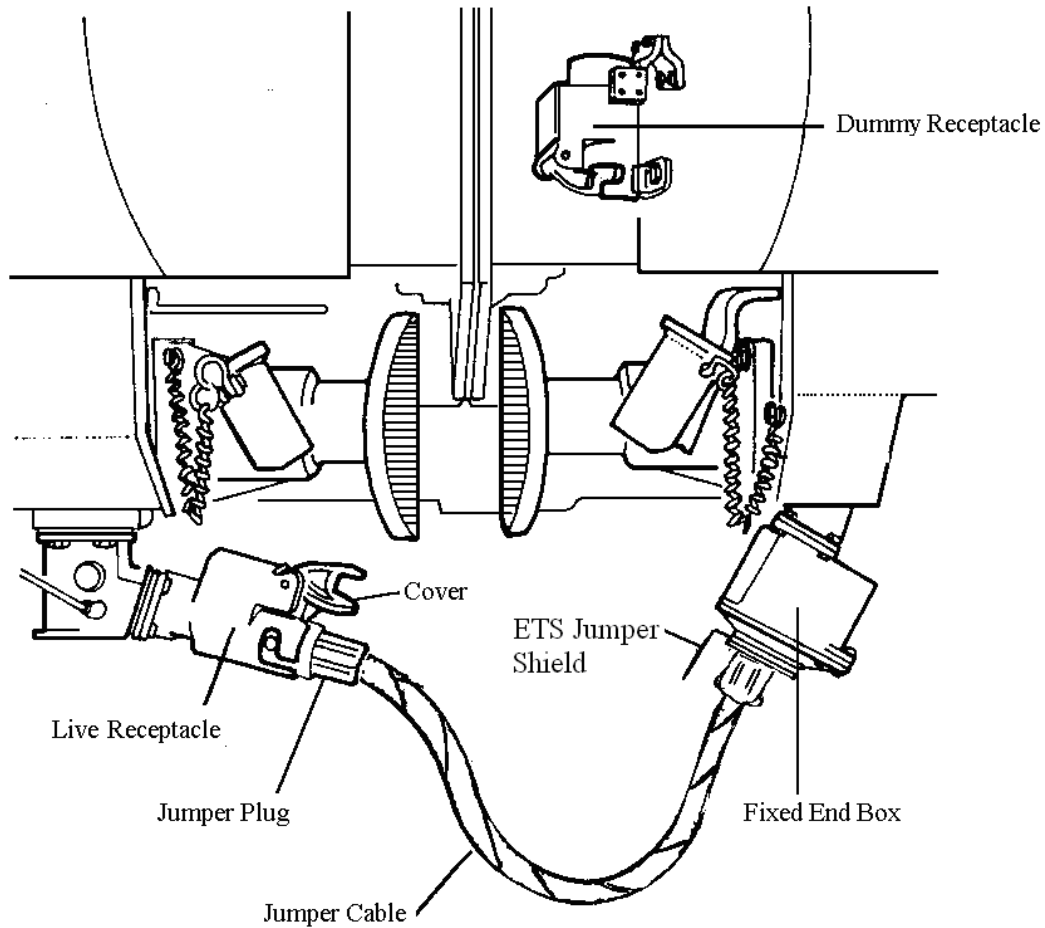



Figure 1: ETS Jumper Equipment showing Location of Jumper Shield

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Rubber Springs - Examine/Gauge

UC 4038

Materials			
Item	Description	Qty/Veh	Cat No.
1	Spring	As Req'd	018/084430

APPLIES TO: All Vehicles

Scheduled Work

NOTE: These springs are removed from, and refitted to, the vehicle in Job Nos. UC 9025 and UC 9027.

1. Clean.
2. Check that the thickness of the spring in the area shown in Figure 1, is not less than 32.5mm. It is suggested that a suitable gauge is manufactured and used for this purpose.
3. Examine each spring for surface cracks deeper than 2mm, and loss of bonding is deeper than 6mm.

Arising Work

- 2,3. Renew the spring (see Materials item 1).

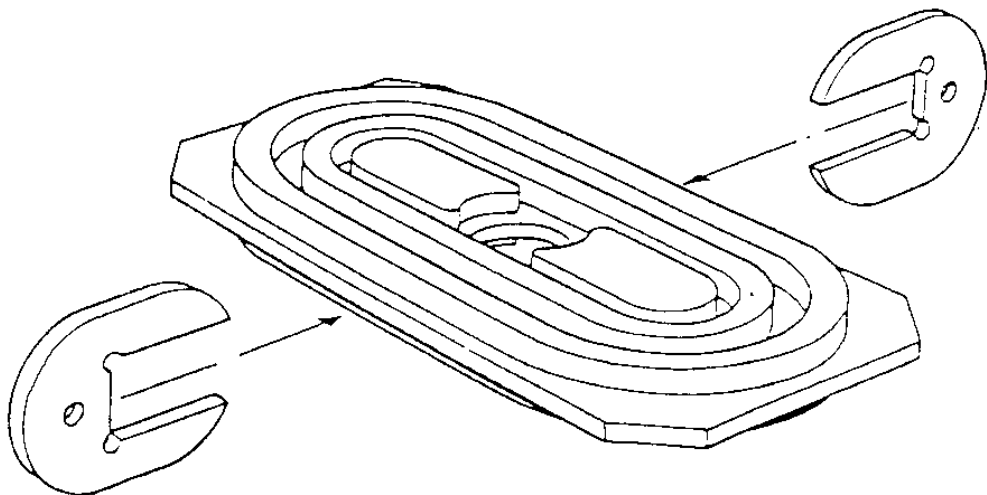



Figure 1: Rubber Spring Thickness Check

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Drawgear Followers – Examine

UC 6081

Reference Documents		
Item	Document No.	Title
1	PB/TP1187	Technical Welding Repair Procedure Reclamation of Worn Areas on HST/Mark 3 Front Follower Castings

APPLIES TO: All Vehicles (2 front and 2 back followers per vehicle)


NOTE: These followers are removed from the vehicle in Job No. UC 9025 and refitted to the vehicle in Job No. UC 9027.

Scheduled Work

1. Clean.
2. Examine the followers for cracks or other defects.
3. Check that the width is not less than 387mm at any point.
4. Check that the thickness of the front follower wear pad is not less than 8.5mm at any point.
5. Check that the thickness of the back follower has not worn to less than 31mm at the sides or 56mm at the centre.

Arising Work

- 2,3, 4,5 Renew the follower.
- 3,4. Repair the front follower in accordance with the specified document (see Reference Document item 1).
- 3,5. Repair the back follower to restore to the drawing dimensions in accordance with a procedure to be agreed by the Engineer.

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	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	

Coupler Support Pin – Examine

UC 6082

Materials			
Item	Description	Qty/Veh	Cat No.
1	Oil, Multigrade SAE 40 (BR Spec 668)	As Req'd	027/020264


APPLIES TO: All except HST (2 per vehicle)

Scheduled Work

1. Clean.
2. Examine for defects and damage.
3. Check that the tails move freely.
4. Check that the pin is straight.
5. Check by gauging that the minimum diameter is not less than 43mm.
6. Examine the chain for defects.
7. Check the security of the chain.
8. Lubricate the tails using light oil (see Materials item 1).

Arising Work

- 2,3, Renew the defective or missing pin.
- 4,5.
6. Renew the defective or missing chain.
7. Resecure the loose chain.

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Drawgear Dividing and End Plates – Examine

UC 6083

APPLIES TO: All Vehicles


NOTE: These plates are removed from the vehicle in Job No. UC 9025 and refitted to the vehicle in Job No. UC 9027.

Scheduled Work

1. Clean.
2. Examine for scores, burrs and damage.

Arising Work

2. Remove score marks and burrs.
2. Renew the plate.

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Centre Pin – Examine

UC 6084

Materials			
Item	Description	Qty/Veh	Cat No.
1	Centre (Support) Pin	As Req'd	063/000553

APPLIES TO: All Vehicles (2 items per vehicle)

NOTE 1: The centre pin (see Figure 1 for location) connects the gangway arrangement to the drawbar.

NOTE 2: This pin is removed from the vehicle in Job No. UC 9025 and is refitted to the vehicle in Job No. UC 9027.

Scheduled Work

1. Examine for defects and damage.
2. Check that the diameter at any point is not less than 24.8mm.

Arising Work

- 1,2. Renew the pin (see Materials item 1).

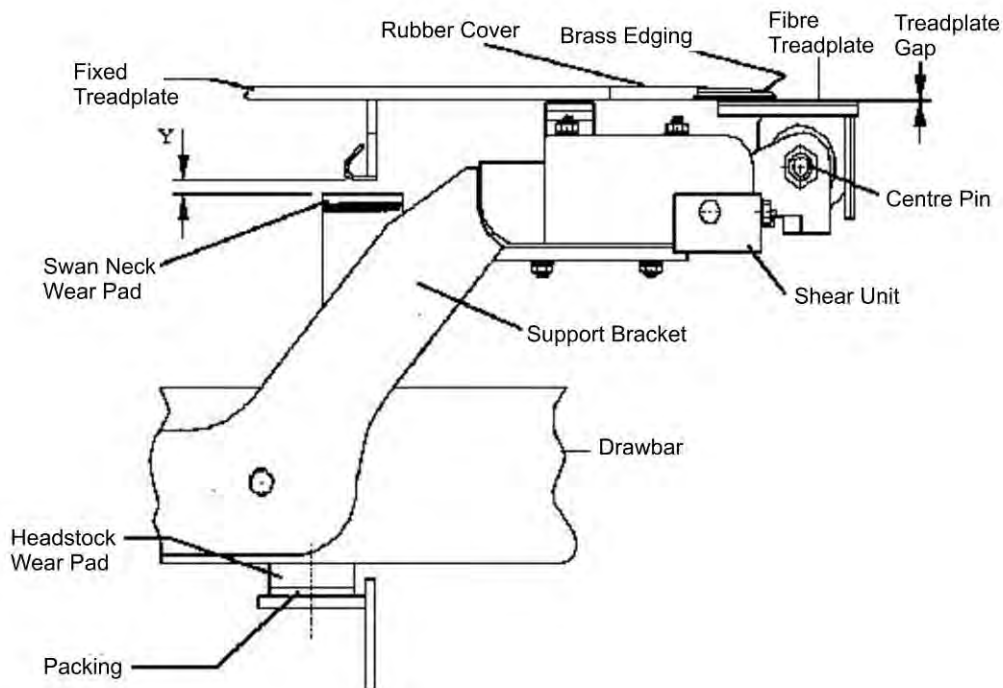



Figure 1: Location of Centre Pin

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	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	

Coupler and Drawgear – Dismantle

UC 9025

APPLIES TO: All Vehicles (2 assemblies per vehicle).

See Figure 1 for identification of components, unless otherwise stated.

Scheduled Work

1. Release the M8 x 16 screws securing the gangway hinged inner panels to the gangway faceplate.
2. Remove the retaining strips securing the faceplate seals and stow seals thus released in a safe manner.
3. Remove the gangway ceiling panel (see Figure 1 in Job No. CVA0116).
4. On LHCS vehicles, remove the buckeye coupler (10).
5. Remove the centre pin (see Figure 1, Job No. UC 9027 for identification) connecting the gangway faceplate to the drawbar. Discard the M20 slotted nut and split pin.
6. Remove the stops (12).
7. Remove the split pin (9), the 2 inch BSW nut (8) and washer (7) from the tail pin (6), and withdraw the drawbar and tail pin assembly. Discard the castle nut and split pin.

NOTE 1: On HST vehicles, this is done best by bolting a spare coupler to a frame which can be attached to a fork lift truck.
The spare coupler is coupled to the vehicle coupler in the normal manner and the fork lift reversed away from the vehicle.

8. Remove the tail pin from the alliance coupler (HST vehicles) or drawbar assembly (LHCS vehicles) and discard.
9. Remove the springs, drawgear dividing and end plates, and drawgear followers from the vehicle.

NOTE 2: Items 1 to 3 above are required to enable the gangway to be flexed to enable removal and refitting of the Alliance coupler (HST vehicles) or drawbar assembly (LHCS vehicles).



Coupler and Drawgear – Dismantle

UC 9025

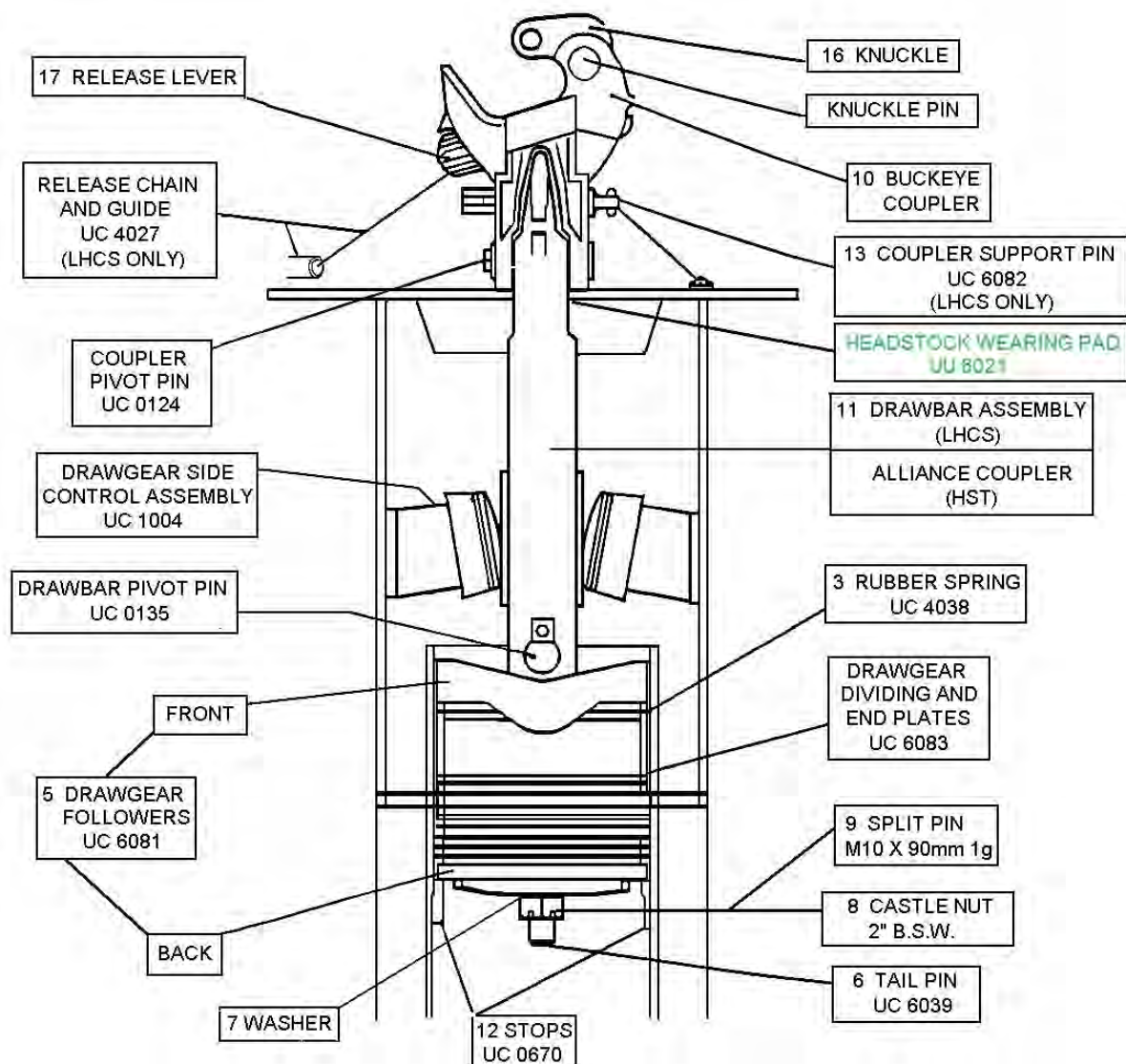



Figure 1: Arrangement of Drawgear

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Coupler and Drawgear – Overhaul

UC 9026

Reference Documents		
Item	Document No.	Title
1	IB/CI0434	Drop-Head Buckeye Coupler Overhaul (Also Refer To Original Document CEPS 1051)
2	IB/CI0480	Component Overhaul Instruction Alliance Coupler
3	IB/CI0435	Component Overhaul Instruction Auto-Coupler Drawhook Overhaul

APPLIES TO: All Vehicles


See Figure 1 in Job No. UC 9025 for identification of components

Scheduled Work

- Overhaul the buckeye coupler (LHCS vehicles only) in accordance with the specified document (see Reference Documents item 1).
- Overhaul the alliance coupler (HST vehicles only) in accordance with the specified document (see Reference Documents item 2), or procedure produced by the Contractor and agreed with the Engineer.
- Overhaul the drawbar assembly (LHCS vehicles only) in accordance with the specified document (see Reference Documents item 3).
- Carry out the actions required for the following components in accordance with the jobs listed.

Component	Job Number
Coupler Pivot Pin (Mark 3A, 3B and RFM Only)	UC 0124
Drawbar Pivot Pin	UC 0135
Drawgear End Stops	UC 0670
Drawgear Side Control Assembly	UC 1004
Coupler Release Chain and Guide	UC 4027
Rubber Springs	UC 4038
Tail Pin	UC 1007
Drawgear Followers	UC 6081
Coupler Support Pin (Mark 3A, 3B and RFM Only)	UC 6082
Drawgear Dividing and End Plates	UC 6083
Centre Pin (Figure 1 in Job No. UC 9027)	UC 6084
Coupler Wearing Pad	UU 6021

NOTE 1: As part of the final re-assembly process (Job No. UC 9027), packing support plates may need fitting under the wearing pad to set the treadplate gap correctly.

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Coupler and Drawgear – Re-assemble and Test

UC 9027

Materials			
Item	Description	Qty/Veh	Cat No.
1	3mm Plate Support (Drg No. 9013637/06)	As Req'd	063/002054
2	5mm Plate Support (Drg No. 9013637/07)	As Req'd	063/002055
3	2mm Plate Support (Drg No. 9013637/08)	As Req'd	063/002056
4	2mm Packing Shear Rubber Mounting (Drg No. C-A0-9477/23)	As Req'd	063/000546
5	3mm Packing Shear Rubber Mounting (Drg No. C-A0-9488/24)	As Req'd	063/000547
6	Tailpin	2	018/000479


Torque Figures			
Item	Description	Size	Torque (Nm)
1	Slotted Nut	M20	100

APPLIES TO: All Vehicles

See Figure 1 in Job No. UC 9025 for identification of components.

Scheduled Work

- Re-assemble using a new tail pin (6) (see Materials item 6), rubber springs (3), dividing and end plates and drawgear followers with washer (7) and new castellated nut (8).
- Remove the swan neck pad and packing.
- Trial fit an overhauled drawbar assembly (LHCS vehicles) or alliance coupler (HST vehicles) (11).
- Temporarily attach the gangway faceplate using the centre pin.
- Pack the headstock wearing pad until the treadplate gap is minimised (see Materials items 1, 2 or 3). The treadplate gap must be constant across the width of the treadplate and must not exceed 3mm.
- Measure dimension 'Y'. Check that it is at least 8mm. See Figure 1.
- Detach the gangway faceplate from the coupler or drawbar and remove the coupler or drawbar.
- Fit packings (see Materials item 4 and 5) under the swan neck pack so that the clearance there is 2mm.
- Refit the drawbar or coupler and secure to tail pin with pivot pin.
- Tighten the tail pin nut until the stops (12) can be fitted.
- Fit the split pin (9) and open out the legs.

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Coupler and Drawgear – Re-assemble and Test

UC 9027

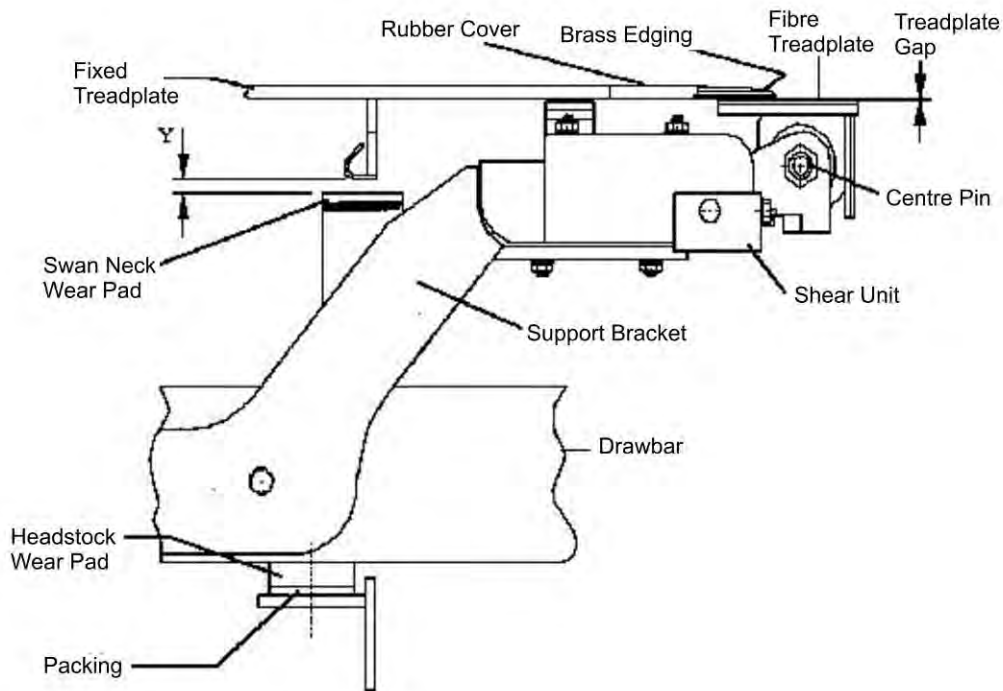



Figure 1: Setting up Gangway Supports


12. Refit the centre pin with new M20 slotted nut. Tighten in accordance with Torque Figures item 1. Tighten further to align slots with the hole and fit a split pin.
13. Secure the hinged panel (27) to the faceplate with M8 x 16 screws. Use a thin wedge placed between the roller and cover strip (12) to temporarily hold the flexible panel in correct position.
14. Secure new faceplate seal and timber packings to faceplate with retaining strips and self tapping screws.
15. Refit the ceiling strip (24) and ceiling panel (25) (see Figure 1 in Job No. CVA0116).
16. Push outwards on ends of hinged panels (overhauled in Job No. CV 0102) and check that they are taut and return freely to their original position.
17. On LHCS vehicles only, fit and test the buckeye coupler as follows:
 - 17.1 Fit the buckeye coupler using suitable lifting equipment.
 - 17.2 Secure with pivot pin and 8 x 71 corrosion resisting split pin and washer.
 - 17.3 Raise the coupler and fit the couple support pin, checking that the tails drop.

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Coupler and Drawgear – Re-assemble and Test 9027

UC

- 17.4 Connect the coupler release chain, checking that it is of the correct length and cannot fall below the ETS jumper shield (see Job No. UC 4027).
- 17.5 Close the coupler if open.
- 17.6 Pull on the coupler release chain and check that the knuckle opens positively.
- 17.7 Check that the release chain is clear of obstructions and does not bear heavily on the guide tube.

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Earth Bonds - Examine/Test

UE 5001

Torque Figures			
Item	Description	Size	Torque (Nm)
1	Earth Bond Screw	-	100

Special Tools		
Item	Description	Cat No.
1	Portable Low Resistance Meter (4 terminal) (capable of delivering at least 2 Amps d.c. with a minimum resolution of 0.01mΩ)	-


APPLIES TO: All Vehicles

Scheduled Work

1. After the bogies have been refitted, check that the following earth leads are intact and connected:
 - Body to Bogie = 2 (1 per bogie)
 - Bogie to Wheelset = 4 (2 per bogie, 1 per wheelset)
2. Check that all body mounted earth bonds and earth links are intact and connected.
3. Check that an earth bond is connected between the 13 amp/RCD socket and the socket metal mounting box.
4. Using a portable low resistance meter (4 terminal) capable of delivering at least 2 Amps d.c. with a minimum resolution of 0.01mΩ (see Special Tools item 1), measure the resistance as follows, on completion of all repairs:
 - 4.1 Between the 13 Amp cleaner's socket fixing screws (in the luggage box) and the earth stud behind the CDL air isolation panel in the vehicle vestibule. Maximum resistance 60mΩ.
 - 4.2 Between the bogie frame and each wheelset. Maximum resistance 1.0mΩ.
 - 4.3 Between the frame and any equipment box or module which has been removed during repair. Maximum resistance 10mΩ.

Arising Work


1. Renew defective lead.
1. Reconnect loose lead. Tighten screws (see Torque Figures item 1).

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Earth Bonds - Examine/Test

UE 5001

2. Connect earth bond.
2. Renew defective bond.
3. Fit earth bond.
4. If the resistance is greater than the stated value, clean the contact surfaces and re-terminate defective and/or disturbed connections. Repeat the test.

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Bogie – Change

UF 6301

Materials			
Item	Description	Qty/Veh	Cat No.
1	MS4 Silicone Grease	As Req'd	027/004612

Reference Drawings		
Item	Drawing No.	Title
1	A1-A1-8504514 A	Body Lifting Pad Modification (Mark 3 Vehicles)
2	B1-A0-9013633 M	DTL Of Bolster
3	PS-A1-002368	Standard Lifting Bkt For SWL Of 17.5 Tonnes (For Vehicles Up To And Including 70 Tonnes Gross Weight)

Reference Documents		
Item	Document No.	Title
1	CR/CI0510	Component Overhaul Instruction: BT10 Bogies

APPLIES TO: All Vehicles


Scheduled Work

1. Remove the bogies as follows:

- 1.1 Set the vehicle on a straight and level track.
- 1.2 Check the wheelset of each bogie.
- 1.3 Exhaust the vehicle air systems
- 1.4 Disconnect the brake and suspension air hoses between the body and bogie at the bogie, seal ends to prevent ingress of dirt.

NOTE 1: On BFO vehicles, disconnect the brake actuator hydraulic hoses at the bogie end and seal bogie mounted connections to prevent ingress of dirt.

- 1.5 Disconnect the WSP electrical conduit and terminals between the body and bogie at the bogie.
- 1.6 Remove the primary vertical dampers and insert a safety link in the damper locations that will retain the wheelset, whilst still being long enough to prevent any load being locked into the primary springs when the body is lifted.
- 1.7 Position lifting equipment (in accordance with Additional Procedure 1) and lift the body from the bogies.
- 1.8 Remove the bogies from beneath the vehicle.

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Bogie – Change

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2. Overhaul bogies in accordance with the specified document (see Reference Documents item 1).

NOTE 2: The BT10 bogies being refitted must be identical to those removed in the following respects:

- a) WSP equipment - Girling self powered or coach powered, BR Mark 2 or Westinghouse.
- b) Primary spring type (colour) and packing is selected according to vehicle type (pivot load). See Job No. US 6909 (see Reference Documents item 1).
- c) BT10A bogies (with fabricated LCR brackets) must only be fitted to LHCS vehicles.
- d) BT10B bogies (with cast LCR brackets) can be fitted on both HST and LHCS vehicles.
- e) Short swing link bogies may be fitted to any Mark 3 vehicle.
- f) Long swing link bogies MUST NOT be fitted to vehicles required to operate over former Southern Region lines electrified on the 3rd rail system.

Section 2 in Reference Documents item 1 contains information to enable variations to be identified.

All vehicles must be fitted with a pair of bogies of the same type, i.e. both BT10a or BT10b, both LSL or both SSL.

If the vehicle is to be fitted with LSL bogies when previously fitted with SSL (or vice versa) alter the swing link code on the vehicle ends as per job CN 0105.

3. Refitting bogies to the vehicle

- 3.1 While the vehicle is supported clean the centre pivot, on the underframe, of any adhering material e.g. rust, paint etc. Coat the pivot with MS4 silicone grease (see Materials item 1).
- 3.2 Locate the bogies, after checking that the bogie identification code for the chosen pivot is correct, at 16 metre centres beneath the vehicle, aligning the centre pivots with the bogie centre pivot bushes and chock wheels.
- 3.3 Slowly lower the vehicle body onto the bogie, ease the wheel chocks and adjust the position of the bogies as necessary to check that the centre pivot locates in the bogie centre pivot bush. Check that the side bearer pads remain located in the base unit recesses during the refitting process.

NOTE 3: Side bearers must not be lubricated.

- 3.4 Remove any caps from the hose ends or seals from the bogie connections and connect the air supplies to the bogie brake and the secondary suspension systems.

Bogie – Change

UF 6301

NOTE 4: On BFO vehicles, remove any caps from the hose ends or seals from the bogie connections and connect the brake actuator hydraulic hoses at the bogie end.

3.5 Reconnect the WSP electrical terminals and flexible conduit.

3.5.1 On vehicles fitted with BR WSP check that the wires in the body to bogie connection box are connected as shown in Figure 1 and Table 1.

3.5.2 On vehicles fitted with Westinghouse WSP check that the wires in the body to bogie connection box are connected as shown in Figure 1 and Table 2.

3.6 Once bogieing is complete the exposed end surfaces of the centre pivot through the bolster must be re-coated with MS4 silicone grease (see Materials item 1) to prevent ingress of moisture and subsequent corrosion.

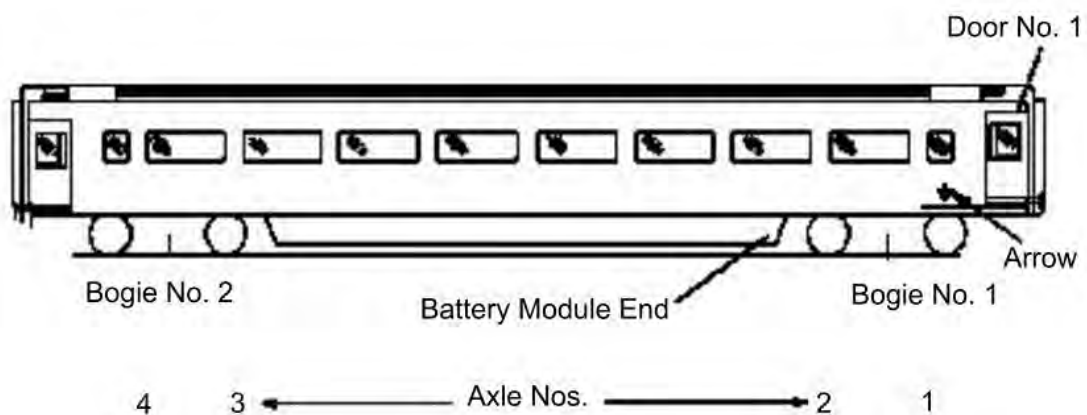



Figure 1: Identification of Axles

Axle No.	Probe Wires	Blowdown Valves
1	1905 and 1906	1901 and 5 WW
2	1907 and 1908	1902 and 5 WW
3	1909 and 1910	1903 and 5 WW
4	1911 and 1912	1904 and 5 WW

Table 1: Wire Numbers for BR WSP

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Bogie – Change


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Terminal Bar	Terminal No.	Wire No's		Function
		No. 1 End	No. 2 End	
TB1	1	P1	P9	Probe wire
TB1	2	P2	P10	Probe wire
TB1	3	P3	P11	Probe wire
TB1	4	Screen P4	Screen P12	Probe wire
TB1	5	P5	P13	Probe wire
TB1	6	P6	P14	Probe wire
TB1	7	P7	P15	Probe wire
TB2	8	Screen P8	Screen P16	Probe wire
TB2	9	D1	D7	Dump valve
TB2	10	D2	D8	Dump valve
TB2	11	D3	D9	Dump valve
TB2	12	D4	D10	Dump valve
TB2	13	D5	D11	Dump valve
TB2	14	D6	D12	Dump valve

Table 2: Wires in Body to Body Connection Box – Westinghouse WSP

D1-6 and D7-12 form a 6 core cable

P1-4, P5-8 etc form a 3 core screened cable

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Bogie – Change

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ADDITIONAL PROCEDURE 1

LIFTING AND JACKING LOCATIONS OF Mark 3/HST COACHING STOCK AND ASSOCIATED BOGIES

NOTE 5: Contractors must assure themselves that any lifting method is safe.

NOTE 6: For locations A to F below, see Figures 2 and 3.

1. Vehicle Issues

The facilities provided for lifting and jacking of Mark 3 coaching stock vary according to the type of coach. All the Mark 3 fleet is fitted with BT10 bogies.

It is necessary to impose restrictions on the use of facilities provided for the coach types listed thus:

(a) Catering Cars except TSOB, TSB and TCC

Jacking at the jacking pads near the headstock (Location D) is prohibited for catering cars because the position of the pad is unsuitable for the car weights.


2. Lifting Facilities

Lifting by overhead crane can be carried out at or near the bogie centre line at Location A and at Location B. By either method, one or both bogies can be lifted with the body.

- 2.1 At Location A the solebars are strengthened locally by a lifting pad (see Figure 4). A hole is provided for locating adaptor plates required for the lifting legs by gantry cranes. It is essential that the adaptor plates sit down on the lifting leg face and not on the pins securing the plate to the legs.

NOTE 7: As part of the wheel wear modification (see Section 5), all vehicles must have had alterations made to the jacking points and vehicle height packings as per modifications UUM TCS 03 (HST stock) and UUM LHC 04 (LHCS). See Figures 3 and 4 (see Reference Drawings items 1 and 2 for details).

- 2.2 At Location B there is a pocket in or under the underframe bolster into which a lifting bracket can be inserted as shown in Figure 5. This was provided for use with Derrick type cranes using a spreader beam of at least 9'-6" lifting centres, (for details of the lifting bracket see Reference Drawings item 3).

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Bogie – Change

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3. Jacking Facilities

Jacking operations can be carried out at or near the bogie centre line at Location A and at Location B. By either method, one or both bogies can be lifted with the body.

3.1 **Location A** - Suitable only for 'Matteson' type jacks.

3.2 **Location B** - The underside of the lifting bracket referred to in 2.2 can be used for jacking. Figure 5 illustrates and gives the jacking centres.

When removing the bogies it is essential that jacks do not foul the bogie components.

3.3 **Location D** - Platform below the underframe near the headstocks of all vehicles except the 5 remaining prototypes. When jacking at Platform D it is **essential** that all body and corner **doors must be closed**.

Platform D may be used for:

- (1) Jacking the bodies clear of the bogies (not suitable for removing bogies).
- (2) For all coaches except catering cars - Jacking one end of each with the bogie at that end attached the other bogie being on the rails.

NOTE 8: It is not permitted under any circumstances to jack at both ends at Platform D with the bogies attached nor is it permitted to jack catering cars at any end with a bogie attached.

3.4 **Location E and F** – It is permitted to jack all coaches using Locations E and F as shown in Figure 3 but it is essential that timber seating pads are employed to spread the load into the structure.


When using Location F it is also essential to insert packings between the bolster and the bogie frame as shown in Figure 2.

3.5 **Location E** – Timber seating pads must be used to seat against and spread the load into the ribs along the underside of the axles.

For BT10 bogies jacking must be applied 100 to 150 mm from the axlebox centre on the coil spring side of the centre to avoid uneven seating against curving ribs.

3.6 **Location F** - Jacking must be directly in line with the air spring centre line as shown in Figure 3. The BT10 is more vulnerable to damage when jacking from this position and extra care is needed as follows:

It is vital that both the seating pad and jack are accurately positioned under the centre of the air spring end internal bump stop to avoid overstressing and permanent bending of the spring plank end tray casting. The air spring/bump stop centre line is midway between the swing links longitudinally and 25mm inside the swing links toward the bogie centre in the lateral plane.

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There are also two types of end tray castings in service with different jacking surfaces. The early design has a flat seating face on the underside but the current design introduced with the short swing link version of the bogie has an upward slope of 3° over the inner half of the seating surface. As the two surfaces meet along the longitudinal centre line of the seating area a timber seating pad with a shallow vee surface (177° included angle) will be necessary to check stable seating and achieve correct jacking load distribution.

4. **Location C₂ – ATTACHING BOGIES TO BODY**

Brackets C are provided in the solebars above each bogie frame corner. Bogies can be chained to these brackets and suitable chains with shackles for deflated secondary suspension and straight track conditions. When using chains it is essential to protect the bogie frame corners by inserting angle sections between the bogie and chains.


- 4.1 When lifting BT10 bogies the primary dampers at the end of the axlebox arms are sufficient to retain and support the wheelset. If it is essential to reduce the jacking stroke by limiting primary spring extension the axlebox arm can be chained near the damper by an adjustable chain or alternatively a long bolt can be used in place of the primary damper.
- 4.2 It is important that the bogies are not lifted with the secondary suspension inflated and both air springs on a bogie must be individually deflated as follows:

BT10 – Loosen the hex headed drain plug fitted to the elbow located under each spring plank and tray by turning anti-clockwise not more than 4 complete turns. If the deflation process is not taking place check 3mm vent hole through shank of drain plug (directly under head) for blockage. On no account must further loosening or complete removal of drain plug be attempted with the air spring inflated. Alternatively the air spring can be deflated by venting through the levelling valves as follows – disconnect the vertical link from levelling valve lever arm by removing the M6 bolt and place lever arm in down position. Reconnecting the vertical link will restore the levelling system to its original working order provided that:

- (1) The adjustable length of the vertical link is not altered.
- (2) The adjustable link and levelling valve lever arm are not bent or damaged.
- (3) The levelling valve is not damaged.

The interchange of bogies or any change in the mechanical condition of the levelling valve or its linkage during lifting and jacking will necessitate implementation of the air suspension setting-up procedure.

- 4.3 It is essential that both air springs are deflated before chaining the bogie to solebar brackets.

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Bogie – Change

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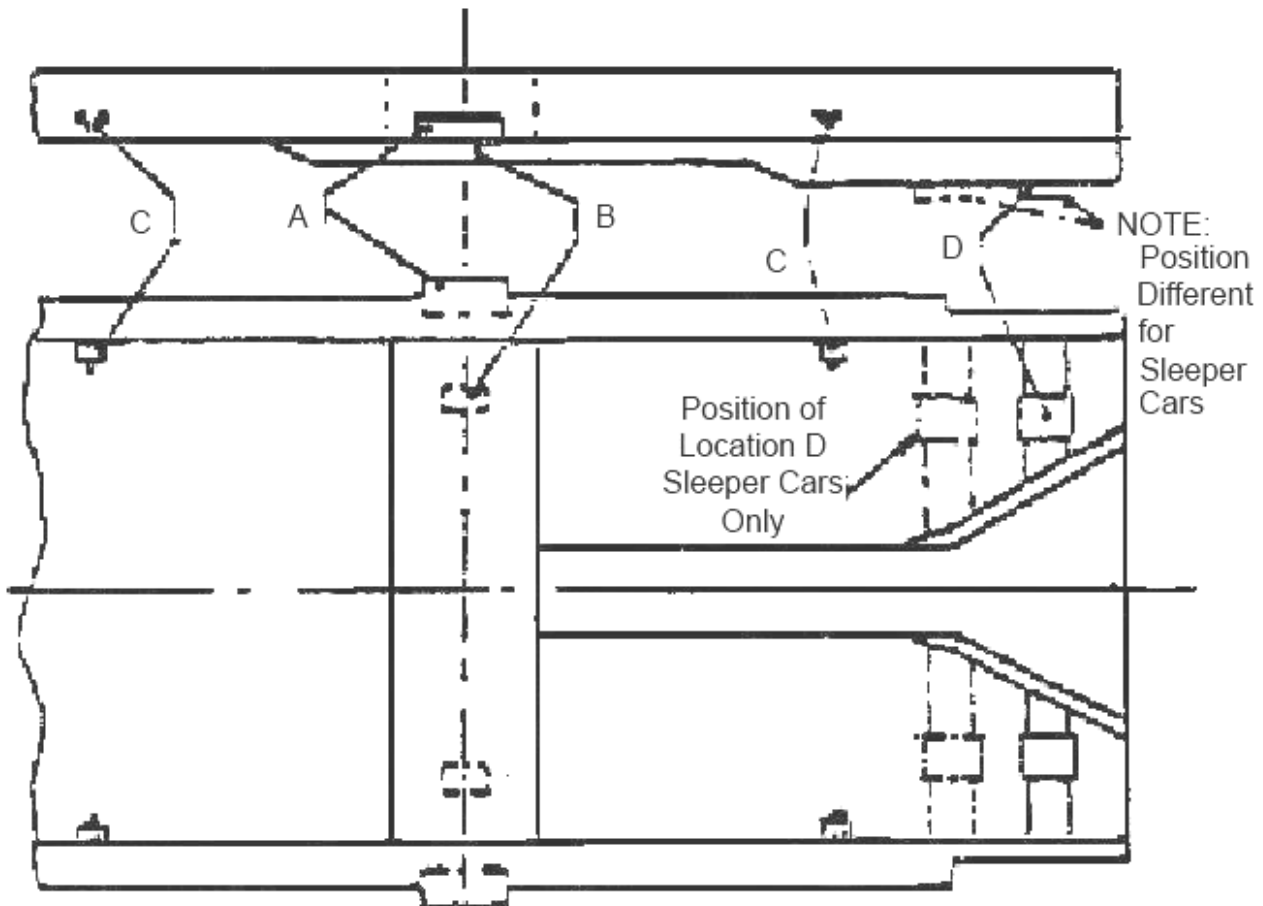



Figure 2: Jacking and Lifting Points

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Bogie – Change

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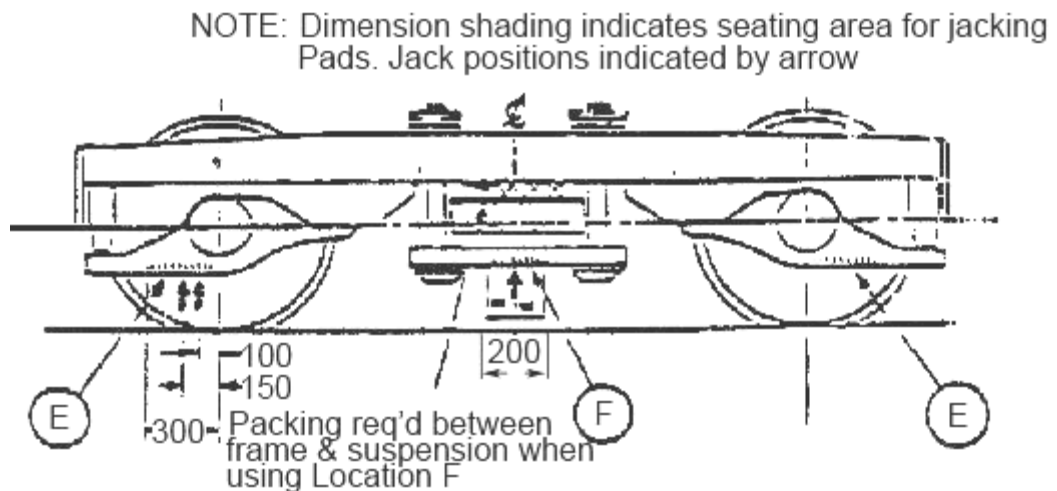


Figure 3: Bogie Jacking and Lifting Points

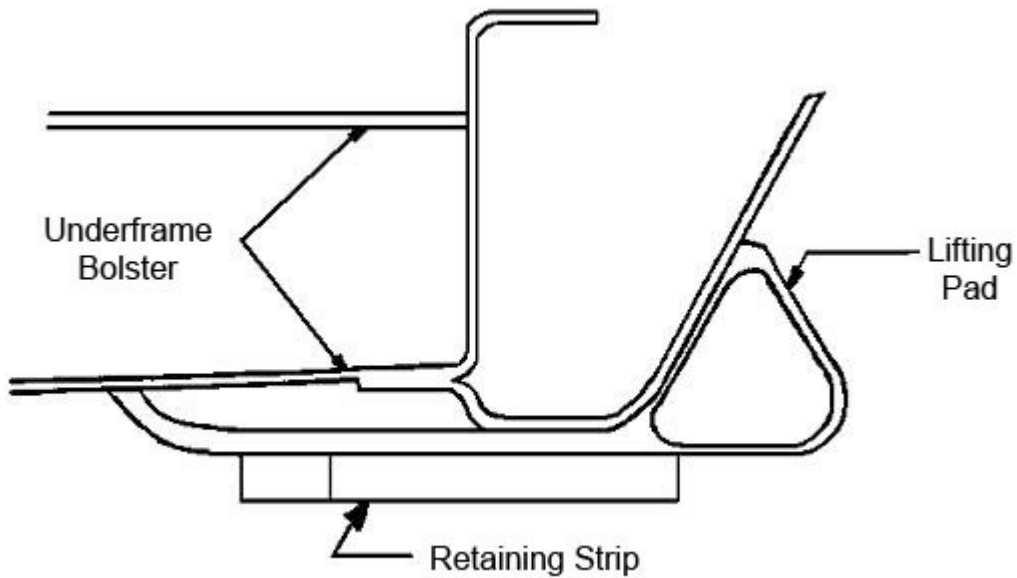



Figure 4: Strengthening of Lifting Point

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Bogie – Change

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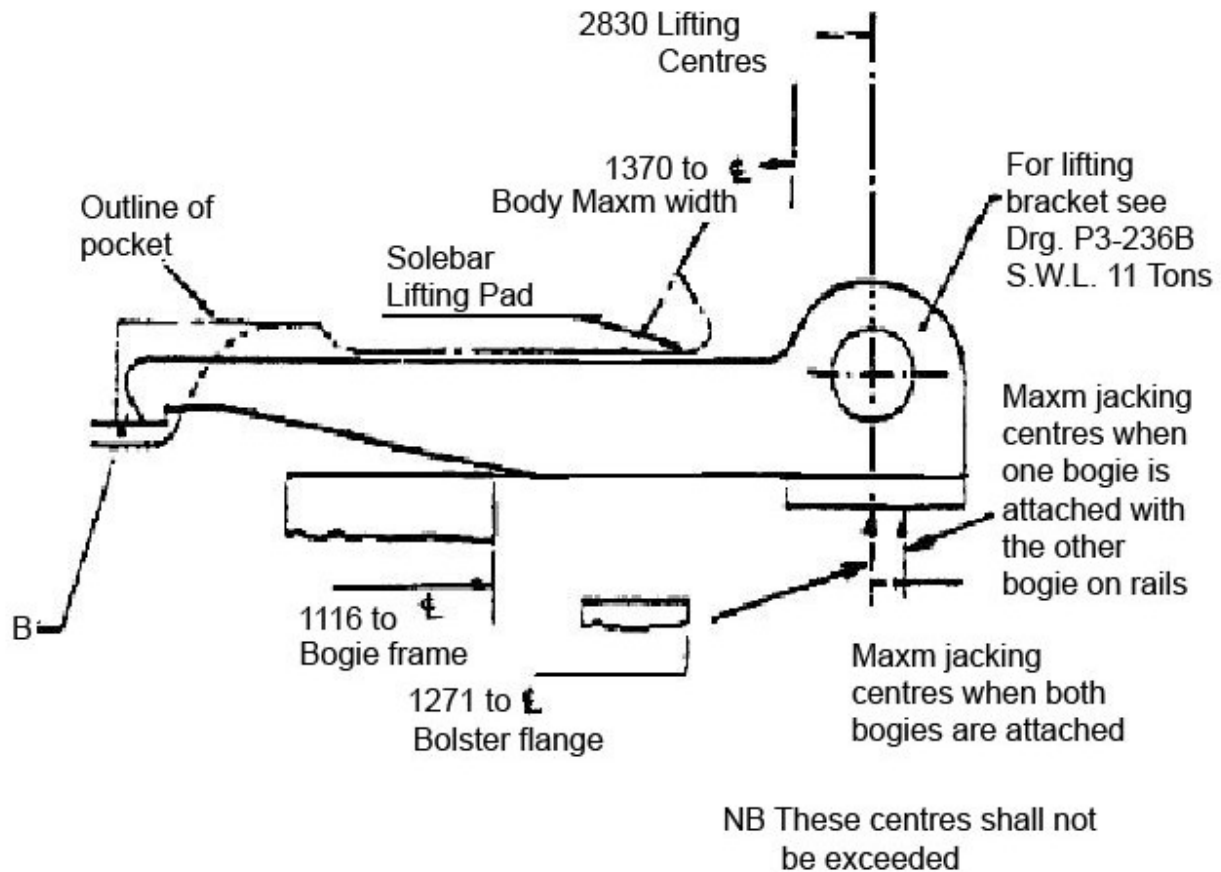



Figure 5: Pocket for Lifting Bracket

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Underskirt Interior – Clean


UI 6017

Reference Documents		
Item	Document No.	Title
1	PB/TP1372	Corrosion Repairs to the fixed skirt of Mark 3 Coaches

APPLIES TO: All Vehicles

Scheduled Work

1. Remove dirt and debris from within the underskirt in accordance with the specified document (see Reference Documents item 1) Section 4.

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Centre Pivot Casting – Examine

UM 6029

Torque Figures			
Item	Description	Size	Torque (Nm)
1	Centre Casting Nut	M24	400

APPLIES TO: All – two per vehicle

Scheduled Work

- With the bogies removed, examine the centre casting, packing and bolster bottom plate for signs of distortion or displacement of the components.
- Check any gaps along the edges with feeler gauges. The gaps must be less than 4mm on the side edges and less than 0.5mm between the bolts on the leading and trailing edges (Figure 1).

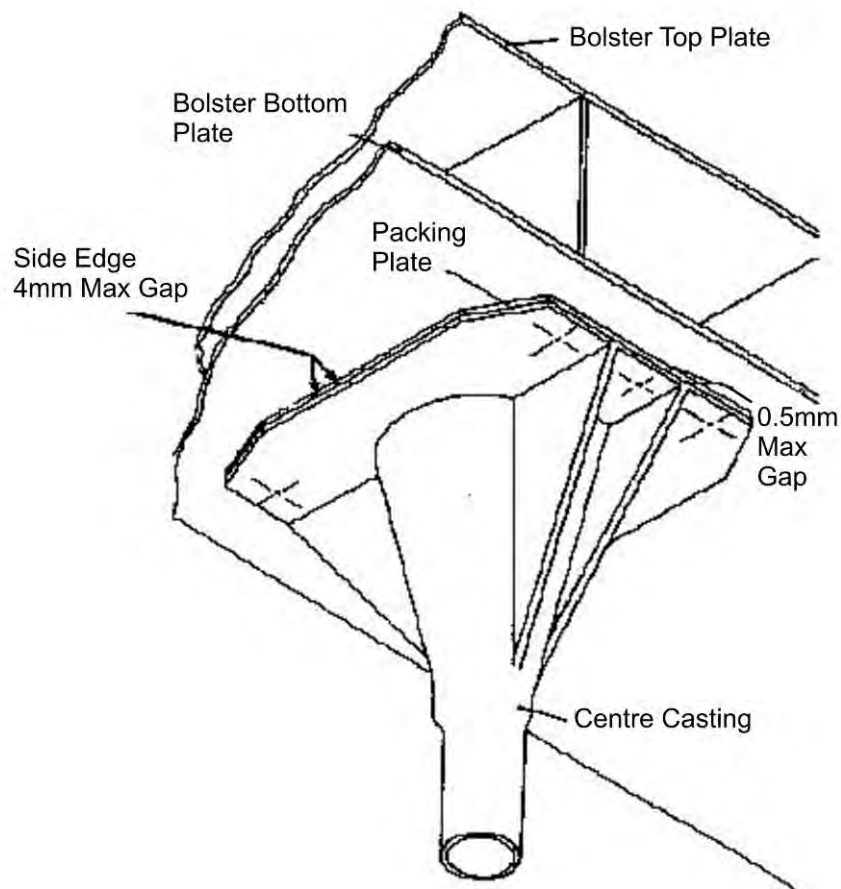



Figure 1: Inspection of Centre Casting

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Centre Pivot Casting – Examine

UM 6029


- Examine the bolster for signs of distortion in the vicinity of the longitudinal members.

Where the bolster has sustained heavy, localised damaged, a check is to be made for overall twist of the bolster beam.

- Examine the 6 bolts and nuts securing the centre casting to the bolster for damage and security.
Check that the bolts are correctly tightened (see Torque Figures item 1).
- Examine the centre pivot casting for damage.

Arising Work

- If any distortion is evident or if the gaps are greater than those quoted in 1 above, then the repair detailed in Job No. UMA6037 must be carried out.
- Renew all the bolts, nuts and split pins in accordance with Section 1 and 9 of Job No. UMA6037.
- Remove centre casting and repair in accordance with Job No. UMA6037.

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	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	

Centre Pivot Casting – Crack Detect

UM 6030

APPLIES TO: All Vehicles (2 per vehicle)

Reference Documents		
Item	Document No.	Title
1	CR/PE0102	Repainting of Rail Vehicles
2	CR/TP1482	Magnetic Particle Testing Of Ferromagnetic Steel Components Using Hand Held Ac Electromagnetic Yokes

Scheduled Work

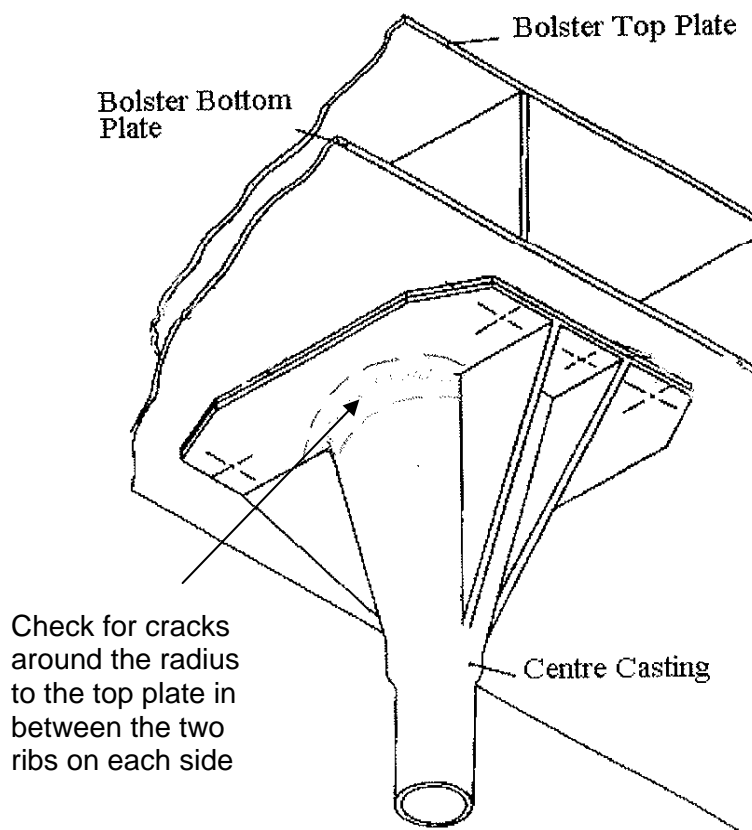



Figure 1: Location for MPI Inspection on Centre Pivot Casting

1. Remove the paint from the centre pivot casting at the top of the tapered cylindrical section around the radius to the top mounting plate in between two opposed ribs on each side as shown in Figure 1.

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Centre Pivot Casting – Crack Detect

UM 6030

2. Inspect the two locations (see Figure 1) using a magnetic particle procedure (see Reference Documents item 2).
3. If any cracks are found, these need to be checked against the allowable limits given in ASTM E 125-63 for a degree 1 classification. If the crack length is below this given limit, it is acceptable to re-use the casting. If the crack length is above the limit given for a degree 1 classification, see Arising Work.
4. Prepare and paint areas shown in Figure 1 where paint has been removed in accordance with Reference Documents item 1.

Arising Work

3. Remove and scrap the centre casting. Renew the centre casting in accordance with Job No. UMA6037.

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Side Bearer Blocks – Examine

UM 6106

Torque Figures			
Item	Description	Size	Torque (Nm)
1	Side Bearer Block Nut	M12	100

Reference Drawings		
Item	Drawing No.	Title
1	CR-C1-2300122	Assembly And Machining Of Side Bearing Block (Previously-Used Top Block). Mark 3 Hst Trailer Vehs
2	CR-C1-2300123	Assembly And Machining Of Side Bearing Block (New Top Block). Mark 3 Hst Trailer Vehicles
3	CR-C1-2300137	Detail Of Bottom Block. Mark 3 Hst Trailer Vehicles

APPLIES TO: All

NOTE 1: If the vehicle is to be stood on trestles using these side bearers, then the contact surface of the side bearer must be protected from damage.


Scheduled Work

1. If directed by the Engineer, check that body bearer blocks are of the "one piece (or integral) stainless steel block" type and not the original "mild steel plus stainless steel liner" type.
2. (Both types) Check that side bearer blocks are securely fitted to the underframe.
3. If fitted with the original 'liner' type, examine as follows:
 - 3.1 Examine stainless steel liners for damage and wear.
 - 3.2 Check that the whole length of each liner is securely fixed to the block.
4. If fitted with one piece blocks, check that the rubbing surface is undamaged (witness marks are acceptable) and free from scoring using a fingernail or equivalent to detect any significant steps/grooves in the surface.
5. Check that vehicle jacking points have been cut away as per modification UUM TCS 03/UUM LHC 04. See Section 5.7 for sketches of correct arrangement (see Figures 2 and 3).

Arising Work

1. If directed by the Engineer, modify body bearers to new arrangement as follows.
 - 1.1 Remove and discard all four body bearer blocks on the vehicle by removing the fasteners (4 off M12 bolts, nuts and spring washers plus 2 off M12 nuts per block).


NOTE 2: Check that permanent packers between the block and bodysell are retained at each corner. These packers are specifically sized for each corner and must not be mixed up.

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Side Bearer Blocks – Examine

UM 6106

- 1.2 Fit new integral stainless steel blocks, as depicted on specified drawings (see Reference Drawings items 1, 2 or 3). It is recommended that new top blocks are used, as depicted on the specified drawing (see Reference Drawings item 2). Use new M12 fasteners and tighten in accordance with Torque Figures item 1.
 2. If any fastener is found loose or missing, renew all fasteners and tighten in accordance with Torque Figures item 1.
 3. Renew the liner or secure the liner if serviceable, as follows:
 - 3.1 Remove the bearer block from the vehicle.
 - 3.2 Clean the exposed face of the side bearer block with emery cloth to remove all traces of old adhesive and to provide a key for the new adhesive.
 - 2.3 Lightly score the mating face of the liner with emery cloth.
 - 3.4 Apply the adhesive (Permabond E3060, Araldite 2011 (AW106/HV953U) or Araldite AY 105 and Hardener HY 953F) along the width and length to within 4mm of the edges, and in a zigzag pattern in the centre.
 - 3.5 Place the liner onto the side bearer block. If a hydraulic press is available, apply a force of 1.5 tonnes for at least 2 hours, otherwise maintain similar pressure with available equipment for at least 2 hours.
 - 3.6 Clean off excess adhesive.
 - 3.7 Refit the bearer block to the vehicle renewing all fasteners. Tighten in accordance with Torque Figures item 1.
- NOTE 3: Any permanent shims fitted between side bearer block and underframe to be carefully refitted to vehicle.
4. Change one piece block. Renew all fasteners and tighten in accordance with Torque Figures item 1.
- NOTE 4: Any reclamation procedure to be agreed with the Engineer. It must include adjustment of the packers mentioned in Note 1.
5. Carry out modification UUM TCS 03 (for LHCS) or modification UUM LHC 04 (for HST stock). Report to the Engineer.

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Centre Pivot Casting – Repair

UMA6037

Materials			
Item	Description	Qty/Veh	Cat No.
1	Anti-Corrosion Paint	As Req'd	028/000150
1	Upol Tigerseal	As Req'd	007/056212

Torque Figures			
Item	Description	Size	Torque (Nm)
1	Centre Casting Nut	M24	400

Reference Documents		
Item	Document No.	Title
1	CR/PE0102	Repainting of Rail Vehicles

APPLIES TO: All

Scheduled Work

1. Support the centre casting and remove the split pins, nuts and washers and free the casting from its housing.
2. Using a suitable straight edge, check the face of the centre casting for alignment across the bolt holes and along the side edges.
3. If any misalignment is present, the casting faceplate can be surface ground or machined to level off the face, subject to a minimum thickness of 9mm being maintained (see Figure 1). If the resulting face thickness after flattening is less than 9mm then the casting must be renewed.

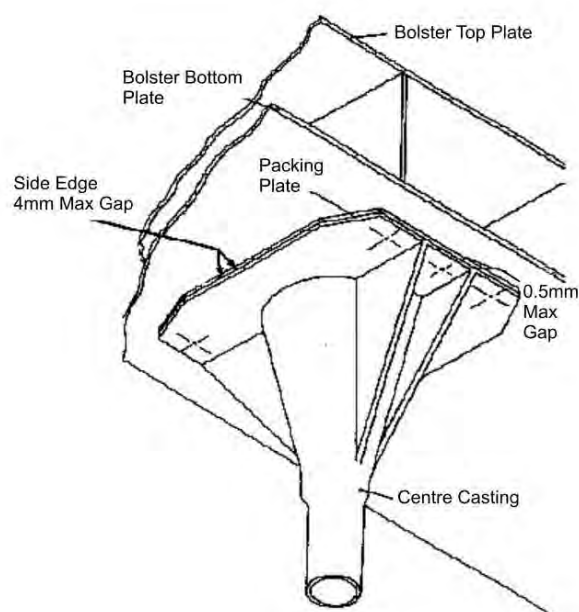



Figure 1: Centre Casting Refacing Limit

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Centre Pivot Casting – Repair

UMA6037


NOTE: Advice on the repair of any other damage e.g. cleavage fractures due to casting defects will be dealt with on an individual basis by the Contract Manager (Site) liaising with the Metallurgical Engineer.

4. Examine the packing for alignment with a suitable straight edge. If any out of alignment is present then the packing plate is to be renewed.
5. Examine the bolster bottom plate for alignment with a suitable straight edge. Any out of alignment is to be corrected by cutting out affected areas and welding by a process to be approved by the Engineer. Some bolsters are polyurethane filled and this must be removed prior to welding.
6. If any distortion of the bolster is evident the welds in the vicinity must be crack detected before and after rectification using an approved magnetic particle technique by suitably trained staff.
7. If any cracked welds are found the Engineer is to be informed who will approve the welding procedure. Any polyurethane filling present must be removed prior to welding.
8. Any protective coatings that have been destroyed when carrying out this instruction must be restored. Internal surfaces must be coated with a corrosion inhibitor to BR Spec No. 62 Item 22. External surfaces must be painted in accordance with the specified document (see Reference Documents item 1).

Corrosion inhibitor must also be applied internally to:

- a) any areas from which polyurethane filling has been removed, as required for the carrying out of this instruction;
- b) any areas which are directly affected by this instruction and which are showing signs of corrosion.


9. Following passing all of the above checks, the joint abutment faces (including any packers) are to be cleaned and degreased. Reassemble the structure using M24 bolts to BS 3692 Grade 8.8. Bolt length to suit packing used. Note, at least 2 clear threads to protrude from the nut when assembled to check correct locking. Slotted nuts to be replaced by prevailing torque nuts to BS 4929 Pt. 1 Class 8 (High type).
10. On reassembly the nuts must be tightened just sufficiently to hold the items in position to allow the gaps between the casting and packer and packing and bolster to be accurately measured.
11. If no gap exists between the centre casting and the packing plate and there are gaps between the packing plate and bolster bottom plate of less than 1mm at the sides and 0.5mm at the leading and trailing edges then the items can be disassembled and the following process carried out:

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Centre Pivot Casting – Repair

UMA6037

- Paint all abutment surfaces by hand with a thin coat of an approved anti-corrosive primer (see Materials item 1) thinned by approximately 20%.
- Clean out all fastener holes to prevent paint getting onto threads (this is important to prevent bolts being over tightened).
- Assemble the components immediately (when paint is wet) and tighten the fasteners (see Torque Figures item 1).
- Wipe off any excess paint and allow to dry for at least one hour.
- Tighten nuts a second time (see Torque Figures item 1), to allow for settlement and bolts that have lost tension due to tightening of adjacent nuts.
- Apply Tigerseal (see Materials item 2) to the external surface of the joint to seal the gap and prevent water ingress.

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Vehicle Height – Adjust

US 6004

Reference Documents		
Item	Document No.	Title
1	CR/CI0510	Component Overhaul Instruction: BT10 Bogies

APPLIES TO: All Vehicles

Scheduled Work

Reset vehicle height in accordance with the following after fitting overhauled bogies in accordance with Job No. UF 6301. The vehicle must not be coupled to any other vehicle.

NOTE 1: Stage 34 of the bogie/assembly sequence (see Reference Documents item 1) covers fitting packing beneath the bogie side bearers to compensate for variations in wheel diameter.

NOTE 2: As far as possible, height checks should be done with the vehicle configured as it would be in traffic, particularly from a weight standpoint. Therefore, all water tanks must be full or alternatively a total weight of 900kg can be positioned in the vehicle (common practice is to use 24 x 25kg bags of sand plus 15 x 20kg weights) when these tests are carried out. Water tanks shall be drained when work on the vehicle is completed if that method is used or the weights removed if that method is used..

Part 1 Air Suspension Height Setting

- 1.1 It is important to understand that levelling valves have a “dead band” of about 10mm. Hence a vehicle will stand lower when the air springs have been inflated on rising pressure than when the springs have been over inflated in the setting procedure.
- 1.2 When setting up a vehicle it is easier to over-inflate the springs and set the links when the valves open to exhaust, which can be clearly heard.

Vehicle Height – Adjust

US 6004

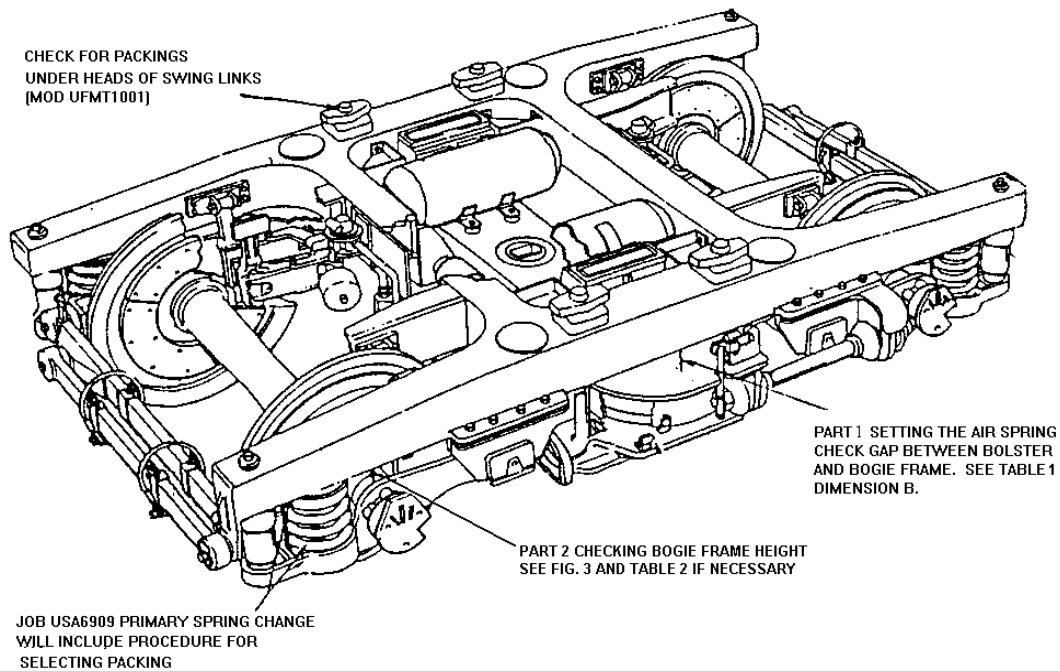



Figure 1: Location of Checks and Packings

- 1.3 Before checking or setting an air spring, find out whether the vehicle has been modified to accept smaller wheels (mods UFMT1001, UUMTCS03 and UUMLHC04). See Section 8 for sketches of these mods.
- 1.4 With all springs deflated remove the bolt (1) and slacken the lock nuts (4) and (5) (see Figure 2) at all four vehicle corners.
- 1.5 Slacken the screw (6) and increase Dimension A by approximately 20mm. If the screw is too short, disconnect and hold the levelling valve arm in the required position.
- 1.6 Open the air suspension isolating cock, and raise the levelling valve arm at one corner to inflate the air spring until Dimension B is approximately 55mm (modified vehicles) or 65mm (unmodified vehicles).
- 1.7 Gently lower the levelling valve arm until Dimension B is within the limits of Table 1, and the valve starts to exhaust.

Vehicle state see Item 1.3	Vehicle in service or on Rising Air Spring	Over-Inflated for setting see 1.6.
Modified	65-72mm	61-64mm
Unmodified	73-80mm	70-72mm

Table 1: Values of Dimension B (see Figure 2)

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Vehicle Height – Adjust

US 6004

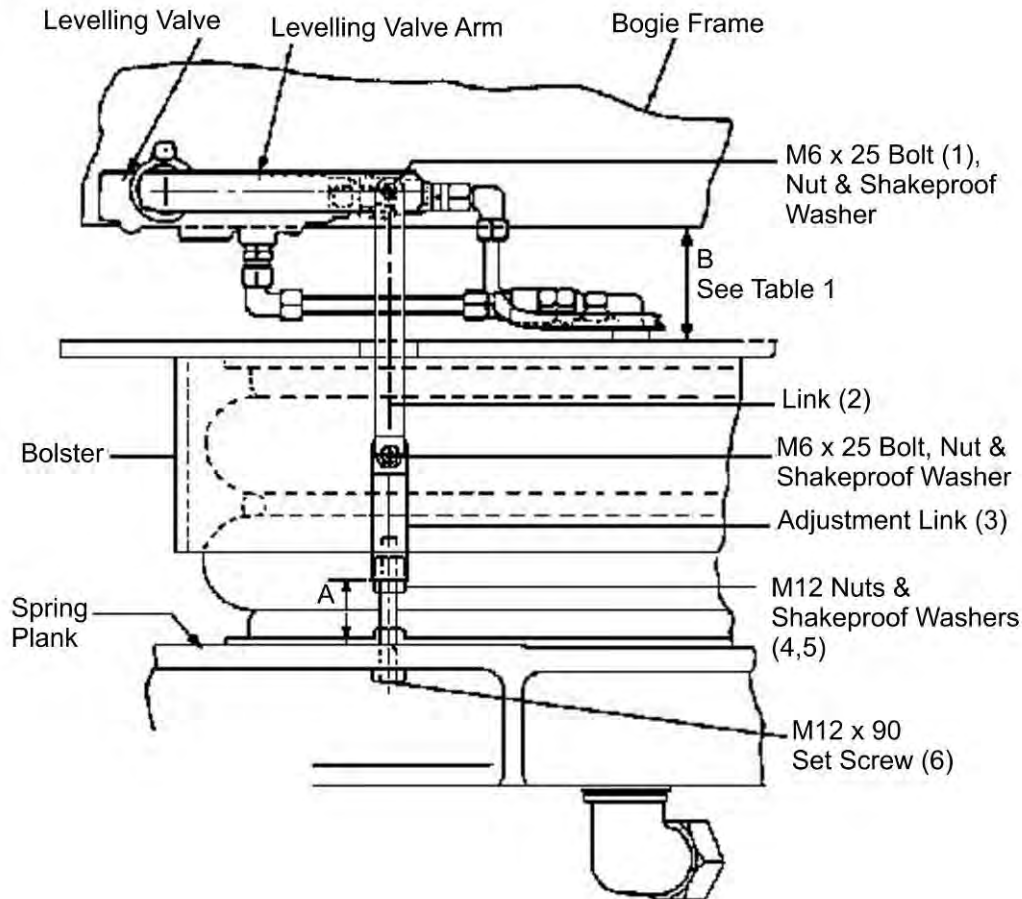



Figure 2: Arrangement of Levelling Valve Linkage

- 1.8 Adjust the position of adjustment link 3 and reconnect the arm and link with bolt 1.
- 1.9 Check that screw 6 engages in item 3 on Figure 2 by at least 3 turns of thread. Renew screw 6 (M12 x 90) with a longer one if too short.
- 1.10 Check that when the valve stops exhausting, Dimension 'B' is still within limits of Table 1.
- 1.11 Repeat steps 1.6 to 1.9 at each corner until Dimension B is within limits of Table 1.
- 1.12 When all four corners are correctly adjusted, tighten lock nuts 4 and 5, and secure bolt 1 with a nut and shake proof washer.

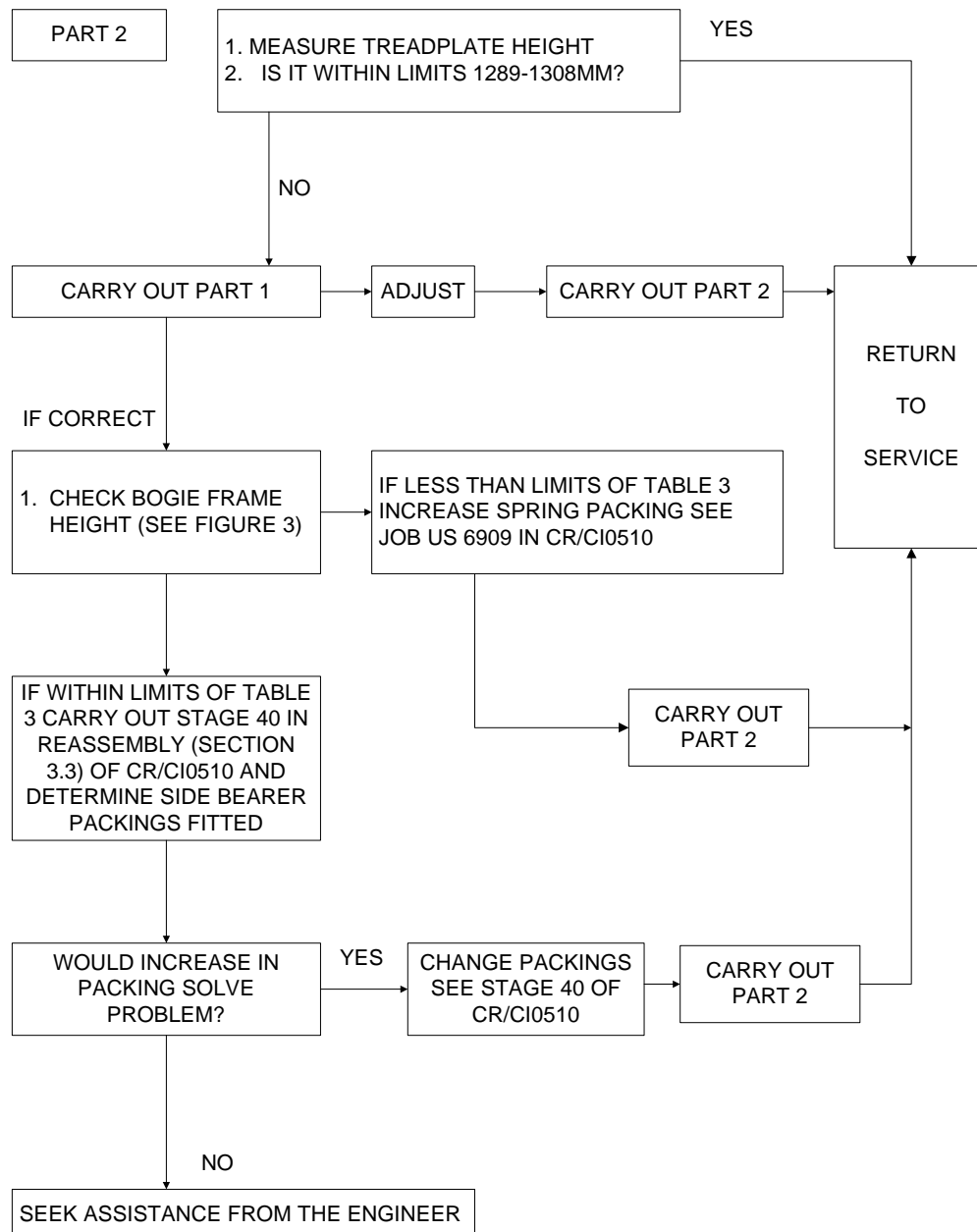
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Vehicle Height – Adjust

US 6004

Part 2 Final Check and Correction of Vehicle Height

- 2.1 Measure the height between the underside of the outside portion of the fixed treadplate and rail level, with air suspension fully inflated. If outside limits 1289 to 1308mm, see flow chart for corrective action.



Vehicle Height – Adjust

US 6004

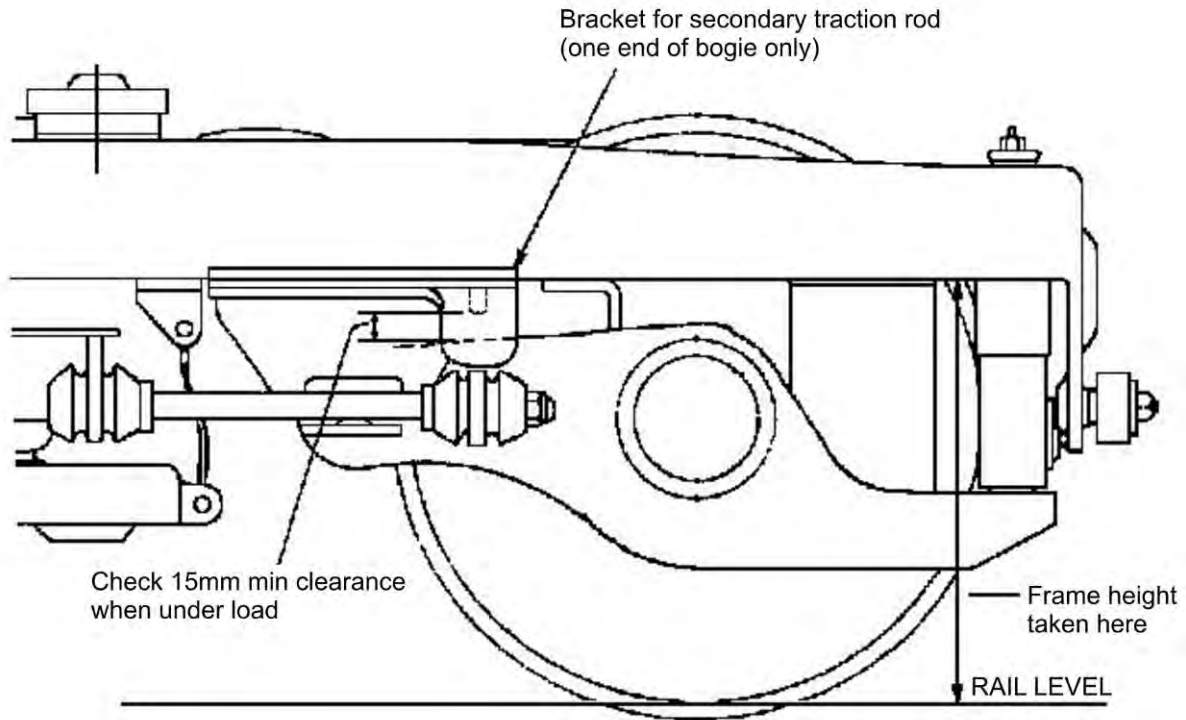



Figure 3: Measuring Bogie Frame Height

Wheel Diameter (mm)	Nominal Frame Height (mm)	Wheel Diameter (mm)	Nominal Frame Height (mm)	Wheel Diameter (mm)	Nominal Frame Height (mm)
914	671±8	890	659±8	866	647±8
912	670±8	888	658±8	864	646±8
910	669±8	886	657±8	862	645±8
908	668±8	884	656±8	860	644±8
906	667±8	882	655±8	858	643±8
904	666±8	880	654±8	856	642±8
902	665±8	878	653±8	854	641±8
900	664±8	876	652±8	852	640±8
898	663±8	874	651±8	850	639±8
896	662±8	872	650±8	848	638±8
894	661±8	870	649±8	846	637±8
892	660±8	868	648±8		

Table 3: Required Frame Height for Different Wheel Sizes

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Underframe Panels – Examine

UU 0110

Materials			
Item	Description	Qty/Veh	Cat No.
1	Rivet, Monobolt, Strainless Steel, Zinc Plated, 4.8 Dia.	As Req'd	030/100600

Reference Drawings		
Item	Drawing No.	Title
1	C-S-11978	Arrangement of U/Floor Sheets (Non-Control End) Mark 3 Day Coach (AC) HST Production Vehicles
2	C-S-11979	Arrangement of U/Floor Sheets (Control End) Mark 3 Day Coach (AC) HST Production Vehicles
3	C-A0-9527	Detail of U/Floor Sheets Mark 3 Daycoach Production Vehs
4	B1-S-9015471	Details of Underfloor Sheets Mark 3 (Ac) Coaches HST Production Vehicles

Reference Documents		
Item	Document No.	Title
1	CR/PE0102	Repainting of Rail Vehicles
2	MT 308	Intercity Procedure For Maintenance Painting Of Traction And Rolling Stock

APPLIES TO: All Vehicles

Scheduled Work

NOTE 1: These panels are often referred to as Spark Guards. They are NOT part of the underframe skirt structure.

NOTE 2: All panels fitted should now be made of steel and fastened with the specified rivet (see Materials item 1). Any aluminium panels should be renewed with steel equivalents.


NOTE 3: Panels may have been removed during Level 4 maintenance on some vehicles. Where this is the case, confirm with the Engineer whether new steel panels should be fitted. Where panels are not fitted, all exposed underframe structure should be painted in accordance with the specified document (see Reference Documents item 1).

NOTE 4: If any vehicle is found with an aluminium supporting frame, contact the Engineer for the action to be taken. Note that the specified steel rivet should not be used on aluminium frame or panels without chromate jointing paste or suitable equivalent to prevent bimetallic corrosion.

1. With the bogies removed, examine the 5 underfloor sheets located in the area above each bogie.

The following are unacceptable:

holes, cracks, corrosion, distortion, enlarged or corroded rivet holes, missing or defective insulation.

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Underframe Panels – Examine

UU 0110

2. Check that all rivets are of the correct type (see Materials item 1) and are secure and holding the panel tightly.
3. Examine supporting steelwork for corrosion and distortion.
4. Paint in accordance with the specified document (see Reference Documents item 1).

Arising Work

1. Fit new steel panels 1mm thick, to BS 1449 BHR43/20 and to dimensions as shown in the specified drawings (see Reference Drawings items 3 and 4). Secure in place using the specified rivet (see Materials item 1). Paint in accordance with the specified document (see Reference Documents item 2).
1. Examine the insulation. Renew if missing or defective with 75mm thick glass fibre insulation, as shown (see Reference Drawings items 1 and 2).
2. Renew incorrect, defective or missing rivets (see Materials item 1).
3. Repair or renew corroded supports. Paint in accordance with the specified document (see Reference Documents item 2).

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Underframe Skirt Fixed Panels, Access Panels and Framings – Examine

UU 0139

Reference Documents		
Item	Document No.	Title
1	PB/TP1372	Corrosion Repairs to the Fixed Skirt of Mark 3 Coaches

Reference Drawings		
Item	Drawing No.	Title
1	ATC-C0-2200136	Fixed Skirt - Installation
2	ATC-C0-2200137	Fixed Skirt - Sections
3	ATC-C0-2200138	Fixed Skirt - Sections
4	ATC-C0-2200139	Fixed Skirt Installation - Marks And Quantities


APPLIES TO: All Vehicles

Scheduled Work

- Examine fixed panels in accordance with Section 5.2 of the specified document (see Reference Documents item 1).
- Examine access panels in accordance with Section 5.3 of the specified document (see Reference Documents item 1).
- Examine underskirt framing in accordance with Section 5.4 of the specified document (see Reference Documents item 1).
- Examine the gusset plates between the skirt and underframe for corrosion and defective welds or riveted joints.

Arising Work

- 1,2,3 Rectify defects in accordance with appropriate arising work section of the specified document (see Reference Documents item 1). Note that only "Long Term" repairs must be carried out unless instructed otherwise by the Engineer.
4. Rectify any defects in accordance with the specified drawings (see Reference Drawings 1 to 4). Refer to Section 7.2 of the specified document (see Reference Documents item 1) for the procedure to remove and refit rivets. Note that the welds between the frame and gussets will need to be cut when the gussets are removed.

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Lifting Loops - Examine

UU 0161

Materials			
Item	Description	Qty/Veh	Cat No.
1	Green Primer	As Req'd	-
2	Underframe Black Paint	As Req'd	-


Reference Drawings		
Item	Drawing No.	Title
1	B1-A0-9013673	Bogie Lifting Attachment – Mark III Coach

Reference Documents		
Item	Document No.	Title
1	CR/PE0102	Repainting of Rail Vehicles
2	BS EN ISO 15614 - 1:2004	Specification and Qualification of Welding Procedures for Metallic Materials

APPLIES TO: All Vehicles

Scheduled Work

- Clean the area around the bogie lifting loops using a scraper and/or wire brush. Ensure that the vertical and horizontal welds are exposed and that any flaky rust is removed.
- Visually examine the bogie lifting loop and surrounding area for signs of impact or damage. If any deformation is present (other than wear or corrosion described below) the lifting loop is to be replaced.
- Visually examine the welds for cracks and corrosion.
- Examine the 10mm plate from which the loop is made for corrosion. If any corrosion is more than surface corrosion, it must be gently removed using emery paper (or similar). Ensure that the overall thickness of the plate is greater than 9.0mm at its thinnest part, as measured with a micrometer (see Figure 1).
- If wear is present on the inner radius of the loop (especially where the chains or straps rest), ensure that the maximum internal diameter does not exceed 52.6mm as measured with vernier callipers.
- Examine the horizontal strengthening plate to which the lifting loop is attached for corrosion.
- Examine the coach floor plate and the solebar adjacent to the lifting loop assembly for obvious signs of damage or corrosion.
- Paint the area in accordance with the specified document (see Reference Documents item 1).

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Lifting Loops - Examine

UU 0161



Clean and examine the vertical and horizontal welds

Ensure the plate is at least 9mm thick


Figure 1: Measuring Loop Plate Thickness

Arising Work

2, 3, 4, 5 Replace the Lifting Loop as follows:

- Lift the vehicle and remove the relevant bogie in accordance with Job No UF 6301, in order to gain access to the loop that requires renewal.
- Remove the damaged lifting loop by first using a plasma cutter, taking care not to damage the top plate or the solebar.
- Using an angle grinder, grind flat any remaining parts of the lifting loop.
- Ensure that the replacement loop conforms to, and is fitted to, the specified drawing (see Reference Drawings item 1).
- Offer up the new lifting loop and check that it is a snug fit along the faces to be welded.
- Clamp the new loop in place.
- Ensure that all electronic equipment is isolated or strapped out to prevent damage.
- Weld the new loop in place in accordance with the specified document (see Reference Documents item 2), ensuring that the procedure, the welder and the inspection are compliant. If any clarification is required, refer to the Engineer.
- Ensure that the finished job restores the assembly to the as built condition, as shown on the specified drawing (see Reference Drawings item 1).

6,7 Repair using a procedure agreed with the Engineer.

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Headstock, Underframe End Structure and Fittings – Examine

UU 3020

Reference Drawings		
Item	Drawing No.	Title
1	B1-A2-9002864	Detail Of Air Hose Coupling Brackets Mk 3 Standard Carriage
2	C-A0-4441	ETH Details For Fitting Heater Box To Headstock
3	C-A0-10948	Arrangement & Details Of Air Pipe Coupling Suspensions, HST Vehicles
4	C-A0-11263	Arrangement & Details Of 36 Pole Jumper Connection Suspension
5	C-A0-11082	Suspension of 3 Phase Receptacle With Cover Retention
6	C-A0-12218	Arrangement & Details Stowage Bracket For 3 Phase & 36 Way Couplers
7	C-A0-13467	ETH Of Mk3 Carriage Arrangement & Details For Fitting Receptacle To Headstock Loco-Hauled
8	C-A1-4958	End Coupling Arrangement (Mk3)
9	C-S-10274	Arrangement of Through Air Pipes, Mk3 Day Coach AC HST


Reference Documents		
Item	Document No.	Title
1	CR/PE0102	Repainting of Rail Vehicles

APPLIES TO: All Vehicles

Scheduled Work

NOTE 1: This job to be done with bogies removed.

- Clean using high pressure hot water spray or other method approved by the Engineer.
- Examine all visible areas including the body bolster.
- Check for distortion.
- On HST vehicles, check that the mounting brackets for the 36-way and three phase jumper boxes and receptacles and the related jumper stowage brackets are undamaged. In particular, check visually for evidence of fractured welds or other defects leading to box “droop” or bracket misalignment (see Reference Drawings items 4, 5 and 6).
- On LHCS vehicles, check the mounting brackets for the ETH jumper boxes and receptacles are undamaged. In particular, check visually for evidence of fractured welds or other defects leading to box “droop” or misalignment (see Reference Drawings items 2 and 7).
- Check that the brake hose stowage brackets (four at each end on HST, two at each end on Mark 3 LHCS) are in good order and that sharp edges do not present a hazard to staff working on vehicle underframes (see Reference Drawings items 3 and 9 for HST vehicles and Reference Drawings items 1 and 8 for LHCS vehicles).

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Headstock, Underframe End Structure and fittings – Examine

UU 3020

7. Prepare and paint all areas which have been repaired, where old paint has flaked off, or have been otherwise unsatisfactorily cleaned, in accordance with the specified document (see Reference Documents item 1) after completion of all arising work.

Arising Work

2. Treat minor surface corrosion.
2. Repair defective welds. Repair process to be approved by the Engineer. See Note.
2. Repair corrosion, other than minor surface corrosion and distortion by cutting out and renewing affected area. Repair process to be approved by the Engineer.
3. Repair by heating and straightening minor distortion. See Note 2.


NOTE 2: It is necessary that coach bodies are adequately supported at both sides by rigid support under the solebars when repair work is being carried out on the body frame and/or exterior panels. The support is to be applied before any work takes place on the body frame/panels and must be such that, using a taut wire line between bolsters of the vehicle as a datum, the body must be given 3mm extra camber (measured on longitudinal centre of vehicle) prior to commencement of work and held in that position until all work is completed.

In all instances repair procedures are agreed with the Engineer's representative prior to any work being undertaken on the repair of body frames and panels.

- 4,5,6 Repair defective welds and resecure brackets. Repair process to be approved by the Engineer.

- 4,5,6 Renew any defective brackets.

- | | |
|----|---|
| 6. | Remove sharp edges ensuring that the brackets are still able to retain the hose coupling heads. |
|----|---|

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	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	

Bolster Welds – Crack Detect

UU 3021

Reference Documents		
Item	Document No.	Title
1	CR/PE0102	Repainting of Rail Vehicles
2	CR/TP1482	Magnetic Particle Testing Of Ferromagnetic Steel Components Using Hand Held AC Electromagnetic Yokes
3	CR/TP1463	Repair to Bolster of Mk3 Coach


Special Tools		
Item	Description	Cat/OEM Pt No.
1	Supports For Coach Body During Welding	Local Supply

APPLIES TO: All Vehicles. Two bolsters per vehicle.

Scheduled Work

NOTE 1: This job to be done with bogies removed and after completion of UU 3020.

1. Examine all visible areas of the body bolster.
2. Check for distortion.
3. Clean and remove paint from around the longitudinal butt weld for each bolster in the location shown in Figure 1 (both sides where accessible), and around the fillet weld of vertical rib to lower flange shown in Figure 2.
4. Finish the area around welds using a fine abrasive disc.
5. Inspect locations shown in Figure 1 and 2 using a magnetic particle inspection procedure (see Reference Documents item 2).
6. Prepare and paint all areas which have been repaired, where old paint has flaked off, or have been otherwise unsatisfactorily cleaned, in accordance with Reference Documents item 1 after completion of all arising work.

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Bolster Welds – Crack Detect

UU 3021

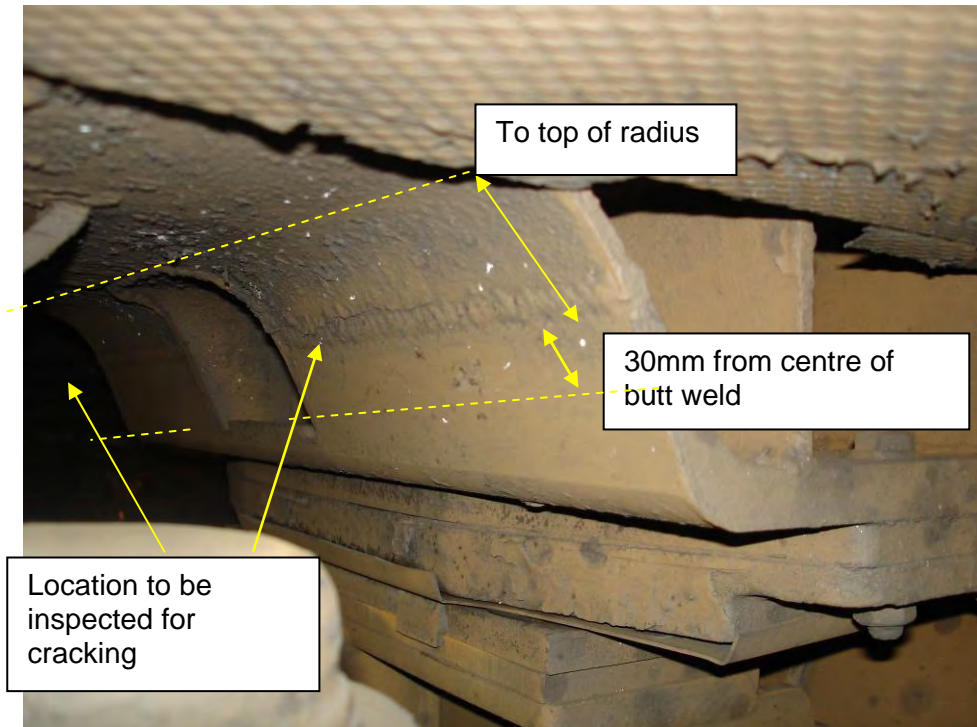


Figure 1: Weld Inspection Location at Bolster

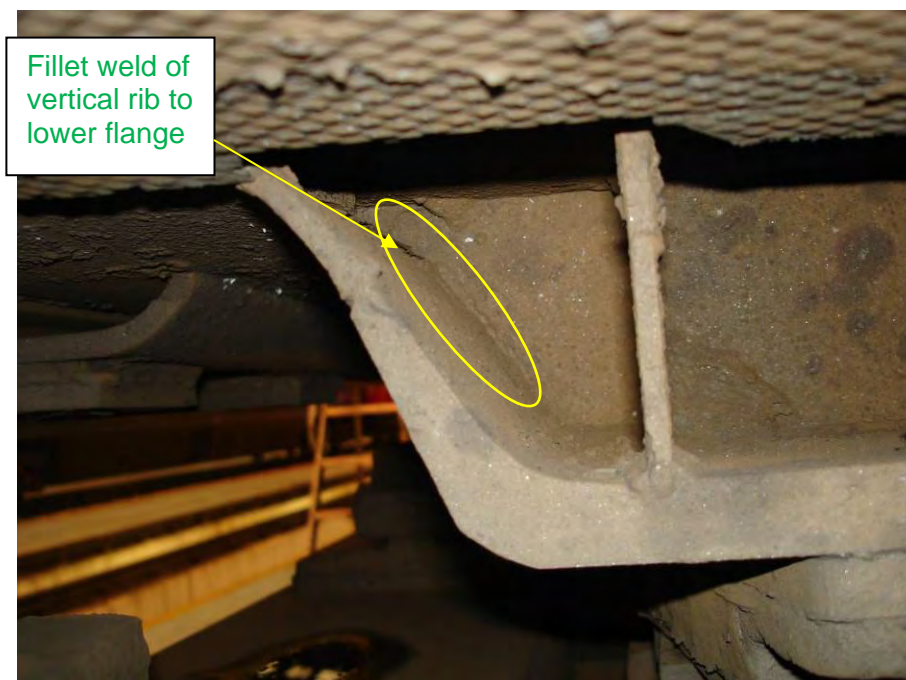



Figure 2: Bolster Lower Flange Butt Weld

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Bolster Welds – Crack Detect

UU 3021

Arising Work

1. Treat minor surface corrosion or repair defective welds in accordance with Reference Documents item 3.


Repair corrosion, other than minor surface corrosion and distortion by cutting out and renewing affected area in accordance with Reference Documents item 3.

2. Repair by heating and straightening minor distortion.

NOTE 2: It is necessary that coach bodies are adequately supported at both sides, by rigid support under the solebars when repair work is being carried out on the body frame and/or exterior panels. The support is to be applied before any work takes place on the body frame/panels and shall be such that, using a taut wire line between bolsters of the vehicle as a datum, the body shall be given 1/8" extra camber (measured longitudinal centre of vehicle) prior to commencement of work and held in that position until all work is completed.

In all instances repair method information is to be obtained from the Engineer prior to any work being undertaken on the repair of body frames and panels.

5. Repair defective welds in accordance with Reference Documents item 3. Repair corrosion, other than minor surface corrosion and distortion by cutting out and renewing affected area in accordance with Reference Documents item 3.

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Headstock Wearing Pad - Examine

UU 6021

Materials			
Item	Description	Qty/Veh	Cat No.
1	Coupler Wearing Pad (Railko)	2	063/000020
2	Coupler Wearing Pad (Polymer - Devol)	2	063/070053
3	Bolt, M16 x 70, Csk Nibbed Head	4	003/112288
4	Nut, M16 Bent Beam, Steel, EZP	4	003/180168

Reference Drawings		
Item	Drawing No.	Title
1	PB-C2-2100103	Detail of Coupler Wearing Pad


APPLIES TO: All Vehicles

Scheduled Work

1. Clean the area around where the headstock wear pads fits to remove any dirt and debris.
2. Check the type of headstock wear pad that is fitted to the vehicle (Railko or Polymer) and carry out the following:
 - 2.1 If the design is of the original Railko material (see Materials item 1), remove and discard the wearing pad and clean the abutment face. Fit a new polymer wearing pad (see Materials item 2) and secure with bolts and washers (see Materials items 3 and 4). Tighten until the assembly is fully clamped.
 - 2.2 If the design is of the polymer material, check the pad (in-situ) has not worn by more than 3mm at the thinnest point (20mm thick when new). If worn to below 3mm at the thinnest point, renew the pad and secure as described above.

NOTE 1: Additional information is shown on Reference Drawings item 1.

NOTE 2: As part of the final re-assembly process (Job UC 9027), packing support plates may need fitting under the wearing pad to set the treadplate gap correctly.

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Water System Components – Renew

WH 0108

Materials			
Item	Description	Qty	Cat. No.
1	Temoinsa Water Heater Resistance (Element) 1000 W 220V AC Temoinsa Part Number 900019980	1	064/009201
2	Water Filter ½" "Y" Type Temoinsa Part Number 3304 04- VAL GE	1	064/009203
3	Water Faucet Cap	1	064/009269

Special Tools		
Item	Description	Cat No.
1	Thermometer	-

APPLIES TO: Vehicle fitted with Temoinsa Toilet (see Section 5.9 for details).


Scheduled Work

1. Open the mirror access panel.
2. Isolate the water supply and drain the water system. Electrically isolate the water system.
3. Renew the water filter as follows:
 - 3.1 Remove the filter nut and filter element. Discard the filter element (see Figure 1).
 - 3.2 Fit a new filter element (see Materials item 2) and refit the filter nut. Fully tighten the nut.



Water Filter

Figure 1: Water Filter Installation

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Water System Components – Renew

WH 0108

4. Renew the water heater element as follows:
 - 4.1 Disconnect the heater element electrical connections (see Figure 2).
 - 4.2 Remove the cover at the base of the heater. This will expose the temperature relay.
 - 4.3 Remove the temperature relay and rubber seal from the base of the heater in order to allow removal of the heater element.
 - 4.4 Remove the heater element by unscrewing it from the heater. A quantity of water will be discharged from the heater.
 - 4.5 Discard the heater element.
 - 4.6 Fit a new heater element (see Materials item 1) to the heater. Fully tighten.
 - 4.7 Refit the temperature relay and check that it is adjusted to an 80°C setting. Turn the regulator wheel to indicate 80°C as required.
 - 4.8 Refit the cover and rubber seal.
 - 4.9 Reconnect the heater electrical connections.

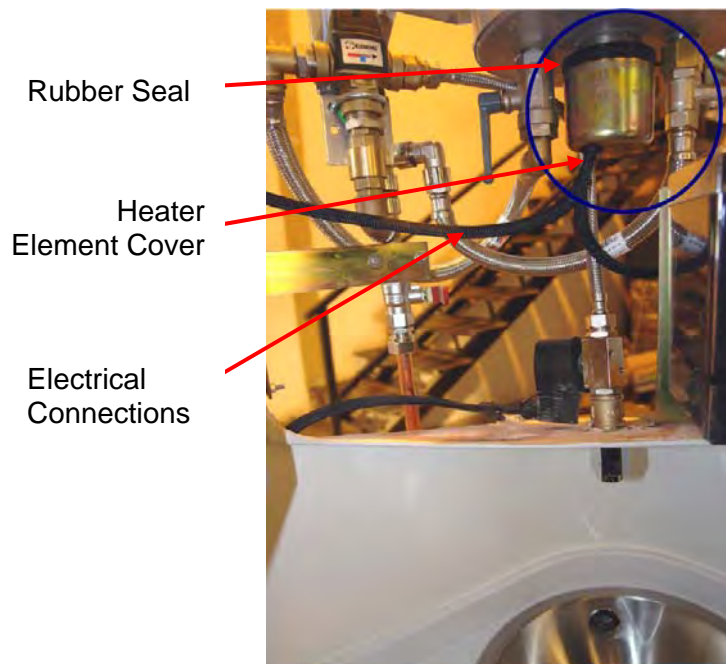



Figure 2: Water Heater Installations

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Water System Components – Renew


WH 0108

5. Examine the earth connection for defects and security.
6. Renew the water faucet cap as follows:
 - 6.1 Remove the water faucet cap (see Figure 3) and discard.



Figure 3: Water Faucet Cap Installation

- 6.2 Fit a new faucet cap (see Materials item 3). Fully tighten.
7. Reinstall the electrical supply and water supply. Check for leaks.
8. Adjust the water outlet temperature from the water heater as follows:
 - 8.1 Check that the external thermostat selector is set at 60°C. Adjust to 60°C if required (see Figure 4).

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Water System Components – Renew

WH 0108

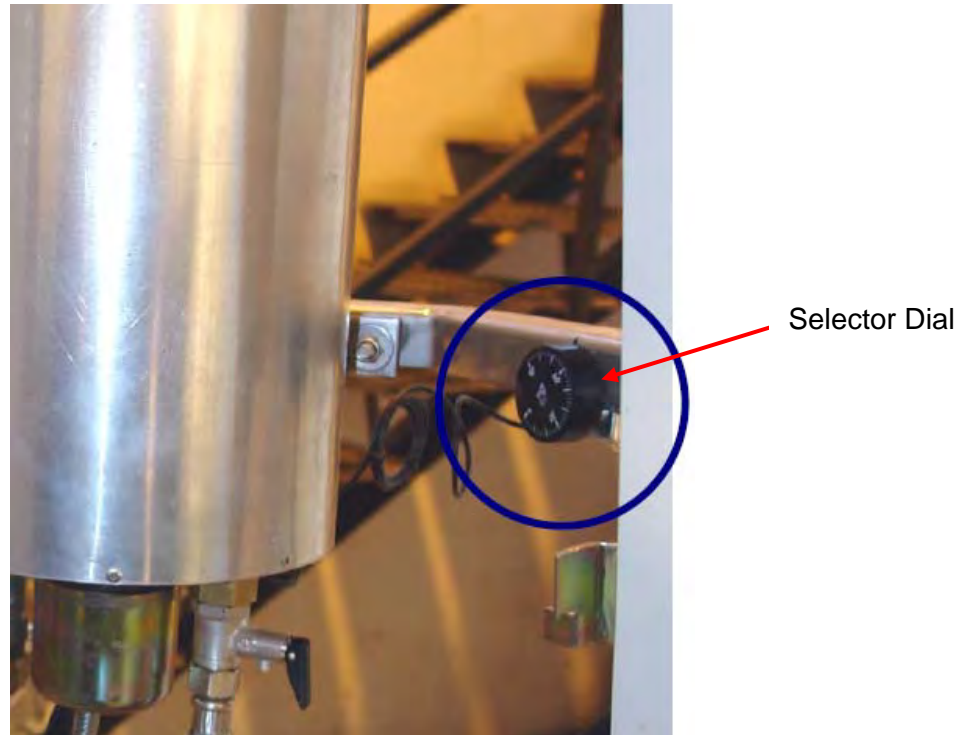



Figure 4: External Thermostat Selector

- 8.2 Activate the tap and using a thermometer (see Special Tools item 1) check the temperature of the water output is 25 to 33°C.
- 8.3 Adjust the temperature as required by removing the mixer valve cover and turning the regulator device. Turning to the right decreases the temperature, to the left increases (see Figure 5).
- 8.4 Refit the mixer valve cover when temperature is within limits.
9. Close the access panels.
10. Isolate the water supply and drain the water system when all work is completed. Electrically isolate the water system.

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Water System Components – Renew

WH 0108

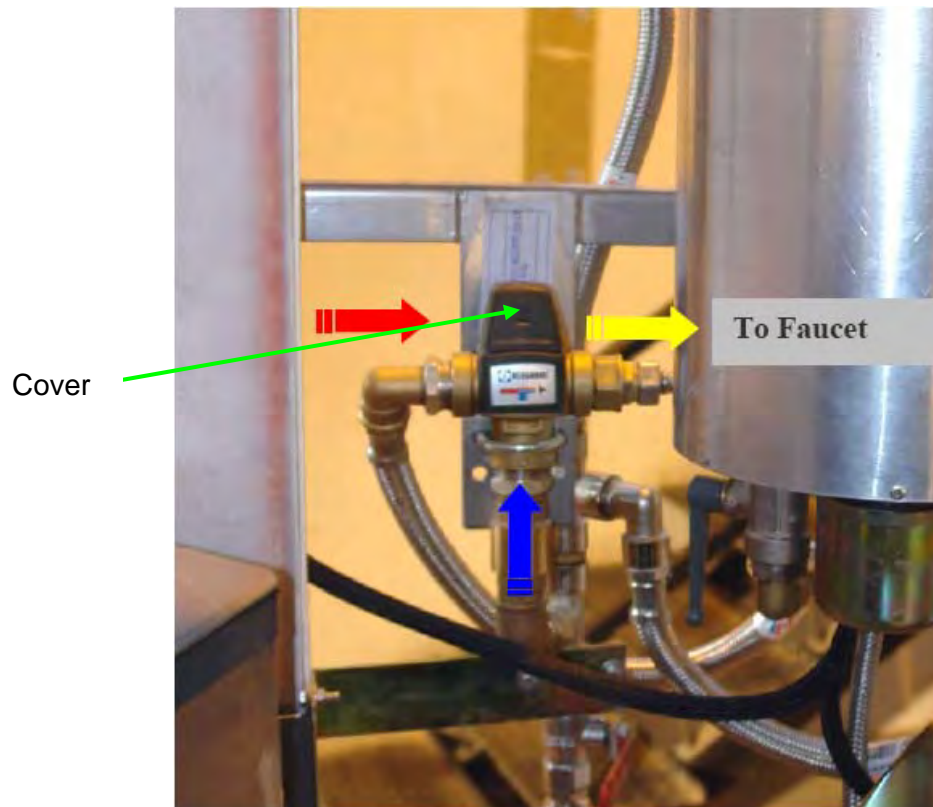



Figure 5: Mixer Valve

Arising Work

5. Renew and test defective earth connections.
7. Rectify leaks.

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Toilet Water Heater – Overhaul

WH 6532

APPLIES TO: All Vehicles fitted with non-disabled toilets as follows:

HST TF and TS (2 per vehicles) except Cross Country TS and FGW TF with trolley store vice 1 toilet (1 per vehicle)
HST TCC, TFD, TFE, TGS, TSB and TSD (1 per vehicle) – (see Notes 1 and 2)
LHCS FO and TSO (2 per vehicle)
LHCS BFO, FOD, RFM, TSOB and TSOD (1 per vehicle) – (see Note 2)

NOTE 1: Not fitted to FGW HST TGS with trolley store vice toilet.

NOTE 2: On vehicles with a disabled and non-disabled toilet fitted, this job only applies to the non-disabled toilet.

NOTE 3: The trolley store end of TFE vehicles are fitted with toilet water heaters but these have been electrically disconnected, as a result the heater at this position does not need overhauling.


Scheduled Work

1. Remove the heater and thermostat unit. On TFE vehicles at the trolley store end, confirm that the wiring to the heater has been disconnected and record on the vehicle records.
2. Remove the float switch.
3. Descale the heater and float switch.
4. Examine the water heater and float switch for damage, defects including evidence of leakage.
5. Test continuity of heating element and float switch.
6. Check that the float switch operates correctly.
7. Examine the water heater tank for damage, defects and evidence of leakage.
8. Clean joint faces.
9. Re-assemble the heater and float switch using new gaskets.

NOTE 4: The assembly is tested in Job No. WZ 6201.

Arising Work

1. If not disconnected, contact the Engineer for the action to be taken.
- 4,5 Renew defective heater.
- 4,5,6. Renew defective float switch.
7. Renew defective tank.

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Drain Pipes – Examine

WP 6708


APPLIES TO: All Vehicles

Scheduled Work

1. Check that all drain and water pipes which pass through the floor are metal not plastic.
2. Check that there are no gaps where pipes pass through the floor.
3. Check that any lagging or insulation is secure and covers the pipes.

Arising Work

1. Renew any pipe which is not metal with a copper one.
2. Seal gaps where pipes pass through flooring with Dow Corning 'Fire Stop 700' silicone sealant. Where gaps are too large for sealant to be effective, fit collars made from flat plate. These may be in two halves to avoid dismantling pipework but must not be kept in place by sealant alone. Clean and dry surfaces before application.
3. Reposition and secure displaced or loose lagging or insulation.

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Toilet Chute – Examine

WW 6719

Reference Drawings		
Item	Drawing No.	Title
1	ITL-C1-8015722	Soil Pipe Fabrication 'Hygiene' Refurbishment

APPLIES TO: All Vehicles fitted with non-disabled toilets as follows:

HST TF and TS (2 per vehicles) except Cross Country TS and FGW TF with trolley store vice 1 toilet (1 per vehicle)
HST TCC, TFD, TFE, TGS, TSB and TSD (1 per vehicle) – (see Notes 1 and 2)
LHCS FO and TSO (2 per vehicle)
LHCS BFO, FOD, RFM, TSOB and TSOD (1 per vehicle) – (see Note 2)

NOTE 1: Not fitted to FGW HST TGS with trolley store vice toilet.

NOTE 2: On vehicles with a disabled and non-disabled toilet fitted, this job only applies to the non-disabled toilet.

Scheduled Work

1. Examine the toilet waste chute. Check that the non-return flap operates correctly.
2. Check that it is at least 100mm clear of the axle when the vehicle has been re-bogied.

Arising Work

- 1,2. Repair defective chute, or renew chute with one to drawing (see Reference Drawings item 1). Refit flap valve on HST vehicles only.

Reseal the gap between the chute and the floor with Dow Corning 'Fire Stop 700' silicone sealant.

2. Realign the chute to be at least 100mm clear of axle.


Torque Valves (M10 Fixings).

Pipe clamp attached to underframe support bracket

56Nm

Clamp securing flap assembly to soil pipe

22Nm

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Toilet Water System – Test

WZ 6201

Reference Documents		
Item	Document No.	Title
1	CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of Spare Cables

APPLIES TO: All Vehicles fitted with non-disabled toilets as follows:

HST TF and TS (2 per vehicles) except Cross Country TS and FGW TF with trolley store vice 1 toilet (1 per vehicle)
HST TCC, TFD, TFE, TGS, TSB and TSD (1 per vehicle) – (see Notes 1 and 2)
LHCS FO and TSO (2 per vehicle)
LHCS BFO, FOD, RFM, TSOB and TSOD (1 per vehicle) – (see Note 2)


NOTE 1: Not fitted to FGW HST TGS with trolley store vice toilet.

NOTE 2: On vehicles with a disabled and non-disabled toilet fitted, this job only applies to the non-disabled toilet.

NOTE 3: The trolley store end of TFE vehicles are fitted with toilet water heaters but these have been electrically disconnected, as a result the heater at this position does not need overhauling.

Scheduled Work

1. Fill the system with clean water.
2. Check that the wash basin supply pipework and joints on the tank do not leak.
3. With a 3ph 415v train supply available, check that water in the toilet water heater warms up.
4. Check that the thermostat cuts out at between 60 and 65°C.
5. Turn the mixer valve to the hottest position and check that hot water is delivered.
6. Close the cold feed to the water heater, drain the heater tank and check that the float switch disconnects heater element.
7. Fully drain the system of water when all work is completed.

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Toilet Water System – Test

WZ 6201

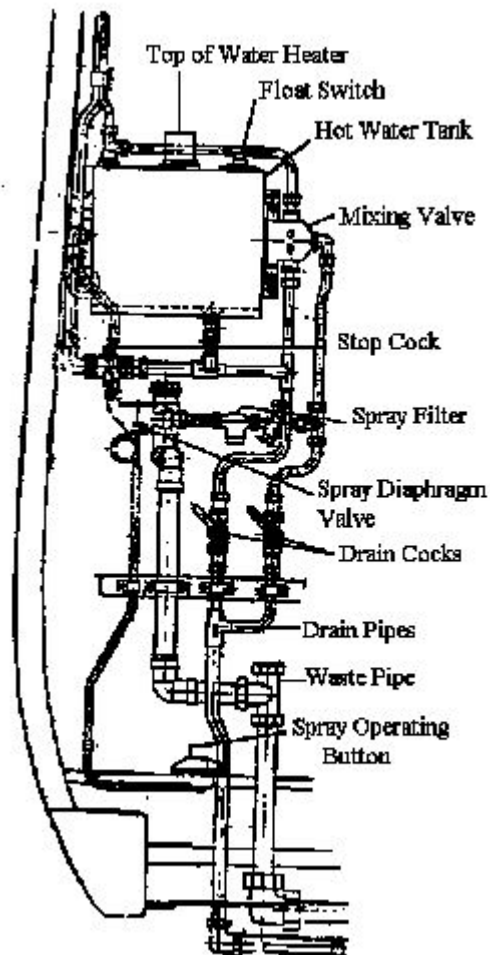



Figure 1: Toilet Water System

Arising Work

2-6. Rectify defects arising from the test.

5. Renew defective mixer valve and repeat test.

NOTE 4: Defective or redundant cables must be removed or isolated in accordance with the specified document (see Reference Documents item 1).

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Toilet Water System – Drain

ZY 0116

Materials			
Item	Description	Qty/Veh	Cat No.
1	Water Heater Isolation Notice	-	-

APPLIES TO: All Vehicles fitted with toilets

Scheduled Work

NOTE: This job is to be carried out following completion of Job No.s WH 0108 and WZ 6201.

1. Drain all toilet water tanks (see Figure 1 and in cupboard behind toilet).
2. Flush toilets until water flow stops.
3. Isolate toilet water heater by tripping water heater supply MCB see Table 1.
4. Affix a "water heater isolated" (see Materials item 1) notice to each water heater.


Arising Work

1. Ease any tight drain cocks.

Renew defective drain cock.

Vehicle Type	MCB	Location
Mark 3A	WHCB 1 WHCB 2	
Mark 3B	T(S)CB1 and 3	
RFM	TSCB1	
HST	WHCB	3 phase distribution box

Table 1: Water Heater MCBs

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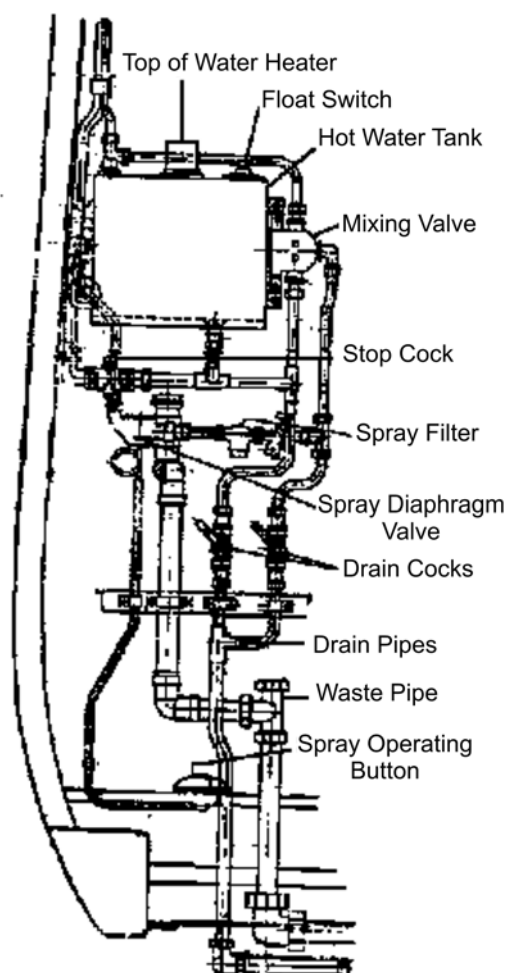
Toilet Water System – Drain


ZY 0116

Figure 1 - Location of Toilet Water System Drain Cocks

Behind vestibule panel
alongside toilet door

In staff toilets on RFM
vehicles 2 drain cocks
are located beneath
basin



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Toilet Pan - Snow Melting Fluid – Apply


ZY 0148

Materials			
Item	Description	Qty/Veh	Cat No.
1	DP705 Snow Melting Fluid	10ltr	007/140762

APPLIES TO: Mark 3A, Mark 3B, RFM, TF, TS, TGS

Scheduled Work

- 1.1. Add 500 ml of snow melting fluid (see Materials item 1) to each toilet pan in accordance with Manufacturer's instructions. If ice has formed in the toilet pan DO NOT break the ice.

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Kitchen Fans Switch Off/Isolate

ZY 0149

APPLIES TO: RFM and HST Caterer (except TCC and TSB)

Scheduled Work

1. On RFM and TBRF (408xx series) switch off the fans at the kitchen control panel (see Figure 1).
2. On TRFB (407xx series) switch off the fans on the kitchen control panel and trip MCB FCB 2 under the staff compartment seat.

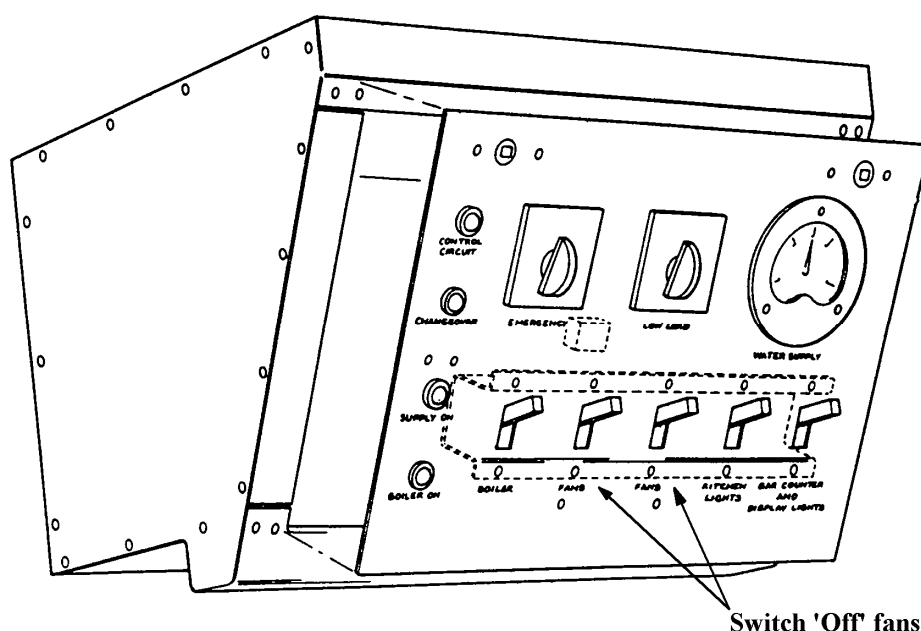



Figure 1: RFM Kitchen Control Panel

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Kitchen Water Tank and Boiler – Drain

ZY 0150

Materials			
Item	Description	Qty/Veh	Cat No.
1	Water Tanks and Boiler Drained Notice	-	-

APPLIES TO: RFM (Part 1)
HST CATERERS (Part 2)
LHCS CATERER (Part 3)

Part 1 – RFM

Scheduled Work

1. Open the access panel to the water steriliser (see Figure 1.1).
2. Open the 2 wheel operated cocks (see note and see Figure 1.2).
3. Remove the panel from the front of the boiler.
4. Open the wheel operated cocks (see note and Figure 1.3).
5. When water flows have stopped, close the cocks and refit or close the access panels.
6. Place a notice "Water tanks and boiler drained" (see Materials item 1) in a prominent position in the kitchen.

NOTE: These cocks labelled "Keep open during service".

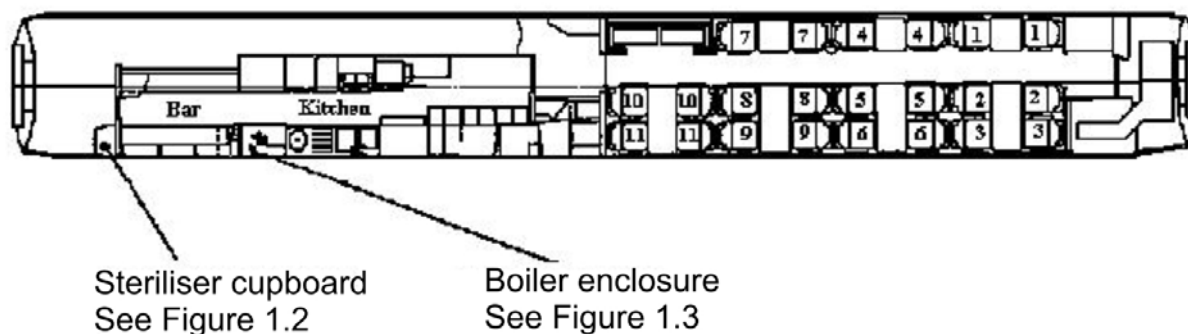



Figure 1.1: Location Of Drain Cocks On RFM

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Kitchen Water Tank and Boiler – Drain

ZY 0150

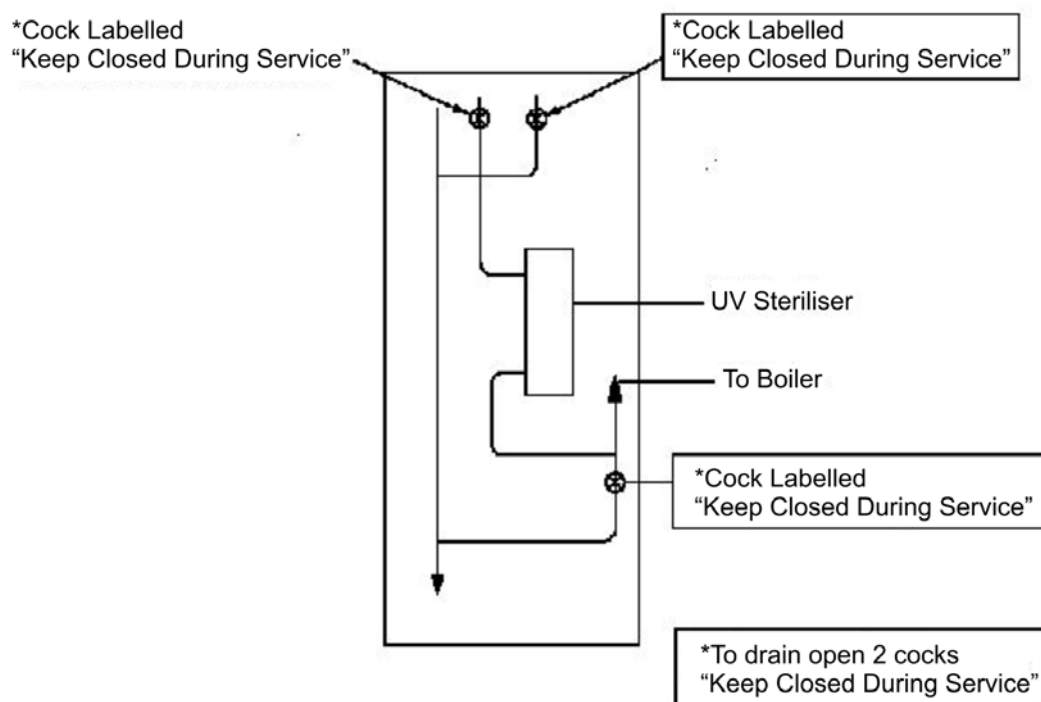


Figure 1.2: Location Of Drain Cocks In UV Steriliser Cupboard

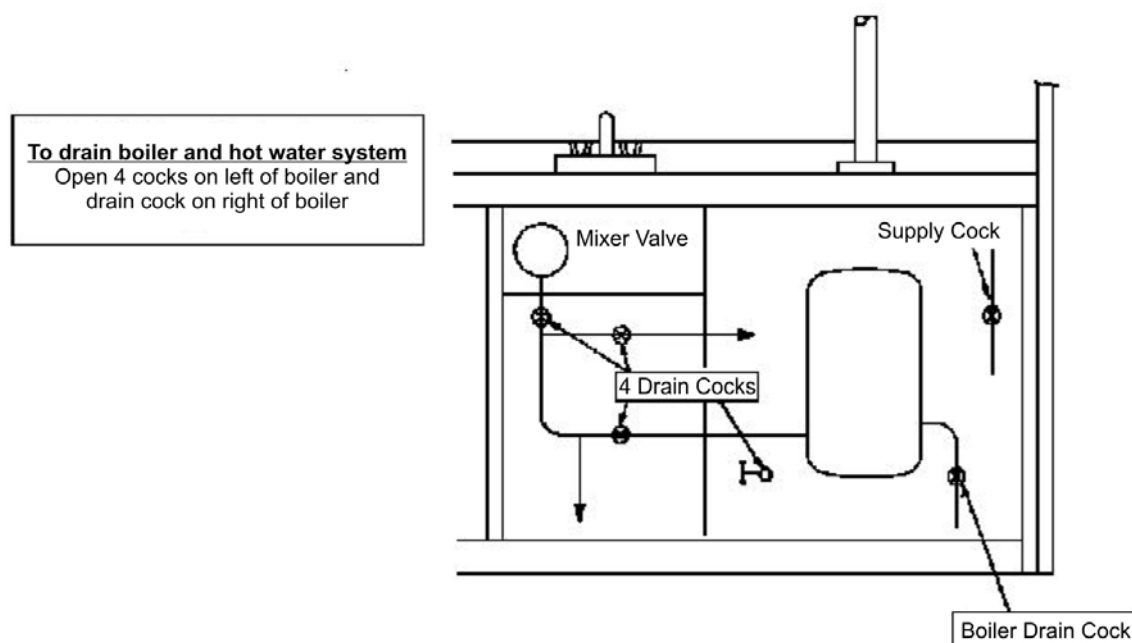



Figure 1.3: Location Of Drain Cocks In Boiler Enclosure

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Kitchen Water Tank and Boiler – Drain

ZY 0150

Part 2 - HST Caterers

Scheduled Work

1. Drain the catering water tanks and boiler - see Figures 2.1 – 2.3 for TBRF, TRFB and TCC.

For TSB proceed as follows:

- Remove the litter bin stainless steel panel below the sink by removing 6 x M5 screws.
 - Open the roof water tank drain valve. Ensure that the Boiler water supply isolating valve is open (see Figure 2.4).
2. When water flows have stopped, close the cocks and refit or close the access panels.
 3. Place a notice "Water tanks and boiler drained" (see Materials item 1) in a prominent position in the kitchen.

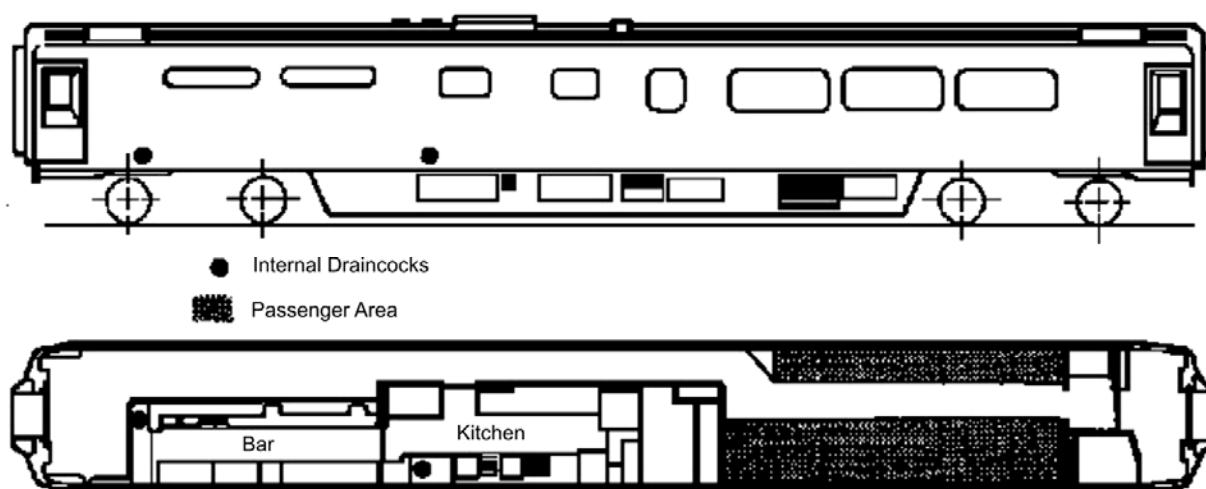



Figure 2.1: Location of Catering Water Drain Cocks TRFB

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Kitchen Water Tank and Boiler – Drain

ZY 0150

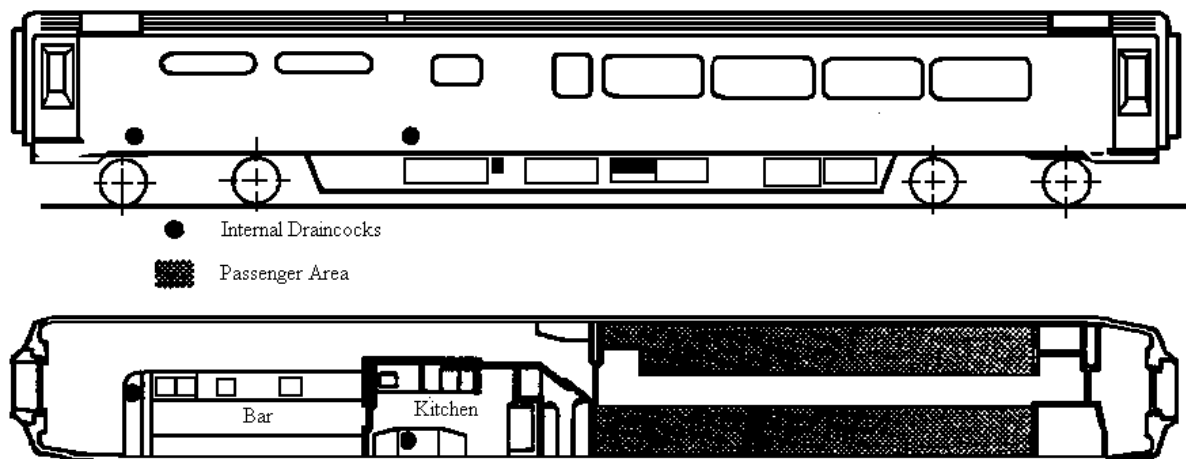


Figure 2.2: Location Of Catering Water Drain Cocks TBRF

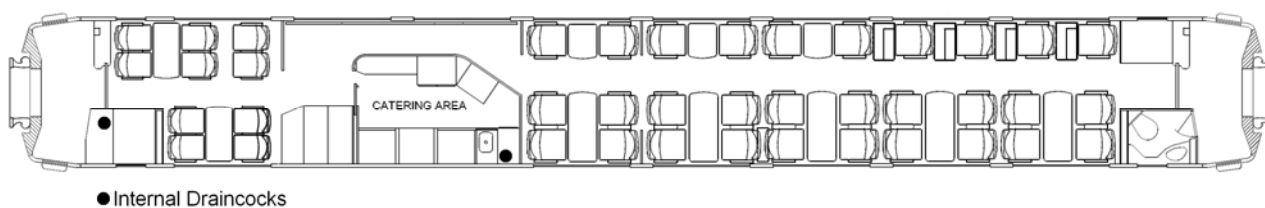



Figure 2.3: Location Of Catering Water Drain Cocks TCC



Figure 2.4: TSB Roof Tank Drain and Water Supply Isolating Valves

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Kitchen Water Tank and Boiler – Drain

ZY 0150

Part 3 – LHCS (TSOB) Caterer

Scheduled Work

1. Open access panels below the sink.
2. Referencing Figure 3.1, operate the cocks/valves as follows:
 - 2.1 Close the cock located in pipework upstream from the water pump (identified as 'A' on Figure 3.1).
 - 2.2 Open the three way valve (identified as 'B' on Figure 3.1) to drain the water tanks.
 - 2.3 Open the drain cock at the bottom of the hot water boiler (identified as 'C' on Figure 3.1).
3. When water flows have stopped, carry out the following:
 - 3.1 Open cock 'A'.
 - 3.2 Return the three way valve 'B' to in service position.
 - 3.3 Close cock 'C'.
4. Close the access panels.
5. Place a notice 'Water tanks and boiler drained' (see Materials item 1) in a prominent position in the kitchen.

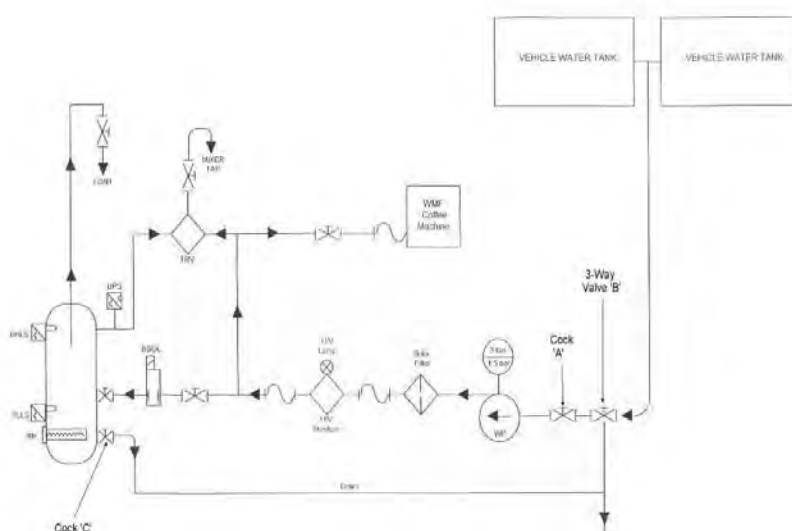



Figure 3.1: Location of Drain Cocks on TSOB

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Heating, Doors and Windows – Check

ZY 0151

APPLIES TO: All Vehicles

NOTE: Certain LHCS vehicles are fitted with an Energy Saving Modification. On these vehicles, the vehicle lights must be switched on to allow the heating to operate unless the ambient temperature is below 5 degrees.


Scheduled Work

1. Close all droplights, internal doors, bodyside doors and gangway doors at ends of rake.
2. If available connect and switch on the train supply.
3. In each vehicle place the auxiliary switch to AUX and AIR COND.
4. Check that heated air is coming from the floor level ducts. These are generally below the centre of each window, except those in the centre of day cars.
5. Turn the auxiliary switch to off.

Arising Work

1. If the droplight will not stay closed, see Job No. CMA0105.
4. Check that neon lights are lit in the vestibule. If not lit, investigate electrical supply. If lit, check air conditioning unit (underskirt access doors K and L). Press heating test button. If no indication, carry out Job No. HC 0814*. If test light illuminates, check thermostat. If unable to rectify fault within 2 hours, carry out Job Nos. ZY 0116 and ZY 0150 if catering.

*See Vehicle Maintenance Instructions

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Brake Rigging - De-Icing Fluid – Apply


ZY 0152

Materials			
Item	Description	Qty/Veh	Cat No.
1	Kilfrost ABC-3	25litre	007/025008
2	GPS GLORIA 142T De-icing Fluid Dispenser with Standard Lance	10 litre	011/082082

APPLIES TO: All Vehicles

Scheduled Work


1. Apply Kilfrost ABC-3 (see Materials item 1) to caliper assembly pivots using GSP GLORIA 142T 10 litre de-icing fluid dispenser (see Materials item 2).
2. Remove ice and/or snow from the following:
 - CLC and RCH jumpers
 - Train supply and 36 way jumpers
 - WSP EP valves
 - Recesses for distributor release rod and isolating cocks.
3. Arrange to have the brakes applied from a speed of at least 15mph to remove any Kilfrost from the brake pads.

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5. TECHNICAL DATA AND RECORDING FORMS

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- 5.3 Air Conditioning Modules.
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- 5.5 Lubricants and Cleaning Agents.
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- 5.7 Procedures requiring approval of the Engineer.
- 5.8 Brake Test Recording Forms.
 - Job BZ 3001 Air and Brake System (Part 1) Test
 - Job BZ 3002 Air and Brake System (Part 2) Test
 - Job BZ 3110 Guards Application Valve Test
 - Job BH 0305 Hydraulic parking Brake Test
 - Job BV 0137 Brake Pipe Limiting Valve Test
 - Job BD 0100 Distributor Insensitivity
 - Job BE 0111 Passenger Communication Full Test
 - Job BV 3110 Guards Application Valve Test
 - Job BV 3111 Schrader Test Connections
 - Job BV 5320 Air Coupling Cocks and Hoses
- 5.9 Table of Vehicle Fitments
- 5.10 Asbestos Data Sheets

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5.1 Electrical Items

5.1.1 Electrical Machines

Minimum Lengths of Brushes

Item	Vehicles	Length	Job No.
Vent Fan Motor	Mark 3A, HST	17 mm	HA 0109
Motor Alternator Set	All except HST	32 mm	MO 4020

5.1.2 Electrical Wiring


Minimum Insulation Values	Value	Job No.
Train Supply Main Circuits to Frame Ø	5MΩ	EW 5004
Train Supply Main to Interlock Circuits Ø	10MΩ	EW 5004
415 volt circuits to Frame Ø	5MΩ	EW 5004
110 volt circuits to Frame *	2MΩ	EW 5004

Ø Use 1000 volt Megger

* Use 500 volt Megger

5.1.3 Earth Bonds - Maximum Resistances

Location	Max Value	Job No.
13A Socket fixing screw and vehicle earth stud	60mΩ	UE 5001
Bogie frame and each wheelset	1.0mΩ	UE 5001
Frame and any equipment box moved during repair	10mΩ	UE 5001

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5.2 Vehicle Bodies

Item	Value (Mm)	Job No.
Gangway treadplates above rail	1289-1308	US 6004
Height of buffer centre line above rail	1048-1067	
Height of coupler centre line above rail	991-1003	
Gap between gangway interior panel and cover strip	1.5 to 2.5	CV 0102

See Page 4 for Table of External Door dimensions and gauges


Drawgear Gauges

Item	Min. Dia.	Gauge No.	Job No.
Coupler pivot pin	40.5mm		UC 0124
Drawbar pivot pin	40mm		UC 0135
End stop	Min width 78.5mm		UC 0670
Drawgear rubber spring	Min thickness 32.5mm		UC 4038
Coupler support pin	43mm		UC 6082
Centre pin	24.8mm		UC 6084

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External Door Dimensions and Gauges

Job No.	Fig No.	Item	Gauge Cat No.	Dimensions
Ref Only		Double acting lock bolt projection when extended	039/028097 039/028098	21.5mm to 23.5mm
		Lock bolt projection when propped	039/028097 039/028098	8 to 12mm
		Lock ram projection	039/028097 039/028098	5 to 7mm
OL 0140 OL 0141		Door handle distortion and wear	800/626901 800/626902	12°
OL 0141	2	Free play in handle.	800/543706	
OL 0140 OL 0141 OO 6110		Overlap between lock bolt and striking plate	800/640203 or 039/028097	6mm to 7mm
OL 6202	1	Projection of striking plate cam	800/640203 or 039/028097	18mm
OP 0109 OL 0140		Clearance between top edge of door and headrail		1mm C4 1-2mm C4X/C4E
OP 0109		Clearance between lock edge of door and lock stand pillar		1mm C4
OP 0118 OL 0140		Clearance between lock edge of door and lock stand pillar		2-3mm C4X/C4E except in lock/ striking plate area which can be 1mm
OP 0118 OL 0140		Variation between body and door profile		5mm
OL 0140 OL 0141	2	Lock bolt spring force min force to start Max force to complete	039/073009	11.0 kgf 21.8 kgf
OP 0118 OP 0109		Clearance door limit control bracket and step board		1mm

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5.3 Air Conditioning Modules


Vehicles Fitted	Cat No.	Manufacturer	Specific Type	Old BR Cat No.	Serial Numbers
HST (except Cross Country and East Coast)	064/002776	Stones	UP31	064/001464	CDD5600-CDD5788 CDD5901-CDD6028
		Temperature	AC414000	064/001930	98133-98299
		Temperature	AC417101	No Change	11646-116543 121675-121680 125838-125964 139153-139180 147982-147993 182014-182055
Cross Country HST		Wabtec Vapor Stone			
East Coast HST		Knorr Bremse			
Mark 3A and RFM	064/001460	Stones	UP30	No Change	CDD5180 CDD5340-CDD5489 CDD5540-CDD5552 CDD6029-CDD6056
		Stones	UP39	064/004530	*
		Temperature	AC413650	064/001459	88109-88194
		Temperature	AC417000	064/002814	121670-121674
Mark 3A, Mark 3B and RFM	064/004015	Stones	UP33	No Change	CDD2139-CDD2158 CDD2179-CDD2199 101-116

* The serial numbers of these modules are not known at present.


Interchangeability

The only interchangeability permitted is that a Stones UP33 may be fitted to a Mark 3A or RFM.

However, as there is a limited number of UP33 modules this cannot be done on a large scale.

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5.4 No Longer Used

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5.5 Lubricants and Cleaning Agents

Lubricants


Job No.	Description	Catalogue No.
BDA3512	Grease Molykote 33 Renolit SI 300 M Ironsides 'A' Blend	027/002195 - 027/004331
BD 3516	Grease 150kg container 3kg barrel 12.5kg barrel 50kg barrel 180kg barrel 400g cartridge	027/001351 027/001353 027/001354 027/001356 027/001357 027/001358
BH 0119	Shell Tellus T15 Oil	027/013279
BH 0305		
BH 0310		
BH 0316		
CM 6615	Adsil	027/001905
	Grease 150kg container 3kg barrel 12.5kg barrel 50kg barrel 180kg barrel 400g cartridge	027/001351 027/001353 027/001354 027/001356 027/001357 027/001358
CVA0117	Graphite Grease	-
HA 0109	Castrol ICEMATIC SW68	027/025022 or 13
	ICI EMKARATE RK68S	027/017019
HM 0112	Grease 150kg container 3kg barrel 12.5kg barrel 50kg barrel 180kg barrel 400g cartridge	027/001351 027/001353 027/001354 027/001356 027/001357 027/001358
OJ 6105	Lithium base No. 2 Molybdenum Di-sulphide grease	027/004150
OK 5000	Molykote 33 Grease	027/002195
OL 0112	Multigrade SAE 40 Oil (BR Spec 668)	027/020264
OL 0137	Silicon Grease	027/001015
OP 0118	Oil	027/023052
	Grease 150kg container 3kg barrel 12.5kg barrel 50kg barrel 180kg barrel 400g cartridge	027/001351 027/001353 027/001354 027/001356 027/001357 027/001358
OP 0120	Oil	027/023052

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	Grease	150kg container 3kg barrel 12.5kg barrel 50kg barrel 180kg barrel 400g cartridge	027/001351 027/001353 027/001354 027/001356 027/001357 027/001358
UB 6022	Grease	150kg container 3kg barrel 12.5kg barrel 50kg barrel 180kg barrel 400g cartridge	027/001351 027/001353 027/001354 027/001356 027/001357 027/001358
UB 6025	Grease	150kg container 3kg barrel 12.5kg barrel 50kg barrel 180kg barrel 400g cartridge	027/001351 027/001353 027/001354 027/001356 027/001357 027/001358
UC 6082	Multigrade SAE 40 Oil (BR Spec 668)		027/020264
UMA6037	Corrosion Inhibitor BR Spec 62 Item 22		-

Cleaning Agents

Job No.	Description	Catalogue No.
AF 0102	Emulsol	-
HM 0112	SDC Fluid	-
MO 4020	Electro Quick Clean	007/007186
OK 5000	Kaba Lock Cleaner 8040	027/001053
UU 0137	'Genklene'	007/021069

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5.6 Wheel Wear Modification Details

5.6.1 Bogie Modification

All BT10 bogies must include a packer under each swing link head as per modification UFMT 1001 (see Figure 1).

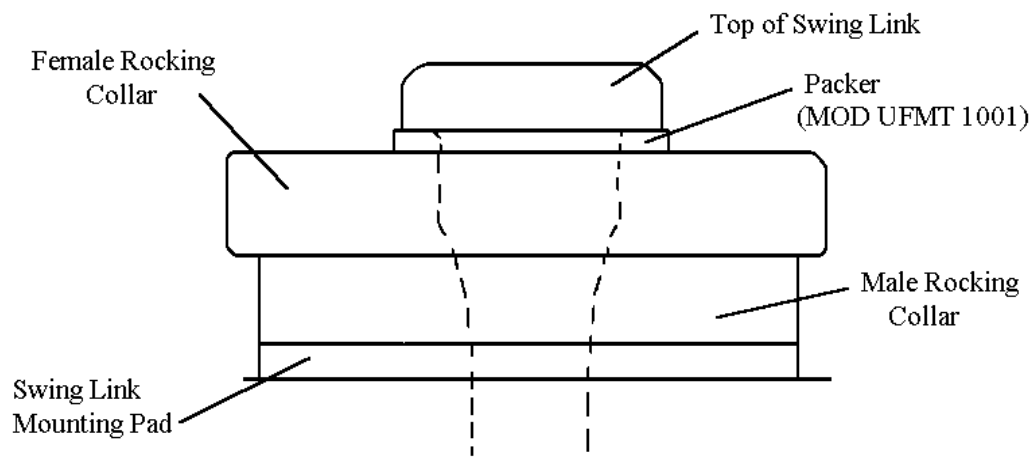


Figure 1: View Showing Top of Swing Link

5.6.2 Body Modifications

All vehicles must have had alterations made to the jacking points and vehicle height packings as per modifications UUM TCS 03 (HST stock) and UUM LHC 04 (LHCS). See Figures 2 and 3. Refer to drawings A1-A1-8504514 A and B1-A0-9013633 M for details.

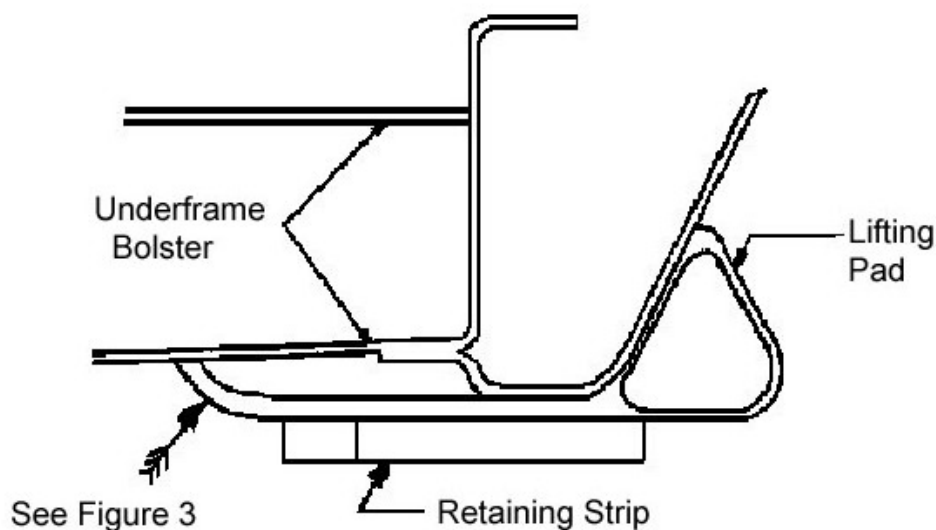



Figure 2: Cross Section of Solebar at Lifting Pad

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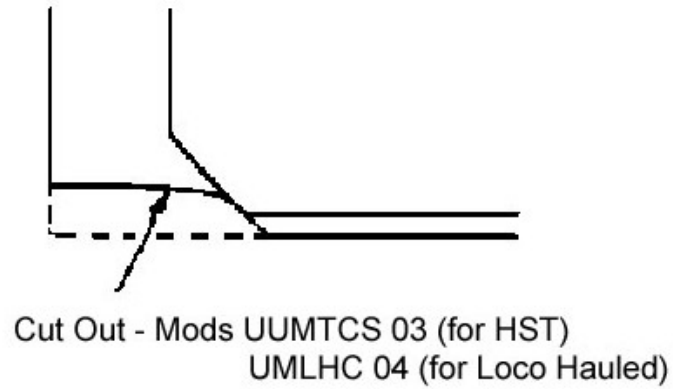




Figure 3: View on Lifting Pad in Direction of Arrow A

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5.7 Procedures Requiring the Approval of the Engineer

In the following areas of work the Contractor is required to propose their own procedure in order to achieve the required performance of the overhauled items. In each case the content of the proposed procedure must be approved by the Engineer before the procedure can be used.

Job No.	Procedure
BH 0119	Parking brake control unit overhaul procedure
BV 0129	Brake pipe limiting valve overhaul procedure
C* 6015	Vehicle bodyside, ends roof and skirt painting procedure
CA 0632	2-pack painting procedure
CA 6001	Damaged or corroded panels or frames or cracked welds repair procedure. Corrosion protection procedure for body structure
CR 6002	Procedure for the removal of redundant antennae, attendant wiring , and sealing of roof apertures
CR 6004	Procedure for renewing guttering
CS 0101	Procedure for repairing defective footsteps
CV 0103	MPI technique for crack detection on faceplates. Faceplate weld repairs, unless covered by PB/TP1139
CWA0119	Repairs to bodyside panelling and structure
EB 0006	Weld repairs to battery modules.
EP 5220	TSD vehicles call for aid system test procedure
EU 0592	Overhaul of HST catering convertors
FTA0100	Repairs to floors
IE 6177	Refinishing of GRP panels
KI 0110	Alternative Kitchen Sealants
MO 5022	Motor alternator and control unit
OI 0105	Door leaf repair procedure
OI 0625	Structural repairs to gangway end doors
OK 0133	CDL air supply module overhaul procedure, unless renewed
OK 0148	Striker plate security check (if door is removed)
OK 5001	CDL full test procedure (if tested as a full rake)
OP 0116	External door crack repair procedure
OP 0118	Corner door repair
U* 0105	Underframe mounted equipment suspension arrangement repair procedure
UB 6025	Repairs to buffer rods
UC 6081	Reclamation of drawgear followers
UC 9026	Alliance coupler overhaul procedure, if not using IB/CI0480
UMA6037	Repairs to bolster bottom plates
UM 6106	Reclamation procedure for one piece side bearer blocks

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UU 0161	Repair procedure for lifting loop strengthening plates, coach floor plates and solebars
UU 3020	Underframe cleaning method. Repairs to headstock and underframe end structure

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5.8 Brake Test Forms

VEH. No:	DATE:	DEPOT/WORKS:
MASTER GAUGE:		
SERIAL Nos:		SIGNATURE:
Master Gauges 1) 2) 3)		
4) 5)		
Distributor Type: Davies and Metcalfe/Westinghouse	PAD TYPE:	

Job No. BZ 3001 - Air and Brake System (Part 1) Test

ITEM

8 Air Suspension Charging Valve/Average Valve Check


- | | | |
|--|--|----------|
| | 8.2 MRP at 5.80 to 6.30 bar. Air escapes from air suspension reservoir drain. | YES/NO |
| | 8.3 MRP has fallen to 5.0 bar. No air escapes from air suspension reservoir drain. | YES/NO |
| | 8.6 Air suspension test point pressure | _____bar |

9 Main Reservoir Leakage Test

- | | | |
|-----|-------------------------------------|----------|
| 9.1 | Main Reservoir Pipe first pressure | _____bar |
| 9.2 | Main Reservoir Pipe second pressure | _____bar |
| | Leakage | _____bar |
| 9.3 | Auxiliary Reservoir pressure | _____bar |
| 9.4 | Air Brake Pipe pressure | _____bar |

10. Air Brake Pipe Leakage Test

- | | | |
|------|-----------------------------------|----------|
| 10.2 | Air Brake Pipe first pressure | _____bar |
| 10.3 | Air Brake Pipe second pressure | _____bar |
| | Leakage | _____bar |
| | Fitted with BPLV with bleed choke | YES/NO |
| 10.4 | Main Reservoir Pipe pressure | _____bar |

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5.8 Brake Test Form

Job No. BZ 3001 - Air and Brake System (Part 1) Test (Cont'd)

11. Auxiliary Reservoir and Brake Cylinder Leakage Test

11.1 Auxiliary Reservoir (Emergency) first pressure _____ bar

11.2 Auxiliary Reservoir second pressure _____ bar

Leakage _____ bar

12. Control Reservoir Releasing, Charging/Single Pipe Test

12.2 Brake Cylinder falls to zero YES/NO


12.5 Brake Cylinder (Full Service) (LHCS only) _____ bar

13. Control Reservoir Leakage Test

13.2 Brake Cylinder first pressure _____ bar

13.3 Brake Cylinder second pressure _____ bar

Leakage _____ bar

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5.8 Brake Test Form

Job No. BZ 3002 - Air and Brake System (Part 2) Test

2. Air Suspension Leakage Checks

- 2.1 Main reservoir pipe first pressure _____ bar
- 2.2 Main reservoir pipe second pressure _____ bar
- 2.3 Leakage _____ bar
- 2.4 Air suspension test point pressure _____ bar

3. Brake Cylinder Pressure (Tare)

- 3.1 Brake Cylinder Pressure, Full Service (Tare) _____ bar

4. Brake Application Time and Emergency BCP (Tare)

- 4.1 Brake Application Time (Tare) _____ secs
- 4.2 Brake Cylinder Pressure, Emergency (Tare) _____ bar

5. Brake Release Time (Tare)

- 5.2 Brake Release Time (Tare) _____ secs

6. Brake Application in Initial

- 6.1 Air Brake Pipe pressure in Initial _____ bar
- 6.2 Brake Application in Initial Brake Cylinder Pressure _____ bar

Brake Application in Initial, Pads still on Discs

Wheel 1 Y / N Wheel 2 Y / N Wheel 3 Y / N Wheel 4 Y / N


Wheel 8 Y / N Wheel 7 Y / N Wheel 6 Y / N Wheel 5 Y / N

- 6.3 Air Brake Pipe pressure after 3 minutes in Initial __bar

Air Brake Pipe pressure loss _____ bar

- 6.4 Brake Cylinder Pressure after 3 minutes in Initial __bar

Brake Cylinder pressure loss _____ bar

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5.8 Brake Test Form

Job No BZ 3002 - Air and Brake System (Part 2) Test (Cont'd)

ITEM

6.4 Brake Application in Initial, Pads still on Discs

Wheel 1 Y / N Wheel 2 Y / N Wheel 3 Y / N Wheel 4 Y / N

Wheel 8 Y / N Wheel 7 Y / N Wheel 6 Y / N Wheel 5 Y / N

7. Proportionality Test (See Tables 3 and 4 in the job for limits)

LHCS that are operated with a Mk3 DVT

7.1 Air Brake Pipe 4.95 - 5.05 Brake Cylinder Pressure _____ bar
 Air Brake Pipe 4.05 - 4.15 Brake Cylinder Pressure _____ bar
 Air Brake Pipe 3.20 - 3.50 Brake Cylinder Pressure _____ bar
 Air Brake Pipe 4.05 - 4.15 Brake Cylinder Pressure _____ bar
 Air Brake Pipe 4.95 - 5.05 Brake Cylinder Pressure _____ bar

LHCS that are not operated with a Mk3 DVT

7.1 Air Brake Pipe 4.95 - 5.05 Brake Cylinder Pressure _____ bar
 Air Brake Pipe 3.95 - 4.05 Brake Cylinder Pressure _____ bar
 Air Brake Pipe 3.20 - 3.50 Brake Cylinder Pressure _____ bar
 Air Brake Pipe 3.95 - 4.05 Brake Cylinder Pressure _____ bar
 Air Brake Pipe 4.95 - 5.05 Brake Cylinder Pressure _____ bar


HST

7.1 Air Brake Pipe 5.05 - 5.15 Brake Cylinder Pressure _____ bar
 Air Brake Pipe 4.05 - 4.15 Brake Cylinder Pressure _____ bar
 Air Brake Pipe 3.20 - 3.50 Brake Cylinder Pressure _____ bar
 Air Brake Pipe 4.05 - 4.15 Brake Cylinder Pressure _____ bar
 Air Brake Pipe 5.05 - 5.15 Brake Cylinder Pressure _____ bar

7.2 Brake Pads fully released

Wheel 1 Y / N Wheel 2 Y / N Wheel 3 Y / N Wheel 4 Y / N

Wheel 8 Y / N Wheel 7 Y / N Wheel 6 Y / N Wheel 5 Y / N

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8. Brake Application Time and Emergency BCP (Laden)

8.2 Brake Application Time (Laden) _____secs

8.3 Brake Cylinder Pressure, Emergency (Laden) _____bar

9. Brake Release Time (Laden)


9.2 Brake Release Time (Laden) _____secs

10. Distributor Dump Valve Test

10.3 Brake Cylinder Pressure _____bar

10.4 Brake Cylinder Pressure at INITIAL _____bar

10.5 Brake Cylinder Pressure at INITIAL
After 30 secs at RUNNING _____bar

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5.8 Brake Test Form

Job No. BV 3110 Guards Application Valve, Test (BFO only)


ITEM

- 2 Air Brake Pipe Pressure, Valve closed _____ bar
3 Air Brake Pipe Pressure, Valve open _____ bar

Job No. BH 0305 Hydraulic Parking Brake - Test (BFO only)

ITEM

- 2 Guard's compartment and control unit indicators show OFF Y / N
4 Brake unit indicator moves almost immediately to NEUTRAL Y / N
5 Pump strokes to apply _____ strokes
6 Pads applied
Wheel 1 Y / N Wheel 2 Y / N Wheel 3 Y / N Wheel 4 Y / N
Wheel 8 Y / N Wheel 7 Y / N Wheel 6 Y / N Wheel 5 Y / N
7 Hydraulic fluid is above the **MIN** mark Y / N
8 Hydraulic release pressure is set to 75 - 85 Bar Y / N
8 Pump motor continues to run for approximately 25 – 35 seconds after button is released Y / N
9 Guard's compartment and control unit indicators show OFF Y / N
10 Guard's compartment and control unit indicators change to ON within 10 seconds Y / N
10 Maximum hydraulic application pressure with the pump _____ bar on the parking brake control unit running continuously
11 Brake unit indicator moves almost immediately to NEUTRAL Y / N
12 Pump strokes to release _____ strokes
13 Pads released
Wheel 1 Y / N Wheel 2 Y / N Wheel 3 Y / N Wheel 4 Y / N
Wheel 8 Y / N Wheel 7 Y / N Wheel 6 Y / N Wheel 5 Y / N
15.3 Brake pipe pressure _____ bar
15.4 Brake pipe pressure _____ bar

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16.2 Air escapes from the slackened air connections with driver's automatic air brake valve handle on the test trolley to the Emergency position


Bogie 1 Y / N Bogie 2 Y / N

16.4 Air ceases to escape from the slackened air connections with parking brake applied

Bogie 1 Y / N Bogie 2 Y / N

16.5 Air escapes from the slackened air connections with parking brake released

Bogie 1 Y / N Bogie 2 Y / N

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5.8 Brake Test Form

NOTE: Some vehicles have had the original Brake Pipe Limit Valve and Check Valve removed and have been modified by fitting a SMC ARP40K-F04-3 Brake Pipe Limit Valve.

Job No. BV 0137 Brake Pipe Limiting Valve

(Where fitted, see Job No. BD 0100 if not fitted)


Part 1 - Original BPLV and Check Valve Arrangement

ITEM

3. Air discharge from porous matrix Y / N
4. Brake pipe overcharge pressure _____bar
5. BPLV test gauge _____bar _____bar _____bar
6. Brake pipe pressure _____bar
8. Air exhausted Y / N
9. No leaks Y / N
10. Pads applied at initial

Wheel 1 Y / N Wheel 2 Y / N Wheel 3 Y / N Wheel 4 Y / N
 Wheel 8 Y / N Wheel 7 Y / N Wheel 6 Y / N Wheel 5 Y / N
13. Pads released

Wheel 1 Y / N Wheel 2 Y / N Wheel 3 Y / N Wheel 4 Y / N
 Wheel 8 Y / N Wheel 7 Y / N Wheel 6 Y / N Wheel 5 Y / N
14. Brake pipe pressure _____bar


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5.8 Brake Test Form

Part 2 – Modified BPLV Arrangement

ITEM

- | | | |
|-----|---|----------|
| 4. | Brake Pipe Pressure | _____bar |
| 4. | No leaks from BPLV assembly | Y / N |
| 6. | Brake Pipe Pressure | _____bar |
| 7. | Test Gauge Pressure after Regulating Valve adjustment | _____bar |
| 7. | No leaks from BPLV assembly | Y / N |
| 8. | Brake Pipe Pressure | _____bar |
| 8. | Brake Cylinder Pressure | _____bar |
| 9. | Brake Pipe Pressure | _____bar |
| 9. | Test Gauge Pressure with Brake Pipe Pressure at 4.90 – 5.10 bar | _____bar |
| 9. | Brake Cylinder Pressure | _____bar |
| 10. | Brake Pipe Pressure | _____bar |
| 10. | Test Gauge Pressure with Brake Pipe Pressure at 5.35 – 5.50 bar | _____bar |
| 12. | Brake Pipe Pressure | _____bar |
| 12. | Brake Cylinder Pressure | _____bar |
| 13. | Brake Pipe Pressure | _____bar |
| 13. | Test Gauge Pressure with Brake Pipe Pressure at 4.90 – 5.10 bar | _____bar |
| 15. | Brake Pipe Pressure | _____bar |
| 15. | Check no leaks from Test Point Connection | Y / N |
| 16. | White Paint applied to pipework | Y / N |

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5.8 Brake Test Form

Job No. BD 0100 Distributor Insensitivity - Test
(to be carried out if Job No. BV 0137 not done)

ITEM

1. Air Brake Pipe Overcharge Pressure _____ bar
3. Final Brake Cylinder Pressure _____ bar

Job No BE 0111 Passenger Communication System - Full Test

ITEM

2. Brake Pipe Pressure after operation of valve.

Saloon Vehicles

Toilet	Saloon				Toilet


Catering Vehicles

Toilet RFM/TSOB only	Saloon		Kitchen (HST only) or Corridor		

Job No. BV 3111 Schrader Test Connections

Part 2

- Item 3 All Schrader test connections air tight YES / NO
- Item 4 All pressures vented and distributor release
handle operated YES / NO

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5.8 Brake Test Form

Job No. BV 5320 Air Coupling Cocks and Hoses Test

ITEM

5. Main Reservoir Cocks

5.2	Coupling Heads Airtight	YES / NO
5.3	Main Reservoir Pipe Cock(s) Vent Holes, Remote End	YES / NO
5.4	Coupling Head Star Valve(s) Airtight	YES / NO
5.5	Coupling Cock(s) Airtight	YES / NO
5.7	Main Reservoir Pipe Cock Vents Hose, Trolley End	YES / NO
5.8	Coupling Head Star Valve Airtight	YES / NO
5.9	Coupling Cock Airtight	YES / NO

ON HST Vehicles only


5.10	Coupling Heads Airtight	YES / NO
5.12	Main Reservoir Pipe Cock Vents Hose, Trolley End	YES / NO
5.13	Coupling Head Star Valve Airtight	YES / NO
5.14	Coupling Cock Airtight	YES / NO

6. Brake Pipe Cocks

6.1	Coupling Heads Airtight	YES / NO
6.2	Coupling Heads Airtight	YES / NO
6.3	Air Brake Pipe Cock(s) Vent Hose, Remote End	YES / NO
6.4	Coupling Cock(s) Airtight	YES / NO
6.6	Air Brake Pipe Cock Vents Hose, Trolley End	YES / NO
6.7	Coupling Cock Airtight	YES / NO

On HST Vehicles only

6.8	Coupling Heads Airtight	YES / NO
6.10	Air Brake Pipe Cock Vents Hose, Trolley End	YES / NO
6.11	Coupling Cock Airtight	YES / NO

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5.9 Table of Vehicle Fitments

See Section 2 for overview of vehicle types.

WSP Type code:

G = Girling, suffix * = coach powered, Ø = system energised from Train Wire 12. No suffix indicates Girling self-powered system.

B = BR Mk2

W = Westinghouse/Knorr-Bremse. Note that there are differences between these vehicle installations.

Air Con module:

V = Wabtec upgraded module

V* = Wabtec upgraded module with 26kw capacity (fitted to XCT vehicles)

S = SCRS (Sea Containers Refrigeration Systems) upgraded module

Blank = non upgraded module

NOTE 1: East Coast vehicles will start to be fitted with Knorr Bremse modules from 2013.

Thermostat:

E= Fitted with "Tactical" electronic vehicle thermostat

X = Fitted with "Xcel" electronic vehicle thermostat

Battery module:

FT = Fixed Tray

FTNLS = Fixed Tray No lead Screw

ST = Sliding Tray

PA systems:

R = Ripper (as-built system)

D = DAC/Gaitronics

J = Joyce Loebel

Toilets:

The following codes indicate differing types of disabled toilets:

BRB = British Rail-design disabled toilet. BRB-MML indicates a BRB-type toilet where the adjacent two-part sliding door has been replaced by a single-leaf door – see Job OJ6102.

BFG = BFG toilet

D = Driessen toilet

T = Temoinsa toilet


Other Toilet codes:

FGW1T – First Great Western vehicle which now only has one toilet (the other being a trolley store)

FGW0T – First Great Western vehicle which now has no toilets (the previous toilet is now a trolley store)

XCT1T – Cross Country Trains vehicle with only one toilet

EC1T – East Coast vehicle (HST, TFE) with only one toilet at No1 end.

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If no code is shown then:

TSOB, TCC and TSB vehicles – have one standard toilet at the opposite end to the catering unit.

RFM's – have one staff only toilet

HST catering vehicles except TSB and TCC – have no toilets

HST TGS, TFE – one toilet

HST TS, TF – two toilets

Mark 3 TSO, TF – two toilets

Mark 3 BFO – one toilet

Décor:

Blank = legacy décor systems, seek advice if needed.

EC = East Coast Main Line vehicles post CSO upgrade at Wabtec, Doncaster in 2006-2009.

EC64 = EMT vehicles transferred to East Coast and internally modified.

EMT = East Midlands Trains HST vehicles refurbished at Neville Hill from 2009 onwards.

FGW = First Great Western post CSO (Continued Service Operation) upgrade. HST vehicles done out at Bombardier Litchurch Lane in 2006-2008 (Brush-Barclay Kilmarnock 2009 in the case of 408xx vehicles and 41153, 41176, 42101, 42102, 42294, 42381, 42382, 42383, 44083 plus 42147, subsequently converted to 40116). Also 41153 converted to 42385 at Kilmarnock 2012.

LHCS (Sleeper Support) vehicles done at Railcare Wolverton in 2007-2008.

LER = Vehicles refurbished for London Eastern Railways (later "National Express East Anglia" and now "Abellio Greater Anglia") in 2005 and 2006. RFM's done by Wabtec, Doncaster, all others by Bombardier Litchurch Lane.

WB64 = Vehicles in set WB64 refurbished by Virgin West Coast by Wabtec Doncaster in 2009.

XCT = Vehicles refurbished by Cross Country Trains at Wabtec Doncaster in 2008.

Brake type:

D&M = Davis & Metcalfe

W = Westinghouse

Brake module:

BM = Job to be performed on vehicles fitted with a "Brake Module"

NBM = Job to be performed on vehicles without a "Brake Module"

Vehicle No.	Type	WSP Type	Air Con module	Air Electronic Thermostat	Battery Module	PA Systems	Disabled Toilet	Décor	Brake Type	Brake Module
10200	RFM	G	V	E	FT	R		LER	D&M	NBM
10203	RFM	G	V	E	FT	R		LER	D&M	NBM
10206	RFM	G		E	FT	D			D&M	NBM
10212	RFM	G	V	E	FT	D		WB64	D&M	NBM
10214	RFM	G	V	E	FT	R		LER	D&M	NBM
10216	RFM	G	V	E	FT	R		LER	D&M	NBM
10217	RFM	G	V	E	FT	D		WB64	D&M	NBM
10219	RFM	G		E	FT	D		FGW	D&M	NBM



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10223	RFM	G	V	E	FT	R		LER	D&M	NBM
10225	RFM	G		E	FT	D		FGW	D&M	NBM
10228	RFM	G	V	E	FT	R		LER	D&M	NBM
10229	RFM	G	V	E	FT	D		LER	D&M	NBM
10232	RFM	G*		E	ST	D		FGW	D&M	NBM
10240	RFM	G*		E	ST	D			D&M	NBM
10241	RFM	G	V	E	ST	R		LER	D&M	NBM
10247	RFM	G	V	E	ST	R		LER	D&M	NBM
10253	RFM	G*		E	ST	D			D&M	NBM
10401 (12168)	TSOB	W	V	E	FT	D		LER	D&M	BM
10402 (12010)	TSOB	W	V	E	FT	D		LER	D&M	BM
10403 (12135)	TSOB	W	V	E	FT	D		LER	D&M	BM
10404 (12068)	TSOB	W	V	E	FT	D		LER	D&M	BM
10405 (12157)	TSOB	W	V	E	FT	D		LER	D&M	BM
10406 (12020)	TSOB	W	V	E	FT	D		LER	D&M	BM
11007	FO	G	V	E	FT	D		WB64	D&M	BM
11018	FO	G	V	E	FT	D		WB64	D&M	BM
11021	FO	G		E	FT	D			D&M	BM
11026	FO	G		E	FT	D			D&M	BM
11048	FO	G	V	E	FT	D		WB64	D&M	BM
11066	FO	W	V	E	ST	D		LER	D&M	BM
11067	FO	W	V	E	ST	D		LER	D&M	BM
11068	FO	W	V	E	ST	D		LER	D&M	BM
11069	FO	W	V	E	ST	D		LER	D&M	BM
11070	FO	W	V	E	ST	D		LER	D&M	BM
11072	FO	W	V	E	ST	D		LER	D&M	BM
11073	FO	W	V	E	ST	D		LER	D&M	BM
11074	FO	B		E	ST	D			D&M	BM
11075	FO	W	V	E	ST	D		LER	D&M	BM
11076	FO	W	V	E	ST	D		LER	D&M	BM
11077	FO	W	V	E	ST	D		LER	D&M	BM
11078	FOD	W	V	E	ST	D	D	LER	D&M	BM
11080	FO	W	V	E	ST	D		LER	D&M	BM
11081	FO	W	V	E	ST	D		LER	D&M	BM
11082	FO	W	V	E	ST	D		LER	D&M	BM



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11085	FOD	W	V	E	ST	D	D	LER	D&M	BM
11087	FOD	W	V	E	ST	D	D	LER	D&M	BM
11088	FOD	W	V	E	ST	D	D	LER	D&M	BM
11090	FOD	W	V	E	ST	D	D	LER	D&M	BM
11091	FO	W	V	E	ST	D		LER	D&M	BM
11092	FOD	W	V	E	ST	D	D	LER	D&M	BM
11093	FOD	W	V	E	ST	D	D	LER	D&M	BM
11094	FOD	W	V	E	ST	D	D	LER	D&M	BM
11095	FOD	W	V	E	ST	D	D	LER	D&M	BM
11096	FOD	W	V	E	ST	D	D	LER	D&M	BM
11098	FOD	W	V	E	ST	D	D	LER	D&M	BM
11099	FOD	W	V	E	ST	D	D	LER	D&M	BM
11100	FOD	W	V	E	ST	D	D	LER	D&M	BM
11101	FOD	W	V	E	ST	D	D	LER	D&M	BM
12005	TSO	W	V	E	FT	D		LER	D&M	BM
12008	TSO	G		E	FT	D			D&M	BM
12009	TSO	W	V	E	FT	D		LER	D&M	BM
12011	TSO	G	V	E	FT	D		WB64	D&M	BM
12012	TSO	W	V	E	FT	D		LER	D&M	BM
12013	TSO	W	V	E	FT	D		LER	D&M	BM
12015	TSO	W	V	E	FT	D		LER	D&M	BM
12016	TSO	W	V	E	FT	D		LER	D&M	BM
12019	TSO	W	V	E	FT	D		LER	D&M	BM
12021	TSO	W	V	E	FT	D		LER	D&M	BM
12022	TSO	G		E	FT	D			D&M	BM
12024	TSO	W	V	E	FT	D		LER	D&M	BM
12026	TSO	W	V	E	FT	D		LER	D&M	BM
12027	TSO	W	V	E	FT	D		LER	D&M	BM
12029	TSO	G		E	FT	D			D&M	BM
12030	TSO	W	V	E	FT	D		LER	D&M	BM
12031	TSO	W	V	E	FT	D		LER	D&M	BM
12032	TSO	W	V	E	FT	D		LER	D&M	BM
12034	TSO	W	V	E	FT	D		LER	D&M	BM
12035	TSO	W	V	E	FT	D		LER	D&M	BM
12036	TSO	G		E	FT	D			D&M	BM
12037	TSO	W	V	E	FT	D		LER	D&M	BM
12040	TSO	W	V	E	FT	D		LER	D&M	BM
12041	TSO	W	V	E	FT	D		LER	D&M	BM
12042	TSO	W	V	E	FT	D		LER	D&M	BM
12045	TSO	G		E	FT	D			D&M	BM
12046	TSO	W	V	E	FT	D		LER	D&M	BM



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12049	TSO	W	V	E	FT	D		LER	D&M	BM
12051	TSO	W	V	E	FT	D		LER	D&M	BM
12056	TSO	W	V	E	FT	D		LER	D&M	BM
12057	TSO	W	V	E	FT	D		LER	D&M	BM
12060	TSO	W	V	E	FT	D		LER	D&M	BM
12061	TSO	W	V	E	FT	D		LER	D&M	BM
12062	TSO	W	V	E	FT	D		LER	D&M	BM
12064	TSO	W	V	E	FT	D		LER	D&M	BM
12066	TSO	W	V	E	FT	D		LER	D&M	BM
12067	TSO	W	V	E	FT	D		LER	D&M	BM
12073	TSO	W	V	E	FT	D		LER	D&M	BM
12078	TSO	G	V	E	FT	D		WB64	D&M	BM
12079	TSO	W	V	E	FT	D		LER	D&M	BM
12081	TSO	W	V	E	FT	D		LER	D&M	BM
12082	TSO	W	V	E	FT	D		LER	D&M	BM
12083	TSO	G		E	FT	D			D&M	BM
12089	TSO	W	V	E	FT	D		LER	D&M	BM
12090	TSO	W	V	E	FT	D		LER	D&M	BM
12091	TSO	W	V	E	FT	D		LER	D&M	BM
12092	TSO	G		E	FT	D			D&M	BM
12093	TSO	W	V	E	FT	D		LER	D&M	BM
12095	TSO	G		E	FT	D			D&M	BM
12097	TSO	W	V	E	FT	D		LER	D&M	BM
12098	TSO	W	V	E	FT	D		LER	D&M	BM
12099	TSO	W	V	E	FT	D		LER	D&M	BM
12100	TSOD	G		E		D	BRB	FGW	D&M	BM
12101	TSO	G		E	FT	D			D&M	BM
12103	TSO	W	V	E	FT	D		LER	D&M	BM
12105	TSO	W	V	E	FT	D		LER	D&M	BM
12107	TSO	W	V	E	FT	D		LER	D&M	BM
12108	TSO	W	V	E	FT	D		LER	D&M	BM
12109	TSO	W	V	E	FT	D		LER	D&M	BM
12110	TSO	W	V	E	FT	D		LER	D&M	BM
12111	TSO	W	V	E	FT	D		LER	D&M	BM
12114	TSO	W	V	E	FT	D		LER	D&M	BM
12115	TSO	W	V	E	FT	D		LER	D&M	BM
12116	TSO	W	V	E	FT	D		LER	D&M	BM
12118	TSO	W	V	E	FT	D		LER	D&M	BM
12120	TSO	W	V	E	FT	D		LER	D&M	BM
12122	TSOD	G	V	E	FT	D	BRB	WB64	D&M	BM
12125	TSO	W	V	E	FT	D		LER	D&M	BM




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12126	TSO	W	V	E	FT	D		LER	D&M	BM
12129	TSO	W	V	E	FT	D		LER	D&M	BM
12130	TSO	W	V	E	FT	D		LER	D&M	BM
12132	TSO	W	V	E	FT	D		LER	D&M	BM
12133	TSO	G	V	E	FT	D		WB64	D&M	BM
12137	TSO	W	V	E	FT	D		LER	D&M	BM
12138	TSO	G	V	E	FT	D		WB64	D&M	BM
12139	TSO	G		E	FT	D			D&M	BM
12141	TSO	W	V	E	FT	D		LER	D&M	BM
12142	TSOD	G		E	FT	D	BRB		D&M	BM
12143	TSO	W	V	E	FT	D		LER	D&M	BM
12144	TSO	G		E	FT	D			D&M	BM
12146	TSO	W	V	E	FT	D		LER	D&M	BM
12147	TSO	W	V	E	FT	D		LER	D&M	BM
12148	TSO	W	V	E	FT	D		LER	D&M	BM
12150	TSO	W	V	E	FT	D		LER	D&M	BM
12151	TSO	W	V	E	FT	D		LER	D&M	BM
12153	TSO	W	V	E	FT	D		LER	D&M	BM
12154	TSO	W	V	E	FT	D		LER	D&M	BM
12156	TSO	G		E	FT	D			D&M	BM
12158	TSO	G		E	FT	D			D&M	BM
12159	TSO	W	V	E	FT	D		LER	D&M	BM
12160	TSO	G		E	FT	D			D&M	BM
12161	TSOD	G		E	FT	D	BRB	FGW	D&M	BM
12163	TSO	G		E	FT	D			D&M	BM
12164	TSO	W	V	E	FT	D		LER	D&M	BM
12166	TSO	W	V	E	FT	D		LER	D&M	BM
12167	TSO	W	V	E	FT	D		LER	D&M	BM
12170	TSO	W	V	E	FT	D		LER	D&M	BM
12171	TSO	W	V	E	FT	D		LER	D&M	BM
17173	BFO	B		E	ST	D		FGW	D&M	BM
17174	BFO	B		E	ST	D		FGW	D&M	BM
17175	BFO	B		E	ST	D		FGW	D&M	BM
40101 (42170)	TSB	W	V	X	FT	D		FGW		BM
40102 (42223)	TSB	W	V	X	FT	D		FGW		BM
40103 (42316)	TSB	W	V	X	FT	D		FGW		BM
40104 (42254)	TSB	W	V	X	FT	D		FGW		BM

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40105 (42084)	TSB	W	V	X	FT	D		FGW		BM
40106 (42162)	TSB	W	V	X	FT	D		FGW		BM
40107 (42334)	TSB	W	V	X	FT	D		FGW		BM
40108 (42314)	TSB	W	V	X	FT	D		FGW		BM
40109 (42262)	TSB	W	V	X	FT	D		FGW		BM
40110 (42187)	TSB	W	V	X	FT	D		FGW		BM
40111 (42248)	TSB	W	V	X	FT	D		FGW		BM
40112 (42336)	TSB	W	V	X	FT	D		FGW		BM
40113 (42309)	TSB	W	V	X	FT	D		FGW		BM
40114 (42086)	TSB	W	V	X	FT	D		FGW		BM
40115 (42320)	TSB	B		X	FT	D		FGW		BM
40116 (42147)	TSB	W	V	X	FT	D		FGW		BM
40117 (42249)	TSB	W	V	X	FT	D		FGW		BM
40118 (42338)	TSB	W	V	X	FT	D		FGW		BM
40119 (42090)	TSB	G Ø		X	FT	D		FGW		BM
40700	TRFB	W	V		FTNLS	D		EMT	D&M	BM
40701	TRFB	W	V		FTNLS	J		EC		BM
40702	TRFB	W	V		FTNLS	J		EC		BM
40708	TRFB	W	V		FTNLS	J		EC		BM
40728	TRFB	W	V		ST	D		EMT	D&M	BM
40730	TRFB	W	V		ST	D		EMT	W	BM
40732	TRFB	W	V		ST	D		EC64	W	BM
40741	TRFB	W	V		ST	D		EMT	D&M	BM
40746	TRFB	W	V		ST	D		EMT	D&M	BM
40749	TRFB	W	V		ST	D		EMT	D&M	BM



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40751	TRFB	W	V		ST	D		EMT	W	BM
40753	TRFB	W	V		ST	D		EMT	W	BM
40754	TRFB	W	V		ST	D		EMT	D&M	BM
40756	TRFB	W	V		ST	D		EMT	W	BM
40801	TBRF	W	V	X	FT	D		FGW		BM
40802	TBRF	W	V	X	FT	D		FGW		BM
40803	TBRF	W	V	X	FT	D		FGW		BM
40804	TBRF	W	V	X	ST	D		FGW		BM
40805	TBRF	W	V		FT	J		EC		BM
40806	TBRF	W	V	X	ST	D		FGW		BM
40807	TBRF	W	V	X	ST	D		FGW		BM
40808	TBRF	W	V	X	FT	D		FGW		BM
40809	TBRF	W	V	X	FT	D		FGW		BM
40810	TBRF	W	V	X	ST	D		FGW		BM
40811	TBRF	W	V	X	FT	D		FGW		BM
41041	TFD	W	V		FT	D	BRB-MML	EMT		BM
41046	TFD	W	V		FT	D	BRB-MML	EMT	D&M	BM
41057	TF	W	V		FT	D		EMT	W	BM
41061	TF	W	V		FT	D		EMT	D&M	BM
41062	TFE	W	V		FT	D		EC64	W	BM
41063	TF	W	V		FT	D		EMT	D&M	BM
41064	TFD	W	V		FT	D	BRB-MML	EMT	W	BM
41067	TFD	W	V		FT	D	BRB-MML	EMT	D&M	BM
41068	TFD	W	V		FT	D	BRB-MML	EMT	D&M	BM
41069	TFD	W	V		FT	D	BRB-MML	EMT	D&M	BM
41070	TFD	W	V		FT	D	BRB-MML	EMT	D&M	BM
41071	TF	W	V		FT	D		EMT	D&M	BM
41072	TFD	W	V		FT	D	BRB-MML	EMT	W	BM
41075	TF	W	V		FT	D		EMT	W	BM
41076	TFD	W	V		FT	D	BRB-MML	EMT	W	BM
41077	TF	W	V		FT	D		EMT	D&M	BM



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Vehicle No.	Type	WSP Type	Air Con module	Air Electronic Thermostat	Battery Module	PA Systems	Disabled Toilet	Décor	Brake Type	Brake Module
41079	TF	W	V		FT	D		EMT	D&M	BM
41081	TF	W	V	X	FT	D	FGW1T	FGW		BM
41083	TF	W	V		FT	J		EC		BM
41084	TFD	W	V		FT	D	BRB-MML	EMT	D&M	BM
41095	TF	W	V		FT	J		EC		BM
41096	TF	W	V	X	FT	D	FGW1T	FGW		BM
41108	TF	W	V	X	FT	D		FGW		BM
41109	TF	W	V	X	FT	D	FGW1T	FGW		BM
41111	TF	W	V		FT	D		EMT	D&M	BM
41112	TF	W	V		FT	D		EMT	D&M	BM
41113	TFD	W	V		FT	D	BRB-MML	EMT	D&M	BM
41115	TFE	W			FT	J		EC		BM
41117	TF	W	V		FT	D		EMT	W	BM
41119	TF	W	V	X	FT	D	FGW1T	FGW		BM
41147	TF	W	V	X	FT	D	FGW1T	FGW		BM
41148	TF	B		X	FT	D	FGW1T	FGW		BM
41149	TF	W	V	X	FT	D		FGW		BM
41154	TFD	W	V		FT	D	BRB-MML	EC64	W	BM
41155	TF	W	V	X	FT	D		FGW		BM
41156	TF	W	V		FT	D		EMT	D&M	BM
41159	TFE	W			FT	J		EC		BM
41161	TF	W	V	X	FT	D		FGW		BM
41165	TF	W			FT	J		EC		BM
41168	TF	W	V	X	FT	D	FGW1T	FGW		BM
41169	TF	B		X	FT	D		FGW		BM
41176 (42352)	TF	W	V	X	FT	D		FGW		BM
41181	TF	W	V	X	FT	D	FGW1T	FGW		BM
41182	TF	W	V	X	FT	D		FGW		BM
41183	TF	W	V	X	FT	D		FGW		BM
41184	TF	W	V	X	FT	D	FGW1T	FGW		BM
41185	TFE	W	V		FT	J		EC		BM
41186	TF	W	V	X	FT	D		FGW		BM
41187	TF	W	V	X	FT	D		FGW		BM
41189	TF	W	V	X	FT	D		FGW		BM
41190 (42088)	TFE	W			FT	J		EC		BM
41191	TF	B	V	X	FT	D	FGW1T	FGW		BM



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Vehicle No.	Type	WSP Type	Air Con module	Air Electronic Thermostat	Battery Module	PA Systems	Disabled Toilet	Décor	Brake Type	Brake Module
(42318)										
41192	TF	W	V	X	FT	D		FGW		BM
41193 (11060)	TFD	W	V*		FT?	D	T	XCT	D&M?	BM
41194 (11016)	TFD	W	V*	E?	FT?	D	T	XCT	D&M?	BM
41195 (11020)	TFD	W	V*	E?	FT?	D	T	XCT	D&M?	BM
42085	TS	W	V	X	FT	D		FGW		BM
42087	TS	W	V	X	FT	D		FGW		BM
42100	TS	W	V		FT	D		EMT	D&M	BM
42101	TS	W	V	X	FT	D		FGW		BM
42102	TS	W	V	X	FT	D		FGW		BM
42109	TS	W			FT	J		EC		BM
42110	TS	W			FT	J		EC		BM
42111	TS	W	V		FT	D		EMT	D&M	BM
42112	TS	W	V		FT	D		EMT	D&M	BM
42113	TS	W	V		FT	D		EMT	W	BM
42115	TS	W	V	X	FT	D		FGW		BM
42117	TS	W			FT	J		EC		BM
42119	TS	W	V		FT	D		EMT	D&M	BM
42120	TS	W	V		FT	D		EMT	D&M	BM
42121	TS	W	V		FT	D		EMT	D&M	BM
42123	TS	W	V		FT	D		EC64	D&M	BM
42124	TS	W	V		FT	D		EMT	D&M	BM
42125	TS	W	V		FT	D		EC64	D&M	BM
42130	TS	W			FT	J		EC		BM
42131	TS	W	V		FT	D		EMT	W	BM
42132	TS	W	V		FT	D		EMT	D&M	BM
42133	TS	W	V		FT	D		EMT	D&M	BM
42135	TS	W	V		FT	D		EMT	D&M	BM
42136	TS	W	V		FT	D		EMT	W	BM
42137	TS	W	V		FT	D		EMT	D&M	BM
42139	TS	W	V		FT	D		EMT	D&M	BM
42140	TS	W	V		FT	D		EMT	D&M	BM
42141	TS	W	V		FT	D		EMT	D&M	BM
42148	TS	W	V		FT	D		EMT	D&M	BM
42149	TS	W	V		FT	D		EMT	D&M	BM
42151	TS	W	V		FT	D		EMT	D&M	BM
42152	TS	W	V		FT	D		EMT	D&M	BM
42153	TS	W	V		FT	D		EMT	W	BM



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42155	TS	W	V		FT	D		EMT	D&M	BM
42156	TS	W	V		FT	D		EMT	D&M	BM
42157	TS	W	V		FT	D		EMT	W	BM
42159	TS	W			FT	J	T	EC		BM
42160	TS	W			FT	J		EC		BM
42163	TS	W	V		FT	J		EC		BM
42164	TS	W	V		FT	D		EMT		BM
42165	TS	W	V		FT	D		EMT	D&M	BM
42166	TS	W	V	X	FT	D		FGW		BM
42173	TSD	W	V	X	FT	D	BFG	FGW		BM
42174	TSD	W	V	X	FT	D	BFG	FGW		BM
42178	TS	W	V	X	FT	D		FGW		BM
42194	TS	W	V		FT	D		EMT	W	BM
42195	TSD	W	V	X	FT	D	BFG	FGW		BM
42205	TS	W	V		FT	D		EC64	W	BM
42210	TS	W	V		FT	D		EC64	D&M	BM
42217	TSD	W	V	X	FT	D	BFG	FGW		BM
42218	TSD	W	V	X	FT	D	BFG	FGW		BM
42220	TS	W	V		FT	D		EMT	W	BM
42222	TS	W	V	X	FT	D		FGW		BM
42224	TSD	W	V	X	FT	D	BFG	FGW		BM
42225	TS	W	V		FT	D		EMT	W	BM
42227	TS	W	V		FT	D		EMT	W	BM
42228	TS	W	V		FT	J		EC		BM
42229	TS	W	V		FT	D		EMT	W	BM
42230	TS	W	V		FT	D		EMT	W	BM
42234	TS	W			FT	D		XCT		BM
42237	TS	W	V		FT	J		EC		BM
42247	TS	W	V	X	FT	D		FGW		BM
42258	TS	W	V	X	FT	D		FGW		BM
42266	TSD	W	V	X	FT	D	BFG	FGW		BM
42286	TS	W			FT	J	T	EC		BM
42290	TS	W			FT	D		XCT		BM
42294	TS	B		X	FT	D		FGW		BM
42306	TS	W	V		FT	J		EC		BM
42307	TS	W	V		FT	J		EC		BM
42308	TS	W	V	X	FT	D		FGW		BM
42310 (41188, 42310)	TSD	W	V	X	FT	D	BFG	FGW		BM
42315	TS	W	V	X	FT	D		FGW		BM



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42317	TSD	W	V	X	FT	D	BFG	FGW		BM
42319	TS	B	V	X	FT	D		FGW		BM
42321	TS	B		X	FT	D		FGW		BM
42322	TS	W			FT	J		EC		BM
42326	TS	W	V		FT	J	T	EC		BM
42327	TS	W	V		FT	D		EMT	W	BM
42328	TS	W	V		FT	D		EMT	D&M	BM
42329	TS	W	V		FT	D		EMT	D&M	BM
42330	TS	W	V		FT	J		EC		BM
42331	TS	W	V		FT	D		EMT	D&M	BM
42335	TS	W	V		FT	D		EC64	W	BM
42337	TS	W	V		FT	D		EMT	D&M	BM
42339	TS	W	V		FT	D		EMT	D&M	BM
42341	TS	W	V		FT	D		EMT	D&M	BM
42364 (41080)	TS	W	V	X	FT	D	BRB- MML	FGW		BM
42365 (41107)	TS	W	V	X	FT	D		FGW		BM
42366 (12007)	TSD	W	V*		FT	D	T	XCT	D&M	BM
42367 (12025)	TS	W	V*		FT	D	XCT1T	XCT	D&M	BM
42368 (12028)	TS	W	V*		FT	D	XCT1T	XCT	D&M	BM
42369 (12050)	TS	W	V*		FT	D	XCT1T	XCT	D&M	BM
42370 (12086)	TS	W	V*		FT	D	XCT1T	XCT	D&M	BM
42371 (12052)	TSD	W	V*		FT	D	T	XCT	D&M	BM
42372 (12055)	TS	W	V*		FT	D	XCT1T	XCT	D&M	BM
42373 (12071)	TS	W	V*		FT	D	XCT1T	XCT	D&M	BM
42374 (12075)	TS	W	V*		FT	D	XCT1T	XCT	D&M	BM
42375 (12113)	TS	W	V*		FT	D	XCT1T	XCT	D&M	BM
42376 (12085)	TSD	W	V*		FT	D	T	XCT	D&M	BM
42377	TS	W	V*		FT	D	XCT1T	XCT	D&M	BM




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Vehicle No.	Type	WSP Type	Air Con module	Air Electronic Thermostat	Battery Module	PA Systems	Disabled Toilet	Décor	Brake Type	Brake Module
(12102)										
42378 (12123)	TS	W	V*		FT	D	XCT1T	XCT	D&M	BM
42381 (41058)	TS	W	V	X	FT	D	BRB-MML	FGW		BM
42382 (12128)	TS	G	?	X	FT?	D		FGW	D&M	BM
42383 (12172)	TS	G	?	X	FT?	D		FGW	D&M	BM
42384 (41078)	TS	W	V		FT	D		EMT	D&M	BM
42385 (41153)	TS	W	V	X	FT	D	FGW1T	FGW		BM
44000	TGS	W	V	X	FT	D	FGW0T	FGW		BM
44021	TGS	W			FT	D		XCT		BM
44027	TGS	W	V		FT	D		EMT	D&M	BM
44041	TGS	W	V		FT	D		EMT	D&M	BM
44042	TGS	W	V	X	FT	D	FGW0T	FGW		BM
44044	TGS	W	V		FT	D		EMT	D&M	BM
44046	TGS	W	V		FT	D		EMT	D&M	BM
44047	TGS	W	V		FT	D		EMT	D&M	BM
44048	TGS	W	V		FT	D		EMT	D&M	BM
44050	TGS	W	V		FT	J		EC		BM
44051	TGS	W	V		FT	D		EMT	D&M	BM
44052	TGS	W	V		FT	D		XCT		BM
44054	TGS	W	V		FT	D		EMT	D&M	BM
44057	TGS	W			FT	J		EC		BM
44060	TGS	W	V	X	FT	D	FGW0T	FGW		BM
44069	TGS	W	V	X	FT	D	FGW0T	FGW		BM
44070	TGS	W	V		FT	D		EMT	D&M	BM
44071	TGS	W	V		FT	D		EMT	W	BM
44072	TGS	W			FT	D		XCT		BM
44073	TGS	W	V		FT	D		EMT	W	BM
44075	TGS	W	V		FT	J		EC		BM
44078	TGS	W	V	X	FT	D	FGW0T	FGW		BM
44079	TGS	W	V	X	FT	D	FGW0T	FGW		BM
44083	TGS	W	V	X	FT	D	FGW0T	FGW		BM
44085	TGS	W	V		FT	D		EMT	W	BM
44090	TGS	W	V	X	FT	D	FGW0T	FGW		BM
44091	TGS	B		X	FT	D	FGW0T	FGW		BM
44097	TGS	W	V	X	FT	D	FGW0T	FGW		BM

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Vehicle No.	Type	WSP Type	Air Con module	Air Electronic Thermostat	Battery Module	PA Systems	Disabled Toilet	Décor	Brake Type	Brake Module
44101	TGS	W	V	X	FT	D	FGW0T	FGW		BM
45001 (12004)	TCC	W	V*	E?	FT?	D		XCT	D&M	BM
45002 (12106)	TCC	W	V*	E?	FT?	D		XCT	D&M	BM
45003 (12076)	TCC	W	V*	E?	FT?	D		XCT	D&M	BM
45004 (12077)	TCC	W	V*	E?	FT?	D		XCT	D&M	BM
45005 (12080)	TCC	W	V*	E?	FT?	D		XCT	D&M	BM
45005 (12080)	TCC	W	V*	E?	FT?	J		XCT	D&M	BM

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5.10 Asbestos Data Sheets

Use	Status	Location	Type	Risk	Measures for Managing	Comments
1. Thermal/Acoustic						
Toilet/Cat Water Heaters	N/A					
Water Pipe Insulation	P-Cy	Plumbing Cupboards	Tap	LOW - only if disturbed by maintenance or overhaul work.	Overhauler to take appropriate precautions when carrying out work in the plumbing cupboards. VM/VOI WPO105 and ZCA0102 refer.	Was believed to have been removed, but was found on several ex Virgin Cross Country vehicles that were refurbished at Eastleigh. For further details, refer to Porterbrook Inter City Fleet Manager.
Heater Insulation	N/A					
General Insulation	N/A					
Exhaust Insulation	N/A					
2. Seals and Gaskets						
Pump/Valve Seal packings	N/A					
General Seals or gaskets	P-Cy		Res	When removed at overhaul	Overhauler to take appropriate precautions.	
Battery Charger Transformer Cover	P-Cy	Battery Charger	Fib	LOW. Not disturbed as part of planned maintenance or overhaul.	Warning labels in place. If damage necessitates replacement, overhauler to take appropriate precautions.	Refer to Interfleet Report ENG/CM/419 for details. Transformer Cat no is 064/003001
Battery Charger Choke Cover	P-Cy	Battery Charger	Fib	LOW. Not disturbed as part of planned maintenance or overhaul.	Warning labels in place. If damage necessitates replacement, overhauler to take appropriate precautions.	Refer to Interfleet Report ENG/CM/419 for details. Choke Cat no is 064/000781
3. Electrical Insulation						
Wiring	N					
Electrical machine packing	N					
Contactor arc chutes	N					
4. Dry Rubbing Bearings						
	N					
5. Others						
	N					
Key						
Cr - Crocidolite (Blue Asbestos)	P - Present					Cem - Cement
Am - Amosite (Brown Asbestos)	R - Removed					Res - Resinous
Cy - Crysolite (White Asbestos)	RR - Removed (residues may remain)					Boa - Board
	N - Not present					Tap - Tape
	N/A - Not applicable					Fib - Fibrous


Use	Status	Location	Type	Risk	Measures for Managing	Comments
1. Thermal/Acoustic						
Tollie/Cat Water Heaters	N/A					
Water Pipe Insulation	P-Cy	Plumbing Cupboards	Tap	LOW - only if disturbed by maintenance or overhaul work.	Overhauler to take appropriate precautions when carrying out work in the plumbing cupboards. VMIVOI WP0105 and ZCA0102 refer.	Was believed to have been removed, but was found on several ex Virgin Cross Country vehicles that were refurbished at Eastleigh. For further details, refer to Porterbrook Inter City Fleet Manager.
Heater Insulation	N/A					
General Insulation	N/A					
Exhaust Insulation	N/A					
2. Seals and Gaskets						
Pump/Valve Seal packings	N/A					
General Seals or gaskets	P-Cy		Res	When removed at overhaul	Overhauler to take appropriate precautions	
Battery Charger Transformer Cover	P-Cy	Battery Charger	Fib	LOW. Not disturbed as part of planned maintenance or overhaul.	Warning labels in place. If damage necessitates replacement, overhauler to take appropriate precautions.	Refer to Interfleet Report ENG/CM/419 for details. Transformer Cat no is 064/003001
Battery Charger Choke Cover	P-Cy	Battery Charger	Fib	LOW. Not disturbed as part of planned maintenance or overhaul.	Warning labels in place. If damage necessitates replacement, overhauler to take appropriate precautions.	Refer to Interfleet Report ENG/CM/419 for details. Choke Cat no is 064/000781
3. Electrical Insulation						
	N					
4. Dry Rubbing Bearings						
	N					
5. Others						
	N					
Key						
Cr - Crocidolite (Blue Asbestos)	P - Present					Cem - Cement
Am - Amosite (Brown Asbestos)	R - Removed					Res - Resinous
Cy - Crysolite (White Asbestos)	RR - Removed (residues may remain)					Boa - Board
	N - Not present					Tap - Tape
	N/A - Not applicable					Fib - Fibrous

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6. EQUIPMENT AND MATERIALS LISTS

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6.1 Equipment Required For Job Nos. BH 0305, BZ 3001 - 2.

- I. 5 calibrated air pressure test gauges, 0 to 10 bar.

2 calibrated hydraulic pressure gauges, 0 to 150 bar (BFO).

Bourdon Tube type gauges which conform to BS 1780/ Part 2; 1971, or an approved type of digital pressure gauge may be used.
- II. An air brake test trolley of an approved type incorporating a standard drivers air brake valve capable of regulating the air brake pipe pressure. The standard BR trolley which incorporates a Westinghouse M6 AT is preferred but alternatives may be considered.


The principle performance features are:

- a. Stable and accurate pressures in RELEASE, RUNNING, INITIAL and FULL SERVICE.
- b. Correct bleed down rate from Release to Running (at the Test Valve rate, not the standard locomotive rate)
- c. Air Flow restriction in the Running position.

The trolley must have an in date calibration certificate.

The trolley must be supplied with dry clean air at a pressure of 7 bar + 0.4 bar. If the local air supply does not meet these requirements a filter/water separator/pressure regulator must be fitted in the air supply to the trolley.

- III. A calibrated stop watch.
- IV. Brake pipe coupling heads, for air brake pipe and main reservoir pipe, with passages which are blanked off but are provided with through gauge connections.
- V. A main reservoir pipe coupling head.
- VI. Suitable hardware for making gauge connections.

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6.2 Labels for Reservoirs, Job No. BRA3004

Suitable Brass labels may be obtained from:

Setons Ltd
PO Box 77
Banbury
Oxon OX16 7LS

Ident. tags Pt. No. RAD 101
Detail for above


DEPOT NAME	DEPOT No.
TESTED PSI	
RESERVOIR No.	
LAST TEST	

6.3 Electrical Items

	Job No
1000V Megger	EW 5004
Frequency Meter (to read 50 Hz).	MO 5022
Sound level meter (able to measure 90-100 dB(A)	EP 5053
Blakell WSP Test Set BR Cat No. 098/070009	EY 0303
SABWABCO WSP Test Set Part No. 69042349	EY 0303
200Ω Rheostat 1.1Amp, available from Claud Lyons, Brook Road, Waltham Cross, Herts Part No. L425/200Ω.	EZ 1006
Air Conditioning Test Box (see job for details).	HZ 8003
Portable low resistance meter (4 terminal) capable of delivering 2 Amps d.c., minimum resolution of 0.01Ω.	UE 5001


6.4 Mechanical Items

Schrader Test Probe	BV 3111
Supports for coach body during welding	CA 6001 CRA0104 UU 3020
Smoke tubes or anemometer	HZ 8003
Key for BR Central Door locking system	OK 5000
Special box spanner for door handle escutcheon plate. Pickersgill Kaye Part No K2463 BR Cat No 039/052226	OL 0137
Door Lock Force testing device }	OL 0140
BR Drg A2-A0-8700100 }	OL 0141
Analogue or Digital Force Gauge reading 10kgf in intervals of 0.05kgf }	OL 0140 OL 0141
Lifting Brackets for Mark 3 coach 17.5 ton	UF 6301


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6.5 Materials


Job No.	Description	Catalogue No.
BD 3000	Gasket (Westinghouse Part Nos. J74647/1)	070/006403
	O' Rings (Westinghouse Part No. J72050/17)	070/003435
	Gasket (D&M Part No. AB12-2)	070/012698
BDA3512	Grease, Molykote 33	027/002195
	Grease, Renolit SI 300 M	-
	Ironside 'A' Blend	027/004331
BD 3516	Grease 150kg container	027/001351
CM 6615	3kg barrel	027/001353
HM 0112	12.5kg barrel	027/001354
OP 0118	50kg barrel	027/001356
OP 0120	180kg barrel	027/001357
UB 6022	400g cartridge	027/001358
UB 6025		
BE 0111	Valve, Exhaust with Whistle	070/070752
	Valve, Emergency Application with Whistle	070/022346
BH 0119	Approved Cleaning Agent	Local Supply
	Molykote 33 Grease	027/002195
	Filler Strainer	
	Spring (38)	
	Strainer Disc	
	Bonded Seal (34)	
	Seal (36)	
	Strainer (37)	
	Bonded Seal (39)	
	Pump Motor	070/022880
	Pump	070/023515
	Selector Valve	070/023628
	'O' Ring (154)	
	Solvent	
	Bonded Seal (170)	
	Fine Emery Cloth	001/106133
	Liquid Metal Polish	007/053080
	Spring (171)	
	Bonded Seal (162)	
	Spring (163)	
	3/8" Dia Ball Bearing (166)	
	Application Relief Valve (16) (Set at 90-100 Bar)	
	Release Relief Valve (17) (Set at 75-85 Bar)	
BH 0119	Shell Tellus T15	027/013279
BH 0305		
BH 0310		
BH 0316		
BP 7205	Aluminium Label	019/004168
BRA3004	Arboseal Sealing Compound	028/022202
BV 0129	Valve Limiting Check Assembly	064/071452

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Job No.	Description	Catalogue No.
	SMC Type ARP40K-F04-3 Pressure Regulator	070/070926
	Sealing Washer ½"	008/151553
	Loctite 542 Sealant	007/060301
BV 4284	Reservoir Isolating Cock	073/002157 or equivalent
BV 5320	Loctite Jointing Paste	007/060327
	Hose Assembly, MRP (Mark 3A, 3B and RFM) 635mm	070/009642
	Hose Assembly, ABP (Mark 3A, 3B and RFM) 660mm	070/005751
	Hose Assembly, MRP (HST) 455mm	070/014261
	Hose Assembly, ABP (HST) 530mm	070/014262
	Hose Assembly, MRP, Spiroband Wrapped (HST) 455mm	070/070942
	Hose Assembly, ABP, Spiroband Wrapped (HST) 530mm	070/070943
	Hose Assembly, MRP, Nylon Reinforced (HST) 455mm	070/070952
	Hose Assembly, ABP, Nylon Reinforced (HST) 530mm	070/070953
	Aluminium Label	019/004168
	Coupling Cock, Westinghouse Lockable Type (RH)	070/022016
	Coupling Cock, Westinghouse Lockable Type (LH)	070/022017
CM 6615	6 X ½" Self Tapping, Slotted Csk Hd, Type B, Thread Forming, Flat End, Hardened Steel, EZZ	035/098122
	Adsil	027/001905
	Channels	063/070036
	Guide	064/003040
	Kautex	010/054060
	Handle Top Locking 18.7/16" long	018/009927
	Wooden Mounting Block	063/001294
	Screw, No10 x 1 ½", Stainless Steel Self Tapping	Local Supply
CRA0104	Insert Roof Panel	063/003259
CR 6002	Roof Ventilator, Roovac TW50	018/009406
	Screw, No. 12, Self Tapping, Pan Hd, Type B, EZZ	035/055775
	Washer, M6, Lock	003/196715
	Roof Cowl, Heating and Air Conditioning	093/056390
	Screw, M8 x 16, Hex Hd, Gde 8.8, EZZ	035/100632
	Washer, M8, Spring, Square Section, EZZ	003/195110
CR 6002 Contd	Roof Cowl, Extraction Duct, 475 x 475 x 55 For Air Conditioning	063/004530
	Roof Cowl, Intake Fan, 720 x 680 x 80	063/003825

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Job No.	Description	Catalogue No.
	For Air Conditioning	
	Intake Fan Cap, 720 x 783 x 80 AEA Technology Part No. 14288-01	-
	Screw, M6 x 16, Hex Hd, Gde 8.8, EZP	035/100502
	Washer, M6, Spring, Square Section, EZP	003/195108
	Washer, M6, Form C	003/190924
CS 0101	Step Lower (comprising Items 5, 6 and 7)	063/008151
	Flange	063/002128
	Web Support (As Drawn)	063/002129
	Web Support (Opp Hand)	063/002130
	Side Plate (As Drawn)	063/002131
	Side Plate (Opp Hand)	063/002132
	Step Channel	063/002133
	Bolt, M12 x 40, Hex Hd, Gde 8.8	003/100692
	Washer, M12, Form C	003/191710
	Slotted Nut, M12	003/175510
	Split Pin M3 x 28	029/000058
	Commode Handle (coated)	063/001003
	Screw, M6 x 20, Slotted Raised Countersunk Hd, EZP, Gde 4.8	035/105609
CV 0102	Washer Taper. 25 Square x 10.5 ID x 20 For Gangway Inner Panel	063/008228
CS 0103	Spherical Rubber Bush	097/006576
	Hood, Gangway, Neoprene Coated Canvas	063/008491
	Strap, Aluminium	063/008292
CV 0104	Diaphragm	063/003274
	Hubner Diaphragm	063/009208
CVA0116	Texaco Rustproof Compound L	027/004601
	Silicone Sealant	007/060344
CVA0117	Bolt Flexitor Linkage	063/007742
	Flexitor Linkage, Gangway	063/007737
	Nylon Bush	063/005386
	Pin	063/007741
	Rubber Units (Set of 4)	063/007989
CWA0119	Matrix 500 or Sikaflex 221	007/005002
	Avdelok ¼" Steel Countersink Fasteners	030/044525
	¼" Collar	030/043718
CWA0121	¼" Countersunk (6.4mm) fastenings	030/044525
	Collar	030/043718
	Bostik 2639	007/005803
	Sikaflex 221	007/005002
	¼" Avdel Monobolts	035/152001
CWA0127	Unit, Laminating Glazing, with 7.5mm Heath Strengthened Inner	009/000004
CW 6013	Bostik 2639	007/005803
	Sikaflex 221	007/005002
	¼" Countersunk Fasteners	030/044525

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Job No.	Description	Catalogue No.
	Collars	030/043718
EB 0006	Bearing - Skefko cylindrical roller Type NJ 206 or equivalent	043/104030
	Roller - Drg. C-A0-17542 item 5	063/009178
	Spacer Drg. C-A0-17542 item 4	063/009179
	Bearing Pin - Drg. C-A0-17542 item 3	063/009180
	Plug interior (LPA Part No. B24979/WIS/BR)	054/082018
	Complete Plug (LPA Part No. B535/23032/BR)	054/084451
EB 0606	Battery Charger Transformer	064/003001
	Choke	064/000781
EH 5203 EH 5206	Fresh Air Damper Pressure Switch, Square D Type ACW (set to close at 1.2 ± 0.1 bar rising and open at 0.8 ± 0.1 bar falling)	064/004940
	Brake Pipe Pressure Switch, Square D Type ACW (set to close at 1.2 bar rising and open at 0.9 bar falling)	064/004939
	Low BSR Pressure Switch, Westinghouse Type (Set to close at 4.5 – 4.7 bar rising and open at 4.1 – 4.2 falling pressure)	064/007322
	Bonded Seal (Westinghouse Pt no. 7769306)	070/022796
EJ 1014	RCH Jumper, 711mm	800/571702
	Arbosil Sealing Compound	028/022209
	Base Terminal Assembly	052/002331
	Rubber Gasket	063/000099
	Jumper Retaining Chain	052/008540
EL 0125	Resistor, 47Ω 2.5W	026/155053
	Capacitor, 0.068μf	026/111572
	Varistor	054/089381
	Crimp, M5, Red	054/119387
ELA1016	Lamp (GE-F8W/29 4W, 300mm Warm White)	-
	Inverter Atlas Pt. No. 15R3933/110	-
HA 0109	Oil, ICI Emkarate RL68S	027/017019
	Oil, Castrol Icematic SW 68	5 litres 027/025022
		25 litres 027/025013
HM 0111	Fan, Extractor	064/072076
HM 0820	Extractor fan (Part No. R2E250-AX47-11 supplied by ebm-papst)	-
HM 5035	Fan Motor (Mk 3B)	064/003900
	Fan Motor (HST)	064/000537 or 064/072076
IF 6033	Rubber Matting	063/003278
	Brass Strip	063/005294
KI 0110	Silicone Sealant (Arbosil1081)	Translucent 028/022208
		White 028/022209
		Black 028/022210
	Available from:	

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Job No.	Description	Catalogue No.
	Adshead Ratcliffe & Co Ltd, Derby Road, Belper, Derbyshire. Tel: 01773 826661	
MO 4029	M8 x 30mm Hex Head Screws, EZP	035/100662
	M8 Bent Beam Type Nuts	003/180320
	M10 x 30mm Hex Head Screws	035/100810
	M10 Bent Beam Type Nuts	003/180325
	M16 x 130mm Hex Head Bolts	003/100990
	M16 Bent Beam Type Nuts (Plain)	003/180340
	M16 Bent Beam Type Nuts (EZP)	003/180342
	Electro Quick Clean	007/007186
	Flexible Mountings	064/000400
MO 5022	AVR Mk 7	064/010938
	AVR Mk 12	064/010937
OI 0105	Actuator	064/004259
	Filter Regulator 'G'	064/004263
	Lock Cylinder	064/004262
	Nylon Wheel, Complete	50104753
	Belt Wheel	50104150
	Door Seal	-
	Door Rail, Floor	W 136 C001
	Adhesive Plexus MA420	-
	Teflon Guide	-
	24V dc Supply Unit	-
	Door Open Push Button	-
	Door Close Push Button	-
	Door Lock Switch	-
	Door Lock Unit	-
	Door Control Unit	85103025
	Relay	850227
	Micro Switch	850079
	Sprocket Belt	830013
	Inductive Sensor	85104033
	Driving Wheel	50104751
	Support Wheel	50104750
	Gear Motor	50104989
	Rubber Stop	50104839
OI 6232	Door Arm Bearings Temoinsa Part Number 900015978	-
	Door Cylinder Front Lozenge Temoinsa Part Number CS 95-50	-
	Door Cylinder Back Hinge Temoinsa Part Number 900027484	-
OJ 0138	Lithium Base No. 2 Molybdenum Di-sulphide Grease	027/004151 or 027/004152
	Polycarbonate Window	064/007467
	Window Rubbers	064/007466
	Locking Strip	064/007465
	Nylon Block	018/023912

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Job No.	Description	Catalogue No.
	Nosing Rubber	010/056399
OJ 0639	Filter Element (40µm) Temoinsa Part Number 900011833	-
	Silencer ¼" Temoinsa Part Number AN203-02	-
OJ 6101	Door Nosing Rubber, 1885mm long (Pt No. 8501393-05)	010/055738
	Door Leaf (Pt No. 8501393-02 (Leading Leaf), 8501393-03 (Trailing Leaf))	-
	Perspex Window (PT No. 8501393-04 (Leading Leaf), 8501393-08 (Trailing Leaf))	009/117344
	Glazing Rubber	010/056159
	M8 Washers Form C	003/191706
	Roller Bearing	043/030019
	Leading Door Runner Bar (Adtranz Pt No. 116-0528-07)	-
	Roller Bracket Assembly (Adtranz Pt No. 400-0707-78)	-
	Trailing Door Rear Runner Bracket (Adtranz Pt No. 116-0528-04)	-
	Trailing Door Rear Runner Nylon Block (Adtranz Part No. 116-0528-03)	-
	Door Guide on Floor of Door Pocket	018/002068
	Toothed Belt	098/009108 and 098/009109
	Door Gear Assembly (Schrader Bellows Part No. 44918A)	8501389-01
OJ 6102	EP Valve (Schrader Bellows Part Nos. 19114 and 19701).	098/072734
	Door Gear Assembly (Schrader Bellows Part No. 44918A).	8501389-01
	Vestibule Door Relay	064/000495
	Filter Regulator	064/004263
OK 0005	Dump Valve	052/004264
OK 0010	Control Panel Standard (Type 1)	052/004249
	Control Panel Standard (SDO) (Type 1)	064/009519
	Control Panel No Pushbuttons (Type 2)	052/004251
	Control Panel No Air Connections (Type 3)	052/004250
OK 0115	Central Lock Bolt	052/004295
	Spring Washer, M6	003/195108
	Nut, Bent Beam, M6	003/180317
OKA0116	Packings 1mm thick	064/006428
	Packings 2mm thick	064/006429
OK 0120	Jumper Cable Assembly (LPA Part. No. 39066/A)	052/070123

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Job No.	Description	Catalogue No.
	Termination Box	052/004260
OK 0121	Receptacle (LPA Part No. 39232/A)	052/070124
	Base Sealing Gasket (LPA Part No 29265)	-
	Screw, M5 x 25, Hex Hd, Gde 8.8, EZP	003/106315
	Washer, Form A, Steel	003/190922
	Nut, M5, Prevailing Torque, EZP	003/180312
OK 0122	Dummy Receptacle (LPA Part. No. 39223)	052/070121
	Base Sealing Gasket (LPA Part No 29265)	-
	Screw, M5 x 25, Hex Hd, Gde 8.8, EZP	003/106315
	Washer, Form A, Steel	003/190922
	Nut, M5, Prevailing Torque, EZP	003/180312
OKA0124	D.C - D.C Converter	052/004290
OKA0128	Tapping Plate ABB No. 113-6644-03 L.H. 113-6604-03 R.H	- - -
	Fastener (Huck MGL 1100-R8-8)	-
	Fastener (Huck MGL 100-R8-8)	-
OKA0130	M8 x ID Helicoil Insert (S103CN)	-
OKA0131	Rivetnut Fastener (Lintite SM08)	-
OK 0133	Air Supply Module (KV Part No. KPC 1652)	052/004265
	Regulator, Filter Assembly for CDL System	052/070141
	Kit, Mounting Filter Regulator for 052/070141	052/070140
OK 0146	Transparent Cover	052/004288
OK 0147	Grease (Ironsides Blend A)	027/004331
	Gasket	052/004287
OK 0148	Screw, M8 x 40, Hex Hd, Gde 8.8, EZP	035/100672
	Washer, M8, Spring, Single Coil, Type A, EZP	003/195110
	Flag Viewing Window	052/070125
OK 0151	Non-Return Valve (IMI Norgren S522) ½"	018/027757
	BSP	
	Filter (Fairly Micro-Filtrex Ltd, Part No. MO94173-12-003)	-
	Loctite 572	007/060325
	Strainer (Complete)	052/004302
	Strainer Element	052/004293
OK 0152	Circuit Board (Whole Unit)	052/004301
OK 5000	Grease, Molykote 33	027/002195
	Lock Cleaner	027/001053
OK 5000	Bulb	054/038044
OK 5001	LED Bodyside Indicator	098/072852
	Bodyside Indicator Gasket	098/005820
OL 0112	Oil, Multigrade SAE 40 (BR Spec 668)	027/020264
OL 0137	Body filler	028/034390
	LH Lock Set - No. 2 and No. 4 Doors	064/070679
	Long life lock with hi-viz handle strip	064/007291
	Comprising:	
	Escutcheon cover for lock	064/006403

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Job No.	Description	Catalogue No.
	1mm thick Sealing Washer	002/120066
	2mm thick Sealing Washer	002/120067
	3mm thick Sealing Washer	002/120068
	Sachet of Silicon Grease	027/001015
	Lock Edge Shims (If Required)	850/111401
	RH Lock Set - No. 1 and No. 3 Doors Long life lock with hi-viz handle strip	064/070680 064/007292
	Comprising:	
	Escutcheon cover for lock	064/006403
	1mm thick Sealing Washer	002/120066
	2mm thick Sealing Washer	002/120067
	3mm thick Sealing Washer	002/120068
	Sachet of Silicon Grease	027/001015
	Lock Edge Shims (If Required)	850/111401
	M6 x 20mm Csk Head M/C Screw EZP Finish (Lock Striking Plate Position)	035/104706
	M6 x 30mm Pan Head M/C Screw EZP Finish M6 x 30mm Pan Head M/C Screw EZP Finish (Lock Mounting Lugs Position)	035/105099
	M6 Nyloc Nut EZP Finish	003/179998
	M6 Washers EZP Finish	003/190924
	Loctite 242	007/060305
OO 0124	Draught Excluder	010/030234
	Headrail Packing 1 or 3 Door	063/002355
	Headrail Packing 2 or 4 Door	063/002354
	Retaining Strip 1 or 3 Door	063/002594
	Retaining 2 or 4 Door	063/002593
	Headrail Packing Fixings, No. 8 x 25mm Type B Csk Head Self Tapping Screws EZP Finish	035/055831
	Retaining Strip Fixings, No. 6 x 20mm Csk Head Steel Woodscrews EZP Finish	035/092220

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Job No.	Description	Catalogue No.
OO 0125	Strip Special Shaped Section Canvas Lined on Inner Face with Sponge Insert. In Multiples of 30m	010/030000
	Moulding Day Coach	063/002573 063/002574
	Catering Veh's	063/002575 063/002576
	Fixings No. 6 x 25mm R'sd Csk Head Steel Woodscrews EZP Finish	035/092654
	Adhesive Evode 613	007/003001
OO 0126	Door Boot Draught Excluder	010/056408
	Adhesive Evode 613	007/003001
OO 6110	Striking Plate (as drawn, No. 2 and No. 4 Doors)	063/008909
	Striking Plate (opp hand, No. 1 and No. 3 Doors)	063/008910
	Striking Plate Shims 1mm thick	800/577117
	2mm thick	800/577124
	3mm thick	800/577123
	4mm thick	800/577125
	Outer Fixings M6 x 40mm Csk Head M/C Screw EZP Finish	035/104734
	Inner Fixings M6 x 50mm Csk Head M/C Screw EZP Finish	035/104748
	Thread Locking Compound Loctite Studlock 270	007/060309
	Plate Mounting (Stamped -1)	800/577119
	Plate Mounting (Stamped +1)	800/577120
	Plate Mounting (Stamped +2)	800/577121
	Plate Mounting (Stamped +3)	800/577122
OP 0109	Check Strap 229mm long	018/024127
	Check Strap 255mm long	063/000082
	Check Strap 280mm long	064/070803
OP 0118	Plain Mineral Lubricating Oil (BR Spec 664 Type 150)	027/023052
	Check Strap 229mm long	018/024127
	Check Strap 255mm long	063/000082
	Check Strap 280mm long	064/070803
OQ 6428	Door Lock – Left Hand	063/001296
	Door Lock – Right Hand	063/001297
U* 0105	Anti-Corrosion Paint	028/000150
	Black Gloss Paint	028/005319
UB 6022	Saddle	018/084211
	Saddle Rest (Support Bracket)	063/000878
	Wooden Support Block	041/007543
UC 1004	Shim (Packer) (Drg 8290184 Item 02)	-

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Job No.	Description	Catalogue No.
	Nose Assembly (22mm thick)	063/001652
	Nose Assembly (38mm thick)	063/007971
UC 1007 UC 9027	Tailpin	018/000479
UC 4038	Spring	018/084430
UC 6082	Oil, Multigrade SAE 40 (BR Spec 668)	027/020264
UC 6084	Centre (Support) Pin	063/000553
UC 9027	3mm Plate Support (Drg No. 9013637/06)	063/002054
	5mm Plate Support (Drg No. 9013637/07)	063/002055
	2mm Plate Support (Drg No. 9013637/08)	063/002056
	2mm Packing Shear Rubber Mounting (Drg No. C-A0-9477/23)	063/000546
	3mm Packing Shear Rubber Mounting (Drg No. C-A0-9488/24)	063/000547
UF 6301	MS4 Silicone Grease	027/004612
UMA6037	Anti-Corrosion Paint	028/000150
	Upol Tigerseal	007/056212
UU 0110	Rivet, Monobolt, Strainless Steel, Zinc Plated, 4.8 Dia.	030/100600
UU 0161	Green Primer	-
	Underframe Black paint	-
UU 6021	Coupler Wearing Pad (Railko)	063/000020
	Coupler Wearing Pad (Polymer - Devol)	063/070053
	Bolt, M16 x 70, Csk Nibbed Hd	003/112288
	Nut, M16 Bent Beam	003/180168
WH 0108	Temoinsa Water Heater Resistance (Element) 1000 W 220V AC Temoinsa Part Number 900019980	064/009201
	Water Filter ½" "Y" Type Temoinsa Part Number 3304 04-VAL GE	064/009203
	Water Faucet Cap	064/009269
ZY 0116	Water Heater Isolation Notice	-
ZY 0148	DP705 Snow Melting Fluid	007/140762
ZY 0150	Water Tanks and Boiler Drained Notice	-
ZY 0152	Kilfroast ABC-3	007/025008
	GPS GLORIA 142T De-icing Fluid Dispenser with standard lance	011/082082

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7. Reference Documents and Drawings

7.1 Reference Drawings


Drawing Number	Drawing Title	Section/ Job No.
1153201	Installation of Emergency Access for Mk3 HST and LHCS	OK 0147
1153218	Arrangement of Jumper Equipment Secondary Locking System U/F End Mk3 LHCS	OK 0120 OK0121 OK 0122 OKA0139
1153897	Arrangement of Jumper Equipment Secondary Locking System U/F End Mk3 HST Coach	OK0120 OK 0121 OK 0122 OKA0139
2200000	Bodyside Grille Support Extrusion HST Trailers	HD 6170
2200001	Bodyside Grille Support Extrusion Details HST Trailers	HD 6170
2200002	Bodyside Grille Support Extrusion Assemblies and Details	HD 6170
2200003	Infill Tube HST Trailers	HD 6170
2200004	Dirt Deflectors, Baffle Plates and Aperture Adjusting Tool Detail	HD 6170
9040599	Pipe Colour Chart	BP 3003
ABB 1153149	Installation of Door Bolt	OKA0131
Adtranz/Bombardier 1132735	Shims	OK 0148
Adtranz/Bombardier 1132736	Shims	OKA0128 OKA0129 OKA0130
(ABB) 1153993	Installation of Door Reinforcement for Striker (Mark 3 vehicles)	OP 0116 OP 0118
ATC-C0-2200136	Fixed Skirt - Installation	UU 0139
ATC-C0-2200137	Fixed Skirt - Sections	UU 0139
ATC-C0-2200138	Fixed Skirt - Sections	UU 0139
ATC-C0-2200139	Fixed Skirt Installation - Marks And Quantities	UU 0139
ATC-C0-2209465	Pneumatic Schematic Davies and Metcalfe Brake Equipment	BE 0006
ATC-C0-2209466	Pneumatic Schematic Davies and Metcalfe Brake Equipment Westinghouse Suspension and WSP Equipment	BE 0006
A1-2481002	HST Trailer Livery TF/TS/TGS/TRSB Virgin X Country	C* 6015
A1-2681003	Mark 3 Loco Hauled Trailer Livery – Virgin W Coast	C* 6015
A1-A0-8500522	Installation Of Air Extraction Over Cooking Equipment In Kitchen TRUK To RFM	CR 6002
A1-A0-8501404	Vestibule Sliding Door Installation Disabled Person Access	OJ 6101

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Drawing Number	Drawing Title	Section/ Job No.
A1-A0-8501405	DTLS Vestibule Sliding Door Disabled Lav and Access	OJ 6101
A1-A1-8501408	Assy of Micro Switches Lav Door Disabled Persons Lav	OI 0105
A1-A1-8501411	DTLS for Lav Door Disabled Persons Lav	OJ 6101
A1-A1-8501435	Pneumatic Equipment Panel and Schematic (Disabled Persons Toilet)	OI 0105
A1-A1-8501438	Control Panel General Arrangement (Disabled Persons Toilet)	OI 0105 OJ 6102
A1-A0-8501389	Door Gear Assy Double Door (Disabled Persons Lav) Access	OJ 6101
A1-A2-8501392	Vestibule Saloon Sliding Double Door Mark S and Qty's Disabled Persons Lav Access	OJ 6101
A1-A0-8501393	Vestibule Saloon Sliding Double Door Disabled Persons Lav Access	OJ 6101
A1-A0-8501440	Wiring Diagram Disabled Persons Lav Mark 3AFO	OJ 6102
A1-A2-8504172	Gauge for Checking Mark 7 and Mark 12 Ma Set Flexible Mountings	MO 4029
A1-A1-8504514 A	Body Lifting Pad Modification (Mark 3 Vehicles)	UF 6301
A1-A1-9019809	Wiring Diagram Saloon Bodyside Heaters	HH8018 HZ 8003
A2-A0-8700100	DTLS of Lock Spring Force Testing Mechanism	OL 0140 OL 0141
B1-A2-9002864	Detail Of Air Hose Coupling Brackets Mk 3 Standard Carriage	UU 3020
A1-C0-9013374	Roof Hatch Mounting Frame	CR 6003
B1-A0-9013633 M	DTL Of Bolster	UF 6301
B1-A0-9013634	Arrangement of Lower Steps	CS 0101
B1-A0-9014585	Details for Lobby Doors Mk3 Vehicles	OI 0625
B1-A1-9016621	Cap For Extraction Duct Over Grill And Toaster	CR 6002
A1-A2-9019533	Wiring Diagram Control Panel	OJ 0138
A1-A2-9019534	Wiring Diagram Control Panel	OJ 0138
A1-A0-9019176	Details of Hot & Cold Air Duct Bend into Air Conditioning Module Mark 3 Vehicles	HD 8002
A1-A0-9019179	Arrangement & Details of Flexible Connections Between Air Conditioning Ducts & Module Mark 3 Vehicles	HD 8002
B1-A0-9019788	Details of Lower Steps	CS 0101
A1-A1-9024549	Schematic Diagram of Pneumatic Brakes and Suspension equipment for Mark 3B.	BV 3320
B1-A0-9009391	Standard Coach Details of Buffer-Corridor and Non-Corridor.	UB 6025
BI-AO-9009394	Standard Coach Details of Buffer-Corridor and Non-Corridor.	UB 6022
B1-A0-9013673	Bogie Lifting Attachment – Mark III Coach	UU 0161
B1-A1-9013724	Doorway Headrail Details	OO 0124
B1-A0-9013735	Roof End Panel	CRA0104

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	PORTERBROOK MARK 3 LOCO HAULED COACHING STOCK AND HST TRAILER VEHICLES	


Drawing Number	Drawing Title	Section/ Job No.
B1-S-9014024	Roof Panel With Extraction Fan Support And Cowl	CR 6002
B1-S-9014043	Arrangement and Details of Removable Panel Above Roof Water Tank	CR 6003
B1-S-9014263	Arrangement of Corner Doorway	OO 0125
B1-S-9015471	Details of Underfloor Sheets	UU 0110
B1-A2-9015694	Flexitor Link Pin and Bolt	CVA0117
B1-S-9015700	Arrangement of Lobby Doors Mk3 Stock	OI 0625
C-A0-4441	ETH Details For Fitting Heater Box To Headstock	UU 3020
C-A1-4958	End Coupling Arrangement (Mk3)	UU 3020
C-A0-5115	Arrangement of Hot & Cold Air Ducting Adjacent to Air Conditioning Module Mark 3 Coach	HD 8002
C-A0-9750	Details of Hot Air Ducting Adjacent to Air Conditioning Module Mark 3 Vehicles	HD 8002
C-A1-10034	Arrangement Of 'Roovac' Vents In Roof Panel	CR 6002
C-A1-10920	Wiring Diagram for Vestibule Doors	OJ 0138
C-A0-10948	Arrangement & Details Of Air Pipe Coupling Suspensions, HST Vehicles	UU 3020
C-A0-11263	Arrangement & Details Of 36 Pole Jumper Connection Suspension	UU 3020
C-A0-11082	Suspension Of 3 Phase Receptacle With Cover Retention	UU 3020
C-A0-12218	Arrangement & Details Stowage Bracket For 3 Phase & 36 Way Couplers	UU 3020
C-A0-13467	ETH Of Mk3 Carriage Arrangement & Details For Fitting Receptacle To Headstock Loco-Hauled	UU 3020
C-S-10274	Arrangement of Through Air Pipes, Mk3 Day Coach AC HST	UU 3020
C-S-11978	Arrangement of Underfloor Sheets	UU 0110
C-S-11979	Arrangement of Underfloor Sheets	UU 0110
C-A0-9527	Details of Underfloor Sheets	UU 0110
C-A0-10276	Arrgt of Pipework & Flexible Connections Local to Brake Module	BP 7204
C-S-12126	Arrangement Of Air Extractor Over Oven	CR 6002
C-S-12127	Arrangement Of Air Extractor Over Grill	CR 6002
C-S-13139	Sect Through Airmax 12" Fan & Plenum Chamber In RUK Vehicles Mk3 Standard Carriage	CR 6002
C-S-13140	Sect Through Woods 15" Fan & Plenum Chamber In RSB & RUK Vehicles Mk3 Standard Carriage	CR 6002
C-A1-13228	Cap, Intake Fans RSB & RUK Mk3 Standard Carriage	CA 6002
C-S-13819	Faceplate – Arch Outer Cover	CV 0103
C-A1-14558	Detail of Gutter Over Door, Mark 3 Coach	CR 6004
C-A1-14580	Arrangement of Guttering Over Corner Door, Mark 3 Standard Carriage	CR 6004
C-A1-15939	Assembly of Battery Box Rear Securing Device HST RUB	EB 0006
C-A1-15940	Assembly of Battery Box Front Securing (Device)	EB 0006

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Drawing Number	Drawing Title	Section/ Job No.
	HST RUB	
C-A0-17542	Detail of Underframe Strengthening and Module Rolling Mechanism Mark 3 Loco Hauled and HST	EB 0006
C-S-17672	Arrangement Of Air Extraction Fans & Duct Above Micro-Aire Oven Mk3 RUB	CR 6002
C-S-17673	Arrangement Of Air Extraction Fans & Duct Above Micro-Wave Oven Mk3 RUB	CR 6002
C-A1-18555	Assembly of Battery Box Rear Securing Device Loco Hauled RUB	EB 0006
CR-C0-2301002	Livery Diagram HST, HST East Coast	C*6015
CR-C0-2301003	Livery Diagram HST, TF/TF(D) East Coast	C*6015
CR-C0-2301111	Livery Diagram HST, TRFB East Coast	C*6015
CR-C1-2300122	Assembly And Machining Of Side Bearing Block (Previously-Used Top Block). Mark 3 Hst Trailer Vehs	UM 6106
CR-C1-2300123	Assembly And Machining Of Side Bearing Block (New Top Block). Mark 3 HST Trailer Vehicles	UM 6106
CR-C1-2300137	Detail Of Bottom Block. Mark 3 HST Trailer Vehicles	UM 6106
DD85723/001	WSP Control Unit (Midland Mainline)	BN 0100
IC-A1-8014219	Tailpin Assy and Details	UC 1007
ITL-C1-8015722	Soil Fabrication "Hygiene" Refurbishment	WW 6719
M-A3-9005452	Bonded Seals.	BP 7205
PB-C2-2100103	Detail of Coupler Wearing Pad	UU 6021
PB-A0-2100142	Arrangement Of Door Control Panel No.2 End	OI 0105
PB-A0-2100387	Installation of Vestibule Sliding Door Assy	OJ 6101
PB-C0-2101507	Flexible Harness	BN 0100
PB-C0-2101508	Cable Assemblies for WSP Equipment	BN 0100 EY 0146
PB-C0-2101509	WSP Equipment Connection to Modification Assemblies	BN 0100
PB-C0-2101511	Wiring Diagram for WSP Equipment, Westinghouse System	BN 0100 EY 0146
PB-C1-2101512	WSP Control Unit Mounting Bracket Assembly	BN 0100
PB-C0-2101519	WSP Equipment Mounting Brackets Details	BN 0100
PB-C0-2101521	WSP Equipment and Suspension Brackets Arrangement	BN 0100
PB-C0-2101522	WSP Equipment and Flexible Conduit Arrangement	BN 0100
PB-C1-2104295	Installation of Thread Inserts and Modified Bracket	OKA0131
PB-C1-2104296	Details of Modified Bracket and Packing Strip	OKA0131
PB-CO-2105987	Painting and Livery Diagram HST TF Coach East Midlands Trains	C*6015
PB-CO-2105988 (TS)	Painting and Livery Diagram HST TS Coach East Midlands Trains	C* 6015
PB-CO-2105989	Painting and Livery Diagram HST TGS Coach	C*6015


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Drawing Number	Drawing Title	Section/ Job No.
	East Midlands Trains	
PB-C0-2105992	Painting and Livery Diagram HST TRFB Coach East Midlands Trains	C*6015
PB-C0-2109715	Virgin livery drawings, WB64	C*6015
PB-C0-2109716	Virgin livery drawings, WB64	C*6015
PB-C0-2109717	Virgin livery drawings, WB64	C*6015
PB-C0-2109718	Virgin livery drawings, WB64	C*6015
PB-C0-2110685	Abellio Livery Drawing	C*6015
PB-C0-2110703	Knorr Bremse WSP conduit and installation (ex BR vehicles) – sheet 1 of 2	BN0100
PB-C0-2110704	Knorr Bremse WSP conduit and installation (ex Girling vehicles) – sheet 1 of 2	BN0100
PB-C0-2110705	Knorr Bremse WSP conduit and installation (ex Girling vehicles) – sheet 2 of 2	BN0100
PB-C0-2110723	Knorr Bremse WSP conduit and installation (ex BR vehicles) – sheet 2 of 2	BN0100
PB-CO-2111112	Pneumatic Schematic Davies and Metcalfe Brake Equipment Knorr Bremse WSP Equipment (LHCS)	BE 0006
PB-C0-2111132	Abellio Livery Drawing	C* 6015
PB-C0-2111133	Abellio Livery Drawing	C* 6015
PB-C0-2111134	Abellio Livery Drawing	C* 6015
PB-C0-2108373	Catering Area Extract Fan Installation (TCC)	CR 6002
PB-C0-2301479	CrossCountry Livery Diagram HST Power Car	C* 6015
PB-C0-2301480	CrossCountry Livery Diagram HST, TS Power Car	C* 6015
PB-C0-2301481	CrossCountry Livery Diagram HST, TFD Power Car	C* 6015
PB-C0-2301482	CrossCountry Livery Diagram HST, TSD Power Car	C*6015
PB-C0-2301483	CrossCountry Livery Diagram HST, TCC Power Car	C*6015
PB-C0-2301484	CrossCountry Livery Diagram HST, TGS Power Car	C*6015
-	First Great Western Livery Diagram	C*6015
PS-A1-002368	Standard Lifting Bkt For SWL of 17.5 Tonnes (For Vehicles Up To And Including 70 Tonnes Gross Weight)	UF 6301
SU-C0- 013996	Assembly Of Plenum Chamber TRSB To TBRF Conversion (Project Rio)	CR 6002
SU-C0-014288	Intake Fan Cap Detail TRSB To TBRF Conversion (Project Rio)	CR 6002
S1-00-8008012	Positioning of Overhead Warning Lines Eqpt Warning Lines for I.C. Coaching Stock	C* 6015
TF-TS-803126	EMT HST Livery drawing	C*6015
TF-TS-803123	EMT HST Livery drawing	C*6015
TF-TS-803132	EMT HST Livery drawing	C*6015
VT-C1-2506582	Brake Pressure Limiting Valve Instin (Typical)	BV 0129


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7.2 Reference Documents


Reference Number	Document Title	Section/ Job No.
-	ORR Railway Safety Publication 1 "Developing and Maintaining Staff Competence" March 2007	Section 2
237302	Ferro International – Maintenance Manual for BFG International Ltd of Bombardier Transportation Mark 3 HST (Disabled Persons Toilet)	OI 0105
502-25-0081-001	Crew Communications System Midland Mainline Technical and Operating Manual GTC DAC	EP 5053
ACOP/EC/01006	Approved code of Practice – Inter-Company Train Engineering Change Approval Process	Section 2
AT/MP0400	Bodyside Grille Modification and Installation HST Trailer Vehicles	HD 6170
BR7	Painting Schedule for Interior Surfaces of Air Reservoirs	BRA3004
BS 837-1	Pressure gauges. Bourdon Tube Pressure Gauges. Dimensions, Metrology, Requirements and Testing	BZ 3001
BS EN 60081:1998 Annex D	Double-capped Fluorescent Lamps - Performance Specifications	EZ 1006
BS EN ISO 15614 - 1:2004	Specification and Qualification of Welding Procedures for Metallic Materials	UU 0161
CR/CI0510	Component Overhaul Instruction: BT10 Bogies	UF 6301 US 6004
CR/CI0555	CAU2 Brake Actuator	BH 0310
CR/CI0597	Davies and Metcalfe Est4f/AL2b/S/HBG, AB13-T5 and Est4f/AL2b/S/D/HBG, AB13-T18 Distributors	BD 3000
CR/CI0598	Westinghouse P4a Distributor and Variable Load Valve Overhaul For HST Trailer Vehicles	BD 3000
CR/PE0102	Repainting of Rail Vehicles	AR 0112, BP 0077, BP 3003, BRA3004, BR 3309, BV 4284 CA 0632 EK 5603 FTA0100 OL 0137 OP 0109 OP 0118, UB 6022, UM6030 UMA6037 UU 0110 UU 0161

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Reference Number	Document Title	Section/ Job No.
		UU 3020 UU3021
CR/TP1084	Removal or Isolation of Defective or Redundant Cables and Provision of New Cables	Section 2 Section 3 CR 6002 EB 0006 EP 0536 EP 5053 ES 2029 ES 5028 EW 5004 EY 0146 EY 0303 EZ 1006 HA 0109 HH 8018 HM 0111 HM 5035 HM 5111 HS 5039 HZ 0102 HZ 8003 MO 5017 MO 5018 MO 5019 MO 5022 OI 0105 OJ 0138 OK 0150 OK 5000 OK 5001 WZ 6201
CR/TP1482	Magnetic Particle Testing of Ferromagnetic Steel Components Using Hand Held AC Electromagnetic Yokes	CV 0103 US 6030 UU 3021
CR/TP1463	Repair to Bolster of Mk3 Coach	UU 3021
CR/TS0591	Performance Specification for Timber Bar Counter Varnish	KI 6428
DT/MNTX/9001	User Guide for Diagnostic Tool Westinghouse WSP	EY 0303
IB/CI0265	Component Overhaul Instruction: Inter-vehicle Air Brake Hoses	BV 5320
IB/CI0434	Component Overhaul Instruction: Auto coupler Drophead type	UC 9026
IB/CI0435	Component Overhaul Instruction: Drawhook	UC 9026
IB/CI0480	Component Overhaul Instruction Alliance Coupler	UC 9026
ISO 4406	Hydraulic Fluid Power – Fluids – Method for	BH 0305

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Reference Number	Document Title	Section/ Job No.
	Coding the Level of Contamination by Solid Particles	BH 0316
ITL/MP0518	Fitting Replacement Brake Pipe Pressure Limiting Valves to Mk3 Sleeping Cars	BV 0129
MT 106	Flexible hose assemblies for use on Traction and Rolling Stock	BP 7205
MT 308	Intercity Procedure For Maintenance Painting Of Traction And Rolling Stock	UU 0110
PB/CI0675	Marl 3 and HST Trailer Air Conditioning Module Overhaul Specification	HA 0109
PB/CI0739	Motor Alternator Overhaul Instruction Mk7 Alternators	MO 4029
PB/CI0740	Motor Alternator Overhaul Instruction Mk12 Alternators	MO 4029
PB/CI2110	Component Overhaul Instruction Mark 3/HST Battery Module	EB 0006
PB/CI2175	Component Overhaul Instruction: Mark 3 coach brake module	AV 3303 BN 0100 BV 0330 BV 3106 BV 3305 BV 3320 EH 5206 U* 0105
PB/MP1233	Engineering Change Reduction of Hydraulic Parking Brake Application Pressure on Mark 3 DVT Vehicles	BH 0119
PB/MP1313	Central Door Locking Bolt Mounting Security – Check and Rectification Procedure	OKA0131
PB/MP1771	Mark 3 Coaching Stock Vehicles Removal of Check Valve from Brake Pipe Pressure Limiting Valve Assembly	BV 0129 BV 0137
PB/MP1991	FGW MK3 BFO Parking Brake Instruction	BH 0119
PB/MP1993	Mk3 Vehicles Removal of Check Valve from Brake Pipe Pressure Limiting Valve	BV 0129 BV 0137
PB/TP1139	Repairs to Fatigue Crack on Mark 3 Coach Gangway Faceplate	CV 0103
PB/TP1187	Technical Welding Repair Procedure Reclamation of Worn Areas on HST/Mark 3 Front Follower Castings	UC 6081
PB/TP1372	Corrosion Repairs to The Fixed Skirt of Mark 3 Coaches	MO 4029 UI 6017 UU 0139
PB/TP1487	Overhaul of Air Reservoirs	BRA3004
RIS-2701-RST	Rail Industry Standard for NDT Processes on Rail Vehicles	Section 2
SERCO/TCS/VA1927/001	Serco Technical Consulting Services Report - HST Trailer Car Bodysell Structural Analysis	CA 6001


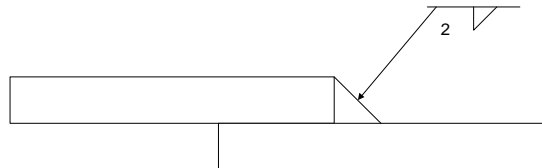
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Reference Number	Document Title	Section/ Job No.
TEE/E/82/M/033	Crew Communication Equipment Type C117	EP 0536 EP 5053
TEE/E/86/M/003	Public Address Receiving Amplifier C176A	EP 5053
TEE/E/86/M/064	Mark 2 WSP Equipment (19" rack) BR Cat. No. 064/007161	EY 0303
TEE/E/87/M/033	Transmitting Amplifier C115/MA	EP 5053
TEE/E/90/M/006	Mark 2 WSP Equipment (19" rack) BR Cat. No. 064/004855	EY 0303
TE/TP0071	Full Test of BR WSP System using Automatic Test Equipment	EY 0303
TE/TP0179	Fault finding guide for Mark 12A 3 phase MA unit as used on Mark 3A (RF) and Mark 3B coaching stock	MO 5022
TE/TP0181	Fault finding guide for Mark 12A 1 phase MA unit as used on Mark 3A converted RF coaching stock	MO 5022
TE/TP0257	LHCS and HST Trailer Car lead acid battery maintenance	EB 0006
TI/TI0024	Repair of loco-hauled coaching stock, HST and Class 488 outward opening bodyside passenger doors and door locks	OKA0128 OK 0148 OL 0137 OL 6202 OO 6110 OP 0109 OP 0116 OP 0118 OP 0120 OY 6479
TI/TP0229	NEI Catering Voltage Converter Test Procedure	EU 0592
TI/TP0430	Full Test of Girling WSP system using test set type 69042349	EY 0303
TI/TP0461	Improved method of retaining Coir matting in Coach Vestibule	IF 6105 OJ 0138 OJ 6102
TI/TP0624	Repair of Altro Safety Flooring in Catering Vehicles	IF 6453
TI/TS0594	Performance Specification for the overhaul of Air Conditioning Module for Mark 3 Coaches	HA 0109
TM/TP0056	Loco Hauled Coaching Stock and HST Outward Opening Door Fault Finding and Repair Procedure	OK 5000 OK 5001 OP 0118
TN/TS0403	Overhaul of bodyside door locks, striking plates, handles, roseplate and escutcheon plates	OL 6202 OO 6110
TS/TRS/004/TIC	Specification for Technical Specification for Motor Alternator Equipment Fault Finding Guide Mark 7 Motor Alternator FM2 Control Unit	MO 5022

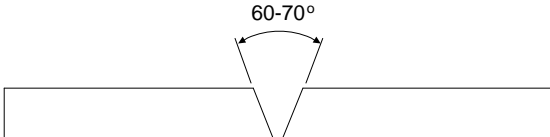

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Reference Number	Document Title	Section/ Job No.
UG/SI-7032-001/001	User Guide for MT32 Diagnostic Tool Westinghouse WSP	EY0303
WOSS 560/3	Cable Repairs	EW 5004
WOSS 643/2	Vestibule Auto Doorgear Associated with Invalid Toilet Auto Doorgear	OJ 6102
WOSS 690/4	Pressure Gauges	BG 3317
WOSS 850/10	Overhaul of Trafag Thermostats	HZ 8003
WPS MG713	Welding Procedure	CRA0104
WPS MG714	Welding Procedure	CRA0104

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BRITISH RAILWAYS BOARD				
WELDING PROCEDURE SPECIFICATION				
Joint Type: Fillet (Lap) Weld		Procedure No: MG 713 Issue : 1		W.P.A.R. No: MG 343
Welding Process: MAG		Welding Spec: TL/TT0005 and BS 5135		
Material Spec: BS 1449 Sec 1.4 HR34/20, HR37/23 and HR 43/25 BS EN 10 025 Fe430B,C,D1 and D2 (Max CEV 0.4%)		Material Thickness Range: 1.6mm to 2mm		
Joint Configuration (Sketch) <div></div> <p>Maximum fit-up gap 0.5mm</p>		Run Sequence (Sketch) <div></div>		
WELDING PARAMETERS		WELDING CONSUMABLES		
Run No.	All			Specification: BS 2901 Part 1: A18
Electrode/Wire dia	1mm			BR Catmaster No: 046/150283
Amperage	115-125			Shield Gas/Flux: * Argoshield 80/20
Arc Voltage	17-19			Storage Conditions: (see Note 1)
Polarity	DC+			HEAT TREATMENT PARAMETERS
Position	All			Preheat Temp: N/A
Travel speed mm/sec	4-5			Interpass Temp: N/A
Gas Flow Rate 1/min	15-18			Measuring Method: N/A
Method of Preparation: Shear, Grind, Degrease and Wire Brush		N.D.T. Method: 100% Visual and M.P.I. if required		
Second Side Treatment: N/A		Note: 1. As per manufacturer's recommendation. *Argoshield 80/20 - 80% Ar/20% CO ₂		
Other Information:				

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BRITISH RAILWAYS BOARD				
WELDING PROCEDURE SPECIFICATION				
Joint Type: Single V Butt Weld		Procedure No: MG 714 Issue : 1	W.P.A.R. No: MG 342	
Welding Process: MAG		Welding Spec: TL/TT0005 and BS 5135		
Material Spec: BS 1449 Sec 1.4 HR34/20, HR37/23 and HR 43/25 BS EN 10 025 Fe430B,C,D1 and D2 (Max CEV 0.4%)		Material Thickness Range: 1.6mm to 2mm		
<div>Joint Configuration (Sketch)</div> <div></div> <div>Root Face 0.5mm Root Gap 1mm to 1.5mm</div>		<div>Run Sequence (Sketch)</div> <div></div>		
WELDING PARAMETERS		WELDING CONSUMABLES		
Run No.	All			Specification: BS 2901 Part 1: A18
Electrode/Wire dia	1mm			BR Catmaster No: 046/150283
Amperage	90-100			Shield Gas/Flux: * Argoshield 80/20
Arc Voltage	16-18			Storage Conditions: (see Note 1)
Polarity	DC+			HEAT TREATMENT PARAMETERS
Position	All			Preheat Temp: N/A
Travel speed mm/sec	4-5			Interpass Temp: N/A
Gas Flow Rate 1/min	15-18			Measuring Method: N/A
Method of Preparation: Shear, Grind, Degrease and Wire Brush		N.D.T. Method: 100% Visual and M.P.I. if required		
Second Side Treatment: N/A		Note: 1. As per manufacturer's recommendation. *Argoshield 80/20 - 80% Ar/20% CO ₂		
Other Information:				


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8. REVISION HISTORY


This revision letter details the changes made in re-issuing PB/VI2133 from Issue 4 to Issue 5 Draft 1.

Content from the previous issue has been deleted, moved and/or modified as detailed in the table below:


Section	Change	Change Category	Reason for Change
General	Document updated to latest template.	M	To reflect Porterbrook's latest requirements.
General	All references to LHCS, LH or Loco Hauled coaching Stock standardised to LHCS.	C	To standardise terminology for the vehicles.
General	All notes capitalised and numbered (except where there is only one note in the job/section).	C	To provide a consistent approach.
General	Text on numerous figures throughout the document enhanced.	C	To improve the quality of the figures.
General	All figures given a title.	C	To aid the end user in what the figures show.
General	All references to TRSB vehicles or 404xx deleted.	N	Porterbrook no longer have these vehicles in the fleet.
General	All references to RF vehicles updated to RFM.	C	To reflect nomenclature of vehicle types in the current fleet to which the document applies.
General	All references to TRBF vehicles updated to TRFB or TBRF as applicable.	C	To reflect nomenclature of vehicle types in the current fleet to which the document applies.
General	References to CR/TP1084 within the following jobs amended: CR 6002, EB 0006, EP 0536, EP 5053, ES 2029, ES 5028, EW 5004, EY 0146, EY 0303, EZ 1006, HA 0109, HH 8018, HM 0111, HM 5111, HM 5035, HS 5039, HZ 0102, HZ 8003, MO 5017, MO 5018, MO 5019, MO 5022, OI 0105, OJ 0138, OK 0150, OK 5000, OK 5001, WZ 6201,	J	To reflect the latest document title.
General	Reference added in numerous sections and jobs to Section 5.9.	C	Section 5.9 now identifies the latest list of vehicles and configuration for each one.

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Section	Change	Change Category	Reason for Change
1	Updated to show latest details for this issue of the document.	N	To reflect latest details.
2	Descriptions of vehicle types covered by this document either entered in full, new vehicle types added and vehicles no longer applicable deleted.	L	To reflect the current fleet of vehicles that are applicable to the document.
	Reference to Section 5.9 included in part 2.2.2 for vehicles fitted with brake modules.	C	To aid the end user.
	Vehicle control end for Mk3a included for RFM (No. 2 end).	C	To reflect findings from a vehicle inspection.
	Revised text for NDT section included.	I	To reflect latest statement used throughout the rail industry.
3	Section updated to identify vehicles fitted or not fitted with brake modules.	A	To aid the end user.
	Jobs either deleted, added or associated periodicities updated accordingly. Original changes that were required were supplied by Porterbrook and have been subsequently amended following dialogue between Porterbrook and Interfleet.	A	To reflect latest findings following a review of the previous issue of the document by Porterbrook and discussion /agreements with Interfleet. (Refer to comments against jobs below for additional information).
4	See entries below:	-	-
AR 0112	Vehicle applicability statement amended.	C	To identify more appropriately the type of vehicle that the job applies to.
AV 3303	Vehicle applicability statement amended.	C	To identify more appropriately the type of vehicle that the job applies to.
BD 0100	Vehicle applicability statement amended.	C	To identify more appropriately the type of vehicle that the job applies to.
	Note added to record air/brake results.	C	Missing from previous issues of the document although the recording form appeared in Section 5.
BD 3000	Vehicle applicability statement amended.	C	To identify more appropriately the type of vehicle that the job applies to.

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Section	Change	Change Category	Reason for Change
BD 3000 Cont'd	Note added for vehicles fitted with Westinghouse distributors and variable load valves including the relevant overhaul document.	J	Not identified in the previous issue of the document.
BD 3516	Full range of grease quantity sizes and associated Cat Numbers are included.	C	To provide the end user with options.
BE 0006	Air schematics now added and explanatory notes added.	C	To aid the end user.
BE 0111	Note added to record air/brake results.	C	Missing from previous issues of the document although the recording form appeared in Section 5.
BH 0119	Job updated to reflect the latest design of parking brake equipment now fitted.	A	BFO vehicle now makes use of the parking brake equipment fitted to the MK3 DVT as identified in Modification Procedure PB/MP1991.
BH 0305	Job updated to reflect the latest design of parking brake equipment now fitted.	A	BFO vehicle now makes use of the parking brake equipment fitted to the MK3 DVT as identified in Modification Procedure PB/MP1991.
	Note added to record air/brake results.	A	Missing from previous issues of the document although the recording form appeared in Section 5.
BH 0316	Job updated to reflect the latest design of parking brake equipment now fitted.	A	BFO vehicle now makes use of the parking brake equipment fitted to the MK3 DVT as identified in Modification Procedure PB/MP1991.
BN 0100	Vehicle applicability statement amended.	C	To identify more appropriately the type of vehicle that the job applies to.
	Reference to overhauling WSP pressure switches deleted.	L	Overhaul of these components is covered in reference document PB/CI2175.
	Reference drawings 10,11,12 & 13	C	To reflect current status of the fleet and aid the end user.

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Section	Change	Change Category	Reason for Change
BP 7204	Vehicle applicability statement amended.	C	To identify more appropriately the type of vehicle that the job applies to.
	Relevant item numbers for hoses and associated drawing reference included.	C	To aid the end user.
BRA3004	Overhaul document for reservoirs amended.	H	To reflect the latest documentation to use for overhaul of the components.
BR 3309	Vehicle applicability statement amended.	C	To identify more appropriately the type of vehicle that the job applies to.
BV 0129	Vehicle applicability statement amended.	C	To identify more appropriately the type of vehicle that the job applies to.
BV 0137	Vehicle applicability statement amended.	C	To identify more appropriately the type of vehicle that the job applies to.
BV 0330	Vehicle applicability statement amended.	C	To identify more appropriately the type of vehicle that the job applies to.
BV 3106	Vehicle applicability statement amended.	C	To identify more appropriately the type of vehicle that the job applies to.
BV 3110	Note added to record air/brake results.	C	Missing from previous issues of the document although the recording form appeared in Section 5.
BV 3111	Vehicle applicability statement amended.	C	To identify more appropriately the type of vehicle that the job applies to.
	Note added to record air/brake results.	C	Missing from previous issues of the document although the recording form appeared in Section 5.
BV 3305	Vehicle applicability statement amended.	C	To identify more appropriately the type of vehicle that the job applies to.
BV 3320	Vehicle applicability statement amended.	C	To identify more appropriately the type of vehicle that the job applies to.
BV 4284	Vehicle applicability statement amended.	C	To identify more appropriately the type of vehicle that the job applies to.
BV 5320	Hose and coupling cock details updated and figures added to identify important issues.	C	To aid the end user and ensure correct components are used.

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Section	Change	Change Category	Reason for Change
	Hose overhaul document updated.	H	To reflect the latest overhaul document to use for these components.
BV 5320 Cont'd	Procedure P deleted from main text.	C	Partly duplicated in arising work 1. Detail that was not in arising work 1 added.
	Note added to record air/brake results.	C	Missing from previous issues of the document although the recording form appeared in Section 5.
BZ 3001	Text of job amended in various locations.	L	To reflect anomalies in previous issues of the document and to capture findings at last C4X vehicle overhaul.
BZ 3002	Text of job updated in various areas.	A	To reflect the recommendations from Interfleet Assignment T30354.
	New proportionality test parameters included for LHCS operated with Mk3 DVTs.	A	To differentiate testing requirements for LHCS that will be operated with a DVT and those that are not operated with a DVT
	Reference made to removing equipment at the end of the test.	L	Missing from previous issue of the document.
C* 6015	New Abellio Greater Anglia or AGA drawings added to drawing list and previous NXEA drawing references deleted.	H	To reflect latest livery requirements.
	New general data panel drawing referenced in drawing list and previous data panel drawings deleted.	H	To reflect the new drawing to be used which simplifies the requirements.
	Painting criteria for Table 1 added for Abellio Greater Anglia or AGA fleet.	A	To reflect latest details for this fleet.
CA 6001	NDT criteria added for stub pillars and areas of the door portal.	A	To ensure these areas are tested if exposed as part of the overhaul.
CC 6442	Vehicle applicability statement amended.	C	To identify more appropriately the type of vehicle that the job applies to.
CM 6615	Full range of grease quantity sizes and associated Cat Numbers are included.	C	To provide the end user with options.

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Section	Change	Change Category	Reason for Change
	Checking of wooden mounting block located below the droplight included.	A	Not covered in previous issues of the document and instances have occurred where the item has not been fitted.
CR 6002	Job enhanced in detail to capture all roof cowls and associated drawings that apply to the fleet.	A	To capture examination of all cowls on the fleet and close out risk after a cowl became detached on a vehicle (NIR 2506).
	Cross references made to relevant fan motor jobs to perform whilst cowls are removed.	C	To aid the end user.
CR 6004	Minor changes to make sure the Supplier identifies procedures to be used if required.	C	Clarification of requirements.
CS 0101	New job to examine footsteps.	A	Not covered in previous issues of the document.
CS 6017	Text updated to enhance examination requirements and fitting procedures.	C	Not covered in previous issues of the document.
	Reference made to the livery drawings for painting of the commode handle.	C	To ensure the correct colour is applied for each user.
CV 0102	No change.	-	-
CV 0103	MPI document added as opposed to referring to the Engineer.	H	New Common Rosco document in force for MPI techniques.
	Note added regarding modified and strengthened gangway faceplates and to contact the Engineer for replacement details.	A	To reflect that certain vehicles (as listed) have been modified and any replacement item must be to the same configuration.
	Spherical rubber bush now 100% renew as opposed to gauge.	A	Agreement from last C4X overhaul.
	Check of the gangway arch and associated retention straps included.	C	Not previously checked so included to ensure components are in a satisfactory condition.
CV 0105	Updated to emphasise the fact the links are to be checked to see that they fitted in the correct orientation and nuts are in the lower position.	C	To overcome problems where they have been known to be fitted incorrectly and damage the gangway diaphragm.

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Section	Change	Change Category	Reason for Change
CVA0117	Note added to emphasise that the bolts and pins are to be fitted in the correct orientation.	C	To overcome problems where they are fitted incorrectly and damage the gangway diaphragm.
CWA0127	Note added to clarify that glazing units must be fitted correct way around.	C	Clarification of requirement
EH 5203	Job rewritten to clarify which pressure switches are to be tested and a table included to show the WSP pressure switch variants.	C	It was not clear in previous issues which switches needed attention so the text has been rewritten to clarify to the end user which switches the job applies to.
EH 5206	New job to address changing pressure switches at C4E and C6 overhauls for vehicles without a brake module. For vehicles that have a brake module, the switches will be overhauled as part of the module overhaul (via Job BN 0100).	A	To clarify to the end user which switches need attention and to what overhaul documentation.
EJ 1014	Checking RCH jumper retaining chain added and details for the cover (pan) plate gasket.	A	Not covered in previous issue of the document and will ensure that chains are in a satisfactory condition. Gasket detail supplied by OEM included to aid the end user.
EL 0125	Job enhanced to explain how many networks are fitted to the vehicle and detailed text explaining how to remove and refit the arrangements.	C	To aid the end user and to ensure the assemblies are correctly fitted.
EP5053	Reference Documents 1 to 3 document numbers corrected.	H	Correction of previous error.
	Catalogue number Item 1 corrected.	H	Correction of previous error.
EU 5902	Vehicle applicability statement amended.	C	To identify more appropriately the type of vehicle that the job applies to.
EY 0303	Reference Documents 4, 5 & 6 document numbers corrected.	H	Correction of previous error.
	Note added to identify that some vehicles have had the WSP racks upgraded.	K	To highlight the issue to the Supplier so appropriate action can be taken.

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Section	Change	Change Category	Reason for Change
FF 6238	Text amended to state any replacement floor covering must be agreed with the Engineer prior to fitting.	K	To ensure that the material is the correct colour and to the correct specification as these may change over time.
FX 0100	Reference to the trolley store area now included.	C	Not covered in previous issue of the document.
	Text amended to state any replacement floor covering must be agreed with the Engineer prior to fitting.	K	To ensure that the material is the correct colour and to the correct specification as these may change over time.
FX 0101	Reference to TSOB vehicles added.	C	TSOB added as these are in the Porterbrook fleet.
HA 0109	Note added regarding East Coast air conditioning modules.	A	To explain a new type module has been fitted and details are available from the Engineer.
	Text in Part 10 for testing the Over – Temperature thermostats rewritten following inspection of a module on-site being overhauled.	C	Testing requirements not fully described in previous issue of the document.
HD 6170	Grille modification procedure and associated drawings included so that any work requested by the Engineer can be performed.	A	To aid the end user and to identify the documentation needed for modifying vehicle grilles.
HD 6193	Note added to explain that temporary filters need to be fitted post duct cleaning.	C	To prevent passengers getting covered in dirt/debris that has been dislodged as part of the duct cleaning process.
HD 8002	Text of job enhanced to examine in more detail the ducts, insulation and fixings including the associated drawings for repair purposes.	C	To clarify in more detail the components that need to be checked to aid the end user.
HH8018	Reference Drawing 1 added.	H	To provide the user with a useful reference drawing.
HM 0111	Vehicle applicability statement amended.	C	To identify more appropriately the type of vehicle that the job applies to.
	Note added to explain about roof cowl attention and original text relating to cowl examination deleted.	C	To explain roof cowl attention is now addressed in Job No. CR 6002 where it is more appropriate.
	Materials table added.	C	To provide the user with data.

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Section	Change	Change Category	Reason for Change
HM 0112	Full range of grease quantity sizes and associated Cat Numbers are included.	C	To provide the end user with options.
HM 0820	Note added to explain about roof cowl attention and original text relating to cowl examination deleted.	C	To explain roof cowl attention is now addressed in Job No. CR 6002 where it is more appropriate.
HM 5035	Vehicle applicability statement amended.	C	To identify more appropriately the type of vehicle that the job applies to.
	Note added to explain about roof cowl attention and original text relating to cowl examination deleted.	C	To explain roof cowl attention is now addressed in Job No. CR 6002 where it is more appropriate.
HM 5111	Note added to explain about roof cowl attention and original text relating to cowl examination deleted.	C	To explain roof cowl attention is now addressed in Job No. CR 6002 where it is more appropriate.
	RFM quantity per vehicle added	C	To provide the user with data.
HM 5113	Note added to explain about roof cowl attention and original text relating to cowl examination deleted.	C	To explain roof cowl attention is now addressed in Job No. CR 6002 where it is more appropriate.
	RFM quantity per vehicle added	C	To provide the user with data.
HTA8401	Note added to explain that some vehicles are fitted with "Xcel" electronic thermostats.	A	To highlight the issue to the Supplier so they are aware of the differences.
HTA8402	Note added to explain that some vehicles are fitted with "Xcel" electronic thermostats.	A	To highlight the issue to the Supplier so they are aware of the differences.
HZ 8003	Testing air flow using smoke deleted.	A	Alternative method now used using an anemometer as per last C4X overhaul.
	Original Section 4.2 deleted relating to testing TRSB vehicles.	N	No TRSB vehicles in Porterbrook fleet any longer.
	Note added to explain that some vehicles are fitted with "Xcel" electronic thermostats.	A	To highlight the issue to the Supplier so they are aware of the differences.
IE 6175	Reference made to decals in Note 1.	C	To reflect the finish that could be applied.

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Section	Change	Change Category	Reason for Change
IF 6033	Job updated to identify that 2 types of arrangements could be found fitted and photos added to show the difference and materials list included.	C	Outcome of a review of the vehicles on site. Material information obtained from relevant drawings to aid the end user.
IF 6105	Job rewritten to encompass all possible types of vestibule floor covering, not just Coir matting as previous.	K	To reflect the floor covering now fitted.
	Materials, Reference document and Reference drawing added as alternatives for retention of covering.	A	Various options exist for retention of floor covering.
IF 6109	Text amended to state any replacement floor covering must be agreed with the Engineer prior to fitting.	K	To ensure that the material is the correct colour and to the correct specification as these may change over time.
IF 6407	Text amended to state any replacement floor covering must be agreed with the Engineer prior to fitting.	K	To ensure that the material is the correct colour and to the correct specification as these may change over time.
IF 6422	Text amended to state any replacement floor covering must be agreed with the Engineer prior to fitting.	K	To ensure that the material is the correct colour and to the correct specification as these may change over time.
	Note added to identify where the TCC vehicle floor covering is addressed.	C	To clarify requirements.
IF 6453	Vehicle applicability statement amended.	C	To identify more appropriately the type of vehicle that the job applies to.
IF 6504	Text amended to state any replacement floor covering must be agreed with the Engineer prior to fitting.	K	To ensure that the material is the correct colour and to the correct specification as these may change over time.
II 6623	Option added to repair defects in addition to capping.	C	Provide an option for the Supplier.
IQ 6631	Job deleted.	N	All vehicles have had the payphone booth removed.
KI 0110	Sealant description identified and included for this application.	C	To aid the end user.
MO 4020	Job deleted.	N	Replaced by new job MO 4029.

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Section	Change	Change Category	Reason for Change
MO 4029	New job to examine the MA set but renew mounts mandatorily. Replace jobs MO 4020, 5013 and 5046 and now applies at C4, C4E and C4X overhauls.	A	To support mileage extension work previously carried out and to minimise confusion as to what the requirements are for the job.
	Reference Document for overhauling MA sets amended from the WOSS to PB/CI0739 and PB/CI0740.	H	To capture latest overhaul document.
	Table included into job to identify the MA sets that are fitted to each vehicle type.	C	To aid the end user.
	Note added to emphasise the fact that the TSOB junction box perspex panels should be transplanted.	C	The panels are unique and need to be retained and only fitted on these vehicles.
MO 5013	Job deleted.	N	Combined into new Job MO 4029.
MO 5022	Original text deleted and replaced by new text supplied by Client.	C	Updated version of the job based on fleet experience.
	Cat Nos. included for the MA sets.	K	Not identified in previous issue of the document.
	New text for Notes 1 to 3 added to replace existing note. Detail based on practical experience by the Supplier.	C	To explain how to test the NVR if a variable ETS supply is not available.
MO 5046	Job deleted.	N	Replaced by new job MO 4029.
OC 0617	Previous reference to OH 6105 now refers to OJ 0138.	-	-
	Vehicle type and door position clarified in Part 1.1.	C	To reflect latest details.
	External air supply pressure clarified.	C	To accommodate HST's fitted with a BFG toilet.
	The word "and" deleted from Note 1 after 7bar.	L	Correction of error in previous issues of the document.
OI 0105	Note 2 amended.	A	Job OC 0617 should be done first regardless of door type.
OI 0625	Text added to check the sealing strips, brush strips and the associated drawings.	A	Not identified in previous issue of the document.

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Section	Change	Change Category	Reason for Change
OJ 0138	New job to replace Job No. OJ 6105.	A	More appropriate job and has been enhanced to capture numerous changes.
	Vehicle applicability amended and explained in more detail at start of job and each sub-section.	C	To reflect latest details and to aid the end user.
	Part 0 updated.	C	To capture additional information that appeared in deleted Job OJ 0650.
	Part 6 updated.	C	To capture additional information that appeared in deleted Job OJ 0650.
	New Part 7 included.	A	To capture the requirements for the doors fitted adjacent to BFG toilets.
OJ 0650	Job deleted and relevant text moved to Job No. OJ 0138 (originally OJ 6105).	N	Duplication of work in Part zero and text is more appropriate in Job OJ 0138 following discussions/agreement with Porterbrook.
OJ 0651	Vehicle applicability amended and location of door included.	C	To identify it only applies to vehicles identified as BRB-MML in Section 5.9.
OJ 6101	Vehicle applicability amended and location of door included.	C	To identify it only applies to vehicles with a BRB toilet.
	Reference to HST related information deleted.	N	Job now only applies to LHCS.
OJ 6102	Vehicle applicability amended and location of door included.	C	To identify it only applies to vehicles with a BRB toilet.
	Reference to HST related information deleted.	N	Job now only applies to LHCS.
	Other amended text updated generally.	C	To aid the end user and to clarify requirements.
OJ 6105	Job deleted.	N	Replaced by Job No. OJ 0138 which now covers examination and testing.
OK 0005	Note 1 added to explain what vehicles and at what positions the brake pipe dump valves are fitted.	C	Clarification and to aid the end user.
OK 0010	Quantity per vehicle table amended for BFO vehicles.	C	To reflect findings following a check of the vehicles.
	Note added to record the positions of the pneumatic connections.	C	To assist when reconnecting the replacement item.

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Section	Change	Change Category	Reason for Change
	Notes added to check that the waterproofing modification has been carried out.	C	To reflect current working practices. Extracted from Anglia documentation.
OK 0115	Note added to explain what vehicles and at what positions the CDL bolts are fitted.	C	Clarification and to aid the end user.
OK 0120	The type of jumper assembly now fitted to vehicles rationalised.	A	To reflect latest configuration of the fleets.
	Explanatory notes added to explain the differences in jumper assemblies that are fitted across the fleets.	C	To reflect latest configuration of the fleets.
	Text added to check the jumper cable terminal box mounting bracket for defects and security.	A	Not covered in previous issues of the document, so a check for defects and security included and the associated drawings for repairs.
OK 0121	Explanatory notes added to explain differences in receptacles that are fitted across the fleets.	C	To reflect latest configuration of the fleets.
OK 0121 Cont'd	Text added to check the receptacle mounting bracket for defects and security.	C	Not covered in previous issues of the document, so a check for defects and security included and the associated drawings for repairs.
	Torque figure and the fasteners used to retain the receptacle to the mounting bracket included.	A	To aid the end user, not previously identified.
	Base gasket details identified and included following discussions with the OEM.	K	To aid the end user, not previously identified.
OK 0122	Explanatory note added to explain some vehicles have modified jumpers which do not use a dummy receptacle.	C	To reflect latest configuration of the fleets.
	Text added to check the dummy receptacle mounting bracket for defects and security.	C	Not covered in previous issues of the document, so a check for defects and security included and the associated drawings for repairs.

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Section	Change	Change Category	Reason for Change
	Torque figure and the fasteners used to retain the receptacle to the mounting bracket included.	A	To aid the end user, not previously identified.
	Base gasket details identified and included following discussions with the OEM.	K	To aid the end user, not previously identified.
OK 0133	Replacement CDL air supply module details included.	A	To reflect the alternative design that has now been made available for use on these vehicles.
	Note added regarding mounting feet requirements.	C	To aid the end user.
	Vehicle applicability content amended in materials table.	C	To reflect latest configuration of the fleet.
	Explanatory note added relating to the new isolation procedure label.	C	To alert staff to isolation procedures that need to be followed.
OKA0139	Explanatory notes for jumper assemblies and associated drawings included.	C	To aid the end user.
OK 0146	Vehicle applicability and qty/vehicle table included.	C	To clarify details and aid the end users.
OK 0147	Vehicle applicability and qty/vehicle table included.	C	To clarify details and aid the end users.
	An additional check of the backing plate included.	A	To address known problems that have been reported of corrosion.
	Reference drawing of the installation included.	C	To aid the end user.
OK 0148	Vehicle applicability and qty/vehicle table included.	C	To clarify details and aid the end users.
	Drawing number for shims corrected.	L	Error in previous issue of the document.
	Note added to explain that the job is not required if the door has already been condemned following jobs OP 0116 or OP 0118.	F	To reduce the risk of abortive work.
	Fixings for striker plate identified and included.	K	To aid the end user.
OK 0151	Vehicle applicability and qty/vehicle table included.	C	To clarify details and aid the end users.
	The brake pipe filter now 100% renewed as opposed to only when advised by the Engineer.	A	Client request.

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Section	Change	Change Category	Reason for Change
OK 5000	Latest Cat Nos. for bulb and LEDs identified and corrected. Details for other materials included or amended.	K	Bulb Cat No. incorrect in previous issue of the document and other items identified and included or detail corrected following checks with depot.
	Note added to explain about single vehicle testing on some vehicles.	C	Following confirmation on site that some vehicles cannot be fully tested.
	The tolerance range when checking the arrow on the flag against the aperture ring amended from $\pm 1.5\text{mm}$ to 1mm.	A	To reflect the VMI figure and to capture a previous review comment from AGA Fleet Manager/Competency Assessor.
OK 5001	Latest Cat Nos. for bulb and LEDs identified and corrected. Details for other materials included or amended,	K	Bulb Cat No. incorrect in previous issue of the document and other items identified and included or detail corrected following checks with depot.
	Note added to explain about single vehicle testing on some vehicles.	C	Following confirmation on site that some vehicles cannot be fully tested.
	The tolerance range when checking the arrow on the flag against the aperture ring amended from $\pm 1.5\text{mm}$ to 1mm.	A	To reflect the VMI figure and to capture a previous review comment from AGA Fleet Manager/Competency Assessor.
	Details in diagrams updated relating to vehicles and locations of equipment.	C	To capture findings of a review that has been carried out.
	New diagram added for TGS vehicles to identify vehicles and location of equipment.	A	Missing from previous issue of the document.
	Testing of the BFO local door release included.	A	Missing from previous issue of the document.
OL 0112	The detail for light oil specified in more detail using existing details from similar sources/components.	C	To identify a suitable oil to be used for this application.
OL 0137	Lock edge shim details included.	A	Outcome of a review on vehicles at the depot.
	Use of Loctite in Part C7 deleted.	N	Covered in Part C11 once checks have been performed and is an outcome of a door review exercise.

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Section	Change	Change Category	Reason for Change
	Reference to using a hole cutter deleted and replaced with a small chisel and hammer.	C	Identified as part of a door review exercise.
OL 0137	Note added to explain that a procedure for fitting a new door lock to a new door identified in Part C.	A	Outcome of a door review exercise.
OL 0140	Checking of the door handle max variation from the horizontal amended to state "handle" and not "door" in part 8.	A	Identified as part of a door review exercise.
OL 0140 Cont'd	Two figure 2's appeared in the job, so reference now made to a Figure 3.	L	Correction of error in previous issue of the document.
OO 0125	Reference to using pins or staples to retain the stand pillar draught excluder replaced with adhesive.	A	To reflect current practice adopted by the Supplier and that used for the door boot draught excluder.
OO 6110	Reference made to using new screws to secure the striking plate in position.	A	Clarification and best practice.
	Torque figure included for use when finally tightening striking plate fasteners.	A	To reflect recommendations from previous C4X overhaul (Variation 5029).
OP 0109	Variations in door check strap lengths included to ensure doors do not open beyond 90°.	K	Identified as an ongoing issue and will help minimise the risk of damage to the door and components.
	Note added to explain some vehicles have protective panels fitted adjacent to catering vehicles and these must be retained if a door is condemned.	C	To ensure the panels are not scrapped and can be retained for use on a new door.
OP 0116	Note added to explain some vehicles have protective panels fitted adjacent to catering vehicles and these must be retained if a door is condemned.	C	To ensure the panels are not scrapped and can be retained for use on a new door.
OP 0118	The detail for light oil specified in more detail using existing details from similar sources/components.	C	To identify a suitable oil to be used for this application.

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Section	Change	Change Category	Reason for Change
OP 0118 Cont'd	Variations in door check strap lengths included to ensure doors do not open beyond 90°.	K	Identified as an outgoing issue and will help minimise the risk of damage to the door and components.
	Note added to explain some vehicles have protective panels fitted adjacent to catering vehicles and these must be retained if a door is condemned.	C	To ensure the panels are not scrapped and can be retained for use on a new door.
	Text added to Arising Work for door lock fitted by referring to Job No. OL 0136 Part C.	A	Outcome of a door review exercise.
U* 0105	Condition check of builders plate included and action required if loose or missing.	A	To address a known problem with the component and prevent incidents occurring.
	Reference to jobs MO 5013 and MO 5046 replaced with new Job MO 4029.	A	To reflect latest job that applies to MA sets.
	Numerous Cat No. entries amended/corrected.	K	Cat Nos. checked and found to be incorrect/wrong number shown.
UB 6022	Check of buffer saddle rest and wooden block included into job.	A	Not previously checked and is subject to damage or rotting.
	Quantity sizes for greases included.	C	To provide the Supplied with options.
UB 6025	Quantity sizes for greases included.	C	To provide the Supplied with options.
	Dimensional checks of the buffer sleeve included.	A	Not previously checked and aids the end user.
	Buffer case larger inside diameter amended from 215mm to 218mm.	L	To correct an error in the previous issue of the document.
UC 1004	Different size side control unit, units included and how to set dimensions.	C	To identify the different types of assembly and how to achieve the required gap.
UC 1007	New job to renew tailpin. Original job UC 6039 to examine and gauge deleted.	N	To close out previous issues with this component – Reference NIR 2827.
UC 6039	Job deleted.	N	Replaced by new job UC 1007.
UC 6081	No change.	-	-
UC 6082	Light oil specified in more detail using existing details from similar sources/components.	C	To identify a suitable oil to be used for this application.

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Section	Change	Change Category	Reason for Change
UC6084	Detail and a diagram showing where the centre pin is located included.	C	Clarification and to aid the end user.
UC 9025	Reference to discarding the tailpin included.	N	Tailpins now renewed in Job No. UC 1007.
	Reference to the headstock wearing pad included in Figure 1.	C	Not shown in previous issues of the document and there is a requirement to examine the component for wear now.
UC 9026	Job No. for tailpin requirements amended in table and new job for wear pad included.	A	To reflect changes throughout the document.
	Note added relating to setting treadplate gaps.	C	To aid the end user by explaining the treadplate gap is addressed as part of the final re-assembly process.
UC 9027	Detail added to materials list for new tailpin.	K	Latest requirement is to renew the pin (see entry for UC 1007) as opposed to examine and gauge and fit as part of the re-assembly process.
UF 6301	Note added to disconnect the hydraulic hoses on BFO vehicles at the bogie and seal to prevent ingress of dirt etc.	A	Not previously identified as a requirement to disconnect these hoses. Disconnection at the bogie included to follow requirements on various other fleets.
	Figures renumbered, title of figures included and associated text amended to reflect changes made.	C	Figure titles not shown in previous issues of the document.
UM 6030	Reference to document TL/NP0117 replaced by CR/TP1482.	H	To reflect the latest documentation to use for MPI.
UMA6037	Cleaning of all abutment faces and shims included.	C	To ensure all mating surfaces are clean and enable a good joint to be achieved.
	A more robust method for clamping and sealing the arrangement included.	C	Previous method out of date and the materials identified found to be not available.
UM 6106	Note added to protect side bearer surfaces if used when standing on trestles.	C	To emphasise the need to protect the surface to prevent damage occurring.
UM 6106 Cont'd	Examination criteria for single piece blocks enhanced.	C	To provide a practical limit which is easily determined.

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Section	Change	Change Category	Reason for Change
	Sub-section cross reference corrected.	L	Correction of error in previous issue of the document.
US 6004	Note added to explain weights can be used as opposed to filling water tanks when setting vehicle heights.	C	Alternative option and has been used recently by a Supplier on another overhaul.
UU 0110	Note added to ensure underframe panels are of steel construction and are retained with the correct fasteners.	A	To clarify latest requirements as defined in Interfleet Report ITLR-T30700-001 Issue 3.
	Painting of the finished assembly added.	C	To protect the fastener and surrounding area.
UU 0139	Checking of the gusset plates for defective welds, corrosion etc. and associated drawings for use when repairs are needed.	A	Not previously checked (specifically) and included to address NIR 2828.
UU 0161	New job to check the lifting loops for defects.	A	Not previously performed as a specific check and is based on an approved copy from another relevant document.
UU 3020	Specific text added for checking supply boxes and their receptacles and inter-vehicle air hose stowage brackets. Relevant drawings and added for repairs if required.	C	To ensure the items are secure and free from defects.
UU 3021	Job revised to reflect details and areas to check from another already approved relevant document.	C	To ensure latest requirements are captured for checking this area.
UU 6021	New job to examine the coupler wear pad and to replace existing design (if fitted) with latest polymer design and associated wear limit.	A	To ensure configuration of the fleet is maintained and only the latest type of pad is fitted.
WH 6532	Vehicle applicability and explanatory notes added to the start of the job.	C	To reflect current status of the fleet and aid the end user.

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Section	Change	Change Category	Reason for Change
WH 6532	Note added to advise the Supplier that the water heaters on TFE vehicles have been electrically isolated or if not an action has been included to contact the Engineer for the action to be taken.	C	To prevent incurring additional costs (by overhauling the component on these vehicles) when the component is not operational.
WPA0103	Job deleted.	N	Advised that asbestos is no longer present on the fleets.
WPA0104	Job deleted.	N	Advised that asbestos is no longer present on the fleets.
WP 0105	Job deleted.	N	Advised that asbestos is no longer present on the fleets.
WP 6708	Reference to job WP 0105 deleted.	N	Job no longer required, see entry for WP 0105.
WW 6719	Vehicle applicability and explanatory notes added to the start of the job.	C	To reflect current status of the fleet and notes added to aid the end user.
WZ 6201	Note added to explain the job does not apply to TFE vehicles any longer.	C	The heater has been electrically isolated on these vehicles so is not functional.
ZC 0101	Job deleted.	N	Advised that asbestos is no longer present on the fleets.
ZY 0116	Vehicle applicability entry amended.	C	Job only applies to vehicles with toilets fitted now.
ZY 0148	No change to the job, but entry missing in Star Chart.	L	Missing from previous issues of the document.
ZY 0149	Vehicle applicability entry amended.	C	To reflect the vehicles that the job now applies to.
ZY 0150	Title for Figure 2.2 corrected.	L	Was TRBF and should read TBRF.
	New Part 3 added for draining of TSOB vehicles.	A	To detail how to drain TSOB vehicles. Detail extracted from VMI (Anglia).
ZY 0151	Note added to explain lights need to be switched on to allow the heating to operate unless ambient temp is below 5°C.	A	To identify some vehicles have the energy saving mod fitted.
5	Section content updated.	C	To reflect the changes made to either jobs or sections as part of this update.


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Section	Change	Change Category	Reason for Change
5 Cont'd	Section 5.9 list of vehicles and technical differences updated.	A	To reflect the vehicles that are now in the owners fleet and to identify known differences to date. This section was initially updated by Porterbrook and has been further updated following dialogue between Porterbrook and Interfleet.
6	Section updated.	C	To reflect the changes made to either jobs or sections as part of this update.
7	Section updated.	C	To reflect the changes made to either jobs or sections as part of this update.
	Reference Drawings numbers amended from "O" to "0" (PB-C0).	L	Incorrectly displayed in previous issue of document.
8	Revision history for Issue 5.	-	To identify the changes made for this issue of the document.

This Revision History was last updated on: 2nd May 2013

The coding system used in the 'Change Category' column provides at-a-glance information on the type of change as defined thus:

Change Category	Definition
A	New Requirement – Additional technical requirement following investigation.
B	Document Reference - Additional document reference called up in text.
C	Clarification - There has been no change in the technical requirements, but the text has been redrafted to improve understanding.
D	Group Standard and Technical Standard for Interoperability Compliance - Change incorporated to comply with standards.
E	Subsidiary Document Requirements - The technical details were previously identified in subsidiary documents and included in this document following review.
F	Clearer Drafting - There has been no change to the technical requirements, but the location of the text has been changed to improve understanding.
G	New Commercial Requirement - Additional commercial requirements as a result of change in industry structure.
H	New Reference - New reference document has been included in the table as it is now covered in the text.
I	British Standard Compliance - Change incorporated to comply with standards.
J	Changed Reference - Reference document including any Group Standard has changed its identification.

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K	New Material - A new material is now called up.
L	Correction - Previous document contained an error.
M	Format Change - Layout of document has altered but there has been no change to the technical content.
N	No Longer Required - The previous requirement is no longer valid.