1-12-10

CARRIAGE DIRECTORATE/COMPUTER WING

COVERING LETTER

SUBJECT: SCANNING/DIGITISATION/INDEXING OF OFFICIALDOCUMENTS OF DIFFERENT DIRECTORATES OF RDSO

1	NAME OF THE DIRECTORATE		ELECTRICAL		
2	NAME OF THE SUB-DIRECTORATE/SECTION		DSE/Three Phase Loco		
3	NAME & DESIGNATION OF THE SCANNING-CORDINATION OFFICER/STAFF		Sri A.K. Goswami, JDSE-8		
4	NAME OF THE RECORD/FILE/DOCUMENT/SPECIFICATION etc. AND ITS VOLUME/VERSION		Scheduled Maintenance Manual Vol. B of WAP-5		
5	TOTAL NO OF PAGES/IMAGES IN THE FILE GIVEN FOR SCANNING (as mentioned by concerned deptt.)				
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	1	Type of Document (File/ DRAWING/TECHNICAL CIRCULAR/MODIFICATION SHEET/SPECIFICATION)	Manual		
	2	Document No.			
	3	SUBJECT	Scheduled Maintenance Manual Vol.B of WAP-5		
	4	SUB-SUBJECT			
	5	VOLUME	Vol. B.		
	6	Sr. No.	From _____ To _____		
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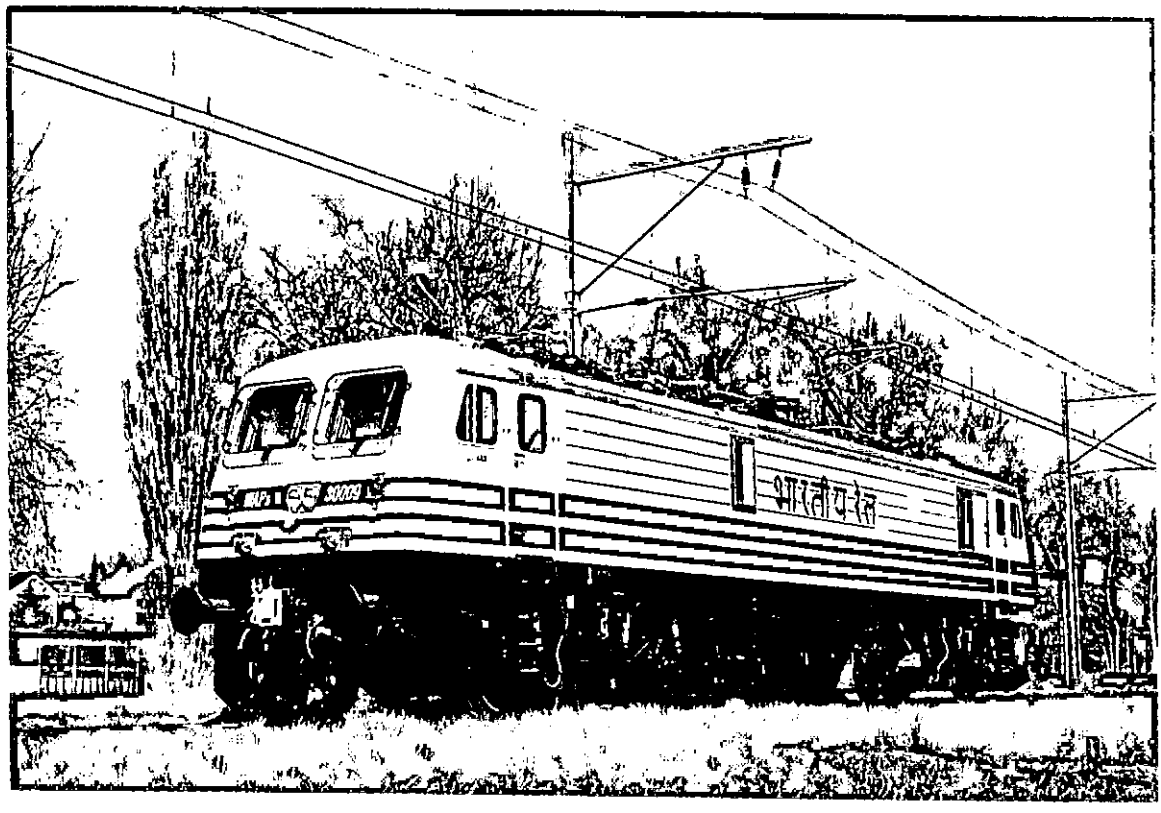
B

Indian Railways



WAP-5 Locomotive
30000 – 30010

Scheduled Maintenance Manual

Responsible Department: CUSP	Prepared: 30-05-2002 (CUSP) R. Kumar	Revision: B	File No.: 5B_PLISb.xls
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No.	Quantities		Copies		Bo'Bo'=B Co'Co'=C	Document No.	Rev.	WAP5 Locomotive (30000 - 30010) Volumes B Scheduled Maintenance Manual (updated document)	Volume No.	Section No.	No. of pages	Repl.of Rev.	Remarks
1			1		B	3EHW411395	12/01	Contents	B		2		
2			1		B	3EHW411395	12/01	Introduction	B	1	6		
3			1		B	3EHW411395	12/01	Index	B	2	20		
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5			1		B	3EHW411396	12/01	Task Frequency Chart	B	4	24		
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0 Contents

1 Introduction

The Scheduled Maintenance Manual contains the information necessary to perform a balanced programme of examinations.

Note

Operating practice and maintenance are decisive for whether the locomotive is always ready for operation and stays operational for a long period. We strongly recommend that the prescribed maintenance tasks be carried out on time and conscientiously.

Section 1.1 provides an overview of the manuals covering the locomotive and information about in which manual specific information is to be found.

Section 1.2 provides tips on how maintenance tasks can be planned using this manual.

Section 1.3 provides an overview of the structure of assemblies.

Section 1.4 provides an overview of the assemblies in the machine room.

1.1 Manuals Overview

The entire documentation is divided into five manuals:

1.1.1 Driver's Manual

The Driver's Manual contains a systematic description, a functional description, the technical data and the operating instructions for the locomotive.

1.1.2 Maintenance and Repair Manual

The Maintenance and Repair Manual contains the maintenance tasks as well as the repair instructions for the locomotive and the assemblies.

1.1.3 Scheduled Maintenance Manual

The Scheduled Maintenance Manual contains the maintenance schedule which indicates when which maintenance tasks are to be carried out.

1.1.4 Fault Finding Manual

The Fault Finding Manual provides tips for diagnosing and localizing the causes of faults.

1.1.5 Illustrated Parts Catalogue

The Illustrated Parts Catalogue shows the replacement parts available and their location in the locomotive.

1.2 Use of Scheduled Maintenance Manual

Before carrying out any work on the locomotive, the safety regulations in Chapter 3 must be studied carefully and adhered to strictly during the work.

Chapter 4 lists the maintenance tasks for all the assemblies. The maintenance tasks are designated by Task Codes.

Chapter 5 lists the maintenance tasks according to maintenance intervals. The maintenance tasks are designated by Task Codes.

Chapter 6 lists in detail the tasks to be carried out for each Task Code. The sections are sorted according to assemblies and then according to maintenance intervals. For most tasks, the Maintenance and Repair Manual, which contains important additional safety regulations, must also be consulted.

The directory of headings in Section 2 enables a further way of orienting oneself.

1.2.1 Task Code Key

101. 1D. 01 Task code

101. Assembly: e.g. 101 = 1.1, 203 = 2.3 etc.

1D. Task Frequency Code

1 number of periods

D. period: In = Initial Maintenance
D = days
W = weeks
M = months (ca. 16000 km)
Y = years (ca. 192000 km)
X = not defined

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Examples:

101.1D.01 Assembly 1.1, daily, task 1

304.6M.03 Assembly 3.4, 6-monthly, task 3

602.1Y.02 Assembly 6.2, yearly, task 2

1.3 Generation Breakdown Structure

- **WAP-5 Locomotives**
  - **1 Loco Body**
    - 1.1 Structure
    - 1.2 Exterior Finish
    - 1.3 Doors and Steps
    - 1.4 Draftgear and Couplers
    - 1.5 Windows
    - 1.6 Horns/Lights
    - 1.7 Washers/Wipers
    - 1.8 Buffers
    - 1.9 Cable Duct (blackbox)
  - **2 Bogies and Running Gear**
    - 2.1 Bogie Frame
    - 2.2 Wheelset
    - 2.3 Primary Suspension
    - 2.4 Secondary Suspension
    - 2.5 Traction Link
    - 2.6 Transmission
    - 2.7 Sanding Equipment
    - 2.8 Wheel Flange Lubrication
  - **3 Power Supply**
    - 3.1 Roof Line
    - 3.2 Pantograph
    - 3.3 Main Circuit Breaker
    - 3.4 Surge Arrester
    - 3.5 Main Transformator
    - 3.6 Trafo Oil Cooling
    - 3.7 Transducers
    - 3.8 Primary Earth
    - 3.9 Filter
  - **4 Propulsion System**
    - 4.1 Traction Converter
    - 4.2 Traction Converter Oil Cooling
    - 4.3 Traction Converter Control
    - 4.4 Traction Motor
    - 4.5 Cabling (not used)

- **WAP-5 Locomotives**
  - **5 Auxiliary System**
    - 5.1 3 Phase Power
    - 5.2 Auxiliary Converter Control
    - 5.3 Battery/Charger
    - 5.4 Hotel Load
    - 5.5 Oil Blowers
    - 5.6 Machine Room Blowers
    - 5.7 Traction Motor Blowers
    - 5.8 Scavenge Blowers/Filters
    - 5.9 *Cabling (not used)*
    - 5.10 Power Supply 415/110V
  - **6 Air Supply and Pneumatic Brakes**
    - 6.1 Main Compressor
    - 6.2 Air Dryer
    - 6.3 Reservoirs
    - 6.4 Auxiliary Compressor
    - 6.5 Brake Frame
    - 6.6 Brake Controller
    - 6.7 Brake Actuators
  - **7 Interior**
    - 7.1 Doors
    - 7.2 Seats
    - 7.3 Lighting
    - 7.4 Blinds
    - 7.5 Cab
    - 7.6 Key Interlocking
    - 7.7 Cabling (not used)
  - **8 Control System**
    - 8.1 Cab Control
    - 8.2 MR Control
    - 8.3 Control Electronics
    - 8.4 Loco-Loco Bus

1.4 Equipment Locator

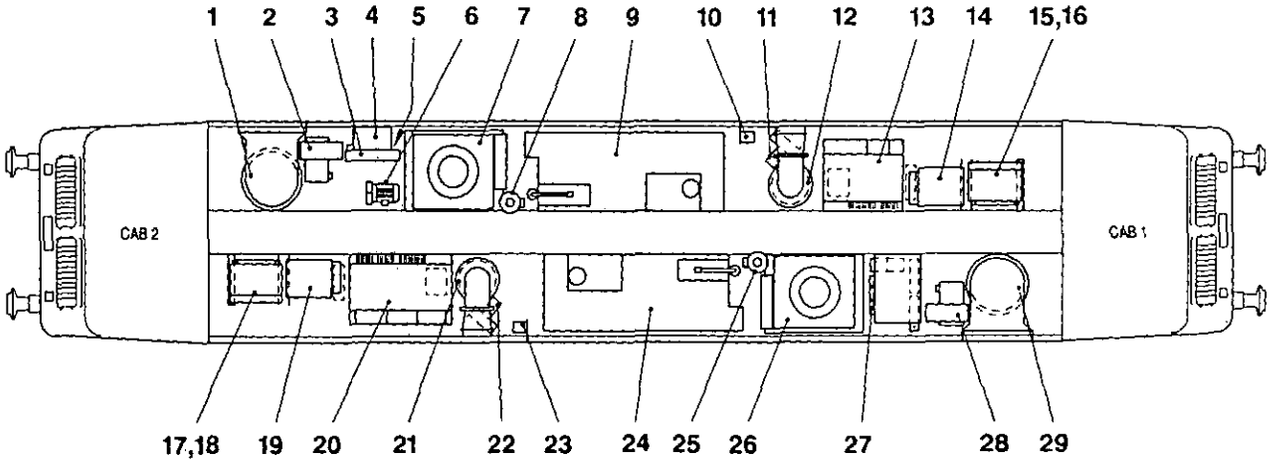

Fig. 1.1 Detailed layout of machine room

53/2	1	Traction motor blower bogie 2
55/2	2	Scavenge blower to traction motor blower 2 / oil cooling unit 1
237	3	Vigilance control equipment
260	4	Control electronics pneumatic manifold
PP	5	Pneumatic panel
48	6	Auxiliary compressor
59/1	7	Oil cooling unit, transformer / converter 1
63/1	8	Oil pump converter 1
SR1	9	Traction converter 1
56.5/1	10	Capacitor to Scavenge blower for machine room blower 1
56/1	11	Scavenge blower to machine room blower 1
54/1	12	Machine room blower 1
1050.1	13	Auxiliary converter box 1
HB1	14	Cubicle auxiliary circuits 1
SB1	15	Cubicle control circuits 1
411	16	Central electronics 1 (CEL 1)
412	17	Central electronics 2 (CEL 2)
SB2	18	Cubicle control circuits 2
HB2	19	Cubicle auxiliary circuits 2
1050.2	20	Auxiliary converter box 2
54/2	21	Machine room blower 2
56/2	22	Scavenge blower to machine room blower 2
56.5/2	23	Capacitor to Scavenge blower for machine room blower 2
SR2	24	Traction converter 2
63/2	25	Oil pump converter 2
59/2	26	Oil cooling unit, transformer / converter 2
FB	27	Filter cubicle
55/1	28	Scavenge blower to traction motor blower 1 / oil cooling unit 2
53/1	29	Traction motor blower bogie 1

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3 Safety Instructions – Precautions and Practices

3.1 General Safety Precautions

1. All employees must take care to avoid the risk of injury to themselves and others, and where any maintenance job requires the isolation of the overhead line, staff must check that the overhead line has been isolated.

2. Overhead line equipment may be approached only after the catenary has been formerly isolated and earthed.

3. Before any examination is started all safety precautions must be carried out.

4. Do not use a buzzer, bell, megger, or flash test equipment until all circuits which include semi-conductor devices have been isolated.

5. Do not attempt to make repairs or adjustments in the control cubicles or driver's desk when power is on. Ensure that the battery supply is disconnected.

6. Observe cleaning solvent manufacturer's instructions, as certain solvents may be toxic or flammable. When handling lubricants, sealants, adhesives, cleaning fluids and any other similar preparations that may be harmful, the local workshop regulations or the instructions issued by the manufacturers of the preparations must be strictly observed.

7. Clean lubricating points before applying the recommended lubricant, a remove excess after applying new lubricant.

8. When welding operations are being carried out on a vehicle, the welding return lead shall be secured as near as possible to the point of welding. All electronic devices shall be individually short circuited. The locomotive structure is a critically stressed unit, and welding should only be carried out to an Approved Welding Procedure.

9. Any defects which become apparent during the examinations must be rectified, and also those which may be reported by the driver.

10. Staff must NOT operate the controls of functional apparatus (e.g. move contactors, relays or EP valves by hand, connect or disconnect wires, remove temporary packings or interfere with brake equipment) of a locomotive undergoing maintenance/testing, whithout first satisfying themselves that there are no persons engaged in any work on or beneath that locomotive, who can be injured in any way by the operation.

11. The equipment on a locomotive will, in many cases, interact between systems, e.g. starting a compressor will cause air pressure to build up which may operate brake equipment. Therefore, if the operation/energisation of any part of the

equipment will endanger the health and safety of any person then the appropriate system must be vented/isolated BEFORE work commences.

12. When using jacks to lift a locomotive, safety supports must be incorporated.

13. Caution signs (stating personnel working on locomotive) to be fitted at both ends of locomotive.

3.2 Locomotive Isolation

1. When carrying out repairs or testing of electrical equipment (unless specifically authorised otherwise), the locomotive high voltage equipment must be isolated by using the Key Interlocking System:

   a) Observe the pantograph is in the lowered position.

   b) Turn off the air supply to the pantographs by switching key A on the air supply isolating cock. The air in the system will be exhausted and by this the pantograph will be locked down.

   c) To release the B keys insert and turn key A in the Earthing Switch of main circuit breaker. A bolt will be released, unlocking the electrical arm of the main circuit breaker earthing switch. Move the electrical arm to the EARTH position then turn and remove the B keys.

   d) Move the battery isolating switch to off.

Warning:

Live power supplies.

The Key Interlocking System prevents 25kV a.c. power supply through the pantograph, but NOT power supply through:

a) Hotel Load 750V a.c.

b) Battery Supply 110V d.c.

Before working on these power supplies ensure that:

a) the locomotive is uncoupled

b) the locomotive is isolated

c) the battery is isolated

d) the capacitors on the battery charger output are discharged

Note:

When working with access panels removed from the:

a) Control Cubicles

b) Auxiliary Cubicles

c) Filter Cubicle

d) Traction Converter

e) Auxiliary Converter

f) Brake Frame

g) Driver's Desk

It is advisable that the key switch and the battery isolating switch are turned OFF otherwise some wires will be energised at 110V d.c.

Warning:

Extreme care must be taken when approaching equipment which has been live, and could remain live for a short period of time because of the delayed discharge time of capacitors.

3.3 Battery Isolation

1. Check that all loads have been switched off and where possible, the battery is isolated before work is commenced.

2. Keep flames, lighted cigarettes and welding operations away from batteries. ***The gases generated by a battery are highly flammable.*** Where a battery is found to be or suspected to be overheated, extreme caution should be taken to prevent ignition until the gases have been allowed to disperse.

3. Use only approved insulated spanners on battery connection. Do not lay any tools on the batteries.

4. Check that the battery is electrically isolated before any work is commenced on the removal of cells or the complete battery from the vehicle. To avoid short circuits and fouling of battery cells during removal, cables in battery boxes should be tied back. These bust be insulated after being disconnected.

5. Take care to keep electrolyte away from eyes, skin and clothing. Protective clothing or aprons, rubber boots and eye protectors must be used during all battery repairs. The eye protectors should be of the approved chemical goggle type.

   If electrolyte enters the eyes or burnes skin, the affected area should be treated immediately. Rinse eyes with water and obtain medical attention immediately for all burns or cases of electrolyte contamination. Nickel-alcaline electrolyte contamination on clothing can be neutralised by an application of boracic solution in the proportion of 1 teaspoonful of boracic powder to 1 pint of water.

Note:
A stock of litmus paper should be held in the depot to enable operators to determine the type of contamination in cases where there is doubt. (RED litmus for detection alkaline solutions, BLUE litmus for detecting acid solutions).

6. Warning signs should be positioned in the vicinity of the battery when it is being charged. Check that all floating cables used for battery charging are protected and positioned so that they do not present any danger to personnel and to avoid damage to cable and equipment.

7. Disposal of electrolyte must be strictly in accordance with local arrangements dependant upon the agreement with the local Authorities and the depot concerned.

3.4 Brakes and Compressed Air

1. Before operating the cocks, check the direction in which the air will be vented and ensure that the blast of compressed air cannot cause injury or damage.

2. When using compressed air lines, electrical supplies and degreasing plant, which can be hazardous, the workshop regulations or the plant manufacturers' instructions must be strictly observed.

3. Before carrying out maintenance or repairs on any item of brake equipment installed in the locomotive, make sure that the locomotive is safely parked with the parking brakes released. Chock wheels to prevent locomotive movement.

4. Before attempting to dismantle or remove any item that is connected to a compressed air system, isolate it from the air supply and exhaust all air from it and the associated system.

5. Do not attempt to dismantle or remove the compressor valves or cylinder head or any part of the intercooler or delivery piping, before closing the main reservoir isolating cock, venting all air from the main reservoirs and isolating the compressor motor from the electrical supply.

6. When blowing out pipes with compressed air, wear goggles and take care to avoid any openings from with the air may blow out, as blown particles can be harmful.

7. During brake testing involving application and release of the brakes, ensure that no other personnel are in positions where they could be endangered by the movement of the brake blocks, rigging etc. Warning signs must be in position at both ends of the locomotive during brake testing or brake maintenance. If the brake system is isolated, warning indicators must also be in position at each end of the locomotive and on both driver's desks.

3.5 750V a.c. supply and 110V d.c. trainline

1. The 750V a.c. hotel load supply and 110V binary signal trainlines are a lethal electrical hazard.

2. Before working on these supplies ensure:
   a) The locomotive is uncoupled at both ends.
   b) The locomotive is isolated (see Paragraph 3.2.1).
   c) The batteries are isolated at the battery isolating switch.

3.6 Operation Keys

The locomotive employs two key systems for security and safety purposes:

a) Locomotive Operation Keys
b) safety Interlock Keys

A two-key-system is used to permit basic locomotive access to initiate the set-up of operation. One key permits access to locomotive via outside cab doors. The second key permits commencement of operation set-up after inserting into key switch. The keys are interchangeable between all WAP5 locomotives.

3.7 Safety Interlock Keys

Access to the roof mounted electrical equipment and high voltage power equipment such as the filter cubicle, auxiliary converters, traction converters, auxiliary cubicles and control cubicles, is strictly forbidden unless the equipment is deenergised and grounded by means of the appropriate earth switches. Maintenance and operating staff are required to operate a key interlock system which ensures access to power equipment is only permitted once the equipment is safe.

The key interlock system comprises 5 different types of key, each identified by means of a letter which is stamped on the key itself and an additional colour coding. The keys of one type are interchangeable with keys of the same type but not with keys of a different type. When used in the correct sequence, the different keys will allow access to roof equipment (via the roof hatch), and the high voltage cubicles (via equipment cubicle doors).

3.7.1 Key Location

The normal locations for the various keys are given below:

Type	Colour	No. Off	Location
A	light blue	1	Pantograph air supply isolating cock
B	yellow	2	Earthing Switch of main circuit breaker
C	green	7	Key Multiplier No. 1
D	black	2	1 Key on the Earthing Switch of each Traction Converter
E	white	6	Key multiplier No. 2

3.7.2 Operation of the Key Interlock System

Removal of a key from a piece of equipment often requires the isolation/earthing of that piece of equipment. This ensures certain parts of the locomotive are safe to access with the keys required. When a key of one type has been inserted and turned, it is held captive to allow the release of other keys of a different type.

The sequence of operations required to gain access to different equipment is decribed in the following paragraphs. This sequence is also illustrated in Fig. 3.1

a) Turn off the air supply to the pantographs by switching key A on the air supply isolating cock. The air in the system will be exhausted and by this the pantograph will be locked down.

b) To release the B keys insert and turn key A in the Earthing Switch of main circuit breaker. A bolt will be released, unlocking the electrical arm of the main circuit breaker earthing switch. Move the electrical arm to the EARTH position then turn and remove the B keys.

c) Insert and turn one key B in the key multiplier 1 to release up to seven keys C. The second B key can be carried by a responsible person for safety reasons. Two of the keys C are used to operate the earthing switch of both traction converters. The other keys are used to unlock covers of auxiliary cubicles, filter cubicle and auxiliary converters.

d) Insert and turn one of the C keys in the earth switch fitted to each of the two traction converters. In each case place the earth switch handle to its EARTH position then turn and remove the D key.

e) Insert and turn both keys D in the key multiplier 2 to release up to six keys E. The E keys can be used to open the access covers on the two traction converters.

The location of the two key multipliers is shown in Fig. 3.2

3.7.3 Return to Normal Mode

To revert back to normal conditions, the procedures a) to e) described in Paragraph „Operation of the Key Interlock System" are reversed.

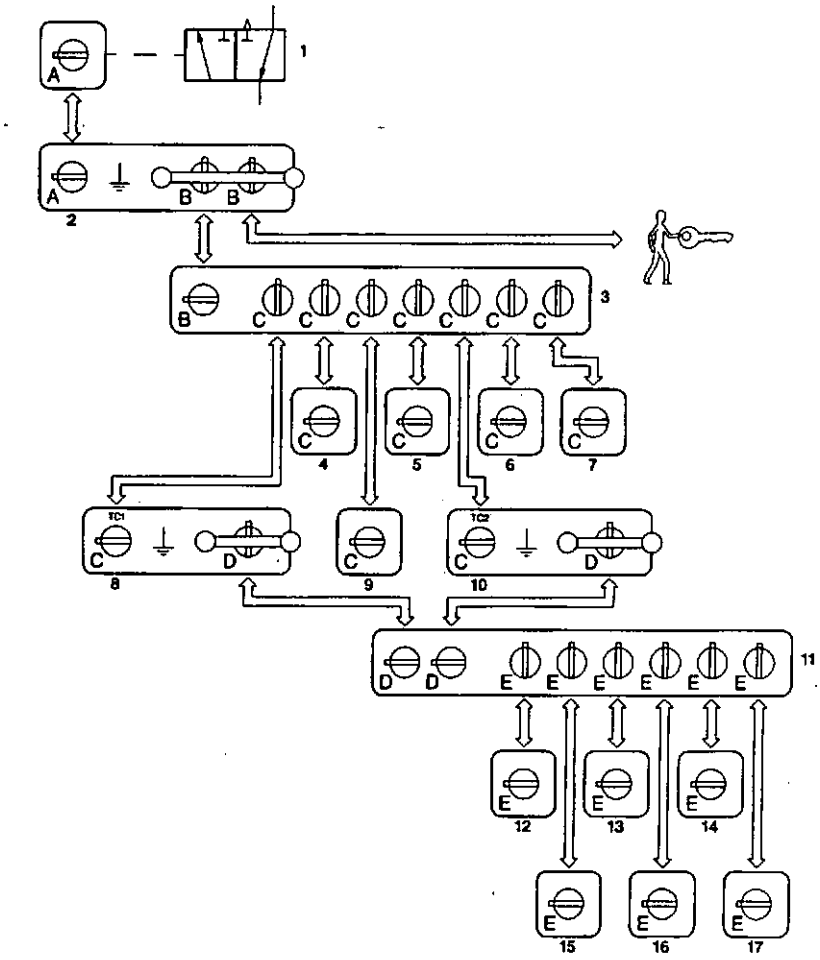

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Fig. 3.1 Interlocking concept

1004.1	1	Pantograph air supply isolating cock
4	2	Earthing switch of main circuit breaker
1004.2	3	Key multiplier 1
1004.4	4	Door lock auxiliary circuits, Cubicle 1
1004.4	5	Door lock auxiliary circuits, Cubicle 5
1004.4	6	Door lock auxiliary converter 1
1004.4	7	Door lock auxiliary converter 2
15.82/1	8	Earthing switch on traction converter 1
1004.4	9	Door lock on filter cubicle
15.82/2	10	Earthing switch on traction converter 2
1004.5	11	Key multiplier 2
1004.6	12	Door lock, traction converter 1
1004.6	13	Door lock, traction converter 1
1004.6	14	Door lock, traction converter 1
1004.6	15	Door lock, traction converter 2
1004.6	16	Door lock, traction converter 2
1004.6	17	Door lock, traction converter 2

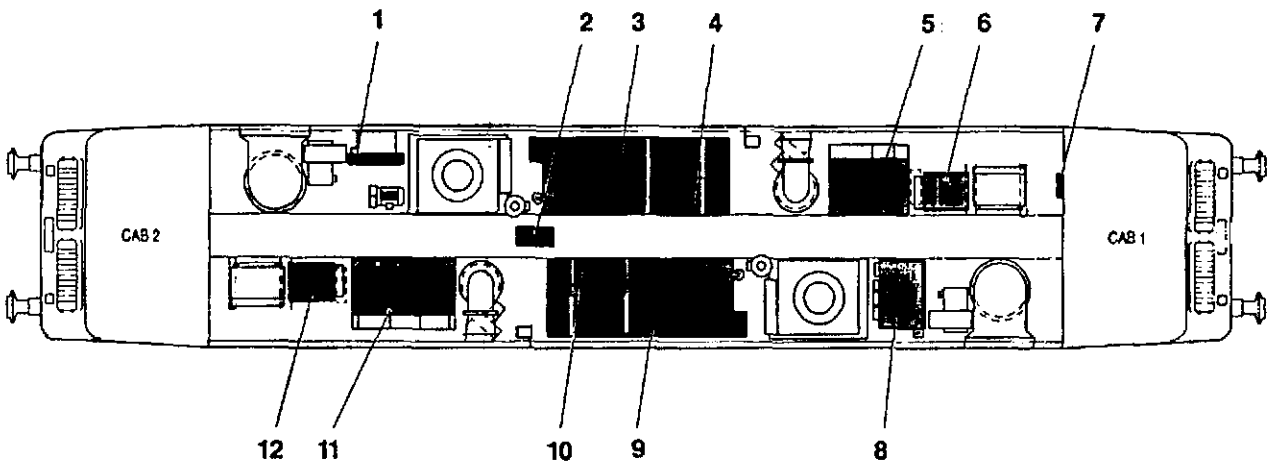

Fig. 3.2 Location Key Interlocking

1 Pantograph air supply isolating cock, pneumatic panel
2 Earthing switch main circuit breaker, middle roof hatch
3 Three door locks, traction converter 1
4 Earthing switch, traction converter 1
5 Door lock, auxiliary converter 1
6 Door lock, cubicle auxiliary circuits 1
7 Key multipliers
8 Door lock on filter block
9 Three door locks, traction converter 2
10 Earthing switch, traction converter 2
11 Door lock, auxiliary converter 2
12 Door lock, cubicle auxiliary circuits 2

4 Task Frequency Chart

The maintenance tasks are divided up according to assemblies. The Task Code serves as a key. The maintenance tasks are described in detail in Chapter 6. The columns indicate the intervals that must be observed.

Task Code Key

101. 1D. 01 Task Code

101. Assembly: e.g. 101 = 1.1, 203 = 2.3 etc.

1D. Task Frequency Code

1 number of periods

D. period: In = Initial Maintenance
D = days
W = weeks
M = months (ca. 16000 km)
Y = years (ca. 192000 km)
X = not defined (in general based on mileage)

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Examples:

101.1D.01	Assembly 1.1, daily, task 1
304.6M.03	Assembly 3.4, 6-monthly, task 3
602.1Y.02	Assembly 6.2, yearly, task 2

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Ass.	Equipment	Task code					
	Period Task frequency Kilometer	In Initial	D Daily	W Weekly	M Monthly 16000	Y Yearly 192000	X See task
1.0	**Loco Body**						
1.1	Cow catcher- Inspect				101.3M.01		
1.1	Rail guards - Inspect				101.3M.02		
1.1	Underframe structure -Inspect				101.3M.03		
1.1	Cab roof vents – Clean				101.6M.01		
1.1	Machine room vents - Clean				101.6M.02		
1.1	Cab roof GRP caps - Inspect				101.6M.03		
1.1	Roof hatch fasteners - Check				101.6M.04		
1.1	Roof hatch clamping bracket fasteners – Check				101.6M.05		
1.1	Body structure –Inspect				101.6M.06		
1.1	Car body – Inspect				101.6M.07		
1.1	Cow catcher fasteners - Check				101.6M.08		
1.1	Roof hatch seals – Inspect					101.1Y.01	
1.1	Roof hatch bushings - Inspect					101.1Y.02	
1.1	Roof hatch clamping brackets – Inspect					101.1Y.03	
1.1	Car body- Water test					101.2Y.01	
1.1	Roof bow fasteners – Check					101.5Y.01	
1.1	Roof hatch bushings - Replace					101.10Y.01	
1.1	Roof hatch rubber seals - Replace					101.10Y.02	
1.2	Exterior finish- Clean				102.1M.01		
1.2	Exterior finish- Inspect				102.6M.01		
1.2	Exterior finish- Decals- Inspect					102.1Y.01	
1.2	Exterior finish-Paint-Inspect					102.5Y.01	
1.2	Exterior finish-Car body- Repaint					102.10Y.01	
1.3	Doors and step- Inspect			103.1W.01			
1.3	Cab door seals- Inspect				103.3M.01		
1.3	Cab door drain apertures- Inspect				103.3M.02		
1.3	Cab door window seal- Inspect				103.3M.03		
1.3	Cab door glass- Inspect				103.3M.04		
1.3	Cab door latch and catch- Inspect				103.6M.01		
1.3	Cab door grab rail paints - Inspect				103.6M.02		
1.3	Cab door grab rail fasteners- Check				103.6M.03		
1.3	Cab door latch and catch fasteners - Check				103.6M.04		
1.3	Cab door lock tongue- Lubricate				103.6M.05		
1.3	Cab door hinges- Lubricate					103.1Y.01	
1.3	Tread plate- Inspect					103.1Y.02	
1.3	Cab door locks- Lubricate					103.1Y.03	
1.3	Cab door seal –Check					103.2Y.01	
1.3	Cab door -Water test					103.2Y.02	
1.3	Cab door seals -Replace					103.5Y.01	
1.3	Cab door locks -Replace					103.10Y.01	
1.3	Cab door window seal -Replace					103.10Y.02	
1.4	Draftgear & Couplers- Check			104.1W.01			
1.4	Draftgear & Couplers- Inspect			104.1W.02			
1.4	Draftgear & Couplers- End cocks - Inspect				104.3M.01		
1.4	Draftgear & Couplers-Striker block wear pad- Lubricate				104.6M.01		
1.4	Draftgear & Couplers- Fasteners-Check				104.6M.02		
1.4	Couplers- Inspect					104.1Y.01	
1.4	Draftgear Rubber buffing element- Inspect					104.1Y.02	

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Ass.	Equipment	Task code					
	Period Task frequency Kilometer	In Initial	D Daily	W Weekly	M Monthly 16000	Y Yearly 192000	X See task
1.4	Draftgear- Inspect					104.1Y.03	
1.4	Coupler adjusting screw- Lubricate					104.1Y.04	
1.4	Striker block wear pad –Inspect					104.1Y.05	
1.4	Draftgear & Couplers- End cocks- Test					104.1Y.06	
1.4	Flexible hoses and couplings- Overhaul					104.4Y.01	
1.4	Draftgear & Couplers-End cocks- Replace					104.4Y.02	
1.4	Striker bock wear pad – Replace					104.5Y.01	
1.5	Windows –Clean			105.1W.01			
1.5	Windows – Examine				105.3M.01		
1.5	Cab sliding windows – Check				105.3M.02		
1.5	Windscreen guard grilles- Inspect				105.3M.03		
1.5	Window drainage channel - Clean				105.3M.04		
1.5	Cab side window drainage channel-Rubber flap- Inspect				105.3M.05		
1.5	Windows – Seals-Inspect				105.6M.01		
1.5	Windscreen guard grilles - Inspect				105.6M.02		
1.5	Windscreen guard grilles fasteners – Check				105.6M.03		
1.5	Windows – Water test				105.6M.04		
1.5	Windows – Seals-Replace					105.5Y.01	
1.5	Cab side window drainage channel-Rubber flap- Replace					105.5Y.02	
1.5	Windscreen guard grilles -Repaint					105.5Y.03	
1.6	Horn and Lights - Check		106.1D.01				
1.6	Headlights –Check			106.1W.01			
1.6	Marker lights -Check			106.1W.02			
1.6	Strobe lights -Check			106.1W.03			
1.6	Warning horns -Check			106.1W.04			
1.6	Strobe light cover -Check				106.1M.01		
1.6	Strobe light cover -Clean				106.1M.02		
1.6	Warning horns -Check				106.3M.01		
1.6	Strobe light fasteners -Check				106.6M.01		
1.6	Warning horn fasteners -Check				106.6M.02		
1.6	Headlight fasteners -Check				106.6M.03		
1.6	Marker light fasteners -Check				106.6M.04		
1.6	Horn pneumatic piping -Inspect				106.6M.05		
1.6	Headlight alignment -Check					106.1Y.01	
1.6	Duplex air valve -Check					106.2Y.01	
1.6	Marker lights –Water test					106.2Y.02	
1.6	Headlights –Water test					106.2Y.03	
1.6	Horns –Water test					106.2Y.04	
1.6	Strobe lights –Water test					106.2Y.05	
1.6	Duplex air valves –Overhaul					106.4Y.01	
1.6	Headlight rubber gasket –Replace					106.5Y.01	
1.6	Headlights seals –Replace					106.5Y.02	
1.6	Horns rubber gaskets –Replace					106.5Y.03	
1.6	Marker lights rubber gasket –Replace					106.5Y.04	
1.6	Strobe lights gasket –Replace					106.5Y.05	
1.6	Warning horns –Overhaul					106.5Y.06	
1.7	Washers / Wipers – Check		107.1D.01				
1.7	Washer reservoir- Refill			107.1W.01			
1.7	Wiper motor- Check			107.1W.02			
1.7	Washers/Wipers- Check			107.1W.03			

Ass.	Equipment	Task code					
	Period Task frequency Kilometer	In Initial	D Daily	W Weekly	M Monthly 16000	Y Yearly 192000	X See task
1.7	Washer piping- Inspect				107.3M.01		
1.7	Washer reservoirs- Inspect				107.3M.02		
1.7	Washer reservoir caps- Inspect				107.3M.03		
1.7	Wiper arm- Inspect				107.3M.04		
1.7	Wiper manual operating handle - Check				107.3M.05		
1.7	Washer pumps- Check				107.3M.06		
1.7	Wiper blades- Replace				107.6M.01		
1.7	Washers/Wipers Fasteners - Check				107.6M.02		
1.7	Wiper blades – Check					107.1Y.01	
1.7	Washer jet- Clean					107.2Y.01	
1.7	Washer reservoir- Check					107.2Y.02	
1.7	Wiper idle shaft- Examine					107.2Y.03	
1.7	Washers/Wipers- Water test					107.2Y.04	
1.7	Washer pump- Overhaul					107.5Y.01	
1.7	Wiper idler shaft seal- Replace					107.5Y.02	
1.7	Wiper idler shaft- Overhaul					107.5Y.03	
1.7	Wiper arms- Overhaul					107.5Y.04	
1.7	Wiper motor assembly- Overhaul					107.5Y.05	
1.7	Wiper motor driver shaft seal - Replace					107.5Y.06	
1.7	Wiper arm washer hose- Replace					107.5Y.07	
1.7	Washer pump – Overhaul					107.5Y.08	
1.7	Washers/Wipers hoses- Replace					107.5Y.09	
1.8	Buffers – Check				108.6M.01		
1.8	Buffers – Grease				108.6M.02		
1.8	Buffers – Inspect				108.6M.03		
2.0	**Bogies and Running gear**						
2.1	Bogie frame – Inspect			201.1W.01			
2.1	Pivot post and end transom - Inspect			201.1W.02			
2.1	Bogie frame – Inspect				201.3M.01		
2.1	Bogie frame piping – Check				201.3M.02		
2.1	Bogie frame pneumatic piping fasteners – Check				201.6M.01		
2.1	Bogie step fasteners – Check				201.6M.02		
2.1	Bogie frame –Steam clean					201.1Y.01	
2.1	Bogie frame – Check					201.1Y.02	
2.1	Bogie frame –Sand blasting					201.5Y.01	
2.1	Bogie frame alignment – Check					201.5Y.02	
2.1	Bogie frame – Inspect					201.5Y.03	
2.1	Bogie frame – Test					201.5Y.04	
2.1	Bogie frame – Refinish					201.5Y.05	
2.1	Bogie frame components – Replace					201.5Y.06	
2.2	Wheelset – Inspect			202.1W.01			
2.2	Wheelset – Inspect				202.3M.01		
2.2	Axle boxes – Inspect				202.3M.02		
2.2	Axle boxes – Inspect				202.3M.03		
2.2	Axle guide rod – Inspect				202.3M.04		
2.2	Axle guide rod spehriblocs – Inspect				202.3M.05		
2.2	Hasler transmitter cable – Check				202.3M.06		
2.2	Axle box front covers – Inspect				202.6M.01		
2.2	Wheel diameter – Measure				202.6M.02		
2.2	Wheel and axle loads – Check				202.6M.03		
2.2	Ride height – Measure				202.6M.04		

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Ass.	Equipment	Task code					
	Period Task frequency Kilometer	**In** Initial	**D** Daily	**W** Weekly	**M** Monthly 16000	**Y** Yearly 192000	**X** See task
2.2	Axle guide rod fasteners – Check				202.6M.05		
2.2	Axle box front cover fasteners – Check				202.6M.06		
2.2	Axle box split ring fasteners – Check				202.6M.07		
2.2	Axle box breather holes – Clean					202.1Y.01	
2.2	Axle guide rod spheriblocs – Clean					202.2Y.01	
2.2	Wheel bearing – Lubrication						202.X.01
2.2	Wheel bearing - Inspect						201.X.02
2.2	Wheel bearing - Inspect						201.X.03
2.2	Wheel bearing – Replace						201.X.04
2.2	Axle labyrinth ring –Check					202.5Y.01	
2.2	Axle – Check					202.5Y.02	
2.2	Axle – Test					202.5Y.03	
2.2	Wheelset – Measure and examine					202.5Y.04	
2.2	Axle Journals – Check					202.5Y.05	
2.2	Axle end caps – Check					202.5Y.06	
2.2	Hasler transmitter drive pin – Check					202.5Y.07	
2.2	Axle boxes – Inspect					202.5Y.08	
2.2	Axle box bearing seat diameter – Measure					202.5Y.09	
2.2	Axle box –Test					202.5Y.10	
2.2	Axle box front covers –Test					202.5Y.11	
2.2	Axle box helicoils –Replace					202.5Y.12	
2.2	Axle box O-rings –Replace					202.5Y.13	
2.2	Wheelset –Replace					202.5Y.14	
2.2	Wheelset fasteners –Replace					202.5Y.15	
2.2	Wheelset –Measure					202.5Y.16	
2.2	Axle guide rod –Test					202.5Y.17	
2.2	Axle guide rod spheriblocs –Replace					202.5Y.18	
2.3	Primary suspension dampers –Inspect			203.1W.01			
2.3	Primary suspension springs –Check				203.3M.01		
2.3	Primary suspension spring paint–Inspect				203.6M.01		
2.3	Primary suspension spring insulating bases –Inspect				203.6M.02		
2.3	Primary suspension damper mountings – Inspect				203.6M.03		
2.3	Primary suspension damper rod –Inspect				203.6M.04		
2.3	Primary suspension damper spheriblocs –Inspect				203.6M.05		
2.3	Primary suspension damper fasteners – Check				203.6M.06		
2.3	Primary axle suspension dampers –Test						203.X.01
2.3	Primary suspension dampers –Overhaul						203.X.02
2.3	Primary suspension damper spheriblocs –Replace						203.X.03
2.3	Primary suspension spring –Measure					203.5Y.01	
2.3	Primary suspension spring deflection– Measure					203.5Y.02	
2.3	Primary suspension springs –Repaint					203.5Y.03	
2.3	Primary suspension spring insulating bases –Replace					203.5Y.04	
2.3	Primary suspension fasteners –Replace					203.5Y.05	
2.4	Secondary suspension dampers –Inspect			204.1W.01			
2.4	Vertical bump stops –Inspect				204.3M.01		
2.4	Lateral bump stops –Inspect				204.3M.02		

Ass.	Equipment	Task code					
	Period Task frequency Kilometer	In Initial	D Daily	W Weekly	M Monthly 16000	Y Yearly 192000	X See task
2.4	Limit chain and pins –Inspect				204.3M.03		
2.4	Secondary suspension spring –Check				204.3M.04		
2.4	Secondary suspension spring paint – Inspect				204.6M.01		
2.4	Secondary suspension spring insulating bases –Inspect				204.6M.02		
2.4	Secondary suspension damper mountings –Inspect				204.6M.03		
2.4	Secondary suspension damper rod – Inspect				204.6M.04		
2.4	Secondary suspension blocs –Inspect				204.6M.05		
2.4	Secondary suspension damper fasteners –Check				204.6M.06		
2.4	Limit chain fasteners –Check				204.6M.07		
2.4	Bump stop fasteners –Check				204.6M.08		
2.4	Secondary suspension dampers –Test						204.X.01
2.4	Secondary suspension dampers – Overhaul						204.X.02
2.4	Secondary suspension damper spheriblocs –Replace						204.X.03
2.4	Secondary suspension –Measure					204.2Y.01	
2.4	Secondary suspension spring height – Measure					204.5Y.01	
2.4	Secondary suspension spring deflection at load –Measure					204.5Y.02	
2.4	Secondary suspension –Repaint					204.5Y.03	
2.4	Secondary suspension –Replace					204.5Y.04	
2.4	Secondary suspension –Examine					204.5Y.05	
2.4	Secondary suspension –Replace					204.5Y.06	
2.4	Secondary suspension –Replace					204.5Y.07	
2.5	Traction link –Inspect			205.1W.01			
2.5	Traction link rod tab washers –Check			205.1W.02			
2.5	Traction link safety cables –Check			205.1W.03			
2.5	Traction link safety cables –Inspect				205.3M.01		
2.5	Pivot head–Check				205.3M.02		
2.5	Traction link rod –Inspect				205.3M.03		
2.5	Traction link paint–Inspect				205.6M.01		
2.5	Traction link fasteners –Check				205.6M.02		
2.5	Traction link rod tab washers–Replace					205.1Y.01	
2.5	Traction link rod and pivot head joint – Inspect					205.1Y.02	
2.5	Traction link rod –Inspect					205.5Y.01	
2.5	Traction link rod locating spigots–Check					205.5Y.02	
2.5	Traction link rod weld–Test					205.5Y.03	
2.5	Traction link–Repaint					205.5Y.04	
2.5	Pivot heads –Test					205.5Y.05	
2.5	Pivot head ring –Replace					205.5Y.06	
2.5	Traction link–Replace					205.5Y.07	
2.5	Traction link fasteners –Replace					205.5Y.08	
2.6	Gear box initial maintenance	206.In.01					
2.6	Gear box initial maintenance	206.In.02					
2.6	Gear box –Inspect			206.1W.01			
2.6	Gear box lubricant -Check			206.1W.02			

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Ass.	Equipment	Task code					
	Period Task frequency Kilometer	In Initial	D Daily	W Weekly	M Monthly 16000	Y Yearly 192000	X See task
2.6	Drive coupling - Inspect			206.1W.03			
2.6	Gear box - Inspect				206.3M.01		
2.6	Gear box support arm spheriblocs - Inspect				206.3M.02		
2.6	Transmission support arm - Inspect				206.3M.03		
2.6	Gear box –Measure				206.3M.04		
2.6	Gear box oil sight cover –Check				206.3M.05		
2.6	Gear box oil sight glass –Inspect				206.3M.06		
2.6	Gear box breather –Clean				206.3M.07		
2.6	Gear box fasteners –Check				206.3M.08		
2.6	Transmission Membranes –Replace					206.1Y.01	
2.6	Transmission –Change					206.1Y.02	
2.6	Gear box lubricant –Change					206.1Y.03	
2.6	Gear box oil –Test						206.X.01
2.6	Main gear bearings – Replace						206.X.02
2.6	Gear box support arm spheriblocs –Test					206.2Y.01	
2.6	Gear box –Overhaul					206.5Y.01	
2.6	Gear backlash –Measure					206.5Y.02	
2.6	Main gear run-out- –Measure					206.5Y.03	
2.6	Gear box support arm –Test					206.5Y.04	
2.6	Gear box support arm spheriblocs – Replace					206.5Y.05	
2.6	Gear box fasteners –Replace					206.5Y.06	
2.6	Main driver gear – Examine					206.5Y.07	
2.6	Main gear oil seals – Replace					206.5Y.08	
2.7	Sanding equipment –Inspect			207.1W.01			
2.7	Sanding equipment –Sand - Fill			207.1W.02			
2.7	Sanding equipment –Check			207.1W.03			
2.7	Sanding equipment –Clean				207.1M.01		
2.7	Sanding equipment –Inspect				207.3M.01		
2.7	Sand box lid seals –Inspect				207.3M.02		
2.7	Sanding nozzles –Check				207.3M.03		
2.7	Sand box fasteners –Check				207.6M.01		
2.7	Sanding equipment security –Check				207.6M.02		
2.7	Sand box –Inspect				207.6M.03		
2.7	Sand flow rate –Measure				207.6M.04		
2.7	Sand box – Inspect				207.6M.05		
2.7	Sand box –Clean					207.2Y.01	
2.7	Sanding equipment –Overhaul					207.5Y.01	
2.7	Sanding hoses – Replace					207.5Y.02	
2.7	Sand box lid seals – Replace					207.5Y.03	
2.7	Sand box – Repaint					207.5Y.04	
2.7	Sanding equipment fasteners – Replace					207.5Y.05	
2.8	Wheel flange lubrication reservoir – Inspect			208.1W.01			
2.8	Wheel flange lubrication –Refill			208.1W.02			
2.8	Wheel flange lubrication system –Check			208.1W.03			
2.8	Wheel flange lubrication operation –Check			208.1W.04			
2.8	Wheel flange lubrication- Hoses –Inspect				208.3M.01		
2.8	Wheel flange lubrication nozzles –Check				208.3M.02		
2.8	Wheel flange lubrication reservoir cap – Inspect				208.3M.03		
2.8	Wheel flange lubrication - pipe –Check				208.3M.04		

Ass.	Equipment Period Task frequency Kilometer	Task code In Initial	D Daily	W Weekly	M Monthly 16000	Y Yearly 192000	X See task
2.8	Wheel flange lubrication- fasteners – Check				208.6M.01		
2.8	Wheel flange lubrication-holes –Clean				208.6M.02		
2.8	Wheel flange lubrication oil flow – Measure				208.6M.03		
2.8	Wheel flange lubrication distribution valve –Overhaul					208.5Y.01	
2.8	Wheel flange lubrication nozzles – Overhaul					208.5Y.02	
2.8	Wheel flange lubrication o- rings –Replace					208.5Y.03	
2.8	Wheel flange lubrication - Hoses – Replace					208.5Y.04	
2.8	Wheel flange lubrication -Fasteners – Replace					208.5Y.05	
3.0	**Power Supply**						
3.1	Roof line contact springs –Inspect				301.3M.01		
3.1	Roof line insulators –Check				301.3M.02		
3.1	High voltage bushing insulator –Check				301.3M.03		
3.1	Roof line contact springs –Check				301.3M.04		
3.1	Roof line jumper cables –Inspect				301.3M.05		
3.1	High voltage bushing –Check				301.3M.06		
3.1	High voltage cable –Inspect				301.3M.07		
3.1	Roof line –Inspect				301.6M.01		
3.1	Roof line security –Inspect				301.6M.02		
3.1	High voltage cable and brackets –Check					301.1Y.01	
3.1	Main transformer connection –Check					301.1Y.02	
3.1	Roof line insulators–Recoat					301.1Y.03	
3.1	High voltage bushing insulator –Recoat					301.1Y.04	
3.1	Primary current transformer resistor – Measure					301.2Y.01	
3.1	Primary current transformer resistor – Inspect					301.2Y.02	
3.1	High voltage bushing seal–Replace					301.5Y.01	
3.2	Pantograph –Check			302.1W.01			
3.2	Pantograph collector shoe wear strips – Inspect				302.1M.01		
3.2	Pantograph flexible electrical connections –Inspect				302.1M.02		
3.2	Pantograph –Lubricate				302.1M.03		
3.2	Pantograph –Check				302.1M.04		
3.2	Pantograph –Inspect				302.3M.01		
3.2	Pantograph insulators –Inspect				302.3M.02		
3.2	Pantograph insulators –Inspect				302.3M.03		
3.2	Pantograph collector head shoe –Check				302.3M.04		
3.2	Pantograph insulator coating –Check				302.3M.05		
3.2	Pantograph travel time –Check				302.3M.06		
3.2	Pantograph collector deployed alignment –Check				302.3M.07		
3.2	Pantograph static load –Measure				302.3M.08		
3.2	Pantograph reaction load –Measure				302.3M.09		
3.2	Pantograph valve box –Test				302.6M.01		
3.2	Pantograph pneumatic motor –Check				302.6M.02		
3.2	Pantograph height –Check				302.6M.03		

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Ass.	Equipment Period Task frequency Kilometer	Task code In Initial	D Daily	W Weekly	M Monthly 16000	Y Yearly 192000	X See task
3.2	Pantograph hardware –Check				302.6M.04		
3.2	Pantograph insulator –Recoat					302.1Y.01	
3.2	Pantograph insulator –Recoat					302.1Y.02	
3.2	Pantograph –Overhaul					302.5Y.01	
3.2	Pantograph motor– Overhaul					302.5Y.02	
3.2	Pantograph pneumatic hoses – Replace					302.5Y.03	
3.3	Main circuit breaker earthing switch – Check			303.1W.01			
3.3	Main circuit breaker insulator –Inspect				303.1M.01		
3.3	Main circuit breaker earthing contact springs –Inspect				303.1M.02		
3.3	Main circuit breaker insulator coat –Check				303.3M.01		
3.3	Main circuit breaker reservoir –Clean				303.3M.02		
3.3	Main circuit breaker pressure regulator – Clean				303.3M.03		
3.3	Main circuit breaker pneumatic circuit – Check				303.3M.04		
3.3	Main circuit breaker - Fasteners –Check				303.3M.05		
3.3	Main circuit breaker insulator –Recoat					303.1Y.01	
3.3	Main circuit breaker switch tube –Check					303.1Y.02	
3.3	Main circuit breaker pressure control valve filter cartridge –Replace					303.1Y.03	
3.3	Main circuit breaker auxiliary contacts – Check					303.1Y.04	
3.3	Main circuit breaker earthing switch break blades –Check					303.1Y.05	
3.3	Main circuit breaker pneumatic pipe – Check					303.1Y.06	
3.3	Main circuit breaker –Check					303.3Y.01	
3.3	Main circuit breaker main contacts –Check					303.3Y.02	
3.3	Main circuit breaker contact spring – Check					303.3Y.03	
3.3	Main circuit breaker lateral cover O-ring – Replace					303.3Y.04	
3.3	Main circuit breaker –Overhaul					303.5Y.01	
3.3	Main circuit breaker shock absorbers – Replace					303.5Y.02	
3.3	Main circuit breaker auxiliary contacts – Replace					303.5Y.03	
3.3	Main circuit breaker earthing switch O-ring –Replace					303.5Y.04	
3.3	Main circuit breaker seal –Replace					303.5Y.05	
3.4	Surge arrester insulators –Inspect				304.3M.01		
3.4	Surge arrester insulator coating –Check				304.3M.02		
3.4	Surge arrester jumper cables –Inspect				304.3M.03		
3.4	Surge arrester jumper cable fasteners – Check				304.6M.01		
3.4	Surge arrester coating –Check					304.1Y.01	
3.5	Main transformer –Inspect			305.1W.01			
3.5	Main transformer –Inspect			305.1W.02			
3.5	Main transformer mountings –Check			305.1W.03			
3.5	Main transformer earthing cables –Inspect				305.3M.01		

Ass.	Equipment	Task code					
	Period Task frequency Kilometer	In Initial	D Daily	W Weekly	M Monthly 16000	Y Yearly 192000	X See task
3.5	Main transformer electrical fasteners – Check				305.6M.01		
3.5	Main transformer fasteners –Check				305.6M.02		
3.5	Main transformer –Inspect				305.6M.03		
3.5	Main transformer mounting tab washers – Replace					305.2Y.01	
3.5	Main transformer – Inspect					305.5Y.01	
3.6	Main transformer expansion tank –Check			306.1W.01			
3.6	Main Transformer expansion tank air dehumidifiers –Check			306.1W.02			
3.6	Main transformer expansion tank –Clean				306.3M.01		
3.6	Main transformer oil cooling –Inspect				306.3M.02		
3.6	Main Transformer hoses –Inspect				306.3M.03		
3.6	Main transformer differential amplifier – Inspect				306.3M.04		
3.6	Main transformer oil cooling piping – Inspect				306.3M.05		
3.6	Main transformer oil pressure sensor – Inspect				306.3M.06		
3.6	Main transformer oil temperature sensor –Inspect				306.3M.07		
3.6	Main transformer oil cooling pipe drain cocks –Inspect				306.3M.08		
3.6	Main transformer oil cooling radiator – Check				306.3M.09		
3.6	Main transformer oil pumps –Check				306.6M.01		
3.6	Main transformer cooling oil –Check					306.1Y.01	
3.6	Main transformer oil cooling pumps – Overhaul					306.5Y.01	
3.6	Main transformer oil cooling piping O-rings –Replace					306.5Y.02	
3.6	Main transformer–Refill					306.5Y.03	
3.7	Transducers rubber cable conduit – Inspect				307.3M.01		
3.7	Transducers coating –Check				307.3M.02		
3.7	Transducers fasteners –Check				307.6M.01		
3.7	Transducers –Check					307.1Y.01	
3.7	Transducers –Recoat					307.1Y.02	
3.7	Transducers rubber cable conduit – Replace					307.5Y.01	
3.8	Primary earthing cable and bracket – Check				308.3M.01		
3.8	Primary earth cable –Inspect				308.3M.02		
3.8	Primary earth fasteners –Check				308.3M.03		
3.8	Primary earth –Check				308.3M.04		
3.8	Primary earth contact plate –Inspect				308.6M.01		
3.8	Primary earth brushes –Check				308.6M.02		
3.8	Primary earth brush springs –Check				308.6M.03		
3.8	Primary earth cable glands –Check				308.6M.04		
3.8	Primary earth fasteners –Check				308.6M.05		
3.9	Filter –Clean				309.3M.01		
3.9	Filter resistor junction box cable glands – Inspect				309.3M.02		

Ass.	Equipment	Task code					
	Period Task frequency Kilometer	In Initial	D Daily	W Weekly	M Monthly 16000	Y Yearly 192000	X See task
3.9	Filter –Clean				309.6M.01		
3.9	Filter resistor fasteners –Check				309.6M.02		
3.9	Hotel load electrical cabling –Inspect				309.6M.03		
3.9	Hotel load electrical fasteners –Check				309.6M.04		
3.9	Filter resistor –Clean					309.1Y.01	
3.9	Filter contactor –Inspect					309.1Y.02	
3.9	Filter contactor –Clean					309.1Y.03	
3.9	Filter contactor contacts –Check					309.1Y.04	
3.9	Filter contactor –Check					309.1Y.05	
3.9	Filter contactor terminals fasteners – Check					309.1Y.06	
3.9	Filter –Overhaul					309.5Y.01	
3.9	Filter resistor junction box cable glands – Replace					309.5Y.02	
3.9	Filter resistor junction box seal – Replace					309.10Y.01	
4.0	**Propulsion System**						
4.1	Traction converter earthing switch – Check			401.1W.01			
4.1	Traction converter earthing switch – Check			401.1W.02			
4.1	Traction converter flexible hoses –Inspect				401.3M.01		
4.1	Traction converter contactor –Check				401.6M.01		
4.1	Traction converter precharge contactor – Check				401.6M.02		
4.1	Traction converter electrical equipment - Check				401.6M.03		
4.1	Traction converter cable –Inspect					401.1Y.01	
4.1	Gate unit fibre optics –Inspect					401.1Y.02	
4.1	Traction converter fasteners –Check					401.1Y.03	
4.1	Valve set tank –Inspect					401.1Y.04	
4.1	Traction converter precharge contactor – Inspect					401.1Y.05	
4.1	Traction converter precharge contactor auxiliary contacts –Measure					401.1Y.06	
4.1	Traction converter precharge contactor – Check					401.1Y.07	
4.1	Traction converter contactor –Examine					401.1Y.08	
4.1	Traction converter contactor –Check					401.1Y.09	
4.1	Traction converter contactor auxiliary contacts –Check					401.1Y.10	
4.1	Traction converter oil circuit –Inspect					401.1Y.11	
4.1	Traction converter doors and locks – Check					401.1Y.12	
4.1	Valve set electrical connections – Inspect					401.1Y.13	
4.1	Traction converter air cooling hoses – Inspect					401.1Y.14	
4.1	Traction converter earthing switch – Check					401.5Y.01	
4.1	Traction converter contactor –Clean					401.5Y.02	
4.1	Traction converter contactor piston ring – Replace					401.5Y.03	

Ass.	Equipment	Task code					
	Period Task frequency Kilometer	In Initial	D Daily	W Weekly	M Monthly 16000	Y Yearly 192000	X See task
4.1	Traction converter precharge contactor – Check					401.5Y.04	
4.1	Traction converter precharge contactor coil –Replace					401.5Y.05	
4.1	Traction converter voltage indicator – Test					401.5Y.06	
4.1	Primary voltage transformers –Test					401.5Y.07	
4.1	Traction converter current transducer – Test					401.5Y.08	
4.1	Traction converter voltage transducers – Test					401.5Y.09	
4.1	Traction converter air cooling hoses – Replace					401.5Y.10	
4.1	Gate unit power supply –Test					401.5Y.11	
4.1	Gate unit – Test					401.5Y.12	
4.1	Valve sets –Test					401.5Y.13	
4.1	Traction converter –Impedance-Measure					401.5Y.14	
4.1	DC-Link capacitors –Measure					401.8Y.01	
4.1	Capacitors –Fasteners –Check					401.8Y.02	
4.1	Earthing resistors –Inspect					401.8Y.03	
4.1	MUB Resistor –Inspect					401.8Y.04	
4.1	Series resonant capacitor –Measure					401.8Y.05	
4.1	Traction converter –Test					401.10Y.01	
4.1	Traction converter precharge resistor – Test					401.10Y.02	
4.1	Fibre optic cables –Test					401.10Y.03	
4.1	Traction converter flexible hoses – Replace					401.10Y.04	
4.1	Traction converter door seals –Replace					401.10Y.05	
4.2	Traction converter oil level –Check			402.1W.01			
4.2	Air dehumidifier –Check			402.1W.02			
4.2	Traction converter oil pumps –Inspect				402.3M.01		
4.2	Traction converter oil expansion tank – Inspect				402.3M.02		
4.2	Traction converter oil cooling piping – Inspect				402.3M.03		
4.2	Traction converter oil cooling pipe drain cock –Inspect				402.3M.04		
4.2	Traction converter oil cooling fasteners – Check				402.6M.01		
4.2	Traction converter cooling oil –Check					402.1Y.01	
4.2	Traction converter oil cooling pumps – Overhaul					402.5Y.01	
4.2	Traction converter oil cooling –Clean and Refill					402.5Y.02	
4.2	Traction converter oil cooling – Clean and Refill					402.8Y.01	
4.3	Traction converter bus station ventilator– Check				403.3M.01		
4.3	Traction converter bus station –Inspect					403.1Y.01	
4.3	Traction converter bus station seal – Inspect					403.1Y.02	

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Ass.	Equipment	Task code					
	Period Task frequency Kilometer	In Initial	D Daily	W Weekly	M Monthly 16000	Y Yearly 192000	X See task
4.3	Traction converter bus station – EPROM memory chips –Replace					403.8Y.01	
4.3	Traction converter bus station Software – Reload					403.8Y.02	
4.4	Traction motor –Inspect			404.1W.01			
4.4	Traction motor dampers –Inspect			404.1W.02			
4.4	Traction motor cables –Inspect			404.1W.03			
4.4	Traction motor bellows –Inspect				404.6M.01		
4.4	Traction motor damper mountings – Inspect				404.6M.02		
4.4	Traction motor damper rod –Inspect				404.6M.03		
4.4	Traction motor spheriblocs –Inspect				404.6M.04		
4.4	Traction motor fasteners –Check				404.6M.05		
4.4	Traction motor support arm fasteners – Check				404.6M.06		
4.4	Traction motor shims –Inspect				404.6M.07		
4.4	Traction motor –Clean					404.1Y.01	
4.4	Traction motor damper –Test						404.X.01
4.4	Traction motor DE bearing –Lubricate						404.X.02
4.4	Traction motor NDE bearing –Lubricate						404.X.03
4.4	Traction motor damper –Overhaul						404.X.04
4.4	Traction motor damper Spheribloc– Replace						404.X.05
4.4	Traction motor bearings –Replace						404.X.06
4.4	Traction motor stator windings –Clean						404.X.07
4.4	Traction motor damper mountings – Inspect					404.2Y.01	
4.4	Traction motor Spheribloc –Test					404.2Y.02	
4.4	Traction motor –Overhaul					404.5Y.01	
4.4	Traction motor electrical insulation – Test					404.5Y.02	
4.4	Traction motor rotary speed transmitter – Test					404.5Y.03	
4.4	Traction motor terminal box–Overhaul					404.5Y.04	
4.4	Traction motor fasteners–Replace					404.5Y.05	
4.4	Traction motor spheriblocs –Replace					404.5Y.06	
4.4	Traction motor temperature sensor – Test					404.5Y.07	
4.4	Traction motor bellows –Replace					404.5Y.08	
4.4	Traction motor support arm –Test					404.5Y.09	
5.0	**Auxiliary System**						
5.1	Auxiliary converter contactors –Inspect				501.6M.01		
5.1	Auxiliary converter seals –Inspect				501.6M.02		
5.1	Auxiliary converter fasteners –Inspect				501.6M.03		
5.1	Auxiliary converter fasteners –Check				501.6M.04		
5.1	Auxiliary converter –Inspect					501.1Y.01	
5.1	Auxiliary converter insulators –Inspect					501.1Y.02	
5.1	Auxiliary converter surge arresters – Inspect					501.1Y.03	
5.1	Auxiliary converter contactors –Check					501.1Y.04	
5.1	Auxiliary converter seals –Inspect					501.1Y.05	
5.1	Auxiliary converter modules –Check					501.1Y.06	
5.1	Auxiliary converter doors –Check					501.1Y.07	

Ass.	Equipment	Task code					
	Period Task frequency Kilometer	In Initial	D Daily	W Weekly	M Monthly 16000	Y Yearly 192000	X See task
5.1	Auxiliary converter heat sinks –Inspect					501.1Y.08	
5.1	Auxiliary converter surge arresters – Inspect					501.1Y.09	
5.1	Auxiliary converter reactors –Clean					501.1Y.10	
5.1	Auxiliary converter heat sinks –Clean					501.1Y.11	
5.1	Auxiliary converter –Clean					501.1Y.12	
5.1	Auxiliary converter transformer –Clean					501.1Y.13	
5.1	Auxiliary converter insulators –Clean					501.1Y.14	
5.1	Auxiliary converter capacitor –Inspect					501.1Y.15	
5.1	Auxiliary converter capacitors –Clean					501.1Y.16	
5.1	Auxiliary converter cabinet –Clean					501.5Y.01	
5.1	Auxiliary converter contactor –Overhaul					501.5Y.02	
5.1	Auxiliary converter reactors and transformers –Clean					501.5Y.03	
5.1	Auxiliary converter insulators –Inspect					501.5Y.04	
5.1	Auxiliary converter CZ units –Clean					501.5Y.05	
5.1	Auxiliary converter filter capacitors –Test					501.10Y.01	
5.1	Auxiliary converter seals –Replace					501.10Y.02	
5.2	Auxiliary converter control –Check				502.3M.01		
5.2	Auxiliary converter control –Inspect					502.1Y.01	
5.2	Auxiliary converter control –EPROM memory chips –Replace					502.8Y.01	
5.2	Auxiliary converter control Software – Reload					502.8Y.02	
5.3	Battery isolation switch –Check			503.1W.01			
5.3	Battery –Clean				503.1M.01		
5.3	Battery box –Inspect				503.3M.01		
5.3	Battery box–Clean				503.3M.02		
5.3	Battery tray locking handles –Check				503.3M.03		
5.3	Battery electrolyte –Check				503.3M.04		
5.3	Battery spacers –Inspect				503.3M.05		
5.3	Battery cables–Inspect				503.3M.06		
5.3	Battery connections –Check				503.3M.07		
5.3	Battery connections fasteners –Check				503.3M.08		
5.3	Battery box cables–Check				503.3M.09		
5.3	Battery box ventilation –Inspect				503.3M.10		
5.3	Battery door locks –Check				503.3M.11		
5.3	Battery tray handles –Check				503.3M.12		
5.3	Battery tray handle –Lubricate				503.3M.13		
5.3	Battery connector –Inspect				503.6M.01		
5.3	Battery box door seal –Inspect				503.6M.02		
5.3	Battery box breathers –Clean					503.1Y.01	
5.3	Battery electrolyte –Check					503.1Y.02	
5.3	Battery charger –Check					503.1Y.03	
5.3	Battery cell –Measure					503.1Y.04	
5.3	Battery tray rollers –Inspect					503.5Y.01	
5.3	Battery tray rollers –Clean					503.5Y.02	
5.3	Battery box ventilation –Replace					503.5Y.03	
5.4	Hotel load contacts –Clean				504.6M.01		
5.4	Hotel load connector main contacts – Inspect				504.6M.02		
5.4	Hotel load control magnet –Clean				504.6M.03		
5.4	Hotel load connector fasteners –Check				504.6M.04		

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Ass.	Equipment	Task code					
	Period Task frequency Kilometer	In Initial	D Daily	W Weekly	M Monthly 16000	Y Yearly 192000	X See task
5.4	Hotel load contact –Inspect					504.1Y.01	
5.5	Oil cooling radiators –Check				505.1M.01		
5.5	Oil blower filter mesh screen –Clean				505.3M.01		
5.5	Oil blower filter –Clean				505.3M.02		
5.5	Oil blower filter seal –Inspect				505.3M.03		
5.5	Oil cooler blower fan and motor –Check				505.3M.04		
5.5	Oil cooler blower seals –Inspect				505.3M.05		
5.5	Oil cooling radiators –Clean				505.3M.06		
5.5	Traction converter oil cooling radiator – Inspect				505.3M.07		
5.5	Oil blower and fan fasteners –Check				505.6M.01		
5.5	Oil blower filter panel and ducting fasteners –Check				505.6M.02		
5.5	Oil blower–Clean					505.1Y.01	
5.5	Oil blower filter panel –Clean					505.1Y.02	
5.5	Oil blower filter –Inspect					505.1Y.03	
5.5	Oil blower filter panel seal–Check					505.1Y.04	
5.5	Oil blower impeller – Balance					505.1Y.05	
5.5	Oil blower motor bearing –Lubricate				505.18M.01		
5.5	Oil blower filter panel –Water test					505.2Y.01	
5.5	Oil blower motor end plates –Clean					505.3Y.01	
5.5	Oil blower motor –Overhaul					505.3Y.02	
5.5	Oil blower motor bearing – Replace					505.3Y.03	
5.5	Oil blower filter duct –Clean					505.5Y.01	
5.5	Oil blower fan impeller–Clean					505.5Y.02	
5.5	Oil blower filter panel –Clean					505.5Y.03	
5.5	Oil blower air cone –Clean					505.5Y.04	
5.5	Oil blower seal–Replace					505.5Y.05	
5.5	Oil blower seal–Replace					505.10Y.01	
5.6	Machine room blower filter screen –Clean				506.3M.01		
5.6	Machine room blower filter louvre –Clean				506.3M.02		
5.6	Machine room blower filter –Clean				506.3M.03		
5.6	Machine room blower seal –Inspect				506.3M.04		
5.6	Machine room blower motor –Check				506.3M.05		
5.6	Machine room blower duct wear plate – Check				506.3M.06		
5.6	Machine room blower fasteners –Check				506.6M.01		
5.6	Machine room blower filter fasteners – Check				506.6M.02		
5.6	Machine room blower –Clean					506.1Y.01	
5.6	Machine room blower filter panel –Clean					506.1Y.02	
5.6	Machine room blower panel –Inspect					506.1Y.03	
5.6	Machine room blower motor bearing – Lubricate				506.18M.01		
5.6	Machine room blower motor end plates – Clean					506.3Y.01	
5.6	Machine room blower motor –Overhaul					506.3Y.02	
5.6	Machine room blower motor bearing – Replace					506.3Y.03	
5.6	Machine room blower filter duct –Clean					506.5Y.01	
5.6	Machine room blower fan impeller –Clean					506.5Y.02	
5.6	Machine room blower seal –Replace					506.5Y.03	

Ass.	Equipment	Task code					
	Period Task frequency Kilometer	In Initial	D Daily	W Weekly	M Monthly 16000	Y Yearly 192000	X See task
5.6	Machine room blower motor capacitor – Test					506.5Y.04	
5.6	Machine room blower seal –Replace					506.10Y.01	
5.7	Traction motor blower filter screen –Clean				507.3M.01		
5.7	Traction motor blower filter louvre –Clean				507.3M.02		
5.7	Traction motor blower filter –Clean				507.3M.03		
5.7	Traction motor blower filter seal –Inspect				507.3M.04		
5.7	Traction motor blower seal –Check				507.3M.05		
5.7	Traction motor blower filter duct seal and wear plate –Inspect				507.3M.06		
5.7	Traction motor blower motor–Check				507.3M.07		
5.7	Traction motor blower fasteners –Check				507.6M.01		
5.7	Traction motor blower filter fasteners – Check				507.6M.02		
5.7	Traction motor blower –Clean					507.1Y.01	
5.7	Traction motor blower filter –Clean					507.1Y.02	
5.7	Traction motor blower filter –Inspect					507.1Y.03	
5.7	Traction Motor Blower motor bearing – Lubricate				507.18M.01		
5.7	Traction motor blower motor end plates – clean					507.3Y.01	
5.7	Traction motor blower motor –Overhaul					507.3Y.02	
5.7	Traction Motor Blower motor bearing – Replace					507.3Y.03	
5.7	Traction motor blower filter duct –Clean					507.5Y.01	
5.7	Traction motor blower duct –Clean					507.5Y.02	
5.7	Traction motor blower impeller –Clean					507.5Y.03	
5.7	Traction motor blower seals –Replace					507.5Y.04	
5.7	Traction motor blower seals –Replace					507.10Y.01	
5.8	Machine room blower scavenge fan – Check				508.3M.01		
5.8	Machine room blower scavenge flexible duct –Inspect				508.3M.02		
5.8	Machine room blower scavenge equaliser hoses –Inspect				508.3M.03		
5.8	Machine room blower scavenge seal – Inspect				508.3M.04		
5.8	Traction motor & oil blower scavenge fan –Check				508.3M.05		
5.8	Traction motor & oil blower scavenge flexible duct –Inspect				508.3M.06		
5.8	Traction motor & oil blower scavenge equaliser hoses –Inspect				508.3M.07		
5.8	Traction motor & oil blower scavenge seal –Inspect				508.3M.08		
5.8	Oil blower Scavenge duct slip joint – Check				508.3M.09		
5.8	Machine room blower scavenge fasteners –Check				508.6M.01		
5.8	Traction motor & oil blower scavenge fasteners –Check				508.6M.02		
5.8	Traction motor & oil blower scavenge motor –Overhaul					508.3Y.01	

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Ass.	Equipment	Task code					
	Period Task frequency Kilometer	In Initial	D Daily	W Weekly	M Monthly 16000	Y Yearly 192000	X See task
5.8	Traction motor & oil blower scavenge motor bearing – Replace					508.3Y.02	
5.8	Machine room blower scavenge motor – Overhaul					508.3Y.03	
5.8	Machine room blower scavenge motor bearing – Replace					508.3Y.04	
5.8	Machine room blower scavenge duct – Clean					508.5Y.01	
5.8	Machine room blower scavenge –Clean					508.5Y.02	
5.8	Machine room blower scavenge fan impeller –Inspect					508.5Y.03	
5.8	Machine room blower scavenge flexible duct –Replace					508.5Y.04	
5.8	Machine room blower scavenge equaliser hose –Replace					508.5Y.05	
5.8	Traction motor & oil blower scavenge duct –Clean					508.5Y.06	
5.8	Traction motor & oil blower scavenge – Clean					508.5Y.07	
5.8	Traction motor & oil blower scavenge fan impeller –Inspect					508.5Y.08	
5.8	Oil blower filter scavenge hose –Replace					508.5Y.09	
5.8	Traction motor & oil blower scavenge equaliser hose –Replace					508.5Y.10	
5.8	Oil blower scavenge duct slip joint seal – Replace					508.5Y.11	
5.8	Machine room blower scavenge motor start-up capacitor –Test					508.5Y.12	
5.8	Traction motor & oil blower scavenge motor start-up capacitor –Test					508.5Y.13	
5.8	Machine room blower scavenge duct seal and gasket –Replace					508.10Y.01	
5.8	Traction motor & oil blower scavenge duct seal and gasket –Replace					508.10Y.02	
5.9	Power supply 415/110V –Inspect				509.6M.01		
6.0	**Air Supply & Pneumatic System**						
6.1	Main compressor –Inspect			601.1W.01			
6.1	Main compressor oil –Check			601.1W.02			
6.1	Main compressor oil –Inspect			601.1W.03			
6.1	Main compressor motor vent –Clean				601.1M.01		
6.1	Main compressor motor oil –Check				601.1M.02		
6.1	Main compressor–Check				601.1M.03		
6.1	Main compressor resilient mounting – Inspect				601.3M.01		
6.1	Main compressor delivery hose –Inspect				601.3M.02		
6.1	Main compressor air flow path –Clean				601.3M.03		
6.1	Main compressor air intake filter –Clean				601.3M.04		
6.1	Main compressor crankcase breather – Clean				601.3M.05		
6.1	Main compressor oil –Change				601.3M.06		
6.1	Main compressor –Measure				601.3M.07		
6.1	Main compressor fasteners & Mounting– Check				601.3M.08		

Ass.	Equipment	Task code					
	Period Task frequency Kilometer	In Initial	D Daily	W Weekly	M Monthly 16000	Y Yearly 192000	X See task
6.1	Drip cup filter –Clean				601.6M.01		
6.1	Main compressor –Inspect					601.1Y.01	
6.1	Main compressor primary oil filter –Clean					601.1Y.02	
6.1	Main compressor secondary oil filter – Change					601.1Y.03	
6.1	Main compressor concentric valves – Clean					601.1Y.04	
6.1	Main compressor oil –Change					601.1Y.05	
6.1	Low Pressure automatic drain valves – Clean					601.1Y.06	
6.1	Main compressor motor bearings – Lubricate				601.18M.01		
6.1	Main compressor –Overhaul					601.3Y.01	
6.1	Main compressor motor –Overhaul					601.3Y.02	
6.1	Main compressor motor bearing–Replace					601.3Y.03	
6.1	Pressure switches –Test					601.4Y.01	
6.1	Drip cup and auto drain valve –Overhaul					601.4Y.02	
6.1	Exhaust valves –Overhaul					601.4Y.03	
6.1	Low pressure automatic drain valves – Overhaul					601.4Y.04	
6.1	Main compressor mounting –Inspect					601.5Y.01	
6.1	Main compressor copper gasket –Replace					601.5Y.02	
6.1	Main compressor delivery hose – Replace					601.5Y.03	
6.1	Main compressor resilient mounting – Replace					601.6Y.01	
6.2	Air dryer –Inspect			602.1W.01			
6.2	Air dryer –Check				602.1M.01		
6.2	Air dryer –Check				602.3M.01		
6.2	Air dryer –Inspect				602.3M.02		
6.2	Air dryer –Clean					602.1Y.01	
6.2	Air dryer electrical conduit –Inspect					602.1Y.02	
6.2	Air dryer pre-coalescer filter –Inspect					602.1Y.03	
6.2	Air dryer isolating cocks –Check					602.1Y.04	
6.2	Air dryer desiccant –Inspect					602.2Y.01	
6.2	Air dryer –Overhaul					602.4Y.01	
6.2	Air dryer isolating cocks –Replace					602.4Y.02	
6.2	Air dryer electrical conduit –Replace					602.5Y.01	
6.3	Reservoirs –drain			603.1W.01			
6.3	Reservoirs pneumatic pipes –Check				603.3M.01		
6.3	Reservoirs Automatic drain valves – Inspect				603.3M.02		
6.3	Main Reservoir isolating cocks –Inspect				603.3M.03		
6.3	Main Reservoir drain cocks –Inspect				603.3M.04		
6.3	Reservoirs safety chains –Check				603.3M.05		
6.3	Main and Auxiliary Reservoir –Inspect				603.6M.01		
6.3	Air line sieve filter –Clean				603.6M.02		
6.3	Automatic drain valves –Test				603.6M.03		
6.3	Compressor check valves –Test					603.1Y.01	
6.3	Main Reservoir isolating cocks –Test					603.1Y.02	
6.3	Main Reservoir drain cocks –Test					603.1Y.03	
6.3	Main Reservoir –Overhaul					603.4Y.01	

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Ass.	Equipment	Task code					
	Period Task frequency Kilometer	In Initial	D Daily	W Weekly	M Monthly 16000	Y Yearly 192000	X See task
6.3	Main Reservoir automatic drain valve – Overhaul					603.4Y.02	
6.3	Main Reservoir drain cock –Replace					603.4Y.03	
6.3	Main Reservoir isolating cocks – Overhaul					603.4Y.04	
6.3	Main Reservoir safety valves –Overhaul					603.4Y.05	
6.3	Compressor check valves –Overhaul					603.4Y.06	
6.3	Control reservoir retaining valve – Overhaul					603.4Y.07	
6.3	Air line sieve filter –Replace					603.4Y.08	
6.4	Auxiliary compressor oil –Check				604.3M.01		
6.4	Auxiliary compressor air intake filters – Clean				604.6M.01		
6.4	Auxiliary compressor fasteners –Check				604.6M.02		
6.4	Auxiliary compressor lubricant –Change					604.1Y.01	
6.4	Auxiliary compressor motor –Check					604.1Y.02	
6.4	Auxiliary compressor delivery hose – Inspect					604.1Y.03	
6.4	Auxiliary compressor –Overhaul					604.4Y.01	
6.4	Auxiliary compressor air intake filters – Replace					604.5Y.01	
6.4	Auxiliary compressor delivery hose – Replace					604.5Y.02	
6.5	Centrifugal air strainer filter bowl –Drain			605.1W.01			
6.5	Centrifugal air strainer –Clean				605.1M.01		
6.5	Brake frame pneumatic system –Check				605.3M.01		
6.5	Air line sieve filter –Clean				605.6M.01		
6.5	Automatic brake filter –Clean					605.1Y.01	
6.5	Check valve strainer –Clean					605.1Y.02	
6.5	Emergency exhaust valve –Test					605.1Y.03	
6.5	EP unloader valve –Test					605.1Y.04	
6.5	EP valve –Test					605.1Y.05	
6.5	Latched isolating cock –Test					605.1Y.06	
6.5	Pressure switches –Test					605.1Y.07	
6.5	Pantograph safety valve –Test					605.1Y.08	
6.5	Safety valves –Clean					605.1Y.09	
6.5	Venturi/Solenoid valve –Test					605.1Y.10	
6.5	Breakaway protection valve –Test					605.2Y.01	
6.5	Duplex check valve –Test					605.2Y.02	
6.5	Air relay valve–Test					605.2Y.03	
6.5	Latched solenoid valve –Test					605.2Y.04	
6.5	Pressure control valve –Test					605.2Y.05	
6.5	Sanding equipment –Test					605.2Y.06	
6.5	Safety valve –Test					605.2Y.07	
6.5	Brake pipe control unit –Test					605.2Y.08	
6.5	EBC/5 Blending unit –Test					605.2Y.09	
6.5	Brake equipment module –Overhaul					605.4Y.01	
6.5	Air line sieve filter –Replace					605.4Y.02	
6.5	Air relay valve –Overhaul					605.4Y.03	
6.5	Automatic brake manifold –Overhaul					605.4Y.04	
6.5	Brake control unit –Overhaul					605.4Y.05	
6.5	Breakaway protection valve –Overhaul					605.4Y.06	
6.5	Centrifugal strainer –Overhaul					605.4Y.07	

Ass.	Equipment	Task code					
	Period Task frequency Kilometer	In Initial	D Daily	W Weekly	M Monthly 16000	Y Yearly 192000	X See task
6.5	Centrifugal air strainer –Overhaul					605.4Y.08	
6.5	Check valve and strainer –Overhaul					605.4Y.09	
6.5	Direct brake manifold –Overhaul					605.4Y.10	
6.5	Distributor valve –Overhaul					605.4Y.11	
6.5	Double check valve –Overhaul					605.4Y.12	
6.5	Duplex check valve –Overhaul					605.4Y.13	
6.5	E70 Brake control unit –Overhaul					605.4Y.14	
6.5	EBC/5 Blending unit–Overhaul					605.4Y.15	
6.5	Brake control system–Test					605.4Y.16	
6.5	Brake control system–Clean					605.4Y.17	
6.5	Exhaust valve –Overhaul					605.4Y.18	
6.5	Relay valve –Overhaul					605.4Y.19	
6.5	EP relay valve –Overhaul					605.4Y.20	
6.5	EP unloader valve –Overhaul					605.4Y.21	
6.5	EP valve –Overhaul					605.4Y.22	
6.5	Auxiliary equipment and flange lubrication –Overhaul					605.4Y.23	
6.5	Flow meter valve –Overhaul					605.4Y.24	
6.5	Manifold mounted isolating cocks – Overhaul					605.4Y.25	
6.5	Latched isolating cocks –Overhaul					605.4Y.26	
6.5	Distributor valve isolator assembly – Overhaul					605.4Y.27	
6.5	Latched solenoid valve –Overhaul					605.4Y.28	
6.5	Limiting valve–Overhaul					605.4Y.29	
6.5	Main equipment manifold –Overhaul					605.4Y.30	
6.5	Pantograph equipment –Overhaul					605.4Y.31	
6.5	Pressure control valve –Overhaul					605.4Y.32	
6.5	Pressure regulators –Overhaul					605.4Y.33	
6.5	Pressure switch –Overhaul					605.4Y.34	
6.5	Safety valve –Overhaul					605.4Y.35	
6.5	Sanding equipment –Overhaul					605.4Y.36	
6.5	SPB equipment –Overhaul					605.4Y.37	
6.5	SPB manifold –Overhaul					605.4Y.38	
6.5	Towing cock –Overhaul					605.4Y.39	
6.5	Venturi check valve –Overhaul					605.4Y.40	
6.5	Venturi/solenoid valve –Overhaul					605.4Y.41	
6.5	Vigilance unit –Test					605.4Y.42	
6.5	Check valve –Overhaul					605.4Y.43	
6.5	Breakaway protection valve–Overhaul					605.5Y.01	
6.6	Automatic brake controller –Check			606.1W.01			
6.6	Direct air brake valve –Check			606.1W.02			
6.6	Exhaust valve –Test					606.2Y.01	
6.6	Automatic brake controller –Overhaul					606.4Y.01	
6.6	Direct air brake valve –Overhaul					606.4Y.02	
6.6	Exhaust valve –Overhaul					606.4Y.03	
6.7	Brake pad –Inspect			607.1W.01			
6.7	Brake pad keys –Inspect			607.1W.02			
6.7	Parking brake –Check			607.1W.03			
6.7	Brake –Check			607.1W.04			
6.7	Brake cylinder –Inspect				607.1M.01		
6.7	Parking brake cylinder –Inspect				607.1M.02		
6.7	Tread cleaning device –Check				607.1M.03		

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Ass.	Equipment	Task code					
	Period Task frequency Kilometer	**In** Initial	**D** Daily	**W** Weekly	**M** Monthly 16000	**Y** Yearly 192000	**X** See task
6.7	Brake activators –Inspect				607.3M.01		
6.7	Brake disk –Examine				607.3M.02		
6.7	Service brake cylinder –Check				607.3M.03		
6.7	Parking brake cylinder –Check				607.3M.04		
6.7	Bogie isolation cock –Inspect				607.3M.05		
6.7	Brake Calliper –Test				607.3M.06		
6.7	*Tread cleaning pad –Inspect*				607.3M.07		
6.7	Brake Calliper –Check				607.6M.01		
6.7	Brake disk –Overhaul					607.1Y.01	
6.7	Anti-slip valve –Check					607.1Y.02	
6.7	Brake activators – Hoses–Inspect					607.1Y.03	
6.7	Brake cylinder hose –Inspect					607.1Y.04	
6.7	Bogie isolation cock –Test					607.1Y.05	
6.7	Brake Calliper –Clean					607.2Y.01	
6.7	Service brake cylinder –Clean					607.2Y.02	
6.7	Parking brake cylinder –Clean					607.2Y.03	
6.7	Service brake cylinder –Overhaul					607.4Y.01	
6.7	Parking brake cylinder –Overhaul					607.4Y.02	
6.7	Brake Calliper –Overhaul					607.4Y.03	
6.7	Anti-slip valve –Overhaul					607.4Y.04	
6.7	Double check valve –Overhaul					607.4Y.05	
6.7	Bogie isolation cock –Replace					607.4Y.06	
6.7	Pressure switch –Test					607.4Y.07	
6.7	Brake bushing –Replace					607.5Y.01	
6.7	Brake Calliper components –Replace					607.5Y.02	
6.7	Brake hoses –Replace					607.5Y.03	
7.0	**Interior**						
7.1	Machine room doors –Check			701.1W.01			
7.1	Machine room door seal –Inspect				701.3M.01		
7.1	Machine room door glass –Inspect				701.3M.02		
7.1	*Machine room door window seal –Inspect*				701.3M.03		
7.1	Locker shelves –Check				701.6M.01		
7.1	Machine room door lock tongue – Lubricate					701.1Y.01	
7.1	Machine room door hinges –Lubricate					701.1Y.02	
7.1	Locker door –Check					701.1Y.03	
7.1	Machine room door seal –Replace					701.10Y.01	
7.1	*Machine room door window seal* – Replace					701.10Y.02	
7.2	Seats –Check			702.1W.01			
7.2	Seat trim –Check				702.3M.01		
7.2	Seats –Clean				702.3M.02		
7.2	Seat fasteners –Check				702.6M.01		
7.2	Seat pedestal shaft –Lubricate					702.1Y.01	
7.2	*Seat slide –Lubricate*					702.1Y.02	
7.3	Cab lights –Check			703.1W.01			
7.3	Machine room lights –Check			703.1W.02			
7.3	Cab lights –Clean				703.3M.01		
7.4	Cab window blinds –Check			704.1W.01			
7.4	Cab window blinds –Inspect				704.3M.01		
7.4	Cab blinds –Clean				704.3M.02		
7.5	*Cab heater/blower –Clean*			705.1W.01			

Ass.	Equipment	Task code					
	Period Task frequency Kilometer	In Initial	D Daily	W Weekly	M Monthly 16000	Y Yearly 192000	X See task
7.5	Fire extinguishers –Check			705.1W.02			
7.5	Driver's desk –Clean				705.3M.01		
7.5	Crew fans –Check				705.3M.02		
7.5	Display screen and keyboard –Clean				705.3M.03		
7.5	Cab floor –Clean				705.3M.04		
7.5	Crew fan fasteners –Check				705.6M.01		
7.5	Cab emergency brake cock –Test					705.1Y.01	
7.5	Cab floor coverings –Inspect					705.1Y.02	
7.5	Emergency brake cock –Replace					705.4Y.01	
7.5	Crew fan motor –Replace					705.5Y.01	
7.5	Cab heater/blower duct –Replace					705.5Y.02	
7.5	Cab –Repaint					705.5Y.03	
7.5	Cab floor coverings –Replace					705.10Y.01	
7.5	Cab heater/blower motor –Replace					705.15Y.01	
7.5	Cab floor boards –Replace					705.20Y.01	
7.6	Key interlocking system –Check				706.3M.01		
8.0	**Control System**						
8.1	Emergency push button –Test			801.1W.01			
8.1	Driver's cab switches –Check			801.1W.02			
8.1	Horn operating valve –Check			801.1W.03			
8.1	Driver's desk indicator lights –Check			801.1W.04			
8.1	Driver's footwell switches–Check			801.1W.05			
8.1	Windscreen wipers and operating valve – Check			801.1W.06			
8.1	Gauges –Check			801.1W.07			
8.1	TE/BE Master controller –Check				801.1M.01		
8.1	TE/BE Master controller interlock –Check				801.1M.02		
8.1	Memotel – Date & time - Check				801.1M.03		
8.1	Memotel –Download				801.6M.01		
8.1	Cab pneumatic piping –Check				801.6M.02		
8.1	TE/BE Master controller –Check					801.1Y.01	
8.1	TE/BE Master controller contact – Measure					801.1Y.02	
8.1	TE/BE Master controller roller –Check					801.1Y.03	
8.1	TE/BE Master controller auxiliary contact –Measure					801.1Y.04	
8.1	TE/BE Master controller fasteners – Check					801.1Y.05	
8.1	Windscreen wiper/washer isolation cock – Test					801.1Y.06	
8.1	TE/BE Master controller –Lubricate					801.1Y.07	
8.1	Horn isolating cock –Test					801.1Y.08	
8.1	Buzzer –Clean					801.1Y.09	
8.1	Horn isolating cock –Replace					801.4Y.01	
8.1	Windscreen wiper/washer isolation cock – Replace					801.4Y.02	
8.1	Windscreen wiper/washer operating valve –Overhaul					801.5Y.01	
8.1	Horn operating valve –Overhaul					801.5Y.02	
8.1	TE/BE Master controller –Overhaul					801.10Y.01	
8.1	Memotel –Change					801.10Y.02	
8.1	Cab switches –Replace					801.15Y.01	
8.1	Driver's footwell switches –Replace					801.15Y.02	

Ass.	Equipment	Task code					
	Period Task frequency Kilometer	**In** Initial	**D** Daily	**W** Weekly	**M** Monthly 16000	**Y** Yearly 192000	**X** See task
8.2	Fire detection unit & its pipeline – Clean				802.1M.01		
8.2	Smoke detector air sampling unit –Check				802.3M.01		
8.2	MR Control terminal connections –Check				802.6M.01		
8.2	MR Control DI relay –Check					802.1Y.01	
8.2	Smoke detector sensor –Check					802.1Y.02	
8.2	Control magnet –Clean					802.1Y.03	
8.2	Fire detection unit – Overhaul					802.2Y.01	
8.2	DI relay –Check					802.3Y.01	
8.2	Smoke detector sensor –Overhaul					802.3Y.02	
8.3	VCU bus station diagnostic computer – Check				803.1M.01		
8.3	VCU bus station diagnostic computer – data acquisition				803.1M.02		
8.3	VCU bus station ventilators –Check				803.3M.01		
8.3	VCU bus station diagnostic computer back-up battery –Check				803.3M.02		
8.3	VCU bus station –Inspect					803.1Y.01	
8.3	VCU bus station cover seal –Inspect					803.1Y.02	
8.3	VCU bus station - Back-up battery – Replace					803.4Y.01	
8.3	VCU bus station – EPROM memory chip – Replace					803.8Y.01	
8.3	VCU bus station – Software –Reload					803.8Y.02	
8.4	Loco-Loco bus –Inspect				804.3M.01		
8.4	Loco-Loco bus –Check					804.1Y.01	
8.4	UIC socket contacts –Check					804.1Y.02	
8.4	UIC socket seal –Replace					804.5Y.01	

5 Maintenance Periods

This chapter lists the Maintenance tasks, sorted by Task Frequency. The task description is given in Chapter 6.

5.1 Initial Maintenance Tasks

206.In.01	Gear box initial maintenance
206.In.02	Gear box initial maintenance

5.2 Supplementary Tasks following Manufacturer's Manual

202.X.01	Wheel bearing – Lubrication
201.X.02	Wheel bearing - Inspect
201.X.03	Wheel bearing - Inspect
201.X.04	Wheel bearing – Replace
203.X.01	Primary axle suspension dampers –Test
203.X.02	Primary suspension dampers –Overhaul
203.X.03	Primary suspension damper spheriblocs –Replace
204.X.01	Secondary suspension dampers –Test
204.X.02	Secondary suspension dampers –Overhaul
204.X.03	Secondary suspension damper spheriblocs –Replace
206.X.01	Gear box oil –Test
206.X.02	Main gear bearing - Replace
404.X.01	Traction motor damper –Test
404.X.02	Traction motor DE bearing –Lubricate
404.X.03	Traction motor NDE bearing –Lubricate
404.X.04	Traction motor damper –Overhaul
404.X.05	Traction motor damper Spheribloc–Replace
404.X.06	Traction motor bearings –Replace
404.X.07	Traction motor stator windings –Clean

5.3 Daily Maintenance Tasks (Before Starting)

106.1D.01	Horn and Lights - Check
107.1D.01	Washers / Wipers – Check

5.4 Weekly Maintenance Tasks

103.1W.01	Doors and step- Inspect
104.1W.01	Draftgear & Couplers- Check
104.1W.02	Draftgear & Couplers- Inspect
105.1W.01	Windows –Clean
106.1W.01	Headlights –Check
106.1W.02	Marker lights -Check
106.1W.03	Strobe lights -Check
106.1W.04	Warning horns -Check
107.1W.01	Washer reservoir- Refill
107.1W.02	Wiper motor- Check
107.1W.03	Washers/Wipers- Check
201.1W.01	Bogie frame – Inspect
201.1W.02	Pivot post and end transom - Inspect
202.1W.01	Wheelset – Inspect
203.1W.01	Primary suspension dampers –Inspect
204.1W.01	Secondary suspension dampers –Inspect
205.1W.01	Traction link –Inspect
205.1W.02	Traction link rod tab washers –Check
205.1W.03	Traction link safety cables –Check
206.1W.01	Gear box –Inspect
206.1W.02	Gear box lubricant -Check
206.1W.03	Drive coupling - Inspect
207.1W.01	Sanding equipment –Inspect
207.1W.02	Sanding equipment –Sand - Fill
207.1W.03	Sanding equipment –Check
208.1W.01	Wheel flange lubrication reservoir –Inspect
208.1W.02	Wheel flange lubrication –Refill
208.1W.03	Wheel flange lubrication system –Check
208.1W.04	Wheel flange lubrication operation –Check
302.1W.01	Pantograph –Check
303.1W.01	Main circuit breaker earthing switch –Check
305.1W.01	Main transformer –Inspect
305.1W.02	Main transformer –Inspect
305.1W.03	Main transformer mountings –Check
306.1W.01	Main transformer expansion tank –Check
306.1W.02	Main Transformer expansion tank air dehumidifiers –Check
401.1W.01	Traction converter earthing switch –Check
401.1W.02	Traction converter earthing switch –Check

402.1W.01	Traction converter oil level –Check
402.1W.02	Air dehumidifier –Check
404.1W.01	Traction motor –Inspect
404.1W.02	Traction motor dampers –Inspect
404.1W.03	Traction motor cables –Inspect
503.1W.01	Battery isolation switch –Check
601.1W.01	Main compressor –Inspect
601.1W.02	Main compressor oil –Check
601.1W.03	Main compressor oil –Inspect
602.1W.01	Air dryer –Inspect
603.1W.01	Reservoirs –drain
605.1W.01	Centrifugal air strainer filter bowl –Drain
606.1W.01	Automatic brake controller –Check
606.1W.02	Direct air brake valve –Check
607.1W.01	Brake pad –Inspect
607.1W.02	Brake pad keys –Inspect
607.1W.03	Parking brake –Check
607.1W.04	Brake –Check
701.1W.01	Machine room doors –Check
702.1W.01	Seats –Check
703.1W.01	Cab lights –Check
703.1W.02	Machine room lights –Check
704.1W.01	Cab window blinds –Check
705.1W.01	Cab heater/blower –Clean
705.1W.02	Fire extinguishers –Check
801.1W.01	Emergency push button –Test
801.1W.02	Driver's cab switches –Check
801.1W.03	Horn operating valve –Check
801.1W.04	Driver's desk indicator lights –Check
801.1W.05	Driver's footwell switches–Check
801.1W.06	Windscreen wipers and operating valve –Check
801.1W.07	Gauges –Check

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5.5 Monthly Maintenance Tasks

102.1M.01	Exterior finish- Clean
106.1M.01	Strobe light cover -Check
106.1M.02	Strobe light cover -Clean
207.1M.01	Sanding equipment –Clean
302.1M.01	Pantograph collector shoe wear strips –Inspect
302.1M.02	Pantograph flexible electrical connections –Inspect
302.1M.03	Pantograph –Lubricate
302.1M.04	Pantograph –Check
303.1M.01	Main circuit breaker insulator –Inspect
303.1M.02	Main circuit breaker earthing contact springs –Inspect
503.1M.01	Battery –Clean
505.1M.01	Oil cooling radiators –Check
601.1M.01	Main compressor motor vent –Clean
601.1M.02	Main compressor motor oil –Check
601.1M.03	Main compressor–Check
602.1M.01	Air dryer –Check
605.1M.01	Centrifugal air strainer –Clean
607.1M.01	Brake cylinder –Inspect
607.1M.02	Parking brake cylinder –Inspect
607.1M.03	Tread cleaning device –Check
801.1M.01	TE/BE Master controller –Check
801.1M.02	TE/BE Master controller interlock –Check
801.1M.03	Memotel – Date & time - Check
802.1M.01	Fire detection unit & its pipeline – Clean
803.1M.01	VCU bus station diagnostic computer –Check
803.1M.02	VCU bus station diagnostic computer –data acquisition

5.5.1 Supplementary Tasks every 3 months

101.3M.01	Cow catcher- Inspect
101.3M.02	Rail guards - Inspect
101.3M.03	Underframe structure -Inspect
103.3M.01	Cab door seals- Inspect
103.3M.02	Cab door drain apertures- Inspect
103.3M.03	Cab door window seal- Inspect
103.3M.04	Cab door glass- Inspect
104.3M.01	Draftgear & Couplers- End cocks - Inspect
105.3M.01	Windows – Examine

105.3M.02	Cab sliding windows – Check
105.3M.03	Windscreen guard grilles- Inspect
105.3M.04	Window drainage channel - Clean
105.3M.05	Cab side window drainage channel-Rubber flap- Inspect
106.3M.01	Warning horns -Check
107.3M.01	Washer piping- Inspect
107.3M.02	Washer reservoirs- Inspect
107.3M.03	Washer reservoir caps- Inspect
107.3M.04	Wiper arm- Inspect
107.3M.05	Wiper manual operating handle - Check
107.3M.06	Washer pumps- Check
201.3M.01	Bogie frame – Inspect
201.3M.02	Bogie frame piping – Check
202.3M.01	Wheelset – Inspect
202.3M.02	Axle boxes – Inspect
202.3M.03	Axle boxes – Inspect
202.3M.04	Axle guide rod – Inspect
202.3M.05	Axle guide rod spehriblocs – Inspect
202.3M.06	Hasler transmitter cable – Check
203.3M.01	Primary suspension springs –Check
204.3M.01	Vertical bump stops –Inspect
204.3M.02	Lateral bump stops –Inspect
204.3M.03	Limit chain and pins –Inspect
204.3M.04	Secondary suspension spring –Check
205.3M.01	Traction link safety cables –Inspect
205.3M.02	Pivot head–Check
205.3M.03	Traction link rod –Inspect
206.3M.01	Gear box - Inspect
206.3M.02	Gear box support arm spheriblocs - Inspect
206.3M.03	Transmission support arm - Inspect
206.3M.04	Gear box –Measure
206.3M.05	Gear box oil sight cover –Check
206.3M.06	Gear box oil sight glass –Inspect
206.3M.07	Gear box breather –Clean
206.3M.08	Gear box fasteners –Check
207.3M.01	Sanding equipment –Inspect
207.3M.02	Sand box lid seals –Inspect
207.3M.03	Sanding nozzles –Check
208.3M.01	Wheel flange lubrication- Hoses –Inspect
208.3M.02	Wheel flange lubrication nozzles –Check
208.3M.03	Wheel flange lubrication reservoir cap –Inspect

208.3M.04	Wheel flange lubrication - pipe –Check
301.3M.01	Roof line contact springs –Inspect
301.3M.02	Roof line insulators –Check
301.3M.03	High voltage bushing insulator –Check
301.3M.04	Roof line contact springs –Check
301.3M.05	Roof line jumper cables –Inspect
301.3M.06	High voltage bushing –Check
301.3M.07	High voltage cable –Inspect
302.3M.01	Pantograph –Inspect
302.3M.02	Pantograph insulators –Inspect
302.3M.03	Pantograph insulators –Inspect
302.3M.04	Pantograph collector head shoe –Check
302.3M.05	Pantograph insulator coating –Check
302.3M.06	Pantograph travel time –Check
302.3M.07	Pantograph collector deployed alignment –Check
302.3M.08	Pantograph static load –Measure
302.3M.09	Pantograph reaction load –Measure
303.3M.01	Main circuit breaker insulator coat –Check
303.3M.02	Main circuit breaker reservoir –Clean
303.3M.03	Main circuit breaker pressure regulator –Clean
303.3M.04	Main circuit breaker pneumatic circuit –Check
303.3M.05	Main circuit breaker - Fasteners –Check
304.3M.01	Surge arrester insulators –Inspect
304.3M.02	Surge arrester insulator coating –Check
304.3M.03	Surge arrester jumper cables –Inspect
305.3M.01	Main transformer earthing cables –Inspect
306.3M.01	Main transformer expansion tank –Clean
306.3M.02	Main transformer oil cooling –Inspect
306.3M.03	Main Transformer hoses –Inspect
306.3M.04	Main transformer differential amplifier –Inspect
306.3M.05	Main transformer oil cooling piping –Inspect
306.3M.06	Main transformer oil pressure sensor –Inspect
306.3M.07	Main transformer oil temperature sensor –Inspect
306.3M.08	Main transformer oil cooling pipe drain cocks –Inspect
306.3M.09	Main transformer oil cooling radiator –Check
307.3M.01	Transducers rubber cable conduit –Inspect
307.3M.02	Transducers coating –Check
308.3M.01	Primary earthing cable and bracket –Check
308.3M.02	Primary earth cable –Inspect
308.3M.03	Primary earth fasteners –Check
308.3M.04	Primary earth –Check

309.3M.01	Filter –Clean
309.3M.02	Filter resistor junction box cable glands –Inspect
401.3M.01	Traction converter flexible hoses –Inspect
402.3M.01	Traction converter oil pumps –Inspect
402.3M.02	Traction converter oil expansion tank –Inspect
402.3M.03	Traction converter oil cooling piping –Inspect
402.3M.04	Traction converter oil cooling pipe drain cock –Inspect
403.3M.01	Traction converter bus station ventilator– Check
502.3M.01	Auxiliary converter control –Check
503.3M.01	Battery box –Inspect
503.3M.02	Battery box–Clean
503.3M.03	Battery tray locking handles –Check
503.3M.04	Battery electrolyte –Check
503.3M.05	Battery spacers –Inspect
503.3M.06	Battery cables–Inspect
503.3M.07	Battery connections –Check
503.3M.08	Battery connections fasteners –Check
503.3M.09	Battery box cables–Check
503.3M.10	Battery box ventilation –Inspect
503.3M.11	Battery door locks –Check
503.3M.12	Battery tray handles –Check
503.3M.13	Battery tray handle –Lubricate
505.3M.01	Oil blower filter mesh screen –Clean
505.3M.02	Oil blower filter –Clean
505.3M.03	Oil blower filter seal –Inspect
505.3M.04	Oil cooler blower fan and motor –Check
505.3M.05	Oil cooler blower seals –Inspect
505.3M.06	Oil cooling radiators –Clean
505.3M.07	Traction converter oil cooling radiator –Inspect
506.3M.01	Machine room blower filter screen –Clean
506.3M.02	Machine room blower filter louvre –Clean
506.3M.03	Machine room blower filter –Clean
506.3M.04	Machine room blower seal –Inspect
506.3M.05	Machine room blower motor –Check
506.3M.06	Machine room blower duct wear plate –Check
507.3M.01	Traction motor blower filter screen –Clean
507.3M.02	Traction motor blower filter louvre –Clean
507.3M.03	Traction motor blower filter –Clean
507.3M.04	Traction motor blower filter seal –Inspect
507.3M.05	Traction motor blower seal –Check
507.3M.06	Traction motor blower filter duct seal and wear plate –Inspect

507.3M.07	Traction motor blower motor–Check
508.3M.01	Machine room blower scavenge fan –Check
508.3M.02	Machine room blower scavenge flexible duct –Inspect
508.3M.03	Machine room blower scavenge equaliser hoses –Inspect
508.3M.04	Machine room blower scavenge seal –Inspect
508.3M.05	Traction motor & oil blower scavenge fan –Check
508.3M.06	Traction motor & oil blower scavenge flexible duct –Inspect
508.3M.07	Traction motor & oil blower scavenge equaliser hoses –Inspect
508.3M.08	Traction motor & oil blower scavenge seal –Inspect
508.3M.09	Oil blower Scavenge duct slip joint –Check
601.3M.01	Main compressor resilient mounting –Inspect
601.3M.02	Main compressor delivery hose –Inspect
601.3M.03	Main compressor air flow path –Clean
601.3M.04	Main compressor air intake filter –Clean
601.3M.05	Main compressor crankcase breather –Clean
601.3M.06	Main compressor oil –Change
601.3M.07	Main compressor –Measure
601.3M.08	Main compressor fasteners & Mounting–Check
602.3M.01	Air dryer –Check
602.3M.02	Air dryer –Inspect
603.3M.01	Reservoirs pneumatic pipes –Check
603.3M.02	Reservoirs Automatic drain valves –Inspect
603.3M.03	Main Reservoir isolating cocks –Inspect
603.3M.04	Main Reservoir drain cocks –Inspect
603.3M.05	Reservoirs safety chains –Check
604.3M.01	Auxiliary compressor oil –Check
605.3M.01	Brake frame pneumatic system –Check
607.3M.01	Brake activators –Inspect
607.3M.02	Brake disk –Examine
607.3M.03	Service brake cylinder –Check
607.3M.04	Parking brake cylinder –Check
607.3M.05	Bogie isolation cock –Inspect
607.3M.06	Brake alliper –Test
607.3M.07	Tread cleaning pad –Inspect
701.3M.01	Machine room door seal –Inspect
701.3M.02	Machine room door glass –Inspect
701.3M.03	Machine room door window seal –Inspect
702.3M.01	Seat trim –Check
702.3M.02	Seats –Clean
703.3M.01	Cab lights –Clean
704.3M.01	Cab window blinds –Inspect

704.3M.02	Cab blinds –Clean
705.3M.01	Driver's desk –Clean
705.3M.02	Crew fans –Check
705.3M.03	Display screen and keyboard –Clean
705.3M.04	Cab floor –Clean
706.3M.01	Key interlocking system –Check
802.3M.01	Smoke detector air sampling unit –Check
803.3M.01	VCU bus station ventilators –Check
803.3M.02	VCU bus station diagnostic computer back-up battery –Check
804.3M.01	Loco-Loco bus –Inspect

5.5.2 Supplementary Tasks every 6 months

101.6M.01	Cab roof vents – Clean
101.6M.02	Machine room vents - Clean
101.6M.03	Cab roof GRP caps - Inspect
101.6M.04	Roof hatch fasteners - Check
101.6M.05	Roof hatch clamping bracket fasteners – Check
101.6M.06	Body structure –Inspect
101.6M.07	Car body – Inspect
101.6M.08	Cow catcher fasteners - Check
102.6M.01	Exterior finish- Inspect
103.6M.01	Cab door latch and catch- Inspect
103.6M.02	Cab door grab rail paints - Inspect
103.6M.03	Cab door grab rail fasteners- Check
103.6M.04	Cab door latch and catch fasteners - Check
103.6M.05	Cab door lock tongue- Lubricate
104.6M.01	Draftgear & Couplers-Striker block wear pad- Lubricate
104.6M.02	Draftgear & Couplers- Fasteners-Check
105.6M.01	Windows – Seals-Inspect
105.6M.02	Windscreen guard grilles - Inspect
105.6M.03	Windscreen guard grilles fasteners – Check
105.6M.04	Windows – Water test
106.6M.01	Strobe light fasteners -Check
106.6M.02	Warning horn fasteners -Check
106.6M.03	Headlight fasteners -Check
106.6M.04	Marker light fasteners -Check
106.6M.05	Horn pneumatic piping -Inspect
107.6M.01	Wiper blades- Replace
107.6M.02	Washers/Wipers Fasteners - Check

108.6M.01	Buffers – Check
108.6M.02	Buffers – Grease
108.6M.03	Buffers – Inspect
201.6M.01	Bogie frame pneumatic piping fasteners – Check
201.6M.02	Bogie step fasteners – Check
202.6M.01	Axle box front covers – Inspect
202.6M.02	Wheel diameter – Measure
202.6M.03	Wheel and axle loads – Check
202.6M.04	Ride height – Measure
202.6M.05	Axle guide rod fasteners – Check
202.6M.06	Axle box front cover fasteners – Check
202.6M.07	Axle box split ring fasteners – Check
203.6M.01	Primary suspension spring paint–Inspect
203.6M.02	Primary suspension spring insulating bases –Inspect
203.6M.03	Primary suspension damper mountings –Inspect
203.6M.04	Primary suspension damper rod –Inspect
203.6M.05	Primary suspension damper spheriblocs –Inspect
203.6M.06	Primary suspension damper fasteners –Check
204.6M.01	Secondary suspension spring paint –Inspect
204.6M.02	Secondary suspension spring insulating bases –Inspect
204.6M.03	Secondary suspension damper mountings –Inspect
204.6M.04	Secondary suspension damper rod –Inspect
204.6M.05	Secondary suspension blocs –Inspect
204.6M.06	Secondary suspension damper fasteners –Check
204.6M.07	Limit chain fasteners –Check
204.6M.08	Bump stop fasteners –Check
205.6M.01	Traction link paint–Inspect
205.6M.02	Traction link fasteners –Check
207.6M.01	Sand box fasteners –Check
207.6M.02	Sanding equipment security –Check
207.6M.03	Sand box –Inspect
207.6M.04	Sand flow rate –Measure
207.6M.05	Sand box – Inspect
208.6M.01	Wheel flange lubrication- fasteners –Check
208.6M.02	Wheel flange lubrication-holes –Clean
208.6M.03	Wheel flange lubrication oil flow –Measure
301.6M.01	Roof line –Inspect
301.6M.02	Roof line security –Inspect
302.6M.01	Pantograph valve box –Test
302.6M.02	Pantograph pneumatic motor –Check
302.6M.03	Pantograph height –Check

302.6M.04	Pantograph hardware –Check
304.6M.01	Surge arrester jumper cable fasteners –Check
305.6M.01	Main transformer electrical fasteners –Check
305.6M.02	Main transformer fasteners –Check
305.6M.03	Main transformer –Inspect
306.6M.01	Main transformer oil pumps –Check
307.6M.01	Transducers fasteners –Check
308.6M.01	Primary earth contact plate –Inspect
308.6M.02	Primary earth brushes –Check
308.6M.03	Primary earth brush springs –Check
308.6M.04	Primary earth cable glands –Check
308.6M.05	Primary earth fasteners –Check
309.6M.01	Filter –Clean
309.6M.02	Filter resistor fasteners –Check
309.6M.03	Hotel load electrical cabling –Inspect
309.6M.04	Hotel load electrical fasteners –Check
401.6M.01	Traction converter contactor –Check
401.6M.02	Traction converter precharge contactor –Check
401.6M.03	Traction converter electrical equipment -Check
402.6M.01	Traction converter oil cooling fasteners –Check
404.6M.01	Traction motor bellows –Inspect
404.6M.02	Traction motor damper mountings –Inspect
404.6M.03	Traction motor damper rod –Inspect
404.6M.04	Traction motor spheriblocs –Inspect
404.6M.05	Traction motor fasteners –Check
404.6M.06	Traction motor support arm fasteners –Check
404.6M.07	Traction motor shims –Inspect
501.6M.01	Auxiliary converter contactors –Inspect
501.6M.02	Auxiliary converter seals –Inspect
501.6M.03	Auxiliary converter fasteners –Inspect
501.6M.04	Auxiliary converter fasteners –Check
503.6M.01	Battery connector –Inspect
503.6M.02	Battery box door seal –Inspect
504.6M.01	Hotel load contacts –Clean
504.6M.02	Hotel load connector main contacts –Inspect
504.6M.03	Hotel load control magnet –Clean
504.6M.04	Hotel load connector fasteners –Check
505.6M.01	Oil blower and fan fasteners –Check
505.6M.02	Oil blower filter panel and ducting fasteners –Check
506.6M.01	Machine room blower fasteners –Check
506.6M.02	Machine room blower filter fasteners –Check

507.6M.01	Traction motor blower fasteners –Check
507.6M.02	Traction motor blower filter fasteners –Check
508.6M.01	Machine room blower scavenge fasteners –Check
508.6M.02	Traction motor & oil blower scavenge fasteners –Check
509.6M.01	Power supply 415/110V –Inspect
601.6M.01	Drip cup filter –Clean
603.6M.01	Main and Auxiliary Reservoir –Inspect
603.6M.02	Air line sieve filter –Clean
603.6M.03	Automatic drain valves –Test
604.6M.01	Auxiliary compressor air intake filters –Clean
604.6M.02	Auxiliary compressor fasteners –Check
605.6M.01	Air line sieve filter –Clean
607.6M.01	Brake alliper –Check
701.6M.01	Locker shelves –Check
702.6M.01	Seat fasteners –Check
705.6M.01	Crew fan fasteners –Check
801.6M.01	Memotel –Download
801.6M.02	Cab pneumatic piping –Check
802.6M.01	MR Control terminal connections –Check

5.6 Yearly Maintenance Tasks

101.1Y.01	Roof hatch seals – Inspect
101.1Y.02	Roof hatch bushings - Inspect
101.1Y.03	Roof hatch clamping brackets – Inspect
102.1Y.01	Exterior finish- Decals- Inspect
103.1Y.01	Cab door hinges- Lubricate
103.1Y.02	Tread plate- Inspect
103.1Y.03	Cab door locks- Lubricate
104.1Y.01	Couplers- Inspect
104.1Y.02	Draftgear Rubber buffing element- Inspect
104.1Y.03	Draftgear- Inspect
104.1Y.04	Coupler adjusting screw- Lubricate
104.1Y.05	Striker block wear pad –Inspect
104.1Y.06	Draftgear & Couplers- End cocks- Test
106.1Y.01	Headlight alignment -Check
107.1Y.01	Wiper blades – Check
201.1Y.01	Bogie frame –Steam clean
201.1Y.02	Bogie frame – Check
202.1Y.01	Axle box breather holes – Clean
205.1Y.01	Traction link rod tab washers–Replace
205.1Y.02	Traction link rod and pivot head joint –Inspect
206.1Y.01	Transmission Membranes –Replace
206.1Y.02	Transmission –Change
206.1Y.03	Gear box lubricant –Change
301.1Y.01	High voltage cable and brackets –Check
301.1Y.02	Main transformer connection –Check
301.1Y.03	Roof line insulators–Recoat
301.1Y.04	High voltage bushing insulator –Recoat
302.1Y.01	Pantograph insulator –Recoat
302.1Y.02	Pantograph insulator –Recoat
303.1Y.01	Main circuit breaker insulator –Recoat
303.1Y.02	Main circuit breaker switch tube –Check
303.1Y.03	Main circuit breaker pressure control valve filter cartridge –Replace
303.1Y.04	Main circuit breaker auxiliary contacts –Check
303.1Y.05	Main circuit breaker earthing switch break blades –Check
303.1Y.06	Main circuit breaker pneumatic pipe –Check
304.1Y.01	Surge arrester coating –Check
306.1Y.01	Main transformer cooling oil –Check
307.1Y.01	Transducers –Check

307.1Y.02	Transducers –Recoat
309.1Y.01	Filter resistor –Clean
309.1Y.02	Filter contactor –Inspect
309.1Y.03	Filter contactor –Clean
309.1Y.04	Filter contactor contacts –Check
309.1Y.05	Filter contactor –Check
309.1Y.06	Filter contactor terminals fasteners –Check
401.1Y.01	Traction converter cable –Inspect
401.1Y.02	Gate unit fibre optics –Inspect
401.1Y.03	Traction converter fasteners –Check
401.1Y.04	Valve set tank –Inspect
401.1Y.05	Traction converter precharge contactor –Inspect
401.1Y.06	Traction converter precharge contactor auxiliary contacts –Measure
401.1Y.07	Traction converter precharge contactor –Check
401.1Y.08	Traction converter contactor –Examine
401.1Y.09	Traction converter contactor –Check
401.1Y.10	Traction converter contactor auxiliary contacts –Check
401.1Y.11	Traction converter oil circuit –Inspect
401.1Y.12	Traction converter doors and locks –Check
401.1Y.13	Valve set electrical connections –Inspect
401.1Y.14	Traction converter air cooling hoses –Inspect
402.1Y.01	Traction converter cooling oil –Check
403.1Y.01	Traction converter bus station –Inspect
403.1Y.02	Traction converter bus station seal –Inspect
404.1Y.01	Traction motor –Clean
501.1Y.01	Auxiliary converter –Inspect
501.1Y.02	Auxiliary converter insulators –Inspect
501.1Y.03	Auxiliary converter surge arresters –Inspect
501.1Y.04	Auxiliary converter contactors –Check
501.1Y.05	Auxiliary converter seals –Inspect
501.1Y.06	Auxiliary converter modules –Check
501.1Y.07	Auxiliary converter doors –Check
501.1Y.08	Auxiliary converter heat sinks –Inspect
501.1Y.09	Auxiliary converter surge arresters –Inspect
501.1Y.10	Auxiliary converter reactors –Clean
501.1Y.11	Auxiliary converter heat sinks –Clean
501.1Y.12	Auxiliary converter –Clean
501.1Y.13	Auxiliary converter transformer –Clean
501.1Y.14	Auxiliary converter insulators –Clean
501.1Y.15	Auxiliary converter capacitor –Inspect
501.1Y.16	Auxiliary converter capacitors –Clean

502.1Y.01	Auxiliary converter control –Inspect
503.1Y.01	Battery box breathers –Clean
503.1Y.02	Battery electrolyte –Check
503.1Y.03	Battery charger –Check
503.1Y.04	Battery cell –Measure
504.1Y.01	Hotel load contact –Inspect
505.1Y.01	Oil blower–Clean
505.1Y.02	Oil blower filter panel –Clean
505.1Y.03	Oil blower filter –Inspect
505.1Y.04	Oil blower filter panel seal–Check
505.1Y.05	Oil blower impeller – Balance
506.1Y.01	Machine room blower –Clean
506.1Y.02	Machine room blower filter panel –Clean
506.1Y.03	Machine room blower panel –Inspect
507.1Y.01	Traction motor blower –Clean
507.1Y.02	Traction motor blower filter –Clean
507.1Y.03	Traction motor blower filter –Inspect
601.1Y.01	Main compressor –Inspect
601.1Y.02	Main compressor primary oil filter –Clean
601.1Y.03	Main compressor secondary oil filter –Change
601.1Y.04	Main compressor concentric valves –Clean
601.1Y.05	Main compressor oil –Change
601.1Y.06	Low Pressure automatic drain valves –Clean
602.1Y.01	Air dryer –Clean
602.1Y.02	Air dryer electrical conduit –Inspect
602.1Y.03	Air dryer pre-coalescer filter –Inspect
602.1Y.04	Air dryer isolating cocks –Check
603.1Y.01	Compressor check valves –Test
603.1Y.02	Main Reservoir isolating cocks –Test
603.1Y.03	Main Reservoir drain cocks –Test
604.1Y.01	Auxiliary compressor lubricant –Change
604.1Y.02	Auxiliary compressor motor –Check
604.1Y.03	Auxiliary compressor delivery hose –Inspect
605.1Y.01	Automatic brake filter –Clean
605.1Y.02	Check valve strainer –Clean
605.1Y.03	Emergency exhaust valve –Test
605.1Y.04	EP unloader valve –Test
605.1Y.05	EP valve –Test
605.1Y.06	Latched isolating cock –Test
605.1Y.07	Pressure switches –Test
605.1Y.08	Pantograph safety valve –Test

605.1Y.09	Safety valves –Clean
605.1Y.10	Venturi/Solenoid valve –Test
607.1Y.01	Brake disk –Overhaul
607.1Y.02	Anti-slip valve –Check
607.1Y.03	Brake activators – Hoses–Inspect
607.1Y.04	Brake cylinder hose –Inspect
607.1Y.05	Bogie isolation cock –Test
701.1Y.01	Machine room door lock tongue –Lubricate
701.1Y.02	Machine room door hinges –Lubricate
701.1Y.03	Locker door –Check
702.1Y.01	Seat pedestal shaft –Lubricate
702.1Y.02	Seat slide –Lubricate
705.1Y.01	Cab emergency brake cock –Test
705.1Y.02	Cab floor coverings –Inspect
801.1Y.01	TE/BE Master controller –Check
801.1Y.02	TE/BE Master controller contact –Measure
801.1Y.03	TE/BE Master controller roller –Check
801.1Y.04	TE/BE Master controller auxiliary contact –Measure
801.1Y.05	TE/BE Master controller fasteners –Check
801.1Y.06	Windscreen wiper/washer isolation cock –Test
801.1Y.07	TE/BE Master controller –Lubricate
801.1Y.08	Horn isolating cock –Test
801.1Y.09	Buzzer –Clean
802.1Y.01	MR Control DI relay –Check
802.1Y.02	Smoke detector sensor –Check
802.1Y.03	Control magnet –Clean
803.1Y.01	VCU bus station –Inspect
803.1Y.02	VCU bus station cover seal –Inspect
804.1Y.01	Loco-Loco bus –Check
804.1Y.02	UIC socket contacts –Check

5.6.1 Supplementary Tasks every 1 & half years (18 months)

505.18M.01	Oil blower motor bearing –Lubricate
506.18M.01	Machine room blower motor bearing –Lubricate
507.18M.01	Traction Motor Blower motor bearing – Lubricate
601.18M.01	Main compressor motor bearings –Lubricate

5.6.2 Supplementary Tasks every 2 years

101.2Y.01	Car body- Water test
103.2Y.01	Cab door seal –Check
103.2Y.02	Cab door -Water test
106.2Y.01	Duplex air valve -Check
106.2Y.02	Marker lights –Water test
106.2Y.03	Headlights –Water test
106.2Y.04	Horns –Water test
106.2Y.05	Strobe lights –Water test
107.2Y.01	Washer jet- Clean
107.2Y.02	Washer reservoir- Check
107.2Y.03	Wiper idle shaft- Examine
107.2Y.04	Washers/Wipers- Water test
202.2Y.01	Axle guide rod spheriblocs – Clean
204.2Y.01	Secondary suspension –Measure
206.2Y.01	Gear box support arm spheriblocs –Test
207.2Y.01	Sand box –Clean
301.2Y.01	Primary current transformer resistor –Measure
301.2Y.02	Primary current transformer resistor –Inspect
305.2Y.01	Main transformer mounting tab washers –Replace
404.2Y.01	Traction motor damper mountings –Inspect
404.2Y.02	Traction motor Spheribloc –Test
505.2Y.01	Oil blower filter panel –Water test
602.2Y.01	Air dryer desiccant –Inspect
605.2Y.01	Breakaway protection valve –Test
605.2Y.02	Duplex check valve –Test
605.2Y.03	Air relay valve–Test
605.2Y.04	Latched solenoid valve –Test
605.2Y.05	Pressure control valve –Test
605.2Y.06	Sanding equipment –Test
605.2Y.07	Safety valve –Test
605.2Y.08	Brake pipe control unit –Test
605.2Y.09	EBC/5 Blending unit –Test
606.2Y.01	Exhaust valve –Test
607.2Y.01	Brake alliper –Clean
607.2Y.02	Service brake cylinder –Clean
607.2Y.03	Parking brake cylinder –Clean
802.2Y.01	Fire detection unit – Overhaul

5.6.3 Supplementary Tasks every 3 years

303.3Y.01	Main circuit breaker –Check
303.3Y.02	Main circuit breaker main contacts –Check
303.3Y.03	Main circuit breaker contact spring –Check
303.3Y.04	Main circuit breaker lateral cover O-ring –Replace
505.3Y.01	Oil blower motor end plates –Clean
505.3Y.02	Oil blower motor –Overhaul
505.3Y.03	Oil blower motor bearing – Replace
506.3Y.01	Machine room blower motor end plates –Clean
506.3Y.02	Machine room blower motor –Overhaul
506.3Y.03	Machine room blower motor bearing – Replace
507.3Y.01	Traction motor blower motor end plates –clean
507.3Y.02	Traction motor blower motor –Overhaul
507.3Y.03	Traction Motor Blower motor bearing – Replace
508.3Y.01	Traction motor & oil blower scavenge motor –Overhaul
508.3Y.02	Traction motor & oil blower scavenge motor bearing – Replace
508.3Y.03	Machine room blower scavenge motor –Overhaul
508.3Y.04	Machine room blower scavenge motor bearing – Replace
601.3Y.01	Main compressor –Overhaul
601.3Y.02	Main compressor motor –Overhaul
601.3Y.03	Main compressor motor bearing–Replace
802.3Y.01	DI relay –Check
802.3Y.02	Smoke detector sensor –Overhaul

5.6.4 Supplementary Tasks every 4 years

104.4Y.01	Flexible hoses and couplings- Overhaul
104.4Y.02	Draftgear & Couplers-End cocks- Replace
106.4Y.01	Duplex air valves –Overhaul
601.4Y.01	Pressure switches –Test
601.4Y.02	Drip cup and auto drain valve –Overhaul
601.4Y.03	Exhaust valves –Overhaul
601.4Y.04	Low pressure automatic drain valves –Overhaul
602.4Y.01	Air dryer –Overhaul
602.4Y.02	Air dryer isolating cocks –Replace
603.4Y.01	Main Reservoir –Overhaul
603.4Y.02	Main Reservoir automatic drain valve –Overhaul
603.4Y.03	Main Reservoir drain cock –Replace
603.4Y.04	Main Reservoir isolating cocks –Overhaul

603.4Y.05	Main Reservoir safety valves –Overhaul
603.4Y.06	Compressor check valves –Overhaul
603.4Y.07	Control reservoir retaining valve –Overhaul
603.4Y.08	Air line sieve filter –Replace
604.4Y.01	Auxiliary compressor –Overhaul
605.4Y.01	Brake equipment module –Overhaul
605.4Y.02	Air line sieve filter –Replace
605.4Y.03	Air relay valve –Overhaul
605.4Y.04	Automatic brake manifold –Overhaul
605.4Y.05	Brake control unit –Overhaul
605.4Y.06	Breakaway protection valve –Overhaul
605.4Y.07	Centrifugal strainer –Overhaul
605.4Y.08	Centrifugal air strainer –Overhaul
605.4Y.09	Check valve and strainer –Overhaul
605.4Y.10	Direct brake manifold –Overhaul
605.4Y.11	Distributor valve –Overhaul
605.4Y.12	Double check valve –Overhaul
605.4Y.13	Duplex check valve –Overhaul
605.4Y.14	E70 Brake control unit –Overhaul
605.4Y.15	EBC/5 Blending unit–Overhaul
605.4Y.16	Brake control system–Test
605.4Y.17	Brake control system–Clean
605.4Y.18	Exhaust valve –Overhaul
605.4Y.19	Relay valve –Overhaul
605.4Y.20	EP relay valve –Overhaul
605.4Y.21	EP unloader valve –Overhaul
605.4Y.22	EP valve –Overhaul
605.4Y.23	Auxiliary equipment and flange lubrication –Overhaul
605.4Y.24	Flow meter valve –Overhaul
605.4Y.25	Manifold mounted isolating cocks –Overhaul
605.4Y.26	Latched isolating cocks –Overhaul
605.4Y.27	Distributor valve isolator assembly –Overhaul
605.4Y.28	Latched solenoid valve –Overhaul
605.4Y.29	Limiting valve–Overhaul
605.4Y.30	Main equipment manifold –Overhaul
605.4Y.31	Pantograph equipment –Overhaul
605.4Y.32	Pressure control valve –Overhaul
605.4Y.33	Pressure regulators –Overhaul
605.4Y.34	Pressure switch –Overhaul
605.4Y.35	Safety valve –Overhaul
605.4Y.36	Sanding equipment –Overhaul

605.4Y.37	SPB equipment –Overhaul
605.4Y.38	SPB manifold –Overhaul
605.4Y.39	Towing cock –Overhaul
605.4Y.40	Venturi check valve –Overhaul
605.4Y.41	Venturi/solenoid valve –Overhaul
605.4Y.42	Vigilance unit –Test
605.4Y.43	Check valve –Overhaul
606.4Y.01	Automatic brake controller –Overhaul
606.4Y.02	Direct air brake valve –Overhaul
606.4Y.03	Exhaust valve –Overhaul
607.4Y.01	Service brake cylinder –Overhaul
607.4Y.02	Parking brake cylinder –Overhaul
607.4Y.03	Brake alliper –Overhaul
607.4Y.04	Anti-slip valve –Overhaul
607.4Y.05	Double check valve –Overhaul
607.4Y.06	Bogie isolation cock –Replace
607.4Y.07	Pressure switch –Test
705.4Y.01	Emergency brake cock –Replace
801.4Y.01	Horn isolating cock –Replace
801.4Y.02	Windscreen wiper/washer isolation cock –Replace
803.4Y.01	VCU bus station - Back-up battery –Replace

5.6.5 *Supplementary Tasks every 5 years*

101.5Y.01	Roof bow fasteners – Check
102.5Y.01	Exterior finish-Paint-Inspect
103.5Y.01	Cab door seals -Replace
104.5Y.01	Striker bock wear pad – Replace
105.5Y.01	Windows – Seals-Replace
105.5Y.02	Cab side window drainage channel-Rubber flap- Replace
105.5Y.03	Windscreen guard grilles -Repaint
106.5Y.01	Headlight rubber gasket –Replace
106.5Y.02	Headlights seals –Replace
106.5Y.03	Horns rubber gaskets –Replace
106.5Y.04	Marker lights rubber gasket –Replace
106.5Y.05	Strobe lights gasket –Replace
106.5Y.06	Warning horns –Overhaul
107.5Y.01	Washer pump- Overhaul
107.5Y.02	Wiper idler shaft seal- Replace
107.5Y.03	Wiper idler shaft- Overhaul

107.5Y.04	Wiper arms- Overhaul
107.5Y.05	Wiper motor assembly- Overhaul
107.5Y.06	Wiper motor driver shaft seal - Replace
107.5Y.07	Wiper arm washer hose- Replace
107.5Y.08	Washer pump – Overhaul
107.5Y.09	Washers/Wipers hoses- Replace
201.5Y.01	Bogie frame –Sand blasting
201.5Y.02	Bogie frame alignment – Check
201.5Y.03	Bogie frame – Inspect
201.5Y.04	Bogie frame – Test
201.5Y.05	Bogie frame – Refinish
201.5Y.06	Bogie frame components – Replace
202.5Y.01	Axle labyrinth ring –Check
202.5Y.02	Axle – Check
202.5Y.03	Axle – Test
202.5Y.04	Wheelset – Measure and examine
202.5Y.05	Axle Journals – Check
202.5Y.06	Axle end caps – Check
202.5Y.07	Hasler transmitter drive pin – Check
202.5Y.08	Axle boxes – Inspect
202.5Y.09	Axle box bearing seat diameter – Measure
202.5Y.10	Axle box –Test
202.5Y.11	Axle box front covers –Test
202.5Y.12	Axle box helicoils –Replace
202.5Y.13	Axle box O-rings –Replace
202.5Y.14	Wheelset –Replace
202.5Y.15	Wheelset fasteners –Replace
202.5Y.16	Wheelset –Measure
202.5Y.17	Axle guide rod –Test
202.5Y.18	Axle guide rod spheriblocs –Replace
203.5Y.01	Primary suspension spring –Measure
203.5Y.02	Primary suspension spring deflection–Measure
203.5Y.03	Primary suspension springs –Repaint
203.5Y.04	Primary suspension spring insulating bases –Replace
203.5Y.05	Primary suspension fasteners –Replace
204.5Y.01	Secondary suspension spring height –Measure
204.5Y.02	Secondary suspension spring deflection at load –Measure
204.5Y.03	Secondary suspension –Repaint
204.5Y.04	Secondary suspension –Replace
204.5Y.05	Secondary suspension –Examine
204.5Y.06	Secondary suspension –Replace

204.5Y.07	Secondary suspension –Replace
205.5Y.01	Traction link rod –Inspect
205.5Y.02	Traction link rod locating spigots–Check
205.5Y.03	Traction link rod weld–Test
205.5Y.04	Traction link–Repaint
205.5Y.05	Pivot heads –Test
205.5Y.06	Pivot head ring –Replace
205.5Y.07	Traction link–Replace
205.5Y.08	Traction link fasteners –Replace
206.5Y.01	Gear box –Overhaul
206.5Y.02	Gear backlash –Measure
206.5Y.03	Main gear run-out- –Measure
206.5Y.04	Gear box support arm –Test
206.5Y.05	Gear box support arm spheriblocs –Replace
206.5Y.06	Gear box fasteners –Replace
206.5Y.07	Main driver gear - Examine
206.5Y.08	Main gear oil seals – Replace
207.5Y.01	Sanding equipment –Overhaul
207.5Y.02	Sanding hoses – Replace
207.5Y.03	Sand box lid seals – Replace
207.5Y.04	Sand box – Repaint
207.5Y.05	Sanding equipment fasteners – Replace
208.5Y.01	Wheel flange lubrication distribution valve –Overhaul
208.5Y.02	Wheel flange lubrication nozzles –Overhaul
208.5Y.03	Wheel flange lubrication o- rings –Replace
208.5Y.04	Wheel flange lubrication - Hoses – Replace
208.5Y.05	Wheel flange lubrication -Fasteners – Replace
301.5Y.01	High voltage bushing seal–Replace
302.5Y.01	Pantograph –Overhaul
302.5Y.02	Pantograph motor– Overhaul
302.5Y.03	Pantograph pneumatic hoses – Replace
303.5Y.01	Main circuit breaker –Overhaul
303.5Y.02	Main circuit breaker shock absorbers –Replace
303.5Y.03	Main circuit breaker auxiliary contacts –Replace
303.5Y.04	Main circuit breaker earthing switch O-ring –Replace
303.5Y.05	Main circuit breaker seal –Replace
305.5Y.01	Main transformer – Inspect
306.5Y.01	Main transformer oil cooling pumps –Overhaul
306.5Y.02	Main transformer oil cooling piping O-rings –Replace
306.5Y.03	Main transformer–Refill

307.5Y.01	Transducers rubber cable conduit –Replace
309.5Y.01	Filter –Overhaul
309.5Y.02	Filter resistor junction box cable glands –Replace
401.5Y.01	Traction converter earthing switch –Check
401.5Y.02	Traction converter contactor –Clean
401.5Y.03	Traction converter contactor piston ring –Replace
401.5Y.04	Traction converter precharge contactor –Check
401.5Y.05	Traction converter precharge contactor coil –Replace
401.5Y.06	Traction converter voltage indicator –Test
401.5Y.07	Primary voltage transformers –Test
401.5Y.08	Traction converter current transducer –Test
401.5Y.09	Traction converter voltage transducers –Test
401.5Y.10	Traction converter air cooling hoses –Replace
401.5Y.11	Gate unit power supply –Test
401.5Y.12	Gate unit – Test
401.5Y.13	Valve sets –Test
401.5Y.14	Traction converter –Impedance- Measure
402.5Y.01	Traction converter oil cooling pumps –Overhaul
402.5Y.02	Traction converter oil cooling –Clean and Refill
404.5Y.01	Traction motor –Overhaul
404.5Y.02	Traction motor electrical insulation –Test
404.5Y.03	Traction motor rotary speed transmitter –Test
404.5Y.04	Traction motor terminal box–Overhaul
404.5Y.05	Traction motor fasteners–Replace
404.5Y.06	Traction motor spheriblocs –Replace
404.5Y.07	Traction motor temperature sensor –Test
404.5Y.08	Traction motor bellows –Replace
404.5Y.09	Traction motor support arm –Test
501.5Y.01	Auxiliary converter cabinet –Clean
501.5Y.02	Auxiliary converter contactor –Overhaul
501.5Y.03	Auxiliary converter reactors and transformers –Clean
501.5Y.04	Auxiliary converter insulators –Inspect
501.5Y.05	Auxiliary converter CZ units –Clean
503.5Y.01	Battery tray rollers –Inspect
503.5Y.02	Battery tray rollers –Clean
503.5Y.03	Battery box ventilation –Replace
505.5Y.01	Oil blower filter duct –Clean
505.5Y.02	Oil blower fan impeller–Clean
505.5Y.03	Oil blower filter panel –Clean
505.5Y.04	Oil blower air cone –Clean
505.5Y.05	Oil blower seal–Replace

506.5Y.01	Machine room blower filter duct –Clean
506.5Y.02	Machine room blower fan impeller –Clean
506.5Y.03	Machine room blower seal –Replace
506.5Y.04	Machine room blower motor capacitor –Test
507.5Y.01	Traction motor blower filter duct –Clean
507.5Y.02	Traction motor blower duct –Clean
507.5Y.03	Traction motor blower impeller –Clean
507.5Y.04	Traction motor blower seals –Replace
508.5Y.01	Machine room blower scavenge duct –Clean
508.5Y.02	Machine room blower scavenge –Clean
508.5Y.03	Machine room blower scavenge fan impeller –Inspect
508.5Y.04	Machine room blower scavenge flexible duct –Replace
508.5Y.05	Machine room blower scavenge equaliser hose –Replace
508.5Y.06	Traction motor & oil blower scavenge duct –Clean
508.5Y.07	Traction motor & oil blower scavenge –Clean
508.5Y.08	Traction motor & oil blower scavenge fan impeller –Inspect
508.5Y.09	Oil blower filter scavenge hose –Replace
508.5Y.10	Traction motor & oil blower scavenge equaliser hose –Replace
508.5Y.11	Oil blower scavenge duct slip joint seal –Replace
508.5Y.12	Machine room blower scavenge motor start-up capacitor –Test
508.5Y.13	Traction motor & oil blower scavenge motor start-up capacitor –Test
601.5Y.01	Main compressor mounting –Inspect
601.5Y.02	Main compressor copper gasket –Replace
601.5Y.03	Main compressor delivery hose –Replace
602.5Y.01	Air dryer electrical conduit –Replace
604.5Y.01	Auxiliary compressor air intake filters –Replace
604.5Y.02	Auxiliary compressor delivery hose –Replace
605.5Y.01	Breakaway protection valve–Overhaul
607.5Y.01	Brake bushing –Replace
607.5Y.02	Brake alliper components –Replace
607.5Y.03	Brake hoses –Replace
705.5Y.01	Crew fan motor –Replace
705.5Y.02	Cab heater/blower duct –Replace
705.5Y.03	Cab –Repaint
801.5Y.01	Windscreen wiper/washer operating valve –Overhaul
801.5Y.02	Horn operating valve –Overhaul
804.5Y.01	UIC socket seal –Replace

5.6.6 Supplementary Tasks every 6 years

601.6Y.01 Main compressor resilient mounting –Replace

5.6.7 Supplementary Tasks every 8 years

401.8Y.01 DC-Link capacitors –Measure
401.8Y.02 Capacitors –Fasteners –Check
401.8Y.03 Earthing resistors –Inspect
401.8Y.04 MUB Resistor –Inspect
401.8Y.05 Series resonant capacitor –Measure
402.8Y.01 Traction converter oil cooling – Clean and Refill
403.8Y.01 Traction converter bus station – EPROM memory chips –Replace
403.8Y.02 Traction converter bus station Software –Reload
502.8Y.01 Auxiliary converter control –EPROM memory chips –Replace
502.8Y.02 Auxiliary converter control Software –Reload
803.8Y.01 VCU bus station – EPROM memory chip –Replace
803.8Y.02 VCU bus station – Software –Reload

5.6.8 Supplementary Tasks every 10 years

101.10Y.01 Roof hatch bushings - Replace
101.10Y.02 Roof hatch rubber seals - Replace
102.10Y.01 Exterior finish-Car body- Repaint
103.10Y.01 Cab door locks -Replace
103.10Y.02 Cab door window seal -Replace
309.10Y.01 Filter resistor junction box seal –Replace
401.10Y.01 Traction converter –Test
401.10Y.02 Traction converter precharge resistor –Test
401.10Y.03 Fibre optic cables –Test
401.10Y.04 Traction converter flexible hoses –Replace
401.10Y.05 Traction converter door seals –Replace
501.10Y.01 Auxiliary converter filter capacitors –Test
501.10Y.02 Auxiliary converter seals –Replace
505.10Y.01 Oil blower seal–Replace
506.10Y.01 Machine room blower seal –Replace
507.10Y.01 Traction motor blower seals –Replace
508.10Y.01 Machine room blower scavenge duct seal and gasket –Replace
508.10Y.02 Traction motor & oil blower scavenge duct seal and gasket –Replace
701.10Y.01 Machine room door seal –Replace

701.10Y.02	Machine room door window seal –Replace
705.10Y.01	Cab floor coverings –Replace
801.10Y.01	TE/BE Master controller –Overhaul
801.10Y.02	Memotel –Change

5.6.9 Supplementary Tasks every 15 years

705.15Y.01	Cab heater/blower motor –Replace
801.15Y.01	Cab switches –Replace
801.15Y.02	Driver's footwell switches –Replace

5.6.10 Supplementary Tasks every 20 years

705.20Y.01	Cab floor boards –Replace

6 Task Description

6.1 Loco Body

101.3M.01 Cow catcher- Inspect

- Visually inspect the cow catcher for dents or damage. Repair any damage, or replace the cow catcher if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Structure.

- Visually inspect the cow catcher for damaged or chipped paint. Refinish the cow catcher as required. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.2, Structure.

101.3M.02 Rail guards - Inspect

- Check the clearance between the rail guards and the rail. Adjust the position of the rail guards if not within specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Structure.

101.3M.03 Underframe structure -Inspect

- Visually inspect the underframe structure, damper and limit chain brackets, spring seats, rebound stops and pivot posts for damage, wear or cracks. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Structure.

- Visually inspect the underframe and underframe fixtures for defects or damage. Repair any damage or other defects found. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Structure.

- Inspect the underframe piping and pneumatic equipment for damage, leaks or other defects. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Structure.

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101.6M.01 Cab roof vents - Clean

- Clean the vents on the cab roof. Clean the vents removing all dirt, debris or obstructions. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Structure.

101.6M.02 Machine room vents - Clean

- Clean the machine room vents on the roof hatches. Remove all dirt, debris and obstructions. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Structure.

101.6M.03 Cab roof GRP caps - Inspect

- Visually inspect the GRP caps on the cab roof and front for damage, cracks or other defects. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Structure.

101.6M.04 Roof hatch fasteners - Check

- Check the security of the pantograph and converter roof hatch fasteners. Tighten the fasteners if

necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Structure.

101.6M.05 Roof hatch clamping bracket fasteners - Check

- Check the security of the pantograph and converter roof hatch clamping bracket fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Structure.

101.6M.06 Body structure -Inspect

- Visually inspect the locomotive body and structure for damage, dents or other defects. Repair any defects found. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Structure.

101.6M.07 Car body - Inspect

- Visually inspect the car body and structure for corrosion. Repair any corrosion found. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Structure.

101.6M.08 Cow catcher fasteners - Check

- Check the security of the cow catcher fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Structure.

101.1Y.01 Roof hatch seals - Inspect

- Visually inspect the pantograph and converter roof hatch seals. Replace the seals if worn, torn, damaged or deteriorating. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Structure.

101.1Y.02 Roof hatch bushings - Inspect

- Inspect the condition of the bushings in the pantograph and converter roof hatches. Replace the bushings if worn, damaged or deteriorated. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Structure.

101.1Y.03 Roof hatch clamping brackets - Inspect

- Visually inspect the condition of the clamping brackets of the converter and pantograph roof hatches. Replace the brackets if worn, damaged or distorted. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Structure.

101.2Y.01 Car body- Water test

- Water test the car body. Rectify any leakage. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Structure.

- Water test around the pantograph and converter roof hatched. Rectify any leaks found. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Structure.

101.5Y.01 Roof bow fasteners - Check

- Remove the converter and pantograph roof hatches, then check the security of the roof bow fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Structure.

101.10Y.01 Roof hatch bushings - Replace

- Replace the pantograph and converter roof hatch bushings. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Structure.

101.10Y.02 Roof hatch rubber seals - Replace

- Replace the rubber seals around the pantograph and converter roof hatches, and the roof beam. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Structure.

102.1M.01 Exterior finish- Clean

- Wash the locomotive. Remove all dirt and debris. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.2, Exterior Finish.

102.6M.01 Exterior finish- Inspect

- Visually inspect the car body for damaged or chipped paint. Refinish the car body as required. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.2, Exterior Finish.

102.1Y.01 Exterior finish- Decals- Inspect

- Visually inspect the decals for fading or damage. Replace any damaged or faded decals on the locomotive. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.2, Exterior Finish.

102.5Y.01 Exterior finish-Paint-Inspect

- Visually inspect the paint work for oxidation (white powder on surface). Refinish the locomotive paint work if the paint is oxidised. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.2, Exterior Finish.

102.10Y.01 Exterior finish-Car body- Repaint

- Repaint the locomotive car body. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.2, Exterior Finish.

103.1W.01 Doors and step- Inspect

- Visually inspect the condition and check the operation of the locomotive cab doors. Ensure the door handles, latches and catches work correctly. Replace any defective parts or adjust the door operating rod as necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.3, Doors & Steps.

103.3M.01 Cab door seals- Inspect

- Visually inspect the cab door seals for wear, damage, tears or deterioration. Replace the seals if worn, torn, damaged or deteriorating. Refer to Suppliers Documentation Volume F1, Section 3, Maintenance Manual Windows/Doors.

103.3M.02 Cab door drain apertures- Inspect

- Check the drain apertures in the cab door tread plates for blockages. Remove all obstructions from the holes. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.3, Doors & Steps.

103.3M.03 Cab door window seal- Inspect

- Visually inspect the cab door window seal for wear, damage, tears or deterioration. Replace the seal if worn, torn, damaged or deteriorating. Refer to Suppliers Documentation Volume F1, Section 3, Maintenance Manual Windows/Doors.

103.3M.04 Cab door glass- Inspect

- Visually inspect the condition of the glass in the cab door. Replace the glass if cracked, broken, missing or otherwise damaged. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.3, Doors & Steps.

103.6M.01 Cab door latch and catch- Inspect

- Visually inspect the cab latch and catch for wear or damage. Rectify any faults found. Refer to Suppliers Documentation Volume F1, Section 3, Maintenance Manual Windows/Doors.

103.6M.02 Cab door grab rail paints - Inspect

- Visually inspect the paint on the cab door grab rails for damage, wear or chips. Refinish the cab door grab rails as required. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.3, Doors & Steps.

103.6M.03 Cab door grab rail fasteners- Check

- Check the security of the cab door grab rail fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.3, Doors & Steps.

103.6M.04 Cab door latch and catch fasteners - Check

- Check the security of the fasteners on the cab door latch and catch. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.3, Doors & Steps.

103.6M.05 Cab door lock tongue- Lubricate

- Lubricate the cab door lock tongue with a thin film of grease. Wipe away any excess grease. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.3, Doors & Steps.

103.1Y.01 Cab door hinges- Lubricate

- Lubricate the cab door hinges with general-purpose oil. Wipe away any excess oil from the hinge and door. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.3, Doors & Steps.

103.1Y.02 Tread plate- Inspect

- Visually inspect the tread plate for wear or damage. Repair or replace the tread plate if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.3, Doors & Steps.

103.1Y.03 Cab door locks- Lubricate

- Lubricate the cab door locks using a small amount of graphite grease. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.3, Doors & Steps.

103.2Y.01 Cab door seal -Check

- Measure the compression of the cab door seal. Adjust the door position or striker plate if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.3, Doors & Steps.

103.2Y.02 Cab door -Water test

- Water test the cab doors. Rectify any leakage. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Doors & Steps.

103.5Y.01 Cab door seals -Replace

- Replace the cab door seals. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.3, Doors & Steps.

103.10Y.01 Cab door locks -Replace

- Overhaul the cab door locks. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.3, Doors & Steps.

103.10Y.02 Cab door window seal -Replace

- Replace the cab door window seal. Refer to Suppliers Documentation Volume F1, Section 3, Maintenance Manual Windows/Doors.

104.1W.01 Draftgear & Couplers- Check

- Check the operation and condition of the uncoupler handles. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.4, Draftgear & Couplers.

104.1W.02 Draftgear & Couplers- Inspect

- Visually inspect the flexible hoses and couplings for damage or deterioration. Replace any damaged or defective hoses. Refer to Suppliers Documentation Volume F14, Section 1, Flexible Hose and Coupling Maintenance Instructions (A1058-A).

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104.3M.01 Draftgear & Couplers- End cocks-Inspect

- Visually inspect the end cocks for damage, dirt, and wear. Replace the cocks if damaged or worn. Thoroughly clean serviceable cocks. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.4, Draftgear & Couplers.

104.6M.01 Draftgear & Couplers-Striker block wear pad- Lubricate

- Lubricate the striker block wear pad with general purpose grease. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.4, Draftgear & Couplers.

104.6M.02 Draftgear & Couplers- Fasteners-Check

- Check the security of the coupler and draft gear fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.4, Draftgear & Couplers.

104.1Y.01 Couplers- Inspect

- Visually inspect the coupler for wear or damage. Rectify any faults found. Refer to Volume D,

Maintenance and Repair Manual, Chapter 1.4, Draftgear & Couplers.

104.1Y.02 Draftgear Rubber buffing element- Inspect

- Inspect the rubber buffing element in the draft gear for wear, damage or deterioration. Replace the element if worn, damaged or deteriorating. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.4, Draftgear & Couplers.

104.1Y.03 Draftgear- Inspect

- Visually inspect the draft gear for wear and damage Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.4, Draftgear & Couplers.

104.1Y.04 Coupler adjusting screw- Lubricate

- Lubricate the coupler adjusting screw using general purpose grease. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.4, Draftgear & Couplers.

104.1Y.05 Striker block wear pad -Inspect

- Visually inspect the striker block wear pad for wear or damage. Replace the pad if worn to the backing plate, at any point, or damaged. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.4, Draftgear & Couplers.

104.1Y.06 Draftgear & Couplers- End cocks- Test

- Test the operation and check the condition of the end cocks. Replace the cocks if defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.4, Draftgear & Couplers.

104.4Y.01 Flexible hoses and couplings- Overhaul

- Overhaul the flexible hoses and couplings. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.4, Draftgear & Couplers.

104.4Y.02 Draftgear & Couplers-End cocks- Replace

- Replace the end cocks. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.4, *Draftgear & Couplers.*

104.5Y.01 Striker block wear pad - Replace

- Replace the striker block wear pad. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.4, Draftgear & Couplers.

105.1W.01 Windows -Clean

- Clean the inside and outside of the cab windscreen and side windows. Remove all dirt and debris from the surfaces. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.5, Windows.

105.3M.01 Windows - Examine

- Examine the cab windows and windscreens for pitting, cracks or scratches. Pay particular attention to imperfections that could impair the driver's view. Replace the windows or windscreens if damaged or pitted. Refer to Volume D, Maintenance and Repair Manual, Chapter

1.5, Windows.

105.3M.02 Cab sliding windows - Check

- Check the operation and condition of the cab sliding window. Rectify any faults found. Replace the catch if damaged or defective. Refer to Suppliers Documentation Volume F1, Section 3, Maintenance Manual Windows/Doors.

105.3M.03 Windscreen guard grilles- Inspect

- Visually inspect the windscreen guard grilles for damage. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.2, Windows.

105.3M.04 Window drainage channel - Clean

- Clean the cab side window drainage channel and outlet. Remove all obstructions, debris and build-up of dirt. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.5, Windows.

105.3M.05 Cab side window drainage channel-Rubber flap- Inspect

- Visually inspect the rubber flap on the side window drainage channel outlet. Replace the flap if damaged, missing or deteriorated. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.5, Windows.

105.6M.01 Windows – Seals-Inspect

- Visually inspect the condition of the cab window and windscreen seals. Replace seals if damaged, defective, leaking or deteriorating. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.5, Windows.

105.6M.02 Windscreen guard grilles - Inspect

- Visually inspect the windscreen guard grilles for damaged or chipped paint. Refinish the grilles if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.2, Windows.

105.6M.03 Windscreen guard grilles fasteners - Check

- Check the security of the windscreen guard grille fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.5, Windows.

105.6M.04 Windows – Water test

- Water test the cab windows and windscreen. Rectify any leakage. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Windows.

105.5Y.01 Windows – Seals-Replace

- Replace the cab window, sliding window, splash shield and windscreen seals. Refer to Suppliers Documentation Volume F1, Section 3, Maintenance Manual Windows/Doors.

105.5Y.02 Cab side window drainage channel-Rubber flap- Replace

- Replace the rubber flap on the cab side window drainage channel outlet. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.5, Windows.

105.5Y.03 Windscreen guard grilles -Repaint

- Repaint the windscreen guard grilles. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.2, Windows.

106.1D.01 Horn and Lights - Check

- Operate the horn control from both cabs and ensure the horn is working satisfactorily.
- Operate the lights control from both cabs and ensure all the lights – marker and headlights, headlight reflectors, strobe light – are working satisfactorily.

106.1W.01 Headlights -Check

- Check the condition and operation of the headlights. Rectify any faults found. Replace the headlight lenses if cracked, damaged or defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.6, Horns/Lights.

106.1W.02 Marker lights -Check

- Check the condition and operation of the marker lights. Rectify any faults found. Replace the marker light lenses if cracked, damaged or defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.6, Horns/Lights.

106.1W.03 Strobe lights -Check

- Check the operation and condition of the strobe light. Rectify any faults found or replace the light if cracked, damaged or defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.6, Horns/Lights.

106.1W.04 Warning horns -Check

- Check the operation and condition of the warning horns. Rectify any faults found or replace the horns if damaged or defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.6, Horns/Lights.

106.1M.01 Strobe light cover -Check

- Visually inspect the strobe light and cover for damage or cracks. Replace the lens or cover if damaged. Refer to Suppliers Documentation Volume F1, Section 6, Signalling Selection Guide (MINI-90-1).

106.1M.02 Strobe light cover -Clean

- Clean the strobe light cover. Remove all traces of dirt and debris. Refer to Suppliers Documentation Volume F1, Section 6, AdaptaBeacon Visual Signals for Indoor, Outdoor & Hazardous Locations (D-BEAC/BROCH 1991).

106.3M.01 Warning horns -Check

- Check the warning horns for damage. Replace the horns if damaged. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.6, Horns/Lights.

106.6M.01 Strobe light fasteners -Check

- Check the security of the strobe light fasteners. Tighten the fasteners if necessary. Refer to

Volume D, Maintenance and Repair Manual, Chapter 1.6, Horns/Lights.

106.6M.02 Warning horn fasteners -Check

- Check the security of the warning horns fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.6, Horns/Lights.

106.6M.03 Headlight fasteners -Check

- Check the security of the headlight fasteners and the retaining ring knob. Tighten the screws or knob if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.6, Horns/Lights.

106.6M.04 Marker light fasteners -Check

- Check the security of the marker light fasteners and lens retaining knob. Tighten the fasteners or knob and locking screw if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.6, Horns/Lights.

106.6M.05 Horn pneumatic piping -Inspect

- Visually inspect the condition of the horn pneumatic piping. Replace the pipes or fittings if damaged. Rectify any air leaks. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.6, Horns/Lights.

106.1Y.01 Headlight alignment -Check

- Check the headlight alignment. Adjust the alignment if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.6, Horns/Lights.

106.2Y.01 Duplex air valve -Check

- Test the duplex air valve. Replace the valve if faulty or defective. The duplex air valve should be tested as part of the brake unit. Refer to Suppliers Documentation Volume F12, Section 3, Metcalfe Duplex Air Valve Maintenance Instructions (A300).

106.2Y.02 Marker lights –Water test

- Conduct a water test around the marker lights. Rectify any leaks found. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.6, Horns/Lights.

106.2Y.03 Headlights –Water test

- Conduct a water test around the headlights. Rectify any leaks found. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.6, Horns/Lights.

106.2Y.04 Horns –Water test

- Conduct a water test around the horns. Rectify any leaks found. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.6, Horns/Lights.

106.2Y.05 Strobe lights –Water test

- Conduct a water test around the strobe light. Rectify any leaks found. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.6, Horns/Lights.

106.4Y.01 Duplex air valves –Overhaul

- Overhaul the duplex air valves. Refer to Suppliers Documentation Volume F12, Section 3, Metcalfe Duplex Air Valve Maintenance Instructions (A300).

106.5Y.01 Headlight rubber gasket –Replace

- Replace the rubber gasket between the headlight housing and the locomotive front panel. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.6, Horns/Lights.

106.5Y.02 Headlights seals –Replace

- Replace the seal between the headlight retaining ring and the headlight housing. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.6, Horns/Lights.

106.5Y.03 Horns rubber gaskets –Replace

- Replace the rubber gaskets between the horn and locomotive roof. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.6, Horns/Lights.

106.5Y.04 Marker lights rubber gasket –Replace

- Replace the rubber gasket and O-ring on the marker lights. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.6, Horns/Lights.

106.5Y.05 Strobe lights gasket –Replace

- Replace the gasket between the locomotive roof and strobe light. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.6, Horns/Lights.

106.5Y.06 Warning horns –Overhaul

- Overhaul the warning horns Refer to Volume D, Maintenance and Repair Manual, Chapter 1.6, Horns/Lights.

107.1D.01 Washers/Wipers- Check

- Check the operation of windscreen wiper/washer. Rectify any faults found.

107.1W.01 Washer reservoir- Refill

- Refill the windscreen washer reservoir with clean, fresh water. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.7, Washers/Wipers.

107.1W.02 Wiper motor- Check

- Check the condition and operation of windscreen wiper motor. Rectify any faults found. Refer to Suppliers Documentation Volume F1, Section 7, Wiper motor W16-60-W-P: Overhaul Instructions (U-UA40.21-EN). Page 10.

107.1W.03 Washers/Wipers- Check

- Check the operation of windscreen wiper/washer. Rectify any faults found. Refer to Suppliers Documentation Volume F1, Section 7, Wiper motor W16-60-W-P: Description (B-UA40.21-EN). Page 10.

107.3M.01 Washer piping- Inspect

- Visually inspect the windscreen washer piping for damage or leakage. Replace any damaged pipes, rectify any leaking fittings. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.7, Washers/Wipers.

107.3M.02 Washer reservoirs- Inspect

- Visually inspect the windscreen washer reservoir for cracks, damage or leaks. Replace the reservoir if required. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.7, Washers/Wipers.

107.3M.03 Washer reservoir caps- Inspect

- Visually inspect the washer reservoir cap and check its security. Secure the cap if necessary or replace if missing. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.7, Washers/Wipers.

107.3M.04 Wiper arm- Inspect

- Visually inspect the windscreen wiper arm for wear or damage. Rectify any faults found. Refer to Suppliers Documentation Volume F1, Section 7, Wiper Arm: Outline Drawing (EN 2B 59691).

107.3M.05 Wiper manual operating handle - Check

- Check the operation and condition of the windscreen wiper's manual operating handles on both the driver's and assistant driver's side of the locomotive. Rectify any faults found. Replace any missing parts. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.7, Washers/Wipers.

107.3M.06 Washer pumps- Check

- Test the operation of the windscreen washer pump. Rectify any faults found. Refer to Suppliers Documentation Volume F1, Section 7, Metering Pump: Overhaul Instructions (U-UD10.21-EN

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107.6M.01 Wiper blades- Replace

- Replace the windscreen wiper blades. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.7, Washers/Wipers.

107.6M.02 Washers/Wipers Fasteners - Check

- Check the security of the windscreen wiper and washer fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.7, Washers/Wipers.

107.1Y.01 Wiper blades - Check

- Check the parked position of the windscreen wiper blades. Adjust the position if not within specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.7, Washers/Wipers.

107.2Y.01 Washer jet- Clean

- Remove the windscreen washer jet and soak it in an alkaline solution. Remove all dirt, debris and obstructions. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.7,

Washers/Wipers.

107.2Y.02 Washer reservoir- Check

- Remove the windscreen washer reservoir and soak it in an alkaline solution. Remove all dirt and debris from the reservoir. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.7, Washers/Wipers.

107.2Y.03 Wiper idle shaft- Examine

- Examine the windscreen wiper idler shaft for wear in the seal area. Replace the idler shaft and seal if worn. Refer to Suppliers Documentation Volume F1, Section 7, Bearing and Shaft: Overhaul Instructions and Description (U-UD50.21-EN).

107.2Y.04 Washers/Wipers- Water test

- Conduct a water test around the windscreen wiper motor shaft and idler shaft seals. Rectify any leakage. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Washers/Wipers.

107.5Y.01 Washer pump- Overhaul

- Overhaul the windscreen washer pump. Refer to Suppliers Documentation Volume F1, Section 7, Metering Pump: Overhaul Instructions (U-UD10.21-EN).

107.5Y.02 Wiper idler shaft seal- Replace

- Replace the windscreen wiper idler shaft seal. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.7, Washers/Wipers.

107.5Y.03 Wiper idler shaft- Overhaul

- Overhaul, or replace, the windscreen wiper idler shaft. Refer to Suppliers Documentation Volume F1, Section 7, Bearing and Shaft: Overhaul Instructions and Description (U-UD50.21-EN).

107.5Y.04 Wiper arms- Overhaul

- Overhaul the windscreen wiper arms. Refer to Suppliers Documentation Volume F1, Section 7, Wiper Arm: Outline Drawing (EN 2B 59691).

107.5Y.05 Wiper motor assembly- Overhaul

- Overhaul the wiper motor assembly. Refer to Suppliers Documentation Volume F1, Section 7, Wiper motor W16-60-W-P: Overhaul Instructions (U-UA40.21-EN). Section 5.

107.5Y.06 Wiper motor driver shaft seal - Replace

- Replace the windscreen wiper motor drive shaft seal. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.7, Washers/Wipers.

107.5Y.07 Wiper arm washer hose- Replace

- Replace the rubber windscreen washer hose on the wiper arm. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.7, Washers/Wipers.

107.5Y.08 Washer pump - Overhaul

- Overhaul the windscreen washer pump. Refer to Suppliers Documentation Volume F1, Section 7, Metering Pump: Overhaul Instructions (U-UD10.21-EN).

107.5Y.09 Washers/Wipers hoses- Replace

- Replace the pneumatic and water hoses on the windscreen wiper and washer system. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.7, Washers/Wipers.

108.6M.01 Buffers - Check

- Check the security of the buffer fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.8, Buffers.

108.6M.02 Buffers - Grease

- Liberally apply general purpose grease to the buffer face and shaft. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.8, Buffers.

108.6M.03 Buffers - Inspect

- Visually inspect the headstock for damage. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.1, Buffers.

6.2 Bogies and Running Gear

201.1W.01 Bogie frame - Inspect

- Visually inspect the bogie frame for damage, cracks or other defects. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.1, Bogie Frame.

201.1W.02 Pivot post and end transom - Inspect

- Visually inspect the pivot post and end transom for damage, cracks or other defects. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.1, Bogie Frame.

201.3M.01 Bogie frame - Inspect

- Visually inspect bogie frame for damaged or chipped paint. Refinish the bogie frame as required. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.2, Bogie Frame.

201.3M.02 Bogie frame piping - Check

- Check the bogie pneumatic and flange lubrication piping for damage or leakage. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.1, Bogie Frame.

201.6M.01 Bogie frame pneumatic piping fasteners – Check

- Check the security of the bogie frame pneumatic piping fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.1, Bogie Frame.

201.6M.02 Bogie step fasteners - Check

- Check the security of the bogie step fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.1, Bogie Frame.

201.1Y.01 Bogie frame –Steam clean

- Remove the bogie from the locomotive and steam clean it. Remove all traces of dirt and debris. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.1, Bogie Frame.

201.1Y.02 Bogie frame - Check

- Carefully check the bogie frame for damage, cracks or other defects. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.1, Bogie Frame.

201.5Y.01 Bogie frame –Sand blasting

- Remove all components from the bogie frame. Remove all paint from the bogie frame. Clean the metal with an abrasive process such as sand blasting. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.2, Bogie Frame.

- Soak the component free bogie frame in an alkaline solution. Remove all dirt, debris and obstructions. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.1, Bogie Frame.

201.5Y.02 Bogie frame alignment - Check

- Measure the alignment of the bogie frame. Correct any misalignment as necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.1, Bogie Frame.

201.5Y.03 Bogie frame - Inspect

- Visually inspect the brackets, webbing and bump stops on the bogie frame for wear, damage or other defects. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.1, Bogie Frame.

201.5Y.04 Bogie frame - Test

- Test the bogie frame welds using a non destructive technique. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.1, Bogie Frame.

201.5Y.05 Bogie frame – Refinish

- Refinish the bogie frame. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.2, Bogie Frame.

201.5Y.06 Bogie frame components – Replace

- Replace all previously removed components. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.1, Bogie Frame.

202.1W.01 Wheelset – Inspect

- Inspect the wheel for any damage or other defects. Rectify faults as necessary.

202.3M.01 Wheelset – Inspect

- Inspect the wheel tread and flange for wear, damage or other defects. Reprofile or replace the wheels as required to maintain the tread profile. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

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202.3M.02 Axle boxes – Inspect

- Visually inspect the axle boxes for leakage from the bearings. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.3M.03 Axle boxes – Inspect

Visually inspect the axle boxes for wear or damage. Replace the axle box if worn or damaged. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.3M.04 Axle guide rod – Inspect

- Visually inspect the axle guide rod for damage, cracks or other defects. Replace the guide rod if damaged or defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.3M.05 Axle guide rod spehriblocs – Inspect

- Visually inspect spheriblocs in the axle guide rods. Replace the spheriblocs if damaged, cracked or deteriorated. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.3M.06 Hasler transmitter cable – Check

- Check the security and condition of the cable between the Hasler transmitter at the transmitter and underframe connection. Replace any damaged or missing components. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.6M.01 Axle box front covers – Inspect

- Visually inspect the axle box front covers for wear of damage. Pay particular attention to the damper mountings. Replace the cover if defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.6M.02 Wheel diameter – Measure

- Measure the diameter of all the wheels on the locomotive. Reprofile all the wheels on the locomotive if any wheel is not within specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.6M.03 Wheel and axle loads – Check

- Check the wheel and axle loads. Adjust if necessary. Refer to Volume D, Maintenance and *Repair Manual, Chapter 2.2, Wheelset.*

202.6M.04 Ride height – Measure

- Measure the ride height of the locomotive. Adjust the ride height of the locomotive if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.6M.05 Axle guide rod fasteners – Check

- Check the security of the axle guide rod fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.6M.06 Axle box front cover fasteners – Check

- Check the security of the axle box front cover fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.6M.07 Axle box split ring fasteners – Check

- Check the security of the axle box split ring fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.1Y.01 Axle box breather holes – Clean

- Clean any obstructions from the breather holes in the axle box front covers. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.2Y.01 Axle guide rod spheriblocs – Clean

- Test the axle guide rod spheriblocs. Replace the spheriblocs if not within specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.X.01 Wheel bearings – Lubrication

- After a distance of approx. 300,000 km, the bearing units must be re-lubricated. Refer to Suppliers Documentation Volume F2, Section 2, Special TBU (1639457 A).

202.X.02 Wheel bearings – Inspect

- First inspection / refurbishing after a distance of 900,000 km max., Refer to Suppliers Documentation Volume F2, Section 2, Special TBU (1639457 A).

202.X.03 Wheel bearings – Inspect

- Second inspection / refurbishing after 0.6 to 0.7 MKms max. after the first inspection / refurbishing. Refer to Suppliers Documentation Volume F2, Section 2, Special TBU (1639457 A).

202.X.04 Wheel bearings – Replace

- Run the bearing further 0.6 to 0.7 MKms max. after the second inspection / refurbishing. Total life of the bearing is 2.2 MKms. Refer to Suppliers Documentation Volume F2, Section 2, Special TBU (1639457 A).

202.5Y.01 Axle labyrinth ring –Check

- Measure the diameters and profile of the axle labyrinth rings. Replace the labyrinth rings if not within specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.5Y.02 Axle – Check

- Check the axle for bend. Replace the axle if damaged or bent. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.5Y.03 Axle – Test

- Test the axle for surface and sub-surface defects using a non destructive technique. Replace the axle if cracked, defective or damaged. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.5Y.04 Wheelset – Measure and examine

- Measure the diameters, and examine the condition, of the journals, seats, fillets and transitions on the axle. Rectify any defects or replace the axle if damaged or out of specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.5Y.05 Axle Journals – Check

- Check all journals on the axle are concentric to the wheel bearing journals. Replace the axle if not within specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.5Y.06 Axle end caps – Check

- Check the axle end caps for wear on the wheel bearing seal surface and other defects. Replace the end caps if worn or damaged. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.5Y.07 Hasler transmitter drive pin – Check

- Check the condition and security of the Hasler transmitter drive pin. Tighten or replace the pin if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.5Y.08 Axle boxes – Inspect

- Visually inspect the axle boxes for wear of damage. Pay particular attention to the guide rod mounts and limit stops. Replace the axle box if defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.5Y.09 Axle box bearing seat diameter – Measure

- Measure the inside diameter of the bearing seat in the axle box. Replace the axle box if not within specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.5Y.10 Axle box –Test

- Test the axle box for surface and sub-surface defects using a non-destructive technique. Pay particular attention to the spring seats and guide rod mounting points. Replace the axle box if cracked or defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.5Y.11 Axle box front covers –Test

- Test the axle box front covers for surface and sub-surface defects using a non destructive technique. Pay particular attention to the damper mountings. Replace the front covers if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.5Y.12 Axle box helicoils –Replace

- Replace any damaged or worn helicoils in the axle box. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.5Y.13 Axle box O-rings –Replace

- Replace the O-rings at the front and rear of the axle box. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.5Y.14 Wheelset –Replace

- Replace all the wheels on the locomotive. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.5Y.15 Wheelset fasteners –Replace

- Replace all fasteners used on the wheelset. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.5Y.16 Wheelset –Measure

- Measure the run-out of the wheels on the assembled wheelset. Press off and reinstall the wheels if the run out exceeds specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.5Y.17 Axle guide rod –Test

- Test the axle guide rod for surface and sub-surface defects using a non destructive technique. Replace the guide rod if cracked or defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

202.5Y.18 Axle guide rod spheriblocs –Replace

- Replace the spheriblocs in the axle guide rods. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.2, Wheelset.

203.1W.01 Primary suspension dampers –Inspect

- Inspect the Primary suspension dampers for evidence of oil leaks. Overhaul the dampers if leaking. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.3, Primary Suspension

203.3M.01 Primary suspension springs –Check

- Check the Primary suspension springs for broken ends, broken coils, cracks or other defects. Replace the spring if broken or damaged. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.3, Primary Suspension .

203.6M.01 Primary suspension spring paint–Inspect

- Visually inspect the Primary suspension spring for chips or other damage to the paint. Remove any oxidation and refinish as required. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.2, Primary Suspension .

203.6M.02 Primary suspension spring insulating bases –Inspect

- Visually inspect the Primary suspension spring insulating bases for wear, deformation or deterioration. Replace all the insulating bases on the bogie if one or more are damaged or defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.3, Primary Suspension .

203.6M.03 Primary suspension damper mountings –Inspect

- Visually inspect the Primary suspension damper mountings on the axle box front covers and bogie frame for cracks, breakage or other damage. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.3, Primary Suspension .

203.6M.04 Primary suspension damper rod –Inspect

- Visually inspect the Primary suspension damper rod surface and end mountings for wear to the rod surface. Overhaul the dampers if the rod is worn or if there is evidence of oil leakage. Refer to Suppliers Documentation Volume F2, Section 3, Maintenance and Repair Handbook for KONI Adjustable Railway Dampers (2984-E).

203.6M.05 Primary suspension damper spheriblocs –Inspect

- Visually inspect the Primary suspension damper spheriblocs for wear, damage or deterioration. Replace the spheriblocs if damaged or defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.3, Primary Suspension .

203.6M.06 Primary suspension damper fasteners –Check

- Check the security of the Primary suspension damper fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.3, Primary Suspension .

203.X.01 Primary axle suspension dampers –Test

- Every 200,000 kilometres — Test the performance of the primary axle suspension dampers. Overhaul the damper if defective. Refer to Suppliers Documentation Volume F2, Section 3, Maintenance and Repair Handbook for KONI Adjustable Railway Dampers (2984-E).

203.X.02 Primary suspension dampers –Overhaul

- Every 400,000 kilometres — Overhaul the Primary suspension dampers. Refer to Suppliers Documentation Volume F2, Section 3, Maintenance and Repair Handbook for KONI Adjustable Railway Dampers (2984-E).

203.X.03 Primary suspension damper spheriblocs –Replace

- Every 400,000 kilometres — Replace the spheriblocs in the Primary suspension dampers. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.3, Primary Suspension .

203.5Y.01 Primary suspension spring –Measure

- Measure the height of the Primary suspension spring. Replace the spring if not within specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.3, Primary Suspension .

203.5Y.02 Primary suspension spring deflection–Measure

- Measure the spring deflection at load. Replace the spring if not within specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.3, Primary Suspension .

203.5Y.03 Primary suspension springs –Repaint

- Remove all old paint and repaint the Primary suspension springs. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.2, Primary Suspension .

203.5Y.04 Primary suspension spring insulating bases –Replace

- Replace the Primary suspension spring insulating bases. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.3, Primary Suspension .

203.5Y.05 Primary suspension fasteners –Replace

- Replace all fasteners on the primary suspension . Refer to Volume D, Maintenance and Repair Manual, Chapter 2.3, Primary Suspension .

204.1W.01 Secondary suspension dampers –Inspect

- Inspect the Secondary suspension dampers for evidence of oil leaks. Overhaul the dampers if leaking. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.4, Secondary suspension .

204.3M.01 Vertical bump stops –Inspect

- Visually inspect the vertical bump stops for wear or damage. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.4, Secondary suspension .

204.3M.02 Lateral bump stops –Inspect

- Visually inspect the lateral bump stops for wear, damage or deterioration. Replace the bump stops if required. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.4, Secondary suspension .

204.3M.03 Limit chain and pins –Inspect

- Visually inspect the limit chain and pins for wear, corrosion or damage. Replace the chain and pins if required. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.4, Secondary suspension .

204.3M.04 Secondary suspension spring –Check

- Check the Secondary suspension springs for broken ends, broken coils, cracks or other defects. Replace the spring if cracked or damaged. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.4, Secondary suspension .

204.6M.01 Secondary suspension spring paint –Inspect

- Visually inspect the Secondary suspension spring for chips or other damage to the paint. Remove any oxidation and refinish as required. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.2, Secondary suspension .

204.6M.02 Secondary suspension spring insulating bases –Inspect

- Visually inspect the Secondary suspension spring insulating bases for wear, deformation or deterioration. Replace all the insulating bases on the bogie if one or more are damaged or defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.4, Secondary suspension .

204.6M.03 Secondary suspension damper mountings –Inspect

- Visually inspect the secondary damper mountings on the bogie frame and locomotive underframe for cracks, breakage or other damage. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.4, Secondary suspension .

204.6M.04 Secondary suspension damper rod –Inspect

- Visually inspect the Secondary suspension damper rod surface and end mountings for wear to the rod surface. Overhaul the dampers if the rod is worn or if there is evidence of oil leakage. Refer to Suppliers Documentation Volume F2, Section 3, Maintenance and Repair Handbook for KONI Adjustable Railway Dampers (2984-E).

204.6M.05 Secondary suspension blocs –Inspect

- Visually inspect the Secondary suspension damper spheriblocs for wear damage or deterioration. Replace the spheriblocs if damaged or defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.4, Secondary suspension .

204.6M.06 Secondary suspension damper fasteners –Check

- Check the security of the Secondary suspension damper fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.4, Secondary suspension .

204.6M.07 Limit chain fasteners –Check

- Check the security of the limit chain fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.4, Secondary suspension .

204.6M.08 Bump stop fasteners –Check

- Check the security of the bump stop fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.4, Secondary suspension .

204.X.01 Secondary suspension dampers –Test

- Every 200,000 kilometers — Test the performance of the suspension dampers. Overhaul the damper if defective. Refer to Suppliers Documentation Volume F2, Section 3, Maintenance and Repair Handbook for KONI Adjustable Railway Dampers (2984-E).

204.X.02 Secondary suspension dampers –Overhaul

- Every 400,000 kilometers — Overhaul the Secondary suspension dampers. Refer to Suppliers Documentation Volume F2, Section 3, Maintenance and Repair Handbook for KONI Adjustable Railway Dampers (2984-E).

204.X.03 Secondary suspension damper spheriblocs –Replace

- Every 400,000 kilometers — Replace the spheriblocs in the Secondary suspension dampers. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.4, Secondary suspension .

204.2Y.01 Secondary suspension –Measure

- Measure the maximum vertical and transverse motion of the bogie against the bump stops. Replace the bump stops if movement exceeds specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.4, Secondary suspension .

204.5Y.01 Secondary suspension spring height –Measure

- Measure the height of the Secondary suspension springs. Replace any spring not within specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.4, Secondary suspension .

204.5Y.02 Secondary suspension spring deflection at load –Measure

- Measure the spring deflection at load. Replace any spring not within specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.4, Secondary suspension .

204.5Y.03 Secondary suspension –Repaint

- Remove all old paint and repaint the Secondary suspension springs Refer to Volume D, Maintenance and Repair Manual, Chapter 1.2, Secondary suspension .

204.5Y.04 Secondary suspension –Replace

- Replace the Secondary suspension spring insulating bases. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.4, Secondary suspension .

204.5Y.05 Secondary suspension –Examine

- Examine the limit chain and pins for wear, corrosion or damage. Measure the inside diameter of the chain links. Replace the chain and pins if worn or out of specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.4, Secondary suspension.

204.5Y.06 Secondary suspension –Replace

- Replace all the Secondary suspension fasteners. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.4, Secondary suspension.

204.5Y.07 Secondary suspension –Replace

- Replace the lateral bump stops. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.4, Secondary suspension.

205.1W.01 Traction link –Inspect

- Visually inspect the link rod, pivot head and pivot head flanges for damage. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.5, Traction Link.

205.1W.02 Traction link rod tab washers –Check

- Check the security of the tab washers on the link rod flange. Tighten the bolts if any tab washers are loose and reseat any loose tab washers. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.5, Traction Link.

205.1W.03 Traction link safety cables –Check

- Check the safety cables are secure on the link rod and that the pins and R-clips are secure. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.5, Traction Link.

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205.3M.01 Traction link safety cables –Inspect

- Visually inspect the safety cables on the link rod for wear, damage or fraying. Replace the cables if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.5, Traction Link.

205.3M.02 Pivot head–Check

- Check the pivot head and pivot head flanges for cracks or other damage. Replace the pivot head if required. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.5, Traction Link.

205.3M.03 Traction link rod –Inspect

- Visually inspect the link rod and link rod flanges for damage and cracks Rectify any faults found, or replace the rod as necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.5, Traction Link.

205.6M.01 Traction link paint–Inspect

- Visually inspect the traction link for chipped or damaged paint. Remove any oxidation and refinish as required. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.2, Traction Link.

205.6M.02 Traction link fasteners –Check

- Check the security of the traction link rod and pivot head fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.5, Traction Link.

205.1Y.01 Traction link rod tab washers–Replace

- Replace the tab washers on the link rod. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.5, Traction Link.

205.1Y.02 Traction link rod and pivot head joint –Inspect

- Visually inspect the joint between the traction link rod and pivot head. Ensure the joint is properly sealed. Reseal the joint if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.5, Traction Link.

205.5Y.01 Traction link rod –Inspect

- Visually inspect the link rod for bend, cracking or other damage. Replace the link rod if bent, cracked or damaged. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.5, Traction Link.

205.5Y.02 Traction link rod locating spigots–Check

- Check the condition of the link rod locating spigots on the pivot head. Replace the pivot head if the spigot worn or damaged. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.5, Traction Link.

205.5Y.03 Traction link rod weld–Test

- Test the weld between the link rod and flange for surface and sub-surface defects using a non destructive technique. Replace the rod if defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.5, Traction Link.

205.5Y.04 Traction link–Repaint

- Remove all old paint and sand blast the link rod and pivot head, then repaint the link rod and pivot heads. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.2, Traction Link.

205.5Y.05 Pivot heads –Test

- Test the pivot heads for surface and sub-surface defects using a non destructive technique. Replace the pivot head if cracked or damaged. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.5, Traction Link.

205.5Y.06 Pivot head ring –Replace

- Replace the ring in the pivot head. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.5, Traction Link.

205.5Y.07 Traction link–Replace

- Replace the safety cables, pins and R-clips. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.5, Traction Link.

205.5Y.08 Traction link fasteners –Replace

- Replace all the fasteners on the link rod and pivot head. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.5, Traction Link.

206.In.01 Gear box initial maintenance

First 1,500 Km (new or after major overhaul)

- Change the Gear box lubricant with the specified lubricant. Refer to Suppliers Documentation Volume F2, Section 6, Drive 15 AN 20 R1: Instructions for Maintenance and Operation (AEB 452 575).

206.In.02 Gear box initial maintenance

First 10,000 Km (new or after major overhaul)

- Change the Gear box lubricant with the specified lubricant. Refer to Suppliers Documentation Volume F2, Section 6, Drive 15 AN 20 R1: Instructions for Maintenance and Operation (AEB 452 575).

206.1W.01 Gear box -Inspect

- Visually inspect the Gear box for damage or other defects. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.6, Transmission.

206.1W.02 Gear box lubricant -Check

- Check the level of lubricant in the Gear box at the sight glass. Top-up with the specified lubricant if required. Refer to Suppliers Documentation Volume F2, Section 6, Drive 15 AN 20 R1: Instructions for Maintenance and Operation (AEB 452 575).

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206.1W.03 Drive coupling – Inspect

- Visually inspect the drive coupling for leakage or damage. Replace the drive coupling if damaged or leaking. Refer to Suppliers Documentation Volume F2, Section 6, Crowned Gear Coupling: Installation, Maintenance, Spare Parts List (651432-5080 750 029).

206.3M.01 Gear box - Inspect

- Visually inspect the Gear box for evidence of oil leakage. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.6, Transmission.

206.3M.02 Gear box support arm spheriblocs - Inspect

- Visually inspect the spheriblocs in the Gear box support arm for wear, damage or deterioration. Replace the spheriblocs if defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.6, Transmission.

206.3M.03 Transmission support arm - Inspect

- Visually inspect the transmission support arm for damage, cracks or other defects. Replace the arm if damaged, cracked or defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.6, Transmission.

206.3M.04 Gear box –Measure

- Measure the installed height of the Gear box. Adjust the height if not within specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.6, Transmission.

206.3M.05 Gear box oil sight cover –Check

- Visually inspect the oil sight cover for damage. Replace the sight glass cover if damaged or missing. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.6, Transmission.

206.3M.06 Gear box oil sight glass –Inspect

- Visually inspect the oil sight glass for cracks, damage or leakage from the seal. Replace the sight glass or seal as required. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.6, Transmission.

206.3M.07 Gear box breather –Clean

- Clean the Gear box breather. Remove all traces of dirt, debris and other obstructions. Refer to Suppliers Documentation Volume F2, Section 6, Drive 15 AN 20 R1: Instructions for Assembly and Disassembly (AEB 452 480).

206.3M.08 Gear box fasteners –Check

- Check the security of the Gear box and Gear box support arm fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.6, Transmission.

206.1Y.01 Transmission Membranes –Replace

- Replace the drive coupling membranes. Refer to Suppliers Documentation Volume F2, Section 6, Crowned Gear Coupling: Installation, Maintenance, Spare Parts List (651432-5080 750 029).

206.1Y.02 Transmission –Change

- Change the lubricant in the drive coupling. Refer to Suppliers Documentation Volume F2, Section 6, Crowned Gear Coupling: Installation, Maintenance, Spare Parts List (651432-5080 750 029).

206.1Y.03 Gear box lubricant –Change

- Change the gear box lubricant. Refer to Suppliers Documentation Volume F2, Section 6, Drive 15 AN 20 R1: Instructions for Maintenance and Operation (AEB 452 575).

206.X.01 Gear box oil –Test

- Every 200,000 kilometres — Analyse a sample of oil from the gear box for impurities. Replace the entire gear box lubricant if contaminated or top-up with the specified lubricant as required. Refer to Suppliers Documentation Volume F2, Section 6, Drive 15 AN 20 R1: Instructions for Maintenance and Operation (AEB 452 575).

206.X.02 Main gear bearings – Replace

- Replace the main gear bearings after 3 million km. Refer to Suppliers Documentation Volume F2, Section 6, Drive 15 AN 20 R1: Instructions for Maintenance and Operation (AEB 452 575).

206.2Y.01 Gear box support arm spheriblocs –Test

- Test the gear box support arm spheriblocs. Replace the spheriblocs if not within specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.6, Transmission.

206.5Y.01 Gear box –Overhaul

- Overhaul the gearbox. Refer to Suppliers Documentation Volume F2, Section 6, Drive 15 AN 20 R1: Instructions for Maintenance and Operation (AEB 452 575).

206.5Y.02 Gear backlash –Measure

- Measure the backlash of the gear box gears. Rectify any faults found, or replace any worn or damaged gears. Refer to Suppliers Documentation Volume F2, Section 6, Drive 15 AN 20 R1: Instructions for Assembly and Disassembly (AEB 452 480).

206.5Y.03 Main gear run-out- –Measure

- Measure the run-out of the main gear installed on the axle. Remove the main gear, then check the axle and gear journals if the run-out is not within specification. Remount the main gear and re-measure the run-out. Refer to Suppliers Documentation Volume F2, Section 6, Drive 15 AN 20 R1: Instructions for Assembly and Disassembly (AEB 452 480).

206.5Y.04 Gear box support arm –Test

- Test the gear box support arm for surface and sub-surface defects using a non destructive technique. Replace the arm if cracked or defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.6, Transmission.

206.5Y.05 Gear box support arm spheriblocs –Replace

- Replace the spheriblocs in the gear box support arm. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.6, Transmission.

206.5Y.06 Gear box fasteners –Replace

- Replace all the fasteners on the gear box and gear box support arm. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.6, Transmission.

206.5Y.07 Main driver gear – Examine

- Press the main drive gear from the axle shaft, then examine the main drive gear. Replace the gear of damaged, defective or out of specification. Refer to Suppliers Documentation Volume F2, Section 6, Drive 15 AN 20 R1: Instructions for Maintenance and Operation (AEB 452 575).

206.5Y.08 Main gear oil seals – Replace

- Replace the oil seals on the main gear. Refer to Suppliers Documentation Volume F2, Section 6, Drive 15 AN 20 R1: Instructions for Assembly and Disassembly (AEB 452 480).

207.1W.01 Sanding equipment –Inspect

- Visually inspect sand trap and ejector. Rectify any faults found. Refer to Suppliers Documentation Volume F12, Section 12, Metcalfe/Salem Sand Trap and Ejector (A557).

207.1W.02 Sanding equipment –Sand - Fill

- Replenish the sand in the sand boxes. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.7, Sanding Equipment.

207.1W.03 Sanding equipment –Check

- Check the operation of the sanding equipment. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.7, Sanding Equipment.

207.1M.01 Sanding equipment –Clean

- Clean sand trap and ejector. Refer to Suppliers Documentation Volume F12, Section 12, Metcalfe/Salem Sand Trap and Ejector (A557).

207.3M.01 Sanding equipment –Inspect

- Visually inspect the sand boxes for damage or other defects. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.7, Sanding Equipment.

207.3M.02 Sand box lid seals –Inspect

- Visually inspect the condition of the sand box lid seals. Replace the seals if worn, damaged or deteriorating. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.7, Sanding Equipment.

207.3M.03 Sanding nozzles –Check

- Check the condition and position of the sanding nozzles. Replace any defective components and adjust the sanding nozzles as required. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.7, Sanding Equipment.

207.6M.01 Sand box fasteners –Check

- Check the security of the sand box fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.7, Sanding Equipment.

207.6M.02 Sanding equipment security –Check

- Check the security of the sanding pipes, support beam and hose fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.7, Sanding Equipment.

207.6M.03 Sand box –Inspect

- Visually inspect the sand boxes for damaged or chipped paint. Refinish the sand boxes as required. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.7, Sanding Equipment.

207.6M.04 Sand flow rate –Measure

- Measure the rate of sand flow at each wheel. Adjust the sanding valve if the flow is not within specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.7, Sanding Equipment.

207.6M.05 Sand box – Inspect

- Visually inspect the sand boxes for corrosion. Repair any corrosion found. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.7, Sanding Equipment.

207.2Y.01 Sand box –Clean

- Empty all sand from the sand boxes, then steam clean them inside and out. Thoroughly dry the inside of the sand boxes before refilling with clean sand. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.7, Sanding Equipment.

207.5Y.01 Sanding equipment –Overhaul

- Overhaul the sand trap and ejector valves. Refer to Suppliers Documentation Volume F12, Section 12, Metcalfe/Salem Sand Trap and Ejector (A557).

207.5Y.02 Sanding hoses – Replace

- Replace the sanding hoses. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.7, Sanding Equipment.

207.5Y.03 Sand box lid seals – Replace

- Replace the seals in the sand box lids. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.7, Sanding Equipment.

207.5Y.04 Sand box – Repaint

- Remove all old paint then repaint the sand boxes. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.2, Sanding Equipment.

207.5Y.05 Sanding equipment fasteners – Replace

- Replace all the fasteners on the sanding equipment fitted to the bogie. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.7, Sanding Equipment.

208.1W.01 Wheel flange lubrication reservoir –Inspect

- Visually inspect the Wheel flange lubrication reservoir for leaks or other defects. Replace the Wheel flange lubrication reservoir if leaking. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.8, Wheel flange lubrication.

208.1W.02 Wheel flange lubrication –Refill

- Replenish the lubricant in the Wheel flange lubrication reservoir. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.8, Wheel flange lubrication.

208.1W.03 Wheel flange lubrication system –Check

- Check the condition of the Wheel flange lubrication system. Replace any damaged, defective or missing parts. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.8, Wheel flange lubrication.

208.1W.04 Wheel flange lubrication operation –Check

- Check the operation of the Wheel flange lubrication. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.8, Wheel flange lubrication.

208.3M.01 Wheel flange lubrication- Hoses –Inspect

- Visually inspect the condition of the Wheel flange lubrication and distribution valve hoses. Replace the hoses if worn, damaged or deteriorating. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.8, Wheel flange lubrication.

208.3M.02 Wheel flange lubrication nozzles –Check

- Check the alignment and position of the Wheel flange lubrication nozzles. Adjust the position if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.8, Wheel flange lubrication.

208.3M.03 Wheel flange lubrication reservoir cap –Inspect

- Visually inspect the Wheel flange lubrication reservoir cap and check its security. Secure the cap if necessary or replace if missing. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.8, Wheel flange lubrication.

208.3M.04 Wheel flange lubrication - pipe –Check

- Check the Wheel flange lubrication oil and pneumatic pipes for leakage. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.8, Wheel flange lubrication.

208.6M.01 Wheel flange lubrication- fasteners –Check

- Check the security of the Wheel flange lubrication equipment and pipe fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.8, Wheel flange lubrication.

208.6M.02 Wheel flange lubrication-holes –Clean

- Remove the nozzles from the Wheel flange lubrication system and clean the air and oil holes. Remove any obstructions from the nozzles. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.8, Wheel flange lubrication.

208.6M.03 Wheel flange lubrication oil flow –Measure

- Measure the rate of oil flow at nozzle. Adjust the flow if not within specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.8, Wheel flange lubrication.

208.5Y.01 Wheel flange lubrication distribution valve –Overhaul

- Overhaul the Wheel flange lubrication distribution valve. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.8, Wheel flange lubrication.

208.5Y.02 Wheel flange lubrication nozzles –Overhaul

- Overhaul the Wheel flange lubrication nozzles. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.8, Wheel flange lubrication.

208.5Y.03 Wheel flange lubrication O-rings –Replace

- Replace the O-ring between the distribution valve and flange lubrication reservoir. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.8, Wheel flange lubrication.

208.5Y.04 Wheel flange lubrication - Hoses – Replace

- Replace the Wheel flange lubrication hoses, including those at the distributor valve. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.8, Wheel flange lubrication.

208.5Y.05 Wheel flange lubrication -Fasteners – Replace

- Replace all the wheel flange lubrication fasteners. Refer to Volume D, Maintenance and Repair Manual, Chapter 2.8, Wheel Flange Lubrication.

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6.3 Power Supply

301.3M.01 Roof line contact springs –Inspect

- Visually inspect the roof line contact springs for wear, cracks, damage or bend. Replace any damaged or defective contact springs. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.1, Roof Line.

301.3M.02 Roof line insulators –Check

- Check the protective coating on the roof line insulators for contamination. If any part of the protective coating is contaminated, remove all protective material from the insulators and completely recoat. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.1, Roof Line.

301.3M.03 High voltage bushing insulator –Check

- Check the protective coating on the high voltage bushing insulator for contamination. If any part of the protective coating is contaminated, remove all material from the insulator and completely recoat. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.1, Roof Line.

301.3M.04 Roof line contact springs –Check

- Check the layer of protective grease on the roof line contact springs. If necessary, remove any contaminated grease and recoat the springs. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.1, Roof Line.

301.3M.05 Roof line jumper cables –Inspect

- Visually inspect all the jumper cables on the roof line and roof equipment for fraying, damage and evidence of arcing. Replace any damaged cables. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.1, Roof Line.

301.3M.06 High voltage bushing –Check

- Check the condition and security of the high voltage bushing. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.1, Roof Line.

301.3M.07 High voltage cable –Inspect

- Check the condition and security of the high voltage cable. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.1, Roof Line.

301.6M.01 Roof line –Inspect

- Visually inspect the roof line for evidence of arcing. Replace any damaged components. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.1, Roof Line.

301.6M.02 Roof line security –Inspect

- Check the security of the roof line and roof equipment fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.1, Roof Line.

301.1Y.01 High voltage cable and brackets –Check

- Check the security of the high voltage cable and brackets. Rectify any faults found. Tighten the

fasteners as necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.1, Roof Line.

301.1Y.02 Main transformer connection –Check

- Visually inspect the high voltage cable at the main transformer connection for damage or oil contamination. Replace the cable if damaged, or if contaminated with oil. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.1, Roof Line.

301.1Y.03 Roof line insulators–Recoat

- Completely remove any previous protective coating from the roof line insulators. Recoat the roof line insulators with the specified coating. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.1, Roof Line.

301.1Y.04 High voltage bushing insulator –Recoat

- Completely remove any previous protective coating from the high voltage bushing insulator. Recoat the insulator with the specified coating. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.1, Roof Line.

301.2Y.01 Primary current transformer resistor –Measure

- Measure the impedance of the primary current transformer resistor. Replace the resistor if not within specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.1, Roof Line.

301.2Y.02 Primary current transformer resistor –Inspect

- Visually inspect the primary current transformer resistor for evidence of overheating. Replace the resistor if damaged or defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.1, Roof Line.

301.5Y.01 High voltage bushing seal–Replace

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- Replace the seal on the high voltage bushing. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.1, Roof Line.

302.1W.01 Pantograph –Check

- Check the operation of the pantograph collector head spring boxes. Rectify any faults found. Refer to Suppliers Documentation Volume F3, Section 2, Pantograph AM92 BU-GV, Maintenance and Operating Descriptive Instruction (PA 37410). Inspection Sheet 4

302.1M.01 Pantograph collector shoe wear strips –Inspect

- Visually inspect the pantograph collector shoe wear strips for wear, damage or cracks. Replace the wear strips as necessary. Refer to Suppliers Documentation Volume F3, Section 2, Pantograph AM92 BU-GV, Maintenance and Operating Descriptive Instruction (PA 37410). Inspection Sheet 8

302.1M.02 Pantograph flexible electrical connections –Inspect

- Visually inspect the condition of the flexible electrical connections on the pantograph. Replace the cables if defective. Refer to Suppliers Documentation Volume F3, Section 2, Pantograph

AM92 BU-GV, Maintenance & Operating Descriptive Instruction (PA 37410). Inspection Sheet 7

302.1M.03 Pantograph –Lubricate

- Lubricate the pantograph and mechanism. Refer to Suppliers Documentation Volume F3, Section 2, Pantograph AM92 BU-GV, Maintenance and Operating Descriptive Instruction (PA 37410). Inspection Sheet 12, Lubrication Schedule

302.1M.04 Pantograph –Check

- Check that the pantograph deploys evenly and smoothly, without bouncing. Adjust the deployment time if the pantograph is not deploying smoothly. Refer to Suppliers Documentation Volume F3, Section 2, Pantograph AM92 BU-GV, Maintenance and Operating Descriptive Instruction (PA 37410). Inspection Sheet 6

302.3M.01 Pantograph –Inspect

- Visually inspect the pantograph frame and articulated system for cracks or damage. Replace any worn or damaged parts. Refer to Suppliers Documentation Volume F3, Section 2, Pantograph AM92 BU-GV, Maintenance and Operating Descriptive Instruction (PA 37410).

302.3M.02 Pantograph insulators –Inspect

- Visually inspect the condition of the insulators between the pantograph and roof for cracks, chips or evidence of impact damage. Replace any damaged or defective insulators. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.2, Pantograph.

302.3M.03 Pantograph insulators –Inspect

- Inspect the pantograph insulators for chips, impact damage or contamination. Rectify any faults found. Refer to Suppliers Documentation Volume F3, Section 2, Pantograph AM92 BU-GV, Maintenance and Operating Descriptive Instruction (PA 37410). Inspection Sheet 11

302.3M.04 Pantograph collector head shoe –Check

- Measure the thickness of the pantograph collector head shoe. Replace the shoe if worn. Refer to Suppliers Documentation Volume F3, Section 2, Pantograph AM92 BU-GV, Maintenance and Operating Descriptive Instruction (PA 37410).

302.3M.05 Pantograph insulator coating –Check

- Check the protective coating on the insulators between the roof and pantograph for contamination. If any part of the protective coating is contaminated, remove all material from the insulators and completely recoat. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.2, Pantograph.

302.3M.06 Pantograph travel time –Check

- Check the pantograph travel time. Adjust the travel time if necessary. Refer to Suppliers Documentation Volume F3, Section 2, Pantograph AM92 BU-GV, Maintenance and Operating Descriptive Instruction (PA 37410). Inspection Sheet 6

302.3M.07 Pantograph collector deployed alignment –Check

- Check the deployed alignment of the collector. Adjust the deployed alignment of the collector, if

necessary. Refer to Suppliers Documentation Volume F3, Section 2, Pantograph AM92 BU-GV, Maintenance and Operating Descriptive Instruction (PA 37410). Inspection Sheet 5

302.3M.08 Pantograph static load –Measure

- Disconnect the pantograph damper, then measure the static load of the collector head on the catenary wire. Adjust the pantograph static load if necessary. Refer to Suppliers Documentation Volume F3, Section 2, Pantograph AM92 BU-GV, Maintenance and Operating Descriptive Instruction (PA 37410). Inspection Sheet 2

302.3M.09 Pantograph reaction load –Measure

- Measure the pantograph load on the reaction stops. Checking and adjustment of the static load must precede this check. Adjust the load, or rectify any faults found. Refer to Suppliers Documentation Volume F3, Section 2, Pantograph AM92 BU-GV, Maintenance and Operating Descriptive Instruction (PA 37410). Inspection Sheet 3

302.6M.01 Pantograph valve box –Test

- Test the valve box for leakage. Overhaul the valve box if not within specification. Refer to Suppliers Documentation Volume F3, Section 2, Pantograph AM92 BU-GV, Maintenance and Operating Descriptive Instruction (PA 37410). Inspection Sheet 9

302.6M.02 Pantograph pneumatic motor –Check

- Check the operation of the pantograph pneumatic motor. Overhaul the pantograph pneumatic motor if not within specification. Refer to Suppliers Documentation Volume F3, Section 2, Pantograph AM92 BU-GV, Maintenance and Operating Descriptive Instruction (PA 37410). Inspection Sheet 9

302.6M.03 Pantograph height –Check

- Check the pantograph deployed height. Adjust if necessary. Refer to Suppliers Documentation Volume F3, Section 2, Pantograph AM92 BU-GV, Maintenance and Operating Descriptive Instruction (PA 37410). Inspection Sheet 1

302.6M.04 Pantograph hardware –Check

- Check the security of all pantograph hardware. Tighten the fasteners if necessary. Refer to Suppliers Documentation Volume F3, Section 2, Pantograph AM92 BU-GV, Maintenance and Operating Descriptive Instruction (PA 37410). Inspection Sheet 13

302.1Y.01 Pantograph insulator –Recoat

- Completely remove any previous protective coating from the pantograph insulators. Recoat the pantograph insulators with the specified protective coating. Refer to Suppliers Documentation Volume F3, Section 2, Single-Arm Pantograph Type ESiD 103-2500, Erection and Maintenance Instructions (SG 480281).

302.1Y.02 Pantograph insulator –Recoat

- Completely remove any previous protective coating from the pantograph insulators. Recoat the pantograph insulators with the specified protective coating. Refer to Suppliers Documentation Volume F3, Section 2, Pantograph AM92 BU-GV, Maintenance and Operating Descriptive Instruction (PA 37410).

302.5Y.01 Pantograph –Overhaul

- Overhaul the pantograph. Refer to Suppliers Documentation Volume F3, Section 2, Pantograph AM92 BU-GV, Maintenance and Operating Descriptive Instruction (PA 37410). Section 8

302.5Y.02 Pantograph motor– Overhaul

- Overhaul the pantograph motor. Refer to Suppliers Documentation Volume F3, Section 2, Pantograph AM92 BU-GV, Maintenance and Operating Descriptive Instruction (PA 37410).

302.5Y.03 Pantograph pneumatic hoses – Replace

- Replace the pantograph pneumatic hoses on the locomotive roof and within the machine room. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.2, Pantograph.

303.1W.01 Main circuit breaker earthing switch –Check

- Check the operation of the earthing switch. Rectify any faults found. Refer to Suppliers Documentation Volume F3, Section 8, Earthing Switch BTE 15.04/25.04, Instruction for Installation and Operation (HSBA433487 E).

303.1M.01 Main circuit breaker insulator –Inspect

- Visually inspect the vacuum circuit breaker insulator for chips, cracks or impact damage. Replace if damaged, chipped or cracked. Refer to Suppliers Documentation Volume F3, Section 3, A.C. Vacuum Circuit-Breaker BVAC, Instructions for Installation and Operation (SG 300094 E).

303.1M.02 Main circuit breaker earthing contact springs –Inspect

- Visually inspect the vacuum circuit breaker earthing contact springs for wear, cracks, damage or bend. Replace any damaged contact springs. Refer to Suppliers Documentation Volume F3, Section 3, A.C. Vacuum Circuit-Breaker BVAC, Instructions for Installation and Operation (SG 300094 E).

303.3M.01 Main circuit breaker insulator coat –Check

- Check the protective coating on the vacuum circuit breaker insulator for contamination. If any part of the protective coating is contaminated, remove all protective material from the insulator and completely recoat. Refer to Suppliers Documentation Volume F3, Section 3, A.C. Vacuum Circuit-Breaker BVAC, Instructions for Installation and Operation (SG 300094 E).

303.3M.02 Main circuit breaker reservoir –Clean

- Drain any water from the vacuum circuit breaker BVAC reservoir. The water must also be drained before the start of each winter season. Refer to Suppliers Documentation Volume F3, Section 3, A.C. Vacuum Circuit-Breaker BVAC, Instructions for Installation and Operation (SG 300094 E).

303.3M.03 Main circuit breaker pressure regulator –Clean

- Drain any water from the vacuum circuit breaker pressure regulator. The water must also be drained before the start of each winter season. Refer to Suppliers Documentation Volume F3, Section 3, A.C. Vacuum Circuit-Breaker BVAC, Instructions for Installation and Operation (SG 300094 E).

303.3M.04 Main circuit breaker pneumatic circuit –Check

- Check the vacuum circuit breaker pneumatic circuit for leakage. Rectify any faults found. Refer to Suppliers Documentation Volume F3, Section 3, A.C. Vacuum Circuit-Breaker BVAC, Instructions for Installation and Operation (SG 300094 E).

303.3M.05 Main circuit breaker - Fasteners –Check

- Check the security of the vacuum circuit breaker high voltage and earthing connection fasteners. Tighten the fasteners if necessary. Refer to Suppliers Documentation Volume F3, Section 3, A.C. Vacuum Circuit-Breaker BVAC, Instructions for Installation and Operation (SG 300094 E). Section 4.3.2.2

303.1Y.01 Main circuit breaker insulator –Recoat

- Completely remove any previous protective coating on the vacuum circuit breaker insulator. Recoat the vacuum circuit breaker insulator with the specified protective coating. Refer to Suppliers Documentation Volume F3, Section 3, A.C. Vacuum Circuit-Breaker BVAC, Instructions for Installation and Operation (SG 300094 E).

303.1Y.02 Main circuit breaker switch tube –Check

- Check the vacuum in the vacuum circuit breaker switch tube. Replace the switch tube if damaged or defective. Refer to Suppliers Documentation Volume F3, Section 3, A.C. Vacuum Circuit-Breaker BVAC, Instructions for Installation and Operation (SG 300094 E).

303.1Y.03 Main circuit breaker pressure control valve filter cartridge –Replace

- Replace vacuum circuit breaker pressure control valve filter cartridge. Refer to Suppliers Documentation Volume F3, Section 3, A.C. Vacuum Circuit-Breaker BVAC, Instructions for Installation and Operation (SG 300094 E).

303.1Y.04 Main circuit breaker auxiliary contacts –Check

- Check the condition of the vacuum circuit breaker auxiliary contacts. Replace the contacts as necessary. Refer to Suppliers Documentation Volume F3, Section 3, A.C. Vacuum Circuit-Breaker BVAC, Instructions for Installation and Operation (SG 300094 E). Section 4.3.3

303.1Y.05 Main circuit breaker earthing switch break blades –Check

- Check the condition of the earthing switch break blades for wear or damage. If necessary, replace any damaged or worn blades. Refer to Suppliers Documentation Volume F3, Section 8, Earthing Switch BTE 15.04/25.04, Instruction for Installation and Operation (HSBA433487 E).

303.1Y.06 Main circuit breaker pneumatic pipe –Check

- Check the vacuum circuit breaker pneumatic pipe and fittings for leakage. Rectify any leakage. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.3, Main Circuit Breaker.

303.3Y.01 Main circuit breaker –Check

- Check the opening and closing speed of the vacuum circuit breaker. Overhaul the vacuum circuit breaker if defective or not within specification. Refer to Suppliers Documentation Volume F3, Section 3, A.C. Vacuum Circuit-Breaker BVAC, Instructions for Installation and Operation (SG 300094 E).

303.3Y.02 Main circuit breaker main contacts –Check

- Check the vacuum circuit breaker main contacts in the vacuum switch tube for wear or damage. Replace the contacts as necessary. Refer to Suppliers Documentation Volume F3, Section 3, A.C. Vacuum Circuit-Breaker BVAC, Instructions for Installation and Operation (SG 300094 E).

303.3Y.03 Main circuit breaker contact spring –Check

- Check the condition of the vacuum circuit breaker contact springs. Replace the contact springs as necessary. Refer to Suppliers Documentation Volume F3, Section 3, A.C. Vacuum Circuit-Breaker BVAC, Instructions for Installation and Operation (SG 300094E).

303.3Y.04 Main circuit breaker lateral cover O-ring –Replace

- Replace the vacuum circuit breaker lateral cover O-ring. Refer to Suppliers Documentation Volume F3, Section 3, A.C. Vacuum Circuit-Breaker BVAC, Instructions for Installation and Operation (SG 300094 E).

303.5Y.01 Main circuit breaker –Overhaul

- Overhaul the vacuum circuit breaker, replacing the vacuum tube switch. Refer to Suppliers Documentation Volume F3, Section 3, A.C. Vacuum Circuit-Breaker BVAC, Instructions for Installation and Operation (SG 300094 E).

303.5Y.02 Main circuit breaker shock absorbers –Replace

- Replace all shock absorbers in vacuum circuit breaker as part of the vacuum circuit breaker overhaul. Refer to Suppliers Documentation Volume F3, Section 3, A.C. Vacuum Circuit-Breaker BVAC, Instructions for Installation and Operation (SG 300094 E).

303.5Y.03 Main circuit breaker auxiliary contacts –Replace

- Replace auxiliary contacts in vacuum circuit breaker as part of the vacuum circuit breaker overhaul. Refer to Suppliers Documentation Volume F3, Section 3, A.C. Vacuum Circuit-Breaker BVAC, Instructions for Installation and Operation (SG 300094 E).

303.5Y.04 Main circuit breaker earthing switch O-ring –Replace

- Replace the O-ring between the earthing switch and the converter roof hatch as part of the vacuum circuit breaker overhaul. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.3, Main Circuit Breaker.

303.5Y.05 Main circuit breaker seal –Replace

- Replace the seal between the vacuum circuit breaker and the converter roof hatch as part of the vacuum circuit breaker overhaul. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.3, Main Circuit Breaker.

304.3M.01 Surge arrestor insulators –Inspect

- Inspect the condition of the surge arrestor insulators for cracks, chips or evidence of impact damage. Replace any damaged, chipped or cracked insulators. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.4, Surge Arrestor.

304.3M.02 Surge arrestor insulator coating –Check

- Check the protective coating on the surge arrestor insulators for contamination. If any part of the protective coating is contaminated, remove all protective material from the insulators and completely recoat. Refer to Vol D, Maintenance & Repair Manual, Chapter 3.4, Surge Arrestor.

304.3M.03 Surge arrestor jumper cables –Inspect

- Visually inspect the surge arrestor jumper cables for damage, fraying or other defects. Replace any damaged or frayed cables. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.4, Surge Arrestor.

304.6M.01 Surge arrestor jumper cable fasteners –Check

- Check the security of the jumper cables between the surge arrestors and the roof line fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.4, Surge Arrestor.

304.1Y.01 Surge arrestor coating –Check

- Completely remove any previous protective coating on the surge arrestors. Recoat the surge arrestors with the specified protective coating. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.4, Surge Arrestor.

305.1W.01 Main transformer –Inspect

- Visually inspect the transformer for cracks or damage. Rectify any faults found. Refer to Suppliers Documentation Volume F3, Section 5, Main Transformer / Reactors Operating and Maintenance Manual, Bo'Bo' (HSTN612135).

305.1W.02 Main transformer –Inspect

- Visually inspect the transformer for leakage. Rectify any faults found. Refer to Suppliers Documentation Volume F3, Section 5, Main Transformer / Reactors Operating and Maintenance Manual, Bo'Bo' (HSTN612135).

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305.1W.03 Main transformer mountings –Check

- Check the security of the tab washers and fasteners on the main transformer mountings. Reseat any loose tab washers and tighten the fasteners as necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.5, Main Transformer.

305.3M.01 Main transformer earthing cables –Inspect

- Visually inspect the condition of the tank and transformer earthing cables for damage, fraying or other defects. Replace any damaged or frayed cables. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.5, Main Transformer.

305.6M.01 Main transformer electrical fasteners –Check

- Check the security of the main transformer electrical connection fasteners. Tighten the fasteners if necessary. Refer to Suppliers Documentation Volume F3, Section 5, Main Transformer / Reactors Operating and Maintenance Manual, Bo'Bo' (HSTN612135).

305.6M.02 Main transformer fasteners –Check

- Check the security of the main transformer fasteners. Tighten the fasteners if necessary. Refer to Suppliers Documentation Volume F, Section , Refer to Volume D, Maintenance & Repair Manual.

305.6M.03 Main transformer –Inspect

- Visually inspect the electrical connections and insulators on the main transformer for cracks, chips, evidence of impact damage. Clean the connectors, or replace any damaged, chipped or cracked insulators. Refer to Suppliers Documentation Volume F3, Section 5, Main Transformer / Reactors Operating and Maintenance Manual, Bo'Bo' (HSTN612135).

305.2Y.01 Main transformer mounting tab washers –Replace

- Replace the tab washers on the main transformer mountings. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.5, Main Transformer.

305.5Y.01 Main transformer – Inspect

- Inspect the main transformer. Refer to Suppliers Documentation Volume F3, Section 5, Main Transformer / Reactors Operating and Maintenance Manual, Bo'Bo' (HSTN612135).

306.1W.01 Main transformer expansion tank –Check

- Check the oil level in the main transformer expansion tanks. Top-up with the specified oil as required. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.6, Transformer Oil Cooling.

306.1W.02 Main Transformer expansion tank air dehumidifiers –Check

- Check the colour of the silica crystals in the transformer expansion tank air dehumidifiers. Replace the silica gel if more than half the crystals are a pink colour. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227). section 2.2.2

306.3M.01 Main transformer expansion tank –Clean

- Drain any water from the transformer oil expansion tank. Refer to Suppliers Documentation Volume F3, Section 5, Main Transformer / Reactors Operating and Maintenance Manual, Bo'Bo' (HSTN612135).

306.3M.02 Main transformer oil cooling –Inspect

- Visually inspect the main transformer oil cooling circuit expansion tanks for damage or leakage. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.6, Transformer Oil Cooling.

306.3M.03 Main Transformer hoses –Inspect

- Visually inspect the hoses between the expansion tanks and main transformer for leakage, damage or deterioration. Replace the hoses if defective. Rectify any leakage. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.6, Transformer Oil Cooling.

306.3M.04 Main transformer differential amplifier –Inspect

- Visually inspect the main transformer differential amplifier for damage. Replace the amplifier if defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.6, Transformer Oil Cooling.

306.3M.05 Main transformer oil cooling piping –Inspect

- Visually inspect the condition of the oil cooling piping. Check for leaks, damage or other defects. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.6, Transformer Oil Cooling.

306.3M.06 Main transformer oil pressure sensor –Inspect

- Visually inspect the main transformer oil pressure sensor for damage or leakage. Replace the sensor if defective. Rectify any leakage. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.6, Transformer Oil Cooling.

306.3M.07 Main transformer oil temperature sensor –Inspect

- Visually inspect the main transformer oil temperature sensor for damage or leakage. Replace the sensor if defective. Rectify any leakage. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.6, Transformer Oil Cooling.

306.3M.08 Main transformer oil cooling pipe drain cocks –Inspect

- Visually inspect the condition of the main transformer oil cooling pipe drain cocks. Rectify any faults found. Replace any damaged, defective or missing parts. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.6, Transformer Oil Cooling.

306.3M.09 Main transformer oil cooling radiator –Check

- Visually inspect the transformer oil cooling radiator and circuit for oil leaks. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.6, Transformer Oil Cooling.

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306.6M.01 Main transformer oil pumps –Check

- Check the security of the main transformer oil pumps and pipes. Tighten the fasteners as necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.6, Transformer Oil Cooling.

306.1Y.01 Main transformer cooling oil –Check

- Sample and analyse the transformer cooling oil. Replace the entire oil if contaminated, or replenish with the specified oil as required. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.6, Transformer Oil Cooling.

306.5Y.01 Main transformer oil cooling pumps –Overhaul

- Overhaul the transformer oil cooling pumps. Refer to Suppliers Documentation Volume F3, Section 6, Transformer Oil Circulating Pump (698.035-FDEI).

306.5Y.02 Main transformer oil cooling piping O-rings –Replace

- Replace the O-rings in the oil cooling piping. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.6, Transformer Oil Cooling.

306.5Y.03 Main transformer–Refill

- Completely drain and flush the transformer and oil cooling system. Refill with clean oil. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.6, Transformer Oil Cooling.

307.3M.01 Transducers rubber cable conduit –Inspect

- Visually inspect the rubber cable conduit between the transducer terminal box and the roof cable duct. Replace the conduit if damaged, cracked or deteriorating. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.7, Transducers.

307.3M.02 Transducers coating –Check

- Check the protective coating on the transducers for contamination. If any part of the protective coating is contaminated, remove all protective material from the insulators and completely recoat. Refer to Suppliers Documentation Volume F3, Section 7, VGF36, Maintenance Instructions for Cast-Resin Insulated Outdoor Instrument Transformers (KB 010108 e).

307.6M.01 Transducers fasteners –Check

- Check the security of the transducer fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.7, Transducers.

307.1Y.01 Transducers –Check

- Check the transducer for damage or other defects. Replace the transducer if damaged or detective. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.7, Transducers.

307.1Y.02 Transducers –Recoat

- Completely remove any previous protective coating. Recoat the transducer with the specified protective coating. Refer to Suppliers Documentation Volume F3, Section 7, VGF36, Maintenance Instructions for Cast-Resin Insulated Outdoor Instrument Transformers (KB 010108 e).

307.5Y.01 Transducers rubber cable conduit –Replace

- Replace the rubber cable conduit between the transducer terminal box and the roof cable duct. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.7, Transducers.

308.3M.01 Primary earthing cable and bracket –Check

- Check the security of the earthing cable and bracket at the axle box. Replace any damaged or missing components. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.8, Primary Earth.

308.3M.02 Primary earth cable –Inspect

- Visually inspect the cable between the primary earth brushes and the terminal box for fraying or damage. Replace the cable if frayed or damaged. Refer to Volume D, Maintenance and Repair

Manual, Chapter 3.8, Primary Earth.

308.3M.03 Primary earth fasteners –Check

- Ensure that the cable is secure at the primary earth brush connection. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.8, Primary Earth.

308.3M.04 Primary earth –Check

- Check the security and condition of the cable between the primary earth brushes and the terminal box. Tighten the fasteners if necessary, or replace the cable if damaged. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.8, Primary Earth.

308.6M.01 Primary earth contact plate –Inspect

- Visually inspect the primary earth contact plate on the end of the axles. Replace any plates where the depth of the grooves is not within the specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.8, Primary Earth.

308.6M.02 Primary earth brushes –Check

- Check the length of the primary earth brushes on the axles. Replace the brushes if worn or not within specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.8, Primary Earth.

308.6M.03 Primary earth brush springs –Check

- Check the tension of the primary earth brush springs on the axle. Replace any spring, which is not within specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.8, Primary Earth.

308.6M.04 Primary earth cable glands –Check

- Check the cable glands where the primary earth cables enter the axle box. Ensure the cable is properly sealed to the axle box. Rectify any faults found. Replace any damaged, defective or missing parts. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.8, Primary Earth.

308.6M.05 Primary earth fasteners –Check

- Check the security of the primary earth fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.8, Primary Earth.

309.3M.01 Filter –Clean

- Remove any obstructions from the filter resistor protection grid. Ensure that the grid openings are not obstructed or blocked. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.9, Filter.

309.3M.02 Filter resistor junction box cable glands –Inspect

- Visually inspect the condition of the cable glands on the filter resistor junction box on the converter roof hatch. Replace the glands if damaged or leaking. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.9, Filter.

309.6M.01 Filter –Clean

- Clean the filter resistor, insulators and ceramic components with compressed air. Remove all dirt and debris from the surfaces. Refer to Suppliers Documentation Volume F3, Section 9, Filter Resistor Type BW, for Bo'Bo', Mounting and Service Instructions (SG 400142 E).

309.6M.02 Filter resistor fasteners –Check

- Check the security of the filter resistor and electrical connection fasteners. Tighten the fasteners if necessary. Refer to Suppliers Documentation Volume F3, Section 9, Filter Resistor Type BW, for Bo'Bo', Mounting and Service Instructions (SG 400142 E).

309.6M.03 Hotel load electrical cabling –Inspect

- Visually inspect the condition of the hotel load electrical cabling in the filter cubicle for wear, damage, fraying or other defects. Rectify any faults found. Refer to Suppliers Documentation Volume F10, Section 4, Hotel Load Coupler: Insulator Top (SI/SP6/022).

309.6M.04 Hotel load electrical fasteners –Check

- Check the security of the hotel load electrical connector fasteners in the filter cubicle. Tighten the fasteners if necessary. Refer to Suppliers Documentation Volume F10, Section 4, Hotel Load Coupler: Insulator Top (SI/SP6/022).

309.1Y.01 Filter resistor –Clean

- Remove the protection grid and clean the filter resistor, insulators and ceramic components with dilute caustic solution. Remove all dirt and debris, then rinse the filter resistor thoroughly in warm water. Refer to Suppliers Documentation Volume F3, Section 9, Filter Resistor Type BW, for Bo'Bo', Mounting and Service Instructions (SG 400142 E).

309.1Y.02 Filter contactor –Inspect

- Visually inspect the condition of the filter contactor arc chute, inside and outside. Replace if worn or damaged. Refer to Suppliers Documentation Volume F3, Section 9, Electro-Pneumatic Contactors Type BPS 30.06 S, Instructions for Erection and Operation (SG 100197 E).

309.1Y.03 Filter contactor –Clean

- Remove and clean the filter arc chutes, inside and outside, with compressed air. After cleaning, reinstall the filter arc chutes. Refer to Suppliers Documentation Volume F3, Section 9, Electro-Pneumatic Contactors Type BPS 30.06 S, Instructions for Erection and Operation (SG 100197 E).

309.1Y.04 Filter contactor contacts –Check

- Check the filter contactor for wear on the contacts. Replace the contacts if worn. Refer to Suppliers Documentation Volume F3, Section 9, Electro-Pneumatic Contactors Type BPS 30.06 S, Instructions for Erection and Operation (SG 100197 E).

309.1Y.05 Filter contactor –Check

- Check the pulling force of the filter contactor. Adjust the pulling force if necessary. Refer to Suppliers Documentation Volume F3, Section 9, Electro-Pneumatic Contactors Type BPS 30.06 S, Instructions for Erection and Operation (SG 100197 E).

309.1Y.06 Filter contactor terminals fasteners –Check

- Check the security of the contactor terminals fasteners. Tighten the fasteners if necessary. Refer to Suppliers Documentation Volume F3, Section 9, Electro-Pneumatic Contactors Type BPS 30.06 S, Instructions for Erection and Operation (SG 100197 E).

309.5Y.01 Filter –Overhaul

- Overhaul the filter contactor. Refer to Suppliers Documentation Volume F3, Section 9, Electro-Pneumatic Contactors Type BPS 30.06 S, Instructions for Erection and Operation (SG 100197 E).

309.5Y.02 Filter resistor junction box cable glands –Replace

- Replace the cable glands on the filter resistor junction box on the converter roof hatch. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.9, Filter.

309.10Y.01 Filter resistor junction box seal –Replace

- Replace the seal of the filter resistor junction box on the converter roof hatch. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.9, Filter.

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6.4 Propulsion System

401.1W.01 Traction converter earthing switch –Check

- Check the mechanical operation of the traction converter earthing switch. Replace the switch if the movement is stiff or restricted. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227). Section 2.3.4.5

401.1W.02 Traction converter earthing switch –Check

- Check the electrical operation of the traction converter earthing switch. Rectify any faults or defects found or replace if defective. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227).

401.3M.01 Traction converter flexible hoses –Inspect

- Visually inspect the flexible hoses to the traction converter valve sets for damage, wear, fraying or leakage at the fittings. Rectify any faults found or replace the hoses if defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.1, Traction Converter.

401.6M.01 Traction converter contactor –Check

- Check the pneumatic connection to the traction converter contactors for damage or leakage. Rectify any faults found. Repair any leakage. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.1, Traction Converter.

401.6M.02 Traction converter Precharge contactor –Check

- Check the connection to the traction converter precharge contactors for damage. Rectify any faults found. Refer to Suppliers Documentation Volume F4, Section 1, Operating Instructions Traction Converter: System description (3EHN 420225). Section 2.3.4.4.

401.6M.03 Traction converter electrical equipment –Check

- Check all the electrical equipment for signs of dirt, corrosion, damage, etc.

- Remove all dust/dirt deposits from the connection insulators by either blowing with compressed air or brushing with soft non metallic brush

  Renew any damage or corroded items

401.1Y.01 Traction converter cable –Inspect

- Visually inspect the traction converter cable routing and cable fixings for evidence of damage, cracking or chafing. Ensure that all cable bends have a suitable radius. Rectify any faults found. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227). Section 2.3.4.2

401.1Y.02 Gate unit fibre optics –Inspect

- Visually inspect the optical fibre for the gate units in the traction converter. Inspect the cables and fixings for evidence of damage, cracking or chafing. Ensure that all cable bends have a radius of greater than 50 mm. Rectify any faults found. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing,

Maintenance (3EHN 420227). Section 2.3.4.2

401.1Y.03 Traction converter fasteners –Check

- Check the security of the power connections to the traction converter fasteners. Tighten the fasteners if necessary. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227). Section 2.3.4.1

401.1Y.04 Valve set tank –Inspect

- Remove the valve sets from the valve set cubicle in the traction converter, then visually inspect the valve sets tanks for cracks, damage or leakage. Replace the valve sets if damaged, defective or leaking. Reinstall the valve sets. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227). Section 2.3.2.2

401.1Y.05 Traction converter precharge contactor –Inspect

- Remove the traction converter precharge contactor arc chute and inspect the chute for evidence of tracing, erosion, or mechanical damage. Replace contactors showing excessive tracing or corrosion. Tracing on the arc chute may indicate traction converter control malfunction. Rectify any faults found. Refer to Suppliers Documentation Volume F4, Section 1, Operating Instructions Traction Converter: System description (3EHN 420225). Section 2.3.4.4

401.1Y.06 Traction converter precharge contactor auxiliary contacts –Measure

- Measure the erosion of the traction converter precharge contactor auxiliary contacts. Replace the contacts if worn. Refer to Suppliers Documentation Volume F4, Section 1, Operating Instructions Traction Converter: System description (3EHN 420225). Section 2.3.4.4

401.1Y.07 Traction converter precharge contactor –Check

- Check the operation of the traction converter precharge contactor mechanical linkage. Replace the contactor if the movement is stiff or restricted. Refer to Suppliers Documentation Volume F4, Section 1, Operating Instructions Traction Converter: System description (3EHN 420225). Section 2.3.4.4

401.1Y.08 Traction converter contactor –Examine

- Remove the traction converter contactor arc chute and examine the chute for evidence of tracing, erosion, or mechanical damage. Replace contactors showing excessive tracing or corrosion. Tracing on the arc chute may indicate a traction converter control malfunction. Rectify any faults found. Refer to Suppliers Documentation Volume F4, Section 1, Operating Instructions Traction Converter: System description (3EHN 420225). Section 2.3.4.3

401.1Y.09 Traction converter contactor –Check

- Check the operation of the traction converter contactor mechanical linkage. Replace the contactor if the movement is stiff or restricted. Refer to Suppliers Documentation Volume F4, Section 1, Operating Instructions Traction Converter: System description (3EHN 420225). Section 2.3.4.3

401.1Y.10 Traction converter contactor auxiliary contacts –Check

- Measure the erosion of the traction converter contactor auxiliary contacts. Replace the contacts

if worn. Refer to Suppliers Documentation Volume F4, Section 1, Operating Instructions Traction Converter: System description (3EHN 420225). Section 2.3.4.2

401.1Y.11 Traction converter oil circuit –Inspect

- Visually inspect the traction converter oil circuit for leaks at the valve set pipe couplings and connections to the converter oil manifold. Rectify any faults found. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227). Section 2.3.2.2

401.1Y.12 Traction converter doors and locks –Check

- Check the security of the traction converter doors and locks. Tighten the fasteners if necessary. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227). Section 2.3.2.2

401.1Y.13 Valve set electrical connections –Inspect

- Visually inspect the valve set electrical connections. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.1, Traction Converter.

401.1Y.14 Traction converter air cooling hoses –Inspect

- Visually inspect the traction converter air cooling hoses for damage or deterioration. Rectify any faults found. Replace the hoses if damaged or deteriorated. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.1, Traction Converter.

401.5Y.01 Traction converter earthing switch –Check

- Check the earthing switch. Replace the switch if defective. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227).

401.5Y.02 Traction converter contactor –Clean

- Clean the traction converter contactors using compressed air. Refer to Suppliers Documentation Volume F5, Section 1, Electro-Pneumatic Contactors Type BPS 15.15 C/2, Instructions for Erection and Operation (SG 200081).

401.5Y.03 Traction converter contactor piston ring –Replace

- Replace the piston rings in the traction converter contactor pneumatic cylinder. Refer to Suppliers Documentation Volume F5, Section 1, Electro-Pneumatic Contactors Type BPS 15.15 C/2, Instructions for Erection and Operation (SG 200081). Section 1

401.5Y.04 Traction converter precharge contactor –Check

- Check the condition of the traction converter pre-charge contactor electrical contacts. Replace the contacts if necessary. Refer to Suppliers Documentation Volume F5, Section 1, Electromagnetic Contactors Type HSm, Instructions for Installation and Maintenance (SG 100198 E). Section 1

401.5Y.05 Traction converter precharge contactor coil –Replace

- Replace the traction converter precharge contactor coil. Refer to Suppliers Documentation

Volume F5, Section 1, Electromagnetic Contactors Type HSm, Instructions for Installation and Maintenance (SG 100198 E). Section 1

401.5Y.06 Traction converter voltage indicator –Test

- Test the voltage indicator. Replace the indicator if required. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227).

401.5Y.07 Primary voltage transformers –Test

- Test the primary voltage transformers. Replace the transformers if required. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227).

401.5Y.08 Traction converter current transducer –Test

- Test the current transducers. Replace the transducers if required. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227).

401.5Y.09 Traction converter voltage transducers –Test

- Test the voltage transducers. Replace the transducers if required. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227).

401.5Y.10 Traction converter air cooling hoses –Replace

- Replace the traction converter air cooling hoses. Refer to Volume D, Maintenance and Repair Manual, Chapter 4?1, Traction Converter.

401.5Y.11 Gate unit power supply –Test

- Test the operation of the gate unit power supply. Replace the power supply if required. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227).

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401.5Y.12 Gate unit – Test

- Test the operation of the gate units. Replace the gate units if required. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227).

401.5Y.13 Valve sets –Test

- Test the valve sets. Overhaul the valve sets if required. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227).

401.5Y.14 Traction converter –Impedance- Measure

- Measure the impedance of the fault detection and MUB resistors. Replace any resistors not within specification. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227). Section 2.4.3.3.4

401.8Y.01 DC-Link capacitors –Measure

- Measure the capacitance of the DC-Link capacitors. Replace the capacitor bank if not within specification. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227). Section 2.4.3.1.2

401.8Y.02 Capacitors –Fasteners –Check

- Check the security of the DC-link and series resonant circuit capacitor bank electrical connections. Tighten the fasteners if necessary. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227). Section 2.4.3.1.1

401.8Y.03 Earthing resistors –Inspect

- Visually inspect the traction converter earthing resistors for signs of overheating. Replace any resistor that is damaged or defective. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227). Section 2.4.3.3.4

401.8Y.04 MUB Resistor –Inspect

- Visually inspect the MUB resistor for evidence of overheating; bending of resistor tapes, discolouration of the resistors or case, or burn marks. Replace the MUB resistor assembly if damaged or defective. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227). Section 2.4.3.2

401.8Y.05 Series resonant capacitor –Measure

- Measure the capacitance of the series resonant circuit capacitor. Replace the capacitor bank if not within specification. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227).

401.10Y.01 Traction converter –Test

- Remove the traction converter from the locomotive and conduct a voltage test and measure the insulation resistance. This inspection tests the traction converter and the valve sets. Replace the traction converter if not within specification. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227). Section 2.4.5

401.10Y.02 Traction converter precharge resistor –Test

- Visually inspect the traction converter precharge resistor for signs of overheating. Replace the pre-charge resistor if damaged or defective. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227). Section 2.4.3.3.3

401.10Y.03 Fibre optic cables –Test

- Test the optic fibre cables. Replace any defective cables. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227). Section 2.4.4

401.10Y.04 Traction converter flexible hoses –Replace

- Replace the flexible hoses to the traction converter valve sets. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.1, Traction Converter.

401.10Y.05 Traction converter door seals –Replace

- Replace the seals on the traction converter doors. Refer to Suppliers Documentation Volume F4, Section 2, Operating Instructions Traction Converter: Mechanical Structure (3EHN 420226).

402.1W.01 Traction converter oil level –Check

- Check the oil level in the traction converter expansion tanks. Top-up with the specified oil as required. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227). Section 2.2.1

402.1W.02 Air dehumidifier –Check

- Check the colour of the silica crystals in the traction converter expansion tank air dehumidifier. Replace the silica gel if more than half the crystals are a pink colour. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227).

402.3M.01 Traction converter oil pumps –Inspect

- Visually inspect the traction converter oil pumps for leakage, wear or damage. Replace any damaged or faulty pumps. Refer to Suppliers Documentation Volume F5, Section 2, Converter Oil Circulating Pump (698.035-FDEI).

402.3M.02 Traction converter oil expansion tank –Inspect

- Visually inspect the traction converter oil cooling circuit expansion tanks for damage or leakage. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.2, Traction Converter Oil Cooling.

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402.3M.03 Traction converter oil cooling piping –Inspect

- Visually inspect the condition of the oil cooling piping. Check for leaks, damage or other defects. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.2, Traction Converter Oil Cooling.

402.3M.04 Traction converter oil cooling pipe drain cock –Inspect

- Visually inspect the condition of the traction converter oil cooling pipe drain cock on the locomotive underframe. Rectify any faults found. Replace any damaged or missing parts. Refer to Volume D, Maintenance and Repair Manual, Chapter 3.6, Traction Converter Oil Cooling.

402.6M.01 Traction converter oil cooling fasteners –Check

- Check the security of the oil cooling and pipe fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.2, Traction Converter Oil Cooling.

- Check the security of the traction converter oil pumps and pipes. Tighten the fasteners as necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.2, Traction

Converter Oil Cooling.

402.1Y.01 Traction converter cooling oil –Check

- Sample and analyse the traction converter cooling oil. Replace the entire oil if contaminated, or replenish with the specified oil as required. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227). Section 2.4.2.1

402.5Y.01 Traction converter oil cooling pumps –Overhaul

- Overhaul the traction converter oil cooling pumps. Refer to Suppliers Documentation Volume F5, Section 2, Converter Oil Circulating Pump (698.035-FDEI).

- Replace the bearings in the traction converter oil cooling pumps as part of the converter oil cooling pump overhaul. Refer to Suppliers Documentation Volume F5, Section 2, Converter Oil Circulating Pump (698.035-FDEI).

- Replace the O-rings in the oil cooling piping as part of the converter oil cooling pump overhaul. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.2, Traction Converter Oil Cooling.

402.5Y.02 Traction converter oil cooling –Clean and Refill

- Completely drain and flush the traction converter cooling system. Refill with clean oil. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227). Section 2.4.2.1

402.8Y.01 Traction converter oil cooling – Clean and Refill

- Completely flush the traction converter oil cooling circuit. Refer to Suppliers Documentation Volume F4, Section 3, Operating Instructions Traction Converter: Installation, Servicing, Maintenance (3EHN 420227). Section 2.4.2.2

403.3M.01 Traction converter bus station ventilator– Check

- Check the operation of the converter bus station ventilators by listening for unusual sounds. The ventilators should run smoothly and without vibration. Replace the ventilator assembly if the fans are not operating correctly. Rectify any faults found. Refer to Suppliers Documentation Volume F6, Section 13, Maintenance Instruction Manual for MICAS-S2 Control Electronics (3EHL420666). Section 6.1

403.1Y.01 Traction converter bus station –Inspect

- Inspect the traction converter bus station equipment and ventilators for build-up of dust and debris. Remove any accumulated material. Refer to Suppliers Documentation Volume F6, Section 13, Maintenance Instruction Manual for MICAS-S2 Control Electronics (3EHL420666). Section 6.2

403.1Y.02 Traction converter bus station seal –Inspect

- Visually inspect the seal on the traction converter bus station cover. Replace the seal if worn, damaged or deteriorating. Refer to Suppliers Documentation Volume F6, Section 13, Maintenance Instruction Manual for MICAS-S2 Control Electronics (3EHL420666). Section 6.2

403.8Y.01 Traction converter bus station – EPROM memory chips –Replace

- Replace the EPROM memory chips in the traction converter bus station. Refer to Suppliers Documentation Volume F6, Section 13, Maintenance Instruction Manual for MICAS-S2 Control Electronics (3EHL420666). Section 7.3

403.8Y.02 Traction converter bus station Software –Reload

- Reload the software to the traction converter bus station computer EPROMs. Refer to Suppliers Documentation Volume F6, Section 13, Maintenance Instruction Manual for MICAS-S2 Control Electronics (3EHL420666). Section 7.3

404.1W.01 Traction motor –Inspect

- Visually inspect the traction motor for damage, dents or other defects. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.4, Traction Motor.

404.1W.02 Traction motor dampers –Inspect

- Inspect the traction motor dampers for evidence of oil leaks. Overhaul the dampers if leaking. Refer to Suppliers Documentation Volume F2, Section 3, Maintenance and Repair Handbook for KONI Adjustable Railway Dampers (2984-E).

404.1W.03 Traction motor cables –Inspect

- Visually inspect the condition and routing of the traction motor power cables, speed sensor and temperature sensor cables on the bogie. Replace any damaged or frayed cables, and secure the cables as necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.4, Traction Motor.

404.6M.01 Traction motor bellows –Inspect

- Visually inspect the traction motor bellows for damage, tears or other defects. Replace the bellows if torn or damaged. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.4, Traction Motor.

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404.6M.02 Traction motor damper mountings –Inspect

- Visually inspect the traction motor damper mountings on the bogie frame and traction motor for cracks, breakage or other damage. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.4, Traction Motor.

404.6M.03 Traction motor damper rod –Inspect

- Visually inspect the traction motor damper rod surface and end mountings for wear to the rod surface. Overhaul the dampers if the rod is worn or if there is evidence of oil leakage. Refer to Suppliers Documentation Volume F2, Section 3, Maintenance and Repair Handbook for KONI Adjustable Railway Dampers (2984-E).

404.6M.04 Traction motor spheriblocs –Inspect

- Visually inspect the traction motor spheriblocs for wear damage or deterioration. Replace the spheriblocs if damaged or defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.4, Traction Motor.

404.6M.05 Traction motor fasteners –Check

- Check the security of the traction motor fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.4, Traction Motor.

404.6M.06 Traction motor support arm fasteners –Check

- Check the security of the traction motor support arm fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.4, Traction Motor.

404.6M.07 Traction motor shims –Inspect

- Check shims at the traction motor support arm spheribloc and bogie frame. Ensure that there is no movement between the spheribloc and bogie frame. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.4, Traction Motor.

404.1Y.01 Traction motor –Clean

- Steam clean the outside of the traction motor. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.4, Traction Motor.

404.X.01 Traction motor damper –Test

- Every 200,000 kilometres — Test the performance of the traction motor damper. Overhaul the damper if defective. Refer to Suppliers Documentation Volume F2, Section 3, Maintenance and Repair Handbook for KONI Adjustable Railway Dampers (2984-E).

404.X.02 Traction motor DE bearing –Lubricate

- Every 250,000 kilometres — Lubricate the traction motor drive end bearings with the specified grease. Refer to Suppliers Documentation Volume F5, Section 3, ABB Traction Motor, Operating Instructions (3EHM670402). Section 5.3.1

404.X.03 Traction motor NDE bearing –Lubricate

- Every 250,000 kilometres — Lubricate the traction motor non-drive end bearings with the specified grease. Refer to Suppliers Documentation Volume F5, Section 3, ABB Traction Motor, Operating Instructions (3EHM670402). Section 5.3.2

404.X.04 Traction motor damper –Overhaul

- Every 400,000 kilometres — Overhaul the traction motor damper. Refer to Suppliers Documentation Volume F2, Section 3, Maintenance and Repair Handbook for KONI Adjustable Railway Dampers (2984-E).

404.X.05 Traction motor damper Spheribloc–Replace

- Every 400,000 kilometres — Replace the spheriblocs in the traction motor damper as part of the traction motor damper overhaul. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.4, Traction Motor.

404.X.06 Traction motor bearings –Replace

- Every 1,600,000 kilometres — Replace the traction motor drive and non-drive bearings. Refer to Suppliers Documentation Volume F5, Section 3, ABB Traction Motor, Operating Instructions

(3EHM670402). Section 5.4

404.X.07 Traction motor stator windings –Clean

- Every 1,600,000 kilometres — Clean the traction motor stator windings. Refer to Suppliers Documentation Volume F5, Section 3, ABB Traction Motor, Operating Instructions (3EHM670402). Section 5.5

404.2Y.01 Traction motor damper mountings –Inspect

- Visually inspect the damper mounting lugs on the traction motor for cracks or damage. Replace the traction motor if the mountings are cracked or damaged. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.4, Traction Motor.

404.2Y.02 Traction motor Spheribloc –Test

- Test the traction motor and support spheriblocs. Replace the spheriblocs if not within specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.4, Traction Motor.

404.5Y.01 Traction motor –Overhaul

- Overhaul the traction motors. Refer to Suppliers Documentation Volume F5, Section 3, ABB Traction Motor, Operating Instructions (3EHM670402).

404.5Y.02 Traction motor electrical insulation –Test

- Test the traction motor electrical insulation as part of the traction motor overhaul. Rectify any faults found. Refer to Suppliers Documentation Volume F5, Section 3, ABB Traction Motor, Operating Instructions (3EHM670402).

404.5Y.03 Traction motor rotary speed transmitter –Test

- Test the traction motor rotary speed transmitter as part of the traction motor overhaul. Replace the transmitter if damaged or defective. Refer to Suppliers Documentation Volume F5, Section 3, ABB Traction Motor, Operating Instructions (3EHM670402)

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404.5Y.04 Traction motor terminal box–Overhaul

- Replace traction motor end plate O-rings and the gaskets on the terminal box as part of the traction motor overhaul. Refer to Suppliers Documentation Volume F5, Section 3, ABB Traction Motor, Operating Instructions (3EHM670402).

404.5Y.05 Traction motor fasteners–Replace

- Replace all the traction motor, support and damper fasteners as part of the traction motor overhaul. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.4, Traction Motor.

404.5Y.06 Traction motor spheriblocs –Replace

- Replace the spheriblocs in the traction motor and traction motor support arm as part of the traction motor overhaul. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.4, Traction Motor.

404.5Y.07 Traction motor temperature sensor –Test

- Test the traction motor temperature sensors as part of the traction motor overhaul. Replace the sensor if damaged or defective. Refer to Suppliers Documentation Volume F5, Section 3, ABB Traction Motor, Operating Instructions (3EHM670402).

404.5Y.08 Traction motor bellows –Replace

- Replace the traction motor bellows as part of the traction motor overhaul. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.4, Traction Motor.

404.5Y.09 Traction motor support arm –Test

- Test the traction motor support arm using a non destructive technique. Replace the arm if damaged or defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.4, Traction Motor.

6.5 Auxiliary System

501.6M.01 Auxiliary converter contactors –Inspect

- Visually inspect the condition of the contactors in the auxiliary converters (BUR) 1, 2 & 3 for damage or defects. Rectify any faults found. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789).

501.6M.02 Auxiliary converter seals –Inspect

- Visually inspect the seals on the auxiliary converters (BUR) 1, 2 & 3 for wear, damage or deterioration. Replace the seals if worn, damaged or deteriorated. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789). Section En: Page 3

501.6M.03 Auxiliary converter fasteners –Inspect

- Visually inspect the auxiliary converter (BUR) 1, 2 & 3 fasteners for corrosion. Replace the fasteners and apply anti-corrosion material as necessary. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789).

501.6M.04 Auxiliary converter fasteners –Check

- Check the security of the auxiliary converter (BUR) 1, 2 & 3 fasteners. Tighten the fasteners as necessary. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789).

501.1Y.01 Auxiliary converter –Inspect

- Visually inspect the fasteners, heat-sinks, cases and electrical connections for corrosion. Rectify any corrosion found and apply a corrosion inhibitor. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789).

501.1Y.02 Auxiliary converter insulators –Inspect

- Visually inspect the insulators on the capacitors in the auxiliary converter cabinets for damage, chips or evidence of over heating. Replace any damaged or defective capacitors. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789).

501.1Y.03 Auxiliary converter surge arrestors –Inspect

- Visually inspect the surge arrestors in the auxiliary converter cabinets for damage, chips or evidence of arch burns. Replace damaged surge arrestors. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789).

501.1Y.04 Auxiliary converter contactors –Check

- Check the contactors in the auxiliary converter cabinets for wear to the contacts. Replace the contact if worn. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789).

501.1Y.05 Auxiliary converter seals –Inspect

- Visually inspect the condition of the seals on the auxiliary converter cabinets and equipment

modules. Replace the seals if worn, damaged or deteriorated. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789).

501.1Y.06 Auxiliary converter modules –Check

- Check that the equipment modules in the auxiliary converter cabinets close fully and seal correctly. Rectify any faults found. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789).

501.1Y.07 Auxiliary converter doors –Check

- Check that the auxiliary converter cabinet doors close fully and seal correctly. Rectify any faults found. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789).

501.1Y.08 Auxiliary converter heat sinks –Inspect

- Visually inspect the auxiliary converters (BUR) 1, 2 & 3 for corrosion to the heat sinks. Replace the heat sinks and apply anti-corrosion material as necessary. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789).

501.1Y.09 Auxiliary converter surge arrestors –Inspect

- Visually inspect the surge arrestors in the auxiliary converters (BUR) 1, 2 & 3 for damage or defects. Replace the surge arrestors if damaged or defective. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789).

501.1Y.10 Auxiliary converter reactors –Clean

- Clean the reactors in the auxiliary converters (BUR) 1, 2 & 3 using compressed air or a vacuum cleaner and a soft non-metallic brush. Remove all build-up of dirt and debris. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789). Section En: Page 2

501.1Y.11 Auxiliary converter heat sinks –Clean

- Clean the heat sinks on modules in auxiliary converters (BUR) 1, 2 & 3 using compressed air or a vacuum cleaner and a soft non-metallic brush. Remove all build-up of dirt and debris. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789). Section En: Page 2

501.1Y.12 Auxiliary converter –Clean

- Clean all heat sinks and insulators in the auxiliary converter cabinets using compressed air and a clean, dry, lint free cloth. Cleaning should be performed at the beginning of summer. Remove all dirt and debris. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789).

501.1Y.13 Auxiliary converter transformer –Clean

- Clean the transformers in the auxiliary converters (BUR) 1, 2 & 3 using compressed air or a vacuum cleaner and a soft non-metallic brush. Remove all build-up of dirt and debris. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789). Section En: Page 2

501.1Y.14 Auxiliary converter insulators –Clean

- Clean the insulators in the auxiliary converters (BUR) 1, 2 & 3 using compressed air or a vacuum cleaner and a soft non-metallic brush. Remove all build-up of dirt and debris. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789). Section En: Page 3

501.1Y.15 Auxiliary converter capacitor –Inspect

- Visually inspect the condition of the capacitors in the auxiliary converters (BUR) 1, 2 & 3 for damage or defects. Rectify any faults found. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789).

501.1Y.16 Auxiliary converter capacitors –Clean

- Clean the capacitors in the auxiliary converter cabinets using compressed air and a clean, dry, lint free cloth. Remove all traces of dirt and debris. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789).

501.5Y.01 Auxiliary converter cabinet –Clean

- Clean inside the auxiliary converter cabinets using a vacuum cleaner. Remove all traces of dust, dirt and debris from the components, cubicle walls and floor. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789).

501.5Y.02 Auxiliary converter contactor –Overhaul

- Overhaul the contactors in the auxiliary converters (BUR) 1, 2 & 3. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789).

501.5Y.03 Auxiliary converter reactors and transformers –Clean

- Clean the reactors and transformers in the auxiliary converter cabinets using compressed air. Remove all traces of dirt, dust and debris. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789).

501.5Y.04 Auxiliary converter insulators –Inspect

- Visually inspect the insulators in the auxiliary converters (BUR) 1, 2 & 3 for damage. Replace any damaged insulators. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789). Section En: Page 3

501.5Y.05 Auxiliary converter CZ units –Clean

- Disassemble the CZ units in the auxiliary converters (BUR) 1, 2 & 3 and clean the parts using compressed air or a vacuum cleaner and a soft non-metallic brush. Remove all build-up of dirt and debris. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789). Section En: Page 3

501.10Y.01 Auxiliary converter filter capacitors –Test

- Test the auxiliary converter filter capacitors. Replace the capacitors if not within the labeled specification. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789).

501.10Y.02 Auxiliary converter seals –Replace

- Replace the seals on the auxiliary converter cabinets and equipment modules. Refer to Suppliers Documentation Volume F8, Section 5, Maintenance (3EHK600789).

502.3M.01 Auxiliary converter control –Check

- Check the operation of the auxiliary converter control unit bus station ventilators by listening for unusual sounds. The ventilators should run smoothly and without vibration. Replace the ventilator assembly if the fans are not operating correctly. Refer to Suppliers Documentation Volume F17, Section 13, Maintenance Instruction Manual MICAS-S2 (3EHL420666).

502.1Y.01 Auxiliary converter control –Inspect

- Inspect the auxiliary converter bus station equipment and ventilators for build-up of dust and debris. Remove any accumulated material. Refer to Suppliers Documentation Volume F6, Section 13, Maintenance Instruction Manual for MICAS-S2 Control Electronics (3EHL420666).

502.8Y.01 Auxiliary converter control –EPROM memory chips –Replace

- Replace the EPROM memory chips in the auxiliary converter control unit bus station. Refer to Suppliers Documentation Volume F17, Section 13, Maintenance Instruction Manual MICAS-S2 (3EHL420666).

502.8Y.02 Auxiliary converter control Software –Reload

- Reload the software to the auxiliary converter control unit bus station computer EPROMs. Refer to Suppliers Documentation Volume F17, Section 13, Maintenance Instruction Manual MICAS-S2 (3EHL420666).

503.1W.01 Battery isolation switch –Check

- Check the condition and operation of the battery isolation switch. Replace the switch if damaged or defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.3, Battery/Charger.

503.1M.01 Battery –Clean

- Clean any dirt and debris from the batteries using clean water. Do not use a wire brush or solvents of any kind. Refer to Suppliers Documentation Volume F10, Section 3, Nickel-cadmium batteries, Technical data, block battery types.

503.3M.01 Battery box –Inspect

- Visually inspect the battery box for damage or defects. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.3, Battery/Charger.

503.3M.02 Battery box–Clean

Clean the battery boxes. Remove all dirt and debris. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.3, Battery/Charger.

503.3M.03 Battery tray locking handles –Check

- Check the operation of the battery tray locking handles. Rectify any faults found. Refer to

Volume D, Maintenance and Repair Manual, Chapter 5.3, Battery/Charger.

503.3M.04 Battery electrolyte –Check

- Check the electrolyte level in the batteries. Top-up the electrolyte with distilled or deionised water if necessary. Refer to Suppliers Documentation Volume F10, Section 3, Nickel-cadmium batteries, technical data, block battery types.

503.3M.05 Battery spacers –Inspect

- Visually inspect the condition of the spacers between the batteries. Replace any damaged or missing spacers. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.3, Battery/Charger.

503.3M.06 Battery cables–Inspect

- Visually inspect the condition of the battery cables. Replace any cables with damage to the insulation, fraying or other defects. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.3, Battery/Charger.

503.3M.07 Battery connections –Check

- Check the battery electrical connections for corrosion. Remove any corrosion and recoat the terminals with petroleum jelly or an anti-corrosion oil. Refer to Suppliers Documentation Volume F10, Section 3, Block battery: Installation and operating Instructions.

503.3M.08 Battery connections fasteners –Check

- Check the security of the battery terminal electrical connection fasteners. Tighten the fasteners if necessary. Refer to Suppliers Documentation Volume F10, Section 3, Nickel-cadmium batteries, Technical data, block battery types.

503.3M.09 Battery box cables–Check

- Check the routing of the cabling in the battery box. Ensure the cables are correctly secured. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.3, Battery/Charger.

503.3M.10 Battery box ventilation –Inspect

- Visually inspect the battery box ventilation hose for wear, damage or other defects. Replace the hose if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.3, Battery/Charger.

503.3M.11 Battery door locks –Check

- Check the operation of the battery door locks. Replace any faulty or defective locks. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.3, Battery/Charger.

503.3M.12 Battery tray handles –Check

- Check the operation of the battery tray handles. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.3, Battery/Charger.

503.3M.13 Battery tray handle –Lubricate

- Lubricate the battery tray handles using a small amount of light oil. Wipe away any excess oil. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.3, Battery/Charger.

503.6M:01 Battery connector –Inspect

- Visually inspect the connector housing and cover for damage. Rectify any faults found. Refer to Suppliers Documentation Volume F10, Section 4, Hotel Load Coupler: Cover Socket Body (SI/SP6/028).

503.6M.02 Battery box door seal –Inspect

- Visually inspect the condition of the battery box door seal. Replace seal if damaged, defective, leaking or deteriorating. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.3, Battery/Charger.

503.1Y.01 Battery box breathers –Clean

- Clean the battery box breathers. Remove all traces of dirt and dust. Clear any obstructions. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.3, Battery/Charger.

503.1Y.02 Battery electrolyte –Check

- Check the battery electrolyte for carbonation. Replace the electrolyte if carbonated. Refer to Suppliers Documentation Volume F10, Section 3, Electrolyte Instructions.
- Check the specific gravity of the battery electrolyte. Replace the electrolyte if necessary. Refer to Suppliers Documentation Volume F10, Section 3, Electrolyte Instructions.

503.1Y.03 Battery charger –Check

- Check that the battery charger output voltage is within specification. Rectify any faults found. *Refer to Suppliers Documentation Volume F10, Section 3, Battery Charger principle* (3EHE626164).

503.1Y.04 Battery cell –Measure

- Measure the voltage of each battery cell. Replace or recharge the battery as necessary. Refer to Suppliers Documentation Volume F10, Section 3, Block battery: Installation and operating Instructions.

503.5Y.01 Battery tray rollers –Inspect

- *Visually inspect the battery tray rollers for wear,* damage or other defects. Replace the rollers as required. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.3, Battery/Charger.

503.5Y.02 Battery tray rollers –Clean

- Remove and clean the rollers from the battery tray. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.3, Battery/Charger.

503.5Y.03 Battery box ventilation –Replace

- Replace the battery box ventilation hose. Refer to Volume D, Maintenance and Repair Manual,

Chapter 5.3, Battery/Charger.

504.6M.01 Hotel load contacts –Clean

- Clean the hotel load contacts using a soft brush or vacuum cleaner. Remove all traces of dirt, dust and debris. Refer to Suppliers Documentation Volume F10, Section 4, GRF30/265 3300 OHM: Technical Data.

504.6M.02 Hotel load connector main contacts –Inspect

- Visually inspect the hotel load connector main contacts. Replace the contacts if the loading stroke has reduced to 1 mm, or less. Refer to Suppliers Documentation Volume F10, Section 4, Hotel Load Coupler: Spring Loaded Contact Tube Female for Earth (SI/SP6/026).

504.6M.03 Hotel load control magnet –Clean

- Clean the surface of the hotel load control magnet using a clean cloth wetted with alcohol. Refer to Suppliers Documentation Volume F10, Section 4, Hotel Load Coupler: Insulator Top (SI/SP6/022).

504.6M.04 Hotel load connector fasteners –Check

- Check the security of the hotel load electrical connector fasteners. Tighten the fasteners if necessary. Refer to Suppliers Documentation Volume F10, Section 4, Hotel Load Coupler: Insulator Top (SI/SP6/022).

504.1Y.01 Hotel load contact –Inspect

- Visually inspect the contacts for wear, damage or other defects. Rectify any faults found or replace defective contacts as required. Refer to Suppliers Documentation Volume F10, Section 4, Hotel Load Coupler: Spring Loaded Contact Tube Female for Earth (SI/SP6/026).

505.1M.01 Oil cooling radiators –Check

- Check the radiators for dirt and debris via the machine Room Access Cover. If necessary clean the radiators.

505.3M.01 Oil blower filter mesh screen –Clean

- Remove the oil blower filter mesh screen, then clean it using a high pressure cleaner. Ensure that all dirt, dust and debris is removed. Inspect the screen for damage or defects and replace if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Oil Blowers.

505.3M.02 Oil blower filter –Clean

- With the mesh screen removed, clean the oil blower filter using a vacuum cleaner. Remove all dust and debris from the filter; ensure that none of the tubes are clogged. Clear any obstructions found. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Oil Blowers.

505.3M.03 Oil blower filter seal –Inspect

- Visually inspect the seal between the oil blower filter and the filter duct for wear or damage. Replace the seal if worn or damaged. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Oil Blowers.

505.3M.04 Oil cooler blower fan and motor –Check

- Check the operation of the oil cooler blower fan and motor. Listen for abnormal noises and check for excessive vibration. Replace the impeller or overhaul the fan motor if the imbalance exceeds specification. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Oil Blowers.

505.3M.05 Oil cooler blower seals –Inspect

- Visually inspect the condition of the seals on the oil cooler blower. Replace any damaged, worn or deteriorated seals. Refer to Suppliers Documentation Volume F10, Section 5, Oil Cooling Unit: Maintenance and Mounting Instruction with Spare Parts List (04.882.00.000).

505.3M.06 Oil cooling radiators –Clean

- Remove and clean all the dust particles and debris from the radiator via the machine Room Access Cover. Refer to Suppliers Documentation Volume F10, Section 5, Page 6.

505.3M.07 Traction converter oil cooling radiator –Inspect

- Visually inspect the traction converter oil cooling radiator for oil leaks. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 4.2, Oil Blowers.

505.6M.01 Oil blower and fan fasteners –Check

- Check the security of the oil blower and fan fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Oil Blowers.

505.6M.02 Oil blower filter panel and ducting fasteners –Check

- Check the security of the oil blower filter panel and ducting fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Oil Blowers.

505.1Y.01 Oil blower–Clean

- Remove all dust and debris from inside the oil blower casing and impeller using a vacuum cleaner and soft, non-metallic brush. Remove all dirt, dust and debris. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Oil Blowers.

505.1Y.02 Oil blower filter panel –Clean

- Remove and clean the oil blower filter panel. Remove all dirt, debris and obstructions. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Oil Blowers.

505.1Y.03 Oil blower filter –Inspect

- Visually inspect the oil blower filter panel flanges for cracks or damage. Replace the filter panel if defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Oil Blowers.

505.1Y.04 Oil blower filter panel seal–Check

- Check the condition of the seal between the filter panel and the pantograph roof hatch for damage or deterioration. Replace the seal if damaged or deteriorated. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Oil Blowers.

505.1Y.05 Oil blower impeller– Balance

- Balance the oil blower impeller. Refer to Suppliers Documentation Volume F10, Section 5,.

505.18M.01 Oil blower motor bearing –Lubricate

- Lubricate the oil blower motor bearings with the specified grease. Refer to Suppliers Documentation Volume F10, Section 5,.

505.2Y.01 Oil blower filter panel –Water test

- Conduct a water test on the oil blower filter panel. Rectify any leakages. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Oil Blowers.

505.3Y.01 Oil blower motor end plates –Clean

- Remove and clean the oil blower motor end plates. Repack the end plates with the specified grease. Refer to Suppliers Documentation Volume F10, Section 5, Motor Type 200L55-RH2a: Parts List (S 321168).

505.3Y.02 Oil blower motor –Overhaul

- Overhaul the oil cooler blower fan motor. Refer to Suppliers Documentation Volume F10, Section 5, Oil Cooling Unit: Maintenance and Mounting Instruction with Spare Parts List (04.882.00.000).

505.3Y.03 Oil blower motor bearing –Replace

Replace the oil blower motor bearings. Refer to Suppliers Documentation Volume F10, Section 5,.

505.5Y.01 Oil blower filter duct –Clean

- Remove and steam clean the oil blower filter duct. Remove all traces of dirt, dust and debris. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Oil Blowers.

505.5Y.02 Oil blower fan impeller–Clean

- Clean the oil cooler blower fan impeller. Steam clean the fan impeller, remove all traces of dirt, dust and debris. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Oil Blowers.

505.5Y.03 Oil blower filter panel –Clean

- Remove and clean the oil blower filter panel. Remove all dirt, debris and obstructions. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Oil Blowers.

505.5Y.04 Oil blower air cone –Clean

- Remove the air cone from the oil cooler blower unit and steam clean. Remove all traces of dirt, dust and debris. Refer to Suppliers Documentation Volume F10, Section 5, Oil Cooling Unit: Maintenance and Mounting Instruction with Spare Parts List (04.882.00.000).

505.5Y.05 Oil blower seal–Replace

- Replace the seal between the oil blower and the filter duct. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Oil Blowers.

- Replace the seal between the oil blower filter and the pantograph roof hatch. Refer to Volume D, *Maintenance and Repair Manual, Chapter 5.5, Oil Blowers.*

- Replace the seals on the oil cooler blower unit. Refer to Suppliers Documentation Volume F10, Section 5, Oil Cooling Unit: Maintenance and Mounting Instruction with Spare Parts List (04.882.00.000).

505.10Y.01 Oil blower seal–Replace

- *Replace the seal between the oil blower and machine room floor.* Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Oil Blowers.

- Replace the seals on the oil blower filter and ducting. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Oil Blowers.

- Replace the seal on the oil blower inspection door. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Oil Blowers.

506.3M.01 Machine room blower filter screen –Clean

- Remove the machine room blower filter screen, then steam clean it. Ensure that all dirt, dust and debris is removed. Inspect the screen for damage or defects and replace if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.6, Machine Room Blowers.

506.3M.02 Machine room blower filter louvre –Clean

- Remove the louvre from the machine room blower filter, then steam clean the louvre, including the drain holes. Remove all dirt, debris and obstructions from the louvres. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.6, Machine Room Blowers.

506.3M.03 Machine room blower filter –Clean

- With the mesh screen and louvre removed, clean the machine room blower filter using a vacuum cleaner. Remove all dust and debris from the filter; ensure none of the tubes are clogged. Clear any obstructions found. Refer to Suppliers Documentation Volume F10, Section 8, Manual for the Maintenance of AS18-FLOSEP Tube Systems (FLO-BS-ISH-01-00).

506.3M.04 Machine room blower seal –Inspect

- Visually inspect the condition of the seals on machine room blower. Replace seals if damaged, worn or deteriorated. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.6, Machine Room Blowers.

506.3M.05 Machine room blower motor –Check

- Check the machine room blower fan for abnormal noises or vibrations during operation. Replace the impeller or overhaul the fan motor if out of balance. Refer to Suppliers Documentation Volume F10, Section 6, HCBX-Fans: Instruction (V4556537).

506.3M.06 Machine room blower duct wear plate –Check

- Check the position of machine room blower duct wear plate. Adjust the position of the wear plate as necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.6, Machine Room Blowers.

506.6M.01 Machine room blower fasteners –Check

- Check the security of the machine room blower fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.6, Machine Room Blowers.

506.6M.02 Machine room blower filter fasteners –Check

- Check the security of the machine room blower filter panel and ducting fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.6, Machine Room Blowers.

506.1Y.01 Machine room blower –Clean

- Remove all dust and debris from inside the machine room blower casing and impeller using a vacuum cleaner and soft, non-metallic brush. Remove all dirt, dust and debris. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Machine Room Blowers.

506.1Y.02 Machine room blower filter panel –Clean

- Remove and clean the machine room blower filter panel. Remove all dirt, debris and obstructions. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Machine Room Blowers.

506.1Y.03 Machine room blower panel –Inspect

- Visually inspect the machine room blower filter panel flanges for cracks or damage. Replace the filter panel if defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.6, Machine Room Blowers.

506.18M.01 Machine room blower motor bearing –Lubricate

- Lubricate the drive and non-drive end bearings of the machine room blower motor. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.6, Machine Room Blowers.

506.3Y.01 Machine room blower motor end plates –Clean

- Remove and clean the machine room blower motor end plates. Repack the end plates with grease. Refer to Suppliers Documentation Volume F10, Section 5, Motor Type 200L55-RH2a: Parts List (S 321168).

506.3Y.02 Machine room blower motor –Overhaul

- Overhaul the machine room blower motor. Refer to Suppliers Documentation Volume F10, Section 6, Motor Type 132M-RFXHE2C: Assembly Drawing (2-77-67/52).

506.3Y.03 Machine room blower motor bearing –Replace

- Replace the drive and non-drive end bearings of the machine room blower motor. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.6, Machine Room Blowers & Suppliers Documentation Volume F10, Section 6, Motor Type 132M-RFXHE2C.

506.5Y.01 Machine room blower filter duct –Clean

- Remove and steam clean the machine room blower filter duct. Remove all traces of dirt, dust and debris. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Machine Room

Blowers.

506.5Y.02 Machine room blower fan impeller –Clean

- Remove the fan impeller from the machine room blower and steam clean. Remove all traces of dirt, dust and debris. Refer to Suppliers Documentation Volume F10, Section 6, HCBX-Fans: Instruction (V4556537).

506.5Y.03 Machine room blower seal –Replace

- Replace the machine room blower filter, plenum and duct seals. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Machine Room Blowers.

- Replace the seal between the machine room blower filter and the filter duct. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Machine Room Blowers.

- Replace the machine room blower filter duct seal and wear plate. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.6, Machine Room Blowers.

506.5Y.04 Machine room blower motor capacitor –Test

- Test the machine room blower motor start-up capacitors. Replace the capacitor if not within specification. Refer to Suppliers Documentation Volume F10, Section 6, MKV Capacitor B25834-C6476-K004.

506.10Y.01 Machine room blower seal –Replace

- Replace the seal on the machine room blower inspection door. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Machine Room Blowers.

- Replace the seals on the machine room blower filter and ducting. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Machine Room Blowers.

- Replace the seal between the machine room blower and machine room floor. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.5, Machine Room Blowers.

507.3M.01 Traction motor blower filter screen –Clean

- Remove the traction motor blower filter screen, then steam clean it. Ensure that all dirt, dust and debris is removed. Inspect the screen for damage or defects and replace if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.7, Traction Motor Blowers.

507.3M.02 Traction motor blower filter louvre –Clean

- Remove the louvre from the traction motor blower filter, then steam clean the louvre, including the drain holes Remove all dirt, debris and obstructions from the louvres. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.7, Traction Motor Blowers.

507.3M.03 Traction motor blower filter –Clean

- With the mesh screen and louvre removed, clean the traction motor blower filter using a vacuum cleaner. Remove all dust and debris from the filter; ensure none of the tubes are clogged. Clear any obstructions found. Refer to Suppliers Documentation Volume F10, Section 8, Manual for the Maintenance of AS18-FLOSEP Tube Systems (FLO-BS-ISH-01-00).

507.3M.04 Traction motor blower filter seal –Inspect

- Visually inspect the seal between the traction motor blower filter and the filter duct for wear or damage. Replace the seal if damaged. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.7, Traction Motor Blowers.

507.3M.05 Traction motor blower seal –Check

- Check the condition of the seals on traction motor blower. Replace seals if damaged, worn or deteriorated. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.7, Traction Motor Blowers.

507.3M.06 Traction motor blower filter duct seal and wear plate –Inspect

- Visually inspect the traction motor blower filter duct seal and wear plate for wear, damage or deterioration. Replace the plate or seal if worn, damaged or deteriorated. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.7, Traction Motor Blowers.

507.3M.07 Traction motor blower motor–Check

- Check the traction motor blower fan for abnormal noises or vibrations during operation. Remove and clean the fan impeller if necessary. Replace the impeller or overhaul the fan motor if the imbalance exceeds specification. Refer to Suppliers Documentation Volume F10, Section 7, HCBX-Fans: Instruction (V4556537).

507.6M.01 Traction motor blower fasteners –Check

- Check the security of the traction motor blower fasteners. Tighten the fasteners if necessary. Refer to Suppliers Documentation Volume F10, Section 7, HCBX-Fans: Instruction (V4556537).

507.6M.02 Traction motor blower filter fasteners –Check

- Check the security of the traction motor blower filter panel and ducting fasteners. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.7, Traction Motor Blowers.

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507.1Y.01 Traction motor blower –Clean

- Remove all dust and debris from inside the traction motor blower casing and impeller using a vacuum cleaner and soft, non-metallic brush. Remove all dirt, dust and debris. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.7, Traction Motor Blowers.

507.1Y.02 Traction motor blower filter –Clean

- Remove and clean the traction motor blower filter panel. Remove all dirt, debris and obstructions. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.7, Traction Motor Blowers.

507.1Y.03 Traction motor blower filter –Inspect

- Visually inspect the traction motor blower filter panel flanges for cracks or damage. Replace the filter panel if defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.7, Traction Motor Blowers.

507.18M.01 Traction motor blower motor bearing –Lubricate

Lubricate the drive and non-drive end bearings of the traction motor blower motor. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.7, Traction Motor Blowers.

507.3Y.01 Traction motor blower motor end plates –clean

- Remove and clean the end plates from the traction motor blower motor. Repack the end plates with grease. Refer to Suppliers Documentation Volume F10, Section 5, Motor Type 200L55-RH2a: Parts List (S 321168).

507.3Y.02 Traction motor blower motor –Overhaul

- Overhaul the traction motor blower motor. Refer to Suppliers Documentation Volume F10, Section 5, Motor Type 200L55-RH2a: Assembly Drawing (1-77-67/67).

507.3Y.03 Traction motor blower motor bearing –Replace

Replace the drive and non-drive end bearings of the traction motor blower motor. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.7, Traction Motor Blowers & Suppliers Documentation Volume F10, Section

507.5Y.01 Traction motor blower filter duct –Clean

- Remove and steam clean the traction motor blower filter duct. Remove all traces of dirt, dust and debris. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.7, Traction Motor Blowers.

507.5Y.02 Traction motor blower duct –Clean

- Clean the duct from the traction motor blower to the bellows in the machine room floor. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.7, Traction Motor Blowers.

507.5Y.03 Traction motor blower impeller –Clean

- Remove the fan impeller from the traction motor blower and steam clean. Remove all traces of dirt, dust and debris. Refer to Suppliers Documentation Volume F10, Section 7, HCBX-Fans: Instruction (V4556537).

507.5Y.04 Traction motor blower seals –Replace

- Replace the traction motor blower filter, plenum, wear plate and duct seals. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.7, Traction Motor Blowers.

507.10Y.01 Traction motor blower seals –Replace

- Replace the seals on the traction motor blower filter and ducting. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.7, Traction Motor Blowers.

- Replace the seal between the traction motor blower and machine room floor. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.7, Traction Motor Blowers.

- Replace the seals on the traction motor blower inspection covers. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.7, Traction Motor Blowers.

508.3M.01 Machine room blower scavenge fan –Check

- Check the machine room blower scavenge fan for abnormal noises or vibrations during operation. Measure the fan imbalance. Remove and clean the fan impeller if necessary. Replace the impeller or overhaul the fan if imbalance exceeds specification. Refer to Suppliers Documentation Volume F10, Section 8, Motor Type 90L24-RE2c: Assembly Drawing (2-77-67/61).

508.3M.02 Machine room blower scavenge flexible duct –Inspect

- Visually inspect the flexible duct between the machine room blower scavenge and filter. Replace the duct if damaged, cracked or deteriorated. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.8, Scavenge Blowers/Filters.

508.3M.03 Machine room blower scavenge equaliser hoses –Inspect

- Visually inspect the equaliser hoses between the machine room blower scavenge and the filter. Clear any obstructions. Replace the hoses if damaged, cracked or deteriorated. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.8, Scavenge Blowers/Filters.

508.3M.04 Machine room blower scavenge seal –Inspect

- Visually inspect the condition of the seals on the machine room blower scavenge. Replace seals if damaged, worn or deteriorated. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.8, Scavenge Blowers/Filters.

508.3M.05 Traction motor & oil blower scavenge fan –Check

- Check the traction motor & oil blower scavenge fan for abnormal noises or vibrations during operation. Measure the fan imbalance. Remove and clean the fan impeller if necessary. Replace the impeller or overhaul the fan motor if the imbalance exceeds specification. Refer to Suppliers Documentation Volume F10, Section 8, Motor Type 90L24-RE2c: Assembly Drawing (2-77-67/61).

508.3M.06 Traction motor & oil blower scavenge flexible duct –Inspect

- Visually inspect the condition of the flexible duct between the traction motor & oil blower scavenge and filter. Replace the duct if damaged, torn, cracked or deteriorated. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.8, Scavenge Blowers/Filters.

508.3M.07 Traction motor & oil blower scavenge equaliser hoses –Inspect

- Visually inspect the condition of the equaliser hoses between the traction motor & oil blower scavenge and the filter. Replace the hoses if damaged, cracked or deteriorating. Clear any obstructions. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.8, Scavenge Blowers/Filters.

508.3M.08 Traction motor & oil blower scavenge seal –Inspect

- Visually inspect the condition of the seal at the oil blower scavenge duct slip joint. Replace the seal if damaged, cracked or deteriorating. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.8, Scavenge Blowers/Filters.

- Visually inspect the condition of the seals on the traction motor & oil blower scavenge. Replace seals if damaged, worn or deteriorated. Refer to Volume D, Maintenance and Repair Manual,

Chapter 5.8, Scavenge Blowers/Filters.

508.3M.09 Oil blower Scavenge duct slip joint –Check

- Check the slip joint between the scavenge and oil blower duct. Adjust the joint if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.8, Scavenge Blowers/Filters.

508.6M.01 Machine room blower scavenge fasteners –Check

- Check the security of the fasteners on the machine room blower scavenge. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.8, Scavenge Blowers/Filters.

508.6M.02 Traction motor & oil blower scavenge fasteners –Check

- Check the security of the fasteners on the traction motor & oil blower scavenge. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.8, Scavenge Blowers/Filters.

508.3Y.01 Traction motor & oil blower scavenge motor –Overhaul

- Overhaul the traction motor & oil blower scavenge motor. Refer to Suppliers Documentation Volume F10, Section 8, Motor Type 100L28-R2c: Assembly Drawing (2-77-67/84).

508.3Y.02 Traction motor & oil blower scavenge motor bearing –Replace

- Replace the drive and non-drive end bearings of the traction motor & oil blower scavenge motor. Refer to Suppliers Documentation Volume F10, Section 8, Motor Type 90L28-R2c: Assembly Drawing (2-77-67/84).

508.3Y.03 Machine room blower scavenge motor –Overhaul

- Overhaul the machine room blower scavenge motor. Refer to Suppliers Documentation Volume F10, Section 8, Motor Type 90L24-RE2c: Assembly Drawing (2-77-67/61).

508.3Y.04 Machine room blower scavenge motor bearing –Replace

- Replace the drive and non-drive end bearings of the machine room blower scavenge motor. Refer to Suppliers Documentation Volume F10, Section 8, Motor Type 90L24-RE2c: Assembly Drawing (2-77-67/61).

508.5Y.01 Machine room blower scavenge duct –Clean

- Clean the machine room blower scavenge ducting. Remove all dirt and dust from inside the duct. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.8, Scavenge Blowers/Filters.

508.5Y.02 Machine room blower scavenge –Clean

- Remove the machine room blower scavenge fan impeller, inlet cone and housing. Steam clean the parts, removing all dirt, dust and debris. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.8, Scavenge Blowers/Filters.

508.5Y.03 Machine room blower scavenge fan impeller –Inspect

- Visually inspect the machine room blower scavenge fan impeller for erosion, corrosion, damage

or cracks. Replace any worn or damaged fan impellers. Refer to Suppliers Documentation Volume F10, Section 8, Motor Type 90L24-RE2c: Dimensional Drawing (4-77-67/64).

508.5Y.04 Machine room blower scavenge flexible duct –Replace

- Replace the flexible duct between the machine room blower scavenge and filter. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.8, Scavenge Blowers/Filters.

508.5Y.05 Machine room blower scavenge equaliser hose –Replace

- Replace the equaliser hoses between the machine room blower scavenge and the filter. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.8, Scavenge Blowers/Filters.

508.5Y.06 Traction motor & oil blower scavenge duct –Clean

- Clean the traction motor & oil blower scavenge ducting. Remove all dirt and dust from inside the duct. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.8, Scavenge Blowers/Filters.

508.5Y.07 Traction motor & oil blower scavenge –Clean

- Remove the traction motor & oil blower scavenge fan impeller, inlet cone and housing. Steam clean the parts, removing all dirt, dust and debris. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.8, Scavenge Blowers/Filters.

508.5Y.08 Traction motor & oil blower scavenge fan impeller –Inspect

- Visually inspect the traction motor & oil blower scavenge fan impeller for erosion, corrosion, damage or cracks. Replace any worn or damaged fan impellers. Refer to Suppliers Documentation Volume F10, Section 8, Motor Type 100L28-R2c: Dimensional Drawing (4-77-67/83).

508.5Y.09 Oil blower filter scavenge hose –Replace

- Replace the hoses at the oil blower filter scavenge boxes. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.8, Scavenge Blowers/Filters.

508.5Y.10 Traction motor & oil blower scavenge equaliser hose –Replace

- Replace the equaliser hoses between the traction motor & oil blower scavenge and the filter. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.8, Scavenge Blowers/Filters.

508.5Y.11 Oil blower scavenge duct slip joint seal –Replace

- Replace the seal at the oil blower scavenge duct slip joint. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.8, Scavenge Blowers/Filters.

508.5Y.12 Machine room blower scavenge motor start-up capacitor –Test

- Test the machine room blower scavenge motor start-up capacitor. Replace the capacitor if not within specification. Refer to Suppliers Documentation Volume F10, Section 8, MKV Capacitor B25834-C6226-K004.

508.5Y.13 Traction motor & oil blower scavenge motor start-up capacitor –Test

- Test the traction motor and oil blower scavenge motor start-up capacitor. Replace the capacitor

if not within specification. Refer to Suppliers Documentation Volume F10, Section 8, Capacitor B25834-C6226-K4: Data Sheet (B25834/Page236).

508.10Y.01 Machine room blower scavenge duct seal and gasket –Replace

- Replace the seals and gaskets on the machine room blower scavenge ducting. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.8, Scavenge Blowers/Filters.

508.10Y.02 Traction motor & oil blower scavenge duct seal and gasket –Replace

- Replace the seals and gaskets on the traction motor & oil blower scavenge ducting. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.8, Scavenge Blowers/Filters.

509.6M.01 Power supply 415/110V –Inspect

- Visually inspect the electrical connections and insulators on the auxiliary transformer for cracks, chips, evidence of impact damage. Clean the connectors, or replace any damaged, chipped or cracked insulators. Refer to Volume D, Maintenance and Repair Manual, Chapter 5.9, Power Supply 415/110V.

6.6 Air Supply and Pneumatic System

601.1W.01 Main compressor –Inspect

- Visually inspect the main compressor for damage. Rectify any faults found or replace the compressor if necessary. Refer to Suppliers Documentation Volume F13, Section 8, Metcalfe Compressor Type 2A320D Maintenance Instructions (A666).

601.1W.02 Main compressor oil –Check

- Check the oil level in the compressor. Top-up with the specified lubricant as required. Do not over fill the compressor. Refer to Suppliers Documentation Volume F13, Section 8, Metcalfe Compressor Type 2A320D Maintenance Instructions (A666). Section 7.4

601.1W.03 Main compressor oil –Inspect

- Visually inspect the compressor for oil leakage. Rectify any faults found or replace the compressor if necessary. Refer to Suppliers Documentation Volume F13, Section 8, Metcalfe Compressor Type 2A320D Maintenance Instructions (A666). Section 7.2

601.1M.01 Main compressor motor vent –Clean

- Clean the air cooling vents on the main compressor motor. Remove all dirt, debris and obstructions. Take care not to allow dirt to enter the bearings during this procedure. Refer to Suppliers Documentation Volume F13, Section 9, Metcalfe Compressor motor Details Maintenance Instructions (A666-A). Section 4.2

601.1M.02 Main compressor motor oil –Check

- Check the main compressor oil pressure. Adjust the oil pressure if not within specification. Refer to Suppliers Documentation Volume F13, Section 8, Metcalfe Compressor Type 2A320D Maintenance Instructions (A666). Section 7.5

601.1M.03 Main compressor–Check

- Check the compressor for unusual noises during operation. Rectify any faults found, or replace the compressor if necessary. Refer to Suppliers Documentation Volume F13, Section 8, Metcalfe Compressor Type 2A320D Maintenance Instructions (A666). Section 7.3

601.3M.01 Main compressor resilient mounting –Inspect

- Visually inspect the main compressor resilient mountings. Replace the mountings if worn, damaged or deteriorated. Refer to Suppliers Documentation Volume F13, Section 8, Metcalfe Compressor Type 2A320D Maintenance Instructions (A666).

601.3M.02 Main compressor delivery hose –Inspect

- Inspect the condition of the delivery hose from the main compressor. Replace the hose if damaged or deteriorating. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.1, Main Compressor.

601.3M.03 Main compressor air flow path –Clean

- Clean the air cooling flow path on the main compressor. Refer to Suppliers Documentation Volume F13, Section 8, Metcalfe Compressor Type 2A320D Maintenance Instructions (A666). Section 7.7

601.3M.04 Main compressor air intake filter –Clean

- Clean the main compressor air intake filter. Refer to Suppliers Documentation Volume F13, Section 8, Metcalfe Compressor Type 2A320D Maintenance Instructions (A666). Section 7.6

601.3M.05 Main compressor crankcase breather –Clean

- Clean the main compressor crankcase breather. Refer to Suppliers Documentation Volume F13, Section 8, Metcalfe Compressor Type 2A320D Maintenance Instructions (A666). Section 7.10

601.3M.06 Main compressor oil –Change

- Change the lubricating oil in the main compressor, if using Indian Oil Company oil type SS68. Refer to Suppliers Documentation Volume F13, Section 8, Metcalfe Compressor Type 2A320D Maintenance Instructions (A666). Section 7.11

601.3M.07 Main compressor –Measure

- Measure the time taken for the main compressor to fill the main reservoirs from empty. Replace the compressor, or rectify any leakage, as necessary. Refer to Suppliers Documentation Volume F13, Section 8, Metcalfe Compressor Type 2A320D Maintenance Instructions (A666). Section 7.9

601.3M.08 Main compressor fasteners & Mounting–Check

- Check the security of the main compressor fasteners and mountings. Tighten the fasteners if necessary. Refer to Suppliers Documentation Volume F13, Section 8, Metcalfe Compressor Type 2A320D Maintenance Instructions (A666). Section 7.8

601.6M.01 Drip cup filter –Clean

- Clean the drip cup filter. Refer to Suppliers Documentation Volume F13, Section 12, Drip Cup with Auto-Drain Valve Maintenance Instructions (A674).

601.1Y.01 Main compressor –Inspect

- Visually inspect the compressor motor, cooling fan housing and oil sump for damage. Rectify any faults found or replace the compressor if damaged. Refer to Suppliers Documentation Volume F13, Section 8, Metcalfe Compressor Type 2A320D Maintenance Instructions (A666).

601.1Y.02 Main compressor primary oil filter –Clean

- Clean the primary oil filter in the main compressor. Refer to Suppliers Documentation Volume F13, Section 8, Metcalfe Compressor Type 2A320D Maintenance Instructions (A666). Section 7.12

601.1Y.03 Main compressor secondary oil filter –Change

- Change the main compressor secondary oil filter. Refer to Suppliers Documentation Volume

F13, Section 8, Metcalfe Compressor Type 2A320D Maintenance Instructions (A666). Section 7.13

601.1Y.04 Main compressor concentric valves –Clean

- Clean the main compressor concentric valves. Refer to Suppliers Documentation Volume F13, Section 8, Metcalfe Compressor Type 2A320D Maintenance Instructions (A666). Section 7.14

601.1Y.05 Main compressor oil –Change

- Change the lubricating oil in the main compressor, if using Shell Corena P100 oil. Refer to Suppliers Documentation Volume F13, Section 8, Metcalfe Compressor Type 2A320D Maintenance Instructions (A666). Section 7.11

601.1Y.06 Low Pressure automatic drain valves –Clean

- Clean the low pressure automatic drain valves. Refer to Suppliers Documentation Volume F11, Section 12, Metcalf Low Pressure Automatic Drain Valve Maintenance Instructions (A165).

601.18M.01 Main compressor motor bearings –Lubricate

- Lubricate the main compressor motor bearings with the specified lubricant. Refer to Suppliers Documentation Volume F13, Section 9, Metcalfe Compressor motor Details Maintenance Instructions (A666-A). Section 4.1

601.3Y.01 Main compressor –Overhaul

- Overhaul the main compressor. Refer to Suppliers Documentation Volume F13, Section 8, Metcalfe Compressor Type 2A320D Maintenance Instructions (A666). Section 8.0

601.3Y.02 Main compressor motor –Overhaul

- Overhaul the main compressor drive motor. Refer to Suppliers Documentation Volume F13, Section 9, Metcalfe Compressor motor Details Maintenance Instructions (A666-A).

601.3Y.03 Main compressor motor bearing –Replace

Replace the main compressor drive motor bearing. Refer to Suppliers Documentation Volume F13, Section 9, Metcalfe Compressor motor Details Maintenance Instructions (A666-A).

601.4Y.01 Pressure switches –Test

- Test the pressure switches. The pressure switches should be tested as part of the brake unit. Replace any faulty or defective switches. Refer to Suppliers Documentation Volume F12, Section 16, Metcalfe Pressure Switch Maintenance Instructions (A576).

601.4Y.02 Drip cup and auto drain valve –Overhaul

- Overhaul the drip cup and auto drain valve. Refer to Suppliers Documentation Volume F13, Section 12, Drip Cup with Auto-Drain Valve Maintenance Instructions (A674).

601.4Y.03 Exhaust valves –Overhaul

- Overhaul and test the exhaust valves. Refer to Suppliers Documentation Volume F11, Section 11, Metcalf Exhaust Valve Maintenance and Overhaul Instructions (AM117).

601.4Y.04 Low pressure automatic drain valves –Overhaul

- Overhaul the low pressure automatic drain valves. Refer to Suppliers Documentation Volume F11, Section 12, Metcalf Low Pressure Automatic Drain Valve Maintenance Instructions (A165).

601.5Y.01 Main compressor mounting –Inspect

- Visually inspect the compressor mounting points on the locomotive underframe for cracks, damage or other defects. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.1, Main Compressor.

601.5Y.02 Main compressor copper gasket –Replace

- Replace the copper gasket at the main compressor outlet. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.1, Main Compressor.

601.5Y.03 Main compressor delivery hose –Replace

- Replace the delivery hose from the main compressor. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.1, Main Compressor.

601.6Y.01 Main compressor resilient mounting –Replace

- Replace the main compressor resilient mountings. Refer to Suppliers Documentation Volume F13, Section 8, Metcalfe Compressor Type 2A320D Maintenance Instructions (A666). Section 15

602.1W.01 Air drier –Inspect

- Visually inspect the air drier for damage. Rectify any faults found or replace the air drier if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.2, Air Drier.

602.1M.01 Air drier –Check

- With the main compressor operating, check the operation of the air drier. Rectify any faults found. Refer to Suppliers Documentation Volume F12, Section 10, Metcalfe/Salem Twin Tower Air Dray and Final Filter Maintenance Instructions (A516).

602.3M.01 Air drier –Check

- Check the pneumatic pipes for damage or leakage. Rectify any faults or leakage. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.2, Air Drier.

602.3M.02 Air drier –Inspect

- Visually inspect the air drier isolating cocks for damage, dirt, and wear. Replace the cocks if damaged or worn. Thoroughly clean serviceable cocks. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.2, Air Drier.

602.1Y.01 Air drier –Clean

- Steam clean the cooling fins on the air drier. Remove all traces of dirt and debris. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.2, Air Drier.

602.1Y.02 Air drier electrical conduit –Inspect

- Visually inspect the electrical conduit between the underframe and air drier for damage, wear or deterioration. Replace the conduit if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.2, Air Drier.

602.1Y.03 Air drier pre-coalescer filter –Inspect

- Visually inspect the pre-coalescer filter in the twin tower air drier final filter element. Check the regenerating orifice operation. Replace the twin tower air drier pre-coalescer element if dirty, obstructed or damaged. Refer to Suppliers Documentation Volume F12, Section 6, Breakaway Protection Valve Maintenance Instructions (A425).

602.1Y.04 Air drier isolating cocks –Check

- Test the operation and check the condition of the air drier isolating cocks. Replace the cocks if defective. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.2, Air Drier.

602.2Y.01 Air drier desiccant –Inspect

- Visually inspect the desiccant in the twin tower air drier. Replace desiccant if contaminated with oil or water. Refer to Suppliers Documentation Volume F12, Section 10, Metcalfe/Salem Twin Tower Air Dray and Final Filter Maintenance Instructions (A516).

602.4Y.01 Air drier –Overhaul

- Overhaul the twin tower air drier. Refer to Suppliers Documentation Volume F12, Section 10, Metcalfe/Salem Twin Tower Air Dray and Final Filter Maintenance Instructions (A516).

602.4Y.02 Air drier isolating cocks –Replace

- Replace the air drier isolating cocks. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.2, Air Drier.

602.5Y.01 Air drier electrical conduit –Replace

- Replace the electrical conduit between the underframe and air drier. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.2, Air Drier.

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603.1W.01 Reservoirs –drain

- Operate the drain cocks on the reservoirs. Allow all water and oil to drain from the reservoirs, then close the drain cock. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.3, Reservoirs.

603.3M.01 Reservoirs pneumatic pipes –Check

- Check the pneumatic pipes for damage or leakage. Rectify any faults or leakage. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.3, Reservoirs.

603.3M.02 Reservoirs Automatic drain valves –Inspect

- Visually inspect the automatic drain valves on the reservoirs. Replace the valves if damaged, missing or defective. Refer to Suppliers Documentation Volume F13, Section 12, Drip Cup with Auto-Drain Valve Maintenance Instructions (A674).

603.3M.03 Main Reservoir isolating cocks –Inspect

- Visually inspect the main reservoir isolating cocks for damage, dirt, and wear. Replace the cocks if damaged or worn. Thoroughly clean serviceable cocks. Refer to Suppliers Documentation Volume F11, Section 7, Metcalfe Isolating and Drain Cocks Operating and Maintenance Instructions. (A34).

603.3M.04 Main Reservoir drain cocks –Inspect

- Visually inspect the main reservoir drain cocks for damage, dirt, and wear. Replace the cocks if damaged, worn or missing. Thoroughly clean serviceable cocks. Refer to Suppliers Documentation Volume F11, Section 7, Metcalfe Isolating and Drain Cocks Operating and Maintenance Instructions. (A34).

603.3M.05 Reservoirs safety chains –Check

- Check the condition and security of the reservoir safety chains. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.3, Reservoirs.

603.6M.01 Main and Auxiliary Reservoir –Inspect

- Visually inspect the main and auxiliary reservoirs for damage. Rectify any faults found. Refer to Suppliers Documentation Volume F14, Section 11, Non-alloy Steel Reservoirs Maintenance Instructions (A1114).

603.6M.02 Air line sieve filter –Clean

- Clean the filter in the air line sieve. Refer to Suppliers Documentation Volume F12, Section 2, Metcalf Air Line Sieve Maintenance Instructions (A273).

603.6M.03 Automatic drain valves –Test

- Test the automatic drain valves. Replace if faulty or defective. Refer to Suppliers Documentation Volume F11, Section 10, Metcalfe Automatic Drain Valve Maintenance Instructions (A70).

603.1Y.01 Compressor check valves –Test

- Test the compressor check valves. Replace any defective valves. Refer to Suppliers Documentation Volume F12, Section 17, Metcalfe Compressor Check Valves Maintenance Instructions (A618).

603.1Y.02 Main Reservoir isolating cocks –Test

- Test the operation and check the condition of the main reservoir isolating cocks. Replace the cocks if defective. Refer to Suppliers Documentation Volume F11, Section 7, Metcalfe Isolating and Drain Cocks Operating and Maintenance Instructions. (A34).

603.1Y.03 Main Reservoir drain cocks –Test

- Test the operation and check the condition of the main reservoir drain cocks. Replace the cocks If defective. Refer to Suppliers Documentation Volume F11, Section 7, Metcalfe Isolating and Drain Cocks Operating and Maintenance Instructions. (A34).

603.4Y.01 Main Reservoir –Overhaul

- Overhaul the main reservoirs. Refer to Suppliers Documentation Volume F14, Section 11, Non-alloy Steel Reservoirs Maintenance Instructions (A1114).

603.4Y.02 Main Reservoir automatic drain valve –Overhaul

- Overhaul the automatic drain valve as part of the main reservoirs overhaul. Refer to Suppliers Documentation Volume F11, Section 10, Metcalfe Automatic Drain Valve Maintenance Instructions (A70).

603.4Y.03 Main Reservoir drain cock –Replace

- Replace the main reservoir drain cocks as part of the main reservoirs overhaul. Refer to Suppliers Documentation Volume F11, Section 7, Metcalfe Isolating and Drain Cocks Operating and Maintenance Instructions. (A34).

603.4Y.04 Main Reservoir isolating cocks –Overhaul

- Overhaul the main reservoir isolating cocks as part of the main reservoirs overhaul. Refer to Suppliers Documentation Volume F11, Section 7, Metcalfe Isolating and Drain Cocks Operating and Maintenance Instructions. (A34).

603.4Y.05 Main Reservoir safety valves –Overhaul

- Overhaul and test the safety valves as part of the main reservoirs overhaul. Refer to Suppliers Documentation Volume F14, Section 3, Metcalfe Safety Valves Maintenance Instructions (A1067).

603.4Y.06 Compressor check valves –Overhaul

- Overhaul compressor check valves as part of the main reservoirs overhaul. Refer to Suppliers Documentation Volume F12, Section 17, Metcalfe Compressor Check Valves Maintenance Instructions (A618).

603.4Y.07 Control reservoir retaining valve –Overhaul

- Overhaul the control reservoir retaining valve as part of the main reservoirs overhaul. Refer to Suppliers Documentation Volume F14, Section 7, Control Reservoir Retaining Valve Maintenance Instructions (A1099).

603.4Y.08 Air line sieve filter –Replace

- Replace the filter element in the air line sieve as part of the main reservoirs overhaul. Refer to Suppliers Documentation Volume F12, Section 2, Metcalf Air Line Sieve Maintenance Instructions (A273).

604.3M.01 Auxiliary compressor oil –Check

- Check the auxiliary air compressor oil level. Top-up with the specified lubricant if required. Refer to Suppliers Documentation Volume F12, Section 5, Auxiliary Air Compressor Maintenance Instructions (A364).

604.6M.01 Auxiliary compressor air intake filters –Clean

- Clean the auxiliary air compressor air intake filters. Remove all dust, dirt and other obstructions. Refer to Suppliers Documentation Volume F12, Section 5, Auxiliary Air Compressor Maintenance Instructions (A364).

604.6M.02 Auxiliary compressor fasteners –Check

- Check the security of the auxiliary compressor fasteners. Tighten the fasteners as required. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.4, Auxiliary Compressor.

604.1Y.01 Auxiliary compressor lubricant –Change

- Change the auxiliary compressor lubricant. Refill with the specified lubricant. Refer to Suppliers Documentation Volume F12, Section 5, Auxiliary Air Compressor Maintenance Instructions (A364).

604.1Y.02 Auxiliary compressor motor –Check

- Check the auxiliary air compressor drive motor brushes. Replace the brushes if worn or damaged. Refer to Suppliers Documentation Volume F12, Section 5, Auxiliary Air Compressor Maintenance Instructions (A364).

604.1Y.03 Auxiliary compressor delivery hose –Inspect

- Visually inspect the delivery hose between the auxiliary compressor and brake frame for damage or deterioration. Replace the hose if damaged or deteriorated. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.4, Auxiliary Compressor.

604.4Y.01 Auxiliary compressor –Overhaul

- Overhaul the auxiliary air compressor. Refer to Suppliers Documentation Volume F12, Section 5, Auxiliary Air Compressor Maintenance Instructions (A364).

604.5Y.01 Auxiliary compressor air intake filters –Replace

- Replace the auxiliary air compressor air intake filters. Refer to Suppliers Documentation Volume F12, Section 5, Auxiliary Air Compressor Maintenance Instructions (A364).

604.5Y.02 Auxiliary compressor delivery hose –Replace

- Replace the delivery hose between the auxiliary compressor and brake frame. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.4, Auxiliary Compressor.

605.1W.01 Centrifugal air strainer filter bowl –Drain

- Drain the centrifugal air strainer filter bowl. Refer to Suppliers Documentation Volume F13, Section 3, Manifold Mounted Centrifugal Air Strainer Maintenance Instructions (A648).

605.1M.01 Centrifugal air strainer –Clean

- Clean out the centrifugal air strainer. Refer to Suppliers Documentation Volume F13, Section 3, Manifold Mounted Centrifugal Air Strainer Maintenance Instructions (A648).

605.3M.01 Brake frame pneumatic system –Check

- Check the pneumatic system for leaks or other defects. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.5, Brake Frame.

605.6M.01 Air line sieve filter –Clean

- Clean the air line sieve filter elements. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.1Y.01 Automatic brake filter –Clean

- Clean the filter in the automatic brake manifold assembly. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.1Y.02 Check valve strainer –Clean

- Clean the check valve strainer. Refer to Suppliers Documentation Volume F, Section , .

605.1Y.03 Emergency exhaust valve –Test

- Test the operation of the emergency exhaust valve. The valve performance should be checked as part of the brake equipment module. Replace the valve if faulty or defective. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.1Y.04 EP unloader valve –Test

- Perform an operational test on the EP unloader valve. The valve performance should be checked as part of the brake equipment module. Replace the valve if faulty or defective. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.1Y.05 EP valve –Test

- Test the EP valves. Replace the valve if faulty or defective. Refer to Suppliers Documentation Volume F12, Section 4, Metcalfe EP Valves Type AB686 Maintenance Instructions (A328).

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605.1Y.06 Latched isolating cock –Test

- Test the operation of the latched isolating cocks. The latched isolating cocks should be checked as part of the brake equipment module. Replace the cocks if faulty or defective. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.1Y.07 Pressure switches –Test

- Test all the pressure switches. The pressure switches should be tested as part of the brake unit. Replace the switches if faulty or defective. Check it's setting. Refer to Suppliers Documentation Volume F12, Section 16, Metcalfe Pressure Switch Maintenance Instructions (A576).

605.1Y.08 Pantograph safety valve –Test

- Test the pantograph safety valve. Replace the valve if faulty or defective. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions

(M366-BEM).

605.1Y.09 Safety valves –Clean

- Clean the safety valves. Refer to Suppliers Documentation Volume F14, Section 3, Metcalfe Safety Valves Maintenance Instructions (A1067).

605.1Y.10 Venturi/Solenoid valve –Test

- Test the operation of the venturi/solenoid valve assembly. The valve performance should be checked as part of the brake equipment module. Replace the valve if faulty or defective. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.2Y.01 Breakaway protection valve –Test

- Test the breakaway protection valves. The breakaway protection valves should be tested as part of the brake unit. Replace the valve if faulty or defective. Refer to Suppliers Documentation Volume F12, Section 6, Breakaway Protection Valve Maintenance Instructions (A425).

605.2Y.02 Duplex check valve –Test

- Test the duplex check valve. Replace the valves if defective. Refer to Suppliers Documentation Volume F14, Section 5, Duplex Check Valve Maintenance Instructions (A1080).

605.2Y.03 Air relay valve–Test

- Test the air relay valves. The air relay valve should be tested as part of the brake unit. (1 for direct air brake, 1 for automatic brake) Replace the valve if faulty or defective. Refer to Suppliers Documentation Volume F12, Section 1, Type D2 Air Relay Valve Maintenance Instructions (A168).

605.2Y.04 Latched solenoid valve –Test

- Test the latched solenoid valve. The latched solenoid valve should be tested as part of the brake unit. Replace the valve if faulty or defective. Refer to Suppliers Documentation Volume F12, Section 8, Latched Solenoid Valve Maintenance Instructions (A452).

605.2Y.05 Pressure control valve –Test

- Test the operation of the pressure control valve. The valve performance should be checked as part of the brake equipment module. Replace the valve if faulty or defective. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.2Y.06 Sanding equipment –Test

- Test the operation of the sanding equipment manifold assembly. The valve performance should be checked as part of the brake equipment module. Replace the manifold or other components if faulty or defective. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.2Y.07 Safety valve –Test

- Test the safety valves. Replace the valves if defective. Refer to Suppliers Documentation

Volume F14, Section 3, Metcalfe Safety Valves Maintenance Instructions (A1067).

605.2Y.08 Brake pipe control unit –Test

- Test the brake pipe control unit. The air relay valve should be tested as part if the brake unit. Replace the control unit of faulty or defective. Refer to Suppliers Documentation Volume F13, Section 4, The Brake Pipe Control Unit for the E70 Brake Pipe Control System (A658).

605.2Y.09 EBC/5 Blending unit –Test

- Test the operation and performance of the EBC/5 blending unit. Replace the unit if faulty or defective. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.4Y.01 Brake equipment module –Overhaul

- Overhaul the brake equipment module. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.5, Brake Frame.

605.4Y.02 Air line sieve filter –Replace

- Replace filter elements in the air line sieve. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.4Y.03 Air relay valve –Overhaul

- Overhaul the air relay valve as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F12, Section 1, Type D2 Air Relay Valve Overhaul Instructions (AM168).

605.4Y.04 Automatic brake manifold –Overhaul

- Overhaul the automatic brake manifold assembly and its components as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.4Y.05 Brake control unit –Overhaul

- Overhaul the brake control unit as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F13, Section 5, E70 Brake Control Unit Overhaul Instructions (AM658).

605.4Y.06 Breakaway protection valve –Overhaul

- Overhaul the breakaway protection valve as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.4Y.07 Centrifugal strainer –Overhaul

- Clean and overhaul the centrifugal strainer as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.4Y.08 Centrifugal air strainer –Overhaul

- Overhaul the centrifugal air strainer as part of the brake equipment module overhaul. Refer to

Suppliers Documentation Volume F13, Section 3, Manifold Mounted Centrifugal Air Strainer Maintenance Instructions (A648).

605.4Y.09 Check valve and strainer –Overhaul

- Overhaul the check valve and strainer as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F14, Section 6, Check Valve with Strainer Maintenance Instructions (A1094).

- Overhaul the check valves as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F14, Section 9, Check Valve Maintenance Instructions (A1106).

605.4Y.10 Direct brake manifold –Overhaul

- Overhaul the direct brake manifold and its related equipment as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.4Y.11 Distributor valve –Overhaul

- Overhaul the distributor valve as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F13, Section 14, Distributor Valve Type DMD3 (A677).

605.4Y.12 Double check valve –Overhaul

- Overhaul the manifold mounted double check valves as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F, Section.

605.4Y.13 *Duplex check valve –Overhaul*

- Overhaul the duplex check valve as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F14, Section 5, Duplex Check Valve Maintenance Instructions (A1080).

605.4Y.14 E70 Brake control unit –Overhaul

- Overhaul the E70 brake control unit and its related components as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.4Y.15 EBC/5 Blending unit–Overhaul

- Overhaul the EBC/5 blending unit as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F11, Section 2, Miscellaneous Components Maintenance Instructions (M366-MC).

605.4Y.16 Brake control system–Test

- Test the electrical control system as part of the brake equipment module overhaul. Replace any defective components or rectify any faults found. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.4Y.17 Brake control system–Clean

- Clean the electronics enclosure using a vacuum cleaner Remove all dirt and dust. Refer to

Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.4Y.18 Exhaust valve –Overhaul

- Overhaul and test the exhaust valves as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F11, Section 11, Metcalf Exhaust Valve Maintenance and Overhaul Instructions (AM117).

605.4Y.19 Relay valve –Overhaul

- Overhaul the relay valves as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F13, Section 11, Metcalfe Relay Valve (A670).

605.4Y.20 EP relay valve –Overhaul

- Overhaul the EP relay valve as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F13, Section 10, Metcalfe EP Relay Valve (A669).

605.4Y.21 EP unloader valve –Overhaul

- Overhaul the EP unloader valve as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.4Y.22 EP valve –Overhaul

- Overhaul the EP valves as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F12, Section 4, Metcalfe EP Valves Type AB686 Maintenance Instructions (A328).

605.4Y.23 Auxiliary equipment and flange lubrication –Overhaul

- Overhaul the auxiliary equipment and flange lubrication manifold assembly as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.4Y.24 Flow meter valve –Overhaul

- Overhaul the flow meter valve as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F12, Section 7, Metcalfe Flow meter Valve and Venturi Check Valve Maintenance Instructions (A429).

605.4Y.25 Manifold mounted isolating cocks –Overhaul

- Overhaul the manifold mounted isolating cocks as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F12, Section 15, Metcalfe Manifold Mounted Isolating Cocks Maintenance Instructions (A568).

605.4Y.26 Latched isolating cocks –Overhaul

- Overhaul the latched isolating cocks as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.4Y.27 Distributor valve isolator assembly –Overhaul

- Overhaul the isolator assembly on the distributor valve as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F14, Section 8, Isolator Assembly Maintenance Instructions (A1100).

605.4Y.28 Latched solenoid valve –Overhaul

- Overhaul the latched solenoid valve as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F12, Section 9, Latched Solenoid Valve Overhaul Instructions (AM452).

605.4Y.29 Limiting valve–Overhaul

- Overhaul the limiting valve on the distributor valve as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F14, Section 10, Limiting Valve Maintenance Instructions (A1108).

605.4Y.30 Main equipment manifold –Overhaul

- Overhaul the main equipment manifold as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.4Y.31 Pantograph equipment –Overhaul

- Overhaul the pantograph equipment manifold and its related equipment as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.4Y.32 Pressure control valve –Overhaul

- Overhaul the pressure control valve as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F13, Section 13, Pressure Control Valve Maintenance Instructions (A675).

605.4Y.33 Pressure regulators –Overhaul

- Overhaul the pressure regulators as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F14, Section 4, Pressure Regulator Maintenance Instructions (A1077).

605.4Y.34 Pressure switch –Overhaul

- Overhaul the all the pressure switchs assemblies as part of the brake equipment module overhaul. Check its setting. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.4Y.35 Safety valve –Overhaul

- Overhaul the safety valves as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F14, Section 3, Metcalfe Safety Valves Maintenance Instructions (A1067).

605.4Y.36 Sanding equipment –Overhaul

- Overhaul the sanding equipment manifold assembly as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.4Y.37 SPB equipment –Overhaul

- Overhaul SPB equipment assembly as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.4Y.38 SPB manifold –Overhaul

- Overhaul the SPB manifold and its related equipment as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.4Y.39 Towing cock –Overhaul

- Overhaul the towing cock as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.4Y.40 Venturi check valve –Overhaul

- Overhaul the venturi check valve as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F12, Section 7, Metcalfe Flowmeter Valve and Venturi Check Valve Maintenance Instructions (A429).

605.4Y.41 Venturi/solenoid valve –Overhaul

- Overhaul the venturi/solenoid valve assembly as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F11, Section 3, Brake Equipment Module Maintenance Instructions (M366-BEM).

605.4Y.42 Vigilance unit –Test

- Test the vigilance unit as part of the brake equipment module overhaul. Replace if faulty or defective. Refer to Suppliers Documentation Volume F13, Section 7, Vigilance Unit Maintenance Instructions (A664).

605.4Y.43 Check valve –Overhaul

- Overhaul the manifold mounted check valves as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F12, Section 13, Metcalfe Manifold Mounted Check Valves Maintenance Instructions (A563).

605.5Y.01 Breakaway protection valve–Overhaul

- Overhaul the breakaway protection valves as part of the brake equipment module overhaul. Refer to Suppliers Documentation Volume F12, Section 6, Breakaway Protection Valve Maintenance Instructions (A425).

606.1W.01 Automatic brake controller –Check

- Check the operation of the automatic brake controller. Test for free movement to and from all positions. Rectify any faults found. Refer to Suppliers Documentation Volume F13, Section 1, Driver's Brake Controller for E70 Brake Pipe Control System (A638).

606.1W.02 Direct air brake valve –Check

- Test the operation of the driver's direct air brake valve. The driver's direct air brake valve should be tested as part of the brake equipment module. Replace the valve if faulty or defective. Refer to Suppliers Documentation Volume F11, Section 4, Driver's Direct Air Brake Valve Type FD1 *Operating and Maintenance Instructions.* (A13).

606.2Y.01 Exhaust valve –Test

- Test the exhaust valves. Replace the valve if faulty or defective. Refer to Suppliers Documentation Volume F11, Section 11, Metcalf Exhaust Valve Maintenance and Overhaul Instructions (AM117).

606.4Y.01 Automatic brake controller –Overhaul

- Overhaul the automatic brake controller. Refer to Suppliers Documentation Volume F13, Section 2, Driver's Brake Controller Overhaul Instructions (AM638).

606.4Y.02 Direct air brake valve –Overhaul

- Overhaul the driver's direct air brake valve. Refer to Suppliers Documentation Volume F11, Section 5, Driver's Direct Air Brake Valve Type FD1 Overhaul Instructions (AM13).

606.4Y.03 Exhaust valve –Overhaul

- Overhaul the exhaust valves. Refer to Suppliers Documentation Volume F11, Section 11, Metcalf Exhaust Valve Maintenance and Overhaul Instructions (AM117).

607.1W.01 Brake pad –Inspect

- Visually inspect brake pads for wear. Replace brake pads as necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.7, Brake Activators.

607.1W.02 Brake pad keys –Inspect

- Visually inspect the condition and security of the brake pad keys. Replace the keys if bent, damaged or missing. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.7, Brake Activators.

607.1W.03 Parking brake –Check

- Check the operation of the parking brake. Rectify any faults found. Refer to Suppliers Documentation Volume F14, Section 15, The SAB Brake Cylinder Adjuster Unit Type PBACF Maintenance Manual (5372GB).

607.1W.04 Brake –Check

- Check the operation of the brakes. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.7, Brake Activators.

607.1M.01 Brake cylinder –Inspect

- Visually inspect the service brake cylinder adjuster units for dirt, damage or leakage. Rectify any faults found, replace any damaged or worn parts. Refer to Suppliers Documentation Volume F14, Section 14, The SAB Brake Cylinder Adjuster Unit Type PBAC Maintenance Manual (5311GB).

607.1M.02 Parking brake cylinder –Inspect

- Visually inspect the service/parking brake cylinder adjuster units for dirt, damage or leakage. Rectify any faults found, replace any damaged or worn parts. Refer to Suppliers Documentation Volume F14, Section 15, The SAB Brake Cylinder Adjuster Unit Type PBACF Maintenance Manual (5372GB).

607.1M.03 Tread cleaning device –Check

- Check the tread cleaning device. Rectify any faults found. Refer to Suppliers Documentation Volume F14, Section 18, BSI Tread Cleaning Device Manual (V94/070-E).

607.3M.01 Brake activators –Inspect

- Visually inspect the brake calipers, rigging, bushes, pins and bolts for damage, wear or other defects. Rectify any faults found, replace any damaged, worn or missing parts. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.7, Brake Activators.

607.3M.02 Brake disk –Examine

- Examine brake disks for defects. Replace the brake disks if damaged, worn or defective. Refer to Suppliers Documentation Volume F14, Section 16, BSI-Wheel-Mounted Brake Disk R920G (V94/032-E).

607.3M.03 Service brake cylinder –Check

- Check operation of service brake cylinder adjuster units. Rectify any faults found, replace any damaged or worn parts. Refer to Suppliers Documentation Volume F14, Section 14, The SAB Brake Cylinder Adjuster Unit Type PBAC Maintenance Manual (5311GB).

607.3M.04 Parking brake cylinder –Check

- Check operation of service/parking brake cylinder adjuster units. Rectify any faults found, replace any damaged or worn parts. Refer to Suppliers Documentation Volume F14, Section 15, The SAB Brake Cylinder Adjuster Unit Type PBACF Maintenance Manual (5372GB).

607.3M.05 Bogie isolation cock –Inspect

- Visually inspect the bogie isolation cocks for damage, dirt, and wear. Replace the cocks if damaged or worn. Thoroughly clean serviceable cocks. Refer to Suppliers Documentation Volume F11, Section 7, Metcalfe Isolating and Drain Cocks Operating and Maintenance Instructions. (A34).

607.3M.06 Brake caliper –Test

- Test the operation of the brake calipers. Rectify any faults found, replace any damaged or worn parts. Refer to Suppliers Documentation Volume F14, Section 17, BSI-Brake Caliper Manual (V94/033-E).

607.3M.07 Tread cleaning pad –Inspect

- Visually inspect the tread cleaning pad. Replace the pads if damaged, worn to the condemning line otherwise not within specification. Refer to Suppliers Documentation Volume F14, Section 18, BSI Tread Cleaning Device Manual (V94/070-E).

607.6M.01 Brake caliper –Check

- Check the brake calipers Rectify any faults found, replace any damaged or worn parts. Refer to Suppliers Documentation Volume F14, Section 17, BSI-Brake Caliper Manual (V94/033-E).

607.1Y.01 Brake disk –Overhaul

- Overhaul the brake disks. Refer to Suppliers Documentation Volume F14, Section 16, BSI-Wheel-Mounted Brake Disk R920G (V94/032-E).

607.1Y.02 Anti-slip valve –Check

- Check the anti-slip valves. Replace the valves if defective. Refer to Suppliers Documentation Volume F11, Section 8, Anti-Slip Valve ASV1 Maintenance Instructions (A69).

607.1Y.03 Brake activators - Hoses–Inspect

- Visually inspect the hoses between the locomotive underframe and bogie for damage, wear or deterioration. Replace any defective hoses. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.7, Brake Activators.

607.1Y.04 Brake cylinder hose –Inspect

- Visually inspect the brake cylinder hoses for damage, wear or deterioration. Replace any defective hoses. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.7, Brake Activators.

607.1Y.05 Bogie isolation cock –Test

- Test the operation and check the condition of the bogie isolation cocks. Replace the cocks if defective. Refer to Suppliers Documentation Volume F11, Section 7, Metcalfe Isolating and Drain Cocks Operating and Maintenance Instructions. (A34).

607.2Y.01 Brake caliper –Clean

- Clean and examine the brake calipers. Rectify any faults found. Refer to Suppliers Documentation Volume F14, Section 17, BSI-Brake Caliper Manual (V94/033-E).

607.2Y.02 Service brake cylinder –Clean

- Clean and examine service brake cylinder adjuster units. Rectify any faults found, replace any damaged or worn parts. Refer to Suppliers Documentation Volume F14, Section 14, The SAB Brake Cylinder Adjuster Unit Type PBAC Maintenance Manual (5311GB).

607.2Y.03 Parking brake cylinder –Clean

- Clean and examine service/parking brake cylinder adjuster units. Rectify any faults found, replace any damaged or worn parts. Refer to Suppliers Documentation Volume F14, Section 15, The SAB Brake Cylinder Adjuster Unit Type PBACF Maintenance Manual (5372GB).

607.4Y.01 Service brake cylinder –Overhaul

- Overhaul the service brake cylinder adjuster units. Refer to Suppliers Documentation Volume F14, Section 14, The SAB Brake Cylinder Adjuster Unit Type PBAC Maintenance Manual (5311GB).

607.4Y.02 Parking brake cylinder –Overhaul

- Overhaul the service/parking brake cylinder adjuster units. Refer to Suppliers Documentation Volume F14, Section 15, The SAB Brake Cylinder Adjuster Unit Type PBACF Maintenance Manual (5372GB).

607.4Y.03 Brake caliper –Overhaul

- Overhaul the brake calipers. Refer to Suppliers Documentation Volume F14, Section 17, BSI-Brake Caliper Manual (V94/033-E).

607.4Y.04 Anti-slip valve –Overhaul

- Overhaul the anti-slip valves. Refer to Suppliers Documentation Volume F11, Section 9, Anti-Slip Valve Overhaul Instructions (AM69).

607.4Y.05 Double check valve –Overhaul

- Overhaul the double check valve. Refer to Suppliers Documentation Volume F11, Section 6, Double Check Valve Maintenance Instructions (A23).

607.4Y.06 Bogie isolation cock –Replace

- Replace the bogie isolation cocks. Refer to Suppliers Documentation Volume F11, Section 7, Metcalfe Isolating and Drain Cocks Operating and Maintenance Instructions. (A34).

607.4Y.07 Pressure switch –Test

- Test the pressure switches. The pressure switches should be tested as part of the brake unit. Replace the switches if faulty or defective. Refer to Suppliers Documentation Volume F, Section 16, Metcalfe Pressure Switch Maintenance Instructions (A576).

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607.5Y.01 Brake bushing –Replace

- Replace the brake bushings in the bogie frame. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.7, Brake Activators.

607.5Y.02 Brake caliper components –Replace

- Replace the bushes, pivots and fasteners on the brake calipers. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.7, Brake Activators.

607.5Y.03 Brake hoses –Replace

- Replace the hoses between the bogie frame connections and the brake cylinders. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.7, Brake Activators.

- Replace the hoses between the locomotive underframe and bogie. Refer to Volume D, Maintenance and Repair Manual, Chapter 6.7, Brake Activators.

6.7 Interior

701.1W.01 Machine room doors –Check

- Check the condition and operation of the machine room doors. Ensure the door handles, latches and catches work correctly. Replace any defective parts as necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.1, Doors.

701.3M.01 Machine room door seal –Inspect

- Visually inspect the machine room door seal for wear, damage, tears or deterioration. Replace the seal if worn, torn, damaged or deteriorating. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.1, Doors.

701.3M.02 Machine room door glass –Inspect

- Visually inspect the condition of the glass in the machine room door. Replace the glass if cracked, broken, missing or otherwise damaged. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.1, Doors.

701.3M.03 Machine room door window seal –Inspect

- Visually inspect the machine room door window seal for wear, damage, tears or deterioration. Replace the seal if worn, torn, damaged or deteriorating. Refer to Suppliers Documentation Volume F1, Section 3, Maintenance Manual Windows/Doors.

701.6M.01 Locker shelves –Check

- Check the condition of the shelves in the lockers. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.1, Doors.

701.1Y.01 Machine room door lock tongue –Lubricate

- Lubricate the machine room door lock tongue with a thin film of grease. Wipe away any excess grease. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.3, Doors.

701.1Y.02 Machine room door hinges –Lubricate

- Lubricate the machine room door hinges with general purpose oil. Wipe away any excess oil from the hinge and door. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.1, Doors.

701.1Y.03 Locker door –Check

- Check the condition and operation of the locker door. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.1, Doors.

701.10Y.01 Machine room door seal –Replace

- Replace the machine room door seal. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.1, Doors.

701.10Y.02 Machine room door window seal –Replace

- Replace the machine room door window seal. Refer to Suppliers Documentation Volume F1, Section 3, Maintenance Manual Windows/Doors.

702.1W.01 Seats –Check

- Check the operation of the driver's and assistant driver's seats. Ensure that the seat moves freely through all ranges. Lubricate the mechanism or rectify any faults found as required. Refer to Suppliers Documentation Volume F15, Section 2, Instruction Manual Chapman Mk 203-128/1474.

702.3M.01 Seat trim –Check

- Visually inspect the trim on the driver's and assistant driver's seats for damage, split seams, tears or other defects. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.2, Seats.

702.3M.02 Seats –Clean

- Clean the crew seats. Remove all dirt. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.2, Seats.

702.6M.01 Seat fasteners –Check

- Check the security of all fasteners on the seats and pedestal of the driver's and assistant driver's seats. Tighten the fasteners as necessary. Refer to Suppliers Documentation Volume F15, Section 2, Instruction Manual Chapman Mk 203-128/1474.

702.1Y.01 Seat pedestal shaft –Lubricate

- Lubricate the crew seat pedestal shafts in each cab with the specified grease. Wipe away any excess grease. Refer to Suppliers Documentation Volume F15, Section 2, Instruction Manual Chapman Mk 203-128/1474.

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702.1Y.02 Seat slide –Lubricate

- Lubricate the crew seat slides with the specified grease. Work the grease into the slides by moving the seat back and forth several times. Wipe away any excess grease. Refer to Suppliers Documentation Volume F15, Section 2, Instruction Manual Chapman Mk 203-128/1474.

703.1W.01 Cab lights –Check

- Check the operations of the ceiling and spot lights in both cabs. Replace any defective bulbs, or rectify any other electrical faults. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.3, Lighting.

703.1W.02 Machine room lights –Check

- Check the operations of the lights in the machine room. Replace any defective bulbs, or rectify any other electrical faults. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.3, Lighting.

703.3M.01 Cab lights –Clean

- Clean the cab lights. Remove all dirt and dust. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.3, Lighting.

704.1W.01 Cab window blinds –Check

- Check the operation of the front and side windows blinds. Ensure the blinds operate smoothly and remain in position. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.4, Blinds.

704.3M.01 Cab window blinds –Inspect

- Visually inspect the condition of the blinds, front and side windows, in both cabs. Repair any tears, split seams, fraying or other defects as necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.4, Blinds.

704.3M.02 Cab blinds –Clean

- Clean the cab blinds. Remove all dirt and dust. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.4, Blinds.

705.1W.01 Cab heater/blower –Clean

- Check the operation of the cab heater/blower. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.5, Cab.

705.1W.02 Fire extinguishers –Check

- Check the fire extinguishers in the each cab and the machine room. Replace the fire extinguishers if missing, damaged or out of survey. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.5, Cab.

705.3M.01 Driver's desk –Clean

- Clean the surfaces of the driver's desk. Remove all dirt and debris. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.5, Cab.

705.3M.02 Crew fans –Check

- Check the operation and condition of the crew fans. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.5, Cab.

705.3M.03 Display screen and keyboard –Clean

- Clean the screen and keyboard on the 'Pixy' diagnostic display. Refer to Suppliers Documentation Volume F6, Section 13, Maintenance Instruction Manual for MICAS-S2 Control Electronics (3EHL420666). Section 7.1

705.3M.04 Cab floor –Clean

- Clean the cab floor. Remove all dirt and debris. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.5, Cab.

705.6M.01 Crew fan fasteners –Check

- Check the security of the fasteners on the crew fans. Tighten the fasteners if necessary. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.5, Cab.

705.1Y.01 Cab emergency brake cock –Test

- Test the operation and check the condition of the cab emergency brake cock. Replace the cock if defective. Refer to Suppliers Documentation Volume F11, Section 7, Metcalfe Isolating and Drain Cocks Operating and Maintenance Instructions. (A34).

705.1Y.02 Cab floor coverings –Inspect

- Visually inspect the condition of the cab floor coverings. Rectify any faults found or replace the floor covering if required. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.5, Cab.

705.4Y.01 Emergency brake cock –Replace

- Replace the emergency brake cock. Refer to Suppliers Documentation Volume F11, Section 7, Metcalfe Isolating and Drain Cocks Operating and Maintenance Instructions. (A34).

705.5Y.01 Crew fan motor –Replace

- Replace the crew fan motor. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.5, Cab.

705.5Y.02 Cab heater/blower duct –Replace

- Replace the cab heater/blower duct. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.5, Cab.

705.5Y.03 Cab –Repaint

- Repaint the surface of the crew cabs, including the driver's desk and footwells. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.2, Cab.

705.10Y.01 Cab floor coverings –Replace

- Replace the cab floor coverings. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.5, Cab.

705.15Y.01 Cab heater/blower motor –Replace

- Replace the cab heater/blower motor. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.5, Cab.

705.20Y.01 Cab floor boards –Replace

- Replace the cab floor boards. Refer to Volume D, Maintenance and Repair Manual, Chapter 7.5, Cab.

706.3M.01 Key interlocking system –Check

- Check the operation of the key interlocking system. Ensure all keys are present and that the

locks operate correctly. Refer to Suppliers Documentation Volume F15, Section 6, Interlocking Concept (SG 350141).

6.8 Control System

801.1W.01 Emergency push button –Test

- Test the operation of the emergency push buttons in the driver's cab. Check that the pantograph lowers and that the emergency brakes are applied. Rectify and faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 8.1, Cab Control.

801.1W.02 Driver's cab switches –Check

- Check the operation of the switches in the driver's cab. Replace any defective switches. Refer to Volume D, Maintenance and Repair Manual, Chapter 8.1, Cab Control.

801.1W.03 Horn operating valve –Check

- Check the operation of the horn operating valve. Rectify any faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 1.6, Cab Control.

801.1W.04 Driver's desk indicator lights –Check

- Check the operation of all indicator lights on the driver's desk. Replace any defective bulbs or rectify any other faults found. Refer to Volume D, Maintenance and Repair Manual, Chapter 8.1, Cab Control.

801.1W.05 Driver's footwell switches–Check

- Check the operation of the switches in the driver's footwell. Replace any defective switches. Refer to Volume D, Maintenance and Repair Manual, Chapter 8.1, Cab Control.

801.1W.06 Windscreen wipers and operating valve –Check

- Check the operation of the windscreen wipers and operating valve. Rectify any faults found. Refer to Suppliers Documentation Volume F1, Section 7, Operating Valves No. [illegible]: Description (B-UC40.21-EN).

801.1W.07 Gauges –Check

- Check the operation of the gauges in the driver's cab. Replace any defective gauges. Refer to Volume D, Maintenance and Repair Manual, Chapter 8.1, Cab Control.

801.1M.01 TE/BE Master controller –Check

- Check the operation the TE/BE master controller in all ranges. Rectify any faults. Refer to Suppliers Documentation Volume F16, Section 1, Drive/brake controller Indian Railways (SG 460150).

801.1M.02 TE/BE Master controller interlock –Check

- Check the TE/BE master controller interlock functions correctly. Rectify any faults. Refer to Suppliers Documentation Volume F16, Section 1, Drive/brake controller Indian Railways (SG 460150).

801.1M.03 Memotel – Date & time check

- Check the time and date displayed on the memotel. Adjust the time or date if necessary. Refer to Suppliers Documentation Volume F16, Section 1, MEMOTEL User Manual (5.0300.032 e). Section 2.9

801.6M.01 Memotel –Download

- Remove the memory card from the Memotel unit and download the data to a storage file. Refer to Suppliers Documentation Volume F16, Section 1, MEMOTEL User Manual (5.0300.032 e). Section 2.9

801.6M.02 Cab pneumatic piping –Check

- Check the condition of the pneumatic piping. Replace the pipes or fittings if damaged or leaking. Rectify any air leaks. Refer to Volume D, Maintenance and Repair Manual, Chapter 8.1, Cab Control.

801.1Y.01 TE/BE Master controller –Check

- Check that the contacts in the TE/BE master controller are operated correctly by the cams. Adjust the cams if necessary. Refer to Suppliers Documentation Volume F16, Section 1, Drive/brake controller Indian Railways (SG 460150). Section 4

801.1Y.02 TE/BE Master controller contact –Measure

- Measure the contact pressures in the TE/BE master controller. Overhaul the controller if not within specification. Refer to Suppliers Documentation Volume F16, Section 1, Drive/brake controller Indian Railways (SG 460150). Section 4

801.1Y.03 TE/BE Master controller roller –Check

- Check that the rollers in the TE/BE master controller are free to rotate. Rectify and faults found. Refer to Suppliers Documentation Volume F16, Section 1, Drive/brake controller Indian Railways (SG 460150). Section 4

801.1Y.04 TE/BE Master controller auxiliary contact –Measure

- Measure the wear on the TE/BE auxiliary contacts. Replace the contacts if the contacts are worn. Refer to Suppliers Documentation Volume F16, Section 1, Drive/brake controller Indian Railways (SG 460150). Section 4

801.1Y.05 TE/BE Master controller fasteners –Check

- Check the security of the fasteners on the TE/BE master controller and cable connections. Tighten the fasteners if necessary. Refer to Suppliers Documentation Volume F16, Section 1, Drive/brake controller Indian Railways (SG 460150). Section 4

801.1Y.06 Windscreen wiper/washer Isolation cock –Test

- Test the operation and check the condition of the windscreen wiper/washer isolation cock. Replace the cock if defective. Refer to Suppliers Documentation Volume F11, Section 7, Metcalfe Isolating and Drain Cocks Operating and Maintenance Instructions. (A34).

801.1Y.07 TE/BE Master controller –Lubricate

- Lubricate the camshaft, seals and other moving parts of the TE/BE master controller. Refer to Suppliers Documentation Volume F16, Section 1, Drive/brake controller Indian Railways (SG 460150). Section 5

801.1Y.08 Horn isolating cock –Test

- Test the operation and check the condition of the horn isolating cock. Replace the cock if defective. Refer to Suppliers Documentation Volume F11, Section 7, Metcalfe Isolating and Drain Cocks Operating and Maintenance Instructions. (A34).

801.1Y.09 Buzzer –Clean

- Clean the dust filter on the buzzer using a soft brush. Remove all traces of dust and dirt. Do not apply pressure to the filter or use compressed air. Refer to Suppliers Documentation Volume F16, Section 1, Combination Buzzer 88.

801.4Y.01 Horn isolating cock –Replace

- Replace the horn isolating cock. Refer to Suppliers Documentation Volume F11, Section 7, Metcalfe Isolating and Drain Cocks Operating and Maintenance Instructions. (A34).

801.4Y.02 Windscreen wiper/washer isolation cock –Replace

- Replace the windscreen wiper/washer isolation cock. Refer to Suppliers Documentation Volume F11, Section 7, Metcalfe Isolating and Drain Cocks Operating and Maintenance Instructions. (A34).

801.5Y.01 Windscreen wiper/washer operating valve –Overhaul

- Overhaul the windscreen wiper/washer operating valve. Refer to Suppliers Documentation Volume F1, Section 7, Operating Valves No. R12: Overhaul Instructions (PW-UC40.21-EN).

801.5Y.02 Horn operating valve –Overhaul

- Overhaul the horn operating valve. Refer to Volume D, Maintenance and Repair Manual Chapter 1.6, Cab Control.

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801.10Y.01 TE/BE Master controller –Overhaul

- Overhaul the TE/BE master controller. Refer to Suppliers Documentation Volume F16, Section 1, Drive/brake controller Indian Railways (SG 460150).

801.10Y.02 Memotel –Change

- Change out the Memotel unit. Return to the manufacturer for overhaul and recalibration. Refer to Suppliers Documentation Volume F16, Section 1, MEMOTEL User Manual (5.0300.032 e).

801.15Y.01 Cab switches –Replace

- Replace the switches in the cab. Refer to Volume D, Maintenance and Repair Manual, Chapter 8.1, Cab Control.

801.15Y.02 Driver's footwell switches –Replace

- Replace the switches in the driver's footwell. Refer to Volume D, Maintenance and Repair Manual, Chapter 8.1, Cab Control.

802.1M.01 Fire detection unit & its pipeline- Clean

- Clean the fire detection unit and its pipeline. Recalibrate the fire detection unit. Refer to Suppliers Documentation Volume F16, Section 2, Document No. BNC4058022122.

802.3M.01 Smoke detector air sampling unit –Check

- Check the smoke detector air sampling unit. Rectify any faults found. Refer to Suppliers Documentation Volume F16, Section 2, ASD-Mono 2 Plus Active Detector Air Sampling Smoke Detector System (Railways) (e1390a).

802.6M.01 MR Control terminal connections –Check

- Check all terminal connections for tightness. Tighten any loose connections. Refer to Volume D, Maintenance and Repair Manual, Chapter 8.2, MR Control.

802.1Y.01 MR Control DI relay –Check

- Check the DI relay. Replace the relay if defective or out of specification. Refer to Suppliers Documentation Volume F16, Section 2, Maintenance Manual of DI Relay. Section 6.0

802.1Y.02 Smoke detector sensor –Check

- Check the operation of the smoke detection sensor. Replace any defective sensors. Refer to Suppliers Documentation Volume F16, Section 2, Wide Spectrum Smoke Detectors, Collective (e1001a).

802.1Y.03 Control magnet –Clean

- Clean the surface of the control magnets using a clean, lint free cloth wetted with alcohol. Tighten any loose connections. Refer to Volume D, Maintenance and Repair Manual, Chapter 8.2, MR Control.

802.2Y.01 Fire Detection Unit - Overhaul

- Overhaul the fire detection unit. Refer to Suppliers Documentation Volume F16, Section 2, Document No. BNC4058022121.

802.3Y.01 DI relay –Check

- Check the DI relay for wear on the contact tips. Replace the contact blocks if the tips are not within specification. Refer to Suppliers Documentation Volume F16, Section 2, Maintenance Manual of DI Relay. Section 6.0

802.3Y.02 Smoke detector sensor –Overhaul

- Overhaul the smoke detector sensor. Refer to Suppliers Documentation Volume F16, Section 2, Wide Spectrum Smoke Detectors, Collective (e1001a).

803.1M.01 VCU bus station diagnostic computer –Check

- Check the time and date displayed on vehicle control unit bus station diagnostic computer. Adjust the time or date if necessary. Refer to Suppliers Documentation Volume F17, Section 13, Maintenance Instruction Manual MICAS-S2 (3EHL420666). Section 7.2

803.1M.02 VCU bus station diagnostic computer –data acquisition

- Read out the diagnostic data from the vehicle control unit bus station diagnostic computer. ***The period may be varied according to the rate of data acquisition.*** Refer to Suppliers Documentation Volume F17, Section 13, Maintenance Instruction Manual MICAS-S2 (3EHL420666). Section 7.2

803.3M.01 VCU bus station ventilators –Check

- Check the operation of the vehicle control unit bus station ventilators by listening for unusual sounds. The ventilators should run smoothly and without vibration. Replace the ventilator assembly if the fans are not operating correctly. Refer to Suppliers Documentation Volume F17, Section 13, Maintenance Instruction Manual MICAS-S2 (3EHL420666). Section 6.1

803.3M.02 VCU bus station diagnostic computer back-up battery –Check

- Check the condition of the vehicle control unit bus station diagnostic computer back-up battery. Replace the batteries if required. Refer to Suppliers Documentation Volume F17, Section 13, Maintenance Instruction Manual MICAS-S2 (3EHL420666). Section 7.2

803.1Y.01 VCU bus station –Inspect

- Inspect and clean the vehicle control unit bus station equipment and ventilators for build-up of dust and debris. Remove any dust, dirt, debris or other accumulated material. Refer to Suppliers Documentation Volume F17, Section 13, Maintenance Instruction Manual MICAS-S2 (3EHL420666). Section 6.2

803.1Y.02 VCU bus station cover seal –Inspect

- Visually inspect the condition of the seal on the vehicle control unit bus station cover. Replace the seal if worn, damaged or deteriorating. Refer to Suppliers Documentation Volume F6, Section 13, Maintenance Instruction Manual for MICAS-S2 Control Electronics (3EHL420666). Section 6.2

803.4Y.01 VCU bus station - Back-up battery –Replace

- Replace the back-up batteries in the vehicle control unit bus station diagnostic and communication computers. Refer to Suppliers Documentation Volume F17, Section 13, Maintenance instruction Manual MICAS-S2 (3EHL420666). Section 8

803.8Y.01 VCU bus station – EPROM memory chip –Replace

- Replace the EPROM memory chips in the vehicle control unit bus station. Refer to Suppliers Documentation Volume F17, Section 13, Maintenance Instruction Manual MICAS-S2 3EHL420666). Section 7.3.

803.8Y.02 VCU bus station – Software –Reload

- Reload the software to the vehicle control unit bus station computer EPROMs. Refer to

Suppliers Documentation Volume F17, Section 13, Maintenance Instruction Manual MICAS-S2 3EHL420666). Section 7.3

804.3M.01 Loco-Loco bus –Inspect

- Visually inspect the condition of the UIC socket, cover and hinge. Rectify any faults found or replace the socket if damaged. Refer to Suppliers Documentation Volume F16, Section 4, UIC Receptacle, 13 Pole Version.

804.1Y.01 Loco-Loco bus –Check

- Check the cabling for damage, insulation defects, loose connections and insecure wiring. Rectify any faults found, Refer to Volume D, Maintenance and Repair Manual, Chapter 8.4, Loco-Loco Bus.

804.1Y.02 UIC socket contacts –Check

- Check the condition of the UIC socket contacts. Replace any damaged contacts. Clean the contacts removing built-up dirt and debris. Refer to Suppliers Documentation Volume F16, Section 4, UIC Receptacle, 13 Pole Version.

804.5Y.01 UIC socket seal –Replace

- Replace the seals in the UIC socket. Refer to Suppliers Documentation Volume F16, Section 4, UIC Receptacle, 13 Pole Version.

7 Lubricant Data

This document outlines the lubrication requirement of the various components on the WAP-5 Locomotives. The items requiring lubrication and recommended lubricants are listed in section 7.2. The address of the various lubricant suppliers are listed in section 7.3. Data sheets for the various lubricants are included in the Appendix.

7.1 Lubrication Requirements

Note :

Annual Usage is estimated for the normal maintenance activities for 10 Locomotives.

Equipment	Annual Usage (estimated)	Recommended Lubricant	Indian Equivalent
1. Locomotive Body			
External Door Hinges	30 litres	General Purpose Oil	
External Door Locks	10 kg	General Purpose Grease	
Centre Buffer Coupler	100kg	General Purpose Grease	
Buffers	100kg	General Purpose Grease	
2. Bogies and Running Gear			
Axle Box Bearing	100 kg	EXXON Arapen RB 320	
Gearbox Transmission Oil	1200 litres	Optimol Optigear 220	
Flexible Coupling	50 litres	BP Energear DL 85W 140 BP Energear HT 85W 140	
Wheel flange Lubrication	500 litres	Shell Malleus B	
3. Power Supply			
Roof Line Insulators	50 kg	Shell / Rhodorsil Paste 408	
Pantograph	30 kg	Alphalub LGE P2 Grease	
Pantograph Insulators	50 kg	Shell / Rhodorsil Paste 408	
VCB Piston	10 kg	Shell Litea Grease 806-12	
VCB Insulators	20 kg	Shell / Rhodorsil Paste 408	
Earthing Switch Contacts	20 kg	Shell Aquares EP810-60	
Surge Arresters	20 kg	Shell / Rhodorsil Paste 408	
Main Transformer Oil	200 litres	Shell Diala DX	
Roof Voltage Transformer	20 kg	Shell / Rhodorsil Paste 408	

Equipment	Annual Usage (estimated)	Recommended Lubricant	Indian Equivalent
4. Propulsion System			
Converter Oil	200 litres	Shell Diala DX	
T.M. Bearings	50 kg	Klüber Isolflex Topas L152	
5. Auxiliary System			
Battery Box slides	10 kg	General Purpose Grease	
M.R. Blower Motor	10 kg	Kluber ASONIC HQ 72 - 102	
Oil Cooler Blower Motor	10 kg	Kluber ASONIC HQ 72 - 102	
T.M. Blower Motor	10 kg	Kluber ASONIC HQ 72 - 102	
6. Air Supply & Pneumatic			
Main Compressor	1200 litres	Shell Corona P100	Indian Oil Company SS 68
Main Compressor Motor	10 kg	Kluber ASONIC HQ 72 - 102	
7. Interior			
Internal doors	20 litres	General Purpose Oil	
8. Control System			
—			

7.2 Lubricant Suppliers

The addresses are subject to change.

Lubricant Brand	Supplier
OPTIMOL	• Optilube Australasia 2 Macro Court, Rowville, VIC 3178 Ph: (039) 764 2187 Fax: (039) 764 2162 • Castrol India Ltd. B – 112, Chittaranjan Park New Delhi – 110 019 Ph: 011 – 623 7109 Fax: 011 – 6237110 • Castrol India Ltd. Speciality Products Division Rayala Towers, Vth Floor, 781 – 785 Anna Salai Madras – 600 002 Ph: 044 – 8559234/35/36/37, Fax – 044 – 8523314, 8583733
SHELL	• The Shell Company of Australia 1 Spring St, Melbourne, VIC 3000 Ph: (039) 667 2001 Fax: (039) 667 2255 • Bharat Shell Ltd 121 - 123, Ansal Towers 38, Nehru Place New Delhi-110 019 Ph: 011-6467772, 6467891, 6467761 Fax: 011 – 6467888
KLÜBER	• Klüber Lubrication München KG Geisenhauserstr. 7 D-81379 München Ph : ++49 – 89 78 76 - 0 Fax: ++49 - 89 78 76 - 333 • Kluber Lubrication India Pvt Ltd 504, Navbharath Estates Zakharia Bunder Road Sewri (West) Mumbai- 400 015 Ph: 022-4166109 Fax: 022-4147319
BP	• TATA-BP Lubricants (I) Ltd 75-77, Maker Chambers VI Nariman Point Mumbai-400 021 Mr.Lobo Ronny- Mgr- Mfg and Tech Ph: 022- 7901141 Fax: 022-7616199

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EXXON	• Esso Petroleum Petroleum India Pvt. Ltd Mauffat Lal House IIIrd Floor, Back way Mumbai – 400 020

8 Appendix

8.1 Lubricant Data Sheets

Empty Page

ASONIC® HQ 72-102

High-temperature lubricating grease for low-noise rolling bearings

KLÜBER LUBRICATION

Description:

ASONIC HQ 72-102 is a synthetic high-temperature lubricating grease. Due to the careful selection of product components and the clean manufacturing environment, ASONIC HQ 72-102 is a rolling bearing grease with a particularly low noise level.

Pack sizes:

400-g cartridge
1-kg can
25-kg bucket

ASONIC HQ 72-102

- High-temperature lubricating grease for rolling bearings
- High purity
- Low noise
- Good water resistance

Application:

In a wide variety of ball bearings operating under extreme thermal stress, ASONIC HQ 72-102 is used for economical long-term or lifetime lubrication. Examples are ball bearings in electric motors, fans, power-tool pumps, textile machinery, office equipment, household appliances and automobile components such as belt tensioners, guide pulleys and air conditioners.

Application notes:

The lubricant is applied by means of a spatula, brush, grease gun or grease cartridge. For use in automatic lubricating systems, the pumpability of the lubricant should be checked.

Certain polyurea greases solidify during elongated periods of storage. Normally, such increase in consistency does not affect the performance of the lubricating grease and is reversible when the grease is subjected to shearing or working stress.

Behaviour towards elastomers and plastics

The following elastomers were statically tested for resistance to ASONIC HQ 72-102.

Medium	Material	Time/temp. h / °C	Change in volume (%)	Shore hardness A	Tensile strength (%)	Elongation at break (%)
ASONIC HQ 72-102	70 ACM 174997	168 / 150	21.4	– 21	– 26	80
ASONIC HQ 72-102	75 FKM 585	168 / 150	4	0	16	– 49
ASONIC HQ 72-102	70 FKM 175825	168 / 150	7.2	– 5	– 10	– 7
ASONIC HQ 72-102	72 NBR 902	168 / 100	17	– 8	– 17	– 22

Prior to series application we recommend testing the compatibility of the grease and the pertinent materials.
(Our test results were obtained with random samples and cannot substitute your own in-house tests.)

Product data:

Base oil / thickener	Ester oil / polyurea
Service temperature range*, °C	– 40 to 180
Colour	beige
Drop point, DIN ISO 2176, °C	> 240
Worked penetration, DIN ISO 2137, at 25 °C; 0.1 mm	250 to 280
Apparent dynamic viscosity, Klüber viscosity grade**	L / M
Water resistance, DIN 51 807, pt. 1, 3 h / 90 °, rating level	0 to 90
Corrosion protection of lubricating greases, DIN 51 802, (SKF-Emcor), test duration: 1 week, distilled water, degree of corrosion	max. 1
Kinematic viscosity of base oil, DIN 51 562, pt. 01, Ubbelohde at 40 °C, mm^2/s, approx. at 100 °C, mm^2/s, approx.	100 12
Speed factor*** for deep groove ball bearings, ($n \times d_m$) mm/min. approx.	700,000
Low-temperature torque in acc. with IP 186/93 at – 40 °C Starting torque, Nmm Running torque, Nmm	 < 1,000 < 100
FAG-FE9 test rig for rolling bearing grease, DIN 51 821 pt. 2 A, 6,000 min^{-1}, 1,500 N, 180 °C, F_{50} in h	> 100
SKF-ROF test rig for rolling bearing grease 10,000 min^{-1}, F_a = 100 N, F_r = 50 N, 170 °C, F_{50} in h	> 1,000

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* Service temperatures are guide values which depend on the lubricant's composition, the intended use and the application method. Lubricants change their consistency, apparent dynamic viscosity or viscosity depending on the mechano-dynamical loads, time, pressure and temperature. These changes in product characteristics may affect the function of a component.

** Klüber viscosity grades: EL = extra-light lubricating grease; L = light lubricating grease; M = medium lubricating grease; S = heavy lubricating grease; ES = extra-heavy lubricating grease

*** Speed factors are guide values which depend on the type an size of the rolling bearing type and the local operating conditions, which is why they have to be confirmed in tests carried out by the user in each individual case.

ASONIC® HQ 72-102
Safety Data Sheet

1.1 Product name: ASONIC HQ 72-102
Code-No.: 094 060
23.12.1999

1.2 Klüber Lubrication München KG
Geisenhausenerstraße 7
D-81379 München
Tel. ++49 - 89 78 76 - 0 telephone exchange
Fax: ++49 - 89 78 76 - 333

Emergency telephone no.:
++49 - 89 7876 - 0

2. Composition / information on ingredients
Chemical characterization (preparation): *Ester oil, polyurea*
Additional information: No hazardous ingredients

3. Hazards identification
No particular hazards known

4. First aid measures
After inhalation: Not applicable
After contact with skin: Wash off with soap and plenty of water
After contact with eyes: Rinse with plenty of water
After ingestion: Do not induce vomiting. Obtain medical attention
Advice to doctor: Treat symptomatically

5. Fire-fighting measures
Suitable extinguishing media: Water spray, foam, dry powder, carbon dioxide (CO_2)
Unsuitable extinguishing media: High volume water jet
Special Hazards: In case of fire the following can be released: Carbon monoxide, hydrocarbons
Special protective equipment for firefighters: Standard procedure for chemical fires
Additional information: Water mist may be used to cool closed containers. In the event of fire and/or explosion do not breathe fumes

6. Accidental release measures
Personal precautions: Not required
Environmental precautions: Do not flush into surface water or sanitary sewer system
Methods for cleaning up / taking up: Use mechanical handling equipment. Dispose of absorbed material in accordance with the regulations
Additional information: None

7. Handling and storage
Advice on safe handling: No special handling advice required
Advice on protection against fire and explosion: No special precautions required
Requirements on storage rooms and vessels: No special storage conditions required
Incompatible materials: Incompatible with oxidizing agents. Do not store together with food
Further information on storage conditions: Store at room temperature in the original container

8. Exposure controls / personal protection
Additional advice on system design: Not applicable
Ingredients and specific control parameters: None
Respiratory protection: No special protective equipment required
Hand protection: No special protective equipment required
Eye protection: No special protective equipment required
Body protection: No special protective equipment required
Other protection measures: No special protective equipment required
General protection and hygiene measures: Avoid prolonged and/or *repeated contact with skin. Remove* soiled or soaked clothing immediately. Clean skin thoroughly after work; apply skin cream

9. Physical and chemical properties

Form	paste
Colour	beige
Odour	characteristic
Drop point	> 240 °C, DIN ISO 2176
Flash point	> 200 °C (base oil)
Flammability	not applicable
Ignition temperature	not applicable
Autoflammability	not applicable
Lower explosion limit	not applicable
Upper explosion limit	not applicable
Vapour pressure-first	not applicable
Density	*approx.* 0.97 *g/cm³*, 20 °C
Water solubility	insoluble
pH value	not applicable
Kinematic viscosity	not applicable
Further information	none

10. Stability and reactivity
Conditions to avoid: None
Materials to avoid: Strong oxidizing agents
Hazardous decomposition products: None under normal use
Additional information: None

11. Toxicological information
The toxicological data has been taken from products of similar composition
Acute toxicity: LD_{50}/oral/rat = > 2 g/kg (literature data)
Chronic toxicity: None
Human experience: Prolonged skin contact may cause skin irritation and/or dermatitis

12. Ecological Information
Information on elimination (persistence and degradability): Product is insoluble in water. May be separated out mechanically in purification plants
Behaviour in environmental compartments: Ecological injuries are not known or expected under normal use
Ecotoxic effects: Aquatic toxicity is unlikely due to low solubility
Additional information: Should not be released into the environment

13. Advice on Disposal
Disposal: Can be incinerated when in compliance with local, state and federal regulations
Dispose of contaminated packaging and recommended cleaning: Offer rinsed packaging material to local recycling facilities

14. Transport information

GGVS / GGVE:	not applicable
ADN / ADNR:	not applicable
IMDG-Code:	not applicable
ICAO / IATA-DGR:	not applicable

Further information: Not classified as dangerous in the meaning of transport *regulations*

15. Regulatory Information
Labelling according to EU-guidelines: The product does not require a hazard warning label in accordance with EC-directives/German regulations on *dangerous substances*
National regulations

16. Other information
Issue-department of Safety Data Sheet: Chemical Documentation, Tel.: ++49 - 89 7876 - 564

The data in this product information is based on our general experience and knowledge at the time of printing and is intended to give information of possible applications to a reader with technical experience. It constitutes neither an assurance of product properties nor does it release the user from the obligation of performing preliminary tests with the selected product. We recommend contacting our Technical Consulting Staff to discuss your specific application. If required and possible we will be pleased to provide a sample for testing. Klüber products are continually improved. Therefore, Klüber Lubrication reserves the right to change all the technical data in this product information at any time without notice.

Freudenberg Klüber Lubrication München KG, a member of the Freudenberg group

Klüber Lubrication München KG
Postfach 70 10 47, D-81310 München
Tel. (0 89) 78 76-0 Telefax (0 89) 78 76-333

MICROFLUX TRANS®

TOTAL
PLANT
CONTROL
an ACN 066 113 120 PTY LTD COMPANY
63 Fanny Street
Annerley Qld 4103
P O Box 173 Annerley Qld
Telephone (07) 892 7068
Facsimile (07) 892 7069

OPTIMOL OPTIGEAR® VG

OPTIMOL OPTIGEAR® - solid-free high performance gear oils containing a powerful additive combination. Use Optigear® VG for long-term or lifetime lubrication even under conditions exceeding the capability of conventional EP lubricants or oils with solid lubricants. Especially use them for highly shock loaded gears.

MICROFLUX TRANS® (TRANS = Triple Action Non-sacrificial Surface engineering) improves friction surfaces to an extent not possible with normal machining processes and conventional EP lubricants.
In a tribological system the polarised MICROFLUX TRANS® additives instantaneously create a passive film on friction surfaces before friction occurs.
At a given load level, the MICROFLUX TRANS® additives release compounds forming a resistant protective layer on friction surfaces.
Under severe load, components of the MICROFLUX TRANS® additive combination are activated and diffuse into the surfaces initiating an improvement of their friction characteristics through plastic deformation. The organic reaction products become a component of the tribopolymer system. Unlike the case with conventional lubricants, the tribopolymers formed by MICROFLUX TRANS® are long-chained compounds with excellent lubricity and adhesion. The load carrying area is improved, a hydrodynamic lubrication film is easier to maintain. This unique physio-chemical reaction is OPTIMOL surface engineering and achieves a non-sacrificial micro-smoothing of the friction surfaces.
The MICROFLUX TRANS® additive technology provides optimum wear protection and an extremely low coefficient of friction even under extremes of pressure, vibration, shock loads, at high or low speeds or varying operational conditions.

FEATURES
- extended oil drain intervals
- excellent anti-wear properties
- extremely shortened running-in times for bearings and gears
- surface improvement to an extent not possible before
- outstanding load carrying capacity
- optimum wear protection in high load range
- smoothing of pitting and scoring marks
- reduction of noise level caused by high-frequency stick-slip
- considerable reduction of coefficient of friction resulting in energy savings
- temperature reduction on friction surface
- excellent rust protection
- compatible with all conventional sealing materials and paints
- surpasses MIL-L-2105 B and API-GL-5; AGMA 250.04 EP gear oils.

USES
To minimise wear during running-in period and to reduce surface fatigue, scoring, spalling, pitting, scuffing in all industrial gears with steel/steel friction surfaces under extreme mechanical conditions such as heavy shock loads or vibration.
For all types of plain and antifriction bearings under heavy loads.
For variable speed chain drives (PIVs) to reduce wear on chain lugs, cones and bearings.
For sealed gear couplings to prevent fretting corrosion and abrasion.
For differential gears of busses, trucks and construction equipment.

Attention! Do not use for self-locking differential gears and synchronised gears due to extremely low coefficient of friction. Do not use on non-ferrous components.

COST-BENEFIT OFFERED BY MICROFLUX TRANS® ADDITIVE TECHNOLOGY
- extended lifetime of machine elements and wear parts, lower maintenance and labor costs by minimised wear and friction.
- full load operation within shortest time, virtually eliminating the running-in period.
- lower costs for lubricants and waste oil disposal because of significant extensions of both service life and relubrication intervals.
- energy savings due to reduced coefficient of friction, lower temperature of lubricant and component, improvement in operating efficiency.
- product consolidation, i.e. simplification and reduction of lubes and spare parts.
- reduction of noise resulting from high frequency stick-slip.
- for "life" lubrication in some applications.

APPLICATION
Viscosity recommended by equipment manufacturers must be followed.
OPTIMOL OPTIGEAR® VG oils are miscible with all premium quality unleaded gear oils. However, maximum performance only is applied unmixed.
OPTIMOL OPTIGEAR® VG oils can be filtered in all common filter systems and separators due to their homogeneous, oil soluble additives.
OPTIMOL OPTIGEAR® BM oils are preferred for lubrication of worm gears.

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OPTIMOL OPTIGEAR

OPTIMOL OPTIGEAR® VG

TECHNICAL DATA

	UNIT	22	32	46	68	100	150	220	320	460	680	1500	TEST METHOD
ISO - viscosity group AGMA	- -	22 -	32 -	46 1EP	68 2EP	100 3EP	150 4EP	220 5EP	320 6EP	460 -	680 -	1500 -	DIN 51519
Density @ + 15°C	g/cm³	0.888	0.889	0.889	0.895	0.900	0.903	0.912	0.919	0.924	0.925	0.929	DIN 51757
Kin. Viscosity @ + 40°C	mm²/s	22.5	34.0	47	70	100	156	220	310	450	650	1508	DIN 51562
@ + 50°C	mm²/s	15.8	23.7	31.4	44.7	62.5	95.0	129.8	173.3	246.2	347.5	820	
@ + 100°C	mm²/2	4.57	5.62	7.00	8.90	11.5	15.4	18.7	22.9	30.8	40.0	77.5	
Viscosity Index VI	-	110	110	106	100	100	100	95	95	95	100	100	DIN ISO 2909
Flash Point	°C	+165	+185	+195	+200	+200	+200	+200	+205	+205	+210	+210	DIN ISO 2592
Pour Point	°C	-38	-37	-29	-29	-25	-24	-23	-14	-12	-15	-11	DIN ISO 3016
FZG Boundary Lubrication A/16.6/90, damage load stage	-	>12	>12	>12	>12	>12	>12	>12	>12	>12	>12	>12	intensified special test
Specific Weight Loss	mg/kWh	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	-
SRV® test run test mode 5a wear dia	mm	0.53	0.53	0.51	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.48	-
Friction Coefficient μ min	-	0.085	0.084	0.084	0.085	0.085	0.083	0.081	0.080	0.077	0.079	0.078	-
Friction Coefficient μ max	-	0.100	0.102	0.099	0.100	0.097	0.099	0.100	0.098	0.097	0.097	0.099	-

1mm²/s ≅ 1cSt

These test data are based on average test results. Minor deviations may occur from case to case.
Further product information is available on request.

OPTIMOL OPTIGEAR

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2/2

TOTAL
IPLANT
CONTROL
an ACN 066 113 120 PTY LTD COMPANY
63 Fanny Street
Annerley Qld 4103
P O Box 173 Annerley Qld
Telephone (07) 892 7068
Facsimile (07) 892 7069

OPTIMOL LONGTIME PD 1 & PD 2

OPTIMOL LONGTIME PD 1 & PD 2 - universal solid-free extreme pressure greases for long-term lubrication with wide application range.
MICROFLUX TRANS® (TRANS = TRiple Action Non-sacrificial Surface engineering) improves friction surfaces to an extent not possible with normal machining processes and conventional EP lubricants.
In a tribological system the polarised MICROFLUX TRANS® additives instantaneously create a passive film on friction surfaces before friction occurs.
At a given load level, the MICROFLUX TRANS® additives release compounds forming a resistant protective layer on friction surfaces.
Under severe load, components of the MICROFLUX TRANS® additive combination are activated and diffuse into the surfaces initiating an improvement of their friction characteristics through plastic deformation. The organic reaction products become a component of the tribopolymer system. Unlike the case with conventional lubricants, the tribopolymers formed by MICROFLUX TRANS® are long-chained compounds with excellent lubricity and adhesion. The load carrying area is improved, a hydrodynamic lubrication film is easier to maintain. This unique physio-chemical reaction is OPTIMOL surface engineering and achieves a non-sacrificial micro-smoothing of the friction surfaces.
The MICROFLUX TRANS® additive technology provides optimum wear protection and an extremely low coefficient of friction even under extremes of pressure, vibration, shock loads, at high or low speeds or varying operational conditions.

FEATURES

- reduction of running-in period, suitable for lifetime lubrication
- surface improvement to an extent not possible before
- outstanding load carrying capacity
- notably decreased coefficient of friction resulting in energy savings
- optimum wear protection in high load range
- smoothing of existing pitting on damaged components
- reduction of noise levels
- excellent rust protection, largely prevents fretting corrosion
- compatible with all conventional sealing materials and nonferrous metals
- easily pumpable in central lubrication systems
- resistant to cold and hot water
- temperature range:
  for LONGTIME PD 1: -35°C to +130°C
  for LONGTIME PD 2: -35°C to +140°C

USES

For a large field of applications and various difficult operating conditions, i.e.

- extreme pressures, vibration, shock loads,
- wide temperature range and
- components that are prone to fretting corrosion
- for constant velocity (CV) joints, ball joints, ball spindles
- for bearings with rotating outer ring and high stresses due to centrifugal load, e.g. in spreader rolls, roll neck bearings in steel mills, for bearings with changing rotational directions or slewing movements.

For long-term and lifetime lubrication of heavily loaded bearings in

- motor vehicles, wheel hubs, shaker screens, wood and metal routers, machine tool spindles, spinning spindles, disk drives, high speed looms, robots
- for high speeds up to Dn factors of 1,000,000

COST BENEFIT OFFERED BY MICROFLUX TRANS® ADDITIVE TECHNOLOGY

- extended lifetime of machine elements and wear parts, lower maintenance and labour costs by minimised wear and friction
- full load operation within shortest time, virtually eliminating the running-in period
- lower costs for lubricants and waste oil disposal because of significant extensions of both service life and relubrication intervals
- energy savings due to reduced coefficient of friction, lower temperature of lubricant and component, improvement in operating efficiency
- product consolidation, i.e. simplification and reduction of lubes and spare parts
- reduction of noise resulting from high frequency stick-slip
- for "life" lubrication in some applications

APPLICATION

Specifications of antifriction bearing manufacturers must be followed.
Maximum performance only if applied unmixed.
OPTIMOL LONGTIME PD greases allow product consolidation of previously used lubricating greases; their high efficiency ensures economical use and hence a reduction of lubricant expenses.

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OPTIMOL LONGTIME

OPTIMOL LONGTIME PD1 & PD2

TECHNICAL DATA				
	UNIT	PD1	PD2	TEST METHOD
Colour	-	Brown		-
Characteristics	-	Lithium grease 12-hydroxy stearate based		- -
Worked penetration Pw 60	0.1mm	310 - 340	265 - 295	DIN ISO 2137
Prolonged worked penetration Pw 100,000 - Pw 60	0.1mm	< 30	< 30	-
Dropping point	°C	> + 180	> +180	DIN ISO 2176
Flow pressure @ + 20°C @ + 35°C	mbar mbar	< 60 < 1200	< 80 < 1600	DIN 51805 DIN 51805
Water resistance @ + 90°C	-	0 (no change)	0 (no change)	DIN 51807 part 1
SKF Emcor	-	0/0	0/0	DIN 51802
VW-filter test, oil sediment after 2 x 24h storage @ + 90°C	m-%	0	0	P-VW 1400
Homogeneity	µm	< 10	< 10	Grindometer
Oxidation stability 100h/100°C Pressure drop	bar	0.4	0.4	DIN 51808
SRV® test run, test mode 3a (2h/200N, 50°C, ball area) Ball wear area Coefficient of friction Wear scar depth	 mm^2 µ(min) µ(max) µm	 0.88 0.04 0.111 0.4	 0.75 0.06 0.107 0.2	 - - - -
Water content	m-%	< 0.1	< 0.1	DIN 51777

These technical data are based on average test results. Minor deviations may occur from case to case.

Further product information is available on request.

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OPTIMOL LONGTIME

ARAPEN® RB 320

ARAPEN RB 320 is a long-life grease developed for the roller bearings of railroad car journals where no provision is made for in-service relubrication. It is fully approved against Specification M-942-88 of the Association of American Railroads for Journal Roller Bearing Grease for non-field-lubricated bearing applications. It is used by major manufacturers of railroad journal bearings as the factory-fill lubricant.

ARAPEN RB 320 has high oxidation stability and is highly resistant to chemical deterioration that might otherwise produce acids or deposits that are detrimental to long bearing life. It has exceptional ability to withstand shear, i.e., retain consistency after prolonged working, as in the churning action of an anti-friction bearing. ARAPEN RB 320 has been shown to have little effect on elastomeric seal materials, thus maintaining good seal performance, a significant requirement for shop-to-shop wheel service. Largely because of its special calcium-lithium-soap base, ARAPEN RB 320 has good heat resistance and a high resistance to deterioration in the presence of water. It is inhibited to give protection against rusting.

Typical Inspections

	AAR M-942-88 Requirements	ARAPEN RB 320
Penetration, ASTM D 217, mm/10, Worked, 60X	290-320	305
Structural stability, change in worked penetration after 100,000 double strokes, mm/10	25 max	-18
Dropping point, °C (°F)	162 (325) min	177 (350)
Bomb oxidation stability, ASTM D 942, pressure drop in 100 hr, kPa (psi)	69 (10) max	7 (1)
500 hr, kPa (psi)	172 (25) max	34 (5)
Corrosion, ASTM D 1743	1 max	1
Moisture, ASTM D 128, %	0.50 max	0.00
Elevated temperature roll stability penetration at 180°F, worked, mm/10	290-350	325
Dynamic mechanical stability migration and distribution,	1 or 2	1
penetration after test, mm/10	270-320	307
Base oil flash point (open cup), °C (°F)	171 (340) min	246 (475)
Base oil viscosity, cSt at 40°C	146-184	163
SSU at 100°F	750-950	840
Base oil viscosity index	80 min	100

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MANUFACTURER : MAPPL SINGAPORE
Ph: +65 660 6000
Fax: +65 265 3683

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EXXON ARAPEN RB 320

Shell Oils

Product Data Sheet

PDS No. 5336

11-Dec-92

CORENA OIL P100

A SPECIALISED MINERAL LUBRICANT FOR RECIPROCATING AIR COMPRESSORS

DESCRIPTION

Shell Corena Oil P100 is a premium, high performance, specialist compressor oil designed for use in reciprocating air compressors. It is formulated from Shell's exclusive XHVI base oil to give very low carbon deposit formation and exceptional oxidational stability.

Shell Corena Oil P's performance in industrial applications rivals or exceeds that of synthetic products.

Shell Corena Oil P is also available in other ISO Viscosity Grades, as Shell Corena Oil P68 and Shell Corena P150.

SUMMARY OF BENEFITS

- Superior wear protection for compressors.
- Minimal carbon deposit formation provides increased margins of safety against fire and explosion.
- Excellent corrosion resistance, anti-wear performance and demulsibility.
- Eliminates problems associated with seal compatibility often encountered with synthetics.
- Long service life resulting in reduced maintenance costs.

PERFORMANCE FEATURES

Shell Corena Oil P100 has been designed around a unique blend of base oils and additives which impart many outstanding performance features.

Safer working environment:
Deposits which block the valves and airways of air compressors can present the danger of fires and explosions. By keeping deposit formation to a minimum, Shell Corena Oil P helps promote a safer working environment.

Improved compressor performance and efficiency:
It has been proven in rig tests at Shell's Thornton (UK) Research Centre that carbonaceous deposits formed as a result of oil degradation can have a severe effect on the performance of an air compressor. Deposits formed on the fine clearances of compressor valves cause air leakages. This results in a loss of efficiency. Because of its extremely low deposit formation tendencies, Shell Corena Oil P is able to significantly increase the efficiency and performance of the compressor. This reduces the need for costly strip downs in order to recondition the valves of the machine.

Reduction in carbonaceous deposits:
The performance of oils in reciprocating air compressors is governed by their tendency to form deposits on the valves and in the airways of the compressor. The environment above the piston of a reciprocating compressor is very demanding, combining high pressures with high temperatures. The oil in this space is subjected to severe degradation by the process of compression and the components of the machine are liable to become coated with the products created by oil decomposition. Shell Corena Oil P has been designed specifically to resist this deposit formation. This ensures longer intervals between oil changes and reduced maintenance costs. It also means increased productivity – due to the higher availability of plant, and a much safer working environment.

Excellent seal compatibility and corrosion resistance:
Many synthetic compressor oils, especially those of the diester type, can present special problems for the user. Synthetic oils are not always compatible with all seal materials and can cause leakages in machines not specially equipped to handle such aggressive fluids. Some synthetics may also have a poor resistance to corrosion and can cause rusting. Shell Corena Oil P, being a mineral oil product is compatible with all normal seal materials and provides outstanding corrosion resistance.

HEALTH AND SAFETY

Information is available on the relevant Material Safety Data Sheet

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SHELL CORENA P100

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11-Dec-92

CORENA OIL P100

A SPECIALISED MINERAL LUBRICANT FOR RECIPROCATING AIR COMPRESSORS

User identifiable benefits:
The outstanding performance features of Shell Corena Oil P can easily be verified by the user. In normal service the air compressor operator would make regular checks of the compressor's valves, replacing them when necessary. The operator thus becomes familiar with the rate at which deposits build up and adjusts his maintenance schedules accordingly. The benefits of using a high performance, mineral based compressor oil – such as Shell Corena Oil P – should therefore be easily verifiable and measurable.

SPECIFICATIONS/APPROVALS

ISO VISCOSITY 100

TYPICAL CHARACTERISTICS

DESCRIPTION	UNITS	METHODS	TYPICAL
APPEARANCE		VISUAL	C&B
VISCOSITY AT 40°C	mm^2/s	ASTM D445	100
VISCOSITY AT 100°C	mm^2/s	ASTM D445	9.4
VISCOSITY INDEX		ASTM D2270	60
POUR POINT	°C	ASTM D97	−20
DEMULSIBILITY		ASTM D1401	40−40−0(10)
COPPER CORROSION 3H@100°C		ASTM D130	1B
RUST PREVENTION		ASTM D665A&B	PASS
OXIDATION STABILITY (POT TEST)			
– EVAPORATIVE LOSS	%m		12.5
–CONRADSON CARBON	%m		2.0

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SHELL CORENA P100

SAFETY DATA SHEET

Trade Name: ISOFLEX TOPAS L 152
Date : 27.06.95 Revision date: 01.09.94 Page: 1 of 6

1. Identification of the substance/preparation and of the company

1.1 Product name: ISOFLEX TOPAS L 152
Article no.: 0000004144

1.2 Manufacturer/supplier information

Klüber Lubrication München KG
Geisenhausenerstr. 7
D 81379 München
Telephone: (089)7876-0 Telefax: (089)7876-333
Department providing information: Chemische Dokumentation
Telephone: (089)7876-564
Emergency telephone number: (089)7876-0

2. Composition/information on ingredients

Chemical characterization: lithium soap , synthetic hydrocarbon oil

Hazardous ingredients:

None

3. Hazard identification

Specific hazards to man and the environment:
No particular hazards known.

First aid measures

93605

Inhalation: Not applicable

Skin contact: In case of contact with skin wash off with soap and water.

Eye contact: In case of contact with eyes rinse thoroughly with water.

Ingestion: Do not induce vomiting. Refer for medical treatment.

Information to doctor: Treat symptomatically.

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5. Fire-fighting measures

Suitable extinguishing media: Water spray jet , foam , dry powder , carbon dioxide

Unsuitable extinguishing media: Full water jet

Special exposure hazards: In case of fire the following can be released: carbon monoxide (CO) , not combusted hydrocarbons

Special protective equipment: No particular precautions necessary.

Other instructions: Do not inhale combustion gases. Cool containers at risk with water spray jet. Fire residues and contaminated firefighting water must be disposed of in accordance with the local regulations.

6. Accidental release measures

Personal precautions: Not necessary.

Environmental precautions: Do not discharge into the drains / surface waters / groundwater.

Methods for cleaning up: Take up mechanically. Dispose of absorbed material in accordance with the regulations.

Other instructions: None

7. Handling and storage

7.1 Handling

Instructions on safe handling:
No special measures necessary if used correctly.

Instructions on protection against fire and explosion:
No special measures necessary. Fire class B according to DIN EN 2.

7.2 Storage

Requirements on storage rooms and vessels:
No special measures required.

Incompatible materials:
Do not store together with food. Do not store together with oxidizing materials.

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Other instructions:
Recommended storage temperature: 0°-40°C

8. Exposure controls and personal protection

8.1 Additional instructions on technical equipment:
Not applicable

8.2 Ingredients and specific control parameters

Limit values:

None

8.3 Personal protection

General protection and hygiene measures:
Avoid prolonged and/or repeated contact with skin. Remove soiled or soaked clothing immediately. Clean skin thoroughly after work; apply skin cream.

Respiratory protection: Not necessary if used correctly.

Hand protection: Not necessary if used correctly.

Eye protection: Not necessary if used correctly.

Skin protection: Not necessary if used correctly.

Physical and chemical properties

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9.1	Appearance	: pasty		
9.2	Colour	: beige - brownish		
9.3	Odour	: characteristic		
9.4	Change in physical state			test method
	Drop point	: > 185	°C	DIN ISO 2176
9.5	Flash point	: > 220	°C	(base oil)
9.6	Flammability Solid	: n.a.		
9.7	Ignition temperature	: n.a.	°C	
9.8	Autoflammability Solid	: n.a.		
9.9	Explosion limits			

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	lower	: n.a.
	uppper	: n.a.
9.10	Vapor pressure	: n. a.
9.11	Density	: approx. 0,88 g/cm3, 20°C
9.12	Water solubility	: not soluble
9.13	pH-value	: n.a.
9.14	Viscosity:	
	Kinematic viscosity	: n.a.
9.15	Other data	: None

10. Stability and reactivity

Conditions to avoid: None
Materials to avoid: Reactions with strong oxidizing materials.
Hazardous decompositon products: No hazardous decomposition products known.
Other instructions: None

11. Toxicological information

The product has not been tested. The information is derived from products of similar composition.

Acute toxicity (LD_{50}/LC_{50} values)

LD_{50} oral : > 2 g/kg,rat (literature data)

Subacute and chronic toxicity: None

Empirical data on effects on humans: Frequent persistent contact with the skin can cause skin irritation.

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12. Ecological information

Biodegradation:
Product is insoluble in water. May be separated out mechanically in purification plants.

Persistence in the environment:
The product has not been tested. Because of the product's consistency and low solubility in water bioavailability is not likely.

Ecotoxic effects on organisms:

SAFETY DATA SHEET

The product has not been tested. Because of the product's consistency and lack of solubility in water bioavailability is not likely.

Other information:
Do not allow to enter soil, waterways or waste water.

13. Disposal considerations

Disposal: Dispose of in accordance with your local, state and federal regulations (authorized incineration plant or waste disposal site).

Disposal of contaminated packaging and recommended cleaning:
Uncontaminated packaging may be taken for recycling. Contaminated packaging should be emptied as far as possible and after appropriate cleansing may be taken for reuse.

14. Transport information

14.1 Land transport ADR/RID and GGVS/GGVE

GGVS/GGVE : Not applicable

14.2 Sea transport

IMDG/GGVsee : Not applicable

14.3 Air transport

ICAO/IATA : Not applicable

14.4 Transport / additional informations:

The product is not subject to transport regulations.

15. Regulatory information

15.1 Labelling according to the regulations of the EEC

Labelling code: The product does not require a hazard warning label in accordance with EC directives/German regulations on dangerous substances.

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15.2 National regulations

Water Hazard Category (Germany): WHC 1, Self-classification

16. Other information

n.a. = not applicable

The information on this data sheet contains safety data corresponding to our present state of knowledge. This safety data sheet is not a technical specification and we, therefore, disclaim any guarantee as to the product properties.

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