

LOS ANGELES COUNTY

METROPOLITAN TRANSPORTATION AUTHORITY

LIGHT RAIL VEHICLE

P2550

**RUNNING
MAINTENANCE
AND
SERVICE MANUAL**

**SECTION 17
MISCELLANEOUS**



LOS ANGELES COUNTY

METROPOLITAN TRANSPORTATION AUTHORITY

LIGHT RAIL VEHICLE

P2550



RUNNING MAINTENANCE
AND
SERVICE MANUAL

VOLUME M-01
PART I
THEORY OF OPERATION
SECTION 17 - MISCELLANEOUS

SECTION 17

MISCELLANEOUS

PART I

THEORY OF OPERATION

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TABLE OF CONTENTS

Section/ Para	Title	Page
17-I-01	INTRODUCTION	1
17-I-01.a	List of Abbreviations, Acronyms and Symbols	2
17-I-01.b	List of Definitions	3
17-I-01.c	List of Measurement Units and Symbols	4
17-I-02	THEORY OF OPERATION	5
17-I-02.01	Components	5
17-I-02.01.01	Windshield Wiper/Washer System	5
17-I-02.01.02	Windshield Defroster/Demister System.....	11
17-I-02.01.03	Horn & Gong System	15
17-I-02.01.04	Fire Extinguisher	20
17-I-02.01.05	Labels.....	21
17-I-03	APPENDIX	28
17-I-03.01	IP Code	28
17-I-03.02	Insulation Class	29

LIST OF ILLUSTRATIONS

Figure	Title	Page
Figure 17-I-02.1	Windshield Wiper/Washer Components	5
Figure 17-I-02.2	Windshield Wiper/Washer Functional Schematic	6
Figure 17-I-02.3	Windshield Wiper/Washer Switch	8
Figure 17-I-02.4	Wiper Motor	9
Figure 17-I-02.5	Windshield Washer	10
Figure 17-I-02.6	Windshield Defroster/Demister	11
Figure 17-I-02.7	Heater/Demister Control Switch	12
Figure 17-I-02.8	Defroster Demister Box	13
Figure 17-I-02.9	Defroster/Demister Functional Schematic	14
Figure 17-I-02.10	Horn and Gong Loud Speaker	15
Figure 17-I-02.11	Horn and Gong Pushbuttons	16
Figure 17-I-02.12	Location of Horn Control Box and Loudspeaker	17
Figure 17-I-02.13	Horn Control Box	18
Figure 17-I-02.14	Horn and Gong functional Schematic	19
Figure 17-I-02.15	Fire Extinguisher	20
Figure 17-I-02.16	Exterior Label Overview	21
Figure 17-I-02.17	Vehicle ID	22
Figure 17-I-02.18	MTA Side Logo	23
Figure 17-I-02.19	USA Flag	23
Figure 17-I-02.20	Manufacturer Logo	24
Figure 17-I-02.21	MTA Front Logo	24
Figure 17-I-02.22	Interior Label Overview	25
Figure 17-I-02.23	Train and Body Section ID	26
Figure 17-I-02.24	Manufacturer Metallic Logo	26
Figure 17-I-02.25	Passenger Intercom Sign	27
Figure 17-I-03.1	Insulation Class	29

LIST OF TABLES

Table	Title	Page
Table 17-I-03.1	Ingress Protection Ratings (IP Codes)	28
Table 17-I-03.2	Insulation Class	29

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SECTION 17

MISCELLANEOUS

17-I-01 INTRODUCTION

This Section of the Running Maintenance and Service Manual is divided into three Parts:

- Part I: Theory of Operation
- Part II: Troubleshooting
- Part III: Maintenance

Each Paragraph is numbered accordingly, to avoid that paragraphs of the same Section, pertaining to a different Part, have the same number.

Part I - Theory of Operation

Part I gives a thorough overview of the System structure and operation, by means of descriptions, figures, photos, schematics, block diagrams and flow charts, together with references to other documents or Sections when needed.

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It gives the Maintenance Technicians a path to troubleshoot the System in every condition by means of the available tools:

- The PTU, equipped with the specific SW program;
- The IDU;
- The Fault Isolation Table.

The Part III - Maintenance consists of:

- Preventive Maintenance
- Corrective Maintenance
- Consumable Materials
- Test Equipment , Tools & Special Tools

17-I-01.a LIST OF ABBREVIATIONS, ACRONYMS AND SYMBOLS

The Abbreviations, Acronyms and Symbols commonly used throughout this manual are given below with their related meaning.

Abbreviation	Meaning
AB.....	Ansaldo Breda
AC/DC	Alternate Current - Direct Current Converter
APS	Auxiliary Power Supply
CB	Circuit Breaker
DC/AC	Direct Current - Alternate Current Converter
DC/DC	Direct Current - Direct Current Converter
HV	High Voltage
HVDS	High Voltage Distribution System
IDU	Integrated Diagnostic Unit
IP	Ingress Protection Rating
KO	Out of Service
LED	Light Emitting Diode
LH.....	Left Hand Side
LRV	Light Rail Vehicle
LV.....	Low Voltage
LVDS.....	Low Voltage Distribution System
LVPS	Low Voltage Power Supply
MBL.....	Metro Blue Line
MV	Medium Voltage
NC	Normally Closed
NO	Normally Open
OK.....	Working
PGL	Pasadena Gold Line
PTU	Portable Test Unit
RH	Right Hand Side
SW	Software
TBS	To Be Supplied

17-I-01.b LIST OF DEFINITIONS

The Definitions commonly used throughout this manual are given below with their related meaning.

Definition	Meaning
//	Parallel
'A' body section.....	The section of an articulated vehicle containing the pantograph
'B' body section.....	The section of an articulated vehicle not containing the pantograph
AW0	Empty car operating weight
AW1	Full seated load plus AW0
AW2	Standees at 4 persons per square meter plus AW1
AW3	Standees at 6 persons per square meter plus AW1
AW4	Standees at 8 persons per square meter plus AW1
Front door	The door close to the Operator's Cab
LC filter.....	Filter made up of Inductance and capacity
Rear door	The door close to the Articulation Section
RLC filter	Filter made up of Resistance, Inductance and Capacity
Sine-wave	Sinusoidal wave

17-I-01.c LIST OF MEASUREMENT UNITS AND SYMBOLS

The Measurement Units commonly used throughout this manual are given below with their related meaning.

Definition	Meaning
Ω_W	Ohm
$^{\circ}C$	Celsius degree
$^{\circ}F$	Fahrenheit degree
A	Ampere
ac.....	Alternate Current
dB	Decibel
dc.....	Direct Current
F	Farad
ft	Foot
gal.....	Gallon
H.....	Henry
Hz.....	Hertz
in.....	Inch
kg.....	Kilogram - approx 2.205 pounds
km.....	Kilometer - approx 0.621 miles
kN	Kilo-Newton - approx 224.809 pounds force
lb	Pound
lb-ft	Pound force
lps.....	Liters per Second
m	Meter - approx 3.28 feet
mm	Millimeter - approx 0.0394 inches
ms.....	Milli second
Pa	Pascal
psig.....	Pounds per square inch
rms	Root Mean Square Voltage
rpm	Revolution per Minute
V	Voltage
W	Watt

17-I-02 THEORY OF OPERATION

17-I-02.01 Components

17-I-02.01.01 Windshield Wiper/Washer System

The vehicle is equipped with two Windshield Wiper/Washer Systems, one per Operator Cab.

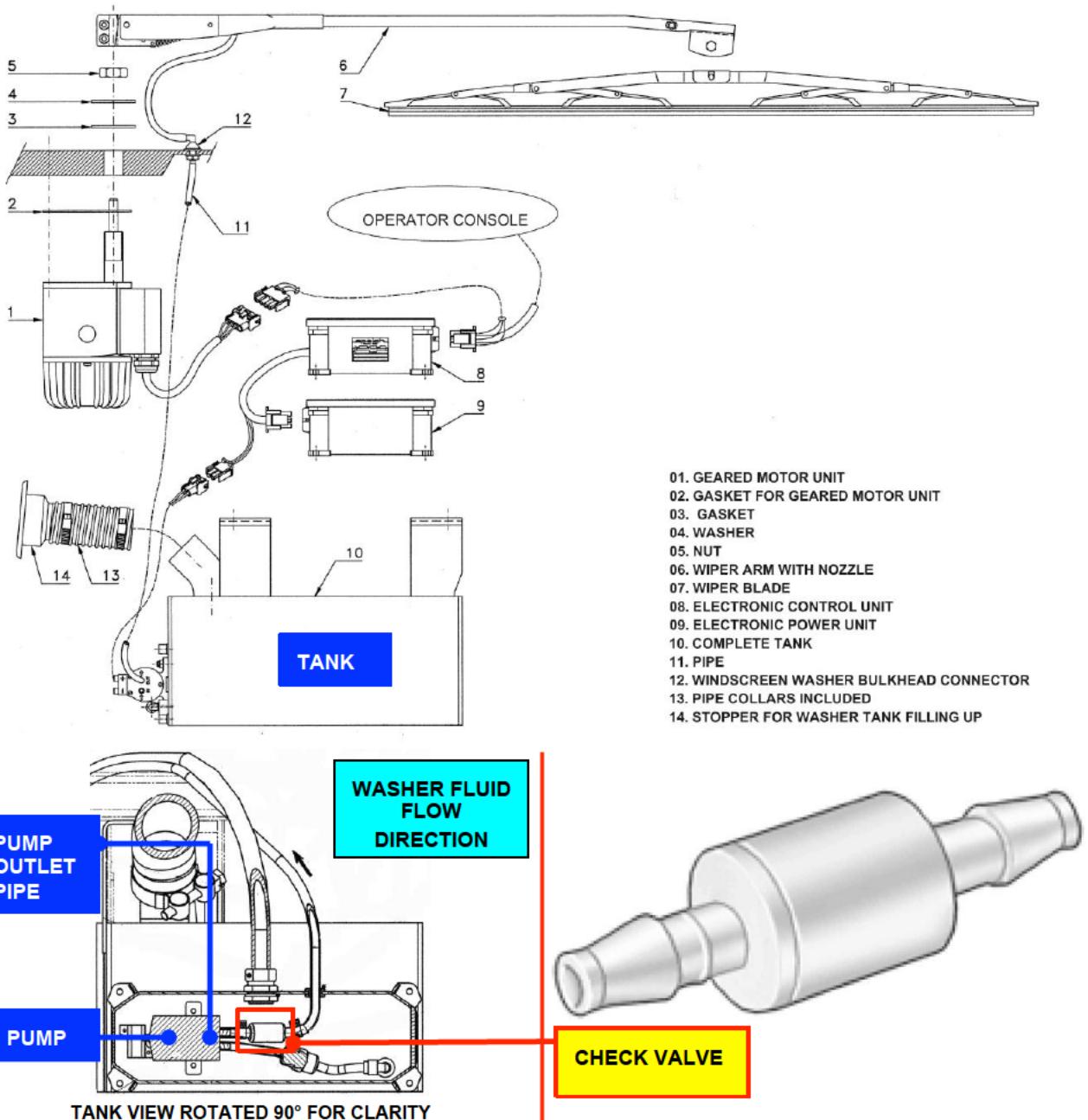


Figure 17-I-02.1 Windshield Wiper/Washer Components

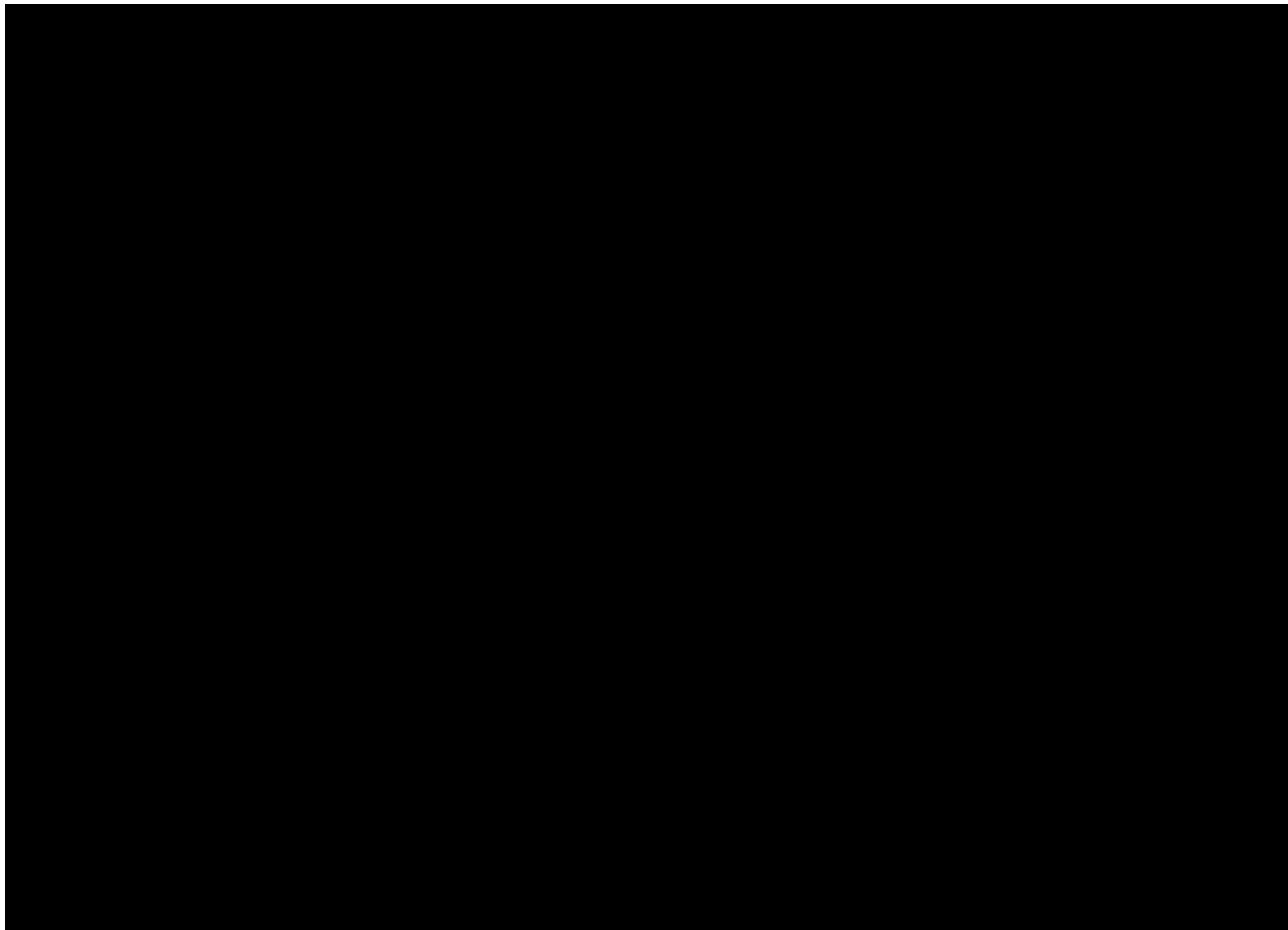


Figure 17-I-02.2 Windshield Wiper/Washer Functional Schematic

17-I-02.01.01.01 Windshield Wiper Subsystem

The Windshield Wiper Subsystem is made up of:

- One Motor Unit;
- One Electrical Power Unit;
- One Electrical Control Unit;
- One Wiper Arm and Blade;
- One Windshield Wiper Switch (in the Operator's Console).

The Windshield Wiper/Washer Switch (10S04) has six positions: WASH, OFF, SHORT DELAY, LONG DELAY, LOW and HIGH that control the blade speed.

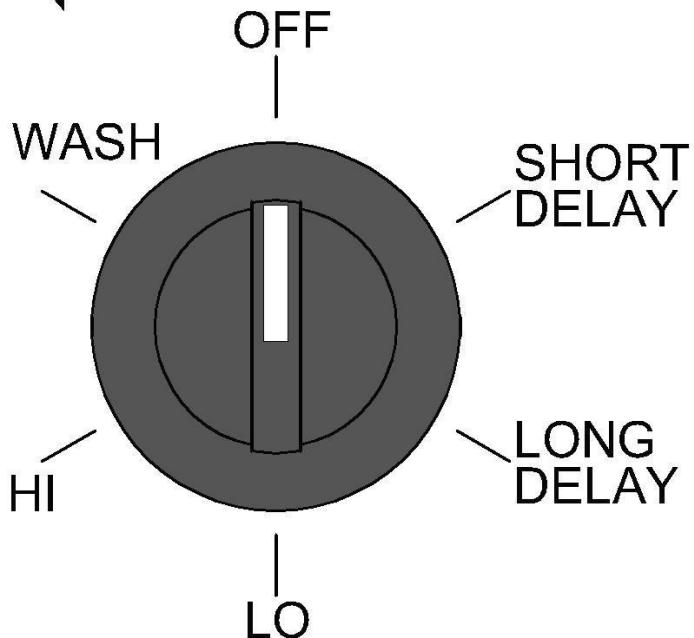
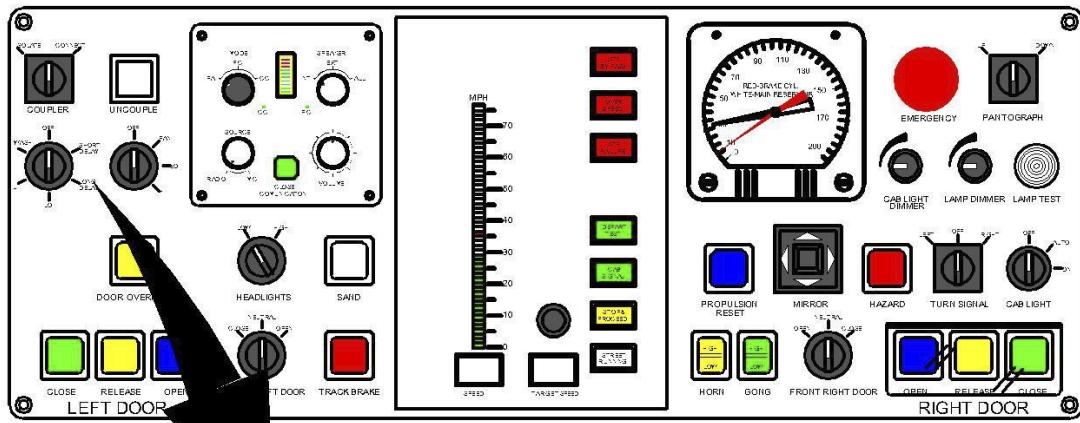
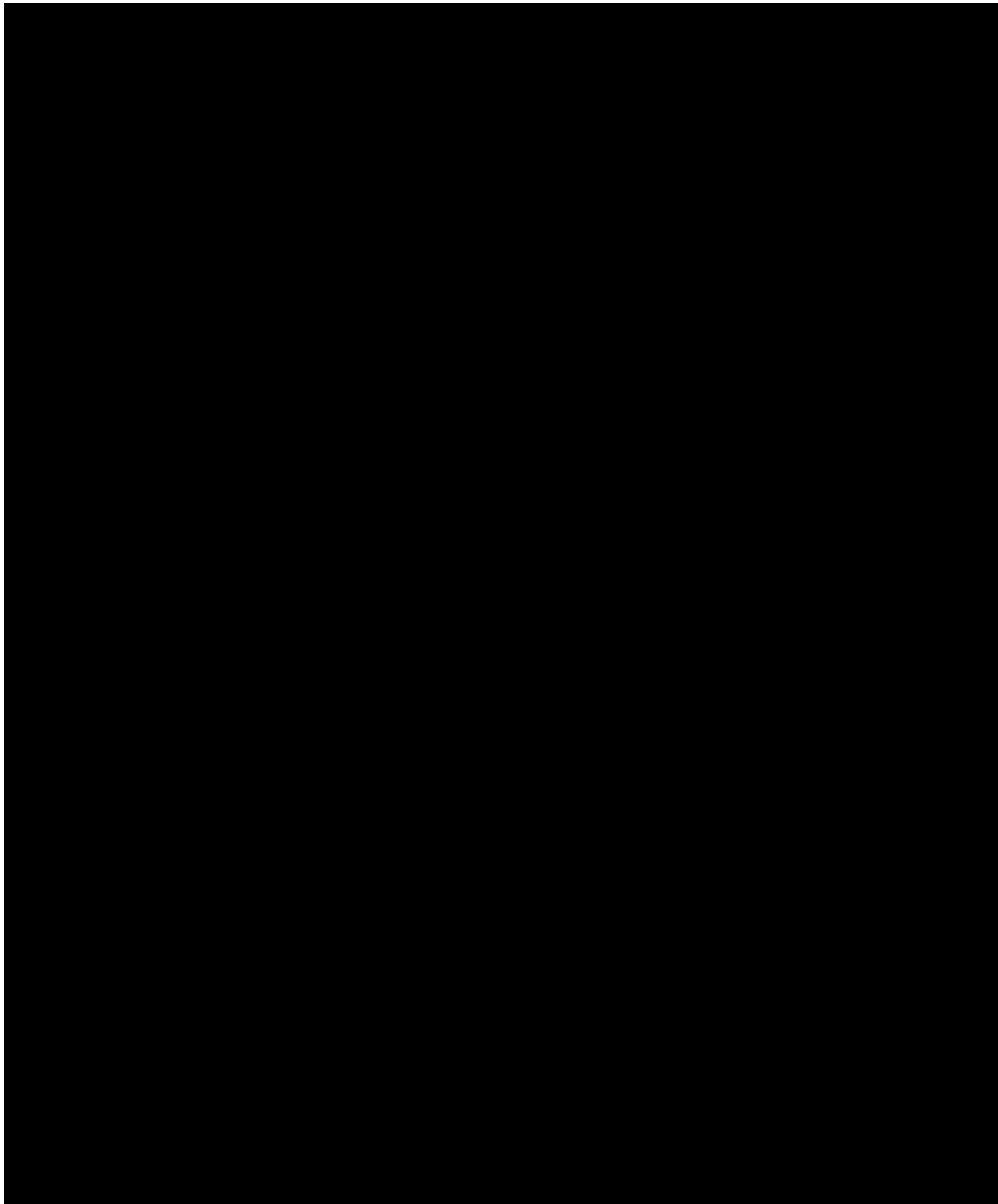


Figure 17-I-02.3 Windshield Wiper/Washer Switch

Each Windshield Wiper Subsystem is powered at 37.5 Vdc through CB (10F02) -Mirror and Windshield Wiper and Washer, located in the Electric Locker of the relative Body Section.



17-I-02.01.01.02 Windshield Washer Subsystem

The vehicle is equipped with two Windshield Washer Subsystems, one per Operator Cab.

The Windshield Washer Subsystem is made up of:

- One washer Tank (installed under the operator Cab)
- One Electric Pump.

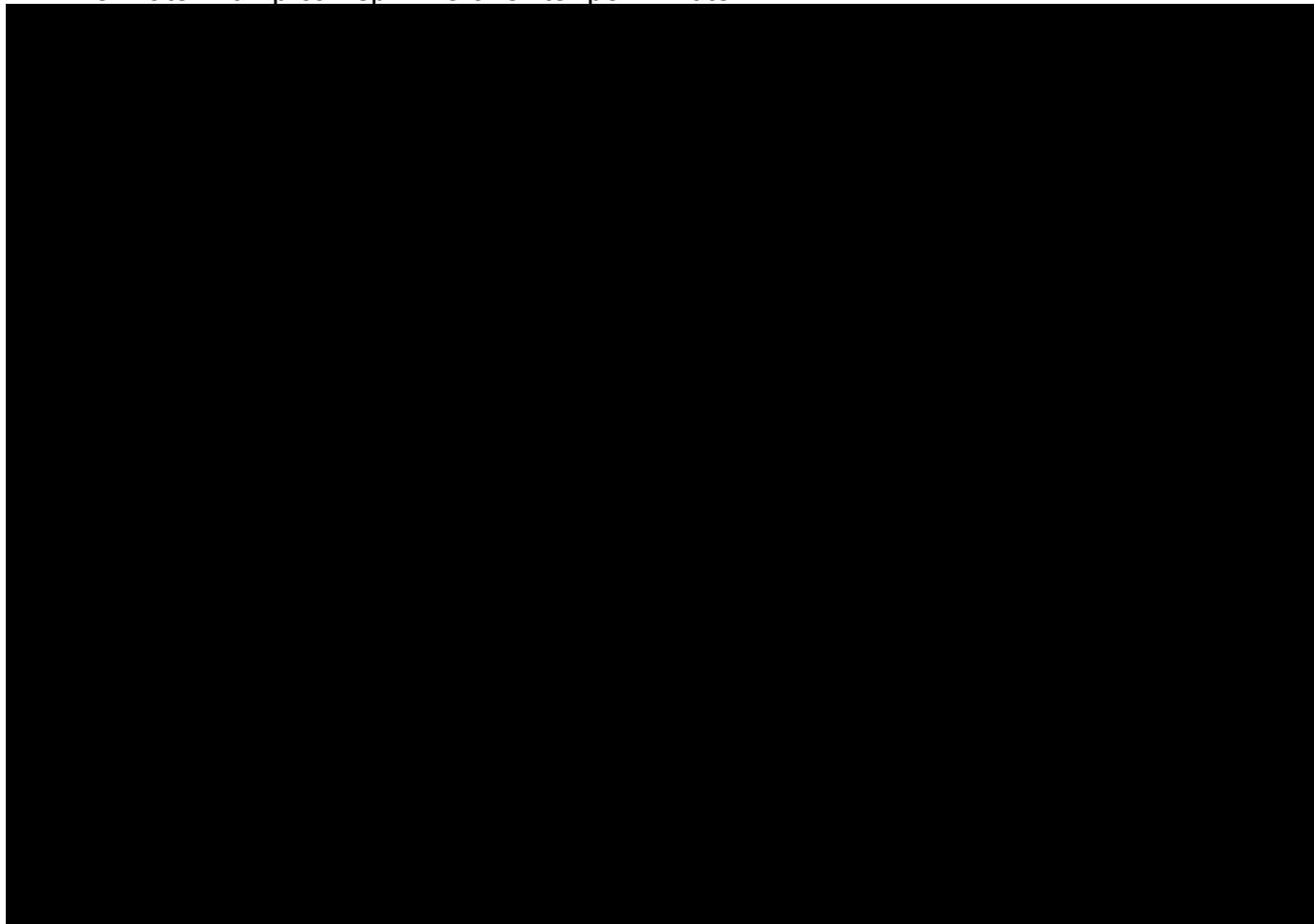
The tank has a capacity of 2.3 gals (10 liters).

The system is controlled through the WASH momentary position of the Windshield Wiper/Washer Switch (10S04).

As described in paragraph 17-I-02.01.01.01, the Windshield Wiper/Washer Switch (10S04) has also OFF, SHORT DELAY, LONG DELAY, LOW and HIGH positions that controls the Windshield Wiper Subsystem (Refer to Figure 17-I-02.3).

Each Windshield Washer Subsystem is powered at 37.5 Vdc through the CB (10F02) - Mirror and Windshield Wiper and Washer, located in the Electric Locker of the relative Body Section.

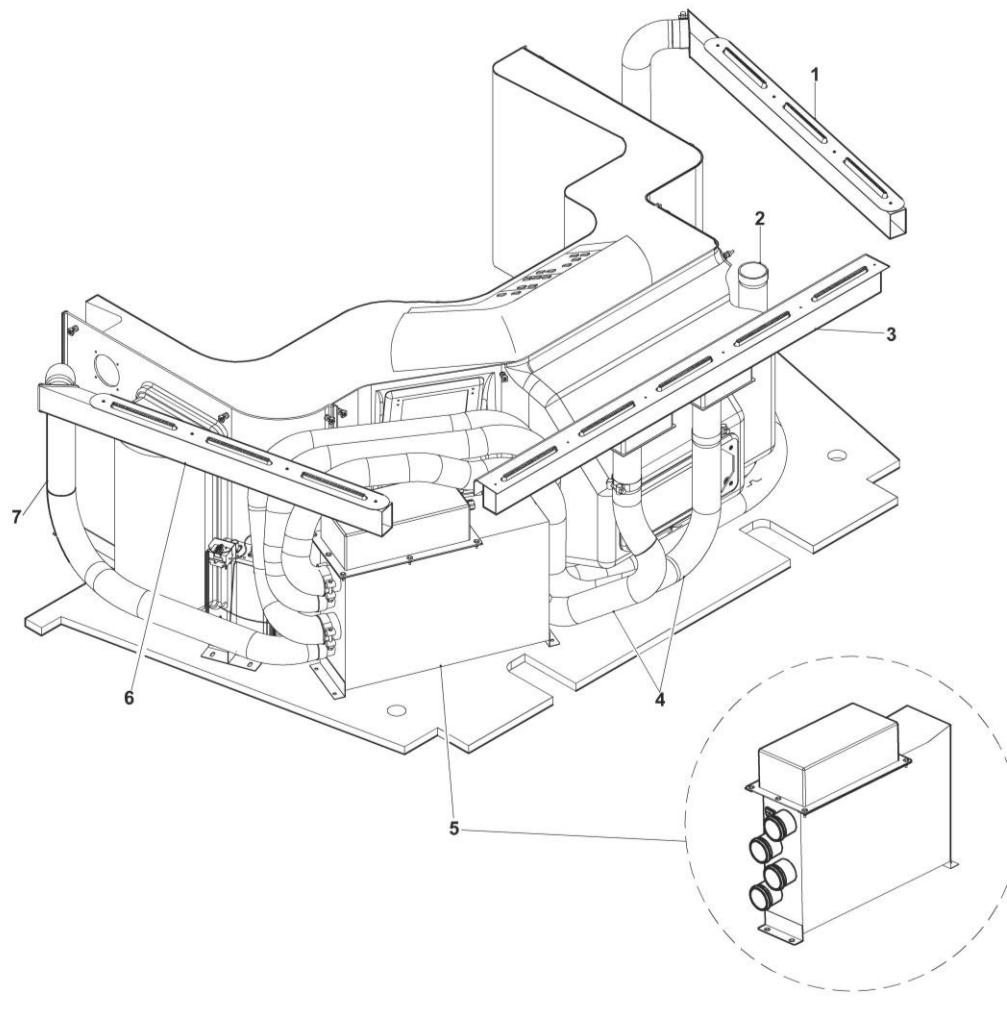
The Water Pump can sprinkle one liter per minute.



17-I-02.01.02 Windshield Defroster/Demister System

The Vehicle is equipped with two Windshield Defroster/Demister Systems, one per operator Cab.

Each system is designed to defrost and demist the Cab Side Windows and Windshield. Each system includes the Defrost Assembly and the related Ducts and Air Diffusers.



01. AIR DIFFUSOR LH
 04. DUCTS FRONT
 07. DUCT RH

02. DUCT LH
 05. DEFROSTER ASSY

03. AIR DIFFUSER FRONT
 06. AIR DIFFUSER RH

Figure 17-I-02.6 Windshield Defroster/Demister

Figure 17-I-02.6 shows the Windshield Defroster/Demister Systems and, on the right, an enlargement of the Defrost Assembly.

The Windshield Defroster/Demister System is powered through a one-phase 120Vac (MV) from the APS System and through the 37.5Vdc (LV) from the LVPS.

The Windshield Defroster/Demister CB (02F11) protects the Defroster/Demister System against MV overcurrent.

The Protective Switch for Defroster (10F04) and the Defroster Ventilation CB (10F05) protect the Defroster/Demister System against LV overcurrent.

The system is controlled through the four position Heater/Demister Control Switch (OFF, FAN, LOW HEAT and HIGH HEAT) located on the Operator's console.

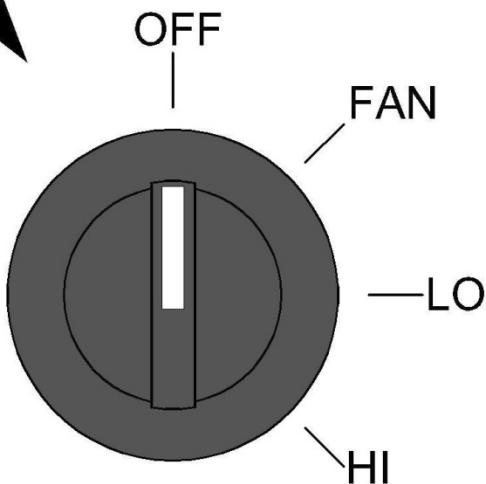
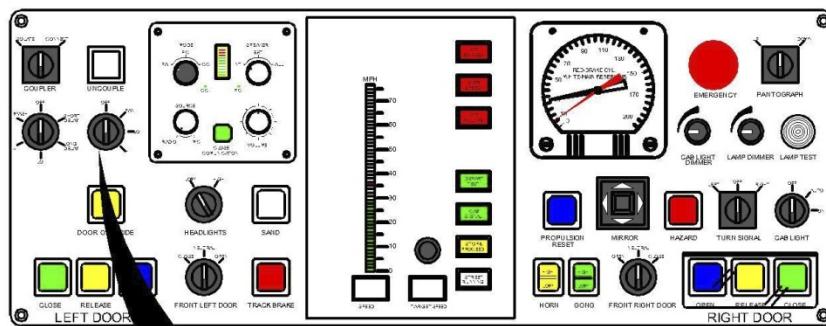
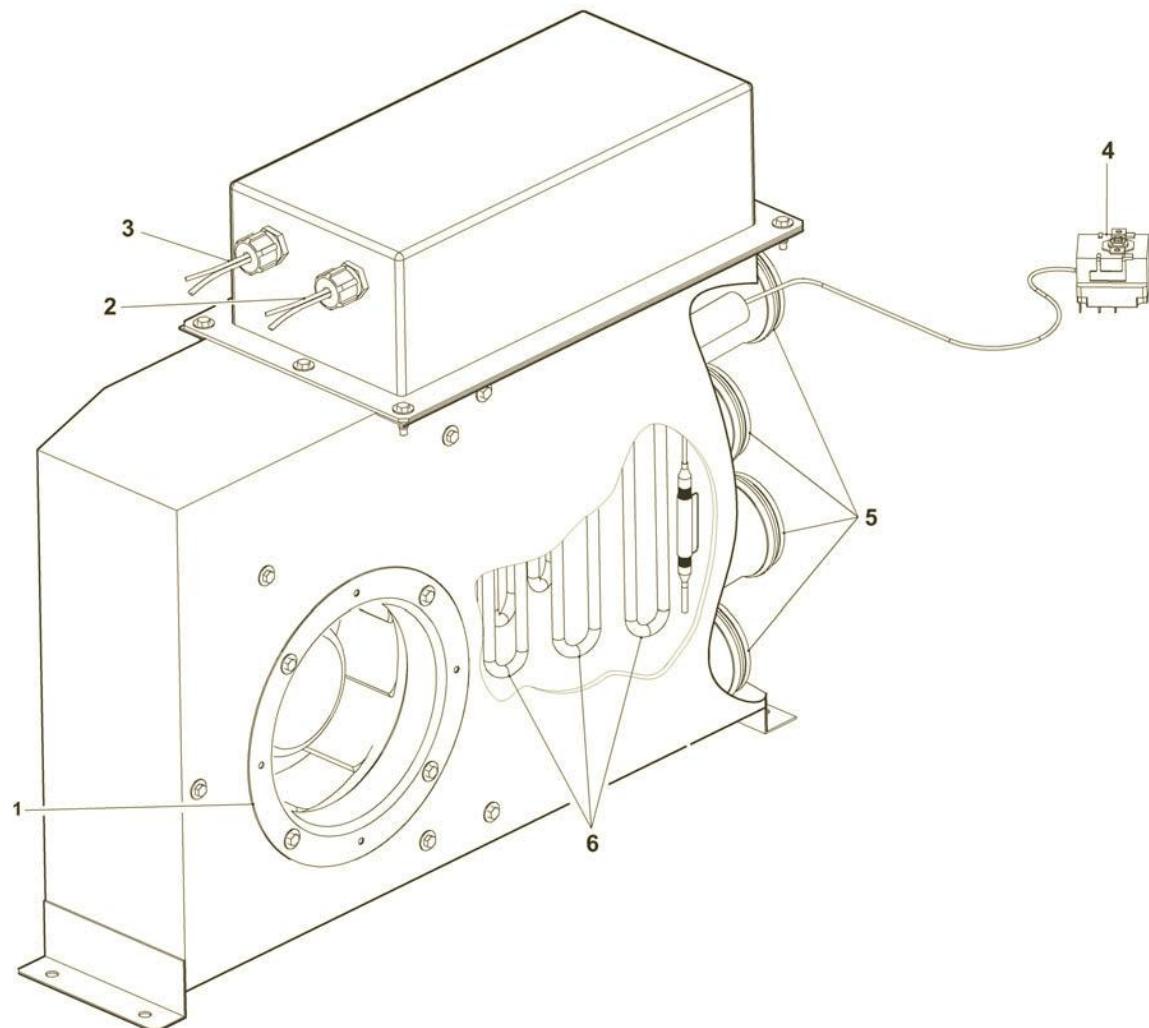


Figure 17-I-02.7 Heater/Demister Control Switch



01. BLOWER-MOTOR ASSEMBLY
04. THERMOSTAT ASSEMBLY

02. I20Vac CABLES
05. OUTPUT DUCTS

03. 37.5Vdc CABLES
06. HEATER ELEMENTS

Figure 17-I-02.8 Defroster Demister Box

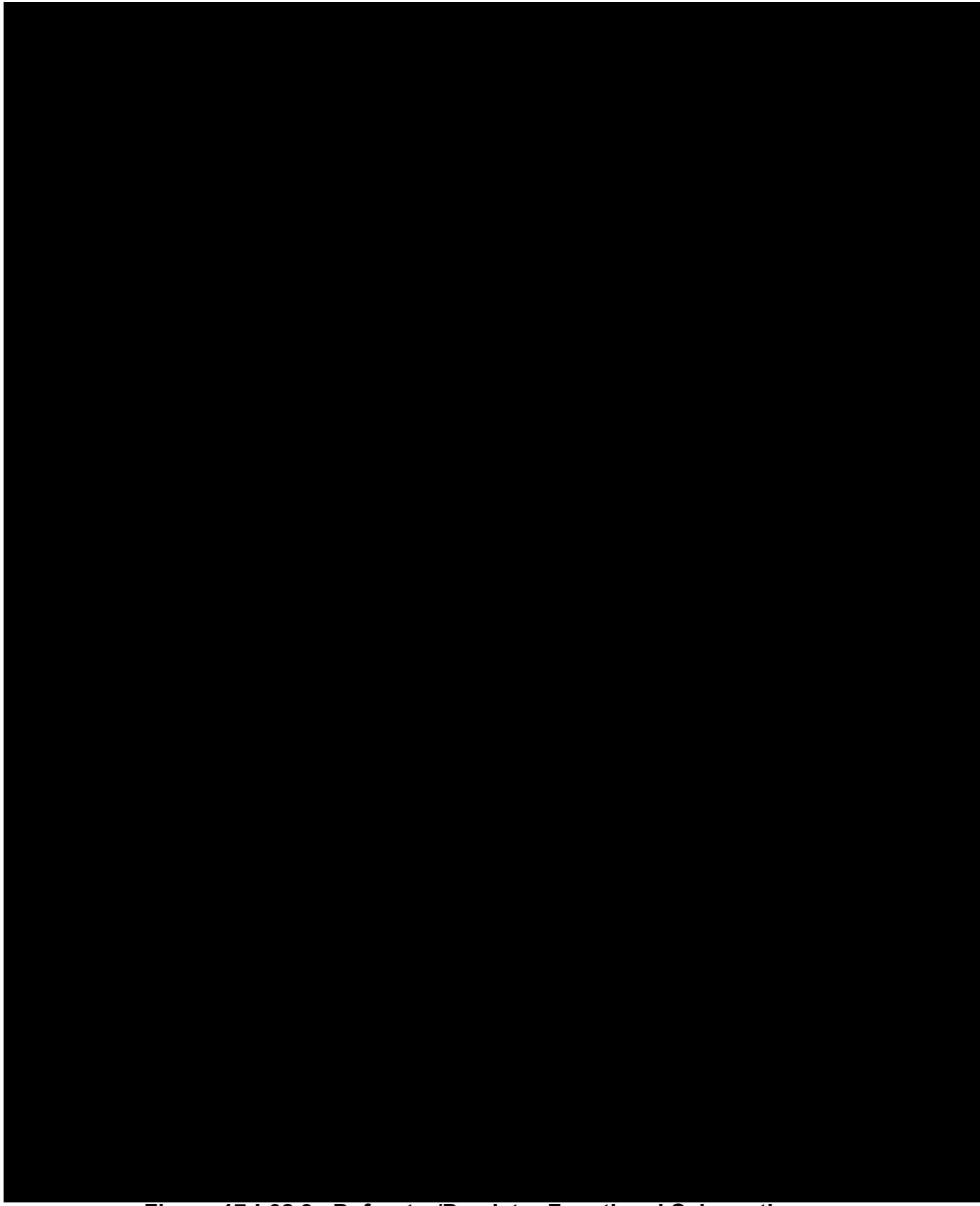


Figure 17-I-02.9 Defroster/Demister Functional Schematic

17-I-02.01.03 Horn & Gong System

The Vehicle is equipped with two Horn and Gong Systems, one per Operator Cab. Each system consists in one Horn & Gong Loud Speaker and one Electronic Control Unit. The Loud Speaker is installed on the Underframe, under the Operator Cab. Each system is powered with the 37.5 Vdc and is protected, through the Protective Switch for Horn & Gong (10F01, Nominal Current: 6A), against overcurrent. The CB is located on the Circuit Breaker Panel of the relative Cab.

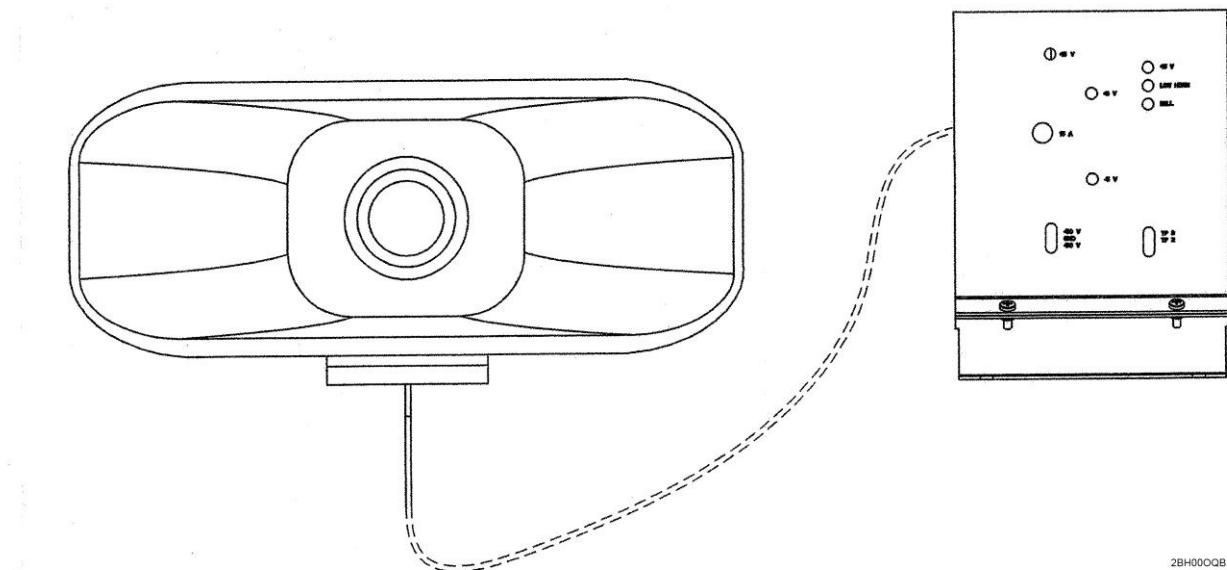


Figure 17-I-02.10 Horn and Gong Loud Speaker

The controller has a switching power supply that transforms the 37.5 Vdc input to +/- 50V for the power amplifier and 16V for other functions.

The controller also has an audio board that stores the digitized signals and has a microprocessor that plays them back when required. The third board in the controller is the power amplifier.

The electronic horn is designed to produce about 96dB SPL at 100 feet using 1 speaker and is capable of being adjusted from 0 to about 96dB SPL.

The Control Box is not weather proof and is mounted inside the overhead compartment in Operator's cab.

The Horn and Gong System is controlled through the HORN Pushbutton (10S01) and GONG Pushbutton (10S02) located on the Operator's Console; both the Horn and the Gong pushbuttons have three statuses:

- High;
- OFF (not pressed);
- Low.

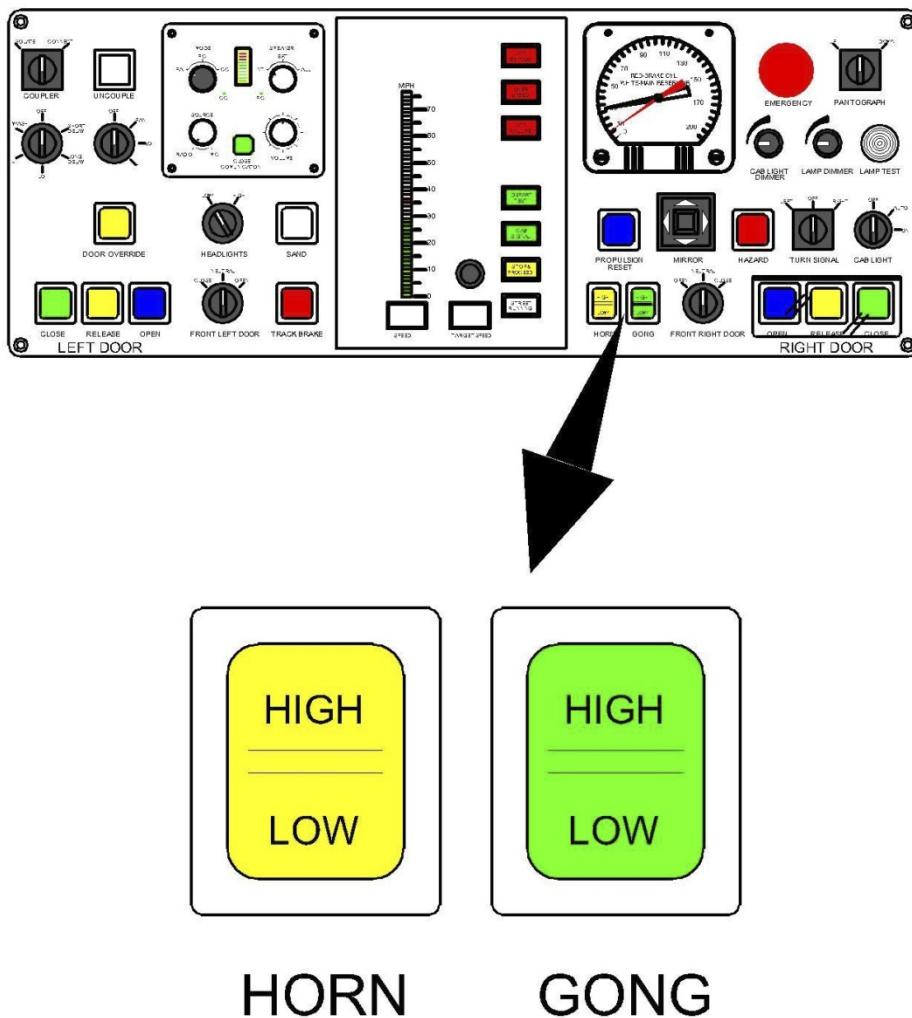
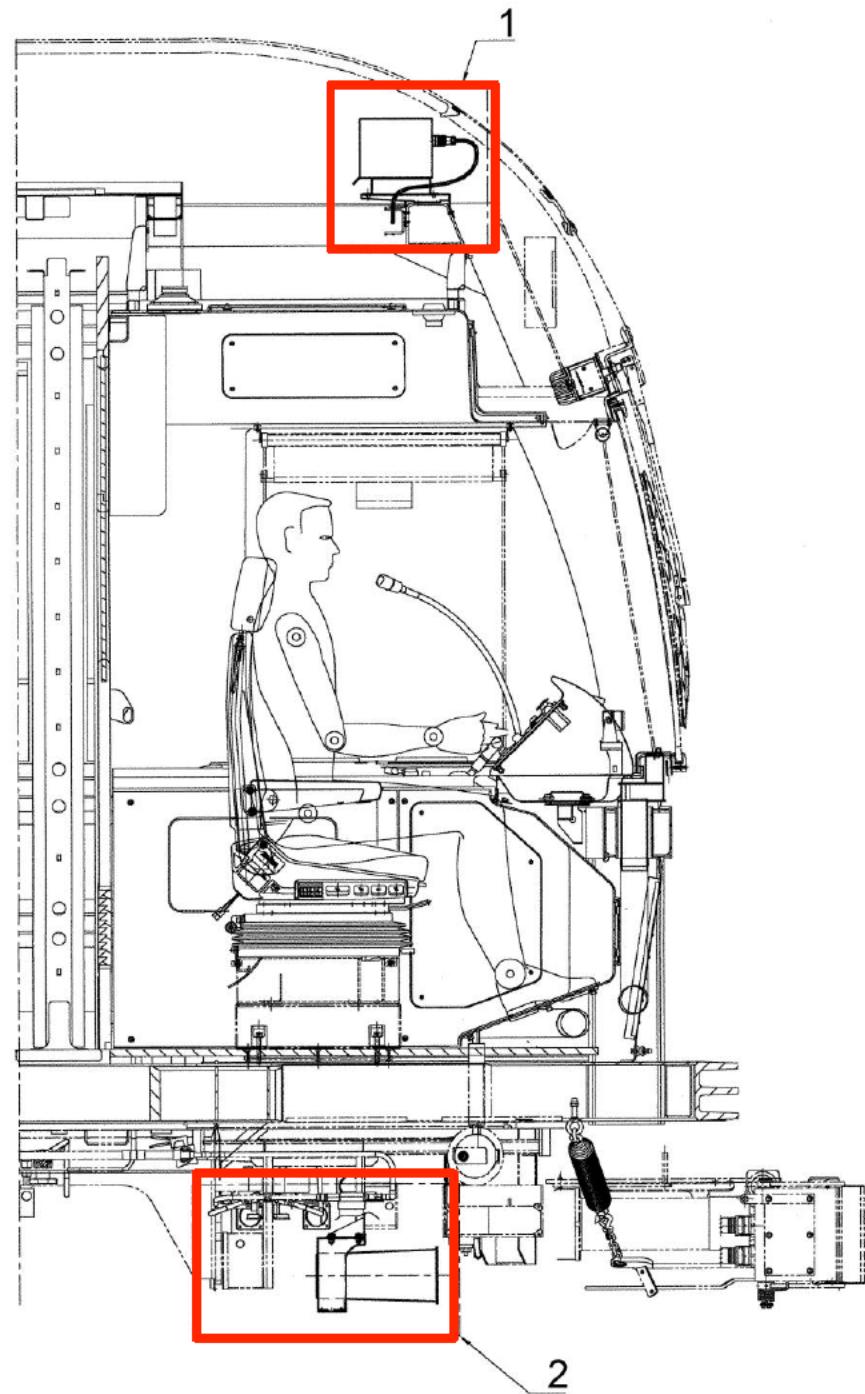


Figure 17-I-02.11 Horn and Gong Pushbuttons



01. CONTROL BOX

02. LOUDSPEAKER

2B0000QC

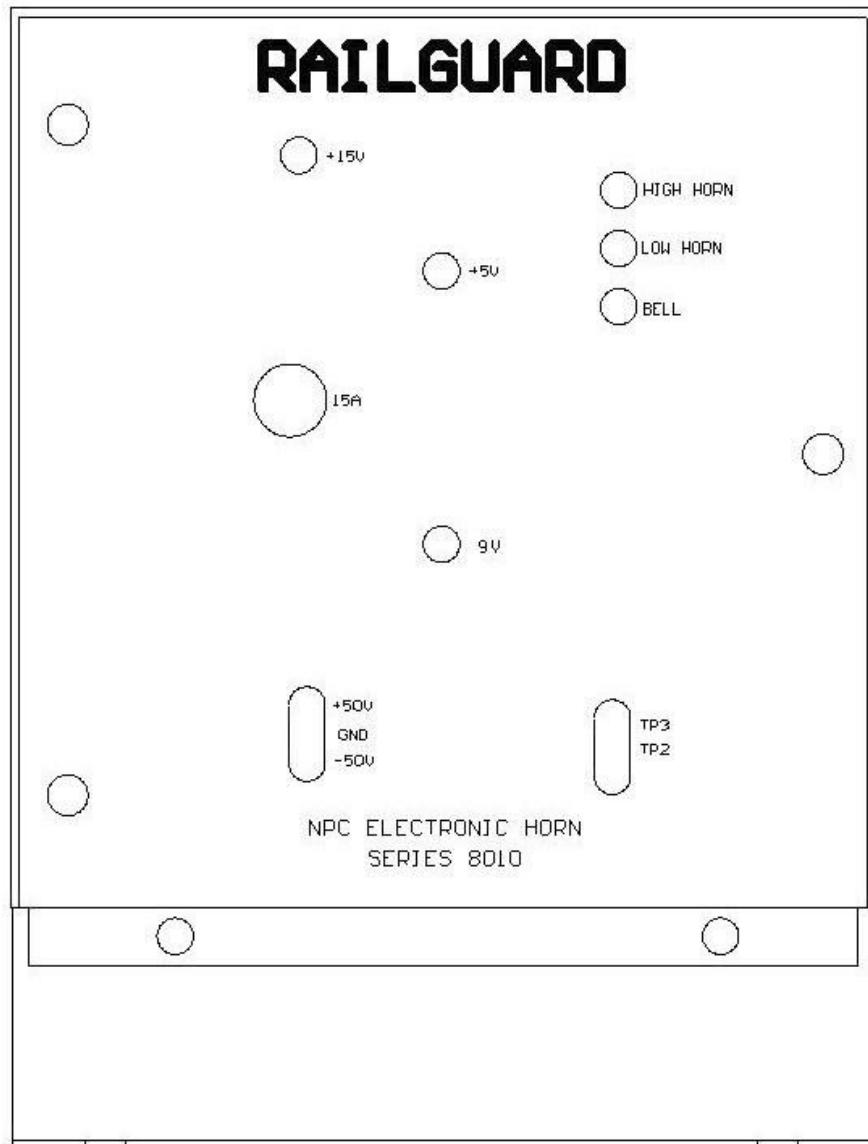


Figure 17-I-02.13 Horn Control Box

The Horn and Gong volume can be adjusted by means of three potentiometers (High Horn, Low Horn and Bell - refer to Figure 17-I-02.13) by turning them clockwise to increase the output level and are accessible from the front side of the Control Box.

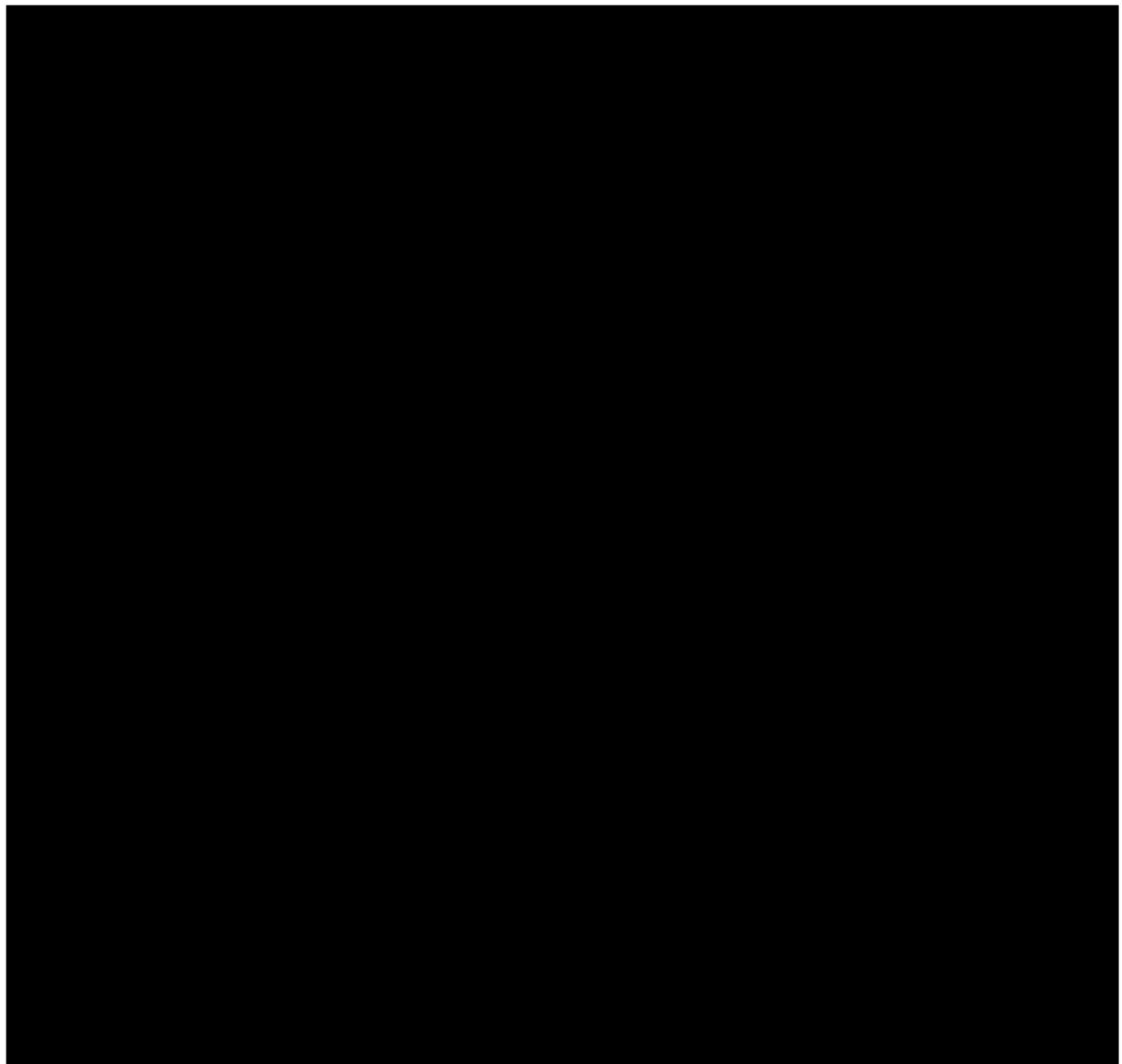


Figure 17-I-02.14 is an abstract of the AB Document 237VE06965C03 (LV Functional Schematic) and shows the Horn and Gong Relay Logic (Refer to Section 10).

When the Operator requests a Horn or Gong Application (both High and Low) the Relay Logic:

- Sends this request to the Horn and Gong Control Unit (10M01);
- Informs the Event Recorder;
- Energizes the 10K02 Relay (with its delay system) and, as consequence, energizes the 10K01 (a Blinking Relay). The 10K01 Intermittent Relay is connected with the Headlights (refer to Section 06) so, the Horn or Gong request generates a flashing headlight.

17-I-02.01.04 Fire Extinguisher

The vehicle is equipped with two Fire Extinguishers, one per each Operator's Cab, located under the operator console.

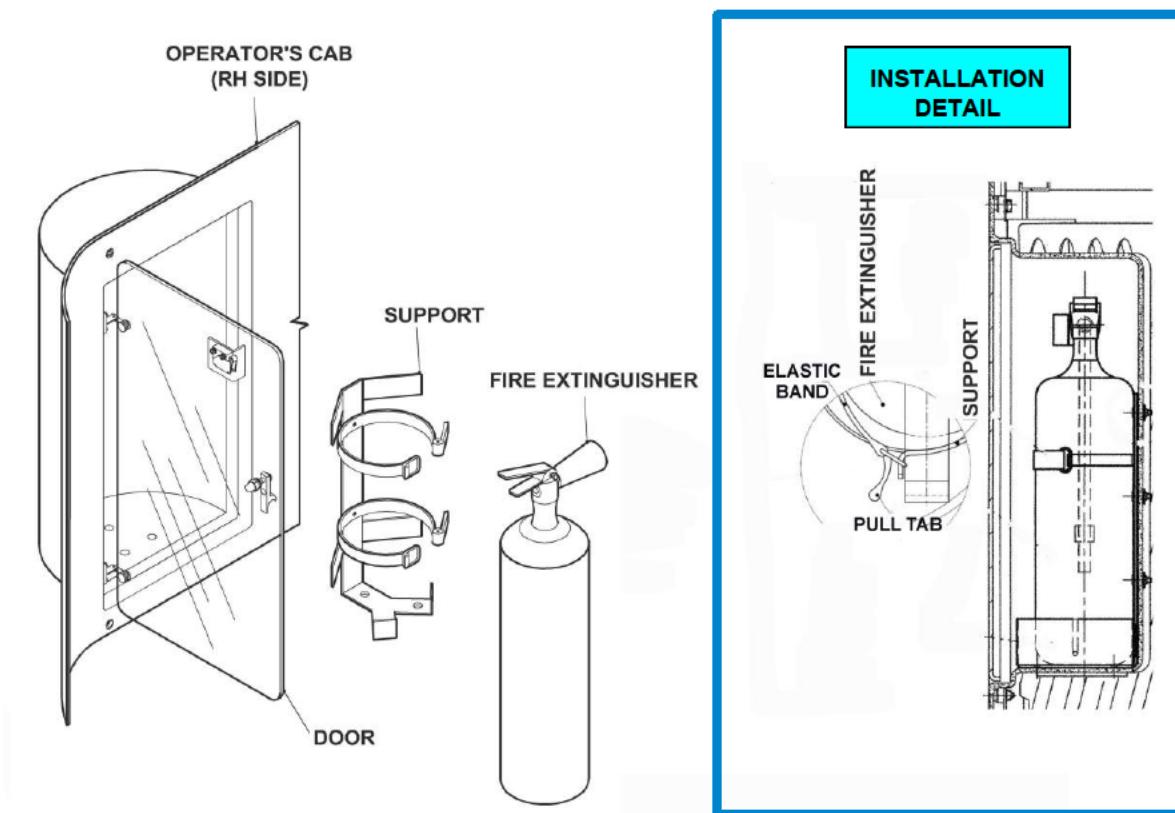


Figure 17-I-02.15 Fire Extinguisher

17-I-02.01.05 Labels

The Vehicle is equipped with external and internal labels designed to provide operating, maintenance and safety instructions to the passengers and maintenance personnel.

17-I-02.01.05.01 Exterior Labels

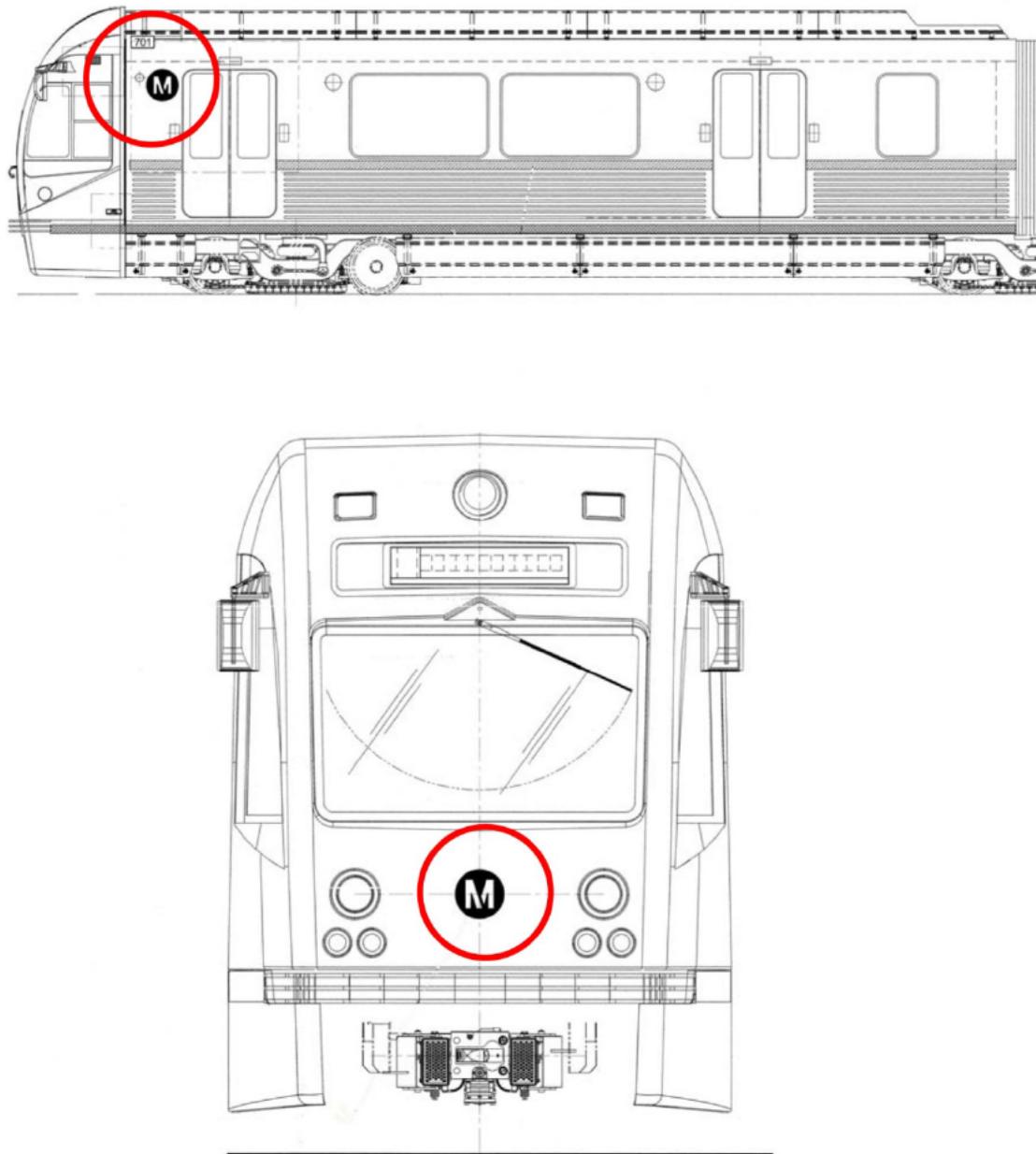


Figure 17-I-02.16 Exterior Label Overview

The External Labels are:

- Vehicle ID (refer to Figure 17-I-02.17 where the Vehicle ID 701 is reported);
- MTA Side Logo (refer to Figure 17-I-02.18);
- USA Flag (refer to Figure 17-I-02.19);
- Manufacturer Logo (refer to Figure 17-I-02.20);
- MTA Front Logo (refer to Figure 17-I-02.21).



Figure 17-I-02.17 Vehicle ID



Metro

Welcome Aboard
Bienvenidos

Figure 17-I-02.18 MTA Side Logo



Figure 17-I-02.19 USA Flag

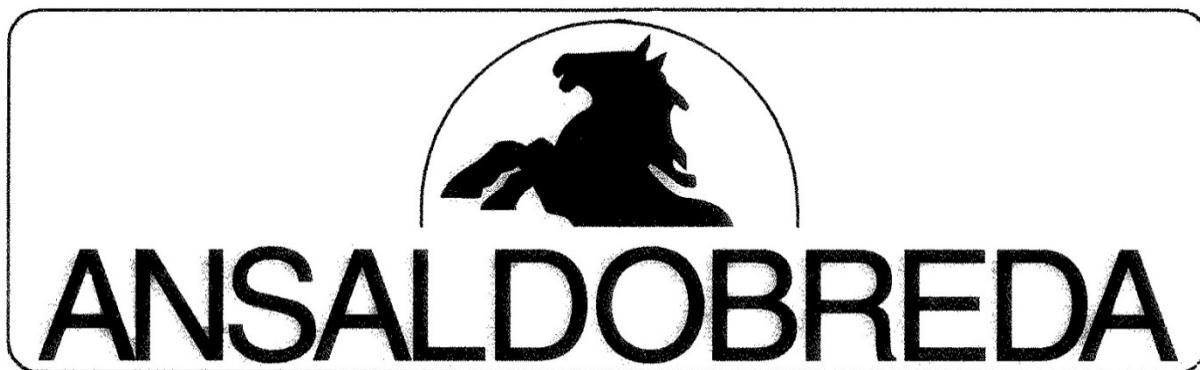


Figure 17-I-02.20 Manufacturer Logo



Figure 17-I-02.21 MTA Front Logo

17-I-02.01.05.02 Interior Labels

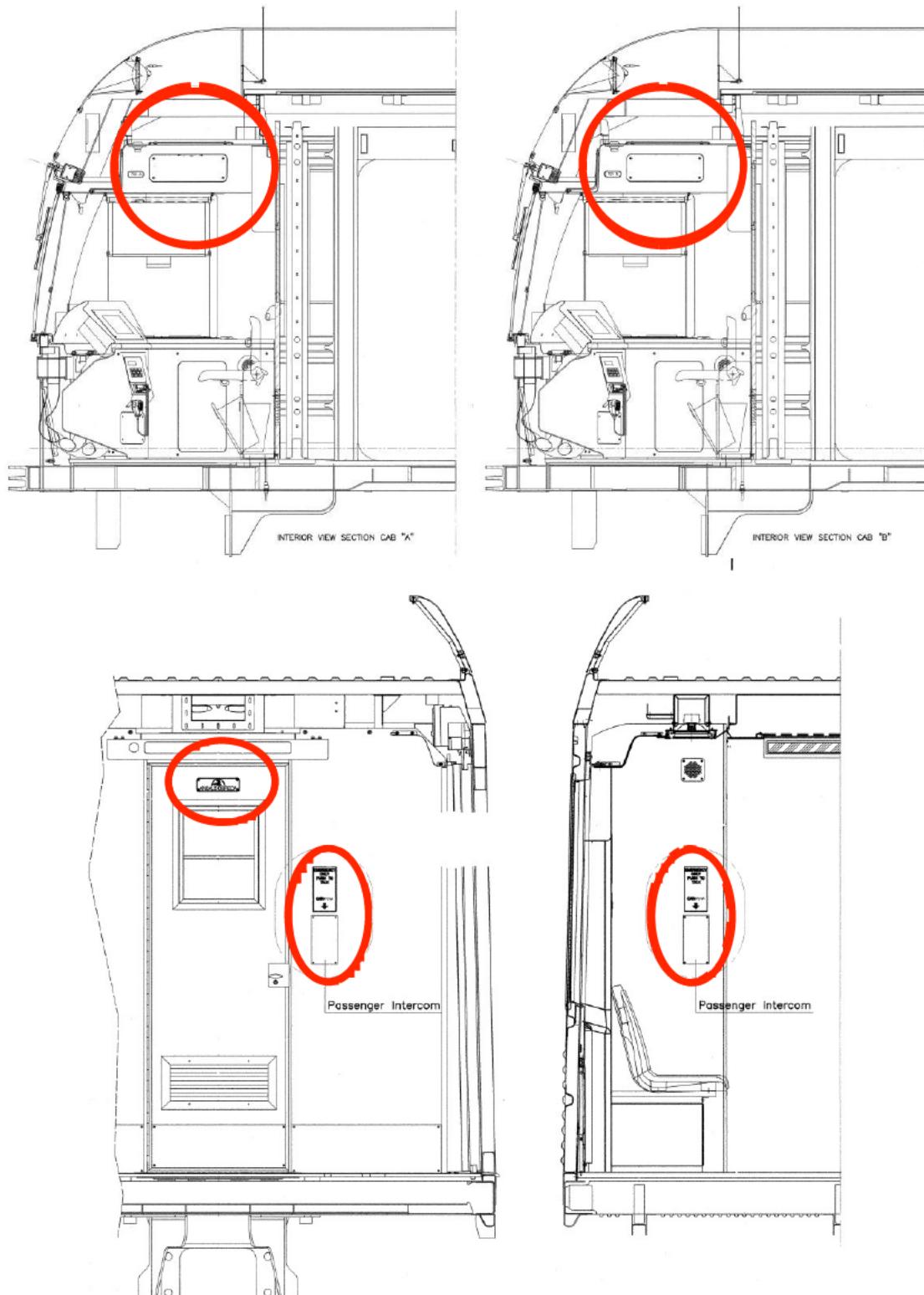


Figure 17-I-02.22 Interior Label Overview

The Interior Labels are:

- Train ID and Body Section, one per Operator Cab (refer to Figure 17-I-02.23);
- Manufacturer Metallic Logo, one per Door Operator Cab (refer to Figure 17-I-02.24);
- Passenger Intercom Signs, two per Body Section (refer to Figure 17-I-02.25).

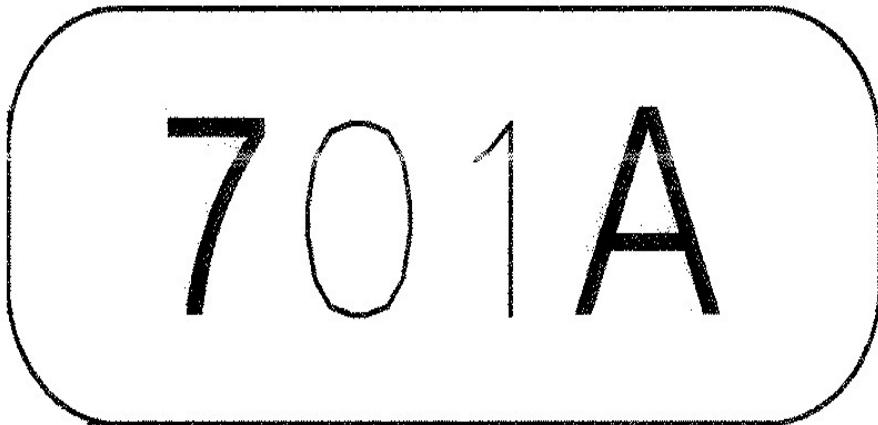


Figure 17-I-02.23 Train and Body Section ID

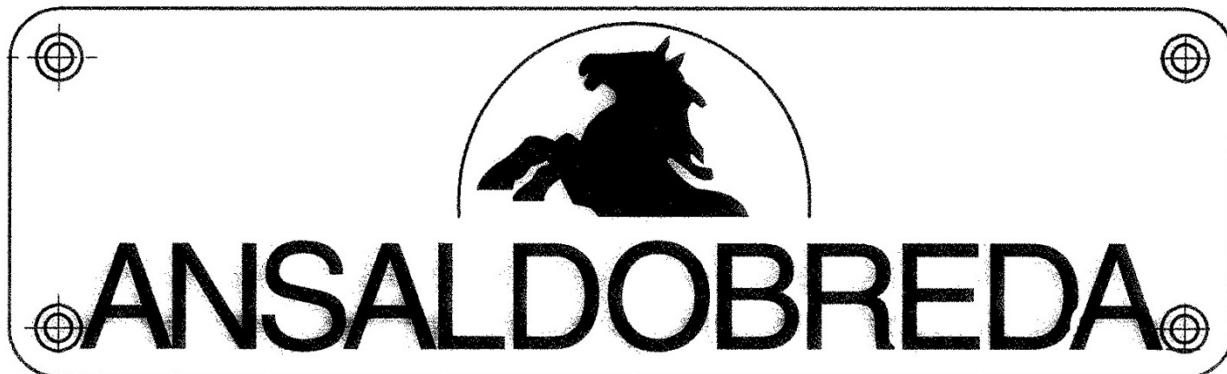


Figure 17-I-02.24 Manufacturer Metallic Logo



Figure 17-I-02.25 Passenger Intercom Sign

17-I-03 APPENDIX

17-I-03.01 IP Code

Table 17-I-03.1 Ingress Protection Ratings (IP Codes)

Ingress Protection Classification			
First Digit		Second Digit	
IP	Protection Provided	IP	Protection Provided
0	No Protection	0	No Protection
1	Protected against solid objects up to 50mm e.g. accidental touch by hands	1	Protected against vertically falling drops of water e.g. condensation
2	Protected against solid objects up to 12mm e.g. fingers	2	Protected against direct sprays of water up to 15 deg from the vertical
3	Protected against solid objects over 2.5mm e.g. tools	3	Protected against direct sprays of water up to 60 deg from the vertical
4	Protected against solid objects over 1mm e.g. wires	4	Protected against water sprayed from all directions - limited ingress permitted
5	Protected against dust - limited ingress (no harmful deposit)	5	Protected against low pressure jets of water from all directions - limited ingress permitted
6	Totally protected against dust	6	Protected against strong jets of water e.g. for use on shipdecks - limited ingress permitted
		7	Protected against the affects of immersion between 15cm and 1m
		8	Protected against long periods of immersion under pressure

17-I-03.02 Insulation Class

Standards established by the *National Electrical Manufacturers Association (NEMA)* to meet motor temperature requirements found in different operating environments.

When a motor is started its temperature will begin to rise above that of surrounding or ambient air.

Each insulation class has an allowable temperature rise which, when added to the ambient, gives the maximum winding temperature. NEMA has standardized an ambient temperature of 104°F (40°C) with a defined attitude range. Allowance is made for a hot spot in the centre of the motor's windings.

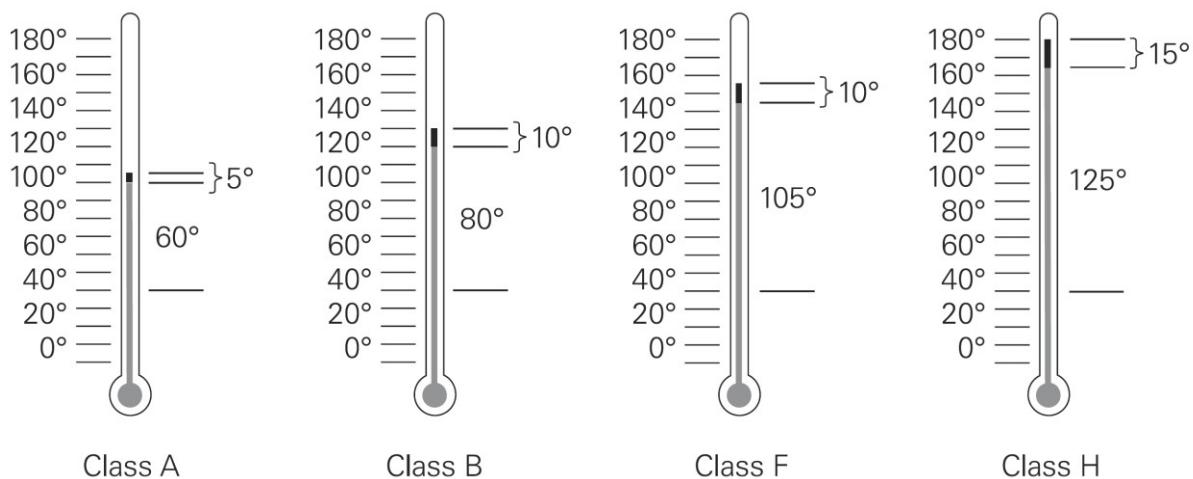


Figure 17-I-03.1 Insulation Class

Table 17-I-03.2 Insulation Class

Class	Rise	Hot Spot
Class A	140°F (60°C)	41°F (5°C)
Class B	176°F (80°C)	50°F (10°C)
Class F	221°F (105°C)	50°F (10°C)
Class H	257°F (125°C)	59°F (15°C)

Operating a motor above the limits of its insulation class reduces the motor's life expectancy.

LOS ANGELES COUNTY

METROPOLITAN TRANSPORTATION AUTHORITY

LIGHT RAIL VEHICLE

P2550



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VOLUME M-01
PART II
TROUBLESHOOTING
SECTION 17 - MISCELLANEOUS



SECTION 17

MISCELLANEOUS

PART II

TROUBLESHOOTING

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TABLE OF CONTENTS

Section/ Para	Title	Page
17-II-01	INTRODUCTION	1
17-II-01.a	List of Abbreviations, Acronyms and Symbols	2
17-II-01.b	List of Definitions	3
17-II-01.c	List of Measurement Units and Symbols	4
17-II-02	TROUBLESHOOTING	5
17-II-02.01	Fault Insulation / Repair Tables	5

LIST OF ILLUSTRATIONS

Figure	Title	Page
--------	-------	------

LIST OF TABLES

Table	Title	Page
Table 17-II-02.1	Fault Isolation/Repair	5

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- The IDU;
- The Fault Isolation Table.

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HVDS	High Voltage Distribution System
IDU	Integrated Diagnostic Unit
IP	Ingress Protection Rating
KO	Out of Service
LED	Light Emitting Diode
LH.....	Left Hand Side
LRV	Light Rail Vehicle
LV.....	Low Voltage
LVDS	Low Voltage Distribution System
LVPS	Low Voltage Power Supply
MBL.....	Metro Blue Line
MV.....	Medium Voltage
NC	Normally Closed
NO	Normally Open
OK.....	Working
PGL.....	Pasadena Gold Line
PTU	Portable Test Unit
RH	Right Hand Side
SW.....	Software
TBS	To Be Supplied

17-II-01.b LIST OF DEFINITIONS

The Definitions commonly used throughout this manual are given below with their related meaning.

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'B' body section.....	The section of an articulated vehicle not containing the pantograph
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AW1	Full seated load plus AW0
AW2	Standees at 4 persons per square meter plus AW1
AW3	Standees at 6 persons per square meter plus AW1
AW4	Standees at 8 persons per square meter plus AW1
Front door	The door close to the Operator's Cab
LC filter.....	Filter made up of Inductance and capacity
Rear door	The door close to the Articulation Section
RLC filter	Filter made up of Resistance, Inductance and Capacity
Sine-wave	Sinusoidal wave

17-II-01.c LIST OF MEASUREMENT UNITS AND SYMBOLS

The Measurement Units commonly used throughout this manual are given below with their related meaning. Ω

Definition	Meaning
Ω_W	Ohm
$^{\circ}C$	Celsius degree
$^{\circ}F$	Fahrenheit degree
A.....	Ampere
ac.....	Alternate Current
dB.....	Decibel
dc.....	Direct Current
F.....	Farad
ft.....	Foot
gal.....	Gallon
H.....	Henry
Hz.....	Hertz
in.....	Inch
kg.....	Kilogram - approx 2.205 pounds
km.....	Kilometer - approx 0.621 miles
kN.....	Kilo-Newton - approx 224.809 pounds force
lb.....	Pound
lb-ft	Pound force
lps.....	Liters per Second
m.....	Meter - approx 3.28 feet
mm	Millimeter - approx 0.0394 inches
ms.....	Milli second
Pa.....	Pascal
psig.....	Pounds per square inch
rms	Root Mean Square Voltage
rpm	Revolution per Minute
V.....	Voltage
W.....	Watt

17-II-02 TROUBLESHOOTING

17-II-02.01 Fault Isolation / Repair Tables

The Fault Isolation / Repair Table lists the System's Malfunction Symptoms with the relevant Probable Causes and Corrective Actions to be accomplished to fix the Fault. The Malfunction Symptoms are listed, sequenced in alphabetical order, by SUBSYSTEM /ASSEMBLY and are provided by Unit / Component.

The Corrective Actions are provided with reference to the relevant Maintenance Sheets the Maintainer should refer to in order to have specific detailed Procedures to be followed.

NOTE: The Preventive and Corrective Maintenance Sheets are consistent, respectively, with the Preventive Maintenance Plan and the Corrective Maintenance Analysis (CMA) of the Vehicle.

For this reason, when, in the Fault Isolation / Repair Table, the Maintenance Sheet reference is " Blank ", it means that the relevant Corrective Action is not specifically indicated in the above AB Documentation and, consequently, that it is not specifically provided in any Maintenance Sheet.

Table 17-II-02.1 Fault Isolation/Repair

SUBSYSTEM / ASSY		DEFROSTER/DEMISTER		
Unit / Component	Malfunction Symptom	Probable Cause	Corrective Action	Refer to Sheet
DEFROSTER/DEMISTER	1. Defroster/ Demister System does not operate.	1. DEFROSTER SUPPLY CB (02F11) is open.	1. Close 02F11 CB	N/A
		2. DEFROSTER VENTILATION CB (10F05) is open	1. Close 10F05 CB	N/A
		3. DEFROSTER/ COMMAND CB (10F04) is open	1. Close 10F04 CB	N/A
		4. HEATER / DEMISTER Control Switch faulty.	1. Replace.	R-C-10-00-00-00/R-00
		5. Defrost Assy faulty.	1. Replace Defrost Assy.	
		6. Fault in the Electrical System.	1. Check the electrical connections and wires.	1. Refer to Low Voltage Distribution System Section 10.

(cont'd)

Table 17-II-02.1 Fault Isolation/Repair

SUBSYSTEM / ASSY		WINDSHIELD WIPER & WASHER		
Unit / Component	Malfunction Symptom	Probable Cause	Corrective Action	Refer to Sheet
WINDSHIELD WIPER	1. Wiper does not operate.	1. MIRROR & WIPER / WASHER (10F02) CB is open.	1. Close 10F02 CB.	N/A
		2. MIRROR & WIPER / WASHER (10F02) CB faulty.	1. Replace	R-C-17-00-00-00/R-00
		3. Wiper Switch faulty.	1. Replace	R-C-17-00-00-00/R-01
		4. Wiper Control Unit faulty.	1. Replace.	R-C-17-01-01-06/R-00
		5. Wiper Power Unit faulty.	1. Replace	
		6. Wiper Motor faulty.	1. Replace	R-C-17-01-01-07/R-00
		7. Fault in the Electrical System.	1. Check the electrical connections and wires.	1. Refer to Low Voltage Distribution System Section 10.
	2 Wiper does not stop in correct position	1. Blade damaged / worn	1. Replace	R-C-17-01-01-08/R-00
		2. Arm / Wiper Motor connection loose	1. Tighten	N/A
		3. Arm / Wiper Motor connection damaged	1. Replace Wiper Motor and Arm	R-C-17-01-01-07/R-00 R-C-17-01-01-08/R-00
		4. Wiper Switch faulty.	1. Replace	R-C-17-00-00-00/R-01
		5. Wiper Motor defective.	1. Replace	R-C-17-01-01-07/R-00
		6. Wiper Control Unit faulty.	1. Replace.	R-C-17-01-01-06/R-00
WINDSHIELD WASHER	1. Windshield Washer does not operate (electric pump doesn't run).	1. MIRROR & WIPER / WASHER (10F02) is open.	1. Close 10F02 CB.	N/A
		2. MIRROR & WIPER / WASHER (10F02) faulty.	1. Replace	R-C-17-00-00-00/R-00
		3. Windshield Wiper/Washer Switch faulty.	1. Replace	R-C-17-00-00-00/R-01
		4. Washer Motor Pump assy faulty.	1. Replace	R-C-17-01-01-05/R-00
		5. Fault in the Vehicle electrical System.	1. Check the electrical connections and wires.	1. Refer to Low Voltage Distribution System Section 10.
	2. Windshield Washer does not operate (electric pump run).	1. Washer Tank empty.	1. Refill	R-P-17-01-02-01/S-00
		2. Washer piping / Check Valve damaged.	1. Replace.	R-C-17-01-01-10/R-00

LOS ANGELES COUNTY

METROPOLITAN TRANSPORTATION AUTHORITY

LIGHT RAIL VEHICLE

P2550



**RUNNING MAINTENANCE
AND
SERVICE MANUAL**

**VOLUME M-01-A
PART III
MAINTENANCE
SECT17 MISCELLANEOUS**



SECTION 17

MISCELLANEOUS

PART III

MAINTENANCE

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SECTION 17

MISCELLANEOUS

TABLE OF CONTENTS

Section / Para	Title	Page
17-III-01	INTRODUCTION	1
17-III-01.a	List of Abbreviations, Acronyms & Symbols	2
17-III-01.b	List of Definitions	3
17-III-01.c	List of Measurement Units	4
17-III-01.d	References	5
17-III-02	P2550 ANSALDOBREDA MAINTENANCE PLAN	6
17-III-03	RUNNING -PREVENTIVE MAINTENANCE	7
17-III-03.01	Running -Preventive Maintenance Matrixes (R-PMM).....	7
17-III-03.01.01	Definitions	8
17-III-03.01.02	Inspection Intervals.....	8
17-III-03.01.03	Safety Critical Preventive Maintenance (SCPM) Tasks	8
17-III-03.01.04	Sheet Code.....	9
17-III-03.01.05	Person Hours.....	9
17-III-03.01.06	Running Preventive Maintenance Matrix (Component Based).....	10
17-III-03.01.07	Running Preventive Maintenance Matrix (Mileage Based).....	10
17-III-03.02	Running -Preventive Maintenance Reports (R-PMR/Job Cards).....	11
17-III-03.02.01	R-PMR/Job Card Form Content	11
17-III-03.02.02	R-PMR/Job Card Sequence	14
17-III-03.02.03	Running -Preventive Maintenance Cycle & R-PMR/Job Card Content	15
17-III-03.02.04	R-PMR/Job Card Data Presentation Sequence	15
17-III-03.02.05	Running Preventive Maintenance Reports R-PMR/Job Cards	17
17-III-03.03	Running -Preventive Maintenance Sheets (R-PMS)	29
17-III-03.03.01	Running- Preventive Maintenance Sheet (R-PMS) Form	29
17-III-03.03.02	How to Use the R-PM Sheets and R-PMR /Job Cards	34
17-III-03.03.03	Running- Preventive Maintenance Sheet (R-PMS) List	36
17-III-03.03.04	Running- Preventive Maintenance Sheets (R-PMS)	37
17-III-04	RUNNING -CORRECTIVE MAINTENANCE.....	43
17-III-04.01	Running -Corrective Maintenance Sheets (R-CMS)	43
17-III-04.01.01	Running- Corrective Maintenance Sheet (R-CMS) Form	44
17-III-04.01.02	How to Use the R-CM Sheets.....	48
17-III-04.01.03	Running- Corrective Maintenance Sheet (R-CMS) List	50
17-III-04.01.04	Running- Corrective Maintenance Sheets (R-CMS).....	51
17-III-05	CONSUMABLE MATERIALS LIST (R-CML)	119
17-III-06	TEST EQUIPMENT & SPECIAL TOOLS LIST (R-TESTL)	119

LIST OF ILLUSTRATIONS

Figure	Title	Page
Figure 17-III-03.1	R-PMR/Job Card Form -Example	14
Figure 17-III-03.2	R-PMS Form	32
Figure 17-III-04.1	R-CMS Form	46

LIST OF TABLES

Table N°	Title	Page
Table 17-III-03.1	Running Preventive Maintenance Matrix (Component Based)	10
Table 17-III-03.2	Running Preventive Maintenance Matrix (Mileage Based)	10
Table 17-III-03.3	Running Preventive Maintenance Sheets List	36
Table 17-III-04.1	Running Corrective Maintenance Sheets List.....	50
Table 17-III-05.1	Running Maintenance Consumable Materials List (R-CML).....	119
Table 17-III-06.1	Running -Test Equipment & Special Tools List (R-TESTL)	119

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SECTION 17

MISCELLANEOUS

17-III-01 INTRODUCTION

The “ MISCELLANEOUS “ Part III - Maintenance consists of:

- Preventive Maintenance
- Corrective Maintenance
- Consumable Materials
- Test Equipment & Special Tools

17-III-01.a List of Abbreviations, Acronyms & Symbols

The Abbreviations, Acronyms and Symbols commonly used throughout this Section are given below with their relevant meaning.

Abbreviation	Meaning
AB	AnsaldoBreda
AC	Alternate Current
AC/DC	Alternate Current - Direct Current Converter
APS	Auxiliary Power Supply
ASSY	Assembly
CB	Circuit Breaker
DC	Direct Current
DC/AC	Direct Current - Alternate Current Converter
DC/DC	Direct Current - Direct Current Converter
ECU	Electronic Control Unit
ELE	Electronic
EPU	Electronic Power Unit
H-CML	Heavy Consumable Material List
H-CMS	Heavy Corrective Maintenance Sheet
HV	High Voltage
IDU	Integrated Diagnostic Unit
IPC	Illustrated Parts Catalog
KO	Out of Service
LED	Light Emitting Diode
LRV	Light Railway Vehicle
LV	Low Voltage
LVDC	Low Voltage Direct Current
PS	Power Supply
PTU	Portable Test Unit
R-CML	Running Consumable Material List
R-CMS	Running Corrective Maintenance Sheet
RMSM	Running Maintenance & Service Manual
R-PMM	Running Preventive Maintenance Matrix
R-PMR	Running Preventive Maintenance Report
R-PMS	Running Preventive Maintenance Sheet
R-TESTL	Running Test Equipment & Special Tools List
SCPM	Safety Critical Preventive Maintenance
SYS	System
TBD	To Be Defined
TBS	To Be Supplied
TOC	Table Of Content
TTEM	Tools & Test Equipment Manual
VAC	Voltage Alternate Current
VDC	Voltage Direct Current
W/	With
W/O	Without

17-III-01.b List of Definitions

The Definitions commonly used throughout this Section are given below with their relevant meaning.

Definition	Meaning
'A' body section	The section of an articulated vehicle containing the pantograph
'B' body section	The section of an articulated vehicle not containing the pantograph
AW0	Empty car operating weight
AW1	Full seated load plus AW0
AW2	Standees at 4 persons per square meter plus AW1
AW3	Standees at 6 persons per square meter plus AW1
AW4	Standees at 8 persons per square meter plus AW1
Front door	The door close to the Operator's Cab
Rear door	The door close to the Articulation Section
MC Handle	Master Controller Handle
"A" Cab (or Cab A)	Operator Cab in the A body section
"B" Cab (or Cab B)	Operator Cab in the B body section

17-III-01.c List of Measurement Units

The Measurement Units commonly used throughout this Section are given below with their relevant meaning.

Definition	Meaning	
ft	Foot	(Length)
gal	Gallon	(Volume)
in	Inch	(Length)
kg	Kilogram - approx 2.205 pounds	(Weight)
km	Kilometer - approx 0.621 miles	(Length)
lb	Pound	(Weight)
lb-ft	Pound force	(Force)
m	Meter - approx 3.28 feet	(Length)
mm	Millimeter - approx 0.0394 inches	(Length)
mph	Miles per hour	(Velocity)
Km/h	Kilometers per hour	(Velocity)
s	Seconds	(Time)
V	Volt	(Tension)
Vdc	Direct Voltage	(Tension)
Vac	Alternate Voltage	(Tension)
kVA	Kilo-Volt-Ampere	(Power)
kW	Kilo-Watt	(Power)
W	Watt	(Power)
F	Farad	(Capacity)
H	Henry	(Inductance)
W	Ohm	(Resistance)
°F	Fahrenheit	(Temperature)
°C	Celsius	(Temperature)
A	Ampere	(Current)
Hz	Hertz	(Frequency)
rpm	Revolution per Minute	(Frequency)
N	Newton	(Force)
Nm	Newton-Meter	(Torque)
mphs	Mile Per Hour Per Second	(Acceleration)

17-III-01.d References

Refer to Section 00 of this RMSM for details relevant to the following Topics:

Topic	Paragraph
MANUAL PURPOSE	00-02
MANUAL ARRANGEMENT	00-03
MANUAL APPLICABILITY	00-04
ACQUISITION OF COPIES, REVISIONS AND CHANGES	00-05
TECHNICAL PUBLICATIONS DISCREPANCY REPORT	00-06
UPDATING	00-07
MANUAL CONTENT	00-08
MANUAL ILLUSTRATIONS	00-09
REFERENCE TO MAINTENANCE MANUALS SET	00-10
 MTA PHILOSOPHY OF MAINTENANCE	 00-11
 SAFETY	 00-12
Vehicle Hazard Areas	00-12.01
General Safety Precautions	00-12.02
Safety Precautions around Electrical Equipment	00-12.03
Safety & Environmental Precautions with Chemicals	00-12.04
 GENERAL MAINTENANCE GUIDE	 00-13
Hardware	00-13.01
Cable Ties (Tie Wraps)	00-13.02
Wiring	00-13.03
Fuses	00-13.04
Lubrication and Cleaning	00-13.05
 ELECTROSTATIC DISCHARGE	 00-14
Description	00-14.01
Methods of Protection	00-14.02
 STORAGE AND HANDLING	 00-15
General Storage Requirements	00-15.01
Special Storage Requirements	00-15.02
 P2550 SOFTWARE CONFIGURATION	 00-21
 P2550 PTU /LAPTOP SOFTWARE LIST	 00-22
P2550 STANDARD TORQUE LIST	00-23
 HOW TO USE IPC	 00-24
HOW TO USE THE FUNCTIONAL SCHEMATICS	00-25
HOW TO USE THE TOPOGRAPHIC SCHEMATICS	00-26
HOW TO USE THE ANSALDOBREDA DATABASE	00-27

17-III-02 P2550 ANSALDOBREDA MAINTENANCE PLAN

The AB Preventive Maintenance Plan (PMP) has been designed in order to permit a 30-year Structural and Service Vehicle Life with the following basic assumptions:

- Yearly mileage: 120,000 Miles
 - Motor and Trailer Truck removal: every 5 years. (600,000 Miles)

The AB Preventive Maintenance Plan (PMP) provides the Preventive Maintenance Tasks to be performed according the following Mileage Intervals:

Running Maintenance	Heavy Maintenance
Daily	
10,000 Miles	
30,000 Miles	600,000 Miles
60,000 Miles	1,200,000 Miles
120,000 Miles	1,800,000 Miles

In accordance with the Preliminary Version of the AB Preventive Maintenance Plan, the Scheduled Maintenance Tasks for the entire Vehicle Life have been grouped into:

- Running Preventive Maintenance
 - Heavy Preventive Maintenance

In accordance with the AB Corrective Maintenance Analysis, the Corrective Maintenance Tasks for the entire Vehicle Life have been grouped into:

- Running Corrective Maintenance
 - Heavy Corrective Maintenance

17-III-03 RUNNING -PREVENTIVE MAINTENANCE

17-III-03.01 Running -Preventive Maintenance Matrixes (R-PMM)

The “ MISCELLANEOUS ”Running -Preventive Maintenance Matrix (R-PMM) provides the Preventive Maintenance Plan of the “ MISCELLANEOUS ”up to 120,000 Miles.

The “ MISCELLANEOUS ”(R-PMM) is provided in two different arrangements as follows:

· R-PMM Component Based

It lists the “MISCELLANEOUS” Running - Preventive Maintenance Tasks ordered by Subsystem /Assemblies / Component break down, followed by the PM Task Description and Scheduled Task Interval and linked to the relevant R-PM Sheet Code.

The R-PMM Component Based provides the Maintainer with the following data:

- SUBSYSTEM /ASSEMBLY/UNIT/COMPONENT
- TASK
- SCPM
- INSPECTION INTERVAL ·
- SHEET CODE

· R-PMM Mileage Based

It lists the “MISCELLANEOUS” Running - Preventive Maintenance Tasks ordered by Scheduled Maintenance Interval and broken down into the related System / Subsystem /Assemblies/Component followed by the PM Task Description and Person Hours and linked to the relevant R-PM Sheet Code.

The R-PMM Mileage Based provides the Users with the following data:

- INSPECTION INTERVAL
- SYSTEM/SUBSYSTEM /ASSEMBLY/UNIT/COMPONENT
- TASK
- SCPM
- PERSON HOURS
- SHEET CODE

The data listed in this Matrix are the same of those listed in the R-PMM Component Based with the exception of the PERSON HOURS.

17-III-03.01.01 Definitions

The following definitions are applicable to both types of R-PMM

Tasks

- Cleaning:** Methods and processes required (Step-By-Step Procedural Instructions) for cleaning specific parts or areas of the Vehicle.
- Inspection:** Preventive Maintenance procedures such as those required to ascertain the serviceability of a Part, Assembly, System or the specific interrelationship of Parts that perform a functional operation.
- Lubrication:** Provides component lubrication Instructions.
- Replacement** Provides the Components / Assemblies and Subassemblies removal & installation in a logical sequential order.
Maintenance procedures identified in this topic include Components that are replaced within a 4 hours window.
- Service:** Operation performed to replenish Sand, Windshield Wiper Washer Fluid, HVAC Coolant, Gear and Compressor Oil, and Vehicle Lubrication.
- Test:** Procedures and Parameters to evaluate the operational efficiency and integrity of a System /Subsystem/Component and the interrelationship of Parts performing functional operations.

17-III-03.01.02 Inspection Intervals

The Running - Preventive Maintenance Intervals for the P2550 LRV Fleet are scheduled as follows:

Daily	10,000 Miles	30,000 Miles	60,000 Miles	120,000 Miles
-------	--------------	--------------	--------------	---------------

The marker "●" in the INSPECTIONS INTERVAL column, indicates the periodicity of the corresponding Task.

17-III-03.01.03 Safety Critical Preventive Maintenance (SCPM) Tasks

The marker "✓" in the SCPM column, indicates that the corresponding Task is a Safety Critical Preventive Maintenance (SCPM) Task, as per the results of the Safety Analyses performed, on Vehicle Subsystems, according to Vehicle Specification.

17-III-03.01.04 Sheet Code

The Sheet Code column, indicates the reference to Running -Preventive Maintenance Sheet where the Procedure to be performed is described and illustrated.

**THE SHEET CODE IS THE EXPLICIT LINK BETWEEN
R-PM MATRIXES, R-PMR /JOB CARDS AND R-PM SHEETS**

Refer to Paragraph 17-III-03.03.01 for Running- Preventive Maintenance Sheet (R-PMS) Form for detailed explanation.

17-III-03.01.05 Person Hours

It indicates the time required to perform the corresponding Task with the basic assumption that the Vehicle is on an Inspection Pit or Stand Up Rail and the Consumables, Tools and Spare Parts needed to accomplish the Task are available at the Location of the Equipment to be maintained.

Refer to:

- Table 17-III-03.1 for Running - Preventive Maintenance Matrix (R-PMM)
(Component Based)
- Table 17-III-03.2 for Running - Preventive Maintenance Matrix (R-PMM)
(Mileage Based)

17-III-03.01.06 Running Preventive Maintenance Matrix (Component Based)
Table 17-III-03.1 Running Preventive Maintenance Matrix (Component Based)

SYSTEM 17 MISCELLANEOUS		SUBSYSTEM ASSY/UNIT/COMPONENT	TASK	S	INSPECTION INTERVAL MILES					SHEET CODE	
S	C	P	M	Daily	10K	30K	60K	120K			
-WINDSHIELD WIPER											
--WINDSHIELD WASHER SYSTEM											
---WASHER FLUID TANK	SERVICE			●						R-P-17-01-02-01/S-00	

17-III-03.01.07 Running Preventive Maintenance Matrix (Mileage Based)
Table 17-III-03.2 Running Preventive Maintenance Matrix (Mileage Based)

SYSTEM 17 MISCELLANEOUS		SUBSYSTEM	TASK	S	PERSON HOURS	SHEET CODE				
S	C			P						
DAILY										
- WINDSHIELD WIPER										
--WINDSHIELD WASHER SYSTEM										
---WASHER FLUID TANK	SERVICE			0.2		R-P-17-01-02-01/S-00				

17-III-03.02 Running -Preventive Maintenance Reports (R-PMR/Job Cards)

This paragraph describes the contents of the “MISCELLANEOUS” Running -Preventive Maintenance Reports (R-PMR/Job Cards) for the Running - Preventive Maintenance Tasks.

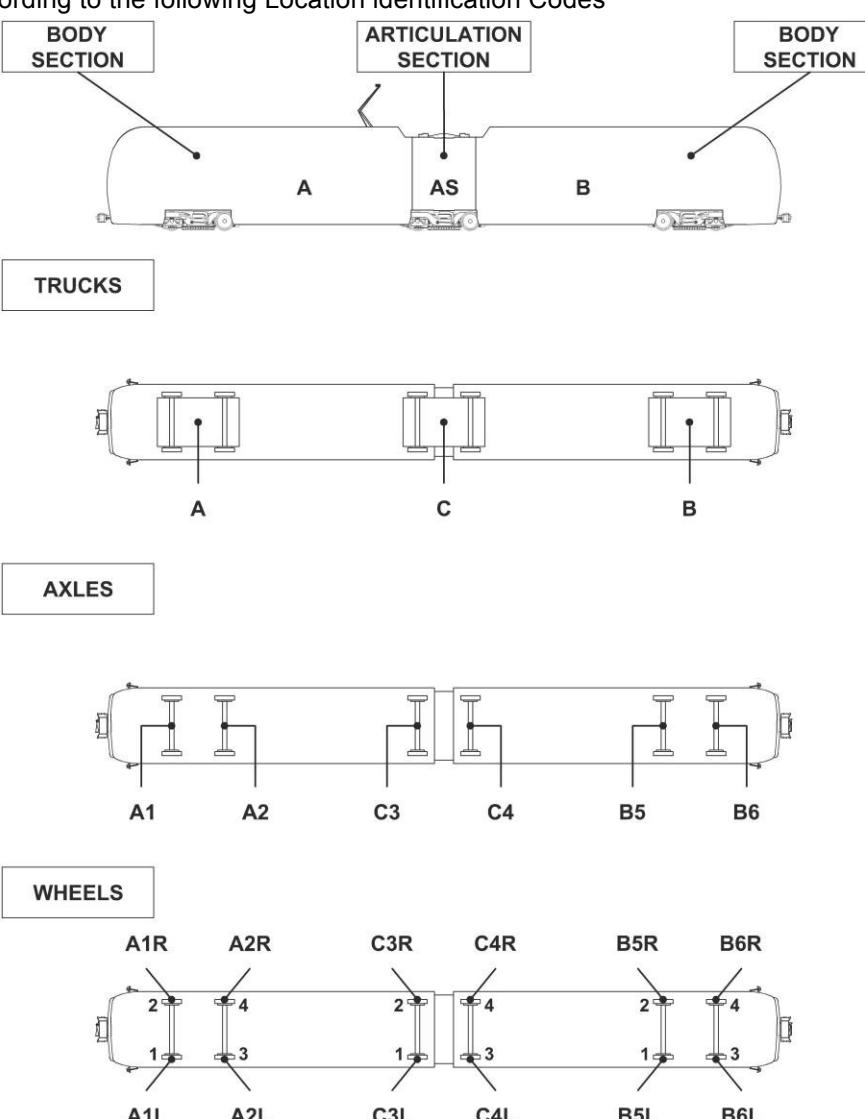
17-III-03.02.01 R-PMR/Job Card Form Content

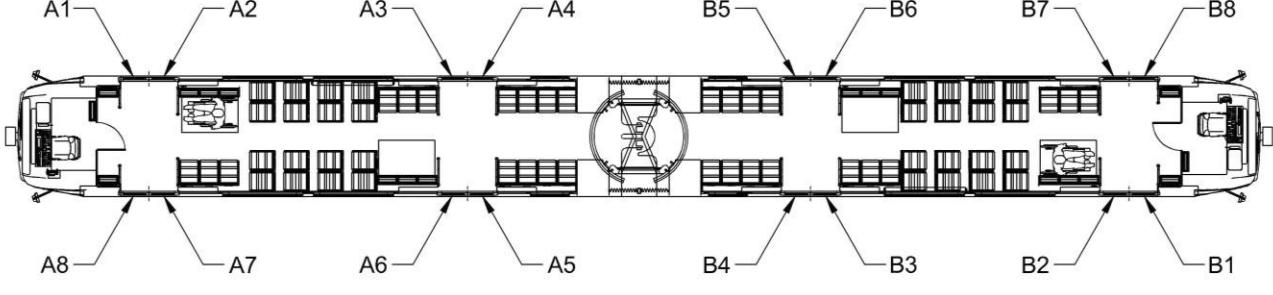
The R-PMR/JOB CARDS are broken down into two main topics:

Specific Data and R-PM Data

Refer to Figure 17-III-03.1 for R-PMR/JOB CARD Form example

RUNNING PREVENTIVE MAINTENANCE REPORTS (R-PMR/JOB CARDS) FORM		
SPECIFIC DATA TO BE FILLED IN BY THE MAINTAINER		
ITEM #	TITLE	EXPLANATORY NOTE
1	VEHICLE #	This field indicates the Vehicle Identification Number
2	DATE	This field indicates the Date on which the Vehicle entered the Maintenance Shop
3	RUNNING HOURS	This field indicates the Vehicle Running Hours at the above Date
4	MILES	This field indicates the Vehicle Running Miles at the above Date.
5	EMPLOYEE # & SIGNATURE	This Field indicates the Employee # & Signature of the Maintainer(s) that perform the referred Task(s)
6	STARTING DATE	This field indicates the Starting Date of the referred Task(s).
7	WORK HOURS	This field indicates the Work duration to perform the referred Task(s).
8	COMPLETION DATE	This field indicates the Completion Date of the referred Task(s).
9	DEFECT FOUND/COMMENTS	This field indicates the result of the Task(s) execution and/ or note related to any items of the maintained Equipment requiring Corrective Maintenance
A	P2550 RUNNING PREVENTIVE MAINTENANCE REPORT SYSTEM (Maintenance Interval) JOB CARD	This field provides R-PMR Title. The R-PM Maintenance Intervals are the following: Daily; 10,000 Miles; 30,000 Miles; 60,000 Miles; 120,000 Miles
B	WORK AREA	This column lists the On Vehicle Areas where the Equipment to be maintained is located The Work Areas are provided to optimize the jobs organization of the Preventive Maintenance tasks in order to: 1- respect the Safety Precautions to be followed 2- complete the preparation and the availability of the Consumables, Tools and Spare Parts, needed to perform the referred Task. 3- respect the time (PERSON HOURS) established to perform the referred Task (with the basic assumption that the Vehicle is on an Inspection Pit or Stand Up Rail and the Consumables, Tools and Spare Parts are available at the location of the Equipment to be maintained.) The On Vehicle Work Areas are the following: Exterior - Interior - Roof - Truck - Undercar - Vehicle (Vehicle as a whole)

RUNNING PREVENTIVE MAINTENANCE REPORTS (R-PMR/JOB CARDS) FORM		
SPECIFIC DATA TO BE FILLED IN BY THE MAINTAINER		
ITEM #	TITLE	EXPLANATORY NOTE
C	ITEM	This column lists the Subsystem/Assembly, Unit, Component to be maintained
D	TASK	<p>This column lists the R-PM tasks to be performed for each Assembly/Unit/Component (i.e., Cleaning, Inspection, Test)</p> <p>The R-PM Tasks are the following:</p> <ul style="list-style-type: none"> - Cleaning - Inspection -Lubrication - - Replacement - Service- Test
E	LOCATION	<p>This column lists the On Board Vehicle Location of all Equipment to be maintained according to the following Location identification Codes</p> 

RUNNING PREVENTIVE MAINTENANCE REPORTS (R-PMR/JOB CARDS) FORM		
SPECIFIC DATA TO BE FILLED IN BY THE MAINTAINER		
ITEM #	TITLE	
E (cont'd)	LOCATION (cont'd)	
EXPLANATORY NOTE		
 <p>CAR "A"</p> <p>CAR "B"</p>		
Door Numbering		
ITEM #	TITLE	EXPLANATORY NOTE
F	PM SHEET CODE	<p>This column lists the reference to Running-Preventive Maintenance Sheet where the Procedure to be performed is described and illustrated.</p> <p>Refer to Running-Preventive Maintenance Sheet (R-PMS) Form for detailed explanation.</p>
G	SHEETOF.....	This field indicates the progressive sheet page number of each R-PMR/JOB CARD

P2550 RUNNING PREVENTIVE MAINTENANCE REPORT PROPULSION 30,000 MILES JOB CARD						SHEET 1 OF 2
VEHICLE#	DATE	/ /	RUNNING HOURS	MILES		
WORK AREA	ITEM		TASK	LOCATION		PM SHEET CODE
				BODY SECTION	TRUCK	
ROOF	BRAKING RESISTOR		CLEANING	A		R-P-07-03-06-00/C-00
	BRAKING RESISTOR		CLEANING	B		R-P-07-03-06-00/C-00
TRUCK	GEARBOX		INSPECTION	A	A	R-P-07-06-01-00/I-00
	GEARBOX		INSPECTION	A	A	R-P-07-06-01-00/I-00
	GEARBOX		SERVICE	A	A	R-P-07-06-01-00/S-00
	GEARBOX		SERVICE	A	A	R-P-07-06-01-00/S-00
			SERVICE	A	A1	R-P-07-06-01-00/S-01

P2550 RUNNING PREVENTIVE MAINTENANCE REPORT PROPULSION 30,000 MILES JOB CARD						SHEET 2 OF 2
VEHICLE#	DATE	/ /	RUNNING HOURS	MILES		
DEFECT FOUND / COMMENTS						
1	2	3	4	5	6	7
8	9					
EMPLOYEE# & SIGNATURE		STARTING DATE	WORK HOURS	COMPLETION DATE		

Page 7-2
 Draft Ch. 01

FINAL VERSION APPROVAL DATE

Figure 17-III-03.1 R-PMR/Job Card Form -Example

17-III-03.02.02 R-PMR/Job Card Sequence

The R-PMR/JOB CARDS provided in this Section are grouped according to the following sequence:

Daily 10,000 Miles 30,000 Miles 60,000 Miles 120,000 Miles

17-III-03.02.03 Running -Preventive Maintenance Cycle & R-PMR/Job Card Content

The Running -Preventive Maintenance Cycle and the relevant R-PMR/JOB CARD content are as follows:

MAINTENANCE INTERVAL	PMR /JOB CARD TITLE	PMR /Job Card CONTENT
DAILY	DAILY JOB CARD	<ul style="list-style-type: none"> • List of Assemblies/Components and related Tasks to be performed DAILY
10,000 Miles	10,000 MILES JOB CARD	<ul style="list-style-type: none"> • DAILY Job Card content + List of Assemblies/Components and related Tasks to be performed at 10,000 Miles
30,000 Miles	30,000 MILES JOB CARD	<ul style="list-style-type: none"> • DAILY Job Card content + 10,000 Job Card content + List of Assemblies/Components and related Tasks to be performed at 30,000 Miles
60,000 Miles	60,000 MILES JOB CARD	<ul style="list-style-type: none"> • DAILY Job Card content + 10,000 Job Card content + 30,000 Job Card content + List of Assemblies/Components and related Tasks to be performed at 60,000 Miles
120,000 MILES	120,000 MILES JOB CARD	<ul style="list-style-type: none"> • DAILY Job Card content + 10,000 Job Card content + 30,000 Job Card content + 60,000 Job Card content + List of Assemblies/Components and related Tasks to be performed at 120,000 Miles

17-III-03.02.04 R-PMR/Job Card Data Presentation Sequence

The Subsystems / Assemblies / Units / Components listed in the ITEMS column of each R-PMR/JOB CARD are grouped by Work Area and Vehicle Systems' and sequenced, in alphabetical order, in conjunction with their On Vehicle Locations and Tasks to be performed.

INTENTIONALLY LEFT BLANK

17-III-03.02.05 Running Preventive Maintenance Reports R-PMR/Job Cards

MISCELLANEOUS

Running - Preventive Maintenance Reports

R-PMR/JOB CARDS

INTENTIONALLY LEFT BLANK

**MISCELLANEOUS
RUNNING PREVENTIVE MAINTENANCE REPORT
DAILY JOB CARD**

VEHICLE # **DATE** **RUNNING HOURS** **MILES** **SHEET 1 OF 1**

WORK AREA	SYSTEM	ITEM	TASK	LOCATION				PM SHEET CODE
				BODY SECT	TRUCK	AXLE	SIDE	
EXTERIOR	MISCELLANEOUS	WASHER FLUID TANK	SERVICE	A				R-P-17-01-02-01/S-00
		WASHER FLUID TANK	SERVICE	B				R-P-17-01-02-01/S-00

DEFECT FOUND / COMMENTS

INTENTIONALLY LEFT BLANK

**MISCELLANEOUS
RUNNING PREVENTIVE MAINTENANCE REPORT
10,000 MILES JOB CARD**

VEHICLE #		DATE		RUNNING HOURS		MILES		SHEET 1 OF 1
-----------	--	------	--	---------------	--	-------	--	--------------

WORK AREA	SYSTEM	ITEM	TASK	LOCATION				PM SHEET CODE
				BODY SECT	TRUCK	AXLE	SIDE	
EXTERIOR	MISCELLANEOUS	WASHER FLUID TANK	SERVICE	A				R-P-17-01-02-01/S-00
		WASHER FLUID TANK	SERVICE	B				R-P-17-01-02-01/S-00

DEFECT FOUND / COMMENTS

INTENTIONALLY LEFT BLANK

**MISCELLANEOUS
RUNNING PREVENTIVE MAINTENANCE REPORT
30,000 MILES JOB CARD**

VEHICLE #		DATE		RUNNING HOURS		MILES		SHEET 1 OF 1
-----------	--	------	--	---------------	--	-------	--	--------------

WORK AREA	SYSTEM	ITEM	TASK	LOCATION				PM SHEET CODE
				BODY SECT	TRUCK	AXLE	SIDE	
EXTERIOR	MISCELLANEOUS	WASHER FLUID TANK	SERVICE	A				R-P-17-01-02-01/S-00
		WASHER FLUID TANK	SERVICE	B				R-P-17-01-02-01/S-00

DEFECT FOUND / COMMENTS

INTENTIONALLY LEFT BLANK

**MISCELLANEOUS
RUNNING PREVENTIVE MAINTENANCE REPORT
60,000 MILES JOB CARD**

VEHICLE #		DATE		RUNNING HOURS		MILES		SHEET 1 OF 1
-----------	--	------	--	---------------	--	-------	--	--------------

WORK AREA	SYSTEM	ITEM	TASK	LOCATION				PM SHEET CODE
				BODY SECT	TRUCK	AXLE	SIDE	
EXTERIOR	MISCELLANEOUS	WASHER FLUID TANK	SERVICE	A				R-P-17-01-02-01/S-00
		WASHER FLUID TANK	SERVICE	B				R-P-17-01-02-01/S-00

DEFECT FOUND / COMMENTS

INTENTIONALLY LEFT BLANK

**MISCELLANEOUS
RUNNING PREVENTIVE MAINTENANCE REPORT
120,000 MILES JOB CARD**

VEHICLE #		DATE		RUNNING HOURS		MILES		SHEET 1 OF 1
-----------	--	------	--	---------------	--	-------	--	--------------

WORK AREA	SYSTEM	ITEM	TASK	LOCATION				PM SHEET CODE
				BODY SECT	TRUCK	AXLE	SIDE	
EXTERIOR	MISCELLANEOUS	WASHER FLUID TANK	SERVICE	A				R-P-17-01-02-01/S-00
		WASHER FLUID TANK	SERVICE	B				R-P-17-01-02-01/S-00

DEFECT FOUND / COMMENTS

INTENTIONALLY LEFT BLANK

17-III-03.03 Running -Preventive Maintenance Sheets (R-PMS)

Each R-PMS provides the following data consistent with Preventive Maintenance Plan (PMP), AB Design Documentation and Vehicle Systems Functional Tree:

- **R-PM Sheet Code**
- **SYSTEM, SUBSYSTEM /ASSEMBLY, UNIT, Component (Names)**
- **SYSTEM, SUBSYSTEM /ASSEMBLY, UNIT, Component (Location)**
- **Maintenance Interval (Miles)**
 - **Maintenance Task,**
 - **Man Hours**, needed to perform the Task
 - **SPARE PARTS**,needed to perform the Task

Each R-PMS also provides:

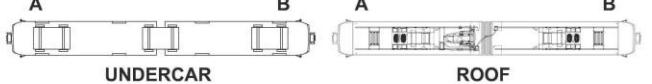
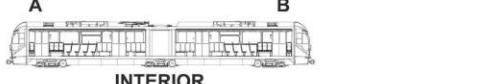
- **SAFETY PRECAUTIONS**, to be followed to safely accomplish the Task
- **TOOLS**, including Special Tools and Test Equipment, needed to accomplish the Task
- **CONSUMABLES**, required to accomplish the Task and consistent with those used by MTA
- **PROCEDURE**, consisting of **Preliminary Operations** and **Procedural Steps**, to be followed while performing Maintenance Tasks.
- **ILLUSTRATIONS** and **Pictures** are inserted in the text to facilitate the understanding of the topics and/or to explain step-by-step procedure.

17-III-03.01 Running- Preventive Maintenance Sheet (R-PMS) Form

The R-PMS Form (refer to Figure 17-III-03.2) consists of several fields containing the following data/ information:

RUNNING -PREVENTIVE MAINTENANCE SHEET (RPMS) Form			
ITEM #	TITLE	CONTENT	EXPLANATORY NOTES
1	Card code	Sheet code	<p>The Sheet Code is an alphanumerical code that identifies each R-PM Sheet.</p> <p>THE SHEET CODE IS THE EXPLICIT LINK BETWEEN R-PM MATRIXES, R-PMR /JOB CARDS AND R-PM SHEETS</p> <p>The Sheet Code consists of letters R-P followed by an 11 digit code number as follows:</p> <p>R-P-nn-mm-zz-ww/Y-kk</p> <p>R = Running P = Preventive</p> <p>nn may vary from 02 to 19, identifying the System/ Manual Section number.</p> <p>mm-zz-ww each one may vary from 00 to 99, according to AB System Functional Tree, allowing the identification of the Assembly/Unit/Component</p> <p>Y Maintenance Task Code. It may be one of the following:</p> <p>C=Cleaning I=Inspection L=Lubrication</p> <p>R=Replacement S=Service T=Test</p> <p>kk It may vary from 00 to 99.</p> <p>It is a progressive number allowing the explicit identification of RPMS when one of the following cases occur:</p> <ul style="list-style-type: none"> 1- same Maintenance Task pertaining to vehicle as a whole or to the same System/Subsystem/Assembly to be performed at same Maintenance Interval in different Vehicle Area (i.e Vehicle as a Whole DAILY Exterior /Interior INSPECTION) 2- same Maintenance Task pertaining to the same Assembly/Unit/Component to be performed at different Maintenance Intervals and for this reason consisting of different Maintenance Procedure
2	System	System name	This field indicates the System to which the Assembly/Unit/Component belongs.
3	Subsystem/ Assembly	Subsystem/ Assembly name	This field indicates the Subsystem/Assembly to which the Unit/Component belongs.
4	Unit	Unit name	This field indicates the Unit to which the Component belongs.
5	Component	Component name	This field indicates the Component the Maintenance Task is referring to
6	Maintenance Task	Maintenance Task name	This field indicates the Maintenance Task to be performed.
7	Interval Miles	Number	<p>This field indicates the maintenance Interval Miles.</p> <p>It may be DAILY, 10,000 Miles, 30,000 Miles, 60,000 Miles, 120,000 Miles</p>

RUNNING -PREVENTIVE MAINTENANCE SHEET (RPMS) Form (cont'd)			
ITEM #	TITLE	CONTENT	EXPLANATORY NOTES
8	Man Hours	Number	The Man Hour field indicates the time needed to perform the corresponding Maintenance Task, with the basic assumption that the Vehicle is staged on an Inspection Pit/Jacking tracks with the required Consumables, Tools and Materials Available.
9	Sheet	Pages numbering	This field indicates the progressive R-PMS sheet page number.
10	LOCATION	Illustration	This field indicates the On Board Location of the Equipment to be maintained The following Graphic Symbols are used for: Assembly/Unit/Component  for System/Subsystem/Vehicle as a Whole 
11	R	Letter	This field indicates that the Sheet pertains to Running Maintenance
12	P	Letter	This field indicates that the Sheet pertains to Preventive Maintenance
13	nn	Number	This field indicates the System/Manual Section number to which the Sheet pertains. It may vary from 01 to 19
14	rr	Number	This field indicates the Sheet Revision number
15	Page ##	Page ##	This field indicates the RMSM Section Page number
16	-#	Number	This field indicates the RMSM Section Revision number
17	SAFETY PRECAUTIONS	Text	This field presents the General and/or specific Safety Precautions to be followed to safely accomplish the relevant Maintenance Tasks.
18	TOOLS	Text	This field lists the description and the P/N of the Standard tools, Special Tools and Test Equipment needed to accomplish the Maintenance Task. Refer to the TTE Manual for the TE and Special Tools detailed descriptions and tools maintenance.
19	CONSUMABLES	Text	This field lists the Consumables Materials (consistent with those used by MTA with the related P/N.) needed to accomplish the Maintenance Task. Cleaning agents are included
20	SPARE PARTS	Text	This field lists the Description and PN of Spare Parts (consistent with Illustrated Parts Catalog) needed to accomplish the Maintenance Task.
21	PROCEDURE	Text	The Procedure field provides Preliminary Operations and Procedural step by step Instructions to be followed while performing the Maintenance Task. Illustrations and Pictures are inserted in the text to facilitate the understanding of the topics and/or to explain step-by-step procedure.

2	 AnsaldoBreda		LACMTA P2550 LRV Running Maintenance and Servicing Manual - Section 01		
P2550 PREVENTIVE MAINTENANCE SHEET					
System:		Card Code: R-P-nn-mm-zz-ww/Y-kk		1	
Subsystem/Assy:		Sheet: x/z		9	
Component:		Man Hours:		4	
Maintenance Task:		Interval/Miles:		8	
LOCATION:					
 RH EXTERIOR LH  A B UNDERCAR  A B ROOF  A B INTERIOR					
10	 RH EXTERIOR LH		7		
11	 RH EXTERIOR LH		16		
12	 RH EXTERIOR LH		15		
R-P-nn-mm-zz-ww/Y-kk M Metro Page 011 Draft					
13	 RH EXTERIOR LH		14		

**Figure 17-III-03.2 R-PMS Form
(Sheet 1 of 2)**

LACMTA P2550 LRV Running Maintenance and Servicing Manual - Section 01		 AnsaldoBreda				
P2550 PREVENTIVE MAINTENANCE SHEET						
Card Code: R-P-nn-mm-zz-ww/Y-kk						
System: _____		Sheet: x/z				
Subsystem/Assy: _____		Unit: _____				
Component: _____		Man Hours: _____				
Maintenance Task: _____		Interval/Miles: _____				
SAFETY PRECAUTIONS:						
17. _____						
18. _____						
19. _____						
20. _____						
21. _____						
TOOLS: _____						
CONSUMABLES: _____						
SPARE PARTS: _____						
PROCEDURE: PRELIMINARY OPERATIONS						
Page 01-2 Draft						
						
<table border="1" style="margin-left: auto; margin-right: 0; border-collapse: collapse;"> <tr> <td style="padding: 2px;">R</td> <td style="padding: 2px;">P</td> <td style="padding: 2px;">nn</td> <td style="padding: 2px;">rr</td> </tr> </table>			R	P	nn	rr
R	P	nn	rr			

**Figure 17-III-03.2 R-PMS Form
(Sheet 2 of 2)**

17-III-03.02 How to Use the R-PM Sheets and R-PMR /Job Cards

To optimize the job organization, proceed as follows:

1. At Scheduled Preventive Maintenance Interval Expiration Date

- a) Use the relevant (Maintenance Interval) R-PMR/JOB CARD where the Subsystems/Assemblies/Units/ Components, listed in the ITEMS column, are grouped by Work Area and Vehicle System and sequenced, in alphabetical order, in conjunction with their On Vehicle Location and Task to be performed.
- b) Select the Work Area and the System
- c) Select the first Equipment listed in the ITEMS column and the Sheet Code listed in conjunction with the Task to be performed and gather the relevant Sheet
- d) Read carefully the Sheet to fully understand the provided Data/Instructions.
- e) Carefully read:
 - The Safety Precautions to perform the Task safely;
 - The Preliminary Operations to set the Vehicle in safety conditions according to MTA Maintenance Shop Regulations;
 - The Tools, Consumables and Spare Parts listed in each Sheet which are needed to accomplish the Task, in order to have all of them available next to the location of the Equipment to be maintained before starting the activities.
- f) Fill the R-PMR/JOB CARD with the data required by the Maintainer at the start of the Maintenance Activities

2. Task Execution

- a) Follow carefully the prescribed Safety Precautions and Maintenance Procedural Steps provided in the R-PM Sheet.
- b) Perform the Maintenance Task Procedure on the first Equipment(listed in the ITEMS column of the relevant R-PMR /JOB CARD) at its On Vehicle LOCATION. as indicated in the LOCATION column of the R-PMR /JOB CARD.
- c) Upon completing the Maintenance Task on the first Equipment, highlight (with a flag) its LOCATION field on the R-PMR / JOB CARD.
- d) Note Equipment Defect Found and / or your Comments on the End Page of the R-PMR / JOB CARD
- e) Proceed to perform the same Task on the second (same) Equipment listed in the R-PMR / JOB CARD at its On Vehicle LOCATION, (different from the previous one) as indicated in the LOCATION column of the R-PMR /JOB CARD.
- f) Proceed as above to perform the same Task on every Equipment (to which the same Sheet Code refers) listed in the ITEMS column of the relevant (Maintenance Interval) R-PMR /JOB CARD.
- g) During Task execution, note any Areas / Items of the Assembly / Unit/ Component under Preventive Maintenance Process requiring Corrective Maintenance.
- h) Gather as much information about the Equipment as is practical to increase your Equipment knowledge (i.e.; knowledge about the malfunction in terms of correctly operating and incorrectly operating equipment processes).

3. At every Task Completion

- a) Follow carefully the prescribed Safety Precautions before restoring Electrical Power to Vehicle.
- b) Check the correct operation and/or functions of the Subsystem to which the maintained Equipment pertains.
- c) Perform this check on the IDU "A" as follows:

NOTE: Through the IDU you can check if all Systems are exchanging data through the MVB or LonWorks Bus and the Trainlines Status.

The IDU Display also shows in real time the Status of all Vehicle Systems.

Reading the IDU Fault List it is possible to immediately detect a fault. Using the IDU in the Operating Mode the Fault Indications are generic,

Using the IDU in Maintenance Mode the same Fault has a detailed description.

For more in depth troubleshooting use the PTU connected to the relevant system that requires further troubleshooting.

1. On IDU "A" access to the Maintenance Menu first and then to the "Faults" Screen by selecting, in sequence, the relevant icons.
2. Check, On IDU "A" through the list of the Current Active Faults shown in the "Faults" Screen, for "Fault" Codes related to the Subsystem to which the maintained Equipment pertains.
Refer to Section 18 of RMSM for Fault Signals Details.
3. As per "Fault" Codes check results proceed as follows:

➤ **No Faults are listed in the "Faults" Screen**

- a) Key OFF the Vehicle.
- b) Record Service and Test results on the Defect Report Card for administrative and maintenance planning.
- c) Fill the R-PMR /JOB CARD with the data required from the Maintainer at the completion of the Maintenance Activities and include your comments

➤ **Fault Codes are listed in the “Faults” Screen**

- a) Investigate/troubleshoot the Equipment previously maintained first and then the System/Subsystem/Assembly/Unit for Fault Probable Causes
- b) Gather as much information about the failure symptoms as is practical.
- c) Refer to Section 18 of RMSM for Fault Signals Details
- d) Try to identify the malfunction in terms of correctly operating and incorrectly operating equipment processes.
- e) Identify which equipment signals or parameters will best help you to localize the failure.
- f) Identify the source of the problem.
- g) Repair or replace the defective component.
- h) Verify that the repair is effective in eliminating all of the failure symptoms.
- i) Evaluate whether or not the defective component was the root cause of the failure.
- j) Once the Fault Codes are not found in the “Faults” Screen perform steps from 3-a through 3-c (previous subparagraph **“No Faults are listed in the “Faults” Screen”**)

17-III-03.03.03 Running- Preventive Maintenance Sheet (R-PMS) List

The “ MISCELLANEOUS “Running- Preventive Maintenance Sheets (R-PMS) List is provided in the following pages

The R-PM Sheets are listed by Subsystem / Assembly / Unit / Component and sequenced by Maintenance Interval in conjunction with their Sheet Codes and Tasks (including SCPM flag) to be performed

Table 17-III-03.3 Running Preventive Maintenance Sheets List

SYSTEM		MISCELLANEOUS			
SUBSYSTEM/ ASSY	ASSY /UNIT/ COMPONENT	SCPM	TASK	MAINTEN. INTERVAL (MILES)	SHEET CODE
WINDSCREEN WIPER	WASHER FLUID TANK		SERVICE	DAILY	R-P-17-01-02-01/S-00

17-III-03.03.04

Running- Preventive Maintenance Sheets (R-PMS)

MISCELLANEOUS

Running - Preventive Maintenance Sheets

R-PMS

INTENTIONALLY LEFT BLANK

P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

R-P-17-01-02-01/S-00

System:

MISCELLANEOUS

Sheet:

1/4

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WASHER

Component:

WASHER FLUID TANK

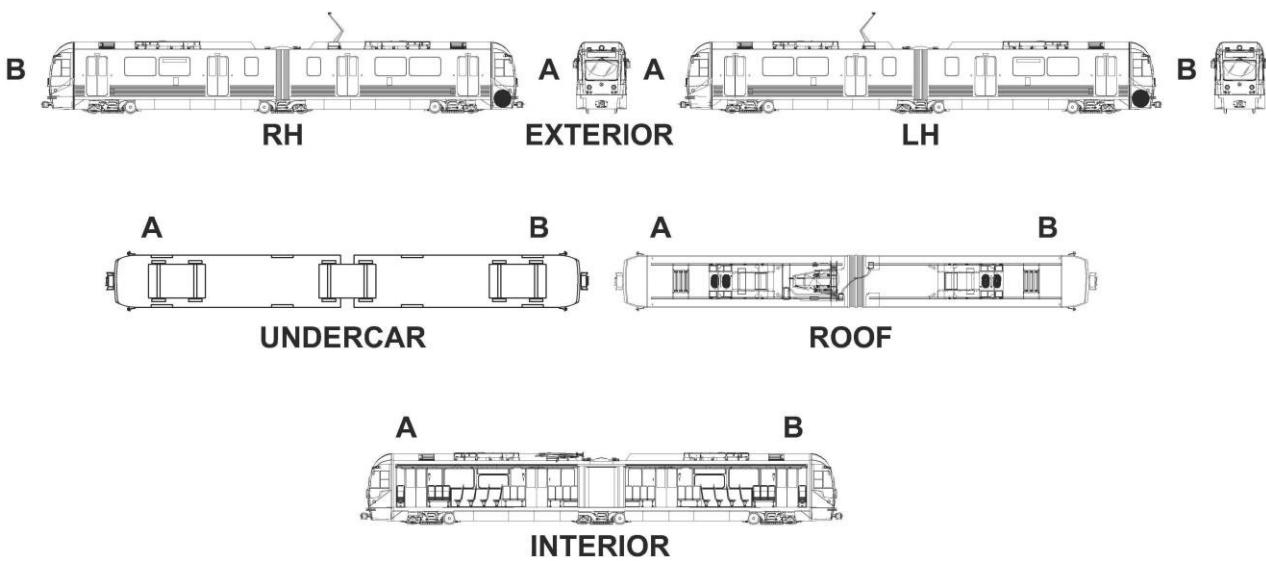
Man Hours:

0.2

Maintenance Task:

SERVICE

Interval/Miles:

DAILY**LOCATION:**

P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

R-P-17-01-02-01/S-00

System:

MISCELLANEOUS

Sheet:

2/4

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WASHER

Component:

WASHER FLUID TANK

Man Hours:

0.2

Maintenance Task:

SERVICE

Interval/Miles:

DAILY

SAFETY PRECAUTIONS:

WARNING: BLUE FLAG THE VEHICLE IN ACCORDANCE WITH ALL LACMTA BLUE FLAG POLICIES, RULES, & PROCEDURES IN ORDER TO WARN THAT MAINTENANCE PERSONNEL ARE WORKING ON, UNDER, OR NEAR ROLLING EQUIPMENT.

WARNING: APPLY WHEEL CHOCKS TO PREVENT THE VEHICLE FROM MOVING.

TOOLS:

LACMTA Maintenance Shop Standard Tools Kit

CONSUMABLES:

Windshield Washer Fluid M3 PN 155551

SPARE PARTS:

N/A

P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

R-P-17-01-02-01/S-00

System:

Sheet:

MISCELLANEOUS
3/4

Subsystem/Assy:

Unit:

WINDSHIELD WIPER AND WASHER SYSTEM
WINDSHIELD WASHER

Component:

Man Hours:

WASHER FLUID TANK
0.2

Maintenance Task:

Interval/Miles:

SERVICE
DAILY

PROCEDURE:

To perform Windshield Washer Fluid Tank Service, proceed as follows (Refer to figure 1):

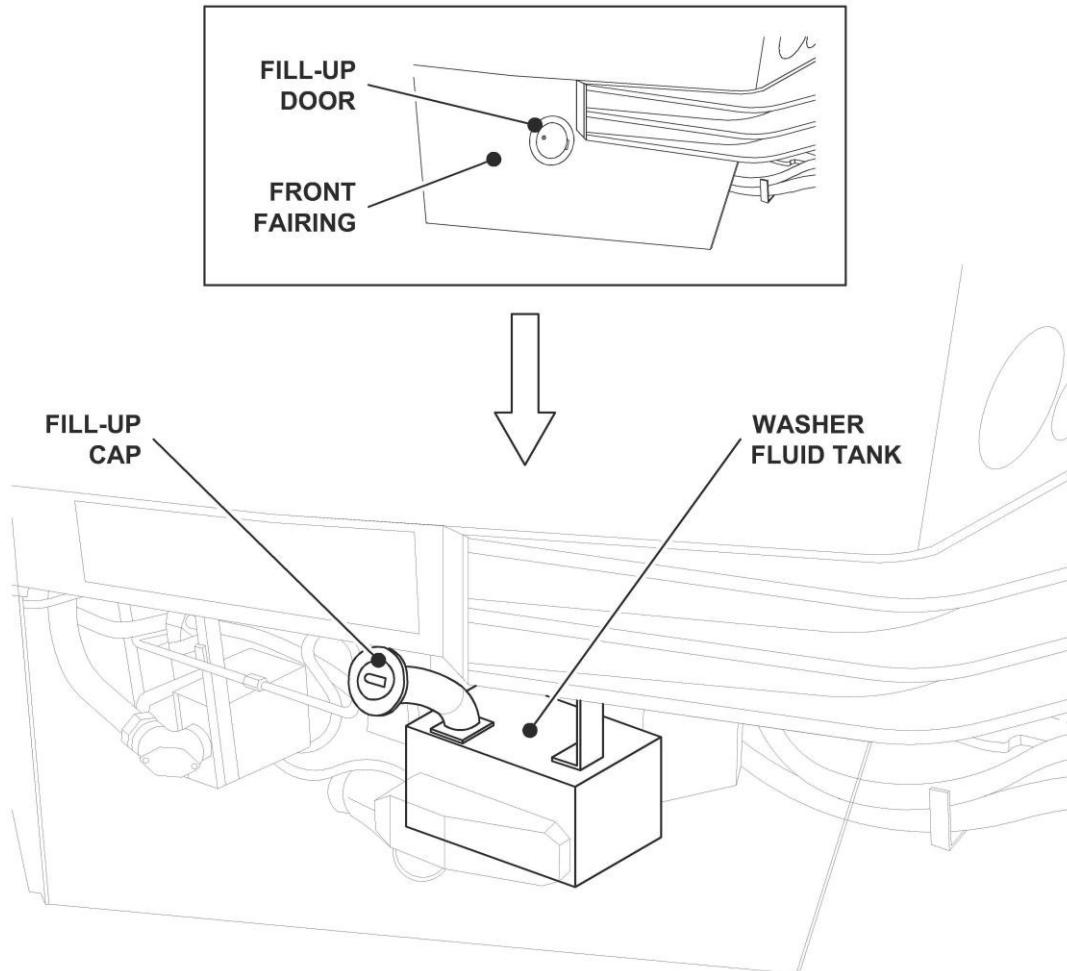


FIGURE 1 - WINDSHIELD WASHER FLUID TANK

P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

R-P-17-01-02-01/S-00

System:

MISCELLANEOUS

Sheet:

4/4

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WASHER

Component:

WASHER FLUID TANK

Man Hours:

0.2

Maintenance Task:

SERVICE

Interval/Miles:

DAILY

PROCEDURE (CONT'D):

PRELIMINARY OPERATION

1. Set the vehicle in safety condition in accordance with LACMTA Maintenance Shop Regulations.

SERVICE

1. Unlock and open Windshield Washer Fluid Tank Fill-up Door using maintenance key.
2. Remove Washer Fluid Tank Fill -up Cap.
3. Perform Washer Fluid Tank replenishment using recommended washer fluid.

CAUTION: MAKE SURE THAT NO DIRT ENTERS THE WASHER FLUID TANK.

4. Once Washer Fluid Tank replenishment is completed, proceed as follows:
 - a) Reinstall and hand tighten securely the Washer Fluid Tank Fill -up Cap.
 - b) Close the Windshield Washer Fluid Tank Fill-up Door and lock it using maintenance key.
5. Record Service Results on the Defect Report Card for administrative and maintenance planning.
6. Perform previous steps 1-5 for each of the Windshield Washer Fluid Tanks installed located on the end of the car.



FIGURE 2 - WINDSHIELD WASHER FLUID SERVICE

17-III-04 RUNNING -CORRECTIVE MAINTENANCE**17-III-04.01 Running -Corrective Maintenance Sheets (R-CMS)**

Each R-CMS provides the following data consistent with Corrective Maintenance Analysis (CMA), AB Design Documentation and Vehicle Systems Functional Tree:

- **R-CM Sheet Code**
- **SYSTEM, SUBSYSTEM /ASSEMBLY, UNIT, Component** (Names) ·
- **SYSTEM, SUBSYSTEM /ASSEMBLY, UNIT, Component** (Location) ·

Maintenance Task,

The following definitions are applicable to the R-CM Tasks

- Inspection:** Maintenance procedures such as those required to ascertain the serviceability of a Part, Assembly, System or the specific interrelationship of Parts that perform a functional operation.
- Leveling:** Procedure to adjust the distance between the Vehicle Floor to the Top Of Rail and the designated Vehicle Height
- Replacement:** Provides the Components / Assemblies and Subassemblies removal & installation in a logical sequential order.
- Re-Profiling:** Provides the procedure to maintain the safe and proper "wheel profile".
- Repair:** Provides detailed procedures for the repair of a specific Equipment / Component
- Service:** Operation performed to replenish Sand, Windshield Wiper Washer Fluid, HVAC Coolant, Gear and Compressor Oil, and Vehicle Lubrication.

- **Man Hours**, needed to perform the Task
- **SPARE PARTS**, needed to perform the Task

Each R-CMS also provides:

- **SAFETY PRECAUTIONS**, to be followed to safely accomplish the Task
- **TOOLS**, including Special Tools and Test Equipment, needed to accomplish the Task
- **CONSUMABLES**, required to accomplish the Task and consistent with those used by MTA
- **PROCEDURE**, consisting of Preliminary Operations and Procedural Steps, to be followed while performing Maintenance Tasks.
- **Illustrations and Pictures** are inserted in the text to facilitate the understanding of the topics and/or to explain step-by-step procedure.

Each R-CM Sheet refers to one Task and consists of several pages where Safety Precautions and Maintenance Instructions to perform safely the Task are provided by Procedural Steps in conjunction with Illustrations and Pictures.

17-III-04.01.01 Running- Corrective Maintenance Sheet (R-CMS) Form

The R-CMS Form (refer to Figure 17-III-04.1) consists of several fields containing the following data/ information:

RUNNING -CORRECTIVE MAINTENANCE SHEET (R-CMS) Form			
ITEM #	TITLE	CONTENT	EXPLANATORY NOTES
1	Card code	Sheet code	<p>The Sheet Code is an alphanumerical code that identifies each R-CM Sheet.</p> <p>THE SHEET CODE IS EXPLICIT</p> <p>The Sheet Code consists of letters R-C followed by an 11 digit code number as follows:</p> <p>R-C-nn-mm-zz-ww/Y-kk</p> <p>R = Running C = Corrective</p> <p>nn may vary from 02 to 19, identifying the System/ Manual Section number.</p> <p>mm-zz-ww each one may vary from 00 to 99, according to AB System Functional Tree, allowing the identification of the Assembly/Unit/Component</p> <p>Y Maintenance Task Code. It may be one of the following:</p> <p>I = Inspection LL =Leveling</p> <p>R = Replacement RP= Re-Profilng</p> <p>RR = Repair S = Service</p> <p>SP = Safety Precautions</p> <p>kk It may vary from 00 to 99. It is a progressive number allowing the univocal identification of R-CMS</p> <p>NOTE: The code R-C-nn-00-00-00-R-kk identifies a Typical Replacement Procedure The Typical Replacement Procedure is provided for the following items: Board, Circuit Breaker, Diode, Indicator Lamp, Main Contactor, Switch & Relays.</p>
2	System	System name	This field indicates the System to which the Assembly/Unit/Component belongs.
3	Subsystem/ Assembly	Subsystem/ Assembly name	This field indicates the Subsystem/Assembly to which the Unit/Component belongs.
4	Unit	Unit name	This field indicates the Unit to which the Component belongs.
5	Component	Component name	This field indicates the Component the Maintenance Task is referring to
6	Maintenance Task	Maintenance Task name	This field indicates the Maintenance Task to be performed.
7	Man Hours	Number	The Man Hour field indicates the time needed to perform the corresponding Maintenance Task. with the basic assumption that the Vehicle is staged on an Inspection Pit/Jacking tracks with the required Consumables, Tools and Materials available.

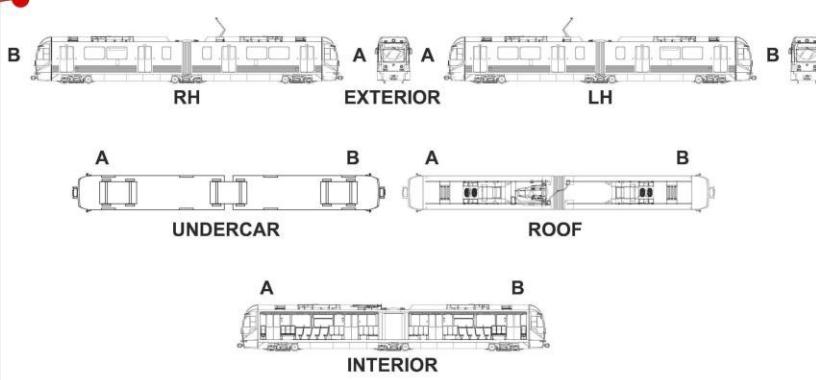
RUNNING -CORRECTIVE MAINTENANCE SHEET (R-CMS) Form (cont'd)			
ITEM #	TITLE	CONTENT	EXPLANATORY NOTES
8	Sheet	Pages numbering	This field indicates the progressive R-CMS sheet page number.
9	LOCATION	Illustration	This field indicates the On Board Location of the Equipment to be maintained The following Graphic Symbols are used for: Assembly/Unit/Component  for System/Subsystem/Vehicle as a Whole 
10	R	Letter	This field indicates that the Sheet pertains to Running Maintenance
11	C	Letter	This field indicates that the Sheet pertains to Corrective Maintenance
12	nn	Number	This field indicates the System/Manual Section number to which the Sheet pertains. It may vary from 01 to 19
13	rr	Number	This field indicates the Sheet Revision number
14	Page ##	Page ##	This field indicates the RMSM Section Page number
15	-#	Number	This field indicates the RMSM Section Revision number
16	SAFETY PRECAUTIONS	Text	This field presents the General and/or specific Safety Precautions to be followed to accomplish safely the relevant Maintenance Tasks.
17	TOOLS	Text	This field lists the description and the P/N of the Standard tools, Special Tools and Test Equipment needed to accomplish the Maintenance Task. Refer to the TTE Manual for the TE and Special Tools detailed descriptions and tools maintenance.
18	CONSUMABLES	Text	This field lists the Consumables Materials (consistent with those used by MTA with the related P/N.) needed to accomplish the Maintenance Task. Cleaning agents are included
19	SPARE PARTS	Text	This field lists the Description and PN of Spare Parts (consistent with Illustrated Parts Catalog) needed to accomplish the Maintenance Task.
20	PROCEDURE	Text	The Procedure field provides Preliminary Operations and Procedural step by step Instructions to be followed while performing the Maintenance Task. Illustrations and Pictures are inserted in the text to facilitate the understanding of the topics and/or to explain step-by-step procedure.

LACMTA P2550 LRV
Running Maintenance and Servicing Manual - Section 01

P2550 CORRECTIVE MAINTENANCE SHEET

System:	Sheet:	Card Code:
Subsystem/Assy:	Unit:	x/z
Component:	Man Hours:	
Maintenance Task:		
LOCATION:		

R-C-nn-mm-zz-ww/Y-kk



1 **2** **3** **4** **5** **6** **7** **8** **9** **10** **11** **12** **13** **14** **15**

M_{Metro}

Page 011 Draft

**Figure 17-III-04.1 R-CMS Form
(Sheet 1 of 2)**

LACMTA P2550 LRV Running Maintenance and Servicing Manual - Section 01		 AnsaldoBreda				
P2550 CORRECTIVE MAINTENANCE SHEET						
Card Code: R-C-nn-mm-zz-ww/Y-kk						
System:	Sheet:	x/z				
Subsystem/Assy:	Unit:					
Component:	Man Hours:					
Maintenance Task:						
SAFETY PRECAUTIONS:						
16						
TOOLS:						
17						
CONSUMABLES:						
18						
SPARE PARTS:						
19						
PROCEDURE:						
PRELIMINARY OPERATIONS						
20						
Page 01-2 Draft						
						
<table border="1" style="margin-left: auto; margin-right: 0; border-collapse: collapse;"> <tr> <td style="width: 10px; height: 10px;"></td> </tr> </table>						

**Figure 17-III-04.1 R-CMS Form
(Sheet 2 of 2)**

17-III-04.01.02 How to Use the R-CM Sheets

To optimize the job organization it is suggested to proceed as follows:

1. Before Task Execution

- a) Carefully read the sheets to ensure that you fully understand all safety precautions, preliminary conditions required, warnings, notes & procedures that will be followed.
- b) Particularly read
 - The Safety Precautions to perform safely the Task
 - The Preliminary Operations to set the Vehicle in safety conditions according to MTA Maintenance Shop Regulations
 - The Tools, Consumables and Spare Parts listed in each Sheet that are needed to accomplish the Task and to have all of them available next the location of the Equipment to be maintained before starting the activities.

2. During Task Execution

- a) Follow accurately the prescribed Safety Precautions and Maintenance Procedural Steps.
- b) Note any Areas/Items of the Assembly/Unit/Component under Corrective Maintenance Process requiring further Corrective Maintenance.
- c) Gather as much information about the Equipment as is practical.
(i.e. knowledge about the malfunction in terms of correctly operating and incorrectly operating equipment processes) to increase your equipment knowledge.

3. At every Task Completion

- a) Carefully follow the prescribed Safety Precautions before restoring the Electrical Power to Vehicle.
- b) Check the correct operation and/or functions of the Subsystem to which the maintained Equipment pertains.
- c) It is suggested to perform this check on the IDU "A" as follows:

NOTE: Through the IDU you can check if all Systems are exchanging data by MVB or LonWorks Bus and the Trainlines Status.

The IDU Display also shows in real time the Status of all Vehicle Systems.

Reading the IDU Fault List it is possible to immediately detect a fault

Using the IDU in the Operating Mode the Fault Indications are generic

Using the IDU in Maintenance Mode the same Fault has a detailed description.

For more in depth troubleshooting use the PTU connected to the relevant system that requires further troubleshooting.

1. On IDU "A" access to the Maintenance Menu first and then to the "Faults" Screen by selecting, in sequence, the relevant icons.
2. Check, On IDU "A" through the list of the Current Active Faults shown in the "Faults" Screen, for Fault Codes related to the Subsystem to which the maintained Equipment pertains.

Refer to Section 18 of RMSM for Fault Signals Details.

3. As per "Fault" Codes check results proceed as follows:

- **No Faults are listed in the "Faults" Screen**
 - a) Key OFF the Vehicle.
 - b) Record Service and Test results on the Defect Report Card for administrative and maintenance planning.
- **Fault Codes are listed in the "Faults" Screen**
 - a) Investigate/troubleshoot the Equipment previously maintained first and then the System/Subsystem/Assembly/Unit for Fault Probable Causes.
 - b) Gather as much information about the failure symptoms as is practical. Refer to Section 18 of RMSM for Fault Signals Details
 - c) Try to identify the malfunction in terms of correctly operating and incorrectly operating equipment processes.
 - d) Identify which equipment signals or parameters will best help you to localize the failure.
 - e) Identify the source of the problem.
 - f) Repair or replace the defective component.
 - g) Verify that the repair is effective in eliminating all of the failure symptoms.
 - h) Evaluate whether or not the defective component was the root cause of the failure.
 - i) Once the Fault Codes are not found in the "Faults" Screen perform steps from 3-a through 3-b (previous subparagraph "**No Faults are listed in the "Faults" Screen**).

17-III-04.01.03 Running- Corrective Maintenance Sheet (R-CMS) List

The “ MISCELLANEOUS ”Running- Corrective Maintenance Sheets (R-CMS) List is provided in the following

Table 17-III-04.1

The R-CM Sheets are listed by Subsystem / Assembly / Unit / Component and sequenced by Sheet Codes and Tasks to be performed

Table 17-III-04.1 Running Corrective Maintenance Sheets List

SYSTEM	17	MISCELLANEOUS		
SUBSYSTEM / ASSY	UNIT	COMPONENT	TASK	SHEET CODE
WINDSCREEN WIPER & WASHER SYSTEM	WIPER	CIRCUIT BREAKER (10F02) TYPE S280	REPLACEMENT	R-C-17-00-00-00/R-00
WINDSCREEN WIPER SYSTEM & HORN SYSTEM		SWITCH	REPLACEMENT	R-C-17-00-00-00/R-01
WINDSCREEN WIPER & WASHER SYSTEM	WIPER	INTERLOCKING DIODE (10V01)	REPLACEMENT	R-C-17-01-01-04/R-00
WINDSCREEN WIPER & WASHER SYSTEM	WINDSCHILD WASHER	WINDSCHILD WASHER MOTOR 10M02	REPLACEMENT	R-C-17-01-01-05/R-00
WINDSCREEN WIPER & WASHER SYSTEM	WINDSCHILD WIPER	CONTROL UNIT (10A01)	REPLACEMENT	R-C-17-01-01-06/R-00
WINDSCREEN WIPER & WASHER SYSTEM	WINDSCHILD WIPER	WINDSCHILD WIPER MOTOR(10M03)	REPLACEMENT	R-C-17-01-01-07/R-00
WINDSCREEN WIPER & WASHER SYSTEM	WINDSCHILD WIPER	BLADE & MECHANICAL PARTS	REPLACEMENT	R-C-17-01-01-08/R-00
WINDSCREEN WIPER & WASHER SYSTEM	WINDSCHILD WASHER	WASHER PIPING	REPLACEMENT	R-C-17-01-01-10/R-00
HORN SYSTEM	HORN & GONG MODULE		REPLACEMENT	R-C-17-02-01-00/R-00

17-III-04.01.04 Running- Corrective Maintenance Sheets (R-CMS)

MISCELLANEOUS

Running - Corrective Maintenance Sheets

R-CMS

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P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-00-00-00/R-00

System:

Sheet:

MISCELLANEOUS
1/8

Subsystem/Assy:

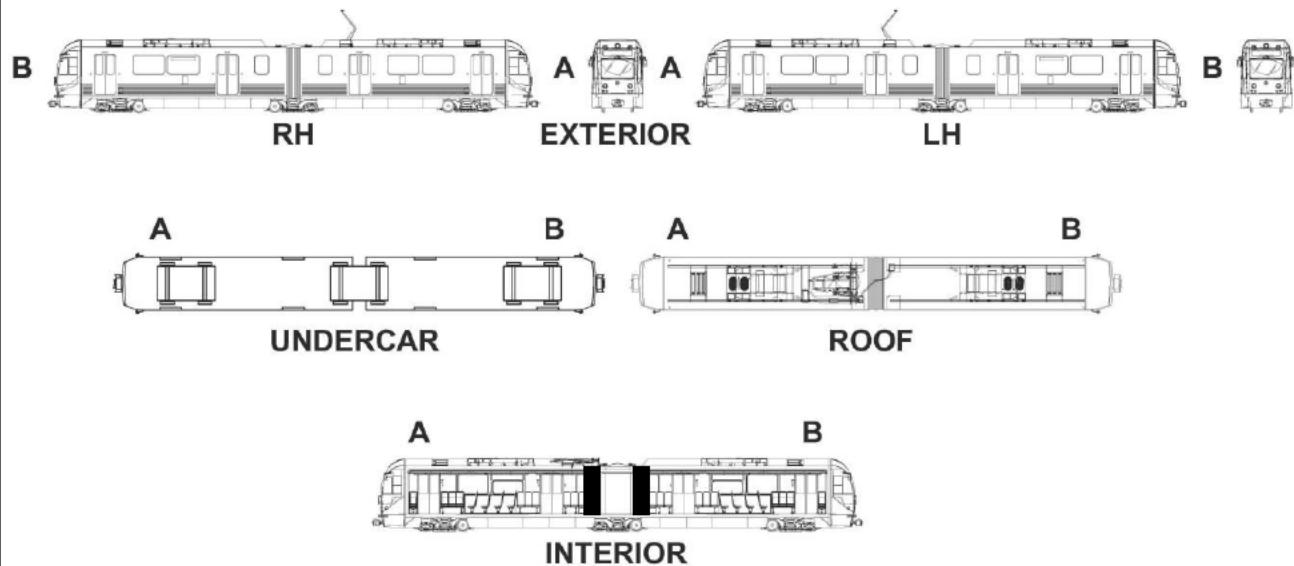
WIPER

Component:

Man Hours:

CIRCUIT BREAKER(10F02) TYPE S280
0.5

Maintenance Task:

REPLACEMENT
LOCATION:

This Replacement procedure is applicable to the following Equipment:

LABEL	DESCRIPTION	TYPE	P/N	CAR	LOCATION	FUNCTIONAL DIAGRAMS	
						SCHEMATICS	SHEET#
10F02	PROTECTION SWITCH FOR MIRRORS AND WINDSHIELD WIPER AND WASHER	S281 C 16A	211EK22984B04	A - B	LV LOCKER	LV	101

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-00-00-00/R-00

System:

MISCELLANEOUS

Sheet:

2/8

Subsystem/Assy:

WINDSCREEN WIPER AND WASHER SYSTEM

Unit:

WIPER

Component:

CIRCUIT BREAKER(10F02) TYPE S280

Man Hours:

0.5

Maintenance Task:

REPLACEMENT**SAFETY PRECAUTIONS:**

LACMTA Maintenance Shop Safety Rules & Regulations

TOOLS:

LACMTA Maintenance Shop Standard Tools Kit

CONSUMABLES:

CRC 2000 Contact Cleaner

SPARE PARTS:

10F02 Protection Switch for Mirrors and Windshield Wiper & Washer Type S281 C 16A
 P/N 211EK22984B04

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-00-00-00/R-00

System:

MISCELLANEOUS

Sheet:

3/8

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WIPER

Component:

CIRCUIT BREAKER(10F02) TYPE S280

Man Hours:

0.5

Maintenance Task:

REPLACEMENT

PROCEDURE:

PRELIMINARY OPERATIONS

Set the Vehicle in safety conditions in accordance with LACMTA Maintenance Shop Regulations:

1. Place the Vehicle in the Maintenance Shop.
2. Set the Master Controller Handle to FSB position.
3. Make sure that all Parking Brakes are applied (by checking on the IDU "Parking Brake A and B Not Released" and on Indicator Panel "A" "Park / Friction Brake" ON).
4. Remove Electrical Power from Vehicle by lowering the Pantograph.
5. Turn the Transfer Switch to OFF.
6. Set the Pantograph Control Motor Switch (5F02 CB LV Locker "A" Section) to OFF.
7. Lock out and tag out the Switch in accordance with all LACMTA Safety Rules, Regulations, Policies, and Procedures

NOTE The tag must indicate the name of the person who removed Power.

That person knows why the Power was removed and when it safe to restore it.

Only the individual whose name appears on the tag or a person with his approval should remove the tag and restore Power.

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-00-00-00/R-00

System:

MISCELLANEOUS

Sheet:

4/8

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WIPER

Component:

CIRCUIT BREAKER(10F02) TYPE S280

Man Hours:

0.5

Maintenance Task:

REPLACEMENT

PROCEDURE (CONT'D):

(Refer to Figures 1 through 5)

REMOVAL

To perform the Task proceed as follows:

1. Gain access to the Circuit Breakers Rack installed in the "A" & "B" LV Lockers, by opening the relevant LV Locker Door using Maintenance Key.
2. Locate the Circuit Breaker to be replaced.

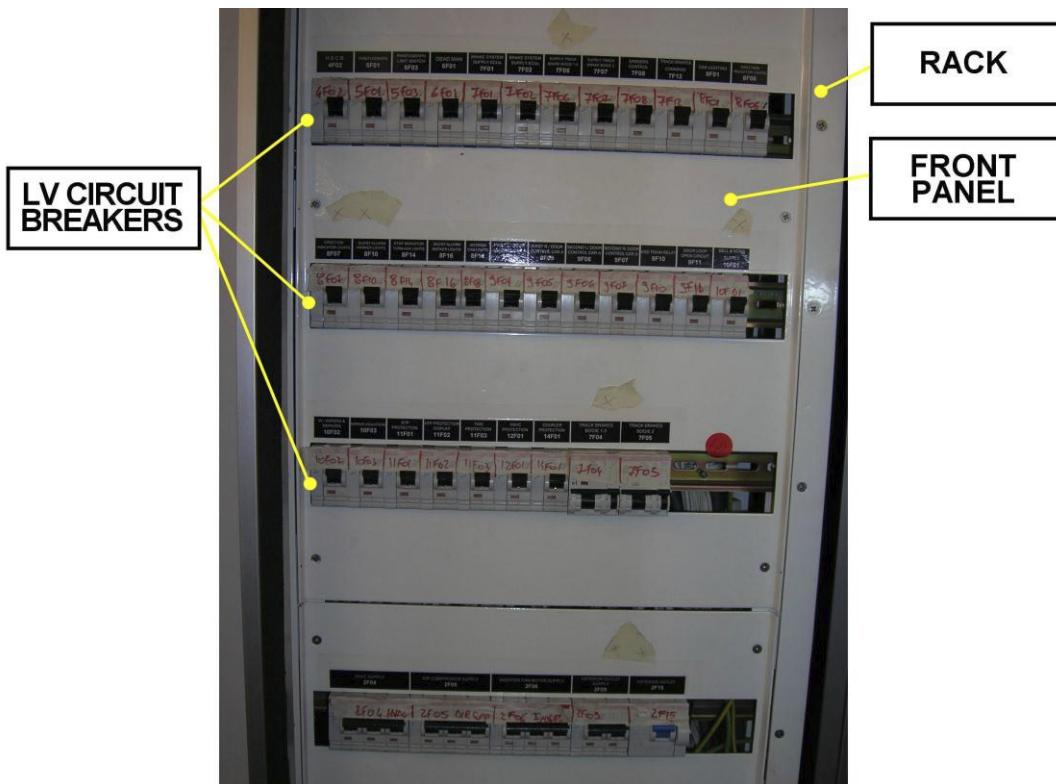


FIGURE 1 - LV LOCKER -CIRCUIT BREAKERS RACK

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-00-00-00/R-00

System:

Sheet:

MISCELLANEOUS**5/8**

Subsystem/Assy:

Unit:

WINDSHIELD WIPER AND WASHER SYSTEM**WIPER**

Component:

Man Hours:

CIRCUIT BREAKER(10F02) TYPE S280**0.5**

Maintenance Task:

REPLACEMENT**PROCEDURE:**

- 3 Remove the Circuit Breakers Front Panel by loosening relevant Fixing Screws.
Retain hardware for later use

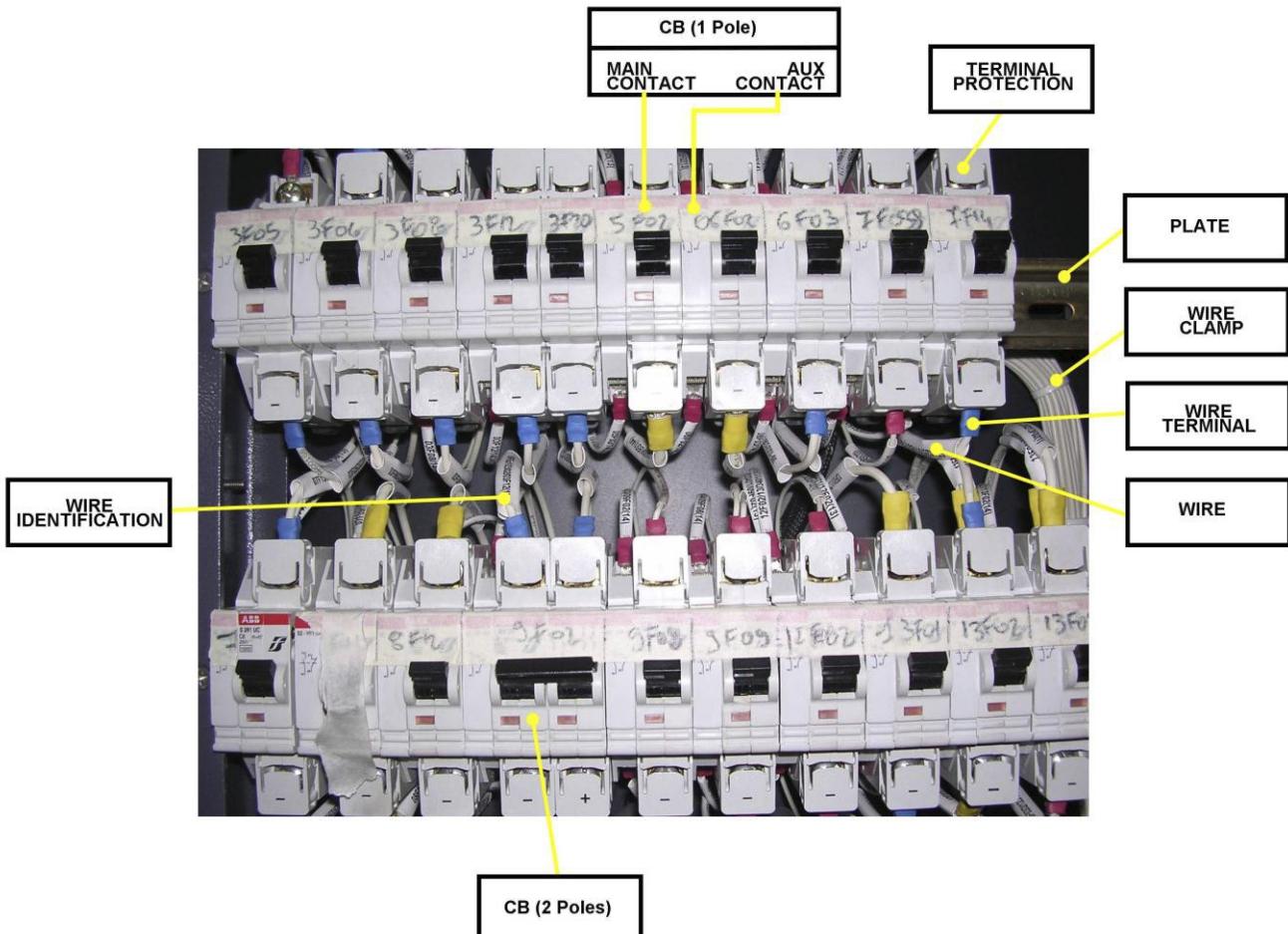


FIGURE 2 - LV LOCKER -CIRCUIT BREAKERS FRONT PANEL REMOVED

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-00-00-00/R-00

System:

MISCELLANEOUS

Sheet:

6/8

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WIPER

Component:

CIRCUIT BREAKER(10F02) TYPE S280

Man Hours:

0.5

Maintenance Task:

REPLACEMENT

PROCEDURE (CONT'D):

- 4 Locate the Circuit Breaker to be replaced

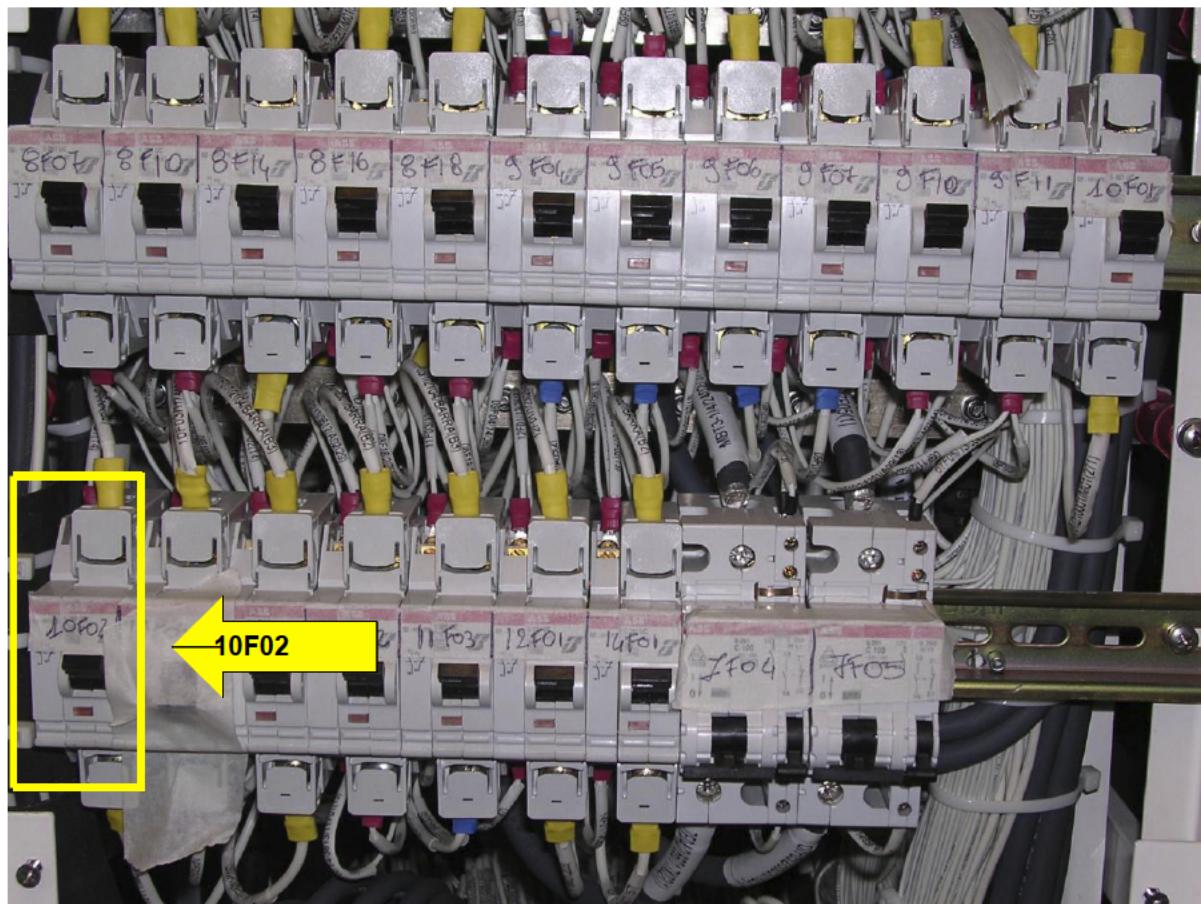


FIGURE 3 - LV LOCKER -CB 10F02 LOCATION

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-00-00-00/R-00

System:

MISCELLANEOUS

Sheet:

7/8

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WIPER

Component:

CIRCUIT BREAKER(10F02) TYPE S280

Man Hours:

0.5

Maintenance Task:

REPLACEMENT

PROCEDURE:

- 5 Remove and discard the Circuit Breaker according to the Instructions provided in the following figure 4

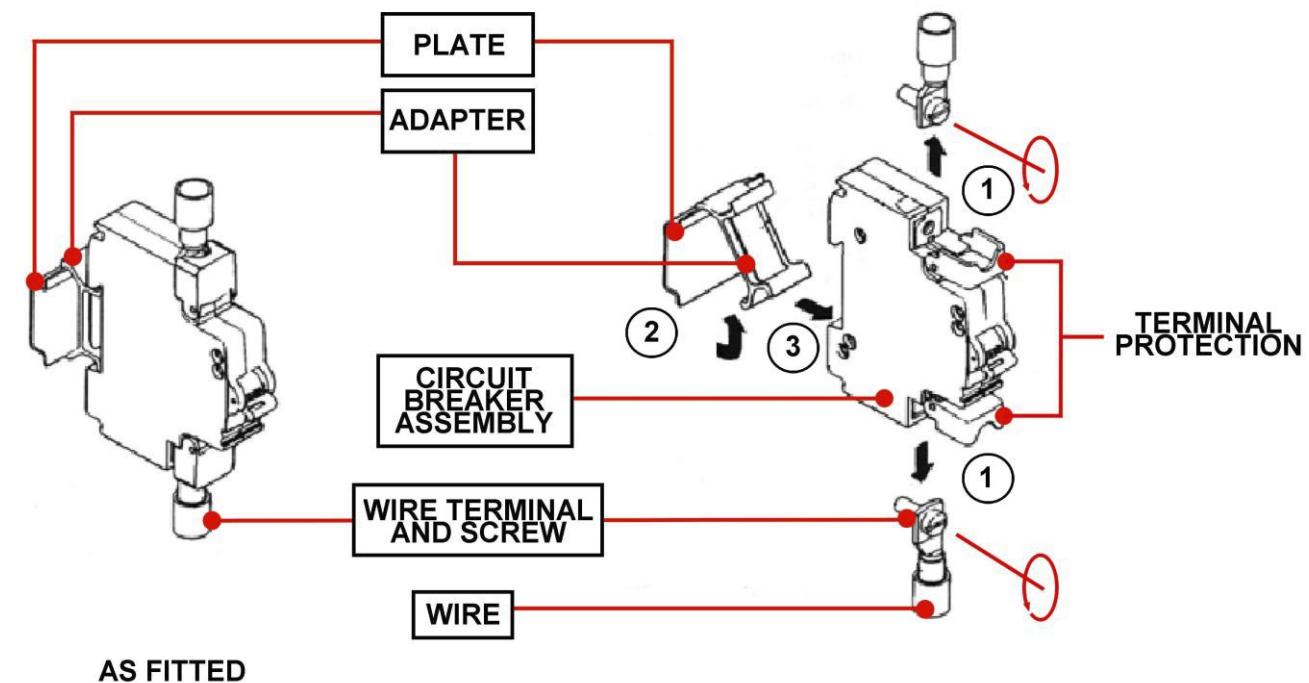


FIGURE 4 - LV LOCKER -10F02 CB REMOVAL

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-00-00-00/R-00

System:

MISCELLANEOUS

Sheet:

8/8

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WIPER

Component:

CIRCUIT BREAKER(10F02) TYPE S280

Man Hours:

0.5

Maintenance Task:

REPLACEMENT**PROCEDURE (CONT'D):**

- 6** Install the Circuit Breaker according to the instructions provided in the following figure 5.

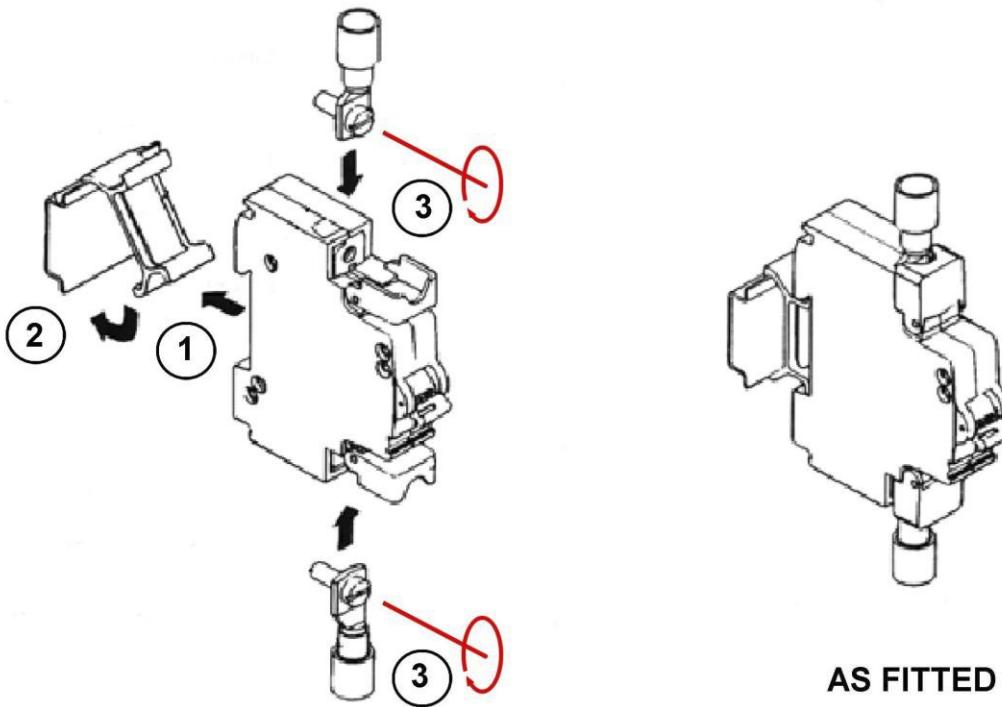


Figure 5 - LV LOCKER -10F02 CB INSTALLATION

- 7** Install the Circuit Breakers Front Panel and secure it by installing and tightening the relevant Holding Screws.
8 Close and secure the LV Locker Door using Maintenance Key.
9 Restore Electrical Power.
10 Record Task Result on the Defect Report Card for administrative and maintenance planning.

NOTE: At Task Completion it is recommended to check the correct operation and/or functions of the Subsystem to which the replaced Equipment pertains.

Refer to **HOW TO USE THE R-CM SHEETS**(para 17-III-04-01-02 of this Section) and follow the prescriptions provided at Step 3 "**At every Task Completion.**"

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-00-00-00/R-01

System:

Sheet:

MISCELLANEOUS
1/6

Subsystem/Assy:

Unit:

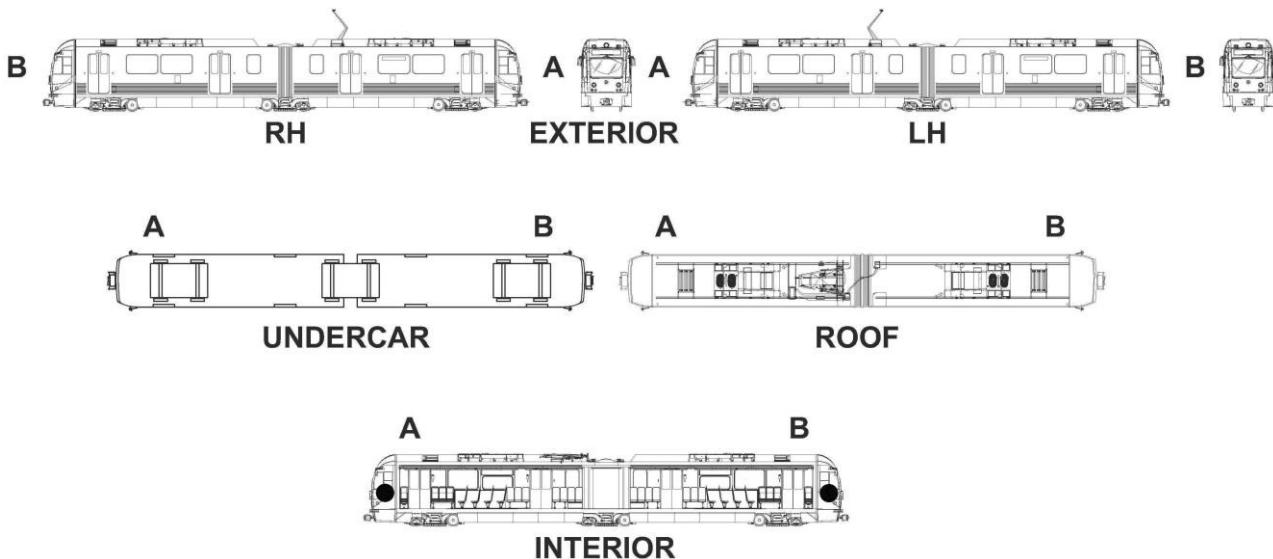
WINDSHIELD WIPER SYSTEM & HORN SYSTEM

Component:

Man Hours:

SWITCH
0.5

Maintenance Task:

REPLACEMENT(TYPICAL)
LOCATION:

This Replacement procedure is applicable to the following Equipment:

LABEL	DESCRIPTION	TYPE	P/N	CAR	LOCATION	FUNCTIONAL DIAGRAMS	
						SCHEMATICS	SHEET#
10S01	HORN SWITCH	TBD	TBD	A - B	CAB CONSOLE	LV	100
10S02	GONG SWITCH	TBD	TBD		CAB CONSOLE	LV	100
10S04	WINDSHIELD WIPER SWITCH	TBD	TBD		CAB CONSOLE	LV	101

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-00-00-00/R-01

System:

MISCELLANEOUS

Sheet:

2/6

Subsystem/Assy:

WINDSHIELD WIPER SYSTEM & HORN SYSTEM

Unit:

Component:

SWITCH

Man Hours:

0.5

Maintenance Task:

REPLACEMENT(TYPICAL)**SAFETY PRECAUTIONS:**

LACMTA Maintenance Shop Safety Rules & Regulations

TOOLS:

LACMTA Maintenance Shop Standard Tools Kit

CONSUMABLES:

N/A

SPARE PARTS:

- | | |
|-------|-------------------------|
| 10S01 | Horn Switch |
| 10S02 | Gong Switch |
| 10S04 | Windshield Wiper Switch |

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-00-00-00/R-01

System:

Sheet:

MISCELLANEOUS**3/6**

Subsystem/Assy:

Unit:

WINDSHIELD WIPER SYSTEM & HORN SYSTEM

Component:

Man Hours:

SWITCH**0.5**

Maintenance Task:

REPLACEMENT(TYPICAL)

PROCEDURE:



FIG 1 CONSOLE



FIG 2 10S04 WINDSHIELD WIPER SWITCH



FIG 3 10S01-HORN SWITCH & 10S02GONG SWITCH

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-00-00-00/R-01

System:

MISCELLANEOUS

Sheet:

4/6

Subsystem/Assy:

WINDSHIELD WIPER SYSTEM & HORN SYSTEM

Unit:

Component:

SWITCH

Man Hours:

0.5

Maintenance Task:

REPLACEMENT(TYPICAL)**PROCEDURE (CONT'D):****PRELIMINARY OPERATIONS**

1. Set the Vehicle in safety conditions in accordance with LACMTA Maintenance Shop Regulations:

REPLACEMENT

To perform the Switch Replacement proceed as follows (Refer to Figures 1 through 5):

1. Removal

- a) Gain access to the rear of the Operator Console Panel Assy by unscrewing and removing the relevant attaching hardware(Screws and Washers)
NOTE: It is advised to retain the attaching Hardware for later use
- b) On the rear of the Operator Console Panel, locate the Switch Body to be replaced and its Electrical Connections.
- c) Note the Switch Body Wiring Identification Codes
- d) Disconnect the Switch Body electrical Connections
- e) Disengage the Switch Assy from its seat
- f) Remove the Switch Assy by pushing it from the rear toward the front of the Operator Console Panel.

2. Installation

- a) Install and engage on its seat the Switch Assy to be installed
- b) Connect the Switch Body Electrical Connections according to the previously noted Wiring Identification Codes (Refer to Figures 4 & 5 for Switches Body Wiring Scheme or to LV Functional Schematic, Sheet 100 or 101 for complete Wiring Scheme)
- c) Position the Operator Console Panel Assy
- d) Install and tighten the Operator Console Panel Assy attaching Hardware
- e) Key on the Vehicle and check that the " new" Switch work properly
- f) Record Task results on the Defect Report Card for administrative and maintenance planning

NOTE: At Task Completion it is recommended to check the correct operation and/or functions of the Subsystem to which the replaced Equipment pertains.

Refer to **HOW TO USE THE R-CM SHEETS**(para 17-III-04-01-02 of this Section) and follow the prescriptions provided at Step 3 "**At every Task Completion.**"

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-00-00-00/R-01

System:

MISCELLANEOUS

Sheet:

5/6

Subsystem/Assy:

WINDSHIELD WIPER SYSTEM & HORN SYSTEM

Unit:

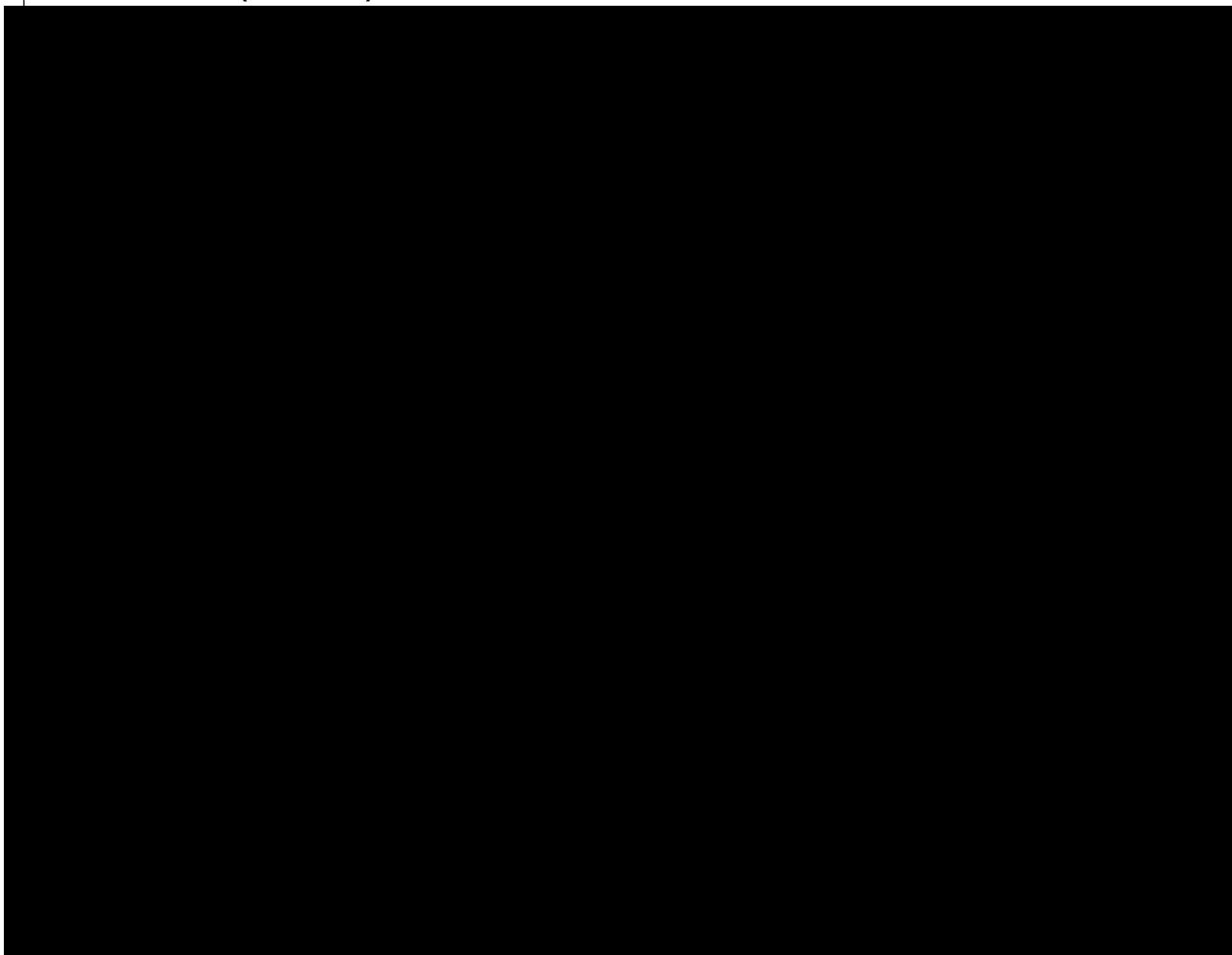
Component:

SWITCH

Man Hours:

0.5

Maintenance Task:

REPLACEMENT(TYPICAL)**PROCEDURE (CONT'D):**

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-00-00-00/R-01

System:

MISCELLANEOUS

Sheet:

6/6

Subsystem/Assy:

WINDSHIELD WIPER SYSTEM & HORN SYSTEM

Unit:

Component:

SWITCH

Man Hours:

0.5

Maintenance Task:

REPLACEMENT(TYPICAL)**PROCEDURE (CONT'D):**

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-04/R-00

System:

MISCELLANEOUS

Sheet:

1/6

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WIPER

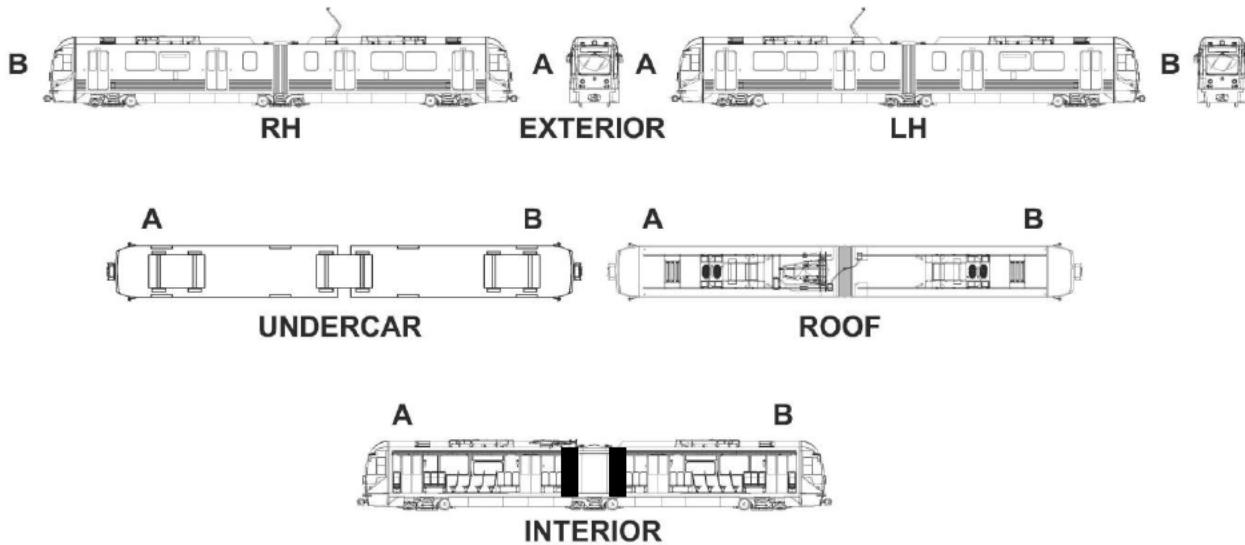
Component:

PROTECTIVE DIODE (10V01)

Man Hours:

0.5

Maintenance Task:

REPLACEMENT**LOCATION:**

This Replacement procedure is applicable to the following Equipment:

LABEL	DESCRIPTION	TYPE	P/N	CAR	LOCATION	FUNCTIONAL DIAGRAMS	
						SCHEMATICS	SHEET#
10V01	PROTECTIVE DIODE	DSEI 2X61 36 A	211VV01044B	A - B	LV LOCKER	LV	101

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-04/R-00

System:

MISCELLANEOUS

Sheet:

2/6

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEMUnit:
WIPER

Component:

PROTECTIVE DIODE (10V01)Man Hours:
0.5

Maintenance Task:

REPLACEMENT**SAFETY PRECAUTIONS:**

LACMTA Maintenance Shop Safety Rules & Regulations

TOOLS:

LACMTA Maintenance Shop Standard Tools Kit

CONSUMABLES:

CRC 2000 Contact Cleaner

SPARE PARTS:

10V01 Protective Diode Type: Commercial PN: 211VV01044B

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-04/R-00

System:

MISCELLANEOUS

Sheet:

3/6

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WIPER

Component:

PROTECTIVE DIODE (10V01)

Man Hours:

0.5

Maintenance Task:

REPLACEMENT

PROCEDURE:

PRELIMINARY OPERATIONS

Set the Vehicle in safety conditions in accordance with LACMTA Maintenance Shop Regulations:

1. Place the Vehicle in the Maintenance Shop.
2. Set the Master Controller Handle to FSB position.
3. Make sure that all Parking Brakes are applied (by checking on the IDU "Parking Brake A and B Not Released" and on Indicator Panel "A" "Park / Friction Brake" ON).
4. Remove Electrical Power from Vehicle by lowering the Pantograph.
5. Turn the Transfer Switch to OFF.
6. Set the Pantograph Control Motor Switch (5F02 CB LV Locker "A" Section) to OFF.
7. Lock-out and tag-out the Overhead Catenary, 750Vdc Power, per LACMTA Safety Rules and Procedures.

NOTE The tag must indicate the name of the person who removed Power.

That person knows why the Power was removed and when it safe to restore it.

Only the individual whose name appears on the tag or a person with his approval should remove the tag and restore Power.

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-04/R-00

System:

MISCELLANEOUS

Sheet:

4/6

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEMUnit:
WIPER

Component:

PROTECTIVE DIODE (10V01)Man Hours:
0.5

Maintenance Task:

REPLACEMENT

PROCEDURE (CONT'D):

To perform the Task proceed as follows:

REMOVAL(refer to figures 1 & 2)

1. Gain access to the Diodes Section on the side of the Rack installed in the "A" & "B" LV Lockers, by opening the relevant LV Locker Door using Maintenance Key.
2. Locate the Diode to be replaced.

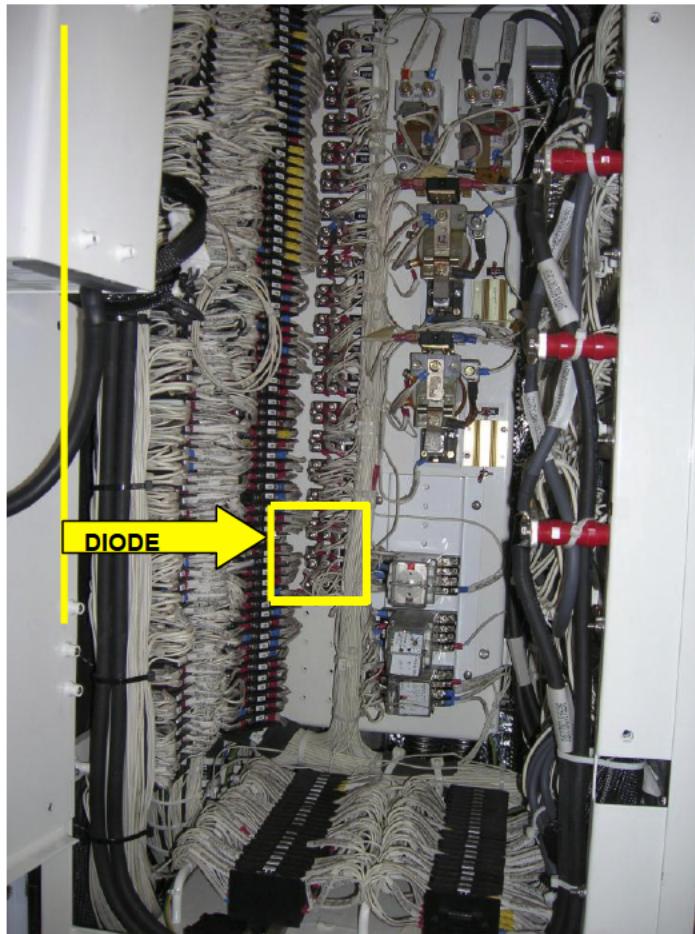


FIGURE 1 DIODE LOCATION

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-04/R-00

System:

MISCELLANEOUS

Sheet:

5/6

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WIPER

Component:

PROTECTIVE DIODE (10V01)

Man Hours:

0.5

Maintenance Task:

REPLACEMENT

PROCEDURE:

3. Take note of Wiring Color Codes and relevant positions on Diode Terminals.
4. Disconnect the Wiring from Diode Terminals by loosening and removing the relevant Screws on 4 Diode Terminals. Retain them for later use.
5. Loose and remove the Diode Locking Screws & Washers. Retain them for later use
6. Remove the Diode and discard it.

INSTALLATION

1. Install the Diode in position.
2. Install Diode Locking Screws & Washers. Tighten as required.
3. Connect the Wiring to the Diode Terminals according to their position and Color Codes previously noted. Tighten as required.
4. Leave the LV Locker and close the LV locker Door using Maintenance Key.
5. Restore Electrical Power
6. Record Task results on the Defect Report Card for administrative and maintenance planning.

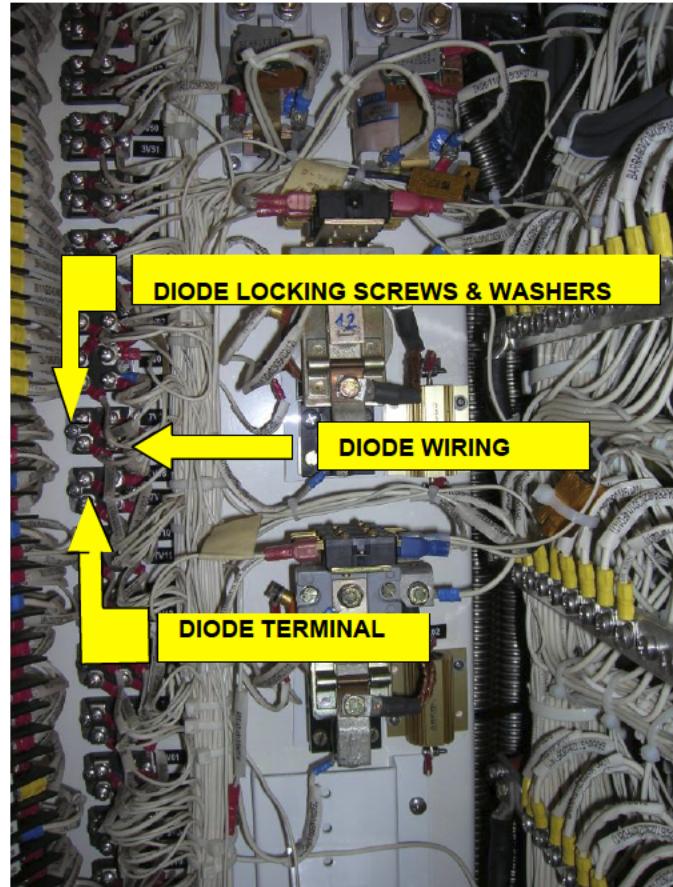


FIGURE 2 DIODE REPLACEMENT

NOTE: At Task Completion it is recommended to check the correct operation and/or functions of the Subsystem to which the replaced Equipment pertains.

Refer to **HOW TO USE THE R-CM SHEETS**(para 17-III-04-01-02 of this Section) and follow the prescriptions provided at Step 3 “At every Task Completion.”

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-04/R-00

System:

MISCELLANEOUS

Sheet:

6/6

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WIPER

Component:

PROTECTIVE DIODE (10V01)

Man Hours:

0.5

Maintenance Task:

REPLACEMENT**INTENTIONALLY
LEFT BLANK**

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-05/R-00

System:

MISCELLANEOUS

Sheet:

1/6

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WASHER

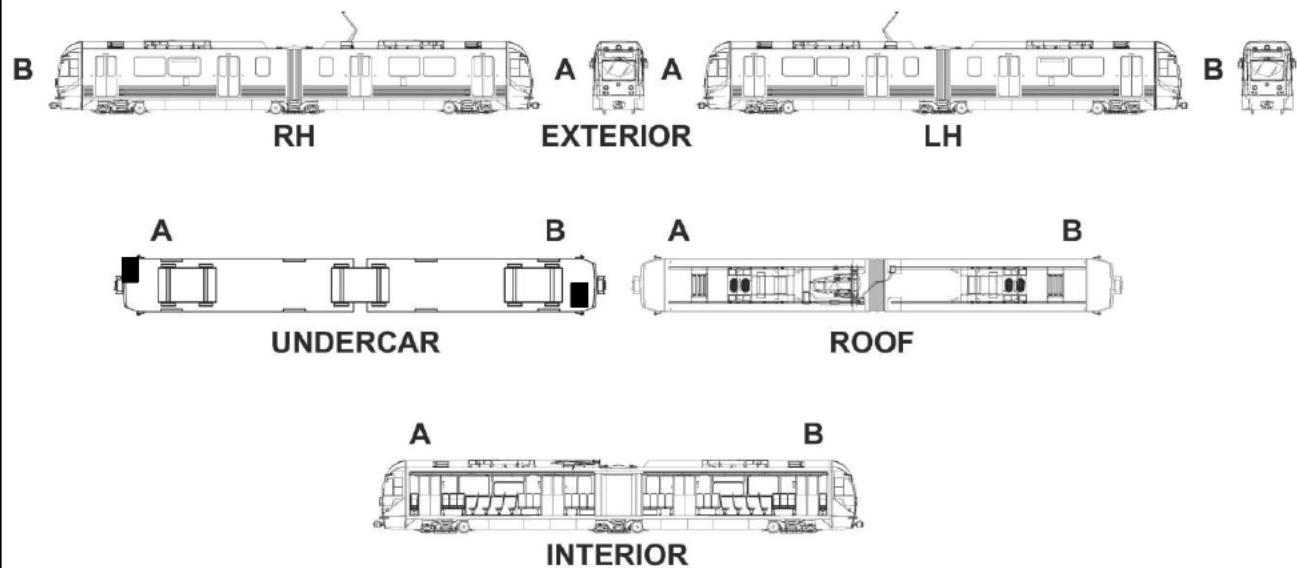
Component:

WINDSHIELD WASHER MOTOR(10M02)

Man Hours:

1.25

Maintenance Task:

REPLACEMENT
LOCATION:


P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-05/R-00

System:

MISCELLANEOUS

Sheet:

2/6

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WASHER

Component:

WINDSHIELD WASHER MOTOR 10M02

Man Hours:

1.25

Maintenance Task:

REPLACEMENT**SAFETY PRECAUTIONS:**

LACMTA Maintenance Shop Safety Rules & Regulations

TOOLS:

LACMTA Maintenance Shop Standard Tools Kit

CONSUMABLES:

N/A

SPARE PARTS:

10M02 Windshield Washer Motor-Pump

P/N: AA04NW3

MFR P/N

PPA.024

P2550 CORRECTIVE MAINTENANCE SHEET	
Card Code: R-C-17-01-01-05/R-00	
System: MISCELLANEOUS	Sheet: 3/6
Subsystem/Assy: WINDSHIELD WIPER AND WASHER SYSTEM	Unit: WINDSHIELD WASHER
Component: WINDSHIELD WASHER MOTOR 10M02	Man Hours: 1.25
Maintenance Task: REPLACEMENT	
PROCEDURE:	
<p>PRELIMINARY OPERATIONS</p> <p>Set the Vehicle in safety conditions in accordance with LACMTA Maintenance Shop Regulations:</p> <ol style="list-style-type: none"> 1. Place the Vehicle in the Maintenance Shop. 2. Set the Master Controller Handle to FSB position. 3. Make sure that all Parking Brakes are applied (by checking on the IDU "Parking Brake A and B Not Released" and on Indicator Panel "A" "Park / Friction Brake" ON). 4. Remove Electrical Power from Vehicle by lowering the Pantograph. 5. Turn the Transfer Switch to OFF. 6. Set the Pantograph Control Motor Switch (5F02 CB LV Locker "A" Section) to OFF. 7. Lock out and tag out the Switch in accordance with all LACMTA Safety Rules, Regulations, Policies, and Procedures. <p>NOTE The tag must indicate the name of the person who removed Power. That person knows why the Power was removed and when it safe to restore it. Only the individual whose name appears on the tag or a person with his approval should remove the tag and restore Power.</p>	

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-05/R-00

System:

MISCELLANEOUS

Sheet:

4/6

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WASHER

Component:

WINDSHIELD WASHER MOTOR 10M02

Man Hours:

1.25

Maintenance Task:

REPLACEMENT

PROCEDURE (CONT'D):

To replace the Windshield Washer Motor proceed as follows:

REMOVAL

NOTE: The Motor and the Pump are a whole Item.



1. Switch off the 10F02 Mirrors and Windshield Wiper and Washer CB located in the LV Locker.

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-05/R-00

System:

MISCELLANEOUS

Sheet:

5/6

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WASHER

Component:

WINDSHIELD WASHER MOTOR 10M02

Man Hours:

1.25

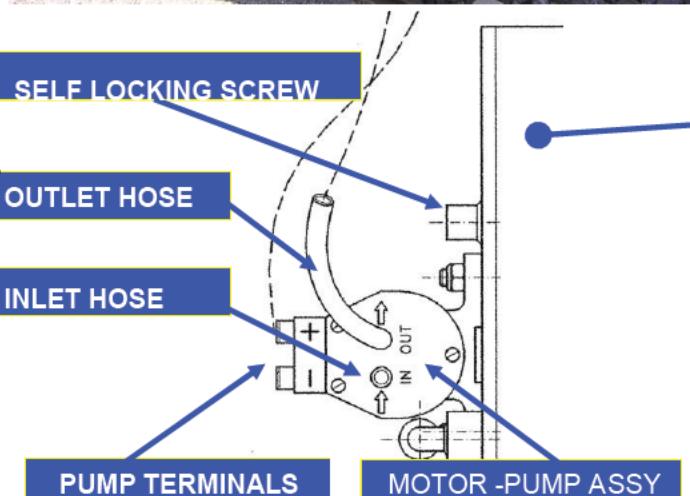
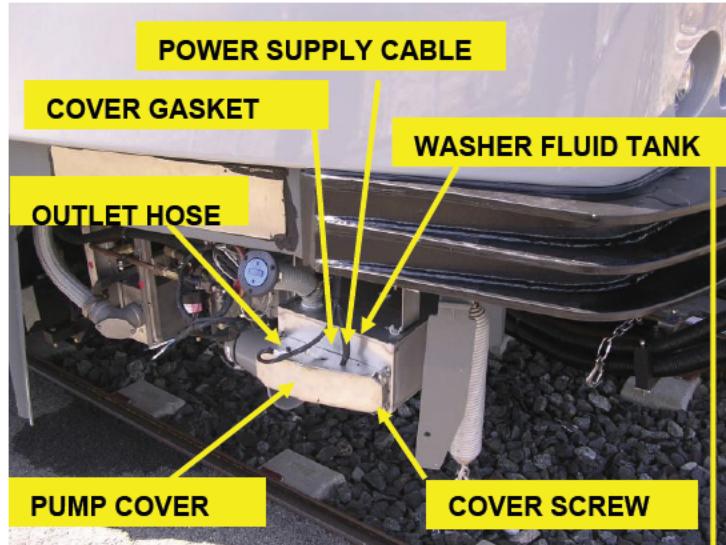
Maintenance Task:

REPLACEMENT

PROCEDURE (CONT'D):

REMOVAL(cont'd)

2. Remove the RH Skirt according to Sheet R-C-02-03-02-00/R-00.
3. Remove the Protection Cover of the Washer Motor-Pump Assy by loosening the relevant hardware(Screw, Washer & Lock Washers).
4. Remove and discard the Cover Gasket.
5. Disconnect the Pump Power Supply Cable by disengaging the relevant Terminals onto the Motor-Pump Body.
6. Disconnect both the Washer Fluid Hoses from Motor-Pump Body(Pump Inlet and Pump Outlet).
7. Supporting the Motor-Pump Assy, loose and remove the Motor-Pump Self Locking Nuts.
8. Discard the Motor-Pump Assy.



NOTE:The Motor and the Pump are a whole, throw away Item.

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-05/R-00

System:

MISCELLANEOUS

Sheet:

6/6

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WASHER

Component:

WINDSHIELD WASHER MOTOR 10M02

Man Hours:

1.25

Maintenance Task:

REPLACEMENT

PROCEDURE (CONT'D):

INSTALLATION

1. Install the "new" Motor-Pump Assy and the relevant fixing Hardware. Tighten to 5 ft lb.
2. Reconnect both the Washer Fluid Hoses to Motor-Pump Body (Pump Inlet and Pump Outlet).
3. Reconnect the Motor-Pump Power Supply Cable by engaging the relevant Terminals onto the Motor-Pump Body.
4. Install the "new" Gasket on the Protection Cover of the Washer Motor-Pump Assy.
5. Install the Cover and relevant attaching Hardware. Torque to 5 ft lb.
6. Install RH Skirt according to Sheet R-C-02-03-02-00/R-00.
7. Switch on the 10F02 Mirrors and Windshield Wiper and Washer CB.
8. Restore power to Vehicle.
9. Check for proper working the "new" Motor-Pump Assy by switching to WASH position the relevant 10S04, Windshield Wiper Switch located on the Operator Console LH Panel.

**CONSOLE****10S04 WINDSHIELD WIPER SWITCH**

10. Record Task results on the Defect Report Card for administrative and maintenance planning.

NOTE: At Task Completion it is recommended to check the correct operation and/or functions of the Subsystem to which the replaced Equipment pertains.

Refer to **HOW TO USE THE R-CM SHEETS** (para 17-III-04-01-02 of this Section) and follow the prescriptions provided at Step 3 "At every Task Completion."

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-06/R-00

System:

MISCELLANEOUS

Sheet:

1/8

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WIPER

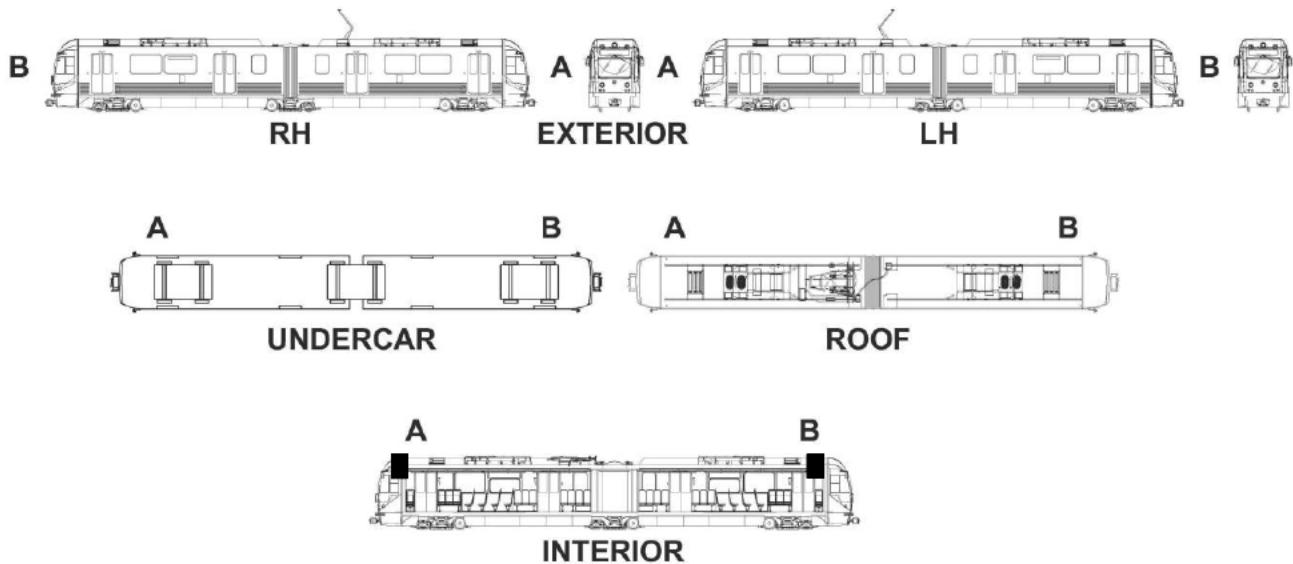
Component:

CONTROL UNIT(10A01)

Man Hours:

0.5

Maintenance Task:

REPLACEMENT
LOCATION:


P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-06/R-00

System:

MISCELLANEOUS

Sheet:

2/8

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WIPER

Component:

CONTROL UNIT(10A01)

Man Hours:

0.5

Maintenance Task:

REPLACEMENT

SAFETY PRECAUTIONS:

LACMTA Maintenance Shop Safety Rules & Regulations

TOOLS:

LACMTA Maintenance Shop Standard Tools Kit

CONSUMABLES:

N/A

SPARE PARTS:

10A01 Windshield Wiper Electronic Control Unit

P/N: AA04NW0

MFR P/N:

PM04.LA

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-06/R-00

System:

MISCELLANEOUS

Sheet:

3/8

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WIPER

Component:

CONTROL UNIT(10A01)

Man Hours:

0.5

Maintenance Task:

REPLACEMENT

PROCEDURE:

PRELIMINARY OPERATIONS

Set the Vehicle in safety conditions in accordance with LACMTA Maintenance Shop Regulations:

1. Place the Vehicle in the Maintenance Shop.
2. Set the Master Controller Handle to FSB position.
3. Make sure that all Parking Brakes are applied (by checking on the IDU "Parking Brake A and B Not Released" and on Indicator Panel "A" "Park / Friction Brake" ON).
4. Remove Electrical Power from Vehicle by lowering the Pantograph.
5. Turn the Transfer Switch to OFF.
6. Set the Pantograph Control Motor Switch (5F02 CB LV Locker "A" Section) to OFF.
7. Lock out and tag out the Switch in accordance with all LACMTA Safety Rules, Regulations, Policies, and Procedures.

NOTE The tag must indicate the name of the person who removed Power.

That person knows why the Power was removed and when it safe to restore it.

Only the individual whose name appears on the tag or a person with his approval should remove the tag and restore Power.

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-06/R-00

System:

MISCELLANEOUS

Sheet:

4/8

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WIPER

Component:

CONTROL UNIT(10A01)

Man Hours:

0.5

Maintenance Task:

REPLACEMENT

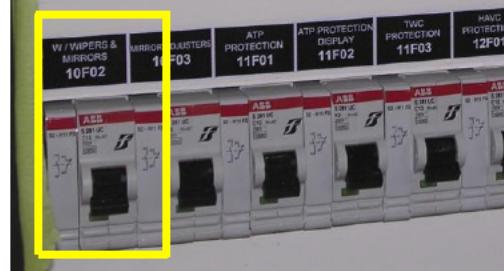
PROCEDURE (CONT'D):

To replace the Windshield Wiper Control Unit proceed as follows(refer to Figures 1 through 5).

REMOVAL



1. Switch off the 10F02 Mirrors and Windshield Wiper & Washer CB located in the relevant "A" / "B" LV Locker.



P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-06/R-00

System:

MISCELLANEOUS

Sheet:

5/8

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WIPER

Component:

CONTROL UNIT(10A01)

Man Hours:

0.5

Maintenance Task:

REPLACEMENT

PROCEDURE (CONT'D):

2. Gain access to the Windshield Wiper Control Unit by removing the Cab Ceiling Inspection Panel



FIG 2 WINDSHIELD WIPER CONTROL UNIT(10A01) ACCESS

3. Locate the Control Unit to be removed

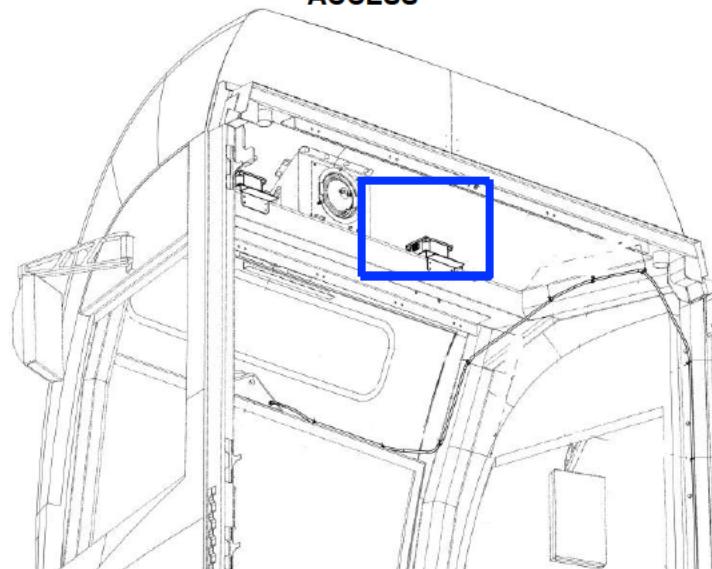


FIG 3 WINDSHIELD WIPER CONTROL UNIT(10A01) LOCATION

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-06/R-00

System:

MISCELLANEOUS

Sheet:

6/8

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WIPER

Component:

CONTROL UNIT(10A01)

Man Hours:

0.5

Maintenance Task:

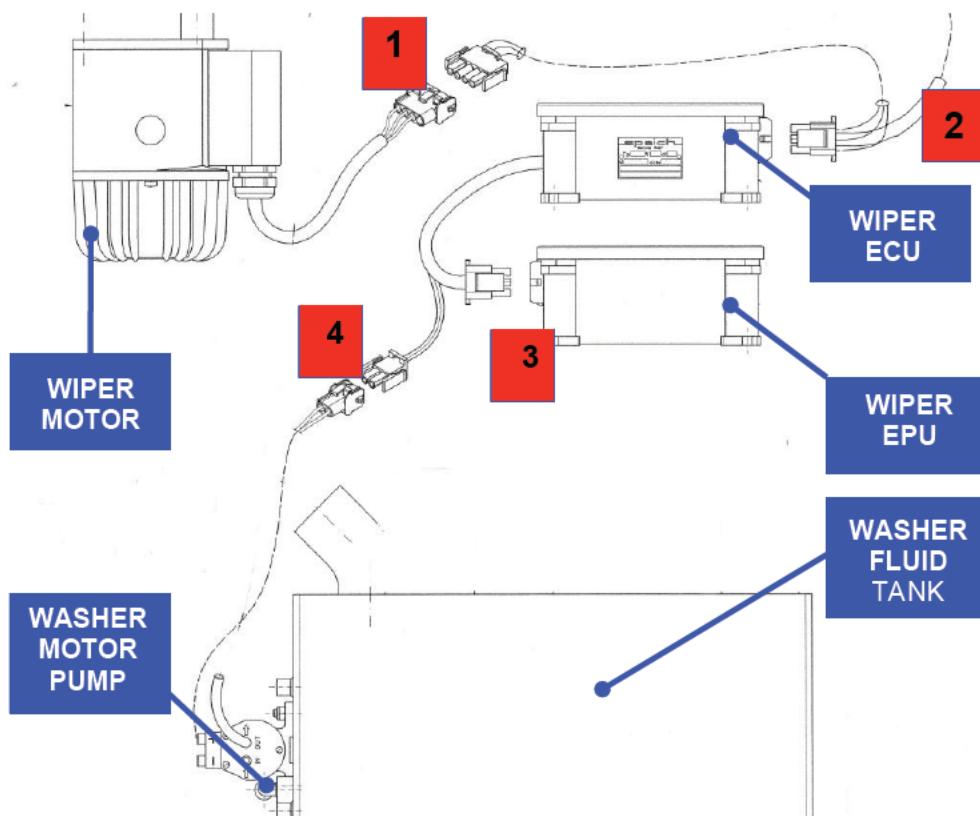
REPLACEMENT

PROCEDURE (CONT'D):

4. Disengage the four (4) Connectors



connecting the Control Unit respectively with:
 - the Wiper Motor (1)
 - the Wiper Switch (2)
 - the Wiper Electronic Power Unit (3)
 - the Washer Motor Pump (4)



**FIG 4 WINDSHIELD WIPER CONTROL UNIT(10A01)
ELECTRICAL CONNECTIONS**

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-06/R-00

System:

MISCELLANEOUS

Sheet:

7/8

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WIPER

Component:

CONTROL UNIT(10A01)

Man Hours:

0.5

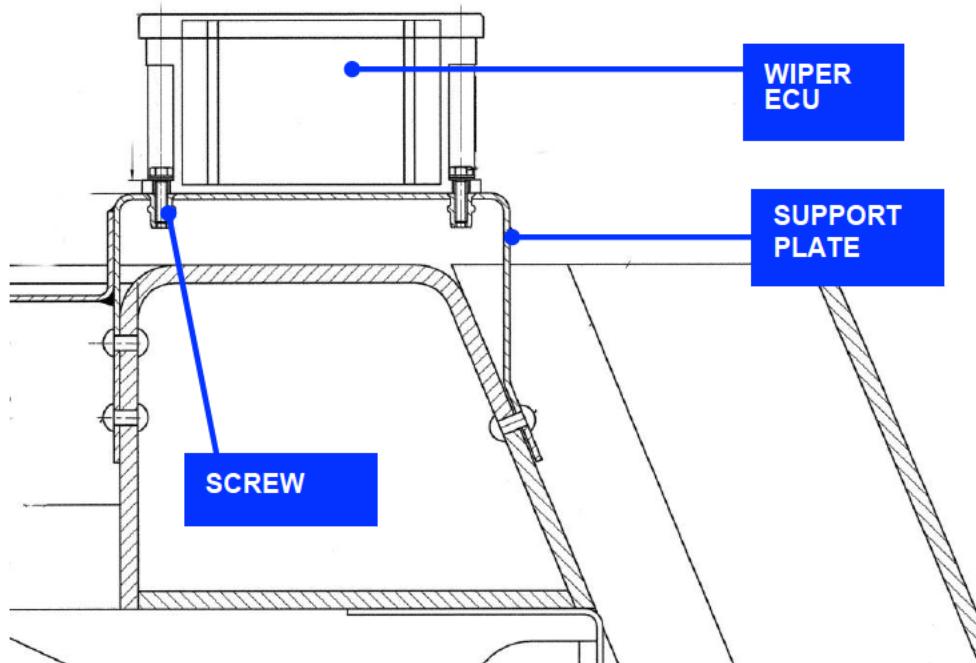
Maintenance Task:

REPLACEMENT

PROCEDURE (CONT'D):

5. Loose and remove the 4 Control Unit Securing Hex Cap Screws M5x16 with relevant Washers & Lock Washers. Retain them for later use.

6. Remove the Control Unit.



**FIG 5 WINDSHIELD WIPER CONTROL UNIT(10A01)
MECHANICAL CONNECTIONS**

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-06/R-00

System:

MISCELLANEOUS

Sheet:

8/8

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WIPER

Component:

CONTROL UNIT(10A01)

Man Hours:

0.5

Maintenance Task:

REPLACEMENT

PROCEDURE (CONT'D):

INSTALLATION(refer to Figures 1 through 5)

1. Position the Control Unit onto its support plate.
2. Install the 4 Control Unit Fixing Hex Cap Screws M5x16 with relevant Washers & Lock Washers.
Torque to **5ft lb.**
3. Reconnect the 4 Connectors.
4. Install the Cab Ceiling Inspection Panel.
5. Switch on the 10F02 Mirrors and Windshield Wiper & Washer CB located in the relevant "A" / "B" LV Locker.
6. Check that the Wiper & Washer System works properly by switching on the relevant 10S04 Windshield Wiper Switch, on Operating Console, LH Panel(select all switch positions).
7. Record Task results on the Defect Report Card for administrative and maintenance planning.

NOTE: At Task Completion it is recommended to check the correct operation and/or functions of the Subsystem to which the replaced Equipment pertains.

Refer to **HOW TO USE THE R-CM SHEETS**(para 17-III-04-01-02 of this Section) and follow the prescriptions provided at Step 3 "**At every Task Completion.**"

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-07/R-00

System:

MISCELLANEOUS

Sheet:

1/8

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WIPER

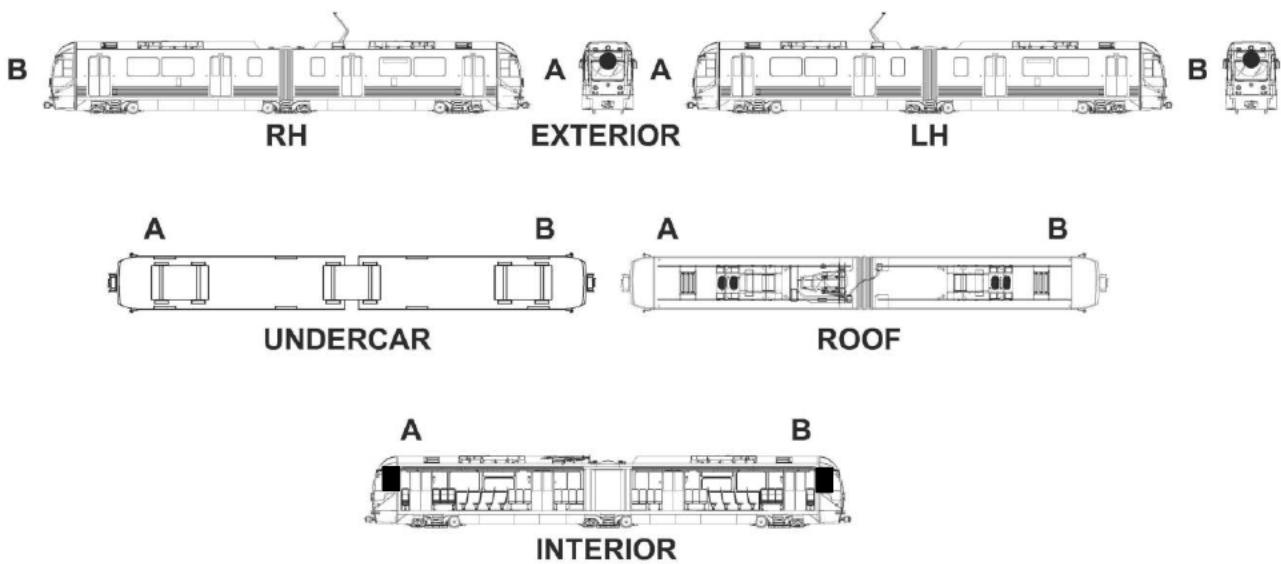
Component:

WINDSHIELD WIPER MOTOR(10M03)

Man Hours:

1

Maintenance Task:

REPLACEMENT
LOCATION:

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-07/R-00

System:

MISCELLANEOUS

Sheet:

2/8

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WIPER

Component:

WINDSHIELD WIPER MOTOR(10M03)

Man Hours:

1

Maintenance Task:

REPLACEMENT

SAFETY PRECAUTIONS:

WARNING: BLUE FLAG THE VEHICLE IN ACCORDANCE WITH ALL LACMTA BLUE FLAG POLICIES, RULES, & PROCEDURES IN ORDER TO WARN THAT MAINTENANCE PERSONNEL ARE WORKING ON, UNDER, OR NEAR ROLLING EQUIPMENT.

WARNING: APPLY WHEEL CHOCKS TO PREVENT THE VEHICLE FROM MOVING.

WARNING: USE SUITABLE EXTERNAL SCAFFOLD IN ORDER TO SAFELY OPERATE ON VEHICLE EXTERIOR.

TOOLS:

LACMTA Maintenance Shop Standard Tools Kit

External Scaffold

CONSUMABLES:

N/A

SPARE PARTS:

10M03 Windshield Wiper Motor P/N: AA04NVW MFR P/N: M024.100.40.DX

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-07/R-00

System:

MISCELLANEOUS

Sheet:

3/8

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WIPER

Component:

WINDSHIELD WIPER MOTOR(10M03)

Man Hours:

1

Maintenance Task:

REPLACEMENT

PROCEDURE:

To replace the Windshield Wiper Motor proceed as follows:

REMOVAL



P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-07/R-00

System:

MISCELLANEOUS

Sheet:

4/8

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WIPER

Component:

WINDSHIELD WIPER MOTOR(10M03)

Man Hours:

1

Maintenance Task:

REPLACEMENT

PROCEDURE (CONT'D):

REMOVAL (cont'd)

OUTSIDE

WARNING: USE SUITABLE EXTERNAL SCAFFOLD IN ORDER TO SAFELY OPERATE ON VEHICLE EXTERIOR

2. Disconnect Washer Fluid Hose (2) from Bulkhead Connector (4).
3. Loose and remove the Screws (3) and remove the Wiper Arm Assy (1) (with Blade).
4. Remove the M20 Nut (10), Washer(11) and Gasket (5).
5. Retain the M20 Nut (10) and discard the Washer and the Gasket.



FIG 1 WINDSHIELD WIPER POSITION

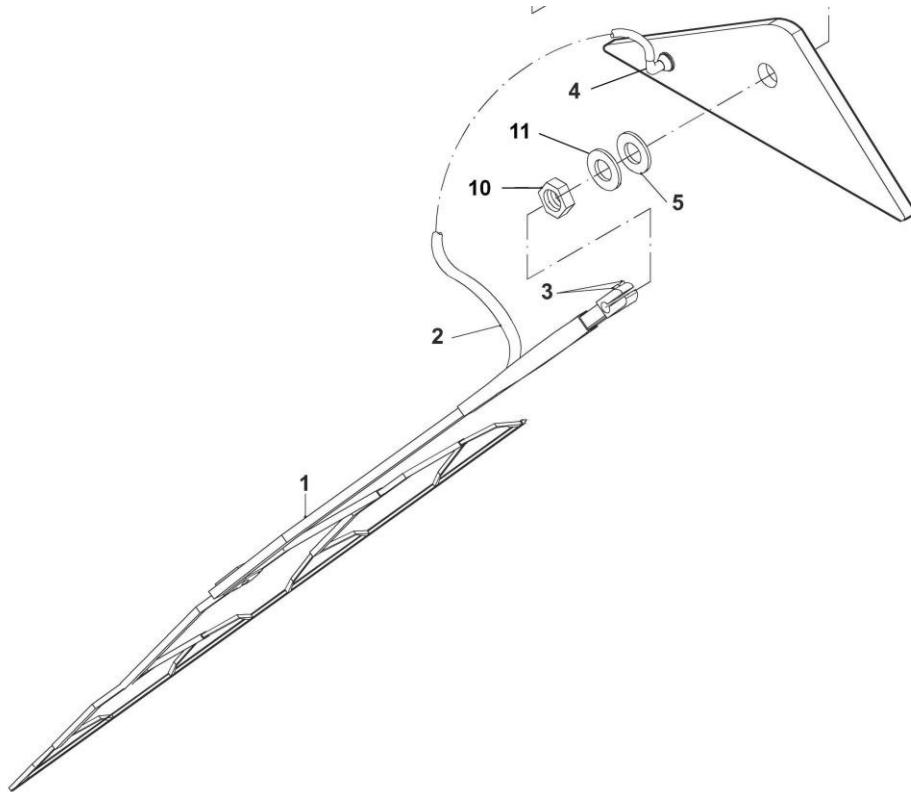


FIG 2 WINDSHIELD WIPER ARM ASSY REPLACEMENT

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-07/R-00

System:

MISCELLANEOUS

Sheet:

5/8

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WIPER

Component:

WINDSHIELD WIPER MOTOR(10M03)

Man Hours:

1

Maintenance Task:

REPLACEMENT

PROCEDURE:

REMOVAL (cont'd)

INSIDE

6. Gain access to the Windshield Wiper Motor by opening the Cab Front Inspection Panel.



FIG 3 CAB FRONT INSPECTION PANEL

7. Locate the Windshield Wiper Motor to be replaced.

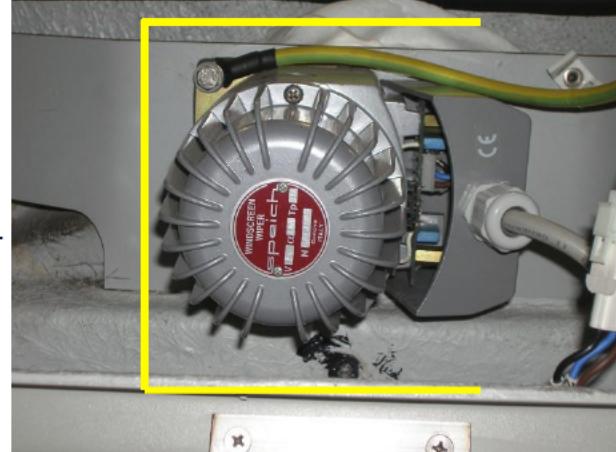


FIG 4 WINDSHIELD WIPER MOTOR LOCATION

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-07/R-00

System:

MISCELLANEOUS

Sheet:

6/8

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WIPER

Component:

WINDSHIELD WIPER MOTOR(10M03)

Man Hours:

1

Maintenance Task:

REPLACEMENT**PROCEDURE (CONT'D):****REMOVAL (cont'd)**

8. Disengage the Motor Power Supply Female Connector (8) from Male Connector (9).

9. Supporting the Motor (7) remove the Motor Support Fixing Screws starting from the Upper Screw where is connected also the Grounding Cable.

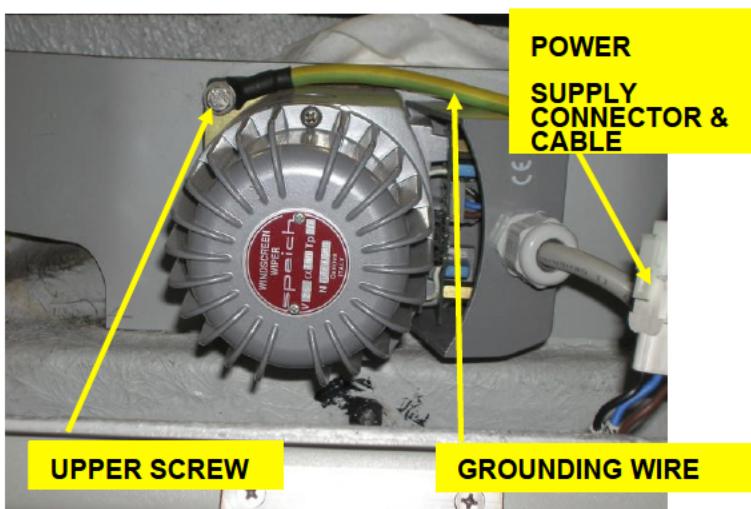
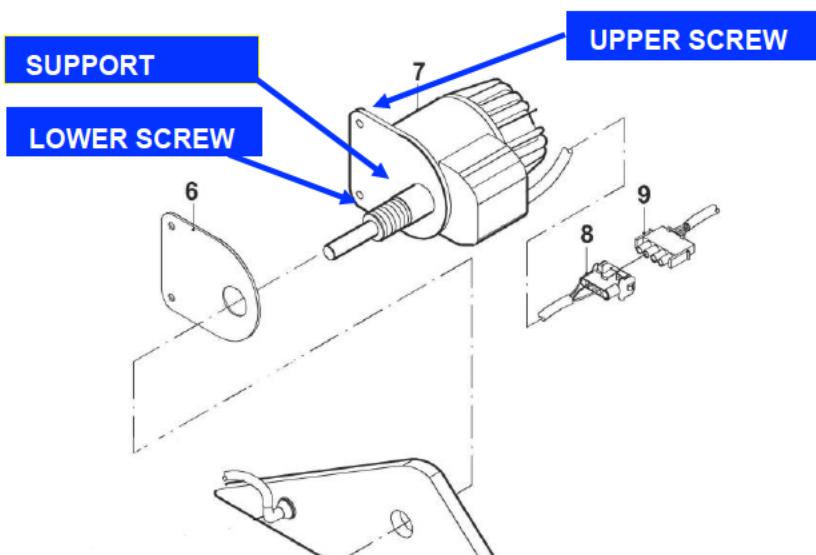
10. Remove the Wiper Motor (7) and Gasket (6).

11. Make available the Motor for Maintenance.

12. Discard the Gasket.

13. Retain Hardware for later use.

14. Protect Grounding Wire Terminal by suitable Protection Cap.

**FIG 5 WINDSHIELD WIPER MOTOR REPLACEMENT**

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-07/R-00

System:

MISCELLANEOUS

Sheet:

7/8

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WIPER

Component:

WINDSHIELD WIPER MOTOR(10M03)

Man Hours:

1

Maintenance Task:

REPLACEMENT

PROCEDURE:

INSTALLATION

To install the Windshield Wiper Motor proceed as follows (refer to Figures 1 through 5):

INSIDE

1. Position the “new” Gasket (6) first and the new Windshield Wiper Motor in its location.
2. Supporting the Motor, install and hand tighten the Lower Motor Support Fixing Screw. Do not full tighten the Screw.
3. Supporting the Motor, position the Grounding Wire Terminal first and then install the Upper Motor Support Fixing Screw.
4. Full tighten both Screws to **6.2 ft lb**.
5. Engage the Motor Power Supply Female Connector (8) with the Male Connector (9).
6. Close and lock the Cab Front Inspection Panel.

OUTSIDE

7. Install the M20 Nut (10) with relevant “new” Washer (11) and “new” Gasket (5). Torque to **20 ft lb**.
8. Install the Wiper Arm Assy (1) (with blade.) and relevant Screws (3). Torque to **12.5 ft lb**.
9. Connect the Washer Fluid Hose (2) to Bulkhead Connector (4).
10. Switch on the 10F02 Mirror and Windshield Wiper & Washer CB located in the relevant “A” / “B” LV Locker
11. Restore power to Vehicle.
12. Check that the Wiper Motor works properly by switching on the relevant 10S04 Windshield Wiper Switch located on the Operator Console.
13. Record Task results on the Defect Report Card for administrative and maintenance planning.

NOTE: At Task Completion it is recommended to check the correct operation and/or functions of the Subsystem to which the replaced Equipment pertains.

Refer to **HOW TO USE THE R-CM SHEETS**(para 17-III-04-01-02 of this Section) and follow the prescriptions provided at Step 3 “**At every Task Completion.**”

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-07/R-00

System:

MISCELLANEOUS

Sheet:

8/8

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WIPER

Component:

WINDSHIELD WIPER MOTOR(10M03)

Man Hours:

1

Maintenance Task:

REPLACEMENT

**INTENTIONALLY
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P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-08/R-00

System:

MISCELLANEOUS

Sheet:

1/6

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WIPER

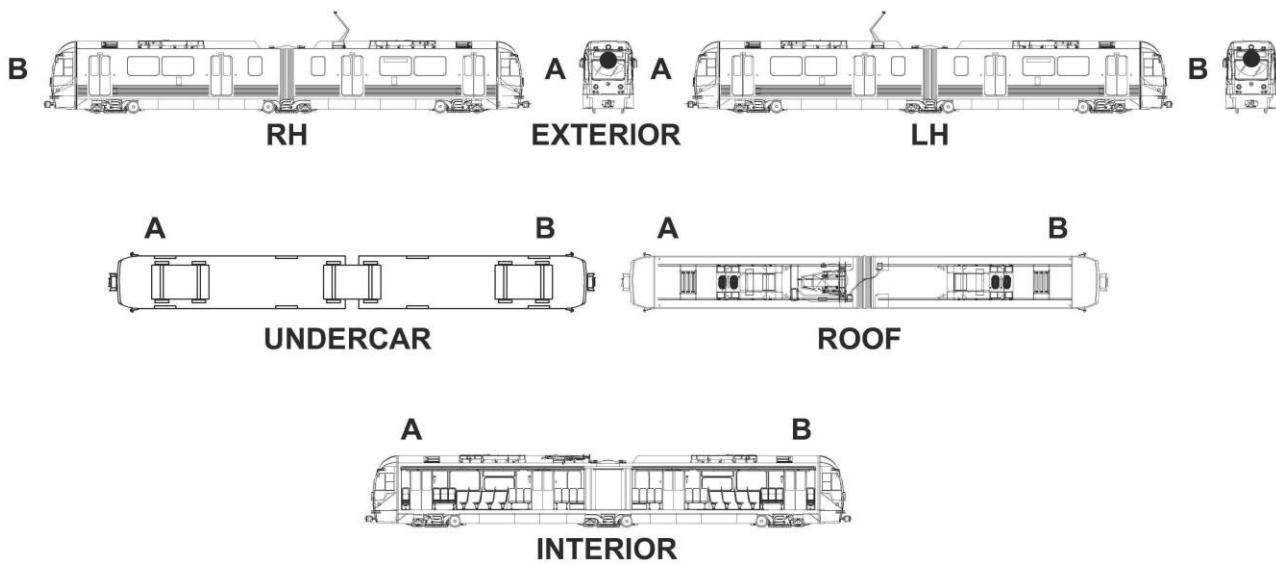
Component:

BLADE & MECHANICAL PARTS

Man Hours:

1

Maintenance Task:

REPLACEMENT
LOCATION:


P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-08/R-00

System:

MISCELLANEOUS

Sheet:

2/6

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WIPER

Component:

BLADE & MECHANICAL PARTS

Man Hours:

1

Maintenance Task:

REPLACEMENT**SAFETY PRECAUTIONS:**

WARNING: BLUE FLAG THE VEHICLE IN ACCORDANCE WITH ALL LACMTA BLUE FLAG POLICIES, RULES, & PROCEDURES IN ORDER TO WARN THAT MAINTENANCE PERSONNEL ARE WORKING ON, UNDER, OR NEAR ROLLING EQUIPMENT.

WARNING: APPLY WHEEL CHOCKS TO PREVENT THE VEHICLE FROM MOVING.

WARNING: USE SUITABLE EXTERNAL SCAFFOLD IN ORDER TO SAFELY OPERATE ON VEHICLE EXTERIOR.

TOOLS:

LACMTA Maintenance Shop Standard Tools Kit

CONSUMABLES:

- Hex Socket Head Cap Screw M6x14 UNI 5931 QTY 2
- Thin Self Locking Hex Nut M6 UNI 7474 QTY 1
- Hex Head Screw M6x30 ISO 4017 QTY 1

SPARE PARTS:

- Arm P/N AA04NVY MFR P/N M70.LA
- Blade P/N AA04NVZ MFR P/N CH700

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-08/R-00

System:

MISCELLANEOUS

Sheet:

3/6

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WIPER

Component:

BLADE & MECHANICAL PARTS

Man Hours:

1

Maintenance Task:

REPLACEMENT

PROCEDURE:

PRELIMINARY OPERATIONS

- Set the Vehicle in safety conditions in accordance with LACMTA Maintenance Shop Regulations:

WARNING: USE SUITABLE EXTERNAL SCAFFOLD IN ORDER TO SAFELY OPERATE ON VEHICLE EXTERIOR.

A WIPER BLADE REPLACEMENT

To replace the Wiper Blade proceed as follows (Refer to Fig 1).

REMOVAL

- Remove the Screw (8) and the Nut (6).
- Remove the Wiper Blade (7).

INSTALLATION

- Position the Wiper Blade (7) into its seat on the Wiper Arm (5).
- Install the Screw (8) and the Nut (6).
- Tighten the Nut (6) as required.
- Check the Blade for proper working by switching on the 10S04 Windshield wiper Switch on operating Console.
- Record Task results on the Defect Report Card for administrative and maintenance planning.

NOTE: At Task Completion it is recommended to check the correct operation and/or functions of the Subsystem to which the replaced Equipment pertains.

Refer to **HOW TO USE THE R-CM SHEETS**(para 17-III-04-01-02 of this Section) and follow the prescriptions provided at Step 3 "**At every Task Completion.**"

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-08/R-00

System:

MISCELLANEOUS

Sheet:

4/6

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WIPER

Component:

BLADE & MECHANICAL PARTS

Man Hours:

1

Maintenance Task:

REPLACEMENT

PROCEDURE (CONT'D):

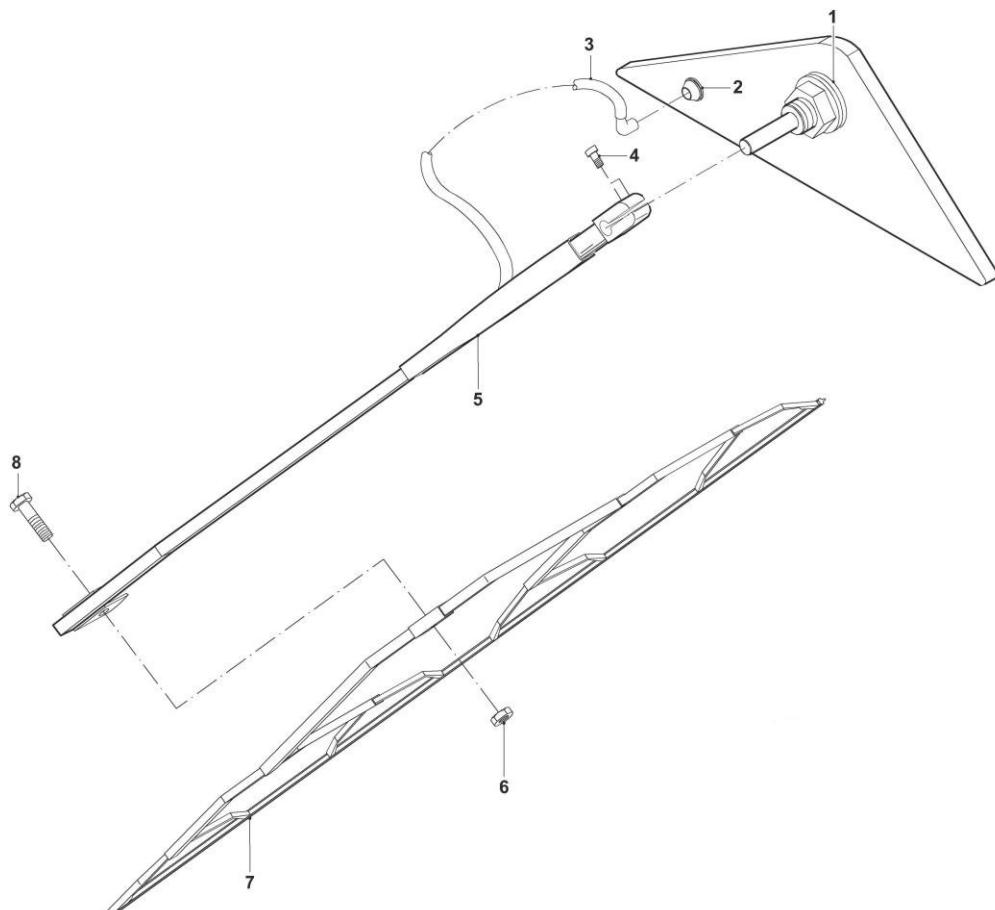


FIG 1 WIPER ARM & BLADE REPLACEMENT

P2550 CORRECTIVE MAINTENANCE SHEET	
Card Code: R-C-17-01-01-08/R-00	
System: MISCELLANEOUS	Sheet: 5/6
Subsystem/Assy: WINDSHIELD WIPER AND WASHER SYSTEM	Unit: WINDSHIELD WIPER
Component: BLADE & MECHANICAL PARTS	Man Hours: 1
Maintenance Task: REPLACEMENT	
PROCEDURE (CONT'D):	
<p>B ARM REPLACEMENT</p> <p>WARNING: USE SUITABLE EXTERNAL SCAFFOLD IN ORDER TO SAFELY OPERATE ON VEHICLE EXTERIOR.</p> <p>To replace the Wiper Arm (with or without Blade) proceed as follows: (Refer to Fig 1).</p> <p>REMOVAL</p> <ol style="list-style-type: none"> 1. Disconnect hose (3) from Bulkhead Connector (2). 2. Loose the Screws (4) and remove the Wiper Arm (5). <p>INSTALLATION</p> <ol style="list-style-type: none"> 1. Position the Wiper Arm (5) on its seat. onto the Motor Shaft. 2. Install the Screws (4). Torque to 12.5 ft-lb (17 Nm). 3. Connect Washer Fluid Hose (3) to the Bulkhead Connector (2). 4. Check the Arm and Blade for proper working by switching on the 10S04 Windshield Wiper Switch on Operating Console, LH Panel. 5. Record Task results on the Defect Report Card for administrative and maintenance planning. <p>NOTE: At Task Completion it is recommended to check the correct operation and/or functions of the Subsystem to which the replaced Equipment pertains.</p> <p>Refer to HOW TO USE THE R-CM SHEETS(para 17-III-04-01-02 of this Section) and follow the prescriptions provided at Step 3 "At every Task Completion."</p>	

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-08/R-00

System:

MISCELLANEOUS

Sheet:

6/6

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WIPER

Component:

BLADE & MECHANICAL PARTS

Man Hours:

1

Maintenance Task:

REPLACEMENT**INTENTIONALLY LEFT BLANK**

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-10/R-00

System:

MISCELLANEOUS

Sheet:

1/10

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WASHER

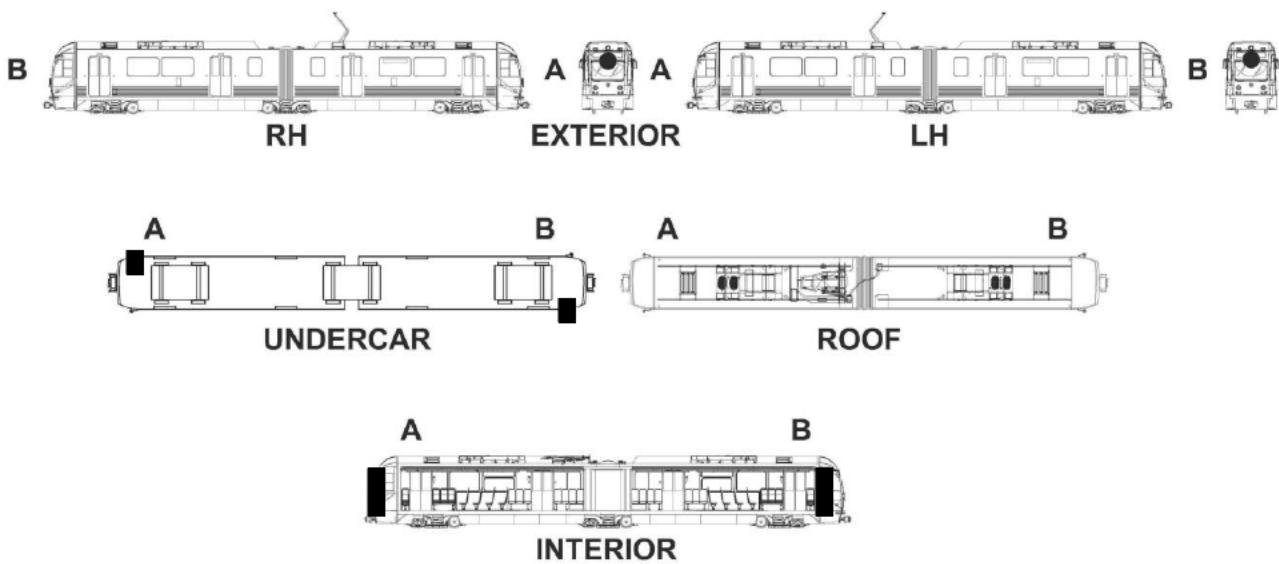
Component:

WASHER PIPING

Man Hours:

1.0

Maintenance Task:

REPLACEMENT
LOCATION:

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-10/R-00

System:

MISCELLANEOUS

Sheet:

2/10

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WASHER

Component:

WASHER PIPING

Man Hours:

1.0

Maintenance Task:

REPLACEMENT**SAFETY PRECAUTIONS:**

WARNING: BLUE FLAG THE VEHICLE IN ACCORDANCE WITH ALL LACMTA BLUE FLAG POLICIES, RULES, & PROCEDURES IN ORDER TO WARN THAT MAINTENANCE PERSONNEL ARE WORKING ON, UNDER, OR NEAR ROLLING EQUIPMENT.

WARNING: APPLY WHEEL CHOCKS TO PREVENT THE VEHICLE FROM MOVING.

WARNING: USE SUITABLE EXTERNAL SCAFFOLD IN ORDER TO SAFELY OPERATE ON VEHICLE EXTERIOR.

TOOLS:

LACMTA Maintenance Shop Standard Tools Kit

CONSUMABLES:

Fastener 5.51 X 0.83 PN: AA01D02

SPARE PARTS:

Pipe DIA 6 X DIA 4 Elastolan (Commercial)

Check Valve PN AA07H49 Type 7757K11, seal Viton, Supplier McMaster Carr

Snap-Grip Tube Clamp PN AA07H4B Type 9579K61, Supplier McMaster Carr,

P2550 CORRECTIVE MAINTENANCE SHEET	
Card Code: R-C-17-01-01-10/R-00	
System: MISCELLANEOUS	Sheet: 3/10
Subsystem/Assy: WINDSHIELD WIPER AND WASHER SYSTEM	Unit: WINDSHIELD WASHER
Component: WASHER PIPING	Man Hours: 1.0
Maintenance Task: REPLACEMENT	
PROCEDURE: PRELIMINARY OPERATIONS <ol style="list-style-type: none"> 1. Set the Vehicle in safety conditions in accordance with LACMTA Maintenance Shop Regulations: <p style="text-align: center;">WARNING: USE SUITABLE EXTERNAL SCAFFOLD IN ORDER TO SAFELY OPERATE ON VEHICLE EXTERIOR</p> <p>To replace the Washer Hose & Piping proceed as follows:</p> <p>A REPLACEMENT OF THE WASHER FLUID HOSE</p> <p style="text-align: center;">FROM THE WINDSHIELD BULKHEAD CONNECTOR. TO THE WIPER ARM SPRINKLER(Refer to Figures 1 & 2).</p> <p>REMOVAL</p> <p>OUTSIDE</p> <ol style="list-style-type: none"> 1. Remove the Wiper Arm Assy according to Sheet R-C-17-01-01-08/R-00. 2. Place the removed Arm on a workbench to proceed with the Task. <p>WORKBENCH</p> <ol style="list-style-type: none"> 1. Remove the Fasteners from the Arm. Discard them. 2. Disconnect the Washer Fluid Hose from the Arm Sprinkler using, as needed, a suitable Nylon Tool. 3. Remove and discard the Washer Fluid Hose. <p>INSTALLATION</p> <p>WORKBENCH</p> <ol style="list-style-type: none"> 1. Clean using recommended agent the Arm Sprinkler. 2. Install the "new" Washer Fluid Hose in the Wiper Arm. 3. Connect the Washer Fluid Hose to the Arm Sprinkler using, as needed, a suitable Nylon Tool 4. Secure the Washer Fluid Hose to the Arm by new Fastners. <p>OUT SIDE</p> <ol style="list-style-type: none"> 1. Install the Wiper Arm Assy according to Sheet R-C-17-01-01-08/R-00. 2. Check that the Wiper Washer System works properly by switching on the relevant 10S04 Windshield Wiper Switch, on Operating Console, LH Panel to WASH position. 3. Record Task results on the Defect Report Card for administrative and maintenance planning <p>NOTE: At Task Completion it is recommended to check the correct operation and/or functions of the Subsystem to which the replaced Equipment pertains. Refer to HOW TO USE THE R-CM SHEETS(para 17-III-04-01-02 of this Section) and follow the prescriptions provided at Step 3 "At every Task Completion."</p>	

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-10/R-00

System:

MISCELLANEOUS

Sheet:

4/10

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WASHER

Component:

WASHER PIPING

Man Hours:

1.0

Maintenance Task:

REPLACEMENT

PROCEDURE (CONT'D):

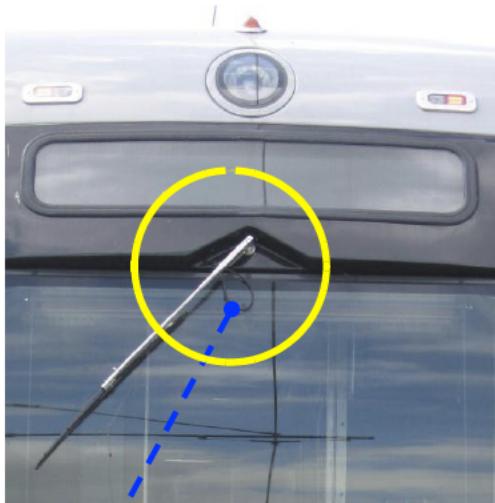


FIG 1 WASHER FLUID HOSE LOCATION

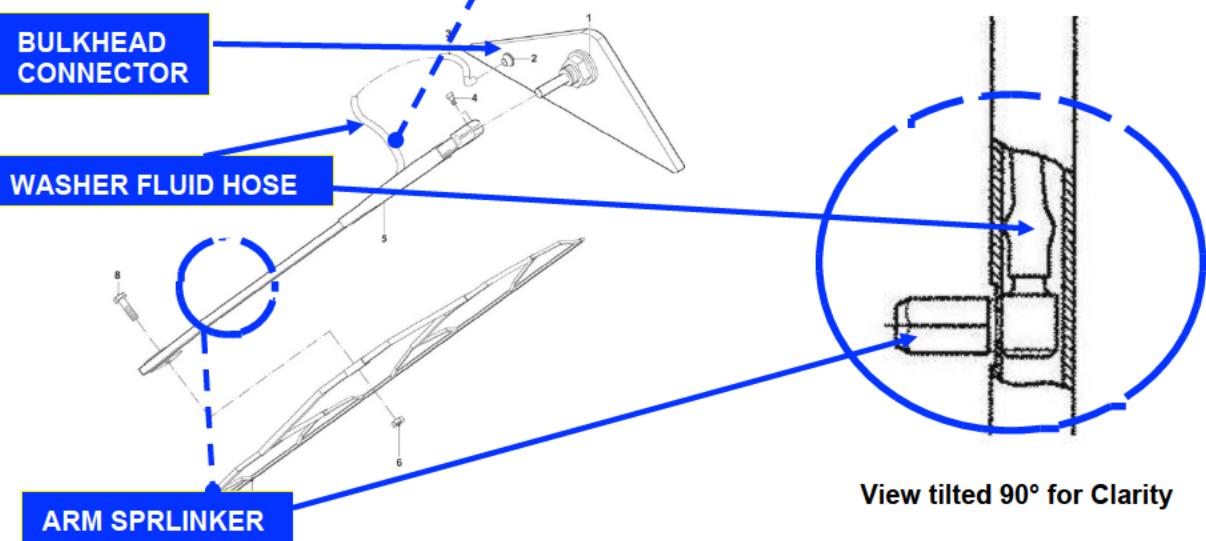


FIG 2 WASHER FLUID HOSE REPLACEMENT

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-10/R-00

System:

MISCELLANEOUS

Sheet:

5/10

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WASHER

Component:

WASHER PIPING

Man Hours:

1.0

Maintenance Task:

REPLACEMENT

PROCEDURE (CONT'D):

B REPLACEMENT OF THE WASHER FLUID PIPE

**FROM THE WINDSHIELD BULKHEAD CONNECTOR
TO THE WASHER FUID MOTOR-PUMP**(Refer to Figures 3 & 4).

REMOVAL

INSIDE

1. Gain access to the Windshield washer fluid Pipe by opening the Cab Front Inspection Panel.



FIG 3 CAB FRONT INSPECTION PANEL

2. Locate the Washer Fluid Pipe to be replaced.
3. Disconnect the Washer Fluid Pipe from the Bulkhead Connector.
4. Perform the Outside Operations provided in the specific step.
5. Gain access to the Washer Fluid Pipe along its path by removing the relevant Cab Liner Panels first and then by removing the Fasteners securing the Washer Fluid Pipe to the Structure.
6. Remove the Pipe.

OUTSIDE

1. Gain access to the Windshield Washer Motor -Pump by removing the RH Assy Skirt according to Sheet R-C-02-03-02-00/R-00.
2. Remove the Washer Motor -Pump Protection Cover by loosening the relevant Hardware (Screw, Washer & Lock Washers).
3. Remove and discard the Cover Gasket.
4. Disconnect the Washer Fluid Pipe (long part) from the Check Valve.
5. Disconnect the Washer Fluid Pipe (short part) from the Pump Body (Pump Outlet) and from Check Valve.

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-10/R-00

System:

MISCELLANEOUS

Sheet:

6/10

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WASHER

Component:

WASHER PIPING

Man Hours:

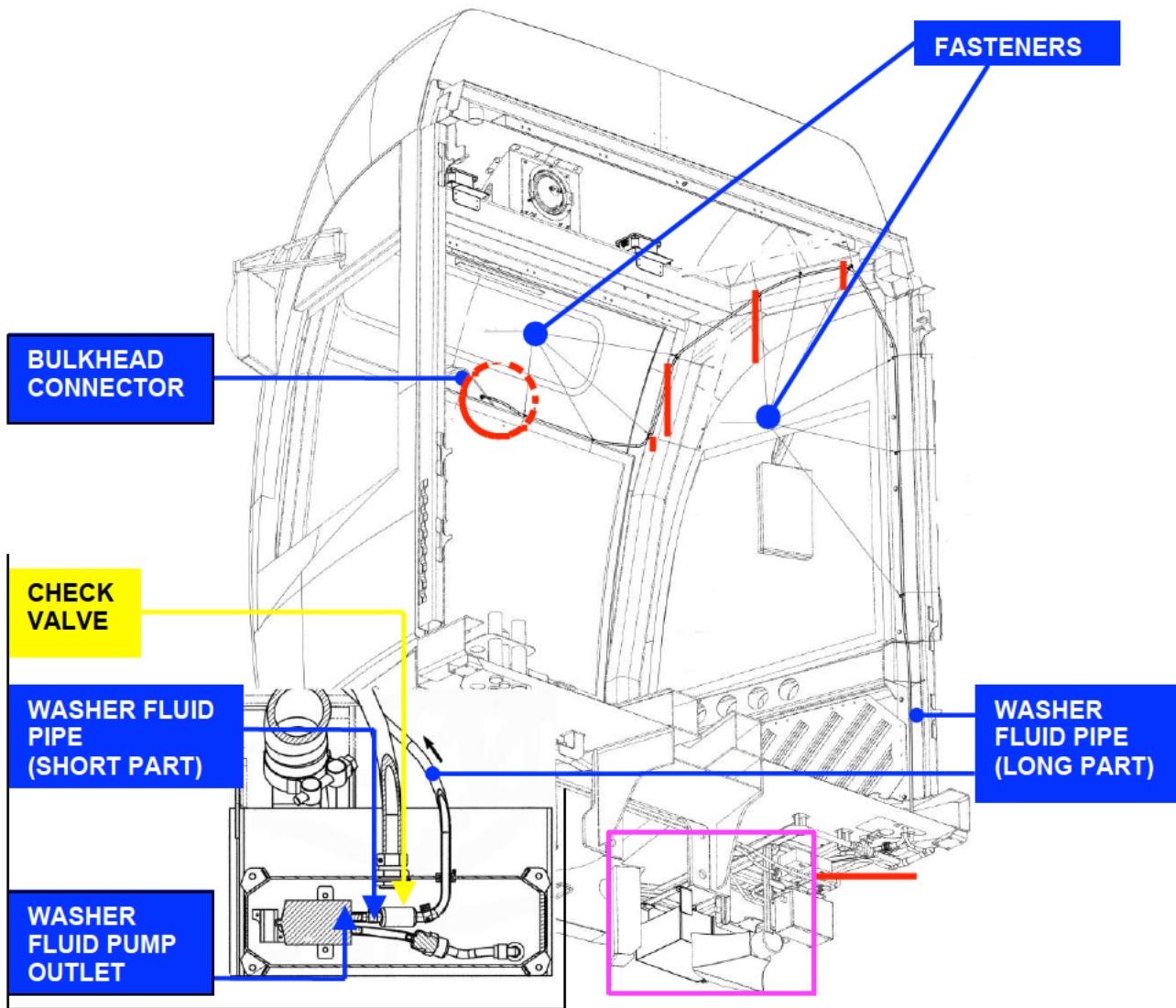
1.0

Maintenance Task:

REPLACEMENT

PROCEDURE (CONT'D):

6. Discard the Washer Fluid Pipe. Check the Check Valve for damage. Replace as needed.



P2550 CORRECTIVE MAINTENANCE SHEET	
Card Code:	
R-C-17-01-01-10/R-00	
System: MISCELLANEOUS Sheet: 7/10	
Subsystem/Assy: WINDSHIELD WIPER AND WASHER SYSTEM	Unit: WINDSHIELD WASHER
Component: WASHER PIPING	Man Hours: 1.0
Maintenance Task: REPLACEMENT	
PROCEDURE (CONT'D):	
INSTALLATION	
INSIDE	
<ol style="list-style-type: none"> 1. Install the Washer Fluid Pipe along its path according to the Vehicle Design. 2. Secure the Washer Fluid Pipe to the Structure using recommended Fasteners. 3. Connect the Washer Fluid Pipe to the Bulkhead Connector. 4. Perform the Outside Operations provided in the specific step. 	
OUTSIDE	
<ol style="list-style-type: none"> 1. Connect the Washer Fluid Pipe (short part) to the Pump Body (Pump Outlet) and to the Check Valve. 2. Connect the Washer Fluid Pipe (long part) to the Check Valve. 3. Check for leakage on both the connections the “ new” Washer Fluid Pipe by switching to WASH position the relevant 10S04 Windshield Wiper Switch located on the Operator Console LH Panel. During this check verify also that the Wiper Washer System works properly. 4. Install the “new “Gasket on the Protection Cover of the Washer Pump Assy. 5. Install the Cover and relevant attaching Hardware. Torque to 5 ft lb. 	
FINAL OPERATIONS	
<ol style="list-style-type: none"> 1. Install RH Skirt according to Sheet R-C-02-03-02-00/R-00. 2. Install the Cab Liner Panels. 3. Close and lock the Cab Front Inspection Panel. 4. Record Task results on the Defect Report Card for administrative and maintenance planning 	
<p>NOTE: At Task Completion it is recommended to check the correct operation and/or functions of the Subsystem to which the replaced Equipment pertains.</p> <p>Refer to HOW TO USE THE R-CM SHEETS(para 17-III-04-01-02 of this Section) and follow the prescriptions provided at Step 3 “At every Task Completion.”</p>	

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-10/R-00

System:

MISCELLANEOUS

Sheet:

8/10

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEM

Unit:

WINDSHIELD WASHER

Component:

WASHER PIPING

Man Hours:

1.0

Maintenance Task:

REPLACEMENT

PROCEDURE (CONT'D):

C REPLACEMENT OF THE WASHER FLUID PIPE

**FROM THE WASHER FLUID PUMP(INLET)
 TO THE WASHER FLUID TANK(Refer to Figure 5)**

REMOVAL

OUTSIDE

1. Gain access to the Windshield Washer Pump by removing the RH Assy Skirt according to Sheet R-C-02-03-02-00/R-00.
2. Remove the Washer Pump Protection Cover by loosening the relevant Hardware (Screw, Washer & Lock Washers).
3. Remove and discard the Cover Gasket.
4. Disconnect the Washer Fluid Pipe from the Pump Body (Pump Inlet).
5. Disconnect the Washer Fluid Pipe from the washer fluid Tank (Tank Outlet).
6. Disengage the Filter from the removed pieces of Pipe.
7. Discard the Pipes and retain the Filter.

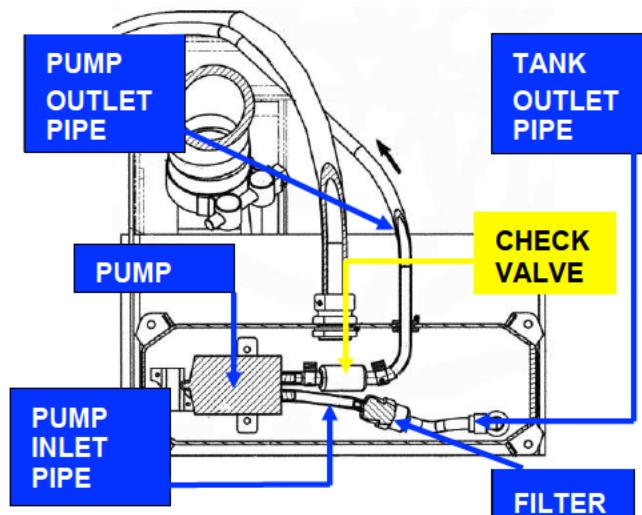
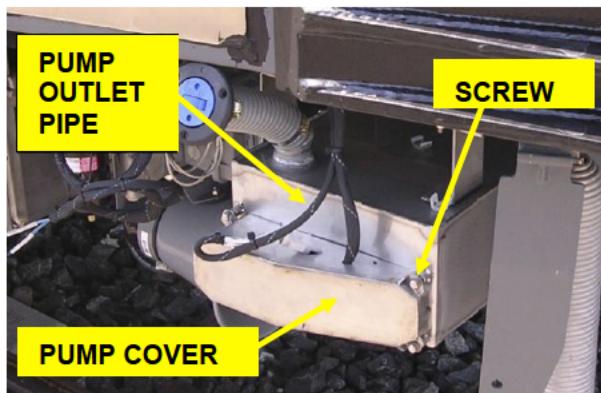


FIG 5 WASHER FLUID TANK & CONNECTIONS

P2550 CORRECTIVE MAINTENANCE SHEET	
Card Code:	
R-C-17-01-01-10/R-00	
System: MISCELLANEOUS	Sheet: 9/10
Subsystem/Assy: WINDSHIELD WIPER AND WASHER SYSTEM	Unit: WINDSHIELD WASHER
Component: WASHER PIPING	Man Hours: 1.0
Maintenance Task: REPLACEMENT	
PROCEDURE (CONT'D):	
INSTALLATION <ol style="list-style-type: none"> 1. Check the Filter for damage. Clean the Filter, using recommended agent or replace as per check Result. 2. Connect the two "new" pieces of pipe to the Filter. 3. Reconnect the whole Assy (Pipe - Filter -Pipe) respectively to the Pump Inlet and to the Washer Fluid Tank Outlet. 4. Check for leakage, on both the connections, the "new" Washer Fluid Pipe by switching to WASH position the relevant 10S04 Windshield Wiper Switch located on the Operator Console LH Panel. During this check verify also that the Wiper Washer System works properly. 5. Install the "new" Gasket on the Protection Cover of the Washer Pump Assy. 6. Install the Cover and relevant attaching Hardware. Torque to 5 ft lb. 	
FINAL OPERATIONS <ol style="list-style-type: none"> 1. Install the RH Skirt according to Sheet R-C-02-03-02-00/R-00. 2. Install the Cab Liner Panels. 3. Close and lock the Cab Front Inspection Panel. 4. Record Task results on the Defect Report Card for administrative and maintenance planning. 	
NOTE: At Task Completion it is recommended to check the correct operation and/or functions of the Subsystem to which the replaced Equipment pertains. Refer to HOW TO USE THE R-CM SHEETS (para 17-III-04-01-02 of this Section) and follow the prescriptions provided at Step 3 " At every Task Completion. "	

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-01-01-10/R-00

System:

MISCELLANEOUS

Sheet:

10/10

Subsystem/Assy:

WINDSHIELD WIPER AND WASHER SYSTEMUnit:
WINDSHIELD WASHER

Component:

WASHER PIPING

Man Hours:

1.0

Maintenance Task:

REPLACEMENT

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LEFT BLANK**

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-02-01-00/R-00

System:

MISCELLANEOUS

Sheet:

1/8

Subsystem/Assy:

HORN SYSTEM

Unit:

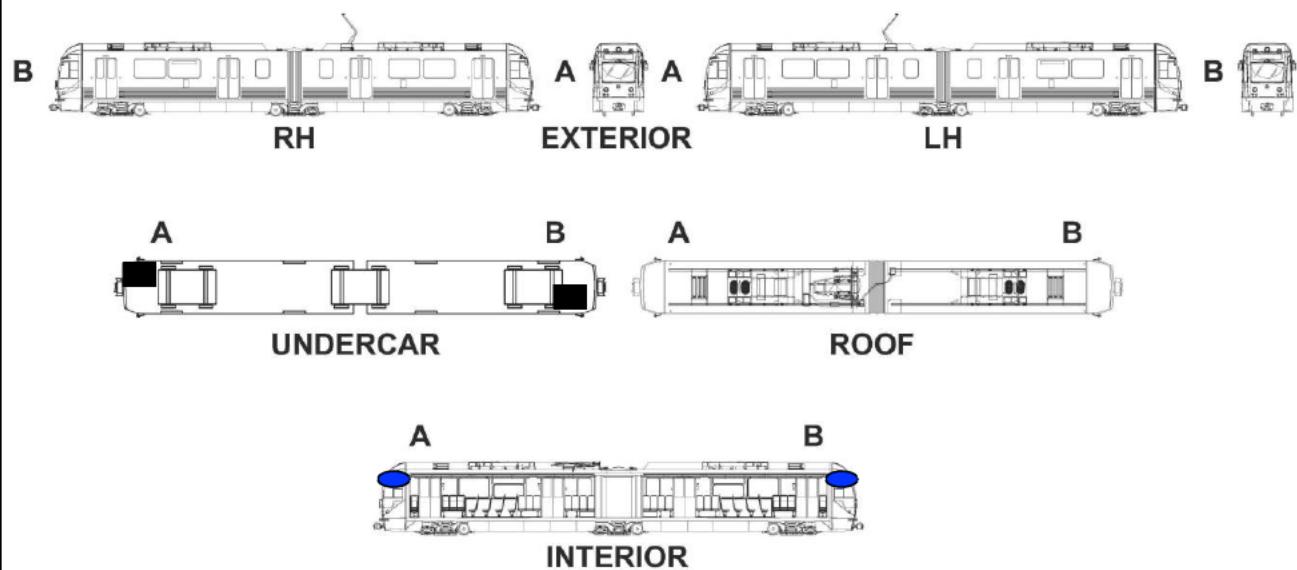
HORN & GONG MODULE

Component:

Man Hours:

0.5

Maintenance Task:

REPLACEMENT
LOCATION:


P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-02-01-00/R-00

System:

MISCELLANEOUS

Sheet:

2/8

Subsystem/Assy:

HORN SYSTEM

Unit:

HORN & GONG MODULE

Component:

Man Hours:

0.5

Maintenance Task:

REPLACEMENT

SAFETY PRECAUTIONS:

WARNING: BLUE FLAG THE VEHICLE IN ACCORDANCE WITH ALL LACMTA BLUE FLAG POLICIES, RULES, & PROCEDURES IN ORDER TO WARN THAT MAINTENANCE PERSONNEL ARE WORKING ON, UNDER, OR NEAR ROLLING EQUIPMENT.

WARNING: APPLY WHEEL CHOCKS TO PREVENT THE VEHICLE FROM MOVING.

WARNING: INSTALL WHEEL CHOCKS TO PREVENT VEHICLE FROM MOVING.

TOOLS:

LACMTA Maintenance Shop Standard Tools Kit

CONSUMABLES:

N/A

SPARE PARTS:

Control Unit P/N AA05GXG MFR P/N: NPC8010SC

Speaker P/N AA05GXH MFR P/N: HPC-370GA

Accessory Kit with Mating Connector MFR P/N: 8010SD-ACC

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-02-01-00/R-00

System:

MISCELLANEOUS

Sheet:

3/8

Subsystem/Assy:

HORN SYSTEM

Unit:

HORN & GONG MODULE

Component:

Man Hours:

0.5

Maintenance Task:

REPLACEMENT

PROCEDURE:

PRELIMINARY OPERATIONS

Set the Vehicle in safety conditions in accordance with LACMTA Maintenance Shop Regulations:

1. Place the Vehicle in the Maintenance Shop.
2. Set the Master Controller Handle to FSB position.
3. Make sure that all Parking Brakes are applied (by checking on the IDU "Parking Brake A and B Not Released" and on Indicator Panel "A" "Park / Friction Brake" ON).
4. Remove Electrical Power from Vehicle by lowering the Pantograph.
5. Turn the Transfer Switch to OFF.
6. Set the Pantograph Control Motor Switch (5F02 CB LV Locker "A" Section) to OFF.
7. Lock out and tag out the Switch in accordance with all LACMTA Safety Rules, Regulations, Policies, and Procedures.

NOTE The tag must indicate the name of the person who removed Power.

That person knows why the Power was removed and when it safe to restore it.

Only the individual whose name appears on the tag or a person with his approval should remove the tag and restore Power.

8. Switch off the 10F01 Protective Switch for Horn & Gong CB located in the relevant "A" / "B" LV Locker



**FIG 1 10F01
PROTECTIVE CB FOR HORN & GONG
LOCATION**

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-02-01-00/R-00

System:

MISCELLANEOUS

Sheet:

4/8

Subsystem/Assy:

HORN SYSTEM

Unit:

HORN & GONG MODULE

Component:

Man Hours:

0.5

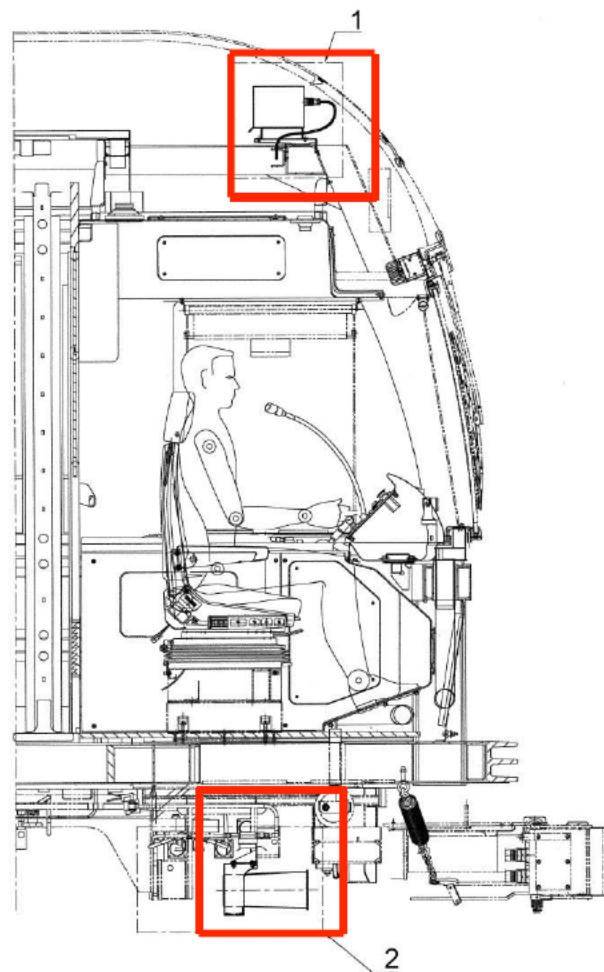
Maintenance Task:

REPLACEMENT

PROCEDURE (CONT'D):

REPLACEMENT

1. Locate the Item to be replaced



01. CONTROL BOX

02. LOUDSPEAKER

FIG 2 HORN & GONG SYSTEM COMPONENTS LOCATION

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-02-01-00/R-00

System:

Sheet:

MISCELLANEOUS
5/8

Subsystem/Assy:

HORN SYSTEM

Unit:

HORN & GONG MODULE

Component:

Man Hours:

0.5

Maintenance Task:

REPLACEMENT

PROCEDURE:

CONTROL BOX REPLACEMENT

1. Enter the Cab and gain access to the Control Box by removing the Cab Ceiling Inspection Panel.



2. Locate the Control Box.

3. Disconnect the Connector.

4. Remove the Control Box Holding Hardware. Retain it for later use.

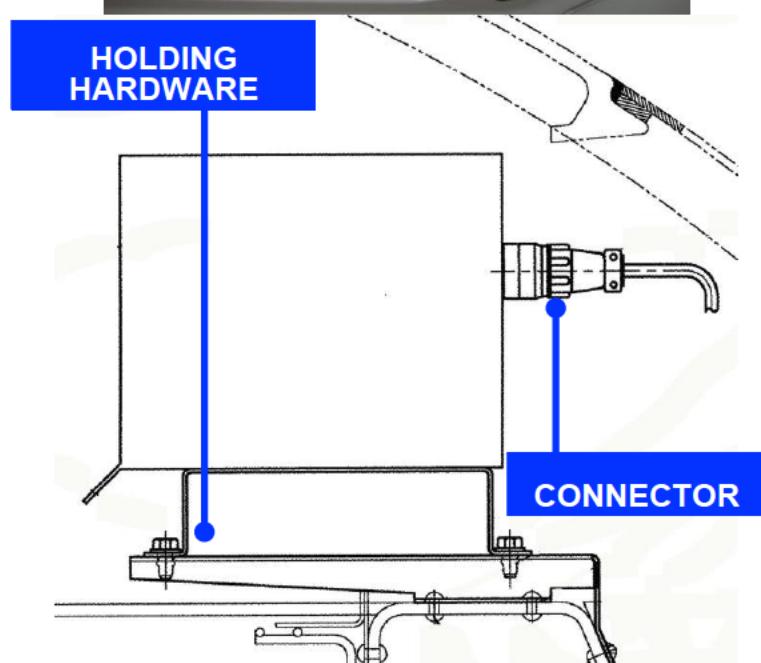


FIG3 CONTROL BOX REPLACEMENT

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-02-01-00/R-00

System:

MISCELLANEOUS

Sheet:

6/8

Subsystem/Assy:

HORN SYSTEM

Unit:

HORN & GONG MODULE

Component:

Man Hours:

0.5

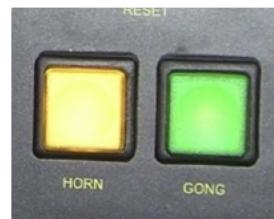
Maintenance Task:

REPLACEMENT**PROCEDURE (CONT'D):****CONTROL UNIT REPLACEMENT(CONT'D)**

6. Make the Control Box available for repair.
7. Vacuum clean the Control Box Assy lodging. Use recommended agent to complete the cleaning.
8. Position the "new" Control Box onto its Seat.
9. Secure the Control Box by installing the relevant Holding Hardware. Torque to 5 ft lb.
10. Reconnect the Control Box Connector.

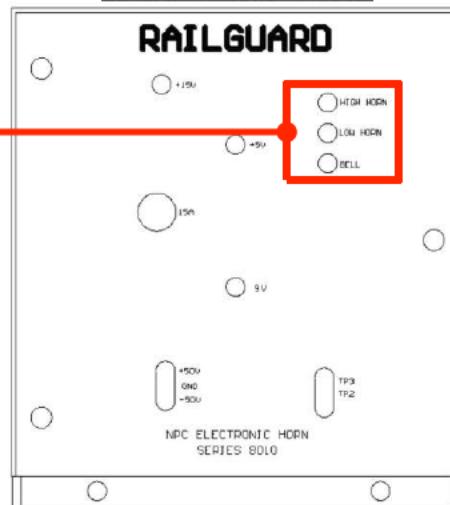
FINAL OPERATIONS

1. Switch on the 10F01 Protective Switch for Horn & Gong CB located in the relevant "A" / "B" LV Locker.
2. Check the Horn & Gong for proper working by switching on the 10S01 & 10S02 Switches on operating Console.



NOTE: The Horn and Gong volume can be adjusted by means of three potentiometers.

(High Horn, Low Horn and Bell).



The potentiometers are accessible from the front side of the Control Box.

Turn them clockwise to increase or counter clockwise to decrease the output level.

3. Upon completing the adjustment, install and secure the Cab Ceiling Inspection Panel.
4. Record Task results on the Defect Report Card for administrative and maintenance planning.

NOTE: At Task Completion it is recommended to check the correct operation and/or functions of the Subsystem to which the replaced Equipment pertains.

Refer to **HOW TO USE THE R-CM SHEETS** (para 17-III-04-01-02 of this Section) and follow the prescriptions provided at Step 3 "At every Task Completion."

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-02-01-00/R-00

System:

MISCELLANEOUS

Sheet:

7/8

Subsystem/Assy:

HORN SYSTEM

Unit:

HORN & GONG MODULE

Component:

Man Hours:

0.5

Maintenance Task:

REPLACEMENT

PROCEDURE (CONT'D):

LOUDSPEAKER REPLACEMENT (refer to Fig 4)

1. Remove the RH Skirt according to Sheet R-C-02-03-02-00/R-00.



2. Locate the Loudspeaker.
3. Disconnect the Wirings.
4. Remove the lower Holding hardware. Retain it for later use.
5. Supporting the Loudspeaker Assy, remove the upper Holding Hardware. Retain it for later use.

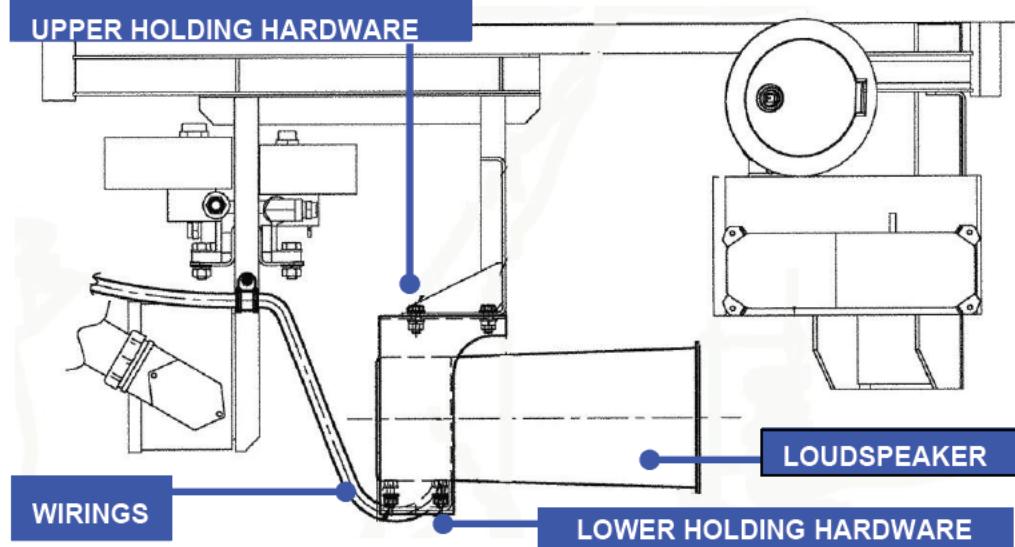


FIG 4 LOUDSPEAKER REPLACEMENT

P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

R-C-17-02-01-00/R-00

System:

MISCELLANEOUS

Sheet:

8/8

Subsystem/Assy:

HORN SYSTEM

Unit:

HORN & GONG MODULE

Component:

Man Hours:

0.5

Maintenance Task:

REPLACEMENT

PROCEDURE (CONT'D):

6. Remove the Loudspeaker and make it available for repair.
7. Clean the Loudspeaker lodging using recommended agent and cleaning rags.
8. Position the "new" Loudspeaker onto its Seat.
9. Install the upper Holding Hardware first and then install the lower Holding Hardware.
10. Secure the Loudspeaker by tightening the relevant Holding Hardware. Torque to **12.5 ft lb.**
11. Connect the Wirings.

FINAL OPERATIONS

1. Switch on the 10F01 Protective Switch for Horn & Gong CB located in the relevant "A" / "B" LV Locker.



NOTE: For Loudspeaker volume adjustment refer to the **NOTE** provided in the "**FINAL OPERATIONS**" of the previous Step "**CONTROL BOX REPLACEMENT.**"

3. Upon completing the adjustment, install the RH Skirt according to Sheet R-C-02-03-02-00/R-00.
4. Record Task results on the Defect Report Card for administrative and maintenance planning.

NOTE: At Task Completion it is recommended to check the correct operation and/or functions of the Subsystem to which the replaced Equipment pertains.

Refer to **HOW TO USE THE R-CM SHEETS**(para 17-III-04-01-02 of this Section) and follow the prescriptions provided at Step 3 "**At every Task Completion.**"

17-III-05 CONSUMABLE MATERIALS LIST (R-CML)

The Consumable Materials needed to accomplish the “MISCELLANEOUS” Running Maintenance are listed, sequenced in alphabetical order, by SUBSYSTEM /ASSY -UNIT / COMPONENT, in the following Table 17-III-05.1.

Table 17-III-05.1 Running Maintenance Consumable Materials List (R-CML)

SYSTEM 17		MISCELLANEOUS		
SUBSYSTEM /ASSY - UNIT / COMPONENT	AGENT	PN	MTA PN	
WINDSCHIELD WIPER & WASHER SYSTEM	Windshield Washer	M3 PN 155551		

17-III-06 TEST EQUIPMENT & SPECIAL TOOLS LIST (R-TESTL)

The Tools and Test Equipment needed to accomplish the “MISCELLANEOUS” Running Maintenance are listed, sequenced in alphabetical order, by SUBSYSTEM /ASSY -UNIT / COMPONENT, in the following Table 17-III-06.1.

Refer to “Tools and Test Equipment Manual” for Special Tools / Test Equipment Description and Maintenance.

Table 17-III-06.1 Running -Test Equipment & Special Tools List (R-TESTL)

SYSTEM 17		MISCELLANEOUS		
SUBSYSTEM /ASSY - UNIT / COMPONENT	LACMTA STANDARD TOOLS KIT	LACMTA WORKSHOP DEVICES	SPECIAL TOOL / TEST EQUIPMENT	PN
WINDSCHIELD WIPER & WASHER SYSTEM	X			
WINDSCHIELD WIPER		External Scaffold		
HORN & GONG	X		Sound Level Meter	3ZH88
MISCELLANEOUS			Service Cart	1FD43
			Multimeter (Fluke 87 V/E)	4EB19

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