

LOS ANGELES COUNTY

METROPOLITAN TRANSPORTATION AUTHORITY

LIGHT RAIL VEHICLE

**P2550**

**RUNNING  
MAINTENANCE  
AND  
SERVICE MANUAL**

**SECTION 06  
LIGHTING**



LOS ANGELES COUNTY

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RUNNING MAINTENANCE  
AND  
SERVICE MANUAL

VOLUME M-01  
PART I  
THEORY OF OPERATION  
SECTION 06 - LIGHTING



# **SECTION 06**

## **LIGHTING**

### **PART I**

#### **THEORY OF OPERATION**

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# SECTION 06

## LIGHTING

### 06-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 overlook 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.

#### Part II - Troubleshooting

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

**06-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.

<b>Abbreviation</b>	<b>Meaning</b>
AB.....	AnsaldoBreda
ADA.....	Americans with Disabilities Act
APS .....	Auxiliary Power Supply
ASM.....	Adaptive Switching Mean (Filter)
C/L.....	Centerline
CB .....	Circuit Breaker
CCH .....	Communication Control Head
CM.....	Coast Motoring
DC/AC .....	Direct Current - Alternate Current Converter
DC/DC .....	Direct Current - Direct Current Converter
EB.....	Emergency Brake
HV .....	High Voltage
HVAC .....	Heat Ventilation & Air Conditioning
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
LON.....	Local Operative Network
LRV .....	Light Rail Vehicle
LV.....	Low Voltage
LVDS.....	Low Voltage Distribution System
LVPD.....	Low Voltage Power Distribution
LVPS .....	Low Voltage Power Supply
MBL.....	Metro Blue Line
MTA.....	Metropolitan Transportation Authority
MV.....	Medium Voltage
MVB.....	Multifunction Vehicle Bus
MVPD.....	Medium Voltage Power Distribution
OK.....	Working
PGL.....	Pasadena Gold Line
PTU .....	Portable Test Unit
RH.....	Right Hand Side
SB.....	Service Brake

<b>Abbreviation</b>	<b>Meaning</b>
TBS .....	To Be Supplied
TCMS .....	Train Communication System
TCN .....	Train Communication Network
TWC .....	Train-to-Wayside Communication
WTB .....	Wired Train Bus

### **06-I-01.b LIST OF DEFINITIONS**

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

<b>Definition</b>	<b>Meaning</b>
// .....	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

**06-I-01.c LIST OF MEASUREMENT UNITS AND SYMBOLS**

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

<b>Definition</b>	<b>Meaning</b>
$\Omega$ .....	Ohm
$^{\circ}\text{C}$ .....	Celsius degree
$^{\circ}\text{F}$ .....	Fahrenheit degree
A .....	Ampere
ac.....	Alternate Current
dB .....	Decibel
dc.....	Direct Current
F .....	Farad
ft .....	Foot
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
kVA.....	Kilo Volt Ampere
kW .....	Kilo Watt
lb.....	Pound
lb-ft .....	Pound force
m .....	Meter - approx 3.28 feet
mm .....	Millimeter - approx 0.0394 inches
ms.....	Milli second
Pa.....	Pascal
rms .....	Root Mean Square Voltage
rpm .....	Revolution per Minute
V.....	Voltage
W.....	Watt

## 06-I-02 THEORY OF OPERATION

### 06-I-02.01 General Description of the System

The LACMTA P2550 Lighting System consists of an Interior and an Exterior Lighting Subsystem.

The Interior Lighting Subsystem is designed to provide internal illumination and to require low maintenance.

Figure 06-I-02.1 shows the Interior Lights' Location of both A and B Vehicle Body Section.

The LACMTA P2550 Interior Lighting Plan Layout shows the location of:

- Passenger Compartment Lights
- Articulation Lights;
- Locker Lights;
- Cab Lights.

The LVPS module supplies 37.5 Vdc to Reflectors with Ballasts. Reflectors without Ballasts are powered by nearby Reflectors that have Dual Ballast Outputs.

Both Compartment and Articulation Lights accommodate Fluorescent Lamps and use inverted ballasts that receive nominal 37.5 Vdc from a car power source.

The inverted ballast applies a isolated high AC voltage through a wiring harness assembly to the lampholder.

Strike voltage (start-up voltage) through this circuitry averages around 600 Vrms, but may range as high as 900 Vrms.

After the lamp illuminates, the voltage reduces to a self-regulating steady state but remains potentially lethal.

Steady state voltage is generally dependent upon lamp size and age.

Power to these lights is controlled by EMERGENCY LIGHTING Circuit Breaker (CB 08F05 - located on the B Cab LV Circuit Breakers Panel) and through CB 8F01 located in the Electric Locker.

Both Compartment and Articulation Lights (Normal and Emergency) are automatically powered in all cars whenever any cab in a train is activated.

Both Compartment and Articulation Lights (Normal and Emergency) remain temporarily ON, when the Vehicle is de-activated, and shut off after an adjustable period of time.

The time period is (initially) set for 16 minutes.

When the Vehicle is not powered (i.e. shop parking) and the External Crew Switch is used to open any door, the Emergency Lights are automatically activated and will remain on for 16 minutes.

In emergency and/or during an active LVPS fault, the Battery supplies the Emergency Lights only.

Emergency Lights still remain active even if:

- The Vehicle is passing through an high voltage gap and/or in any other condition which may cause the Vehicle loose power supply;
- The Vehicle is keying Off and any Door is open.

In the passenger compartment there are two Electric Lockers and two Electronic Lockers (refer to Section 10).

Each one of them is equipped with a special LED light.

In particular, each Locker is provided with one Internal Light Fixture accommodating a Light Emitting Diode (LED) Light controlled by microswitches 8S06 and 8S07.

LEDs are less sensitive to shock and vibration than incandescent lamps.

The Interior Lighting subsystem also includes the Operator Cab.

Each cab area has two directionally adjustable Light Fixtures located on the ceiling.

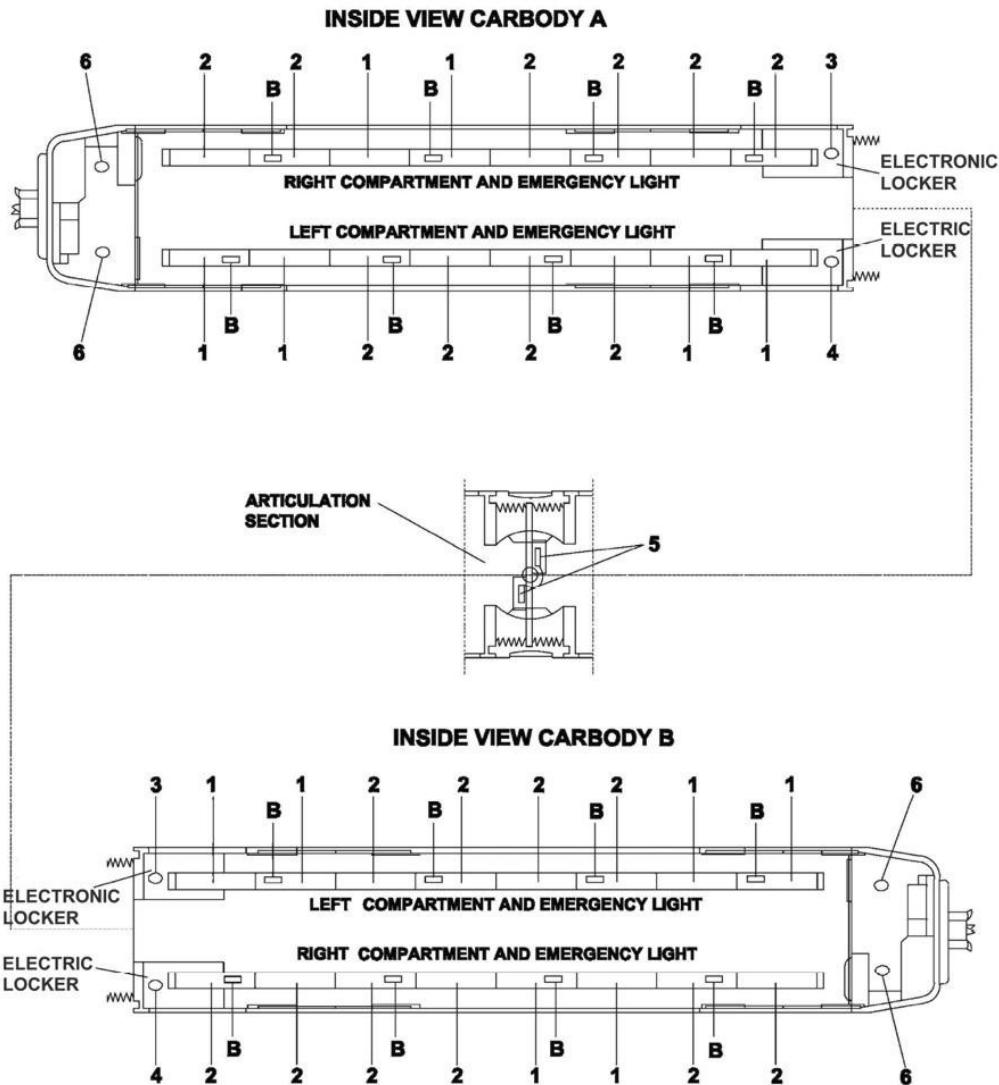
Each Light Fixture accommodates one halogen lamp (10W) and it is controlled by CAB LAMP Switch and relevant Dimmer both located on the Operator Console.

The cab lights will be turned on when the crew key switch is used if the console switch is left in the AUTO position.

When the Vehicle is not powered (i.e. shop parking) and the Operator opens the Front Door with the Crew Switch, the Cab Lights are not activated.

Cab Lights are powered when the Operator turns the Transfer Switch to ON or LOCAL first and then switches the CAB LAMP Switch to ON.

Cab Lights still remain active even if the Vehicle is passing through an high voltage gap and/or in any other condition which may causes the Vehicle lose the power supply.



#### B. BALLAST

- |                           |                        |                             |
|---------------------------|------------------------|-----------------------------|
| 01. EMERGENCY LIGHT       | 02. COMPARTMENT LIGHT  | 03. ELECTRONIC LOCKER LIGHT |
| 04. ELECTRIC LOCKER LIGHT | 05. ARTICULATION LIGHT | 06. CAB LIGHT               |

**Figure 06-I-02.1 Interior Lighting Plan Layout**

The Exterior Lighting Subsystem is designed to take care of lighting needs on the Vehicle Exterior and to require low maintenance.

Refer to Figure 06-I-02.2 for the P2550 Exterior Lighting Plan Layout.

The P2550 Exterior Lighting Plan Layout shows the location of:

- Silent Alarm Light
- "By Pass Active" Light
- Marker Lights
- Roof Head Light
- Front Head Lights
- Stop / Tail Lights
- Turn Indicators / Hazard Lights

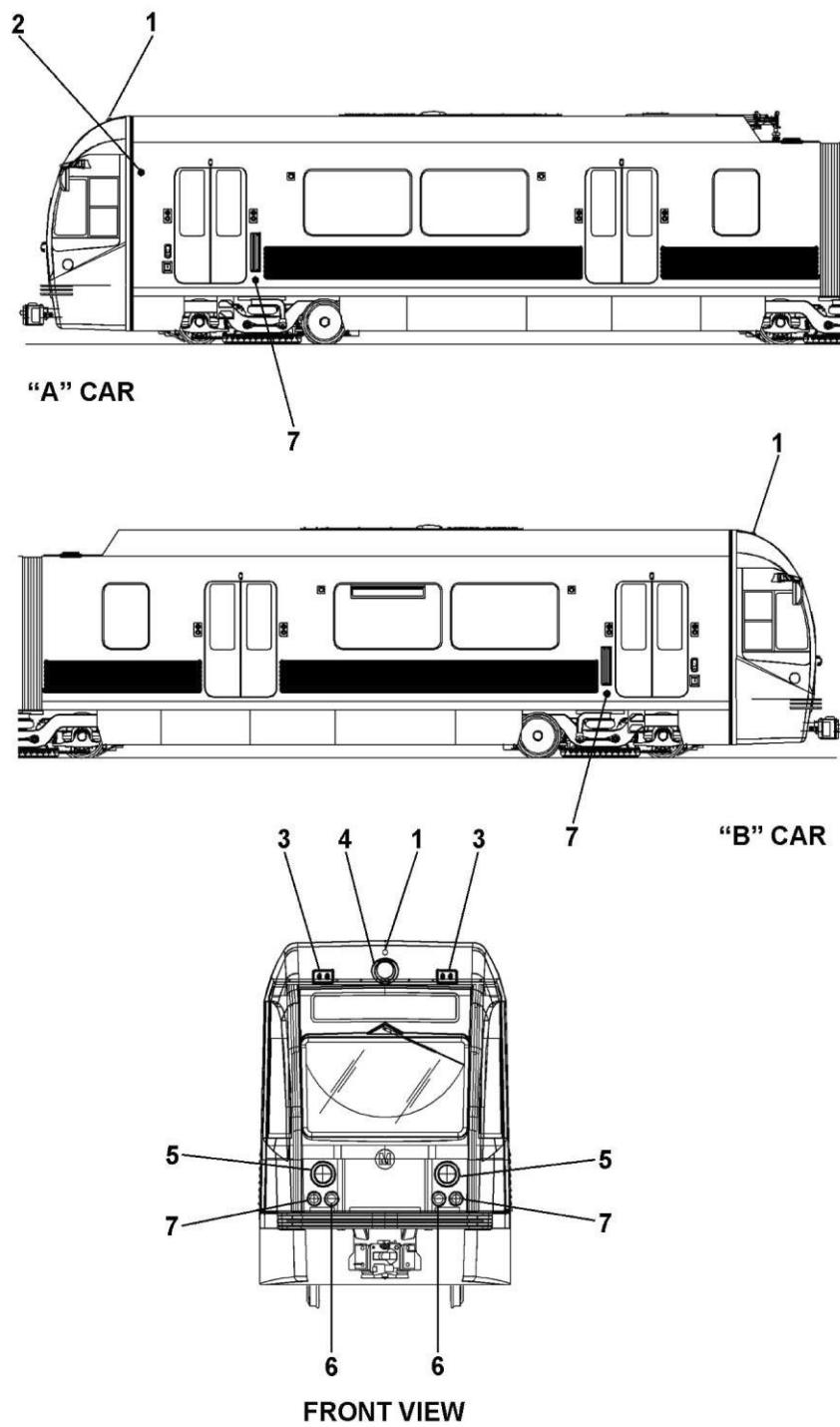
All Lighting Controls are powered by the LV System by means of the appropriate relay and/or logic circuitry.

Both electrical feeds to the lamp are insulated from ground and all Assemblies and their exposed metallic surfaces are grounded.

All Assemblies installed on the vehicle exterior and in doorways are waterproof.

All Assemblies are designed and installed to provide easy, quick and safe maintenance.

For these reasons re-lamping of each Assemblies is performed from the outside with the exception of the Roof Head Light (for safety reasons due to its location on the roof close to the 750 Vdc catenary voltage).



- |                                 |                          |                     |
|---------------------------------|--------------------------|---------------------|
| 01. SILENT ALARM LIGHT          | 02. BY-PASS ACTIVE LIGHT | 03. MARKER LIGHT    |
| 04. ROOF HEADLIGHT              | 05. FRONT HEADLIGHT      | 06. STOP/TAIL LIGHT |
| 07. TURN INDICATOR/HAZARD LIGHT |                          |                     |

**Figure 06-I-02.2 Exterior Lighting**

### i. System-Vehicle Relationship

The Lighting System is strictly connected with the LVDS and in particular with the Relay Logic of the LVDS (Refer to Section 10).

The Relay Logic manages turning ON and OFF the lights in accordance with the Operator request (e.g. the turn indicators) and/or through an automatic logic (e.g. the stop lights are ON when the train is braking).

The Relay Logic for each component is described in paragraph 06-I-02.02.

The Following description summarizes, for each light type, the LVDS Relay Logic operation (without the relevant faults):

- **Cab Lights** switch ON in one of the following conditions:
  - Cab Lighting Command Switch (8S01) is ON
  - Cab Lighting Command Switch (8S01) is ON or AUTO with Cab Active (ON/LOCAL)
- **Passenger Compartment Lights** (Emergency and Normal) switch ON when:
  - **Emergency Lights:** a Door is Open with the crew key switch and the vehicle is timed out
  - **Normal Light:** a Cab is Active (ON/LOCAL)
- **Articulation Lights** switch ON if:
  - Door is Open with the crew key switch and the vehicle is timed out
- **Locker (Electric and Electronic) Lights** switch ON if:
  - One of the Cabs is Active (ON/LOCAL), and
  - Electric Locker or Electronic Locker is opened
- **Low/High Headlights** (Low or High depending on the High/Low Command Switch (8S02) Status):
  - Switch ON in the Front Cab only (if a Cab is Active (ON/LOCAL))
  - Blink ON/OFF (right and left alternatively) if a Horn/Gong is active (only in the Front Cab and if the Cab is active (ON)).
- **Roof Headlight** (Low or High depending on the High/Low Command Switch (8S02) Status):
  - Switch ON in the Front Cab only (if the Cab is active (ON/LOCAL))
  - Blink ON/OFF if a Horn/Gong is active (in the Front Cab only and if the Cab is active (ON))
- **Stop Lights** switch ON in the Rear Cab only, when:
  - The train is in Brake
  - One of the Cabs is active
- **Tail Lights** switch ON in the Rear Cab only, when:
  - One of the Cabs is active (ON/LOCAL)

—**Left/Right Turn Indicators / Hazard Lights** blink when:

- The Cab is active (ON)
- The Direction Indicator Command (8S03) status is RIGHT or LEFT or the Hazard Pushbutton (8S04) is pressed

—**Marker Lights**, if a Cab is active (ON/LOCAL), are:

- ON (RED) in the Rear Cab
- ON (AMBER) in the Front Cab

—**By-Pass Light** is ON when:

- One of the cabs is active (ON/LOCAL)
- The 35mph Speed Limit line is deenergized because at least one Vehicle System is bypassed or there is any active TCU and/or ECU fault

—**Silent Alarm** is ON when:

- One of the Cabs is active (ON/LOCAL)
- A Silent Alarm Switch (8S05) has been pressed

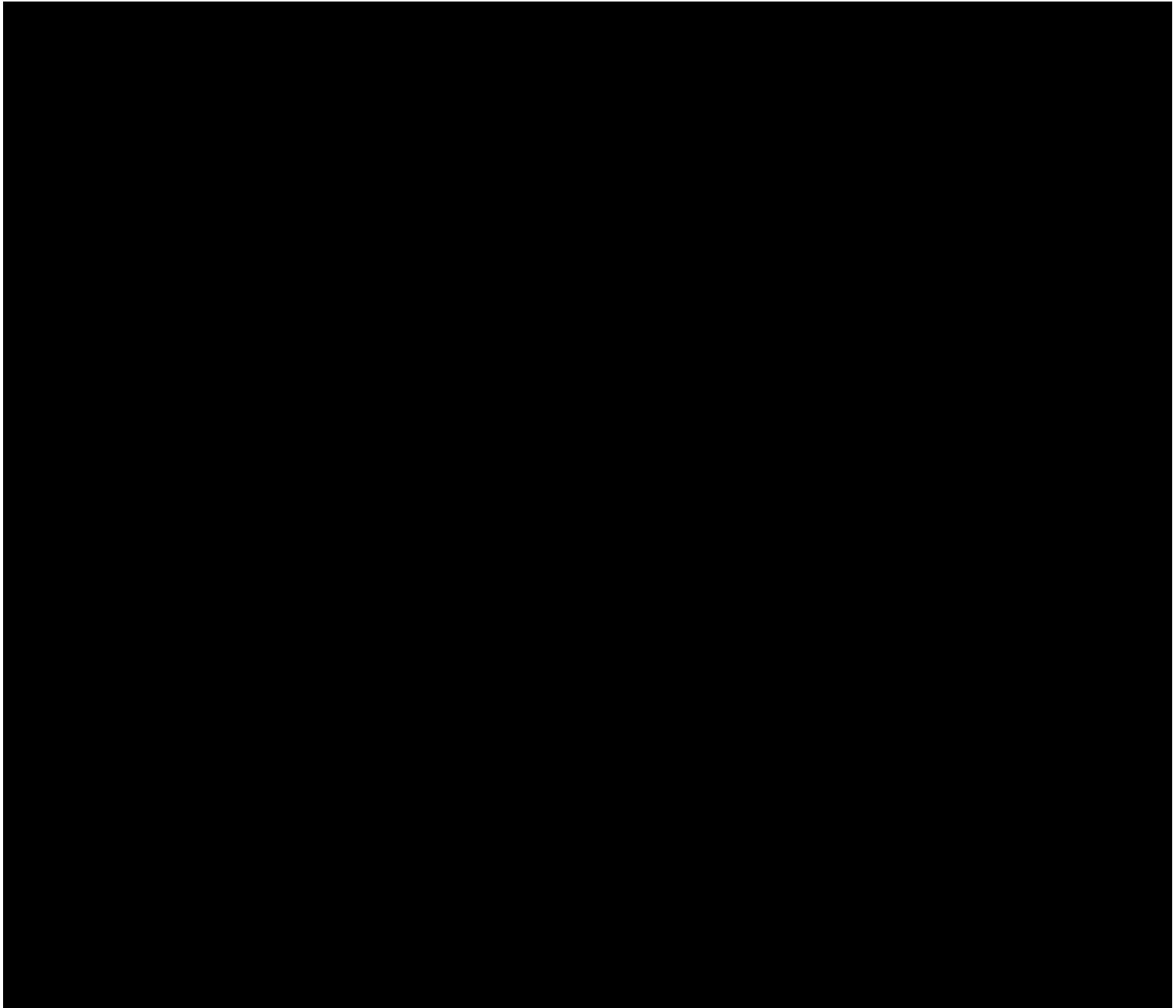
The Light Fixtures, in the Passenger Compartment are also used as Air Diffusers for the HVAC System (refer to Section 05).

## ii. System-Equipment Relationship

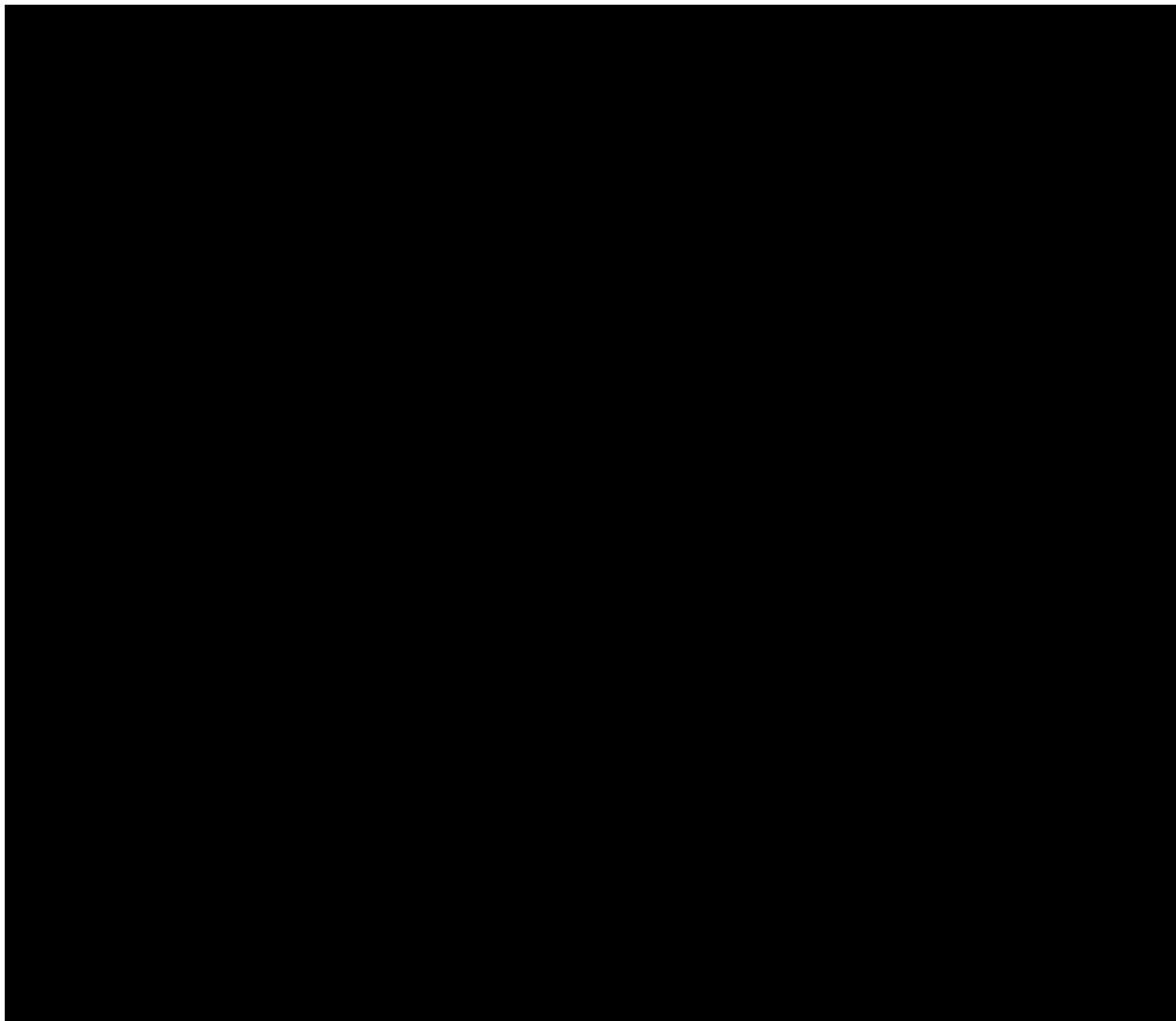
The Lighting system is made up of two main sub systems:

- The Interior Lighting
- The Exterior Lighting

Figure 06-I-02.3 and Figure 06-I-02.4 describe the Interior and the Exterior Lighting System of one Body Section. The two Vehicle Body Sections have identical Lighting System layout.



**Figure 06-I-02.3 Interior Lighting System**



**Figure 06-I-02.4 Exterior Lighting System**

## 06-I-02.02 The Lighting System Components

The Lighting System is made up of two main subsystems:

- The Internal Lighting
- The External Lighting

This paragraph will describe the main Components of the two subsystems.

### 06-I-02.02.01 Interior Lighting Subsystem

The Interior Lighting Subsystem is designed to provide internal illumination and to require low maintenance.

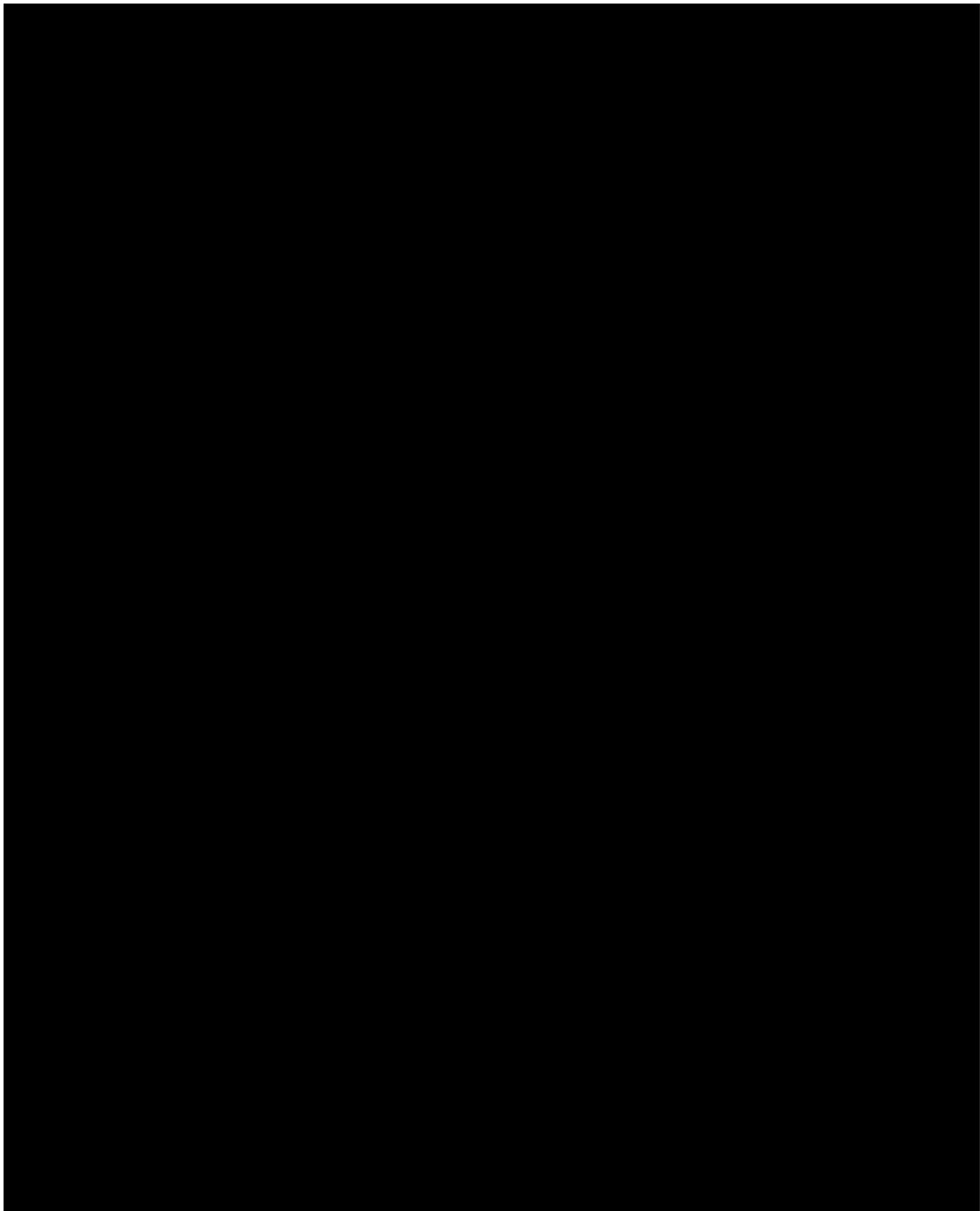
The LACMTA P2550 Interior Lighting Plan Layout shows the location of:

- Cab Lights and Indicators:
- Passenger Compartment Lights
- Articulation Lights
- Electric and Electronic Locker Lights

Refer to Figure 06-I-02.5 for LACMTA P2550 Interior Lighting Schematic Diagram.

This Diagram is an abstract of the LV Functional Schematic (237VE06965C03), refer to it for a more detailed description.

All Lighting Controls are powered by the LVDS System using relevant Circuit Breakers and appropriate Relays and/or Logic Circuitry (Relay Logic) (Refer to Section 10).



**Figure 06-I-02.5 Interior Lighting Relay Logic and Supply**

### 06-I-02.02.01.01 CAB Lights

Each cab has two directionally adjustable Light Fixtures located on the ceiling of the cab.

Each Light Fixture is a recessed mounted fixture consisting of housing and tempered glass lens mounted into a swiveling black polymer bezel.

The installation is made through an aluminum black powder coat plate provided with three screws to match the fixture onto the cab ceiling.

Electrical Connection is made at the socket terminal screws.

The Socket is designed to accommodate one 10 W halogen lamp and is mounted in the Lamp Housing.

The Cab Spot Light is controlled by Cab Light Switch, located on Operator Console, through CB 8F01 located in the Electric Locker.

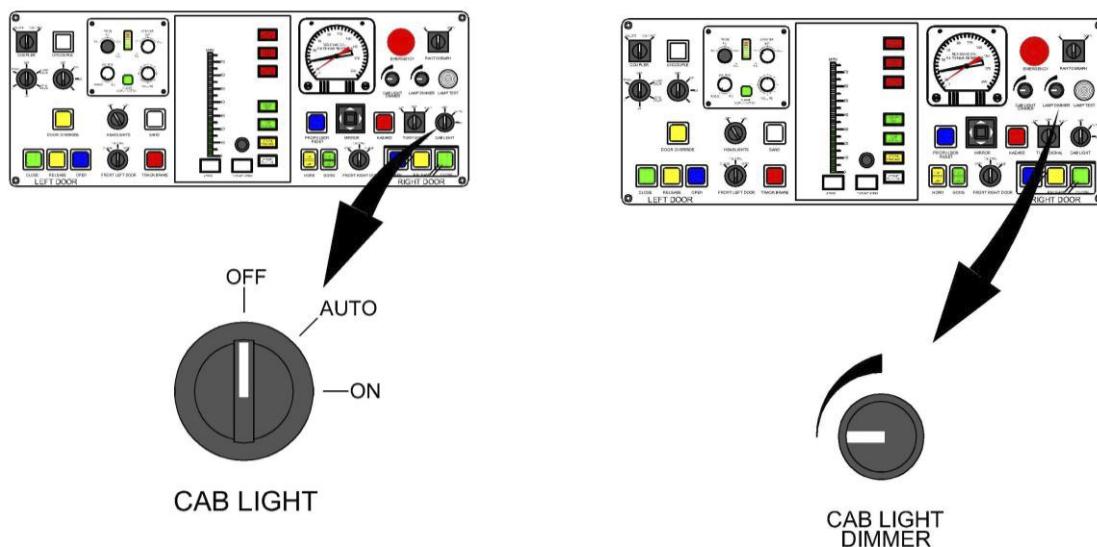
The luminous intensity of the Cab Spot Light can be adjusted by means of the Cab Light Dimmer (8R01) located on the Operator Console, next to the Cab Light Switch (8S01).

When the Vehicle is not powered (i.e. shop parking) and the Operator open the Front Door by the Crew Switch, the Cab Lights are not activated.

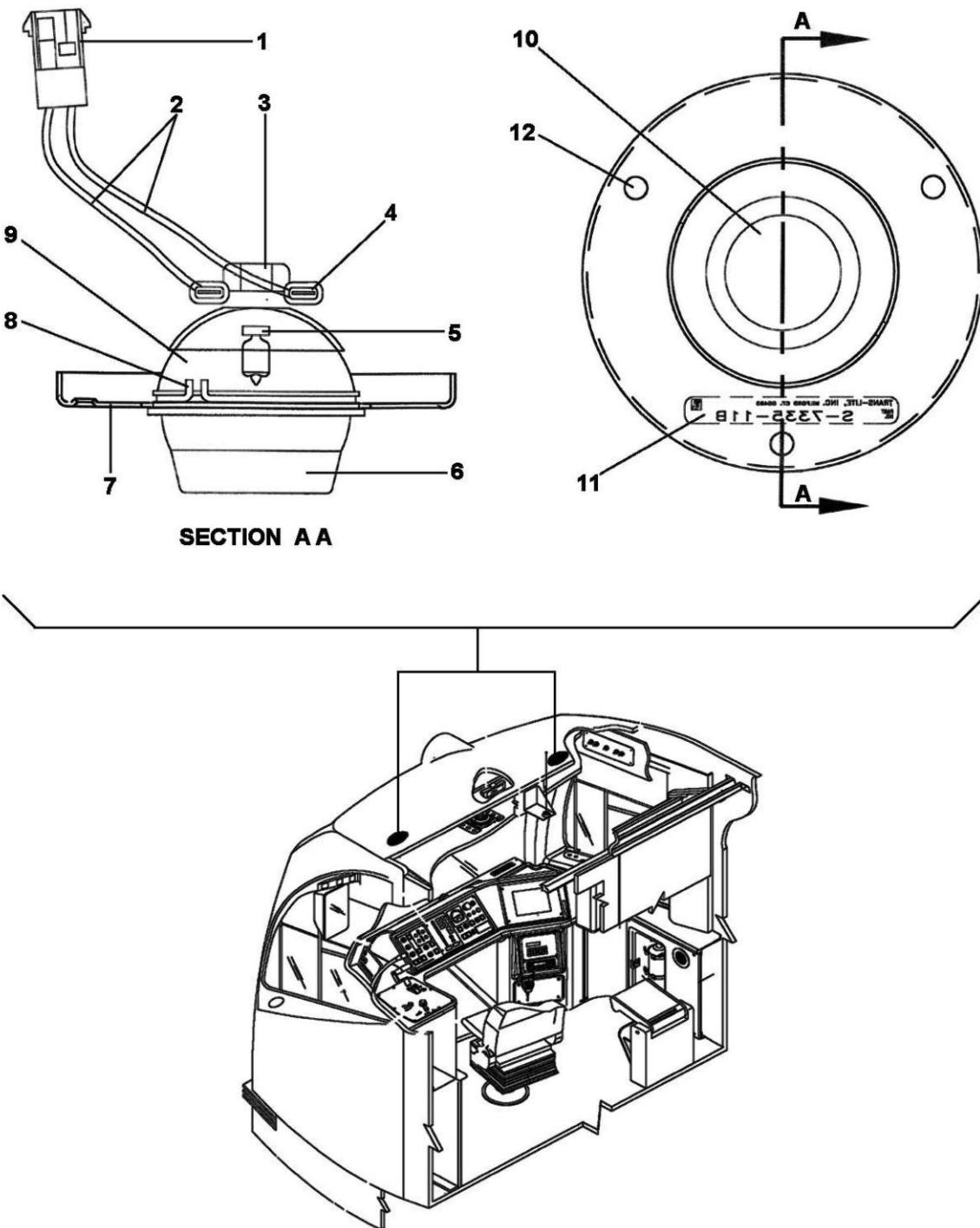
Cab Lights are powered when the Operator turn the Cab Light Switch (Console) to ON position or to AUTO position with the Transfer Switch to ON or LOCAL position.

In Emergency Condition, the Battery supplies the Cab Lights.

Therefore, Cab Lights remain active even if the Vehicle is passing through an high voltage gap and/or in any other condition which may causes the Vehicle to loose the power supply.



**Figure 06-I-02.6 Cab Light Switch and Cab Light Dimmer (Operator Console)**



- |                     |                        |                        |
|---------------------|------------------------|------------------------|
| 01. CONNECTOR       | 02. CABLE              | 03. SOCKET             |
| 04. FAST CONNECTION | 05. HALOGEN LAMP [LOW] | 06. ADJUSTABLE FIXTURE |
| 07. PLATE           | 08. RETAINER RING      | 09. LAMP HOUSING       |
| 10. GLASS LENS      | 11. LABEL              | 12. SCREW              |

**Figure 06-I-02.7 Cab Spot Light - Location and Components**

### 06-I-02.02.01.02 Passenger Compartment Lights

Each Section of the Passenger Compartment (Body A and B) is equipped with eight Lights Fixtures that illuminate the passenger seating areas.

Four of them are installed on the LH side and four on the RH side.

The Light Fixtures support the ASM filler as Air Diffusers for the HVAC System (refer to Figure 06-I-02.10).

Each Fixture is 100 inches long and consists of two 50 inches Reflector Assemblies.

The Light Fixture is:

- Designed for efficient installation, cleaning, and maintenance
- Built of aluminum and all visible surfaces are clear anodized

Lamps are accessed through a hinged gasket-sealed door secured by captive, stainless steel fasteners.

The Light Fixture has a neoprene sponge gasket between the door and the housing to prevent dust from entering the fixture.

Refer to Figure 06-I-02.1 for a Passenger compartment Lights' vehicle overview.

Overall Dimensions =100" x 8.12" x 4.45" (w/o Filler ASM)

Each Reflector Assembly accommodates one cool white F32T8 (48") fluorescent lamp and it is equipped with locking-type sockets, designed to provide support at the end of the lamp in addition to the support from the terminal pins.

The locking device is not used as grounding of the terminal pins to the Fixture.

The socket provides automatic engagement of the lamp upon insertion.

A Lamp retainer to prevent the lamp from dropping out of the Fixture is provided in addition to the Lamp-holder.

The Reflector Assembly layout can be with DC Ballast or without Ballast (Slave Reflector).

The line supplies 37.5 Vdc to Reflectors with DC Ballast consisting of 37.5 Vdc AutoOff, Safety Ballast Assembly.

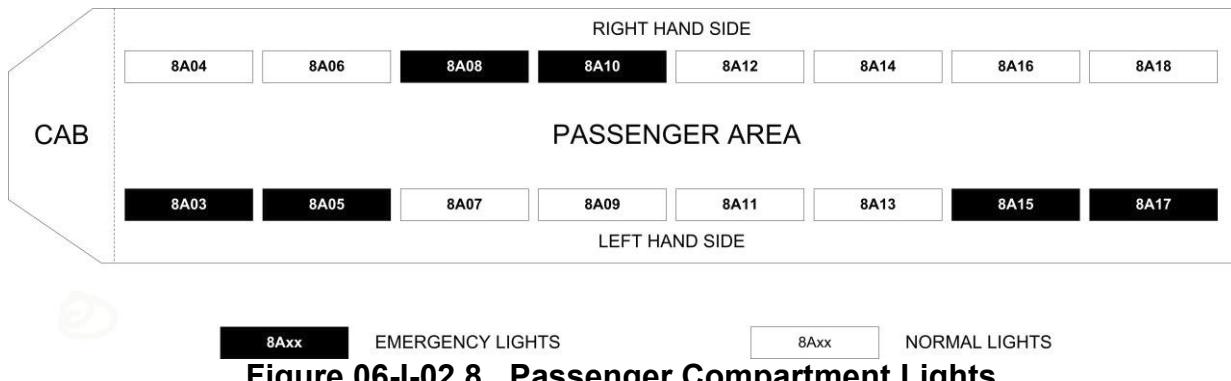
Reflectors without Ballasts are powered by the nearby Reflectors that have Dual Ballast Outputs.

Designated Reflectors Assembly serve as Emergency Lighting when Vehicle main power is disrupted (LVPS is not working) and battery backup power is applied.

The Emergency Light location is shown in Figure 6-I-02-08: four lights on the left side and two lights on the right side.

The Normal Passenger Compartment Lights switch ON when a Vehicle Cab is enabled.

The Emergency Passenger Compartment Lights (and the Articulation Lights) switch ON when a crew door opens with the crew key switch.

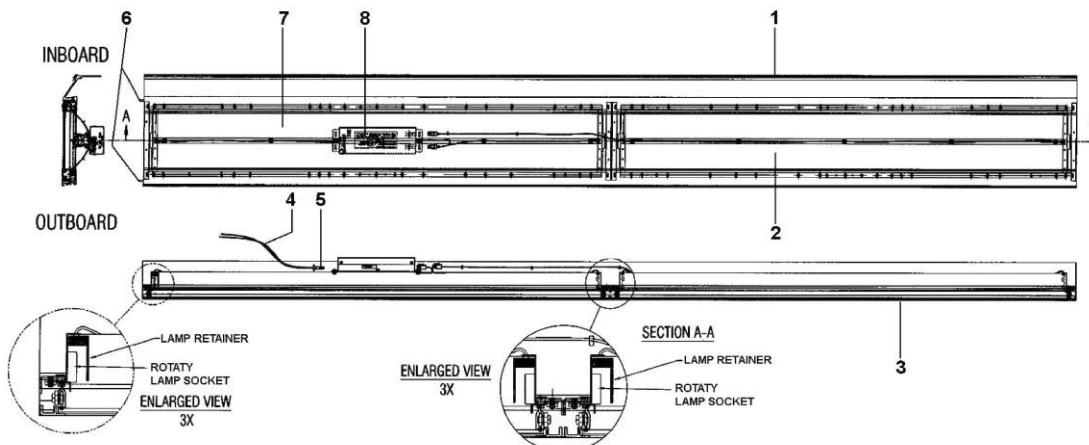


**Figure 06-I-02.8 Passenger Compartment Lights**

The Ballast applies an isolated high AC voltage through a wiring harness assembly to the lamp-holder.

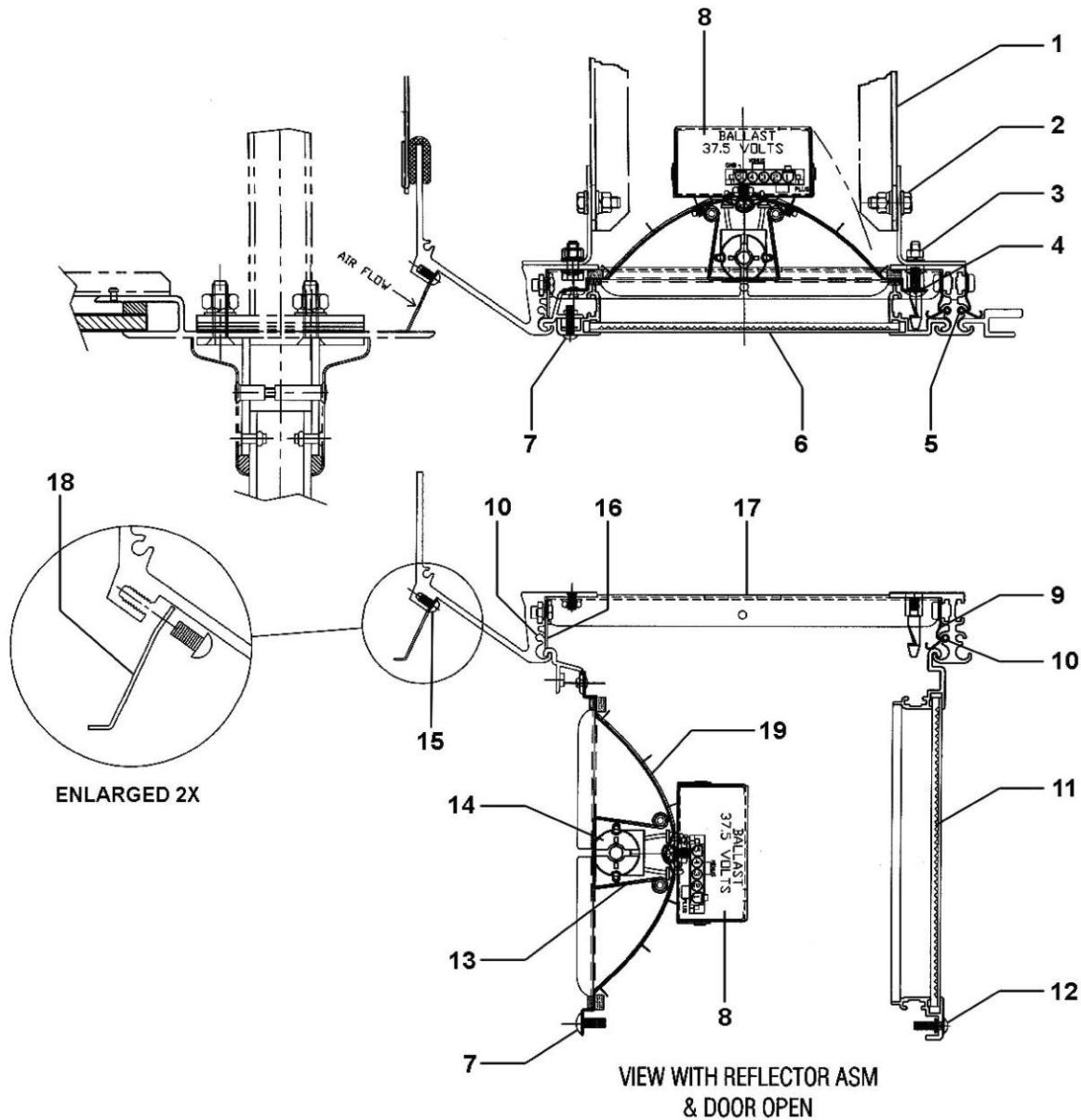
<u>WARNING:</u>	<b>STRIKE VOLTAGE (START-UP VOLTAGE) THROUGH THIS CIRCUITRY AVERAGES AROUND 600 VRMS, BUT MAY RANGE AS HIGH AS 900 VRMS. AFTER THE LAMP ILLUMINATES, THE VOLTAGE REDUCES TO A SELF-REGULATING STEADY STATE BUT REMAINS POTENTIALLY LETHAL. STEADY STATE VOLTAGE IS GENERALLY DEPENDENT UPON LAMP SIZE AND AGE.</b>
-----------------	--

The Ballast plate hinges downward to access ballast and car body wiring by loosening captive mounting screws and the sliding plate until the screw head clears the keyhole



- |   |  |   |
|---|--|---|
| <b>01. FRAME ASM</b><br><b>04. CABLE</b><br><b>07. REFLECTOR W. BALLAST</b> | <b>02. REFLECTOR W/O BALLAST</b><br><b>05. CONNECTOR</b> | <b>03. BEZEL</b><br><b>06. ALIGNMENT PINS</b><br><b>08. BALLAST</b> |
|---|--|---|

**Figure 06-I-02.9 Passenger Compartment Light Overview**



- |                        |                        |                                |
|------------------------|------------------------|--------------------------------|
| 01. BRACKET            | 02. SCREW              | 03. NUT                        |
| 04. SCREW              | 05. FRAME              | 06. BEZEL                      |
| 07. CATCH SCREW        | 08. BALLAST            | 09. DOOR RETAINER              |
| 10. ALIGNMENT PIN      | 11. BEZEL (LENS)       | 12. TAMPER PROOF CAPTIVE SCREW |
| 13. LAMP RETAINER      | 14. LAMP ROTARY SOCKET | 15. SCREW                      |
| 16. REFLECTOR RETAINER | 17. SUPPORT            | 18. DAMPER                     |

**Figure 06-I-02.10 Passenger Compartment Light Detail**

### 06-I-02.02.01.03 Articulation Lights

The Articulation Section is equipped with two Articulation Lights Fixtures (with no air diffuser).

Each Fixture is 18" long and consists of one 18" Reflector Assembly. Only the Fixture facing the B Body Section accommodates the Ballast.

The Light Fixture is:

- Designed for efficient installation, cleaning, and maintenance
- Made of aluminum and all visible surfaces are clear anodized

A Side Articulation Light Characteristics (without Ballast):

- Overall Dimensions: 20.91" x 7.5 "x 1.98"
- Frame Material & Exterior Surface Finish = Exposed aluminum extrusion etched and anodized
- Lens: a polycarbonate clear lens with the inside having a polycarbonate prismatic pattern with UV stabilizing film to achieve specific illumination levels.
- Lens Door provided with Tamper proof #8 hex socket captive screws
- Lamp Accommodation: 2 x FB024T8 (18") lamp (cool white). Lamps are accessed through a hinged gasket-sealed door secured by captive, stainless steel fasteners

B Side Articulation Light Characteristics (with Ballast):

- Overall Dimensions: 20.91" x 7.5 "x 3.95"
- Frame Material & Exterior Surface Finish: Exposed aluminum extrusion etched and anodized
- Lens: a polycarbonate clear lens with the inside having a polycarbonate prismatic pattern with UV stabilizing film to achieve specific illumination levels
- Lens Door provided with Tamper proof #8 hex socket captive screws
- Lamp Accommodation = 2x FB024T8 (18") lamp (cool white)
- Lamps are accessed through a hinged gasket-sealed door secured by captive, stainless steel fasteners
- Ballast Accommodation = 1 Ballast 37.5 Vdc auto-off, safety Ballast assembly

The Articulation Lamp are connected to the Emergency Lighting, so they stay on also when the LVPS is not working.

The Articulation Lights (and the Emergency Passenger Compartment Lights) switch ON when a crew door is opened with the crew key switch.

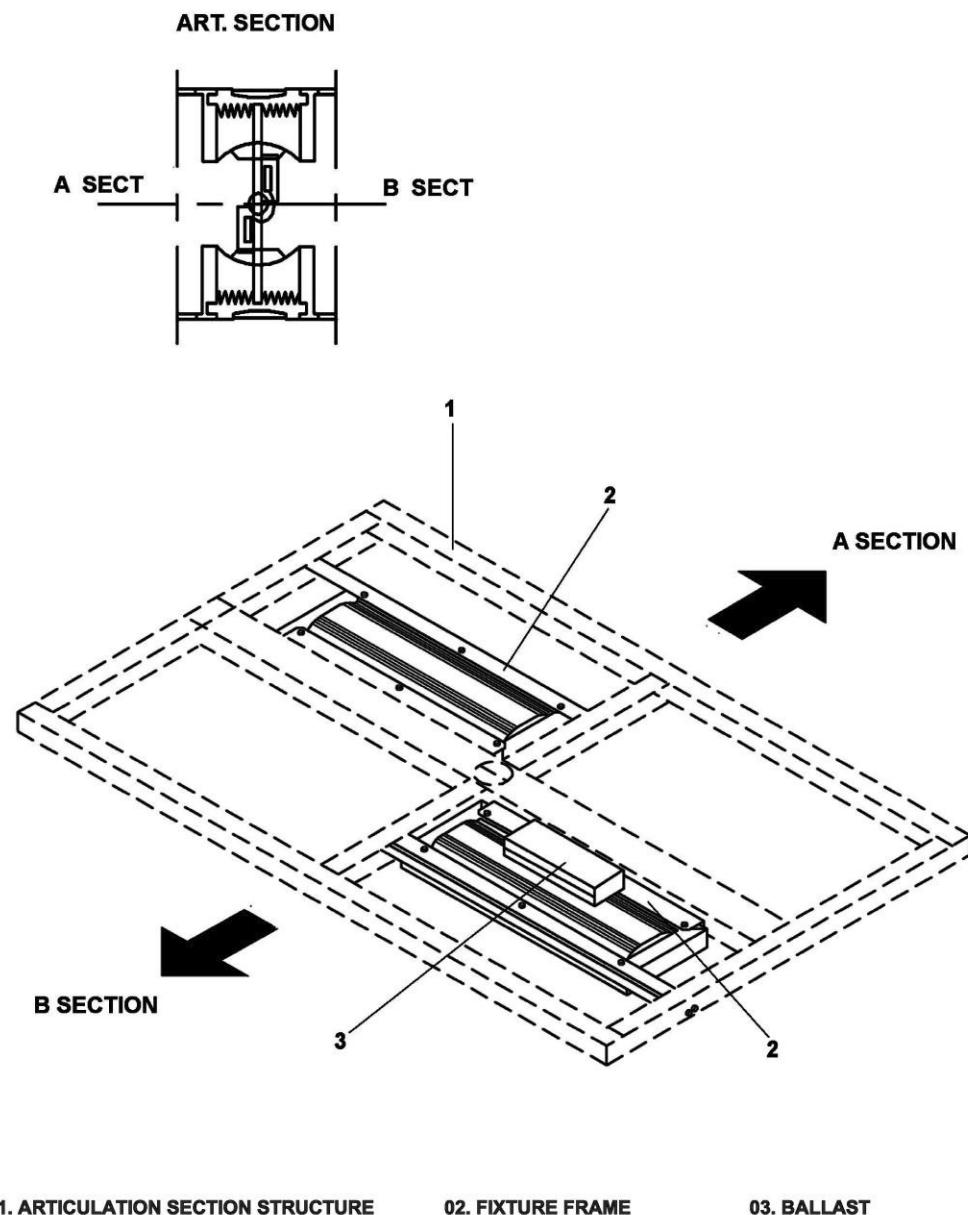


Figure 06-I-02.11 Articulation Lights Fixtures Location

Each Articulation Light Reflector Assembly accommodates one cool white FB24T8 (18") fluorescent lamp and is equipped with locking-type sockets, designed to provide support at the end of the lamp in addition to the support from the terminal pins.

The locking device is not used as grounding of the terminal pins to the Fixture.

The socket provides automatic engagement of the lamp upon insertion. A Lamp retainer to prevent the lamp from dropping out of the Fixture is provided in addition to the Lamp-holder.

The Reflector Assembly layout can be with DC Ballast or without Ballast (Slave Reflector). In particular the ballast is located in the B side Articulation Light.

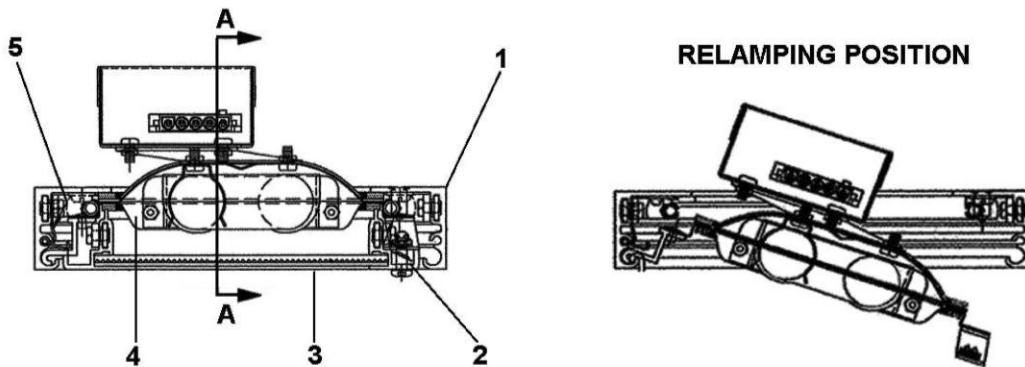
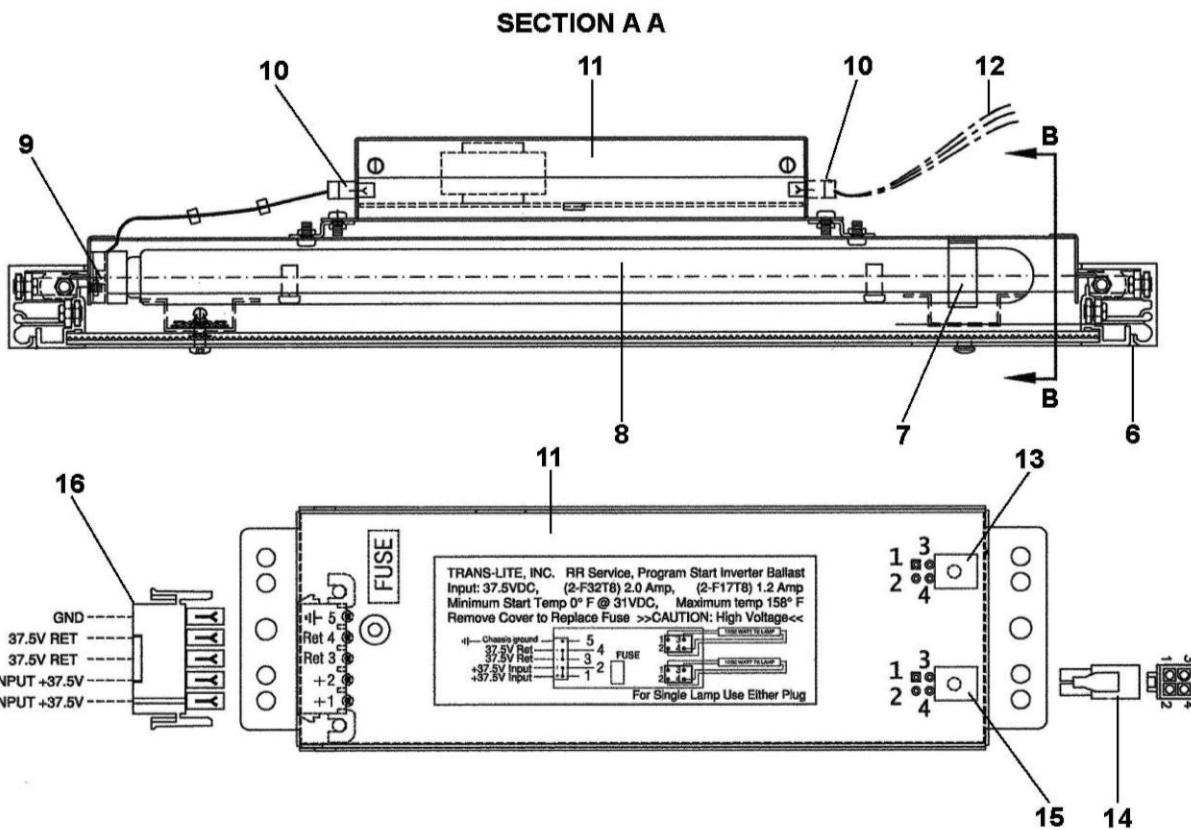
The line supplies 37.5 Vdc to Reflectors with DC Ballast consisting of 37.5 Vdc Auto-Off, Safety Ballast Assembly. The A side Light is supplied by the B side Light Ballast.

Articulation Light Reflector Assemblies serve as Emergency Lighting when the Vehicle main power is disrupted and battery backup power is applied.

The Ballast applies a isolated high AC voltage through a wiring harness assembly to the lamp-holder.

**WARNING:** STRIKE VOLTAGE (START-UP VOLTAGE) THROUGH THIS CIRCUITRY AVERAGES AROUND 600 VRMS, BUT MAY RANGE AS HIGH AS 900 VRMS. AFTER THE LAMP ILLUMINATES, THE VOLTAGE REDUCES TO A SELF-REGULATING STEADY STATE BUT REMAINS POTENTIALLY LETHAL. STEADY STATE VOLTAGE IS GENERALLY DEPENDENT UPON LAMP SIZE AND AGE.

The Ballast plate hinges downward to access ballast and car body wiring by loosening captive mounting screws and the sliding plate until the screw head clears the keyhole.

**SECTION B B****RELAMPING POSITION**

01. FRAME ASM

04. REFLECTOR

07. LAMP CLAMP

10. PLUG

13. SOCKET (TO REMOVE FIXTURE)

16. CONNECTOR (INPUT)

02. RELAMPING DOOR

05. RETAINER

08. LAMP

11. BALLAST

14. CONNECTOR (OUTPUT)

03. BALLAST

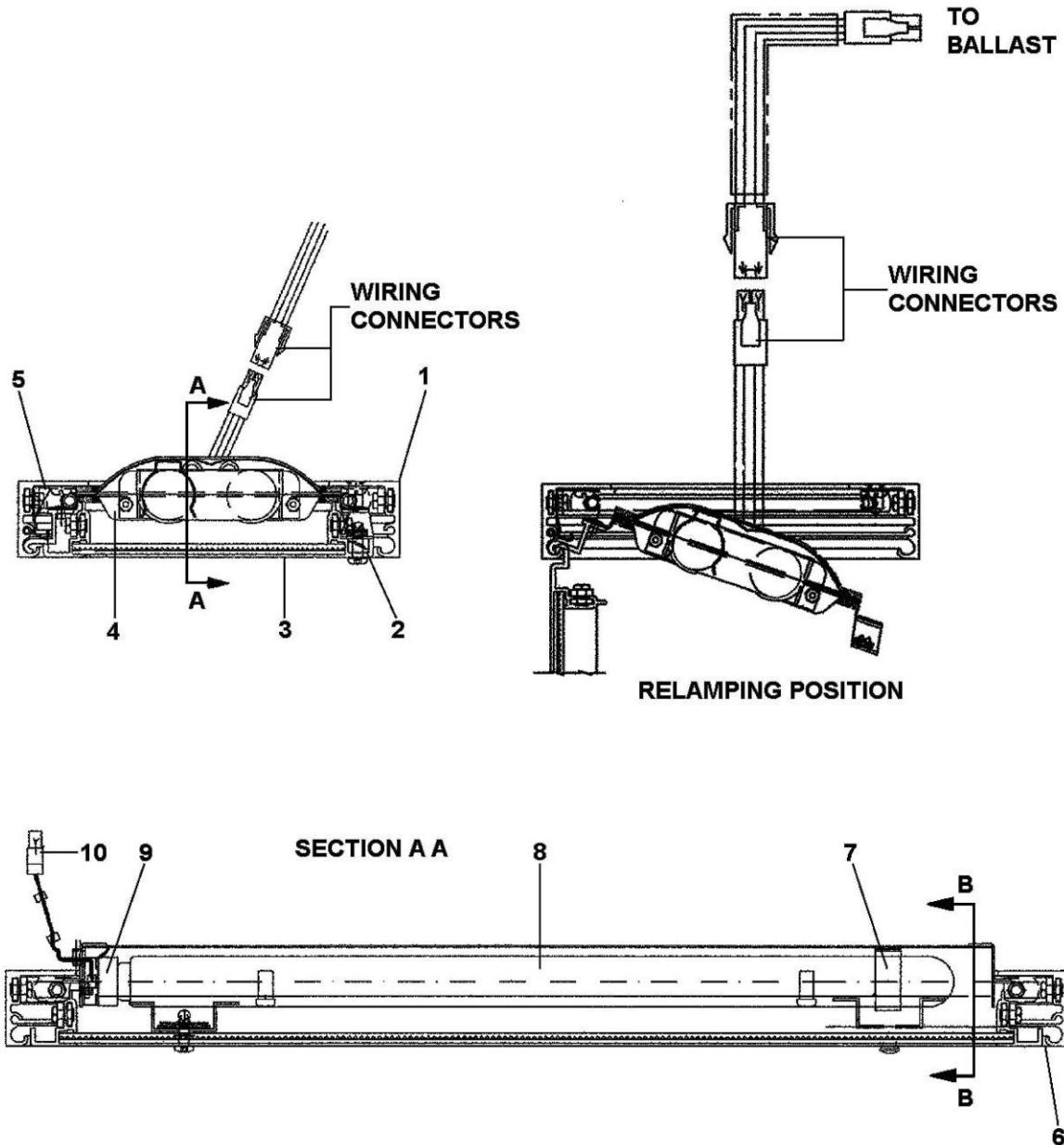
06. CATCH SCREW

09. LAMP HOLDER

12. CAR WIRING

15. SOCHET (OUTPUT)

**Figure 06-I-02.12 Articulation Light Fixtures with Ballast Components**



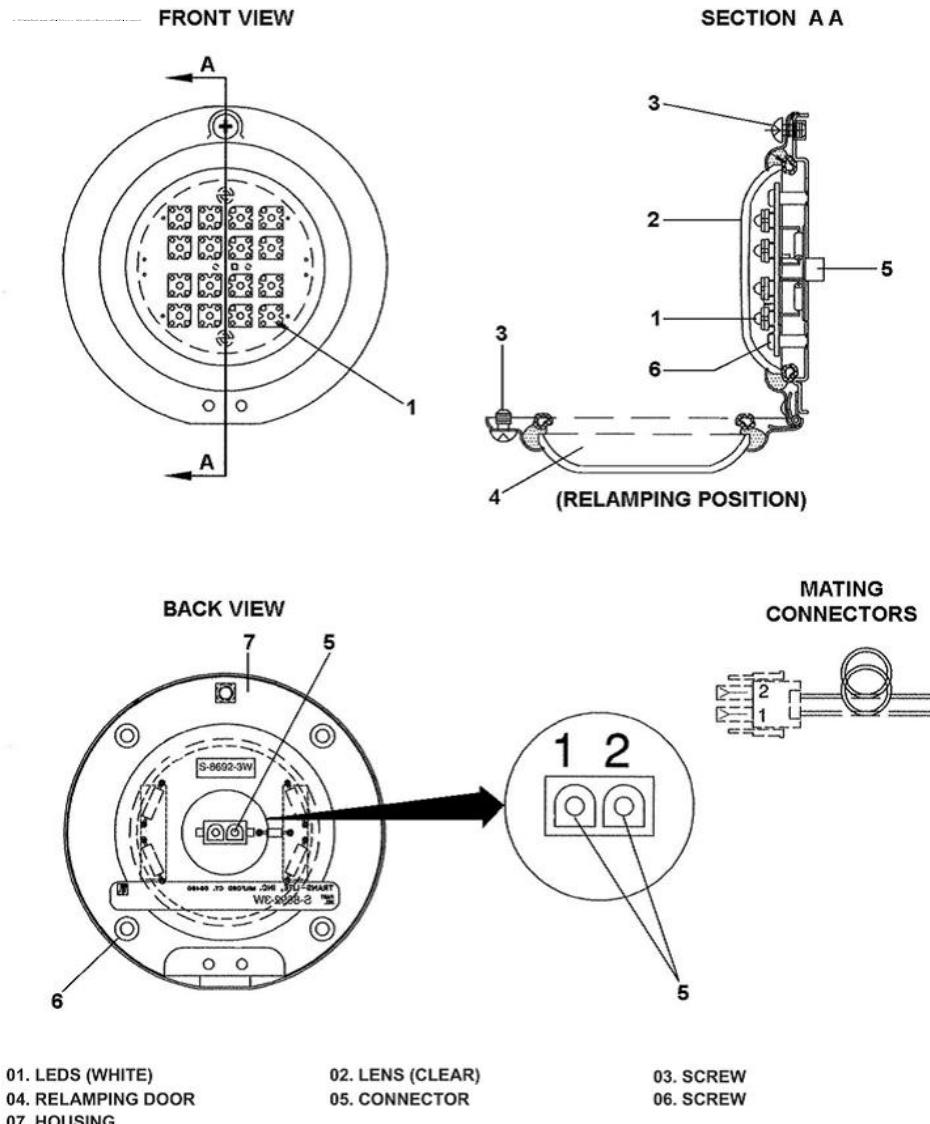
**Figure 06-I-02.13 Articulation Light Fixtures without Ballast Components**

#### 06-I-02.02.01.04 Locker Lights

The P2550 LRV has four lockers: an Electronic Locker and an Electric Locker per Body Section. They are located in the Passenger Area, near the Articulation Section (Refer to Figure 06-I-02-1)

Each Locker Light (both for Electronic and Electric Lockers) is provided with one Internal Light Fixture accommodating a Light Emitting Diode (LED) Light controlled by the relevant Switch (8S06 for Electronic Locker and 8S07 for Electric Locker).

LED Light operates on 14 Vdc reduced from a 37.5 Vdc car power source applied to a receptacle on the back of each sealed LED module. LED is less sensitive to shock and vibration than incandescent lamp.



**Figure 06-I-02.14 Electronic and Electric Locker Light Components**

### 06-I-02.02.02 Exterior Lighting Subsystem

The Exterior Lighting Subsystem is designed to take care of lighting needs on the Vehicle Exterior and to require low maintenance.

The Exterior Lighting Subsystem is made up of:

- Silent Alarm Light
- "By Pass Active" Light
- Marker Lights
- Roof Head Lights
- Front Head Lights
- Stop / Tail Lights
- Turn Indicators / Hazard Lights
- Door Lights (Refer to Section 04)

Both electrical feeds to the lamp are insulated from ground and all Assemblies and their exposed metallic surfaces are grounded.

All Assemblies installed on the vehicle exterior and in doorways are waterproof.

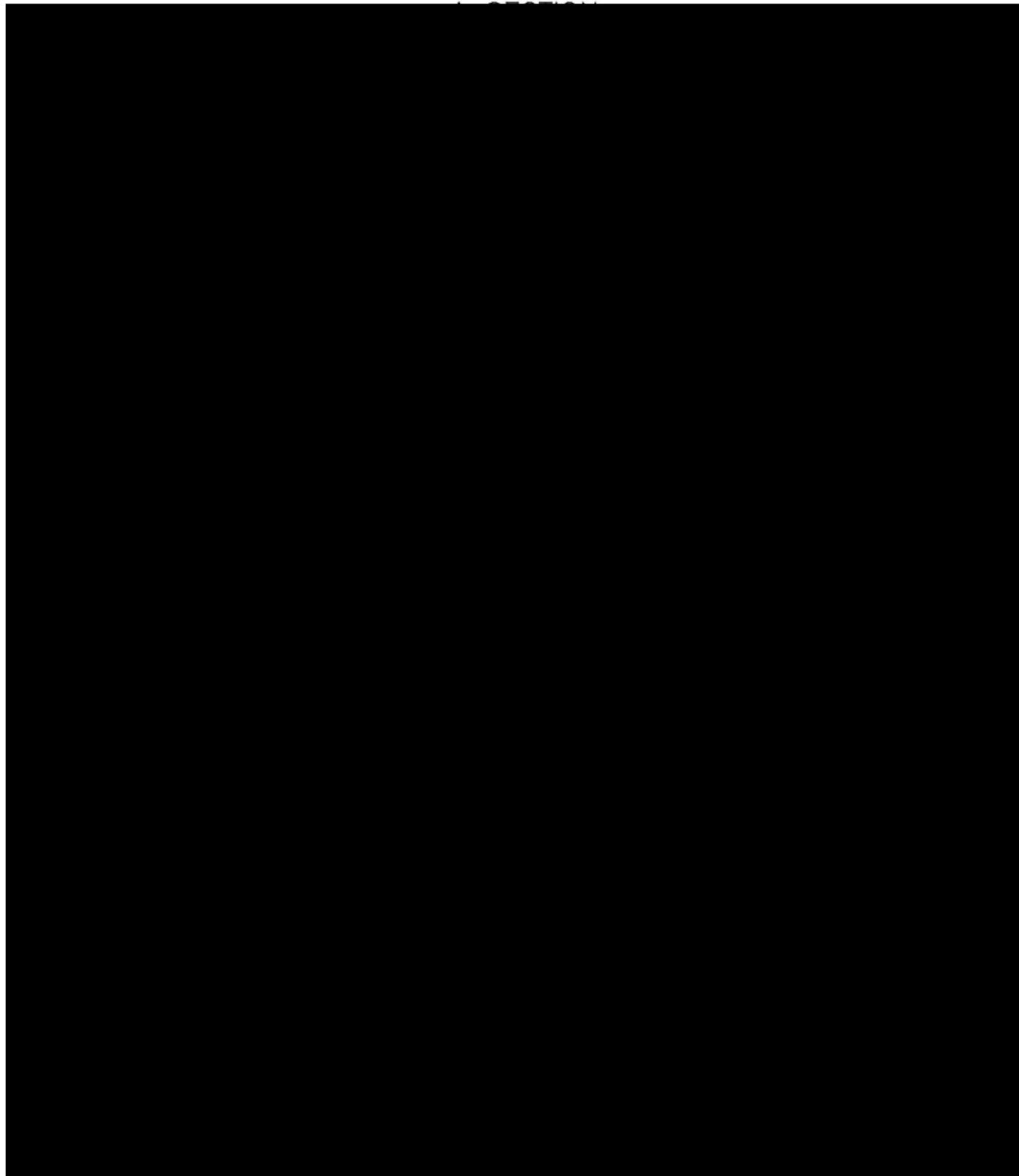
All Assemblies are designed and installed to provide easy, quick and safe maintenance.

For these reasons re-lamping of each Assembly is performed from the outside with the exception of the Roof Head Light (for safety reason: the Roof Head Light is near the Catenary Line, for this reason an exterior re-lamping is potentially dangerous).

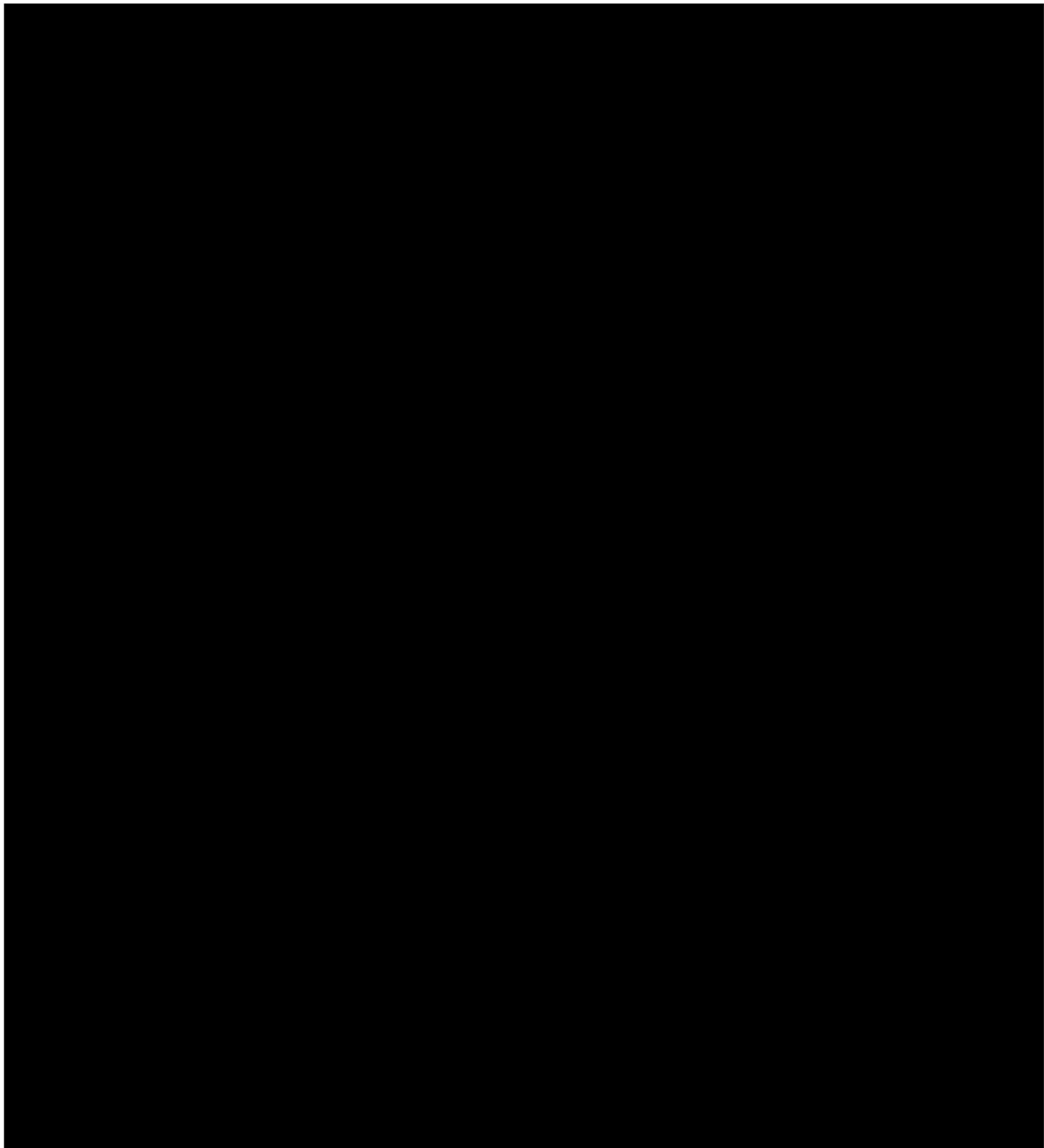
Refer to Figure 06-I-02.2 for the Exterior Lights location.

Figure 06-I-02.15 and Figure 06-I-02.16 show the Exterior Light Relay Logic and Supply.

These figures are a simplification of the P2550 LV Functional Schematic (237VE06965C03); refer to it for a more detailed description.



**Figure 06-I-02.15 Exterior Lighting Relay Logic and Supply (A Body Section)**



**Figure 06-I-02.16 Exterior Lighting Relay Logic and Supply (B Body Section)**

### 06-I-02.02.02.01 Headlights

The Headlights are not supplied directly by the LVDS (refer to Section 10).

These lights are supplied by a specific DC/DC Converter.

The DC/DC Converter is located under the passenger seats near the Electric Locker of the B Body Section and it supplies both the A and the B Body Section Headlights.

The P2550 LRV Headlights are the following:

- Low Headlights
- High Headlights
- Roof Headlight.

The Vehicle Headlights have the following functions:

- To illuminate the front area (night/tunnel functioning)
- To alert people around the tracks (flashing)

#### a ) Low and High Headlights

The Low and High Headlights (Front Headlights) are located inside the same fixture and are installed on the outside of the vehicle front, under the windshield on the right and left side of each Front/Rear side. (Refer to Figure 06-I-02.17).

Each headlight fixture is designed to accept PAR 56, Sealed Beam Lamp (65W).

The fixture is adjustable to plus or minus 3 degrees vertical and horizontal. The housing and bezel are stainless steel.

The exposed surface is satin brush finished, and the interior painted with reflective white enamel.

The housing is secured to the car body and sealed with a gasket to prevent water leakage.

Electrical connection is made at terminal screws on the back of the lamp.

The Headlights stay ON only in the lead Cab of the Vehicle/Train.

The Low and High Headlights are controlled by the Low/High Light Command Switch (Label: 8S02) located on the Operator Console and are protected against overcurrents by the 8F11 CB (Nominal Current: 16A, located in the CB Cab Panel) for both High and Low status.

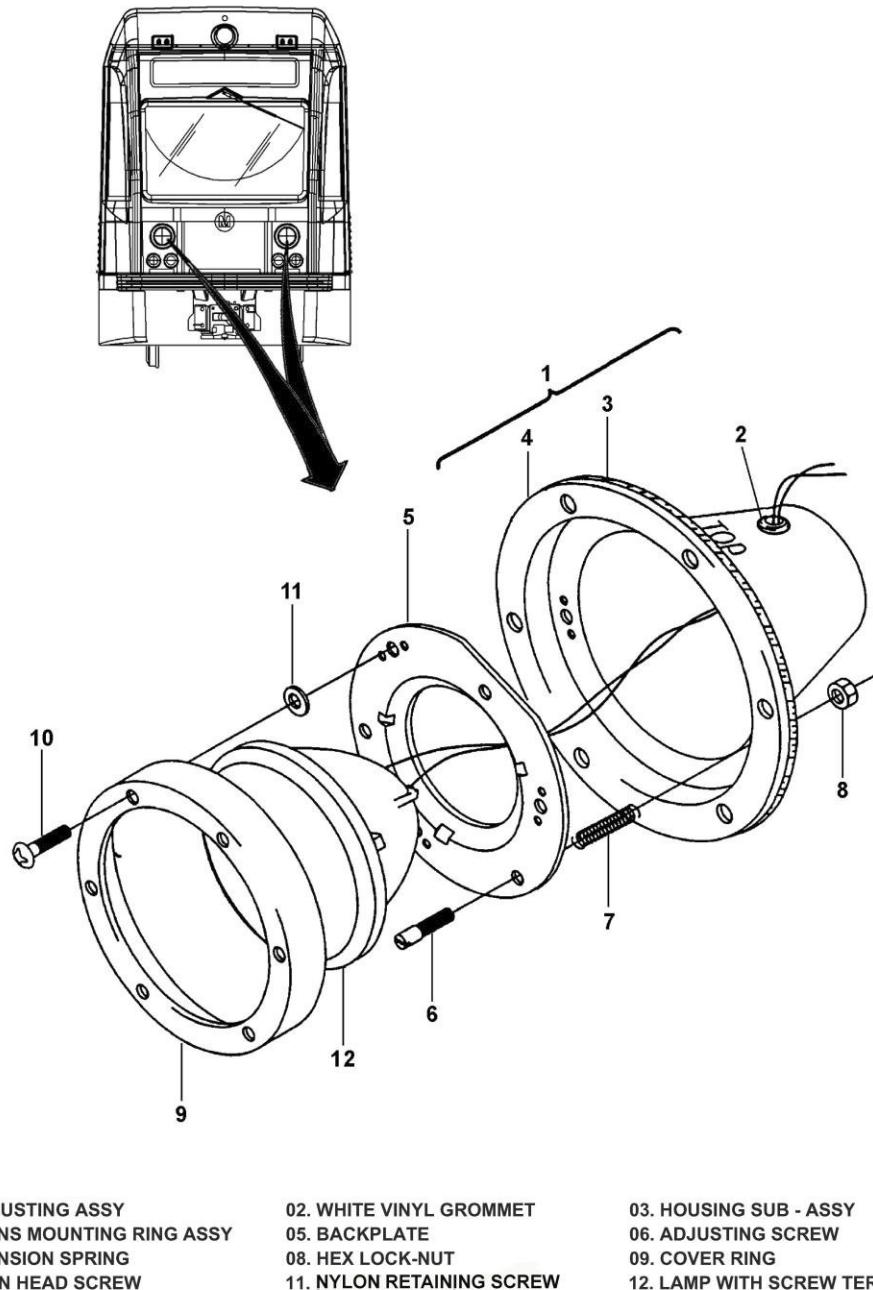
The Low/High Light Command Switch (which controls also the Low/High Roof Head Light) is shown in Figure 06-I-02.18.

Thanks to the LVDS Relay Logic, Low or High Headlights switch ON in the Lead Cab only (Body Section with the Forward direction Relay (3K14) and End of Train Relay (9K08) energized).

When the Low/High Light Command Switch is set to High, the "High Beams" Indicator Lamp is turned ON (refer to Figure 06-I-02.19).

This Indicator is located in the Indicator Panel, over the Cab Windshield (refer to Section 10).

The Low/High Headlights automatically blink every time Horn or Gong is operated.



**Figure 06-I-02.17 Low and High Headlights**

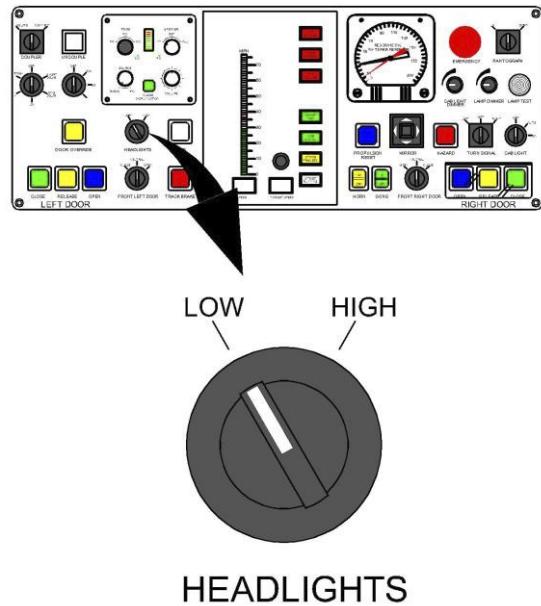


Figure 06-I-02.18 Low/High Light Command Switch

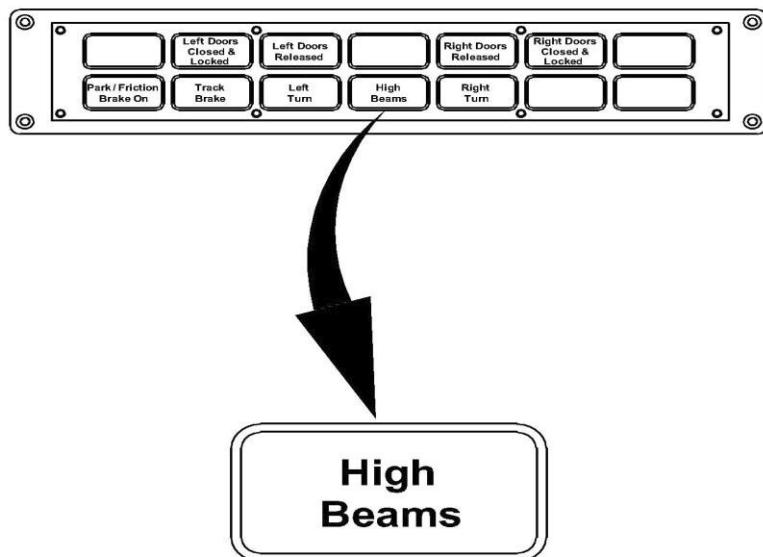


Figure 06-I-02.19 “High Beams” Indicator

### b ) Roof Headlight

A Roof Headlight is Located in each Vehicle Front/Rear Side (two Roof Headlights per vehicle, one per Body Section)

The Fixture contains a PAR 56 Type Sealed Beam 200W, single filament Lamp.

Re-lamping, because of the Catenary Line proximity, must be done from the Interior.

The Fixture and Lamp are designed to permit aiming (plus or minus 3 degrees vertical and horizontal) of the lamp from the outside. It is possible through a specific Adjusting Screw.

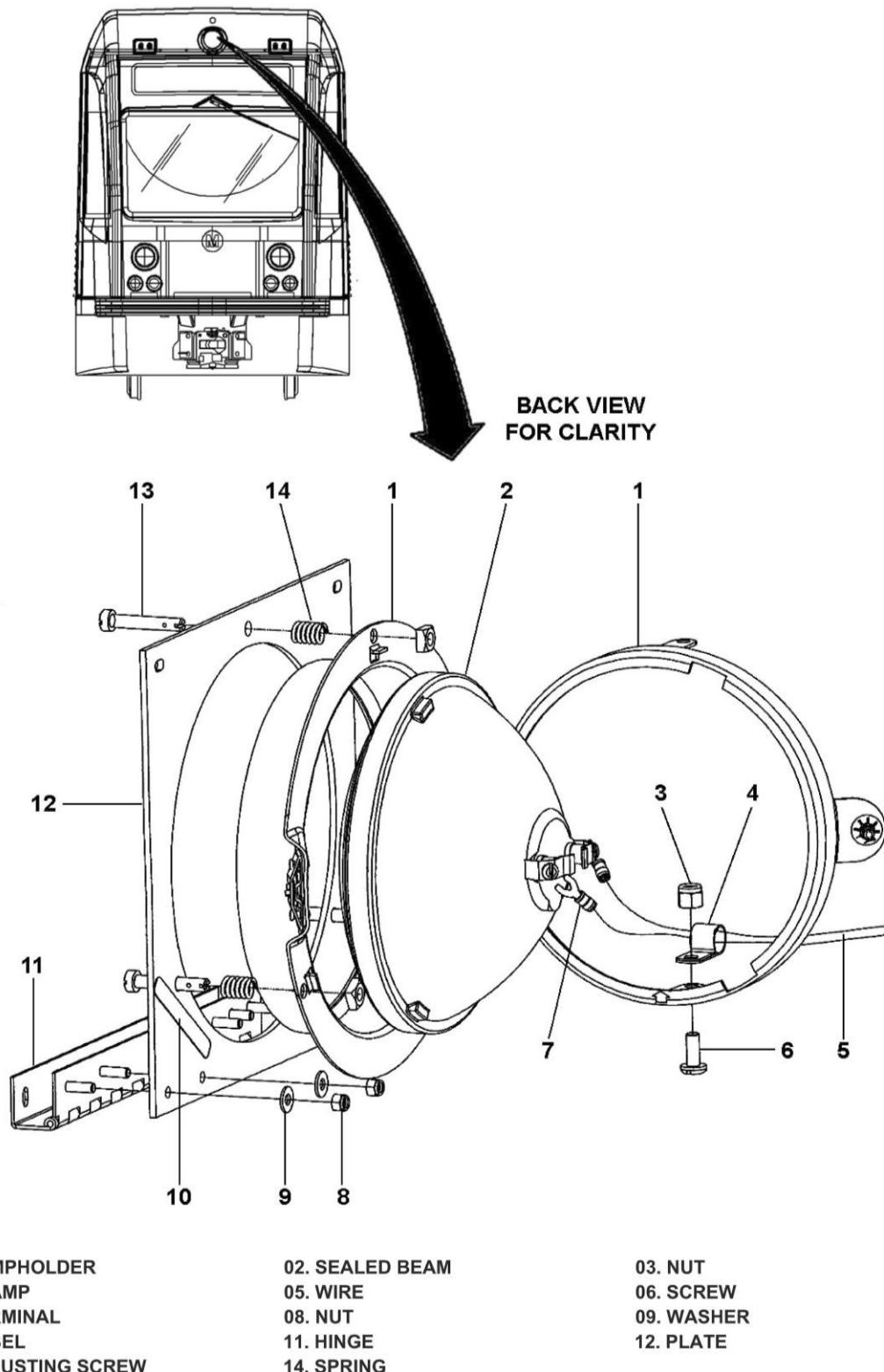
The Roof Headlight stays ON in the Lead Cab of the Vehicle/Train only.

The Roof Headlight is controlled by the Low/High Light Command Switch (Label: 8S02) located on the Operator Console and are protected against overcurrents by the 8F11 CB (Nominal Current:16A, located in the CB Cab Panel) when in Low Mode, and by the 8F12 CB (Nominal Current 10A, located in the CB Cab Panel) when in High Mode.

The Low/High Light Command Switch (which controls also the Low and High Headlights) is shown in Figure 06-I-02.18.

Thanks the LVDS Relay Logic, the Roof Headlight switches ON in the Lead Cab only (Body Section with the Forward direction Relay (3K14) and End of Train Relay (9K08) energized). When the Low/High Light Command Switch is set on High the "High Beams" Indicator Lamp is turned ON (refer to Figure 06-I-02.19).

This Indicator is located in the Indicator Panel, above the Cab Windshield (refer to Section 10).

**Figure 06-I-02.20 Roof Headlight**

## c ) DC/DC Converter

The Headlights (Low and High Headlights and Roof Headlight) are supplied by a DC/DC Converter.

This DC/DC Converter (800W) it is supplied by the LVPS and generates two different LV Outputs:

Input:

- Input Voltage: 37.5Vdc
- Input Voltage Static Range: 22.5Vdc - 45Vdc
- Overvoltage admitted: 50Vdc (time  $\leq$  100ms)
- Insulating Resistance: 10M $\Omega$
- The DC/DC Converter is protected by a Circuit Breaker (label: 8F17) with 50A of Nominal Current.

Output:

- Output Voltage1: 24Vdc  $\pm$  3% ( $\pm$  5% during dynamic conditions)
- Output Voltage2: 30 Vdc  $\pm$  3% ( $\pm$  5% during dynamic conditions)
- Output Current1: 21A
- Output Current2: 10A
- Short Circuit Current:  $\leq$ 200%Nominal Output Current
- Short Circuit Protection (the DC/DC stops): (105% - 200%) Nominal Output Current.

Efficiency:  $\geq$ 92% (Nominal Output Power, 185,00°F (85°C))

Weight:  $\leq$  13.23 pounds (6 kg)

Environmental conditions:

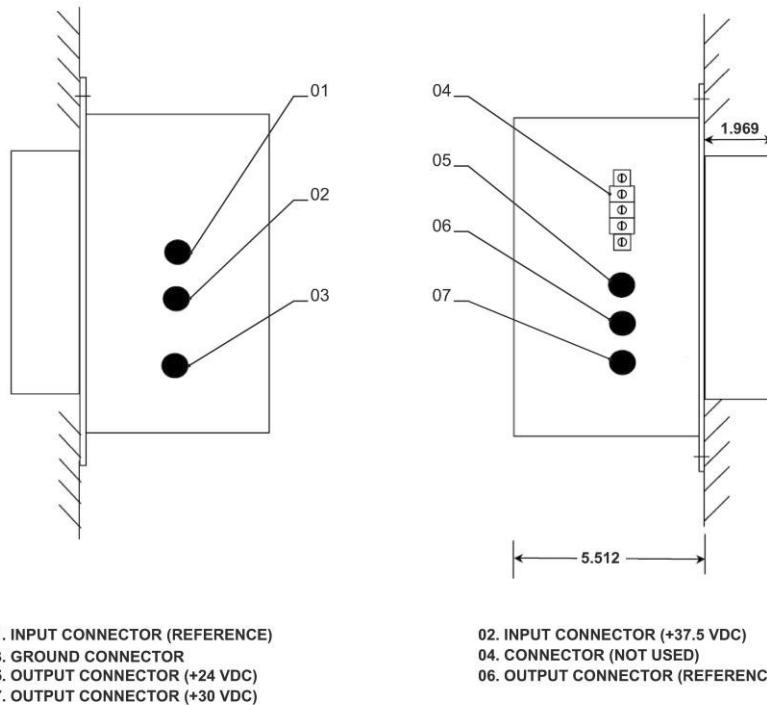
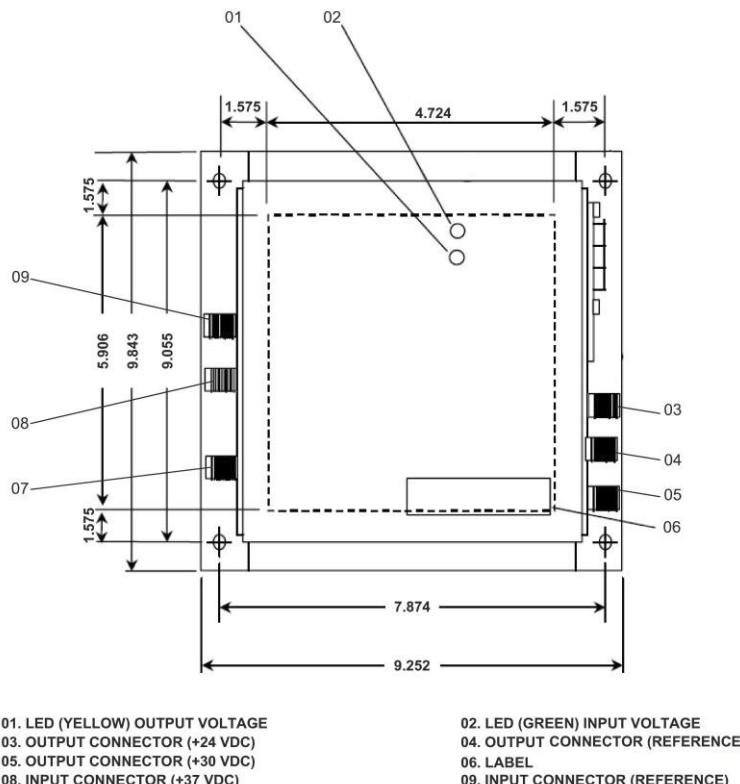
- Functioning Temperature: -13,00°F to +185,00°F (-25°C to +85°C)
- Air Humidity: 75% (year average)
- Storage Temperature: -40,00°F to +185,00°F (-40°C to +85°C)
- Max working altitude: 3937ft (1200m)

The 30Vdc Output Voltage is used to supply the Roof Headlight when the Low/High Light Command Switch status is high.

All other Headlights, in any other status, are supply through the 24Vdc DC/DC Converter Output Voltage.

The DC/DC Converter have two LEDs, a green LED and a yellow LED for Input and output Voltage monitoring:

- Green LED: ON when Input Voltage is present;
- Yellow LED: ON when both 24Vdc and 30Vdc Outputs are applied.

**Figure 06-I-02.21 DC/DC Converter Side View****Figure 06-I-02.22 DC/DC Converter - Front View**

### 06-I-02.02.02.02 Stop and Tail Lights

The Stop and Tail Lights are located inside the same Fixture under the Low and High Headlights.

There are two Stop and tail Lights per Vehicle Front (left and right front side).

Each Stop and Tail Light is provided with one External Light Fixture accommodating Light Emitting Diode (LED) Light (Red) and a Clear polycarbonate Lens. Re-lamping is done from outside.

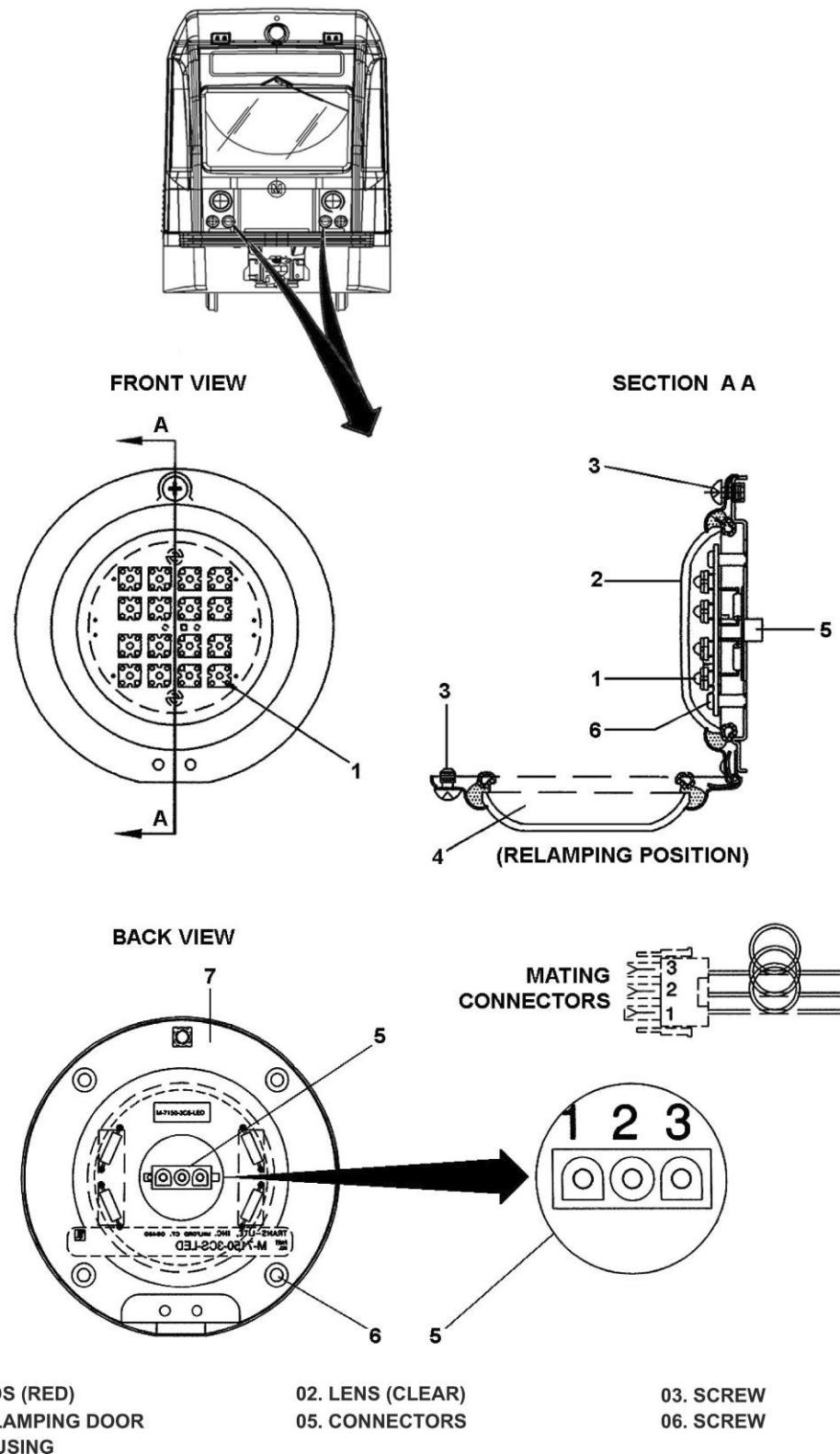
When illuminated, the intensity level of the Stop Lights is higher than the intensity level of the Tail Lights: the Stop Light is a 5.7W LED Lamp, the Tail Light is a 1.8W LED Lamp.

LED Light operates on 14 Vdc reduced from a 37.5 Vdc car power source applied to a receptacle on the back of each sealed LED module. LED is less sensitive to shock and vibration than incandescent lamp and has longer life.

CB 8F14 (Nominal Current: 6A, located in the Electric Locker of the A Body Section) protects the Stop Lights. CB 8F15 (6A of Nominal Current, located in the Electric Locker of the B Body Section) protects the Tail Lights.

Thanks to the LVDS Relay Logic, all the Stop/Tail Lights in a single Vehicle or in a Train Consist are OFF except the Stop/Tail Lights located at the end of the train (End of Train relay (9K08) and Backward Direction Relay (3K15) energized for Stop Lights or Forward Direction Relay (3K14) not energized for Tail Lights); if the train is braking (from SB to EB) the Stop lights will be lit OR if the train is in Power or Coast Mode then the Tail lights will be lit.

All Tail Lights are OFF in a single Vehicle or in a Train Consist except the ones located at the end of the train.



**Figure 06-I-02.23 Stop and Tail Lights**

### 06-I-02.02.02.03 Turn Indicator / Hazard Lights

Turn Indicator / Hazard Lights are of two types:

- Front Turn Indicator / Hazard Lights
- Side Turn Indicator / Hazard Lights

Turn Indicator / Hazard Lights (right and left side) are installed at both ends (under the Front Head Lights) of the Vehicle. Side Turn Indicator / Hazard Lights (right and left side) are installed on the Side of each Vehicle Section (next to Front Doors).

Each Front / Side Turn Indicator / Hazard Light is provided with one External Light Fixture accommodating Light Emitting Diode (LED) Light (Amber) and a Clear polycarbonate Lens. Re-lamping is done from outside.

LED Light operates on 14 Vdc reduced from a 37.5 Vdc car power source applied to a receptacle on the back of each sealed LED module.

LED is less sensitive to shock and vibration than incandescent lamp and has longer life.

The Turn Indicator Light functions are controlled by the Turn Signal Switch (Label 8S03) located on the Operator Console.

Hazard Lights functions are managed by the red Hazard Pushbutton (label 8S04) (located on the Operator Console).

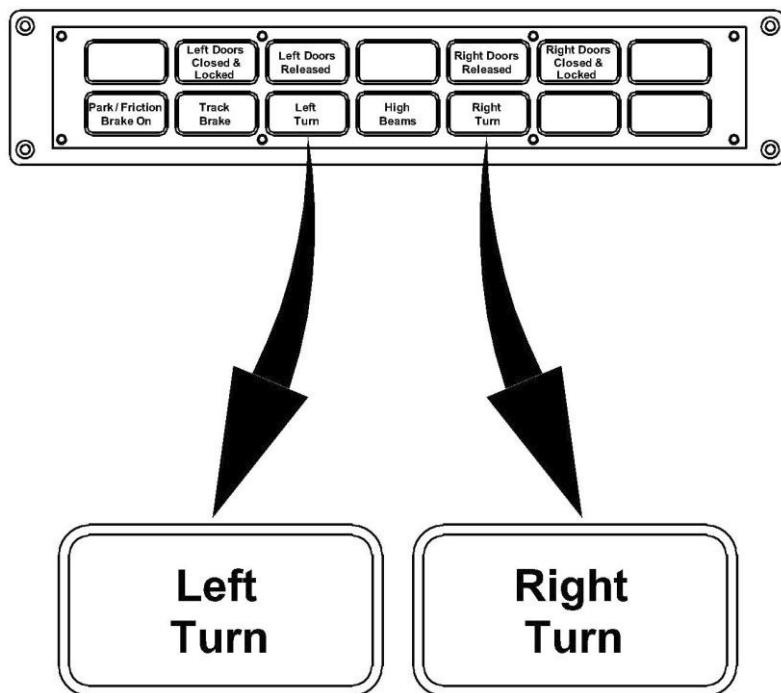
These Lights are protected against overcurrents by the 8F08 CB (RH Side) and 8F09 CB (LH Side); both located in the Electronic Locker of the B Body Section with 10A Nominal Current.

Thanks to the LVDS Relay Logic, by pressing the Hazard Push Button the Turn Indicator / Hazard Lights (right and left) of the vehicle/train start blinking.

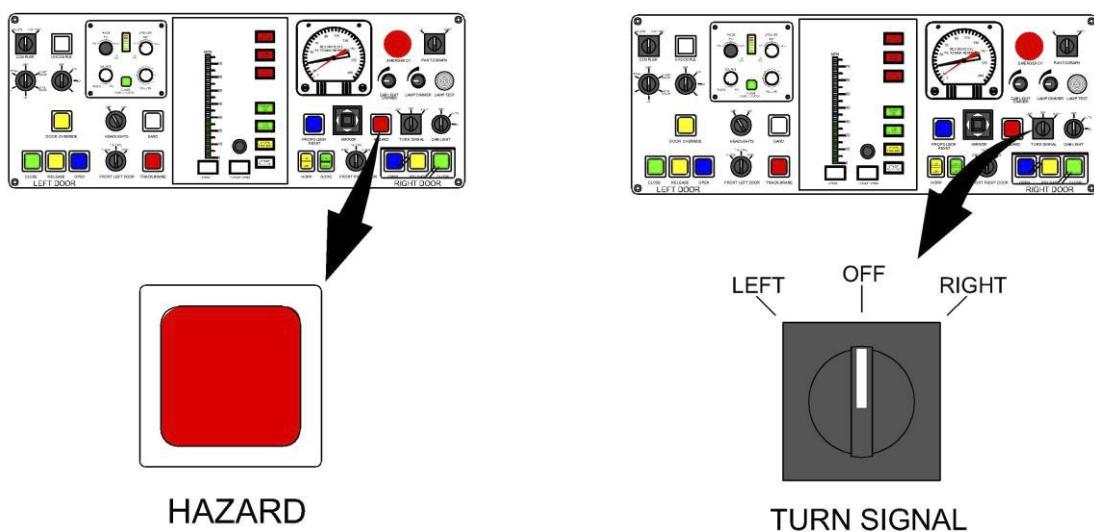
By switching the Turn Signal Switch to the Right (Left), all the Right (Left) Turn Indicators / Hazard Lights blink.

Every time the Turn Indicator / Hazard Lights are active, the relative Indicator lamp blinks in the Indicator panel above the Windshield:

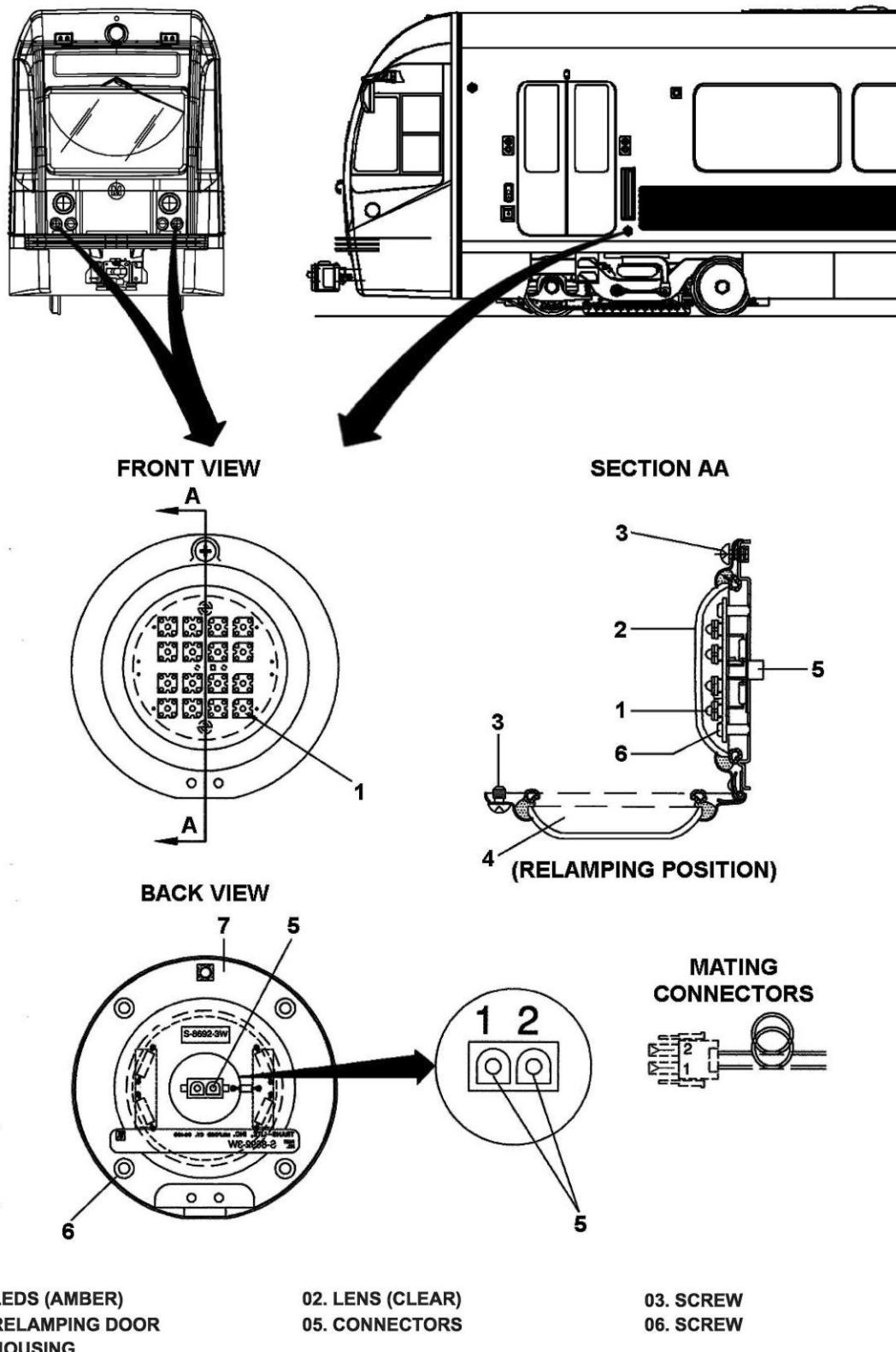
- Left Turn when the Turn Indicator Switch is on left
- Right Turn when the Turn Indicator Switch is on right
- Both Left Turn and Right Turn when the Hazard Pushbutton is pressed



## **Figure 06-I-02.24 Left and Right Turn Lamps - Indicator Panel**



**Figure 06-I-02.25 Turn Signal Switch and Hazard Pushbutton**



**Figure 06-I-02.26 Turn Indicator / Hazard Lights**

#### 06-I-02.02.02.04 Marker Lights

The Marker Lights are located near the upper corners of the vehicle front end: right and left Marker Light.

Each Marker Light is made up of:

- A Red Light (made up of LEDs)
- An Amber Light (made up of LEDs)

The Red Light is external and the Amber Light is internal in each Marker Light.

Each fixture is designed to use a multi-clustered, high intensity LEDs.

Housing is made of seamless aluminum and the interior is painted with a high reflectance white enamel.

The lens has a gasket between the bezel and housing to prevent water entry.

The electrical connections are made with “fast-on” terminals.

Relamping is done from the outside.

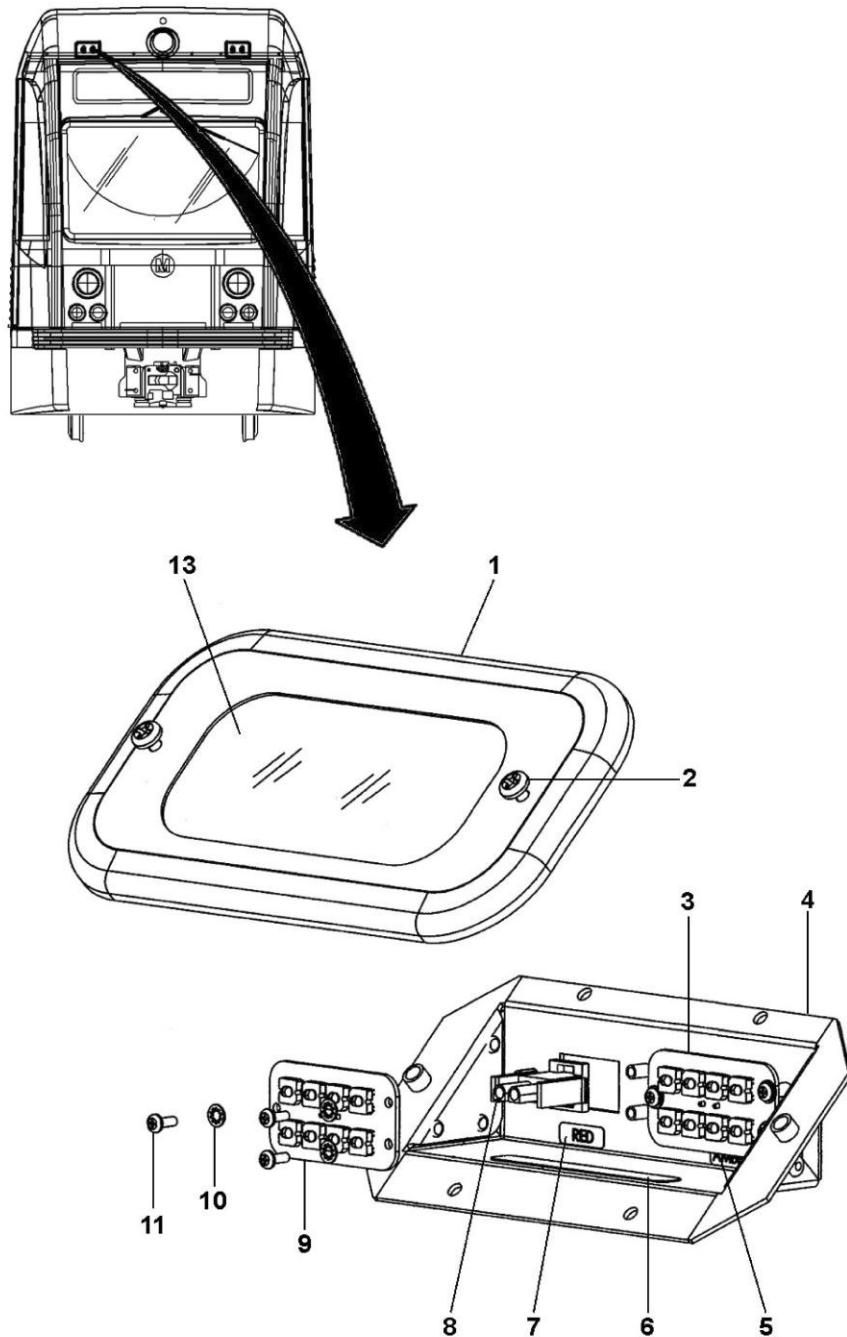
LED Light operates on 14 Vdc reduced from a 37.5 Vdc car power source applied to a receptacle on the back of each sealed LED module.

LEDs are less sensitive than incandescent lamps to shock and vibration.

CB 8F10 (Nominal Current:2A, located in the Electric Locker of the A Body Section) protects the Marker Lights against overcurrent.

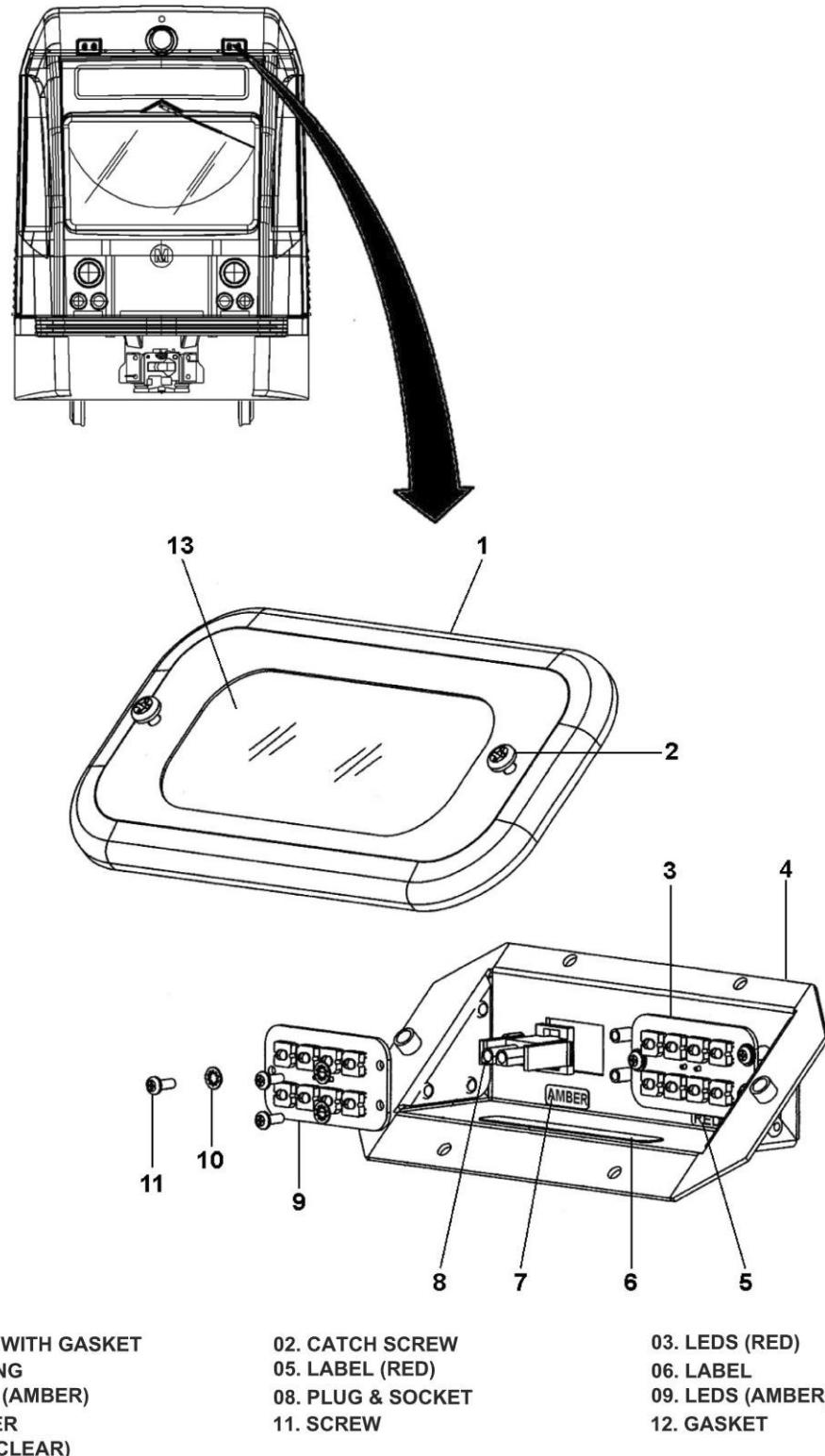
Thanks to the LVDS Relay Logic, when the Vehicle is ON (one Transfer Switch is ON) the Red Marker Lights located at the rear of the Vehicle (End of Train Relay (9K08) energized and Forward Relay (3K14) not energized) and the Amber Marker Lights located at the Front of the Vehicle turn ON automatically (End of Train Relay (9K08) and Forward relay (3K14) energized).

If the train is made up of two or more vehicles (Train Consist), all the Marker Lights between external cabs are inoperative.



- |                       |                   |                  |
|-----------------------|-------------------|------------------|
| 01. BEZEL WITH GASKET | 02. CATCH SCREW   | 03. LEDS (AMBER) |
| 04. HOUSING           | 05. LABEL (AMBER) | 06. LABEL        |
| 07. LABEL (RED)       | 08. PLUG & SOCKET | 09. LEDS (RED)   |
| 10. WASHER            | 11. SCREW         | 12. GASKET       |
| 13. LENS (CLEAR)      |                   |                  |

**Figure 06-I-02.27 Right Marker Light**

**Figure 06-I-02.28 Left Marker Light**

### 06-I-02.02.02.05 By-Pass Light

The By-Pass Lights (two per Vehicle - Blue) are installed at each end of the Vehicle, between the left First Door and the Cab (refer to Figure 06-I-02.2).

Each By-Pass Light is provided with one External Light Fixture accommodating Light Emitting Diode (LED) Light (Blue) and a Clear polycarbonate Lens.

Re-lamping is done from outside. LED Light operates on 14 Vdc reduced from a 37.5 Vdc car power source applied to a receptacle on the back of each sealed LED module.

LEDs are less sensitive than incandescent lamps to shock and vibration.

The 8F16 CB (Nominal Current: 2A, located in the Electric Locker of the A Body Section) protects the By-pass lights against overcurrents.

Thanks to the LVDS Relay Logic, the By-Pass Lights are ON when a 35mph Speed Limit is active (35mph Speed Limit Relay (3K24) is not energized) and/or the vehicle has at least one of the following bypasses activated (By Pass Relay (3K22) energized):

- 3S08: No-Motion Bypass
- 11S01: ATP Bypass
- 9S11: Right Door Bypass
- 9S12: Left Door Bypass
- 7S05: Brake Apply Bypass

These bypasses are located in the Bypass Panel of the A and/or B Cab (refer to Section 10).

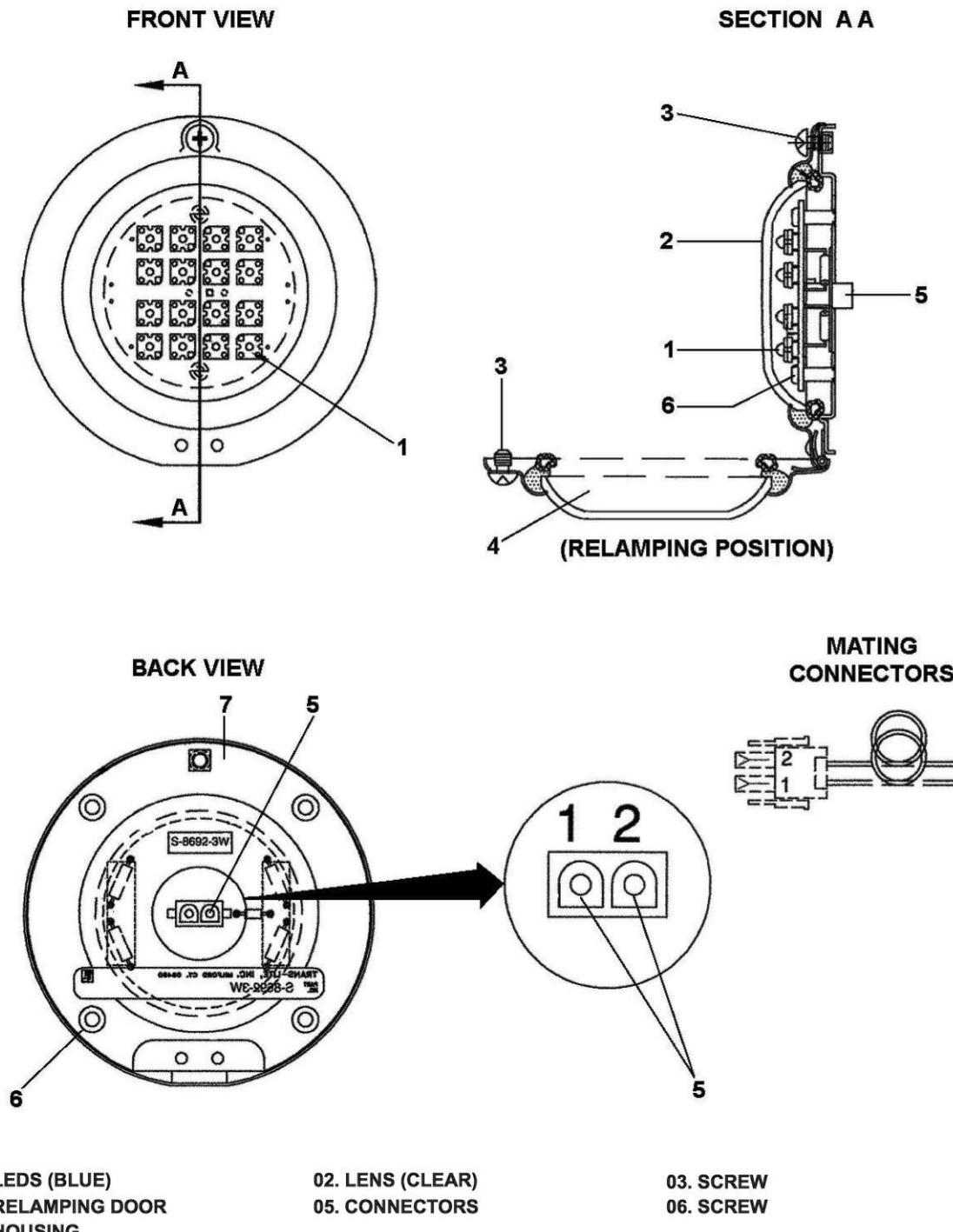


Figure 06-I-02.29 By-pass Light

### 06-I-02.02.02.06 Silent Alarm Light

The Silent Alarm Lights (two per Vehicle) are installed on the roof over the Cab at both Vehicle ends.

Each Silent Alarm Light is provided with one External Light Fixture accommodating Light Emitting Diode (LED) Light and a Glass Amber Lens.

LED Light operates on 14 Vdc reduced from a 37.5 Vdc car power source applied to a receptacle on the back of each sealed LED module.

LEDs are less sensitive than incandescent lamps to shock and vibration.

Re-lamping is done from outside.

The 8F13 CB (Nominal Current: 2A, located in the Electric Locker of the B Body Section) protects the Silent Alarm Lights against overcurrents.

Each Light is controlled by the Silent Alarm Switch (label 8S05) located under the Console of the each Cab.

Thanks to the LVDS Relay Logic, the Silent Alarm starts automatically blinking when at least one of the Silent Alarm Switches of the Vehicle/Train (8S05) is pressed.

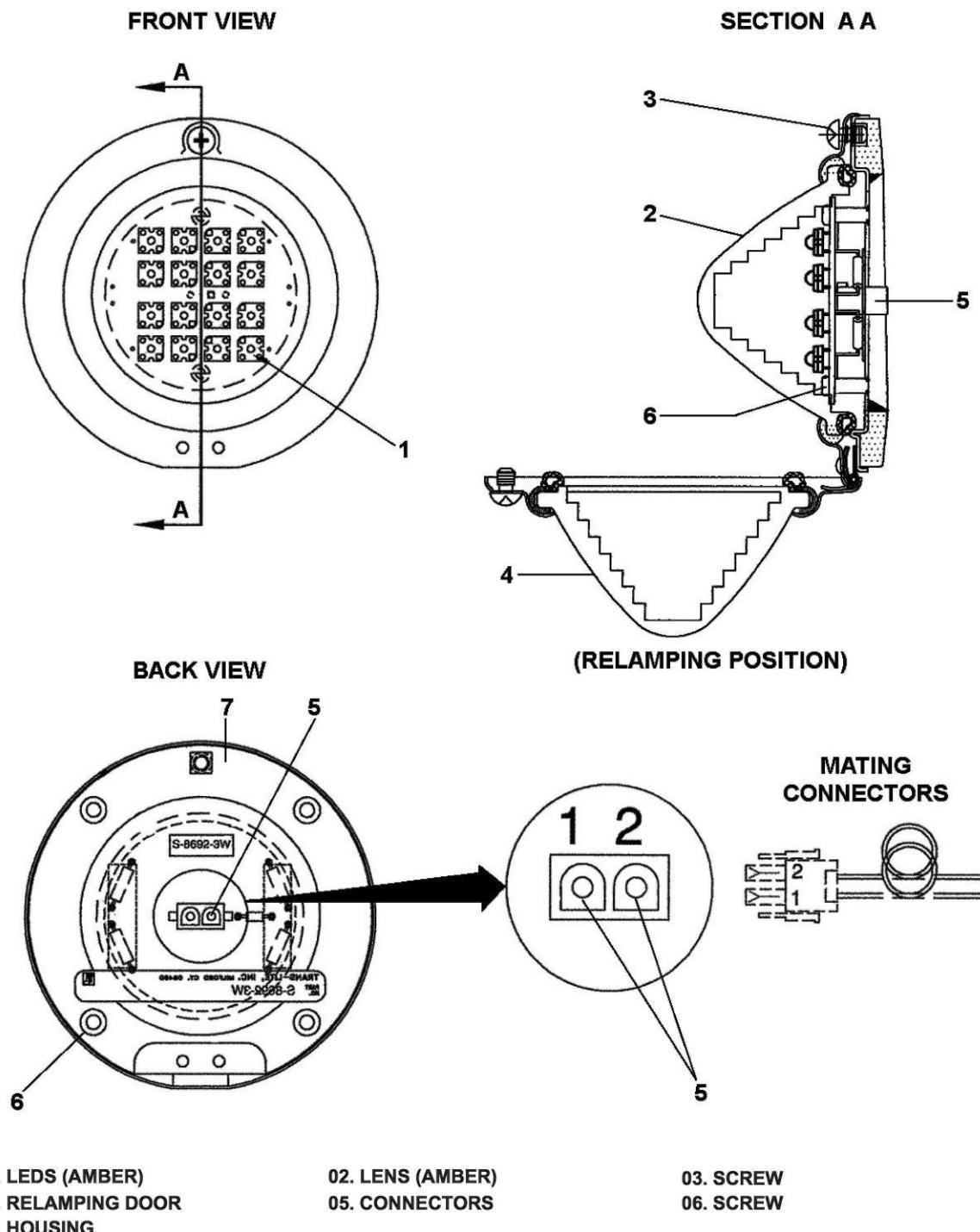


Figure 06-I-02.30 Silent Alarm

**06-I-03 APPENDIX**
**06-I-03.01 Ingress Protection Ratings (IP Codes)**
**Table 06-I-03.1 Ingress Protection Ratings (IP Codes)**

Ingress Protection Classification			
First Number		Second Number	
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 effects of immersion between 15cm and 1m
		8	Protected against long periods of immersion under pressure

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LOS ANGELES COUNTY

METROPOLITAN TRANSPORTATION AUTHORITY

LIGHT RAIL VEHICLE

**P2550**



RUNNING MAINTENANCE  
AND  
SERVICE MANUAL

VOLUME M-01  
PART II  
TROUBLESHOOTING  
SECTION 06 - LIGHTING





# **SECTION 06**

**LIGHTING**

**PART II**

**TROUBLESHOOTING**

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# SECTION 06

## LIGHTING

### 06-II-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 overlook 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.

#### Part II - Troubleshooting

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

**06-II-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.

<b>Abbreviation</b>	<b>Meaning</b>
AB .....	AnsaldoBreda
ADA .....	Americans with Disabilities Act
APS .....	Auxiliary Power Supply
ASM .....	Adaptive Switching Mean (Filter)
C/L .....	Centerline
CB .....	Circuit Breaker
CCH .....	Communication Control Head
CM .....	Coast Motoring
DC/AC .....	Direct Current - Alternate Current Converter
DC/DC .....	Direct Current - Direct Current Converter
EB .....	Emergency Brake
HV .....	High Voltage
HVAC .....	Heat Ventilation & Air Conditioning
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
LON .....	Local Operative Network
LRV .....	Light Rail Vehicle
LV .....	Low Voltage
LVDS .....	Low Voltage Distribution System
LVPD .....	Low Voltage Power Distribution
LVPS .....	Low Voltage Power Supply
MBL .....	Metro Blue Line
MTA .....	Metropolitan Transportation Authority
MV .....	Medium Voltage
MVB .....	Multifunction Vehicle Bus
MVPD .....	Medium Voltage Power Distribution
OK .....	Working
PGL .....	Pasadena Gold Line
PTU .....	Portable Test Unit
RH .....	Right Hand Side

Abbreviation	Meaning
SB .....	Service Brake
TBS .....	To Be Supplied
TCMS .....	Train Communication System
TCN .....	Train Communication Network
TWC .....	Train-to-Wayside Communication
WTB .....	Wired Train Bus

**06-II-01.b LIST OF DEFINITIONS**

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

<b>Definition</b>	<b>Meaning</b>
// .....	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

**06-II-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
$\Omega$ .....	Ohm
$^{\circ}\text{C}$ .....	Celsius degree
$^{\circ}\text{F}$ .....	Fahrenheit degree
A.....	Ampere
ac.....	Alternate Current
dB.....	Decibel
dc.....	Direct Current
F.....	Farad
ft.....	Foot
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
kVA .....	Kilo Volt Ampere
kW.....	Kilo Watt
lb .....	Pound
lb-ft .....	Pound force
m.....	Meter - approx 3.28 feet
mm.....	Millimeter - approx 0.0394 inches
ms .....	Milli second
Pa.....	Pascal
rms .....	Root Mean Square Voltage
rpm.....	Revolution per Minute
V.....	Voltage
W.....	Watt

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## 06-II-02 TROUBLESHOOTING

The tools for troubleshooting the Lighting System are:

- The IDU Fault Chart (refer to paragraph 06-II-02.01)
- The Lighting Fault Insulation / Repair Tables (refer to paragraph 06-II-02.02)

The IDU lists, in the Lighting Fault Chart, the faults that are affecting the Lighting System.

With the IDU\_A in Maintenance Mode also the Fault History can be displayed.

Fault Insulation / Repair Tables list, for each light type, a troubleshooting method from the symptom to the proposed Corrective Action.

### 06-II-02.01 Troubleshooting with the IDU Fault List

By touching the “Faults” button at the bottom of the IDU screen, the “Faults” Screen pops up with the list of the faults present in all train Systems, with date and time of the occurrence. In this way the Maintenance personnel can detect a fault as soon as it occurs.

As soon as a fault occurs (fault “activated” - red characters), the Train Control and Monitoring System (TCMS - refer to Section 18 for a more detailed description) saves the “image” of the fault in a file of the “A” IDU memory (the B IDU has no used memory) named “LogFile.dat.”

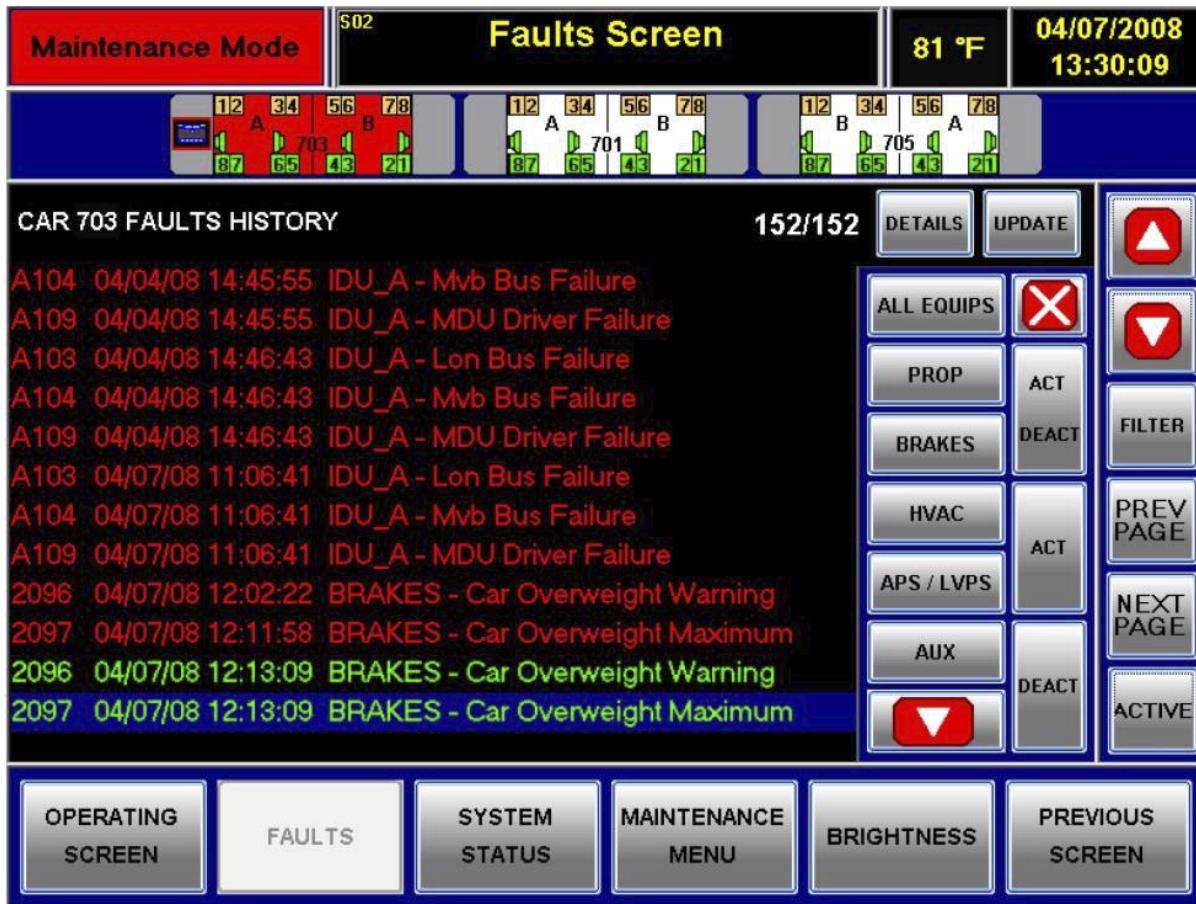
The system saves an image of the activated fault every 100 ms for a period from 1 s before and 5 s after the activation.

The system also saves a sample of the deactivated faults (green characters) once and with the information present at the time of the memorization.

The IDU considers the Lighting System under the AUX (Auxiliary) Systems.

These faults are under the “AUX\_LIGHTS” System Source and the Fault Number (four digit numbers) starts with “57”.

Lighting System Faults reported on the IDU consider only the Light Circuit Breakers’ Status.



**Figure 06-II-02.1 IDU Faults Screen (Faults History)**

The Complete AUX\_LIGHTS IDU Fault List is reported in Appendix of Section 10 Part II.

The Appendix describes, for each fault type, how to troubleshoot the Lighting System using the IDU, both in Operating and in Maintenance Mode (for the Lighting system Operating and Maintenance Faults are exactly the same).

The suggested Maintenance Actions (Operator Guide) are shown by pressing the “Details” Screen Button and are referred to the selected Fault shown on the IDU “Faults Screen”.

The Fault List can also be filtered by means of the system button (in this case the AUX button - (refer to Figure 06-II-02-1)

## 06-II-02.02 Fault Insulation / Repair Tables

For each type of Light the “Malfunction Symptom” and the relative “Probable Cause” and “Corrective Action” are divided in:

- Light Supply: fault related with the Supply System of the troubleshoot light(s)
- Single Light: fault related with the Light itself

**Table 06-II-02.1 Passenger Compartment / Articulation Lights - Fault Isolation/Repair**

Malfunction Symptom	Probable Cause	Corrective Action
<b>Light Supply</b>		
1. Compartment Lights. (A/B Sections) do not turn on.	1. Battery Disconnect (CB 3F01) and/or LV Main CB (3F02) (Battery Box) open. 2. Transfer Switch to OFF position. 3. COMPARTMENT LIGHTING SWITCH (CB 08F02) (Circuit Breaker Panel - "B" Cab) open/faulty. 4. Relay 3K04 (LVPS Fault) (Electric Locker B Sect) open/faulty. 5. Relay 8K04 (Electric Locker B Sect) Faulty.	1. Close Battery Disconnect (CB 3F01) and/or LV Main (CB 3F02). 1. Set Transfer Switch to ON or LOCAL position. 1. Close/Replace COMPARTMENT LIGHTING SWITCH (CB08F02). 1. Investigate LVPS. 2. Replace Relay 3K04. 1. Replace Relay 8K04.
2. Compartment Lights. (A Section) do not turn on.	1. COMPARTMENT LIGHTING SWITCH (CB 08F03) (Electric Locker A Sect) open/faulty.	1. Close/Replace COMPARTMENT LIGHTING SWITCH (CB 08F03).
3. Compartment Lights. (B sections) do not turn on.	1. COMPARTMENT LIGHTING SWITCH (CB 08F04) open/faulty.	1. Close/Replace COMPARTMENT LIGHTING SWITCH (CB 08F04).
4. Emergency and Articulation Lights do not turn on.	1. Battery Disconnect (CB 3F01) (Battery Box) Open and LVPS faulty.	1. Close Battery Disconnect CB 3F01. 1. Investigate LVPS fault.
	2. Emergency Lighting (CB 3F15) (Electric Locker B Section) open/faulty.	1. Close/Replace Emergency Lighting (CB 3F15).
4. Emergency and Articulation Lights do not turn on.(cont'd)	3. Contactor Timing Unit (8D01) (Electric Locker B Section) Faulty.	1. Replace Contactor Timing Unit 8D01

**Table 06-II-02.1 Passenger Compartment / Articulation Lights - Fault Isolation/Repair**

Malfunction Symptom	Probable Cause	Corrective Action
	4. Relay Contact 8K08 (Electric Locker B Section) faulty.	1. Replace Relay Contact 8K08.
4. Emergency and Articulation Lights do not turn on. (cont'd)	5. Relay Emergency Lighting (8K03) (Electric Locker B Section) faulty 6. EMERGENCY LIGHTING SWITCH (CB 08F05) (Circuit Breaker Panel - "B" Cab) open/faulty.	1. Replace Relay Emergency Lighting (8K03). 1. Close/Replace EMERGENCY LIGHTING SWITCH (CB 08F05).

**Single Light**

1. Light is flickering, dim, or not illuminating.	1. Fluorescent lamp faulty.	1. Replace fluorescent lamp.
	2. Ballast faulty.	1. Check that the plug connector to the ballast is fully engaged (note locking tabs). If problem still persists replace the ballast.
2. Fluorescent lamp(s) cycles in one fixture only.	1. Ballast overheating, thermal protector cycling.	1. Replace Ballast.
3. Fluorescent lamp(s) cycles in many fixtures.	1. Ballast overheating, thermal protector cycling.	1. Check main power to fluorescent light. Voltage or frequency may be wrong.

**Table 06-II-02.2 Electric and Electronic Locker Lights - Fault Isolation/Repair**

<b>Malfunction Symptom</b>	<b>Probable Cause</b>	<b>Corrective Action</b>
<b>Light Supply</b>		
1. Electric Locker Light (A section) does not turn on.	1. Battery Disconnect (CB 3F01) and/or LV Main (CB 3F02) (Battery Box ) open. 2. Transfer Switch to OFF position. 3. Relay 3K04 (LVPS Fault) (Electric Locker B Sect) open/faulty. 4. Cabinet Light Switch (CB 8F18) (Electric Locker A Section) open / faulty. 5. Limit Switch (8S07) (LV Locker A Sect) Faulty. 6. Electronic Locker LEDs faulty.	1 Close Battery Disconnect (CB 3F01) and/or LV Main (CB 3F02). 1. Set Transfer Switch to ON or LOCAL position. 1. Investigate LVPS. 2. Replace Relay 3K04 (LVPS Fault). 1. Close/replace CB 8F18. 1. Replace Limit Switch (8S07). 1. Replace LEDs.
2. Electric Locker Light (B section) does not turn on.	1. Battery Disconnect (CB 3F01) and/or LV Main (CB 3F02) (Battery Box ) open. 2. Transfer Switch to OFF position. 3. Relay 3K04 (LVPS Fault) (Electric Locker B Sect) open/faulty. 4 Cabinet Light Switch (CB 8F18) (Electric Locker B Section) open / faulty. 5. Limit Switch (8S07) (Electric Locker B Sect) faulty. 6 Electric Locker LEDs faulty.	1 Close Battery Disconnect (CB 3F01) and/or LV Main (CB 3F02). 1. Set Transfer Switch to ON or LOCAL position. 1. Investigate LVPS. 2. Replace Relay 3K04. 1. Close/replace CB 8F18. 1. Replace Limit Switch (8S07). 1. Replace LEDs.
3. Electronic Locker Light (A section) does not turn on.	1. Battery Disconnect (CB 3F01) and/or (LV Main CB 3F02) (Battery Box) open. 2. Transfer Switch to OFF position. 3 Relay 3K04 (LVPS Fault) (Electric Locker B Sect) open/faulty.	1 Close Battery Disconnect (CB 3F01) and/or (LV Main CB 3F02). 1. Set Transfer Switch to ON or LOCAL position. 1. Investigate LVPS. 2. Replace. Relay 3K04.

**Table 06-II-02.2 Electric and Electronic Locker Lights - Fault Isolation/Repair**

<b>Malfunction Symptom</b>	<b>Probable Cause</b>	<b>Corrective Action</b>
3. Electronic Locker Light (A section) does not turn on.(cont'd)	4. Cabinet Light Switch (CB 8F18) (Electric Locker A Section) open / faulty.	1. Close / replace CB 8F18.
	5. Limit Switch (8S06) (Electronic Locker A Section) faulty.	1. Replace Limit Switch (8S06).
	6. Electronic Locker LEDs faulty.	1. Replace LEDs.
4. Electronic Locker Light (B section) does not turn on.	1. Battery Disconnect (CB 3F01) and/or LV Main (CB 3F02) (Battery Box) open.	1. Close Battery Disconnect (CB 3F01) and/or LV Main (CB 3F02).
	2. Transfer Switch to OFF position.	1. Set Transfer Switch to ON or LOCAL position.
	3. Relay 3K04 (LVPS Fault) (Electric Locker B Sect) open/faulty.	1. Investigate LVPS. 2. Replace Relay 3K04(LVPS Fault).
	4 Cabinet Light Switch (CB 8F18) (Electric Locker B Section) open / faulty.	1. Close/replace CB 8F18.
	5. Limit Switch (8S06) (Electronic Locker B Sect) faulty.	1. Replace Limit Switch (8S06).
	6. Electronic Locker LEDs faulty.	1. Replace LEDs.
<b>Single Light</b>		
1. Light not illuminated.	1. Defective LED.	1. Replace suspect LED, activate power, and verify illumination.
	2. Loose/defective connector or wiring harness.	1. Verify proper connections and nominal 14 Vdc at LED module input power wiring connector. 2. Repair/replace items as necessary.
	3. Defective ground connection.	1. Check for loose wires or improper ground connections. 2. Repair as necessary.

**Table 06-II-02.3 Cab Spot Lights - Fault Isolation/Repair**

<b>Malfunction Symptom</b>	<b>Probable Cause</b>	<b>Corrective Action</b>
<b>Light Supply</b>		
1. Operator's (A/B) Cab Spot Lights do not turn on.	1. Battery Disconnect (CB 3F01) (Battery Box) Open	1. Close Battery Disconnect (CB 3F01).
	2. Emergency Lighting (CB 3F15) (Electric Locker B Section) open/faulty.	1. Close/Replace Emergency Lighting (CB 3F15).
	3. Contactor Timing Unit (8D01) (Electric Locker B Section) faulty.	1. Replace Contactor Timing Unit (8D01).
	4. Relay Contact (8K08) (Electric Locker B Section) faulty.	1. Replace Relay Contact (8K08).
	5. Relay Emergency Lighting (8K03) (Electric Locker B Section) Faulty.	1. Replace Relay Emergency Lighting (8K03).
2. Operator's A Cab Spot Lights do not turn on.	1. Cab Lighting Switch (CB8F01) (Electric Locker A Sect) open/faulty.	1. Close / replace Cab Lighting Switch (CB8F01).
	2. CAB LIGHT Switch (8S01) (Console) in OFF position.	1. Set the CAB LIGHT Switch to ON position.
	3. CAB LIGHT Switch (8S01) (Console) in AUTO position with A Cab Disabled.	1. Enable A Cab. 2. Set the CAB LIGHT Switch to ON position.
	4. CAB LIGHT Switch (8S01) (Console) Faulty.	1. Replace CAB LIGHT Switch.
	5. Cab Light DIMMER (8R01) (Console) faulty.	Replace Cab Light DIMMER.
3. Operator's B Cab Spot Lights do not turn on.	1. Cab Lighting Switch (CB8F01) (Electric Locker B Sect) open / faulty.	1. Close / replace Cab Lighting Switch (CB8F01).
	2. CAB LIGHT Switch (8S01) (Console) in OFF position.	1. Set the CAB LIGHT Switch to ON position.
	3. CAB LIGHT Switch (8S01)(Console) in AUTO position with B Cab disabled.	1. Enable A Cab. 2. Set the CAB LIGHT Switch to ON position.
	4. CAB LIGHT Switch (8S01) (Console) faulty.	1. Replace CAB LIGHT Switch.
	5. Cab Light DIMMER (8R01) (Console) faulty.	1. Replace Cab Light DIMMER.

**Table 06-II-02.3 Cab Spot Lights - Fault Isolation/Repair**

<b>Malfunction Symptom</b>	<b>Probable Cause</b>	<b>Corrective Action</b>
<b>Single Light</b>		
1. Lamp will not illuminate.	1. Defective lamp  2. Loose/Defective car wiring.  3. Defective ground.  4. Defective lamp socket	1. Visually inspect lamp for darkened appearance inside lamp bulb and filament for open condition: a. A bulb with stretched or broken filaments was subjected to vibration. b. A yellowish, whitish or bluish glaze on the bulb indicates rupture in the bulb glass envelope. c. A dark metallic finish indicates old age. d. A black, sooty bulb indicates a poor seal in the bulb.  2. Replace suspect lamp, activate power to lamp, and verify illumination.  1. Verify proper connections and nominal 37.5 Vdc across lamp socket terminals.  1. Check for loose wires or improper ground connections.  1. Repair/replace items as necessary. 2. Replace lamp socket, activate power to lamp, and verify illumination.
2. Lamp is too dim.	1. Under voltage problem	1. Under voltage problem

**Table 06-II-02.4 Silent Alarm Light - Fault Isolation/Repair**

<b>Malfunction Symptom</b>	<b>Probable Cause</b>	<b>Corrective Action</b>
<b>Light Supply</b>		
1. Silent Alarm Lights do not turn on.	1. Battery Disconnect (CB 3F01) and/or LV Main (CB 3F02) (Battery Box) open. 2. Transfer Switch to OFF position. 3 Silent Alarm Light Switch (CB 8F13) (Electric Locker B Section) open / faulty. 4. Silent Alarm Pushbuttons (8S05) (under Consoles) both open or any faulty. 5. Silent Alarm Intermittent Relay (8K09) (Electric Locker B Section) faulty.	1 Close Battery Disconnect (CB 3F01) and/or LV Main (CB 3F02). 1. Set Transfer Switch to ON or LOCAL position. 1. Close/replace (CB 8F13). 1. Close/replace Silent Alarm Pushbuttons (8S05). 1. Replace Silent Alarm Intermittent Relay (8K09).
2. Silent Alarm Lights does not flash (fixed light).	1. Silent Alarm Intermittent Relay (8K09)(Electric Locker B Section) faulty.	1. Replace Silent Alarm Intermittent Relay (8K09).
<b>Single Light</b>		
1. Light not illuminated.	1. Power to Light not activated. 2. Defective LED. 3. Loose/defective connector or wiring harness. 4. Defective ground connection.	1. Activate power and verify illumination. 1. Replace suspect LED, activate power, and verify illumination. 1. Verify proper connections and nominal 14 Vdc at LED module input power wiring connector. 2. Repair/replace items as necessary. 1. Check for loose wires or improper ground connections. 2. Repair as necessary.

**Table 06-II-02.5 By-Pass Light - Fault Isolation/Repair**

<b>Malfunction Symptom</b>	<b>Probable Cause</b>	<b>Corrective Action</b>
<b>Light Supply</b>		
1. "By Pass Active" Lights do not turn on.	1. Battery Disconnect (CB 3F01) and/or LV Main (CB 3F02) (Battery Box) open.	1. Close Battery Disconnect (CB 3F01) and/or LV Main (CB 3F02).
	2. Transfer Switch to OFF position.	1. Set Transfer Switch to ON or LOCAL position.
	3 "Active By Pass" Lights Switch (CB 8F16) (Electric Locker A Section) open/faulty.	1. Close/Replace (CB 8F16).
	4. No Cut-out Switch (By pass Panel) activated.	1. Active any Cut-out Switch (By pass Panel).
	5. By Pass Relay (3K22) (Electric Locker A Section) Faulty.	1. Replace By Pass Relay (3K22).
<b>Single Light</b>		
1. Light not illuminated.	1. Power to Light not activated.	1. Activate power and verify illumination.
	2. Defective LED.	1. Replace suspect LED, activate power, and verify illumination.
	3. Loose/defective connector or wiring harness.	1. Verify proper connections and nominal 14 VDC at LED module input power wiring connector. 2. Repair/replace items as necessary.
	4. Defective ground connection.	1. Check for loose wires or improper ground connections. 2. Repair as necessary.

**Table 06-II-02.6 Marker Lights - Fault Isolation/Repair**

<b>Malfunction Symptom</b>	<b>Probable Cause</b>	<b>Corrective Action</b>
<b>Light Supply</b>		
1. Marker Lights (A section) do not turn on.	1. Battery Disconnect (CB 3F01) and/or LV Main (CB 3F02) (Battery Box) open. 2. Transfer Switch to OFF position. 3. Marker Lights Switch (CB 8F10) (Electric Locker A Section) open/faulty. 4. End Train Relay (9K08) (Electric Locker A Section) faulty 5. Forward Direction Relay (3K14) (Electric Locker A Section) faulty	1 Close Battery Disconnect (CB 3F01) and/or LV Main (CB 3F02). 1. Set Transfer Switch to ON or LOCAL position. 1. Close/replace (CB 8F10). 1. Replace End Train Relay (9K08). 1. Replace Forward Direction Relay (3K14).
2. Marker Lights (B Section) do not turn on.	1. Battery Disconnect (CB 3F01) and/or LV Main (CB 3F02) (Battery Box) open. 2. Transfer Switch to OFF position. 3. Marker Lights Switch (CB 8F10) (Electric Locker A Section) open/faulty. 4. End Train Relay (9K08) (Electric Locker B Section) faulty 5. Forward Direction Relay (3K14) (Electric Locker B Section) faulty.	1 Close Battery Disconnect (CB 3F01) and/or LV Main (CB 3F02). 1. Set Transfer Switch to ON or LOCAL position. 1. Close/replace (CB 8F10). 1. Replace End Train Relay (9K08). 1. Replace Forward Direction Relay (3K14).
<b>Single Light</b>		
1. LED module will not illuminate.	1. Defective LED module 2. Loose/defective connector or wiring harness.	1. Replace suspect LED module, activate power to LED, and verify illumination. 1. Verify proper connections and nominal 14 Vdc at LED module input power wiring connector. 2. Repair/replace items as necessary

**Table 06-II-02.6 Marker Lights - Fault Isolation/Repair**

<b>Malfunction Symptom</b>	<b>Probable Cause</b>	<b>Corrective Action</b>
1. LED module will not illuminate. (cont'd)	3. Defective ground connection.	<p>1. Check for loose wires or improper ground connections. When lamps are grounded through the lamp housing, make sure there is a clean metal-to-metal connection.</p> <p>2. Repair as necessary.</p>

**Table 06-II-02.7 Roof Head Light - Fault Isolation/Repair**

<b>Malfunction Symptom</b>	<b>Probable Cause</b>	<b>Corrective Action</b>
<b>Light Supply</b>		
1. Roof Head Light (A/B Section) does not turn on.	1. Battery Disconnect (CB 3F01) and/or LV Main (CB 3F02) (Battery Box) open. 2. Transfer Switch to OFF position. 3. Power Supply Switch (CB 8F17) (Electric Locker B Section) open/faulty. 4. Head Lights Power Supply (8A01). faulty	1 Close Battery Disconnect (CB 3F01) and/or LV Main (CB 3F02). 1. Set Transfer Switch to ON or LOCAL position. 1. Close/replace (CB 8F17). 1 Replace/repair Head Lights Power Supply (8A01).
2. Roof Head Light (A Section) does not turn on.	1 Roof Headlights Switch (CB 8F12) (Circuit Breaker Panel - "A" Cab) open/faulty. 2. End Train Relay (9K08) (Electric Locker A Section) faulty. 3. Forward Direction Relay (3K14) (Electric Locker A Section) faulty. 4 Roof Head Relay (8K07) (Electric Locker A Section) Faulty. 5 HIGH/LOW HEADLIGHTS command Switch (8S02) (Operator Console A Cab) OFF position. 6 HIGH/LOW HEADLIGHTS command Switch (8S02) (Operator Console A Cab) Faulty. 7 Roof Headlight Lamp faulty	1 Close/replace Roof Headlights Switch (CB 8F12). 1. Replace End Train Relay (9K08). 1. Replace Forward Direction Relay (3K14). 1. Replace Roof Head Relay (8K07). 1 Set the HIGH/LOW HEADLIGHTS command Switch to HIGH/LOW position. 1 Replace HIGH/LOW HEADLIGHTS command Switch (8S02). 1 Replace Roof Headlight Lamp faulty.
3 Roof Head Light (B Section) does not turn on.	1 Roof Headlights Switch (CB 8F12) (Circuit Breaker Panel - "B" Cab) open/faulty. 2. End Train Relay (9K08) (Electric Locker B Section) faulty.	1 Close/replace Roof Headlights Switch (CB 8F12). 1. Replace End Train Relay (9K08).

**Table 06-II-02.7 Roof Head Light - Fault Isolation/Repair**

<b>Malfunction Symptom</b>	<b>Probable Cause</b>	<b>Corrective Action</b>
3 Roof Head Light (B Section) does not turn on (cont'd)	3. Forward Direction Relay (3K14) (Electric Locker B Section) faulty.	1. Replace Forward Direction Relay (3K14).
	4 Roof Head Relay (8K07) (Electric Locker B Section) Faulty.	1. Replace Roof Head Relay (8K07).
	5 HIGH/LOW HEADLIGHTS command Switch (8S02) (Operator Console B Cab) OFF position.	1 Set the HIGH/LOW HEADLIGHTS command Switch to HIGH/LOW position.
	6 HIGH/LOW HEADLIGHTS command Switch (8S02) (Operator Console B Cab) Faulty.	1 Replace HIGH/LOW HEADLIGHTS command Switch (8S02).
	7 Roof Headlight Lamp faulty.	Replace Roof Headlight Lamp faulty.
<b>Single Light</b>		
1. Lamp will not illuminate.	1. Defective lamp.	1. Visually inspect lamp for darkened appearance inside lamp bulb and filament for open condition: a A bulb with stretched or broken filaments was subjected to vibration. b A dark metallic finish indicates old age. c A black, sooty bulb indicates a poor seal in the bulb.
		2. Replace suspect lamp, activate power to lamp, and verify illumination.
		3. Verify proper connections and nominal 37.5 Vdc across lamp socket terminals.
1. Lamp will not illuminate.(cont'd)	2. Loose/defective car wiring.	1. Check for loose wires
	3. Defective ground.	1. Check for improper ground connections

**Table 06-II-02.7 Roof Head Light - Fault Isolation/Repair**

<b>Malfunction Symptom</b>	<b>Probable Cause</b>	<b>Corrective Action</b>
4. Defective lamp socket.		1. Repair/replace items as necessary.
		2. Replace lamp socket, activate power to lamp, and verify illumination
2. Lamp is too dim	1. Under voltage problem.	1. Check for poor electrical connections.
3. Lamp is too bright.	1. High voltage problem.	1. Check for faulty or shorted voltage dropping device such as a resistor.
		2. Replace voltage dropping device.

**Table 06-II-02.8 Front Headlight - Fault Isolation/Repair**

<b>Malfunction Symptom</b>	<b>Probable Cause</b>	<b>Corrective Action</b>
<b>Light Supply</b>		
1. Front Head Lights (A/B Section) do not turn on.	1. Battery Disconnect (CB 3F01) and/or LV Main (CB 3F02) (Battery Box) open.	1. Close Battery Disconnect (CB 3F01) and/or LV Main (CB 3F02).
	2. Transfer Switch to OFF position.	1. Set Transfer Switch to ON or LOCAL position.
	3. Power Supply Switch (CB 8F17) (Electric Locker B Section) open/faulty.	1. Close/replace (CB 8F17).
	4. Head Lights Power Supply (8A01) Faulty.	1. Replace/repair Head Lights Power Supply (8A01).
2. Front Head Lights (A Section) do not turn on.	1. HEADLIGHTS Switch (CB 8F11) (Circuit Breaker Panel - "A" Cab) Open/faulty.	1. Close/Replace HEADLIGHTS Switch (CB 8F11).
	2. End Train Relay (9K08) (Electric Locker A Section) faulty.	1. Replace End Train Relay (9K08).
	3. Forward Direction Relay (3K14) (Electric Locker A Section) faulty.	1. Replace Forward Direction Relay (3K14).
	4. HIGH/LOW HEADLIGHTS command Switch (8S02) (Operator Console A Cab) Faulty.	1. Replace HIGH/LOW HEADLIGHTS command Switch (8S02).
	5. Headlights Flashing Relay (10K01 and/or 10K02) (Electric Locker A Section) faulty	1. Replace Headlights Flashing Relay (10K01 and/or 10K02).
3. Front Head Lights (B Section) do not turn on.	1. HEADLIGHTS Switch (CB 8F11) (Circuit Breaker Panel B" Cab) Open/faulty.	1. Close/Replace HEADLIGHTS Switch (CB 8F11).
	2. End Train Relay (9K08) (Electric Locker B Section) faulty.	1. Replace End Train Relay (9K08).
	3. Forward Direction Relay (3K14) (Electric Locker B Section) faulty.	1. Replace Forward Direction Relay (3K14).

**Table 06-II-02.8 Front Headlight - Fault Isolation/Repair**

<b>Malfunction Symptom</b>	<b>Probable Cause</b>	<b>Corrective Action</b>
3. Front Head Lights (B Section) do not turn on. (cont'd)	4. HIGH/LOW HEADLIGHTS command Switch (8S02) (Operator Console B Cab) OFF position.  5. HIGH/LOW HEADLIGHTS command Switch (CB 8S02) (Operator Console B Cab) Faulty.  6. Headlights Flashing Relay (10K01 and/or 10K02) (Electric Locker B Section) Faulty.	1. Set the HIGH/LOW HEADLIGHTS command Switch to HIGH/LOW position.  1. Replace HIGH/LOW HEADLIGHTS command Switch (CB 8S02).  1. Replace Headlights Flashing Relay (10K01 and/or 10K02).
<b>Single Light</b>		
1. Lamp will not illuminate.	1. Defective lamp.  2. Loose/defective car wiring.  3. Defective ground.  4. Defective lamp socket.	1. Visually inspect lamp for darkened appearance inside lamp bulb and filament for open condition: a A bulb with stretched or broken filaments was subjected to vibration. b A dark metallic finish indicates old age. c A black, sooty bulb indicates a poor seal in the bulb.  2. Replace suspect lamp, activate power to lamp, and verify illumination.  3. Verify proper connections and nominal 37.5 Vdc across lamp socket terminals  1. Check for loose wires  1. Check for improper ground connections  1. Repair/replace items as necessary.
1. Lamp will not illuminate. (cont'd)	4. Defective lamp socket.	2. Replace lamp socket, activate power to lamp, and verify illumination

**Table 06-II-02.8 Front Headlight - Fault Isolation/Repair**

<b>Malfunction Symptom</b>	<b>Probable Cause</b>	<b>Corrective Action</b>
2. Lamp is too dim	1. Under voltage problem.	1. Repair/replace items as necessary.
		2. Replace lamp socket, activate power to lamp, and verify illumination
1. Lamp is too bright.	1. Voltage problem.	1. Check for poor electrical connections.
		2. Check for faulty or shorted voltage dropping device such as a resistor.
		2. Replace voltage dropping device.

**Table 06-II-02.9 Stop and Tail Lights - Fault Isolation/Repair**

<b>Malfunction Symptom</b>	<b>Probable Cause</b>	<b>Corrective Action</b>
<b>Light Supply</b>		
1. STOP/TAIL Lights (A/B Section) do not turn on.	1. Battery Disconnect (CB 3F01) and/or LV Main (CB 3F02) (Battery Box) open. 2. Transfer Switch to OFF position. 3. Cab Enable Switch (CB 3F07) (Electric Locker A/B Section) open/faulty.	1. Close Battery Disconnect (CB 3F01) and/or LV Main (CB 3F02). 1. Set Transfer Switch to ON or LOCAL position. 1. Close/replace Cab Enable Switch (CB 3F07).
2. STOP Lights (A/B Section) do not turn on.	1. Stop Indicator Lights Switch (CB 8F14) (Electric Locker A Section) open/faulty. 2. Stop Indicator Lights Relay (8K05) (Electric Locker B Section) Supplied/faulty. 3. End Train Relay (9K08) (Electric Locker B Section) faulty. 4. Backward Direction Relay (3K15) (Electric Locker A/B Section) faulty.	1. Close/replace Stop Indicator Lights Switch (CB 8F14). 1. Investigate circuit number [7206] supplying Stop Indicator Lights Relay (8K05)/replace Stop Indicator Lights Relay (8K05). 1. Replace End Train Relay (9K08). 1. Replace Backward Direction Relay (3K15).
3. TAIL Lights (A/B Section) do not turn on.	1. Supply Tail Switch (CB 8F15) (Electric Locker B Section) open/faulty. 2. Cab Enable Interlock Relay (3K16) (Electric Locker A/B Section) not supplied/faulty. 3. Forward Direction Relay (3K14) (Electric Locker A/B Section) faulty. 4. End Train Relay (9K06) (Electric Locker A/B Section) faulty.	1. Close/replace Supply Tail Switch (CB 8F15). 1. Investigate circuit number [2204] supplying Cab Enable Interlock Relay (3K16)/replace Cab Enable Interlock Relay (3K16). 1. Replace Forward Direction Relay (3K14). 1. Replace End Train Relay (9K06).

**Table 06-II-02.9 Stop and Tail Lights - Fault Isolation/Repair**

<b>Malfunction Symptom</b>	<b>Probable Cause</b>	<b>Corrective Action</b>
<b>Single Light</b>		
4. Light not illuminated.	1. Defective LED.	1. Replace suspect LED, activate power, and verify illumination.
	2. Loose/defective connector or wiring harness.	1. Verify proper connections and nominal 14 VDC at LED module input power wiring connector. 2. Repair/replace items as necessary.
	3. Defective ground connection.	1. Check for loose wires or improper ground connections. 2. Repair as necessary.

**Table 06-II-02.10 Turn Indicator / Hazard Lights - Fault Isolation/Repair**

<b>Malfunction Symptom</b>	<b>Probable Cause</b>	<b>Corrective Action</b>
<b>Light Supply</b>		
1. TURN INDICATOR Lights do not turn on	1. Battery Disconnect (CB 3F01) and/or LV Main (CB 3F02) (Battery Box) open. 2. Transfer Switch to OFF position. 3. Direction Indicator Switch (CB 8F07) (Electric Locker A/B Section) open/faulty. 4. TURN SIGNAL Switch (8S03) (Operator Console A/B Cab) to OFF position/faulty. 5. Direction Indicator Intermittent Relay (8K06) (Electric Locker B Section) Faulty.	1. Close Battery Disconnect (CB 3F01) and/or LV Main CB 3F02). 1. Set Transfer Switch to ON position. 1. Replace Direction Indicator Switch (CB 8F07). 1. Set to LEFT or RIGHT position/replace TURN SIGNAL Switch (8S03). 1. Replace Direction Indicator Intermittent Relay (8K06).
2. TURN INDICATOR Left side Lights do not turn on.	1. Direction Indicator Switch (CB 8F09) (Electric Locker B Section) Open/faulty. 2. Direction Indicator Relay (8K02) (Electric Locker B Section) Faulty.	1. Close/replace Direction Indicator Switch (CB 8F09). 1. Replace Direction Indicator Relay (8K02).
3 TURN INDICATOR Right side Lights do not turn on.	1 Direction Indicator Switch (CB 8F08) (Electric Locker B Section) Open/faulty. Direction Indicator Relay (8K01) (Electric Locker B Section) Faulty.	1 Close/replace Direction Indicator Switch (CB 8F08). 1 Replace Direction Indicator Relay (8K01).
<b>Single Light</b>		
1. Light not illuminated.	1. Defective LED. 2. Loose/defective connector or wiring harness.	1. Replace suspect LED, activate power, and verify illumination. 1. Verify proper connections and nominal 14 Vdc at LED module input power wiring connector. 2. Repair/replace items as necessary.

**Table 06-II-02.10 Turn Indicator / Hazard Lights - Fault Isolation/Repair**

Malfunction Symptom	Probable Cause	Corrective Action
1. Light not illuminated (cont'd)	3. Defective ground connection.	<ol style="list-style-type: none"><li>1. Check for loose wires or improper ground connections.</li><li>2. Repair as necessary.</li></ol>

**LOS ANGELES COUNTY**

**METROPOLITAN TRANSPORTATION AUTHORITY**

**LIGHT RAIL VEHICLE**

**P2550**



**RUNNING MAINTENANCE  
AND  
SERVICE MANUAL**

**VOLUME M-01-C  
PART III  
MAINTENANCE  
SECT 06 LIGHTING**





# **SECTION 06**

## **LIGHTING**

## **PART III**

## **MAINTENANCE**

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# SECTION 06

## LIGHTING

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# SECTION 06

## LIGHTING

### 06-III-01 INTRODUCTION

The Lighting Part III - Maintenance consists of:

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

### **06-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.

<b>Abbreviation</b>	<b>Meaning</b>
AB	AnsaldoBreda
ADA	Americans with Disabilities Act
APS	Auxiliary Power Supply
ASM	Adaptive Switching Mean (Filter)
ASSY	Assembly
C/L	Centerline
CB	Circuit Breaker
CCH	Communication Control Head
CM	Coast Motoring
DC	Direct Current
DC/AC	Direct Current - Alternate Current Converter
DC/DC	Direct Current - Direct Current Converter
EB	Emergency Brake
ELE	Electronic
H-CML	Heavy Consumable Material List
H-CMS	Heavy Corrective Maintenance Sheet
HV	High Voltage
HVAC	Heat Ventilation & Air Conditioning
HVDS	High Voltage Distribution System
IDU	Integrated Diagnostic Unit
IP	Ingress Protection Rating
IPC	Illustrated Parts Catalog
KO	Out of Service
LED	Light Emitting Diode
LH	Left Hand Side
LON	Local Operative Network
LRV	Light Rail Vehicle
LV	Low Voltage
LVDS	Low Voltage Distribution System
LVPD	Low Voltage Power Distribution
LVPS	Low Voltage Power Supply
MBL	Metro Blue Line
MTA	Metropolitan Transportation Authority
MV	Medium Voltage
MVB	Multifunction Vehicle Bus
MVPD	Medium Voltage Power Distribution
OK	Working
PS	Power Supply

(cont'd)

(cont'd)

Abbreviation	Meaning
PTU	Portable Test Unit
R-CML	Running Consumable Material List
R-CMS	Running Corrective Maintenance Sheet
RH	Right Hand Side
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
SB	Service Brake
SCPM	Safety Critical Preventive Maintenance
SYS	System
TBD	To Be Defined
TBS	To Be Supplied
TCMS	Train Control & Monitoring System
TCN	Train Communication Network
TOC	Table Of Content
TTEM	Tools & Test Equipment Manual
TWC	Train-to-Wayside Communication
VAC	Voltage Alternate Current
VDC	Voltage Direct Current
W/	With
W/O	Without
WTB	Wired Train Bus

## 06-III-01.b List of Definitions

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

<b>Definition</b>	<b>Meaning</b>
'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
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

### **06-III-01.c List of Measurement Units**

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

<b>Definition</b>	<b>Meaning</b>
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)
$\Omega$	Ohm (Resistance)
$^{\circ}\text{F}$	Fahrenheit (Temperature)
$^{\circ}\text{C}$	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)

**06-III-01.d References**

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

<b>Topic</b>	<b>Paragraph</b>
<i>MANUAL PURPOSE</i>	00-02
<i>MANUAL ARRANGEMENT</i>	00-03
<i>MANUAL APPLICABILITY</i>	00-04
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**06-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:

<b>Running Maintenance</b>		<b>Heavy Maintenance</b>	
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

## 06-III-03 RUNNING -PREVENTIVE MAINTENANCE

### 06-III-03.01 Running -Preventive Maintenance Matrixes (R-PMM)

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

The Lighting (R-PMM) is provided in two different arrangements as follows:

- **R-PMM Component Based**

It lists the Lighting 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 Lighting Running - Preventive Maintenance Tasks ordered by Scheduled Maintenance Interval and broken down into the related 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 Maintainer 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.

### 06-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.

### 06-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
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The marker “●” in the INSPECTIONS INTERVAL column, indicates the periodicity of the corresponding Task.

### 06-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.

**06-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 06-III-03.03.01 for Running- Preventive Maintenance Sheet (R-PMS) Form for detailed explanation.

**06-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 06-III-03.1 for Running - Preventive Maintenance Matrix (R-PMM)  
(Component Based)
- Table 06-III-03.2 for Running - Preventive Maintenance Matrix (R-PMM)  
(Mileage Based)

**06-III-03.01.06**
**Running Preventive Maintenance Matrix (Component Based)**
**Table 06-III-03.1 Running Preventive Maintenance Matrix (Component Based)**

SYSTEM 06		LIGHTING					SHEET CODE
SUBSYSTEM ASSY/UNIT/COMPONENT	TASK	SCPM	INSPECTION INTERVAL MILES				
			Daily	10K	30K	60K	120 K
-INTERNAL LIGHTING & CAB SYSTEM	INSPECTION			●			R-P-06-01-00-00/I-00
-- LAMP	REPLACEMENT					●	R-P-06-01-00-01/R-00
-EXTERNAL LIGHTING SYSTEM	INSPECTION			●			R-P-06-02-00-00/I-00
-- LAMP/LED	REPLACEMENT					●	R-P-06-02-00-01/R-00

**06-III-03.01.07**
**Running Preventive Maintenance Matrix (Mileage Based)**
**Table 06-III-03.2 Running Preventive Maintenance Matrix (Mileage Based)**

SYSTEM 06		LIGHTING			SHEET CODE
SUBSYSTEM	TASK	SCPM	PERSON HOURS		
<b>10,000 MILES</b>					
-INTERNAL LIGHTING AND CAB SYSTEM	INSPECTION		1	R-P-06-01-00-00/I-00	
-EXTERNAL LIGHTING SYSTEM	INSPECTION		1	R-P-06-02-00-00/I-00	
<b>60,000 MILES</b>					
INTERNAL LIGHTING & AB SYSTEM - LAMP	REPLACEMENT		3	R-P-06-01-00-01/R-00	
EXTERNAL LIGHTING SYSTEM - LAMP/LED	REPLACEMENT		4	R-P-06-02-00-01/R-00	

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

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

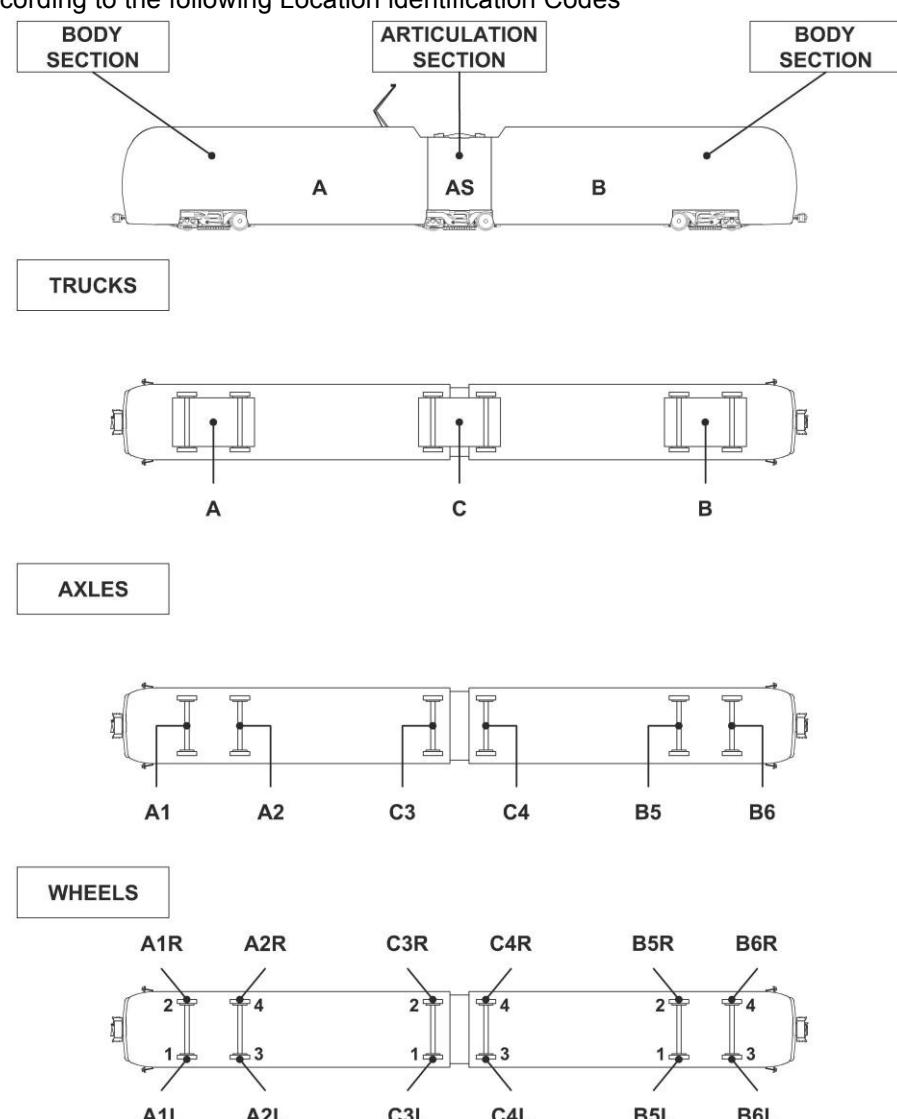
### 06-III-03.02.01 R-PMR/Job Card Form Content

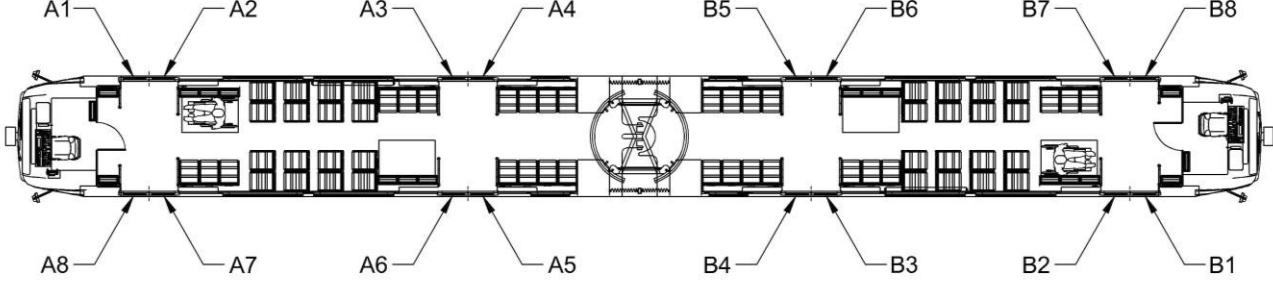
The R-PMR/JOB CARDS are broken down into two main topics:

Specific Data and R-PM Data

Refer to Figure 06-III-03.1 for R-PMR/JOB CARD Form example

<b>RUNNING PREVENTIVE MAINTENANCE REPORTS (R-PMR/JOB CARDS) FORM</b>		
<b>SPECIFIC DATA TO BE FILLED IN BY THE MAINTAINER</b>		
<b>ITEM #</b>	<b>TITLE</b>	<b>EXPLANATORY NOTE</b>
1	<b>VEHICLE #</b>	This field indicates the Vehicle Identification Number
2	<b>DATE</b>	This field indicates the Date on which the Vehicle entered the Maintenance Shop
3	<b>RUNNING HOURS</b>	This field indicates the Vehicle Running Hours at the above Date
4	<b>MILES</b>	This field indicates the Vehicle Running Miles at the above Date.
5	<b>EMPLOYEE # &amp; SIGNATURE</b>	This Field indicates the Employee # & Signature of the Maintainer(s) that perform the referred Task(s)
6	<b>STARTING DATE</b>	This field indicates the Starting Date of the referred Task(s).
7	<b>WORK HOURS</b>	This field indicates the Work duration to perform the referred Task(s).
8	<b>COMPLETION DATE</b>	This field indicates the Completion Date of the referred Task(s).
9	<b>DEFECT FOUND/COMMENTS</b>	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	<b>P2550 RUNNING PREVENTIVE MAINTENANCE REPORT SYSTEM (Maintenance Interval) JOB CARD</b>	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	<b>WORK AREA</b>	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)

<b>RUNNING PREVENTIVE MAINTENANCE REPORTS (R-PMR/JOB CARDS) FORM</b>		
<b>SPECIFIC DATA TO BE FILLED IN BY THE MAINTAINER</b>		
<b>ITEM #</b>	<b>TITLE</b>	<b>EXPLANATORY NOTE</b>
<b>C</b>	<b>ITEM</b>	This column lists the Subsystem/Assembly, Unit, Component to be maintained
<b>D</b>	<b>TASK</b>	<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"> <li>- Cleaning - Inspection -Lubrication -</li> <li>- Replacement - Service- Test</li> </ul>
<b>E</b>	<b>LOCATION</b>	<p>This column lists the On Board Vehicle Location of all Equipment to be maintained according to the following Location identification Codes</p>  <p><b>BODY SECTION</b></p> <p><b>ARTICULATION SECTION</b></p> <p><b>TRUCKS</b></p> <p><b>AXLES</b></p> <p><b>WHEELS</b></p>

<b>RUNNING PREVENTIVE MAINTENANCE REPORTS (R-PMR/JOB CARDS) FORM</b>		
<b>SPECIFIC DATA TO BE FILLED IN BY THE MAINTAINER</b>		
<b>ITEM #</b>	<b>TITLE</b>	
E (cont'd)	LOCATION (cont'd)	
<b>EXPLANATORY NOTE</b>		
 <p>CAR "A"</p> <p>CAR "B"</p>		
<b>Door Numbering</b>		
<b>ITEM #</b>	<b>TITLE</b>	<b>EXPLANATORY NOTE</b>
F	<b>PM SHEET CODE</b>	<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	<b>SHEET ....OF.....</b>	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		AXLE
	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	A	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			9
EMPLOYEE# & SIGNATURE		STARTING DATE		WORK HOURS		COMPLETION DATE
Page 7-2 Draft Ch. 01		FINAL VERSION APPROVAL DATE				
5	6	7	8			

**Figure 06-III-03.1 R-PMR/Job Card Form -Example**

#### 06-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

### **06-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:

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

### **06-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.

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

## **LIGHTING**

### **Running - Preventive Maintenance Reports**

#### **R-PMR/JOB CARDS**

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<b>LIGHTING</b> <b>RUNNING PREVENTIVE MAINTENANCE REPORT</b> <b>10,000 MILES JOB CARD</b>								
VEHICLE #		DATE		RUNNING HOURS		MILES		SHEET 1 OF 3
WORK AREA	SYSTEM	ITEM	TASK	LOCATION				PM SHEET CODE
				BODY SECT	TRUCK	AXLE	SIDE	
EXTERIOR	LIGHTING	BY-PASS ACTIVE LIGHT	INSPECTION	A			LH	R-P-06-02-00-00/I-00
		FRONT HEAD LIGHTS	INSPECTION	A				R-P-06-02-00-00/I-00
		INDICATOR LIGHT DOOR (A1/A2)	INSPECTION	A			RH	R-P-06-02-00-00/I-00
		INDICATOR LIGHT DOOR (A3/A4)	INSPECTION	A			RH	R-P-06-02-00-00/I-00
		INDICATOR LIGHT DOOR (A5/A6)	INSPECTION	A			LH	R-P-06-02-00-00/I-00
		INDICATOR LIGHT DOOR (A7/A8)	INSPECTION	A			LH	R-P-06-02-00-00/I-00
		MARKER LIGHTS	INSPECTION	A				R-P-06-02-00-00/I-00
		ROOF HEAD LIGHT	INSPECTION	A				R-P-06-02-00-00/I-00
		SIDE TURN INDICATOR LIGHTS	INSPECTION	A			LH	R-P-06-02-00-00/I-00
		SIDE TURN INDICATOR LIGHTS	INSPECTION	A			RH	R-P-06-02-00-00/I-00
		SILENT ALARM LIGHT	INSPECTION	A				R-P-06-02-00-00/I-00
		STOP/TAIL LIGHTS	INSPECTION	A				R-P-06-02-00-00/I-00
		TURN INDICATOR/HAZARD LIGHTS	INSPECTION	A				R-P-06-02-00-00/I-00
		BY-PASS ACTIVE LIGHT	INSPECTION	B			RH	R-P-06-02-00-00/I-00
		FRONT HEAD LIGHTS	INSPECTION	B				R-P-06-02-00-00/I-00
		INDICATOR LIGHT DOOR (B1/B2)	INSPECTION	B			LH	R-P-06-02-00-00/I-00
		INDICATOR LIGHT DOOR (B3/B4)	INSPECTION	B			LH	R-P-06-02-00-00/I-00
		INDICATOR LIGHT DOOR (B5/B6)	INSPECTION	B			RH	R-P-06-02-00-00/I-00
		INDICATOR LIGHT DOOR (B7/B8)	INSPECTION	B			RH	R-P-06-02-00-00/I-00
		MARKER LIGHTS	INSPECTION	B				R-P-06-02-00-00/I-00
		ROOF HEAD LIGHT	INSPECTION	B				R-P-06-02-00-00/I-00
		SIDE TURN INDICATOR LIGHTS	INSPECTION	B			LH	R-P-06-02-00-00/I-00
		SIDE TURN INDICATOR LIGHTS	INSPECTION	B			RH	R-P-06-02-00-00/I-00
		SILENT ALARM LIGHT	INSPECTION	B				R-P-06-02-00-00/I-00
		STOP/TAIL LIGHTS	INSPECTION	B				R-P-06-02-00-00/I-00
		TURN INDICATOR /HAZARD LIGHTS	INSPECTION	B				R-P-06-02-00-00/I-00

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<b>LIGHTING - RUNNING PREVENTIVE MAINTENANCE REPORT 10,000 MILES JOB CARD</b>							
VEHICLE #		DATE		RUNNING HOURS		MILES	SHEET 2 OF 3

WORK AREA	SYSTEM	ITEM	TASK	LOCATION				PM SHEET CODE
				BODY SECT	TRUCK	AXLE	SIDE	
INTERIOR	LIGHTING	CAB LIGHTS	INSPECTION	A				R-P-06-01-00-00/I-00
		COMPARTMENT / EMERGENCY LIGHTS	INSPECTION	A				R-P-06-01-00-00/I-00
		ELE LOCKER LIGHT	INSPECTION	A				R-P-06-01-00-00/I-00
		LV LOCKER LIGHT	INSPECTION	A				R-P-06-01-00-00/I-00
		AISLE LIGHTS	INSPECTION	AS				R-P-06-01-00-00/I-00
		CAB LIGHTS	INSPECTION	B				R-P-06-01-00-00/I-00
		COMPARTMENT / EMERGENCY LIGHTS	INSPECTION	B				R-P-06-01-00-00/I-00
		ELE LOCKER LIGHT	INSPECTION	B				R-P-06-01-00-00/I-00
		LV LOCKER LIGHT	INSPECTION	B				R-P-06-01-00-00/I-00

DEFECT FOUND / COMMENTS

(cont'd)

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<b>LIGHTING - RUNNING PREVENTIVE MAINTENANCE REPORT 10,000 MILES JOB CARD</b>							
VEHICLE #		DATE		RUNNING HOURS		MILES	

DEFECT FOUND / COMMENTS

EMPLOYEE # & SIGNATURE	STARTING DATE	WORK HOURS	COMPLETION DATE

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

VEHICLE #		DATE		RUNNING HOURS		MILES		SHEET 1 OF 5
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WORK AREA	SYSTEM	ITEM	TASK	LOCATION				PM SHEET CODE
				BODY SECT	TRUCK	AXLE	SIDE	
EXTERIOR	LIGHTING	BY-PASS ACTIVE LIGHT	INSPECTION	A			LH	R-P-06-02-00-00/I-00
		BY-PASS ACTIVE LIGHT	REPLACEMENT	A			LH	R-P-06-02-00-00/R-01
		FRONT HEAD LIGHTS	INSPECTION	A				R-P-06-02-00-00/I-00
		FRONT HEAD LIGHTS	REPLACEMENT	A				R-P-06-02-00-00/R-01
		INDICATOR LIGHT DOOR (A1/A2)	INSPECTION	A			RH	R-P-06-02-00-00/I-00
		INDICATOR LIGHT DOOR (A1/A2)	REPLACEMENT	A			RH	R-P-06-02-00-00/R-01
		INDICATOR LIGHT DOOR (A3/A4)	INSPECTION	A			RH	R-P-06-02-00-00/I-00
		INDICATOR LIGHT DOOR (A3/A4)	REPLACEMENT	A			RH	R-P-06-02-00-00/R-01
		INDICATOR LIGHT DOOR (A5/A6)	INSPECTION	A			LH	R-P-06-02-00-00/I-00
		INDICATOR LIGHT DOOR (A5/A6)	REPLACEMENT	A			LH	R-P-06-02-00-00/R-01
		INDICATOR LIGHT DOOR (A7/A8)	INSPECTION	A			LH	R-P-06-02-00-00/I-00
		INDICATOR LIGHT DOOR (A7/A8)	REPLACEMENT	A			LH	R-P-06-02-00-00/R-01
		MARKER LIGHTS	INSPECTION	A				R-P-06-02-00-00/I-00
		MARKER LIGHTS	REPLACEMENT	A				R-P-06-02-00-00/R-01
		ROOF HEAD LIGHT	INSPECTION	A				R-P-06-02-00-00/I-00
		ROOF HEAD LIGHT	REPLACEMENT	A				R-P-06-02-00-00/R-01
		SIDE TURN INDICATOR LIGHTS	INSPECTION	A			LH	R-P-06-02-00-00/I-00
		SIDE TURN INDICATOR LIGHTS	INSPECTION	A			RH	R-P-06-02-00-00/I-00
		SIDE TURN INDICATOR LIGHTS	REPLACEMENT	A			LH	R-P-06-02-00-00/R-01
		SIDE TURN INDICATOR LIGHTS	REPLACEMENT	A			RH	R-P-06-02-00-00/R-01
		SILENT ALARM LIGHT	INSPECTION	A				R-P-06-02-00-00/I-00
		SILENT ALARM LIGHT	REPLACEMENT	A				R-P-06-02-00-00/R-01
		STOP/TAIL LIGHTS	INSPECTION	A				R-P-06-02-00-00/I-00
		STOP/TAIL LIGHTS	REPLACEMENT	A				R-P-06-02-00-00/R-01
		TURN INDICATOR/HAZARD LIGHTS	INSPECTION	A				R-P-06-02-00-00/I-00
		TURN INDICATOR/HAZARD LIGHTS	REPLACEMENT	A				R-P-06-02-00-00/R-01
		BY-PASS ACTIVE LIGHT	INSPECTION	B			RH	R-P-06-02-00-00/I-00

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LIGHTING - RUNNING PREVENTIVE MAINTENANCE REPORT - 60,000 MILES JOB CARD							
VEHICLE#		DATE		RUNNING HOURS		MILES	
							SHEET 2 OF 5

WORK AREA	SYSTEM	ITEM	TASK	LOCATION				PM SHEET CODE
				BODY SECT	TRUCK	AXLE	SIDE	
EXTERIOR  LIGHTING	LIGHTING	BY-PASS ACTIVE LIGHT	REPLACEMENT	B			RH	R-P-06-02-00-00/R-01
		FRONT HEAD LIGHTS	INSPECTION	B				R-P-06-02-00-00/I-00
		FRONT HEAD LIGHTS	REPLACEMENT	B				R-P-06-02-00-00/R-01
		INDICATOR LIGHT DOOR (B1/B2)	INSPECTION	B			LH	R-P-06-02-00-00/I-00
		INDICATOR LIGHT DOOR (B1/B2)	REPLACEMENT	B			LH	R-P-06-02-00-00/R-01
		INDICATOR LIGHT DOOR (B3/B4)	INSPECTION	B			LH	R-P-06-02-00-00/I-00
		INDICATOR LIGHT DOOR (B3/B4)	REPLACEMENT	B			LH	R-P-06-02-00-00/R-01
		INDICATOR LIGHT DOOR (B5/B6)	INSPECTION	B			RH	R-P-06-02-00-00/I-00
		INDICATOR LIGHT DOOR (B5/B6)	REPLACEMENT	B			RH	R-P-06-02-00-00/R-01
		INDICATOR LIGHT DOOR (B7/B8)	INSPECTION	B			RH	R-P-06-02-00-00/I-00
		INDICATOR LIGHT DOOR (B7/B8)	REPLACEMENT	B			RH	R-P-06-02-00-00/R-01
		MARKER LIGHTS	INSPECTION	B				R-P-06-02-00-00/I-00
		MARKER LIGHTS	REPLACEMENT	B				R-P-06-02-00-00/R-01
		ROOF HEAD LIGHT	INSPECTION	B				R-P-06-02-00-00/I-00
		ROOF HEAD LIGHT	REPLACEMENT	B				R-P-06-02-00-00/R-01
		SIDE TURN INDICATOR LIGHTS	INSPECTION	B			LH	R-P-06-02-00-00/I-00
		SIDE TURN INDICATOR LIGHTS	INSPECTION	B			RH	R-P-06-02-00-00/I-00
		SIDE TURN INDICATOR LIGHTS	REPLACEMENT	B			LH	R-P-06-02-00-00/R-01
		SIDE TURN INDICATOR LIGHTS	REPLACEMENT	B			RH	R-P-06-02-00-00/R-01
		SILENT ALARM LIGHT	INSPECTION	B				R-P-06-02-00-00/I-00
		SILENT ALARM LIGHT	REPLACEMENT	B				R-P-06-02-00-00/R-01
		STOP/TAIL LIGHTS	INSPECTION	B				R-P-06-02-00-00/I-00
		STOP/TAIL LIGHTS	REPLACEMENT	B				R-P-06-02-00-00/R-01
		TURN INDICATOR/HAZARD LIGHTS	INSPECTION	B				R-P-06-02-00-00/I-00
		TURN INDICATOR/HAZARD LIGHTS	REPLACEMENT	B				R-P-06-02-00-00/R-01

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<b>LIGHTING - RUNNING PREVENTIVE MAINTENANCE REPORT - 60,000 MILES JOB CARD</b>							
VEHICLE#		DATE		RUNNING HOURS		MILES	
							<b>SHEET 3 OF 5</b>

WORK AREA	SYSTEM	ITEM	TASK	LOCATION				PM SHEET CODE
				BODY SECT	TRUCK	AXLE	SIDE	
INTERIOR I	LIGHTING	CAB LIGHTS	INSPECTION	A				R-P-06-01-00-00/I-00
		CAB LIGHTS	REPLACEMENT	A				R-P-06-01-02-00/R-00
		COMPARTMENT / EMERGENCY LIGHTS	INSPECTION	A				R-P-06-01-00-00/I-00
		COMPARTMENT / EMERGENCY LIGHTS	REPLACEMENT	A				R-P-06-01-02-00/R-00
		ELE LOCKER LIGHT	INSPECTION	A				R-P-06-01-00-00/I-00
		ELE LOCKER LIGHT	REPLACEMENT	A				R-P-06-01-02-00/R-00
		LV LOCKER LIGHT	INSPECTION	A				R-P-06-01-00-00/I-00
		LV LOCKER LIGHT	REPLACEMENT	A				R-P-06-01-02-00/R-00
		AISLE LIGHTS	INSPECTION	AS				R-P-06-01-00-00/I-00
		AISLE LIGHTS	REPLACEMENT	AS				R-P-06-01-02-00/R-00
		CAB LIGHTS	INSPECTION	B				R-P-06-01-00-00/I-00
		CAB LIGHTS	REPLACEMENT	B				R-P-06-01-02-00/R-00
		COMPARTMENT / EMERGENCY LIGHTS	INSPECTION	B				R-P-06-01-00-00/I-00
		COMPARTMENT / EMERGENCY LIGHTS	REPLACEMENT	B				R-P-06-01-02-00/R-00
		ELE LOCKER LIGHT	INSPECTION	B				R-P-06-01-00-00/I-00
		ELE LOCKER LIGHT	REPLACEMENT	B				R-P-06-01-02-00/R-00
		LV LOCKER LIGHT	INSPECTION	B				R-P-06-01-00-00/I-00
		LV LOCKER LIGHT	REPLACEMENT	B				R-P-06-01-02-00/R-00

<b>DEFECT FOUND / COMMENTS</b>								

(cont'd)



(cont'd)

**LIGHTING - RUNNING PREVENTIVE MAINTENANCE REPORT - 60,000 MILES JOB CARD**

VEHICLE #		DATE		RUNNING HOURS		MILES		SHEET 5 OF 5
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**DEFECT FOUND / COMMENTS**


EMPLOYEE # & SIGNATURE	STARTING DATE	WORK HOURS	COMPLETION DATE

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### 06-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:

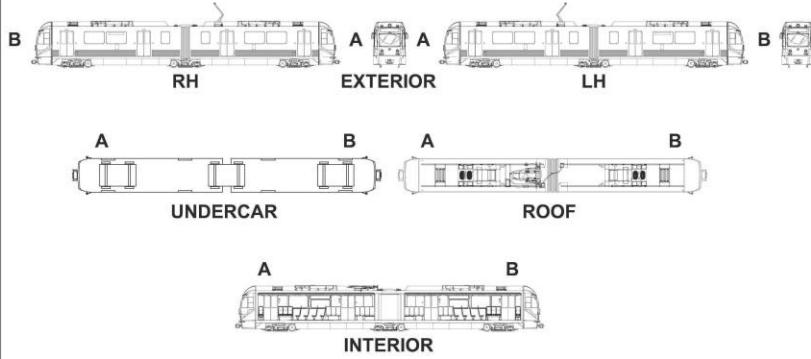
- **SAFETY PRECAUTIONS**, to be followed to safely accomplish the Task
- **TOOLS**, including Special Tools and Test Equipment, needed to accomplish the Task
- **CONSUMABLES**, required to accomplish the Task and consistent with those used by MTA
- **PROCEDURE**, consisting of **Preliminary Operations** 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

#### 06-III-03.03.01      Running- Preventive Maintenance Sheet (R-PMS) Form

The R-PMS Form (refer to Figure 06-III-03.2) consists of several fields containing the following data/ information:

<b>RUNNING -PREVENTIVE MAINTENANCE SHEET (R-PMS) Form</b>			
<b>ITEM #</b>	<b>TITLE</b>	<b>CONTENT</b>	<b>EXPLANATORY NOTES</b>
1	Card code	Sheet code	<p>The Sheet Code is an alphanumerical code that identifies each R-PM Sheet.</p> <p><b>THE SHEET CODE IS THE EXPLICIT LINK BETWEEN R-PM MATRIXES, R-PMR /JOB CARDS AND R-PM SHEETS</b></p> <p>The Sheet Code consists of letters R-P followed by an 11 digit code number as follows:</p> <p><b>R-P-nn-mm-zz-ww/Y-kk</b></p> <p><b>R</b> = Running      <b>P</b> = Preventive</p> <p><b>nn</b>      may vary from 02 to 19, identifying the System/ Manual Section number.</p> <p><b>mm-zz-ww</b>    each one may vary from 00 to 99, according to AB System Functional Tree, allowing the identification of the Assembly/Unit/Component</p> <p><b>Y</b>      Maintenance Task Code. It may be one of the following:</p> <p><b>C=Cleaning</b>      <b>I=Inspection</b>      <b>L=Lubrication</b></p> <p><b>R=Replacement</b>      <b>S=Service</b>      <b>T=Test</b></p> <p><b>kk</b>      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"> <li>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)</li> <li>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</li> </ul>
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>

<b>RUNNING -PREVENTIVE MAINTENANCE SHEET (R-PMS) Form (cont'd)</b>			
<b>ITEM #</b>	<b>TITLE</b>	<b>CONTENT</b>	<b>EXPLANATORY NOTES</b>
8	<b>Man Hours</b>	<b>Number</b>	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	<b>Sheet</b>	<b>Pages numbering</b>	This field indicates the progressive R-PMS sheet page number.
10	<b>LOCATION</b>	<b>Illustration</b>	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	<b>R</b>	<b>Letter</b>	This field indicates that the Sheet pertains to Running Maintenance
12	<b>P</b>	<b>Letter</b>	This field indicates that the Sheet pertains to Preventive Maintenance
13	<b>nn</b>	<b>Number</b>	This field indicates the System/Manual Section number to which the Sheet pertains. It may vary from 01 to 19
14	<b>rr</b>	<b>Number</b>	This field indicates the Sheet Revision number
15	<b>Page ##</b>	<b>Page ##</b>	This field indicates the RMSM Section Page number
16	<b>-#</b>	<b>Number</b>	This field indicates the RMSM Section Revision number
17	<b>SAFETY PRECAUTIONS</b>	<b>Text</b>	This field presents the General and/or specific Safety Precautions to be followed to accomplish safely the relevant Maintenance Tasks.
18	<b>TOOLS</b>	<b>Text</b>	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	<b>CONSUMABLES</b>	<b>Text</b>	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	<b>SPARE PARTS</b>	<b>Text</b>	This field lists the Description and PN of Spare Parts (consistent with Illustrated Parts Catalog) needed to accomplish the Maintenance Task.
21	<b>PROCEDURE</b>	<b>Text</b>	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
<b>P2550 PREVENTIVE MAINTENANCE SHEET</b>	
System: <span style="float: right;">Card Code: <b>R-P-nn-mm-zz-ww/Y-kk</b></span>	
Subsystem/Assy: <span style="float: right;">Sheet: <b>x/z</b></span>	
Component: <span style="float: right;">Man Hours:</span>	
Maintenance Task: <span style="float: right;">Interval/Miles:</span>	
<b>LOCATION:</b>	
	
<span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">1</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">2</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">3</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">4</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">5</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">6</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">7</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">8</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">9</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">10</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">11</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">12</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">13</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">14</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">15</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">16</span>	<span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">1</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">2</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">3</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">4</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">5</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">6</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">7</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">8</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">9</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">10</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">11</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">12</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">13</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">14</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">15</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">16</span>
<span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">R</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">P</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">nn</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">mm</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">zz</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">ww</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">Y</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 5px;">kk</span>	
<span style="font-size: 2em;">M</span> <b>Metro</b>	
Page 011 Draft	

**Figure 06-III-03.2 R-PMS Form  
(Sheet 1 of 2)**

LACMTA P2550 LRV Running Maintenance and Servicing Manual - Section 01		 <b>AnsaldoBreda</b>				
<b>P2550 PREVENTIVE MAINTENANCE SHEET</b>						
Card Code: <b>R-P-nn-mm-zz-ww/Y-kk</b>						
System: _____		Sheet: <b>x/z</b>				
Subsystem/Assy: _____		Unit: _____				
Component: _____		Man Hours: _____				
Maintenance Task: _____		Interval/Miles: _____				
<b>SAFETY PRECAUTIONS:</b>						
17. _____						
18. _____						
19. _____						
20. _____						
21. _____						
<b>TOOLS:</b> _____						
<b>CONSUMABLES:</b> _____						
<b>SPARE PARTS:</b> _____						
<b>PROCEDURE:</b> <b>PRELIMINARY OPERATIONS</b>						
Page 01-2 Draft						
						
<table border="1" style="margin-left: auto; margin-right: auto;"> <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 06-III-03.2 R-PMS Form  
(Sheet 2 of 2)**

**06-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 to 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”**).

#### **06-III-03.03.03      Running- Preventive Maintenance Sheet (R-PMS) List**

The Lighting 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 06-III-03.3    Running Preventive Maintenance Sheets List**

<b>SYSTEM      06</b>		<b>LIGHTING</b>			
<b>SUBSYSTEM/ ASSY</b>	<b>ASSY /UNIT/ COMPONENT</b>	<b>SCPM</b>	<b>TASK</b>	<b>MAINTEN. INTERVAL (MILES)</b>	<b> SHEET CODE</b>
INTERNAL LIGHTING & CAB SYSTEM	INTERNAL LIGHTING & CAB SYSTEM		INSPECTION	10,000	R-P-06-01-00-00/I-00
INTERNAL LIGHTING & CAB SYSTEM	LAMP		REPLACEMENT	60,000	R-P-06-01-00-01/R-00
EXTERNAL LIGHTING SYSTEM	EXTERNAL LIGHTING SYSTEM		INSPECTION	10,000	R-P-06-02-00-00/I-00
EXTERNAL LIGHTING SYSTEM	LAMP / LED		REPLACEMENT	60,000	R-P-06-02-00-01/R-00

06-III-03.03.04

**Running- Preventive Maintenance Sheets (R-PMS)**

## LIGHTING

### **Running - Preventive Maintenance Sheets**

### **R-PMS**

**INTENTIONALLY LEFT BLANK**

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-01-00-00/I-00**

System:

**LIGHTING**

Sheet:

**1/12**

Subsystem/Assy:

**INTERNAL AND CAB LIGHTING SYSTEM**

Unit:

Component:

Man Hours:

**1**

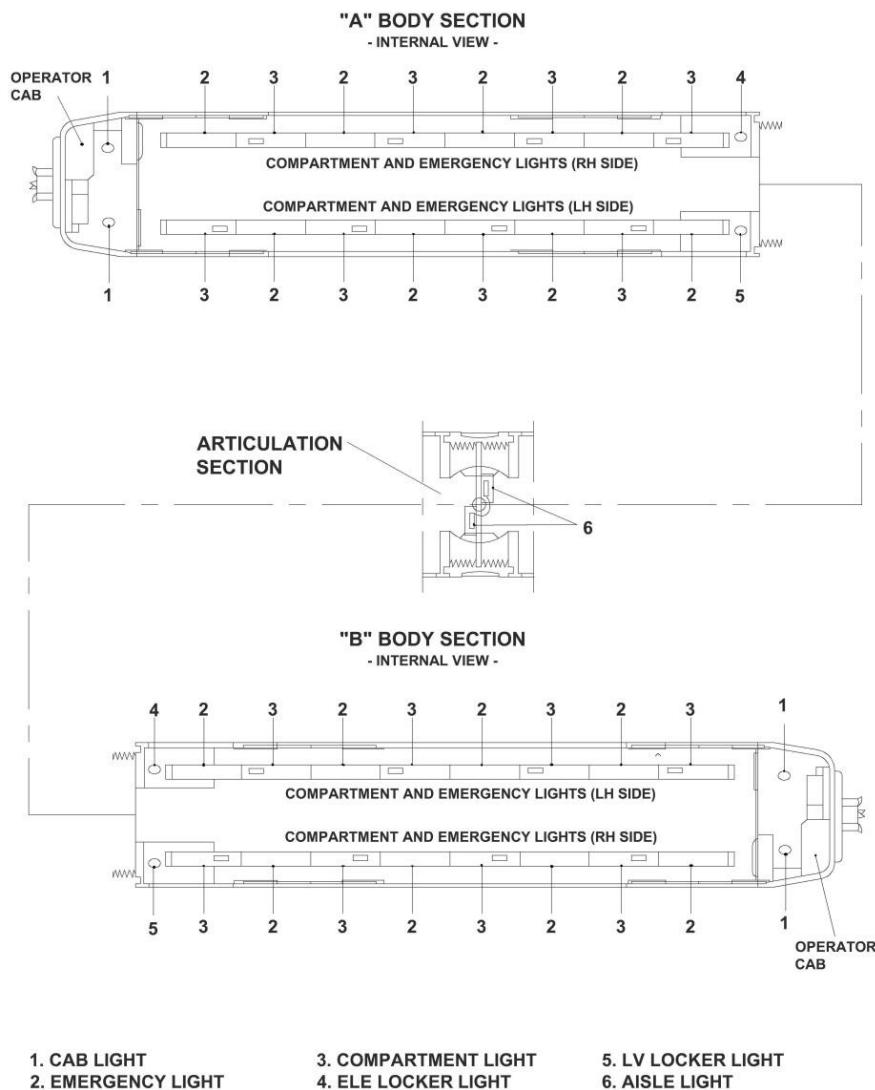
Maintenance Task:

**INSPECTION**

Interval/Miles:

**10,000**

### LOCATION:



## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-01-00-00/I-00**

System:

**LIGHTING**

Sheet:

**2/12**

Subsystem/Assy:

**INTERNAL AND CAB LIGHTING SYSTEM**

Unit:

Component:

Man Hours:

**1**

Maintenance Task:

**INSPECTION**

Interval/Miles:

**10,000**

### SAFETY PRECAUTIONS:

**WARNING: WEAR HAND AND EYE PROTECTION WHEN HANGING LAMP TUBES TO PREVENT INJURY FROM SHATTERED GLASS.**

### TOOLS:

LACMTA Maintenance Shop Standard Tools Kit

MULTIMETER (FLUKE 87 V/E) PN 4EB19

### CONSUMABLES:

N/A

### SPARE PARTS:

FT32T8 (48") COOL WHITE FUORESCENT LAMP

P/N AA04FAW

FB024T8 (18") U SHAPED LAMP

P/N AA04FAV

HALOGEN LAMP (10 W)

BALLAST 37.5 V

LED WHITE - 37.5 Vdc 0.08 A 2.7 W

P/N TRANS-LITE M-8561-6

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-01-00-00/I-00**

System:

**LIGHTING**

Sheet:

**3/12**

Subsystem/Assy:

**INTERNAL AND CAB LIGHTING SYSTEM**

Unit:

Component:

Man Hours:

**1**

Maintenance Task:

**INSPECTION**

Interval/Miles:

**10,000**

### PROCEDURE:

#### PRELIMINARY OPERATIONS

- a. Set the Vehicle in safety condition in accordance with LACMTA Maintenance Shop Regulations.
- b. Set the Transfer Switch (located on the Operator's Console) to "ON" or "LOCAL" Position.

#### INSPECTION

To perform the Task proceed as follows:

**NOTE.** It is assumed that all Circuit Breakers of the Internal & Cab Lighting System are in proper working position.

#### A COMPARTMENT & AISLE LIGHT FIXTURES

Inspect Light Fixtures as follows:

##### 1 Switch OFF the following CBs

- CB 08F02 (located on the "B" Cab Circuit Breaker Panel)
- CB 08F03 (located on the "B" Section LV Locker)
- CB 08F04 (located on the "B" Section LV Locker)
- CB 08F05 (located on the "B" Cab Circuit Breaker Panel)



B' Cab Circuit Breaker Panel  
CIRCUIT BREAKERS LOCATION



B' Section LV Locker  
CIRCUIT BREAKERS LOCATION

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-01-00-00/I-00**

System:

**LIGHTING**

Sheet:

**4/12**

Subsystem/Assy:

**INTERNAL AND CAB LIGHTING SYSTEM**

Unit:

Component:

Man Hours:

**1**

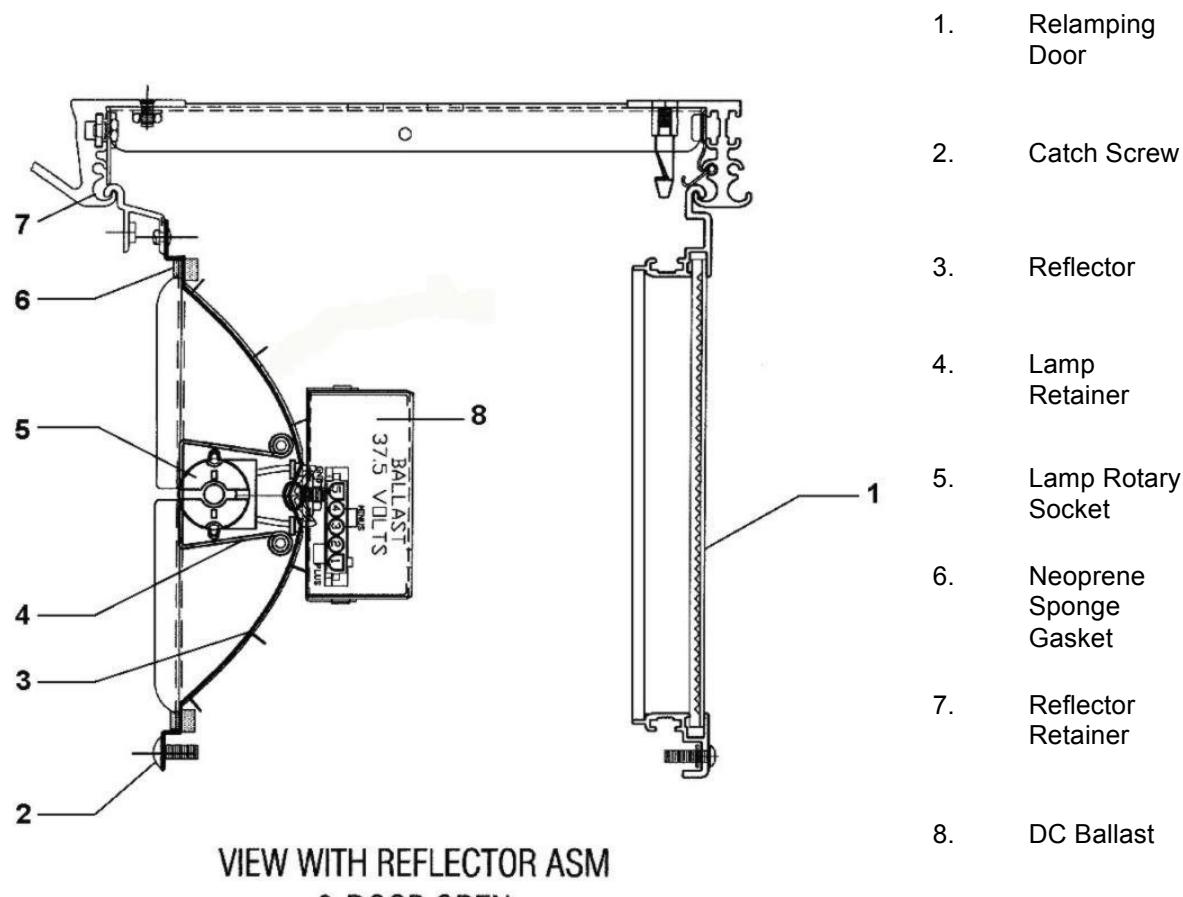
Maintenance Task:

**INSPECTION**

Interval/Miles:

**10,000****PROCEDURE(CONT'D)****COMPARTMENT & AISLE LIGHT FIXTURES (CONT'D)**

- 2** Open Relamping Door and release Reflector Connector.

**COMPARTMENT LIGHT FIXTURE (TYPICAL)**

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-01-00-00/I-00**

System:

**LIGHTING**

Sheet:

**5/12**

Subsystem/Assy:

**INTERNAL AND CAB LIGHTING SYSTEM**

Unit:

Component:

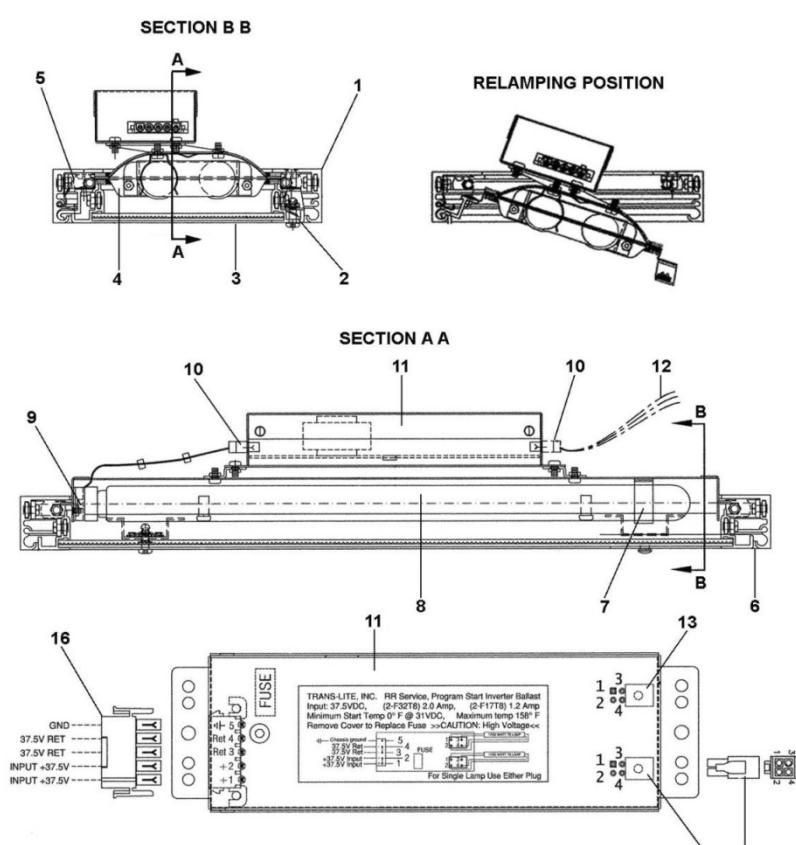
Man Hours:

**1**

Maintenance Task:

**INSPECTION**

Interval/Miles:

**10,000****PROCEDURE(CONT'D)****COMPARTMENT & AISLE LIGHT FIXTURES (CONT'D)**

1. Frame ASM
2. Relamping Door
3. Lens (Clear)
4. Reflector
5. Retainer
6. Catch screw
7. Lamp Clamp
8. Lamp
9. Lampholder
10. Plug
11. Ballast
12. Car wiring
13. Socket (to remote Fixture)
14. Connector (output)
15. Socket (output)
16. Connector (input)

**AISLE LIGHT FIXTURE with Ballast**

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-01-00-00/I-00**

System:

**LIGHTING**

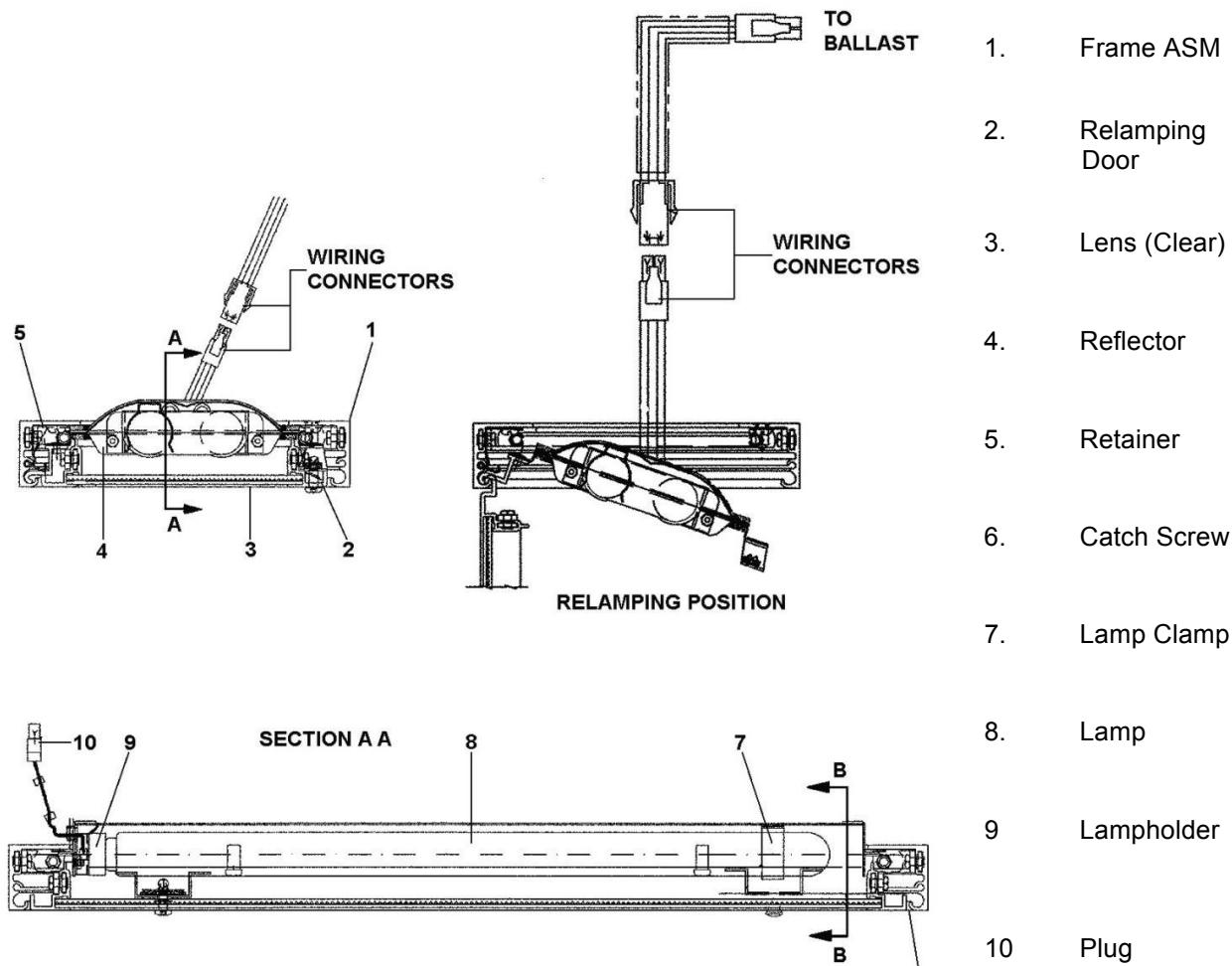
Subsystem/Assy:

**INTERNAL AND CAB LIGHTING SYSTEM**

Component:

Man Hours:  
**1**

Maintenance Task:

**INSPECTION**Interval/Miles:  
**10,000****PROCEDURE(CONT'D)****COMPARTMENT & AISLE LIGHT FIXTURES (CONT'D)****AISLE LIGHT FIXTURE without Ballast**

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-01-00-00/I-00**

System:

**LIGHTING**

Sheet:

**7/12**

Subsystem/Assy:

**INTERNAL AND CAB LIGHTING SYSTEM**

Unit:

Component:

Man Hours:

**1**

Maintenance Task:

**INSPECTION**

Interval/Miles:

**10,000****PROCEDURE(CONT'D)****COMPARTMENT & AISLE LIGHT FIXTURES (CONT'D)**

- 3 Remove Lamps as applicable.
- 4 Inspect Lamp Pins for pitting, indications of arcing (blackened or scorched appearance), or corrosion.
- 5 Set Lamp in safe place away from work area. Replace any Lamp and Lamp Socket exhibiting symptom(s).
- 6 Inspect Lamp Sockets for symptoms of arcing (blackened or scorched appearance around contact slots), corrosion, damage, and loose/missing hardware.
- 7 Inspect Lamp Socket Leads for strain, excess slack, and insulation damage. Replace Lamp Sockets exhibiting symptom(s). Tighten or replace hardware as necessary.
- 8 Inspect DC Ballasts for leaks, conspicuous hot tar like odor, discoloration, and loose or missing hardware. Replace ballast exhibiting symptom(s) or damage. Inspect Ballast for loose or missing hardware.
- 9 Tighten or replace hardware as necessary. Note any item requiring Corrective Maintenance.
- 10 Engage the Reflector Connector and close the Relamping Door
- 11 Restore Power by switching ON the CB 08F02, 08F03, 08F04 and 08F05
- 12 Record inspection results on the Defect Report Card for administrative and maintenance planning.

**B COMPARTMENT LIGHTS/EMERGENCY LIGHTS**

- 1 Check that all Compartment Lights and all Emergency Lights are on.
- 2 If one or more Lights are off, check that the following CBs are in ON position. Set every CB accordingly
  - CB 08F02 (located on the "B" Cab C B Panel)
  - CB 08F03 (located on the "B" Section LV Locker)
  - CB 08F04 (located on the "B" Section LV Locker)
  - CB 08F05 (located on the "B" Cab C B Panel)
- 3 If the trouble persists perform Troubleshooting to find the faulty Component to be replaced.
- 4 As per Troubleshooting Result replace:
  - Lamps according to
  - (Reflector Assy) Ballast according to
  - Circuit Breakers according to
  - Relays according to
  - Switches according to
  - Diodes according to

**COMPARTMENT LIGHTS**

- Sheet R-C-06-01-02-00/R-00  
 Sheet R-C-06-01-01-00/R-00  
 Sheet R-C-06-00-00-00/R-00  
 Sheet R-C-06-00-00-00/R-01  
 Sheet R-C-06-00-00-00/R-02  
 Sheet R-C-06-00-00-00/R-03

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-01-00-00/I-00**

System:

**LIGHTING**

Sheet:

**8/12**

Subsystem/Assy:

**INTERNAL AND CAB LIGHTING SYSTEM**

Unit:

Component:

Man Hours:

**1**

Maintenance Task:

**INSPECTION**

Interval/Miles:

**10,000**

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

#### **C AISLE LIGHTS**

1. Check that the two Lights are on.
2. If one or both Lights are off, check that the CB 08F05 (located on the "B" Cab CB Panel) is in ON position. Set it accordingly
3. If the trouble persists perform Troubleshooting to find the faulty Component to be replaced
4. As per Troubleshooting Result replace:
  - Lamps according to Sheet R-P-06-01-02-00/R-00
  - (Reflector Assy) Ballast according to Sheet R-C-06-01-01-00/R-00
  - Circuit Breakers according to Sheet R-C-06-00-00-00/R-00
  - Relays according to Sheet R-C-06-00-00-00/R-01
  - Switches according to Sheet R-C-06-00-00-00/R-02
  - Diodes according to Sheet R-C-06-00-00-00/R-03
5. Record inspection results on the Defect Report Card for administrative and maintenance planning.



**AISLE LIGHTS**

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-01-00-00/I-00**

System:

**LIGHTING**

Sheet:

**9/12**

Subsystem/Assy:

**INTERNAL AND CAB LIGHTING SYSTEM**

Unit:

Component:

Man Hours:

**1**

Maintenance Task:

**INSPECTION**

Interval/Miles:

**10,000****PROCEDURE (CONT'D):****D CAB LIGHTS****CAB LIGHT SWITCH 8S01****CAB LIGHT****CAB LIGHT CB 08F01****B" Section LV Locker****CONSOLE**

1. Enter the "A" Cab
2. Set the CAB LIGHT Switch 8S01 (located on the Operator's Console), to "ON" Position.
3. Check that both the Cab Lights are on.
4. If one or both Cab Lights are off, check that the CB 08F01 (located in the LV Locker) is ON.
5. If the trouble persists perform Troubleshooting to find the faulty Component to be replaced
6. As per Troubleshooting Result replace
  - Lamps according to Sheet R-C-06-01-02-00/R-00
  - Circuit Breakers according to Sheet R-C-06-00-00-00/R-00
  - Relays according to Sheet R-C-06-00-00-00/R-01
  - Switches according to Sheet R-C-06-00-00-00/R-02
  - Diodes according to Sheet R-C-06-00-00-00/R-03
7. Set the CAB LIGHT Switch 8S01 to "AUTO" Position, and check CAB LIGHT DIMMER (8R01) for proper operation.
8. Set the CAB LIGHT Switch 8S01 to "OFF" Position.
9. Inspect both Cab Lights for loose or missing hardware.  
Tighten or replace.
10. Check that Cab Light Lens is not damaged.
11. Note any item requiring Corrective Maintenance.
12. Repeat Steps 1 through 10 for the "B" Cab
13. Record inspection results on the Defect Report Card for administrative and maintenance planning.

**CAB LIGHT DIMMER 8R01**

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-01-00-00/I-00**

System:

**LIGHTING**

Sheet:

**10/12**

Subsystem/Assy:

**INTERNAL AND CAB LIGHTING SYSTEM**

Unit:

Component:

Man Hours:

**1**

Maintenance Task:

**INSPECTION**

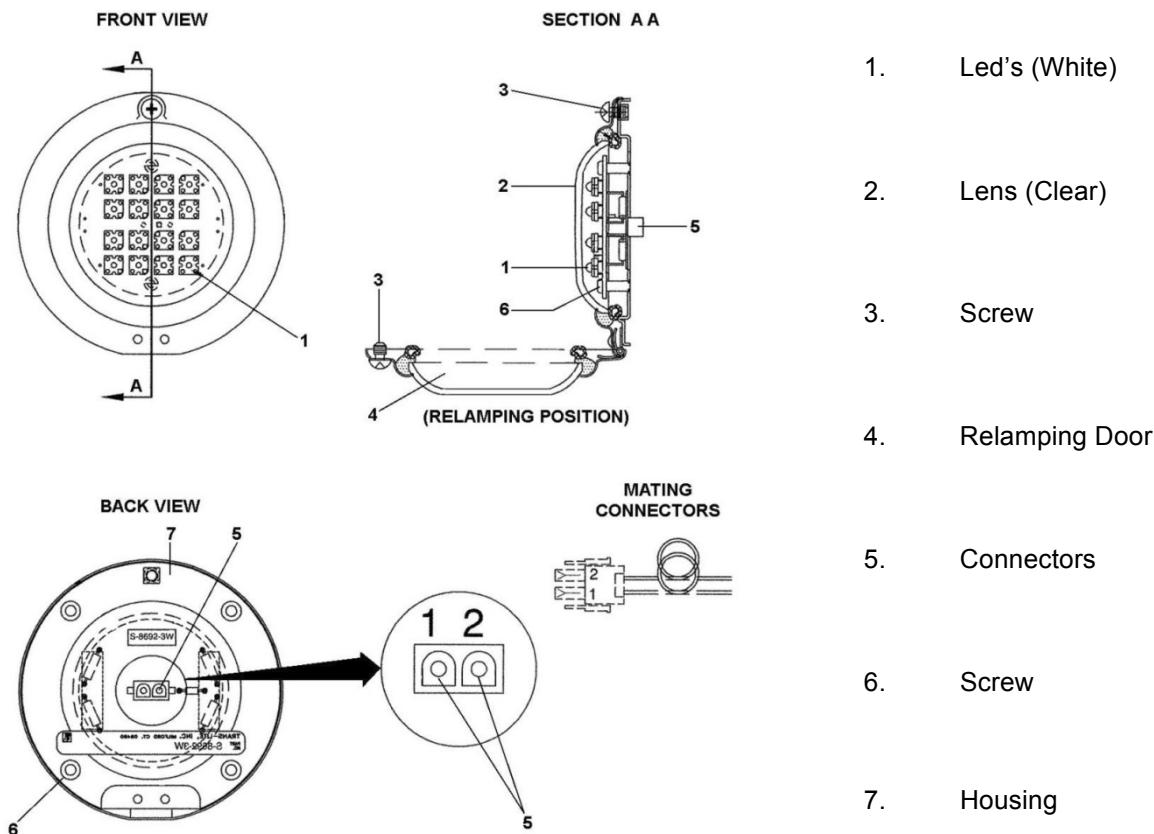
Interval/Miles:

**10,000****PROCEDURE (CONT'D):****E      LOCKERS LIGHTS**

1. Turn off Power by switching OFF the following Switches & Circuit Breakers:

SECTION	LOCKER	SWITCH	CIRCUIT BREAKER
A	ELE	8S06	08F18
B	ELE	8S06	08F18
A	LV	8S07	08F18
B	LV	8S07	08F18

2. Open Relamping Door.

**ELE & LV LOCKER LIGHTS Components**

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-01-00-00/I-00**

System:

**LIGHTING**

Sheet:

**11/12**

Subsystem/Assy:

**INTERNAL AND CAB LIGHTING SYSTEM**

Unit:

Component:

Man Hours:

**1**

Maintenance Task:

**INSPECTION**

Interval/Miles:

**10,000**

### PROCEDURE (CONT'D):

#### LOCKERS LIGHTS (CONT'D)

3. Inspect Lens and LED's for damage. Replace the Lens or LED's as necessary.
4. Inspect Lens for discoloration, cracks, and chips. Replace if necessary.
5. Check light wiring harness assembly and wiring connections for signs of arching, pitting or corrosion. Replace items exhibiting any of these symptom(s).
6. Inspect for loose mounting. Tighten as necessary.
7. Install Lens and LED's as applicable.
8. Note any item requiring Corrective Maintenance.
9. Turn on power to Locker Light and verify illumination also by closing and re-opening Locker Door.
10. Inspection results must be recorded on Defect Report Cards to Allow the Planning of Maintenance Operations.

#### F ELE LOCKERS LIGHT

1. Start inspection from "A" ELE Locker.
2. Open the Locker Door and check that the ELE Locker Light is on.
3. If the ELE Locker Light is off, proceed as follows:
  - a. Check that the Switch 8S06 (located in the ELE Locker), is in ON position. Set it accordingly.
  - b. Check that the CB 08F18 (located in the LV Locker) is in ON position. Set it accordingly.
4. If the trouble persists perform Troubleshooting to find the faulty Component to be Replaced.
5. As per Troubleshooting Result replace:
 

• LED according to	Sheet R-P-06-01-02-00/R-00
• Circuit Breakers according to	Sheet R-C-06-00-00-00/R-00
• Relays according to	Sheet R-C-06-00-00-00/R-01
• Switches according to	Sheet R-C-06-00-00-00/R-02
• Diodes according to	Sheet R-C-06-00-00-00/R-03
6. Repeat Steps 1 through 5 for the "B" ELE Locker.
7. Record inspection results on the Defect Report Card for administrative and maintenance planning.



## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-01-00-00/I-00**

System:

**LIGHTING**

Sheet:

**12/12**

Subsystem/Assy:

**INTERNAL AND CAB LIGHTING SYSTEM**

Unit:

Component:

Man Hours:

**1**

Maintenance Task:

**INSPECTION**

Interval/Miles:

**10,000****PROCEDURE (CONT'D):****G LV LOCKERS LIGHT**

1. Start inspection from " A " LV Locker
2. Open the Locker Door and check that the LV Locker Light is on.
3. If the LV Locker Light is off, proceed as follows:
  - a. Check that the Switch 8S07 (located in the LV Locker), is in ON position. Set it accordingly.
  - b. Check that the CB 08F18 (located in the LV Locker) is in ON position. Set it accordingly.
4. If the trouble persists perform Troubleshooting to find the faulty Component to be Replaced.
5. As per Troubleshooting Result replace:
 

• LED according to	Sheet R-P-06-01-02-00/R-00
• Circuit Breakers according to	Sheet R-C-06-00-00-00/R-00
• Relays according to	Sheet R-C-06-00-00-00/R-01
• Switches according to	Sheet R-C-06-00-00-00/R-02
• Diodes according to	Sheet R-C-06-00-00-00/R-03
6. Repeat Steps 1 through 5 for the "B" LV Locker.
7. Record inspection results on the Defect Report Card for administrative and maintenance planning.

**H INDICATOR LIGHT DOORS**

1. Check ADA Lamp and DOOR OUT OF SERVICE (DOS) INDICATOR lamps  
If needed, replace :

- ADA Lamp according to Sheet R-C-04-10-00-00/R-00
- (DOS) INDICATOR lamps according to Sheet R-C-04-08-00-00/R-00

**I FINAL OPERATIONS**

**NOTE:** At Task Completion it is recommended to check the correct operation and/or functions of the Subsystem to which the maintained Equipment pertains.  
Refer to **HOW TO USE THE R-PM SHEETS** (para 06-III-03-03-02 of this Section) and follow the prescriptions provided at Step 3 "**At every Task Completion.**"

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-01-00-01/R-00**

System:

**LIGHTING**

Sheet:

**1/8**

Subsystem/Assy:

**INTERNAL LIGHTING AND CAB SYSTEM**

Unit:

Component:

**LAMP**

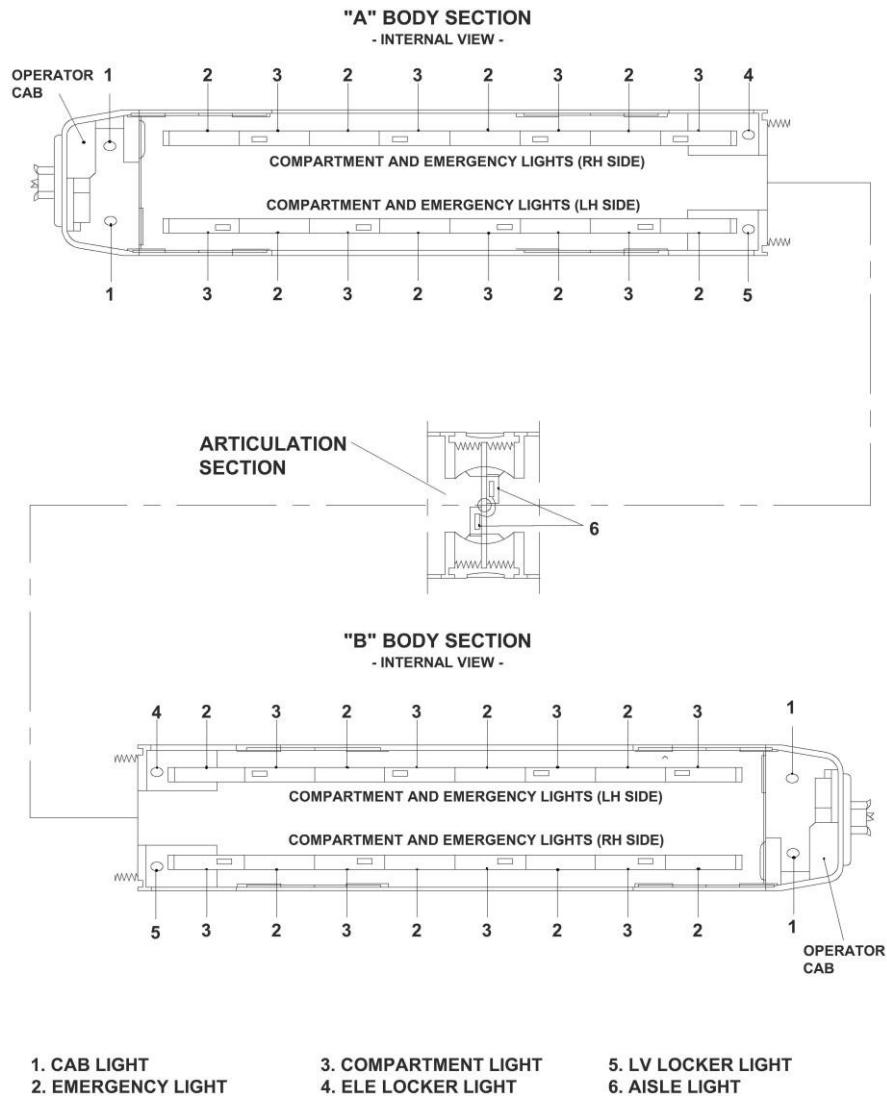
Man Hours:

**3**

Maintenance Task:

**REPLACEMENT**

Interval/Miles:

**60,000**
**LOCATION:**


## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-01-00-01/R-00**

System:

**LIGHTING**

Sheet:

**2/8**

Subsystem/Assy:

**INTERNAL LIGHTING AND CAB SYSTEM**

Unit:

Component:

**LAMP**

Man Hours:

**3**

Maintenance Task:

**REPLACEMENT**

Interval/Miles:

**60,000**

### **SAFETY PRECAUTIONS:**

**WARNING: WEAR HAND AND EYE PROTECTION WHEN HANGING LAMP TUBES TO PREVENT INJURY FROM SHATTERED GLASS.**

**WARNING: CONTACT WITH ELECTRIC PARTS CAN CAUSE PERSONAL INJURY IF THE ELECTRIC CURRENT IS ALIVE. TO AVOID ACCIDENTS, IF ELECTRIC CURRENT NEED TO BE CONNECTED FOR TESTING PURPOSES. KEEP HANDS, TOOLS ETC. AWAY FROM ANY ELECTRIC PART, IN ANY OTHER CASE, CUT OFF ALL ELECTRIC SUPPLY TO THE SYSTEM.**

**CAUTION: TO PERFORM LIGHTING SYSTEM COMPONENTS MAINTENANCE, THE 37.5 VDC REMOVAL IS NOT NECESSARY BUT RECOMMENDED TO AVOID DAMAGE TO EQUIPMENT.**

### **TOOLS:**

LACMTA Maintenance Shop Standard Tools Kit  
MULTIMETER (FLUKE 87 V/E) PN 4EB19

### **CONSUMABLES:**

N/A

### **SPARE PARTS:**

FT32T8 (48") COOL WHITE FUORESCENT LAMP  
FB024T8 (18") LAMP  
HALOGEN LAMP (10 W)  
LED WHITE - 37 Vdc 0.08 A 2.7 W

P/N AA04FAW  
P/N AA04FAV  
P/N TRANS-LITE M-85461-6

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-01-00-01/R-00**

System:

**LIGHTING**

Sheet:

**3/8**

Subsystem/Assy:

**INTERNAL LIGHTING AND CAB SYSTEM**

Unit:

Component:

**LAMP**

Man Hours:

**3**

Maintenance Task:

**REPLACEMENT**

Interval/Miles:

**60,000**

### PROCEDURE:

To perform the Task proceed as follows

#### PRELIMINARY OPERATION

1. Set the Vehicle in safety condition in accordance with LACMTA Maintenance Shop regulations.
2. According to the Item to be replaced, place to "OFF" position the relevant CB as follows:

ITEM	CIRCUIT BREAKER	CB LOCATION
Compartment / Emergency Lights	8F02	"B" CAB CB PANEL
	8F03	LV LOCKER - B SECTION
	8F04	
	8F05	"B" CAB CB PANEL
ELE Locker Light	8F18	LV LOCKER - A / B SECTION
LV Locker Light	8F18	LV LOCKER - A / B SECTION
Aisle Light	8F05	"B" CAB CB PANEL
Cab Light	8F01	LV LOCKER - A / B SECTION


**LV LOCKER - A / B SECTION**
**"B" CAB CB PANEL  
CIRCUIT BREAKERS LOCATION**
**LV LOCKER - A / B SECTION**

#### A COMPARTMENT / EMERGENCY LIGHTS LAMP

To replace the Compartment / Emergency Lights Lamp refer to Sheet R-C-06-01-02-00/R-00

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-01-00-01/R-00**

Sheet:

**4/8**System:  
**LIGHTING**Subsystem/Assy:  
**INTERNAL LIGHTING AND CAB SYSTEM**

Unit:

Component:  
**LAMP**Man Hours:  
**3**

Maintenance Task:

**REPLACEMENT**Interval/Miles:  
**60,000**

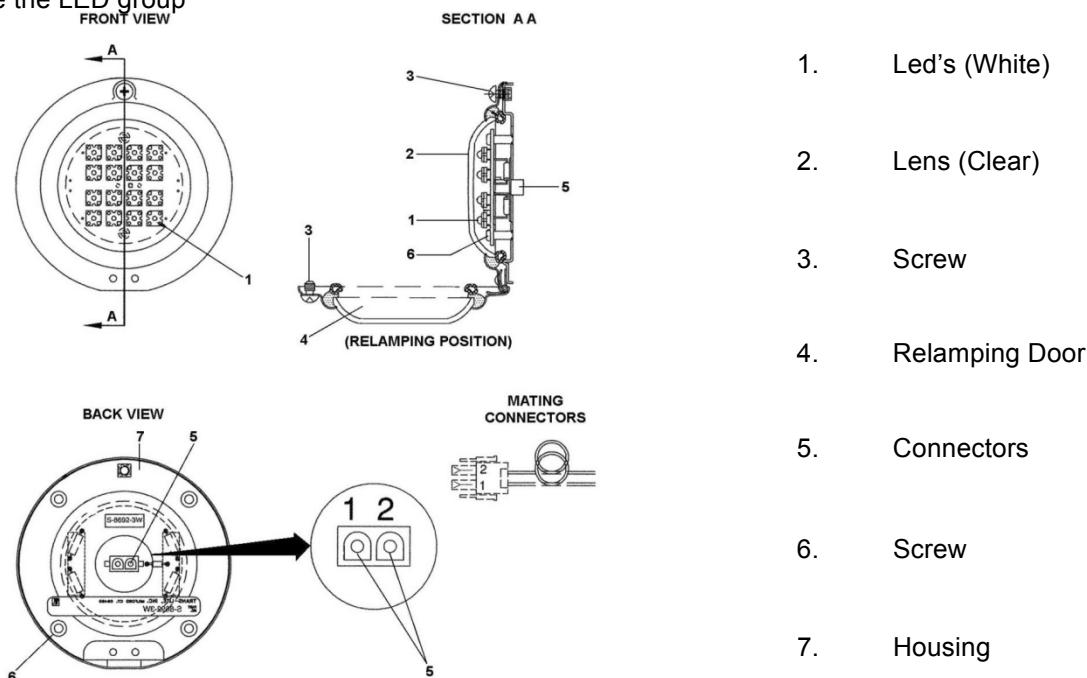
### PROCEDURE (CONT'D):

#### B ELE & LV LOCKER LIGHT -LED

##### REMOVAL

To remove LED, proceed as follows:

1. Turn off Power to the Locker Light by switching OFF the relevant Circuit Breaker previously indicated in the Preliminary Operations.
2. Supporting the Relamping Door (4) Assembly loose the Head Closing Screw (3) until the Door opens.
3. Remove the LED group



**ELE & LV LOCKER LIGHTS Components**

##### INSTALLATION

To install the Led, proceed as follows

1. Position the new LED group
2. Temporarily activate Power to Locker Light and verify illumination.
3. Close and secure the Relamping Door (4) assembly with head closing screw (3).
4. Turn on Power to the Locker Light by switching ON the relevant Circuit Breaker previously indicated in the Preliminary Operations.

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-01-00-01/R-00**

System:

**LIGHTING**

Sheet:

**5/8**

Subsystem/Assy:

**INTERNAL LIGHTING AND CAB SYSTEM**

Unit:

Component:

**LAMP**

Man Hours:

**3**

Maintenance Task:

**REPLACEMENT**

Interval/Miles:

**60,000**

### PROCEDURE (CONT'D):

#### C AISLE LIGHT LAMP

##### REMOVAL

To remove the Lamp, proceed as follows:

1. Turn off Power to the Locker Light by switching OFF the relevant Circuit Breaker previously indicated in the Preliminary Operations.
2. Supporting the Relamping Door, loose the two Phillips Head Closing Screws until the Relamping Door opens.
3. Carefully allow Relamping Door to hinge downward into open position.
4. Carefully allow Reflector to hinge downward into open position. Do not apply pressure to the Lamp. Do not rotate the Lamp.
5. Gently support (do not apply pressure) the Lamp and depress the Lamp Retaining Button on one Lamp Holder until it clears the Lamp.
6. Do not rotate the Lamp, but carefully pull the Lamp end straight from the Lamp Holder. Set Lamp aside to avoid breakage.
7. Ensure expired and damaged Lamps are disposed properly.

##### INSTALLATION

To install the Lamp, proceed as follows:

1. Ensure Power is off to the relevant Reflector Assy using the Multimeter
2. Insert one end of the Lamp into the Lamp Holder.
3. Do not rotate the Lamp. Carefully press the other end of the Lamp straight into the opposite Lamp Holder, past the Lamp Retaining Button.
4. Ensure both Lamp Holder Retaining Buttons are properly positioned over Lamp Ends.
5. Temporarily activate power and verify illumination.
6. Close and secure the Reflector with two Phillips Head Closing Screws.
7. Close and secure the Relamping Door with two Phillips Head Closing Screws.
8. Turn on Power to the Aisle Lights by switching ON the relevant Circuit Breaker previously indicated in the Preliminary Operations.

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-01-00-01/R-00**

System:

**LIGHTING**

Sheet:

**6/8**

Subsystem/Assy:

**INTERNAL LIGHTING AND CAB SYSTEM**

Unit:

Component:

**LAMP**

Man Hours:

**3**

Maintenance Task:

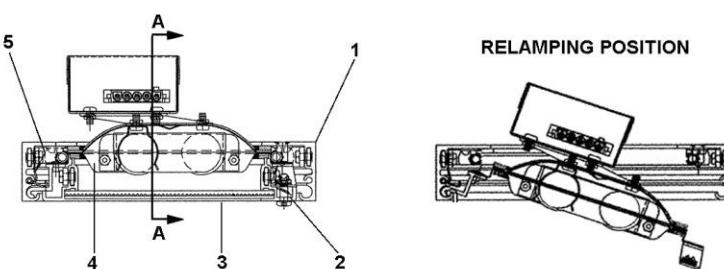
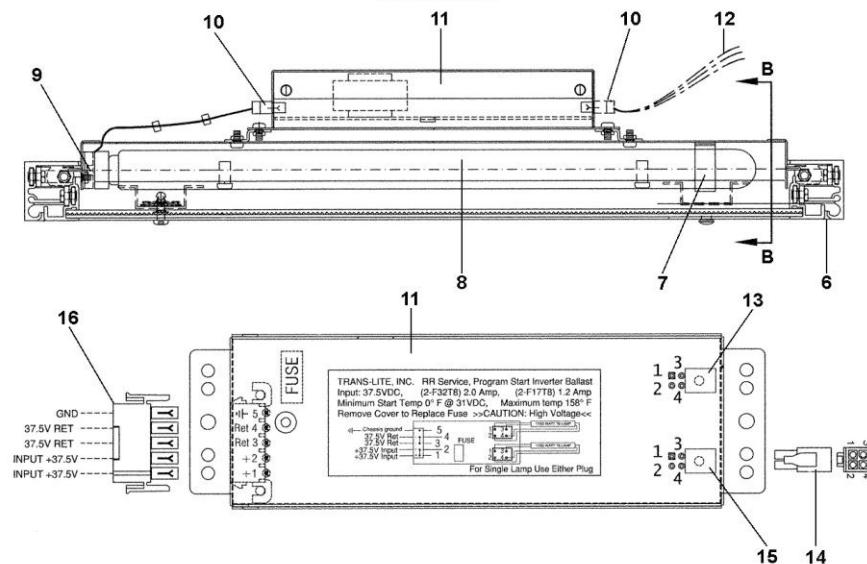
**REPLACEMENT**

Interval/Miles:

**60,000**

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

#### **AISLE LIGHT LAMP (CONT'D)**

**SECTION B B****SECTION A A**

- |                   |               |                                |
|-------------------|---------------|--------------------------------|
| 1. Frame ASM      | 7. Lamp Clamp | 12. Car wiring                 |
| 2. Relamping Door | 8. Lamp       | 13. Socket (to remote Fixture) |
| 3. Lens (Clear)   | 9. Lampholder | 14. Connector (output)         |
| 4. Reflector      | 10. Plug      | 15. Socket (output)            |
| 5. Retainer       | 11. Ballast   | 16. Connector (input)          |
| 6. Catch screw    |               |                                |

**AISLE LIGHT - WITH BALLAST**

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-01-00-01/R-00**

System:

**LIGHTING**

Sheet:

**7/8**

Subsystem/Assy:

**INTERNAL LIGHTING AND CAB SYSTEM**

Unit:

Component:

**LAMP**

Man Hours:

**3**

Maintenance Task:

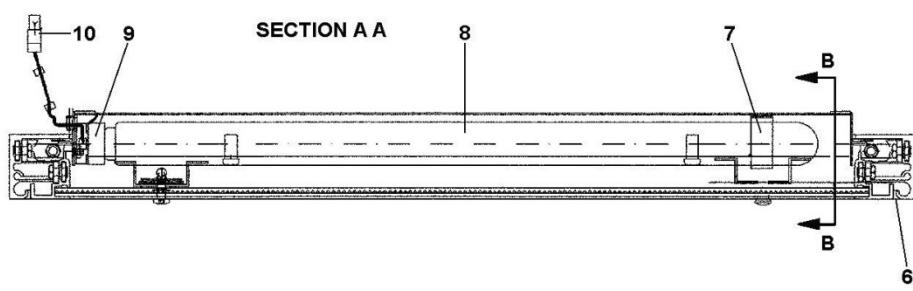
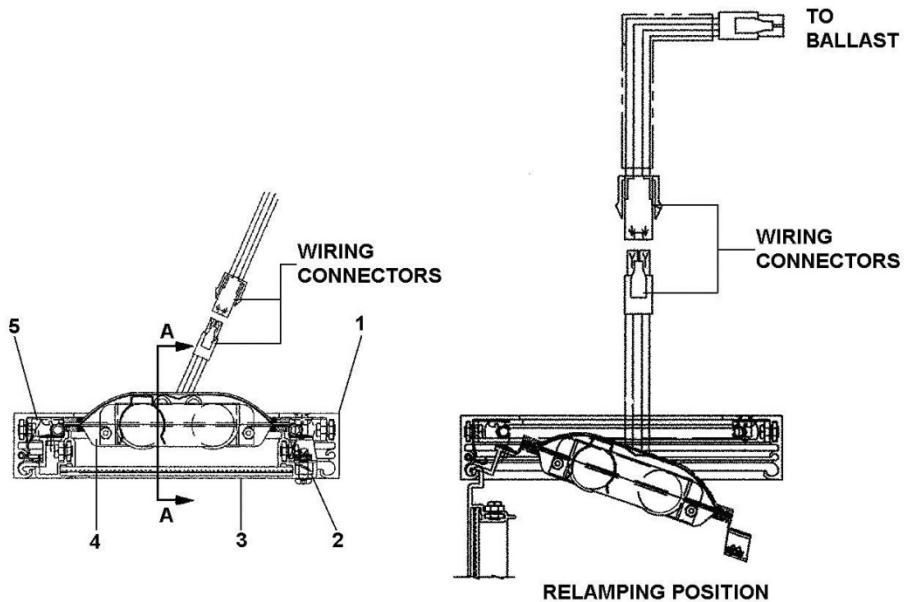
**REPLACEMENT**

Interval/Miles:

**60,000**

### PROCEDURE (CONT'D):

#### AISLE LIGHT LAMP (CONT'D)



1. Frame ASM
2. Relamping Door
3. Lens (Clear)

4. Reflector
5. Retainer
6. Catch Screw

7. Lamp Clamp
8. Lamp
9. Lampholder

**AISLE LIGHT - WITHOUT BALLAST**

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-01-00-01/R-00**

System:

**LIGHTING**

Sheet:

**8/8**

Subsystem/Assy:

**INTERNAL LIGHTING AND CAB SYSTEM**

Unit:

Component:

**LAMP**

Man Hours:

**3**

Maintenance Task:

**REPLACEMENT**

Interval/Miles:

**60,000**

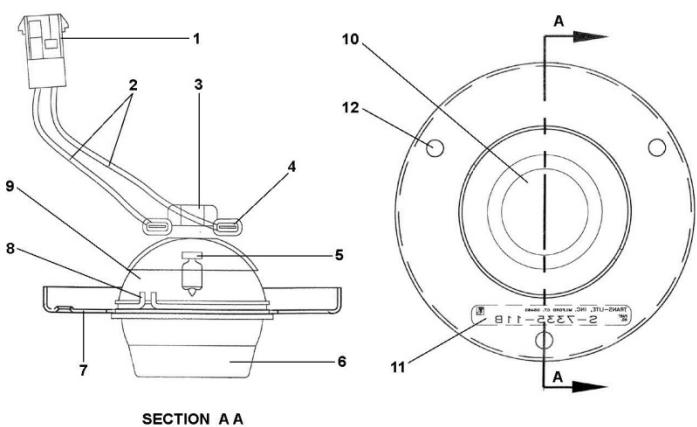
### PROCEDURE (CONT'D):

#### D CAB LIGHTS LAMP

##### REMOVAL

To Remove Light Bulb, proceed as follows

- 1 Turn off Power to the Cab Lights by switching OFF the relevant Circuit Breaker previously indicated in the Preliminary Operations.
2. Turn bezel CCW, and remove it.
3. Pull Lamp off to remove from socket.



1. Connector
2. Cable
3. Socket
4. Fast Connection
5. Lamp (Halogen)
6. Fixture (Adjustable)
7. Plate
8. Retainer Ring
9. Lamp housing
10. Glass Lens
11. Label
12. Screw

##### INSTALLATION

To Install Light Bulb, proceed as follows:

1. Push Lamp in to install in the socket.
2. Position bezel tighten by turning CW.
3. Turn on Power to the Cab Lights by switching ON the relevant Circuit Breaker previously indicated in the Preliminary Operations.

#### E FINAL OPERATIONS

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

Refer to **HOW TO USE THE R-PM SHEETS** (para 06-III-03-03-02 of this Section) and follow the prescriptions provided at Step 3 “At every Task Completion.”

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-02-00-00/I-00**

System:

**LIGHTING**

Sheet:

**1/10**

Subsystem/Assy:

**EXTERNAL LIGHTING SYSTEM**

Unit:

Component:

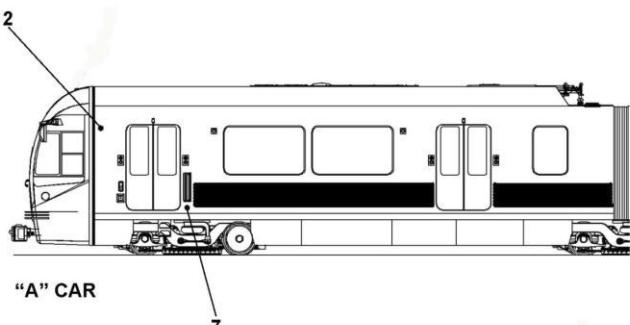
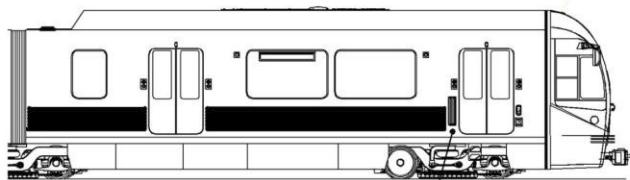
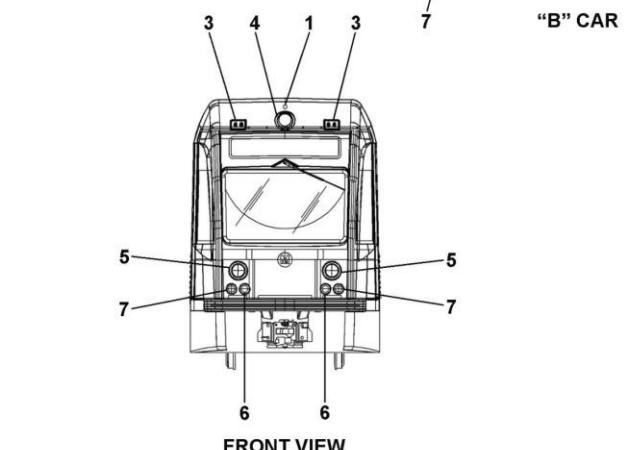
Man Hours:

**1**

Maintenance Task:

**INSPECTION**

Interval/Miles:

**10,000**
**LOCATION:**

**1 Silent Alarm Light**

**2 "By Pass Active" Light**

**3 Marker Lights**
**4 Roof Head Light**
**5 Front Head Lights**
**6 Stop/Tail Lights**
**7 Turn Indicator / Hazard Lights**
**EXTERNAL LIGHTING**

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-02-00-00/I-00**

System:

**LIGHTING**

Sheet:

**2/10**

Subsystem/Assy:

**EXTERNAL LIGHTING SYSTEM**

Unit:

Component:

Man Hours:

**1**

Maintenance Task:

**INSPECTION**

Interval/Miles:

**10,000****SAFETY PRECAUTIONS:**

LACMTA Safety Rules &amp; Regulations

**TOOLS:**LACMTA Maintenance Shop Standard Tools Kit.  
MULTIMETER (FLUKE 87 V/E) PN 4EB19**CONSUMABLES:**

N/A

**SPARE PARTS:**

- LED AMBER	37.5 Vdc 70-154 MA 5.7 W	P/N TRANS-LITE M-8005-4°
- LED BLUE	37.5 Vdc 81 MA 2.7 W	P/N TRANS-LITE M-8561-4
- LED RED	37.5 Vdc	P/N TRANS-LITE M-8054-4R
- LED AMBER	37.5 Vdc	P/N TRANS-LITE M-8054-5A
- LED RED	37.5 Vdc 34-57 MA 2.1 W	P/N TRANS-LITE M-8805-2
- LED AMBER	37.5 Vdc 32-74 MA 2.7 W	P/N TRANS-LITE M-8005-2A
- ROOF HEADLIGHT LAMP	SINGLE FILAMENT - GE PAR-56 30V/200W VNSP	P/N AA04FAY
- HEADLIGHT LAMP	DOUBLE FILAMENT - H4 24V 70-75 W - P43T HD	P/N AA00FL9

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-02-00-00/I-00**

System:

**LIGHTING**

Sheet:

**3/10**

Subsystem/Assy:

**EXTERNAL LIGHTING SYSTEM**

Unit:

Component:

Man Hours:

**1**

Maintenance Task:

**INSPECTION**

Interval/Miles:

**10,000**

### PROCEDURE:

#### PRELIMINARY OPERATIONS

1. Set the Vehicle in safety condition in accordance with LACMTA Maintenance Shop regulations.
2. Set the Transfer Switch (located on the Operator's Console) to "ON" or "LOCAL" Position.

#### INSPECTION

To perform the Task proceed as follows:

**NOTE:** It is assumed that all Circuit Breakers of the Internal & Cab Lighting System are in proper working position

##### (1) SILENT ALARM LIGHT

1. Enter the "A" Cab
2. Press Silent Alarm Pushbutton 8S05  
(located under Operator's Console LH side).
3. Check that the Silent Alarm Light, located on the Top of the Front Head, is flashing.
4. If the Silent Alarm Light is off, check that the CB 08F13  
(located on the "B" Section LV Locker) is ON. Set it accordingly
5. If the trouble persists perform Troubleshooting to find the faulty Component to be replaced
6. As per Troubleshooting Result replace:
  - LED according to Sheet R-C-06-02-05-00/R-00
  - Circuit Breakers according to Sheet R-C-06-00-00-00/R-00
  - Relays according to Sheet R-C-06-00-00-00/R-01
  - Switches according to Sheet R-C-06-00-00-00/R-02
  - Diodes according to Sheet R-C-06-00-00-00/R-03
7. Turn off power by switching OFF the CB 08F13
8. Gain safely access to the Top of the Front Head using suitable scaffold
9. Open Silent Alarm Light Relamping Door.
10. Inspect Lens and LED's for damage. Replace the Lens or LED's as necessary.
11. Inspect Lens for discoloration, cracks, and chips. Replace if necessary.
12. Check Light Wiring Harness Assembly and Wiring Connections for signs of arching, pitting or corrosion. Replace items exhibiting any of these symptom(s).
13. Inspect for loose mounting. Tighten as necessary.
14. Note any Item requiring Corrective Maintenance.
15. Turn on power to Silent Alarm Light
16. Repeat Steps 1 through 14 for "B" Cab
17. Record inspection results on the Defect Report Card for administrative and maintenance planning.



SILENT ALARM PUSHBUTTON



SILENT ALARM LIGHT



SILENT ALARM MARKER LIGHTS  
8F13



ABB

S2-H11 FS S 261 UC

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## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-02-00-00/I-00**

System:

**LIGHTING**

Sheet:

**4/10**

Subsystem/Assy:

**EXTERNAL LIGHTING SYSTEM**

Unit:

Component:

Man Hours:

**1**

Maintenance Task:

**INSPECTION**

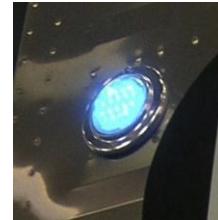
Interval/Miles:

**10,000**

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

#### **"(2) BY-PASS ACTIVE "LIGHT**

1. Enter the " A " Cab
2. Set the ATP BY-PASS SWITCH (11S01) (located on the "A" Section By-Pass Panel) to ON Position:
3. Check that the "By-Pass Active "Light, located next the Front Doors, is on.
4. If the "By-Pass Active " Light is off, check that the CB 08F16 (located on the "A" Section LV Locker) is ON. Set it accordingly
5. If the trouble persists perform Troubleshooting to find the faulty Component to be replaced
6. As per Troubleshooting Result replace:
  - LED according to Sheet R-C-06-02-11-00/R-00
  - Circuit Breakers according to Sheet R-C-06-00-00-00/R-00
  - Relays according to Sheet R-C-06-00-00-00/R-01
  - Switches according to Sheet R-C-06-00-00-00/R-02
  - Diodes according to Sheet R-C-06-00-00-00/R-03
7. Turn off power by switching OFF the CB 08F16
8. Open Silent Alarm Light Relamping Door.
9. Inspect Lens and LED's for damage. Replace the Lens or LED's as necessary.
10. Inspect Lens for discoloration, cracks, and chips. Replace if necessary.
11. Check Light Wiring Harness Assembly and Wiring Connections for signs of arching, pitting or corrosion. Replace items exhibiting any of these symptom(s).
12. Inspect for loose mounting. Tighten as necessary.
13. Note any Item requiring corrective maintenance.
14. Turn on power to "By-Pass Active "Light
15. Repeat Steps 1 through 14 for "B " Cab
16. Record inspection results on the Defect Report Card for administrative and maintenance planning.



**"BY-PASS  
ACTIVE" LIGHT**



**"A" SECTION LV  
LOCKER**

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-02-00-00/I-00**

System:

**LIGHTING**

Sheet:

**5/10**

Subsystem/Assy:

**EXTERNAL LIGHTING SYSTEM**

Unit:

Component:

Man Hours:

**1**

Maintenance Task:

**INSPECTION**

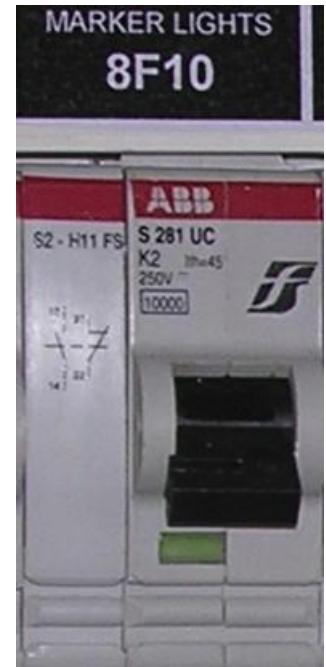
Interval/Miles:

**10,000**

### PROCEDURE (CONT'D):

#### (3) MARKER LIGHTS

1. Check that the RH & LH Marker Lights are on (Amber on Vehicle Front and Red on Vehicle Rear)..
2. If the Marker Light are off, check that the CB 08F10 (located on the "A" Section LV Locker) is ON. Set it accordingly
3. If the trouble persists perform Troubleshooting to find the faulty Component to be replaced
4. As per Troubleshooting Result replace:
  - LED according to Sheet R-C-06-02-03-00/R-00
  - Circuit Breakers according to Sheet R-C-06-00-00-00/R-00
  - Relays according to Sheet R-C-06-00-00-00/R-01
  - Switches according to Sheet R-C-06-00-00-00/R-02
  - Diodes according to Sheet R-C-06-00-00-00/R-03
7. Turn off power by switching OFF the CB 08F10
8. Gain safely access to the Vehicle Front / Rear Heads using suitable scaffold
9. Inspect Bezel for damage, and proper Gasket seal. Replace Gasket and/or Bezel as necessary.
10. Inspect for discoloration of Lens, cracks, and chips. Replace items showing any of these symptom(s).
11. Check LED module, Wiring Harness Assembly, and Connector Contacts for signs of arcing, pitting or corrosion. Replace items exhibiting any of these symptom(s).
12. Inspect for loose or missing hardware. Tighten or replace hardware as necessary.
13. Note any Item requiring corrective maintenance.
14. Turn on power to "By-Pass Active "Light
15. Repeat Steps 1 through 14 for "B " Cab
16. Record inspection results on the Defect Report Card for administrative and maintenance planning.

**MARKER LIGHT ASSY****"A" SECTION  
LV LOCKER**

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-02-00-00/I-00**

System:

**LIGHTING**

Sheet:

**6/10**

Subsystem/Assy:

**EXTERNAL LIGHTING SYSTEM**

Unit:

Component:

Man Hours:

**1**

Maintenance Task:

**INSPECTION**

Interval/Miles:

**10,000****PROCEDURE (CONT'D):****(4) ROOF HEAD LIGHT****ROOF HEAD LIGHT****HEADLIGHTS SWITCH 8S02****INDICATOR PANEL****HORN P.B. 10S01  
GONG P.B. 10S02****CAB CB PANEL**

1. Enter the "A" Cab and designate it as Lead Cab
2. Operate the Headlights Switch 8S02 (located on the Operator's Console LH side) to "HIGH" position
3. Check (externally) that the Light Beams change direction and intensity.
4. Check that the "High Beams" Indicator, located in the Indicator Panel (above the Cab Windshield); turn on
5. Operate the Switch 8S02 to "LOW" position
6. Operate the Horn Pushbutton 10S01 (located on the Operator's Console RH side) and, at the same time, check (externally) that the Light Beams and the "High Beams" Indicator flash.
7. Repeat the previous step by operating the Gong Pushbutton 10S02
8. If any previous checks fail, check that the CB 08F11 and CB 08F12 (located on the Cab CB Panel) are ON. Set them accordingly
9. If the trouble persists perform Troubleshooting to find the faulty Component to be replaced
- 10 As per Troubleshooting Result replace:
  - Lamp according to Sheet R-C-06-02-06-00/R-00
  - Circuit Breakers according to Sheet R-C-06-00-00-00/R-00
  - Relays according to Sheet R-C-06-00-00-00/R-01
  - Switches according to Sheet R-C-06-00-00-00/R-02
  - Diodes according to Sheet R-C-06-00-00-00/R-03
- 11 Turn off power by switching OFF the CB 08F11 and CB 08F12
- 12 Gain safely access to the Roof Head Light through the Cab Ceiling Inspection Panel
- 13 Inspect for damage (cracks, chips, etc.), and proper gasket seal as applicable. Replace faulty items as necessary.
- 14 Inspect Lamp for open filament, discoloration of inside glass, and contact pitting or corrosion. Replace Lamp exhibiting any of these symptom(s).
- 15 Inspect Lamp socket for contact pitting or corrosion. Replace Lamp socket exhibiting any of these symptom(s).
- 16 Inspect for loose or missing hardware. Tighten or replace hardware as necessary.
17. Note any Item requiring Corrective Maintenance.
18. Turn on power to Roof Head Light
19. Repeat Steps 1 through 18 for "B" Cab
20. Record inspection results on the Defect Report Card for administrative and maintenance planning.

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-02-00-00/I-00**

System:

**LIGHTING**

Sheet:

**7/10**

Subsystem/Assy:

**EXTERNAL LIGHTING SYSTEM**

Unit:

Component:

Man Hours:

**1**

Maintenance Task:

**INSPECTION**

Interval/Miles:

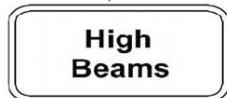
**10,000**

### PROCEDURE (CONT'D):

#### (4) FRONT HEAD LIGHTS

1. Enter the " A " Cab and designate it as Lead Cab
2. Operate the Headlights Switch 8S02 (located on the Operator's Console LH side).to " HIGH " position
3. Check (externally) that the Light Beams change direction and intensity.
4. Check that the "High Beams "Indicator, located in the Indicator Panel (above the Cab Windshield); turn on
5. Operate the Switch 8S02 to " LOW " position
6. Operate the Horn Pushbutton 10S01 (located on the Operator's Console RH side) and, at the same time, check (externally) that the Light Beams and the "High Beams "Indicator flash.
7. Repeat the previous step by operating the Gong Pushbutton 10S02
8. If any previous checks fail, check that the CB 08F11 (located on the Cab CB Panel) is ON. Set it accordingly
9. If the trouble persists perform Troubleshooting to find the faulty Component to be replaced
10. As per Troubleshooting Result replace:
  - Lamp according to Sheet R-C-06-02-01-00/R-00
  - Circuit Breakers according to Sheet R-C-06-00-00-00/R-00
  - Relays according to Sheet R-C-06-00-00-00/R-01
  - Switches according to Sheet R-C-06-00-00-00/R-02
  - Diodes according to Sheet R-C-06-00-00-00/R-03
11. Turn off power by switching OFF the CB 08F11
12. Inspect for damage (cracks, chips, etc.), and proper gasket seal as applicable. Replace faulty items as necessary.
13. Inspect Lamp for open filament, discoloration of inside glass, and contact pitting or corrosion. Replace Lamp exhibiting any of these symptom(s).
14. Inspect Lamp socket for contact pitting or corrosion. Replace Lamp socket exhibiting any of these symptom(s).
15. Inspect for loose or missing hardware. Tighten or replace hardware as necessary.
16. Note any Item requiring Corrective Maintenance.
17. Turn on power to Front Head Lights
18. Repeat Steps 1 through 17 for "B " Cab
19. Record inspection results on the Defect Report Card for administrative and maintenance planning.


**FRONT HEAD LIGHT**

**HEADLIGHTS  
SWITCH 8S02**

**HIGH BEAMS INDICATOR**

**HORN P.B. 10S01  
GONG P.B.10S02**

**CAB CB PANEL**

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-02-00-00/I-00**

System:

**LIGHTING**

Sheet:

**8/10**

Subsystem/Assy:

**EXTERNAL LIGHTING SYSTEM**

Unit:

Component:

Man Hours:

**1**

Maintenance Task:

**INSPECTION**

Interval/Miles:

**10,000****PROCEDURE (CONT'D):****(6) STOP LIGHTS**

1. Enter the " A " Cab and designate it as Lead Cab and direction
2. Set Master Controller Handle to FSB/HRSB/SCHEB Position and check, at Vehicle End, that the two Stop Lights are on (Red)
3. If one or more Stop Lights are off, check that CB 08F14 (located on the "B" Section LV Locker) is ON. Set it accordingly
4. If the trouble persists perform Troubleshooting to find the faulty Component to be replaced
5. As per Troubleshooting Result replace:
  - LED according to Sheet R-C-06-02-07-00/R-00
  - Circuit Breakers according to Sheet R-C-06-00-00-00/R-00
  - Relays according to Sheet R-C-06-00-00-00/R-01
  - Switches according to Sheet R-C-06-00-00-00/R-02
  - Diodes according to Sheet R-C-06-00-00-00/R-03
6. Turn off power by switching OFF the CB 08F14
7. Open Re-lamping Door.
8. Inspect Lens and LED's for damage.  
Replace the Lens or LED's as necessary.
9. Inspect Lens for discoloration, cracks, and chips. Replace if necessary.
10. Check Light Wiring Harness Assembly and Wiring Connections for signs of arching, pitting or corrosion.  
Replace items exhibiting any of these symptom(s).
11. Inspect for loose mounting. Tighten as necessary.
12. Install Lens and LED's as applicable.
13. Note any Item requiring Corrective Maintenance.
14. Turn on power to Stop Lights
15. Repeat Steps 1 through 14 for "B " Cab
16. Record inspection results on the Defect Report Card for administrative and maintenance planning.

**STOP LIGHT****MC HANDLE****"B" SECTION LV LOCKER**

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-02-00-00/I-00**

System:

**LIGHTING**

Sheet:

**9/10**

Subsystem/Assy:

**EXTERNAL LIGHTING SYSTEM**

Unit:

Component:

Man Hours:

**1**

Maintenance Task:

**INSPECTION**

Interval/Miles:

**10,000**

### PROCEDURE (CONT'D):

#### (6) TAIL LIGHTS

1. Enter the "A" Cab and designate it as Lead Cab and direction
2. Check, at Vehicle End, that the two Tail Lights are on (Red)
3. If one or both Tail Lights are off, check that CB 08F15 (located on the "B" Section LV Locker) is ON. Set it accordingly
4. If the trouble persists perform Troubleshooting to find the faulty Component to be replaced
5. As per Troubleshooting Result replace:
  - LED according to Sheet R-C-06-02-07-00/R-00
  - Circuit Breakers according to Sheet R-C-06-00-00-00/R-00
  - Relays according to Sheet R-C-06-00-00-00/R-01
  - Switches according to Sheet R-C-06-00-00-00/R-02
  - Diodes according to Sheet R-C-06-00-00-00/R-03
6. Turn off power by switching OFF the CB 08F15
7. Open Re-lamping Door.
8. Inspect Lens and LED's for damage.  
Replace the Lens or LED's as necessary.
9. Inspect Lens for discoloration, cracks, and chips. Replace if necessary.
10. Check Light Wiring Harness Assembly and Wiring Connections for signs of arching, pitting or corrosion.  
Replace items exhibiting any of these symptom(s).
11. Inspect for loose mounting. Tighten as necessary.
12. Install Lens and LED's as applicable.
13. Note any Item requiring Corrective Maintenance.
14. Turn on power to Tail Lights
15. Repeat Steps 1 through 14 for "B" Cab
16. Record inspection results on the Defect Report Card for administrative and maintenance planning.

**TAIL LIGHT****"B" SECTION LV LOCKER**

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-02-00-00/I-00**

System:

**LIGHTING**

Sheet:

**10/10**

Subsystem/Assy:

**EXTERNAL LIGHTING SYSTEM**

Unit:

Component:

Man Hours:

**1**

Maintenance Task:

**INSPECTION**

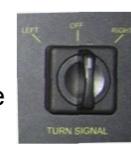
Interval/Miles:

**10,000****PROCEDURE (CONT'D):****(7) TURN INDICATOR & HAZARD LIGHTS**

1. Enter the "A" Cab and designate it as Lead Cab
2. Operate in sequence the Turn Signal Switch 8S03 (located on the Operator's Console RH side).to "LEFT" and "RIGHT" position
3. Check (externally) that all the Turn Indicator Lights of the designated side flash.
4. Check that the "Left Turn" & "Right Turn" Indicators, located in the Indicator Panel (above the Cab Windshield); turn on and flash
5. Place the Turn Signal Switch 8S03 to OFF
6. Press the Hazard Pushbutton 8S04 (located on the Operator's Console RH side)
7. Check (externally) that all RH & LH the Turn Indicator Lights flash at the same time
8. Check that the "Left Turn" & "Right Turn" Indicators flash.
9. If any previous checks fail, check that the CB 08F07, CB 08F08 (for LH side) and 08F09 (for RH side) (located respectively on the "A" / "B" Section LV Lockers) are ON. Set they accordingly
- 10** If the trouble persists perform Troubleshooting to find the faulty Component to be replaced

**11** As per Troubleshooting Result replace:

- LED according to Sheet R-C-06-02-10-00/R-00
- Circuit Breakers according to Sheet R-C-06-00-00-00/R-00
- Relays according to Sheet R-C-06-00-00-00/R-01
- Switches according to Sheet R-C-06-00-00-00/R-02
- Diodes according to Sheet R-C-06-00-00-00/R-03

**12** Turn off power by switching OFF the CB 08F07,CB 08F08 and CB 08F09**13** Open Re-lamping Door.**14** Inspect Lens and LED's for damage.**15** Replace the Lens or LED's as necessary.**16** Inspect Lens for discoloration, cracks, and chips. Replace if necessary.**17** Check Light Wiring Harness Assembly and Wiring Connections for signs of arching, pitting or corrosion. Replace items exhibiting any of these symptom(s).**19** Inspect for loose mounting. Tighten as necessary.**20** Install Lens and LED's as applicable.**21** Note any Item requiring Corrective Maintenance.**22** Turn on power to Front Head Light**23** Repeat Steps 1 through 22 for "B" Cab**24**. Record inspection results on the Defect Report Card for administrative and Planning.**TURN INDICATOR & HAZARD LIGHT****TURN SIGNAL SWITCH****HAZARD P.B. 8S04****INDICATOR PANEL****LV LOCKERS CBs**

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-02-00-01/R-00**

System:

**LIGHTING**

Sheet:

**1/4**

Subsystem/Assy:

**EXTERNAL LIGHTING SYSTEM**

Unit:

Component:

**LAMP/LED**

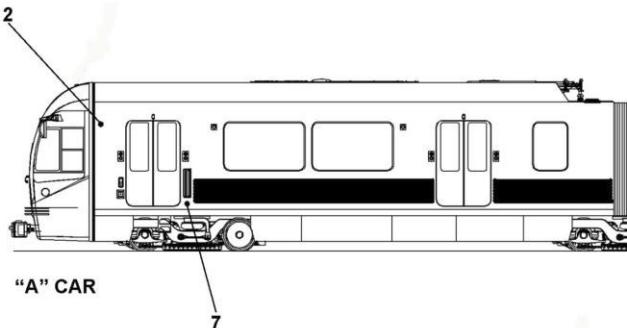
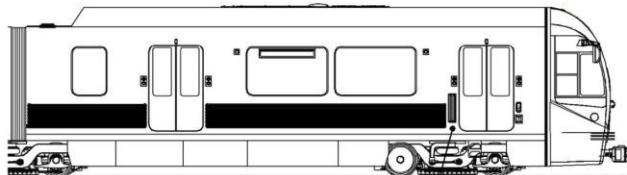
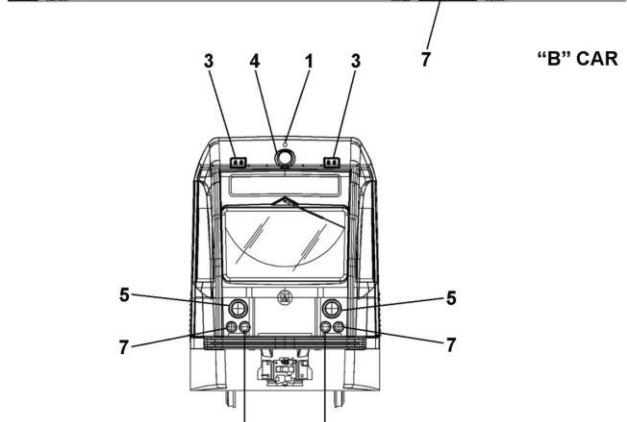
Man Hours:

**4**

Maintenance Task:

**REPLACEMENT**

Interval/Miles:

**60,000**
**LOCATION:**

**1 Silent Alarm Light**

**2 "By Pass Active" Light**

**3 Marker Lights**
**4 Roof Head Light**
**5 Front Head Lights**
**6 Stop/Tail Lights**
**7 Turn Indicator / Hazard Lights**
**EXTERNAL LIGHTING**

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-02-00-01/R-00**

System:

**LIGHTING**

Sheet:

**2/4**

Subsystem/Assy:

**EXTERNAL LIGHTING SYSTEM**

Unit:

Component:

**LAMP/LED**

Man Hours:

**4**

Maintenance Task:

**REPLACEMENT**

Interval/Miles:

**60,000**

### **SAFETY PRECAUTIONS:**

**WARNING: WEAR HAND AND EYE PROTECTION WHEN HANGING LAMP TUBES TO PREVENT INJURY FROM SHATTERED GLASS.**

**WARNING: CONTACT WITH ELECTRIC PARTS CAN CAUSE PERSONAL INJURY IF THE ELECTRIC CURRENT IS ALIVE. TO AVOID ACCIDENTS, IF ELECTRIC CURRENT NEED TO BE CONNECTED FOR TESTING PURPOSES. KEEP HANDS, TOOLS ETC. AWAY FROM ANY ELECTRIC PART, IN ANY OTHER CASE, CUT OFF ALL ELECTRIC SUPPLY TO THE SYSTEM.**

**CAUTION: TO PERFORM LIGHTING SYSTEM COMPONENTS MAINTENANCE, THE 37.5 VDC REMOVAL IS NOT NECESSARY BUT RECOMMENDED TO AVOID DAMAGE TO EQUIPMENT.**

### **TOOLS:**

LACMTA Maintenance Shop Standard Tools Kit  
MULTIMETER (FLUKE 87 V/E) PN 4EB19

### **CONSUMABLES:**

N/A

### **SPARE PARTS:**

- LED AMBER	37.5 Vdc 70-154 MA 5.7 W	P/N TRANS-LITE M-8005-4°
- LED BLUE	37.5 Vdc 81 MA 2.7 W	P/N TRANS-LITE M-8561-4
- LED RED	37.5 Vdc	P/N TRANS-LITE M-8054-4R
- LED AMBER	37.5 Vdc	P/N TRANS-LITE M-8054-5A
- LED RED	37.5 Vdc 34-57 MA 2.1 W	P/N TRANS-LITE M-8805-2
- LED AMBER	37.5 Vdc 32-74 MA 2.7 W	P/N TRANS-LITE M-8005-2A
- ROOF HEADLIGHT LAMP	SINGLE FILAMENT - GE PAR-56 30V/200W VNSP	P/N AA04FAY
- HEADLIGHT LAMP	DOUBLE FILAMENT - H4 24V 70-75 W - P43T HD	P/N AA00FL9

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-02-00-01/R-00**

System:

**LIGHTING**

Sheet:

**3/4**

Subsystem/Assy:

**EXTERNAL LIGHTING SYSTEM**

Unit:

Component:

**LAMP/LED**

Man Hours:

**4**

Maintenance Task:

**REPLACEMENT**

Interval/Miles:

**60,000**

### PROCEDURE:

To perform the Task proceed as follows:

### PRELIMINARY OPERATIONS

1. Set the vehicle in safety condition in accordance with LACMTA Maintenance Shop regulations.
2. According to the Item to be replaced, place to "OFF" position the relevant CB as follows:

LIGHTS	CIRCUIT BREAKER	CB LOCATION
Silent Alarm Light	8F13	LV LOCKER - B SECTION
"By Pass Active" Light	8F16	LV LOCKER - B SECTION
Marker Lights	8F10	LV LOCKER - A SECTION
Roof Head Light	8F11	CB PANEL - A/B CAB
	8F12	
Front Head Light	8F11	CB PANEL - A/B CAB
Stop Lights	8F14	LV LOCKER - A SECTION
Tail Lights	8F15	LV LOCKER - B SECTION
Turn Indicators/Hazard Lights	8F07 8F08 8F09	LV LOCKER - B SECTION


**LV LOCKER - A SECTION**

**CIRCUIT BREAKER LOCATION**

**CB PANEL - A/B CAB**

## P2550 PREVENTIVE MAINTENANCE SHEET

Card Code:

**R-P-06-02-00-01/R-00**

System:

**LIGHTING**

Sheet:

**4/4**

Subsystem/Assy:

**EXTERNAL LIGHTING SYSTEM**

Unit:

Component:

**LAMP/LED**

Man Hours:

**4**

Maintenance Task:

**REPLACEMENT**

Interval/Miles:

**60,000**

### PROCEDURE (CONT'D):



**LV LOCKER -B SECTION  
CIRCUIT BREAKER LOCATION**

### REPLACEMENT

ITEM TO BE REPLACED	REFERT TO SHEET
(1) SILENT ALARM LIGHT LED	R-C-06-02-05-00/R-00
(2) "BY PASS ACTIVE" LIGHTS LED	R-C-06-02-11-00/R-00
(3) MARKER LIGHTS LED	R-C-06-02-03-00/R-00
(4) ROOF HEAD LIGHT LAMP	R-C-06-02-06-00/R-00
(5) FRONT HEAD LIGHTS LAMP	R-C-06-02-01-00/R-00
(6) STOP/ LIGHTS LED	R-C-06-02-07-00/R-00
(7) TAIL LIGHTS LED	R-C-06-02-07-00/R-00
(8) TURN INDICATOR / HAZARD LIGHTS LED	R-C-06-02-10-00/R-00

### FINAL OPERATIONS

**NOTE:** At Task Completion it is recommended to check the correct operation and/or functions of the Subsystem to which the maintained Equipment pertains.  
 Refer to **HOW TO USE THE R-PM SHEETS** (para 06-III-03-03-02 of this Section) and follow the prescriptions provided at Step 3 "**At every Task Completion**".

## 06-III-04 RUNNING -CORRECTIVE MAINTENANCE

### 06-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.

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

The R-CMS Form (refer to Figure 06-III-04.1) consists of several fields containing the following data/ information:

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

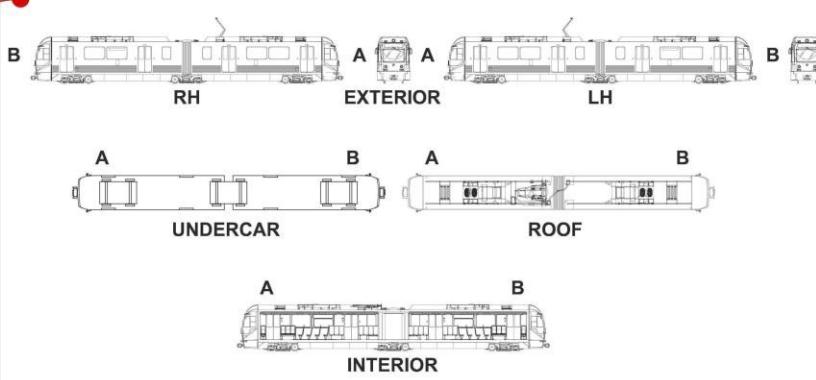
<b>RUNNING -CORRECTIVE MAINTENANCE SHEET (R-CMS) Form (cont'd)</b>			
<b>ITEM #</b>	<b>TITLE</b>	<b>CONTENT</b>	<b>EXPLANATORY NOTES</b>
8	Sheet	Pages numbering	This field indicates the progressive R-CMS sheet page number.
9	LOCATION	Illustration	This field indicates the On Board Location of the Equipment 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:		
<b>LOCATION:</b>		

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



**M<sub>Metro</sub>**

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

Page 011 Draft

**Figure 06-III-04.1 R-CMS Form  
(Sheet 1 of 2)**

LACMTA P2550 LRV Running Maintenance and Servicing Manual - Section 01		 <b>AnsaldoBreda</b>				
<b>P2550 CORRECTIVE MAINTENANCE SHEET</b>						
Card Code: <b>R-C-nn-mm-zz-ww/Y-kk</b>						
System:	Sheet:	<b>x/z</b>				
Subsystem/Assy:	Unit:					
Component:	Man Hours:					
Maintenance Task:						
<b>SAFETY PRECAUTIONS:</b>						
16						
<b>TOOLS:</b>						
17						
<b>CONSUMABLES:</b>						
18						
<b>SPARE PARTS:</b>						
19						
<b>PROCEDURE:</b>						
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 06-III-04.1 R-CMS Form  
(Sheet 2 of 2)**

## 06-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**").

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

The Lighting Running- Corrective Maintenance Sheets (R-CMS) List is provided in the following Table 06-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 06-III-04.1    Running Corrective Maintenance Sheets List**

<b>SYSTEM      06</b>		<b>LIGHTING</b>		
<b>SUBSYSTEM / ASSY</b>	<b>UNIT</b>	<b>COMPONENT</b>	<b>TASK</b>	<b>SHEET CODE</b>
CAB & CAR LIGHTING CONTROL		CIRCUIT BREAKER TYPE S280	REPLACEMENT (TYPICAL)	R-C-06-00-00-00/R-00
CAB & CAR LIGHTING CONTROL		RELAY	REPLACEMENT (TYPICAL)	R-C-06-00-00-00/R-01
CAB & CAR LIGHTING CONTROL		SWITCH	REPLACEMENT (TYPICAL)	R-C-06-00-00-00/R-02
CAB & CAR LIGHTING CONTROL		PROTECTIVE DIODE	REPLACEMENT (TYPICAL)	R-C-06-00-00-00/R-03
INTERNAL LIGHTING & CAB	REFLECTOR ASSY	BALLAST	REPLACEMENT	R-C-06-01-01-00/R-00
INTERNAL LIGHTING & CAB	REFLECTOR ASSY	LAMP	REPLACEMENT	R-C-06-01-02-00/R-00
INTERNAL LIGHTING & CAB	CAB LIGHT	LAMP	REPLACEMENT	R-C-06-01-03-00/R-00
EXTERNAL LIGHTING	FRONT HEAD LIGHTS	LAMP	REPLACEMENT	R-C-06-02-01-00/R-00
EXTERNAL LIGHTING	MARKER LIGHTS	LED	REPLACEMENT	R-C-06-02-03-00/R-00
EXTERNAL LIGHTING	SILENT ALARM LIGHT	LED	REPLACEMENT	R-C-06-02-05-00/R-00
EXTERNAL LIGHTING	ROOF HEAD LIGHT	LAMP	REPLACEMENT	R-C-06-02-06-00/R-00
EXTERNAL LIGHTING	STOP / TAIL LIGHTS	LED	REPLACEMENT	R-C-06-02-07-00/R-00
EXTERNAL LIGHTING	TURN / HAZARD LIGHTS	LED	REPLACEMENT	R-C-06-02-10-00/R-00
EXTERNAL LIGHTING	"BY PASS ACTIVE " LIGHTS	LED	REPLACEMENT	R-C-06-02-11-00/R-00
EXTERNAL LIGHTING	HEADLIGHTS	POWER SUPPLY	REPLACEMENT	R-C-06-02-12-00/R-00

**06-III-04.01.04      Running- Corrective Maintenance Sheets (R-CMS)**

## **LIGHTING**

### **Running - Corrective Maintenance Sheets**

#### **R-CMS**

**INTENTIONALLY LEFT BLANK**

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-00-00-00/R-00**

System:

**LIGHTING**

Sheet:

**1/10**

Subsystem/Assy:

**CAB & CAR LIGHTING CONTROL**

Unit:

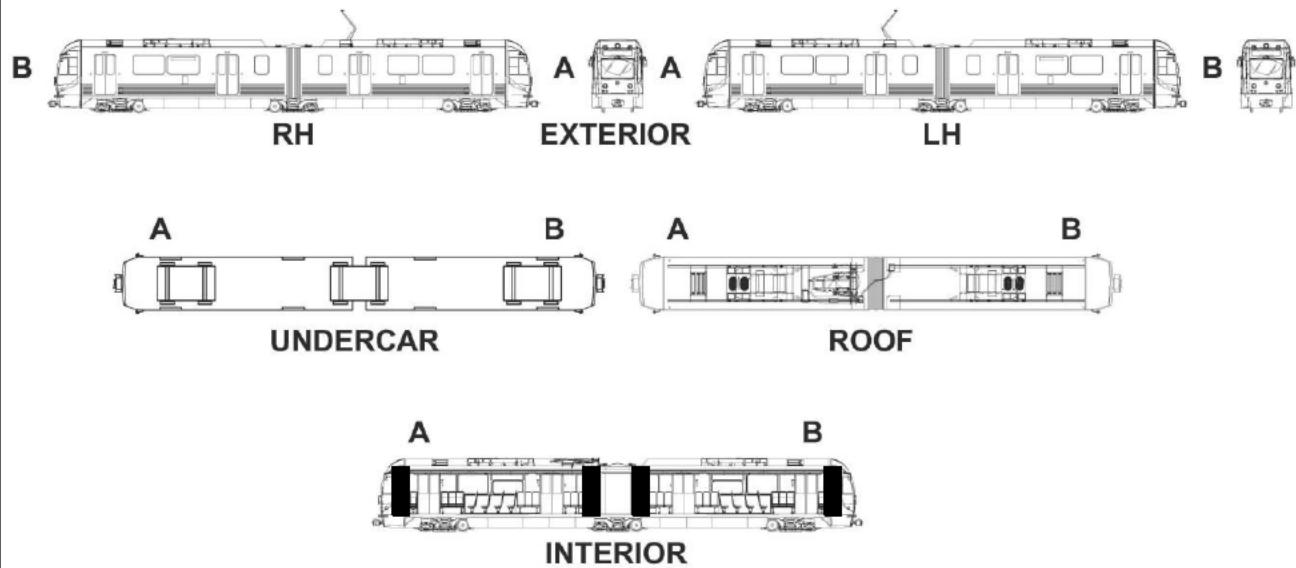
Component:

**CIRCUIT BREAKER TYPE S280**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT (TYPICAL)****LOCATION:****APPLICABILITY:**

This Replacement procedure is applicable to the following Equipment:

**TABLE 1 CIRCUIT BREAKERS IDENTIFICATION & LOCATIONS**

LABEL	DESCRIPTION	TYPE	P/N	CAR	LOCATION	FUNCTIONAL DIAGRAMS	
						SCHEMATICS	SHEET#
8F01	CAB LIGHTING SWITCH	S281 C 16A	211EK22984B04	A - B	LV LOCKER	LV	70
8F02	COMPARTMENT LIGHTING SWITCH	S281 C 6A	211EK22984B01	B	CAB - LV CB PANEL	LV	70

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-00-00-00/R-00**

System:

**LIGHTING**

Sheet:

**2/10**

Subsystem/Assy:

**CAB & CAR LIGHTING CONTROL**

Unit:

Component:

**CIRCUIT BREAKER TYPE S280**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT (TYPICAL)****APPLICABILITY: (cont'd)****TABLE 1 CIRCUIT BREAKERS IDENTIFICATION & LOCATIONS (cont'd)**

LABEL	DESCRIPTION	TYPE	P/N	CAR	LOCATION	FUNCTIONAL DIAGRAMS		
						SCHEMATICS	SHEET#	
8F03	A COMPARTMENT LIGHTING SWITCH	S281 C 25A	211EK22984B06	B	LV LOCKER	LV	70	
8F04	B COMPARTMENT LIGHTING SWITCH	S281 C 25A	211EK22984B06	B	LV LOCKER	LV	70	
8F05	EMERGENCY LIGHTING SWITCH	S281 C 25A	211EK22984B06	B	CAB -LV CB PANEL	LV	70	
8F06	HAZARD LIGHTS SWITCH	S281 K 3A	211EK22984B14	A - B	LV LOCKER	LV	73	
8F07	DIRECTION INDICATORS SWITCH	S281 K 3A	211EK22984B14	A - B	LV LOCKER	LV	73	
8F08	DIRECTION INDICATORS SWITCH	S281 C 10A	211EK22984B03	B	LV LOCKER	LV	73	
8F09	DIRECTION INDICATORS SWITCH	S281 C 10A	211EK22984B03	B	LV LOCKER	LV	73	
8F10	MARKER LIGHTS SWITCH	S281 K 2A	211EK22984B13	A	LV LOCKER	LV	75	
8F11	HEADLIGHTS SWITCH	S281 C 16A	211EK22984B04	A - B	CAB -LV CB PANEL	LV	74	
8F12	ROOF HEADLIGHTS SWITCH	S281 C 10A	211EK22984B03	A - B	CAB -LV CB PANEL	LV	74	
8F13	SILENT ALARM LIGHTS SWITCH	S281 K 2A	211EK22984B13	B	LV LOCKER	LV	75	
8F14	STOP INDICATOR LIGHTS SWITCH	S281 C 6A	211EK22984B01	A	LV LOCKER	LV	72	
8F15	SUPPLY TAIL SWITCH	S281 C 6A	211EK22984B01	B	LV LOCKER	LV	72	
8F16	ACTIVE BYPASS LIGHTS SWITCH	S281 K 2A	211EK22984B13	B	LV LOCKER	LV	75	
8F17	8A01 POWER SUPPLY SWITCH	S281 C 5A	211EK22984B09	B	LV LOCKER	LV	74	
8F18	LOCKERS LIGHT SWITCH	S281 K 3A	211EK22984B13	A - B	LV LOCKER	LV	76	

<b>P2550 CORRECTIVE MAINTENANCE SHEET</b>	
	Card Code: <b>R-C-06-00-00-00/R-00</b>
System: <b>LIGHTING</b>	Sheet: <b>3/10</b>
Subsystem/Assy: <b>CAB &amp; CAR LIGHTING CONTROL</b>	Unit:
Component: <b>CIRCUIT BREAKER TYPE S280</b>	Man Hours: <b>0.5</b>
Maintenance Task: <b>REPLACEMENT (TYPICAL)</b>	
<b>SAFETY PRECAUTIONS:</b>	
LACMTA Maintenance Shop Safety Rules & Regulations	
<b>CAUTION:</b> SWITCH OFF THE 3F01 CB (BATTERY BOX) BEFORE STARTING TO PERFORM THE REPLACEMENT OF ANY ITEM LISTED IN THE PREVIOUS TABLE 1	
<b>TOOLS:</b>	
LACMTA Maintenance Shop Standard Tools Kit	
MULTIMETER (FLUKE 87 V/E) PN 4EB19	
<b>CONSUMABLES:</b>	
CRC 2000 Contact Cleaner	
<b>SPARE PARTS:</b>	
Refer to Table 1 Circuit Breakers Identification & Locations	

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-00-00-00/R-00**

System:

**LIGHTING**

Sheet:

**4/10**

Subsystem/Assy:

**CAB & CAR LIGHTING CONTROL**

Unit:

Component:

**CIRCUIT BREAKER TYPE S280**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT (TYPICAL)**

### PROCEDURE:

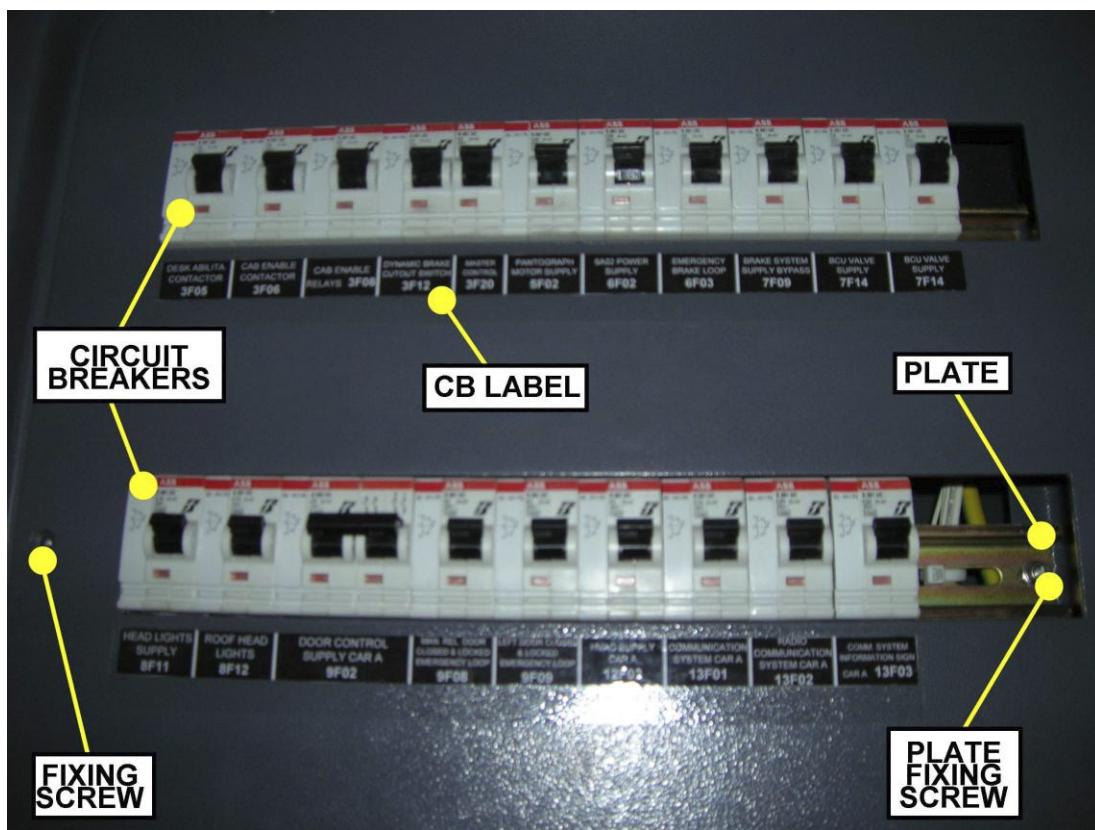
#### PRELIMINARY OPERATIONS

1. Set the Vehicle in safety conditions in accordance with LACMTA Maintenance Shop Regulations:  
**CAUTION:** SWITCH OFF THE 3F01 CB (BATTERY BOX) BEFORE STARTING TO PERFORM  
 THE REPLACEMENT OF ANY ITEM LISTED IN THE PREVIOUS TABLE 1

#### REMOVAL

To perform the Task proceed as follows:

1. Locate the Circuit Breaker to be replaced according to the Label identification and the Location provided in the previous Table 1



**FIG 1 CAB LV CB PANEL**

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-00-00-00/R-00**

System:

**LIGHTING**

Sheet:

**5/10**

Subsystem/Assy:

**CAB & CAR LIGHTING CONTROL**

Unit:

Component:

**CIRCUIT BREAKER TYPE S280**

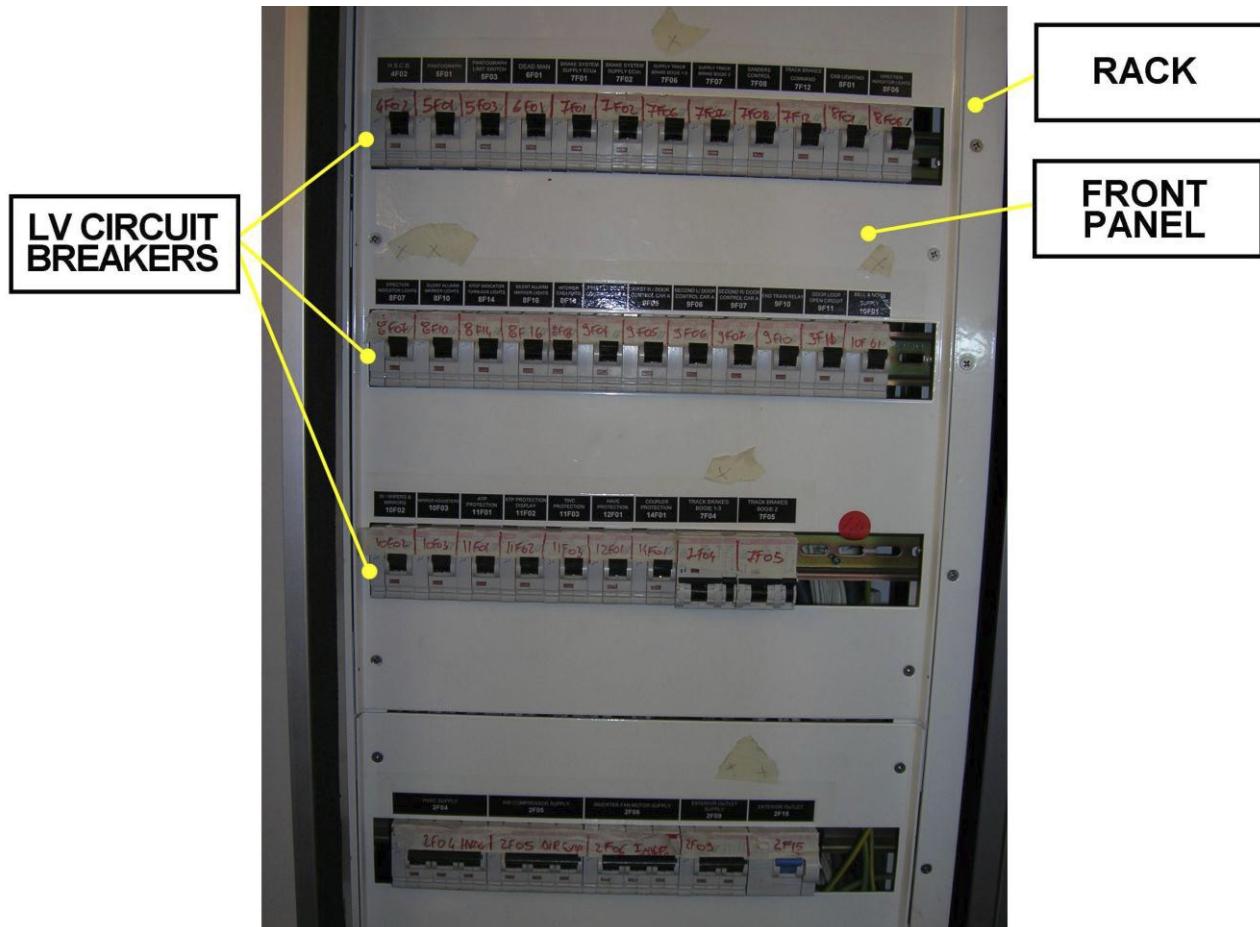
Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT (TYPICAL)**

### PROCEDURE (CONT'D):

**REMOVAL**


**FIGURE 2 - LV LOCKER -CIRCUIT BREAKERS RACK**

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-00-00-00/R-00**

System:

**LIGHTING**

Sheet:

**6/10**

Subsystem/Assy:

**CAB & CAR LIGHTING CONTROL**

Unit:

Component:

**CIRCUIT BREAKER TYPE S280**

Man Hours:

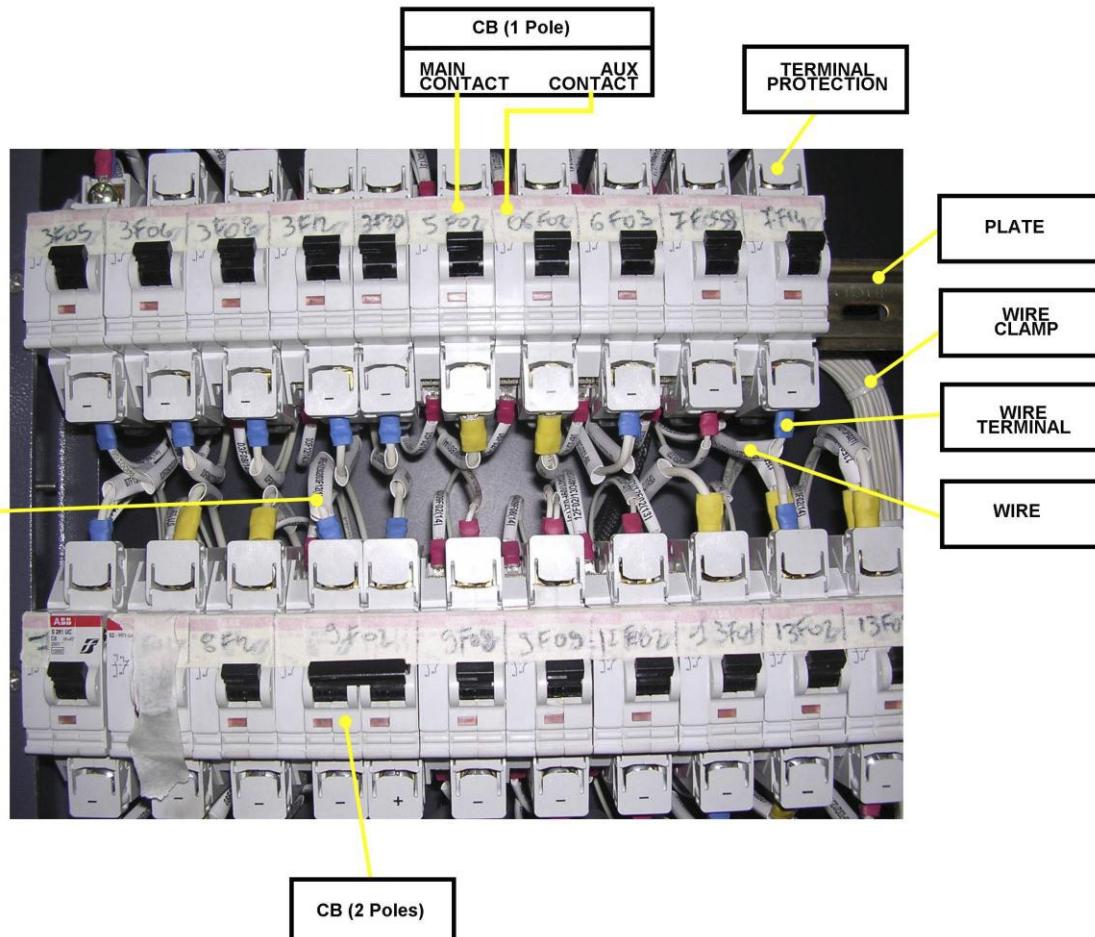
**0.5**

Maintenance Task:

**REPLACEMENT (TYPICAL)**

### PROCEDURE:

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



**FIGURE 3 -CIRCUIT BREAKERS FRONT PANEL REMOVED**

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-00-00-00/R-00**

System:

**LIGHTING**

Sheet:

**7/10**

Subsystem/Assy:

**CAB & CAR LIGHTING CONTROL**

Unit:

Component:

**CIRCUIT BREAKER TYPE S280**

Man Hours:

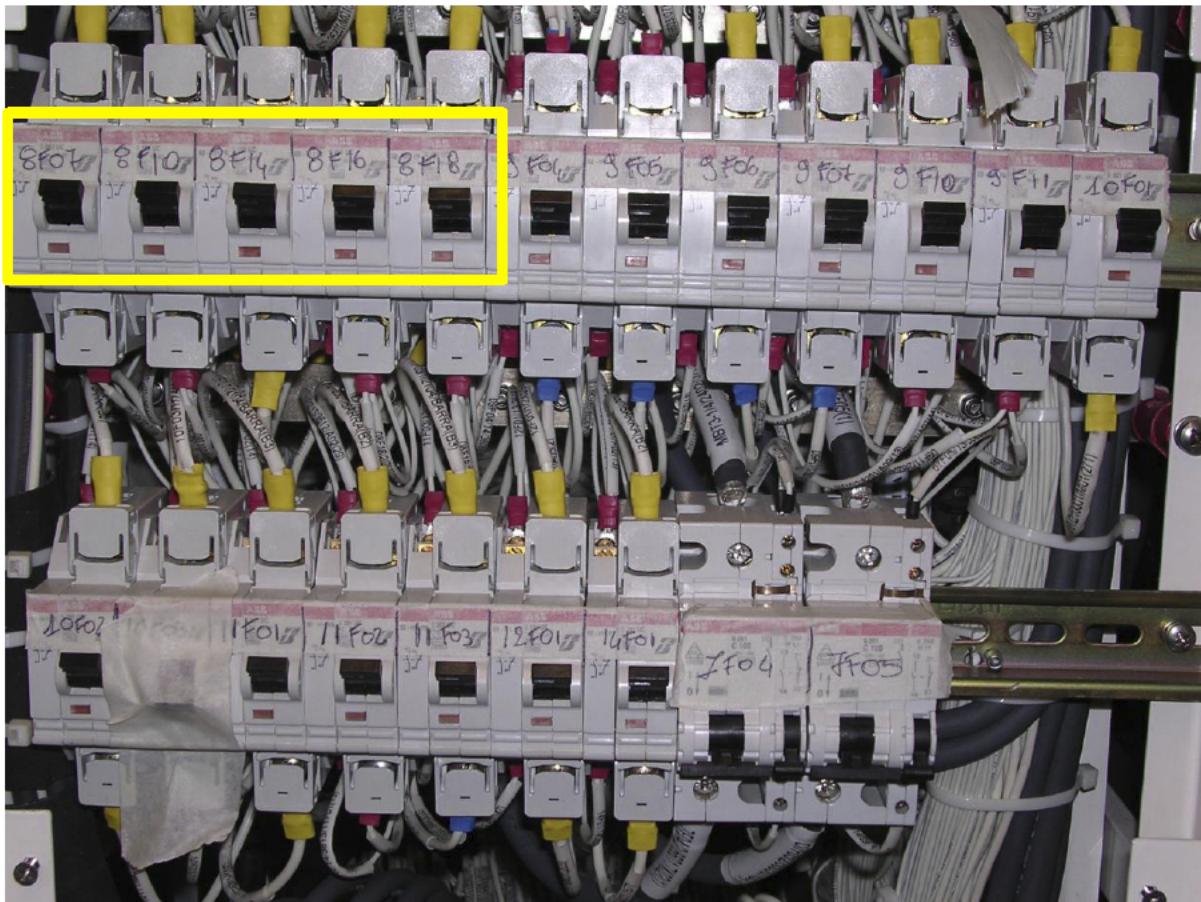
**0.5**

Maintenance Task:

**REPLACEMENT (TYPICAL)**

### PROCEDURE (CONT'D):

- 3 Locate the Circuit Breaker to be replaced



**FIGURE 4 -CB INSTALLATION (TYPICAL)**

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-00-00-00/R-00**

System: **LIGHTING** Sheet: **8/10**

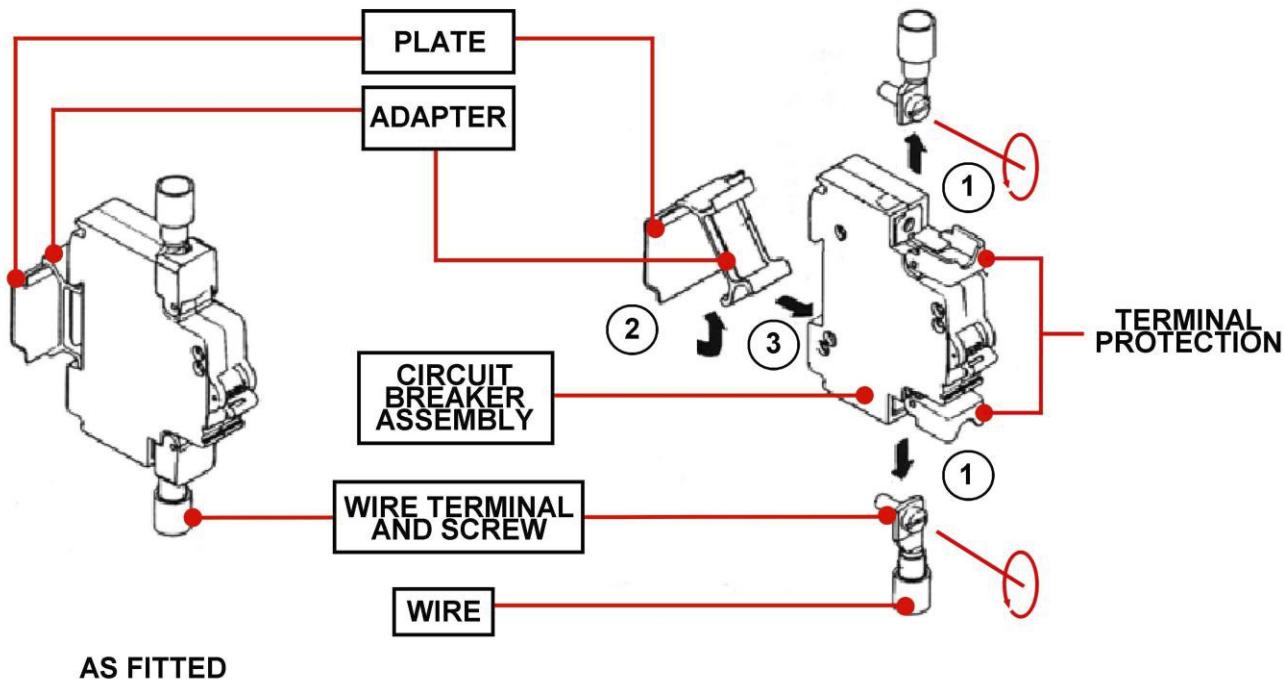
Subsystem/Assy: **CAB & CAR LIGHTING CONTROL** Unit:

Component: **CIRCUIT BREAKER TYPE S280** Man Hours: **0.5**

Maintenance Task: **REPLACEMENT (TYPICAL)**

### PROCEDURE:

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



**FIGURE 5 -CB REMOVAL**

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-00-00-00/R-00**

System:

**LIGHTING**

Sheet:

**9/10**

Subsystem/Assy:

**CAB & CAR LIGHTING CONTROL**

Unit:

Component:

**CIRCUIT BREAKER TYPE S280**

Man Hours:

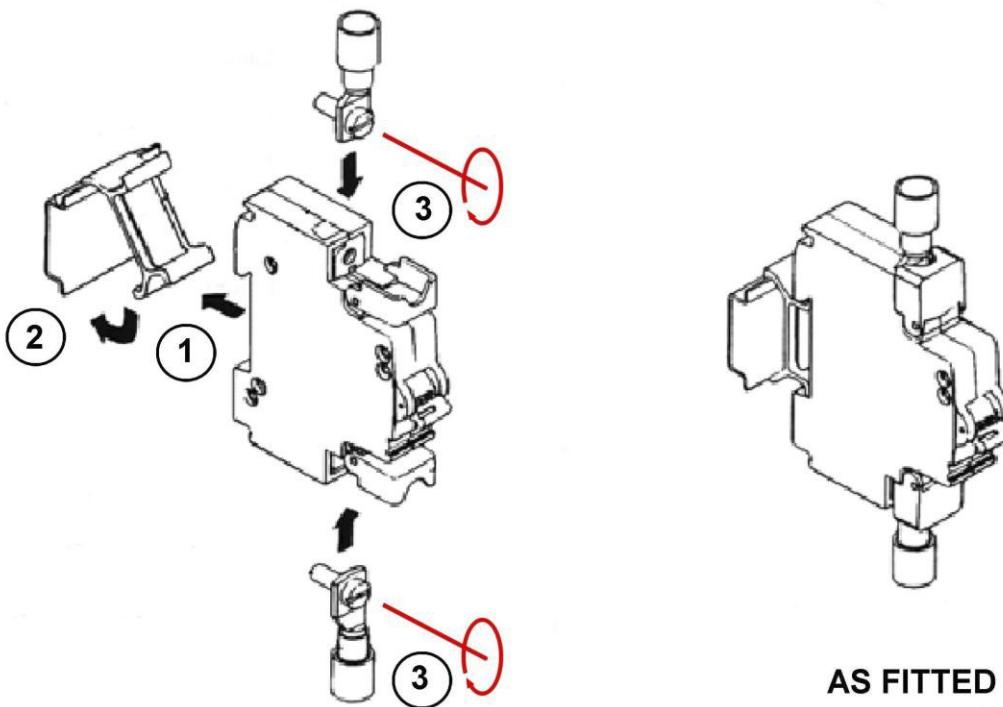
**0.5**

Maintenance Task:

**REPLACEMENT (TYPICAL)**

**PROCEDURE (CONT'D):**

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



**FIGURE 6 -CB INSTALLATION**

- 6 Install the Circuit Breakers Front Panel and secure it by installing and tightening the relevant Fixing Screws.
- 7 Close and secure the LV Locker Door using the Maintenance Key.
- 8 Restore Electrical Power.
- 9 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 06-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-06-00-00-00/R-00**

System:

**LIGHTING**

Sheet:

**10/10**

Subsystem/Assy:

**CAB & CAR LIGHTING CONTROL**

Unit:

Component:

**CIRCUIT BREAKER TYPE S280**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT (TYPICAL)****INTENTIONALLY  
LEFT BLANK**

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-00-00-00/R-01**

System:

**LIGHTING**

Sheet:

**1/6**

Subsystem/Assy:

**CAB & CAR LIGHTING CONTROL**

Unit:

Component:

**RELAY**

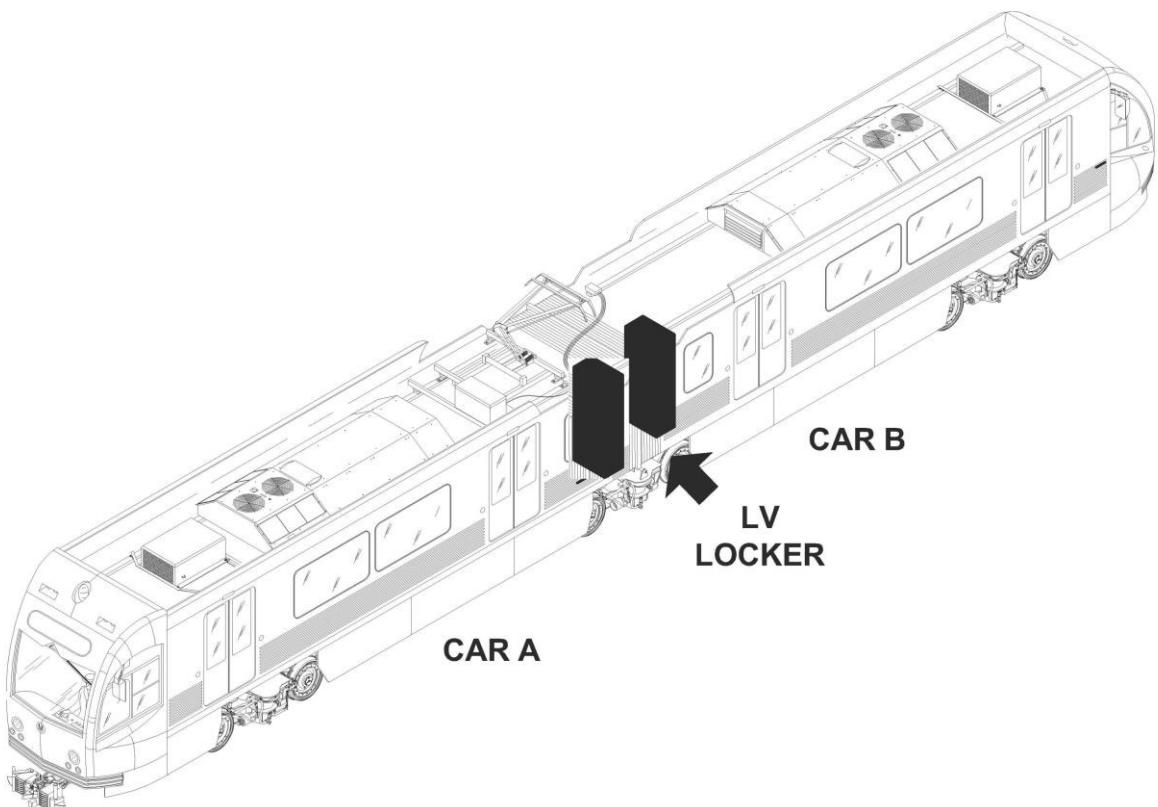
Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT (TYPICAL)**

### LOCATION



## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-00-00-00/R-01**

System:

**LIGHTING**

Sheet:

**2/6**

Subsystem/Assy:

**CAB & CAR LIGHTING CONTROL**

Component:

**RELAY**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT (TYPICAL)****APPLICABILITY:**

This Replacement procedure is applicable to the following Items:

**TABLE 1 RELAY IDENTIFICATION & LOCATIONS**

LABEL	DESCRIPTION	TYPE	P/N	CAR	LOCATION	FUNCTIONAL DIAGRAMS	
						SCHEMATICS	SHEET #
8K01	DIRECTION INDICATORS RELAY	2 CONTACTS	211VK01404B	B	LV LOCKER	LV	73
8K02	DIRECTION INDICATORS RELAY	2 CONTACTS	211VK01404B	B	LV LOCKER	LV	73
8K03	EMERGENCY LIGHTING CONTACTOR RELAY	2 CONTACTS	211VK01330B0221	B	LV LOCKER	LV	70
8K04	COMPARTMENT LIGHTING CONTACTOR RELAY	2 CONTACTS	211VK01330B0221	B	LV LOCKER	LV	70
8K05	STOP INDICATOR LIGH RELAY	2 CONTACTS	211VK01374B0801	B	LV LOCKER	LV	72
8K06	DIRECTION INDICATORS RELAY	2 CONTACTS	211VK01403B	B	LV LOCKER	LV	73
8K07	ROOF HEAD RELAY	2 CONTACTS	211VK01405B	A - B	LV LOCKER	LV	74
8K08	LIGHTS RELAY	2 CONTACTS	211VK01374B0801	A - B	LV LOCKER	LV	70
8K09	SILENT ALARM RELAY	2 CONTACTS	211VK01403B	B	LV LOCKER	LV	75

**P2550 CORRECTIVE MAINTENANCE SHEET**

Card Code:

**R-C-06-00-00-00/R-01**

System: <b>LIGHTING</b>	Sheet: <b>3/6</b>
Subsystem/Assy: <b>CAB &amp; CAR LIGHTING CONTROL</b>	Unit:
Component: <b>RELAY</b>	Man Hours: <b>0.5</b>

Maintenance Task:

**REPLACEMENT (TYPICAL)****SAFETY PRECAUTIONS:**

LACMTA Maintenance Shop Safety Rules &amp; Regulations

**CAUTION:** SWITCH OFF THE 3F01 CB (BATTERY BOX) BEFORE STARTING TO PERFORM THE REPLACEMENT OF ANY ITEM LISTED IN THE PREVIOUS TABLE 1.**TOOLS:**

LACMTA Standard Tools Kit

MULTIMETER (FLUKE 87 V/E) PN 4EB19

**CONSUMABLES:**

CRC 2000 Contact Cleaner

**SPARE PARTS:**

Refer to Table 1 Relay Identification &amp; Locations

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-00-00-00/R-01**

System:

**LIGHTING**

Sheet:

**4/6**

Subsystem/Assy:

**CAB & CAR LIGHTING CONTROL**

Unit:

Component:

**RELAY**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT (TYPICAL)**

### PROCEDURE:

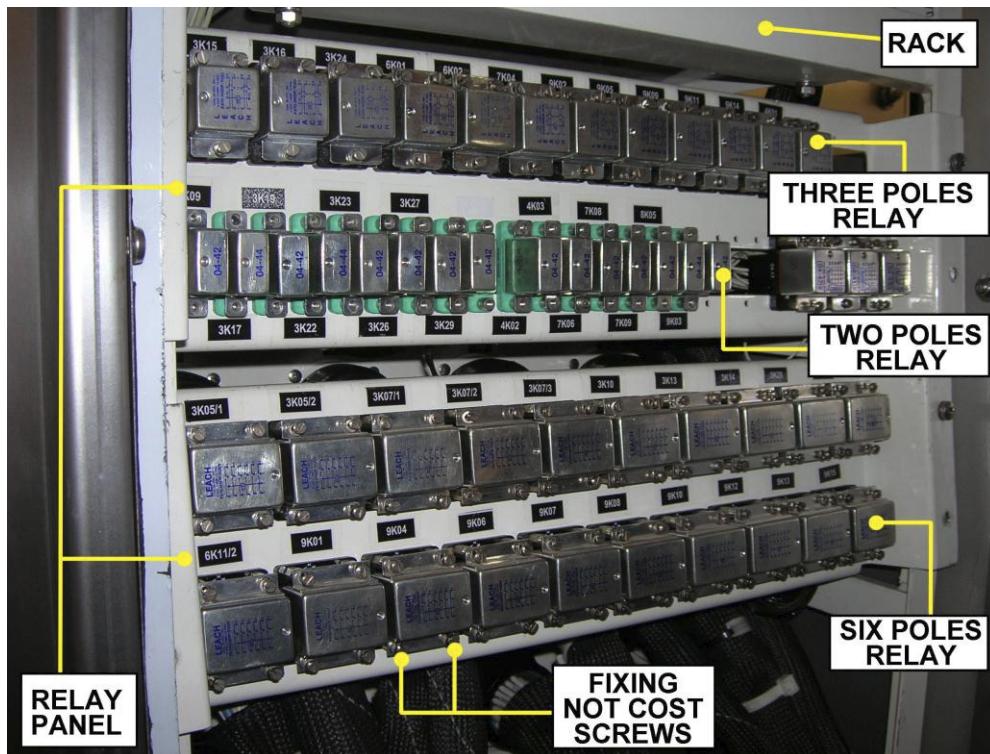
#### PRELIMINARY OPERATIONS

2. Set the Vehicle in safety conditions in accordance with LACMTA Maintenance Shop Regulations:  
**CAUTION:** SWITCH OFF THE 3F01 CB (BATTERY BOX) BEFORE STARTING TO PERFORM THE REPLACEMENT OF ANY ITEM LISTED IN THE PREVIOUS TABLE 1.

To perform the Task proceed as follows:

#### REMOVAL

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



**FIGURE 1 - LV LOCKER -RELAYS REPLACEMENT**

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-00-00-00/R-01**

System: <b>LIGHTING</b>	Sheet: <b>5/6</b>
Subsystem/Assy: <b>CAB &amp; CAR LIGHTING CONTROL</b>	Unit:
Component: <b>RELAY</b>	Man Hours: <b>0.5</b>

Maintenance Task:

### **REPLACEMENT (TYPICAL)**

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

##### **T REMOVAL (cont'd)**

3. Loose and remove the Self Locking Nuts & Washers fixing the Relay to the Rack.  
Retain them for later use.
4. Slide out the Relay in order to gain access to the relevant Wiring and Terminals connections.
5. Take note of Wiring Color Codes and relevant positions on Relay Terminals.
6. Disconnect the Wiring Cable from Relay Terminals.
7. Remove and discard the Relay.

#### **INSTALLATION**

1. Clean the Relay Seat using recommended Cleaner / Agent and lint-free rags.
2. Check Relay Plate for installation / missing / loosen Hardware.
3. Torque, as per check result, at **15.2 ft-lb**.
4. Check Wires and Wire Terminals for signs of overheating.
5. Connect the Wiring to the Relay Terminals according to their position and Color Codes previously Noted.  
Refer to the Functional Schematic Sheet listed in the previous Table 1 for complete Wiring Details.
6. Torque the Wires Screw Terminals to **4 ft-\*lb**.
7. Install the Relay in its position.
8. Install the Relay attaching Washers and Self Locking Nuts. Torque to **4 ft-\*lb**.
9. Leave the LV Locker.
10. Close and the LV locker Door using the Maintenance Key.
11. Restore Electrical Power.
12. 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 06-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-06-00-00-00/R-01**

System:

**LIGHTING**

Sheet:

**6/6**

Subsystem/Assy:

**CAB & CAR LIGHTING CONTROL**

Unit:

Component:

**RELAY**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT (TYPICAL)****INTENTIONALLY  
LEFT BLANK**

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-00-00-00/R-02**

System:

**LIGHTING**

Sheet:

**1/6**

Subsystem/Assy:

**CAB & CAR LIGHTING CONTROL**

Unit:

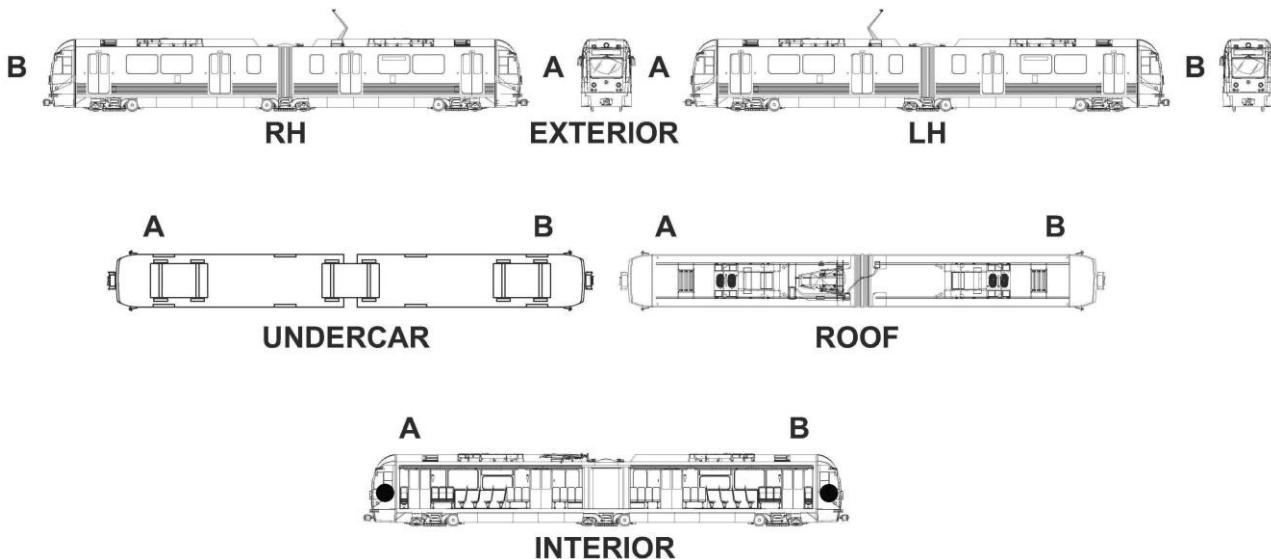
Component:

**SWITCH**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT (TYPICAL)****LOCATION:****APPLICABILITY:**

This Replacement procedure is applicable to the following Items:

**TABLE 1 SWITCHES IDENTIFICATION & LOCATIONS**

LABEL	DESCRIPTION	TYPE	P/N	CAR	LOCATION	FUNCTIONAL DIAGRAMS	
						SCHEMATICS	SHEET#
8R01	CAB LIGHTS DIMMER			A - B	CONSOLE	LV	70
8S01	CAB LIGHTING COMMAND SWITCH			A - B	CONSOLE	LV	70
8S02	HEAD LIGHTS COMMAND SWITCH			A - B	CONSOLE	LV	74
8S03	TURN INDICATORS COMMAND SWITCH			A - B	CONSOLE	LV	73
8S04	HAZARD COMMAND SWITCH			A - B	CONSOLE	LV	73
8S05	SILENT ALARM COMMAND SWITCH			A - B	UNDER CONSOLE	LV	75

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-00-00-00/R-02**

System:

**LIGHTING**

Sheet:

**2/6**

Subsystem/Assy:

**CAB & CAR LIGHTING CONTROL**

Component:

**SWITCH**

Unit:

Man Hours:  
**0.5**

Maintenance Task:

**REPLACEMENT (TYPICAL)**

### **SAFETY PRECAUTIONS:**

LACMTA Maintenance Shop Safety Rules & Regulations

**CAUTION:** SWITCH OFF THE 3F01 CB (BATTERY BOX) BEFORE STARTING TO PERFORM THE REPLACEMENT OF ANY ITEM LISTED IN THE PREVIOUS TABLE 1.

### **TOOLS:**

LACMTA Maintenance Shop Standard Tools Kit

MULTIMETER (FLUKE 87 V/E) PN 4EB19

### **CONSUMABLES:**

CRC 2000 Contact Cleaner

### **SPARE PARTS:**

8S03 Hazard Command Switch Lamp      Type/PN      MB400-NFW28H-BP

Refer to Table 1 Switches Identification & Locations

**P2550 CORRECTIVE MAINTENANCE SHEET**

Card Code:

**R-C-06-00-00-00/R-02**

System:

**LIGHTING**

Sheet:

**3/6**

Subsystem/Assy:

**CAB & CAR LIGHTING CONTROL**

Unit:

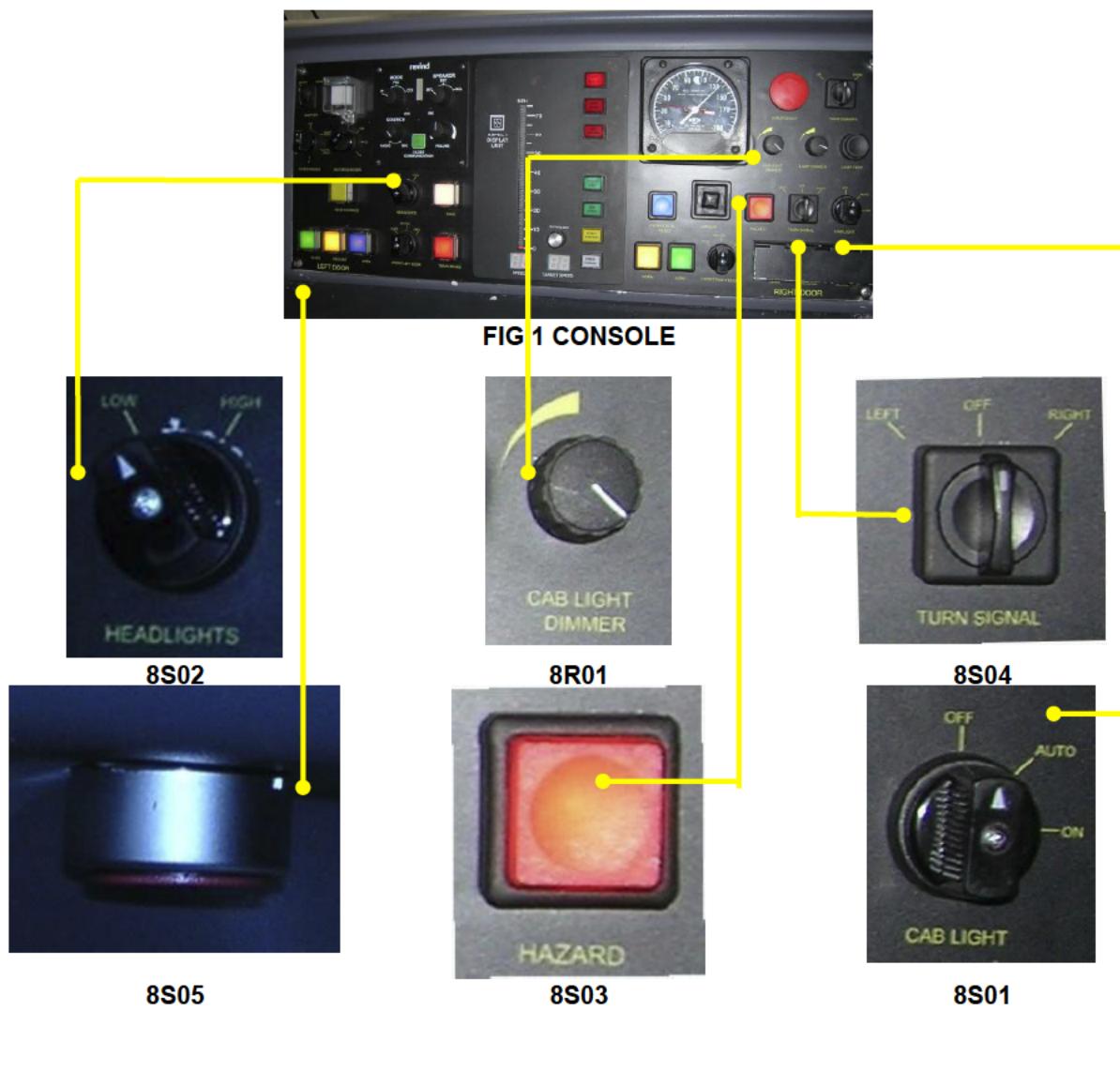
Component:

**SWITCH**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT (TYPICAL)**
**PROCEDURE:**


## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-00-00-00/R-02**

System:

**LIGHTING**

Sheet:

**4/6**

Subsystem/Assy:

**CAB & CAR LIGHTING CONTROL**

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:

**CAUTION:** SWITCH OFF THE 3F01 CB (BATTERY BOX) BEFORE STARTING TO PERFORM THE REPLACEMENT OF ANY ITEM LISTED IN THE PREVIOUS TABLE 1

#### **REPLACEMENT**

To perform the Switch Replacement proceed as follows:

##### **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 2 through 5 for Switches Body Wiring Scheme or to LV Functional Schematic, Sheets 70-73-74-75 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 06-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-06-00-00-00/R-02**

System: <b>LIGHTING</b>	Sheet: <b>5/6</b>
Subsystem/Assy: <b>CAB &amp; CAR LIGHTING CONTROL</b>	Unit:
Component: <b>SWITCH</b>	Man Hours: <b>0.5</b>
Maintenance Task: <b>REPLACEMENT(TYPICAL)</b>	

**FIG 2**

**8R01-CAB LIGHT DIMMER &  
8S01 CAB LIGHTING SWITCH  
WIRING SCHEME**

**FIG 3**

**8S03 TURN INDICATOR SWITCH &  
8S04HAZARD P.B WIRING SCHEME**

**P2550 CORRECTIVE MAINTENANCE SHEET**

Card Code:

**R-C-06-00-00-00/R-02**

System:

**LIGHTING**

Sheet:

**6/6**

Subsystem/Assy:

**CAB & CAR LIGHTING CONTROL**

Unit:

Component:

**SWITCH**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT (TYPICAL)**

**FIG 4**  
**8S02-HEADLIGHTS SWITCH**  
**WIRING SCHEME**

**FIG 5**  
**8S05 SILENT ALARM P.B**  
**WIRING SCHEME**

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-00-00-00/R-03**

System:

**LIGHTING**

Sheet:

**1/6**

Subsystem/Assy:

**CAB & CAR LIGHTING CONTROL**

Unit:

Component:

**PROTECTIVE DIODE**

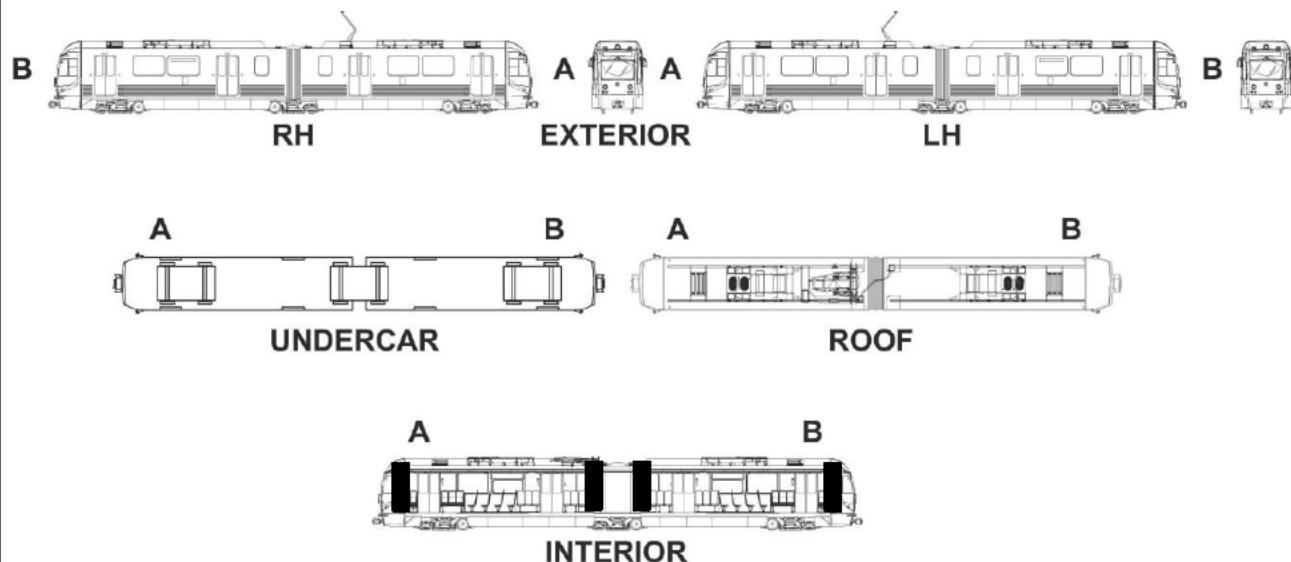
Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT(TYPICAL)**

### LOCATION:



### APPLICABILITY:

This Replacement procedure is applicable to the following Items:

**TABLE 1 DIODES IDENTIFICATION & LOCATIONS**

LABEL	DESCRIPTION	TYPE	P/N	CAR	LOCATION	FUNCTIONAL DIAGRAMS	
						SCHEMATICS	SHEET
8V01	PROTECTIVE DIODE	ABB DACOM	211VV01044B	B	LV LOCKER	LV	70
8V02	PROTECTIVE DIODE	ABB DACOM	211VV01044B	B	LV LOCKER	LV	70

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-00-00-00/R-03**

System:

**LIGHTING**

Sheet:

**2/6**

Subsystem/Assy:

**CAB & CAR LIGHTING CONTROL**

Unit:

Component:

**PROTECTIVE DIODE**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT(TYPICAL)****APPLICABILITY:****TABLE 1 DIODES IDENTIFICATION & LOCATIONS (cont'd)**

LABEL	DESCRIPTION	TYPE	P/N	CAR	LOCATION	FUNCTIONAL DIAGRAMS	
						SCHEMATICS	SHEET
8V04	PROTECTIVE DIODE	ABB DACOM	211VV01044B	B	LV LOCKER	LV	73
8V05	PROTECTIVE DIODE	ABB DACOM	211VV01044B	A - B	LV LOCKER	LV	73
8V06	PROTECTIVE DIODE	ABB DACOM	211VV01044B	A - B	LV LOCKER	LV	73
8V11	PROTECTIVE DIODE	ABB DACOM	211VV01044B	B	LV LOCKER	LV	75
8V12	PROTECTIVE DIODE	ABB DACOM	211VV01044B	B	LV LOCKER	LV	73

To replace the following items refer to Sheet R-C-10-00-00-00/R-05

LABEL	DESCRIPTION	TYPE	P/N	CAR	LOCATION	FUNCTIONAL DIAGRAMS	
						SCHEMATICS	SHEET
8V03	PROTECTIVE DIODE			A - B	INDICATOR PANEL	LV	74
8V07	PROTECTIVE DIODE			A - B	INDICATOR PANEL	LV	73
8V08	PROTECTIVE DIODE			A - B	INDICATOR PANEL	LV	73
8V09	PROTECTIVE DIODE			A - B	INDICATOR PANEL	LV	73
8V10	PROTECTIVE DIODE			A - B	INDICATOR PANEL	LV	73

<b>P2550 CORRECTIVE MAINTENANCE SHEET</b>	
	Card Code: <b>R-C-06-00-00-00/R-03</b>
System: <b>LIGHTING</b>	Sheet: <b>3/6</b>
Subsystem/Assy: <b>CAB &amp; CAR LIGHTING CONTROL</b>	Unit:
Component: <b>PROTECTIVE DIODE</b>	Man Hours: <b>0.5</b>
Maintenance Task: <b>REPLACEMENT(TYPICAL)</b>	
<b>SAFETY PRECAUTIONS:</b> LACMTA Maintenance Shop Safety Rules & Regulations	
<b>CAUTION:</b> :SWITCH OFF THE 3F01 CB (BATTERY BOX) BEFORE STARTING TO PERFORM THE REPLACEMENT OF ANY ITEM LISTED IN THE PREVIOUS TABLE 1.	
<b>TOOLS:</b> LACMTA Maintenance Shop Standard Tools Kit MULTIMETER (FLUKE 87 V/E) PN 4EB19	
<b>CONSUMABLES:</b> CRC 2000 Contact Cleaner	
<b>SPARE PARTS:</b> Refer to Table 1 Diodes Identification & Locations	

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-00-00-00/R-03**

System:

**LIGHTING**

Sheet:

**4/6**

Subsystem/Assy:

**CAB & CAR LIGHTING CONTROL**

Unit:

Component:

**PROTECTIVE DIODE**

Man Hours:

**0.5**

Maintenance Task:

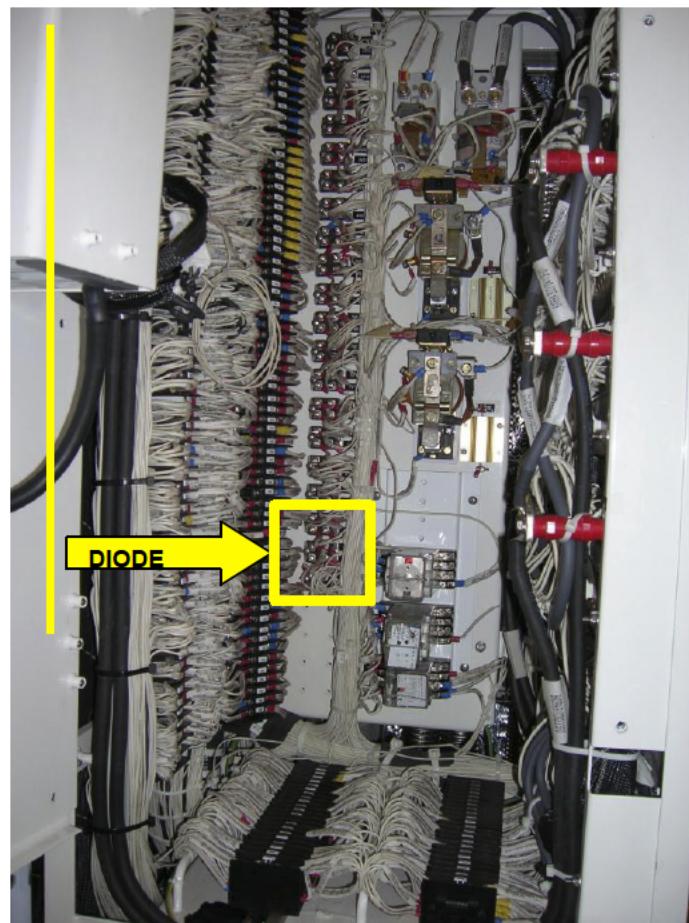
**REPLACEMENT(TYPICAL)****PROCEDURE:****PRELIMINARY OPERATIONS**

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

**CAUTION:** SWITCH OFF THE 3F01 CB (BATTERY BOX) BEFORE STARTING TO PERFORM THE REPLACEMENT OF ANY ITEM LISTED IN THE PREVIOUS TABLE 1.

**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 the Maintenance Key.

**FIGURE 1 DIODE LOCATION**

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-00-00-00/R-03**

System:

**LIGHTING**

Sheet:

**5/6**

Subsystem/Assy:

**CAB & CAR LIGHTING CONTROL**

Unit:

Component:

**PROTECTIVE DIODE**

Man Hours:

**0.5**

Maintenance Task:

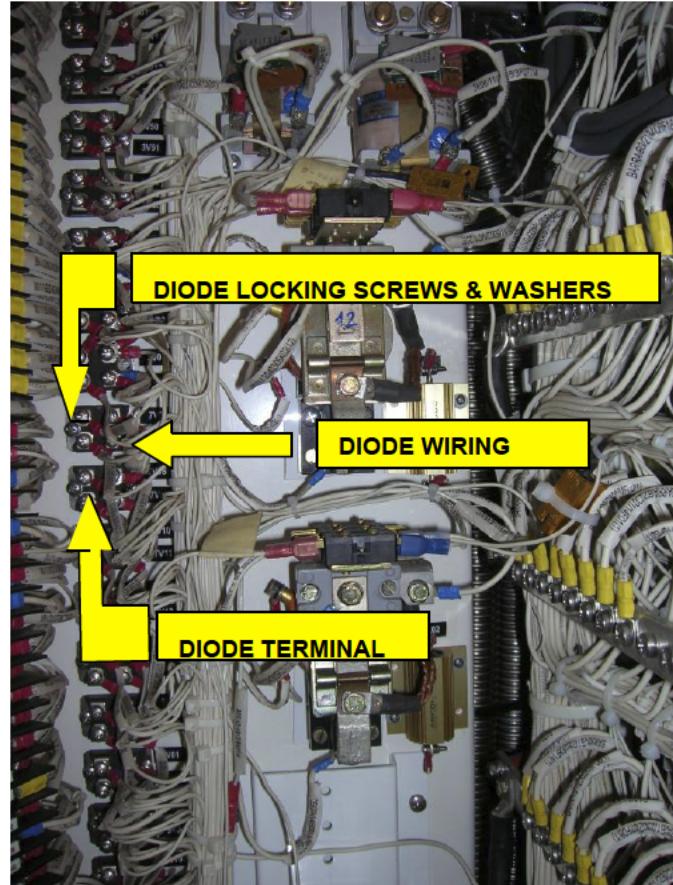
**REPLACEMENT(TYPICAL)**

### 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 the 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 06-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-06-00-00-00/R-03**

System:

**LIGHTING**

Sheet:

**6/6**

Subsystem/Assy:

**CAB & CAR LIGHTING CONTROL**

Unit:

Component:

**PROTECTIVE DIODE**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT(TYPICAL)**

**INTENTIONALLY  
LEFT BLANK**

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-01-01-00/R-00**

System:

**LIGHTING**

Sheet:

**1/6**

Subsystem/Assy:

**INTERNAL LIGHTING & CAB**

Unit:

**REFLECTOR ASSY**

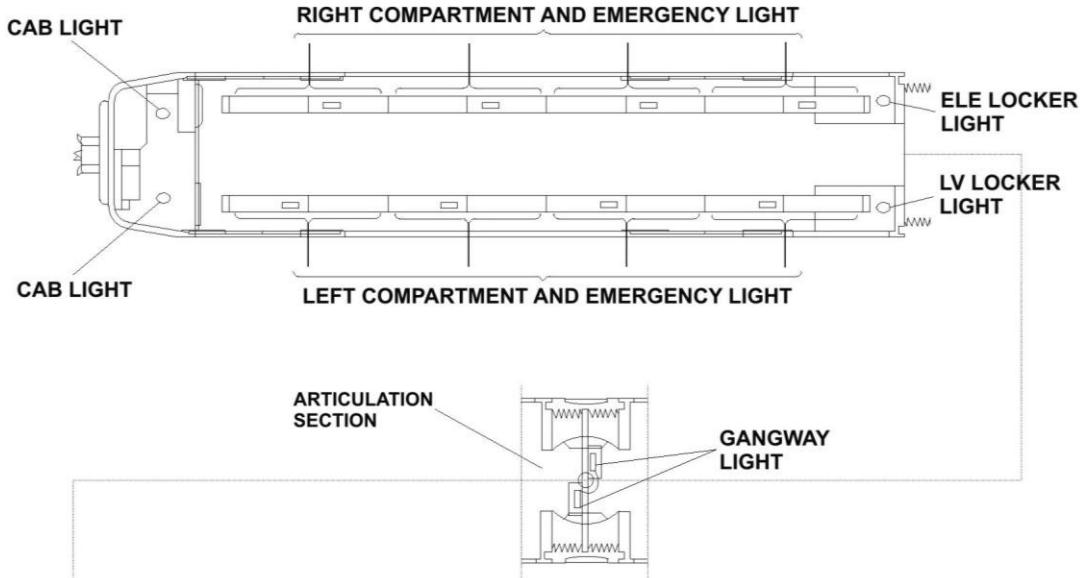
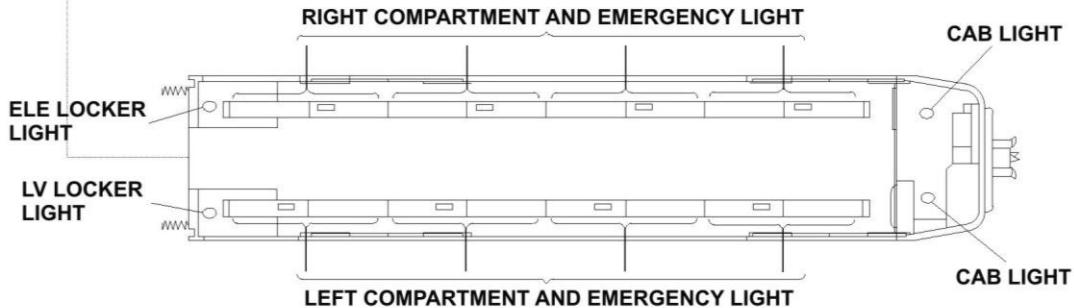
Component:

**BALLAST**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT****LOCATION:****INSIDE VIEW CARBODY A****INSIDE VIEW CARBODY B**

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-01-01-00/R-00**

System:

**LIGHTING**

Sheet:

**2/6**

Subsystem/Assy:

**INTERNAL LIGHTING & CAB**

Unit:

**REFLECTOR ASSY**

Component:

**BALLAST**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

### **SAFETY PRECAUTIONS:**

**WARNING:** BEFORE PERFORMING MAINTENANCE PROCEDURES AND TOUCHING ANY COMPONENT, USE A RELIABLE HIGH VOLTAGE TEST PROBE TO VERIFY THAT NO VOLTAGE IS PRESENT.

**CAUTION:** TO PERFORM LIGHTING SYSTEM COMPONENTS MAINTENANCE, THE 37.5 VDC REMOVAL IS NOT NECESSARY BUT RECOMMENDED TO AVOID DAMAGE TO EQUIPMENT.

### **TOOLS:**

LACMTA Maintenance Shop Standard Tools Kit.

MULTIMETER (FLUKE 87 V/E) PN 4EB19

### **CONSUMABLES:**

### **SPARE PARTS:**

Air /Light Fixture Ballast 37.5 V  
 Aisle Lights Ballast      PN S-7593-10R

## **P2550 CORRECTIVE MAINTENANCE SHEET**

Card Code:

**R-C-06-01-01-00/R-00**

System:

**LIGHTING**

Sheet:

**3/6**

Subsystem/Assy:

**INTERNAL LIGHTING & CAB**

Unit:

**REFLECTOR ASSY**

Component:

**BALLAST**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

### **PROCEDURE:**

#### **PRELIMINARY OPERATIONS**

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 Indicators Panel "A" "Park / Friction Brake" ON).

#### **A BALLAST INSTALLED IN THE COMPARTMENT AIR / LIGHT FIXTURES (Refer to Figure 1)**

#### **REMOVAL**

To remove the Ballast, proceed as follows

1. Turn off power to the Lights of the Compartment where is located the Ballast to be removed by switching off the relevant Circuit Breakers, as follows:
  - A COMPARTMENT LIGHTING SWITCH -CB 08F03-  
(located on the "B" LV Locker)
  - B COMPARTMENT LIGHTING SWITCH -CB 08F04-  
(located on the "B" LV Locker)
  - EMERGENCY LIGHTING SWITCH -08F05-  
(located on the "B" Cab Circuit Breaker Panel)
2. Support the Relamping Door (1) and loosen two Phillips Head Closing Screws (8) until the Relamping Door opens.
3. Carefully allow Relamping Door (1) to hinge downward into open position.
4. Support the Reflector (3) and loosen two Phillips Head Closing Screws (2) until the Reflector (3) opens.
5. Carefully allow Reflector (3) to hinge downward into open position.
6. Support Ballast Plate and loosen two Captive Quick Release Mounting Screws.
7. Slide Ballast mounting Plate until keyhole slots clear screw heads. Carefully allow the Ballast Plate to descend from the housing until access to the Ballast connections are achieved.
8. Tag and unplug Ballast Connector(s) from Wiring Harness Connector(S) as applicable.
9. Remove two keeps Nuts, split Washers that secure Ballast (9) to mounting Plate.
10. Tag defective Ballast and send it to Electronics Bench Service or return it to Manufacturer for repair.

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-01-01-00/R-00**

System:

**LIGHTING**

Sheet:

**4/6**

Subsystem/Assy:

**INTERNAL LIGHTING & CAB**

Unit:

**REFLECTOR ASSY**

Component:

**BALLAST**

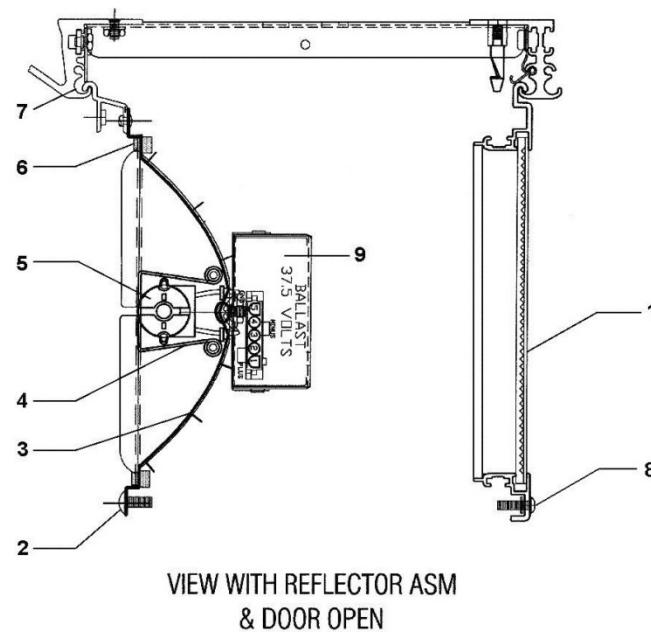
Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

### PROCEDURE (CONT'D):



- |                   |                           |                       |
|-------------------|---------------------------|-----------------------|
| 1. Relamping Door | 4. Lamp Retainer          | 7. Reflector Retainer |
| 2. Catch Screw    | 5. Lamp Rotary Socket     | 8. Captive Screw      |
| 3. Reflector      | 6. Neoprene Sponge Gasket | 9. DC Ballast         |

**FIGURE 1 - AIR /LIGHT FIXTURE ASSY - BALLAST REPLACEMENT**

### INSTALLATION

To install the Ballast, proceed as follows:

1. Ensure Power is off to relevant Light Fixture Assy using a Multimeter.
2. Secure Ballast (9) to Mounting Plate with two flat Washers, split Washers, and keeps Nuts.
3. Connect Ballast Connector(s) to appropriate Wiring Housing Connector(S) on top of housing as tagged in removal procedure.
4. Lift Ballast mounting Plate into installation position and secure with two captive Screws.
5. Temporarily activate power to Light Fixture and verify illumination.
6. Close and secure the Reflector (3) with two Phillips head closing screws (2).
7. Close and secure the Relamping Door (1) with two Phillips head closing screws (8).
8. Restore Power to the Compartment Lights.
9. Record Task results on the Defect Report Card for administrative and maintenance planning.

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-01-01-00/R-00**

System:

**LIGHTING**

Sheet:

**5/6**

Subsystem/Assy:

**INTERNAL LIGHTING & CAB**

Unit:

**REFLECTOR ASSY**

Component:

**BALLAST**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

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

#### **B BALLAST INSTALLED IN THE AISLE LIGHT FIXTURE (Refer to Figure 2)**

#### **REMOVAL**

To remove the Ballast, proceed as follows

1. Turn off power to Aisle Lights by switching off the following Circuit Breakers:  
EMERGENCY LIGHTING SWITCH -08F05-  
(located on the "B" Cab Circuit Breaker Panel).
2. Open Relamping Door and remove Lamp in accordance with Sheet R-C-06-01-02-00 / R-00.
3. Support Ballast Plate and loosen two Captive Quick Release Mounting Screws.
4. Slide Ballast Mounting Plate until keyhole slots clear Screw Heads. Carefully allow the Ballast Plate to descend from the Housing until access to the Ballast Connections are achieved.
5. Tag and unplug Ballast Connector(s) from Wiring Harness Connector(S) as applicable.
6. Remove two keeps Nuts, split Washers that secure Ballast to Mounting Plate.
7. Tag defective Ballast and send it to Electronics Bench Service or return it to Manufacturer for Repair.

#### **INSTALLATION**

To install the Ballast, proceed as follows

1. Ensure Power is off to relevant Aisle Lights Assy using a Multimeter.
2. Secure Ballast to Mounting Plate with two flat Washers, split Washers, and keeps Nuts.
3. Connect Ballast Connector(S) to appropriate Wiring Housing Connector(S) on top of Housing as tagged in removal procedure.
4. Lift Ballast Mounting Plate into installation position and secure with two Captive Screws.
5. Install Lamp in accordance with Sheet R-C-06-01-02-00 / R-00.
6. Temporarily activate power to Aisle Lights and verify illumination.
7. Close and secure the Aisle Lights assy with two Phillips Head Closing Screws.
8. Close and secure the Relamping Door with two Phillips Head Closing Screws.
9. Restore Power to the Aisle Lights.
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 06-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-06-01-01-00/R-00**

System:

**LIGHTING**

Sheet:

**6/6**

Subsystem/Assy:

**INTERNAL LIGHTING & CAB**

Unit:

**REFLECTOR ASSY**

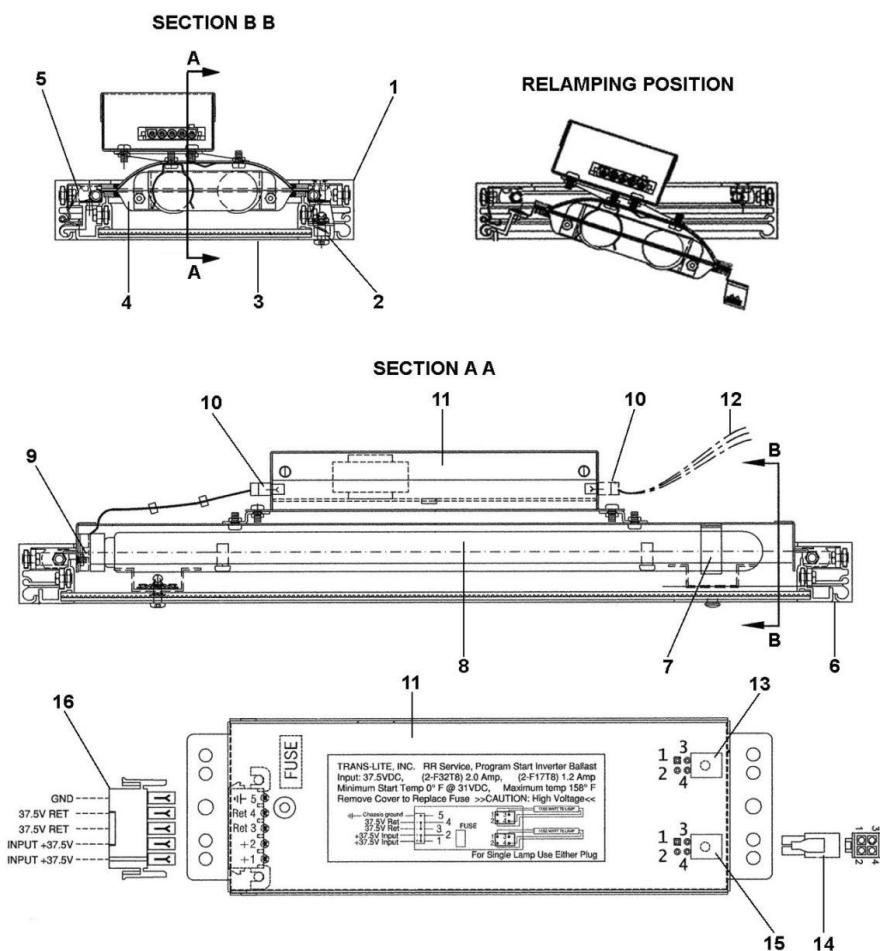
Component:

**BALLAST**

Man Hours:

**0.5**

Maintenance Task:

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

- |                   |               |                                |
|-------------------|---------------|--------------------------------|
| 1. Frame ASM      | 7. Lamp Clamp | 12. Car wiring                 |
| 2. Relamping Door | 8. Lamp       | 13. Socket (to remote Fixture) |
| 3. Lens (Clear)   | 9. Lampholder | 14. Connector (output)         |
| 4. Reflector      | 10. Plug      | 15. Socket (output)            |
| 5. Retainer       | 11. Ballast   | 16. Connector (input)          |
| 6. Catch screw    |               |                                |

**FIGURE 2 - AISLE LIGHT FIXTURE ASSY - BALLAST REPLACEMENT**

**P2550 CORRECTIVE MAINTENANCE SHEET**

Card Code:

**R-C-06-01-02-00/R-00**

System:

**LIGHTING**

Sheet:

**1/8**

Subsystem/Assy:

**INTERNAL LIGHTING & CAB**

Unit:

**REFLECTOR ASSY**

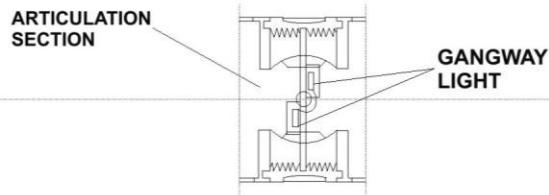
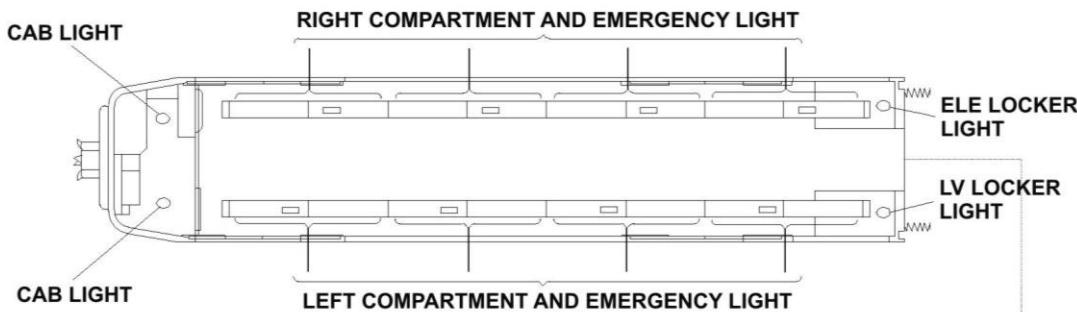
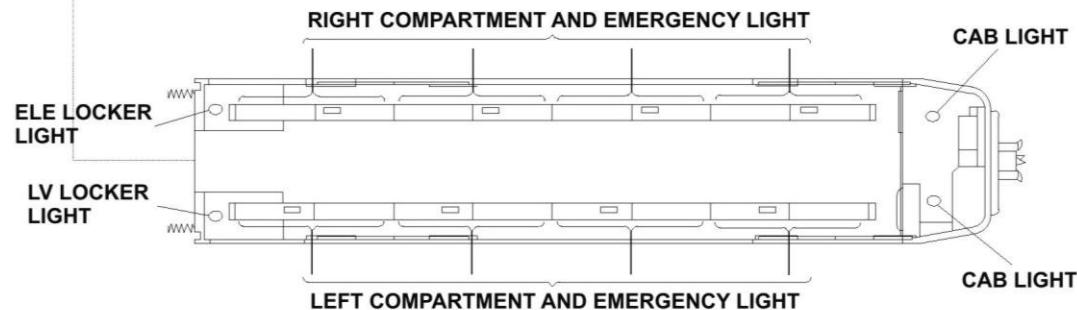
Component:

**LAMP**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**
**LOCATION:****INSIDE VIEW CARBODY A****INSIDE VIEW CARBODY B**

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-01-02-00/R-00**

System:

**LIGHTING**

Sheet:

**2/8**

Subsystem/Assy:

**INTERNAL LIGHTING & CAB**

Unit:

**REFLECTOR ASSY**

Component:

**LAMP**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

### **SAFETY PRECAUTIONS:**

**WARNING:** BEFORE PERFORMING MAINTENANCE PROCEDURES AND TOUCHING ANY COMPONENT, USE A RELIABLE HIGH VOLTAGE TEST PROBE TO VERIFY THAT NO VOLTAGE IS PRESENT.

**CAUTION:** TO PERFORM LIGHTING SYSTEM COMPONENTS MAINTENANCE, THE 37.5 VDC REMOVAL IS NOT NECESSARY BUT RECOMMENDED TO AVOID DAMAGE TO EQUIPMENT.

### **TOOLS:**

LACMTA Maintenance Shop Standard Tools Kit.

MULTIMETER (FLUKE 87 V/E) PN 4EB19

### **CONSUMABLES:**

### **SPARE PARTS:**

AIR/FIXTURE LAMP	TYPE F32T8
AISLE LAMP	TYPE FB24T8
WHITE LED	P/N 8E08

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-01-02-00/R-00**

System:

**LIGHTING**

Sheet:

**3/8**

Subsystem/Assy:

**INTERNAL LIGHTING & CAB**

Unit:

**REFLECTOR ASSY**

Component:

**LAMP**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

### PROCEDURE:

#### PRELIMINARY OPERATIONS

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 Indicators Panel "A" "Park / Friction Brake" ON).

#### A      LAMP INSTALLED IN THE COMPARTMENT AIR / LIGHT FIXTURES (Refer to Figure 1)

##### REMOVAL

To remove the Lamp, proceed as follows

1. Turn off power to the Lights of the Compartment where is located the Lamp to be removed by switching off the relevant Circuit Breakers, as follows:
  - A COMPARTMENT LIGHTING SWITCH -CB 08F03- (located on the "B" LV Locker)
  - B COMPARTMENT LIGHTING SWITCH -CB 08F04- (located on the "B" LV Locker)
  - EMERGENCY LIGHTING SWITCH -08F05- (located on the "B" Cab Circuit Breaker Panel)
2. Support the Relamping Door (1) and loosen two Phillips Head Closing Screws (8) until the Relamping Door opens.
3. Carefully allow Relamping Door (1) to hinge downward into open position.
4. Gently support (do not apply pressure) the Lamp and depress the Lamp Retaining Button on one Lamp Holder until it clears the Lamp.
5. Do not rotate the Lamp, but carefully pull the Lamp End straight from the Lamp holder. Set Lamp aside to avoid breakage.
6. Ensure expired and damaged Lamps are disposed properly.

##### INSTALLATION

To install the Lamp, proceed as follows:

1. Ensure Power is off to relevant Light Fixture Assy using a Multimeter.
2. Insert one end of the Lamp into the Lamp Holder.
3. Do not rotate the Lamp. Carefully press the other end of the Lamp straight into the opposite Lamp Holder, past the Lamp Retaining Button.
4. Ensure both Lamp Holder Retaining Buttons are properly positioned over Lamp Ends.
5. Temporarily activate power to Light Fixture and verify illumination.
6. Close and secure the Relamping Door (1) with two Phillips Head Closing Screws (8).
7. Restore Power to the Compartment Lights.
8. Record Task results on the Defect Report Card for administrative and maintenance planning.

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-01-02-00/R-00**

System:

**LIGHTING**

Sheet:

**4/8**

Subsystem/Assy:

**INTERNAL LIGHTING & CAB**

Unit:

**REFLECTOR ASSY**

Component:

**LAMP**

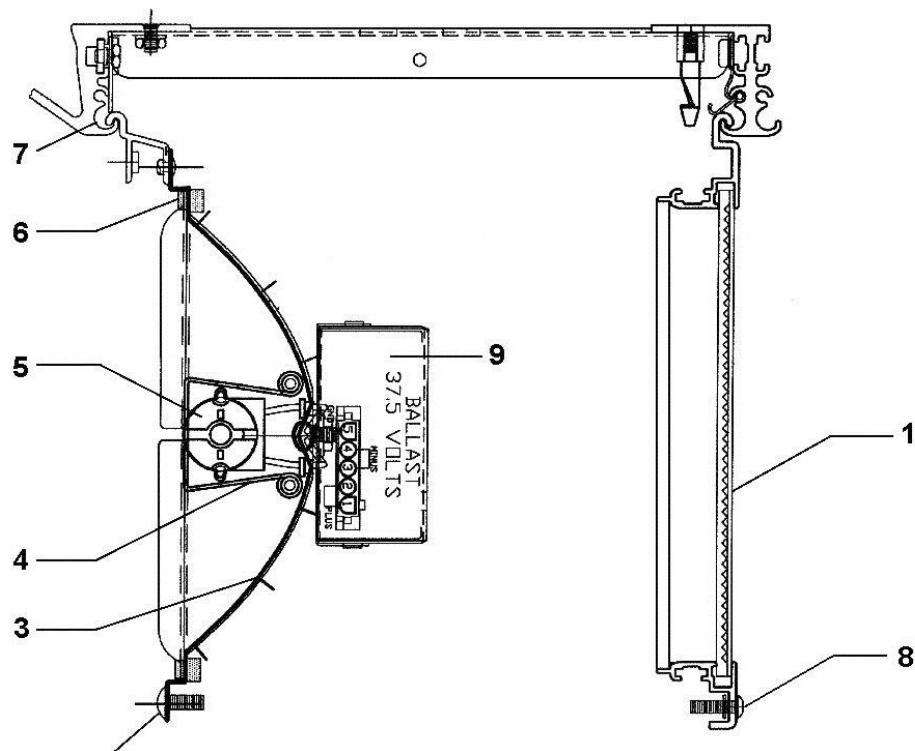
Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

### PROCEDURE (CONT'D):



**VIEW WITH REFLECTOR ASM  
& DOOR OPEN**

- |                   |                           |                       |
|-------------------|---------------------------|-----------------------|
| 1. Relamping Door | 4. Lamp Retainer          | 7. Reflector Retainer |
| 2. Catch Screw    | 5. Lamp Rotary Socket     | 8. Captive Screw      |
| 3. Reflector      | 6. Neoprene Sponge Gasket | 9. DC Ballast         |

**FIGURE 1 - AIR / LIGHT FIXTURE ASSY - LAMP REPLACEMENT**

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-01-02-00/R-00**

System:

**LIGHTING**

Sheet:

**5/8**

Subsystem/Assy:

**INTERNAL LIGHTING & CAB**

Unit:

**REFLECTOR ASSY**

Component:

**LAMP**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

### PROCEDURE (CONT'D):

#### B      LAMP INSTALLED IN THE AISLE LIGHT FIXTURES (Refer to Figure 2)

##### REMOVAL

To remove the Lamp, proceed as follows

1. Turn off power to Aisle Lights by switching off the following Circuit Breakers:  
EMERGENCY LIGHTING SWITCH -08F05-  
(located on the "B" Cab Circuit Breaker Panel).
2. Support Relamping Door and loosen two Phillips head closing screws until the Relamping Door opens.
3. Carefully allow Relamping Door to hinge downward into open position.
4. Carefully allow Reflector to hinge downward into open position. Do not apply pressure to the lamp. Do not rotate the lamp.
5. Gently support (do not apply pressure) the Lamp and depress the Lamp Retaining Button on one Lamp Holder until it clears the Lamp.
6. Do not rotate the Lamp, but carefully pull the Lamp end straight from the Lamp Holder. Set Lamp aside to avoid breakage.
7. Ensure expired and damaged Lamps are disposed properly.

##### INSTALLATION

To install the Lamp, proceed as follows:

1. Ensure Power is off to Aisle Lights using a Multimeter.
2. Insert one end of the Lamp into the Lamp Holder.
3. Do not rotate the Lamp. Carefully press the other end of the Lamp straight into the opposite Lamp Holder, past the Lamp Retaining Button.
4. Ensure both Lamp Holder Retaining Buttons are properly positioned over Lamp Ends.
5. Temporarily activate power to Reflector and verify illumination.
6. Close and secure the Reflector with two Phillips Head Closing Screws.
7. Close and secure the Relamping Door with two Phillips Head Closing Screws.
8. Restore Power to the Aisle Lights.
9. Record Task results on the Defect Report Card for administrative and maintenance planning.

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-01-02-00/R-00**

System:

**LIGHTING**

Sheet:

**6/8**

Subsystem/Assy:

**INTERNAL LIGHTING & CAB**

Unit:

**REFLECTOR ASSY**

Component:

**LAMP**

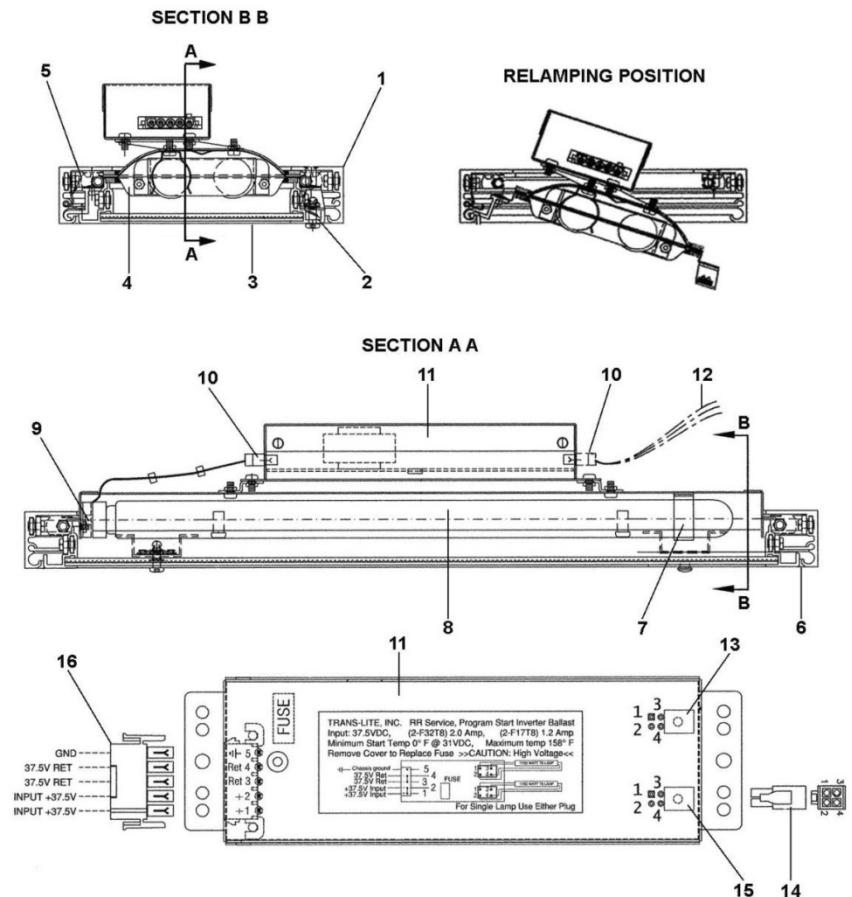
Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

### PROCEDURE (CONT'D):



- |                   |               |                                |
|-------------------|---------------|--------------------------------|
| 1. Frame ASM      | 7. Lamp Clamp | 12. Car wiring                 |
| 2. Relamping Door | 8. Lamp       | 13. Socket (to remote Fixture) |
| 3. Lens (Clear)   | 9. Lampholder | 14. Connector (output)         |
| 4. Reflector      | 10. Plug      | 15. Socket (output)            |
| 5. Retainer       | 11. Ballast   | 16. Connector (input)          |
| 6. Catch screw    |               |                                |

**FIGURE 2 - AISLE LIGHT FIXTURE ASSY - LAMP REPLACEMENT**

## **P2550 CORRECTIVE MAINTENANCE SHEET**

Card Code:

**R-C-06-01-02-00/R-00**

System:

**LIGHTING**

Sheet:

**7/8**

Subsystem/Assy:

**INTERNAL LIGHTING & CAB**

Unit:

**REFLECTOR ASSY**

Component:

**LAMP**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

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

#### **C LED INSTALLED IN THE LOCKERS(Refer to Figure 3)**

##### **REMOVAL**

To remove the LED, proceed as follows:

1. Turn off power to the ELE / LV Lockers Light by switching OFF the LOCKERS LIGHT SWITCH CB 8F18 (located in the A/B LV Locker A Section).:
2. Support Relamping Door (4) assembly and loosen Head Closing Screw (3) until the Door opens.
3. Remove faulty Led.

To remove the ELE / LV Lockers Light Assembly, proceed as follows:

1. Carefully allow Relamping Door to hinge downward into open position.
2. Remove Hinge Pin that attach the Relamping Door and Housing Hinge Bracket together.
3. Set Relamping Door aside to avoid damage.
4. Support Housing, remove and save the Hardware that secure the Housing to the Car Body.
5. Allow Housing to slightly descend from installation position until Interface Wiring Connectors are accessible.
6. Tag and unplug car wiring connectors.

##### **INSTALLATION**

1. Ensure power is off to ELE / LV Lockers Light using a Multimeter

To install ELE / LV Lockers Light Assembly, proceed as follows:

1. Lift and support Housing slightly below installation position.
2. Plug appropriate Car Wiring Connectors tagged during removal procedure.
3. Secure the Housing to Car Body with relevant Hardware saved during removal.
4. Align Relamping Door hinge bracket with Fixture Hinge Bracket and install Hinge Pin.
5. Allow Relamping Door to hinge downward into open position.
6. Close Relamping Door and secure with head closing screws.

To install LED, proceed as follows:

1. Position new LED.
2. Temporarily activate power to ELE / LV Lockers Light and verify illumination.
3. Close and secure the Relamping Door (4) assembly with head closing screw (3).
4. Restore Power to ELE / LV Lockers Light.
5. Record Task results on the Defect Report Card for administrative and maintenance planning.

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-01-02-00/R-00**

System:

**LIGHTING**

Sheet:

**8/8**

Subsystem/Assy:

**INTERNAL LIGHTING & CAB**

Unit:

**REFLECTOR ASSY**

Component:

**LAMP**

Man Hours:

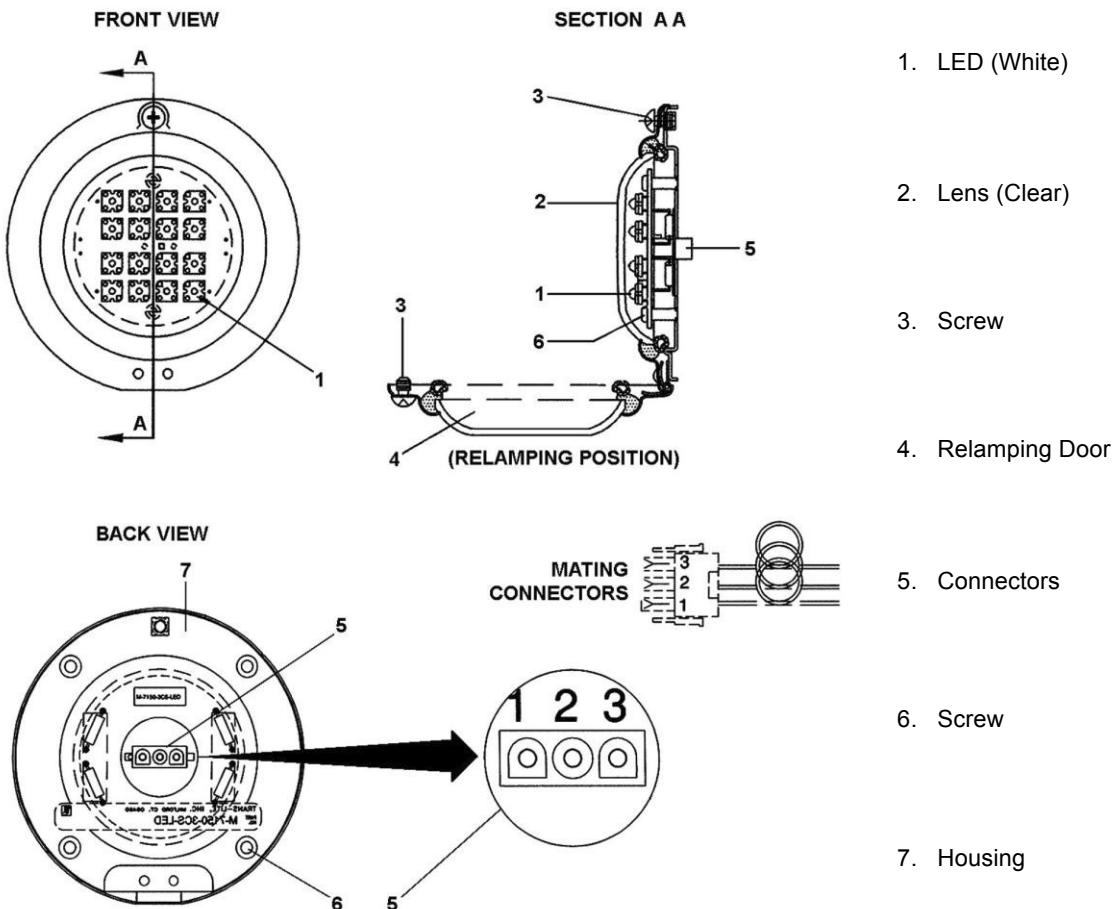
**0.5**

Maintenance Task:

**REPLACEMENT**

### PROCEDURE (CONT'D):

**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 06-III-04-01-02 of this Section) and follow the prescriptions provided at Step 3 "At every Task Completion."



**FIGURE 1 - LOCKERS LIGHTS COMPONENTS REPLACEMENT**

**P2550 CORRECTIVE MAINTENANCE SHEET**

Card Code:

**R-C-06-01-03-00/R-00**

System:

**LIGHTING**

Sheet:

**1/4**

Subsystem/Assy:

**INTERNAL LIGHTING & CAB**

Unit:

**CAB LIGHT**

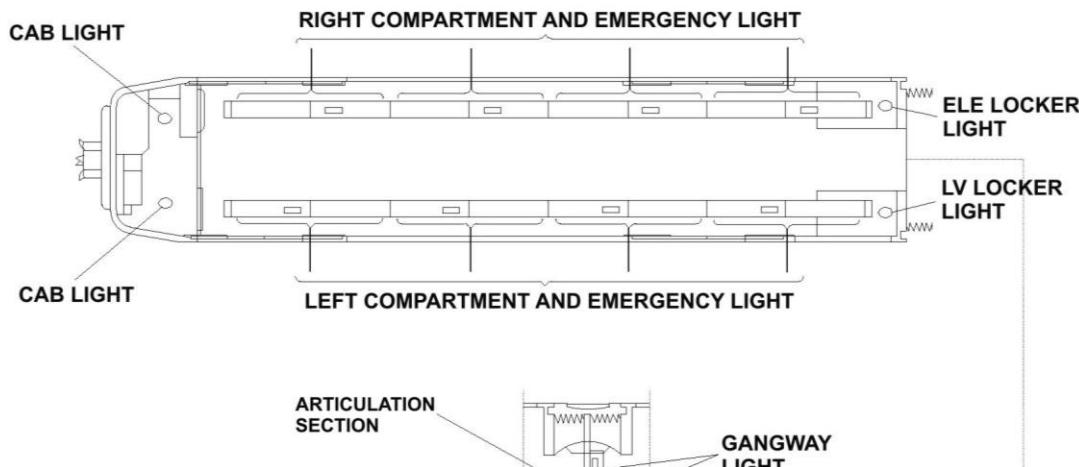
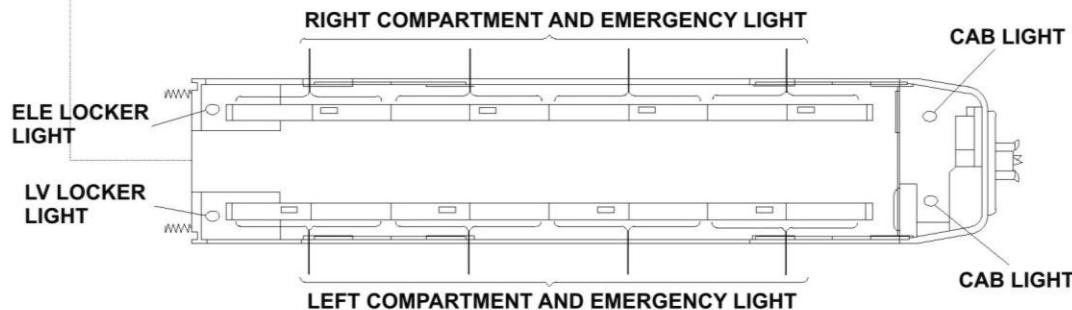
Component:

**LAMP**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**
**LOCATION:****INSIDE VIEW CARBODY A****INSIDE VIEW CARBODY B**

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-01-03-00/R-00**

System:

**LIGHTING**

Sheet:

**2/4**

Subsystem/Assy:

**INTERNAL LIGHTING & CAB**

Unit:

**CAB LIGHT**

Component:

**LAMP**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

### **SAFETY PRECAUTIONS:**

- WARNING:** DO NOT TOUCH AN ILLUMINATED HALOGEN LAMP.  
 CONTACT WITH AN HALOGEN LAMP WHILE ILLUMINATED, AND FOR A SHORT  
 TIME AFTER BEING EXTINGUISHED, CAN CAUSE SERIOUS INJURY.  
 AFTER SWITCHING OFF AN HALOGEN LAMP, ALLOW A FEW MINUTES FOR THE  
 LAMP TO COOL BEFORE HANDLING.
- WARNING:** BEFORE PERFORMING MAINTENANCE PROCEDURES AND TOUCHING ANY  
 COMPONENT, USE A RELIABLE HIGH VOLTAGE TEST PROBE TO VERIFY THAT NO  
 VOLTAGE IS PRESENT.
- CAUTION:** TO PERFORM LIGHTING SYSTEM COMPONENTS MAINTENANCE, THE 37.5 VDC  
 REMOVAL IS NOT NECESSARY BUT RECOMMENDED TO AVOID DAMAGE TO  
 EQUIPMENT.

### **TOOLS:**

LACMTA Maintenance Shop Standard Tools Kit.

MULTIMETER (FLUKE 87 V/E) PN 4EB19

### **CONSUMABLES:**

### **SPARE PARTS:**

HALOGEN CAB LIGHT      P/N AA047DN (S7335-11H)

<b>P2550 CORRECTIVE MAINTENANCE SHEET</b>	
Card Code:	
<b>R-C-06-01-03-00/R-00</b>	
System: <b>LIGHTING</b>	Sheet: <b>3/4</b>
Subsystem/Assy: <b>INTERNAL LIGHTING &amp; CAB</b>	Unit: <b>CAB LIGH</b>
Component: <b>LAMP</b>	Man Hours: <b>0.5</b>
Maintenance Task: <b>REPLACEMENT</b>	
<b>PROCEDURE:</b>	
<p><b>PRELIMINARY OPERATIONS</b></p> <ol style="list-style-type: none"> <li>1. Place the Vehicle in the Maintenance Shop.</li> <li>2. Set the Master Controller Handle to FSB position.</li> <li>3. Make sure that all Parking Brakes are applied (by checking on the IDU "Parking Brake A and B Not Released" and on Indicators Panel "A" "Park / Friction Brake" ON).</li> </ol>	
<p><b>REMOVAL</b></p> <p>To remove the Lamp, proceed as follows:</p> <p><b>WARNING: DO NOT TOUCH AN ILLUMINATED HALOGEN LAMP. CONTACT WITH AN HALOGEN LAMP WHILE ILLUMINATED, AND FOR A SHORT TIME AFTER BEING EXTINGUISHED, CAN CAUSE SERIOUS INJURY. AFTER SWITCHING OFF AN HALOGEN LAMP, ALLOW A FEW MINUTES FOR THE LAMP TO COOL BEFORE HANDLING.</b></p> <ol style="list-style-type: none"> <li>1. Turn off power to Cab Light by switching off the following Circuit Breakers:           <ul style="list-style-type: none"> <li>· CAB LIGHT Switch 8S01, (located on Operator Console)</li> <li>· CAB LIGHTING SWITCH CB 8F01 (located in the A / B LV Locker)</li> </ul> </li> <li>2. Turn Bezel CCW, and remove it.</li> <li>3. Pull the Halogen Lamp off to remove from Socket.</li> </ol> <p>To remove the Cab Light Assembly, proceed as follows:</p> <ol style="list-style-type: none"> <li>1. Remove the Screw that secure the Plate to the Cab Ceiling.</li> <li>2. Pull the Assembly slightly away from the Cab Ceiling.</li> <li>3. Tag and unplug the Wiring Connector from Car Wiring.</li> </ol>	
<p><b>INSTALLATION</b></p> <ol style="list-style-type: none"> <li>1. Ensure Power is off to the Cab Light Assembly using a Multimeter.</li> </ol> <p>To install the Cab Light Assembly, proceed as follows:</p> <ol style="list-style-type: none"> <li>1. Plug Wiring Connector into Car Wiring Connector as tagged from removal.</li> <li>2. Align and secure the Plate to Cab Ceiling with the relevant Screws.</li> </ol> <p>To Install the Lamp, proceed as follows:</p> <ol style="list-style-type: none"> <li>1. Push the Halogen Lamp into the Socket.</li> <li>2. Position Bezel and secure it by turning it CW.</li> <li>3. Restore Power to the Cab Light.</li> <li>4. Record Task results on the Defect Report Card for administrative and maintenance planning.</li> </ol> <p><b>NOTE:</b> 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 <b>HOW TO USE THE R-CM SHEETS</b> (para 06-III-04-01-02 of this Section) and follow the prescriptions provided at Step 3 "<b>At every Task Completion.</b>"</p>	

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-01-03-00/R-00**

System:

**LIGHTING**

Sheet:

**4/4**

Subsystem/Assy:

**INTERNAL LIGHTING & CAB**

Unit:

**CAB LIGHT**

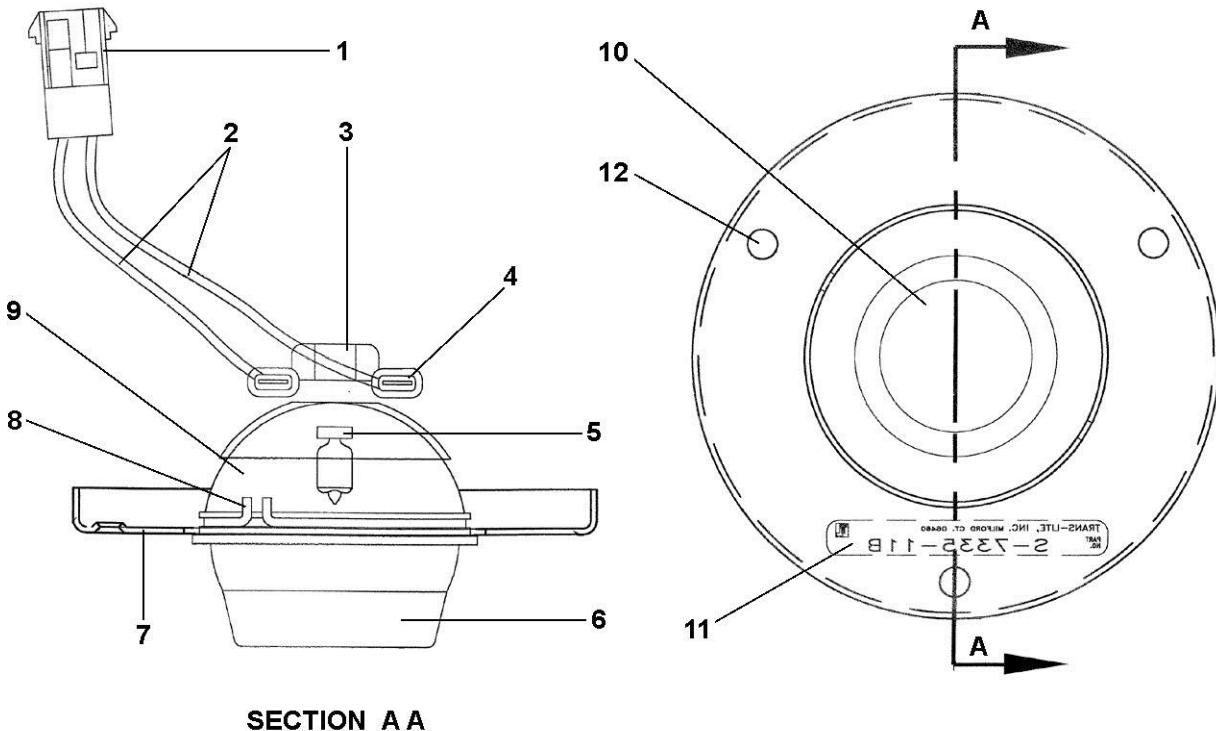
Component:

**LAMP**

Man Hours:

**0.5**

Maintenance Task:

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

- |                    |                         |                |
|--------------------|-------------------------|----------------|
| 1. Connector       | 5. Lamp (Halogen)       | 9. Lamphousing |
| 2. Cable           | 6. Fixture (Adjustable) | 10. Glass Lens |
| 3. Socket          | 7. Plate                | 11. Label      |
| 4. Fast Connection | 8. Retainer Ring        | 12. Screw      |

**FIGURE 1 - CAB LIGHT COMPONENTS REPLACEMENT**

**P2550 CORRECTIVE MAINTENANCE SHEET**

Card Code:

**R-C-06-02-01-00/R-00**

System:

**LIGHTING**

Sheet:

**1/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**FRONT HEAD LIGHTS**

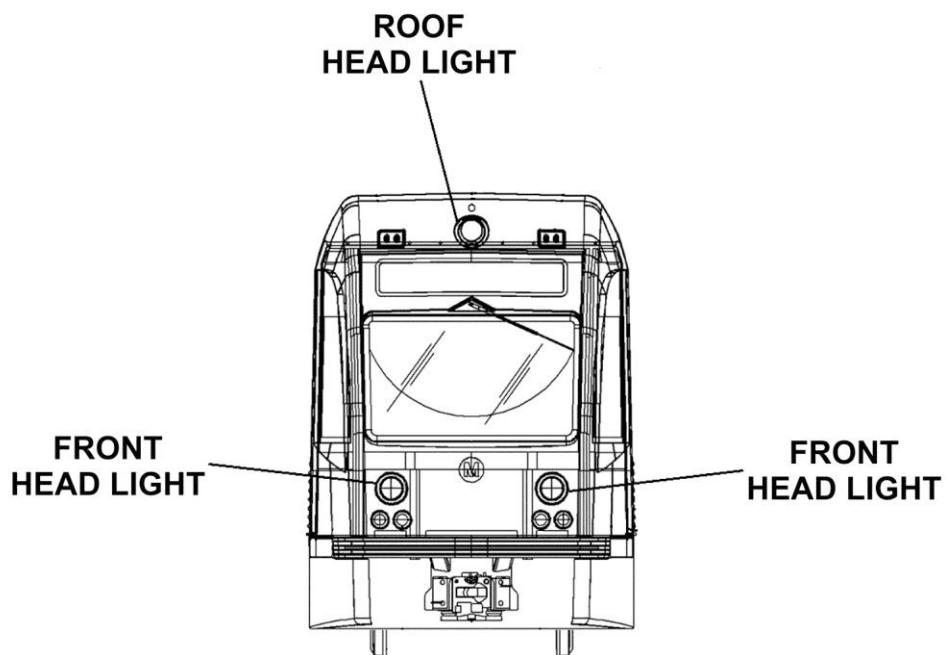
Component:

**LAMP**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**
**LOCATION:**

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-02-01-00/R-00**

System:

**LIGHTING**

Sheet:

**2/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**FRONT HEAD LIGHTS**

Component:

**LAMP**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

### **SAFETY PRECAUTIONS:**

- WARNING:** DO NOT TOUCH AN ILLUMINATED INCANDESCENT LAMP.  
 CONTACT WITH AN INCANDESCENT LAMP WHILE ILLUMINATED, AND FOR A  
 SHORT TIME AFTER BEING EXTINGUISHED, CAN CAUSE SERIOUS INJURY.  
 AFTER EXTINGUISHING AN INCANDESCENT LAMP, ALLOW A FEW MINUTES FOR  
 THE LAMP TO COOL BEFORE HANDLING.
- WARNING:** BEFORE PERFORMING MAINTENANCE PROCEDURES AND TOUCHING ANY  
 COMPONENT, USE A RELIABLE HIGH VOLTAGE TEST PROBE TO VERIFY THAT NO  
 VOLTAGE IS PRESENT.
- CAUTION:** TO PERFORM LIGHTING SYSTEM COMPONENTS MAINTENANCE, THE 37.5 VDC  
 REMOVAL IS NOT NECESSARY BUT RECOMMENDED TO AVOID DAMAGE TO  
 EQUIPMENT.

### **TOOLS:**

LACMTA Maintenance Shop Standard Tools Kit.

MULTIMETER (FLUKE 87 V/E) PN 4EB19

### **CONSUMABLES:**

### **SPARE PARTS:**

FRONT HEAD LIGHT ASSY  
LAMP, DOUBLE FILAMENTP/N AA03PTN (FC1754)  
P/N AA00FL9 (H4 24V-70/75W - P43T HD)

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-02-01-00/R-00**

System:

**LIGHTING**

Sheet:

**3/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**FRONT HEAD LIGHTS**

Component:

**LAMP**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

### PROCEDURE:

#### PRELIMINARY OPERATIONS

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 Indicators Panel "A" "Park / Friction Brake" ON).

#### REMOVAL

To remove each Front Head Light Lamp (8E05-09) / (8E06-10), proceed as follows

1. Turn off power to the Front Head Light by switching OFF the HEADLIGHTS SWITCH CB 8F11 located in the Cab CB Panel.
2. Support the Lamp and loosen the three Captive Closing Screws securing the Lamp Retaining Ring.  
**NOTE:** To avoid the re-adjusting of the Light Beam it is advised to not modify the positions of the Adjustment Screws that are accessible through the Holes in the Lamp Retaining Ring.
3. Pull the Lamp slightly from the Fixture and disconnect two Wires from the Screw Terminals on the back of the Lamp.
4. Place the Lamp in a safe location or dispose of expired Lamp properly.

To remove the High Beam Indicator Led (Cab Indicator Panel) refer to Sheet R-C-10-00-00-00/R-05.

To remove each Front Head Light Assembly, proceed as follows:

1. Remove six Sets of Hardware that secure the Housing outer edge to the Car Body.
2. Pull the Housing slightly away from the Car Body.
3. Tag and unplug the Wiring Connector from Car Wiring.

#### INSTALLATION

1. Ensure Power is off to the Front Head Light using a Multimeter.

To install each Front Head Light Assembly, proceed as follows:

1. Ensure that the Seal around the back of the Light Fixture Housing is in proper condition.
2. Plug the Wiring Connector into the Car Wiring Connector as tagged from removal.
3. Align and secure the Housing to the Car Body with six Sets of hardware.

To install the High Beam Indicator Led (Cab Indicator Panel) refer to Sheet R-C-10-00-00-00/R-05.

To install the Front Head Light Lamp (8E05-09) / (8E06-10), proceed as follows:

1. Connect two Wires to the Screw Terminals on the back of the Lamp (polarity is not critical).
2. Align and support the Lamp into the Lamp Mounting Ring.
3. Align the Lamp Retaining Ring over the Lamp and secure to the Housing with three captive closing Screws.
4. Restore Power to the Front Head Lights and verify Lamp illumination.
5. Perform the Front Head Lights Adjustment as indicated below.
6. Record Task results on the Defect Report Card for administrative and maintenance planning.

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-02-01-00/R-00**

System:

**LIGHTING**

Sheet:

**4/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**FRONT HEAD LIGHTS**

Component:

**LAMP**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

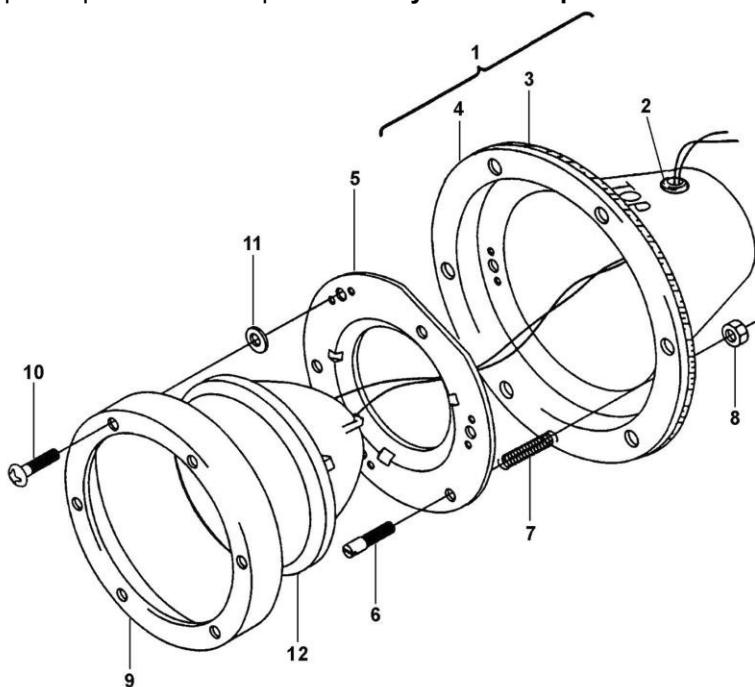
### PROCEDURE:

#### ADJUSTMENT

1. Adjust for desired Light-Beam Direction, according to LACMTA requirements.  
Each Front Head Light may be adjusted 3° to either side of the Car Centerline by turning each of the three Adjustment Screws until the light is properly directed.

**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 06-III-04-01-02 of this Section) and follow the prescriptions provided at Step 3 “**At every Task Completion.**”



- |                            |                    |                              |
|----------------------------|--------------------|------------------------------|
| 1. Housing Assy            | 5. Backplate       | 9. Cover Ring                |
| 2. White Vinyl Grommet     | 6. Adjusting Screw | 10. Pan Head Screw           |
| 3. Housing Sub-Assy        | 7. Tension Spring  | 11. Nylon Retaining Washer   |
| 4. Lens Mounting Ring Assy | 8. Hex Lock-Nut    | 12. Lamp with Screw Terminal |

**FIGURE 1 - FRONT HEAD LIGHT ASSEMBLY COMPONENTS REPLACEMENT**

**P2550 CORRECTIVE MAINTENANCE SHEET**

Card Code:

**R-C-06-02-03-00/R-00**

System:

**LIGHTING**

Sheet:

**1/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**MARKER LIGHTS**

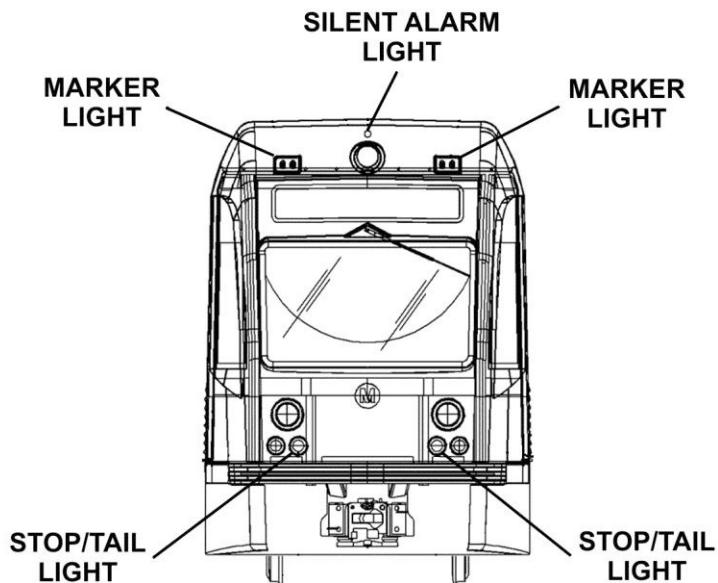
Component:

**LED**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**
**LOCATION:**

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-02-03-00/R-00**

System:

**LIGHTING**

Sheet:

**2/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**MARKER LIGHTS**

Component:

**LED**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

### **SAFETY PRECAUTIONS:**

**WARNING: DO NOT TOUCH AN ILLUMINATED LED LAMP.  
TO AVOID BURN INJURY, TURN THE LAMP OFF AND ALLOW TO COOL BEFORE  
TOUCHING.  
FAILURE TO COMPLY COULD RESULT IN BURN INJURY.**

**WARNING: BEFORE PERFORMING MAINTENANCE PROCEDURES AND TOUCHING ANY  
COMPONENT, USE A RELIABLE HIGH VOLTAGE TEST PROBE TO VERIFY THAT NO  
VOLTAGE IS PRESENT.**

**CAUTION: TO PERFORM LIGHTING SYSTEM COMPONENTS MAINTENANCE, THE 37.5 VDC  
REMOVAL IS NOT NECESSARY BUT RECOMMENDED TO AVOID DAMAGE TO  
EQUIPMENT.**

### **TOOLS:**

LACMTA Maintenance Shop Standard Tools Kit.

MULTIMETER (FLUKE 87 V/E) PN 4EB19

### **CONSUMABLES:**

### **SPARE PARTS:**

MARKER LIGHT ASSY	P/N AA04DUW (M8691-3RA)
AMBER LED	P/N 8E03-04
RED LED	P/N 8E21-22

<b>P2550 CORRECTIVE MAINTENANCE SHEET</b>	
Card Code:	
<b>R-C-06-02-03-00/R-00</b>	
System: <b>LIGHTING</b>	Sheet: <b>3/4</b>
Subsystem/Assy: <b>EXTERNAL LIGHTING</b>	Unit: <b>MARKER LIGHTS</b>
Component: <b>LED</b>	Man Hours: <b>0.5</b>
Maintenance Task: <b>REPLACEMENT</b>	
<b>PROCEDURE:</b>	
<p><b>PRELIMINARY OPERATIONS</b></p> <ol style="list-style-type: none"> <li>1. Place the Vehicle in the Maintenance Shop.</li> <li>2. Set the Master Controller Handle to FSB position.</li> <li>3. Make sure that all Parking Brakes are applied (by checking on the IDU "Parking Brake A and B Not Released" and on Indicators Panel "A" "Park / Friction Brake" ON).</li> </ol>	
<p><b>REMOVAL</b> (Refer to Figure 1)</p> <p>To remove the Amber LED and /or the Red LED from Marker Light Assy, proceed as follows:</p> <ol style="list-style-type: none"> <li>1. Turn off power by switching OFF the CB 08F10 (located on the "A" Section LV Locker).</li> </ol> <p><b>CAUTION:</b> If the module is hot, wait a few minutes for it to cool for safe handling.</p> <ol style="list-style-type: none"> <li>1. Gain safely access to the Vehicle Front / Rear Heads using suitable scaffold</li> <li>2. While supporting the Cover Bezel, loosen the two Captive Screws securing Bezel to Housing</li> <li>3. Remove LED module and dispose it properly.</li> </ol>	
<p>To remove each Marker Light Assembly, proceed as follows:</p> <ol style="list-style-type: none"> <li>1. Remove the Sets of Hardware that secure the Housing Outer Edge to the Car Body.</li> <li>2. Pull the Housing slightly away from the Car Body. Tag and unplug the Wiring Connector from Car Wiring.</li> </ol>	
<p><b>INSTALLATION</b> (Refer to Figure 1)</p> <ol style="list-style-type: none"> <li>1. Ensure Power is off to the Marker Light using a Multimeter.</li> </ol> <p>To install each Marker Light Assembly, proceed as follows:</p> <ol style="list-style-type: none"> <li>1. Gain safely access to the Vehicle Front / Rear Heads using suitable scaffold.</li> <li>2. Ensure that the Seal around the back of the Light Fixture Housing is in proper condition.</li> <li>3. Plug Wiring Connector into Car Wiring Connector as tagged from removal.</li> <li>4. Align and secure Housing to Car Body with the Sets of Hardware.</li> </ol>	
<p>To install the Amber LED and / or the Red LED on Marker Light Assy, proceed as follows:</p> <ol style="list-style-type: none"> <li>1. Install LED module into Module Socket.</li> <li>2. Position Cover Bezel with two Washers and two Captive Screws.</li> <li>3. Tighten Captive Screws securing Cover Bezel to Housing.</li> <li>4. Restore Power to Marker Lights and verify illumination.</li> <li>5 Record Task results on the Defect Report Card for administrative and maintenance planning.</li> </ol>	
<p><b>NOTE:</b> 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 <b>HOW TO USE THE R-CM SHEETS</b> (para 06-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-06-02-03-00/R-00**

System:

**LIGHTING**

Sheet:

**4/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**MARKER LIGHTS**

Component:

**LED**

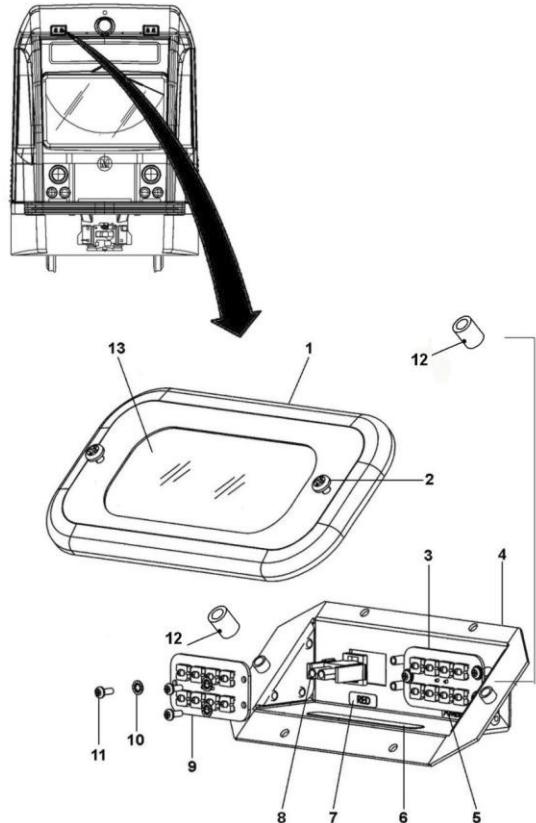
Man Hours:

**0.5**

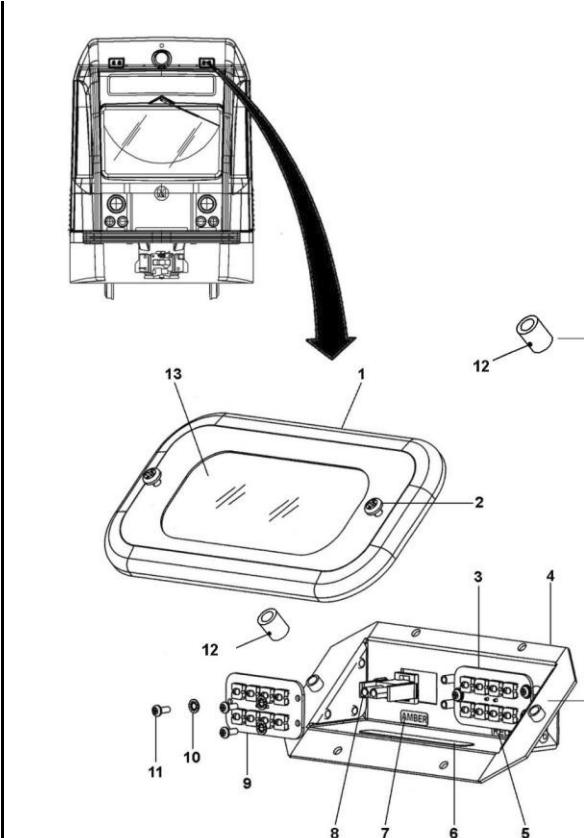
Maintenance Task:

**REPLACEMENT**

### PROCEDURE (CONT'D):

**RH MARKER LIGHT ASSY**3. **AMBER LEDS (8E03-04)**9. **RED LEDS (8E21-22)**

1. Bezel with Gasket
2. Catch Screw
3. LEDs
4. Housing
5. Label

**LH MARKER LIGHT ASSY**3. **RED LEDS (8E21-22)**9. **AMBER LEDS (8E03-04)**

6. Label
7. Label
8. Plug & Socket
9. LEDs
10. Washer
11. Screw
12. Gasket
13. Lens (Clear)

**FIGURE 1 - MARKER LIGHT ASSY COMPONENTS REPLACEMENT**

**P2550 CORRECTIVE MAINTENANCE SHEET**

Card Code:

**R-C-06-02-05-00/R-00**

System:

**LIGHTING**

Sheet:

**1/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**SILENT ALARM LIGHT**

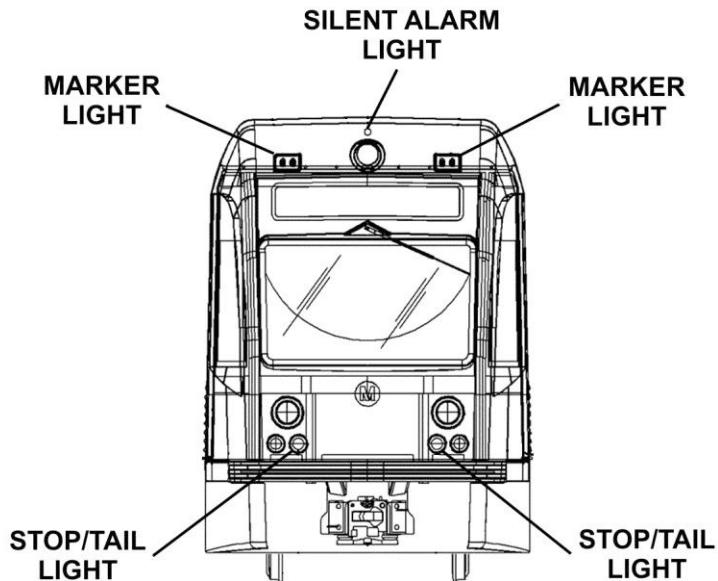
Component:

**LED**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**
**LOCATION:**

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-02-05-00/R-00**

System:

**LIGHTING**

Sheet:

**2/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**SILENT ALARM LIGHT**

Component:

**LED**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT****SAFETY PRECAUTIONS:**

**WARNING:** DO NOT TOUCH AN ILLUMINATED LED LAMP.  
 TO AVOID BURN INJURY, TURN THE LAMP OFF AND ALLOW TO COOL BEFORE  
 TOUCHING.  
 FAILURE TO COMPLY COULD RESULT IN BURN INJURY.

**WARNING:** BEFORE PERFORMING MAINTENANCE PROCEDURES AND TOUCHING ANY  
 COMPONENT, USE A RELIABLE HIGH VOLTAGE TEST PROBE TO VERIFY THAT NO  
 VOLTAGE IS PRESENT.

**CAUTION:** TO PERFORM LIGHTING SYSTEM COMPONENTS MAINTENANCE, THE 37.5 VDC  
 REMOVAL IS NOT NECESSARY BUT RECOMMENDED TO AVOID DAMAGE TO  
 EQUIPMENT.

**TOOLS:**

LACMTA Maintenance Shop Standard Tools Kit.

MULTIMETER (FLUKE 87 V/E) PN 4EB19

**CONSUMABLES:****SPARE PARTS:**

SILENT ALARM LIGHT ASSY P/N AA047DV (M4608-20)  
 WHITE LED P/N 8E08

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-02-05-00/R-00**

System:

**LIGHTING**

Sheet:

**3/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**SILENT ALARM LIGHT**

Component:

**LED**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

### PROCEDURE:

#### PRELIMINARY OPERATIONS

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 Indicators Panel "A" "Park / Friction Brake" ON).

#### REMOVAL (Refer to Figure 1)

To remove the LED, proceed as follows:

1. Turn off power to the Silent Alarm Lights by switching OFF the CB 08F13 ("B" LV Locker).
2. Gain safely access to the Top of the Front Head using suitable scaffold.
3. Support Relamping Door (4) assembly and loosen Head Closing Screw (3) until the Door opens.
4. Remove faulty Led.

To remove the Silent Alarm Light Assembly, proceed as follows:

1. Carefully allow Relamping Door to hinge downward into open position.
2. Remove Hinge Pin that attach the Relamping Door and Housing Hinge Bracket together. Set Relamping Door aside to avoid damage.
3. Support Housing, remove and save the Hardware that secure the Housing to the Car Body.
4. Allow Housing to slightly descend from installation position until Interface Wiring Connectors are accessible.
5. Tag and unplug Car Wiring Connectors.

#### INSTALLATION (Refer to Figure 1)

1. Ensure power is off to relevant Silent Alarm Lights using a Multimeter.

To install the Silent Alarm Light Assembly, proceed as follows:

1. Lift and support Housing slightly below installation position.
2. Plug appropriate Car Wiring Connectors tagged during removal procedure.
3. Secure the Housing to Car Body with relevant Hardware saved during removal.
4. Align Relamping Door Hinge Bracket with Fixture Hinge Bracket and install Hinge Pin.
5. Allow Relamping Door to hinge downward into open position.
6. Close Relamping Door and secure with head closing screws.

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-02-05-00/R-00**

System:

**LIGHTING**

Sheet:

**4/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**SILENT ALARM LIGHT**

Component:

**LED**

Man Hours:

**0.5**

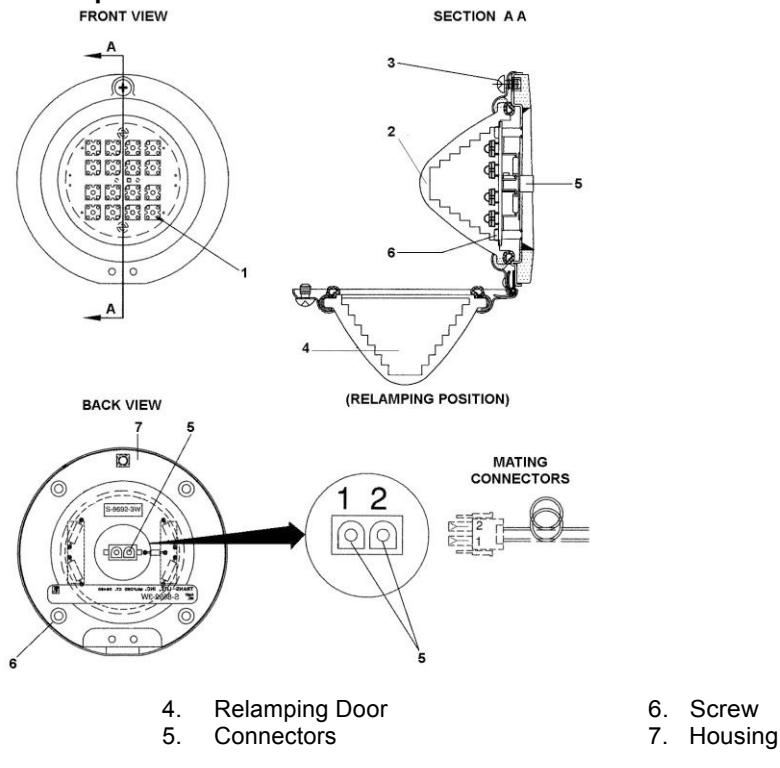
Maintenance Task:

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

To install the LED, proceed as follows:

1. Position new LED.
2. Temporarily activate power to Silent Alarm Light and verify illumination and flashing.
3. Close and secure the Relamping Door (4) assembly with head closing screw (3).
4. Restore Power to Marker Lights and verify illumination.
5. 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 06-III-04-01-02 of this Section) and follow the prescriptions provided at Step 3 "At every Task Completion."



**FIGURE 1 - SILENT ALARM LIGHT COMPONENTS REPLACEMENT**

**P2550 CORRECTIVE MAINTENANCE SHEET**

Card Code:

**R-C-06-02-06-00/R-00**

System:

**LIGHTING**

Sheet:

**1/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**ROOF HEAD LIGHT**

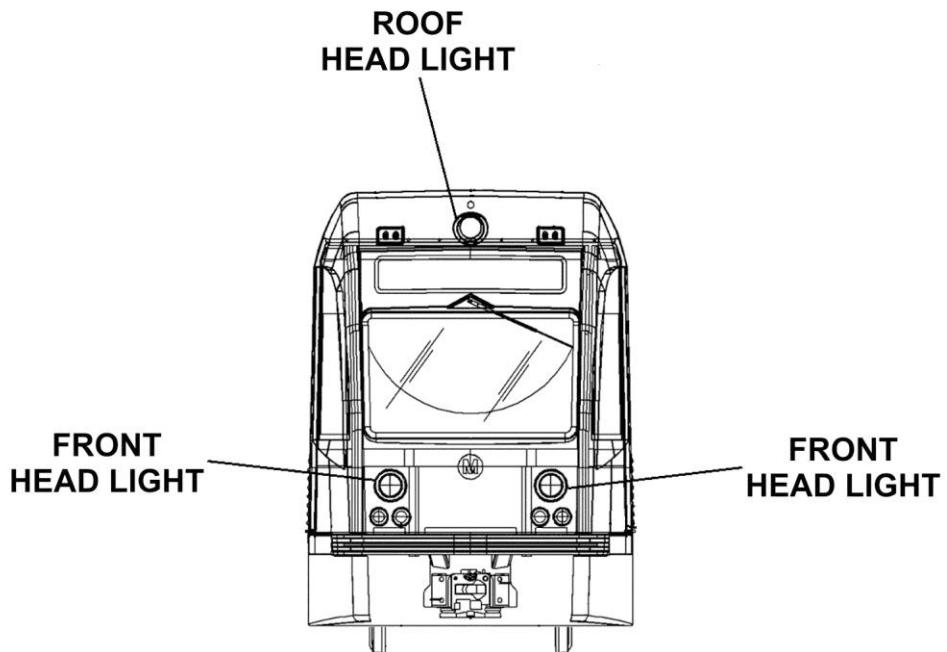
Component:

**LAMP**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**
**LOCATION:**

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-02-06-00/R-00**

System:

**LIGHTING**

Sheet:

**2/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**ROOF HEAD LIGHT**

Component:

**LAMP**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

### SAFETY PRECAUTIONS:

- WARNING:** DO NOT TOUCH AN ILLUMINATED INCANDESCENT LAMP.  
 CONTACT WITH AN INCANDESCENT LAMP WHILE ILLUMINATED, AND FOR A SHORT TIME AFTER BEING EXTINGUISHED, CAN CAUSE SERIOUS INJURY.  
 AFTER EXTINGUISHING AN INCANDESCENT LAMP, ALLOW A FEW MINUTES FOR THE LAMP TO COOL BEFORE HANDLING.
- WARNING:** BEFORE PERFORMING MAINTENANCE PROCEDURES AND TOUCHING ANY COMPONENT, USE A RELIABLE HIGH VOLTAGE TEST PROBE TO VERIFY THAT NO VOLTAGE IS PRESENT.
- CAUTION:** TO PERFORM LIGHTING SYSTEM COMPONENTS MAINTENANCE, THE 37.5 VDC REMOVAL IS NOT NECESSARY BUT RECOMMENDED TO AVOID DAMAGE TO EQUIPMENT.

### TOOLS:

LACMTA Maintenance Shop Standard Tools Kit.

MULTIMETER (FLUKE 87 V/E) PN 4EB19

### CONSUMABLES:

### SPARE PARTS:

ROOF HEAD LIGHT ASSY	P/N AA047DP (C2412-8)
LAMP	P/N 8E07
LAMP	P/N 1131-1

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-02-06-00/R-00**

System:

Sheet:

**LIGHTING****3/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**ROOF HEAD LIGHT**

Component:

**LAMP**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

### PROCEDURE:

#### PRELIMINARY OPERATIONS

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 Indicators Panel "A" "Park / Friction Brake" ON).

#### REMOVAL (Refer to Figure 1)

To remove the Roof Head Light Lamp, proceed as follows

1. Turn off power to the Headlights by switching OFF the following Circuit Breakers (located on the Cab CB Panel):
  - CB 08F11 HEADLIGHTS SWITCH
  - CB 08F12 ROOF HEADLIGHTS SWITCH
2. Gain safely access to the Roof Head Lights through the Cab Ceiling Inspection Panel.
3. Support the Lamp and loosen three Captive Closing Screws
4. Pull the Lamp slightly from the Fixture and disconnect the two Wires from the Screw Terminals on the back of the Lamp.
5. Place the Lamp in a safe location or dispose it properly.

To remove the High Beam Indicator Led (Cab Indicator Panel) refer to Sheet R-C-10-00-00-00/R-05.

To remove the Roof Head Light Assembly, proceed as follows:

1. Remove the Screw that secure the Housing Outer Edge to the Car Body.
2. Pull the Housing slightly away from the Car Body.
3. Tag and unplug the wiring connector from car wiring.

#### INSTALLATION (Refer to Figure 1)

1. Ensure Power is off to the Roof Head Light using a Multimeter

To install the Roof Head Light Assembly, proceed as follows:

1. Ensure that the Seal around the back of the Light Fixture Housing is in proper condition.
2. Plug Wiring Connector into Car Wiring Connector as tagged from removal.
3. Align and secure Housing to Car Body with the relevant Screws.

To install the High Beam Indicator Led (Cab Indicator Panel) refer to Sheet R-C-10-00-00-00/R-05

To install the Roof Head Light Lamp proceed as follows:

1. Connect two Wires to the Screw Terminals on the back of the Lamp.
2. Align the Lamp into the Lamp Mounting Ring and support.
3. Align the Lamp Retaining Ring over the Lamp and secure to the Housing with three Captive Closing Screws.
4. Restore Power to the Roof Head Light and verify Lamp illumination.
5. Perform the Roof Head Light Adjustment as indicated below.
6. Record Task results on the Defect Report Card for administrative and maintenance planning.

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-02-06-00/R-00**

System:

**LIGHTING**

Sheet:

**4/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**ROOF HEAD LIGHT**

Component:

**LAMP**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

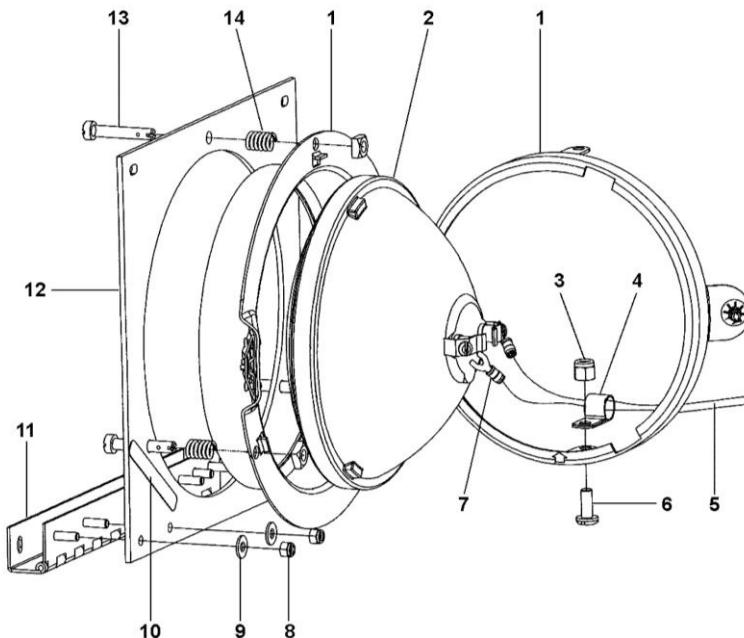
### PROCEDURE:

#### ADJUSTMENT

1. Adjust the Roof Head Light Assembly for desired light-beam direction, according to LACMTA requirements.  
The Roof Head Light may be adjusted 3° to either side of the Car Centerline by turning each of the three Adjustment Screws until the Light is properly directed.

**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 06-III-04-01-02 of this Section) and follow the prescriptions provided at Step 3 "At every Task Completion."



- |                |             |                     |
|----------------|-------------|---------------------|
| 1. Lampholder  | 6. Screw    | 11. Hinge           |
| 2. Sealed Beam | 7. Terminal | 12. Plate           |
| 3. Nut         | 8. Nut      | 13. Adjusting Screw |
| 4. Clamp       | 9. Washer   | 14. Spring          |
| 5. Wire        | 10. Label   |                     |

**FIGURE 1 - ROOF HEAD LIGHT COMPONENTS REPLACEMENT**

**P2550 CORRECTIVE MAINTENANCE SHEET**

Card Code:

**R-C-06-02-07-00/R-00**

System:

**LIGHTING**

Sheet:

**1/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**STOP / TAIL LIGHTS**

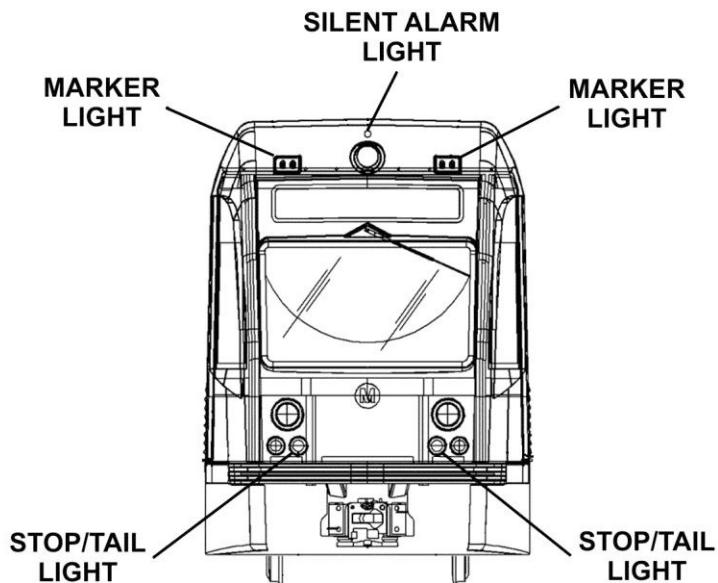
Component:

**LED**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**
**LOCATION:**

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-02-07-00/R-00**

System:

**LIGHTING**

Sheet:

**2/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**STOP / TAIL LIGHTS**

Component:

**LED**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

### **SAFETY PRECAUTIONS:**

**WARNING:** DO NOT TOUCH AN ILLUMINATED LED LAMP.  
 TO AVOID BURN INJURY, TURN THE LAMP OFF AND ALLOW TO COOL BEFORE  
 TOUCHING.  
 FAILURE TO COMPLY COULD RESULT IN BURN INJURY.

**WARNING:** BEFORE PERFORMING MAINTENANCE PROCEDURES AND TOUCHING ANY  
 COMPONENT, USE A RELIABLE HIGH VOLTAGE TEST PROBE TO VERIFY THAT NO  
 VOLTAGE IS PRESENT.

**CAUTION:** TO PERFORM LIGHTING SYSTEM COMPONENTS MAINTENANCE, THE 37.5 VDC  
 REMOVAL IS NOT NECESSARY BUT RECOMMENDED TO AVOID DAMAGE TO  
 EQUIPMENT.

### **TOOLS:**

LACMTA Maintenance Shop Standard Tools Kit.

MULTIMETER (FLUKE 87 V/E) PN 4EB19

### **CONSUMABLES:**

### **SPARE PARTS:**

TAIL/STOP LIGHT LED	P/N AA047DR (M7150-3CS-LED)
STOP LIGHT LED	8E11-12
TAIL LIGHT LED	8E13-14

<b>P2550 CORRECTIVE MAINTENANCE SHEET</b>	
	Card Code: <b>R-C-06-02-07-00/R-00</b>
System: <b>LIGHTING</b>	Sheet: <b>3/4</b>
Subsystem/Assy: <b>EXTERNAL LIGHTING</b>	Unit: <b>STOP / TAIL LIGHTS</b>
Component: <b>LED</b>	Man Hours: <b>0.5</b>
Maintenance Task: <b>REPLACEMENT</b>	
<b>PROCEDURE:</b>	
<b>PRELIMINARY OPERATIONS</b>	
<ol style="list-style-type: none"> <li>1. Place the Vehicle in the Maintenance Shop.</li> <li>2. Set the Master Controller Handle to FSB position.</li> <li>3. Make sure that all Parking Brakes are applied (by checking on the IDU "Parking Brake A and B Not Released" and on Indicators Panel "A" "Park / Friction Brake" ON).</li> </ol>	
<b>REMOVAL</b> (Refer to Figure 1)	
To remove the LED, proceed as follows:	
<ol style="list-style-type: none"> <li>1. Turn off power to the Stop / Tail Lights by switching OFF the following Circuit Breakers (located in the LV Locker B Section).:           <ul style="list-style-type: none"> <li>· 8F14 STOP INDICATOR LIGHT SWITCH</li> <li>· 8F15 SUPPLY TAIL SWITCH</li> </ul> </li> <li>2. Support Relamping Door (4) assembly and loosen Head Closing Screw (3) until the Door opens.</li> <li>3. Remove faulty Led.</li> </ol>	
To remove the Stop / Tail Light Assembly, proceed as follows:	
<ol style="list-style-type: none"> <li>1. Carefully allow Relamping Door to hinge downward into open position.</li> <li>2. Remove Hinge Pin that attach the Relamping Door and Housing Hinge Bracket together.</li> <li>3. Set Relamping Door aside to avoid damage.</li> <li>4. Support Housing, remove and save the Hardware that secure the Housing to the Car Body.</li> <li>5. Allow Housing to slightly descend from installation position until Interface Wiring Connectors are accessible.</li> <li>6. Tag and unplug car wiring connectors.</li> </ol>	
<b>INSTALLATION</b> (Refer to Figure 1)	
<ol style="list-style-type: none"> <li>1. Ensure power is off to Stop /Tail Light Assy using a Multimeter.</li> </ol>	
To install Stop / Tail Assembly, proceed as follows:	
<ol style="list-style-type: none"> <li>1. Lift and support Housing slightly below installation position.</li> <li>2. Plug appropriate Car Wiring Connectors tagged during removal procedure.</li> <li>3. Secure the Housing to Car Body with relevant Hardware saved during removal.</li> <li>4. Align Relamping Door hinge bracket with Fixture Hinge Bracket and install Hinge Pin.</li> <li>5. Allow Relamping Door to hinge downward into open position.</li> <li>6. Close Relamping Door and secure with head closing screws.</li> </ol>	

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-02-07-00/R-00**

System:

**LIGHTING**

Sheet:

**4/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**STOP / TAIL LIGHTS**

Component:

**LED**

Man Hours:

**0.5**

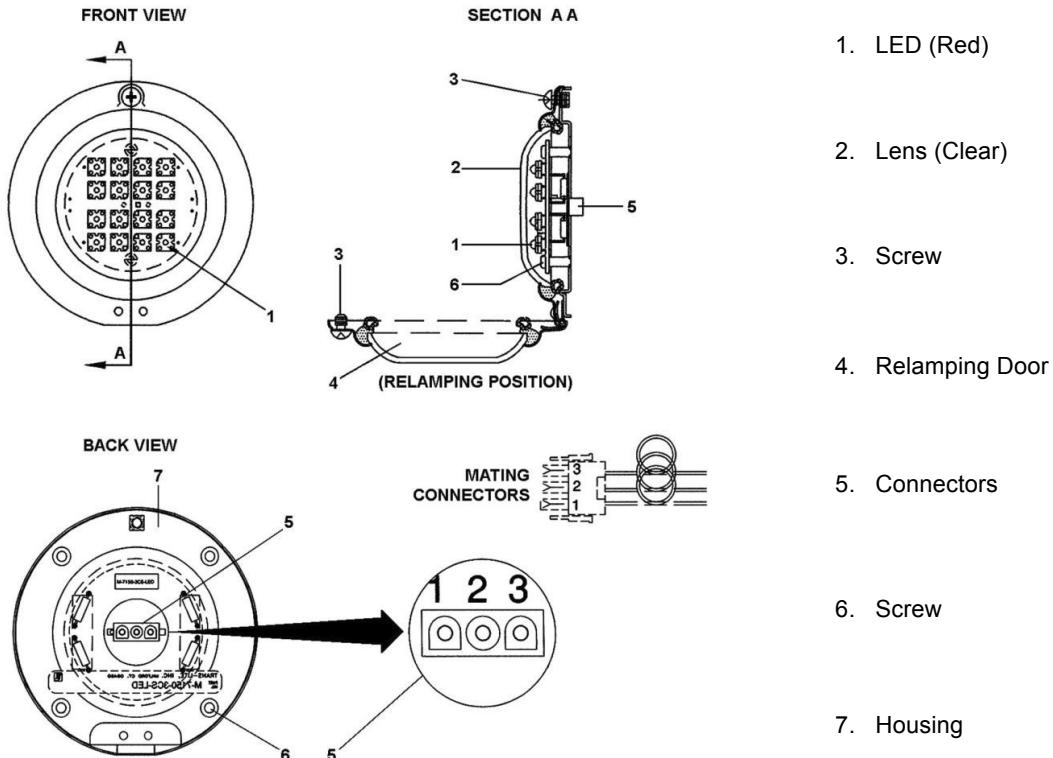
Maintenance Task:

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

To install LED, proceed as follows:

1. Position new LED.
- 2 Temporarily activate power to Stop /Tail Lights and verify illumination.
3. Close and secure the Relamping Door (4) assembly with head closing screw (3).
4. Restore Power to Stop / Tail Lights.
- 5 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 06-III-04-01-02 of this Section) and follow the prescriptions provided at Step 3 "At every Task Completion".

**FIGURE 1 - STOP /TAIL LIGHTS COMPONENTS REPLACEMENT**

**P2550 CORRECTIVE MAINTENANCE SHEET**

Card Code:

**R-C-06-02-10-00/R-00**

System:

**LIGHTING**

Sheet:

**1/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**TURN / HAZARD LIGHTS**

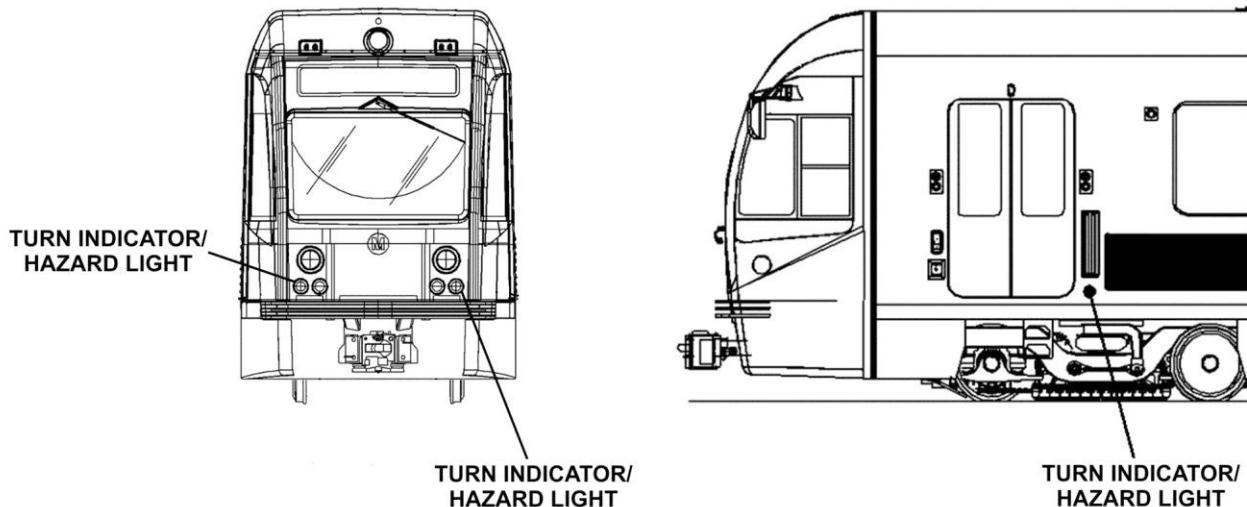
Component:

**LED**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**
**LOCATION:**

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-02-10-00/R-00**

System:

**LIGHTING**

Sheet:

**2/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**TURN / HAZARD LIGHTS**

Component:

**LED**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

### **SAFETY PRECAUTIONS:**

**WARNING:** DO NOT TOUCH AN ILLUMINATED LED LAMP.  
 TO AVOID BURN INJURY, TURN THE LAMP OFF AND ALLOW TO COOL BEFORE  
 TOUCHING.  
 FAILURE TO COMPLY COULD RESULT IN BURN INJURY.

**WARNING:** BEFORE PERFORMING MAINTENANCE PROCEDURES AND TOUCHING ANY  
 COMPONENT, USE A RELIABLE HIGH VOLTAGE TEST PROBE TO VERIFY THAT NO  
 VOLTAGE IS PRESENT.

**CAUTION:** TO PERFORM LIGHTING SYSTEM COMPONENTS MAINTENANCE, THE 37.5 VDC  
 REMOVAL IS NOT NECESSARY BUT RECOMMENDED TO AVOID DAMAGE TO  
 EQUIPMENT.

### **TOOLS:**

LACMTA Maintenance Shop Standard Tools Kit.

MULTIMETER (FLUKE 87 V/E) PN 4EB19

### **CONSUMABLES:**

### **SPARE PARTS:**

FRONT TURN SIGNAL LED    P/N AA047DX (M7150-8A)  
 SIDE TURN SIGNAL LED      P/N AA047DT (M7150-9A)

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-02-10-00/R-00**

System:

**LIGHTING**

Sheet:

**3/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**TURN / HAZARD LIGHTS**

Component:

**LED**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

### PROCEDURE:

#### PRELIMINARY OPERATIONS

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 Indicators Panel "A" "Park / Friction Brake" ON).

#### REMOVAL (Refer to Figure 1)

To remove the LED, proceed as follows:

1. Turn off power to the Turn / Hazard Lights by switching OFF the following Circuit Breakers (located in the LV Locker B Section):
  - CB 08F07 DIRECTION INDICATORS SWITCH
  - CB 08F08 DIRECTION INDICATORS SWITCH (LH SIDE)
  - CB 08F09 DIRECTION INDICATORS SWITCH (RH SIDE)
2. Support Relamping Door (4) assembly and loosen Head Closing Screw (3) until the Door opens.
3. Remove faulty Led.

To remove the Turn / Hazard Light Assembly, proceed as follows:

1. Carefully allow Relamping Door to hinge downward into open position.
2. Remove Hinge Pin that attach the Relamping Door and Housing Hinge Bracket together.
3. Set Relamping Door aside to avoid damage.
4. Support Housing, remove and save the Hardware that secure the Housing to the Car Body.
5. Allow Housing to slightly descend from installation position until Interface Wiring Connectors are accessible.
6. Tag and unplug car wiring connectors.

To remove the Turn / Hazard Indicator Leds (Cab Indicator Panel) refer to Sheet R-C-10-00-00-00/R-05

#### INSTALLATION (Refer to Figure 1)

1. Ensure power is off to Turn / Hazard Light using a Multimeter.

To install Turn / Hazard Light Assembly, proceed as follows:

1. Lift and support Housing slightly below installation position.
2. Plug appropriate Car Wiring Connectors tagged during removal procedure.
3. Secure the Housing to Car Body with relevant Hardware saved during removal.
4. Align Relamping Door hinge bracket with Fixture Hinge Bracket and install Hinge Pin.
5. Allow Relamping Door to hinge downward into open position.
6. Close Relamping Door and secure with head closing screws.

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-02-10-00/R-00**

System:

**LIGHTING**

Sheet:

**4/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**TURN / HAZARD LIGHTS**

Component:

**LED**

Man Hours:

**0.5**

Maintenance Task:

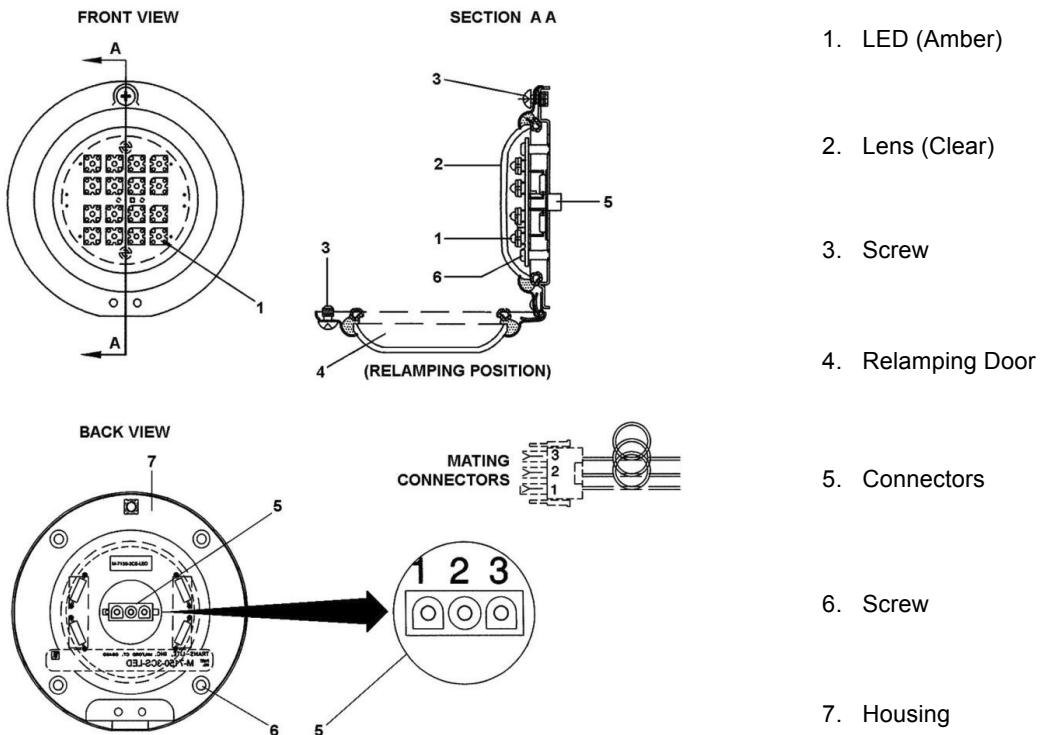
**REPLACEMENT****PROCEDURE (CONT'D):****INSTALLATION (CONT'D)**

To install LED, proceed as follows:

1. Position new LED.
- 2 Temporarily activate power to Turn / Hazard Light Assembly and verify illumination and flashing.
3. Close and secure the Relamping Door (4) assembly with head closing screw (3).
4. Restore Power to Turn / Hazard Lights.
- 5 Record Task results on the Defect Report Card for administrative and maintenance planning.

To install the Turn / Hazard Indicator Leds (Cab Indicator Panel) refer to Sheet R-C-10-00-00-00/R-05.

**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 06-III-04-01-02 of this Section) and follow the prescriptions provided at Step 3 "At every Task Completion."

**FIGURE 1 - TURN / HAZARD LIGHTS COMPONENTS REPLACEMENT**

**P2550 CORRECTIVE MAINTENANCE SHEET**

Card Code:

**R-C-06-02-11-00/R-00**

System:

**LIGHTING**

Sheet:

**1/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**"BY PASS ACTIVE" LIGHTS**

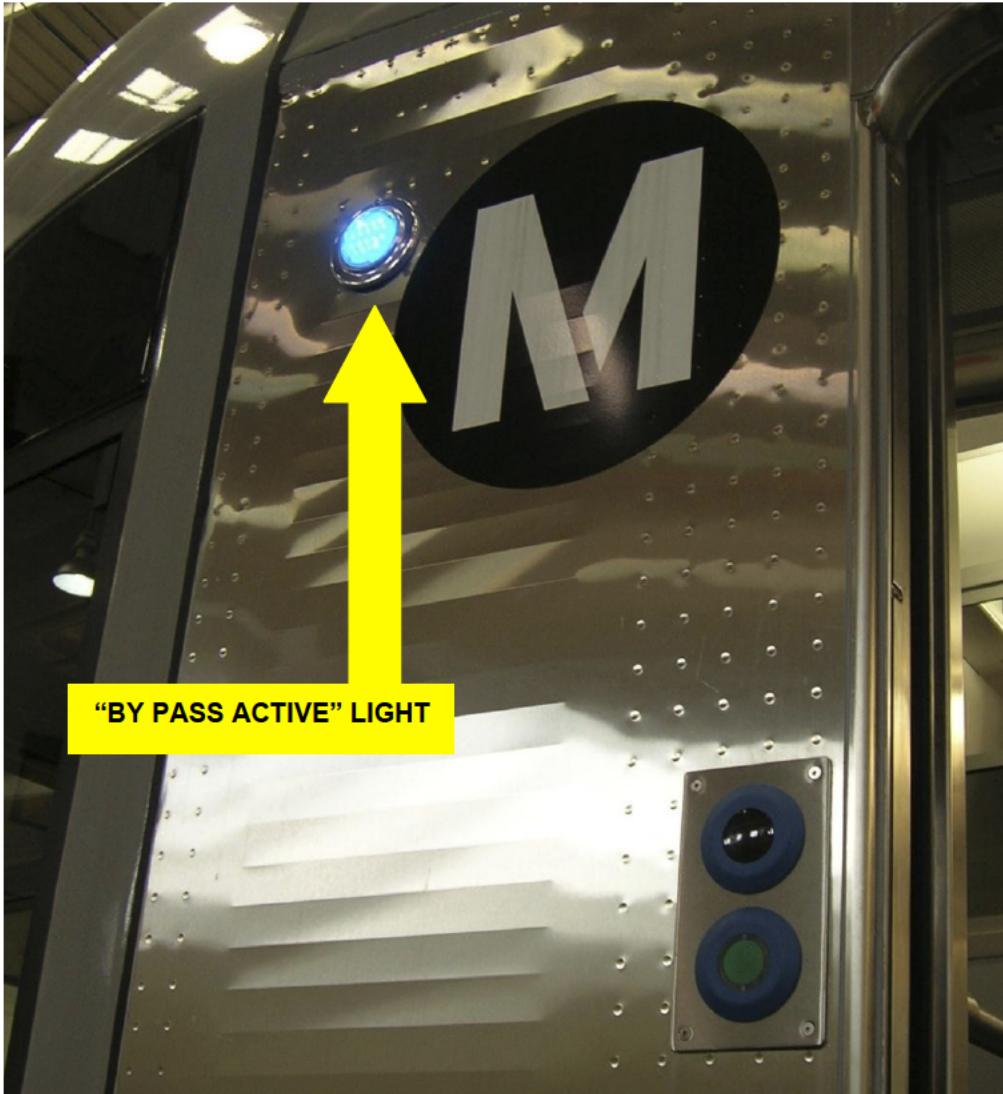
Component:

**LED**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**
**LOCATION:**
**"BY PASS ACTIVE" LIGHT**


## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-02-11-00/R-00**

System:

**LIGHTING**

Sheet:

**2/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**"BY PASS ACTIVE " LIGHTS**

Component:

**LED**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

### **SAFETY PRECAUTIONS:**

**WARNING: DO NOT TOUCH AN ILLUMINATED LED LAMP.  
TO AVOID BURN INJURY, TURN THE LAMP OFF AND ALLOW TO COOL BEFORE  
TOUCHING.  
FAILURE TO COMPLY COULD RESULT IN BURN INJURY.**

**WARNING: BEFORE PERFORMING MAINTENANCE PROCEDURES AND TOUCHING ANY  
COMPONENT, USE A RELIABLE HIGH VOLTAGE TEST PROBE TO VERIFY THAT NO  
VOLTAGE IS PRESENT.**

**CAUTION: TO PERFORM LIGHTING SYSTEM COMPONENTS MAINTENANCE, THE 37.5 VDC  
REMOVAL IS NOT NECESSARY BUT RECOMMENDED TO AVOID DAMAGE TO  
EQUIPMENT.**

### **TOOLS:**

LACMTA Maintenance Shop Standard Tools Kit.

MULTIMETER (FLUKE 87 V/E) PN 4EB19

### **CONSUMABLES:**

### **SPARE PARTS:**

"BY PASS ACTIVE " LIGHT ASSY BLUE LED (M7150-9A)	P/N AA047DW P/N TRANS-LITE M-8561-4
---	--

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-02-11-00/R-00**

System:

**LIGHTING**

Sheet:

**3/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**"BY PASS ACTIVE " LIGHT**

Component:

**LED**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

### PROCEDURE:

#### PRELIMINARY OPERATIONS

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 Indicators Panel "A" "Park / Friction Brake" ON).

#### REMOVAL (Refer to Figure 1)

To remove the LED, proceed as follows:

1. Turn off power to the "By Pass Active " Light by switching OFF the ACTIVE BY PASS LIGHT SWITCH CB 08F16 (located in the LV Locker A Section):
2. Support Relamping Door (4) assembly and loosen Head Closing Screw (3) until the Door opens.
3. Remove faulty Led.

To remove the "By Pass Active " Light Assembly, proceed as follows:

1. Carefully allow Relamping Door to hinge downward into open position.
2. Remove Hinge Pin that attach the Relamping Door and Housing Hinge Bracket together.
3. Set Relamping Door aside to avoid damage.
4. Support Housing, remove and save the Hardware that secure the Housing to the Car Body.
5. Allow Housing to slightly descend from installation position until Interface Wiring Connectors are accessible.
6. Tag and unplug car wiring connectors.

#### INSTALLATION (Refer to Figure 1)

1. Ensure power is off to "By Pass Active " Lights using a Multimeter

To install "By Pass Active " Light Assembly, proceed as follows:

1. Lift and support Housing slightly below installation position.
2. Plug appropriate Car Wiring Connectors tagged during removal procedure.
3. Secure the Housing to Car Body with relevant Hardware saved during removal.
4. Align Relamping Door hinge bracket with Fixture Hinge Bracket and install Hinge Pin.
5. Allow Relamping Door to hinge downward into open position.
6. Close Relamping Door and secure with head closing screws.

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-02-11-00/R-00**

System:

**LIGHTING**

Sheet:

**4/4**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**"BY PASS ACTIVE " LIGHT**

Component:

**LED**

Man Hours:

**0.5**

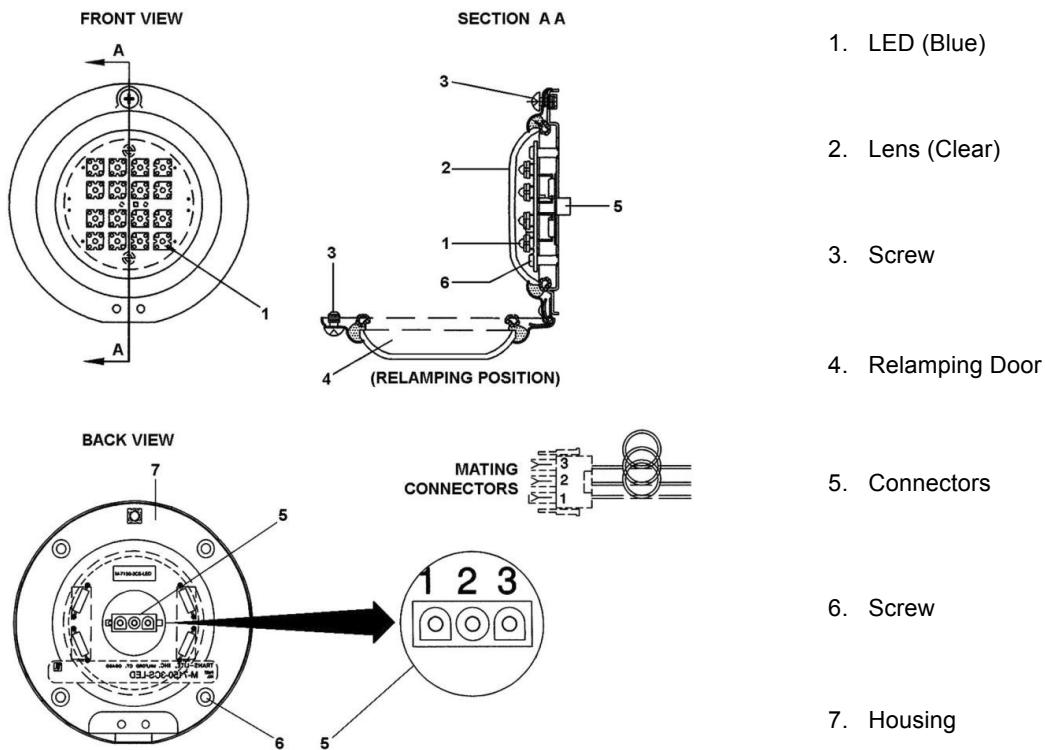
Maintenance Task:

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

To install LED, proceed as follows:

1. Position new LED.
2. Temporarily activate power to "By Pass Active " Lights and verify illumination by activating one By Pass Switch located on the By Pass Switch Panel of A/B Cab.
3. Close and secure the Relamping Door (4) assembly with head closing screw (3).
4. Restore Power to "By Pass Active " Lights.
5. 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 06-III-04-01-02 of this Section) and follow the prescriptions provided at Step 3 "At every Task Completion."

**FIGURE 1 - "BY PASS ACTIVE " LIGHTS COMPONENTS REPLACEMENT**

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-02-12-00/R-00**

System:

**LIGHTING**

Sheet:

**1/6**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**HEADLIGHTS**

Component:

**POWER SUPPLY**

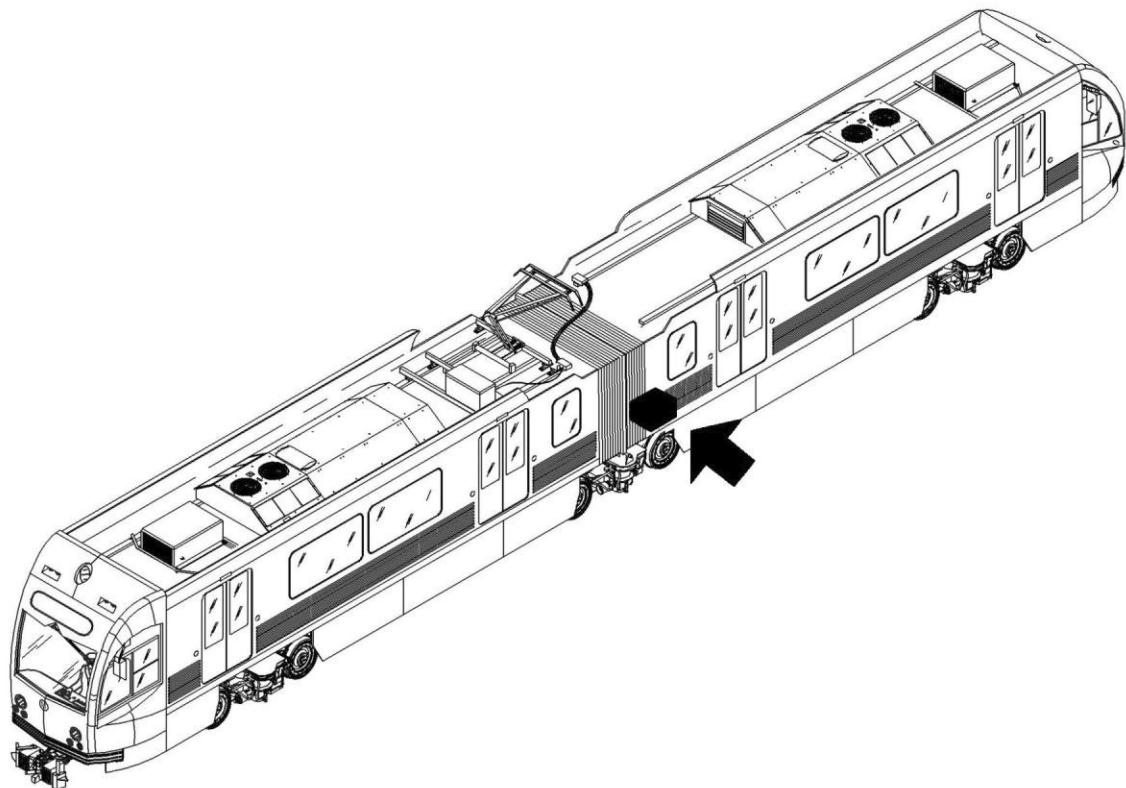
Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

LOCATION:



## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-02-12-00/R-00**

System:

**LIGHTING**

Sheet:

**2/6**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**HEADLIGHTS**

Component:

**POWER SUPPLY**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

### **SAFETY PRECAUTIONS:**

**WARNING:** BEFORE PERFORMING MAINTENANCE PROCEDURES AND TOUCHING ANY COMPONENT, USE A RELIABLE HIGH VOLTAGE TEST PROBE TO VERIFY THAT NO VOLTAGE IS PRESENT.

**CAUTION:** TO PERFORM LIGHTING SYSTEM COMPONENTS MAINTENANCE, THE 37.5 VDC REMOVAL IS NOT NECESSARY BUT RECOMMENDED TO AVOID DAMAGE TO EQUIPMENT.

### **TOOLS:**

LACMTA Maintenance Shop Standard Tools Kit.

MULTIMETER (FLUKE 87 V/E) PN 4EB19

### **CONSUMABLES:**

### **SPARE PARTS:**

POWER SUPPLY      P/N AA0464K (211EG23904B)

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-02-12-00/R-00**

System:

**LIGHTING**

Sheet:

**3/6**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**HEADLIGHTS**

Component:

**POWER SUPPLY**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT**

### PROCEDURE:

#### PRELIMINARY OPERATIONS

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 Indicators Panel "A" "Park / Friction Brake" ON).

#### REMOVAL (Refer to Figure 1)

To remove the Headlights Power Supply (8A01), proceed as follows:

1. Turn off Power to the Headlights Power Supply by switching OFF the (8A01) POWER SUPPLY SWITCH CB 8F17 (located in the B LV Locker).
2. Locate the RH Under Seat Box in the "B" Passenger Compartment.
3. Gain access to the Headlights Power Supply by opening the relevant Under Seat Box Cover using the Maintenance Key.
4. Locate the Headlights Power Supply to be replaced.
5. Disconnect the:
  - a. Input Power & Output Wires
  - b. Grounding Braid
 by loosening the relevant Terminals Fixing Hardware. Retain it for later use.
6. Take note of Wirings Identifications & Color Codes and relevant positions on the Unit.
7. Protect the Terminals on the Unit and of the Wires by suitable Protection Caps.
8. Loose and remove the Unit Fixing Hardware, Screws (2) and Washers (3 and 4).Retain hardware for later use and discard Lock Washer.
9. Remove the Unit from Support (5). and make it available for Repair.

#### INSTALLATION (Refer to Figure 1)

To install the Headlights Power Supply, proceed as follows:

1. Vacuum clean the Under Seat Box Compartment. Use recommended agent and lint-free rags.as needed
2. Make sure that the Wires inside the Under Seat Box Compartment are properly positioned to make easier the Headlights Power Supply installation.
3. Check the Wires & Wires Terminals for damage / signs of overheating. Replace as per check results
4. Install the Headlights Power Supply on Support (5) with the Screws (2) and Washers (3) and "new" Lock Washers (4).
5. Torque the Fixing Hardware to **5 ft lb**.
6. Remove the Protection Caps from the Terminals on the Unit and on the Wires.
7. Connect the Wires to the relevant Headlights Power Supply Terminals according to their positions, Identification & Colour Codes previously noted.  
 Refer to Fig 2 for Wiring Scheme or to the Functional Schematic Sheet 74 for complete Wiring Details.

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-02-12-00/R-00**

System:

**LIGHTING**

Sheet:

**4/6**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**HEADLIGHTS**

Component:

**POWER SUPPLY**

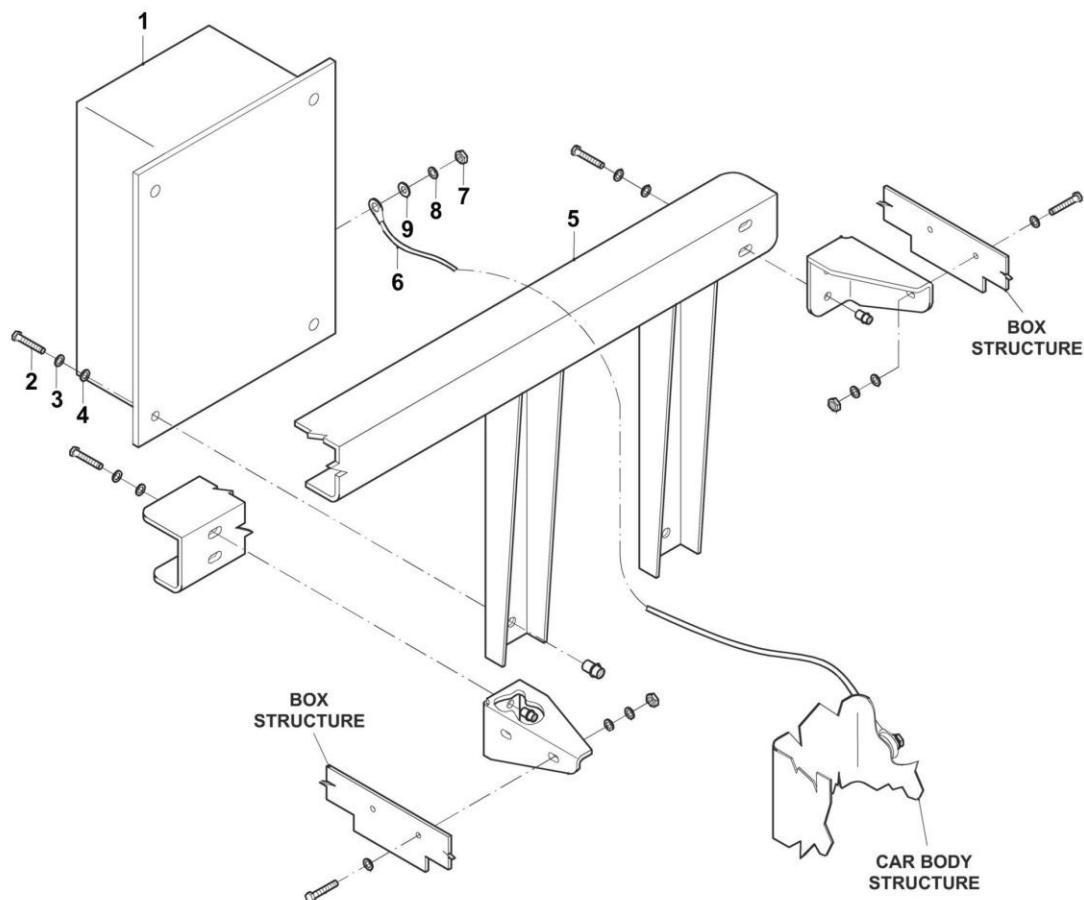
Man Hours:

**0.5**

Maintenance Task:

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

8. Torque the (M5) Electrical Connections to **5 ft-\*lb**
9. Connect the Ground Cable (6) by means of related hardware.
10. Restore the Electrical Power to the Headlights Power Supply by switching ON the (8A01) POWER SUPPLY SWITCH CB 8F17 (located in the B LV Locker)

**FIGURE 1 - HEAD LIGHTS POWER SUPPLY REPLACEMENT**

## P2550 CORRECTIVE MAINTENANCE SHEET

Card Code:

**R-C-06-02-12-00/R-00**

System:

**LIGHTING**

Sheet:

**5/6**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**HEADLIGHTS**

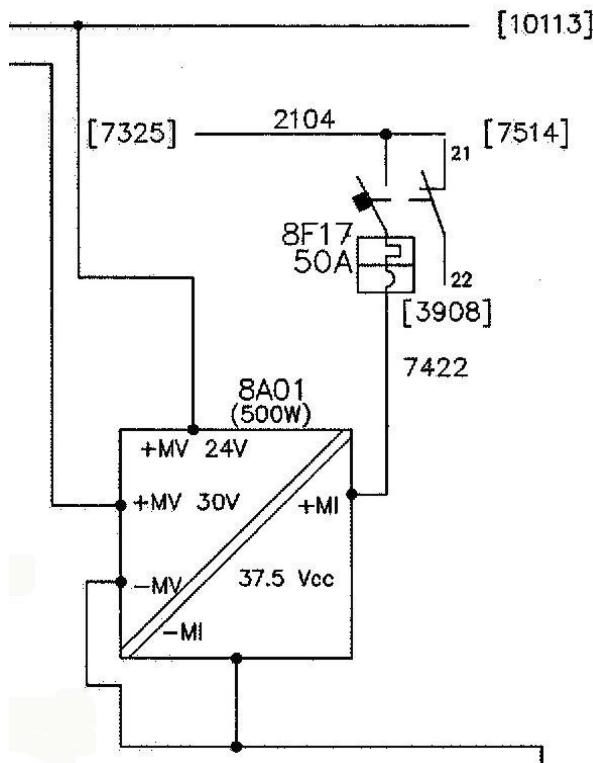
Component:

**POWER SUPPLY**

Man Hours:

**0.5**

Maintenance Task:

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

**FIG 2 HEADLIGHTS POWER SUPPLY WIRING SCHEME**

12. Check the Gasket of the Under Seat Box Cover for damage / deformation. Replace as per check results.
13. Install the Under Seat Box Cover and lock it using the Maintenance Key
14. 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 06-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-06-02-12-00/R-00**

System:

**LIGHTING**

Sheet:

**6/6**

Subsystem/Assy:

**EXTERNAL LIGHTING**

Unit:

**HEADLIGHTS**

Component:

**POWER SUPPLY**

Man Hours:

**0.5**

Maintenance Task:

**REPLACEMENT****INTENTIONALLY  
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### **06-III-05 CONSUMABLE MATERIALS LIST (R-CML)**

The Consumable Materials needed to accomplish the Lighting Running Maintenance are listed, sequenced in alphabetical order, by SUBSYSTEM /ASSY -UNIT / COMPONENT, in the following Table 06-III-05.1.

**Table 06-III-05.1 Running Maintenance Consumable Materials List (R-CML)**

<b>SYSTEM 06</b>		<b>LIGHTING</b>		
<b>SUBSYSTEM /ASSY - UNIT / COMPONENT</b>	<b>AGENT</b>	<b>PN</b>	<b>MTA PN</b>	
CAB AND CAR LIGHTING CONTROL	CRC Industrial - Precision Cleaner	M3 PN 147535		
	Dry Compressed Air for Electronic Equipment	(commercial)		
EXTERNAL LIGHTING SYSTEM INTERNAL AND CAB LIGHTING SYSTEM	TBD			
	TBD			

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

The Tools and Test Equipment needed to accomplish the Lighting Running Maintenance are listed, sequenced in alphabetical order, by SUBSYSTEM /ASSY -UNIT / COMPONENT, in the following Table 06-III-06.1.

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

**Table 06-III-06.1 Running -Test Equipment & Special Tools List (R-TESTL)**

<b>SYSTEM 06</b>		<b>LIGHTING</b>		
<b>SUBSYSTEM /ASSY - UNIT / COMPONENT</b>	<b>LACMTA STANDARD TOOLS KIT</b>	<b>LACMTA WORKSHOP DEVICES</b>	<b>SPECIAL TOOL / TEST EQUIPMENT</b>	<b>PN</b>
CAB AND CAR LIGHTING CONTROL	<b>X</b>	Vacuum Cleaner	MULTIMETER (FLUKE 87 V/E)	4EB19
INTERNAL AND CAB LIGHTING SYSTEM				
EXTERNAL LIGHTING SYSTEM	<b>X</b>		MULTIMETER (FLUKE 87 V/E)	4EB19

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