

Pretoria - Tech Talk # 1

Date: Revised 4/14/2008

Topic: Servicing and Cleaning Pretoria Interior Lighting Systems

Pretoria Transit Interiors has issued this Tech Talk to keep our customers informed on issues pertaining to passenger interior light systems.

Pretoria Interior Lighting

Circuit diagrams for the interior lights and their controlling switches, relays, and circuit breakers, are shown on the applicable wiring diagrams in the OEM's Electrical Schematics Manual.

Fluorescent Lighting System

The interior fluorescent lights are energized when the "Interior Lights" toggle switch is flipped to the ON position. When these switches are properly set, current flows through a Multiplexing module to complete the circuit and illuminate the lamp tubes. Refer to the "Interior Lighting" wiring diagram in the OEM's Electrical Schematics Manual for further information on the appropriate circuits and connections.

Individual power supply units (ballasts) are mounted in the fluorescent lamp base plate assembly. The ballasts are accessible for replacement after lowering the lamp lens and removing the ballast mounting plate.



The fluorescent lights in the interior lighting system operate on high voltage. Take care to avoid sustaining electrical shocks, which may cause personal injury or damage to the equipment. ALWAYS TURN OFF THE BATTERY DISCONNECT SWITCH before servicing fluorescent lighting!



If the lamp is not functioning, it may be related to a bad connection and not end-of-life failure. See Figure 9-7. The molded plastic comprising the recessed double contact (RDC) that protects the double pins at the ends of high output lamp tubes is very brittle. An HO lamp tube with a cracked RDC should not be used as the lamp will easily turn in the fixture, causing intermittent or no contact with the lamp pins and socket receptacles. Install very carefully by following the guidelines provided in "Extinguishable Ballast Replacement" on the following pages.

Fluorescent Bulb Replacement

- 1) Place the INTERIOR LIGHTS switch in the OFF position.
- 2) Carefully remove the lens from the panel to replace. Start by prying with the special tool provided with your coach as shown in Figure 9-6, or you can squeeze the lens with your hand and work your way down the lens, being careful not to scratch or crack it.
- 3) Remove the bulb by pushing it toward the spring ended socket, which compresses to free the opposite end terminals from the socket. Remove the bulb from the light fixture.
- 4) The bulb is replaced by reversing the above steps. To replace the lens, hold the lens in place and, starting from one end, squeeze the lens and push into the fixture working your way toward the opposite end you may also gently pound into place with the heel of your hand as if you were replacing a hubcap.



Figure 9-6, Remove Fluorescent Lens with Lamp Tube Extraction Tool

The newest fluorescent lamp technology for this market has been in the introduction of safer power supplies or lamp ballast. Ballast that meet the requirement of UL 935; Type CC will limit the amount of arcing that fluorescent ballast will allow.

The use of extinguishing or dimming ballast in combination with HO (high output) lamp tubes is recommended to extend the operational life of lamp tubes required to switch with the doors. This topic is addressed in the APTA - Standard Bus Procurement Guidelines (SBPG) in the Passenger Interior Lighting section. HO lamp tubes are used in conjunction with extinguishable and dimmable ballast, HO lamp tubes are bi-pin as shown below rather than single pin. Bi-pin configurations are used in order to provide a limited but constant power to the lamp tube filaments keeping them warm and ready for full power when desired.

Ballast Replacement

The following instructions are for replacement of ballast. See “Extinguishable Ballast Replacement” for additional instructions for replacing High – Output (HO) lamp tubes used with Extinguishable Ballast.

Remove the two screws which attach the ballast mounting plate to the light fixture. Pull the assembly far enough out from the light housing to gain access to the ballast connector.

Disconnect the electrical connectors attaching the ballast to the light fixture.

Replace the ballast by reversing the above steps.



Remove Ballast Face Plate Screws



Remove Ballast from Light Housing

Extinguishable / Dimmable Ballast Replacement

Extinguishing and Dimmable ballast are used in combination with HO (high output) lamp tubes to extend the operational life of lamp tubes required to switch with the doors. HO lamp tubes are bi-pin rather than single pin. The bi-pin configuration is used in order to provide a limited but constant amount of power to the lamp tube filaments, keeping them warm and ready for full power when required.

The installation of an HO lamp tube into a HO socket must be done with care, by properly aligning the lamp end with the socket. It is important when installing lamp tubes to inspect both the lamp ends for damage and the lamp sockets for debris or bent contact pins before installation. Always insert the lamp tube in the floating (push-spring) socket first and then the fixed socket. Never force or twist an HO lamp tube into the socket, as these actions may crack the recessed double contact (RDC) bays on the ends of the lamp tubes.

The molded plastic comprising the RDC is very brittle. The RDC not only protects the pins from damage, but most importantly keeps the lamp ends seated properly in the socket. An HO lamp tube with a cracked RDC should not be used, as the lamp will easily turn in the fixture, causing intermittent or no contact with the lamp pins and socket receptacles.

Broken pieces of the HO lamps RDC can become lodged in the HO socket. Any pieces of broken RDC should be completely removed from the socket before installation of a new HO lamp tube. Inserting a new HO lamp in an HO socket with RDC debris left in the socket can damage a new lamp tube’s RDC and HO socket receptacle pins, causing a poor or non-existent connection. Never force or twist HO lamp tubes into their mating sockets, and always inspect the lamp ends and sockets before installation.

Figure 9-7, High-Output Lamp Tube and Socket Conditions

It is good practice to inspect the HO sockets for bent socket pins and for foreign objects that should not be in the socket receptacle. It is also good practice to inspect the HO lamp tubes ends for damage to the RDC as shown. If the RDC or socket pins are damaged it is advisable to replace the parts in question to ensure a proper fit and function.



Damaged RDC



Damaged RDC & Damaged Socket Receptacle



High-Output Socket Receptacle Proper Pin Contact



Cutaway RDC Shows Proper Condition

Figure 9-7, High-Output Lamp Tube and Socket Conditions

Troubleshooting Ballast and Lamp Tubes

If you suspect that extinguishing ballast is malfunctioning, shut off the power to the lights, remove the lamp completely from the sockets, and inspect the lamp ends and socket pins for any damage. If damage is present, replace the lamp or socket before changing the ballast. Black or darkened ends on the lamp usually indicate the end of lamp life as the phosphorous lining the lamp tube interior has been depleted.

Ballast Diagnostics

Over Temperature Protection	Integrated PTC* Fuse
Reverse Polarity Protection	Integrated PTC* Fuse
Short Circuit Protection	Non-Latching
Green LED Indicator	Green LED On Indicates Ballast Functioning Properly
Red LED Indicator	Red LED On Indicates Ballast Malfunction or no Lamp Tube in Fixture †

*This ballast incorporates a PTC (Positive Temperature Coefficient re-settable fuse) which provides protection for reverse polarity—after correcting polarity, ballast will operate. Over temperature—at 230°F—the PTC fuse will trip. After cooling off, the input power needs to be reapplied for start. †Note that for extinguishable ballast, the red LED on also indicates that ballast is in extinguish mode.

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Cleaning of Panels and Lens

The panels used to on the standard Pretoria light / duct system are aluminum composite panels which are finished with a baked on - coil coated - Polyester finish. Although baked on Polyester finishes are very durable, care must be taken not to use cleaning agents containing solvents or aromatic hydrocarbons which may soften the paint system. We have found that most non-abrasive and mild detergent household cleaners such as Windex, Fantastic, 409 etc will clean normal dirt and grime off of the aluminum composite with satisfactory results. Graffiti of various types can also be cleaned off of the aluminum composite panels with good results using common graffiti removers suited for painted objects such as So -Safe Graffiti remover by Hilti, and other commercially available citrus based graffiti removal systems. Always test a non-conspicuous area for compatibility and use your best judgment before cleaning the entire panel surface.

Lens cleaning is best accomplished with mild detergents suited for polycarbonate. Do not use solvents of any type to clean the polycarbonate lens as crazing, yellowing, or softening of the surface may result.

For more information, call your OEM Service Representative, or contact Pretoria at: