

Medlux[®] MRI-Safe Color Changing Troffer System

INSTALLATION MANUAL



TO AVOID DOING IRREPARABLE DAMAGE TO DRIVE CIRCUITRY
NEVER APPLY AC POWER DIRECTLY TO LED LIGHTING MODULES!



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1.0 SAFETY

For the safe handling, installation and operation of the MedLux™ Color Changing Troffer (to be referred to as CCT throughout this manual) systems, a thorough review and understanding of the material written in this manual must be completed before starting the installation process. Failure to properly install the MedLux™ systems per these instructions will void your warranty. There are no serviceable components in the MedLux™ systems. Attempting to repair or alter the MedLux™ CCT systems in any way will also void your warranty. Always install MedLux™ systems according to all local, state, and national codes.

NOTE: Additional supports and/or hangers for the drop ceiling grids and MedLux™ CCT fixture(s) are recommended and necessary in earthquake zoned areas or when required by local/state safety codes.

Other Important Safety Requirements and Precautions:

- ✓ All MEDLUX™ CCT System components are designed for indoor use and installation ONLY.
- ✓ Make sure that all required safety equipment is present and all workers are familiar with the local safety codes.
- ✓ Observe proper precautions when working in an MRI suite. ***Always assume the magnet is active!***
- ✓ Installation requires a separate 120-VAC branch circuit (rated at 20 Amps) for the power supply assembly(ies).
- ✓ NEVER replace any fuse with anything other than the indicated type and rating! Failure to do so may violate the Class 2 circuit requirements.
- ✓ Class 2 wiring (power cables between the fuse box and CCT fixture(s)) is not intended for use in air handling spaces.



DANGER: POWER TO MEDLUX™ SYSTEM MUST BE DISCONNECTED BEFORE ATTEMPTING TO WIRE OR SERVICE THIS PRODUCT AT ANY TIME.

2.0 APPROVALS

1. **UL/cUL:** The MedLux™ CCT systems are constructed as Indoor Section Sign Systems per UL 48, ELECTRIC SIGN STANDARD (both US and Canadian Requirements).
2. **CE:** The MedLux™ CCT systems are compliant with all applicable European directives. Approval is pending.
3. **LOCAL AUTHORITY:** The subcontractor/installer should secure permits with the appropriate authorities.

3.0 INTRODUCTION

3.1 SCOPE

This manual provides the instructions for the installation of a MedLux™ Color Changing Troffer (CCT) system. All MedLux™ System components are designed for Indoor use ONLY. For assistance during the installation process or operation there after, please call **1-800-610-6053** between 8:00 am and 5:00 pm CST.

3.2 SYSTEM COMPONENTS

The following components are included in the MedLux™ CCT system purchased:

- MedLux™ Power Supply Assembly (ies)
- MedLux™ Class 2 Fuse Assembly Box
- MedLux™ Color Changing Troffer(s) (as required)

- MedLux™ RGB Driver Assembly
- MedLux™ Cove Light Controller / Keypad
- Class 2 Power source for Controller / Keypad
- Power Feed Cable(s)
- Installation Instructions

3.3 SYSTEM COMPONENTS NOT SUPPLIED

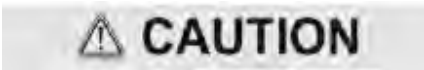
The following components are not supplied by Everbrite, LLC and must be made available by the customer to complete the installation process:

- EMI Facility and Signal Filter(s) (Note: Though not normally supplied these are available as options)
- Class 1 Conduit for incoming mains power wiring
- Class 1 Conduit and fittings for the wiring between the MedLux™ Power Supply Box(es) and the EMI Facility Filter
- Ceiling grid components
- Additional grid drop ceiling supports, hangers, or other hardware as required by National & Local Building Codes



ALL COMPONENTS SUPPLIED BY THE INSTALLER FOR USE INSIDE OF AN MRI ROOM FACILITY MUST BE NON-FERROUS OR DAMAGE TO THE SYSTEM CAN OCCUR.

3.4 TOOLS AND MATERIALS



All tools must be approved for use in a MRI suite before entering (Always assume the magnet is active!). Certain tool materials can damage the MRI equipment.

The following items are recommended for the installation of this product.

- Tape Measure and Ladder(s)
- Wire Strippers
- Channel Locks or Adjustable Wrench for EMI Filter Nut
- Screwdrivers appropriate for hardware
- ¼" x 1" sheet metal or lag screws for mounting Power Supply Assembly – Qty (4)
- ¼" x 1" sheet metal or lag screws for mounting EMI Driver / Facility Filter – Qty (2 if required)
- Drill with hole forming bit or saw appropriate for thru-wall EMI Facility Filter Installation
- Additional grid ceiling support wires as needed (must be non-ferrous)

3.5 GLOSSARY OF TERMS

MedLux™ Color Changing Troffer

A lighting fixture featuring color LEDs, designed to be mounted in a standard drop ceiling grid. Standard sizes include 2x2, 2x4, and 4x4.

MedLux® Power Supply Assembly Box(es)

A box housing an electrical device designed to convert 120 Volt AC to 24 Volt regulated DC; also referred to as the Power Supply. See Figure 1. Some installations may require more than one power supply assembly.

MedLux® Dimmer / Controller / Keypad

This is a flat panel module that mounts onto a standard single or double gang switch box. All connections are Class 2 circuits. Please refer to the "Medlux® Dimmer" or "CCT/Cove Light Controller" Operating Instructions Manual for detailed operating information.

Driver Assembly

Electrical control gear with an integral class 2 power source providing proprietary drive signals needed for MRI safe operation.

MedLux® GPI Class 2 Fuse Assembly Box

A wiring distribution assembly designed to provide Class 2 power limitation for the circuits feeding the LED Cove Lighting modules. See Figure 6.

Power Feed Cable

Connecting cable between the fuse box and LED Cove Lighting Modules. There could be one or more power feed cables depending on the system configuration.

Facility Filter

A filter assembly designed to prevent EMI (Electromagnetic Interference) from getting inside the MRI room, and to provide the main 24V power feed for the MRI Safe LED Lighting system. (Customer Supplied) See Figure 3.

Signal Filter

A filter assembly designed to prevent EMI (Electromagnetic Interference) from getting inside the MRI room, and to provide the unique dimming signals for the MRI Safe LED Lighting system generated by the Driver Assembly. (Customer Supplied)

4.0 PRE-INSTALLATION

4.1 PRODUCT DELIVERY AND INSPECTION

Upon delivery, **immediately** uncrate the MedLux™ CCT system components. Inspect the product to ensure that nothing is damaged and that all components have been received. **Immediately** notify the Freight Company of any damaged components. Damaged product must not leave the loading dock until the shipper can verify claim. You will be held responsible for any damage not reported within fifteen (15) days of receipt of shipment.

4.2 SITE PREPARATION

Before beginning site work, notify the business or construction manager of the following:

- Scope of Work - include length of installation, any disruptions to electrical service, and what hours you will be working
- Any safety requirements or conditions specific to the installation site.
- Mounting location of the MedLux™ Power Supply Box(es), EMI Drive / Facility Filter (both generally found in an equipment room), the MedLux™ Class 2 Fuse Box (always located inside the shield room) and the MedLux™ Cove Light Controller / Keypad (mounted in the control room). See the approved site documentation for approximate location(s).

Also ensure that:

- The installation surfaces for the Power Supply and Fuse or Distribution Boxes are flat, clean and free of any debris or obstacles.

- The double gang box to be used for the Controller module has adequate clearance on all sides for the wide overhang of the Keypad. Note that it will not be possible to mount any other switch or receptacle directly adjacent to the Keypad due to the overhang.

4.3 VERIFICATION BEFORE INSTALLATION

1. Each MedLux™ Power Supply Box is intended to power only the MedLux™ System Component(s) as indicated in these instructions.
2. A minimum clearance of 8" above the inside lip of the drop ceiling grid framework is required for installation above each MedLux™ CCT Light Box. The product itself will rise 7" above the inside lip of the drop grid ceiling framework.
3. The ceiling grid must be capable of supporting the combined weight of the diffuser panel and CCT fixture. The installer is responsible for verifying the load capability of the support grid.

4.4 ELECTRICAL REQUIREMENT

Using the site documentation, locate the power supply assembly location(s). Both the main CCT Power Supply and the Controller Power Source (P/N: RLD-133) Mains Circuits must be wired in accordance with all local and state UL codes. Although the CCT Power Supply is considered low voltage, the total power capacity exceeds the limits for a Class 2 system. Consequently, it is necessary to provide Class 1 wiring between this unit and the Facility Filter unit. Please refer to the wiring detail found in the appendix to this document.

5.0 INSTALLATION

5.1 FACILITY FILTER



Figure 1: Facility Filter

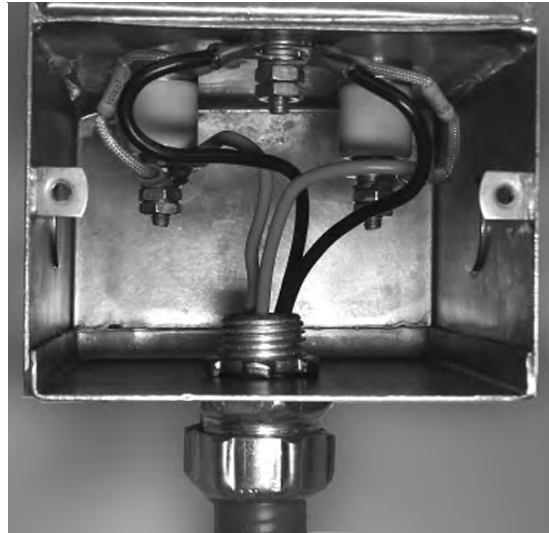


Figure 2: Filter Wiring Layout

The Facility Filter functionally eliminates electromagnetic interference from entering the scan room. Mount the Filter assembly according to approved system layout documentation and instructions below. The power wiring coming from the MedLux® Power Supply is considered Class 1 wiring even though it is low voltage DC. The interconnecting Class 1 wiring (conduit) is customer supplied and must meet local electrical code specifications. Refer to installation wiring diagram for ampacity requirements.

1. Cut an appropriate access hole for the filter nipple at designated location.
2. Install additional filters in a similar fashion if more than one power supply is specified. Be sure to allow adequate side-by-side spacing when mounting multiple units.
3. Guide the threaded pipe at the rear of the filter module through the hole in the access panel leading into the MRI room from the equipment control room and temporarily fasten with the locknut provided. Later, it will be fully secured with the lock nut from inside the Fuse box module. Be sure to install an EMI sealing gasket, also supplied with the filter, between the access panel and fuse box as shown.

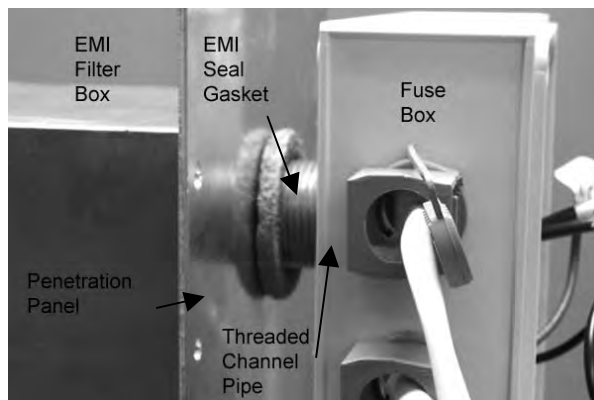


Figure 3: Penetration/Access Panel fitting from EMI Filter

5.2 POWER SUPPLY ASSEMBLY



Figure 4: Power Supply Module

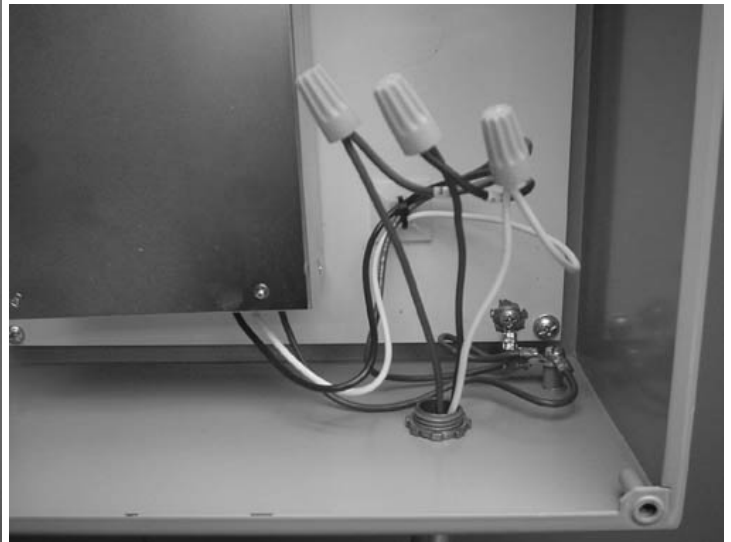


Figure 5: Grounding Post Locations

The power supply converts incoming electrical power down to 24 volts DC. Mount the Power Supply box(es) according to the approved system layout documentation. The power supply assembly is intended for **INDOOR USE ONLY**. All power supply mounting hardware is to be supplied by the customer or subcontractor. Mounting orientation must have mains connection coming into the box from the bottom.



DANGER

VERIFY THAT POWER IS OFF FROM THE FACILITIES MAIN ELECTRICAL POWER SOURCE TO ELIMINATE POSSIBLE ELECTRIC SHOCK AND INJURY DURING INSTALLATION.

To install, proceed as follows:

NOTE: All Class 1 wiring should be done by a certified electrician.

1. Determine and mark location(s) for mounting the power supply per approved system layout documentation.

NOTE: One or more power supply modules may need to be mounted depending on the system configuration.

(See Cove Lighting System Diagram in Appendix A)

2. Mount the Power Supply module using four ¼" x 1" sheet metal or lag screws as required.
3. Route the output wiring (#10AWG) to the Facility Filter using Class 1 methods.
4. The red +24V feed wire is connected to either line terminal at the filter input. See Figure 2. It is important to identify this circuit on the output side of the filter to maintain proper continuity.
5. Connect the 0V (COM) power feed wire (BLK) to the remaining line terminal at the filter input.

5.3 RGB DRIVER ASSEMBLY

Note: This assembly is not required for "white only" cove systems



Figure 6: RGB Driver / Power Supply

The RGB Driver Assembly is housed in a standard 10" x 12" utility box, mounted with four 1/2" lag or machine bolts. Refer to Figure 6.

To install, proceed as follows:

1. Choose a mounting location as close as possible to the shield room penetration panel.
2. Run mains field wiring through knockout hole at bottom of enclosure and attach primary connections.

3. Install a suitable fitting in the upper left knockout. Run a length of PLTC cable (three pair for RGB; one pair for white) from the driver board to the signal filter(s). See Section 5.4 for installation of signal filter. Wire as follows:
 - A. For RGB systems: (See Cove Lighting System Diagram in Appendix A)
 1. Tie all black leads together, along with the shield drain wire and a short piece of jumper wire. Attach the jumper to TB3, POS 5 (GND).

NOTE: The existing black wire at TB3, POS 5 must remain attached.
 2. Attach red wire #1 to TB3, POS 1 (RED).
 3. Attach red wire #2 to TB3, POS 2 (GRN).
 4. Attach red wire #3 to TB3, POS 3 (BLU).
 - B. If a driver assembly is supplied for use with white or monochrome systems: (See Cove Lighting System Diagram in Appendix A, using just one channel)
 1. Attach the black wire and the shield drain wire to TB3, POS 5 (GND).
 2. Attach the red wire to TB3, POS 4 (WHT).
 - C. For white or monochrome systems driven by a MedLux[®] dimmer, see wiring diagram "...White LED Cove Light with Dimmer..." in Appendix A.
 - D. For white or monochrome systems driven by a third party lighting control, see wiring diagram "...XLIM -16 Control Interface Module..." in appendix A.
4. Route standard Cat5e cable between Keypad/Controller and the Driver Assembly. Use the top-right knockout with a suitable fitting.
 - A. Tie the brown and white/brown striped wires together and attach to TB1, POS 5 (+15V).
 - B. Tie all remaining striped wires together and attach them to TB1, POS 2 (COM).
 - C. Attach the solid orange wire to TB1, POS 3.
 - D. Attach the solid green wire to TB1, POS 4.
 - E. For RGB Systems, attach the solid blue wire to TB1, POS 6.
For White Systems, attach this wire to TB1, POS 1 instead.

5.4 EMI SIGNAL FILTERS

1. The Signal Filter (s) transmit the white or RGB Control Signals into the shield room after removing any external RF Interference above 14KHz. The Filter(s) is attached to the penetration panel in similar fashion to the facility filter. For RGB Systems, be sure to group all three filters closely together. If possible, tie the filter input chambers together with close nipples to make through wiring easier.
2. Run the paired PLTC cable from the Driver Assembly (if supplied) to the first filter and attach the red wire (for White Systems) or the red #3 wire (for RGB Systems) to the Signal Terminal. Finally, attach the black or black #3 wire to the ground lug. If direct connection to a dimmer is required, wire as shown on the wiring diagram found in Appendix A.
3. For RGB Systems, feed the two remaining pairs of PLTC cable to the second and third filters using the #2 pair for the second and #1 pair for the third respectively. Then attach the red wires to the signal terminal and the black wires to the ground lug.

5.5 CLASS 2 DISTRIBUTION PANEL / Class 2 FUSE BOX

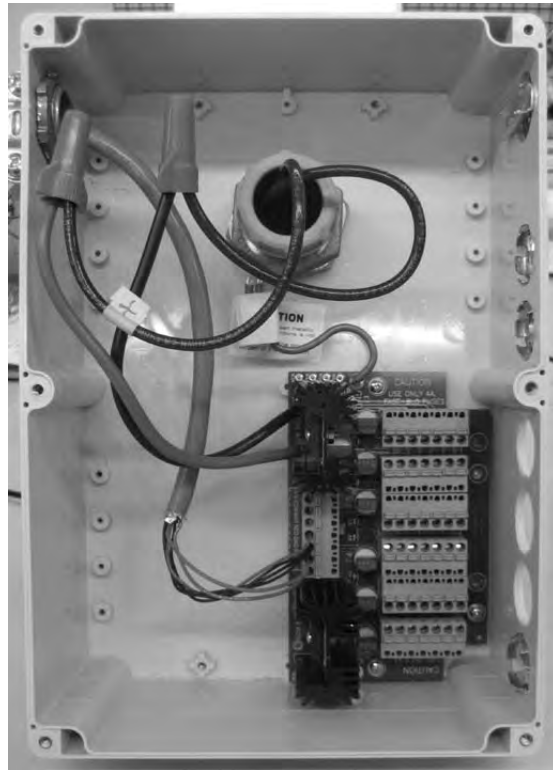


Figure 7: Distribution Panel / Fuse Box (Shown with one typical Class 2 circuit installed)

The Distribution Panel / Fuse Box routes electrical power to the LED Cove Lighting module(s) configured into the overall system. It provides circuit protection in the event of an overload and convenient power distribution to the Lighting Components. To install, proceed as follows:

1. Before mounting the Fuse box, and based on the system wiring plan, remove the knockouts that provide easiest access to the terminal blocks that are adjacent to installed fuses.



Figure 8: Non-ferrous Cable Strain Relief Fitting



Figure 9: Mounting Sequence, Inside Rear of Fuse Box

2. Install Cable fittings into knock out holes where required. See Figure 8.
NOTE: Install plugs in all unused knockout holes. See Figure 8.
3. Mount Fuse Box to the Facility Filter feed through pipe inside the MRI shield room. The sequence of items used to secure the Fuse Box to the filter, is as follows:
 4. Install the EMI Gasket as seen in Figure 3.
 5. Slide Fuse Box over threaded pipe fitting and press against EMI gasket.
 6. Screw on and tighten the first lock nut to pipe fitting from inside the Fuse Box.
 7. Slide the ground loop over the pipe. This is part of the green wire attached to the fuse board. See Figure 8.
NOTE: If the fuse box is remotely located, route ground wire to external tie point (See Cove Lighting System Diagrams in Appendix A).
 8. Screw on the second lock nut and tighten against the ground loop.
 9. Connect the wires coming into the Fuse Box from the Facility Filter. Some systems may require more than one power circuit in which case two fuse boards may be supplied. In such cases, the fuse board on the right is referred to as "Side A" while the one on the left is "Side B".
 10. Assuming there is only one power supply and one fuse board; attach the red #10AWG power wire from the fuse board to the filter output lead previously identified as the positive circuit. Attach the black #10AWG wire from the fuse board to the negative filter output wire.
 11. For systems with two fuse boards, the wires from a second facility filter must be routed to the fuse box externally.
NOTE: To install wire into the terminal block, take a small flat head screw driver and push down on the tab adjacent to the connection point. See Figure 10. Insert the end of each wire into proper terminal hole until it bottoms out and release the tab. Ensure that all loose wire strands are captured by the terminal block. Give the wire a slight 'tug' to be certain it is seated properly.
 12. Using a section of the paired PLTC Cable, route the control leads from the signal filter(s) to the fuse box. See Figure 7.
 13. For White or Monochrome Systems, the red wire connects to "TB0", POS "WHT"; The black wire to POS "COM". For RGB Systems, red #1 connects to "TB0", POS "Red"; #2 to POS "GRN" and #3 to POS "BLU". All three black wires should be spliced to a short jumper wire that is attached to "TB0", POS "GND".
 14. If multiple power supplies and/or fuse boards are supplied, wire the other set of power leads to the second set of filter leads. Only one set of control wires need be attached, so either TB0 block can be used. When more than one power supply or fuse board is required, a specific wiring diagram will be included in Appendix A of this document.

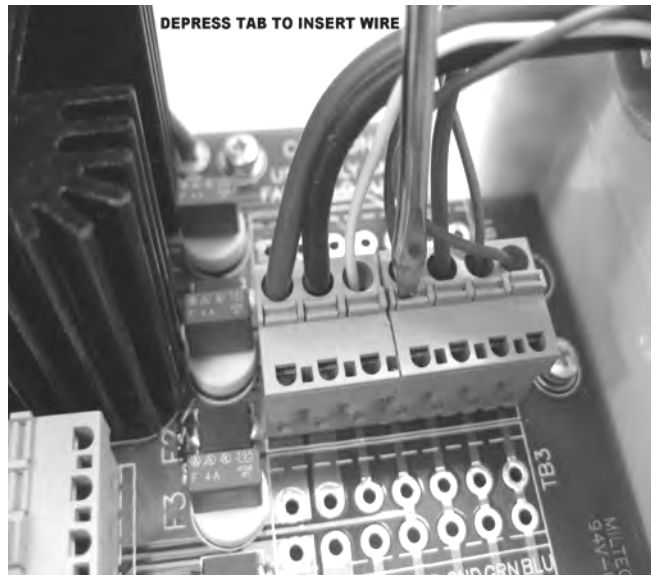


Figure 10: Installing Cable Wires

5.6 Diffuser Panel Installation

The white diffuser panel(s) is supplied detached from the troffers and must be installed by the customer. See cover of this manual and Figure 11 below for an example of a typical panel installed. The Troffer(s) is designed to rest atop the diffuser panel(s). In some cases, grid elements must be removed to accommodate the panel being installed. If this is necessary, do so at this time. Note that the diffuser panel is intended to be placed directly onto the grid structure with the CCT box placed onto the panel.

CAUTION

Contact with any of the internal components of the CCT Light Box can damage or drastically reduce the light output of the product if touched or bumped. Plastic clips may be used to attach some of the LED strips. Be careful not to dislodge any of these clips during installation.

5.7 CCT Light Box(es)

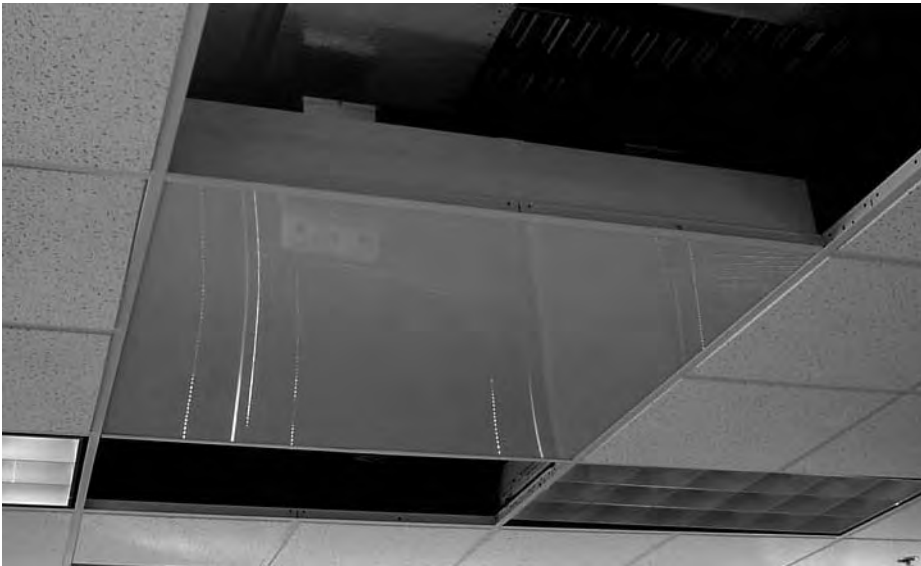


Figure 11: CCT Light Box

The CCT Light Box illuminates the nearby area with a pleasant uniform glow. Systems can be configured individually or in a number of combinations and sizes. To install a CCT Light Box, proceed as follows:

Note: Power cables are normally supplied pre-connected. Unless local codes dictate otherwise, these cables are plenum rated and can be routed in any convenient way back to the Fuse box assembly.

CAUTION

It may be necessary to install extra support hangers, depending on the added weight of the CCT Light Boxes. Verify with local or state code regulations.



Figure 12: CCT Light box & Grid Supports

Remove or move ceiling grid interlock for ease of installation.

1. Lift and tilt the CCT Light Box into place on the ceiling support rail. For larger boxes, two people may be required.
2. Slide the diffuser panel in place between the grid and the edge(s) of the CCT box(es). See figure 11.
 - Note: In some cases, it may be easier to 'drop' the diffuser panel in place first, then install the CCTs.
3. Replace the grid interlock as seen in figure 12 above.
4. Repeat steps one through three above for installation of any remaining CCT Light Boxes.



Figure 13: Top View CCT Light

5.8 Interconnection Wiring & Installation

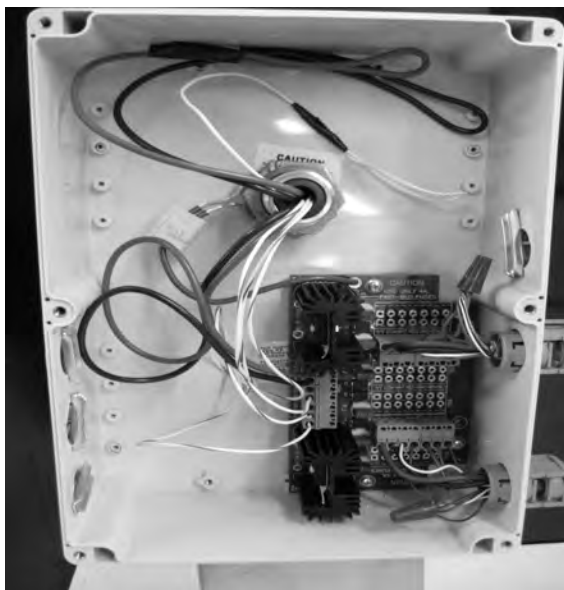


Figure 14: Fuse Box Wiring

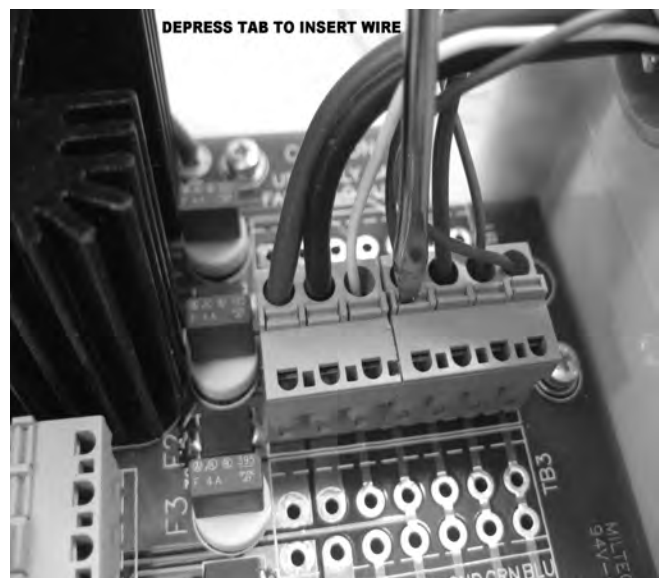


Figure 15: Install Source Cable Wire

1. Run the source cable over the ceiling grid and route as desired to the Distribution/Fuse Box
2. Strip cable jacket as needed and run wires into the Fuse Box as seen in figure 14. Choose the nearest terminal block that is adjacent to an installed fuse.
3. All wires to be connected should be stripped back about ¼”.
4. The RED wire is connected to the +V terminal; the BLACK wire is connected to the COM (0V) terminal.
5. To install wire into the terminal block, take a small flat head screw driver and push down on the tab adjacent to the connection point. See figure 15
6. Insert end of wire and release the tab. Ensure that all loose wire strands are captured by the terminal block. Give the wire a slight ‘tug’ to be certain it is seated properly.
7. The color control wires are twisted pairs. Gather the wires from each pair that have black stripes, strip them and wire nut them to the green wire already installed in the “GND” position of each respective terminal block.
8. Now attach the red, green, and blue wires to their respective locations in each terminal block.
9. Continue in similar fashion until all the power cables are connected.

5.9 Color Controller / Keypad Installation

The Color Control Module should be located at a convenient location in the control room.

NOTE: THIS DEVICE IS NOT MRI-SAFE AND MUST NOT BE LOCATED INSIDE THE SHIELD ROOM!

The controller is typically mounted in a double gang switch box. All the wiring connecting to it is considered Class 2, power limited, so conduit or raceway methods may not be necessary. This unit requires an external power source – either from the RGB Driver assembly, or from an optional 16VAC ‘bell’ transformer (supplied separately).

1. Locate the desired mounting position for the Controller/Keypad.
2. If used, position the 16V transformer in a nearby concealed location, perhaps in the ceiling directly above the keypad.
3. If used, connect the transformer output with 18-2 PLTC cable (supplied separately) to the Controller terminals marked “ACIN”.
4. Pull a run of CAT5e data cable (supplied) from the equipment room where the RGB Driver unit is located (when supplied with the system) to the Keypad/Controller location.
5. At the Keypad, connect the CAT5e wires as follows:
 - a. If the RGB Driver is supplied, connect the brown: brown/white wire pair to one of the “ACIN” terminals. If the optional 16V transformer is connected, cut the brown: brown/white pair short.
 - b. Gather the orange/white, green/white, and blue/white wires, strip, and connect them all to the terminal marked “COM”.
 - c. Strip and connect the orange wire to “RED”; the green wire to “GRN”, and the blue wire to “BLU”.
6. At the RGB driver in the equipment room, route the CAT5e cable to the knockout located on the left side of the filter housing.
7. At the six position data signal terminal block, TB1, connect the CAT5e wires as follows:
 - a. Connect the brown: brown/white wire pair to terminal 5, +15V.
 - b. Gather the orange/white and green/white and blue/white wires together, strip, and attach to terminal 2, “COM”

- c. Attach the blue wire to terminal 6, "Bin"; green wire to terminal 4, "Gin", and orange wire to terminal 3, "Rin".

5.10 System Test

Apply power to the 24V power supply box and to the Keypad in the Control Room. Within 1 to 3 seconds, the CCT should light. If it does not, verify that the keypad is receiving input power (either 15VDC or 16VAC) and that the Facility Filter wiring measures 24V at the Fuse Box. If either of these conditions is not met, please contact Everbrite Customer Service.

6.0 SITE CLEAN-UP

Ensure that all packaging materials, screws, tools, etc. are disposed of properly.

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