ZXR-EXT LED Down Light

Med-Vizion™

MRI Interior LED Lighting System

Installation Manual for MRI Applications

ETS-LINDGREN
An ESCO Technologies Company

Revision Record

MANUAL, MEDVIZION ZXR | Part #206472, Rev. C

Revision	Description	Date
A	Initial Release	January, 2018
B	Updates	April, 2018
C	Updates	May, 2020

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Notes, Cautions, and Warnings

Note: Denotes helpful information intended to provide tips for better use of the product.

CAUTION: Denotes a hazard. Failure to follow instructions could result in minor personal injury and/or property damage. Included text gives proper procedures.

WARNING: Denotes a hazard. Failure to follow instructions could result in SEVERE personal injury and/or property damage. Included text gives proper procedures.

1.0 Introduction

This manual provides instructions to install the **ETS-Lindgren Med-Vizion™ MRI Interior LED Lighting System**. All Med-Vizion system components are designed for indoor use and installation only.

Note: For assistance during the installation process or operations thereafter, please contact ETS-Lindgren.

Before You Begin Installation

For the safe handling, installation, and operation of the Med-Vizion system, a thorough review and understanding of the information in this manual must be completed before starting the installation process.

WARNING: There are no serviceable components in the Med-Vizion system.

Failure to properly install the Med-Vizion system per the instructions in this manual will void your warranty. Attempting to repair or alter the Med-Vizion system in any way will void your warranty.

WARNING: Additional supports and/or hangers for the drop ceiling grids on Med-Vizion fixture(s) are recommended and necessary in earthquake zones or when required by local/state safety codes.

Always install Med-Vizion according to all local, state and national codes.

Other Important Safety Requirements and Precautions

WARNING: Power to the Med-Vizion system must be de-activated before attempting to wire or service this product at any time. AC power is removed by activation of the dimmer switch. By placing the dimmer in the most down position, you will have removed the power from the lights.

- 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 one separate 115-277 VAC branch circuit (rated at 10 Amps) to power up to 15 ZXR-EXT fixture(s).

- The Med-Vizion system is not intended for use in air handling spaces.

Standard Configuration

The following components are included with the Med-Vizion system:

- Med-Vizion Light Engine Assembly and Plaster Frame/Driver Assembly
- Anti-microbial white trim with 93% frosted lens
- Rails and Trim Ring
- Installation Instructions
- Med-Vizion Power Supply Panel
- Med-Vizion Distribution Panel
- Med-Vizion 0-10V Dimmer module

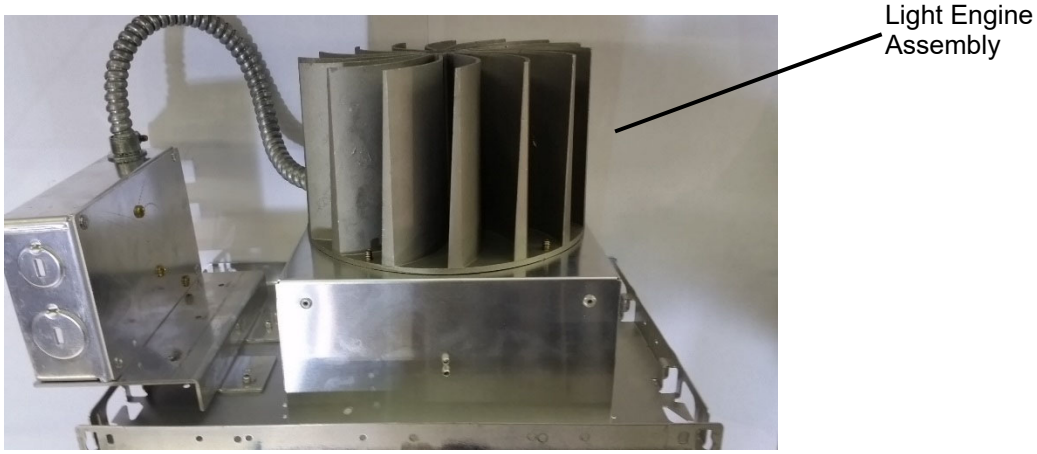

Figure 1: Med-Vizion LED Lighting System

Available Color Temperatures

Stock fixtures available in 3500K and 4000K color temperatures.

3000K available via special order.

Required Items (To Be Supplied by Customer)

WARNING: All components supplied by the installer for use inside an MRI room must be non-ferrous.

The following components are not supplied by ETS-Lindgren and must be provided by the customer to complete the installation process:

- Class 1 Conduit/ box for incoming mains power wiring
- Class 1 Conduit and fittings for the wiring between the Med-Vizion fixture(s) and the EMI facility filter
- EMI facility filter, minimum ratings: 250VAC/120VAC, =/>20A
- Ceiling grid components
- Drop ceiling grid supports, hangers, or other hardware as required by National and Local Building Codes
- All wire should be 16AWG as shown in Figure 20 on page 25

Approvals

UL/cUL

The Med-Vizion system is constructed as an Indoor Recessed Down light per UL 1598, LUMINAIRE STANDARD (both US and Canadian Requirements).

CE

The Med-Vizion system is compliant with all applicable European directives.

Technical Construction Files are available upon request.

Local Authority

The subcontractor/installer should secure permits with the appropriate authorities.

2.0 Pre-Installation Tasks

CAUTION: Before connecting any components, follow the information provided in *Introduction* on page 6.

Product Delivery and Inspection

Note: Customer is responsible for any damage not reported within fifteen (15) days of receipt of shipment.

Upon delivery, immediately unpack the Med-Vizion™ MRI Interior LED Lighting System. 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.

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 specific hours of the day the installation is to be done.
- Any safety requirements or conditions specific to the installation site.

Verification Before Installation

WARNING: Verify load capability as instructed in step 2 following this warning. Any ceiling grid, ZXR fixture(s), or tile(s) falling onto a person(s) or equipment in a room where the ZXR assemblies have been installed may cause serious injury or damage.

1. **Clearance:** A minimum clearance of 8 inches above the surface of the drop ceiling is required for installation for every Med-Vizion light box. The ZXR assembly rises 6 inches above the ceiling tile when installed.
2. **Load capability:** The ceiling grid must be capable of supporting the combined weight of the ZXR fixtures. The installer is responsible for verifying the load capability of the support grid.

3. **Condition of the magnet:** Confirm if the magnet has been energized. Active MRI magnets produce extremely powerful magnetic fields that can produce serious injury or death if proper safety precautions are not followed.

Electrical Requirements

- Circuits must be wired in accordance to all state and local electrical codes.
- If any ZXR lamp senses an over-temperature condition, it will shut OFF. In order to restore normal operation, it will be necessary to reset the system by turning the ZXR system power switch OFF, then ON again.
- A dimmer switch module is part of the Med-Vizion system and must be installed outside of the MRI room.
- Commercial, incandescent, lighting dimmers, or fan speed controls (electronic, phase angle) are not compatible with the ZXR lighting system. Electronic, phase angle dimmer controls are not compatible with facility RF electric filters nor will they operate the individual ZXR LED lamps.

Please familiarize yourself with the different combinations that are available for the Med-*Vision Systems. The number of fixtures to be placed in each separate dimmable circuit shall determine the Power Supply/Distribution Box Model to be used.*

PS/DB Kit Part #	Fixtures Per Circuit	Min. Per Channel	Max. Per Channel	RF Filters Required
250564	1-2	1	2	1
250563	2-10	2	5	2
250565	11-15	2	5	3

Table 1: Shows the multiple configurations available for the Med-Vizion Power Supply/Distribution Box

Fixture Part #	Color Temp	Lumens	Input Voltage	Input Current	Input Power
250592	3500K	1500	120/240V 50/60Hz	1/0.5Amp	32W
250593	4000K	1500	120/240V 50/60Hz	1/0.5Amp	32W

Table 2: Shows the stock fixtures available

3.0 Installation

WARNING: All tools must be approved for use in an MRI suite; always assume the magnet is active.

CAUTION: Before installing any components, follow the safety information provided in *Introduction* on page 6.

Note: Before installing any components, complete the steps in *Pre-Installation Tasks* on page 9.

Required Tools and Materials (To Be Supplied by Customer)

The following items are recommended for the installation of the Med-Vizion™ MRI Interior LED Lighting System:

- Tape measure and ladder(s)
- Wire strippers
- Screwdrivers appropriate for hardware
- Additional grid ceiling support wires as needed (must be non-ferrous)

Dimensions and Weights

Power Supply	Dimensions	Weight
1-2	11.5 X 10.75 X 8	35 Lbs.
2-10	11.5 X 10.75 X 8	36.5 Lbs.
11-15	11.5 X 10.75 X 8	38 Lbs.

ZXR-EXT Light Fixture	Dimensions	Weight
	6.5 X 8.75 X 14	5 Lbs.

Med-Vizion Distribution box	Dimensions	Weight
	5-3/4 X 8-3/4 X 2-1/8	2 Lb.

Table 3: Note All Dimensions are in inches

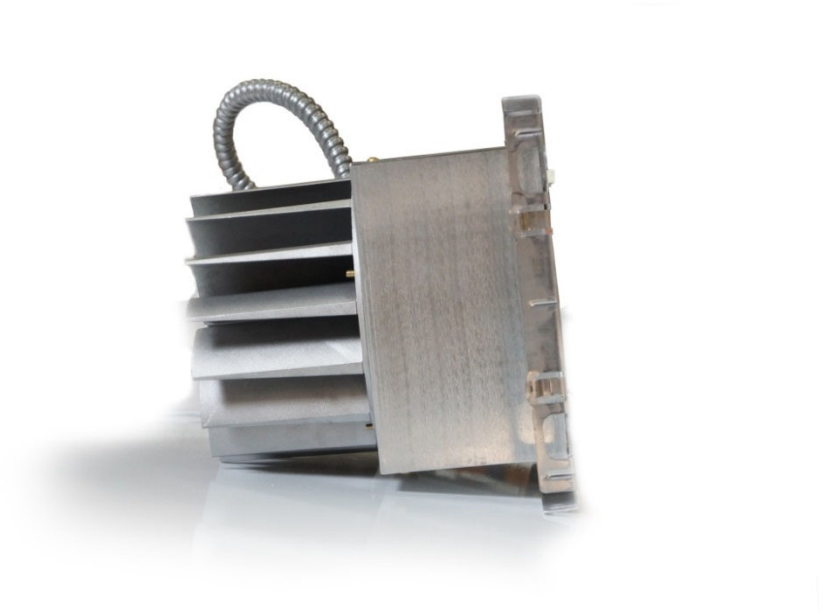

Figure 2: ZXR Light Engine

1. With all wiring and conduit, install per manual and to meet local code. First remove the ceiling tile in which the Med-Vizion system is to be installed.

2. Find the center of the ceiling tile and cut a 6-3/4” diameter hole.

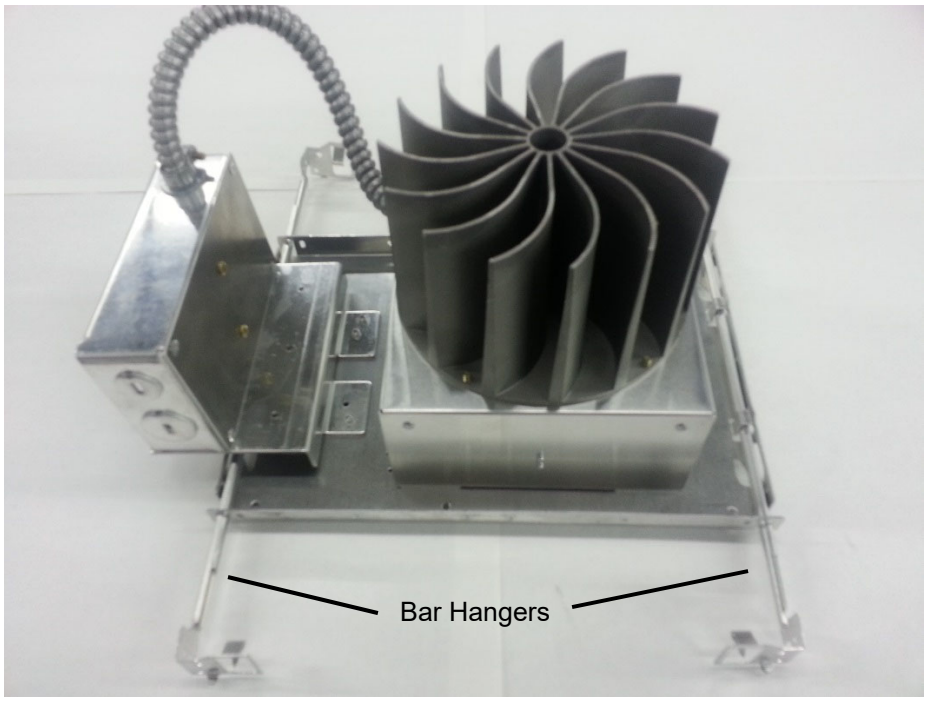

Figure 3: Bar Hangers inserted through Plaster Frame

3. Insert two retractable bar hangers through the slots in the end of the plaster frame.

4. Remove ceiling tile adjacent to the space where the Med-Vizion lamp will be located.

   Extend the end of the bar hangers to the sides of the ceiling tile and replace the tile with the Med-Vizion lamp back into the ceiling grid by setting the hanger ends onto the ceiling grid. The cut out of the hanger end interlocks with the grid framework.

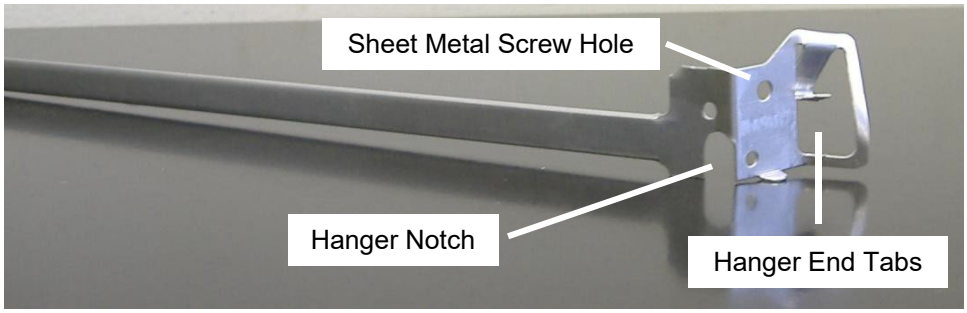

Figure 4: Adjustable Bar Hanger End

5. Use sheet metal screws to further anchor the hanger ends to the ceiling grid. As an alternative, the triangular tabs on the hanger ends can be bent over and interconnected with the ceiling grid to secure the hanger ends.

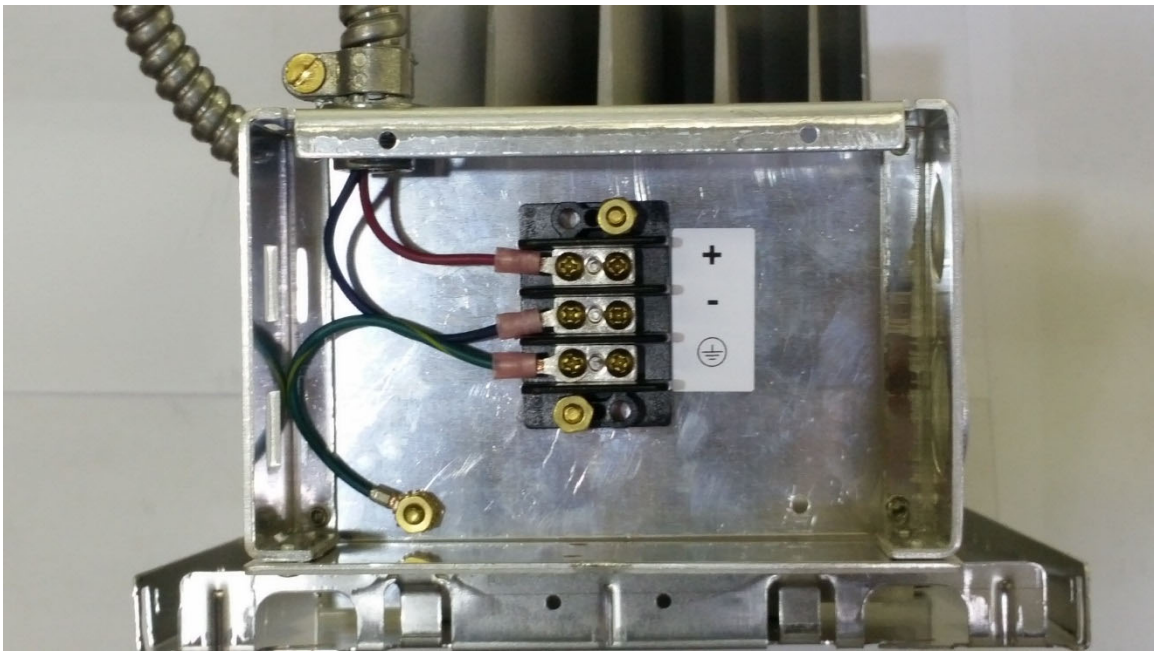

Figure 5: Junction Box Cover

6. Remove junction box cover plate, along with desired knockout for the filtered DC mains.

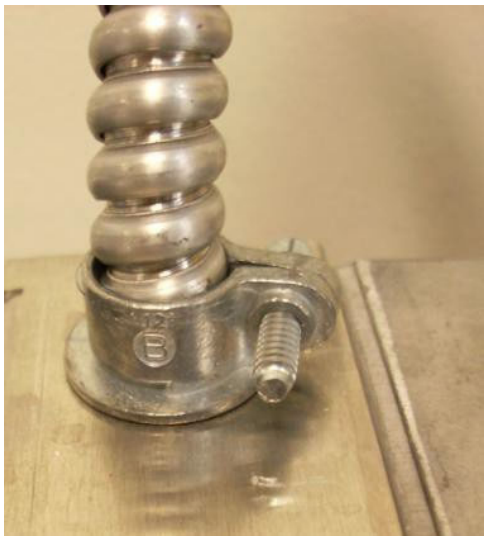

Figure 6: Non-Ferrous Fitting on Junction Box (not user serviceable)

7. Use local code compliant conduit, wiring and non-ferrous fittings for DC power to the junction box. All DC power from the facility RF filter to the distribution box is then routed to each individual lamp.

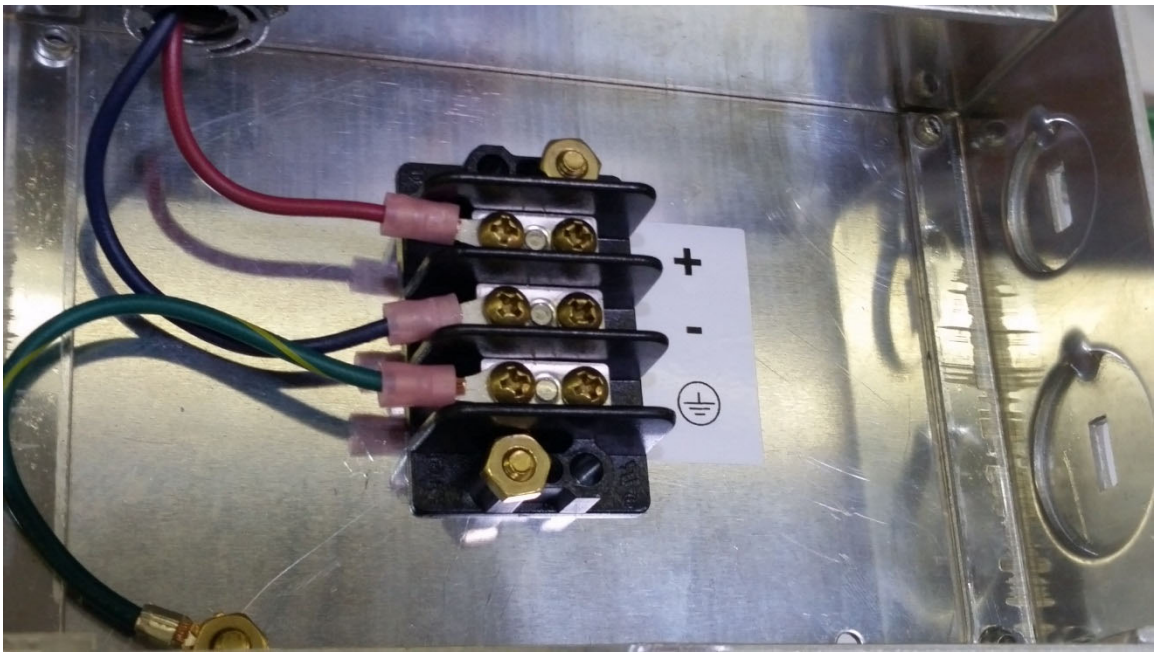

Figure 7: Junction Box Wiring Connections

8. Wire incoming Hot, Neutral and Ground (3) wires into the junction box and replace cover plate on the junction box.

Trim Ring Installation

Slide the trim ring into the fixture housing and position the spring wire clips within the brackets located on the inside wall of the housing.

Note: If ceiling tile thickness is less than 0.75”, modify the spring wire clip by bending it as shown in Figure 8. This will allow for additional space when working with shallow ceiling tiles.

Slide the trim ring into the fixture housing. Position the spring underneath one of the four locating flanges of the housing. Position the second spring underneath the flange across and allow the trim to lock in. (Figure 8A). For ceilings less than 1.2” thick, mounting bracket is positioned downward. For ceilings more than 1.2” thick, mounting bracket is positioned upward (Figure 8B).

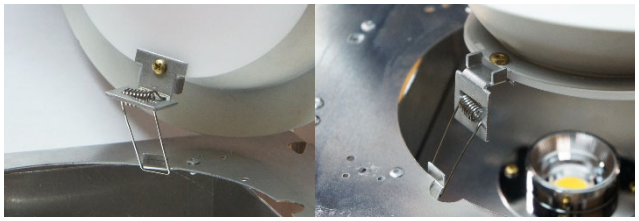

Figure 8A: Locking positin Trim Ring

Figure 8B: Mounting bracket put in position upward

When connecting the power supply, 16AWG should be used for termination from the power supplies to the filters and from the filters to the distribution box. Figure 9 shows the inside of basic 10 light power supply. The quantity of lights required will determine the quantity and type of drivers used. Lighting systems may have one, two or three drivers in the power supply.

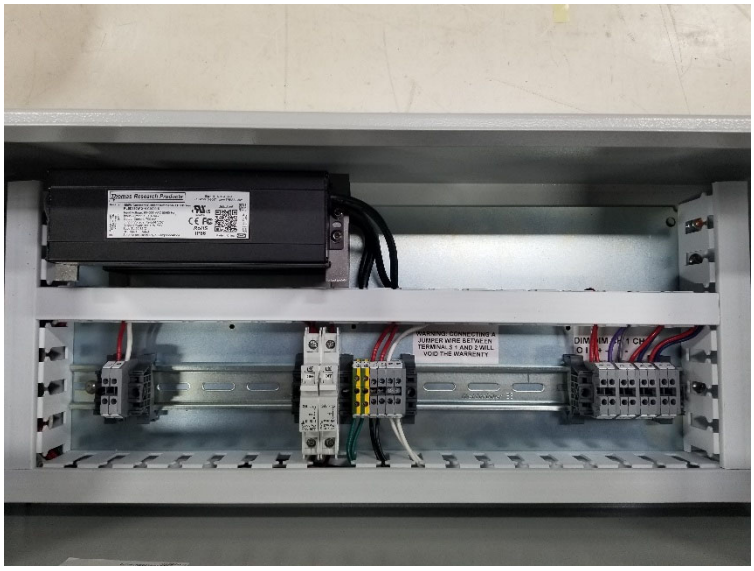

Figure 9: Inside a basic Med-Vizion Power Supply

The power supply is comprised of several components. When bringing power to the panel, you will need to connect 120VAC to terminal blocks which are designated by “L” and “N” for Line and Neutral as shown in Figure 9.1.

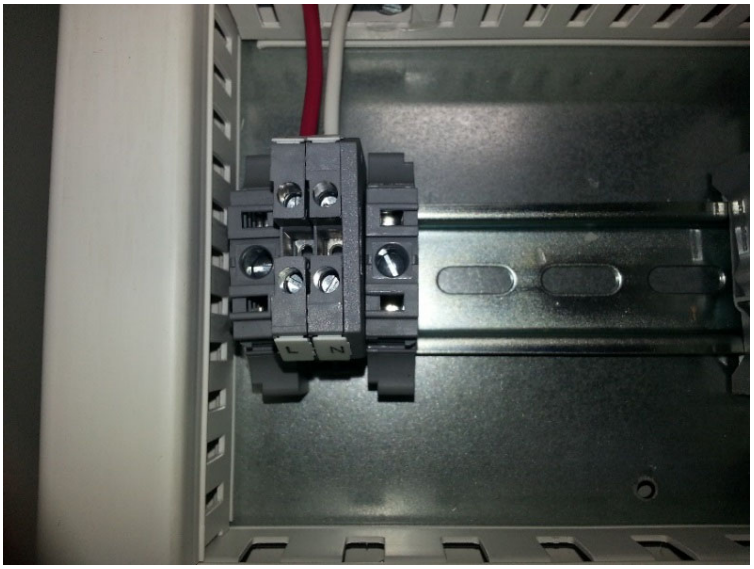

Figure 10: Connection terminals for the power supply

Once the wires are connected for the 120VAC into the power supply, you will need to connect to the dimmer terminals for the 120VAC to be wired through so that you will have the availability to turn the lights on and completely off as shown in Figure 9.2. These terminals are labeled terminals 1 and 2. Terminal one is the out line to the dimmer and 2 is the return line for the dimmer. These terminals are connected to the black wires located on the dimmer itself. The connection of the dimmer wires will be covered on page 23 of the manual.

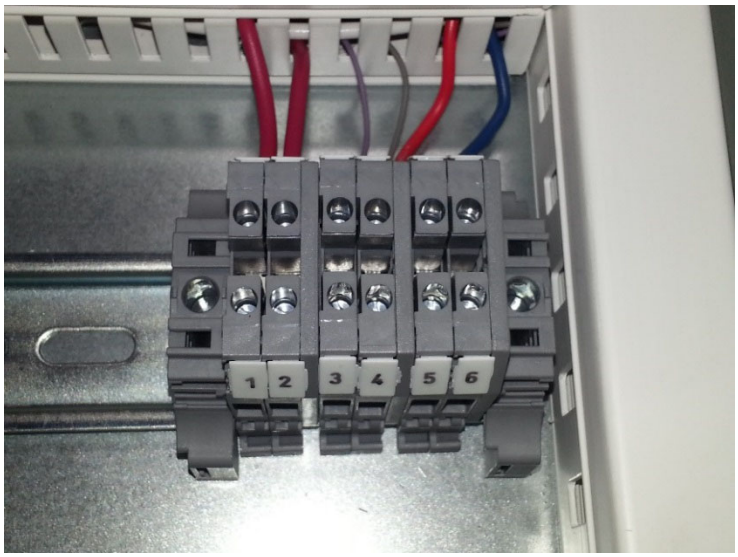

Figure 11: Terminal block connections for the Dimmer Module and ZXR-EXT light system

Terminals 3 and 4 are used for the dimming feature associated with the LED lights. The purple wire is the “plus” and the gray wire is the “minus” for the dimming. You will notice that on the dimmer, there is also a purple and a gray wire and these need to be matched when terminating them. If these wires are not terminated properly, the lights will still illuminate, but the dimming function will have no effect on the LEDs. The wiring for this is also covered on page 23 in this manual.

The last two terminals that need to be wired are terminals 5 and 6 which are the voltage from the driver that goes to the filters. The gauge for these wires should be 16AWG minimum to prevent any overheating on the wires that may occur. As mentioned earlier, this reference is for a 10-light system. If you had a 2-10-light system then there would be terminal 7 and 8 and if it was a 15-light system there would be a 9 and 10. Each set of wires MUST be wired to only one filter. If you have a 2-10-light system then you would need two filters and for 15, you would need three filters. You must be careful not to switch the wires on the output side of the filter once you have wired them. Mis-wiring the positive and negative to the distribution box, this may cause damage to one or more of the LED lights you have installed.

EMI Facility Filter (To Be Supplied by Customer)

The EMI facility filters are designed to prevent EMI (Electromagnetic Interference) from getting inside the MRI room. The EMI facility filters are NOT supplied as part of the Med-Vizion system components and is not necessary for non-MRI applications. The filters may be purchased from ETS-Lindgren separately or as part of the lighting system.

The EMI filters and mounting hardware are supplied by the customer or specified RF shield subcontractor. The EMI filter functionally eliminates electromagnetic interference from entering the room. Mount the EMI facility filter according to RF Shielding supplier requirements. The interconnection Class 1 wiring (Lamp-To-Lamp) is customer supplied and must meet local electrical code specifications. Refer to installation wiring diagram for ampacity requirements. The EMI filter(s) may be sourced from ETS-Lindgren if needed.

Load end
Inside RF shield

Line end
punch can
to accept conduit

Figure 12: EMI Facility RF Filter

Figures 13 and 14 shows a distribution box that will support a lighting system that has two channels in and 15 lights on the output. From the filter, the positive and negative wires are brought into the Channel 1, 2 and 3 connectors. Internally these lights are wired in series and all connections are to be wired on the outputs. We will explain how to wire the outputs if you only have 2 to 4 lights a little later in this section.

Note: You MUST connect at least two lights in the circuit in order for the lights to work correctly. Failure to do so will result in the lights not illuminating when power is applied.

Figure 13: Input terminal connections for the Med-Vizion Distribution Box

Figure 14: Output terminal for the Med-Vizion Distribution Box

16AWG wire should be used when wiring to and from the Distribution Box. Figures 15 and 16 show a closer look at the inputs and outputs respectively to the Distribution Box. As you can see, they are clearly labeled with the channel and positive/negative terminal on the connectors.

Figure 15: A closer view of the output connections of the Med-Vizion Distribution Box

In Figure 16 you can see an example of how the wires are run from the distribution panel to the lighting system.

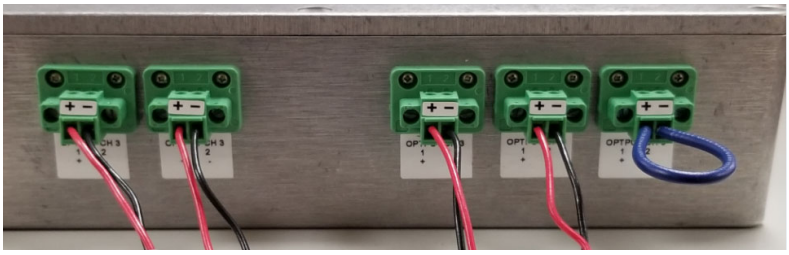

Figure 16: Output wiring from the Med-Vizion Distribution Box and Jumper if needed

The above figure shows how the lights for a 5-light system would be connected. Notice the blue jumper wire that is connected to the fifh terminal is used to complete the circuit for the lights to function. Earlier in this section it was discussed how to wire a lighting system if all 10 lights were not needed. Whenever a lighting system has fewer than the five lights needed in a row, a jumper wire MUST BE INSTALLED to complete the series circuit of the DC voltage traveling through the distribution box.
With this configuration, if you are not intending on using all five output terminals, you will need to connect a jumper wire in each unused output to ensure that the lights will function.

The dimmer module for the lights wires directly to the power supply outside of the RF shielding. **Use of any dimmer module other than that provided by ETS-Lindgren will result in the warranty being voided.**

Figure 17: Med-Vizion Dimmer Module

Note: The Slide Dimmer is wired to the power supply and controls the dimming of the lights through it. 16AWG wire is to be used for the termination to the lights**. The 0-10V dimmer module MUST be installed external to the RF shielding.**

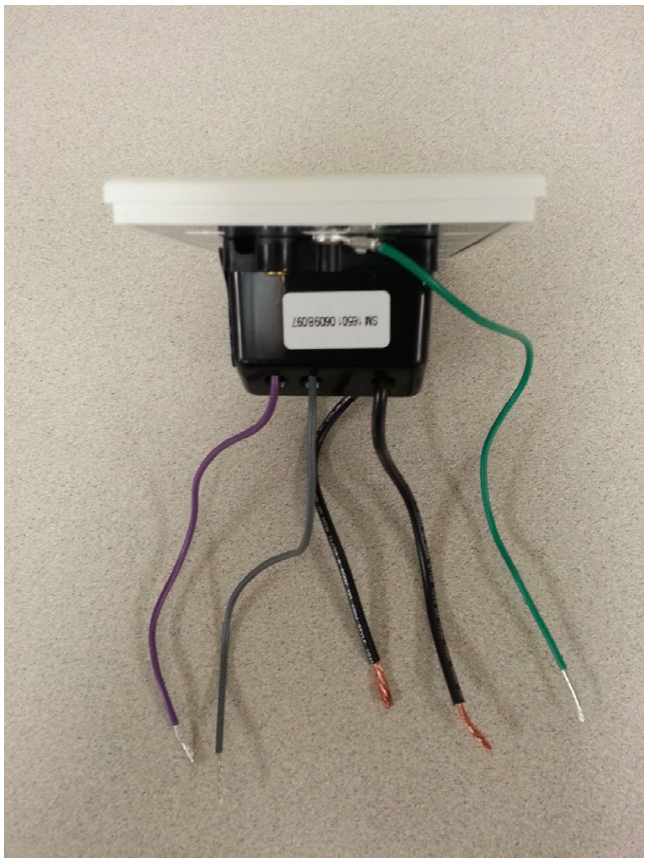

Figure 18: Electrical connections of the Med-Vizion Dimmer Module

Wiring the slide dimmer: There are five wires on the backside of the dimmer switch.

- Green – Ground
- Black – These wires are the 120VAC from and to the power supply. These will be terminated at terminal blocks “1” and “2”. It doesn’t matter which black wire is selected to and from. There are two reasons for this to be wired this way. One reason for this termination is so that you may turn off the lights when not in use. The second reason, and very important is, that the dimmer acts as a current limiting device and will only allow the set value of current to be distributed to the lights. Since the lights are constant current, it is best to not overfeed them with more current than they are able to process to avoid damaging them. Not wiring in the dimmer switch in this configuration may damage the driver and void the warranty.

- Purple and Gray – These two wires are used to control the dimming feature of the lights. The “Purple” wire is for the plus voltage and the “Gray” is for the minus voltage. When wiring these in at the terminal box, you will notice that the wires that go to terminals “3” and “4” are purple and gray respectively. The dimmer function uses a 0-10VDC signal to control the intensity of the lights.

ZXR, LED, Lamp Operation Test

1. Verify proper lamp operation by sliding the dimmer module up to the ON position. All lamps should light to full ON.

2. Slide the dimmer module down and the lamps should gradually begin to dim.

3. To turn off the lights, slide the dimmer to the full down position where it will “click” into position.

Dimming Installation

The ZXR system will install as a typical interior MRI lighting system. It will utilize a standard EMI facility power filter for each independent lighting circuit. The following schematic depicts a typical dual circuit installation. Additional independent lighting circuits will duplicate this schematic.

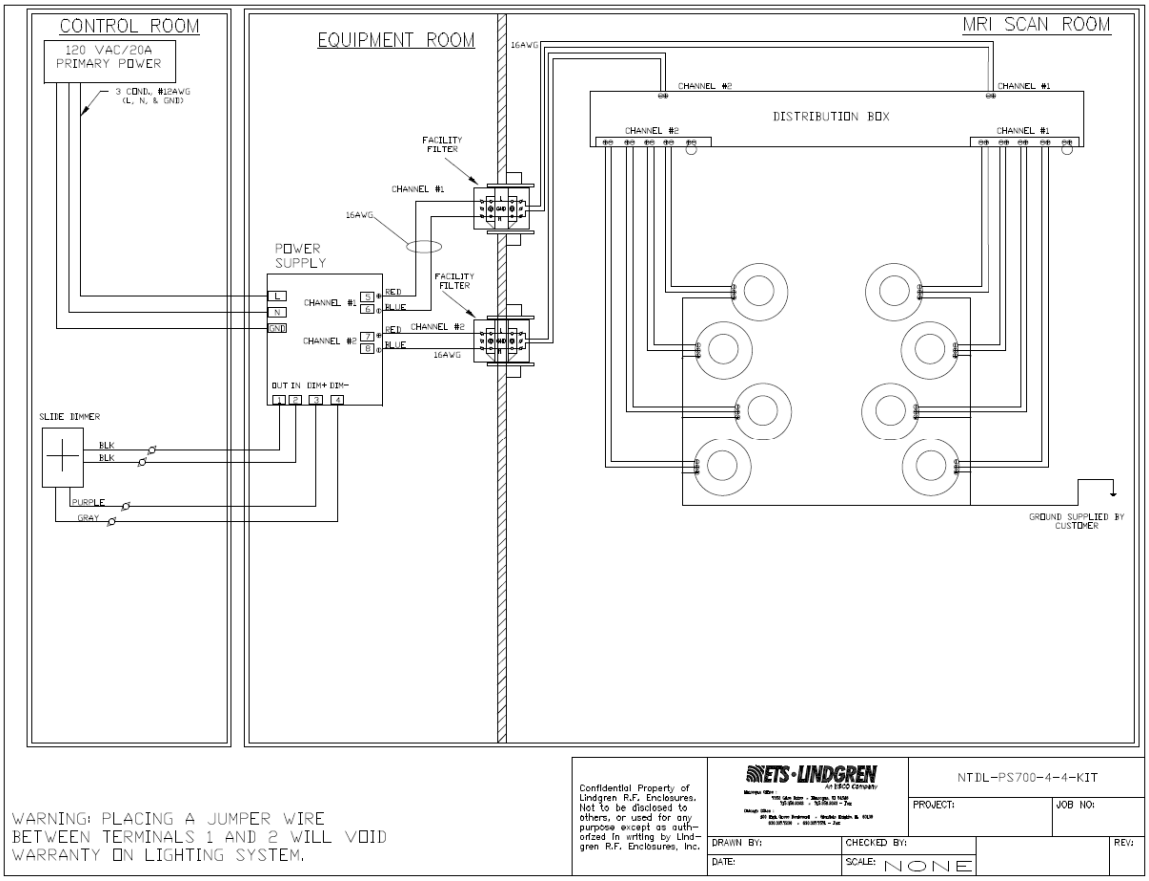

Figure 19: ZXR-EXT Med-Vizion Lighting System Installation

Appendix B: Glossary of Terms

Med-Vizion Light Fixture	The mechanical/electrical subassembly comprised of the ceiling plaster frame and AX mains wiring J-box. See Figure 1 on page 7.
Facility AC Power RF Filter	An RF filter assembly designed to prevent electromagnetic interference (EMI) from getting inside the MRI room. Provides 120 VAC power directly to each individual ZXR lamp fixture. This filter is made part of the primary RF shield installation and is not supplied with the ZXR lamp system.
Med-Vizion System Power Switch	The electrical disconnect switch wired into the mains feed to the facility filter that supplies 120 VAC power to the ZXR lighting power supply circuit.
Med-Vizion Dimmer Module	Electronic controller sends a 0-10V signal to the Med-Vizion Power supply to control each ZXR lamp.
Med-Vizion Power Supply	The purpose of the Med-Vizion Power Supply is to supply the voltage to the light fixtures and give it the capability of dimming.
Med-Vizion Distribution Box	The Med-Vision Distribution Box allows you to bring a single cable through the RF Filter and branch off to the light fixtures. You do not need to run additional cables to the lights fixtures to control the dimming due to the fact that the dimmer module is connected directly to the Med-Vizion Power Supply.