

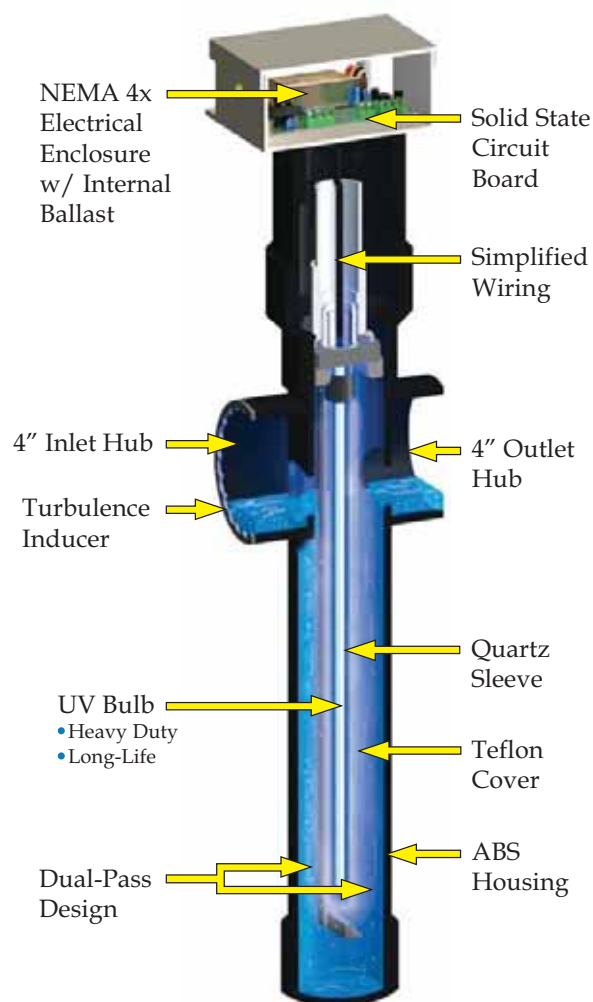
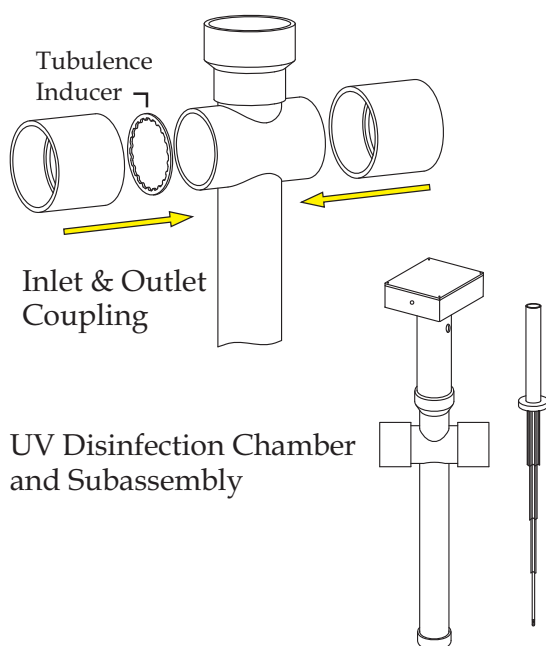
### PL-UV1 UV Disinfection Unit

Your complete solution to meet even the most stringent environmental permit requirements, the PL-UV1 UV Disinfection Unit reduces bacteria levels from secondary effluent to achieve strict water quality standards. The reliability and performance of the PL-UV1 is unmatched for onsite and decentralized treatment applications. Every component of the compact unit is highly engineered and constructed to provide reliable disinfection and superior operational life.

UV disinfection is routinely used in ecologically sensitive areas where residuals from chemical disinfection might possibly create problems in the receiving environment. Harmful pathogens and other contaminants, including some that are resistant to chemical disinfection, are rendered completely harmless by the reliable performance of the PL-UV1 UV Disinfection Unit.

#### Features:

- Dual Pass design.
- Weatherproof electrical components.
- Long-life UV bulb.
- Easy to install.
- No chemical residual or harmful by-products.
- Low electrical usage.
- Inexpensive to install and operate.



**FLOW RATES** - 100 GPD through 8,640 GPD (Gravity flow only)

Required influent characteristics:

100 GPD - 4,320 GPD (3 GPM) with a 30 mg/L BOD and 30 mg/L SS  
4,321 GPD - 8,640 GPD (6 GPM) with a 10 mg/L BOD and 10 mg/L SS

**UV DOSAGE** - The Model PL-UV1 disinfection system provides a UV dose greater than 40,000 microwatt-sec per square cm at 254 nanometers.

**TRANSMISSIVITY** - The Model PL-UV1 disinfection system provides a transmissivity quality of 65%.

# MODEL PL-UV1

## BASIC PERFORMANCE CRITERIA MODEL PL-UV1 DISINFECTION SYSTEM

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**BALLAST LOCATION** - The ballast is located safely inside the durable NEMA 4X electrical enclosure for protection and long-life.

**UV LAMP PROTECTION** - The long-life bulb is encased within a transparent quartz sleeve to isolate the bulb from the flow stream.

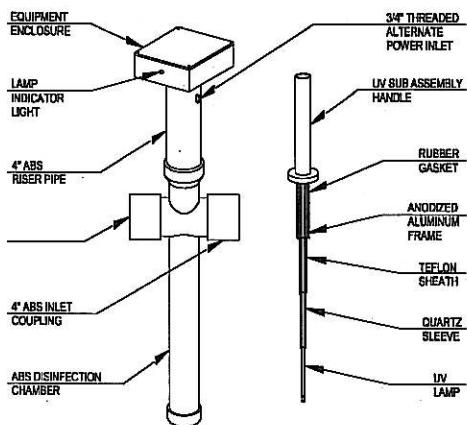
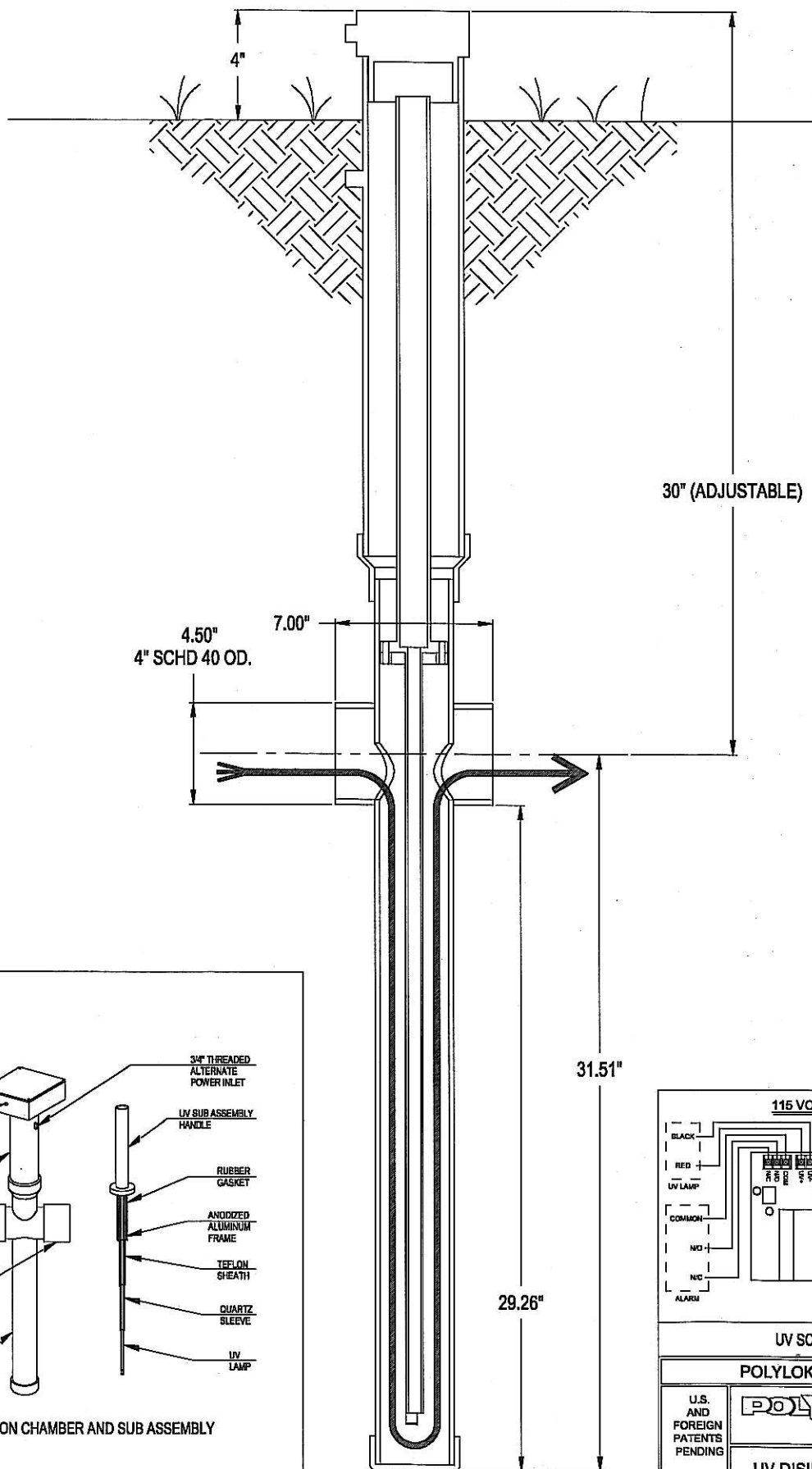
**ALARM** - A current sensing circuit automatically monitors performance of the UV bulb and provides constant assurance of proper operation. The system can also be monitored externally.

**EXPECTED PERFORMANCE** - The Model PL-UV1 disinfection system will reduce fecal coliform levels by 3-Logs or 99%.

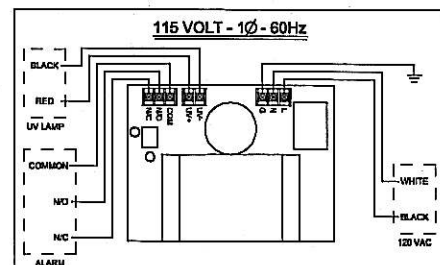
**OPTIMUM LAMP OPERATION TEMPERATURE** - The Model PL-UV1 disinfection system provides lamp operation temperature in the range of 104 - 120 degrees Fahrenheit.

**DIMENSION** - There is a 1 inch distance from the tube to the chamber wall of the Model PL-UV1 disinfection system.

**HOUSING** - The system is contained within an ABS housing that is carbon-impregnated for maximum durability. The internal subassembly can easily be removed for cleaning of the quartz sleeve.



UV DISINFECTION CHAMBER AND SUB ASSEMBLY



UV SCHEMATIC

POLYLOK Part No.: PL-UV1

|                                                                                                                                                                             |               |             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------|
| U.S. AND FOREIGN PATENTS PENDING                                                                                                                                            | POLYLOK       |             |
|                                                                                                                                                                             | REVISION DATE | NO          |
|                                                                                                                                                                             | NO            | NO          |
|                                                                                                                                                                             | DESIGNED BY   | BDS         |
| © MMVIII                                                                                                                                                                    | APPROVED BY   |             |
|                                                                                                                                                                             | JMM           |             |
|                                                                                                                                                                             | DATE          | 11-20-08    |
|                                                                                                                                                                             | SCALE         | NTS         |
| UV DISINFECTION UNIT                                                                                                                                                        |               | DRAWING NO. |
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# MODEL PL-UV1

## UV DISINFECTION SYSTEM

# INSTALLATION AND OPERATION MANUAL

Ultraviolet (UV) disinfection is an effective and proven method of reducing bacteria levels in wastewater. Preferred in environmentally sensitive areas, UV disinfection does not generate any hazardous byproducts. The Polylok UV disinfection system can be installed downstream of any wastewater treatment plant. The compact design of the Polylok UV minimizes the excavation size that is required for installation. The underground electrical service cable for the UV disinfection system should be installed in the same trench as the incoming power and/or influent plumbing of the wastewater treatment plant. Install the electrical cable in conduit to prevent damage where contact with concrete may occur. **CAUTION: DO NOT LOOK DIRECTLY AT THE UV LAMP OR EXPOSE SKIN TO THE LAMP DURING OPERATION. PERMANENT EYE DAMAGE AND SKIN BURNS WILL OCCUR FROM DIRECT EXPOSURE TO ULTRAVIOLET RADIATION.**

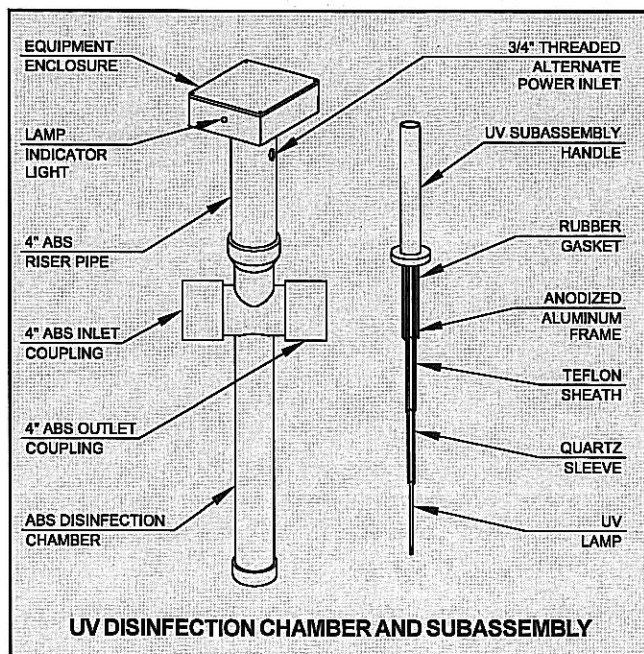
### COMPONENTS

The Model PL-UV1 disinfection system consists of the following components:

- |                           |                                                                                         |
|---------------------------|-----------------------------------------------------------------------------------------|
| 1) Equipment enclosure    | 7) UV subassembly with anodized aluminum frame, handle, quartz sleeve and Teflon sheath |
| 2) 4" ABS riser pipe      |                                                                                         |
| 3) 4" ABS inlet coupling  |                                                                                         |
| 4) Turbulence inducer     |                                                                                         |
| 5) 4" ABS outlet coupling | 8) UV lamp                                                                              |
| 6) Disinfection chamber   | 9) Dielectric grease (5 g)                                                              |

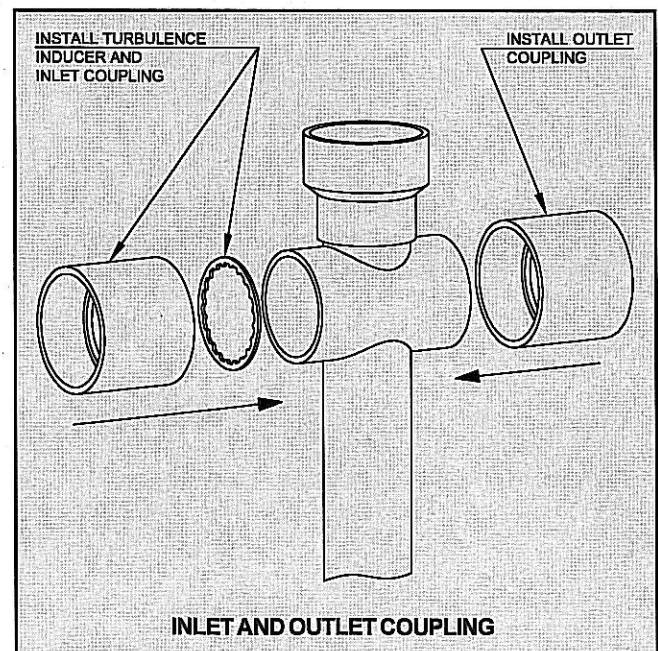
These components should be supplied by the installer:

- |                        |                                        |
|------------------------|----------------------------------------|
| 1) Solvent cement      | 6) Type UF, #14/2 AWG electrical cable |
| 2) Hacksaw             |                                        |
| 3) Glycerin (optional) | 7) Conduit hole saw                    |
| 4) Clean, soft cloth   | 8) Flexible conduit                    |
| 5) Isopropyl alcohol   | 9) Conduit sealing washer              |



### INSTALLATION INSTRUCTIONS

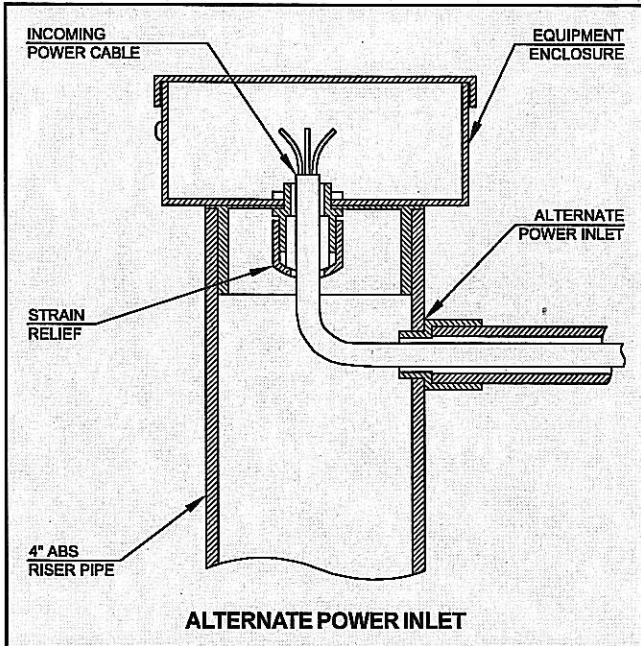
1. The treatment system excavation should be made 3' longer to allow the 4" inlet and outlet couplings of the Model PL-UV1 to be connected to the outlet plumbing of the treatment plant and final effluent line.
2. Carefully unpack the Model PL-UV1 system. Remove and properly discard all packaging materials from the system components. The UV lamp should remain in the protective shipping sleeve until it is installed.
3. Insert the turbulence inducer into the 4" inlet coupling. Solvent weld the inlet coupling to the disinfection chamber with the turbulence inducer towards the chamber. Solvent weld the 4" outlet coupling to the disinfection chamber.



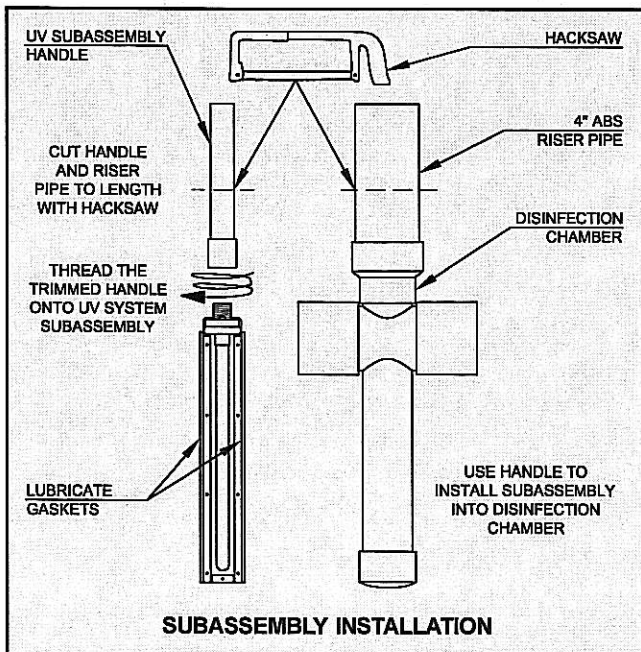
4. Solvent weld the upstream treatment system effluent line to the 4" inlet coupling of the Model PL-UV1. Next, solvent weld the outlet coupling to the final effluent line. Backfill up to the bottom of the inlet and outlet couplings.

## ULTRAVIOLET DISINFECTION (Cont.)

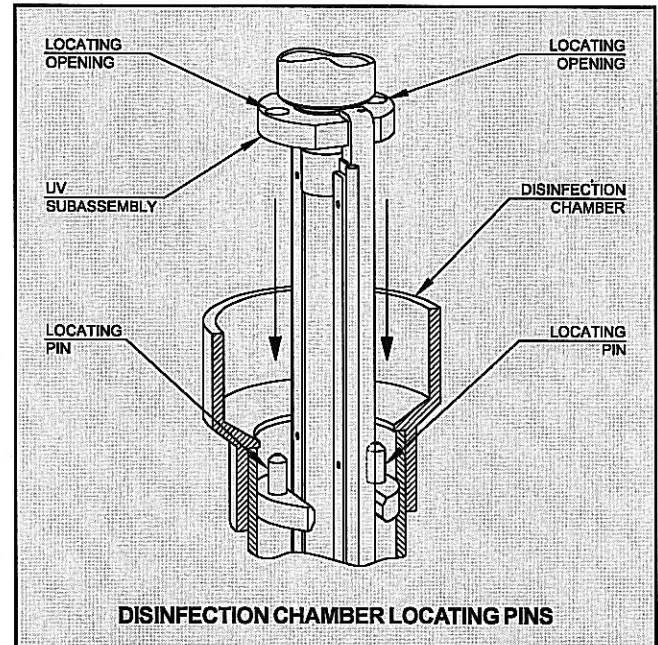
5. Fit the 4" ABS riser pipe into the top of the disinfection chamber. Mark the ABS riser pipe to make a trim line 1" above where finished grade will be. **NOTE: If the alternate power connection will be used, be sure to mark the lower end of the riser pipe so the 3/4" threaded opening is not removed.** Mark the UV subassembly handle at the same length.



6. Use a hacksaw to cut along the trim line on both the riser pipe and handle to make them the proper length.
7. Solvent weld the riser pipe to the disinfection chamber. Thread the handle onto the UV system subassembly.
8. Use water or glycerin to lubricate the rubber gaskets located on both sides of the subassembly. **NOTE: Do not use petroleum-based oils or greases to lubricate the gaskets.**



9. Be careful not to touch the Teflon sheath surrounding the quartz sleeve. Do not allow excess glycerin to contact the Teflon sheath. Fingerprints and glycerin will contaminate the sheath and have a negative impact on disinfection. Use a clean, soft cloth moistened with isopropyl alcohol to carefully remove any fingerprints or glycerin that contaminates the sheath.
10. Using the handle, insert the UV subassembly into the disinfection chamber. Make sure that the locating pins in the disinfection chamber lock into the openings on the subassembly. The subassembly must be fully engaged to insure proper operation.



11. Use a dedicated 115 volt AC single phase 15 amp (minimum) circuit in the main electrical panel for service to the UV disinfection system. **NOTE: Make sure the breaker is "off" before proceeding.**
12. Install a type UF, #14/2 AWG cable from the dedicated breaker in the main electrical panel to the UV equipment enclosure. Use the conduit hole saw to drill a properly sized hole for the conduit used to connect the incoming power cable. Flexible conduit and a sealing washer should be used to connect the power cable to the equipment enclosure to insure a watertight connection.
13. Attach the incoming hot (black) lead to the terminal block marked "L" in the equipment enclosure. Attach the common (white) lead to the terminal block marked "N" in the equipment enclosure. Attach the incoming ground (green) lead to the terminal block marked "G" in the equipment enclosure.

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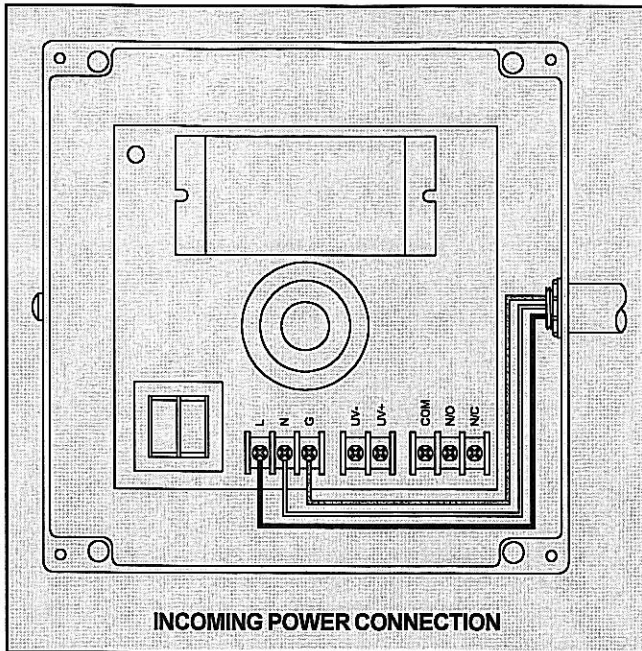
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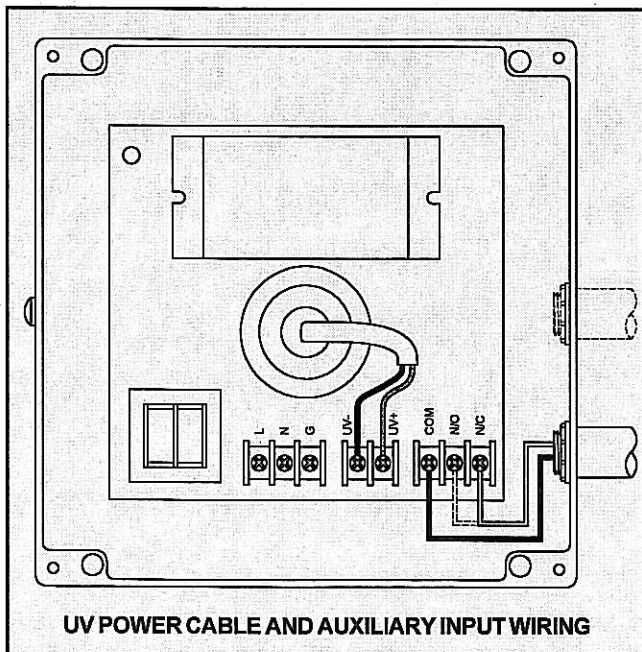
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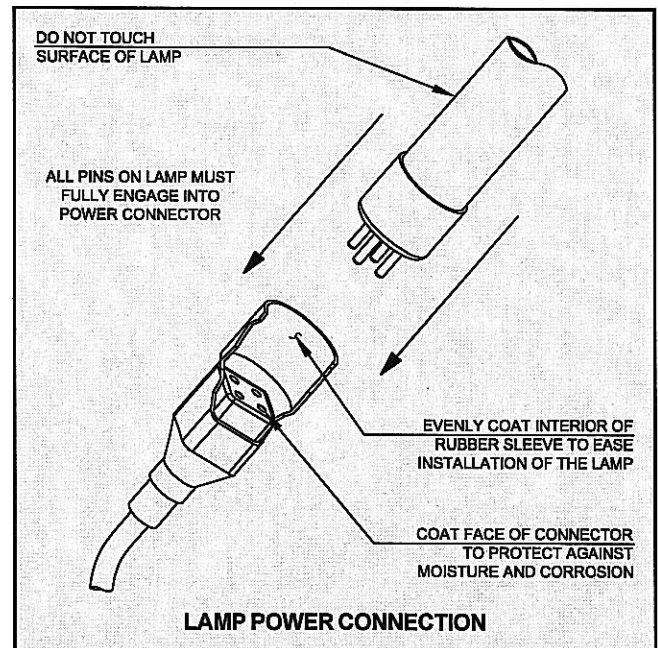
## ULTRAVIOLET DISINFECTION (Cont.)



14. (Optional) If the auxiliary alarm output is being used, drill a properly sized hole in the equipment enclosure with the conduit hole saw to install the conduit that will be used to connect the auxiliary alarm leads. Flexible conduit and a sealing washer should be used to connect the alarm leads to ensure a watertight connection. Connect one alarm lead to either the normally open (N/O) terminal or the normally closed (N/C) terminal, as shown on the wiring diagram below. Choose the correct terminal for the type of signal required by the alarm panel. Connect the other lead to the common (COM) terminal. Run the leads out through a separate flexible conduit through the side of the enclosure. The alarm leads should be properly wired and run in conduit to the panel that will be receiving the alarm signal.



15. The Model PL-UV1 is shipped from the factory with the UV lamp power cable connected to the equipment enclosure. If this power cable has become disconnected, it must be reconnected at this time. Route the cable through the strain relief in the bottom of the equipment enclosure with the wire leads inside. Connect the red lead on the UV lamp power cable to the terminal block marked "UV+." Connect the black lead on the cable to the terminal block marked "UV-".
16. Apply a liberal amount of dielectric grease into the four pin connector on the power cable to protect against corrosion and moisture. Evenly coat the interior of the black rubber sleeve with grease to ease installation of the lamp into the four pin power connector. Use the clean, soft cloth to grasp the UV lamp and insert it into the rubber sleeve of the power cable. Securely attach the UV lamp to the four pin connector. Insert the lamp by the power cable completely into the quartz sleeve. When inserting the lamp, be careful not to damage the lamp or quartz sleeve inside the subassembly.



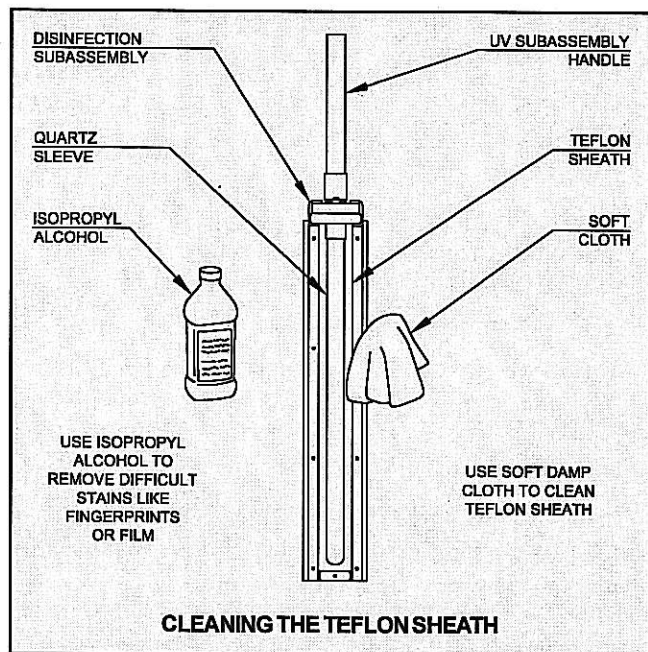
17. Fill the disinfection chamber with clean water through the riser pipe, outside of the subassembly handle. **NOTE: Do not allow water to enter the subassembly or quartz sleeve.** Fill the system to the outlet invert.
18. Tuck the excess power cable into the riser pipe.
19. Place the equipment enclosure on the riser pipe. The ABS fitting on the enclosure should fit into the riser.
20. Secure the gasketed cover in place on the top of the enclosure, using the four screws provided.
21. Backfill around the disinfection chamber and riser pipe. Finished grade should be 1" below the bottom of the enclosure to prevent the entry of mud and surface water.
22. Turn "on" the UV breaker in the main electrical panel.
23. The green lamp indicator light on the side of the equipment enclosure should now be illuminated to indicate the system is operational.

# ULTRAVIOLET DISINFECTION (Cont.)

## MAINTENANCE AND SERVICE

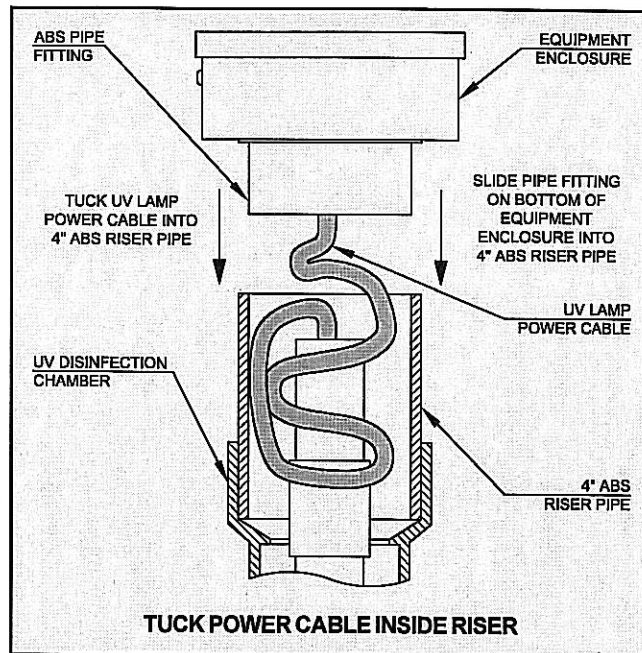
It is recommended that the disinfection subassembly be removed and serviced every six months to insure proper effluent disinfection. Inspect the Teflon sheath for damage or biological film. If the sheath is torn or biofilm is present between the sheath and the quartz sleeve, the Teflon sheath must be replaced. Contact Polylok for replacement parts. If biofilm is present on the surface of the Teflon sheath, the sheath must be cleaned to insure proper disinfection. To clean the Teflon sheath:

1. Use a soft damp cloth to carefully wipe down the sheath.
2. Use isopropyl alcohol on a soft cloth to carefully remove difficult stains like fingerprints or biological film.



The Model PL-UV1 system is designed to provide long service life. It is recommended that the UV lamp be replaced every two years to insure proper disinfection of the treatment system effluent. The green light on the side of the equipment enclosure will no longer illuminate when the lamp needs replaced. To replace the lamp:

1. Turn off the dedicated breaker in the main electrical panel that supplies power to the UV system. Confirm that the green indicator light on the side of the enclosure is "off".
2. Carefully remove the equipment enclosure from the riser pipe without disconnecting the cable connected to the UV lamp and set it aside.
3. After confirming the UV lamp is not lit, use the power cable connected to the UV lamp to carefully remove the lamp from the disinfection subassembly.
4. Disconnect the UV lamp from the four pin connector inside the black rubber sleeve on the power cable.
5. Connect the new lamp to the four pin connector and carefully lower the new lamp into the UV subassembly. Make sure the lamp is fully seated in the quartz sleeve.



6. Tuck the remaining power cable into the riser pipe.
7. Place the equipment enclosure on the 4" ABS riser pipe. The fitting on the back of the enclosure should engage securely into the riser pipe.
8. Turn on the dedicated circuit breaker located in the main electrical panel that supplies power to the UV system. Verify that the green lamp indicator light on the side of the equipment enclosure is illuminated.

**NOTE:** The UV lamp contains mercury which is harmful to the environment. Insure that old UV lamps are disposed of at a recycling center.

## ALARM CIRCUIT

The Model PL-UV1 disinfection system is equipped with an internal current sensing circuit that continuously monitors the performance of the UV lamp. If the UV lamp output drops below an acceptable level for proper ultraviolet disinfection, the alarm circuit will turn "off" the green lamp indicator light located on the outside of the equipment enclosure. This will also activate the optional alarm outputs. When connected to a telemetry system the service provider can be immediately notified that maintenance to the UV system is required. For more information regarding connection of the Model PL-UV1 disinfection system alarm to a control center, please refer to the installation and operation instructions for the control center.

|                                                                                                                                            |                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
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