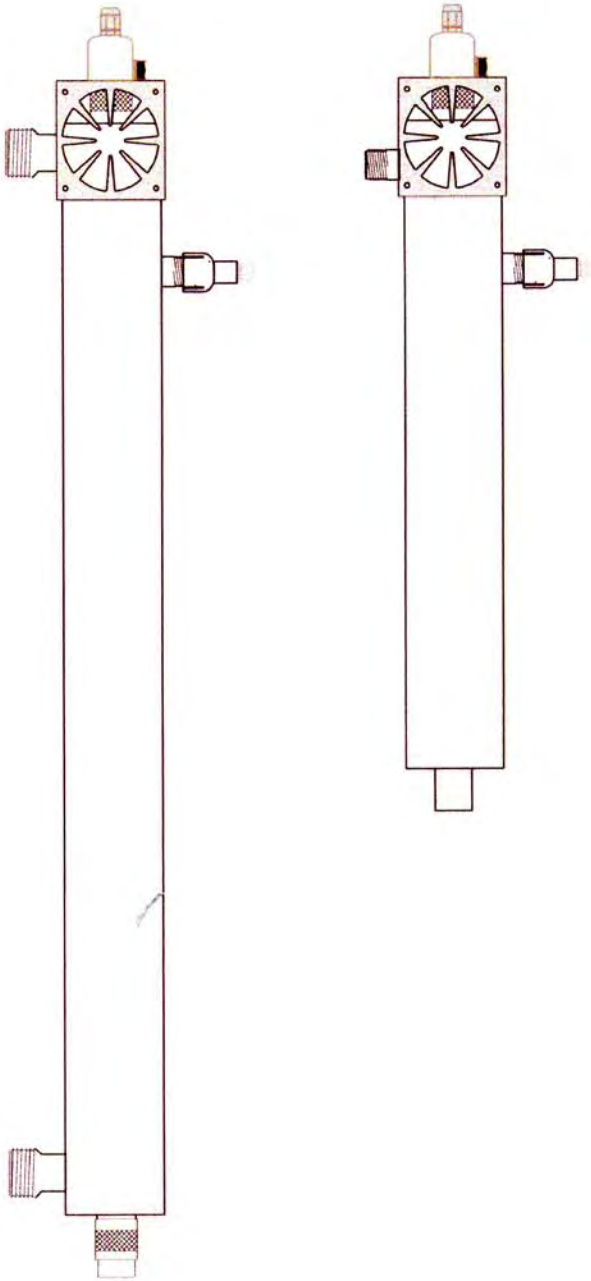
INSTALLATION & OPERATIONS MANUAL

Models

8.40C
11.40C
14.40C
20.40C
30.40C



Drinking Water
NSF/ANSI 55

System tested and certified by CSA against NSF/ANSI Standard 55 for disinfection performance, Class A.

UVDynamics Inc.

315 Neptune Crescent
London, Ontario
Canada, N6M 1A9

1.888.667.4629
1.519.452.1701

support@uvdynamics.com

UV Dynamics

WWW.UVDYNAMICS.COM

Installation and Maintenance Manual

READ AND UNDERSTAND ALL INSTRUCTIONS BEFORE INSTALLING OR USING THIS PRODUCT

TABLE OF CONTENTS

UV RADIATION HAZARD

NEVER OPERATE UV LAMP OUTSIDE OF THE UV DISINFECTION CHAMBER – EXPOSURE TO UV LIGHT CAN RESULT IN SEVERE BURNING OF SKIN AND EYES

Safety instructions – Please read carefully

❶ **DANGER** – *To reduce risk of electrical shock this system must be grounded.* Connect your UV system to a grounded, GFI protected (3 pronged) receptacle (120V, 60HZ) and ensure that the lamp connector ground wire is connected to the ground stud on the top of the disinfection chamber.
Note: Power source for applications outside of North America must match requirements of the unit (eg. 240V, 50Hz).
Do not plug the unit in if any of the external surfaces or electrical parts are wet. Condensation on the disinfection chamber is normal.

❷ To avoid possible electric shock, special care should be taken since water may be present near electrical equipment. Unless referred to in these instructions, do not attempt repairs yourself. Contact the installing dealer or manufacturer for service advice.

❸ Do not operate this system if it has a damaged electrical cord or plug, is malfunctioning, or has been dropped or damaged in any way.

❹ Do not use this unit for anything other than its intended potable water application. The use of attachments not recommended, approved, or sold by the manufacturer/distributor may result in an unsafe condition.

❺ Before any cleaning or maintenance, always disconnect the unit from the AC supply voltage and de-pressurize the system.

❻ Protect your unit from freezing. Drain all water from the unit if freezing temperatures exist.

❼ System must be installed in accordance with all applicable codes and regulations.

❽ If system indicates a failure state, water needs to be boiled before use and the system and plumbing are required to be disinfected after system failure is resolved.

❾ This installation and operating manual is to be kept with UV system.

APPLICATION OVERVIEW

UVDynamics UV disinfection systems certified to NSF/ANSI standard 55 are suitable for use on waters which are known to be contaminated. This product uses a proprietary extended cold spot lamp design along with an active temperature controlled cold spot cooling fan, resulting in improved lamp output maintenance during stagnant hot water conditions. The UV display indicates actual dose in mj/cm^2 at rated flow.
To insure trouble free operation of your UVDynamics UV disinfection system it is important to ensure that your water source meets the minimum water quality parameters specified.
Failure to meet minimum water quality standards may result in excessive maintenance requirements or, in the case of UVT% below 70%, may preclude the system from reaching the minimum operating UV fluence (dose).

WATER QUALITY

Your UV disinfection system requires clean water for optimum performance. You should only operate your unit if the source water meets the following standards:

Turbidity	**< 1 NTU**
Suspended Solids	**< 10mg/L**
Colour	**None**
Total Iron	**< 0.3 mg/L**
Manganese	**< 0.05 mg/L**
Hardness	**< 7 gpg**
UVT%	**> 80%**

If your source water does not meet these water quality parameters, additional pre-treatment will be required. Operation of this system with water that does not meet these quality standards will increase the occurrence of nuisance alarms, and result in increased maintenance and more frequent lamp replacement. Operating the system with excessively low UVT% (ultraviolet transmission percentage) will reduce UV intensity to the point where operation of the system is not possible.

INSTALLATION CONSIDERATIONS

❶ Select a disinfection system mounting location where a potential leak will not cause water damage. UVDynamics is not responsible for water damage. When the disinfection system can only be located where water damage is a possibility, the installation of an automatic leak detector / shut off device is highly recommended

❷ UVDynamics disinfection devices are designed to be installed on the cold water line only.

❸ Cold water source must be connected to the inlet port only.
CAUTION: reversing the flow direction by connecting the water source to the output port could result in reduced disinfection performance and improper operation of the flow regulator.

❹ Install your UV Dynamics disinfection system indoors in a protected area where the temperature does not fall below 9°C (40°F) and the humidity level is low (to prevent condensation on the chamber). This unit functions ideally in a temperature range from 9°C - 29°C. (49 – 85F)

❺ Models 8.40C, 12.40C and 15.40C must be installed vertically. Models 20.40C and 30.40C may be mounted horizontally with inlet and outlet ports orientated upwards only. Installing with ports orientated downward will result in air being trapped in the disinfection chamber, resulting in reduced disinfection performance and erratic UV sensor operation.

❻ Use teflon tape on all pipe connections. **DO NOT USE ANY OTHER SEALANT.**

❼ If the AC power distribution system is subject to frequent outages or electrical storm activity, the installation of an external surge protection device is required. Preferably, the surge protection device will have an indicator showing that the surge protection components have not failed and the device should be checked frequently.

❽ If the water system in which the UV disinfection system is to be installed includes a pump, the UV disinfection system should not be connected to the same AC supply circuit as the pump. Pumps can create significant voltage droop on start-up which my be sufficient to trigger an abnormal operating condition alarm in the UV power source. In these cases connection of the UV disinfection system to an isolated AC supply will minimize nuisance alarms.

Installation Procedure

The UV disinfection system should be the last step of your water treatment system. Choose a location for installation with a close electrical outlet. Note the direction of water flow in the supply line. Refer to the installation example diagrams and check that you have all necessary fittings for installation. **Note**: Ensure that the chosen mounting location has adequate clearance to facilitate quartz sleeve and UV lamp replacement.

❶ Shut off the main water supply valve.

❷ Mount the unit to the wall using the mounting brackets provided. Mount ballast beside the chamber. Ensure that the chosen ballast location is not subject to any possible dripping of condensation from either plumbing or system components

❸ Install new plumbing as per diagram. **Note**: When installing the 5 micron pre-filter, make sure the flow arrows point in the same direction as the water flow. **WARNING: if soldering, do not allow heat near plastic threads or fittings.**

❹ **SOLENOID VALVE INSTALLATION**

On vertically mounted systems a solenoid valve can be directly mounted to the inlet port. In all other mounting configurations the solenoid valve should be isolated by 12" (30cm) of piping on either port of horizontally mounted disinfection chambers, and the output port of vertically mounted chambers,

Mounting of the solenoid valve directly to the ports of a horizontally mounted chamber or directly to the output port of a vertically mounted chamber will result in premature solenoid coil failure due to the elevated temperature conditions that exist during periods of no water flow.

❺ **QUARTZ SLEEVE INSTALLATION - Model 8.40C**

Verify that the red "O" ring is installed in the inside groove of the gland nut, and place the black "O" ring on the open end of the quartz sleeve approximately 1"(25mm) from the end. Then push the quartz sleeve into the gland nut until the sleeve touches the top of the retainer edge in the gland nut. *Failure to insert the quartz sleeve fully into the gland nut will allow excessive sleeve movement during water flow, resulting in possible water leakage and sleeve breakage.*

❻ **QUARTZ SLEEVE INSTALLATION - All other Models**

Install one of the black "O" rings on the end of the quartz sleeve and position approximately 1"(25mm) from the open quartz sleeve end. Carefully insert the other end of the quartz sleeve into the disinfection chamber. Install the second black "O" ring on the remaining quartz sleeve end which is now emerging from the end of the chamber and adjust sleeve position so that equal amounts of quartz sleeve extend from both ends of the disinfection chamber. Install the gland nut with the black light shield on the bottom or non lamp end of the disinfection chamber. The other gland nut is used on the lamp end of the disinfection chamber. Hand tighten both gland nuts.

❼ Place the lamp spring, then the lamp into the quartz sleeve. Install the *Cold Spot Fan™* over the gland nut. Holding the top of the lamp, attach lamp to the lamp connector. Insure the lamp is orientated so that the lamp wires are not in the path of the UV Sensor Probe. ***FAILURE TO ORIENTATE LAMP CORRECLY COULD RESULT IN REDUCED UV DOSE INDICATION*** Push the lamp connector down snugly into the gland nut and tighten the lamp connector set screw.
WARNING: do not over tighten as plastic threads are easily damaged.
Connect the lamp connector cable labeled **FAN** to the *Cold Spot Fan™* assembly.

❽ Remove the nut from the ground stud at the top of the unit. Next, place the ground wire (green wire with yellow stripe) over the stud and re-install nut and tighten. ***FAILURE TO GROUND CHAMBER MAY RESULT IN AN ELECTRICAL SHOCK HAZARD AND ERRATIC UV SENSOR BEHAVIOUR***

❾ Install UV Sensor Probe. The probe must be hand tightened completely to insure accurate calibration. Connect UV Sensor Probe plug into port labeled UV Sensor on the UV power source.
Caution – Hand tighten only

❿ Open the valves on either side of the disinfection chamber. Check for leaks. Open supply valve slowly and bleed air from system.

Connect UV power source to AC line. UV power source audio alarm will sound three times before igniting the lamp.

Your UV Dynamics disinfection system is now ready for service. Before service begins, all household plumbing lines should be chemically disinfected.

DISINFECTION PROCEDURE

THE FOLLOWING DISINFECTION PROCEDURE IS GENERALLY ACCEPTED AS BEING SUITABLE FOR THE DISINFECTION OF PLUMBING SYSTEMS KNOWN TO BE CONTAMINATED.

IF YOU ARE UNCERTAIN ABOUT THE EFFICACY OF THIS PROCEDURE, YOU ARE ADVISED TO CONTACT THE LOCAL HEALTH AUTHORITY RESPONSIBLE FOR WATER SAFETY.

The UV disinfection process takes place only in the UV disinfection chamber and the process provides no residual disinfection capability, ***therefore it is necessary to chemically disinfect the entire plumbing system before using water treated by the UV system.***

❶ The disinfection of the plumbing system is most readily accomplished by removing the 5 micron sediment filter cartridge and adding 250ml - 500ml (1 –2 cups) of standard 5.25% concentration un-scented chlorine bleach to the empty filter housing and re-installing.

❷ Verify that the UV disinfection unit is connected to the AC supply voltage and operating properly. The addition of chlorine bleach to the plumbing system may cause the water to go cloudy, resulting in a low UV alarm condition. If a solenoid valve is installed it will be necessary to place the solenoid valve in the manual open mode.

❸ Operate ***all faucets, fixtures and appliances*** until you clearly smell chlorine, then shut off. *This includes shower heads, outside taps, dishwashers, laundry equipment and any appliance connected to the plumbing system.*

❹ Leave the bleach solution for 30 minutes.

❺ Re-install the sediment filter cartridge and thoroughly flush the system at all fixtures and appliances connected to the system.

Note: The introduction of a chlorine disinfection solution to a hot water heater that has been used with untreated hard water or water with excessive iron, manganese or other organic contaminants may lead to oxidization of these materials. If you feel that these conditions may apply to your installation, a thorough flushing of the hot water tank should be undertaken to eliminate the oxidized material from the system.

UV POWER SOURCE FEATURES

The micro-processor controlled UV power source supplied has both audio and visual alarm indicators to validate lamp operation and an integral annual lamp change reminder timer.
A two digit display is provided to display the actual UV dose, lamp life remaining (when timer reset button is pressed), and various error codes to aid in system diagnostics. If the actual UV dose falls below 40mj/cm^2, the unit goes into the low UV alarm mode and the solenoid valve, if installed, will be de-activated.

UV power source initialization sequence: When AC power is applied to the UV power source the lamp is ignited, as indicated by the green lamp-on LED, after which a self test of the annual lamp change reminder timer LED and alarm buzzer occurs. This test consists of three buzzer beeps and three red timer LED flashes. The two digit display indicates the actual UV dose. If a solenoid is connected to the UV power source, it will activate when the UV level reaches 40mj/cm^2.

Normal Operation: During normal operation, the green lamp-on LED is illuminated and the two digit display indicates the actual UV dose in mj/cm^2.

Diagnostic Display

Pushing the timer reset button on the UV power source initiates the diagnostic display function of the system. In sequence, the display will output the parameter followed by the parameter value;

- (lr) Lamp life remaining (weeks)
- (ul) UV level
- (tf) Disinfection Chamber temperature F^0
- (tc) Disinfection Chamber temperature C^0
- (fn) *Cold Spot Fan™* status 1=on 0=off
- (at) Alarm threshold – "C" for certified system

Note: The diagnostic display does not function if a lamp failure condition exists.

Lamp failure: When the UV power source detects a lamp failure or enters the auto shut down mode due to abnormal operating conditions, the alarm buzzer sounds, the red *lamp failure LED* lights, and the green *lamp-on LED* and 2 digit display are extinguished. If connected, the solenoid valve will terminate the water flow.
Note: The UV power source is designed to shut down if the AC input voltage is outside of operating limits. When a lamp failure alarm is active, the unit should be unplugged from the AC power source for fifteen seconds and then reconnected to the AC power source. If the failure was due to out of limit AC power, the unit will re-ignite the lamp and operate normally.

Chamber Over Heat: When the chamber temperature exceeds 45^O C (113^O F) the chamber overheat alarm (**oh**) will be displayed.

Lamp timer operation: The annual lamp change reminder timer will run for approximately one full year. At the end of the one year period the **E5** lamp change reminder error code will be displayed and the buzzer will sound. The **E5** error code indicates that the lamp timer function is in the 28 day grace period. Pushing the timer button during this grace period will silence the buzzer for a seven day period but the **E5** error code will remain. The buzzer reset can be activated a maximum of four times during the 28 day grace period. Under no circumstance does the grace period exceed 28 days. At the expiry of the 28 day grace period the **E5** error code is replaced by **E6.** When the **E6** error code is active the lamp must be replaced and the lamp timer reset.
Note: *As long as the UV level reading on the two digit display is above* 40mj/cm^2 *the solenoid valve drive is not disabled.*

Time remaining: When the lamp change reminder timer is not in the grace period or lamp change alarm mode, the number of weeks of lamp life remaining will be displayed on the two digit display by pressing the timer reset button. .

Solenoid Valve Output: The UV power source is capable of directly powering a solenoid valve which will shut off water flow during lamp failure alarm conditions.

Low UV Intensity: If the output of the UV detection system falls below 40mj/cm^2, a low UV alarm will be initiated and error code **E1** will be displayed. If a solenoid valve is installed it will be deactivated to stop the flow of water.

Alarm Override: The UV power source has an alarm override feature to disable the audio alarm when the system has entered a low UV alarm state. Pressing the button during error code ***E1*** will initiate the override, which is active for 24hrs, but can be reset indefinitely. The alarm override feature will not function if the lamp has failed. The display will read error code ***E4*** while the alarm override is active.

CAUTION: The water treated by the unit will not be properly disinfected when the alarm override is in operation and should not be consumed without boiling.

UV Sensor Error: If the UV Sensor Probe is not connected to the UV power source, or if communication with sensor is not possible, the error code ***E3*** will be displayed. Verify that the sensor plug is fully inserted into the UV power source before replacing the UV Sensor Probe. The system also includes a sensor self test mode which is automatically executed if an **E1** low UV alarm is entered, or if the diagnostic display is activated. If the sensor fails the self test, the **E7** error code is displayed and the sensor will need to be replaced.

ERROR Codes Summary

The UV power source displays the following error codes to announce system problems. If more than 1 error code is applicable, all active error codes will be displayed in sequence.

E1 – Low UV Alarm
E3 – Sensor Communication Error
E4 – Alarm Override Active
E5 – Change Lamp Reminder
E6 – Lamp Life Expired – Change lamp
E7 – Sensor Self Test Failure
oh – chamber over heat

Operating and Maintenance

Your UV system is on continuously during normal use.
After periods of not using your water supply exceeding 2-3 days, it is recommended to open all faucets and flush your plumbing lines for a minute or two.
Caution: Protect your unit from freezing. Drain all water from the unit if freezing temperatures exist.
Ultraviolet lamp replacement: The ultraviolet lamp located inside the chamber will operate effectively, around the clock, for approximately one year. While the lamp will light longer than this, the UV light penetration may fall below the prescribed safety level. Therefore, annual lamp replacement is necessary regardless of apparent condition.

Replacing the UV lamp and cleaning the quartz sleeve

Note: Do not touch the lamp or the quartz sleeve with your fingers. Handle by ends only or wear soft gloves.

❶ Unplug the system from the electrical outlet, turn off all water supplies to the unit, and de-pressurize system

❷ Carefully extract the lamp connector from the sleeve gland nut assembly to expose just the top of the lamp. While holding the lamp base firmly, remove the lamp connector. **Caution:** lamp base can be very hot – be careful not to drop lamp into quartz sleeve as it is easily broken.

❸ Carefully slide the UV lamp out of the quartz sleeve and discard according to local disposal regulations.

❹ Remove the quartz sleeve by loosening the gland nut(s) and carefully extracting it from unit. **Caution:** The quartz sleeve is fragile and is easily chipped or broken – use care when removing or installing.

❺ Clean the quartz sleeve with a vinegar solution or any readily available scale removal product (***Limeaway, CLR etc.***)

❻ Re-install the quartz sleeve – replace "O" ring(s) if they appear damaged.

❼ Install new lamp by reversing procedure described in step 2 above.

❽ Slowly open water supply valve and purge air from system – verify that there are no leaks before reconnecting to AC power.

RESETTING THE LAMP CHANGE TIMER

❶ The lamp change timer is reset by disconnecting the UV power source from the AC supply, waiting for fifteen seconds and reconnecting to the AC supply while depressing the timer reset button. The UV power source will emit a solid three second beep indicating that the reset was successful.
It is not possible to reset the lamp change timer unless the timer is in the grace period or lamp change alarm mode. If, due to premature lamp failure, you need to reset the lamp change timer prior to the end of one full year there are special instructions included with all replacement lamps describing the necessary procedure.

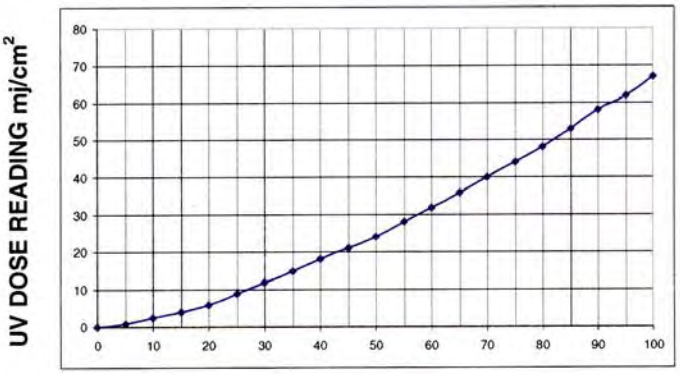
LOW UV ALARM

When the UV intensity level falls below 40mj/cm^2, the system enters the Low UV Alarm state and the ***E1*** error code is displayed. If installed, the solenoid valve will shut off water flow.

Whenever a Low UV Alarm is present the UV sensor self test function is executed. If the UV sensor fails the self test, the ***E7*** error code will also be displayed indicating that the UV level sensor needs to be replaced.

The Low UV Alarm Flow Chart on page 9 simplifies resolving Low UV Alarm conditions.

UVT% ESTIMATOR CHART note 1



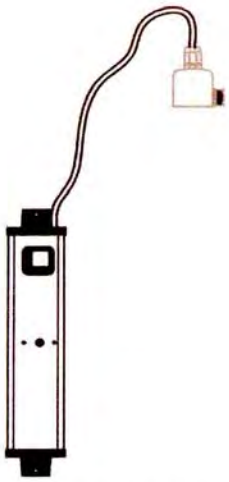
Note 1

- Chart is only valid with new lamp, sleeve and sensor.

- operate system for thirty minutes and allow water to flow for five minute before taking reading.

- If UV dose reading below the alarm threshold of 40mj/cm^2 use diagnostic display function to read dose level.

- Validate system performance by rinsing and filling disinfection chamber with water of known quality. eg (bottled water)



UV Power Source + UV Detect
Part # 400206

UV Lamp
Model 8.40C Part # 400269

Lamp Spring Part # 400111

Internal Glandnut "O" ring (red)
Part # 400288

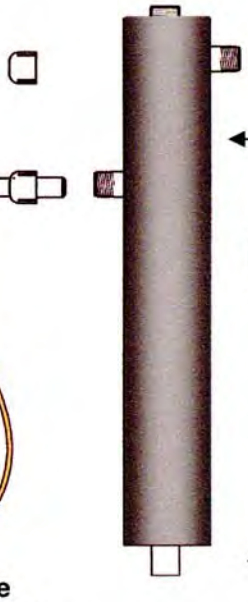
Glandnut Part # 400103

IEC Power Cord
Part# 400114 all models

Quartz Sleeve
Model 8.40C Part # 400274

ColdSpot Fan™
Part # 400290 all models

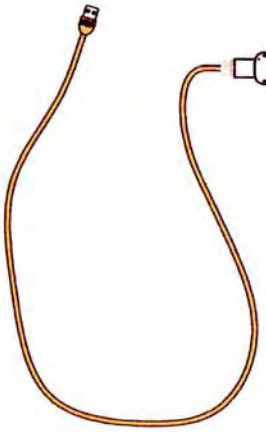
"O" Ring Part # 400286



Outlet Port

Disinfection Chamber
Model 8.40C Part # 400268

Mounting bracket
Part # 400108

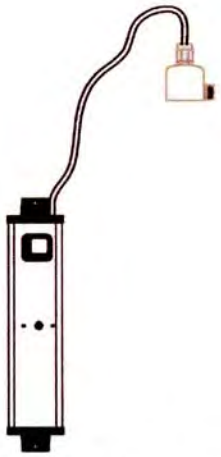


Inlet Port

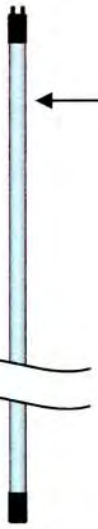
UV Sensor Probe
Part # 400295 all models

UV Sensor "O" Ring
Part # 400289

COMPONENT IDENTIFIIER - Model 8.40C



UV Power Source + UV Detect
Part # 400206 models 11.40C, 14.40C
Part # 400250 model 20.40C
Part # 400283 model 30.40C



UV Lamp

Model 11.40C Part # 400269
Model 14.40C Part # 400270
Model 20.40C Part # 400271
Model 30.40C Part # 400272

Lamp Spring Part # 400111

IEC Power Cord
Part# 400114 all models

Glandnut Part # 400103

Quartz Sleeve

Model 11.40C Part # 400274
Model 14.40C Part # 400157
Model 20.40C Part # 400271
Model 30.40C Part # 400276

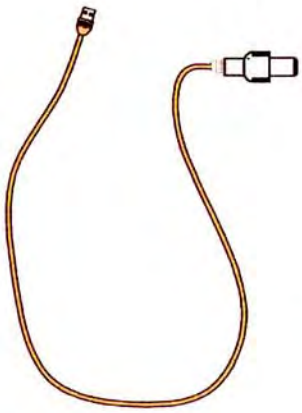
ColdSpot Fan™
Part # 400290 all models

"O" Ring Part # 400286

Outlet Port

Disinfection Chamber

Model 11.40C Part # 400270
Model 14.40C Part # 400114
Model 20.40C Part # 400272
Model 30.40C Part # 400274



Mounting bracket
Part # 400108

Inlet Port

"O" Ring Part # 400286

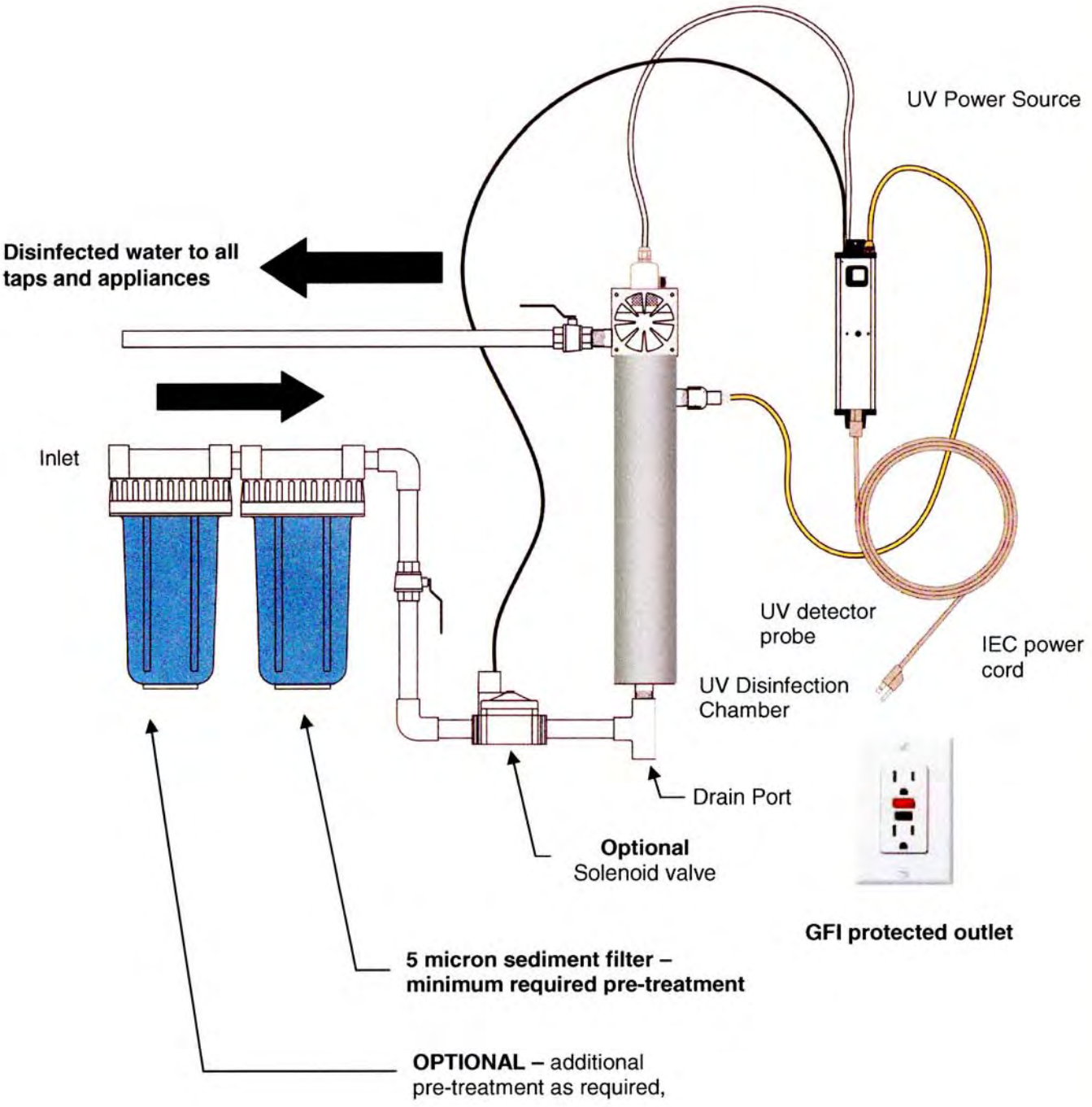
Glandnut Part # 400287

UV Sensor Probe
Part # 400295 all models

UV Sensor "O" Ring
Part # 400289

COMPONENT IDENTIFIIER - Model 11.40C, 14.40C, 20.40C, & 30.40C

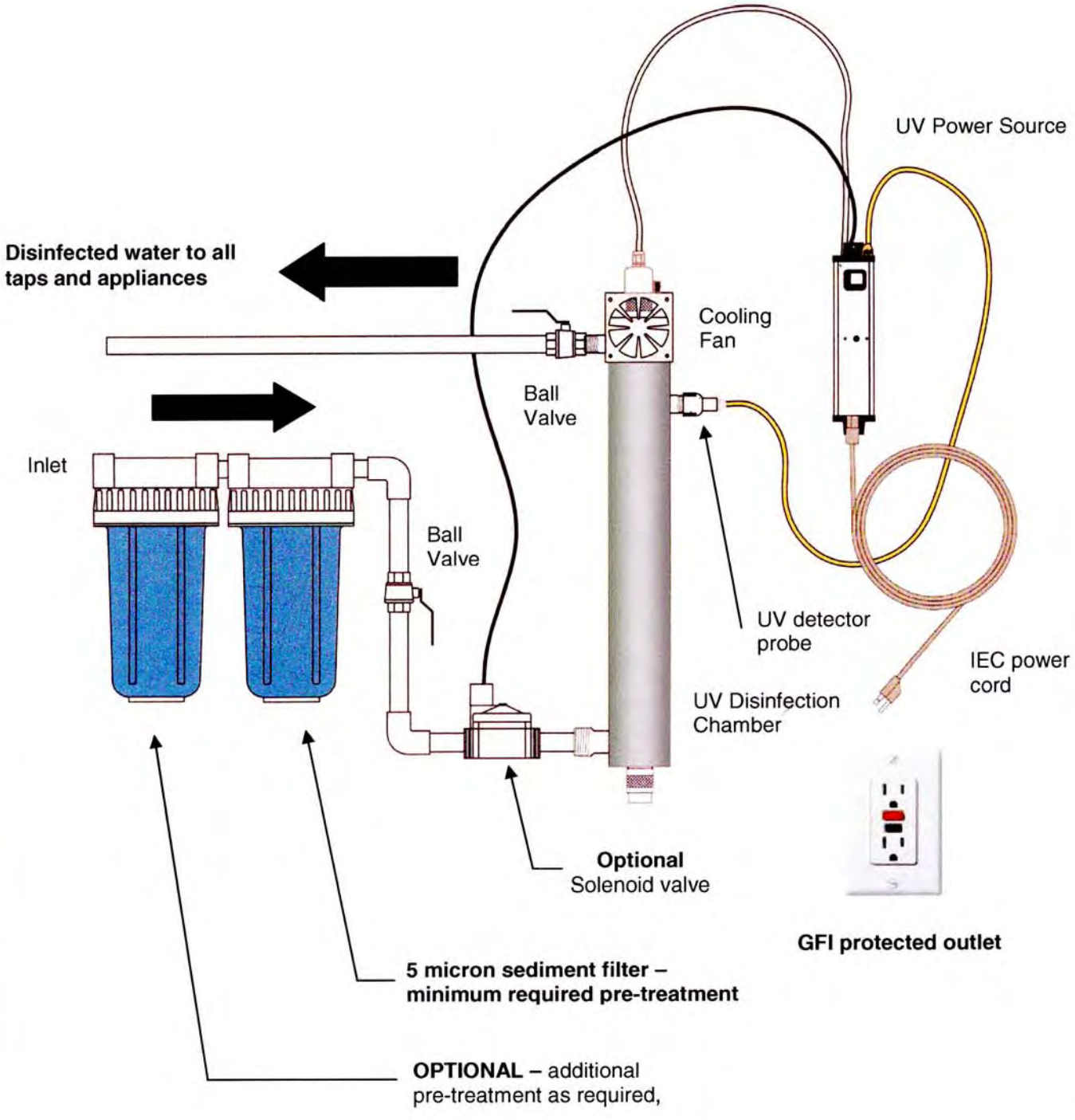
READ INSTALLATION CAUTIONS AND VERIFY MINIMUM WATER QUALITY REQUIREMENTS BEFORE PROCEEDING WITH INSTALLATION



Installation Example - Model 8.40C

Select a disinfection system mounting location where a potential leak will not cause water damage. UVDynamics is not responsible for water damage. When the disinfection system can only be located where water damage is a possibility, the installation of an automatic leak detector / shut off device is highly recommended

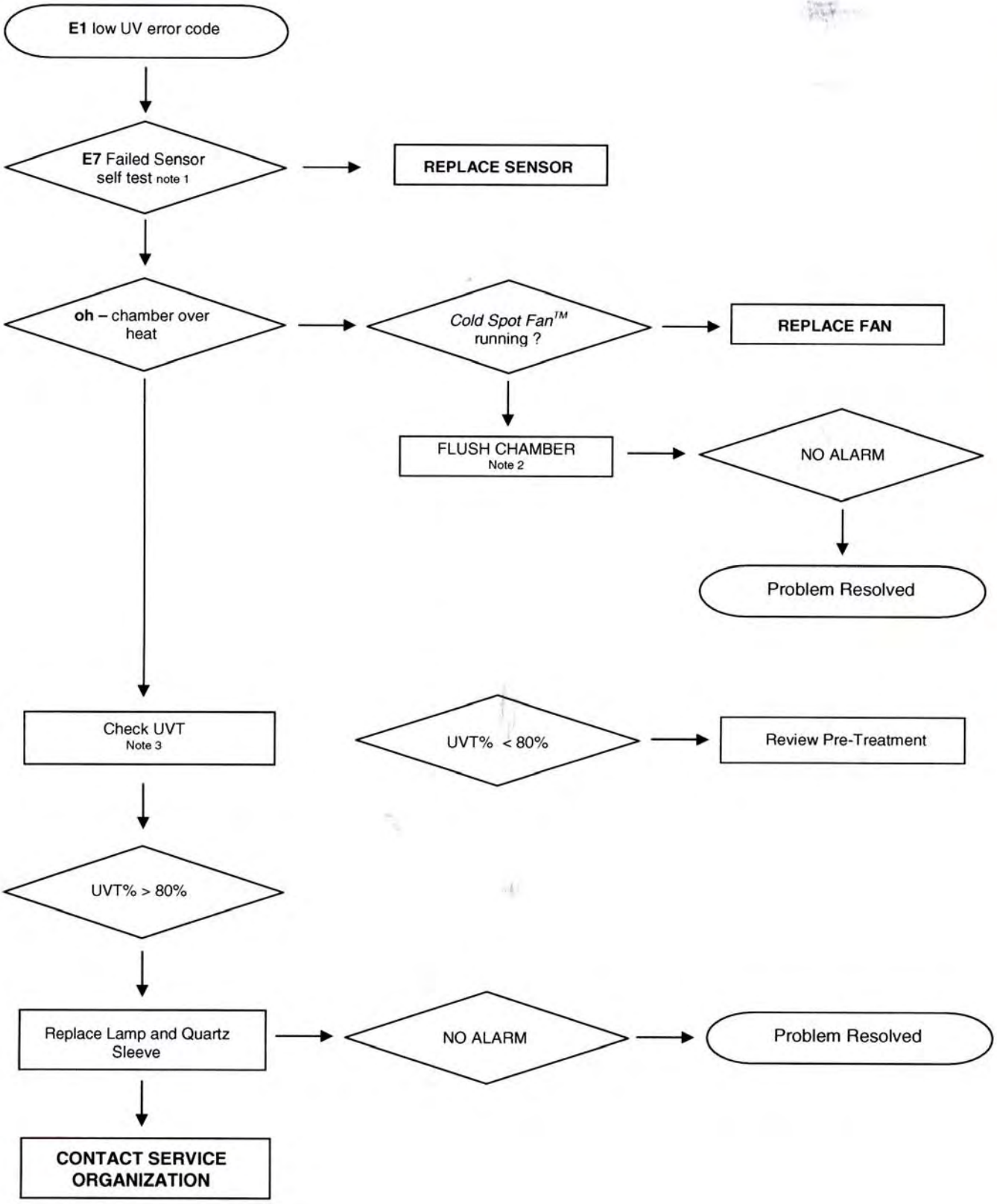
READ INSTALLATION CAUTIONS AND VERIFY MINIMUM WATER QUALITY REQUIREMENTS BEFORE PROCEEDING WITH INSTALLATION



Installation Example - Model 11.40C, 14.40C, 20.40C, & 30.40C

Select a disinfection system mounting location where a potential leak will not cause water damage. UVDynamics is not responsible for water damage. When the disinfection system can only be located where water damage is a possibility, the installation of a automatic leak detector / shut off device is highly recommended

LOW UV ALARM – Diagnostic flow chart



Note 1 – The Sensor self test is automatically performed whenever a low UV Alarm or diagnostic display is activated.

Note 2 – Purge hot water from disinfection chamber by closing isolation valves, remove UV sensor from disinfection chamber. Position a pail or other suitable receptacle to contain the purge water and slowly partially open the inlet isolation valve to purge the hot water from the disinfection chamber. If you chose to purge the hot water from the disinfection chamber by placing the solenoid valve in the by-pass mode and using a tap on the plumbing system **you will be required to disinfect the plumbing system as described in this manual before the UV system is returned to service.**

Note 3 – To measure the UVT% of the water requires a specialized test instrument. Contact your installing dealer or private water testing laboratory.