Installation and Operation Manual

Element Q®

This Manual Applies to models:

- Element Q 100
- Element Q 80
- Element Q 60

This manual applies to serial numbers:

21LN0001 and above

Patents Pending

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Engineered Solutions

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SECTION 1: GENERAL INFORMATION

1.1 Description

The Element is the first all-in-one, fully engineered water wellness solution that provides safe, reliable domestic hot water through a complete, compact system designed and built by a single source, and operated by a supervisory controller. It integrates water heating, temperature control, and water treatment; mitigates risks waterborne pathogens and scalding; and aids in full building sanitation.

The Element features a unique, supervisory controller for the entire system for easy installation, operation, maintenance, and sanitation. The compact footprint allows for multiple units to be installed in parallel and can all be accessed from a single unit or mobile device. The unit controller and mobile app locally and remotely control and report on the health of the system.

See Table 1-1 for the three (3) models available:

Element Q Models			
Maximum Flow	**Q 100**	**Q 80**	**Q 60**
Cold Water Supply			
Flow Rate GPM (LPM)	30 (113.6)	25 (94.6)	20 (75.5)
Recirculation Loop			
Flow Rate GPM (LPM)	30 (113.6)	14 (53.0)	14 (53.0)
Performance			
Input MBH (kW)	999 (293)	800 (234)	600 (176)
Recovery GPH (Thermal Efficiency)			
70°F to 140°F	1635 (95%)	1317 (96%)	988 (96%)
40°F to 140°F	1157 (97%)	932 (97%)	699 (98%)

Table 1-1 - Element Q Performance

Input Requirements	
Natural gas pressure	>3.5in W.C. flowing (872 Pa), <14in W.C. static (3487 Pa). Convertible to use LP gas (propane)
Electrical service	120VAC, 30A
Exhaust venting	Use a Category IV PVC, CPVC or ETL, UL, ULC or CSA listed stainless steel or Centrotherm InnoFlue SW Polypropylene vent. Minimum vent length is 5 eq. feet. See installation manual for specifics.
Inlet Combustion Air Duct	Use PVC or galvanized pipe. 150 eq. ft. using 6in pipe. Longer lengths are ETL listed with larger diameters: see installation manual for specifics.
Internet connectivity	Wired via Ethernet RJ-45
Ambient temperature	0 - 130°F (-17.8 – 54.4 °C). Assumes continuous cold water supply flow.

Table 1-2 - Element Input Requirements

Cold Water Inlet Requirements	
Pressure	15 - 145psi (1000 kPa)
Temperature	Cold: 40 - 100°F (5 - 38 °C) Recirc: ≤ 180°F (≤ 82.2 °C)
Flow rate, minimum1	0.5 gpm (1.9 L/min)
pH	6.5 - 8.5
Hardness	Cold: ≤ 30 grains (≤ 513 ppm CaCO3) Recirc: ≤ 7 grains (≤ 120 ppm CaCO3)
Free chlorine	≤ 1 ppm
Iron	≤ 0.3 ppm
Manganese	≤ 0.05 ppm
Phosphates	< 3.0 ppm
Silica	≤ 20 ppm
Oil and H2S	Must be removed
TDS	500 mg/L
Copper	< 1.3 ppm
Chloride	≤ 200 ppm
Sulfate	≤ 250 ppm

Table 1-3 - Element Q Requirements

[1] For a downstream fitting; assumes a recirculation pump is flowing at least 5 gpm (19 L/min).

The Element provides consolidated controls and a single source of service for ease of operation. Each Element unit is equipped with a hot water system, master mixing, UV disinfection, anti-scale and a filtration system.

Internal and external communications are covered by a separate *Element Communications Manual for System Integrators*. Refer to that for connections to building automation systems (BAS) or building management systems (BMS).

The Edge SC Controller contains a highly sensitive capacitive touchscreen. It continuously checks for user interaction at a high frequency. Boiler room environments are often harsh, electromagnetically noisy and dirty, and can experience wide temperature ranges, all of which can damage sensitive electronic components.

Lync has taken precautions to ensure proper operation of your unit. The Edge SC Controller is built with a high-quality glass screen for clarity and performance and has an optically bonded overlay covering the front of the enclosure to prevent dirt and liquids from affecting its operation.

1.2 Electrical Requirements

See appliance rating decal for electrical requirements. The appliance must be supplied and grounded in accordance with the requirements of the authority having jurisdiction or with the latest edition of the National Electrical Code ANSI/NFPA No. 70. In Canada, the electrical service must conform to local electrical codes and/or CSA C22.1, Canadian Electrical Code, Part 1.

- All wiring between the unit and field installed devices must be made with thermocouple wire.
- Line voltage wires must be enclosed in approved conduit or metal-clad cable.
- To avoid serious damage, DO NOT energize the unit until the appliance is full of water.

1.3 Theory of Operation

Element Q heats, treats, mixes, and reports on operation to the user. Following Figure 1-1 from the cold inlet, incoming potable water is filtered through Filter 1, a 5µm sediment filter. Next it passes through the AquaSolve Media Actuated Crystallization (MAC) anti-scale unit. Following that it passes through the cold water Lync UV system to inactivate pathogens. Not shown in the figure is the booster pump. The intent of the booster pump is not to compensate for lower incoming cold water pressure but rather to overcome any internal losses with the unit.

Following the booster pump and tee connection, cold water enters the Lync Q water heater. It exits from the top where there is another tee to supply the hot water to the building, and the DigiTemp Jr digital mixing valve that supplies mixed water for distribution to end user fittings and fixtures, e.g. showers and faucets.

On return, the recirculated water is passed through an additional 5µm sediment filter and an additional recirc water Lync UV system for ongoing pathogen prevention. The recirc water enters the Lync Q water heater at a mid-tank port.

A recirculation sanitation pump and check valve are located between the water heater exit and entrance for tank volume sanitation cycles.

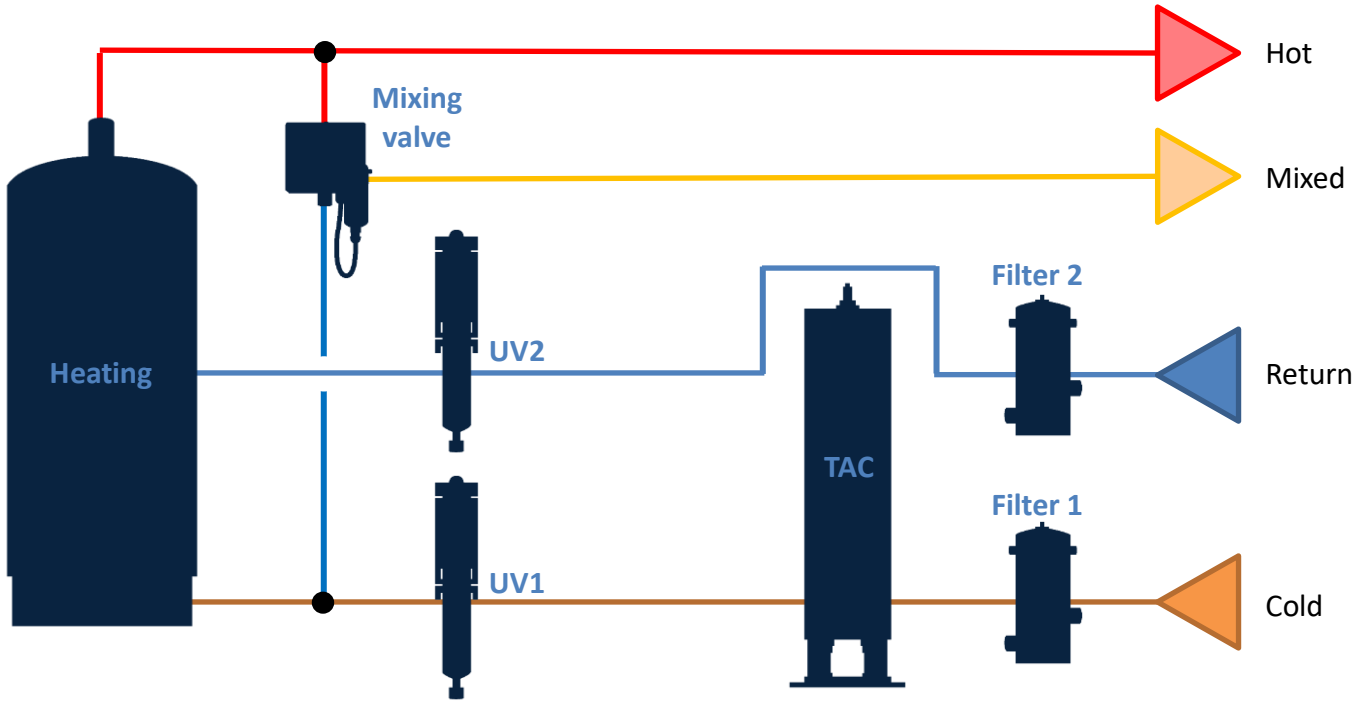


Figure 1-1 - Element Summary Schematic

You will notice when opening the front door of Element that the controllers for the various subsystems are all located in front. All wiring is connected to these front panels with external communication and power connections at the rear. Wiring schematics are located in the appendix.

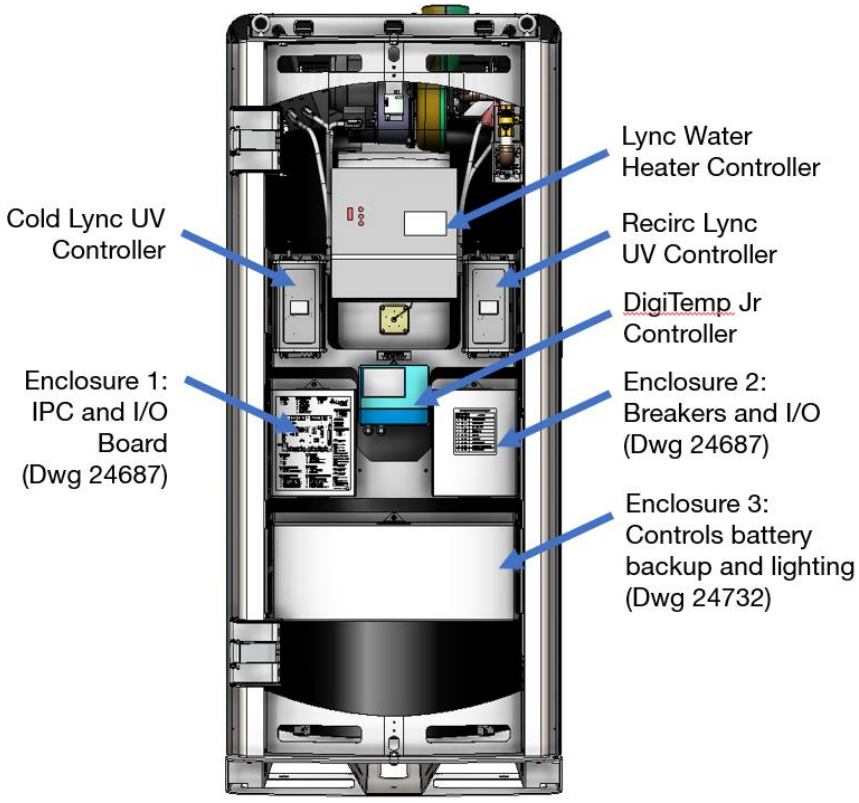


Figure 1-2 - Front of Unit, Door Assembly Removed. See Appendix B.

SECTION 2: SAFETY PRECAUTIONS

2.1 Warnings & Cautions

Follow these **WARNINGS** and **CAUTIONS** at all times. Failure to follow these instructions can cause property damage, personal injury, exposure to hazardous materials or death.

- Initial startup of all units must be performed by factory-trained personnel to ensure a proper startup and to maintain the product warranty.
- Installers and operating personnel must observe all applicable safety regulations.
- In addition to these requirements, installation must conform with local building codes as well as, where applicable, the current Installation Code for Gas Burning Appliances and Equipment, CSA B149.1, and applicable Provincial regulations. Authorities having jurisdiction should be consulted before installation.

CAUTION:

All initial installation procedures must be satisfied before attempting to start the unit.

⚠ WARNING!

DO NOT dry-fire the unit. Starting the unit without a full water level can seriously damage the unit, may result in personnel injury or property damage, and will void all warranties.

DO NOT store or use gasoline or other flammable vapors or liquids near this or any appliance.

IF YOU SMELL GAS: Do not try to light appliance. Do not touch any electric switch; do not use any phone in your building. Immediately call your gas supplier from a location away from your building and the smell of gas. Follow the gas supplier's instructions. If you cannot reach your gas supplier, call the fire department.

IN AN EMERGENCY: Shut the main gas supply valve to the appliance from a location safely away from the emergency.

Installers and operating personnel MUST observe all safety regulations at all times. The following warnings and cautions are general and must be given the same attention as specific precautions included in these instructions. In addition to all the requirements included in this manual, the installation of units MUST conform with local building codes, or, in the absence of local codes, ANSI Z223.1 (National Fuel Gas Code Publication No. NFPA-54) for gas-fired heaters and ANSI/NFPASB for LP gas-fired heaters. Where applicable, the equipment shall be installed in accordance with the current Installation Code for Gas Burning Appliances and Equipment, CSA B149.1, and applicable Provincial regulations for the class; which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.

WARNING:

This Manual is an integral part of the product and must be maintained in legible condition. It must be given to the user by the installer and kept in a safe place for future reference.

The water heater can only be used for applications where the chlorine concentrations **do not exceed 4 mg/L**, the EPA limit for chlorine concentrations in drinking water.

Do Not use this heater for a pool heating application.

⚠ WARNING!

Do not use matches, candles, flames, or other sources of ignition to check for gas leaks.

Fluids under pressure may cause injury to personnel or damage to equipment when released. Be sure to shut off all incoming and outgoing water shutoff valves and carefully decrease all trapped pressures to zero before performing maintenance.

The electrical service connection cover must be installed at all times except maintenance and servicing.

A disconnect switch must be installed at the electrical service connection per local codes.

CAUTION!

Many soaps used for gas pipe leak testing are corrosive to metals. The piping must be rinsed thoroughly with clean water after leak checks have been completed.

DO NOT use this heater if any part has been under water. Call a qualified service technician to inspect and replace any part that has been under water.

2.2 Emergency Shutdown

If overheating occurs or the gas supply fails to shut off, close the manual gas shutoff valve (Figure 1-1) located external to the unit.

IMPORTANT!

The Installer must identify and indicate the location of the emergency shutdown manual gas valve to operating personnel.

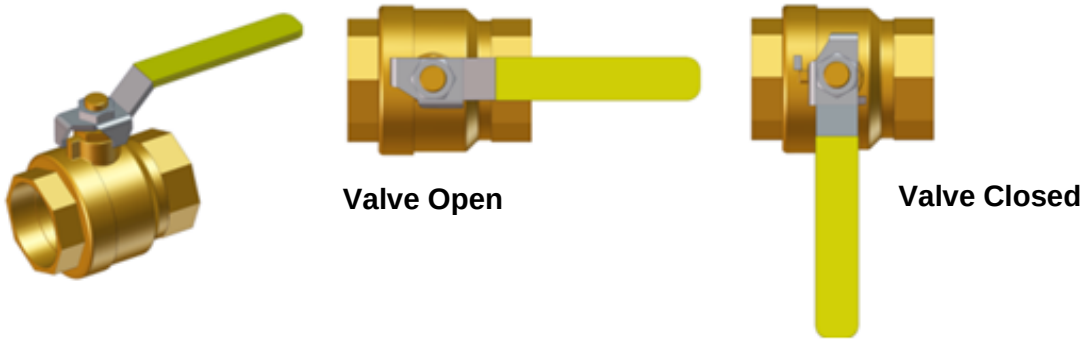


Figure 2-1 - Manual Gas Shutoff Valve

2.3 Prolonged Shutdown

After prolonged shutdown, it is recommended that the initial startup procedures in Chapter 4 and the safety device test procedures in Chapter 5 of this manual be performed to verify all system-operating parameters. If there is an emergency, turn off the electrical power supply to the unit and close the manual gas valve located upstream of the unit.

2.4 For Massachusetts Installations

Installations in the Commonwealth of Massachusetts must conform with **248 CMR Section 5.**

SECTION 3: INSTALLATION

Installation consists of the following tasks, in summary:

1. Unpack the unit from its shipping container (Section 3.2).
2. Position, secure, and level the unit at the site. Ensure the base is level (Section 3.4).
3. Verify condensate discharge piping is installed per local codes (Section 3.7)
4. Connect and install gas supply (Section 3.80) and venting (Section 3.10)
5. Connect the domestic hot water (DHW) supply piping and mixed (i.e. tempered) supply from the unit.
6. Connect DHW return and cold-water supply (CWS) piping.
7. Flow water through the unit to remove any entrapped air.
8. Connect external AC power to the rear of the Element enclosure.
9. Commission the water heater (Section 8).
10. Connect Element to the internet via network connection.
11. Set up the EdgeSC Controller (Section SECTION 5:).
12. Configure Element per system and site needs.

3.1 Receiving and Inspecting the Unit

Inspect the unit completely upon receipt from the freight carrier before signing the bill of lading. Inspect the appliance and all accompanying parts for signs of impact or mishandling. Verify the total number of pieces shown on packing slips with those actually received. Contact the freight carrier immediately if any damage or shortage is detected.

Check the data decal on the appliance. Be sure the electrical, water and gas supply is adequate for the installation.

NOTE: Each unit has a Tip-N-Tell indicator on the outside of the shipping container, which indicates if the unit has been turned on its side during shipment. If the Tip-N-Tell indicator is tripped, do not sign for the shipment. Note the information on the carrier's paperwork and request a freight claim and inspection by a claims adjuster before proceeding. Notify delivering carrier immediately of any damage to the packaging. Lync is not responsible for lost or damaged freight.

3.2 Unpacking the Unit

Carefully remove all side and top shipping supports and bracing. If possible, do not remove the wooden base/skid assembly until the product has been moved to its final location for installation and operation.

After unpacking, make a close inspection of the unit to ensure that there is no evidence of damage not indicated by the Tip-N-Tell indicator. The freight carrier should be notified immediately if any damage is detected.

⚠ WARNING!

Use industry-standard safe rigging methods, such as spreader bars, when moving this product. Failure to follow industry standard rigging methods can result in property damage, serious injury or death.

Each unit is shipped as a single crated unit. Shipping weight is approximately 3,000 lbs (1,360 kg).

The unit must be moved with the proper equipment (forklift, pallet jack, etc.) to avoid possible injury to personnel or damage to the shipping container or unit. Unpack the unit from its shipping container, taking care not to damage the unit when cutting away the packaging material.

1. Each unit includes an installation kit. Verify that each of the following has been received:

Item #	Qty	Part Number	Description
1	1	34120	Base Fascia Plate
2	1	96020	Exhaust Adapter
3	2	96018	Exhaust Vent
4	1	24757	Flexible Rubber Adapter
5	1	89025-2	Condensate Neutralizer
6	4	89061	Panel Plug 1-1/2" Id
7	6	89064	Snap-In Round Plug
8	1	89076	Media for Aquasolve

Table 3-1 - Element Installation Kit BOM (part # 58204)

2. If optional accessories were ordered, they may be packed within the unit's shipping container, installed on the unit, or shipped in a separate container. Any accessories shipped separately should be identified and stored in a safe place until ready for installation or use.

3.3 Moving the Element

Inspect the path and all thresholds that unit will move through to ensure appropriate clearance. It is recommended to use the installed pallet to move the Element to the installation site, if possible. The pallet is fastened to the unit with (6) hex-head lag bolts, as shown in Figure 3-1.

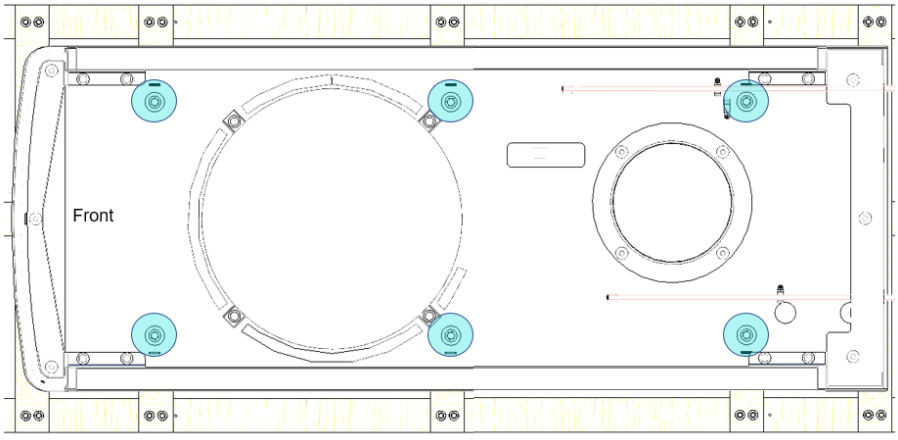


Figure 3-1 – Locations of Lag Bolts to Remove Unit from Wood Pallet.

Moving the Unit with a Crane: Remove the rear, top cover panel to expose the rear eyebolts. Open the front door to fasten the front rigging hooks. Spreader bars are recommended when lifting with a crane, to prevent damage to the unit.

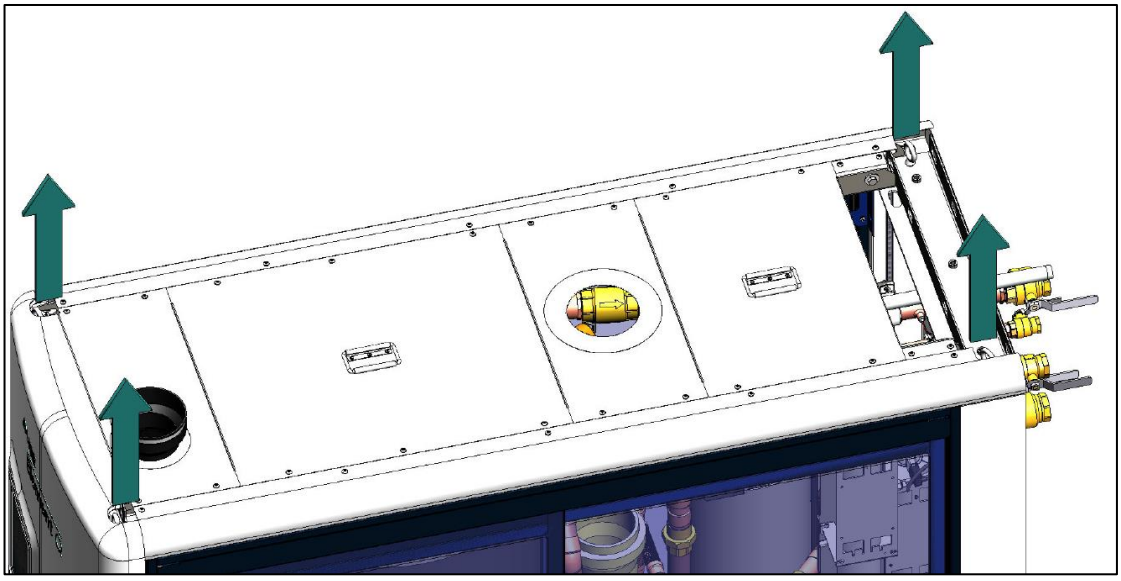


Figure 3-2 – Lifting Points

Moving the Unit with Pallet Forks: Ensure that the middle of Element is supported when using forks from the front, and that the middle of the water heater is supported when using forks from the rear. When complete, install the front fascia plate.

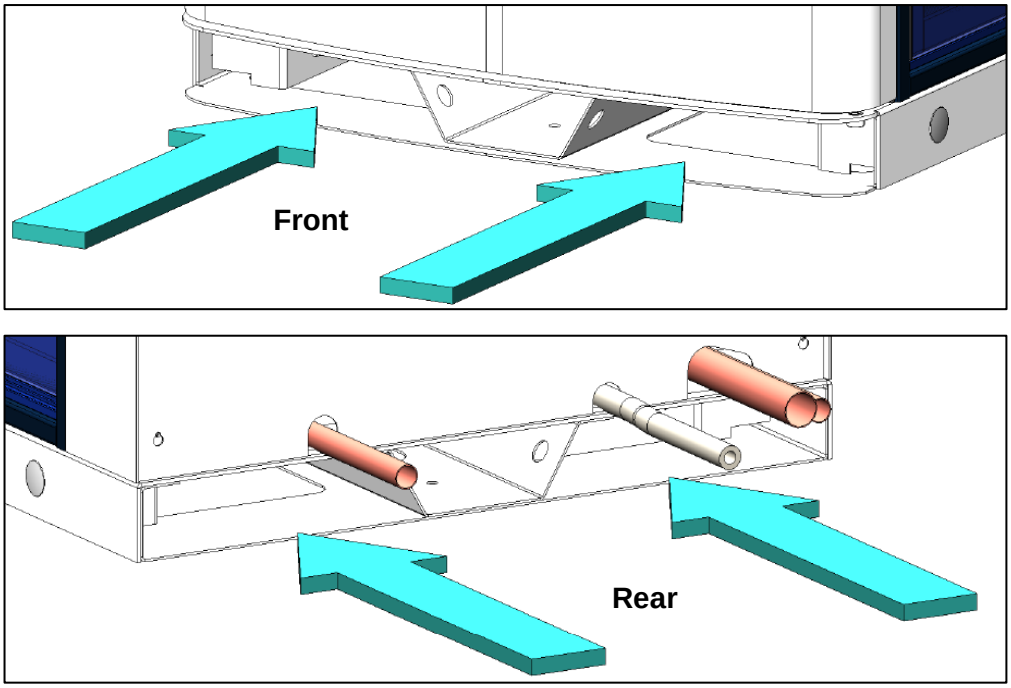


Figure 3-3 – Pallet Fork Insertion Points

Moving the Unit with Crossbars: Insert crossbars through the entire width of the unit. Hole diameter is 1.5in (3.8cm). The width of Element is 35.5in (90.2cm).

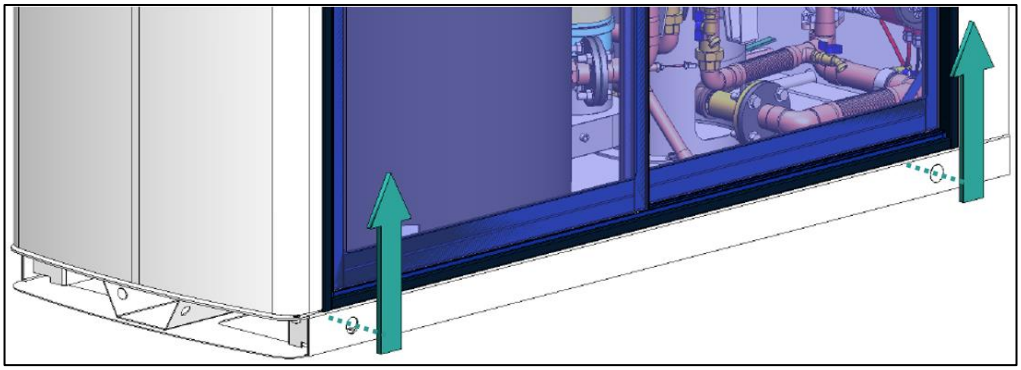


Figure 3-4 – Crossbar Insertion Points

3.4 Site Preparation

- The Element unit must be installed indoors where it will not be exposed to freezing temperatures. The water heater may be installed directly on a combustible floor.
- Install the unit on a level surface near a floor drain. Position the unit so if the tank or water connections should leak, water damage will not occur to the adjacent area or to lower floors of the building. The manufacturer's warranty does not cover water damage.
- Protect all electrical components and connections from water (dripping, spraying, rain, etc.) during operation and service.
- Position the unit where the vent and air intake piping, when installed, will remain within the maximum equivalent lengths allowed. See **Section 3.10: Venting.**
- Allow for minimum service clearances as described in Section 3.5.1.
- No concrete pad is required for installation of the Element.

3.5 Installation Site Requirements

- Access to AC Input Power: 120 VAC, Single-Phase, 60 Hz @ 30 Amps
- Access to a natural gas line or LP gas (propane) line.
  - Natural gas units require a minimum flowing pressure of 3.5 inches of water column (0.87 kPa) with the unit operating at maximum BTU output. Maximum static pressure is 14.0 inches of water column (3.49 kPa).
  - LP gas units require minimum flowing pressure of 8.0 inches of water column (2.0 kPa) with the unit operating at maximum BTU output. Maximum static pressure is 13.0 inches of water column (3.24 kPa).
- A cold-water connection protected by a backflow prevention assembly per local codes.
- Access to the internet via RJ45 connection. Ensure any firewalls, IP filters, and MAC filters are appropriately configured.
- Floor drain, for condensate and water discharge. Maximum water discharge is from a fully open 1" CTS pipe at system return pressure. Discharge to floor drain musy pass through an air gap.

⚠ WARNING:
Always follow local codes and regulations to reduce risk of electrical shock.

⚠ WARNING:

Condensate discharge from the Element can be corrosive and damage the drain, waste, vent (DWV) piping system. It is recommended to install a condensate neutralizer such as the Lync CN-2 between the Element condensate drain tube and discharge to drain.

Risk of flooding if floor drain is not sized or located properly. Risk of excessive splashing from a drain grate can create a slip and fall hazard.

3.5.1 Service Clearances

All Element models are packaged in enclosures that have identical exterior dimensions. The unit must be installed with sufficient clearance for service access. The recommended clearance dimensions are listed below. However, if local building codes require additional clearances, these codes take precedence.

Sides: 30 in. (76 cm) **Front:** 34 in. (86 cm) **Rear:** 18 in. (45 cm) **Top:** 18 in. (45 cm)

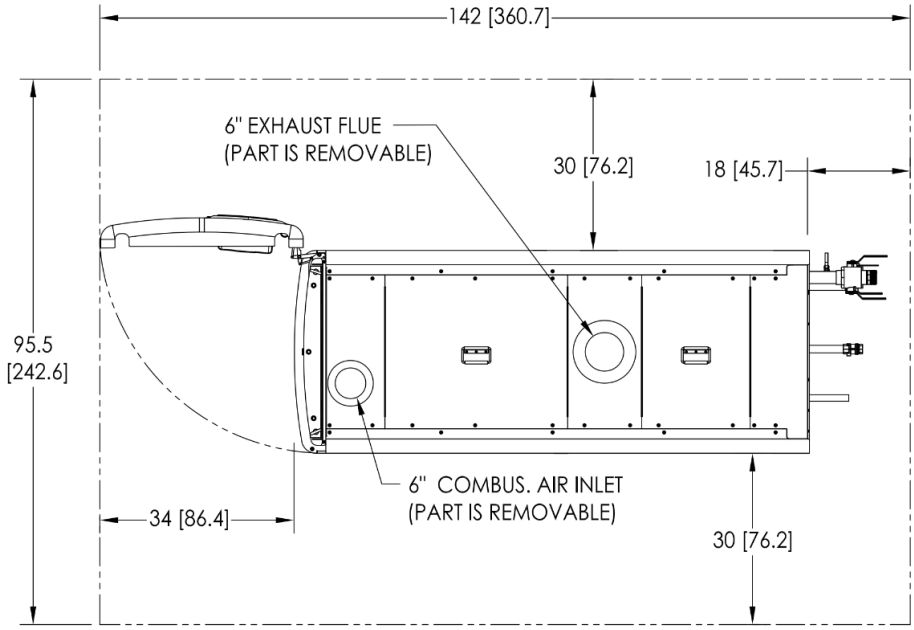


Figure 3-5 – Plan View Service Clearances

Additional clearance beyond the minimum required from combustible material should be considered to facilitate access for inspection and service of the burner, gas controls and plumbing connections. Also allow sufficient space for installing and servicing building water, gas, vent, combustion air, electrical, pump and other auxiliary/optional equipment and connections.

Additional clearance may be required to comply with local, state or national codes and regulations. It is the responsibility of the installer to comply with these requirements. Examples of codes or regulations that may apply are the National Electric Code, State/Regional/National drain water and flue emissions regulations, the National Fuel Gas Code, Building Construction and Safety Codes, the Americans with Disabilities Act (ADA) and, in states where a water heater above a certain input or storage capacity is considered a boiler, applicable boiler code requirements, boiler installation requirements in “Safety Code for Controls and Safety Devices for Automatically Fired Boilers” (CSD-1) and other regulatory requirements.

3.5.2 Electrical Service

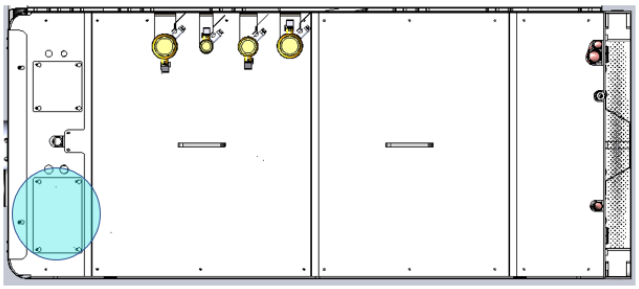


Figure 3-6 – Location of Power and Interlocks

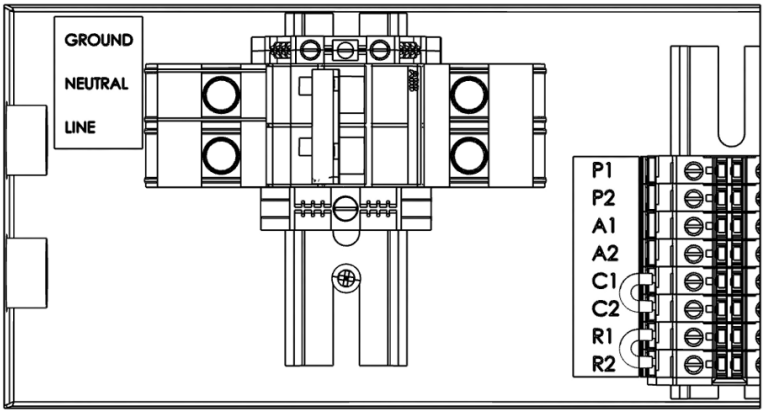


Figure 3-7 – Power and Interlocks

The Element requires a 120VAC single phase electrical connection going into the rear power and interlock panel. The “neutral” connection from the building power supply should be connected to the upper 30A circuit breaker, and the “hot/line” connection should be connected to the lower 30A circuit breaker. Perform electrical connections according to all applicable electrical codes. Ensure a suitable “Earth” connection is securely installed to the designated green terminal block above/next to the 30A circuit breakers.

NOTE: The circuit breakers on the back are not substitutes for a building’s circuit overload protection! Ensure properly rated conductors and matching circuit breakers supply the power and interlock panel.

3.6 General Piping Guidelines

3.6.1 Inlet and Outlet Connections

⚠ WARNING:
Hot outlet and cold-water piping materials connected to this product must be suitable for temperatures up to 212ºF at normal operating water pressures.

1. Use only non-ferrous water piping and fittings. Do not use galvanized pipe or fittings. Use of ferrous or galvanized pipe or fittings can cause rust to form.
2. Install shut-off valves and unions on the inlet and outlet water piping before servicing. Use caution when threading pipe connections to prevent cross threading or over-tightening. Always use a back-up wrench on tank nipples when tightening unions, valves, etc.
3. Insulate hot water and return circulation lines. Insulate cold water supply lines if subject to freezing during shutdown periods.

WARNING:
Do not use the plumbing connected to the Element as a ground for any purpose.

4. Pipe the drain valve to a suitable drain capable of receiving temperatures up to 212ºF.
5. For maximum efficiency, cold water into the Element should not exceed 100ºF. It is recommended that the building return or dishwasher recirculation piping be connected to the return water connection, not the cold inlet water supply. The Element utilizes cold inlet water to extract heat energy and allow the use of PVC venting. Higher cold inlet water temperatures will reduce heater efficiency and increase the vent temperature. If the vent temperature approaches the maximum allowed, a vent temperature limit switch will cycle the heater off to protect the PVC vent.

⚠ WARNING:
Risk of severe scalding is present if downstream valves and fittings are not set to reduce point-of-use water temperatures to meet local code requirements.

6. While dependent on incoming water conditions, an initial 20µm sediment filter on both the cold and recirc inlets is recommended to minimize a buildup of large sediment in the filters.

3.6.2 Building Return Piping

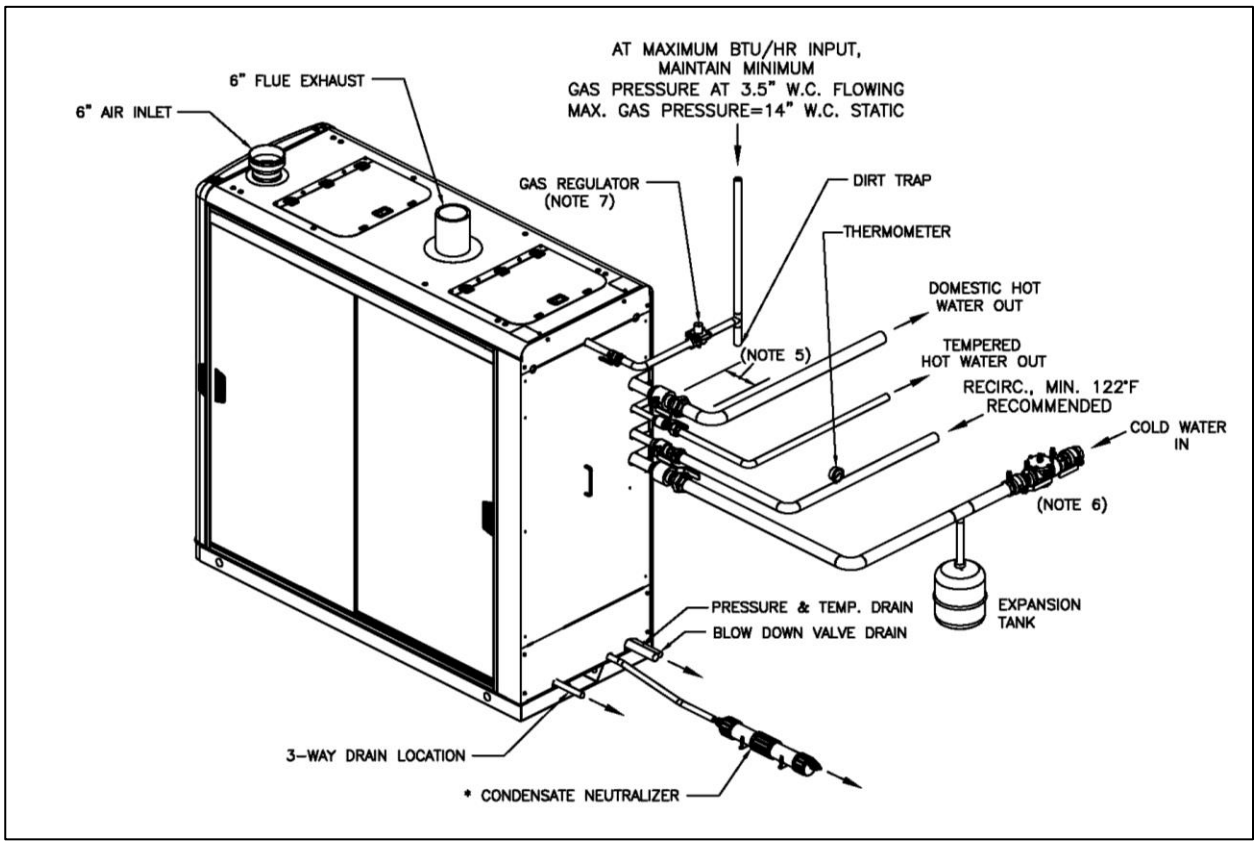


Figure 3-8 – Element Installation Example

3.6.3 Flow Requirements

The pressure drop across Element from cold inlet to hot and mixed outlets is negligible due to the internal booster pump. Minimum flow capacity is a C_V of 5.8 during a building power outage.

3.7 Condensate Drain, Trap & Disposal

The Element is designed to operate with normal cold inlet water temperatures of $\geq$ 100°F and to produce a significant amount of condensate. The condensate drain is under slightly positive flue pressure, so the provided ¾" PVC condensate trap must always be used. This trap is sized and designed to fill with the proper amount of condensate and create a liquid barrier to prevent flue gases escaping through the condensate drain into the installed space.

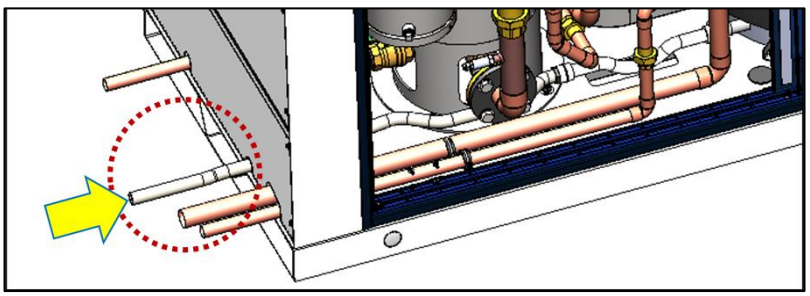


Figure 3-9 – Condensate Tube Location

⚠ WARNING!

The condensate trap must be installed and maintained as described and must be included as part of the condensate piping system. This trap is required to keep potentially combustible products from entering condensate piping. Failure to properly install this trap can cause injury, exposure to hazardous materials or death.

3.7.1 Connect Condensate Trap

1. The condensate drain is located at the bottom-rear of the Lync Q water heater, near the flue outlet. Confirm that the condensate trap is assembled and rotated with the bend pointing to the floor to the PVC fitting on the outlet. Do not rotate the offset toward the ceiling. Do not use tools to tighten the PVC union. Hand-tighten the PVC union to seat the internal gasket.
2. Do not combine the Element condensate drain with condensate drains of other appliances into a single drain line. Route each drain line into a drain suitable for condensate and make certain the end of each line is not submerged or otherwise blocked.
3. All condensate plumbing must be protected from freezing. Do not locate the condensate piping such that an ice dam of frozen condensate can block condensate from leaving the outlet.
4. Connect the Condensate Neutralization System (CNS) drain line to the barbed hose connection, sized for 1" heavy wall vinyl tubing rated for 170ºF or higher, located at the end of the condensate trap. All piping from the trap to the drain or the CNS must remain below the highest point (top of the condensate outlet pipe) on the condensate trap.

Figure 3-10: AERCO Condensate Neutralizer tank

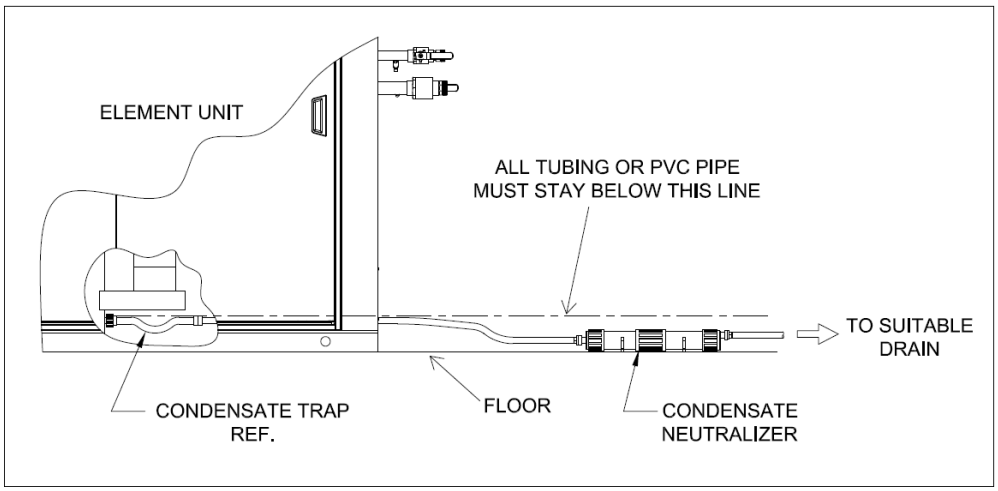


Figure 3-11 – Condensate Neutralizer Installation

3.7.2 Condensate Neutralization System (CNS)

The Element is shipped with a field-installed CNS.

Condensate is acidic (3 to 5 pH). In some locations, local codes require it to be neutralized prior to entering a suitable drainage system. If required, this acidity can be neutralized by routing it through a CNS. The Element includes a CNS sized for the specific system and shipped separately. For additional information on the CNS, contact your local Lync representative.

The CNS neutralizes condensate while it slowly flows through a container filled with renewable neutralizing media. The CNS reduces or avoids the need for separate chemical treatment or dilution using substantial quantities of tap water.

CNS Installation Requirements:

a) Install CNS in a visible location between the condensate outlet and a suitable drain.

b) CNS must be positioned so condensate flows downhill from the outlet to the inlet on one end of the CNS, and then downhill from the other end to the drain. If downhill flow is not maintained trap will not operate properly and condensate may back up into water heater.

c) Install CNS where the threaded end cap can be removed to recharge the Neutralizer.

d) Follow instructions included with CNS to connect tubing. Use only PVC tubing.

e) The CNS must be mounted horizontally and level.

f) Do not drain the condensate trap unless the Element is turned off for maintenance, or to recharge the condensate neutralizer with replacement media. LYNC Q water heater condenses significantly in normal operation.

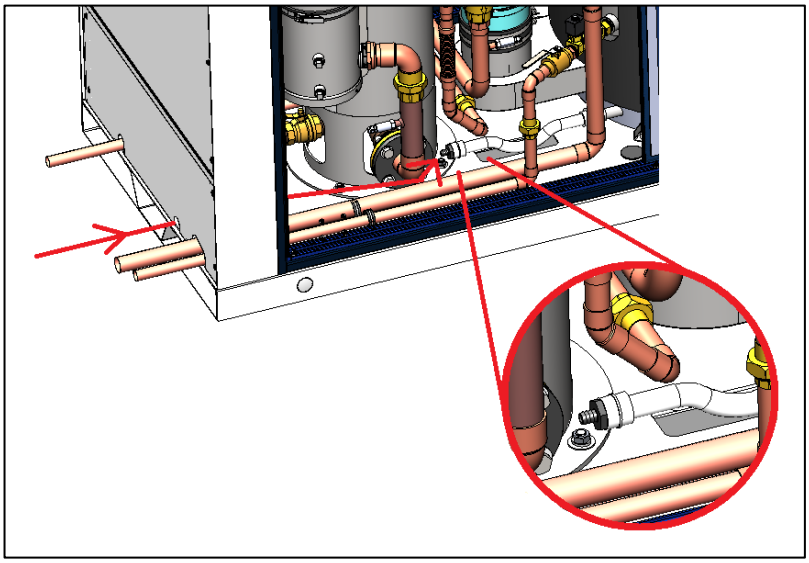


Figure 3-12 - Condensate Drain Assembly

⚠ WARNING!

If Element is installed in area subject to freezing temperatures, custom condensate piping with heat trace or other freeze protection may be required.

Proper installation and use of a condensate trap is required. A damaged, improperly installed, or missing condensate trap can cause hazardous combustion products to enter the room and cause property damage, hazardous conditions, personal injury or death.

3.8 Gas Supply and Piping

Verify the type of gas specified on rating plate is supplied to the unit. This unit is designed for operation up to 2000 feet altitude. Appliance Btu/h input derates 4% per 1000 feet elevation above sea level. Consult Factory for installations above 2000 feet elevation.

3.8.1 Gas Control Trains

All Element models include the following gas control train components: manual shutoff valve, two safety shutoff valves, zero governor type regulator, manual test valve and manifold pressure taps. These components may be separate or combined in a common housing.

⚠ WARNING!

Do not adjust or remove any screws or bolts on gas train control components which are secured with a red or blue sealing compound. In addition to voiding warranties and certification listings, such adjustment or disassembly can cause improper operation which could result in property damage, personal injury or death.

3.8.2 Inlet Pressure

Measure at the inlet pressure tap by the main gas cock. The inlet pressure must remain within the minimum and maximum values while the unit is at rest and at maximum firing rate.

Inlet Pressure	Nat. Gas	Propane
Maximum Static Pressure (in-H_2O)	14.0	13.0
Minimum Flow Pressure (in-H_2O)	3.5	8.0

Table 3-2 – Fuel inlet pressure limits

3.8.3 Manifold Pressure

Measure at the pressure tap on the downstream side of the manual valve closest to the burner. The rated manifold pressure appears on the product data label near the front of the appliance.

3.8.4 Gas Piping Size

CAUTION: Do not use the gas pipe connection size to determine the gas supply piping.

Designing and sizing a gas supply piping system requires consideration of many factors and must be done by a gas supply piping expert. Always follow NFPA 54 National Fuel Gas Code for gas pipe sizing and gas pipe system design. The following charts provide examples of some of the information used by the gas supply piping expert to determine proper pipe sizes.
Use the values in the following table to add the equivalent straight pipe for each elbow or tee to obtain the total distance from the meter:

Diameter Fitting (inches)	¾”	1”	1 ¼”	1 ½”	2”	3”	4”	5”
Equivalent Length of Straight Pipe (feet)	2’	2’	3’	4’	5’	10’	14’	20’

Table 3-3 - Fittings converted to equivalent straight pipe.
See NFPA 54 National Fuel Gas Code for actual pipe size selection and for sizing Propane gas piping.

Use the following table to determine the possible pipe size based on distance from gas meter for a Single Unit Installation using Schedule 40 Metallic Gas Pipe.*

	Distance from meter in equivalent feet of schedule 40 metallic gas pipe.				
	0 – 10ft	11 – 25ft	26 – 50ft	51 – 100ft	101 – 200ft
Element Q 60	1 ½"	1 ½"	2"	2"	2 ½"
Element Q 80	1 ½"	1 ½"	2"	2"	2 ½"
Element Q 100	1 ½"	1 ½"	2"	2"	2 ½"

Table 3-4 - Single Unit Installation – Possible Schedule 40 Metallic Gas Pipe Size. See NFPA 54 National Fuel Gas Code for actual pipe size selection and for sizing Propane gas piping

*Based on inlet pressure less than 2 psi, specific gravity of 0.60 and a pressure drop of 0.5 in. W.C.

Maximum Capacity of Pipe in Thousands of BTU/HR, per hour for gas pressures of 14 Inches Water Column (0.5 PSIG) or less and a pressure drop of 0.05 Inch Water Column (Based on NAT GAS, 1025BTU's per Cubic Foot of Gas and 0.60 Specific Gravity).*														
Nominal Iron Pipe Size	Length of Pipe in Straight Feet													
	10	20	30	40	50	60	70	80	90	100	125	150	175	200
1 ¼	1400	974	789	677	595	543	502	472	441	410	369	333	308	287
1 ½	2150	1500	1210	1020	923	830	769	707	666	636	564	513	472	441
2	4100	2820	2260	1950	1720	1560	1440	1330	1250	1180	1100	974	871	820
2 ½	6460	4460	3610	3100	2720	2460	2310	2100	2000	1900	1700	1540	1400	1300
3	11200	7900	6400	5400	4970	4410	4000	3800	3540	3300	3000	2720	2500	2340
4	23500	16100	13100	11100	10000	9000	8300	7690	7380	6870	6150	5640	5130	4720

Table 3-5 - Multiple Unit Installations Schedule 40 Metallic Gas Pipe Size Chart. See NFPA 54 National Fuel Gas Code for actual pipe size selection and for sizing Propane gas piping.

3.8.5 Appliance Isolation during Gas Supply Piping Pressure Test

1. The appliance and its provided manual shutoff valve must be disconnected from the gas supply during any pressure testing in excess of ½ PSI (3.5 kPa).
2. The appliance must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or less than ½ PSI (3.5 kPa).
3. The appliance and its gas connection must be leak-tested before placing it in operation.

3.8.6 Gas Connection

1. Safe operation of the unit requires adequate gas supply with the required static and dynamic (flow) pressures. Actual piping selection depends on many variables that must be carefully considered by the gas piping system designer.
2. Do not use gas connection size to determine gas supply piping.

3. Do not select gas pipe sizes based only on the supplied tables. These tables are for use by the gas piping system designer as a reference in checking pipe size selections.
4. Gas pipe size may be larger than heater connection.
5. Installation of a union is suggested for ease of service.
6. Install a manual main gas shutoff valve on the gas supply piping connected to the appliance to isolate the burner and gas train from the main supply gas in compliance with NFPA 54 National Fuel Gas Code and most local Codes.
7. The gas system installer must clearly identify the emergency shut-off device.
8. A sediment trap (drip leg) MUST be provided in the inlet of the gas connection to the unit.
9. The combination gas valve's internal vent limiter is for indoor use only. Do not vent outdoors.
10. The Lync Q water heater combination gas valves and/or regulators incorporate either an internal vent limiter or an externally mounted vent limiting orifice and 1/4" aluminum tube in a "T" attached to the regulator vent port. Venting to outdoors is not required. Never remove, cut, splice or alter the flexible tubing attached directly to the regulator vent port or to a vent limiting fitting attached externally to the regulator, as this will cause unreliable ignition and can cause improper operation. Although not required, a connection to the open end of the 1/4" aluminum tube can be made and routed to the outdoors. No other connection point is allowed. Do not remove the aluminum tubing and connect directly to the "T", as damage to the required vent limiter and improper gas control could result.

3.9 Combustion Air Requirements

Element Q requires the following combustion air volumes when operated at full capacity:

Input MBTU/hr	Required Air (SCFM)
600	130
800	173
1000	216

Table 3-6 - Remote Air Duct Specifications

These flows MUST be accommodated. Air supply is a direct requirement of NFPA 54, CSA B149.1-10 (Canada) and local codes that should be consulted for correct design implementation.

1. Intakes must be located to prevent infiltration of chlorine, chlorides, halogens or any other chemicals detrimental to combustion equipment. Common sources of these chemicals are swimming pools, degreasing compounds, water softener salts, plastic processing and refrigerants. This will ensure the longevity of the equipment and maintain warranty validation.

⚠ WARNING:
If the equipment room is in the vicinity of any of these chemicals it must be supplied with clean combustion air, and have a slightly positive room air pressure (provided by a powered combustion air supply louver or duct) to prevent infiltration of chemicals into the room.

2. When calculating free area using louvers and grilles, the required size of the openings for combustion, ventilation, and dilution air shall be based on the total free area of each opening.
   - If the free area through a designed louver or grille is known, it shall be used in calculating the size of opening required to provide the free area specified.
   - If the louver and grille design free areas are not known, assume the following: For wooden

louvers a 25 percent free area; for metal louvers and grilles a 75 percent free area opening.

3. When terminating the combustion air through the roof:
   - The combustion air inlet must be 3 ft. (0.9 m) below any vent outlet within 10 ft. (3 m).
   - The combustion air inlet must also face away from the vent outlet (see Figure 10).

4. All inlet air ducts must be sealed air tight.

5. The mechanical room must not be under negative guage pressure, even when the combustion air is directly ducted. If necessary, ventilate the room to prevent this condition from occurring.

⚠ WARNING!

- Non-motorized louvers and grilles must be fixed in an open position.
- Minimum screens mesh size shall not be smaller than 1 inch (25.4 mm) mesh.

6. Air intakes must not be located in the proximity of garages, industrial and medical hood venting, loading docks or refrigerant vent lines. The Element must not be installed in the proximity of activities that generate dust that may enter the combustion air intake. The Element must be located so that moisture and precipitation cannot enter combustion air inlets.

7. If a Water Heater is used to temporarily provide heat during building construction or renovation, accumulated drywall dust, sawdust and similar particles can:
   - Accumulate in the unit's combustion air intake and block combustion air flow
   - Accumulate over the burner surface and restrict flow of air/fuel mixture

   In these situations, a disposable air intake filter must be temporarily installed above the combustion air inlet. Air filters may be required year-round in instances in which dust or debris can enter the combustion air tube. Contact your local Lync representative for more information.

8. Combustion air temperatures as low as 5°F (-15°C) can be used without affecting the integrity of the equipment; however, combustion settings may require adjustment to compensate for site conditions.

3.9.1 Combustion Air Code Requirements

Outdoor combustion air shall be provided through opening(s) to the outdoors in accordance with the methods described below. The minimum dimension of air openings shall not be less than 3 inches (80 mm). The required size of the openings for combustion air shall be based upon the net free area of each opening. When the free area through a louver, grille, or screen is known, it shall be used to calculate the opening size required to provide the free area specified. For additional details, consult NFPA 54, or in Canada, CSA B149.1-10, paragraphs 8.4.1 and 8.4.3.

Provisions for adequate combustion and ventilation air to the mechanical room must be in accordance with Section "Air for Combustion and Ventilation" in the latest edition of the NFPA 54 National Fuel Gas Code, ANSI Z223.1 and/or CSA B149.1, Natural Gas and Propane Installation Code or applicable provisions of the local building codes. Any method addressed in NFPA 54 National Fuel Gas Code section "Air for Combustion and Ventilation" is acceptable and several are outlined below.

The following table lists the minimum required air openings in square inches (square centimeters) freely communicating with the outdoors for mechanical room combustion and ventilation air for each unit. For multiple unit installations, sum the openings for the specific heater sizes.

Model	Two Openings from within Building, each w/ opening, in2 (m2)	Two Direct or Vertical Duct Openings, each w/ opening, in2 (m2)	Two Horizontal Ducts, each w/ opening, in2 (m2)	Single Permanent Opening, in2 (m2)
Element Q 60	600 in^2 (0.39)	150 in^2 (0.97)	300 in^2 (0.19)	200 in^2 (0.13)
Element Q 80	800 in^2 (0.52)	200 in^2 (0.13)	400 in^2 (0.26)	270 in^2 (0.17)
Element Q 100	1000 in^2 (0.65)	250 in^2 (0.16)	500 in^2 (0.32)	335 in^2 (0.22)

Table 3-7: Summary of Minimum Required Air Openings for Mechanical Room Combustion & Ventilation Air

3.9.2 Two-Permanent-Openings Method (USA Only)

Two permanent openings shall be provided: one commencing within 12 inches (305 mm) of the top of the enclosure and one commencing within 12 inches (305 mm) of the bottom. The openings shall communicate directly — or by ducts — with the outdoors, or spaces that freely communicate with the outdoors, as show on the following pages:

1. When communicating directly with the outdoors, or when communicating to the outdoors through vertical ducts, each opening shall have a minimum free area of 1 $inch^2$ per 4,000 BTU/hr (645 mm^2/1.17 kW) of total input rating of all appliances in the space (see Figures 4 and 5).

2. When communicating outdoors through horizontal ducts, each opening shall have a minimum free area of 1 $inch^2$ per 2,000 BTU/hr. (654 mm^2/0.59 kW) of total input rating of all appliances in the space .

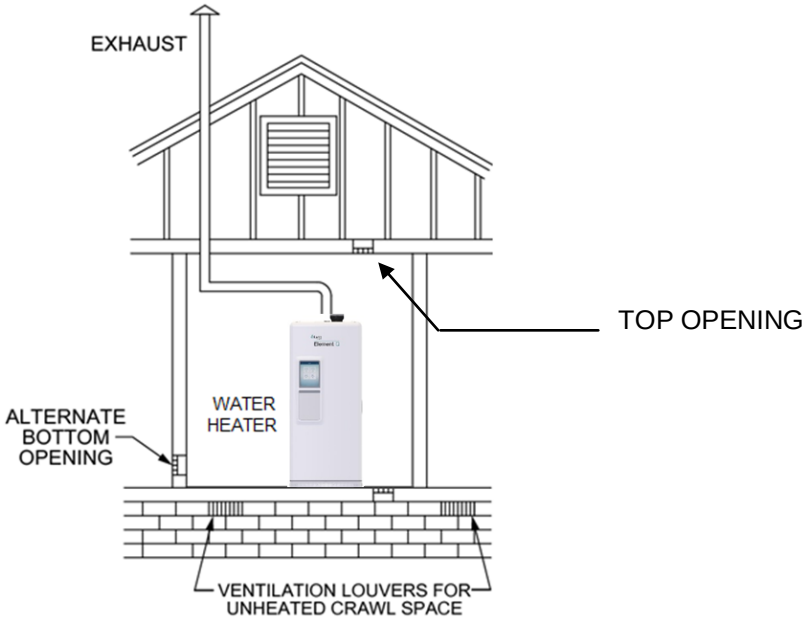


Figure 3-13 - All Combustion Air from Outdoors - Inlet Air from Ventilated Crawl Space and Outlet Air to Ventilated Attic

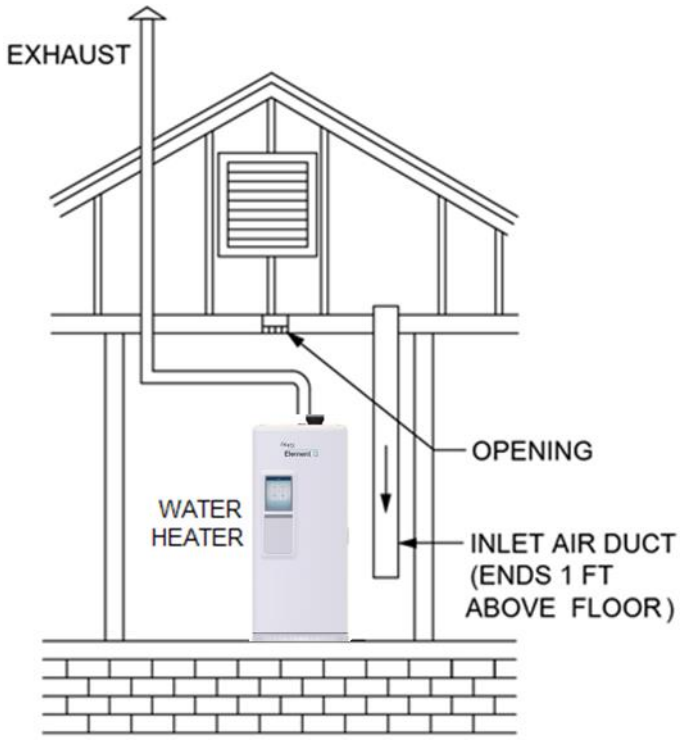


Figure 3-14: All Combustion Air from Outdoors – Through Ventilated Attic

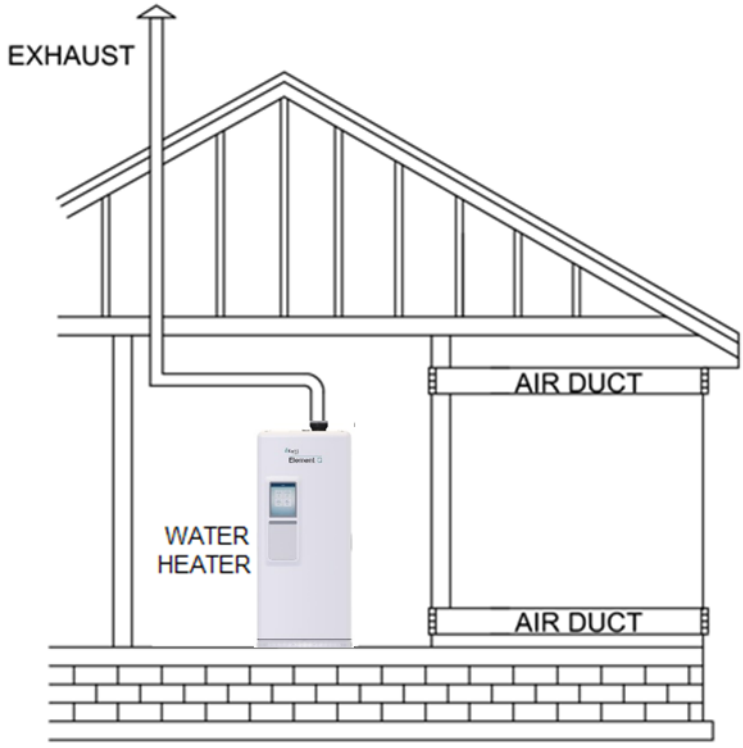


Figure 3-15 - All Combustion Air from Outdoors – Through Horizontal Ducts

3.9.3 One Permanent Opening Method

One permanent opening shall be provided, commencing within 12 inches (305 mm) of the top of the enclosure. The opening shall communicate with the outdoors directly or through a vertical or horizontal duct to the outdoors or spaces that freely communicate with the outdoors (as shown in Figure 6) and shall have a minimum free area as follows:

- 1 inch^2 per 3,000 BTU/hr (645 mm^2/0.88 kW) total input rating of all appliances in the space.

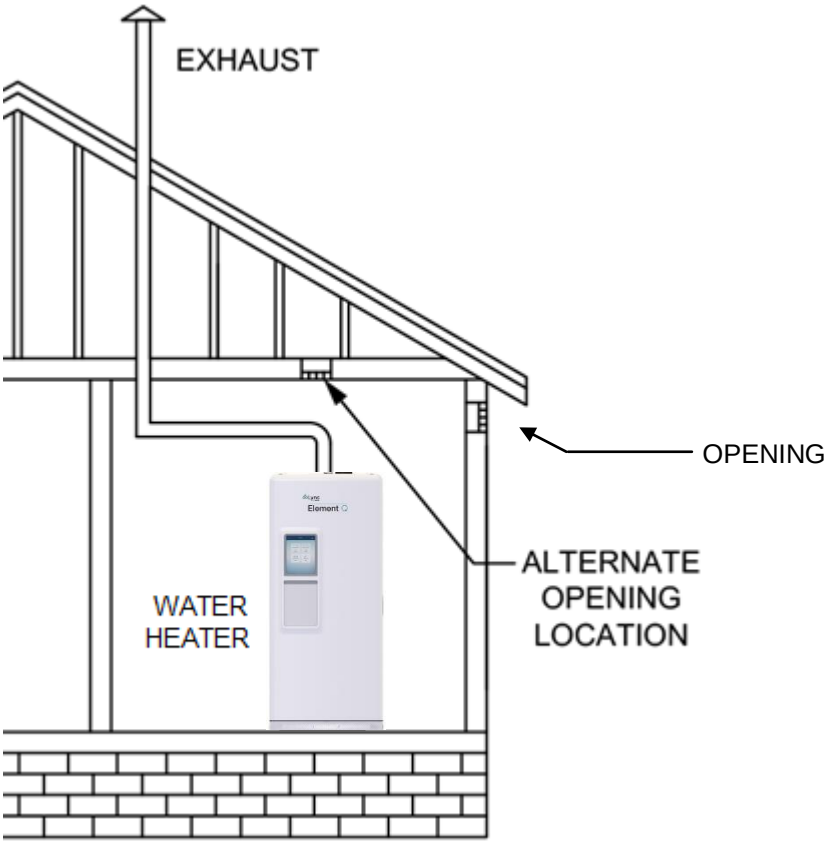


Figure 3-16 - All Combustion Air from Outdoors Through Single Combustion Air Opening

3.9.4 Equipment Located in Confined Spaces

Equipment located in confined spaces requires two openings, one commencing within 12" (30.5 cm) from the top of the enclosure/room and one commencing within 12" from bottom of the enclosure/room to assure adequate combustion air and proper ventilation. The total input of all gas utilization equipment installed in the room must be used to determine the required minimum air volume needed for combustion, ventilation and dilution of flue gasses. Also consider makeup air requirements from other equipment within the mechanical room or other rooms that are pressure connected with the mechanical room. Some examples of other makeup air requirements are from kitchen exhaust hoods, clothes dryers, powered exhaust fans, etc.

All Air from Outdoors: Each opening requires a minimum free area of 1 square inch per 4000 Btu/hr of the total input rating of all appliances in the enclosure, if directly communicating with the outdoors or communicating to the outdoors through vertical ducts.

Each opening requires a minimum free area of 1 square inch per 2000 Btu/hr of the total input rating of all appliances in the enclosure, if communicating with the outdoors through horizontal ducts.

All Air from Inside the Building: Follow the requirements of NFPA 54 National Fuel Gas Code, ANSI Z223.1 section “Indoor Combustion Air”.

Combination Of Air from The Indoors and From the Outdoors: Follow the requirements of NFPA National Fuel Gas Code, ANSI Z223.1 section “Combination Indoor and Outdoor Combustion Air”.

From Outdoors Through One Opening: Follow the requirements of NFPA National Fuel Gas Code, ANSI Z223.1 section “One Permanent Opening Method”.

NOTE: This unit may be installed with a remote air intake system which uses a make-up air duct to draw combustion air directly from outdoors.

⚠ WARNING!

Adequate clean combustion air must be provided to the appliance. The appliance must never operate under a negative pressure. Particular care must be taken when exhaust fans, compressors, air handling units, etc. may rob air from the appliance. The combustion air supply must be completely free of any chemicals or fumes, which may be corrosive to the appliance. Some common chemical fumes to avoid are fluorocarbons and other halogenated compounds, most commonly present as refrigerants or solvents, such as Freon, trichloroethylene, perchlorethylene, chlorine, etc. These chemicals, when in contact with the equipment or when burned, form acids which quickly attack the tubes, flue collector, stack and other appliance and auxiliary equipment. Failure to provide adequate clean combustion air or operating under negative pressure can cause premature, unwarranted product failure or unsafe operation producing carbon monoxide that could escape into the building. Exposure to carbon monoxide can lead to personal injury or death.

3.9.5 Maximum Allowed Remote Combustion Air Inlet Length (Equivalent Length)

A vertical or horizontal remote air inlet system can be connected without modification. The maximum length of field supplied single wall pipe, such as galvanized ventilation pipe, is shown in the chart below. Use metal tape or RTV sealant to seal each pipe joint.

Duct Size	4" Duct	6" Duct	8" Duct
Max Equivalent Length Element Q 60	N/A	250 feet / 10	300 feet / 10
Max Equivalent Length Element Q 80	N/A	250 feet / 10	300 feet / 10
Max Equivalent Length Element Q 100	N/A	150 feet / 5	250 feet / 10

Table 3-8 - Maximum Air Inlet Duct Equivalent Length / Max Elbows

To determine the maximum straight length of duct allowed, use the Duct Fitting Equivalent Length chart below to find the total equivalent length for all duct fittings in your combustion air system. Then subtract this number of feet from the total equivalent length allowed in Maximum Air Inlet Duct Equivalent Length chart above. The sum of this calculation is the maximum length of straight duct allowed. If a longer length is required, repeat the calculation using a larger duct size. No additional deduction is required for the addition of the duct system terminal.

Duct Pipe:	6" Duct	8" Duct
90º Elbow	20 feet	10 feet

90º Long Radius Elbow	12 feet	6 feet
45º Elbow	12 feet	6 feet

Table 3-9 - Duct Fitting Equivalent Length

3.9.6 Remote Combustion Air Cap

A suitable remote air termination must be used to prevent water, debris, animals or obstructing material from entering the remote air supply.

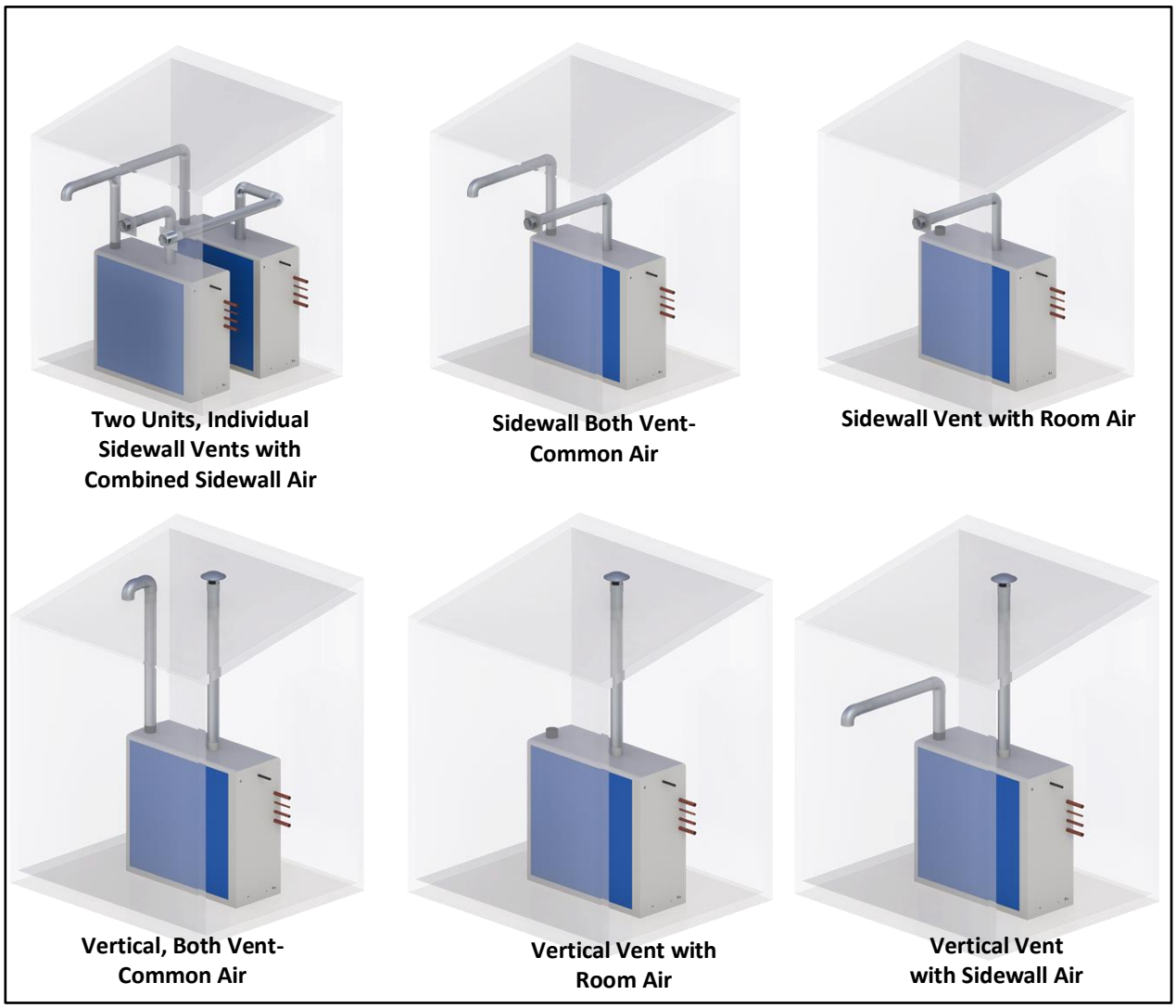


Figure 3-17: Options for piping the inlet and flue vents.

NOTE: Straight discharge flue outlets must be separated from each other a minimum of 18".

3.9.7 Combining Remote Air Ducting

Each water heater MUST have separate intake piping, unless the air inlet piping, exhaust duct and other system considerations have been fully evaluated and a combined duct system has

been designed per local codes. Follow the duct manufacturer's installation and maintenance instructions before operation of a combined remote air ducting system.

Combined air intake piping must incorporate a variable speed blower capable of providing and regulating positive pressure air supplied to all water heaters in the system. **The pressure of the supplied air must not be less than 0.0" W.C. and must not exceed 0.25" W.C.**

The common combustion air supply system must be interlocked, so the water heaters will not begin operation until the common combustion air supply is proved to be within the range of 0.0 to 0.25" W.C. See Section on **Remote Connections** for how to connect the proving circuit.

⚠ WARNING!

Do not combine remote air ducting of multiple appliances into a single remote air duct unless the combined remote air ducting system has been evaluated and designed by a specified duct design firm and the combined remote air duct system is installed, operated, and maintained following instructions from that firm. Combining remote air ducting without following these requirements can result in failure of the water heater and venting system and/or exposure to carbon monoxide and can result in property damage, personal injury, or death.

3.10 Venting

All Element Q models are condensing with positive pressure (Category IV appliance) generated by the burner system blower to push combustion products out of the vent.

All Element units are supplied with (2) 6" polypropylene (PP) exhaust vents 39.5" in length along with an exhaust adapter. Note that these are shipped separately and must be field installed. This exhaust run may be extended using field-sourced venting. See the appropriate materials below.

Because the vent system is under positive pressure and must be capable of containing condensate, it must be constructed of one of the following:

- Schedule 40 solid PVC pipe
- Schedule 40 solid CPVC pipe

PP or single or double wall stainless steel venting listed by ETL, UL, ULC or CSA for Category IV positive pressure condensing gas appliance venting If it is not desired to use the supplied PP, field-sourced venting material may be used from the water heater connection to termination.

⚠ WARNING!

Use of cellular core PVC (ASTM F891), cellular core CPVC, or Radel® (polyphenylsulfone) in nonmetallic venting systems is prohibited.

Use of ABS, PVC or CPVC pipe with cell/foam type construction or of venting materials other than specified can result in failure of the venting system and/or exposure to carbon monoxide or other toxic fumes, which can result in property damage, personal injury or death.

Use of polypropylene and stainless steel that complies with UL 1738 and is listed for Category IV positive pressure gas appliance venting is allowed. CPVC listed with UL 1738 may be permitted depending on the application. Contact your Lync rep for more information.

NOTE: For listed vent materials other than PVC or CPVC, follow the vent manufacturer's instructions for installation, sealing, supporting and terminating their vent system.

The supplied 6" polypropylene exhaust adapter will connect to the water heater's exhaust manifold, located toward the center of the Element. The Lync Element Q Water Heater can be vented either vertically, through a ceiling or roof, or horizontally through a wall.

⚠ WARNING!

Covering non-metallic vent pipe and fittings with thermal insulation is prohibited.

Do not use a barometric damper with the Lync Water Heater positive pressure vent. Barometric dampers are designed for use with certain Category I negative pressure vent systems. The Element uses Category IV positive pressure vent systems and will not operate safely with a barometric damper.

The Element Q includes Category IV positive pressure gas appliance venting and can be routed to the outdoors in any direction, provided an upward slope is maintained. The vent must be installed and supported at least every four feet. The vent system should always be pitched up 1/4 inch per foot of run towards the vent termination to enable condensate to drain back to the unit for disposal. Low spots in the vent must be avoided. The venting system shall also have a means for collection and disposal of condensate. All penetrations through walls and roofs must be weather and gas tight, such that rain and products of combustion cannot pass from outdoors back indoors.

A protective debris screen with a minimum ¼″ to a maximum 3/4″ mesh is recommended for the air inlet and flue outlet, or a drier vent type air register with adequate inlet area or elbow with appropriate mesh.

NOTE: For common venting applications, please contact Lync for your specific installation.

⚠ WARNING:

Read and follow the information, instructions and warnings in “VENTING” section.

Do not insulate the plastic vent pipe.

Design the vent pipe route so that normal expansion and contraction due to changing temperatures does not bind or put stress on cemented pipe fittings.

3.10.1 Installing the Provided PP Flue

1. The provided 6” pipe coupling MUST be the first fitting attached to the vent connection. The first 39” PP piece fits into this coupling and is secured by the rubber clamp.
2. Join the two 39” PP stacks together by pushing them together. The O-Ring inside of the stack will secure the two together.
3. Follow the vent manufacturer’s instructions on connecting the PP flue to the field supplied flue. An adapter between dissimilar materials may be required.
4. For listed stainless steel or polypropylene vent systems, follow the vent system manufacturer’s instructions regarding vent support.

3.10.2 Testing for Leaks

Once the vent system is installed, check that all joints are air- and water- tight. After the vent is assembled, close the end of the vent with a taped plastic bag or other temporary seal. With the gas supply turned off, energize the Lync Water Heater combustion blower to apply air pressure to the vent system. Spray each joint and vent connection with commercially available leak detection liquid to confirm no air is escaping from any point. Repair any leaks and retest. After testing is complete, de-energize the combustion blower, wipe the leak detection liquid clean and REMOVE the temporary vent closure.

The vent pipe must be sealed at the point where it passes through a wall or roof, to prevent rain, insects or flue products from entering the living space or interior of the building.

See Section 3.10.5 or the venting manufacturer’s manual for termination information.

⚠ WARNING:

DO NOT vent this water heater into an existing or traditional gas vent or chimney, do not combine vent with any other appliance and do not use a barometric damper in the vent. Such venting could result in

failure of the venting system and/or exposure to carbon monoxide which can result in property damage, injury or death.

3.10.3 Maximum Vent Length (Equivalent Length)

The maximum length of field-supplied Category IV venting for Element Q is shown below:

Duct Size	6” Duct	8” Duct
Max Equivalent Length Model Q 60 and Q 80	250 ft / 10 elbows	300 ft / 10 elbows
Max Equivalent Length Model Q 100	150 ft / 5 elbows	250 ft / 10 elbows

Table 3-10: Maximum Allowable Equivalent Vent Length / Max Number of Elbows

For individually vented units, the exhaust system must be designed so that the vent pressure anywhere in the system is in the range from 0.0in W.C. to +0.5in W.C. See section 0 for common venting information.

Pipe fittings reduce the maximum allowable vent length. Use the vent manufacturer’s equivalent length deduction for all elbows, terminations, etc. If the information is not readily available from the vent manufacturer, use Table 3-11 below to find the total equivalent length for all vent fittings in your combustion air system. Subtract this number of feet from the total equivalent length allowed in Table 3-10 above. The sum of this calculation is the maximum length of straight vent allowed. If a longer length is required, repeat the calculation using a larger vent size. When using this chart, no additional deduction is required for the addition of the vent system terminal. The minimum distance required between two elbows is 5 feet (1.52m).

Vent Pipe Size	6 in		8 in
Vent Material	Polypropylene	Stainless Steel or other UL 1738 listed material	All
90° Elbow	22 feet	20 feet	10 feet
90° Long Radius Elbow	14 feet	12 feet	6 feet
45° Elbow	14 feet	12 feet	6 feet

Table 3-11 - Vent Fitting Equivalent Length

3.10.4 Common Venting: Combining Category IV Vents

Combined Category IV gas vent systems must incorporate an Exhausto, Tjernlund or US Draft variable speed, modulating, mechanical draft inducer capable of maintaining the appropriate negative draft at the end of the common flue, to assure that all water heaters in the combined vent system operate with a negative draft. Do not exceed negative 0.25" W.C. See Figure 3-18 below.

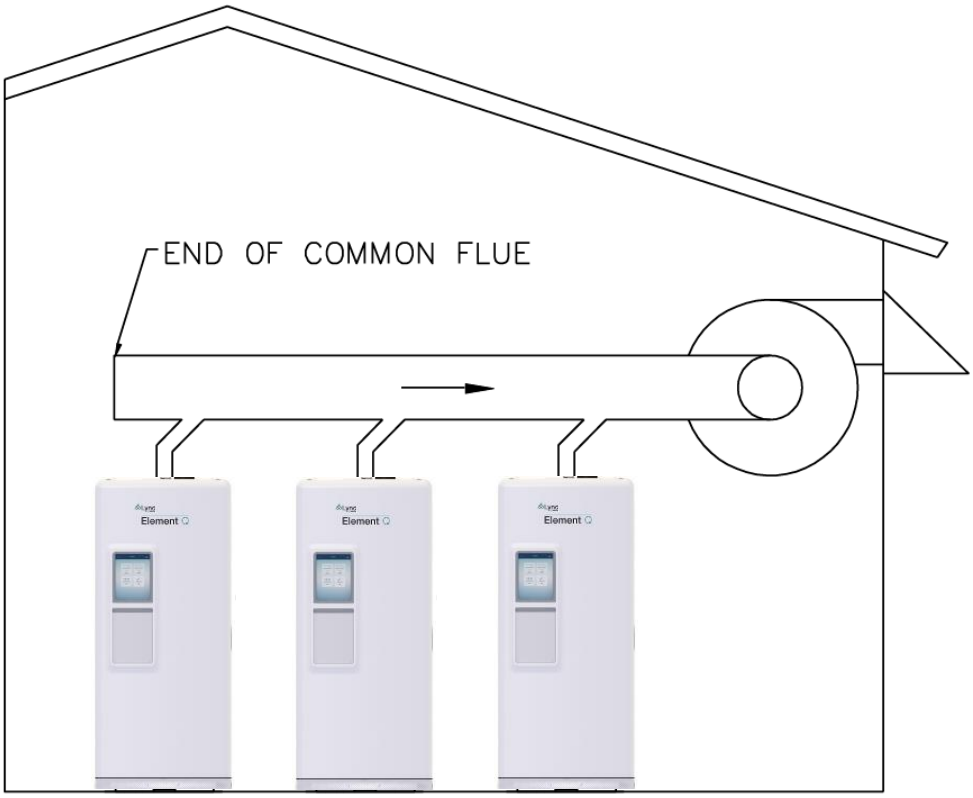


Figure 3-18 – Common venting with draft inducer

Combining the exhaust vents of multiple Element Q units into a common, unpowered or “gravity” vent is never recommended (i.e. venting as Category II). Element Q units are too efficient and their flue products too cold to generate the natural buoyancy required for such combined vent systems to function reliably and safely.

The common mechanical draft vent system must be interlocked, so the water heaters will not begin operation until the common mechanical draft vent system negative pressure is proved to be within the range of 0.04" and 0.25" W.C. See Section on Remote Connections for instructions for how to connect the proving circuit. When combining the exhausts of multiple Element Q units, do not use individual remote ducts to provide outdoor combustion air. When exhaust vents are combined, it is necessary to either:

- Draw all combustion air for each heater from the mechanical room in which they are installed, or
- Use a common air supply system that is designed and installed by a qualified professional firm and that meets all the requirements in these instructions.

⚠ WARNING!

Do not connect multiple water heaters vents into a single unpowered or fixed speed powered vent. This could cause unsafe operation and the potential for poisonous carbon monoxide to enter occupied areas. Such improper installation can cause property damage, exposure to hazardous materials, personal injury or death.

3.10.5 Vent Termination: Vertical or Horizontal

1. Vent terminals must have a minimum clearance of 4ft (1.22 m) horizontally from, and NOT be located directly above or below electric meters, gas meters, regulators or relief equipment.
2. Vent caps must terminate at least 3ft (0.91 m) above any forced air inlet within 10ft (3 m).
3. The vent shall terminate at least 4ft (1.22 m) below, 4ft (1.22 m) horizontally from or 1ft (0.3 m) above any door, window or building air inlet to the building.
4. The vent system shall terminate at least 1ft (0.3 m) above grade and at least 1ft (0.3m) above possible snow accumulation levels. When located adjacent to public walkways or gathering areas, the vent system shall terminate at least 7ft (2.13 m) above grade.
5. To avoid a blocked flue condition, keep the vent cap clear of snow, ice, leaves, debris, etc.
6. The vent must not exit over a public walkway, near soffit vents or crawl space vents or other areas where condensate or vapor could create a nuisance or hazard or cause property or could be detrimental to the operation of regulators, relief valves or other equipment.
7. A horizontal vent must extend one foot beyond the wall.
8. A horizontal vent terminal must not be installed closer than 3 feet (0.91m) from an inside corner of an L-shaped structure.
9. A vertical vent must exhaust outside the building at least 3 feet (0.91m) above the point of the exit and at least 2 feet (0.61 m) above the highest point of the roof within a 10-foot (3.05 m) radius of the termination.
10. A vertical termination less than 10 feet (3.05. m) from a parapet wall must be a minimum of 2 feet (0.61 m) higher than the parapet wall.
11. A vertical termination greater than 10 feet (3.05 m) from a parapet wall must terminate a minimum of 3 feet (0.91 m) above the ground.

3.10.6 Vertical or Horizontal Remote Air Duct Termination

- Air inlet must be located no less than 3 feet (0.91m) below the exhaust terminal if they are within 10 feet (3.05 m) of each other unless the flue outlet terminates with a straight discharge. If the flue outlet terminates with a straight discharge, the air inlet can be located no less than 18 inches (0.46m) below the exhaust terminal.
- If terminating through the roof, the air inlet must terminate at least 12 inches (0.3 m) above roof level and at least 12 inches (0.3 m) above snow levels.
- If terminating through a sidewall, the air inlet must terminate at least 12 inches (0.3 m) above grade and/or at least 12 inches (0.3 m) above possible snow levels.

Venting multiple units:

- For a common venting system, combining the air-intake system or drawing the air for each heater from the mechanical room is highly recommended.
- A draft control system is required for common venting. When an exhaust fan is implemented, it is necessary to combine the air intake, or to draw air for each heater from the mechanical room, in order to have a common reference point when using a regulated fan-assisted exhaust system. For example, when the air supply is coming from the room, the common reference for the draft control is in the room. When the air is supplied with a common air duct, the duct can become the common reference pressure for the heaters.

- For common venting systems the combustion air intake can be individually vented ONLY if a draft control system such as an isolation damper is installed on each water heater.
- A variable speed blower capable of providing & regulating positive pressure air to the heater is required for a common combustion air intake. For an individually vented system for this design, a draft control system on each heater is recommended.
- For special venting applications not mentioned, please contact your sales representative.

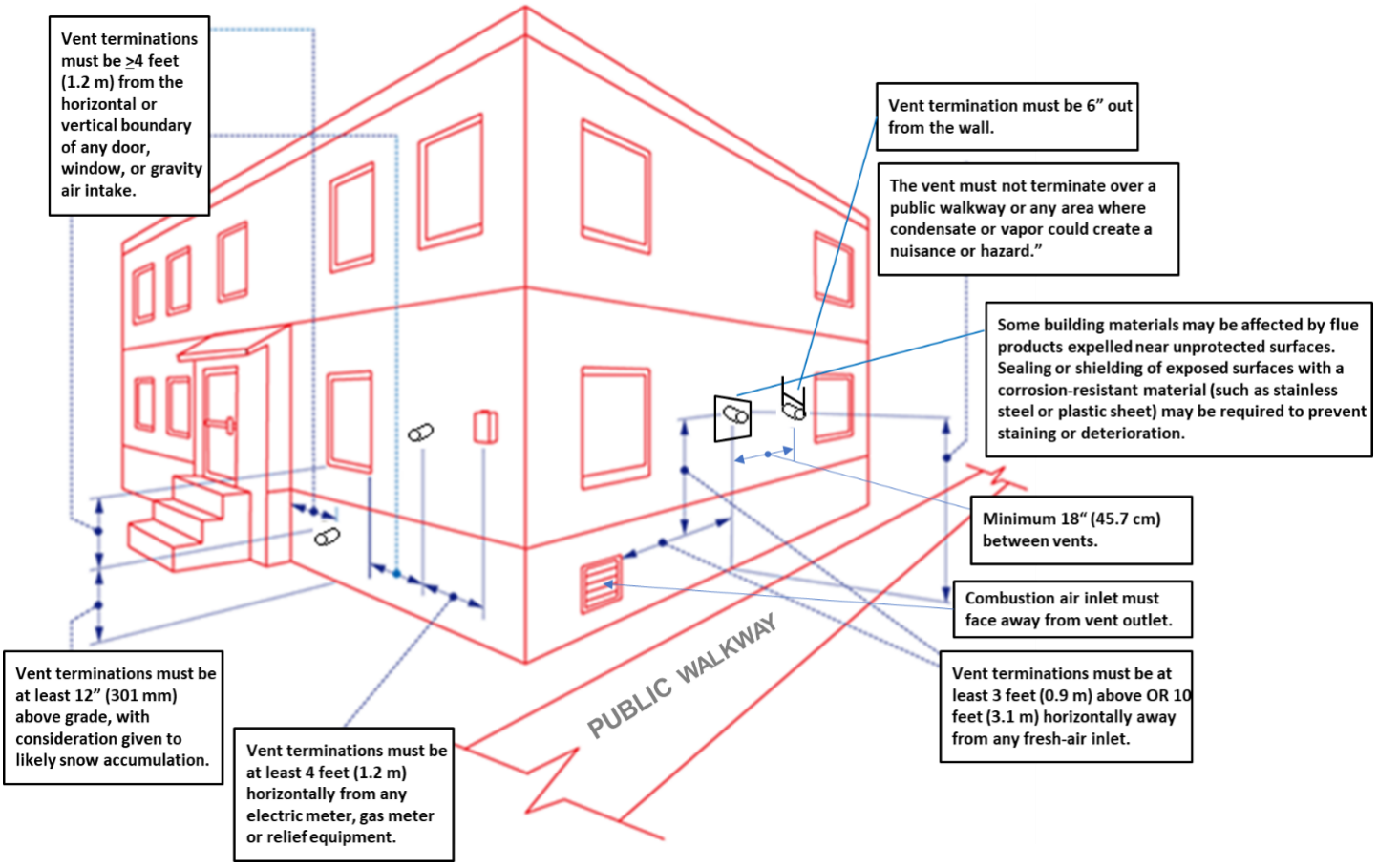


Figure 3-19 - Determining Location of Vent Outlet

NOTE: Vertical terminations shall extend at least 3 feet (0.9 m) above the highest point where it passes through a roof of a building and at least 2 feet (0.6 m) higher than any portion of the building within a horizontal distance of 10 feet (3.1 m). Terminations that extend more than 2 feet (0.6 m) above the roof must be laterally supported.

3.10.7 Installation Requirements for Vertical Venting

- Combustion air inlet must be 3 ft. (0.9 m) below any vent outlet that is within 10 ft. (3.1 m).
- Vertical terminations shall extend at least 3 ft. (0.9 m) above the highest point where it passes through a roof of a building and at least 2 ft. (0.6 m) higher than any portion of the building within a horizontal distance of 10 ft. (3.1 m). Terminations that extend more than 2 ft. above the roof must be laterally supported.
- Combustion air inlet must also face away from the vent outlet.
- Use vent pipe manufacturer's vent cap or exit cone (velocity cone), fire stop, support collar, roof flushing and storm collar.
- The use of an exit cone is recommended in lieu of a termination rain cap for normal installations and T- termination for high-wind areas.

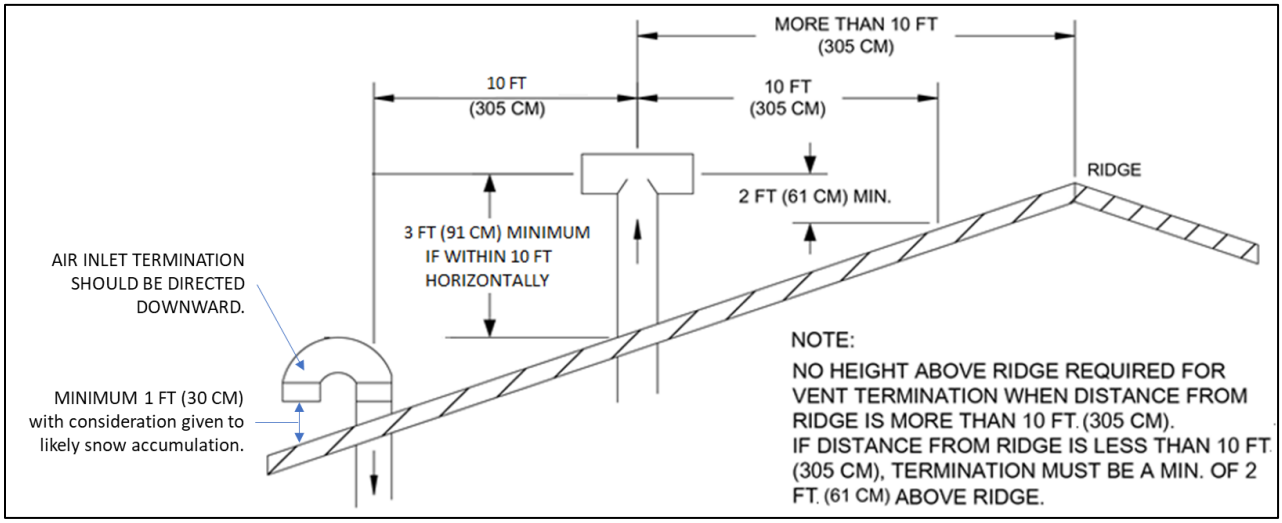


Figure 3-20 - Vertical Venting Outlet Configuration

3.10.8 Connecting to an Existing Vent System

Do not connect the Element to an existing vent system until confirming that it complies with all requirements for a new vent system. A venting system in full compliance with these instructions is required for safe and reliable operation. Do not connect the Element to a masonry chimney.

⚠ WARNING!

Before operating a unit connected to an existing vent system, confirm the vent system complies with all guidance and requirements for a new vent system specified in this manual. Failure to confirm the existing vent system complies can result in unsafe operation and the potential for poisonous carbon monoxide to enter occupied areas and can cause property damage, personal injury, exposure to hazardous materials or death.

Part II – Element Startup Procedure

Startup of Element essentially consists of two parts: the Lync Q water heater (SECTION 4:) and the controls system (SECTION 5:.)

In order to prevent potential damage if energizing the unit dry, breakers 3, 5, and 6 are set open (turned off) during shipment located in Figure 3-21 and listed in Table 3-12. Breaker positions start with #1 at the top. The Lync Q water heater does not have a separate breaker and is controlled by the main power breaker at the rear of the unit. Close (turn on) all breakers once the unit is filled with water.

It is recommended to open (turn off) the same breakers when draining the unit in order to prevent accidental use in a dry state.

Breaker Position	Current Rating	Connection
1	0.5A	Blowdown Valve
2	5A	Cabinet Lights
3	5A	Booster Pump
4	0.5A	DigiTemp Jr
5	2A	Cold UV System
6	2A	Recirc UV System
7	6A	Sanitation Pump
8	2A	I/O Board and Touchscreen
9	1.5A	Diverter Valve

Table 3-12 – Local Circuit Breaker Directory

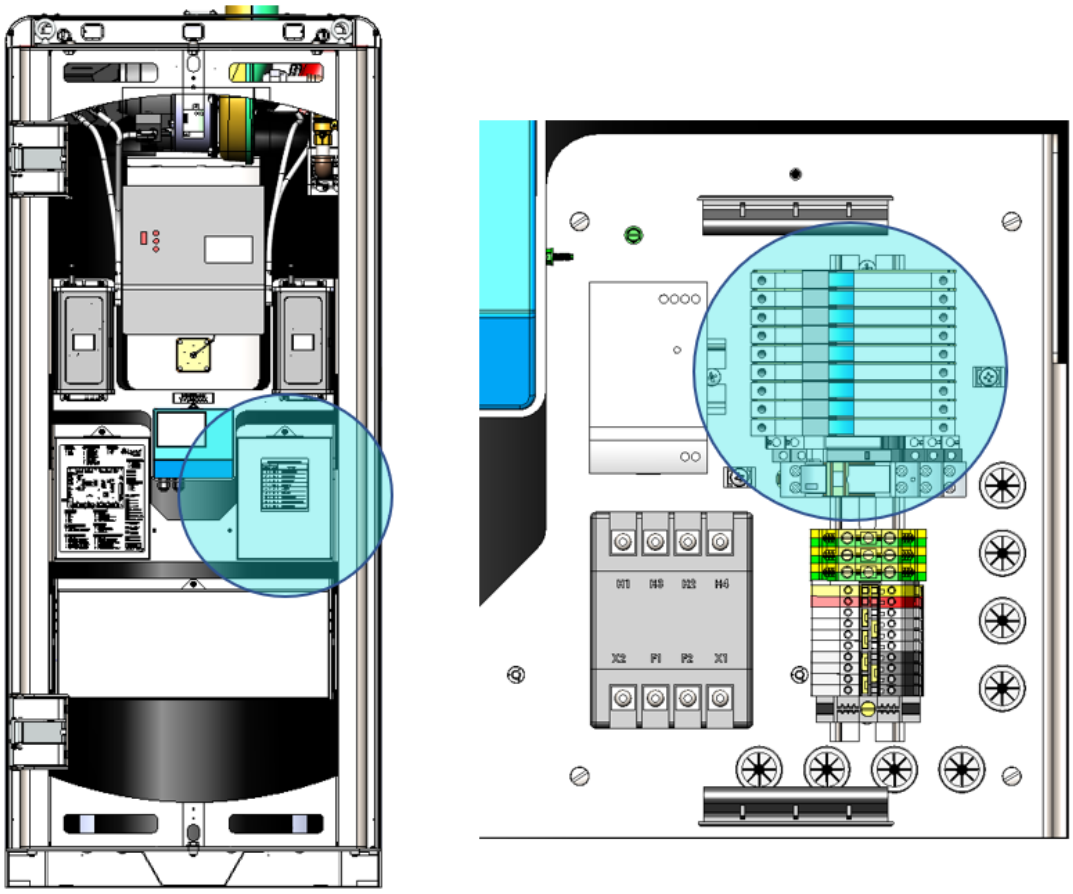


Figure 3-21 – Location of Local Circuit Breakers. Breaker #1 is at the top.

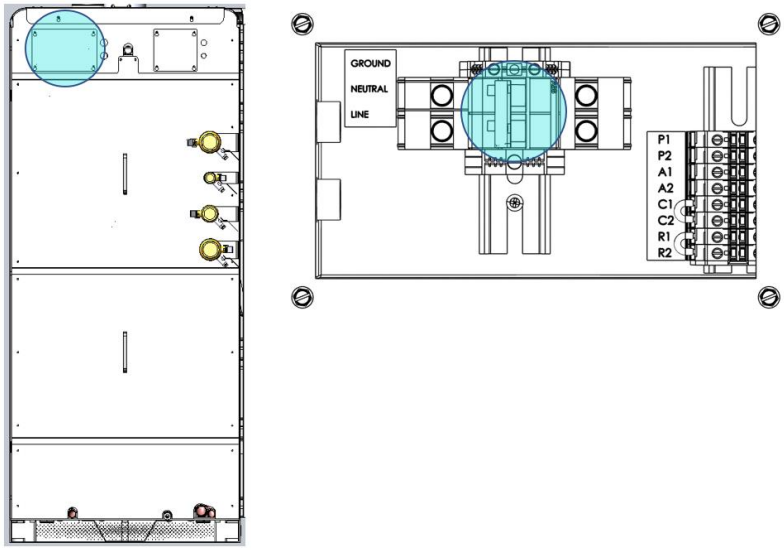


Figure 3-22 – Location of Primary Breaker for Element

SECTION 4: WATER HEATER AND AQUASOLVE STARTUP

4.1 Initial Startup Requirements

Installation must be complete before performing initial startup and placing the Element unit into service. Starting the Element without proper piping, combustion air, venting or electrical connections or control settings can be dangerous and may void the product warranty. Follow these instructions precisely to achieve proper operation and trouble-free service life.

⚠ WARNING!

Proper startup must be made by a qualified installer or service agency, who must read and follow the supplied instructions and unit markings. Failure to complete proper startup before use, tampering with controls or not following all instructions and markings may damage this equipment, void the warranty and may result in property damage, personal injury or death.

4.2 Required Tools and Instrumentation

- Stack Temperature Gauge
- Stack Draft Gauge
- Electronic Combustion Analyzer
- Two U-tube Manometers or pressure gauges
- AC/DC Multi-meter (with 20,000 OHM/Volt rating)
- Amp Meter
- Normal Hand Tools

4.3 Resources

- Product Installation & Maintenance Manuals
- Start-up Report with instructions
- Local, State, & Federal Codes
- Website: https://lyncbywatts.com/support
- Technical Support: 1-800-433-5654

4.4 On-Site Considerations

- Electrical Supply in accordance with the Nameplate Rating
- Adequate uncontaminated indoor or outdoor combustion air
- Adequate Fuel Supply
- Adequate Water Supply
- Exhaust Vent that complies with the installation instructions
- Condensate drainage that complies with the installation instructions

4.5 Pre-Startup Checklist

IMPORTANT: Ensure the unit is properly and completely installed before startup. Confirm adequate electrical service; check any external control wiring connections; ensure tank is filled with water; check all tank connections for leaks; ensure that condensate trap is properly installed and that the gas supply meets the product rating decal requirements.

If a unit is not installed properly, DO NOT attempt startup. Contact your installer immediately.

4.5.1 Check Electrical Service

The standard electrical service required is a grounded 120-volt, single phase, 60 Hertz power supply. See rating decal at rear of unit for specific requirements.

W A R N I N G !
Do not use the plumbing connected to the Element as a ground for any purpose.

Shut off electrical service to unit and turn power switch on water heater to **OFF**.

1. Remove panel screws on water heater to lower the hinged upper control enclosure panel.
    a) Locate the document packet containing the control circuit fuse and fuse cap. A wiring diagram is also attached to the back of the front panel.
    b) Remove fuse and cap from the packet and install them into fuse holder on front of panel.
    c) Check back of the digital control display board on the hinged panel to see if a 2-wire, RS-485 communication cable is connected. These wires must be removed to isolate the water heater from the Building Automation System during startup. Remember to reconnect cable to digital display board after startup is complete.
    d) Ensure that all components are intact and that no damage is visible.
    e) Ensure all wiring connections within the control cabinet are tight. A loose connection could cause sporadic shutdowns and malfunctions.
    f) Close the hinged upper control enclosure panel and secure the panel screws.

2. At the rear of the Element, remove the panel screws on the left service panel per Figure 4-1.
    a) Check if terminals **R1** and **R2** are jumped. If they are, nothing more needs to be done. If the terminals are not jumped but have wires connected to them, this indicates that a remote on/off relay is controlling the water heater from the Building Automation System. These wires must be removed and the terminals must be jumped prior to startup. Remember to remove jumper and reconnect wires after startup is complete.
    b) Re-check all components and ensure all wire connections are tight.
    c) Close the service panel cover and secure panel screws.

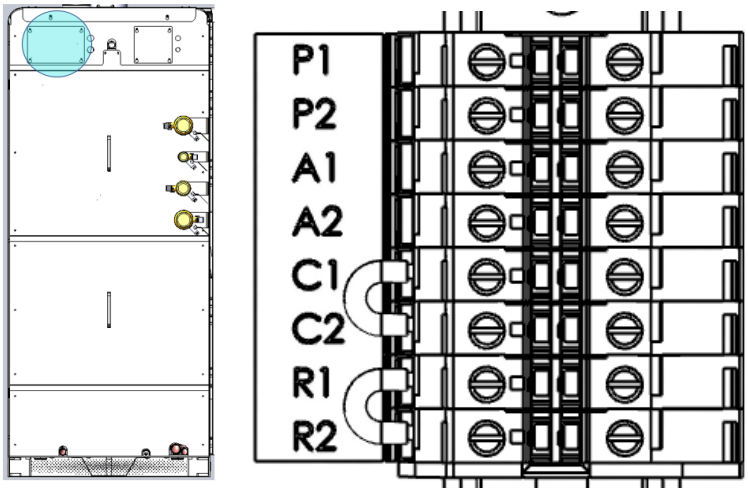


Figure 4-1 – Interlocks and Controls Terminal Block

4.5.2 Confirm Water Tanks are Completely Filled

IMPORTANT:
Using the T&P Relief valve alone to vent the tank will NOT allow the tank to completely fill!

1. Close the water heater drain valve.
2. Fully open shutoff valves on the cold-water inlet and hot water outlet piping to the unit.
3. Open the T&P valve to vent the tank. Close the valve when flow is observed.
4. Open a nearby hot water faucet(s) to allow trapped air to escape from the piping.
5. A steady flow observed from the hot water faucet(s) indicates the tank is full.
6. Close the hot water faucet(s).

4.5.3 Check Tank Flanges and Plumbing Connections for Leaks

Be sure all connections into the tank are tight, as leaks at tank fittings may damage insulation.

4.5.4 Check Condensate Trap

A condensate trap assembly ships installed in the Element to prevent flue gasses from escaping and creating a hazardous condition in the installed space. The water heater condensate drain is located at the bottom rear of the water heater near the flue outlet.

Ensure the condensate trap assembly is connected securely to the PVC fitting on the condensate drain pipe. Rotate trap so it contacts the floor. Connect 1/2" ID clear vinyl tubing rated for ≤170°F or an optional Condensate Neutralization System to barbed hose connection at end of condensate trap.

4.5.5 Confirm Gas Type

The Element requires either **Natural gas** or **Propane**. Confirm the gas type supplied matches the rating label requirement on the front of the unit.

If available gas type is not correct the Element unit will require a conversion. Contact your Lync representative for instructions for converting to/from **Natural Gas** or **Propane**.

4.5.6 Confirm Supply Gas Pressure

⚠ WARNING!

If you smell gas do not try to light the unit. Do not touch any electrical switch or use a phone inside the building. Immediately call your gas supplier and follow their instructions.

For **Natural Gas**, the maximum inlet static gas pressure must not exceed **14.0** inches water column and must not drop below **3.5** inches water column during operation.

For **Propane Gas**, the maximum inlet static gas pressure must not exceed **13.0** inches water column and must not drop below **8.0** inches water column during operation.

Complete the following to check the supply gas pressure:

1. Shut off the main gas supply to the Element.
2. Ensure that manual gas valves at the burner and at the inlet of the gas train are closed.
3. Attach 1/8" NPT pilot shutoff test valve and tube to test port on the manual shutoff gas valve at the inlet of the gas train. Attach a second test valve and tube to the valve downstream of gas train at the burner. Close both test valves.
4. Attach U-tube manometers or gas pressure gauges to both pilot shutoff test valves.
5. Open the main gas supply to the water heaters and check for gas leaks on all joints upstream of the manual shutoff gas valve at the inlet of the gas train.
6. Open test valve at the inlet of the gas train and measure the supply gas pressure.

IMPORTANT:

If the supply gas pressure is outside of the allowable range, notify the building maintenance personnel or installer to reduce the gas pressure to the water heaters.

7. Open manual shutoff valve at inlet of gas train. Check the train for leaks using a soap solution. If any bubbles are detected close manual gas valve, tighten the leaking connection, then open the manual gas shutoff valve again and check for leaks.
8. Open the 1/8" pilot shut-off test valve connected to the manual shutoff gas valve downstream of the gas train closest to the burner. Note gas pressure measured by the monometer. Check gas pressure again after about 15 minutes. A gas pressure increase of 0.5" W.C. or more indicates one of the gas solenoid valves is leaking. Isolate and replace the leaking gas valve. After any leaking valve is replaced, the reassembled gas train must be leak tested again before start-up is attempted.
   NOTE: Some flame controls read the flame signal in micro amps, some in volts DC.

4.6 Startup Procedure

1. Turn the water heater power switch to the OFF position.
2. Drill a small test hole in the flue vent approximately two feet from the vent connection and insert the combustion analyzer probe into the vent test hole.
3. Simulate a Safety Shutoff Ignition Fail Test of the EOS control system on each Element:
   a) With the manual gas valve at the burner closed, turn on the electrical service to the water heater, then turn the Element power switch to the ON position.
   b) The EOS Temperature control touch screen will energize. If the tank temperature is 5° or more below the factory setpoint of 120° the Call-For-Heat sequence will initiate.

c) With no gas pressure, the ignition control will attempt to ignite the burner three times before proceeding to a safety shutoff. Following the third failed attempt, the display screen immediately shows a **LOCKOUT** condition has occurred.

d) In a few seconds an **ERROR** code flashes in the Status field, and a **FLAME FAIL** alarm message is displayed followed by **"IGNITION TRIAL FAIL"** across the top of the screen.

e) **IMPORTANT:** Open one or more nearby hot water faucets before restarting the Element to allow heat to dissipate.

4. When the call for heat sequence begins, the burner blower is energized.

a) When the BLOWER operation is verified by the tachometer, the **Ignition Pre-Purge** sequence and **Hot Surface Igniter Heat up Period** begins. The **BLOWER** message is displayed during this pre-purge period.

b) Following a pre-purge and Hot Surface Igniter Heat Up countdown of about 36 seconds, a 4-second trial for Ignition period is initiated. During this sequence the screen displays **IGNITION** while the gas valves are being energized.

c) When ignition occurs, and flame is proven, the Status field shows the **BURNER** is firing and the flame **CURRENT** is displayed in micro amps for about 8 seconds.

d) As the burner fires, the modulating firing rate percentage displayed at the bottom of the screen will increase and then decrease as the Element reaches its setpoint temperature of 120 degrees. Disregard this display for inputs with On-Off burner control systems.

e) The **CONTROL TEMPERATURE** will continue to display throughout the burner run cycle and after shutdown until the Element returns to a satisfied and idle state.

4.6.1 Burner Combustion Adjustment – General

⚠ WARNING!

If carbon monoxide is in excess of 200 ppm at any point, do not operate unit. Contact your Lync representative for assistance. Carbon monoxide (CO2) is a colorless, odorless and poisonous gas that is extremely dangerous to humans and animals. CO2 levels above 200 ppm can cause property damage, personal injury, exposure to hazardous materials or death.

1. With the burner firing, measure the flow gas pressure at the beginning of the gas train.

a) If the inlet flow gas pressure for Natural Gas is equal to or greater than 3.5 inches water column, or if the inlet flow gas pressure for Propane Gas is equal to or greater than 8.0 inches water column, continue startup.

b) If the inlet flow gas pressure drops below these levels a supply gas volume or piping problem may exist and must be corrected before startup can continue.

2. With the burner firing, monitor the combustion analyzer readings. The CO2 level must be between 8.5 and 9.5% for Natural Gas and between 9.5 to 10.5% for Propane Gas.
   a) If the CO2 level is in this range, no adjustment is required or recommended.

   b) If the CO2 level is outside of these ranges, the combustion must be optimized.

4.6.2 Optimizing Combustion

Element uses a modulating burner control system with a larger gas regulator and separate safety solenoid gas valves. The CO2 level on these models must be adjusted at both Low Fire and High Fire in the Manual Override menu, through the EOS Touch Screen Digital Control.

To access the Manual Override Menu:

1. Press and hold the **HOME** button for 3 seconds.
2. Press the **NEXT ITEM** or **ITEM BACK** buttons to navigate to the **TOOLBOX** menu.
3. Press the **ENTER** button to display the **ACCESS** screen.
4. Press the **UP** or **DOWN** arrow buttons to select the **ADVANCED** setting.
5. Exit the menu by pressing the **HOME** button.
6. Press the **NEXT ITEM** or **ITEM BACK** buttons to navigate to the **OVERIDE** menu.
7. Press the **Enter** button to display the **MANUAL OVERRIDE** screen. Press the **UP** or **DOWN** arrow buttons to select the **HAND** setting.
8. Press the **NEXT ITEM** or **ITEM BACK** buttons to navigate to the **HEATER MODULATION (HTR MOD)** menu. This setting will override the operating control.
9. Press the **UP** or **DOWN** arrow buttons to select firing rate. **NOTE**: If the **HTR MOD** program is activated while the burner is firing, the burner will shut down and recycle.
10. Press the **UP** or **DOWN** arrow buttons to adjust the firing rate from **OFF** to the minimum rate of 10% for **Low Fire**. Then adjust the **Gas Regulator** screw clockwise to increase gas flow and increase CO2, or counter-clockwise to decrease flow and decrease CO2.
11. Once the desired **Low Fire** combustion levels are achieved, return to the touch screen and increase the **HTR MOD** firing rate to the maximum **High Fire** rate for the specific product. **NOTE**: The maximum factory-set **High Fire** firing rate may not be 100%.
12. With the burner firing rate now stabilized at High Fire, turn the Gas Valve Orifice Adjustment screw clockwise to decrease gas flow and decrease CO2, or counter-clockwise to increase gas flow and increase CO2. For models LC5Q to LC8Q, loosen the set screw on the side of the shutter valve body before attempting to adjust the shutter. Be sure to tighten the set screw on the valve body when adjustments are complete.
13. Once desired combustion is reached at **High Fire**, return to **Low Fire** to confirm settings.
14. When all combustion adjustments are complete, go back to the **MANUAL OVERRIDE** screen and return the function back to the "**AUTO**" setting.

4.6.3 Check the Vent Pressure

Once the combustion is properly adjusted, use the test hole in the flue vent to measure vent pressure. With the burner firing, confirm the vent pressure does not exceed 0.5" W.C. Pressure in excess of 0.5" W.C. indicates a vent sizing issue that must be addressed before operating the water heater.

⚠ WARNING!

When adjustments are complete return the MAN OVR function back to "AUTO" before operating unit to avoid risk of high water temperature that may result in property damage, scalding, other serious injury or death.

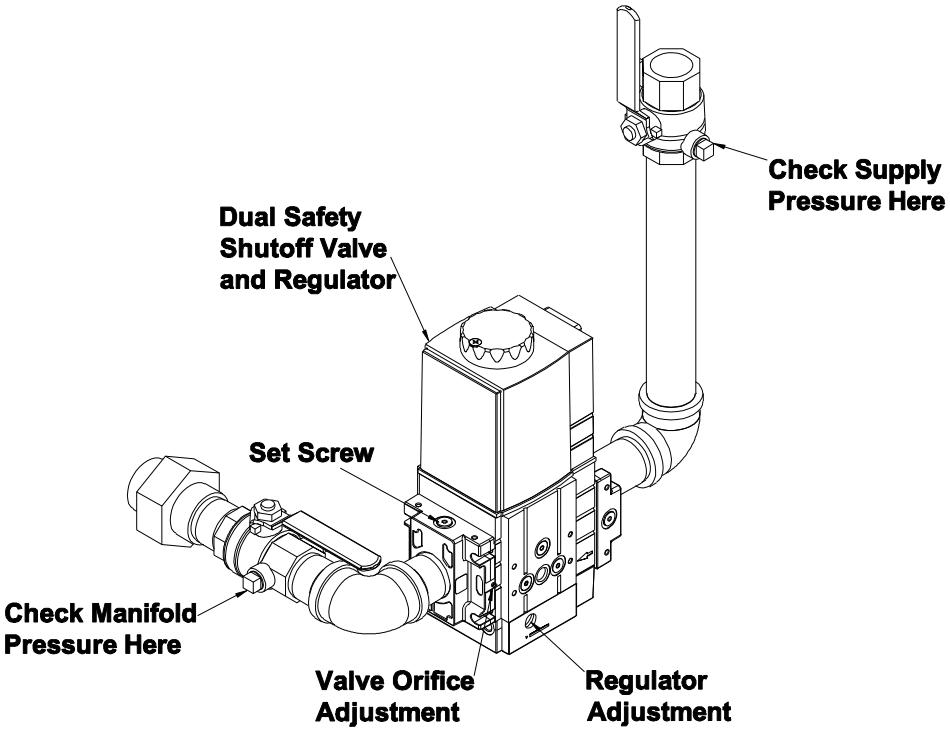


Figure 4-2 – Gas Train Illustration

NOTE: Optional components may not be shown.

4.6.4 Water Heater Interlocks

As a safety measure for interfacing with an Energy Management System, the Lync Q Water Heater includes interlocks that connect to remote devices such as draft dampers, gas pressure gauges, and air proving switches. The labels at the rear of the unit match the terminal block on the water heater itself.

⚠ WARNING!

Turn off all electrical service to the Element when accessing the remote connections and close and fasten control cabinet cover before restoring electrical service to them. The remote connection terminals are High Voltage or may become High Voltage. If the electrical service is not turned off and these terminals are touched, a dangerous shock could occur, causing personal injury or death.

Terminal Connections	Description
P1 – P2	Provides a 5 Amp contact closure to control remote equipment (e.g. mechanical room air louvers, draft inducer or power vent, etc.). Do not directly energize pumps or motors through these terminals. If operation or repositioning of the remote equipment is required for safe operation of Elements, the remote equipment must send a return proving signal to terminals C1-C2, via its proving switch, to confirming proper operation or repositioning to enable Element units to energize.
A1 – A2	Used to activate a remote alarm, signaling shutdown of combustion control. Provides a maximum 2 Amp relay contact closure when the control system terminates operation due to a tripped safety interlock (e.g, an air proving switch, high limit switch or flame sensor, etc.).
C1 – C2	Used for proving operation of remote device. Terminals are wired to a proving switch on a remote device such as a power venter, louvers or a combination of these in series. When all remote proving switches close, the circuit from C1 to C2 is completed and the Element's controls are enabled. Elements ship from the factory with an orange jumper between terminals C1 and C2 that must be removed when a proving switch is connected.
R1 – R2	Used to activate / de-activate the water heater from remote master control. When switching this low current circuit, a relay with gold plated contacts or the use of two relay contacts in parallel must be used. Terminals are wired to a relay in a remote Energy Management System. When the relay closes, the circuit from R1 to R2 is completed and the unit's controls are enabled. The Element ships from factory with a jumper between terminals. Remove orange jumper when connecting to a remote controller.

Table 4-1 – Interlock Terminal Functions

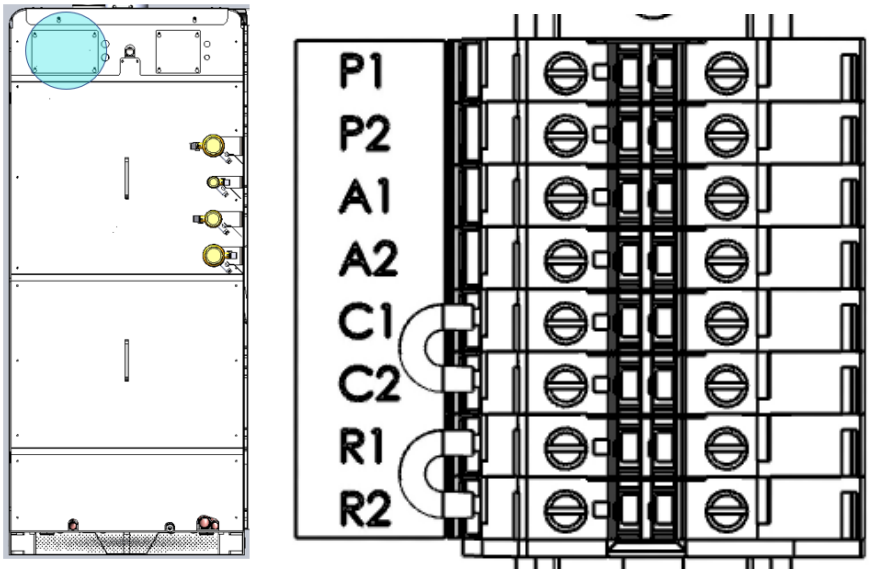


Figure 4-3 - Interlocks and Controls Terminal Block

4.7 AquaSolve Media Fill

In systems with new copper piping, such as new construction or recently repaired domestic hot water piping, copper and flux may temporarily increase the copper content of the supply water above the recommended operating limits for the AquaSolve scale prevention system. In these cases, it is highly recommended to withhold adding AquaSolve media into the system for the first 6 weeks of operation to allow the new copper piping to develop a natural protective oxide layer. After 6 weeks, add AquaSolve media following the procedure in section 11.5.1

SECTION 5: CONTROLS STARTUP

Before initiating controls startup, verify that:

1. The unit is installed in a location that meets minimum maintenance clearance requirements.
2. Water, gas, venting, combustion air, electric and drain discharge are connected.
3. The water heater has been successfully calibrated and commissioned.
4. AquaSolve TAC media, both UV bulbs and both filters are installed.
5. The unit is connected to the internet via RJ45 connection.

5.1 Sign In

Upon startup, the "Owner" user is created on the device as the default user. The Edge SC Controller can be accessed with the preassigned password: **2143.**

⚠ WARNING!
Inform the customer to change this password as soon as possible per Section 5.3

5.2 Download & Install the Latest Firmware

Lync is committed to making the Edge SC Controller a reliable and easy to use front-end to your Water Heating Solutions. As part of that effort, Lync will be continuously monitoring the user's experience and implementing improvements to the Controller firmware.

It is possible the Controller firmware on the unit may be out of date. **You must update the firmware to the latest version before using the Edge SC Controller for the first time.** This will eliminate potential problems and allow Lync Technical Support to better serve you if you need assistance.

The latest firmware can be found directly through the Controller by accessing **Settings → Unit Software → Install Update**. Follow the steps in Section 6.4.6.1.

Certified technicians can download the latest firmware from the Lync Learning Management System (LMS) website at https://training.watts.com , or by contacting your local Lync rep.

5.3 Change Owner PIN on Unit

Upon start up, it is highly recommended to change the PIN for the Owner role at this time. Click on the sequence as shown in the below figures.

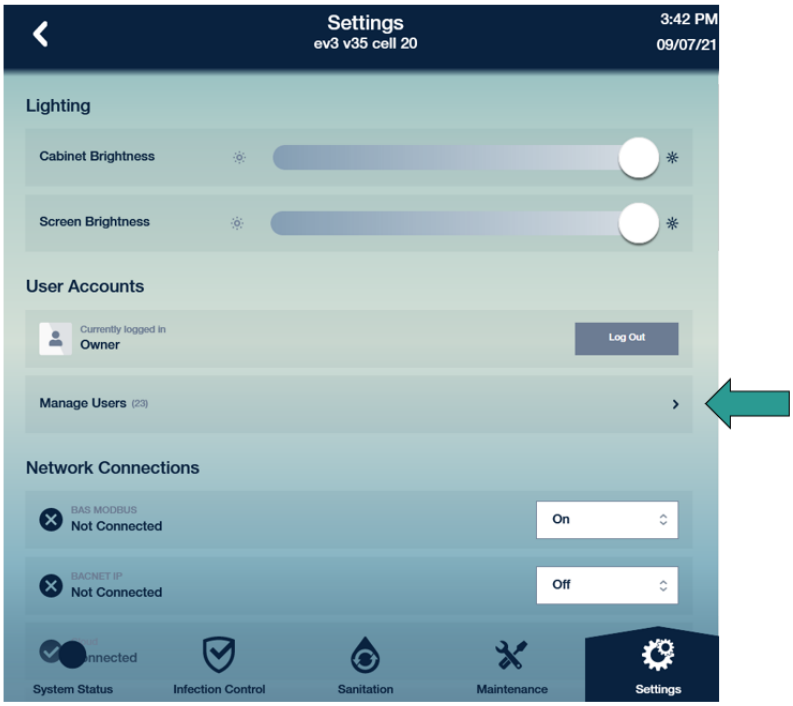


Figure 5-1 – Go to the Settings Page and click on Manage Users

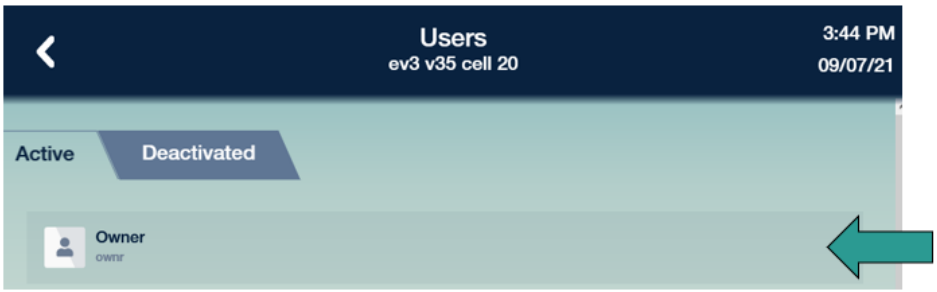


Figure 5-2 – Click on the Owner User Profile

Figure 5-3 – Change PIN in owner profile

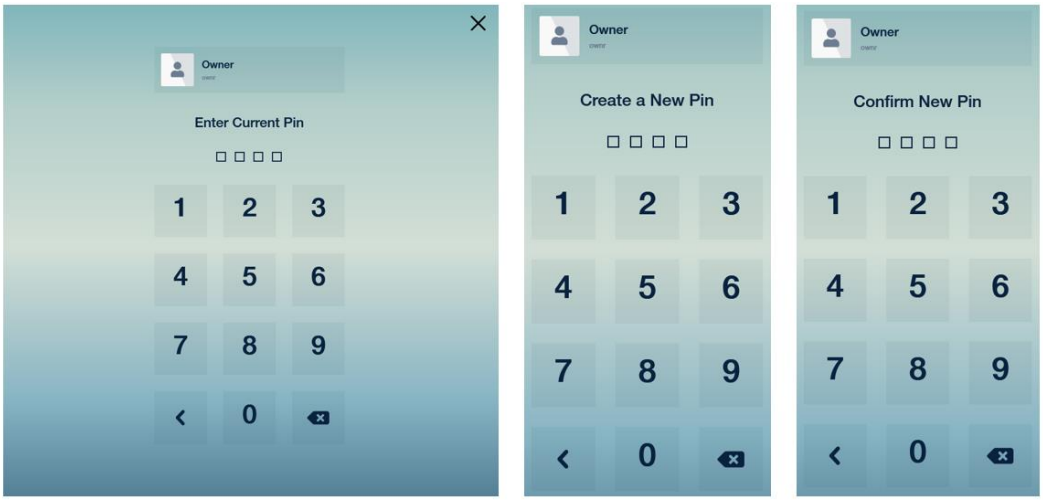


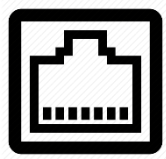
Figure 5-4 – Create new PIN

CAUTION
Keep your PIN information in a safe place. PIN recovery for an Owner requires assistance from Lync technical support and your Lync rep.

5.4 Communication Wiring

Even before being connected to the network or the cloud, or when communication is interrupted, the Element can operate as a standalone unit. Once connected, Element can communicate via the onboard EdgeSC supervisory controller with a Building Automation System (BAS) or Building Management System (BMS) using either BACnet® or Modbus® protocols.

The EdgeSC is designed with integrated communication as one of its main features. In addition to the I/Os, it connects to a BMS and the cloud using two primary methods:



- **Ethernet**:
  1. BACnet IP
  2. Modbus TCP

- **RS485**:
  1. BACnet MSTP
  2. Modbus RTU
  3. External devices

1. Open the rear, low-voltage electrical panel on the right side of Element per Figure 5-5.
2. Connect as required to the building's internet connection to the top RJ45 ports, ENET 1. The other RJ45 port, ENET 2, is used for BAS connections.

Port	Label	Function
Ethernet 0	ENET 1	Internet connection to myLync
Ethernet 1	ENET 2	BAS TCP/IP

Table 5-1 – Explanation of Ports

3. To the right of the ports is a 3-pole terminal block for an RS485 connection. Connect to the open pole on the left for BAS RS485 +, to the middle for BAS RS485 -, and to the right for BAS RS485 Ground.

NOTE: The BAS chain may only have one shield connection in order to avoid a ground loop. If that is Element, connect at the green ground screw below the RS485 terminal block. Else connect it elsewhere among BAS units.

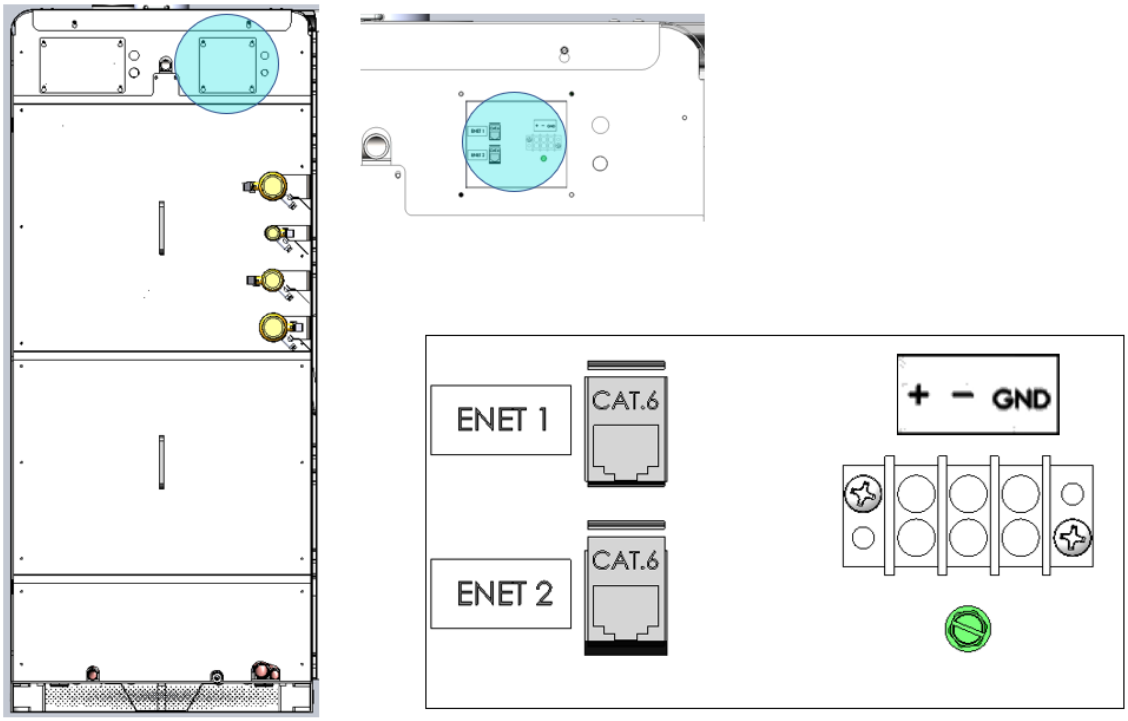


Figure 5-5 – Location of network and BAS connections via ethernet or RS485 at the rear of the unit.

5.5 Initial BAS Connectivity

A secure connection to the Element is critical to ensure appropriate service to the domestic hot water system. The EdgeSC has security options built into its firmware to support this.

Log in with a user assigned one of the following roles: Owner, Chief Engineer, Facilities Manager, Infection Control or Technical Customer Support.

1. Navigate to the System Settings screen.

Figure 5-6

2. Confirm network connection is established by scrolling to **Network Connections** and observing a checkmark and IP address for Ethernet. If an IP address is not present,

check the rear of the unit in the low voltage section of the electrical compartment for a proper network connection to ENET 1 per Figure 5-5 and Table 5-1. Element receives an IP address via DHCP rather than a static IP. MAC addresses are available if the building network requires MAC filtering.

3. Confirm that a network connection is established by scrolling to the network connections section and observing a checkmark and IP address for Ethernet.

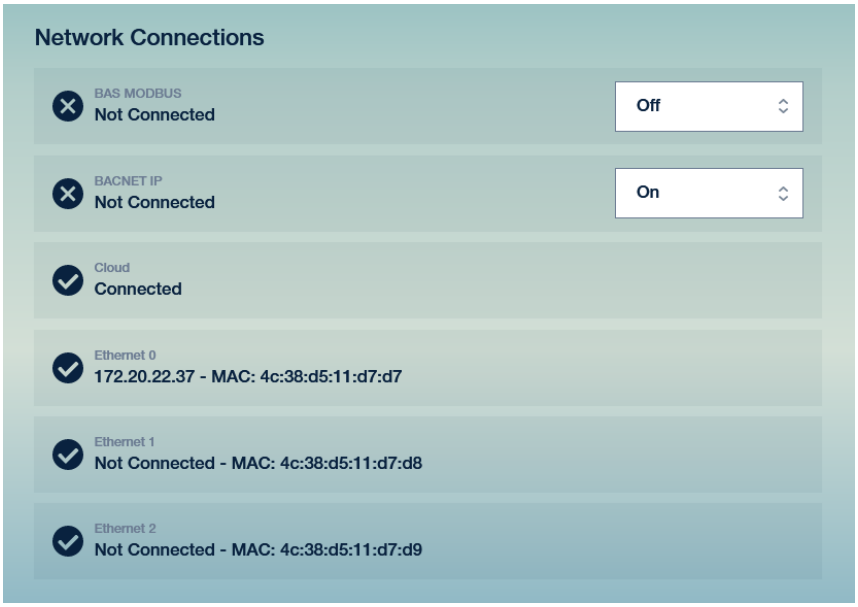


Figure 5-7 – Network Settings

4. Change the BAS MODBUS and/or BACNET IP dropdowns from Off to On.
5. Verify that Element is visible in the building automation software.

NOTE: All points are read-only. Any configuration of the unit may be performed using the myLync app or at the unit itself with sufficient permissions.

5.6 Initial Startup and the First User

The myLync app available on iOS and Android provides remote monitoring of any Element associated with an organization to anyone who has the appropriate permission and credentials. Initial setup is performed by the Lync rep and installer and then the unit is transferred to the customer. Follow the flow chart in

Figure 5-20 as well as the instructions below.

1. Install the Element and connect to a network with access to the internet. Turn the unit on.

2. The first user created is the “Owner”. Log in as the Owner with the code: **2143**. It is recommended that once the customer receives access to the unit that the user managing the Owner role changes this code immediately.
3. The Element can now be accessed locally. Cloud provisioning is recommended to gain full access to the benefits of Element. This is performed between the Lync rep and the installer.

NOTE: If you choose not to connect to the cloud at this time, continue to Section 5.8

4. First-time myLync users must navigate to the web app at http://www.mylyncbywatts.com. Click on *Create an Account*. This can also be performed through the myLync mobile app, available on the Google Play® store or on the Apple® app store.

NOTE: This address is different from the main Lync product page.

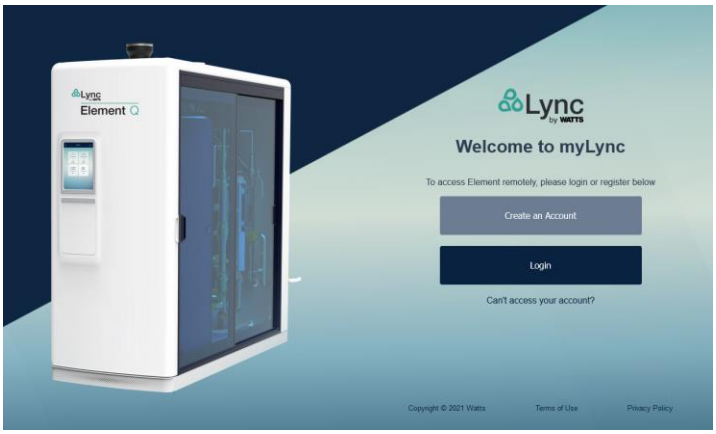


Figure 5-8 – myLync Web App Welcome Page

Figure 5-9 – myLync Mobile Landing Page

5. This new account is created through the Microsoft Azure® credentialing service. This login info is used throughout Azure. If the user has another Azure account, log in with those credentials. For most first-time users, enter the information shown in Figure 5-10 to create a Watts account.

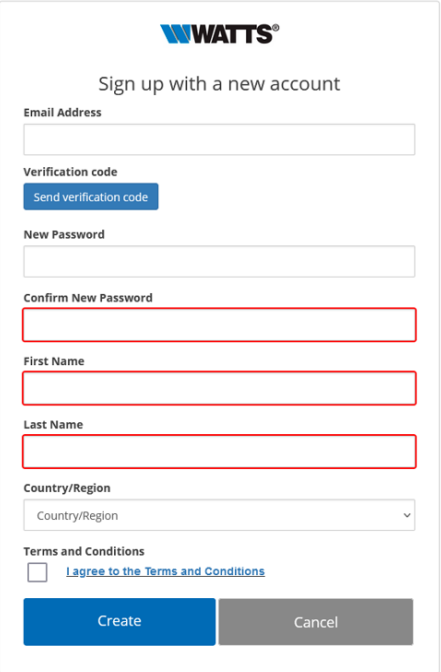


Figure 5-10 – New Watts Account

NOTE: Use of a revocable company-issued email is recommended for security purposes.

6. Navigate back to http://mylyncbywatts.com or to the mobile app home page and click on *Login*.

7. The user is now able to create an organization and the associated hierarchy within their buildings. See Section 5.7 for information on setting up the organization hierarchy.

8. If the initial user is the installer or the Lync rep, they are now a part of the organization. Follow Section 5.9 to perform an ownership transfer to the first customer user.

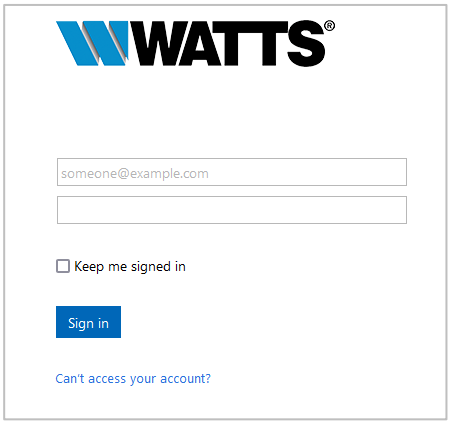


Figure 5-11 – Login Page

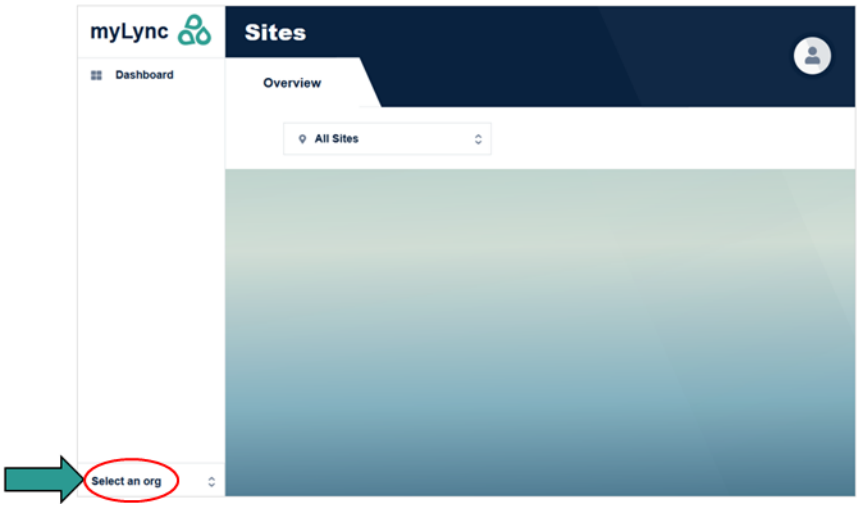


Figure 5-12 – New User Dashboard on Web App

9. Click on *Select an org*. No organizations are available, so click on *Add Organization*.

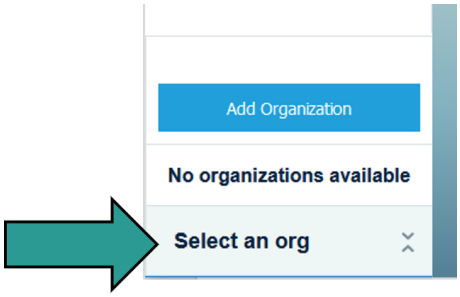


Figure 5-13 – Add a New Organization

10. Enter your organization's name. This can be edited later.

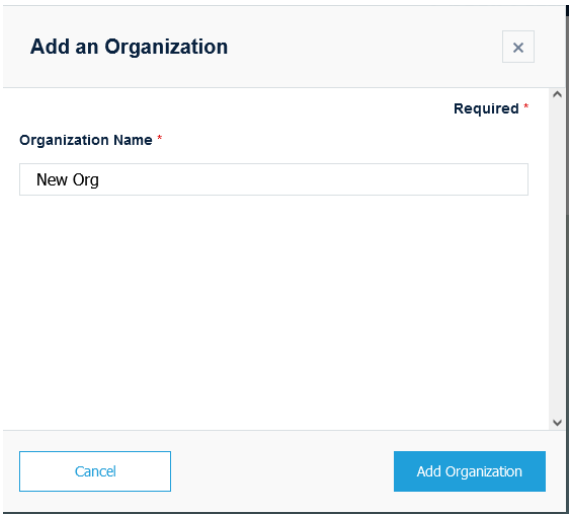


Figure 5-14 – New Organization Entry

11. The creator of the organization is automatically the owner. Ownership can be transferred after another user is added to the organization (see Section 5.9.1).

12. Next, create a site within the organization by following the prompts (see Section 5.7).

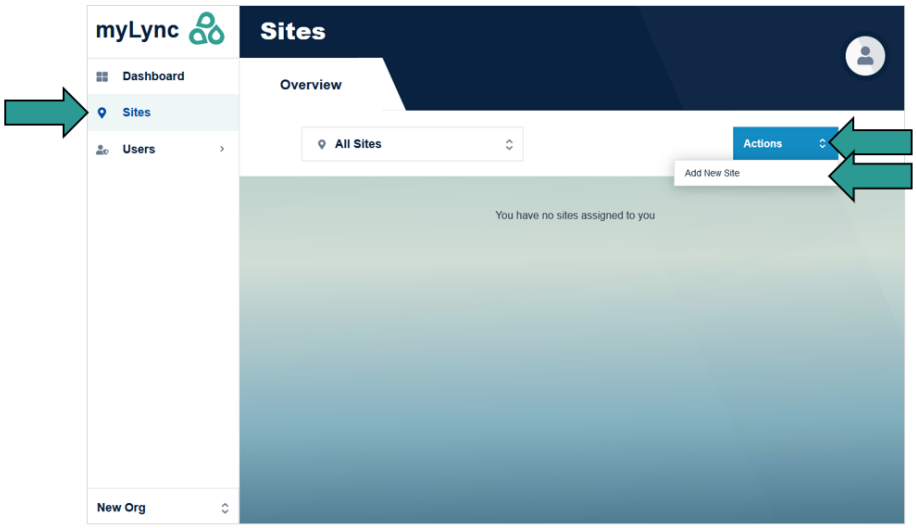


Figure 5-15 – Create a New Site

13. Go to the site's page. In this example it is "Central Cross" as a part of the "New Org" organization. Click on *Actions* then *Add New Unit*.

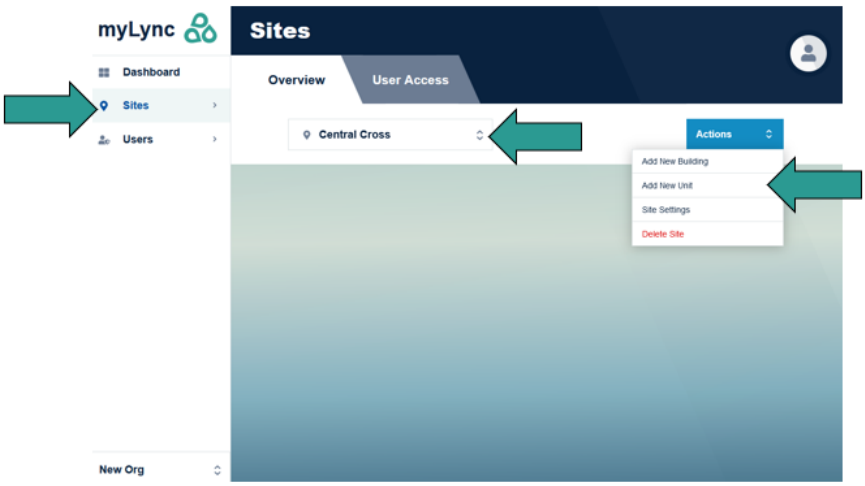


Figure 5-16 – Add a Unit Within the Site

14. The pop-up window will ask for a Unit Code and a Unit Name.

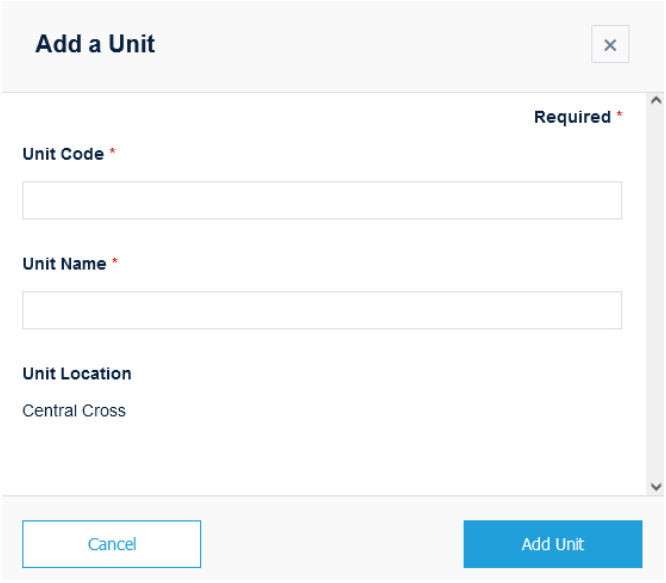


Figure 5-17 – Add Unit Information

15. Type in a *Unit Name* of your choosing. The *Unit Code* comes from the Element itself so it can be associated with the site and organization. On the unit, go to the settings page and click on the *Commission* button as shown in Figure 5-18.

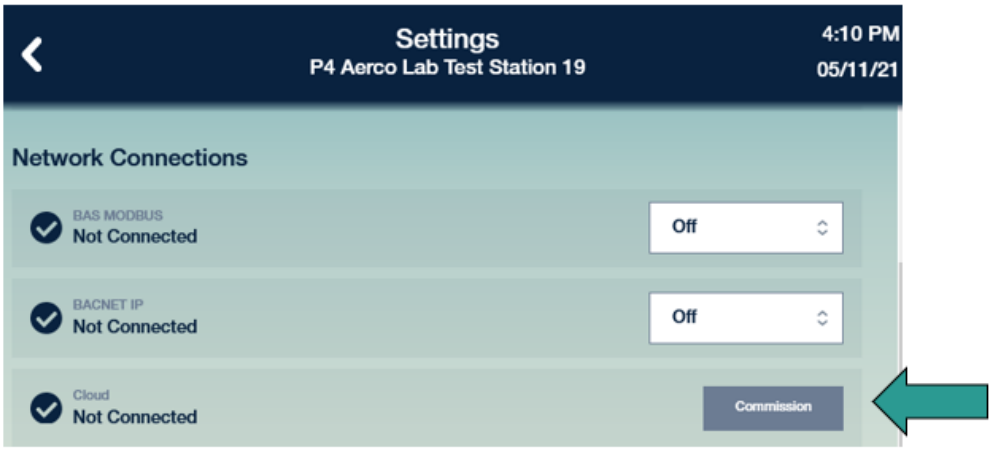


Figure 5-18 – Connecting a Unit to the Cloud

16. This creates a unique, temporary cloud-commissioning code. This code expires in 25 minutes once generated. Enter this code into the app. If successful, a new unit will be a part of the site. If unsuccessful, *Error adding unit* will show.
    a. Confirm the time between generating the code and adding the unit in the prompt.
    b. Confirm whether the unit has access to the internet and any firewall or MAC filters are appropriately set within the network.
    c. Also confirm the code itself.

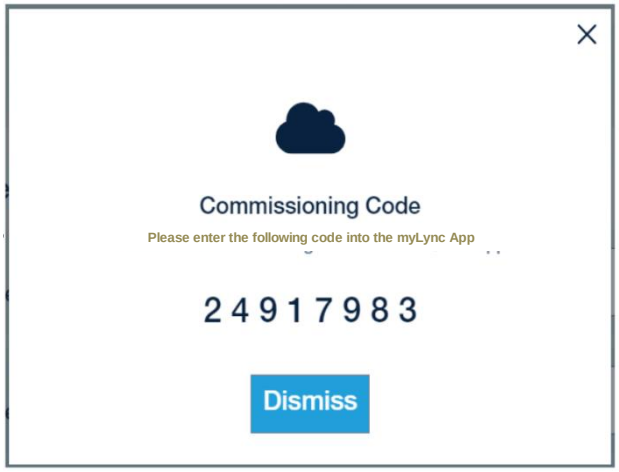


Figure 5-19 – Sample Commissioning Code

17. Verify connectivity on the mobile app and web app.

CONNECTIVITY SETUP WORKFLOW

myLync Mobile & Web

Element unit

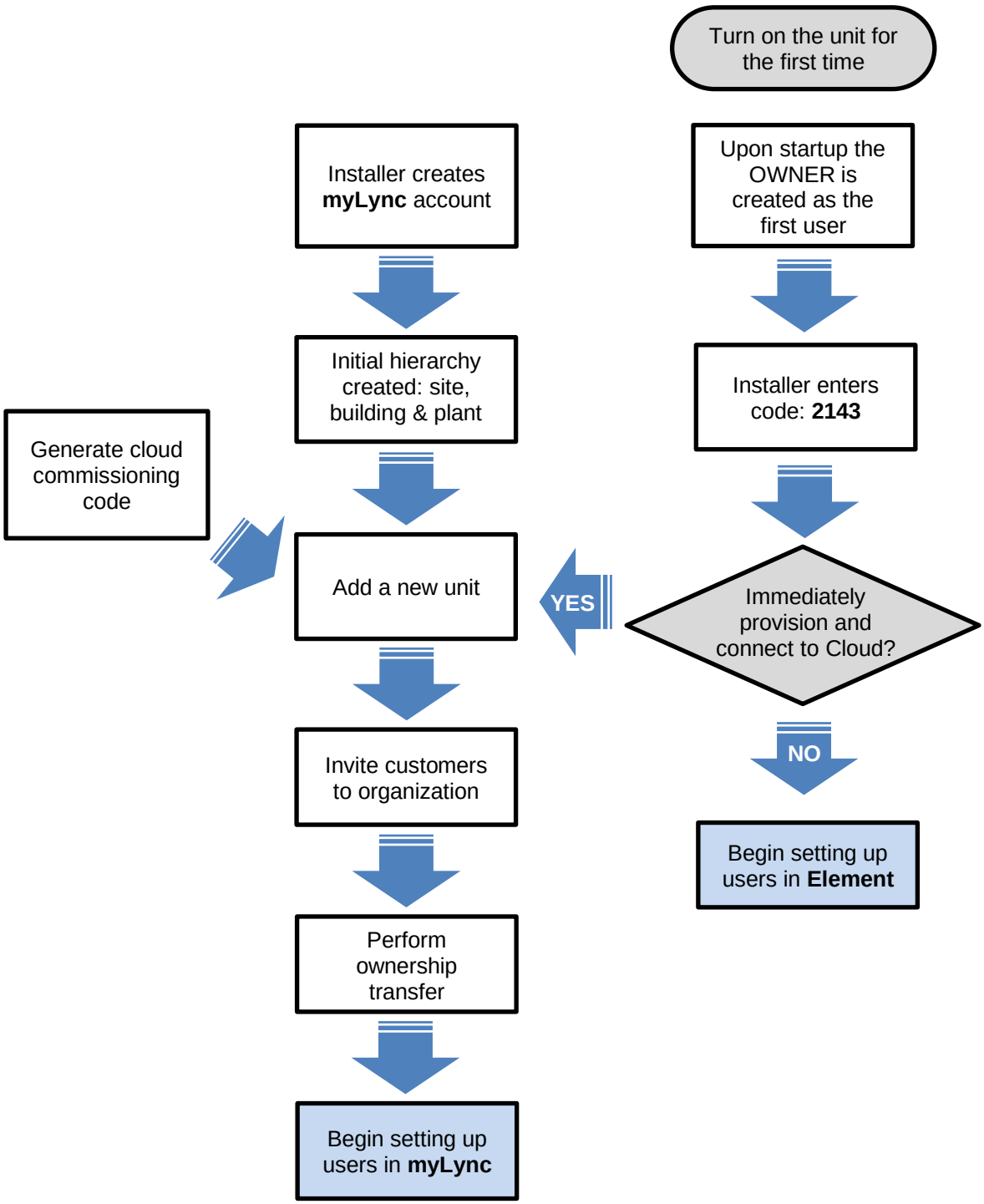


Figure 5-20 – Connectivity Setup Workflow

5.7 Setting up the Organization Hierarchy

The Element is designed to be managed remotely and from a central location for multiple units. Units are organized by Organization, Site, Building, Plant, and Unit. The hierarchy assists with organizing individual units, defining user permissions, organizing reports, and communication between staff members.

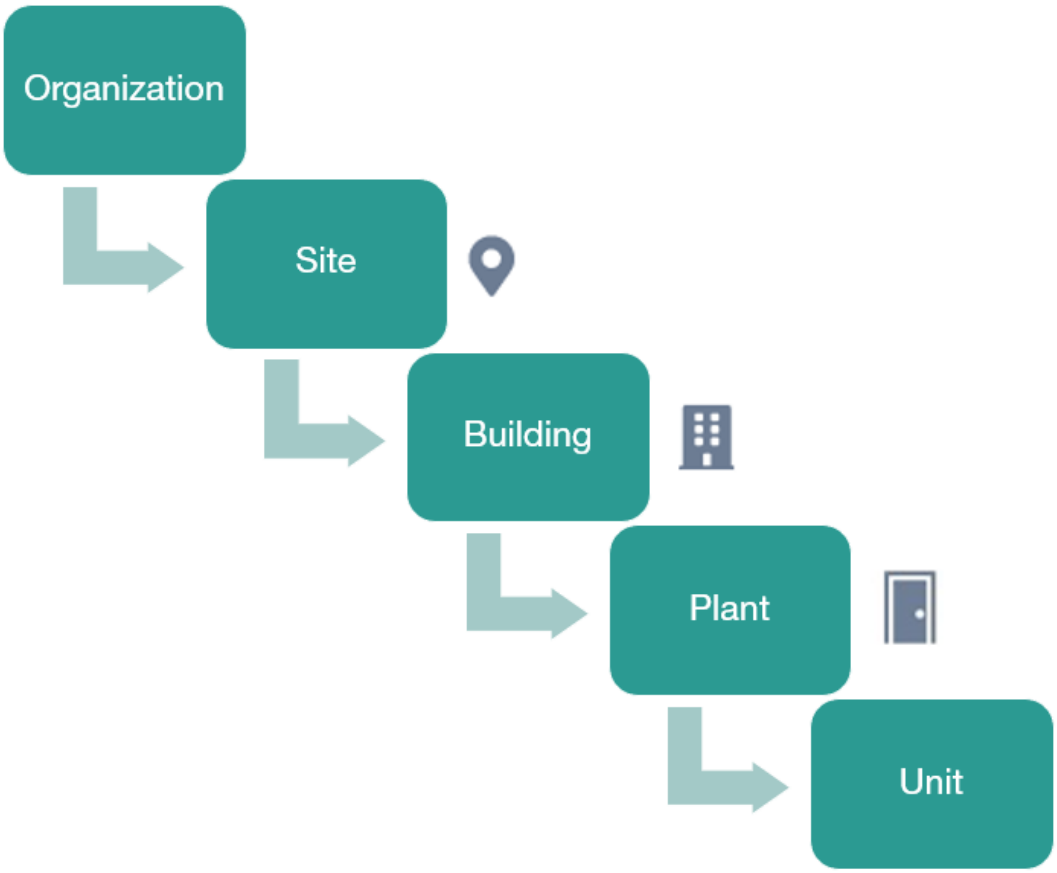


Figure 5-21 – Hierarchy of Locations

Organization	The parent organization of the customer
Site	The campus or location where one or multiple Element units are installed. Top level user permissions would be assigned here.
Building	The name of the building. When a central water heating plant services multiple buildings, it is recommended to state the name of the building group.
Plant	The name of the single or group of Element units that serve a specific domestic hot water system. Recommended to either be the name of the mechanical room or the system the unit(s) serve.
Unit	The individual Element unit

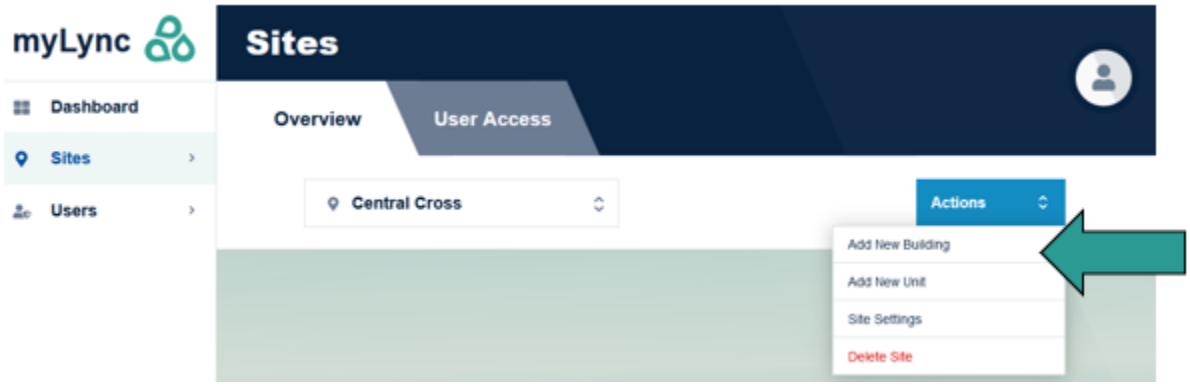
Table 5-2 – Hierarchy Definitions

An organization can be created by any user within the myLync web or mobile apps. From there, users with appropriate permissions can define the structure of the hierarchy. Units can be

associated directly with a site or building if desired, however it is recommended to establish the hierarchy down to the individual plant level.

NOTE: Creating hierarchies can be performed only in myLync, not locally at the unit.

- Creating a new organization and site is shown in section 5.6.
- To create a new building, from the site page click *Actions* > *Add New Building*.



- To create a new plant, navigate to the building page then click *Actions* > *Add New Plant*.
- To change the name of the site, building, or plant select *Actions* > *Settings*.
- Deleting a location level will delete the structure beneath it.

NOTE: Organizations, sites, buildings, and plants cannot be deleted if there are units associated in the hierarchy. Remove or transfer ownership of the units before deleting a part of the hierarchy structure.

5.8 Managing Users

Element is designed to be used by multiple people with different responsibilities both inside and outside your company. There are numerous predefined personas for each of team members as given in **Appendix C: User Permissions Tables**. Verify the access you are giving via the selected persona matches your intent for permissions to the unit and organization.

When assigning personas for cloud-connected units, a user's persona given at the site level will cascade to all other levels and units in the hierarchy below that. However, it will not cascade up, nor will a user that is defined at the organization level cascade down. This is because individual units cannot be associated with organizations, only sites and lower. When defining permissions and personas, start at the site level and work down towards the plant level.

5.8.1 Invite New Users

1. Go to the user page within the myLync app (Figure 5-22).
2. Click on "+ Invite" to invite a new user to the organization (Figure 5-23).
3. Go to the Users page and click on "+ Invite User".The user will receive an email from no-reply@watts.com inviting them to create a new cloud account.

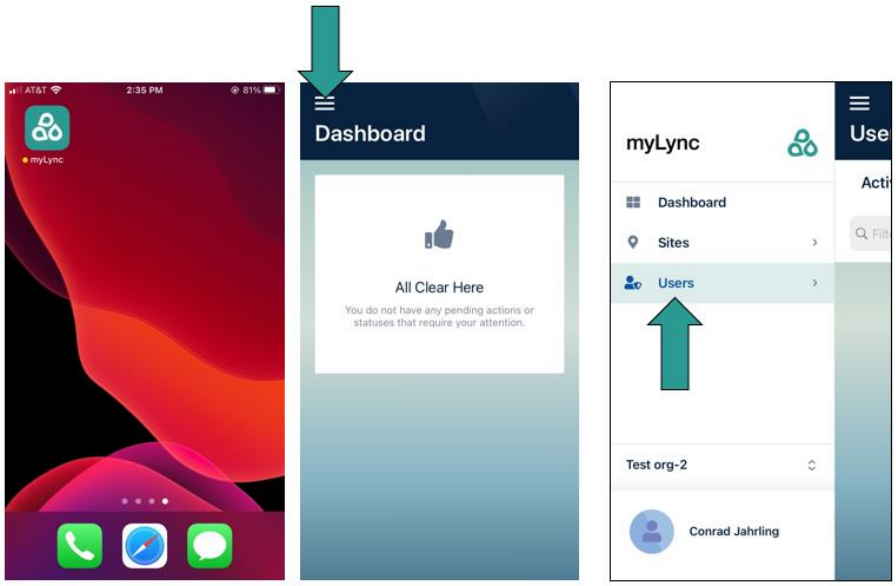


Figure 5-22 – myLync User Page

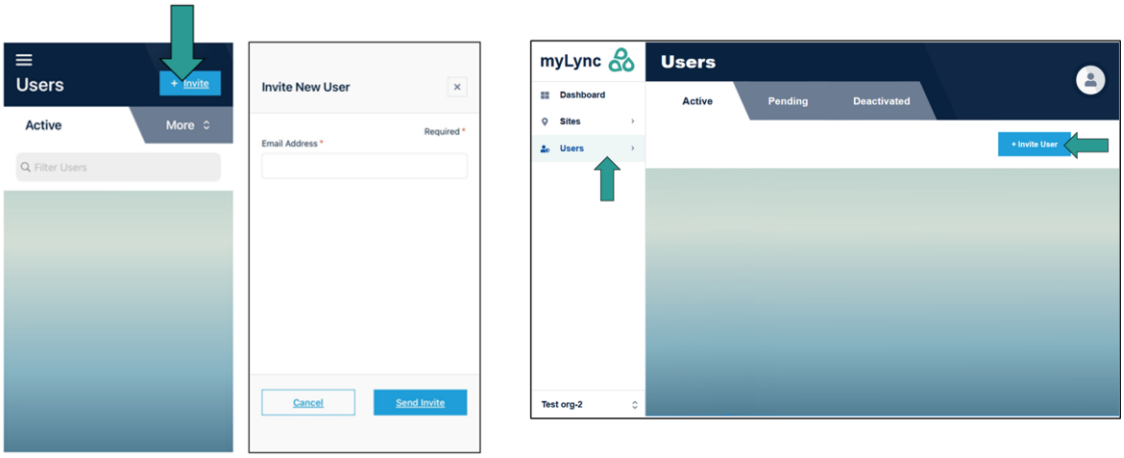


Figure 5-23 - Invite New User

NOTE: It is recommended that users keep the same email address for multiple units, plants, buildings, sites, and organizations (especially individuals who manage multiple clients' equipment) so all notifications can be compiled into the same app without re-logging in.

5.8.2 Reassigning Personas

If you have the appropriate permissions, you may change the persona of another user. For cloud-connected units, log in and navigate to the Users page. You may not reassign yourself. The owner persona may not be reassigned. Changing owners is performed by ownership transfer.

5.8.3 Deactivating Users

The Owner may deactivate a user at any time (see Section 6.4.1). Users cannot be deleted, because their history of interaction with the unit remains intact even after they leave the organization. Similarly, the Owner persona cannot be deactivated, although it can be transferred to a different user. The new Owner can then deactivate the previous Owner, as described in Section 6.4.1.

5.9 Ownership Transfer

Once the unit has been setup by the installer or Lync rep, whom the Element recognizes as the initial user and owner, ownership is then transferred to the customer. The analogy for ownership transfer is handing the keys to your car to someone else: you will no longer have access without their permission.

There are three methods of ownership transfer:

1. At a non-cloud-connected unit, the initial Owner can transfer ownership to another user.
2. At the organization level for a cloud-connected unit, the organization Owner is the owner of all units within the organization. The transfer process begins in the mobile or web app.
3. At the unit for a non-cloud-connected unit, the initial Owner pin can simply be shared and then changed in the Settings page on the unit. An explanation is given in the *Lync Element Installation and Operation Manual (L-OMM-003)* in Section 9.

NOTE: There can only be one owner on any unit. Once the unit is connected to the cloud, **the local owner role will be removed and replaced** with the organization's owner. There can only be one owner of any Organization.

5.9.1 Organization Ownership Transfer

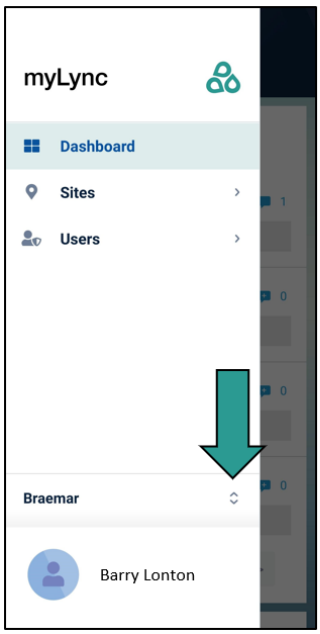
Cloud-connected units are associated with an organization. The organization owner role assumes the role of the owner for all Element units in the organization. Transfer of organization ownership is performed within either the mobile app or the web app.

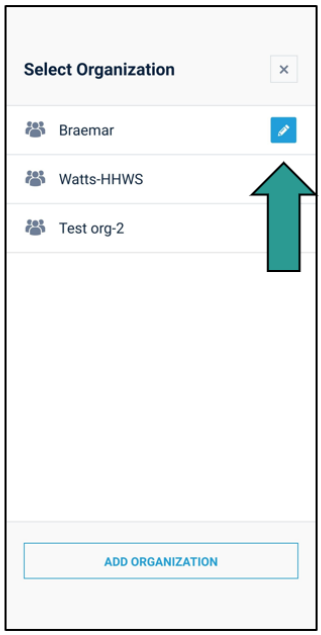
⚠ WARNING!
Once an organization transfer is complete, the previous owner is no longer part of the organization.

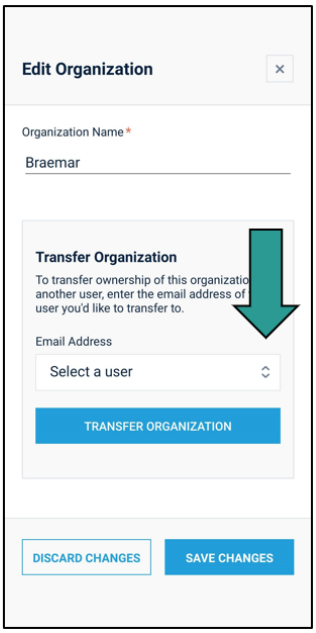
5.9.1.1 Using the Mobile App

Ownership transfer is performed in the mobile app through editing the organization. When logged in as the owner role, select the organization menu, click on the blue icon to edit organization, and select a user to transfer organization.

NOTE: The user must already be a part of the organization.







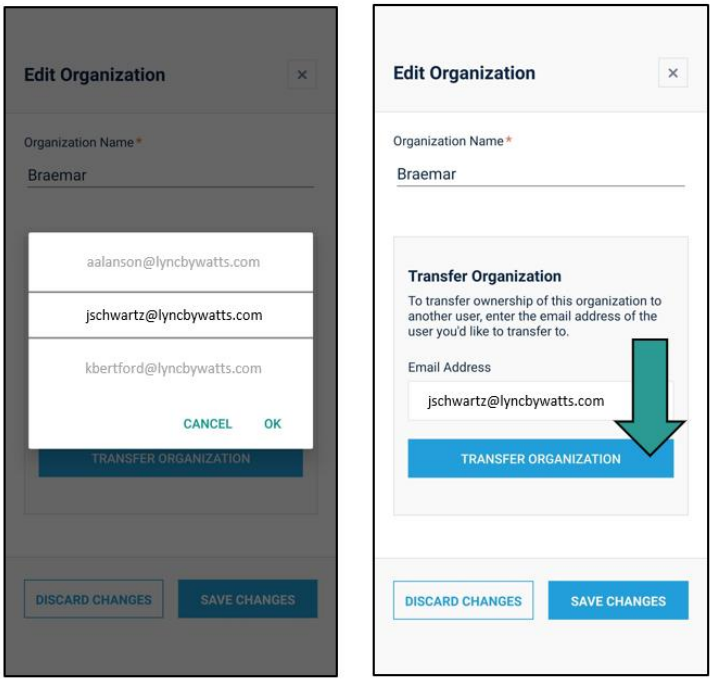


Figure 5-24 - Organization transfer from owner screen on mobile app

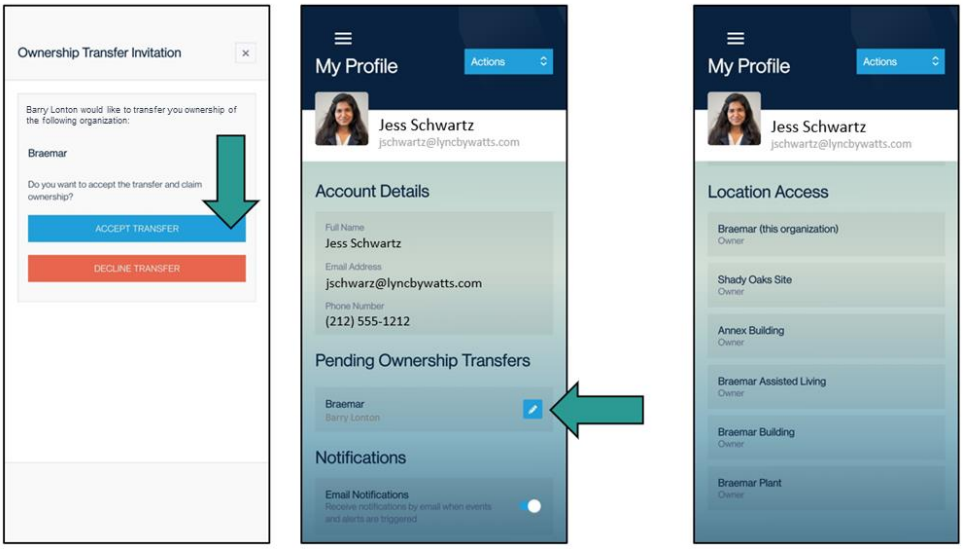


Figure 5-25 - Organization transfer from receiving screen on mobile app

When the receiving user logs into their mobile app again (close and reopen the app if necessary), they will see the Ownership Transfer Invitation. They may choose to accept it, decline it, or close the window. If the window is closed, the invitation can be accessed in their profile view.

Once accepted, it will show under Location Access in their profile view as being the owner, and the previous owner will no longer be a part of the organization.

5.9.1.2 Using the Web App

Alternatively, organizational ownership transfer can occur in the web app. Navigate to https://www.mylyncbywatts.com and log in as the owner. Click on the organization menu. Click on the pencil to edit. Select the user to transfer the organization. Click on Transfer Organization. The next time the selected user logs into the web app, a notification will show to either accept or decline the transfer, or to close the window to postpone decision.

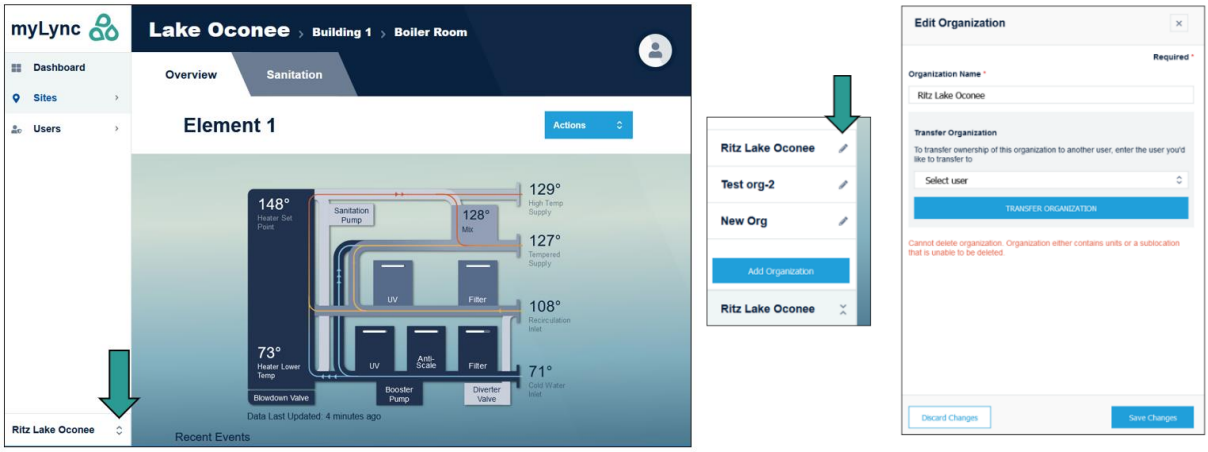


Figure 5-26 - Organization transfer using web app

5.9.2 Troubleshooting Ownership Transfer

Cannot perform ownership transfer	• No other users besides the Owner within the organization. Invite and add a user. • Target user rejected transfer. Communicate and try again. • You do not see the transfer menu because you are not the Owner. Determine the unit's or organization's owner.
Transfer request sent to wrong email	• Transfer requests can be cancelled • Requests expire after 24 hours.
Transfer request accepted by wrong person	• Verify user. Target user needs to be a part of the organization first in order to act on the request. • Upon incorrect transfer, it needs to be transferred back.
Owner is no longer with our company	• Contact your Lync rep for technical support
Lost Owner Pin on the unit	• Perform a factory reset on the unit. Data will be lost on the unit. • For cloud-connected units, data will still be available in myLync.

Section III – Sub-System Details

SECTION 6: EDGE SC CONTROLLER OPERATION

The information in this Chapter provides a guide to the operation of the Element using the Edge SC Controller. Initial startup of this unit should only be performed by factory trained personnel. Operation prior to initial startup by factory trained personnel will void the equipment warranty. In addition, the following WARNINGS must be observed at all times.

⚠ WARNING:

Do not attempt to dry-fire the unit. Starting the unit without a full water level can seriously damage the unit, may result in injury to personnel or property and will void any warranty.

The unit must be serviced only by factory certified service technicians.

6.1 Edge SC Controller Description

The Edge SC Controller contains all the controls, indicators and displays necessary to operate, adjust and troubleshoot the Element. The Edge SC Controller's capacitive touchscreen is a highly sensitive device that continuously checks for user interaction at a very high frequency.

Mechanical room environments are sometimes harsh, electromagnetically noisy and dirty, and can experience wide temperature ranges, and can be difficult for sensitive electronic components. Care should be taken to not damage the touchscreen or get any grease or pipe thread sealant on the touchscreen.

6.2 Welcome Screen and Navigation

Upon powering up, the Welcome screen appears with a **Sign In** prompt. This initial display shows the **Tempered Supply**, **High Temp. Supply**, **Recirculation Inlet** and **Cold Water Inlet** temperature along with any applicable **Set Point** temperatures. Selecting any option will forward the user to the Main Menu with each component displayed as outlined below.

Figure 6-1 – Welcome Screen

The Edge Controller SC allows users to view each component of the Element along with the status, alerts, temperature (if applicable), monitoring and event history. The intuitive menu highlights the selected component and displays all connected parts. The user can toggle between the various components to view their status or check alerts.

The image below shows the Controller displaying a high temperature alert:

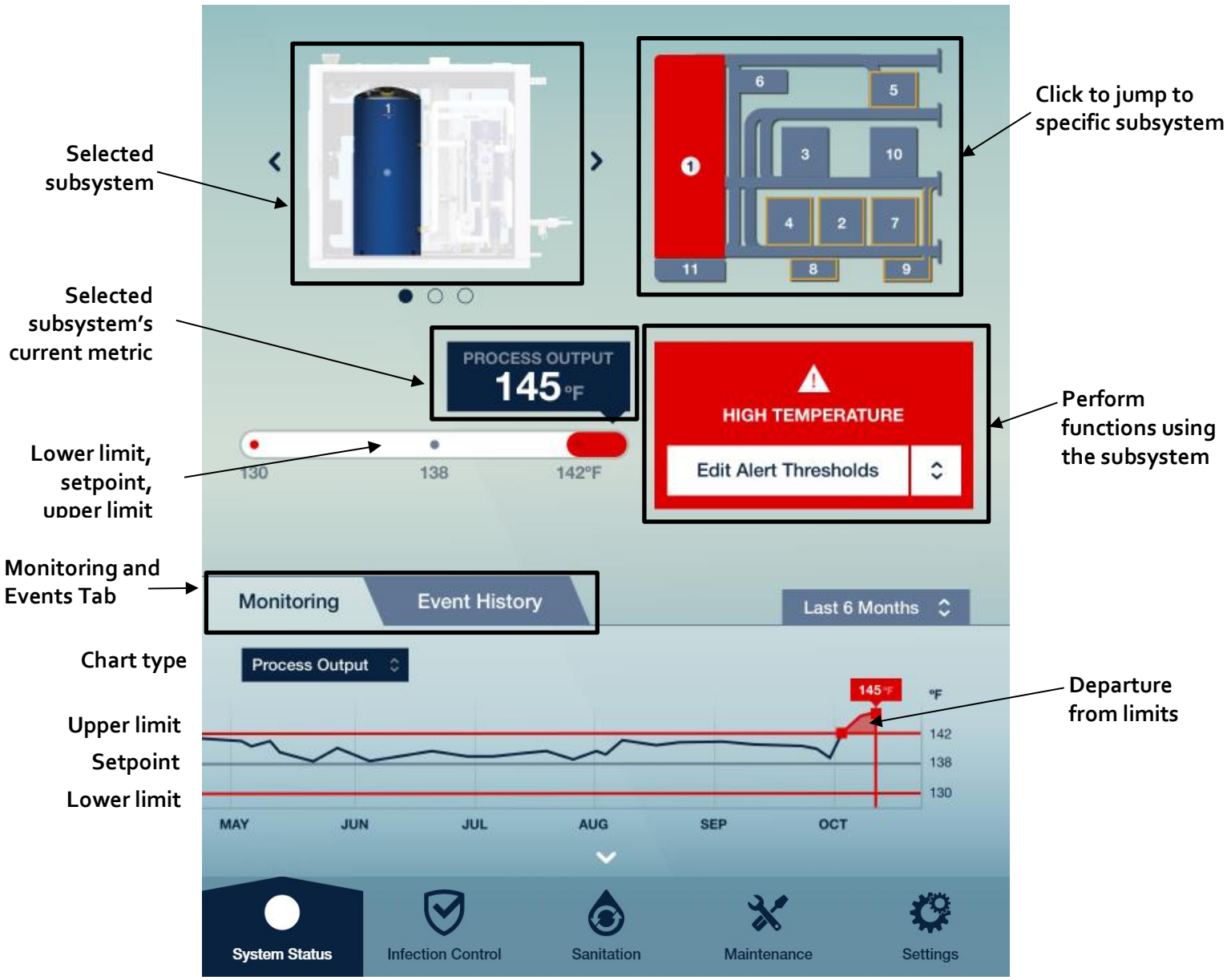


Figure 6-2 – Menu Navigation Example

6.3 Menu Structure

The **System Status** menu provides a dashboard of the Element and the status of each of the ten (10) subsystems within the Element:

- Lync Q Water Heater
- Anti-Scale
- Mixing Valve
- Booster Pump
- Diverter Valve
- Blowdown Valve
- UV: Recirculation
- Filter: Recirculation
- UV: Cold Water
- Filter: Cold Water

Each selection provides a visual of each subsystem allowing the user to monitor outputs, review event history and edit alert thresholds or set points.

Figure 6-3 – System Status

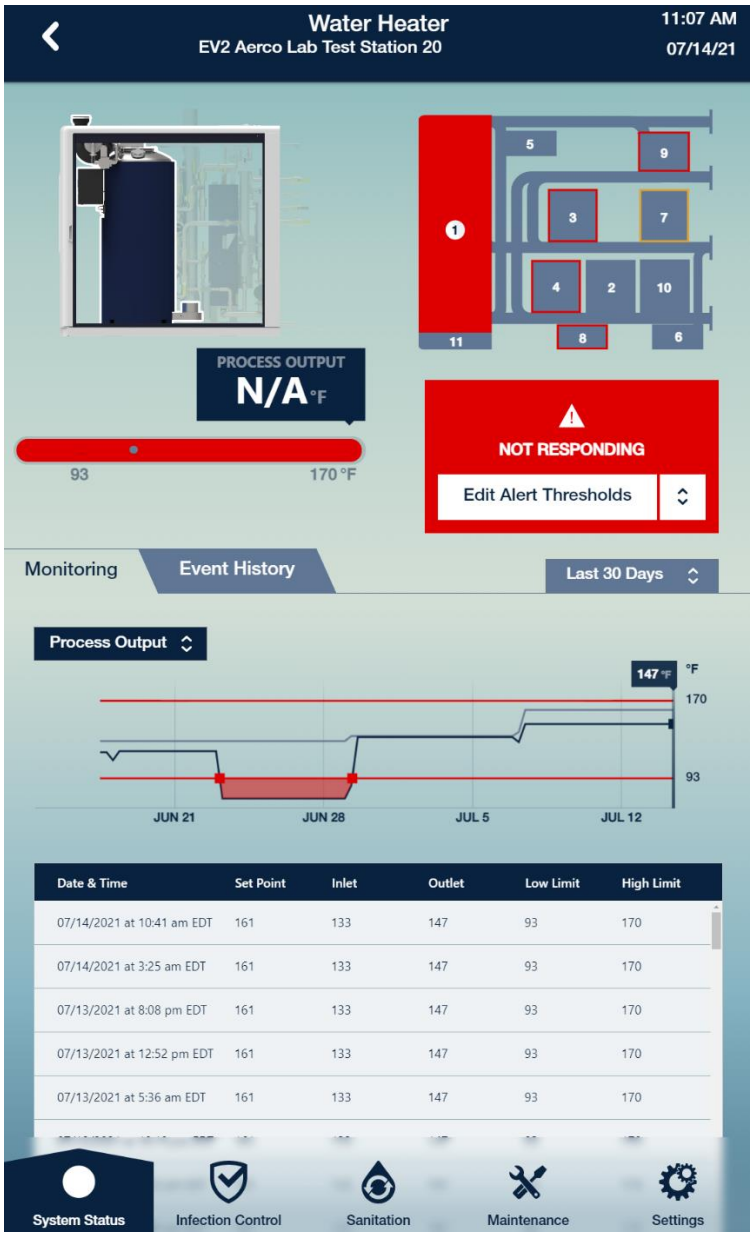


Figure 6-4 – Menu Structure

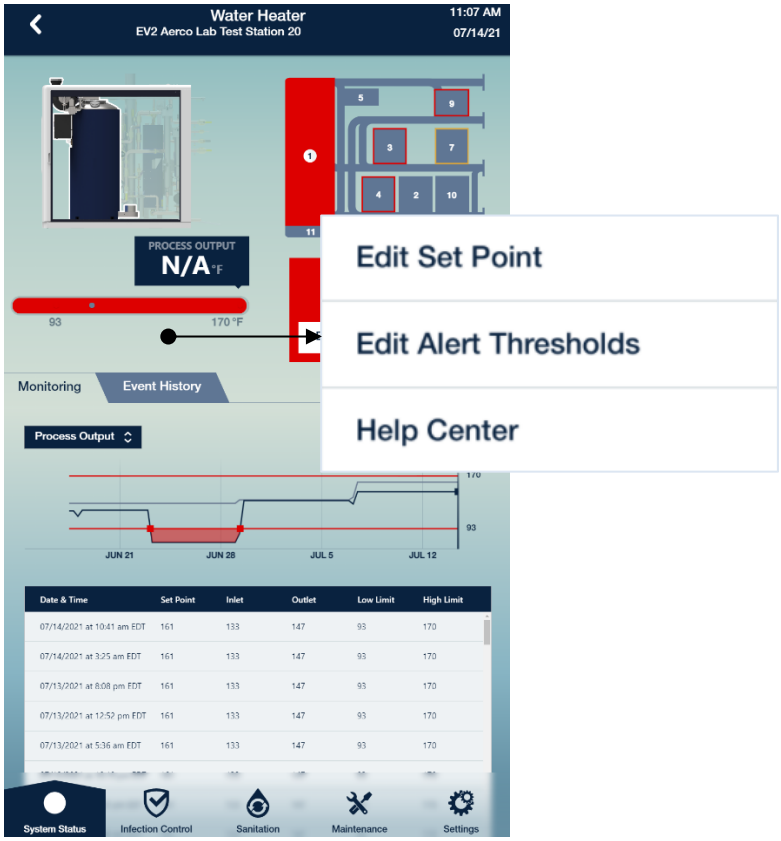
The five (5) menu shortcuts on the bottom provide specific visibility into the Element:

- System Status
- Infection Control
- Sanitation
- Maintenance Log
- Settings

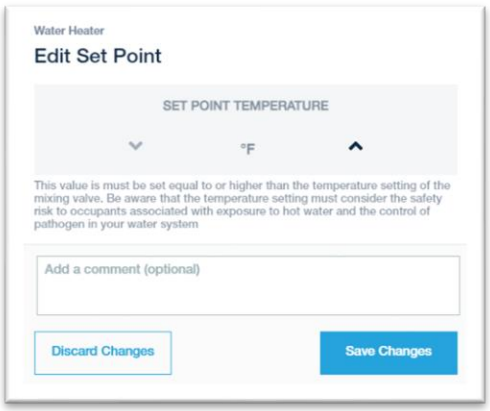
The following sections show examples of the display along with corresponding submenus for each selection. Each component is highlighted when selected and displays any pending alerts or warnings. Additional information shows a monitoring chart along with an Event History option. The default history graph shows values for the previous 6 months.

6.3.1 Water Heater

The **Water Heater** screen shows the component's current status. Options also include viewing the Process Output Temperature, editing the current Set Point and editing the alert thresholds.



Edit Set Point:



Edit Alert Thresholds:

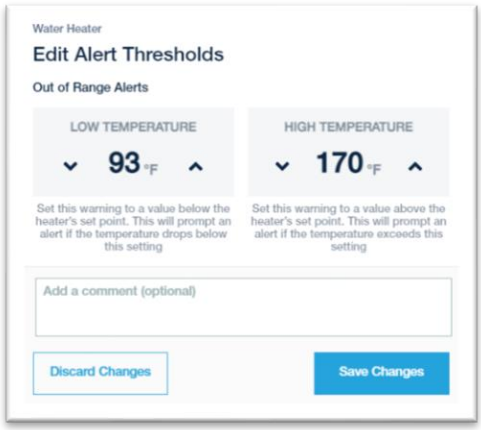
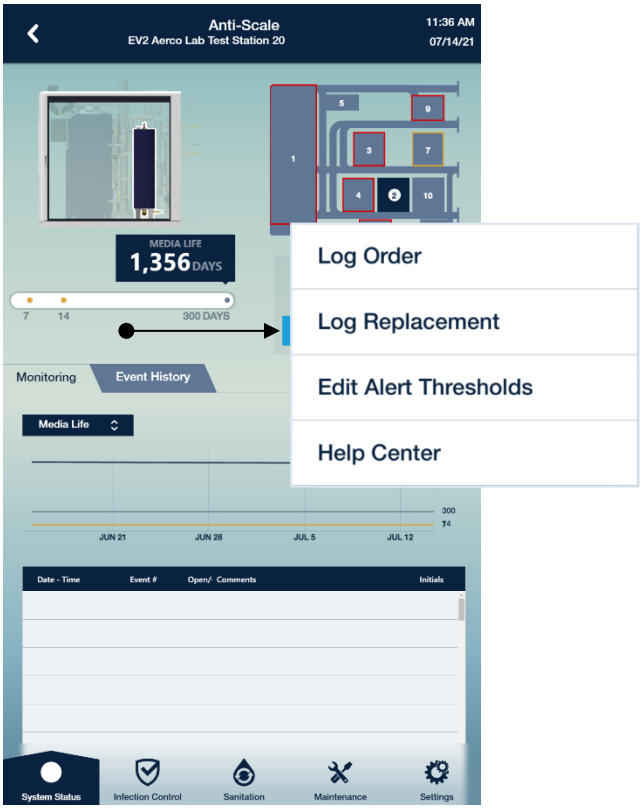


Figure 6-5 – Water Heater

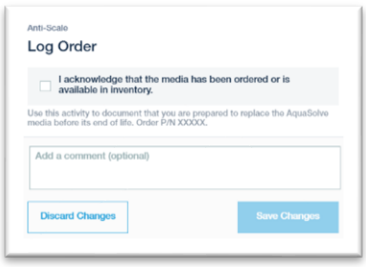
6.3.2 Unit Anti-Scale

The Lync AquaSolve anti-scale subsystem prevents scaling of minerals such as calcium and magnesium salts within the DHW system and downstream fittings.

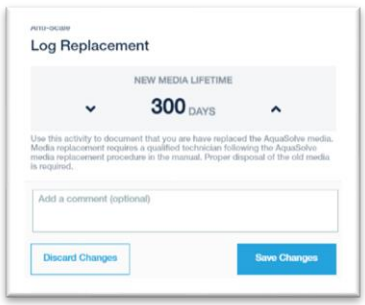
The **Anti Scale** screen shows the component's current status. Options include viewing the media life, logging an order or replacement, and editing alert thresholds.



Log Order



Log Replacement



Alert Thresholds

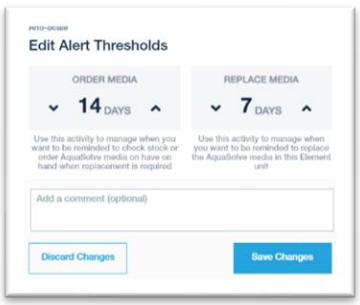
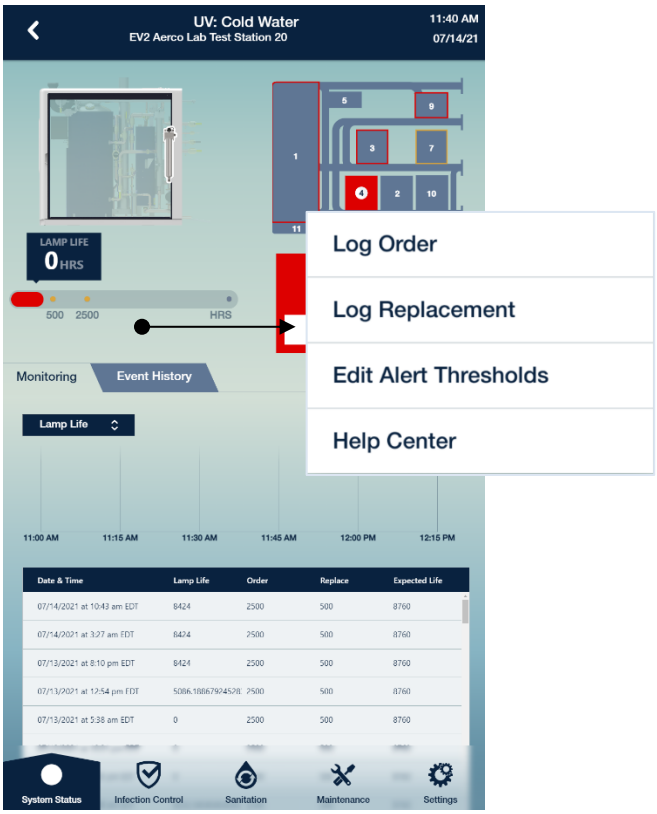


Figure 6-6 – Anti-Scale

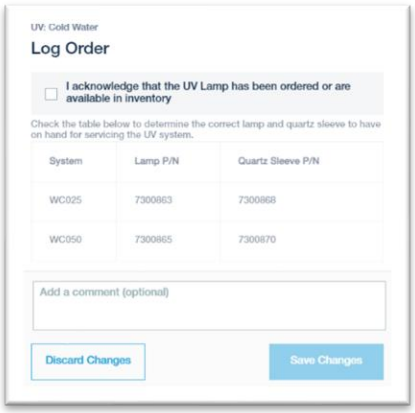
6.3.3 UV Cold Water and UV Recirculation

The ultraviolet (UV) subsystems disinfect water that passes through the Element, with one subsystem for the cold inlet for incoming water and a second subsystem for the recirc inlet for ongoing disinfection in the DHW loop.

The UV Cold Water and UV Recirculation screens show the component's current status. Options include viewing lamp life, logging an order or replacement and editing alert thresholds.



Log Order



Log Replacement

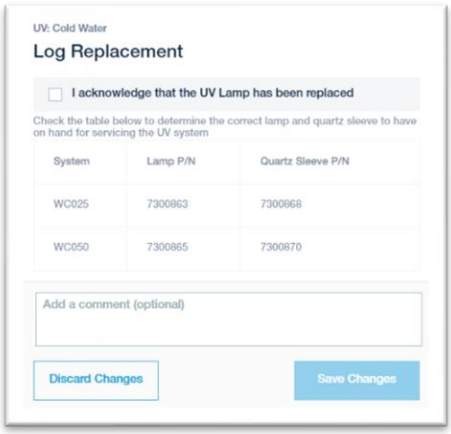
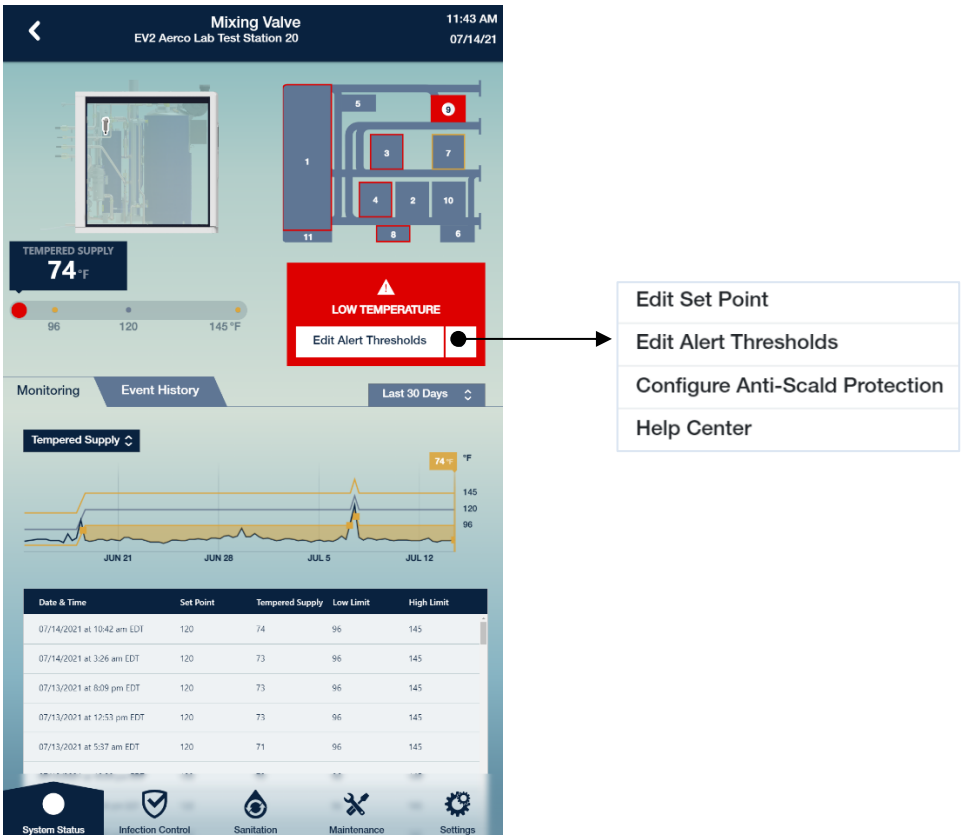


Figure 6-7 – UV Cold Water

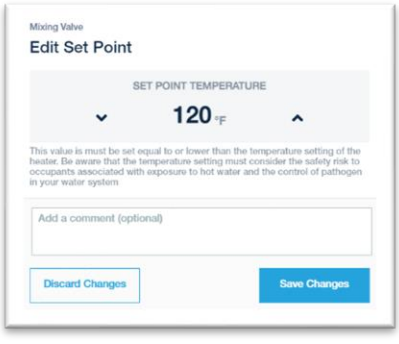
6.3.4 Mixing Valve

The mixing valve provides tempered water for distribution using the integral Lync DigiTemp Jr subsystem that complies with ASSE 1017.

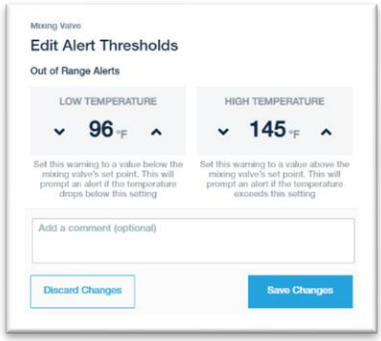
The **Mixing Valve** screen shows the component's current status and tempered supply temperature. Options include editing the set point, editing alert thresholds, and updating the anti-scald protection.



Edit Set Point



Edit Alert Thresholds



Anti-Scald Protection

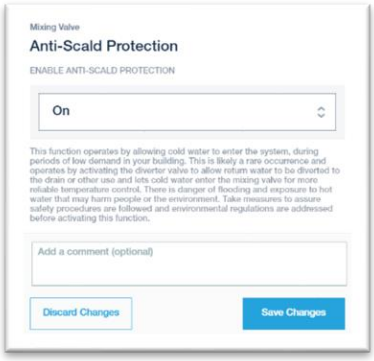


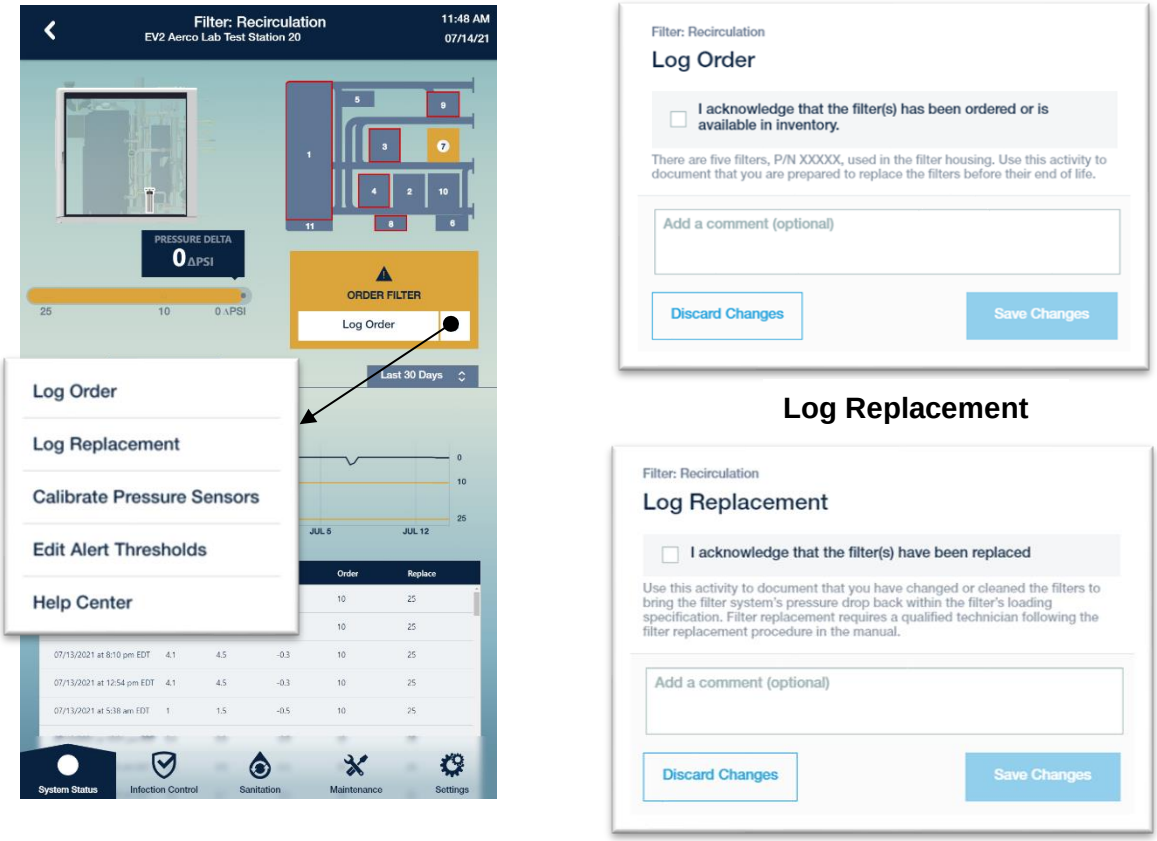
Figure 6-8 – Mixing Valve

6.3.5 Filters: Cold Water and Recirculation

The 5µm integrated filters promote proper function of the UV systems by minimizing sediment to allow UV light to reach any microorganisms. They also remove sediment that would otherwise enter the DHW system to create surfaces for biofilm to grow, or to feed the biofilm nutrients.

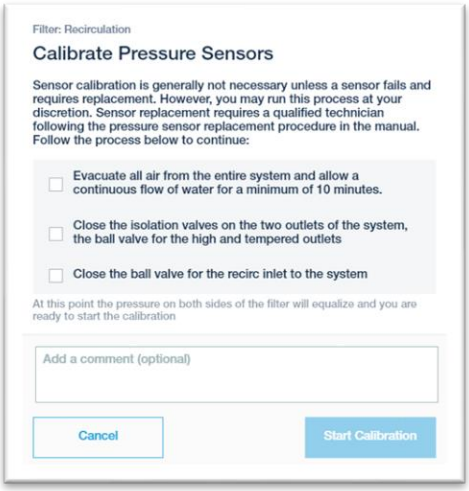
The **Filter: Cold Water** and **Filter: Recirculation** screens show current status and pressure drop. Options include logging an order or replacement, calibrating the pressure sensors, and editing alert thresholds.

Log Order



Log Replacement

Calibrate Pressure Sensors



Edit Alert Thresholds

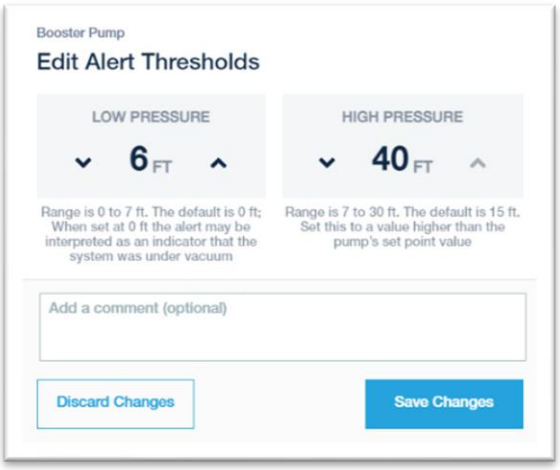
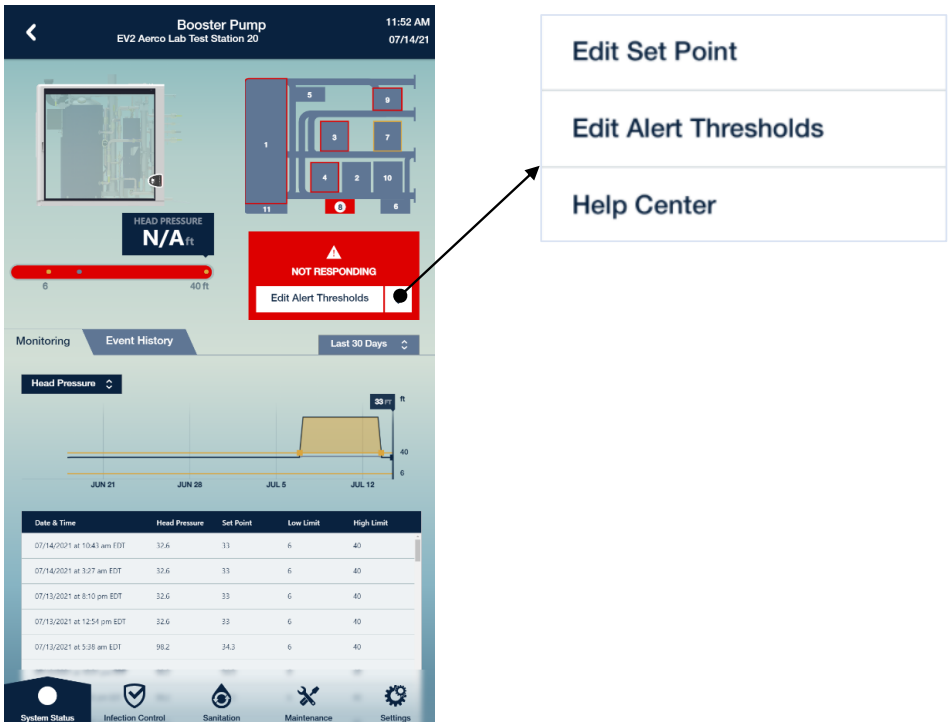


Figure 6-9 – Cold Water Filter

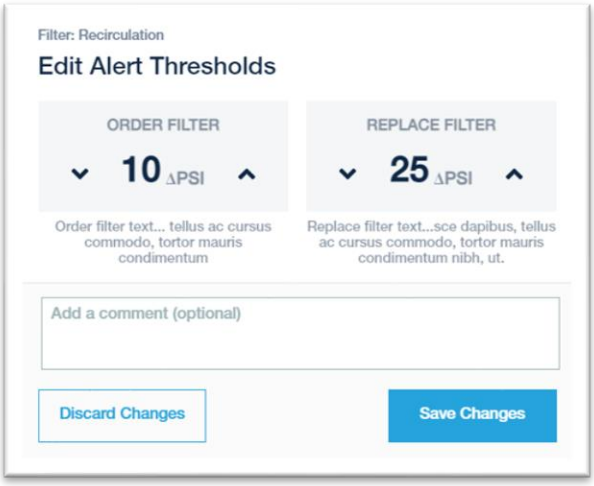
6.3.6 Booster Pump

The booster pump compensates for internal pressure drops between the cold-water inlet and the outlets. This ensures that there is virtually no pressure drop across the system.

The **Booster Pump** screen shows the component's current status and PSI pressure. Options include editing the current Set Point and editing alert thresholds.



Edit Alert Thresholds



Edit Set Point

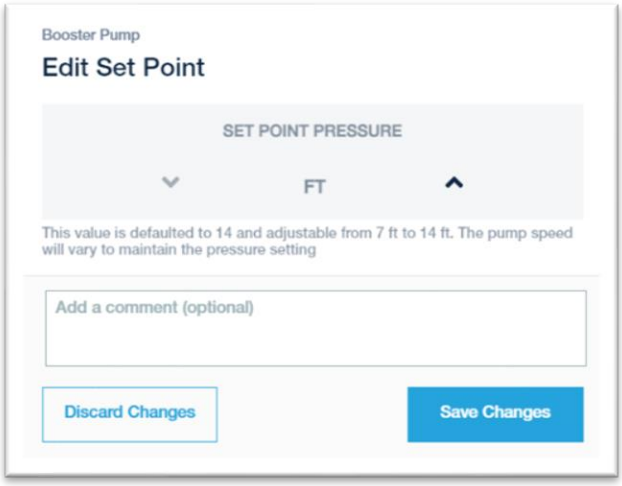
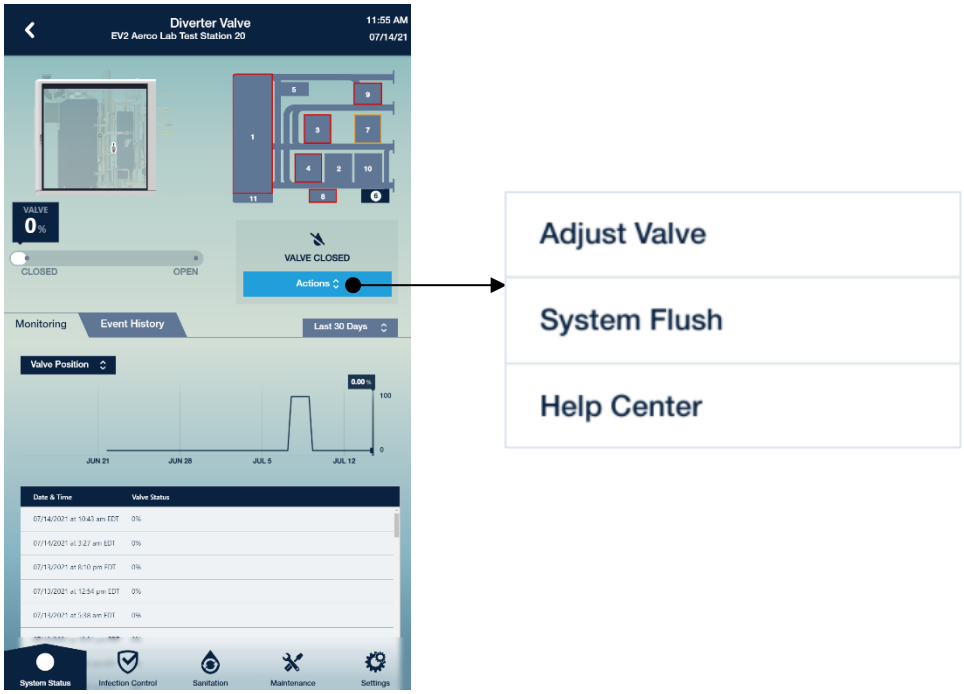


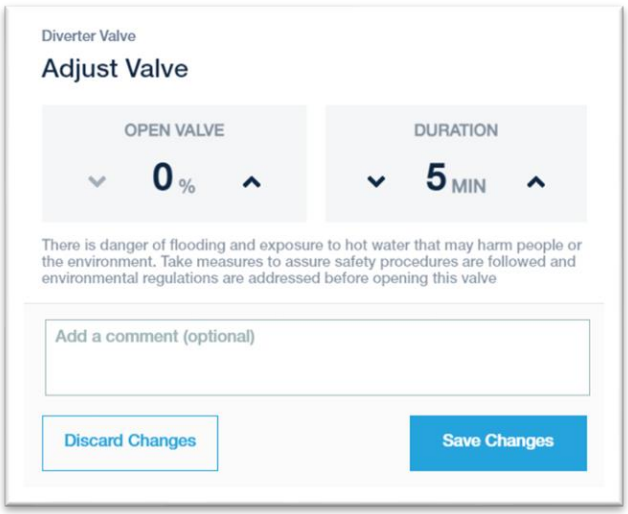
Figure 6-10 - Booster Pump

6.3.7 Diverter Valve

The **Diverter Valve** screen shows the component's current status and if the valve is open or closed. Options include editing the adjusting the valve and coordinating a system flush.



Adjust Valve



System Flush

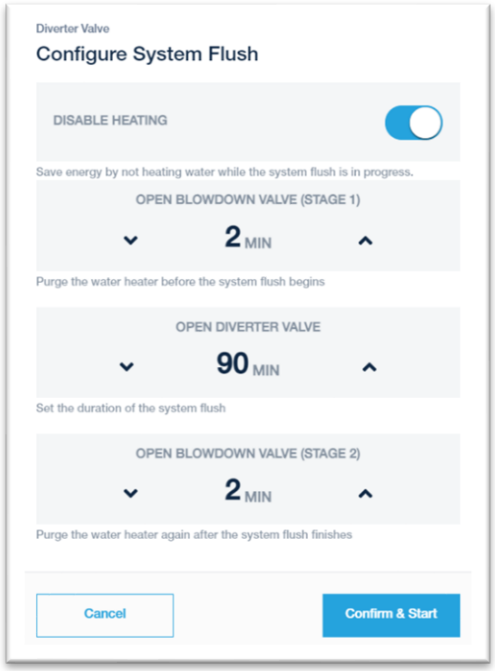
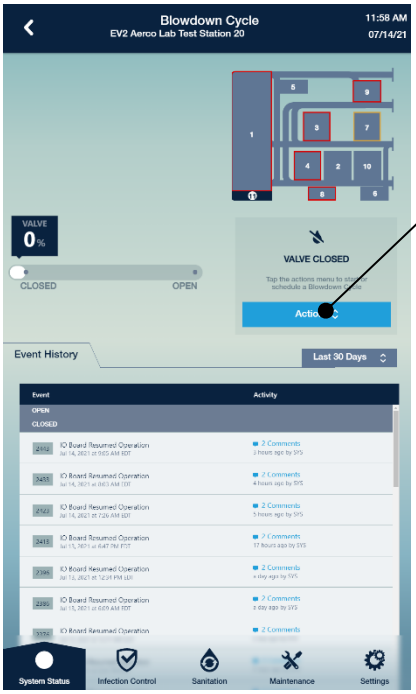
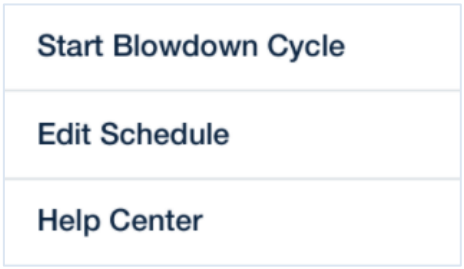


Figure 6-11- Diverter Valve

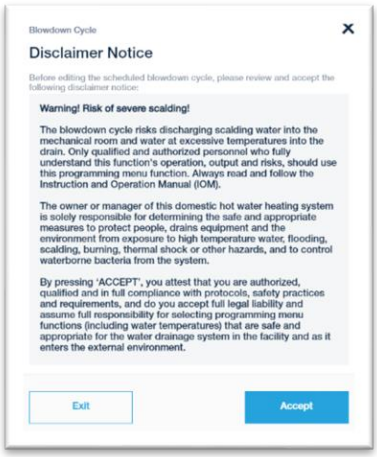
6.3.8 Blowdown Valve

The **Blowdown Valve** screen shows the component's current status and whether the valve is open or closed. Options include starting the Blowdown Cycle and editing the schedule.

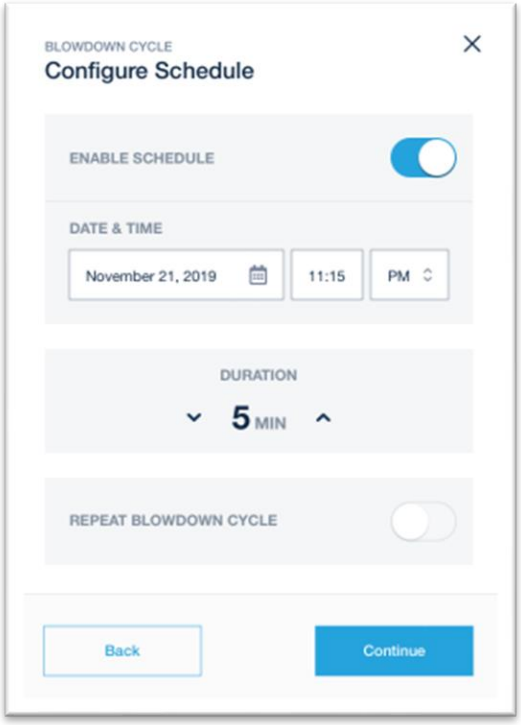




Disclaimer



Configure Schedule



Start Blowdown Cycle

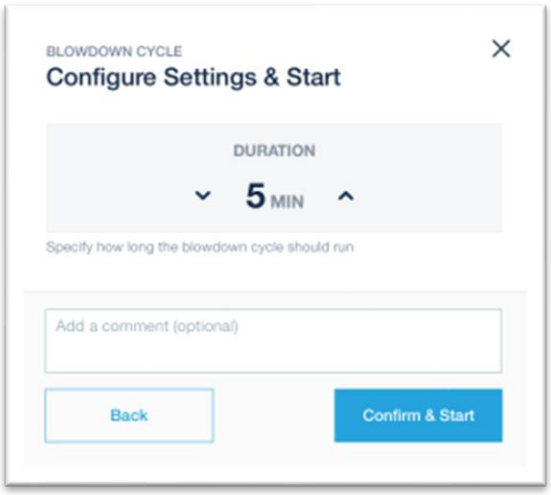


Figure 6-12 - Blowdown Valve

6.3.9 Sanitation Pump

The **Sanitation Pump** screen shows the current status and provides options for starting or scheduling sanitation. The Element can perform three (3) types of sanitation:

- **Sanitation Loop Conditioning:** Eliminates thermal stacking in the water heater volume
- **Water Heater Sanitation Loop:** Thermal self-disinfection of the water heater volume
- **Full System Sanitation:** Thermal disinfection of the DHW loop

6.3.9.1 Sanitation Loop Conditioning

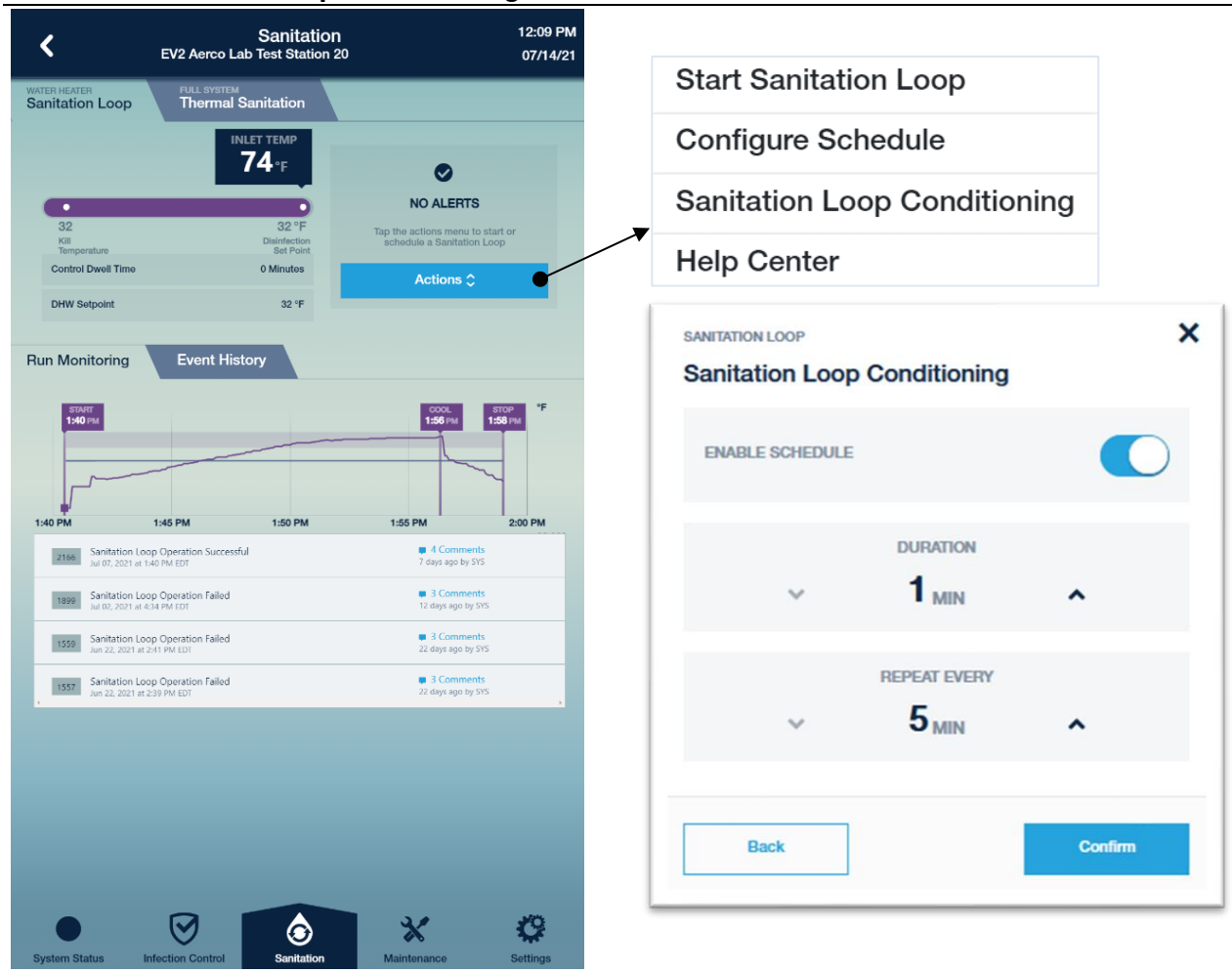


Figure 6-13 - Sanitation Loop Conditioning

Set to enable schedule. Set the conditioning cycle duration and interval between cycles and select Confirm to begin.

6.3.9.2 Water Heater Sanitation

NOTE: Domestic hot water should be stored above 140°F (60°C) to prevent pathogen proliferation. However, system demand, sizing, stacking, and setpoints may prevent that. Furthermore, the bottom of the tank is susceptible to biofilm growth given the potential for sediment settling. It is recommended to regularly perform a water heater sanitation cycle at elevated temperatures for a specific duration in order to be confident of pathogen removal. The temperature and dwell time in lab environments have been shown to be effective in reducing microbial populations including Legionella, however in the field there are many different parameters to account for including the insulating properties of biofilm, thermal loss through the system, thermal resistance of various bacteria, etc.

It is generally agreed that in a laboratory setting, a temperature of 122°F (30°C) results in an equilibrium point where certain species of Legionella are proliferating and dying at the same rate. Legionella populations begin to reduce at higher temperatures and per the following texts, Legionella die rapidly at temperatures above 158°F (70 °C):

ASHRAE. 2020. Guideline 12 – Managing the Risk of Legionellosis Associated with Building Water Systems

USEPA. 2016. Technologies for Legionella Control in Premise Plumbing Systems: Scientific Literature Review. EPA 810-R-16-001. US EPA Office of Water.

Regular testing for Legionella and regular water heater sanitation cycles in compliance with ASHRAE 188 is recommended as part of your building's Water Management Plan.

Before starting the sanitation loop, review and accept the disclaimer notice.

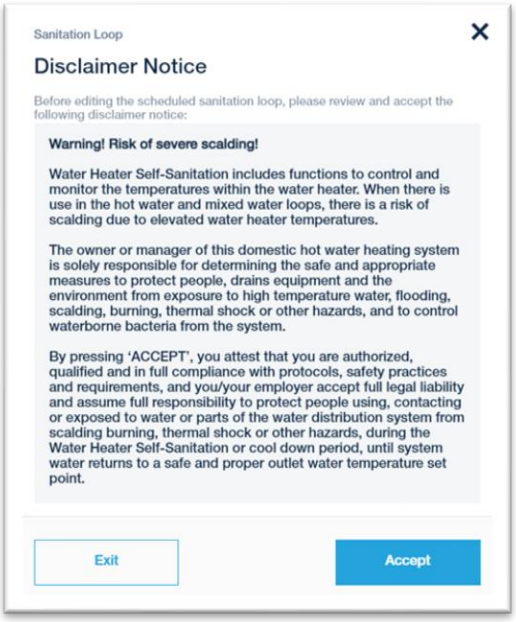


Figure 6-14 - Disclaimer Notice

⚠ WARNING:
There is a risk of severe scalding with raising the temperature of the water heater. Only authorized personnel should initiate a water heater sanitation loop cycle.

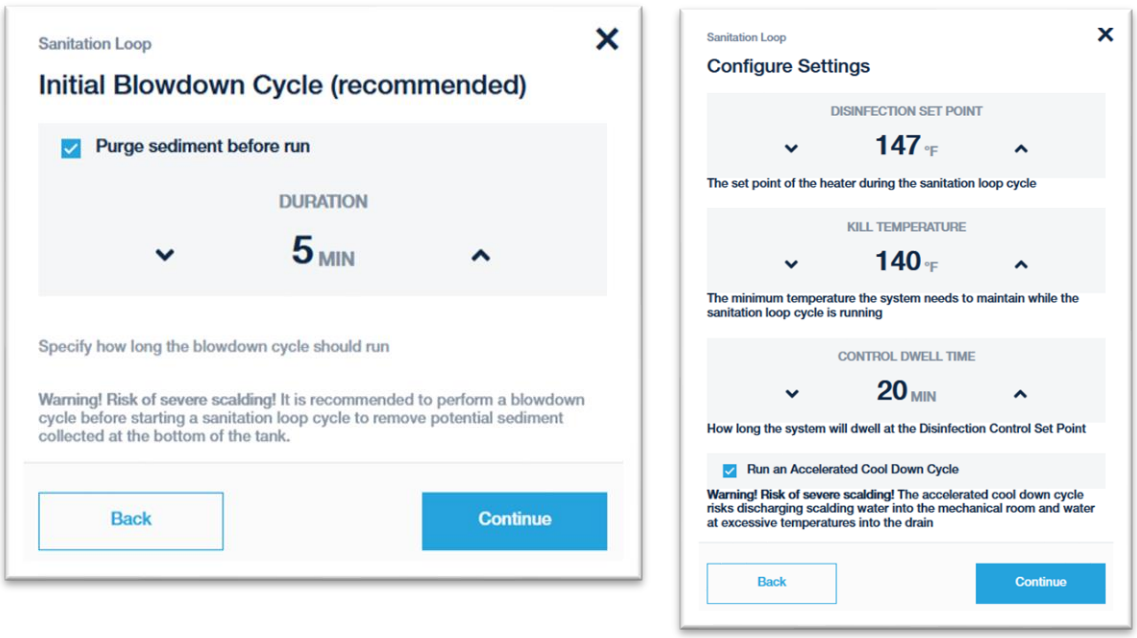


Figure 6-15 - Sanitation Loop

CAUTION
Discharging water at elevated temperatures may cause scalding. Discharging water at elevated temperatures into the DWV system may cause drain line damage. Follow local codes and regulations. A corresponding discharge of cold water may be needed in order to temper the water.

Before performing a water heater sanitation loop, it is recommended to perform a blowdown cycle to remove any collected sediment at the bottom of the water heater tank. Physically removing potential biofilm will assist in disinfection. It is unknown how much sediment is present, so set the duration based on the experience of the last blowdown cycle and observe how long it took to have discharge without sediment present.

Next, set the temperature and duration for the sanitation loop. The *disinfection setpoint* is the control signal given to the water heater to raise the temperature temporarily. The *kill temperature* is the control measure to ensure that a minimum temperature is reached. Once the kill temperature is reached, the timer begins associated with the *control dwell time*. If the water heater temperature goes below the kill temperature during the sanitation loop for a time period, the cycle will fail and the setpoint will return to the previous setting.

NOTE: Perform sanitation loop during a period of low demand to better control temperature.

There is the option of an *Accelerated Cool Down Cycle* where the volume returns to setpoint quickly by purging the hot water from the volume and bringing in cold makeup water. The duration of the cycle depends on the temperatures set during the sanitation loop and the incoming cold water. Alternatively, if the accelerated cool down cycle is not selected, the water will remain at temperature with the setpoint returned to the previous setting.

⚠ WARNING:
A demand for hot water may cause scalding as downstream mixing valves and fittings may not be able to compensate for the elevated temperature.

The Element's mixed output compensates for this rise in temperature, so the temperature will be controlled to the mixed output setpoint and control limits once reaching steady state.

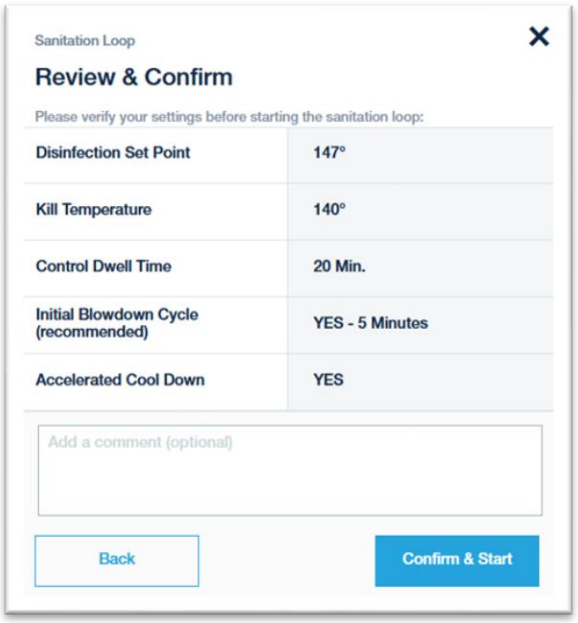


Figure 6-16 - Sanitation Loop

A confirmation screen will display to review the settings provided. Adding a comment to the process will included it in the generated event.

6.3.9.3 Full System Thermal Sanitation

The **Thermal Sanitation** screen shows the current status and allows the user to start a Thermal Sanitation or Add More Time.

It is recommended to include full system thermal sanitation cycles and regular testing for Legionella in your building's Water Management Plan, in compliance with ASHRAE 188.

6.3.10 Monitoring

Most components allow information to be monitored through the **Monitoring** tab of each menu. The **Monitoring** menu records previous variables and allows users to view previous temperatures from various timeframes.

6.3.11 Event History

Each component allows information to be stored and reviewed in the **Event History** tab of each menu. The **Event History** displays open and closed requests and allows users to add comments as needed:

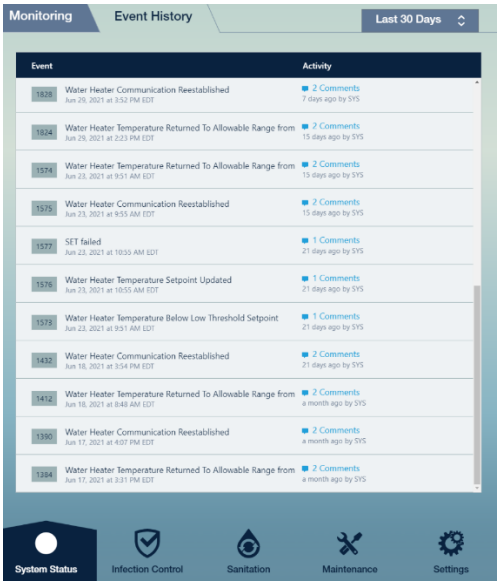


Figure 6-17 - Event History

6.3.12 Infection Control

Infection Control displays all events related to the Element. This list shows the event, component and activity beginning with the most recent activity:

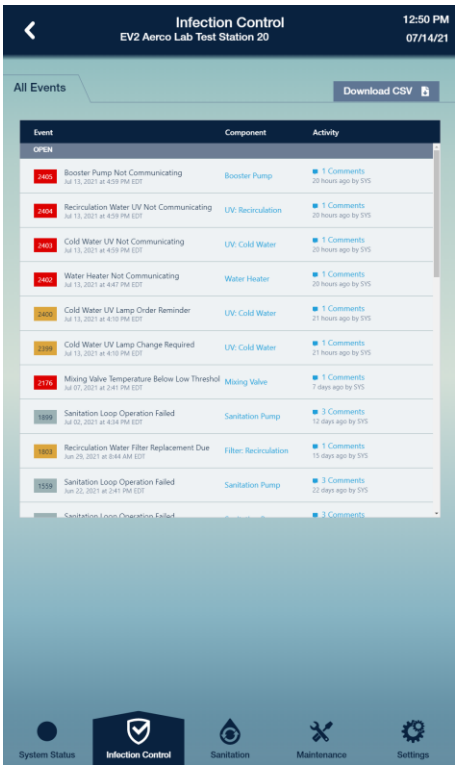


Figure 6-18 - Infection Control

6.3.13 Comments

Users have the option to add comments within the Event History. Open Events and closed Events display a log of comments along with date and timestamp. To view, add or edit a comment select the component, scroll to the **Event History** tab and select the desired Event. In the Activity column, click the blue link.

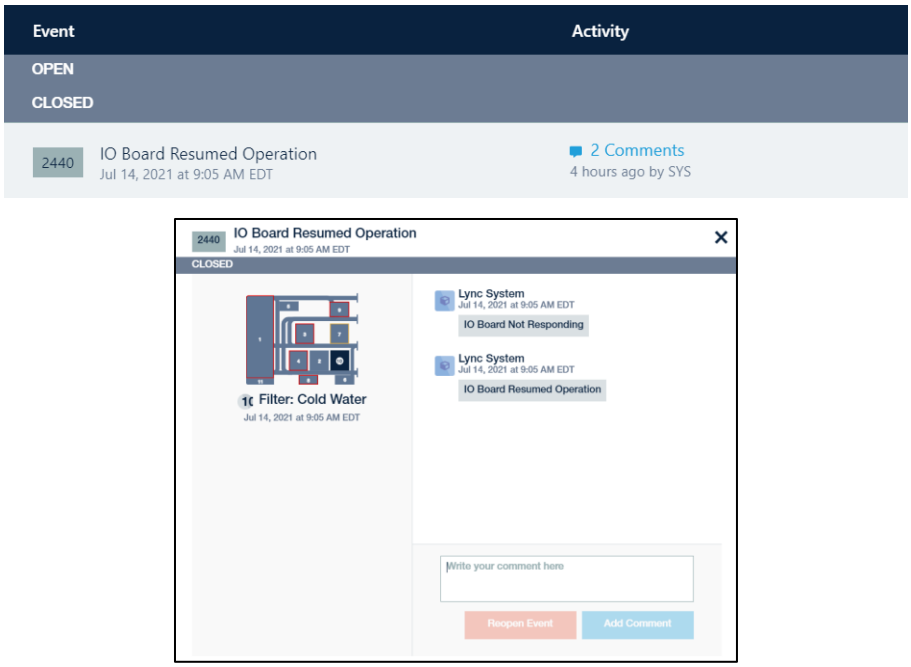


Figure 6-19 – Comments

6.3.14 Alerts and Notifications

Element provides alerts and notifications when various subsystems or Element as a whole requires attention. Some alerts are defined by the user, such as the maximum deviation from a setpoint, while others are defined by the EdgeSC, such as a maintenance alert. A complete list of remote alerts and notifications are provided in Appendix A.

The frequency of alerts can at times be more than expected, especially for temperature deviations. This is based on the building's domestic hot water plumbing system as well as the alert settings in the EdgeSC. For example, the lack of demand on the mixed outlet flow can result in the outlet pipe cooling to a temperature below the low temp alert limit. Upon use, the temperature would rebound to within setpoint. The low temp alert limit would need to be adjusted based on the expected demand unique to the occupants', building's, and your needs.

6.4 Settings

The Settings menu allows users to create and manage user accounts, edit network connection, change unit details, update software, and create system backups. The following section will provide information on how to edit the settings.

Figure 6-20 – Settings

6.4.1 User Accounts

Create and manage user accounts by navigating the menu as referenced below:

Figure 6-21 - User Accounts

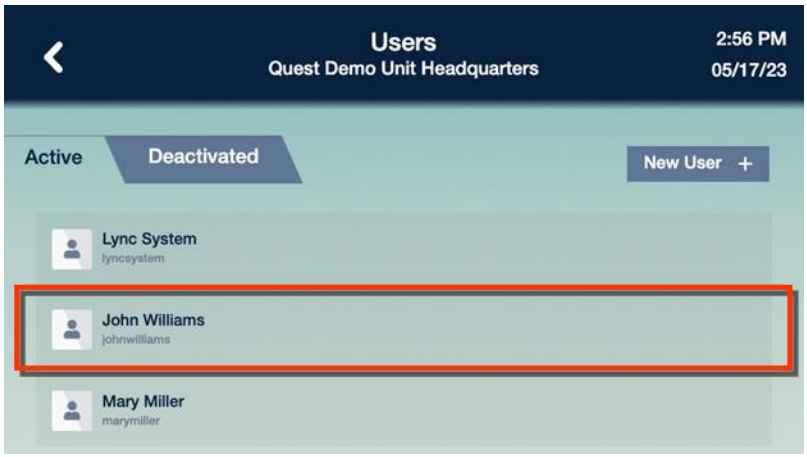
To Create a New User select **Manage Users** > **New User**.

1. Fill in the required information and select **Continue**:

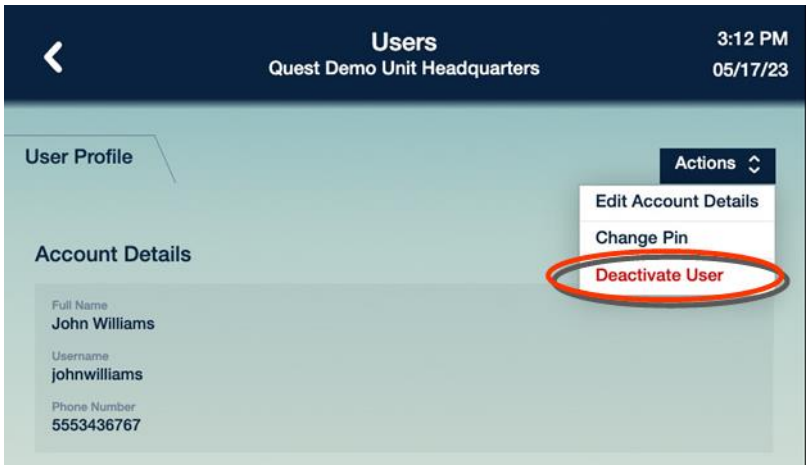
2. The system then prompts the user to create a 4-digit pin number.

To deactivate an Active User, select **Manage Users**. (Figure 6-21).

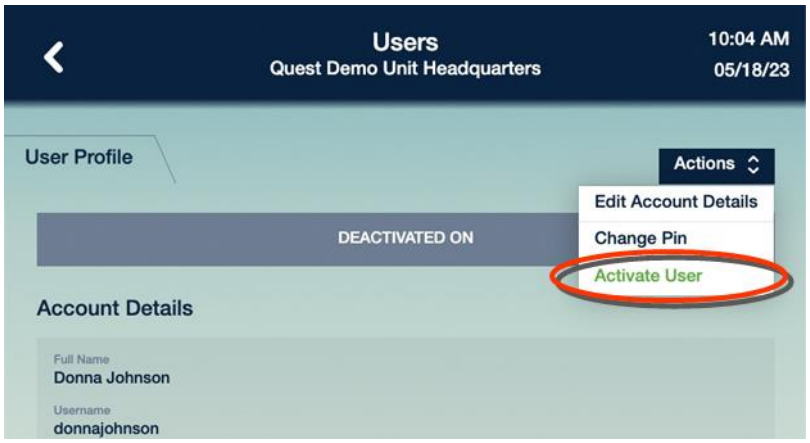
Under **Active** tab, select the user to deactivate.



Select **Actions > Deactivate User**. The user will be moved from **Active** to **Deactivated**.



To reactivate a Deactivated User, select **Manage Users > Deactivated**. Select **Actions > Activate User**. The user will be moved from **Deactivated** to **Active**.



6.4.2 Network Connections

Figure 6-22 - Network Connections

6.4.3 Cloud Connectivity

To experience the full benefit of the Element through the myLync remote experience, connect the unit to the cloud by way of local network connection. This is done by Cloud-Commissioning the unit. Once a connection to the internet has been established and you have created a site within the myLync app, click on the **Commission** button as shown below.

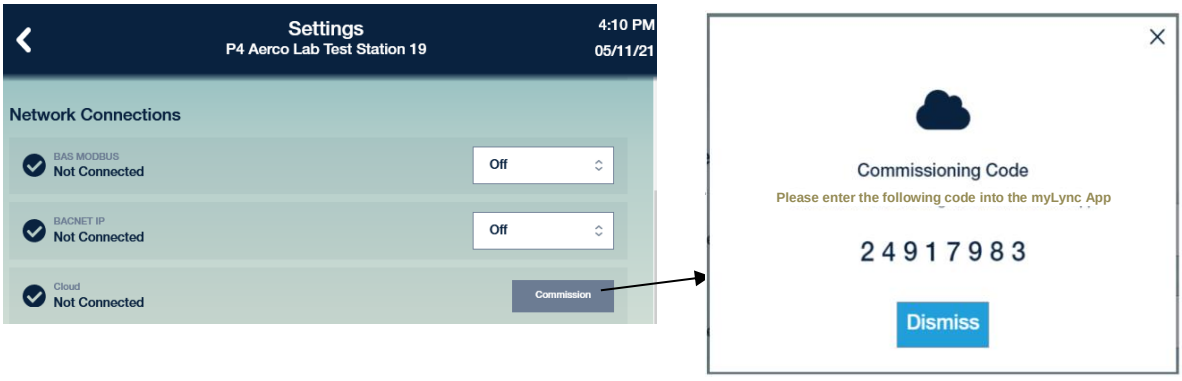


Figure 6-23 - Cloud-Commission Unit

This creates a unique, temporary cloud commissioning code. Add a unit to the site within the myLync app and when prompted, enter the code to link the unit with the site, building, or plant.

WARNING!

Lync by Watts is not responsible for alert failures or loss of remote control connectivity due to external connectivity or power issues.

6.4.4 Unit Details

Unit details, serial number and full model number are shown further down the settings page.

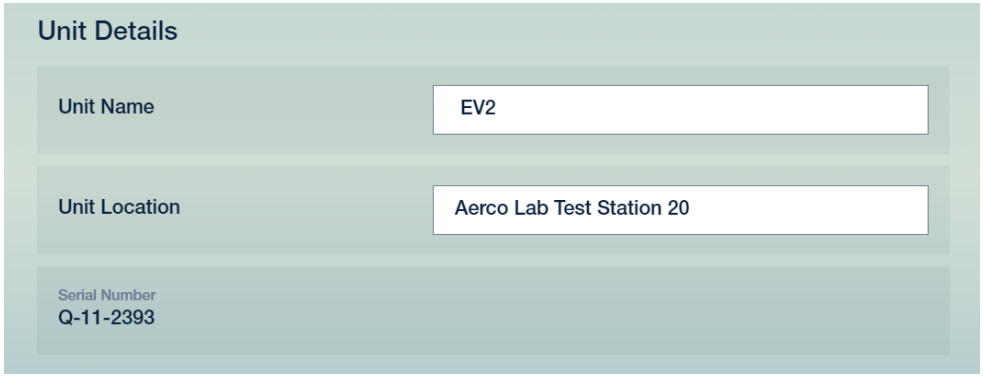


Figure 6-24 - Unit Details

6.4.5 Time

Select the boxes as shown below to change date, time and time zone.

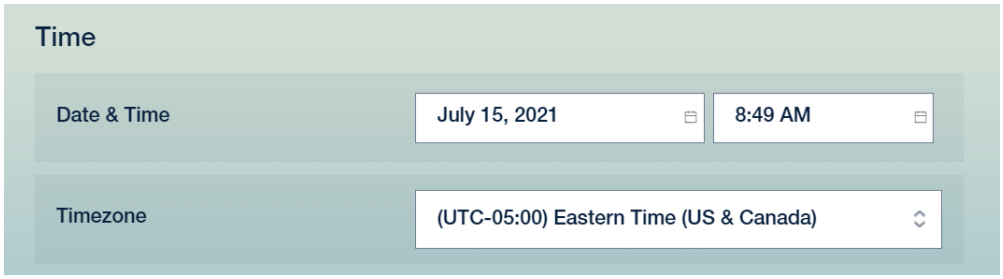


Figure 6-25 - Time and Date

6.4.6 Units

Units displayed can be changed in the drop-down menus below. Temperature can be displayed in either Fahrenheit or Celsius; Pressure in PSI or Bar; and Pump Head in Feet or Meters.
Note: The units displayed in the mobile experience are specific to the user.

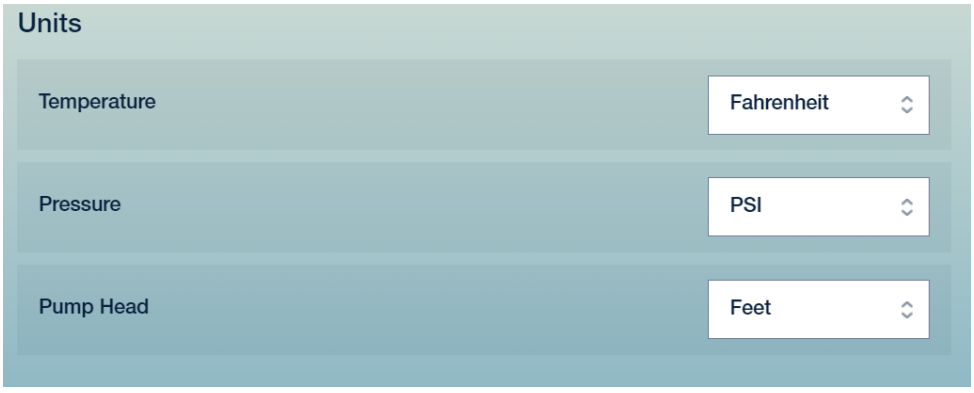


Figure 6-26 - Units

6.4.6.1 Installing Updates

To update software on the Element click **Install Update** and follow the prompts. Perform a cloud update if the unit is cloud-commissioned, or use a file loaded onto a USB memory stick.

The current system can be backed up onto a USB memory stick or restored from a previous backup. This is typically only necessary for units that are not cloud-commissioned as the data is already backed up in the secure Azure cloud servers while connected to the network.

Previous backups and versions of EdgeSC firmware can be managed from this screen.

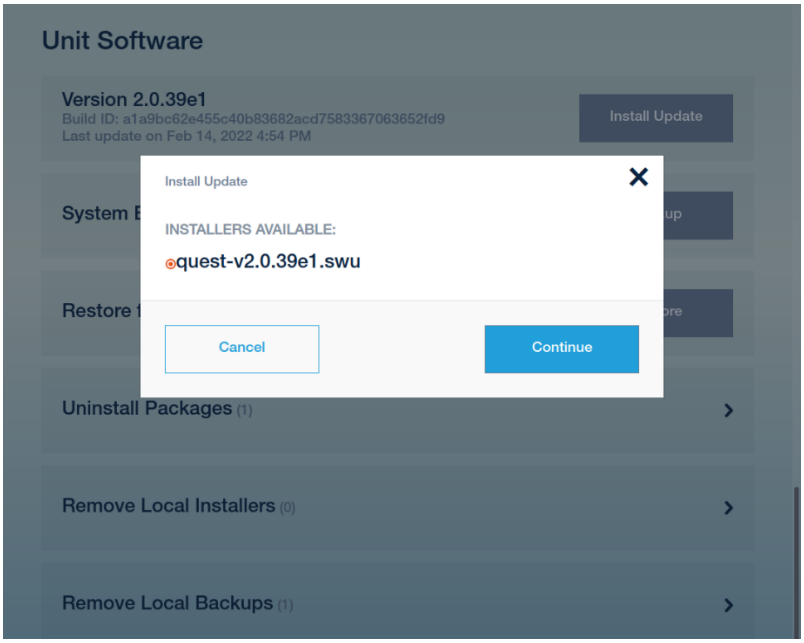


Figure 6-27 - Unit Software

6.4.6.2 System Backup

To perform a system backup, plug in the USB memory stick. Select **Backup** in the System Backup menu. Begin the Back Up process by selecting **Start Backup** on each menu prompt.

6.4.6.3 Presence Sensor and Screen Dimming

The screen will dim approximately 5 minutes after the Element does not detect a person in front of it. The screen may not dim because either an alert needs to be reviewed or something has changed in the surrounding environment.

6.5 BAS Connections

Modbus can be utilized to connect to a remote BAS or BMS to read (not write to) Element data.

6.5.1 Communication Specification

Communication Protocol	Modbus over RS485
Physical Layer	RS485 Two-Wire plus Signal Ground
Baud Rate	2400, 9600, 19200, 57.6k, 115k) (default 19200 bps)
Recommended Cable	18 AWG Shielded Twisted-Pair (STP)
Transmission Mode	RTU or ACSII (default RTU)
Start Bits	1 Bit
Stop Bits	2 Bits
Data Length	8 Bits for RTU Mode
	7 Bits for ACSII Mode
Parity	None (2 Stop Bits)
	Even (1 Stop Bit)
	Odd (1 Stop Bit)
	(default Even)
Addressing	1 to 247 (default 1)

6.5.2 Troubleshooting

If there is no communication, check the following:

- Check that the polarity on the Modbus + and - terminals is correct
- Check that the Modbus GND terminal is securely connected.
- Check that the Baud Rate on both devices is the same.

If the communication is intermittent, check the following:

- Check that the communication cable is twisted pair type.
- Reliable communication depends on the cable length & Baud Rate used. Long cable length may require a lower baud rate.

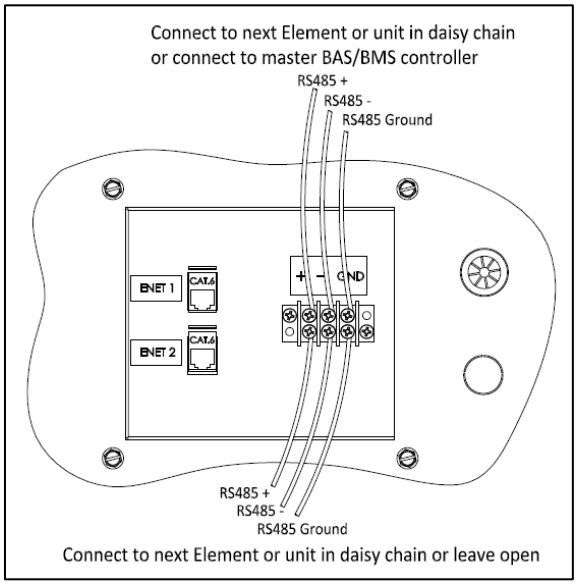


Figure 6-28: RS485 Modbus Connection Diagram

6.5.3 Modbus Points and BACnet Object List

See Appendix D

SECTION 7: LYNC Q WATER HEATER OPERATION

7.1 Temperature and Pressure Relief Valve(s)

A Temperature and Pressure Relief Valve(s) sized in accordance with ASME Boiler and Pressure Vessel Code, Section IV HLW is installed in the tank.

⚠ WARNING!

Secure relief valve discharge pipe to a suitable floor drain so hot water does not splash during discharge, which may result in property damage, personal injury or death.

- Follow the temperature and pressure relief valve manufacturer's installation instructions and all local, regional, and national codes applicable to temperature and pressure relief valve installation and discharge piping.
- The relief valve discharge pipe must not be smaller than the relief valve opening and must be secured to prevent it from lifting out of the drain under discharge pressure and must be routed to allow complete drainage of the valve and line.
- Do not plug the relief valves or install a reducing coupling, valve or other restriction in the relief valves discharge lines, as this will eliminate the critical water temperature and pressure protection it provides.
- Thermal Expansion - A relief valve that periodically discharges may result from thermal expansion if Element is installed in a system closed by components, such as a backflow preventer or check valve in the cold water supply. These systems must be provided with means to control expansion. Contact a water heater or plumbing professional to resolve this situation.

⚠ WARNING!

Do not plug relief valve(s), use discharge piping smaller than valve opening, or install a reducing coupling, valve or other restriction in the relief valve discharge line. Failure to comply with these requirements may prevent valve from providing its intended temperature and pressure protection and cause a sudden loss of pressure containment that can cause property damage, exposure to hazardous materials, personal injury or death.

7.2 Electronic Low Water Cut-Off

When the water level is above the electrode position in the tank, pushing the RESET button will energize the control (LED will be lit). The control remains energized until the water level drops below the electrode position (LED will not be lit). Unless otherwise specified, there is a three-second time delay on decreasing water level. Water level must be below tank probe location for full three seconds before control de-energizes. In the event that a low water condition occurs, a failure message will be displayed on the controller touch-screen. This failure lockout can be reset by pressing the LWCO RESET button located on the front control panel. Once the LWCO control board has been reset, the Main Reset button located on the front control panel can be reset as well.

The Electronic Low Water Cut-Off probe is located in the top head of the Element water heater.

⚠ WARNING!

Turn off all electrical service before accessing the limit or other controls inside the control cabinet or burner area. Close and fasten the control cabinet and burner area cover before restoring electrical service. The cabinet and burner area contain High Voltage wiring and terminals. If the electrical service is not turned off and these terminals are touched, a dangerous shock causing property damage, personal injury or death could occur.

7.3 Operating Temperature Control

An adjustable digital operating control is located in the front control panel. This control is continuously updated by the EdgeSC controller so any adjustment will be reset unless there is a communication error. It is not recommended to adjust the water heater temperature directly onto the Lync Q water heater unless performing troubleshooting.

7.4 High Water Temperature Limit

The Electronic Operating Control System (EOS) includes a single probe that contains the limit and operating sensors. Since both sensors are in the same location in the heated storage tank, the EOS checks to be sure their output is within a degree or two of each other. If not, or if the maximum water temperature exceeds 200ºF, the EOS will lockout and the manual Reset button on the control panel must be pressed before the water heater will resume operation.

7.5 Electronic Operating System (EOS)

The Electronic Operating System (EOS) consists of three components:

- The Platform Ignition Module (PIM)
- A plug-in ID card,
- The Control Display.

The PIM is connected to the BTCII control display using the 143558 cable that connects into the RJ45 port at J4. This cable provides all communication between the PIM and display as well as power to the display.

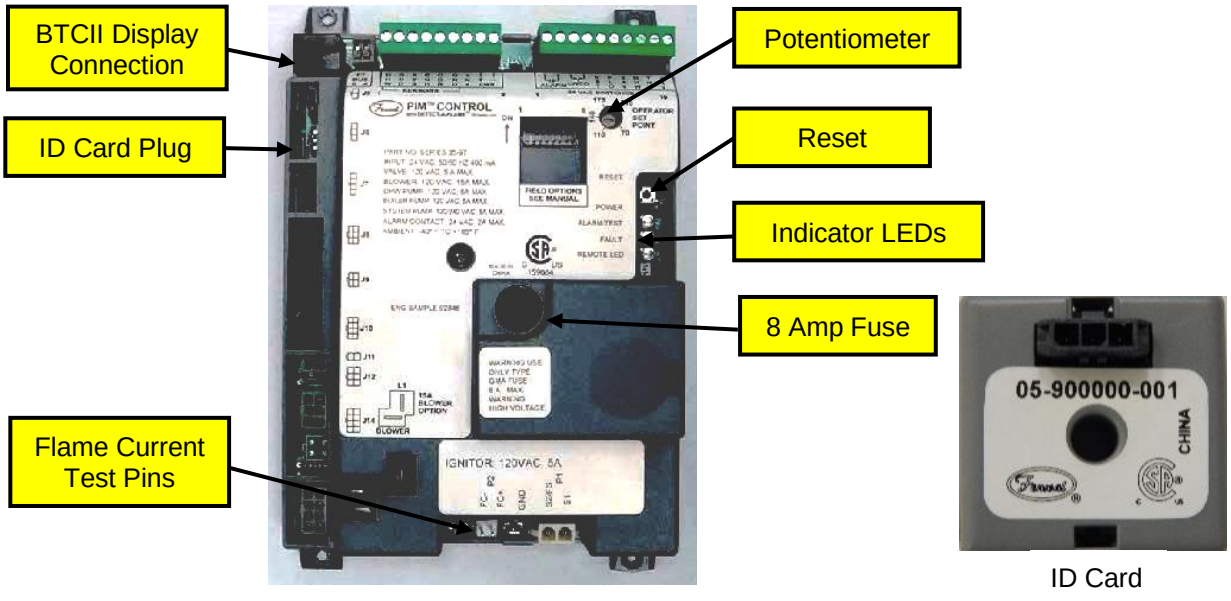


Figure 7-1 Platform Ignition Module (PIM)

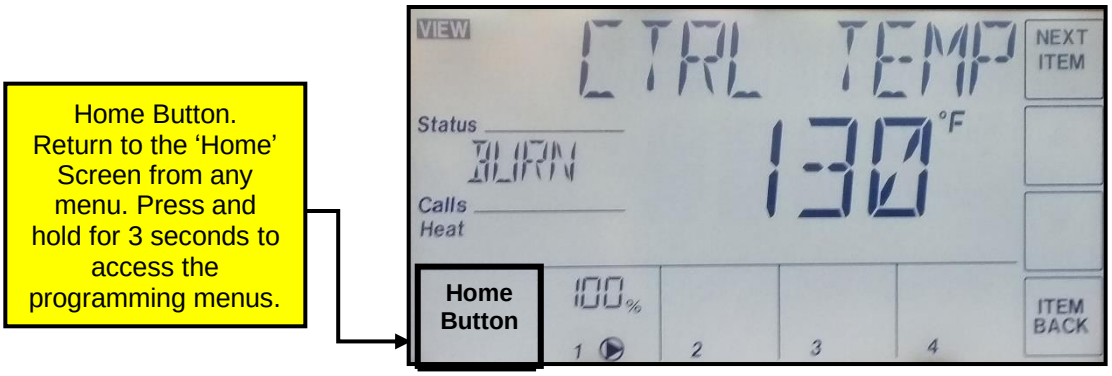


Figure 7-2 Touch Screen User Interface (BTC II)

7.5.1 Touch Screen User Interface

The EOS touchscreen provides one-touch access to view and adjust various Menu setpoints. The touchscreen displays Status Fields, Items, Water Heater Output and Number Fields. It also contains buttons for navigation & adjustment, and the Home Button to access menu selections.

7.5.2 Status Field Display

The Status Field displays the current operating status of the control display. Most items in the status field are only visible when in the View Menu or an alarm condition is present.

Item	Description
ARSW	EOS is attempting to purge but waiting for monitoring tachometer (TAC) sensor in the fan motor to reach reset speed (RPM) to prove blower air flow.
BURN	Burner has ignited and flame has been sensed.
HAND	Hand Mode: allows user to manually control the operation and firing rate of the burner.
IDLE	EOS is Idle due to no demand for heat.
IGN	Hot Surface Igniter is hot and gas valve has opened to attempt ignition (4 seconds).
PREP	Pre-Purge: EOS is pre-purging the burner system.
PURG	Post-Purge: when heating cycle ends, the blower runs for a pre-determined time to vent combustion gases
OFF	System has been disabled in the Manual Override Menu.
SANI	Sanitation Mode: Temporarily energizes a field-installed sanitation pump and operates the water heater at an elevated setpoint temperature.

Table 7-1 – Status Field Display

7.5.3 Operational Sequence Field Display

The EOS displays the following operational sequence, ignition status, timings, temperatures and values:

Item	Units	Description
SATISFIED	ºF	There is no Call for Heat based on temperature at the top of the tank
CALL FOR HEAT	READY	Initiated when the temperature sensed at the control sensor at the top of the tank is 5 degrees less than the setpoint temperature.
BLOWER (1)	mm:ss	Displays the blower time for pre-purge and HSI heat up time. Keeps counting until trial for ignition starts.
IGNITION	mm:ss	Trial for ignitions starts, only on for 1-4 seconds. Gas valve clicks, HSI turns off and becomes a flame sensor, and heater starts looking for a flame signal.
CURRENT	µA	Flame current. Range is 0 - 10.0µA
CTRL TEMP	ºF	Flame is established and the temperature sensed at the control sensor at top of tank is displayed.
BLOWER (2)	mm:ss	When call for heat has ended, the blower runs for a predetermined time to evacuate the venting of combustion gases. The post purge time is displayed.

Table 7-2 – Operational Sequence Field Display

7.5.4 View Menu (Home Screen - Default Display)

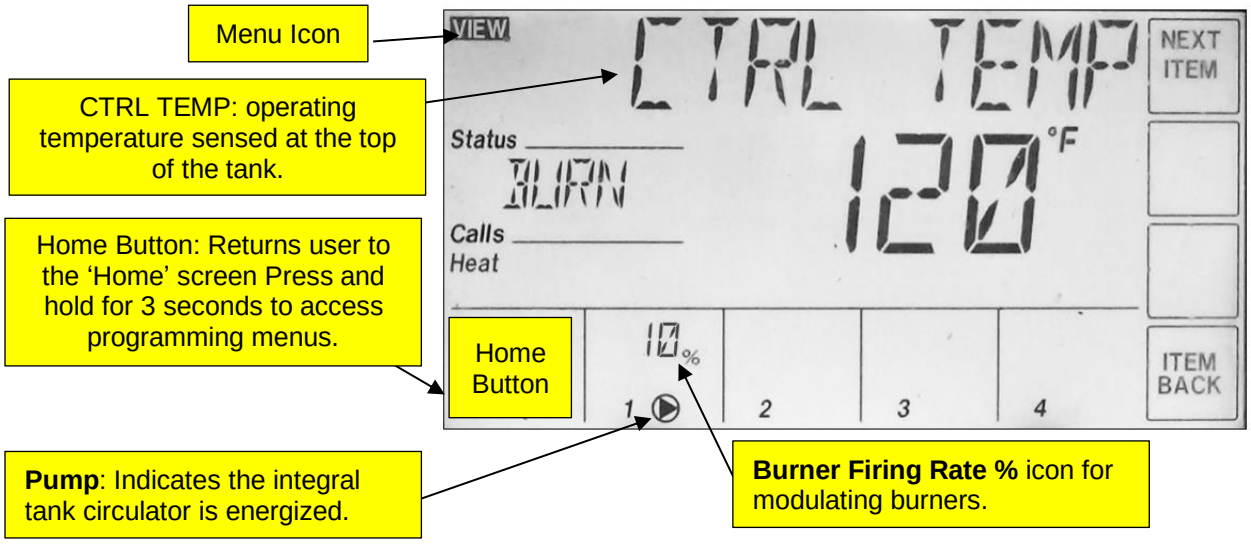


Figure 7-3 - Home Screen - Default Display

The **VIEW** menu is the default display (home screen) of the EOS control system and displays general operation and status information. The default display includes a **Burner** firing rate % icon for modulating Elements (disregard for fixed rate burners), a **Pump** icon visible whenever the integral tank circulator is energized, and Failure Messages for alarms or error conditions.

Use the **NEXT ITEM** and **ITEM BACK** buttons to scroll and view the View Menu Item Fields and their associated values. The Item Field descriptions are listed below:

Item Field	Description

SETPOINT	Display screen displays the current operating setpoint but does not allow the user to make changes in this menu.
VENT	Displays the current flue gas temperature as measured by the flue gas sensor located in the flue outlet.
TANK TOP	Displays the current temperature at the top of the Element's tank as measured by the operating control sensor located near the hot outlet.
TANK BOT	Displays current temperature at the bottom of tank as measured by the control sensor responsible for regulating the operation of the integral tank circulator.
TANK ΔT	Displays temperature difference between TANK TOP and TANK BOT sensors.
FLAME CUR	Displays burner flame current in approximate μA dc. Since this is an approximation it is recommended that a flame current measurement be taken at the PIM control board using a micro-amp meter.
TIME	Displays the real time as programed in the TIME menu.

7.5.5 Control System Menus

The control display has multiple access levels. System critical settings will not be available for adjustment. Settings that can be adjusted will display UP and DOWN arrows on the right side of the display. These programmable menu items are located in the Control System Menu.

To access the Control System Menu:

1. Press and hold the **HOME** button for 3 seconds.
2. Press **NEXT ITEM** to navigate to the next menu. Touch **ITEM BACK** to go reverse.
3. Press **ENTER** to change user accessible menu item settings in the control system menus.
4. Most settings are in the USER access level. Other setting will be located in the INSTaller or ADVanced access level depending on the necessity for field adjustment. See Section 10.12: *Using Tool Box Menu* for details.

Menu	Description
SETUP	Displays and modifies the temperature control setpoints for the burner, integral tank circulator and the SANI functions
SOURCE	Displays factory programmed settings which can be adjusted with the the up and down arrows
MONITOR	Displays operational information such as water and vent temperatures, hours of operation, and number of cycles
TIME	Sets the time, day and year. Setting the time is necessary when using the scheduled setback
SCHEDULE	Allows the user to create a schedule for reducing the water heater's setpoint when a building is unoccupied for a period of time
NETWORK	Displays and modifies parameters for creating a Modbus communication connection with the water heater
OVERRIDE	Allows the user to assume manual control of the burner operation and pumps
TOOLBOX	Displays alarm message history. Changes User access level and reset to factory default settings

Figure 7-4 - Control System Menu Descriptions

7.5.6 Changing the Vent Material Type (ADVanced Level Access)

If the cold inlet water temperature is above 100°F, the use of solid CPVC, Polypropylene or Stainless Steel venting is required and the vent limit switch must be adjusted for the higher temperature rating allowed by these vent materials.

To change the Vent Type Value:

1. From the View Menu, press and hold the **HOME** button for 3 seconds to enter the Control System Menu. The first menu displayed is the SETUP Menu.
2. Touch the **Next Item** or **Item Back** buttons to navigate to the TOOLBOX menu.
3. Touch the **ENTER** button to display the ACCESS screen.
4. Hold **#4 button** to change to ADVANCED.
5. Exit the menu by pressing the **HOME** button.
6. Use the **Next Item** or **Item Back** buttons to navigate to the SOURCE menu.
7. Enter the SOURCE menu.
8. Use the **Next Item** or **Item Back** buttons to navigate to the VENT TYPE menu.
9. Using the **UP** or **DOWN** arrow buttons, select between the four choices: PVC (default setting), PPS, CPVC or SS.
10. Exit the menu by pressing the **HOME** button.
11. Using **Next Item** or **Item Back**, go to the TOOL BOX menu, press **enter**. Hold **#4 button** to remove ADVANCED level, use **arrows** to return to USER level. Hit **HOME** to exit TOOLBOX menu, hit **HOME** button again to exit MENUs.

7.5.7 Changing the Operating Setpoint (USER Level Access)

The unit operates to satisfy the stored water temperature setpoint of the EOS control. The value of the controls' setpoint is the desired stored tank water temperature. Elements ship with a factory setpoint of 120ºF.

Although the setpoint can be displayed in the VIEW menu, it is necessary to enter the **CONTROL SYSTEM** MENU in order to adjust the water heater's setpoint and other parameters.

To Change the Operating Setpoint:

1. From the VIEW MENU, press and hold the **HOME** button for 3 seconds to enter the Control System Menu. The first menu displayed is the SETUP MENU.
2. Touch the **ENTER** button to display the SETPOINT MENU.
3. Adjust the setpoint value using the **UP** and **DOWN** arrow buttons.
4. To save the new value, touch the **NEXT ITEM** or **ITEM BACK** buttons or exit the menu by pressing the **HOME** button.

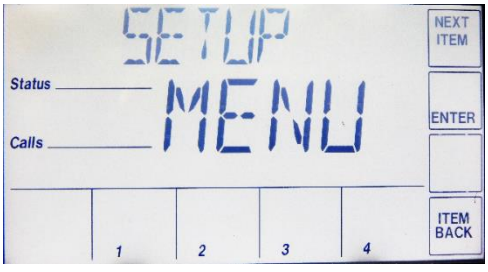


Figure 7-5 - Changing the Setpoint

7.5.8 Setting the Real Time Clock (User & Installer Level Access)

The TIME MENU allows the user to program the time of day, the date and the year. A 12 or 24 hour time clock as well as daylight saving time can be selected. When selected, the time clock can be displayed in the VIEW MENU.

1. Press and hold **HOME** button for 3 seconds to enter **CONTROL SYSTEM** Menu. Use the **NEXT ITEM** button to scroll to the **TIME** menu. Press **ENTER** button to enter **TIME** menu.
2. Use the **NEXT ITEM** button to move to the first screen. Use the UP & DOWN arrow buttons to set the hour, then press the **NEXT ITEM** button to enter the value and move to the minute. Once the parameters for the time screen have been entered, move to the date and year screen and enter settings in the same manner.
3. To display the real time clock in the **VIEW** menu, select daylight saving time or choose between a 12 and 24 hour clock, use the **NEXT ITEM** button to move to the correct screen and then the arrow button to select. Save and exit the menu by pressing the **HOME** button.

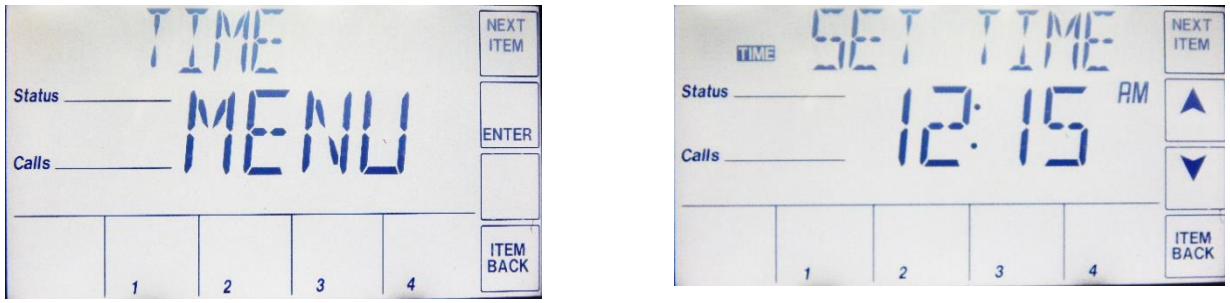


Figure 7-6 - Setting the Clock

7.5.9 Scheduled Setback (USER Level Access)

The **SCHEDULE MENU** allows the user to program the unit to automatically lower, or setback, the operating setpoint when a facility is not occupied, or the use of hot water is curtailed.

1. Press and hold the **HOME** button for 3 seconds to enter the Control System Menu. Use the **NEXT ITEM** button to scroll to the **SCHEDULE** menu. Activate the schedule function by first turning on the **HEAT SCHD** using the arrow buttons.
2. There are four setback schedule types: 24hr, 5-2, 5-11 and 7DAY. The 24hr schedule (default) is a daily schedule that will follow the same program every day of the week. All other schedule types are selected using the arrow buttons. The 24hr schedule allows for a 2 or 4 EVENT/DAY. The 2 event day provides for one occupied time and one unoccupied time per day. The 4 event day allows for two occupied times and two unoccupied times per day.

NOTE: Unoccupied setpoints are programed in the same manner as occupied setpoints.

For example, a 24hr type and a 4 event day schedule might look like this:

a) The 1st occupied time begins at 6:00am and the 1st unoccupied time begins at 11:00am; therefore, the occupied setpoint will be used between 6:00am and 11:00am.

a) The 2nd occupied period begins at 4:00pm; the 2nd unoccupied time begins at 10:00pm.

b) Between the 1st unoccupied time of 11:00am and the beginning of the 2nd occupied period, the unoccupied setpoint will be used.

c) At 4:00pm the 2nd occupied period will begin and continue until 10:00pm.

d) From 10pm until 6:00am, the unoccupied setpoint will then be used.

Note: Schedule times are identified as occupied (**Occ**) or unoccupied (**UnOcc**) here.

3. The 5-2 schedule type provides for a 2 or 4 EVENT/DAY but also allows for one schedule to be followed Monday–Friday and another on Saturday and Sunday.
4. The 5-11 schedule type provides for a 2 or 4 EVENT/DAY but also allows for one schedule to be followed Monday–Friday, another on Saturday and another on Sunday.
5. The 7DAY schedule type allows for a 2 or 4 EVENT/DAY for all 7 days of the week.

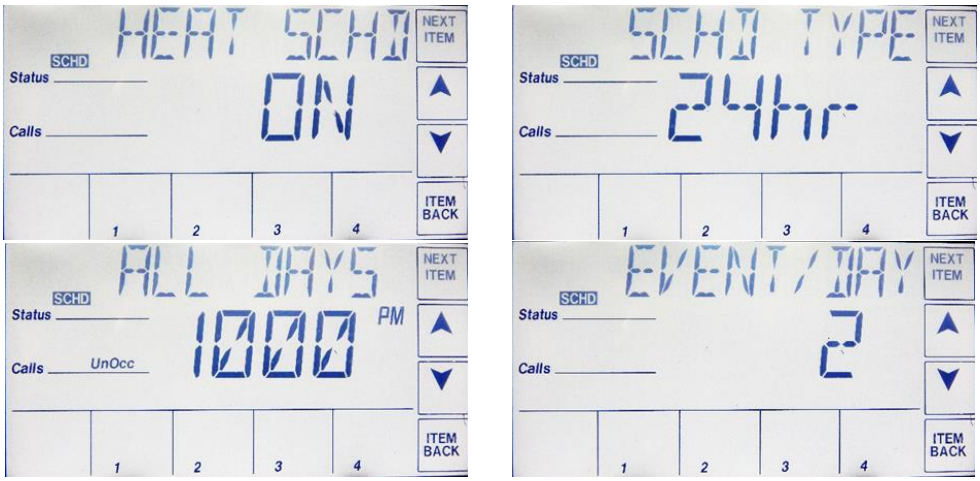


Figure 7-7 - Scheduled Setback

7.5.10 Using the Manual Override Menu (ADVanced Level Access)

The **OVERRIDE MENU** controls the integral tank circulator and optional SANI pump; it is useful during initial commissioning as well as anytime burner adjustment is necessary.

To access the Manual Override menu and enter the Advanced Level access:

1. Press and hold the **HOME** button for 3 seconds.
2. Touch the **NEXT ITEM** or **ITEM BACK** button to navigate to the **TOOLBOX** menu.
3. Touch the **ENTER** button to display the ACCESS screen.
4. Depending on the control software version, the ADVANCED level can be selected using the **UP** and **DOWN** arrow buttons. Subsequent software revisions will require pushing button #4 (bottom right corner) to place the control in the ADVANCED access level.
5. Exit the menu by pressing the **HOME** button.
6. Use the **NEXT ITEM** or **ITEM BACK** buttons to navigate to the **OVERIDE** menu.
7. Enter the OVERRIDE MENU. Using the arrow buttons, select between the three choices. The default setting is **AUTO**. In the **AUTO** position the operating temperature control will work to control the water temperature based on the active setpoint. When manual control of water heater operation is complete, always return this parameter to the **AUTO** setting.
8. The second setting is **OFF**. This will stop all control function and prevent the burner from operating.
9. The third setting is **HAND**. Once enabled, use the **NEXT ITEM** button to scroll to the next screen. The **TIMEOUT** setting is a safety precaution that will disable the override function at the end of the specified time period if the **MAN OVR** setting is not returned to AUTO.

10. The next screen is **SAN PUMP**. To force on the SANI pump, turn this setting to **ON**.
11. The next screen is **HTR PUMP**. To force on the integral tank circulator, turn setting to **ON**.
12. The next screen is **HTR MOD**. This setting will override the operating control and using the up and down arrow buttons, force the burner to fire at the selected firing rate. This function is useful when tuning the operation of the burner at a range of firing rates.
    NOTE: If the **HTR MOD** control is activated while the burner is firing, the burner will shut down and recycle.

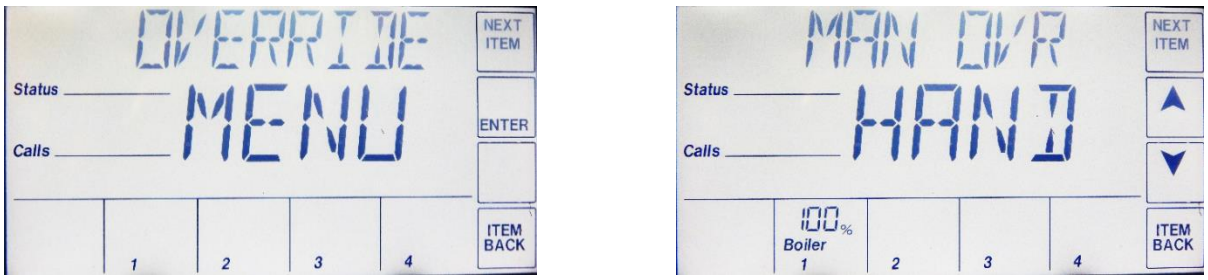


Figure 7-8 - Manual Override Menu

⚠ WARNING!
When adjustments are complete and before putting the Element into service, return the MAN OVR function to “AUTO”. Failure to return MAN OVR function to “AUTO” can cause high water temperatures that can result in property damage, scalding, other serious injury or death.

7.5.11 Potentiometer (Operating Setpoint for Standalone Operation)

The PIM Ignition Control will continue to operate the Element at a 120° internal setpoint should the touch screen control fail, or communication between the two devices is interrupted. This internal setpoint can be adjusted using the potentiometer to maintain a different operating temperature under these circumstances if desired. This feature is intended to be used on a temporary basis, since accuracy of temperature control is dependent upon the touch screen control.

IMPORTANT: At the time of commissioning, It is recommended that the startup technician adjust the potentiometer to desired setpoint displayed in the **OPERATOR** screen located in the **SOURCE** control system menu. The standalone setpoint can be adjusted independently of the touchscreen but a specific setting may be difficult to achieve on the PIM.

NOTE: If operating setpoint is changed after initial commissioning, potentiometer should be readjusted as well.

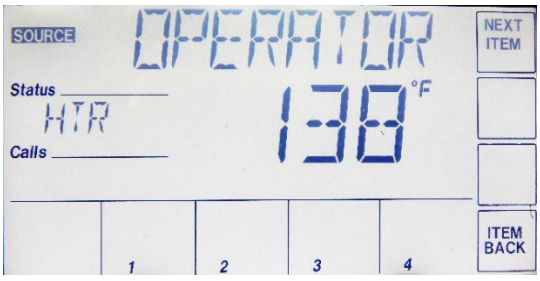


Figure 7-9 - Setting the Setpoint

7.5.12 Using Tool Box Menu

The **TOOL BOX** menu contains adjustable parameters and up to 15 previously logged alarm messages.

1. The first screen in the Tool Box is for the **ACCESS** level. The three choices available here are USER, INSTaller and ADVanced. Depending on the control software revision, the ADVanced level can be selected using the UP and DOWN arrow buttons for the first revision. Subsequent software revisions require button 4 (bottom right corner) be pressed and held to place the control in the ADVanced access level. Consult factory before changing any settings requiring an ADVanced access level. Depending on the access level selected, different parameters will become visible and adjustable. Selecting the appropriate access level will make menu navigation easier and minimize the possibility that parameters will be unintentionally changed.
2. The second screen will display the software revision for the touch panel display. Press the **ENTER** button to view.
3. The third screen allows the user to turn the display backlight ON continuously, OFF or TMPY (keeps the backlight on only during use).
4. The fourth screen allows the user to choose between Fahrenheit and Celsius.
5. The screens following the fourth screen will display up to 15 of the most recent alarm messages as well as time and date of the failure, beginning with the most recent.

7.5.13 Basic Operational Reference Information

Ext Enable: Terminals R1 – R2, Jumper to enable. Units ship with jumper on this. An external enable/disable can be attached to this. You can monitor the state of this input. 1 = enabled.

- **Upper Tank Temp:** is a temperature probe in the top of the tank.
- **High Limit Temp:** is a 2nd sensor in the same mechanical probe as the **Upper Tank Temp** probe. This is used as a safety.
- **Lower Tank Temp:** Temperature of the mid-section of the tank, this sensor controls the integral tank circulator pump.
- **Vent Temp:** Temperature of the Flue gasses exiting the water heater.
- **Modulation:** Represents the signal sent to fan motor. *(Not used on LC4Q prefix models)*
- **Pump Status:** This is the integral circulating pump ON/OFF.
- **Pump Runtime:** Hours on for integral circulating pump.

Discrete connections:

Enable/Disable: R1 – R2 (Input to water heater) Closed = ENABLE.

Alarm: A1 & A2 (Output from water heater) Closed = ALARM.

Remote Equipment / Burner ON: P1 – P2 (Output from water heater) Closed – water heater is heating.

Remote Proving: C1 – C2 (Input to water heater).

- **Closed** = Remote device is ready, it is OK to operate the burner.
- **Open** = Remote device is not ready. If the water heater has a call for heat, this will cause an error if not resolved within a few minutes.

7.5.14 Potentiometer (Adjusting the Setpoint)

The Platform Ignition Module (PIM) will continue to operate the Element at a 120 degree internal factory setpoint should the touch screen control fail, or communication between the two devices is interrupted. This internal setpoint can be adjusted using the potentiometer to maintain a different operating temperature under these circumstances if desired.

To Adjust The PIM Potentiometer Set-point:

1. Press and hold the **HOME** button for 3 seconds to display the SETUP Menu.
2. Use the **NEXT ITEM** or **ITEM BACK** buttons to navigate to the **TOOLBOX** menu. Press **ENTER** to display the **ACCESS** menu.
3. Use the **UP** or **DOWN** arrow buttons to select the **INSTALLER** setting.
4. Press the **HOME** button to return to the **TOOLBOX** menu, then use the **NEXT ITEM** or **ITEM BACK** buttons to navigate to the **SOURCE** menu.
5. Press **ENTER** to enter the source menu and use the **NEXT ITEM** or **ITEM BACK** buttons to navigate to the **OPERATOR** screen to display the potentiometer set-point.
6. Open the hinged upper panel of the control enclosure and locate the potentiometer on the PIM Ignition Module.
7. Use a small screwdriver to manually adjust the PIM Potentiometer to a desired stand-alone setpoint temperature as you view the adjusted temperature setting in the **OPERATOR** screen.
8. Exit the menu by pressing the **HOME** button.

7.6 Sequence of Operation

Incoming 120VAC:

a. Full time power to the Fuse

b. Full time power to the Main Control Switch

Power On - When the main control switch is turned on:

a. 120V is applied to the step-down transformer (24V)

b. 120V is applied to the L.W.C.O. terminal L1 (if used)

c. 24V and 120V is applied to the Platform Ignition Module (PIM). The circulator, blower and HSI circuits are 120V.

d. The PIM performs a processor and memory self-test to insure proper operation. The PIM confirms the presence of a valid ID card which matches the configuration previously stored in memory. If the valid ID card is not present, the PIM generates a diagnostic fault. The non-volatile memory is checked for an active lockout condition. A lockout indicates the previous attempt to light was unsuccessful, or a hi-limit or other system fault occurred. The PIM stays in lockout until a manual reset is performed.

Control Device Pre-check – The following control circuits are checked for closer before the control system will initiate a Call for Heat.

a. The PIM continuously monitors the flame status to verify no flame is present during Standby. If an erroneous flame is detected, the PIM generates a flame error fault.

b. The Electronic Low Water Cut-Off control is a self-contained electronic device which senses the presence of water at the top of the storage tank. When the presence of water is confirmed, the contacts close on the ELWCO and is sensed by PIM control.

c. The High Temperature Limit is combined in a common probe body with the upper tank sensor. The PIM will compare the high limit thermistor temperature with the upper tank thermistor temperature. If the two temperatures are not the same, a sensor failure will result.

d. When the High Temperature Limit operation has been verified by comparison, the limit temperature will then be confirmed to be under the maximum allowable temperature.

e. Terminals P1-P2 are closed to activate any connected remote devices.

f. The circuit between Terminals C1-C2 is closed by any connected remote proving switches, enabling the water heater to continue the sequence of operation.

Call For Heat - If the operating control senses that the temperature at the upper tank sensor is below the water heater setpoint and the previous control interlocks and safeties are satisfied, the following sequence will begin:

a. Terminals P1-P2 are closed to activate any connected remote devices.

b. The circuit between Terminals C1-C2 is closed by any connected remote proving switches, enabling the water heater to continue the sequence of operation.

c. The High Gas Pressure and Low Gas Pressure Switch (if equipped) are energized and their monitored pressures are proved. The individual safety circuits will close when satisfied and be sensed by the PIM control.

d. When the burner blower is energized and operation is verified to close within 60 seconds to prove flow.

e. The ignition pre-purge delay takes place.

f. The voltage level of the 24 VAC supply input is confirmed to be above 18.0 VAC.

g. The Ignition cycle begins.

h. **Heat-Up** - Following the pre-purge delay, the hot surface igniter will be energized:

i. The flame control will send 120V to the hot surface igniter for approximately 20 seconds.

j. The HSI Element proving current is verified.

k. The heat-up delay takes place to allow the hot surface element to reach ignition temperature.

Ignition - When dwell time is completed a 4-second Trial for Ignition (TFI) period is initiated:

a. Gas Safety Valves are energized.

b. The hot surface element is de-energized during the last second of the TFI period.

c. During TFI the flame safeguard control will monitor the flame using flame rectification through the hot surface igniter.

d. If the flame control senses the presence of flame before the end of the TFI period, the igniter will be de-energized and the flame control will continue to monitor the flame, through the igniter, until the operating thermostat ends the call for heat condition.

Heating

a. The flame status, airflow switch, LWCO switch, water pressure switch and other safety switches are continually monitored for proper state.

b. The High Limit sensor is confirmed to read below the High Limit set-point.

c. The temperature of water in the tank is compared to the temperature control setpoint to determine when to begin firing in heating mode.

d. The water heater remains in heating mode and, with extended operation, condensation begins to fill the condensation trap and drain line; (a normally operating booster water heater does not create condensation). The water heater stops firing when the tank water temperature matches the temperature control setpoint.

e. The gas valve(s) are immediately disabled.

f. A Blower Post-purge is completed and the control proceeds to Standby mode.

Integral Circulating Pump – Controlled independently of the call-for-heat.

a. When the main control switch is turned on, the control system will continuously monitor the water temperature in the tank and attempt to maintain a uniform water temperature within the tank by using the integral circulating pump.

b. If the temperature sensed in the tank drops 5 degrees or more below the temperature set-point, the pump is energized and a pump circulator icon will illuminate on the control display touch screen.

c. The operation of the integral circulating pump may occur before, during or after the call-for-heat period.

Flame Failure / Flame Loss

a. If the igniter fails to sense flame during an attempt to light the burner (Ignition Trail Fail), the ignition control will end the ignition sequence and the gas valve will be closed. Immediately following the end of the first failed ignition cycle, a new ignition sequence will be initiated to attempt to relight the burner. The standard Element configuration allows for three ignition failures before lockout. Since Elements include the CSD-1 option, this ignition failure will result in a lockout and require manual reset to attempt operation again.

If the burner successfully lights and operates but the flame is lost, the gas valve will be closed and the blower will continue to operate in order to purge any remaining combustion products from the water heater. Since Elements include the CSD-1 option, this flame loss will result in a lockout and require manual reset to attempt operation again. The standard Element configuration allows for three (Main Flame Loss) occurrences before lockout. Following each (Main Flame Loss) the PIM will purge and initiate the ignition sequence until the maximum of three flame loss events occur.

SECTION 8: DIGITEMP JR. MIXING VALVE

8.1 Description

DigiTemp Jr is a digital mixing valve that provides user-directed control and monitoring water distribution. It includes an electronic Control Module featuring a color touch screen digital display to select desired outlet water temperature, an electronically actuated valve that mixes hot and cold water, a quick response temperature sensor and check valves. DigiTemp Jr monitors mixed outlet temperature. It also features a user programmable high temperature Sanitization mode to help limit water borne bacteria as part of a user-directed and controlled thermal eradication protocol.

Adjustment of DigiTemp Jr is the responsibility of the owner and installer and must be done by qualified personnel in accordance with the manufacturer's instructions, and complying with all governmental requirements, building and construction codes and standards. It is recommended to install the Element as part of an ASSE compliant water distribution system, including mixing

valves and/or temperature limiting devices at all point-of-use fixtures (faucets, sinks, tubs, showers, etc.) that are approved to ASSE 1016, 1069, 1070 and 1071.

The DigiTemp Jr owner/user is responsible for maintaining proper water quality and condition, and deciding what temperature is appropriate for distribution users and facility.

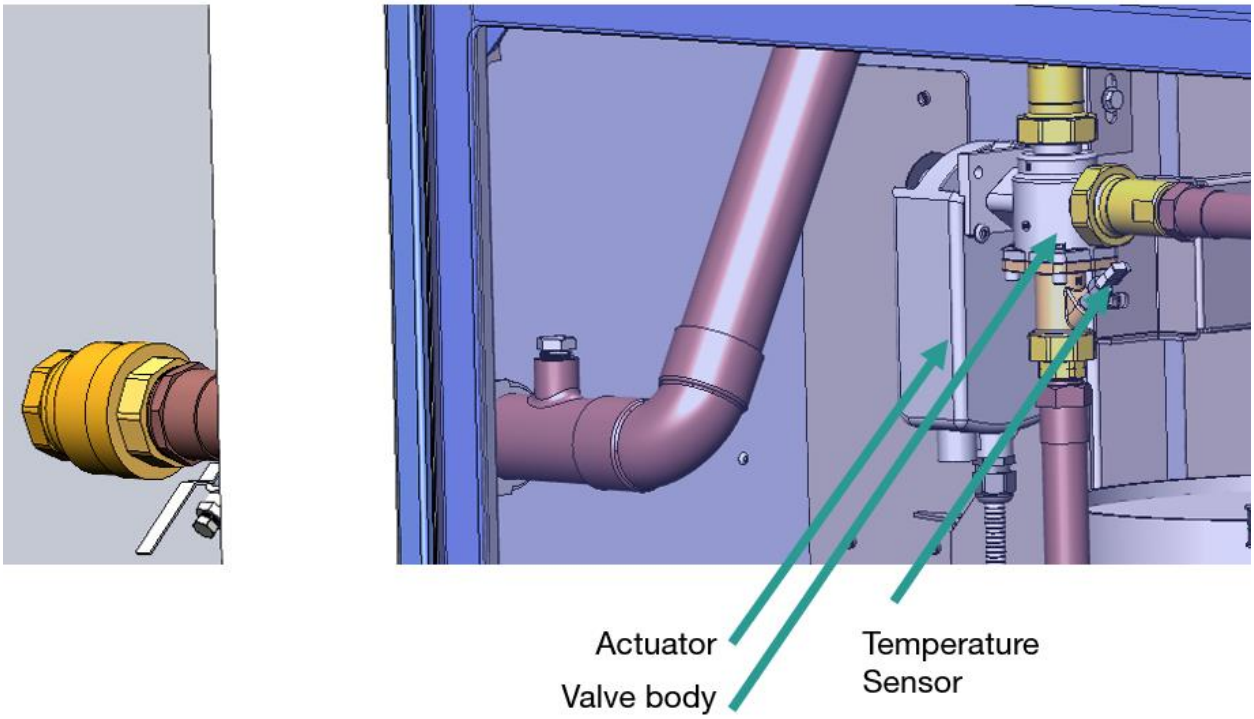


Figure 8-1 – DigiTemp Jr Valve.
Note: Controller is detached from and placed in the front of the unit.

8.1.1 Repair

As a pre-installed subsystem of Element, the following is intended for repairing the DigiTemp Jr:

⚠ WARNING!
The procedure below carries exposes personnel to the following hazards:
- Hot water and scalding
- Burns and hot surfaces
- Electrical shock and electrocution

Failure to follow all installation requirements risks possible death, personal injury, property damage, and failure of DigiTemp Jr to perform as intended.

Use ONLY with a potable water distribution system free of debris, foreign materials, corrosive chemicals or substances, and other adverse conditions.

DigiTemp Jr is electrically powered. ALWAYS take proper precautions to recognize, evaluate, and control electricity hazards during use and service/maintenance.

To connect Power supply

1. Press down on top of the front cover and pull out and down
2. Lift the front cover up and away from the controller
3. Loosen the screws at the front of the wiring cover
4. Pull wiring cover straight out from the wiring chamber
5. Connect live wire to terminal marked “L” and neutral wire to terminal marked “N”.
6. Re-assemble in reverse order.

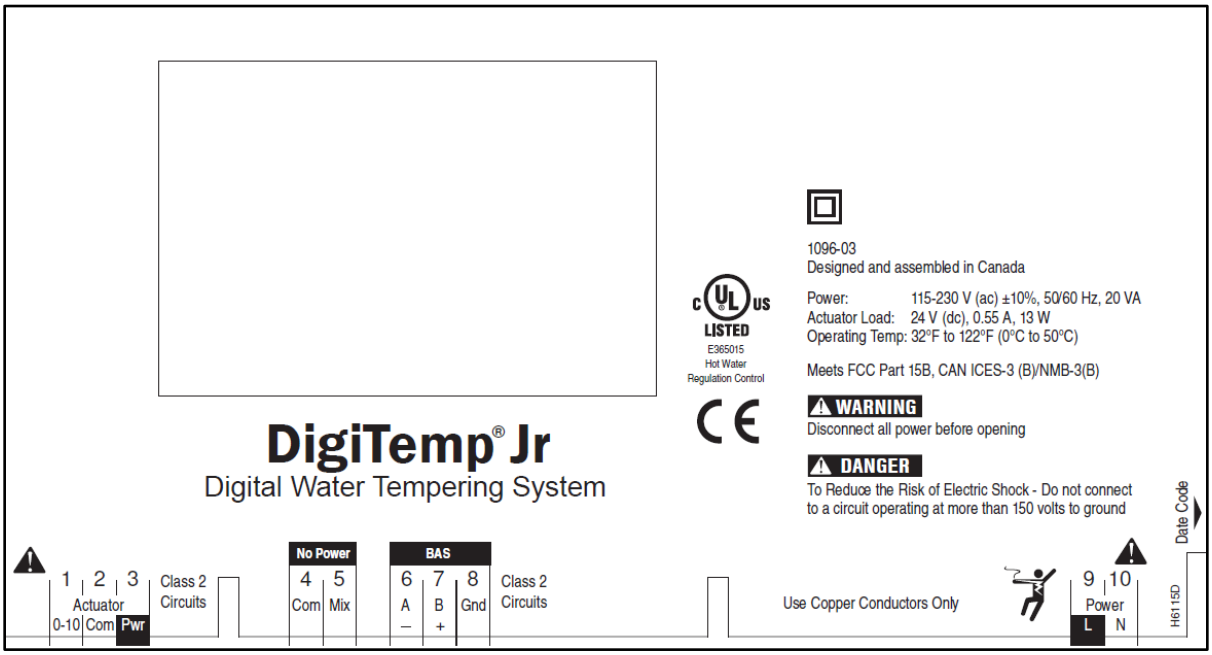


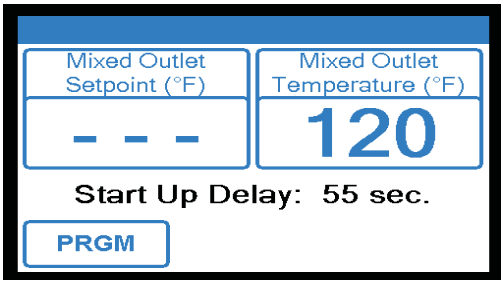
Figure 8-2 - DigiTemp Jr Control Unit Connections

8.2 Setup and Programming

NOTE: During normal operation, there is no need to separately program the DigiTemp Jr controller. The Edge SC performs all necessary Modbus calls from the primary controller. The following is provided for troubleshooting purposes.

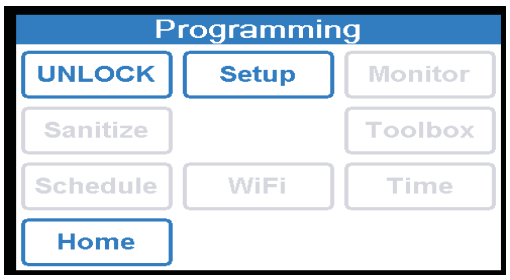
In the event of a power cycle of Element, there is a potential risk of some of the configurations specific to Element being reset, however this is typically due to a non-volatile memory (NVM) error. Contact your Lync service representative if that error is given.

When powered up, the display will show a 100 second countdown timer and read:



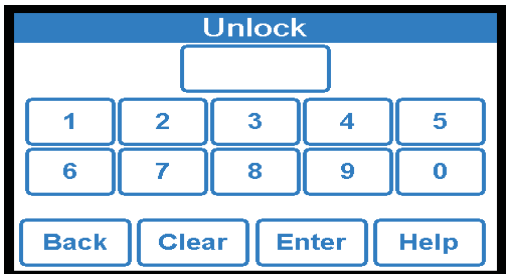
NOTE: The control will begin mixing operations automatically after 100 seconds. During that time the user may adjust setting and configure the control by pressing the **PRGM** menu. If the user does nothing, the control automatically routes to the home screen and begins normal operation. Attempting to program the device at this time will reset the 100 second clock.

To program the system, press the **PRGM** button. The **Programming** screen appears.



8.2.1 To Create a Passcode:

DigiTemp Jr comes programmed with the default passcode **1017**. For added security it is recommended that you create a unique 4 digit passcode. On the Programming menu, press the **UNLOCK** icon. The Unlock function screen appears and you are prompted to enter the passcode:



Creating your own passcode:

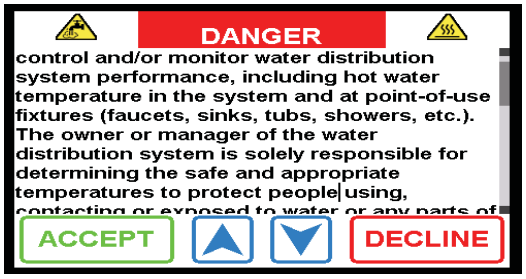
- Enter the default passcode 1017 and press the Help icon.
- Enter a new 4-digit passcode and press Enter (make sure to keep new code secure).
- Re-enter the new passcode and press Enter again to finalize the passcode change. **NOTE:** If you make a mistake entering your passcode and it does not match, **????** appears.

8.2.2 To Unlock the System

To unlock the system, on the Unlock screen, enter your new passcode and then press **Enter**.

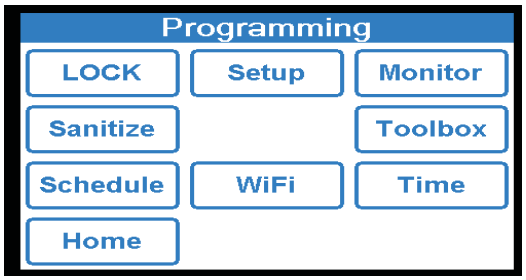
NOTE: To clear your entry and start again, press **CLEAR**. To go back to the Programming menu, press **BACK**. If you did not set your own passcode, enter default passcode **1017**.

When the passcode is entered, you are directed to the liability acceptance screen:



Press **ACCEPT** to access system functions. Pressing **DECLINE** means you will not be able to change system settings and you accept all default settings (including outlet water temperature of 140° F/ 160° C). You will be returned to the **Programming** screen.

When you press **ACCEPT**, the Programming screen appears.



8.2.3 System Setup Menu

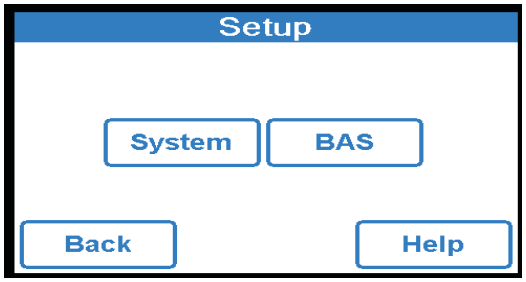
⚠ WARNING!

The next steps involve selecting or adjusting the mixed outlet water temperature, the hot water temperature in the water distribution system delivered to point-of-use fixtures (faucets, sinks, tubs, showers, etc.). The owner or manager of the water distribution system is solely responsible for determining the safe and appropriate temperatures to protect people using or exposed to water or any parts of the water distribution system from scalding, burning, thermal shock or other hazards, and to control water- borne bacteria in the system.

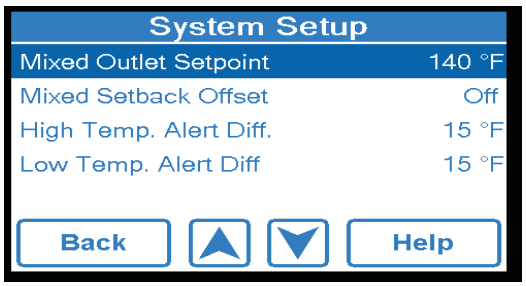
Only qualified and authorized personnel who fully understand each function's operation, output and risks should use Programming Menu functions.

Always read and follow the User Guide & Instruction Manual.

Press **SETUP**; the Setup screen now appears.



You can setup the operation of the system by pressing the **System** button. To setup operation of the system, continue with the system setup.



NOTE: Mixed Setback Offset is only available if a schedule is selected.

8.2.4 Setting the mixed outlet water temperature setpoint during a controller issue

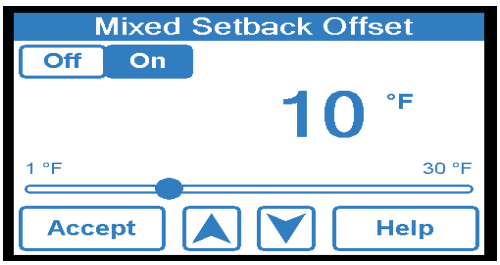
⚠ WARNING!
BEFORE setting mixed outlet water temperature or electing default temperature, point-of-use mixing valves and/or temperature limiting devices MUST be installed at all fixtures (faucets, sinks, tubs, showers, etc.)

NOTE: By default, the EdgeSC manages the setpoint and will override any changes periodically over Modbus. Set the safe, appropriate, and desired outlet water temperature for your users, application and facility though the EdgeSC.

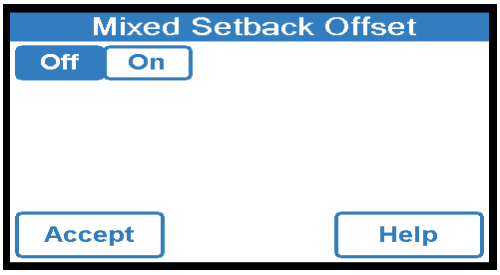
If there is a connection issue or the temperature is not updating, you may set the setpoint locally at the DigiTemp Jr controller by pressing **Mixed Outlet Setpoint** on the System Setup menu and then using the **SLIDER** or **UP** and **DOWN** arrows until the selected temperature is displayed. Press **Accept**. The System Setup screen will reappear.

⚠ WARNING
The owner or manager of the water distribution system is solely responsible for determining the safe and appropriate temperatures to protect people using, contacting or exposed to water or any parts of the water distribution system from scalding, burning, thermal shock or other hazards, and to control water-borne bacteria in the system.

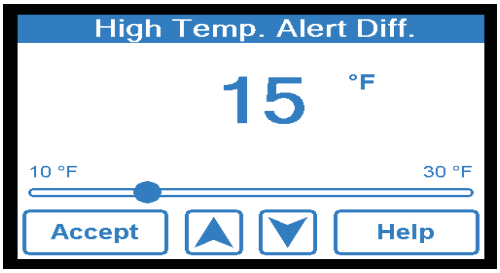
To turn on the **Mixed Setback Offset** feature (sets temperature lower during unoccupied period), press **On** and **Accept.** Change the temperature using the slider or by pressing the **UP** or **DOWN** arrows, then press **Accept** when done.



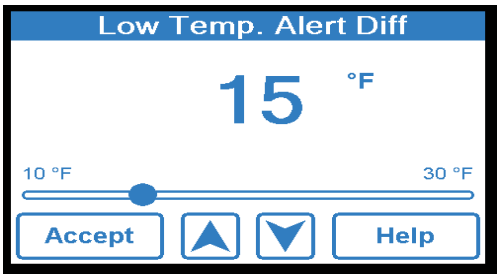
To turn the Mixed Setback Offset feature off, press **Mixed Setback Offset** on the **System Setup** menu and press **Off** and **Accept**.



To change the high temperature alert differential, press **High Temp. Alert Diff.** in the **System Setup** menu. Use slider or **UP** or **DOWN** arrows to set high temperature alert differential, then **ACCEPT**.

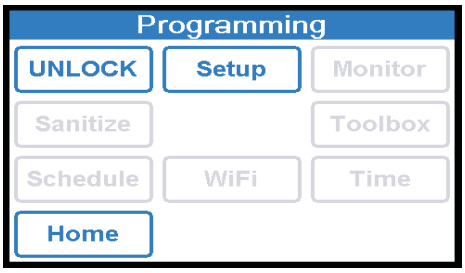


To change low temperature alert differential, press **Low Temp. Alert Diff**. in the **System Setup** menu. Use slider or **UP** or **DOWN** arrows to set low temperature alert differential, then **ACCEPT**.



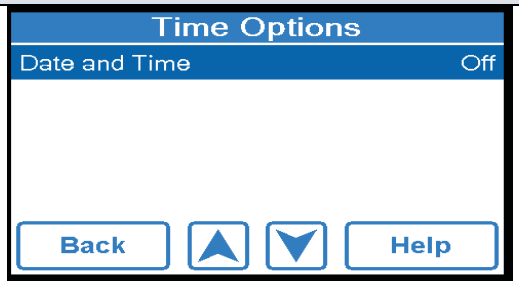
NOTE: If finished, the system will return to a locked state if not touched for 100 seconds. Or, press the **BACK** icon twice to return to the **Programming** menu, then press **LOCK**.

When the system is locked, the **Programming** screen displays the **UNLOCK** icon.

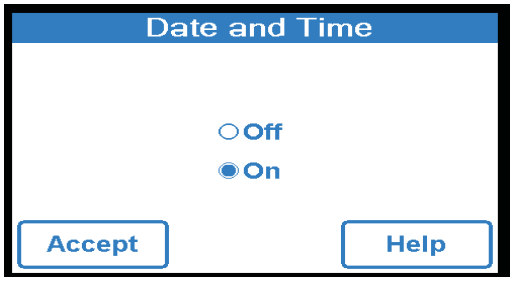


8.3 Time Function

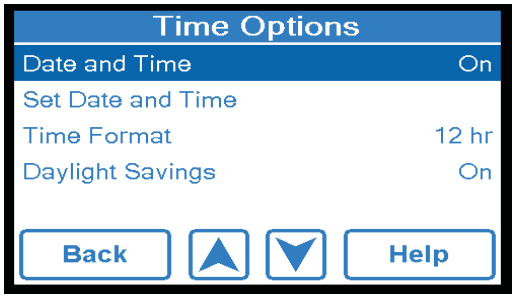
Press the **TIME** icon on the **Programming** Menu to access the Time Function.
To turn on the **Date & Time** functionality, press **Date & Time** from the Time Options menu.



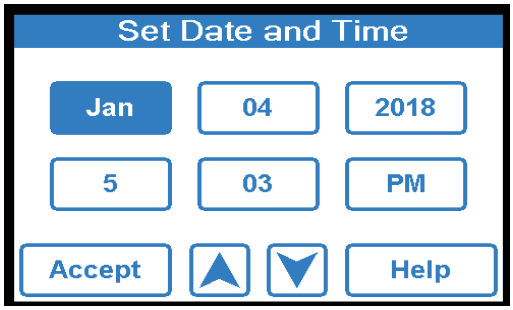
Once in the **Date and Time** menu, toggle the radio button to **ON** and then press **Accept**.



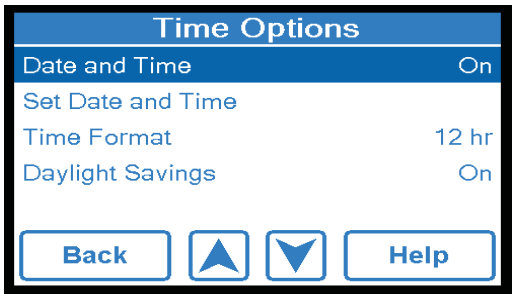
To set date and time, press **Set Date and Time** from the **Time Options** menu.



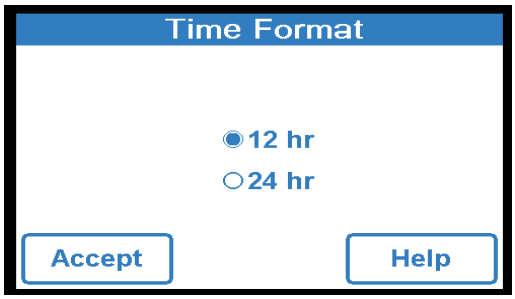
To set date and time, select month, date, year, hour, minute and AM/PM icons one at a time and change with **UP** or **DOWN** arrows, then press **Accept**.



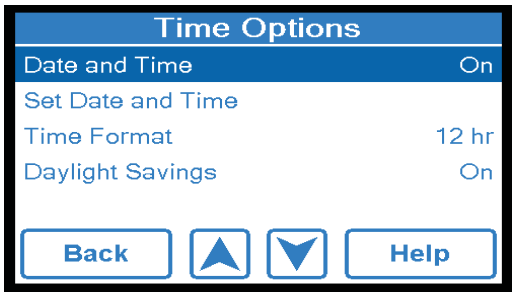
To select the time format, press **Time Format** from the **Time Option** menu.



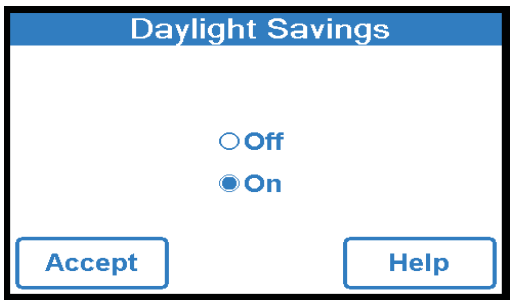
To select time format, toggle to the **12hr** or **24hr** radio button and press **Accept**.



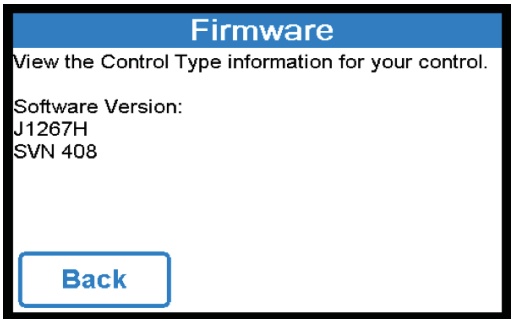
To select daylight savings time, press **Daylight Savings** from the **Time Options** menu.



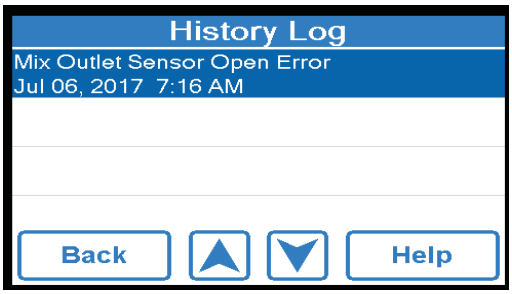
Once in the **Daylight Savings** menu, toggle the **On** radio button and press **Accept**.



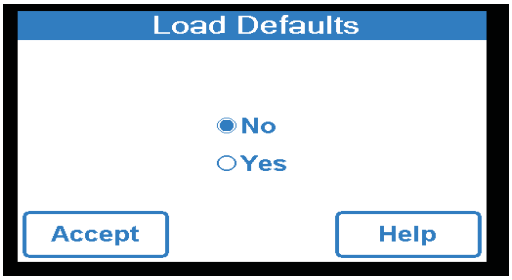
To view the control type information for your controls, press **Firmware** from the **Toolbox** menu and then press **Back**.



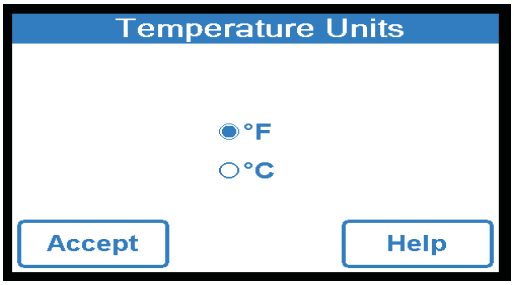
To access the history log, press **History Log** from the **Toolbox** menu then press **Back**.



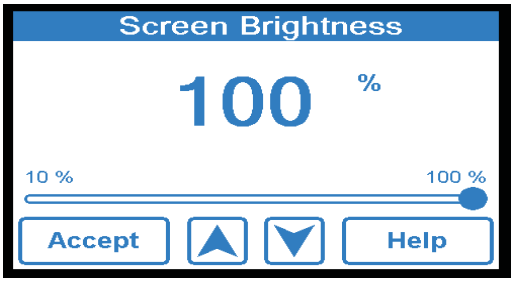
To select load default, press **Load Defaults** from the **Toolbox** menu. Toggle the radio button to **No** for no load or **Yes** for Load Defaults, then **Accept**.



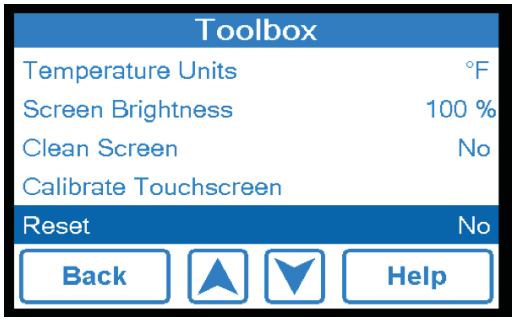
To select load temperature units of measure, press **Temperature Units** in the **Toolbox** menu. Toggle the radio button to **°F** for Fahrenheit or **°C** for Celsius, then press **Accept**.



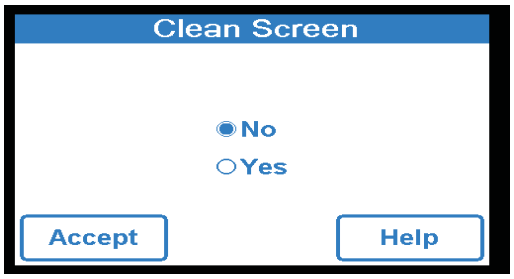
To adjust the screen brightness, press **Screen Brightness** from the **Toolbox** menu. Move the slider or use the **Up** or **Down** arrows to adjust the brightness, press **Accept**.



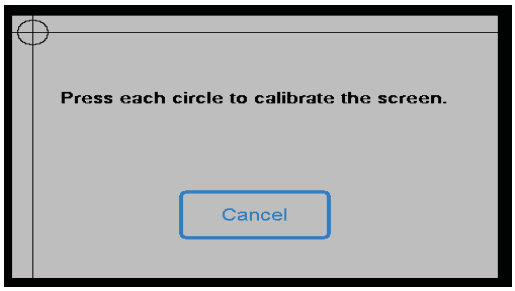
To clean dirty screen, press **Clean Screen** on the **Toolbox** menu.



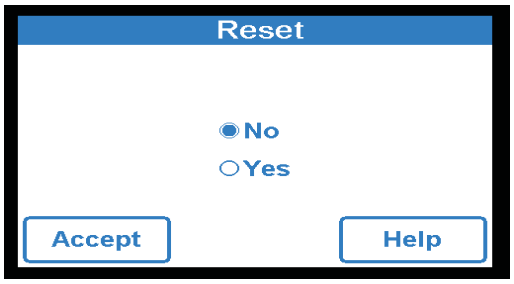
Toggle the radio button to **Yes** to lock the screen to clean, or press **No** to keep it unlocked, then **Accept**.



To calibrate the touchscreen, press **Calibrate Touchscreen** on the **Toolbox** menu. Press each circle to calibrate the touch screen.



To reset all, press **Reset** on the **Toolbox** menu. Toggle the radio button to **Yes** or toggle to **No** to retain the current settings.



8.4 Troubleshooting

Problem: Outlet temp is below set point temp/low temp alarm has been activated

1. Depending on the heating plant plumbing and location, it may take several minutes for the hot water to reach the unit. Ensure that you have allowed enough time (5 minutes) for the system to come up to temperature.
2. On the Home screen, check the “Mixed Outlet Set point” and the hot water supply temperature. The hot water supply temperature needs to be above the setpoint or the unit will not be able to reach the setpoint.
3. If the hot water supply temperature is BELOW the “Mixed Outlet Set point”
   a) Raise hot water supply temp at least 2°F (1°C) above the mixed outlet set-point temperature.
   b) Ensure that the hot water is flowing.
   c) Check the hot water source set-point temperature and ensure that the hot supply line has no obstructions or closed valves restricting flow to the DigiTemp Jr.
4. If the hot water supply temperature is ABOVE the “Mixed Outlet Set point”, there are no obstructions preventing hot water from reaching the unit, and there is sufficient flow through

the unit, reset the control by pressing the PRGM icon to access the “Programming” menu. Unlock the control and then select the “Toolbox” to navigate to the “Toolbox” menu. From within the “Toolbox” menu use down arrow to highlight “Reset” then press enter. This will access “Reset” menu. Press “Yes” and then press “Accept”. The controller will reset and begin a startup sequence.

NOTE: Alternately, reset control by opening and closing the circuit breaker switch and waiting 100 seconds to resume normal operation.

Problem: Outlet temperature is above set point temperature.
If the mixed outlet temperature rises to or above the programmed High Temp Alert Setting, this will cause the control box to send a signal to the actuator to reset. During a reset, the actuator armature will move to the cold position, stay there for about 1min, then move back towards the mixed outlet set point temperature. This is a safety precaution to prevent scalding.

If the High Temp Alert Setting is triggered 3 times, it will move to the cold position and stay there until the DigiTemp Jr controller is reset.

Solution:
1. Ensure flow is above the minimum rated flow by opening the hot water valve on two to four fittings being supplied with tempered water.
2. Ensure that the cold supply is flowing.
3. Check cold water temperature and ensure that it is lower than the set point temperature and supply line has no obstructions or closed valves restricting flow to the DigiTemp Jr.
4. Unlock the control and then select the “Toolbox” to navigate to the “Toolbox” menu. From within the “Toolbox” menu use down arrow to highlight “Reset” then press enter. This will access “Reset” menu. Press “Yes” and then press “Accept”. The controller will reset and begin start up sequence.

NOTE: Alternately, the control can be reset by opening and closing the circuit breaker switch and waiting 100 seconds to resume normal operation.

Problem: DigiTemp Jr controller displays "---" instead of a measured value.
Solution:
Sensor is not connected or functioning properly.
1. Check the connection at the sensor and the connection within the control module.
2. Disconnect all power and fully de-energize DigiTemp Jr BEFORE opening the control module. This can be done by opening breaker #4. See Table *3-12* and Figure 3-21.
3. Open the Control Module and locate the sensor.
4. Unlock the control and Power up the system and then select the “Toolbox” to navigate to the “Toolbox” menu. From within the “Toolbox” menu use down arrow to highlight “Reset” then press enter. This will access “Reset” menu. Press “Yes” and then press “Accept”. The controller will reset and begin start up sequence.

NOTE: Alternately, the control can be reset the control by opening and closing the circuit breaker switch and waiting 100 seconds to resume normal operation.

5. Waiting 1-5 minutes for the control to resume normal operation Also, ensure that there is a load (at least one tap on the mixed outlet system) present while the control is resuming normal operation.

Problem: It is hypothesized that the actuator is no longer operational.
DigiTemp Jr controller is constantly resetting before it makes it through the startup countdown . Example: The startup countdown goes from 110sec to 100sec and restarts the 110sec countdown again. The 10sec mark is when the control box engages the actuator. If the actuator doesn't respond, the control box resets and begins the startup countdown again.

Solution: To prove that the actuator is faulty:
1. Turn OFF power to the Digitemp Jr using the Element Q circuit breaker #4 per Table *3-12*.
2. Remove all the actuator wires from the terminal strip, then turn the Power ON. This should allow the DigiTemp Jr controller to make its way through the whole 110sec startup countdown. If it does, the actuator is no longer functional and needs to be replaced.

Problem: It is hypothesized that the DigiTemp Jr controller is no longer operational.
Solution: If the display is all white or has lines across it, replace the DigiTemp Jr controller. Else follow the below process to verify valve position vs actuator feedback.

Valve Position is the signal the controller sends to the actuator
Actuator Feedback is the signal the actuator sends to the controller.
When the actuator and controller are operating correctly, these two voltage readings should be similar. Example: Valve Position 7.6V, Actuator Feedback 7.2V

Voltage Position:
0.5V = fully open to the Cold Position / The actuator armature will be positioned on the left side of the actuator.
9.5V = Fully open to the Hot Position / The actuator armature will be positioned on the right side of the actuator .

If Actuator Feedback signal reads 0-0.4V and the armature is in the cold position and does not move, there is an issue with the actuator or actuator wiring.

If the Valve Position signal reads 0V and the Actuator Feedback signal reads 0-0.5V, the controller is not sending a signal to the actuator. Replace the DigiTemp Jr controller.

8.4.1 Error Code Resolution

Error #1: Mixing valve NVM memory error.

Error #	Error Type	Cause	Control Behavior
1	NVM Error, System	Corrupt System Menu Block	Displays Error. Ceases Operation
1	NVM Error, Network	Corrupt Network Menu Block	Displays Error. Continues Operation
1	NVM Error, BAS	Corrupt BAS Menu Block	Displays Error. Continues Operation

NVM stands for Non-Volatile Memory. NVM errors mean the DigiTemp Jr controller lost all programmed memory (System Menu/BAS Menu/Network Menu). To solve this issue, locally reload the default memory per **Error! Reference source not found.**. If error code #1 persists a fter reset, the controller needs to be replaced.

NOTE: When reloading the default memory, you will lose all programmed settings in the System Menu, Network Menu and BAS Menu.

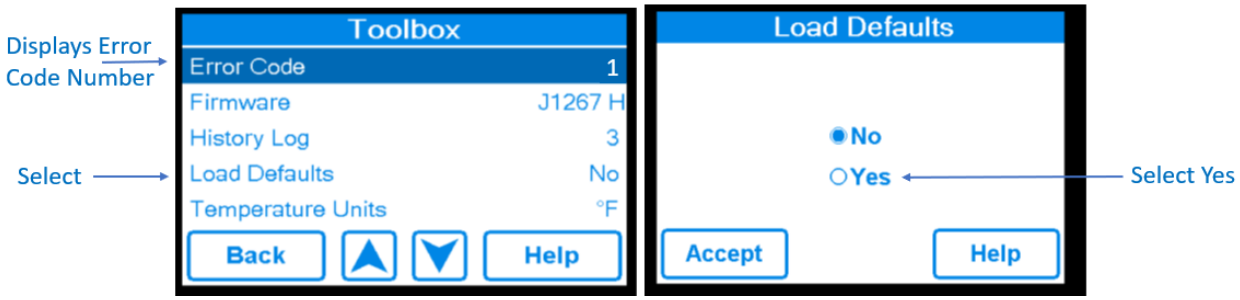


Figure 8-3 – Resetting the memory on the DigiTemp Jr controller after an error code #1

Once the memory is reset, the EdgeSC requires specific DigiTemp Jr settings for appropriate operation.

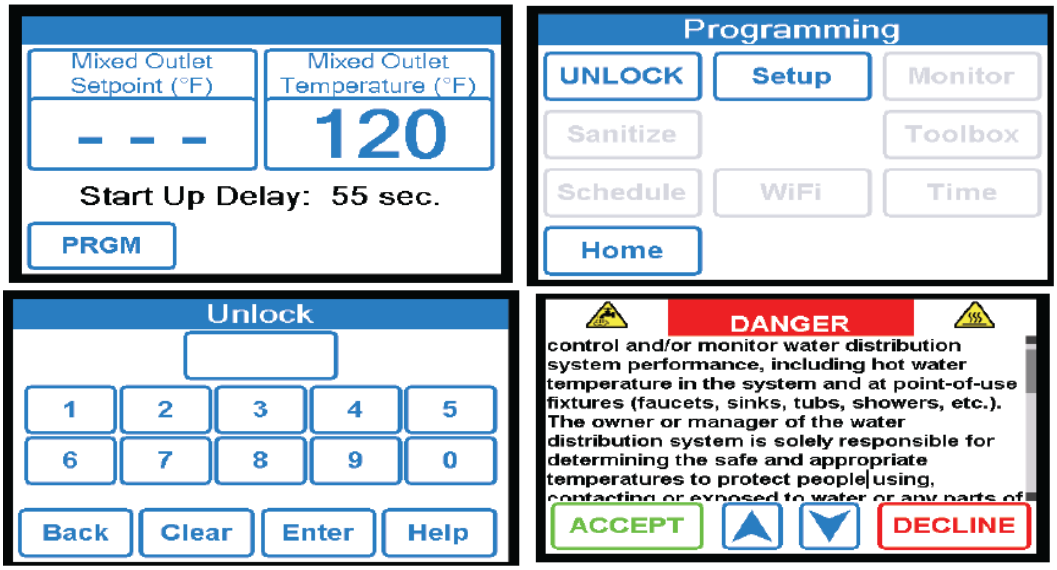


Figure 8-4 – Unlocking the local DigiTemp Jr controller

1. Press PRGM and then UNLOCK
2. Type in the programming password. The factory default is “1017”.
3. Read and accept the warning.

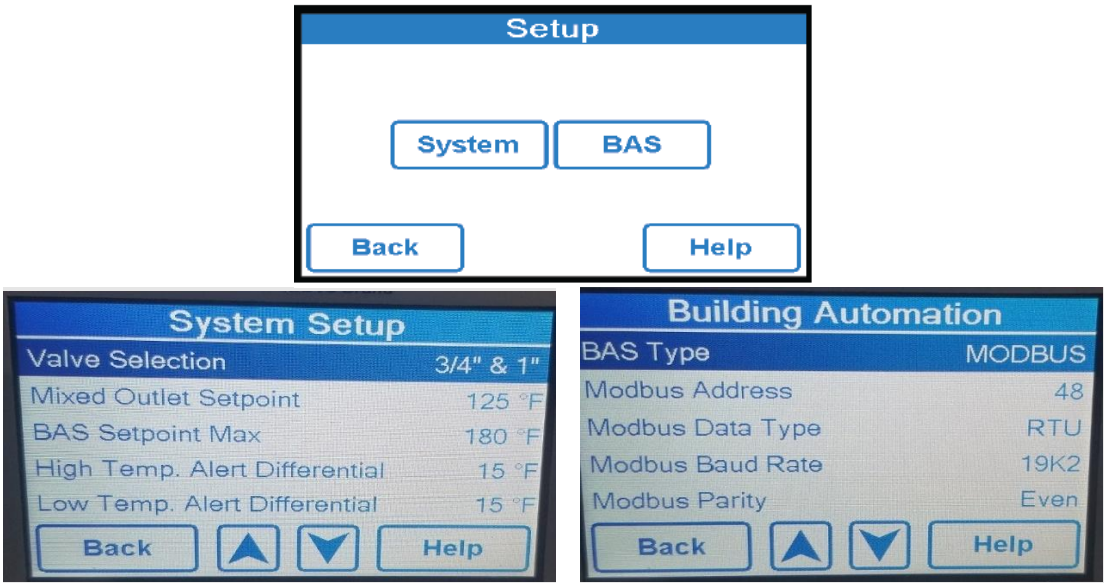


Figure 8-5 – Setup the controller with the settings as shown.

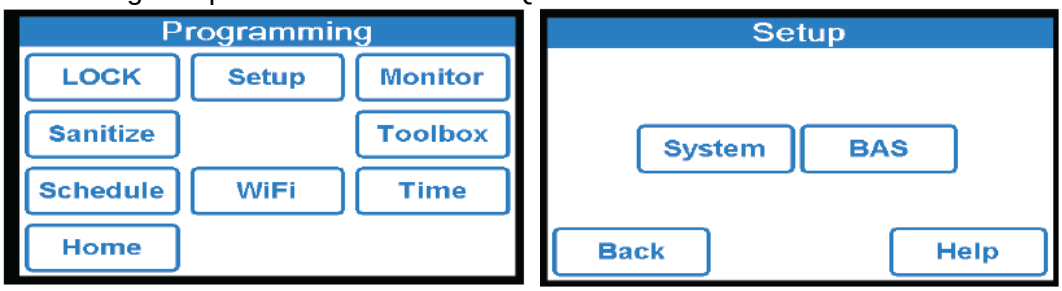
System	
Valve Selection	¾" & 1"
Mixed Outlet Setpoint	125 °F
BAS Setpoint Max	180 °F
High Temp. Alert Differential	15 °F
Low Temp. Alert Differential	15 °F

BAS	
BAS Type	MODBUS
Modbus Address	48
Modbus Data Type	RTU
Modbus Baud Rate	19K2
Modbus Parity	Even

Table 8-1 – System and BAS settings

Error #2: Mixing valve temperature sensor failure.
Verify connection or replace with new high speed temperature sensor with wire kit.

Error #3: Mixing valve size selection is not set.
The ¾" DigiTemp Jr is used in Element Q. Set this as follows:



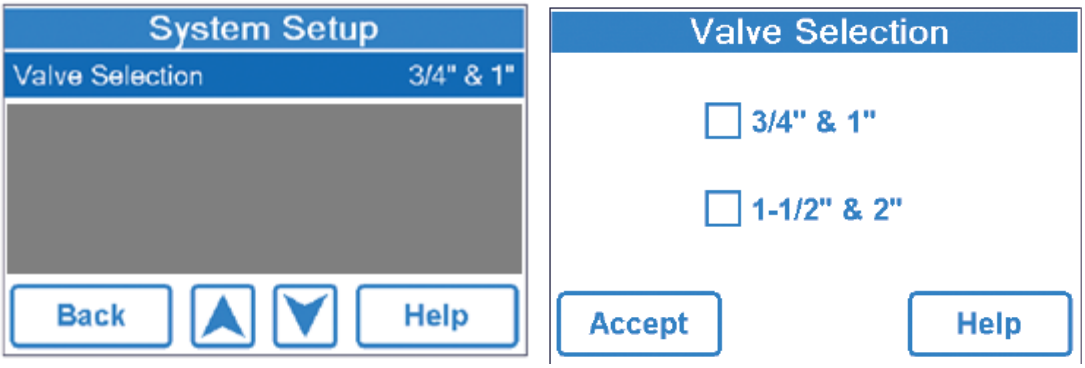


Figure 8-6 – Selecting the appropriate valve size locally on DigiTemp Jr.

4. Follow the unlocking sequence in Section 8.2.1.
5. Select “Setup” and then “System”
6. Select “Valve Selection”
7. Select the ¾” and 1” option. Click “Accept”.

SECTION 9: AQUASOLVE ANTI-SCALE OPERATION

The Lync AquaSolve Anti-Scale System prevents scale formation on internal plumbing surfaces by transforming the normal dissolved hardness minerals into undissolved crystal microparticles. These crystals stay suspended in the water and have a greatly reduced ability to react and attach to surfaces, minimizing scale buildup in pipes, water heaters and on fixtures and glass.

AquaSolve Anti-Scale is not a water softener or a chemical additive (like an anti-scalant or sequestrants). It is a scale prevention device with proven third-party laboratory test data and years of successful residential and commercial installation. AquaSolve Anti-Scale is the one water treatment device that effectively provides scale protection and is a great salt free alternative to water softening (ion exchange) or scale sequestering chemicals. Laundry and warewashing chemistry will like-wise require adjustments.

9.1 AquaSolve Anti-Scale Benefits

AquaSolve Anti-Scale provides chemical-free scale prevention and protection by converting hardness minerals into harmless, inactive microscopic crystals, thus making it an effective alternative water softener technology. Its advantages include:

- Virtually maintenance free – no control valve.
- Environmentally friendly - no salt or chemicals to add, no electricity and no wastewater.
- Improves efficiency of all water using appliances – both hot and cold. NOTE: For hot water applications where feed water temperature is 100° - 140°F (38° - 60°C), please contact your local Lync representative.
- Safe for landscaping and lawn watering, no need for costly bypass plumbing.
- Compatible with all on-site and community wastewater treatment systems.
- Perfect for towns or communities where water softeners are banned or restricted.
- Does not remove minerals or add sodium to the water supply.
- Can be installed as pre-treatment to commercial reverse osmosis systems (contact your local Lync representative for further details).

⚠ WARNING!

Do not use water that is microbiologically unsafe or of unknown quality without adequate disinfection. Systems are certified through WQA against NSF 61, CSA B483.1, and to NSF 372 for Lead Free compliance.

9.2 Specifications

The AquaSolve Anti-Scale system must operate upflow, and does not require additional water to backwash, flush, or regenerate. It does not require chemical additives and or electricity for operation.

9.3 Standards

Independent scientific testing has confirmed Media Assisted Crystallization (MAC) technology provides scale reduction of over 95%. Testing was conducted under protocol based on DVGW W512 test to access control of scale formation.

NOTE: Spotting may occur on external plumbing surfaces.

The AquaSolve Anti-Scale system performs best in single pass potable water applications with no additional chemical additives. Depending on hardness, soft scale spotting may occur. Soft scale spots in most cases can be easily wiped down with a damp cloth and will not form hard scale deposits. A Point of Use (POU) Water Softener should be used on mandatory spot-free applications (e.g. glass stemware, dishware).

⚠ WARNING!

Do not let the system freeze. Damage to the tank may result.

System must be operated in a vertical position. Do not lay it down during operation.

Place system on a smooth, level surface. Because system operates in an upflow, fluidized bed mode, a level surface is more important than with a softener or media filter.

A bypass valve should be installed on every system to facilitate installation and service.

Observe all local plumbing and building codes when installing the system.

AquaSolve Anti-Scale must be the last stage in the treatment chain. Do not install any filters after AquaSolve Anti-Scale or before any devices for which scale prevention is required. POU filters, e.g. carbon, RO or Ultraviolet (UV) are exempt from this requirement.

Do not apply any other anti-scalants before or after AquaSolve Anti-Scale.

The addition of soaps, chemicals, or cleaners, before or after AquaSolve Anti-Scale treatment, may reverse its anti-scale treatment effects and/or create water with a heavy residue or spotting potential. Any adverse conditions caused by the addition of soaps, chemicals, or cleaners are the sole responsibility of the end user.

AquaSolve Anti-Scale is not a water softener and does not soften the water. Water treatment chemistry (e.g. antiscalants, sequestrants, soaps, chemicals or cleaners etc.) will most likely have to be changed to be compatible with AquaSolve Anti-Scale treated water. Laundry and ware-washing chemistry will likewise require adjustments.

9.4 Equipment Specifications

AquaSolve Anti-Scale systems are complete, self-contained, and come ready to use. Review operating pressures, temperatures and water chemistry limitations to ensure compatibility.

NOTE: Water with heavy dirt and debris may require filtration prior to AquaSolve Anti-Scale.

⚠ WARNING!

Due to the unique properties of **AquaSolve Anti-Scale**, there are some unique requirements for using **AquaSolve Anti-Scale** in conjunction with other forms of water treatment:

Feed Water Chemistry Requirements	
pH	6.5-8.5
Hardness (max)	30 grains (513 ppm CaCo3) [1]
Alkalinity	100 ppm
Water Pressure	15 psi to 150 psi (1.03 to 10.34 bar)
Temperature	40°F to 100°F (5°C to 38°C)
Free Chlorine	< 1 ppm
Chloride	200 ppm
Iron (max)	0.3 ppm[2]
Manganese (max)	0.05 ppm[2]
Copper	1.3 ppm[3]
Oil & H_2S	Must be Removed Prior to AquaSolve Anti-Scale
Total Phosphates	< 3.0 ppm
Sulfate	< 250 ppm
Silica (max)	20 ppm[4]
TDS	1500 mg/l[5]

[1] Just as with conventional water softening media, AquaSolve Anti-Scale media needs to be protected from excess levels of certain metals that can easily coat the active surface, reducing its effectiveness over

time. Public water supplies rarely, if ever, present a problem, but if the water supply is from a private well, confirm that the levels of iron (Fe) and manganese (Mn) are less than 0.3 mg/L and 0.05 mg/L, respectively.

[2] Just as with conventional water softening media, AquaSolve Anti-Scale media needs to be protected from excess levels of certain metals that can easily coat the active surface, reducing its effectiveness over time. Public water supplies rarely, if ever, present a problem, but if the water supply is from a private well, confirm that the levels of iron (Fe) and manganese (Mn) are less than 0.3 mg/L and 0.05 mg/L, respectively.

[3] Pursuant to the EPA drinking water standards, the copper concentration permitted is up to 1.3 ppm. Typically originating from new copper plumbing, high levels of copper can foul AquaSolve Anti-Scale media. For appli-cations with copper concentration greater than 1.3 ppm, please consult Watts Water Quality Technical Service. To further minimize any problem with excess copper, avoid applying excessive flux on the inner surfaces of the pipe and use a low-corrosivity water soluble flux listed under the ASTM B813 standard.

[4] AquaSolve Anti-Scale media does not reduce silica scaling. While silica tends to have a less significant effect on scale formation than other minerals, it can act as a binder that makes water spots and scale residue outside the plumbing system difficult to remove. This 20 ppm limitation is for aesthetic purposes.

[5] All other contaminants must meet the requirements of the USEPA Safe Drinking Water Act. Specific Mineral and Metal MCL's, identified in Watts published Feed Water Chemistry Requirements, supersedes the USEPA SDWA.

NOTE: AquaSolve Anti-Scale technology prevents scale formation inside the plumbing system at influent hardness levels of 30 grains per gallon of calcium carbonate and less. Due to variances in water chemistry, certain aesthetic conditions external of the plumbing system may not be attained. AquaSolve Anti-Scale is designed for the treatment of potable water that meets the requirements of the current USEPA Safe Drinking Water Act.

Mechanical Specifications		
Model	**LM8414TM-COM**	**LM8416TM-COM**
Dry Weight	124 lbs / 56 kg	145 lbs / 66 kg
Service Weight	458 lbs / 208 kg	550 lbs / 250 kg
Inlet/Outlet Connection	2" FNPT	2" FNPT

Replacement Media		
A	M8414-COM-RM	Replace media every 3 years
B	M8416-COM-RM	Replace media every 3 years

Dimensions (nominal - inches)		
Model	LM8414TM-COM	LM8416TM-COM
A	14	16
B	73.1	73.1

Max. Service Flow (gpm) vs. Water Temp. (ºF)							
System	40º	45º	50º	55º	60º	65º	70º
LM8414TM	40	44	48	50	50	50	50
L M8416TM	45	51	56	59	63	69	75

Intermittent Duty Systems	
LM8414TM-COM	50 gpm at all temperatures
LM8416TM-COM	75 gpm at all temperatures

Max. Flow Rate*		
LM8414TM-COM	50 gpm	189 lpm
LM8416TM-COM	75 gpm	284 lpm

*Exceeding maximum flow can reduce effectiveness and void warranty.

Pressure drop at peak flow rate is less than 22 psi.

Pressure drop reading taken with inlet and outlet gauges installed at a common elevation and 80 degree feed water.

SECTION 10: LYNC UV

NOTE: This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

The Lync UV™ systems provides protection against microbiological contamination in water. Disinfection of water with Lync UV is a simple, rapid physical process. When contaminated water is exposed to a Lync UV 254 nanometer UV light, the UV light penetrates the cell walls of microorganisms and disrupts their genetic deoxyribonucleic acid (DNA) material. This quickly inactivates microorganisms by destroying their ability to replicate and infect.

⚠ WARNING:
DO NOT rely solely on this system to make water safe to drink. This system is intended to be used as part of a well-designed water treatment system. Water that contains microbiological contamination should be tested regularly to ensure its quality and safety at the point of use.

To install the Lync UV:

1. Install the quartz sleeve into the UV chamber. **DO NOT** touch the quartz sleeve with your fingers. Hold it with a paper towel.
2. Install the quartz sleeve O-ring onto the visible end of the quartz sleeve. Screw the quartz sleeve nut onto the quartz sleeve port thread and tighten hand tight.
3. Install the ultraviolet lamp into the quartz sleeve. **DO NOT** touch the lamp with your fingers. Hold it with a paper towel.
4. Insert the lamp power lead wire into the receptacle on the lamp's glow cap.
5. If water hammer is evident, install water hammer arrestors before the system.

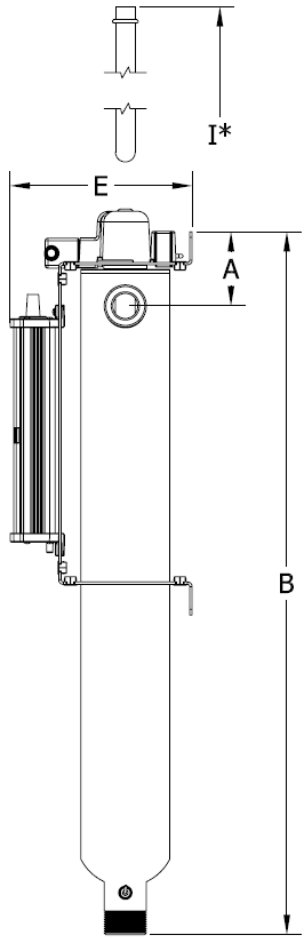
⚠ WARNING:
This appliance contains a UV-C emitter (UV lamp). Unintended use of the appliance or damage to the housing may result in dangerous UV-C radiation escaping. UV-C radiation can harm eyes and skin even in small doses. Damaged appliances must not be operated. Do not operate UV-C emitter when it is removed from the appliance enclosure. The appliance must be disconnected from power supply before replacing the UV-C emitter. DO NOT look directly at the UV-C emitter while on. Permanent serious eye injury could occur.

10.1 System Features & Specifications

	Model # WC025	Model # WC050
GPM Rating	25	50
Lamp On Indicator	✓	✓
Glow Cap Lamp Indicator	✓	✓
Lamp Life Timer with 3-digit display	✓	✓
Automatic Lamp Shut Off when Removed from the Chamber (wireless)	✓	✓
Lamp Dimming	✓	✓
System Max Nominal Input Power	67 watts	118 watts

	Model # WC025	Model # WC050
Lamp Max Nominal Electrical Power	64 watts	112 watts
Lamp Technology	Quartz glass low pressure lamp / ozone free / true pre-heat starting / glow-cap indicator	
Wireless Lamp Key	Standard	Standard
Lamp Dimming / Flow Switch	Standard	Standard
UV Sensor	Available Option	Available Option
Chamber Material	316L SS	

10.2 Dimensions



Controller Mounted on Chamber- 6 to 50 GPM	
Model #	Dimension (inches)
WC025	30.00
WC050	48.00

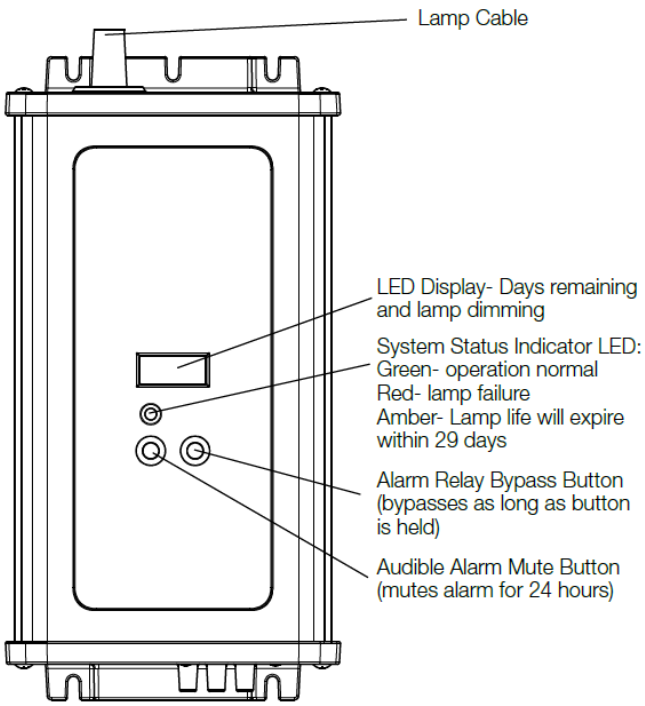
*Allow this amount of overhead clearance for removal of lamp and quartz sleeve.

NOTE: C Series controllers are certified by the Federal Communications Commission (FCC) listed under identification number FCC ID: 2AFJT-SMARTSTREAM and Industry Canada (IC) listed under identification number IC: 20623-SMARTSTREAM.

10.3 Troubleshooting

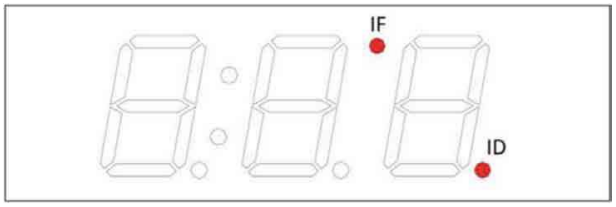
PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
Bacteria in outlet water	Low or no UV transmittance into water	Replace lamp
		Clean or replace quartz sleeve
		Replace prefilter
		Confirm the pretreatment is adequate
		Confirm the feed water meets the feed water requirements within this manual
	Biofilm in outlet plumbing	System needs to be sterilized
	System not on	Confirm continuous power supply
Low UV intensity	Lamp over 1 year old	Replace lamp
	Fouled quartz sleeve	Clean or replace quartz sleeve
	Fouled prefilter	Replace prefilter
	High turbidity in feed water	Confirm the pretreatment is adequate
		Confirm the feed water meets the feed water requirements within this manual
	UV sensor fouled or defective	Clean or replace UV sensor
	Low power to lamp	Replace controller
	Lamp intensity does not increase with water flow	Confirm flow switch is functioning
	Excessive water temperature	Cold water temperature should not exceed 100°F (38°C). Return water temperature can operate up to 180 °F (82.2°C).
	Excessive flow rate	Measure flow rate for both cold and return flows. Refer to Element Q Technical Data Sheet (TDS) for appropriate flow rates by model.
White or milky colored water	Air in water from new prefilter or quartz sleeve replacement	Flow water through system until clear
Lamp out alarm ON	Filaments broken in lamp	Replace lamp
Glow cap not illuminated	Lamp not rotated into position for normal operation	Rotate lamp glow cap so that electrical connections align with cut out in bracket
Low pressure after system	Clogged prefilter	Replace prefilter
Quartz sleeve nut leaks	Quartz sleeve nut loose	Tighten quartz sleeve nut
	O-ring is defective	Replace O-ring

10.4 Controller Screen and LED Identification



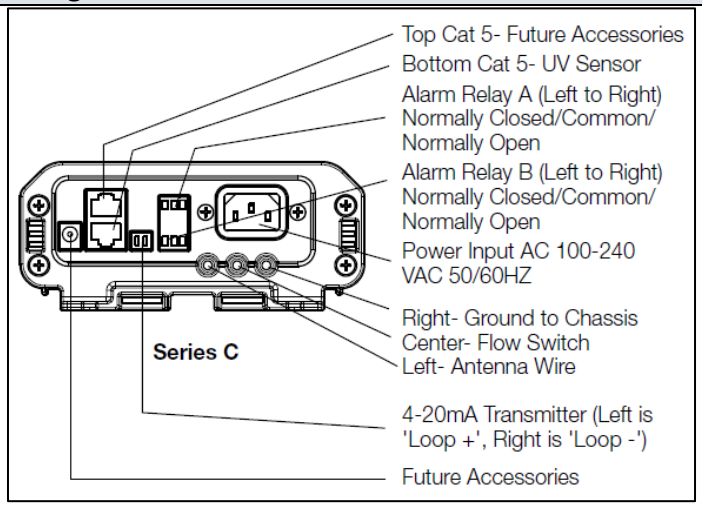
Series C Controller - Displays lamp life days remaining, dimming light indicator, button for silencing the alarm button for overriding the alarm relay, LED Status Indicator

10.5 Controller LED Screen Identification



CONDITION	IF	ID
No Lamp Arc Current (Lamp Off)	Off	Off
Full Lamp Arc Current	On	Off
Reduced Lamp Arc Current (Dimmed)	Off	On

10.6 Controller Wiring



SECTION 11: MAINTENANCE

Regular service and routine maintenance must be performed by a qualified service agency or maintenance provider to ensure safe, reliable, and efficient operation. To ensure proper maintenance, the following instructions should be posted near the appliance and maintained in legible condition. Verify proper operation after servicing.

11.1 Recommended Spare Parts List

Lync representatives will assist you in getting the appropriate repair parts as soon as you request them. At the same time, supply chain and shipping issues can sometimes cause unplanned interruptions. It is recommended to keep a small quantity of repair parts locally with maintenance staff in order to keep disruptions to a minimum. Lync service technicians will also have a set of spare parts on hand.

SubSystem	Part #	Description	Qty
Lync UV Cold	7300863	UV lamp, cold	1
Lync UV Cold	7300868	Quartz sleeve, cold	1
Lync UV Return	7300865	UV lamp, return	1
Lync UV Return	7300870	Quartz sleeve, return	1
Lync UV	68108284	Flow switch and cable repair kit with O-ring grease	1
AquaSolve	89073	AquaSolve media replacement, 30gpm	1
Filter Cold	87012	5µm Pleated filter cartridge. 2-3/4” OD x 9-3/4” Length	5
Filter Return	87011	5µm High temperature filter cartridge	1
Condensate Neutralizer	89026	Replacement condensate neutralizer	2

Table 11-1 – Recommended Spare Parts List

11.2 Recommended Maintenance Schedule for Lync Q Water Heater

11.2.1 Annually (Every 12 Months)

- Schedule annual service call by qualified service agency.
- Repair any leaks around pumps, relief valves, and tank connections.
- Ensure area is free from combustible materials, gasoline, and other flammables.
- Visually inspect venting system for proper function, deterioration or leakage.
- Check temperature and pressure relief valve. Refer to instructions on valve.
- Inspect condensate drain and ensure condensate is directed to an appropriate condensate system or drain, as required by local codes.
- Check operation of all safety devices. Refer to manufacturer’s instructions.
- Inspect burner and gas train components for wear or deterioration.
- Check the electronic-ignition system for quick ignition and proper flame signal.
- Check gas safety shut-off valves for proper operation and tightness.
- Follow startup procedure in this Installation, Operation & Maintenance manual.

11.2.2 Semi-Annually (Every 6 Months)

- Test Low-water-cut-off (if equipped). Refer to manufacturer's instructions and reset.
- Test electronic-ignition flame failure detection system. Refer to instructions and reset.

11.2.3 Monthly

- Check condensate drain system for blockage. Check output pH with litmus paper. If pH is <5.0, replace condensate media.
- Visually inspect venting system for proper function, deterioration or leakage.
- Confirm the low-water cutoff and alarm are operating.

11.2.4 Daily

- Check for and remove any obstruction to the flow of combustion or ventilation air.
- Ensure area is free from combustible materials, gas, and other flammables.
- Check gauges, monitors and indicators.

11.2.5 As Required

- Flush and clean tank as required using the blowdown cycle with the unit valved off from service and vented. Upon refill and restart, ensure any trapped air is removed.

11.2.6 Maintenance Procedure

Listed below are items that must be checked to ensure reliable operations. Maintenance must be performed by a qualified maintenance provider. Verify proper operation after servicing.

⚠ WARNING:
When servicing controls use exact, factory authorized, replacement parts and label all wires prior to disconnection. Verify proper operation after servicing. Incorrect parts substitution and wiring errors can cause damage, improper operation, fire, carbon monoxide, exposure to toxic fumes or other unsafe conditions that can result in fire, personal injury or death.

1. Examine the appliance and venting system at least once a year. Check more often in first year to determine inspection interval.
    a. Check all joints and pipe connections for tightness, corrosion or deterioration.
    b. Check the electronic-ignition system for quick ignition and a proper flame signal.
    c. Check all safety controls including thermostats for proper operation.
    d. Check safety shut-off valves for operation and tightness.
    e. Keep appliance area clear and free from combustible materials, gasoline and other flammable vapors and liquids.
    f. Have the entire system, including, but not limited to, the burner, heat exchanger and venting system, periodically inspected by a qualified service agency.

2. Exposure to Dusty or Dirty Combustion Air: An appliance installed in a dust or dirt contaminated atmosphere will require more frequent inspection and cleaning of the burner to prevent nuisance shutdowns or premature burner failure.

3. Any sign of soot on the heat exchanger or in the flue indicates the need for a combustion inspection. Properly installed and adjusted units seldom need heat exchanger cleaning. If soot has formed, the most common causes are restricted combustion air or excessive gas. A blocked heat exchanger can cause unsafe operation and will reduce efficiency. A qualified service agent or installer should inspect and clean the heat exchanger as described below.

4. All gaskets on disassembled components must be replaced on reassembly with exact, Factory Authorized, replacement parts only. Gasket kits are available from your Lync representative.

5. Burner and/or Heat Exchanger Inspection and Cleaning Procedure:
    a. Turn off main power to unit.
    b. Turn off gas supply.
    c. See Section 11.3.10 for information on how to disassemble and reassemble.
    d. Disconnect electrical components by disconnecting the wires going to terminal strip in the top control enclosure and the respective conduit connections on the back of the control enclosure. If a wiring diagram is not attached to the back of the enclosure door or otherwise provided with the water heater, make careful notes of the locations for all the wires.
    e. Remove the metal cover on top of the appliance by disconnecting the fasteners holding it to the plastic jacket.
    f. Remove the hot surface igniter, (HSI) from the burner. Be very careful not to bump the igniter element due to the fragility of the igniter.

6. Burner inspection
    a. Break the unions that connect the gas train to the blower and disconnect the electrical connector for the valve
    b. Remove the blower junction box cover and disconnected the power and control cable connectors from the blower. The blower can now be unbolted from the blower/burner transition.
    c. Remove the nuts that secure the transition to the burner top plate and remove.
    d. Remove the nuts that secure the burner top plate to the combustion chamber and lift the top plate/refractory assembly up until it is completely extracted from water heater.
    e. Inspect top plate refractory for damage. The refractory must provide a tight seal against the top edge of the burner deck.
    f. Inspect the burner surface for signs of cracking or thermal fatigue.
    g. Replace any damaged components and reassemble in reverse order. Torque fasteners to 4-5 ft/lbs.
    h. Cycle unit and test to verify all safety and operating controls are properly functioning and the burner top plate flange is free of leaks.

7. Inspect integral circulation pump for gasket leaks or failure or the pump motor. Rotation of the pump is indicated by the cooling fan on the back of the motor.
    a. If the pump is not running when the pump symbol shows on the #1 button of the Lync Q Water Heater controller, check power at the motor terminals on the component terminal strip (Figure 11-2).
    b. If pump is receiving power but does not run, it needs to be replaced.

8. Inspect low water cutoffs and relief valves for proper operation at every six months, or more often if indicated by inspection.

9. The temperature and pressure relief valve should be checked at regular intervals to ensure safe operation. Take proper precautions while operating relief valve to avoid contact with hot water coming out of the relief valve and to prevent water damage. The openings inside the valve may become inoperative. If the valve does not open and close

properly when tested, it must be replaced. If a relief valve discharges periodically, this may be due to thermal expansion in a closed water supply system. Contact the water supplier or local plumbing inspector on how to correct the situation. Do not plug the relief valve. Replace relief valve with a like kind or one meeting the requirements stated on the rating decal located adjacent to the relief valve mounting location.

10. Keep appliance area clear and free from combustible materials, gasoline and other flammable vapors and liquids.

11. Check the flow of combustion and ventilation air is unobstructed to the appliance.

12. When electrical controls are serviced or replaced, label all connections as they are removed, to know the proper placement on the replacement part.

13. If the Element is to be shut down for an extended period of time, the primary gas valve and the water supply should be shut off. When the appliance is returned to service, any standing water in the tank must be flushed and a thorough inspection of all utilities and general appliance condition should be conducted.

11.3 Lync Q Water Heater Communications and Diagnostics

11.3.1 Indicators

The PIM has three LED indicators to display operational status and to help diagnose system error conditions:

- **Green LED – Power:** Indicates the PIM module is receiving 24 VAC power.
- **Amber LED – Alarm/Test:** Indicates PIM is in Commission Test Mode or a diagnostic alarm (fault).
- **Red LED – Diagnostic Code:** Normally off. During a control or system fault condition, this LED flashes the error codes.

11.3.2 Alarm Messages – Diagnostic Codes (Flashes)

MESSAGE	DESCRIPTION	LED Flashes	MODBUS CODE
ID CARD	The ID card is connected to the PIM control board when the system is initialized for the first time, the ID card selects the control profile to be used. An ID card error may occur when the original card is replaced with an incorrect card or has been disconnected from the PIM control board.	Red LED ON, Green LED OFF	20
INTERNAL FAIL	The PIM control board may have failed. Replace the control board if manually resetting the control does not correct the fault.	Red LED ON	21
CTL SETUP FAIL	Reset defaults in the TOOL BOX menu. If unable to correct, replace the control display.	N/A	1
VENT LIM	Vent temperature sensor is approaching the programmed limit, forcing burner to operate at reduced firing rate.	N/A	5

MESSAGE	DESCRIPTION	LED Flashes	MODBUS CODE
AIR FLOW FAIL	Blower is not reaching the minimum speed for purge and burner operation. This may be caused by a faulty blower.	1	9
FLAME FLSE	Usually caused by leaky gas valve which propagates flame after call for heat cycle. Check for leakage through gas valve, or replace flame control.	2	19
FLAME FAIL	Burner failed to light/no flame signal detected. If burner fails to light it is likely hot surface igniter (HSI) is faulty or the burner fuel/air mixture is out of adjustment. If burner lights but immediately goes out, check for inadequate gas supply, faulty gas valve/regulator or poorly adjusted combustion.	3	15
FLAME LOSS	Flame loss can be caused by faulty igniter, damaged refractory or combustion that becomes poorly adjusted as burner modulates to higher inputs.	3	16
LOW HSI	The PIM control board is not sensing the correct amp draw from the HSI (Hot Surface Igniter). This is most likely caused by a faulty or disconnected igniter.	4	
LOW 24VAC	The 24VAC supply to the PIM control is below threshold for reliable control operation. May be caused by low voltage to the water heater or a faulty 120/24VAC supply transformer.	5	17
VENT MAX	The vent temperature sensor is used to protect low temperature vent systems from damage caused by high flue gas temperatures. When this alarm occurs, first confirm that the vent material is suitable for the application as well as the limit setting for this control. When this product is operated with high return or inlet water temperature, the flue gas can exceed the rating of low temperature vent systems.	6	18
HTR MAX	Water temperature has exceeded safety limit. May be caused by a sensor failure or a faulty control board.	7	11
HTR TOP	Indicates problem with top temperature sensor, possibly a shorted wire or failed sensor. **NOTE**: The top sensor and the high limit sensor are in the same probe body.	8	14
HI LIMIT	Indicates problem with high limit temp sensor, possibly a shorted wire or failed sensor. **NOTE**: The top sensor and high limit sensor are in the same probe body.	8	14
HTR BOT	Indicates a problem with the bottom temperature sensor, possibly a broken or shorted sensor wire or failed sensor.	8	
VENT	Indicates a problem with the vent temperature sensor, possibly a broken or shorted sensor wire or failed sensor.	8	
LOGASPRES FAIL	The low gas pressure safety switch (optional) is not sensing minimum gas pressure required for safe operation. Check the gas pressure to ensure that the minimum is available. If the gas pressure is adequate check for fluctuating gas pressure or a faulty pressure switch.	9	
REM PROV FAIL	The remote proving circuit is designed to check for the operation of ancillary mechanical room equipment such as a fresh air damper or flow switch. Check for the proper function and correct wiring of such equipment.	10	
LOW WATER FAIL	The low water cutoff is not sensing water at its probe. May be caused by a faulty low water board or sensor	12	

MESSAGE	DESCRIPTION	LED Flashes	MODBUS CODE
HTR LOST	Possible bad connection between the PIM control and the digital control display, or failure of either device.	14	
HIGASPRES	Check gas pressure to ensure that building supply does not exceed value on heater rating plate. If within rated limit, check for faulty pressure switch.	15	

11.3.3 Fuse

The 24 VAC input and output circuits of the PIM are protected by an 8.0 Amp fuse.

11.3.4 Self-Check/Control Failure

The PIM confirms the integrity of the gas valve relay contacts to insure safety. It also monitors the processor memory and software execution for proper program flow. If the control detects an error in its software or hardware, all outputs are turned off and the LED displays a steady ON condition. If this condition persists after an attempt to restart then the control must be replaced.

11.3.5 System Safety Checks

The PIM monitors the safety switches, temperature sensors, supply voltage, and blower speed and will go to soft lockout until the error condition is corrected. Individual LED diagnostic codes or messages on the RS485 communicates problem information for efficient troubleshooting.

11.3.6 Flame Current Measurements

The PIM supports direct measurement of flame signal strength using the flame current test pins (FC+, FC-) on connector P2. Flame current may be measured by a micro-ammeter, or alternately by using a standard digital voltmeter. The signal on P2 is calibrated to 1 micro-amp/volt, so flame current in micro-amps can be directly read on the volts scale.

The user interface displays an approximation of flame current up to 5 micro-amps**.**

11.3.7 Non-Volatile Lockout/Manual Reset

The PIM normally allows for volatile ignition lockout where a lockout condition is reset by a loss in 24VAC power or the call for heat demand. In certain applications or where required (such as by CSD-1), it can be configured through the parameter settings for non-volatile lockout after ignition failure. In this case the lockout may only be reset by the on-board manual reset button, or the remote reset input.

11.3.8 ID Card

The PIM determines its operating parameters by reading the identification code of an external plug-in ID card. The ID card is connected to the PIM at the J6 connector.

NOTE: ID card must be present for the PIM and unit to operate. This card selects the proper settings in the PIM's memory for various Lync LC-Q models. The first time a PIM is powered up attached to an ID card, the ID card setting is stored in non-volatile memory. Once set, the PIM only operates with the correct ID card installed that matches its internal ID settings. The PIM verifies the ID card at power-up and on each heating cycle.

11.3.9 Error Codes

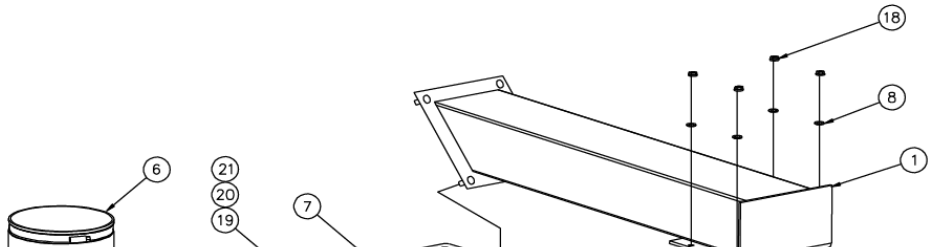
Code	Description
0	No Error

Control Display Errors	
1	EEPROM
2	Outdoor Sensor
3	Supply Sensor
4	DHW Sensor
5	Vent Limiting
6	FTBus Communication
PIM Errors	
7	LWCO
8	Remote Proof
9	Air Pressure
10	Low Gas Pressure
11	Boiler Outlet/Tank Top Sensor
12	Boiler Inlet/Tank Bottom Sensor
13	Vent Sensor
14	Hi-Limit Sensor
15	Ignition Failure
16	Flame Loss
17	Vent Hi-Limit
18	Boiler/Tank Hi-Limit
19	False Flame
20	OEM Card
21	Internal Failure
22	Hi-Delta
23	Not used
24	Low Voltage
25	Blower Speed
26	High Gas Pressure
tN4 Errors (related to communication between multiple heaters in a linked system)	
27	Master Lost
28	Device Lost
29	Device Duplicate
30	Device Error

11.3.10 Replacement Parts

Below are the lists of replacement part subassemblies and associated parts.

11.3.10.1 Blower & Burner Assembly



ITEM	DESCRIPTION	PART #
1	BURNER/BLOWER TRANSITION	151511
2	BULKHEAD WITH INSULATION	145178
3	BLOWER EBM G3G200	126337
4	BURNER 100 X 348 MM	145168
5	AIR INTAKE WHIRLWIND	126864
6	FLEXIBLE RUBBER ADAPTER	126849
	FIELD INSTALLED AIR FILTRATION KIT	157224
7	BLOWER OUTLET GASKET	144548
8	5/16 FLAT WASHER	138392
9	BURNER GASKET	145270
10	GASKET, IGNITOR 1/8 232 CRANEGLAS Y271	111791
11	IGNITER, HOT SURFACE NORTON #271Y - 1 ½	107774
12	WASHER, FLAT 1/4 PLT	15607
13	NUT, WING 1/4 X 20 NC STEEL ZINC PLT	79972
14	NUT, HEX 1/4 X 20 NC STEEL ZINC PLT	128323
15	WASHER, FLAT 1/4 PLT	15607
16	WASHER, LOCK 1/4 PLT	3494
17	FLAME ELECTRODE CROWN	127816
18	NUT, FLANGED LOCK 5/16	3476
19	SCREW #8 – 32 X 1/4	144867
20	BLOWER JUNCTION BASE	145356
21	BLOWER JUNCTION COVER	145357

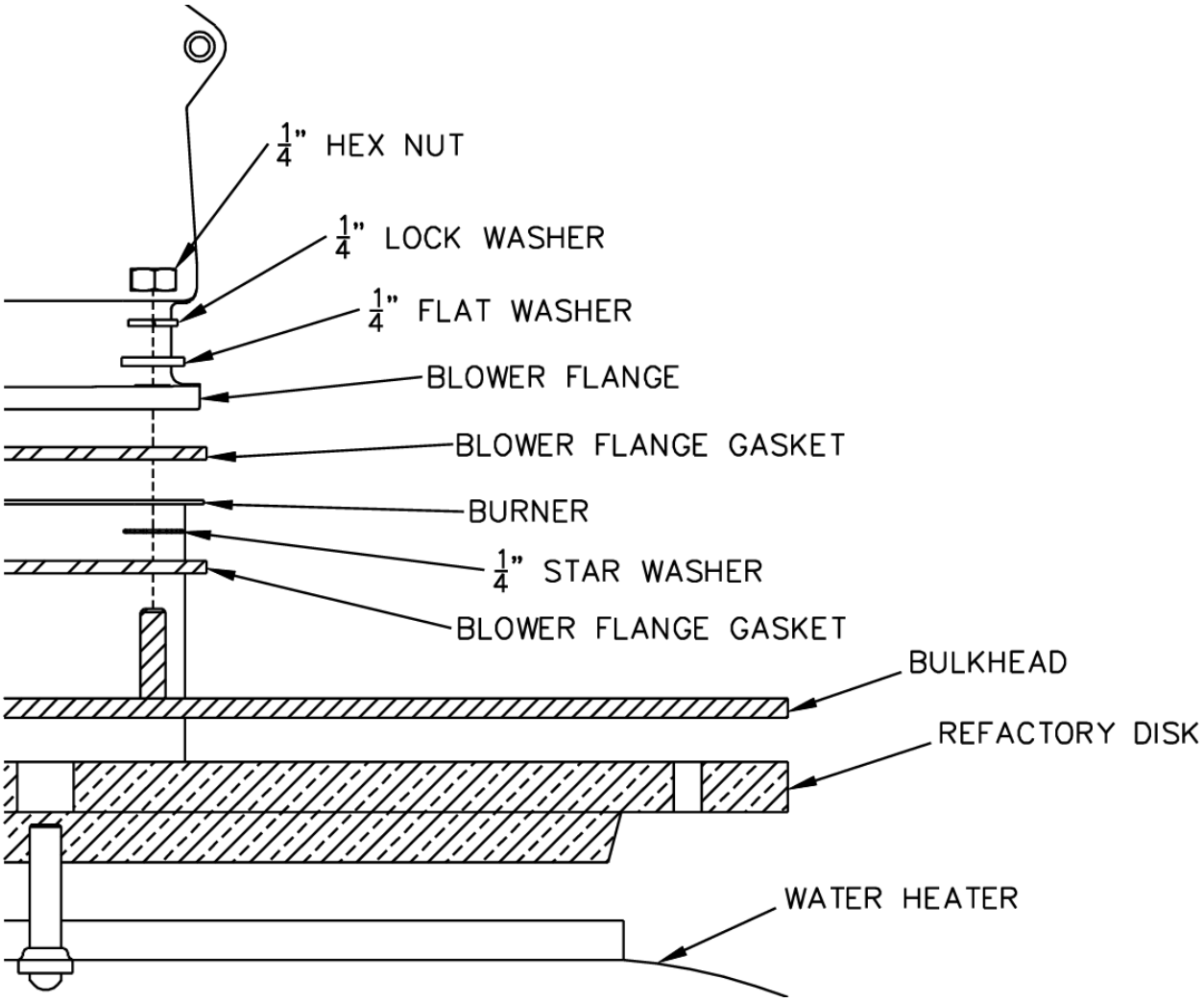
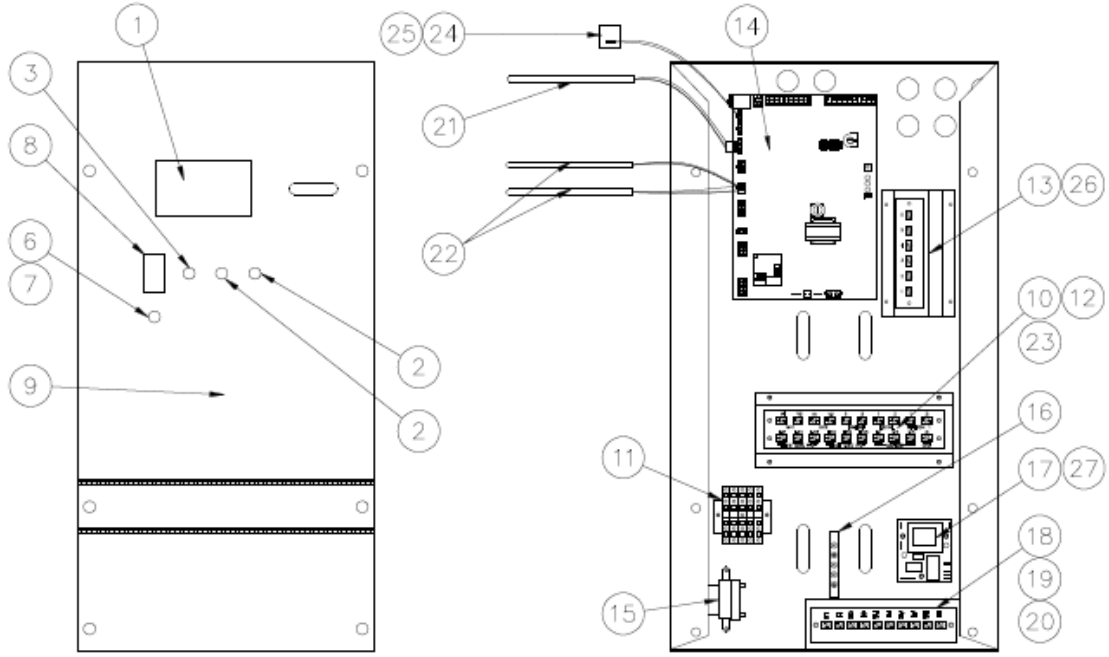


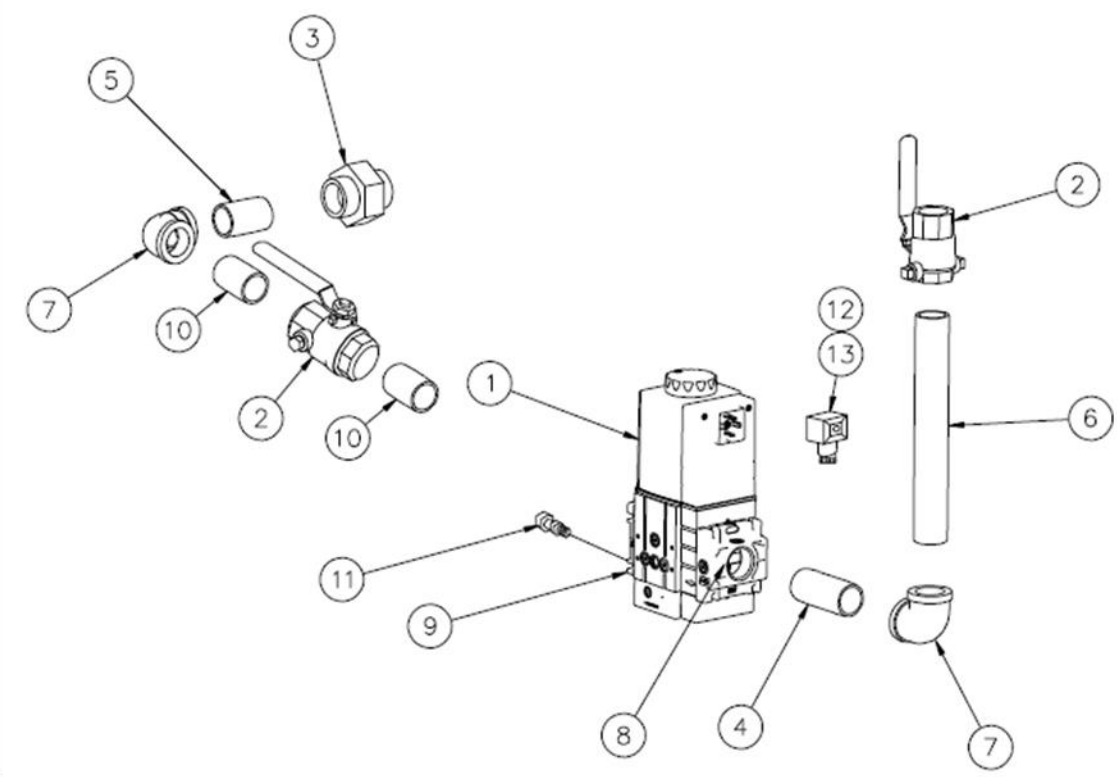
Figure 11-1 – Burner Attachment Layering Illustration

11.3.10.2 Control Panel Components



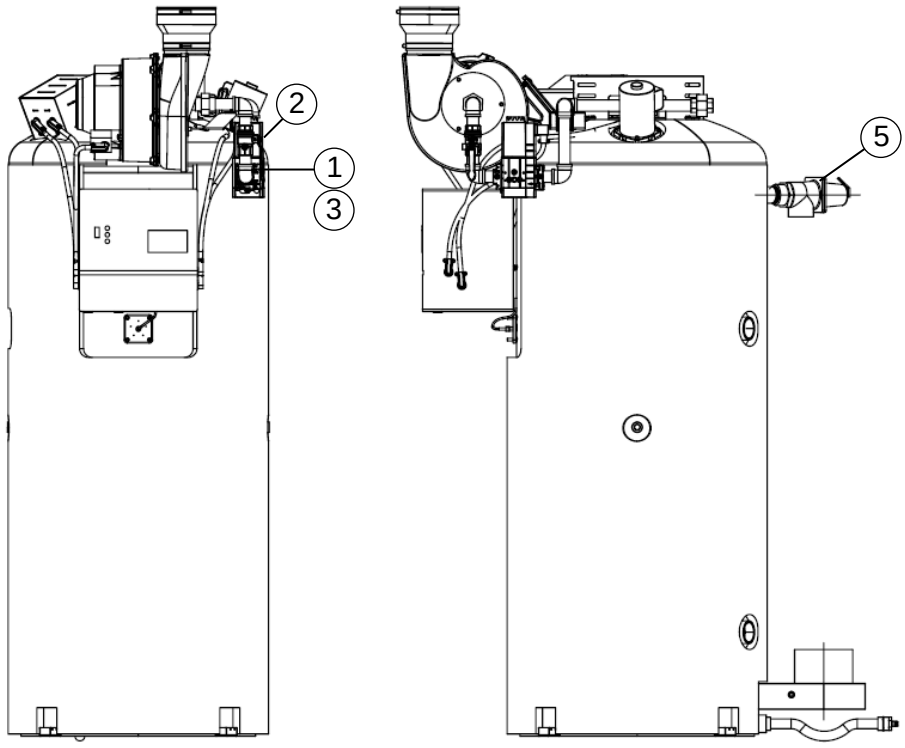
ITEM	DESCRIPTION	PART #
1	Kit, EOS BTCII User Interface	147313
2	Switch, SPST N.C. Momentary Contact Selecta #SS229	70573
3	Switch, SPST N.O. Momentary Contact Selecta #SS228	75908
4	Face Plate Decal	126335
5	Screw 10-24 X 1/2	125249
6	Fuseholder, Panel Type #HTB-28I	5613
7	Fuse, MDA 10 Amp Buss 250V	76267
8	Switch, Carling #LTILA51-6S-BL-AM-NBL-125N/LNDP	70565
9	Plate, Face AGC PIM/Digital Control Display	145468
10	Board, Terminal Elec-Tron #PV13080 20 Pole Feed	122346
11	Block, Terminal Wago #280-833 600V 20A DIN	122319
12	Jumper, Terminal Block Wago #280-402 23A	122320
13	Board, Terminal Elec-Tron #Es-70x Pv04075 6 Pole Feed Thru Type	103259
14	Kit, PIM Control	147306
15	Transformer, Step Down Triad #F5-24 115VAC 24VCT	126865
16	Bar, Ground Square D #PK5GTA 5 Pole	122321
17	LWCO, Protodesign #LW-3-C-1-A-03 120V	129013
18	Board, Terminal Elec-Tron #PV13140 10 Pole	140328
19	Bracket, Terminal Strip Mtg 3 X 6 for P/N 102011	121749
20	Jumper, Elec-Tron #ESJ-145	102467
21	Sensor, Thermistor Tekmar #91769 Direct Measure Dual	126090
22	Sensor, Thermistor Tekmar #91768 Direct Measure Single	126089
23	Jumper, Elec-Tron #ESJ-154	122746
24	Card, Pim Fenwal #05-900000 Water heater	143365
25	Card Cable Fenwal #05-900001-018	126537
26	Bracket, Terminal Strip Mtg 3 X 6 Angle Face for P/N 103259	145267
27	Probe, LWCO Warrick #3L1D002.75 w/1/8 MPT	58154
28	(not shown) CABLE, PATCH CAT 5E 8P8C 5 FT FOR EOS PIM J4 TO BTCII	143558

11.3.10.3 Gas Train Assembly



ITEM	DESCRIPTION	PART #
1	VALVE, GAS DUNGS #259487 MBC SE 1000/602L S02 120VAC	109884
2	VALVE, SHUTOFF 1 GAS RUB #S82F41	148964
3	UNION, BLACK 1	5929
4	NIPPLE, BLACK 1 X 2	6011
5	NIPPLE, BLACK 1 X 3 1/2	6013
6	NIPPLE, BLACK 1 X 9	6020
7	ELL, BLACK 90DEG 1	6163
8	FLANGE, VALVE 1 DUNGS #D221999	110308
9	SHUTTER, FLANGE 1 DUNGS #255132	126862
10	NIPPLE, BLACK 1 X CL	6009
11	CONNECTOR, 1/8 MPT X 1/4 COMPRESSION	6480
12	CONNECTOR, DIN DUNGS #210-319	114995
13	ADAPTER, CONDUIT 1/2 DUNGS #240-671	117067

11.3.10.4 Drain Valve – T & P Relief Valve – Integral Circulating Pump Assembly



ITEM	DESCRIPTION	PART #
1	FLANGE, MTG BRONZE INTEGRAL PUMP PL 2 SIDE	119301
2	MOTOR, PUMP B & G #1BL113 MODEL #PL-75 115 VAC W/IMPELLER	120090
3	O-RING, GASKET 4.25 OD X 3.50 ID X .375	122423
4	VALVE, BALL 1 WATTS #LFFBV-3C BRASS THREADED 400 WOG	122394
5	VALVE, T & P RELIEF 150 PSI WATTS	73458

11.3.11 Component Wiring and Routing Details

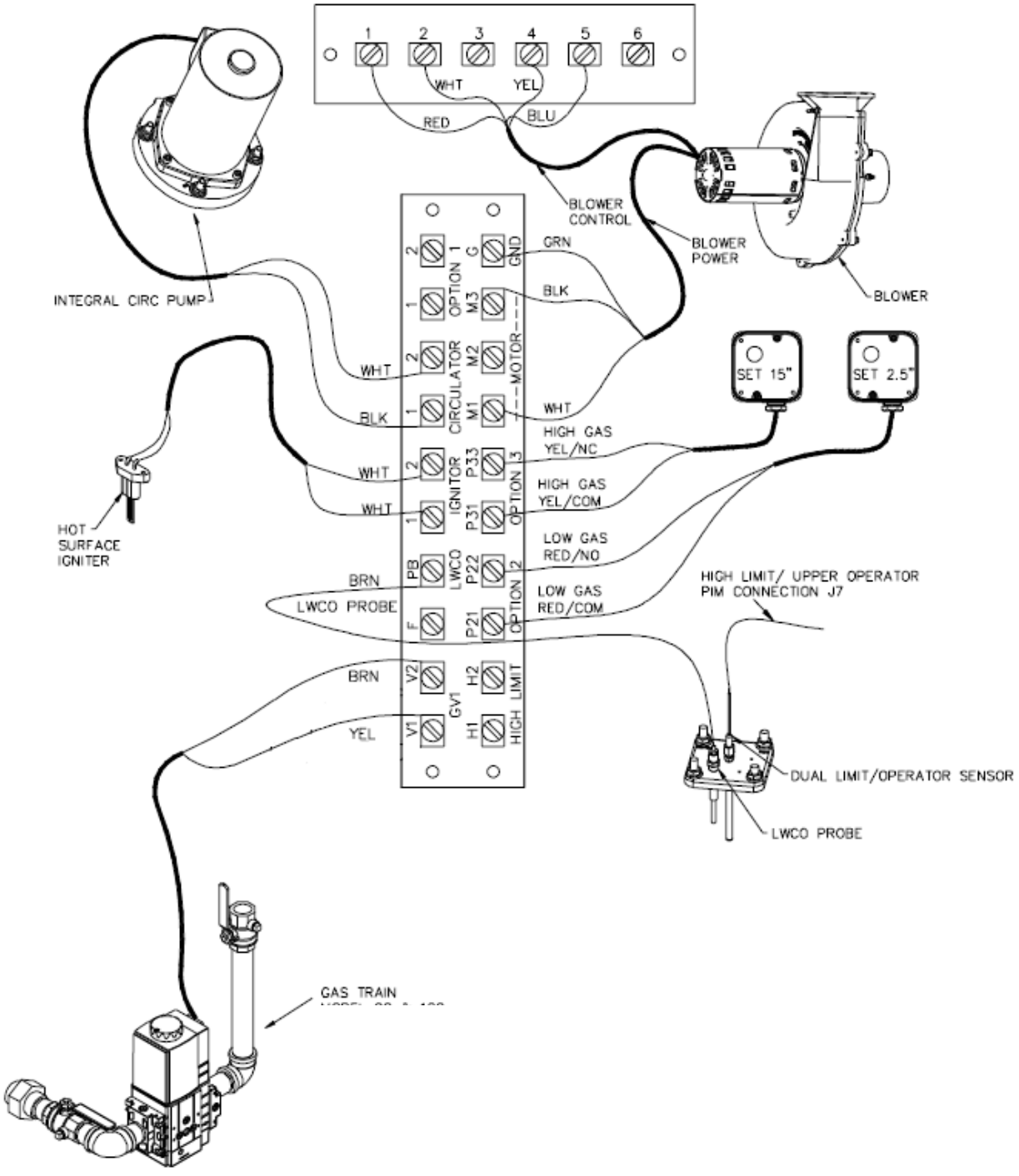


Figure 11-2 – Lync Q Water Heater Component Wiring

11.4 DigiTemp Jr Maintenance

The DigiTemp Jr mixing valve must be tested periodically in compliance with local codes, and at least once per year or more as service conditions warrant. The unit must be retested once maintenance has been performed. Corrosive water conditions and/or unauthorized adjustments or repair could render the product ineffective for the service intended. Regular checking and cleaning of the product's internal and external components helps assure maximum life and proper product function.

11.4.1 Actuator Replacement

1. Disconnect all power and fully de-energize the mixing valve. This can be done by opening breaker #4. See Table *3-12* and Figure 3-21.
2. Once de-energized and disconnected, the display will become inactive and the control box can be opened.
3. Pop open the controller cover and then loosen two screw to expose actuator connection.
4. Using the slot screwdriver loosen terminals 1 to 3 in the upper left side of the control module. Take note of the wire colors connected to each of the terminals. This connection should be as follows from left to right:
   1) Grey 2) Black 3) Red

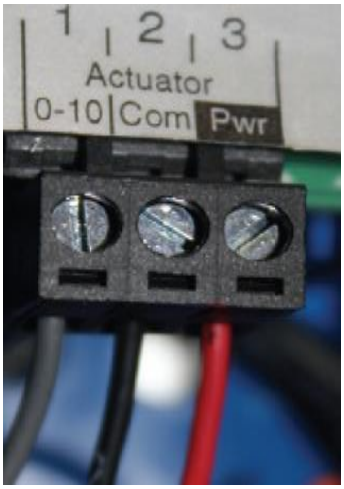


Figure 11-3 – Actuator connection on DigiTemp Jr Controller

5. Remove the Actuator Cables from the control box.
6. Remove the actuator from the valve as follows:
   a. Using the T30 Torx driver remove the two actuator support plate T30 Torx screws
   b. Using the 10mm wrench loosen the actuator armature clamping nut
   c. Using the T30 Torx driver completely remove the support plate T30 Torx screws
   d. At this point the actuator should be free to slide off the valve stem away from the valve. If not, further loosen the actuator armature clamping nut
   e. Carefully remove the actuator and set it aside

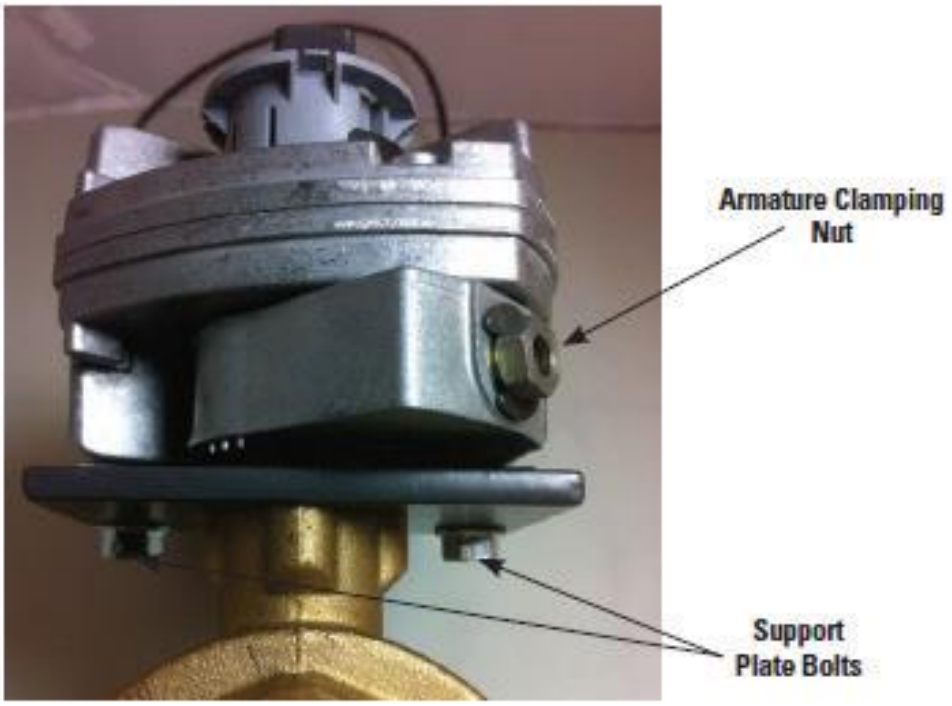


Figure 11-4 – Actuator connection to valve

Note: As an additional safety check, once the box is open, confirm the unit is de-energized by measuring the AC voltage across the “L” and “N” terminals (46 and 45 respectively) using the voltmeter. Alternatively, use a voltage detector to confirm that the unit is NOT energized.

7. Install the new actuator:
   a. Use the T30 Torx driver to tighten support plate T30 Torx screws (see below).
   b. Ensure the support plate bolts are sufficiently loose to allow for very slight movement between the support plate and the actuator. This will allow the actuator to find the proper position when the armature clamping nut is tightened down.
   c. Position the actuator armature in the un-powered rest position. Make sure "T" on the valve stem points away from and is parallel with the mixed outlet (Figure 11-5).
   d. Tighten the armature clamping nut using the 10mm socket and torque wrench to 50 in-lbs (5.65 N-m). Sometimes the nut on the armature comes loose and doesn’t have a firm grip on the valve stem. The armature may move without moving the valve stem or slightly move the valve stem. If the nut is loosening on its own, add a small amount of non-permanent Loctite on the threads to keep the nut from coming loose

NOTE: If the valve stem is out of alignment, the DigiTemp Jr will not control temperature to the programmed mixed outlet setpoint.

   e. Use 3/8" socket, elbow and torque wrench to torque support plate nut to 50 in-lbs.
   f. Connect wire harness to existing control wires.
   g. Ensure dip switches are positioned to the right per Figure 11-6.

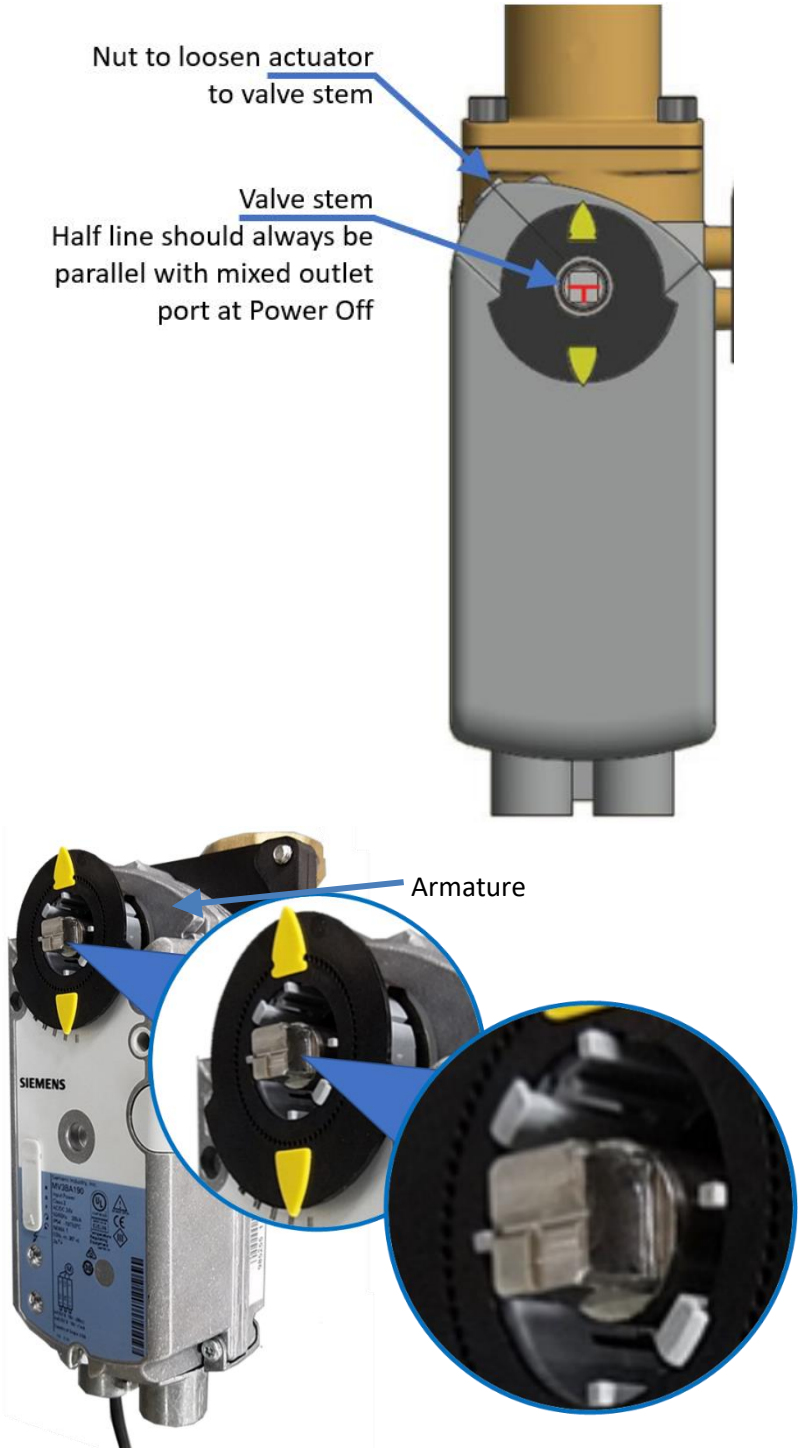


Figure 11-5 – Correct Actuator Orientation Relative to Valve.

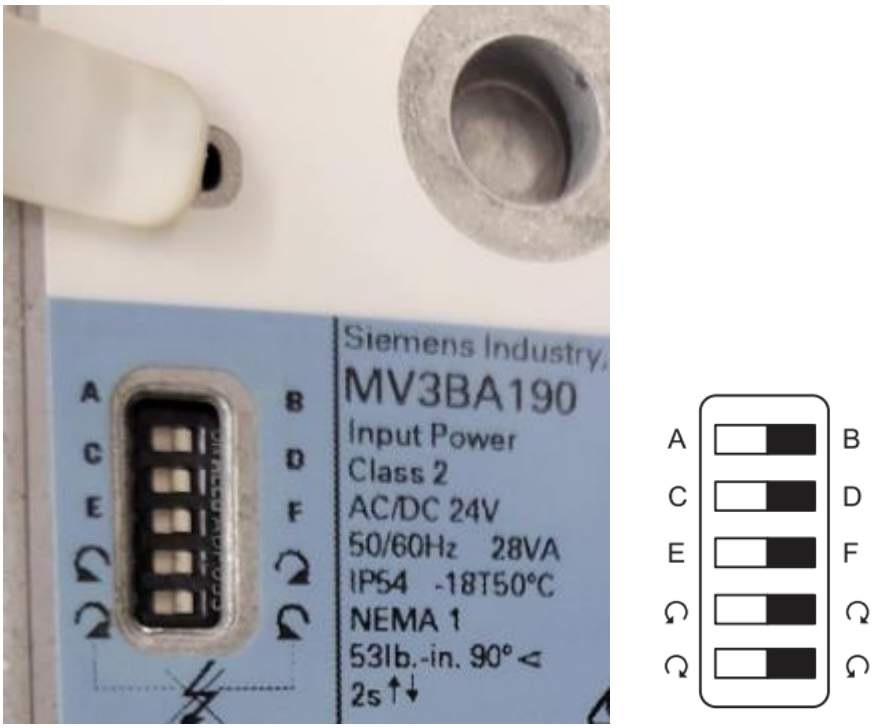


Figure 11-6 – Correct dip switch orientation on DigiTemp Jr actuator

11.4.2 Valve Replacement

1. Ensure water is valved off and pressure is relieved to hot, cold, and mixed lines.
2. Follow actuator removal above in steps 1 through 6.
3. Un-plug temperature sensor from the valve.
4. Remove valve and replace. Install actuator per step 0 above and plug in sensor.

11.4.3 DigiTemp Replacement Parts

Part #	Description
58207	DigiTemp Jr. Actuator Kit
59364	DigiTemp Jr. High speed temperature sensor with wire kit
24774-2	DigiTemp Jr. Controller kit
24779	DigiTemp Jr. ¾-in Valve and Actuator Kit
59365	DigiTemp Jr. ¾-in Valve

Table 11-2 – DigiTemp Jr Replacement Parts

11.5 AquaSolve Maintenance

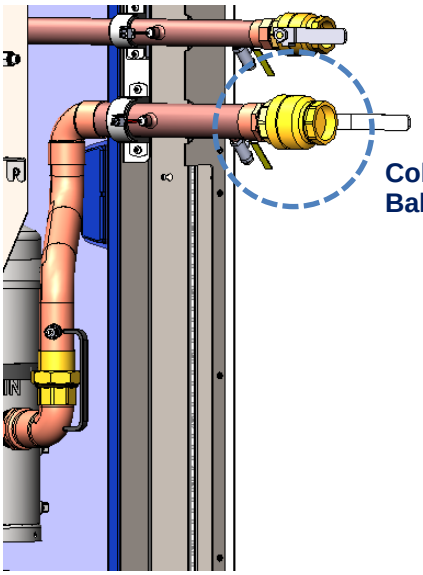
The AquaSolve media needs to be replaced every 3 years or sooner, depending on water conditions. The Edge SC will inform users based on the defined reminder period as well as when it is recommended to ensure media is on hand. The media are composed of small pellets that are best collected by way of a sieve or a rice bag. Do not dispose into the drain, but rather into a refuse container.

11.5.1 Replacing the Media

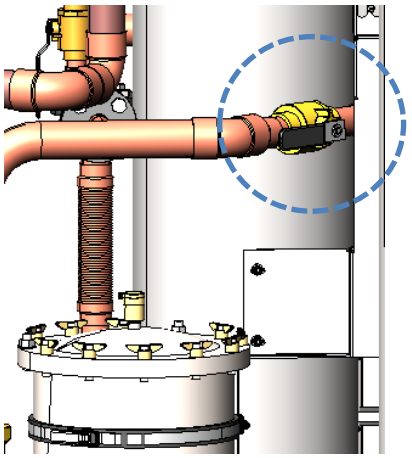
1. Remove the rear panels from Element unit. Each handle panel has 4 wingnuts along the edges that need to be removed. The bottom panel has 4 screws in the corners.

Figure 11-7 – Removing Rear Panel

2. Isolate the AquaSolve tank by closing flow at the cold-water inlet ball valve and cold-water water heater inlet as shown.

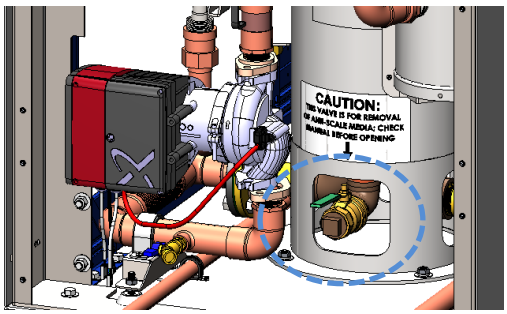


Cold-Water Inlet Ball Valve



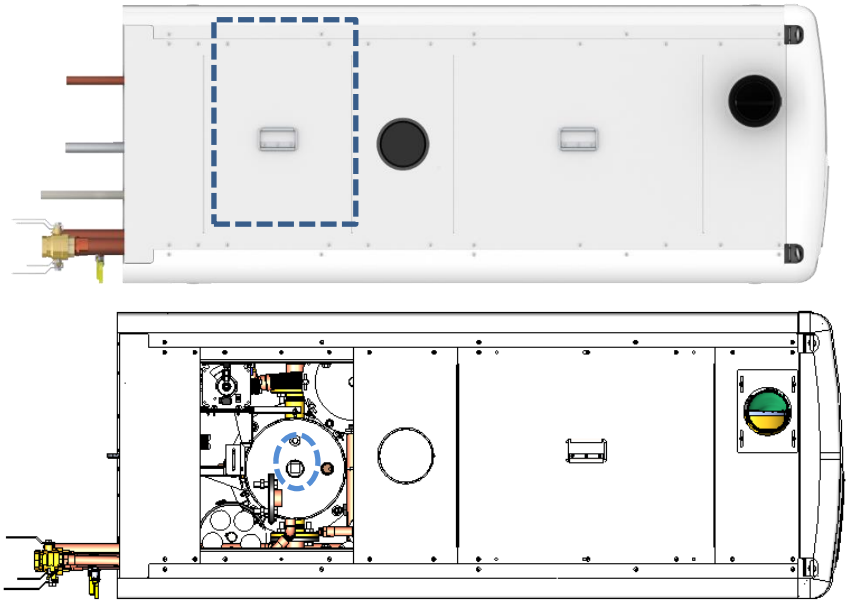
Cold-Water Inlet

3. Remove drain plug from AquaSolve ball valve.
4. Connect drain pipe to AquaSolve ball valve.
5. Vent the AquaSolve tank at the top, center inlet.
6. Open ball valve to drain tank and capture media into a rice bag or sieve for disposal. Open cold-water inlet for 1 minute to flush potential media into suspension to drain.
7. Close ball valve and cold-water inlet.



AquaSolve Ball Valve

8. Open the rear top hatch. Attach AquaSolve media reservoir to the top of the vent.
9. Refill the unit with AquaSolve media M8414-COM-RM at the vent.
10. Slowly open cold-water inlet and fill to top of the vent. Close the inlet and close the vent.
11. Log media replacement in the Element Edge SC control system.

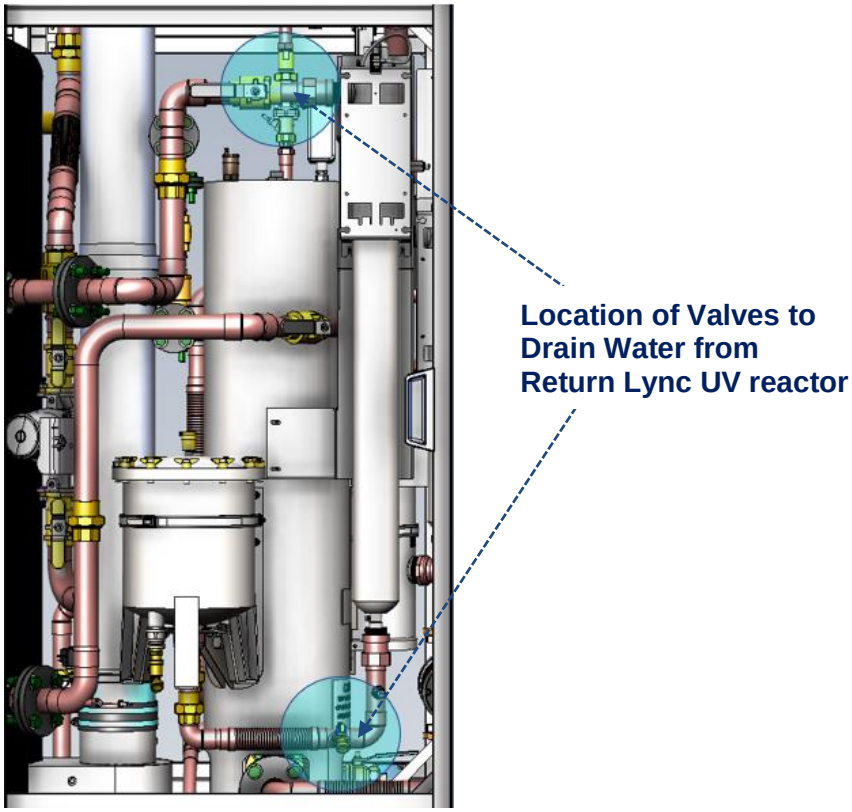


Rear-Top Hatch and Top Vent

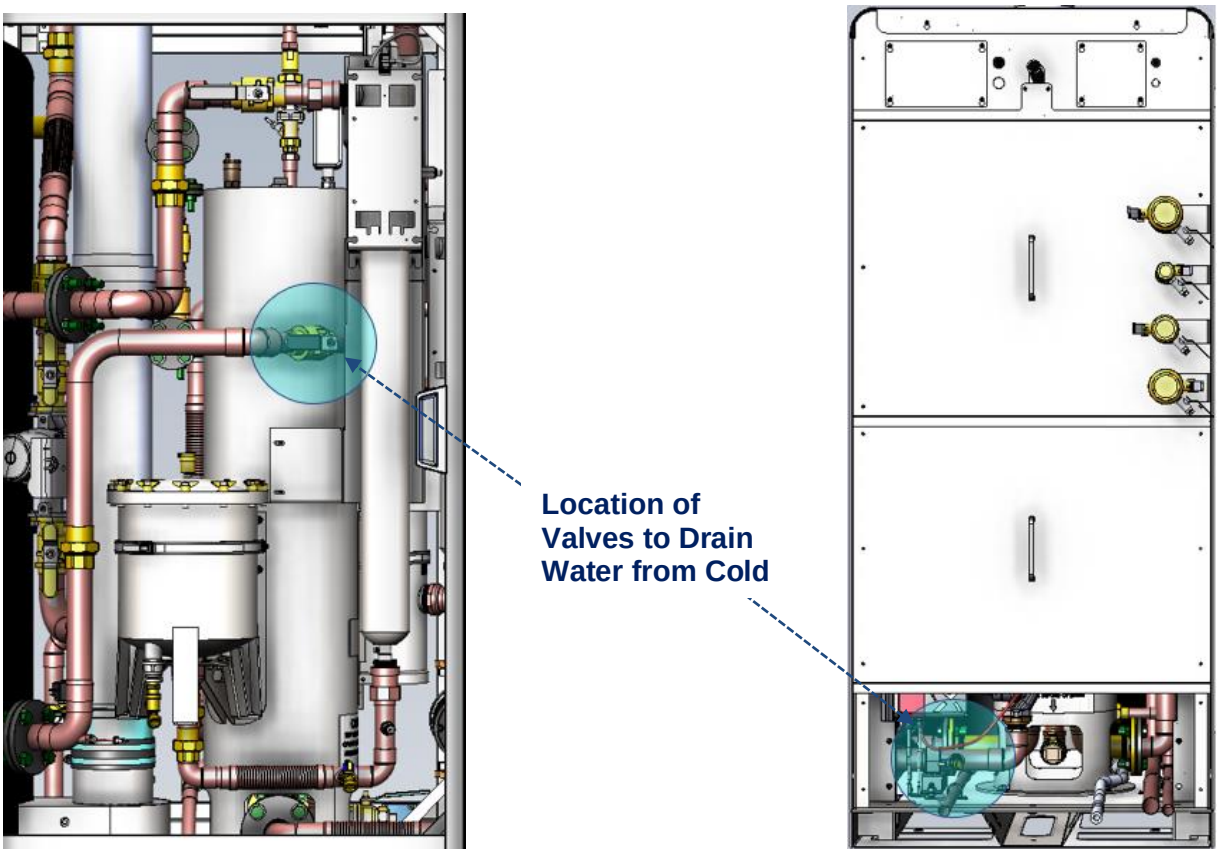
11.6 Lync UV Systems Maintenance

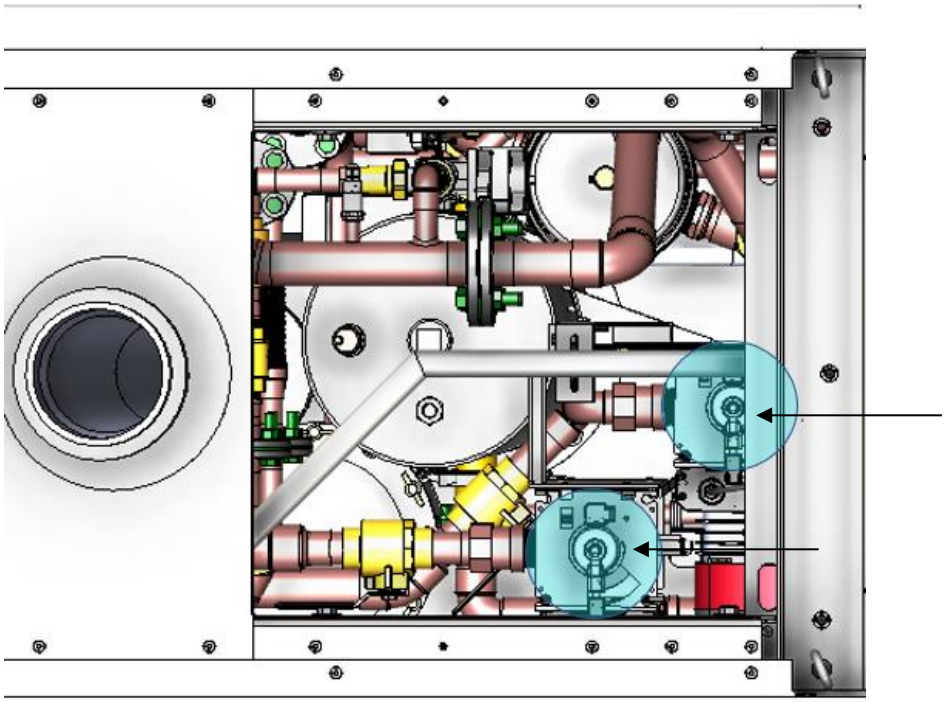
The Edge SC will inform users when a bulb should be ordered and when it requires replacement (every 9,000 hours). When a bulb or quartz tube needs to be replaced:

1. Isolate the Element from the DHW system and depressurize. De-energize Element.
2. For the recirc water UV:
   a. Close the ball valve downstream (near the top) of the UV assembly.
   b. Connect a hose to the drain outlet upstream (near the bottom) of the UV assembly.
   c. Open drain valve. The air vent above the recirc filter will open and allow branch to drain.
   d. Close drain valve and remove hose.



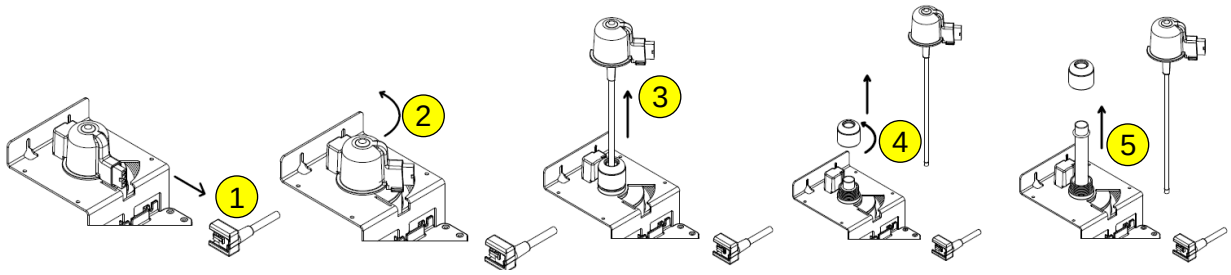
3. For the cold water UV:
   a. Close the ball valve downstream (near the top) of the UV assembly.
   b. Connect a hose to the drain outlet upstream (near the bottom) of the UV assembly.
   c. Open the drain valve. The air vent above the recirc filter will open and allow the branch within Element to drain. This will also drain the AquaSolve chamber.
   d. Close drain valve and remove hose.





Top view location of Lync UV reactor assemblies

4. Remove the two rear top hatches to expose the tops of both UV assemblies. Place an absorbent cloth around the port to catch any water discharge.



5. Disconnect the lamp lead wire from the glow cap electrical port (no. 1).
6. Rotate the glow cap counterclockwise to unlock it from the mounting bracket (no. 2).
7. Pull up on the glow cap to remove the lamp from the quartz sleeve (no. 3). If not replacing the quartz, sleeve proceed to step 13.
8. Grip the quartz sleeve nut with your hand and unscrew counterclockwise until it can be lifted from the reactor chamber's threaded port (no. 4).
9. Remove the quartz sleeve from the reactor chamber (no. 5).
10. Remove all components from packaging and inspect for any damage, cracks, or scuffs.
11. Fully insert a new quartz sleeve into the reactor chamber and install the O-ring over the quartz sleeve. Press the O-ring down over the quartz sleeve until it is seated in the bevel of the stainless steel reactor chamber's threaded port.

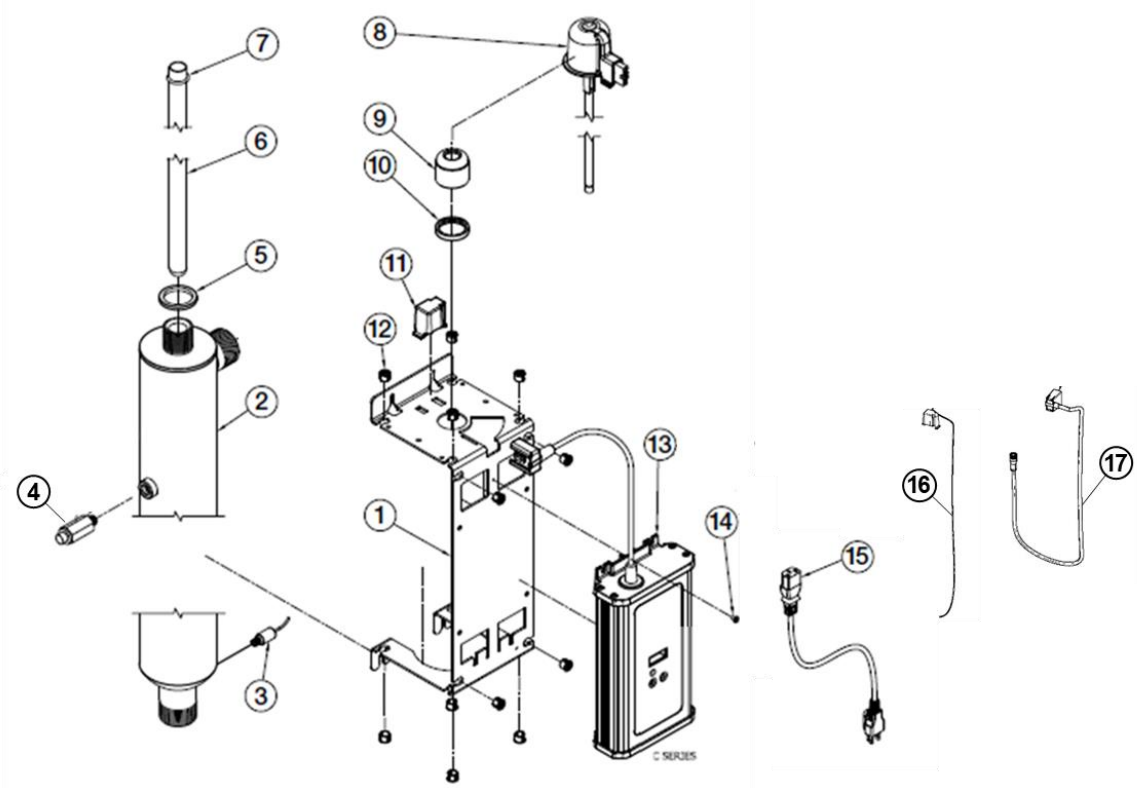
NOTE: DO NOT touch the quartz sleeve with your fingers as fingerprint residue will cause the sleeve to prematurely fail. Hold it with a paper towel or soft, clean cloth.

12. Install the quartz sleeve nut onto the threaded port of the reactor chamber. Screw the nut on clockwise and tighten hand tight.
13. Insert a new lamp into the quartz sleeve.

NOTE: DO NOT touch the lamp with your fingers as fingerprint residue will cause the sleeve to prematurely fail. Hold it with a paper towel or soft, clean cloth.

14. Gently press down on the glow cap and rotate it clockwise until it locks in place on the mounting bracket.
15. Reconnect the lamp lead wire to the new lamp.
16. Open the rear shut-off valves and check for leaks. Repair leaks as needed.
17. Re-energize the Element.

11.6.1 Replacement Parts Diagram



11.6.2 Parts List

Item	Qty.	Order Code	Location	Description
1	1	T7402038		Bracket for Mounting UV Chamber
2	1	T7400156	Cold	UV Chamber 4.0" OD 1 1/2" MNPT X 1" FNPT
		T7400158	Return	UV Chamber 4.0" OD 1 1/2" MNPT X 1" FNPT
3	1	68110378		Flow Switch with Cable
4	1	68110381		Lync UV Sensor Cable Assembly
5	1	T7400147		Spacer for Chamber
6	1	T7401111	Cold	Lync UV Replacement Quartz Sleeve
		T7401114	Return	Lync UV Replacement Quartz Sleeve
7	1	T7402102		Quartz Sleeve O-Ring
8	1	T7401031	Cold	Lync UV Lamp Assembly
		T7401033	Return	Lync UV Lamp Assembly
9	1	T7400145		Quartz Sleeve Nut
10	1	T7400146		UV Ring nut
11	1	T7402025		UV Antenna Housing
12	12	T7402057		Wire Bushing
13	1	68110026		Lync Controller C_Series
14	1	T7402032		Pan Screw #8 X .375"
15	1	T7402222		Power Cord 6' 120V Standard USA Plug with Ground
16	1	68110368		UV Top End Plate Lamp Assembly
17	1	68110377		RFID Cable

11.7 Component Maintenance and Troubleshooting

11.7.1 Sanitation Pump

Lync Part Number: 69378

Failure to Operate

When pump is first started, the shaft may rotate slowly until water has fully penetrated the bearings. If the pump does not run, the shaft can be rotated manually. To accomplish this, switch off the power supply (see Table *3-12* – Local Circuit Breaker Directory), and close the isolation valves on each side of the pump. Remove the indicator plug in the middle of the nameplate. Insert a small flat-blade screwdriver into the end of the shaft, and gently turn until the shaft moves freely. Replace and tighten the plug. Open the isolating valves and wait 2 to 3 minutes for the system pressure to equalize before starting the pump.

After a long shutdown period, multispeed pumps should be started on speed 3 and then adjusted to the regular setting.

11.7.2 Booster Pump

Lync Part Number: 24695

16. Fault finding

Warning

Before dismantling the pump, drain the system or close the isolating valve on either side of the pump. The pumped liquid may be scalding hot and under high pressure.

16.1 Grundfos Eye operating indications

Grundfos Eye	Indication	Cause
	No lights on.	Power off. Pump not running.
	Two opposite green indicator lights running in the direction of rotation of the pump.	Power on. Pump running.
	Two opposite green indicator lights permanently on.	Power on. Pump not running.
	One yellow indicator light running in the direction of rotation of the pump.	Warning. Pump running.
	One yellow indicator light permanently on.	Warning. Pump stopped.
	Two opposite red indicator lights flashing simultaneously.	Alarm. Pump stopped.
	One green indicator light in the middle permanently on (in addition to another indication).	Remote-controlled. The pump is currently being accessed by Grundfos GO Remote.

16.2 Signalling communication with remote control

The center indicator light in the Grundfos Eye will indicate communication with Grundfos GO Remote.
The table below describes the desired function of the center indicator light.

Case	Description	Signalling by the center indicator light
Wink	The pump in question is highlighted in the Grundfos GO Remote display. To inform the user of the location of the highlighted pump, the center indicator light will flash four or five times once to signal "I am here".	Four or five quick flashes once to signal "I am here". 
Push me	The pump in question is selected/opened in the Grundfos GO Remote menu. The pump will signal "Push me" to ask the user to select the pump/allow the pump to exchange data with Grundfos GO Remote. The indicator light will flash continuously until a pop-up window asks the user to press [OK] to allow communication with Grundfos GO Remote.	Flashing continuously with 50 % duty cycle. 
I am connected	The indicator light is signalling that the pump is connected to Grundfos GO Remote. The indicator light is permanently on as long as the pump is selected in Grundfos GO Remote.	Indicator light permanently on. 

16.3 Fault finding

A fault indication can be reset in one of the following ways:

- When the fault cause has been eliminated, the pump will revert to normal duty.
- If the fault disappears by itself, the fault indication will automatically be reset.
- The fault cause will be stored in the pump alarm log.

Warning and alarm codes	Fault	Automatic reset and restart?	Corrective actions
Pump communication fault (10) Alarm	Communication fault between different parts of the electronics.	Yes	Replace the pump, or call GRUNDFOS SERVICE for assistance. Check if the pump is running in turbine operation. See code (29) Forced pumping.
Forced pumping (29) Alarm	Other pumps or sources force flow through the pump even if the pump is stopped and switched off.	Yes	Switch off the pump on the main switch. If the light in the Grundfos Eye is on, the pump is running in forced-pumping mode. Check the system for defective non-return valves and replace, if necessary. Check the system for correct position of non-return valves, etc.
Undervoltage (40, 75) Alarm	Supply voltage to the pump too low.	Yes	Check that the power supply is within the specified range.
Blocked pump (51) Alarm	The pump is blocked.	No	Dismantle the pump, and remove any foreign matter or impurities preventing the pump from rotating.
Dry running (57) Alarm	No water at the pump inlet or the water contains too much air.	No	Prime and vent the pump before a new start-up. Check that the pump is operating correctly. If not, replace the pump, or call GRUNDFOS SERVICE for assistance.
High motor temperature (64) Alarm	Temperature in stator windings too high.	No	Check the winding resistance according to the *MAGNA3 service instructions*.
Internal fault (72, 84, 155, 157) Warning/alarm	Internal fault in the pump electronics.	Yes	Replace the pump, or call GRUNDFOS SERVICE for assistance.
Overvoltage (74) Alarm	Supply voltage to the pump too high.	Yes	Check that the power supply is within the specified range.
Communication fault, twin-head pump (77) Warning	Communication between pump heads disturbed or broken.	Yes	Check that the second pump head is powered or connected to the power supply.
Internal sensor fault (88) Warning	The pump is receiving a signal from the internal sensor which is outside the normal range.	Yes	Check that the plug and cable are connected correctly in the sensor. The sensor is located on the back of the pump housing. Replace the sensor, or call GRUNDFOS SERVICE for assistance.
External sensor fault (93) Warning	The pump is receiving a signal from the external sensor which is outside the normal range.	Yes	Does the electrical signal set (0-10 V or 4-20 mA) match the sensor output signal? If not, change the setting of the analog input, or replace the sensor with one that matches the setup. Check the sensor cable for damage. Check the cable connection at the pump and at the sensor. Correct the connection, if required. The sensor has been removed, but the analog input has not been disabled. Replace the sensor, or call GRUNDFOS SERVICE for assistance.

Caution ***If the power supply cable is damaged, it must be replaced by the manufacturer, the manufacturer's service partner or a similarly qualified person.***

17. Sensor

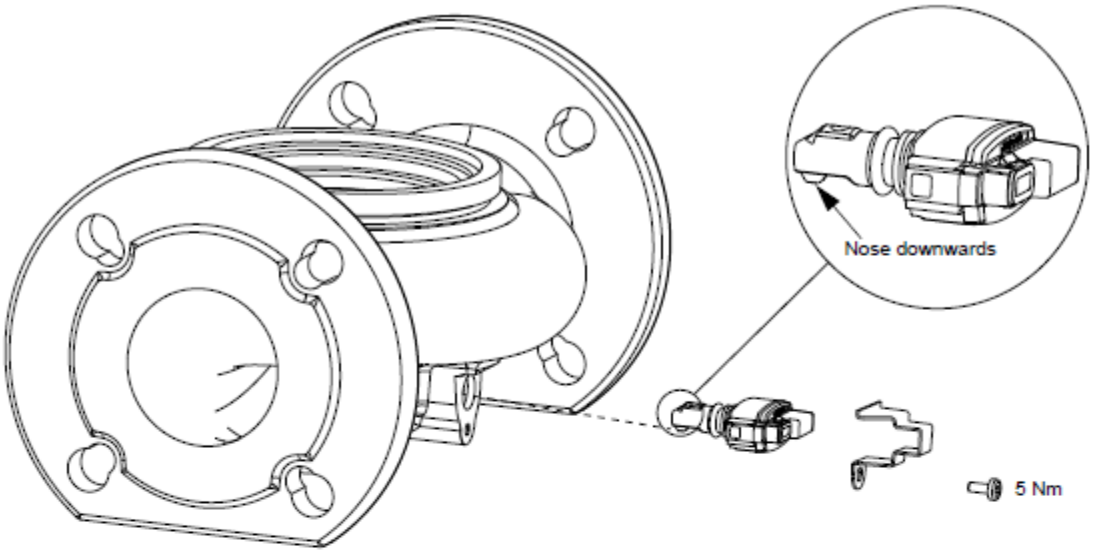


Fig. 39 Correct position of sensor

During maintenance and replacement of the sensor, it is important that the sealing cap is fitted correctly on the sensor housing.
Tighten the screw holding the clamp to 3.7 ft-lbs (5 Nm).

Warning
Before replacing the sensor, make sure that the pump is stopped and that the system is not pressurized.

17.1 Sensor specifications

17.1.1 Pressure

Maximum differential pressure during operation	29 psi / 2 bar / 0.2 MPa
Accuracy +32 to +185 °F (0 to +85 °C)	2 %*
Accuracy +14 to +32 °F and +185 to +266 °F (-10 to 0 °C and +85 to +130 °C)	3 %*

* Full scale.

17.1.2 Temperature

Temperature range during operation	+14 to +266 °F (-10 to +130 °C)
Accuracy	± 3.6 °F (± 2 °C)

11.7.3 Blowdown Valve

Lync Part Number: 92158

1. After disconnecting the supply voltage and discharging the pressure, inspect the valve.
2. Clean and inspect all the internal parts and replace them if necessary.
3. Remount all the parts making up the solenoid valve with care, paying great attention to the correct position of each part and protecting the sealing surfaces.
4. Check for tightness and correct operation.

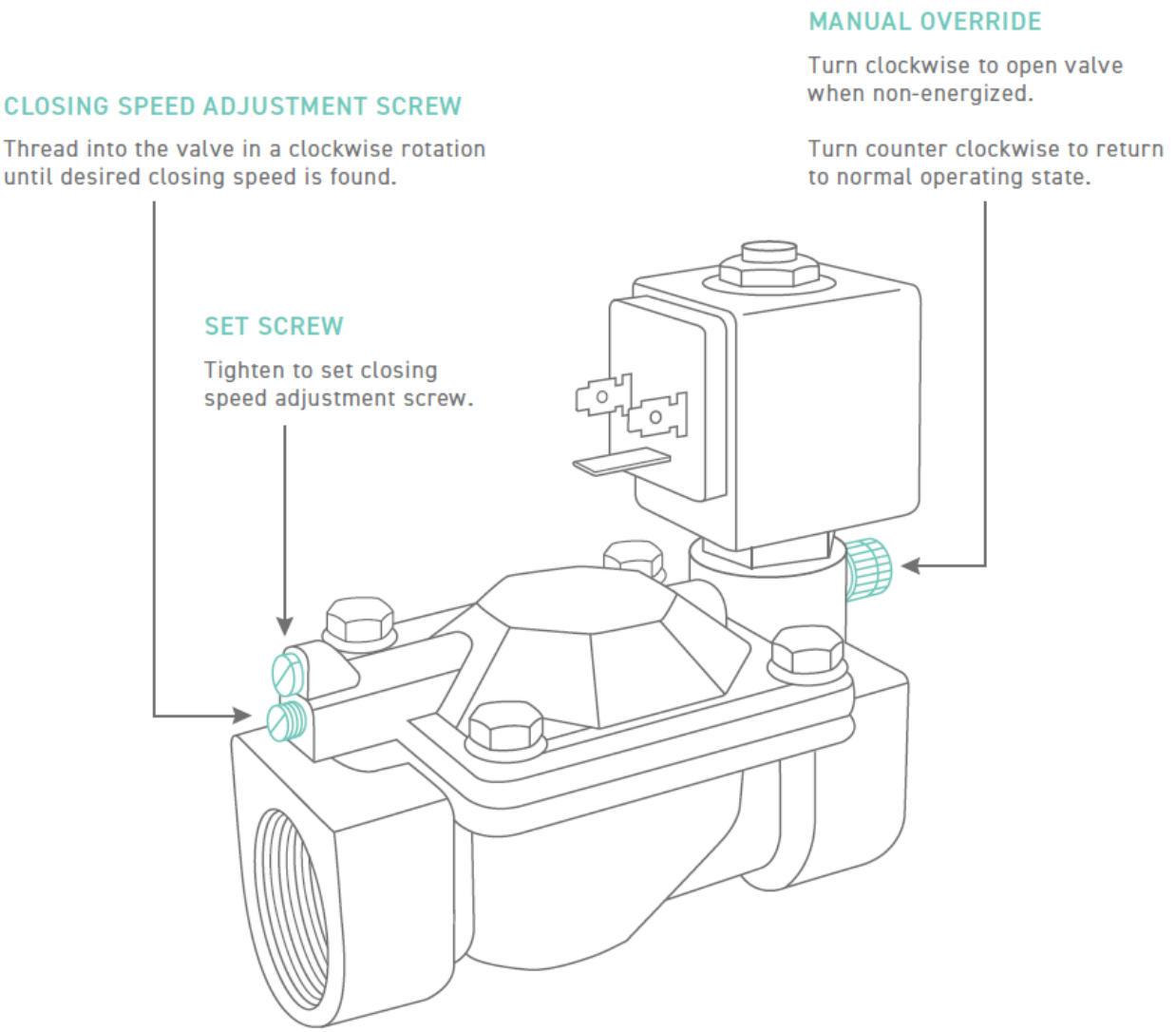


Figure 11-8 – Local adjustment of diverter valve

11.7.4 Diverter Valve

Lync Part Number: 92159

⚠ WARNING!
Do not press the clutch while actuator is powered.

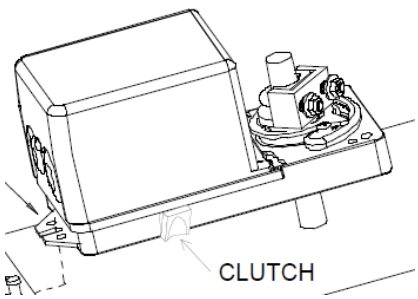


Figure 11-9 – Location of Clutch

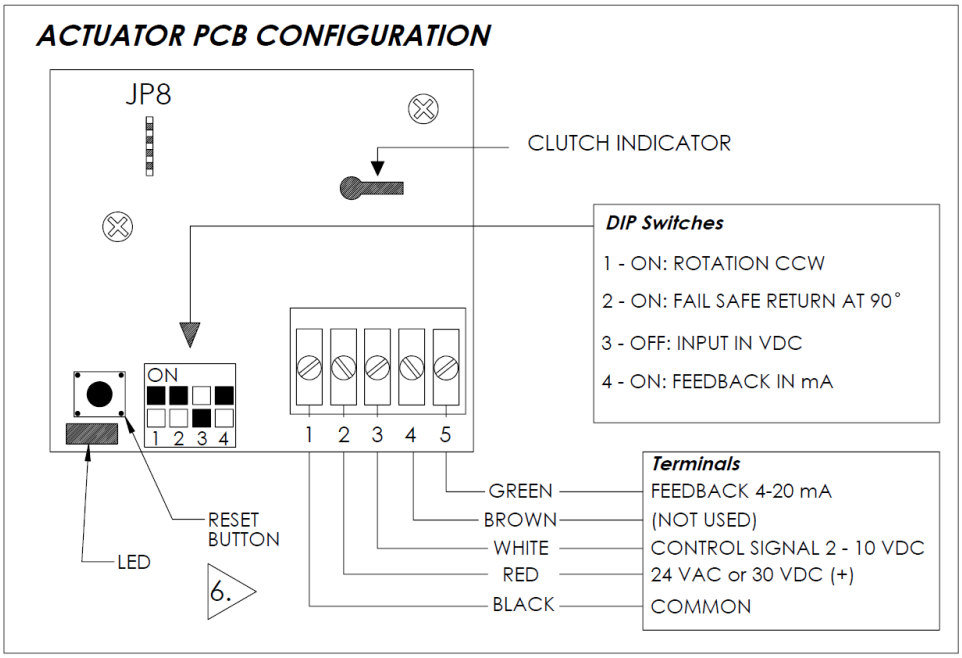


Figure 11-10 – PC Board

11.7.4.1 Stroke Adjustment

1. Apply power and WAIT FOR LED TO TURN OFF (around 10 seconds).
2. Press the reset button to start auto-stroke process. The LED should illuminate.
   a. First option: The actuator will then travel in both directions to find its limit and position itself according to the demand. The LED will extinguish, the process is complete.
   b. Second option: When the desired start position is reached, press and release the reset button. The actuator will now go the end position. (you can also press and release the reset button when It's reaches the end position) The LED will extinguish, and the process is complete.

11.7.4.2 Zero and Span Calibration

This feature is applicable to analog control signal only.

1. Remove power and put all dip switches "OFF". (factory preset).
2. Apply power and, within 10 seconds press and hold the reset button until the LED blinks once. The Zero and span calibration process then start.
3. Release the reset button. The LED is now constantly illuminated.
4. Apply new minimum voltage. It can be any value between 0 to 7 Vdc, with an external 0 to 10 volt supply (ex: MEP).
5. Press and release the reset button to memorize the new minimum voltage. The LED blinks.
6. Apply new maximum voltage. It can be any value between 3 to 10 Vdc, this value should be greater than the new minimum value.
7. Press and release the reset button to memorize the new maximum voltage. The LED blinks. The Zero and span calibration process is complete.

11.8 Filter Maintenance

11.8.1 Cold Filter

The Element uses a cold Lync filter cartridge, part no: **87012**. These cartridges are washable and reusable, filter to 5µm, and reduce filtration costs.

Specifications:

Max Pressure	40 PSID
Recommended Change Out	20-30 PSID

11.8.2 Recirculation Filter

The Element uses a high temperature, pleated Lync cartridge for high capacity filtration to 5µm; part no: **87011.**

Specifications:

Temperature	Up to 200° F (90° C)
Recommended Change Out	25 PSI ∆ P (1.7 bar)

11.8.3 Cleaning

Clean cartridges with pressure nozzle using standard hose. Direct spray at an angle to remove particulate. For best results, direct spray into pleats to dislodge sediment, or allow the cartridge to dry and brush off filter cake from the surface of the media. For specific entrapped materials:

Oils in aqueous solutions: Soak cartridges in a solution of tri-sodium phosphate or similar strong detergent (2 lbs. to 10 gallons of water). Soak up to 12 hours. Rinse after soaking.

Organic matter and algae in aqueous solution: Use tri-sodium phosphate or similar strong detergent as described above, plus 1 pint of liquid chlorine to kill organic matter and algae. Soak cartridges 1 hour or longer until surface is no longer slippery. Rinse after soaking.

Calcium & mineral deposits: Follow directions for oils described above. Rinse cartridges thoroughly for approximately 10 minutes in a solution of one part muriatic acid to 20 parts of water. Rinse cartridge thoroughly with water.

CAUTION:
Remove all oils and organic matter with detergent before rinsing cartridges with acid soak for mineral removal. Flush cartridges with water after muriatic or tri-sodium phosphate baths. Generally, it is not possible to clean cartridges filtering petroleum-based liquids, toxic substances and when using one and sub-micron cartridges.

11.9 Cold and Recirc Sediment Filter Maintenance

The Edge SC will inform users when the cold or recirc filters should be ordered and replaced, based on pressure drop due to collected sediment and foreign material within the system.

11.9.1 Changing Recirc Filter

1. Close the upstream return ball valve and downstream ball valve.

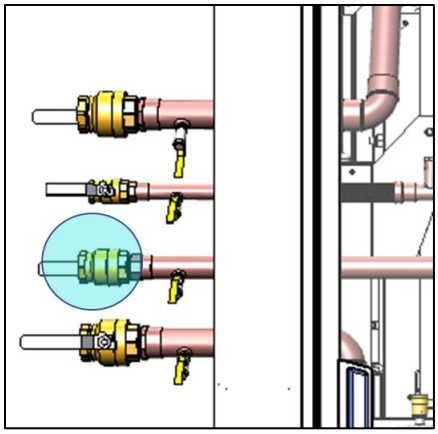


Figure 11-11 - Upstream Return Valve

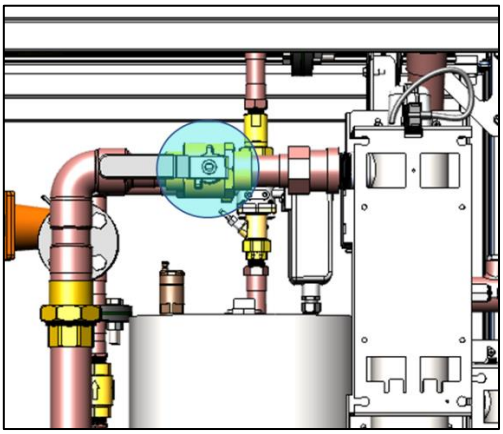
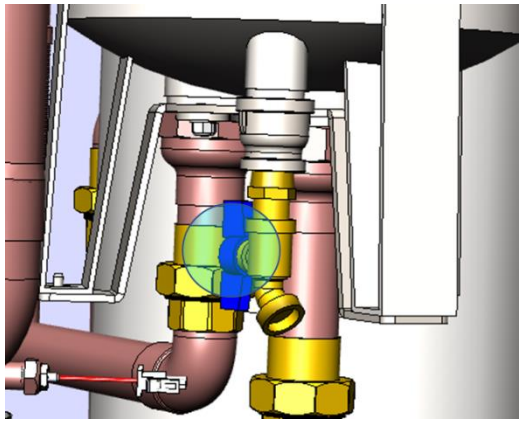
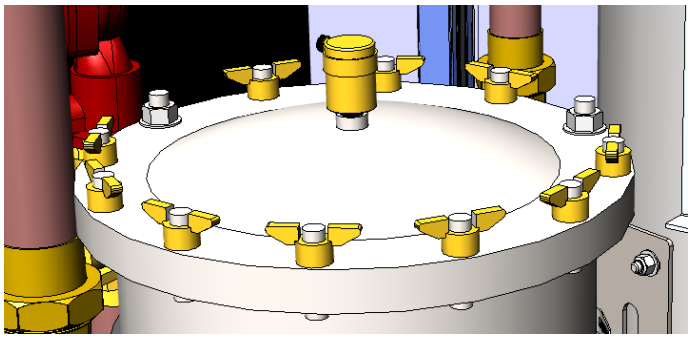


Figure 11-12 - Downstream Return Valve

2. Drain bottom of filter from the hose connection. Air will vent from top of filter housing.



3. Remove all wingnuts and screws from the filter housing cover.



4. Open and remove filter from the housing. Clean or replace with new filter cartridge.
5. Replace filter housing cover.

6. Slowly open ball valves and allow line to fill. Check for leaks.

11.9.2 Changing Cold Filter

1. Close the upstream return and downstream cold inlet ball valves after the cold UV system.

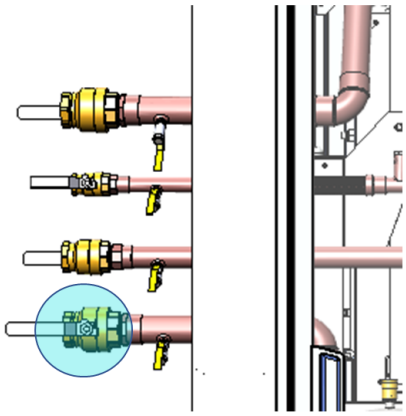


Figure 11-13

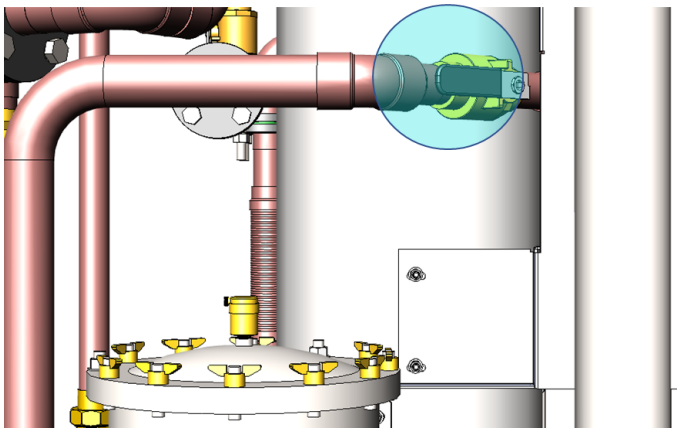


Figure 11-14

2. Remove the bottom rear panel.

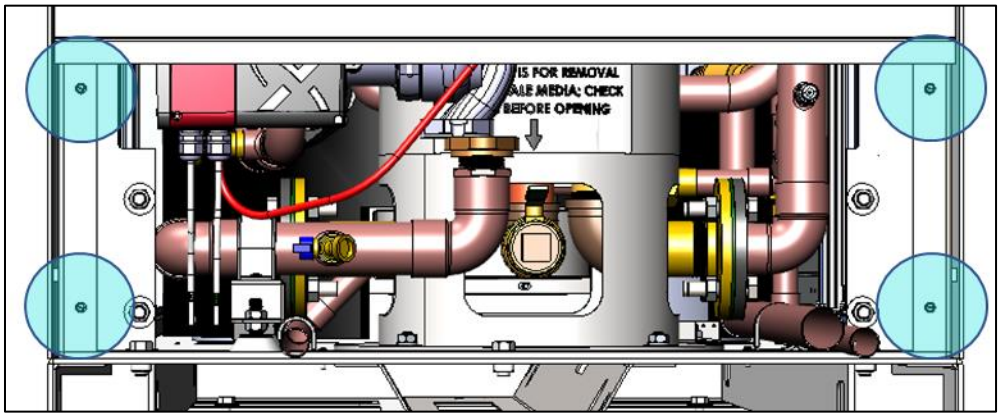


Figure 11-15 - Rear Panel with Locations of Panel Screws Highlighted

3. Open the hose connection to drain the filter, UV, and AquaSolve.
4. Remove the clamp on the filter housing and remove lid.
5. Remove and clean or replace the 5 filter cartridges as needed.
6. Assembly is the same as disassembly.
7. Slowly open the ball valves to refill the line.

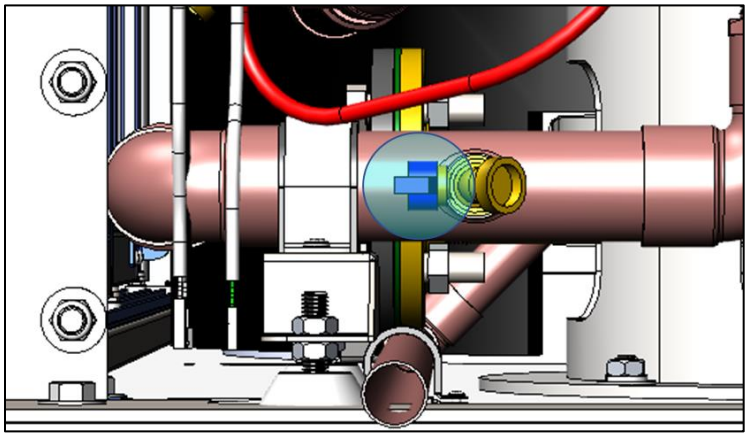


Figure 11-16

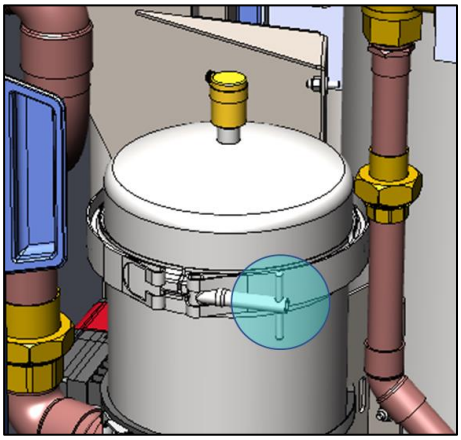


Figure 11-17

11.9.3 Parts List

Item	Qty.	Order Code	Filter	Description
1	5	87012	Cold	5-micron pleated filter cartridge. 2-3/4 in x 9-3/4 in. FM-5-975
2	1	87011	Return	5-micron Hurricane 40 Cartridge

APPENDIX

Appendix A. Status, Fault Messages

The Element provides alerts to users via email, SMS, and push notifications through the myLync app. These messages can be configured by the user in myLync to appear through the different means of communication.

Log into the myLync web app. Click on the top right into your profile. Scroll down to find the Notifications section. Set your preferences accordingly.

The Element will provide notification of system alerts and errors. Many alerts are generated from the Edge SC itself based on incoming data. The following is a list of errors and alerts generated by the system:

Table 11-3 – Alerts and notifications generated by the EdgeSC

ID	SubSystem	Condition	Description
1	Lync UV	Alert Thresholds Updated	Thresholds for cold water UV output, hours left for lamp order, or hours left for replacement lamp has been changed.
2	Lync UV	Order Reminder	Cold water UV lamp is nearing its end of life.
3	Lync UV	Ordered or Verified	Cold water UV lamp has been ordered or inventory verified.
4	Lync UV	Change Required	Cold water UV lamp is nearing its end of life.
5	Lync UV	Replaced	Cold water UV lamp has been changed.
6	DigiTemp Jr	Temperature Setpoint Updated	Mixed water temperature setpoint has been changed.
7	DigiTemp Jr	Temperature Alert Thresholds Updated	Mixed temperature alert thresholds have been changed.
8	DigiTemp Jr	High Temperature Threshold Setpoint Exceeded	Tempered water temperature is over the temperature threshold.
9	DigiTemp Jr	Temperature Invalid	Mixing valve outlet temperature is invalid. Outlet temperature is out of range relative to hot and cold inlets.
10	DigiTemp Jr	Temperature Below Low Threshold Setpoint	Tempered water temperature is under temperature threshold.
11	DigiTemp Jr	Temperature Returned to Allowable Range	Temperature at mixing valve has returned to allowable range.
12	Lync Q Water Heater	Temperature Setpoint Updated	Water heater temperature setpoint has been changed.
13	Lync Q Water Heater	Alert Thresholds Updated	Water heater alert thresholds have been changed.
14	Lync Q Water Heater	High Temperature Threshold Setpoint Exceeded	Water heater temperature is over the temperature threshold.
15	Lync Q Water Heater	Temperature Below Low Threshold Setpoint	Water heater temperature is under the temperature threshold
16	Lync Q Water Heater	Temperature Returned to Allowable Range	Temperature at water heater is [X] and has returned to allowable range.
17	AquaSolve	Alert Thresholds Updated	Aquasolve anti-scale media alert thresholds have been changed.
18	AquaSolve	Media Order Reminder	Aquasolve anti-scale media is nearing its end of life.
19	AquaSolve	Media Ordered or Verified	Aquasolve anti-scale media has been ordered or inventory verified.
20	AquaSolve	Media Change Required	Aquasolve anti-scale media replacement is required.
21	AquaSolve	Media Replacement and Timer Reset	Aquasolve anti-scale media has been replaced and the timer reset.
22	Sediment Filter	Alert Thresholds Updated	Cold water filter alert thresholds have been changed.
23	Sediment Filter	Order Reminder	Cold water filter nearing allowable pressure drop. Ensure that a clean filter is on hand.
24	Sediment Filter	Ordered	Cold water filter has been ordered.

25	Sediment Filter	Replacement Due	Cold water filter is exceeding allowable pressure drop. Replace.
26	Sediment Filter	Replaced	Cold water filter has been changed.
27	Blowdown Valve	Blowdown Cycle Failed	Blowdown cycle failed. It did not meet the specified duration time
28	Blowdown Valve	Blowdown Cycle Completed	Blowdown cycle completed successfully.
29	Booster Pump	Pressure Too High	Booster pump pressure exceeded the high pressure alert threshold.
30	Booster Pump	Pressure Too Low	Booster pump pressure is beneath the low pressure alert threshold.
31	Booster Pump	Returned To Allowable Range from Setpoint	Pressure at the booster pump has returned to the allowable range.
32	Booster Pump	Pressure Setting Updated	Booster pump pressure setting has been changed.
33	Booster Pump	Pressure Alert Thresholds Updated	Booster pump pressure alert thresholds have been changed.
34	Thermal Disinfection	Thermal Disinfection Warm-up Completed | Stage 1	Stage 1 warm-up process complete. Process is proceeding to disinfection. Once complete, you may start branch verification.
35	Thermal Disinfection	Thermal Disinfection Period Completed | Stage 2	Stage 2 thermal disinfection process is complete. The branches have not yet been disinfected. Personnel may now begin to flush branch outlets. Caution should be taken when working at elevated temperature.
36	Thermal Disinfection	Thermal Disinfection Branch Verification Completed | Stage 3	Stage 3 branch verification process was verified complete.
37	Thermal Disinfection	Thermal Disinfection Kill Temp Setpoint Failure	System thermal disinfection process has failed and temperature fell below kill temperature setpoint. Ensure failure condition is documented.
38	Thermal Disinfection	Thermal Disinfection Terminated by User	System thermal disinfection process was terminated. Ensure reason for ending the process has been documented.
39	Water Heater Sanitation	Scheduled Operation Authorized	Scheduled sanitation loop operation has been authorized.
40	Water Heater Sanitation	Scheduled Requires Authorization	Scheduled sanitation loop is, requires an authorization to execute.
41	Water Heater Sanitation	Sanitation Operation Failed	Sanitation loop operation failed.
42	Water Heater Sanitation	Sanitation Operation Successful	Sanitation loop operation completed successfully.

The following is a list of errors and codes generated directly from the different subsystems.

Table 11-4 – Lync Q Water Heater Error Codes

Error #	Description
1	Technical service required on heater. Error #1
5	High exhaust temperature from heater
6	Technical service required on heater. Error #6
7	Low water level detected at heater
8	Interlock not proving, technical service required on heater or interlocked devices
9	Air flow proving switch not closing
10	Low gas pressure detected
11	Tank Top Sensor error. Technical service required on heater
13	Vent Sensor error
14	High Limit Sensor error. Technical service required on heater
15	Ignition Failure error. Technical service required on heater
16	Flame Loss error. Technical service required on heater
17	Vent Temperature High Limit.
19	False Flame error. Technical service required on heater
21	Heater fault. Perform power cycle of unit
24	Low voltage at heater
25	Detected blower speed too low at heater
26	High gas pressure detected at heater

Table 11-5 – Lync UV System Error Codes

Error #	Description
UVLVRAT_2	The UV system is not sufficiently disinfecting. Check bulb life, clean quartz sleeve, clean UV sensor window, or check UV sensor connection.

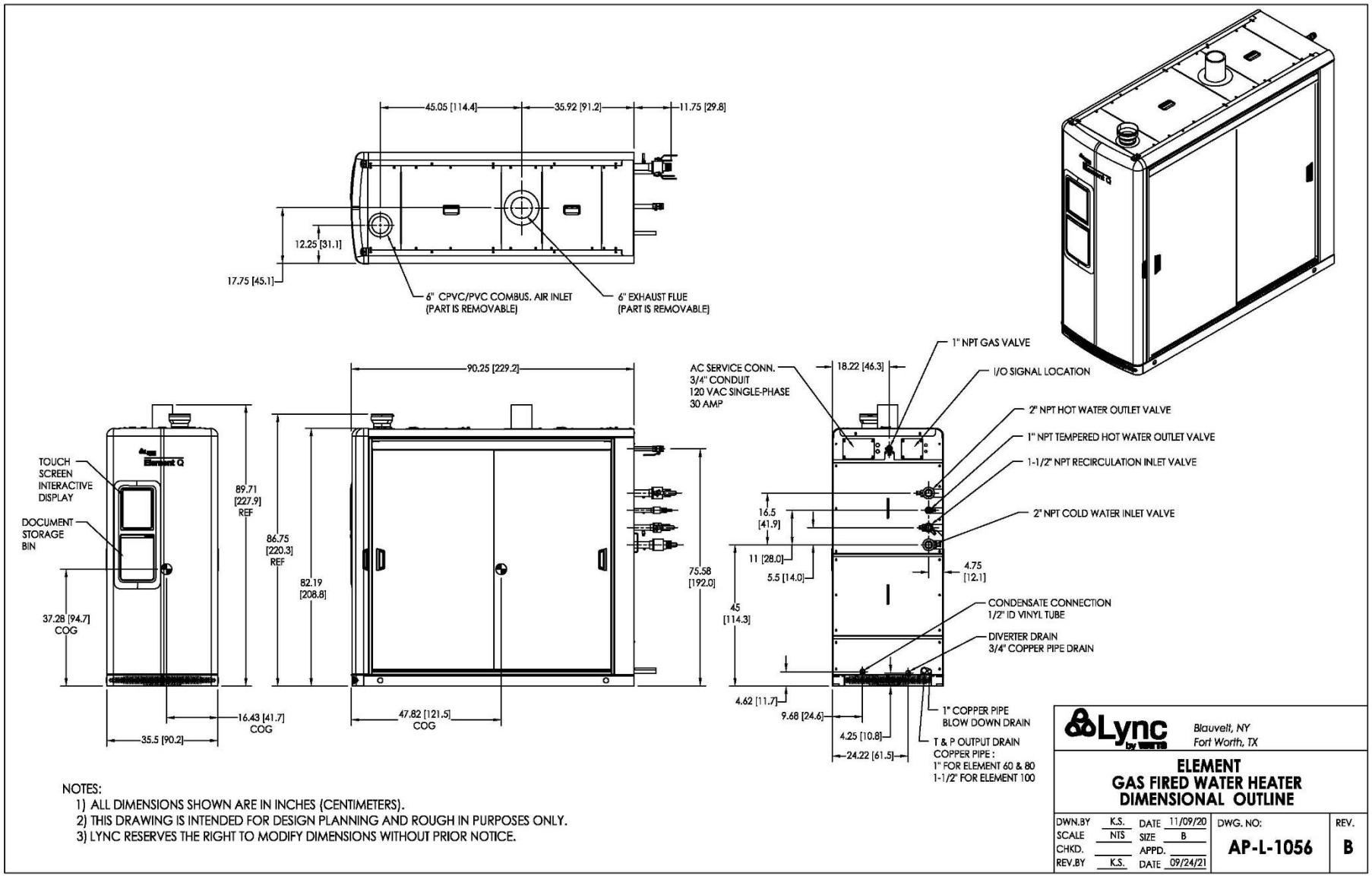
Table 11-6 – DigiTemp Jr Mixing Valve Error Codes

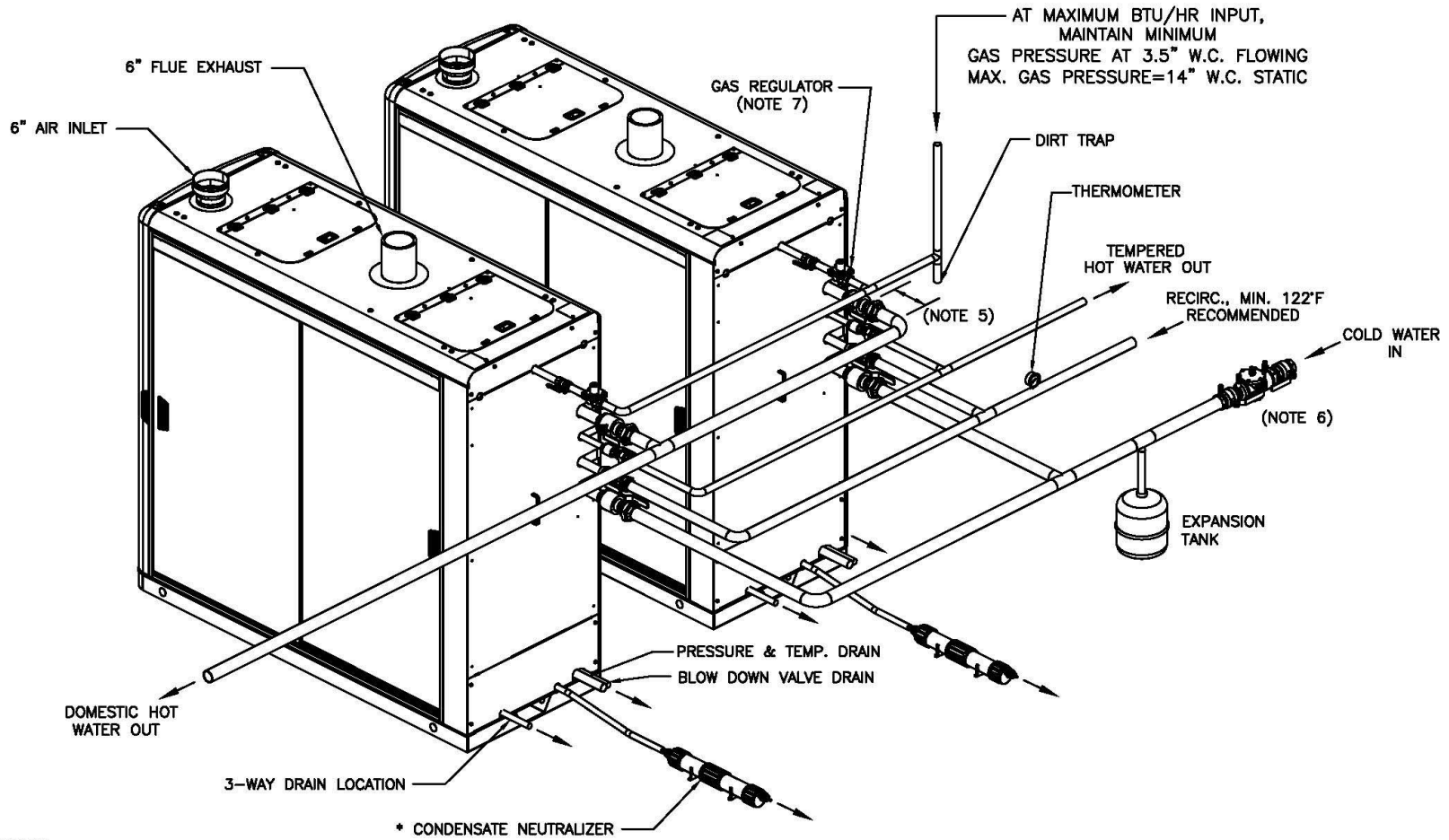
Error #	Description
1	Mixing valve NVM memory error.
2	Mixing valve temperature sensor failure.
3	Mixing valve size selection is not set.

Table 11-7 – Booster Pump Error Codes

Error #	Description
4	Too many booster pump restarts
7	Too many booster pump shutdowns
29	Reverse flow detected at booster pump
48	Booster pump Overload
66	Booster pump control electronics temperature high
67	Booster pump internal temperature too high
68	Booster pump water temperature high

Appendix B. Diagrams



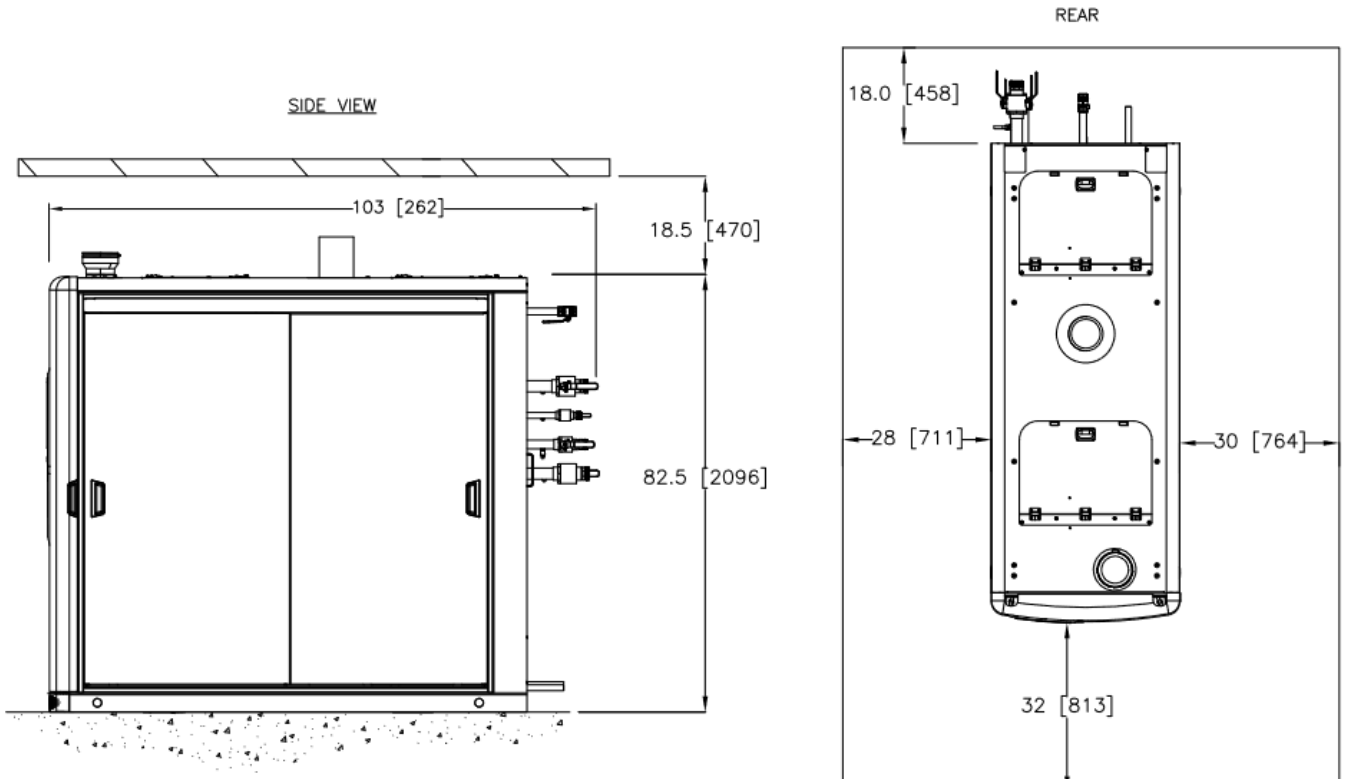


NOTES:
1. FOR ACTUAL SIZES AND LOCATIONS OF PIPING AND OTHER CONNECTIONS TO THE HEATER, SEE DIMENSIONAL DRAWING.
2. ALL DRAINS AND CONDENSATE HOSE SHOULD BE ARRANGED TO PERMIT THE FLUIDS TO DRAIN FREELY, BY GRAVITY, TO A FLOOR DRAIN. RELIEF VALVE DISCHARGE SHOULD BE PIPED TO THE NEAREST FLOOR DRAIN. WHEN NO FLOOR DRAIN IS AVAILABLE, THE RELIEF VALVE DISCHARGE SHOULD BE PIPED VERTICALLY TO A HEIGHT OF AT LEAST 6" ABOVE THE FLOOR BUT NOT LESS THAN 2 PIPE DIAMETERS.
3. ALL (*) ITEMS ARE INCLUDED SEPARATELY IN SHIPMENT.
4. THIS IS A TYPICAL INSTALLATION DRAWING. LOCAL CODES AND AUTHORITIES SHOULD BE CONSULTED.
5. LOCATE WATER INLET AND OUTLET FITTINGS (i.e.UNIONS, ELBOWS, ETC.) A MINIMUM OF 6" FROM WATER HEATER FITTINGS, TO PREVENT INTERFERENCE WITH REMOVAL OF HEATER PANELS.
6. IF PERMITTED BY LOCAL CODES, A CHECK VALVE MAY BE USED IN PLACE OF A BACKFLOW PREVENTER.
7. AT 14" W.C. OR BELOW, A GAS REGULATOR IS OPTIONAL UNLESS REQUIRED BY LOCAL CODE.

Lync by WATTS — Blauvelt, NY / Fort Worth, TX

ELEMENT GAS FIRED WATER HEATER
SINGLE UNIT INSTALLATION

DWN.BY K.S. DATE 082520 SCALE NTS REV.DATE	SD-A-1211	REV. A



INSTALLATION CLEARANCES:

1) THIS APPLIANCE MAY BE INSTALLED ON COMBUSTIBLE FLOORING
2) MINIMUM CLEARANCES TO ADJACENT CONSTRUCTION ARE AS SHOWN AND WITH FLOOR TO CEILING HEIGHT OF 101"[2565]

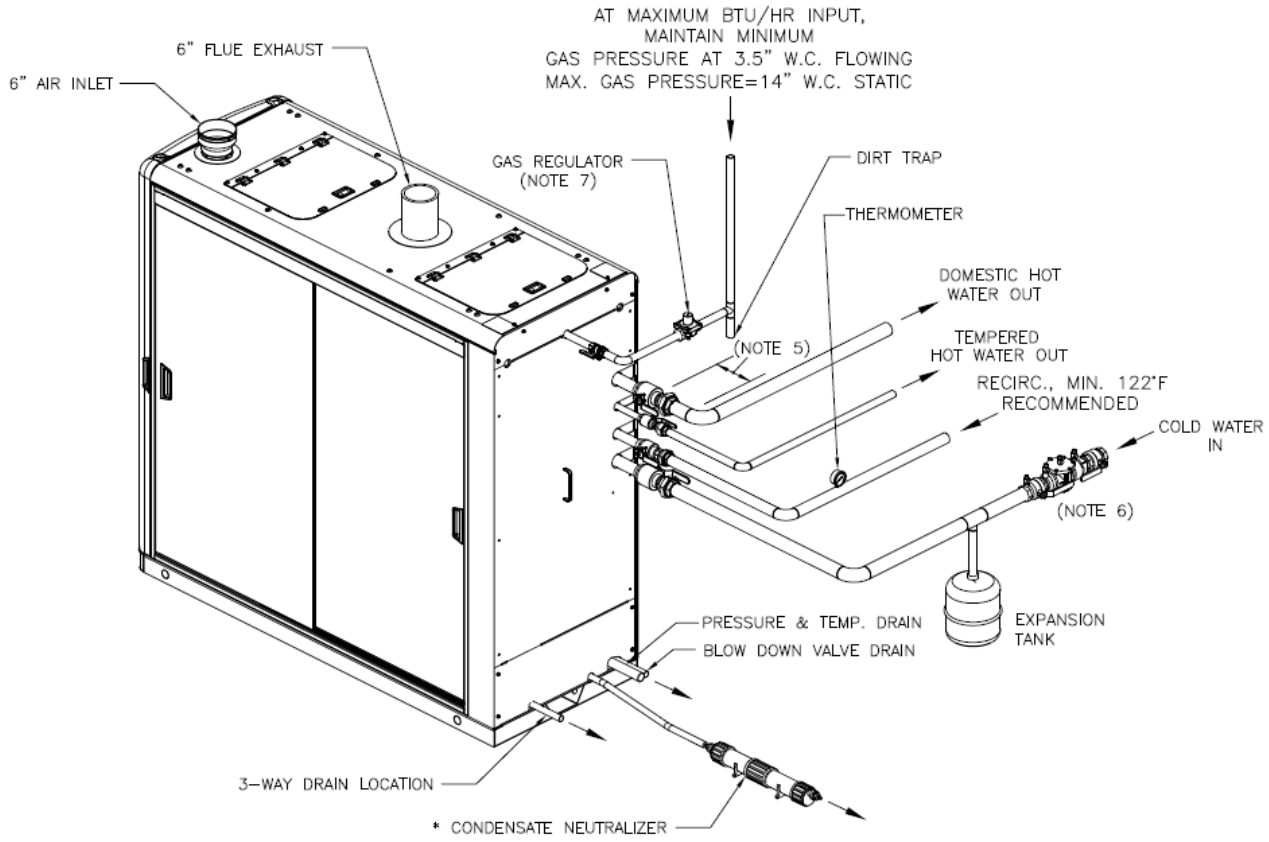
NOTE:
1. ALL DIMENSIONS SHOWN ARE IN INCHES (CENTIMETERS).
2. CLEARANCE DIMENSIONS ARE MINIMUMS RECOMMENDED BY LYNC. LOCAL CODES AND AUTHORITIES SHOULD BE CONSULTED.

LYNC RESERVES THE RIGHT TO MODIFY DIMENSIONS WITHOUT PRIOR NOTICE

Lync by WATTS — Blauvelt, NY / Fort Worth, TX

ELEMENT – SINGLE UNIT
CLEARANCE DIMENSIONAL DRAWING

DWN.BY K.S. DATE 090420	SD-L-1213	REV. A
SCALE ____ CHKD. ____ APPD. ____ REV.DATE ____		

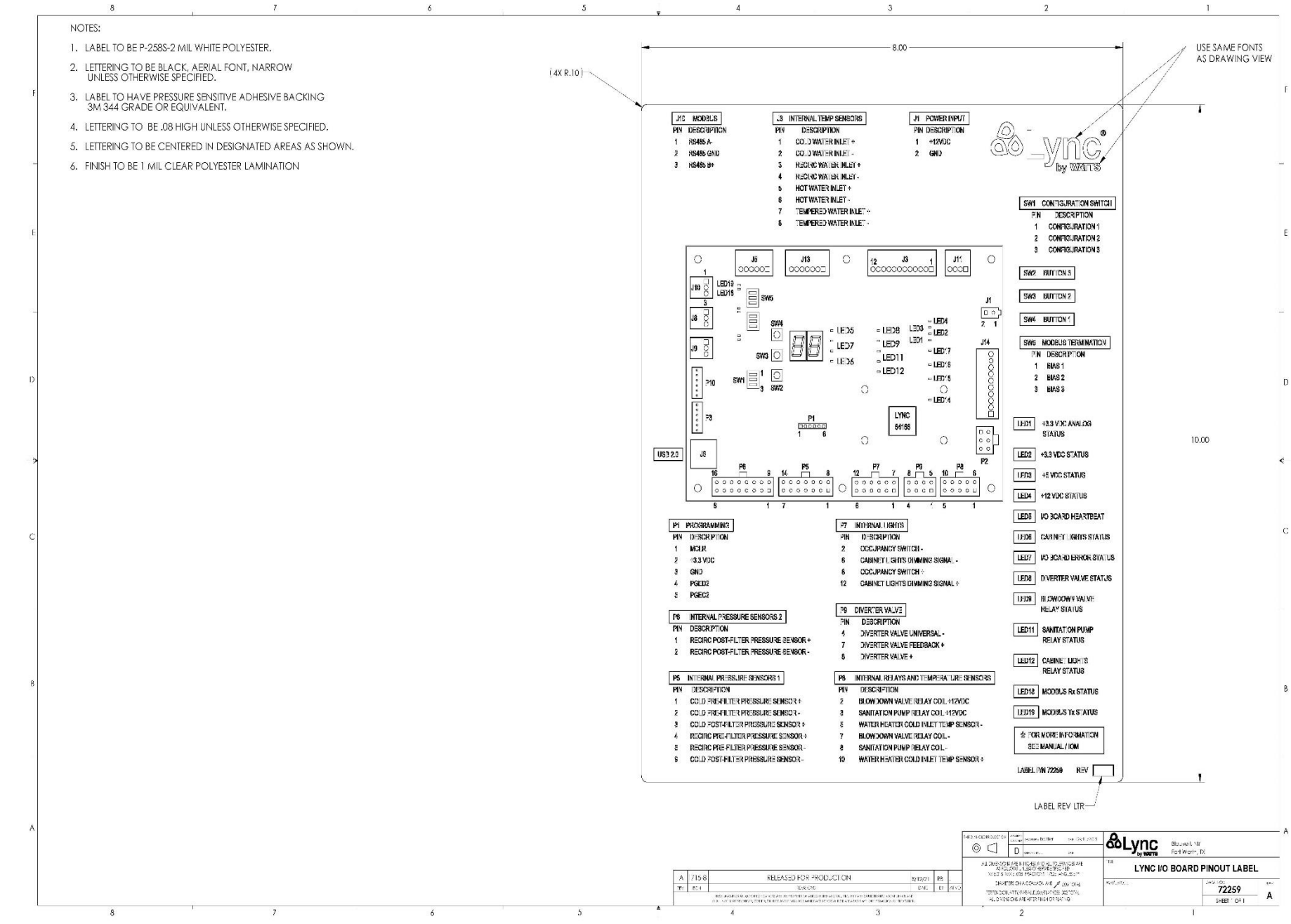


NOTES:
1. FOR ACTUAL SIZES AND LOCATIONS OF PIPING AND OTHER CONNECTIONS TO THE HEATER, SEE DIMENSIONAL DRAWING.
2. ALL DRAINS AND CONDENSATE HOSE SHOULD BE ARRANGED TO PERMIT THE FLUIDS TO DRAIN FREELY, BY GRAVITY, TO A FLOOR DRAIN. RELIEF VALVE DISCHARGE SHOULD BE PIPED TO THE NEAREST FLOOR DRAIN. WHEN NO FLOOR DRAIN IS AVAILABLE, THE RELIEF VALVE DISCHARGE SHOULD BE PIPED VERTICALLY TO A HEIGHT OF AT LEAST 6" ABOVE THE FLOOR BUT NOT LESS THAN 2 PIPE DIAMETERS.
3. ALL (*) ITEMS ARE INCLUDED SEPARATELY IN SHIPMENT.
4. THIS IS A TYPICAL INSTALLATION DRAWING. LOCAL CODES AND AUTHORITIES SHOULD BE CONSULTED.
5. LOCATE WATER INLET AND OUTLET FITTINGS (i.e.UNIONS, ELBOWS, ETC.) A MINIMUM OF 6" FROM WATER HEATER FITTINGS, TO PREVENT INTERFERENCE WITH REMOVAL OF HEATER PANELS.
6. IF PERMITTED BY LOCAL CODES, A CHECK VALVE MAY BE USED IN PLACE OF A BACKFLOW PREVENTER.
7. AT 14" W.C. OR BELOW, A GAS REGULATOR IS OPTIONAL UNLESS REQUIRED BY LOCAL CODE.

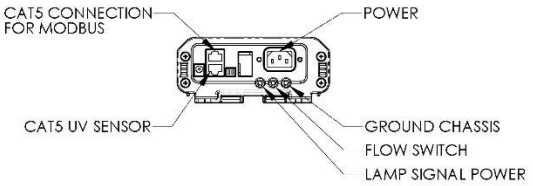
Lync by WATTS — Blauvelt, NY / Fort Worth, TX

ELEMENT GAS FIRED WATER HEATER
SINGLE UNIT INSTALLATION

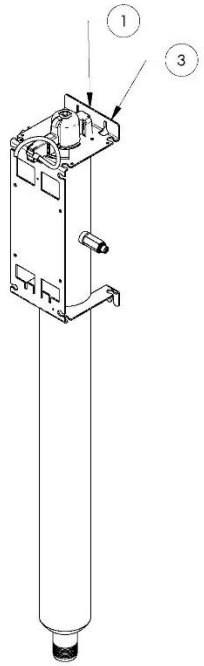
DWN.BY K.S. DATE 082520 SCALE NTS REV.DATE	SD-L-1214	REV. A


NOTES:
1. LABEL TO BE P-258S-2 MIL WHITE POLYESTER.
2. LETTERING TO BE BLACK, AERIAL FONT, NARROW UNLESS OTHERWISE SPECIFIED.
3. LABEL TO HAVE PRESSURE SENSITIVE ADHESIVE BACKING 3M 344 GRADE OR EQUIVALENT.
4. LETTERING TO BE .08 HIGH UNLESS OTHERWISE SPECIFIED.
5. LETTERING TO BE CENTERED IN DESIGNATED AREAS AS SHOWN.
6. FINISH TO BE 1 MIL CLEAR POLYESTER LAMINATION
8.00
10.00
(4X R.10)
USE SAME FONTS AS DRAWING VIEW
J10 MODBUS
J3 INTERNAL TEMP SENSORS
J1 POWER INPUT
SW1 CONFIGURATION SWITCH
SW2 BUTTON 3
SW3 BUTTON 2
SW4 BUTTON 1
SW5 MODBUS TERMINATION
P1 PROGRAMMING
P7 INTERNAL LIGHTS
P6 INTERNAL PRESSURE SENSORS 2
P8 DIVERTER VALVE
P5 INTERNAL PRESSURE SENSORS 1
P5 INTERNAL RELAYS AND TEMPERATURE SENSORS
LED1 +3.3 VDC ANALOG STATUS
LED2 +3.3 VDC STATUS
LED3 +5 VDC STATUS
LED4 +12 VDC STATUS
LED5 I/O BOARD HEARTBEAT
LED6 CABINET LIGHTS STATUS
LED7 I/O BOARD ERROR STATUS
LED8 DIVERTER VALVE STATUS
LED9 BLOWDOWN VALVE RELAY STATUS
LED11 SANITATION PUMP RELAY STATUS
LED12 CABINET LIGHTS RELAY STATUS
LED18 MODBUS Rx STATUS
LED19 MODBUS Tx STATUS
* FOR MORE INFORMATION SEE MANUAL / IOM
LABEL P/N 72259 REV
LABEL REV LTR
LYNC I/O BOARD PINOUT LABEL
72259
A
SHEET 1 OF 1
RELEASED FOR PRODUCTION

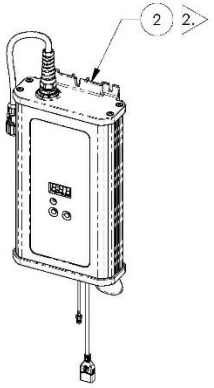
NOTES:
1. REFER TO WORK INSTRUCTIONS: LNC-0005
2. THE CONTROLLER WILL BE MOUNTED ON A HIGHER LEVEL: 24686
3. CABLES WILL BE ASSEMBLED ON A HIGHER LEVEL: 29532



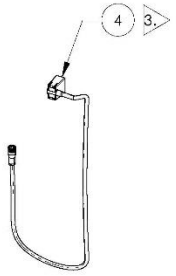
CONNECTIONS TO THE SMART STREAM CONTROLLER



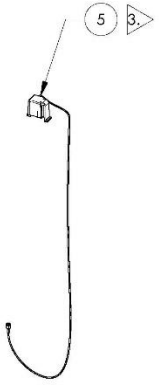
UV SMARTSTREAM REACTOR ASSEMBLY



LYNC CONTROLLER C SERIES

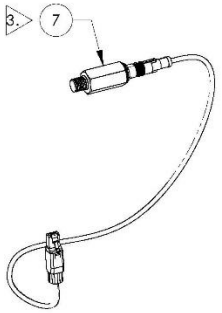


LYNC UV TOP END PLATE LAMP CABLE ASSEMBLY



LYNC RFID CABLE ASSEMBLY

LYNC FLOW SENSOR CABLE ASSEMBLY



LYNC UV SENSOR CABLE ASSEMBLY

REPLACEMENT PARTS

PART NUMBER	DESCRIPTION	24751-1/ QTY	24751-2/ QTY
68110026	LYNC CONTROLLER, C SERIES	1	1
68108263	SMART STREAM QUARTZ SLEEVE	1	-
68108261	SMART STREAM QUARTZ SLEEVE	-	1
68108282	SMART STREAM LAMP 4X42.7	1	-
68108281	SMART STREAM LAMP 4X31	-	1
68108254	SMART STREAM QUARTZ SLEEVE ORING	1	1

ITEM NO.	PART NUMBER	OEM PART NUMBER	DISCRIPTION
1	24724-1	68110332	UV SMARTSTREAM ASSY, 50 GAL, ELEMENT
2	24724-2	68110026	UV SMARTSTREAM CONTROLLER, 50 GAL, ELEMENT
2	24724-3	68110331	UV SMARTSTREAM ASSY, 25 GAL, ELEMENT
3	24724-4	68110026	UV SMARTSTREAM CONTROLLER, 25 GAL, ELEMENT
4	24724-5	68110368	LYNC UV TOP END PLATE LAMP CABLE ASSEMBLY
5	24724-6	68110377	LYNC RFID CABLE ASSEMBLY
6	24725-7	68110378	LYNC FLOW SENSOR CABLE ASSEMBLY
7	24724-8	68110381	LYNC UV SENSOR CABLE ASSEMBLY

REV	ECN	REVISIONS	DATE	BY	APVD
A	1715-3	RELEASED FOR PRODUCTION	7/19/21	RB	.

THIRD ANGLE PROJECTION | DRAWN: bottar | DATE: 9/30/20 | SIZE: C

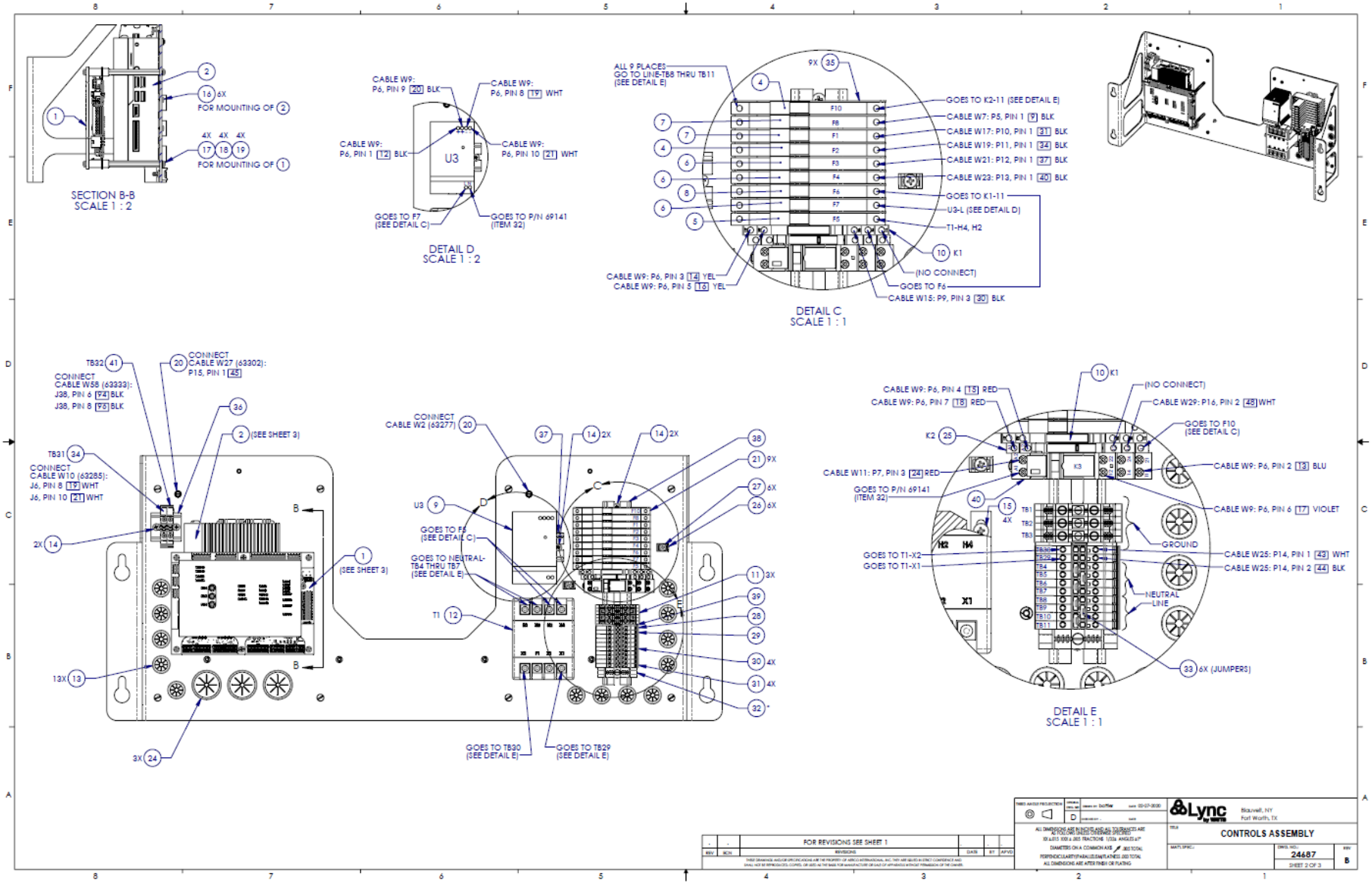
ALL DIMENSIONS ARE IN INCHES AND ALL TOLERANCES ARE AS FOLLOWS UNLESS OTHERWISE SPECIFIED
XX ±.015 XXX ±.005 FRACTIONS 1/32± ANGLES ±1°
DIAMETERS ON A COMMON AXIS ⌀ .005 TOTAL
PERPENDICULARITY PARALLELISM FLATNESS .003 TOTAL
ALL DIMENSIONS ARE AFTER FINISH OR PLATING

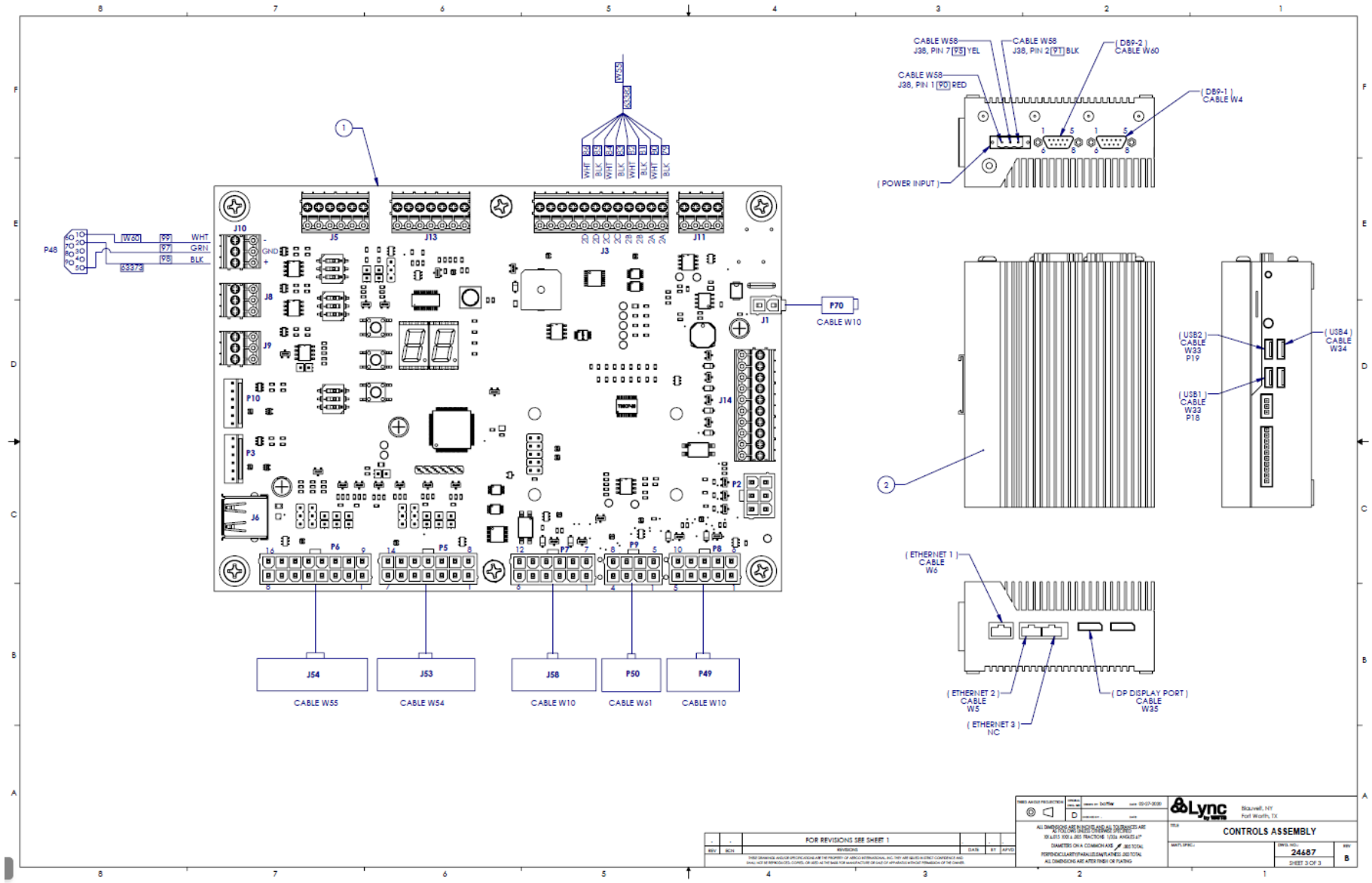
Lync by WATTS — Blauvelt, NY; Fort Worth, TX

TITLE: UV SMARTSTREAM ASSY ELEMENT

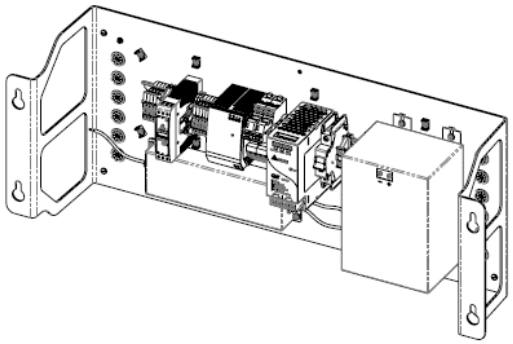
MATL SPEC: . .

DWG. NO.: 24724-TAB | REV: A | SHEET 1 OF 1

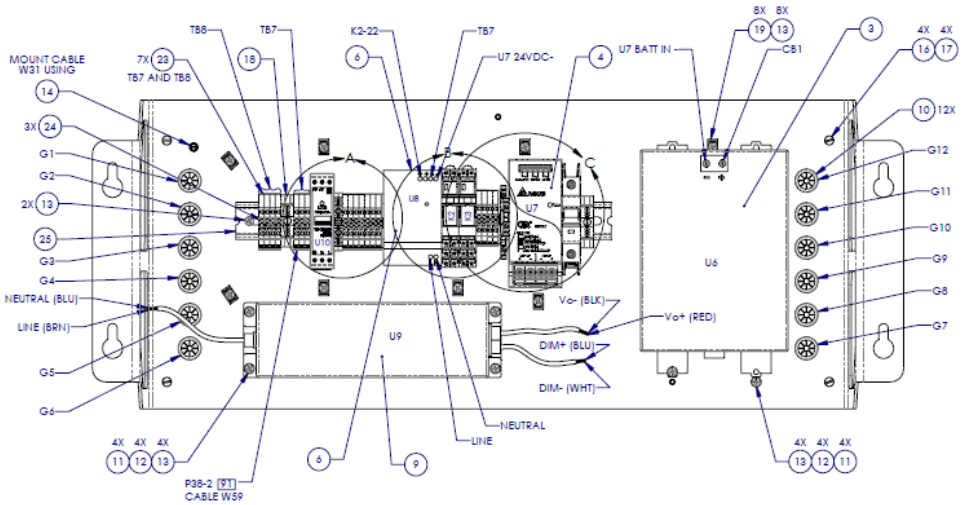

SECTION B-B
SCALE 1 : 2
DETAIL D
SCALE 1 : 2
DETAIL C
SCALE 1 : 1
DETAIL E
SCALE 1 : 1
CONTROLS ASSEMBLY
FOR REVISIONS SEE SHEET 1
24487
SHEET 2 OF 3


CABLE W58
J38, PIN 7 [95] YEL
CABLE W58
J38, PIN 2 [97] BLK
CABLE W58
J38, PIN 1 [90] RED
(DB9-2)
CABLE W60
(DB9-1)
CABLE W4
(POWER INPUT)
P48
[W60]
[99] WHT
[97] GRN
[95] BLK
03372
J10
J5
J13
J3
J11
J8
J9
P10
P3
J6
J14
P2
P6
P5
P7
P9
P8
P70
CABLE W10
J1
(USB2)
CABLE
W33
P19
(USB4)
CABLE
W34
(USB1)
CABLE
W33
P18
(ETHERNET 1)
CABLE
W6
(ETHERNET 2)
CABLE
W5
(ETHERNET 3)
NC
(DP DISPLAY PORT)
CABLE
W35
J54
CABLE W55
J53
CABLE W54
J58
CABLE W10
P50
CABLE W61
P49
CABLE W10
FOR REVISIONS SEE SHEET 1
CONTROLS ASSEMBLY
24687
SHEET 3 OF 3
B

NOTE:
1. FOR WIRING DIAGRAM SEE "PVI" DRAWING B11869



ISOMETRIC VIEW



THESE CABLES ARE PART OF THIS ASSEMBLY

CONNECTOR REFERENCE DESIGNATION	QTY	LYNC PART NUMBER	CABLE NUMBER	GROMMET NUMBER
J5	1	63283	W8	G1
P17	1	63306	W31	-
J24	1	63311	W36	G4
J25	1	63312	W37	G4
J26	1	63313	W38	G5
J27	1	63314	W39	G5
J28	1	63315	W40	G6
J29	1	63316	W41	G6
P38	1	63334	W59	G2
P30-1	1	63385	W90	G3
P31-1	1	63386	W91	G3

(ROUTE CABLES AS REQUIRED THRU GROMMETS)

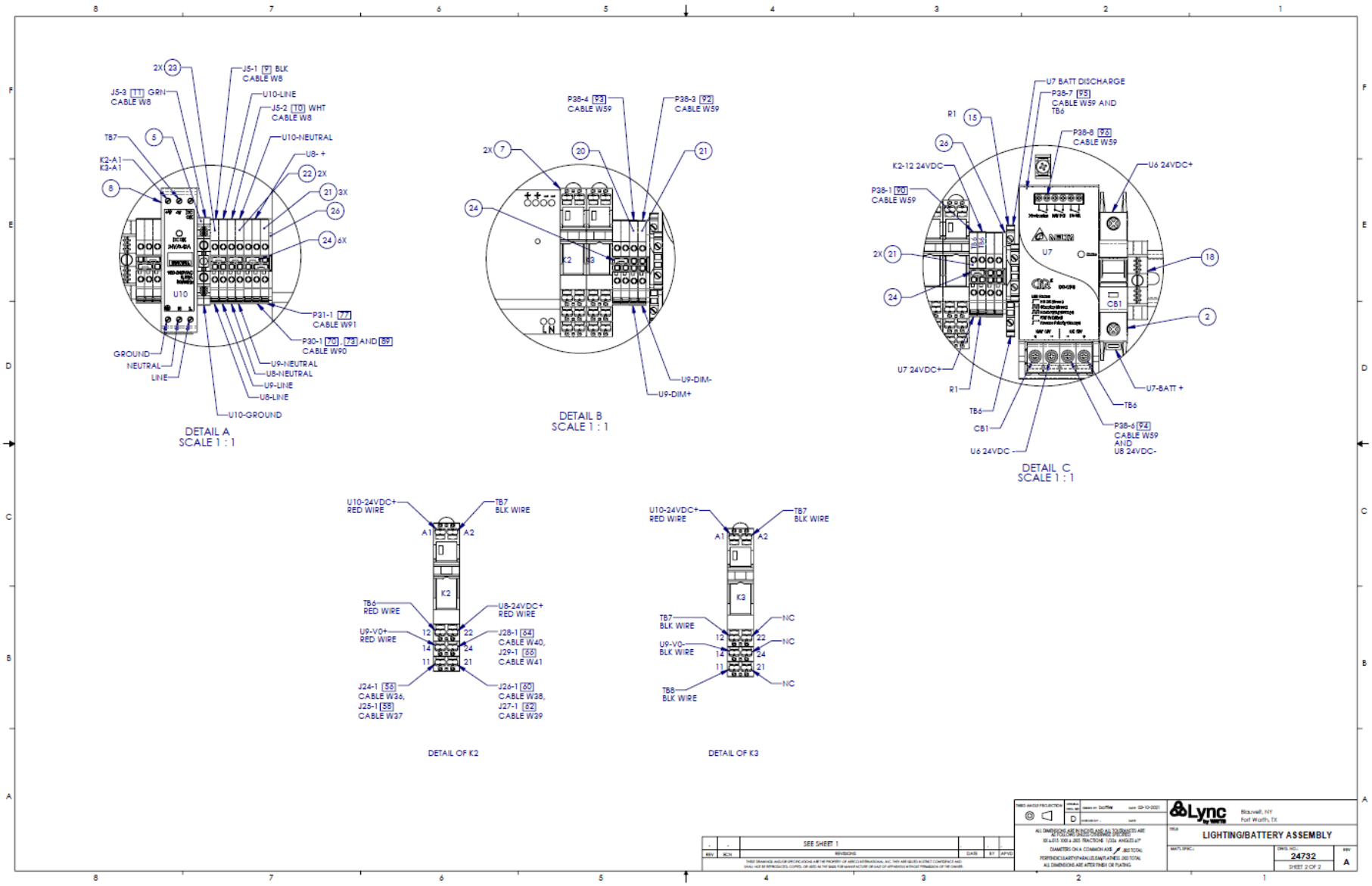
ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	33296	BRACKET, BATTERY BACKUP
2	1	65261	CIRCUIT BREAKER
3	1	65260	BATTERY 24V DC, 7.0 AH
4	1	65262	DC-UPS MODULE
5	1	65122	TERMINAL GROUND BLOCK, DIN MOUNTED
6	1	65263	POWER SUPPLY 24V, 4.2A
7	2	65264	POWER RELAY, 24VDC, 18mA
8	1	65265	POWER SUPPLY
9	1	65266	LED POWER SUPPLY
10	12	12951-2	BUSHING, CONTROL BOX
11	8	123804	#8 FLAT WASHER, ZINC PLATED STEEL
12	8	123788	WASHER, LOCK #8
13	18	54196	PAN HEAD SCREW 8-32 X .50 LONG
14	1	54199	ELECTRICAL GROUNDING SCREW 6-32 X 3/8 LONG
15	1	65268	TERMINAL BLOCK, 24A, 12-26 AWG
16	4	54200	SLOTTED MACHINE SCREW
17	4	59322	ALUM UNTHRD SPACER
18	2	69141	DIN RAIL MOUNT END STOP
19	8	59323	CABLE TIE HOLDER #8
20	1	65270-1	TERMINAL BLOCK, 20A, 12-24AWG, YELLOW
21	6	65270-2	TERMINAL BLOCK, 20A, 12-24AWG, RED
22	2	65270-3	TERMINAL BLOCK, WHITE
23	9	65270-4	TERMINAL BLOCK, BLACK
24	10	65271	JUMPER BAR
25	1	69161-10	DIN RAIL, 14"
26	2	65272	END PLATE, TE TERMINAL BLOCKS

REV	ECN	REVISIONS	DATE	BY	APVD
A	1715-3	RELEASED FOR PRODUCTION. NO CHANGES TO REV 5	6/29/21	RS	

Lync by WATTS — Blauvelt, NY / Fort Worth, TX

TITLE: LIGHTING/BATTERY ASSEMBLY

DWG. NO.: 24732 — REV: A — SHEET 1 OF 2


DETAIL A
SCALE 1 : 1
DETAIL B
SCALE 1 : 1
DETAIL C
SCALE 1 : 1
DETAIL OF K2
DETAIL OF K3
LIGHTING/BATTERY ASSEMBLY
24732
SHEET 2 OF 2
SEE SHEET 1

Appendix C. User Permissions Table

#	Unit and Remote Experiences	Menu Location	Permission Type	New User	Owner	Chief Engr	Facilities Manager	Infection Control	Maint. Tech.	Technical Customer Support	Service Contractor	Water Mgmt Contractor
4	Component Detail Screen - Change Settings	System Status	Edit	N/A	Yes	Yes	Yes	Yes	No	Yes	No	No
5	System Settings Screen	Settings	View	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	System Settings - Change Settings	Settings	Edit	N/A	Yes	No	Yes	Yes	No	Yes	No	No
9	Sanitation Loop - Change Scheduled Operation	Sanitation	Edit	N/A	Yes	No	Yes	Yes	No	Yes	No	No
10	Sanitation Loop - Run Manual Operation	Sanitation	Run/ Execute	N/A	Yes	No	Yes	Yes	No	Yes	No	Yes
11	Sanitation Loop - (Re)Authorize Operation	Sanitation	Run/ Execute	N/A	Yes	No	Yes	Yes	No	Yes	No	Yes
13	System Flush - Change Scheduled Operation	System Status	Edit	N/A	Yes	No	Yes	No	No	Yes	No	No
14	Heater Blowdown Screen	System Status	View	N/A	Yes	Yes	Yes	Yes	Yes	Yes	No	No
15	Heater Blowdown - Change Scheduled Operation	System Status	Edit	N/A	Yes	No	Yes	No	Yes	Yes	No	No
16	Heater Blowdown - Run Manual Operation	System Status	Run/ Execute	N/A	Yes	No	Yes	No	Yes	Yes	Yes	No
17	Thermal Shock Screen	Sanitation	View	N/A	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
18	Thermal Shock - Run Manual Operation	Sanitation	Run/ Execute	N/A	Yes	No	Yes	No	Yes	Yes	No	Yes
19	Chemical Shock Screen	N/A	View	N/A	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
20	Chemical Shock - Run Manual Operation	N/A	Run/ Execute	N/A	Yes	No	Yes	No	Yes	Yes	No	Yes
22	Maintenance Screens - Export Report	Maintenance	View/ Run/ Export	N/A	Yes	Yes	Yes	Yes	Yes	Yes	No	No
23	Infection Control Screens	Infection Control	View	N/A	Yes	Yes	Yes	Yes	No	Yes	No	Yes
24	Infection Control Screens - Export Report	Infection Control	View/ Run/ Export	N/A	Yes	Yes	Yes	Yes	No	No	No	Yes
25	Change Temperature Setpoints	System Status	Edit	N/A	Yes	No	Yes	No	Yes	Yes	Yes	Yes
26	Change Temperature Notification Thresholds	System Status	Edit	N/A	Yes	No	Yes	No	No	Yes	No	No
27	Record a Scheduled Maintenance Operation	System Status	Edit	N/A	Yes	No	Yes	No	Yes	Yes	Yes	Yes
28	Change Component Lifetime Configuration	System Status	Edit	N/A	Yes	No	Yes	No	No	Yes	No	No
31	System Events - Close & Re-Open	System Status	Edit	N/A	Yes	Yes	Yes	Yes	Yes	Yes	No	No
33	Create New Organization	Mobile / Web	Location Mgmt	No	Yes	No	No	No	No	Yes	No	No
34	Change Organization Name	Mobile / Web	Location Mgmt	N/A	Yes	No	No	No	No	Yes	No	No

35	Delete an Organization	Mobile / Web	Location Mgmt	N/A	Yes	No	No	No	No	No	No	No
36	Transfer Ownership	Mobile / Web	Device Mgmt	N/A	Yes	No	No	No	No	No	No	No
37	Create, Edit, and Delete New Site/Building/Plant	Mobile / Web	Location Mgmt	N/A	Yes	Yes	Yes	No	No	Yes	No	No
38	Manage User Access/Permission Levels	Mobile / Web	User Mgmt	N/A	Yes	Yes	Yes	No	No	Yes	No	No
42	Commission new unit	System Status	Device Mgmt	Yes	Yes	Yes	Yes	No	No	Yes	No	No
45	Decommission a Unit	System Status	Device Mgmt	N/A	Yes	No	Yes	No	No	Yes	No	No
52	Create New User	System Status	User Mgmt	N/A	Yes	No	Yes	No	No	No	No	No
53	View Other User Profiles	System Status	User Mgmt	N/A	Yes	Yes	Yes	No	Yes	No	No	No
55	Disable User	System Status	User Mgmt	N/A	Yes	No	Yes	No	No	Yes	No	No
58	View/Export Infection Control/Sanitation Report	N/A	View/ Run/ Export	N/A	Yes	Yes	Yes	Yes	No	No	No	Yes
57	Request and Export Wellness Report - PDF	Mobile / Web	View/ Run/ Export	N/A	Yes	Yes	Yes	Yes	No	No	No	Yes

Appendix D. Modbus Points and BACnet Object List

Modbus Address	BACnet Object Name	Min	Max	Type	Length (# of 16-bits)	Subsystem / Component	Description	Data Type / Units
0x0001	bas_modbus_id	1	247	holding	1	EdgeSC	BAS Modbus RTU client address (1-247). Default = 1	text
0x0002	bas_modbus_baud			holding	2	EdgeSC	Baud rate of Modbus data (in bits per second). Default =9600	integer
0x0004	bas_modbus_data_bits	7	8	holding	1	EdgeSC	Least common multiple of data bits per RTU frame (7 or 8bits). Default=8	integer
0x0005	bas_modbus_stop_bits	1	2	holding	1	EdgeSC	Number of stop bits per RTU frame (1 or 2). Default=1	integer
0x0006	bas_modbus_parity			holding	1	EdgeSC	Modbus RTU parity (odd, even, or none). Default=none	integer
0x0008	bas_modbus_last_connect			input	2	EdgeSC	Number of seconds since last BAS session was opened? Need to confirm data	seconds
0x0064	occupancy_detected	0	1	input	1	Element Q	Informs whether the occupancy sensor is currently active. 0 = No, 1 = Yes	Boolean
0x0065	ambient_light_level	0	100	holding	1	Element Q	Current brightness of the cabinet lighting	%
0x00C8	cold_inlet_actual_temp			input	1	Element Q	Temperature sensed at the cold water inlet	°C
0x012D	cold_sediment_pre_pressure	-150	150	input	1	Cold filter	Pressure upstream of the filter	psi
0x012E	cold_sediment_post_pressure	-150	150	input	1	Cold filter	Pressure downstream of the filter	psi
0x012F	cold_sediment_pressure_delta	-300	300	input	1	Cold filter	Difference between upstream and downstream pressure across the filter	psi
0x0130	cold_sediment_replace_pending	0	1	input	1	Cold filter	Flag if the filter pressure drop exceeds the replacement threshold. 0 = No, 1 = Yes	Boolean
0x0131	cold_sediment_order_pending	0	1	input	1	Cold filter	Flag if the filter pressure drop exceeds the order threshold. 0 = No, 1 = Yes	Boolean
0x0132	cold_sediment_baseline_pending	0	1	input	1	Cold filter	Turns 1 when at "complete calibration screen"	Boolean
0x0133	cold_sediment_pressure_baseline	0		input	1	Cold filter	Baseline pressure set during filter pressure reset.	psi
0x0134	cold_sediment_percent_remaining	0	100	input	1	Cold filter	Ratio of the current filter pressure drop to the filter replacement threshold pressure	%
0x0139	cold_sediment_filter_ordered	0	1	input	1	Cold filter	Informs whether filter has been confirmed as ordered. 0 = No, 1 = Yes	Boolean
0x013A	cold_sediment_replace_threshold			holding	1	Cold filter	Pressure of filter for when order alert is triggered	psi
0x013B	cold_sediment_order_threshold			holding	1	Cold filter	Pressure of filter for when replacement alert is triggered	psi
0x0191	anti_scaling_media_lifetime	0		input	1	AquaSolve	Total lifetime of AquaSolve media when it was replaced	days
0x0192	anti_scaling_media_life_rem			input	1	AquaSolve	Remaining lifetime of AquaSolve media	days
0x0193	anti_scaling_percent_remaining	0	100	input	1	AquaSolve	Remaining lifetime of AquaSolve media	%

Modbus Address	BACnet Object Name	Min	Max	Type	Length (# of 16-bits)	Subsystem / Component	Description	Data Type / Units
0x0198	anti_scaling_order_threshold			holding	1	AquaSolve	Lifetime of AquaSolve media for when order alert is triggered	days
0x0199	anti_scaling_replace_threshold			holding	1	AquaSolve	Lifetime of AquaSolve media for when replacement alert is triggered	days
0x01F5	booster_pump_error_code			input	1	Booster pump	See table below for booster pump code explanation	
0x01F6	booster_pump_actual_pressure			input	1	Booster pump	Measured pressure at the booster pump	psi
0x01F7	booster_pump_setpoint_pressure			holding	1	Booster pump	Current pump setpoint pressure	psi
0x01F8	booster_pump_low_threshold			holding	1	Booster pump	Booster pump minimum pressure alert threshold	ft head
0x01F9	booster_pump_high_threshold			holding	1	Booster pump	Booster pump minimum pressure alert threshold	ft head
0x025A	cold_uv_percent_remaining	0	100	input	1	Cold UV System	Current remaining % of UV bulb	%
0x025B	cold_uv_lamp_op_time			input	1	Cold UV System	Current usage time of UV bulb	hours
0x025C	cold_uv_lamp_life_rem			input	1	Cold UV System	Current remaining time of UV bulb	hours
0x025E	cold_uv_order_threshold			holding	1	Cold UV System	Lifetime of UV bulb for when order alert is triggered	hours
0x025F	cold_uv_replace_threshold			holding	1	Cold UV System	Lifetime of UV bulb for when replacement alert is triggered	hours
0x02BC	recirc_inlet_actual_temp			input	1	Element Q	Temperature sensed at the recirculation water inlet	°C
0x0320	recirc_diverter_setpoint_position	0	100	holding	1	Diverter valve	Target position of the diverter valve. 0 = closed. 100 = fully open.	%
0x0321	recirc_diverter_actual_position	0	100	input	1	Diverter valve	Current position of the diverter valve. 0 = closed. 100 = fully open.	%
0x0385	recirc_sediment_pre_pressure			input	1	Recirc filter	Pressure upstream of the filter	psi
0x0386	recirc_sediment_post_pressure			input	1	Recirc filter	Pressure downstream of the filter	psi
0x0387	recirc_sediment_pressure_delta			input	1	Recirc filter	Difference between upsteam and downstream pressure across the filter	psi
0x0388	recirc_sediment_replace_pending	0	1	input	1	Recirc filter	Flag if the filter pressure drop exceeds the replacement threshold. 0 = No, 1 = Yes	Boolean
0x0389	recirc_sediment_order_pending	0	1	input	1	Recirc filter	Flag if the filter pressure drop exceeds the order threshold. 0 = No, 1 = Yes	Boolean
0x038A	recirc_sediment_baseline_pending	0	1	input	1	Recirc filter	Turns 1 when at "complete calibration screen"	Boolean
0x038B	recirc_sediment_pressure_baseline			input	1	Recirc filter	Baseline pressure set during filter pressure reset.	psi
0x038C	recirc_sediment_percent_remaining			input	1	Recirc filter	Ratio of the current filter pressure drop to the filter replacement threshold pressure	%
0x0391	recirc_sediment_replace_threshold			holding	1	Recirc filter	Pressure of filter for when order alert is triggered	psi
0x0392	recirc_sediment_order_threshold			holding	1	Recirc filter	Pressure of filter for when replacement alert is triggered	psi
0x0393	recirc_sediment_filter_ordered			input	1	Recirc filter	Informs whether filter has been confirmed as ordered. 0 = No, 1 = Yes	Boolean

Modbus Address	BACnet Object Name	Min	Max	Type	Length (# of 16-bits)	Subsystem / Component	Description	Data Type / Units
0x03E8	recirc_uv_status			input	1	Recirc UV System	***No connection. Does not change from 0 when faulted or controller turned off***	
0x03EA	recirc_uv_percent_remaining	0	100	input	1	Recirc UV System	Current remaining % of UV bulb	%
0x03EB	recirc_uv_lamp_op_time			input	1	Recirc UV System	Current usage time of UV bulb	hours
0x03EC	recirc_uv_lamp_life_rem			input	1	Recirc UV System	Current remaining time of UV bulb	hours
0x03EE	recirc_uv_order_threshold			holding	1	Recirc UV System	Lifetime of UV bulb for when order alert is triggered	hours
0x03EF	recirc_uv_replace_threshold			holding	1	Recirc UV System	Lifetime of UV bulb for when replacement alert is triggered	hours
0x044C	hot_supply_actual_temp			input	1	Element Q	Temperature sensed at the hot water outlet	°C