Quality People. Building Solutions.

Comfort Systems USA (Arkansas), Inc.
P.O. Box 16620
Little Rock, AR 72231
Phone 501-834-3320
Fax 501-834-5416

Date: 1/22/25

Project:BWD Western Corridor Pump Station
Supplier: Sanders
Manufacturer: Various
Submittal: Plumbing Fixtures/Equipment
Closeout Doc Number: 15400-01
Spec Section: 15400
Drawing #:

ARCHITECT
Black and Veatch

GENERAL CONTRACTOR
Crossland Heavy Contractors

ENGINEER
Black and Veatch

MECHANICAL SUBCONTRACTOR
Comfort Systems USA (Arkansas), Inc.
116 Commercial Ave
Lowell, AR 72745
479-770-8992

Notes:

CSUSA PROJECT NO.
23-5002
jzuber@comfortar.com

4806 Rixey Road
No. Little Rock, AR 72117

Beaver Water Pump Station

Springdale, AR

Comfort Systems USA

Lowell, AR

Operation & Maintenance

Sanders Supply

Hot Springs, AR

January 20, 2025

Beaver Water Pump Station O&M

Plumbing Fixture Schedule Index

TAB	Description
ES/EEW-1	Emergency Shower/Eyewash
EWC-1	Electric Water Cooler
L-1	Lavatory
MS-1	Mop Sink
UR-1	Urinal
WC-1	Water Closet
MV-1	Mixing Valve
CP-1	Circulator Pump
ET-1	Expansion Tank
EWH-1	Electric Water Heater
TP-1	Trap Primer

ES/EEW-1

☑ G1990 Safety Station with Eyewash, PVC Construction with Stainless Steel Valves

Application: All-PVC combination eyewash and shower safety station. Unit is constructed of PVC, PVC-coated components and stainless steel valves for superior corrosion resistance. Ideal for industrial environments where harsh acids or caustics are present. Eyewash features two GS-Plus™ spray-type outlet heads that deliver a flood of water for rinsing eyes.

Shower Head: 10" diameter orange ABS plastic with 20 GPM flow control.

Shower Valve: 1" IPS Type 316 stainless steel stay-open ball valve. Valve has stainless steel ball and PTFE seals. Furnished with stainless steel actuating arm and 29" stainless steel pull rod.

Spray Head Assembly: Two GS-Plus™ spray heads. Each head has a "flip top" dust cover, internal flow control and filter to remove impurities from water flow.

Eyewash Bowl: 11-3/4" diameter orange ABS plastic.

Eyewash Valve: 1/2" IPS Type 316 stainless steel stay-open ball valve. Valve has stainless steel ball and PTFE seals.

Pipe and Fittings: Schedule 80 PVC.

Supply: 2" IPS socket weld top female inlet.

Waste: 2" IPS socket weld female outlet.

Sign: ANSI-compliant identification sign.

Quality Assurance: Valve and spray head assemblies are factory assembled and water tested prior to shipment.



Available Options

- ☐ **G6040** Thermostatic mixing valve precisely blends hot and cold water to deliver tepid water as required by ANSI Z358.1-2014. Refer to "Thermostatic Mixing Valves" section for complete technical and product selection information.
- ☐ **GRN** Green ABS plastic shower head and bowl.
- ☐ **YEL** Yellow ABS plastic shower head and bowl.
- ☐ **SSH** Stainless steel shower head.
- ☑ **AP275-200** Electric flashing light and alarm horn unit for mounting on wall or vertical pipe. Light illuminates and horn sounds when eyewash or shower is activated. Furnished complete with flow switch and mounting hardware.

Guardian Equipment
1140 N North Branch St
Chicago, IL 60642

312 447 8100 TELEPHONE
312 447 8101 FACSIMILE
gesafety.com

Listed 8116. Units have been tested to and comply with ANSI Z358.1-2014 and the Uniform Plumbing Code.

☐ AP275-200 Combination Flashing Light and Alarm Horn for Safety Stations

Application: Combination flashing light and alarm horn unit for safety stations. Flashing light activates and alarm horn sounds loudly when eyewash or shower is activated. Ideal for use in high traffic, industrial applications and areas with low ambient light.

Installation: Unit is designed for use with combination safety stations, and can be mounted on either the vertical pipe of the station or on a wall adjacent to the unit. 120 volt, 0.48 amp electrical supply is required.

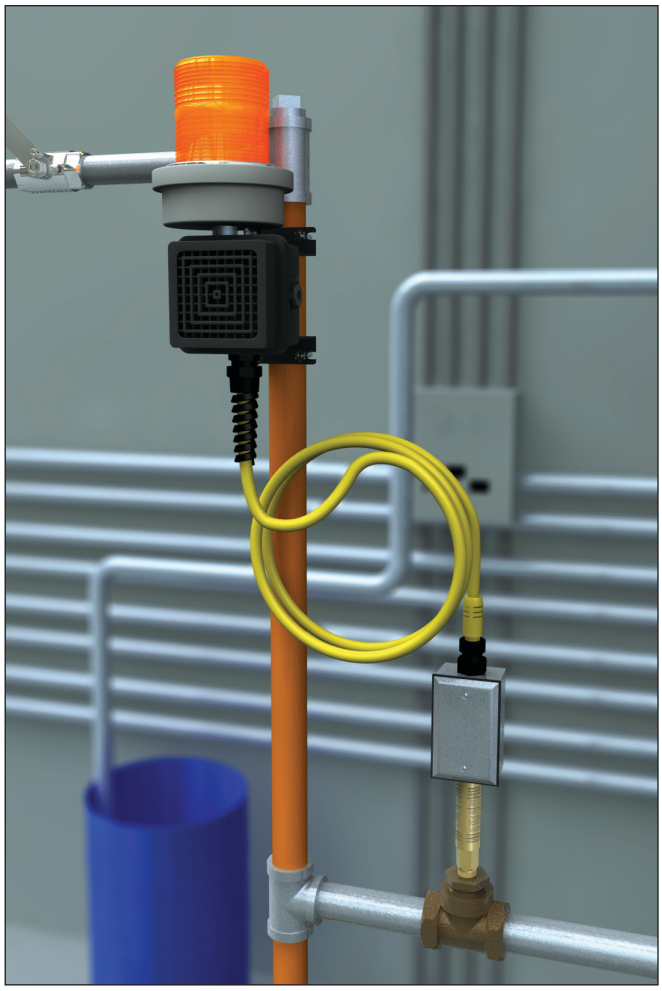
Visual Signal: Weatherproof amber flashing light with shatter-resistant lens.

Audible Signal: Weatherproof horn delivers distinctive, urgent signal. Volume is preset at 100 db at 10 feet. An adjustment screw on the front of horn allows adjustment of output sound level.

Flow Switch: 1-1/4" IPS single pole, double throw waterproof flow switch for installation in water supply line to emergency unit. Switch senses flow of water when either the eyewash or shower is activated. Flow switch must be installed with tee fitting in horizontal position, flow switch body in vertical position and at least 6" from closest fitting. Direction of flow is marked on switch body.

Mounting: Furnished complete with bracket for mounting on vertical pipe or wall, junction box and 5 foot flexible NEMA 4X cord and receptacle. Electrical connection by others.

Quality Assurance: Unit is fully assembled, wired and factory tested prior to shipment.



Available Options

☐ **HV** High Voltage. Unit is designed for 208-240VAC at 50/60 Hz.

☐ **SW** Silencing switch for alarm horn.

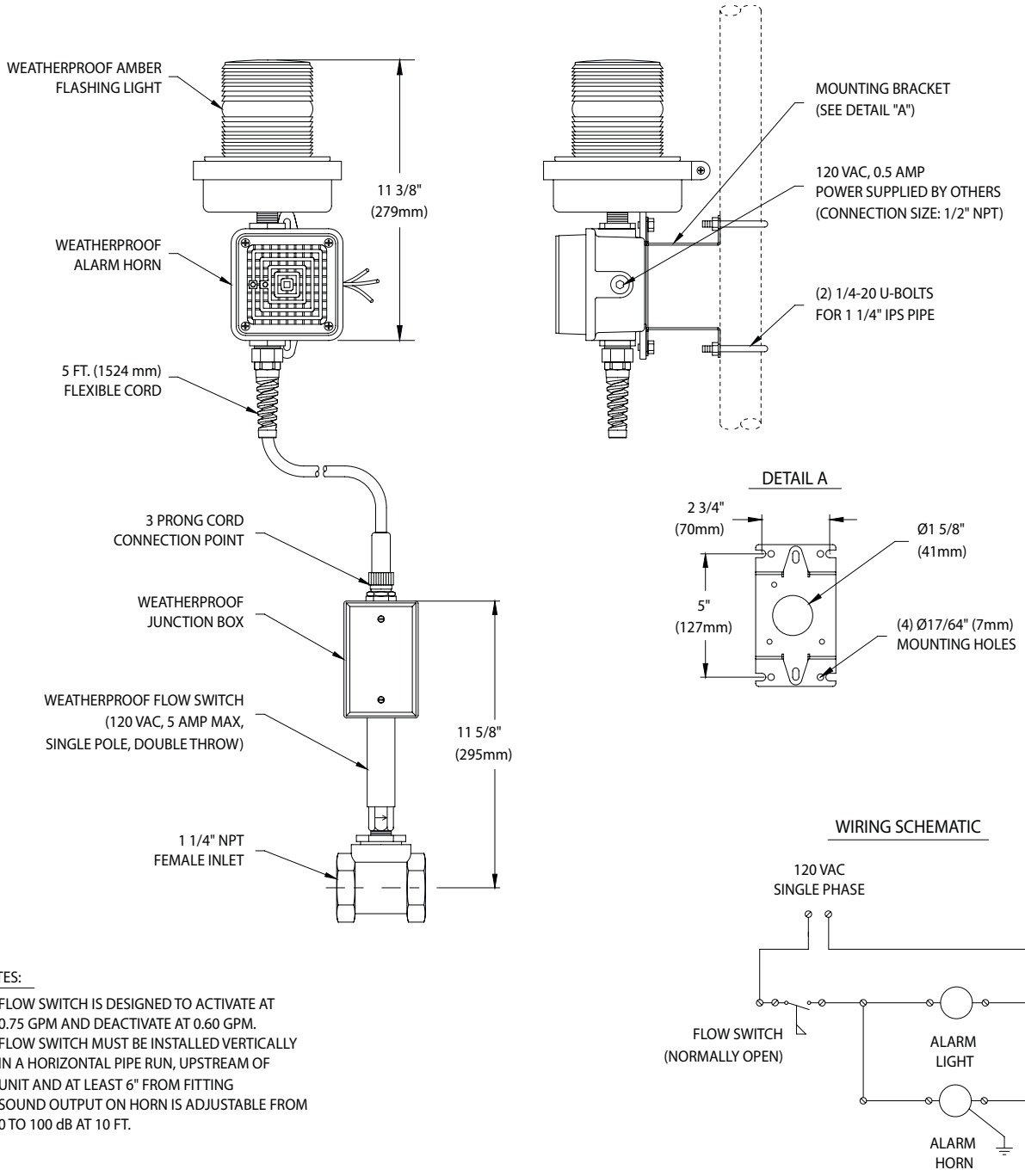
Additional Model

☑ **AP275-205** Same as above except with double pole, double throw flow switch for connection to monitoring system. When emergency unit is actuated, light and horn activate and electrical signal is sent to remote monitoring location.

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☐ AP275-200 Combination Flashing Light and Alarm Horn for Safety Stations



NOTES:

1. FLOW SWITCH IS DESIGNED TO ACTIVATE AT 0.75 GPM AND DEACTIVATE AT 0.60 GPM.
2. FLOW SWITCH MUST BE INSTALLED VERTICALLY IN A HORIZONTAL PIPE RUN, UPSTREAM OF UNIT AND AT LEAST 6" FROM FITTING
3. SOUND OUTPUT ON HORN IS ADJUSTABLE FROM 0 TO 100 dB AT 10 FT.

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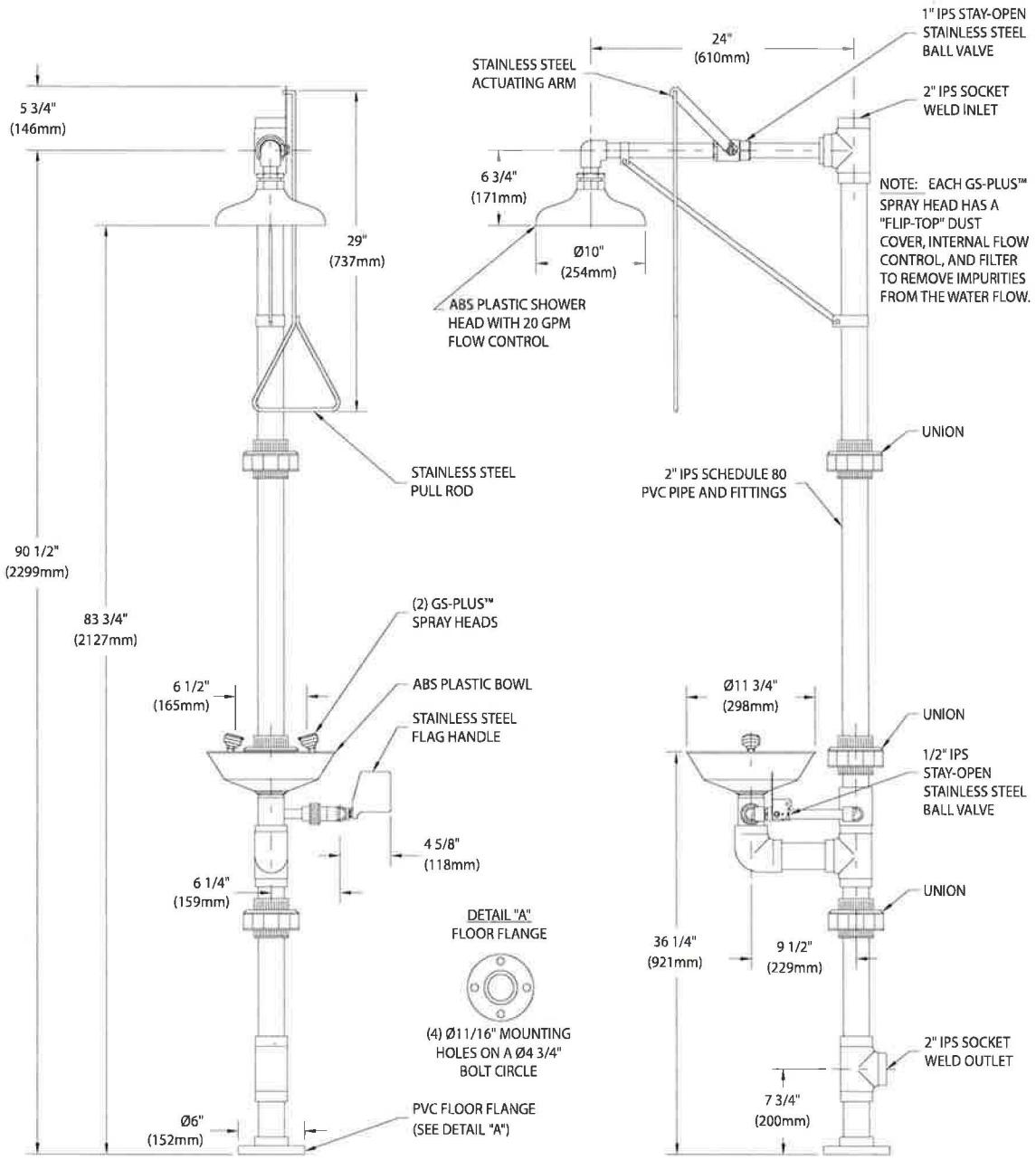
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Corrosion-Resistant Units

G1990 Safety Station with Eyewash, PVC Construction with Stainless Steel Valves



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Sign Included



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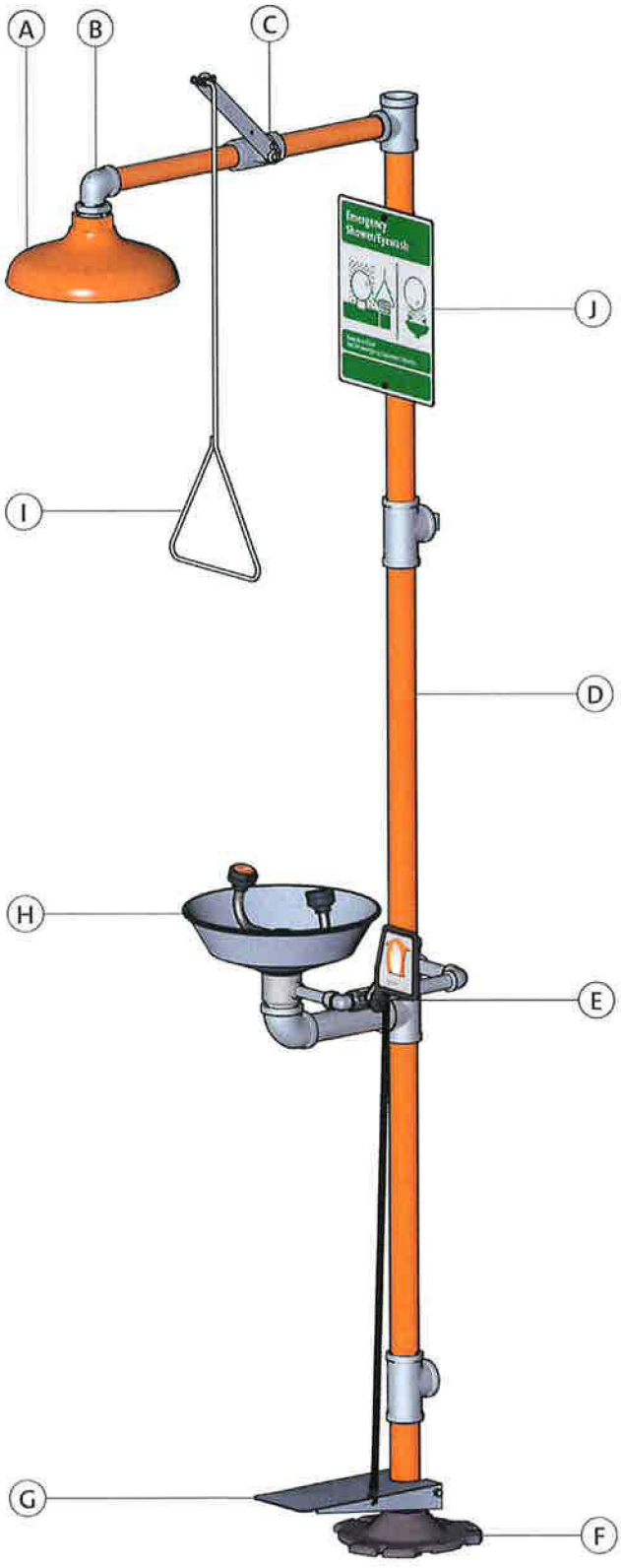
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Listed 8116. Units have been tested to and comply with ANSI Z358.1-2014 and the Uniform Plumbing Code.

Guardian

Parts List
Safety Stations

Item	Part Number	Description
Shower Heads		
A	AP450-032ORG-R	Orange ABS Plastic Shower Head with 20 GPM Flow Control and 1" Hex Bushing
	AP450-032GRN-R	Green ABS Plastic Shower Head with 20 GPM Flow Control and 1" Hex Bushing
	AP450-032YEL-R	Yellow ABS Plastic Shower Head with 20 GPM Flow Control and 1" Hex Bushing
	AP450-048	10" Dia. Stainless Steel Shower Head
Shower Head Elbow		
B	300-08SE	1" IPS Galvanized Steel Street Elbow
Shower Valve Assembly		
C	AP600-335H	1" IPS Chrome Plated Brass Stay-Open Ball Valve, Single Activation. Furnished with stainless steel actuating arm.
Galvanized Pipe Pack		
D	AP500-100	Galvanized Steel Pipe Pack for Units with Eyewash Bowl
	AP530-100	Orange Pipe Covers
Eyewash Valve Assemblies		
E	AP600-101H	1/2" IPS Chrome Plated Brass Stay-Open Ball Valve with Powder Coated Aluminum Flag Handle
	AP600-101HFC-H	1/2" IPS Chrome Plated Brass Stay-Open Ball Valve with Powder Coated Aluminum Flag Handle for Units with Hand/Foot Control
F	150-032	Powder Coated Cast Aluminum Floor Flange, 1-1/4" NPT Female Connection
G	AP050-010	Stainless Steel Foot Treadle and Return Spring with Aluminum Clevis Pin
H	See Page 2	Eyewash and Eye/Face Wash Assemblies
Shower Pull Rod		
I	AP050-079	29" Stainless Steel Pull Rod
Sign		
J	AP250-008G	Emergency Safety Station Sign



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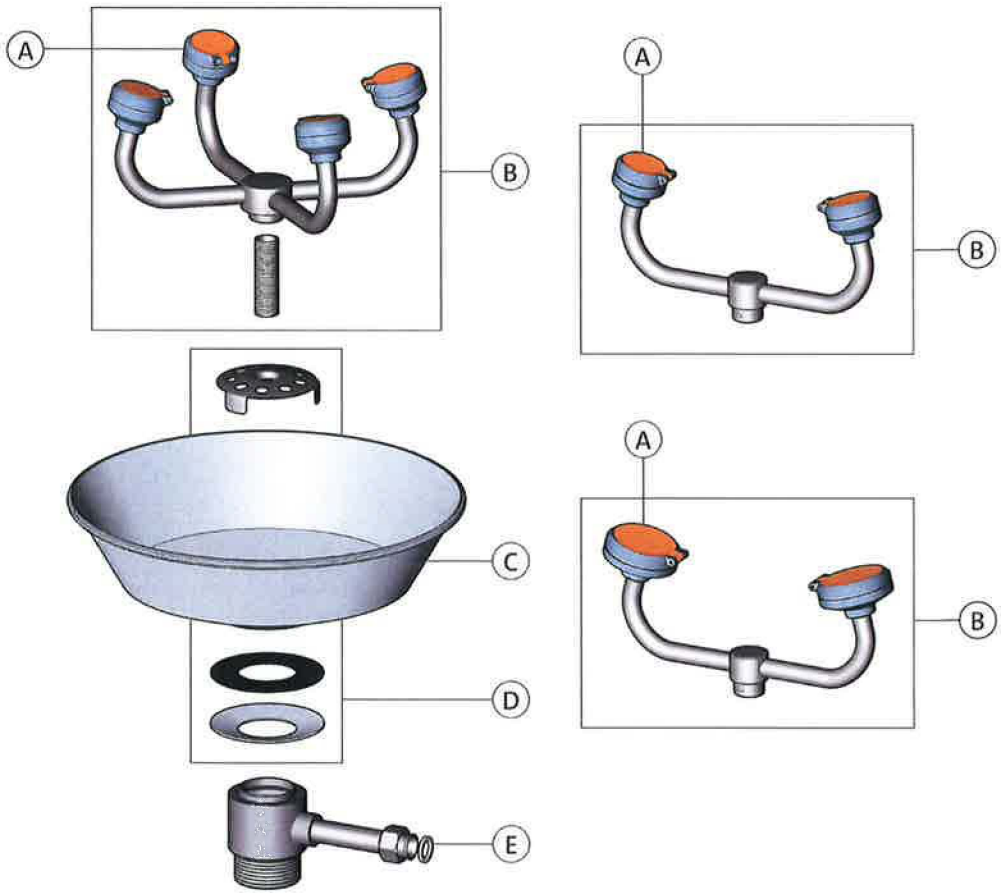
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Parts List
Eyewash and Eye/Face Wash Assemblies
Safety Stations

Item	Part Number	Description
Spray Heads		
A	AP470-001	GS-Plus™ Spray Head Assy.
	AP470-021	FS-Plus™ Spray Head Assy.
Outlet Assemblies		
B	AP470-100R	(2) GS-Plus™ Spray Heads with Chrome Plated Brass Fittings
	AP470-110R	(2) FS-Plus™ Spray Heads with Chrome Plated Brass Fittings
	AP470-120R	(4) GS-Plus™ Spray Heads with Chrome Plated Brass Fittings
	BI136-02-04	3/8" IPS X 2-1/4" Brass Shank

Item	Part Number	Description
Bowls		
C	100-009ORG-R	Orange ABS Plastic Bowl
	100-009GRN-R	Green ABS Plastic Bowl
	100-009YEL-R	Yellow ABS Plastic Bowl
	100-008R	Stainless Steel Bowl
	Note: Includes Cupped Washer and Gasket	
Drain Plate Assemblies		
D	AP150-012A	Drain Plate Assembly for Plastic Bowls
	AP150-012B	Drain Plate Assembly for Stainless Steel Bowls
	Note: Includes Drain Plate, Cupped Washer, and Gasket	
Waste Receptor		
E	150-066-1R	Waste Receptor with Flared Nipple Coupling and Gasket, 1-1/2" NPT Male Outlet



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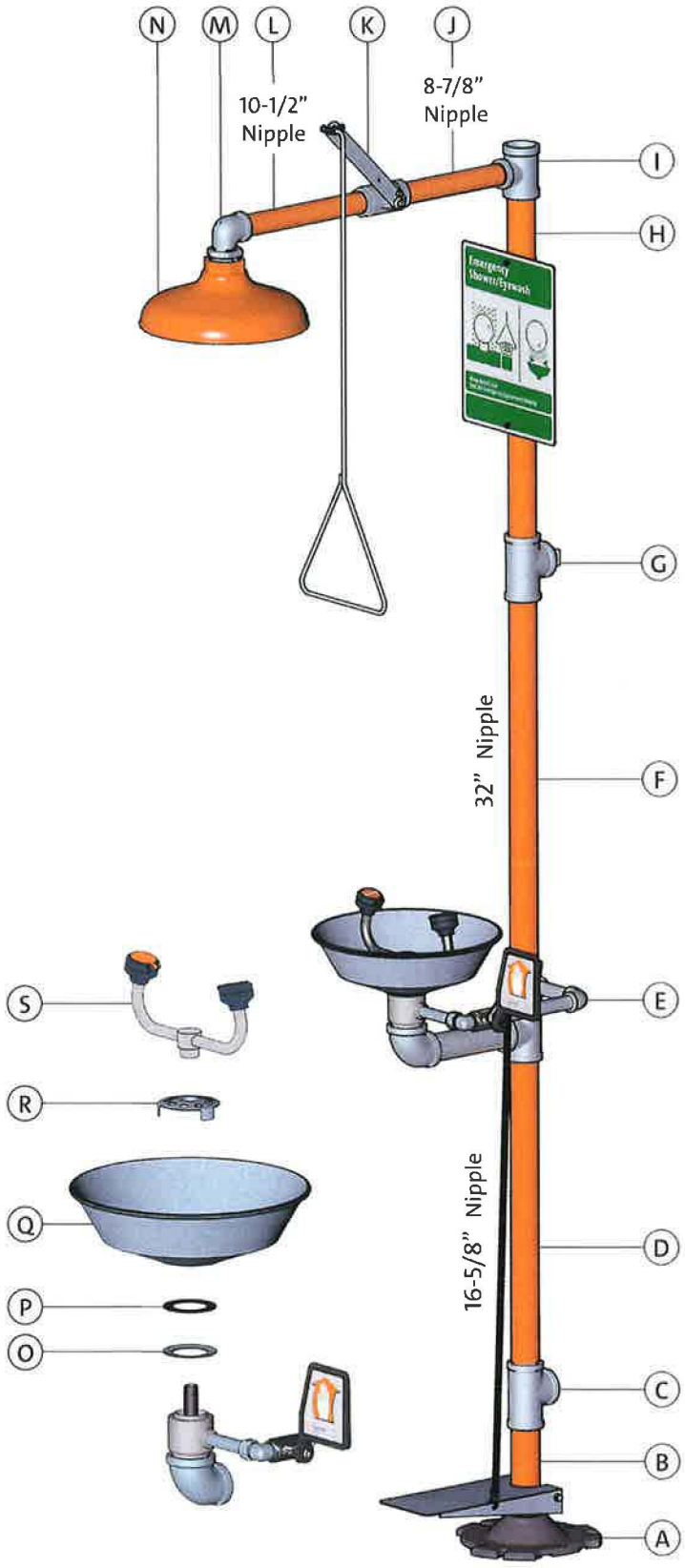
Assembly Instructions
Safety Stations

Safety stations are designed for easy assembly in the field. Essentially, these units are assembled from the "bottom up," as described below:

1. Assemble floor flange (A), 1-1/4" IPS x 6-1/4" nipple (B), and plugged outlet tee (C). If unit has a foot treadle, the floor flange and treadle are pre-assembled. Position foot treadle for proper access by users, and tee for connection to drain. *IMPORTANT: Plugged tee (C) must be oriented with plugged end down to ensure proper drainage.*
2. Assemble 1-1/4" IPS x 16-5/8" nipple (D) and frame assembly (E). Position frame assembly for proper access by users.
3. Assemble 1-1/4" IPS x 32" nipple (F) and inlet tee (G). Position tee for connection to supply. If the top vertical inlet will be employed, plug tee with supplied 1-1/4" IPS square head plug.
4. Assemble 1-1/4" IPS x 22" nipple (H) and 1-1/4" x 1" IPS reducing inlet tee (I). Position tee forward for proper location of shower. If the back horizontal inlet will be employed, plug tee with supplied 1-1/4" IPS square head plug.
5. Assemble 1" IPS x 8-7/8" nipple (J), emergency shower valve (K), 1" IPS x 10-1/2" nipple (L), elbow (M), and shower head with hex bushing (N).
6. Place cupped, stainless steel washer (O), rubber gasket (P), and bowl (Q) onto waste receptor. Center components to ensure a watertight seal.
7. Thread drain plate (R) down onto mounting shank as far as possible. If neccessary, rotate bowl clockwise to draw drain plate down onto mounting shank.
8. Thread eye or eye/face wash spray head assembly (S) onto mounting shank. Position outlet heads for proper access by user.
9. Secure entire unit to floor and/or wall for stability.
10. If unit has foot treadle, connect foot treadle chain to valve/handle assembly.
11. Attach orange plastic pipe covers and sign.

Notes:

1. *All threads are tapered pipe and require pipe joint compound or PTFE tape to ensure watertight connection.*
2. *If unit is furnished with corrosion-resistant powder coating, care must be taken to avoid damaging finish during assembly. For best results, a strap wrench should be used.*
3. *Test the entire unit for proper operation.*
4. *The use of dielectric unions is required when connecting to copper supply to avoid premature corrosion.*



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Parts List
GS-Plus™ and FS-Plus™ Spray Heads
Safety Stations

Each spray head features:

- Tough polypropylene plastic construction
- Highly visible integrated nylon dust cover
- Easily accessible 1.6 GPM (GS-Plus™) or 3.2 GPM (FS-Plus™) flow controls.
- Dense (60 pore per inch) polyurethane filter
- Unique design provides a consistently soft, full spray of water across a range of working pressures from 30 to 100 PSI

Item	Part Number	Description
A	**AP470-001**	GS-Plus™ Spray Head (assembled)
B	**AP470-002ORG-R**	Dust Cover and Cap Assembly
C	**470-004R**	60 PPI Polyurethane Filter
D	**470-005R**	1.6 GPM Flow Control
E	**AP470-021**	FS-Plus™ Spray Head (assembled)
F	**AP470-022ORG-R**	Dust Cover and Cap Assembly
G	**470-024R**	60 PPI Polyurethane Filter
H	**470-025R**	3.2 GPM Flow Control



IMPORTANT
In order to operate properly, the flow control must be inserted into the body ***concave end first.***

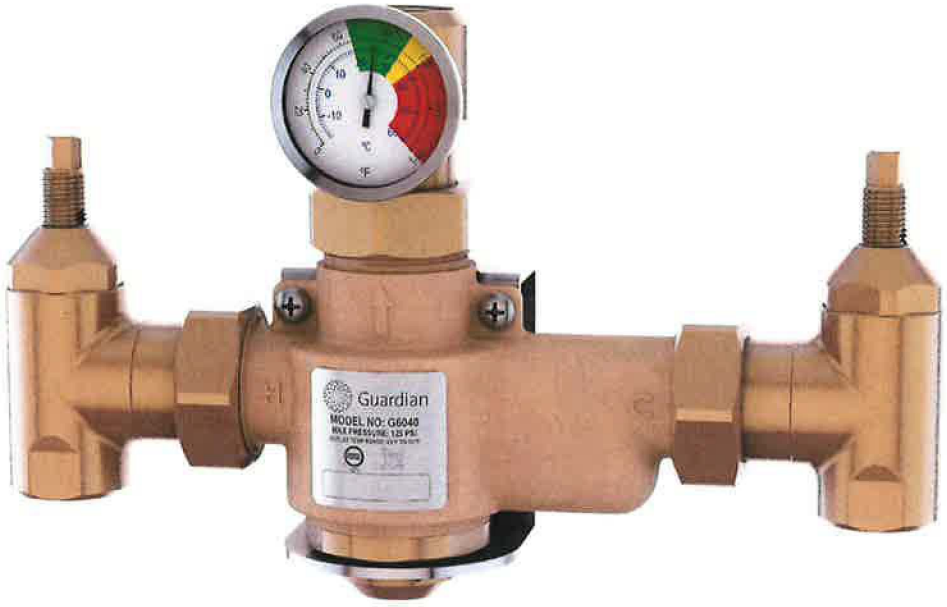
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A. SS-37* - Corrosion resistant, combination eyewash and shower safety station with ABS plastic shower head, internal 20 GPM flow control, ABS plastic bowl, stainless steel flag handle, PVC floor flange, 2" IPS Schedule 80 PVC pipe and fittings, 1" IPS and ½" IPS U.S. made stainless steel stay-open ball valves, and polished stainless steel pull rod. Unit shall have (2) polypropylene GS-Plus™ spray heads with integral "flip-top" dust covers, filters, and 1.6 GPM flow control orifices mounted on a PVC coated brass head assembly. Unit shall include ANSI compliant sign.
B. Performance: Unit shall meet or exceed ANSI Z358.1 – 2014, and come with a full 2-year warranty.
C. Fixture: Guardian Equipment G1990

G6040 Thermostatic Mixing Valve, 50 Gallon/189 Liter Capacity



Application: Thermostatic mixing valve to blend hot and cold water to deliver tepid water. Valve has flow capacity of 50 gallons (189 liters) per minute at 30 PSI (2.1 bar) pressure drop. Valve can be used to supply emergency shower or combination safety station. Depending on water supply size and pressure, valve can supply multiple units.

Mounting: Valve inlets can be positioned on top, back or bottom of valve. Outlet can be on top or bottom. Valve can be configured in the field for any mounting position. Furnished with heavy duty stainless steel mounting bracket.

Temperature Control: Valve has precision thermal actuator that senses incoming water temperature and automatically blends water to preset temperature. Valve is factory set to deliver 85°F (29°C) water. Temperature of tepid water can be adjusted as required and then locked. Furnished with dial temperature gauge as standard to monitor temperature of tepid water.

Cold Water Bypass: If the supply of hot water is restricted or interrupted, an internal bypass allows the valve to deliver cold water only. In bypass mode, the valve delivers 38 GPM (144 L/min) at 30 PSI (2.1 bar) pressure drop.

Hot Water Shutoff: Valve has internal PTFE valve seat. If the supply of cold water is interrupted, the valve will close completely and *not deliver any water at all*, eliminating any possibility of scalding.

Flow Capacity: Refer to table below for flow capacity of valve at specified pressure drops.

Checkstops/Filters: Each inlet has a lockable shutoff valve for maintenance, internal check valve to prevent backflow and stainless steel basket filter to remove debris from the water flow.

Construction: Valve meets the requirements of the U.S. Safe Drinking Water Act as lead-free.

Inlet/Outlet: 1" NPT female inlets and 1-1/4" NPT female outlet as standard.

Quality Assurance: Valve is ASSE certified under ANSI/ASSE 1071. Valve is fully assembled and factory tested prior to shipment.

Water Pressure/Temperature Requirements

Supply Pressure: Maximum incoming water pressure is 125 PSI (8.6 bar). Pressure of hot and cold water supplies can vary up to 25% and still deliver the flow and temperature required by ANSI/ASSE 1071.

Hot Water Supply Temperature: Incoming hot water temperature range is 120° - 180°F (49° - 82°C). Guardian recommends that the hot water temperature not exceed 140°F (60°C).

Cold Water Supply Temperature: Incoming cold water temperature range is 40° - 70°F (4° - 21°C). Cold water temperature must be at least 10°F (5.6°C) less than the temperature of the delivered tepid water.

Tepid Water Temperature: Temperature of tepid water is adjustable within a range of 65° - 95°F (18° - 35°C) and then locks in position. High temperature limit stop is set at 90°F (32°C) to prevent misadjustment.

G6040 Thermostatic Mixing Valve, 50 Gallon/189 Liter Capacity

Pressure Drop (PSI)	1	5	10	15	20	25	30	35	40
Flow Rate (GPM)	0.5	17	28	34	41	46	50	55	59
Bypass Flow Rate (GPM)	0.5	13	20	25	30	34	38	41	45

Pressure Drop (Bar)	0.1	0.3	0.7	1.0	1.4	1.7	2.1	2.4	2.8
Flow Rate (L/min)	2	64	106	129	155	174	189	208	223
Bypass Flow Rate (L/min)	2	49	76	95	114	129	144	155	170

Ordering Information

Models

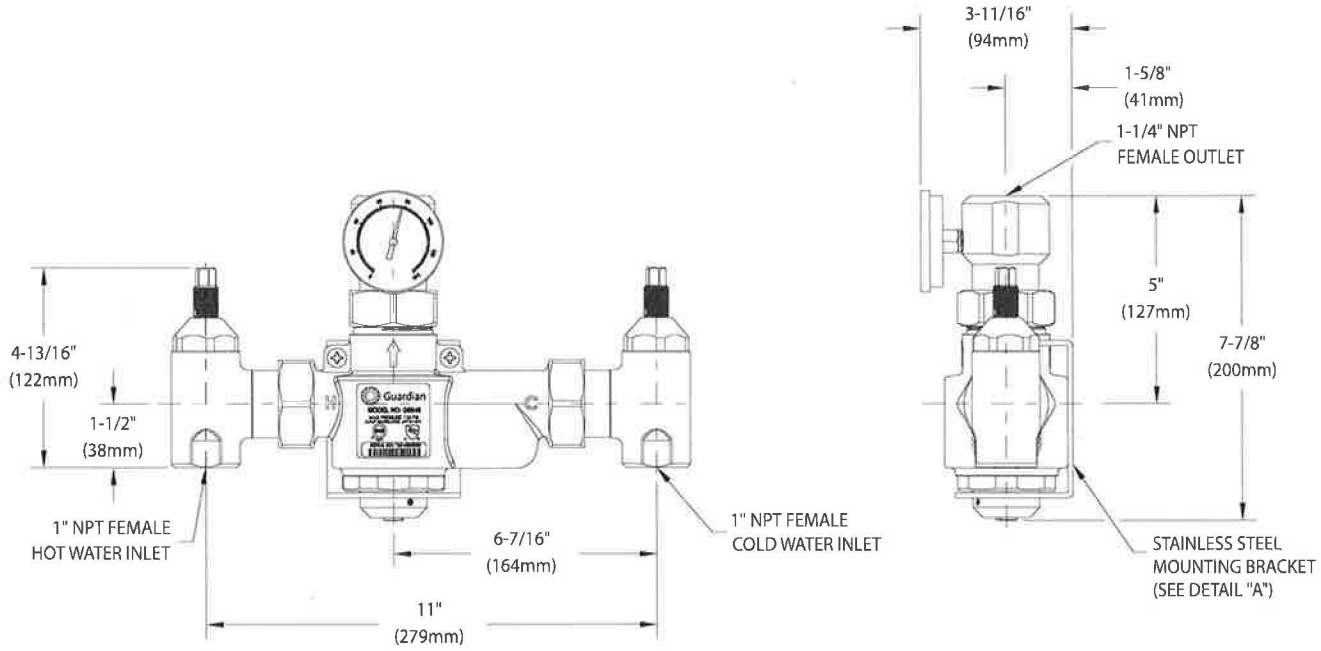
✓	G6040	Thermostatic Mixing Valve, 50 Gallon/189 Liter Capacity
☐	G6041-XXX	G6040 valve installed in surface mounted powder coated steel cabinet
☐	G6042-XXX	G6040 valve installed in surface mounted stainless steel cabinet
☐	G6043-XXX	G6040 valve installed in recess mounted powder coated steel cabinet
☐	G6044-XXX	G6040 valve installed in recess mounted stainless steel cabinet

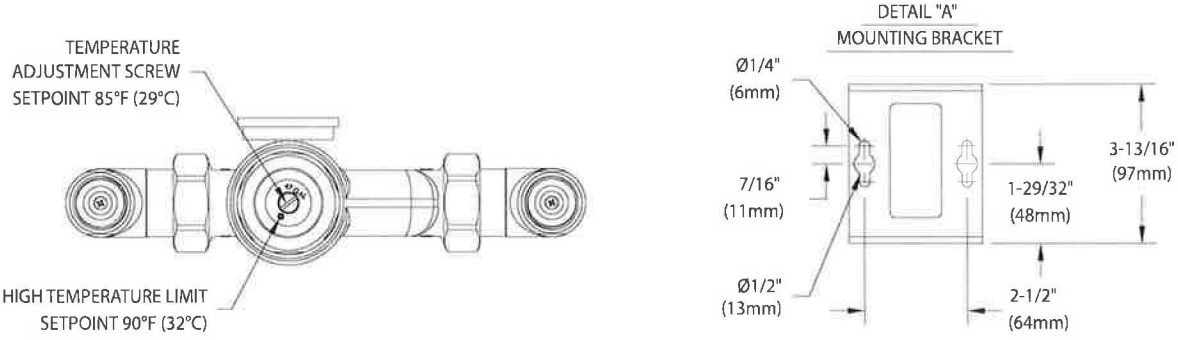
Available Options

☐	Finish	Chrome plated finish in place of raw brass (add suffix "CP")
☐	Inlet/Outlet Threads	G1 female thread on inlets and G1-1/4 female thread on outlet (add suffix "G")
✓	Temperature Gauges	Temperature gauges on hot and cold water inlets (add suffix "IT")
☐	Pressure Gauges	Pressure gauges on hot and cold water inlets (add suffix "IP")
☐	Temperature/Pressure Gauges	Temperature and pressure gauges on hot and cold water inlets (add suffix "ITP")

Note: *Installation of temperature and/or pressure gauges will change rough-in dimensions of valve. Contact factory for catalog drawing.*

G6040 Thermostatic Mixing Valve, 50 Gallon/189 Liter Capacity





Notes:

1. ANSI Z358.1-2014 states that the water temperature delivered by emergency equipment should be "tepid". Tepid is defined as 60°F - 100°F (16°C - 38°C). However, in circumstances where a chemical reaction can be accelerated by water temperature, a medical professional should be consulted to determine the optimum water temperature for the application.
2. For thermostatic mixing valves to deliver the required water temperature and volume, the system must be sized correctly. Please refer to the flow capacity, pressure and temperature requirements herein when designing the tepid water system.
3. Valve is factory set to deliver 85°F (29°C) tepid water. Depending on pressure and temperature of the incoming water supplies, this setting may require adjustment in the field. The adjustment screw is locked in position after adjusting.
4. Thermostatic mixing valves, like all emergency equipment, must be installed in accordance with the manufacturer's instructions and maintained on a regular basis. Per ANSI Z358.1-2014, all emergency equipment should be activated weekly and inspected at least annually. Thermostatic mixing valves should be treated the same.
5. Per ANSI Z358.1-2014, plumbed emergency equipment must be connected to a potable water supply. This valve meets the requirements of the U.S. Safe Drinking Water Act as lead-free and is safe for use with potable water.
6. This valve is supplied with shutoff valves. Per ANSI Z358.1-2014, if shutoff valves are installed on the water supply to emergency equipment, the valves must be lockable to prevent unauthorized shutoff. Accordingly, each shutoff valve stem on this valve has a hole for installing a lock to secure the stem in the open position.

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G6040 Thermostatic Mixing Valve

1. Basis-of-Design Product: Guardian Equipment G6040 thermostatic mixing valve.
2. Temperature Control. Valve shall have a precision thermal actuator to accurately blend hot and cold water. Valve is factory preset to deliver 85° F (29° C) tepid water with high temperature limit stop at 90° F (32° C). Temperature can be adjusted in field up to limit and locked.
3. Capacity. Valve shall have a flow capacity of 50 GPM (189 L/min) at 30 PSI (2.1 bar) pressure drop.
4. Failsafe Protection. In event the hot water supply fails, the valve shall deliver cold water only (i.e. bypass mode) at a flow rate of 38 GPM (144 L/min) at 30 PSI pressure drop. In the event the cold water supply fails, the valve shall close and *not deliver any water at all.*
5. Supply Pressure. Maximum supply pressure is 125 PSI. Pressure of hot and cold water supplies can vary up to 25% and still deliver the flow and temperature required by ANSI/ASSE 1071.
6. Construction. Valve shall be furnished with lockable shutoff valves on the hot and cold water supplies, internal check valves to prevent cross-mixing of hot and cold water and stainless steel basket filters to remove debris from the water flow. Valve shall be furnished with outlet temperature gauge and stainless steel mounting bracket. Valve shall meet the requirements of the U.S. Safe Drinking Water Act as lead-free.
7. Inlets/Outlet. Valve shall have 1" NPT female inlets and 1-1/4" NPT outlet. Inlets can be positioned in the field for top, back or bottom supply. Outlet can be positioned on top or bottom.
8. Quality Control. Valve shall be third-party certified to comply with ANSI/ASSE 1071 and shall be fully assembled and factory tested prior to shipment.

EWC-1

OASIS® Water Coolers

BARRIER-FREE VERSACOOLER®

Energy and Water Conservation Technology

PG8AC, PGAC, Mechanical Activation



Suggested Specification

Model PG8AC shall be for Green Specified construction, deliver 8.0 gph of 50°F water at 90°F ambient and 80°F inlet water. Model PGAC is a non-refrigerated drinking fountain and delivers ambient water. Models PG8AC and PGAC shall include front and side push pads to shall be Mechanically Activated. Basin shall be designed to eliminate splashing and standing water. **Water Saver Bubbler reduce waste water by 50%** and shall have a flexible guard and operate between 20 and 120 psi. Cabinet finish shall be Sandstone powder coated paint on galvanized steel or brushed stainless steel. **New** High Efficient positive start compressor and cooling system shall use R-134a refrigerant, fully insulated and controlled by positive sensing thermostat. Shall comply with ANSI A117.1 and ADA. Shall be listed by Underwriters' Laboratories to U.S. and Canadian standards. Shall comply with ANSI/NSF 61, ARI standard 1010.

Models

PG8AC delivers 8.0 gallons of chilled drinking water per hour. **PGAC** is a non-refrigerated fountain. These models satisfy CABO/ANSI A117.1. This cooler will comply with ADA guidelines when properly installed. Models also meet guidelines for children's accessibility providing the floor to orifice height is 30 inches and proper clear floor space is provided for frontal approach.

Standard Features

> Built-in 100 micron strainer stops particles before they enter the waterway
> Waterways are lead-free in materials & construction
> Stainless Steel top
> Flexible, one-piece **Water Saver Bubbler** guard
> Heavy Duty galvanized steel frame
> **New** High Efficiency cooling system
> Refrigerant R-134a
> Four push pad Mechanical activation electricity not required
> External stream height adjustment

Finishes

> Standard cabinet finish: Sandstone powder coated paint on steel Optional finishes at additional cost: Stainless Steel, Regency Bronze, and optional powder coated finishes

Options (at additional cost)

> Glass Fillers (factory installed)
> Push Handle (029603-004)
> Push Back (029603-005)
> Push Down (029603-006)
> **Filtration System 100% Biodegradable**
> Stainless Steel Bubbler

Installation

> Prior to roughing, consult with local, state and federal codes for proper mounting height
> Shipped with complete instructions and wall mounting bracket
> Removable side and front panels provide easy access for installation

Project Name:_____

_____

_____

Engineer/Contractor Name:_____

_____

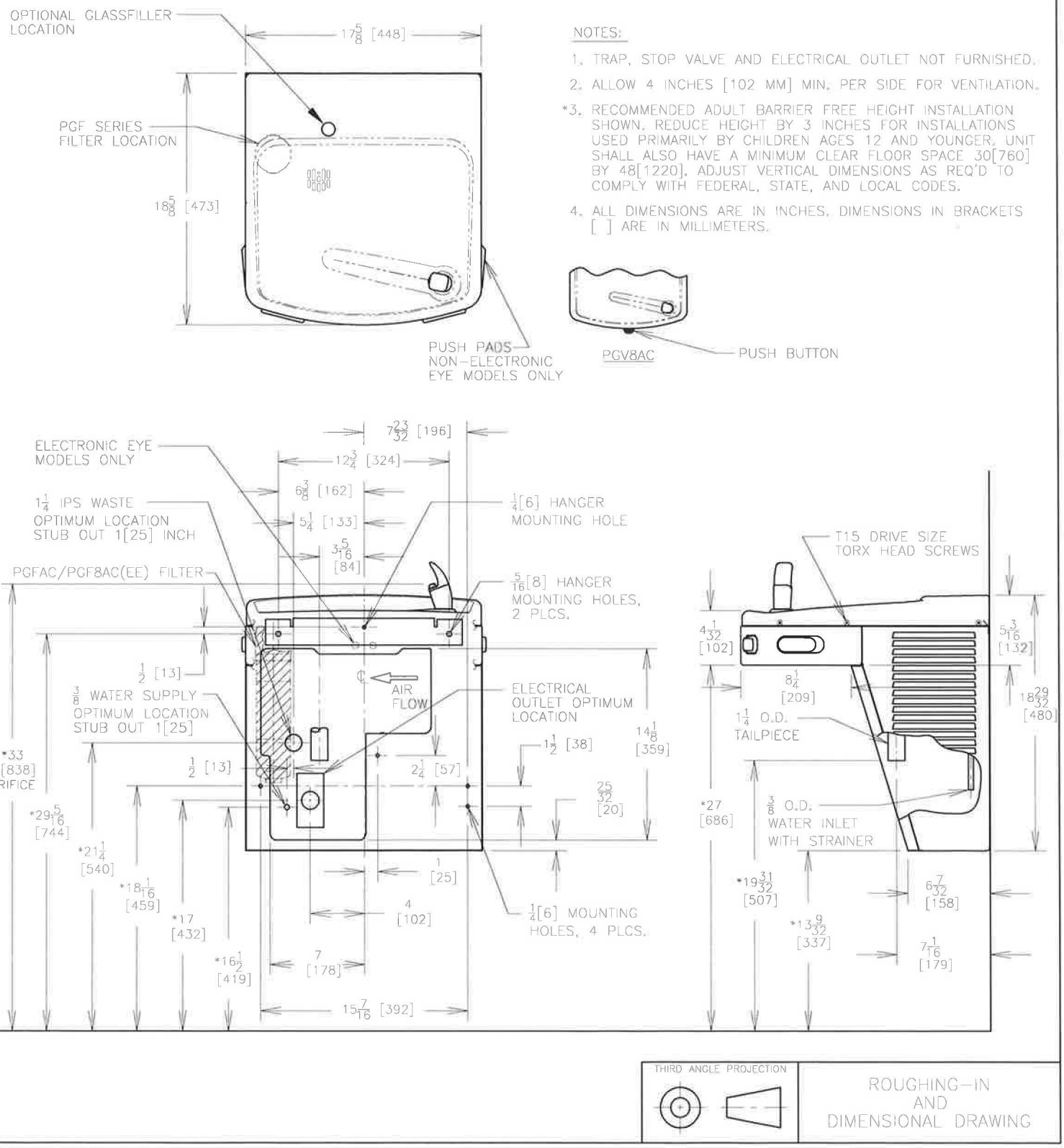
Approval:_____

Date:_____

Model	50°F Drinking Water 90°F Ambient Air Temperature*			Hot 'N Cold™ Model	115 Volts, 60 Hz			Glass Filler Access. Option	Cabinet Color Finish	Net Wt. Approx.
	Rated Capacity GPH	Bubbler Rate GPH	Pre-Cooler		Compr. HP	Full Load Amps	Rated Watts			
PG8AC	8.0	8.0	No	No	1/4	3.1	286	Yes	Yes	59 lbs.
PGAC								Yes	Yes	25 lbs.

* Industry Standard Rating Condition 50°F inlet water temperature
** Special export models available, upgrade on 220-240 volts, 50 60 Hz
Specifications subject to change without notice

OASIS® BARRIER-FREE Versacooler® II MODELS
PG8AC, PGAC, PG8ACEE, PGF8AC, PGFAC, PGF8ACEE, PGV8AC



Form 4087
Tri Palm International, LLC
www.oasiswatercoolers.com

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OASIS® VERSACOOLER®II MODELS

A. **INSPECTION**

Inspect carton and water cooler for evidence of rough handling and concealed damage. Damage claims should be filed with carrier.

B. **TO PUT WATER COOLER INTO SERVICE**

1. **Note:** The following states require a licensed plumber to install cooler; AR, GA, MA, MI, OK, RI, SC, SD, TX, VT and WI. CA, KS, MN, NM and OR allow for a state-registered installer or contractor as well. State and local plumbing codes may prohibit the use of saddle tapping valves for water line connection in some applications. All connections must conform to applicable plumbing codes.
2. Locate and install plumbing and electrical service, if required, in accordance with Roughing-in Drawing. Filter units have additional instructions on a label inside access panel. Read these before installing unit. This drinking water cooler is designed to be operated at a water supply line pressure of up to 100 psi (690 kPa). A pressure regulator must be installed in front of unit's water inlet if water pressure (including any possible pressure spikes) could exceed 100 psi (690 kPa).
3. FLUSH BUILDING WATER SUPPLY LINE BEFORE INSTALLING UNIT.
4. Install unit on wall hanger. **Wall hanger is shipped fastened to back of unit.**
5. **Install a trap in the waste line and a shut off valve in water supply line**. An in-line strainer is furnished in "Water Supply" tube. Connect "Water Supply" tube to shut off valve. This connection should not be a solder joint or flare connection to allow access to the strainer for service. To ease removal of the strainer, a sheet metal screw may be lightly threaded into the open end. **NOTE: ACTIVATION VALVE IS PLUMBED BEFORE COOLING TANK AT FACTORY TO AVOID PRESSURIZING COOLING TANK.** When unit has an internal waste trap, the trap should be wrapped with insulating tape to prevent sweating. Use of the 1-3/4 diameter knockout for a waste line is not recommended because of a potential conflict with ADA* toe space clearance requirements. Check your local building code inspector for approval.
6. Rotate fan blade by hand to see that it is free of obstructions.
7. Check available power supply against the water cooler data plate to assure correct electrical service. This drinking water cooler is intended to be connected to a 20A minimum ground fault circuit interrupting (GFCI) device to meet UL requirements. Plug power supply cord into wall outlet. The rear most 1-3/8 diameter knockout in frame bottom is for an externally located electrical supply. Make sure knockout hole edge is smooth and free of any burrs. Use of a Heyco bushing #2184 in knocked out hole is recommended in order to prevent damage to service cord and to close up excess opening around cord. Route cord so it does not interfere with ADA* space requirements.
8. To fill cold water tank on water cooler versions, open water supply line shut-off and push any one of front or side pushbuttons to allow water to flow to bubbler. On T model, actuate solenoid by holding one hand approximately 1" from infrared sensor. Run water until stream is free of bubbles.
9. To Adjust Bubbler Stream:

   All models are equipped with a Cartridge Regulator. The standard push pad and electric eye models have a slot at back of underside of shelf. Insert a screwdriver in this slot to adjust regulator. Turn adjustment clockwise to increase stream height. To access the PGV8AC adjustment, remove the Bezel and Button from front of cooler.
10. On electric eye equipped models (T models), place and then hold hand approximately 1" from sensor (under front edge of shelf) to actuate solenoid valve. After approximately 30 seconds run time, solenoid valve will automatically shut off. To reactivate, move hand away for an instant and then again place it in front of sensor.
11. To adjust beam range of sensor (T models only):
    a) Shut off water. Actuate sensor to relieve water pressure. NOTE: Unplug cooler or avoid touching fan blade and electrically live components before adjusting sensor.
    b) Remove six screws holding top on. Lift up front to access sensor.
    c) To adjust sensing distance, use a mini-screwdriver (2.5mm flat tip or smaller) and rotate adjustment potentiometer screw on side of sensor. Turn clockwise to sense objects further away. This is represented by thicker end of curve on sensor label. The screw can be turned a maximum of ¾ of a turn. The sensor has a maximum range of approximately 14". It is factory set at 4".



    d) NOTE: Do not turn distance adjustment as high as it can go. If you do, sensor will lock on until you turn sensing distance back down.
    e) There is an adjustable on-time delay if desired. It is factory set for immediate response upon activation. To adjust on-time delay, rotate blue knob on timer clockwise. The maximum on-time delay is 1 second. Water will shut off immediately once object is removed from under shelf. Maximum on-time for water flowing is 30 seconds should someone tamper with sensor. NOTE: Floors with a reflective finish, i.e., ceramic tile, may cause false actuation no matter what sensor adjustment is for distance. Therefore, do not install unit in such an area or dull surface of floor under cooler so it will not reflect light.
    f) Replace top and screws. Snug up screws, but do not over tighten.

C. **MAINTENANCE**

1. Inspection of condenser should be made at 3-month intervals. To remove dirt and lint from condenser, disconnect power supply cord, then use small stiff non-wire or vacuum cleaner attachment brush. Observance of this procedure will insure adequate air circulation through condenser so operation is efficient and economical.
2. Outside of unit can be wiped clean with mild soap and water mixture. Never use harsh chemicals or abrasive cleaners, including any chlorine solutions. Rinse thoroughly with clean water, then dry surfaces.

D. **OVERLOAD PROTECTION**

The compressor motor, where used, is equipped with an automatic reset protector which will disconnect the motor from the line in case of an overload.

E. **LUBRICATION**

This unit is equipped with a hermetically sealed compressor and requires no additional lubrication. The fan motor, where used, on this unit seldom needs oiling, but if required, a few drops of SAE 10 oil should be used.

F. **TO DISCONTINUE USE OF WATER COOLER**

1. Close water shut-off valve.
2. Provide container to catch water to be drained.
3. On push button model, disconnect power supply cord then disconnect water supply line at shut off valve. Route water supply line to container and actuate push button. If this drains too slowly for you, prepare 3/8" ID tube or 3/8" OD tube with quick-connect fitting and remove screw plug in tank drain. Slide tube over drain and route to container. Replace screw plug when draining is complete. Do not over-tighten. O-ring only needs to be snug to seal.
4. On T model, disconnect water supply line at shut off valve. Place water supply line in container and actuate solenoid as explained in Step B8. If this drains too slowly for you, prepare 3/8" ID tube or 3/8" OD tube with quick-connect fitting and remove screw plug in tank drain. Slide tube over drain and route to container. Disconnect power supply cord. Replace screw plug when draining is complete. Do not over-tighten. O-ring only needs to be snug to seal.
5. ALWAYS DRAIN ALL WATER WHEN FREEZING TEMPERATURES ARE ANTICIPATED AND BEFORE SHIPPING WATER COOLER.

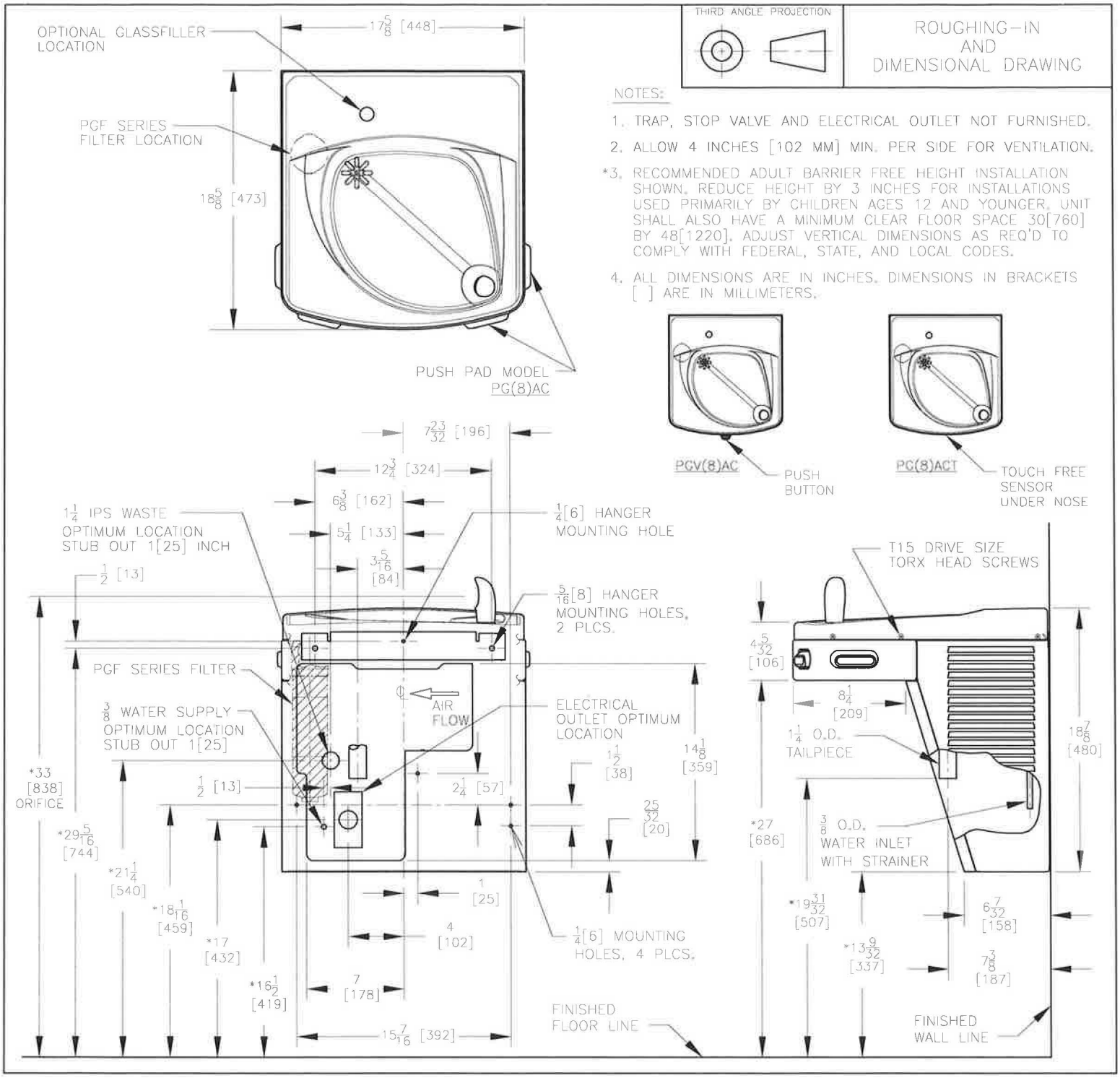
*Americans With Disabilities Act

WARNING

The warranty and the Underwriters' Laboratory Listing for this machine are automatically voided if this machine is altered, modified, or combined with any other machine or device. Alteration or modification of this machine may cause serious flooding and/or hazardous electrical shock or fire.

EXCEPT AS SET FORTH HEREIN, THE MANUFACTURER MAKES NO OTHER WARRANTY, GUARANTEE OR AGREEMENT EXPRESSED, IMPLIED OR STATUTORY, INCLUDING ANY IMPLIED WARRANTY OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

OASIS® VERSACOOLER®II MODELS



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030099-267 Rev. E, Date 04/2020

OASIS®

Illustrated Parts Breakdown

Models: P8AC, PG8AC
P8ACSL, PG8ACSL





SPECIFICATIONS:

Models: P8AC, PG8AC

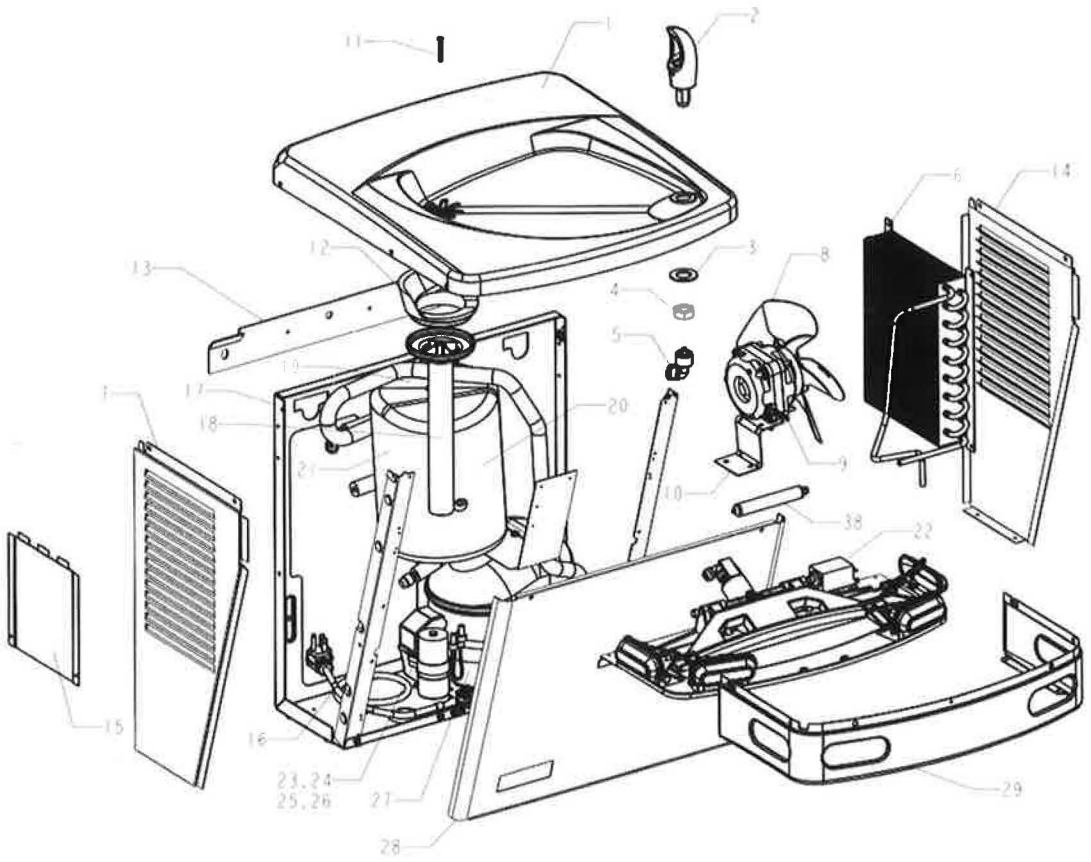
Voltage	115VAC±10%/1 PH/60 Hertz
Size	17 5/8" W, 18 5/8" D, 18 29/32" H
Shipping Weight (Approx)	59 lbs.
Cold Water Capacity*	8 GPH
Compressor	1/4 hp
Refrigerant	134a
Compressor (Full Load) - Huayi	4.4 amps
Refrigerant Charge - Huayi	3.95 OZ
Compressor (Full Load) - Danfoss	4.8 amps
Refrigerant Charge - Danfoss	4.75 OZ

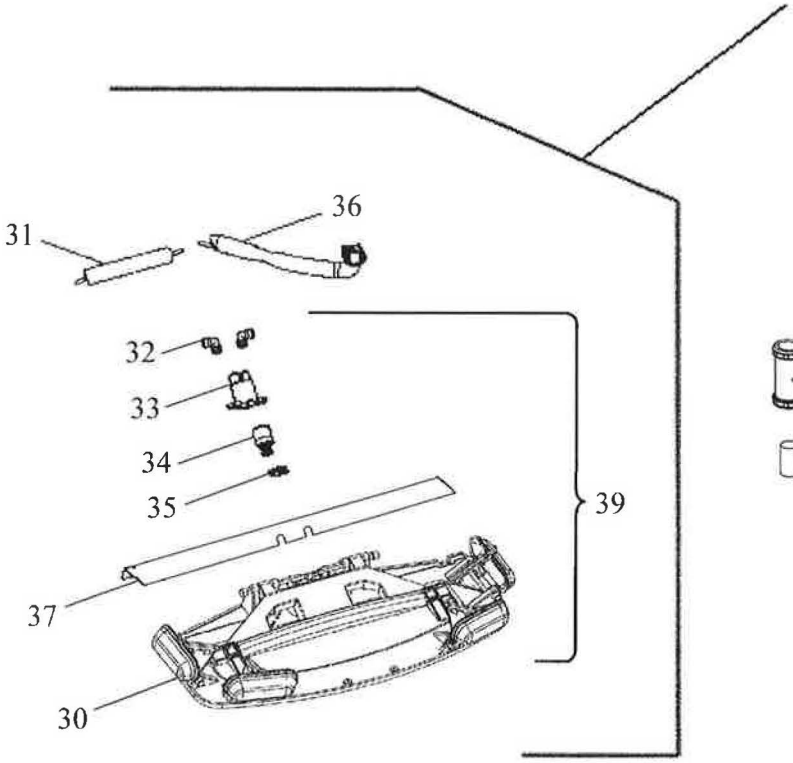
Models: P8ACSL, PG8ACSL

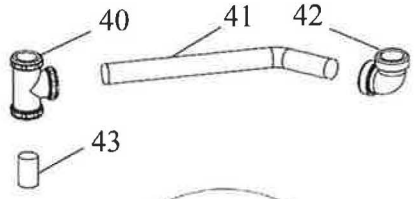
Voltage	115VAC±10%/1 PH/60 Hertz
Size	35 1/4" W, 18 5/8" D, 24 29/32" H
Shipping Weight (Approx)	84 lbs.
Cold Water Capacity*	8 GPH
Compressor	1/4 hp
Refrigerant	134a
Compressor (Full Load) - Huayi	4.4 amps
Refrigerant Charge - Huayi	3.95 OZ
Compressor (Full Load) - Danfoss	4.8 amps
Refrigerant Charge - Danfoss	4.75 OZ

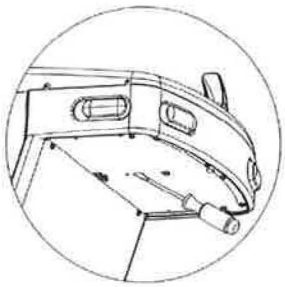
*Room Temperature 90°F; Supply Water Temperature 80°F; Drinking Water Temperature 50°F.

Specifications subject to change without notice.









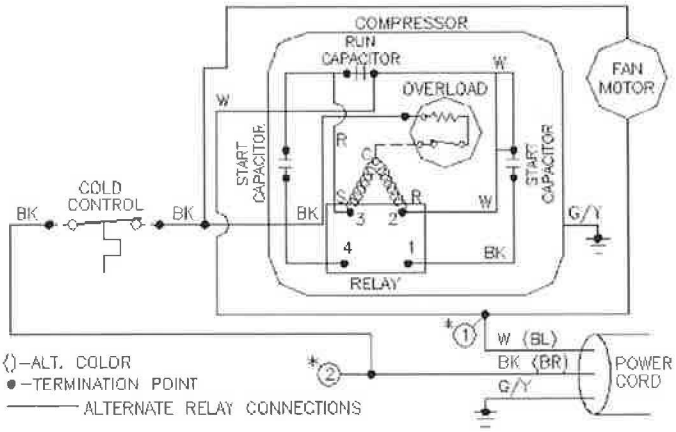
To adjust stream height, insert a 1/8" Flat blade screwdriver into the slotted hole as shown. The screwdriver will engage the stream height adjuster in the cartridge plunger. Turn clockwise to increase stream height, or ccw to reduce stream height.

Parts List

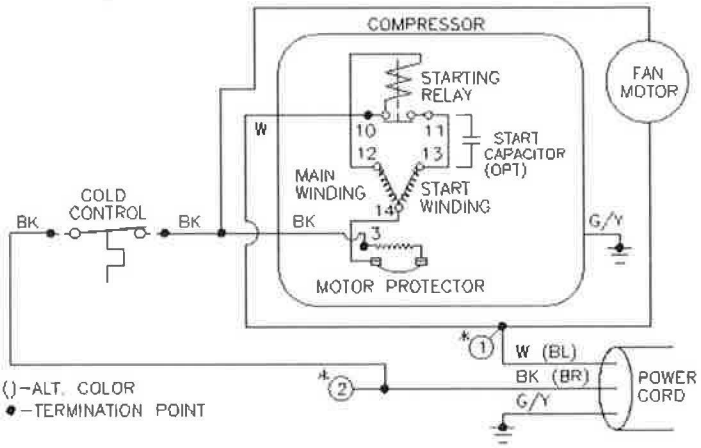
Item #	Description	PG8AC	PG8ACS	PGACS
1	Top, New Design - Requires 031756-003 Waste Drain Gasket	038934-101	038934-101	038934-101
2	Bubbler, Antimicrobial	035607-111	035607-111	035607-111
3	Washer, Undertop	028706-030	028706-030	028706-030
4	Locknut	026824-019	026824-019	026824-019
5	Bubbler Nut W/JG	036026-001	036026-001	036026-001
6	Condenser	031766-201	031766-201	N/A
7	Side Panel, Left Sandstone	035080-009	035080-309	035080-009
	Side Panel, Left Greystone	035080-001	035080-301	035080-001
	Side Panel, Left Stainless Steel	035080-010	035080-310	035080-010
8	Blade, Fan - (H3XX & D3X1 series)	024033	024033	N/A
	Blade, Fan - (D3X3 & D3X4 Series) Included with 038813-001 Fan Motor	038773-002	038773-002	N/A
9	Motor, Fan - (H3XX & D3X1 series)	027354-036	027354-036	N/A
	Motor, Fan - (D3X3 & D3X4 Series) Includes 038773-002 Fan Blade	038813-001	038813-001	N/A
10	Bracket, Fan Motor	036478-001	036478-001	N/A
11	Drain Screw	036049-002	036049-002	036049-002
12	Waste Gasket - (H3XX & D3X1 series)	031756-002	031756-002	031756-002
	Waste Gasket - (D3X3 & D3X4 Series) for new top design 038934-101	031756-003	031756-003	031756-003
13	Hanger Bracket	031363-002	031363-002	031363-002
14	Side Panel, Right Sandstone	035081-009	035081-009	035081-309
	Side Panel, Right Greystone	035081-001	035081-001	035081-301
	Side Panel, Right Stainless Steel	035081-010	035081-010	035081-310
15	Patch Plate, Sandstone	N/A	036142-009	036142-009
	Patch Plate, Greystone	N/A	036142-001	036142-001
	Patch Plate, Stainless Steel	N/A	036142-010	036142-010
16	Service Cord	036820-001	036820-001	N/A
17	Frame	035089-001	035089-001	035089-001
18	Waste Assy	036011-001	036011-002	036009-002
19	Insulation Right Cooling Tank	035088-001	035088-001	N/A
20	Insulation Left Cooling Tank	035088-002	035088-002	N/A
21	Cooling Tank, Insulated - Huayi	033469-055-SP	033469-055-SP	N/A
	Cooling Tank, Insulated - (D300, D3X1 & D3X3 Series)	033469-001	033469-001	N/A
	Cooling Tank, Insulated - (D3X4 Series)	033469-060	033469-060	N/A
22	Cold Control	027040-039	027040-039	N/A
23	Relay - Huayi	036056-003	036056-003	N/A
	Relay/Overload Combo - Danfoss	032836-007	032836-007	N/A
24	Overload - Huayi	036055-003	036055-003	N/A
25	Start Capacitor - 60 MFD - Huayi	027956-008	027956-008	N/A
	Start Capacitor - Danfoss	027956-004	027956-004	N/A
26	Run Capacitor - 25 MFD - Huayi	027956-009	027956-009	N/A
27	Compressor Assy. - Huayi	036115-001	036115-001	N/A
	Compressor Assy. - Danfoss	033425-006	033425-006	N/A
28	Front Panel, Sandstone	035079-009	035079-009	035079-009
	Front Panel, Greystone	035079-001	035079-001	035079-001
	Front Panel, Stainless Steel	035079-010	035079-010	035079-010
29	Front Nosepiece, Sandstone	035077-009	035077-009	035077-009
	Front Nosepiece, Greystone	035077-001	035077-001	035077-001
	Front Nosepiece, Stainless Steel	035077-010	035077-010	035077-010
30	Activation Assy.	035412-005-SP	035412-005-SP	035412-005-SP
31	Waterline, Tank to Valve	035504-011-SP	035504-011-SP	N/A
	Waterline, Inlet to Valve or Tank	035504-010-SP	035504-010-SP	035504-010-SP
32	Union Elbow Fitting JG	028481-101	028481-101	028481-101
33	Cartridge Holder	035990-001	035990-001	035990-001
34	Cartridge	029967-005	029967-005	029967-005
	Cartridge	029967-002	029967-002	029967-002
35	Retaining Nut, Cartridge	A020957	A020957	A020957
36	Waterline, Valve to Bubbler	035504-013-SP	035504-013-SP	035504-013-SP
37	Shelf	035078-002	035078-002	035078-002
38	Drier	034343-003	034343-003	N/A
39	Activation Shelf	035092-110	035092-110	035092-110
40	Waste Tee	N/A	N/A	A020968
41	Waste Arm Assy.	N/A	N/A	026980-004
42	Waste Elbow	N/A	N/A	A020967
43	Waste Extension Tube	N/A	N/A	036010-016
Parts Not Shown				
	Strainer, In-Line	033264-003	033264-003	033264-003
	Supply Tube Extension	N/A	N/A	032312-001
	Screw, T15	031875-003	031875-003	031875-003
	Insert, Nameplate OASIS	020850	020850	020850

Wiring Diagram: P8AC, PG8AC
P8ACSL, PG8ACSL

- H3 Series



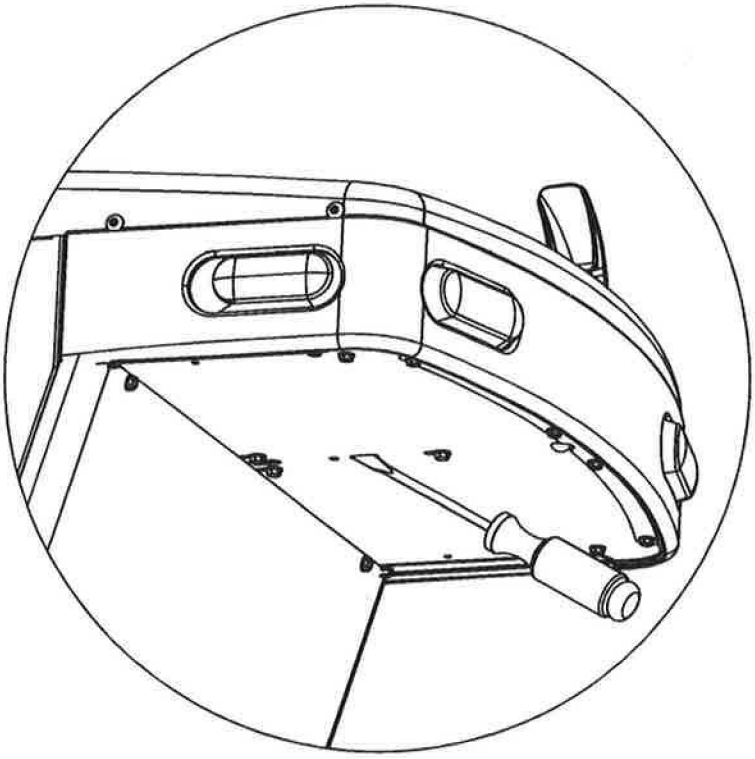
- D3 Series



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To adjust stream height, insert a 1/8" Flat blade screwdriver into the slotted hole as shown. The screwdriver will engage the stream height adjuster in the cartridge plunger. Turn clockwise to increase stream height, or ccw to reduce stream height.

032386-048 Rev. A

OWNER'S COPY

5 YEAR
WATER COOLER LIMITED WARRANTY

FIRST YEAR:

The Manufacturer promises the original purchaser (user) to repair, give credit for, or, at the Manufacturer's option, to replace any part of this water cooler which proves to be inoperative due to a defect in material or workmanship under normal use, for a period of one year from the date of original installation or for a period of eighteen (18) months after date of shipment from the factory, whichever occurs first. During the one year warranty, the Manufacturer will either replace, credit, or repair the water cooler through its approved service center, and provide labor and parts necessary to correct such inoperative condition at no charge, if it has been installed and operated in accordance with the written instructions furnished with the water cooler.

The cost of labor required to disconnect and reconnect plumbing and electrical connections will be the responsibility of the user (owner).

SECOND THROUGH FIFTH YEAR:

The Manufacturer promises within the second through fifth year to repair, give credit for (Pro-rated Value Based on the Remaining Warranty Period), or at its option, to replace any part of the sealed refrigeration system (compressor, condenser, evaporator, and interconnecting refrigerant lines) which prove to be inoperative due to a defect in material or workmanship. The Manufacturer will provide the labor at no charge through its approved service center, to install such parts of the sealed refrigeration system.

The cost of labor to diagnose a sealed refrigeration system failure or the cost of labor required to disconnect and reconnect plumbing and electrical connections, will be the responsibility of the user (owner).

GENERAL PROVISIONS AND EXCLUSIONS:

This warranty applies only within the Continental Limits of the United States of America and Canada.

This warranty does not apply and no agreement, either expressed or implied, shall be applicable if the affixed serial number is removed, defaced or obliterated.

This warranty does not apply if service of the sealed refrigeration system or parts furnished as original equipment by the Manufacturer are not obtained from an approved service center or the factory.

This warranty does not apply to any water components that become inoperative due to liming conditions.

This warranty does not apply to any water cooler or components that become inoperable because of a failure to satisfy standards or regulations adopted by any government or agency thereof subsequent to the date of shipment from the factory.

This warranty does not cover performance, failure or damages of any part resulting from external causes such as alterations, abuse, misuse, misapplication, corrosion or acts of God.

This warranty does not apply to non-refrigerated water fountains, cuspidors, dispensers and accessories, nor the following models: VP13FSN; ER2-RR; TPK; ER2; R1P. These products and models have individual warranties.

WARNING

The warranty and the Underwriters' Laboratory listing for this machine are automatically voided if this machine is altered, modified, or combined with any other machine or device. Alteration or modification of this machine may cause serious flooding and/or hazardous electrical shock or fire.

Except as set forth herein, the Manufacturer makes no other warranty, guarantee or agreement expressed, implied or statutory, including any implied warranty of merchantability or fitness for a particular purpose.

The foregoing is in lieu of all other agreements expressed, implied or statutory and all other obligations or liabilities of the Manufacturer. The Manufacturer does not assume or authorize any person to assume any obligations of liability in connection with this product. In no event will the Manufacturer be liable for special or consequential damages or for any delay in the performance of this agreement due to causes beyond their control.

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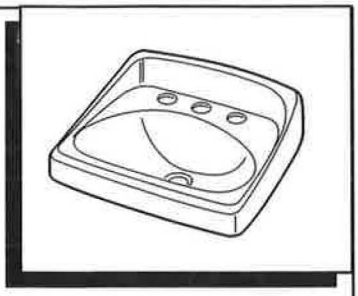
020036 Rev R

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L-1

American Standard **INSTALLATION INSTRUCTIONS**

Wall Hung Bathroom Sink



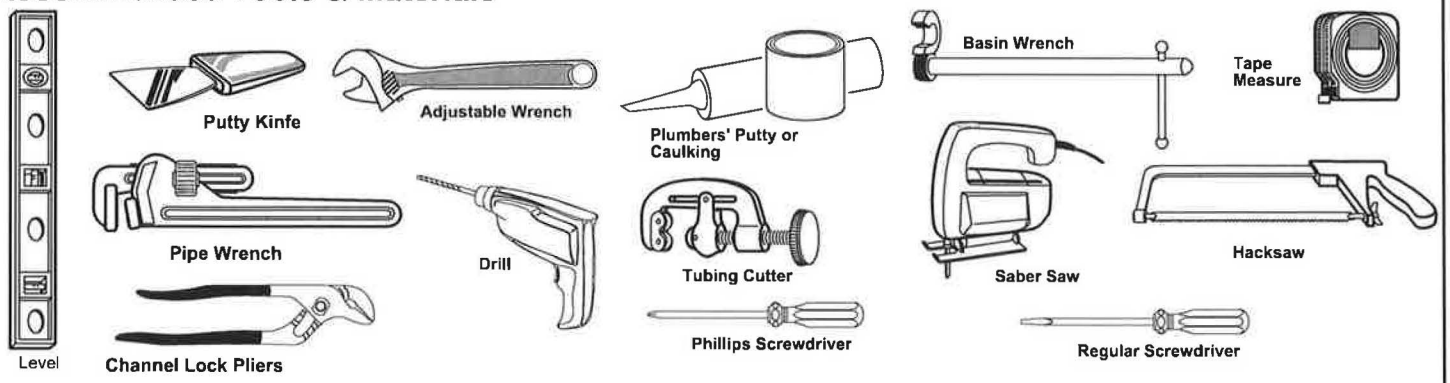
*NOTE: For installation of models using concealed or exposed arms, follow instruction provided by arms manufacturer.

Introduction: Thank you for selecting our products...products which have been the benchmarks of fine quality for years. To help insure that the installation process will proceed smoothly, please read these instructions carefully before you begin. Also, review the recommended tools and materials list; carefully unpack and examine your new plumbing fixture.

⚠ **CAUTION: PRODUCT IS FRAGILE. TO AVOID BREAKAGE AND POSSIBLE INJURY HANDLE WITH CARE!**

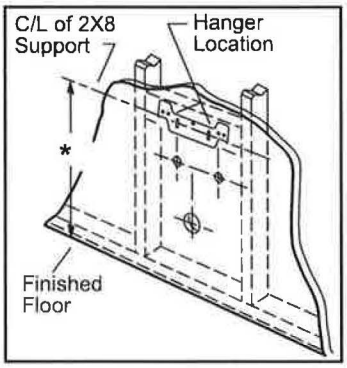
NOTE: *Pictures may not exactly define contour of china and components.*

Recommended Tools & Materials



1 Provide suitable reinforcement behind finished wall for lavatory hanger mounting screws. *Determine horizontal center line location of support from the table listed in Step 2. (Make sure support bottom extends to lavatory back wall bottom.)

NOTE: If replacing an existing sink be certain to shut off water supply before removing old sink.



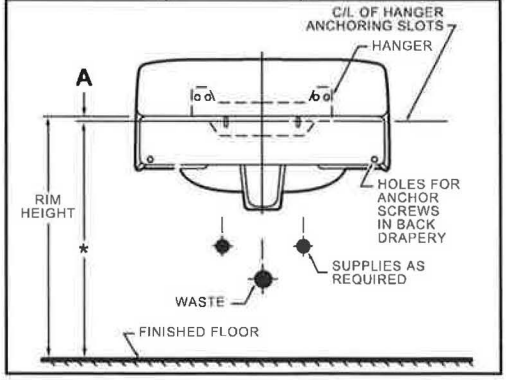
2 Determine the desired rim height (for example 32") then select from the Table at right the height of the hanger mounting bolts centerline

EXAMPLE:

For Lucerne:
32"-1"=31"
For Ledgewood:
32"+2-7/8"=34-7/8"

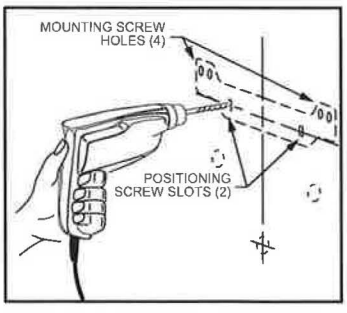
TABLE

Part #	Model	Distance "A"
0124	Comrade	- 2-1/2" (64mm)
0321	Declyn	- 2-3/4" (70mm)
0355/0356	Lucerne	- 1" (25mm)
0372/0373	Penlyn	- 1/8" (3mm)
4300	Ledgewood	+ 2-7/8" (73mm)
4867/4869	Regalyn	+ 2-3/4" (70mm)
5300	Ledgemere	+ 2-1/2" (64mm)



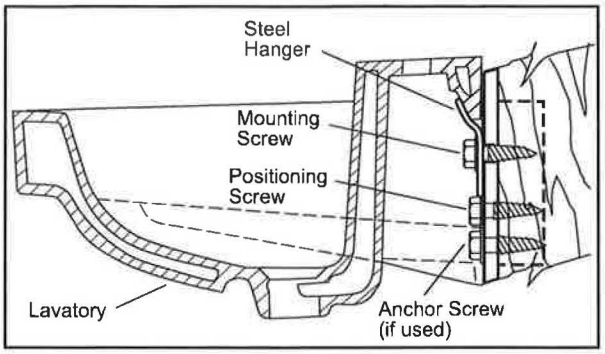
3 Position hanger according to Step 2, making sure its center is aligned with the waste hole centerline. Mark the hanger screw locations through its mounting holes.

4 Drill pilot holes in positioning screw slots of hanger. (Note: Some models are supplied with anchor screws, or steel hangers for lavatory installations. Other models are not provided with mounting hardware which can be purchased at local hardware outlets. Lavator-ies with bottom anchor screw holes should be secured with anchor screws in addition to hangers.

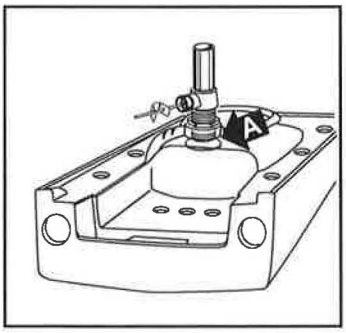


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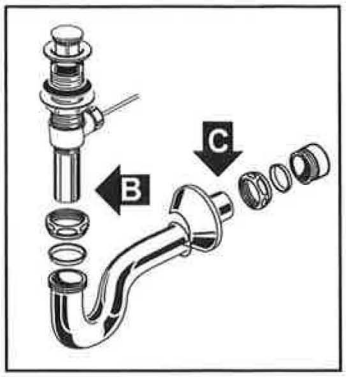
5 Affix hanger to wall (hand tighten only). Mount lavatory for positioning, level the deck, and mark bottom anchor screw holes (if applicable). Remove lavatory, tighten the hanger positioning screws and drill pilot holes for anchor screws and 4 mounting screws. Install and tighten the mounting screws.



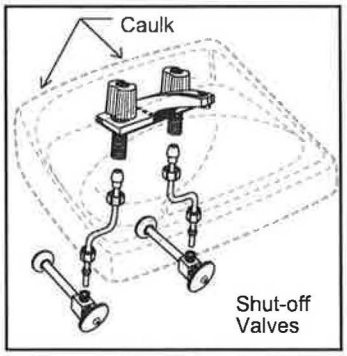
6 Following manufacturers instructions, install faucet and drain assembly. (Not included). Be certain to apply a bead of sealing putty on the underside of the drain (Part "A") in order to ensure a watertight seal between the lavatory and drain. Remove excess putty after installing drain on lavatory.



7 Return the fitted lavatory to the installed position. Connect trap to drain assembly hand tight to check alignment. It may be necessary to cut off part of the tailpiece (area "B") or part of the horizontal leg of the trap (area "C").



8 Secure lavatory on hanger as shown in **5**. Insert and tighten anchor screws if applicable. Connect hot and cold supply lines to the shut-off valves. Tighten trap joints for watertight assembly. Apply a bead of caulk around the edge which contacts the wall as shown.



American Standard Ideal Standard Inersa Standard Sadosa Standard Cedelca Saniwares

AMERICAN STANDARD ONE-YEAR LIMITED WARRANTY

If inspection of this American Standard plumbing product, within one year after its initial installation, confirms that it is defective in materials or workmanship, American Standard will repair or, at its option, exchange the product for a similar model.

This limited warranty **does not apply** to local building code compliance; since local building codes vary considerably, the purchaser of this product should check with a local building or plumbing contractor to insure local code compliance before installation.

This warranty **shall be void** if the product has been moved from its initial place of installation; if it has been subjected to faulty maintenance, abuse, misuse, accident or other damage; if it was not installed in accordance with American Standard's instructions; or if it has been modified in a manner inconsistent with the product as shipped by American Standard.

American Standard's option to repair or exchange the product under this warranty does not cover any labor or other costs of removal or installation, **nor shall American Standard be responsible for any other incidental or consequential damages attributable to a product defect or to the repair or exchange of a defective product, all of which are expressly excluded from this warranty.** (Some states or provinces do not allow the exclusion or limitation of implied warranties, so this exclusion may not apply to you.)

This warranty gives you specific legal rights. You may have other statutory rights that vary from state to state or from province to province, in which case this warranty does not affect such statutory rights.

For service under this warranty, it is suggested that a claim be made through the contractor or dealer from or through whom the product was purchased, or that a service request (including a description of the product model and of the defect) be sent to the following address:

In the United States:
American Standard, Inc.
One Centennial Ave.
Piscataway, New Jersey 08855
Attention: Director of Consumer Affairs

Toll Free: (800) 442-1902

In Canada:
American Standard, Inc.
2480 Stanfield Rd.,
Mississauga, Ontario
Canada L4Y 1S2
Toll Free: (800) 387-0369

In Mexico:
Customer Service Manager
American Standard, Inc.
Via Morelos #330
Col. Santa Clara
Ecatepec 55540 Edo. Mexico

T&S RELIABILITY BUILT IN

Limited One Year Warranty

T&S warrants to the original purchaser (other than for purposes of resale) that such product is free from defects in material and workmanship for a period of one (1) year from the dale of purchase. During this one-year warranty period, if the product is found to be defective, T&S shall, at its options, repair and/or replace it. To obtain warranty service, products must be returned to...

T&S Brass and Bronze Works, Inc.
Attn: Warranty Repair Department
2 Saddleback Cove
Travelers Rest, SC 29690

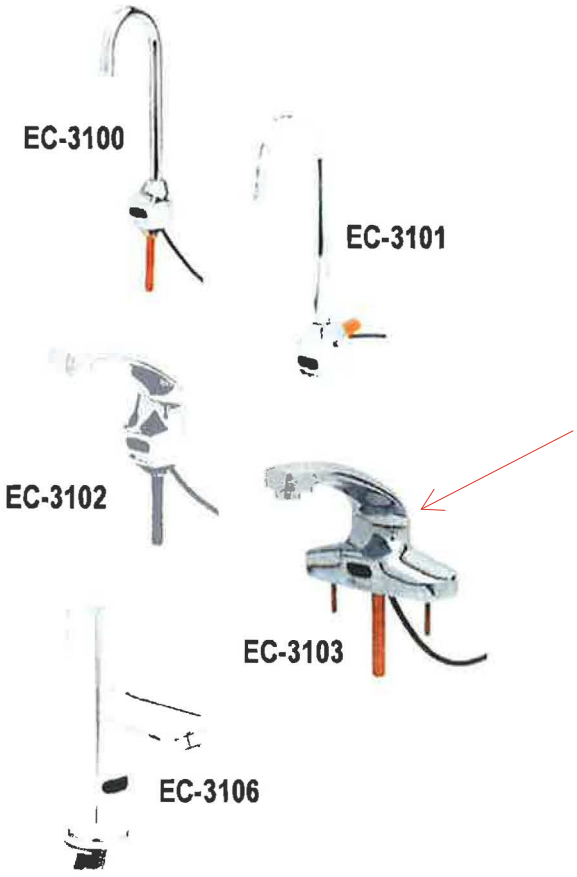
Shipping, freight, insurance, and other transportation charges of the product to T&S and the return of repaired or replaced product to the purchaser are the responsibility of the purchaser. Repair and/or replacement shall be made within a reasonable time after receipt by T&S of the returned product. This warranty does not cover items which have received secondary finishing or have been altered or modified after purchase, or for defects caused by physical abuse to or misuse of the product, or shipment of the products.

Any express warranty not provided herein, and any remedy for Breach of Contract which might arise, is hereby excluded and disclaimed. Any implied warranties of merchantability or fitness for a particular purpose are limited to one year in duration. Under no circumstances shall T&S be liable for loss of use or any special consequential costs, expenses or damages.

Some states do not allow limitations on how long and implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. Specific rights under this warranty and other rights vary from state to state.

P/N: 098-016361-45 Rev.6
Date: 04-22-14
Drawn: TEH
Checked: GEF 05-07-14
Approved: JHB 05-07-14

Installation and Maintenance Instructions



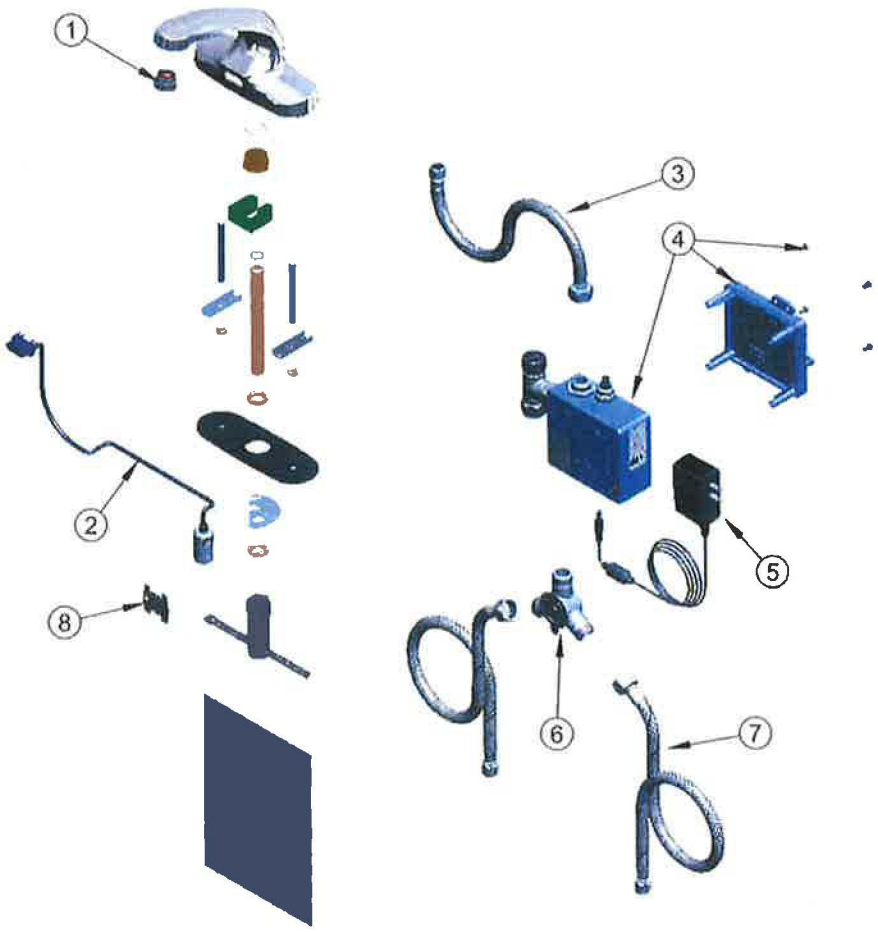
EC-3100 Series

ChekPoint

ELECTRONIC FAUCET DECK-MOUNT & WALL-MOUNT GOOSENECK, SPOUT & 4" CENTERSET SENSOR OPERATED

Exploded View

EC-3103



Part Number Guide

EC-3100 & EC-3101 Electronic Faucets

1	Aerator, Vandal Resistant	B-0199-06
2	Adapter for Non-Splash Aerator	044A
3	O-Ring	006575-45
4	Angled Sensor w/ Cable	017195-45
5	Inlet Hose for use with EC-3100	
	1/2" NPSM-F x 1/4" NPSM-F x 18" Long	016297-45
5	Inlet Hose for use with EC-3101	
	1/2" NPSM-F x 3/8" NPSM-F x 30" Long	016325-45
6	Electronic Module	016647-45
7	A/C Transformer	5EF-0002
8	Manual Mixing Valve	5EF-0006
9	Supply Hose, 9/16-24 UN Female x 1/2" NPSM	5EF-0005
10	Vandal Resistant Key	Q015425-45

EC-3102 & EC-3103 Electronic Faucets

1	Aerator, Vandal Resistant, 2.2 GPM	016355-45
2	Angled Sensor w/ Cable	017195-45
3	Inlet Hose, Faucet, 1/2" NPSM-F x 1/4" NPSM-F	016297-45
4	Electronic Module	016647-45
5	A/C Transformer	5EF-0002
6	Manual Mixing Valve	5EF-0006
7	Supply Hose, 9/16-24 UN Female x 1/2" NPSM	5EF-0005
8	Vandal Resistant Key	Q015425-45

EC-3106 Electronic Faucet

1	ChekPoint Module (Blue) with Bypass Tee	017493-45
2	A/C Transformer	5EF-0002
3	Manual Mixing Valve	5EF-0006
4	Supply Hose, 9/16-24 UN Female x 1/2" NPSM	5EF-0005
5	VR Aerator with Key	B-0199-09
6	Vandal Resistant Key	Q015425-45

General Instructions

Important:

· ALL ELECTRICAL WIRING IS TO BE INSTALLED IN ACCORDANCE WITH NATIONAL/LOCAL CODES AND REGULATIONS.

· ALL PLUMBING IS TO BE INSTALLED IN ACCORDANCE WITH APPLICABLE CODES AND REGULATIONS.

· USE APPROPRIATE PRECAUTIONS WHILE CONNECTING TRANSFORMER TO 120 VAC POWER SOURCE.

· DO NOT PLUG TRANSFORMER INTO POWER SOURCE (RECEPTACLE) UNTIL ALL WIRING IS COMPLETED.

· FLUSH ALL WATER LINES UNTIL WATER IS CLEAR BEFORE CONNECTING FAUCET TO SUPPLY STOPS.

Tools Required For Installation of Faucets

· 8" (200mm) adjustable wrench

· 1/8" hex key wrench

· Basin wrench

· Slotted screwdriver, 3/16"

· Phillips head screwdriver, #1

· Pliers

Prior to Installation:

Prior to installing the T&S ChekPoint Series Faucet, install the items listed on next column. Also, refer to Figure 1.

· Provide electrical receptacle within approximately 6' from sink for plug-in transformer — 120 VAC, 2 amp service for each plug-in transformer used.

· Scrub or wash-up sink

· Drain line

· Hot and cold water supply lines

Mixing Valve

When installing the faucet with the mixing valve the Installation Instructions MUST be followed.

Figure 1

Deck-Mount





Wall-Mount

General Instructions

Installation of ChekPoint Faucets

The T&S ChekPoint Sensor Operated Faucet is a pre-tempered faucet. A mixing valve (supplied) must be used in conjunction with the faucet. Water temperature can be controlled by adjusting the mixing valve.

Install Faucet Assembly (Figures 2A, 2B, 2C and 2D)

TO MOUNT ON A SURFACE UP TO 1" (25mm) THICK

Insert faucet cable and spout shank through base gasket and then through the mounting hole of scrub or wash-up sink. Secure using lockwasher and nut supplied.

Note: T&S Brass does NOT supply hardware necessary for mounting the faucet on surfaces thicker than 1" (25 mm) thick.



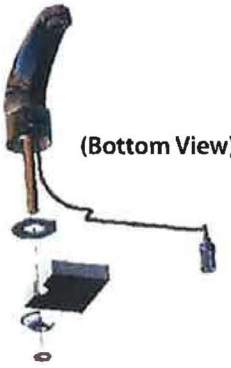
Figure 2A
Wall-Mount
(Front View)



(Back View)



Figure 2B
Single Hole Deck-Mount
(Front View)



(Bottom View)



(Front View)



Figure 2C
4" Deck-Mount
(Bottom View)



Figure 2D
EC-3106

General Instructions

OPTIONAL ANTI-ROTATION FEATURE

Wall-Mount Model: EC-3101

(Figure 2D)

Note: The anti-rotation feature uses a set screw to anchor the faucet in the vertical position and is intended for use ONLY on stainless steel sinks.

Use the mounting hole diagram or faucet base gasket as a template by placing it in position over the faucet mounting hole. Mark the stainless steel mounting surface at the center of the small notch at the bottom of the base gasket. Drill a 9/32" (7.14 mm) diameter hole through the stainless steel mounting surface. Extend the 1/4-20 set screw installed in the back of the faucet body by unscrewing it (counterclockwise) with a 1/8" hex key wrench. Unscrew it far enough that it protrudes past the base gasket and into the 9/32" drilled hole. Assemble the washer and nut to secure the faucet in place

EC-3101 MOUNTING HOLE DIAGRAM

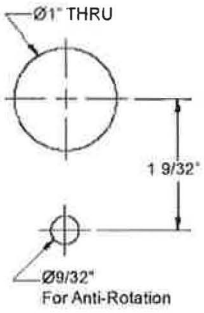
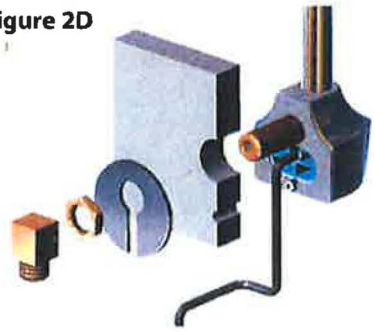


Figure 2D



OPTIONAL ANTI-ROTATION FEATURE

Deck-Mount Models: EC-3100 & EC-3102

(Figure 2E)

Note: The anti-rotation feature uses a pin to anchor the faucet in position and is intended for use ONLY on stainless steel sinks.

Use the mounting hole diagram or the faucet base gasket as a template by placing it in position over the faucet mounting hole. Mark the stainless steel mounting surface at the center of the small hole at the bottom of the base gasket. Drill a 5/32" (4 mm) diameter hole through the stainless steel mounting surface. Install the faucet aligning the pin with the small hole. Assemble the washer and nut to secure the faucet in place.

Note: The pin can be removed with pliers if not needed.

EC-3100 & EC-3102 MOUNTING HOLE DIAGRAM

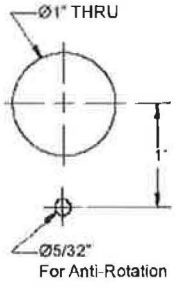


Figure 2E



General Instructions

Install Mixing Valve Assembly (Figure 3)
(If supplied separately)

Install mixing valve into fitting on control module as shown in Figure 3. Tighten fitting snugly **BUT DO NOT OVERTIGHTEN.** No thread sealant is necessary.

Important: Orient mixing valve as shown in Figure 3.

Figure 3



Mount Control Module to Wall

Install the control module in an appropriate location. When installed all cables and hoses should have some slack. Mount control module to wall using mounting screws and plastic anchors (not included). It is important to have the control box mounted securely before any further connections are made.

Figure 4



FOR HOT AND COLD WATER SUPPLY APPLICATIONS

Supply stops must be furnished by installer or purchased from T&S. Flush supply lines of any debris. Tighten compression fittings securely on supply lines.

Sensor Cable and Supply Line Connections

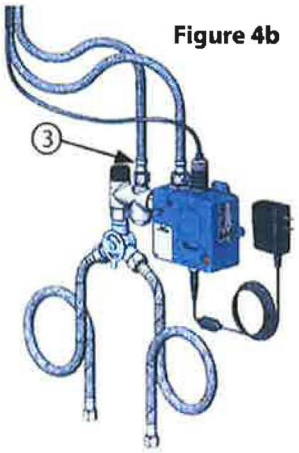
(Figures 4, 4a and 4b)

Route the sensor cable from the spout to the top of the control module. Align the (2) white arrows (one on the male side and one on the female side) and plug the mating connectors together. Drop the chrome sleeve down over the sensor plug and screw to tighten (fig. 4a ①). Secure the supply line from the spout to the fitting on top of the controller (do not overtighten). (Fig. 4a ②) For the EC-3106, also secure the second supply line to the manual by-pass on the manifold next to the controller (Fig. 4b ③). Tighten the compression fitting securely on the supply lines but do not over tighten.

Figure 4a



Figure 4b



General Instructions

TRANSFORMER OPTION (Figure 5)

Figure 5

Important: DO NOT plug Transformer into receptacle until all wiring has been completed.

This type of Transformer is designed to be plugged into a 120 VAC wall receptacle. The Transformer is supplied with a 6 foot Cable. Remove the rubber plug from the transformer connector on the control module. Plug the transformer cable into the transformer connector.



plug-in transformer

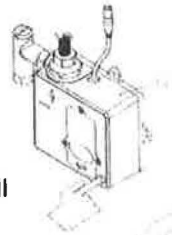
BATTERY OPTION

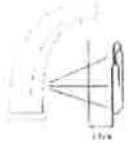
Note: Should you choose to run your sensor faucet on battery power, it will require (4) AA alkaline batteries.

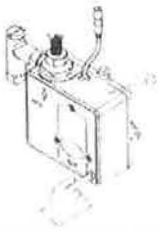
1. If the AC adapter is plugged in, unplug it from its power source and the control module.
2. With the help of a phillips head screwdriver, remove the battery cover's three (3) fasteners and pull cover away from the control box.
3. Replace old batteries if needed.
4. Install the new AA batteries, making sure that the + and - ends are facing the correct direction. Return the battery cover to its spot and tighten fasteners.
5. Re-set the sensor range if needed (see sensor range setup).

Note: For the Hydro Generator (EC-HYDROGEN) power option, refer to the instruction manual in the EC-HYDROGEN kit ordered separately. For hard wiring and hard wire ganging (EC-HARDWIRE) and easy-wire (EC-EASYWIRE) ganging power options , refer to the instruction manual in each respective kit when ordered separately.

SENSOR RANGE SETUP







1. AF-serial sensor range can only be set by using the on/off button situated on the bottom right corner of the control box. Do not attempt to open control box.
2. Push and hold the on/off button for 5-7 seconds. Water flow will stop and the red LED light inside the electronic eye will blink on. Release the on/off button. The LED should turn itself off, signaling that the faucet is ready for setup.
3. Place and hold your hand at the desired sensor distance. The LED will turn "ON".
4. Use the other hand to press the on/off button. The LED will flash 5 times to save the new sensor range setting.
5. The default sensor range is 5-1/2" (14cm). Sensing distance is adjustable from 3/4" (2cm) to 5-1/2" (14cm).

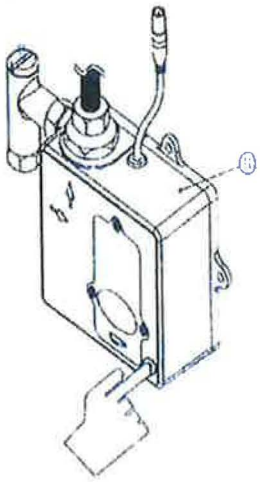
General Instructions

OPERATION

1. Place hands under spout. Water will flow for as long as the user's hands remain within sensor range and will shut off after 15 seconds (time adjustable).
2. Keep electronic eye cover clean.
3. Red flashing in the electronic eye indication low batteries.
(Replacement batteries: Alkaline AA.)
4. Solid red light in the electronic eye and no water flow indicated batteries are dead.
5. When used in conjunction with the optional AC adapter, the faucet will automatically switch to AC power and conserve its battery power.

Fresh alkaline batteries should last 450,000 on/off cycles.





Running Time Range:	15 seconds - 20 minutes (6 presets selectable)
Response Time:	0.3 seconds
Sensing Range:	3/4" to 5-1/2" (2-14 cm) from sensor
Power Source:	AC and/or DC
Low Battery Indicator:	Red LED on

(See next page for EC-3106 Manual/Auto Operation.)

CARE AND CLEANING OF CHROME AND SPECIAL FINISHES

DO NOT use abrasive or chemical cleaners (including chlorine bleach) to clean faucets as they may dull the luster and attack the chrome or special decorative finishes. Use ONLY soap and water, then wipe dry with clean cloth or towel. While cleaning the bathroom tile, the faucet should be protected from any splattering of cleaner. Acids and cleaning fluids will discolor or remove chrome plating. Do not use abrasive or chemical cleaners on the sensor lens as this will damage it and affect operation.

General Instructions

FEATURES

➲AUTO-ADJUSTMENT SCAN PERIOD

- Two scan periods of 0.4 seconds or 0.7 seconds are automatically adjusted. The scan period at 0.4 seconds occurs while the faucet is at standby. The scan period will change to 0.7 seconds when the faucet detects an object in the front of the sensor.

➲WATER FLOW CONTROL ADJUSTMENTS

- The ChekPoint controller offers a selection of pre-set flow control adjustments. These selections are made by configuring a bank of six switches, SW(1) to SW(6), according to the tables below. The flow control switches are located inside the ChekPoint control module in a black box next to the battery compartment. To access the switches, remove the (4) screws and back cover of the control module.

➲AUTO TIME-OUT ADJUSTMENT (SWITCHES 1-3)

- The ChekPoint controller provides six periods to select from for shutting off the water when the object is left in front of the electronic eye. The time periods to select from are: 15 seconds, 30 seconds, 45 seconds, 60 seconds, 3 minutes and 20 minutes. The default setting is 15 seconds.

Note: The chart below indicates the switch positions required for each auto time-out mode.

Auto Time Out Selection			
PERIOD	**SW(1)**	**SW(2)**	**SW(3)**
15 seconds	OFF	OFF	OFF
30 seconds	OFF	OFF	ON
45 seconds	OFF	ON	OFF
60 seconds	OFF	ON	ON
3 minutes	ON	OFF	OFF
20 minutes	ON	OFF	ON

Water Shut Off Delay Selection		
PERIOD	**SW(5)**	**SW(6)**
1 seconds	OFF	OFF
10 seconds	OFF	ON
15 seconds	ON	OFF
30 seconds	ON	ON

Auto Flush Mode SW (4)
ON - (Enable)
OFF - (Disable)

➲WATER SHUT-OFF DELAY ADJUSTMENT (SWITCHES 5 & 6)

- The ChekPoint controller provides four periods to select from for shutting off the water when the object is removed from in front of the electronic eye. The time periods to select from are: 1 second, 10 seconds, 15 seconds, and 30 second. The default setting is 1 second.

➲AUTO-FLUSH (SWITCH 4)

- The ChekPoint controller offers the option to select the Auto Flush mode in switch 4 position. When enabled, the controller will flush the ChekPoint faucet every 12 hours for 25-30 seconds when the faucet is not used. Default setting from the factory is in the "off" position.

General Instructions

➲LOW BATTERY DETECTION

- A red flashing light in the electronic eye indicates low batteries.
- A solid red light in the electronic eye and no water flow indicates the batteries are dead.
- The user should change new batteries immediately.

➲POWER SAVING

- If the electronic eye (sensor) has not detected object motion within 30 minutes, the controller will enter its lowest scan period of 1.4 seconds
- When object motion is detected, the controller will change the scan period from 0.4 seconds to 0.7 seconds and change back to 0.4 seconds when the object removed.

➲ANTI-INTEFERENCE SYSTEM

- Sunlight or other types of lighting may interfere with the distance sensing range. In this case, the controller will compensate the sensing distance to a safe range temporarily. The controller will adjust the distance to the normal range when no interference is detected.

General Instructions

Q&A

Q: Can I operate the faucet manually, without using the electronic eye?
A: Yes. Press the on/off button and water will start flowing. To turn water off, press on/off button again. If you forget to turn the water off, the faucet will automatically turn it off after 60 seconds.

Q: What is the optimal sensing distance?
A: About 2" from sensor.

Q: Does the electronic eye require special maintenance?
A: In order for the sensor to function, the electronic eye must be clean. Use only mild soaps and water. Wipe with a soft cloth.

Q: Why doesn't the water shut itself off after I have moved my hands away from the electronic eye?
A: Sensor range could be too long. User may have to adjust sensor range.

Q: No water will come out of the faucet and the red LED stays on. What is the problem?
A: Replace the batteries.



016647-45



5EF-0002



5EF-0006



017195-45

General Instructions

TROUBLESHOOTING GUIDE

PROBLEM	POSSIBLE CAUSE/SOLUTION
No Water When Activated Red LED in electronic eye	**If red LED stays on or is flashing:** 1. Replace batteries and/or make sure transformer is plugged in 2. If appropriate action from no. 1 does not correct problem: • Sensor range too long/picking up sink. Reduce range. • Sensor is faulty; replace sensor module.
Very Low Flow or Slow Dribble	1. Check supply stop(s); open if closed. 2. Debris in solenoid filter; remove, clean and reinstall. 3. Debris in aerator or spray head; remove, clean and reinstall
False Triggering (Unit goes on by itself)	1. Range too long; decrease detection zone. Check surroundings for factors that can contribute to the range; for example, bright lights, highly reflective surfaces, sunlight, etc.
Continues to Run (Even after power to faucet has been disconnected)	1. Debris in solenoid valve, won't close properly. 2. Control module is faulty; replace control module.

RELIABILITY BUILT IN™

EC-HARDWIRE
Installation Instructions

1. The EC-HARDWIRE kit may be used to hardwire and gang up to 8 of any of the ChekPoint models with the exception of the EC-3119A and EC-3119B. The kit consists of the following components assembled on the mounting plate as shown (Figure 1):
   (1) 4-11/16" square mounting plate for assembly to a 2-1/8" deep conduit box (box not included)
   (1) Electronic AC Transformer - Input 100-240 VAC, 47-63HZ
   (1) Terminal block for connections of up to 8 ChekPoint faucet controller connections

2. All ChekPoint models (except the EC-3119A and EC-3119B) come with control modules ready for hardwire installation by utilizing the 2 terminals labeled '+' and '-' on the back of the controller (Figure 2).

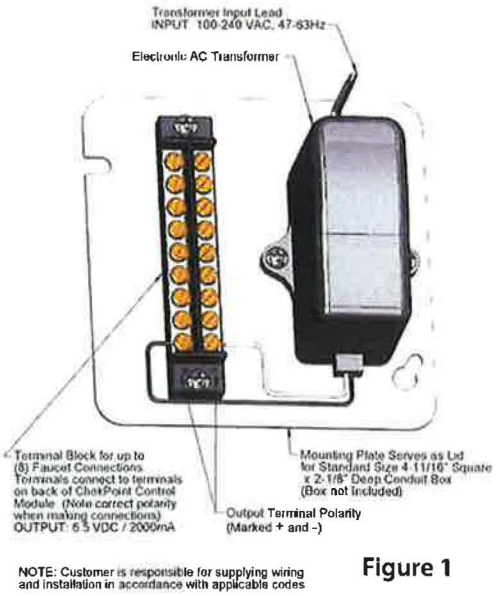
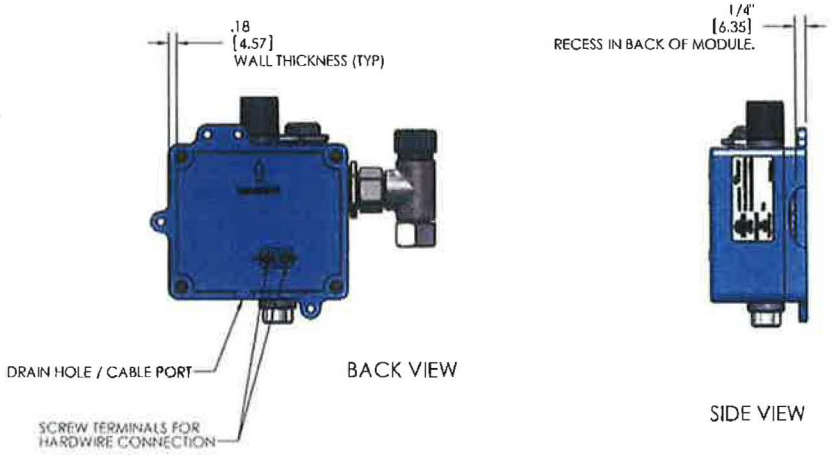


Figure 1

Figure 2



3. Each ChekPoint controller is to be wired to one location on the terminal block included in the EC-HARDWIRE kit with the positive terminal on the back of the controller wired to the positive side of the terminal block and the same process for negative terminals. Up to 8 ChekPoint faucet controllers can be wired this way. Be sure all connections are wired with the correct polarity - positive to positive and negative to negative. Wiring is supplied by the customer. It is recommended that the distance between the ChekPoint controllers and EC-HARDWIRE kit be no more than 50 ft. using 24 AWG minimum wire.

4. The power from the facility is to be connected to the input leads on the transformer. Wiring is supplied by the customer.

5. Once all wiring connections are complete, the mounting plate with all components can be assembled to an appropriate 4-11/16" x 2-1/8" deep conduit box (not supplied) at the facility with the plate positioned so the components are inside the conduit box.

6. Any faucet controller not wired properly will result in the faucet not operating.

SENSOR RANGE SETUP

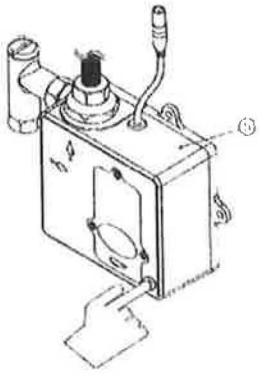
1. AF-serial sensor range can only be set by using the on/off button situated on the bottom right corner of the control box. Do not attempt to open control box.

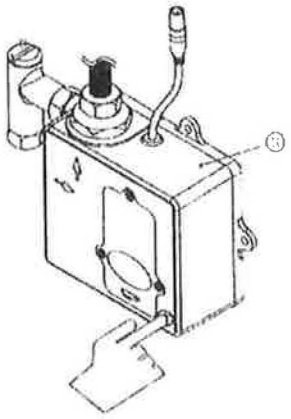
2. Push and hold the on/off button for 5-7 seconds. Water flow will stop and the red LED light inside the electronic eye will blink on. Release the on/off button. The LED should turn itself off, signaling that the faucet is ready for setup.

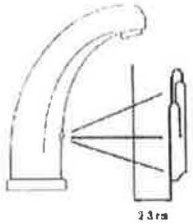
3. Place and hold your hand at the desired sensor distance. The LED will turn "ON".

4. Use the other hand to press the on/off button. The LED will flash 5 times to save the new sensor range setting.

5. The default sensor range is 5-1/2" (14cm). Sensing distance is adjustable from 3/4" (2cm) to 5-1/2" (14cm).







Limited One Year Warranty

T&S warrants to the original purchaser (other than for purposes of resale) that such product is free from defects in material and workmanship for a period of one (1) year from the date of purchase. During this one-year warranty period, if the product is found to be defective, T&S shall, at its options, repair and/or replace it. To obtain warranty service, products must be returned to...

T&S Brass and Bronze Works, Inc.
Attn: Warranty Repair Department
2 Saddleback Cove
Travelers Rest, SC 29690

Shipping, freight, insurance, and other transportation charges of the product to T&S and the return of repaired or replaced product to the purchaser are the responsibility of the purchaser. Repair and/or replacement shall be made within a reasonable time after receipt by T&S of the returned product. This warranty does not cover items which have received secondary finishing or have been altered or modified after purchase, or for defects caused by physical abuse to or misuse of the product, or shipment of the products.

Any express warranty not provided herein, and any remedy for Breach of Contract which might arise, is hereby excluded and disclaimed. Any implied warranties of merchantability or fitness for a particular purpose are limited to one year in duration. Under no circumstances shall T&S be liable for loss of use or any special consequential costs, expenses or damages.

Some states do not allow limitations on how long and implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. Specific rights under this warranty and other rights vary from state to state.

T&S Brass and Bronze Works, Inc. · 2 Saddleback Cove · P.O. Box 1088 · Travelers Rest, SC 29690
www.tsbrass.com · E-mail: tsbrass@tsbrass.com · Phone (800) 476-4103 · Fax (800) 868-0084

West Coast Sales and Distribution · 4596 Ish Drive · Unit 220
Simi Valley, CA 93063 · Phone (800) 423-0150

098-017997-45 Rev. 0 6-10
Checked GEF 06-30-10
Approved JHB 07-01-10

RELATED T&S BRASS PRODUCT LINE

T&S BRASS AND BRONZE WORKS, INC.

A firm commitment to application-engineered plumbing products

2 Saddleback Cove, P.O. Box 1088,
Travelers Rest, SC 29690
Phone: (864) 834-4102
Fax: (864) 834-3518
E-mail: tsbrass@tsbrass.com

T & S Brass-Europe
'De Veenhoeve'
Oude Nieuwveenseweg 84
2441 CW Nieuwveen
The Netherlands



LEONARD®
WATER TEMPERATURE CONTROLS

Bulletin G-170A
October 2020

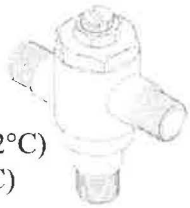
INSTALLATION & SERVICE INSTRUCTIONS MODEL 170A-LF

170A-LF 3/8" COMPRESSION

ASSE 1070 CERTIFIED

WARNING: This product can expose you to chemicals including lead, which is known to the State of California to cause cancer. For more information, go to

NOTE: DO NOT USE THREAD SEALANT ON COMPRESSION CONNECTIONS



PERFORMANCE:

- Maximum Pressure: 125 PSI (8.6 BAR)
- Maximum Hot water temperature: 180°F (82°C)
- Hot water inlet temperature range: 120-180°F (49-82°C)
- Cold water inlet temperature range: 33-80°F (1-27°C)
- Outlet temperature range: 95-120°F (35-49°C)
- Minimum flow certified to ASSE 1070: 0.25 GPM
- Maximum flow: 4 GPM

⚠ WARNING!! ⚠

WATER TEMPERATURES IN EXCESS OF 110°F (43°C) MAY CAUSE SCALDING, SEVERE INJURY, OR DEATH!!

IMPORTANT!

This thermostatic water mixing valves is NOT pre-set and can be adjusted to deliver water at temperatures exceeding 110°F (43°C). After installation, the installer must check the outlet water temperature and adjust the temperature setting to ensure delivery of a safe water temperature not exceeding 110°F (43°C).

Periodic inspection and maintenance is required

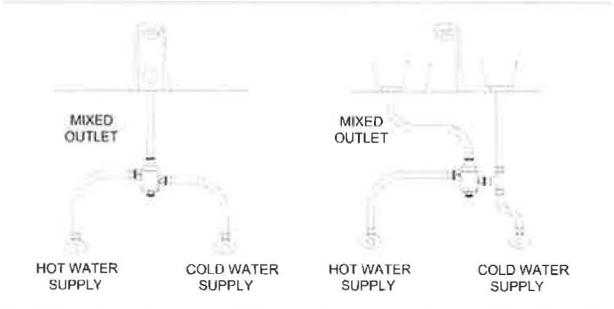
Regular inspection of the valve and the outlet temperature are required. Cleaning at a minimum of annually will help assure proper function of the mixing valve. Frequency of cleaning and inspection of the outlet temperature depends upon local water quality conditions.

1. Valve should be installed where it can be easily cleaned, adjusted or repaired. Leonard recommends that shutoffs are installed on the inlets to the mixing valve.
2. Inlets are furnished with 3/8" compression connections. If using copper tubing, do NOT extend tubing more than 3/16" beyond the compression ferrule. **DO NOT use thread sealant.**
3. Tighten compression nuts by hand, then tighten only 1/4 turn, overtightening will cause leaks and possibly crush checks.
4. Flush the hot and cold water lines before installing mixing valve.
5. "H" and "C" are clearly marked on the inlets, install hot water line to inlet marked "H" and cold water line to the inlet marked "C". Valve can be installed in any position.
6. Valve is NOT pre-set and must be set after installation. Run water for at least 1-2 minutes to allow water to stabilize.
7. Loosen locknut on stem, turn stem (screwdriver adjustment) counter-clockwise (stem coming out of valve) for hotter and clockwise (stem going into valve) for colder outlet temperature. Do not force the valve to below 90° F.
8. Tighten down the locknut to prevent unauthorized adjustment.
9. Verify the outlet temperature is set to the correct temperature.

TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
Cannot reach desired outlet temperature	Valve is full of debris or Inlets supplies are reversed	Flush valve with water Pipe hot to hot inlet, cold to cold inlet
Flow rate reduced or fluctuating	Inlet screen filled with debris	Check inlet screens for debris
No flow from outlet	Hot or Cold water supply failure	Restore Hot and Cold water inlet supplies
No flow from outlet	Inlet supply tube extending more than 3/16" beyond ferrule	Shorten tube and replace inlet checks
Hot water flows into Cold water supply or vice versa	Check valve has debris, inlets were not properly flushed	Replace inlet check valves and screens
Outlet temperature not warm enough	Hot water supply not 10° F above required outlet temperature (5° F with equal pressures)	Increase Hot water inlet temperature

INSTALLATION



170A - BP ONLY



PACKING
PART # 7539



CHECK KIT - KIT 4/108
INCLUDES CHECKS
AND SCREENS

LIMITED WARRANTY

Leonard Valve Company warrants the original purchaser that products manufactured by them (not by others) will be free from defects in materials and workmanship under normal conditions of use, when properly installed and maintained in accordance with Leonard Valve Company's instructions, for a period of one year from date of shipment. During this period the Leonard Valve Company will at its option repair or replace any product, or part thereof, which shall be returned, freight prepaid, to the Leonard factory and determined by Leonard to be defective in materials or workmanship. There are no warranties, express or implied, which extend beyond the description contained herein. There are no implied warranties of merchantability or of fitness for a particular purpose. In no event will Leonard be liable for labor or incidental or consequential damages. Any alteration or improper installation or use of the product will void this limited warranty.

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Printed in USA

1360 Elmwood Avenue, Cranston, RI 02910 USA
Phone: 401.461.1200 Fax: 401.941.5310
Email:
Web Site: http://www.leonardvalve.com

McGUIRE

a Bead Industries, Inc. company

Warranty, Terms and Return Policies

TERMS: All sales are subject to credit approval. Terms are 2% ten days – net 30.

RETURNED GOODS: Requests for returning purchased items are subject to factory approval.

A Returned Goods Authorization (RGA) must be obtained from the factory prior to any return. Returned merchandise must be in their original cartons, listed in our current List Price Sheet and in clean saleable condition.

Restocking charge:

- Material that was shipped within 18 months of the return request is subject to a 25% restocking charge.
- Material that was shipped more than 18 months of the return request but less than 3 years is subject to a 50% restocking charge.
- Material returned more than 18 months after it was shipped is not subject to any stock rotation agreement.
- Material that was shipped more than 3 years before the return request is not returnable.
- Invoice dates as well as dates on packaging will control.

The restocking charge may be reduced if a new order of equal value is placed at the time the RGA is requested:

- 25% may be reduced to 15%
- 50% may be reduced to 35%

MINIMUM RETURN POLICY:

Return requests less than $200 net will be charged $50 processing fee in lieu of any restocking charge.

INVOICE:

We reserve the right to invoice all merchandise at prices in effect at time of shipment.

NO MINIMUM ORDER:

Orders less than $200 list will be invoiced at list price less 35% (.65 multiplier).

McGuire Manufacturing Co., Inc.
60 grandview court • cheshire • ct • 06410
tel 203-699-1801 • fax 203-699-1813
mcguiremfg com
customerservice@mcguiremfg com

FREIGHT:

We will pay freight on shipments within the continental United States when the order (pre-tax) totals more than $2200 net. We select the method of shipment and carrier when we pay the freight.

Limited Warranty Information

McGuire Manufacturing Co., Inc. (McGuire) warrants its product to be free from defects in material and workmanship for the period indicated below by product type measure from the date of purchase:

ITEM	WARRANTY PERIOD
Brass products	15 years
ProWrap	5 years
Eco P-Traps, Eco Strainers and Valve Strainers	1 year
Stainless Steel products	1 year
Lite Commercial P-Traps	1 year

McGuire's sole responsibility will be to replace, at no additional charge, any product which proves to be defective within the applicable warranty period. Shipping costs for product located outside the continental United States will be the sole responsibility of the customer. Duties and taxes, if levied, shall be the sole responsibility of the customer.

The above Limited Warranty shall not apply if the product has been damaged due to abuse, misuse, improper installation, accident, or other cause not within McGuire's control.

THE ABOVE LIMITED WARRANTY IS THE SOLE AND EXCLUSIVE WARRANTY. ALL OTHER WARRANTIES ARE DISCLAIMED, WHETHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL MCGUIRE BE RESPONSIBLE OR LIABLE FOR ANY SPECIAL INCIDENTAL, OR CONSEQUENTIAL DAMAGES OR LOSSES ARISING FROM THE USE OF THIS PRODUCT.

McGuire may, at its option, alter the contents of this LIMITED WARRANTY at anytime. These changes will affect products manufactured after the effective date of this policy.

McGuire Manufacturing Co., Inc.
60 grandview court • cheshire • ct • 06410
tel 203-699-1801 • fax 203-699-1813
mcguiremfg.com
customerservice@mcguiremfg.com

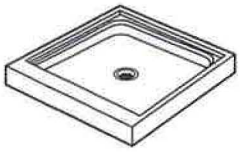
MS-1

Installation Instructions – Terrazzo

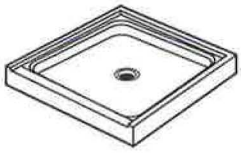
Precast Shower Floors & Mop Basins

FIAT® PRODUCTS

DO NOT STACK OR STORE TERRAZZO FLAT



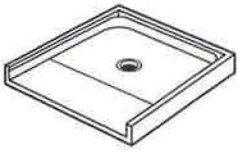
MONTEREY



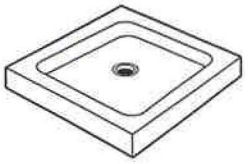
SIERRA



GIBRALTAR



ADATN, ADAWN, WTR WHEELCHAIR ACCESS



MOP SERVICE BASIN

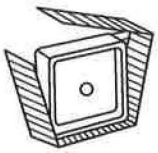
1. REMOVE CRATE AT INSTALLATION POINT. DO NOT ROCK TERRAZZO ON EDGES IN ORDER TO PREVENT DAMAGES TO CORNERS.
2. CHECK ALL SIDES OF PRODUCT FOR TRANSPORTATION DAMAGES.

A: WIPE FACE OF THE TERRAZZO WITH A WATERED CLOTH.

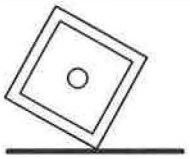
B: AFTER WATER EVAPORATES, CHECK FOR CRACKS OR DAMAGE.

NOTE: FIAT PRODUCTS IS NOT RESPONSIBLE FOR SHOWER INSTALLATIONS ADHERING TO A.D.A. GUIDELINES. CHECK LOCAL AUTHORITY FOR CODE AND INSTALLATION REQUIREMENTS.

DO NOT LIFT SHOWER BY FLANGE



REMOVE CRATE WITH CARE



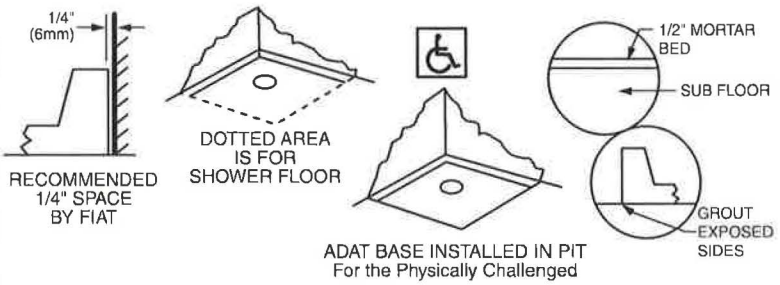
DO NOT STAND ON END

LEVEL PRODUCT CAREFULLY

2A. ESTABLISH PROPER CLEARANCE BETWEEN UNIT AND WALL. PLACE A 1/2" LAYER OF MORTAR WHERE THE SHOWER FLOOR IS TO BE INSTALLED. THIS PROCEDURE IS REQUIRED BY FIAT TO PROVIDE SUPPORT OF THE UNIT IN CASE THE SUB FLOOR IS UNEVEN. LAYER OF GROUT SHOULD BE AT LEAST 1/4" THICK AND COVER ENTIRE AREA UNDER THE UNIT.

2B. ADAT AND ADAW SHOWERS ARE FOR A.D.A. OR PHYSICALLY CHALLENGED USE. THE SHOWER ENTRY SHOULD BE NO MORE THAN 1/4" HIGHER THAN THE FINISHED FLOOR OF THE ROOM. THE ADAT SHOWER SHOULD BE INSTALLED INTO A RECESSED PIT 2 INCHES DEEP TO MEET CODE REQUIREMENTS.

2C. IT IS RECOMMENDED THAT A FLOOR DRAIN AT OR NEAR THE ENTRANCE TO ALL ADAT, ADAW AND WTR SHOWER FLOORS BE INCLUDED.



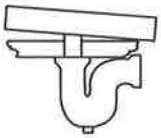
FAILURE TO INSTALL TERRAZZO ON A 1/2" MORTAR BED WILL VOID WARRANTY.

WARNING

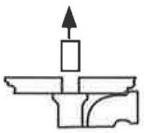
3. DO NOT DROP UNIT OVER EXPOSED PIPE. IT IS ADVISABLE TO REMOVE DRAIN PIPE AND SET UNIT IN PLACE. INSERT PIPE THROUGH DRAIN IN FLOOR BACK INTO "P" TRAP.

TIGHTEN METAL CONNECTIONS WITH AN INTERNAL PIPE WRENCH.

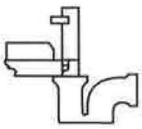
IF USING PLASTIC WASTE PIPE, FIT AND SOLVENT WELD.



DO NOT DROP ON PIPE



REMOVE PIPE FROM TRAP



REINSERT PIPE & TIGHTEN WITH AN INTERNAL WRENCH

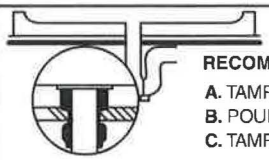
4A. METHOD OF DRAIN CONNECTION: PLASTIC OR METAL WASTE PIPE

WHEN USING PLASTIC WASTE PIPE , IT IS NECESSARY TO USE THE QDC QUICK DRAIN CONNECTOR.

INSTALL PIPE THROUGH RECEPTOR.

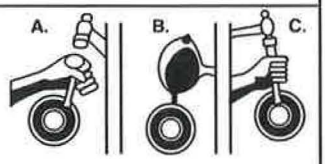
LUBRICATE QDC CONNECTOR WITH SOAP, STRETCH QDC CONNECTOR OVER PIPE WITH LETTERS FACING UP.

TAMP CONNECTOR WITH A HAMMER AND PIECE OF WOOD. WORK AROUND CONNECTOR WITH A SERIES OF BLOWS UNTIL IT BOTTOMS. TOP OF PIPE SHOULD BE EVEN WITH TOP OF CONNECTOR.



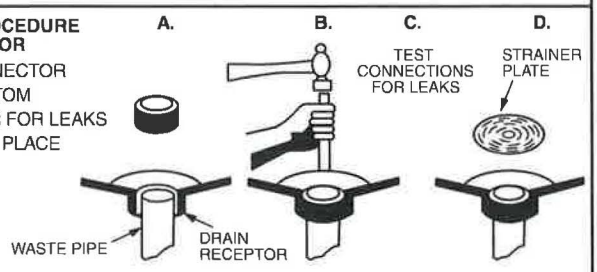
RECOMMENDED PROCEDURE

A. TAMP OAKUM TO 5/8" DEPTH
B. POUR MOLTEN LEAD
C. TAMP LEAD CAREFULLY



RECOMMENDED PROCEDURE QDC CONNECTOR

A. INSTALL QDC CONNECTOR
B. TAMP QDC TO BOTTOM
C. TEST CONNECTION FOR LEAKS
D. SNAP STRAINER IN PLACE



4B. METHOD OF DRAIN CONNECTION: METAL WASTE PIPE

USE OAKAM AND MOLTEN LEAD.

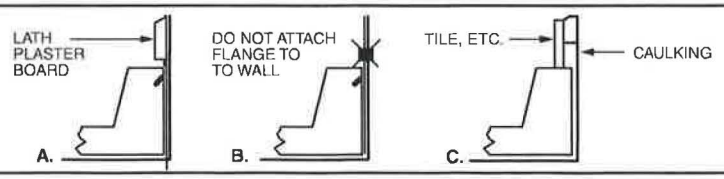
THIS LEAD CAULKED JOINT PERMITS LIMITED MOVEMENTS SUCH AS NORMAL STRUCTURAL SETTLEMENT WITHOUT LEAKAGE.

WARNING: MODELS WITH TILING FLANGE OPTIONS

5A. DO NOT LET ROUGH WALL MATERIAL OVERLAP FLANGE.

5B. DO NOT ATTACH FLANGE TO BUILDING.

5C. LET FINISHED WALL (TILE, ETC) OVERLAP AND REST ON SHOULDER.



Product names listed herein are trademarks of FIAT
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Sealers - New Installations

Immediately following installation of a new floor or thorough cleaning of an older floor, the floor must be sealed with a penetrating sealer. Such sealers are available at paint or tile stores and **must** state that they are approved for use on Terrazzo products. Sealers are not permanent and can be reapplied (after a thorough cleaning) approximately once a year, or as recommended by the manufacturer of the sealer.

RECOMMENDED CLEANING & MAINTENANCE PROCEDURES FOR TERRAZZO PRECAST SHOWER FLOORS AND MOP SERVICE BASINS

Regular Cleaning

To maintain the original terrazzo surface appearance, clean regularly with a liquid detergent such as Joy, Liquid Ajax, or Spic n Span (for the latter, prepare a solution containing 1/2 cup of Spic n Span in a gallon of water). Scrub with a stiff bristled, non-metallic scrub brush and then rinse thoroughly.

NOTE: Do *not* use any acid (ie, muratic) or cleaning agents that contain acid.

Special or Unusual Conditions

A. Scum on Surface caused by soap, makeup, etc.:	Use a cleaning powder, such as Ajax, plus lots of elbow grease.
B. Surface cleaning:	Heel marks, plaster, etc. may require abrasive removal. This can be done with a wet emery cloth. If emery cloth is ineffective, use an 80 to 100 grit aluminum oxide coated paper. Abrasive cloth or paper will result in a very faint grinding away of the floor surface.
C. Penetrated stains:	Stains such as caused by oil, putty, etc., may be removed by scouring with a cleanser and then soaking floor overnight, if need be, with a commercial bleach such as Linco, etc.

FIAT PRODUCTS, LLC. LIMITED ONE YEAR WARRANTY FOR PERSONAL RESIDENTIAL AND COMMERCIAL USE OF FIAT® PRODUCTS

WARRANTY COVERAGE

FIAT Products warrants products against defects in material and workmanship under both normal residential and commercial use for as long as it is owned by the original purchaser for a period of one (1) year from the date of first purchase.

This warranty is provided for the exclusive benefit of the initial consumer purchaser or owner. This warranty is non-transferable to subsequent purchasers or owners. The sole exception to the non-transferability of this warranty is that if this product is purchased by a plumber, contractor or other service provider, this warranty extends to the first residential or commercial property owner on whose behalf the product was purchased for installation. This warranty applies only to FIAT® Products installed in the United States of America or Canada.

If a defect arises and a valid claim is received, FIAT Products, at its option, will either (1) repair the product, (2) replace the product or any part therein with a FIAT product of equal or similar type and size, or (3) refund to the consumer the wholesale price of the product. If FIAT Products elects to refund the wholesale price to the consumer, FIAT Products shall have no further obligation to its wholesale customer, or any contractor with respect to such product. Goods proven to be defective will be replaced after proper inspection, but no claims for damages incurred or for work done thereon will be allowed. Replacements when supplied will be shipped at no cost to the consumer.

EXCLUSIONS AND LIMITATIONS

1. This warranty only applies to products purchased through an authorized FIAT® Products dealer or re-seller.
2. This warranty does not apply to defects or damage caused by non-genuine FIAT parts, installation error, product abuse, product misuse, improper maintenance, improper care or cleaning, improper repair or installation, and/or movement or transfer of the product from its original installation location (whether performed by you, a plumber, a contractor or a service company). Because improper care and cleaning can cause significant damage to the product, it is strongly recommended that you follow the Care and Cleaning Instructions (as well as the other instructions).
3. FIAT Products is not responsible for labor charges and/or damage incurred during installation, repair, or replacement.
4. FIAT Products does not warrant that this product and/or its installation complies with local code requirements. FIAT Products recommends that you consult with a plumbing contractor about local code requirements.

TO THE EXTENT PERMITTED BY LAW, THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER ORAL OR WRITTEN, STATUTORY, EXPRESS, OR IMPLIED. FIAT PRODUCTS HEREBY EXCLUDES SPECIAL, INCIDENTAL AND CONSEQUENTIAL DAMAGES FOR ANY BREACH OF ANY EXPRESS OR IMPLIED WARRANTY APPLICABLE TO THIS PRODUCT.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state (or province, as applicable).

OBTAINING WARRANTY SERVICE

If you feel you have a warranty claim, contact FIAT Products, either through an authorized FIAT Products dealer or re-seller, or by writing:

In the United States and Canada:
FIAT Products, LLC
4515 E. 139th St.
Grandview, MO 64030

Please be sure to provide all pertinent information regarding your claim, including a complete description of the problem, the product, model number, color, finish, purchase date, and from whom the product was purchased.

For other information, call (833) 549-2887 (in the United States and Canada) or visit www.fiatproducts.com.

RELIABILITY BUILT IN™

Limited One Year Warranty

T&S warrants to the original purchaser (other than for purposes of resale) that such product is free from defects in material and workmanship for a period of one (1) year from the date of purchase. During this one-year warranty period, if the product is found to be defective, T&S shall, at its options, repair and/or replace it. To obtain warranty service, products must be returned to...

T&S Brass and Bronze Works, Inc.
Attn: Warranty Repair Department
2 Saddleback Cove
Travelers Rest, SC 29690

Shipping, freight, insurance, and other transportation charges of the product to T&S and the return of repaired or replaced product to the purchaser are the responsibility of the purchaser. Repair and/or replacement shall be made within a reasonable time after receipt by T&S of the returned product. This warranty does not cover items which have received secondary finishing or have been altered or modified after purchase, or for defects caused by physical abuse to or misuse of the product, or shipment of the products.

Any express warranty not provided herein, and any remedy for Breach of Contract which might arise, is hereby excluded and disclaimed. Any implied warranties of merchantability or fitness for a particular purpose are limited to one year in duration. Under no circumstances shall T&S be liable for loss of use or any special consequential costs, expenses or damages.

Some states do not allow limitations on how long and implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. Specific rights under this warranty and other rights vary from state to state.

P/N: 098-009518-45 Rev.2
Date: 05-15-06
Drawn: TEH
Checked: DHL 07-13-06
Approved: JHB 07-13-06

Installation and Maintenance Instructions



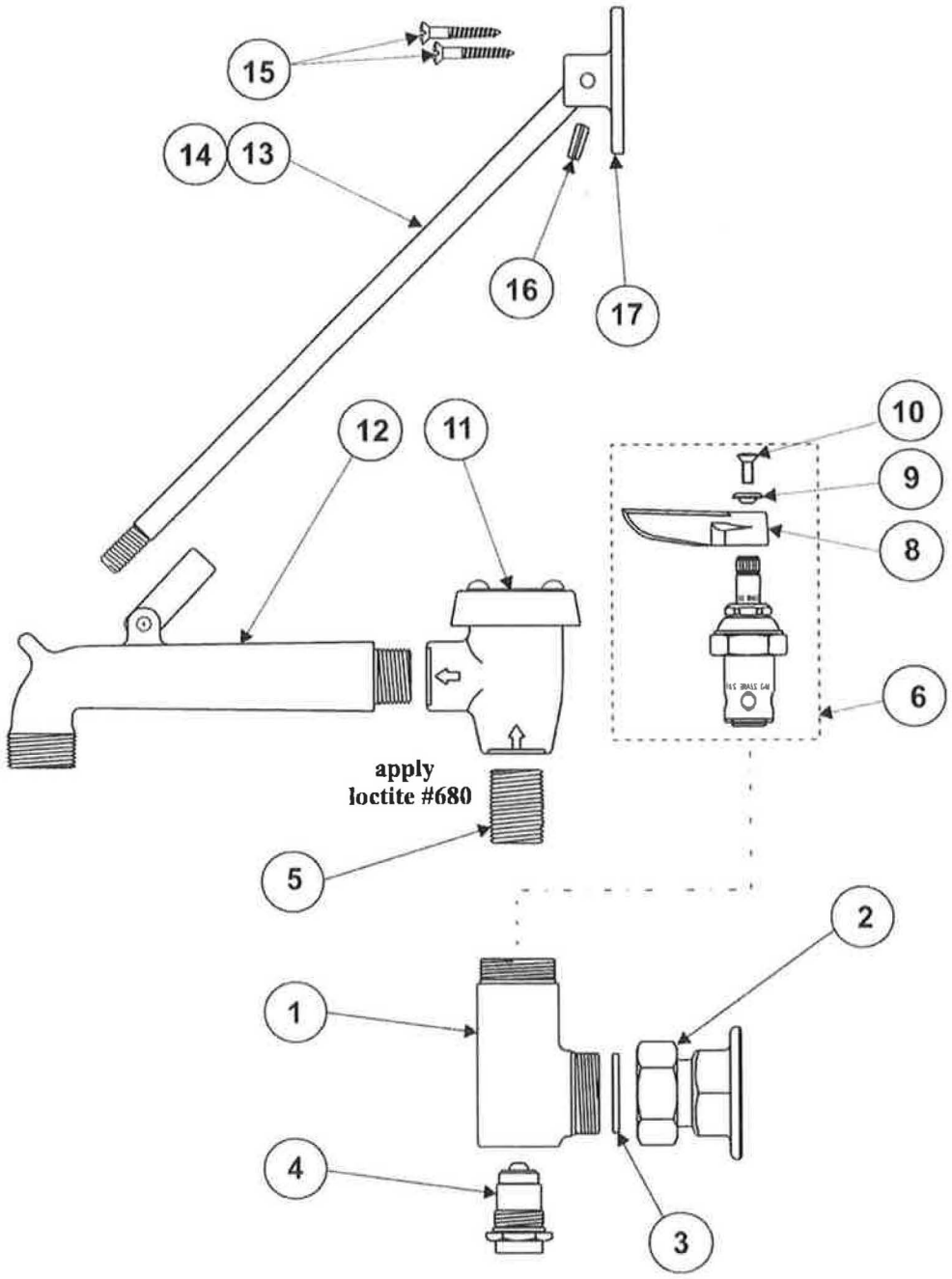
Surgical Sink and Service Sink Faucets with Built-In Stops B-0665-BST Series

Deutsch: Installations- und Wartungsanleitungen

Español: la Instalación y las Instrucciones de Mantenimiento

Français: les Instructions d'Installation et d'Entretien

Exploded View



* Some items are listed for instructional purposes and may not be sold as separate parts.

Part Number Guide

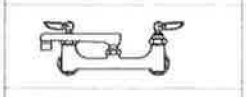
Service Sink Faucet Assemblies

1	Asm, Base Faucet	B-0665-BSTP
	Body, Faucet	*
2	Asm, Flange Coupling	002893-40
3	Washer, Coupling Flange	001019-45
4	Asm, BST Spindle & Insert	163A
5	Nipple, Close 1/2 HWL	002534-25
6	Asm, Eterna w/ Spring Checks & Handle (Cold)	002711-40
	Asm, Eterna w/ Spring Checks & Handle (Hot)	002712-40
8	Handle, Lever (Blank)	001638-45
9	Index, Button (Red / Hot)	001661-45
	Index, Button (Blue / Cold)	001660-45
10	Screw, Handle	000922-45
11	Asm, Vacuum Breaker, 1/2"	B-0969
12	Spout	*
13	Asm, Upper Nozzle Support	009546-40
14	Rod, Support	005060-40
15	Screw, Wall Mount	000915-45
16	Pin, Coiled 3/16" x 1/2" S.S.	004713-25
17	Flange	003007-40

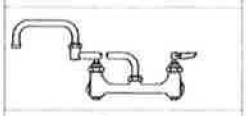
Models with Built-In Stops (-BST)



B-0230-BST Sink mixing faucet with 18" swing nozzle; lever handles
B-0231-BST Sink mixing faucet with 12" swing nozzle; lever handles
B-0232-BST Sink mixing faucet with 16" swing nozzle; lever handles



B-0234-BST Sink mixing faucet with 6" cast spout; lever handles



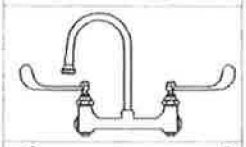
B-0265-BST Combo sink faucet w/ 18" double-joint swing nozzle
B-0266-BST Combo sink faucet w/ 15" double-joint swing nozzle
B-0267-BST Combo sink faucet w/ 12" double-joint swing nozzle



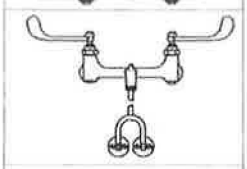
B-0330-BST Combo sink faucet w/ rigid gooseneck; lever handles



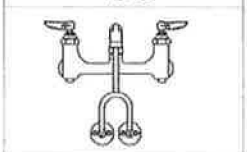
B-0331-BST Combo sink faucet w/ swivel gooseneck; lever handles



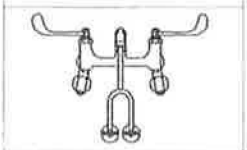
B-0350-BST Surgical sink fct w/rigid gooseneck; 6" WH; rosespray
B-0351-BST Surgical sink fct w/rigid gooseneck; 6" WH; stream reg.
B-0352 & -04 Surgical sink fct w/rigid GN; 6" & 4" WH; rosespray
B-0353 & -04 Surgical sink fct w/rigid GN; 6" & 4" WH; stream reg.



B-0363 Service sink fct w/VB nozzle; 6" WH; bottom brace



B-0650-BSTP Service sink fct w/pail hook nzl; btm brace; polished
B-0650-BSTR Service sink fct w/pail hook nzl; btm brace; rough



B-0652 Service sink fct; 6" wrist-action handles; bottom brace



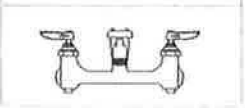
B-0655-BSTP Service sink fct w/VB nozzle; bottom brace; polished
B-0655-BSTR Service sink fct w/VB nozzle; bottom brace; rough
B-0657-BST Service sink fct w/VB nozzle; 6" WH; bottom brace



B-0660-BSTP Service sink fct w/pail hook nozzle; top brace; polished
B-0660-BSTR Service sink fct w/pail hook nozzle; top brace; rough



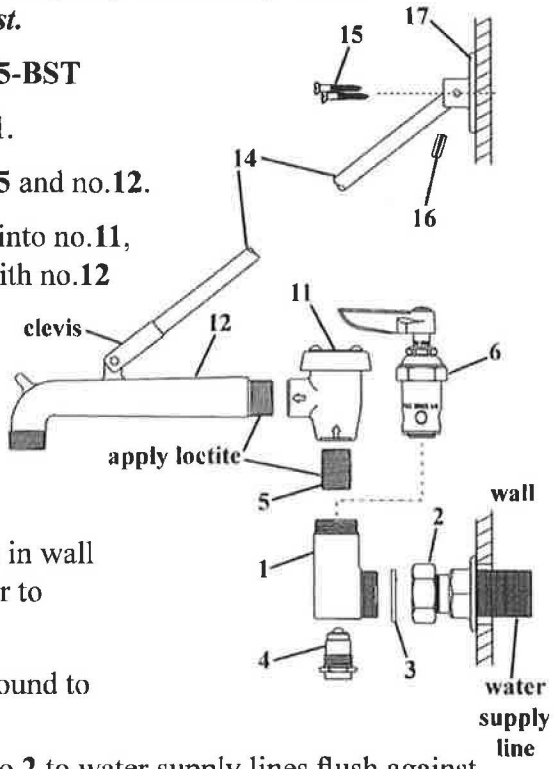
B-0665-BSTP Service sink fct w/VB & pail hook; top brace; polished
B-0665-BSTR Service sink fct w/VB & pail hook; top brace; rough



B-0674-BSTP Service sink fct w/VB & pail hook nozzle; polished
B-0674-BSTR Service sink fct w/VB & pail hook nozzle; rough

General Instructions

Note: This is a general instructional example of units using -BST. Nozzles should be installed on unit first.



<u>Nozzle Installation</u>: ex. model B-0665-BST

1. Remove no.**6** from both sides of no.**1**.

2. Apply Loctite #680 to threads of no.**5** and no.**12**.

3. Insert no.**12** into no.**11**. Thread no.**5** into no.**11**, then rotate no.**11** into no.**1** until tight with no.**12** facing front of sink.

4. Replace no.**6** into no.**1** following nozzle installation.

<u>Faucet Installation</u>:

5. Shut off water supply and drain lines. Drill (2) two 7/8" [2.2 cm] holes in wall or backsplash of sink, 8" [20 cm] center to center, where you are installing no.**1**.

6. Apply teflon tape or pipe joint compound to threads of water supply lines.

7. Remove no.**2** from no.**1** and attach no.**2** to water supply lines flush against wall. Tighten by hand. ***Trim supply lines if necessary.***

8. Attach no.**1** to no.**2**, adjusting center to center fit by turning no.**2** if needed. ***Make sure no.3 remains in place.*** Tighten no.**2** firmly with a wrench.

9. Turn on water supply and check for leaks.

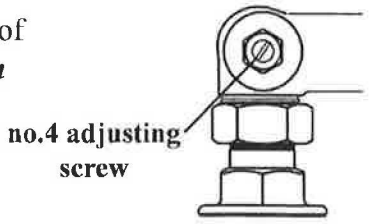
<u>Upper Nozzle Support Installation</u>:

10. Attach no.**14** to no.**12** by screwing no.**14** into ***clevis*** on no.**12**.

11. Position no.**17** against wall. Mark holes and secure no.**17** to wall using no.**15**.

<u>Adjusting Built-in Stops:</u>

Insert a screwdriver to adjust no.**4** at the base of no.1 on each side. ***Water should be turned on for this procedure.***



Botton view of faucet body and Built-in Stop

<u>Close</u> Stop turn clockwise



<u>Open</u> Stop turn counter-clockwise

UR-1

INSTALLATION INSTRUCTIONS

WASHBROOK URINAL

6590 & 6515 SERIES

Thank you for selecting American Standard – the benchmark of fine quality for over 100 years. To ensure this product is installed properly, please read these instructions carefully before you begin. (Certain installations may require professional help.) Also be sure your installation conforms to local codes.

BEFORE YOU BEGIN

⚠ **CAUTION: PRODUCT IS FRAGILE. TO AVOID BREAKAGE AND POSSIBLE INJURY HANDLE WITH CARE!**

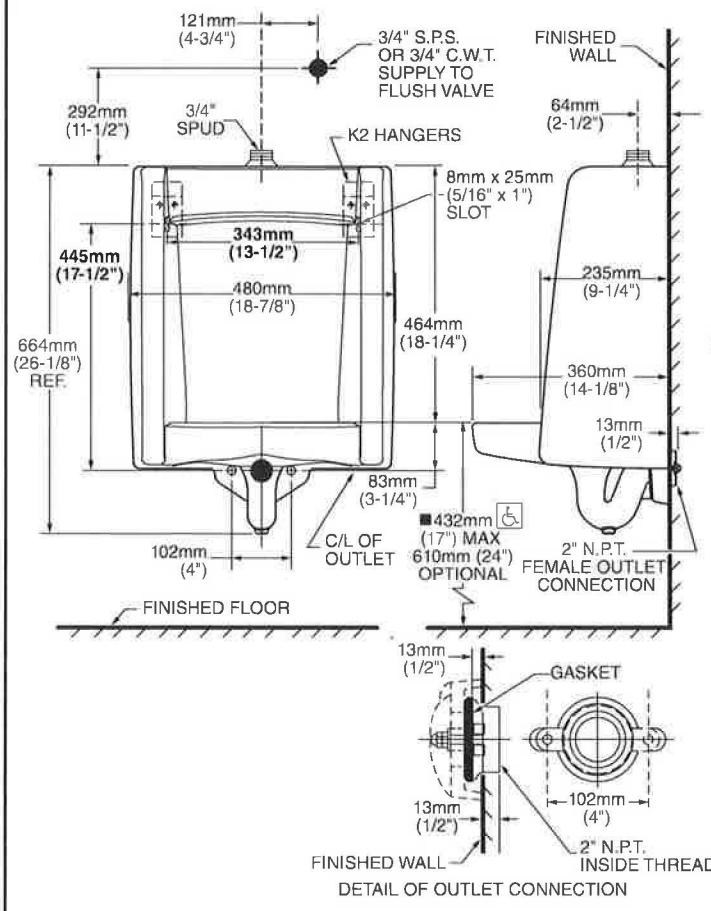
NOTES:

- *Pictures may not exactly define contour of china and components.*
- *Observe all local plumbing and building codes.*
- *Refer to local codes and manufacturer's instructions for flush valve requirements.*
- *Carefully inspect the new urinal for damage.*
- *Fixture dimensions are nominal and conform to tolerances by ASME Standard A112.19.2.*
- *Site preparation may require additional tools and hardware.*

RECOMMENDED TOOLS AND MATERIALS

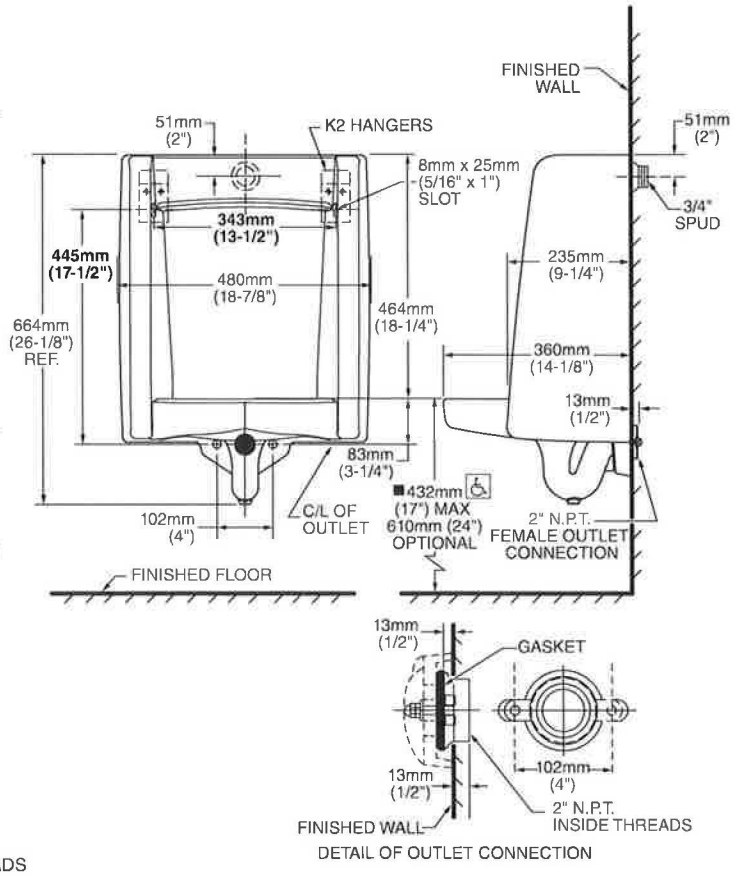
Safety Glasses	Tape Measure	Adjustable Wrench	Pencil	Hole Cutting Equipment
Thread Sealant	1/4" Ratchet	Blade Screwdriver	Levels	

Top Spud



DETAIL OF OUTLET CONNECTION

Back Spud



DETAIL OF OUTLET CONNECTION

SAVE FOR FUTURE USE

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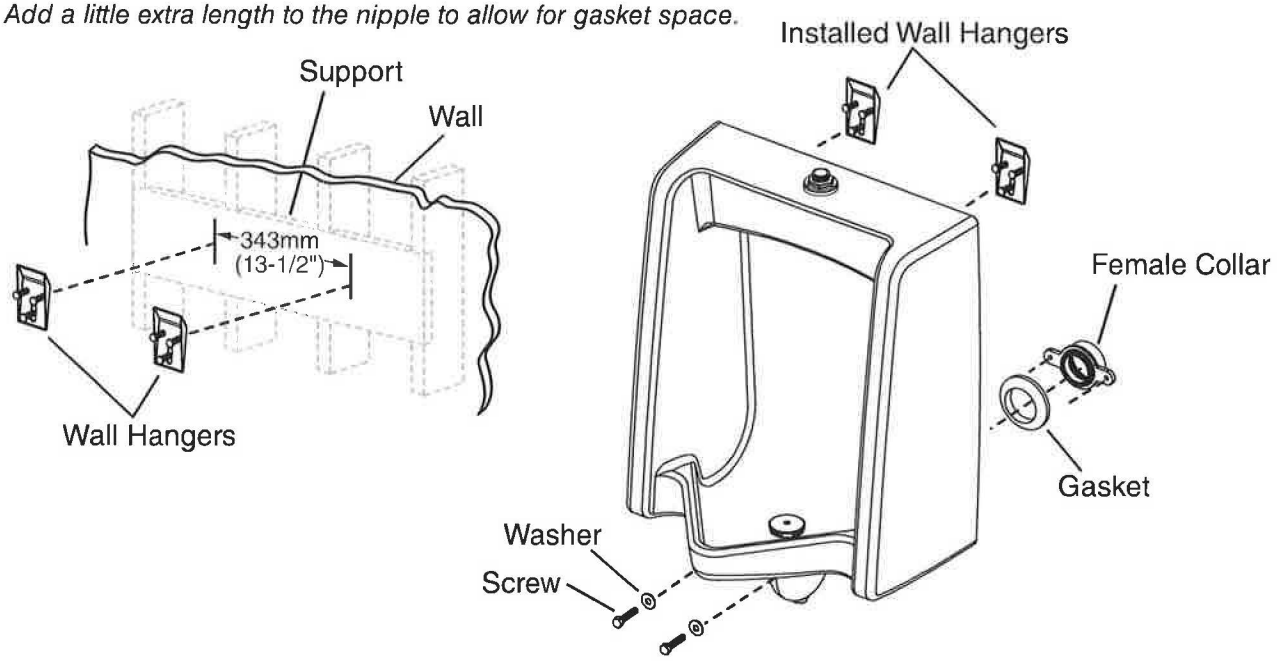
7301778-100 Rev. B 8/18

7301778-100B

1 PREPARATION

a. Turn the water supply OFF.
b. Install or relocate the supply tubing and waste pipe as necessary to conform to the roughing in dimensions.
c. Install the shut off valve.
d. Install adequate support framing for the wall hangers as needed.
e. Determine the position of the waste pipe nipple. When establishing the nipple length, take into account the length of the urinal outlet spud and the distance the female collar will thread onto the waste pipe nipple.

NOTE: *Add a little extra length to the nipple to allow for gasket space.*



2 INSTALL THE URINAL

⚠ CAUTION: RISK OF PERSONAL INJURY OR PRODUCT DAMAGE. HANDLE WITH CARE. VITREOUS CHINA CAN BREAK OR CHIP IF THE PRODUCT IS HANDLED CARELESSLY.

⚠ CAUTION: RISK OF PRODUCT DAMAGE. DO NOT OVERTIGHTEN THE BOLTS.

a. Install the wall hangers according to the roughing in illustration.
b. Apply thread sealant tape to the pipe threads and install the female collar to the waste pipe.
c. Place the gasket onto the female collar with the beveled surface facing away from the collar.
d. Carefully position the urinal on the wall hangers.
e. Secure the urinal to the female collar using the screws and washers provided.

3 COMPLETE THE INSTALLATION

a. Install the flush valve according to the manufacturer's instructions.
b. Connect the water supply and complete the waste pipe connections.
c. Turn on the water supply.
d. Flush and check the entire installation for leaks.

CARE & CLEANING

Wash with mild soapy water and rinse thoroughly. Dry with a soft cloth. Avoid detergents, disinfectants or cleaning products in aerosol cans as they may damage fittings.

In the United States:
American Standard Brands
1 Centennial Ave.
Piscataway, New Jersey 08854
Attention: Director of Customer Care
For residents of the United States, warranty information may also be obtained by calling the following toll free number: (800) 442-1902
www.americanstandard.com

In Canada:
AS Canada, ULC
5900 Avebury Rd.
Mississauga, Ontario
Canada L5R 3M3
Toll Free: (800) 387-0369
www.americanstandard.ca

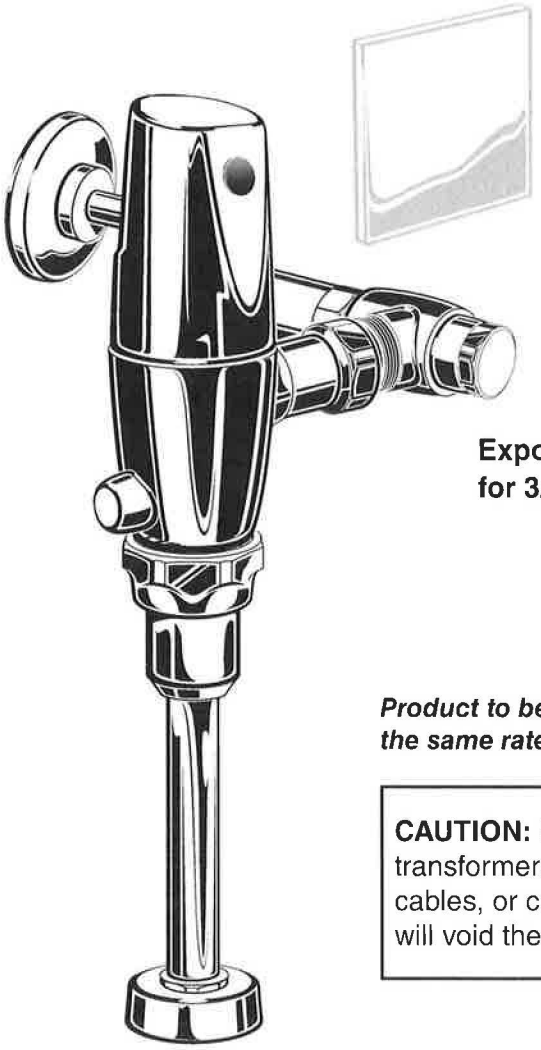
In Mexico:
American Standard B&K Mexico
S. de R.L. de C.V.
Via Morelos #330
Col. Santa Clara
Ecatepec 55540 Edo. Mexico
Toll Free: 01-800-839-1200
www.americanstandard.com.mx

Installation Instructions

Ultima™ Selectronic® Battery Powered

Urinal Flush Valve, Piston-Type

MODEL NUMBERS		
606B.101	606B.051	606B.013



COVER PLATE
(Required for Front Installation Only)

Exposed Flushometer
for 3/4" Top Spud Urinals

Product to be used with WaterSense Certified Fixture with the same rated flush volume.

CAUTION: Use only American Standard supplied transformers and cable sets. Using non-AS supplied cables, or cutting, splicing or modifying any components will void the warranty.

Certified to comply with ASME A112.19.2

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M965645

American Standard

NOTE TO INSTALLER: Please give this manual to the customer after installation.

To learn more about American Standard Selectronic® Products visit our website at: **www.americanstandard-us.com** or e-mail us at: **CRTTEAM@lixilamericas.com**

For Parts, Service, Warranty or other Assistance,
please call (844) CRT-TEAM / (844) 278-8326 (In Canada: 1-800-387-0369)
(In Toronto Area only: 1-905-306-1093)

American Standard CRT Certified Response Technician

Thank you for selecting American-Standard...the benchmark of fine quality for over 100 years. To ensure that your installation proceeds smoothly--please read these instructions carefully before you begin.

UNPACKING

All American Standard Products Are Water Tested At Our Factory. Some Residual Water May Remain In The Valve During Shipping.

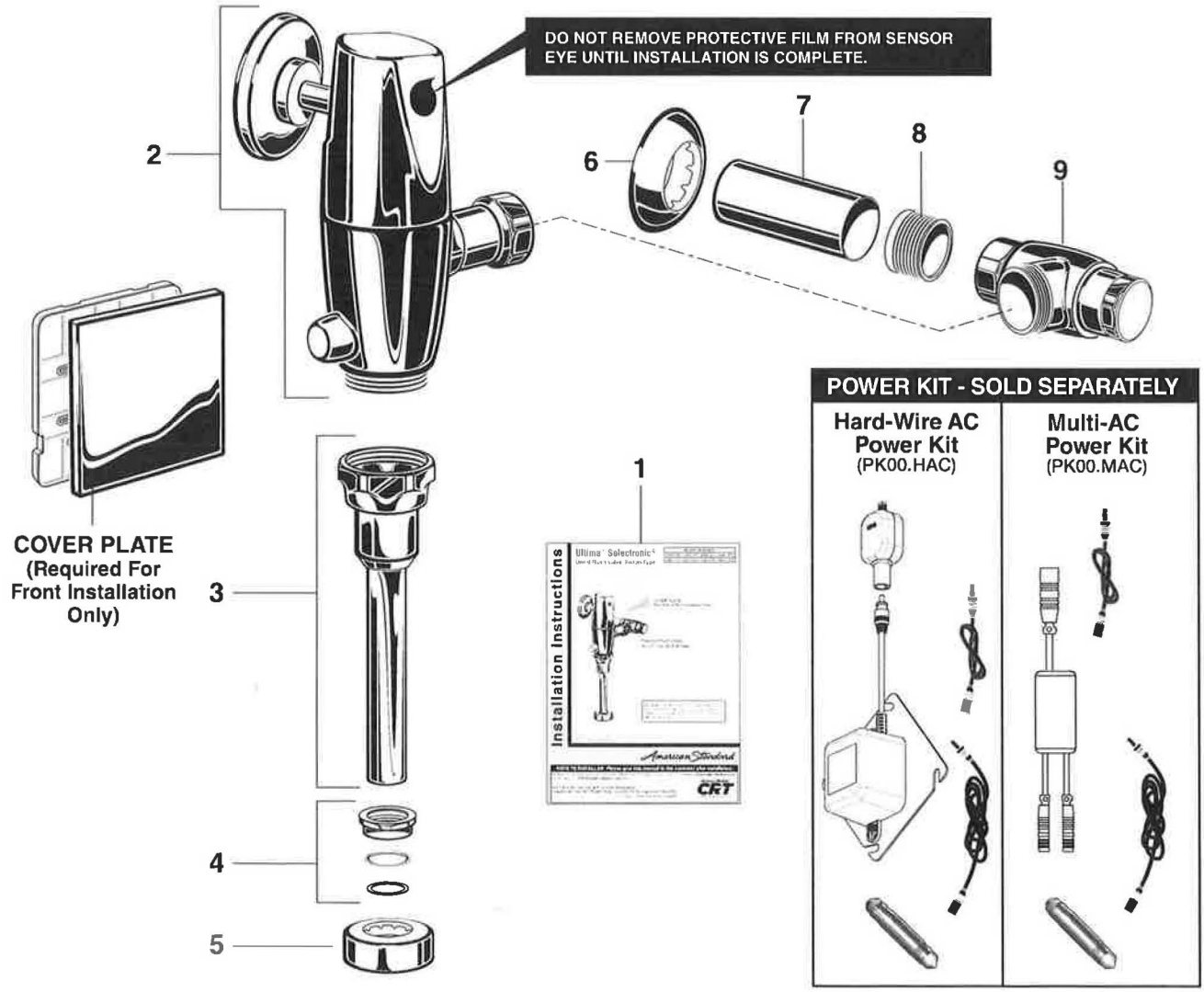
Remove the Flush Valve items from the carton. The illustration below shows all items after they have been removed from the carton. Some items may be packaged partially assembled to other items.

1. Installation Instructions
2. Flush Valve Body Assembly
3. Vacuum Breaker Tube
4. Spud Coupling Nut and Washers
5. Spud Flange
6. Wall Escutcheon
7. Cover Tube
8. Sweat Adapter
9. Stop Valve

CARE INSTRUCTIONS:

DO: CLEAN THE PRODUCT WITH CLEAR WATER, DRY WITH A SOFT COTTON FLANNEL CLOTH.

DO NOT: DO NOT CLEAN THE PRODUCT WITH SOAPS, ACID, POLISH, ABRASIVES, HARSH CLEANERS, OR A CLOTH WITH A COARSE SURFACE.



Roughing-in Dimensions *(Front Installation Shown)*

Right or Left Hand Installation

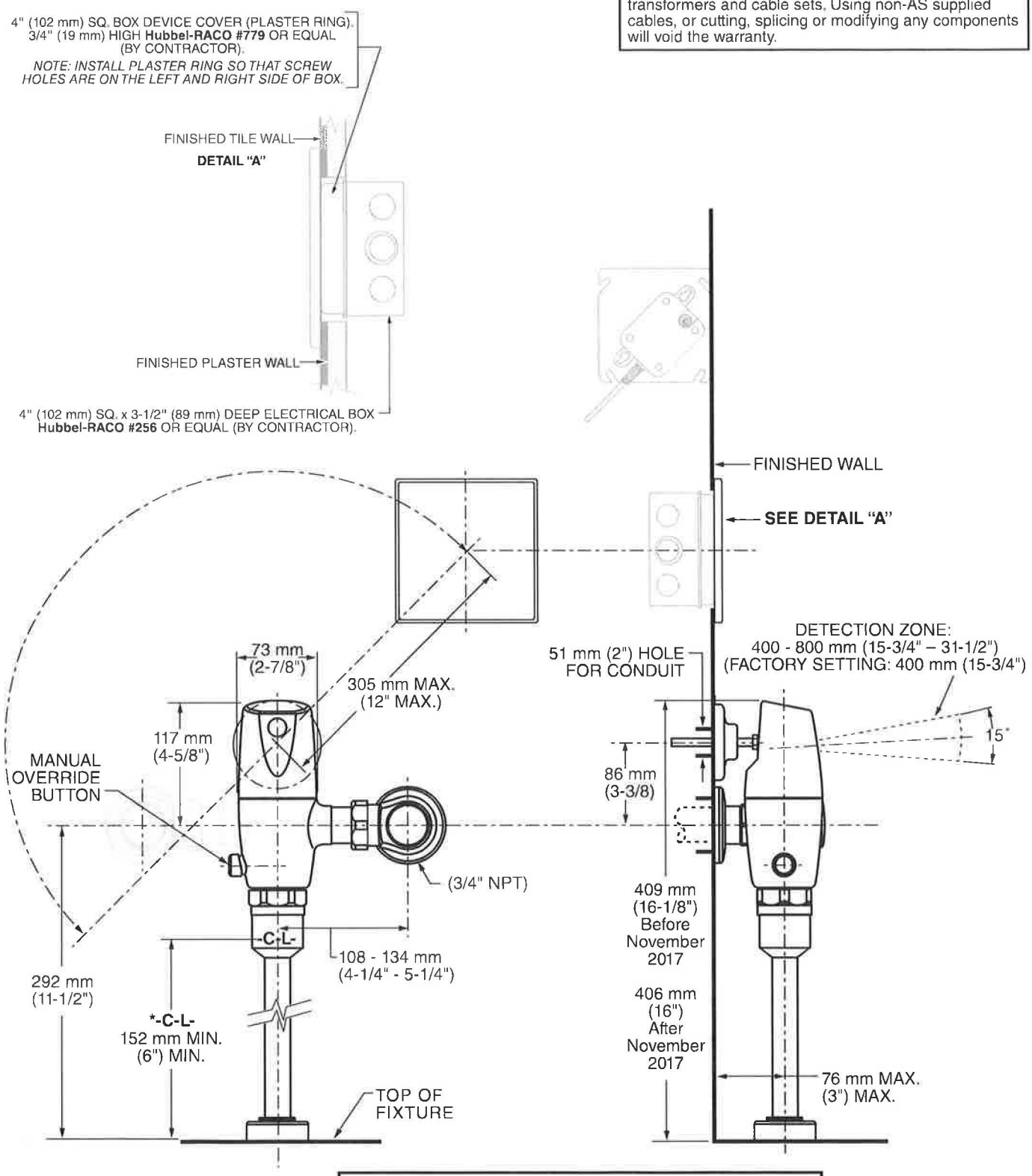
See (Section 5) for converting Flush Valve to Left Hand Installation.

GENERAL DESCRIPTION:

SELECTRONIC® PROXIMITY URINAL FLUSH VALVE

Exposed Flushometer for 3/4" Top Spud Fixtures

CAUTION: Use only American Standard supplied transformers and cable sets. Using non-AS supplied cables, or cutting, splicing or modifying any components will void the warranty.

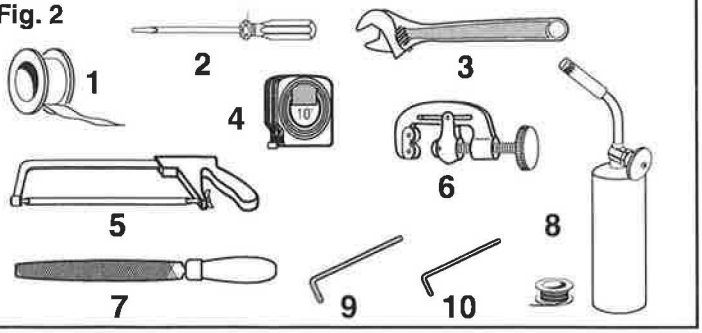


*Note: The Critical Line (-C-L-) on Vacuum Breaker must typically be 6" (152mm) above fixture. Consult Codes for details.

RECOMMENDED TOOLS; Fig. 2.

1. Teflon Tape
2. Flat Blade Screwdriver
3. Adjustable Wrench
4. Tape Measure
5. Hacksaw
6. Tubing Cutter
7. File
8. For Sweat Connection; Solder and Torch
9. 2.5 mm Hex Wrench
10. 1.5 mm Hex Wrench

Fig. 2



PRIOR TO INSTALLATION

Note: Prior to installing the Selectronic™ Flush Valve the following items must be installed.

1. Urinal
2. Drain line
3. Water supply line

IMPORTANT:

- **All plumbing and electrical wiring should be installed in accordance with applicable codes and regulations.**
- The use of water hammer arrestors is strongly recommended for commercial applications. All piping behind the walls should be properly secured and fastened.
- Water supply lines must be sized to provide an adequate volume of water for each fixture.
- Flush all water lines prior to operation. Dirt and debris can cause flush valve to run continuously.
- **With the exception of Stop Valve Inlet, DO NOT use pipe sealant or plumbing grease on any valve component or coupling!**
- Protect the chrome or special finish on the Flushometer. DO NOT USE toothed tools on finished surfaces to install or service these valves. Also see "Care and Cleaning" section of this manual.
- This product contains mechanical and/or electrical components that are subject to normal wear. These components should be checked on a regular basis and replaced as needed to maintain the valve's performance.

FLUSH VALVE INSTALLATION

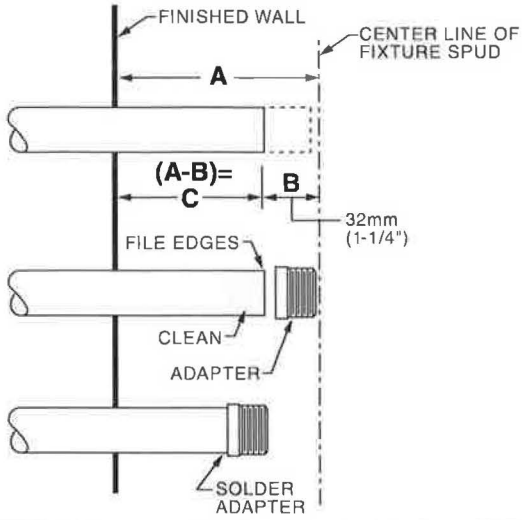
1 INSTALL SWEAT ADAPTER; Fig. 3

CAUTION Turn water supplies off before beginning

Note: Install Optional Sweat Adapter (Supplied) for copper pipe supply line.

1. Measure the distance (A) from the finished wall to the center of the inlet spud on the fixture.
2. Cut the supply pipe 1-1/4" (A-B=C) shorter than the measurement taken in Step 1. File any rough edges off the end of the supply pipe.
3. Clean the end of the supply pipe. Push the threaded Adapter until it is seated against the internal stop. Sweat the Adapter to the pipe.

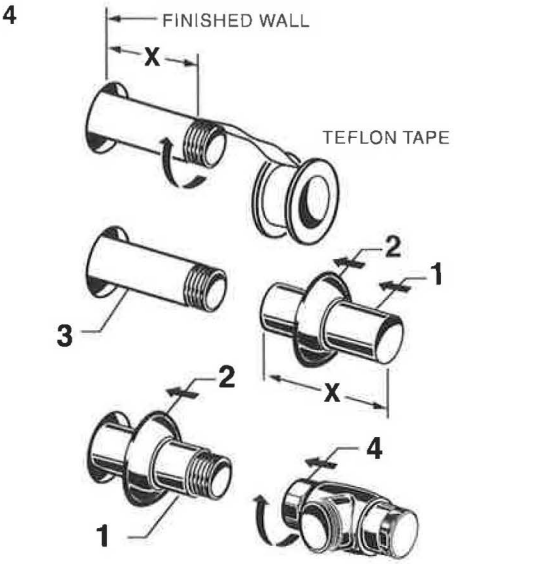
Fig.3



2 INSTALL COVER TUBE, WALL ESCUTCHEON and STOP VALVE; Fig. 4

1. Measure from finished wall to first thread of Adapter or threaded supply pipe (dimension "X"). Cut COVER TUBE **(1)** to length (X). Apply Teflon Tape to the threaded end of the Adapter or supply pipe.
2. Push WALL ESCUTCHEON (2) onto the COVER TUBE **(1)**. Slide both onto the SUPPLY PIPE **(3)**.
3. Push the COVER TUBE **(1)** in to expose the threads of the supply pipe. With a wrench thread the STOP VALVE **(4)** onto the SUPPLY PIPE **(3)**. Align and tighten.
4. Pull COVER TUBE **(1)** against STOP VALVE **(4)** and push WALL ESCUTCHEON **(2)** against finished wall.

Fig. 4

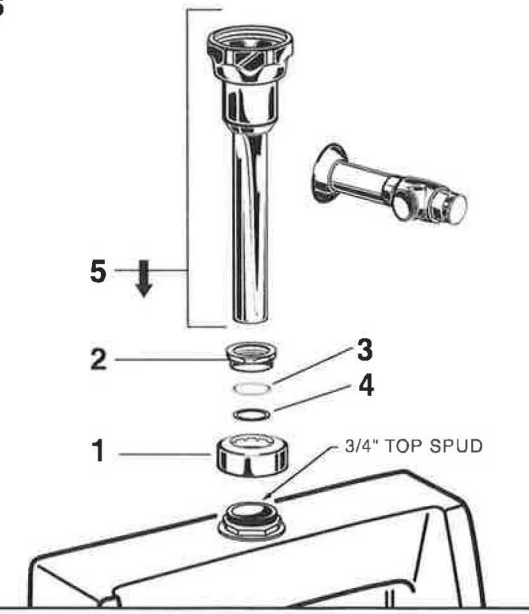


3 INSTALL VACUUM BREAKER TUBE; Fig. 5

1. Place the SPUD FLANGE **(1)** over the spud on the Fixture.
2. Place FRICTION WASHER **(3)** and SEAL WASHER **(4)** inside SPUD COUPLING NUT **(2)** and thread onto Spud. Do not tighten fully.
3. Insert the VACUUM BREAKER TUBE **(5)** into the SPUD COUPLING NUT **(2)** and push it down.

Note: *If cutting VACUUM BREAKER TUBE (5) to size, note that Critical Line (C/L) on Vacuum Breaker must typically be 6" (152mm) above fixture. Consult Code for details.*

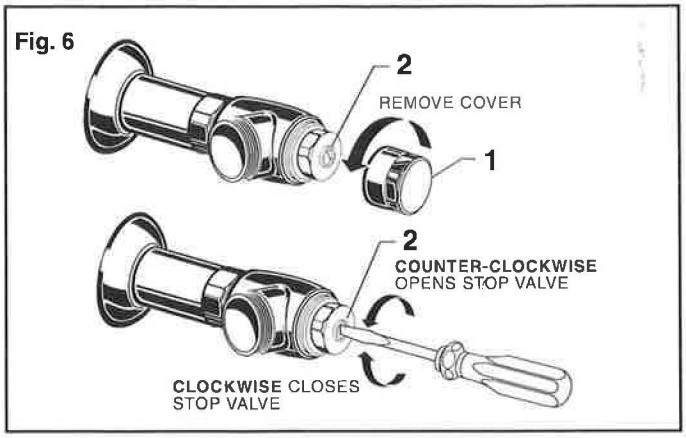
Fig. 5



M965645 EN REV. 2.6 (3/22)

4 FLUSH OUT SUPPLY LINES; Fig. 6

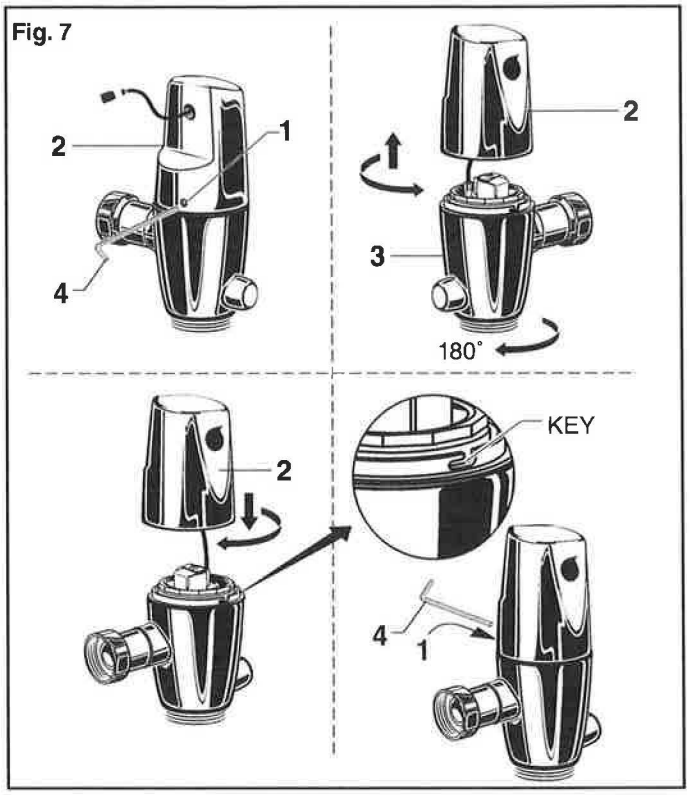
1. Remove STOP VALVE COVER **(1)** from STOP VALVE **(2)**.
2. Open STOP VALVE **(2)** with a flat blade screwdriver.
3. Turn on water supply to flush line of any debris or sediment.
4. Close STOP VALVE **(2)** and replace STOP VALVE COVER **(1)**.



5 LEFT OR RIGHT HAND INSTALLATION; Fig. 7

The unit is shipped with the adjustable tailpiece on the right side. If needed, the orientation can be modified by following the steps below.

1. Loosen SET SCREW **(1)** with 2.5mm Hex Wrench **(4)** in back of FLUSH VALVE COVER **(2)**.
2. Rotate FLUSH VALVE COVER **(2)** to the right and pull off.
3. Rotate FLUSH VALVE BODY **(3)** 180˚
4. Replace COVER **(2)** and rotate until key engages. Tighten SET SCREW **(1)**.



6 INSTALL FLUSH VALVE; Fig. 8, 8a

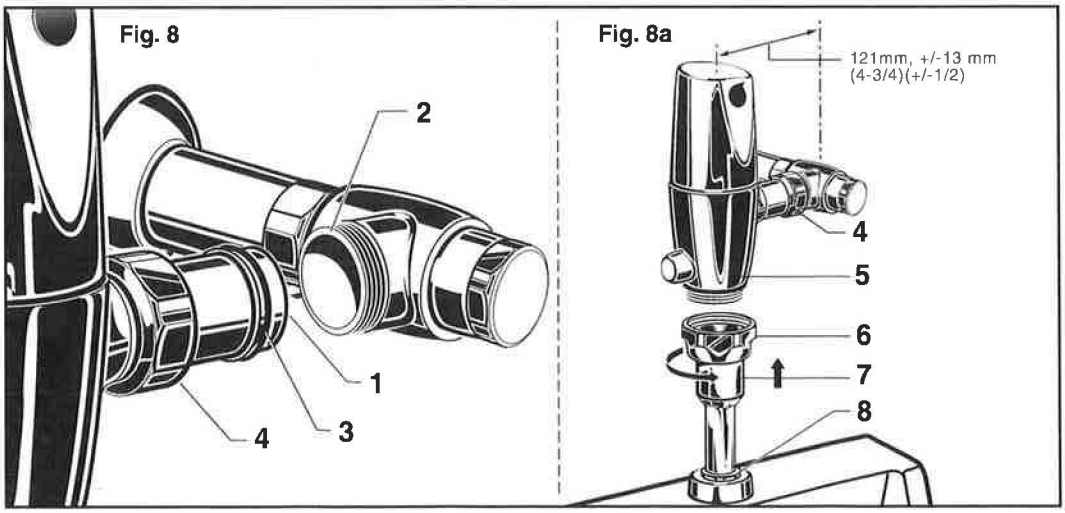
1. Insert ADJUSTABLE TAILPIECE **(1)** into the STOP VALVE **(2)**. Lubricate the O-RING **(3)** with water if necessary. Lightly tighten COUPLING NUT **(4)**. **Fig. 8**.

Important: ***Do not use lubricants (other than water) or any type of thread sealing paste or tape.***

2. Align the FLUSH VALVE BODY **(5)** directly above the VACUUM BREAKER TUBE **(7)** and VACUUM BREAKER COUPLING NUT **(6)**. **Fig. 8a**.

Note: ***There is a +/- 13mm (+/- 1/2) on the 121mm (4-3/4) dimension.***

3. Pull the VACUUM BREAKER TUBE **(7)** up to meet the threaded FLUSH VALVE BODY **(5)**, hand tighten the VACUUM BREAKER COUPLING NUT **(6)**. Align all components of the flush valve assembly. **Fig. 8a**.
4. Lightly tighten the COUPLING NUT **(4)** connection first, then the VACUUM BREAKER COUPLING NUT **(6)** and finally the SPUD COUPLING NUT **(8)**. Once alligned correctly, use a wrench to tighten couplings to make water tight connections. **Fig. 8a**.



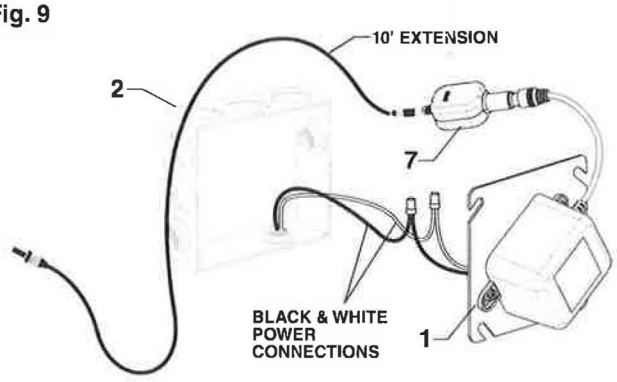
ELECTRICAL INSTALLATION

7 INSTALL POWER SUPPLY AND MAKE ELECTRICAL CONNECTIONS; Fig. 9 (remote and front installation)

CAUTION Ensure that the line power to bathroom is OFF prior to making connections.

1. Connect Black and White power connections to AC TRANSFORMER **(1)**. Mount AC TRANSFORMER **(1)** onto ELECTRICAL BOX **(2)**.
2. Connect the 10' EXTENSION CABLE (sold seperately) to the CONVERTER **(7)**.

Fig. 9



NOTE: AC Transformer must be installed on the outside of the Electrical Box.

8 INSTALL ELECTRICAL BOX (BY OTHERS); Fig. 10

FRONT INSTALLATION (with optional cover plate)

Note: ***The ELECTRICAL BOX (1) can be installed in any location along the marked arc.***

Cut a 105 x 105 mm (4-1/8" x 4-1/8") opening in finished wall for ELECTRICAL BOX **(1)** (by others) and follow installation template provided in box. See **Fig. 10**.

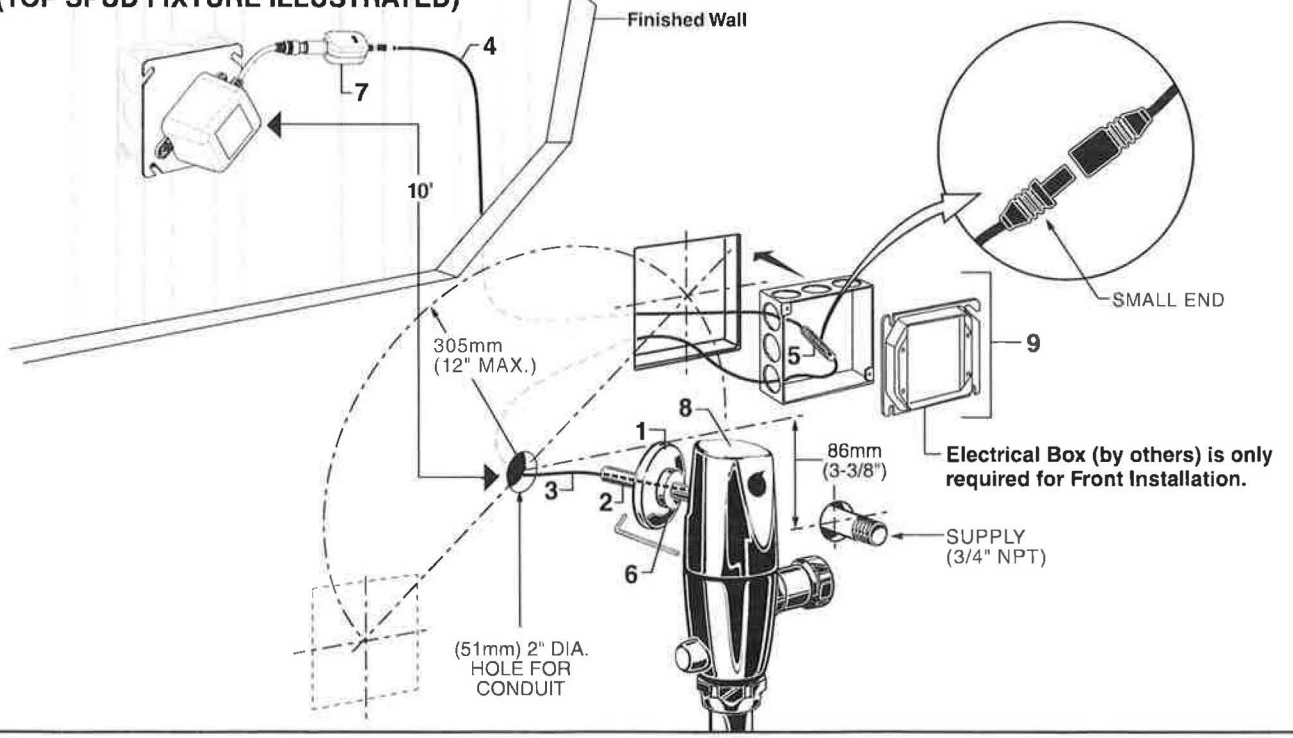
REMOTE INSTALLATION FOR POWER SUPPLY

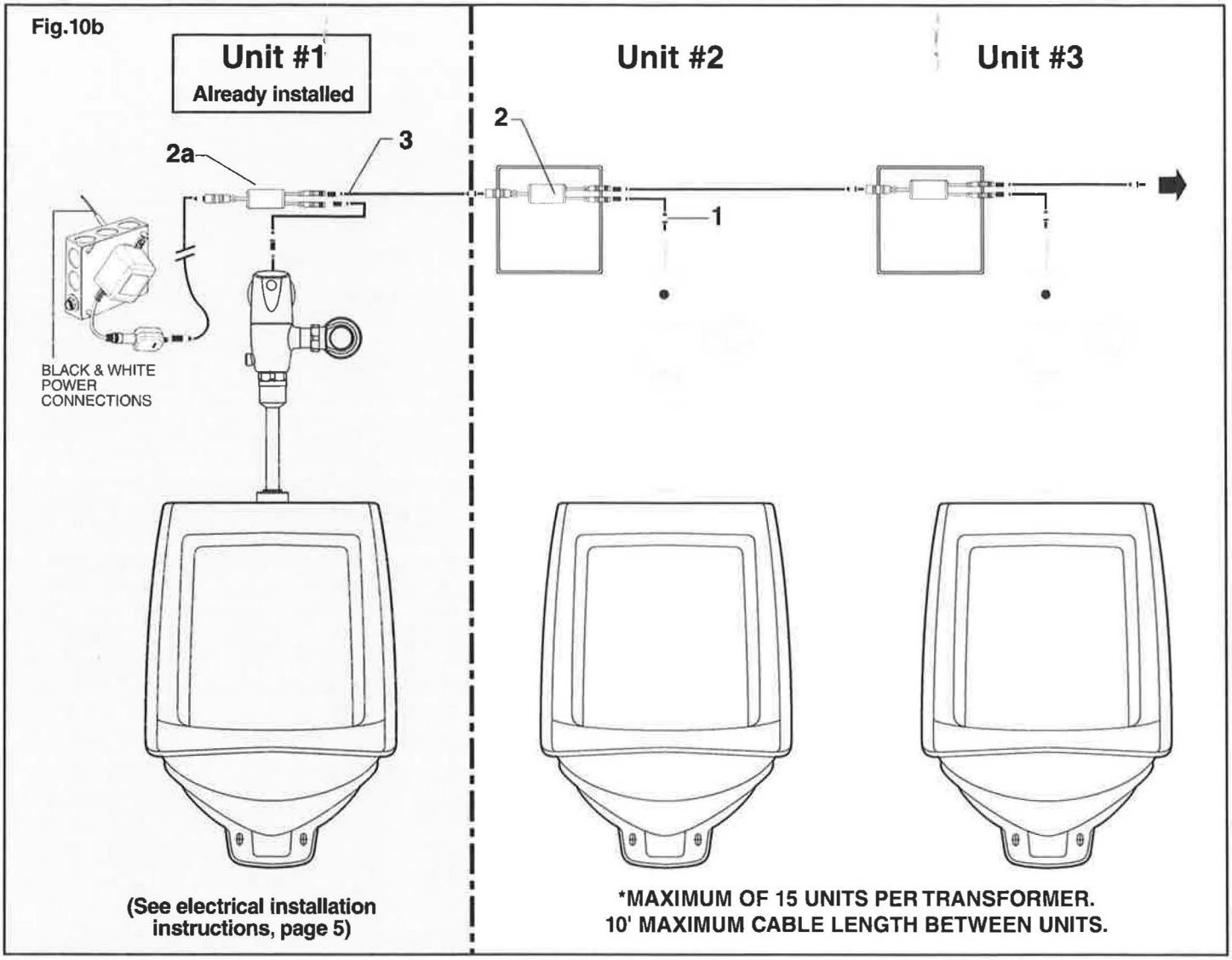
Mount a 4" x 4" x 2-1/2" (102 x 102 x 64 mm), ELECTRICAL BOX **(1)** (by others) within 10' from the installed flush valve. See **Fig. 10**.

8a INSTALL CONDUIT, ESCUTCHEON AND SENSOR CABLE; Fig. 10

1. Drill a 2" diameter hole (shown in **Fig. 10**) in the finished wall for the CONDUIT **(2)**.
2. Pull 27" EXTENSION CABLE **(3)** through CONDUIT **(2)**.
3. Slide ESCUTCHEON **(1)** onto CONDUIT **(2)**.
4. For front installation, connect the 10' EXTENSION CABLE **(4)** to the 27" EXTENSION CABLE **(3)**. Secure this connection with the CONNECTOR LOCKING DEVICE **(5)** and place inside electrical box.
5. Slide ESCUTCHEON **(1)** tight against finished wall and secure by tightening SET SCREW **(6)**.

Fig.10 (TOP SPUD FIXTURE ILLUSTRATED)





8b MULTI-AC VERSION (DAISY-CHAIN); Fig. 10b.

CAUTION Ensure that the line power to bathroom is OFF prior to making connections.

Important: ***All cover plates must be uninstalled before beginning to make daisy-chain connections. Disconnect the first unit's Y-Adapter from power supply before making daisy-chain connections.***

Note: ***For Unit #1 electrical instructions, refer to section #7 & #8a (page 5). For subsequent Units, refer to section #7 (page 5), as well as instructions below...***

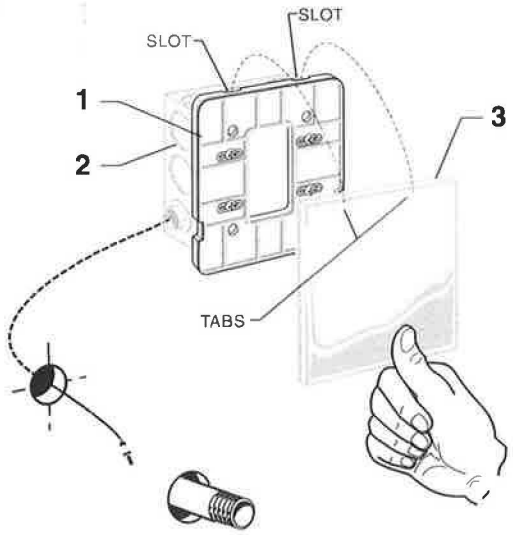
1. Connect one end of the 27" EXTENSION CABLE **(1)** to one of the two available terminals on the one end of the Y-ADAPTER **(2)**.
2. Take the 10' EXTENSION **(3)** and connect one end to the single terminal of Y-ADAPTER **(2)**, and the other end to available terminal of the previous unit's Y-ADAPTER **(2a)**.
3. Repeat process for each subsequent unit.
4. Place Y-ADAPTERS **(2)** into respective electrical box.
5. Reconnect the first unit's Y-ADAPTER **(2a)** to power supply once all daisy-chain unit connections have been made.

CAUTION: Use only American Standard supplied transformers and cable sets. Using non-AS supplied cables, or cutting, splicing or modifying any components will void the warranty.

9 COVER PLATE FRAME AND COVER PLATE INSTALLATION (front installation); Fig. 11

1. After power supply is remotely installed and wire connections are completed, install the COVER PLATE FRAME **(1)** onto the ELECTRICAL BOX **(2)**.
2. Install the two tabs on the back side of the COVER PLATE **(3)** into the two Slots located on the top edge of the COVER PLATE FRAME **(1)**. Push on bottom until it snaps into place.

Fig. 11



CAUTION: Use only American Standard supplied transformers and cable sets. Using non-AS supplied cables, or cutting, splicing or modifying any components will void the warranty.

MAINTENANCE

A ADJUST STOP VALVE; Fig. 12

IMPORTANT: ***To avoid overflowing, the STOP VALVE (3) must never be opened to the point where the flow from the valve exceeds the draining ability of the fixture.***

1. After installation is complete, peel off the PROTECTIVE FILM **(1)** from the sensor. Standing to one side, block the sensor with your hand for 10 seconds.

Remove your hand and listen for audible "click" from within the valve.

2. Remove STOP VALVE COVER **(2)** from STOP VALVE **(3)**. Turn on water supply 1/4 turn to 1/2 turn (CCW) and test for leaks.

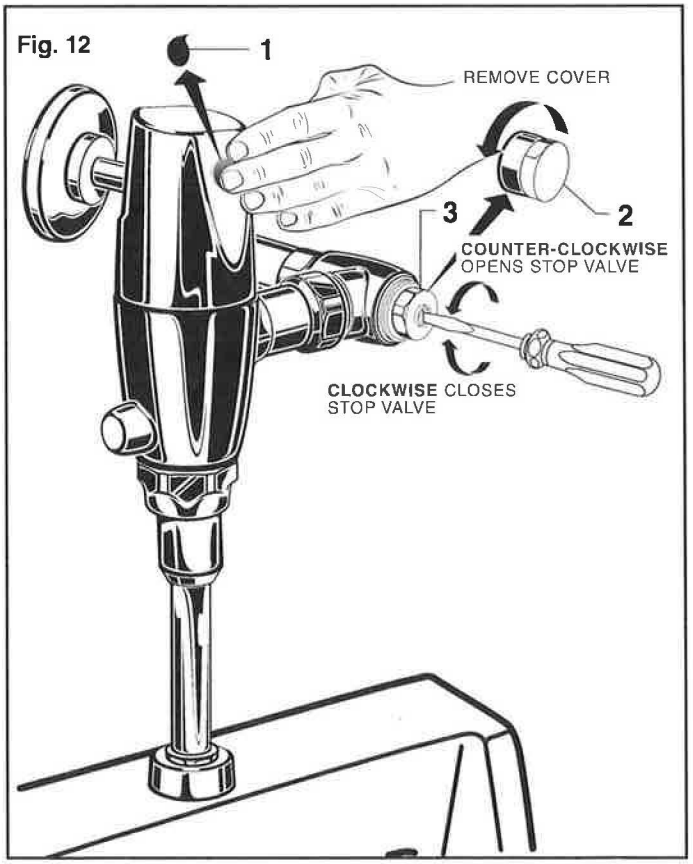
Note: ***Unit may flush for approximately 5 to 10 sec. when water is first turned on. If flow persists, turn water off and repeat step #1 above.***

3. Actuate the FLUSH VALVE:
   A) Cover sensor with hand for 10 seconds.

   NOTE: ***Stand outside of sensor detection area.***

   B) Remove hand from sensor detection area; unit will flush in approximately 3 seconds.
4. Adjust STOP VALVE **(3)** after each flush until the stated flush volume is achieved, no splashing occurs and the fixture is properly cleansed.
5. When adjustment is complete, replace STOP VALVE COVER **(2)** and tighten to ensure vandal-resistance.

Fig. 12



B SET DETECTION RANGE (if Required); Fig. 13 & 14

Note: ***The detection distance is preset and ideal for most installations. Should an adjustment be required, follow the steps below.***

1. To remove the COVER PLATE **(1)**, insert WIRE KEY **(2)** (supplied) into the two holes located at the bottom of the COVER PLATE **(1)**. Push the WIRE KEY **(2)** up until it releases the bottom clips. Pull the bottom edge away and lift the COVER PLATE **(1)** off. **Fig. 13**.

2. Remove the connections from the CONNECTOR LOCKING DEVICE **(5)**. Disconnect the 27" EXTENSION CABLE **(3)** from the 10' EXTENSION CABLE **(4)**, and reconnect.

Note: ***You have 5 seconds to begin entering the program code after power connection is made.***

3. While the SENSOR CONTROL LED **(1)** is blinking slowly, place your hand 1 to 2 in. (30-50 mm.) in front of the sensor. **Fig. 14**.

4. When the LED **(1)** stops blinking and stays "ON", move your hand to the desired position from sensor and hold in place until the LED **(1)** begins to blink again.

Note: ***Detection Zone is 400 - 800 mm (15-3/4"x 31-1/2"). (Factory Setting: 400 mm (15-3/4")***

5. Once the SENSOR CONTROL LED **(1)** begins to blink again, remove your hand from the detection zone. When the flashing stops, the detection distance is set.

6. Actuate the FLUSH VALVE:
   A) Cover sensor with hand for 10 seconds.

   NOTE: Stand outside of sensor detection area.

   B) Remove hand from detection area; unit will flush in approximately 3 seconds.

Fig. 13

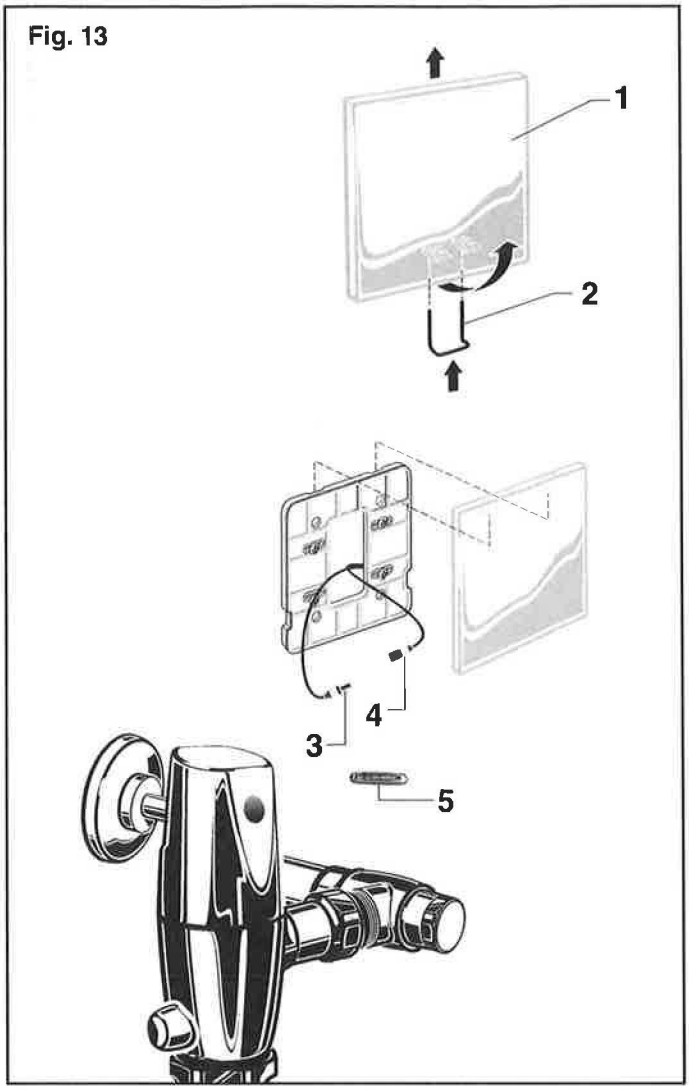
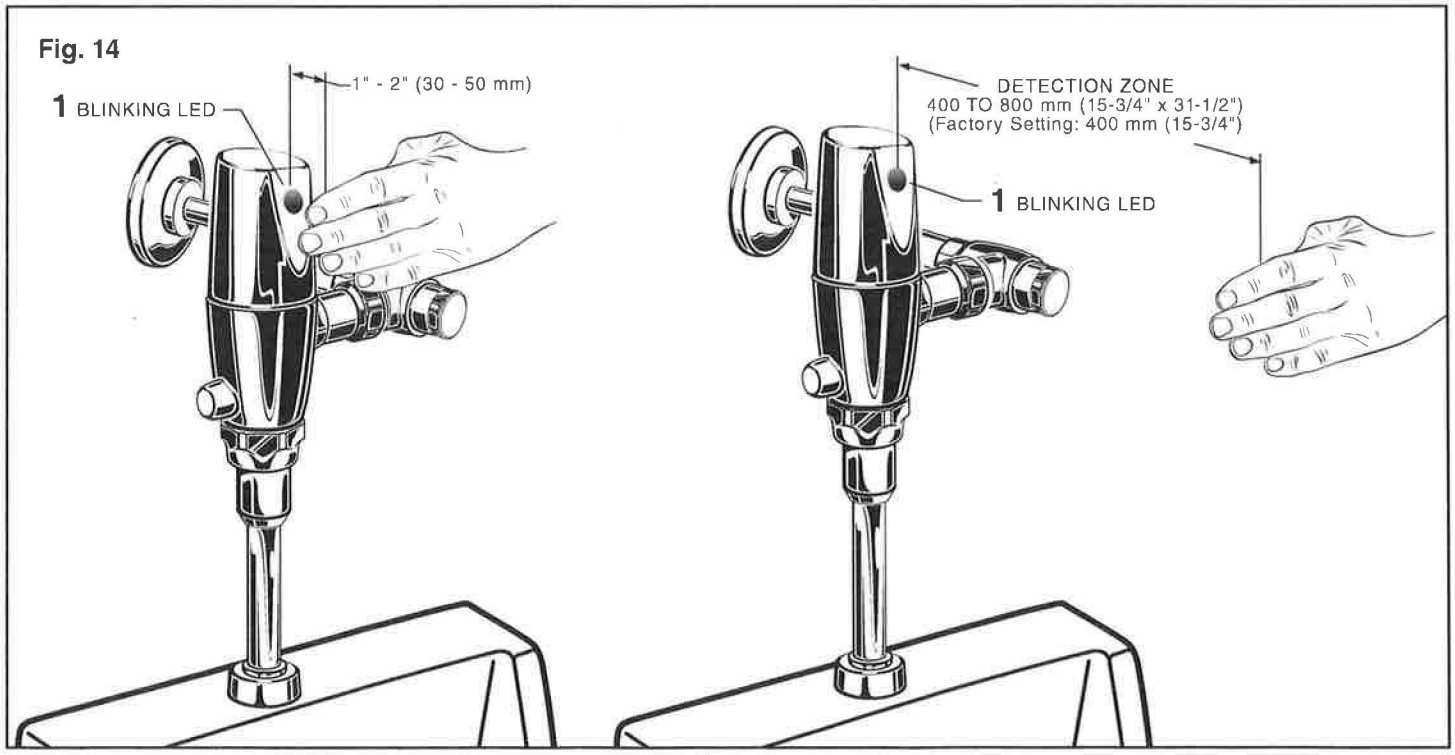


Fig. 14



TROUBLESHOOTING FLOW CHARTS

UNIT DOES NOT FUNCTION

IS ANGLE STOP OPEN? → NO → OPEN VALVE

↓ YES

REPEATED DOUBLE FLASH ON SENSOR? → YES → LOW VOLTAGE. TEST OUTPUT OF TRANSFORMER. MUST BE >5.4 VAC.

↓ NO

RECONNECT TRANSFORMER TO SENSOR. FLASH ON SENSOR FOR 5 SECONDS?
- 1 → NO → 1 → BAD TRANSFORMER. REPLACE. REPEAT.
- 2 → NO → 2 → DAMAGED SENSOR. REPLACE SENSOR.

↓ YES

PUSH MANUAL OVERRIDE BUTTON; WILL THE UNIT FLUSH? → YES → DAMAGED SOLENOID. REPLACE SOLENOID

↓ NO

REPLACE PISTON ASSEMBLY.



HOT LINE FOR HELP

For toll-free information and answers to your questions, call:

(844) CRT-TEAM / (844) 278-8326

Mon.– Fri. 8:00 a.m. to 8:00 p.m. EST Sat. 10:00 a.m. to 4:00 p.m. EST

IN MEXICO 01-800-839-1200

IN CANADA 1-800-387-0369 (TORONTO 1-905-306-1093)

Weekdays 8:00 a.m. to 7:00 p.m. EST

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To learn more about American Standard Selectronic® Products visit our website at: www.americanstandard-us.com or e-mail us at: CRTTEAM@lixilamericas.com

UNIT IS CONTINUOUSLY FLUSHING

CLOSE ANGLE STOP AND OPEN AGAIN TO PRIME THE VALVE. DOES FLUSHING STOP?

↓ NO

PUSH MANUAL OVERRIDE BUTTON. DOES IT RETURN TO ITS ORIGINAL POSITION FREELY? → NO → DAMAGED MANUAL OVERRIDE BUTTON. REPLACE MANUAL OVERRIDE BUTTON

↓ YES

RECONNECT TRANSFORMER TO SENSOR. FLASH ON SENSOR FOR 5 SECONDS?
- 1 → NO → 1 → BAD TRANSFORMER. REPLACE. REPEAT.
- 2 → NO → 2 → DAMAGED SENSOR. REPLACE SENSOR.

↓ YES

REPLACE PISTON & SOLENOID ASSEMBLY.

UNIT WILL ONLY FLUSH MANUALLY

REPEATED DOUBLE FLASH ON SENSOR? → YES → CRITICALLY LOW BATETRY. INSTALL NEW BATTERY

↓ NO

RECONNECT TRANSFORMER TO SENSOR. FLASH ON SENSOR FOR 5 SECONDS?
- 1 → NO → 1 → BAD TRANSFORMER. REPLACE. REPEAT.
- 2 → NO → 2 → DAMAGED SENSOR. REPLACE SENSOR.

↓ YES

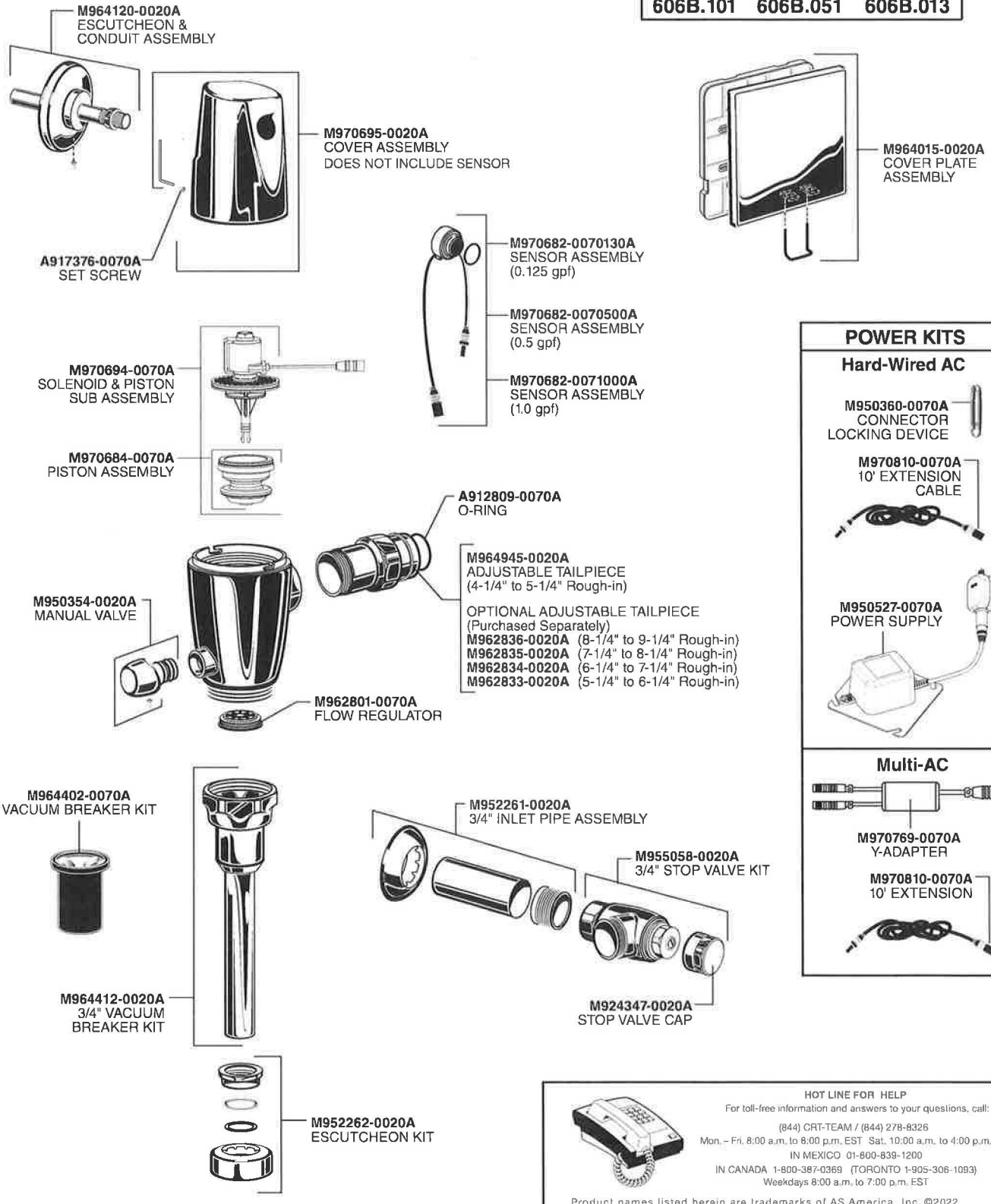
REPLACE SOLENOID.

American Standard

Ultima™ Selectronic® Battery Powered

Urinal Flush Valve, Piston-Type

MODEL NUMBERS		
606B.101	606B.051	606B.013



POWER KITS

Hard-Wired AC

Multi-AC

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IN CANADA 1-800-387-0369 (TORONTO 1-905-306-1093)

Weekdays 8:00 a.m. to 7:00 p.m. EST

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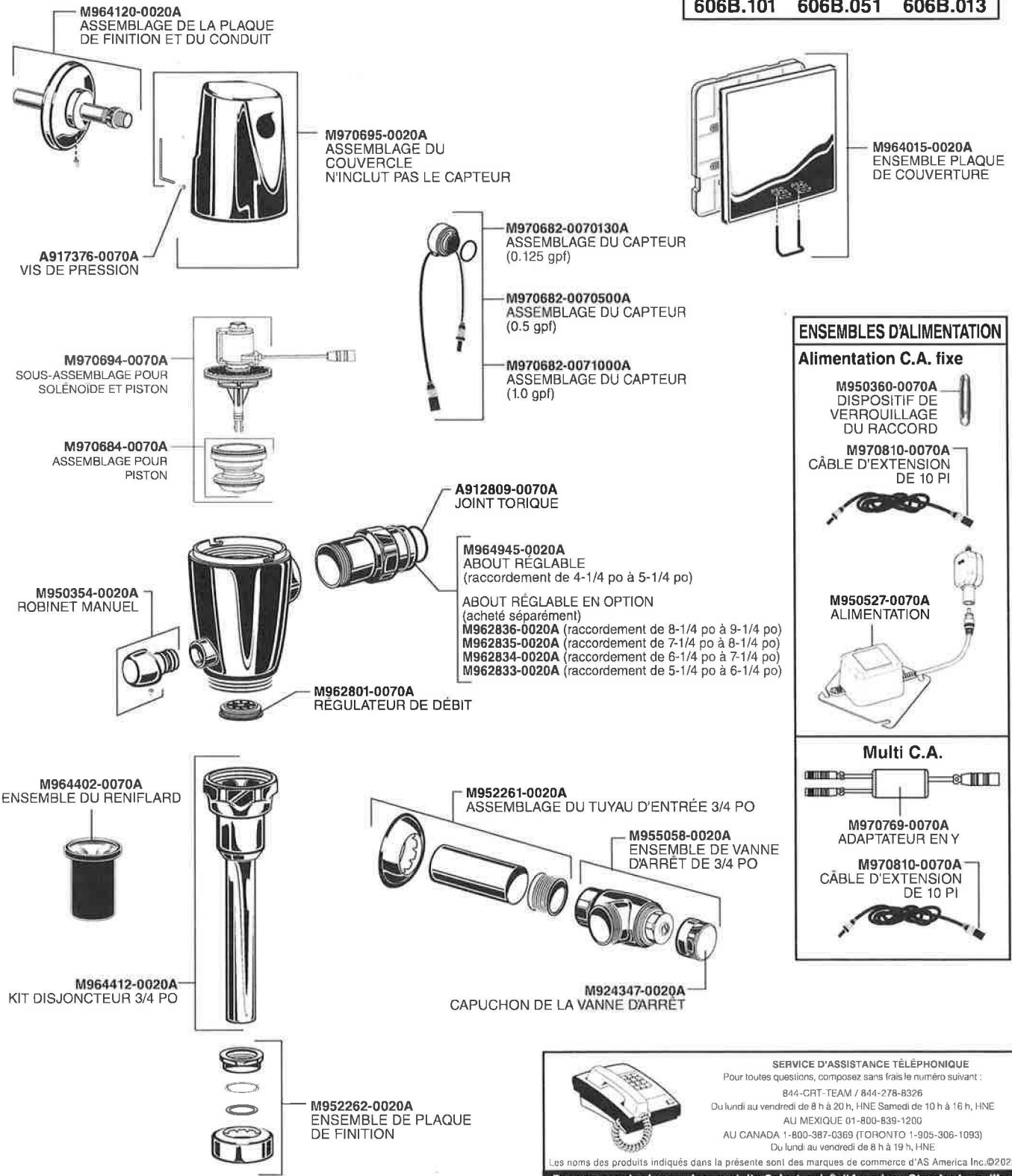
PART OF LIXIL

American Standard

Ultima,[MC] Selectronic[MD] à pile

Robinet de chasse d'urinoir, à piston

NUMÉROS DE MODÈLE		
606B.101	606B.051	606B.013



ENSEMBLES D'ALIMENTATION

Alimentation C.A. fixe

Multi C.A.

SERVICE D'ASSISTANCE TÉLÉPHONIQUE

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AU CANADA 1-800-387-0369 (TORONTO 1-905-306-1093)

Du lundi au vendredi de 8 h à 19 h, HNE

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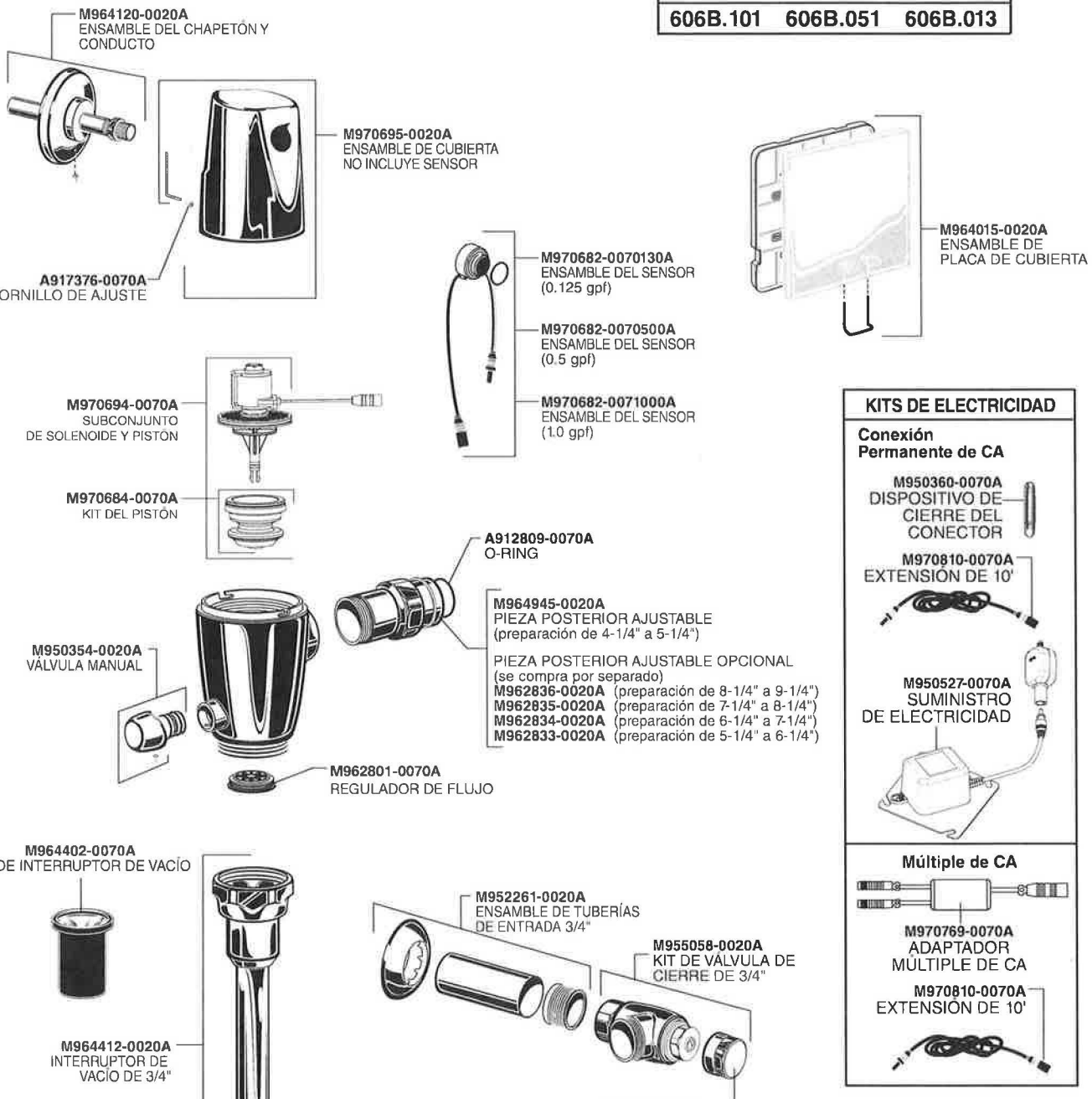
PART OF LIXIL

American Standard

Ultima™ Con baterías Selectronic®

Válvula de descarga del mingitorio, pistón

NÚMEROS DE MODELO		
606B.101	606B.051	606B.013



KITS DE ELECTRICIDAD

Conexión Permanente de CA

Múltiple de CA



LÍNEA DE AYUDA DIRECTA

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Hora normal del este
EN MÉXICO: 01-800-839-1200
EN CANADÁ: 1-800-387-0369 (TORONTO: 1-905-306-1093)
Los días de semana de 8:00 a.m. a 7:00 p.m. Hora normal del este

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PART OF LIXIL

WC-1

INSTALLATION INSTRUCTIONS

AFWALL® MILLENNIUM™ FLUSHOMETER WALL-MOUNTED TOILETS

Models 3351.101, 3352.101, 3353.101, 3354.101, 2257.101, 2257.101.NAF, 2633.101, 2634.101

Meets the American Disabilities Act Guidelines and ANSI A117.1 Requirements for the Physically Challenged

Thank you for selecting American Standard – the benchmark of fine quality for over 100 years. To ensure this product is installed properly, please read these instructions carefully before you begin. (Certain installations may require professional help.) Also be sure your installation conforms to local codes.

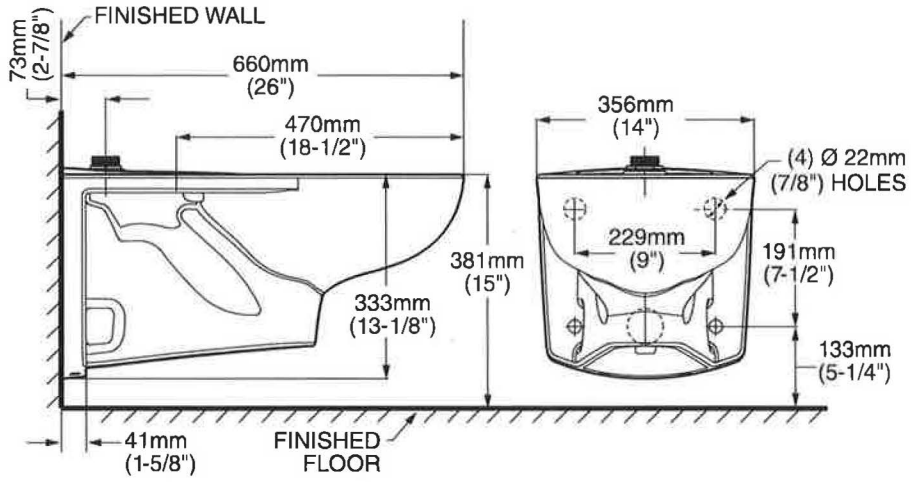
⚠ CAUTION: PRODUCT IS FRAGILE. TWO PEOPLE ARE RECOMMENDED FOR HANDLING TO AVOID BREAKAGE AND POSSIBLE INJURY!

NOTE: *For proper operation product requires a minimum of 30 psi working line pressure*

RECOMMENDED TOOLS AND MATERIALS

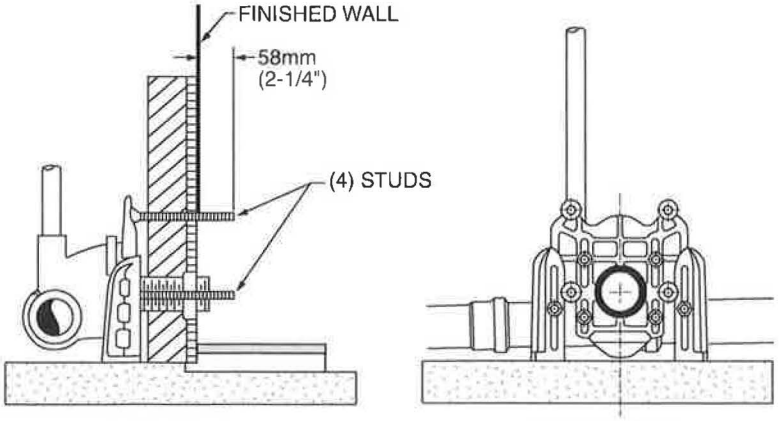
Closet Carrier Support	Regular Screwdriver	Sealant	Carpenters Level
Putty Knife	Adjustable Wrench	Tape Measure	Flush Valve

1 Pictures may not exactly define contour of china



2 FIXTURE MOUNTING

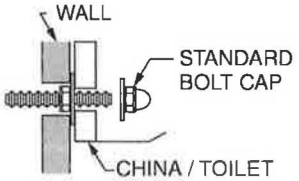
Fixture studs should project 58mm (2-1/4") from face of finished wall.



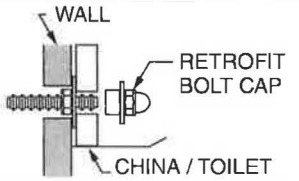
SIDE VIEW **FRONT VIEW**

NOTE: If carrier bolt does not extend or is flush with china, use retrofit caps 7381285-200 (sold separately).

STANDARD BOLT CAP



RETROFIT BOLT CAP



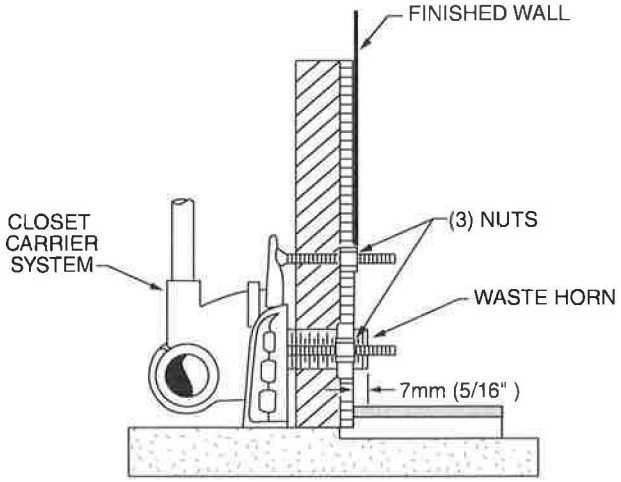
SAVE FOR FUTURE USE

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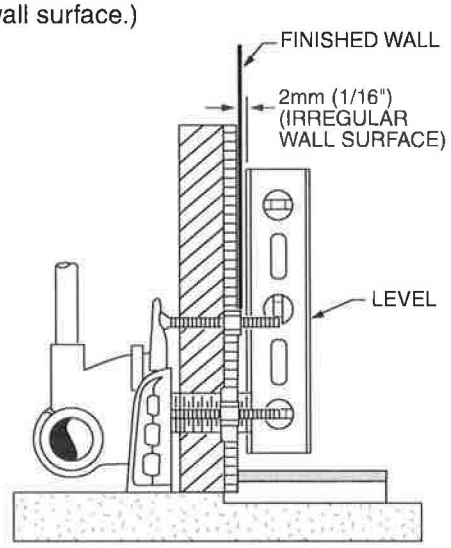
3

- Place back-up nuts on both bottom bolts, and the top left-hand bolt only.
- Adjust the two lower back-up nuts so that front face of nuts is flush with finished wall.
- Adjust waste horn to project 7mm (5/16") from finished wall.



4

- Using a level, adjust the top left back-up nut so that it is in the same vertical plane as the lower left back-up nut. (If wall surface is irregular, the three back-up nuts must be positioned to allow a minimum 1/16" (2mm) gap between fixture and wall surface.)



5

- NOTE: Bearing nuts and washers must be set to take full loading from the fixture allowing 1/16" (2mm) clearance between fixture and wall.
- Follow support manufacturer's recommended setting of closet outlet connection.
- Place felt or neoprene gasket (wax ring not recommended) on closet outlet.
- When the fixture is installed, closet outlet gasket must be compressed sufficiently to assure a gas and watertight seal.

The following steps require a helper:

- Install bowl on support using cap nuts and fiber washers with the back-up nuts and washers.

  DO NOT APPLY TOP RIGHT FIBER WASHER AND CAP NUT UNTIL OTHER CAP NUTS HAVE BEEN FIRMLY TIGHTENED USING A WRENCH.

- Install top right cap nut with fiber washer and run up hand tight. Wrench tighten approximately 1/4 turn.

- Apply sealant to gap between bowl and finished wall. Remove excess sealant.

In the United States:
American Standard Brands
P.O. Box 6820
Piscataway, New Jersey 08855
Attention: Director of Customer Care

For residents of the United States, warranty information may also be obtained by calling the following toll free number: (800) 442-1902

www.americanstandard.com

In Canada:
AS Canada, ULC
5900 Avebury Rd.
Mississauga, Ontario
Canada L5R 3M3

Toll Free: (800) 387-0369

www.americanstandard.ca

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American Standard B&K Mexico
S. de R.L. de C.V.
Via Morelos #330
Col. Santa Clara
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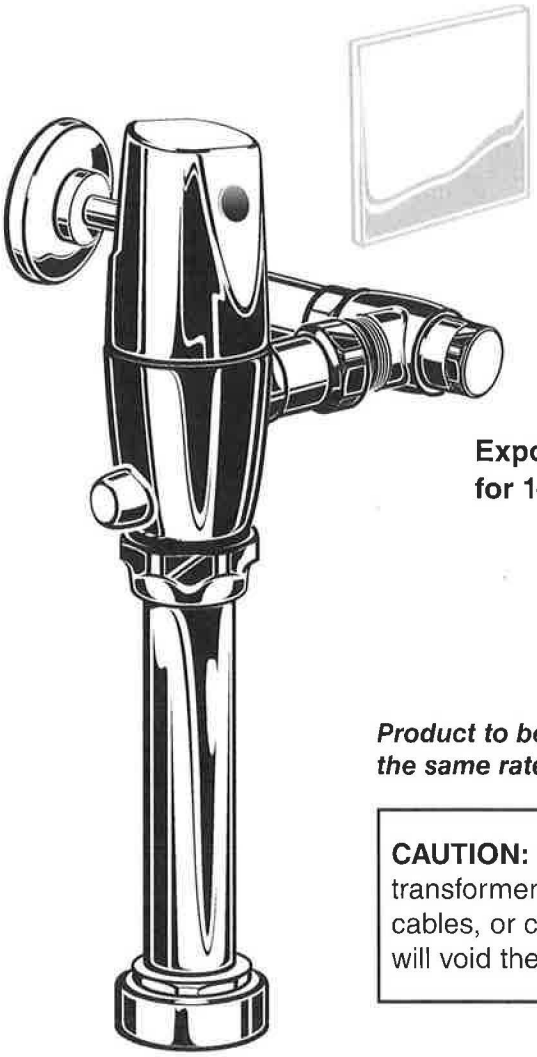
www.americanstandard.com.mx

Installation Instructions

Ultima™ Selectronic® Battery Powered

Toilet Flush Valve, Piston-Type

MODEL NUMBERS				
606B.111	606B.121	606B.161	606B.721	606B.761



COVER PLATE
(Required for Front Installation Only)

Exposed Flush Valve
for 1-1/2" Top Spud Bowls

Product to be used with WaterSense Certified Fixture with the same rated flush volume.

CAUTION: Use only American Standard supplied transformers and cable sets. Using non-AS supplied cables, or cutting, splicing or modifying any components will void the warranty.

Certified to comply with ASME A112.19.2

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M965644

American Standard

NOTE TO INSTALLER: Please give this manual to the customer after installation.

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For Parts, Service, Warranty or other Assistance, please call (844) CRT-TEAM / (844) 278-8326 (In Canada: 1-800-387-0369)
(In Toronto Area only: 1-905-306-1093)

American Standard CRT Certified Response Technician

Thank you for selecting American-Standard...the benchmark of fine quality for over 100 years. To ensure that your installation proceeds smoothly--please read these instructions carefully before you begin.

UNPACKING

All American Standard Products Are Water Tested At Our Factory. Some Residual Water May Remain In The Valve During Shipping.

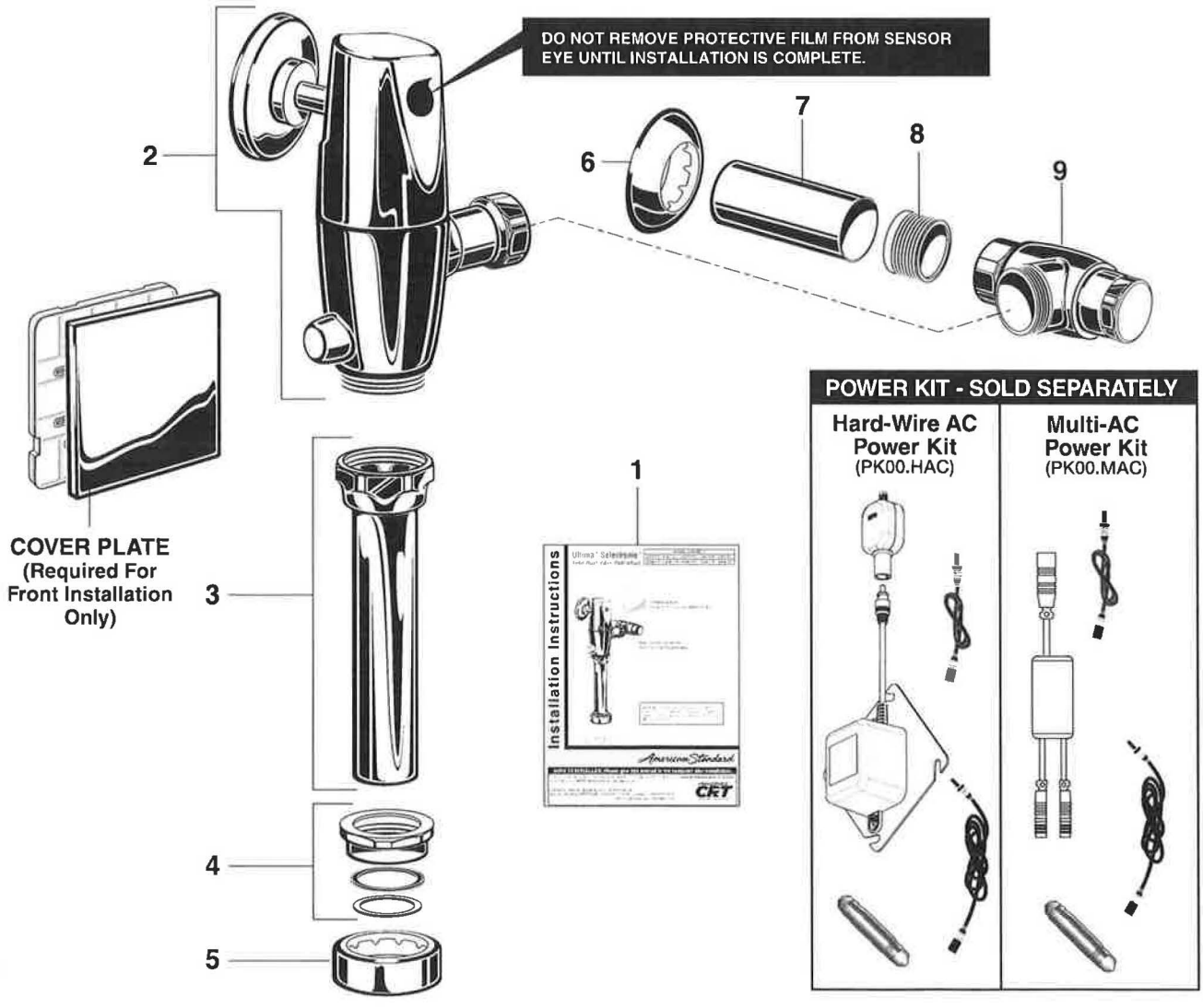
Remove the Flush Valve items from the carton. The illustration below shows all items after they have been removed from the carton. Some items may be packaged partially assembled to other items.

1. Installation Instructions
2. Flush Valve Body Assembly
3. Vacuum Breaker Tube
4. Spud Coupling Nut and Washers
5. Spud Flange
6. Wall Escutcheon
7. Cover Tube
8. Sweat Adapter
9. Stop Valve

CARE INSTRUCTIONS:

DO: CLEAN THE PRODUCT WITH CLEAR WATER, DRY WITH A SOFT COTTON FLANNEL CLOTH.

DO NOT: DO NOT CLEAN THE PRODUCT WITH SOAPS, ACID, POLISH, ABRASIVES, HARSH CLEANERS, OR A CLOTH WITH A COARSE SURFACE.



M965644 EN REV. 2.7 (2/22)

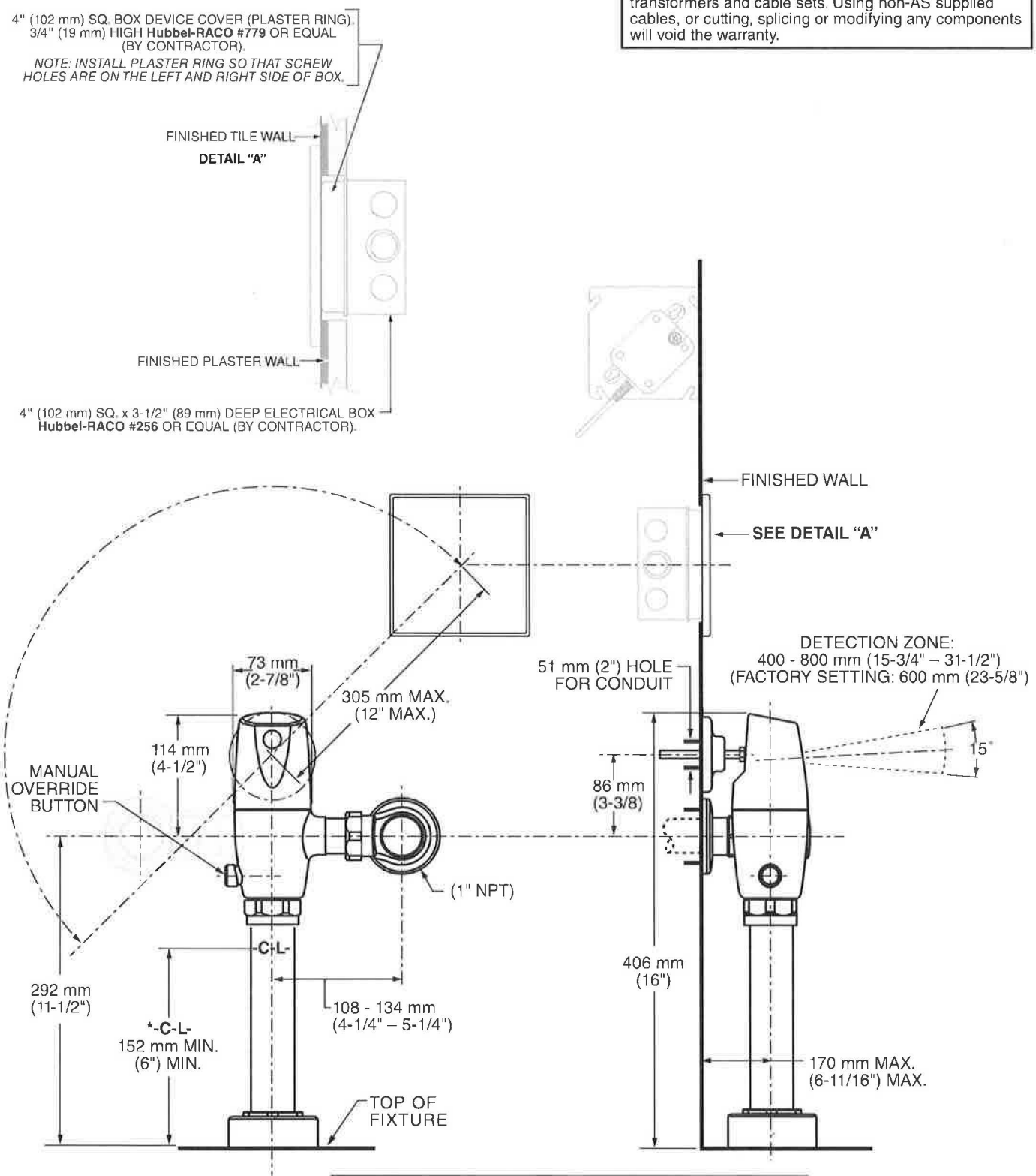
Roughing-in Dimensions *(Front Installation Shown)*

Right or Left Hand Installation
See **(Section 5)** for converting Flush Valve to Left Hand Installation.

GENERAL DESCRIPTION:

SELECTRONIC® PROXIMITY TOILET FLUSH VALVE for 1-1/2" Top Spud Fixtures

CAUTION: Use only American Standard supplied transformers and cable sets. Using non-AS supplied cables, or cutting, splicing or modifying any components will void the warranty.

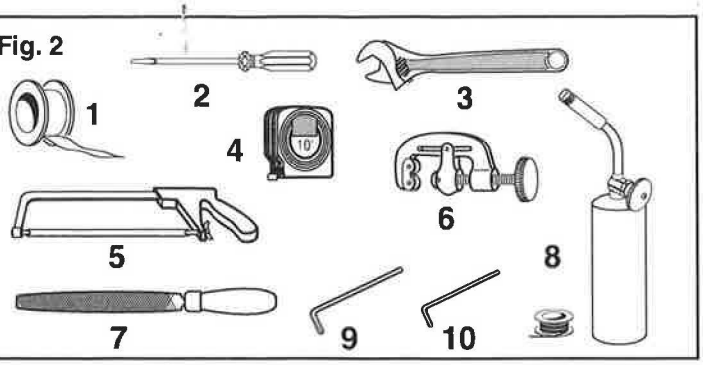


*Note: The Critical Line (-C-L-) on Vacuum Breaker must typically be 6" (152mm) above fixture. Consult Codes for details.

RECOMMENDED TOOLS; Fig. 2.

1. Teflon Tape
2. Flat Blade Screwdriver
3. Adjustable Wrench
4. Tape Measure
5. Hacksaw
6. Tubing Cutter
7. File
8. For Sweat Connection; Solder and Torch
9. 2.5 mm Hex Wrench
10. 1.5 mm Hex Wrench

Fig. 2



PRIOR TO INSTALLATION

Note: Prior to installing the Selectronic™ Flush Valve the following items must be installed.

1. Toilet
2. Drain line
3. Water supply line

IMPORTANT:

- **All plumbing and electrical wiring should be installed in accordance with applicable codes and regulations.**
- The use of water hammer arrestors is strongly recommended for commercial applications. All piping behind the walls should be properly secured and fastened.
- Water supply lines must be sized to provide an adequate volume of water for each fixture.
- Flush all water lines prior to operation. Dirt and debris can cause flush valve to run continuously.
- **With the exception of Stop Valve Inlet, DO NOT use pipe sealant or plumbing grease on any valve component or coupling!**
- Protect the chrome or special finish on the Flushometer. DO NOT USE toothed tools on finished surfaces to install or service these valves. Also see "Care and Cleaning" section of this manual.
- This product contains mechanical and/or electrical components that are subject to normal wear. These components should be checked on a regular basis and replaced as needed to maintain the valve's performance.

FLUSH VALVE INSTALLATION

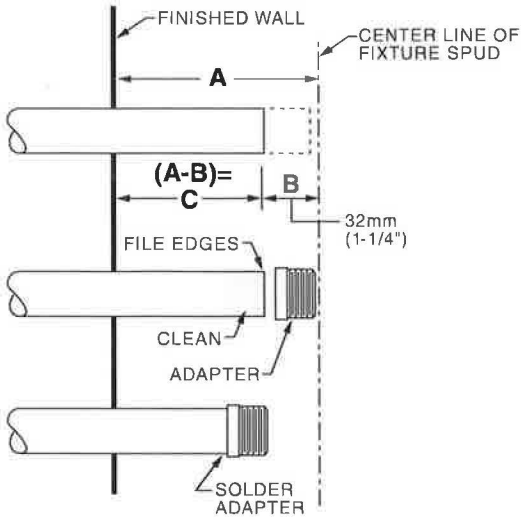
1 INSTALL SWEAT ADAPTER; Fig. 3

CAUTION Turn water supplies off before beginning

Note: Install Optional Sweat Adapter (Supplied) for copper pipe supply line.

1. Measure the distance (A) from the finished wall to the center of the inlet spud on the fixture.
2. Cut the supply pipe 1-1/4" (A-B=C) shorter than the measurement taken in Step 1. File any rough edges off the end of the supply pipe.
3. Clean the end of the supply pipe. Push the threaded Adapter until it is seated against the internal stop. Sweat the Adapter to the pipe.

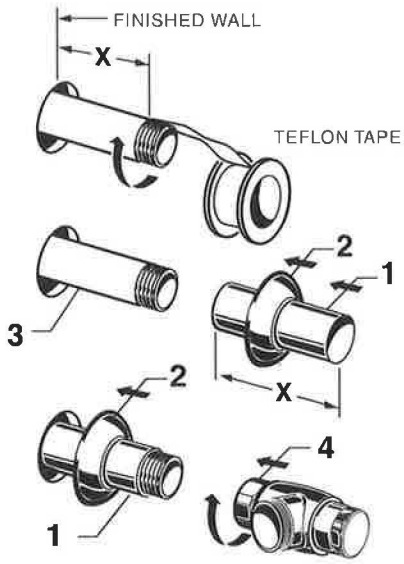
Fig.3



2 INSTALL COVER TUBE, WALL ESCUTCHEON and STOP VALVE; Fig. 4

1. Measure from finished wall to first thread of Adapter or threaded supply pipe (dimension "X"). Cut COVER TUBE **(1)** to length (X). Apply Teflon Tape to the threaded end of the Adapter or supply pipe.
2. Push WALL ESCUTCHEON (2) onto the COVER TUBE **(1)**. Slide both onto the SUPPLY PIPE **(3)**.
3. Push the COVER TUBE **(1)** in to expose the threads of the supply pipe. With a wrench, thread the STOP VALVE **(4)** onto the SUPPLY PIPE **(3)**. Align and tighten.
4. Pull COVER TUBE **(1)** against STOP VALVE **(4)** and push WALL ESCUTCHEON **(2)** against finished wall.

Fig. 4

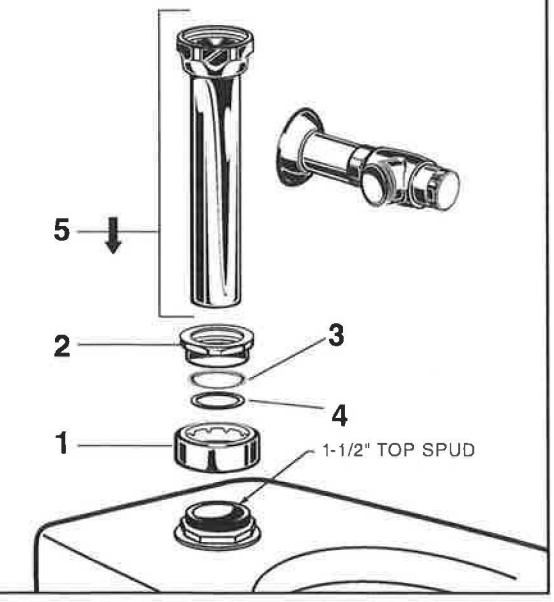


3 INSTALL VACUUM BREAKER TUBE; Fig. 5

1. Place the SPUD FLANGE **(1)** over the spud on the Fixture.
2. Place FRICTION WASHER **(3)** and SEAL WASHER **(4)** inside SPUD COUPLING NUT **(2)** and thread onto Spud. Do not tighten fully.
3. Insert the VACUUM BREAKER TUBE **(5)** into the SPUD COUPLING NUT **(2)** and push it down.

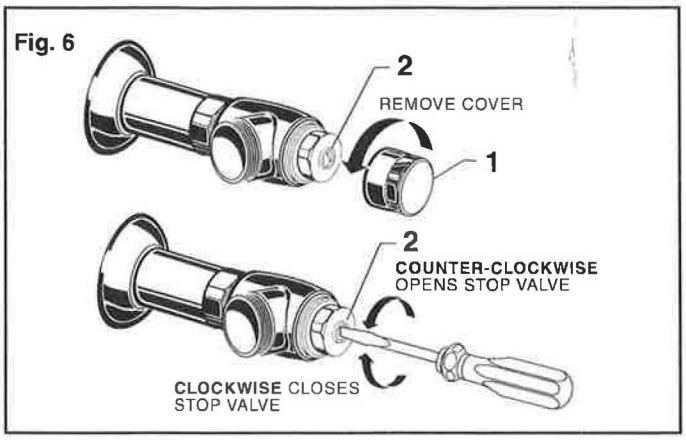
Note: ***If cutting VACUUM BREAKER TUBE (5) to size, note that Critical Line (C/L) on Vacuum Breaker must typically be 6" (152mm) above fixture. Consult Code for details.***

Fig. 5



4 FLUSH OUT SUPPLY LINES; Fig. 6

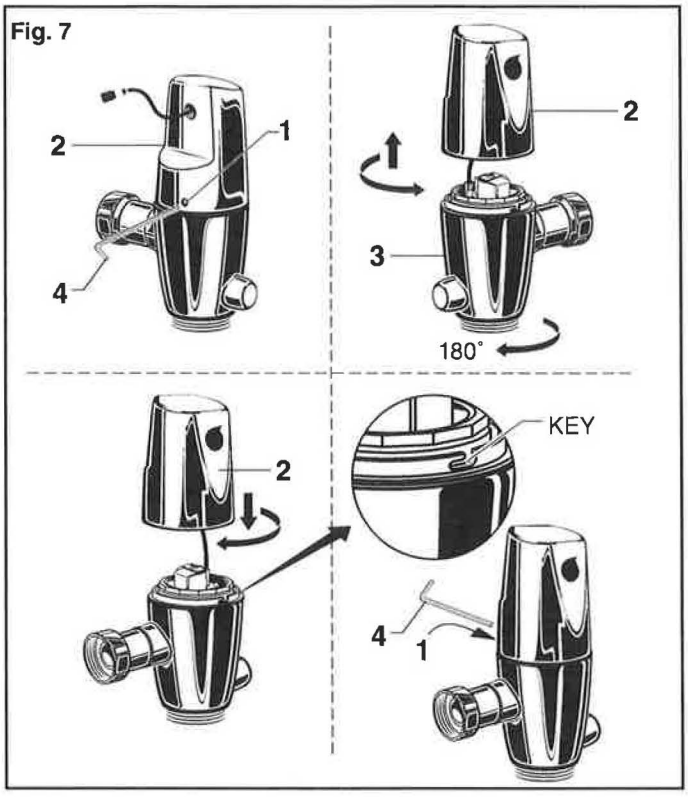
1. Remove STOP VALVE COVER **(1)** from STOP VALVE **(2)**.
2. Open STOP VALVE **(2)** with a flat blade screwdriver.
3. Turn on water supply to flush line of any debris or sediment.
4. Close STOP VALVE **(2)** and replace STOP VALVE COVER **(1)**.



5 LEFT OR RIGHT HAND INSTALLATION; Fig. 7

The unit is shipped with the adjustable tailpiece on the right side. If needed, the orientation can be modified by following the steps below.

1. Loosen SET SCREW **(1)** with 2.5mm Hex Wrench **(4)** in back of FLUSH VALVE COVER **(2)**.
2. Rotate FLUSH VALVE COVER **(2)** to the right and lift off.
3. Rotate FLUSH VALVE BODY **(3)** 180˚
4. Replace COVER **(2)** and rotate until key engages. Tighten SET SCREW **(1)**.



6 INSTALL FLUSH VALVE; Fig. 8, 8a

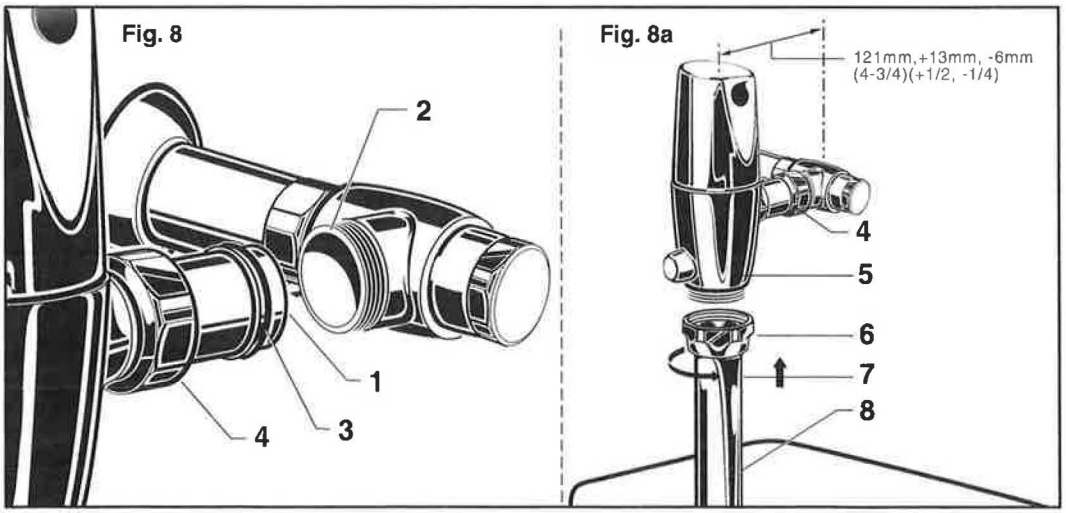
1. Insert ADJUSTABLE TAILPIECE **(1)** into the STOP VALVE **(2)**. Lubricate the O-RING **(3)** with water if necessary. Lightly tighten COUPLING NUT **(4)**. **Fig. 8**.

Important: ***Do not use lubricants (other than water) or any type of thread sealing paste or tape.***

2. Align the FLUSH VALVE BODY **(5)** directly above the VACUUM BREAKER TUBE **(7)** and VACUUM BREAKER COUPLING NUT **(6)**. **Fig. 8a**.

Note: ***There is a +13mm, -6mm (+1/2, -1/4) tolerance for the 121mm (4-3/4) dimension.***

3. Pull the VACUUM BREAKER TUBE **(7)** up to meet the threaded FLUSH VALVE BODY **(5)**, hand tighten the VACUUM BREAKER COUPLING NUT **(6)**. Align all components of the flush valve assembly. **Fig. 8a**.
4. Lightly tighten the COUPLING NUT **(4)** connection first, then the VACUUM BREAKER COUPLING NUT **(6)** and finally the SPUD COUPLING NUT **(8)**. Once alligned correctly, use a wrench to tighten couplings to make water tight connections. **Fig. 8a**.



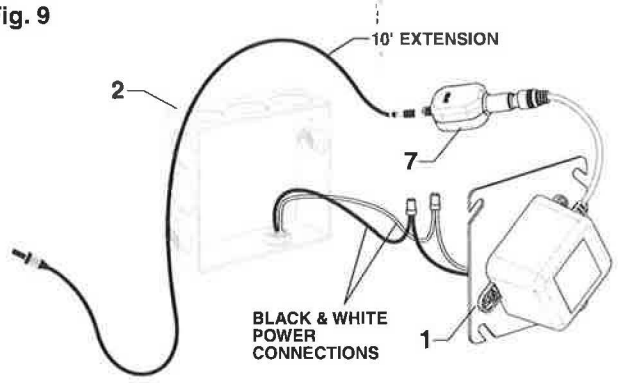
ELECTRICAL INSTALLATION

7 INSTALL POWER SUPPLY AND MAKE ELECTRICAL CONNECTIONS; Fig. 9 (remote and front installation)

CAUTION Ensure that the line power to bathroom is OFF prior to making connections.

1. Connect Black and White power connections to AC TRANSFORMER **(1)**. Mount AC TRANSFORMER **(1)** onto ELECTRICAL BOX **(2)**.
2. Connect the 10' EXTENSION CABLE (sold seperately) to the CONVERTER **(7)**.

Fig. 9



NOTE: AC Transformer must be installed on the outside of the Electrical Box.

8 INSTALL ELECTRICAL BOX (BY OTHERS); Fig. 10

FRONT INSTALLATION (with optional cover plate)

Note: ***The ELECTRICAL BOX (1) can be installed in any location along the marked arc.***

Cut a 105 x 105 mm (4-1/8" x 4-1/8") opening in finished wall for ELECTRICAL BOX **(1)** (by others) and follow installation template provided in box. See **Fig. 10**.

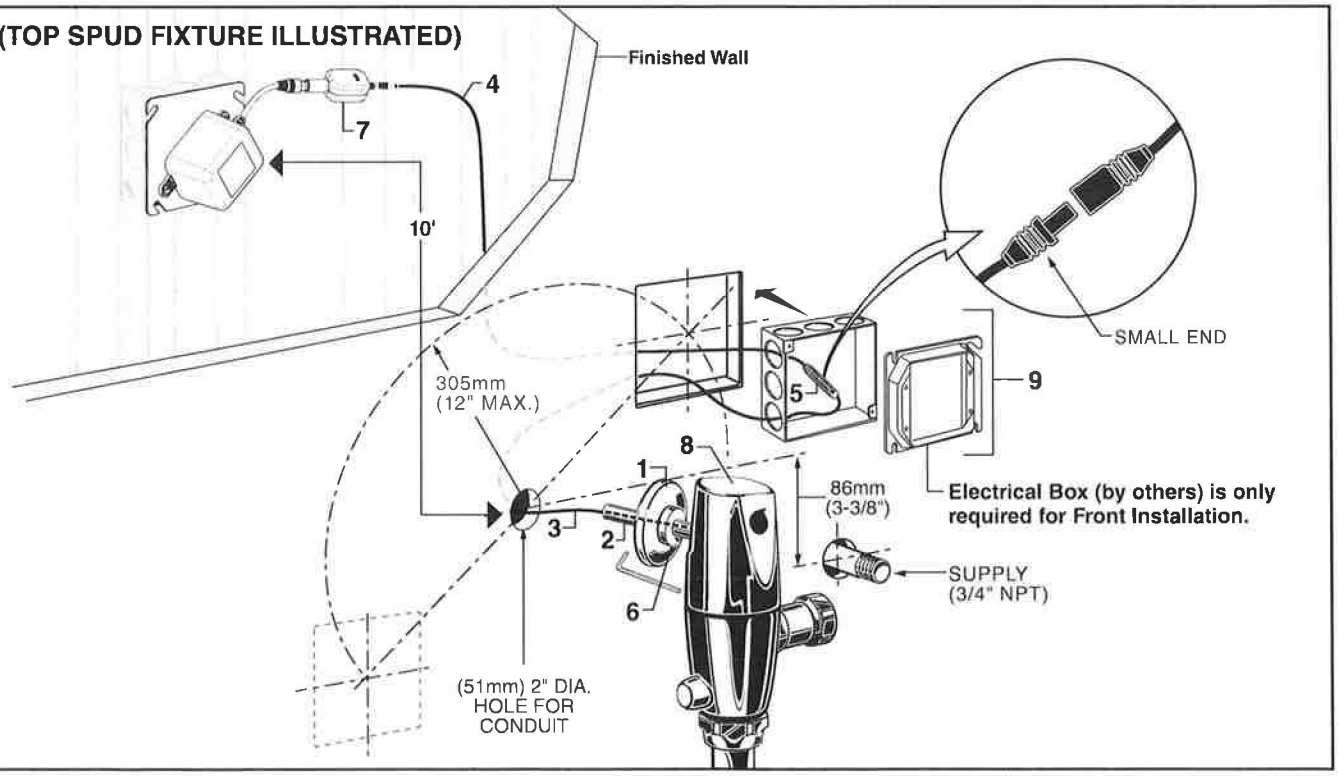
REMOTE INSTALLATION FOR POWER SUPPLY

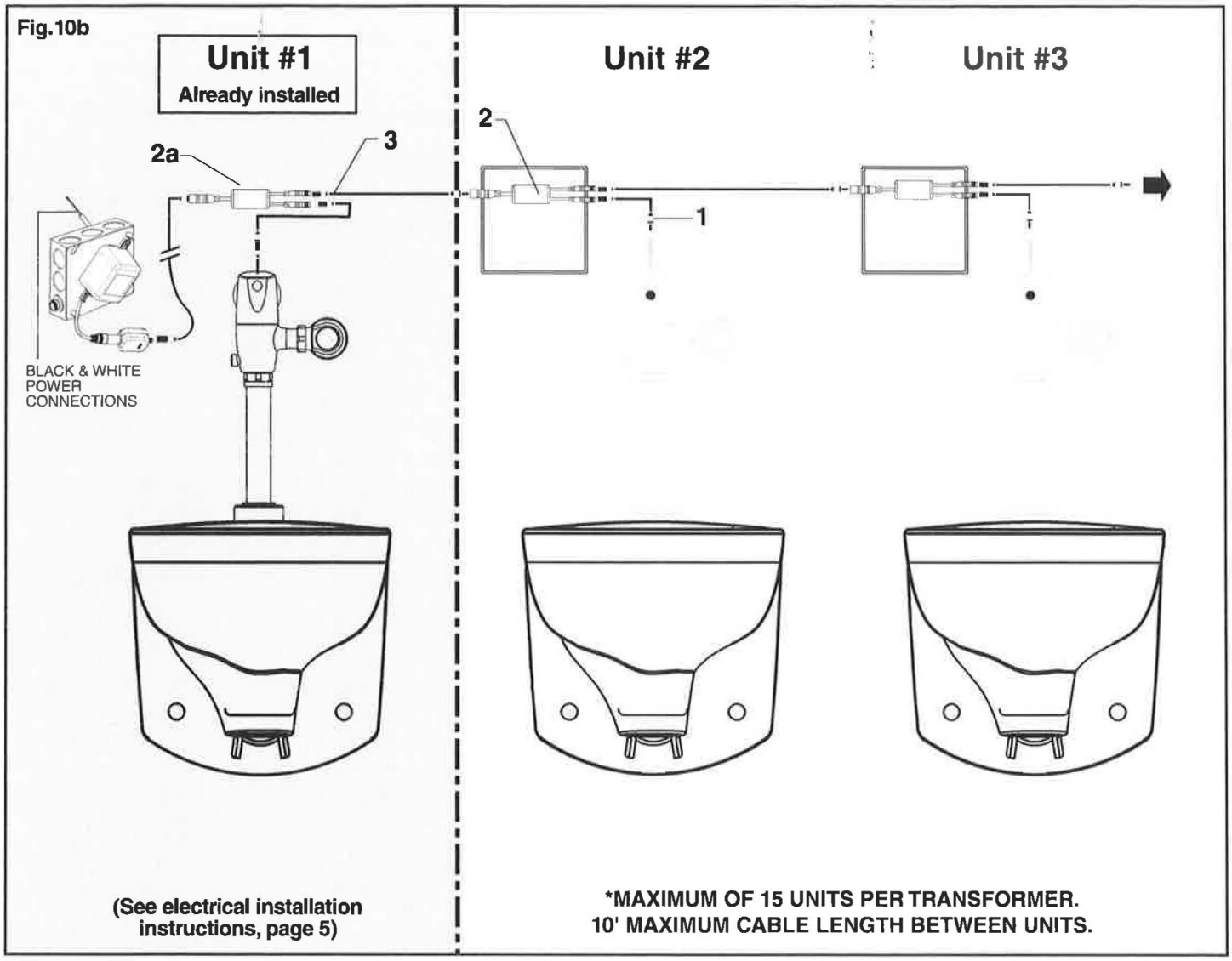
Mount a 4" x 4" x 2-1/2" (102 x 102 x 64 mm), ELECTRICAL BOX **(1)** (by others) within 10' from the installed flush valve. See **Fig. 10**.

8a INSTALL CONDUIT, ESCUTCHEON AND SENSOR CABLE; Fig. 10

1. Drill a 2" diameter hole (shown in **Fig. 10**) in the finished wall for the CONDUIT **(2)**.
2. Pull 27" EXTENSION CABLE **(3)** through CONDUIT **(2)**.
3. Slide ESCUTCHEON **(1)** onto CONDUIT **(2)**.
4. For front installation, connect the 10' EXTENSION CABLE **(4)** to the 27" EXTENSION CABLE **(3)**. Secure this connection with the CONNECTOR LOCKING DEVICE **(5)** and place inside electrical box.
5. Slide ESCUTCHEON **(1)** tight against finished wall and secure by tightening SET SCREW **(6)**.

Fig.10 (TOP SPUD FIXTURE ILLUSTRATED)





8b MULTI-AC VERSION (DAISY-CHAIN); Fig. 10b.

CAUTION Ensure that the line power to bathroom is OFF prior to making connections.

Important: ***All cover plates must be removed before beginning to make daisy-chain connections.***

Note: ***For Unit #1 electrical instructions, refer to section #7 & #8a (page 5).***
For subsequent Units, refer to section #7 (page 5), as well as instructions below...

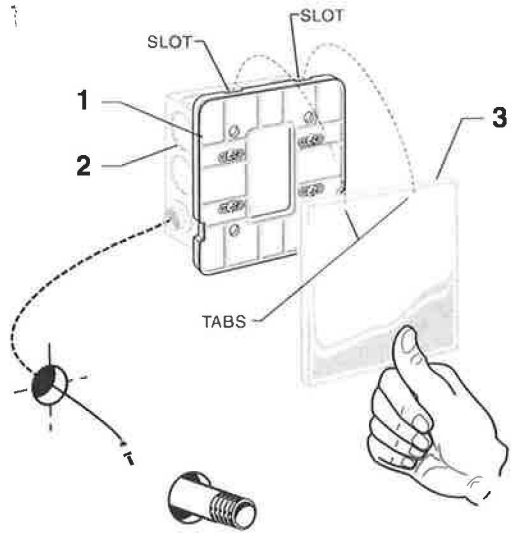
1. Connect one end of the 27" EXTENSION CABLE **(1)** to one of the two available terminals on the one end of the Y-ADAPTER **(2)**.
2. Take the 10' EXTENSION **(3)** and connect one end to the single terminal of Y-ADAPTER **(2)**, and the other end to available terminal of the previous unit's Y-ADAPTER **(2a)**.
3. Repeat process for each subsequent unit.
4. Place Y-ADAPTERS **(2)** into respective electrical box.
5. Reconnect the first unit's Y-ADAPTER **(2a)** to power supply once all daisy-chain unit connections have been made.

CAUTION: Use only American Standard supplied transformers and cable sets. Using non-AS supplied cables, or cutting, splicing or modifying any components will void the warranty.

9 COVER PLATE FRAME AND COVER PLATE INSTALLATION (front installation); Fig. 11

1. After power supply is remotely installed and wire connections are completed, install the COVER PLATE FRAME **(1)** onto the ELECTRICAL BOX **(2)**.
2. Install the two tabs on the back side of the COVER PLATE **(3)** into the two Slots located on the top edge of the COVER PLATE FRAME **(1)**. Push on bottom until it snaps into place.

Fig. 11



CAUTION: Use only American Standard supplied transformers and cable sets. Using non-AS supplied cables, or cutting, splicing or modifying any components will void the warranty.

MAINTENANCE

A ADJUST STOP VALVE; Fig. 12

IMPORTANT: ***To avoid overflowing, the STOP VALVE (3) must never be opened to the point where the flow from the valve exceeds the draining ability of the fixture.***

1. After installation is complete, peel off the PROTECTIVE FILM **(1)** from the sensor. Standing to one side, block the sensor with your hand for 10 seconds.

Remove your hand and listen for audible "click" from within the valve.

2. Remove STOP VALVE COVER **(2)** from STOP VALVE **(3)**. Turn on water supply 1/4 turn to 1/2 turn (CCW) and test for leaks.

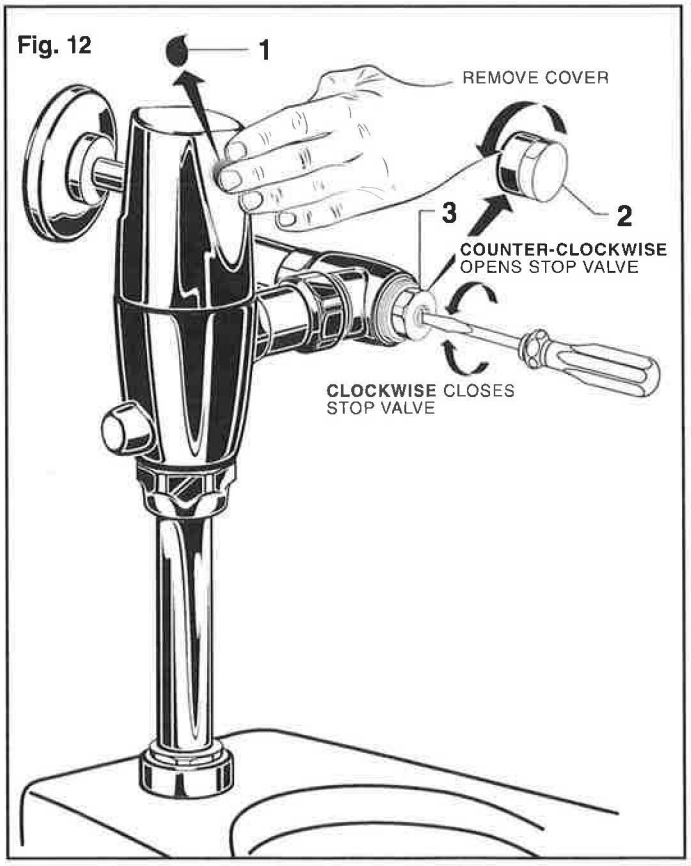
Note: ***Unit may flush for approximately 5 to 10 sec. when water is first turned on. If flow persists, turn water off and repeat step #1 above.***

3. Actuate the FLUSH VALVE:
   A) Cover sensor with hand for 10 seconds.

      NOTE: ***Stand outside of sensor detection area.***

   B) Remove hand from sensor detection area; unit will flush in approximately 3 seconds.
4. Adjust STOP VALVE **(3)** after each flush until the stated flush volume is achieved, no splashing occurs and the fixture is properly cleansed.
5. When adjustment is complete, replace STOP VALVE COVER **(2)** and tighten to ensure vandal-resistance.

Fig. 12



B SET DETECTION RANGE (if Required); Fig. 13 & 14

Note: ***The detection distance is preset and ideal for most installations. Should an adjustment be required, follow the steps below.***

1. To remove the COVER PLATE **(1)**, insert WIRE KEY **(2)** (supplied) into the two holes located at the bottom of the COVER PLATE **(1)**. Push the WIRE KEY **(2)** up until it releases the bottom clips. Pull the bottom edge away and lift the COVER PLATE **(1)** off. **Fig. 13**.
2. Remove the connections from the CONNECTOR LOCKING DEVICE **(5)**. Disconnect the 27" EXTENSION CABLE **(3)** from the 10' EXTENSION CABLE **(4)**, and reconnect.

Note: ***You have 5 seconds to begin entering the program code after power connection is made.***

3. While the SENSOR CONTROL LED **(1)** is blinking slowly, place your hand 1 to 2 in. (30-50 mm.) in front of the sensor. **Fig. 14**.
4. When the LED **(1)** stops blinking and stays "ON", move your hand to the desired position from sensor and hold in place until the LED **(1)** begins to blink again.

Note: ***Detection Zone is 400 - 800 mm (15-3/4"x 31-1/2"). (Factory Setting: 400 mm (15-3/4")***

5. Once the SENSOR CONTROL LED **(1)** begins to blink again, remove your hand from the detection zone. When the flashing stops, the detection distance is set.
6. Actuate the FLUSH VALVE:
   A) Cover sensor with hand for 10 seconds.

   NOTE: Stand outside of sensor detection area.

   B) Remove hand from detection area; unit will flush in approximately 3 seconds.

Fig. 13

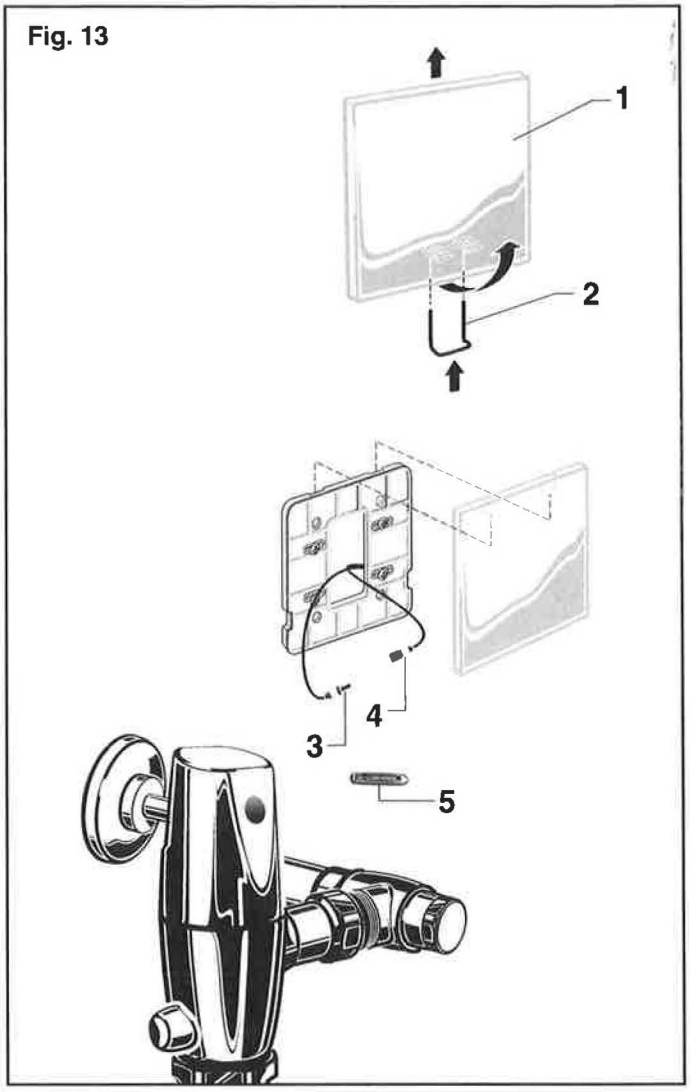
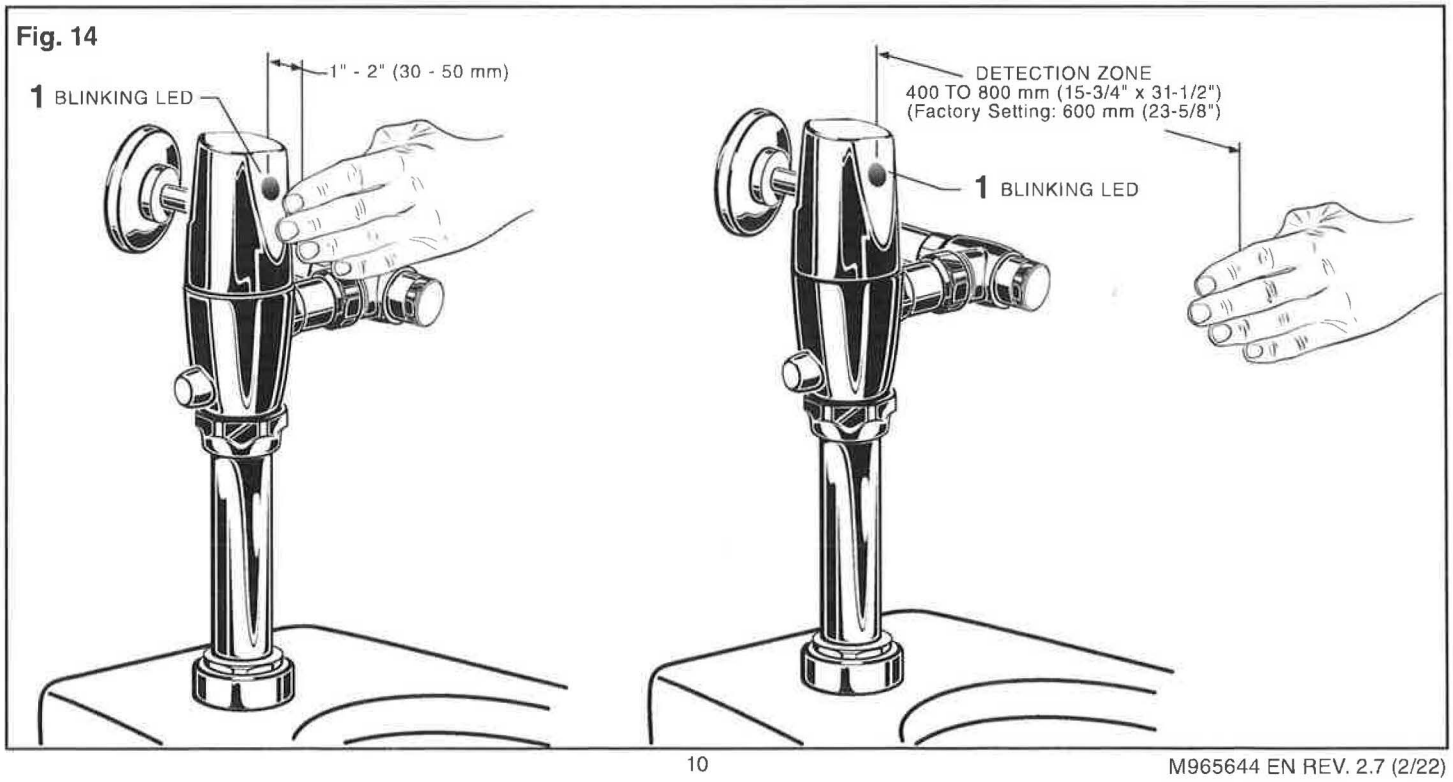


Fig. 14



TROUBLESHOOTING FLOW CHARTS

UNIT DOES NOT FUNCTION

IS ANGLE STOP OPEN? → NO → OPEN VALVE

↓ YES ↓

REPEATED DOUBLE FLASH ON SENSOR? → YES → LOW VOLTAGE. TEST OUTPUT OF TRANSFORMER. MUST BE >5.4 VAC.

↓ NO ↓

RECONNECT TRANSFORMER TO SENSOR. FLASH ON SENSOR FOR 5 SECONDS?
- 1 → NO → 1 → BAD TRANSFORMER. REPLACE. REPEAT.
- 2 → NO → 2 → DAMAGED SENSOR. REPLACE SENSOR.

↓ YES ↓

PUSH MANUAL OVERRIDE BUTTON; WILL THE UNIT FLUSH? → YES → DAMAGED SOLENOID. REPLACE SOLENOID

↓ NO ↓

REPLACE PISTON ASSEMBLY.



HOT LINE FOR HELP

For toll-free information and answers to your questions, call:

(844) CRT-TEAM / (844) 278-8326

Mon.– Fri. 8:00 a.m. to 8:00 p.m. EST Sat. 10:00 a.m. to 4:00 p.m. EST

IN MEXICO 01-800-839-1200

IN CANADA 1-800-387-0369 (TORONTO 1-905-306-1093)

Weekdays 8:00 a.m. to 7:00 p.m. EST

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UNIT IS CONTINUOUSLY FLUSHING

CLOSE ANGLE STOP AND OPEN AGAIN TO PRIME THE VALVE. DOES FLUSHING STOP?

↓ NO ↓

PUSH MANUAL OVERRIDE BUTTON. DOES IT RETURN TO ITS ORIGINAL POSITION FREELY? → NO → DAMAGED MANUAL OVERRIDE BUTTON. REPLACE MANUAL OVERRIDE BUTTON

↓ YES ↓

RECONNECT TRANSFORMER TO SENSOR. FLASH ON SENSOR FOR 5 SECONDS?
- 1 → NO → 1 → BAD TRANSFORMER. REPLACE. REPEAT.
- 2 → NO → 2 → DAMAGED SENSOR. REPLACE SENSOR.

↓ YES ↓

REPLACE PISTON & SOLENOID ASSEMBLY.

UNIT WILL ONLY FLUSH MANUALLY

REPEATED DOUBLE FLASH ON SENSOR? → YES → CRITICALLY LOW BATETRY. INSTALL NEW BATTERY

↓ NO ↓

RECONNECT TRANSFORMER TO SENSOR. FLASH ON SENSOR FOR 5 SECONDS?
- 1 → NO → 1 → BAD TRANSFORMER. REPLACE. REPEAT.
- 2 → NO → 2 → DAMAGED SENSOR. REPLACE SENSOR.

↓ YES ↓

REPLACE SOLENOID.

American Standard

Ultima™ Selectronic® Battery Powered

Toilet Flush Valve, Piston-Type

MODEL NUMBERS				
606B.111	606B.121	606B.161	606B.721	606B.761



POWER KITS

Hard-Wired AC

Multi-AC

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Warranty Statement

All products are guaranteed against defects in material and workmanship for a period of one (1) year from date of purchase.

This guarantee does not apply to any compression molded wood, solid wood, decorator, or economy residential plastic toilet seats used in nonresidential installations, including hotels and motels. This guarantee does not apply to any toilet seats which are modified in any way or used on any type of installation or unit other than conventional water closets. We assume no liability for toilet seats modified or installed on anything other than conventional water closets.

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MV-1

LEONARD
WATER TEMPERATURE CONTROLS

WARNING: This product can expose you to chemicals including lead, which is known to the State of California to cause cancer. For more information, go to www.P65Warnings.Ca.gov

Bulletin G-170370
July 2020

INSTALLATION, OPERATION & MAINTENANCE MANUAL

170-LF 3/8" Compression ASSE 1070	270-LF 1/2" - M-NPT ASSE 1070/1017	370-LF 3/4" - M-NPT ASSE 1070/1017
		
Eco-Mix Certified Lead Free	Eco-Mix Certified Lead Free	Eco-Mix Certified Lead Free

170-LF WARNING:
DO NOT use thread sealant on compression connections as it will cause damage.

270-LF / 370-LF WARNING:
When using flex hoses be careful, swivel connectors may damage inlet checks and / or element on outlet on 270-LF, 370-LF models. Coupling fittings may be needed if swivel connectors have a brass protruding tube or any protrusion that may damage the valve.

WARNING!

WATER TEMPERATURES IN EXCESS OF 110°F (43°C) MAY CAUSE SCALDING, SEVERE INJURY, OR DEATH!!

1) Valve should be installed where it can be easily cleaned, adjusted or repaired.
2) 170 Inlets are furnished with 3/8" compression connections. If using copper tubing, **DO NOT extend tubing more than 1/8" beyond the compression ferrule. DO NOT use thread sealant.**
3) Verify tubing is straight, tighten compression nuts by hand, then tighten only 1/4 turn, overtightening will cause leaks and possibly crush checks.
4) 270 / 370 Inlets are furnished with NPT connections. When soldering close to this unit, **DO NOT OVERHEAT**, internal components may become damaged.
5) Leonard recommends that unions and shutoffs are installed on the inlets and outlet.
6) Use solder or pipe cement sparingly. Supply pipes should be flushed before the valve is connected. Flush outlet pipe and valve as soon as it is connected.
7) Open hot and cold water supply valves to mixing valve.
8) Open mixed water outlet.
9) With the fixture in the full open position, calibrate the mixed water outlet temperature by placing a thermometer in the mixed water stream. Loosen knob set screw with 5/64" Allen wrench. Adjust the setting of the valve to obtain the desired temperature (counter-clockwise to increase temperature – clockwise to decrease temperature).
10) Tighten knob set screw to lock temperature setting.

PRESSURE-TEMPERATURE:

Maximum pressure: 125 PSI (8.6 BAR)

Maximum hot water temperature: 180°F (82°C)

Hot water inlet temperature range: 120-180°F (49-82°C)

Cold water inlet temperature range: 33-80°F (1-27°C)

Temperature adjustment range: 90-140°F (32-60°C)

Minimum Flow: 170 / 270 - .25 GPM, 370 - .5 GPM

IMPORTANT:

Maximum Operating Pressure: 125 PSI (860 KPA)

These thermostatic water mixing valves can be adjusted to deliver water at temperatures exceeding 110°F (43°C). After installation, the installer must check the outlet water temperature and adjust the temperature setting to ensure delivery of a safe water temperature not exceeding 110°F (43°C).

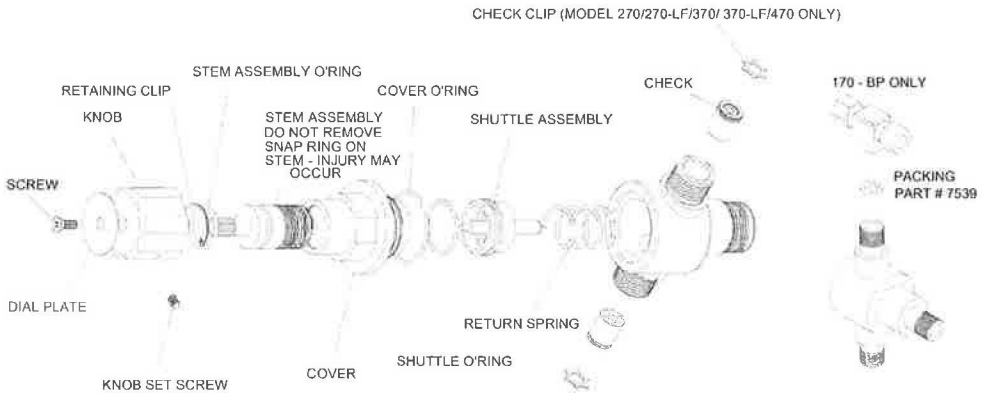
1360 Elmwood Avenue, Cranston, RI 02910 USA Phone: 401.461.1200 Fax 401.941.5310
Email: info@leonardvalve.com Web Site: http://www.leonardvalve.com

LEONARD
WATER TEMPERATURE CONTROLS

Bulletin G-170370
July 2020

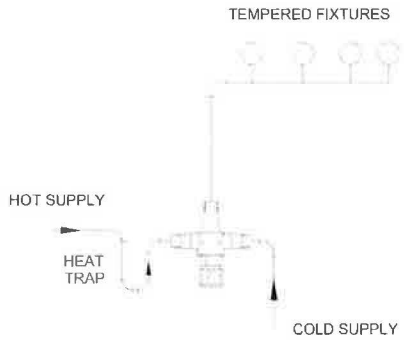
TROUBLESHOOTING INSTRUCTIONS

SYMPTOMS	REPAIR KIT	170-LF	270-LF	370-LF
Leaking water between valve cover and body. Leaking water under knob.	GASKET KIT	1/WX	1/WX	1/WX
Valve will not control temperature after cleaning.	REBUILDING KIT	R/170	R/270/370	R/270/370
Hot water by-passes into the Cold Water Supply Cold water by-passes into the Hot Water Supply	CHECKSTOP KIT	4/108	4/220	4/320

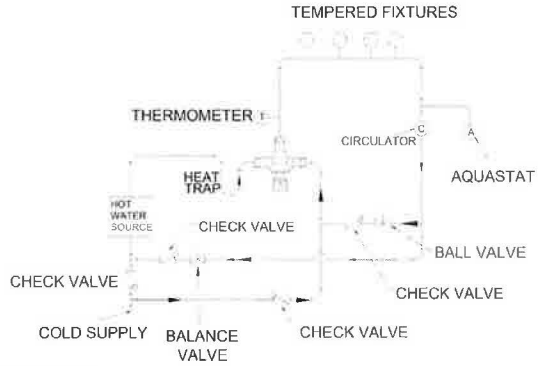


170-LF (3/8"COMP) ASSE 1070	270-LF (1/2"NPT) ASSE1017/ASSE 1070	370-LF (3/4"NPT) ASSE1017/ASSE 1070
1/ WX Gasket Kit Shuttle O-Ring Stem assembly O-Ring Cover O-Ring	**1/ WX Gasket Kit** Shuttle O-Ring Stem assembly O-Ring Cover O-Ring	**1/ WX Gasket Kit** Shuttle O-Ring Stem assembly O-Ring Cover O-Ring
R/170 Rebuild Kit Return spring Shuttle assembly Shuttle O-Ring Stem assembly O-Ring Cover O-Ring	**R/270/370 Rebuild Kit** Return spring Shuttle assembly Shuttle O-Ring Stem assembly O-Ring Cover O-Ring	**R/270/370 Rebuild Kit** Return spring Shuttle assembly Shuttle O-Ring Stem assembly O-Ring Cover O-Ring
4/108 Check valve Kit 2 Check Valves	**4/220 Check valve Kit** 2 Check Valves 2 Check Clips	**4/320 Check valve Kit** 2 Check Valves 2 Check Clips

NO RECIRCULATION



RECIRCULATION



LIMITED WARRANTY

Leonard Valve Company warrants the original purchaser that products manufactured by them (not by others) will be free from defects in materials and workmanship under normal conditions of use, when properly installed and maintained in accordance with Leonard Valve Company's instructions, for a period of one year from date of shipment. During this period the Leonard Valve Company will at its option repair or replace any product, or part thereof, which shall be returned, freight prepaid, to the Leonard factory and determined by Leonard to be defective in materials or workmanship. There are no warranties, express or implied, which extend beyond the description contained herein. There are no implied warranties of merchantability or of fitness for a particular purpose. In no event will Leonard be liable for labor or incidental or consequential damages. Any alteration or improper installation or use of the product will void this limited warranty.

1360 Elmwood Avenue, Cranston, RI 02910 USA Phone: 401.461.1200 Fax 401.941.5310
Email: info@leonardvalve.com Web Site: http://www.leonardvalve.com

CP-1

Taco Comfort Solutions
A Taco Group Company

Instruction Sheet

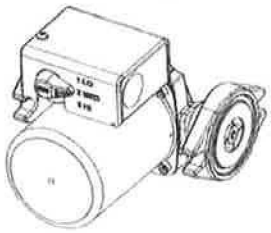
102-433

0015-MSF-IFC Multi-Speed Cartridge Circulator with Integral Flow Check

SUPERSEDES: June 1, 2014 EFFECTIVE: August 10, 2015

Plant ID# 001-4002

APPLICATION:



- Maximum operating pressure is 125 psi (862 kPa).
- Maximum water temperature not to exceed nameplate rating.
- Cast iron circulators are to be used for closed loop systems only.
- Stainless steel circulators are to be used on open, potable water systems.
- Taco Cartridge circulator pumps are for indoor use only – employer uniquement a l'interieur.
- For use with water or maximum of 50% glycol/water mix systems only.

WARNING: Do not use in swimming pool or spa areas; pump has not been investigated for this application.

WARNING: In the event the electrical box has been pulled off of the housing, DO NOT attempt to reattach it. Use of any other screw may short out the stator windings, creating a risk of electrical shock.

CAUTION: When installing electrical connections, do not apply mechanical loads to the capacitor box; otherwise, retaining screws may be pulled out of the housing, making circulator unusable.

CAUTION: 1. The addition of petroleum based fluids or certain chemical additives to systems utilizing TACO equipment voids the warranty.

2. Use supply wires suitable for 90°C – ATTENTION: Employer des fils d'alimentation adequats pour 90°C.

WARNING: To avoid electrical shock, disconnect the power supply to the circulator and the main electrical unit.

INSTALLATION:

1. Location – Install the "OO" circulator on the supply side of the boiler "pumping away" from the expansion tank as shown in Figure 1. This is the best pump location for optimum system performance and maintaining positive system pressure. An alternate location is on the boiler return line as shown in Figure 2.

CAUTION: Do not use flat rubber gaskets on pump flanges. Only use O-ring gaskets provided or leaking will result. Warranty will be void.

2. Mounting position – Mount circulator with the motor in the horizontal position. It may be mounted vertically with the motor up, provided that the system cold fill pressure is at least 20 psi (138 kPa) to ensure proper air purging and prevent flashing.
3. Rotating body – Body has an arrow on the front that indicates direction of flow. To rotate body, remove the four body bolts, rotate body and replace bolts. Make sure that the junction box is NOT located underneath the circulator. (The junction box must NOT be located in the 6 o'clock position, as viewed from the motor end.)
4. Electrical connections – Observe all applicable codes when connecting to power supply. The motor is thermally protected, and does not require additional overload protection. Either colored wire from the capacitor box can be attached to either colored wire from the power supply. There is no "hot" or "common" wire leading from the capacitor box. Typical installation would be to attach the white wire to the white (common) power supply wire and either the yellow or blue wire to the black (hot) power supply wire. The pump cannot run backwards.

ELECTRICAL DATA

SPEED	Amps (Watts)
1	0.54 (58)
2	0.74 (79)
3	0.85 (98)

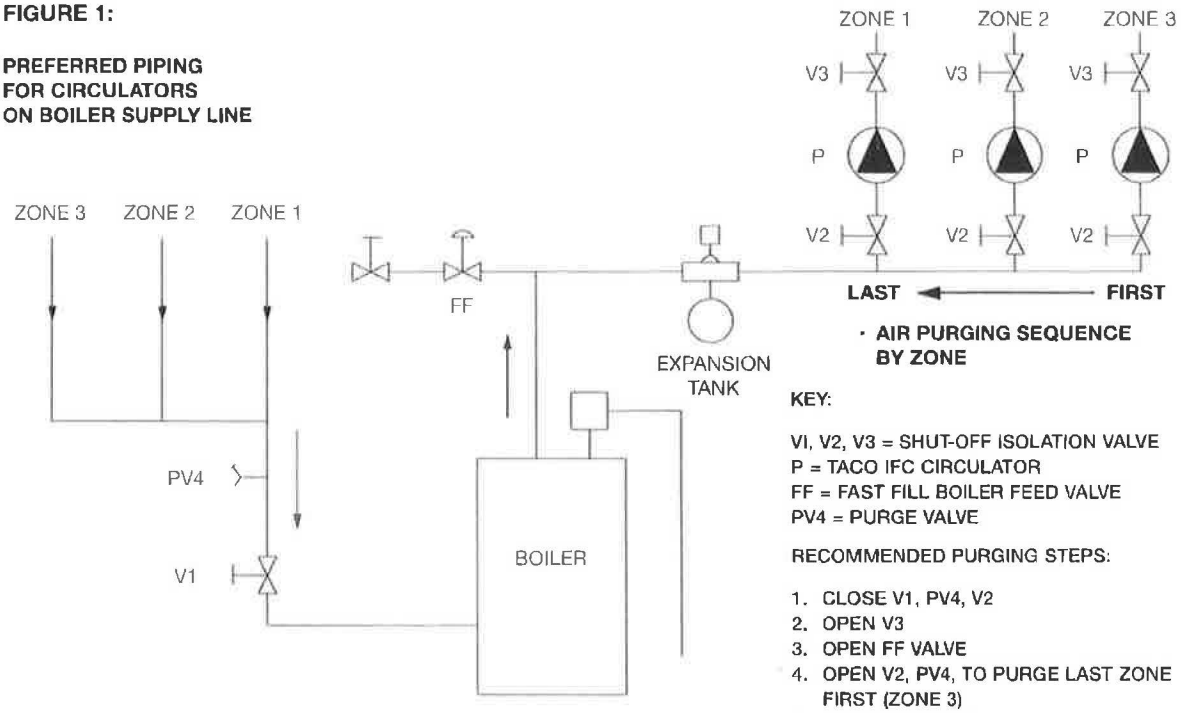
CAUTION: Installations at higher elevations over 5000 feet must have higher fill pressure of 20 psi minimum to prevent pump cavitation and flashing. Premature failure may result. Adjust expansion tank pressure to equal fill pressure. A larger size expansion tank may be required.

CAUTION: Never run circulator dry or permanent damage may result.

5. Fill system with tap water or maximum 50% glycol/water mix – The system must be filled before operating the circulator. The bearings are water lubricated and should not be allowed to operate dry. Filling the system will result in immediate lubrication of the bearings. It is always good practice to flush a new system of foreign matter before starting the circulator.
6. Circulator operation – Operate the circulator for 5 minutes at full speed immediately after flushing the system to purge remaining air from the bearing chamber. This is especially important when installing the circulator during the off-season.
7. Turn speed dial on circulator to the desired speed and performance range. See Figure 3.

FIGURE 1:

PREFERRED PIPING FOR CIRCULATORS ON BOILER SUPPLY LINE



KEY:

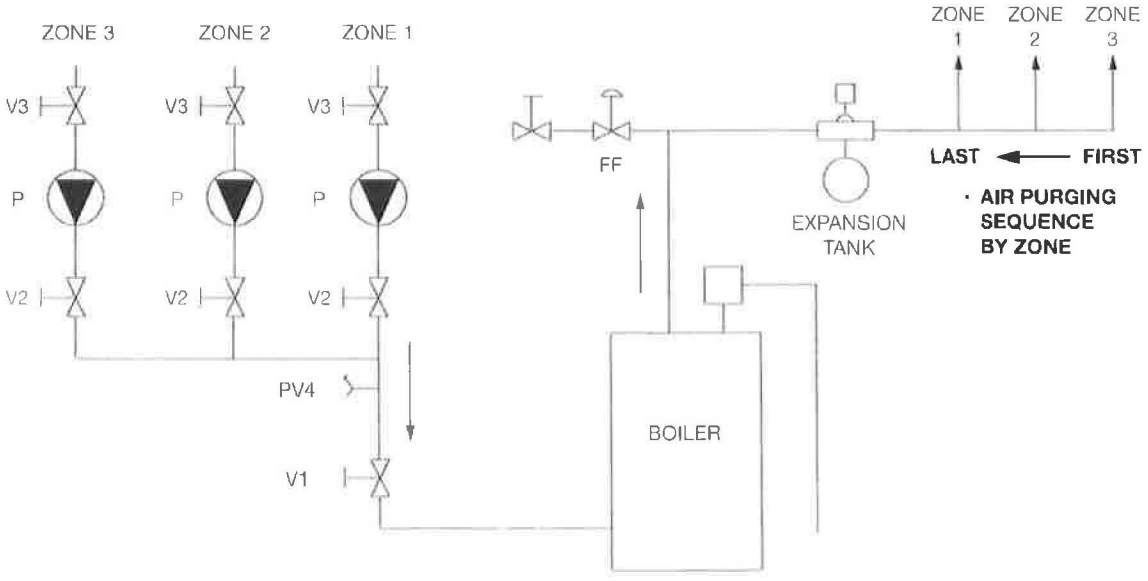
VI, V2, V3 = SHUT-OFF ISOLATION VALVE
P = TACO IFC CIRCULATOR
FF = FAST FILL BOILER FEED VALVE
PV4 = PURGE VALVE

RECOMMENDED PURGING STEPS:

1. CLOSE V1, PV4, V2
2. OPEN V3
3. OPEN FF VALVE
4. OPEN V2, PV4, TO PURGE LAST ZONE FIRST (ZONE 3)
5. CLOSE FF VALVE
6. CLOSE V2, PV4
7. REPEAT STEPS 1 TO 6 FOR EACH ADDITIONAL ZONE, PURGE ZONE 1 LAST
8. OPEN V1 WHEN ALL ZONES ARE PURGED
9. ADJUST SYSTEM TO DESIRED OPERATING FILL PRESSURE IF REQUIRED

FIGURE 2:

ALTERNATE PIPING FOR CIRCULATORS ON BOILER RETURN LINE



60 Hz PERFORMANCE FIELD:

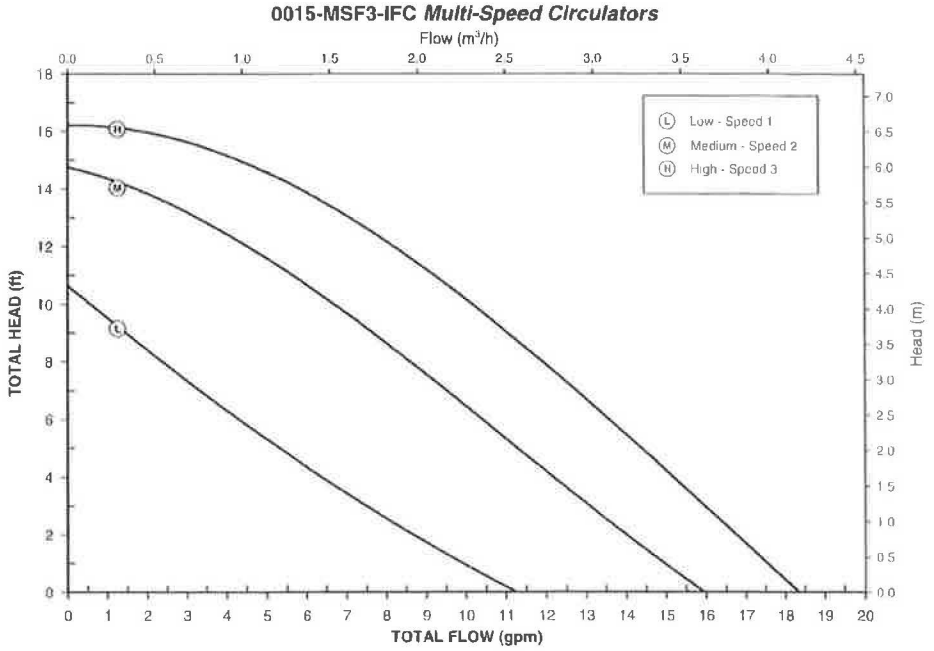
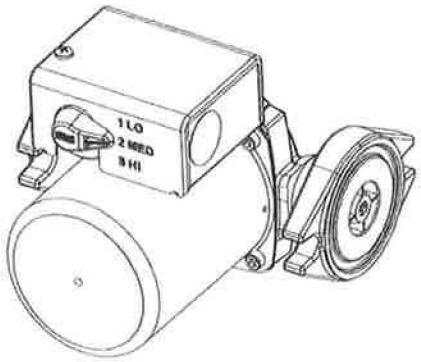


Figure 3: Multi-Speed Control Dial



PUMP REPLACEMENT CROSS REFERENCE

3-Speed Models				
TACO	**Armstrong**	**Grundfos**	**Wilo**	**B & G**
0015-MSF-IFC *	Astro-230-3	UPS15-58FC	Star-S16F	NRF-25
	Astro-250-3		Star-S21F	

* Replaces Taco 00R-MSF-IFC 3-speed.

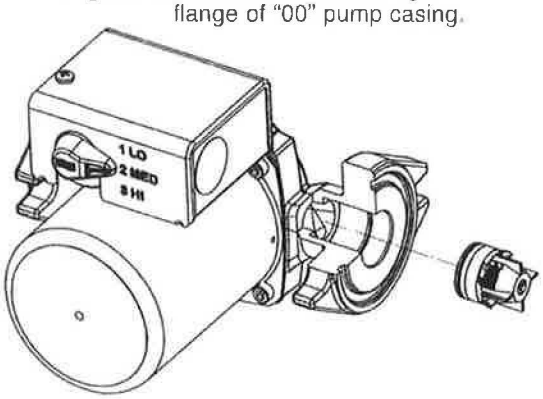
PROPER REMOVAL/REPLACEMENT OF THE INTEGRAL FLOW CHECK (IFC)

Your "00" circulator with an Integral Flow Check (IFC) is designed for easy removal, service and replacement. Please follow these instructions to ensure proper service and operation of the circulator.

REMOVAL:

1. Disconnect power to circulator and related equipment.
2. Shut off water supply. Isolate circulator using service valves or drain system if valves are not available.
3. Allow system to cool to prevent scalding. Loosen flange bolts slowly to relieve system pressure and remove circulator from the system. Access the IFC located in the discharge flange (Figure 4).
4. Using needle nose pliers, carefully grip the IFC body and remove slowly.

Figure 4: View of IFC in discharge flange of "00" pump casing.



IFC Replacement Kit: Part #0010-025RP

REPLACEMENT: Replacement IFC Kit: Part #0010-025RP

1. Make sure the IFC pocket is clean and free of any debris.
2. Position IFC into the machined pocket inside the casing as shown in Figure 4. Firmly press the IFC into the pocket until it snaps into place.
3. Reinstall circulator with new flange gaskets, if required.
4. Open water supply and refill system. Check for any leaks.
5. Reconnect power to circulator and check for proper operation of system.

REPLACING MOTOR ASSEMBLY:

1. Disconnect the electrical supply.
2. Reduce system pressure to 0 psi and allow system to return to room temperature. Isolate the circulator by closing the service valves or draining the system.
3. Remove the body bolts and swing motor assembly away from the body.
4. Transfer impeller cartridge from old motor to new motor making sure the cover plate is between the cartridge flange and motor housing.
5. Install new motor, and reassemble circulator using the new gasket and bolts supplied.
6. Follow the "installation" procedure to start up the circulator

REPLACING CARTRIDGE ASSEMBLY: Replacement cartridges: Part #0015-002RP Cast Iron
Part #0015-003RP Stainless Steel

1. Disconnect the electrical supply.
2. Reduce system pressure to 0 psi and allow system to return to room temperature. Isolate the circulator by closing the service valves or draining the system.
3. Remove the body bolts and swing motor assembly away from the body.
4. Pull cartridge out of the motor housing.
5. Install replacement cartridge, making sure that the cover plate is between the cartridge flange and motor.
6. Make sure the replacement cartridge corresponds to the full circulator product number. A complete parts list is available from your local plumbing supply wholesaler.
7. Reassemble the circulator using the new gasket and bolts supplied.
8. Follow the "Installation" procedure to start up the circulator.

REPLACING CAPACITOR: Replacement Capacitor Kit: Part #0015-004RP

1. Replacement capacitor must have same rating as originally furnished.

LIMITED WARRANTY STATEMENT

Taco, Inc. will repair or replace without charge (at the company's option) any Taco 00 Series circulator or circulator part which is proven defective under normal use within three (3) years from the date of manufacture.

In order to obtain service under this warranty, it is the responsibility of the purchaser to promptly notify the local Taco stocking distributor or Taco in writing and promptly deliver the subject product or part, delivery prepaid, to the stocking distributor. For assistance on warranty returns, the purchaser may either contact the local Taco stocking distributor or Taco. If the subject product or part contains no defect as covered in this warranty, the purchaser will be billed for parts and labor charges in effect at time of factory examination and repair.

Any Taco product or part not installed or operated in conformity with Taco instructions or which has been subject to misuse, misapplication, the addition of petroleum-based fluids or certain chemical additives to the systems, or other abuse, will not be covered by this warranty.

If in doubt as to whether a particular substance is suitable for use with a Taco product or part, or for any application restrictions, consult the applicable Taco instruction sheets or contact Taco at (401-942-8000).

Taco reserves the right to provide replacement products and parts which are substantially similar in design and functionally equivalent to the defective product or part. Taco reserves the right to make changes in details of design, construction, or arrangement of materials of its products without notification.

TACO OFFERS THIS WARRANTY IN LIEU OF ALL OTHER EXPRESS WARRANTIES. ANY WARRANTY IMPLIED BY LAW INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS IS IN EFFECT ONLY FOR THE DURATION OF THE EXPRESS WARRANTY SET FORTH IN THE FIRST PARAGRAPH ABOVE.

THE ABOVE WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR STATUTORY, OR ANY OTHER WARRANTY OBLIGATION ON THE PART OF TACO.

TACO WILL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF ITS PRODUCTS OR ANY INCIDENTAL COSTS OF REMOVING OR REPLACING DEFECTIVE PRODUCTS.

This warranty gives the purchaser specific rights, and the purchaser may have other rights which vary from state to state. Some states do not allow limitations on how long an implied warranty lasts or on the exclusion of incidental or consequential damages, so these limitations or exclusions may not apply to you.

Taco Comfort Solutions A Taco Group Company
Taco, Inc., 1160 Cranston Street, Cranston, RI 02920 | Tel: (401) 942-8000 | FAX: (401) 942-2360
Taco (Canada), Ltd., 8450 Lawson Road, Suite #3, Milton, Ontario L9T 0J8 | Tel: (905) 564-9422 | FAX: (905) 564-9436
Visit our web site: www.TacoComfort.com | Printed in USA | ©2015 Taco, Inc.

ET-1

ELBI OF AMERICA, INC.
15882 Diplomatic Plaza Suite 170
Houston, TX 77032-2669
Tel. (713) 674-2900 - Fax (713) 674-2982
www.elbi.net elbi@elbi.net

DTS-40

ASME WARRANTY

Manuf. does not provide OM Data

ASME commercial tanks are warranted to be free from defects in workmanship and material for a period of (12) months from the date of installation, or eighteen (18) months from the date of purchase, from Elbi of America, Inc., whichever occurs first.

The procedure to be followed when making a claim under the warranty is as follows:

1. You should contact Elbi of America for a Warranty Claim Form (RGA)at 713-674-2900.
2. Once you receive the claim form via fax, it is to be completed in order for the claim to be considered.
3. Fax this to Elbi of America, Inc. (713-674-2982) and you will be notified with an RGA Number, which is required for processing, and further instructions.

   These instructions may include but not limited to: returning the tank prepaid, return only the label, or be notified the warranty claim is denied and the reason for denial.
4. All returns are to include the original Warranty Claim Form, the original proof of purchase or installation, and the original label via certified US mail or the defective tank prepaid to:

   Elbi of America, Inc.
   15882 Diplomatic Plaza Suite 170
   Houston, TX 77032

   Please retain a copy of all documentation for your records.
5. A "Warranty Memo" for the same model of tank will be issued and faxed to you within five (5) days of receipt of the requested items.

"RGA REQUIRED FOR CONSIDERATION OF CLAIM – NO EXCEPTIONS"

WARRANTY CLAIM PROCEDURES

Effective July 1, 2002

Our procedures for warranty claims have been revised so that it can be administered in a more timely and equitable manner. Please review these procedures for the implementation of a smooth transition in procedure.

Credits will no longer be given in lieu of tanks found defective under the limited five-year warranty provided by Elbi of America, Inc. Defective tanks will be replaced tank for tank. The replacements will be shipped along with the next order placed for shipment.

The procedure to be followed when making a claim under the warranty is as follows:

1. You should contact your Sales Representative or Elbi of America for a Warranty Claim Form.
2. Once you receive the claim form via fax, it is to be completed in its **entirety** in order for the claim to be considered.
3. Fax this to Elbi of America, Inc. (713-674-2982) and you will be notified with an RGA Number and further instructions within three (3) working days.

   These instructions may include: returning the tank prepaid, return only the label, or be notified the warranty claim is denied and the reason for denial.
4. All returns are to include the original Warranty Claim Form, the original proof of purchase or installation, and the original label via certified US mail or the defective tank prepaid to:

   Elbi of America, Inc.
   525 McCarty Street
   Houston, TX 77029

   Please retain a copy of all documentation for your records.
5. A "Warranty Memo" for the same model of tank will be issued and faxed to you within five (5) days of receipt of the requested items.
6. The item will be shipped back to when your next order is placed unless requested prior and then it will be shipped to you prepaid. You will be credited within five (5) working days for all freight charges for any tanks found to be defective.

Please keep in mind that the Labor Allowance was discontinued effective January 1, 2002. If any damages are caused by Elbi tanks due to their failure, a detailed incident statement, including any pictures taken of the damages, must be filed along with the Warranty Claim Form. This will be forwarded to our insurance carrier by certified mail within three (3) working days of receipt for investigation and processing.

The Manufacturer

Elbi of America, Inc.

ELBI WARRANTY CLAIM FORM

Please fill in the Warranty Claim Form in its entirety and fax it to Elbi to obtain RGA#

RGA #

TANK REPLACED		REPLACEMENT TANK	
Serial Number:		Serial Number:	
Model:	Date code:	Model:	Date code:
DISTRIBUTOR:		**INSTALLER:**	
Address:		Address:	
City: ST: Zip:		City: ST: Zip:	
Phone #	Fax #	Phone #	License #

TANK INSTALLATION INFORMATION			
Date purchased	Date installed	Date of failure	System Application – Brief Description

DESCRIPTION OF THE FAILURE
Comments: _____

__ *RETURN TANK FOR INSPECTION* __ *SCRAP TANK, MAIL LABEL FOR WARRANTY CONSIDERATION*

REPRESENTATIVE'S INSPECTION NOTES		
Rep Signature _____	Date inspected: _____	Field inspected (Y/N):

ELBI PRODUCTION / QC INSPECTION			
Date inspected	Comments:		
Inspector:		Factory Defect : ☐	Customer Defect : ☐

R 06/06

ELBI OF AMERICA, INC. •525 Mc Carty St. - Houston, TX 77029 • Phone (713) 674-2900 • Fax (713) 674-2982 • www.elbi.net • elbi@elbi.net

EWH-1

Instruction Manual

COMMERCIAL ELECTRIC WATER HEATERS

MODELS DRE-52/80/120 SERIES 100
& DVE-52/80/120 SERIES 100

INSTALLATION - OPERATION - SERVICE - MAINTENANCE - LIMITED WARRANTY

A.O. Smith
500 Tennessee Waltz Parkway
Ashland City, TN 37015

C UL US CLASSIFIED UL EPH

LW

ASME
(OPTIONAL)



Thank you for buying this energy efficient water heater. We appreciate your confidence in our products.



⚠ WARNING

Read and understand this instruction manual and the safety messages herein before installing, operating, or servicing this water heater.

Failure to follow these instructions and safety messages could result in death or serious injury.

This manual must remain with the water heater.

⚠ WARNING

If the heater becomes immersed in water up to or above the level of the bottom of the element doors, the heater should be examined by a qualified service agency before it is placed in operation, see Page 2.

PLACE THESE INSTRUCTIONS ADJACENT TO HEATER AND NOTIFY OWNER TO KEEP FOR FUTURE REFERENCE.

PRINTED IN THE U.S.A 0908

196674-002

SAFE INSTALLATION, USE, AND SERVICE

The proper installation, use and servicing of this water heater is extremely important to your safety and the safety of others.

Many safety-related messages and instructions have been provided in this manual and on your own water heater to warn you and others of a potential injury hazard. Read and obey all safety messages and instructions throughout this manual. It is very important that the meaning of each safety message is understood by you and others who install, use, or service this water heater.

⚠	**This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.**

⚠ DANGER	**DANGER indicates an imminently hazardous situation which, if not avoided, could result in death or injury.**
⚠ WARNING	**WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or injury.**
⚠ CAUTION	**CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.**
CAUTION	**CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, could result in property damage.**

All safety messages will generally tell you about the type of hazard, what can happen if you do not follow the safety message, and how to avoid the risk of injury.

The California Safe Drinking Water and Toxic Enforcement Act requires the Governor of California to publish a list of substances known to the State of California to cause cancer, birth defects, or other reproductive harm, and requires businesses to warn of potential exposure to such substances.

This product contains a chemical known to the State of California to cause cancer, birth defects, or other reproductive harm. This appliance can cause low level exposure to some of the substances listed, including formaldehyde.

IMPORTANT DEFINITIONS

- **Qualified Installer or Service Agency:**

  Installation and service of this water heater requires ability equivalent to that of a Qualified Agency (as defined by ANSI below) in the field involved. Installation skills such as plumbing, electrical supply are required in addition to electrical testing skills when performing service.

- **ANSI Z223.1 2006 Sec. 3.3.83:**

  "Qualified Agency" - "Any individual, firm, corporation or company that either in person or through a representative is engaged in and is responsible for (a) the installation, testing or replacement of gas piping or (b) the connection, installation, testing, repair or servicing of appliances and equipment; that is experienced in such work; that is familiar with all precautions required; and that has complied with all the requirements of the authority having jurisdiction."

GENERAL SAFETY INFORMATION

PRECAUTIONS

DO NOT USE THIS APPLIANCE IF ANY PART HAS BEEN UNDER WATER. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system which has been under water.

If the unit is exposed to the following, do not operate heater until all corrective steps have been made by a qualified service agency.

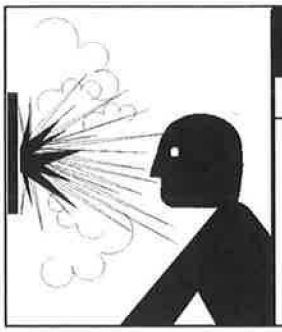
1. External fire.
2. Damage.
3. Firing without water.

GROUNDING INSTRUCTIONS

This water heater must be grounded in accordance with the National Electrical Code and/or local codes. These must be followed in all cases. Failure to ground this water heater properly may also cause erratic control system operation on ELECTRONIC CONTROL models.

This water heater must be connected to a grounded metal, permanent wiring system; or an equipment grounding conductor must be run with the circuit conductors and connected to the equipment grounding terminal or lead on the water heater.

HYDROGEN GAS (FLAMMABLE)



⚠ WARNING

Explosion Hazard

- Flammable hydrogen gases may be present.
- Keep all ignition sources away from faucet when turning on hot water.

Hydrogen gas can be produced in a hot water system served by this heater that has not been used for a long period of time (generally two weeks or more). Hydrogen gas is extremely flammable. To reduce the risk of injury under these conditions, it is recommended that the hot water faucet be opened for several minutes at the kitchen sink before using any electrical appliance connected to the hot water system. If hydrogen is present there will probably be an unusual sound such as air escaping through the pipe as the water begins to flow. THERE SHOULD BE NO SMOKING OR OPEN FLAME NEAR THE FAUCET AT THE TIME IT IS OPEN.

When servicing this unit, verify the power to the unit is turned off prior to opening the control cabinet door.



⚠ WARNING

Read and understand this instruction manual and the safety messages herein before installing, operating, or servicing this water heater.

Failure to follow these instructions and safety messages could result in death or serious injury.

This manual must remain with the water heater.



⚠ WARNING

- **Before removing any access panels or servicing the water heater, make sure the electrical supply to the water heater is turned "OFF."**
- **Failure to do this could result in death, serious bodily injury, or property damage.**

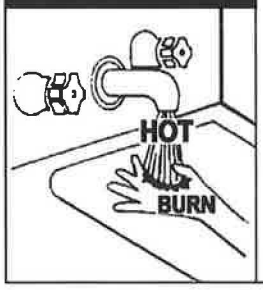
CAUTION

Improper Installation, use and service may result in property damage.

- Do not operate water heater if flood damaged.
- Inspect anode rods regularly, replace when significantly depleted.
- Install in location with drainage.
- Fill tank with water before operation.
- Properly sized thermal expansion tanks are required on all closed water systems.

Refer to this manual for installation and service.

⚠ DANGER



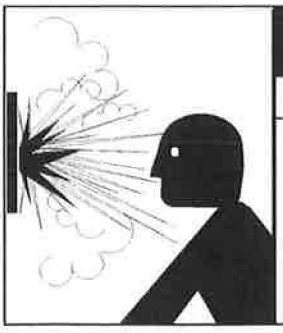
Water temperature over 125°F (52°C) can cause severe burns resulting in severe injury or death.

Children, the elderly, and the physically or mentally disabled are at highest risk for scald injury.

Feel water before bathing or showering.

Temperature limiting valves are available.

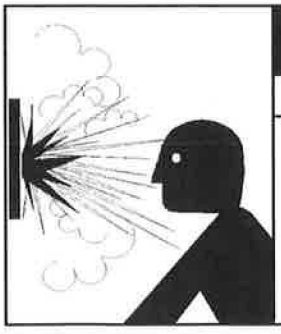
Read instruction manual for safe temperature setting.



⚠ WARNING

Explosion Hazard

- Flammable hydrogen gases may be present.
- Keep all ignition sources away from faucet when turning on hot water.



⚠ WARNING

Explosion Hazard

- Overheated water can cause water tank explosion.
- Properly sized temperature and pressure relief valve must be installed in opening provided.

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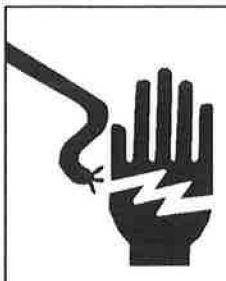
INTRODUCTION

Thank You for purchasing this water heater. Properly installed and maintained, it should give you years of trouble free service.

Abbreviations Found In This Instruction Manual:

- ANSI - American National Standards Institute
- ASME - American Society of Mechanical Engineers
- GAMA - Gas Appliance Manufacturer's Association
- NEC - National Electrical Code
- NFPA - National Fire Protection Association
- UL - Underwriters Laboratory

PREPARING FOR THE INSTALLATION



⚠ WARNING

- **Before removing any access panels or servicing the water heater, make sure the electrical supply to the water heater is turned "OFF."**
- **Failure to do this could result in death, serious bodily injury, or property damage.**

1. Read the "General Safety Information" section of this manual first and then the entire manual carefully. If you don't follow the safety rules, the water heater may not operate safely. It could cause DEATH, SERIOUS BODILY INJURY AND/OR PROPERTY DAMAGE.

   This manual contains instructions for the installation, operation, and maintenance of the electric water heater. It also contains warnings throughout the manual that you must read and be aware of. All warnings and all instructions are essential to the proper operation of the water heater and your safety. **READ THE ENTIRE MANUAL BEFORE ATTEMPTING TO INSTALL OR OPERATE THE WATER HEATER.**

   Detailed installation diagrams are in this manual. These diagrams will serve to provide the installer with a reference for the materials and method of piping suggested. IT IS NECESSARY THAT ALL WATER PIPING AND THE ELECTRICAL WIRING BE INSTALLED AND CONNECTED AS SHOWN IN THE DIAGRAMS.

   Particular attention should be given to the installation of thermometers at the locations indicated in the diagrams as these are necessary for checking the operation of the heater.

   Be sure to turn off power when working on or near the electrical system of the heater. Never touch electrical components with wet hands or when standing in water. When replacing fuses always use the correct size for the circuit. see page 13.

   The principal components of the heater are identified on pages 7 & 8. The model and rating plate on page 6 interprets certain markings into useful information. Both of these references should be used to identify the heater, its components and optional equipment.

2. The installation must conform with these instructions and the local code authority having jurisdiction and the requirements of the power company. In the absence of code requirements, follow NFPA-70 (current edition). In the absence of local codes, the installation must comply with the latest editions of the National Electrical Code, NFPA 70 or the Canadian Electrical Code CSA C22.1. The National Electrical Code may be ordered from: National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269. The Canadian Electrical Code is available from the Canadian Standards Association, 8501 East Pleasant Valley Road, Cleveland, OH 44131.

3. If after reading this manual you have any questions or do not understand any portion of the instructions, call the toll free number listed on the back cover of this manual for technical assistance.

   A sample rating plate is shown on page 6 of this manual. In order to expedite your request, please have full model and serial number available for the technician.

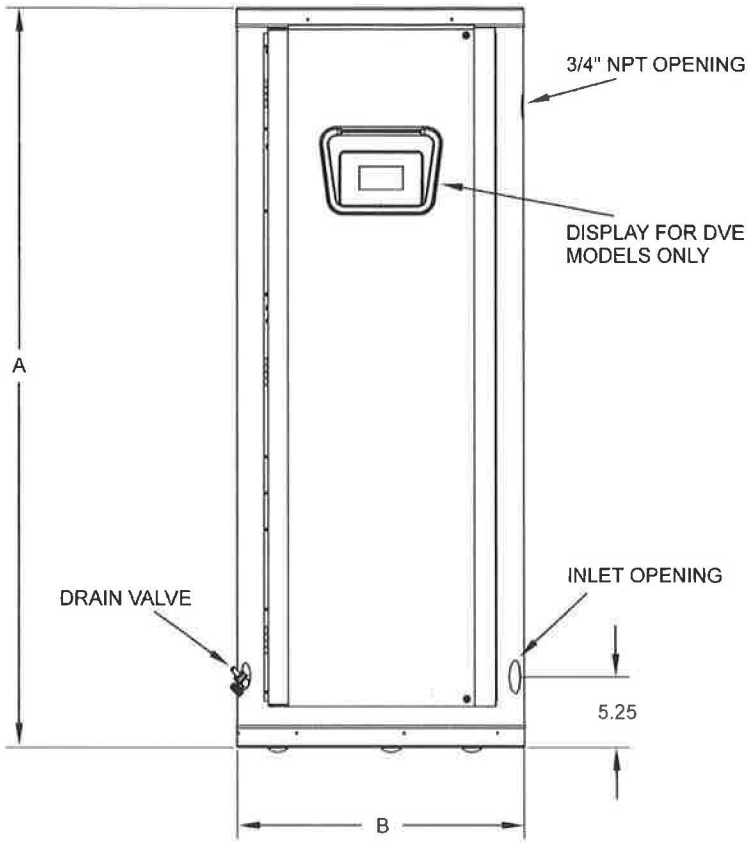
4. Carefully plan your intended placement of the water heater. Examine the location to ensure the water heater complies with the "Locating the New Water Heater" section in this manual.

   Installation and service of this water heater requires ability equivalent to that of a licensed tradesman or qualified agency (page 2) in the field involved. Plumbing and electrical work are required.

5. For installation in California this water heater must be braced or anchored to avoid falling or moving during an earthquake. See instructions for correct installation procedures. Instructions may be obtained from California Office of the State Architect, 1102 Q Street, Suite 5100, Sacramento, CA 95811.

6. Massachusetts Code requires this water heater to be installed in accordance with Massachusetts 248-CMR 2.00: State Plumbing Code and 248-CMR 5.00.

DIMENSIONS AND CAPACITIES DATA



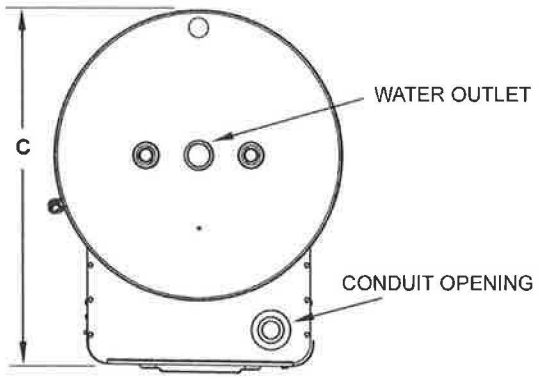
DRE/DVE MODEL DIFFERENCES

This Instruction Manual covers two models of commercial electric water heaters; DRE models and DVE models. These two models are equipped from the factory with different controls.

DRE models are factory equipped with surface mounted thermostat/ECO combination controls. DVE models are factory equipped with an electronic control system.

In this Instruction Manual "DRE" models are referred to as: "Surface Mount Control" models.

In this Instruction Manual "DVE" models are referred to as: "Electronic Control" models.



Model Number	Tank Capacity in Gallons (Liters)	A - Inches (mm)	B - Inches (mm)	C - Inches (mm)	Inlet/Outlet
DRE/DVE-52	50 (189.3)	55 3/4 (1416)	21 3/4 (552)	27 (685)	1 1/4
DRE/DVE-80	80 (302.8)	60 1/4 (1350)	25 1/2 (648)	31 (787)	1 1/4
DRE/DVE-120	119 (450.5)	62 1/4 (1581)	29 1/2 (749)	35 (889)	1 1/4

RECOVERY RATE IN GALLONS PER HOUR*
Temperature Rise °F

Standard KW Input	BTU/ Hour	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°	130°	140°
6	20,478	82	62	49	41	35	31	27	25	22	21	19	18
9	30,717	123	92	74	62	53	46	41	37	34	31	28	26
12	40,956	164	123	98	82	70	61	55	49	45	41	38	35
13.5	46,075	184	138	111	92	79	69	62	55	50	46	43	40
15	51,195	205	154	123	102	88	77	68	61	56	51	47	44
18	61,434	246	184	148	123	105	92	82	74	67	61	57	53
24	81,912	328	246	197	164	140	123	109	98	89	82	76	70
27	92,151	369	276	221	184	158	138	123	111	101	92	85	79
30	102,390	410	307	246	205	176	154	137	123	112	102	95	88
36	122,868	492	369	295	246	211	184	164	148	134	123	113	105
40.5	138,226	554	418	3332	277	237	208	1185	166	151	138	128	119
45	153,585	615	461	369	307	263	230	205	184	168	154	142	132
54	184,302	738	553	443	369	316	277	246	221	201	184	170	158

*Figured at 1 KW (3413 Btu) = 4.1 gallons at 100°F temperature rise.
To determine recovery rate per minute, divide recovery rate per hour by 60.

APPROVALS

All models meet National Sanitation Foundation NSF-5 requirements.

All models are listed by Underwriters Laboratories Inc.

MODEL AND RATING

COMMERCIAL STORAGE TANK WATER HEATER

LISTED 22U1

ANSI/NSF-5

MODEL NUMBER	SERIAL NUMBER	ITEM ID / PART NUMBER
120 100	J04M008327	9290443004

PHASE	VOLTS - AC	No. OF ELEMENTS	WATTS EACH	WATTS TOTAL	CITY OF NEW YORK DEPT. OF BUILDINGS MEA
3	480	9	6000	540000	XXX-XX-X

CAPACITY US GAL RATED	CAPACITY US GAL MEASURED	STANDBY LOSS %	STANDBY LOSS WATTS	MAX WORKING PRESSURE
XXX	XXX	XX	XX	150

ELECTRIC WATER HEATER
CHAUFFE-EAU ELECTRIQUE

LISTED 22U1

ANSI/NSF-5

MODEL NUMBER / N° DE MODELE	SERIAL NUMBER / N° DE SERIE	ITEM ID / PART NUMBER

VOLTS AC ONLY / VOLT CA SEULEMENT	NO. OF ELEMENTS / NOMBRE D'ELEMENTS	WATTS EACH / WATTS CHACUN	TOTAL WATTS CONNECTED / COURANT TOTAL	PHASE

MAX. WORKING PRESSURE / PRESSION DE SERVICE MAXIMALE PSI	MAX. WORKING PRESSURE / PRESSION DE SERVICE MAXIMALE KPA	CAPACITY LITERS / CAPACITE LITRE

ELECTRONIC CONTROL MODELS

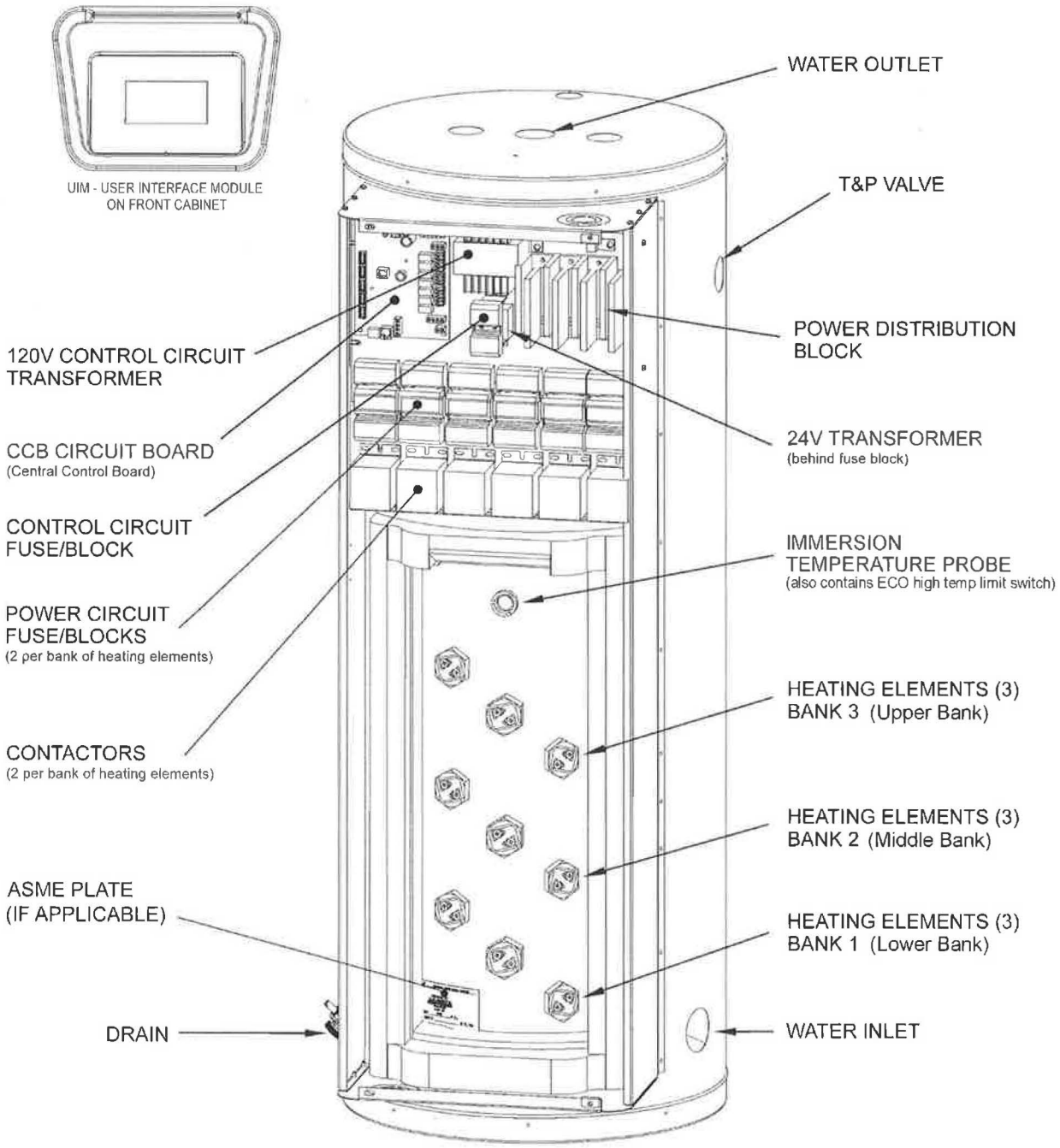


FIGURE 1

SURFACE MOUNT CONTROL MODELS

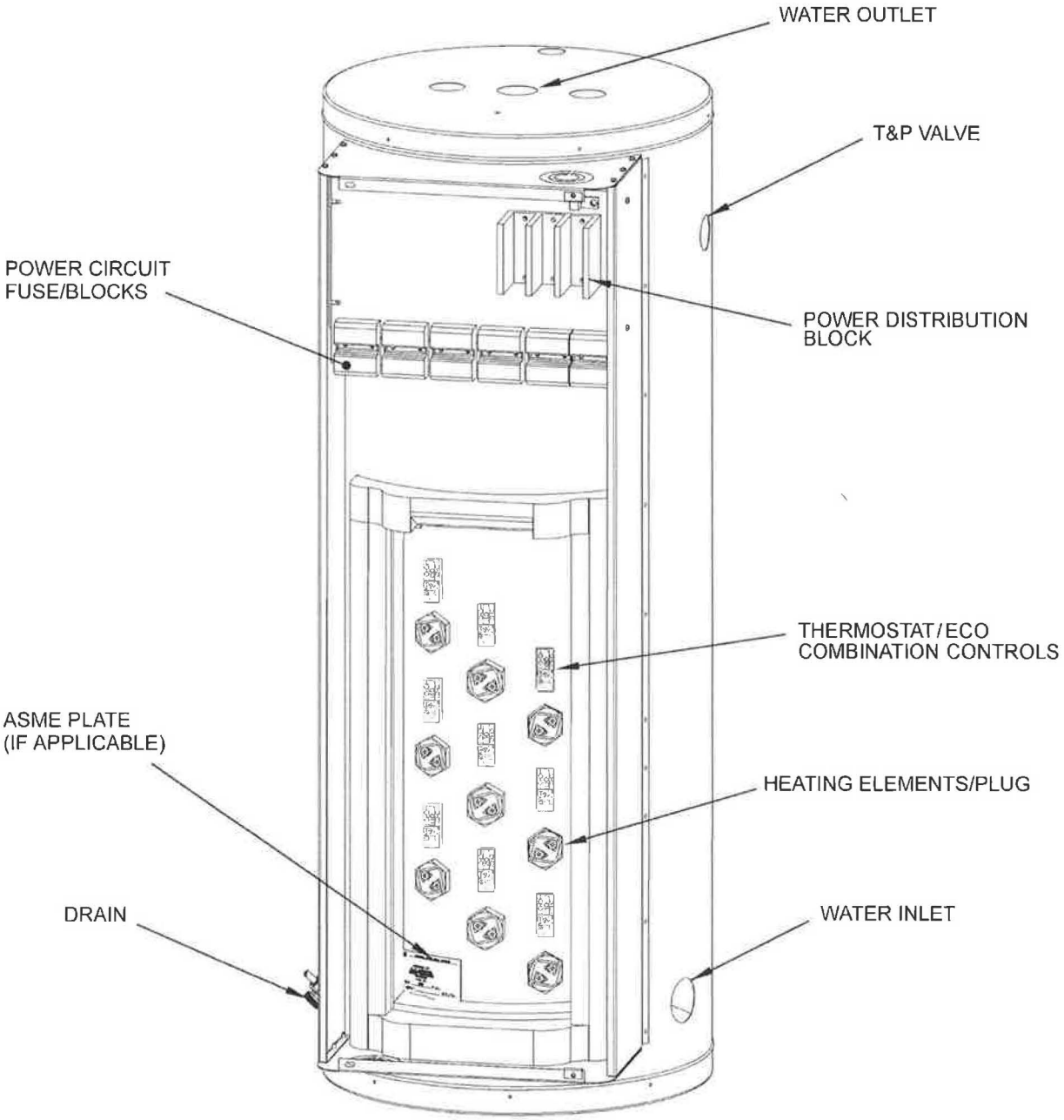


FIGURE 2

LOCATING THE NEW WATER HEATER

FACTS TO CONSIDER ABOUT THE LOCATION

CAUTION

Property Damage Hazard

- All water heaters eventually leak
- Do not install without adequate drainage.

Carefully choose a location for the new water heater. The placement is a very important consideration for the safety of the occupants in the building and for the most economical use of the appliance.

Whether replacing an old water heater or putting the water heater in a new location, the following critical points must be observed. The water heater must be located:

1. On a level surface. Shim the channel type skid base as necessary if levelling is required.
2. Near a floor drain. The heater should be located in an area where leakage of the tank or connections will not result in damage to the area adjacent to the heater or to lower floors of the structure.
3. Close to the point of major hot water usage and the power supply.

Hot water piping and branch circuit wiring should be as short as possible.

Insulate hot and cold water piping where heat loss and condensation may be a problem.

Heater construction permits installation, maintenance, and service work to be performed through the front control panel.

Suggested clearances from adjacent surfaces are 12 inches on top, 30 inches in front for access to the unit.

The heater may be installed on or against combustible surfaces. The left side and back may be placed flush against adjacent surfaces.

The temperature of the space in which the water heater is installed must not go below 32°F or above 122°F.

INSTALLATION

REQUIRED ABILITY

Installation and service of this water heater requires ability equivalent to that of a qualified agency (page 2) in the field involved. Plumbing and electrical work is required.

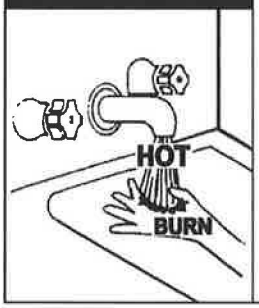
GENERAL

The installation must conform with these instructions and the local code authority having jurisdiction and the requirements of the power company. In the absence of code requirements, follow NFPA-70 (current edition). In the absence of local codes, the installation must comply with the latest editions of the National Electrical Code, NFPA 70 or the Canadian Electrical Code CSA C22.1. The National Electrical Code may be ordered from: National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269. The Canadian Electrical Code is available from the Canadian Standards Association, 8501 East Pleasant Valley Road, Cleveland, OH 44131.

Do **NOT** test electrical system before heater is filled with water, follow the START UP procedure in the OPERATION section of this manual.

The principal components of the heater are identified in the Features and Components illustrations on pages 6 and 7.

⚠DANGER



Water temperature over 125°F (52°C) can cause severe burns resulting in severe injury or death.

Children, the elderly, and the physically or mentally disabled are at highest risk for scald injury.

Feel water before bathing or showering.

Temperature limiting valves are available.

Read instruction manual for safe temperature setting.

MIXING VALVE USAGE:
Water heaters are intended to produce hot water. Water heated to a temperature which will satisfy space heating, clothes washing, dish washing, cleaning and other sanitizing needs can scald and permanently injure you upon contact. Some people are more likely to be permanently injured by hot water than others. These include the elderly, children, the infirm, or physically/developmentally disabled. If anyone using hot water in your home fits into one of these groups or if there is a local code or state law requiring a maximum water temperature at the hot water tap, then you must take special precautions. In addition to using the lowest possible temperature setting that satisfies your hot water needs, a means such as a **MIXING VALVE**, should be used at the hot water taps used by these people or at the water heater.

MIXING VALVES for reducing point of use temperature are available. Consult a qualified installer or service agency. Follow all manufacturer's Instructions for installation of these valves. Before changing the factory setting on the thermostat, read the "Temperature Regulation" section in this manual.

⚠ WARNING

Toxic Chemical Hazard

- Do not connect to non-potable water system.

CONTAMINATED WATER

This water heater shall not be connected to any heating system(s) or component(s) used with a non-potable water heating appliance.

Toxic chemicals, such as those used for boiler treatment shall not be introduced into this system.

CIRCULATING PUMP

Field installed circulating pumps should be of all bronze construction.

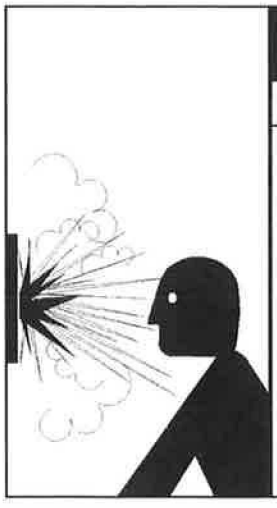
INSULATION BLANKETS

Insulation blankets are available to the general public for external use on electric water heaters but are not necessary with this product. The purpose of an insulation blanket is to reduce the standby heat loss encountered with storage tank heaters. Your water heater meets or exceeds the EPACT and ASHRAE/IES 90.1 standards with respect to insulation and standby loss requirements, making an insulation blanket unnecessary.

Should you choose to apply an insulation blanket to this heater, you should follow these instructions below. Failure to follow these instructions can result in fire, serious personal injury, or death.

- Do not cover the temperature and pressure relief (T & P) valve with an insulation blanket.
- Do not cover the instruction manual. Keep it on the side of the water heater or nearby for future reference.
- Do obtain new warning and instruction labels for placement on the blanket directly over the existing labels.

TEMPERATURE-PRESSURE RELIEF VALVE



⚠ WARNING

Explosion Hazard

- Temperature-pressure relief valve must comply with ANSI Z21.22 and ASME code.
- Properly sized temperature-relief valve must be installed in opening provided.
- Failure to install relief valve can result in overheating and excessive tank pressure.
- Failure to follow these instructions can cause serious injury or death.

This water heater is provided with a properly rated/sized and certified combination temperature - pressure relief valve by the

manufacturer. The valve is certified by a nationally recognized testing laboratory that maintains periodic inspection of production of listed equipment of materials as meeting the requirements for Relief Valves for Hot Water Supply Systems, ANSI Z21.22 • CSA 4.4, and the code requirements of ASME.

If replaced, the new valve must meet the requirements of local codes, but not less than a combination temperature and pressure relief valve rated/sized and certified as indicated in the above paragraph. The new valve must be marked with a maximum set pressure not to exceed the marked hydrostatic working pressure of the water heater (150 psi = 1,035 kPa) and a discharge capacity not less than the water heater Btu/hr or KW input rate as shown on the water heater's model rating plate.

For safe operation of the water heater, the temperature and pressure relief valve must not be removed from its designated opening nor plugged. The temperature-pressure relief valve must be installed directly into the fitting of the water heater designed for the relief valve. Install discharge piping so that any discharge will exit only within 6 inches (15.2 cm) above, or at any distance below the structural floor. Be certain that no contact is made with any live electrical part. The discharge opening must not be blocked or reduced in size under any circumstances. Excessive length, over 30 feet (9.14 m), or use of more than four elbows can cause restriction and reduce the discharge capacity of the valve.

No valve or other obstruction is to be placed between the relief valve and the tank. Do not connect discharge piping directly to the drain unless a 6" (15.2 cm) air gap is provided. To prevent bodily injury, hazard to life, or property damage, the relief valve must be allowed to discharge water in adequate quantities should circumstances demand. If the discharge pipe is not connected to a drain or other suitable means, the water flow may cause property damage.

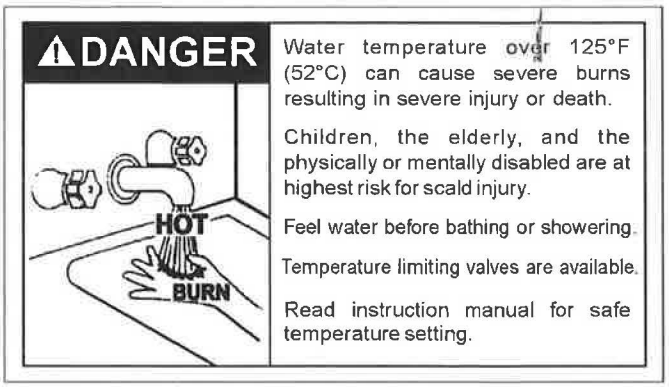
CAUTION

Water Damage Hazard

- Temperature-pressure relief valve discharge pipe must terminate at adequate drain.

The Discharge Pipe:

- Shall not be smaller in size than the outlet pipe size of the valve, or have any reducing couplings or other restrictions.
- Shall not be plugged or blocked.
- Shall be of material listed for hot water distribution.
- Shall be installed so as to allow complete drainage of both the temperature-pressure relief valve and the discharge pipe.
- Shall terminate at an adequate drain.
- Shall not have any valve or other obstruction between the relief valve and the drain.



The temperature-pressure relief valve must be manually operated at least once a year. Caution should be taken to ensure that (1) no one is in front of or around the outlet of the temperature-pressure relief valve discharge line, and (2) the water manually discharged will not cause any bodily injury or property damage because the water may be extremely hot. If after manually operating the valve, it fails to completely reset and continues to release water, immediately close the cold water inlet to the water heater, follow the draining instructions in this manual, and replace the temperature-pressure relief valve with a properly rated/sized new one.

If you do not understand these instructions or have any questions regarding the temperature-pressure relief valve call the toll free number listed on the back cover of this manual for technical assistance.

WATER LINE CONNECTIONS

This manual provides detailed piping installátion diagrams (see back section of this manual) for typical methods of application. For the heater inlet and outlet connections, di-electric unions are recommended. The water heater may be installed by itself, or with a separate storage tank, on both single and two-temperature systems. When used with a separate storage tank, the circulation may be either by gravity or by means of a circulating pump. When a circulating pump is used it is important to note that the flow rate should be slow so that there will be a minimum of turbulence inside the heater.

CLOSED WATER SYSTEMS

Water supply systems may, because of code requirements or such conditions as high line pressure, among others, have installed devices such as pressure reducing valves, check valves, and back flow preventers. Devices such as these cause the water system to be a closed system.

THERMAL EXPANSION

As water is heated, it expands (thermal expansion). In a closed system the volume of water will grow when it is heated. As the volume of water grows there will be a corresponding increase in water pressure due to thermal expansion. Thermal expansion can cause premature tank failure (leakage). This type of failure is not covered under the limited warranty. Thermal expansion can also cause intermittent temperature-pressure relief valve operation: water discharged from the valve due to excessive pressure build up. This condition is not covered under the limited warranty. The temperature-pressure relief valve is not intended for the constant relief of thermal expansion.

A properly sized thermal expansion tank should be installed on all closed systems to control the harmful effects of thermal expansion. Contact a local plumbing service agency to have a thermal expansion tank installed.

ELECTRICAL



⚠ WARNING

- **Before removing any access panels or servicing the water heater, make sure the electrical supply to the water heater is turned "OFF."**
- **Failure to do this could result in death, serious bodily injury, or property damage.**

GENERAL

The installation must conform with these instructions and the local code authority having jurisdiction and the requirements of the power company. In the absence of local codes, the installation must comply with the current editions of the National Electrical Code, NFPA 70 or the Canadian Electrical Code CSA C22.1.

An electrical ground is required to reduce risk of electrical shock or possible electrocution. The water heater should be connected to a separate grounded branch circuit with over-current protection and disconnect switch. The water heater should be grounded in accordance with national and local codes.

Voltage applied to the heater should not vary more than +5% to -10% of the model and rating plate marking for satisfactory operation.

TABLE 310-16. Allowable Ampacities of Insulated Conductors

Not more than three conductors in raceway, cable, or earth (directly buried), based on ambient temperature of 30°C (86°F)

Size	Temperature Rating of Conductor. See Table 310-13								Size
	60°C (140°F)	75°C (167°F)	85°C (185°F)	90°C (194°F)	60°C (140°F)	75°C (167°F)	85°C (185°F)	90°C (194°F)	
AWG MCM	TYPES RUW, T TW, UF	TYPES FEPW, RH, RHW, RUH, THW THWN, XHHW, USE, ZW	TYPES V, MI,	TYPES TA, TBS, SA, AVB, SIS, +FEP, +FEPB, +RHH, +THHN, +XHHW*	TYPES RUW, T TW, UF	TYPES RH, RHW, RUH, THW, THWN, XHHW, USE	TYPES V, MI,	TYPES TA, TBS, SA, AVB, SIS, +RHH, +THHN, +XHHW*	AWG MCM
	COPPER				ALUMINUM OR COPPER-CLAD ALUMINUM				
18	.....	.....	.....	21	.....	.....	.....	.....	.....
16	.....	.....	22	22	.....	.....	.....	.....	.....
14	15	15	25	25	.....	.....	.....	.....	.....
12	20	20	30	30	15	15	25	25	12
10	30	30	40	40	25	25	30	30	10
8	40	45	50	50	30	40	40	40	8
6	55	65	70	70	40	50	55	55	6
4	70	85	90	90	55	65	70	70	4
3	80	100	105	105	65	75	80	80	3
2		115	120	120	75	90	95	95	2
1		130	140	140		100	110	110	1
0		150	155	155		120	125	125	0
00		175	185	185		135	145	145	00
000		200	210	210		1155	165	165	000
0000		230	235	285		180	185	185	0000
250		255	270	270		205	215	215	250
300		285	300	300		230	240	240	300
350		310	325	325		250	260	260	350
400		335	360	360		270	290	290	400
500		380	405	405		310	330	330	500
	CORRECTION FACTORS								
Ambient Temp. °C	For ambient temperatures over 30°C, multiply the ampacities shown above by the appropriate correction factor to determine the maximum allowable load current.								Ambient Temp. °F
31-40	.82	.88	.90	.91	.82	.88	.90	.91	86-104
41-50	.58	.75	.80	.82	.58	.75	.80	.82	105-122
51-60	.....	.58	.67	.71	.....	.58	.67	.71	123-141
61-70	.....	.35	.52	.58	.....	.35	.52	.58	142-158
71-80	.....	.....	.30	.41	.....	.....	.30	.41	159-176

+The load current rating and the overcurrent protection for these conductors shall not exceed 15 amperes for 14 AWG, 20 amperes for 12 AWG, and 30 amperes for 10 AWG copper; or 15 amperes for 12 AWG and 25 amperes for 10 AWG aluminum and copper-clad aluminum.
*For dry locations only. See 75°C column for wet locations.

KW Input	Number of Elements	Element Wattage	Full Load Current in Amperes							No. of Thermostats	No. of Fuses
			Single Phase				Three Phase				
			208V	240V	277V	480V	208V	240V	480V		
6		2000	28.8	25.0	21.7	12.5	16.7	14.4	7.2		
9		3000	43.3	37.5	32.5	18.8	25.0	21.7	10.8		
12	3	4000	57.7	50.0	43.3	25.0	33.3	28.9	14.4	3	6
13.5		4500	64.9	56.3	48.7	28.1	37.5	32.5	16.2		
15		5000	72.1	62.5	54.2	31.3	41.6	36.1	18.0		
18		6000	---	75.0	65.0	37.5	---	43.3	21.7		
18		3000	86.5	---	---	---	50.0	---	---		
24		4000	115.4	100.0	86.6	50.0	66.6	57.7	18.9		
27	6	4500	129.8	112.5	97.5	56.3	74.9	65.0	32.5	6	12
30		5000	144.2	125.0	108.3	62.5	83.3	72.2	36.1		
36		6000	---	150.0	130.0	75.0	---	86.6	43.3		
36		4000	173.1	---	---	---	99.9	---	---		
40.5	9	4500	194.7	168.8	146.2	84.4	112.4	108.3	54.1	9	18*
45		5000	216.3	187.5	162.5	93.8	124.9	108.3	54.1		
54		6000	---	225.0	194.9	112.5	149.9	129.9	65.0		

AMPERAGE TABLE/OVERCURRENT PROTECTION

The tables above provides the total connected heating element load in amperes for branch circuit conductor and overcurrent protection sizing. Single-phase heaters are two wire circuits. Three-phase heaters are three wire circuits. In addition to the foregoing, a grounded conductor is required.

The rating of the overcurrent protection must be computed on the basis of 125% of the total connected load amperage. Where the standard ratings and settings do not correspond with this computation, the next higher standard rating or setting should be selected.

HEATER CIRCUITS - ELECTRONIC CONTROL MODELS

The water heater's electrical components are pictured and identified in Figures 1 and 2. The model and rating plate illustration on page 4 identifies heater circuit ratings. The ELECTRONIC CONTROL model has two electrical circuits.

- The control circuit, which controls the electrical power to heating elements, referring the following control circuit diagram Figure 3.
- The power circuit, which is operated by the control circuit carries the electrical load of the heating elements. The following describes the heater circuits and includes wiring diagrams for Delta configuration, refer to the "WYE Configuration Insert" for water heaters operating at 380V/400V/416V/575V. All heater circuits are designed for 50/60 cycle alternating current.

CONTROL CIRCUIT - ELECTRONIC CONTROL MODELS

These models are equipped with an electronic control system. The system includes a CCB (Central Control Board) circuit board, an immersion temperature probe with ECO for temperature sensing and limiting, a UIM (User Interface Module) for user interface & information display and element current sensors for monitoring the power circuits. Refer to the control circuit label on the water heater for details. The CCB is powered by a small 120V/24V transformer. The control circuit operates on 120V supplied by a larger 100VA transformer. Standard equipment includes control circuit fusing using two, 3 amp, class G fuses with 600 volt rating. Do not substitute fuses of a different rating.

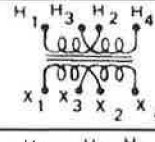
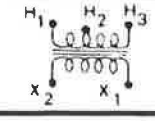
Sequence of Operation

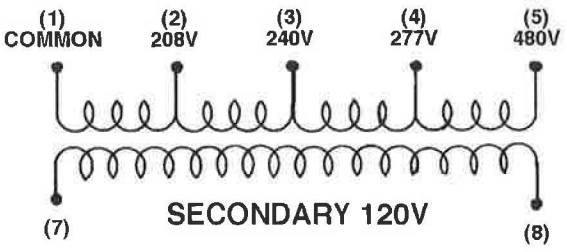
1. When the control is powered, the UIM should display model information, water temperature, Operating Set Point, heating status and operating mode.
2. If the control determines that the actual water temperature inside the tank is below the programmed Operating Setpoint minus the (1st) differential, a call for heat is activated.
3. After all safety checks are verified, the CCB will energize contactor coils starting with the lower bank of heating elements (each diagonal row of three heating elements is considered a "bank" - see Figure 1) then energize the middle bank (if so equipped) and top bank (if so equipped). The middle and top banks (if so equipped) are energized according to programmed 2nd and 3rd differential set points.
4. The control remains in the heating mode until the water temperature reaches the programmed Operating Setpoint. At this point the contactors will be de-energized in the reverse order.
5. The control system now enters the standby operating mode while continuing to monitor the water temperature and the state of other system devices. If the water temperature drops below the programmed Operating Setpoint minus the (1st) differential, the control will automatically return to step 2 and repeat the heating cycle.

NOTE: See the Electronic Control Models Operation section for more detailed information on temperature settings mentioned above.

120 VAC CONTROL CIRCUIT TRANSFORMER CONNECTIONS - ELECTRONIC CONTROL MODELS

NOTE: THIS TABLE TO BE USED FOR 8 TAP AND 5 TAP TRANSFORMERS

	VOLTS	LINE ON	LOAD ON	CONNECT
	480	H_1 & H_4	X_1 & X_4	H_2 & H_3
	480/277			X_1 & X_3 X_2 & X_4
	208	H_1 & H_2	X_1 & X_2	—
	240	H_1 & H_3	X_1 & X_2	—



VOLTS	LINE ON	LOAD ON
208	COMMON & 208	SECONDARY 120V
240	COMMON & 240	
277	COMMON & 277	
480	COMMON & 480	

CCB (CENTRAL CONTROL BOARD) CIRCUIT BOARD
CONTROL CIRCUIT DIAGRAM - ELECTRONIC CONTROL MODELS

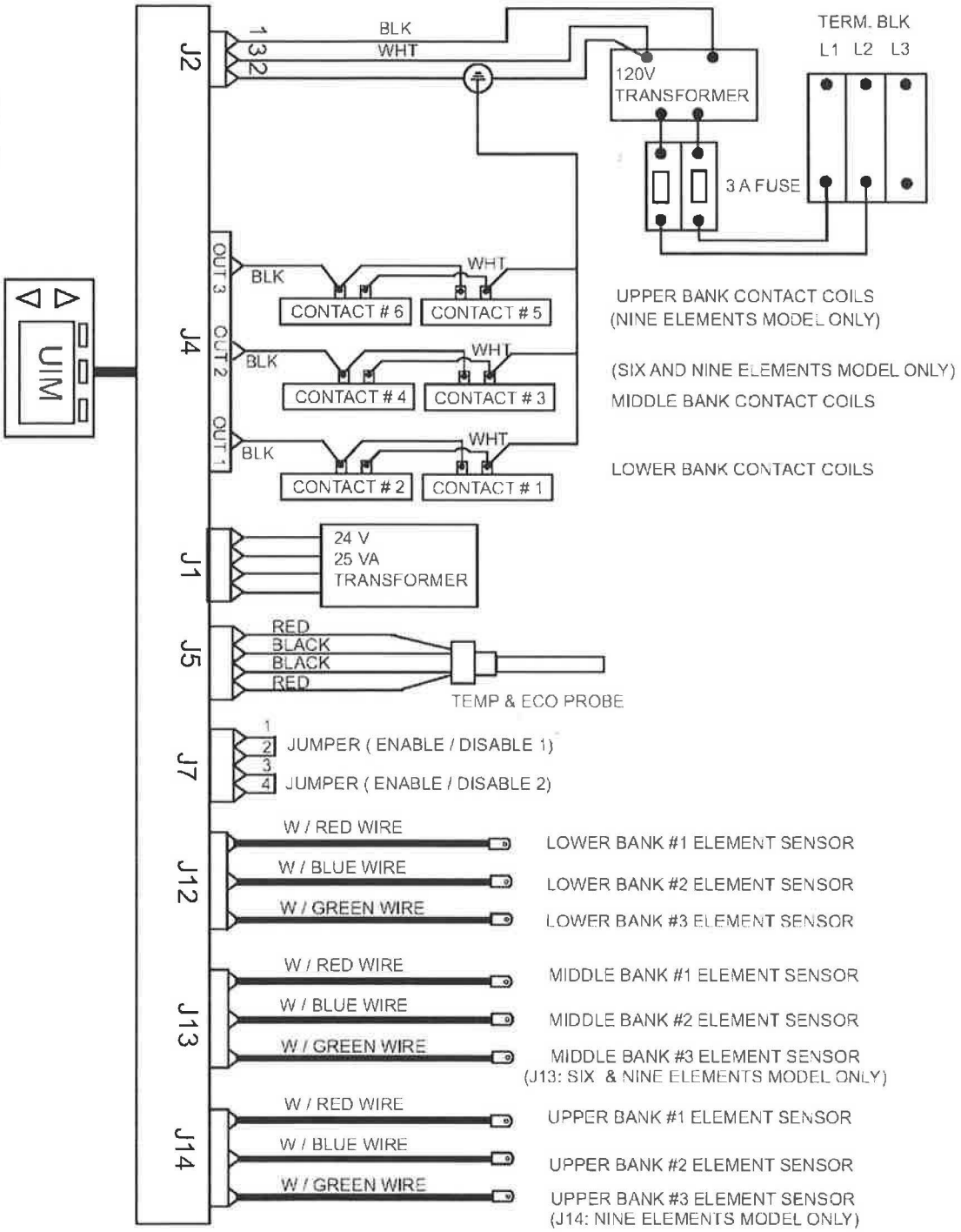
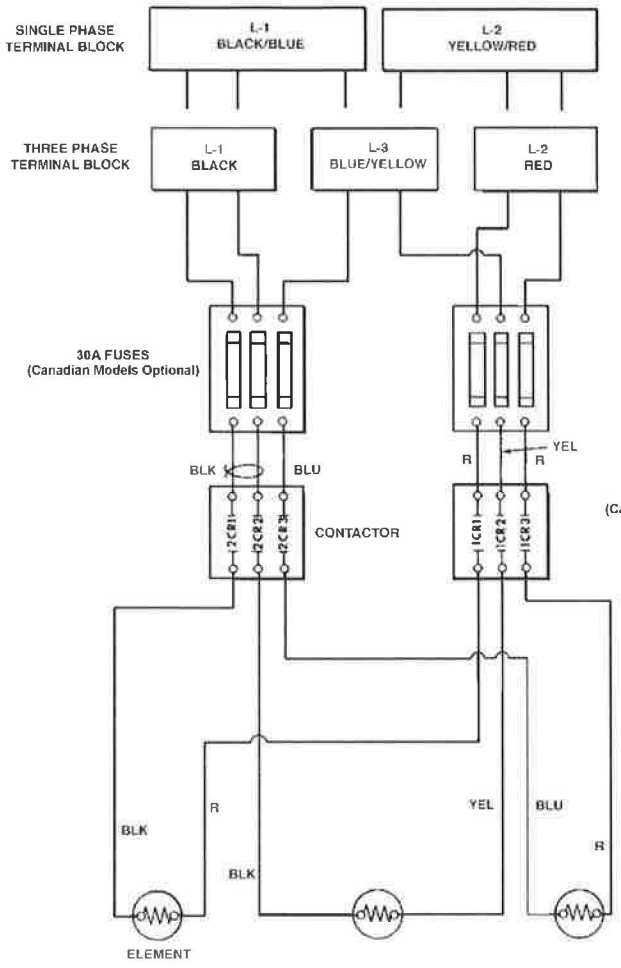


FIGURE 3.

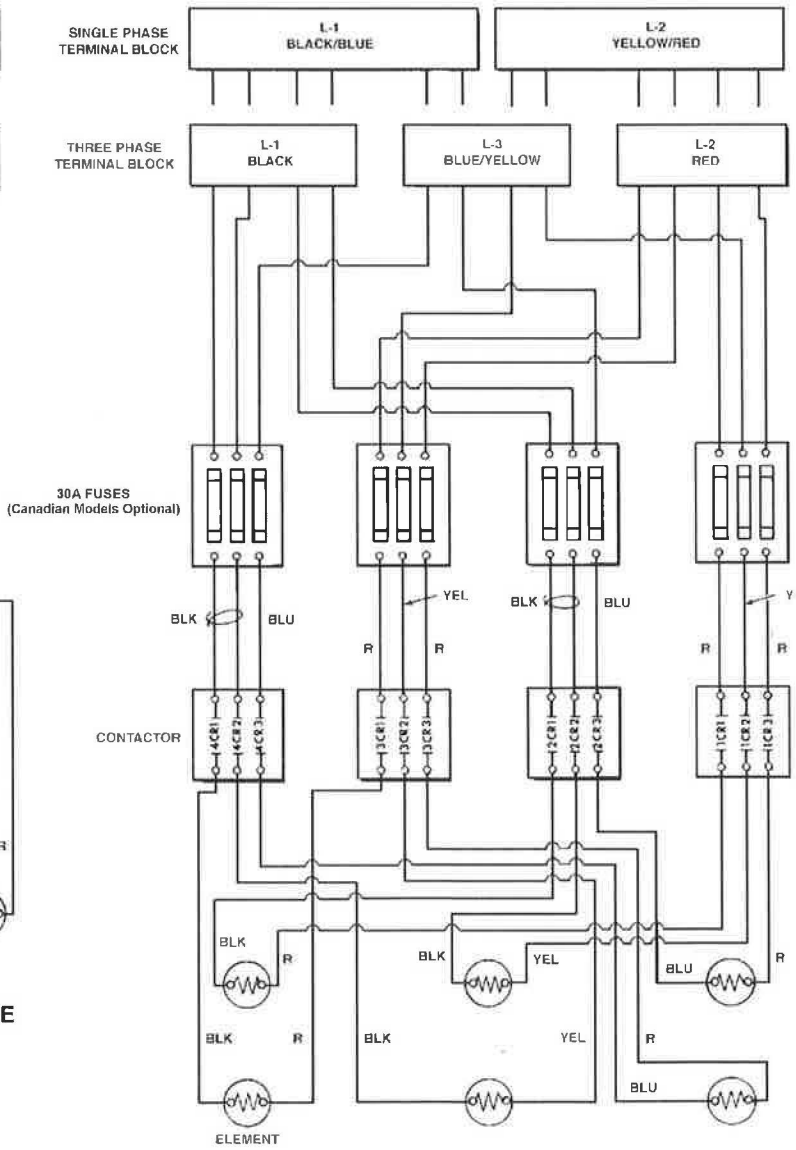
WIRING DIAGRAMS

POWER CIRCUIT DIAGRAMS - ELECTRONIC CONTROL MODELS

The water heater's electrical components are pictured and identified on page 7. The following describes the heater circuits and includes wiring diagrams. All heater circuits are designed for 60/50 hertz alternating current. The water heater circuit wiring is 12 AWG, AWM, or TEW type, rated 600 volts, 105°C. Fusing consists of three 30 amp fuses for each contactor. Fusing is an optional feature for Canadian models.



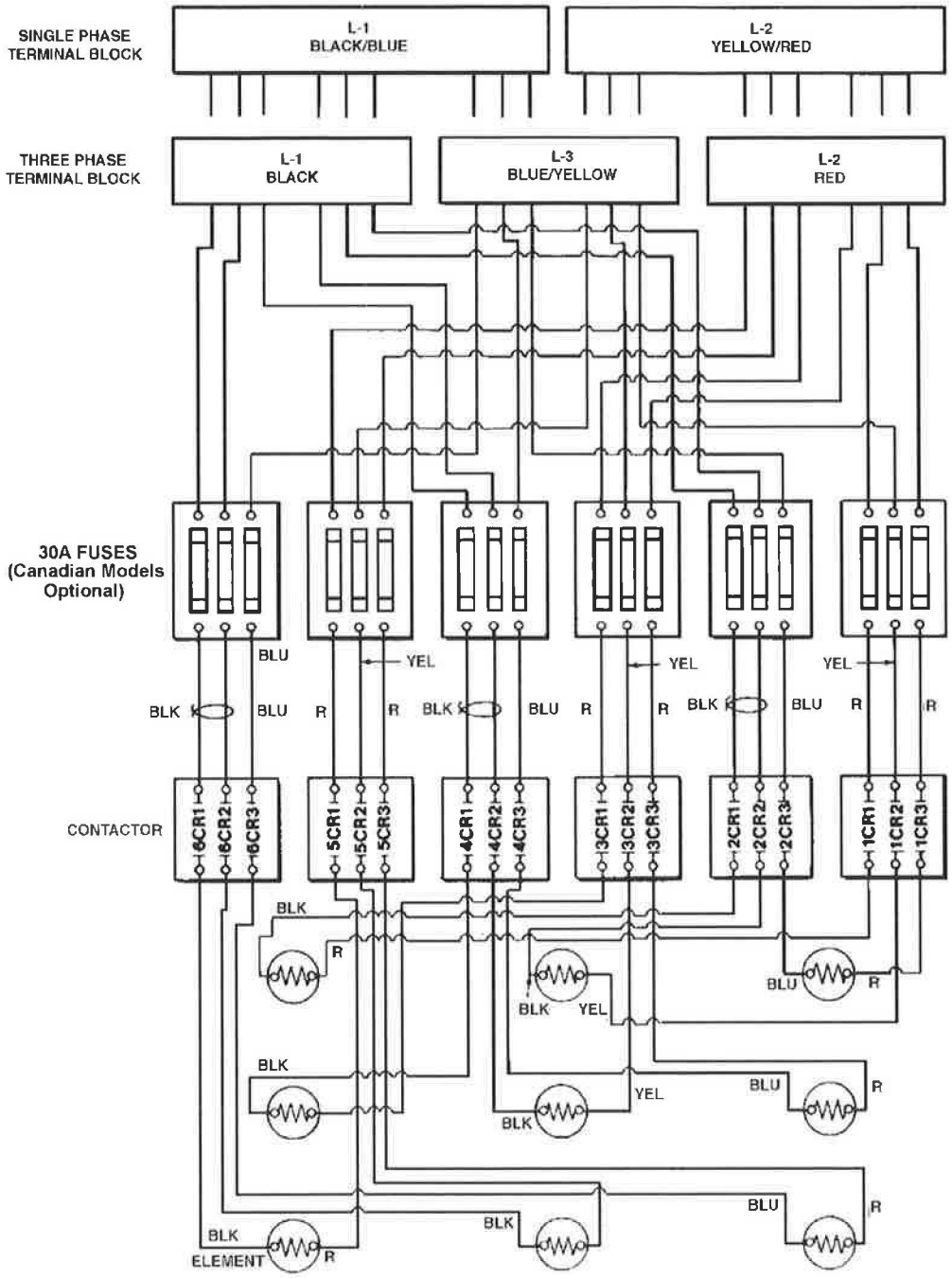
THREE ELEMENTS - SINGLE AND THREE PHASE



SIX ELEMENTS - SINGLE AND THREE PHASE

DIAGRAM 1.

WIRING DIAGRAMS



NINE ELEMENT - SINGLE AND THREE PHASE

DIAGRAM 2.

CONVERSION TO SINGLE PHASE

When the heater is shipped for connection to a three-phase electrical service, it may be connected to a single-phase electrical service of the same voltage by:

1. Disconnect blue wires and yellow wires from terminal L3.
2. Reconnect all blue wires to terminal L1 (with black wires).
3. Reconnect all yellow wires to terminal L2 (with red wires).
4. Connect incoming power to terminals L1 and L2.

CONVERSION TO THREE PHASE

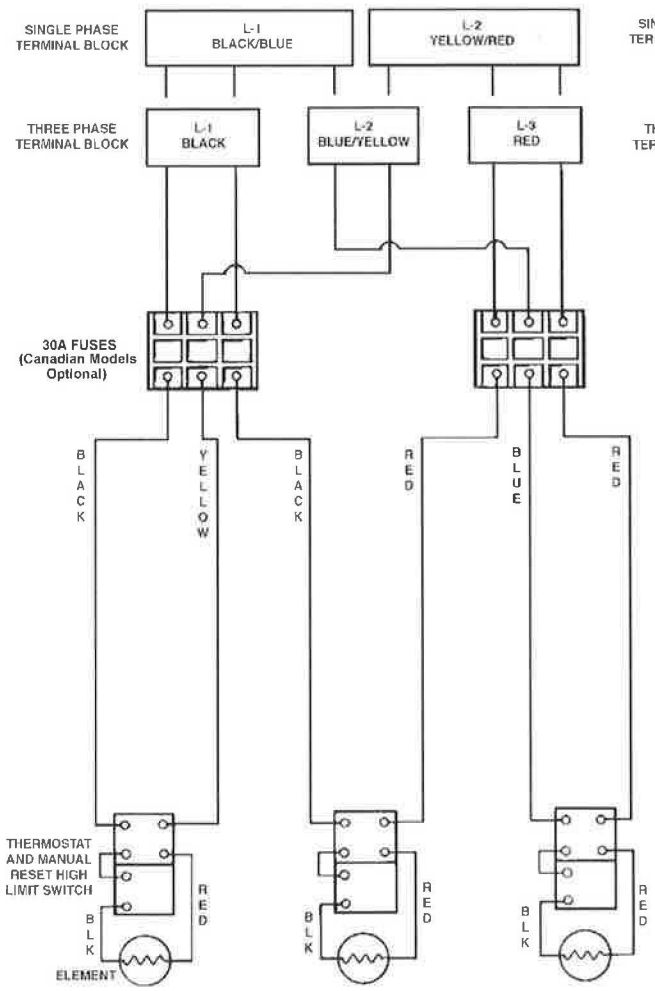
When heater is shipped for connection to a single-phase electrical service, it may be connected to a three-phase electrical service of the same voltage by:

1. Disconnect blue wires from terminal L1.
2. Disconnect yellow wires from terminal L2.
3. Reconnect all blue wires and yellow wires to terminal L3.
4. Connect incoming power to terminals L1, L2, and L3.

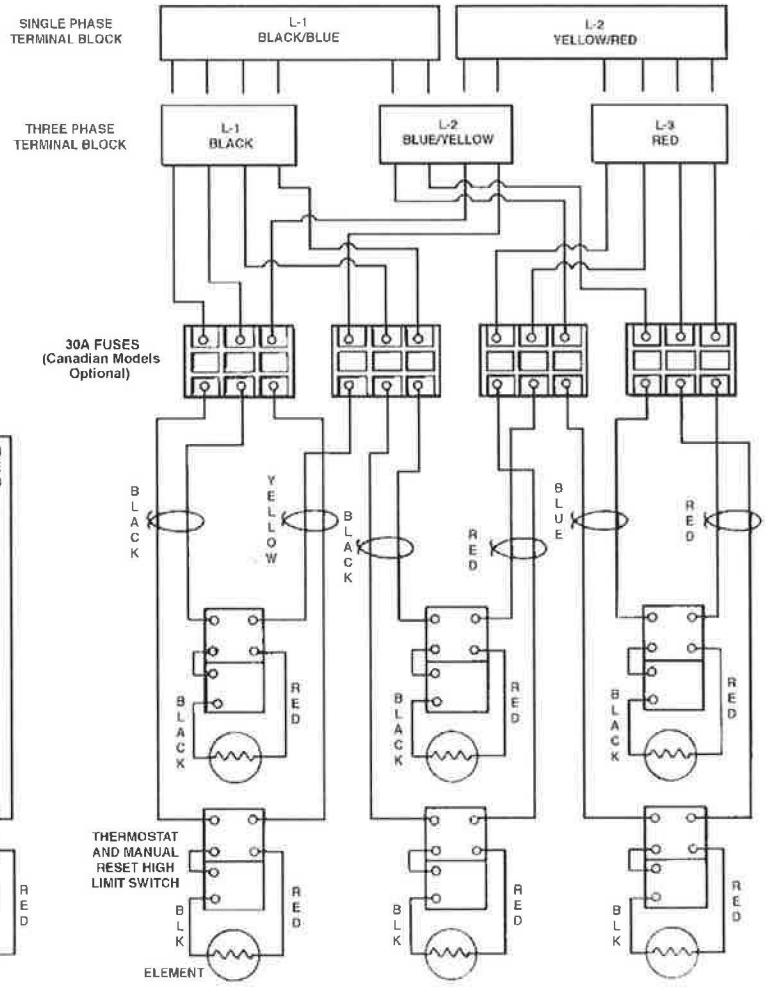
WIRING DIAGRAMS

POWER CIRCUIT DIAGRAMS - SURFACE MOUNT CONTROL MODELS

The water heater's electrical components are pictured and identified on page 8. The following describes the heater circuits and includes wiring diagrams. All heater circuits are designed for 60/50 hertz alternating current. The water heater circuit wiring is 12 AWG, AWM, or TEW type, rated 600 volts, 105°C. Fusing consist of two 30 amp fuses for each element. Fusing is an optional feature for Canadian models.



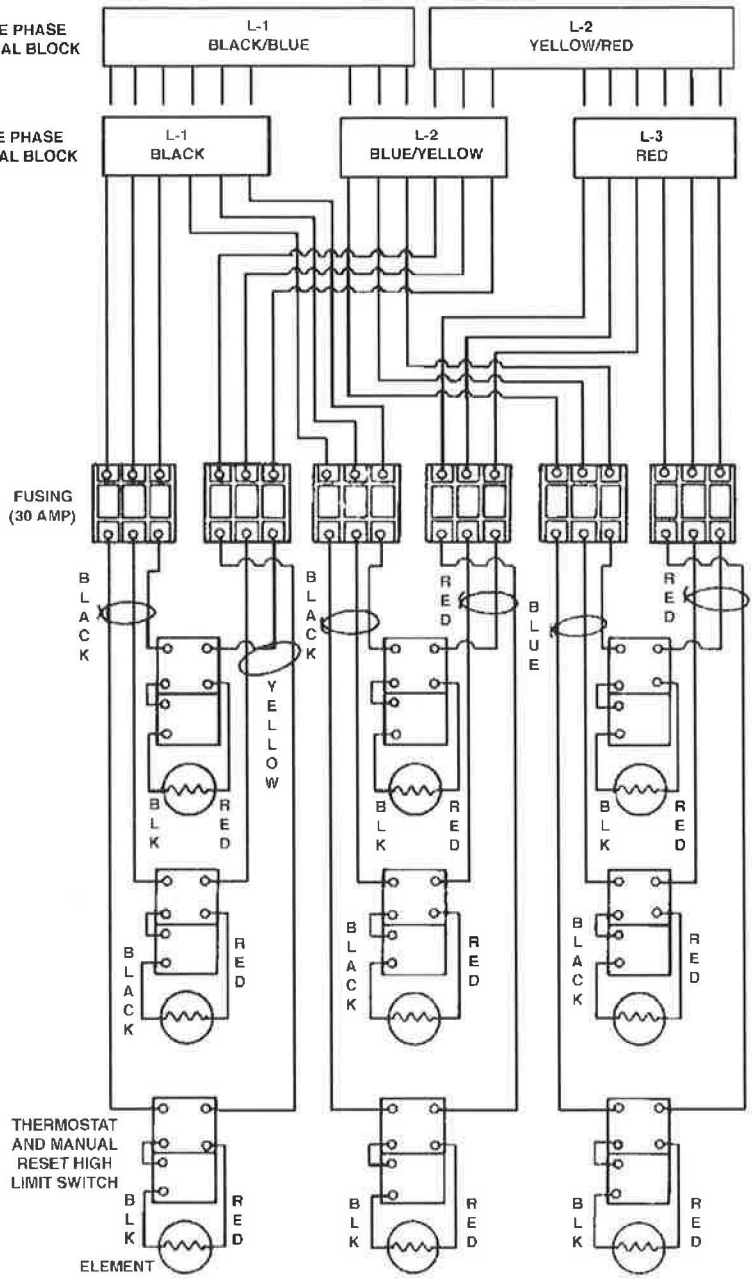
THREE ELEMENTS - SINGLE AND THREE PHASE



SIX ELEMENTS - SINGLE AND THREE PHASE

DIAGRAM 3.

WIRING DIAGRAMS



NINE ELEMENTS - SINGLE AND THREE PHASE

DIAGRAM 4.

CONVERSION TO SINGLE PHASE

When the heater is shipped for connection to a three-phase electrical service, it may be connected to a single-phase electrical service of the same voltage by:

1. Disconnect blue wires from terminal L2.
2. Connect all blue wires to terminal L1 (with black wires).
3. Disconnect all red wires from terminal L3.
4. Connect all red wires to terminal L-2 (with yellow wires).
5. Connect incoming power to terminals L1 and L2.

CONVERSION TO THREE PHASE

When heater is shipped for connection to a single-phase electrical service, it may be connected to a three-phase electrical service of the same voltage by:

1. Disconnect blue wires from terminal L1
2. Disconnect red wires from terminal L2.
3. Connect all blue wires to terminal L2 (with yellow wires).
4. Connect red wires to terminal L3.
5. Connect incoming power to terminals L1, L2 and L3.

OPERATION

GENERAL

Refer to the Features and Components section of this manual (pages 7 & 8) for the location of components mentioned in the instructions that follow.

NEVER turn on power to the water heater without being certain the water heater is filled with water and a temperature and pressure relief valve is installed in the relief valve opening.

DO NOT TEST ELECTRICAL SYSTEM BEFORE HEATER IS FILLED WITH WATER. FOLLOW FILLING AND START-UP INSTRUCTIONS IN OPERATION SECTION.



⚠DANGER

Full power is present whenever the cabinet door is opened even with the pilot switch turned off.

FILLING THE WATER HEATER

CAUTION

Property Damage Hazard

In order to avoid water heater damage, fill tank with water before operating.

1. Turn off the electrical disconnect switch.
2. Close the water heater drain valve.
3. Open a nearby hot water faucet to permit the air in the system to escape.
4. Fully open the cold water inlet pipe valve allowing the heater and piping to be filled.
5. Close the hot water faucet as water starts to flow. The heater is now ready for STARTUP and TEMPERATURE REGULATION.

INITIAL START UP

The following checks should be made by the installer when the heater is placed into operation for the first time.

1. Turn off the electrical disconnect switch.
2. Open the front panel, check all water and electrical connections for tightness. Also check connections on top and side of heater. Repair water leaks and tighten electrical connections as necessary.
3. Depress the red manual reset button on each Thermostat/ECO combination control (Surface Mount Control Models only).
4. Turn on the electrical disconnect switch.
5. Observe the operation of the electrical components during the first heating cycle. Use care as the electrical circuits are energized.
6. Close the front panel.

Temperature control and contactor operation should be checked by allowing heater to come up to temperature and shut off automatically. **Use care as the electrical circuits are energized.**

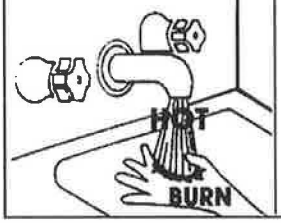
DRAINING THE WATER HEATER

The water heater must be drained if it is to be shut down and exposed to freezing temperatures. Maintenance and service procedures may also require draining the heater.

1. Turn off the electrical disconnect switch.
2. Close the supply water inlet valve to heater.
3. Attach hose to outlet opening of drain valve and direct end to drain.
4. Open a nearby hot water faucet and the heater drain valve.
5. If the heater is being drained for an extended shutdown, it is suggested the drain valve be left open during this period. The hose may be removed.

Follow FILLING instructions when restoring hot water service.

⚠DANGER



- Burn hazard
- Hot water discharge.
- Keep clear of relief valve discharge outlet.

TEMPERATURE REGULATION

HIGH TEMPERATURE LIMIT CONTROLS (ECO)

Both the ELECTRONIC CONTROL and SURFACE MOUNT CONTROL model water heaters are equipped with one or more ECO (energy cut off) non adjustable high temperature limit control(s). An ECO is a normally closed switch that opens (activates) on a rise in temperature. If the ECO switch contacts open (activate) due to abnormally high water temperatures it will lock-out and disable further heating element operation. It is important that a qualified service agent be contacted to determine the reason for the ECO activation before resetting the ECO. Once the reason has been determined and corrected the ECO(s) can be reset as follows:

Surface Mount Control Models

Surface Mount Control models have multiple surface mounted Thermostat/ECO combination controls. One for each installed heating element - see the Surface Mount Control wiring diagrams in this manual. The ECO high temperature limit switch contacts on each control will open when the tank temperature reaches approximately 200°F/93°C. When the ECO switch contacts open (activate) voltage to ONE heating element ONLY is terminated to prevent further heating operation of that element. Voltage may still be present at other heating elements and they may still be heating the water.

The ECO is a manual reset switch. Should one or more ECO activate, the tank temperature must drop below 120°F/49°C before an ECO can be reset. To manually reset an ECO:

1. Disconnect the power supply to the water heater.
2. Allow the tank temperature to cool below 120°F/49°C.
3. Remove the front control cover from the effected control(s).
4. Press the manual reset button on each of the effected controls.

Once the control(s) has been reset the control cover should be replaced prior to restoring power to the water heater.

Electronic Control Models

The ECO high temperature limit switch is located inside the immersion Temperature Probe (two red wires) on ELECTRONIC CONTROL models. The ECO switch contacts will open when the water temperature reaches approximately 202°F/94°C. When the ECO switch contacts open (activate) the electronic control system locks out and displays a Fault message. Voltage to the contactor coils and heating elements is terminated to prevent further heating operation.

Should the ECO activate, the water temperature must drop below 140°F/60°C before the control system can be reset. Once the water temperature has cooled below this point the power supply to the water heater must be turned off and on again to reset the control system.

THERMOSTAT CONTROLS

The water heaters covered in this instruction manual are equipped with adjustable thermostat controls to control water temperature. Hot water temperatures required for automatic dishwasher and laundry use can cause scald burns resulting in serious personal injury and/or death. The temperature at which injury occurs varies with the persons age and duration of exposure. The slower response time of children, the elderly or disabled persons increases the hazards to them. Never allow small children to use a hot water tap or draw their own bath water. Never leave a child or disabled person unattended in a bathtub or shower.

The water heater should be located in an area where the general public does not have access to set temperatures.

Setting the water heater temperatures at 120°f will reduce the risk of scalds. Some States require settings at specific lower temperatures.

THERMOSTAT SETTINGS - SURFACE MOUNT CONTROL



⚠ DANGER

Water temperature over 125°F (52°C) can cause severe burns resulting in severe injury or death.

Children, the elderly, and the physically or mentally disabled are at highest risk for scald injury.

Feel water before bathing or showering.

Temperature limiting valves are available.

Read instruction manual for safe temperature setting.

These models have multiple thermostat/ECO combination controls one for each heating element installed. These thermostats are set from the factory at 140°F/60°C. Set the thermostat dial at the lowest setting which produces an acceptable hot water supply. This will always give the most energy efficient operation.

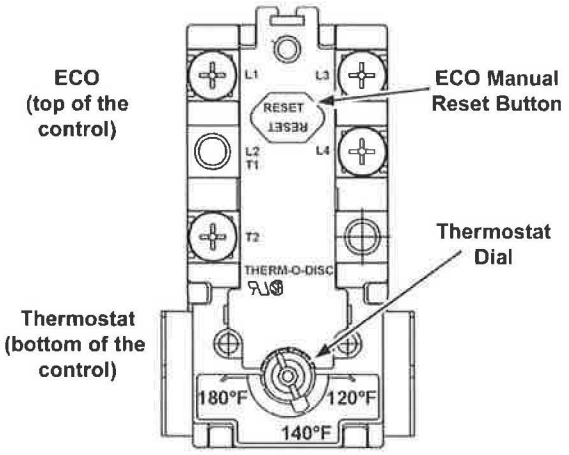
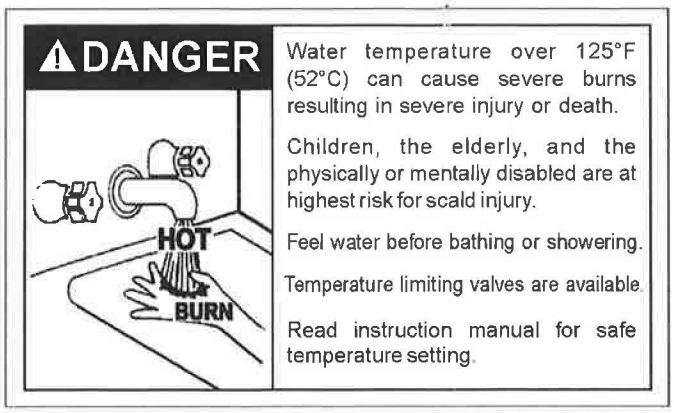


Figure 4 shows the approximate time-to-burn relationship for normal adult skin.

Temperature Settings	Time to Produce 2nd & 3rd Degree Burns on Adult Skin
180°F (82°C)	Nearly Instantaneous
160°F (71°C)	About 1/2 second
150°F (66°C)	About 1-1/2 seconds
140°F (60°C)	Less than 5 seconds
130°F (54°C)	About 30 seconds
120°F (49°C)	More than 5 minutes
80°F (27°C)	----------

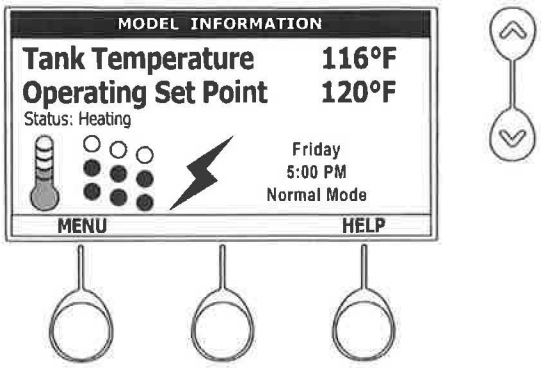
FIGURE 4

THERMOSTAT SETTINGS - ELECTRONIC CONTROLS



These models are equipped with an electronic control system. The control system senses temperature from a factory installed Immersion Temperature Probe (see Figure 1). The "Operating Set Point" is adjusted to control water temperature. This is an adjustable user setting in the control system's "Temperatures Menu." This and all control system menus are accessed through the UIM (User Interface Module - see Figure 5) located on the front panel of the water heater.

The Operating Set Point is adjustable from 90°F/42°C to 190°F/88°C. The factory setting is 120°F/49°C. See the Electronic Control Models Operation section of this manual for instructions on how to adjust the Operating Set Point and other user settings.



UIM (User Interface Module)
FIGURE 5

Set the Operating Set Point at the lowest setting which produces an acceptable hot water supply. This will always give the most energy efficient operation.

ELECTRONIC CONTROL MODELS OPERATION

CONTROL SYSTEM FEATURES

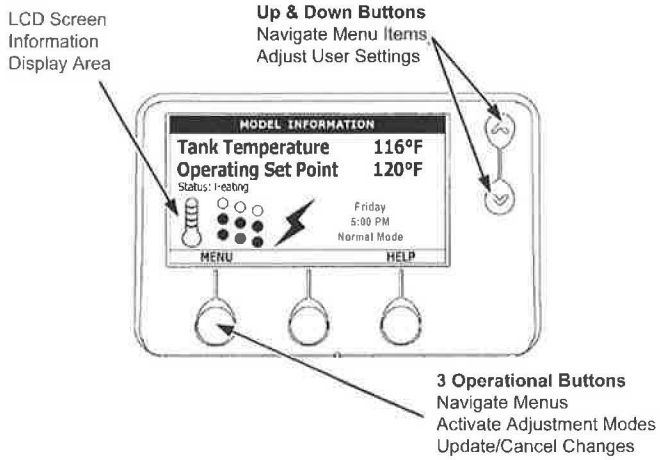
Advanced Diagnostics: Plain English text and animated icons display detailed operational and diagnostic information. LCD screen on the front of the water heater displays the Sequence of Operation in real time. Fault or Alert messages are displayed when operational problems occur. Advanced Service menu displays a list of possible causes for current Fault and Alert conditions to aid in servicing.

Economy Mode Operation: Control system automatically lowers the Operating Set Point by a programmed value during user defined time periods. Helps reduce operating costs during unoccupied or peak demand periods.

Linear Sequencing: Banks of heating elements (3 elements per bank) are energized according to adjustable (1 to 20°) differential set points for each bank. First bank on is the last bank off. Helps reduce operating costs during low/moderate loads.

CONTROL SYSTEM NAVIGATION

The UIM (User Interface Module) is located on the front cabinet of the Electronic Control Model water heaters. All operational information and user settings are displayed and accessed using the UIM. The UIM includes five snap acting (momentary) user input buttons; an Up, Down and 3 Operational Buttons.



UIM - USER INTERFACE MODULE
FIGURE 6.

Up & Down Buttons

Used to navigate (up and down) and to select (highlight) menu items. Also used to adjust or change (increase/decrease, on/off, set time) various user settings.

Operational Buttons

The 3 Operational Buttons are multifunctional. Their current function is defined by the text that appears above each button on the LCD screen. The function will change depending on what menu is currently displayed or what menu item is selected. When no text appears on the LCD screen above an Operational Button there is no function assigned.

THE DESKTOP SCREEN

Figure 7 below shows the control system "Desktop Screen." This is the default screen. If there are no active Fault or Alert conditions and no user input for approximately 10 minutes the control system will return to this screen automatically.

Model Information

Model information and menu titles are shown in the black bar at the top of the Desktop Screen.

Tank Temperature

Current water temperature as sensed from the immersion Temperature Probe.

Operating Set Point: Temperature at which the control system will maintain tank (water) temperature in the Normal Mode. This line of text will read **Economy Set Point** whenever the control system is operating in the Economy Mode.

Status: The Operating State of the control system is displayed beneath the Operating Set Point.

Service Note: The Desktop Screen displays text and animated icons that convey operational information.

Review the Status Icons explanation in Table 1. Learning to use this real time visual display of the operating sequence will help to quickly and accurately diagnose operational problems.

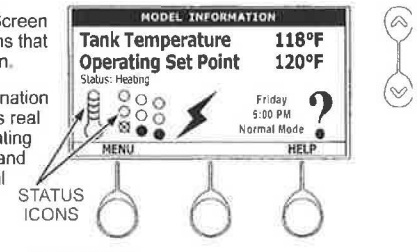


FIGURE 7.

Menu: The left Operational Button is pressed to enter the Main Menu where all control system menus are accessed. See Table 3 for a list of control system menus.

Help: The right Operational Button is pressed to access instructions and explanations for user settings, Operating States, Status Icons, manufacturer's web address, technical support phone number and service agent contact information.

Day/Time/Operating Mode: The current time and day are also displayed on the Desktop Screen. "Clock Not Set" will be displayed until the time clock has been initially set. Day and Time are adjusted in the Economy Mode Setup menu. The current Operating Mode, either Normal Mode or Economy Mode, is displayed beneath the day and time.

Discreet Menu Contact Information: From the Desktop Screen press and hold down the middle (unmarked) Operational Button for 30 seconds and then release it. This will launch a discreet menu where personalized contact information can be entered. Installing contractors and/or service agents can enter their company name and telephone number. This contact information will be displayed with all Fault and Alert messages.

TABLE 1 STATUS ICONS.

ICON	DESCRIPTION
	Water temperature in the tank has fallen. Shaded area of the animated thermometer icon will rise and fall in response to water temperature in the storage tank as sensed from the immersion Temperature Probe.
	Water temperature in the tank has reached the Operating Set Point. Shaded area of the animated thermometer icon will rise and fall in response to water temperature in the storage tank as sensed from the immersion Temperature Probe.
	The control is unable to initiate a heating cycle. This will happen whenever a Fault condition is detected by the control system or when either of the two Enable/Disable circuits are open circuits.
	The control system is in Heating Mode and has energized the electromagnetic contactor coils for at least one bank of heating elements. This animated icon DOES NOT indicate current has been sensed from the heating elements, only that there is a call for heat present and the control system has initiated heating operation.
	Heating elements icon for a water heater equipped with 1 Bank of heating elements. Each circle represents one heating element. Each diagonal row of 3 elements = 1 Bank of elements. Open circles represent heating elements the control system has not energized and is not sensing electrical current from.
	Heating elements icon for a water heater equipped with 2 Banks of heating elements. Each circle represents one heating element. Each diagonal row of 3 elements = 1 Bank of elements. Open circles represent heating elements the control system has not energized and is not sensing electrical current from.
	Heating elements icon for a water heater equipped with 3 Banks of heating elements. Each circle represents one heating element. Each diagonal row of 3 elements = 1 Bank of elements. Open circles represent heating elements the control system has not energized and is not sensing electrical current from.
	Heating elements icon for a water heater equipped with 3 Banks of heating elements. Each circle represents one heating element. Each diagonal row of 3 elements = 1 Bank of elements. Filled circles represent heating elements the control system has energized AND is sensing electrical current from.
	Heating elements icon for a water heater equipped with 3 Banks of heating elements. Each circle represents one heating element. Each diagonal row of 3 elements = 1 Bank of elements. Open circles with an X represent heating elements the control system has energized that it IS NOT sensing electrical current from.
	The control has detected/declared a Fault Condition. Fault message details can be viewed in the Current Fault menu. Heating operation is discontinued (locked out) until the condition that caused the fault is corrected. Power to the water heater must be cycled off and on to reset the control system. Note; cycling power will not reset the control system if the condition that caused the fault has not been corrected.
	The control has detected/declared an Alert Condition. The water heater will continue to operate during an Alert Condition but there is an operational condition that requires the attention of a Qualified Service Agent. Alert message details can be viewed in the Current Alert menu.

TABLE 2 OPERATING STATES.

STATE	DESCRIPTION
Standby	The water heater is not in an active heating cycle. This usually indicates the temperature in the tank has reached the Operating Set Point and the control system has terminated the heating cycle.
Heating	The control system is in the Heating Mode. At least one bank of heating elements has been energized.
Alert	The control system has detected/declared an Alert Condition. The controls system will continue heating operation. However, a Qualified Service Agent should be contacted to check/service the water heater.
Fault	The control system has detected/declared a Fault Condition. The control system will discontinue heating operation and "lock out." Power to the water heater must be cycled off and on to reset the control system. Note; cycling power will not reset the control system until the condition that caused the fault has been corrected.

TABLE 3 CONTROL SYSTEM MENUS.

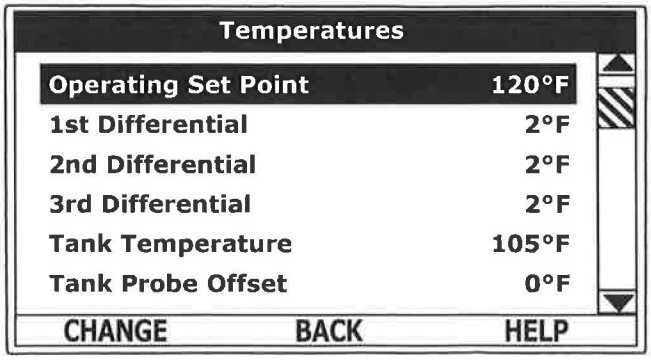
MENUS	DESCRIPTION
Temperatures	Most commonly accessed menu. Operating Set Point, Differential settings, Tank Temperature and Tank Probe Offset are located in this menu.
Heater Status	Current Operating State/Mode (heating/standby etc) and status (open/closed - on/off - yes/no) of monitored water heater functions and components are displayed in this menu.
Economy Mode Setup	Seven day 24 hour time clock with temperature set back capability to reduce operating costs during unoccupied or reduced demand periods.
Alarm Output Setup	The control system's CCB (Central Control Board) features on board SPDT (single pole double throw) relay contacts for building EMS (Energy Management System) notification of operational conditions such as Fault Conditions and heating mode status. This menu features a list of user definable conditions for relay activation.
Display Settings	Temperature units (°F or °C), appearance (brightness contrast) and backlight delay user adjustable settings are located in this menu.
Heater Information	Elapsed time of operation, total heating cycle time, heating cycle count, heating element bank(s) cycle count and heating bank on time along with UIM and CCB software revisions can be viewed in this menu.
Current Fault/Alert	Displays any current Alert or Fault messages.
Fault History	Retains 9 event history of Fault/Alert messages with time stamp. The Fault History is useful when dealing with intermittent operational problems or when the customer has reset the control system prior to a service agent's arrival.
Fault Occurrence	Running total of all Fault and Alert Conditions that have occurred are displayed in this menu. Can help determine potential root cause(s) of related operational problems.
Restore Factory Defaults	This control system feature allows the user to restore control system user settings to their factory default settings. Alarm Output Setup and Display Settings menu items ARE NOT changed when factory defaults are restored.
Help Menu	Accessible by pressing the corresponding Operational Button from most menus and screen displays. This menu provides access to instructions and explanations for user settings, Operating States, Status Icons, manufacturer's web address, technical support phone number and service agent contact information.

TEMPERATURES MENU

Operating Set Point

User adjustable setting 90°F to 190°F range; factory default is 120°F. When the water temperature sensed by the control system from the immersion Temperature Probe reaches the Operating Set Point the control system will end the heating cycle. A call for heat will be activated again when the water temperature drops below the Operating Set Point minus the 1st Differential Setting.

Example: Operating Set Point is 120°F, the 1st Differential Setting is 2°F (factory default). A call for heat will be activated when the sensed water temperature drops to 118°F.



Differential Settings

Adjustable user setting(s) 1°F to 20° range; factory default is 2°F. The water heaters covered in this Instruction Manual will have 3, 6 or 9 heating elements. Each group of 3 heating elements is one "Bank" of heating elements. Heating elements are energized in Banks of 3. Each Bank of heating elements will have a Differential Setting associated with it. Differential Settings are located in the Temperatures Menu.

There is a 1st Differential Setting on all models. There will be one additional Differential Setting visible/adjustable for each additional Bank of (3) heating elements.

Operating Sequence

With an Operating Set Point of 120°F and all Differential settings at 2°F the On/Off sequencing of heating element Banks would be as follows:

BANK NUMBER	DIFFERENTIAL SETTING	TURN ON TEMP	TURN OFF TEMP
Bank 1	2°F	118°F	120°F
Bank 2	2°F	116°F	118°F
Bank 3	2°F	114°F	116°F

Tank Temperature

Non adjustable information display. Current water temperature as sensed by the control system from the immersion Temperature Probe.

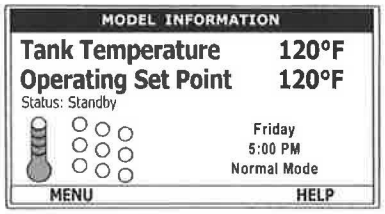
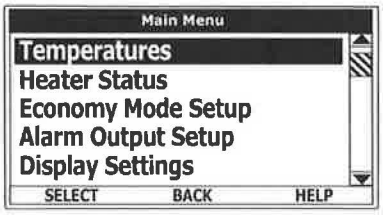
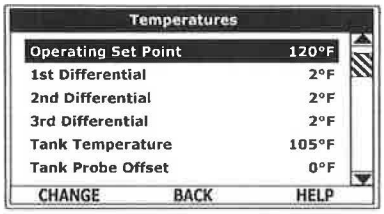
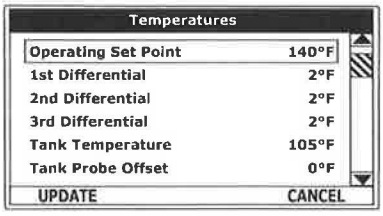
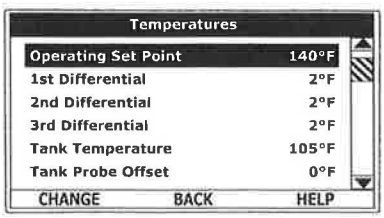
Tank Probe Offset

User adjustable setting -5°F to +5°F range; factory default is 0°F. If the current Tank Temperature is sensed (from the immersion Temperature Probe) at 120°F and the offset is adjusted to -5°F the control system would calibrate or "offset" the Tank Temperature to 115°F. Heating cycles would then start/stop based on the calibrated Tank Temperature.

Used to calibrate for slight differences in control system temperature sensing. This can improve the precision of temperature control in the storage tank and at points of use. This feature can also be used to compensate for building recirculation loops (hot water returning to the storage tank) that may cause the heating cycle to terminate prematurely.

TEMPERATURE SETTINGS

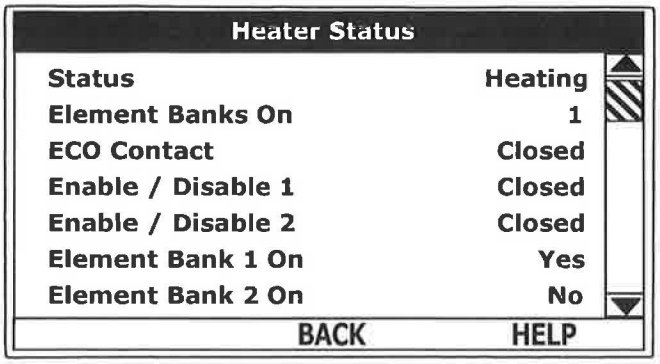
The Operating Set Point and the Differential Settings are adjusted in the Temperatures Menu. The following instructions explain how to adjust these user settings and navigate the control system menus.

ACTION	DISPLAY
From the Desktop Screen, press the Operational Button underneath "MENU" to enter the Main Menu. Notice how the text above the Operational Buttons on the display changes as you navigate through the various menus and screens.	
With Temperatures selected (highlight in black) in the Main Menu, press the Operational Button underneath "SELECT" to enter the Temperatures Menu. If Temperatures is not selected use the Up and Down buttons to select this menu item.	
With the Operating Set Point selected in the Temperatures Menu, press the Operational Button underneath "CHANGE" to activate the adjustment mode for this menu item.	
Press the Up and Down buttons to adjust the Operating Set Point to the desired setting. Press the Operational Button underneath "UPDATE" to confirm the new setting. Press the Operational Button underneath "CANCEL" to discard the new setting and retain the previous setting. The new Operating Set Point value should now be displayed as the current value. NOTE: Use this same procedure to adjust the Differential settings and the Tank Probe Offset in the Temperatures Menu. This same procedure is used to change user settings in other control system menus.	 

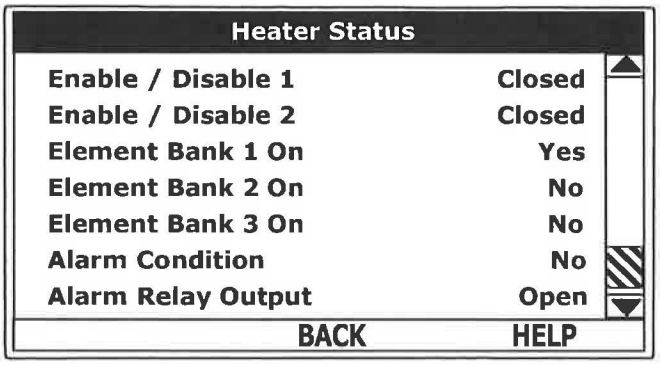
HEATER STATUS MENU

This menu displays non adjustable operational information. This menu contains more information that can be displayed on one screen of the LCD display. Use the Up & Down Buttons to navigate to the bottom of this menu.

Top of Menu



Bottom of Menu



Status

Displays the current Operating State of the control system. IE: Heating, Standby, Fault see Table 2.

Element Banks On

Displays the current number of heating element Banks the control system has energized. Each Bank of elements contains 3 heating elements.

ECO Contact

Displays the current state of the ECO high temperature limit switch contacts. The ECO switch is located inside the immersion Temperature Probe (two red wires).

Enable / Disable 1 & 2

Displays the current state, open or closed, of the two Enable/Disable circuits (J7 socket on the CCB - see wiring diagrams) provided for external supervisory controls such as building EMS (Energy Management System). Both of these Enable/Disable circuits must be closed to "enable" heating operation. If either Enable/Disable circuit is open for any reason heating operation will be "disabled." There is a plug with two jumper wires installed from the factory in the CCB J7 socket to enable heating operation when external controls are not in use.

Service Note: If a supervisory control(s) is used to enable/disable heating operation, install field wiring between the J7 socket on the CCB and a set of "dry contacts" on the external control per all applicable building codes. This is a switching circuit only: DO NOT apply any external voltage or connect any load (IE: relay coil) to either circuit.

Element Bank On

Displays the on/off status of each Bank of heating elements. Yes = On, No = Off.

Alarm Condition

Displays the status of the user definable Alarm Output function - see Alarm Output Setup Menu. Yes = alarm condition has been met, No = alarm condition has not been met.

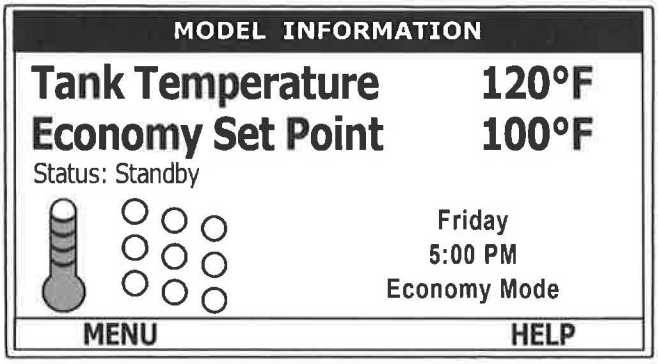
Alarm Relay Output

Displays the state of the normally open contacts of the Alarm Output relay. This relay (J3 contacts on the CCB) is used for building EMS (Energy Management System) notification of operational conditions such as Fault conditions.

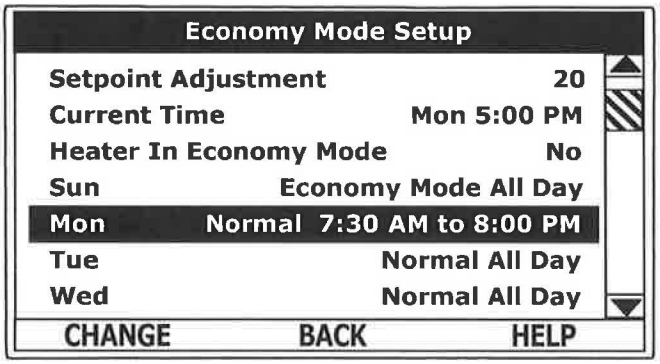
ECONOMY MODE SETUP MENU

This menu contains settings used to establish an "Economy Set Point" and "Economy Mode" operating periods. This control system feature can help reduce operating costs during unoccupied, low load, or peak demand periods.

Desktop Screen During Economy Mode



Economy Mode Setup Menu



Setpoint Adjustment

Adjustable user setting (2°F to 50°F - factory default is 20°F) the control system uses to calculate the "Economy Set Point." The Economy Set Point = normal Operating Set Point minus the programmed Setpoint Adjustment value. The Economy Set Point is the water temperature the control system maintains during programmed Economy Mode time periods. "Economy Set Point" is displayed instead of "Operating Set Point" and "Economy Mode" appears beneath the current time on the Desktop Screen during Economy Mode time periods.

Current Time

Seven Day 24 hr clock. Use this menu item to set the current time and day of the week. Current day and time are not set from the factory. "Clock Not Set" will be displayed on the Desktop until the time/day has been initially set.

Heater In Economy Mode

Displays whether the control system is currently operating in Economy Mode or not.

Daily Operating Mode (Sun - Mon - Tue - Wed - Thu - Fri - Sat)

Seven daily sub menus are listed at the bottom of the Economy Mode Setup menu. There are 3 Operating Modes in each sub menu;

"Normal Operation All Day" - "Economy Mode All Day" and "Normal Operation Between." Only one Operating Mode can be active, the factory default is Normal Operation All Day.

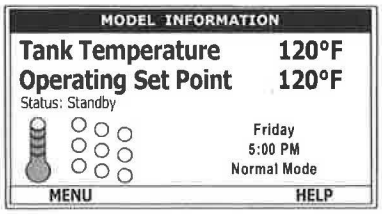
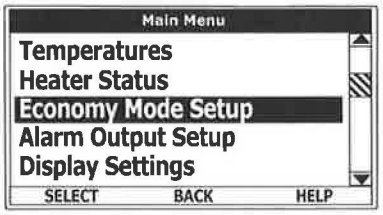
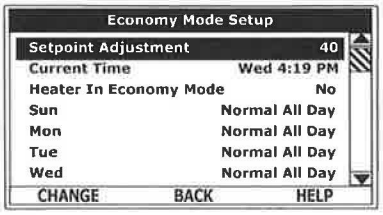
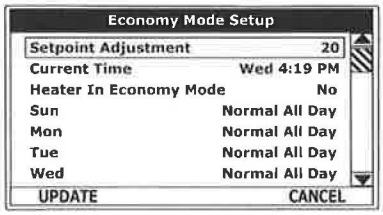
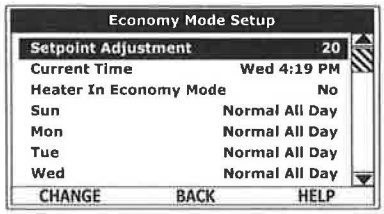
Normal Operation All Day: When this operating mode is active the normal Operating Set Point is used for the entire day.

Economy Mode All Day: When this operating mode is active the Economy Set Point is used for the entire day.

Normal Operation Between: When this operating mode is active there will also be start and stop times to program. The normal Operating Set Point is used between the programmed start and stop times and the Economy Set Point will be in effect during the rest of the day. There is one start time and one stop time event per day.

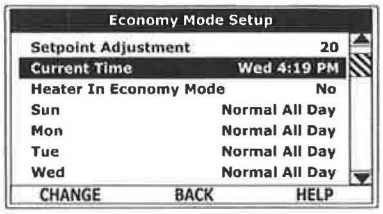
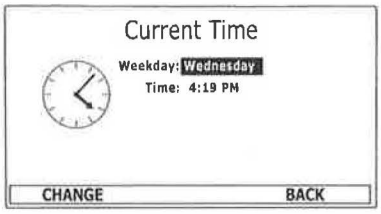
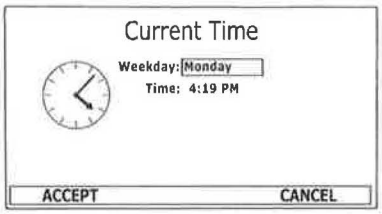
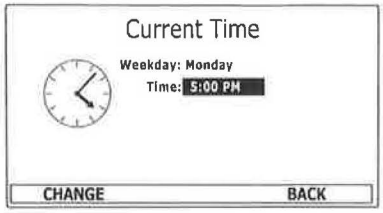
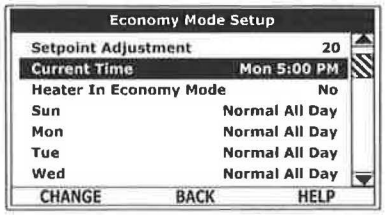
ECONOMY MODE SETTINGS

Setpoint Adjustment Value

ACTION	DISPLAY
From the Desktop Screen, press the Operational Button underneath "MENU" to enter the Main Menu. Notice how the text above the Operational Buttons on the display changes as you navigate through the various menus and screens.	
Use the Up/Down buttons to select (highlight in black) the Economy Mode Setup menu from the Main Menu. Press the Operational Button underneath "SELECT" to enter the Economy Mode Setup menu.	
Use the Up/Down buttons to select (highlight in black) Setpoint Adjustment. Press the Operational Button underneath "CHANGE" to activate the adjustment mode for the Setpoint Adjustment value.	
Use the Up/Down buttons to change the Setpoint Adjustment to the desired value. The Setpoint Adjustment value is adjustable from 2°F to 50°F. The factory default is 20°F. Notice how the text above the Operational Buttons on the display changes to "UPDATE" & "CANCEL" when the adjustment mode is activated and how the current value is outlined rather than highlighted in black. Press the Operational Button underneath "UPDATE" to enter and confirm the new value. Pressing the Operational Button underneath "CANCEL" would discard the new value and retain the previous value.	
The new Setpoint Adjustment value should now be displayed as the current value.	

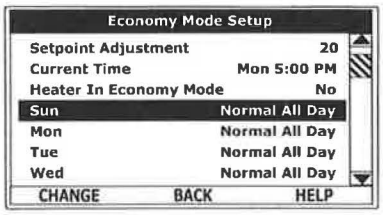
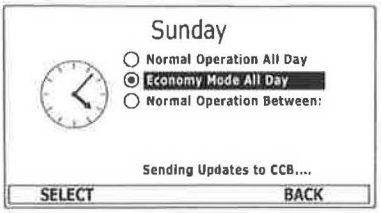
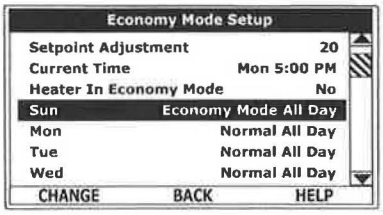
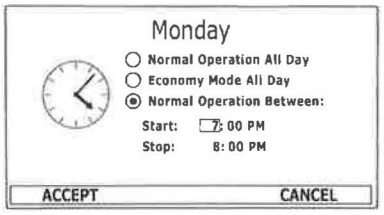
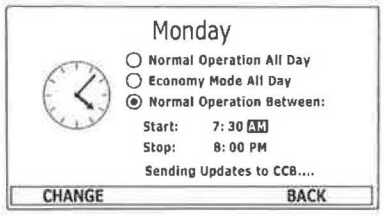
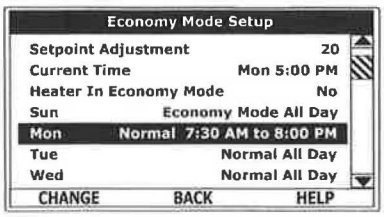
ECONOMY MODE SETTINGS

Time Clock Settings

ACTION	DISPLAY
From the Desktop Screen navigate to the Economy Mode Setup menu. Use the Up/Down buttons to select (highlight in black) Current Time sub menu. Press the Operational Button underneath "CHANGE" to enter the Current Time sub menu.	
Use the Up/Down buttons to select the "Weekday" setting. Press the Operational Button underneath "CHANGE" to activate the adjustment mode for this setting.	
Press the Up and Down buttons to adjust the Weekday setting to the current day. Notice how the text above the Operational Buttons on the display changes to "ACCEPT" & "CANCEL" when the adjustment mode is activated and how the current setting is outlined rather than highlighted in black. Press the Operational Button underneath "ACCEPT" to enter and confirm the new setting. Pressing the Operational Button underneath "CANCEL" would discard the new setting and retain the previous setting.	
Use the Up/Down and the CHANGE/ACCEPT Operational Buttons to individually select and change the remaining time settings (Hour, Minutes, AM/PM) to the current time in the same way as outlined above. When finished making changes press the Operational Button underneath "BACK" to confirm all new settings and update the control system. The display will automatically return to the Economy Mode Setup menu.	
The new settings should be displayed as the Current Time.	

ECONOMY MODE SETTINGS

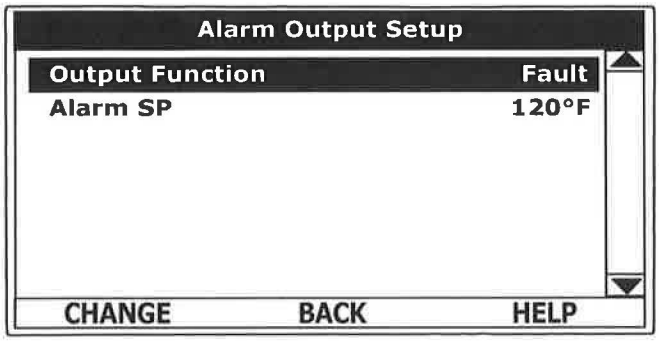
Daily Operating Mode Settings

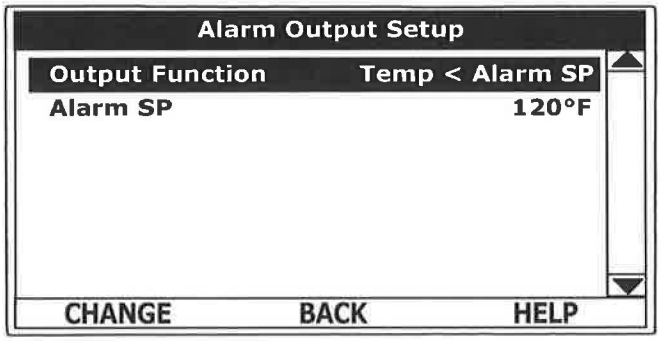
ACTION	DISPLAY
Economy Mode All Day: From the Economy Mode Setup menu use the Up/Down buttons to select (highlight in black) the Daily sub menu for "Sun." Press the Operational Button underneath "CHANGE" to enter this menu.	
Use the Up/Down buttons to select (highlight in black) the "Economy Mode All Day" setting. Press the Operational Button underneath "SELECT" to change from the factory default Normal Operation All Day setting to the Economy Mode All Day setting. Press the Operational Button underneath "BACK" to confirm the new setting and update the control system. You will be returned to the Economy Mode Setup menu. The new setting should now be displayed for Sun.	 
Normal Operation Between: From the Economy Mode Setup menu Use the Up/Down and CHANGE buttons to enter the Mon sub menu. Use the Up/Down buttons to select (highlight in black) the "Normal Operation Between" setting. Press the Operational Button underneath "SELECT" to change the operating mode for Monday to Normal Operation Between. Note that when this setting is selected Start and Stop time user settings appear on the display. Use the Up/Down buttons to navigate between the Start and Stop time Hour, Minutes and AM/PM settings. With each item selected press the Operational Button underneath "SELECT" to activate the adjustment mode for each setting. Use the Up/Down buttons to change the value to the desired setting. Press the Operational Button underneath "ACCEPT" to enter the new setting or "CANCEL" to discard the new setting and retain the previous setting. Press the Operational Button underneath "BACK" to confirm the settings and update the control system. You will be returned to the Economy Mode Setup menu. The new settings should be shown for Mon.	  

ALARM OUTPUT SETUP MENU

Permits user to set the condition (from a list of options) for when the CCB's integral alarm output relay will be energized. Alarm relay connections (common, normally open, normally closed) are located on the J3 terminal strip on the CCB. Alarm output relay contacts are capable of switching 1 amp maximum at 120 VAC.

The alarm relay operates in the background according to the settings in this menu and is not capable of disabling water heater operation. The alarm relay is used for external notification/verification of various operational conditions such as fault conditions and heating mode status. This relay can be used with building EMS (Energy Management System) and other external supervisory controls.





Output Function

Adjustable user setting. Available options for the Alarm Output Function setting are:

Heating Mode: Used for heating mode on/off status notification.

Enable / Disable Closed: Used for notification and/or verification of the enable/disable circuits open/closed status. There are two enable/disable circuits available for external supervisory control(s) at the J7 socket on the CCB - see wiring diagrams. Enable/disable circuit(s) status can be viewed in the Heater Status Menu.

Temp < Heater SP: Used for external notification when current tank temperature drops below Operating Set Point.

Temp < Alarm SP: Used for external notification when current tank temperature drops below programmable Alarm SP.

Fault or Alert: Used for external notification whenever a Fault or Alert condition is active.

Fault: Used for notification whenever a Fault condition is active.

Disabled: Disables the Alarm Relay Output Function.

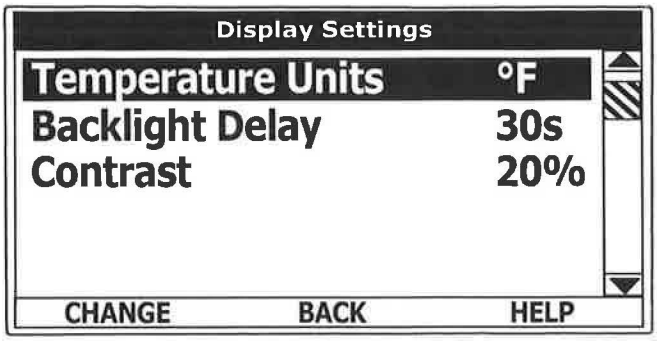
Alarm SP: Adjustable user setting (90°F to 190°F) the control system uses for the "Temp < Alarm SP" function described above. This setting has no effect with any other Alarm Output functions.

Alarm Output Settings: Changing the user settings in this menu is done using the same methods for changing the Operating Set Point.

Service Note: Adjustable user settings in the Alarm Output Setup menu are unaffected by Restore Factory Defaults.

DISPLAY SETTINGS MENU

Permits user to set display options for viewing information on the UIM's LCD screen.



Temperature Units

Adjustable user setting that changes temperature units display to Celsius °C or Fahrenheit °F.

Backlight Delay

Adjustable user setting that determines how long the UIM's LCD backlight remains illuminated after a key has been pressed. Available settings are; Always Off, 10, 30 or 60 seconds and Always On.

Contrast

Adjustable user setting to adjust the UIM's LCD screen contrast between text and background.

Display Settings

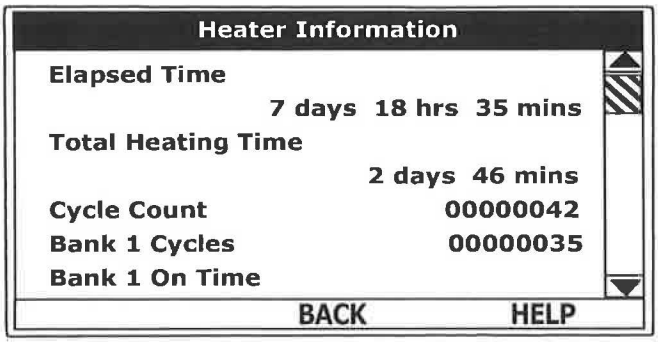
Changing the user settings in this menu is done using the same methods for changing the Operating Set Point.

Service Note

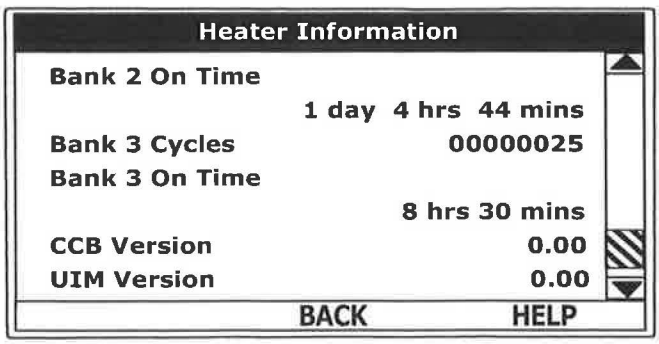
Adjustable user settings in the Display Settings menu are unaffected by Restore Factory Defaults.

HEATER INFORMATION MENU

This menu displays non adjustable operational information.



TOP OF MENU



BOTTOM OF MENU

Elapsed Time

Total accumulated time the control system (water heater) has been energized.

Total Heating Time

Total accumulated time the control system has been in the heating mode. IE: any heating elements have been energized.

Bank # Cycles

Total accumulated count of heating cycles for each Bank of heating elements.

Bank # On Time

Total accumulated heating on time for each Bank of heating elements.

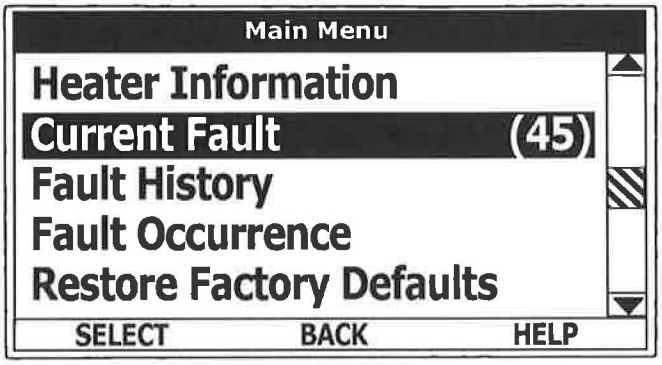
CCB Version
Software version for Central Control Board.

UIM Version
Software version for User Interface Module.

CURRENT FAULT / ALERT MENU

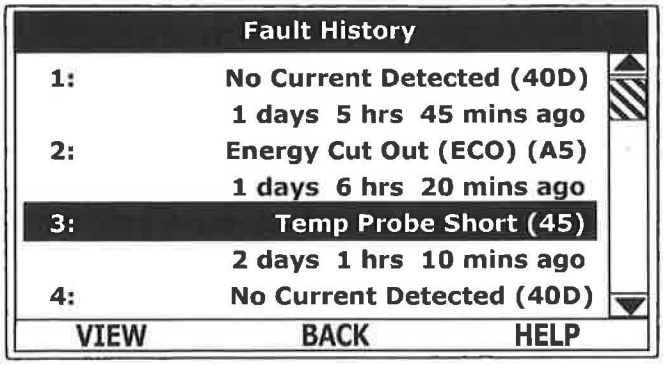
This menu displays non adjustable operational information. With the Fault History sub menu selected in Main Menu; press the Operational Button underneath "SELECT" to display the current Fault or Alert message. If there is not a Fault or Alert condition currently active "(none)" is displayed to the right of this menu.

Main Menu - Current Fault Selected



FAULT HISTORY MENU

Fault History Menu



This menu displays non adjustable operational information. The control system records and stores the last 9 Fault and Alert messages in chronological order in this menu. The most recent will be at the top of the list. A time stamp is displayed below each listed Fault and Alert message showing when the Fault or Alert condition occurred.

The Fault History is useful when dealing with intermittent operational problems or when the customer has reset the control system prior to a service agent's arrival.

With a Fault or Alert item selected press the Operational Button underneath "VIEW" to display the details for the Fault or Alert message. The Fault/Alert message screen displays a brief description of the condition, contact information and access to the Advanced service information sub menu.

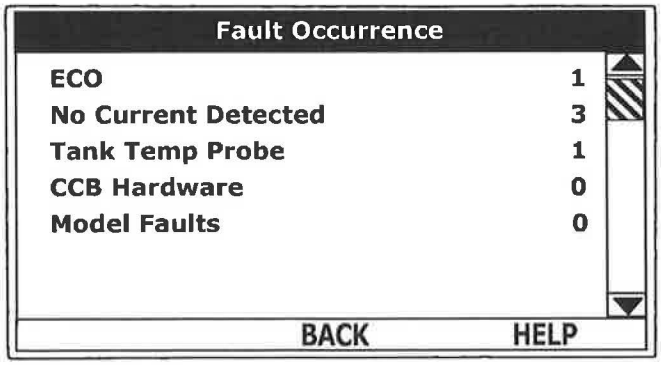
Current / History Fault Message



FAULT OCCURRENCE MENU

Total accumulated number each individual Fault condition has occurred is displayed in this menu. This running total of Fault Occurrences can be useful in determining which (if any) operational problems have been persistent.

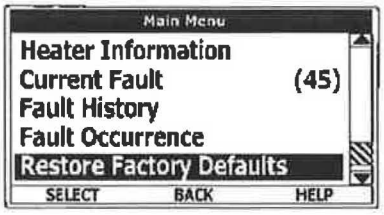
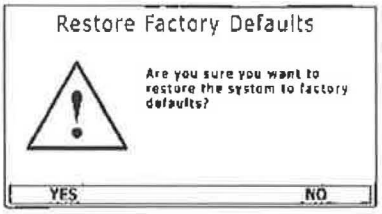
Fault Occurrence Menu



RESTORE FACTORY DEFAULTS MENU

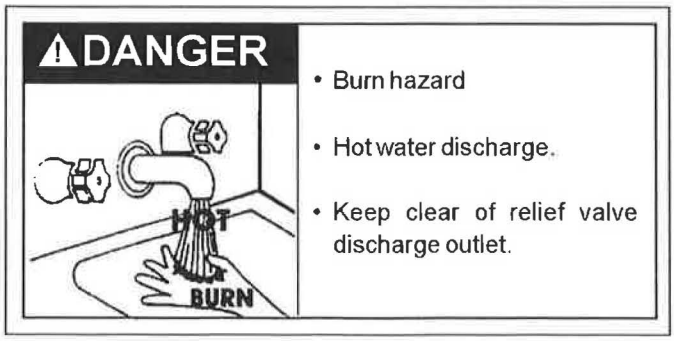
This control system menu allows the user to restore most of the control system's user settings to their factory default settings. User settings in the Alarm Output Setup and Display Settings menus are unaffected by executing Restore Factory Defaults.

Restore Factory Defaults

ACTION	DISPLAY
From the Main Menu use the Up/Down buttons to select (highlight in black) the "Restore Factory Defaults" menu. Press the Operational Button underneath "SELECT." The Restore Factory Defaults menu will be displayed.	
From the Restore Factory Defaults menu press the Operational Button underneath "YES." The display will show text confirming the factory default settings have been restored. Press the Operational Button underneath "BACK" to exit the Restore Factory Defaults menu.	

MAINTENANCE

GENERAL



Periodically the drain valve should be opened and the water allowed to run until it flows clean. This will help to prevent sediment buildup in the tank bottom.

Periodically check the temperature and pressure relief valve to ensure that it is in operating condition. Lift the lever at the top of the valve several times until the valve seats properly and operates freely.

Water heater maintenance includes periodic tank flushing and cleaning, and removal of lime scale from the heating element.

The heater tank is equipped with an anode rod to aid in corrosion control.

ANODE INSPECTION AND REPLACEMENT

Inspection of the sacrificial anode every 6 to 12 months allows you to identify a spent anode and replace it. Replace the anode when

its diameter is 3/8" (1 cm) of an inch, or annually which ever is first. Aggressive, very hot and softened water causes rapid consumption of the anode requiring frequent inspections. Call the toll free number on the back cover of this manual for information on obtaining replacement anode rods.

MAINTENANCE SCHEDULE			
Component	**Operation**	**Interval**	**Required**
Tank	Flushing	Periodically	
Elements	Lime Scale Removal	As needed	Un•Lime® delimer & element gaskets, Part

Tank flushing should be performed in accordance with the above schedule. Tank sediment removal and element lime scale removal must be performed as needed as determined by periodic inspection. Following are the instructions for performing recommended maintenance.

FLUSHING

The water heater drain valve should be opened periodically to help prevent sediment buildup on the tank bottom.

1. Turn off the electrical disconnect switch.
2. Attach hose to outlet opening of drain valve and direct end to drain.
   - Open the drain valve by turning the hand wheel to the left (counterclockwise). Allow water to flow until it runs clean.
   - If water does not flow from opened drain valve, follow instructions for sediment removal.
3. When finished flushing:
   - Close heater drain valve and remove hose.
   - Turn on electricity.

SEDIMENT REMOVAL

Water borne impurities consist of fine particles of soil and sand which settle out and form a layer of sediment on the bottom of the tank. In time, if not removed, the level of sediment might reach the heating elements and cause their failure.

For convenience, sediment removal and element lime scale removal should be performed at the same time as follows.

LIME SCALE REMOVAL

Lime scale accumulations on the heating elements is a normal condition, common to all immersion type elements. Factors which affect the amounts of this formation are:

1. Amount of hot water used. As the volume of water heated increases, more scale results.
2. Water temperature. As the temperature of the water is increased, more scale is deposited on the elements.
3. Characteristics of water supply.

   Regardless of water treatment, the elements should be examined regularly.

Lime scale accumulations may cause noises to occur during operation.

It is recommended that a heating element be removed periodically for examination. If it is scaled, all of the elements should be removed and cleaned. If the tank bottom has an accumulation of sediment it should be cleaned.

Lime scale should be removed by dissolving the accumulation in UN•LIME® delimer. Do not use muriatic or hydrochloric acid base deliming solutions to remove lime scale from the elements.

THE PROCESS FOR LIME SCALE REMOVAL IS AS FOLLOWS:

1. Turn off electrical disconnect switch.
2. Drain the heater following DRAINING instructions.
3. Open front panel.
4. Disconnect the element wiring. Try not to disturb the wiring unnecessarily and reconnection will be easier.
5. Unscrew each element.
6. Remove the elements and gaskets from the openings.
   - Use a twisting, pulling action to remove elements scaled beyond the size of the tank openings.
   - Brush loose scale from elements.
7. Lime scale removal:
   - Place limed ends of heating elements into UN•LIME delimer and allow scale to dissolve. Do not permit delimer or water to contact heating element electrical terminals.
   - Silicates, sulfates, and aluminates must be removed by scraping or other mechanical means. Lime scale dissolvents will not remove these types of scale which are occasionally encountered.

Call the toll free phone number on the back cover of this Instruction Manual to purchase UN-LIME and heating element gaskets.

OTHER SCALE REMOVAL:

1. Flush cleaned ends of elements with water when deliming or cleaning is completed.
2. Remove sediment and scale from the tank bottom through the access provided by the element openings or drain valve opening.
   - The cold water inlet valve and drain valve may be opened to aid the cleanout process.
3. Clean remaining gasket material from tank and element flanges Do not reuse original element gaskets.
4. Put new gaskets on each element and install into tank openings.
   - Uniformly tighten element bolts. Torque to approximately 32 ft./lbs.
5. Attach element wires to connection points from which they were removed.
6. Follow FILLING instructions to restore hot water service.
   - Check for water leaks around elements and proper operation when heater is filled.
   - Close the front panel.

TROUBLESHOOTING CHECKLIST

CHECKLIST

Before calling for service, check the following points to see if the cause of trouble can be identified and corrected.

Reviewing this checklist may eliminate the need of a service call and quickly restore hot water service. See Figures 1 and 2 in this manual to identify and locate water heater components.



NOT ENOUGH OR NO HOT WATER

1. Be certain the electrical disconnect switch serving the water heater is in the ON position.
2. Check the fuses.
   - The electrical disconnect switch usually contains fuses.
   - The heater has fusing.
3. If the water was excessively hot, and is now cold, the high limit switch may have activated.
   - See the Temperature Regulation section of this manual for more information on how to reset the ECO high limit controls.
4. The capacity of the heater may have been exceeded by a large demand for hot water.
   - Large demands require a recovery period to restore water temperature.
5. Cooler incoming water temperature will lengthen the time required to heat water to the desired temperature.
6. Look for hot water leakage.
7. Sediment or pipe scale may be affecting water heater operation.

ABNORMAL SOUNDS

1. Sediment or lime scale accumulations on the elements causes sizzling and hissing noises when the heater is operating.
   - The sounds are normal, however, the tank bottom and elements should be cleaned. See the Maintenance section of this manual.
2. Some of the electrical components of the water heater make sounds which are normal.
   - Contactors will "click" or snap as the heater starts and stops.
   - Transformers and contacts often hum.

Water leakage is suspected

Refer to Leakage Checkpoint on the following page.

1. Check to see if the heater drain valve is tightly closed.
2. If the outlet of the relief valve is leaking it may represent:
   - Excessive water temperature.
   - Faulty relief valve.
   - Excessive water pressure.
3. Excessive water pressure is the most common cause of relief valve leakage. It is often caused by a "closed system". See "Closed Water Systems" and "Thermal Expansion" in the Installation section of this manual for more information.
4. Examine the area around the element for gasket leakage.
   - Tighten the elements or, if necessary, follow the WATER AND LIME SCALE REMOVAL procedure to replace the gaskets.

IF YOU CANNOT IDENTIFY OR CORRECT THE SOURCE OF MALFUNCTION

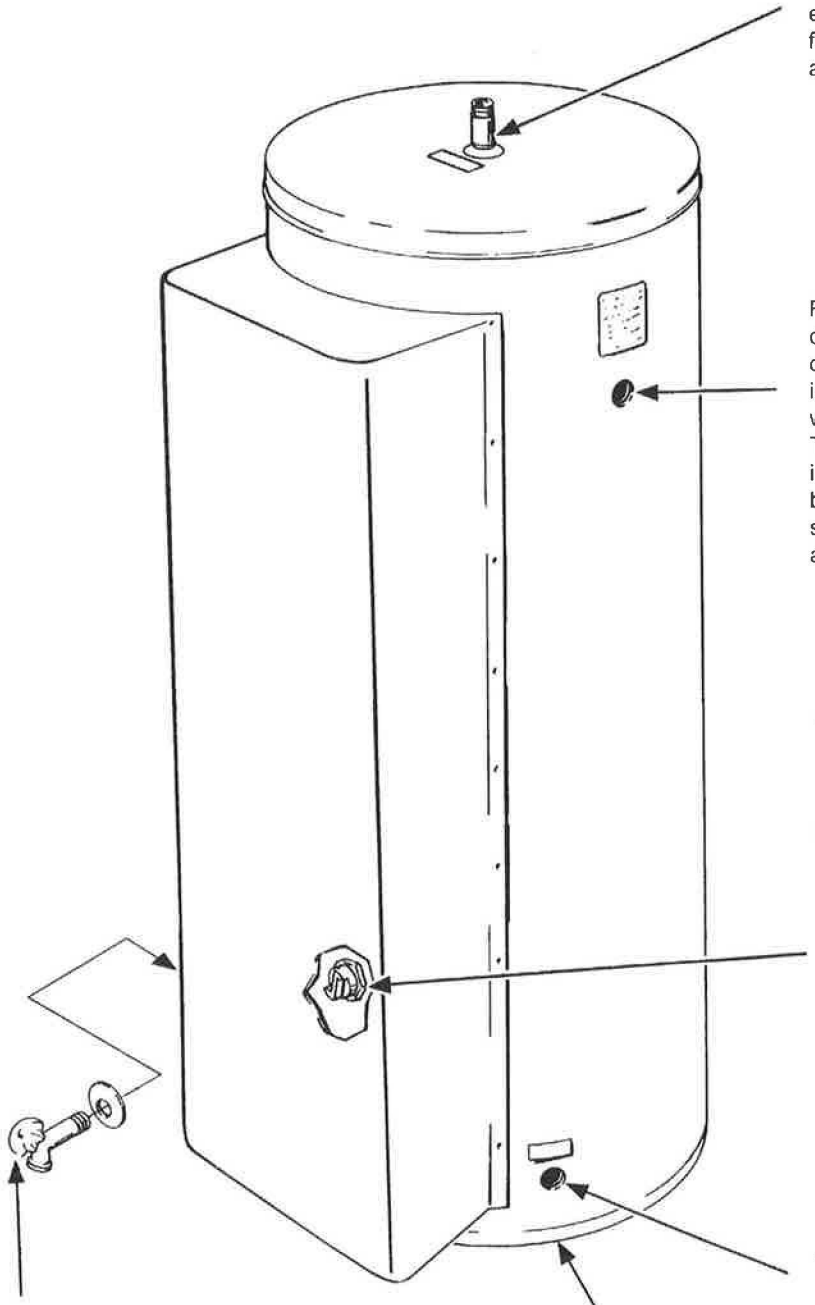
1. Turn the power supply to the water heater off.
2. Close the supply water inlet valve to the heater.
3. Contact a Qualified Service Agency in your area. Call the toll free phone number on the back cover of this Instruction Manual for assistance in locating a service agency in your area.

REPLACEMENT PARTS

Call the toll free phone number on the back cover of this Instruction Manual for assistance in locating replacement parts.. When ordering parts, specify complete model no., serial no., (see rating plate), quantity and name of part desired. Standard hardware items should be purchased locally.

LEAKAGE CHECKPOINTS

INSTRUCTIONS: USE THIS ILLUSTRATION AS A GUIDE WHEN CHECKING FOR SOURCES OF WATER LEAKAGE.



Where possible, remove or lift top cover to examine threads of fittings installed into tank for evidence of leakage. Correct fitting leaks as necessary.

Relief valve operation and leakage may be due to water expansion during heating cycle or foreign material on seat of valve. If the valve is not piped to an open drain, the released water could be mistaken for a leaking heater. To check where threaded portion enters tank, insert Q-tip or similar absorbent material between jacket opening and valve to swab spud area. Remove valve* if leak is indicated and repair with pipe joint compound.

Water on the side of the tank may be condensation due to the panel or insulation not being in place.

Water leaks at the elements may be due to:

1. Defective elements which leak at terminals or through flange. Replace element*.
2. Loose element/gasket leak:

   Tighten element with element wrench. If leak continues, remove element* and discard gasket. Clean gasket seating areas and reinstall element with new gasket.

Condensation and dripping may appear on pipes when inlet water temperature is low. Pipe fitting may be leaking.

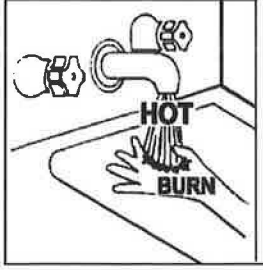
Drain valve leakage could be from the valve itself. Either correct the problem or replace the valve*. To check for leakage where threaded portion enters tank, insert Q-tip or similar absorbent material between jacket opening and valve to swab spud area. Remove valve* if leak is indicated and repair with pipe joint compound.

* Contact a Qualified Service Agency as it is necessary to shut off electricity and drain tank to perform procedure.

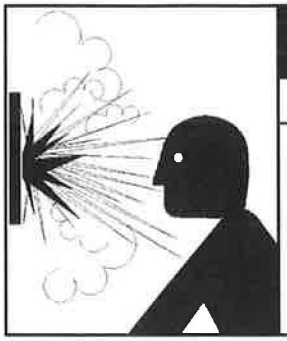
All water which appears at the heater bottom or on the surrounding floor may be caused by condensation, loose connections or relief valve operation and leakage. Do not replace the heater until a full inspection of all potential leak points is made and corrective steps taken to stop the leak. Leakage from other appliances, water lines, or ground seepage should also be suspected until proved otherwise.

PIPING DIAGRAMS

⚠ DANGER



Temperature setting should not exceed safe use temperature at fixtures. See water temperature control warning section. If higher preheat temperatures are necessary to obtain adequate booster output, add an anti-scald valve for hot water supplied to fixtures.



⚠ CAUTION

Explosion Hazard

If building cold water supply has a back-flow preventer, check valve or water meter with check valve, provisions for thermal expansion of water in hot water system must be provided.

ONE TEMPERATURE WITH CIRCULATING LOOP

BOOSTER WITH CIRCULATING LOOP

INSERT A

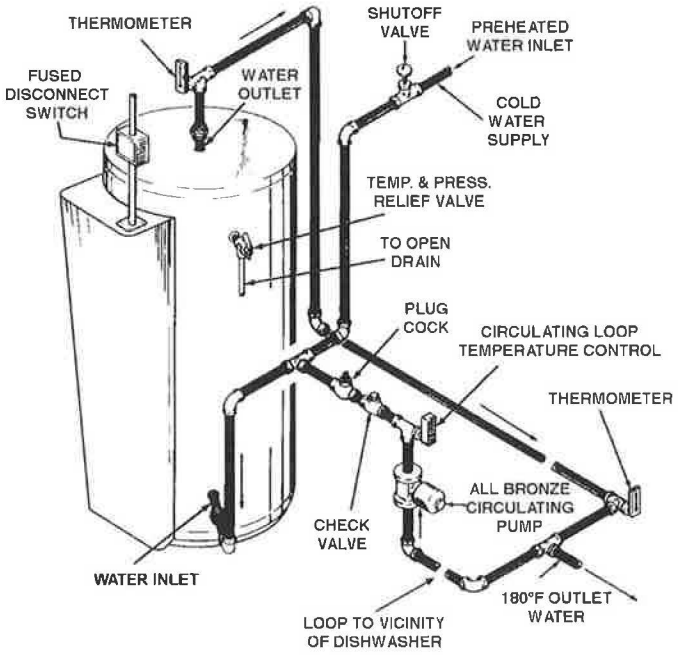


INSTALL THERMAL EXPANSION TANK ON COLD WATER SUPPLY LINE, IF CHECK VALVE OR PRESSURE REDUCING VALVE IS USED IN SUPPLY.

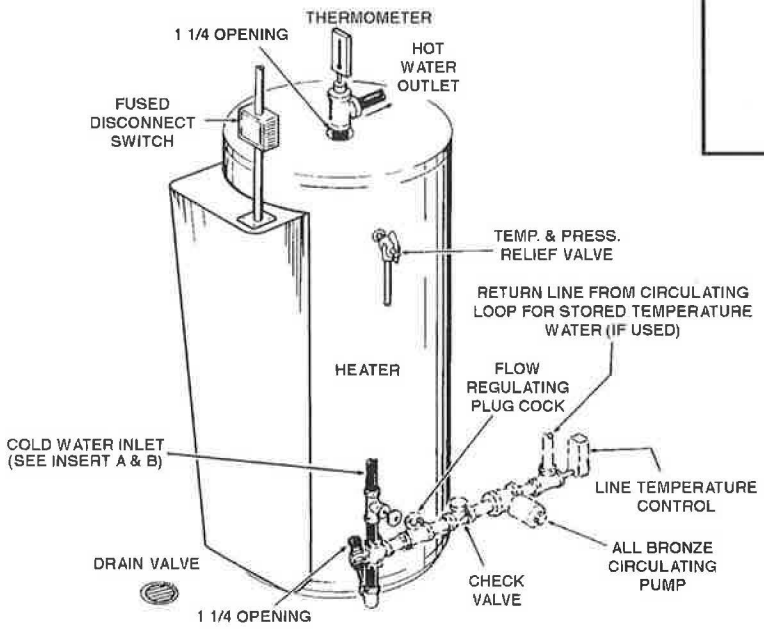
INSERT B



VACUUM RELIEF VALVE. INSTALL PER LOCAL CODES.

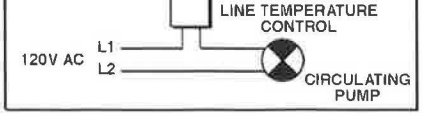


ONE TEMPERATURE



***PIPE TO OPEN DRAIN INSTALL IN ACCORDANCE WITH ALL LOCAL CODES.**

CIRCULATING PUMP WIRING DIAGRAM



WARRANTY

A. O. Smith Corporation, the warrantor, extends the following LIMITED WARRANTY to the owner of this water heater:

1. THE TANK
   If the glass-lined tank in this water heater shall prove upon examination by the warrantor to have leaked due to natural corrosion from potable water therein, during the first THREE years after initial installation, the warrantor will supply a complete new A. O. Smith water heater of equivalent size and current model. Some government agencies are requiring energy efficient standards for water heaters. In the event regulations prohibit sale of a model of equivalent size and construction, A. O. Smith will provide a model which complies with the regulations of your area, in which case the consumer will be charged the difference in price between the like replacement and the energy efficient model required. The warranty on the replacement water heater will be limited to the unexpired term of the original warranty.

2. ALL OTHER PARTS
   If within ONE year after initial installation of this water heater, any part or portion shall prove upon examination by the warrantor to be defective in material or workmanship, the warrantor will repair or replace such part or portion at its option.

3. CONDITIONS and EXCEPTIONS
   This warranty shall apply only when the water heater is installed in accordance with local plumbing and building codes, ordinances and regulations, the printed instructions provided with it and good industry practices. In addition, a temperature and pressure relief valve, certified by A.G.A.and approved by the American Society of Mechanical Engineers, must have been installed.
   a. This warranty shall apply only when the heater is used:
      (1) at temperatures not exceeding the maximum setting of its thermostat;
      (2) at water pressure not exceeding the working pressure shown on the water heater;
      (3) when filled with potable water, free to circulate at all times;
      (4) in a noncorrosive and non-contaminated atmosphere;
      (5) in the United States, its territories or possessions, and Canada.
      (6) used with factory approved anode(s) installed;
      (7) in its original installation location;
      (8) sized in accordance with proper sizing techniques for commercial water heaters;
      (9) bearing a rating plate which has not been altered, defaced or removed except as required by the warrantor;
      (10) not used in a closed system without a properly sized and installed thermal expansion tank;
      (11) fired at the proper voltage and wattage;
      (12) maintained in accordance with the instructions printed in the manual included with the heater.
   b. Any accident to the water heater, any misuse, abuse (including freezing) or alteration of it, any operation of it in a modified form, or any attempt to repair tank leaks will void this warranty.

4. SERVICE and REPAIR EXPENSE
   Under this limited warranty the warrantor will provide only a replacement water heater or part thereof. The owner is responsible for all other costs. Such costs may include but are not limited to:
   a. Labor charges for service, removal, repair, or reinstallation of the water heater or any component part;
   b. Shipping, delivery, handling, and administrative charges for forwarding the new heater or replacement part from the nearest distributor and returning the claimed defective heater or part to such distributor;
   c. All cost necessary or incidental for any materials and/or permits required for installation of the replacement heater or part.

5. LIMITATIONS ON IMPLIED WARRANTIES
   Implied warranties, including any warranty of merchantability imposed on the sale of this heater under state law are limited to one (1) year duration for the heater or any of its parts. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

6. CLAIM PROCEDURE
   Any claim under this warranty should be initiated with the dealer who sold the heater, or with any other dealer handling the warrantor's products. If this is not practicable, the owner should contact:

   U.S. Customers
   A. O. Smith Water Products Company
   500 Tennessee Waltz Parkway
   Ashland City, TN 37015
   Telephone: 1-800-323-2636

   Canadian Customers
   A. O. Smith Enterprises, Ltd.
   P. O. Box 310 - 768 Erie Street
   Stratford, Ontario N5A 6T3
   Telephone: 1-800-265-8520

   a. The warrantor will only honor replacement with identical or similar water heater or parts thereof which are manufactured or distributed by the warrantor.
   b. Dealer replacements are made subject to in-warranty validation by warrantor.

7. DISCLAIMERS
   NO OTHER EXPRESS WARRANTY HAS BEEN OR WILL BE MADE IN BEHALF OF THE WARRANTOR WITH RESPECT TO THE MERCHANTABILITY OF THE HEATER OR THE INSTALLATION, OPERATION, REPAIR, OR REPLACEMENT OF THE HEATER. THE WARRANTOR SHALL NOT BE RESPONSIBLE FOR WATER DAMAGE, LOSS OF USE OF THE UNIT, INCONVENIENCE, LOSS OR DAMAGE TO PERSONAL PROPERTY, OR OTHER CONSEQUENTIAL DAMAGE. THE WARRANTOR SHALL NOT BE LIABLE BY VIRTUE OF THIS WARRANTY OR OTHERWISE FOR DAMAGE TO ANY PERSONS OR PROPERTY, WHETHER DIRECT OR INDIRECT, AND WHETHER ARISING IN CONTRACT OR IN TORT.

   a. Some states do not allow the exclusion or limitation of the incidental or consequential damage, so the above limitation or exclusion may not apply to you.
   b. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Fill in the following for your own reference. Keep it. Registration is not a condition of warranty. The model and serial number are found on the heater's rating plate.

Model No._____ Serial No._____ Date Installed _____

Dealer's Name_____

Dealer's Address _____ Phone No. _____

City and State _____ Zip _____

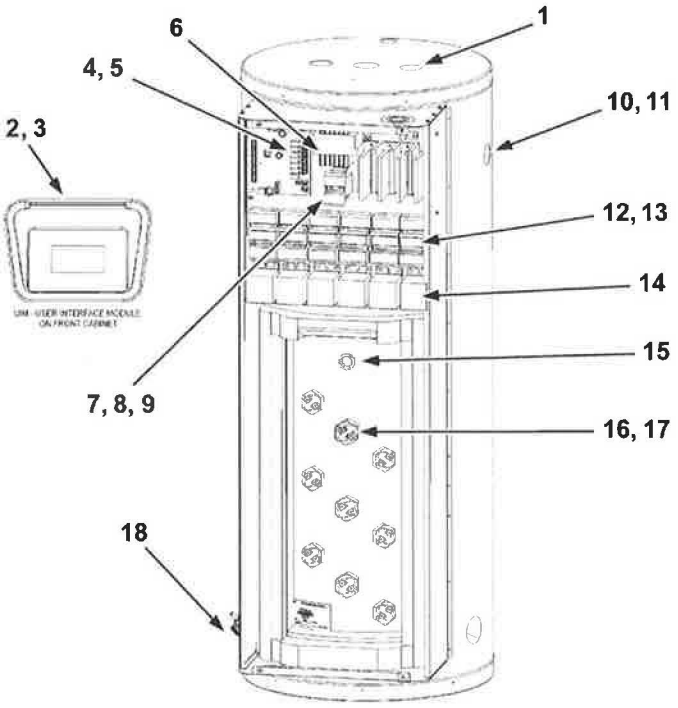


500 Tennessee Waltz Parkway, Ashland City, TN 37015
Technical Support: 800-527-1953 • Parts: 800-433-2545 • Fax: 800-644-9306
www.hotwater.com

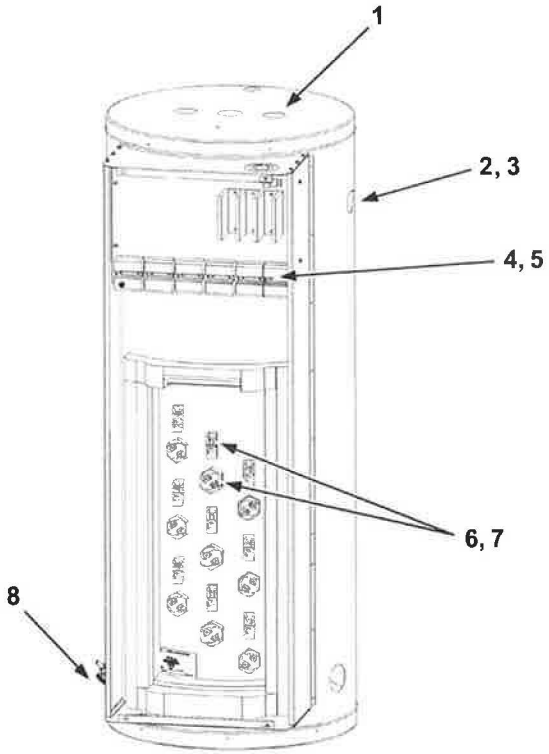
COMMERCIAL ELECTRIC WATER HEATER SERVICE PARTS LIST

DRE-52/80/120 SERIES 100	DVE-52/80/120 SERIES 100

A.O. Smith Water Heater Parts Fulfillment
125 Southeast Parkway • Franklin, TN 37068
www.hotwater.com • 1-800-433-2545



DVE MODELS



DRE MODELS

Item #	Description	DVE52	DVE80	DVE120
1A	Anode, 2 required (Alu, Std)	9003893205	9004097205	9004097205
1B	Anode, 2 required (Mag, Special)	9001829005	9001829005	9001829005
2	Display - Board	9006240005	9006240005	9006240005
3	Display - Overlay	9006851005	9006851005	9006851005
4A	CCB - 3 El Temperature controller	9006852005	9006852005	9006852005
4B	CCB - 6 El Temperature controller	9006853005	9006853005	9006853005
4C	CCB - 9 El Temperature controller	9006854005	9006854005	9006854005
5	Communication Cable	9006541015	9006541015	9006541015
6A	Transformer - 100VA Std (208, 240, 277, 480V)	9006861005	9006861005	9006861005
6B	Transformer - 100VA Universal (220, 380, 415, 575V)	9006862005	9006862005	9006862005
7	Transformer - 25VA 120/24V	9006863005	9006863005	9006863005
8	Fuse - Control Circuit	9005720215	9005720215	9005720215
9	Fuse Block - Control Circuit	9005721215	9005721215	9005721215
10	Nipple - T & P valve extension	9005717215	9005717215	9005717215
11A	T & P Valve - 3 elements	9005715205	9005715205	9005715205
11B	T & P - 6 or 9 elements	9005923205	9005923205	9005923205
12A	Fuse - Power Circuit (not 54KW at 208V or not 575V)	9005904215	9005904215	9005904215
12B	Fuse - Power Circuit for 54KW at 208V model	9006864015	9006864015	9006864015
12C	Fuse - Power Circuit for 575V models	9005893215	9005893215	9005893215
13A	Fuse Block - Power Circuit (not 54KW at 208V or not 575V Models)	9005009205	9005009205	9005009205
13B	Fuse Block - Power Circuit for 54KW at 208V model	9005079205	9005079205	9005079205
13C	Fuse Block - Power Circuit for 575V models	9005007205	9005007205	9005007205
14	Contactor	9005013205	9005013205	9005013205
15	Temperature probe	9006865015	9006865015	9006865015
16	Element Gasket (BOX OF 50)	9000308005	9000308005	9000308005
17	Elements (max 54KW 9 elements)	SEE CHART		
18	Drain Valve	9003907015	9003907015	9003907015
19*	Element Sensors (1 per bank)	9006867005	9006867005	9006867005

* Not illustrated

Item #	Description	DRE52	DRE80	DRE120
1A	Anode, 2 required (Alu, Std)	9003893205	9004097205	9004097205
1B	Anode, 2 required (Mag)	9001829005	9001829005	9001829005
2	Nipple - T & P valve extension	9005717215	9005717215	9005717215
3A	T & P Valve - 3 elements	9005715205	9005715205	9005715205
3B	T & P - 6 or 9 elements	9005923205	9005923205	9005923205
4A	Fuse - Power Circuit (not 54KW at 208V or not 575V)	9005904215	9005904215	9005904215
4B	Fuse - Power Circuit for 54KW at 208V model	9006864015	9006864015	9006864015
4C	Fuse - Power Circuit for 575V models	9005893215	9005893215	9005893215
5A	Fuse Block - Power Circuit (not 54KW at 208V or not 575V Models)	9005009205	9005009205	9005009205
5B	Fuse Block - Power Circuit for 54KW at 208V model	9005079205	9005079205	9005079205
5C	Fuse Block - Power Circuit for 575V models	9005007205	9005007205	9005007205
6	Element Gasket (BOX OF 50)	9000308005	9000308005	9000308005
7	Elements (max 54KW 9 elements)	SEE CHART		
8	Drain Valve	9003907015	9003907015	9003907015

Replacement Gold-Plated Elements for Both DRE and DVE Models (Gasket Included)				
KW	208V (1Φ/3Φ)	240V (1Φ/3Φ)	277V 1Φ	480V (1Φ/3Φ)
2	9006875005	9006874005	9006884005	9006879005
3	9006869005	9006868005		9006880005
4	9006872005	9006869005	9006868005	9006881005
4.5	9006873005	9006870005		9006882005
5	9006876005	9006871005		9006883005
6	9006877005	9006873005	9006878005	9006884005

Replacement Incoloy Elements for Both DRE and DVE Models (Gasket Included)				
KW	208V (1Φ/3Φ)	240V (1Φ/3Φ)	277V (1Φ)	480V (1Φ/3Φ)
2	9004284005	9004283005	9004290005	9004298005
3	9000049005	9000664005	9004296005	9004300005
4	9004294005	9004751105	9004759005	9004763105
4.5	9004287005	9000050005	9004297005	9004760105
5	9004753105	9004293005	9004756115	9004761105
6	9004289005	9004287005	9004757115	9004762105

Replacement Incoloy Elements (Gasket Included) For Heaters with "Y" Configuration			
KW	380V 3Φ "Y" Config	415V 3Φ "Y" Config	575V 3Φ "Y" Config
3	9006885005	900064005	9006889005
4	9006886005	9004751105	9006890005
4.5		9000050005	9006891005
5	9006887005	9004293005	9006892005
6	9006888005	9004287005	9006893005

TP-1

Precision Plumbing Products

"Specify with Confidence - Install with Pride"

LEAD FREE

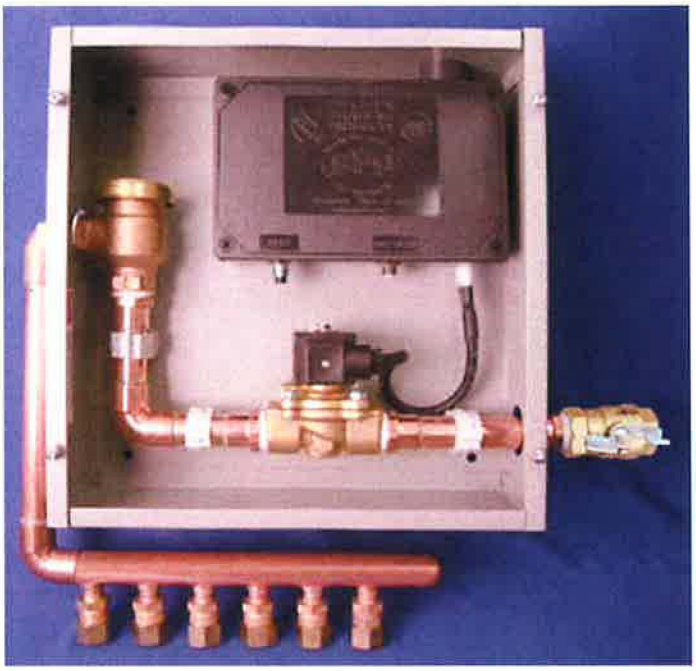
PRIME-TIME ELECTRONIC TRAP PRIMING ASSEMBLY SURFACE MOUNT

www.pppinc.net

It's PRIME-TIME to meet your floor drain trap priming needs. This unique trap priming assembly automatically maintains a constant water seal in floor drain traps and is available in 4 to 30 opening configurations and all the contractor needs to do is simply supply the potable water and power, Precision supplies the rest...

Features:

- ATMOSPHERIC VACUUM BREAKER
- PRE-SET 24 HOUR ADJUSTABLE TIMER
- MANUAL OVER RIDE SWITCH/TEST BUTTON
- 120v or 220v SOLENOID VALVE
- 3/WIRE SINGLE POINT CONNECTION
- 3/4" FNPT CONNECTION
- CALIBRATED MANIFOLD FOR EQUAL WATER DISTRIBUTION
- 5/8" OR 1/2" OUTLET COMPRESSION OR 1/2" PEX AND PROPEX FITTINGS FOUR OPENING
- MANIFOLD TO THIRTY OPENING MANIFOLD



PART NUMBERS:

PTS-4, PTS-6, PTS-8, PTS-10, PTS-12,
PTS-1320, PTS-2130.

SURFACE MOUNT CABINET

The PRIME-TIME PRIMING ASSEMBLY will supply a minimum of 2 oz. of potable water at 20 PSIG at a preset factory setting of 6 seconds every 24 hours. The entire unit is pre-assembled in a steel cabinet ready to be surface wall mounted. The Priming assembly must be mounted above the finished floor.

PATENT NO. 5,253,670

SURFACE MOUNT CABINET

METAL CABINET:
12" x 12" x 4" NEMA-1 with cover plate, UL 50, 12" x 12" x 4" - 16 gauge steel w/screw on cover ANSI 61 gray polyester powder paint.

INLET:
3/4" inch NPT female. ANSI/ASME BI.20.1.

OUTLET:
5/8" or 1/2" inch compression fitting. SAEJ512.

MANIFOLD:
3/4" Type "L" copper tubing. ASTM B88.

SOLDERED JOINTS:
95-5 lead free containing lead not in excess of 0.2%.

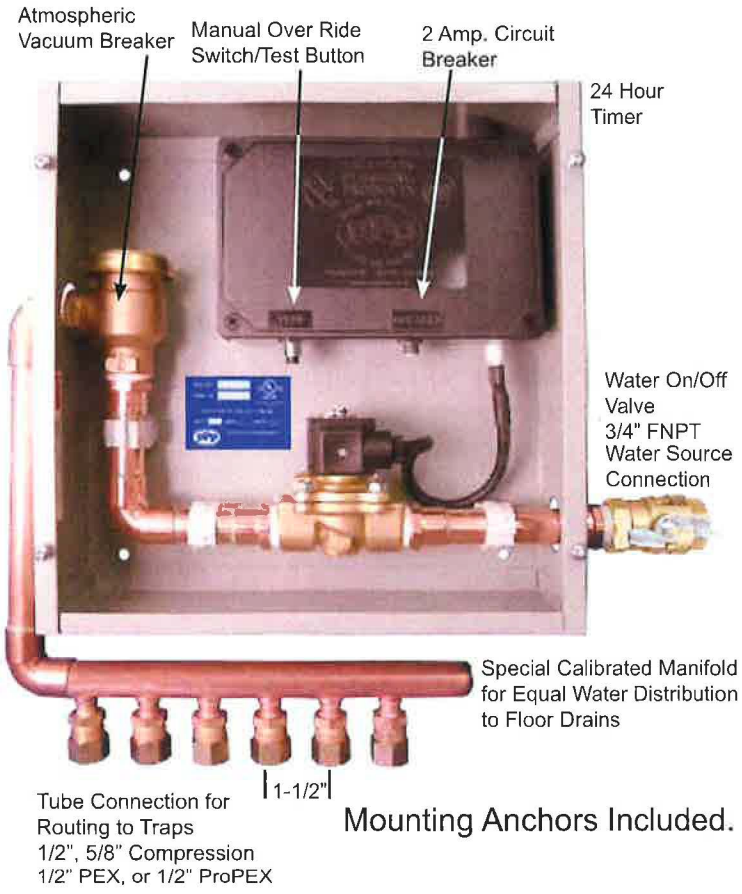
ELECTRICAL COMPONENTS:
2 Amp Circuit Breaker, Manual Over Ride Switch/Test Button, Timer, Solenoid Valve marked as UL listed.

BACKFLOW PREVENTION:
Anti-Siphon atmospheric vacuum breaker meets Los Angeles code, IAPMO, New York Board of Standards, ASSE 1001 and CSA.

TEMPERATURE/PRESSURE:
32°F - 125°F, 20 PSI - 150 PSI.

ELECTRICAL SPECIFICATIONS:

120 VOLT PT		240 VOLT PT	
120/60	6. Watts	240/60	6. Watts
110/50	16 VA Holding	220/50	16 VA Holding
	34 VA In Rush		34 VA In Rush



Mounting Anchors Included.

MODEL # PTS- _____

PTS-1320 - # of Drains Served: _____

PTS-2130 - # of Drains Served: _____

PLEASE NOTE :
Unit must be installed plumb and must be installed with access. (Please refer above for dimensions of cabinet models).
Must be installed above finished floor. Allow one foot of elevation for every 20 feet of distance ran for floor drain make up line.

COMPRESSION FITTINGS: (CHECK ONLY ONE)	
	1/2" Comp. for 3/8" ID Copper Line
	5/8" Comp. for 1/2" ID Copper Line. This line is the floor drain trap make-up water line.
	1/2" PEX
	1/2" ProPEX

VOLTAGE: (CHECK ONLY ONE)	
	120 Volt 60 Hz./110 Volt 50 Hz.
	240 Volts 60 Hz./220 Volts 50 Hz.

PROJECT SUBMITTAL

Project: _____

Contractor: _____

Engineer: _____

Date Submitted: _____

Prepared By: _____

Precision Plumbing Products
Division of JL Industries, Inc.

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PRECISION PLUMBING PRODUCTS

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"Specify with confidence - Install with pride."®

Prime Time Series Electronic Trap Priming System
Installation & Maintenance Instructions

UL Listed
UPC Listed
125 PSI Max.

Models **PT-4 through 2130 & PTS-4 through 2130.**

DESCRIPTION:

Prime Time is an electronically activated trap priming device. The system functions in a pre-selected sequence, delivering potable water to floor drains through a restricted manifold. (CAUTION: THIS UNIT MUST ALWAYS BE INSTALLED ABOVE ALL DRAINS IT IS INTENDED TO SERVE. ANY BACK PRESSURE WILL ENGAGE THE ATMOSPHERIC VACUUM BREAKER CAUSING WATER TO BE RELEASED INSIDE THE CONTROL CABINET.)

OPERATION:

A pre-set timer energizes a normally closed electronic solenoid valve. Potable water under system pressure enters the supply manifold and is distributed via compression fittings to the designated floor drains. The pre-set timer then de-energizes the solenoid allowing it to close until the next operational cycle.

INSTALLATION: Wiring diagram not available from manufacturer

1) Anchor flush mount cabinet (PT Series) to studs with #14 wood screws. Remove cover and anchor surface mount cabinet (PTS Series) to wall using 1/4" fasteners designed for the surface in question. Device must be installed a minimum of 12" above flood level of device being served. (CAUTION: ENSURE MANIFOLD AND BOX ARE INSTALLED LEVEL AND SQUARE.)
2) Installer should incorporate a means of disconnect from the supply mains in accordance with local wiring rules. Disconnect during installation.
3) Remove cover screws from the composite timer control box containing the test switch and circuit breaker and make a three wire electrical connection. Black is "hot", white is "neutral" and green is "ground". (DANGER: THIS IS A HIGH VOLTAGE CONNECTION). All wiring must be in accordance with local and national electrical codes.
4) Connect a fresh water line to the 3/4" NPT inlet ball valve.
5) Connect appropriately sized (3/8" or 1/2" ID) copper supply lines to the manifold. (CAUTION: USE TWO WRENCHES WHEN MAKING COMPRESSION FITTING CONNECTIONS.) Must be installed above the finished floor. Allow one foot of elevation for every twenty feet of distance ran for floor drain make up line.
6) Energize the system. The primer will fire for 6 seconds upon energizing. Test for leaks by holding down the manual override button marked "Test". Make certain all make up lines are free of debris by observing water flowing into the drains during testing. Should the circuit breaker trip, reset by pushing in. Recheck wiring and voltage.

Timing/Delivery Rate:
This unit is pre-set at the factory to deliver water to the traps for 6 seconds at an interval of once every 24 hours. **THIS IS ADEQUATE TO SERVE 30 FLOOR DRAINS. ALWAYS DE-ENERGIZE WHEN ENTERING THE TIMER CONTROL BOX.**

INSTRUCTIONS PERTAINING TO A RISK OF FIRE ELECTRIC SHOCK, OR INJURY TO PERSONS
***** IMPORTANT SAFETY INSTRUCTIONS *****
***** SAVE THESE INSTRUCTIONS *****

WARNING - When using electric appliances, basic precautions should always be followed, including the following:

a) Read all of the instructions before using the appliance.
b) Do not contact moving parts.
c) Only use attachments recommended or sold by the manufacturer
d) Do not use outdoors.
Do not operate any appliance after the appliance malfunctions or is dropped or damaged in any manner. Return appliance to the nearest authorized service facility for examination, repair, or electrical or mechanical adjustment.
e) For a permanently connected appliance - De-energize when the appliance is not in use and before servicing or cleaning.
f) For a grounded appliance - Connect to a properly grounded service only. See grounding instructions.

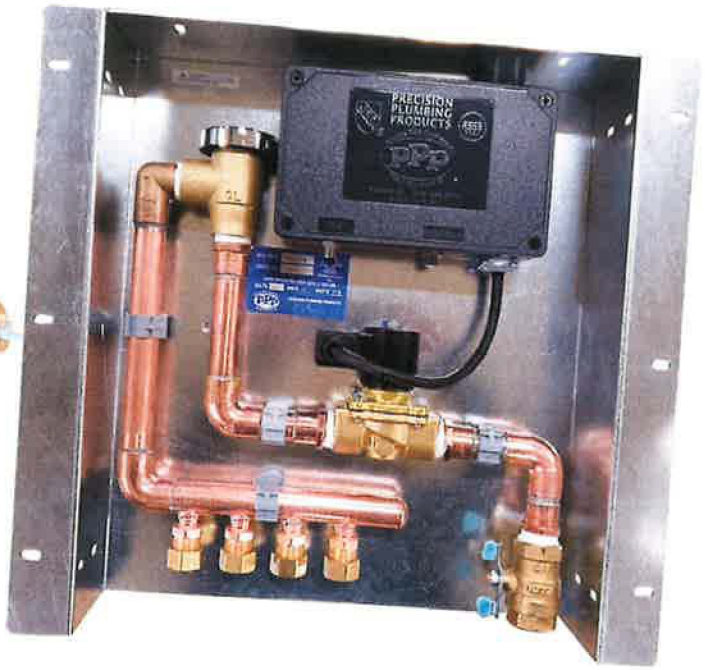
GROUNDING INSTRUCTIONS:

This appliance must be connected to the grounded metal stud inside the cabinet.

PRIME-TIME SURFACE MOUNT
Cabinet Size: 12" x 12" x 4"



PRIME-TIME FLUSH MOUNT
Cabinet Size: Inside Dimensions
MODELS: PT-4 - PT-12 14"W x 16"L x 3 3/8"D
MODEL: PT-1320 20 1/2"W x 16 1/2"L x 3 3/8"D
MODEL: PT-2130 30 1/2"W x 20 1/2"L x 3 3/8"D



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SALES: 503-256-4010 (tel:503-256-4010)
TECHNICAL: 503-328-6705 (tel: 503-328-6705)
Contact Us (contact.html)

WARRANTY/CERTIFICATION

WARRANTY

Precision Plumbing Products of Portland, Oregon (USA) warrants our manufactured products to be free from defects and workmanship under normal use and service. The sole and exclusive remedy for our manufactured products that do not conform to this limited and express warranty and our sole obligation under this limited and express warranty is to replace the defective part or product during the three year period after original installation.

This warranty excludes any parts or products that are modified or improperly installed or installed where PH levels, chemical conditions or electrolysis prematurely degrade the product. We specifically disclaim any warranties or responsibility for defects due to quality, material, dimensional tolerances or quality control of any fitting or other third party supplied parts or components. EXCLUSIONS OF ALL OTHER WARRANTIES INCLUDING IMPLIED WARRANTIES: All other warranties, including the implied warranties of MERCHANTABILITY and fitness for a particular purpose, are EXCLUDED from this transaction and shall not apply to goods sold by us.

The above warranties are in lieu of all other warranties and representations, express or implied, and all other obligations or liabilities on our part. We shall not be liable for consequential damages, loss of profit, interruption of business or any other special, incidental, or punitive damages suffered or sustained by Customer. Any part or products being returned under this warranty must have prior authorization by us. Any part or product received by us without a return of goods authorization will be returned to the shipper.

All returned merchandise must be prepaid by shipper. Our personnel, including salespeople, as well as independent distributors and sales agents may have made oral statements about our products. Those statements are not warranties by us and should not be relied on by the buyer/customer/user. If you use this product you are agreeing to this warranty contract between us. This writing constitutes the final expression of the parties and is the complete and exclusive statement of that contract for warranties.

CLICK ON THE ISO LOGO BELOW TO DOWNLOAD THE LATEST CERTIFICATIONS AND WARRANTY DOCUMENTS

(pdf/iso-qual-enviro-certs-2025-2027.pdf)

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