

# **PLUMBING O&M MANUAL**



## **MAYO USP800 SCRUB**

1200 NORTH SICKLES DRIVE

TEMPE, ARIZONA 85281

SUBMITTED BY:

**UNIVERSITY MECHANICAL &  
ENGINEERING CONTRACTORS, INC.**



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## **SURGEON SCRUB SINK**

- CHICAGO 116.595.AB.1 TOUCH-FREE PROGRAMMABLE FAUCET WITH ABOVE-DECK ELECTRONICS DESIGNED SPECIFICALLY FOR PATIENT CARE APPLICATIONS
- GUARDIAN G5026 EYEWASH WITH DRENCH HOSE UNIT, WALL MOUNTED
- GUARDIAN G3800LF THERMOSTATIC MIXING VALVE
- POWERS E420-S-1-2-K-1-0-0-0-0 HYDROGUARD COMBINATION TEMPERING VALVES

SURGEON SCRUB SINK

# HyTronic® User Guide Installation Instructions

For single supply and dual supply HyTronic faucets

**CHICAGO FAUCETS**

Geberit Group

## Overview

Chicago Faucets deck mounted faucets feature cast brass bodies and precision cartridges for years of reliable operation. Metering models with adjustable cycle time offer true water savings.

## Notice to the Installer

- Make sure there is enough space and lighting available during installation and service
- Do not modify or convert this Chicago Faucets product yourself. All warranties will be voided.

Pressurized plumbing fixtures shall be installed in accordance with manufacturer's recommendations. The supply piping to these devices shall be securely anchored to the building structure to prevent installed device from unnecessary movement when operated by the user. Care shall be exercised when installing the device to prevent marring the exposed surface.

NOTE: The information in this manual is subject to change without notice.

Please leave this manual with the facility manager after completing the faucet installation. This document contains information necessary for routine maintenance and servicing.

NOTE: Before installation, turn off water supplies to existing faucet and remove faucet if replacing. Clean faucet basin and clear away debris. Flush all supply lines before connecting to faucet. Failure to do so can result in debris clogging the inlets and/or cartridges.

NOTE: Before installing a new ceramic cartridge flush lines completely.

## Safety Information

Read this entire user guide to ensure proper installation. Compliance and conformity to local codes and ordinances is the responsibility of the installer.

The following safety notes must always be complied with during handling of this product:

- Make sure there is enough space and lighting available during installation and service.
- Do not modify or convert this Chicago Faucets product yourself. All warranties will be voided.

## Important

- Installation may be performed at different times of construction by different individuals. For this reason, these instructions should be left on-site with the facility or maintenance manager.
- Pressurized plumbing fixtures shall be installed in accordance with manufacturer's recommendations. The supply piping to these devices shall be securely anchored to the building structure to prevent installed device from unnecessary movement when operated by the user. Care shall be exercised when installing the device to prevent marring the exposed significant surface.
- Do not use pipe dope.
- Flush all the water supply lines before making connections.

This faucet comes with all the components needed for installation, however, some tools and supplies are not included.

- |                             |                          |
|-----------------------------|--------------------------|
| • Basin Wrench              | • Plumber's Putty        |
| • Adjustable Wrench         | • Hex Key (supplied)     |
| • Adjustable Locking Pliers | • Aerator Key (supplied) |

NOTE: Do not use pipe dope on faucet and supply connections.

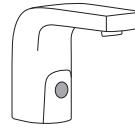
Possible solenoid contamination could occur and will void any warranty.



Traditional  
Lavatory



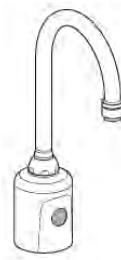
Contemporary  
Lavatory



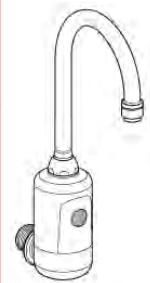
Edge



Curve



Gooseneck



Wall Mount

# HyTronic® User Guide Installation Instructions

(continued)

**CHICAGO FAUCETS**

Geberit Group

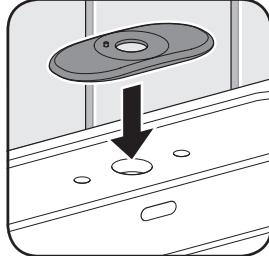
## Mounting of Lavatory and Gooseneck Faucet

### Prerequisites

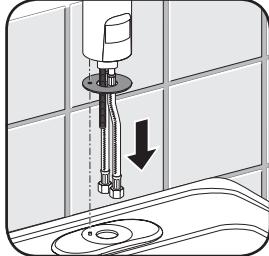
- Supply valve is installed
- Water supply lines are flushed properly
- For AC and faucets with EBPS, power outlet is installed

### Important

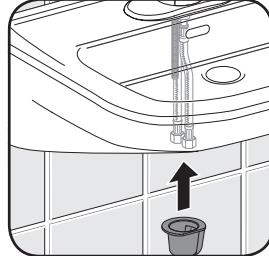
- It is not necessary to unscrew the connection between braided hose and housing to install the product.
- Do not remove protective covering from sensor until starting up faucet operation.
- Do not tighten locknut before step 4 is completed.



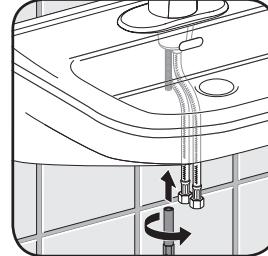
1. Mount cover plate if required. Plumber's putty is recommended to seal cover plate to the sink. Security pin must be located on the left side.



2. Mount gasket and put faucet into sink.



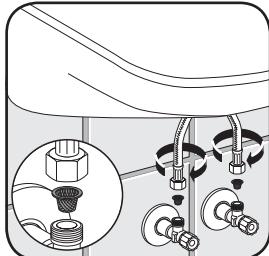
3. Mount bracket from underneath. Place hoses through large opening and mounting rod through small opening. Make sure flange sits securely against surface.



4. Place nut onto mounting rod and tighten with wrench.  
5. If faucet was installed with cover plate, secure with basin washer, flat washer and locknut.



6. Install aerator and tighten with aerator key (supplied).



7. For Gooseneck faucets, tighten spout with wrench.

8. Connect braided hose with filter to supply valve.

Cold water > white label  
Hot water > no label

Note: For AC faucets and faucets with EBPS, please refer to the plugin or hardwired transformer installation instructions.

9. Connect to power supply.

The faucet is now mounted.

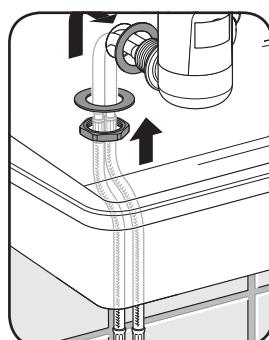
## Mounting of Wall Mount Faucet

### Prerequisites

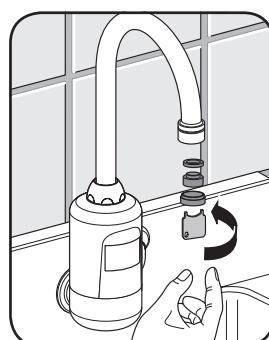
- Supply valve is installed
- Water supply lines are flushed properly
- For AC faucets and faucets with EBPS power outlet is installed

### Important

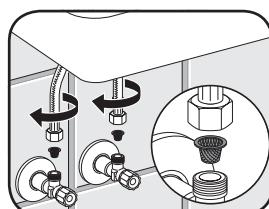
- It is not necessary to unscrew the connection between braided hose and housing to install the product.
- Do not remove protective covering from sensor until starting up faucet operation.



1. Mount gasket, put faucet into opening and tighten



3. For gooseneck faucets, tighten spout with wrench



4. Connect braided hose with filter to supply valve

Cold water > white label  
Hot water > no label

For AC faucets and faucets with EBPS, please refer to the plugin or hardwired transformer installation instructions.

5. Connect to power supply  
The Wall Mount faucet is now mounted.

# HyTronic® User Guide Installation Instructions

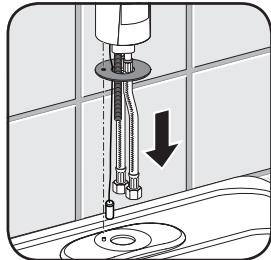
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**CHICAGO FAUCETS**

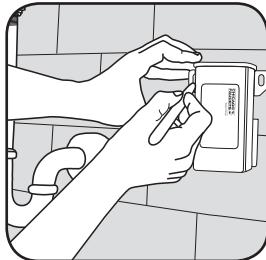
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## Mounting of Long Term Power System (LTPS) Pack (LTPS Models Only)

The LTPS Power Pack comes with mounting hardware (screws and anchors). You will need a drill and Phillips screwdriver to complete the installation.



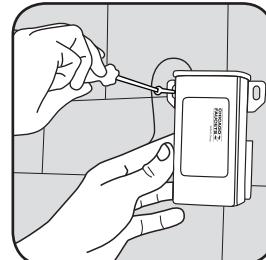
1. Mount faucet by following the standard mounting instructions on page 2.



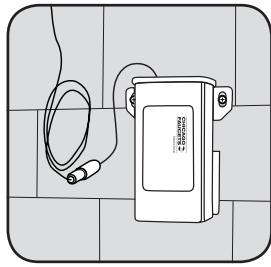
2. Position LTPS unit on wall and mark mounting holes on mounting surface.



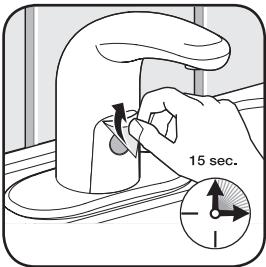
3. Drill holes for screw anchors.



4. Insert anchors into holes and mount LTPS unit to wall with supplied screws.



5. Connect spout wire to LTPS connector wire, making sure connectors are oriented correctly.



6. Remove protective covering from sensor.  
Wait 15 seconds for faucet to calibrate to its environment.

## LTPS End of Life Directives:

In an effort to produce environmentally conscious products, the LTPS contains materials that are required be recycled by specialized companies. Please ensure you dispose of your LTPS according to local regulations. Follow applicable laws and regulations for transport, shipping, and disposal of batteries. For details on, and locations for recycling lithium-based batteries, please contact a government recycling agency, your waste-disposal service, or visit reputable online recycling sources such as [www.call2recycle.org](http://www.call2recycle.org).

# HyTronic® User Guide Installation Instructions

(continued)

**CHICAGO FAUCETS**

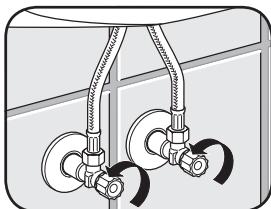
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## Start-up Operation

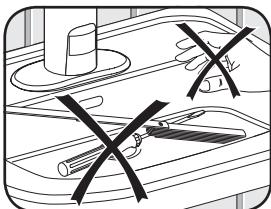
A traditional lavatory faucet is shown as an example. The start-up operation applies to all models.

### Prerequisites

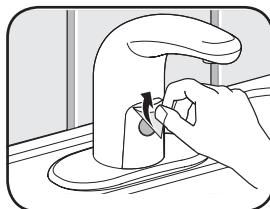
- Faucet is mounted
- Water supply is on
- Water supply lines are flushed properly
- For AC faucets and faucets with EBPS, power outlet is installed



1. Fully open supply valves



2. Remove all items from sink



3. Remove protective covering from sensor

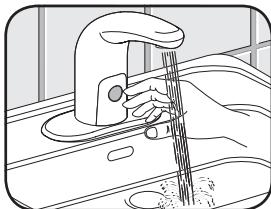


4. Wait for 15 seconds for faucet to calibrate to its environment

The faucet is now activated.

## Test Function

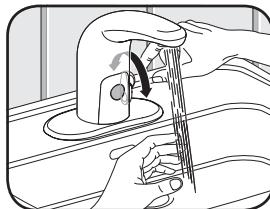
NOTE: If the faucet does not work as described below, see "Troubleshooting" section.



1. Hold hand in front of sensor until water begins to flow.



**WARNING:** Hot water may burn your skin. Avoid contact with the water stream until the water temperature has been properly adjusted. See page 5 for instructions on adjusting water temperature.



2. For faucets with external mixer, turn mixer handle from cold to warm. You should feel the water temperature increase.



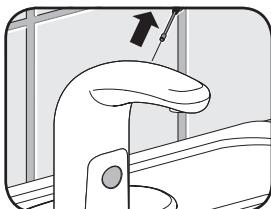
3. Move hand away from sensor until water flow stops.

## Enabling "Manual Setting" Mode

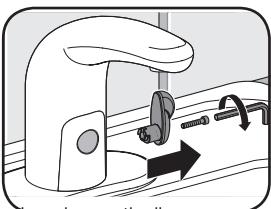
A battery model is shown in the following example. These instructions apply to all models. After 30 minutes, the "Manual Setting" mode will be disabled automatically and all settings will be saved.

### Prerequisites

- Water supply valve is open
- Battery is full (LED does not blink) for DC faucets
- For EBPS faucets, disconnect AC power
- AC power is on for AC faucets



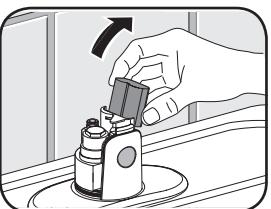
1. Remove shut-off screw



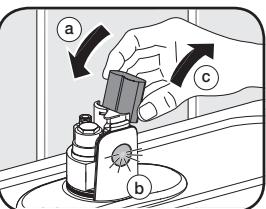
2. Remove mixer handle (only for faucets with external mixer)



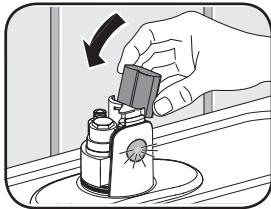
3. Remove housing vertically



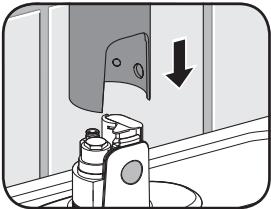
4. Remove battery from battery holder



5. The following procedure (a, b, c) must be done three (3) times in a row.  
a - Reinsert battery  
b - LED lights up  
c - Remove battery immediately after LED switches off



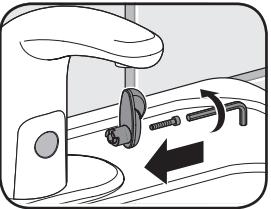
6. Insert battery



7. Mount housing vertically



8. Mount shut-off screw



9. Mount mixer handle (only for faucets with external mixer)

The "Manual Setting" Mode is now enabled.

# HyTronic® User Guide Installation Instructions

(continued)

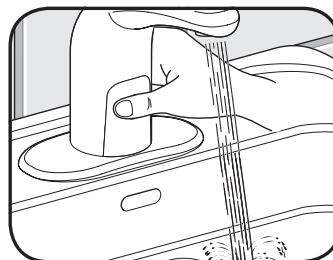
**CHICAGO FAUCETS**

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## CARE AND MAINTENANCE INSTRUCTIONS

The following instructions are described in this section:

- Setting Various Modes
- Reset to Default Settings
- Replacing Battery
- Adjusting Water Temperature (Internal Mixer)
- Adjusting Hot Water Limiter (External Mixer)
- Cleaning or Replacing Inlet Filter
- Cleaning or Replacing Outlet



### Setting Cleaning Mode

Setting the Cleaning Mode will make the faucet inactive for 90 seconds.

1. Enable "Manual Setting" Mode  
    > see "Enabling Manual Setting Mode" section (page 3).
2. Fully cover sensor with hand, until water flow stops.  
(This takes 5 seconds.)
3. Remove hand.

The Cleaning Mode is now active.

For the next 90 seconds, the faucet will be inactive.

### Setting Normal Mode

Setting the Normal Mode will allow the faucet to activate only when it senses a hand presence.

1. Enable "Manual Setting" Mode  
    > see "Enabling Manual Setting Mode" section (page 3).
2. Fully cover sensor with hand.  
Water flow stops after 5 seconds  
- keep sensor covered for one (1) additional water pulse.
3. Remove hand.

Normal Mode is now activated.

### Setting Metering Mode (10 seconds)

Setting the Metering Mode will allow the faucet to activate for a full 10 seconds after it senses a hand presence.

1. Enable "Manual Setting" Mode  
    > see "Enabling Manual Setting Mode" section (page 3).
2. Fully cover sensor with hand.  
Water flow stops after 5 seconds  
- keep sensor covered for another two (2) additional water pulses.
3. Remove hand.

Metering Mode is now activated for 10 seconds.

### Sensor Range Adjustment

The detection distance of the sensor can be adjusted between approximately 4 - 11 inches from the infrared window.

1. Enable "Manual Setting" Mode  
    > see "Enabling Manual Setting Mode" section (page 3).
2. Remove all items from sink.
3. Fully cover sensor with hand.  
Water flow will stop after 5 seconds - keep sensor covered for five (5) additional water pulses.
4. Remove hand.
5. Hold hand in the current detection area until LED flashes. Then move hand to the desired detection distance. When LED stays lit for (2) seconds, detection distance has been re-set to new location.

### Setting Scrub Mode

(60 seconds)

Setting the Scrub Mode for 60 seconds will allow the faucet to activate and run continuously for 60 seconds before shutting off.

1. Enable "Manual Setting" Mode  
    > see "Enabling Manual Setting Mode" section (page 3).
2. Fully cover sensor with hand.  
Water flow stops after 5 seconds  
- keep sensor covered for another three (3) additional water pulses.
3. Remove hand.

Scrub Mode is now activated for 60 seconds.

### Setting Scrub Mode

(180 seconds)

Setting Scrub Mode for 180 seconds will allow the faucet to activate and run continuously for 180 seconds before shutting off.

1. Enable "Manual Setting" Mode  
    > see "Enabling Manual Setting Mode" section (page 3).
2. Fully cover sensor with hand.  
Water flow stops after 5 seconds  
- keep sensor covered for another four (4) additional water pulses.
3. Remove hand.

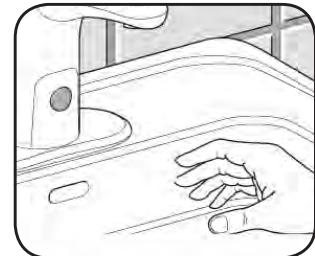
Scrub Mode is now activated for 180 seconds.

### Reset

All settings will be reset to default setting. The "Manual Setting" Mode will be disabled.

The procedure for the reset is the same as "Enabling Manual Setting Mode", but step 5 needs to be done six (6) times in a row.

All settings are reset to default settings and the manual-setting-mode is now disabled.



The detection distance is now calibrated.

# HyTronic® User Guide Installation Instructions

(continued)

**CHICAGO FAUCETS**

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## Replacing Battery

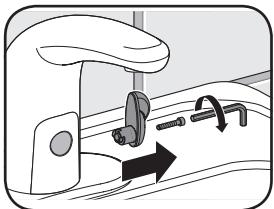
A traditional lavatory faucet is shown as an example. These instructions apply to all DC and EBPS models.

### Prerequisites

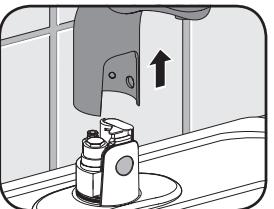
- Battery is low (LED is lit)
- New 6 V Lithium battery (CR-P2) is required
- NOTE: For EBPS units, low battery LED will only light when AC power is disconnected



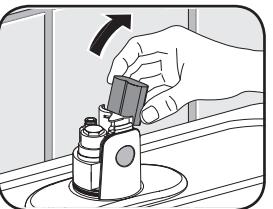
1. Remove shut-off screw



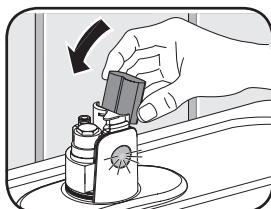
2. Remove mixer handle  
(for faucets with external mixer only)



3. Remove housing vertically



4. Remove used battery  
from holder and recycle



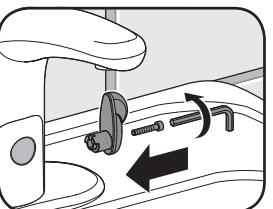
5. Insert new battery.  
IMPORTANT: be sure  
battery is fully seated.  
LED will illuminate when  
battery is properly  
installed.



6. Mount housing vertically



7. Install shut-off screw

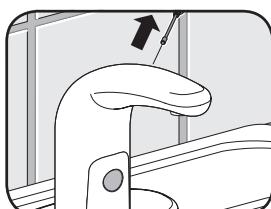


8. Install mixer handle  
(for faucets with external  
mixer only)

The battery is now  
replaced.

## Adjusting Water Temperature (Internal Mix)

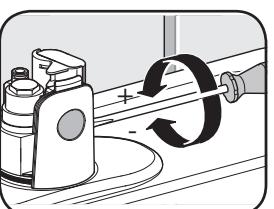
A traditional lavatory faucet is shown as an example. These instructions apply to all models with internal mixers.



1. Remove shut-off screw



2. Remove housing vertically



3. Adjust internal mixer with  
screwdriver  
Clockwise > warm  
Counterclockwise < cold



4. Mount housing vertically



5. Install shut-off screw

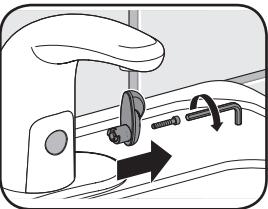
The temperature is now  
adjusted. Carefully test  
the new temperature. If  
necessary, adjust again.

## Adjusting Hot Water Limiter (External Mixer)

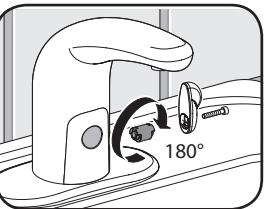
A traditional lavatory faucet is shown as an example. These instructions apply to all models with user adjustable temperature control. The proportion of hot water can be switched from approximately 85% to 95% (or reverse) depending upon inlet water pressures and temperatures. The default setting is 85%.

**WARNING:** Hot water  
may burn your skin.

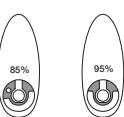
To avoid the risk  
of scalding, use a  
thermometer to check  
water temperature.  
Avoid contact with the  
water stream until the  
water temperature has  
been properly adjusted.



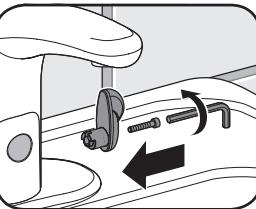
1. Remove mixer handle



2. Carefully pull out hot  
water limiter from handle  
(using pliers) and reverse  
by 180°



Settings of hot water limiter  
(View from placement in  
mixer handle)



3. Mount mixer handle

The proportion of hot water  
is now changed.

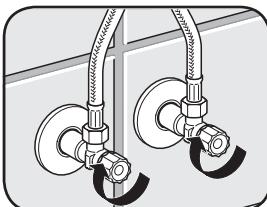
# HyTronic® User Guide Installation Instructions

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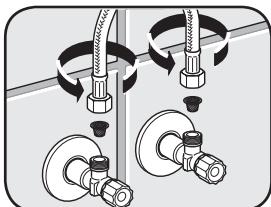


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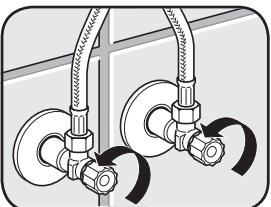
## Cleaning or Replacing Inlet Filter



1. Close supply valves

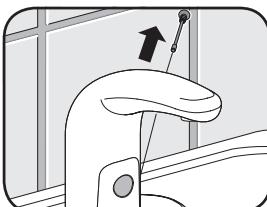


2. Disconnect braided hoses and carefully remove filter that is pressed into hose. Clean or replace filter.

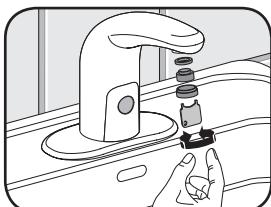


3. Connect braided hoses with filter to supply valves and open the valves.  
Cold water > white label  
Warm water > no label  
  
The filter is now cleaned or replaced.

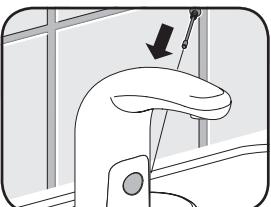
## Cleaning or Replacing Aerator



1. Remove shut-off screw



2. Remove outlet with vandal resistant wrench supplied with the faucet. Clean or replace outlet, then reinstall.



3. Install shut-off screw  
  
The outlet is now cleaned or replaced.

## Faucet Adjustment Overview

Operating modes and sensor ranges can be adjusted with a manual operation through the infrared sensor. A traditional lavatory faucet is shown as an example. Faucet adjustment operations apply to all models. Alternatively, operating modes and sensor ranges can be adjusted with the Chicago Faucets Commander™ Handheld Programming Unit. For more information, visit [chicagofaucets.com/commander](http://chicagofaucets.com/commander).

Operating Modes	Description
Cleaning Mode	The faucet is inactive for 90 seconds.
Normal Mode	The faucet is activated if it senses a hand presence. This is the default operating mode of the faucet.
Metering Mode (10 s)	The faucet will shut off after 10 seconds regardless of hand presence detected.
Scrub Mode (60 s)	The faucet will shut off 60 seconds after the detection of the last hand presence.
Scrub Mode (180 s)	The faucet will shut off 180 seconds after the detection of the last hand presence.
Sensor Range Adjustment	Change the detection distance of the infrared sensor. The default sensor range is approximately 1" beyond the spout.
Reset	All settings will be reset to original factory settings.

In order to set the operating modes, the faucet needs to be placed into "Manual Setting" mode. At this time, operating modes can be changed within the next 30 minutes.

## Commander Handheld Programming Unit

Use the Commander™ Handheld Programming Unit to change settings quickly and easily on your Chicago Faucets HyTronic® and E-Tronic® products. The Commander™ Handheld Programming Unit lets you program, maintain, and monitor our electronic faucets from the palm of your hand. Commander features a ruggedized housing, infrared communications, and touch-screen technology. Refer to the *Commander Quick Start Guide* to get started.



### Care and Maintenance

All Chicago Faucets fittings are designed and engineered to meet or exceed industry performance standards. Care should be taken when cleaning this product. Do not use abrasive cleaners, chemicals or solvents as they can result in surface damage. Use mild soap with warm water for cleaning and protecting the surface of Chicago Faucets fittings.

For additional technical assistance, call 800/TEC-TRUE (800-832-8783) or visit our website at [chicagofaucets.com](http://chicagofaucets.com).

## CHICAGO FAUCETS LIMITED WARRANTY

**TO WHOM DOES THIS WARRANTY APPLY?** — The Company extends the following limited warranty to the original user only.

**WHAT DOES THIS WARRANTY COVER AND HOW LONG DOES IT LAST?**

This warranty covers the following Commercial Products:

**LIFETIME FAUCET WARRANTY** — The "Faucet," defined as any metal cast, forged, stamped or formed portion of the Product, not including electronic or moving parts or other products separately covered by this Limited Warranty or water restricting components or other components, is warranted against material manufacturing defects for the life of the Product.

**FIVE YEAR FAUCET WARRANTY** — Certain Products and portions of the Product are warranted against material manufacturing defects for a period of five (5) years from the date of Product purchase. Products warranted against material manufacturing defects for a period of five (5) years from the date of Product purchase are referred to by the product numbers 42X, 43X, 15XX and E-Tronic™ - 4X, 5X, 6X, 7X, 8X and 9X. All zinc die cast portions of Product are warranted against material manufacturing defects for a period of five (5) years from the date of Product purchase.

**THREE YEAR ELECTRONICS WARRANTY** — Electronic components, including the solenoid, are warranted for three (3) years from the date of installation.

**FIVE YEAR CARTRIDGE WARRANTY** — The "Cartridge," defined as the metal portion of any Product typically referred to by the product numbers containing 1-099, 1-100, 1-310, 377X, 217X and 274X, excluding any rubber or plastic components, is warranted against material manufacturing defects for a period of five (5) years from the date of Product purchase.

All Cartridges included in the Company's Single Control or Shower Products also are warranted against material manufacturing defects for a period of five (5) years from the date of Product purchase.

**ONE YEAR FINISH WARRANTY — COMMERCIAL** — For Products used in commercial applications, the finish of the Product is warranted against material manufacturing defects for a period of one (1) year from the date of Product purchase.

**OTHER WARRANTIES** — All other Products not covered above are warranted against material manufacturing defects for a period of one (1) year from the date of Product purchase.

Other restrictions and limitations apply. For complete warranty details, call Chicago Faucets Customer Service at 847-803-5000 or visit [chicagofaucets.com](http://chicagofaucets.com).

The Chicago Faucet Company  
2100 South Clearwater Drive  
Des Plaines, IL 60018  
Phone: 847/803-5000  
Fax: 847/803-5454  
Technical: 800/832-8783  
[www.chicagofaucets.com](http://www.chicagofaucets.com)



# Guardian

EMERGENCY EYEWASH & SHOWER TECHNOLOGY

## Installation, Operation and Maintenance Guide:

### Eyewash/Drench Hose Units Drench Hose Units



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Guardian Equipment is the world's leading manufacturer of emergency eyewash and shower technology and related products for use in industrial facilities, commercial institutions, and many other applications where eye and body protection is a concern. As such, Guardian drench hose units and dual purpose eyewash/drench hose units have been installed in thousands of facilities over the past thirty years. These units are relied upon to instantly flush the user's eyes, face or body should a chemical spill occur.

Like all Guardian products, our eyewash/drench hose and drench hose units are designed, engineered and manufactured for reliable performance and exceptional durability. However, like all of our products, they must be installed correctly, operated properly, inspected regularly and maintained periodically to assure that they will be available when needed. This Installation, Operation and Maintenance Guide will assist users and facility maintenance personnel in these activities.

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## Application Information

Drench hose units are typically installed on a countertop or a wall and are used to rinse any part of a user's eyes, face or body. These units are equipped with a single FS-Plus™ spray-type outlet head. As a single head unit, they cannot be used as a fixed eyewash unit, since they cannot wash both eyes simultaneously. Under "American National Standard for Emergency Eyewash and Shower Equipment" (ANSI Z358.1-2014), drench hose units support emergency eyewash and shower stations, but do not replace them. Consequently, drench hose units are intended solely as supplemental units providing additional protection, as they cannot serve as the primary means for eyewash protection.

Twenty years ago, Guardian introduced the first dual purpose eyewash/drench hose unit. These units are designed to meet the provisions of ANSI Z358.1-2014 as both an eyewash and a drench hose. Dual purpose eyewash/drench hose units are typically installed on a countertop next to or behind a sink. They may also be mounted on a wall. The deck flange or wall bracket positions the unit so the handle and spray heads face forward at all times. In an emergency, the user can use the unit as a fixed eyewash by squeezing the lever handle to activate the water flow. A locking clip on the lever handle holds the valve open, so the user's hands are free during use. The user can lean over the unit to rinse his or her eyes. Alternatively, the user can use the unit as a drench hose by removing it from the deck flange or wall bracket and rinsing any part of his or her eyes, face or body.

## Installation

Installing Guardian eyewash/drench hose and drench hose units requires the use of common plumbing installation techniques. Observing the following guidelines will help to assure trouble-free installation:

1. The water supply line should be at least 1/2" OD and should be copper or other corrosion resistant material.
2. Deck mounted units require a 1-3/8" diameter mounting hole. The hole should be large enough to accommodate the shank on the deck flange but not permit excessive lateral movement. Minimizing the hole size provides as large a surface as possible for the locknut and lockwasher to secure against.
3. Thoroughly clean and flush the supply line prior to installing unit. Pipe shavings, scale, tape and other debris can be carried through a pipe and into the unit when the system is activated. This debris can damage valve components and interfere with proper operation of the valve.
4. Units have a 3/8" NPT male thread on the inlet. Use PTFE tape or other pipe sealant to seal this thread. Do not apply the sealant in a way that will permit it to enter into the unit.
5. Units are fully assembled and factory tested prior to shipment. Units are tagged when factory testing is complete. If a unit is received without an inspection tag, please notify the factory.
6. Clean eyewash/drench hose and drench hose units using only a soft cloth and soapy water. Do not use abrasives, detergents or other cleaners that can damage the finish on the unit. *Never use any cleaning agent that contains ammonia near a laboratory service fitting or emergency eyewash unit, as ammonia will aggressively corrode the brass contained in these products.*

In addition to observing these common plumbing installation techniques, there are several additional guidelines specific to these units that must be observed:

1. Install units with adequate clear space around them to be free of obstructions. In an emergency, units should be readily accessible to the user without interference from other equipment (such as mixing faucets, pegboards, instrumentation, etc.). Units should be installed at least 6" from the wall.
2. Install units so that the handle and spray heads face forward toward the user. On deck mounted units, this requires installing the deck flange with the handle locator guides properly positioned.
3. On deck mounted units, make sure that the hose does not bind underneath the counter. In addition, there should be no sharp edges, corners or objects that can rub against the hose. The unit must be able to be removed from the deck flange without restriction or binding and the hose must pull out easily from the deck flange. On deck mounted eyewash/drench hose units, make sure that the unit is accessible from the front edge of the counter on which it is installed.

## Operation

The proper use of an eyewash/drench hose or drench hose unit requires observing a few simple guidelines:

1. All users must be instructed as to the location of all safety equipment in the facility, including emergency eyewash and shower equipment.
2. In the event of a chemical splash or spill, the affected area of the victim's body must be flushed immediately for at least fifteen minutes. For chemical spills to the eyes, the user should hold his or her eyes open as wide as possible to permit the water to reach all areas around the eye.
3. Rinsing the affected area for fifteen minutes is only the first step in treating exposure to a hazardous chemical. Following rinsing, the victim should be examined and treated by a doctor or other trained medical specialist as soon as possible.

## Inspection and Maintenance

Like all emergency eyewash and shower equipment, eyewash/drench hose and drench hose units must be inspected on a regular basis to assure that, in an emergency, they are available for immediate and effective use. Guardian recommends that the following inspection schedule be followed for all emergency eyewash and shower equipment:

**Weekly Activation:** In accordance with the provisions of ANSI Z358.1-2014, all emergency equipment should be activated at least weekly to assure proper operation.

**Monthly Maintenance Inspection:** All emergency equipment, including eyewash/drench hose and drench hose units, should be inspected at least monthly to find and address any maintenance issues. The monthly inspection should incorporate the recommended weekly activation of the unit, as well as a thorough inspection of the unit to assure that it is in good operating condition and showing no signs of wear. Particular attention should be paid to the spray heads, valve and hose assembly.

**Annual Compliance Inspection:** All emergency equipment should be inspected at least annually to verify continued compliance with the provisions of ANSI Z358.1-2014.

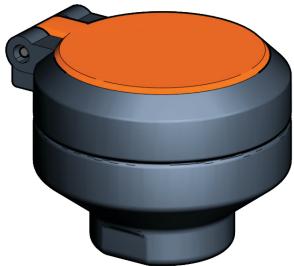
Each of these inspections is described in more detail below.

### 1. Weekly Activation

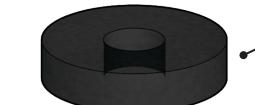
Weekly activation is a simple but effective check to make sure that the emergency equipment is in good operating condition. A record of the weekly activation should be maintained on a tag affixed to the unit.

### 2. Monthly Maintenance Inspection

The monthly maintenance inspection of eyewash/drench hose and drench hose units is a longer and more comprehensive inspection than the weekly activation. Listed below are the major elements that this inspection should cover. In addition, Guardian has developed the "Monthly Inspection Troubleshooting Guide" included below to assist in the recommended monthly inspections of eyewash/drench hose and drench hose units.



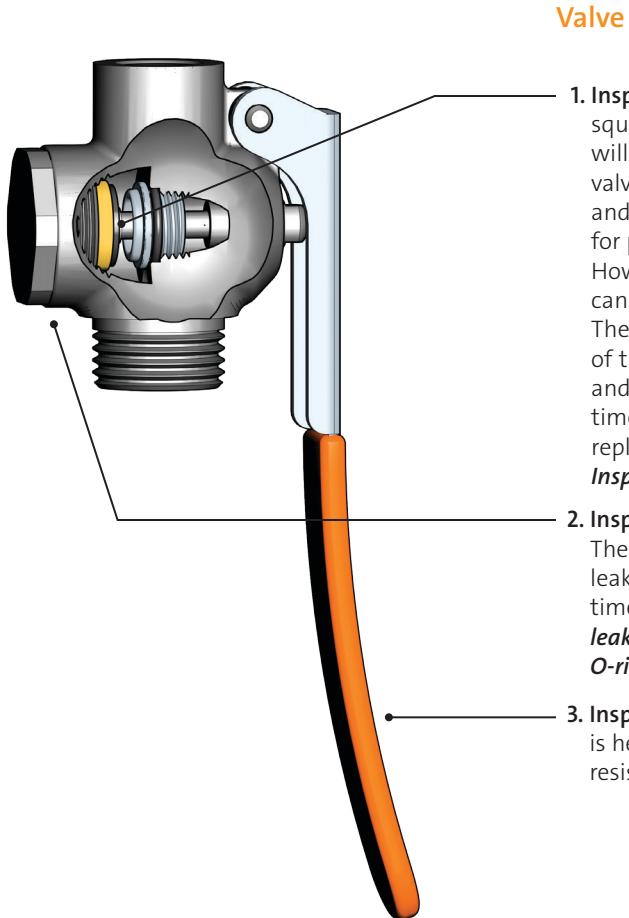
## Spray Heads



**1. Inspect "Flip Top" Dust Cover(s).** Guardian developed the "flip top" style dust cover as an alternative to the loose caps with chains that other manufacturers use. The "flip top" cover is attached to the spray head by a permanent stainless steel rivet so it can never be lost or removed. *Verify that the cover swings freely and is removed from the spray head by the water flow.*

**2. Inspect Filter(s).** Each spray head contains an internal foam filter to remove particles, scale and other debris from the water flow before it enters the user's eyes. Over time, this foreign matter will collect in the filter. Depending on the amount of foreign matter in the water flow, the filter can become clogged and the flow of water through the spray head can be impaired. *Inspect filter for debris and/or deterioration. Clean or replace the filter as required.*

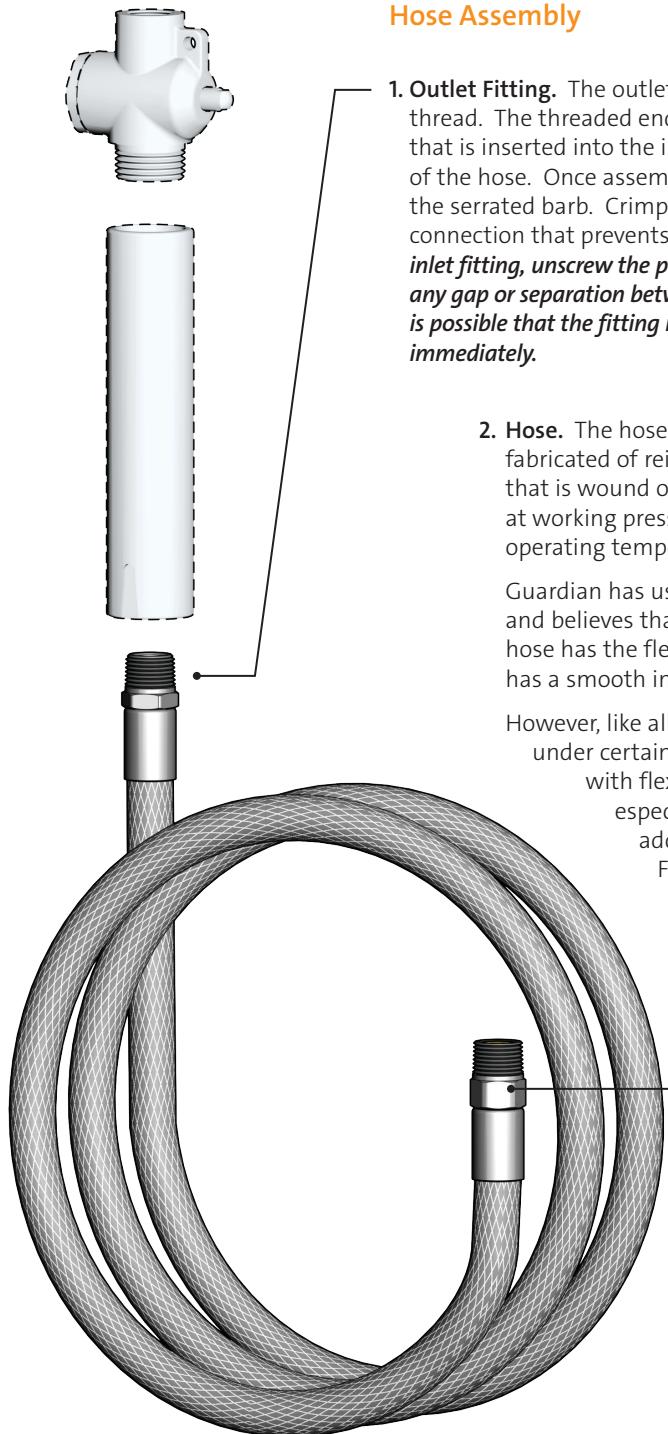
**3. Inspect Flow Control(s).** Each spray head contains a flow control to regulate the flow of water through the spray head. The flow control assures that the unit delivers a soft, generous flood of water regardless of incoming water line pressure. Over time, debris can collect in the flow control or it can deteriorate due to age. If this occurs, the flow control must be cleaned or replaced. *Inspect flow control for debris and/or deterioration. Clean or replace as required.*



**1. Inspect Valve for Leakage Through Seat.** The Guardian squeeze valve is manufactured from components that will provide the valve with exceptional durability. The valve seat is machined from solid stainless steel bar stock and the valve disc is high durometer synthetic rubber for positive shutoff and exceptional wear resistance. However, it is possible that, over time, these components can wear or be damaged by impurities in the water flow. Therefore, Guardian has designed these valves so that all of the wearing components of the valve are removable and replaceable. Should any of the components wear over time and the valve begin to leak, the components can be replaced and the valve will be essentially "as good as new." ***Inspect valve components for wear and replace as required.***

**2. Inspect Valve for Leakage Around Valve Stem and Bonnet.** The valve stem and bonnet have O-ring seals to prevent leakage outside of the valve body. These O-rings can over time wear or deteriorate. ***Inspect the unit for signs of leakage around the valve stem and bonnet. Replace the O-rings as required.***

**3. Inspect Squeeze Handle.** The squeeze handle on the valve is heavy duty stainless steel to withstand bending and resist corrosion. ***Inspect the handle for proper operation.***



## Hose Assembly

**1. Outlet Fitting.** The outlet of the hose assembly has a brass fitting with a 3/8" NPT male thread. The threaded end connects to the inlet of the valve. The fitting has a serrated barb that is inserted into the inside of the hose. A brass ferrule or sleeve is fitted over the outside of the hose. Once assembled, the ferrule is crimped (crushed) to squeeze the hose onto the serrated barb. Crimping the ferrule over the hose and barb forms a secure, permanent connection that prevents the serrated barb from ever pulling out of the hose. *To inspect the inlet fitting, unscrew the plastic handle of the unit. Check for any sign of leakage. Check also for any gap or separation between the ferrule and the barb fitting. If any leakage or gap is found, it is possible that the fitting may be pulling out of the hose. If this occurs, the hose must be replaced immediately.*

**2. Hose.** The hose on Guardian eyewash/drench hose and drench hose units is fabricated of reinforced PVC. The hose has a PVC inner core, a braided polyester yarn that is wound over the inner core, and a PVC outer cover. The hose is rated for use at working pressures up to 275 PSI, has a burst pressure of 1000 PSI and a maximum operating temperature of 150°F.

Guardian has used reinforced PVC hose for drench hose units for over thirty years and believes that this hose is the best choice for this application. Reinforced PVC hose has the flexibility of rubber but is much more durable. In addition, the hose has a smooth interior wall surface and is FDA approved for use with potable water.

However, like all elastomeric materials, reinforced PVC is subject to deterioration under certain conditions. PVC contains plasticizers to provide the material with flexibility. Over time, these plasticizers can leach out of the material, especially when exposed to concentrated acids, alkalies or UV light. In addition, exposure to gasoline and oils can cause PVC to harden.

Finally, PVC hose can weaken due to continuous rubbing, abrasion, cuts or tears. Since the hose is under continuous water pressure, the consequence of a rupture can be serious. *Inspect the hose for abrasion, loss of flexibility or other deterioration. If any such deterioration is found, the hose must be replaced immediately.*

**3. Inlet Fitting.** The inlet of the hose assembly has a similar serrated barb fitting, except that the inlet fitting is designed to swivel to facilitate connection of the unit to the water supply. The fitting has a 3/8" NPT male thread for connection to the water supply. The fitting also has a serrated barb that is inserted into the inside of the hose and then secured with a crimped ferrule so as to be non-removable. *Check for any sign of leakage or any gap or separation between the ferrule and the barb fitting. If any leakage or gap is found, it is possible that the fitting may be pulling out of the hose. If this occurs, the hose must be replaced immediately.*



## Monthly Maintenance Troubleshooting Guide

Problem	Potential Cause	Corrective Action
Limited or no water flow from spray heads.	Obstruction in spray heads or water way.	<ol style="list-style-type: none"><li>1. Remove spray cover and check for lime or calcium buildup. Clean or replace as necessary.</li><li>2. Inspect filter. Clean or replace as necessary.</li><li>3. Unscrew spray head and check flow control for debris or other obstruction. Clean or replace as necessary.</li><li>4. If these actions do not correct problem, open valve by unscrewing bonnet. Inspect valve for obstruction in waterways. Clean as required.</li><li>5. If unit is equipped with a backflow preventer or vacuum breaker, disassemble device and inspect for debris or other obstructions. Clean as required.</li></ol>
Hinged "flip top" dust cover not opening when unit is activated.	Hinged cover is binding.	<ol style="list-style-type: none"><li>1. Make sure hinge between dust cover and spray cover is located at bottom of eyewash spray head.</li><li>2. Make sure hinged cover swings freely from spray head. Replace cover if required.</li></ol>
Water leaking from spray heads when unit is not in use.	Valve is not shutting off completely when handle is in closed position.	Shut off water to unit. Open valve by unscrewing valve bonnet. Inspect valve disc and seat for wear. Replace as required.
Water leaking from around valve stem or bonnet.	Seals are worn.	Shut off water to unit. Open valve by unscrewing valve bonnet. Inspect O-rings on valve stem and bonnet. Replace as required.
Hose is stiff and inflexible.	Plasticizers in PVC inner and outer core of hose may have leached out due to age, exposure to acids or alkalies, exposure to UV light, etc.	Replace hose immediately.
Hose shows signs of wear such as scrapes, cuts, fraying, tears or other abrasion.	Hose may have snagged or rubbed on sharp object or is wearing due to age.	Replace hose immediately.
Hose is not secure on end fittings. Hose turns freely on fittings or there is a gap or separation between the crimped ferrule and end fitting.	Hose may be working loose from fitting.	Replace hose immediately.



## Annual Compliance Inspection

As noted above, Guardian recommends, and ANSI Z358.1-2014 provides, that emergency equipment be inspected at least annually for continued compliance with the provisions of the standard. Guardian has prepared the following checklist to assist in the annual compliance inspection. This list is based upon the provisions of the ANSI standard relating to eyewash and drench hose units. Additional copies of the checklist may be requested from the factory or downloaded from our website.

### Eyewash/Drench Hose Unit

Owner		Inspection Date	
Building		Inspected by	
Floor/Room No.			

Item	ANSI Z358.1 Section Reference	Pass/ Fail	Corrective Action Required
<b>Location</b>			
1. Emergency eyewash/drench hose unit installed within 10 seconds walking time or 55 feet of hazard.	5.4.2/ Appendix B5		
2. Eyewash/drench hose unit is on same level as hazard and there is unobstructed travel path from hazard to unit.	5.4.2		
3. Unit identified with highly visible sign.	5.4.3/8.2.3.2		
4. Area around unit well lighted.	5.4.3/8.2.3.2		

<b>Installation</b>			
1. Unit connected to water supply delivering at least 0.4 GPM.	5.4.5		
2. Flushing fluid flow pattern positioned 33-53" from floor and at least 6" from wall or nearest obstruction.	5.4.4		
3. Valve actuator easy to locate and readily accessible to user.	5.2/8.2.2		
4. Spray heads protected from airborne contaminants.	5.1.3		

<b>Activation</b>			
1. Valve goes from "off" to "on" in one second or less.	5.2/8.2.2		
2. Once activated, valve stays open for "hands free" use.	5.2		
3. Water flow washes both eyes simultaneously and is controlled, low velocity and non-injurious to user.	5.1.1/8.2.1		
4. Unit delivers at least 0.4 GPM for 15 minutes.	5.1.6		
5. Water delivered by unit is tepid (60-100°F).	5.4.6/8.2.3.4		

<b>Training</b>			
1. All employees trained in location and proper use of eyewash/drench hose units.	5.5.4/8.2.4.4		



## Drench Hose Unit

Owner		Inspection Date	
Building		Inspected by	
Floor/Room No.			

Item	ANSI Z358.1 Section Reference	Pass/ Fail	Corrective Action Required
<b>Location</b>			
1. Verify emergency eyewash and shower equipment installed in vicinity of hazard.	8		
2. Unit identified with highly visible sign.	8.2.3.2		
3. Area around unit well lighted.	8.2.3.2		
4. Area around unit free of debris and obstructions.	8.2.3.2		

<b>Installation</b>			
1. Unit connected to water supply.	8.2.3.3		
2. Valve actuator easy to locate and readily accessible to user.	8.2.2		

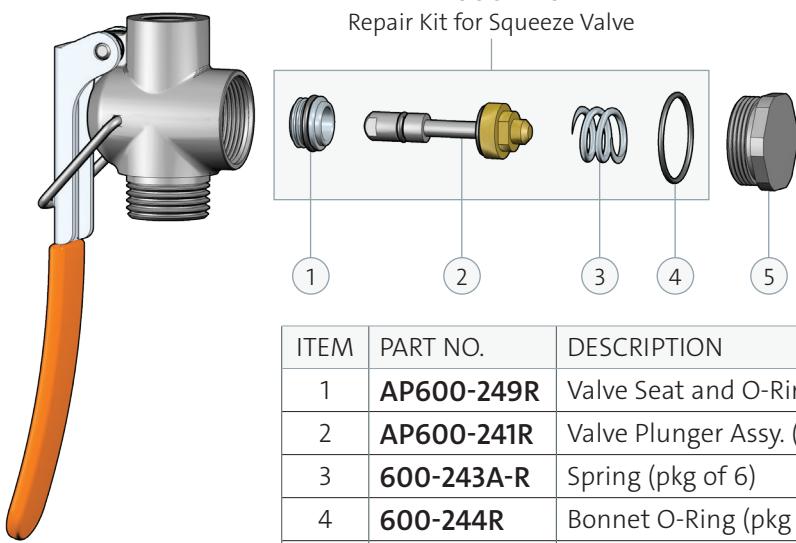
<b>Activation</b>			
1. Valve goes from "off" to "on" in one second or less.	8.2.2		
2. Water flow is controlled, low velocity and non-injurious to user.	8.2.1		
3. Water delivered by unit is tepid (60-100°F).	8.2.3.4		

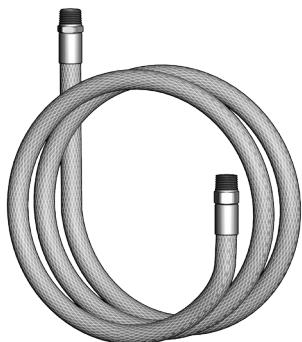
<b>Training</b>			
1. All employees trained in location and proper use of drench hose units.	8.2.4.4		



## ○ AP600-240LC Squeeze Valve with Locking Clip. 3/8" NPT Female Outlet.

*Note: Prior to 2002, Guardian manufactured the AP600-220-3 squeeze valve. This valve had an integral (non-removable) valve seat. In 2002, Guardian replaced this valve with the AP600-240 valve with a replaceable stainless steel valve seat. All eyewash/drench hose units and drench hose units manufactured after 2002 utilize the AP600-240 squeeze valve.*





**AP350-100-096**  
8 ft. reinforced PVC hose for eyewash/  
drench hose and drench hose units.  
3/8" NPT male swivel inlet,  
3/8" NPT male outlet.



**350-007**  
Molded nylon handle for  
eyewash/drench hose and  
drench hose units.



**AP350-011G**  
Molded nylon deck flange for  
eyewash/drench hose and  
drench hose units. 1" IPS mounting shank.



**AP150-003A**  
45 degree panel flange for eyewash/  
drench hose and drench hose units.  
3/4" IPS mounting shank.



**AP150-051C**  
Wall Bracket for  
Eyewash/Drench Hose Units



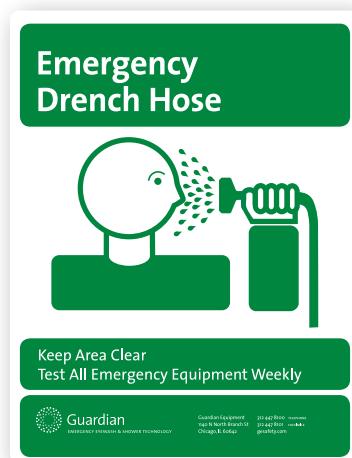
**150-062A**  
Wall Hook for  
Drench Hose Units



**AP150-084**  
Wall Bracket for  
Eyewash/Drench Hose Units



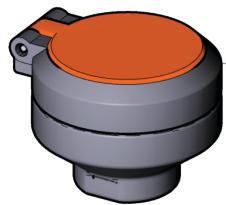
**250-010G**  
8-1/2" x 11" plastic sign



**250-006G**  
8-1/2" x 11" plastic sign



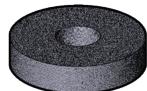
## ○ GS-Plus™ Spray Head



**AP470-001**  
GS-Plus™ Spray Head.  
1-1/2" Diameter.  
1/4" NPT female inlet.



**AP470-002ORG-R**  
1-1/2" Diameter Spray  
Cover with "Flip Top"  
Dust Cover (pkg of 2)



**470-004R**  
1-1/8" Diameter Foam  
Filter (pkg of 6)

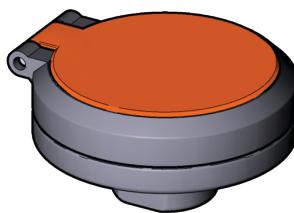


**470-001R**  
GS-Plus™ Spray Head  
Body (pkg of 6)



**470-005R**  
1.6 Gallon Per Minute  
Flow Control  
(pkg of 6)

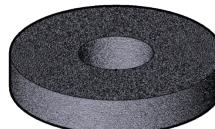
## ○ FS-Plus™ Spray Head



**AP470-021**  
FS-Plus™ Spray Head.  
2-1/8" Diameter.  
1/4" NPT female inlet.



**AP470-022ORG-R**  
2-1/8" Diameter Spray  
Cover with "Flip Top"  
Dust Cover (pkg of 2)



**470-024R**  
1-3/4" Diameter Foam  
Filter (pkg of 6)



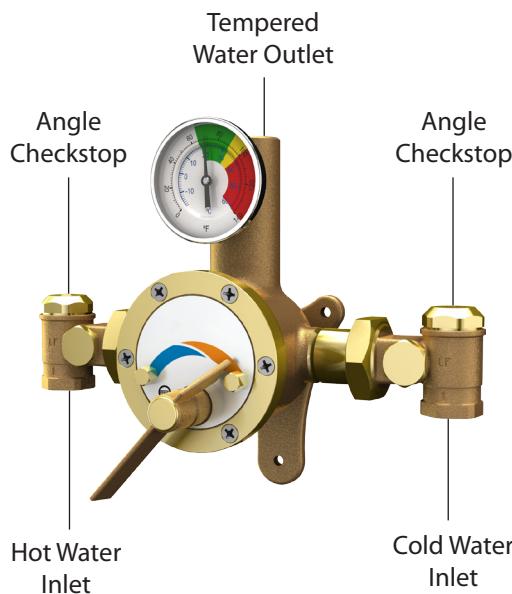
**470-021R**  
FS-Plus™ Spray Head  
Body (pkg of 6)



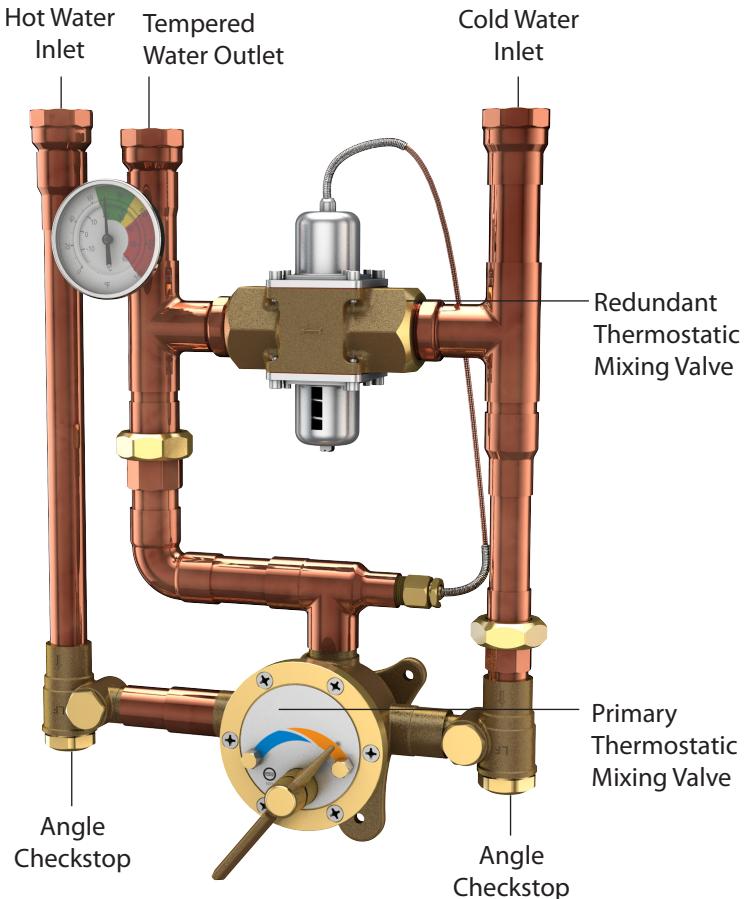
**470-025R**  
3.2 Gallon Per Minute  
Flow Control (pkg of 6)



Note: Please provide valve serial number (stamped on cover of valve) when ordering parts.



**G3800LF**



**G3850LF**

## Installation

1. Install valve in a location where it may be easily cleaned, adjusted or repaired.
2. Inlets are clearly marked on valve body casting. Connect hot water to inlet marked "HOT" and cold water to inlet marked "COLD".
3. Included angle checkstops must be installed on both supply lines.

4. Use solder or pipe cement sparingly. Flush supply pipes before connecting valve. Flush outlet pipe and valve once valve is connected.

Maximum operating pressure is 125 PSI (860 KPA) for hot and cold water. Maximum hot to cold water pressure differential is 5%.

*Note: Should piping be exposed to excessive hot or cold conditions, it may be necessary to insulate piping to prevent freezing or scalding water.*



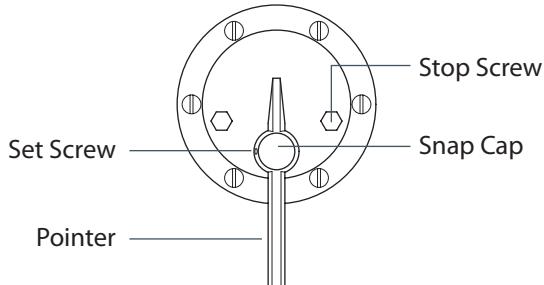
**IMPORTANT: THESE SYSTEMS ARE DESIGNED TO PROVIDE MIXED WATER FROM 60 TO 90°F (15 TO 32°C) FOR EMERGENCY EQUIPMENT APPLICATIONS ONLY IN ACCORDANCE WITH ASSE 1071.**

Note: This is a control system which must be cleaned and maintained regularly (see Maintenance Guide and Record card included with valve shipment).

### Adjustment and Service

Guardian thermostatic mixing valves may be easily cleaned, adjusted and repaired. Servicing may be possible without disconnecting valve.

### To Reset Adjustable High Temperature Limit Stop:



1. Loosen set screw. Remove snap cap, pointer screw, washer, and pointer.
2. Activate emergency fixture.
3. Temporarily place pointer on pointer rod and turn handle to the left, allowing cold water to flow. Then, slowly adjust handle to the right until the required maximum temperature is reached. *Note: Temperatures above 90°F are not recommended. Consult a medical advisor for correct temperature settings.*
4. Once maximum temperature has been reached, remove pointer and replace on pointer rod such that its right edge rests against the stop screw located on the right side of the cover.
5. Tighten set screw and replace washer, pointer screw, and snap cap. Hold a thermometer under water flow to verify maximum temperature has been set appropriately. Then set desired operating temperature.

*Note: Thermostatic water mixing valves are regulating mechanisms which must be regularly maintained to provide best performance. Local water quality and usage conditions dictate cleaning frequency. (See Maintenance Guide and Record card included with valve shipment and reference ANSI Z358.1)*



**WARNING: THIS THERMOSTATIC MIXING VALVE HAS AN ADJUSTABLE HIGH TEMPERATURE LIMIT STOP WHICH MUST BE CHECKED. IF TEMPERATURE IS TOO HIGH, THE INSTALLER MUST RESET THIS STOP IMMEDIATELY. ALWAYS CHECK THE TEMPERATURE OF THE MIXED WATER WHEN THE LEVEL HANDLE IS TURNED TO FULL HOT. THE WATER TEMPERATURE OF EACH INDEPENDENT OUTPUT MUST BE CHECKED IF USING A COMBINATION UNIT. EXCESSIVE HOT WATER TEMPERATURE IS DANGEROUS AND MAY CAUSE SCALDING.**

THE HIGH TEMPERATURE LIMIT STOP IS FACTORY SET AT APPROXIMATELY 90°F (32°C) WITH AN INCOMING HOT WATER SUPPLY TEMPERATURE OF 135°F (57°C). IF THE INCOMING HOT WATER IS HIGHER THAN 135°F (57°C), THE VALVE (WHEN TURNED TO FULL HOT) WILL DELIVER WATER IN EXCESS OF 90°F (32°C) AND THE HIGH TEMPERATURE LIMIT STOP MUST BE RESET.

### Troubleshooting

Symptom	Component Type	Part No.	Description
Leak at pointer rod.	Packings and Gaskets	MU-5A	O-Ring
Leak between valve cover and body.	Packings and Gaskets	TM-21/50	Flange Packing
Valve outlet temperature will not mix consistently.	Port Sleeve Assembly	TGM-1/50M or RK3800A	Port Sleeve Assembly or Repair Kit
After cleaning or replacing port sleeve assembly, valve will not hold temperature.	Thermostat Group	TGM-2/50 or RK3800A	Thermostat Group or Repair Kit
Hot water bypass into cold line.	Checkstops	RK3800B	Checkstop Kit
Supplies cannot be shut off completely.	Checkstops		
Leak at checkstop bonnet.	Checkstops		

If installed on a circulated hot water system, verify the valve is piped according to Required Piping Method on page 3.

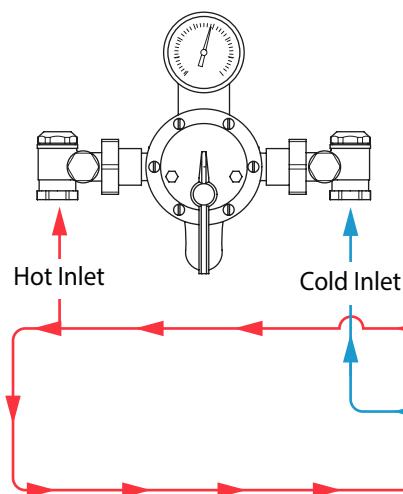
### See page 5 for complete parts breakdown and parts kits.

*Note: This is a control system which must be cleaned and maintained regularly (see Maintenance Guide and Record card included with valve shipment).*

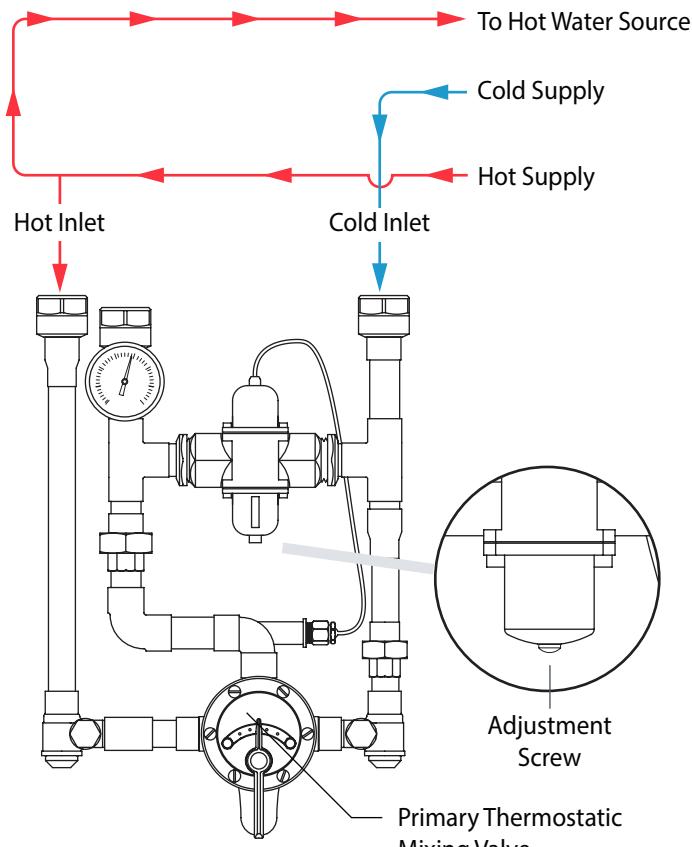


### Required Piping Method

Required when hot water must be circulated to a thermostatic mixing valve that is a substantial distance from the hot water source. Recommended hot water inlet temperature is 135°F (57°C).



G3800LF



G3850LF

This unit must be cycled each time the emergency equipment is inspected (See ANSI Z358.1, Maintenance and Training Section).

1. Set the thermostatic mixing valve to full hot. (primary thermostatic mixing valve on the G3850LF)
2. Activate emergency equipment and allow temperature to reach set point.
3. Turn (primary) thermostatic mixing valve to full cold and wait ten seconds.
4. Turn (primary) thermostatic mixing valve to full hot and wait ten seconds.
5. Verify outlet temperature does not exceed 90°F (32°C).
6. Turn (primary) thermostatic mixing valve to full cold and wait ten seconds.
7. If necessary, adjust high temperature limit stop (see page 2). Then set (primary) mixing valve to desired operating temperature and deactivate emergency equipment.

The G3850LF Redundant Thermostatic Mixing Valve has been factory set at 90°F (32°C). This set point can be adjusted with a 3/8" wrench (see above). Twisting the adjustment screw clockwise will increase the temperature. Maximum set point is 100°F (38°C).

Note: This is a control system which must be cleaned and maintained regularly (see Maintenance Guide and Record card included with valve shipment).



### To Dismantle Valve:

Shut off hot and cold water supplies to valve. Loosen set screw. Remove snap cap, pointer screw, washer, pointer and friction spring (see Figure 1). Remove cover screws and cover (thermostat and gears are attached to cover).

When reassembling, insert flange packing into valve body and replace cover and cover screws. Then replace friction spring, pointer, washer, screw, and snap cap.

After replacing parts, pointer must be reset. Refer to page 2 instructions "To Reset Adjustable High Temperature Stop."

### To Clean Port Sleeve Assembly:

Screw (twist) the check nut away from valve body towards port sleeve assembly. Then twist port sleeve nut away from port sleeve assembly (towards valve body) to release port sleeve and thimble (Figure 2).

Clean with non-corrosive agent and soft cloth. DO NOT USE ABRASIVES. Wash parts thoroughly after cleaning and reassemble.

Install port sleeve with elongated holes nearest the check nut and tighten port sleeve nut against port sleeve assembly. DO NOT OVERTIGHTEN. Tighten check nut against valve body. Driving ball on thermostat group should then be inserted into ball socket for final reassembly (Figure 1).

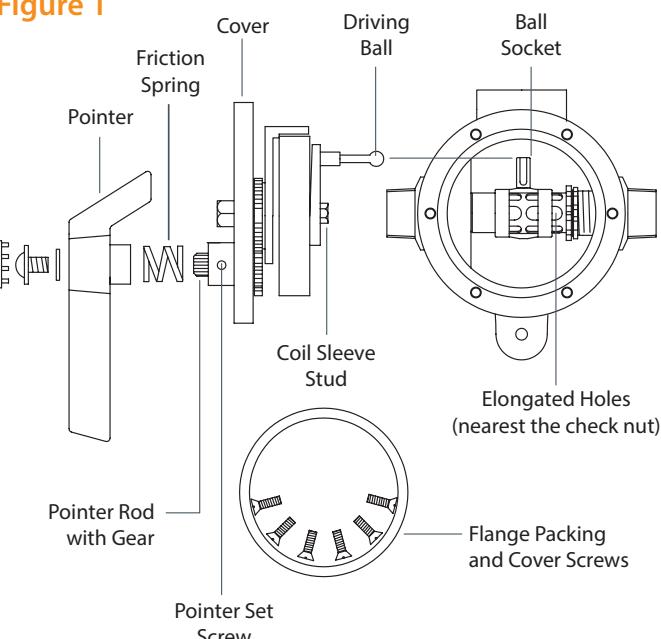
### To Replace Pointer Rod With Gear:

Loosen set screw and remove snap cap, pointer screw, washer, pointer and friction spring (Figure 1). Remove cover screws and cover. Then remove coil sleeve stud and thermostat group. Replace pointer rod with gear, and reassemble.

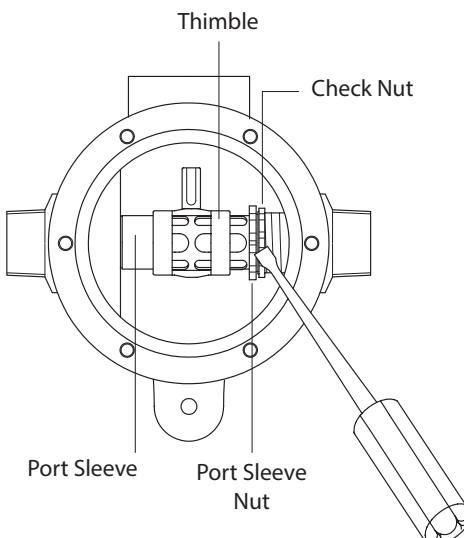
### To Replace or Clean Thermostat Group:

See "To Replace Pointer Rod with Gear" (above) to disassemble valve. Clean any collected deposits from thermostatic coil with brush and non-corrosive cleaning solution.

**Figure 1**



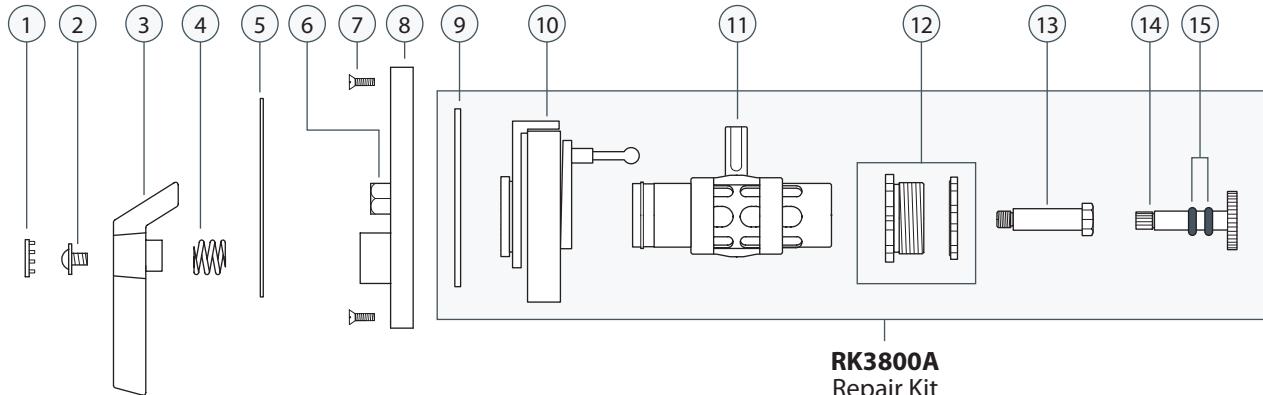
**Figure 2**



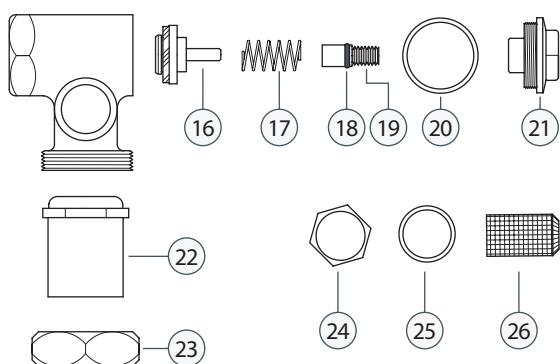
Note: This is a control system which must be cleaned and maintained regularly (see Maintenance Guide and Record card included with valve shipment).



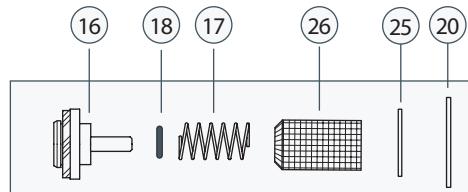
## Thermostatic Mixing Valve Parts



## Checkstop Parts



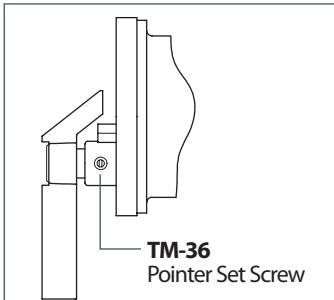
## Repair Kits



**RK3800B**  
Checkstop Kit

Repair kit Includes parts to repair both hot and cold checkstops

## Lockable Pointer (suffix "LTR")



### Notes:

1. After installing new parts, the adjustable high temperature limit stop must be reset (see page 2).
2. All G3800LF and G3850LF valves are furnished with lockable pointers.

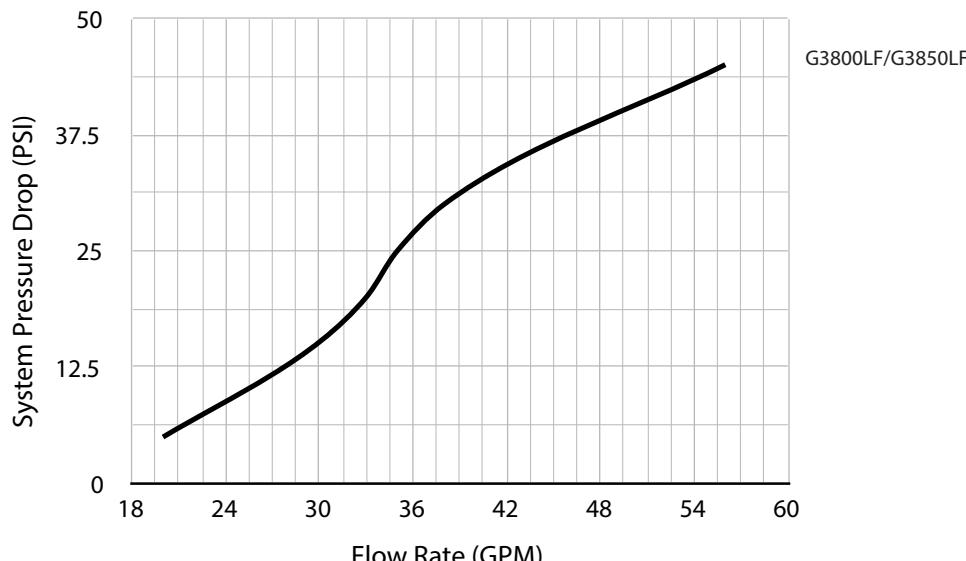
Item	Part No.	Description
1	57-L	Snap Cap
2	TM-29/29A	Pointer Screw
3	TM-25C	Pointer
4	30	Friction Spring
5	615	Dial Plate
6	TM-25D	Stop Screw
7	TM-16	Cover Screws (6)
8	TM-15B/50	Cover
9	TM-21/50	Flange Packing
10	TGM-2/50	Thermostat Group
11	TGM-1/50M	Port Sleeve Assembly
12	TM-3/50M	Port Sleeve Nut Assembly
13	TM-8	Coil Sleeve Stud
14	TM-28A	Pointer Rod

Item	Part No.	Description
15	MU-5A	O-Ring
16	03	Lower Stem & Packing
17	011	Spring (Hot Side)
18	015	Spring (Cold Side)
19	MU-5A	O-Ring
20	MU-4A	Upper Stem
21	05	Packing
22	02	Bonnet
23	04/50	Swivel
24	09/50	Swivel Nut
25	06	Strainer Cap
26	014	Cap Packing
	013	Screen

Note: This is a control system which must be cleaned and maintained regularly (see Maintenance Guide and Record card included with valve shipment).



## Flow Capacities



MODEL	IN	OUT	MINIMUM FLOW (GPM) L/MIN	INTERNAL COLD WATER BYPASS MINIMUM	SYSTEM PRESSURE DROP									
					5	10	15	20	25	30	35	40	45	PSI BAR
G3800LF	1"	1 1/4"	3	20	20	25	30	33	35	38	43	50	56	GPM
			11	76	76	95	114	125	132	144	163	189	212	L/MIN
G3850LF	1 1/4"	1 1/4"	3	20	20	25	30	33	35	38	43	50	56	GPM
			11	76	76	95	114	125	132	144	163	189	212	L/MIN
MAXIMUM FLOW CAPACITY														

**CAUTION: ALL THERMOSTATIC MIXING VALVES HAVE LIMITATIONS. THEY WILL NOT PROVIDE THE DESIRED ACCURACY OUTSIDE OF THEIR FLOW CAPACITY RANGE. CONSULT THE CAPACITY CHART AND DO NOT OVERRSIZE. MINIMUM FLOW MUST BE NO LESS THAN SHOWN ABOVE.**

**IMPORTANT: THESE SYSTEMS ARE DESIGNED TO PROVIDE MIXED WATER FROM 60 TO 90°F (15 TO 32°C) FOR EMERGENCY EQUIPMENT APPLICATIONS ONLY IN ACCORDANCE WITH ASSE 1071.**

## Limited Warranty

Guardian Equipment warrants the original purchaser that its products will be free from defects in materials and workmanship under normal usage conditions, and when properly installed and maintained according to manufacturer's instructions for a period of two years from date of shipment. During the warranty period, Guardian Equipment will (at its discretion) repair or replace any product or part thereof, which shall be returned, freight prepaid to Guardian's factory and determined by the manufacturer to be defective in materials or workmanship. There are no warranties, expressed or implied, which extend beyond verbiage contained herein. There are no implied warranties of merchantability or fitness for a particular purpose. Guardian Equipment will not be held liable for labor, incidental or consequential damages. Any alteration or improper installation or improper use of the product will void this limited warranty.

Note: This is a control system which must be cleaned and maintained regularly (see Maintenance Guide and Record card included with valve shipment).

## Technical Instructions

### Description ■

The Series e420 HydroGuard® T/P automatically mixes hot and cold water to deliver blended water within a specified range. Using an advanced thermal actuator, the Series e420 quickly compensates for temperature fluctuations induced by water temperature and pressure changes. In the event of cold water failure, the thermostatic motor virtually shuts off the flow of hot water.

Featuring heavy, cast-brass construction and integral checkstops, all parts of the e420 Series valve are accessible from the front of the valve and are corrosion resistant. The unit also features a metal to metal temperature limit stop, and all Series e420 valves open in the cold water position to ensure maximum bather safety and comfort.

The accuracy, reliability and water economy of the Series e420 HydroGuard® make it preferable for applications that require precise, consistent water control: showers, baths, hospital hydrotherapy and residential areas.

Many HydroGuard® Series e420 valves and shower systems can be selected to meet the Americans with Disabilities Act (ADA).

### Specifications ■

**Valve Construction:** Thermostatic mixing valve, with heavy cast bronze body, metal to metal temperature limit stop, integral checkstops and brass stem. Available with ADA-compliant lever handle.

Connections: ..... 1/2" NPT inlets/outlets  
..... 1/2" sweat inlets/outlets

Capacity ..... 5.0 gpm [19.0 L/min]\*  
..... ( $\pm 0.25$  gpm [0.90 L/min])

Checkstops ..... Integral to casting

Maximum Hot Water Supply Temperature ..... 190°F (88°C)

Minimum Hot Water Supply Temperature ..... 10°F (6°C) above set point

Maximum Operating Pressure ..... 125 psig (862 kPa)

#### Temperature Ranges

ASSE 1016 Type T/P ..... 90 - 110°F (32 - 43°C)

ASSE 1016 Type T ..... 65 - 115°F (18 - 46°C)

Temperature Limit Stop ..... Adjustable (factory set at  
110°F [43°C])

Maximum Static Pressure ..... 125 psig (862 kPa)

Minimum Flow: ..... 1 gpm (3.781 L/min)

Certification ..... CSA B125

Compliance ..... ASSE 1016 Type T/P

Shipping Weight ..... 5 lbs. (2.3 kg)

All HydroGuard® Series e420 thermostatic mixing valves meet above performance specifications based on typical operating conditions as stated in ASSE 1016 [45 psi pressure differential, hot water supply between 140°-180°F (60°-82°C), cold water supply less than 70°F (21°C)].

If your operating conditions vary from those stated in the standard, performance may vary as well. Consult your local sales representative or the Powers technical support department @ 1.800.669.5430, Press "2" to discuss your specific application. All Powers thermostatic mixing valves perform to the requirements of standards ASSE 1016 Type T/P and CSA B125.

### Operation ■

Hot and cold water enter respective ports in the valve and mix in a chamber containing an advanced thermal actuator (refer to cutaway view). This actuator senses and maintains the set point of the valve.

Rotating the adjustment handle repositions the shuttle in the cartridge assembly to produce the desired temperature. The mixed water passes over the shutoff disc



Advanced Thermal Activation

### WARNING

FAILURE TO COMPLY WITH PROPER INSTALLATION AND MAINTENANCE INSTRUCTIONS COULD CONTRIBUTE TO THE VALVE FAILURE, RESULTING IN INJURY AND/OR DEATH.

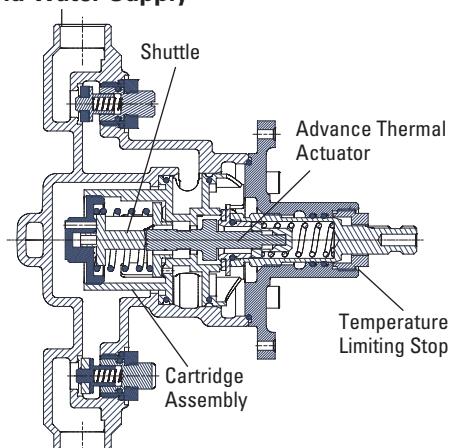
TO ENSURE THE ACCURATE AND RELIABLE OPERATION OF THIS PRODUCT, IT IS ESSENTIAL TO:

- Properly design the system to minimize pressure and temperature variations.
- Conduct an annual maintenance program to ensure proper operation of all critical components.
- Check outlet temperature to ensure it does not exceed 110°F (43°C). Make sure temperature limit stop is properly re-set to maximum 110°F (43°C) following valve maintenance or repair. Tampering with limit stop in any way may result in scalding temperature causing serious bodily harm and/or death.

### WARNING

Need for Periodic Inspection: Periodic inspection by a licensed contractor is recommended. Corrosive water conditions, and/or unauthorized adjustments or repair could render the valve ineffective for service intended. Regular checking and cleaning of the valve's internal components and check stops helps assure maximum life and proper product function. Frequency of cleaning and inspection depends upon local water conditions.

#### Cold Water Supply



#### Hot Water Supply

\* At 45 psi differential [310 kPa], with hot water supply between 140°-180°F [60°-82°C].

## Operation cont. ■

to the outlet. If the hot or cold supply water temperature or pressure changes, the thermal actuator will contract or expand. This movement repositions the shuttle to maintain the desired temperature. With the adjustment handle in full clockwise (OFF) position, the shutoff disc closes the mixing chamber from the outlet.

## Installation ■

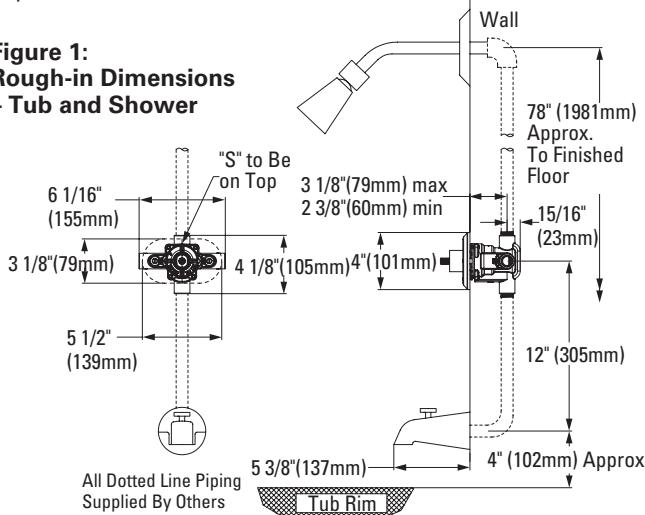
**NOTE:** Installation should be in accordance with accepted plumbing practices. Flush all piping thoroughly before installation. Failure to do so can result in a valve malfunction.

### TO INSTALL

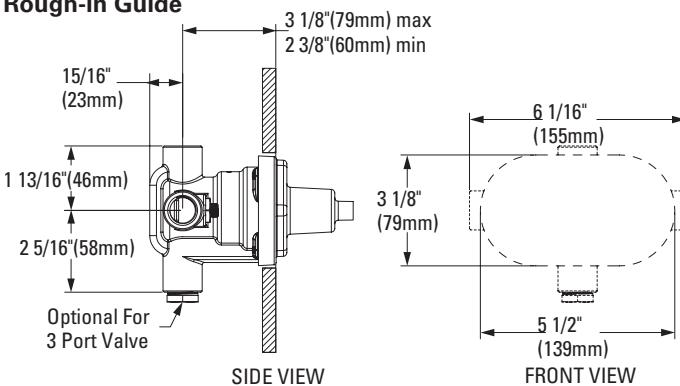
1. Position mixing valve  $2\frac{3}{4}'' \pm \frac{3}{8}''$  (69mm ± 10mm) from inlet center to finished wall surface. For reference a rough-in guide is provided, ensure it is pushed on fully and the valve is closed when positioning valve. The tub outlet port is marked "TUB" and should face down. Facing the front of the mixing valve, connect hot water to left side and connect cold water to right side. The mixing valve has "C" and "H" cast into the body near the appropriate ports. Inlets and outlet connections must be piped correctly for proper operation of valve. If hot and cold water connections are reversed, valve will not function properly.
2. **For tub and shower installations**, see Figure 1. Pipe bottom outlet port "TUB" directly to the diverter tub spout. The mixing valve is designed to operate without the use of a twin ell. Pipe top outlet port "S" to the showerhead.
3. **For shower only installation**, see Figure 2. Pipe top outlet port "S" directly to the showerhead and plug bottom port.

**CAUTION:** When soldering during the installation process, do not heat the valve any higher than the temperature required to flow solder. Excessive overheating of the valve may cause damage to the valve internals. By following this recommendation, you will be able to solder the valve without removing either the cartridge or the checkstops internals. If either brazing or resistance (electric) solder is used, all checkstop and valve internals must be removed.

**Figure 1:**  
**Rough-in Dimensions**  
— Tub and Shower



**Figure 3:**  
**Rough-in Guide**



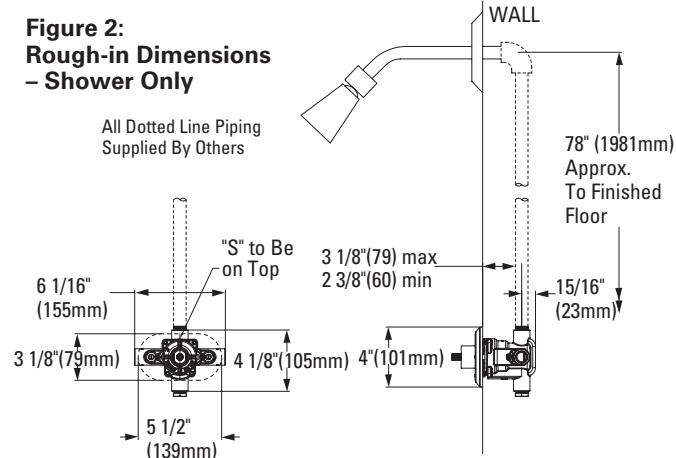
A temperature limit stop limits the movement of the control handle. The standard HydroGuard® e420 valve is factory set to deliver tempered water up to 110°F [43°C] with equal supply pressures, with hot water temperature 140°F [60°C], cold water temperature 60°F [15.6°C]

4. Turn hot and cold water supplies on and verify there are no leaks.

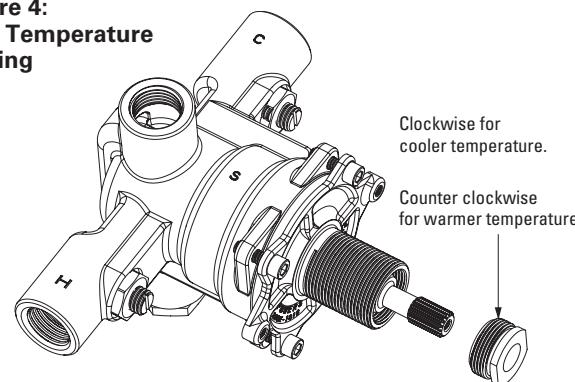
### 5. Rough-in guide installation

- a. Before strapping the pipes and before completing the finished wall, slide rough-in guide onto the mixing valve stem and press fit into place, see Figure 3. (valve stem must be rotated fully clockwise).
- b. The rough-in guide will insure the proper size opening and location of the finish wall.
6. After finished wall is completed, remove rough-in guide to allow installation of the trim.
7. Peel off backing of dial gasket and attached it to the inside top edge of dial plate. Make sure gasket is approximately 1/16" beyond the plate edge.
8. Hold plate firmly against the wall. Thread sleeve on the bonnet making sure that the cut away on the sleeve is towards you and is in the bottom position when tightened. Do not use any tool to tighten which will scratch the sleeve surface.
9. Install handle with the screw provided.
10. Maximum temperature setting adjustment (Figure 4) must be set on the job. The high temperature limit stop is threaded into the bonnet and is turned counter clockwise for an increased setting and clockwise for a decreased setting. Powers recommends a maximum setting of 110°F (43°C). To adjust temperature, rotate handle to the maximum desired outlet temperature, screw temperature limit stop until it touches stem's shoulder. Close valve and open it to verify setting.

**Figure 2:**  
**Rough-in Dimensions**  
— Shower Only



**Figure 4:**  
**Max Temperature**  
**Setting**



## Preventative Maintenance ■

**NOTE:** Before servicing checkstops or piping, always turn off the upstream water supply.

### EVERY 12 MONTHS:

Open up the checkstops and check for free movement of the poppet. To access the checkstops, remove the valve handle assembly and dial plate.  
Before servicing, turn off the water supply upstream.  
To close the checkstops, turn the adjustment screw fully clockwise on each checkstop.  
Remove the valve bonnet and rinse all grit and impurities from the internal components.  
Winterize valves that are used outdoors. Remove and store the internal components and drain all water from the valve.

### EVERY 3 MONTHS:

Every three months, check the maximum temperature setting (handle rotation setting).

### CALIFORNIA PROPOSITION 65 WARNING

**WARNING:** This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. (California law requires this warning to be given to customers in the State of California.)  
For more information: [www.watts.com/prop65](http://www.watts.com/prop65)

### ⚠️ WARNING

Always verify the maximum temperature setting of the valve when any changes are made to the safety program.

## Safety Guidelines - All Models ■

Adherence to these guidelines and recommendations promotes safe product use and ensures proper valve performance.

1. Thermostatic water mixing valves are control devices which must be cleaned and maintained on a regular basis. Powers specifies periodic maintenance at least once a year or immediately after any changes are made to the plumbing system. Annual cleaning and inspection is recommended, however, frequency of cleaning depends on quality of local water conditions. Refer to the Preventive Maintenance section for recommended cleaning procedure.
2. **WARNING:** To prevent injury to the user, it is important to periodically check the maximum temperature adjustment on the valve.

3. Quick closing valves may cause damage to the mixing valve by creating shock waves. When the HydroGuard® supplies tempered water to self-closing and/or solenoid valves, Powers recommends installing a shock absorber (Powers Part #460-353) on the discharge line, which will protect the HydroGuard® from damage.
4. Position the e420 valve as close as possible to outlet fixture to avoid waste of energy and water (except in applications where the valve is used as a primary mixing valve).

## Servicing ■

### To Disassemble:

1. Turn off hot & cold water supply-stops
2. Remove the handle and trim plate
3. Remove 4 bonnet screws and bonnet assembly
4. Remove all internal components from valve body
5. At this point you should have an empty valve body.

**WARNING:** After completing any maintenance/repairs, reset the high temperature limit stop.

### To Reassemble:

1. Ensure the inside of the valve body is free of deposits and debris. Clean as necessary.
2. Push the cartridge into the body without the "O" rings installed. The cartridge should slide in easily, and bottom out with its large fins just inside the front surface of the casting. If the cartridge is difficult to install, or does not go in all the way, remove the cartridge and clean the body or remove any obstructions. Repeat this step until the cartridge installs easily.
3. Remove the cartridge and install the 2 "O" rings. Lubricate the "O" rings with silicon lubricant.
4. Install the cartridge back into the body. The cartridge should go in until the large fins are just inside the front surface of the casting (same position as in step 2). If you cannot push it in all the way due to O-rings, use bonnet and two (2) screws to force in.

5. Place the wax element into the stem assembly, stem side first, and place this bonnet-stem-motor assembly into/onto the valve body. Rotate the bonnet assembly to line up the bonnet screw holes and reinstall and tighten the four bonnet screws.
6. With handle, rotate the stem assembly clockwise, until it bottoms out on the cartridge. At this point your valve is in the off position.
7. Turn the hot and cold water supplies back on and verify there is no leakage.
8. Verify proper operation by rotating the stem from the off position, counterclockwise, to the high temperature position. Verify the temperature does not exceed your desired maximum temperature. Rotate stem back to the off position.
9. Leave the adjusting stem in the full hot position to determine the high temperature limit stop is set properly. If not, rotate clockwise or counterclockwise, decrease or increase the high temperature limit stop respectively. Powers recommends a maximum setting of 110°F (43°C).
10. Install handle with the screw provided onto the stem and tighten in place. Ensure that the set screw lines up with the groove on the adjustment stem.

## Troubleshooting ■

*What to look for if:*

### The maximum temperature cannot be obtained...

- Lime deposits may have accumulated in the hot water pipes, restricting the hot water supply.
- The hot water supply temperature may be too low.
- The temperature limit stop setting may be too low. Remove valve handle, and readjust the temperature limit stop.

### Flow of water is less than desired...

- The upstream supply valves may not be fully open.
- The inlet supply pressure(s) may be low.
- Lime deposits may have accumulated in cartridge, restricting water flow.
- The showerhead may be clogged. Remove and clean.
- The checkstops may be clogged. Clean check stops.

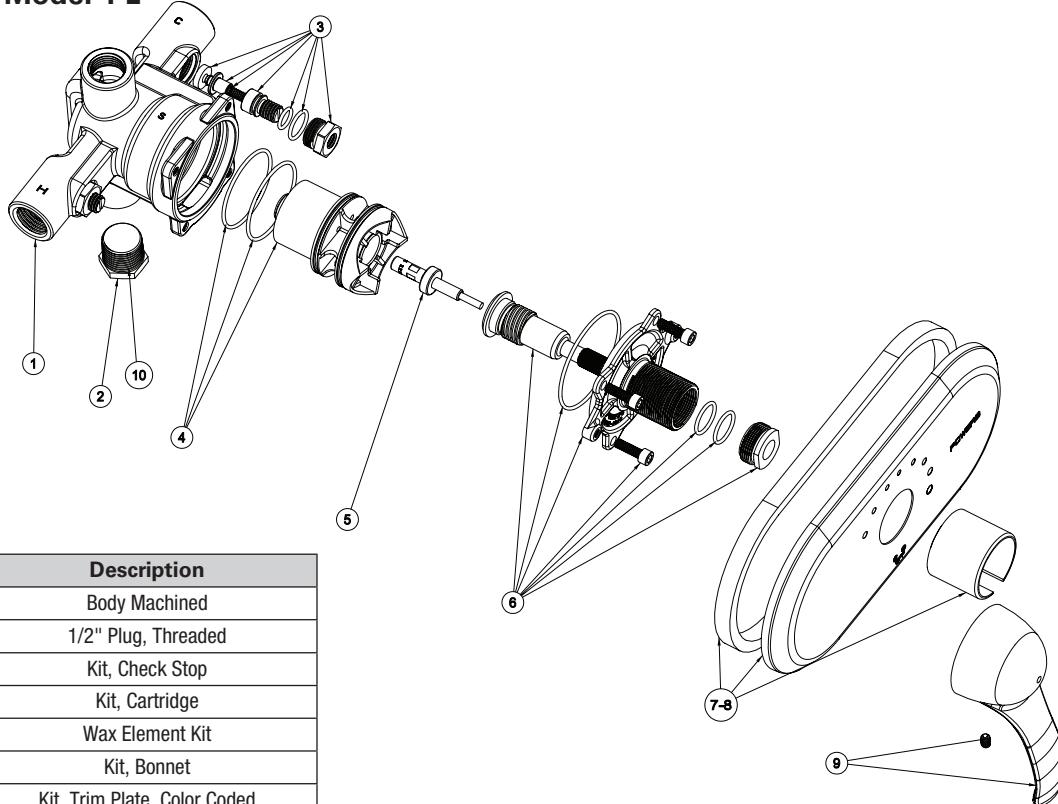
### The valve opens with hot water flow rather than cold water flow...

- The inlet water supplies are connected to the wrong ports. Remove the valve and reinstall.

### Flow of water is completely shut off...

- The upstream supply valves may be completely closed.
- The hot or cold water supply pressure may have failed. The HydroGuard® 420 valve is designed to reduce the flow of water upon either supply failure.
- The checkstops may be closed. Access the checkstops and open by turning the adjustment screw fully counterclockwise.

## Parts List - E420 Model 1 ■



Index	Part #	Description
1	N/A	Body Machined
2	200 046	1/2" Plug, Threaded
3	900 050	Kit, Check Stop
4	420 452	Kit, Cartridge
5	420 453	Wax Element Kit
6	420 457	Kit, Bonnet
7	420 046	Kit, Trim Plate, Color Coded
8	420 047	Kit, Trim Plate, Etched
9	420 049	Handle Kit, Dome
10	473 024	1/2" Plug, Sweat

**ATTENTION INSTALLER:** After installation, please leave this Instruction Sheet for occupant's information.  
**IMPORTANT:** Inquire with governing authorities for local installation requirements.

## Warranty ■

The Seller warrants that the equipment manufactured by it and covered by this order or contract is free from defects in material and workmanship and, without charge, equipment found to be defective in material or workmanship will be repaired, or at Seller's option replaced F.O.B. original point of shipment, if written notice of failure is received by Seller within one (1) year after date of shipment (unless specifically noted elsewhere), provided said equipment has been properly installed, operated in accordance with the Seller's instructions, and provided such defects are not due to abuse or decomposition by chemical or galvanic action. THIS EXPRESS WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, GUARANTEES, OR REPRESENTATIONS, EXPRESS OR IMPLIED. THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE. The Seller assumes no responsibility for repairs made on the Seller's equipment unless done by the Seller's authorized personnel, or by written authority from the Seller. The Seller makes no guarantee with respect to material not manufactured by it.

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A Watts Water Technologies Company

IS-P-e420 1045

EDP# 6511214

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