ARMSTRONG

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INSTALLATION AND OPERATING INSTRUCTIONS

Astro Express - Hot Water Delivery System

TYPICAL APPLICATIONS

The Armstrong Astro Express hot water delivery system ensures that you have hot water at the tap when you need it, while helping you to conserve water. It's easy to install, and does not require special return piping to the water heater.

Equipped with a high performance circulator and adjustable flowrate injection valve, the Astro Express system is a "one-size-fits-all" solution for virtually any residential installation. The Astro Express is the ideal solution for existing home retrofit where recirculation system return line installation is impractical, or new home construction where dedicated hot water return line installation is cost prohibitive.

HOW IT WORKS

Armstrong Astro Express hot water delivery systems consist of a circulator for water heater mounting, and a valve for under-sink mounting. In operation, the timer activated circulator creates differential pressure across the Astro Express valve. When the water at the hot water faucet cools below the Astro Express valve low temperature setpoint, the valve opens, allowing the cooled water to be injected into the cold water line. When the water reaches the valve high temperature setpoint, the valve closes. The valve is equipped with a pressure independent flowrate adjustment to maintain the desired temperature balance. Additionally, the valve is equipped with a check valve to prevent cold water backflow when the hot water faucet is opened.

INSTALLATION

WARNING:

- Installation should only be completed by qualified personnel, in accordance with all applicable codes, and following generally accepted installation practices.
- Ensure the hot and cold water supply is turned off before installation, to avoid personal injury or damage to property.
- Read and understand these instructions thoroughly before beginning the installation.

CAUTION:

Prior to installation flush all piping of any foreign material to prevent pump blockage and preventable damage.

PROCEDURE

1. To mount the Astro Express circulator:
   a) Disconnect the hot water distribution pipe from the water heater outlet.
   b) Connect the Astro Express circulator inlet to the water heater outlet nipple.
   c) Connect the distribution pipe to the circulator outlet.

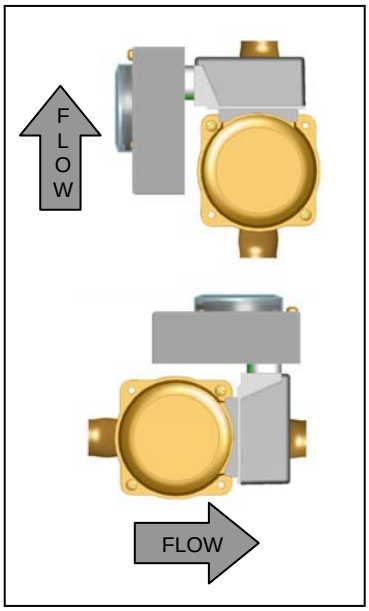
2. Ensure the following conditions are met:
   a) The circulator shaft is horizontal.
   b) The clock/timer face is accessible for viewing and adjustment.
   c) The direction of water flow matches the arrow on the circulator casing.
   d) The piping is sufficiently rigid to support the system in operation.
   e) Neither the clock/timer nor black terminal box is under the circulator.

3. If the arrow on the circulator casing is not pointing away from the hot water heater, see **ROTATING THE CIRCULATOR CASING.**

4. To mount the Astro Express valve:
   a) Select the faucet to be controlled, typically the furthest faucet from the hot water heater. (For multi-branch hot water piping runs, a valve may be required on each branch for maximum effectiveness.)
   b) Disconnect the hot and cold supply pipes from the faucet.
   c) Connect the hot and cold water supply to the Astro Express valve 1/2" threaded inlets. (Stainless steel flex hose recommended.)
   d) Connect the hot and cold Astro Express valve 3/8" threaded outlets to the faucet. (Stainless steel flex hose recommended.)
   e) Secure the valve to the wall under the sink, using the plastic wall anchor and screw.

5. Check the installation for leaks:
   a) Ensure the faucet is closed.
   b) Open the hot and cold water supply valves.
   c) Open the faucet hot and cold taps to purge all air from the system. Close the faucet.
   d) Inspect the circulator and valve connections for leakage. If a leak exists, close hot and cold supply valves until leaks are corrected.

6. To connect power to the circulator:
   a) Verify that the timer's manual over-ride switch is in the "OFF" position.
   b) Plug the power cord into a standard 115 Vac household electrical receptacle.
   c) To perform and initial system test, see **OPERATION.**



ROTATING THE CIRCULATOR CASING

Prior to connecting the system to the hot water piping, if alternate orientation of either the circulator discharge or clock timer is required, proceed as follows:

1. Remove the two hex socket head screws that hold the casing to the circulator.
2. Gently pull the casing from the circulator body, taking care not to damage the gasket or impeller.
3. Rotate the casing as required to meet circulator discharge and clock timer orientation requirements.
4. Tighten the two hex socket head screws evenly; ensuring the gasket seals the mating surfaces.
5. To verify the circulator shaft still spins freely:
   a) Remove the brass plug from the end of circulator with a slotted screwdriver.
   b) Insert the screwdriver in the slot in the end of the shaft.
   c) Ensure the shaft turns freely and smoothly in both directions.
   d) Replace the brass plug and gently tighten.

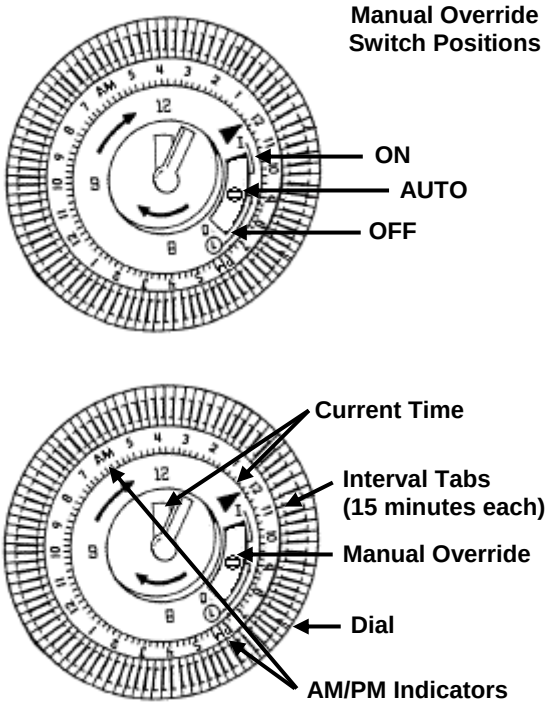
OPERATION

CAUTION: Never operate the system “dry” or permanent damage may occur to the circulator. Never shut off the water supply or restrict flow in any way while the circulator is operating.

1. Verify water is present at the circulator.
2. Verify the power cord is plugged into an appropriate household electrical receptacle.
3. To continuously run the circulator or test for initial operation, set the manual override switch to the “ON” position and verify the circulator operates smoothly and quietly.
4. To prevent circulator operation, such as for extended periods that the residence will be vacated, set the manual over ride switch to the “OFF” position.
5. For normal automatic operation, set the clock/timer as required and move the manual override switch to the “AUTO” position.

SETTING THE CLOCK/TIMER

1. Rotate the dial in a clockwise direction until both the time shown, and the appropriate AM or PM indicator, correspond to the current time of day. (This adjustment is required for initial operation, following a power interruption, to adjust for daylight savings time, or for periodic time correction.)
2. Remove the clear plastic cover from the dial.
3. The outer ring of the dial has an adjustable tab for each 15 minute time interval of a 24 hour day. To enable circulator operation for a specific time interval, slide the corresponding interval tab toward the perimeter of the dial. All tabs positioned toward the center of the dial disable circulator operation for those time intervals.
4. Verify the manual override switch is in the “AUTO” position.
5. Replace the clear plastic cover on the dial.



For maximum energy savings, set the timer to:

a) Activate the circulator at least ½ hour before initial hot water demand for the day is anticipated.
b) Deactivate the circulator when the anticipated hot water demand for the day ends.

SETTING THE VALVE

The Astro Express valve is factory set to suit most applications. The valve may be easily adjusted to suit application conditions and personal preferences.

1. To increase the water temperature at the hot-water tap, turn the flowrate adjustment counter clock-wise one or two increments.
2. To decrease the water temperature at the cold-water tap, turn the flowrate adjustment clock-wise one or two increments.
3. To completely stop flow through the valve, turn the valve completely closed by turning the flowrate adjustment fully clockwise.

If necessary to achieve the desired water temperature control, set the circulator timer to cycle the circulator on/off during the anticipated hot water demand period, in combination with valve adjustment.

Allow ample time (at least several hours) after valve or timer adjustment, for the system temperature to stabilize, prior to evaluating the result of the adjustment.

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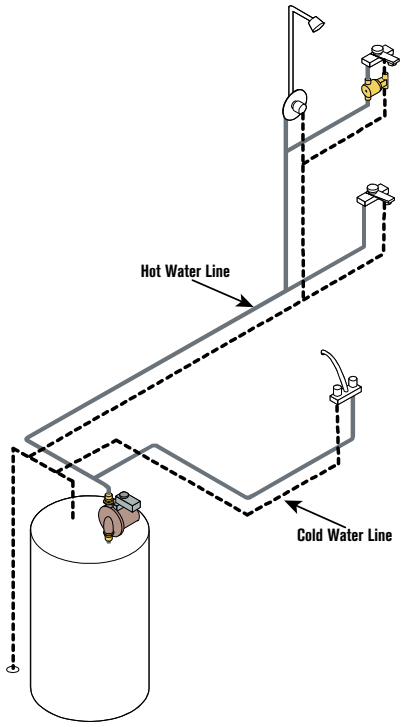
TECHNICAL DATA

ASTRO EXPRESS CIRCULATOR	
Power Requirements	120 Vac, 60 Hz, 1/25 hp, 0.5 A max.
Power Connection	5.0 ft (1.5 m) power cord, molded duplex plug with ground
maEnvironment	Indoor use only
Max. Head	5.8 ft (1.7 m)
Max. Flow	11.5 GPM (0.73 L/s)
Max. Working Pressure	140 psi (965 kPa)
Ambient Temperature	-40°F to 180°F (-40°C to 82°C)
Max. Water Temperature	230°F (110°C)
Clock Timer	12-hour analog clock with AM/PM indication
Timer Settings	Individual toggles for each 15 minute interval over 24 hours
Manual Override	3 position slide switch, on/off/auto
Pump Casing	Cast bronze with 1-1/4" NPSM union threads
Impeller	Glass filled polypropylene
Shaft	Stainless steel
Bearings / Seal	Graphite / EPDM
Union Tailpieces	Brass, 3/4" FPT (two) and 3/4" MPT (one)
Union Gaskets	EPDM (two)
Approvals	c UL us listed

ASTRO EXPRESS VALVE	
Housing	Forged brass with Noryl cap
Internal Components	Stainless steel and plastic with EPDM o-rings
Connections	Threaded, 1/2" hot & cold inlets, 3/8" hot & cold outlets
Environment	Indoor use only
Flowrate Adjustment	0 – 100%, multi-turn slotted screw
Max. Working Pressure	125 psi (862 kPa)
Max. Water Temperature	150°F (66°C)
Mounting	Plastic wall anchor with screw



REPLACEMENT PARTS

Part Description	Item Number
Astro 20 BU-T	110123-244
3/4" FPT Union Hardware Kit	810120-224
3/4" MPT Union Tailpiece	810120-246
24-Hour Timer	110123-130
Timer Cover	110123-031
Astro Express Valve	561100-001

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