

# Instruction Sheet

## Hot-LinkPlus-e™

ECM High-Efficiency Hot Water Recirculation System

U.S. Patent # 8.594.853

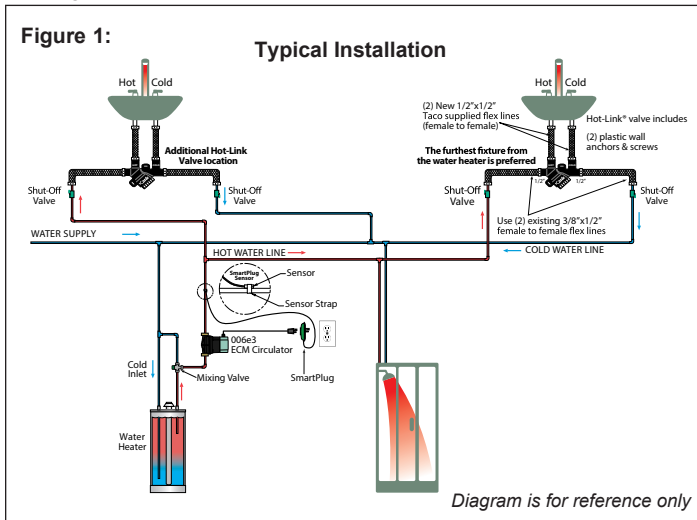
SUPERSEDES: NEW

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Plant ID# 001-5007

### Application:

The Taco **Hot-LinkPlus-e™ System** for Domestic Hot Water recirculation ensures instant hot water comfort at showers and faucets. It saves thousands of gallons of water per year by supplying fresh hot water to the fixtures while returning the “cooled” hot water back to the water heater through the cold water line. The average family can achieve yearly savings of up to 12,000 gallons of water normally wasted down the drain while waiting for hot water.



### High Quality Features:

The **Hot-LinkPlus-e System** includes a high-efficiency Taco multi-speed 006e3 ECM permanent magnet circulator. The circulator is suitable for most residential homes with hot water supply lines up to 100 feet.

**SmartPlug Instant Hot Water Control®** learns weekly hot water usage patterns in the home. It uses that information to run the circulator providing hot water when its needed.

The unique **Hot-Link® Valve** is the key to the system. Made of durable high temperature polymer, it creates an easy-to-install return loop through the cold line from the furthest fixture back to the water heater. An integral thermal sensor disc closes when hot water reaches the valve. An internal flow check prevents cold water from backing into the hot water line. Stainless steel braided flex hoses complete the installation.

### Installing the Hot-LinkPlus-e 006e3 System Circulator:



**WARNING:** All local plumbing and electrical codes should be followed when installing this product.

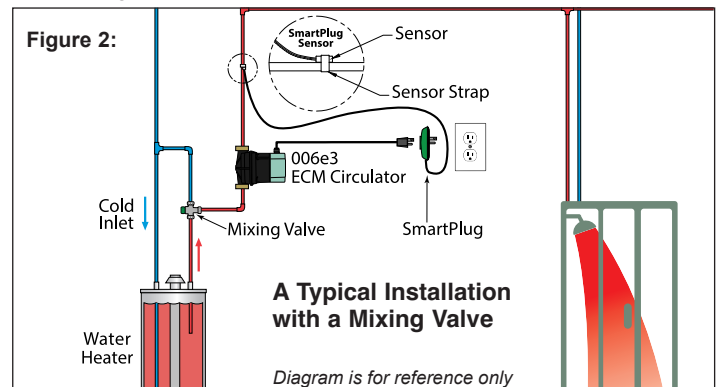
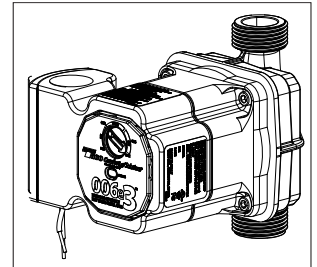


**CAUTION:** To ensure all plumbing system components are protected from the damaging effects of water hammer, be sure an approved water hammer arrestor is installed in the system per locally recognized National plumbing codes.



**WARNING:** Circulator must be installed on and supported by the circulation piping.

1. Follow all local plumbing and electrical codes when installing the **Hot-LinkPlus-e System**.
2. Shut off the cold water supply valve to water heater.
3. Open a hot water faucet in the house to drain the hot water line.
4. Open the water heater drain valve located at the bottom of tank to drain remaining hot water from the lines. It is not necessary to drain the entire tank.
5. Disconnect the hot water supply line at water heater outlet nipple.
6. Install the 3/4" female tailpiece and union adapter provided to the water heater outlet.
7. Install the 3/4" male tailpiece and union adapter to the pump outlet connection. Be sure flow arrow located on the pump casing is in the proper direction.



8. Install the **Hot-LinkPlus-e** 006e3 circulator by connecting to the union nut/tailpiece attached to the water heater outlet. Circulator motor must be in the horizontal position. To set the circulator speed turn the dial to the 006 performance point.

**NOTE:** If flow velocity noise develops at the 006 setting turn dial counter-clockwise to reduce pump speed until noise disappears.



**CAUTION:** Do not run circulator dry. Permanent damage may result and will void warranty.

9. Reconnect the hot water supply line to the union tail-piece attached to the circulator discharge.
10. Open the supply valve to water heater. Let water run until all air is purged from lines. Check for any leaks. If leaks are detected, close supply valve and tighten all connections.
11. Shut off open hot water faucet.



Figure 3:



Hot-Link Valve

Figure 4:



Hot-Link Valve removable cartridge for service

### Installing the Hot-LinkPlus-e Hot-Link Valve:

1. Select the hot water faucet furthest from the water heater. If your plumbing system branches in two different directions, another **Hot-Link Valve** may need to be installed at the end of each run (see Figure 1 on page 1).



**CAUTION:** Do not use pipe dope or Teflon tape on the valve body threads.



**CAUTION:** Use caution when attaching flex hoses to the Hot-Link Valve to prevent cross-threading or stripping of the threads.

2. Shut off the hot and cold angle stop valves below the sink.
3. Open the hot and cold faucets to purge water from the lines.
4. Disconnect the hot and cold flex hoses from the 1/2" faucet connections beneath the sink and reconnect them to the respective hot and cold inlet ports on the **Hot-Link Valve**. Locate the flow arrows on the side of the valve to verify flow direction.
5. Install the 1/2" x 1/2" flex hoses provided. Connect one hose to the hot outlet of the valve and the hot water connection on the faucet (left side). Connect the second flex hose to the cold outlet of the valve and the cold water connection on the faucet (right side). See Figure 5 below.
6. When all connections are made, open angle stop valves and check for leaks.
7. Attach the **Hot-Link Valve** to the wall using anchor screws provided.

**NOTE:** The Hot-Link Valve can be disassembled for service and cleaning. Repeat steps number 2 and 3. Unthread the valve stem from the body and clean internal screen of debris (see Figures 3 & 4 above). Reattach valve stem securely to prevent leaks. Open angle stop valves and check for leaks.

### Installing the Hot-LinkPlus-e SmartPlug Instant Hot Water Control®:

#### Application:

Taco's Hot-LinkPlus-e SmartPlug Instant Hot Water Control is designed to upgrade any hot water recirculation system. SmartPlug replaces inefficient timers and aquastats typically used in recirculation systems. It adds intelligence to your system by learning when hot water is used in the home. The pipe-mounted sensor records daily hot water usage patterns during the course of the week. Recorded data is used to automatically run the 006e3 at the same times the following week. So hot water is always available when it is needed. If usage pattern changes, the SmartPlug adjusts automatically.

#### Benefits:

**Easy to Install:** Upgrades the Hot-LinkPlus-e 006e3 circulator to "Smart" operation.

**Comfort and Convenience:** Hot water is available in seconds. No timers or programming required.

**Efficiency:** "Smart" mode maximizes hot water comfort and energy savings.

**Reliability:** The SmartPlug, when combined with the 006e3 circulator, provides whisper quiet operation and industry leading electronics for proven performance and dependability.

#### SmartPlug Control Options/Features:

**"Smart" Mode:** When set to Smart mode, the SmartPlug will run in Pulse mode as described below for the first 7 days of operation. During the first 7 days, the SmartPlug monitors and records the home's hot water usage pattern. For the following 7 days, the SmartPlug will use the preceding week's usage pattern to cycle the 006e3 during the recorded hot water usage times. This process of recording and repeating is continuous, and automatically adjusts the 006e3 ON times to match the household's usage pattern.

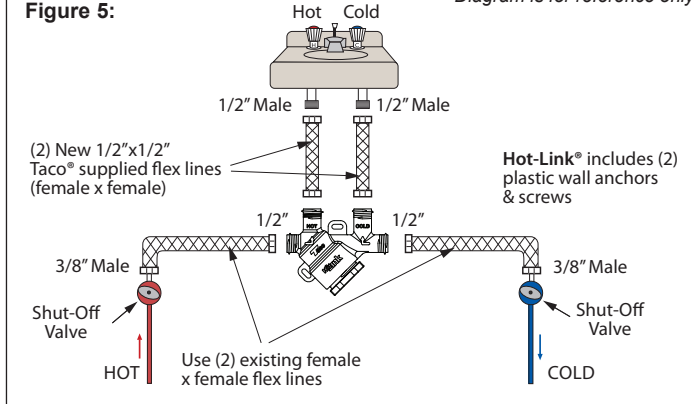
**"Pulse" Mode:** When set to Pulse mode, the SmartPlug will cycle the 006e3 ON for 5 minutes, then OFF for 10 minutes to maintain hot water at all faucets and taps. It will repeat the cycle continuously.

**Vacation Mode:** After 36 hours of no hot water usage, the SmartPlug will automatically turn the 006e3 OFF, and will automatically restart when hot water usage is detected.

**Exercise Function:** While in vacation mode, the SmartPlug will cycle the 006e3 ON for 10 seconds every 7 days to prevent corrosion or scale buildup.

Figure 5:

Diagram is for reference only



**Hot-LinkPlus-e SmartPlug Installation:**

1. The Hot-LinkPlus-e SmartPlug control is designed for use with Taco's Hot-LinkPlus-e 006e3 ECM High-Efficiency circulator.
2. Using the black sensor strap provided, attach the SmartPlug sensor to the HOT water supply pipe from the hot water heater. **USE EXTREME CAUTION WHEN INSTALLING THE TEMPERATURE SENSOR ON THE HOT WATER SUPPLY PIPE AS PIPE TEMPERATURE MAY BE EXTREMELY HOT.** The sensor must be strapped at least 18" away from the hot water source to ensure proper sensor temperature readings. The "flat" side of the sensor should be strapped directly to the hot water supply pipe using the black sensor strap provided. If the supply pipe is insulated it will be necessary to remove the insulation at the point where the sensor is installed to ensure accurate sensor readings.

**SmartPlug Specifications**

<b>Input:</b>	120VAC, 50/60HZ, single phase, 6A.
<b>Output:</b>	120VAC, 50/60HZ, single phase, 1/2 hp (limited to 6 FLA, 36LRA).
<b>Sensor:</b>	NTC Thermistor, 10K ohm @ 77°F, B= 3392.
<b>Fuse:</b>	125V, 6A, Medium Acting 5x20 mm glass, Littelfuse® p/n 0233006 mxp.
<b>Operating Ambient Temp:</b>	50-104°F, 10-40°C.

**FCC STATEMENT:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

3. Install the SmartPlug temperature sensor. Connect the 2 wire leads on the temperature sensor to the green sensor connector terminal block by loosening the 2 set screws. Insert the 2 wire leads from the temperature sensor into the terminal slots on the terminal connector and tighten the 2 set screws. Be careful not to over tighten screws as you may damage the terminal connector. Once the temperature sensor wires are securely fastened, insert the terminal block into the SmartPlug receptacle labeled "SENSOR". NOTE: The SmartPlug sensor is provided with a 10' lead wire. Some installations may require a sensor lead wire in excess of 10'. If the sensor lead length needs to be increased, standard "18 AWG" gage wire and 2 wire nuts can be spliced into the temperature sensor lead wires to extend the overall length.
4. Plug the SmartPlug into a properly grounded 120V wall outlet. All LED's will illuminate and a 10 second diagnostic check will begin.
5. Plug the 006e3 line cord into SmartPlug. The blue LED will illuminate on the face of the 006e3. NOTE: The 006e3 is double-insulated, so does not need to be grounded.



**Setting the Hot-LinkPlus-e SmartPlug Operating Mode:**

1. The Hot-LinkPlus-e SmartPlug has a MODE SELECT push button on the bottom of the control that allows for 2 operating modes. "Smart" or "Pulse" mode can be selected by pressing the MODE SELECT button located on the lower right side of the control box. To set the mode, make sure the SmartPlug is plugged into a properly grounded 120V outlet. A yellow LED labeled "MODE" on the face of the SmartPlug identifies the mode selected.
  - “Smart” Mode: Solid Yellow LED
  - “Pulse” Mode: Blinking Yellow LED
 Press and release the MODE SELECT button once to change the mode.
2. The SmartPlug is also provided with a red "SENSOR" LED. If the sensor is properly installed the “SENSOR” LED will not illuminate. If the red LED is flashing, refer to the troubleshooting section on page 4.
3. Installation and mode selection are complete.
4. To ensure the SmartPlug is providing hot water properly, open a hot water tap at the fixture furthest away from the hot water tank. Use CAUTION as the water may be extremely hot.

- WARNING: For indoor use only.**
- WARNING: All local plumbing and electrical codes should be followed when installing this product.**
- WARNING: Risk of electrical shock. This product is supplied with a grounding conductor and grounding-type attachment plug. To reduce the risk of shock, be certain that it is connected only to a properly grounded grounding-type receptacle.**

## Hot-LinkPlus-e Trouble Shooting

SYMPTOM	POSSIBLE CAUSE	SERVICE TIP
No Hot Water	Clogged filter screen	<ul style="list-style-type: none"> <li>• Close angle stop valves beneath sink.</li> <li>• Open hot and cold faucets to drain line of pressure.</li> <li>• Remove valve stem, thoroughly clean screen, replace, open angle stop valves and check operation.</li> </ul>
	006e3 installed incorrectly	<ul style="list-style-type: none"> <li>• Check to see if flow arrow on pump casing is in correct direction.</li> </ul>
	006e3 not running	<ul style="list-style-type: none"> <li>• Ensure power cord is firmly plugged into SmartPlug and SmartPlug is properly plugged into electrical outlet.</li> <li>• Check to ensure temperature sensor is installed correctly.</li> <li>• Check to ensure blue LED on pump is on.</li> <li>• If LED is red, rotor may be blocked. Cycle power off/on to activate <b>SureStart®</b> mode to unblock rotor.</li> </ul>
	SmartPlug SENSOR error	<ul style="list-style-type: none"> <li>• Red SENSOR LED blinking once every 5 seconds = sensor shorted. Use sensor replacement kit 194-3726.</li> <li>• Red SENSOR LED blinking twice every 5 seconds = bad sensor connection.</li> </ul>
	SmartPlug is in Vacation mode	<ul style="list-style-type: none"> <li>• Check to ensure the SmartPlug SENSOR lead is installed correctly on the hot water supply pipe. The sensor lead must be in direct contact with hot water supply pipe.</li> <li>• Sensor may be installed too close to the hot water tank and may need to be moved at least 18" from the hot water tank.</li> </ul>
	Blown fuse in SmartPlug	<ul style="list-style-type: none"> <li>• Red SENSOR LED blinking 3 times every 5 seconds - Unplug SmartPlug and replace 6A, 125V fuse. Contact TacoTech Service for part #.</li> </ul>
	Hoses connected incorrectly	<ul style="list-style-type: none"> <li>• Check to see if flex hoses are connected to proper Hot/Cold ports on valve.</li> </ul>
Abundance of Hot Water in Cold Line  Note: It is normal for some warm water to be in cold line during recirculation cycle.	If unable to flush the hot water from the cold line by running the cold faucet, it may indicate that the valve is damaged.	<ul style="list-style-type: none"> <li>• Replace valve.</li> </ul>
Water is too Hot	<b>Hot-LinkPlus-e</b> system has improved delivery of hot water.	<ul style="list-style-type: none"> <li>• Install mixing valve on water heater outlet. See piping schematic on page 1.</li> </ul>

## LIMITED WARRANTY STATEMENT

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

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

Any Taco product or part not installed or operated in conformity with Taco instructions or which has been subject to misuse, misapplication, the addition of petroleum-based fluids or certain chemi-

cal additives to the systems, or other abuse, will not be covered by this warranty.

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

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

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

**FORTH IN THE FIRST PARAGRAPH ABOVE.**

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

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

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

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