102-550

Instruction Sheet

SmartPlus-e™

ECM High-Efficiency Hot Water Recirculation System

U.S. Patent # 8,594,853

SUPERSEDES: NEW

EFFECTIVE: February 27, 2018

Plant ID# 001-5008

APPLICATION:

The Taco SmartPlus-e™ consists of a 006e3™ ECM high-efficiency circulator combined with our SmartPlug Instant Hot Water Control®. The SmartPlus-e is designed to increase hot water comfort while conserving water and energy. By recirculating "cooled" hot water back to the water heater, the wait for hot water is reduced to seconds. A dedicated hot water recirculation line within the piping system is required.

HIGH QUALITY FEATURES:

The **SmartPlus-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 300 feet.

SmartPlug Instant Hot Water Control learns weekly hot water usage patterns in the home. It uses that information to run the 006e3 providing hot water when its needed.

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.

CAUTION: Do not plug in the 006e3 circulator power cord until the system is filled with water and purged of air.

WARNING: The 006e3 circulator must be installed and supported by the circulation piping.

Installing the SmartPlus-e 006e3 Circulator:

Hot Water Return Line (Option No. 1)

1. Install the SmartPlus-e 006e3 circulator in-line on the DHW return line pumping toward the hot water source as shown in Figure 1. Be sure the directional arrow on the casing is installed with the arrow pointing toward the hot water source.

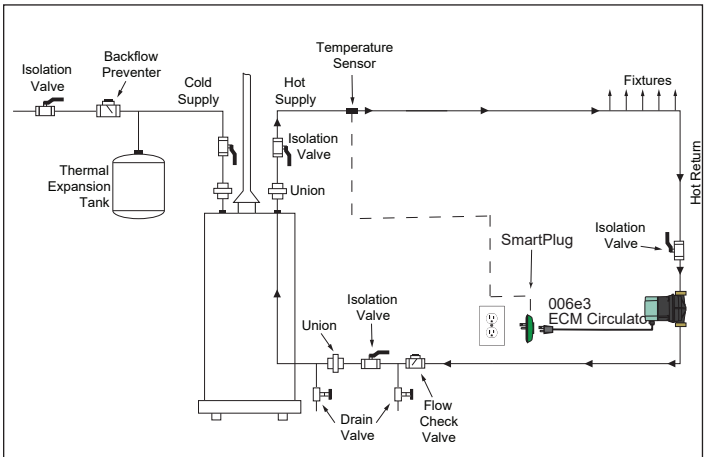

Figure 1: Installation Diagram (For reference only)

2. Install all other system components as shown in the piping diagram in Figure 1.
3. When all components are installed, fill system with water.
4. Close the isolation valve on the return line between the water heater and the flow check valve.
5. Open the drain valve between the isolation valve and flow check valve and drain water until all air is purged from the line.
6. Close drain valve and open isolation valve.

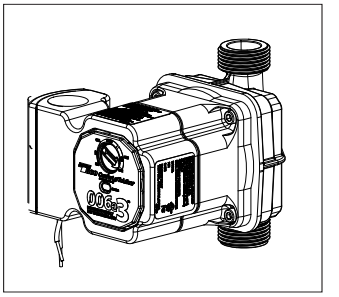

Figure 2

To change operating speed settings:

Modify the performance of the 006e3 as needed by rotating the programming dial using a flat screwdriver. A blue LED will illuminate when the circulator is powered on. The LED will flash each time mode is changed. The selection of the right performance curve depends on the characteristics of the system and the actual flow and head requirements. See 006e3 Performance Curves and Setting Selection Guide on page 3 to determine best speed setting for the system.
NOTE: If flow velocity noise develops, turn dial counter-clockwise to reduce pump speed until noise disappears.

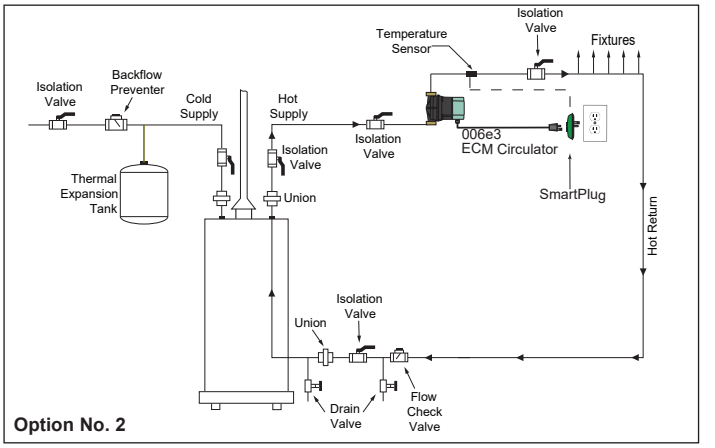

Figure 4: Installation Diagram (For reference only)

Hot Water Supply Line (Option No. 2)

1. Install the SmartPlus-e 006e3 circulator in-line on the DHW supply line as shown in Figure 4. Be sure the directional arrow on the casing is installed with the arrow pointing away from the hot water source.
2. Install all other system components as shown in the piping diagram in Figure 4.
3. Follow steps 3 through 6 listed under the **Hot Water Return Line (Option No. 1)** section.

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Installing the SmartPlus-e SmartPlug Instant Hot Water Control®

Application:

Taco's SmartPlus-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 awlays available when it is needed. If usage pattern changes, the SmartPlug adjusts automatically.

Benefits:

- **Easy to Install:** Upgrades the SmartPlus-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

SmartPlus-e SmartPlug Installation:

1. The SmartPlus-e SmartPlug is designed for use with Taco's SmartPlus-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 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.
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. LED's will illuminate and a 10 second diagnostic check will begin.
5. Plug the 006e3 circulator 120V line cord into the SmartPlug. The blue LED will illuminate on the face of the 006e3.
   NOTE: The 006e3 circulator is double insulated so does not need to be grounded.

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Setting the SmartPlus-e SmartPlug Operating Mode:

1. The SmartPlus-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 below.
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.

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 follow-ing 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.

Union Fitting Selection Guide

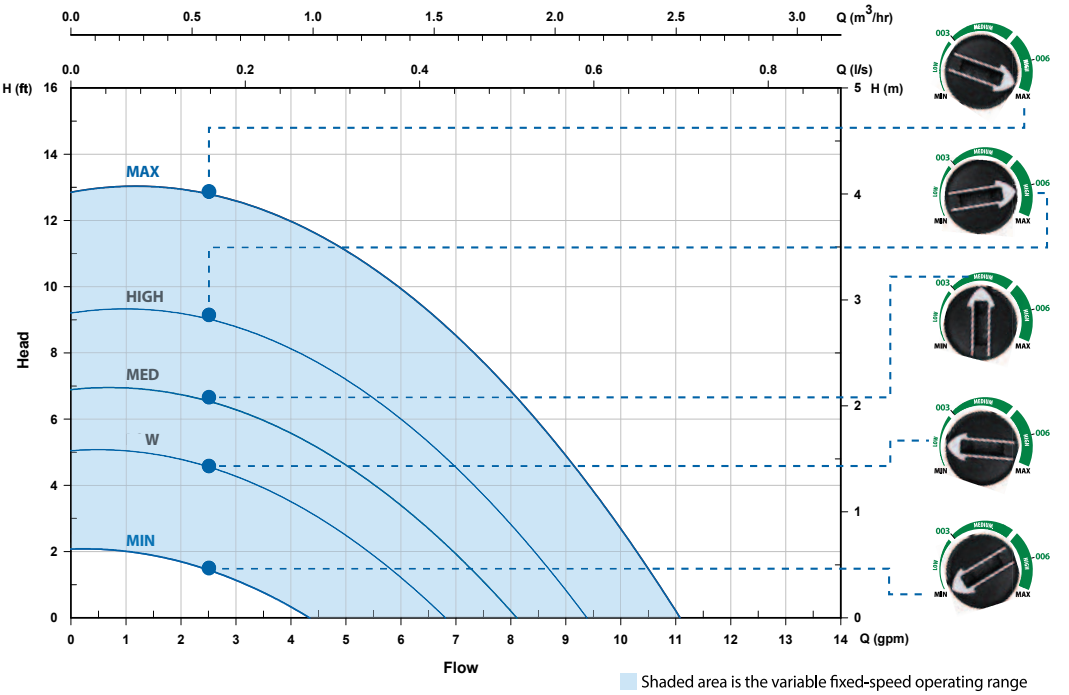
Description	Product Code
1/2" Union Sweat	UFS-050S
1/2" Union FNPT	UFS-050T
1/2" Union Press	UFS-050P
3/4" Union Sweat	UFS-075S
3/4" Union FNPT	UFS-075T
3/4" Union Press	UFS-075P
Fitting sets include (2) gaskets, (2) union nuts and (2) tail pieces.	

SmartPlug Specifications:

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

Setting Selection Guide	
Based on 3/4" supply, 1/2" return copper pipe of equal length	
High	500 ft pipe
Medium	350 ft pipe
Low	200 ft pipe or less
NOTE: Figures are for reference purposes only. Refer to ASTM guidelines for piping flow & velocity standards. For PEX, refer to pipe manufacturer guidelines.	

006e3™ PERFORMANCE CURVES



3 fixed speed settings (◺) (Low, Medium High) allows the installer to choose the speed and flow rate to precisely match system requirements. It also has infinitely variable speed settings between MIN/MAX to fine tune flows more precisely. Pre-marked 003/006 settings enable installers to set 006e3 to match standard 003 or 006 performance.

SmartPlus-e Trouble Shooting

SYMPTOM	POSSIBLE CAUSE	SERVICE TIP
No Hot Water	006e3 installed incorrectly	• Check to see if flow arrow on pump casing is in correct direction.
	006e3 not running	• Ensure power cord is firmly plugged into SmartPlug and SmartPlug is properly plugged into electrical outlet. • Check to ensure temperature sensor is installed correctly. • Check to ensure blue LED on pump is on. • If LED is red, rotor may be blocked. Cycle power off/on to activate ***SureStart***® mode to unblock rotor.
	SmartPlug SENSOR error	• Red SENSOR LED blinking once every 5 seconds = sensor shorted. Use sensor replacement kit 194-3726. • Red SENSOR LED blinking twice every 5 seconds = bad sensor connection.
	SmartPlug is in Vacation mode	• 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. • 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.
	Blown fuse in SmartPlug	• Red SENSOR LED blinking 3 times every 5 seconds - Unplug SmartPlug and replace 6A, 125V fuse. Contact TacoTech Service for part #.

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

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

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

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

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

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

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

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