



Domestic Hot Water Recirculation Systems

Application, Selection & Installation Guide



Domestic Hot Water Recirculation

The Problem: Waiting for Hot Water

It's a common problem: turn on the faucet or shower for hot water, then wait for it to arrive. In fact, the wait can be up to two minutes in larger homes with multiple bathrooms and long runs of pipe between the plumbing fixtures and the water heater! With a Taco Domestic Hot Water Recirculation System in place, there's no more wait. Instant hot water!



Waiting Means Wasting

Waiting for hot water sends millions of gallons of cooled water down the drain each year. In fact, an average family of four wastes up to 12,000 gallons of water each year waiting for hot water.* Water conservation is so important that many US states and municipalities routinely impose watering bans and offer rebate incentives to help conserve this natural resource.

*Source: Dept. of Energy study.

Energy Down The Drain

Of course, all that "waiting water" contains some heat energy (BTU's), even if it's only room temperature. Wasting those BTU's and starting over with fresh, cold water to heat up requires even more heat energy. So in addition to wasting water, millions of BTU's and energy dollars are wasted, too.

The Solution: Install a Taco Domestic Hot Water Recirculation (DHWR) Product

Provide your customers with the comfort and convenience of instant hot water without the waste. Taco DHWR circulators are designed to meet a variety of DHWR system types, and offer customers a variety of options to control hot water delivery to faucets and showers.

System Types & Products

Dedicated return line piping.

This system is provided with a dedicated return line installed between the end of the hot water supply pipe and the water heater. A circulator is installed in the piping loop to move the hot water from the tank through the supply pipe and back through the return pipe.

Taco provides three great options for this system:

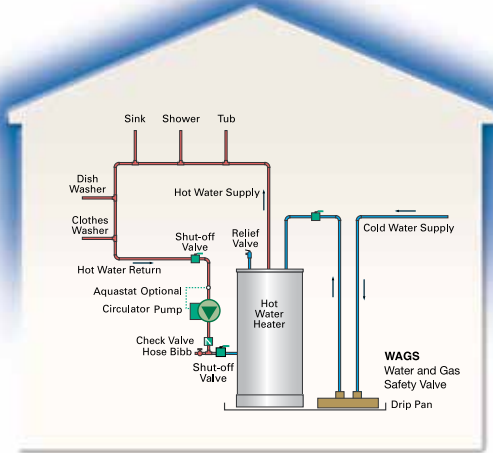
- Plumb N'Plug®
- SmartPlus™
- On Command™

Piping without a return line.

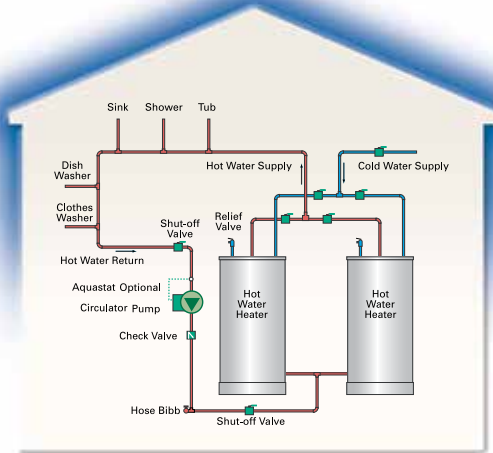
A domestic hot water system without a dedicated return line requires a "point of use" product that is typically installed at the fixture furthest from the hot water heater. The cold water supply pipe is used as the return line to the water heater. The new Taco On Command™ is a great choice for this application.

Typical Installation & Piping

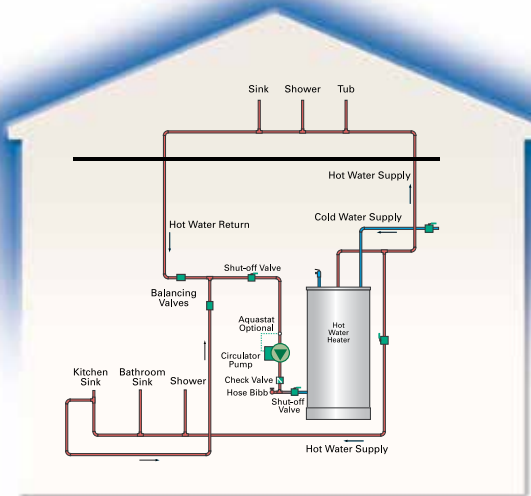
One-Story with 1 Water Heater



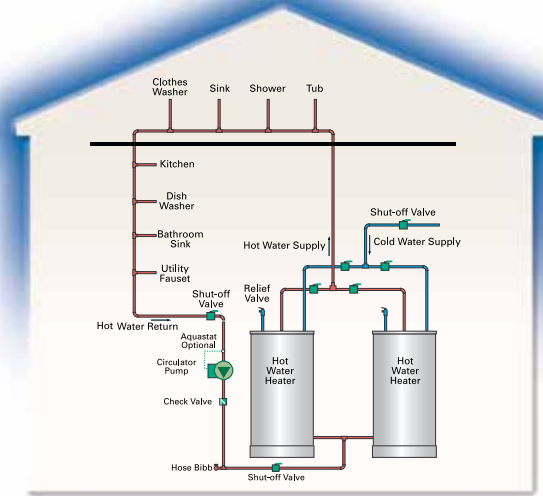
One-Story with 2 Water Heaters



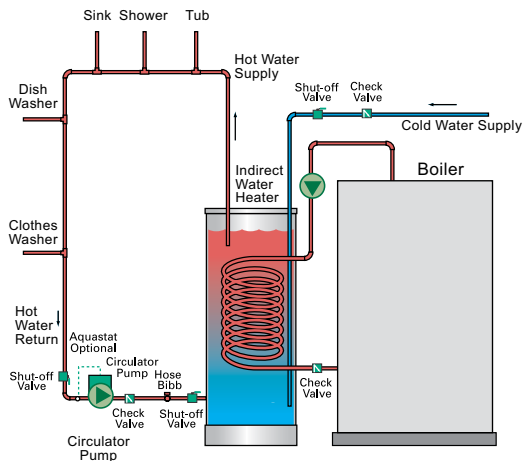
Multi-Story with 1 Water Heater



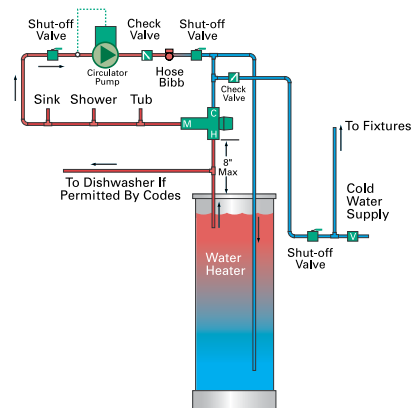
Multi-Story with 2 Water Heaters



Recirculation Piping with Indirect Water Heater

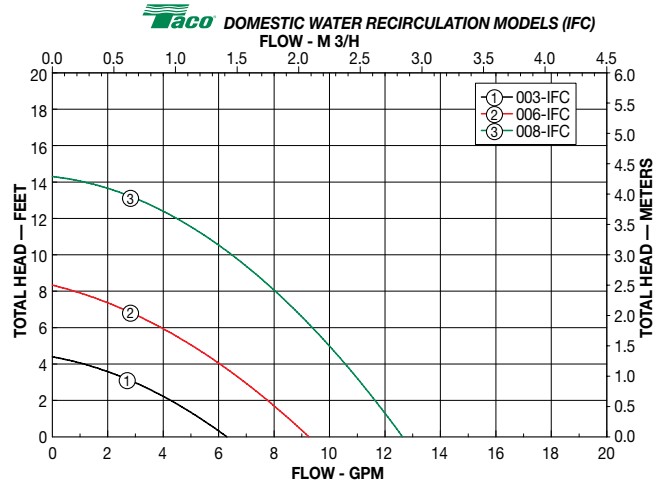
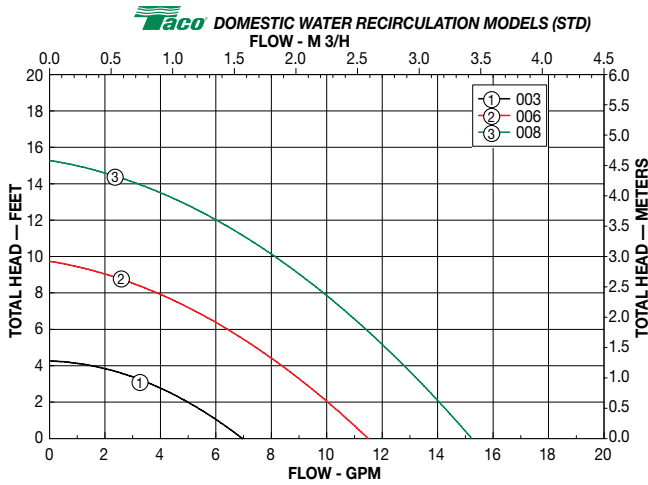


Recirculation Piping with Storage Water Heater & Mixing Valve



Choosing the Correct Circulator for the Job

Performance Field Information - 60 Hz



Pump Selection Charts

This information is provided as a guide only. Larger models are available. For larger systems, consult your local Taco representative. Find the table below that best describes the design you plan to use. Select the pump model based on the supply and return pipe length, size and pump options. Do not oversize the pump or high velocity noise and erosion corrosion of system piping may result.

1/2" Supply & 1/2" Return Lines

Model #	Supply Pipe Maximum Length (ft.)	Total Maximum Pipe Length (ft.)
003	50	100
006	150	300
008	275	550
003-IFC*	50	100
006-IFC*	125	250
008-IFC*	250	500

* With Integral Flow Check

3/4" Supply & 3/4" Return Lines

Model #	Supply Pipe Maximum Length (ft.)	Total Maximum Pipe Length (ft.)
003	350	700
006	900	1,800
008	1,450	2,900
003-IFC*	350	700
006-IFC*	750	1,500
008-IFC*	1,350	2,700

* With Integral Flow Check

3/4" Supply & 1/2" Return Lines

Model #	Supply Pipe Maximum Length (ft.)	Total Maximum Pipe Length (ft.)
003	100	200
006	275	550
008	450	900
003-IFC*	100	200
006-IFC*	275	550
008-IFC*	425	850

* With Integral Flow Check

1" Supply & 1/2" Return Lines

Model #	Supply Pipe Maximum Length (ft.)	Total Maximum Pipe Length (ft.)
003	125	250
006	325	650
008	525	1,050
003-IFC*	130	260
006-IFC*	275	550
008-IFC*	500	1,000

* With Integral Flow Check

1" Supply & 3/4" Return Lines

Model #	Supply Pipe Maximum Length (ft.)	Total Maximum Pipe Length (ft.)
003	600	1,200
006	1,500	3,000
003-IFC*	1,200	1,200
006-IFC*	2,500	2,500

* With Integral Flow Check

Assumptions:

Flow = 1 GPM

Max. Velocity = 3 ft./sec.

Allowances have been added for pressure drop of other typical system components

Type L Copper Tubing

Supply & Return Piping are equal in length

SmartPlus™ HOT WATER RECIRCULATION



See Taco Catalog #100-97 and Submittal Datasheet 101-154 for full details.



How SmartPlus™ works

The SmartPlus circulator has a mode select toggle switch that allows for 2 operation modes. "Pulse" or "Smart" mode can be selected using the toggle switch located on the capacitor base mounted electronic control board. A yellow LED indicates which mode is selected. All operation is automatic, no manual timer or temperature setting is required.

Pulse Mode

When set for Pulse mode, the SmartPlus circulator will run for 150 seconds every 10 minutes to maintain hot water at all fixtures.

Smart Mode

When set for Smart mode, the circulator will run in Pulse mode as above for the first 7 days. During the first 7 days, the SmartPlus will monitor and record the homes hot water usage pattern. For the next 7 days, the SmartPlus will use the preceding week's usage pattern to cycle the pump. This process will be repeated every 7 days.

Features and Benefits

Vacation Function — After 36 hours of inactivity the pump will automatically TURN OFF and remain off until hot water usage is detected again.

Exercise Function — While in vacation mode the pump will cycle on once every 7 days and run for 10 seconds to prevent any corrosion or scale buildup.

Factory installed 6' line cord

Remote Sensor Included

**Optional IFC®
(Integral Flow Check)**

Quiet, Efficient Operation

**Unique Replaceable Cartridge
Design-Field Serviceable**

Self-Lubricating

No Mechanical Seal

**Unmatched Reliability—
Maintenance Free**

Comfort and Convenience

*Once the pump is set to the desired operating mode it never needs to be set again.
Hot water is always available in seconds.*

Efficiency

Smart/Pulse operation maximizes hot water comfort and energy savings.

Reliability

The SmartPlus provides quiet operation and industry leading electronics with Taco's 00® circulator proven performance & dependability.

3 Year Warranty

LED Indicator lights

- GREEN — Power
- YELLOW — Mode
- RED — Sensor Connection

MATERIALS OF CONSTRUCTION

Circulator:

Stator Housing	Steel
Cartridge	Stainless Steel
Impeller	Noryl
Shaft	Ceramic
Bearings	Carbon
O-Ring	EPDM
Casing (Volute)	Bronze, Sweat Stainless Steel, Threaded Stainless Steel, Union Stainless Steel, flanged

Integral Flow Check (IFC®):

Body & Plunger	Acetal
Spring	Stainless Steel
O-Ring	EPDM

Plumb N' Plug® Circulators



See Taco Catalog #100-6.6 and Submittal Datasheet 101-066 for full details.



Features with an Analog Timer

- Factory Installed 6' Line Cord and 24 Hour/15 Minute Interval Analog Timer
- UL Listed
- Optional 95°F –115°F Aquastat Available
- Standard High Capacity Output
- Compact Design
- Quiet, Efficient Operation
- Direct Drive-Low Power Consumption
- Unique Replaceable Cartridge Design-Field Serviceable
- Self Lubricating
- No Mechanical Seal
- Unmatched Reliability-Maintenance Free
- Sweat Connections — Bronze
- Union & Threaded Connections — St. Steel
- Flanged — St. Steel

Additional Features with a Digital Timer

- Digital Timer, 7 day Programmable
- Large LCD Display
- Up to 8 ON/OFF Program Settings
- Easy-to-Use Program Buttons
- On/Off Intervals as Short as 1 Minute
- 100 hour Capacitor Backup, Saves Settings

MATERIALS OF CONSTRUCTION

Circulator:

Casing (Volute)	Bronze or Stainless Steel
Stator Housing	Steel
Cartridge	Stainless Steel
Impeller	Non-Metallic
Shaft	Ceramic
Bearings	Carbon
O-Ring	EPDM

Integral Flow Check (IFC®):

Body & Plunger	Acetal
Spring	Stainless Steel
O-Ring	EPDM

Submittal Data Information



See Taco Catalog #100-15 and Submittal Datasheet 101-150 for full details.



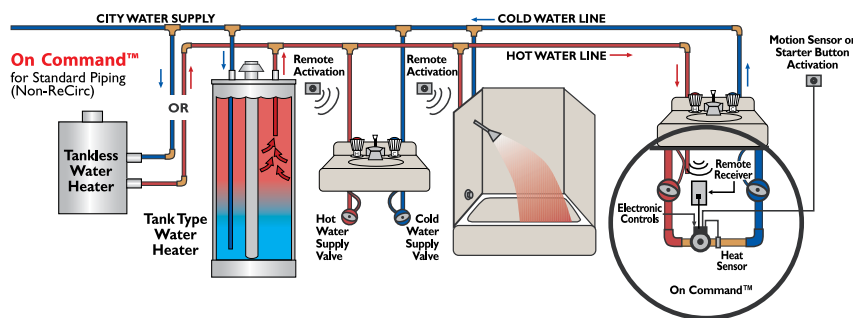
For New or Retrofit Installations

Using the existing cold water line as the return line, On Command™ is ideal for both new and retrofit installations. Typically installed at the furthest fixture from the water heater, On Command™ fits out of the way, under any bathroom vanity. Connections are made from the hot and cold lines to the suction and discharge side of the pump using adapter tees and stainless flex lines provided. When hot water is needed, the pump is activated by pressing a starter button, runs only long enough to supply hot water to the fixture and then automatically stops. This prevents hot water from entering the cold line. A spring-loaded Integral Flow-Check valve (IFC®) prevents cold water from entering the hot line. Optional wireless RF or motion sensor starters are also available.



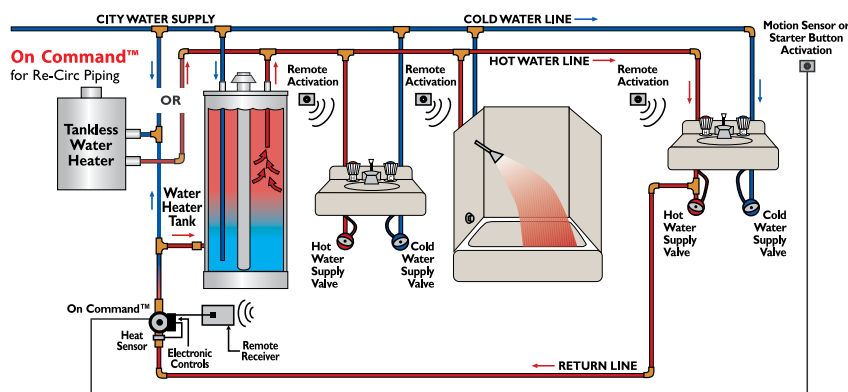
Features and Benefits of the Taco On Command™

- Instant Hot Water Comfort
- Maximum Water & Energy Savings
- 24 Hour operation
- Maintenance free circulator - unmatched reliability
- Removable stainless steel cartridge - contains all moving parts
- UL listed
- Integral Flow-Check (IFC®) to prevent thermo-siphoning or gravity flow
- Pre-wired power cord and integral temperature sensor
- Adapter tees & stainless steel flex lines included
- RF wireless remote or motion sensor starter-optional
- Ideal for tankless water heaters



ON COMMAND™ INCLUDES

- On Command Circulator
- Hard Wire Push Button
- (2) Copper T's
- (2) Flex Hoses
- RF Wireless Starter Kit (Optional)
- Motion Sensor (Optional)



MATERIALS OF CONSTRUCTION

Circulator:

- Casing (Volute).....Stainless Steel
- Stator Housing.....Steel
- Cartridge.....Stainless Steel
- Impeller.....Noryl
- Shaft.....Ceramic
- Bearings.....Carbon
- O-Ring.....EPDM

Integral Flow Check (IFC®):

- Body & Plunger.....Acetal
- O-Ring.....EPDM

Domestic Hot Water Accessories

Freedom Flange®	System Connection	Sweat	NPT
Shut-Off	1/2"	242-2	242-1
	3/4"	243-2	243-1
Bronze	1/2"	110-522BSF	---
	3/4"	110-523BSF	110-251BF



Freedom Flange®



Shut-off Freedom Flange®

Unions	System Connection	Sweat	NPT
Half Unions	1/2"	110-558	110-556
	3/4"	110-559	110-557
Shut-Off Unions	1/2"	258-3	258-1
	3/4"	258-4	258-2



Half Unions



Shut-off Unions

Plumb n' Plug® Accesories	Model #
Analog Timer Kit	265-1
Digital Timer Kit	265-3
Aquastat	563-2



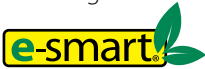
265-1
Analog Timer



265-3
Digital Timer



563-2
Aquastat





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