Smart Recirculation Retrofit – Installation Guide
Leridian Dynamics, Inc.

Congratulations on purchasing the most advanced micro processor controlled, on demand hot water solution made. This system is designed to run only when you need it thus saving water and energy while not sacrificing comfort. It is designed and built with pride in the USA to provide years of service and savings. I know people don't like to read instruction manuals so I will try to be brief, but please bear with me to ensure a trouble free installation. If you are not comfortable with any part of these instructions please contact a licensed plumber to perform the installation.

Contents:

1 Smart Pump Control assembly

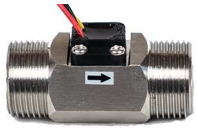
1 Smart Flow Control

2 ¾" Stainless Steel hook-up lines

2 ½" Stainless Steel Tee assembly with two ½" nipples. One nipple is already attached to the ½" to ¾" bushing.

1 Temperature Sensor with RJ-11 connector

1 ¾" or 1" NPT Flow Sensor with JST connector



1 Wiring Harness with RJ-45, RJ-11 and JST connectors

1 RJ-11 Connector

Needed:

The following items are needed for the installation, but are not included.
Electrical Tape for connecting temperature sensor to piping
PTFE (Teflon) Tape (Poly-Temp 36336 anti-seize nickel-filled PTFE recommended for Stainless Steel)
Wire fasteners for securing wiring to the wall

System Test

The system relies on a 915 MHz transceiver to communicate. These transceivers, under ideal conditions, have a range of up to a mile or more. But installation in a home is certainly not ideal conditions. There are appliances, piping, wiring and ducting that work to confound the transmission of information. So before the system is installed perform the following system test to ensure the transceivers will work at the locations where they will be installed. This will require two people to complete.

1. Connect the wiring harness to the Smart Flow Control via the RJ45 connector.

2. Connect the temperature sensor to the wiring harness using the RJ11 connector ensuring both ends snap in securely.

3. Connect the flow meter to the wiring harness.

4. Plug the Smart Flow Control into a wall outlet at the water heater and ensure that the green LED on the Smart Flow Control flashes 3 times. If it doesn't, but instead rapidly flashes red, the controller is unable to communicate with the temperature sensor. See Troubleshooting item 1 on page 8.

5. Take the Smart Pump Control to the sink at the furthest location from the water heater where it will be installed and plug the Smart Pump Control into a wall outlet. The LED on the side of the controller should flash green 3 times indicating the units are able to communicate. If it doesn't, unplug the Smart Pump Control and wait 15 seconds and plug the Smart Pump Control back in. If it still doesn't flash green 3 times please contact customer support at support@smartrecirculationcontrol.com or 831-761-8659.

6. One final test to ensure the flow meter is working correctly. This is where you will need a second person. Have one person remain with the Smart Pump Control and have the other person go back to the Smart Flow Control. Ensure you can communicate with the other person and then gently blow through the flow meter in the direction of the arrow until you see the red LED on the Smart Flow Meter turn on for approximately 3 seconds. The person at the Smart Pump Control should now notice the red LED turn on, hear valve open and the pump turn on. It will run for approximately 10 seconds. Congratulations! The system test was successful and you can proceed with the plumbing installation.

LED Legend For Smart Flow Meter

GREEN LED: will blink 3 times when first plugged in to indicate the unit is functioning correctly
RED LED: fast blinking indicates that temperature sensor is not connected properly
RED LED: solid on for 3 seconds when flow threshold exceeded.

LED Legend For Smart Pump Control

GREEN LED: will blink 3 times when first plugged in to indicate the unit is functioning correctly
GREEN LED: solid on when a timer is active and pump is not running
RED LED: solid on when the pump is running whether due to a timer or due to demand
RED LED: blinking indicates that communication with the Smart Flow Meter has been interrupted
BLUE LED: solid on when connected via the smart phone app

Smart Flow Meter Installation

1. Note setting of water heater thermostat and then set to lowest temperature setting (do not turn off the pilot light).
2. Shut off the cold water supply to the water heater.
3. Open the closest hot water faucet to the water heater to depressurize the hot water line. When water quits flowing, turn off the faucet.
4. Disconnect the cold water supply line from water heater. Be careful not to bend and crease the supply line when manipulating it. Be prepared with some towels as some water will flow out from the piping and the hookup line. You don't have to drain the tank and as long as all the faucets remain closed you should not get any back flow from the hot water line.
5. Connect the flow meter to the cold water input of water heater using PTFE tape being sure that the arrow on the flow meter is pointing toward the water heater.
6. Connect the cold water supply line to the input side of the flow meter. The supply line uses a rubber washer to seal instead of PTFE tape so you don't need to use PTFE tape on this connection. The rubber washer will seal the line to the flow meter. Hand tighten and turn an additional ¼ to ½ turn. DO NOT OVER TIGHTEN!
7. Turn on cold water supply to water heater and inspect for any leaks.
8. Turn water heater thermostat back to its original temperature setting.

9. Place the temperature sensor against the hot water outlet pipe of the water heater and tape it securely in place. Note: The temperature sensor must be taped securely in place UNDERNEATH the insulation that is covering the pipe.

10. Connect the temperature sensor to the wiring harness using the RJ-11 connector as you did in the system test ensuring it snaps together securely.

11. Connect the flow meter to the wiring harness via the JST connector.

12. Secure the wires to the wall away from the water heater.

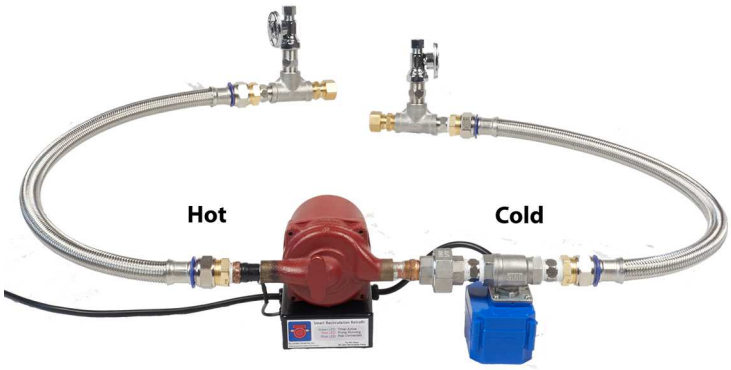
13. Plug the wiring harness into the Smart Flow Control via the RJ-45 connector.

14. Plug the Smart Flow Control into an electrical outlet.
15. The green LED will blink 3 times if everything is OK. If the red LED flashes quickly instead please see Trouble Shooting item 1 on page 8.

Smart Pump Control Installation

1. The next step of the installation requires a little planning. In order to have the highest flow to provide hot water the quickest, the system was designed to connect directly to the ½" rough plumbing line coming out of the wall instead of going through the much smaller connection on the shutoff valves. So you will be inserting the supplied Tees in between the shutoff valves and the rough plumbing and hooking the Smart Pump Control up to the other line of the Tee.
2. Shut off the water supply to the installation location. Typically this will require shutting of the main water supply to the house.
3. Turn on both the hot and cold water at the installation location until there is no water coming out of the faucet.
4. Disconnect the hookup line from both the hot and cold shutoff valves to the faucet.
5. Remove both shutoff valves from the rough plumbing.
   A. If you purchased the NPT kit, the valves should unthread from the rough plumbing.
   B. If you purchased the compression adapter kit, the nut on the back of the shutoff valve will unthread allowing you to remove the shutoff valve.
6. Next you will be connecting the Tees to the rough plumbing. The Tees can be configured in a couple of different ways as shown in the pictures. I recommend test fitting them to see which configuration works best for your installation.

7. Once you know how the Tees are going to be installed and prior to attaching the Tees to the rough plumbing, attach the nipples to the correct ports on the Tees using PTFE tape and attach the shutoff valves to the nipples using PTFE tape. 4 to 6 wraps of PTFE is recommended for stainless steel.
8. Now connect the Tees to the rough plumbing.
   A. If you purchased the NPT kit then you will connect the Tee using PTFE tape.
   B. If you purchased the compression adapter kit, connect the compression adapter to the Tee using PTFE tape and then connect the Tee to the rough plumbing.
9. Connect the faucet hookup lines to the shutoff valves.
10. Connect the hookup lines from the Smart Pump Control to the Tee ensuring that the arrow on the pump is pointing from HOT to COLD. The HOT line connects to the pump side of the Smart Pump Control and the COLD line connects to the valve side.



11. Turn the water back on and inspect for leaks.
12. Go to a faucet and turn the hot water on and then off. This will trigger the Smart Pump Control to turn on and run until it is up to temperature. The red LED turns on while the pump is running. If the Smart Pump Control doesn't turn on, turn on the hot water for a bit longer and then turn it off again. If it still doesn't turn on see Smart Recirculation Control Setup with Smart Phone – Basic Settings – Sensitivity on Page 6.
13. Once the difference in temperature between the water leaving the water heater and the water arriving at the Smart Pump Control is within the set range OR 104 Deg F (mandated by Uniform Plumbing Code), the controller will turn the pump off. For more information see Smart Recirculation Control Setup with Smart Phone – Basic Settings – Temperature Range on Page 7.

Smart Recirculation Retrofit Setup with Smart Phone

The Smart Recirculation Retrofit can be used simply as an on-demand hot water control or, once configured using either an iPhone or Android smart device, it will also work as an advanced timer keeping the water hot between specific times of day and on specific days of the week (up to 10 timers can be set). Even when a timer is active it only runs the pump until the water has heated up and then it shuts the pump off while continuing to monitor the flow demand and the water temperature. The app uses Bluetooth in order to communicate with the Smart Pump Control so you need to be sure that Bluetooth is enabled on your smart device. The app can be downloaded for free from either the Apple App Store or from Google Play by looking up "Smart Recirculation Control".

Note: Only the Smart Pump Control has the ability to connect via a smart phone. You cannot connect to the Smart Flow Meter from the app. The Smart Flow Meter's setting are updated via the Smart Pump Control.

Running the app will connect to the Smart Pump Control and display the timers currently set. The blue LED on the controller will illuminate when the app is connected. If the blue LED doesn't illuminate, press the menu button in the top right of the app and select "Scan for Recirc Control". NOTE: I have noticed that some smart devices have a harder time connecting than others so if it fails to connect after pressing the "Scan for Recirc Control" menu item, try restarting the app.

Once connected you can tap any of the existing timers to edit or delete them or press the Add Timer button to add a new one. You must close the app to disconnect and enable the Smart Pump Control. Sending the app to the background does not disconnect it and the Smart Pump Control will not run when the app is connected. The app is connected if the blue LED is lit.

The real time clock in the Smart Pump Control is set when you connect to the controller with your smart phone. When a timer is active the green LED will light. When the Smart Pump Control turns the pump on, the LED will change from green to red. When the water is up to temperature the pump will shut off and the led will change back from red to green.

The Smart Pump Control has a built in power backup that will keep the clock's time for approximately 48 hours after which the clock will lose its time and the controller's timers won't function until the time is set by running the app and connecting to the Smart Pump Control.

The clock does not adjust for daylight savings time so when the time changes you will need to connect to the Smart Pump Control with your smart device and the time will be set to the time of your smart device.

Smart Recirculation Retrofit Settings

The app also allows for controlling all the settings of the firmware of the Smart Recirculation Retrofit. To access the settings press the menu button in the top right of the app and select "Settings". There will be a list of basic settings and the ability to expand the settings to "Show Advanced Settings".

Basic Settings:

Sensitivity – The sensitivity setting allows the user to set how many clicks of the flow meter are required for the Smart Flow Meter to send a signal to the Smart Pump Control tell it there is flow in the hot water line. The default value is 20 which is fine for most installations. If you find that the Smart Pump Control is not turning on when you turn a faucet on and off, you would decrease this value to make the Smart Flow Meter more sensitive to flow (require fewer clicks to turn the controller on). Correspondingly, if you find that the Smart Pump Control is turning on when there is no timer active and no hot water being drawn, you would increase this number to make the Smart Flow Meter less sensitive to fluctuations in flow (require more clicks to turn the Smart Pump Control on).

Temperature Range – The temperature range setting allows the user to set the temperature differences that cause the Smart Pump Control to turn on and off. When the Smart Flow Meter senses flow, it sends the temperature at the water heater to the Smart Pump Control. The Smart Pump Control compares the received temperature with the local temperature and if the difference is greater than the large difference it turns the pump on. It runs the pump while receiving the remote temperature and reading the local temperature until the temperature difference is less than or equal to the small difference. The default large difference is 8 F deg and the default small difference is 5 F deg. These values work fine for most installations, however if you find that the controller is turning on and never turning off, you can increase the value of the small difference. If you find that the controller turns on but doesn't run the pump for more than the Initial Pump Run Time (see Advanced Setting), you can decrease the large difference. NOTE: As per to Uniform Plumbing Code the highest temperature allowed to be pumped into a cold water line is 104 deg F. The Smart Pump Control will shut off when the temperature reaches this value.

Advanced Settings:

Dormant Interval – The dormant interval is the number of minutes that the Smart Pump Control lies dormant after having run the pump and gotten the water up to temperature. This setting prevents fast cycling of the pump when hot water is being turned on and off over a short period of time. This is also the number of minutes that the Smart Pump Control waits when a timer is active after turning the pump off before turning the pump on again to check the water temperature. If you want the pump to turn on more often while a timer is active or more quickly between pump runs when you draw hot water you would reduce this value. This value is set to 10 minutes which is fine for most installations.

Flow Meter Delay – The flow meter delay is the amount of time in hundredths of a second during which time the Smart Flow Meter counts the number of clicks that occur in the flow meter. If the number of clicks is above the sensitivity threshold then the Smart Flow Meter sends a signal to the Smart Pump Control to tell it that there is flow in the hot water line. This value is set to 75 hundredths of a second which is fine for most installations.

Initial Pump Run Time – The initial pump run time is the number of seconds that the pump runs when it first senses flow IF the pump hasn't run in the last dormant interval. This is to ensure that water from the heater makes it to the temperature sensor in order to obtain an accurate temperature comparison between the water temperature at the water heater and at the Smart Pump Control. When a timer is active the Smart Pump Control will turn on every dormant interval for the length of the initial pump run time in order to check the temperature of the water. This value is set to 10 seconds which is fine for most installations.

Reset to Factory – This will reset the Smart Pump Control and Smart Flow Meter back to the factory defaults. If you experience strange behavior of the Smart Recirculation Retrofit system, resetting to the factory defaults would be a good thing to try to resolve the issue. This will also reset all the timers back to the 4 factory default timers so if you have changed the timers you will need to reset them after performing a factory reset. You must type "yes" when prompted in order for the factory reset to take place.

Trouble Shooting:

1. SYMPTOM: Red LED on the Smart Flow Meter flashes quickly after it is plugged in and never stops.

   ISSUE: The Smart Flow Meter is not able to get temperature information from the temperature sensors.

   RESOLUTION: Unplug the Smart Flow Meter from the wall, disconnect the wiring harness from the Smart Flow Meter, disconnect the temperature sensor. Reconnect the temperature sensor to the wiring harness ensuring it is firmly connected and snaps together. Plug the wiring harness back into the Smart Flow Meter. Plug the Smart Flow Meter back into the wall outlet.

2. SYMPTOM: Red LED on the Smart Flow Meter flashes slowly after it is plugged in and never stops.

   ISSUE: The flow meter is not connected correctly to the wiring harness.

   RESOLUTION: Connect the flow meter to the wiring harness. If it is connected, then unplug the Smart Flow Meter from the wall, disconnect the flow meter and inspect the wires on the wiring harness and the flow meter to ensure none are broken. Reconnect the flow meter to the wiring harness. Plug the Smart Flow Meter back into the wall outlet.

3. SYMPTOM: Pump won't turn on when hot water is drawn from a faucet.

   ISSUE: Water in the line is already hot.

   RESOLUTION: Unplug the Smart Pump Control from the wall outlet, wait 15 seconds and plug it back in. Ensure that the green LED blinks 3 times. Go to the faucet and turn on the hot water and see if the pump turns on for the Initial Pump Run Time and then off. If it does, then the unit is functioning correctly. If it doesn't, then the sensitivity of the Smart Flow Meter needs to be adjusted. Please see Basic Settings – Sensitivity on Page 5.

4. SYMPTOM: Pump turns on when no hot water is being drawn.

   ISSUE: Pressure spikes in the cold water supply line caused by abrupt turning off of the cold water (for instance when a toilet fills) or caused by fluctuations in the feed from the utility company can cause the Smart Flow Meter to trigger the Smart Pump Control to turn on.

   RESOLUTION: The sensitivity of the Smart Flow Meter should be adjusted. Please see Basic Settings – Sensitivity on Page 5.

5. SYMPTOM: Red LED on the Smart Pump Control is flashing.

   ISSUE: The Smart Pump Control is not receiving data from the Smart Flow Meter.

   RESOLUTION: Ensure that the Smart Flow Meter has power. Unplug the Smart Flow Meter, wait 15 seconds and plug it back in. Ensure that the green LED blinks 3 times. If it doesn’t double check the power.

If you need further support please contact:
Leridian Dynamics, Inc.
support@smartrecirculationcontrol.com or 831-761-8659