Smart Recirculation Control 32 - Installation Guide

QUICKSTART GUIDE SEE PAGE 2

Congratulations on purchasing the most advanced micro processor controlled, hot water recirculation pump controller made. This system is designed to run the recirculation pump only when you need it thus saving both water and energy. It is designed and built with pride in the USA to provide years of service and savings.

Contents:

(1) Smart Recirculation Control 32 with RJ-45 connector

(2) Temperature Sensors with RJ-14 connectors and RJ-14 Splitter

(1) ¾” or 1” NPT Flow Sensor with JST connector

(1) Wiring Harness with RJ-45, RJ-14 and JST connectors

Needed: The following items are needed for the installation, but are not included.
Electrical Tape
PTFE (Teflon) Tape
Wire fasteners for securing wiring to the wall

QUICKSTART GUIDE

Prior to installation perform the following system test.

1. Connect the wiring harness to the controller.

2. Connect the flow meter to the wiring harness.

3. Connect the temperature sensors to the wiring harness.

4. Plug the controller into a wall outlet and ensure that the LED on the controller flashes green 3 times.

5. Blow through the flow meter in the direction of the arrow and ensure the controller makes a slight audible click and the red LED turns on for approximately 10 seconds.

If this test fails, disconnect all connections and inspect the wires to ensure they are not broken or loose and that the pins in the Y connector are not bent. Reconnect all connections ensuring they snap together and re-test. If this test still fails, contact customer support at support@smartrecirculationcontrol.com or 831-761-8659.

1. Install the flow meter at the cold water input to the water heater ensuring the arrow on the flow meter points in the direction of flow. NOTE: PTFE tape is necessary when joining to a female NPT connector. PTFE tape is NOT necessary when connecting to a flexible hook up line as they have a washer that creates the seal.

2. Attach one temperature sensor to copper piping near the hot water outlet from the water heater with electrical tape ensuring the entire length of the sensor is in contact with the pipe. Cover the temperature sensor with insulation. The temperature sensor lines can be extended with standard RJ-14 telephone line extensions if needed.

3. Attach the second temperature sensor to copper piping on the returning hot water line before the return line T's into the cold water feed upstream from the check valve and preferable upstream from the recirculation pump ensuring the entire length of the sensor is in contact with the pipe. Cover the temperature sensor with insulation.

4. Connect the temperature sensors to the wiring harness using the RJ-14 Y connector, connect the flow meter to the wiring harness and plug the wiring harness into the controller.

5. Plug the controller into an outlet and plug the pump into the controller.

6. Turn a hot water faucet fully on for 1 second and the pump should turn on. If the hot water line is cold the pump should continue to run until hot water recirculates throughout the house and raises the temperature of the return sensor to within 5 F degrees (default) of the outgoing hot water sensor.

If the pump fails to turn on or fails to stay on past the initial 10 seconds or continues to run for longer than 5 minutes and the piping feels hot, see Trouble Shooting on page 7.

LED Legend:

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: fast blinking indicates that one or both of the temperature sensors are not connected properly
RED LED: solid on when the pump is running whether due to a timer or due to demand
BLUE LED: solid on when connected via the smart phone app
NO LED: normal behavior after initial boot up – no timer is active and pump is not running

DETAILED INSTRUCTIONS

Please read over the following detailed instructions. If you are not comfortable with any part of them please contact a licensed plumber to perform the installation.

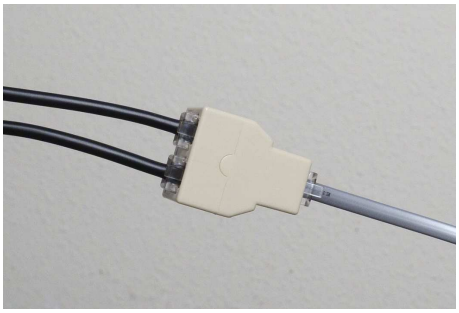
Prior to installation you must perform the system test at the beginning of the Quickstart Guide on page 2.

Installation:

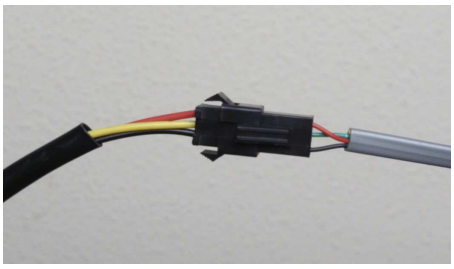
1. Note setting of the water heater thermostat and then set it to lowest temperature setting (do not turn off the pilot light).
2. Shut off the cold water supply to the water heater.
3. Open the closest hot water faucet to the water heater to depressurize the hot water line. When water quits flowing, 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 of the hookup line. You don't have to drain the tank. 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 the 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 washer to seal so you don't need to use PTFE tape on this connection. Hand tighten and turn an additional ¼ to ½ turn. DO NOT OVER TIGHTEN!
7. Turn on the cold water supply to the water heater and inspect for leaks.
8. Turn the water heater thermostat back to its original temperature setting.

9. Locate the recirculation pump.
10. Place one temperature sensor against the recirculation loop return pipe upstream from the pump and tape it securely in place ensuring it is in contact with the copper piping for its entire length and cover it with insulation. You may install the sensor downstream from the pump however the pump absorbs heat requiring it to run longer before the temp sensor will see the increase in temperature.
    Note 1: If installing on PEX you will need to plumb in a short section of copper pipe to which to attach the temperature sensors. PEX is a pretty good insulator and will cause a lag in the controller sensing the temperature change. **Note 2:** Temperature sensor MUST be placed before the return line T's back into the cold water supply line.
11. Place the other temperature sensor against the hot water outlet pipe of the water heater and tape it securely in place ensuring it is in contact with the copper piping for its entire length. Cover the temperature sensor with insulation.



12. Connect the temperature sensors to the wiring harness using the RJ-14 splitter ensuring they snap together securely.



13. Connect the flow meter to the wiring harness via the JST connector ensuring it snaps together securely.
14. Secure the wires to the wall away from the water heater.

15. Plug the wiring harness into the Smart Recirculation Control 32 via the RJ-45 connector ensuring it snaps in securely.

16. Plug the recirculation pump into the Smart Recirculation Control 32 and plug the Smart Recirculation Control 32 into an electrical outlet.
17. The green LED on the side of the controller will blink 3 times if everything is OK. If the red LED flashes quickly see Trouble Shooting page 7, item 1.
18. Turn a hot water faucet fully on for 1 second. This will trigger the recirculation pump to turn the pump on. The red LED turns on while the pump is running.
19. If the hot water line is cold the pump should continue to run until the temperature difference between the two sensors is less than the small temperature difference (default 5 F degrees).
20. The temperature of the sensors and the status of the pump can be monitored via the smart phone app by selecting “Live Data”$_{TM}$ from the menu.
21. If the pump fails to turn on when a faucet is fully opened for 1 second, see Trouble Shooting page 7, item 2.
22. If the pump fails to stay on past the initial pump run time of 10 seconds, see Trouble Shooting page 7, item 3.
23. If the pump continues to run for longer than 5 minutes and the piping feels hot see Trouble Shooting page 8, item 4.

Smart Recirculation Control 32 Setup with Smart Phone

The Smart Recirculation Control 32 can be used simply as an on demand controller for your recirculation pump or, once configured using either an iPhone or Android smart device, it can be configured via timers to keep the recirculation loop 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 recirculation loop has heated up and then it shuts the pump off while continuing to monitor the recirculation loop temperature.

The app uses Bluetooth in order to communicate with the controller 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 searching for "Smart Recirculation Control". There is no need to "pair" the Bluetooth device, running the app will find and connect to the Smart Recirculation Control 32 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 at the top right of the app and select "Scan for Recirc Control". **Note:** We have noticed that some Android devices can sometimes have a hard time connecting so if it fails to connect after pressing the "Scan for Recirc Control" menu item a couple of times, 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. The real time clock in the Smart Recirculation Control 32 is set when you connect to the controller with your smart phone. When a timer is active the green LED will be lit. When the Smart Recirculation Control 32 turns the pump on, the LED will change from green to red. When the loop is up to temperature the pump will shut off and the LED will change back from red to green.

When connected to the controller via the smart phone app, the blue LED will always be lit. To know if the pump is running or a timer is active, select "Live Data"$_{TM}$ from the menu and it will provide the status of the pump and timers.

The Smart Recirculation Control 32 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 Recirculation Control 32.

The clock does not adjust for daylight savings time so when the time changes you will need to connect to the Smart Recirculation Control 32 with your smart device and the time will be set to the time of your smart device.

Smart Recirculation Control 32 Settings:

The app also allows for controlling all the settings of the firmware of the Smart Recirculation Control 32. 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 pulses of the flow meter are required to turn the controller on. The default value is 20 which is fine for most installations. If you find that the controller is not turning on when you turn a faucet on and off, you would decrease this value to make the controller more sensitive to flow (require fewer pulses to turn the controller on). Correspondingly, if you find that the controller is turning on when there is no timer active and no hot water being drawn, you would increase this number to make the unit less sensitive to fluctuations in flow (require more pulses to turn the controller on).

Temperature Range – The temperature range setting allows the user to set the temperature differences that cause the controller to turn the pump on and off. When the controller senses flow, it checks to see if the temperature difference between the two temperature sensors is greater than the large difference and if it is, it

turns the pump on. It runs the pump while reading the temperature sensors 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 should increase the value of the small difference. See Trouble Shooting page 8, item 4.

Timers Enabled – This switch manually enables and disables the timers. This can be used to turn the timers off when you go away on vacation or to simply turn them off if you just want to use the on demand feature of the controller. The Smart Recirculation Control 32 implements "Smart Timers"$_{TM}$ which, regardless of this setting, will automatically disable themselves if no hot water usage is detected within 24 hours. The timers are re-enabled as soon as hot water flow is detected.

Advanced Settings:

Dormant Interval – The dormant interval is the number of minutes that the controller lies dormant after sensing flow and heating up the loop. As long as there is hot water flow within the dormant interval, it is assumed that the temperature sensor on the outlet of the water heater has an accurate temperature reading and therefore the pump doesn't need to run unless the temperature difference gets greater than the large difference specified in the Temperature Range setting. Therefore when flow is detected within the dormant interval, the dormant interval timer is reset. The dormant interval is also the number of minutes that the controller waits when a timer is active between pump runs. If you want the pump to turn on more quickly 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 controller counts the number of pulses that occur in the flow meter. If the number of pulses is above the sensitivity threshold then the controller deems 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 there hasn't been flow within the dormant period. This is to ensure that water from the water heater makes it to the first temperature sensor in order to obtain an accurate temperature comparison between the two temperature sensors. When a timer is active the pump will turn on every dormant interval for the length of the initial pump run time in order to check the temperature of the recirculation loop. This value is set to 10 seconds which is fine for most installations. If the temperature sensor for the hot water outlet is installed some distance from the water heater this value may have to be increased.

Reset to Factory – This will reset the Smart Recirculation Control 32 back to the factory defaults. If you experience strange behavior of the controller, 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.

Firmware

The firmware of the Smart Recirculation Control 32 can be updated via the smart phone app. To check if there is new firmware available go to the menu and select Firmware. If there is new firmware available it will be displayed and the selection will be enabled. Select the firmware and click the "Update Firmware" button. The update can take up to 5 minutes to complete. Do not allow the application to go to the background or the phone to sleep while the firmware update is running or the update will fail. The system is designed to only switch to the new firmware if the update is successful so if this does happen simply attempt the firmware update again.

There is an option on this screen to “Show All Firmware Versions” which will display the firmware from our entire product line. The sensor requirements for the different firmware versions are different so updating to a different product without understanding the implications may provide unexpected results. Please see our web site for a description of the different products.

Trouble Shooting

1. SYMPTOM: Red LED flashes quickly after it is plugged in and never stops.

   ISSUE: The Smart Recirculation Control 32 is not able to get temperature information from the temperature sensors.

   RESOLUTION: Unplug the Smart Recirculation Control 32 from the wall, disconnect the connection to the temperature sensors, disconnect the wiring harness from the Smart Recirculation Control 32. Inspect the pins in the connectors and ensure they are not bent or broken. Inspect the wires connecting to the connectors and ensure they are not broken or loose. Reconnect the temperature sensors ensuring they are firmly connected and snapped together. Plug the wiring harness back into the Smart Recirculation Control 32. Plug the Smart Recirculation Control 32 back into the wall outlet.

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

   ISSUE 1: If the controller has run within the dormant interval, the pump won't automatically turn on when flow is detected.

   RESOLUTION 1: Unplug the controller from power for 10 seconds and plug it back in. This will reset the controller and it will now turn on automatically when it detects flow. Turn a hot water faucet fully on for 1 second. If it still doesn't turn on see ISSUE 2.

   ISSUE 2: The sensitivity value is set too high for the controller to detect the flow provided by your faucet.

   RESOLUTION 2: Open the smart phone app and go to the menu and select "Live Data"$_{TM}$. This will show you what the controller is sensing. Turn a hot water faucet fully on for and watch the flow value. If it goes greater than 20 then the pump will turn on. If it doesn't go greater than 20 then you will need to reduce the sensitivity value to be less than the maximum value you observed. For example, if the Flow Meter value went to 15, then set your sensitivity to 13 and try this test again.

3. SYMPTOM: Pump won't continue running after the initial pump run time expires.

   ISSUE: The controller isn't sensing a temperature difference greater than the large difference that is set in the Temperature Range setting (default 8 F degrees).

   RESOLUTION 1: Ensure that the temperature sensor is securely connected to the copper piping coming out of the water heater as close to the water heater as reasonable. Typically this will be after the hookup line. If it is loose, re-secure it in place with electrical tape, cover it with insulation and test it again. If it still won't stay on see RESOLUTION 2.

   RESOLUTION 2: This is typically a situation where it is taking longer than 10 seconds for the pump to get hot water out to the location of the first temperature sensor and cause the temperature difference to be greater than the large difference that is set in the Temperature Range setting (default 8 F degrees). To test this, after the pump has run for the initial 10 seconds, turn the hot water on again for a few seconds. If the pump kicks on and starts running then you need to increase the Initial Pump Run Time under Advanced Settings. The default is 10 seconds. I would recommend increasing this by 5 seconds at a time and test again when the system is cold. You can also view the "Live Data"$_{TM}$ in the app which displays live temperature values and difference to see what is actually being sensed.

4. SYMPTOM: Pump continues to run even though the piping feels hot.

   ISSUE: The controller isn't sensing the temperature difference dropping below the small difference that is set in the Temperature Range setting (default 5 F degrees).

   RESOLUTION 1: Ensure that the temperature sensor is securely connected to the copper piping on the return line and that it is connected before it T's into the cold water feed into the water heater. If it is loose, re-secure it in place with electrical tape, cover it with insulation and test it again. If it still won't stay on see RESOLUTION 2.

   RESOLUTION 2: Open the smart phone app and go to the menu and select "Live Data"$_{TM}$. It will display the temperature values and the difference. If this difference is greater than the small temperature difference in the Temperature Range setting (default 5 F degrees) then the pump won't turn off. Go into the Settings → Temperature Range and increase the small temperature difference value to be greater than the value observed in "Live Data"$_{TM}$ and the pump will turn off. This typically happens in homes where the hot water line isn't well insulated and the water loses temperature as it recirculates throughout the home. Do your best to insulate all hot water pipes that you can reasonably access. It will make the system perform better and it will save you money on energy bills. **Note:** You may also need to increase the large difference value. If you were to make these values the same the pump would cycle on and off often. It is recommend that these values be at least 3 degrees apart.

5. 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 Recirculation Control 32 to trigger the hot water recirculation pump to turn on.

   RESOLUTION: The sensitivity value of the Smart Recirculation Control 32 is too low and should be adjusted higher.

If you need further support please contact:

Leridian Dynamics, Inc.
support@smartrecirculationcontrol.com
or 831-761-8659