COMFORT SYSTEMS USA

Quality People. Building Solutions.

Comfort Systems USA (Arkansas), Inc.
P.O. Box 16620
Little Rock, AR 72231
Phone 501-834-3320
Fax 501-834-5416

Date: 7/12/2023
Return Request: 7/22/2023
Project: LRSD – Rockefeller Early Childhood
Supplier: Falk
Manufacturer: Various
Submittal: Plumbing Equipment
Submittal Number: 22 30 00-01
Drawing # and Installation: Plumbing Drawings

ARCHITECT
WDD Architects
5050 Northshore Lane
N. Little Rock, AR 72118
501-376-6681

ENGINEER
Insight Engineering
201 S. Chester St.
Little Rock, AR 72201
501-237-3077

GENERAL CONTRACTOR
Kinco Constructors
12600 Lawson Rd. #2711
Little Rock, AR 72210
501-225-7606

MECHANICAL SUBCONTRACTOR
Comfort Systems USA (Arkansas), Inc.
9924 Landers Rd.
N. Little Rock, AR 72117
501-834-3320

Notes:

chowell@comfortar.com

KINCO CONSTRUCTORS
LITTLE ROCK, ARKANSAS

JOB NAME: LRSD Rockefeller
JOB #: 23.1004
SUBMITTAL #: 23 30 00-1
VENDOR: Comfort Systems
SPEC SECTION: 22 30 00
BY: Andrew McCarty **DATE:** 7/18/23
COMMENTS:

Kinco's review indicates that general conformity to the contract drawings, specifications and addenda to the best of our technical knowledge has been met by the vendor. This review does not in any way relieve the vendor of its obligation to perform or supply their product in strict accordance with the aforementioned contract documents. This submittal is certiified to be in conformance with contract documents unless noted of herein.

LRSD ROCKEFELLER EARLY CHILDHOOD

PLUMBING OPERATION & MAINTENANCE

WATER HEATER

Owner's Guide

CONGRATULATIONS

Congratulations and thank you for choosing our tankless water heater. Before use, we recommend that you read through this owner's guide carefully. Keep this manual for future reference.

If you need an additional manual, contact the manufacturer or your local distributor. When you call, please tell us the product name and the serial number of your unit written on the rating plate of the water heater.

OPERATING SAFETY

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.

B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

C. Use only your hand to turn the gas shutoff valve. Never use tools. If the valve will not turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

D. Do not use this appliance if any part has been under water. Immediately contact a qualified installer or service agency to replace a flooded water heater. Do not attempt to repair the unit! It must be replaced!

OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
2. Turn off all electric power to the appliance.
3. Do not attempt to light the burner by hand.
4. Turn the gas shutoff valve located on the outside of the unit to the closed position.
5. Wait five (5) minutes to clear out any gas. If you then smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
6. Turn the gas shutoff valve located on the outside of the unit to the open position.
7. Turn on all electrical power to the appliance.
8. If the appliance will not operate, follow the instructions in "To Turn Off Gas to Appliance," and call your service technician or gas supplier.

TO TURN OFF GAS TO APPLIANCE

1. Turn off all electric power to the appliance if service is to be performed.
2. Turn the gas shutoff valve located on the outside of the unit to the closed position.

⚠ DANGER

Vapors from flammable liquids will explode and catch fire causing death or severe burns.
Do not use or store flammable products such as gasoline, solvents or adhesives in the same room or area near the water heater.

Do not install water heater where flammable products will be stored or used unless the main burner is at least 18" above the floor. This will reduce, but not eliminate the risk of vapors being ignited by the main burner.

FLAMMABLES

Read and follow water heater warnings and instructions. If the owner's manual is missing, contact the retailer or manufacturer.

Keep flammable products:

1. Far away from heater.
2. In approved containers.
3. Tightly closed and out of reach of children.
4. Water heater has a main burner, which may come on at any time and will ignite flammable vapors.

Vapors:

1. Cannot be seen.
2. Are heavier than air.
3. Go a long way on the floor.
4. Can be carried from other rooms to the main burner by air currents.

⚠ DANGER

1. Water temperature over 125°F (52°C) can cause severe burns instantly or death from scalds.
2. Children, disabled and elderly are at highest risk of being scalded.
3. Feel water before bathing or showering.
4. Temperature limiting valves are available. See manual.
5. The outlet temperature of the water heater is set at 120°F (50°C). If you require water temperatures below this setting, follow the instruction manual.
6. Use this heater at your own risk. Test the water before bathing or showering. Do not leave children or an infirm person unsupervised. See your local water supply company [plumbing hardware retailer] for temperature limiting valves that are available.

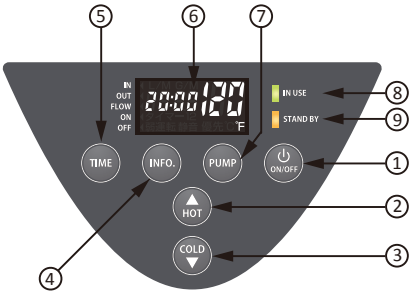
A pressure relief valve listed as complying with the standard for Relief Valve and Automatic Gas Shutoff Devices for Hot Water Supply System, ANSI Z21.22 • CSA 4.4, shall be installed at the time of installation of the water heater in the location specified by the manufacturer. Local codes shall govern the installation of relief devices for safety operation of the water heater. The relief valve must not be removed or plugged.
No valve shall be placed between the relief valve and the water heater. The relief from the discharge of the pressure relief valve shall be disposed of in a suitable place where it will cause no damage. Also, there shall be no other reducing coupling or other restrictions installed on the discharge line to restrict flow.
See Installation Manual heading "PRESSURE RELIEF VALVES" for installation and maintenance of relief valve discharge line and other safety precautions.

NORMAL OPERATION

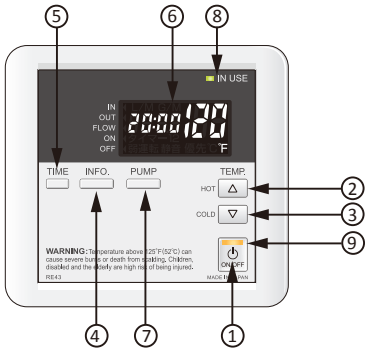
BUILT-IN CONTROLLER and REMOTE CONTROLLER

The illustration below shows an example of the controllers. The exact display may differ from examples.

Built-in controller



Remote controller



No.	Description	Note	No.	Description	Note
1	**"ON/OFF" Button**	Press this button to start or stop operation.	5	**"TIME" Button**	Press this button to set the current time.
2	**"HOT" Button**	Press the "HOT" button or the "COLD" button to set the outlet water temperature, the current time, and PUMP TIMER.	6	**LCD**	The current time, set temperature, error code and other information are displayed.
3	**"COLD" Button**		7	**"PUMP" Button**	Press this button to set and control the pump operation.
4	**"INFO." Button**	Press the "INFO." button to display the inlet & outlet water temperature and water flow and set the outlet temperature, pump choosing, and unit conversion.	8	**IN USE LED**	The LED lights during combustion.
			9	**STAND BY LED**	The LED lights when power is on.

NOTICE

- When the remote controller is installed it will take priority over the built-in controller.
- The controller has an energy saving mode. Five minutes after the water heater stops operating, the backlight of the controller turns off.
- The backlight of the remote will turn back on once the water heater begins firing again.

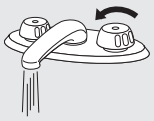
GENERAL

WARNING

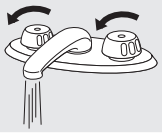
Temperatures above 125 °F (52 °C) can cause severe burns or death from scalding. Children, disabled and the elderly are at high risk of being injured.

°F	120	125	130	135	140	145	150	155
°C	49	52	54	57	60	63	66	68
Time to produce serious burn	more than 5 min.	1½ to 2 min.	about 30 sec.	about 10 sec.	less than 5 sec.	less than 3 sec.	about 1½ sec.	about 1 sec.

1. Open a cold water fixture.



2. Mix hot water with the cold water to get the correct temperature water.



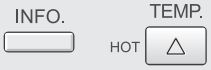
3. When finished, close the water fixtures.

NOTICE

- Flow rate to activate the water heater: 0.5 gallon per minute at the default set temperature (1.9 L/min.)
- Flow rate to keep the water heater running: 0.4 gallon per minute (1.5 L/min.)

OUTLET WATER TEMPERATURE SETTING

-Set temperature-

	Operation	Controllers	
		Built-in controller	Remote controller
1.	Turn on the 120 VAC power supply to the unit.		
2.	Press the **"ON/OFF"** button on the controller in order to turn the controller on.		
3.	When ON, the STAND BY LED is lit.		
4.	It shows the set temperature of output water on its display as shown in the picture on the right. (EX.: 120 °F)	 (EX.: 120 °F)	
5.	Press the **"HOT"** button or the **"COLD"** button to set the temperature setting of the unit.		
	Increasing temperature from 120 °F (50 °C) to 125 °F (52 °C) : 1. The water heater must be in Stand By to increase the temperature. 2. Press the "HOT" button to set 120 °F (50 °C). 3. Press and hold the "INFO" button and the "HOT" button for at least 3 seconds. The remote will emit a beep and change to 125 °F (52 °C). 4. Press the "HOT" button to set up to 140 °F (60 °C).		

TEMPERATURE TABLE OF CONTROLLER

°F	100	105	110	115	120*	125	130	135	140
°C	38	40	43	45	50*	52	55	57	60

*Factory setting (Default): 120 °F (50 °C)

NOTICE

- The controllers have an energy saving mode. Five minutes after the water heater stops operating, the backlight of the controllers turns off.
- The backlight of the controllers will turn back on once the water heater begins firing again.

SETTING THE TIME

	Operation	Controllers	
		Built-in controller	Remote controller
1.	Turn on the 120 VAC power supply to the unit.		
2.	Press the **"TIME"** button on the controller in order to set the time. This operation is available regardless of ON/ OFF of the controller.		
	The time in the display will flash. The controllers can only have 24 hours indication of time.		
3.	Press the **"HOT"** button or **"COLD"** button to set the time. Press and hold the "HOT" or "COLD" button to adjust the time more quickly. **NOTICE**: The time is displayed in twenty-four hour clock time. For example, 11:00 is 11:00 a.m. and 23:00 is 11:00 p.m.		
4.	Press the **"TIME"** button on the controller in order to save and exit.		
	When the remote is on, the current time and set temperature are displayed. When the remote is off, the display turns off.	 OR 	

PUMP OPERATION TIMERS

The built-in controller and remote offer two timer settings for the pump operation: PUMP TIMER 1 and TIMER 2.
The pump will only operate during the times set for TIMER 1 and TIMER 2.
There are four options for pump timer operation.

1. Both PUMP TIMER 1 and PUMP TIMER 2 are activated.
2. Neither PUMP TIMER 1 nor PUMP TIMER 2 are activated.
   (The recirculation pump will never operate in this mode.)
3. Only PUMP TIMER 1 is activated.
4. Only PUMP TIMER 2 is activated.

NOTICE: Set the time for PUMP TIMER 1 and PUMP TIMER 2 before you select a pump timer option. Follow the steps in SETTING THE TIME, then complete the steps in Setting pump timers.

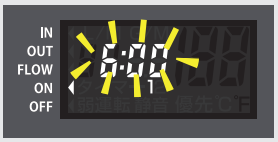
PUMP TIMERS 1 & 2 activated

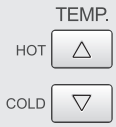
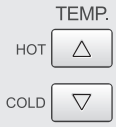
NO PUMP TIMER activated

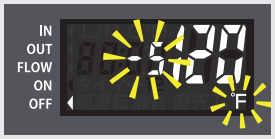
Only PUMP TIMER 1 activated

Only PUMP TIMER 2 activated

- Setting pump timers -

	Operation	Controllers	
		Built-in controller	Remote controller
1.	Turn on the 120 VAC power supply to the unit.		
2.	Press and hold the **"PUMP"** button on the controller for at least 3 seconds to enter the pump timer setting mode. This operation is available regardless of ON/OFF of the controller.		
	The ON time for PUMP TIMER 1 will flash, indicating that you can set the start time.		
3.	Press the **"HOT"** button or **"COLD"** button to select the time. Press and hold the "HOT" or "COLD" button to adjust the time more quickly. **NOTICE**: The time is displayed in twenty-four hour clock time. For example, 11:00 is 11:00 a.m. and 23:00 is 11:00 p.m.		
4.	Press the **"PUMP"** button when the desired time flashes on the display.		
	The OFF time for PUMP TIMER 1 will flash, indicating that you can set the end time.		
5.	Press the **"HOT"** button or **"COLD"** button to select the time. Press and hold the "HOT" or "COLD" button to adjust the time more quickly. **NOTICE**: The time is displayed in twenty-four hour clock time. For example, 11:00 is 11:00 a.m. and 23:00 is 11:00 p.m.		
6.	Press the **"PUMP"** button when the desired time flashes on the display.		
	The ON time for PUMP TIMER 2 will flash, indicating that you can set the start time.		

<table>
<tr><th></th><th>Operation</th><th colspan="2">Controllers</th></tr>
<tr><th></th><th></th><th>Built-in controller</th><th>Remote controller</th></tr>
<tr><td>7.</td><td>Press the "HOT" button or "COLD" button to select the time. Press and hold the "HOT" or "COLD" button to adjust the time more quickly.
NOTICE: The time is displayed in twenty-four hour clock time. For example, 11:00 is 11:00 a.m. and 23:00 is 11:00 p.m.</td><td> 
</td><td> 
</td></tr>
<tr><td rowspan="2">8.</td><td>Press the "PUMP" button when the desired time flashes on the display.</td><td> 
</td><td> 
</td></tr>
<tr><td>The OFF time for PUMP TIMER 2 will flash, indicating that you can set the end time.</td><td colspan="2"> 
</td></tr>
<tr><td>9.</td><td>Press the "HOT" button or "COLD" button to select the time. Press and hold the "HOT" or "COLD" button to adjust the time more quickly.
NOTICE: The time is displayed in twenty-four hour clock time. For example, 11:00 is 11:00 a.m. and 23:00 is 11:00 p.m.</td><td> 
</td><td> 
</td></tr>
<tr><td>10.</td><td>Press the "PUMP" button when the desired time flashes on the display.</td><td> 
</td><td> 
</td></tr>
<tr><td rowspan="3">11.</td><td>The following steps will set the temperature drop that must occur before the recirculation pump will activate.</td><td colspan="2"> 
</td></tr>
<tr><td colspan="3"><table>
<tr><td rowspan="2">Temperature drop below set temp. at which pump turns on</td><td>°F</td><td>-10</td><td>-15</td><td>-20*</td><td>-25</td><td>-30</td><td>-35</td><td>-40</td></tr>
<tr><td>°C</td><td>-6</td><td>-8</td><td>-11</td><td>-14</td><td>-17</td><td>-19</td><td>-22</td></tr>
</table>
*The value has been preset at the factory. (Default)</td></tr>
<tr><td>Press the "HOT" button or the "COLD" button to select the temperature at which the pump will activate.</td><td> 
</td><td> 
</td></tr>
<tr><td>12.</td><td>Press the "PUMP" button on the controller to save your settings.</td><td> 
</td><td> 
</td></tr>
</table>

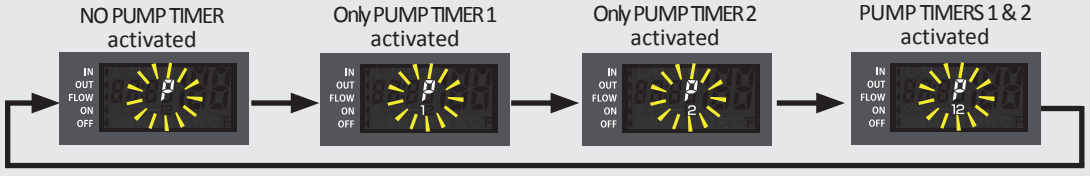
	Operation	Controllers	
		Built-in controller	Remote controller
13.	The following steps will set the **temperature drop** that must occur before the recirculation pump will turn off.		

Temperature drop below set temp. at which pump turns off	°F	-5*	-10	-15	-20	-25	-30	-35
	°C	-3	-6	-8	-11	-14	-17	-19

*Preset at the factory. (Default)

13.	Press the **"HOT"** button or the **"COLD"** button to select the temperature at which the pump will turn off.		
14.	Press the **"PUMP"** button on the controller to save your settings.		
	When the controller is on, the current time and set temperture in the display turns on. When the controller is off, the display turns off.	 OR 	

- Selecting a pump timer-

	Operation	Controllers	
		Built-in controller	Remote controller
1.	Press the **"PUMP"** button on the controller to set the mode. (The options are shown in step 3.) This operation is available regardless of the ON/OFF status of the controller.		
2.	The current status of the **PUMP TIMER** will flash for 10 seconds. During this time, you can change the mode. Otherwise, the mode will remain unchanged.		
3.	Press the **"PUMP"** button on the controller in order to change the option. The order of the option is as follows.		
			
4.	Press the **"INFO"** button on the controller in order to save your setting.		

-Display example-

The display on the controller indicates which PUMP TIMER is set by displaying a number below the time: 1, 2, or 12. (12 indicates PUMP TIMER 1 and PUMP TIMER 2.)

The arrow to the right of ON or OFF indicates the current status of the PUMP TIMER(s). If the current time falls within the time range set for a PUMP TIMER, the arrow will point toward ON. (The timer is ON.)

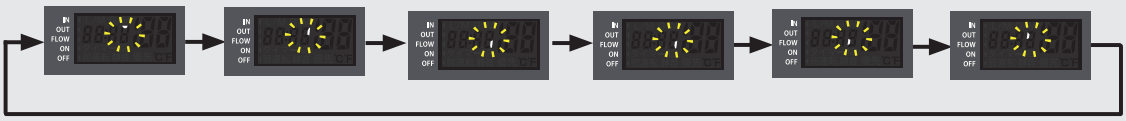
If the current time falls outside the time range set for a PUMP TIMER, the arrow will point toward OFF. (The timer is OFF.)

See below for examples of each scenario. In each scenario below, PUMP TIMER 1 is set to activate at 6:00 AM (6:00) and deactivate at 9:00 AM (9:00). PUMP TIMER 2 is set to activate at 6:00 PM (18:00) and deactivate at 9:00 PM (21:00).

	Examples	Controllers	
		Built-in controller	Remote controller
1.	The display shows that PUMP TIMER 1 is in operation. The current time falls within the time range that is set for for PUMP TIMER 1. Current time: 8:00 AM (8:00) Set temperature of output water: 120 °F PUMP TIMER 1: SET PUMP TIMER 2: OFF		
2.	The display shows that PUMP TIMER 1 is NOT in operation. The current time falls outside the time range that is set for for PUMP TIMER 1. Current time: 10:00 AM (10:00) Set temperature of output water: 120 °F PUMP TIMER 1: SET PUMP TIMER 2: OFF		
3.	The display shows that PUMP TIMER 2 is in operation. The current time falls within the time range that is set for for PUMP TIMER 2. Current time: 8:00 PM (20:00) Set temperature of output water: 120 °F PUMP TIMER 1: OFF PUMP TIMER 2: SET		
4.	The display shows that PUMP TIMER 2 is NOT in operation. The current time falls outside the time range that is set for for PUMP TIMER 2. Current time: 10:00 PM (22:00) Set temperature of output water: 120 °F PUMP TIMER 1: OFF PUMP TIMER 2: SET		
5.	The display shows that PUMP TIMER 1 and PUMP TIMER 2 are set, and one of them is in operation. In this example, PUMP TIMER 1 is running because it is set to activate between 6:00 AM and 9:00 AM. (See above.)Current time: 7:00 AM (7:00) Set temperature of output water: 120 °F PUMP TIMER 1: SET PUMP TIMER 2: SET		
6.	The display shows that PUMP TIMER 1 and PUMP TIMER 2 are set, and none of them is in operation. The current time falls outside the time ranges that are set for for PUMP TIMER 1 and PUMP TIMER 2. Current time: 10:00 AM (10:00) Set temperature of output water: 120 °F PUMP TIMER 1: SET PUMP TIMER 2: SET		

-Pump operation test-

The following procedure will operate the pump. This is useful to verify that the pump is operating properly and to check the water flow rate.

	Operation	Controllers	
		Built-in controller	Remote controller
1.	Press the ON/OFF button on the controller so the STAND BY LED turns off.		
2.	Press and hold "INFO." and "PUMP" simultaneously for at least 3 seconds, then the integrated pump starts operation for 5 minutes.		
3.	A segment of the zero (on the right) is lit as follows in clockwise order during forced pump operation.  		
4.	The pump will stop operation automatically after five minutes. OR Press the "ON/OFF" button to stop pump operation test.		

-Manual pump operation-

This operation runs the pump and fire the water heater each time the “PUMP” button is pushed to minimize energy consumption. The pump runs until water temperature at the thermistor inside the water heater reaches 102 °F (38.9 °C) or the water temperature at the thermistor rises 10 °F (5.6 °C) above the initial temperature of the water. The pump runs for five minutes at the longest. No. 5 DIP switch of the lower bank needs to be changed to "ON" position in the operation.

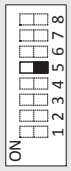
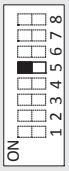
Note: The pump timer is not available when the No. 5 DIP swtch of the lower bank is set to "ON".

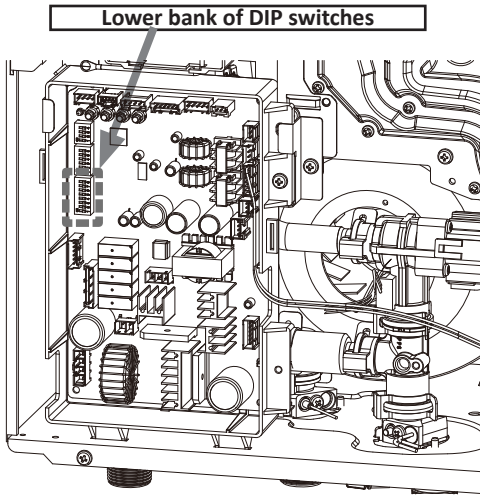
	Operation	Controllers	
		Built-in controller	Remote controller
1.	Press the "PUMP" button to start pump operation and fire the water heater.		
2.	"P" and the set temperature are indicated (on the right) during Manual pump operation.		
3.	The pump will stop automatically in five minutes and the current set temperature and time will be displayed on the screen.		

WARNING

- **For manual pump operation, adjust only the No. 5 DIP switch in the LOWER bank of DIP switches. (See below.) DO NOT adjust the other DIP switches.**
- **Turn off the power supply to the water heater before changing the DIP switch settings.**
- **Failure to observe these warnings could lead to carbon monoxide poisoning or death.**

Set DIP switch shown in the table below.

Manual pump operation		
Lower bank of DIP switches	 No. 5 : OFF **DEFAULT**	 No. 5 : ON



ADDITIONAL FEATURES

-Information mode-

You can get some information about the water heater condition by pressing the **"INFO"** button. For more information, follow the procedures below:

	Operation	Controllers	
		Built-in controller	Remote controller
1.	Press the **"INFO"** button on the controller to enter the information mode.		
2.	Press the **"INFO"** button to display the inlet water temperature.	 Inlet water temperature (EX.: 60 °F)	
3.	Press the **"INFO"** button again to display the outlet water temperature.	 Outlet water temperature (EX.: 120 °F)	
4.	Press the **"INFO"** button again to display the water flow.	 Water flow (EX.: 3.5 GPM)	
5.	Press the **"INFO"** button to exit the information mode.		

-Unit conversion mode-

Units of measure can be changed from Imperial to Metric and vice versa. For example, temperature can be changed from °F to °C. Flow rate will also change from gallons per minute to liters per minute when this setting is changed. Follow this procedure to change this setting:

	Operation	Screen on the controller	
		Built-in controller	Remote controller
1.	Press the **"ON/OFF"** button on the controller in order to turn the controller on.		
2.	When ON, the STAND BY LED is lit.		
3.	The current set temperature and time will be displayed on the screen.	 (EX.: 120 °F)	
4.	Press the **"INFO"** buttons for at least 3 seconds.		
5.	The set temperature should now be displayed in the alternate unit of measurement.	 (EX.: 50 °C)	

NOTICE When installed on an indoor heater, the 100276687 (TM-RE43) has priority for set temperature over the built-in controller.

SETTING THE TEMPERATURE ON THE PCB (WITHOUT BUILT-IN CONTROLLER or REMOTE CONTROLLER)

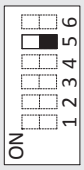
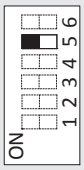
WARNING

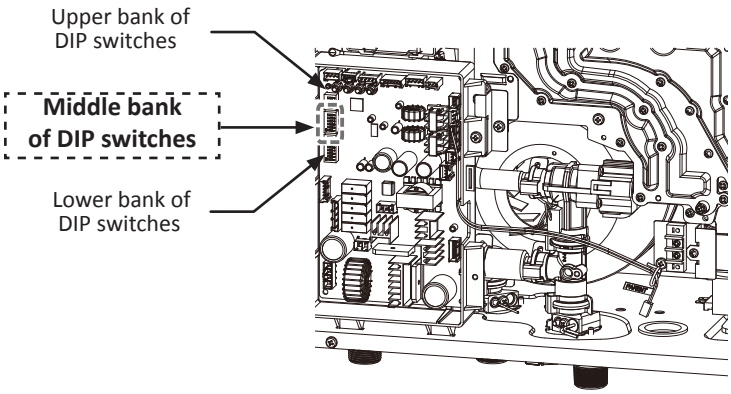
- **To set the temperature, adjust only the No. 5 DIP switch in the MIDDLE bank of DIP switches. (See below.) DO NOT adjust the other DIP switches.**
- **Turn off the power supply to the water heater before changing the DIP switch settings.**
- **Failure to observe these warnings could lead to carbon monoxide poisoning, severe personal injury, or death.**

There are two preset temperatures (120°F (50°C) and 140°F (60°C)) that you can select when the temperature controller is inoperable. To do so, adjust the appropriate DIP switch as shown in the table below. When the remote controller is in normal operation, the set temperature of the remote controller is given priority over the set temperature of the DIP switch settings.

The temperature has been preset at the factory to 120 °F (50 °C).

Middle bank of DIP switches

120 °F (50 °C) DEFAULT	140 °F (60 °C)
	
No.5 : OFF	No.5 : ON



NOTE: Only change the switches with dark squares. The dark squares indicate the correct DIP switch positions.

FLOW

- The flow rate through the water heater is limited to a maximum of 10.0 GPM (38 L/min) for the 540P model.
- The temperature setting, along with the supply temperature of the water will determine the flow rate output of the unit.
- Please refer to the temperature vs. gallons per minute chart on p. 76 to determine the likely flow rates based on your local ground water temperature and your desired outlet water temperature.
- Refer to the table below for typical household plumbing fixture flow rates to determine what the water heater can do in a household application.

Household Flow Rates

Appliance/Use	Flow rate	
	GPM (US)	L/min
Lavatory Faucet	1.0	3.8
Bath Tub	4.0 – 10.0	15.2 - 37.8
Shower	2.0	7.5
Kitchen Sink	1.5	5.6
Dishwasher	1.5	5.6
Washing machine	4.0	15.2

Taken from UPC 2006

FREEZE PROTECTION SYSTEM

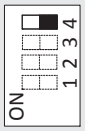
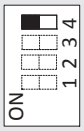
WARNING

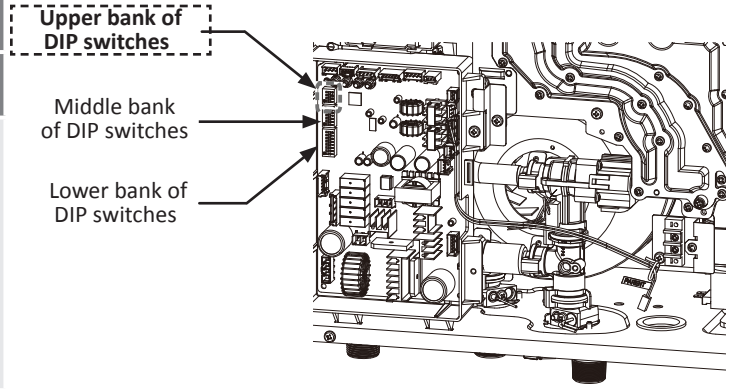
- **To set pump operation for freeze protection, adjust only the No. 4 DIP switch in the UPPER bank of DIP switches. (See below.) DO NOT adjust the other DIP switches.**
- **Turn off the power supply to the water heater before changing the DIP switch settings.**
- **Failure to observe these warnings could lead to carbon monoxide poisoning, severe personal injury, or death.**

- There are two systems for freeze protection in the water heater-**heating block system** and **recirculation system** with the integrated pump.
- This water heater comes equipped with heating blocks to protect the unit against damages associated with freezing. When the freeze protection thermostat senses air temperature below 36.5 °F (2.5 °C), the blocks will heat up to prevent freezing of the unit.
- This water heater can recirculate the water in the pipes installed in the recirculation system with the integrated pump to prevent freezing. When the integrated thermistors detect water temperature below 50 °F (10 °C), the pump will activate and recirculate the water in the recirculation line.*
- To operate these freeze protection systems, there has to be electrical power to the unit. Damage to the heat exchanger caused by freezing temperatures due to power loss is not covered under the warranty. In cases where power losses can occur, consider the use of a backup power supply.
- In any areas subject to freezing temperatures, the manufacturer highly recommends an indoor installation with an indoor model.
- The manufacturer also highly recommends the use of a backflow preventer (sold separately) to minimize the amount of cold air entering through the exhaust venting when the water heater is off.
- It is the installer's responsibility to be aware of freezing issues and take all preventative measures. The manufacturer will not be responsible for any damage to the heat exchanger as a result of freezing.
- If you will not be using your heater for a long period of time:
  1. Completely drain the water out of the unit. Refer to p. 63.
  2. Disconnect power to your heater.

  This will keep your unit from freezing and being damaged.

*Recirculation system for freeze protection is only activated when the built-in/remote controller is off. When the integrated thermistors detect the water temperature above 52 °F (11 °C) over five minitues, the operation is deactivated. If you want to stop the recirculation system for freeze protection, change the DIP switch setting below.

Pump operation for freeze protection	
Active	Inactive
	
No.4 : OFF	**No.4 : ON DEFAULT**



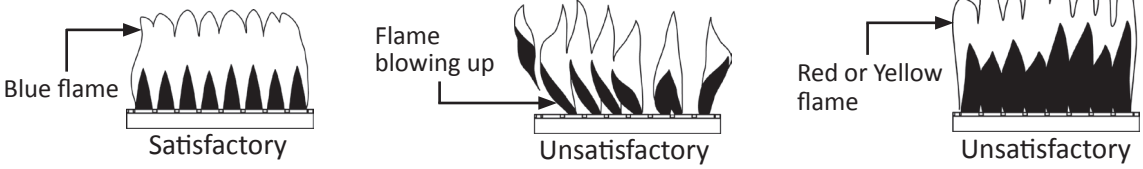
NOTICE Only pipes within the water heater are protected by the freeze protection system. Any water pipes (hot or cold) located outside the unit will not be protected. Properly protect and insulate these pipes from freezing.

MAINTENANCE AND SERVICE

WARNING

- **Turn off the electrical power supply and close the manual gas shutoff valve and the manual water control valve before servicing.**
- **Failure to do so could result in severe personal injury, or death.**

- Clean the cold-water inlet filter. (Refer to the Unit Draining and Filter Cleaning Section on this page.)
- Be sure that all openings for combustion and ventilation air are not blocked.
- The venting system should be checked annually for any leaks, corrosion, blockages or damage.
- The burner should be checked annually for dust, lint, grease or dirt.
- Keep the area around the water heater clear. Remove any combustible materials, gasoline or any flammable vapors and liquids.
- If the relief valve discharges periodically, it may be due to thermal expansion in a closed water supply system. Contact the water supplier or local plumbing inspector on how to correct this situation.
- Visually check of burner flames (see below) through the burner window in the burner assembly located at the middle of the water heater.



The manufacturer recommends having the unit checked once a year or as necessary by a licensed technician. If repairs are needed, any repairs should be done by a licensed technician.

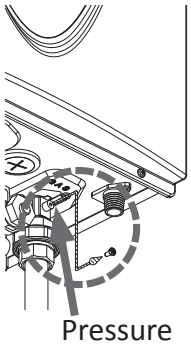
-Measuring inlet gas pressure-

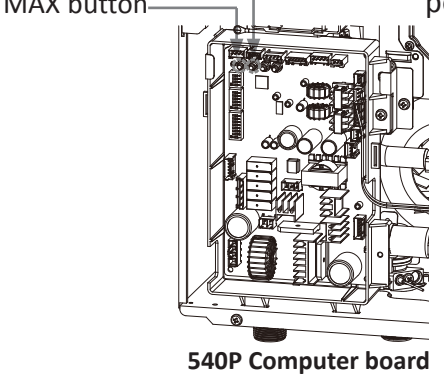
WARNING

1. Turn off all electric power to the water heater if service is to be performed.
2. Turn the manual gas valve located on the outside of the unit to the off position.
3. Failure to follow these steps could lead to fire or explosion, resulting in personal injury or death.

The water heater cannot perform properly without sufficient inlet gas pressure. Below are instructions on how to check the inlet gas pressure. **THIS IS ONLY TO BE DONE BY A LICENSED PROFESSIONAL**.

1. Shut off the manual gas valve on the gas supply line.
2. Remove the screw from the pressure port which is located on the gas inlet of the water heater shown in the diagram on the right.
3. Connect the manometer to the pressure port and zero the manometer.
4. Re-open the manual gas valve. Verify that there are no gas leaks.
5. With all gas burning equipment off, take a reading of the static gas pressure and make a note of it.
6. Measure gas supply pressure at maximum heater operation: Open hot water faucets to create maximum flow. Press the MAX button on the computer board. (Refer to the diagrams below.) Take a reading of the supply dynamic gas pressure with all gas burning equipment running at maximum rate.
7. The static and dynamic pressures should be within the ranges specified on the heater's rating plate and the table on p. 31.
8. The difference of static to dynamic pressure should not exceed 1.5" W.C. Pressure drops that exceed 1.5" W.C. can indicate restricted gas flow, undersized gas lines, and/or undersized supply regulators. (NOTICE: In Canada, the pressure drops cannot exceed those specified in CSA B149.1.)
9. Measure gas supply pressure at minimum heater operation: Reduce water flow so the heater is running at minimal operation. Press the MIN button on the computer board. (Refer to the diagram.) Take a supply gas pressure reading and verify that it is within the specified inlet gas pressure range.

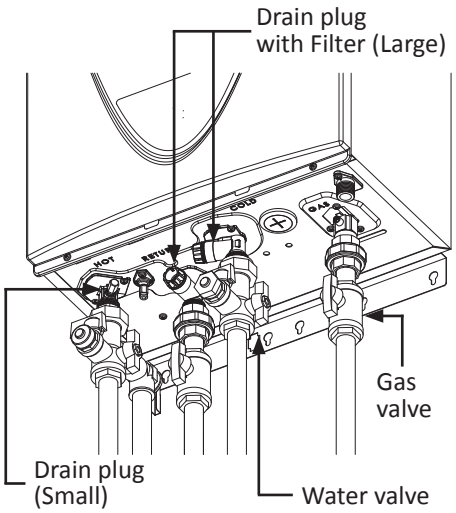


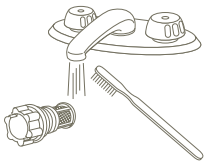


540P Computer board

UNIT DRAINING and FILTER CLEANING

1. Close the manual gas shutoff valve.
2. Turn off power to the unit and wait a couple of seconds. Turn on again.
3. Wait 30 seconds, and then turn off power to the unit.
4. Close the inlet water valve.
   - If the heater is part of an Easy-Link or Multi-Unit System, close the inlet and outlet water valves to isolate the heater. Then proceed to step 6.
5. Open all hot water taps in the house. When the residual water flow has ceased, close all hot water taps.
6. Have a bucket or pan to catch the water from the unit's drain plugs. If Isolation valves are installed, open the drains to drain the water. If isolation valves are not installed, **unscrew** the two drain plugs (large and small) to drain all the water out of the unit. Do not lose the o-rings that will be on the two drain plugs.
7. Wait a few minutes to ensure all water has completely drained from the unit.
8. **Clean the filter**: Check the water filter located within the cold inlet. With a tiny brush, clean the water filter of any debris which may have accumulated and reinsert the filter back into the cold water inlet.
9. Securely screw the drain plugs back into place.
   Hand- tighten only.

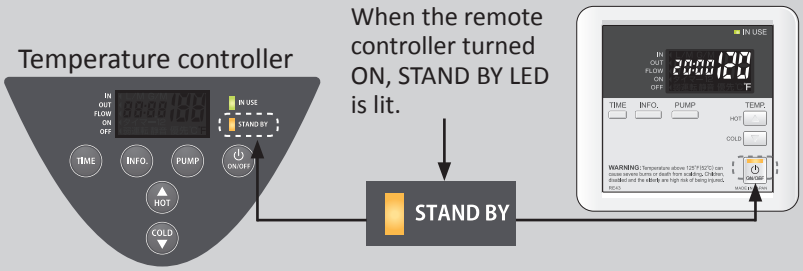
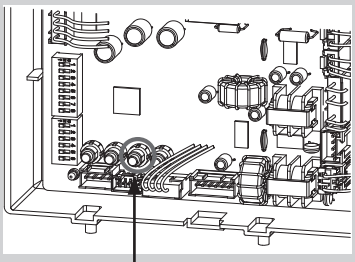




TROUBLESHOOTING

GENERAL

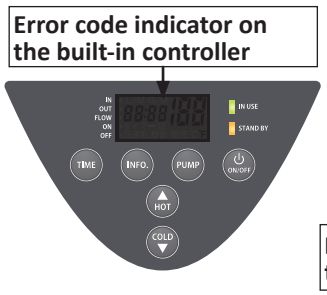
	PROBLEM	SOLUTIONS
TEMPERATURE and AMOUNT OF HOT WATER	It takes a long time to get hot water at the fixtures.	• Check to see if a recirculation timer is active. If not, it will take time for the hot water to get from the heater to the fixture. • Check the recirculation pump for proper flow. • The inlet filters on the return and inlet connections may need to be cleaned.
	The water is not hot enough.	• Compare the flow and temperature. See the charts on p. 76. • Check cross plumbing between cold water lines and hot water lines. • Is the gas supply valve open fully? (p. 44) • Is the gas line sized properly? (p. 31) • Is the gas supply pressure sufficient? (pp. 31 and 62) • Is the set temperature set too low? (pp. 51 and 60)
	The water is too hot.	• Is the set temperature set too high? (pp. 51 and 60)
	The hot water is not available when a fixture is opened.	• Make sure the unit has 120 VAC, 60 Hz power supply. • If you are using the remote controller and/or temperature controller, is the power button turned on? • Is the gas supply valve open fully? (p. 44) • Is the water supply valve open fully? (p. 44) • Is the filter on the cold water inlet and return connection clean? (p. 63) • Is the hot water fixture sufficiently open to draw at least 0.5 GPM (1.9 L/min) through the water heater? (p. 50) • Is the unit frozen? (p. 61) • Is there enough gas in the tank / cylinder? (For Propane model)
	The hot water turns cold and stays cold.	• Is the flow rate enough to keep the water heater running? (p. 50) • If there is a recirculation system installed, does the recirculation line have enough check valves? (p. 33) • Is the gas supply valve open fully? (p. 44) • Is the filter on the cold water inlet and return connection clean? (p. 63) • Are the fixtures clean of debris and obstructions? • Check if the flow rate is too low. (p. 50)
	Fluctuation in hot water temperature.	• Is the filter on the cold water inlet and return connection clean? (p. 63) • Is the gas line sized properly? (p. 31) • Is the supply gas pressure sufficient? (pp. 31 and 62) • Check for cross connection between cold water lines and hot water lines.

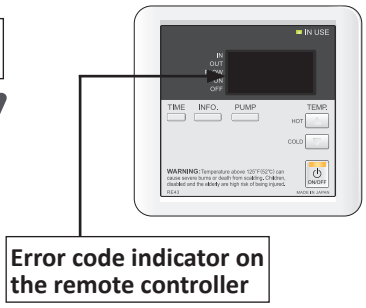
	PROBLEM	SOLUTIONS
WATER HEATER	Unit does not ignite when water goes through the unit.	• Is the flow rate over 0.5 GPM (1.9 L/min)? (p. 50) • Is the filter on cold water inlet and return connection clean? (p. 63) • Check for reverse connection and cross connection. • If you use the remote controller and/or built-in controller, is the power button turned on? • Check if the inlet temperature is too high.
	The fan motor is still spinning after operation has stopped.	• This is normal. After operation has stopped, the fan motor keeps running from 15 to 70 seconds in order to re-ignite quickly, as well as purge all the exhaust gas out of the flue.
	Unit sounds abnormal while in operation	• Contact the manufacturer at 1-877-737-2840 (USA) 1-888-479-8324 (Canada)
BUILT-IN CONTROLLER AND REMOTE CONTROLLER	Controller does not display anything when the power button is turned on.	• Make sure the unit is supplied with power. • Make sure the connection to the unit is correct. (pp. 38 and 39) NOTICE: When the unit has not operated for five minutes or more, the display of the controllers turns off to conserve energy.  Although the controller of the parent unit will display the set temperature at the Easy-Link System, the controller of the child unit will not display the set temperature.
	An ERROR code is displayed.	• Please see pp. 68 and 69.
EASY-LINK SYSTEM	How are the unit numbers assigned?	• For an Easy-Link System, the Parent unit is always labeled #1 and all other subsequent Child units are numbered randomly. • To check which numbers are assigned to which Child units, push the button on the computer board of any Child unit as shown below. The unit number will be displayed on the built-in controller of the Child unit and/or the remote controller of the Child unit, if installed. (Refer to pp. 40 and 41.) Child units : 540 models 

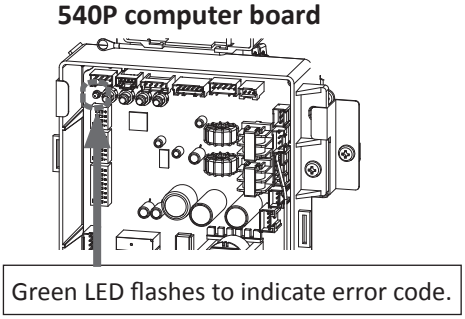
ERROR CODES

-General-

- The units have self-diagnostic functions for safety and convenience when troubleshooting.
- If there is a problem with the installation or the unit, the error code will be displayed on the built-in controller or remote controller.
- Consult the table on the following pages for the description of each error code.







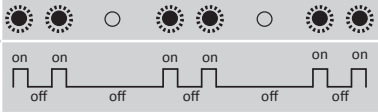
-Single unit Installations-

<u>Example</u>: If your unit has the "321" error code (which signifies an inlet thermistor failure)

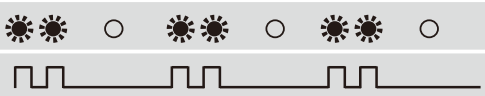
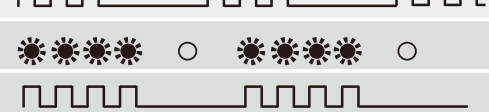
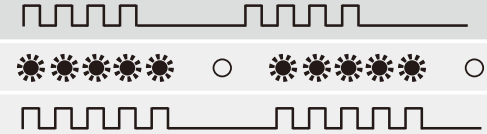
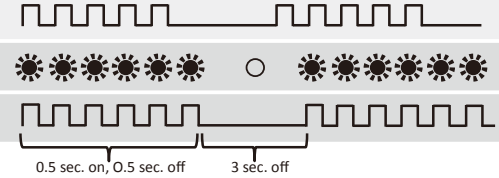
- **Indicator on the built-in controller and/or remote controller:** "321" will be displayed on the screen in its entirety.

Error code

- **Green LED on the computer board:** The green LED on the computer board will indicate this code with two flashes every 1/2 second. The pattern will repeat with a three second delay between patterns.

Error code	Green LED
321	

Error Indication

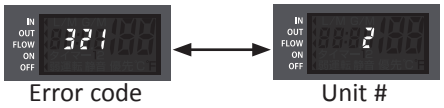
Error Code on the temperature controller	Green LED	
	The number of flashes	Flash pattern
031 701 711	One	
311 321 331 341 351 391 441	Two	
111 121	Three	
611 631 651 661	Four	
101 941 991	Five	
510 551 721	Six	

-How error codes display in an Easy-Link System-

Error codes will be displayed differently with units installed in an Easy-Link System. It will show both the error code and which unit has the error code. Below is an example of how the error code of "321" is displayed in an Easy-Link System.

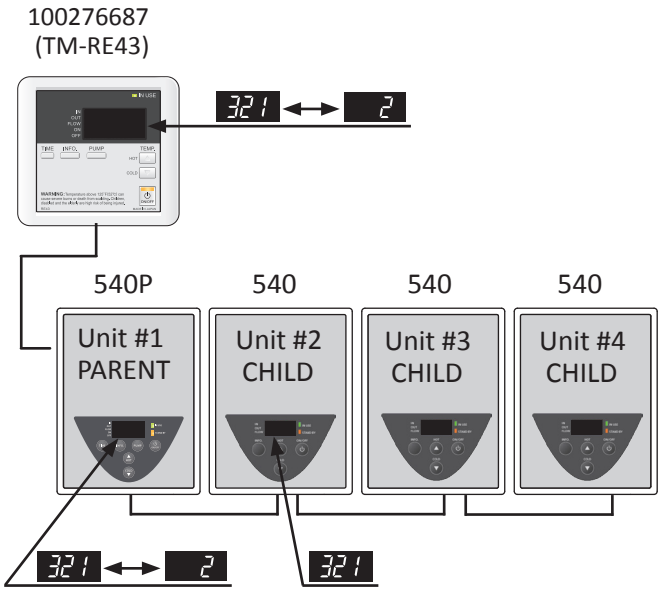
<u>Example</u>: Unit #2 with a "321" error code (inlet thermistor failure)

- **Indicator on the built-in controller and/or remote controller of Parent unit*:** "321" and "2" will alternately flash on the display.



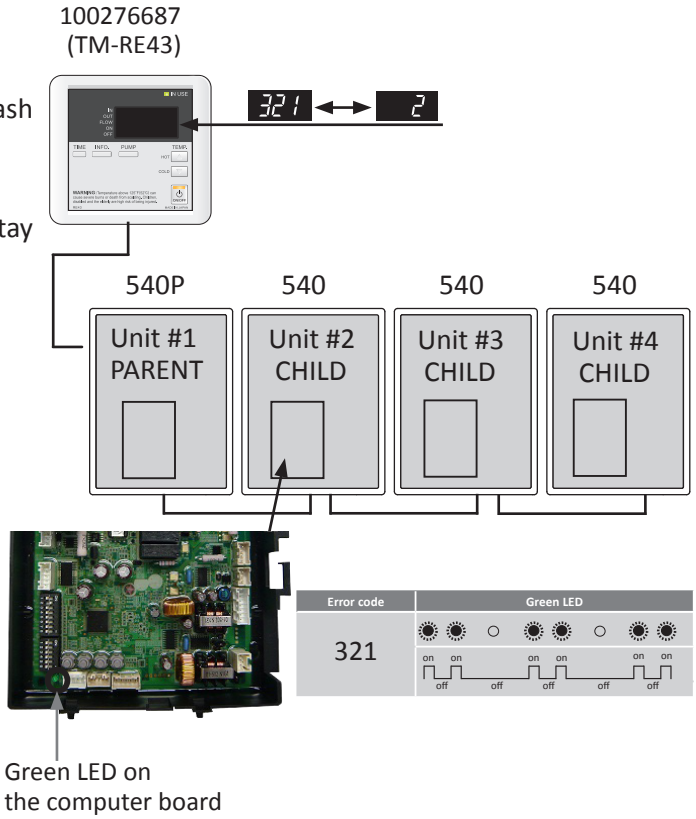
Indoor model installation

- **Unit #2:** "321" will flash on the display. The green LED on the computer board will be flashing twice, just like in the single unit example.
- **Unit #3 and #4:** These units will not display anything, as the error code does not pertain to them.



Outdoor model installation

- **Unit #2:** The green LED on the computer board will flash twice, just like in the single unit example.
- **Unit #3 and #4:** The green LED on the computer board will stay off.



*If the 540P Indoor model is the PARENT unit and the remote controller is connected to the unit, the remote controller has priority over the built-in controller.

-Fault analysis-

If the error code is displayed on the computer board of the water heater or remote controller and/or temperature controller, please check the following. After checking, **consult with the manufacturer**.

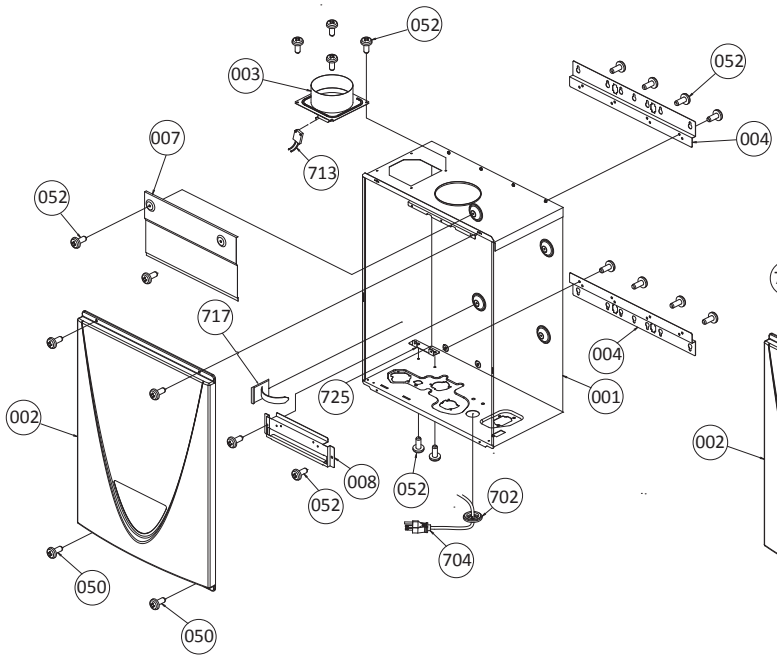
Remote	Green LED	Malfunction description	Diagnosis
031	One Time	Incorrect DIP switch setting	• Check the DIP switch settings on the PCB (Part #701).
101	Five Times	Warning for the "991" error code	• Check the gas type of the water heater. • Check if there is any blockage in the intake air and/or exhaust. • If the water heater is installed as a direct vent system, check whether there is enough distance between the intake air terminal and the exhaust terminal. • Check the altitude/elevation of area of where the water heater is installed. • Check if there is grease and/or dirt in the burner (Part #101) and the fan motor (Part #103), especially if the water heater has been installed in a contaminated area.
111	Three Times	Ignition failure	• Check if the Hi-limit switch (Part #412) is properly functioning. • Check for connection/breakage of wires (Part #413, 708, 709, 711), burn marks on the computer board (Part #701), and/or soot on the flame rod (Part #108). • Check if there is a buzzing spark ignition sound coming from the burner (Part #101) when water heater prepares for combustion. • Listen for the double "clunk" sound coming from gas valve assembly (Part #102) when water heater goes into combustion. • Check if there is leaking from heat exchanger (Part #401).
121	Three Times	Loss of flame	• Check if the Hi-limit switch (Part #412) is functioning properly. • Check for connection/breakage of wires (Part #413, 708, 709, 711), burn marks on the computer board (Part #701), and/or soot on the flame rod (Part #108). • Check if there is leaking from heat exchanger (Part #401).
311	Two Times	Heat exchanger thermistor failure	• Check for connection/breakage of wires and/or debris on thermistor (Part #407, 408, 411, 715, 718, 731).
321	Two Times	Inlet thermistor failure	
331	Two Times	Outlet thermistor failure	
341	Two Times	Exhaust thermistor failure (Indoor model only)	
351	Two Times	Return Thermistor Failure	
391	Two Times	Air-fuel ratio rod failure	• Check for connection/breakage of wires (Part #709) and/or soot on the AFR rod (Part #108).
441	Two Times	Flow sensor failure	• Check for connection/breakage of wires and/or debris on the flow sensor impeller (Part #402).
510	Six Times	Abnormal main gas solenoid valve	• Check for connection/breakage of wires (Part #708) and/or burn marks on the computer board (Part #701).
551	Six Times	Abnormal gas solenoid valve	• Check for connection/breakage of wires (Part #708) and/or burn marks on the computer board (Part #701).

Remote	Green LED	Malfunction description	Diagnosis
611	Four Times	Fan motor fault	• Check for connection/breakage of wires, dust buildup in the fan motor (Part #103) and/or burn marks on the computer board (Part #701). • Check for frozen/corrosion of connectors (Part #103).
631	Four Times	Pump fault	• Check for connection/breakage of wires in the pump(Part #726). • Check if the water in the pump has frozen (Part #726).
651	Four Times	Flow adjustment valve fault (Easy-Link System only)	• Inspect the flow adjustment valve (Part #402), for connection/ breakage of wires, locked motor drive due to scale buildup, and/ or water leakage.
661	Four Times	Bypass valve fault	• Inspect the bypass valve (Part #403), for connection/breakage of wires, locked motor drive due to scale buildup, and/or water leakage.
701	One Time	Computer board fault	• Check for connection/breakage of wires (Part #714).
711	One Time	Gas solenoid valve drive circuit failure	• Refer to the 111 and 121 error codes.
721	Six Times	False flame detection	• Check if there is leaking from heat exchanger (Part #401).
741	N/A	Miscommunication between water heater and remote controller	• Check the model type of the remote controller. • Inspect the connections between the water heater and remote controller. • Check the power supply of the water heater.
751	N/A	Miscommunication between water heater and built-in controller (Indoor model only)	• Inspect the connections between the water heater and built-in controller. • Check the power supply of the water heater.
761	N/A	Miscommunication in Easy-Link System	• Check if the connections between the parent unit and the child units are correct. Refer to pp. 40 and 41.
941	Five Times	Abnormal exhaust temperature (Indoor model only)	• Check if the inlet and return water temperature is higher than 140°F (60°C) in the recirculation system.
991	Five Times	Imperfect combustion	• Check the gas type of the water heater. • Inspect the environment around the water heater. Determine how long the unit has been installed. • Check the altitude/elevation of the area of where the water heater is installed. • Check if there is any blockage in the intake air and/or exhaust. • If the water heater is installed as a direct-vent system, check whether there is enough distance between the intake air terminal and the exhaust terminal. • Check if there is grease and/or dirt in the burner (Part #101) and the fan motor (Part #103), especially if the water heater has been installed in a contaminated area.

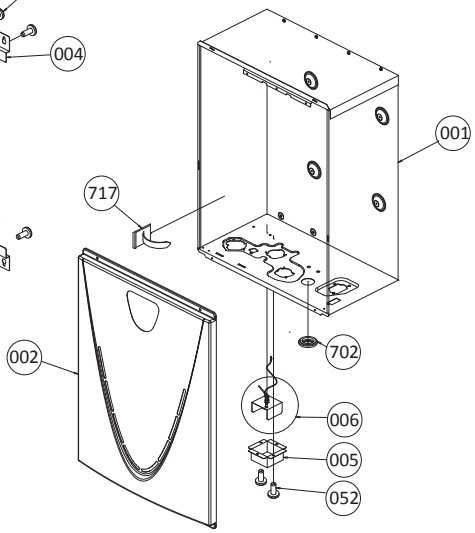
COMPONENTS DIAGRAM

Case assembly

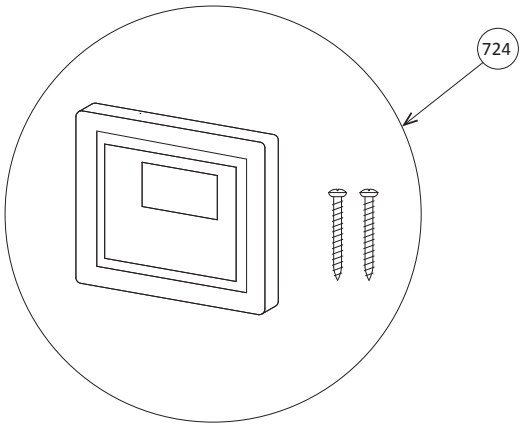
Indoor model



Outdoor model

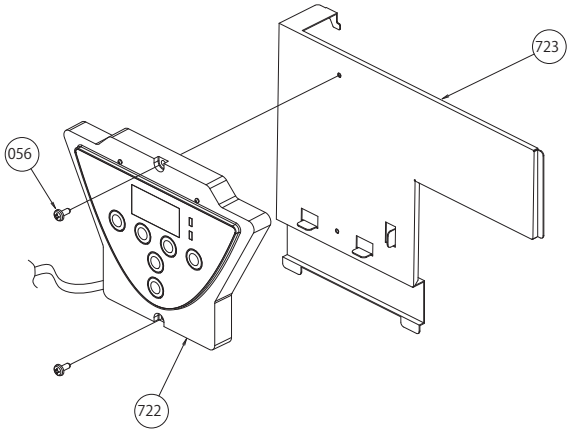


Temperature remote controller

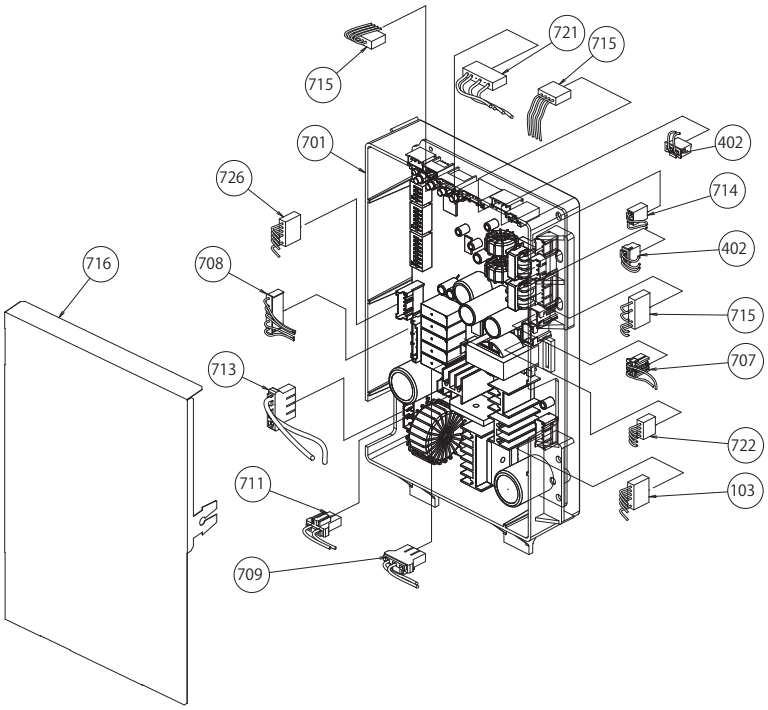


Built-in controller

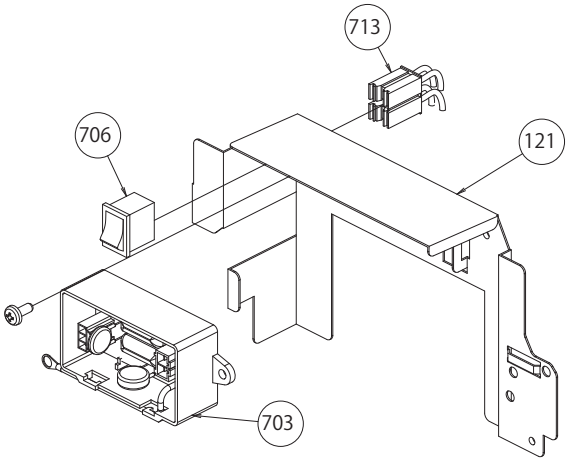
Indoor model



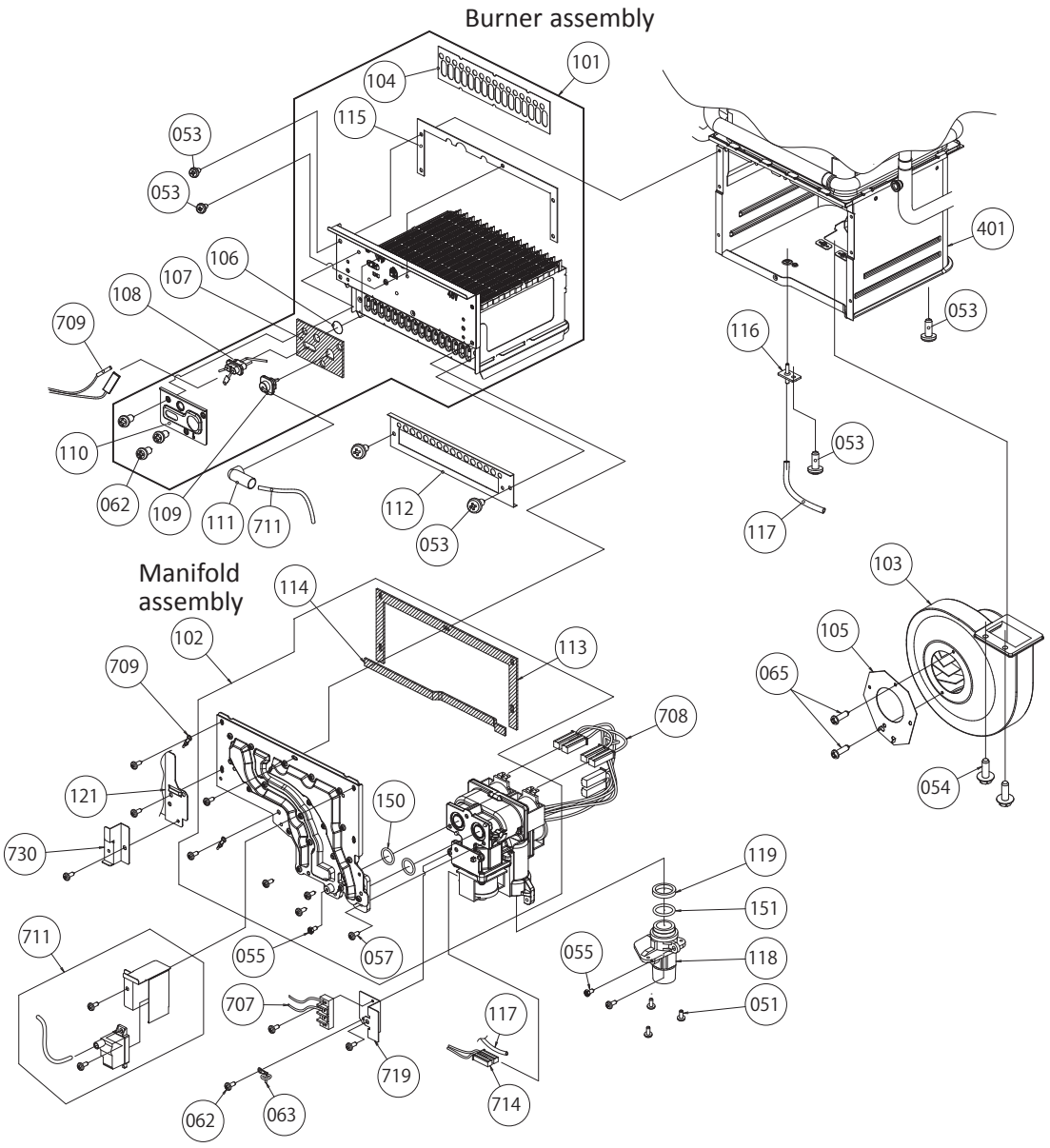
Computer board assembly



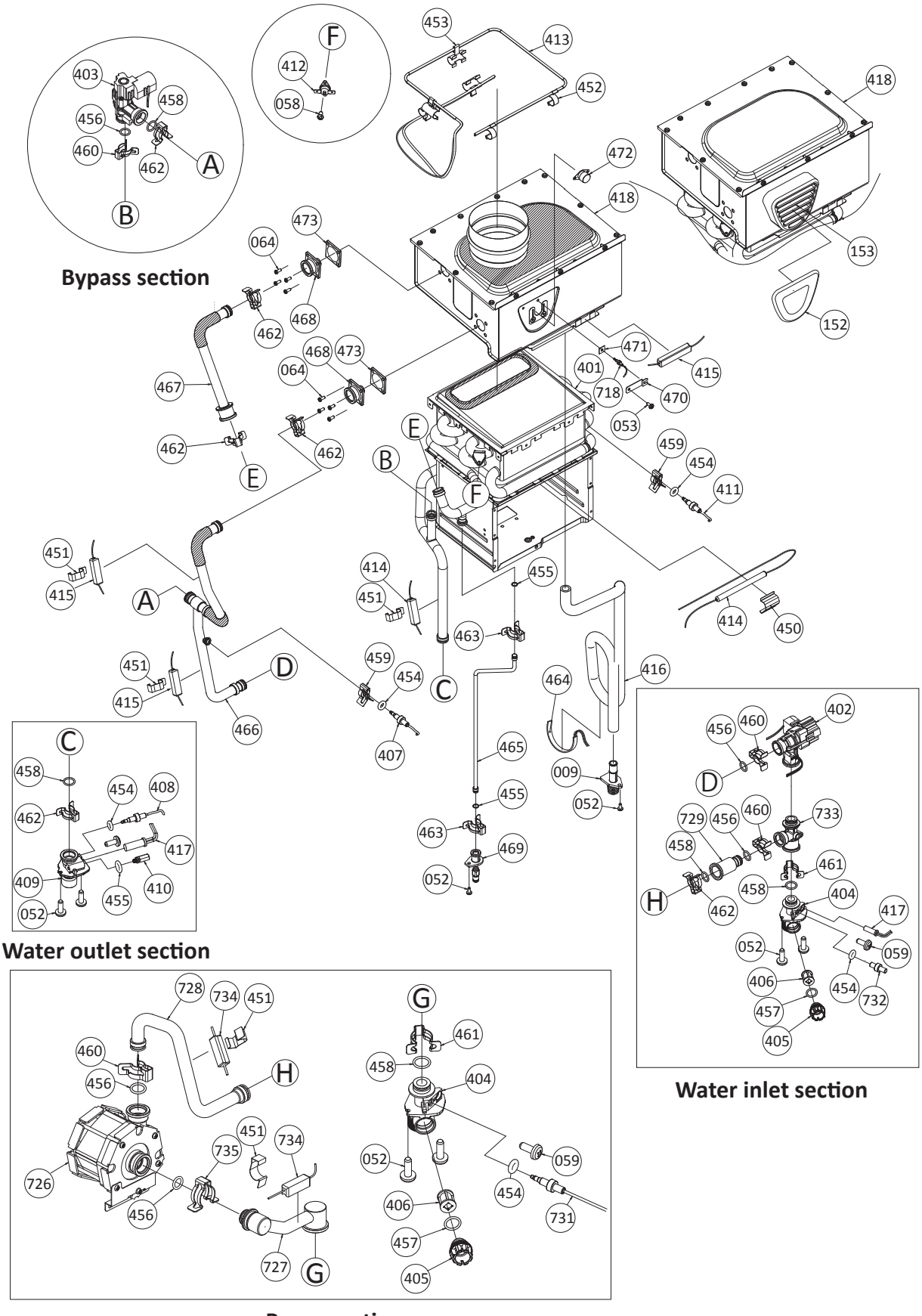
Surge box assembly



Burner assembly



Water way assembly



PARTS LIST

Item #	Description	Part #	
		540P	(AT-H3P)
001	Case assembly for Indoor model	N/A	EK617
	for Outdoor model	N/A	EK635
002	Front cover for 540P Indoor	100074665	EK158
	for 540P Outdoor	100074666	EK174
003	Intake air port assembly	100074667	EK170
004	Bracket	N/A	EK162
005	Junction box	100074668	EK190
006	Power supply cord assembly	100276679	EK637
007	Back guard panel	N/A	EK161
008	Chamber fixing plate	N/A	EK160
009	Condensate drain port	100074203	EKH23
050	Truss screw M4×12 (W/Washer) SUS410	100074210	EW000
051	Truss screw M4×10 (W/Washer) SUS410	100074509	EW001
052	Truss screw M4×10 (Coated) SUS3	100074211	EW002
053	Truss screw M4x10 SUS	100074245	EW003
054	Hex head screw M4×12 (W/Washer) SUS3	100074510	EW004
055	Hex head screw M4x8 FEZN	100074248	EW005
056	Pan screw M4x20 SUS410	N/A	EW018
057	Tap tight screw M4x12 FEZN	100074385	EKK31
058	Tapping screw M3x6 SUS3 Pan head	100074272	EW00A
059	Tapping screw M4x6 SUS3 Truss head	100074512	EW009
060	Tap tight screw M4x12	100076269	EKK37
061	Plus bind Screw M3x6 FEZN	N/A	EK191
062	Pan screw M4x8 MFZN	100074526	EW00D
063	Wire clamp 60	100074233	EM167
064	Screw M4x10	N/A	EK230
065	Screw M3x6 SUS3 Binding head	100074514	EW00B
101	Burner assembly	100074670	EK192
102	Manifold with gas valve assembly LP	100074671	EK181
	Manifold with gas valve assembly NA	100074672	EK182
103	Fan motor for Indoor model	100074606	EK109
	Fan motor for Outdoor model	100074228	EKK25
104	Burner gasket	100074216	EKK2X
105	Fan damper for Indoor model	100074466	EM381
106	Burner window	100074218	EKK2V
107	Rod holder gasket	100074219	EKK2W
108	Flame rod	100074673	EK193
109	Igniter rod	100074222	EKK0F
110	Rod holder	100074221	EKK32
111	Rod cap	100074223	EKN61
112	Burner damper LP	100074674	EK183
	Burner damper NA	100074675	EK169
113	Manifold gasket A	100074229	EKK2Y
114	Manifold gasket B	100074230	EKK2K
115	Burner holder gasket	100074217	EKK0G
116	Pressure port	100074227	EKK2D
117	Combustion chamber tube	100074528	EX019
118	Gas inlet	100074616	EK117
119	Gas inlet ring	100074526	EX00D
121	Surge box plate	N/A	EK618
150	O-ring P18 NBR (Black)	100074533	EZP18
151	O-ring P20 NBR (Black)	100074242	EK042
152	Silicon ring for Outdoor model	100074678	EK157
153	Exhaust port for Outdoor model	100074679	EK177

Item #	Description	Part #	
		540P	(AT-H3P)
401	Primary heat exchanger assembly for 540P model	100276637	EK621
402	Flow adjustment valve / Flow sensor	100074624	EK129
403	Bypass valve	100074625	EKD58
404	Water inlet	100074377	EKK1U
405	Inlet drain plug	100074381	EKK2B
406	Inlet water filter	100074382	EKK2C
407	Inlet thermistor	100276682	EK641
408	Outlet thermistor	100074374	EKK1A
409	Water outlet	100074681	EK208
410	Outlet drain plug	100074383	EKK2E
411	Heat exchanger thermistor	100074281	EKK2T
412	Hi-Limit switch	100074280	EKN34
413	Overheat-cut-off fuse	100074334	EK333
414	Pipe heater	100074682	EK209
415	Inlet heater for Indoor model	100074683	EK210
	Inlet heater for Outdoor model	100074684	EK211
416	Drain tube	100074685	EK231
417	Inlet heater	100074629	EK105
418	Secondary heat exchanger for Indoor model	100074700	EK251
	Secondary heat exchanger for Outdoor model	100074701	EK256
450	Pipe heater fixing plate	100074273	EKK27
451	Heater fixing plate 16	100074310	EK031
452	Fuse fixing plate 18	100074251	EKK26
453	Fuse fixing plate 14	100074331	EK029
454	O-ring P4 FKM	100076303	EZM04
455	O-ring P6 FKM	100076305	EZM06
456	O-ring P14 FKM	100076306	EZM14
457	O-ring P15 FKM	100076307	EZM15
458	O-ring P16 FKM	100076308	EZM16
459	Fastener “4-11”	100074282	EKH30
460	Fastener “14-22”	100074290	EKK24
461	Fastener “16A”	100074410	EM192
462	Fastener “16-25A”	100074389	EKK39
463	Fastener “6-15”	100074297	EX12K
464	Flat heater	100074686	EK217
465	Drain tube	100276674	EK625
466	Cold pipe	100276640	EK624
467	Stainless heat exchanger out pipe	100074690	EK222
468	Header connection	100074691	EK226
469	Drain port	100074692	EK228
470	Thermistor fixing plate	100074291	EX13H
471	Exhaust thermistor gasket	100074296	EX13L
472	Hi-limit switch for exhaust	100074289	EKH6G
473	Gasket	100074693	EK229
701	Computer board	100276677	EK628
702	Rubber grommet	100076470	EX00B
703	Surge box	100076100	EK280
704	120 VAC wire for Indoor model	100074601	EK146
706	120 VAC Power ON-OFF switch	100074326	EKK4V
707	Remote controller wire	100074650	EK165
708	Gas valve wire	N/A	EK633
709	Flame rod wire	N/A	EK634
711	Igniter assembly	100276678	EK630

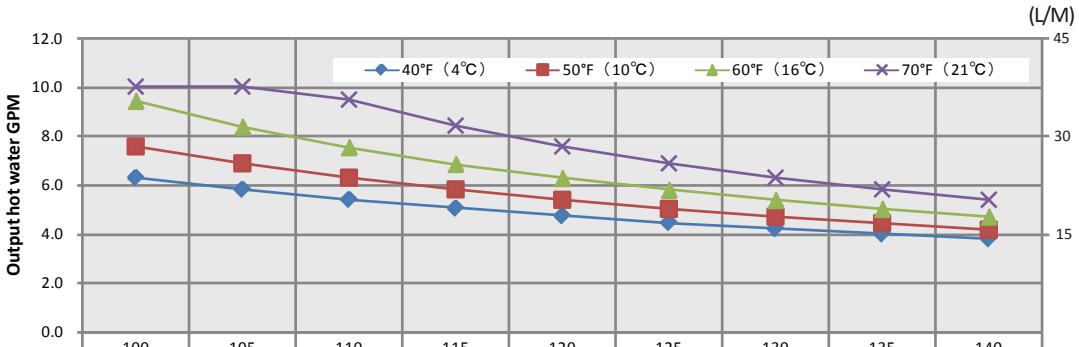
Item #	Description	Part #	
		540P	(AT-H3P)
713	Switch wire with thermostat for Indoor model	N/A	EK631
	for Outdoor model	N/A	EK636
714	Proportional gas valve wire	100074657	EK167
715	24V cables for Indoor model	N/A	EK632
	for Outdoor model	N/A	EK638
716	Computer board cover	100074375	EKK1M
717	Cable clamp	N/A	EX13C
718	Exhaust thermistor for Indoor model	100074316	EKH6E
719	Remote fixing plate	100074644	EK152
721	Exhaust Hi-limit switch wire	100074659	EK180
722	Temperature controller for Indoor model	100276680	EK639
723	Fixing plate	N/A	EK629
724	Temperature remote controller	100276687	TM-RE43
725	Pump fixing plate	N/A	EK619
726	Recirculation pump assembly	100276636	EK620
727	Pump inlet pipe	100276638	EK622
728	Pump outlet pipe	100276639	EK623
729	Pump connection	100276676	EK626
730	PCB fixing plate	N/A	EK627
731	Return thermistor	100276681	EK640
732	Closing plug	100276683	EK642
733	Three way connection	100276686	EK643
734	Heater	100076326	EK469
735	Fastner "12.7"	100076400	EM190

OUTPUT TEMPERATURE CHART

Chart is based on properly sized gas line.

540P model

Output Temperature vs. GPM (Max. 10.0 GPM) with Various Inlet Water Temperature



Incoming temp. °F(℃) \ Set temp. °F(℃)	100 (38)	105 (40)	110 (43)	115 (45)	120 (50)	125 (52)	130 (55)	135 (57)	140 (60)
40°F (4℃)	6.3 (23.9)	5.8 (22.0)	5.4 (20.4)	5.0 (19.1)	4.7 (17.9)	4.4 (16.8)	4.2 (15.9)	4.0 (15.1)	3.8 (14.3)
50°F (10℃)	7.6 (28.6)	6.9 (26.0)	6.3 (23.9)	5.8 (22.0)	5.4 (20.4)	5.0 (19.1)	4.7 (17.9)	4.4 (16.8)	4.2 (15.9)
60°F (16℃)	9.5 (35.8)	8.4 (31.8)	7.6 (28.6)	6.9 (26.0)	6.3 (23.9)	5.8 (22.0)	5.4 (20.4)	5.0 (19.1)	4.7 (17.9)
70°F (21℃)	10.0 (37.9)	10.0 (37.9)	9.5 (35.8)	8.4 (31.8)	7.6 (28.6)	6.9 (26.0)	6.3 (23.9)	5.8 (22.0)	5.4 (20.4)

*When the set temperature is 130 °F (55 °C) or higher, maximum flow rate is limited to 8.0 GPM.

5M2051-1
2000536265
(REV. B)

CIRC PUMP

Taco Comfort Solutions
A Taco Group Company

Instruction Sheet

102-067B

Timer and Aquastat

SUPERSEDES: January 3, 2014 EFFECTIVE: November 24, 2015

Plant I.D. 001-4223

Application:

The Taco Clock Timer/Temperature Aquastat combination is designed to cycle the circulator during peak demand periods. The Analog Timer (No. 265-1) is adjustable to 15 minute intervals within a 24 hour time frame. The Digital Timer (No. 265-3) can be programmed for 7 day operation. The Temperature Aquastat (No. 563-2) automatically switches the circulator ON at 95ºF and OFF at 115ºF. The two can be used in combination, or they can be used separately. When the Clock Timer/Temperature Aquastat are used together, the Timer switches ON sending power to the unit. The Temperature Aquastat measures the temperature, and cycles the circulator as long as the Timer is switched to the ON mode.

If used separately, the Clock Timer operates the circulator during the chosen number of ON/OFF intervals. When using only the Temperature Aquastat, the circulator cycles intermittently to maintain a temperature between 95ºF and 115ºF.

The Clock Timer and Temperature Aquastat are easy to retrofit to any "00" Series Circulator. The user-friendly 24 hour analog clock has an hour hand, raised minute hand for ease of adjustment, two directional arrows, and AM/PM time settings. Our easy to program digital timer provides maximum convenience, comfort and energy savings. The Clock Timer can be mounted in any direction by just attaching it to the capacitor box electrical connection hole.

Installation: FOLLOW ALL INSTRUCTIONS IN THE SEQUENCE THAT THEY APPEAR.

Analog Timer Installation Instructions:

1. Disconnect the electrical supply. Remove circulator terminal box screw and cover.
2. Loosen Timer box cover screw and remove cover.
3. Assemble the back portion of the Timer to the "00" terminal box as shown in the Timer installation diagram (006 circulator pictured). Make sure that the protruding tang on the back of the Timer box fits under the circulator's terminal box base. Adjust until the two terminal box openings are aligned.
4. Secure the locknuts. Feed the yellow and white circulator lead wires into the Timer through the bushing. Reassemble circulator terminal box cover and secure with the screw.
5. See electrical hook-up for Timer wiring.

Aquastat Installation Instructions:

1. Disconnect the electrical supply. Securely fasten the Aquastat clip to ¾" pipe or to the circulator casing for ½" pipe applications. The Aquastat must be properly fastened to insure a good reading.
2. See electrical hook-up for Aquastat wiring.

Electrical Hook-Up:

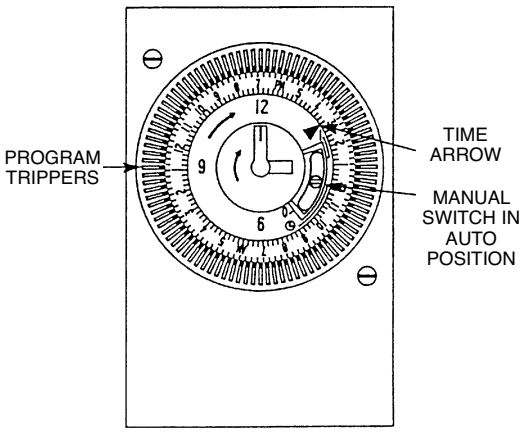
1. All electrical work must be performed by an electrician in accordance with the latest edition of the National Electrical Codes and Local Codes and Regulations.
2. Verify that the voltage, phase and frequency are correct for the Circulator, Timer and Aquastat prior to connection.
3. Follow the appropriate wiring diagram

Analog 24 Hour Timer Programming:

1. Set clock to the exact time of day by turning the outer black ring clockwise to move the hour/minute hands to the correct position. Pay special attention to the white arrow pointing to the correct **AM/PM** time in the 24 hour outer ring.
2. Set the desired **ON/OFF** times by pushing the trippers away from the clock face for **ON** operation. Leave the trippers toward the clock face for **OFF** operation. Each tripper represents a 15 minute interval.
3. Set switch in the middle position for ◷ automatic operation.

Analog Timer Manual Switch Settings:

1. Up = On, Constant Circulation I
2. Middle = Automatic operation ◷
3. Down = Off O



Analog Timer Clock Face

e-smart

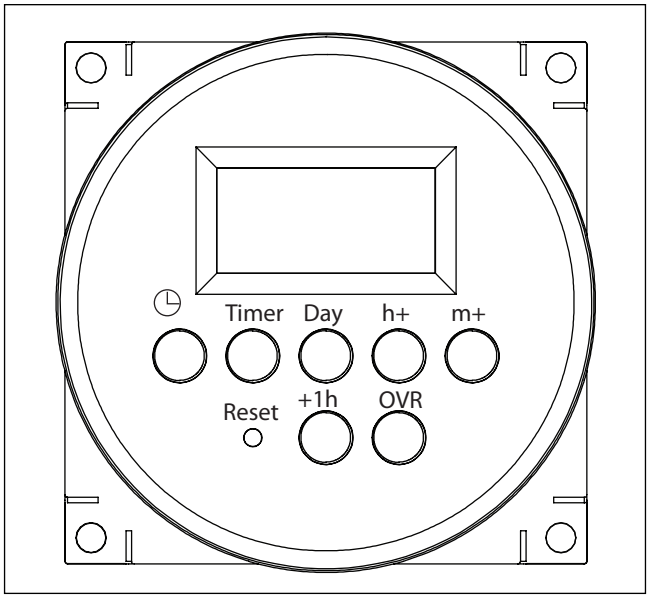
A Taco resource – saving product

Digital 7 Day Programmable Timer:

The Plumb n' Plug (PNP) digital timer features a large LCD display with user friendly keys for setting time and run programs. An internal re-chargeable battery holds programmed settings for up to 2,500 hours during power outages.

Note: Although the Plumb n' Plug digital timer contains some degree of spike and electrical noise protection, as with all electronic devices, these units can be affected by electrical noise. It is recommended that they be powered from a voltage source that has no switching devices or inductive loads connected.

Clock Face Description:



Setting the Time of Day

Follow this procedure to set the time of day and day of the week.

1. Press and release the **Reset** button with a blunt object to reset the unit. The timer screen flashes.
2. Press and hold ◷ and **h+** simultaneously to access the **12:00 AM** screen.
3. Take one of these actions.

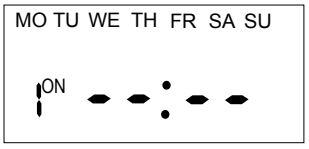
If..	Then...
Your time zone currently is in Daylight Savings Time,	Press the +1h button. Go to step 4.
Your time zone is not in Daylight Savings Time	Go to step 4 to set the current time.

4. Press and hold ◷ and press **h+** repeatedly until you advance to the current hour.
5. Press and hold ◷ and press **m+** repeatedly until you advance to the current minute.
6. Press and hold ◷ and press **Day** repeatedly until you advance to the current day.

Programming Events

To set ON/OFF event pair, set ON event and then repeat procedure to set OFF event. The timer enables up to 7 ON/OFF event pairs.

1. Press the **Timer** button. Dashed lines appear to indicate no event is set for event 1.



2. Press **Day** to select the days of the week for the ON event.
NOTE: To set the ON event:

ON a Specific Day	Select: The desired day
Every Day of Week	Select: **MO, TU, WE, TH, FR, SA, SU**
Every Weekday:	Select: **MO, TU, WE, TH, FR**
Every Weekend:	Select: **SA, SU**
Monday through Saturday	Select: **MO** through **SAT**
Monday, Wednesday, Friday	Select: **MO, WE, FR**

3. Press **h+** to scroll to the desired hour for ON event.
4. Press **m+** to scroll to the desired minute for the ON event.
5. Press **Timer** to advance to the OFF event screen.
6. Press **Day** to select the days of the week for the OFF event.
7. Press **h+** to scroll to the desired hour for the OFF event.
8. Press **m+** to scroll to the desired minute for the OFF event.

Take one of these actions.

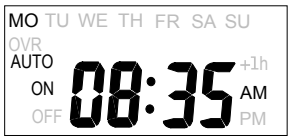
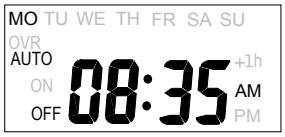
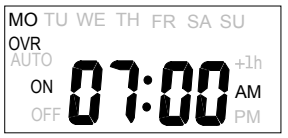
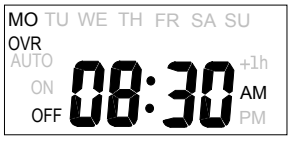
If...	Then...
You need to program another ON/OFF event pair,	Press **Timer** to advance to the next event ON screen and repeat steps 2 through 8.
All the required ON/OFF events are programmed,	Press ◷ to return main screen. The procedure is complete.

NOTE: If events include or intersect with each other, each ON/OFF event can be independently executed at the setpoint.

NOTE: If an ON event and OFF event occur at the same time, the timer will run the OFF event.

Daily Operation

Below is an overview of the different operation modes for FM1D14.

Mode	Timer Display	Description
Auto ON		Appears when an ON setpoint has been triggered
Auto OFF		Appears when an OFF setpoint has been triggered
OVR ON		Indicates relay has been overridden to ON status
OVR OFF		Indicates relay has been overridden to OFF status

NOTE: To execute an ON/OFF status override, press the **OVR** button on the timer to override an ON or OFF status. The override remains active until the next programmed event.

Modifying an Event

Follow this procedure to review or modify an event.

1. Press Timer to scroll to ON or OFF event you want to modify.
2. Take one of these actions.

If you want to modify the...	Then...
Days of the week for ON/OFF event,	Press **Day** repeatedly to scroll to desired days of the week Go to step 3.
Hour for ON or OFF event,	Press **h+** to scroll to desired hour Go to step 3.
Minute for ON or OFF event,	Press **m+** to scroll to desired minute Go to step 3.

3. Repeat steps 1 and 2 as needed to modify additional events.
4. When all the desired events are modified, press ◷ to confirm event settings and return to the time of day screen.

Deleting an Event

Follow this procedure to delete an event.

1. Press **Timer** to scroll to ON or OFF event you want to delete.
2. Press **OVR** to delete the event. Dashed lines appear in place of the time to indicate the event is deleted.
   NOTE: If necessary, repeat this procedure to delete both ON and OFF settings for the event.
3. When the modifications are complete, press ◷ to return to time of day screen.

Retrieving an Event

The timer enables deleted events to be retrieved. All deleted events can be retrieved until a new event is programmed in place of event.

1. Press Timer to scroll to the ON/OFF event you previously deleted. Dashed lines appear in place of the event time.
2. Press OVR to retrieve deleted event. The event ON or OFF time replaces the dashed line indicating that the event is retrieved.
   NOTE: If necessary, repeat this procedure to retrieve both ON and OFF settings for the event.
3. When the modifications are complete, press ◷ to return to time of day screen.

Adjusting Daylight Saving Time

Press **+1h** button to add the Daylight Saving Time hour to the current time or remove the hour to return to standard time.
NOTE: Do not perform this procedure if your area does not use Daylight Saving Time.

Resetting the Timer

In case of a timer malfunction or to delete all previous settings, the unit can be reset.
To reset the timer, use a blunt pointed object to press **Reset** as shown in Figure 4 on the next page. The timer resets and **deletes all the settings in the unit.**

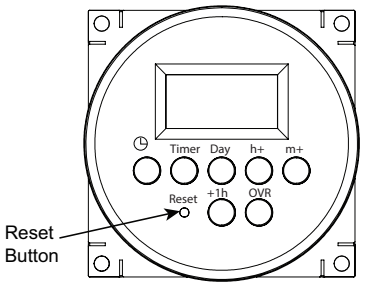


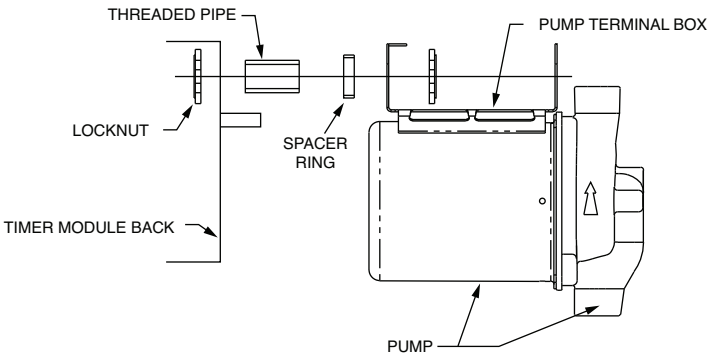
Figure 4. Reset Button

Overview of Power Loss Functions

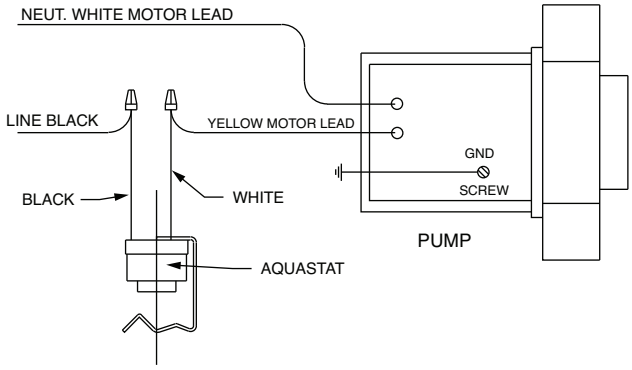
In the event of a power loss, the digital timer does the following:

- Relay will be in the OFF state
- Upon power restore, relay will go to the current programmed state

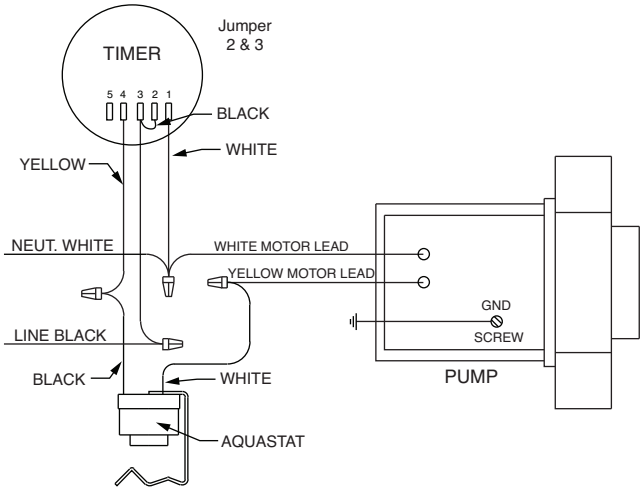
Timer Installation Diagram (006 Circulator Shown)



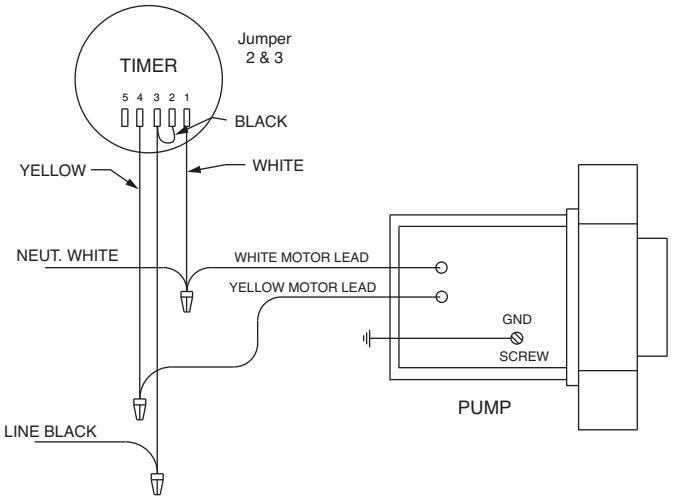
Aquastat Only Wiring Diagram



Timer and Aquastat Wiring Diagram



Timer Only Wiring Diagram



LIMITED WARRANTY STATEMENT

Taco, Inc. will repair or replace without charge (at the company's option) any Taco 00 Series circulator or circulator 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.

Taco® Comfort Solutions™ A Taco Group Company
Taco, Inc., 1160 Cranston Street, Cranston, RI 02920 | Tel: (401) 942-8000 | FAX: (401) 942-2360
Taco (Canada), Ltd., 8450 Lawson Road, Suite #3, Milton, Ontario L9T 0J8 | Tel: (905) 564-9422 | FAX: (905) 564-9436
Visit our web site: www.TacoComfort.com | Printed in USA |

LETTER OF TRANSMITTAL

TO: *Kinco Constructors*

RE: *LRSD Rockefeller EC Center*

DATE: August 8, 2023

JOB NO.: 22-046

ATTN: Mr. Casey Sowell/ Mr. Andrew McCarty

COPIES	DATE	NO.	DESCRIPTION
1 Emailed	07/28/23	22 30 00-1	Plumbing Equipment

THESE ARE TRANSMITTED:

[ ]For Approval [ ]As Requested [XX] Reviewed for General Compliance [ ]Resubmit___copies for approval

[ ]For Your Use [ ]For Review and Comment [] Reviewed and Noted [ ]Submit ___copies for distribution

[ ]For Your Information [] Revise and Resubmit Comments [ ]Return___corrected prints

REMARKS:

COPY TO: Job File

BY: _____
JoAnn White, CIT
Contract Administrator

201 S Chester
Little Rock, AR 72201
501.237.3077

Submittal Comment Sheet

Project Name: Rockefeller Pre-K Renovation

Project Number:22-050
Date Received: 07/28/2023
Date Returned:08/07/2023
Reviewed By: N. Santos

1. WH-1 thru 8
    a. Approved.
2. ET-1
    a. Approved.
3. CP-1
    a. Approved.
4. CP-2
    a. Approved.

End of Comments

Submittal #22 30 00-1.0
22 30 00 - PLUMBING EQUIPMENT

Central Arkansas
12600 Lawson Road
Little Rock, Arkansas 72210
Phone: (501) 225-7606
Fax: (501) 225-1028

Project: 23.1004 - 23.1004 LRSD Rockefeller Early Childhood Center (WDD #22-046)
700 East 17th Street
Little Rock, 72206

Plumbing Equipment

SPEC SECTION:	22 30 00 - PLUMBING EQUIPMENT	**SUBMITTAL MANAGER:**	Andrew McCarty **(Kinco Constructors, LLC)**
STATUS:	Open	**DATE CREATED:**	07/17/2023
ISSUE DATE:	07/17/2023	**REVISION:**	0
RESPONSIBLE CONTRACTOR:	Comfort Systems USA Arkansas, Inc.	**RECEIVED FROM:**	Matt Aldridge
RECEIVED DATE:		**SUBMIT BY:**	
FINAL DUE DATE:	07/31/2023	**LOCATION:**	
TYPE:	Product Data	**COST CODE:**	
APPROVERS:	JoAnn White **(Wittenberg, Delony & Davidson, Inc)**		

BALL IN COURT:
JoAnn White **(Wittenberg, Delony & Davidson, Inc)**

DISTRIBUTION:

DESCRIPTION:

ATTACHMENTS:
22 30 00-01 Plumbing Equipment.pdf

SUBMITTAL WORKFLOW

NAME	SUBMITTER/ APPROVER	SENT DATE	DUE DATE	RETURNED DATE	RESPONSE	ATTACHMENTS	COMMENTS
Andrew McCarty	Submitter		7/17/2023	7/28/2023	Submitted	22 30 00-01 Plumbing Equipment.pdf	Kinco Reviewed
JoAnn White	Approver	7/28/2023	7/31/2023		Pending		

BY **DATE** **COPIES TO**

WH-1 THRU 8

COMMERCIAL-GRADE

RESIDENTIAL / COMMERCIAL GAS WATER HEATERS

TANKLESS CONDENSING HIGH EFFICIENCY

Ultra-Low NOx gas tankless water heaters with condensing technology featuring up to 0.95 Uniform Energy Factor (UEF) which lowers operating costs and is environmentally friendly.

FEATURES:

ULTRA-LOW NOX CONDENSING TECHNOLOGY PROVIDES UP TO 0.95 UNIFORM ENERGY FACTOR

DURABLE HEAT EXCHANGER

- Primary Heat Exchanger is constructed of Commercial-Grade Copper that is more resilient to erosion and is 25x better at heat transfer than stainless steel thus stabilizing outgoing water temperatures quicker
- Secondary Heat Exchanger is made of Type 316L Stainless Steel to protect against corrosion

CONTINUOUS MAXIMUM FLOW RATES UP TO 10.0 GPM

ENERGY STAR® QUALIFIED+

AVAILABLE IN NATURAL GAS OR PROPANE (LP)

INDOOR MODEL - INCLUDES INTEGRATED TEMPERATURE CONTROLLER AND ADVANCED DIAGNOSTICS TO SIMPLIFY TROUBLESHOOTING

OUTDOOR MODEL - INCLUDES A WALL MOUNT TEMPERATURE REMOTE CONTROLLER AND ADVANCED DIAGNOSTICS TO SIMPLIFY TROUBLESHOOTING

FACTORY-INSTALLED POWER CORD INCLUDED FOR INDOOR MODELS

GTS-540 MODELS

- Can be used in residential and commercial applications
- Easy-link up to 4 heaters
- Multi-link up to 20 heaters

COMMON VENT UP TO 8 UNITS

COMPLIES WITH LEAD FREE STANDARDS

SAFETY FEATURES:

- Air-Fuel Ratio (AFR) Sensor
- Exhaust & Water Temperature Safety Control
- Overheat Cut-Off Fuse

INTERNAL FREEZE PROTECTION SYSTEM

POWER DIRECT VENT DESIGN

- Exhaust, 3" PVC Venting up to 70 feet or 4" PVC Venting up to 100 feet
- Provides flexible venting with PVC, CPVC, or ABS Pipe for Intake and Exhaust (solid core only). Canadian Installations Require ULCS636 Listed PVC or CPVC Pipe for Venting.
- Category III or IV venting can be used

ACCESSORIES

- Pipe Cover
- Neutralizer Kit
- Isolation Valve Kits
- Concentric Termination

WARRANTY

- 15-year limited warranty on heat exchanger in residential applications
- 5-year limited warranty on heat exchanger in commercial applications
- 5-year limited warranty on all parts

+Select models

INDOOR MODELS
GTS-240, GTS-340, GTS-540

OUTDOOR MODELS
GTS-240, GTS-340, GTS-540

Meets: SCAQMD Rule 1146.2 California and Texas

ENERGY STAR

540 models only

LOW-LEAD IAPMO R&T

AHRI CERTIFIED® www.ahridirectory.org

ANSI Z21.10.3 CSA 4.3

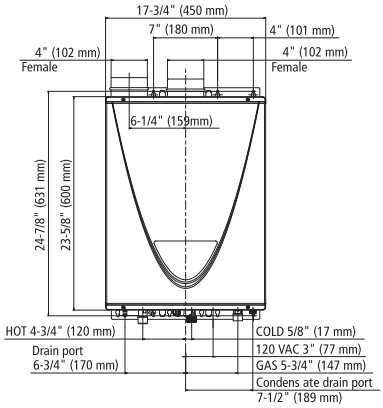
SOLID. STATE.

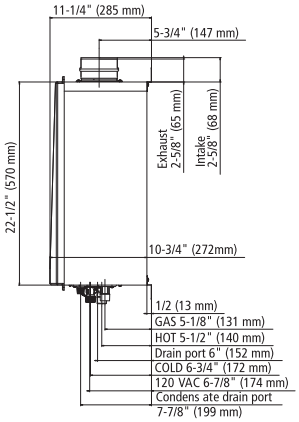
Model Number	Type	Gas Consumption Input		Inlet Gas Pressure		UEF	Maximum GPM*	Hot/Cold Connections	Gas Connection	Dimensions in Inches			Approx Shipping Weight (lbs)
		Minimum BTU/H	Maximum BTU/H	Minimum in. W.C.	Maximum in. W.C.					Height	Width	Depth	
Indoor Models													
GTS-240-NIH	Natural	15,000	160,000	4.0	10.5	0.94	6.6	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	71
GTS-240-PIH	Propane	13,000	160,000	8.0	14.0	0.94	6.6	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	71
GTS-340-NIH+	Natural	15,000	180,000	4.0	10.5	0.95	8	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	71
GTS-340-PIH+	Propane	13,000	180,000	8.0	14.0	0.95	8	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	71
X **GTS-540-NIH**	Natural	15,000	199,000	4.0	10.5	0.93	10	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	71
GTS-540-PIH	Propane	13,000	199,000	8.0	14.0	0.93	10	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	71
Outdoor Models													
GTS-240-NEH+	Natural	15,000	160,000	4.0	10.5	0.95	6.6	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	69
GTS-240-PEH+	Propane	13,000	160,000	8.0	14.0	0.95	6.6	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	69
GTS-340-NEH	Natural	15,000	180,000	4.0	10.5	0.94	8	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	69
GTS-340-PEH	Propane	13,000	180,000	8.0	14.0	0.94	8	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	69
GTS-540-NEH+	Natural	15,000	199,000	4.0	10.5	0.95	10	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	69
GTS-540-PEH+	Propane	13,000	199,000	8.0	14.0	0.95	10	3/4" NPT	3/4" NPT	23-5/8	17-3/4	11-1/4	69

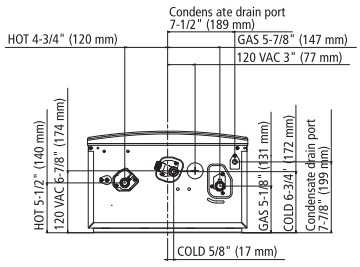
All dimensions are in inches.
15-150 psi Water Pressure. 40 psi or above is recommended for maximum flow.
*Current numbers based on factory testing; 0.4 GPM required for continuous fire after initial ignition.
Indoor models are certified from sea level to 10,100 ft. elevations.
Outdoor models are certified from sea level to 6,000 ft. elevation.
The manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligation.
+ENERGY STAR® Qualified

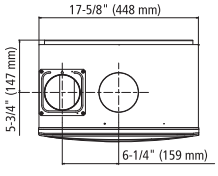
VERIFY HxWxD DIMENSIONS ARE ACCEPTABLE.

INDOOR MODELS

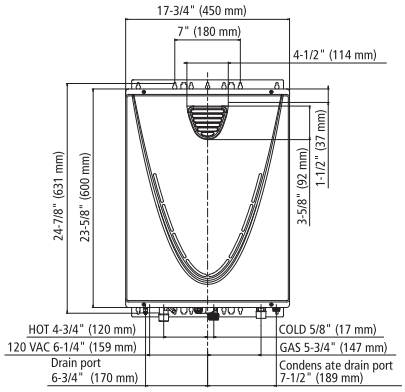


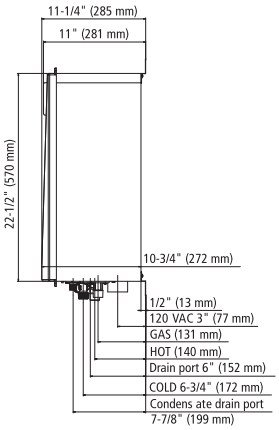


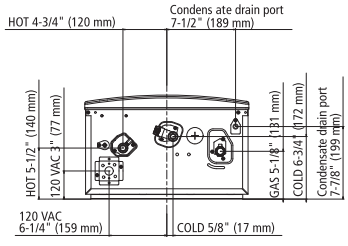


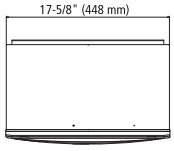


OUTDOOR MODELS

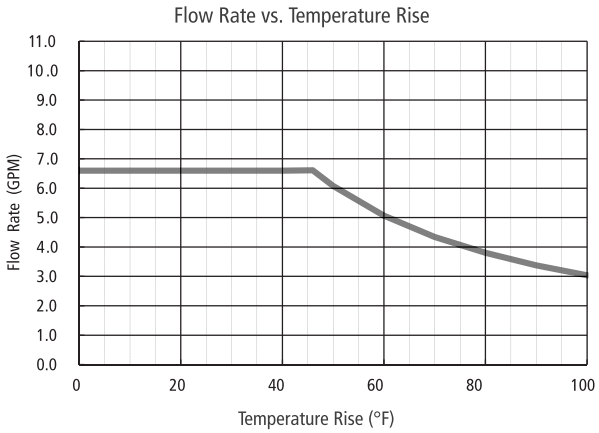


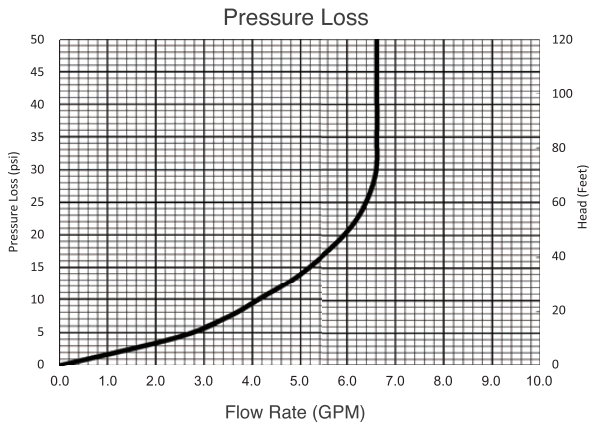




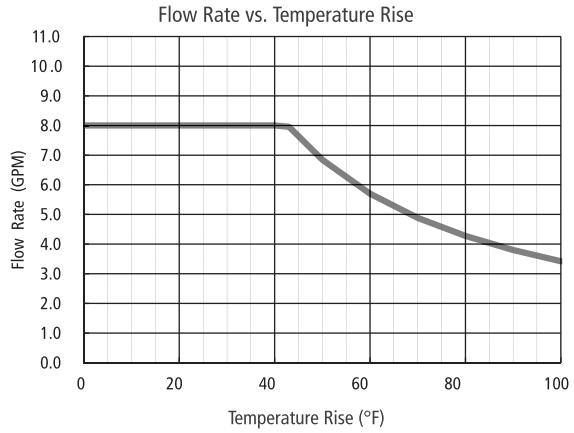


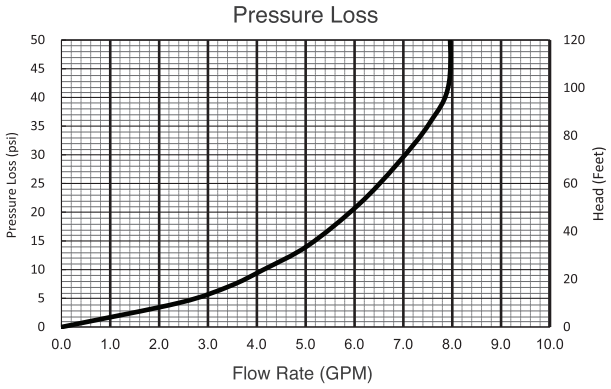
240 MODEL



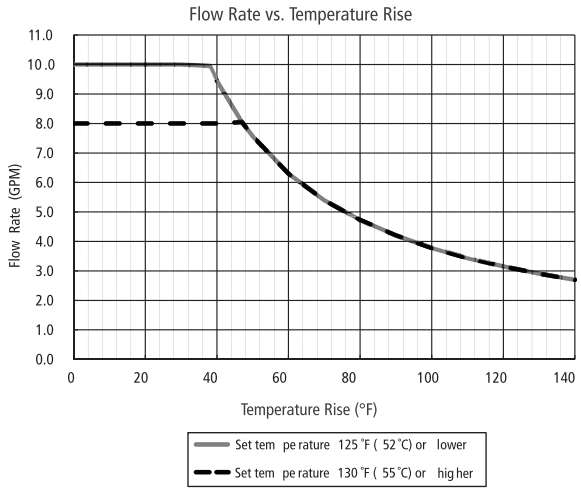


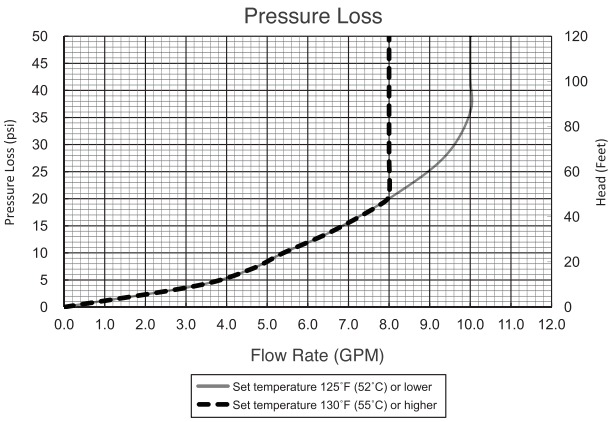
340 MODEL





540 MODEL





TANKLESS CONDENSING HIGH EFFICIENCY SPECIFICATIONS

The fully modulating, on-demand, condensing gas fired tankless water heater(s) shall be State model GTS540, having a maximum input rating of 199,000 Btu/h and available in NG or LP. The heater shall have ¾ in. male NPT water and gas connections. The inlet gas supply pressures shall be 4.0 in. WC (min.) up to 10.5 in. WC (max) for NG and 8.0 in. WC (min.) up to 14 in. WC (max.) for LP. The indoor heater(s) shall incorporate an integrated temperature controller that will provide diagnostic information, fault history, and heater set temperature. The outdoor heater(s) shall be factory supplied with a temperature remote, 100209924, that can be installed up to 400 ft. from the heater using 18 gauge (minimum) control wire. The temperature remote shall provide diagnostic information, fault history, and heater set temperature. The heater(s) shall operate using 120 V / 60 Hz power source. The indoor heater(s) will incorporate a factory installed power cord.

The indoor heater(s) shall be vented with 3" or 4" diameter schedule 40 PVC, CPVC, ABS, or Category IV vent pipe with a length not to exceed 70 ft. (equivalent) for 3" vent or 100 ft. (equivalent) for 4" vent, terminating horizontally or vertically. The intake pipe may use material such as PVC, ABS, aluminum, or Category IV pipe and cannot exceed 70 ft. (equivalent) for 3" vent or 100 ft. (equivalent) for 4" vent. The outdoor heater(s) shall be constructed with an integral exhaust vent on the front of the heater.

The water heater(s) shall use a commercial-grade copper, fin tube primary heat exchanger with quick release brass or bronze waterways. The secondary heat exchanger shall be constructed from stainless steel 316L. The heater(s) shall be controlled by an on-board solid-state printed circuit board which uses the following factory installed components: thermistors to monitor water temperature and exhaust temperature; a flow sensor to measure flow rate; a flame sensor to monitor combustion; an Air-Fuel Ratio Rod to measure and adjust air input in order to maintain optimal combustion efficiency. The heater also consists of in-line fusing and surge absorbers for electrical surge protection, an electronic spark igniter, aluminized stainless steel burners, hi-limit temperature switches to monitor water and exhaust temperatures, modulating gas valve, dual freeze protection that will automatically fire the heater (indoor model only) and use heating blocks to protect the heat exchanger, and an overheat cutoff fuse.

The heater(s) can manifold to Easy-Link up to 4 heaters to provide additional capacity. The Easy-Link controls shall be built onto the on-board solid-state printed circuit board and does not require external controls. The linking control wire shall be supplied with the heater. The heater(s) can use a Multi-Unit controller, 100112691, to manifold 5-20 heaters. The Easy-Link and Multi-Unit Controller shall modulate the system for the most efficient performance. The Easy-Link and Multi-Unit Controller shall rotate the priority heater every 12 hours of operation time or 100 starts for balanced duty/cycle operation.

The heater(s) shall be CSA approved for sale in the United States and Canada, has a minimum uniform energy factor of 0.93, meets the energy efficiency requirements of the U. S. Department of Energy and ASHRAE 90.1-2007, complies with Ultra-Low NOx emissions of 14 ng/J or 20 ppm, and shall be certified to NSF 5 Standards.

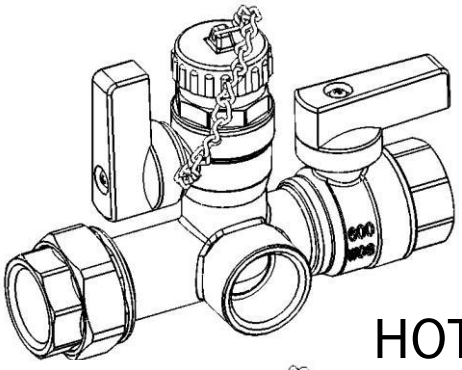
Product Submittal Form

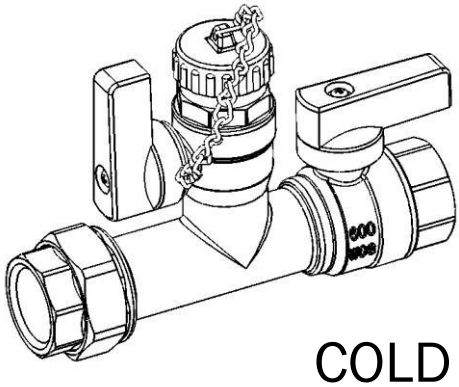
For Residential and Commercial Applications

Job Name		Engineer / Architect	
Job Location		Wholesaler	
Submittal Date		Contractor	

TWV30 /TWV3S Tankless Water Heater Hot/Cold Service Valves

Use: For use in potable water distribution systems for water flow control. Valves connect directly to cold water inlet and hot water outlet of the tankless water heater. Use for appliance maintenance and emergency shut-off.





Design Features:

- **Compact design** ideal for recessed and cover box installations
- **Captive coupling nut & washer** reduces opportunity for component loss making installation easier
- **Captive washer** won't kink or tear during installation
- **Forged, one-piece construction** reduces the potential for pinhole leaks
- **Integrated drain valve** with independent, ¼ turn operation allows quick system diagnostic testing and maintenance
- **Built-in side port** for the pressure relief valve reduces the number of connections & simplifies the installation
- **Right-sized handles, color-coded** for immediate system identification. Perfect for tight installations
- **100%** Compliant

Operating Specifications:

Temperature: 40°- 180° F

Pressure: 125 PSI maximum

Standard

MATERIAL SPECIFICATIONS	
Valve Body	*Forged brass*
Stem	*Brass*
Handle	*Aluminum, coated*
Handle Screw	*Steel, zinc plated*
Flat Seal	*Rubber*
Coupling Nut	*Forged brass*
Drain Cap	*Forged brass*
Cap Gasket	*Rubber*
Seat	*PTFE*
Ball	*Brass, chrome plated*

Compliant

MATERIAL SPECIFICATIONS	
Valve Body	*Compliant forged brass*
Stem	*Compliant brass*
Handle	*Aluminum, coated*
Handle Screw	*Steel, zinc plated*
Flat Seal	*Rubber*
Coupling Nut	*Forged brass*
Drain Cap	*Forged brass*
Cap Gasket	*Rubber*
Seat	*PTFE*
Ball	*Compliant brass, chrome plated*

Product Submittal Form

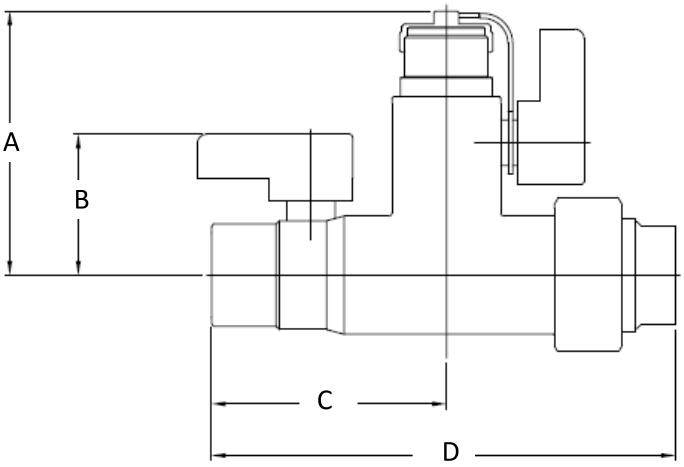
TWV30 /TWV3S Tankless Water Heater Hot/Cold Service Valves

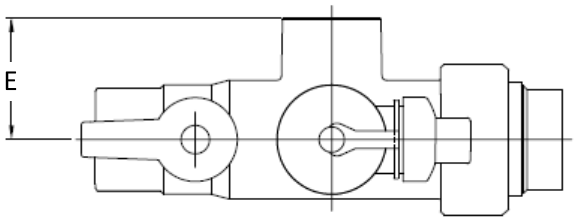
Standard Part Listing:

☐	TWV30	3/4” IPS x 3/4” IPS Hot/Cold Service Valves Only
☐	TWV30R	3/4” IPS x 3/4” IPS Hot/Cold Service Valve Kit w/ 200K Pressure Relief Valve
☐	TWV3S	3/4” Sweat x 3/4” IPS Hot/Cold Service Valves Only
☐	TWV3SR	3/4” Sweat x 3/4” IPS Hot/Cold Service Valve Kit w/ 200K Pressure Relief Valve

Compliant Part Listing:

☐	TWV30X	3/4” IPS x 3/4” IPS Hot/Cold Service Valves Only
☒	TWV30RX	3/4” IPS x 3/4” IPS Hot/Cold Service Valve Kit w/ 200K Pressure Relief Valve
☐	TWV3SX	3/4” Sweat x 3/4” IPS Hot/Cold Service Valves Only
☐	TWV3SRX	3/4” Sweat x 3/4” IPS Hot/Cold Service Valve Kit w/ 200K Pressure Relief Valve





PART SPECIFICATIONS *(Inches)*					
Model	***DIM. A***	***DIM. B***	***DIM. C***	***DIM. D***	***DIM. E****
TWV30 / TWV30R	3.03	1.76	2.60	5.61	1.09
TWV3S / TWV3SR	3.03	1.76	2.60	5.61	1.09

*Dimension for hot valve with pressure relief valve port

Listings and Certifications:

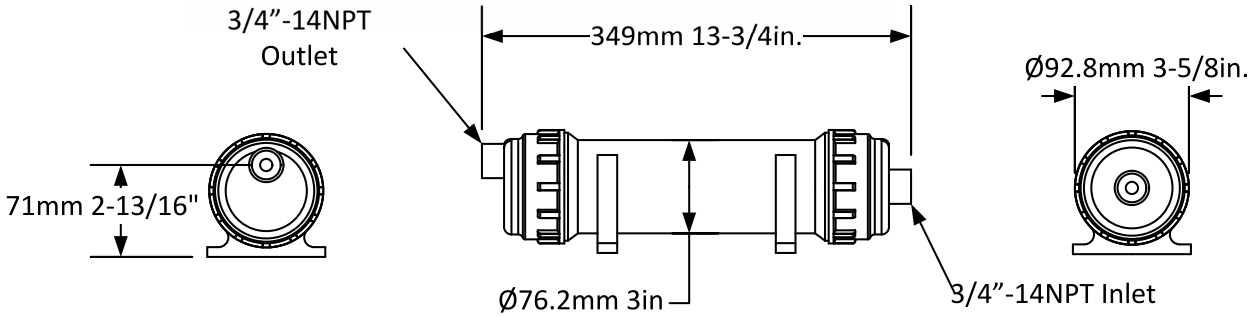
- CSA verified to WOG 600 rating
- IAPMO listed to NSF/ANSI 61-2010 (File # N-5427) and IGC 157-2010 (File # 5427)
- Compliant product manufactured in compliance with section 116875 of the California Health & Safety Code. IAPMO File # 6242

NC-1 Condensate Neutralizer Technical Information

KIT CONTENTS :

No.	Parts Description
A	Two NC Series O-Rings for Canister
B	Two NC Series Unions
C	One NC Series Y Connector - Nylon
D	Three 3/4" NPT to 1/2" Hose Barb Fittings
E	Six Hose Clamps
F	10ft of 1/2 Vinyl Tubing
G	Two Base/Wall Mounting Clamps

DIMENSIONS :



WEIGHT : 2 kg, 4.4 lbs. (dry weight with Media)

SPECIFICATION :

The condensate neutralization capsule shall be AXIOM INDUSTRIES LTD. model NC-1. System shall include 1 litre (0.26 U.S. gallon) transparent capsule made from corrosion resistant materials with two 3" fill/access openings, 3" inlet and outlet screen, 3/4"-14NPT threaded inlet, 3/4"-14NPT threaded outlet, two ¾" MNPT x ¾" FNPT unions, three 3/4" NPT to ½" hose barb fittings, ½" barbed Y fitting, six hose clamps, 10 ft of 1/2" ID vinyl tubing, two base/wall mounting clamps.

OPTIONAL ACCESSORIES :

- ☐ **NM-1** -- Replacement LipHter⁺ neutralization media (Exact Refill)
- ☐ **NM-1BULK** -- Replacement LipHter⁺ neutralization media (Up to 15 Refills)

LIMITED WARRANTY :

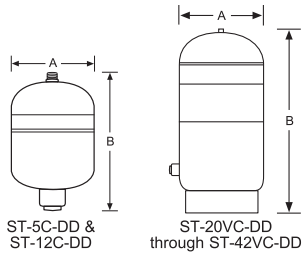
The “NC-1” is warranted against defects in materials and workmanship for one year.

Project _____ **Location** _____
Consultant _____ **Contractor** _____
Unit Tag _____ **Sales Agent** _____

SB-CN-NC1-01

ET-1

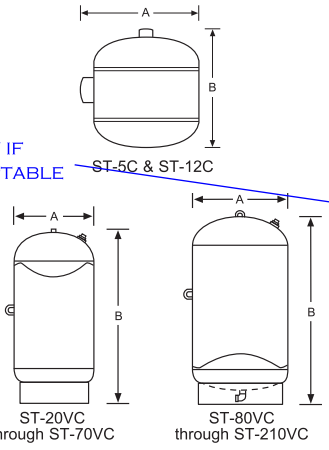
ASME Thermal Expansion Tanks



ASME Deep Drawn Diaphragm Series Specifications

Model Number	Tank Volume (Gallons)	Max. Accept. Volume (Gallons)	A Diameter (Inches)	B Height (Inches)	System Conn.[1] (Inches)	Shipping Weight (lbs.) Max. Working Pressure			
						150 PSI	175 PSI	250 PSI	300 PSI
ST-5C-DD	2.0	0.9	8	14	3/4 NPTM	10	12	-	-
ST-12C-DD	6.4	3.2	12	18	3/4 NPTM	17	19	-	-
ST-20VC-DD	8.6	3.2	12	22	3/4 NPTM	36	38	-	-
ST-30VC-DD	16.6	11.3	15	25	3/4 NPTM	48	-	-	-
ST-42VC-DD	23.2	11.3	15	33	3/4 NPTM	68	-	-	-

[1]*Stainless Steel System Connection. Maximum Operating Temperature: 200°F. Factory Pre-charge: 55 PSIG.*

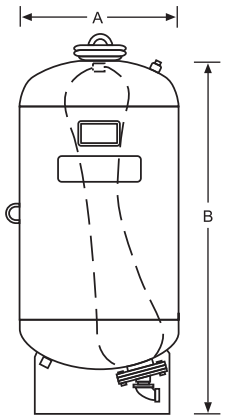


Anti-Legionella Liner & Fresh Water Turbulator featured in all diaphragm tank models.

ASME Head & Shell Diaphragm Series Specifications

Model Number	Tank Volume (Gallons)	Max. Accept. Volume (Gallons)	A Diameter (Inches)	B Height (Inches)	System Conn.[1] (Inches)	Shipping Weight (lbs.) Max. Working Pressure			
						150 PSI	175 PSI	250 PSI	300 PSI
ST-5C	2.1	0.9	10	10	3/4 NPTF	-	-	25	30
ST-12C	6.4	3.2	12	14	3/4 NPTF	-	-	42	50
ST-20VC	8.6	3.2	12	19	3/4 NPTF	-	-	50	62
X ST-30VC	14.0	9.0	16	19	3/4 NPTF	-	64	96	108
ST-42VC	18.0	11.0	16	24	3/4 NPTF	-	75	101	112
ST-60VC	25.0	11.0	16	32	3/4 NPTF	85	113	125	139
ST-70VC	34.0	11.0	16	45	3/4 NPTF	99	122	136	151
ST-80VC	53.0	35.0	24	37	1 1/4 NPTF	224	296	305	340
ST-120VC	68.0	35.0	24	44	1 1/4 NPTF	266	340	375	400
ST-180VC	77.0	35.0	24	49	1 1/4 NPTF	285	360	380	420
ST-210VC	90.0	35.0	24	57	1 1/4 NPTF	319	380	405	440

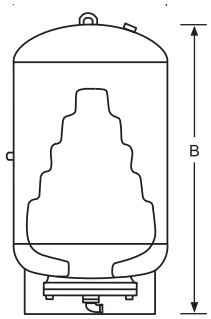
[1]*Stainless Steel System Connection. Maximum Operating Temperature: 200°F. Factory Pre-charge: 55 PSIG.*



ASME Full Acceptance Bladder Series Specifications

Model Number	Tank Volume (Gallons)	Max. Accept. Volume (Gallons)	A Diameter (Inches)	B Height (Inches)	System Conn.[1] NPTF (Inches)	Shipping Weight (lbs.) Max. Working Pressure				
						125 PSI	150 PSI	175 PSI	250 PSI	300 PSI
ST-447C	53	53	24	45	2	236	262	290	370	425
ST-448C	80	80	24	59	2	274	340	430	492	540
ST-449C	106	106	24	73	2	320	360	450	510	560
ST-450C	132	132	24	87	2	354	400	460	570	632
ST-451C	158	158	30	73	2	494	587	680	815	895
ST-452C	211	211	30	91	2	593	625	699	1,005	1,107
ST-453C	264	264	36	86	3	667	760	845	1,100	1,205
ST-454C	317	317	36	98	3	762	850	960	1,265	1,400
ST-455C	370	370	36	110	3	842	935	1,065	1,350	1,490
ST-456C	422	422	48	82	3	1,152	1,423	1,650	1,660	1,830
ST-457C	528	528	48	97	3	1,335	1,505	1,875	2,230	2,455

[1]*Bronze System Connection. Maximum Operating Temperature: 240°F. Factory Pre-charge: 25 PSIG.*



ASME Partial Acceptance Bladder Series Specifications

Model Number	Tank Volume (Gallons)	Max. Accept. Volume (Gallons)	A Diameter (Inches)	B Height (Inches)	System Conn.[1] NPTF (Inches)	Shipping Weight (lbs.) Max. Working Pressure 150 PSI
ST-35CL	10	10	10	37	1	76
ST-50CL	13	11	12	37	1	78
ST-85CL	22	11	16	35	1	95
ST-100CL	26	11	16	39	1	102
ST-130CL	34	27	20	35	1	134
ST-165CL	44	27	20	40	1	153
ST-200CL	53	27	24	41	1	205
ST-300CL	80	27	24	56	1	254
ST-400CL	106	53	24	69	1	308
ST-500CL	132	53	24	83	1	352
ST-600CL	158	53	30	67	1	442

[1]*Stainless Steel System Connection. Maximum Operating Temperature: 240°F. Factory Pre-charge: 25 PSIG.*

Visit amtrol.com for sizing information.

CP-1

Submittal Data Information

2400 Series High Capacity Circulators

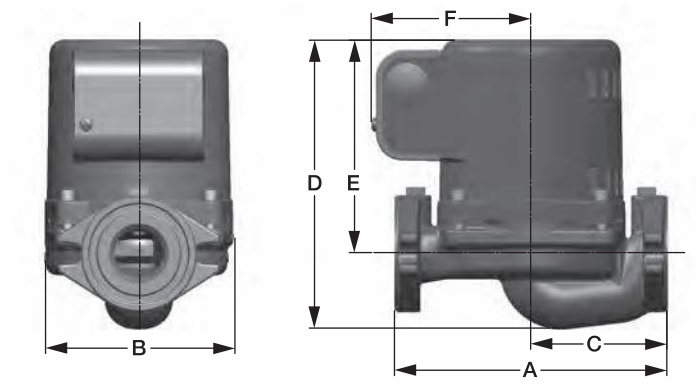
101-134

EFFECTIVE: January 5, 2023 SUPERSEDES: March 1, 2015

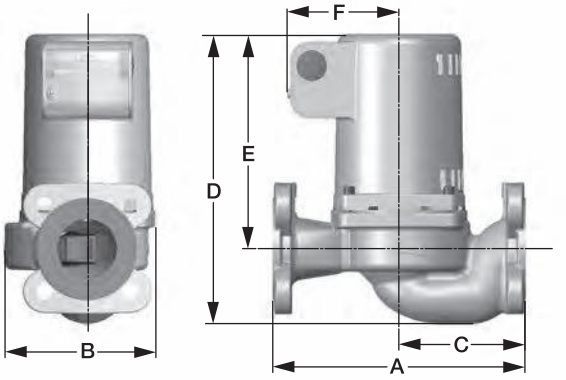
JOB _____ ENGINEER _____ CONTRACTOR _____ REP. _____

ITEM	MODEL NO.	G.P.M.	HEAD (FT.)	H.P.	ELEC. CHAR.

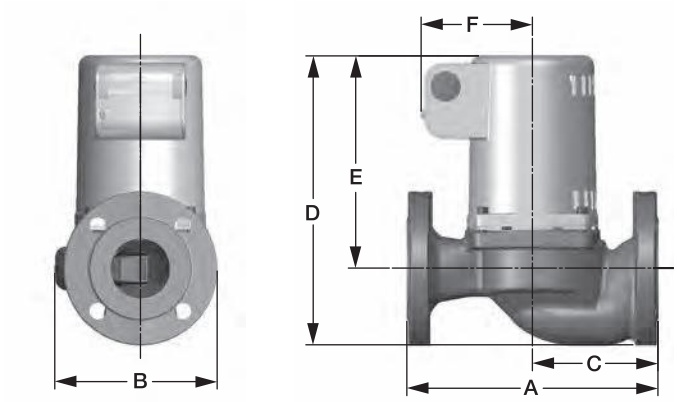
Models 2400-10-3P thru 2400-50S/2-3P



Models 2400-60-3P thru 2400-70S-3P



Models 2400-70/3-3P and 2400-70S/3-3P



PUMP DIMENSIONS & WEIGHTS

All dimensions and weights are approximate.

CAST IRON MODEL	STAINLESS STEEL MODEL	A		B		C		D		E		F		SHIP WEIGHT	
		IN.	MM	IN.	MM	IN.	MM	IN.	MM	IN.	MM	IN.	MM	LBS.	KG
2400-10-3P	2400-10S-3P	6 3/8	162	4 1/2	114	3 3/16	82	6 7/8	175	5	127	3 3/4	95	12.0	5.5
2400-20-3P	2400-20S-3P	6 3/8	162	4 1/2	114	3 3/16	82	6 7/8	175	5	127	3 3/4	95	12.0	5.5
2400-30-3P	2400-30S-3P	8 1/2	216	4 3/4	121	4 1/4	108	8	203	5 1/4	133	3 3/4	95	14.5	6.6
2400-40-3P	2400-40S-3P	8 1/2	216	4 3/4	121	4 1/4	108	8	203	5 1/4	133	3 3/4	95	14.5	6.6
2400-45-3P	2400-45S-3P	6 3/8	162	4 5/8	119	3 3/16	82	8 3/4	222	6 7/8	175	3 3/4	95	15.0	6.8
2400-50-3P	2400-50S-3P	6 3/8	162	4 5/8	119	3 3/16	82	8 3/4	222	6 7/8	175	3 3/4	95	16.0	7.3
2400-50/2-3P	2400-50S/2-3P	6 3/8	162	5 1/4	133	3 3/16	82	8 3/4	222	6 7/8	175	3 3/4	95	16.5	7.5
2400-60-3P	2400-60S-3P	8 1/2	216	5 3/16	132	4 1/4	108	7 7/8	200	5 1/4	133	3 3/4	95	18.0	8.2
2400-65-3P	2400-65S-3P	8 1/2	216	5 1/2	140	4 1/4	108	9 7/8	251	7 1/4	184	3 3/4	95	22.0	10.0
2400-70-3P	2400-70S-3P	8 1/2	216	5 1/2	140	4 1/4	108	9 7/8	251	7 1/4	184	3 3/4	95	23.0	10.4
2400-70/3-3P	2400-70S/3-3P	8 1/2	216	6 5/8	168	4 1/4	108	10 1/2	267	7 1/4	184	3 3/4	95	29.0	13.2

MATERIALS OF CONSTRUCTION

Casing: Cast Iron or Stainless Steel
Seal Face Plate: Stainless Steel
Motor Housing: Aluminum
Impeller: 30% Glass-filled Noryl® *
Impeller Insert: Stainless Steel
Shaft: Stainless Steel
Mechanical Seal: Carbon/Silicon-Carbide
Motor Bearings: Permanently lubricated ball bearing
O-Ring/Flange Gaskets: EPDM

* Noryl is a registered trademark of General Electric Co.

MODEL NOMENCLATURE

S – Stainless Steel, Flanged
Y – 230V/60/1Motor

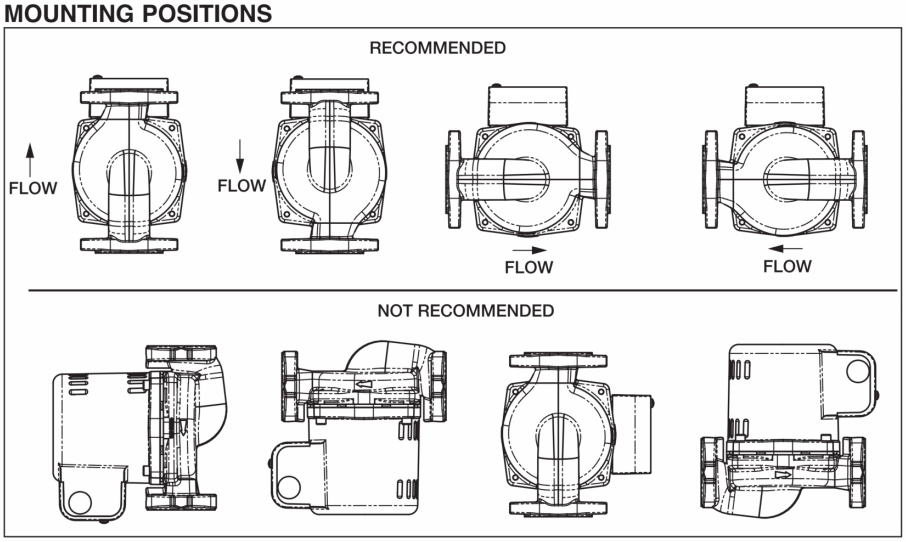
PERFORMANCE DATA

Maximum Flow: 90 GPM
Maximum Head: 46 Feet
Minimum Fluid Temp: 40˚F (4˚C)
Maximum Fluid Temp: 225˚F (107˚C)
Maximum Working Pressure: 150psi

ELECTRICAL DATA

Model Number	Hz	Ph	Amps		RPM	HP
			115 V	230 V		
2400-10-3P	60	1	1.9	NA	3450	1/6
2400-20-3P			1.9	1.0		1/6
2400-30-3P			1.9	1.0		1/6
2400-40-3P			1.9	1.0		1/6
2400-45-3P			3.6	1.7		1/3
2400-50-3P			4.9	2.4		1/2
2400-60-3P			1.9	1.0		1/6
2400-65-3P			3.6	1.7		1/3
2400-70-3P			4.9	2.4		1/2
Motor Type	Open drip proof, permanent split capacitor, thermally protected					

MOUNTING POSITIONS



c UL us LISTED
FOR INDOOR USE ONLY
NSF Certified to NSF/ANSI 372
STAINLESS STEEL MODELS ONLY

2400 SERIES COMPANION FLANGE SETS

Models	CONNECTION	¾"	1"	1¼"	1½"	2"	2½"	3"
2400-10/10S-3P 2400-20/20S-3P 2400-45/45S-3P 2400-50/50S-3P	Iron NPT	110-251F	110-252F	110-253F	110-254F	–	–	–
	S. Steel NPT	110-251SF	110-252SF	110-253SF	110-254SF	–	–	–
	Bronze SWT	110-523BSF	110-524BSF	110-525BSF	110-526BSF	–	–	–
	Shut-Off NPT	SF-075T	SF-100T	SF-125T	SF-150T	–	–	–
	Shut-Off SWT	SF-075S	SF-100S	SF-125S	SF-150S	–	–	–
2400-50/50S/2-3P 2", 2 bolt	Iron NPT	–	–	–	–	194-2124F	–	–
	S. Steel NPT	–	–	–	–	194-2124SF	–	–
2400-30/30S-3P 2400-40/40S-3P	Iron NPT	–	–	194-1540F	194-1542F	–	–	–
	S. Steel NPT	–	–	194-1540SF	194-1542SF	–	–	–
	Shut-Off NPT	–	–	SF-125T-0012	SF-150T-0012	–	–	–
	Shut-Off SWT	–	–	SF-125S-0012	SF-150S-0012	–	–	–
2400-60/60S-3P 2400-65/65S-3P 2400-70/70S-3P	Iron NPT	–	–	–	–	185-086C	–	–
	Bronze NPT	–	–	–	–	185-086B	–	–
2400-70/70S/3-3P 3", 4 bolt	Iron NPT	–	–	–	–	–	185-112C	185-113C
	Bronze NPT	–	–	–	–	–	185-112B	185-113B

Taco Comfort Solutions® A Taco Family Company
Taco, Inc., 1160 Cranston Street, Cranston, RI 02920 | Tel: (401) 942-8000
Taco (Canada), Ltd., 8450 Lawson Road, Suite #3, Milton, Ontario L9T 0J8 | Tel: (905) 564-9422
Visit our web site: www.TacoComfort.com | Printed in USA |

"00"® Timers / Aquastat

The Taco Clock Timers and Temperature Aquastat are designed to operate Taco circulators for domestic hot water recirculation during peak demand periods. The 24-hour clock timer can be set in 15 minute on/off intervals. A digital 7-day programmable timer can be set to run at varying times and intervals each day. The timer enclosures feature rugged steel construction. Temperature control is easy with the Aquastat — automatically ON at 95˚F and OFF at 115˚F. Adaptable to any "00" Series Circulator.

HYDRONIC COMPONENTS & SYSTEMS

Do it once.
Do it right.® Taco®

Supersedes: 9/15/94

Effective Date: 04/30/06
Printed in USA

Submittal Data Information
"00"® Timers / Aquastat

Submittal Data # 101-036
Supersedes: 09/15/94

Effective: 04/30/06

24 Hour Analog Clock Timer Performance Data – #265-1

Electrical Characteristics: 115/60/1
Timer Switch: 16A @115V
Timer Interval: 15 Minutes
Clock face: Hour and Minute Hands
Manual Switch: I Permanently ON
Automatic Operation
O Permanently OFF

7 Day Digital Timer Performance Data – #265-3

Electrical Characteristics: 115/60/1
Timer Switch: 16A @115V
Timer Interval: 1 Minute (+) Adjustable
Clock face: Digital with Circulator Programming
Max. On/Off Settings: 10
Capacitor Backup: 100 hours

Temperature Aquastat – Snap Action Temperature Switch – #563-2

Electrical Characteristics: 115/60/1
Connections: 1/2" (Snap on circ. body)
3/4" Copper pipe
Temperature Setting: ON @ 95°F
OFF @ 115°F
Contacts: 7 amp SPDT Switch
Wire Leads: 18" – Type 18-2,
Round Premium Cable

Application

The Taco Clock Timers and Temperature Aquastat are designed to control the operation of Taco circulators on Domestic Hot Water Recirculation Systems for maximum comfort and energy efficiency. They are adaptable to any "00"® Series circulator by attaching the enclosure or wiring to the electrical box.

24 Hour Analog Timer

Operates the circulator at the same pre-set times every day. Time intervals are in 15 minute increments. This user friendly clock has a raised minute hand for easy adjustments, quick-set trippers and an operation switch for Manual ON/OFF or Automatic modes.

7 Day Digital Programmable Timer

Digital Timer can be programmed to operate at different times on different days, weekdays or weekends, for maximum comfort and convenience to match family schedules. Easy circular programming clock face and LCD readout screen allows for a maximum of 10 on/off settings. Run time intervals as short as 1 minute provides maximum energy efficiency. A capacitor backup saves settings for 4 days (100 hours) during power outages.

Temperature Aquastat

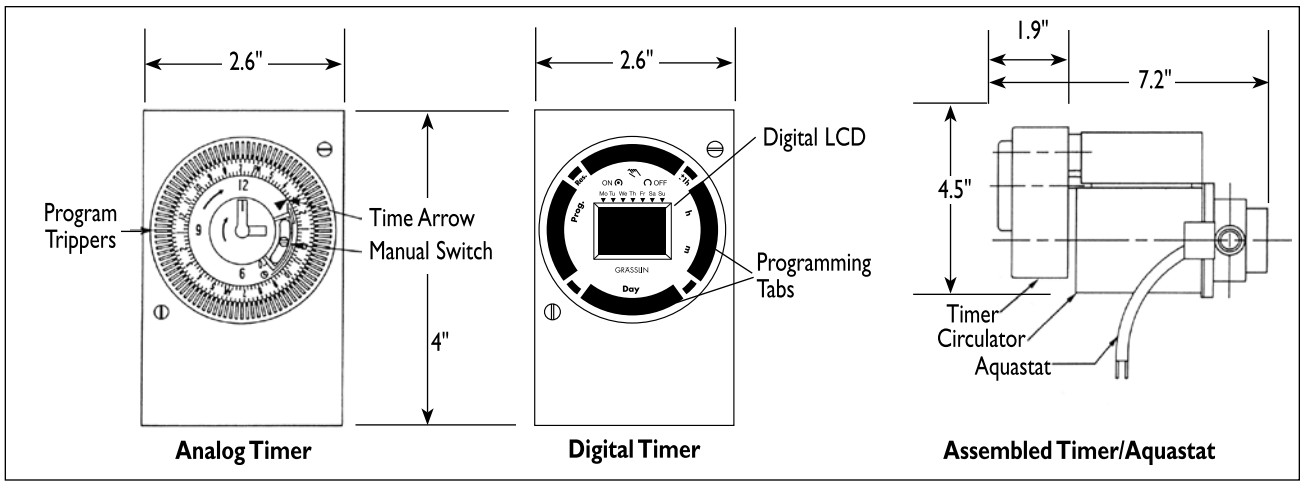
Controls pump operation to maintain system temperature between 95°F and 115°F. Easy clip-on Aquastat attaches directly to 3/4" pipe or a 1/2" sweat pump casing.

Shipping Weight

Model	Item	Lbs.	Kg
265-1	Analog Timer	.75	.35
265-3	Digital Timer	.75	.35
563-2	Aquastat	.25	.11

c UL us LISTED

FOR INDOOR USE ONLY



HYDRONIC COMPONENTS & SYSTEMS

Do it once. Do it right.® Taco®

Taco Inc., 1160 Cranston Street, Cranston, RI 02920 / (401) 942-8000 / Fax (401) 942-2360
Taco (Canada) Ltd., 6180 Ordan Drive, Mississauga, Ontario L5T 2B3 / (905) 564-9422 / Fax (905) 564-9436
www.taco-hvac.com

Honeywell

L4006A,B,E,H Aquastat® Controllers

INSTALLATION INSTRUCTIONS

APPLICATION

These boiler-mounted, immersion type controllers operate in response to temperature changes in hydronic heating systems.

L4006A breaks the circuit on a temperature rise to the control setting. It is used for high limit or low limit control. When used as a controller or as a low limit, a separate high limit must be used.

L4006B makes the circuit on a temperature rise. It is used as a circulator controller, delaying circulator operation when boiler water temperature is below the control setting.

L4006E,H includes a trip-free manual reset switch. These models are designed to break the control circuit whenever the temperature of the controlled medium reaches the high limit setting. A reset button on the front of the case must be pressed to re-establish the control circuit. L4006H also includes bracket and clamp for surface mounting on pipe or tank.

A plastic bag of heat-conductive compound is included with the L4006A,B,E Aquastat® Controllers for use when the sensing bulb is inserted into a well designed for a large bulb than the one used on the L4006A,B,E. A 124904 Well Adapter, for use on old wells that do not fit the L4006A,B,E immersion well clamp, can be ordered; see form 68-0040, Wells and Fittings for Temperature Controllers. A setting stop is included to prevent setting above a desired temperature on limit.

If a well adapter or other accessories are needed, refer to form 68-0040, Wells and Fittings for Temperature Controllers, for part numbers and ordering information.

INSTALLATION

When Installing This Product...

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After installation is complete, check out product operation as provided in these instructions.

⚠ WARNING

Electrical Shock Hazard.
Can cause serious injury, death or equipment damage.
Disconnect the power supply before beginning installation to prevent electrical shock or equipment damage.

Installing Immersion Well Models (L4006A,B,E)

IMPORTANT

Obtain the best thermal response with a well that snugly fits the sensing bulb. The bulb should be inserted until it rests against the bottom of the well. Use a well of correct length and bend the tubing, if necessary, to provide enough force to hold the bulb against the bottom of the well. Do not make a sharp bend in the tubing. A sharp bend can produce a break in the tubing and cause a loss of fill. This condition will cause the high and low limit controls to be made continuously.

If the well is not a snug fit on the bulb, use the heat-conductive compound as follows. Fold the plastic bag of compound lengthwise and twist gently. Snip the end of the bag and insert into the well. Slowly pull out the bag while squeezing firmly to distribute the compound evenly in the well. Insert the bulb into the well. Bend the tubing, if necessary, to provide force to hold the bulb against the bottom of the well and to hold the out end of the bulb in firm contact with the side of the well. Wipe off any excess compound.

NOTE: Some models have an adjustable capillary tubing length to 3 inches (76 mm). In these models, pull out extra tubing from inside the case, if needed.

Follow the boiler manufacturer instructions, if available; otherwise, proceed as follows.

1. Remove the old control.
2. Refer to the cover insert of the old control to identify and tag each lead as it is disconnected.
3. Leave the old well in place if it is suitable.

If Well is Otherwise Suitable But Does Not Fit The L4006 Immersion Well Clamp

Use a 124904 Well Adapter (order separately, see form 68-0040) to secure the L4006 to the old well. The adapter has a flange at one end for fastening the L4066 adapter clamp.

1. Loosen, but do not remove, the two adapter clamp screws (see Fig. 1).
2. Slide the adapter onto the capillary and short tube; see Fig. 2 inset.
3. Make sure the flanged end of the adapter fits into the hole in the case. Position the adapter well clamp snugly over the flange on the adapter, then tighten the clamp screws.
4. Insert the bulb into the well, as shown in Fig. 2. If necessary, use the heat-conductive compound as instructed in the IMPORTANT statement on page 1.
5. Tighten the setscrew (if one is present in the old well spud) against the adapter.

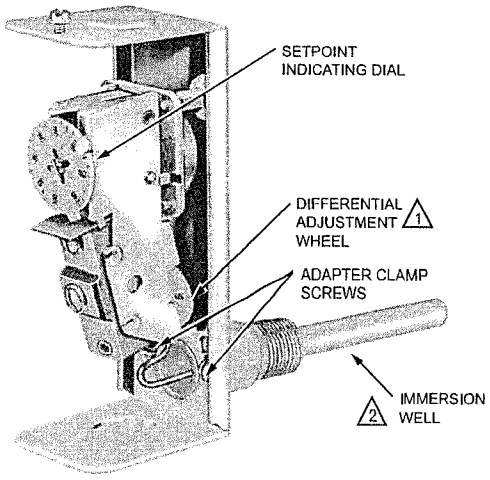


Fig. 1. Internal view of L4006A,B with horizontal well. L4006E is the same with reset button added.

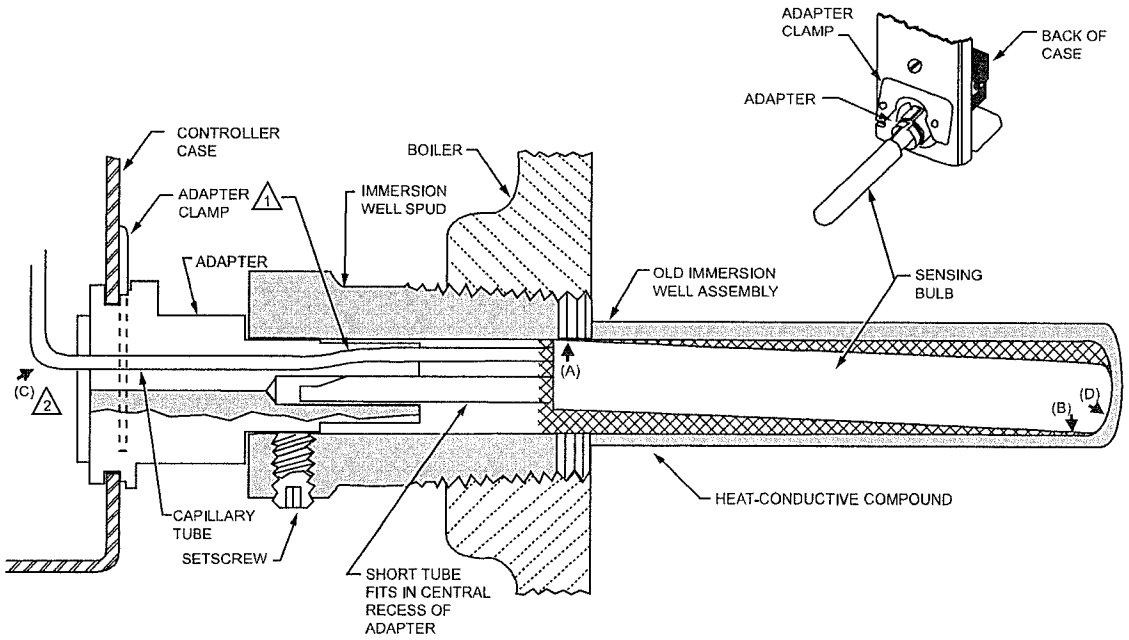


Fig. 2. Bulb in immersion well and use of adapter.

If the Old Well Is Unsuitable.

1. Drain the system and remove the well.
2. Select a new well from form 68-0040 (order well separately).
3. Install the new well, refill the system and check for leaks.
4. Loosen, but do not remove, the two adapter clamp screws (Fig. 1).
5. Insert the sensing bulb into the well until it bottoms as show in Fig. 2. Add heat-conductive compound, if necessary, as instructed in the IMPORTANT statement on page 1.

6. Make sure the end of the well fits into the hole in the case. Position the immersion well clamp snugly over the well flange and tighten the clamp screw securely.

Mounting Surface Mount Model (L4006H)

The L4006H is designed for surface mounting on piping or tank and can be mounted in any position.

When mounting the L4006H on piping, the pipe should be 1 in. (25 mm) diameter or larger for accurate temperature sensing.

1. Remove any insulation from the pipe.
2. Thoroughly scrape off all scale, rust or paint.
3. Mount controller as shown in Fig. 3 using adjustable 12 in. (294 mm) pipe strap furnished.

When mounting the L4006H on a tank, use a pipe strap of appropriate length, approximately 6-10 ft (17.6- 29.4m) for the tank (not provided). Fit the pipe strap through the slot in the mounting bracket. See Fig. 3.

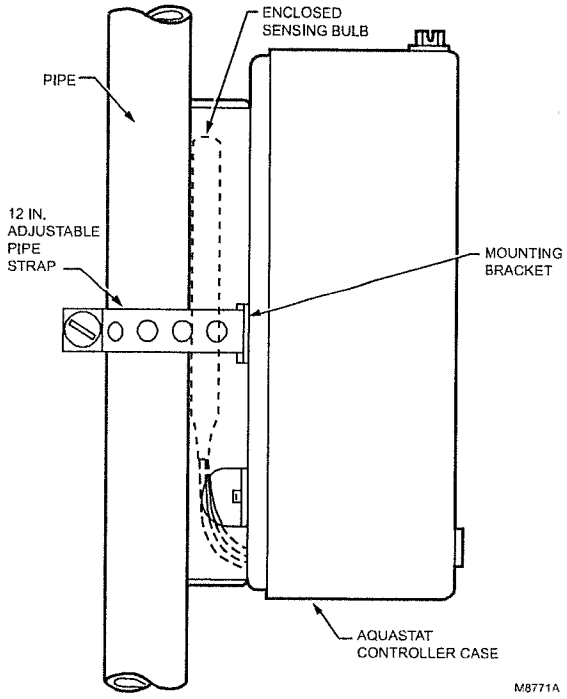


Fig. 3. Mount L4006H directly on surface.

Wiring

⚠ WARNING

Electrical Shock Hazard.
Can cause serious injury, death or equipment damage.
Disconnect power supply before connecting wiring to avoid electrical shock or equipment damage.

All wiring must comply with local codes and ordinances regarding wire size, insulation, enclosure, etc. See Fig. 4 and 5 for typical diagrams of Aquastat® Controllers used in heating systems.

Use these Aquastat Controllers with copper wire only.

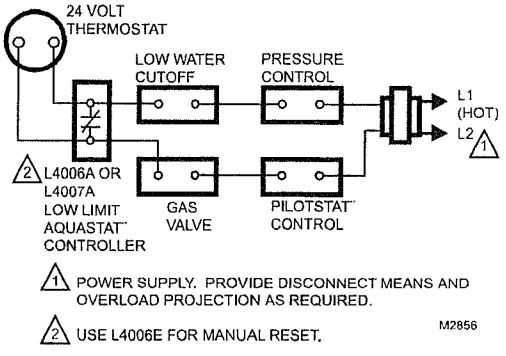


Fig. 4. Typical hookup for gas-fired system with domestic hot water.

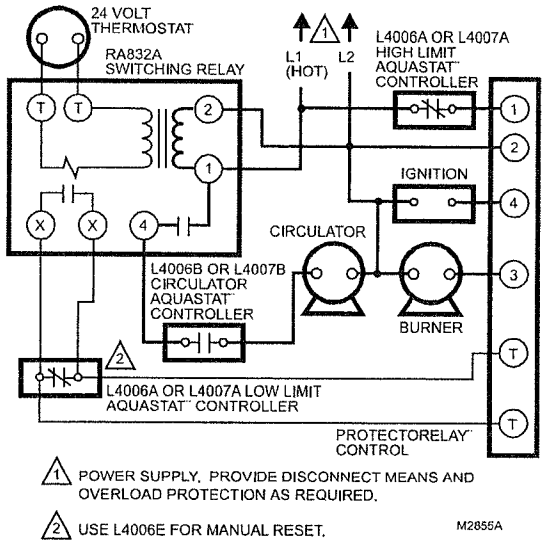


Fig. 5. Hookup for oil-fired, summer-winter, hydronic system with domestic hot water. This is typical where control for domestic hot water is added, or where each Aquastat Controller is mounted in a separate location.

OPERATION

For proper selections of settings, follow boiler manufacturer recommendations:

1. High limit controller: Shuts off burner when water temperature exceeds high limit setting. Burner restarts when temperature drops to high limit setting minus the temperature differential.

NOTE: If L4006E or H, see Manual Reset section.

2. Low limit controller: Maintains minimum boiler temperature for domestic hot water. Turns boiler on at temperature setting, less differential.
3. Circulator controller: Prevents circulation of water that is not hot enough. Breaks circulator circuit at temperature setting minus differential and remakes at setting.

ADJUSTMENT

Set the differential to correspond with the boiler manufacturer recommendations. To adjust models with adjustable differential, rotate the wheel on the back of the snap switch until the desired reading is aligned with the V notch in the frame. The wheel provides an adjustment from 5°F to 30°F (3°C to 17°C). Replace the cover on the Aquastat Controller.

Adjust the control point to correspond with the boiler manufacturer recommendations. To adjust, insert a screwdriver in the slotted screw type head located beneath the window in the cover. Turn the scale to the desired control point.

Manual Reset

When the device includes manual reset (L4006E and H), be sure to press the red reset button on the front of the case to make sure that the controller is not locked out on safety. When checking out the system, adjust the control point low enough so the temperature of the controlled medium reaches the high limit setting, the burner shuts off, and the Aquastat Controller locks out. When the temperature of the controlled medium drops to the high limit setting minus differential, push the manual reset button and the system should be operative again. Reset control to proper high limit setting.

CHECKOUT

Check to make certain that the Aquastat Controller has been installed and adjusted properly. Put the system into operation and observe the action of the device through several cycles to make certain that it provides proper control of the system as described in the Operations section. Further adjustments can be made to meet more exact comfort requirements.

MATERIAL SAFETY DATA SHEET

Section 1. Product And Company Identification

Product Name: Heat Conductive Compound

MSDS ID: DS9021

Synonyms: MS1699

Product Use: Heat conductive material used to enhance contact and heat transfer in temperature sensor applications.

Manufacturer: Honeywell Inc., 1985 Douglas Drive North, Minneapolis, MN 55422.

Date Released: October 8, 1999

Customer Response Center: 800-328-5111

Emergency Telephone Information: 888-809-3787

NFPA Ratings:

Health 0; Flammability 1; Reactivity 0; Personal Protection B

Section 2. Composition, Information on Ingredients

Ingredient	CAS Number	Percent	PEL	TVL
#2 Lithium Complex Grease (70%):				
Mineral Oil	64742-65-0	35-50	5 mg/m^3	5 mg/m^3
Mineral Oil	64742-62-7	20-25	5 mg/m^3	5 mg/m^3
Lithium Hydrostearate/Sebacate Complex	68815-49-6	4-9	—	—
Zinc Alkyldithiophosphate	68649-42-3	0-2	—	—
Aluminum Paste (30%):				
Aluminum, as Al	7429-90-5	20-25	15 mg/m^3	10 mg/m^3
Aliphatic Petroleum Distillates	8052-41-3	10-15	2900 mg/m^3	525 mg/m^3
Stearic Acid	57-11-4	1-2	—	—
Aromatic Petroleum Distillates	64742-95-6	1-2	5 mg/m^3	5 mg/m^3

Additional Information: Part No. 120650 (0.5 oz tube); Part No. 107408 (4 oz can); Part No. 197007 (5 gallon container). May also contain minute amounts of lithium and molybdenum lubricant compounds.

Section 3. Hazard Identification

Acute Health Effects:

Skin: Excessive contact may cause skin irritation and dermatitis.

Eye: Direct contact with eye will cause irritation.

Inhalation: No adverse effects are expected.

Ingestion: Ingestion of product may cause nausea, vomiting and diarrhea.

Chronic Health Effects:

Existing skin rash or dermatitis may be aggravated by repeated contact.

OSHA Hazard Classifications: None.

Carcinogenicity: Not considered to be a carcinogen by either OSHA, NTP, IARC, or ACGIH.

Section 4. First Aid Measures

Eye Contact: Flush eyes with water for 15 minutes. Remove any contact lenses and continue to flush. Obtain medical attention if irritation develops and persists.

Skin Contact: Remove excess with cloth or paper. Wash thoroughly with mild soap and water. Obtain medical attention if irritation develops and persists.

Ingestion: Contact physician or local poison control center *immediately*.

Inhalation: Remove patient to fresh air and obtain medical attention if symptoms develop.

Section 5. Fire Fighting Measures

Material Flash Point: > 383°F (195°C). Will burn if exposed to flame.

Extinguishing Media: Carbon dioxide, dry chemical or foam.

Special Fire Fighting Procedures: None.

Explosion Hazards: None. Aluminum powder can react with water to release flammable hydrogen gas. In the form of this product, this reaction is not expected.

Section 6. Accidental Release Measures

Scrape up and dispose of as solid waste in accordance with state and federal regulations.

Section 7. Handling and Storage

Store in dry place. Keep container closed when not in use.

Section 8. Exposure Controls and Personal Protection.

Ventilation: No special ventilation is required when working with this product.

Respiratory Protection: None required.

Eye Protection: Not normally required. However, use chemical safety goggles or faceshield if potential for eye contact exists, especially if material is heated.

Hand/Clothing Protection: Not normally required. Protective gloves and clothing are recommended, as material is difficult to remove from skin and clothing.

Other Protective Equipment: None required.

Section 9. Physical and Chemical Properties

Appearance/Odor: Aluminum color, semi-solid material, pleasant odor.

Solubility in Water: Negligible.

Specific Gravity: 0.86.

Section 10. Stability and Reactivity

Stability: Stable.

Reactivity: Hazardous polymerization will not occur.

Incompatibilities: Strong oxidizing agents and halogens.

Hazardous Decomposition Products: Carbon dioxide, carbon monoxide.

Section 11. Toxicology Information.

No data available.

Section 12. Ecological Information

Chemical Fate Information: Hydrocarbon components will biodegrade in soil; relatively persistent in water.

Section 13. Disposal Consideration

Dispose of as solid waste in accordance with local, state and federal regulations.

Section 14. Transportation Information

DOT Classification: Not classified as hazardous.

Section 15. Regulatory Information

SARA Title III Supplier Notification: Include in Section 311/312 inventory reports if amounts exceed 10,000 pounds. Aluminum compounds are subject to the reporting requirements under Section 313 of Emergency Planning and Community Right-To-Know Act of 1986 (40 CFR 372). Ingredients listed in TSCA Inventory.

Section 16. Other Information

This information is furnished without warranty, expressed or implied, except that is is accurate to the best of our knowledge.

Prepared by: PROSAR, 1295 Bandana Boulevard, Suite 335, St. Paul, MN 55108 (651-917-6100).

Automation and Control Solutions

Honeywell International Inc.
1985 Douglas Drive North
Golden Valley, MN 55422
customer.honeywell.com

Honeywell Limited-Honeywell Limitée
35 Dynamic Drive
Scarborough, Ontario M1V 4Z9

60-0915—5 C.H. Rev. 08-05

Honeywell

CP-2

Submittal Data Information

101-032

Model 009 Cartridge Circulator

Effective: February 10, 2009 **Supersedes:** September 1, 2003

Job: _____ Engineer: _____ Contractor: _____ Rep: _____

ITEM NO.	MODEL NO.	IMP. DIA.	G.P.M.	HEAD/FT.	H.P.	ELEC. CHAR.

Features

- 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
- Universal flange to flange dimensions
- Cast Iron or Stainless Steel construction

Materials of Construction

Casing (Volute):	Cast Iron or Stainless Steel
Stator Housing:	Aluminum
Cartridge:	Stainless Steel
Impeller:	Non-Metallic
Shaft:	Ceramic
Bearings:	Carbon
O-Ring & Gaskets:	EPDM

Model Nomenclature

F – Cast Iron, Flanged

SF – Stainless Steel, Flanged

Variations:

Z – Zoning Circulator

J – Bronze cartridge with Cast Iron casing

Performance Data

Flow Range: 0 – 10 GPM

Head Range: 0 – 35 Feet

Minimum Fluid Temperature: 40°F (4°C)

Maximum Fluid Temperature: 230°F (110°C)

Maximum Working Pressure: 125 psi

Connection Sizes: 3/4", 1", 1-1/4", 1-1/2" Flanged

c UL us LISTED

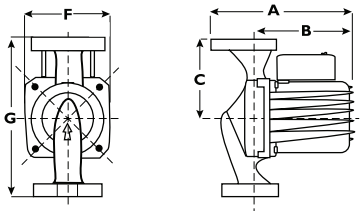
FOR INDOOR USE ONLY

Application

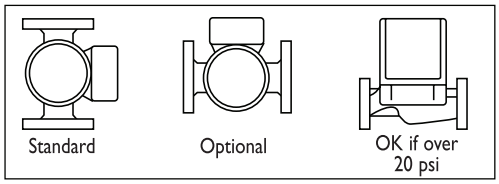
The Taco 009 is designed for a wide range of residential and light commercial higher-head/lower-flow water circulating applications. Typical uses include hydronic heating, radiant in-floor/panel heating and closed-loop solar heating systems. The Stainless Steel 009 can be used in higher-head/lower-flow heat recovery, open-loop solar heating and light commercial domestic water recirculation systems. The unique replaceable cartridge contains all of the moving parts and allows for easy service, instead of replacing the entire circulator. Compact, direct-drive, low power consumption design is ideal for high-efficiency jobs.

Pump Dimensions & Weights

		A		B		C		D		F		G		Ship Wt.	
Model	Casing	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lbs.	Kg
009-F5	Cast Iron	7	178	5-11/16	144	3-3/16	81	3-5/16	84	4-1/8	105	6-3/8	162	9.5	4.3
009-SF5	St. Steel	7	178	5-11/16	144	3-3/16	81	3-5/16	84	4-1/8	105	6-3/8	162	9.5	4.3



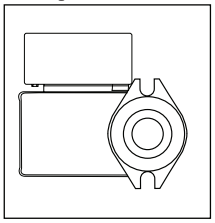
Mounting Positions



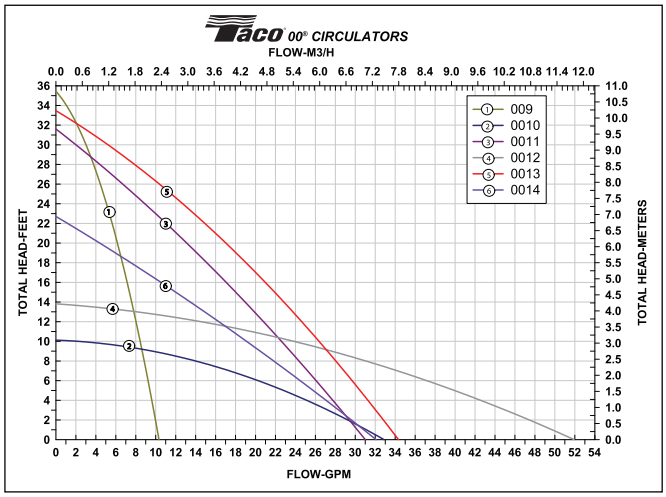
Electrical Data

Model	Volts	Hz	Ph	Amps	RPM	HP
009-F5	115	60	1	1.40	3250	1/8
009-SF5	115	60	1	1.40	3250	1/8
Motor Type	Permanent Split Capacitor Impedance Protected					
Motor Options	220/50/1, 220/60/1, 230/60/1, 100/110/50/60/1					

Flange Orientation



Performance Field - 60Hz



Do it Once. Do it Right.®

TACO INC., 1160 Cranston Street, Cranston, RI 02920 Telephone: (401) 942-8000 Fax: 942-2360

TACO (Canada), Ltd., 6180 Ordan Drive, Mississauga, Ontario L5T 2B3 Telephone: (905) 564-9422 Fax: (905) 564-9436

Visit our website at: www.taco-hvac.com

"00"® Timers / Aquastat

The Taco Clock Timers and Temperature Aquastat are designed to operate Taco circulators for domestic hot water recirculation during peak demand periods. The 24-hour clock timer can be set in 15 minute on/off intervals. A digital 7-day programmable timer can be set to run at varying times and intervals each day. The timer enclosures feature rugged steel construction. Temperature control is easy with the Aquastat — automatically ON at 95˚F and OFF at 115˚F. Adaptable to any "00" Series Circulator.

HYDRONIC COMPONENTS & SYSTEMS

Do it once.
Do it right.® Taco®

Supersedes: 9/15/94

Effective Date: 04/30/06
Printed in USA

Submittal Data Information
"00"® Timers / Aquastat

Submittal Data # 101-036
Supersedes: 09/15/94

Effective: 04/30/06

24 Hour Analog Clock Timer Performance Data – #265-1

Electrical Characteristics: 115/60/1
Timer Switch: 16A @115V
Timer Interval: 15 Minutes
Clock face: Hour and Minute Hands
Manual Switch: I Permanently ON
Automatic Operation
O Permanently OFF

7 Day Digital Timer Performance Data – #265-3

Electrical Characteristics: 115/60/1
Timer Switch: 16A @115V
Timer Interval: 1 Minute (+) Adjustable
Clock face: Digital with Circulator Programming
Max. On/Off Settings: 10
Capacitor Backup: 100 hours

Temperature Aquastat – Snap Action Temperature Switch – #563-2

Electrical Characteristics: 115/60/1
Connections: 1/2" (Snap on circ. body)
3/4" Copper pipe
Temperature Setting: ON @ 95°F
OFF @ 115°F
Contacts: 7 amp SPDT Switch
Wire Leads: 18" – Type 18-2,
Round Premium Cable

Application

The Taco Clock Timers and Temperature Aquastat are designed to control the operation of Taco circulators on Domestic Hot Water Recirculation Systems for maximum comfort and energy efficiency. They are adaptable to any "00"® Series circulator by attaching the enclosure or wiring to the electrical box.

24 Hour Analog Timer

Operates the circulator at the same pre-set times every day. Time intervals are in 15 minute increments. This user friendly clock has a raised minute hand for easy adjustments, quick-set trippers and an operation switch for Manual ON/OFF or Automatic modes.

7 Day Digital Programmable Timer

Digital Timer can be programmed to operate at different times on different days, weekdays or weekends, for maximum comfort and convenience to match family schedules. Easy circular programming clock face and LCD readout screen allows for a maximum of 10 on/off settings. Run time intervals as short as 1 minute provides maximum energy efficiency. A capacitor backup saves settings for 4 days (100 hours) during power outages.

Temperature Aquastat

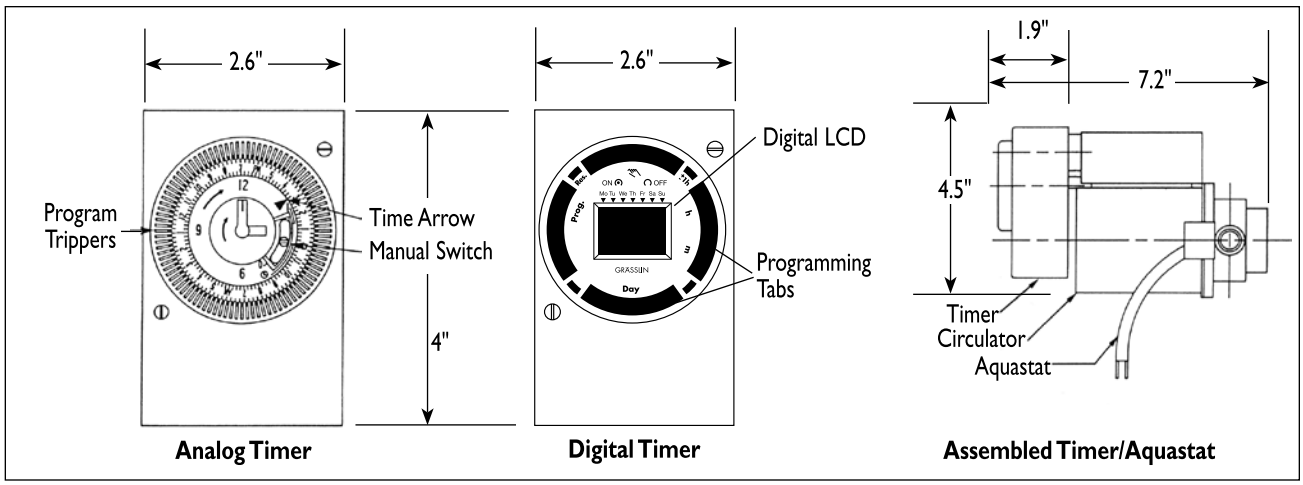
Controls pump operation to maintain system temperature between 95°F and 115°F. Easy clip-on Aquastat attaches directly to 3/4" pipe or a 1/2" sweat pump casing.

Shipping Weight

Model	Item	Lbs.	Kg
265-1	Analog Timer	.75	.35
265-3	Digital Timer	.75	.35
563-2	Aquastat	.25	.11

c UL us LISTED

FOR INDOOR USE ONLY



HYDRONIC COMPONENTS & SYSTEMS

Do it once. Do it right.® Taco®

Taco Inc., 1160 Cranston Street, Cranston, RI 02920 / (401) 942-8000 / Fax (401) 942-2360
Taco (Canada) Ltd., 6180 Ordan Drive, Mississauga, Ontario L5T 2B3 / (905) 564-9422 / Fax (905) 564-9436
www.taco-hvac.com

Honeywell

L4006A,B,E,H Aquastat® Controllers

INSTALLATION INSTRUCTIONS

APPLICATION

These boiler-mounted, immersion type controllers operate in response to temperature changes in hydronic heating systems.

L4006A breaks the circuit on a temperature rise to the control setting. It is used for high limit or low limit control. When used as a controller or as a low limit, a separate high limit must be used.

L4006B makes the circuit on a temperature rise. It is used as a circulator controller, delaying circulator operation when boiler water temperature is below the control setting.

L4006E,H includes a trip-free manual reset switch. These models are designed to break the control circuit whenever the temperature of the controlled medium reaches the high limit setting. A reset button on the front of the case must be pressed to re-establish the control circuit. L4006H also includes bracket and clamp for surface mounting on pipe or tank.

A plastic bag of heat-conductive compound is included with the L4006A,B,E Aquastat® Controllers for use when the sensing bulb is inserted into a well designed for a large bulb than the one used on the L4006A,B,E. A 124904 Well Adapter, for use on old wells that do not fit the L4006A,B,E immersion well clamp, can be ordered; see form 68-0040, Wells and Fittings for Temperature Controllers. A setting stop is included to prevent setting above a desired temperature on limit.

If a well adapter or other accessories are needed, refer to form 68-0040, Wells and Fittings for Temperature Controllers, for part numbers and ordering information.

INSTALLATION

When Installing This Product...

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After installation is complete, check out product operation as provided in these instructions.

⚠ WARNING

Electrical Shock Hazard.
Can cause serious injury, death or equipment damage.
Disconnect the power supply before beginning installation to prevent electrical shock or equipment damage.

Installing Immersion Well Models (L4006A,B,E)

IMPORTANT

Obtain the best thermal response with a well that snugly fits the sensing bulb. The bulb should be inserted until it rests against the bottom of the well. Use a well of correct length and bend the tubing, if necessary, to provide enough force to hold the bulb against the bottom of the well. Do not make a sharp bend in the tubing. A sharp bend can produce a break in the tubing and cause a loss of fill. This condition will cause the high and low limit controls to be made continuously.

If the well is not a snug fit on the bulb, use the heat-conductive compound as follows. Fold the plastic bag of compound lengthwise and twist gently. Snip the end of the bag and insert into the well. Slowly pull out the bag while squeezing firmly to distribute the compound evenly in the well. Insert the bulb into the well. Bend the tubing, if necessary, to provide force to hold the bulb against the bottom of the well and to hold the out end of the bulb in firm contact with the side of the well. Wipe off any excess compound.

NOTE: Some models have an adjustable capillary tubing length to 3 inches (76 mm). In these models, pull out extra tubing from inside the case, if needed.

Follow the boiler manufacturer instructions, if available; otherwise, proceed as follows.

1. Remove the old control.
2. Refer to the cover insert of the old control to identify and tag each lead as it is disconnected.
3. Leave the old well in place if it is suitable.

If Well is Otherwise Suitable But Does Not Fit The L4006 Immersion Well Clamp

Use a 124904 Well Adapter (order separately, see form 68-0040) to secure the L4006 to the old well. The adapter has a flange at one end for fastening the L4066 adapter clamp.

1. Loosen, but do not remove, the two adapter clamp screws (see Fig. 1).
2. Slide the adapter onto the capillary and short tube; see Fig. 2 inset.
3. Make sure the flanged end of the adapter fits into the hole in the case. Position the adapter well clamp snugly over the flange on the adapter, then tighten the clamp screws.
4. Insert the bulb into the well, as shown in Fig. 2. If necessary, use the heat-conductive compound as instructed in the IMPORTANT statement on page 1.
5. Tighten the setscrew (if one is present in the old well spud) against the adapter.

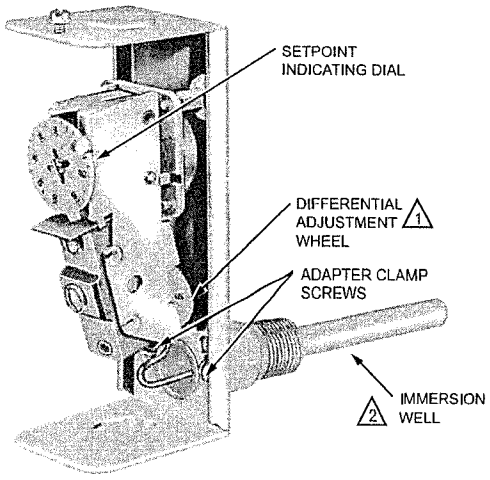


Fig. 1. Internal view of L4006A,B with horizontal well. L4006E is the same with reset button added.

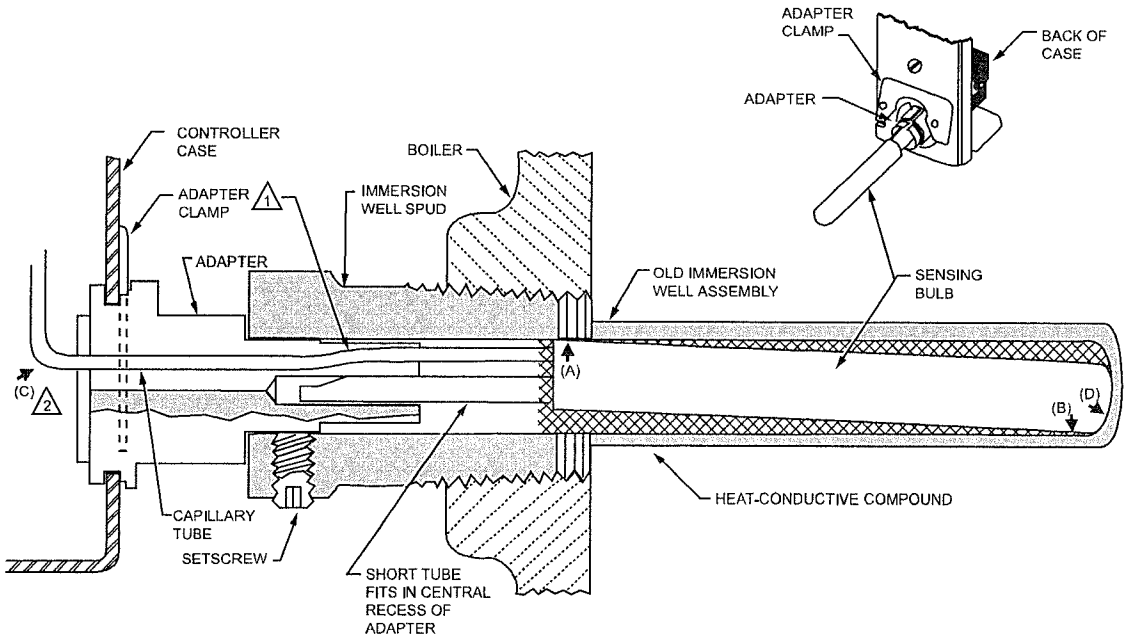


Fig. 2. Bulb in immersion well and use of adapter.

If the Old Well Is Unsuitable.

1. Drain the system and remove the well.
2. Select a new well from form 68-0040 (order well separately).
3. Install the new well, refill the system and check for leaks.
4. Loosen, but do not remove, the two adapter clamp screws (Fig. 1).
5. Insert the sensing bulb into the well until it bottoms as show in Fig. 2. Add heat-conductive compound, if necessary, as instructed in the IMPORTANT statement on page 1.

6. Make sure the end of the well fits into the hole in the case. Position the immersion well clamp snugly over the well flange and tighten the clamp screw securely.

Mounting Surface Mount Model (L4006H)

The L4006H is designed for surface mounting on piping or tank and can be mounted in any position.

When mounting the L4006H on piping, the pipe should be 1 in. (25 mm) diameter or larger for accurate temperature sensing.

1. Remove any insulation from the pipe.
2. Thoroughly scrape off all scale, rust or paint.
3. Mount controller as shown in Fig. 3 using adjustable 12 in. (294 mm) pipe strap furnished.

When mounting the L4006H on a tank, use a pipe strap of appropriate length, approximately 6-10 ft (17.6- 29.4m) for the tank (not provided). Fit the pipe strap through the slot in the mounting bracket. See Fig. 3.

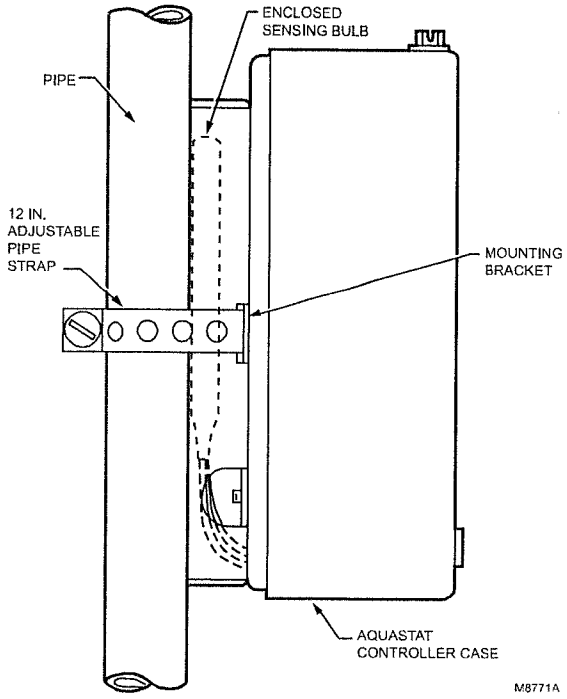


Fig. 3. Mount L4006H directly on surface.

Wiring

⚠ WARNING

Electrical Shock Hazard.
Can cause serious injury, death or equipment damage.
Disconnect power supply before connecting wiring to avoid electrical shock or equipment damage.

All wiring must comply with local codes and ordinances regarding wire size, insulation, enclosure, etc. See Fig. 4 and 5 for typical diagrams of Aquastat® Controllers used in heating systems.

Use these Aquastat Controllers with copper wire only.

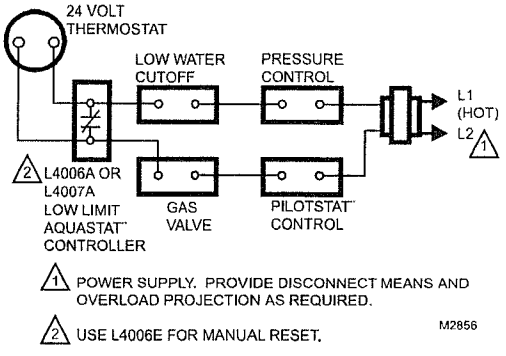


Fig. 4. Typical hookup for gas-fired system with domestic hot water.

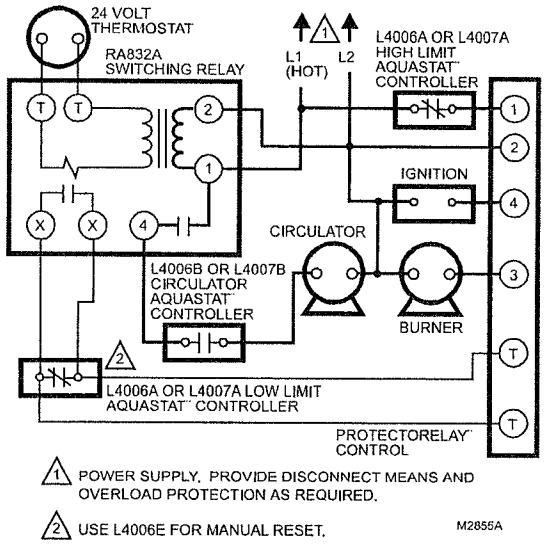


Fig. 5. Hookup for oil-fired, summer-winter, hydronic system with domestic hot water. This is typical where control for domestic hot water is added, or where each Aquastat Controller is mounted in a separate location.

OPERATION

For proper selections of settings, follow boiler manufacturer recommendations:

1. High limit controller: Shuts off burner when water temperature exceeds high limit setting. Burner restarts when temperature drops to high limit setting minus the temperature differential.

NOTE: If L4006E or H, see Manual Reset section.

2. Low limit controller: Maintains minimum boiler temperature for domestic hot water. Turns boiler on at temperature setting, less differential.
3. Circulator controller: Prevents circulation of water that is not hot enough. Breaks circulator circuit at temperature setting minus differential and remakes at setting.

ADJUSTMENT

Set the differential to correspond with the boiler manufacturer recommendations. To adjust models with adjustable differential, rotate the wheel on the back of the snap switch until the desired reading is aligned with the V notch in the frame. The wheel provides an adjustment from 5°F to 30°F (3°C to 17°C). Replace the cover on the Aquastat Controller.

Adjust the control point to correspond with the boiler manufacturer recommendations. To adjust, insert a screwdriver in the slotted screw type head located beneath the window in the cover. Turn the scale to the desired control point.

Manual Reset

When the device includes manual reset (L4006E and H), be sure to press the red reset button on the front of the case to make sure that the controller is not locked out on safety. When checking out the system, adjust the control point low enough so the temperature of the controlled medium reaches the high limit setting, the burner shuts off, and the Aquastat Controller locks out. When the temperature of the controlled medium drops to the high limit setting minus differential, push the manual reset button and the system should be operative again. Reset control to proper high limit setting.

CHECKOUT

Check to make certain that the Aquastat Controller has been installed and adjusted properly. Put the system into operation and observe the action of the device through several cycles to make certain that it provides proper control of the system as described in the Operations section. Further adjustments can be made to meet more exact comfort requirements.

MATERIAL SAFETY DATA SHEET

Section 1. Product And Company Identification

Product Name: Heat Conductive Compound

MSDS ID: DS9021

Synonyms: MS1699

Product Use: Heat conductive material used to enhance contact and heat transfer in temperature sensor applications.

Manufacturer: Honeywell Inc., 1985 Douglas Drive North, Minneapolis, MN 55422.

Date Released: October 8, 1999

Customer Response Center: 800-328-5111

Emergency Telephone Information: 888-809-3787

NFPA Ratings:

Health 0; Flammability 1; Reactivity 0; Personal Protection B

Section 2. Composition, Information on Ingredients

Ingredient	CAS Number	Percent	PEL	TVL
#2 Lithium Complex Grease (70%):				
Mineral Oil	64742-65-0	35-50	5 mg/m^3	5 mg/m^3
Mineral Oil	64742-62-7	20-25	5 mg/m^3	5 mg/m^3
Lithium Hydrostearate/Sebacate Complex	68815-49-6	4-9	—	—
Zinc Alkyldithiophosphate	68649-42-3	0-2	—	—
Aluminum Paste (30%):				
Aluminum, as Al	7429-90-5	20-25	15 mg/m^3	10 mg/m^3
Aliphatic Petroleum Distillates	8052-41-3	10-15	2900 mg/m^3	525 mg/m^3
Stearic Acid	57-11-4	1-2	—	—
Aromatic Petroleum Distillates	64742-95-6	1-2	5 mg/m^3	5 mg/m^3

Additional Information: Part No. 120650 (0.5 oz tube); Part No. 107408 (4 oz can); Part No. 197007 (5 gallon container). May also contain minute amounts of lithium and molybdenum lubricant compounds.

Section 3. Hazard Identification

Acute Health Effects:

Skin: Excessive contact may cause skin irritation and dermatitis.

Eye: Direct contact with eye will cause irritation.

Inhalation: No adverse effects are expected.

Ingestion: Ingestion of product may cause nausea, vomiting and diarrhea.

Chronic Health Effects:

Existing skin rash or dermatitis may be aggravated by repeated contact.

OSHA Hazard Classifications: None.

Carcinogenicity: Not considered to be a carcinogen by either OSHA, NTP, IARC, or ACGIH.

Section 4. First Aid Measures

Eye Contact: Flush eyes with water for 15 minutes. Remove any contact lenses and continue to flush. Obtain medical attention if irritation develops and persists.

Skin Contact: Remove excess with cloth or paper. Wash thoroughly with mild soap and water. Obtain medical attention if irritation develops and persists.

Ingestion: Contact physician or local poison control center *immediately*.

Inhalation: Remove patient to fresh air and obtain medical attention if symptoms develop.

Section 5. Fire Fighting Measures

Material Flash Point: > 383°F (195°C). Will burn if exposed to flame.

Extinguishing Media: Carbon dioxide, dry chemical or foam.

Special Fire Fighting Procedures: None.

Explosion Hazards: None. Aluminum powder can react with water to release flammable hydrogen gas. In the form of this product, this reaction is not expected.

Section 6. Accidental Release Measures

Scrape up and dispose of as solid waste in accordance with state and federal regulations.

Section 7. Handling and Storage

Store in dry place. Keep container closed when not in use.

Section 8. Exposure Controls and Personal Protection.

Ventilation: No special ventilation is required when working with this product.

Respiratory Protection: None required.

Eye Protection: Not normally required. However, use chemical safety goggles or faceshield if potential for eye contact exists, especially if material is heated.

Hand/Clothing Protection: Not normally required. Protective gloves and clothing are recommended, as material is difficult to remove from skin and clothing.

Other Protective Equipment: None required.

Section 9. Physical and Chemical Properties

Appearance/Odor: Aluminum color, semi-solid material, pleasant odor.

Solubility in Water: Negligible.

Specific Gravity: 0.86.

Section 10. Stability and Reactivity

Stability: Stable.

Reactivity: Hazardous polymerization will not occur.

Incompatibilities: Strong oxidizing agents and halogens.

Hazardous Decomposition Products: Carbon dioxide, carbon monoxide.

Section 11. Toxicology Information.

No data available.

Section 12. Ecological Information

Chemical Fate Information: Hydrocarbon components will biodegrade in soil; relatively persistent in water.

Section 13. Disposal Consideration

Dispose of as solid waste in accordance with local, state and federal regulations.

Section 14. Transportation Information

DOT Classification: Not classified as hazardous.

Section 15. Regulatory Information

SARA Title III Supplier Notification: Include in Section 311/312 inventory reports if amounts exceed 10,000 pounds. Aluminum compounds are subject to the reporting requirements under Section 313 of Emergency Planning and Community Right-To-Know Act of 1986 (40 CFR 372). Ingredients listed in TSCA Inventory.

Section 16. Other Information

This information is furnished without warranty, expressed or implied, except that is is accurate to the best of our knowledge.

Prepared by: PROSAR, 1295 Bandana Boulevard, Suite 335, St. Paul, MN 55108 (651-917-6100).

Automation and Control Solutions

Honeywell International Inc.
1985 Douglas Drive North
Golden Valley, MN 55422
customer.honeywell.com

Honeywell Limited-Honeywell Limitée
35 Dynamic Drive
Scarborough, Ontario M1V 4Z9

60-0915—5 C.H. Rev. 08-05

Honeywell