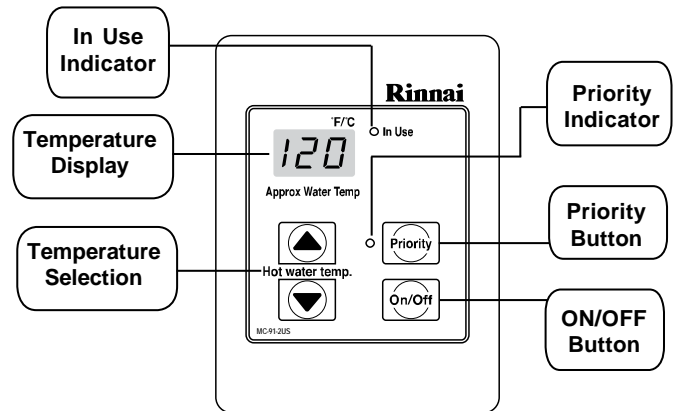


## How to use the Temperature Controller

Dimensions (inches): 3.5 W x 4.75 H x 0.75 D

The MC-91-2 controller is the standard temperature controller that is supplied with the water heater. On indoor models it is integrated into the front panel. The MCC-91-2 controller is for commercial and hydronic applications requiring higher temperatures. When the MCC-91-2 controller is connected, these higher temperatures are available on all controller models in the system. Refer to the section on temperature ranges.

DO NOT repeatedly operate the water heater and then use a hot water tap while the controller is turned off. Operating the water heater in this way to alternately produce hot water may cause water to condense on the outside of internal parts and accumulate in the water heater cabinet.



### **WARNING**

- 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.
- Keep the area around the appliance clear and free from combustible materials, gasoline, and other flammable vapors and liquids.
- Always check the water temperature before entering a shower or bath.
- Do not use this appliance if any part has been under water. Immediately call a licensed professional to inspect the appliance and to replace any part of the control system and any gas control which has been under water.
- Should overheating occur or the gas supply fail to shut off, turn off the manual gas control valve to the appliance.
- Do not adjust the DIP switch unless specifically instructed to do so.
- Do not use an extension cord or an adapter plug with this appliance.
- Any alteration to the appliance or its controls can be dangerous and will void the warranty.


If you install this water heater in an area that is known to have hard water or that causes scale build-up the water must be treated and/or the heat exchanger flushed regularly. Rinnai provides a "Scale Control System" that offers superior lime scale prevention and corrosion control by feeding a blend of control compounds into the water supply. Damage and repair due to corrosive compounds in the air is not covered by warranty.

Keep the air intake location free of chemicals such as chlorine or bleach that produce fumes. These fumes can damage components and reduce the life of your appliance. Damage and repair due to scale in the heat exchanger is not covered by warranty.

## How to Set the Temperature

This water heater requires a minimum flow rate to operate. This rate can be found on the specification page in this manual. In some cases when you are not getting hot water or if the water alternates between hot and cold, it is due to the water flow being below or close to the minimum flow rate. Increasing the flow rate should resolve these problems in these cases.

If you are experiencing issues with higher temperature settings, then reduce the temperature setting. Selecting a temperature closer to that which is actually used at the faucet will increase the amount of hot water being delivered to the faucet, due to less cold water mixing at the fixture.

	<p>Hot water can be dangerous, especially for infants or children, the elderly, or infirm. There is hot water scald potential if the thermostat is set too high. Water temperatures over 125° F (52° C) can cause severe burns or scalding resulting in death.</p> <p>Hot water can cause first degree burns with exposure for as little as:</p> <ul style="list-style-type: none"> <li>3 seconds at 140° F (60° C)</li> <li>20 seconds at 130° F (54° C)</li> <li>8 minutes at 120° F (49° C)</li> </ul> <p>Test the temperature of the water before placing a child in the bath or shower.</p> <p>Do not leave a child or an infirm person in the bath unsupervised.</p>
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1. If the water heater is off, press the Power button to turn on.
2. If the Priority light is off, then press the "Priority button" on the temperature controller. The green Priority light will glow indicating that this controller is controlling the temperature and that the water heater is ready to supply hot water. (The priority can only be changed while no hot water is running.)



Hot water temp.



3. Press the up or down buttons to obtain the desired temperature setting.
- All hot water sources are able to provide water at this temperature setting until it is changed again at this or another temperature controller.

### NOTICE

While any hot water is being provided, the temperature setting can only be adjusted between 98° F and 110° F.

### NOTICE

Check local codes for the maximum water temperature setting allowed when used in nursing homes, schools, day care centers, and all other public applications.

### NOTICE

If a newly installed unit with a controller has not been powered for at least 6 hours then the temperature will return to the default setting of 104° F (40° C) if power is interrupted.

### NOTICE

There may be a variation between the temperature displayed on the temperature controller and the temperature at the tap due to weather conditions or the length of pipe to the water heater.

## Temperatures Available with a Controller

The water heater can deliver water at only one temperature setting at a time. The available temperatures are provided below. A temperature lower than 98° F (37° C) can be obtained at the tap by mixing with cold water.

To change the temperature scale from Celsius to Fahrenheit or vice versa, press and hold the “On/Off” button for 5 seconds while the water heater is OFF.

Temperature Settings Available (Fahrenheit °F)																
RL75i, RL75e	98	100	102	104	106	108	110	115	120	125	130	135	140	150	160	185**
RL94i, RL94e										*	*	*	*	**	**	
Celsius °C	37	38	39	40	41	42	43	46	49	52	54	57	60	66	71	85

\* Temperature settings from 125-140 °F (52-60 °C) are available by setting switch 6 to ON in the SW1 Dip switch (tan switches). These models have a default maximum temperature of 120° F (49° C) and an option (switch 6) to increase the maximum temperature to 140 °F (60 °C).

\*\* These settings require the MCC-91-2 controller. When the MCC-91-2 controller is connected, these higher temperatures are available on all controller models in the system. Use of an MCC-91-2 controller in a residential dwelling will reduce the warranty coverage to that of a commercial warranty application.

<b>! WARNING</b>	DO NOT adjust the other switches unless specifically instructed to do so.
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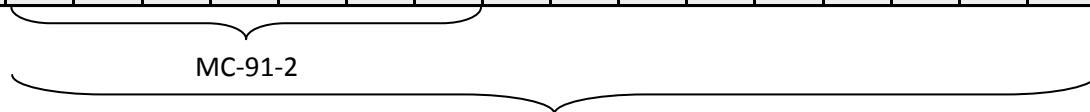
- These temperatures are suggestions only:**
- Kitchen 120 °F (49° C)
  - Shower 98 - 110 °F (37 - 43 °C)
  - Bath Fill 102 - 110 °F (39 - 43 °C)

## Alternate Temperature Settings

A different range of temperature settings is available by setting switches 2 and 3 of the SW2 dip switch (white switches) to ON. The table below shows the settings available with the MC-91-2 and MCC-91-2 controller.

<b>! WARNING</b>	MC-91-1, MCC-91-1, MC-100V-1, and BC-100V-1 controllers are not compatible with Alternate Temperature Settings. Alternate Temperature Settings are for commercial applications only.
	DO NOT use the MC-91-1, MCC-91-1, MC-100V-1, or BC-100V-1 controllers when dip switches 2 and 3 (white switches) are in the ON position.

Alternate Temperature Settings Available (Fahrenheit °F)																
RL75i, RL75e	110	115	120	125	130	135	140	145	150	155	160					
RL94i, RL94e												165	170	175	180	185
Celsius °C	43	46	49	52	54	57	60	63	66	68	71	74	77	79	82	85



## Temperature Options Without a Temperature Controller

The default temperature setting for this appliance installed without a temperature controller is 120° F (49° C). If desired, the temperature setting can be changed to 140° F (60° C) by adjustment of a switch.

In the SW1 Dip switch (tan switches), set switch 5 to ON to obtain 140° F water temperature setting. Set switch 5 to OFF (default) to obtain 120° F water temperature setting. If a temperature controller is installed, then switch 5 has no effect on temperature settings.

## Setting Controller to Mute

On the MC-91-2 to eliminate the beeps when keys are pressed or to turn the beeps back on, press and hold both the up and down buttons until a beep is heard (approximately 5 seconds).

## Locking the Controller

The MC-91-2 controller can be locked by pressing the Priority button and the up button together for 5 seconds. A beep will sound confirming that the controller is locked. The display will alternately show “LOC”, the temperature setting, and a diagnostic code if one has been activated. All of the controllers in the system are also locked.

To unlock the controller press the Priority button and the up button together for 5 seconds.

## Diagnostic Codes

This water heater is designed to display diagnostic codes. If there is a potential operation concern refer to the code and remedy on the next page.

### To Display Diagnostic Information

To display the most recent diagnostic information codes press and hold the “On/Off” button for 2 seconds on the MC-91-2 controller. While holding the “On/Off” button press the up button. The last 9 diagnostic codes will flash one after the other. To exit this mode press the “On/Off” and up button as before.

To enter or exit the maintenance monitor information mode press and hold the down button for 2 seconds and without releasing it press the ON/OFF button.

To obtain the water flow rate press the up or down buttons until “01” displays. The water flow rate will then appear. For example “58” means 5.8 gal/min.

To obtain the outgoing water temperature press the up or down buttons until “02” displays. The temperature will appear in degrees Fahrenheit.

No.	Data	Unit
01	Water flow rate	0.1 gal/min
02	Outgoing water temperature	Degrees Fahrenheit

## Diagnostic Codes and Remedies



### WARNING

Some of the checks below should be done by a licensed professional. Consumers should never attempt any action that they are not qualified to perform.

Code	Definition		Remedy
03	Power interruption during Bath Fill (Water will not flow when power returns).		Turn off all hot water taps. Press ON/OFF twice.
10	Air Supply or Exhaust Blockage		Check that nothing is blocking the flue inlet or exhaust. Check all vent components for proper connections.
		licensed professional only	Ensure approved venting materials are being used. Ensure vent length is within limits. Verify dip switches are set properly. Check fan for blockage.
11	No Ignition (heater not turning on)		Check that the gas is turned on at the water heater, gas meter, or cylinder. If the system is propane, make sure that gas is in the tank. Ensure appliance is properly grounded.
		licensed professional only	Ensure gas type and pressure is correct. Ensure gas line, meter, and/or regulator is sized properly. Bleed all air from gas lines. Verify dip switches are set properly. Ensure igniter is operational. Check igniter wiring harness for damage. Check gas solenoid valves for open or short circuits. Remove burner cover and ensure all burners are properly seated. Remove burner plate and inspect burner surface for condensation or debris. Check the ground wire for the PC board.
12	No Flame		Check that the gas is turned on at the water heater, gas meter, or cylinder. Check for obstructions in the flue outlet. If the system is propane, make sure that gas is in the tank.
		licensed professional only	Ensure gas line, meter, and/or regulator is sized properly. Ensure gas type and pressure is correct. Bleed all air from gas lines. Ensure proper venting material was installed. Ensure condensation collar was installed properly. Ensure vent length is within limits. Verify dip switches are set properly. Check power supply for loose connections. Check power supply for proper voltage and voltage drops. Ensure flame rod wire is connected. Check flame rod for carbon build-up. Disconnect and reconnect all wiring harnesses on unit and PC board. Check for DC shorts at components. Check gas solenoid valves for open or short circuits. Remove burner plate and inspect burner surface for condensation or debris.
14	Thermal Fuse has activated		Check for restrictions in air flow around unit and vent terminal.
		licensed professional only	Check gas type of unit and ensure it matches gas type being used. Check for low water flow in a circulating system causing short-cycling. Ensure dip switches are set to the proper position. Check for foreign materials in combustion chamber and/or exhaust piping. Check heat exchanger for cracks and/or separations. Check heat exchanger surface for hot spots which indicate blockage due to scale build-up. Refer to instructions in manual for flushing heat exchanger. Hard water must be treated to prevent scale build up or damage to the heat exchanger. Measure resistance of safety circuit. Ensure high fire and low fire manifold pressure is correct. Check for improper conversion of product.
16	Over Temperature Warning (safety shutdown because unit is too hot)		Check for restrictions in air flow around unit and vent terminal.
		licensed professional only	Check for low water flow in a circulating system causing short-cycling. Check for foreign materials in combustion chamber and/or exhaust piping. Check for blockage in the heat exchanger.

Code	Definition		Remedy	
19	Electrical Grounding		Check all components for electrical short.	
32	Outgoing Water Temperature Sensor		Check sensor wiring for damage. Measure resistance of sensor. Clean sensor of scale build-up. Replace sensor.	
33	Heat Exchanger Outgoing Temperature Sensor		Check for restrictions in air flow around unit and vent terminal. Check sensor wiring for damage. Measure resistance of sensor. Clean sensor of scale build-up. Ensure fan blade is tight on motor shaft and is in good condition. Replace sensor.	
34	Combustion Air Temperature Sensor		Check for restrictions in air flow around unit and vent terminal. Check sensor wiring for damage. Measure resistance of sensor. Clean sensor of scale build-up. Ensure fan blade is tight on motor shaft and is in good condition. Replace sensor.	
41	Outside temperature thermistor (outdoor models only)		Check sensor wiring for damage. Measure resistance of sensor. Clean sensor of scale build-up. Replace sensor.	
51	Inlet water temperature thermistor (RL94 only)		Check sensor wiring for damage. Measure resistance of sensor. Clean sensor of scale build-up. Replace sensor.	
52	Modulating Solenoid Valve Signal	licensed professional only	Check modulating gas solenoid valve wiring harness for loose or damaged terminals. Measure resistance of valve coil.	
57	Burner		Contact a licensed professional.	
61	Combustion Fan		Ensure fan will turn freely. Check wiring harness to motor for damaged and/or loose connections. Measure resistance of motor winding.	
65	Water Flow Control		The water flow control valve has failed to close during the bath fill function. Immediately turn off the water and discontinue the bath fill function. Contact a licensed professional to service the appliance.	
70	PC Board		Check PC board DIP switches for correct position. Check the connection harness at the connection on the PC board. Replace PC board.	
71	Solenoid Valve Circuit		Replace the PC Board.	
72	Flame Sensing Device		Verify flame rod is touching flame when unit fires. Check all wiring to flame rod. Remove flame rod and check for carbon build-up; clean with sand paper. Check inside burner chamber for any foreign material blocking flame at flame rod. Measure micro amp output of sensor circuit with flame present. Replace flame rod.	
79	Water Leak Detected		Water has been detected at the bottom of the unit. Turn off water supply. Check all plumbing internally for leakage.	
LC # (LC0, LC1, LC2,...)	Scale Build-up in Heat Exchanger (when checking maintenance code history, "00" is substituted for "LC")			LC0~LC9 indicates that there is scale build up in the heat exchanger and that the heat exchanger needs to be flushed to prevent damage. Refer to the flushing instructions in the manual. <b>Hard water must be treated to prevent scale build up or damage to the heat exchanger.</b> To operate the water heater temporarily until the heat exchanger can be flushed, push the On/Off button on the temperature controller 5 times. Repeated LC codes will eventually lockout the water heater. Please call Rinnai technical department.
FF	Maintenance has been performed			Indicates a licensed professional performed maintenance or corrected an issue.
No code	Nothing happens when water flow is activated.		Clean inlet water supply filter. On new installations ensure hot and cold water lines are not reversed. Verify you have at least the minimum flow rate required to fire unit.	
		licensed professional only	Check for cold to hot cross over. Isolate circulating system if present. Turn off cold water to the unit, open pressure relief valve; if water continues to flow, there is bleed over in your plumbing. Verify turbine spins freely. Measure the resistance of the water flow control sensor. If the display is blank and clicking is coming from the unit, disconnect the water flow servo motor (GY, BR, O, W, P, BL, R). If the display comes on then replace the water flow servo motor.	