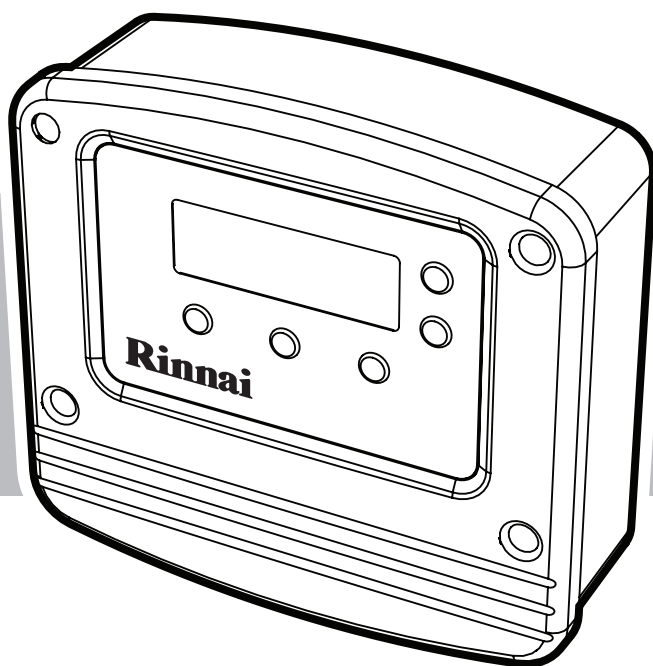




Operation Manual

Rinnai Commercial Controller



Models
DDSTAT | DDSOLAR | DDCPDEL

This Controller shall be installed in accordance with:

- Manufacturer's Installation Instructions
 - Current AS/NZS 3000
 - Local Regulations and Municipal Building Codes including local OH&S requirements
- This appliance must be installed, maintained and removed only by an Authorised Person.
For continued safety of this controller it must be installed and maintained in accordance with the manufacturers instructions.



WARNING & REGULATORY

READ ALL INSTRUCTIONS BEFORE USING THIS COMMERCIAL CONTROLLER

Always comply with the following precautions to avoid dangerous situations and to ensure optimum performance.

Failure to carefully read and follow all instructions in this manual can result in equipment malfunction, property damage, personal injury and/or death.

WARNINGS: WHEN IGNORED, CAN RESULT IN SERIOUS INJURY OR DEATH.

CAUTIONS: WHEN IGNORED, CAN RESULT IN MINOR INJURY OR PRODUCT DAMAGE.



REGULATORY / INSTALLATION

This controller shall be installed in accordance with:

- Manufacturer's Installation Instructions.
- Current AS/NZS 3000.
- Local Regulations and Municipal Building Codes including local OH&S requirements.

This controller must be installed, maintained and removed by an Authorised Person.

For continued safety of this controller must be installed and maintained in accordance with the manufacturers instructions.

Take care when opening or unpacking this controller. Failure to do so may result in serious injury or product failure.

DO NOT modify the electrical wiring of this controller. If the wiring is damaged or deteriorated then it must be replaced by an Authorized Person. Failure to do so may result in electric shock, fire, serious injury or product failure.



CONTROLLER INSTALLATION POSITIONING

- When installing and locating the Controller (other than the default factory position), please ensure that the position is dry and free from constant exposure to water droplets, both GPO should be in use, if not the unused GPO should be plugged.
- Do not use power boards with this Controller.

DDSTAT OPERATION

DDSTAT

The DDSTAT model is used in conjunction with Demand Duo systems and operates by measuring the temperature of the water in the storage tank. If the temperature of the water falls below the “tank set temperature” and the “tank low limit temperature” the controller will switch ON the pump(s) and circulate water from the tank through the HD water heater(s) and back to the tank.

The DDSTAT is configured with a power feed to the controller, a tank temperature probe, 2 integrated GPOs for pump or HD power supplies, and a second temperature probe that can be utilised to detect hot water return temperatures from the HD heat source(s) if required.

- Available “TANK SET TEMPERATURE” range is 60°C to 82°C (factory default setting 65°C)
- Available “TANK LOW LIMIT TEMPERATURE” range is: 3°C less “tank set temperature” to 50°C (factory default setting 5°C).

For example:

Tank Set Temperature	Tank Low Limit Temperature Range Available
82°C	50°C to 79°C
71°C	50°C to 68°C
60°C	50°C to 57°C

The DDSTAT Controller can be set up with the following pump operation:

System Description	Model Name	LH GPO	RH GPO
DD with 1 HD & 1 Pump	DD 1	Permanently active for HD	Pump
DD with 2 or more HDs & 1 Pump	DD 2 + (1 Pump system)	Disabled	Pump
DD with 2 or more HDs & 2 Pumps	DD 2 + (2 Pump system)	Pump 1	Pump 2



For DD systems with 2 pumps either simultaneous or alternation operation mode can be requested.

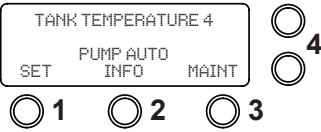
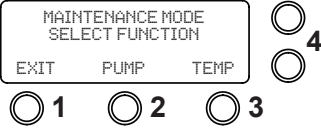
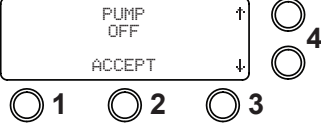
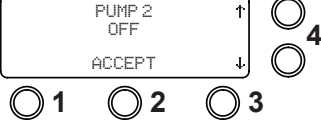
DDSTAT BASIC OPERATION

Once the controller has power, the tank temperature (home) screen is displayed. If the temperature probe is in place a temperature reading will be displayed, if no probe is attached then an error will be registered and displayed.

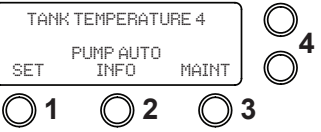
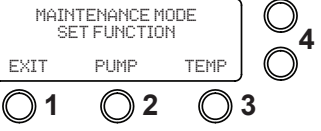
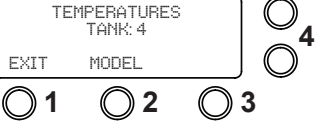
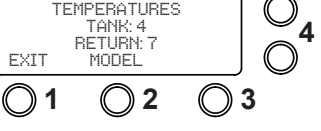
To program the “Tank Set Temperature”:

1. From home screen select "SET" button 1.	
2. Using the arrow buttons select the "TANK SET TEMPERATURE" then select "ACCEPT" button 2.	
3. Using the arrow buttons select the "TANK LOW LIMIT TEMPERATURE" then select "ACCEPT" button 2.	

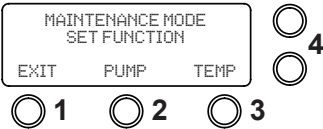
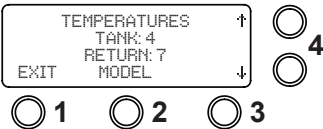
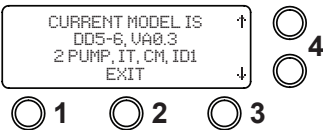
To isolate and maintain the pump(s):

4. From the home screen select "MAINT" button 3.	
5. Select "PUMP" button 2.	
6. Use the arrow buttons to manually operate the pump on and off, select "ACCEPT" button 2 to run command.	
7. If a second pump has been configured you have the option to manually operate this pump also.	

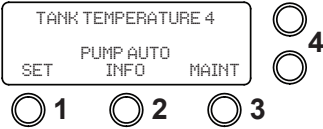
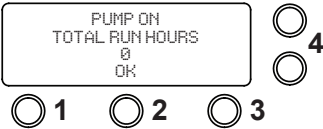
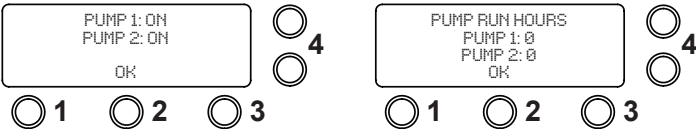
To view system temperatures:

1. From home screen select "MAINT" button 3.	
2. Select "TEMP" button 3 system temperatures will then be displayed.	
3. Tank temperature will be shown.	
4. If the 2nd temperature sensor has been enabled a return temperature from the HD heat source will be shown.	

To view controller configuration:

1. For controller configuration information, from home screen select "MAINT", Select "TEMP" button 3.	
2. From the Temperature screen select "MODEL" button 2.	
3. The Controller configuration will then be displayed select "EXIT" button 2 to return to home screen.	

To view pump status and run times:

1. From the home screen select "INFO" button 2.	
2. If one pump has been configured the pump operation status and run time hours will be displayed.	
3. If two pumps have been configured the screen will scroll through pump operation status and run time hours.	

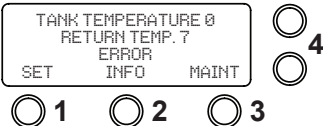
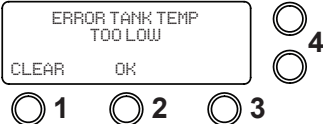
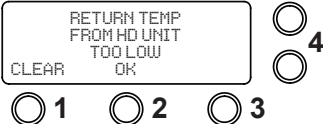
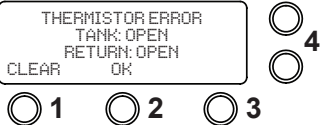
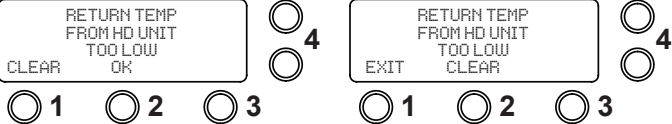
DDSTAT ERROR DETECTION

The DDSTAT controller has in-built system error detection connected to voltage free contacts. Errors that are present are displayed on the home operating screen.

The voltage free contacts can connect to BMS and be either programmed to open or close on error detection. With the 2nd sensor connected and enabled, the controller has the ability to detect three predetermined errors, see below:

- Error 1, Tank Temperature falls below low set point and does not rise to temperature set point within the prescribed period of time. This generally indicates a faulty pump.
- Error 2, With the 2nd sensor enabled only. The temperature of the water returning from the HD Water Heaters is insufficient. This generally indicates a faulty heat source
- Error 3, If any one or both of the sensors are faulty (outside of measurement range).

DDSTAT ERROR DETECTION CONTINUED**To view displayed errors:**

1. From the home screen select "INFO" button 2.	
2. For Error 1 the following screen will be displayed.	
3. For Error 2 the following screen will be displayed. If both errors are present then they will scroll through each display every 3 seconds.	
4. For Error 3 the following screen will be present for any one or both of the sensors. If more than 1 error is present the screen will scroll through each error.	
5. To remove any of the errors select the "CLEAR" button 1. Followed by "CLEAR" button 2.	

Sensor Mounting:

With the second temperature sensor enabled, the mounting location **MUST BE** close to the hot outlet of the HD unit(s) where the hot water returns to the tank, refer Figure 1. The sensor should be securely mounted in a dry-well and bonded in-place with a thin film of heat conducting medium and must be protected against moisture and water ingress. Refer to Figure 1.

Care should be taken when fixing the correct sensor to the correct location as both sensor cables look identical. For BMS (voltage free contacts) connection to the controller, remove the cover and wire the connections to the points identified in Figure 2.

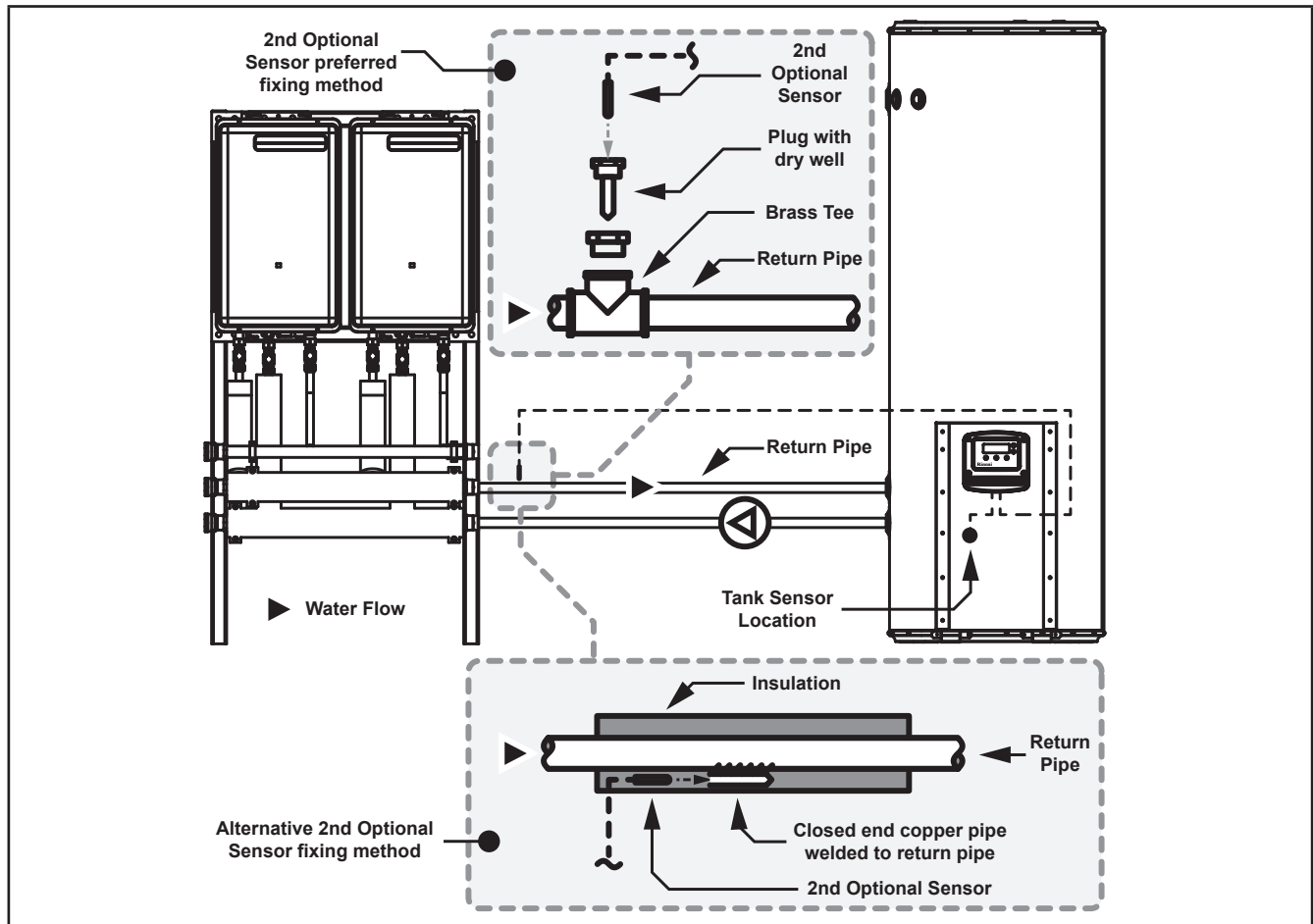


Fig. 1 Approximate Sensor Locations

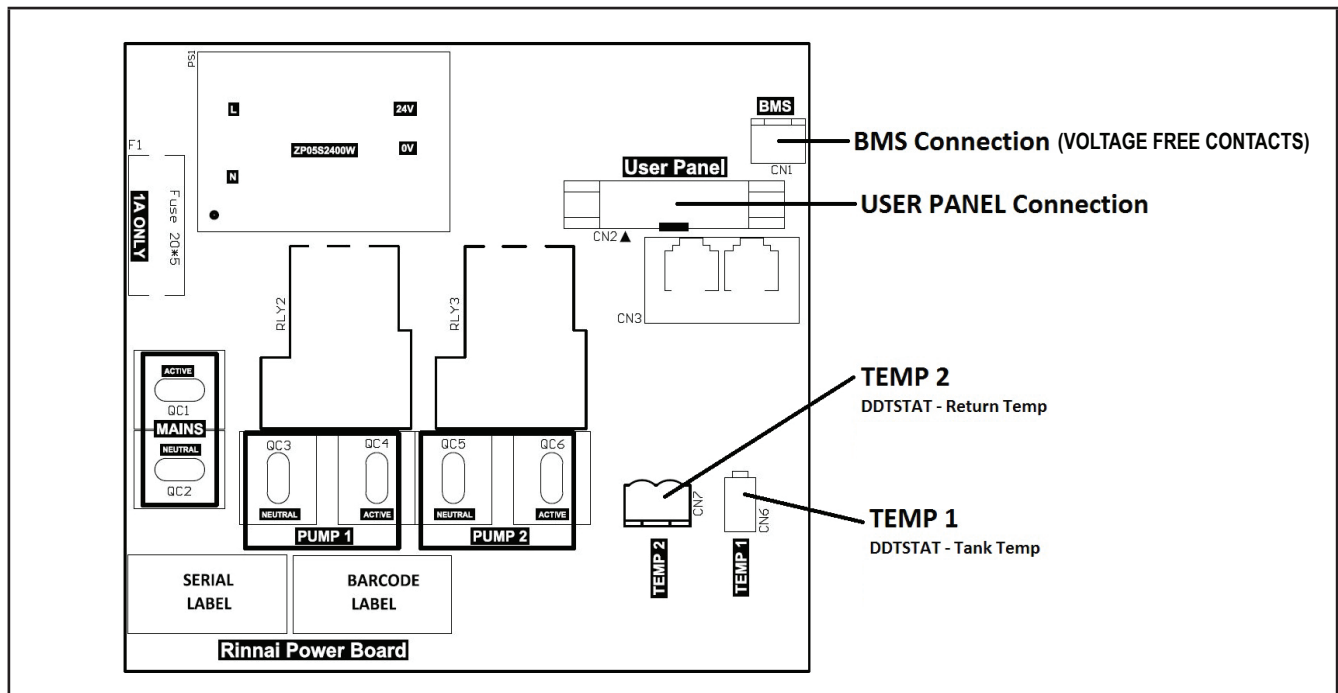


Fig. 2 DDSTAT Internal PCB showing Thermistor Connections

DDSOLAR OPERATION

DDSOLAR (COMMERCIAL SOLAR CONTROLLER)

The solar controller's function is to turn the solar pump on and off to collect and transfer solar heated water to the storage water cylinder. It can be supplied to operate single or dual pumps with the further option to have dual pumps switched simultaneously or alternatively (12 hour cycle).



For single pump systems the pump must be plugged into the right hand GPO.

The controller determines if there is capacity in the cylinder(s) to store more solar heated water and when the temperature difference between the cylinder(s) and collector(s) is suitable for energy collection the controller will activate the circulating pump(s).

Solar gain pump 'ON'	
No Solar gain pump idle.	

When there is a differential temperature between the solar collector (hot sensor) and the tank (cold sensor) the circulating pump is switched on. When differential falls to below the predetermined limit the circulation pump is then switched off.

When the tank temperature sensor reaches the predetermined set point the pump is de-energised. This prevents water that is too hot returning from the solar collectors to the storage cylinder and activating the P&TR valve.

Alternatively if the collector temperature is over the safe operating temperature the controller de-energises the pump.

The other function of the controller is to circulate water through the collectors when there are low ambient temperature frost conditions to prevent the collector from freezing. When the hot temperature sensor (in collector) drops below the pre-determined limit the pump activates to prevent freezing. The circulator will stop once the hot sensor temperature increases.

This is a function that is selected from the Maintenance menu. This function **MUST** be enabled, in areas that may experience low temperatures and to comply with warranty conditions.

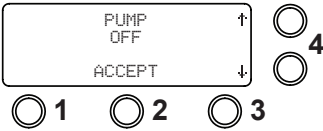
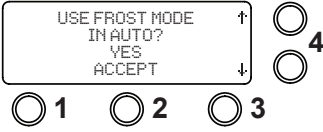
To view pump status and run times:

1. From the home screen select "INFO" button 2.	
2. The screen will alternate between pump operation status and run time hours.	

Activating Frost Protection:

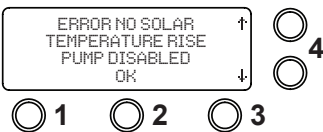
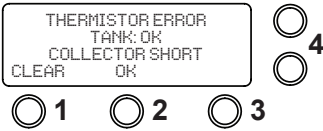
1. From home screen select "MAINT" button 3.	
2. From the Maintenance screen select "PUMP" button 2.	

Activating Frost Protection Continued:

3. From the Pump screen select "ACCEPT" button 2.	
4. Using the arrow buttons select either "YES" or "NO" for Frost Mode then select "ACCEPT" button 2. This will take you back to the Maintenance screen.	

DDSOLAR ERROR DETECTION

The DDSolar controller has in-built system error detection connected to voltage free contacts. During solar gain if there is no temperature rise within 2 hours then an error will be displayed, errors that are present are displayed on the main operating screen. See the two errors listed below.

1. No temperature rise within a predetermined time during a solar gain period.	
2. If one or both thermistors are outside the predetermined measurement range. This screen justifies an error with the collector short.	

The voltage free contacts can connect to BMS and either programmed as open or closed on error detection. Refer to Figure 3 for BMS connection and thermistor locations.

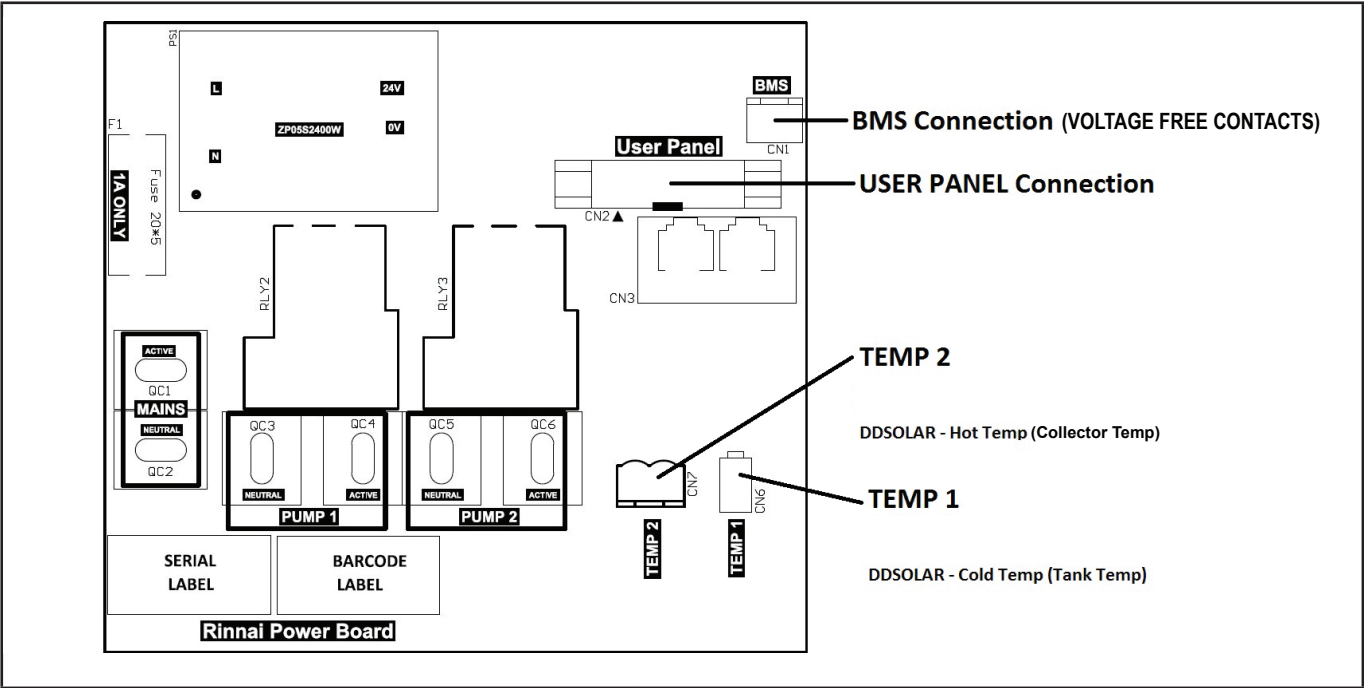


Fig. 3 DDSOLAR Internal PCB showing Thermistor Connections

DDPCDEL OPERATION

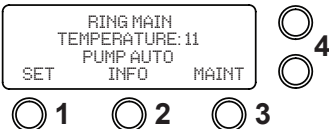
DDPCDEL (DELUXE PUMP CONTROLLER)

The DDPCDEL is used to monitor commercial flow and return systems. The main functionality of the controller in this mode is to extend the life of the pumps by regular alternation or overcome any issues with faulty pump if present.

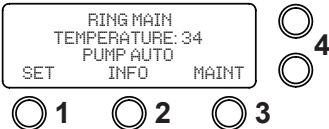
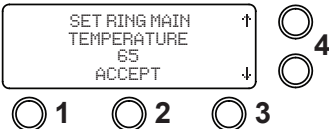
The features of this controller are:

- Operating temperature selection range of 40°C to 80°C with 1°C increment setting.
- 12 hour changeover cycle between pumps (this is the factory Pre-set but 24 hours is available on request).
- Capability of controlling dual pump systems up to a power load of 900 Watts per pump.
- Numerical display of monitored water temperature.
- Thermistor temperature sensor (to be located on pipework common to both pumps).
- Voltage free contacts selectable as open or closed on fault for easy connection to BMS.

On initial start up the controller will run in "AUTO" mode, energise pump one and display the current temperature reading from the thermistor. It can also be factory configured to run 2 pumps simultaneously.

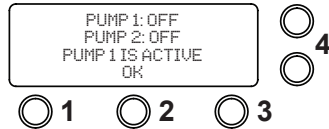
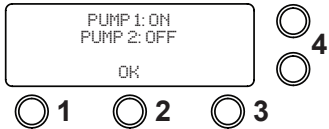
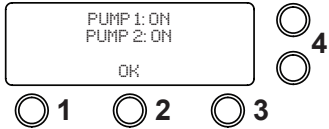
1. Home Screen image.	
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TO PROGRAM THE "RING-MAIN TEMPERATURE"

1. From home screen select "SET" button 1.	
2. Using the arrow buttons select the "RING-MAIN TEMPERATURE" then select 'ACCEPT' button 2.	

Once the controller has been configured to suit the application it will begin to monitor the Ring-Main temperature and adjust accordingly. If the temperature reaches the set point all pumps will be de-energised, thus saving energy, if the temperature reduces, within the set range, a single pump will be energised. This single pump will remain energised to maintain this temperature for the set period of time (12 hours) when in "AUTO" mode. When the time period has elapsed the controller will automatically switch to the second pump and continue to maintain the temperature.

If you press the "INFO" button the pump run hours and active pumps are displayed.

When Ring-Main temperature reaches the set point all pumps will be de-energised, the active pump is identified as the next to operate.	
When Ring-Main temperature within 5°C less of set point, one pump is operational.	
When the Ring-Main temperature is between 5°C to 10°C less the set temperature both pumps energised.	

When operating in "AUTO" mode and the Ring-Main temperature drops below the set point for a prescribed period of time then an error is displayed and the controller automatically switches to the alternative pump.

Main temperature 5°C low error screen image.	<div><div>RING MAIN TEMPERATURE ERROR SET INFO MAINT</div><div><div>1</div><div>2</div><div>3</div><div>4</div></div></div>
Pump 1 disabled screen.	<div><div>ERROR MAIN TEMP 5 deg. LOW PUMP 1: DISABLED OK</div><div><div>1</div><div>2</div><div>3</div><div>4</div></div></div>

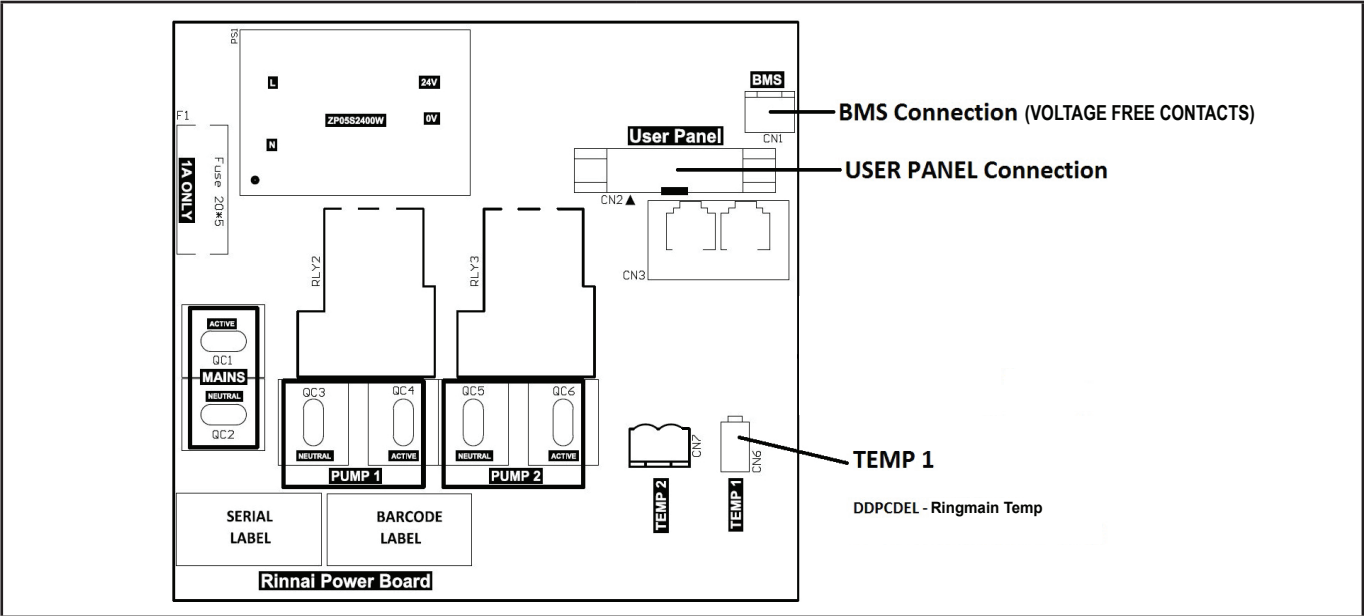


Fig. 4 DDPCDEL Internal PCB showing Thermistor Connections

If the temperature returns to the set point, within a prescribed period of time, the controller will stop alternating to the affected pump and continue to display a pump error.

If the Ring-Main temperature drops below the set point for a prescribed period of time while both pumps are operating simultaneously then the low temp error is displayed however both pumps continue to operate. If the temperature recovers, within a prescribed time frame, then the error is removed and the controller returns to normal operation. If the temperature continues to drop in excess of 10°C below the set point and does not recover for a prescribed period of time the controller will disable both pumps.

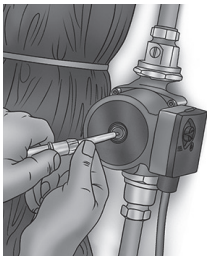
Main temperature 10°C low error screen image.	<div><div>ERROR MAIN TEMP 10 deg. LOW PUMPS DISABLED CLEAR OK</div><div><div>1</div><div>2</div><div>3</div><div>4</div></div></div>
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The controller has an additional inbuilt function to identify a thermistor error.

Thermistor open circuit. Thermistor values are outside the prescribed range,	<div><div>THERMISTOR ERROR RING OPEN CLEAR OK</div><div><div>1</div><div>2</div><div>3</div><div>4</div></div></div>
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As a final setup prior to operating the flow and return pump system, ensure all pipework with the flow and return system is full of water and all air has been purged.

This can be done using the air vent screw that good quality pumps are supplied with, see example right.



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AU45204

Rinnai has a Service and Spare Parts network with personnel who are fully trained and equipped to give the best service on your Rinnai appliance. If your appliance requires service, please call our National Help Line. Rinnai recommends that this appliance be serviced at least every 1 year.

With our policy of continuous improvement, we reserve the right to change, or discontinue at any time, specifications or designs without notice.

Product Sales & Service National Help Line

Tel: **1300 555 545*** Fax: **1300 555 655**

*Monday to Friday, 8.00am to 5.30pm EST

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or email **enquiry@rinnai.com.au**