

## N-Series

### Pump cable connection 2 m (R1071)



The N-Series water heaters have the ability to control a circulation pump, in a commercial ring main application, with the use of the pump cable connector (UV resistant and rated for outdoor installation). This allows hot water<sup>1</sup> to cycle through the ring main, ensuring hot water is quickly available when a tap is opened.

#### Suitable for

- Single unit N56 commercial installations
- Commercial / showerblock installations with multiple N56 units, as specified by Rinnai commercial



Rinnai INFINITY digital controllers (Compact, Bathroom, and Kitchen Deluxe) are not compatible with the N-Series pump cable and ring main applications.



Before commencing installation please check that you have the commissioning sheet from inside the appliance front cover. It has the information you need to change the PCB settings on the N56. These are needed in conjunction with these instructions to do the installation.

#### Sequence of operation

Pump recirculation begins when the water heater is turned on. The inlet and outlet thermistors measure the water temperature. The water heater produces hot water at the temperature setting. If the inlet thermistor detects an abnormal temperature then error code 51 is generated and the pump will turn off.

When the return water temperature reaches approximately 8 °C below the temperature setting, the water heater pump will turn off. The cycle will restart at the interval set in the recirculation mode setting, for example 9 minutes if set for comfort, or 18 minutes if set at economy.

- **Economy:** Cycles the pump less often and uses less energy to maintain the circulation loop temperature
- **Comfort:** Cycles the pump more frequently, ensuring the loop temperature remains higher, but also uses more energy. Select comfort mode for poorly insulated ring main piping.

#### Footnotes

<sup>1</sup> To meet the NZ Building Code requirements, (G12.3.2, G12.3.9) Verification method VM1:AS/NZS 3500.4:2018 Section 10.2 is used. "The delivery temperature flowing from the water heater, bank of water heaters, or a heated water heater storage vessel shall not be less than 60 °C". Otherwise another form of treatment, for example UV sterilisation, must be included.

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## Installation

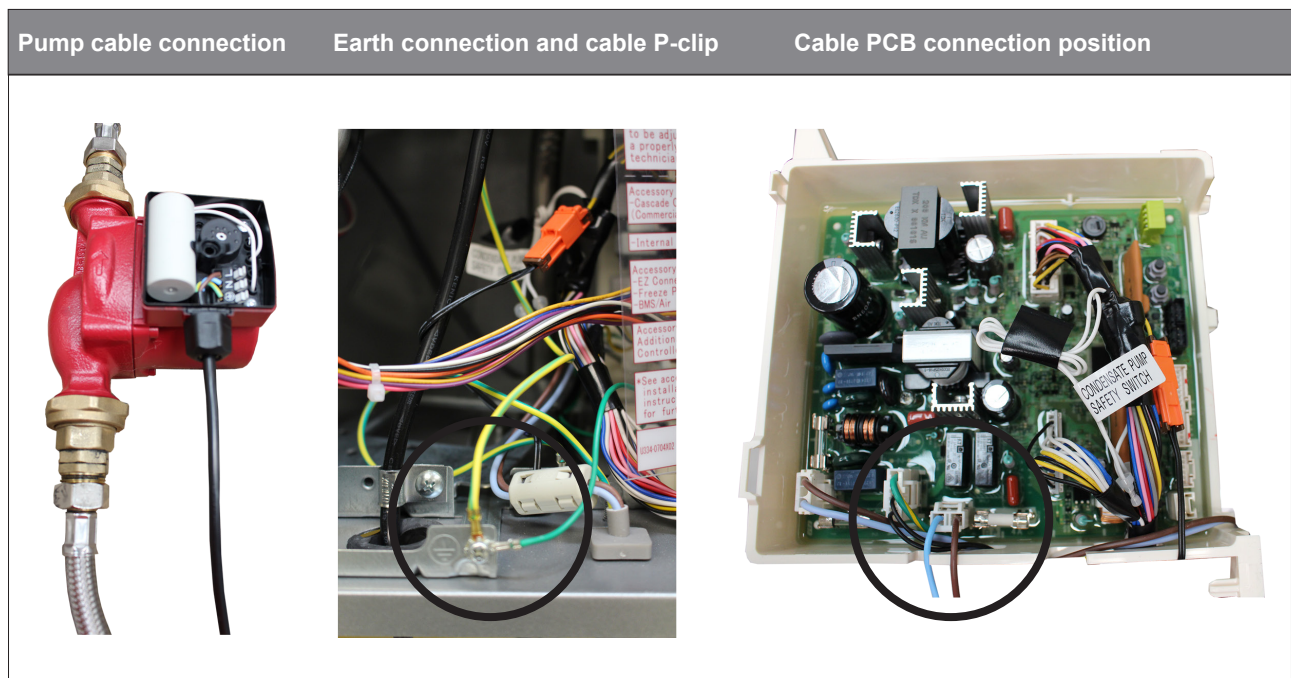


You **MUST** connect the cable to the pump **BEFORE** connecting the cable to the N56 as there may be 230 V mains power on the pump terminals.

1. Turn off the N56 and unplug from the power.
2. Connect the cable to the pump.
3. Connect the pump cable and earth connection to the N56.
4. Connect power to the water heater.
5. Adjust the PCB parameters shown below using the commissioning instructions.  
02C > 04b > 05A or 5b > 11A > 13b

02C	= temperature setting → 65 °C <sup>1</sup>
04b	= recirculation pump output → yes
05A or 05b	= recirculation mode → economy or comfort
11b	= auto reset → on
13b	= temperature setting → fixed

<sup>1</sup> The pump cable will only work on a temperature setting 65 °C or lower. It will not work if you set the temperature higher.



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## Pump selection

A Grundfos UPS 20-60 N 150 96913096, set to speed 3, should be sufficient. Maximum current draw (including any surge on startup) MUST BE < 2 A at 230 V. Most domestic circulating pumps will be well under this current draw.



The pump must have sufficient flow to activate the N56, 10 L/min should be sufficient for this.

At 10 L/min the pressure loss through the N56 will be approximately 20 kPa—the pump should be sufficient to pump 10 L/min at 20 kPa, plus allow for pipe system pressure losses.

### NZS 3501 Copper pressure losses at 10 L/min\* example

Size	kPa / min	m	Pressure loss
DN25	0.05	8	0.4
DN20	0.22	20	4.4
DN15	1.60	10	10
N56	-	-	20
<b>Total</b>			<b>34.8 kPa</b>

For other piping systems, please refer to suppliers instructions.

A Grundfos 20-60 will be sufficient for up to approximately 50 kPa pressure loss.

\* Calculated using the Kembla NZS3501 Plumbing Copper Brochure

### Pump placement considerations

Most domestic pumps are not rated for outdoor installations, including the Grundfos pump noted above. These will require a rain shield for protection from direct rain and UV.

Domestic pumps are also usually limited in the installation orientation of the impeller shaft and electrical junction boxes. Be sure to follow the manufacturers instructions when installing the pump.

Position the pump within a 2 m cable run of the N56—the cable can be extended.

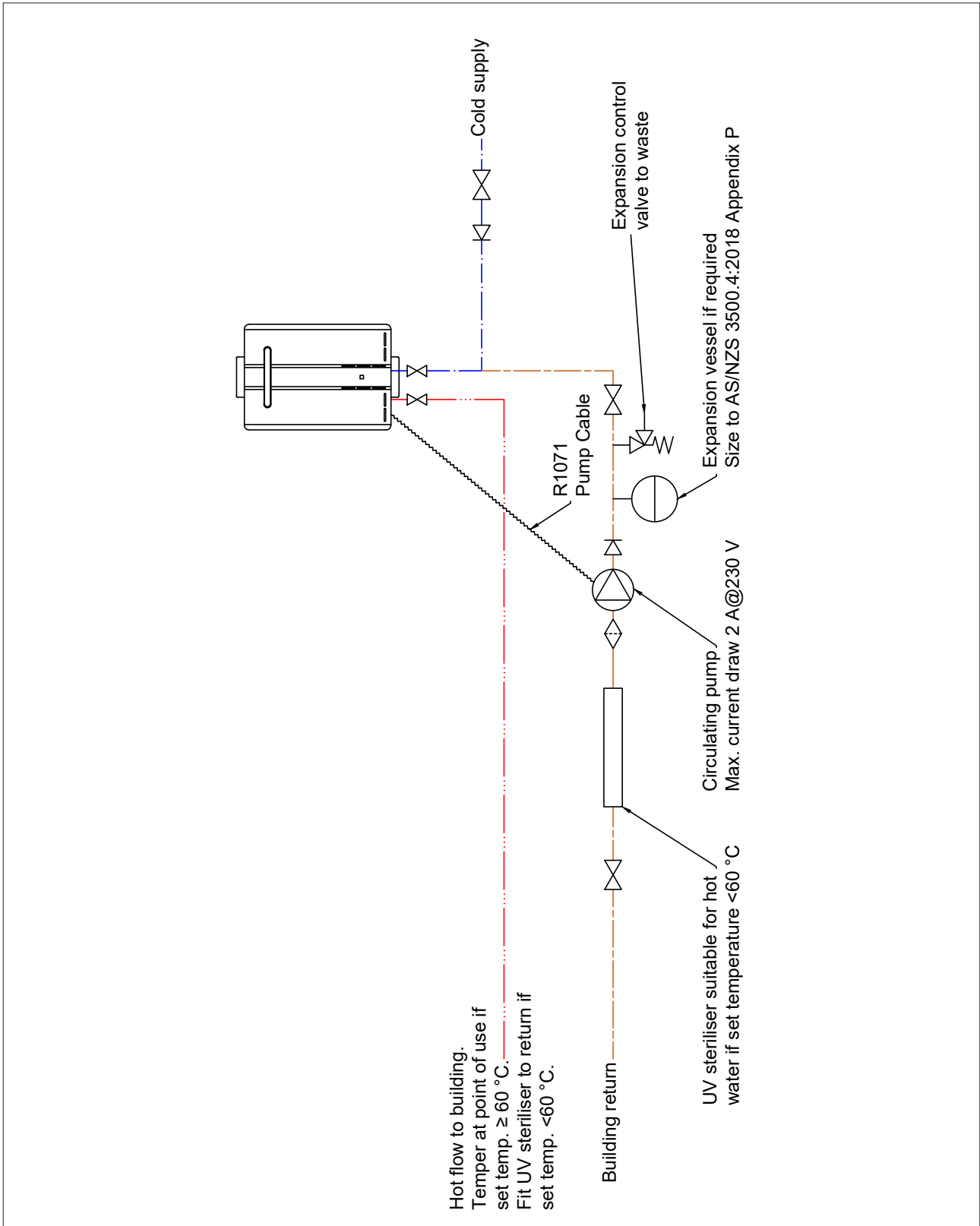
### Timer

The current N56 PCB configuration does not work with a timer placed in the circuit between the N56 and the pump.

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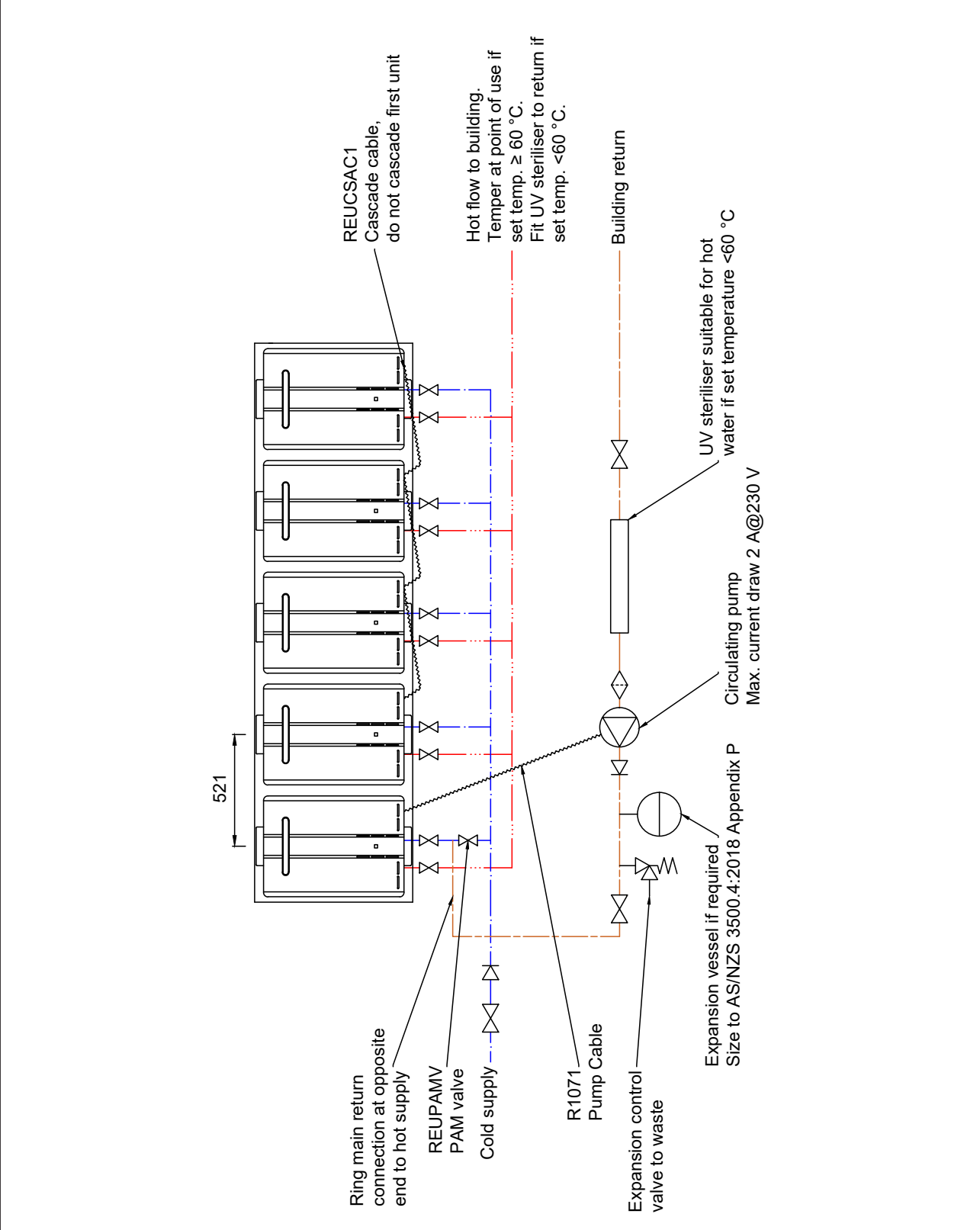
### Ring main configuration: N56 single unit



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### Ring main configuration: N56 Demand Direct



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### Error code 63: Recirculation low flow

#### Troubleshooting error code 63

Step	Action	Detail
1	Double check PCB parameter settings	Refer p.2
2	Circulation flow rate below 5 L/min	<p>Using the temperature controller see if the water heater is producing flow. To display the recovery flow rate in L/min through the water heater, press the UP button for three seconds followed by the On/Off button. The display will show the flow rate. Example 040 = 4.0 L/min. If the flow rate is below 5 L/min do the following:</p> <ol style="list-style-type: none"><li>1. Bleed all air from the system, including the pump.</li><li>2. Clean the inlet water filter.</li><li>3. Check you have the proper water supply to the water heater at a flow rate higher than 5L/min.</li><li>4. Check you have at least 300 kPa of water pressure to the water heater.</li><li>5. Clean pump filter on water heater if application uses a crossover valve.</li><li>6. Inspect check valves are functional and that you have no restrictions if installed on a dedicated circulation return line.</li></ol>



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N-Series pump cable connection 12845-B