Synergy Heat Installation Guide

⚠ ***Note: Installation must be carried out by a suitably licensed electrician. Wiring and installation should be in accordance with AS/NZS 3000 and any other applicable standards.***

1. System Overview

The Synergy Heat system is designed to manage and monitor hot water heating systems efficiently. The system integrates temperature probes, current transformers (CTs), and controller relays to ensure optimal performance and scheduling flexibility. This document outlines guidance for standard installation, verification, and commissioning processes.

2. Installation Guide

2.1 Controller Location

Mount the control box as close as possible to the main switchboard.

2.2 Antenna Placement

Run the aerial cable from the controller to the building exterior with an unobstructed horizon. Secure the antenna with conduit saddles.

2.3 Temperature Probe Installation

- Use one probe per hot water cylinder.
- Probes are 0.5m and can be extended using soldered joins.
- Insert the probe against the inner tank under insulation, ideally near the top element pocket. The probe (lug and barrel) should touch the inner cylinder wall, and the probe, including the barrel, should be fully inserted until little or no probe is shown.
- *Note: Avoid inaccurate temperature readings from open element lids when testing*.

2.4 CT Installation

- Fixed-length 2m CTs (3-phase) connect from switchboard to controller.
- Group and phase-match element load cables correctly. Neutral is unused for hot water.
- Example: group red phase elements through one CT, white phase through another, etc. Dot on CT faces the load.

2.5 Supply & Relay Wiring

- Run a max 10A supply from the switchboard to the controller (dedicated and labelled).
- Connect the two relay control cables from the controller to the appropriate contactor coils. Insert the controller relay in a series with the contactor control circuit.
- Match: CYL1 = Temp Probe 1 → Relay 1, CYL2 = Temp Probe 2 → Relay 2.

2.6 Control Wiring Configurations

- Type 1: Existing contactors at the switchboard controlled via thermostat loop.
- Type 2: Install new contactors (in switchboard) controlled by relays.

- Bypass any existing time clocks to allow 24hr control from the Synergy Heat controller

2.7 Bypass Switch Description

Allows manual override of schedule during faults or manual boosts.

3. Cylinder ID & Labelling

Apply Site ID and schedule tags to each hot water cylinder in plain sight and label as required.

4. Verification Checklist

☐ Radio communication with the system (Flex-Able or portal check)

☐ Correct current draw and CT phasing (verify with a clamp meter, matching expected on-site current to the kW value on the Flex portal or by contacting Flex-Able to check)

☐ Thermostat and element operation (ensure the thermostats control the hot water cylinder temperature and the elements are operating correctly)

☐ Manual and Auto relay switching functionality (use Finder relay test function and cycle bypass switch to ensure correct function – Test Auto function with Flex Portal or contact Flex-Able)

☐ Unit installed as per manufacturer guidelines

☐ Unit tested & commissioned per commissioning sheet (the commissioning sheet can also be used at a later stage to set up the controller or verify settings remotely)

☐ Synergy Heat site card left in visible location

☐ Tank stickers/labels attached to each cylinder

☐ All components (elements, thermostats, contactors) confirmed functioning correctly

☐ Customer walkthrough complete, explaining:

☐ - Device location

☐ - Override (bypass) switch

☐ - Labelling on the tank and site card use

☐ - Brief technical walk-through

☐ - Is the site set up correctly in Flex Portal? Does the site have access?

Photos as required to capture: (recommended for remote assistance and records)

☐ Tank labels & site card

☐ Synergy Heat unit

☐ HWC contactors

5. Installation Examples



Example: Controller location (directly above switchboard)

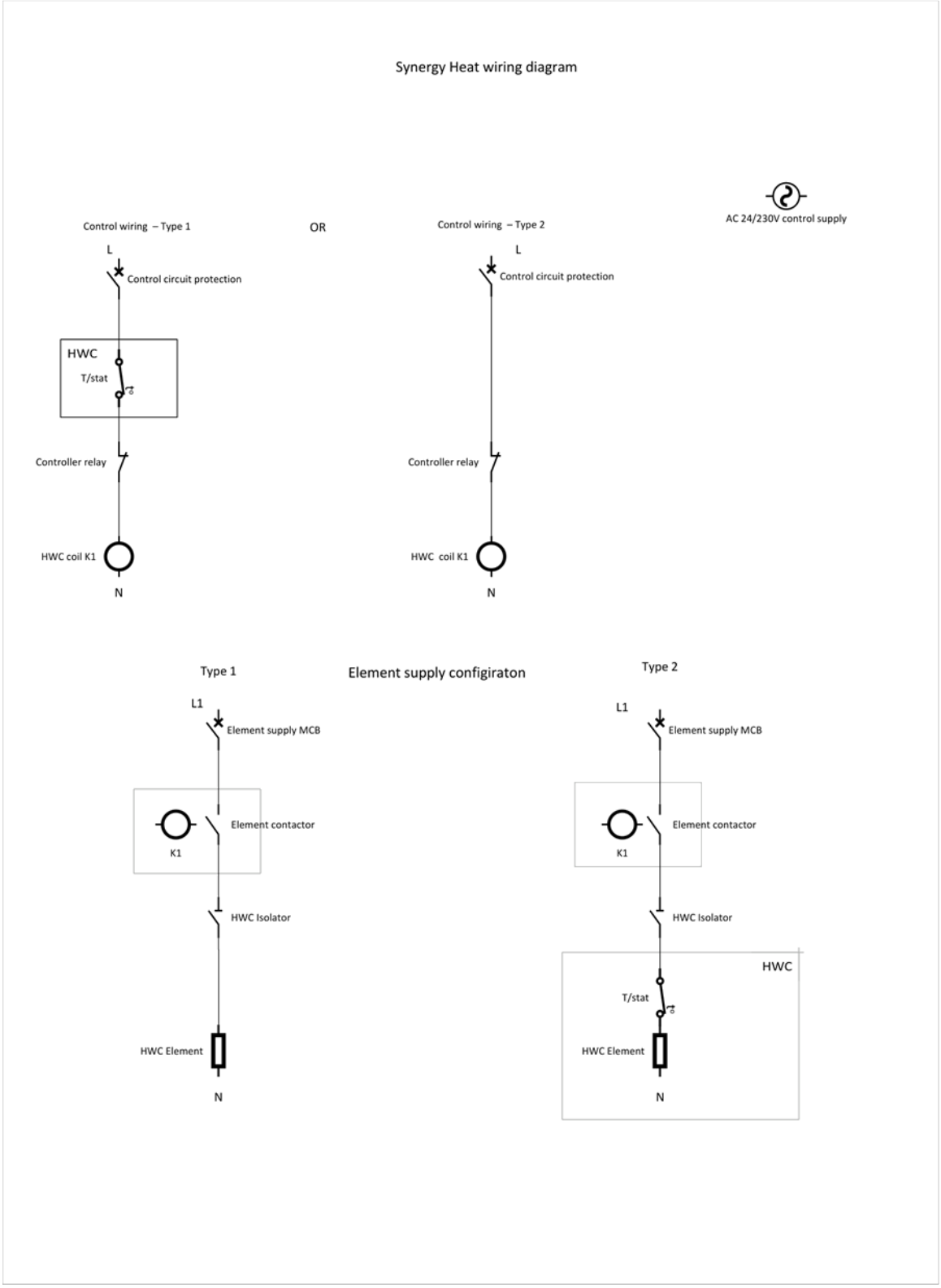


Antenna external installation



The tank label must be positioned to show the operator the cylinder's name and the scheduled HOT times.

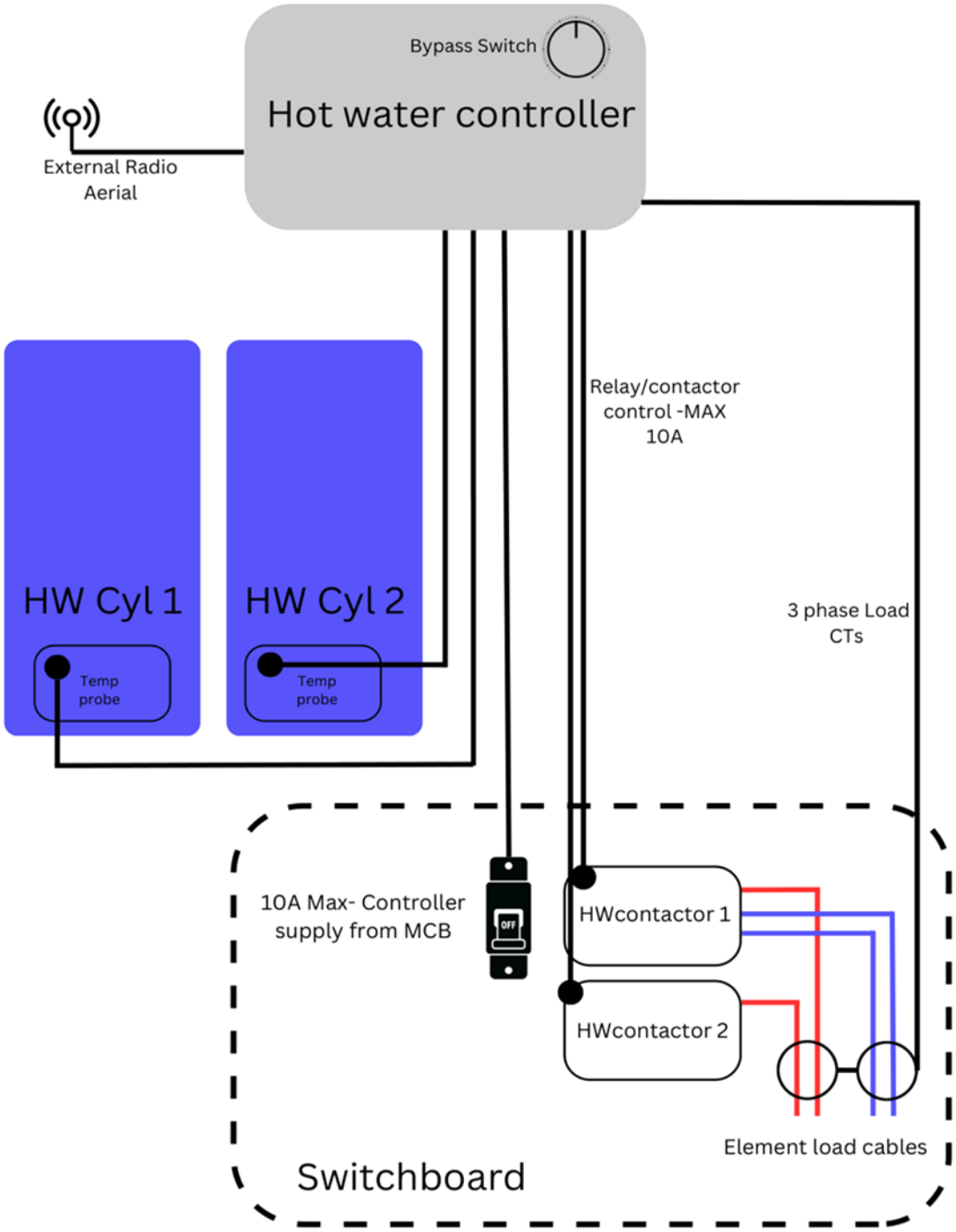
6. Wiring Diagrams



Example wiring diagrams commonly found – Type 1 & Type 2

Overall System Diagram

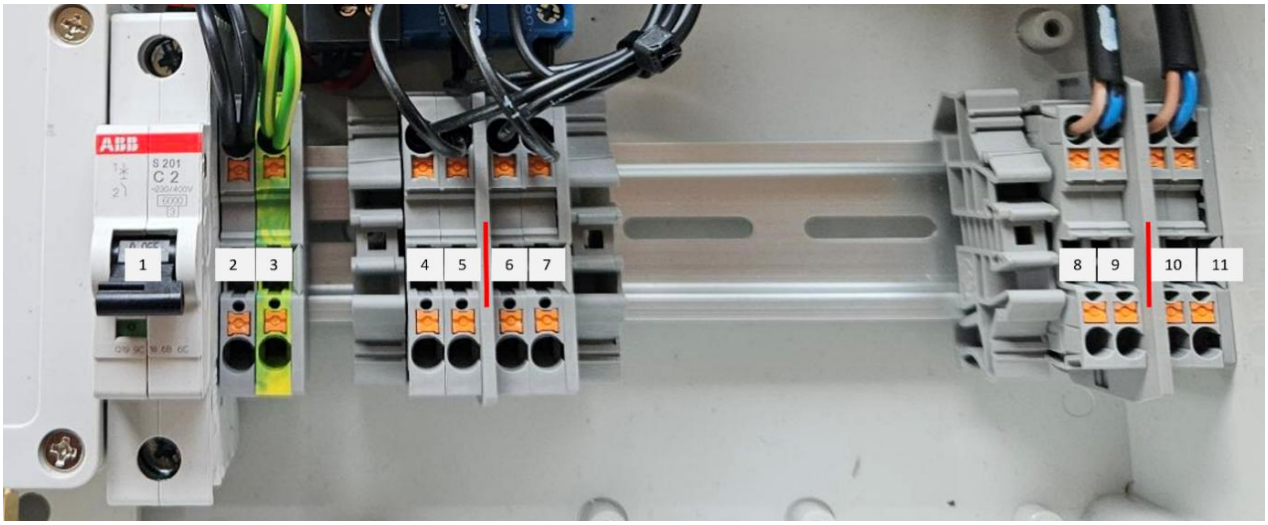
SYNERGY HEAT V2



7. Wiring Assignments

DTM01/02c – Hot Water Controller V2.1+





Label (as above)	Wiring Assignment
1	Mains Feed – Live
2	Mains Feed – Neutral
3	Mains Feed – Earth
4	Cylinder 1 Control Relay – In
5	Cylinder 1 Control Relay – Out
6	Cylinder 2 Control Relay – In
7	Cylinder 2 Control Relay – Out
8	Cylinder 1 Temperature Probe – Brown
9	Cylinder 1 Temperature Probe – Blue
10	Cylinder 2 Temperature Probe – Brown
11	Cylinder 2 Temperature Probe – Blue

8. Key specifications

Component	Specification
Mains supply	230VAC 50Hz 3W
Cylinder 1 Control Relay	24VAC / 10A max (terminals 4 and 5) (230V at installers discretion)
Cylinder 2 Control Relay	24VAC/ 10A max (terminals 6 and 7) (230V at installers discretion)
IP rating (Enclosure)	IP66

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Installation Verification Using Flex Portal

Overview

Once the unit is live, a function check should be performed via the Flex Portal to confirm proper communication, temperature accuracy, and control of contactors.

This can assist in verifying:

- The unit is talking to the network
- The bypass switch and its 3 positions operate correctly
- The temperatures are accurate and match the expected cylinder
- The system controls the correct contactor, and both contactors switch on and off remotely.
- Verification of current measurement/element monitoring

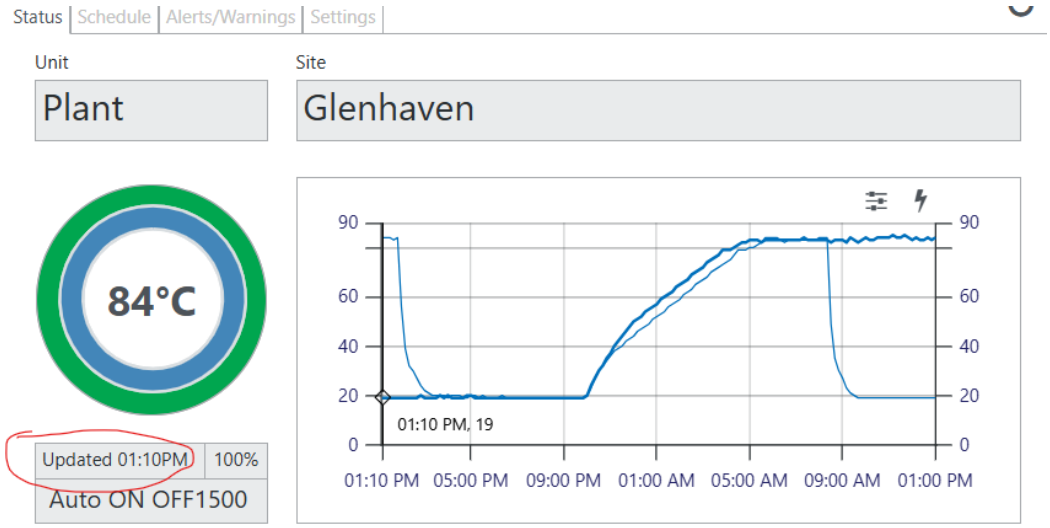
Key points to remember:

⚠️ Note: The controller sends updates every 10 minutes. Send one command at a time and allow the interval to pass before verifying functionality.

1. Network Communication Verification

Log in to Flex portal and find the preconfigured site in the site tree.

Open the site and select the first cylinder – On the status page, the time of the last message is displayed (circled in red below). This timestamp lets you know the message has been received from the device.



The next indication is that the temperature has been displayed in the field above the red circle. This is a good sign that data is being received.

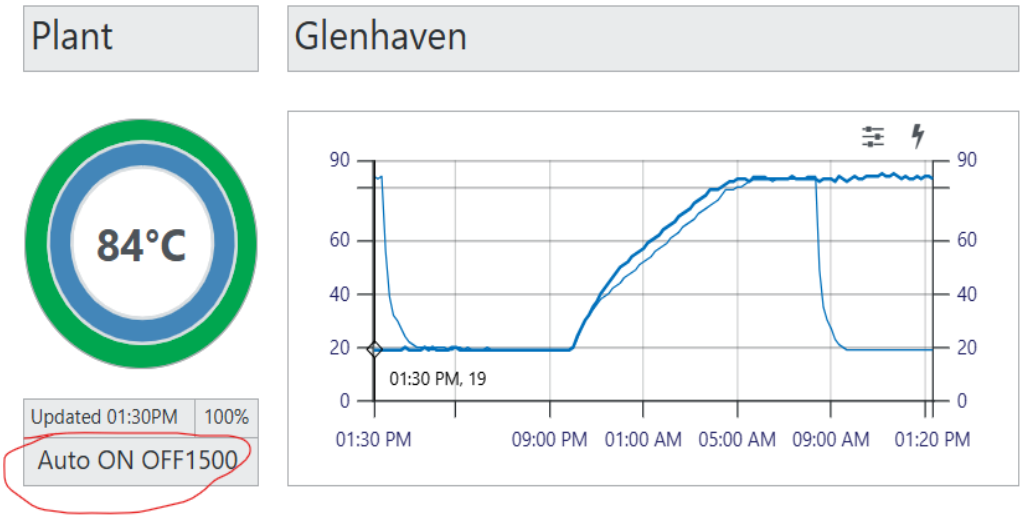
Note the time! The system updates every 10 minutes. As we perform the next test, we will monitor this timestamp to ensure the message updates every 10 minutes. The time stamp will not match the expected message time if the system misses a message.

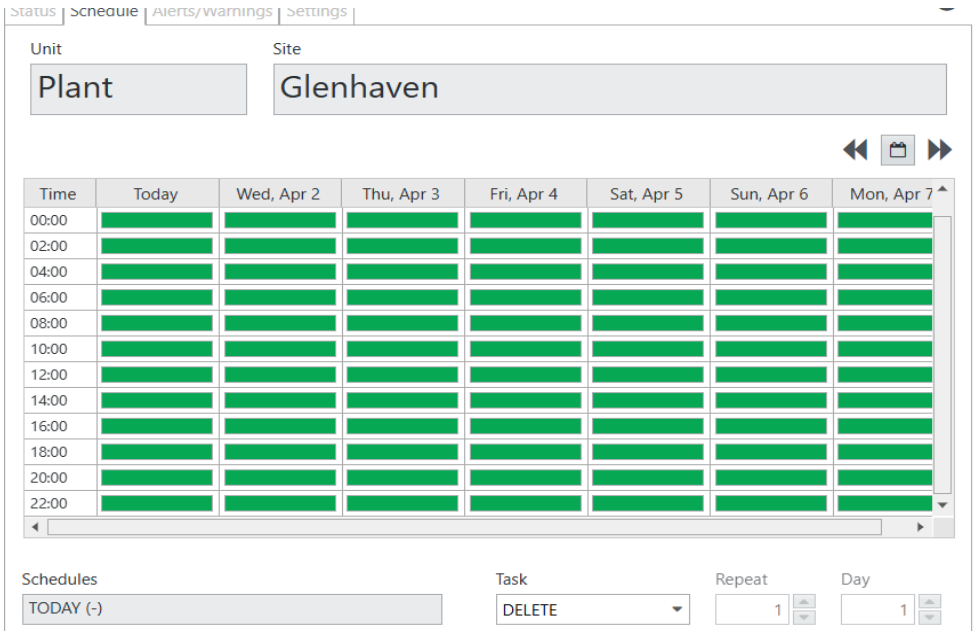
e.g. Unit first checked at 1.10 pm, the next message should be at 1.20 pm, and at 1.23 pm, you initiate a change; after refreshing the page, the last update remains at 1.10pm. This may indicate a missed message. Check again at 1.31 pm and after a refresh check for the updated time. It should be updated at 1.30 pm. If you suspect missing messages, contact Flex-Able for support. We can check the signal strength for you. You can check for missed messages as you carry out the other functional tests.

2. Auto Control & Bypass Switch Functionality

Switch the device control switch into automatic from the off position. Observe the two hot water contactors. They should both be OFF and then pull in (turn ON) when switched to Auto. This is because all units are shipped with the auto schedule set to HOTALL (AUTO ON). You can verify this is the case in two ways.

Check below the temperature readout on the cylinder status page. This indicates the automatic schedule status (circled below)





Also, the schedule tab shows all green in the scheduler. (see above)

If this isn't the case, set both cylinder schedules to daily HOTALL using the scheduler. Wait until the contactors both turn ON at the next 10 minute message.

After confirming that both contactors have now turned ON in AUTO mode, select the desired cylinder/unit in the portal and delete the schedule. This can be confirmed with a clear scheduler, and the schedule on the status page will show AUTO OFF. Wait for the next 10-minute period to pass and verify that the expected contactor shuts off. e.g. Vat = OFF , contactor controlling the cylinder labelled Vat is OFF. Repeat for both cylinders. Both cylinders should now be turned off.

With both contactors turned OFF in auto, cycle the bypass switch to MAN and verify both contactors turn ON.

Now, In the portal, reset both cylinders to daily HOTALL. Switch the unit back to AUTO and verify that both cylinders turn back ON at the next 10-minute period.Leave the new installation with the schedules set to HOTALL and the bypass switch in the AUTO position.

This should be done until parameters such as thermostat settings can be verified in the portal as being correct (often 24 hours) before setting a schedule.

3. Temperature Verification

While waiting for the control messages to be checked, the temperatures can be assessed for accuracy in the portal. These should be no more than a degree or two off the observed temperature on site. If no indicator is present, water may be drawn, and a dairy thermometer may be used to gauge the water temperature. Check that the probes are sending data for the correct cylinder by checking the information. See below:

Cylinder on site named VAT = 67deg on the tanks site gauge.

Cylinder on site named PLANT = 81deg on the tanks site gauge

Portal displays VAT= 66 deg

Portal displays PLANT = 82 deg

The above indicates the correct temperature for the correct cylinder

Note: Use the temperature offset in the Flex portal to adjust the probe reading to the actual water temperature, as observed with the dairy thermometer in a bucket of hot water.

4. Element Load & Current Verification

The portal displays the sum of the sites power in kW for each cylinder. E.g. when you are testing Vat cylinder and this has 6 kW of elements, it will show 6kW for both VAT and PLANT. When both are running, if PLANT was also 6 kW it would show 12kW. You can use this to ensure all expected elements are picked up by the CTs.

In the case of a cylinder at setpoint temperature or near temperature, some of the elements may have been switched off by the thermostat which may not provide the expected kW reading. It is worth noting that to get a good kW reading in the portal, the unit should be on for more than one 10-minute period. Quickly turning the unit on and off can sometimes provide misleading information.

5. Site configuration

Before any schedule is set, the site must be configured correctly. Each cylinder must have the correct volume and element configurations selected correctly.

⚠️ Note: Alerts and automated functionality will not be correct without the correct settings, including unverified temperature data!

There are two ways to set up the site correctly:

1. Call Flex-Able and have on hand the information required from the commissioning sheet.
2. Have the site set up by a suitably trained installer/administrator

We are here to help – load@flex-able.co.nz Monday-Fri 9am-4pm

Appendix A – Commissioning sheet

Synergy commissioning checks

JOB NUMBER:

CLIENT NAME: CLIENT ADDRESS:

SHED LOCATION: RAPID NUMBER:

SERIAL NUMBER OF UNIT:

VOLTAGE:	TANK NUMBER:	TANK NUMBER:
CONTACTOR SIZE:	TANK SIZE:	TANK SIZE:
CONTACTOR RATING:	TANK NAME:	TANK NAME:
CONTROL VOLTAGE:	TANK CLADDING:	TANK CLADDING:
SUPPLY MCB:	ELEMENT SIZE KW:	ELEMENT SIZE KW:
MCB SIZE:	MCB SIZE/POSITION:	MCB SIZE/POSITION:
	VOLATGE:	VOLATGE:
ELEMENT CONFIGURATION **(I)**	ELEMENTS: L1 L2 L3	ELEMENTS: L1 L2 L3
	CABLE SIZE:	CABLE SIZE:
	THERMOSTAT RANGE:	THERMOSTAT RANGE:
	THERMOSTAT CONTROL:	THERMOSTAT CONTROL:
	DIRECT: ☐ INDIRECT: ☐	DIRECT: ☐ INDIRECT: ☐
	THERMOSTAT CONTROL VERIFICATION:	THERMOSTAT CONTROL VERIFICATION:
	PASS: ☐ FAIL: ☐	PASS: ☐ FAIL: ☐
	THERMOSTAT SETTING:	THERMOSTAT SETTING:
	L1 L2 L3	L1 L2 L3

INSTALLATION CHECK LIST

TERMINATIONS CHECKED INCLUDING FACTORY WIRING	☐		
AERIAL INSTALLED AND FIXED IN POSITION:	☐	ALL STICKERS LABELING COMPLETE:	☐
CTs INSTALLED AND CORRECT DIRECTION:	☐	CLIENT ADVISED OF COMPLETION:	☐
PHASES CHECKED AND NO CROSS PHASES DETECTED:	☐	CLIENT SHOWN OPERATION:	☐
TIME CLOCK BYPASSED (IF REQD):	☐	CLIENT GIVEN INSTRUCTIONS:	☐
TEMP PROBE JOINS SOLDERED AND HEAT SHRINKED:	☐	IS UNIT ON SITE PORTAL:	☐
RADIO SIGNAL AND CURRENTS VERIFIED REMOTELY (PORTAL)	☐	PHOTOS OF INSTALL TAKEN:	☐
TEMP PROBES CORRECT TO CORRECT TANK:	☐	HAS PORTAL BEEN SET TO HOTALL:	☐
TANK TEMPERATURES CHECKED AND VERIFIED:	☐	AUTO / MANUAL TEST:	☐
TEMP VERIFICATION TANK 1: DEG:	☐	FAULTS/ISSUES NOTED TO FOLLOW UP:	☐
TEMP VERIFICATION TANK 2: DEG:	☐	SERIAL NUMBER NOTED:	☐
MCB FEED INSTALLED TO CONTROL BOX (10A MAX):	☐		
ALL MACHINERY REINSTATED POST INSTALLATION:	☐		
RELAY CONTROL IN BOX IS CORRECT TO THE CORRECT TANK NUMBER:	☐		
TEMP PROBES INSTALLED AND LOCATED HARD AGAINST THE CYLINDER SKIN:	☐		