

tepeo



ZEB-40R

Troubleshooting and Health Check Guide

**INSTRUCTIONS FOR USE BY COMPETENT, QUALIFIED
ENGINEERS REGISTERED WITH TEPEO ONLY**

Document Purpose

To instruct *competent* persons how to safely troubleshoot a ZEB®. *Competent* persons are those suitably qualified to carry out plumbing and electrical work and have successfully completed product training by tepeo or an authorised training partner.

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1. General Information

1.1. Troubleshooting Instructions





The ZEB must be serviced by tepeo or a competent and qualified engineer who is registered with tepeo; in accordance with these instructions; the current regulations in force; and using genuine parts and materials supplied by tepeo. Please read these instructions carefully before servicing the appliance.

The latest available ZEB manuals and information can be found at www.tepeo.com.

ALWAYS isolate power to the ZEB at the double pole isolator before removing any panels.

If safe electrical isolation cannot be performed or confirmed, for whatever reason, works must NOT continue.

1.2. Symbols and Hazard Statements

Symbol	Explanation
 DANGER	DANGER Indicates a hazard with a high level of risk, that if not avoided, will result in death or serious injury
 WARNING	WARNING Indicates a hazard with a medium level of risk, that if not avoided, could result in death or serious injury
 CAUTION	CAUTION Indicates a hazard with a low level of risk, that if not avoided, could result in minor or moderate injury
	TAKE NOTICE Important information regarding the usage or installation of the appliance

A triangle symbol is used to indicate a hazard; a circle symbol indicates a point of information. Hazards are divided into three categories of severity - CAUTION, WARNING and DANGER. The table above gives a generic explanation. Specific hazards are detailed in the manual at the appropriate juncture.

1.3. Competence, Qualification and Approval

- Any servicing or maintenance MUST be carried out by tepeo, or any other competent and qualified engineer who is registered with tepeo
- DO NOT allow children or any other unqualified or unapproved persons to install, repair, clean, relocate, interfere or tamper with the product
- tepeo accepts no responsibility of unsatisfactory performance of the ZEB that is the result of failure to comply with the servicing instructions
- tepeo is not responsible for the selection, specification, or effectiveness of equipment, unless stated in writing. Responsibility lies with the customers and any experts or consultants involved in design or installation

1.4. Installation Support

In the unlikely event of a malfunction with the ZEB during the installation and commissioning procedure please follow this guide before contacting tepeo. If at any point you are unsure then stop work and contact tepeo for guidance.

For safety information and technical support please contact:


tepeo ltd
630 Wharfedale Road
Winnersh Triangle
Wokingham
RG41 5TP
hello@tepeo.com
tepeo.com

Read the full Safety Instructions in [Section 2](#) of this manual before working on this product

2. Safety Instructions


tepeo is not responsible for the failure of components not specified in the service manual; supplied by other manufacturers; and/or installed by others.

2.1. Electrical Safety

 <p>DANGER</p>	<p>Electric Shock Death or serious personal injury</p> <ul style="list-style-type: none">- Switch off the power supply before starting any work- Isolate the ZEB at the local double pole switch and at the consumer unit- Follow safe isolation procedures- Use voltage indicator and proving unit to verify isolation
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- The product must be earthed correctly and have its own independent electrical supply
- The dedicated electrical supply to the ZEB must be protected by a Residual Current Device (Type A)

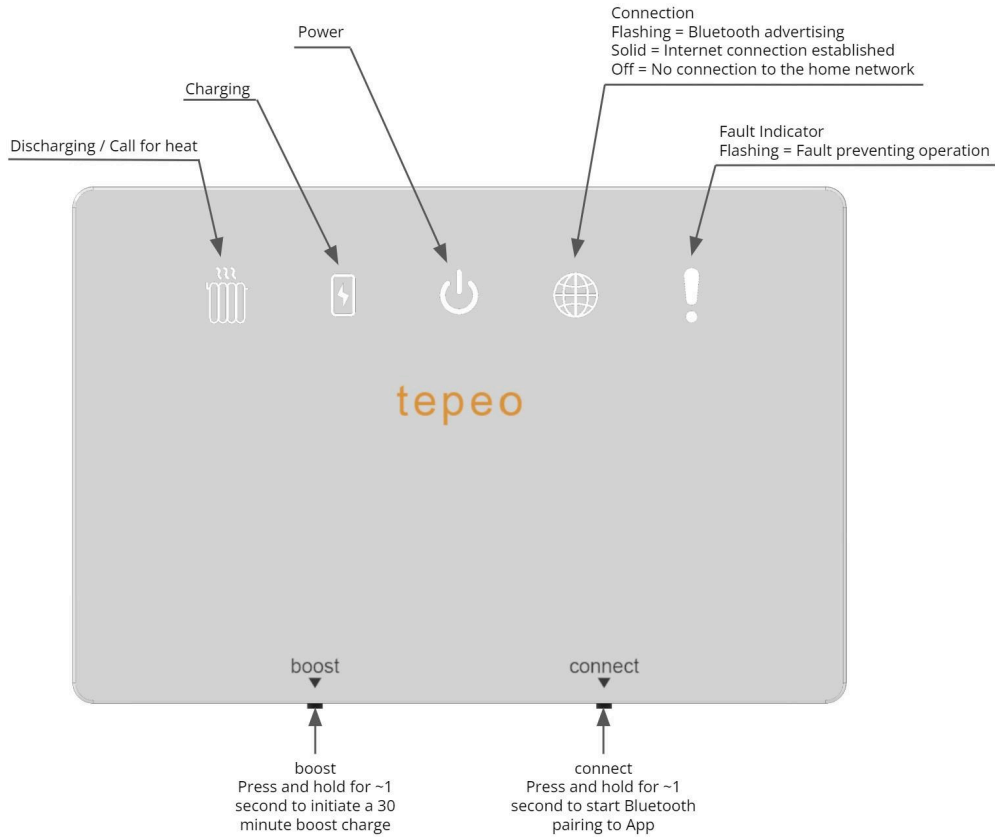
2.2. General Safety

 <p>CAUTION</p>	<p>Hot Surface Minor or moderate personal injury</p> <ul style="list-style-type: none">- Some components get hot during normal operation. Allow to cool and wear suitable PPE
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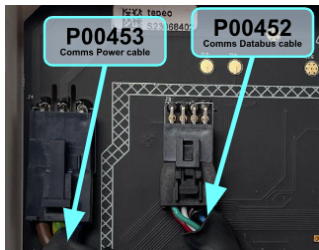
INSTRUCTIONS FOR USE BY COMPETENT, QUALIFIED SERVICE ENGINEERS REGISTERED WITH TEPEO ONLY

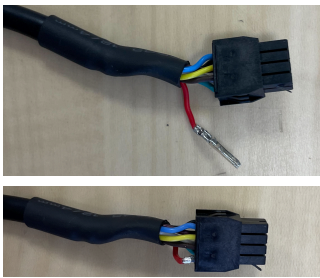
3. Troubleshooting

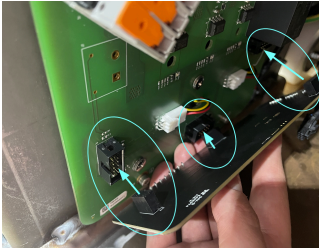
3.1. Comms Box Faults






	Symptom	Suggestion
3.1.1.	Power LED is not illuminated	<p>Check the MCB/RCBO in the consumer unit has not tripped.</p> <p>If it has, check relevant wiring to establish cause before resetting.</p> <p>Confirm the double pole isolator (ZEB supply) is ON. Check the power LED.</p> <p>If the power LED is still not illuminated then after safely isolating the electrical supply at the MCB/RCBO, open the double pole isolator and check all connections inside the isolator are connected correctly.</p> <p>After safely isolating the electrical supply, check the condition of comms power and data cables including the connectors at both ends (comms</p>




		<p>box and core power pcb) ensuring they are plugged back in correctly and securely after checking.</p> <p>If any damage is found contact tepeo.</p>
3.1.2.	Network LED not illuminated	<p>Check network devices in the property - is there wifi and is it set to accept 2.4GHz connections?</p> <p>Do phones/laptops etc have internet access? If No, try restarting the router/access point.</p> <p>Confirm the WIFI access point name and password have been entered correctly.</p>
		<p>After safely isolating the electrical supply; check the condition of the comms data cable including the connectors at both ends, ensuring it is plugged back in correctly and securely.</p> <p>If any damage is found contact tepeo.</p>
3.1.3.	Fault LED flashing	<p>The <i>fault</i> LED flashes when something is preventing the ZEB from charging or discharging.</p> <p>Check for any isolation valves on the flow and return pipes to the ZEB - if these are closed it will prevent water flow and trigger an error.</p> <p>Check the system pressure is above 0.5bar (vented systems) or above 1bar (unvented/sealed systems).</p> <p>If not, rectify as necessary.</p> <p>Is the system completely vented of air? If the system is airlocked the unit will cycle the demand light and the fault light on and off.</p> <p>If not, rectify as necessary.</p> <p>If the fault appears after a call for heat has stopped and any isolation valves to the ZEB are</p>

		<p>confirmed as open, it is possible the water flow is restricted in the system.</p> <p>If the system is an S-plan, it may require a bypass valve to be fitted.</p> <p>If there is a bypass valve present it may require adjusting as per the ZEB Installation instructions.</p> <hr/> <p>Check external circulator pump operation - if the ZEB receives a call for heat but this does not supply enough consistent water flow as stated in the installation instructions, the ZEB will be unable to discharge. Is it supplying enough flow?</p> <p>If not, rectify as necessary.</p> <hr/> <p>After safely isolating the electrical supply; check the condition of all cables between all of the PCBs - a broken/damaged cable or incorrectly located cable plug between modules can trigger a fault state. Relocate if necessary.</p> <p>If any damage is found contact tepeo.</p>
		<p>After safely isolating the electrical supply; check the core comms PCB is pushed home correctly onto the core power PCB by gently pushing it towards the left hand side of the ZEB.</p> <p>Excessive pressure is not required.</p>

3.2. ZEB Charging Issues

	Symptom	Suggestion
3.2.1.	<p>Charge light is on but ZEB is not charging</p>  <p>DANGER</p>	<p>The thermal cutout may have tripped.</p> <p>Follow Thermal Cutout Reset to confirm and rectify.</p> <p>If none of the above, contact tepeo.</p>
3.2.2.	<p>Charge light is on but ZEB is not drawing full power</p>  <p>DANGER</p> 	<p>A fuse to the element bank(s) may have blown. Ensure power to the ZEB is switched OFF before proceeding.</p> <p>Follow Element Fuse Check & Replacement to confirm and rectify.</p> <p>An element bank may have also failed.</p> <p>Confirm/identify a failed element bank by testing continuity and resistance in the inspection holes.</p> <p>If there is no continuity, or resistance measures outside of $17.9 < R < 19.5$ ohms, then the element bank will need replacing.</p> <p>Contact tepeo for a replacement.</p>

3.3. ZEB Discharging Issues

	Symptom	Suggestion
3.3.1.	<p>Demand for heat is on but Discharge/Call for heat light does not illuminate</p>  <p>DANGER</p>	<p>Confirm the ZEB has 240V on the SL connection at the installer board; or if a volt free connection is being used, check the link is complete using a multimeter.</p> <p>After safely isolating the electrical supply, a link wire can be placed between the volt-free A & B connections (see figure 1 below) to confirm the ZEB is responding correctly to a call for heat.</p> <p>If the ZEB now operates correctly, there is a fault external to the ZEB.</p> <p>Rectify as necessary remembering to remove the link wire when completed.</p> <p>Never apply 240V to the volt-free connections as this will cause damage to the ZEB. If you believe this has happened please contact tepeo.</p>

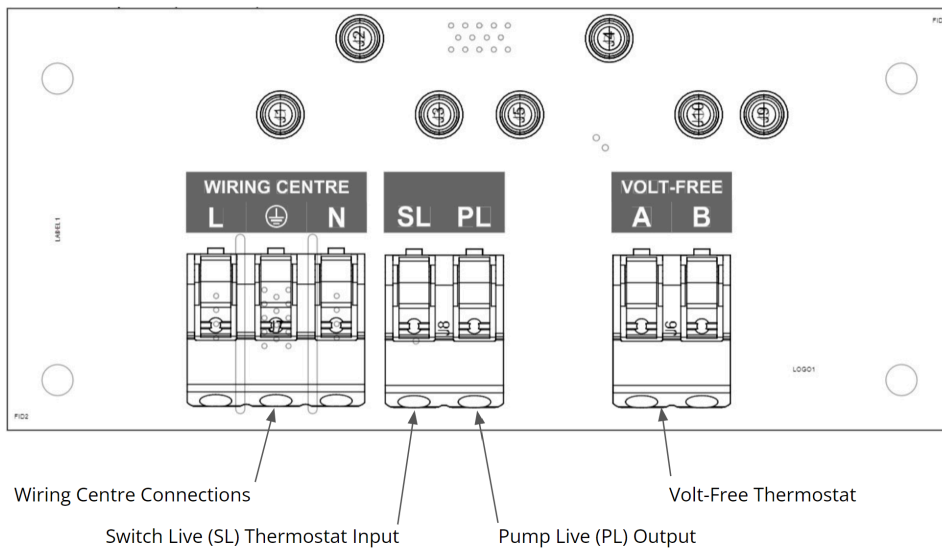


Figure 1: ZEB Comms Box installer PCB wiring diagram

If after following the above troubleshooting the ZEB is still not operating correctly please contact tepeo for further assistance.


4. Health Check Procedures


The ZEB health check must be performed:



- by tepeo, or a competent and qualified engineer who is registered with tepeo;
- in accordance with these instructions;
- the current regulations in force; and
- using genuine parts and materials supplied by tepeo.


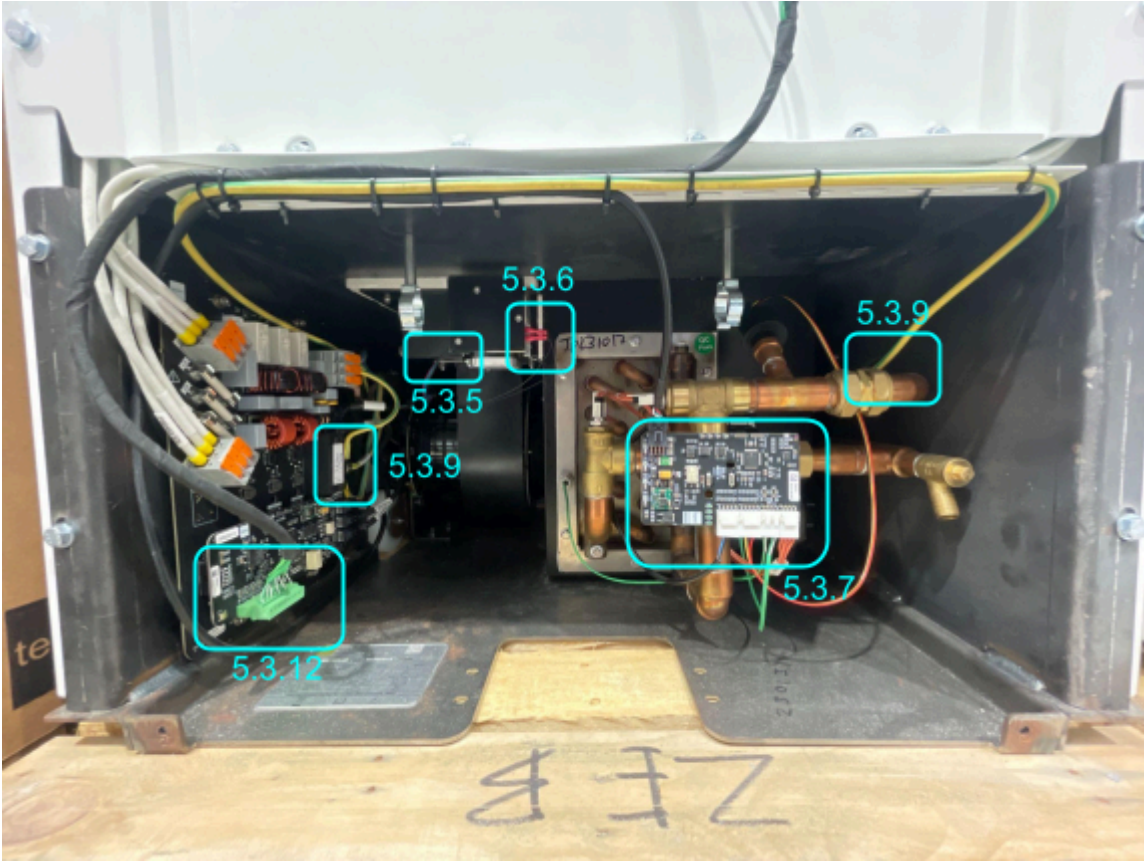
Please read these instructions carefully before performing a health check of the appliance.

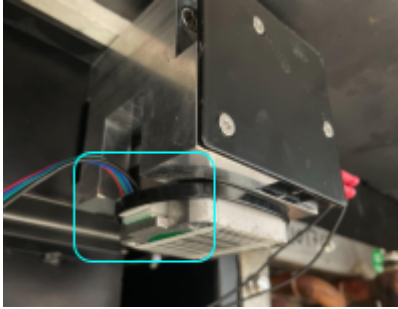
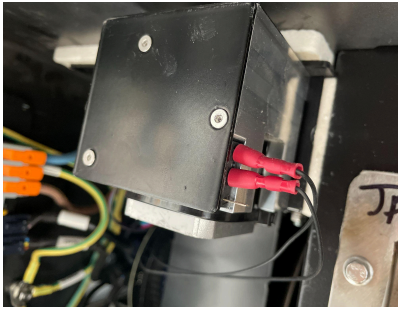

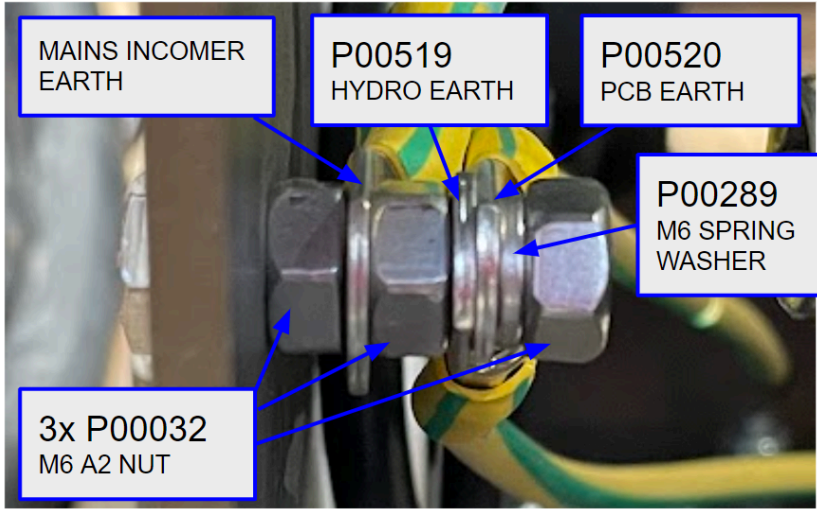
The latest available ZEB manuals and information can be found at www.tepeo.com.

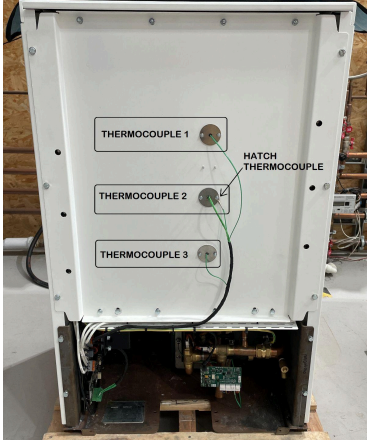
4.1. Electrical Isolation	
	DANGER - Electric Shock Death or serious personal injury
TOOLS	Multimeter / voltage indicator
	Before commencing any work on the ZEB, the engineer MUST safely isolate the ZEB
	Where 3rd party controls have the potential to remain Live, these must be isolated and proved safe before further work can commence
	Use a voltage indicator on all connections to ZEB, and plumbing system components before continuing the Health Check
	If the ZEB is located within the dwelling where there is a risk of interference from the customer, children or animals, the engineer will conduct a risk assessment and inform the customer to ensure a safe space for works
	If for any reason the engineer has to isolate the electrical supply to the consumer board, they MUST ask permission from the customer before doing so
	If safe electrical isolation cannot be performed or confirmed, for whatever reason, works must NOT continue



4.2. Water Quality checks	
	<p>DANGER - Electric Shock Death or serious personal injury - Electrical Isolation procedure MUST be followed before continuing with water quality checks</p>
TOOLS	Adey ProCheck kit, Inhibitor (e.g: Fernox F1)
	System filter is to be cleaned and inspected for any leaks, the filter is the property of the customer and external to the ZEB, any faults or replacement will not be covered by Health Check consumables or Care Plan
	Water sample to be tested with Adey ProCheck kit, any recommendation for inhibitor top up will be included in the visit
	The heating circuit will need to be run for a short time before the inhibitor level can be re-tested, if the initial test was a failure
	If water sample fails on corrosion or pH levels, the engineer will advise the customer to consider a system clean, this is not covered by a Health Check or Care Plan


4.3. Visual Inspection	
	<p>DANGER - Electric Shock Death or serious personal injury - Electrical Isolation procedure MUST be followed before continuing with visual inspection</p>
	<p>CAUTION - Hot Surface Minor or moderate personal injury</p> <ul style="list-style-type: none"> - If the ZEB is at >20% SoC it is likely some internal components may be too warm to comfortably touch - Use gloves & caution as appropriate
TOOLS	2.5mm allen key, 5mm allen key

		<p>Check for the small fixing underneath the Comms Box.</p> <p>It is essential this fixing (with pre-applied thread-lock) is fitted, to protect against accidental exposure to mains electricity.</p> <p>If missing then refit using a spare fixing.</p>
	<p>Remove the cover from the ZEBs 2-pole isolator at the property and inspect the condition of all cables and connections - confirm all terminals are adequately tightened and well engaged.</p> <p>Replace the cover.</p>	
	<p>Remove the Front Dress panel. Refer to Front Dress Panel Removal if needed.</p>	
		
	<p>Check the condition and connection of all cables. Pay particular attention to the Mains incomer cable condition and connections.</p> <p>Tug test element connections. Check there is adequate cable restraint throughout.</p>	

		<p>Check the stepper motor cable is well attached - the connector fully home, and restrained with a cable tie [where necessary]</p>
		<p>Check limit switch connections are fully seated and there is no cable strain or damage</p>
<p>Check all connections to the Hydro module are well seated</p>		
<p>Inspect all plumbing joints for any signs of water egress E.g: rust spots, dried water, staining, actual water</p>		
	<p>Inspect earth bonding and copper connections, confirm all fixings are tight and there is a good connection to the copper pipework. Check cable along its length for any damage or snags. Confirm connections to the earth stud are as shown below.</p>	
		


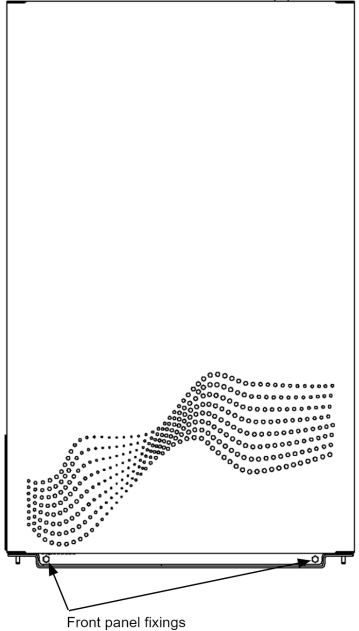
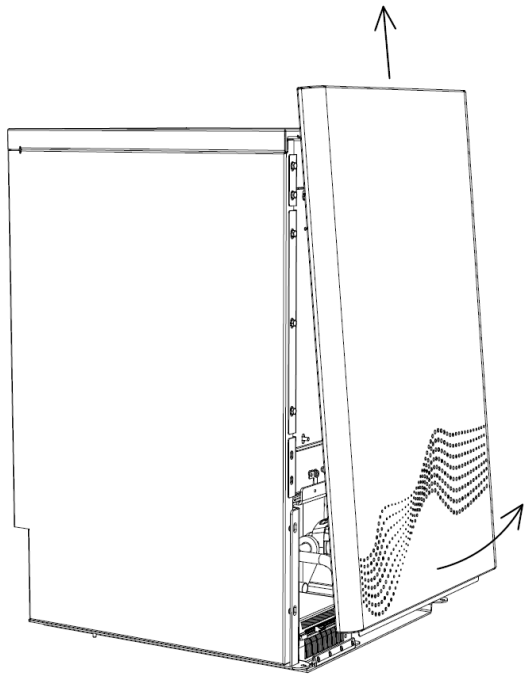
	Inspect all gasket areas for signs of damage or thermal leakage. Including heat exchanger gasket, duct/scroll cone gasket, and bypass gaskets top & front
	Check thermocouple connector to CORE_CTRL PCB, must be well seated and secure with no damage
	Check the condition of all main thermocouples - no gaskets are damaged, no cables are strained or damaged

4.4. Element condition check	
	<p>DANGER - Electric Shock Death or serious personal injury - Electrical Isolation procedure MUST be followed before continuing with elements condition check</p>
TOOLS	Multimeter
	<p>Use the element inspection holes in the Hatch to access the heads of the bolt on each element connection. Use a multimeter to measure resistance between connections a & b for each of the element banks 1 to 3</p> <p>Record the value of each bank to the Health Check sheet</p>



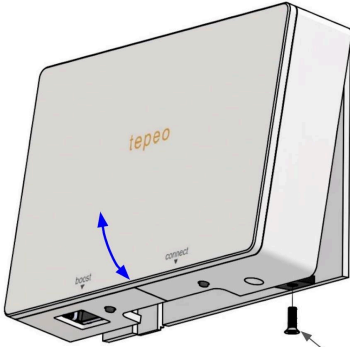
		<p>Pass = Resistance between 17.9Ω to 19.5Ω</p> <p>Fail = No continuity, or resistance measures outside that range</p>
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4.5. Commissioning	
TOOLS	tepeoPro App
	Refit the Front dress panel, refer to Front Dress Panel Removal
	Power to ZEB and controls to be re-established and functional checks be carried out. Refer to Commissioning Process if needed.
	<p>Follow the commissioning checklist using the tepeoPro app to test the ZEB during a call for heat. To do this:</p> <ul style="list-style-type: none"> ● Sign into the tepeoPRO app ● Go to 'Install a ZEB' ● Pair ZEB via bluetooth (press the 'connect' button on the communications box and then start the scan in the app) ● Follow the commissioning process in the app ● Review commissioning report ● Click Submit <p>Refer to Commissioning Process if needed.</p>
	Carry out a general check on external controls and their functionality
	Engineer to complete Health Check Job Sheet and be retained by Customer Services who will send a copy to the customer
	Annual reminder to be set by Customer Services


5. Servicing Procedures - Basic


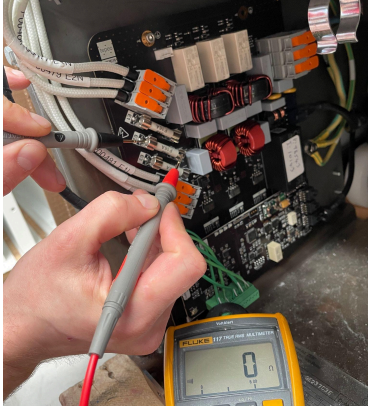
5.1. Front Dress Panel Removal	
	<p>DANGER - Electric Shock Death or serious personal injury</p> <ul style="list-style-type: none"> - Switch OFF the power supply before starting any work - Isolate the ZEB at the local double pole switch and at the consumer unit - Follow safe isolation procedures - Use voltage indicator and proving unit to verify isolation
TOOLS	5mm allen key
5.1.1.	Use a 5mm allen key to remove the two screws & star washers at the bottom of the front panel
5.1.2.	Carefully hinge the bottom of the front panel forward
5.1.3.	The front cover can now be lifted off and removed
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Front panel fixings</p> </div> <div style="text-align: center;">  </div> </div>	
5.1.4.	For re-installation of the panel follow the procedure in steps 1 to 3 in reverse and ensure the two securing bolts to hold the front panel in place are securely fastened, including the star washers


5.2. Comms Box Cover Removal



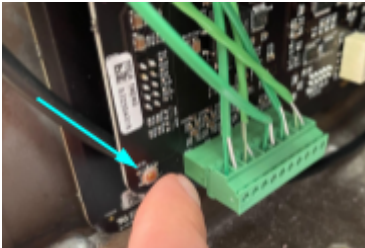
	<p>DANGER - Electric Shock Death or serious personal injury</p> <ul style="list-style-type: none"> - Switch OFF the power supply before starting any work - Isolate the ZEB at the local double pole switch and at the consumer unit - Follow safe isolation procedures - Use voltage indicator and proving unit to verify isolation 	
TOOLS	2mm, 2.5mm allen key	
5.2.1.		<p>Unscrew the small fixing underneath the Comms Box.</p> <p>It is essential this fixing (with pre-applied thread-lock) is refitted, so do not lose this fixing.</p>
5.2.2.		<p>Lift the comms box off of the backplate from the bottom edge, it will detach with a firm snapping sound.</p> <p>When refitting, ensure all cables to the installer pcb are strain relieved to the backplate, and cannot be trapped as the comms box clips back on.</p>

5.3. Element Fuse Check & Replacement

	<p>DANGER - Electric Shock Death or serious personal injury</p> <ul style="list-style-type: none"> - Switch OFF the power supply before starting any work - Isolate the ZEB at the local double pole switch and at the consumer unit - Follow safe isolation procedures - Use voltage indicator and proving unit to verify isolation 	
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TOOLS	Multi-meter	
5.3.1.	Follow Front Dress Panel Removal procedure	
5.3.2.		<p>Identify these fuses on the CORE_POWER pcb.</p> <p>Each fuse protects one element bank, the numbers correspond to the relevant bank.</p>
5.3.3.		<p>Check continuity across the fuses.</p> <p>If there is no continuity, replace the fuse with a quick acting, ceramic fuse (16A type F 500VAC 1500A breaking capacity 6.3 x 32mm cartridge).</p> <p>While removing the fuse, it is recommended to pry at the end cap, not in the centre of the fuse, which may break.</p>

5.4. Thermal Cutout Reset	
	<p>DANGER - Electric Shock Death or serious personal injury <i>- Use extra caution during this service action with a Live device</i></p>
5.4.1.	Follow Front Dress Panel Removal procedure, once the dress panel is removed, the power can be turned back on to the ZEB.

5.4.2.		<p>Confirm the thermal cutout board has tripped by observing the 3x LEDs.</p> <p>LED Off = Thermal cutout has tripped</p>
5.4.3.		<p>Identify the thermal cutout reset button.</p> <p>Ensure the ZEB is not currently attempting to charge.</p> <p>Resetting the thermal cutout under load can potentially damage the CORE_POWER pcb.</p> <p>This can be prevented by setting the ZEB to Away mode in the user App.</p>
5.4.4.		<p>With the ZEB powered up, and NOT trying to charge, press and hold the reset button until the relays reset (there should be an audible click of the mechanical relays).</p>
5.4.5.	<p>If the thermal cutout immediately trips again, it might be that a thermocouple is damaged/disconnected.</p> <p>Inspect the 10-way green connector for stray wires, and reattach if obvious.</p> <p>If there is irreparable damage, contact tepeo.</p>	
5.4.6.	<p>With the thermal cutout board reset, instigate a charge using the Boost button on the Comms box. Current should be ~38A.</p>	

5.5. Commissioning Process

Core Charging

A minimum State of Charge is required for the ZEB to start discharging heat. Therefore the ZEB may require a short period of charging as part of the commissioning process if it hasn't already been manually boost-charged.

- Using the Installer App, set the ZEB to charge
- Check that the power consumption of the ZEB is approximately 9kW
- Check that the white 'Charging' LED is on

Call-For-Heat Functionality

To test the functionality of the ZEB in response to a call for heat:

- Manipulate the room/tank thermostats and/or programmers to provide a call for either/both central heating and hot water
- Leave the call-for-heat engaged until all air is removed from the water system
- The installer App will prompt for return of the thermostats and/or programmers to the end user's settings later in the commissioning checks
- Repeat for Stored Hot water if there is an indirect hot water cylinder in the system

Note that the ZEB will not deliver heat to the water circuit until the core reaches a minimum State of Charge of 2 kWh. See 'Core Charging' below.

Water Sensor Verification

Using the Installer App check that the water pump is active, and that the water pressure and flow rate are showing expected values, depending on whether the system is open vented or sealed.

Water pressure should be above the minimum pressure required. **0.5 - 2.0 bar** is typical depending on vented vs unvented & system design.

The pump power setting can be adjusted to give a flow rate typically in the range of **600 - 800 l/h** for optimal performance of the ZEB - subject to target dT between flow and return temperatures and the recommendation of the qualified installer.

Discharging

With the minimum state of charge achieved and the call-for-heat still engaged:

- Check that the white 'Discharging' LED is on

- The internal air discharge fan will now be operating
- Use the Installer App to check that the internal air temperature onto the heat exchanger (HX inlet temp) is >20°C above ambient, and the water temperature is starting to rise
- Outcome: fan speed reported should be (>40 RPS), air temperatures should be >150°C, water power >3000 Watts (State of Charge and flow temperature dependant)

Reset

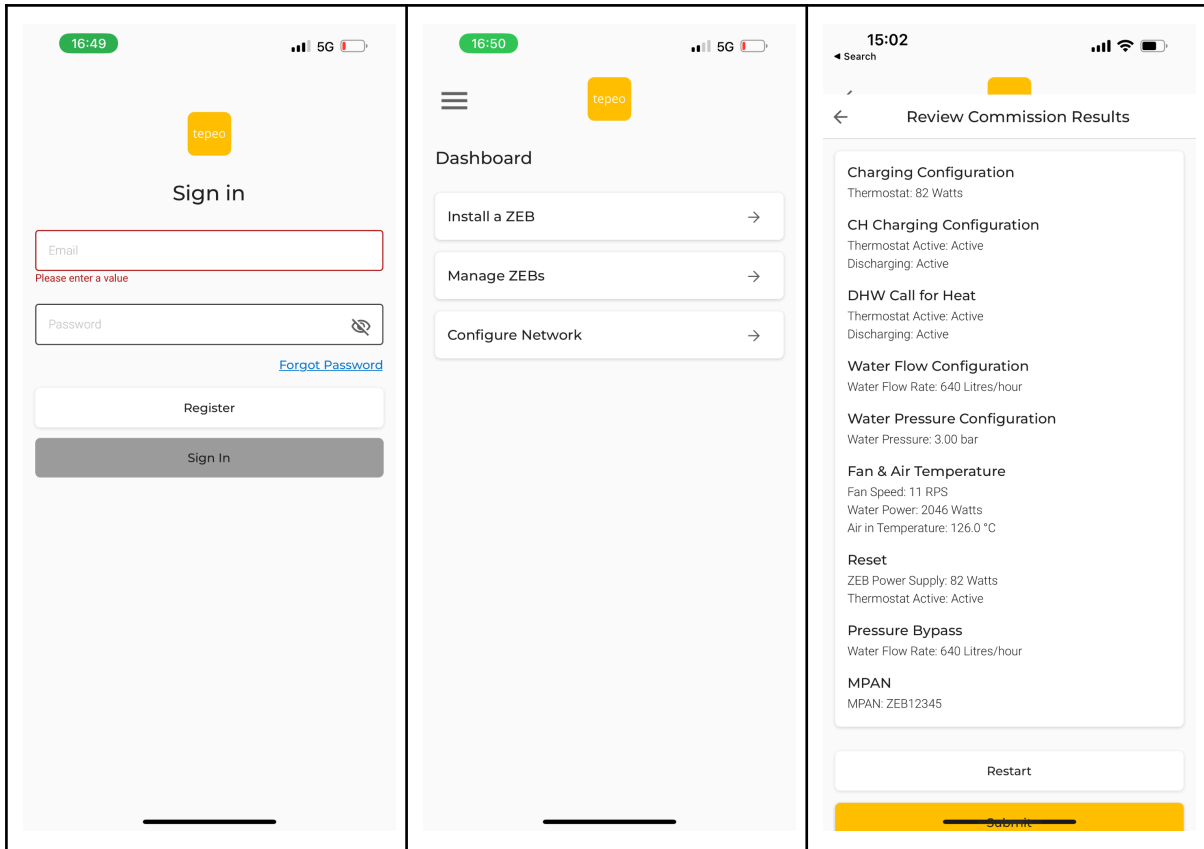
- Adjust the thermostats to stop the call for heat. Confirm that the ZEB power supply is less than 150 Watts

Pressure bypass

- Use the Installer App to verify/adjust the automatic bypass valve to achieve the minimum required flow of **210 l/h** when pump overrun is active

Completion

- Return the room/tank thermostats and/or programmers to the end user's setting
- Using the Installer App, confirm that the ZEB detects the absence of the call-for-heat, and that the internal air fan and external water pump stop
- Verify this for all heating and hot water zones. Test them separately
- Review commissioning results
- Confirm commissioning completed within nominal parameters



Appendix

A. Troubleshooting Flow Chart

