

# Service Manual

## Model Numbers

*XL25 – 25 Litre*

*XL50 – 50 Litre*

*XL75 – 75 Litre*

All versions from Jan 1997 – 2002

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## Technical Data

**Element: -** 3kW @ 230/240volts  
Resistance  $17\Omega \pm 7.5\%$

**Solenoid valve: -** Coil Voltage 230/240v ~ 6w  
Coil resistance  $38\Omega \pm 10\%$

**Thermistor: -** Resistance at 20°C - 3745Ω  
Resistance at 45°C - 1310Ω  
Resistance at 60°C - 746Ω  
Resistance at 85°C - 320Ω

**Low Level Probe: -** Continuity to earth when in contact with water

**High Level Probe: -** Continuity to earth when in contact with water

**PCB: -** Maximum Voltage - 250volts  
Live Terminals - 230/240volts  
Solenoid Terminal - 230/240volts (when filling)  
Element Terminal - 230/240volts (when heating)  
Temperature Range 25°C - 85°C

**Cut Out: -** 230/240volts  
Operating Temperature 96°C

## Introduction

This service manual has been produced to ensure that a safe and reliable service is performed to any XL water heater attended. Contained within these pages you will find all the information that will be required to diagnose and perform repairs efficiently.

There have been several versions of the printed circuit board (PCB) and information on each version is in this manual. Please refer to this section to ensure compatibility of both level-sensing probes to any replacement PCB that is required to be fitted.

All versions of the XL have a built in test mode to enable the engineer to quickly establish the exact state that the unit is in. Refer to page 8 for further information.

Earlier versions have limited fault codes built-in to be displayed in the event of a failure. However, more recent versions do have a more extensive range, refer to page 9 for further details.

## Operation

The Zip XL is a vented storage water heater that relies on being installed as high as possible to provide adequate flow to the tap(s). The unit has a vent pipe that must be installed correctly (refer to **Installation Verification pg 4** ).

The XL has advanced electronics to ensure that the stored water temperature is maintained and delivered within 1°C of the selected temperature. In order to achieve this the fill rate is controlled to ensure that the stored water temperature does not fall too far; as a result it is possible to withdraw the entire contents from the unit. At this point water will cease to flow from the taps, this is not a fault, but may indicate that the unit is under sized for the application.

Upon commissioning, the unit will allow water to fill to the low level probe; when reached, the solenoid valve will close and the heating element will be switched on. The water will now be heated to the selected temperature. To select the desired water temperature simply use the red and blue buttons to increase or decrease, the temperature will be shown on the PCB display. On version Z142-7 and above, if a temperature above 45°C is required then the link switch will need to be changed, please refer to page 15 on selecting temperature.

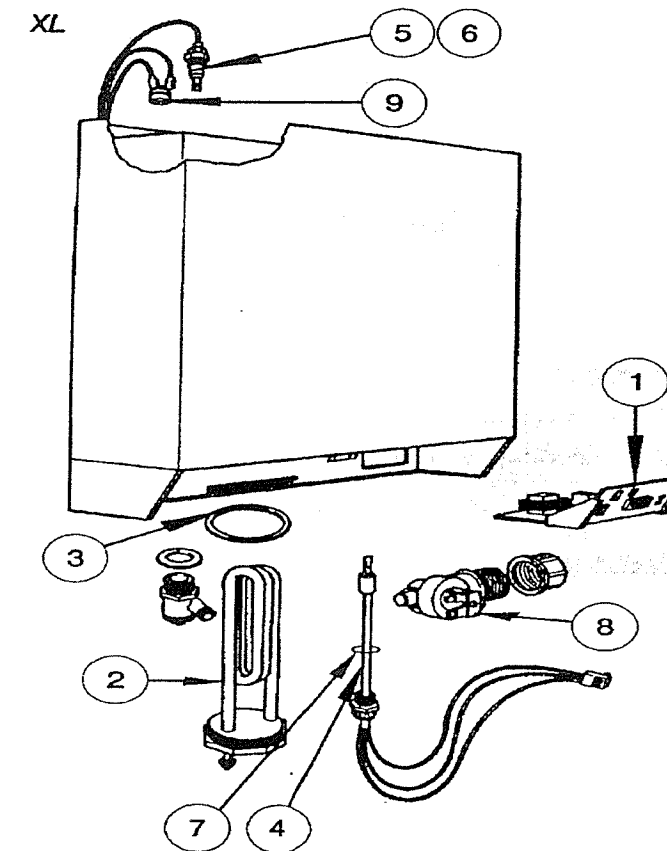
Once the stored water temperature has been achieved the solenoid valve will open and allow water to enter the tank (see **version section for exact operation**). Once a 1°C drop in the stored water temperature has been sensed the heating element will switch back on and re-heat the water to the selected temperature. This operation will continue until the high level probe is reached.

During the heating cycle the neon light on the right will show the exact status of the unit at any given time (refer to **version section for options**).

When full the unit will simply maintain the selected water temperature ensuring that the water will always be at the required temperature. Once water is withdrawn there will be a 30 second delay before the heat and fill cycle will commence again.

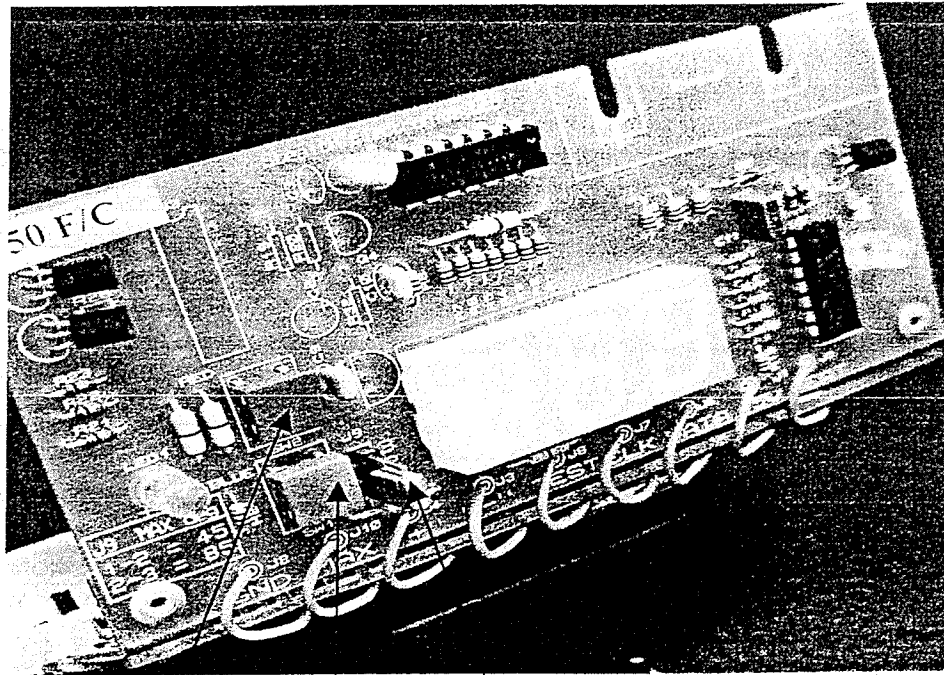
The PCB features several fault codes that will be displayed in the event of a failure, please refer to page 9.

## Spare Parts



<i>Item</i>	<i>Part No.</i>	<i>Description</i>
1	XL0814/N	PCB - Novomec
1	XL0814/S	PCB - Zentronic/Stealth
2	XL0816	Element 3kW
3	XL0817	Element Gasket
4	XL0818/N	Thermistor/Low Level Probe - Novomec
4	XL0818/S	Thermistor/Low Level Probe - Zentronic/Stealth
5	XL0819/N	25 Litre High Level Probe - Novomec
5	XL0819/S	25 Litre High Level Probe - Zentronic/Stealth
6	XL0820/N	50/75 Litre High Level Probe - Novomec
6	XL0820/S	50/75 Litre High Level Probe - Zentronic/Stealth
7	XL0821	Probe 'O' Ring
8	XL0822	Solenoid Valve
9	XL0829	Resettable Cut-Out

## Selecting Temperature



Red Button    Blue Button    Link Switch (NOT on all models)

By depressing either button once the display will show the current selected temperature.

To change the selected temperature use the coloured buttons to either increase or decrease the temperature by increments of 1°C.

**Red to increase**  
**Blue to decrease**

Versions Z142-7 onwards are fitted with a temperature limiter that will restrict the temperature when in certain positions.

**Pins 1 & 2 Linked – maximum temperature 45°C**  
**Pins 2 & 3 Linked – maximum temperature 85°C**

## Installation Verification

The following points should be checked upon arrival on site:

1. That the vent pipe is installed correctly.
2. That the unit is providing a sufficient head of pressure to supply the tap(s).

### Vent pipe

As a general rule if the end of the vent pipe is *not* visible when standing in front of the unit then a tundish *must* be fitted. With a tundish fitted the vent pipe may be routed externally, but under no circumstances must this be done without the tundish.

Without the tundish the vent pipe should have a continuous fall and must not exceed 3 metres in length or have any more than 3 right-angled bends.

Failure to comply with these instructions can result in a tank implosion or explosion.

*The warranty is void if the vent connection is not correct, under these circumstances complete a visit report sheet detailing the installation, the serial number & ticking the 'faulty installation' box and obtaining a signature from the customer.*

### Positioning

The unit should be positioned at least 750mm above the highest draw off point. Any lower than this and the flow rate from the unit will be dramatically reduced. Refer to the chart below to get an indication of the pressure that can be expected from certain heights.

Ft Head	Mtrs Head	lbs/sq.ins	bar	Ft Head	Mtrs Head	lbs/sq.ins	bar
1	0.30	0.43	0.03	11	3.35	4.73	0.33
2	0.61	0.86	0.06	12	3.66	5.16	0.36
3	0.91	1.29	0.09	13	3.96	5.59	0.39
4	1.22	1.72	0.12	14	4.27	6.02	0.42
5	1.52	2.15	0.15	15	4.57	6.45	0.45
6	1.83	2.58	0.18	16	4.88	6.88	0.48
7	2.13	3.01	0.21	17	5.18	7.31	0.51
8	2.44	3.44	0.24	18	5.49	7.74	0.54
9	2.74	3.87	0.27	19	5.79	8.17	0.57
10	3.05	4.3	0.3	20	6.10	8.6	0.6

## Versions – Electronics

### Novomec Controls.

- Identification:-** Novomec Controls – Top left of display PCB  
Aqualogic – Centre of display PCB  
480-8000-011 – Part number, rear of display PCB
- Issue Dates:-** July 1997 – April 1998
- Level Probes:-** Low Level – 3-pin connector incorporating the thermistor.  
High Level – Single spade connector terminal.
- LED Display:-** Red LED to the left indicates power ON.  
Green LED to the left indicates various stages of heating.
- Green OFF - Heating element ON.  
Green FLASHING - Temperature within 1°C of set point.  
Green ON - Unit ready and at temperature.
- Compatibility with other Versions:-** PCB - Not compatible with later Versions.  
Low Level - Not compatible with later Versions.  
High Level - Yes compatible, See below.

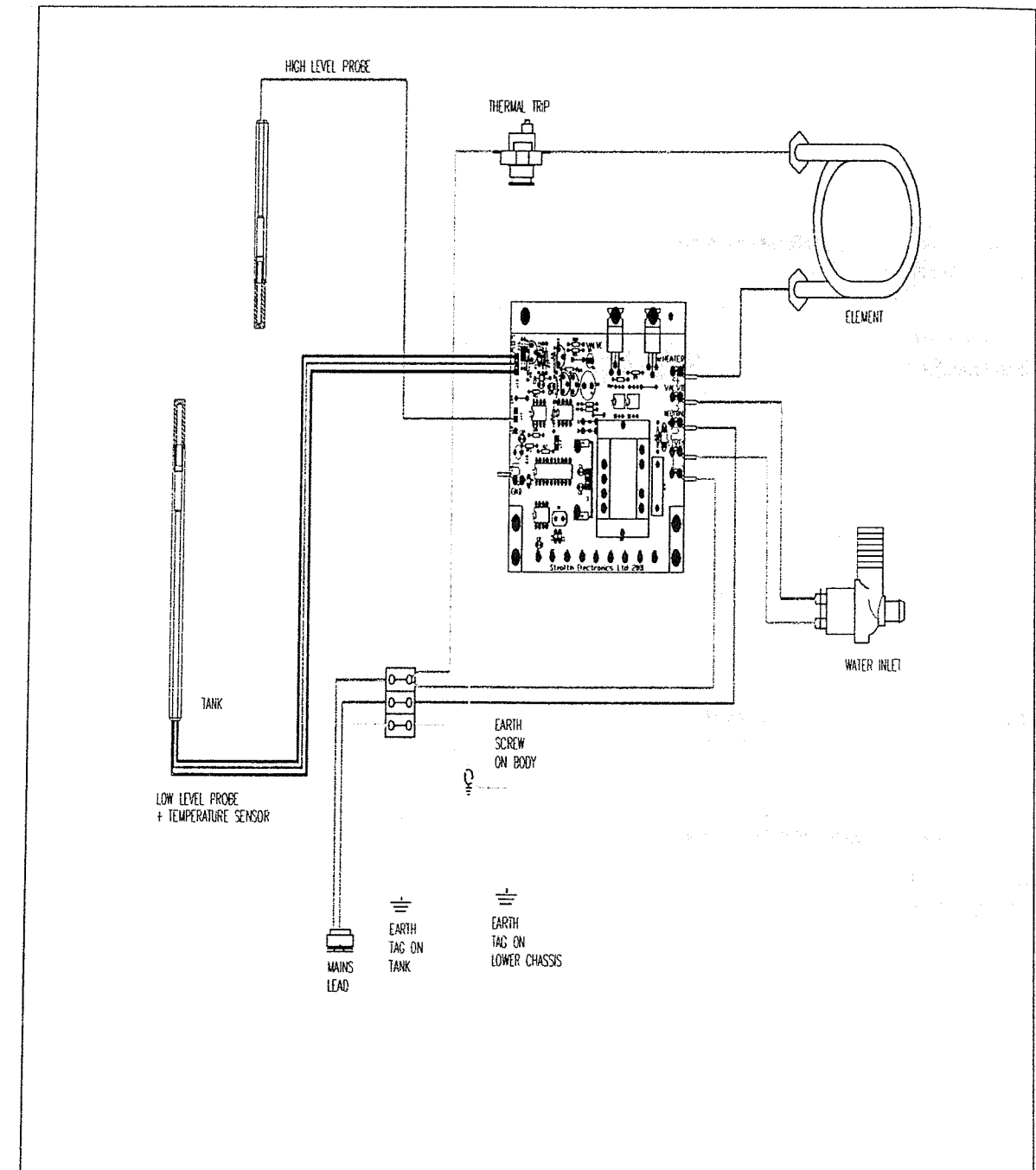
High-level probe can be connected to later versions PCB's using an adaptor available from Zip.

High-level probes can be connected directly to the PCB on versions Z142-8+ using the spade terminal located next to the pin connectors.

**Heat & Fill Cycle:-** Once water has been detected at low level the solenoid valve will close and the heating element will be switched on. When the stored water temperature has reached set point the solenoid valve will re-open and will **stay open** until the thermistor has sensed a 1°C drop in stored water temperature. At this point the valve will close and the element will be switched back on. The cycle will continue until the high-level probe is reached.

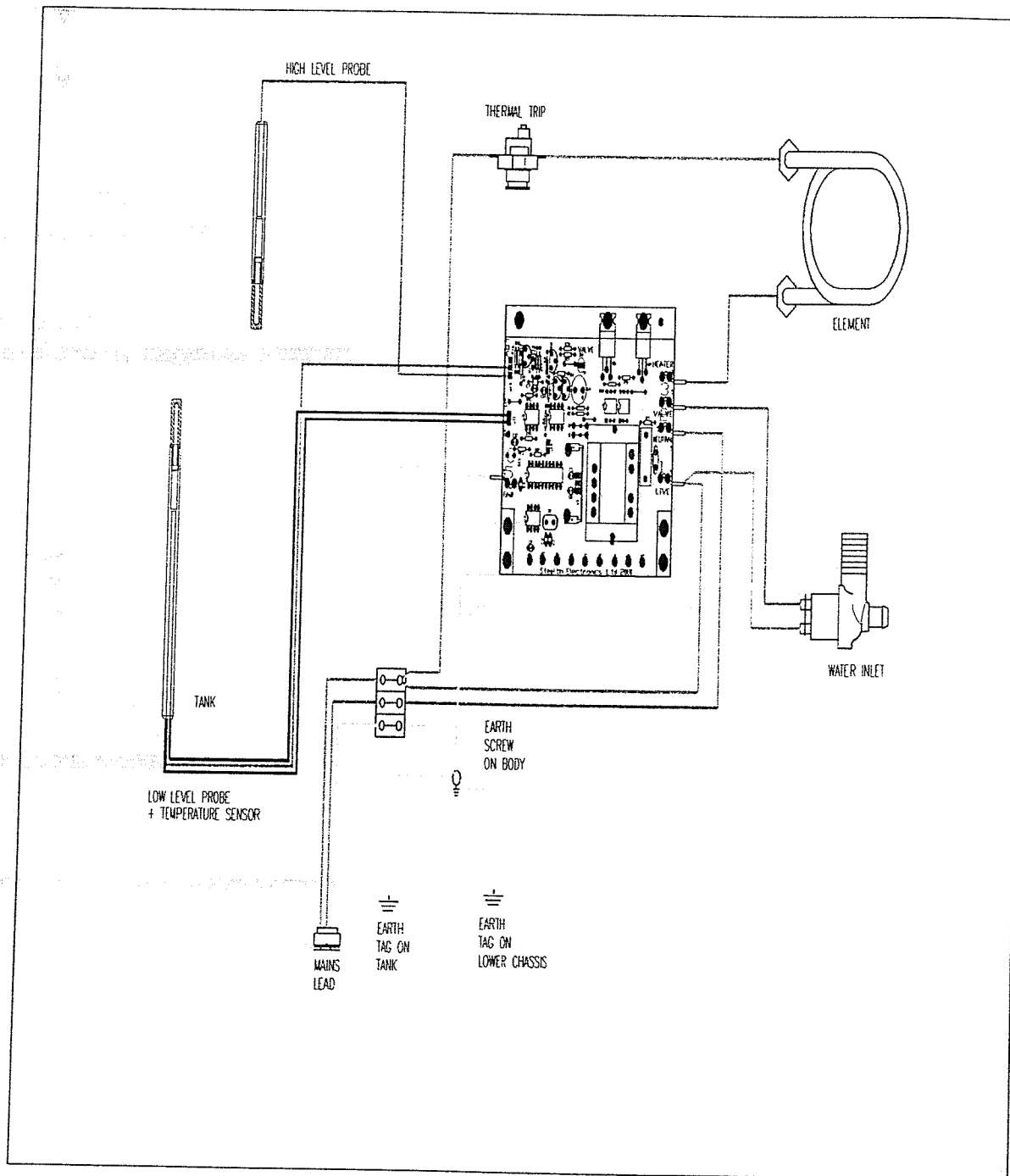
## Wiring Diagrams

### Stealth Electronics Version



## Wiring Diagrams

### Zentronic Version



## Versions – Electronics

### Zentronic Versions Z142-3 → Z142-5

**Identification:-** Zentronic Designs – Top left of display PCB

**Issue Dates:-** April 1998 – July 2000

**Level Probes:-** **Low Level** – 3 wires, 2 black connect to two pin Connector, single red two 3-pin connector. Refer to diagram on page 13

**High Level** – Single wire, connected to 3-pin connector with low level probe. Refer to diagram on page 13

**LED Display:-** Red LED to the left indicates power ON.  
Red LED to the left indicates various stages of heating.

Red ON - Heating element ON.  
Red FLASHING - Temperature within 1°C of set point.  
Red OFF - Unit ready and at temperature.

**Compatibility with other Versions:-** PCB - Not compatible with Novomec Low Probe.  
- Compatible with High probe. (See below)  
- Compatible with later versions.  
Low Level - Not compatible with Novomec PCB.  
- Compatible with later version.  
High Level - Not compatible with Novomec PCB.  
- Compatible with later versions.

**Heat & Fill Cycle:-** Once water has been detected at low level the solenoid valve will close and the heating element will be switched on. When the stored water temperature has reached set point the solenoid valve will re-open for **3 seconds** at a time, until the thermistor has sensed a 1°C drop in stored water temperature. At this point the valve will close and the element will be switched back on. The cycle will continue until the high-level probe is reached.

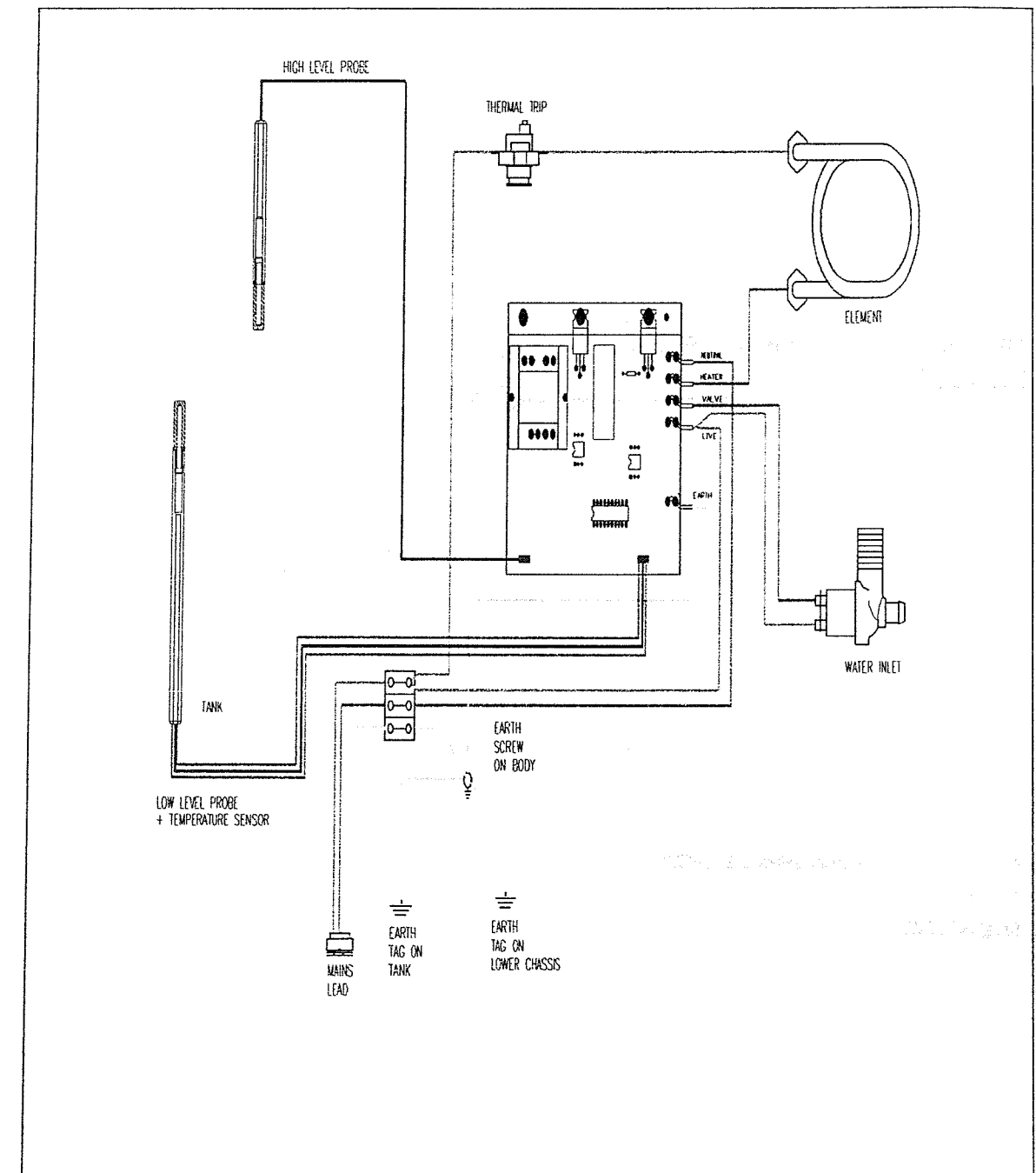
## Versions – Electronics

### Stealth Electronics Version Z142-6 → Z142-9

- Identification:-** Stealth Electronics – Top left of display PCB
- Issue Dates:-** July 2000 – Present day.
- Level Probes:-** **Low Level** – 3 wires, all connect to three-pin connector. Refer to diagram on page 14
- High Level** – Single wire, connected to 2-pin connector. Refer to diagram on page 14
- LED Display:-** Red LED to the left indicates power ON.  
Red LED to the left indicates various stages of heating.
- Red ON - Heating element ON.  
Red FLASHING - Temperature within 1°C of set point.  
Red OFF - Unit ready and at temperature.
- Compatibility with other Versions:-**
- |            |   |
|------------|---|
| PCB        | - Not compatible with Novomec Version.<br>- Compatible with Zentronic & later versions. |
| Low Level  | - Not compatible with Novomec Version.<br>- Compatible with Zentronic & later versions. |
| High Level | - Not compatible with Novomec version.<br>- Compatible with Zentronic & later versions. |
- Heat & Fill Cycle:-** Once water has been detected at low level the solenoid valve will close and the heating element will be switched on. When the stored water temperature has reached set point the solenoid valve will re-open for **3 seconds** at a time, until the thermistor has sensed a 1°C drop in stored water temperature. At this point the valve will close and the element will be switched back on. The cycle will continue until the high-level probe is reached

## Wiring Diagrams

### Novomec Version





## Fault Finding

Possible cause in ***bold & italic*** are the most likely cause and should be checked first.

Symptom	Possible Cause	Solution
Temperature will not go above 45°C	<b><i>Link switch set at low temperature range.</i></b>	Set link switch to higher temperature range setting.
Water periodically ceases to flow from the taps.	<b><i>Unit is too small for demand.</i></b>	Suggest that larger unit is fitted.
Unit is overflowing	Solenoid valve stuck open <b><i>Faulty high level probe</i></b> <b><i>Faulty PCB</i></b>	Replace solenoid valve. Go to test mode and check status and replace as necessary.
No Water from taps	Faulty installation of vent pipe. Faulty operation of taps. Unit not installed at correct height.  Unit not installed correctly.  <b><i>Faulty high level probe.</i></b> <b><i>Faulty PCB.</i></b>	Check for restriction or blockage. Check Operation of taps. Check that the base of unit is higher than taps. Check that pipe work is ALL below the unit. Go to test mode and check status, Replace as necessary.
Unit Leaking.	<b><i>Faulty seal on low level probe.</i></b> Faulty seal on element. Faulty seal on solenoid valve. Split or worn inlet hose. Poor fitting JG push on connectors. <b><i>Inner tank holed or split.</i></b>	Tighten or replace as necessary. Tighten or replace as necessary. Tighten or replace as necessary. Replace as necessary. Pull apart and remake connection. Check vent pipe for blockage or restriction. Tank probably imploded.

## Service Mode

Every model has a built-in service mode designed to make it easy to establish the exact status of the unit at any time. This can also help with fault finding.

### To access. – All versions

To access, switch the power supply OFF and remove the front panel. This will reveal the PCB. On the front of the PCB you will find two buttons (one red; one blue), depress **BOTH** buttons and turn the power back on.

**NB. It is essential that you keep both buttons depressed firmly while switching the power back on**

Release both buttons and the display will now show one of the following:-

**- - °C**

Indicates that the water level is **below low level.**

**L - °C**

Indicates that water is detected at **low level only.**

**- H °C**

Indicates that water is detected at **high level only.**

**L H °C**

Indicates that water is detected at **low level and high level.**

In this mode you can also check the operation of the solenoid valve and heating element.

By pressing the BLUE button the solenoid valve will open and allow water to enter the unit.

By pressing the RED button the heating element will be switched on.

In this mode if you find, for example, that the display is showing ' L - °C ' yet the water heater is overflowing it would be fair to assume that the high level probe has failed.

## Fault Codes

The cross-reference chart will indicate the fault codes that may be found on various PCB's.

Manufacturer	Date	PCB Version	Software Version	Test Mode	Fr	F1	F2	F3	F4	F5	F6	Max fill Cycles	Re-prog. F/Cycles	Temp. Limiter
Novomec Controls	97-00	N/A	N/A	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
Zentronic Designs	Apr-98	Z142 – 3/4	V-1	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
Zentronic Designs	Jul-00	Z142 – 4/5	V-2	✓	✗	✓	✓	✓	✗	✗	✗	50	✗	✗
Zentronic Designs	Jul-00	Z142 – 4/5	V-3	✓	✗	✓	✓	✓	✗	✗	✗	80	✗	✗
Stealth Electronics	Dec-00	Z142 – 6	HEAT V-0	✓	✗	✓	✓	✓	✗	✗	✗	80	✗	✗
Stealth Electronics	Jan-01	Z142 – 7	HEAT V-1	✓	✗	✓	✓	✓	✗	✗	✗	80	✗	✓
Stealth Electronics	Jan-01	Z142 – 7	HEAT V-2	✓	✗	✓	✓	✓	✗	✗	✗	80	✗	✓
Stealth Electronics	Mar-01	Z142 – 7	HEAT V-3	✓	✗	✓	✓	✓	✗	✗	✗	175	✗	✓
Stealth Electronics	Mar-01	Z142 – 7	HEAT V-4	✓	✗	✓	✓	✓	✗	✗	✗	175	✗	✓
Stealth Electronics	Jun-01	Z142 – 8	HEAT V-5	✓	✗	✓	✓	✓	✗	✗	✗	75,125, 175	✓	✓
Stealth Electronics	Jun-01	Z142 – 8	HEAT V-6	✓	✗	✓	✓	✓	✗	✗	✗	100,150, 200	✓	✓
Stealth Electronics	Oct-01	Z142 – 8/9	V-250	✓	✗	✓	✓	✓	✗	✗	✗	250	✗	✓

**Fr** - Water temperature sensed at below 5°C.

**F1** - Low level probe not sensing water after the solenoid valve has been open for a period of 4 minutes.

**F2** - High level probe not sensing water after the maximum fill cycles has been reached.

**F3** - Not sensing a water temperature reading or stored water temperature fallen below 5°C.

**F4** - Indicates that water temperature has risen 5°C above the selected temperature.

**F5** - Indicates that the element has failed.

**F6** - Indicates that the solenoid valve has failed.

**Note:-** F1 & F2 fault codes will **LOCK** the unit. To unlock follow the procedure below:-

Once the fault has been rectified to unlock depress both the red and the blue buttons, with the power **ON**, until the fault code disappears and is replaced with a temperature setting. This will normally take between 10 – 15 seconds.

## Fault Finding

Possible cause in **bold & italic** are the most likely cause and should be checked first.

Symptom	Possible Cause	Solution
F1 code displayed	<b>No Water Supply</b> <b>Low water pressure</b> Blocked inlet filter screen Faulty Solenoid valve Faulty PCB	Test for water at Solenoid Valve. Test water pressure (min 1bar). Clean filter screen. Go to test mode and check operation of S/V & PCB. Replace as necessary.
F2 code displayed	<b>No Water Supply</b> <b>Low water pressure</b> <b>Tap(s) left open.</b> Blocked inlet filter screen Unit is under-sized Faulty Solenoid valve Faulty PCB	Test for water at Solenoid Valve. Test water pressure (min 1bar). Check ALL taps. Clean filter screen. Suggest larger unit is required. Go to test mode and check operation of S/V & PCB. Replace as necessary.
F3 code displayed	Unit Frozen <b>Water supply below 5°C</b> Thermistor failure or not connected PCB failure	Allow unit to defrost naturally. Suggest pipes are insulated. Go to test mode and check if the unit will heat. Replace as necessary.
F4 code displayed	<b>Thermistor failure</b> PCB failure	Replace Thermistor. Replace PCB.
F5 code displayed	Element failure	Replace element.
F6 code displayed	Solenoid valve failure	Replace solenoid valve.
No Display	No power supply Faulty PCB	Check supply to the unit. Replace PCB.
Heating LED is on but water is not hot.	<b>Cut out tripped</b> <b>PCB failure. Resistor 'R10' blown</b> Element failure Thermistor failure	Reset unit. Replace PCB. Replace Element. Replace Thermistor.
Display showing 'Fr'	<b>Water supply below 5°C</b> Unit Frozen	Suggest pipes are insulated. Allow unit to defrost naturally.