Thermino® TS Installation & User Instructions (UK/EU)

NOTICE

Please read & comply with all these instructions before commencing installation. Failure to install and operate this Heat Battery in accordance with these instructions will invalidate the manufacturer's warranty.

Please leave this manual with the customer for future reference.

CONTENTS

1. INTRODUCTION

1.1 GENERAL

The following instructions provide guidance for the installer and user of Thermino® TS Heat Batteries.

The installation must be carried out by a competent installer in accordance with local codes and regulations for plumbing, electrical installations and potable water supply. Only competent persons who are suitably qualified may undertake installations, repairs or relocations of the product. Product training on the full range of Thermino Heat Batteries is available through Sunamp or authorised training partners and is recommended.

Please note that Thermino® TS Heat Batteries are intended to be used with external heat sources.

1.2 SYMBOLS USED

In these instructions the following symbols are being used to draw the user's attention to information of particular importance.

WARNING

Indicates a hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION

Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury or material damage.

NOTICE
Signals information that is considered important but not hazard related.

1.3 ABBREVIATIONS

The following abbreviations are used in the manual:

- ASHP – Air Source Heat Pump
- DHW – Domestic Hot Water
- dT – Delta T (Change in Temperature)
- ERV – Expansion Relief Valve
- EV – Expansion Vessel
- GSHP – Ground-Source Heat Pump
- HP – Heat Pump
- HW – Hot Water
- PCM – Phase Change Material
- PRV – Pressure Reducing Valve
- TMV – Thermostatic Mixing Valve
- VIP – Vacuum Insulation Panel

Please note that the term External Heat Source in this manual can refer to suitable Ground Source (GSHP) & Air Source (ASHP) Heat Pumps, as well as boilers. A suitable external heat source is one that can deliver flow temperatures of minimum 65°C, must achieve a minimum return temperature of 63°C at end of charging, and is able to operate using the temperature sensor provided with the Heat Battery. When using the optional SBC-B200 external controller, the heat source must be able to accept a volt-free hot water demand signal.

1.4 RESPONSIBILITIES

Manufacturer's Responsibilities

Our products are manufactured in compliance with the requirements of applicable EU & UK laws and regulations. More information can be found in the Declaration of Conformity supplied with the Heat Battery.

As an innovative company committed to achieving net zero, Sunamp continuously improves its products, which means that all specifications and other information stated in this manual are subject to change without prior notice.

Sunamp will not provide a manufacturer's product warranty in the following cases:

- Failure to abide by the instructions on using the Heat Battery.
- Faulty or insufficient maintenance of system components protecting the Heat Battery.
- Failure to abide by the instructions on installing the Heat Battery.

Installer's Responsibilities

The installer is responsible for the installation and the commissioning of the Heat Battery. The installer must:

- Ensure they are suitably qualified for the level of plumbing and electrical work required for the installation of this Heat Battery.
- Check the manufacturer's website for the most up to date information.
- Read, understand and follow the instructions given in the manuals provided with the Heat Battery.

- Comply with the prevailing legislation and standards when carrying out the installation.
- Perform the initial start-up and carry out any checks necessary.
- Complete the commissioning procedure and checklist in this manual.
- Explain the installation to the user.
- If maintenance on system components is necessary, warn the user of the requirement to check the system components to maintain the system in good working order.
- Give all the instruction manuals to the user.

User's Responsibilities

To achieve optimum operation and longevity of the Heat Battery, the user must adhere to the following instructions:

- Check the manufacturer's website for the most up to date information for your product.
- Read and follow the instructions provided in the manuals provided with the Heat Battery.
- Call on qualified professionals to carry out installation, initial start-up and commissioning.
- Ask your installer to explain your installation to you.
- Ensure that system components are maintained as necessary.
- Keep the instruction manuals in good condition and close to the Heat Battery.

CAUTION

Children shall not play with the Heat Battery.
Cleaning and user maintenance shall not be carried out by children.
Children must be supervised to ensure they do not play with the Heat Battery.

1.5 WARRANTY

For information on warranty terms and conditions, and product registration, please visit our website here: https://sunamp.com/warranty-registration/.

2. SAFETY

2.1 GENERAL SAFETY NOTICES

WARNING

Only competent persons suitably qualified to carry out plumbing and electrical work may undertake installations, repairs or relocations of the Heat Battery.
Product training on the full range of Thermino Heat Batteries is available from Sunamp or authorised training partners. For more information, please visit https://sunamp.com/en-gb/information-hub/training/.

WARNING

Minimum working pressure of the Heat Battery is 0.15 MPa/ 1.5 Bar (on the secondary circuit side, ports D to A). The maximum operating pressure of the Heat Battery in both circuits is 0.5 MPa/ 5 Bar.

Water temperatures over 50°C can cause severe burns instantly or death from scalds. An appropriate DHW TMV **must** be installed at the hot water outlet as per this manual.

CAUTION

A thermal regulating or cut-off device MUST be present on the External Heat Source to ensure that the flow temperatures to the Heat Battery DO NOT exceed 80°C.

CAUTION

The product MUST be grounded correctly in accordance with state and local regulations.
The Heat Battery circuits MUST NOT be connected to a direct refrigerant circuit.

CAUTION

When following the commissioning procedure (section 7), identify whether the cold commissioning (section 7.3) or standard commissioning (section 7.4) is the correct procedure to follow.

When following the cold commissioning procedure (section 7.3), **do not** fill, vent or purge the heat exchanger circuits until the cold commissioning procedure has been completed first.

WARNING (USER)

If this Heat Battery develops a fault, switch the Heat Source off at the nearest isolator and contact the installer. Shut off the water supply to the Heat Battery if necessary. There are no user serviceable, adjustable, or settable parts in this Heat Battery. Do not remove or adjust any component, cover, or part of this Heat Battery – please contact your qualified installer.
DO NOT bypass the thermal cut-out(s) in any circumstances.

3. PRODUCT SPECIFICATIONS

3.1 TECHNICAL SPECIFICATIONS

	Unit	Thermino 150 TS	Thermino 210 TS	Thermino 300 TS
Water content Primary Circuit	L	3.7	5.3	6.4
Fresh water content Secondary Circuit[1]	L	3.7	5.3	6.4
Equivalent Hot Water Cylinder Size[2] (when charged to boiler set points)	L	142	212	284
Equivalent Hot Water Cylinder Size[3] (when charged to heat pump set points)	L	128	192	256
Volume of hot water available at 40°C (V40)[4] (when charged to boiler set points)	L	185	300	370
Volume of hot water available at 40°C (V40)[5] (when charged to heat pump set points)	L	167	271	333
Heat loss[6]	kWh/24h (W)	0.65 (27)	0.74 (31)	0.81 (34)
Energy label class[7]	-	A+	A+	A+
Recommended maximum charging flow rate	L/Min	15	20	25
Recommended maximum HW flow rate[8]	L/Min	15	20	25
Minimum supply pressure at Heat Battery inlet	MPa (Bar)	0.15 (1.5)	0.15 (1.5)	0.15 (1.5)
Recommended operating pressure/PRV set point	MPa (Bar)	0.3 (3)	0.3 (3)	0.3 (3)
Maximum operating pressure/PRV set point	MPa (Bar)	0.5 (5)	0.5 (5)	0.5 (5)
Recommended ERV set point	MPa (Bar)	0.6 (6)	0.6 (6)	0.6 (6)
Maximum ERV set point	MPa (Bar)	0.8 (8)	0.8 (8)	0.8 (8)
Maximum design pressure	MPa (Bar)	1.0 (10)	1.0 (10)	1.0 (10)
Maximum Heat source (Charging) flow temperature $T_{CH\text{-}IN\text{-}MAX}$[9]	°C	80		
Minimum Heat source (Charging) flow temperature $T_{CH\text{-}IN\text{-}MIN}$	°C	65		
Minimum Heat source return temperature[10]	°C	63		
Phase Change Material Transition Temperature $T_{PCM\text{-}PT}$	°C	58		
Maximum Ambient Temperature	°C	40		
Pressure loss characteristics	-	See Figures 4a & 4b		
Recommended TMV setting	°C	45-55		
IP rating	-	IP31 (suitable for indoor use only!)		

Table 1 – Thermino TS Heat Battery technical specifications

Table 1 Notes:

1. Water content of the Heat Battery for sizing expansion vessels.
2. Calculated from the storage capacity of the Heat Battery when charged to boiler set points and assuming that the equivalent hot water cylinder thermostat is set at 60°C, mains cold water inlet temperature is at 10°C and the stored energy utilisation factor of the cylinder is 0.85.
3. Calculated from the storage capacity of the Heat Battery when charged to heat pump set points and assuming that the equivalent hot water cylinder thermostat is set at 60°C, mains cold water inlet temperature is at 10°C and the stored energy utilisation factor of the cylinder is 0.85.
4. The hot water volume available from the Heat Battery normalised to an average outlet temperature of 40°C when charged to boiler set points.
5. The hot water volume available from the Heat Battery normalised to an average outlet temperature of 40°C when charged to heat pump set points.
6. Tested in alignment with the requirements of standards EN 12897, EN 15332 and EN 60379.
7. ERP class When heated by an External Heat Source.
8. While the Heat Battery can deliver higher flow rates than those listed, doing so will result in reduced performance in terms of duration of discharge and energy provided.
9. DO NOT exceed this temperature value when charging the Heat Battery using an External Heat Source. A thermal regulating or cut-off device MUST be present on the external heat source to prevent this.
10. The External Heat Source MUST be able to reach this temperature on the Return back to the External Heat Source from the Heat Battery Outlet at the end of the charging cycle.

3.2 GENERAL OVERVIEW

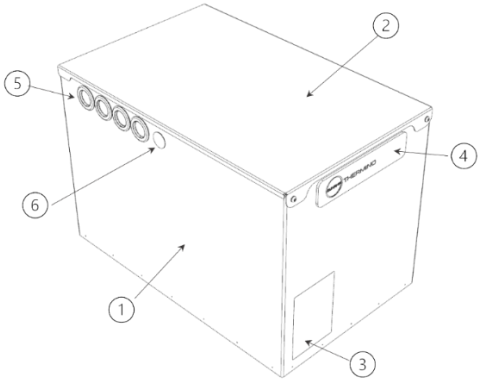


Figure 1: External Overview of Thermino TS Heat Battery

Item	Description
1	Heat Battery – Outer Case Main body
2	Heat Battery – Lid
3	Product Data badge / Serial number
4	Product Branding
5	Pipe entries via Rubber Grommets (3 sides)
6	Temperature Sensor cable entries / Blanks (3 sides)

Table 2: External Overview of Thermino TS Heat Battery

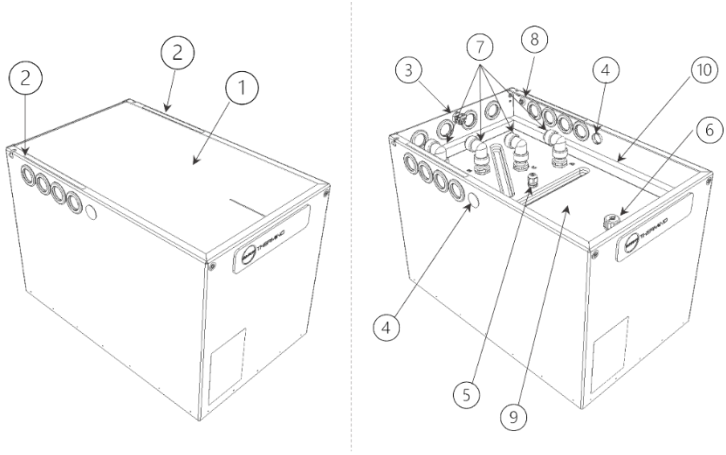


Figure 2 - Internal overview of the Thermino TS Heat Battery

Item	Description
1	3 layers of flexible insulation, 2 layers to be fit around pipe exits
2	Port identification label – A B C D
3	Temperature sensor cable strain relief- Interchangeable position with item 4
4	Blanking bush – Interchangeable position with item 3
5	Temperature sensor gland
6	PCM Cell one-way breather valve – **Do not tamper or defeat!**
7	4 X Port connections - A B C D - 360 degree rotatable 'push fit' elbows.
8	Ground connection point
9	The 'Cell' contains the PCM and Heat Exchanger.
10	Vacuum Insulation Panels (VIP)

Table 3 – Internal overview of the Thermino TS Heat Battery

*Do not insert temperature sensors other than those supplied with the Heat Battery.

3.3 DIMENSIONS

General Dimensions

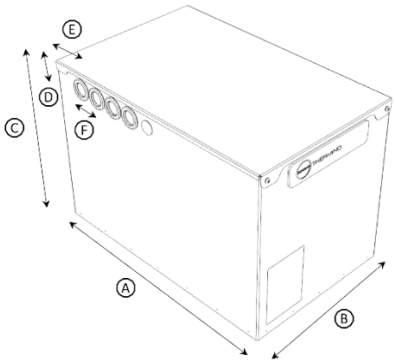


Figure 3 – Thermino Heat TS Battery dimensions

All data in (mm)		Thermino 150 TS	Thermino 210 TS	Thermino 300 TS
A – Length		575		
B – Width		365		
C – Height		590	816	1001
Centre of side pipe-entry from	D -Top	37		
	E - Rear	78		
	F - Centre of next pipe	50		
Centre of rear pipe-entry from (not shown)	D - Top	37		
	E - Sides	78		
	F - Centre of next pipe	50		

Table 4 - Thermino TS Heat Battery dimensions

3.4 WEIGHTS

NOTICE

Weight (empty) refers to an **empty Heat Battery** (i.e. no water in the heat exchanger); **Weight (filled)** refers to the heat battery when the heat exchanger is filled with water.

All data in (kg)	Thermino 150 TS	Thermino 210 TS	Thermino 300 TS
Weight (with packaging)	114	164	204
Weight (empty)	109	159	199
Weight (filled)	116	170	212

Table 5 – Thermino TS Heat Battery weights

3.5 PRESSURE LOSS

The two hydronic circuits within the ***Thermino 150, 210, 300 TS*** **products,** heat exchangers are split evenly and thus both the Primary and Secondary circuit pressure loss (head) values can be read in Figures 4a & 4b below respectively:

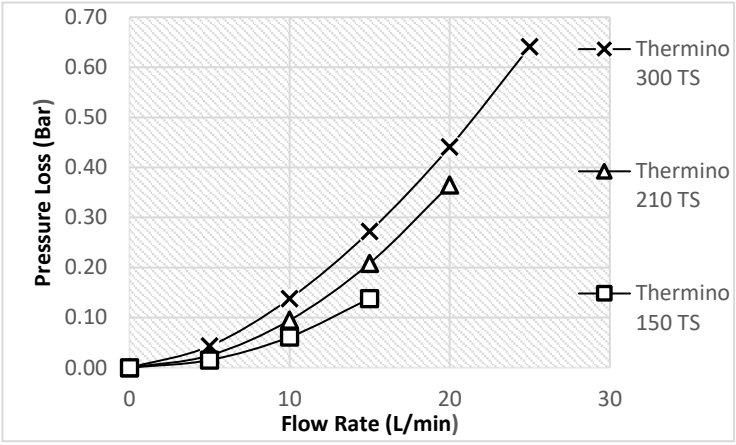


Figure 4a – Thermino TS Pressure Loss Characteristics – Primary Circuit

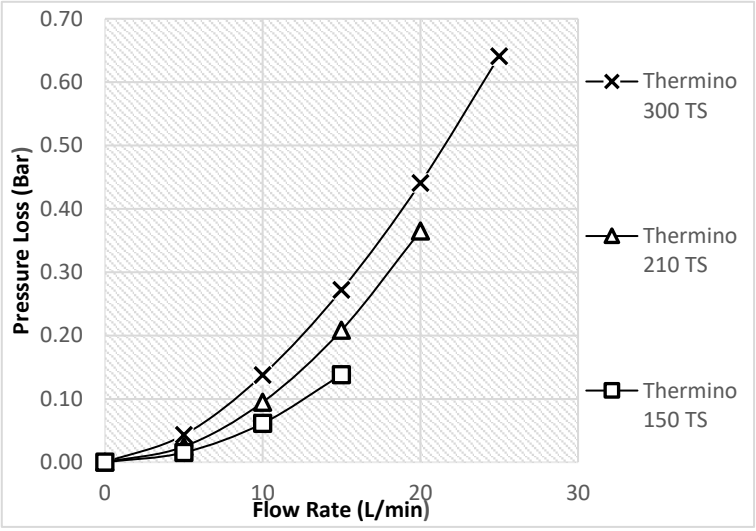


Figure 4b – Thermino TS Pressure Loss Characteristics – Secondary Circuit

3.6 HEAT SOURCE SIZING GUIDELINE

This section details the sizing guidance for the Thermino TS range of products with external Heat Sources. Its purpose is to assist and offer a guideline for choosing the correct size of Thermino TS Heat Battery to Heat Source Capacity and promote sizing.

The graph below details the relationship between Flow Rate (l/min) and Power (kW) at dT's of 5, 7, 10 and 15, which are the most common range of operation for external heat sources used in Domestic Hot Water (DHW) mode.

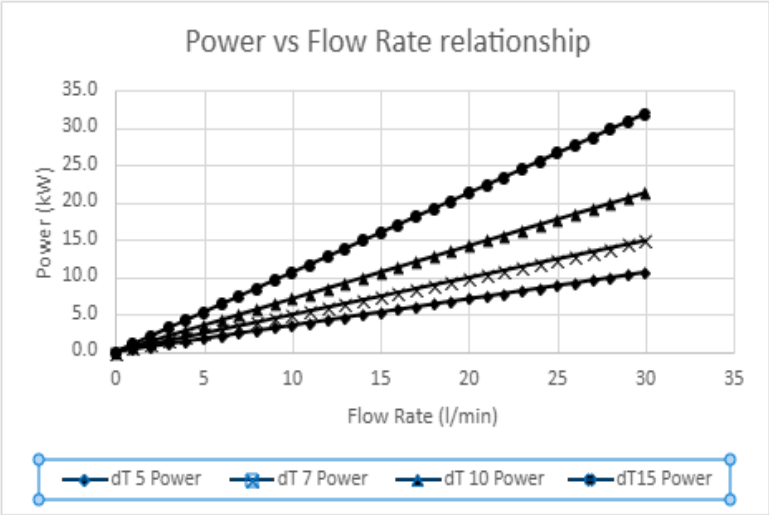


Figure 5 – Power vs Flow Rate relationship

The Thermino TS Heat Batteries work to a maximum recommended flow rate for charging via suitable external heat sources as detailed in the Technical Specification Table (Table 1). Therefore, the following compatibility table can be used as a sizing guide for External Heat Source capacity and Heat Battery size:

Heat Battery Size	Heat Source Capacity Range (kW)			
	(3 to 5)	(5.5 to 7.5)	(8 to 10.5)	(11 to 14)
Thermino 150 TS	o	o	o	Δ
Thermino 210 TS	!	o	o	Δ
Thermino 300 TS	!	!	o	o
! – Caution: Special consideration must be given to heat up and reheat times when combining low powered heat sources with high capacity heat batteries. o – fully compatible sizing. Δ – compatible with the use of an Autobypass valve to ensure the flow rate of the heat source is within the recommended flow rate for the Heat Battery sizing.				

Table 6: Heat Battery size and Heat Source capacity compatibility

NOTICE

If using a suitable Heat Pump as an external heat source, an autobypass valve is always recommended in installations with Thermino TS Heat Batteries as it also assists in the HP's defrost condition requirements.

4. PRODUCT OVERVIEW

4.1 GENERAL DESCRIPTION

Sunamp Thermino® TS Heat Batteries are modern-day, energy-saving thermal stores made with a high-performance Phase Change Material (PCM) to deliver fast-flowing hot water reliably, safely, and efficiently. Up to four times smaller than the equivalent hot water cylinder, the sleek, super-compact design means the Thermino looks great in any home and frees up valuable storage space. They are also easy to install and require no mandatory annual maintenance.

Thermino TS Heat Batteries are charged by suitable external heat sources such as Heat Pumps or Boilers only. A suitable external heat source is one that can deliver flow temperatures of minimum 65°C, must achieve a minimum return temperature of 63°C at end of charging, and is able to operate using the temperature sensor provided with the Heat Battery. When using the optional SBC-B200 external controller, the heat source must be able to accept a volt-free hot water demand signal.

Thermino TS Heat Batteries are used for the provision of on-demand domestic hot potable water.

4.2 HOW IT WORKS

The secret to the success of Sunamp Heat Batteries is our world leading, patented Plentigrade® technology. The Thermino range uses the high-performance, non-toxic and non-flammable Plentigrade P58 phase change material to deliver hot water on demand.

PCMs absorb, store and release large amounts of latent heat when changing state between solid and liquid. Our unique formula stores up to four times more energy than water over the same temperature

range, which means Thermino TS Heat Batteries are up to four times smaller than the hot water cylinders they replace.

The ‘Sustained with Plentigrade’ quality mark on our products is assurance of performance, efficiency, safety, and reliability.

4.3 INTENDED USE

Sunamp Thermino TS Heat Batteries are intended for use as hot water appliances for domestic and residential uses only.

The product is intended for installation in a frost-free and weather-protected environment, where it cannot be damaged by weather conditions.

Thermino TS products are designed to produce domestic hot water by using suitable external heat sources such as Heat Pumps or Boilers as the only source of heat.

NOTICE

A suitable external heat source is one that can deliver flow temperatures of minimum 65°C, must achieve a minimum return temperature of 63°C at end of charging, and is able to operate using the temperature sensor provided with the Heat Battery. When using the optional SBC-B200 external controller, the heat source must be able to accept a volt-free hot water demand signal.

4.4 STORAGE & HANDLING

WARNING

Take into account the weight of the Heat Battery (Table 4) and local Health & Safety Regulations and Practices when considering safe lifting methods for moving the Heat Battery.
Verify all floors during transportation, storing or installation of the Heat Battery are suitable for the product weight (Table 5).
The Heat Battery MUST not be stepped or sat on at any time during storage, handling, installation and use.

CAUTION

The Heat Battery must be stored in a dry, weather-protected and frost-free environment. The Heat Battery will incur damage if exposed to weather conditions including but not limited to rain, snow and extremes of temperature.

CAUTION

Handle products with care! Use appropriate automated lifting equipment (contact Sunamp Customer Service for further information).

- Do not tilt the product more than 45 degrees during the transportation or installation process
- Do not drop the product

5. PRE-INSTALLATION

CAUTION

Ensure that the following requirements have been considered and are met before choosing or installing a Sunamp Thermino Heat Battery.

5.1 WATER SUPPLY

- The Heat Batteries are not suitable for tank fed hot water systems. Tank fed hot water systems have to be converted to mains pressurised systems when installing a Sunamp Heat Battery.
- Ensure that the water supply requirements are within the Minimum and Maximum Pressure & Maximum Flow Rates detailed in (Table 1).
- Where mains water hardness can exceed **150 ppm Total Hardness**, you **MUST** install a scale reducing device in the cold-water supply to the Heat Batteries.
- Limescale can be controlled using chemical limescale inhibitors, polyphosphate dosing, electrolytic scale reducers or water softeners (please refer to the manufacturer's instructions for servicing any water conditioning system).
- All system components used in the Heat Battery installation **MUST** be suitable for potable water and approved by local water regulations.
- The external heat source circuit (closed circuit) **MUST** be fitted with an appropriately sized expansion vessel and expansion relief valve.

- Use of the Heat Battery in combination with any additives to the secondary (fresh water) circuit from port D to A (with the exception of suitable water softeners in areas where water hardness exceeds 150ppm – please refer to above points), including dye, coolant or soldering flux, will invalidate the Heat Battery warranty and are not considered standard intended use.
- The primary circuit (port B to C) **MUST** be adequately protected against corrosion, clogging and fouling from poor system water quality. Note, this may include the use of inhibitors or non-inhibitor water treatment solutions, and the installation of suitable filters as required by the external heat source.

5.2 LOCATING THE HEAT BATTERY

CAUTION

The Heat Battery MUST be installed indoors and in a frost-free environment. Installations in locations such as unheated attics, garages etc may result in damage to the appliance and will affect your warranty. To be covered by warranty, the following conditions **must** be met:

- All connected pipework must be adequately insulated to prevent them from freezing
- Any external facing walls of garages, attics or lofts must be adequately insulated
- attics and/or lofts must also be accessible via a main staircase suitable for motorised stairclimbing equipment

For more information, contact Sunamp Customer Service.

NOTICE

Installation of the product at a height may affect the terms of your warranty. For products installed at a height, the following conditions **MUST** be met to enable Sunamp to safely support product warranty claims where the product has not been installed at floor level:

- lifting of products **MUST** be conducted by suitable mechanical means/equipment, and the product **MUST not** be tilted during removal
- a ledge or reinforced ground support **MUST** be installed (if applicable) to support the size and weight of the heat battery (see Tables 3 and 4)
- the product clearance requirements **MUST** be accounted for (see Table 5)
- if the unit is installed at height of more than 800mm from floor level, it is the owner/user's responsibility to contact their installer and arrange for the appliance to be decommissioned and safely returned to floor level in the event of any warranty replacements, and then recommissioned thereafter
- Thermino 300 TS products **MUST** only be installed at floor level

Assess the location where the Heat Battery will be installed, for the spatial & clearance requirements of the Heat Battery (Figure 6, Table 7).

- Ensure that the location chosen has a hard, solid and level surface that can withstand the weight of the Heat Battery as detailed in (Table 5).

- Ensure that the Heat Battery can be transported to the desired installation location, considering the weight of the Heat Battery and safe lifting methods according to local Health & Safety Regulations and Practices.
- If using multiple Heat Batteries, do not stack the Heat Batteries directly on top of each other. Racking must be used to ensure access to the water connections and controller.
- The following clearances are required for serviceability and maintenance access (this is not an operational requirement):

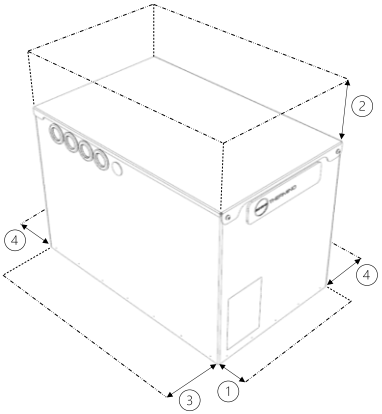


Figure 6 – Thermino TS Heat Battery Spatial Requirements

Item	Distance (mm)	Notes
1	150	To ensure visibility of the data badge and lid access
2	450	To remove lid and access internals
3	150	To allow for pipe and temperature sensor cable entry and minimum cable-bend radiuses (side dependent)
4	10	If no access required (side dependent)

Table 7 - Thermino TS Heat Battery Spatial Requirements

6. INSTALLATION

6.1 GENERAL

CAUTION

To avoid damage to the VIP insulation of the appliance do not:

- Carry out work that may leave sharp or abrasive residue in the Heat Battery, such as deburring of pipes, drilling of holes or stripping of wires above the open appliance.
- Deposit tools in the open appliance.
- Use sharp objects, such as cutters or similar, to cut grommets or insulation layers while they are located in the appliance.

NOTICE

Prior to installing the Heat Battery, please familiarise yourself with the product by looking at Figure 1 & Table 2 (general product overview) and ensure that all pre-installation requirements (Chapter 5) are met.

- Remove lid. The lid is secured by 2 x M5 button head cap screws at the front and two locating pins at the back (Figure 7):
    - (1) Remove 2 x M5 button head cap screws using 3mm hex head and set aside.
    - (2) Slide the lid forward, (3) then lift the lid up and set aside.

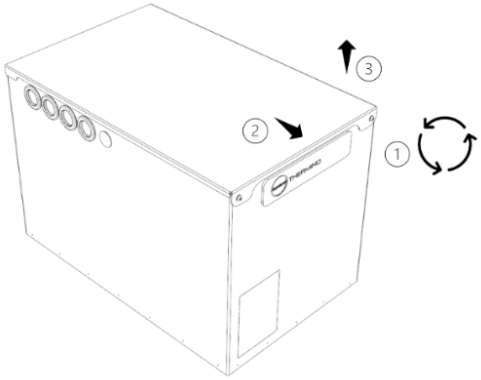


Figure 7 - Lid Removal of Thermino Heat Battery

6.2 WATER CONNECTIONS

WARNING

All connection pipe work inside the Heat Battery casing MUST be using **Ø 22mm copper pipe**. This is to allow the earth connection between the case, inlet, and outlet pipe fittings.

CAUTION

All Plumbing components used for the Heat Battery installation MUST be approved for use with potable water according to local water regulations.
Do not fit any check valves between Heat Battery, ERV & Expansion Vessel.
The Heat Battery lid MUST be kept closed whilst performing any hydraulic works to avoid water or particles coming into contact with internal components of the Heat Battery.
Do not carry out hot works on the appliance.

Please follow the instructions below in conjunction with Figure 10 for the Heat Battery hydraulic installation:

NOTICE
Sizing of the pipe work must consider mains water supply pressure, the design flow rates, size of the Heat Battery and pressure loss detailed in Figure 4a & Figure 4b.

- Remove the top two layers of insulation layer 1 is 10mm and layer 2 is 32mm thick, and set aside.
- Rotate the elbows to the side you wish to connect the hydraulics (left, right or back) (Figure 8).
- The cold water inlet must be connected to Port D & the hot water outlet to Port A. Meanwhile the External Heat Source Flow to Heat Battery must be connected to Port B & External Heat Source Return from the Heat Battery to Port C (Figure 8).
- Remove the respective rubber grommets (item 3 – Figure 9) in the outer housing and cut the centres (with a cross) with a knife.

Re-insert the cut grommets. Do not cut the grommets in place, as this may damage the VIP.

NOTICE

It is recommended that the pipes exiting the Heat Battery are installed in a manner that avoids thermo-syphons, as this may increase the heat losses of the installation.

- Cut and prepare the necessary lengths of OD 22mm copper pipes to suit the rest of the installation / system:
    - Always cut the pipe uniformly at a 90-degree angle, using a rotary pipe cutter whenever possible. Ensure the cutter wheel is appropriate for the copper pipe.
    - Deburr the pipe end, both internally and externally to create a 1mm chamfer on the outside of the pipe.
    - Check the pipe ends are free from damage and clean, wiping away any swarf to avoid damaging the 'O' ring inside the push-fit elbow upon pipe insertion.
    - The pipe end must also be free from stickers, tape and adhesive residues.
    - Mark the socket depth 27mm on the pipe with a marker.
    - Insert the pipe firmly with a slight twisting action until it reaches the pipe stop with a positive "click".
    - Ensure the depth insertion mark corresponds with the mouth of the fitting, then pull firmly on the pipe to ensure the fitting is secure.
- Fit the earth clamp to one of the copper pipes and the earthing stud on the product case.
- Connect to the rest of the fixed system hydraulics.

- If carrying out hot works (such as soldering, welding or brazing) these must be performed on pipes detached from the Heat Battery (minimum 1 metre away).
- Fill the system with water, purging any air out of the system. This may take several minutes and can be aided by repeatedly opening and closing the outlet. This must be applied to both circuits of the Heat Battery.

NOTICE

To be carried out only if cold commissioning procedure is not required prior to standard commissioning procedure! Please refer to section 7.3.

- Once finished purging and with the system pressurised, inspect the piping/tubing and joints for any leaks. Take remedial action if necessary.

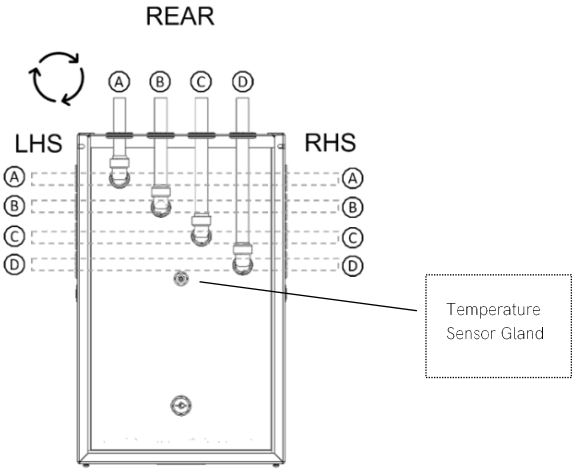


Figure 8 - Thermino TS Heat Battery Ports

Item	Description
A	Secondary Circuit – A – POTABLE HOT WATER
B	Primary Circuit – B – HEAT SOURCE FLOW
C	Primary Circuit – C – HEAT SOURCE RETURN
D	Secondary Circuit – D – POTABLE COLD WATER
	Tube and cable entries are used depending on the installation location

Table 8 – Thermino TS Heat Battery Ports

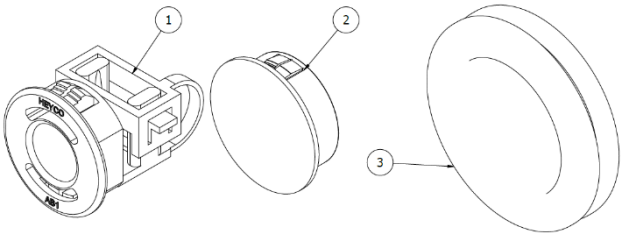


Figure 9 - Thermino TS Heat Battery Grommets & pipe interfaces

Item	Description
1	Temperature sensor cable entry strain relief gland
2	Temperature sensor cable entry blanking bush
3	Tube entry grommet

Table 9 – Thermino TS cable and pipe/tube interfaces

NOTICE

After completion of the leak checks or commissioning process, all connected pipes MUST be adequately insulated for **at least 1 metre** from their connection points with

the Heat Battery to avoid increased heat losses through the connected pipework.

6.3 TEMPERATURE SENSOR CONTROL CONNECTIONS

- Move the temperature sensor cable strain relief fittings to the side you wish to make the entries/exits. Cover all other holes in the enclosure with the supplied blanking bushes (See Figure 9).
- Feed the temperature sensor cable through the strain relief bushing in the Heat Battery housing.
- Line up the temperature sensor cable strain relief fitting ratchet feature and compress firmly so that the fitting grips the cable.
- Connect the Temperature sensors to the appropriate control terminals.

6.4 SYSTEM PLUMBING

Item	Description	Notes
1	Heat Battery Isolation Valve	This **MUST** be fitted (please see Table 11 for more information).
2	Mains Cold Water Pressure Reducing Valve	This **MUST** be fitted (please see Table 11 for more information).
3	Mains Check Valve	
4	Mains Expansion Relief Valve	This **MUST** be fitted. The maximum rating of the ERV **MUST** be no higher than 8 Bar (please see Table 11 for more information).
5	Expansion Vessel/Shock Arrestor (secondary circuit)	This **MUST** be fitted. The Charge Pressure of the EV/Shock Arrestor MUST be equal to the pressure setting of the PRV (item 2) (please see Table 11 for more information).
D	Cold Water Inlet - Port D	**MUST** be 22mm OD Copper pipe.
A	Hot Water Outlet - Port A	**MUST** be 22mm OD Copper pipe.
6	Anti-thermosiphon (U-bend) pipework	Recommended if the pipework from the appliance is plumbed horizontally or vertically upwards.
7	Hot Water Tempering Valve	This **MUST** be fitted & regulated to provide hot water output ranging between 45°C and 55°C.
8	Hot Water Flow Regulator Valve	Set the flow rate at the outlet of the Heat Battery to match the maximum recommended flow rate for the relevant Heat Battery size (see Table 1).
9	Hot Water Isolation Valve	
10	Heat Source (eg Air Source Heat Pump)	Boilers, Air Source & Ground Source Heat Pumps
B	External Heat Source Flow - Port B	**MUST** be 22mm OD Copper pipe.
C	External Heat Source Return - Port C	**MUST** be 22mm OD Copper pipe.
11	External Heat Source Central Heating/DHW Diverter Valve	Ensure that a Diverter Valve is used and not a Mid-Position Valve.
12	Auto-bypass Valve*	This **MUST** be fitted & regulated to meet flow rate requirements and Heat Pump's defrost minimum flow rate and volume requirements (please see Table 11 for more information). * Can be omitted if: (i) heat source does not exceed the maximum recommended flow rate of the heat battery in any operational mode, (ii) there is sufficient system volume to allow defrost operation of the heat source, (iii) heat source does not use the heat battery for defrost, and (iv) heat source is a GSHP or a Boiler.
13	Expansion Vessel (primary circuit)	The external heat source circuit (closed circuit) **MUST** be fitted with a suitably sized EV (if not already integrated with the heat source) such that there is an unobstructed pathway between heat battery ports B & C and the expansion vessel. Please refer to external heat source manufacturer's guidelines for suitably sized expansion vessels.

Item	Description	Notes
		*NOTE: if the heat battery is isolated from the expansion vessel, then an additional expansion relief valve **MUST** be fitted between the heat battery and its isolation point to avoid overpressure forming in a closed circuit! Please refer to the heat source manufacturer's instructions for suitably rated expansion relief valves.
-	Pipework Insulation	All exposed pipework **MUST** be adequately insulated for **at least 1 metre** from their connection points with the heat battery.

Table 10 – Figure 10 diagram descriptions

CAUTION

Ensure the Heat Battery has unobstructed pathways to the expansion vessels and expansion relief valves on both primary and secondary circuits.
Do not place any isolation valves between expansion relief points and the Heat Battery.
Do not shut off any isolation valves while the Heat Battery is in operation. Always switch off the appliance and external heat source before engaging any isolation valves.

CAUTION

If installing a Heat Battery at a height above the lowest tapping point in the household, you should consider installing an anti-vacuum valve.

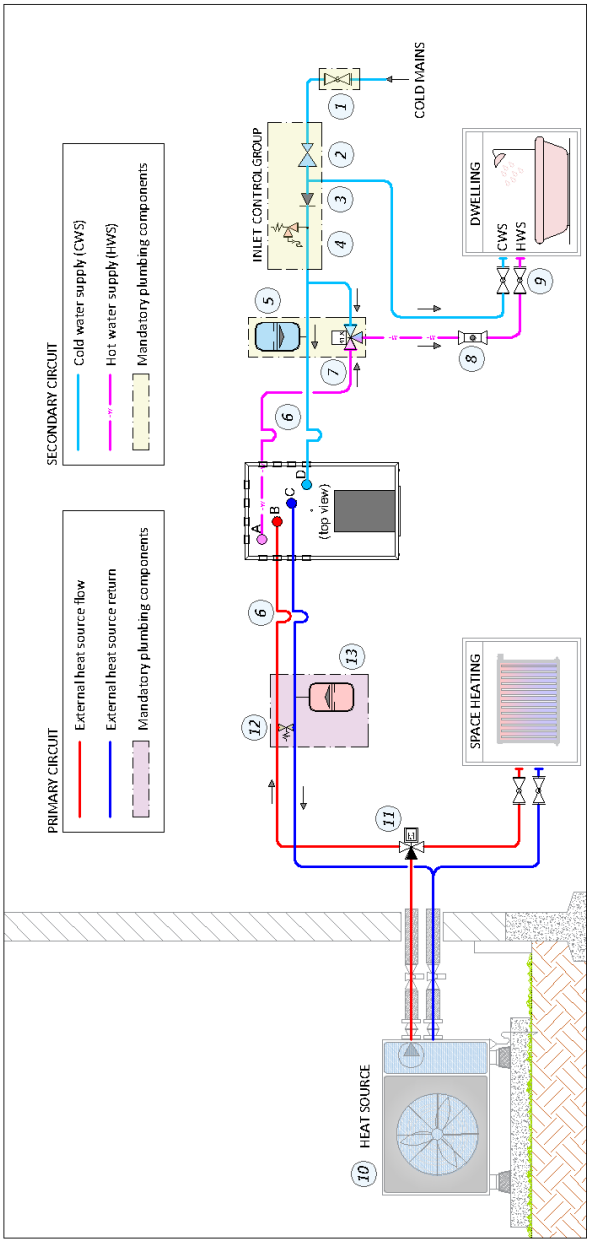


Figure 10 - Thermino TS plumbing diagram

6.5 MANDATORY PLUMBING COMPONENTS

CAUTION

The components within the dotted border in Figure 10 MUST be fitted with each Heat Battery installation (NOT fitting them may lead to Heat Battery damage and invalidation of the warranty).
The ERV can be located away from the Heat Battery, provided there are no check valves between the ERV and the Heat Battery. The ERV must be discharged in accordance with local codes and regulations.

The following plumbing components are mandatory and are required for the Heat Battery warranty to be valid (items 1, 2, 4, 5, 7, 12 & 13 MUST ALWAYS be fitted. The remaining items must be fitted in certain circumstances – please refer to the Notes. Please also refer to the manufacturer's instructions for the maintenance of these components):

Item	Description	Notes
1	Heat Battery Isolation Valve	**MUST** be fitted in order to enable safe & adequate Heat Battery maintenance (if required).
2	Mains Cold Water Pressure Reducing Valve	The maximum rating of the PRV **MUST** not exceed the maximum operating pressure of the Heat Battery (see Table 1).
4	Mains Expansion Relief Valve	The maximum rating of the Valve **MUST** be no higher than 8 Bar. The operation of the component must be checked and deemed satisfactory in accordance with the manufacturer's instructions, and preferably coincide with the expansion vessel maintenance intervals.
5	Expansion Vessel/Shock Arrestor (secondary circuit)	Charge Pressure of Expansion Vessel/Shock Arrestor **MUST** be equal to the pressure setting of the PRV (item 2). A minimum of 0.5L expansion vessel/shock arrestor is required (please follow the correct calculation methodology for sizing). The charge pressure must be checked & topped up in accordance with the

Item	Description	Notes
		manufacturer's instructions for maintenance or annually, whichever is sooner.
7	Hot Water Thermostatic Mixing Valve	**MUST** be fitted & regulated to provide hot water output ranging between 45°C and 55°C.
12	Auto-bypass Valve	**MUST** be regulated to meet Flow Rate requirements and Heat Pump's defrost minimum flow rate and volume requirements (if external heat source has an integrated auto-bypass valve, please do **not** install another!). * Can be omitted if: (i) heat source does not exceed the maximum recommended flow rate of the heat battery in any operational mode, (ii) there is sufficient system volume to allow defrost operation of the heat source, (iii) heat source does not use the heat battery for defrost, and (iv) heat source is a GSHP or a Boiler.
13	Expansion Vessel (primary circuit)	The external heat source circuit (closed circuit) **MUST** be fitted with a suitably sized expansion vessel (if not already integrated with the heat source) such that there is an unobstructed pathway between heat battery ports B & C and the expansion vessel. Please refer to external heat source manufacturer's guidelines for suitably sized expansion vessels. NOTE: if the heat battery is isolated from the expansion vessel, then an additional expansion relief valve **MUST** be fitted between the heat battery and its isolation point to avoid overpressure forming in a closed circuit! Please refer to the heat source manufacturer's instructions for suitably rated expansion relief valves.
-	Water Conditioner	**MUST** be installed in areas where water hardness can exceed 150ppm.

Table 11 - Mandatory plumbing components

NOTICE

A complete Heat Battery protection kit is available for purchase from Sunamp Ltd. This kit includes items 1, 2, 4, 5 and 7 from the mandatory components highlighted above. Please see Accessories (Section 12) for more information.

7. COMMISSIONING

7.1 GENERAL

CAUTION

Before commissioning the Heat Battery, first check that you have properly reviewed the previous sections, particularly regarding Heat Battery specifications as well as location, pre-installation and water supply requirements.

CAUTION

When following the standard commissioning procedure (section 7.4), the Heat Battery and its associated pipework MUST be filled and fully vented in both Primary and Secondary circuits before the Heat Source power supply is switched on.

When following the cold commissioning procedure (section 7.3), **do not** fill, vent or purge any heat exchanger circuits until the cold commissioning procedure has been completed first.

7.2 PRE-COMMISSIONING CHECKLIST

- Check all packaging material has been removed.
- Check all components are clean and undamaged.
- Identify the correct commissioning procedure to follow (section 7.3 or 7.4)

- Adjust PRV on Cold Mains Supply if the Pressure exceeds 5 Bar (0.5 MPa).
- If present, adjust the flow regulator valve to within the maximum recommended flow rate for the Heat Battery size installed.
- If required, adjust the Auto-bypass valve on the primary circuit to the recommended flow rate for the Heat Battery size installed.

7.3 COLD COMMISSIONING PROCESS

CAUTION

The Cold Commissioning Process must be followed if the Heat Battery was either stored or transported in ambient temperature conditions below 0°C for more than 24h prior to installation.

DO NOT fill, vent or purge any pipes before this commissioning process has been completed first!

NOTICE

Refer to document D0114 'Cold Commissioning Process for Thermino Products' (available on our website) for the steps that must be followed

NOTICE

When the correct cold commissioning procedure has been completed in full, proceed with the standard commissioning process as outlined in this Installation and User Instructions Manual (section 7.4)

7.4 COMMISSIONING PROCESS

1. Check that the temperature sensor of the Heat Battery has not become dislodged during transport and is fully inserted into its

pocket. The white marker should be sitting on top of the blue cable gland (see Figure 8).

2. Turn on the water supply and check that there are no leaks.
3. Fully open any hot water tap or shower that delivers the highest flowrate in the dwelling and allow it to run for a **minimum time of 4 minutes**. This is for any air to leave the system. This may vary depending on Heat Battery model size.
4. Switch on the External Heat Source to start charging the Heat Battery.
5. Allow the Heat Battery to charge for approximately **30 minutes** with the hot water tap closed.
6. After 30 minutes open the hot water tap/s and check for hot water.
7. Once charged, check the hot water temperature at all hot water outlets in the dwelling with the customer and advise on temperature settings. Adjust the DHW Thermostatic Mixing Valve so that the output temperature is between **45°C and 55 °C or as per local codes.**
8. Once the installation is finished, please carry out the following steps:

    - Explain to the customer / end user all safety precautions.
    - Leave all product information and literature with the customer / end user.
    - It's the responsibility of the end user to supply this manual to any other subsequent users.

Final Fit After Commissioning:

Commissioning instructions are provided in this Section 7 of the manual. Follow the instructions below after commissioning.

- Cut the 32mm thick insulation layer to suit the pipe and cable entries. This layer has several perforations for guidance. This

can be done with a sharp knife or scissors. Please DO NOT cut inside the Heat Battery and near the Vacuum Insulation panels located at the side of the Heat Battery.

- Re-place the newly cut 32mm thick insulation layer nesting the insulation around the pipe work and cables. Make sure the temperature sensor cable sits above this layer.
- Re-place the top layer 10mm layer of insulation.
- Re-place the lid, aligning the rear pins with the slots in the rear of the unit, slide back, fit the 2 x M5 button head cap screws using 3mm hex head.

8. OPERATION

CAUTION

Always read the safety instructions in Section 2 of the manual before operating the Thermino TS Heat Batteries. There are no operating instructions for this product, as it forms a passive component within the system (please see sections 8.1 and 8.2 for control logic).

8.1 TEMPERATURE SENSORS & CONTROL

The ***Thermino** TS* range of Heat Batteries is supplied with a factory-fitted temperature sensor cable comprising of three integrated temperature sensors, (S1, S2 & S3).

The sensors measure the internal temperature of the PCM in the centre of the Heat Battery at three heights.

These can be used with a suitable external controller, or the SBC-B200 controller available for purchase from Sunamp Ltd, to manage the charging and discharging of the Heat Battery. A suitable external heat source is one that can deliver flow temperatures of minimum 65°C, must achieve a minimum return temperature of 63°C at end of charging, and is able to operate using the temperature sensor provided with the Heat Battery. When using the optional SBC-B200 external controller, the heat source must be able to accept a volt-free hot water demand signal. For wiring purposes, the sensor cable colour coding is shown in Figure 11 and the specification of the sensors is given in the section below:

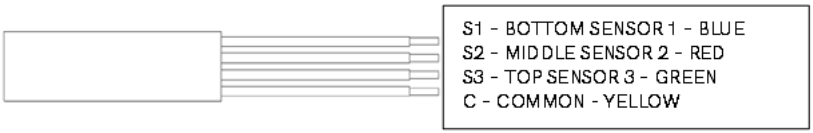


Figure 11 - Temperature sensor colour coding

8.2 GENERAL CONTROL LOGIC

The technical, performance and operating parameters are listed in Table 1. The function and control strategy of the Heat Battery will depend upon the application and the external heat source used. However, a simple generic control logic based on the functional schematic shown in Figure 12 is described below for guidance.

NOTICE

The guidance below only applies if the Heat Battery ports have been configured as detailed in this manual.

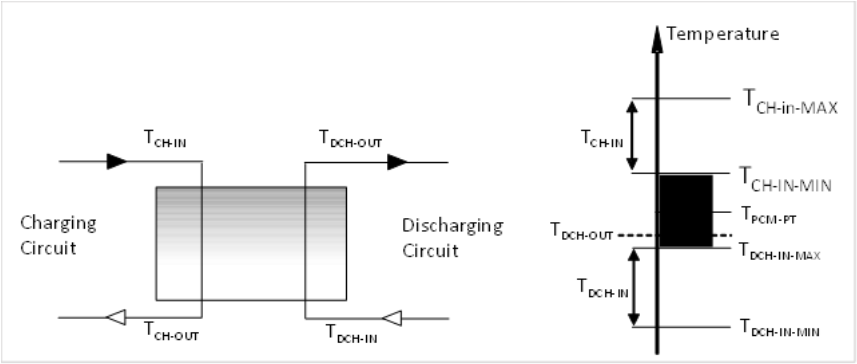


Figure 12: Heat Battery Control logic and hydronic setup

- Charging Circuit (Primary): Top to Bottom - Port B to Port C

- Discharging Circuit (Secondary): Bottom to Top - Port D to Port A

- For efficient charging of the heat batteries, the charging circuit flow temperature,
  $T_{CH\text{-}IN}$ must be:
  - $\geq T_{CH\text{-}IN\text{-}MIN}$ (65°C)
  - $\leq T_{CH\text{-}IN\text{-}MAX}$ (80°C)

- To ensure that the heat battery is fully charged at the end of a charge cycle, the return temperature, $T_{CH\text{-}OUT}$, must be:
  - $\geq T_{PCM\text{-}PT}$ + 5°C (63°C)
  - $\leq T_{CH\text{-}IN\text{-}MAX}$ (80°C)

- The Heat Battery charging can be activated when:
  - $T_{S2} < T_{PCM\text{-}PT}$ (58°C)

- The Heat Battery charging can be deactivated when:
  - $T_{S3} > T_{CH\text{-}IN\text{-}MIN}$ (65°C)
  - $T_{S2} > T_{CH\text{-}IN\text{-}MIN}$ (65°C)
  - $T_{S1} > T_{PCM\text{-}PT}$ + 5°C (63°C)

CAUTION

These Heat Batteries are not factory-fitted with high temperature cut-off devices and therefore, if a heat source can deliver hot water greater than 80°C, then a suitable energy cut-off device set at 80°C maximum must be fitted in the charging circuit to prevent charging above its maximum permitted temperature to protect the Heat Battery.

9. MAINTENANCE

CAUTION

Where undertaking maintenance, repairs or removals, ensure that the system is first disconnected from the electrical and/or water supply.

- In areas where the mains water hardness can exceed 150 ppm Total Hardness and a scale-reducing device has been fitted, the service and maintenance requirements of this device (especially re-fill requirements) need to be adhered to.
- The air pressure in the expansion vessel MUST be checked and topped up in line with the expansion vessel manufacturer's instructions for maintenance or annually, whichever is sooner.
- The peripherals and accessories that are part of the Heat Battery install MUST be maintained according to their manufacturer's instructions.
- Except as identified above, the Heat Battery does NOT require any regular maintenance.
- No access to the PCM container is required in the field under any circumstances. Breaching the PCM containment will void the warranty of the product.
- The product does not require any regular cleaning.Should the product exterior become dirty, it can be wiped down with a damp cloth and a mild detergent after having been isolated from the electricity supply. Let the product dry before reconnecting.

10. TROUBLESHOOTING

Fault	Possible Cause(s)	Possible Solution
The Heat Battery does not deliver hot water after installation	Issue with External Heat Source	Refer to External Heat Source manual.
	External heat source flow temperature is too low	Ensure that the flow temperature from the external heat source is sufficient.
	Heat Battery is not charged sufficiently	Ensure that the flow temperature from the external heat source is sufficient. Check that the Heat Battery temperature sensor is connected correctly and reads suitably.
	TMV setting too low	Increase the TMV setting to match a temperature output between 45°C and 55°C or as per local codes.
	Air might be trapped in the system	Check that the mains supply valve is fully opened. Make sure the appliance/system is fully de-aired and purge if necessary. Check for faults on the external heat source and follow the air purging instructions.
	Installed non-self-resetting thermal cut-out has tripped	Check the status of the energy cut-off device and the flow setting of the external heat source temperature. Reinstate the energy cut-off device once the external heat source is within normal working parameters.
Water leak	Heat Battery elbow joints may be damaged or not fully engaged	The copper pipes have not been cut and finished properly. This may have damaged the internal O-ring. Remove, check and replace if necessary. The copper tubes have not been fully inserted into the elbow. Mark pipes with depth and re-insert.

Fault	Possible Cause(s)	Possible Solution
The flowrate from the Heat Battery is lower than expected	Air might still be trapped in the system	Check that the mains supply valve is fully opened. Make sure the Heat Battery is fully de-aired and purge if necessary.
	Incoming water pressure is too low	Measure the incoming pressure from the mains supply and **contact Sunamp Ltd.**

Table 12 – Troubleshooting of Thermino Heat Battery

11. DECOMMISSIONING & DISPOSAL

11.1 DECOMMISSIONING

To successfully decommission the Heat Battery, please carry out the following steps:

1) Switch off all Electrical Power Supplies to the Heat Battery.
2) If Heat Battery is charged and no leaks are present, cool down the Heat Battery by flowing cold water through, until the temperature at the Outlet side is equal to the temperature at the Inlet.
3) Isolate the Cold Mains Supply to the Heat Battery.
4) Open the hot water taps to drain the secondary circuit system and release the pressure in the pipe work.
5) Drain the primary circuit that is connected to the External Heat Source.
6) Remove all pipework from the Heat Battery connections, using appropriate tools and methods. Cap pipework if it cannot be removed from the Heat Battery connections.
7) Ensure that the Heat Battery is left to cool for at least 60 minutes after completion of step 2 before moving it.

11.2 DISPOSAL

This symbol on the Heat Battery and accompanying documents means the Heat Battery should not be mixed with general household waste at the end of its life.

For proper treatment, recovery and recycling, please take the Heat Battery to designated recycling points where it will be accepted free of charge at the end of its life.

Disposing of this Heat Battery correctly will help save valuable resources and prevent any potential negative effects on human health and the environment, which could otherwise arise from inappropriate waste handling.

Please contact your local authority for further details of your nearest designated collection point. Penalties may be applicable for incorrect disposal of this waste, in accordance with your national legislation.

12. ACCESSORIES

Part Number	Description
C5388	Thermostatic Mixing Valve
C5436	Expansion Vessel 1.0L
A2057	Heat Battery Protection Kit*
C5381	Water conditioner
C5377	22mm Tectite Pro Elbow TX12 65524 (see note)
C5435	22mm x (3/4") Tectite Pro Elbow TX12-22mmx3/4"
A2059	SBC-B200 External Controller

Note: 4 x C5377 are supplied with all Thermino TS products.

* Includes 1x inlet control group (pressure reducing valve, non-return valve and expansion relief valve), 1x thermostatic mixing valve (C5388), 1x 2.0L expansion vessel and 1x isolation valve.

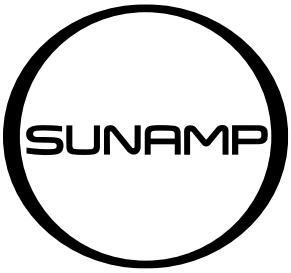
Please visit our website for all the latest accessories.

Table 13 – Thermino TS Heat Battery Accessories

BLANK PAGE

BLANK PAGE

BLANK PAGE



Manual Part Number: D0102

Version Number: 1.1

Publication Date: 13.10.2025

Sunamp Ltd
1 Satellite Park
Macmerry
East Lothian
EH33 1RY
Scotland

Customer Service (Phone): +44 (0)1875 610 001

Customer Service (Email): customerservice@sunamp.com

www.sunamp.com