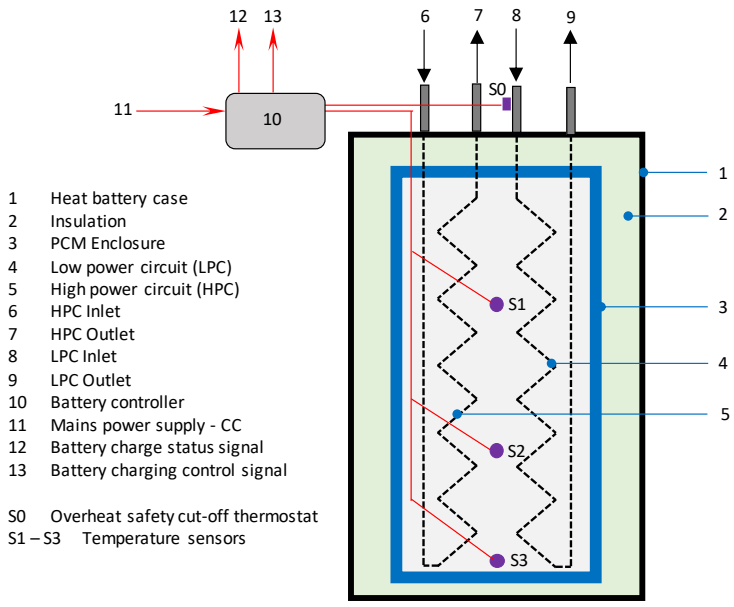
Sunamp UniQ Dual Port Heat Batteries
Technology Introduction

Sunamp UniQ™ dual port heat batteries use phase change materials (PCM) to store heat (rather than water as in hot water thermal stores). Therefore, the sanitary water content of the Sunamp heat stores is very low (typically less than 15 Litres) minimising legionella concern and not subject to G3 regulations.



1 Heat battery case
2 Insulation
3 PCM Enclosure
4 Low power circuit (LPC)
5 High power circuit (HPC)
6 HPC Inlet
7 HPC Outlet
8 LPC Inlet
9 LPC Outlet
10 Battery controller
11 Mains power supply - CC
12 Battery charge status signal
13 Battery charging control signal

S0 Overheat safety cut-off thermostat
S1 – S3 Temperature sensors

Figure 1.1: Sunamp dual port heat battery

All Sunamp UniQ dual port heat batteries have two independent water circuits for transferring heat to and from the PCM heat storage material as shown *schematically* in Figure 1.1. Depending upon the application, the heat battery can be charged via a low power circuit (LPC) and discharged via a high-power circuit (HPC) or vice versa.

The power ratings of the low-power circuit (LPC) and the high-power circuit (HPC) are different. For example, the heat battery can be charged by a boiler via LPC and instantaneously-heated domestic hot water can be supplied using the HPC (or vice-versa).

In the **UniQ HW** configuration, the construction and the materials of the heat exchangers are identical, with only copper pipes and brass fittings in contact with sanitary water, so both circuits are suitable for domestic hot water heating and either one may be used with sanitary hot water.

In the **UniQ Dual** configuration, the primary system water charging circuit can also be used for supplying space heating from the heat battery. Therefore, UniQ Dual heat batteries can be used for storing heat for *both* space and hot water heating. A suitable hydraulic circuit must be constructed per UniQ Dual installation manual. (Forthcoming availability: Fully-integrated **Sunamp HydrobloQ**™ incorporating system pump and other hydraulic functions.)

Note: Some Sunamp UniQ products use other circuit arrangements, such as higher pressure refrigerant-capable copper circuit in **UniQ rHW** (OEM-only) or single high power circuit in **UniQ Heat** (secondary unused LPC is removed to reduce price).

All heat batteries are fitted with a bespoke **UniQ Qontroller**™ which manages the operation of the heat battery and interfaces it with any third party heating system master controller via volt-free contacts (and forthcoming: OpenTherm).

Also forthcoming availability: **SunampOS**™ **Qontroller,** a system controller with advanced Demand-Side Management, app-based system configuration, remote diagnostics, state of charge indication and other monitoring functions.

Typical applications of Sunamp UniQ heat batteries are:

a) Use with renewable heat sources e.g. heat pumps, solar PV and solar thermal based heating systems. The stored heat in the batteries can be used for space and hot water heating. Therefore, the heat can be stored when it is available from the renewable heat source or when it is cheaper to run the heat source (for example, using low-tariff off-peak electricity or PV generation). The heat stored in the UniQ heat battery can then be used for space and/or hot water heating (depending on UniQ model) when required.

b) Use in conventional heating systems as replacement for vented and unvented hot water cylinders and calorifiers in residential or commercial buildings (saving space and with lower heat losses, hence higher energy efficiency).

c) Use in conventional heating systems as replacement for vented and unvented primary thermal stores for generating domestic hot water and/or for buffering heat to reduce cycling frequency of the heat source (reduced maintenance costs) *and* for rapid warming of the heat emitters when the heating is switched on from cold (more comfort and higher energy efficiency).

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Table 1.1: Technical specification of all models of *UniQ HW* product range			
Parameters			UniQ HW 3, UniQ HW 6 UniQ HW 9, UniQ HW 12
Maximum operating pressure	Hot water circuit	[bar/MPa]	10 / 1.0
	Primary e.g. boiler circuit	[bar/MPa]	10 / 1.0
Heat source flow temperature [1]	Minimum	[°C]	65
	Maximum	[°C]	85
Hot water outlet temperature at design flow rate [2]		[°C]	50 - 55
Power supply via local 2-pole isolator	Standard models	[-]	230V, AC, 50Hz, 6A
	Models fitted with standby electric heaters	[-]	230V, AC, 50Hz, 16A
Standard equipment supplied with UniQ HW heat stores a) Sunamp controller b) Installation and commissioning manual c) Basic installation kit (Wiring harness & heat store pipework)			
Optional equipment a) Standby electric heater b) Heating system hydronic block assembly c) Hot water thermostatic blending valve			
Notes *1) To fully charge the battery, the source flow temperature should be set so that it does not start to cycle on its internal thermostat until the heat source return temperature is at least 60°C.* *2) At reference test conditions: a) Battery is fully charged, b) Inlet water temperature is 10°C.*			

Table 1.2: Technical specification of UniQ HW Heat Stores					
		UniQ HW 3	UniQ HW 6	UniQ HW 9	UniQ HW 12
Nominal storage capacity [1]	[kWh]	2.6 – 3.6	6.4 – 7.2	10.6 – 11.3	12.7 – 13.3
Width – All models	[mm]	370	370	370	370
Depth – All models	[mm]	575	575	575	575
Height – Standard models	[mm]	410	605	815	1,025
Height – Models with standby electric heater	[mm]	455	650	860	1,070
Water content					
Primary - Boiler: Low power circuit (LPC)	[L]	1.30	2.36	3.46	4.56
Hot water: High power circuit (HPC)	[L]	2.24	4.48	6.76	9.04
Weight	[kg]	55	105	155	205
V_{40}, Volume of hot water available at 40°C [2]	[L]	77	183	295	370
Equivalent hot water cylinder size [3]	[L]	62	131	198	261
• Heat loss rate	[kWh/24h]	0.520	0.752	0.855	0.938
• Heat loss rate	[W]	17.7	31.3	35.6	39.1
• ErP Rating class	[-]	A	A	A	A
Typical HW flow rates	[L/min]	3 – 6	3 – 15	3 – 18	3 – 24
Pressure loss characteristics					
Primary - Boiler: Low power circuit (LPC)	[Kv-Value] [4]	1.623	1.255	1.066	0.963
Hot water: High power circuit (HPC)	[Kv-Value] [4]	2.871	2.356	1.951	1.451
[1] Depends upon operating conditions					
[2] Calculated from hot water draw-off volume up to 40°C outlet temperature.					
[3] Based on cylinder thermostat set at 60°C, mains cold water inlet temperature at 10°C and the energy utilisation factor of 0.85.					
[4] Kv-Value = Flow rate in m^3/h at 1.0bar pressure difference.					

Table 1.3: UniQ HW model selection for replacing indirect HW cylinders		
Indirect cylinder		Sunamp UniQ HW models
Capacity Size [L]	Energy storage capacity [kWh]	
60	2.96	UniQ HW 3
90	4.44	UniQ HW 6
120	5.92	UniQ HW 6
150	7.40	UniQ HW 9
180	8.88	UniQ HW 9
210	10.36	UniQ HW 9
250	12.34	UniQ HW 12
300	14.80	UniQ HW 3 + UniQ HW 12 UniQ HW 6 + UniQ HW 9

Table 1.4: Sunamp UniQ HW models for solar thermal systems [*Heated by solar thermal only*]		
Net collector area [m^2]	Dedicated storage capacity required [1] [kWh]	Sunamp UniQ HW model
1	1.6	UniQ HW 3
2	3.2	UniQ HW 3
3	4.8	UniQ HW 6
4	6.4	UniQ HW 6
5	8.0	UniQ HW 9
6	9.6	UniQ HW 9
7	11.2	UniQ HW 12, 2 x UniQ HW 6
8	12.8	UniQ HW 12, 2 x UniQ HW 6

Table 1.5: Minimum storage capacities recommended by NHBC for gas heating systems						
	1 Shower only	1 Bath only	1 Bath & up to 2 showers	2 Baths	2 Baths and 1 shower	2 Baths and 2 showers
Cylinder size / Storage capacity, [L]	60	120	145	180	205	230
Energy storage capacity [1], [kWh]	2.96	5.92	7.12	8.88	10.16	11.46
Sunamp heat battery models	UniQ HW 3	UniQ HW 6	UniQ HW 9	UniQ HW 9	UniQ HW 12	UniQ HW 12
[1] Based on cylinder thermostat set at 60°C, mains cold water inlet temperature at 10°C and the energy utilisation factor of 0.85.						

Sunamp
Heat Batteries™

*correct at time of going to print subject to minimal changes.

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