



## AED Locator Cabinet Heating

22<sup>nd</sup> November 2013

### AED HeartSafe® Combination Lock Cabinets and AED Locator HeartSafe®

The HeartSafe® Cabinets are designed for mounting in sheltered external locations. They contain small heaters to prevent the temperature inside dropping below freezing.

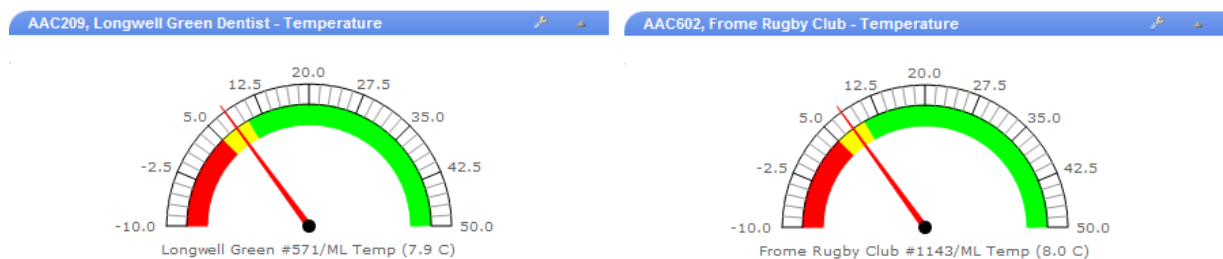
Defibrillator manufacturers recommend storage temperature ranges for their products. The AED Locator HeartSafe® cabinets are designed to house the defibrillator in an environment to meet the specification. In the case of the HeartSine® PAD 500P defibrillator, the manufacturer recommends that the unit is stored between 0°C and +50°C (+32° to 122°F).

As such, each HeartSafe® cabinet includes a small 100W thermostatically controlled enclosure heater. (See attached technical documentation attached.) The function of the heater is to warm the air inside the cabinet with gentle convection to prevent the build-up of condensation inside the cabinet, and also to prevent icing in cold conditions.

Each heater is fitted with a fixed thermostat, which switches on the heater when the temperature inside the cabinet reaches +5°C (+41°F), and off again when the thermostat measures the air temperature inside the cabinet to be +15°C (+59°F). Each of these thresholds is subject to a tolerance of ±3°C.

It is important to understand that the Heater does not directly heat the Defibrillator but maintains the temperature of the air inside the enclosure within set limits. This is designed to prevent the actual temperature of the defibrillator dropping below the lower heater thermostat limit of +5°C (+41°F) with a tolerance of ±3°C so a theoretical bottom limit temperature of +2°C (+36°F) even if the external conditions are below freezing.

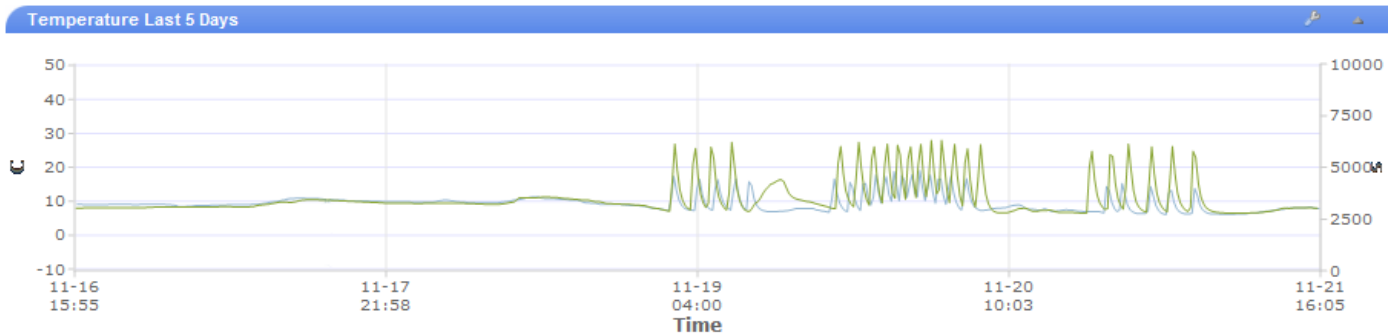
The HeartSafe® AED cabinet includes a sensor inside the enclosure, which accurately records and logs the temperature every 15 minutes.



Example showing 2 live HeartSafe® cabinet temperature gauges

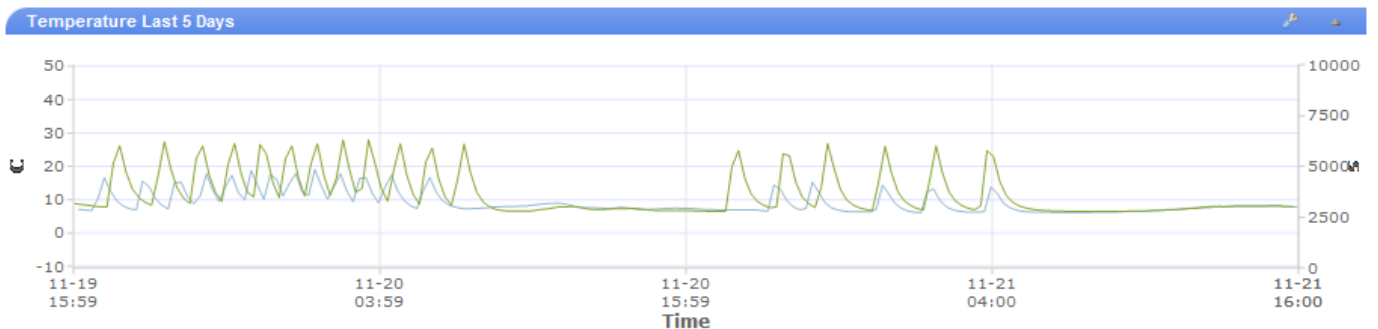
As data is collected every 15 minutes, it can be viewed to see how the temperature inside the cabinet changes over time, and also how the heater is working during cold conditions.

Below example shows the temperature profile for the same two HeartSafe® cabinets over five days in November 2013 where the outside temperature has dropped towards 0°C (+32°F).



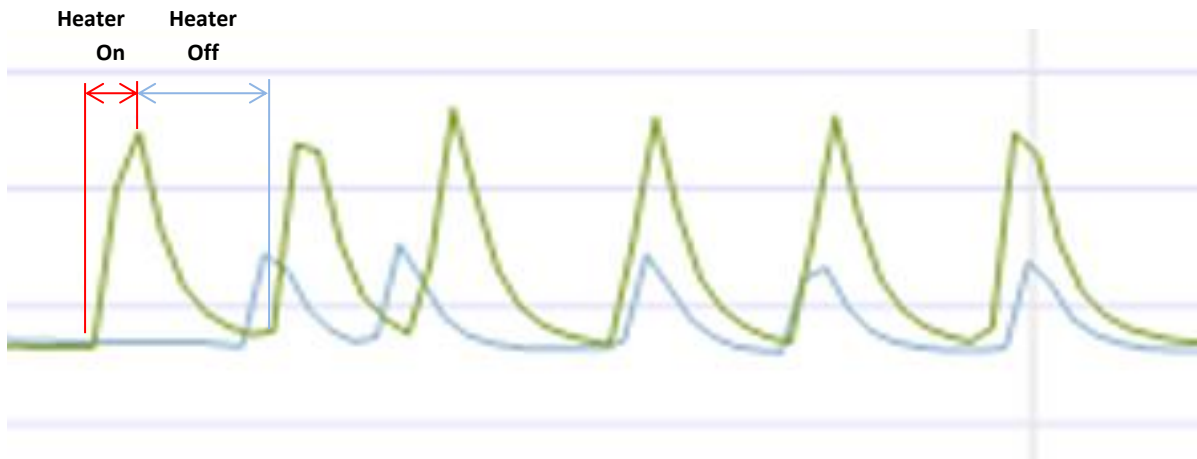
As you can see, the temperature hovered around +10°C (+50°F) degrees for the first 2 days, but during the early hours of 19<sup>th</sup> Nov, the heater inside both of the cabinets switched on causing the air temperature inside the cabinets to rise showing the characteristic on/off heating/cooling peaks.

Below, you can see in better detail when looking at the same data over the last 48 hours:



The pattern of peaks shows the heater coming on when the lower temperature threshold for the thermostat is reached, then switching off when the thermostat senses the air temperature in the cabinet reaches the upper limit.

The tighter pattern of peaks on the night of 19/20<sup>th</sup> Nov compared to the night of 20/21<sup>st</sup> Nov shows that it was colder on the night of 19/20<sup>th</sup>. This means the heater needed to turn on more frequently to maintain the temperature inside the cabinet.



Interestingly, you can clearly see the difference in the two heater control thermostats, with one switching off when the temperature inside reaches +15°C (+59°F), and the other around +25°C (+77°F). The upper temperature threshold is not so critical as the lower, and you can clearly see that neither of the cabinets dropped below +7°C (+45°F). This ensures that the defibrillator is being stored according to the manufacturers recommended environmental conditions.

## The Cabinet Heater



This 100W Heater is utilised in all external AED Locator HeartSafe® cabinets, the sensor logging of the cabinet gives visibility of exactly how the heater is working.

The temperature inside the cabinet needs to drop significantly below +10° (+50°F) for the heater to switch on. As you can see from the above examples, the heater itself is turning on for a relatively short period of time, typically 15 to 20 minutes. This is enough time to heat the (approximately) 25 litres of air inside the lightly insulated cabinet sufficiently before the heater turns off again.

The heater itself is designed to heat air passing through it and therefore the cabinet by convection. As it is a 'touch-safe' design, so with the exception of the heater grill itself, the outer surface of the heater does not rise above +80°C (+176°F)

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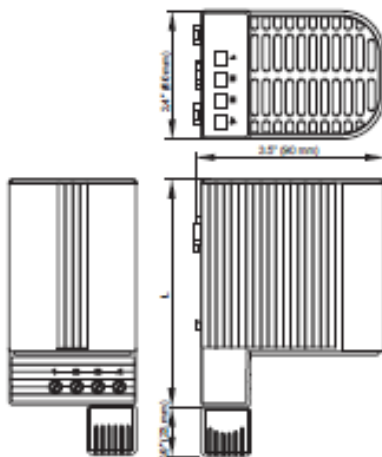
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- Low surface temperature**
- Integrated thermostat**
- Compact size**
- Wide voltage range**
- Double insulated protection**
- DIN rail mountable**

The CSF 060 is a touch-safe heater for use in enclosures. The design of the heater utilizes natural convection which results in a circulating current of warm air. The surface temperatures on the accessible side surfaces of the housing are minimized as a result of the heater design. This model with plug-in thermostat does not require additional wiring. The CSF 060 is also available in a version without thermostat (CS 060).



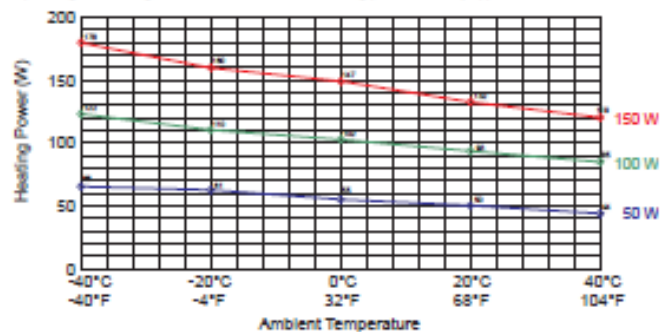
Wiring example



### Technical Data

Operating voltage	120-240VAC* (min. 110V, max. 265V)
Heating capacity	see table
Heating element	PTC resistor - temperature limiting
Surface temperature	< 176°F (80°C), exempt upper protective grill
Connection	4-pole terminal AWG 14 max (2.5mm <sup>2</sup> ), torque 0.8Nm max.
Housing	plastic, UL 94V0, black
Mounting	clip for 35mm DIN rail, EN 60 715
Mounting position	vertical
Operating / Storage temperature	-4 to +158°F (-20 to +70°C) / -48 to +158°F (-45 to +70°C)
Protection class	II (double insulated)
Protection type	IP 20
Approvals	UL File No. E150057, VDE

\*Operating with voltages below 140VAC reduces heating performance by approx. 10%.



Part No.	Heating capacity <sup>1)</sup>	Max. current (lin/sh)	Air outlet temperature <sup>2)</sup>	Switch-off temperature <sup>3)</sup>	Switch-on temperature <sup>3)</sup>	Dimensions	Weight (approx.)
0600 1.0-00	50W	2.5A	187°F (86°C)	59°F (15°C)	41°F (5°C)	5.2 x 2.4 x 3.5" (133 x 60 x 90 mm)	10.6 oz. (300g)
0600 2.0-00	50W	2.5A	187°F (86°C)	77°F (25°C)	59°F (15°C)	5.2 x 2.4 x 3.5" (133 x 60 x 90 mm)	10.6 oz. (300g)
0601 1.0-00	100W	4.5A	248°F (120°C)	59°F (15°C)	41°F (5°C)	5.2 x 2.4 x 3.5" (133 x 60 x 90 mm)	10.9 oz. (310g)
0601 2.0-00	100W	4.5A	248°F (120°C)	77°F (25°C)	59°F (15°C)	5.2 x 2.4 x 3.5" (133 x 60 x 90 mm)	10.9 oz. (310g)
0602 1.0-00	150W	8.0A	293°F (145°C)	59°F (15°C)	41°F (5°C)	6.8 x 2.4 x 3.5" (173 x 60 x 90 mm)	15.5 oz. (440g)
0602 2.0-00	150W	8.0A	293°F (145°C)	77°F (25°C)	59°F (15°C)	6.8 x 2.4 x 3.5" (173 x 60 x 90 mm)	15.5 oz. (440g)

<sup>1)</sup> see Heating capacity / Ambient temperature diagram

<sup>2)</sup> measured 2" (50mm) above protective grill

<sup>3)</sup> tolerance of ± 5K

Specifications are subject to change without notice. Suitability of this product for its intended use and any associated risks must be determined by the end customer/buyer in its final application.