

WC-series: Thermoelectric Fluid Coolers

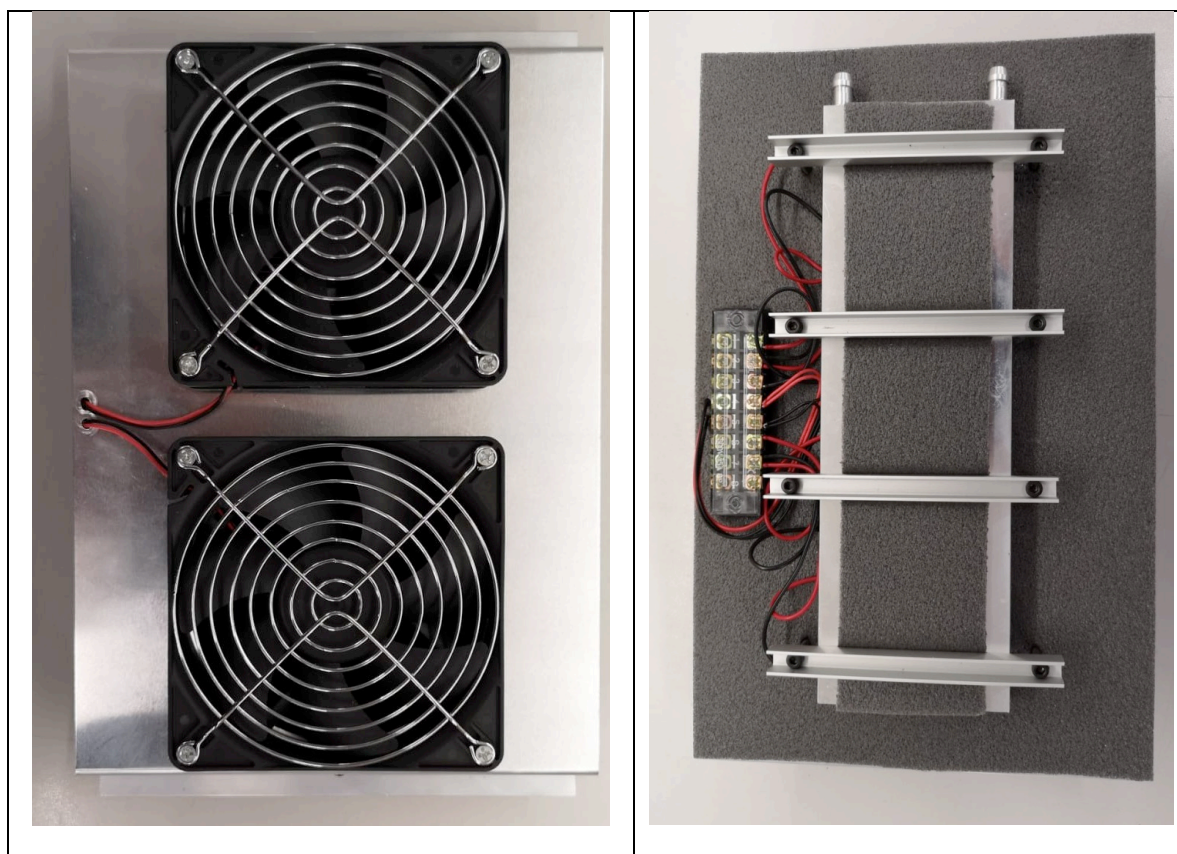


WC Series

Revised October 2020. Draft

WC-180-35-12V, WC-180-35-24V and WC-180-35-48V

180W Fluid-to-Air Thermoelectric Cooling System



Quick Description

The WC-180-35 is an air-to-fluid thermoelectric cooler with integrated fans on the 'hot side'. The unit is formed around a 280mm x 200mm x 36mm dense fin aluminium heatsink extrusion. The hot side has two 120mm x 38mm fan blowing air at the fins. On the opposite side, four high performance Peltier modules are held on the extrusion by a heat exchanger plate that cools the fluid. The rear face of the extrusion is covered with a 3mm thick layer of closed-cell neoprene insulation to minimise condensate formation when operated below the dew point. The unit has a cooling capacity of 180W

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at $\Delta T = 0^\circ\text{C}$ and a $\Delta T(\text{max})$ of 35°C . In heater mode, the unit has a heating power of up to 500W. If cooling a fluid that is warmer than the ambient temperature the cooling capacity is considerably greater than 180W.

Heat Absorption and Rejection

Heat rejection from the unit is via the fan-cooled aluminium extrusion. The fluid ports on the cold side are pagoda-style nozzles to suit pipe in the range 8 to 9mm diameter internal diameter. If the system is to be used bi-directionally, *i.e.*, as a heater or cooler unit to maintain a constant temperature over widely-varying ambient temperature, the TECs can operate as very efficient heater for the temperature-controlled volume over the range -20°C to $+60^\circ\text{C}$.

Thermal and Electrical Performance

The performance figures in this data sheet are for an ambient temperature of 20°C and a coolant flow rate of 5.5 Litres per minute. Increasing either or both of these parameters will increase the performance of the cooler.

Operating Parameters: WC-180-35

Qc [W]*^	180	0
dT[°C]*^	0	35
TEC V [V]^+	12/24/48	12/24/48
TEC P [W]	440	440

**Measured at ambient temperature of 20°C*

^ Both Qc (max) and dT (max) increase above $T(\text{amb}) = 20^\circ\text{C}$

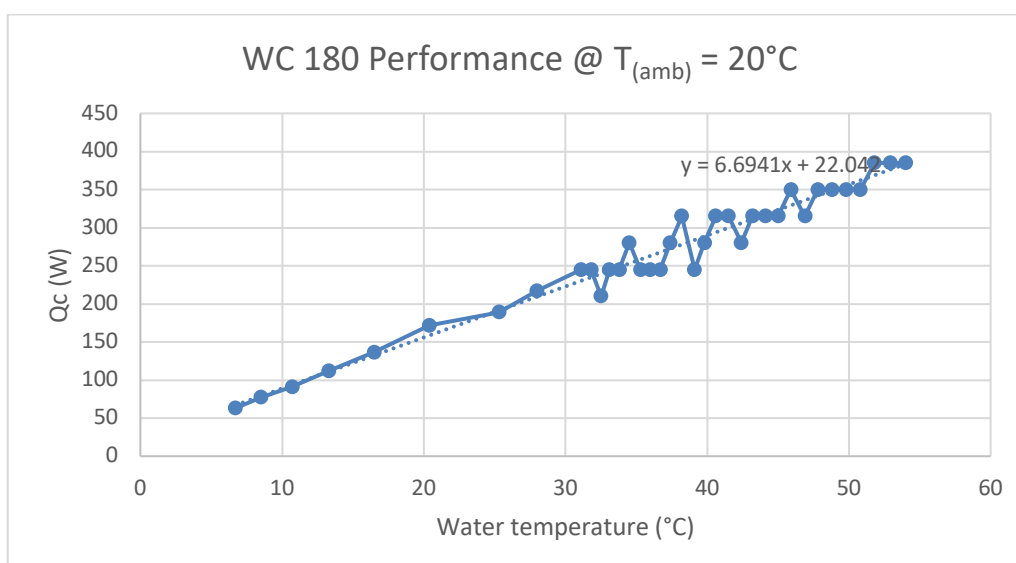
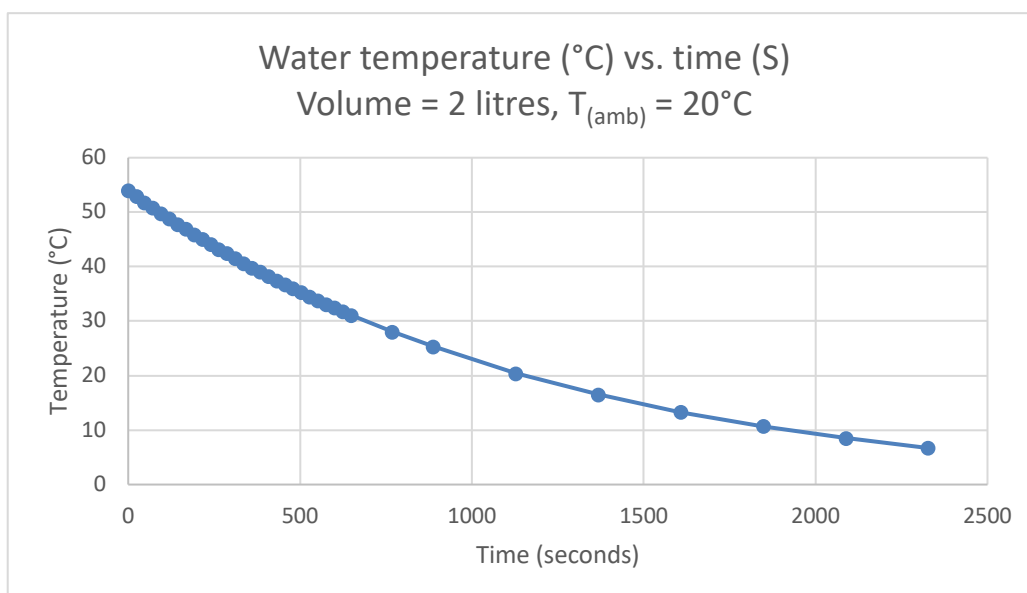
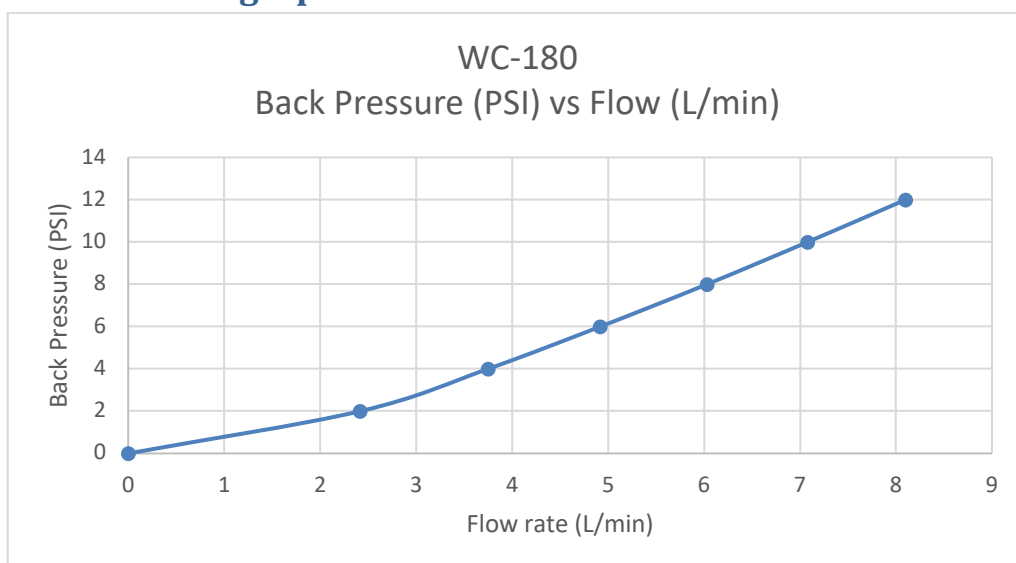
+ The TECs can be wired for 12V, 24V or 48V operation. (Fan voltage is separate)

Notes

1. The fans and the Peltier modules are electrically isolated from the extrusion.
2. The cooler can be used as a heater by polarity reversal of the Peltier module current.
3. The minimum "cold" side temperature of the cooler depends on the freezing point of the coolant fluid in use. The "hot" side should not be operated at a temperature below -20°C as this will shorten the fan's life. Similarly, the "hot" side should not exceed 65°C .
4. The fans have a separate electrical connection to the Peltier modules.
5. When used as a heater, providing there is no condensate build-up on the hot side extrusion the unit can be operated in any orientation. If there is a possibility of condensate forming then the unit should be mounted in such a way that condensate cannot fall on to the hot-side fans.
6. All wiring is from the "cold" side.
7. The cooler unit can be mounted in a chassis using 8 x 4.0mm self-tapping screws.
8. The recommended minimum copper wire gauge for power connections to the Peltier modules is 4.0mm^2 for 24V use and 6.0mm^2 for 12V use.
9. The start-up current is $\sim 30\%$ higher than the running current for the 3 seconds after switch-on.
10. The unit is designed for indoor use. Higher IP ratings available upon request.
11. For voltage and power ratings see above table. The fan voltages can be configured as per the requirements of the customer.

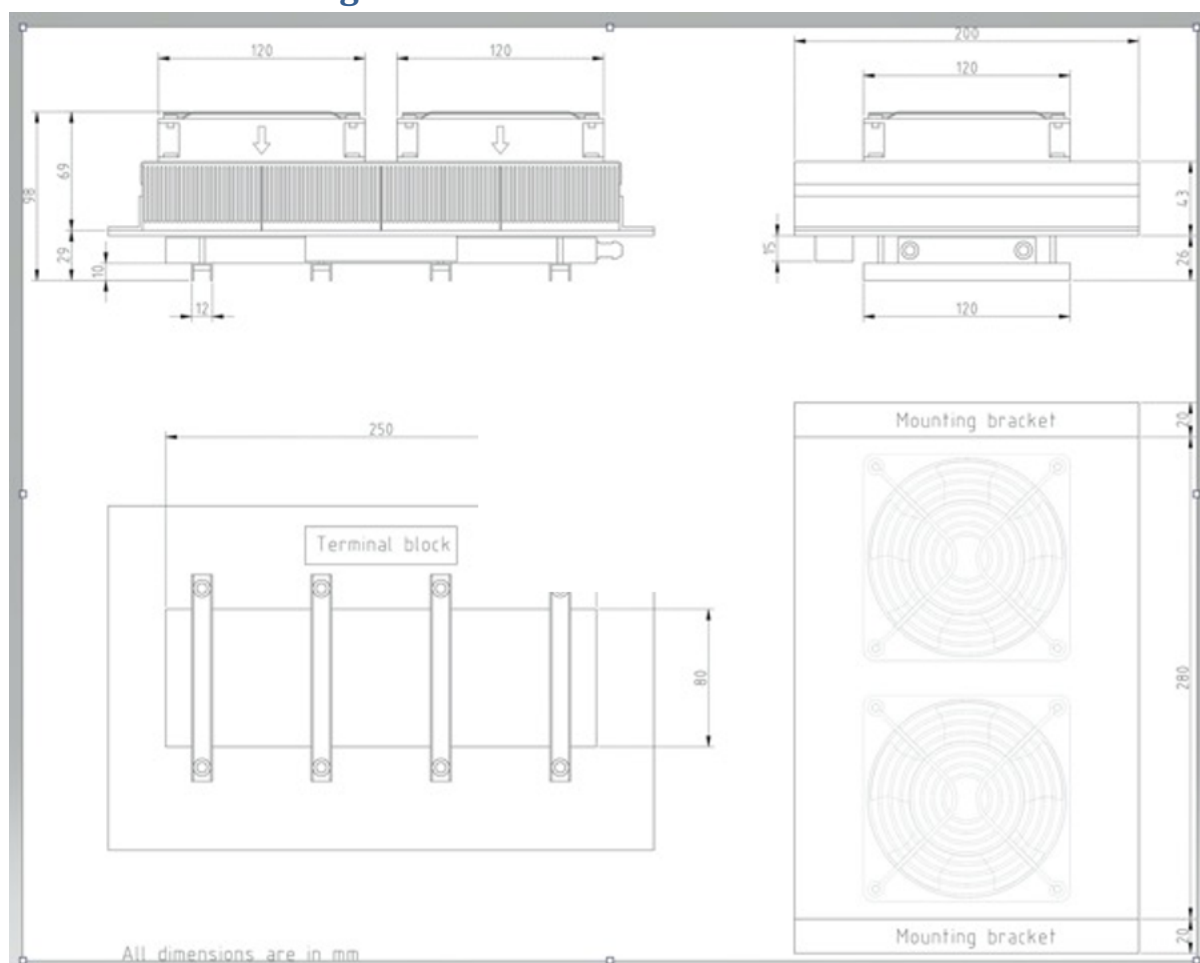
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Performance graphs



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Mechanical Drawings



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This TCS product is not authorised for use as critical component in life support devices.

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