TEconversion.com
THERMOELECTRIC CONVERSION SYSTEMS

AA Series

August 2022

Air-to-Air Thermoelectric Cooling System



Quick Description

The AA series are compact air-to-air thermoelectric coolers with integrated hot and cold-side fans. The unit is formed around dense fin aluminium heatsink extrusions on both the hot and cold sides. The rear face of the hot-side extrusion is covered with a layer of closed-cell neoprene. The unit is particularly well suited to applications where a low temperature is required with a large heat load.

Notes:

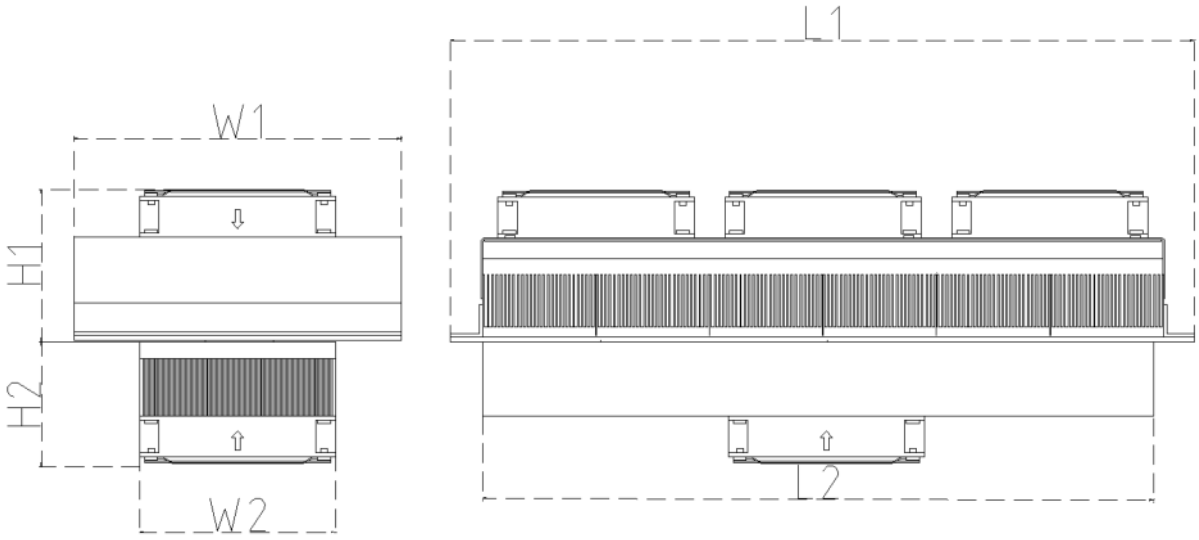
1. All the fans and the Peltier modules are electrically isolated from the extrusions.
2. The cooler can be used as a heater by polarity reversal of the Peltier module current.
3. ΔT is $T_{ambient} - T_{cold}$. Where $T_{ambient}$ = 41°C

Specifications

Part Number	AA-100-50	AA-200-50	AA-180-40	AA-300-40	AA-400-40
Cooling Power (W)	100	200	180	300	400
Current (A)	20 / 10	40 / 20	40/20	58 / 29	40
Voltage (Vdc)	12V / 24				24
Maximum Temperature Difference ΔT	50		40		
Weight (kg)	6	7	6	8	14
Length: L1/L2	170 / 105	315 / 250	315 / 250	455 / 410	290 / 250
Width: W1/W2	250 / 250	200 / 125	200 / 125	200 / 125	410 / 410
Height: H1/H2	95 / 65	105 / 75	105 / 75	110 / 85	110 /105
Number of Fans: Cold side/Hot side	1 / 1	1 / 2	1 / 2	1 /3	3 / 2

© 2022 Thermoelectric Conversion Systems Limited

Mechanical Drawings



The units are designed for indoor use. Higher IP ratings are available upon request.

Fans

The cold side fan can be used over the voltage ranges 6-14V for '12V' and 10V to 26V for '24V'. This gives a speed range of approximately 4:1. ΔT(max) is measured with a fan operating voltage of 6V/10V/24V. A slightly lower temperature is available from the unit if the fan is switched off entirely.

NOTE: Providing there is no condensate build-up on the cold 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 cold-side fan. If the unit is to be operated below 0°C for extended periods it is recommended the TCS thermoelectric de-humidifier unit is used in conjunction with the AA units to prevent excessive frost build up. Alternatively, the cooler controller should be programmed with a defrost cycle.

© 2022 Thermoelectric Conversion Systems Limited

Wiring Diagram

Product Image | Wiring Schematic

AA-100



24V:

Terminal	Function	Colour	Voltage
1	TEG -VE	Black	0V
2	[series conn]	N/A	N/A
3	TEG +VE	Red	24V
4	Hot Fan Tacho	Yellow	O.C.
5	Hot Fan -ve	Black	0V
6	Hot Fan +ve	Red	24V

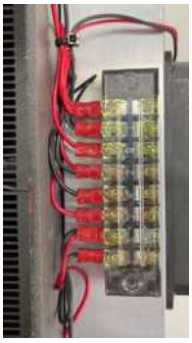
AA-200



24V:

Terminal	Function	Colour	Voltage
1	TEG -VE	Black	0V
2	[series conn]	N/A	N/A
3	TEG +VE	Red	24V
4	Cold Fan -ve	Black	0V
5	Cold Fan +ve	Red	24V
6	Hot Fan Tacho	Yellow	O.C.
7	Hot Fan -ve	Black	0V
8	Hot Fan +ve	Red	24V

AA-180



24V:

Terminal	Function	Colour	Voltage
1	TEGs 1&2 -VE	Black	0V
2	[series conn]	N/A	N/A
3	TEGs 1&2 +VE	Red	24V
4	TEGs 3&4 -VE	Black	0V
5	[series conn]	N/A	N/A
6	TEGs 3&4 +VE	Red	24V
7	Fan -ve	Black	0V
8	Fan +ve	Red	24V

AA-300



12V Operation – TEC Connector (25A)			
Terminal	**Function**	**Colour**	**Voltage**
1	TEC 1, 2,3 -VE	Black	0V
2	TEC 1, 2,3 +VE	Red	12V
3	TEC 4, 5, 6 -VE	Black	0V
4	TEC 4, 5, 6 +VE	Red	12V

12V Operation – Fan Connector (15A)			
Terminal	**Function**	**Colour**	**Voltage**
1	Cold Fan -VE	Black	0V
2	Cold Fan +VE	Red	12V
3	Hot Fans -VE	Black	0V
4	Hot Fans +VE	Red	12V

24V Operation – 15A Connector (shown here)			
Terminal	**Function**	**Colour**	**Voltage**

© 2022 Thermoelectric Conversion Systems Limited

	1	TECs 1&2 +VE	Red	0V
	2	[series conn]	N/A	N/A
	3	TECs 1&2 +VE	Black	24V
	4	TECs 3&4 +VE	Red	0V
	5	[series conn]	N/A	N/A
	6	TECs 3&4 -VE	Black	24V
	7	TECs 5&6 +VE	Red	0V
	8	[series conn]	N/A	N/A
	9	TECs 5&6 -VE	Black	24V
	10	Cold Fan +VE	Black	0V
	11	Hot Fans +VE	Red	24V
	12	Fans -VE	Black	24V

AA-400



Terminal	Function	Colour	Voltage
1	TEC -VE	Black	0V
2	TEC +VE	Red	24V
3	Fan -VE	Black	0V
4	Fan +VE	Red	24V

Notes

1. TCS AA Series Coolers must be secured in chassis using mounting brackets drilled to suit.
2. Rear of hot side of extrusion covered with a layer of closed-cell neoprene.
3. Ensure fan entry free of obstructions withing 50mm of fan guards.
4. Ensure airflow leaving the extrusions is not obstructed. When the unit is mounted with the long side horizontal, the hot side air leaves to the left and right of the unit and the cold air leaves the unit at the top and bottom of the unit.
5. AA-300 & AA400 only: this cross-flow design simplifies the insulation requirements of the cabinet to be cooled.
6. The initial current drawn by the unit is ~ 20% higher than the operating current.

Thermoelectric Conversion Systems Limited (TCS) does not assume any responsibility for use of any circuit described, no circuit patent licenses are implied and TCS reserves the right at any time without notice to change said circuitry and specifications.

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

 © 2022 Thermoelectric Conversion Systems Limited