



EC-L-2

Gas Cooler Series EC®

Compact Version EC-L
for 2 x 250 NI/h or 1 x 500 NI/h

Special Features

- **Upgradable to a complete gas conditioning unit**
- **Patented Jet-Stream heat exchangers available in 3 standard materials**
- **Gas flow 2 x 250 NI/h or 1 x 500 NI/h**
- **Ambient pre-cooling stage(s) optionally**
- **Ambient temperature up to 45 °C [up to 113 °F]**
- **Dew point stability < ±0.1 °C [< ±0.18 °F]**
- **Outlet dew point adjustable from +2 to +7 °C [35.6 to 44.6 °F]**
- **Status alarm contact**
- **High reliability**
- **Self-controlled**
- **CFC-free**

Application

The M&C gas cooler EC-L is used in gas analysis to lower the dew point of humid gas to prevent condensation in the analyzer(s). An extremely stable and low gas outlet dew point minimizes water vapor cross-sensitivity and volumetric errors. Additionally components for the gas conditioning such as filter or sample gas pump can be integrated.

Description

The EC-L cooler is compact, self-controlling and requires minimum maintenance. Intelligent detailed solutions provide optimum cooling of the sample gas and ensure reliable separation of condensate.

The new controlled compressor cooling system and the special design of the Jet-Stream heat exchangers ensure optimum dew point reduction to a low, stable value. Another advantage of the Jet-Stream principle is a short contact time between sample gas and condensate. This minimizes washout effects of water-soluble sample gas components. For applications with high water vapor content, an additional pre-cooling stage can be installed. This one- or two-stage pre-cooling unit reduces the inlet dew point or the load on the main cooling stage.

The condensate is optionally discharged by the integrated small peristaltic pumps SR25.2 or externally by the condensate drains AD or the collection vessels TG/TK.

The practical design allows the installation of heat exchangers made of different materials depending on the application. Heat exchangers made of glass, stainless steel or PVDF can be ordered optionally.

The digital display on the front panel shows the current cooler temperature. The cooler function can be monitored externally via an alarm contact. The factory settings of the alarm limits are < +1.5 °C [34.7 °F] and > +8.5 °C [47.3 °F].

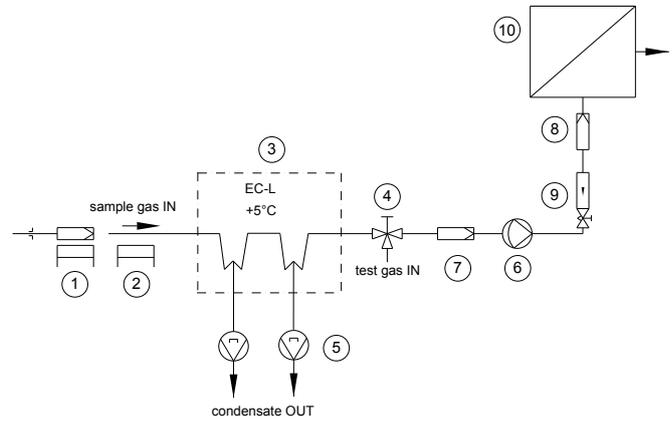
The EC-L gas cooler can be equipped with 2 x heat exchangers for a flow rate of max. 500 NI/h. This allows two separate sample gas lines with a maximum flow rate of 2 x 250 NI/h or one sample gas line for a maximum flow rate of 500 NI/h to be connected.

The compact and lightweight design ensures space-saving and easy installation in gas conditioning systems. The EC-L gas coolers are self-monitoring and require minimum maintenance.

If necessary, the cooler can be upgraded to a complete gas conditioning unit. For this purpose, a mounting plate is attached to the cooler in order to install the required components such as a pump or a filter with liquid alarm sensor.

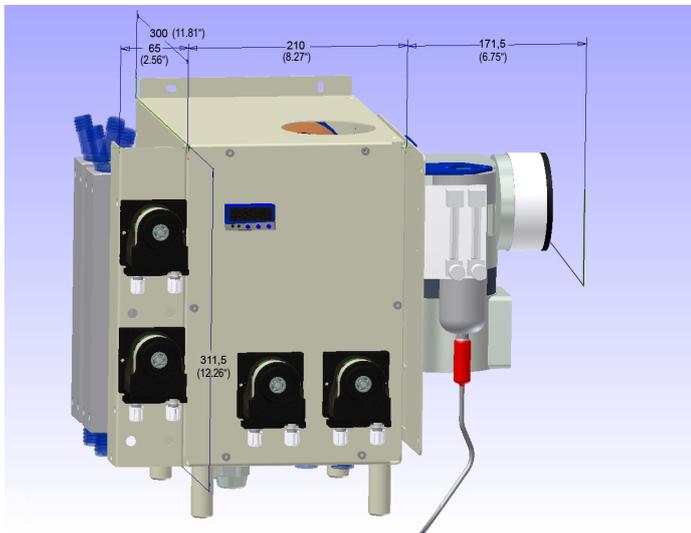
Application example for EC-L

- 1 Gas sample probe or dilution probe
- 2 Heated sample line
- 3 Gas cooler EC-L
- 4 3-way ball valve
- 5 Peristaltic pump SR25.2
- 6 Sample gas pump, e.g. MP-F10
- 7 Fine filter FP-2T-D with liquid alarm LA1S
- 8 Aerosol filter CLF-5/W optional according to application
- 9 Flow meter FM40, 25-250 NI/h
- 10 Analyzers, e.g. GenTwo PMA1000



Dimensions

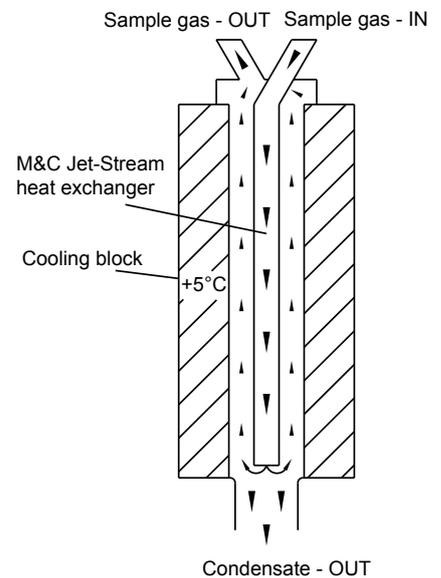
Compact gas cooler EC-L with pre-cooler, filter, liquid alarm sensor and diaphragm pump



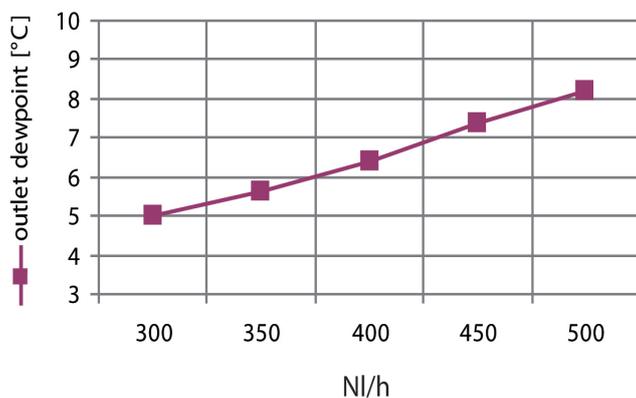
Dimensions in mm

Drawing shows EC-L with two heat exchangers out of glass, two pre-cooling stages, peristaltic pumps, a filter with liquid alarm sensor and a diaphragm pump.
Heat exchanger(s), peristaltic pump(s), filter with liquid alarm sensor and diaphragm pump to be ordered optionally!

Functional diagram of M&C Jet-Stream heat exchanger



Sample gas outlet dew point stability for EC-L-2G



Sample gas outlet dew point stability at gas inlet dew point of 80 °C.
Heat exchangers are connected in series.
Characteristics of heat exchanger out of PVDF or stainless steel upon request.

Technical Data

Gas Cooler Series EC*	Version EC-L
Part No. basic cooler without heat exchanger, 230 V 50 Hz	02K4000X
Part No. basic cooler without heat exchanger, 115 V 50-60 Hz	02K4000XA
Number of heat exchangers	2
Ambient temperature	+10 up to +45 °C [50 up to 113 °F]
Sample outlet dew point	Range of adjustment: +2 to +7 °C [35.6 to 44.6 °F], factory setting: +5 °C [41 °F]
Dew point stability	At constant conditions < ±0.1 °C [< ±0.18 °F]
Sample inlet temperature***	Max. 180 °C [max. 356 °F]
Sample inlet dew point***	Max. 80 °C [max. 176 °F]
Total cooling capacity	144 kJ/h at +10 to +45 °C [50 to 113 °F] ambient temperature
Ready for operation	< 15 min.
Main power connection/power consumption	230 V AC* or 115 V AC**(a) -15 %/+10 %, 50/60 Hz, max. 200 VA start-up current: 230 V 50 Hz = 2.5 A/115 V 60 Hz = 4.5 A
Electrical connection	Terminals 2.5 mm ² , 2 x M20
Status alarm 2 contacts, potential-free	Contact rating 250 V AC, 2 A, 500 VA, 50 W, alarm limit settings < +1.5 °C [34.7 °F] and > +8.5 °C [47.3 °F]*
Type of housing protection/electrical standard	IP20 EN 60529/EN 61010
Method of mounting/case colour	Wall-mounting/case colour gray, RAL 9003
Dimensions (W x H x D)	210 x 380 x 350 mm [≈ 8.3" x 15" x 13.8"] (height including cooler feet and depth including peristaltic pump)
Weight	17.6 kg [≈ 38.8 lbs] (with 2 x SR25.2 and 2 x glass heat exchangers)

Options

Options for basic cooler	EC-L		
Heat exchanger type	ECL-G	ECL-PV	ECL-SS
Part No.	97K0605	97K0610	97K0600
Material of heat exchanger	Duran® glass	PVDF	SS 316Ti
Max. gas flow rate per heat exchanger	250 NI/h***	250 NI/h***	250 NI/h***
Gas pressure max. bar abs. ³⁾	2/3 ²⁾	3	10*
Sample gas connection	GL 18 for ø 6 mm o.d. tube*	Tube ø 6 mm*	Tube ø 6 mm
Condensate connection	GL 25 for ø 12 mm tube* ø 8 mm or ø 10 mm	G 3/8" female	G 3/8" female or 3/8 NPT**
ΔP at max. flow rate	1 mbar	1 mbar	1 mbar
Stagnant space approximately	50 ml [≈ 0.013 gal]	50 ml [≈ 0.013 gal]	50 ml [≈ 0.013 gal]
Peristaltic pump SR25.2	1 pc. integrated into the cooler, compl. installed, Part No.: 01P9125 cooler weight plus 0.6 kg [≈ 1.3 lb] per pump		

One ambient pre-cooling stage, without heat exchanger, completely installed, Part No.: 02K4020

Two ambient pre-cooling stages, without heat exchanger, completely installed, Part No.: 02K4022

Mounting bracket for installing up to two peristaltic pumps, Part No.: 02K4030

Peristaltic pump for pre-cooling stage, one peristaltic pump for each pre-cooling stage needed, Part No.: 01P9125

Mounting plate for gas conditioning components like filter or pump, completely installed, Part No.: 97K0631

Analog output for cooler temperature on request

* Standard, other version upon request.

** Option

*** Maximum values in technical data must be rated in consideration of the total cooling capacity at 25 °C [77 °F] ambient temperature.

²⁾ With GL connecting adapter.

³⁾ With SR25.2 max. 2 bar abs.

Duran® is a brand name for borosilicate glass produced the company Duran Group GmbH.

Order example:

1 x cooler EC-L with 2 x heat exchangers out of glass ECL-G and 2 x peristaltic pumps SR25.2, power: 115 V 60 Hz,
Part numbers: 1 x 02K4000XA; 2 x 97K0605; 2 x 01P9125

GL adapters and tube fittings for the connection of different tube diameters at the heat exchanger see data sheets 'Fittings for GL-Connections' and 'Hose & Tube Fittings'