



EC30C with three SR25.2 peristaltic pumps

Ultra-Low Gas Cooler Series EC®

Version EC30C with graphical display for easy navigation, dew point up to -30 °C [-22 °F], max. 250 NI/h sample flow rate

Special Features

- **Cooling capacity 130 kJ/h over the entire permissible ambient temperature range**
- **250 NI/h max. sample gas flow rate**
- **Inlet water vapor dew point up to $+70\text{ °C}$ [$+158\text{ °F}$]**
- **Outlet dew point can be set from -20 to -30 °C [-4 to -22 °F]**
- **Outlet dew point stability $\pm 0.1\text{ °C}$ [$\pm 0.18\text{ °F}$]**
- **24/7 operation**
- **Icon-based warning & fault display including self-test with advance warning of upcoming maintenance**
- **mA output configurable**
- **Separate relays for active deep-freezing unit (TKS), alarm and warning messages**
- **Real-time alarm history with memory for over 700 messages**
- **Humidity alarm (external) and sample gas flow alarm (internal or external) are optionally available**
- **Service-friendly enclosure concept for 19" rack and wall mounting**

Application

The patented M&C ultra-low cooler EC30C is used in the gas analysis technique to reduce the dew point of humid sample gases, to provide a stable and very low dew point and prevent condensation and aerosol formation in the analyzer. The cooler EC30C can be mounted near the gas sample point to avoid costly energy-consuming heated sample lines. Due to the extremely stable and low gas outlet dew point, there are no water vapor cross-sensitivity and volumetric errors.

Description

The M&C gas cooler EC30C is a two-stage combination of compressor and Peltier cooler. The automatic defrost function of the dual deep-freezer unit ensures 100 % availability during operation.

The microprocessor-controlled electronics of the EC30C in combination with the graphical display offers a high degree of functionality, convenience in use and safe operation.

The EC30C is built for 24/7 operating time. The cooling capacity of 130 kJ/h is constant, even up to the maximum permissible ambient temperature. A capacity reserve enables the EC30C to largely compensate for the physically induced aging of the components and thus maximizes the service life of the cooler.

The pre-cooler unit is equipped with a Jet-Stream heat exchanger. The heat exchanger is cooled down to the constant temperature of $+2\text{ °C}$ [35.6 °F] by a separate microprocessor-controlled compressor cooling unit. The Jet-Stream heat exchanger in the pre-cooler unit removes a large amount of condensate, this ensures a safe and reliable pre-drying of the sample gas. An additional external vessel to separate the condensate is under normal conditions not necessary. The cooling unit of the pre-cooler dissipates the heat of the Peltier elements.

The dual deep-freezer unit is equipped with two modified Jet-Stream heat exchangers. Two separate pairs of Peltier elements are cooling the heat exchangers down to a con-

stant temperature between -20 °C [-4 °F] and -30 °C [-22 °F]. The factory setting is -30 °C [-22 °F].

The EC30C switches automatically every 3 hours between the two deep-freezer units. The deep freezer, which is currently not in use, will be defrosted. This actively prevents the heat exchangers from freezing and the gas lines from being clogged.

The new graphical user interface is icon-based for easy and intuitive navigation. The messages are displayed in the form of easy-to-understand icons.

Features like time stamps for the alarm message history, periodical self-monitoring and pre-warning messages to inform about upcoming maintenance work ensure a maximum degree of convenience, ease-of-use and safety when operating the EC30C.

The smart periodical self-monitoring of the EC30C helps to plan upcoming maintenance and service work to prevent unnecessary downtime.

A configurable mA output is part of the EC30C standard version.

Three optional peristaltic pumps SR-25.2 for automatic condensate removal can be installed into the unit.

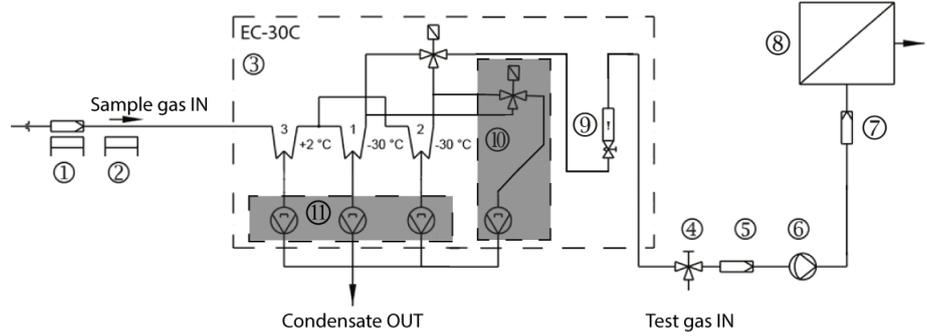
Optionally, an internal flow meter including flow alarm can be installed in the ultra-low cooler. Further options would be an external flow meter including flow alarm or an externally connected humidity alarm.

A fourth optional peristaltic pump can be installed in combination with a second solenoid valve to provide permanently fresh sample gas to the inactive deep-freezing unit. This ensures that even in systems, where water vapor cross-sensitivity exists, there are no visible peaks when switching the dual deep-freezer unit. This also prevents short peaks in the sample gas concentration due to stagnant gas.

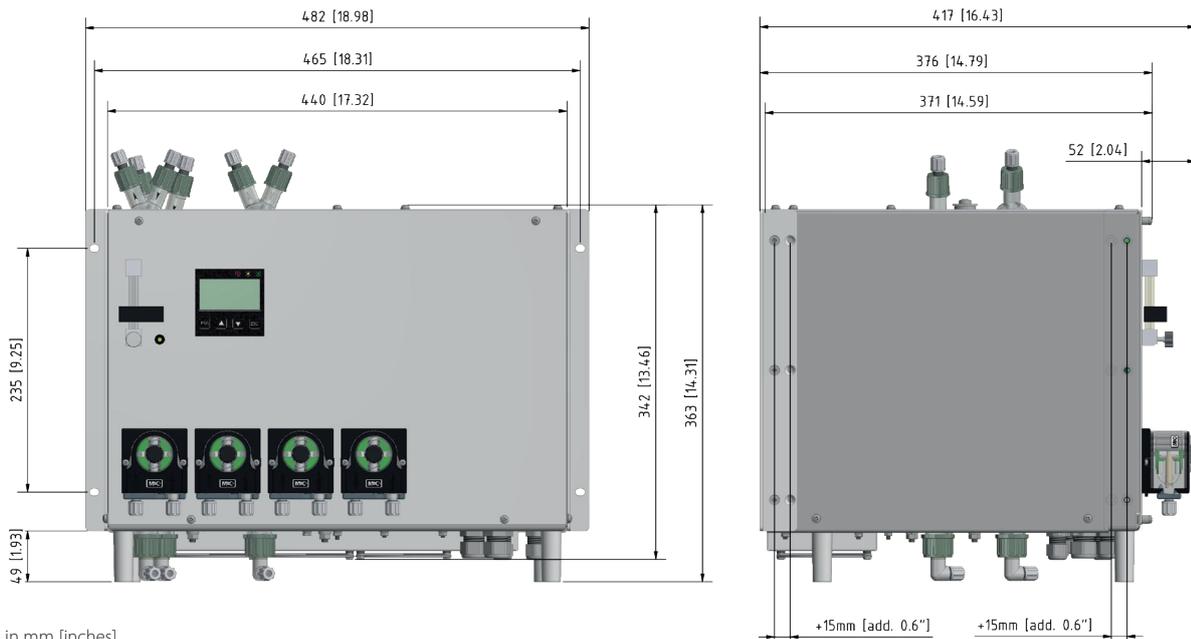
Example application for EC30C



- ① Heated filter sample probe SP2000-H
- ② Heated sample line 4M4/6
- ③ Ultra-low cooler EC30C
- ④ 3-way ball valves 3L/PV-1
- ⑤ Fine filter FP-2T-D with liquid alarm LA1
- ⑥ Full PTFE bellows pump MP-F
- ⑦ Aerosol filter CLF-5/W optional according to application
- ⑧ Analyzer, e.g. PMA1000
- ⑨ Flow meter FM 40, 25-250 NI/h
- ⑩ Option: heat exchanger purging with 4th peristaltic pump and solenoid valve
- ⑪ Option: 3 peristaltic pumps SR25.2

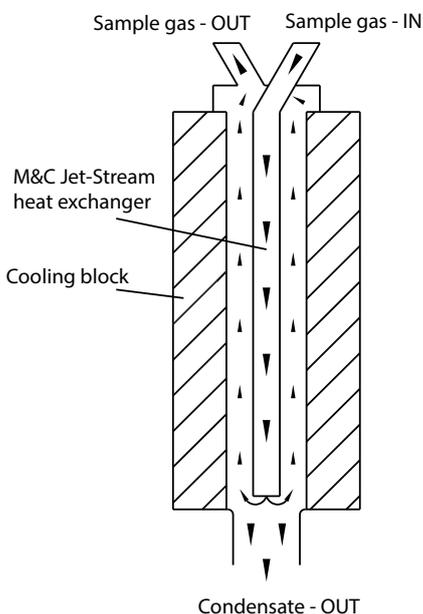


Dimensions



Dimensions in mm [inches]

Schematic diagram of M&C heat exchanger



Max. possible inlet water vapor dew point (°C)* depending on flow rate and incoming gas temperature

Flow rate NI/h	Incoming gas temperature °C [°F]				
	70 [158 °F]	90 [194 °F]	120 [248 °F]	150 [302 °F]	180 [356 °F]
90	70 [158 °F]	70 [158 °F]	69 [156.2 °F]	68 [154.4 °F]	67 [152.6 °F]
110	68 [154.4 °F]	67 [152.6 °F]	66 [150.8 °F]	65 [149 °F]	63 [145.4 °F]
130	65 [149 °F]	64 [147.2 °F]	63 [145.4 °F]	61 [141.8 °F]	59 [138.2 °F]
150	62 [143.6 °F]	61 [141.8 °F]	59 [138.2 °F]	58 [136.4 °F]	56 [132.8 °F]
170	59 [138.2 °F]	58 [136.4 °F]	56 [132.8 °F]	55 [131 °F]	53 [127.4 °F]
190	57 [134.6 °F]	56 [132.8 °F]	54 [129.2 °F]	52 [125.6 °F]	50 [122 °F]
210	55 [131 °F]	54 [129.2 °F]	52 [125.6 °F]	49 [120.2 °F]	46 [114.8 °F]
230	53 [127.4 °F]	52 [125.6 °F]	49 [120.2 °F]	47 [116.6 °F]	43 [109.4 °F]
250	52 [125.6 °F]	50 [122 °F]	47 [116.6 °F]	44 [111.2 °F]	41 [105.8 °F]

* This table shows the values of the max. possible inlet water vapor dew point depending on flow rate and incoming sample gas temperature. These values correspond to the max. cooling capacity of 130 kJ/h, and they must not be exceeded.

Cooler Series EC*	Version EC30C	
Part No.	02K6100	02K6100a
Sample gas connection	Tube connector DN 4/6	
Condensate connections	3 x tube connector GL 25-12 mm	
Material of sample-contacting parts	Duran® glass, PTFE, PVDF	
Single stream, gas flow rate	90 to 250 NI/h	
Gas pressure	Max. 3 bar abs.	
Ambient temperature	+5 to +45 °C [+41 to +113 °F]	
Storage temperature	-20 to +60 °C [-4 to +140 °F]	
Sample outlet dew point	-20 to -30 °C [-4 to -22 °F], default -30 °C [-22 °F]	
Sample inlet temperature	Max. 180 °C [356 °F]	
Inlet water vapor dew point	Max. 70 °C [158 °F]	
Cooling capacity	Max. 130 kJ/h* (at given input conditions)	
Main power connection/power consumption	230 V 50 Hz/380 VA	115 V 60 Hz/380 VA
Start-up time	< 60 min.	
Dead volume	Approx. 160 ml [≈ 5.4 fl. oz]	
ΔP at 250 NI/h flow rate	5 mbar	
Electrical connection	2.5 mm ² terminals, cable glands 1 x M12, 2 x M16, 2 x M20	
mA output	0 - 20 mA/4 - 20 mA, max. 500 Ohm load (including cable resistance),	
Relay output alarm	1 changeover contact: 230 V AC 3 A, 24 V DC 3 A Alarm: COM & NC closed No alarm: COM & NO closed	
Relay output warning	1 NO contact, 24 V (AC/DC), 0.5 A Warning: open	
Relay output freezer units I and II	1 NO contact, 24 V (AC/DC), 0.5 A Unit I on: closed Unit II on: open	
Case protection	IP20 EN 60529	
Electrical equipment standard	EN 61010	
Method of mounting	19" rack or wall-mount	
Case color	RAL 9003	
Dimensions (W x H x D)	19" or wall-mount device with mounting brackets: 482 x 342 x 376 mm [≈ 19" x 13.5" x 14.8"] Device with equipment feet: 440 x 363 x 371 mm [≈ 17.3" x 14.3" x 14.6"]	
Weight	Approx. 39.4 kg [≈ 86.9 lbs]	

* For the given input conditions, please refer to table: "Max. possible inlet water vapor dew point (°C) depending on flow rate and incoming gas temperature".

Duran® is a brand name for borosilicate glass produced by the German company DWK Life Sciences GmbH.

Please note: NI/h and NI/min refer to the German standard DIN 1343 and are based on these standard conditions: 0 °C [32 °F], 1013 mbar.

Options

Part No.	Options for EC30C
01P9145	Peristaltic pump SR25.2, to mount at the front panel of the EC30C (three peristaltic pumps are required)
03F3000	Aerosol filter CLF-5: External mounting in the outlet of an ultra low gas cooler EC30C when sample tends to form aerosols. Technical data, see data sheet "Fluid Particle Filter Series CLF", Version CLF-5, CLF-5/W for removal of aerosols from gases"
02K9700	Heat exchanger purging: 4th peristaltic pump with solenoid valve for EC30C with 230 V/50 Hz
02K9700a	Heat exchanger purging: 4th peristaltic pump with solenoid valve for EC30C with 115 V/60 Hz
02K9710	FM 40 (Flow meter, 25-250 NI/h)
03E1001	LA 1S (Humidity sensor)
02E3500	FA 20 (Flow sensor)