



EC-EX

Gas Cooler Series EC®

Version ECS and EC-EX
for 4 x 250 NI/h

Special Features

- **Jet-Stream heat exchangers in 3 standard materials**
- **Ambient temperature up to 50 °C [122 °F]**
- **Outlet dew point adjustable from 2 to 7 °C [35.6 to 44.6 °F]**
- **Dew point stability < ±0.25 °C [$< \pm 0.45$ °F]**
- **Status alarm contact standard**
- **High reliability**
- **Self-monitoring**
- **ATEX certified versions for hazardous zone 1 areas**
- **100 % CFC-free**

Application

ECS and EC-EX gas coolers are used in gas analysis systems to lower the dew point of humid gases in order to avoid condensation in the analyzer. An extremely stable gas dew point prevents water vapour cross-sensitivity and volumetric errors.

Description

The electronically controlled compressor cooling system and the special design of the Jet-Stream heat exchangers guarantee optimum dew point reduction to a low, stable value and safe condensate separation. No external pre-draining is needed.

Up to 4 peristaltic pumps can be installed in the ECS to drain condensate. Otherwise, the condensate must be removed with traps or collected in vessels.

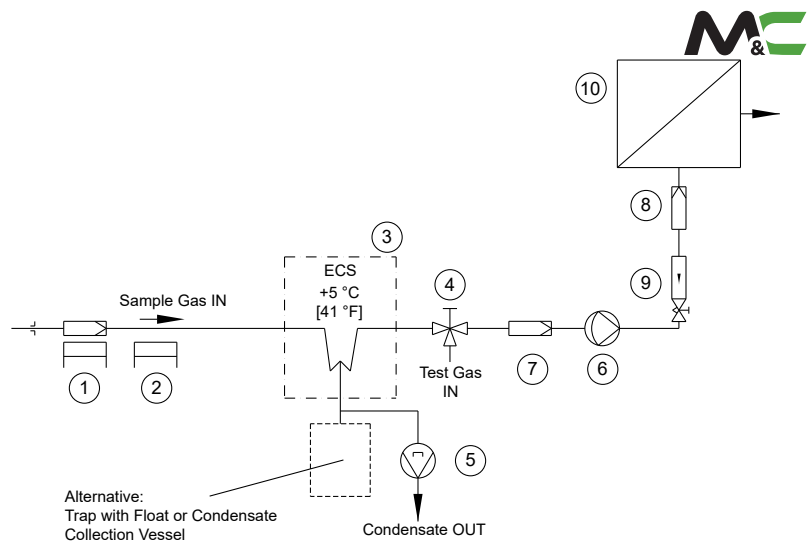
An EC-F fan unit for ambient temperatures > 40 °C [104 °F] with additional fans for forced ventilation of the cooler and condensate drainage is offered as a subassembly to the ECS.

The new design enables up to 4 heat exchangers to be integrated either at the factory or later, without any problems. They can be connected in series or parallel. Heat exchangers are available in various materials depending on the application.

LEDs indicate the operating conditions as well as high and low temperatures. A temperature deviation of ±3 °C [±5.4 °F] triggers an alarm. The gas coolers are self-monitoring in operation and require only minimum maintenance.

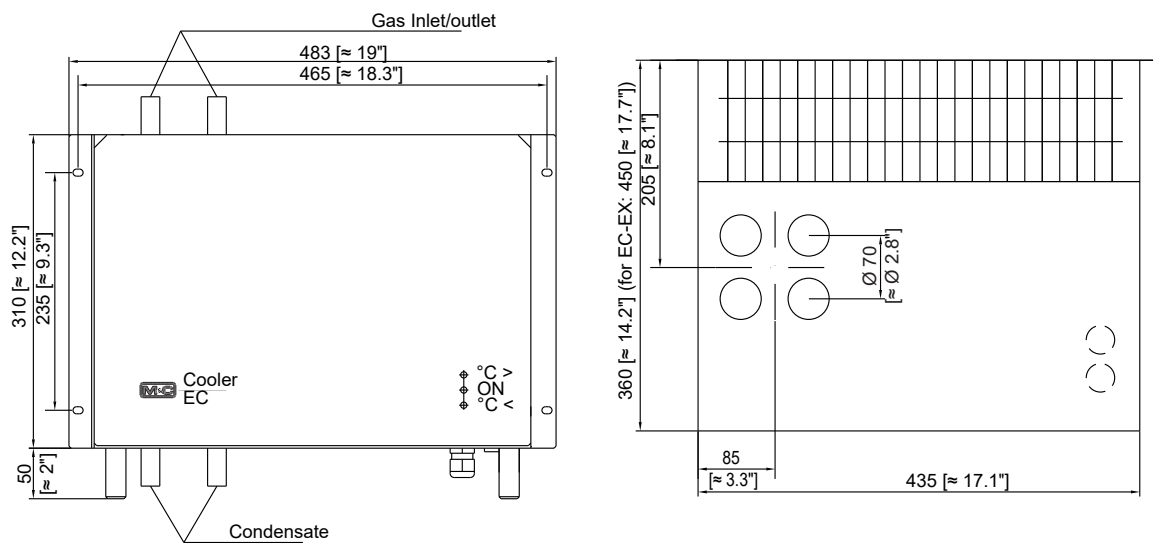
Application example for ECS

- 1 Heated gas sample probe SP210-H or SP2000-H
- 2 Heated sample line 4M4/6
- 3 Gas cooler ECS
- 4 3-way ball valve 3L/PV-1
- 5 Peristaltic pump SR25.2
- 6 Diaphragm pump MP47 or MP06/12 or N5KP
- 7 Fine filter FP-2T-D with liquid alarm LA1
- 8 Aerosol filter CLF-5/W optional according to application
- 9 Flow meter FM10 or FM40, 25-250 NI/h
- 10 Analyzers e.g. PMA1000



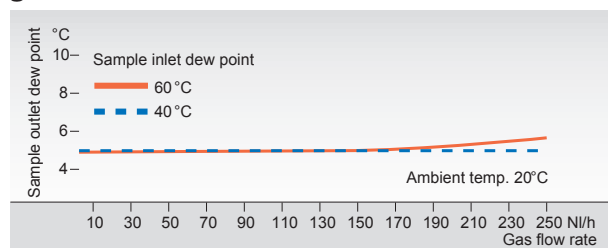
Dimensions

Gas cooler ECS/EC-EX

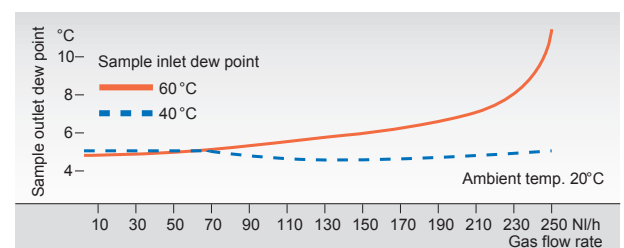


Dimensions in mm [Inches]

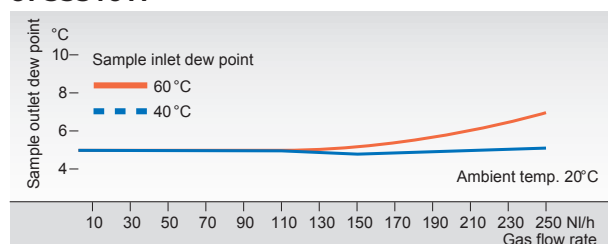
Cooler type EC-G with heat exchanger out of glass



Cooler type EC-PV with heat exchanger out of PVDF



Cooler type EC-SS with heat exchanger out of SS316Ti



Technical Data

Gas Cooler Series EC®	ECS	EC-EX
Part No. without heat exchanger	02K1500X(a)	02K5000X(a)
Part No. with glass heat exchanger	02K1500(a)	02K5000(a)
Part No. with stainl. steel heat exchanger	02K2500(a)	02K5010(a)
Part No. with PVDF heat exchanger	02K3500(a)	02K5020(a)
Number of heat exchanger(s)	Optional up to 4 (ECS unit with 6 heat exchangers available on request)	Optional up to 4
Gas flow rate per heat exchange	250 NI/h**	
Ambient temperature	+5 to 45 °C [41 to 113 °F], with option EC-F = +5 to 50 °C [41 to 122 °F]	+5 to 45 °C [41 to 113 °F]
Storage temperature	-20 to +60 °C [-4 to 140 °F]	
Sample outlet dew point	Range of adjustment: +2 °C [35.6 °F] to +7 °C [44.6 °F], factory setting: +5 °C [41 °F]	
Dew point stability	At constant conditions < ±0.25 °C [< ±0.45 °F]	
Sample inlet temperature	Max. 180 °C [356 °F]**	
Sample inlet dew point	Max. 80 °C [176 °F]**	
Total cooling power	Max. 520 kJ/h at 25 °C [77 °F] ambient temperature	
Power consumption	280 VA, start up current at 230 V= 7.9 A	
Mains connection	230 V ±10 %, 50 Hz, optional 115 V ±10 %, 50-60 Hz	230 V ±10 %, 50 Hz, optional 115 V ±10 %, 50-60 Hz
Ready for operation	< 30 min.	
Electrical connection	2.5 mm ² terminals	
Status alarm: ECS 2 changeover contacts	Contact rating: 250 V, 2 A, 500 VA, 50 W, alarm point: ΔT ±3 °C [±5.4 °F] to T _{SET}	
Status alarm: EC-EX 1 changeover contact	Contact rating: 220 V, 2 A, 100 VA, 50 W, alarm point: ΔT ±3 °C [±5.4 °F] to T _{SET}	
Type of housing protection	IP20; EN 60529	
Electrical standard/certificate No.	EN 61010	 Starting from serial No. 1904XXXX:
Case color	RAL 9003	
Method of mounting	19"-rack or wall mounting	
Dimensions (W x H x D)	84 HP x 7U x 360 mm [≈ 14.2"]	84 HP x 7U x 450 mm [≈ 17.7"]
Weight	31 kg [≈ 68 lbs]	40 kg [≈ 88 lbs]

Options

Heat exchanger versions

Heat exchanger material	Duran® glass	PVDF	Stainless steel 316Ti
Part No.	02K9100	02K9300	02K9200
Admissible gas pressure bar g	3 ²⁾ / 2 ³⁾	3 / 2 ³⁾	10 bar
Sample gas connection	GL 18-6 ø 6 mm 8 o. 10 mm*	G 1/4" female	G 1/4" female, NPT*
Condensate connection	GL 25-12 ø 12 mm 10 o. 8 mm*	G 3/8" female	G 3/8" female, NPT*
ΔP per heat exchanger at 300 NI/h	1 mbar		
Dead volume per heat exchanger	70 ml		

* Optional

** Maximum values in technical data must be rated in consideration of the total cooling capacity at 25 °C [77 °F] ambient temperature and an outlet dew point of 5 °C [41 °F].

1) Others upon request.

2) With GL connection adapter.

3) With SR25.2 max. 2 bar abs.

(a) Addition to part number for 115 V version

GL adapters and tube fittings to connect different tube diameters at the heat exchanger see data sheets "Fittings for GL Glass Connections" and "Flexible and rigid tube fittings, plugs and connectors with barbed fitting".

Duran® is a registered trade mark for borosilicate glass produced by the company DWK Life Sciences GmbH, Germany.

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.

Type	Part No.	Gas cooler in wall-mounting housing ¹⁾
ECS-1-G	02K1500	Gas cooler with 1 x heat exchanger out of Duran® glass, depth of housing 360 mm [≈ 14.2"], 230 V, 50 Hz
ECS-1-SS	02K2500	Gas cooler with 1 x heat exchanger out of stainless steel, depth of housing 360 mm [≈ 14.2"], 230 V, 50 Hz
ECS-1-PV	02K3500	Gas cooler with 1 x heat exchanger out of PVDF, depth of housing 360 mm [≈ 14.2"], 230 V, 50 Hz
/115V	02K...A	Power EC/ECS 115 V 60 Hz
EC-EX-1G	02K5000	Gas cooler with 1 x heat exchanger out of Duran® glass, depth of housing 450 mm [≈ 17.7"], 230 V, 50 Hz, Ex version
EC-EX-1SS	02K5010	Gas cooler with 1 x heat exchanger out of stainless steel, depth of housing 450 mm [≈ 17.7"], 230 V, 50 Hz, Ex version
EC-EX-1PV	02K5020	Gas cooler with 1 x heat exchanger out of PVDF, depth of housing 450 mm [≈ 17.7"], 230 V, 50 Hz, Ex version
/115V	02K...A	Power EC-EX 115 V 60 Hz

Additional heat exchangers installed

EC-G	02K9100	1 x Jet-Stream heat exchanger out of Duran® glass
EC-G-90°	02K9150	1 x Jet-Stream heat exchanger out of Duran® glass with 90° bend at the gas connectors
EC-SS	02K9200	1 x Jet-Stream heat exchanger out of stainless steel 316Ti
EC-PV	02K9300	1 x Jet-Stream heat exchanger out of PVDF

Options

/PT 100	02K9500	PT 100 Sensor integrated in cooling block of EC/ECS for external temperature controlling
EC-F*	02K9530	Universal unit with 2 fans and dust filter for mounting under EC/ECS cooler, completely assembled, 230 V, 50 Hz or 115 V, 60 Hz, not available for EC-EX
/SR25.2	01P9140	Extra charge for 1 pc. peristaltic pump SR25.2 integrated in the front plate of the cooler, compl. installed, cooler weight plus 0.6 kg [≈ 1.3 lbs] per pump, up to 4 pumps

1) 19"-housing on request - please indicate in your order

* Separate data sheets for the EC-F unit, peristaltic pumps, collecting vessels and fittings are available on www.mc-techgroup.com.

Order example:

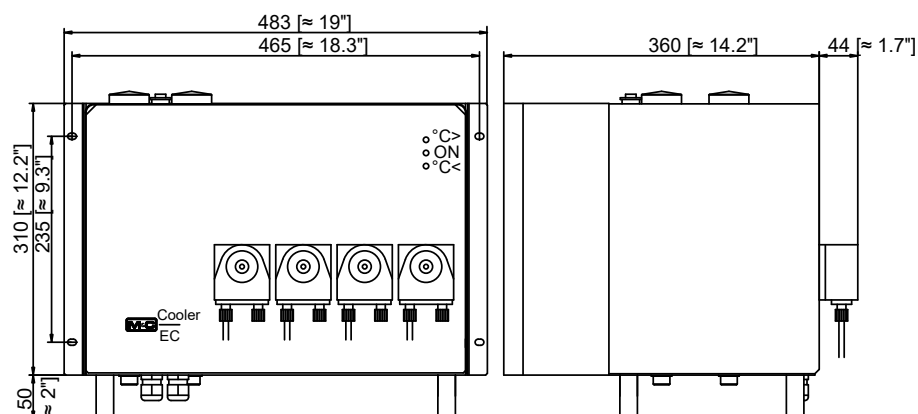
1 x Gas cooler ECS, power 115 V 60 Hz, with 4 x glass heat exchangers and 4 x peristaltic pumps; Part Numbers.

1 x 02K1500Xa (ECS without heat exchanger)

4 x 02K9100 (glass heat exchanger)

4 x 01P9140 (peristaltic pump SR25.2)

Gas cooler ECS with SR25.2 integrated in the front plate of the cooler



Dimensions in mm [Inches]



EC-F, EC-FD

Universal Unit Series EC®

Versions EC-F, EC-FD, EC-D

Special Features

- **EC-F unit for forced ventilation of the EC/ECS gas cooler at higher ambient temperatures**
- **EC-FD unit for forced ventilation of the EC/ECS gas cooler plus automatic condensate drainage**
- **Including ambient air dust filter pad**
- **EC-D unit for automatic condensate drainage**
- **Compact design**
- **Minimum maintenance**
- **Exclusively factory-assembled under gas coolers EC, ECS**

Application

The M&C gas cooler EC/ECS is used in gas analysis to lower the dew point of humid gas in order to prevent condensation in the analyzer.

With higher ambient temperatures or in case of gas conditioning systems in a protective housing with low ventilation, it is often necessary to mount an EC-F or EC-FD universal unit under the gas cooler EC/ECS for adequate forced ventilation.

For automatic condensate drainage, the universal units EC-FD and EC-D equipped with up to 4 peristaltic pumps SR25.1 are mounted under the EC cooler in a compact and service-friendly manner.

Description

The M&C universal unit EC-F is equipped with 2 fans and an ambient air dust filter pad, which can be easily replaced in a drawer, for forced ventilation of the EC cooler .

The universal unit EC-FD is also equipped with 2 fans and an ambient air dust filter pad, which can be easily replaced in a drawer, and can be supplied with up to 4 peristaltic pumps for automatic condensate drainage.

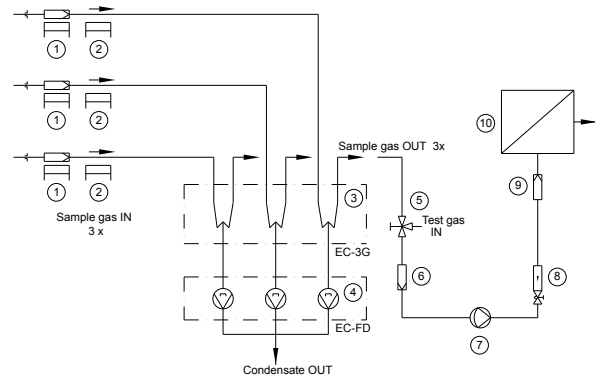
The M&C universal unit EC-D with integrated automatic condensate drainage does not have a fan, but up to 4 peristaltic pumps SR25.1. The basic equipment includes 1 pump.

M&C universal units are mounted under the EC/ECS gas cooler exclusively by the factory. Retrofitting incurs considerable additional expenditure.

Example application for EC-3G /FD

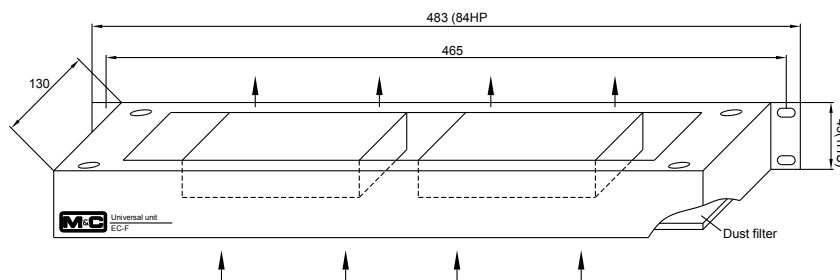


- 1 Heated gas sample probe SP2000-H
- 2 Heated sample line 4M4/6
- 3 Gas cooler EC-3G
- 4 Universal unit EC-FD with 3 peristaltic pumps SR25.1
- 5 3-way ball valve 3L/PV-1
- 6 Fine filter FP-2T-D with liquid alarm LA1
- 7 Diaphragm pump MP 47
- 8 Flow meter FM 10
- 9 Aerosol filter CLF-5/W optional according to application
- 10 Analyzer PMA..

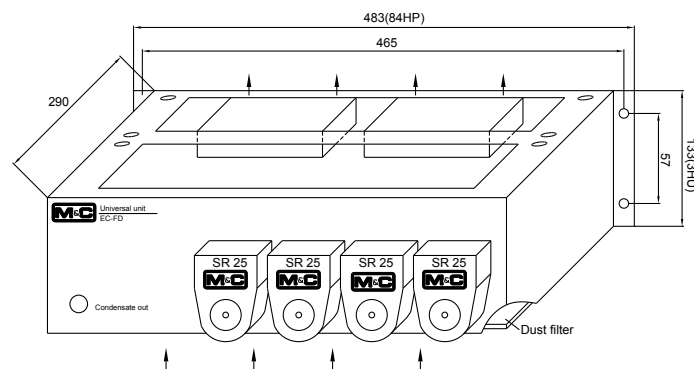


Dimensions

Universal Unit EC-F



Universal Unit EC-FD



Dimensions in mm

Technical Data

Universal Unit EC	Version EC-F	Version EC-FD	Version EC-D
Part No.	02K9530 (a)**	02K9540 (a)**	02K9535 (a)**
Fan/ambient air dust filter pad	2 x/yes		
Peristaltic pump SR25.1		1 x basic; max. 4 pcs. can be mounted	
Condensate connection		1 x hose connection DN 4/6	
Sample gas pressure	See cooler/liquid drainer spec.	Max. 2.2 bar abs.	
Ambient temperature	+5 to +50 °C [41 to 122 °F]		
Ready for working	Immediately		
Main power connection	230 V/50Hz or **Part No. ...-a = 115 V/60 Hz		
Power consumption	35 VA	40 VA #	5 VA #
Electrical connection	Terminals 2.5 mm ² ; cabling intern with EC cooler		
Case protection	IP20 EN 60529		
Electrical standard	EN 61010		
Method of mounting	Substructure for EC cooler		
Case colour	RAL 9003		
Dimensions	84 HP x 1 U x 130 mm [≈ 5.1"]	84 HP x 3 U x 290 mm [≈ 11.4"]	
Weight approximately	2.1 kg [≈ 4.6 lbs]	5.8 kg [≈ 12.8 lbs]	5.2 kg [≈ 11.5 lbs]
Option:			
Part No. for one additional SR25.1 peristaltic pump mounted into a universal unit		1 x 01P1000 + 1 x 01P9100	