ECEX

Gas Cooler Series EC®

Version ECS and ECEX
for 4 x 250 Nl/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 [< ±0.45 °F]**
- **Status alarm contact standard**
- **High reliability**
- **Self-monitoring**
- **ATEX certified versions for hazardous zone 1 areas**

Application

ECS and ECEX 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 vapor cross-sensitivity and volumetric errors.

Description

The electronically controlled compressor cooling system and the special design of the jet stream heat exchangers ensure optimum dew point reduction to a low, stable value and reliable condensate separation. External condensate pre-separation is not required.

The innovative design allows up to 4 heat exchangers to be installed at the factory or easily retrofitted, which can also be connected in series or parallel. Depending on the requirements, heat exchangers are available in a wide range of materials. LEDs signal the operating status as well as under- and overtemperature. An alarm function is triggered at a temperature deviation of ±3 °C [±5.4 °F]. The gas coolers are self-monitoring and maintenance-free.

Up to 4 peristaltic pumps can be installed in the ECS for condensate removal. Alternatively, the condensate can be discharged with a trap or collected in a collecting vessel. Another option is the subassembly of a condensate drain unit with up to four peristaltic pumps.

The universal base units EC-D (with one peristaltic pump) and EC-FD (with one peristaltic pump and two fans) can be used for automatic condensate drainage if the peristaltic pumps cannot be mounted directly in the front panel of the ECS.

For ambient temperatures that are over 40 °C [104 °F], the EC-F cooler ventilation unit and the EC-FD combined cooler ventilation and condensate drain unit can be mounted under the ECS cooler for forced ventilation.

The ECEX cooler can be equipped with the EC-D/Ex condensate drain unit for automatic condensate drainage.

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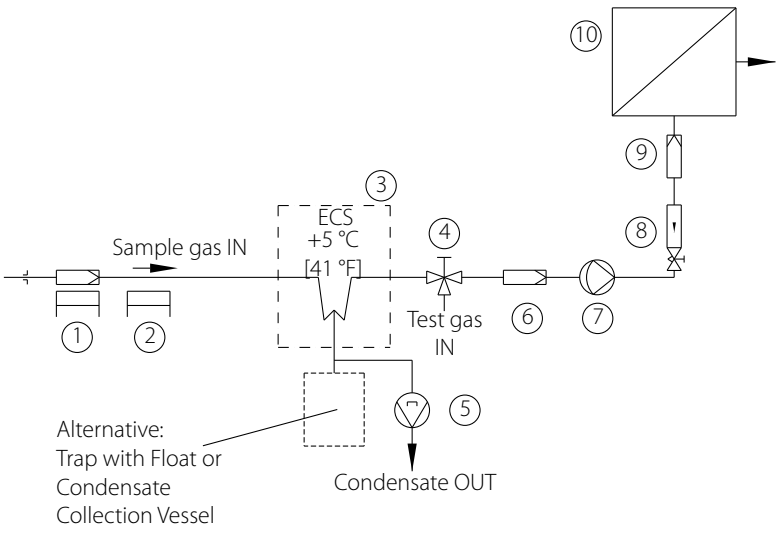
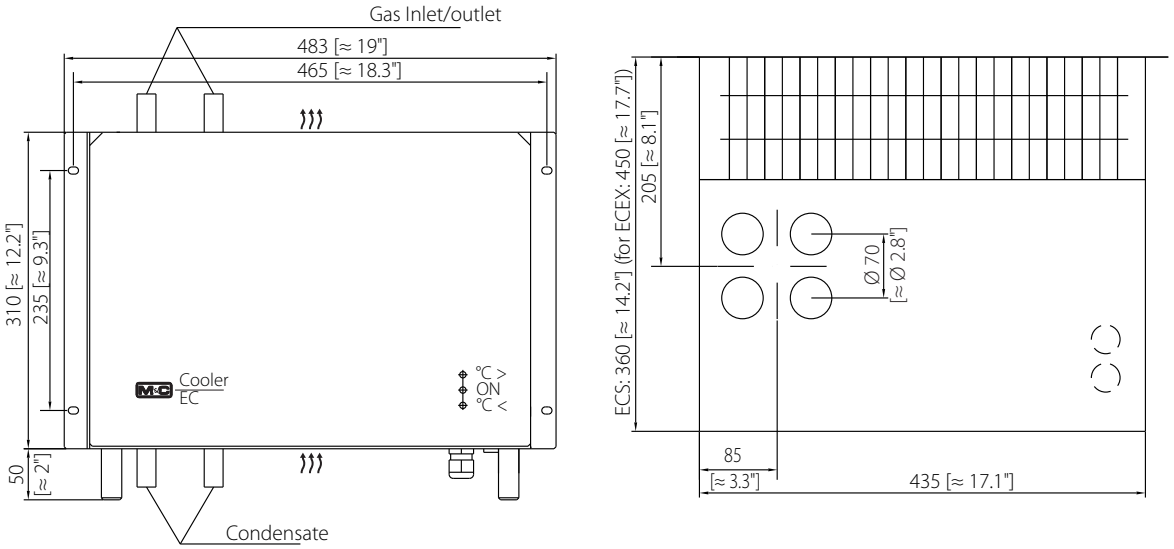
Application example for ECS

1 Heated gas sample probe 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 Fine filter FP-2T-D with liquid alarm LA1S
7 Sample gas pump
8 Flow meter FM10
9 Aerosol filter CLF-5/W optional according to application
10 Analyzer



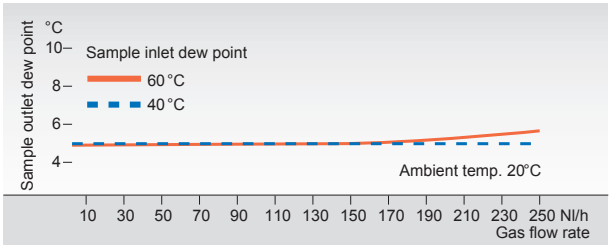
Dimensions

Gas cooler ECS/ECEX

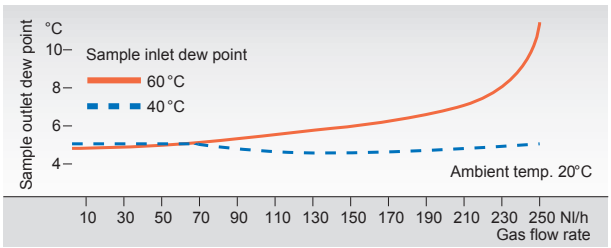


Dimensions in mm [Inches]
Air flow direction

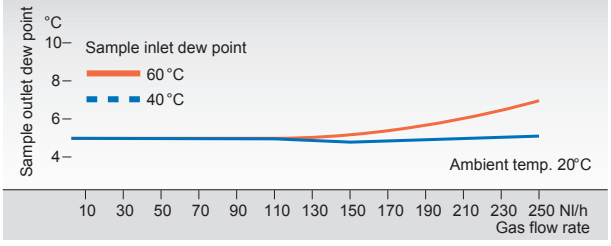
Cooler type EC-G with heat exchanger out of glass



Cooler type EC-PV with heat exchanger out of PVDF



Cooler type EC-SS with heat exchanger out of SS316Ti



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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 exchanger	250 Nl/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: ECEX 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	II 2G Ex pxb db eb q [ib] IIC T4 Gb (Certificate No. BVS 17 ATEX E 080) Starting from serial No. 1904XXXX: Ex pxb db eb q [ib] IIC T4 Gb (Certificate No. IECEx BVS 18.0021)
Case color	RAL 9003	
Method of mounting	19"-rack or wall mounting	
Dimensions (W x H x D)	483 x 310 x 360 mm [≈ 19" x 12.2" x 14.2"], with equipment feet: 483 x 360 x 360 mm [≈ 19" x 14.2" x 14.2"]	483 x 310 x 450 mm [≈ 19" x 12.2" x 17.7"], with equipment feet: 483 x 360 x 450 mm [≈ 19" x 14.2" x 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 Nl/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 differerent 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: Nl/h and Nl/min refer to the German standard DIN 1343 and are based on these standard conditions: 0 °C [32 °F], 1013 mbar.

Gas cooler ECS/EC-EX

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 ECS 115 V 60 Hz
ECEX-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
ECEX-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
ECEX-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 ECEX 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 for ECS cooler		
/PT 100	02K9500	PT 100 Sensor integrated in cooling block of ECS for external temperature controlling
EC-F*	02K9530	Universal unit type EC-F in wall-mounted or 19**"** rack housing for substructure on ECS coolers, with 2 fans and dust filter drawer, mains:230 V, 50 Hz or 115 V, 60 Hz
/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
Options for ECEX cooler		
EC-D/Ex*	02K9550(a)	Universal unit type EC-D/Ex as 19**"** rack with 3 U, for mounting under the ECEX cooler with one peristaltic pump type SR25.1Ex (max. 4 pcs.) for automatic condensate removal, completely connected to the cooler with tubing in Novoprene/ PVDF, condensate outlet: DN 4/6, power: 230 V/50 Hz, separate power supply required

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:

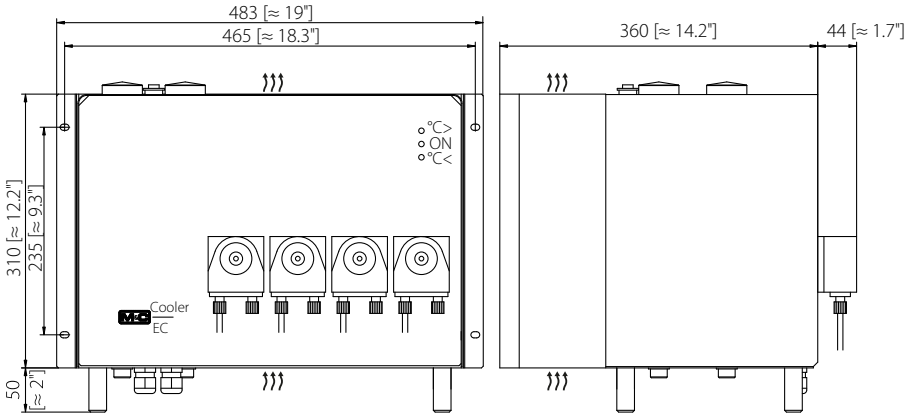
1 x Gas cooler ECS, power 115 V 60 Hz, with 4 x glass heat exchangers and 4 x peristaltic pumps; part numbers:

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 [inch]
Air flow direction

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EC-F (above) , EC-FD with 3 x SR25.2 (below)

Universal Unit Series EC®

Versions EC-F, EC-FD, EC-D and EC-D/Ex

Special Features

- **Cooler ventilation unit EC-F for forced ventilation at higher ambient temperatures**
- **Cooler ventilation and condensate drain unit EC-FD for forced ventilation and automatic condensate drainage**
- **Cooler ventilation units EC-FD and EC-F are equipped with air recirculation filter mat**
- **EC-D and EC-D/Ex are condensate drain units only**
- **EC-D and EC-FD are equipped with one SR25.2 peristaltic pump**
- **EC-D/Ex is eqipped with one SR25.1/Ex peristaltic pump**
- **Compact design**
- **Minimum maintenance**

Application

The M&C gas coolers ECS and ECEX are used in gas analysis to lower the dew point of humid gas in order to prevent condensation in the analyzer.

In the case of increased ambient temperatures or analyzer systems in protective cabinets with insufficient ventilation, it may often be necessary to combine the ECS compressor cooler with the EC-F or EC-FD base unit for forced ventilation.

The EC-FD and EC-D universal base units with automatic condensate drainage can be used with the ECS compressor cooler if the peristaltic pumps cannot be mounted directly in the ECS front panel.

For additional automatic condensate drainage for the ECEX cooler, the universal base unit EC-D/Ex can be used.

Description

The M&C EC-F cooler ventilation unit has two fans and a replaceable recirculating air filter mat, which is easily accessible in a drawer.

The EC-FD cooler ventilation and condensate drain unit is also equipped with two fans and a recirculating air filter mat, plus an SR25.2 peristaltic pump for automatic condensate drainage.

The EC-D condensate drain unit includes an SR25.2 peristaltic pump for automatic condensate drainage.

The EC-D/Ex universal base unit is equipped with an SR25.1/Ex peristaltic pump.

In total, up to four peristaltic pumps can be inserted into the housings of the EC-D and EC-D/Ex for condensate drainage.

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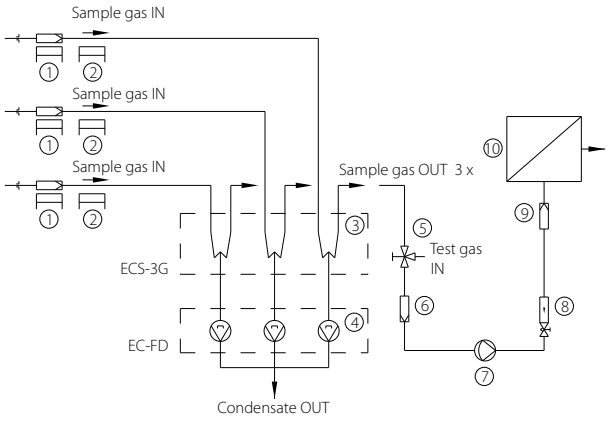
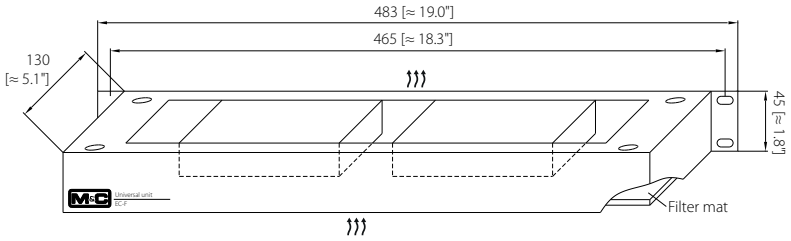
Example application for ECS-3G and EC-FD with 3 x SR25.2

1 Heated gas sample probe SP2000-H
2 Heated sample line 4M4/6
3 Gas cooler ECS-3G (ECS incl. 3 x heat exchangers)
4 Universal base unit EC-FD with 3 x peristaltic pumps SR25.2
5 3-way ball valve 3L/PV-1
6 Fine filter FP-2T-D with liquid alarm LA1S
7 Sample gas pump
8 Flow meter FM 10
9 Aerosol filter CLF-5/W optional according to application
10 Analyzer.

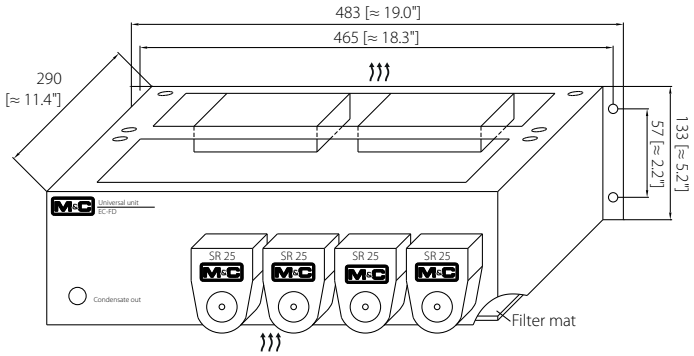


Dimensions

Universal base unit EC-F



Universal base unit EC-FD with 4 x SR25.2



Dimensions in mm [Inches]
Air flow direction

Technical Data

Universal Unit EC	Version EC-F	Version EC-FD	Version EC-D	Version EC-D/Ex
Part No.	02K9530(a)*	02K9540(a)*	02K9535(a)*	02K9550(a)*
Fan/air recirculation filter mat	2 x fans/1 x air recirculation filter mat		No/No	No/No
Peristaltic pumps	No	1 x SR25.2 included; max. 4 pcs.		1 x SR25.1/Ex included; max. 4 pcs
Condensate connection	No	1 x tube 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/50 Hz or Part No. with (a)* = 115 V/60 Hz			
Power consumption	35 VA	40 VA	5 VA	5 VA
Electrical connection	Terminals 2.5 mm², internally wired to the ECS cooler			Separate mains supply, cable gland: M20, terminal 2.5 mm²
Case protection	IP20 EN 60529			IP40 EN 60529
Electrical standard	EN 61010			EN 60079-0, EN 60079-7, EN 60079-18
ATEX marking	No			Ex II 2 G II T5
Method of mounting	Attached to the bottom of the cooler (substructure)			
Case color	RAL 9003			
Dimensions	483 x 45 x 130 mm [≈ 19" x 1.8" x 5.1"]	483 x 133 x 290 mm [≈ 19" x 5.2" x 11.4"]		
Weight approximately	2.1 kg [≈ 4.6 lbs]	5.8 kg [≈ 12.8 lbs]	5.2 kg [≈ 11.5 lbs]	5.6 [≈ 12.3 lbs]
Option:				
Part numbers for one additionally factory installed pump	No	1 x 01P1300 (SR25.2) + 1 x 01P9100 (factory installation)		1 x 01P1201 (SR25.1/Ex)+ 1 x 01P9100 (factory installation)

* (a) is an addition to the Part No. for 115 V versions.

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