



ModbusRTU

Sample gas cooler RC 1.1

Many gas analysis processes require extracting sample gas from the process. This also extracts process-related contamination such as particles or moisture. These can impact the measurement results or damage the measuring cells. The sample gas must therefore be conditioned before entering the analyser. The sample gas cooler reduces the gas temperature to below the dew point for this purpose, causing moisture to drop out, which is then discharged as condensate.

In addition to the status output to monitor the sample gas cooler function, we offer an optional 4 – 20 mA analog output or digital interface. The process control can access the process and diagnostic data via the Modbus RTU interface as well as configure the device settings.

The RC 1.1 is a compressor sample gas cooler designed for high cooling output and high ambient temperatures. Depending on the application, it can be configured with one or two gas paths. This makes it a vital cooling component in sophisticated analysis systems.

Compact design: Pre-installed and ready to connect

Choose from one or two gas paths

Heat exchanger made from stainless steel, Duran glass and PVDF

Adjustable outlet dew point and alarm thresholds

Cooling block temperature display

Status display and output

Rated cooling power 341 Btu/h

Constant dew point stability ± 0.2 °F

Optional 4 - 20 mA or Modbus RTU signal output

Moisture detector, filter and condensate pump optional

Successor to the EGK 1/2 and EGK 1SD



Overview

The RC 1.1 series was designed specifically for high cooling capacities and high ambient temperatures.

The compressor coolers are distinguished by two types based on the cooling nests. This classification is reflected in the type designation. The exact item number of the model defined by you is determined by the model code in the ordering information category.

Additional components which every conditioning system should feature can optionally be integrated:

- Peristaltic pump for condensate separation
- Filter
- Moisture detector

In addition, we offer different signal outputs:

- Status output
- Analog output, 4...20 mA, incl. status output,
- Modbus RTU digital output, incl. status output

This allows for various configurations of the cooler and its options. Here the approach is to simplify the creation of a complete system in a cost-efficient way using pre-installed components with hoses connected. We also prioritised easy access to wear parts and consumables.

Gas cooler technical data

Gas cooler technical data			
Ready for operation	after max. 15 minutes		
Rated cooling capacity (at 77 °F)	341 Btu/h		
ambient temperature	41 °F to 122 °F		
Gas outlet dew point			
preset:	41 °F		
adjustable:	37 °F to 68 °F		
Dew point fluctuations			
static:	± 0.1 K		
in the entire specification range:	± 1.5 K		
IP rating	IP 20		
Housing	Stainless steel		
Packaging dimensions	approx. 16.5 x 17.3 x 13.8 in		
Weight incl. heat exchanger	approx. 35.2 lb		
Electric supply	115 V, 60 Hz or 230 V, 50/60 Hz ± 5% Plug per DIN EN 175301-803		
Electrical data		230 V	115 V
	Typical power input:	396 VA	402 VA
	max. operating current:	2.5 A	5 A
Alarm output switching connection	max. 250 V, 2 A, 50 VA Connector per DIN EN 175301-803		
Installation	stand-alone or wall-mounted		

Technical Data - Options

Technical Data Peristaltic Pumps CPsingle / CPdouble

Flow rate	0.005 lpm (50 Hz) / 0.006 lpm (60 Hz) with standard hose
Vacuum inlet	max. 11.6 psi
Pressure inlet	max. 14.5 psi
Outlet pressure	14.5 psi
Hose	4 x 1.6 mm (0.04 in)
Condensate outlet	Hose nipple Ø6 mm (0.24 in) Screw connection 4/6 (metric), 1/6"-1/4" (US)
Protection class	IP 40
Materials	
Hose:	Norprene (Standard), Marprene, Fluran
Connections:	PVDF

Analogue Output Cooler Temperature Technical Data

Signal	4-20 mA or 2-10 V corresponds to -4 °F to 140 °F cooler temperature
Connection	M12x1 plug, DIN EN 61076-2-101

Digital interface technical data

Signal	Modbus RTU (RS-485)
Connection	M12x1 connector, DIN EN 61076-2-101

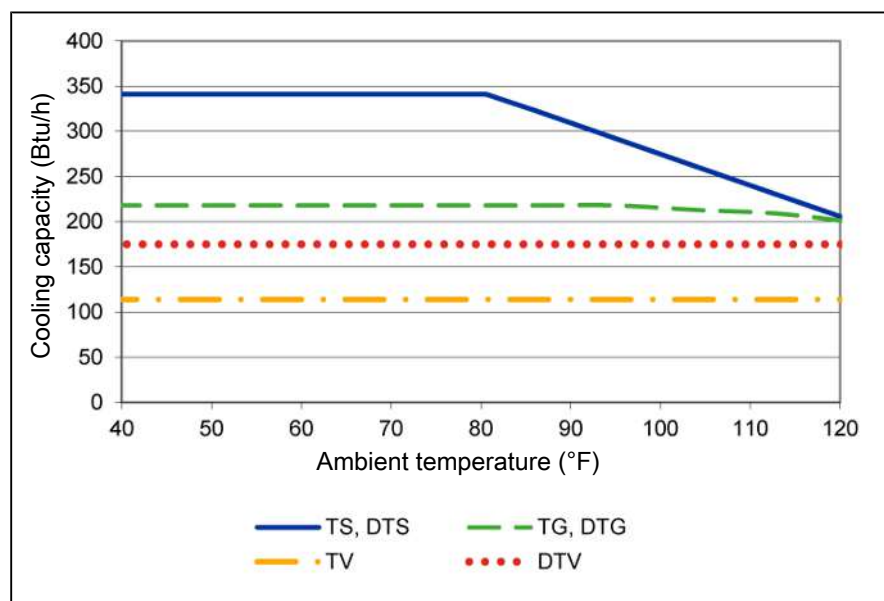
Technical Data Filter AGF-PV-30-F2-L

Ambient temperature	37 °F to 212 °F
max. operating pressure with filter	58 psi
Filter surface	19.4 in ²
Filter fineness	2 µm
Dead volume	6.59 cu. in.
Materials	
Filter:	PVDF, Duran glass (parts in contact with mediums)
Seal:	Viton
Filter element:	sintered PTFE

Technical Data FF-3-N Moisture Detector

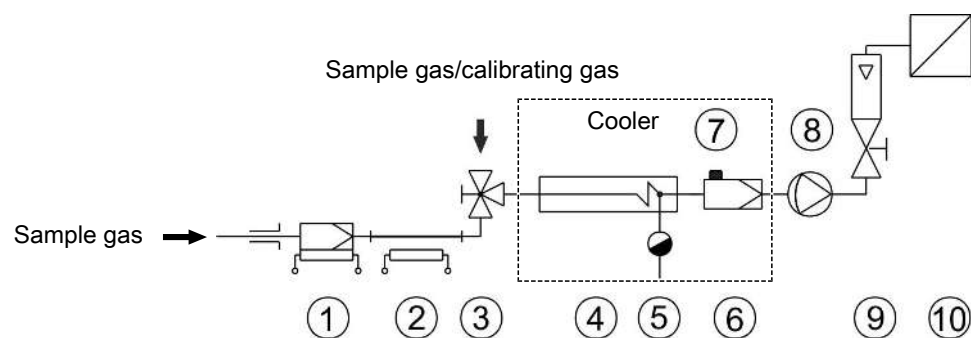
Ambient temperature	37 °F to 122 °F
max. operating pressure with FF-3-N	29 psi
Material	PVDF, PTFE, epoxy resin, stainless steel 1.4571, 1.4576

Performance data



Note: The limit curves for the heat exchangers exchanger apply to a dew point of 149 °F.

Diagram typical installation



1 Sample gas probe	2 Sample gas line
3 Reversing tap	4 Sample gas cooler
5 Automatic condensate drain or peristaltic pump	6 Fine mesh filter
7 Moisture detector	8 Sample gas pump
9 Flow meter	10 Analyser

See data sheets for individual component types and data.

Heat exchanger description

The energy content of the sample gas and the required cooling capacity of the gas cooler is determined by three parameters: gas temperature ϑ_G , (inlet) dew point τ_e (moisture content) and volume flow v . The outlet dew point rises with increasing energy content of the gas. The approved energy load from the gas is therefore determined by the tolerated rise in the dew point.

The following limits are specified for a normal standard operating point of $\tau_e = 149^\circ\text{F}$ and $\vartheta_G = 194^\circ\text{F}$. The maximum volume flow v_{\max} in NI/h of cooled air is indicated, so after moisture has condensed.

If the values fall below τ_e and ϑ_G , the flow v_{\max} may be increased. For example, on the TG heat exchanger the parameter triple $\tau_e = 149^\circ\text{F}$, $\vartheta_G = 194^\circ\text{F}$ and $v = 4.7$ lpm may also be used in place of $\tau_e = 122^\circ\text{F}$, $\vartheta_G = 176^\circ\text{F}$ and $v = 6.3$ lpm.

Please contact our experts for clarification or refer to our design program.

Heat exchanger overview

Heat exchanger	TS TS-I ²⁾	TG TG	TV TV-I ²⁾	DTS (DTS-6 ³⁾) DTS-I (DTS-6-I ³⁾) ²⁾	DTG DTG	DTV ³⁾ DTV-I ²⁾ ³⁾
Materials in contact with media	Stainless steel	Glass PTFE	PVDF	Stainless steel	Glass PTFE	PVDF
Flow rate v_{\max} ¹⁾	8.9 lpm	4.7 lpm	2.6 lpm	2 x 4.2 lpm	2 x 2.3 lpm	2 x 2 lpm
Inlet dew point $\tau_{e,\max}$ ¹⁾	175 °F	175 °F	149 °F	175 °F	149 °F	149 °F
Gas inlet temperature $\vartheta_{G,\max}$ ¹⁾	356 °F	284 °F	284 °F	356 °F	284 °F	284 °F
Max. Cooling capacity Q_{\max}	427 Btu/h	218 Btu/h	114 Btu/h	427 Btu/h	218 Btu/h	175 Btu/h
Gas pressure p_{\max}	2321 psi	44 psi	44 psi	363 psi	44 psi	29 psi
Pressure drop Δp ($v=2.5$ lpm)	0.12 psi	0.12 psi	0.12 psi	0.1 psi each	0.1 psi each	0.22 psi each
Dead volume V_{tot}	4.2 cu. in.	2.9 cu. in.	7.9 cu. in.	1.7 / 1.5 cu. in.	1.7 / 1.5 cu. in.	1.3 / 1.3 cu. in.
Gas connections (metric)	G1/4	GL 14 (6 mm) ⁴⁾	DN 4/6	6 mm tube	GL14 (6 mm) ⁴⁾	DN 4/6
Gas connections (US)	NPT 1/4"	GL 14 (1/4") ⁴⁾	1/4"-1/6"	1/4" tube	GL14 (1/4") ⁴⁾	1/4"-1/6"
Condensate out connections (metric)	G3/8	GL 25 (12 mm) ⁴⁾	G3/8	Tube 10 mm (6 mm)	GL18 (10 mm) ⁴⁾	DN 5/8
Condensate out connections (US)	NPT 3/8"	GL 25 (1/2") ⁴⁾	NPT 3/8"	Tube 3/8" (1/4")	GL18 (3/8") ⁴⁾	3/16"-5/16"

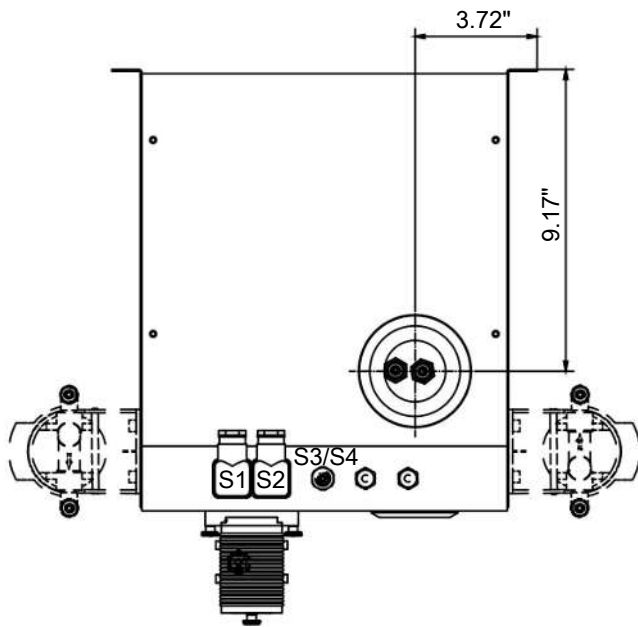
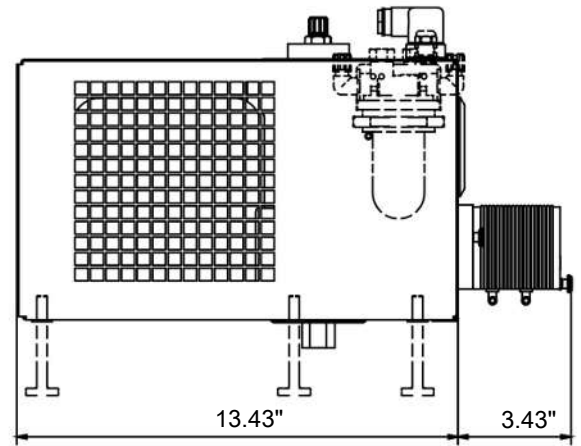
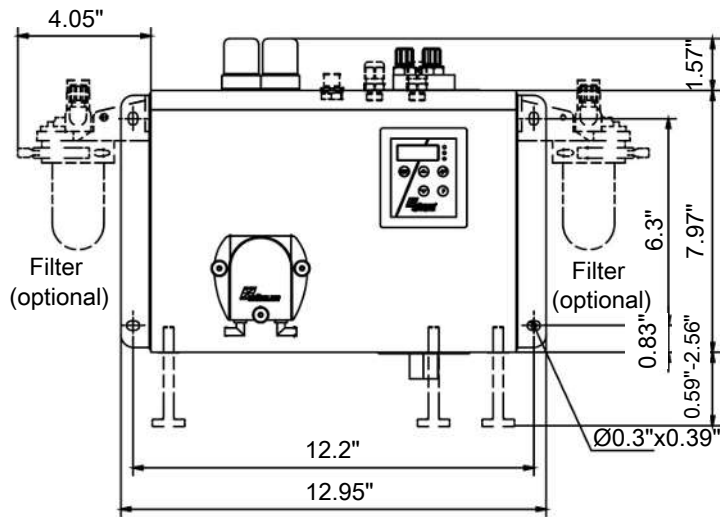
¹⁾ Max. cooling capacity of the cooler must be considered

²⁾ Models marked I have NPT threads or US tubes, respectively.

³⁾ Condensate drain only possible with condensate pump

⁴⁾ Gasket inside diameter

Dimensions



S1 = Electric supply

S2 = Alarm contact

S3/S4 = Analog/digital output (optional)

Ordering instructions

Gas cooler

The item number is a code for the configuration of your unit. Please use the following model code:

4596	2	1	1	0	X	X	X	X	X	0	X	X	X	0	0	0	0	0	Product Characteristics
																			Voltage
																			115 V, 60 Hz
																			230 V, 50/60 Hz
																			Heat exchanger
																			1 gas path, stainless steel/ (TS), metric
																			1 gas path, stainless steel/ (TS-I), US
																			1 gas path, glass/ (TG), metric
																			1 gas path, glass/ (TG), US hoses
																			1 gas path, PVDF/ (TV), metric
																			1 gas path, PVDF/ (TV-I), US
																			2 gas paths, stainless steel/ (DTS), metric
																			2 gas paths, stainless steel/ (DTS-6) ¹⁾ , metric
																			2 gas paths, stainless steel/ (DTS-I), US
																			2 gas paths, stainless steel/ (DTS-6-I) ¹⁾ , US
																			2 gas paths, glass/ (DTG), metric
																			2 gas paths, glass/ (DTG-I), US hoses
																			2 gas paths, PVDF/ (DTV) ¹⁾ , metric
																			2 gas paths, PVDF/ (DTV-I) ¹⁾ , US
																			Condensate drain²⁾
																			without condensate drain
																			CPsingle with adapter, angled ³⁾
																			CPdouble with adapter, angled ³⁾
																			CPsingle with screw connection, metric/US ³⁾
																			CPdouble with screw connection, metric/US ³⁾
																			Filter/moisture detector
																			without filter, without moisture detector
																			without filter, 1 moisture detector
																			without filter, 2 moisture detectors
																			Moisture detector in stainless steel adapter
																			2 moisture detectors in stainless steel adapter
																			1 filter, without moisture detector
																			1 filter, 1 moisture detector
																			1 filter, 2 moisture detectors
																			2 filters, without moisture detector
																			2 filters, 1 moisture detector
																			2 filters, 2 moisture detectors
																			Signal outputs
																			status output only
																			Analog output, 4..20 mA, incl. status output
																			Modbus RTU digital output, incl. status output

¹⁾ Condensate outlets only suitable for connecting peristaltic pumps.

²⁾ Peristaltic pumps also available for separate installation, see data sheet 450020.

³⁾ Supply voltage corresponds with that of the main unit.

Spare Parts and Accessories

Item no.	Description
41020050	Filter element F2-L; unit 2 count (for type RC 1.1)
41030050	Filter element F2; unit 5 count (for type RC 1.2+)
4410001	Automatic condensate drain 11 LD V 38
4410004	Automatic condensate drain AK 20, PVDF
4410005	Condensate trap GL 1; glass, 0.4 L
4410019	Condensate trap GL 2; glass, 1 L
459600026	Adapter plate EGK 1/2 to RC 1.1 and RC 1.2+
see data sheet 410001	Fine mesh filter AGF-PV-30
see data sheet 450020	Peristaltic Condensate Pumps CPsingle, CPdouble