ModbusRTU

Gas cooler series RC 1.2+

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 1.2+ features a new generation heat exchangers with a particularly low wash out effect of water-soluble components and are specifically suitable for measuring emissions. Most notably, the washout of SO_2 is low. RC 1.2+ coolers can therefore be used for so-called automated measuring systems (AMS) per EN 15267-3.

- Low wash out effects
- Suitable for AMS as per EN 15267-3
- Compact design: Pre-installed and ready to connect
- One gas path with two in-line heat exchangers
- Duran glass and PVDF heat exchanger
- Adjustable outlet dew point and alarm thresholds
- Cooling block temperature display
- Rated cooling power 390 kJ/h
- Constant dew point stability ± 0.1 °C
- Status display and output
- 4 – 20 mA or Modbus RTU signal output optional
- Moisture detector, filter and condensate pump optional

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Technical Data

Gas Cooler Technical Data

Ready for operation:	after max. 15 minutes		
Rated cooling capacity (at 25 °C):	390 kJ/h		
Ambient temperature:	5 °C to 50 °C		
Gas outlet dew point preset: adjustable:	 5 °C 3 °C to 20 °C		
Dew point fluctuations static: in the entire specification range:	 ± 0.1 K ± 1.5 K		
IP rating:	IP 20		
Housing:	Stainless steel		
Weight incl. heat exchanger:	approx. 15.5 kg		
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:	250 V, 2 A, 50 VA Plug per DIN EN 175301-803		
Packaging dimensions:	approx. 420 mm x 440 mm x 350 mm		

Technical Data - Options

Technical Data CPdouble Condensate Pump

Flow rate:	0.3 L/h (50 Hz) / 0.36 L/h (60 Hz) with standard hose
Inlet vacuum:	max. 0.8 bar
Inlet pressure:	max. 1 bar
Output pressure:	1 bar
Hose:	4 x 1.6 mm
Protection class:	IP 40
Materials Hose: Connections:	 Norprene (standard), Marprene, Fluran PVDF

Analogue Output Cooler Temperature Technical Data

Signal	4-20 mA or 2-10 V corresponds to -20 °C to +60 °C cooler temperature
Connection	M12x1 plug, DIN EN 61076-2-101

Digital interface technical data

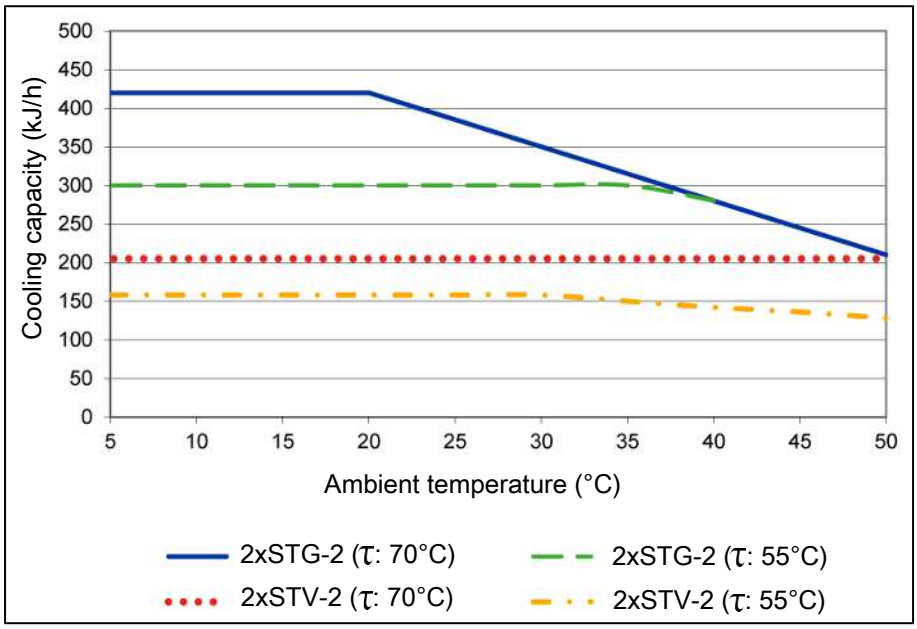
Signal	Modbus RTU (RS-485)
Connection	M12x1 connector, DIN EN 61076-2-101

Technical Data FF-3-N Moisture Detector

Ambient temperature	3 °C to 50 °C
max. operating pressure with FF-3-N	2 bar
Material	PVDF, PTFE, epoxy resin, stainless steel 1.4571, 1.4576

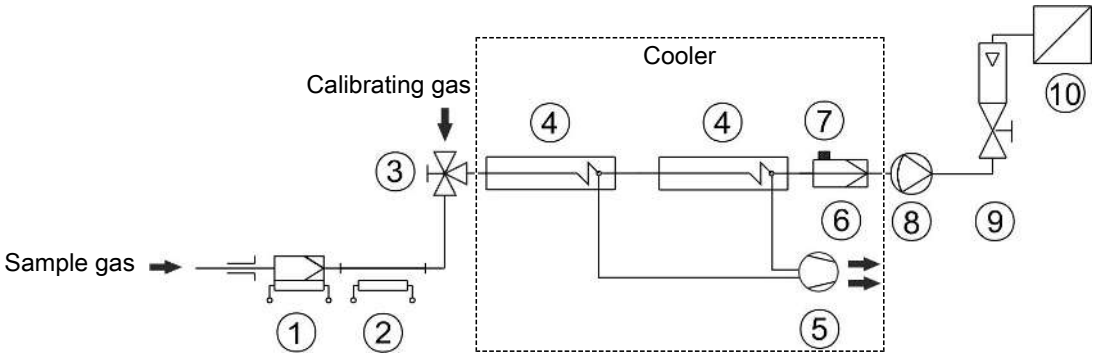
AGF-PV-30-F2 Filter Technical Data	
Ambient temperature	3 °C to 100 °C
max. operating pressure with filter	4 bar
Filter surface	60 cm^2
Filter fineness	2 µm
Dead volume	57 ml
Materials	
Filter:	PVDF, Duran glass (parts in contact with media)
Seal:	Viton
Filter element:	sintered PTFE

Performance data



Note: The limit curves of the heat exchangers apply to different dew points (τ), see legend.

Diagram typical installation



1	Sample gas probe	6	Fine mesh filter
2	Sample gas line	7	Moisture detector
3	Reversing tap	8	Sample gas pump
4	Sample gas cooler	9	Flow meter
5	Condensate Pump	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, 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 standard operating point of τ_e = 70 °C and ϑ_G = 110 °C. The maximum volume flow v_{max} in Nl/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, with the STG heat exchanger in place of τ_e = 70 °C, ϑ_G = 110 °C and v = 320 Nl/h the parameter triple τ_e = 50 °C, ϑ_G = 105 °C and v = 420 Nl/h may also be used.

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

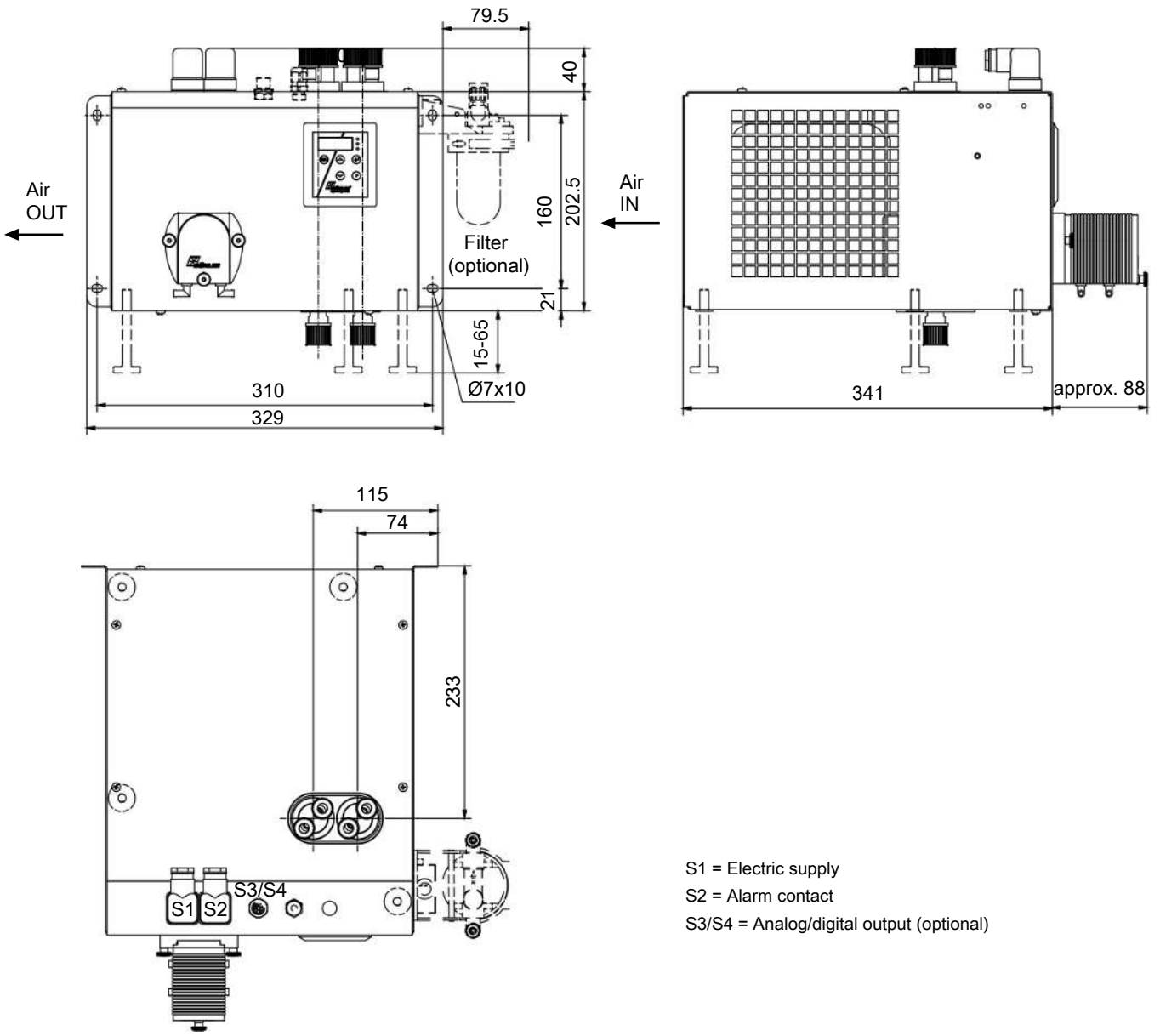
Heat exchanger overview

Heat exchanger	2x STG-2	2x STV-2
Materials in contact with media	Glass PTFE	PVDF
Flow rate v_{max} [1]	320 L/h	300 L/h
Inlet dew point $\tau_{e,max}$ [1]	70 °C	70 °C
Gas inlet temperature $\vartheta_{G,max}$ [1]	140 °C	140 °C
Gas pressure p_{max}	3 bar	3 bar
Pressure drop Δp (v=150 L/h)	2.6 mbar	2.9 mbar
Max. cooling capacity Q_{max}	345 kJ/h	210 kJ/h
Dead volume V_{dead}	47 ml	41 ml
Gas connections (metric)	GL 14 (6 mm) [2]	DN 4/6
Gas connections (US)	GL 14 (1/4") [2]	1/4"-1/6"
Condensate out connection (metric)	GL 18 (10 mm) [2]	G1/4
Condensate out connection (US)	GL 18 (10 mm) [2]	NPT 1/4"

[1] Considering the maximum cooling capacity of the cooler

[2] 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 key:

4596	2	1	2	0	X	X	X	X	X	0	X	X	X	0	0	0	0	0	Product Characteristics
																			Voltage
					1														115 V, 60 Hz
					2														230 V, 50/60 Hz
																			Heat exchanger
						1	2	2											1 gas path/ 2 heat exchangers, glass/ (STG-2), metric
						1	2	7											1 gas path/ 2 heat exchangers, glass/ (STG-2), US
						1	3	2											1 gas path/ 2 heat exchangers, PVDF/ (STV-2), metric
						1	3	7											1 gas path/ 2 heat exchanger, PVDF/ (STV-2), US
																			Condensate drain [1]
									0	0									without condensate drain
									2	0									Condensate pump CPdouble with hose nipple, angled [2]
									4	0									Condensate pump CPdouble with screw connection, metric/US [2]
																			Filter and moisture detector
											0								without filter
											1								1 filter
																			Moisture detector
												0							without moisture detector
												1							1 moisture detector
												3							Moisture detector in stainless steel adapter
												4							2 moisture detectors in stainless steel adapter
																			Signal outputs
													0						status output only
													1						Analog output, 4..20 mA, incl. status output
													2						Modbus RTU digital output, incl. status output

[1] Condensate pumps also available for separate installation, see data sheet 450020.

[2] The 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