

# Sample gas cooler RC 1.2+

Sample gas coolers are used in extractive gas analysis. The sample gas is taken from the process and may contain impurities such as particles or moisture that can damage the measuring cells or influence the measurement results. For this reason, the moist gas is cooled below the dew point in the sample gas cooler, causing the moisture to condense so it can be removed from the system.

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.

The natural refrigerant R600a meets the requirements of EU Regulation (EU) 2024/573 and is a very environmentally friendly solution thanks to the reduction in CO, emissions. At the same time, it ensures the future-proof operation of your systems that comply with legal requirements in the long term. Optimised for gases with water-soluble substances (e.g. SO<sub>2</sub>)

Can be used for systems for continuous emission monitoring pursuant to EN 15267-3 due to low wash-out effects

Efficient cooling with a nominal output of 390 kJ/h

Accurate setting of the gas outlet dew point in a range from +3 °C to 20 °C with a constant dew point stability of  $\pm$  0.1 K

Corrosion-resistant heat exchanger made of DURAN glass or PVDF

Ambient temperature from +5 °C to +50 °C

Future-proof and climate-friendly: Use of natural refrigerants instead of HFC refrigerants

Option: Signal output 4 - 20 mA for function and temperature monitoring

Option: Digital output (Modbus RTU) for device configuration and access to process and diagnostic data



# RC 1.2+

#### Overview

The RC 1.2+ series was designed specifically for the requirements in so-called automated measuring systems (AMS) according to EN 15267-3. The series connection of the heat exchangers will cool in two cycles to minimise wash-out effects.

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.

Application	Cooler model	Heat exchanger
Washout-optimised gas cooling	RC 1.2+	2 heat exchangers in series

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

- Peristaltic pump for condensate separation
- Filter,
- Moisture detector.

In addition, we offer a range of signal outputs:

- Status output,
- Analogue 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.

#### **Technical Data**

Gas Cooler Technical Data			
Rated cooling capacity (at 25 °C):	390 kJ/h		
Ambient temperature:	5 °C to 50 °C		
Ready for operation:	after max. 15 minutes		
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		
	l able-top or wall mounting		
Housing:	Stamless steel		
Packaging dimensions:	approx. 530 x 400 x 400 mm		
Weight:	approx. 15 kg		
max. altitude:	Altitudes up to 2000 m		
Refrigerant:	R600a (28 g)		
Electrical connection:	Plug per DIN EN 175301-803		
Contamination level:	2		
Overvoltage category:	II		
Electrical data:		230 V	115 V
Available options may result in details that differ from these	Tolerance:	+/-10% at 50 Hz +/-10% at 60 Hz	- +/-10% at 60 Hz
	Typical power input:	414 VA	345 VA
	max. operating current:	1.8 A	3.0 A
	Starting current:	2.3 A	3.6 A
	Protection:	4 A (delayed action)	4 A (delayed action)
Status output switching capacity:	max. 250 V AC, 150 V DC 2 A, 50 VA, potential-free		
Condensate outlet:	Hose nipple Ø5 mm or with screw connection (metric/US)		
Parts in contact with media Filter: Moisture detector:	see "Technical Data - Options" see "Technical Data - Options"		
Heat exchanger:	see table "Heat Exchanger Overview"		
Peristaltic pump: Tubing:	see "Technical Data - Options" PTFE/FKM (Viton)		

### Technical Data - Options

Analogue Output Technical Data		
Signal:	4-20 mA or 2-10 V	
-	corresponds to -20 °C to +60 °C cooling block temperature	
Connection:	M12x1 connector, DIN EN 61076-2-101	
Technical Data, digital output		
Signal:	Modbus RTU (RS-485)	
Connection:	M12x1 connector, DIN EN 61076-2-101	
Technical Data CPdouble Condensate P	umps	
Ambient temperature:	0 °C to 60 °C	
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.1bar	
Outlet pressure:	1 bar	
Weight:	0.51 kg	
Hose:	4 x 1.6 mm	
Condensate outlet:	Hose nipple Ø5 mm Screw connection 4/6 (metric), 1/6"-1/4" (US)	
IP rating:	IP 40	
Materials		
Hose:	Tygon (Norprene)	
Connections:	PVDF	
Technical Data FF-3-N Moisture Detecto	or	
Ambient temperature:	3 °C to 50 °C	
max. operating pressure with FF-3-N:	2 bar	
Weight:	0.04 kg (incl. cable)	
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	
Weight:	0.24 kg	
Filter surface:	60 cm <sup>2</sup>	
Filter fineness:	2 μm	
Dead volume:	57 ml	
Materials		
Filter:	PVDF, DURAN glass (parts in contact with media)	
Seal:	FKM (Viton)	
Filter element:	sinterea PIFE	



#### Diagram typical installation



See data sheets for individual component models and data.

#### Performance data



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

## RC 1.2+

#### 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  $\vartheta_G$ , dew point  $T_e$  (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  $\tau_e = 70$  °C and  $\vartheta_G = 110$  °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  $\tau_e$  and  $\vartheta_c$ , the flow  $v_{max}$  may be increased. For example, with the STG heat exchanger in place of  $\tau_e = 70$  °C,  $\vartheta_G = 110$  °C and v = 320 Nl/h the parameter triple  $\tau_e = 50$  °C,  $\vartheta_G = 105$  °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	2 x STG-2	2 x STV-2
Materials in contact with media	DURAN Glas PTFE	PVDF
Weight	2 x 0.14 kg	2 x 0.11 kg
Flow rate v <sub>max</sub> <sup>1)</sup>	320 L/h	300 L/h
Inlet dew point T <sub>e,max</sub> <sup>1)</sup>	70 °C	70 °C
Gas inlet temperature $\vartheta_{G,max}$ 1)	140 °C	140 °C
Gas pressure p <sub>max</sub>	3 bar	3 bar
Pressure drop Δp (v=150 L/h)	2.6 mbar	2.9 mbar
Max. Cooling capacity Q <sub>max</sub>	345 kJ/h	210 kJ/h
Dead volume V <sub>dead</sub>	47 ml	41 ml
Gas connections (metric)	GL 14 (6 mm) <sup>2)</sup>	DN 4/6
Gas connections (US)	GL 14 (1/4") <sup>2)</sup>	1/4"-1/6"
Condensate out connection (metric)	GL 18 (10 mm) <sup>2)</sup>	G1/4
Condensate out connection (US)	GL 18 (10 mm) <sup>2)</sup>	NPT 1/4"

<sup>1)</sup> Max. cooling capacity of the cooler must be considered.

<sup>2)</sup> Gasket inside diameter.







S1 = Electric supply S2 = Status output S3/S4 = Analogue/digital output (optional) **Ordering instructions** 

#### Gas cooler with two heat exchangers in series

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



4596 3 1 2 0 X X X X 0 X X X 0 0 0 0 0 0 Product characteristic

<sup>1)</sup> The supply voltage corresponds with that of the main unit.

#### **Spare Parts and Accessories**

ltem 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