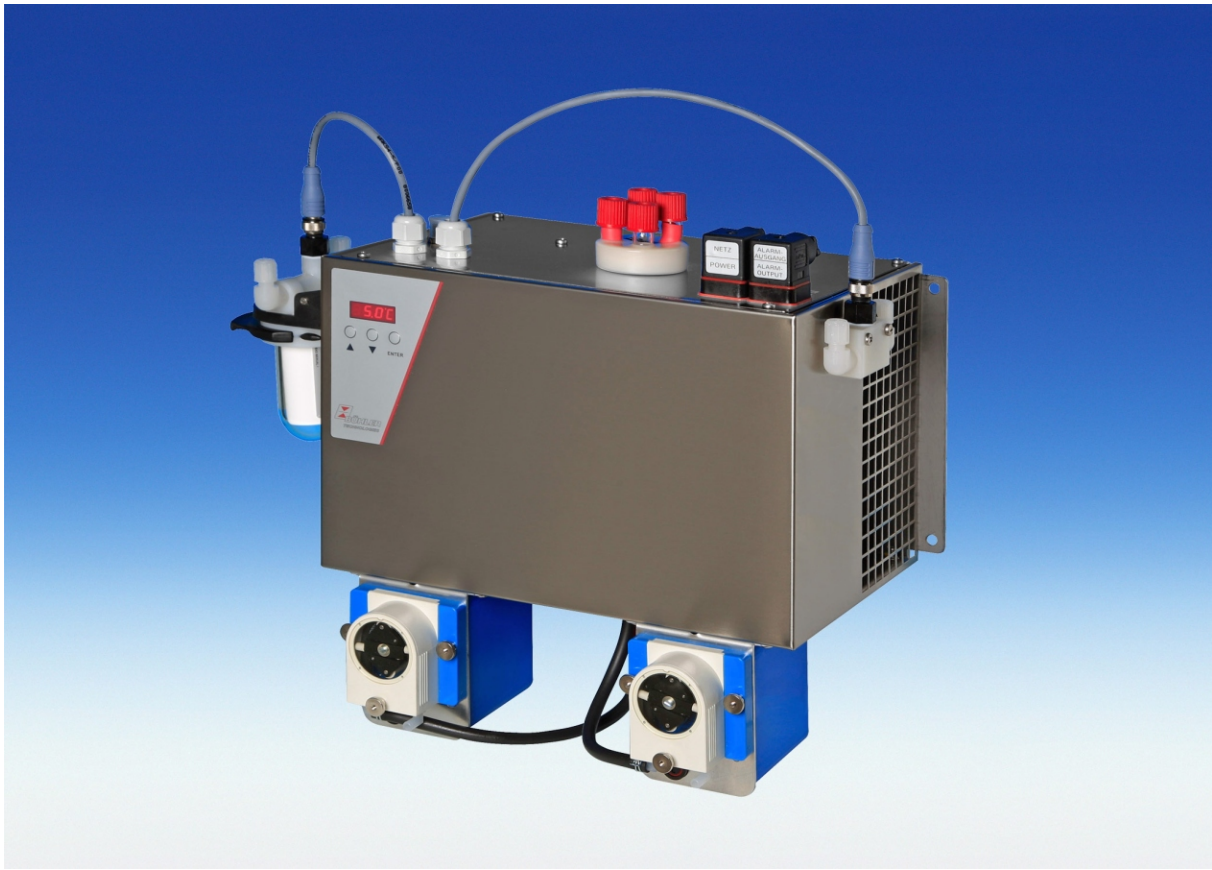


Sample Gas Cooler PKE 52



The PKE 52 is the most powerful Peltier cooler in our series. Our quality heat exchangers are available in various materials like stainless steel, Duran glass or PVDF are available as well as one or two gas paths.

The controller keeps the adjustable output dew point constant. The cooling block temperature is shown on the display. A fail-safe circuit with relay output monitors extreme temperature levels. The output signal may be used to switch the sample gas pump on or off in order to ensure that the gas flow is turned on only when reaching the allowable cooling range.

Depending on the application, PKE 52 can be equipped with stainless steel, glass or PVDF heat exchangers and with 1 or 2 gas paths. The condensate can be drained with the built-in peristaltic pumps. A micro filter can be mounted to the cooler. As an option and a moisture detector can be integrated into the micro filter.

Measurement and display of signals are by the internal micro controller and the LED display.

Multiple combinations and pre-mounted parts allow easy and cost efficient integration of several sample gas conditioning components into one device.

- **Compact design: completely pre-assembled and ready for connecting**
- **Low maintenance cost due to easy accessibility**
- **One or two gas paths**
- **Heat exchanger made of stainless steel, Duran glass or PVDF**
- **Adjustable outlet dew point and alarm limits**
- **Self-monitoring**
- **Status outputs**
- **Ambient temperatures up to 50°C**
- **Nominal cooling capacity 200 kJ/h**
- **Dew point stability 0.1 K**

Modular design

The concept of PKE 52 is based on a cooler with various heat exchanger.
Optional components commonly found in conditioning system can be integrated:

- peristaltic pumps for condensate drainage
- filters
- moisture detectors

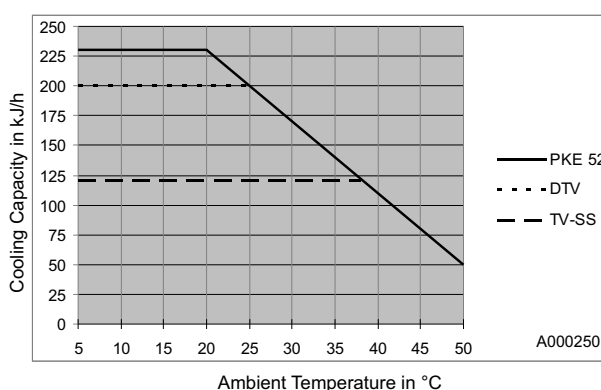
Due to the several options, the cooler can easily be customized. This modular approach combines many of the discrete functions of previous designs therefore minimizing cost and assembly time.

The condition of the filter element can be viewed easily through the glass and the moisture detector is easy to maintain.

Technical data

Warming up time after max.	10 min.
Nominal cooling capacity (at 25°C)	200 kJ/h
Ambient temperature	+5...50 °C
Factory set dew point	ca. 5 °C
Dew point stability static	0.1 K
Drift over full range	± 1.5 K
Max. input gas parameters	see table heat exchanger
Max. Pressure	see table heat exchanger possible limitations by filter or peristaltic pump (see there)

Performance data



General data

Housing	stainless steel
Packing dimensions	appr. 600 x 450 x 300 mm
Weight incl. heat exchangers	appr. 11 kg
Weight fully equipped	appr. 13 kg
Gas terminals: exchangers	see table
	filter, adapter moisture G1/4 or NPT 1/4
condensate drain pump	hose nipple Ø6 mm (approx. 1/4")
Media wetted materials	
Filter:	see table
Exchanger	see table
Moisture detector	see below
Tubing	PTFE / Viton

Electrical specification

Power supply	115 or 230 V, 50/60 Hz
Power consumption incl. Pumps	max. 250 VA
Alarm output switching load	max. 230 V AC, 150 V DC
	2 A, 50 VA
	potential-free
	plug according to DIN 43650
Protection class	IP 20

Options

Analogue output temperature cooler

(included in option moisture detector)	
Signal	4-20 mA (corresponds to -20 °C to +50 °C cooler temperature)
	Connector M12x1

Peristaltic pump

Operating pressure with pump	≤ 0.5 bar
Hose	Norprene
Pump flow	0.3 l/h
Vacuum	> 320 mbar
Pressure	> 0.5 bar

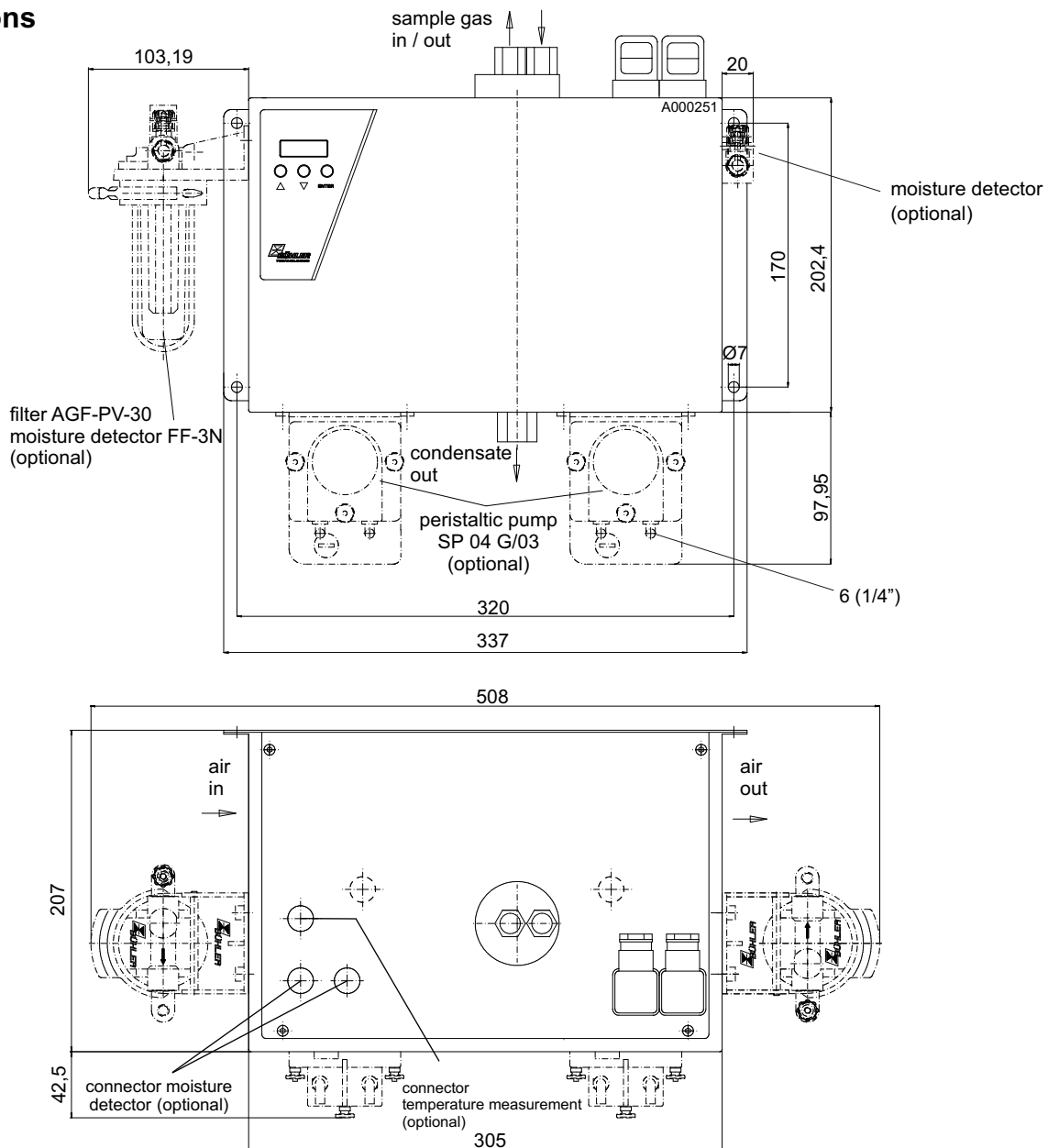
Filter AGF-PV-30-F2

Operating pressure with filter	max. 2 bar
Filter surface	60 cm ²
Retention rate	2µm
Dead volume	57 ml
Material	Filter housing: PVDF, Duran glass (wetted parts)
	Sealing: Viton
	Filter element: PTFE sintered

Moisture detector FF-3-N

(includes analogue output)	
Operating pressure with FF-3-N	max. 2 bar
Material	PVDF, PTFE, Epoxy resin, Stainless steel 1.4571, 1.4576

Dimensions



Heat Exchanger

The energy content of the sample gas and the required cooling capacity of the gas cooler is determined by 3 parameters: gas temperature ϑ_G , dew point τ_e (moisture content) and flow v . The outlet dew point rises with increasing energy content (heat) of the gas. The required cooling capacity is determined by the maximum acceptable level of the outlet dew point.

The following table shows cooler performance assuming the following conditions: $\tau_e=50^\circ\text{C}$ and $\vartheta_G=70^\circ\text{C}$. Indicated is the v_{\max} in NI/h cooled air (i.e. after the moisture has condensed). If the actual values stay below the parameters τ_e and ϑ_G , v_{\max} can be increased. For example (TG), instead of $\tau_e=50^\circ\text{C}$, $\vartheta_G=70^\circ\text{C}$ and $v=345$ l/h the values $\tau_e=40^\circ\text{C}$, $\vartheta_G=70^\circ\text{C}$ and a maximum flow rate of $v=425$ l/h could be achieved. **Please contact one of Buhler's application specialists for assistance and further information.**

Heat Exchanger	TS	TG	TV-SS	DTS (DTS-6 ³⁾)	DTG	DTV ³⁾
	TS-I ²⁾	TG	TV-I ²⁾	DTS-I (DTS-6-I ^{3) 2)}	DTG	DTV-I ^{2) 3)}
Flow rate v_{\max} ¹⁾	500 l/h	400 l/h	235 l/h	2 x 250 l/h	2 x 200 l/h	2 x 160 l/h
Inlet dew point $\tau_{e,\max}$ ¹⁾	80 °C	80 °C	65 °C	80 °C	65 °C	65 °C
Gas inlet temperature. $\vartheta_{G,\max}$ ¹⁾	180 °C	140 °C	140 °C	180 °C	140 °C	140 °C
Max. cooling capacity Q_{\max}	450 kJ/h	230 kJ/h	120 kJ/h	450 kJ/h	230 kJ/h	185 kJ/h
Gas pressure p_{\max}	160 bar	3 bar	3 bar	25 bar	3 bar	2 bar
Pressure drop Δp ($v=150$ l/h)	8 mbar	8 mbar	8 mbar	each 5 mbar	each 5 mbar	each 15 mbar
Dead volume V_{tot}	69 ml	48 ml	129 ml	28 / 25 ml	28 / 25 ml	21 / 21 ml
Sample gas connections (metric)	G 1/4"	GL 14 (6 mm) ⁴⁾	DN 4/6	tube 6 mm	GL 14 (6 mm) ⁴⁾	DN 4/6
(US)	NPT 1/4"	GL 14 (1/4") ⁴⁾	1/4"-1/6"	tube 1/4"	GL 14 (1/4") ⁴⁾	1/4"-1/6"
Condensate out connections (metric)	G 3/8"	GL 25 (12 mm) ⁴⁾	G 3/8"	tube 10 mm (6 mm)	GL 18 (10 mm) ⁴⁾	DN 5/8
(US)	NPT 3/8"	GL 25 (1/2") ⁴⁾	NPT 3/8"	tube 3/8" (1/4")	GL 18 (3/8") ⁴⁾	3/16"-5/16"

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

²⁾ Types marked "I" have NPT-threads or US tubes, respectively

³⁾ Con only be used with peristaltic pumps

⁴⁾ Inner diameter gasket

