



## Portable sample gas conditioning PCS.smart+

Carrying out accurate and reliable gas analyses in changing locations requires a small, compact gas conditioning system. We developed a complete sample gas conditioning system protected inside a case for this application.

The basic version of this system consists of a gas cooler with condensate pump and a filter. A gas pump, moisture detector, flow meter or temperature controller are optional.

The sample gas cooler cools the sample gas to the preset dew point (factory preset +5 °C) regardless of the ambient temperature. The safety circuit only activates the sample gas pump once the cooler has reached its operating point.

The sample gas cooler in the PCS.smart+ features a new generation heat exchangers with a particularly low scrubbing effect of water-soluble components and are specifically suitable for measuring emissions. The PCS.smart+ can therefore be used for measurements to EN 15267-4.

Low scrubbing effects of water-soluble gas components

Particularly suited for sample measurement in emissions monitoring

Adjustable outlet dew point and alarm thresholds

TC-Standard OEM Cooling system with 80 kJ/h nominal capacity

Optional moisture detector, sample gas pump, flow meter, bypass

Optimal for Smartline heated line or alternative heated lines

Optionally available with built-in controller up to max. 1600 W



## Description and Function

The PCS.smart series portable gas conditioners offer a variety of options and other useful features for a variety of applications. An optional built-in type P1 sample gas pump with bypass valve and flow meters is available to supply up to two gas outputs separately.

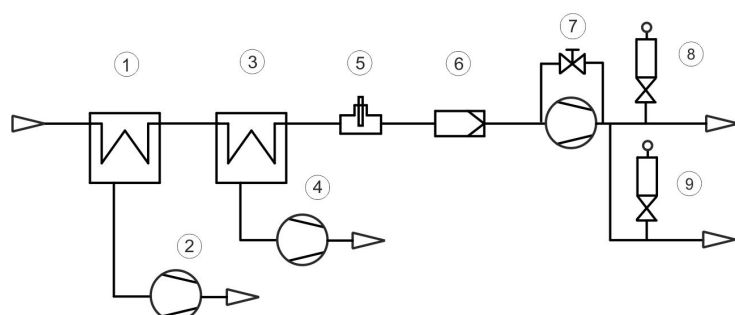
A heated line can be connected directly. An unregulated or regulated sample gas line can be connected. The PCS.smart will also control the temperature. The Smartline is specially coordinated and as a heated line with panel filter can simultaneously also be used as a portable probe. We offer a variety of gas inlet or outlet fittings which can be mixed and matched.

The "cold start" function ensures it is ready for use quickly if the storage temperature before use is +5 °C.

Unlike the PCS.smart (see data sheet no. 464005), the PCS.smart+ has two heat exchangers. The special configuration of the PCS.smart+ reduces scrubbing of water-soluble gas components. This makes the PCS.smart+ particularly suited for sample measurement when monitoring emissions.

## Flow chart

PCS.Smart+, Item No. CSPS 2xxx



1 Cooler	6 Filter
2 Condensate pump	7 Sample gas pump with bypass (optional)
3 Cooler	8 Flow meter (optional)
4 Condensate pump	9 Flow meter (optional)
5 Moisture detector (optional)	

## Technical Data

### Technical Data PCS.smart

Ambient temperature:	+5 to 50 °C <sup>1)</sup>
Gas output dew point:	adjustable, 2 ... 20 °C
Warning thresholds:	adjustable, -3 ... -1 K and +1 ... +7 K around dew point
Flow rate:	approx. 50 ... 280 L/h <sup>2)</sup>
Operating pressure:	0.2 ... 2 bar abs. <sup>2)</sup>
Dew point static	0.1 K
throughout the range:	±1.5 K
Inlet dew point max.:	70 °C <sup>1)</sup>
Gas inlet temperature:	max. 140 °C <sup>1)</sup>
Rated cooling capacity (at 25 °C):	80 kJ/h <sup>2) 3)</sup>
Electric supply:	230/115 V, 50/60 Hz
IEC connector, termination length:	2.5 m
Power input:	max. 250 VA (without heated line)
Operational readiness:	after approx. 10 min.
Dimensions without line (h x w x d):	approx. 460 x 360 x 260 mm
Weight standard version:	approx. 13.5 kg
Parts in contact with media:	PVDF, glass, stainless steel, PTFE, Norprene, Viton, epoxy resin, sintered PTFE <sup>2)</sup>
Protection class:	IP 20 D

<sup>1)</sup> Considering the available total cooling capacity (see Technical Data TC-Standard OEM). Please also refer to our calculation program or contact our sales department for guidance.

<sup>2)</sup> May vary due to optional add-on parts.

<sup>3)</sup> Subject to installation conditions

## Technical Data - Options

### Technical Data Sample Gas Pump P1

Inlet:	0.5 ... 1.3 bar abs.
Outlet:	Back-pressure max. 1 bar rel.
Nominal output:	280 L/h (at p = 1 bar abs.)

### Technical Data DK 702 Flow Meter

Standard measuring tubes:	Air 20 °C, 1.2 bar abs.
Meas. range:	25 ... 250 NL/h
Options:	Built-in needle valve

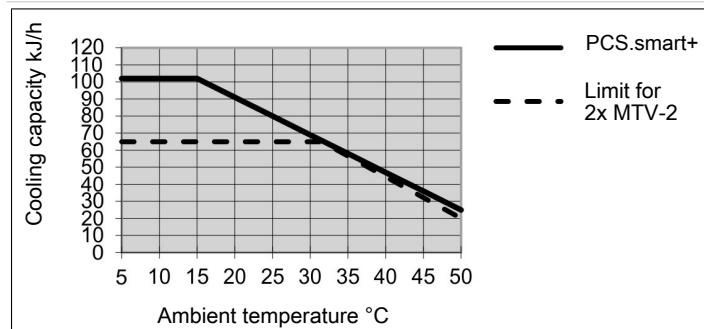
### Technical Data Controller for heated line

Temperature, preset:	100 °C
adjustable:	40 °C ... 200 °C
Motor power:	max. 1600 W (230 V) / 800 W (115 V)
Sensor type:	Pt100, 2-wire
Connection:	693 series socket, 7-pin

## Output

### PCS.smart+

Rated cooling capacity (at 25 °C)	80 kJ/h
Max. Ambient temperature	50 °C
Dew point fluctuations static	± 0.1 K
in the entire specification range	± 1.5 K
Temperature difference between heat exchangers	< 0.5 K



Remark: The limit curve for the heat exchanger applies to a dew point of 50 °C.

### 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  $\tau_e$  (moisture content) and volume flow  $v$ . The outlet dew point rises with increasing energy content of the gas. The following limits for the maximum flow are specified for a standard operating point of  $\tau_e = 40\text{ °C}$  and  $\vartheta_G = 70\text{ °C}$ . Indicated is the maximum flow  $v_{\max}$  in NL/h of cooled air, so after moisture has condensed. Values may differ for other dew points and gas inlet temperatures. However, the physical facts are so vast we decided to omit the illustration. Please contact our experts for clarification or refer to our design program.

### Volume flow temperature chart

$T_e$	$V_{\max}$ [NL/h]*
40	205
50	180
65	100

\*at 25 °C ambient temperatures.

### Heat exchanger overview

Heat exchanger	2x MTV-2 in-line
Version / Material	PVDF
Flow rate $v_{\max}$ <sup>1)</sup>	100 NL/h
Inlet dew point $\tau_{e,\max}$ <sup>1)</sup>	70 °C
Gas inlet temperature $\vartheta_{G,\max}$ <sup>1)</sup>	140 °C
Max. Cooling capacity $Q_{\max}$	90 kJ/h

<sup>1)</sup> Considering the maximum cooling capacity of the cooler

Ordering instructions

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

PCS.smart+

CSP	S	2	X	8	1	X	X	X	2	X	X	X	0	X	X	Product characteristic
<b>Supply voltage</b>																
1																115 V AC
2																230 V AC
<b>Heat exchanger</b>																
8																PVDF
<b>Filter</b>																
1																Panel filter, AGF-FE-4
<b>Moisture detector</b>																
0																without moisture detector
1																with moisture detector
<b>Sample gas pump and flow meter</b>																
0	0															none
0	3															without P1, 1x flow meter with needle valve
2	0															P1 with bypass, without flow meter
2	1															P1 with bypass and 1x flow meter
2	4															P1 with bypass and 2x flow meters with needle valve <sup>1)</sup>
2	5															P1 with bypass, 1x flow meter and 1x flow meter with needle valve
<b>Condensate pump</b>																
2																2x CPsingle with angled adapter
<b>Gas inlet</b>																
0																Screw connection, metric, PVDF, DN 4/6 <sup>2)</sup>
1																Screw connection, US, PVDF, 1/4" / 1/6" <sup>2)</sup>
2																Screw connection, metric, stainless steel, 6 mm <sup>3)</sup>
3																Screw connection, US, stainless steel, 1/4" <sup>3)</sup>
4																Quick-coupler with counter piece, metric, PVDF, DN 4/6 <sup>2)</sup>
5																Quick-coupler with counter piece, US, PVDF, 1/4" / 1/6" <sup>2)</sup>
6																Quick-Lock <sup>2)</sup>
<b>Gas outlet</b>																
0																Screw connection, metric, PVDF, DN 4/6
1																Screw connection, US, PVDF, 1/4" / 1/6"
2																Screw connection, metric, stainless steel OD, 6 mm
3																Screw connection, US, stainless steel, 1/4"
4																Quick-coupler with counter piece, metric, PVDF, DN 4/6
5																Quick-coupler with counter piece, US, PVDF, 1/4" / 1/6"
6																Quick-Lock
<b>heated line</b>																
0	0															none
2	0															heated line
<b>Status outputs</b>																
0																status output only
1																Analogue output option, add-on
<b>Trolley</b>																
0																No
1																Yes
CSP	S	2		8	1				2					0		Order key

<sup>1)</sup> Version 2 x SM with needle valve includes an additional bypass gas outlet. The connection corresponds with the selected gas outlet configuration.

<sup>2)</sup> Maximum medium temperature 140 °C.

<sup>3)</sup> Recommended for connecting a heated line.

**Spare parts and accessories**

<b>Item no.</b>	<b>Description</b>
CS PX 00012	Removable trolley case with 50 mm casters; aluminium
44 92 00 35 012	Norprene replacement hose with angled connections for peristaltic pump 0.3 L/h
41 15 10 50	FE-4 spare filter, 8 count
42 28 00 3	Bellow for P1 pump
90 09 39 8	O-ring for bypass P1 pump
42 28 06 6	Set inlet/outlet valves 70 °C for P1 pump
see data sheet 4640002	Smartline