

4 Installation and connection

4.1 Installation site requirements

The device is intended for indoor use, either in a 19" rack-mount enclosure or for wall mounting. The maximum installation altitude is suitable for elevations up to 2000 m.

Wall mounting: The device must be fixed at the designated through-holes 4 x Ø7 mm. It must be ensured that the load capacity and stability of the wall and the cabinet are sufficient for the weight of the device.

The device is designed for use with pollution degree 2 and overvoltage category II. When used outdoors, adequate weather protection must be provided.

Install the device, leaving enough room below the cooler to discharge the condensate. There should also be some space above for gas supply connections. During operation, condensate may form and drip off under unfavourable ambient conditions. Ensure that no moisture-sensitive components or devices are positioned beneath the device.

Ensure that the permissible ambient temperature is maintained. Do not obstruct the convection of the cooler. The vents must have enough room to the next obstacle. In particular, on the air outlet side, the distance must be at least 10 cm.

The device contains the flammable refrigerant R600a (isobutane) in a technically permanently sealed refrigerant circuit and was leak-tested at the factory.

Despite the basic, safe design, residual risks should be minimised through appropriate measures with regard to installation location, operation, maintenance, service, repair and disposal (see corresponding chapter). Please observe in particular the warning on flammable substances.

The respective national legal regulations regarding devices with flammable refrigerants apply. The refrigerant quantity can be found in the technical data or directly on the device.

Adequate ventilation must especially be ensured when installing in enclosed housings, e.g. analyser cabinets, to prevent refrigerant accumulation.

This can be done using one of the following measures, for example:

- Ensuring an adequate free air volume (see minimum room volume recommendation) around the device.
- Ensuring natural convection.
- Active ventilation through suitable ventilation equipment (cooler air outlet directly into a free minimum room volume).
- Purging the sealed housing with air or other inert gases.
- Use of a fan to dissipate heat and mix the ambient air.
- Use of an LEL (lower explosion limit) sensor with automatic shutoff.

All measures should be implemented under consideration of applicable national regulations. The operator is responsible for assessing safety.

Recommended minimum room

The recommended minimum room for assembly, startup, maintenance, service, repair and disposal is 3.25 m³.

The recommended minimum room for operation is 0.7 m³.

WARNING

Flammable substances



The device is filled with flammable refrigerant R600a.

a) Careful handling and specific choice of installation location and operating conditions. The recommended minimum room must be observed, or other safety measures must be taken.

b) Do not damage the refrigeration circuit. In the event of damage:

- ⇒ Keep away from open flames or sources of ignition.
- ⇒ Ventilate the room for several minutes.
- ⇒ Switch off the device.
- ⇒ Contact the manufacturer for repair.
- ⇒ Do not discharge refrigerant into drains or rooms where there are open flames or sources of ignition.

4.2 Installation

Run the gas supply to the cooler with a downward slope. The gas inputs are marked in red and additionally labelled "IN".

If a large amount of condensate accumulates, we recommend using a condensate trap with automatic condensate drain. Our condensate drains, 11 LD spec., AK 20 V, or model 165 SS, are suitable.

Glass vessels and automatic condensate drains are available for draining condensate for external mounting below the unit. When using automatic condensate drains, the sample gas pump must be installed upstream of the cooler (pressure operation) to ensure proper function of the condensate drain.

If the sample gas pump is located at the cooler outlet (suction operation), we recommend using glass condensate traps or peristaltic pumps.

4.2.1 Connecting the filter gas connections (optional)

The connection between the heat exchanger outlet and the filter inlet does not have tubing included. The connection G1/4 or NPT 1/4" (filter head marked NPT) for the gas outlet must be carefully and properly connected using a suitable screw connection.

When ordering the cooler with the **option filter without Moisture detector**, a bypass may be connected to the filter head.

The filter head is intended for a G1/4 internal screw thread which is plugged at the factory. To use it, unscrew the plug and screw in a suitable screw connection. Pay attention to leaks.

NOTICE



Installing **filters** limits the maximum approved **operating pressure** in the system!
Operating pressure ≤ 4 bar

4.2.2 Flow adapter connection (optional)

When ordering the cooler with the **option moisture detector without filter**, it will be factory installed inside a flow adapter.

The connection between the heat exchanger outlet and the flow adapter inlet does not have tubing included. The connection G1/4 or NPT 1/4" (flow adapter marked NPT) for the gas inlet/outlet must be carefully and properly connected using a suitable screw connection. Here the direction of flow is not relevant.

4.2.3 Connecting the moisture detector (option)

When ordering the cooler with **moisture detector option**, it will be factory installed inside a flow adapter, or for the **filter option** installed and connected in the filter head.

4.2.4 Peristaltic pump connector (optional)

Coolers ordered with attached peristaltic pump already have it installed and wired. Heat exchangers ordered at the same time are already installed and connected to the peristaltic pump.

The $\varnothing 6$ mm (0.24 inch) hose nipple for the pump's condensate outlet must be carefully and properly connected with a suitable hose and hose clamp.

Versions with screw connections DN 4/6 or 1/6"-1/4" are supplied with ferrule and knurled nut and must be carefully sealed with appropriate hose.

NOTICE



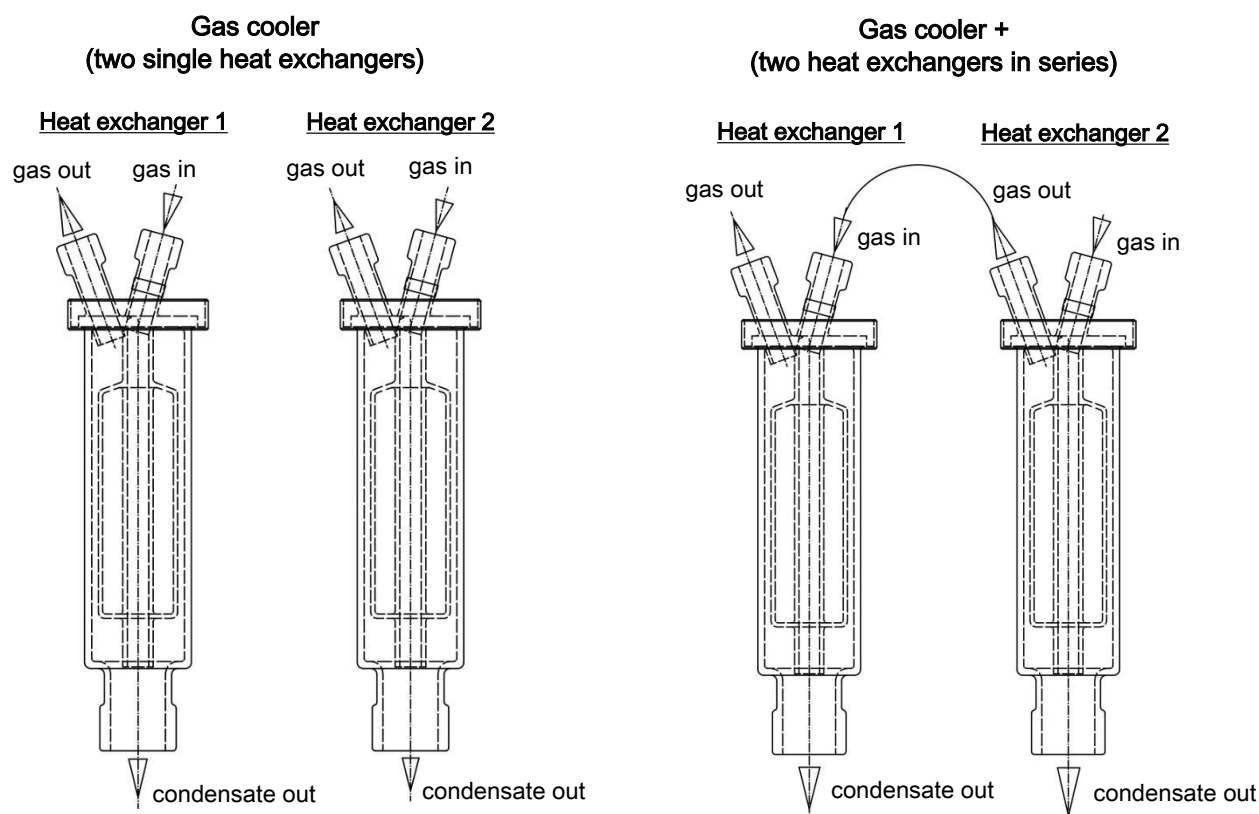
Installing peristaltic **pumps** CPsingle / CPdouble limits the maximum permissible **operating pressure** in the system!
Operating pressure ≤ 1 bar

4.2.5 Connecting the heat exchanger

The picture on the left shows the schematics for connecting (two) separate heat exchangers.

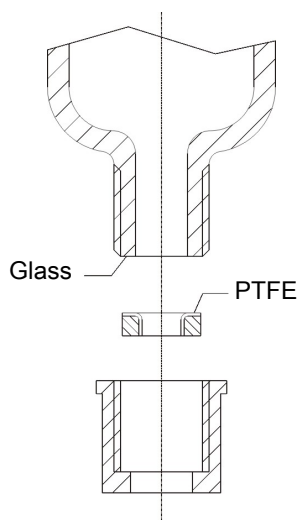
To minimise gas wash out in the cooler, the two (identical) heat exchangers must be operated in series (right picture). This should be done as follows:

1. Gas inlet line to red gas inlet on heat exchanger 2 (pre-cooling).
2. Connection between gas outlet on heat exchanger 2 and the red gas inlet on heat exchanger 1 (after-cooling).
3. Attaching the final gas output line to the gas outlet on heat exchanger 1.



The gas inputs are marked in red.

On glass heat exchangers, the correct position of the seal is important when connecting the gas lines (see image). The seal consists of a silicone ring with a PTFE sleeve. The PTFE side must face the glass thread.



Pay attention to the appropriate spanner size when selecting fittings for stainless steel heat exchangers.

PTS/PTS-I gas connections: SW 14 or 9/16"

PTS/PTS-I condensate out connections: SW 22

4.2.6 Condensate drain connection

Depending on the material, build a connecting line with fittings and tubing or hose between the heat exchanger and condensate drain. For stainless steel the condensate drain can be suspended directly to the connecting tube, for hoses the condensate drain must be secured separately using a clamp.

Condensate lines must always be installed with a slope and a minimum inside diameter of DN 8/10 (5/16").

4.3 Electrical connections

The operator must install an external separator for the device which is clearly assigned to this device.

This separator

- must be located near the device,
- must be easy for the operator to reach,
- must comply with IEC 60947-1 and IEC 60947-3,
- must separate all live conductors and the status output, and
- must not be attached to the power feed.

The power supply line of the device must be protected according to the specifications in the technical data.

WARNING



Hazardous electrical voltage

The device must be installed by trained staff only.

CAUTION



Wrong mains voltage

Wrong mains voltage may damage the device.
Regard the correct mains voltage as given on the type plate.

WARNING



High voltage

Damage to the device in case of insulation testing
Do not proceed insulation tests with high voltage to the device as a whole!

Insulation test

The device is equipped with extensive EMC protection. If insulation tests are carried out the electronic filter devices will be damaged. All necessary tests have been carried out for all concerned groups of components at the factory (test voltage 1 kV or 1.5 kV respectively, depending on the device).

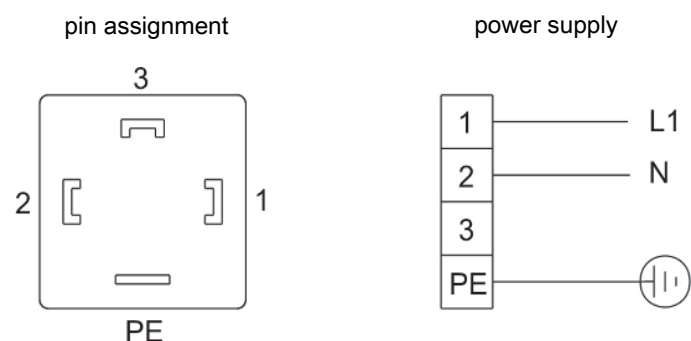
If you wish to carry out the insulation test by yourself, please test only separate groups of components.

Disconnect the compressor, the fan, the heating or the peristaltic pumps, respectively, and then carry out the insulation tests.

Connection via plug

The device is equipped with a plug according to EN 175301-803 for power supply and signal output. The following are the pin assignments, with the numbers corresponding to those on the plugs.

The supply line cross-sections must be suitable for the rated current. Use a maximum line cross-section of 1 mm² (AWG 17) and a maximum line cross-section of 1.5 mm² (AWG 16) and a cable diameter of 8–10 mm (0.31–0.39 inches).

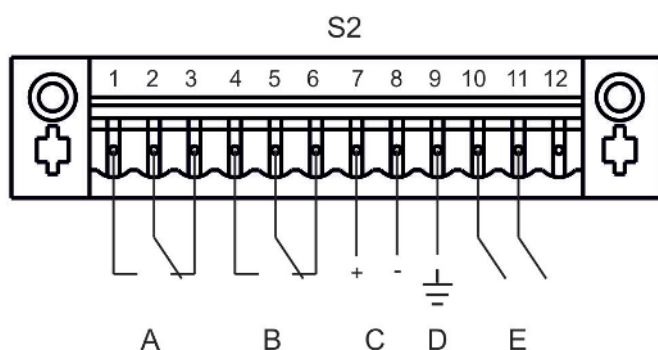


The clamping range has a diameter of 8–10 mm.

4.4 Signal outputs

At the top of the device there is a 12-pole terminal block providing various status signals.

The maximum supply voltage is 30 V AC / 60 V DC.



A	Status output humidity (residual moisture) (option)	D	Device ground: Connection of the shield for the 4-20 mA signal line
B	Cooler status output (excessive or insufficient temperature)	E	Digital output (option)
C	Analogue temperature output (4–20 mA) (option)		

4.4.1 Signalling via the display

The front foil contains three LEDs:

Colour	Marking	Function
Red	S2	High/low temperature, device error
Yellow	S1	---
Green	OP	Normal operation

The OP and S2 LEDs indicate the device status in the same way as the status output S2, B.

4.4.2 Humidity status output (A)

The maximum switching capacity of the status output is 30 V AC / 60 V DC, 1 A.

The status output (S2, A) indicates when residual moisture is still present in the conditioned sample gas or if a cable break is detected at the humidity sensor. The signalling does not distinguish between humidity sensor 1 or 2.

Function / contact type	Description
Internal changeover contact: max. 30 V AC / 60 V DC, 1 A	The following device states can be indicated via the switching output: Contact between 2 and 3 closed (alarm) – Humidity sensor detects residual moisture in the sample gas or cable break: Error message. Contact between 1 and 2 closed (OK) – No residual moisture in the sample gas / no cable break.

4.4.3 Status output cooler (B)

The maximum switching capacity of the status output is 30 V AC / 60 V DC, 1 A.

The status output (S2, B) indicates when the cooler block temperature is outside the specified limits. No distinction is made as to whether the alarm was triggered by excess temperature or insufficient temperature.

Function / contact type	Description
Internal changeover contact: max. 30 V AC / 60 V DC, 1 A	The following device states can be indicated via the switching output: Contact between 5 and 6 closed (alarm) – No mains voltage and/or actual temperature value outside the set alarm thresholds. – Device in fault condition / pump deactivated. Contact between 4 and 5 closed (ok) – Mains voltage applied + actual temperature value within the set alarm thresholds.

4.4.4 Analogue output (C)

If the analogue output option is integrated, the actual cooling block temperature is output via the 12-pin terminal block (S2, C) as a 4...20 mA signal.

The device menu offers the option to reconfigure the interface from current output to voltage output. The analogue value is then represented as a 2...10 V signal.

Function / contact type	Description
4-20 mA analog output ($R_{load} < 500 \Omega$)	Signalling of the cooling block temperature (please use shielded cables) $T_{cooler} = -20 \text{ °C} \triangleq (-4 \text{ °F}) \rightarrow 4 \text{ mA}/2 \text{ V}$ $T_{cooler} = 5 \text{ °C} \triangleq (41 \text{ °F}) \rightarrow 9 \text{ mA}/4.5 \text{ V}$ $T_{cooler} = 60 \text{ °C} \triangleq (140 \text{ °F}) \rightarrow 20 \text{ mA}/10 \text{ V}$

4.4.5 Digital output (E)

The digital output option is available via the 12-pin terminal block (S2, E). Pin 10: Signal A, Pin 11: Signal B.

Via this interface, various measurement values and device statuses can be read and the cooler can be parameterised. A detailed description of the interface can be found in the chapter Using the Digital Interface.

Function / contact type	Description
Digital output	Modbus RTU (RS-485) Interface default values Baudrate – Parity – Stop bit: 19200 – Even – 1 Default ID: 10 The bus lines are not internally terminated.