

4 Installation and connection

4.1 Installation site requirements

The unit is only intended for wall-mounted use in enclosed areas. Adequate protection from the weather must be provided when used outdoors.

Install the unit leaving enough room below the cooler to discharge the condensate. Leave room above for the gas supply.

Be sure to maintain the approved ambient temperature. Do not obstruct the convection of the cooler. The vents must have enough room to the next obstacle. The distance must especially be a minimum of 10 cm on the air outlet side.

Ensure adequate ventilation when installing in enclosed housings, e.g. analyser cabinets. If the convection is inadequate, we recommend aerating the cabinet or installing a fan to lower the inside temperature.

When wall mounting the sample gas cooler, be sure the wall or the cabinet provide adequate weight bearing and stability.

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 V38, AK 20, AK 5.5 OR AK 5.2, 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 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.

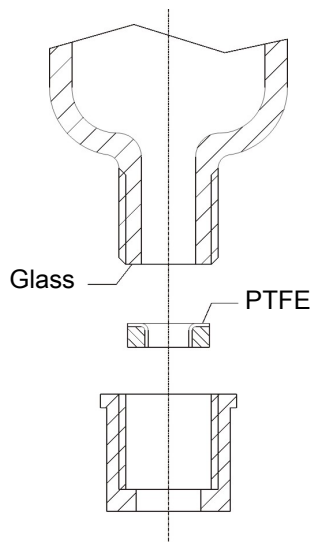
4.2.3 Connecting the moisture detector (option)

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 Connecting the heat exchanger

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.

TS/TS-I gas connections: SW 17

TS/TS-I condensate out connections: SW 22

4.2.5 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 hung directly from the connecting tube; for hoses, the condensate drain must be secured separately using a clamp.

The condensate drain can be mounted directly to the heat exchanger.

When choosing the option for high-purity oxygen, make sure to select the suffix -O2.

If the condensate drain 11 LD V 38 is used for high hydrogen concentrations, the system in which it is installed must be tested for leaks.

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

Depending on the material, a connecting line consisting of fitting and pipe or hose must be installed between the heat exchanger and condensate drain. For stainless steel, the condensate drain can be hung directly from the connecting tube; for hoses, the condensate drain must be secured separately using a clamp.

The condensate drain can be mounted directly to the heat exchanger.

Condensate lines must always be installed with a slope and a minimum nominal diameter of DN 8/10 (5/16"), if the drainage is passive via collection vessels or automatic condensate drains. Use screw joints with a minimum inner span of 7 mm, sold separately as accessories. The MTG heat exchanger in glass cannot be operated in conjunction with an automatic condensate drain.

4.3 Electrical connections

NOTICE



The connection must be made by a trained professional.

CAUTION



Wrong mains voltage

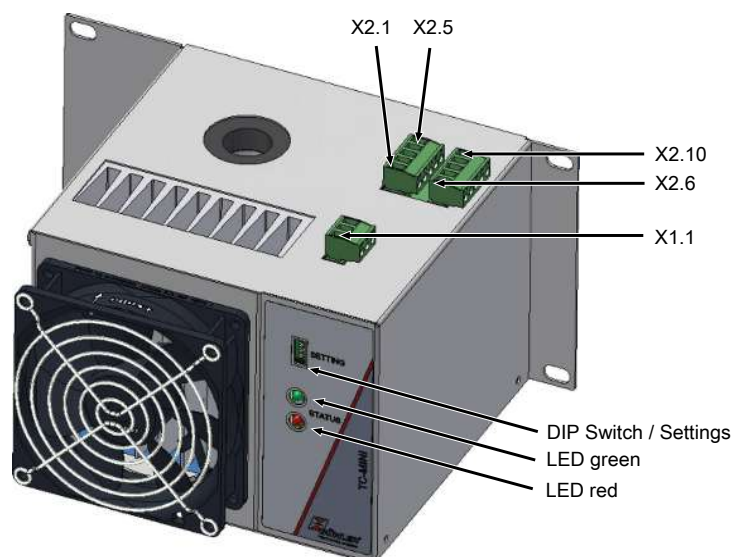
Wrong mains voltage may damage the device.
Regard the correct mains voltage as given on the type plate.

The sample gas cooler features plug-in connectors at the top for connecting the power supply and the status outputs.

The unit features an output for status messages. Please refer to the technical data for ratings.

An alarm is triggered if the temperature of the cooler is outside the specified limits. It does not indicate if the alarm was triggered due to excess temperature or insufficient temperature.

When the moisture detector (optional) is installed, an alarm is activated if the moisture is still present in the prepared sample gas. This is the same alarm output as for the temperature.



Inputs/outputs	Terminal	Function	Description
Moisture detector	X1.1	FF.1 (white)	Moisture detector
	X1.2	FF.2 (brown)	
	X1.3	FE:	Shield for moisture detector inlet
Status	X2.1	Status NC (Alarm)	Alarm/Status
	X2.2	Status COM	Changeover contact, potential-free,
	X2.3	Status NO (ok)	Ratings see technical data
24 V input	X2.4	24 V DC -	Power supply
	X2.5	24 V DC +	
Analog output	X2.6	FE:	Shield for analog output
	X2.7	mA +	Analog output
	X2.8	mA -	4...20 mA, 0 - 80 °C
Digital output	X2.6	FE:	Shield for digital output
	X2.7	Signal A	Communication line for digital interface
	X2.8	Signal B	
24 V output *	X2.9	24 V DC -	Supply for optional add-on units
	X2.10	24 V DC +	
			maximum current, see technical data

* Add-on units, e.g. a pump, with 24 V supply can be connected to the output, switched via the status output. The 24 V supply must then be configured appropriately (see data sheet).

4.4 Settings

Remarks on outlet dew point

Not all applications require an outlet dew point of 5 °C. In some applications a higher dew point is sufficient. In other applications a stable outlet dew point doesn't matter, it's enough for the gas to be dry, so for the outlet dew point to have an adequate difference in temperature below the ambient temperature.

The advantage of a higher outlet temperature is that at a given ambient temperature the Peltier cooler provides significantly more cooling performance. So on the e.g. TC-MINI version model 6111, at an ambient temperature of 40 °C this means:

Outlet dew point:	5 °C	10 °C	15 °C
Available cooling capacity:	16 kJ/h	28 kJ/h	39 kJ/h

To fully utilize these advantages, the electronics feature several parameter settings:

1. Adjustable outlet dew point

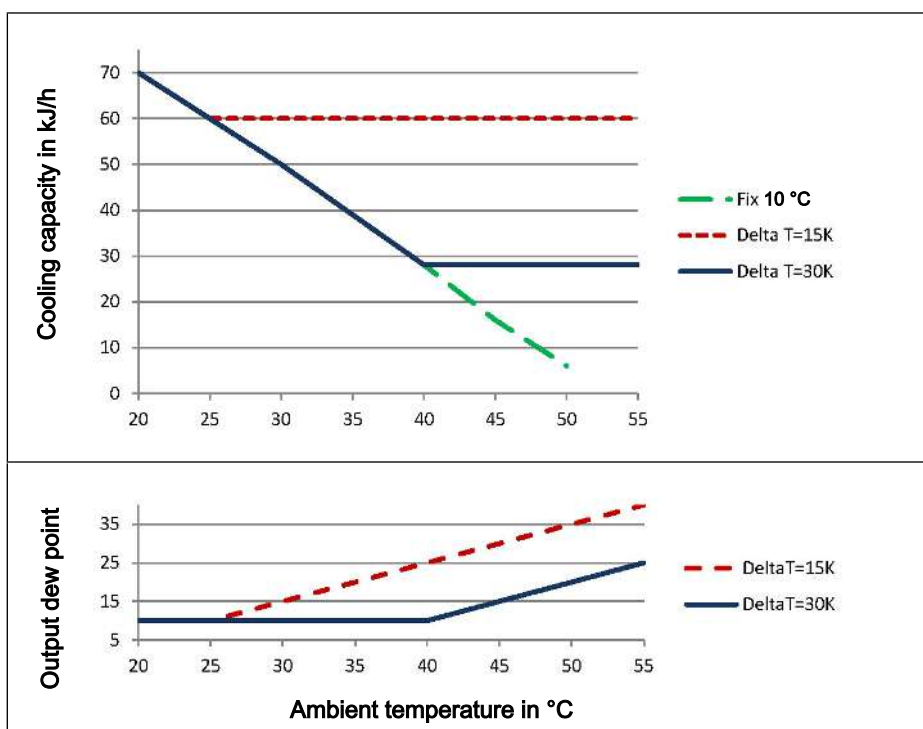
An outlet dew point of 3, 5, 10 or 15 °C can be set to reach the specified values. Here it's important the ambient temperature is always ABOVE the outlet dew point setting, or condensation may form in the lines after the cooler. So the ambient temperature range is limited.

2. Delta-T Control

Here the electronics measures the ambient temperature and regulates the outlet dew point to a an about 15 °C or 30 °C lower value, but no less than the dew point set under 1. This extends the potential cooling capacity to the limits of the heat exchanger. Here it's important to note the outlet dew point fluctuates along with the ambient temperature and a stable dew point cannot be a prerequisite for the measurement.

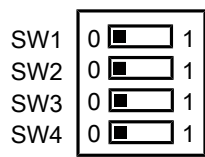
As seen in the following graphics using the TC-MINI 6111 as an example, a difference of 15 °C from the ambient temperature means the focus is on drying the sample gas. The stability of the dew point then takes a backseat to the high performance which can be achieved.

At a difference of 30 °C, at a set outlet dew point of 10 °C this means the dew point remains stable up to an ambient temperature of approx. 40 °C, and the safe drop is only preferred over the ambient temperature with ambient temperature peaks over 40 °C.



DIP switch

The unit is configured using four DIP switches at the front of the cooler.



1 ON switch

0 OFF switch

SW Switch, the following numbering of the SWs corresponds with the numbering on the DIP switch.

SW1 / SW2	SW2	SW1	Gas output dew point
	0	0	3 °C
	0	1	5 °C (factory setting)
	1	0	10 °C
	1	1	15 °C
SW3 / SW4	SW3	SW4	Delta-T control/digital interface
	0	0	Gas output dew point, fixed
	0	1	Difference from ambient temperature approx. 15 °C
	1	0	Difference from ambient temperature approx. 30 °C
	1	1	Modbus option active (only with optional Modbus RTU digital output)

Using the Modbus RTU option

On devices with Modbus option, the DIP switches are set so the digital interface is active. With the interface active, it's important the switch settings SW1 and SW2 are not relevant for the cooler function. In this case, the cooler uses the values in the registers.

When disabling the digital interface with the DIP switch, the settings apply based on the DIP switches again. The Modbus registers will not be overwritten.