



Sample gas cooler EGK 2-19+

In emission measurement, process control relies on prompt and exact determination of the operating parameters.

Here, gas analysis is the key for safe and efficient control of process flows, environmental protection and quality assurance. This benefits controlling flue gas emission in power stations as well as measurements in small combustion plants or exhaust gas analysis in automotive engineering.

Many of the analysis processes used in these fields require extracting the sample gas. This inevitably also extracts process-related contamination such as particles or moisture. These in turn can impact the measurement results or damage the measuring cells. The sample gas must therefore be conditioned before entering the analyser.

The EGK 2-19+ series features a new generation heat exchangers with a particularly low wash out effect of water-soluble components and are specifically suitable for measuring emissions. Particularly the wash out effect of SO₂ is low. These coolers can therefore be used for so-called automated measuring systems (AMS) per EN 15267-3.

Compact design: fully assembled and ready to connect

Low maintenance costs based on easy accessibility

One gas path

Optimised heat exchanger type 2 in DURAN® glass or PVDF

Adjustable outlet dew point and alarm thresholds

Self-monitoring

Status outputs

Ambient temperatures up to 122 °F

Rated cooling power 303 Btu/h

Dew point stability 0.2 °F

Available as 19" rack or for wall-mounting



Description

Concept

The EGK 2-19+ concept is firstly based on a cooler for two in-line heat exchangers.

In addition, other components which every conditioning system should feature can optionally be integrated:

- Peristaltic pump for condensate separation
- Filter
- Moisture detector

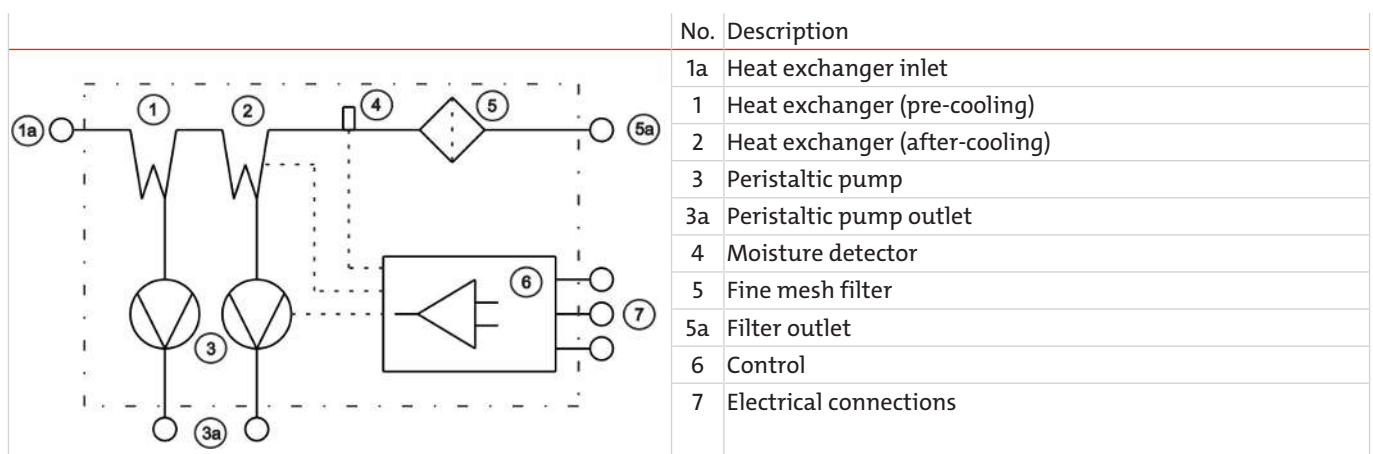
This therefore allows for virtually any configuration of cooler and options. Here the approach is to simplify creating a complete system in a cost-efficient way through pre-installed components with hoses connected. We further paid attention to easy access to consumables, consequently located at the front.

The glass dome allows the dirt level of the filter element to easily be determined.

The moisture detector is easy to remove. This may be required if water enters the cooler due to a malfunction and the peristaltic pump can no longer remove it.



Description of a fully equipped gas path



The gas to be conditioned is fed directly into the inlet of the heat exchanger (1, 1a). A hose is pre-installed between the heat exchanger (2) outlet and the fine mesh filter (5). Sample gas is continued directly from the outlet of this filter via hose fitting (5a).

Condensate is removed by the peristaltic pumps (3), the inlet of which is directly connected to the heat exchanger via hose.

A moisture detector (4) may be installed directly into the filter, which is analysed by electronics (6). This eliminates the need to purchase additional controllers.

Control (6)

The control features a microprocessor-controlled Bühler Constant Regulation at its core.

The display with control keys at the front displays the cooler temperature as well as all operating statuses.

Use the keys to set various parameters such as outlet dew point, alarm limits or the sensitivity of moisture detectors.



Electrical connections (7)

All signals output by the electronics can be accessed via Phoenix plug at the top of the cooler. The electric supply is also a plug connection. This means no fixed wiring is required.

Gas cooler technical data

Gas Cooler Technical Data

| | | | |
|---|---|--------|--------|
| Ready for operation: | after max. 15 minutes | | |
| Rated cooling capacity (at 77 °F): | 303 Btu/h | | |
| Ambient temperature: | 41 °F to 122 °F | | |
| Gas outlet dew temperature, preset: | 41 °F | | |
| Dew point fluctuations | | | |
| static: | ± 0.1 K | | |
| in the entire specification range: | ± 1.5 K | | |
| Temperature difference between heat exchangers: | < 0.5 K | | |
| Max. inlet temperature: | see table "Heat Exchanger Overview" | | |
| max. pressure: | see table "Heat Exchanger Overview" Limitations due to filter or peristaltic pump (see Technical Data - Options) | | |
| IP rating: | IP 20 | | |
| Housing: | Stainless steel | | |
| Packaging dimensions: | approx. 21.9 x 16.9 x 13.4 in | | |
| Weight incl. heat exchanger: | approx. 33 lb approx. 41 lb at full expansion stage | | |
| Refrigerant (global warming potential): | R134a (GWP 1430) | | |
| Quantity: | 2.65 oz | | |
| CO ₂ -equivalent: | 0.107 T | | |
| Electric supply: | 115 V, 60 Hz or 230 V, 50 Hz Plug per EN 175301-803 | | |
| Electrical data: | 230 V | 115 V | |
| | Typical power input: | 140 VA | 155 VA |
| | max. operating current: | 1.6 A | 3.2 A |
| Status output switching capacity: | max. 250 V, 2 A Phoenix plug | | |
| Gas connections: | Heat exchanger see table "Heat exchanger overview" Filter DN 4/6 or 1/4"-1/6" | | |
| Condensate outlet: | Hose nipple Ø0.2 in | | |
| Parts in contact with mediums | | | |
| Filter: | see "Technical Data - Options" | | |
| Moisture detector: | see "Technical Data - Options" | | |
| Heat exchanger: | see table "Heat Exchanger Overview" | | |
| Peristaltic pump: | see "Technical Data - Options" | | |
| Tubing: | PTFE/Viton | | |

Technical Data - Options**Technical data analogue output cooler temperature**

| | |
|--------|--|
| Signal | 4-20 mA or 2-10 V corresponds to -4 °F to 122 °F cooler temperature Phoenix Plug |
|--------|--|

Technical Data FF-3-N Moisture Detector

| | |
|-------------------------------------|---|
| Ambient temperature | 37 °F to 122 °F |
| max. operating pressure with FF-3-N | 29 psi |
| Material | PVDF, PTFE, epoxy resin, stainless steel 1.4571, 1.4576 |

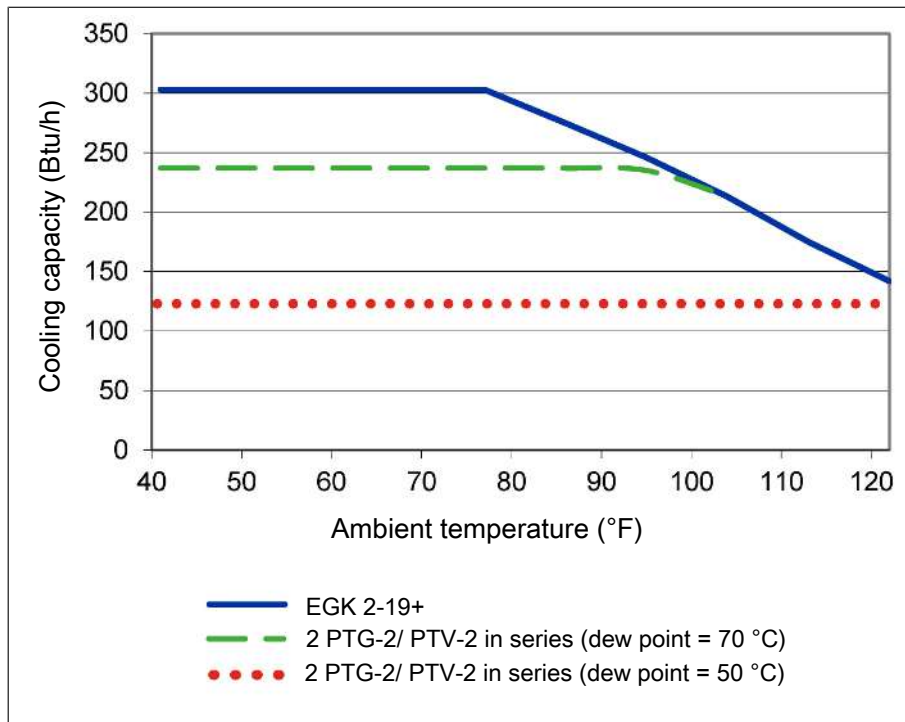
CPsingle Peristaltic Pumps Technical Data

| | |
|------------------|--|
| Flow rate | 0.005 lpm (50 Hz) / 0.006 lpm (60 Hz) with standard hose |
| Vacuum inlet | max. 11.6 psi |
| Pressure inlet | max. 14.5 psi |
| Outlet pressure | 14.5 psi |
| Hose | 4 x 1.6 mm (0.04 in) |
| Protection class | IP 40 |
| Materials | |
| Hose: | Norprene (standard), Marprene, Fluran |
| Connections: | PVDF |

Technical Data Filter AGF-FA-5

| | |
|-------------------------------------|---|
| max. operating pressure with filter | 29 psi |
| Filter surface | 6.5 in ² |
| Filter fineness | 2 µm |
| Dead volume | 1.74 cu. in. |
| Materials | |
| Filter: | PTFE, PVDF, Duran glass (parts in contact with mediums) |
| Seal: | Viton |
| Filter element: | sintered PTFE |

Performance data



Remark: The limit curves for the heat exchanger apply to a dew point of 158 °F under standard conditions per DIN EN 15267-3:2008-03 and to a dew point of 122 °F under operating conditions.

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 ϑ_G , dew point τ_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 $T_e = 104$ °F and $\vartheta_G = 158$ °F. The maximum flow v_{max} in NI/h of cooled air indicated, 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 calculation program.

Heat exchanger overview

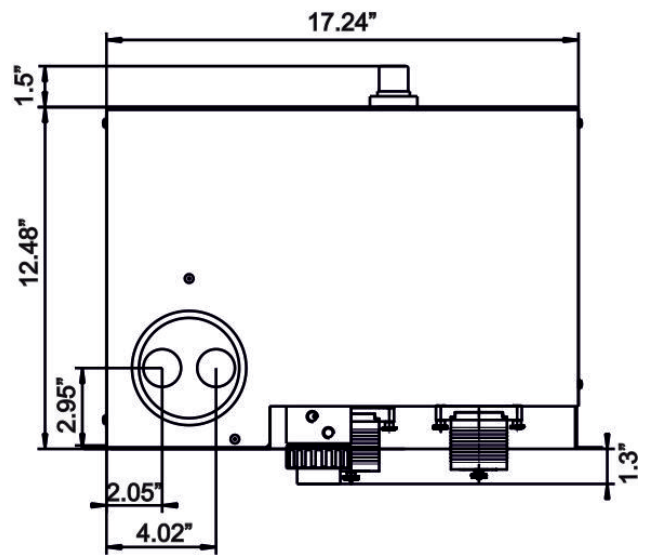
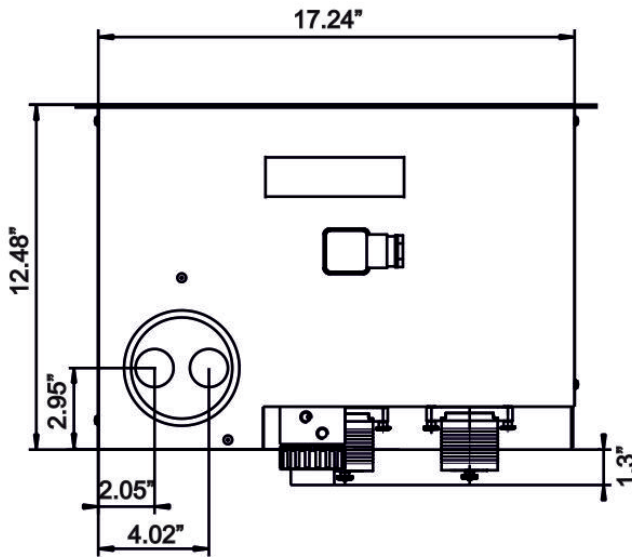
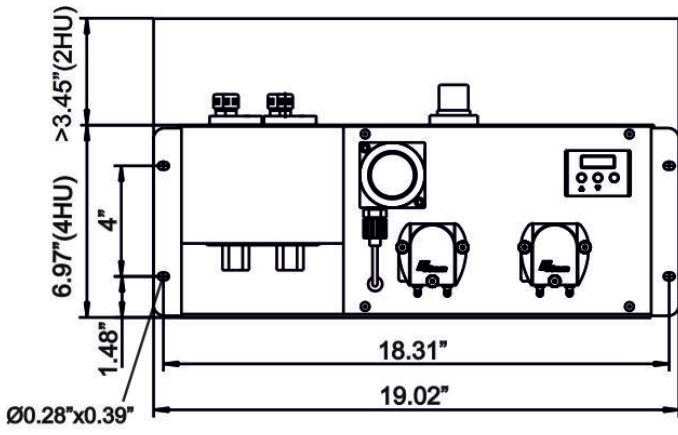
| Heat exchanger | 2x PTG-2 2x PTG-2-I | 2x PTV-2 2x PTV-2-I ²⁾ |
|---|-----------------------------|--------------------------------------|
| Materials in contact with media | DURAN® glass PTFE | PVDF |
| Flow rate v_{max} ¹⁾ | 4.2 lpm | 4.2 lpm |
| Inlet dew point $\tau_{e,max}$ ¹⁾ | 158 °F | 158 °F |
| Gas inlet temperature $\vartheta_{G,max}$ ¹⁾ | 284 °F | 284 °F |
| Max. Cooling capacity Q_{max} | 218 Btu/h | 204 Btu/h |
| Gas pressure p_{max} | 44 psi | 29 psi |
| Pressure drop Δp ($v=2.5$ lpm) total | 0.29 psi | 0.29 psi |
| Dead volume V_{tot} total | 3.6 cu.in. | 7 cu.in. |
| Gas connections (metric) | GL 14 (6 mm) ³⁾ | DN 4/6 |
| Gas connections (US) | GL 14 (1/4") ³⁾ | 1/4"-1/6" |
| Condensate out connections (metric) | GL 25 (12 mm) ³⁾ | G3/8 |
| Condensate out connections (US) | GL 25 (1/2") ³⁾ | NPT 3/8" |

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

²⁾ Models marked I have NPT threads or US tubes, respectively.

³⁾ Gasket inside diameter.

Dimensions (inch)



Ordering instructions

Gas cooler type with two heat exchangers in series

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

| | | | | | | | | | | | |
|-----|---|---|---|---|---|---|---|---|---|-----|---|
| 452 | X | X | X | X | X | X | X | X | X | 0 | Product characteristic |
| | | | | | | | | | | | Gas cooler models (with 2 heat exchangers) |
| | | | | | | | | | | 0 | Wall mounting |
| | | | | | | | | | | 1 | 19" rack installation |
| | | | | | | | | | | | Supply voltage |
| | | | | | | | | | | 1 | 115 V metric screw connections |
| | | | | | | | | | | 2 | 230 V metric screw connections |
| | | | | | | | | | | 3 | 115 V US screw connections |
| | | | | | | | | | | 4 | 230 V US screw connections |
| | | | | | | | | | | | Heat exchanger |
| | | | | | | | | | | 0 0 | Without heat exchanger |
| | | | | | | | | | | 1 6 | 2 single glass heat exchangers/ (2x PTG-2) |
| | | | | | | | | | | 1 7 | 2 single PVDF heat exchangers/ (2x PTV-2 or PTV-2-I) |
| | | | | | | | | | | | Condensate drain |
| | | | | | | | | | | 0 | Without condensate drain |
| | | | | | | | | | | 2 | 2 CPsingle peristaltic pumps with 90° angle hose connection ¹⁾ |
| | | | | | | | | | | 4 | 2 CPsingle peristaltic pumps with straight hose connection ¹⁾ |
| | | | | | | | | | | | Filter |
| | | | | | | | | | | 0 | Without filter |
| | | | | | | | | | | 1 | 1 filter installed |
| | | | | | | | | | | | Moisture detector ²⁾ |
| | | | | | | | | | | 0 | Without moisture detector |
| | | | | | | | | | | 1 | 1 moisture detector installed (only possible with 1 filter) |
| | | | | | | | | | | | Optional ²⁾ |
| | | | | | | | | | | 0 | Without option |
| | | | | | | | | | | 1 | With 4 - 20 mA analogue output for temperature |

¹⁾ Each heat exchanger is equipped with one peristaltic pump. The supply voltage corresponds with that of the main unit.

²⁾ The "moisture detector" option includes the option "4 - 20 mA analogue output".

Spare parts and accessories

| Item no. | Description |
|----------|---|
| 41151050 | Filter element FE-4; Unit 8 count |
| 4101003 | O-ring for filter AGF-FA-5, Unit 8 count, sintered PTFE |