Gas Analysis

Sample gas cooler

EGK 2A Ex

Installation and Operation Instructions

Original instructions

BE450020
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Read this instruction carefully prior to installation and/or use. Pay attention particularly to all advises and safety instructions to prevent injuries. Bühler Technologies can not be held responsible for misusing the product or unreliable function due to unauthorised modifications.

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1 Introduction

1.1 Intended use

This unit is intended for industrial use in gas analysis systems. It's an essential component for conditioning the sample gas to protect the analysis instrument from residual moisture in the sample gas.

The device is suitable for use in explosive areas Zone 1 (EPL Gb) and Zone 2 (EPL Gc), explosion groups IIA, IIB and IIC, as well as temperature classes T1, T2, T3 and T4.

The permissible ambient temperature range is -20 °C ≤ T_{amb} ≤ 45 °C.

Markings on the sample gas cooler include ignition protection types Ex pxb eb mb q [ia] IIC T4 Gb. The erection specifications (e.g. EN/IEC 60079-14) must be observed.

The device may only be used as specified in the operating instructions and the related technical documentation. The specifications on the specific intended use, existing material combinations, as well as pressure and temperature limits must be observed. The cooler is not a safety device when used properly.

When selecting and installing accessories, it's important these are equivalent to the cooler markings or that these are suitable for the conditions of the prevailing explosive area. Installing accessories or components of lower classifications (e.g. zone, gas group, temperature class, ambient temperature) reduces the area of application of the cooler to the lowest classification.

Improper use, modifications not authorised by the manufacturer and incorrect operation contrary to the parameters specified in this operating manual will void any warranty and manufacturer liability.

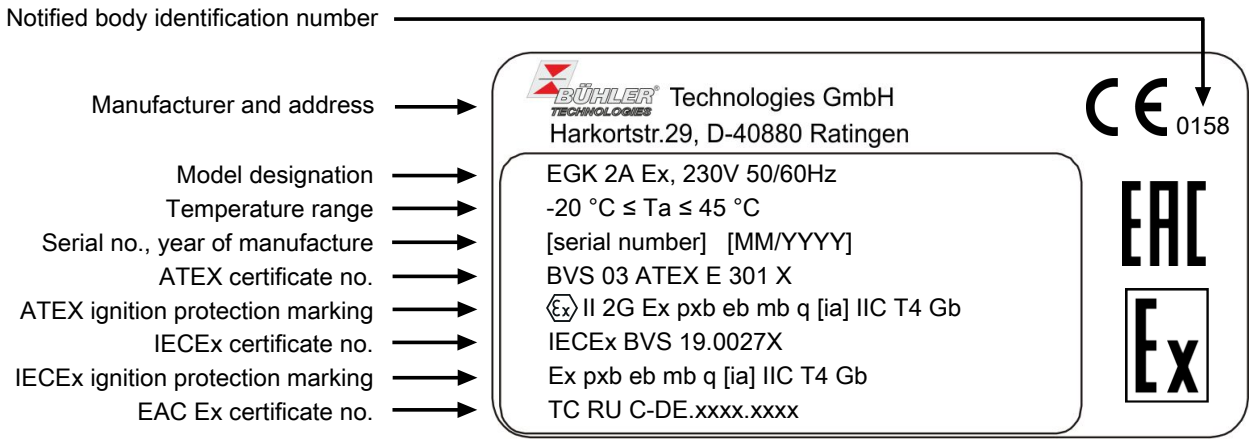
1.2 Design types

These operating instructions describe the main units for voltages 230 V, 50/60 Hz and 115 V, 50/60 Hz.

Please refer to the nameplate to identify your cooler. In addition to the job number, this also contains the item number (also see chapter Ordering instructions [> page 4]).

1.3 Type plate

Example:



1.4 Scope of delivery

- Cooler
- Product documentation
- Connection-/mounting accessories (optional)

1.5 Ordering instructions

The item number is a code for the configuration of your unit. Please use the following model key:
Please note: Every individual gas path must be equipped with condensate drain.

4590	X	X	X	X	X	X	X	1	Product characteristics (metric connections)
									Voltage [1]
	1								115 V
	2								230 V
									Gas path/material/version
		0	0	0					without heat exchanger
									1 gas path/material/version
		1	1	0					1x single heat exchanger/stainless steel/TS
		1	2	0					1x single heat exchanger/glass/TG
		1	3	0					1x single heat exchanger/PVDF/TV
									2 gas paths/material/version
		2	1	0					2x single heat exchanger/stainless steel/TS
		2	2	0					2x single heat exchanger/glass/TG
		2	3	0					2x single heat exchanger/PVDF/TV
		2	6	0					1x dual heat exchanger/stainless steel/DTS (10 mm)
		2	6	1					1x dual heat exchanger/stainless steel/DTS-6
		2	7	0					1x dual heat exchanger/glass/DTG
		2	8	0					1x dual heat exchanger/PVDF/DTV [2]
									3 gas paths/material/version
		3	1	0					1x single heat exchanger + 1x dual heat exchanger/stainless steel/TS+DTS (10 mm)
		3	1	1					1x single heat exchanger + 1x dual heat exchanger/stainless steel/TS+DTS-6
		3	2	0					1x single heat exchanger + 1x dual heat exchanger/glass/TG+DTG
		3	3	0					1x single heat exchanger + 1x dual heat exchanger/PVDF/TV+DTV [2]
									4 gas paths/material/version
		4	6	0					2x dual heat exchanger/stainless steel/DTS (10 mm)
		4	6	1					2x dual heat exchanger/stainless steel/DTS-6
		4	7	0					2x dual heat exchanger/glass/DTG
		4	8	0					2x dual heat exchanger/PVDF/DTV [2]
									Condensate drain
					0	0	0		without condensate drain
									1 gas path
					1	1	1		1x peristaltic pump CPsingle with adapter [3]
					1	1	3		1x peristaltic pump CPsingle with screw connection [3]
					3	0	0		1x AK20 installed [3]
					4	0	0		1x 11 LD V38 installed
									2 gas paths
					1	2	2		1x peristaltic pump CPdouble with adapter [3]
					1	2	4		1x peristaltic pump CPdouble with screw connection [3]
					3	0	0		2x AK20 installed [3]
					4	0	0		2x 11 LD V38 installed
									3 gas paths
					1	3	2		1x peristaltic pump CPdouble + 1x peristaltic pump CPsingle with adapter [3]
					1	3	4		1x peristaltic pump CPdouble + 1x peristaltic pump CPsingle with screw connection [3]
					3	0	0		3x AK20 installed [3]
					4	0	0		3x 11 LD V38 installed
									4 gas paths
					1	4	2		2x peristaltic pump CPdouble with adapter [3]
					1	4	4		2x peristaltic pump CPdouble with screw connection [3]
					3	0	0		4x AK20 installed [3]
					4	0	0		4x 11 LD V38 installed

4590	X	X	X	X	X	X	X	1	Product characteristics (US connections)
									Voltage [1]
	1								115 V
	2								230 V
									Gas path/material/version
		0	0	0					without heat exchanger
									1 gas path/material/version
		1	1	5					1x single heat exchanger/stainless steel/TS-I
		1	2	5					1x single heat exchanger/glass/TG-I
		1	3	5					1x single heat exchanger/PVDF/TV-I
									2 gas paths/material/version
		2	1	5					2x single heat exchanger/stainless steel/TS-I
		2	2	5					2x single heat exchanger/glass/TG-I
		2	3	5					2x single heat exchanger/PVDF/TV-I
		2	6	5					1x dual heat exchanger/stainless steel/DTS-I (3/8")
		2	6	6					1x dual heat exchanger/stainless steel/DTS-6-I
		2	7	5					1x dual heat exchanger/glass/DTG-I
		2	8	5					1x dual heat exchanger/PVDF/DTV-I [2]
									3 gas paths/material/version
		3	1	5					1x single heat exchanger + 1x dual heat exchanger/stainless steel/TS+DTS-I (3/8")
		3	1	6					1x single heat exchanger + 1x dual heat exchanger/stainless steel/TS+DTS-6-I
		3	2	5					1x single heat exchanger + 1x dual heat exchanger/glass/TG+DTG-I
		3	3	5					1x single heat exchanger + 1x dual heat exchanger/PVDF/TV-I+DTV-I [2]
									4 gas paths/material/version
		4	6	5					2x dual heat exchanger/stainless steel/DTS-I (3/8")
		4	6	6					2x dual heat exchanger/stainless steel/DTS-6-I
		4	7	5					2x dual heat exchanger/glass/DTG-I
		4	8	5					2x dual heat exchanger/PVDF/DTV-I [2]
									Condensate drain
					0	0	0		without condensate drain
									1 gas path
					1	1	1		1x peristaltic pump CPsingle with adapter [3]
					1	1	3		1x peristaltic pump CPsingle with screw connection [3]
					3	0	0		1x AK20 installed [3]
					4	0	0		1x 11 LD V38 installed
									2 gas paths
					1	2	2		1x peristaltic pump CPdouble with adapter [3]
					1	2	4		1x peristaltic pump CPdouble with screw connection [3]
					3	0	0		2x AK20 installed [3]
					4	0	0		2x 11 LD V38 installed
									3 gas paths
					1	3	2		1x peristaltic pump CPdouble + 1x peristaltic pump CPsingle with adapter [3]
					1	3	4		1x peristaltic pump CPdouble + 1x peristaltic pump CPsingle with screw connection [3]
					3	0	0		3x AK20 installed [3]
					4	0	0		3x 11 LD V38 installed
									4 gas paths
					1	4	2		2x peristaltic pump CPdouble with adapter [3]
					1	4	4		2x peristaltic pump CPdouble with screw connection [3]
					3	0	0		4x AK20 installed [3]
					4	0	0		4x 11 LD V38 installed

[1] Cooler operation inside Ex area only permitted with suitable protective motor switch.

[2] Operation with condensate drains and traps not available.

[3] This option limits the approved application of the complete cooler to gas group IIB.

2 Safety instructions

2.1 Important notices

NOTICE

The device is suitable for hazardous areas.

This unit may only be used if:

- The product is being used under the conditions described in the operating- and installation instructions, used according to the nameplate and for applications for which it is intended. Any unauthorized modifications to the unit will void the warranty provided by Bühler Technologies GmbH,
- The specifications and markings in the type plate must be observed,
- The threshold values in the data sheet and the instructions must be observed,
- Monitoring equipment / protection devices must be connected correctly,
- Service and repair work not described in these instructions are performed by Bühler Technologies GmbH,
- Genuine replacement parts must be used.

Erecting electrical systems in explosive areas requires compliance with the regulation IEC/EN 60079-14.

Additional national regulations pertaining to initial operation, operation, maintenance, repairs and disposal must be observed.

These operating instructions are a part of the equipment. The manufacturer reserves the right to change performance-, specification- or technical data without prior notice. Please keep these instructions for future reference.

Signal words for warnings

DANGER	Signal word for an imminent danger with high risk, resulting in severe injuries or death if not avoided.
WARNING	Signal word for a hazardous situation with medium risk, possibly resulting in severe injuries or death if not avoided.
CAUTION	Signal word for a hazardous situation with low risk, resulting in damaged to the device or the property or minor or medium injuries if not avoided.
NOTICE	Signal word for important information to the product.

Warning signs

These instructions use the following warning signs:

	Warns of a general hazard		General notice
	Warns of voltage		Unplug from mains
	Warns not to inhale toxic gasses		Wear respiratory equipment
	Warns of corrosive liquids		Wear a safety mask
	Warns of explosive areas		Wear gloves
	Warns of hot surfaces		

2.2 General hazard warnings

The equipment must be installed by a professional familiar with the safety requirements and risks.

Be sure to observe the safety regulations and generally applicable rules of technology relevant for the installation site. Prevent malfunctions and avoid personal injuries and property damage.

The operator of the system must ensure:

- Safety notices and operating instructions are available and observed,
- The respective national accident prevention regulations are observed,
- The permissible data and operational conditions are maintained,
- Safety guards are used and mandatory maintenance is performed,
- Legal regulations are observed during disposal,
- compliance with national installation regulations.
- upstream devices must be designed so that a sample gas cooler failure cannot result in secondary damages. The cooler is not a safety device when used properly,
- the device is suitable for the respective purpose is (e.g. zone, temperature class, etc.),
- the lightning protection must comply with the applicable local regulations,
- the sample gas cooler is protected from external heat or cold sources.

Maintenance, Repair

Please note during maintenance and repairs:

- Repairs to the unit must be performed by Bühler authorised personnel.
- Only perform conversion-, maintenance or installation work described in these operating and installation instructions.
- Always use genuine spare parts.
- Do not install damaged or defective spare part. If necessary, visually inspect prior to installation to determine any obvious damage to the spare parts.

Always observe the applicable safety and operating regulations in the respective country of use when performing any type of maintenance.

DANGER

Electrical voltage

Electrocution hazard.

a) Disconnect the device from power supply.

b) Make sure that the equipment cannot be reconnected to mains unintentionally.

c) The device must be opened by trained staff only.

d) Regard correct mains voltage.

DANGER

Danger to life and explosion during installation and maintenance

The unit must not be worked on (assembly, installation, maintenance) in explosive atmospheres.

DANGER

Explosion hazard due to frequency converter operation

The motor could produce incendive leakage currents or potential differences due to frequency converter operation.
Frequency converter operation of the motors prohibited!

DANGER

Toxic, corrosive gas/condensate

Sample gas/condensate may be hazardous to health.

a) If necessary, ensure a safe gas/condensate discharge.

b) Always disconnect the gas supply when performing maintenance or repairs.

c) Protect yourself from toxic/corrosive gasses/condensate when performing maintenance. Wear appropriate protective equipment.

DANGER

Explosion hazard

Life and explosion risk may result from gas leakage due to improper use.

a) Use the devices only as described in this manual.

b) Regard the process conditions.

c) Check tubes and hoses for leakage.

WARNING

Risk of breakage

a) Protect the equipment against being hit.

b) Protect the device against falling objects.

3 Product description

3.1 General description

A sample gas cooler is used to lower the moisture content, thus the dew point of a sample gas. This is intended to on one hand lower measurement accuracies through volume influence, on the other to avoid for moisture to condense further along the measuring path and cause damage, particularly to the delicate measuring cell of the analyser.

The sample gas cooler is therefore a part of conditioning, which is illustrated as a typical flow chart below.

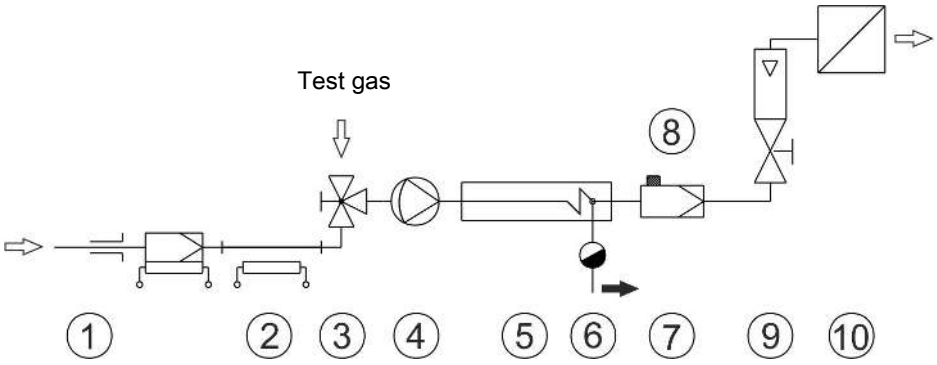


Fig. 1: A100060 Flow chart

1	Probe	6	Condensate drain/peristaltic pump
2	Line (heated)	7	Fine filter
3	Reversing tap for calibration	8	Moisture detector
4	Gas pump	9	Flow meter with control valve
5	Gas cooler	10	Analyser

The cooling circuit cool a cooling block (left front of the unit) to a defined temperature. The actual heat exchangers are placed inside this cooling block, thus also cooled.

The warm, "moist" sample gas is fed into the inlet at the top of the heat exchanger, where it is cooled, and exits through the output at the top. The water vapour condenses on the cooling surfaces of the heat exchanger and drains to the bottom, where the condensate output of the heat exchanger is located.

From there, the condensate can then be collected in a receptacle or drained directly using an automatic condensate drain or peristaltic pump. An automatic condensate drain can only be used if the heat exchanger has excess pressure.

As already mentioned in the preface, there are various heat exchanger models and materials. When making your selection, please be sure to pay particular attention to the durability (see resistance list [> page 31]) and permissible pressures (see attached data sheet).

3.2 Functional principle of the cooler

On principle, the cooling circuit is constructed just as a refrigerator. In place of the cooled interior, it has the cooling block mentioned above. A compressor is switched on or off within a tolerance range.

After switching on the cooler, the block temperature will be displayed. The display will flash until the (set) temperature range around the preset initial dew point has been reached. The display will indicate an error in form of a flashing error message. The electronics also provides this differentiation as a potential-free output used in fail-safe control. Thus a power failure is also reported to the master display. For a detailed description of the various states illustrated, please refer to chapter Operation.

4 Transport and storage

The sample gas cooler must be transported in the original packaging or a suitable alternative. It must be transported upright. Never place it on its side during transport, as oil could otherwise leak from the compressor and enter the cooling circuit. This can result in cooler start-up problems or failure.

During extended periods of non-use, protect the cooler against moisture and heat. It must be stored in a covered, dry, vibration- and dust-free location at temperatures between -20°C and +40°C.

5 Installation and connection

CAUTION	Explosion hazard
	Before using any accessories with the sample gas cooler, verify these parts are suitable for the purpose and use in explosive atmospheres. Please note, accessories may limit use of the sample gas cooler with respect to explosion protection.

5.1 Installation site requirements

The unit is intended for use in enclosed areas. Adequate protection from the weather must be provided when used outdoors. The approved environmental conditions for explosive areas according to the enclosed data sheet must be met.

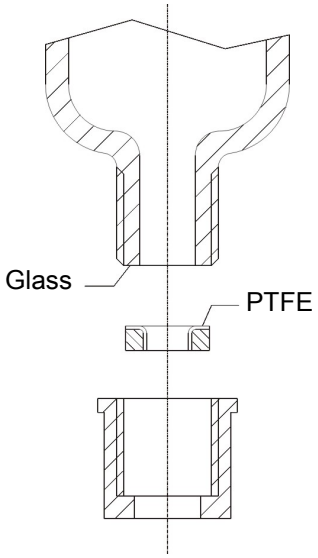
The sample gas cooler can be used as a stand-alone unit or wall mounted. Do not obstruct the convection. Maintain a clearance to other objects of at least 10 cm all around the bottom of the cooler. Above the cooler, particularly above the rear vent, maintain a clearance of at least 40 cm. With respect to components installed above, remember the air emitted upward from the cooler can be very warm.

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. We recommend mounting to solid walls with metal wall anchors and M8 screws with washer. Additional requirements (tightening torque, screw-in depth, etc.) must be selected per the specifications of the metal anchor manufacturer. When mounting inside control cabinets, we also recommend mounting with M8 bolts directly to the mounting plate.

5.2 Connecting the gas- and condensate connections

On glass heat exchangers the correct position of the seal is important when connecting the gas lines. 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

Run the gas supply with a downward slope all the way to the cooler. If a large amount of condensate accumulates, we recommend using a condensate pre-separator before the cooler. Our fluid separators with automatic condensate drain, 11 LD spec., AK 20 V or model 165, are suitable.

The gas inputs on the heat exchanger are marked red

When using glass- or PVDF heat exchangers the enclosed cover must be used. In this case remove the cover, pull the hoses through the cover, connect the hoses to the heat exchanger, and finally replace and secure the cover.

Be careful when connecting the glass- and PVDF heat exchanger, and only tighten the fittings by hand.

DANGER **Explosion hazard due to flame propagation**

Severe injuries and damage to the system
If the process holds a risk of flame propagation, install a flame arrestor.

When using automatic condensate drains, the gas pump must be installed ahead of the cooler 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 collectors or peristaltic pumps.

Glass vessels and automatic condensate drains are available for draining condensate for external mounting below the unit.

Connecting a condensate drain: 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.

An external peristaltic pump may be installed a little away from the cooler.

Be sure the gas line connections are tight.

5.3 Peristaltic pump connector (optional)

When using peristaltic pumps, these can also be mounted separate from the cooler. An adapter plate is available to mount the pumps directly below the cooler. The cooler frame features mounts for mounting the plate. Mount with M6 screws and a tightening torque of 6.3 Nm.

When ordering the cooler with attached peristaltic pumps, these are already installed but not yet wired. A 3 m cable on each pump allows wiring outside the cooler. Please refer to the separate operating instructions for more information about connecting the peristaltic pump.

Heat exchangers ordered at the same time are already installed and connected to the peristaltic pumps.

NOTICE

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

5.4 Electrical connections and potential equalisation

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.

DANGER **Electrical voltage**

Electrocution hazard.

a) Disconnect the device from power supply.

b) Make sure that the equipment cannot be reconnected to mains unintentionally.

c) The device must be opened by trained staff only.

d) Regard correct mains voltage.

NOTICE **When used in explosive areas**

Regulation IEC/EN 60079-14 must be observed when erecting electrical systems in explosive areas.
Additional national regulations pertaining to initial operation, operation, maintenance, repairs and disposal must be observed.

The sample gas cooler may only be operated with a suitable protective motor switch as overload protection. A suitable approved version of the protective motor switch protected against explosion is required when installing in an explosive area. A selection of suitable protective motor switches for safe and for explosive areas are available as accessories (see chapter Spare Parts and Accessories [> page 29]).

The setting of the protective motor switch varies by cooler version. For the correct setting, see chapter Technical Data [> page 33].

The supply line cross-sections must be suitable for the rated current.

The status outlet can also be connected to an intrinsically safe inlet. The specifications for this inlet must be met. The capacity and inductance of the contact are zero, so that only the cable used must be considered.

Connecting the cooler

- On the black terminal box, loosen the four screws in the corners of the face.
- Carefully lift off the cover: The control elements are attached to the to the electronics with cables.
- Turn the cover and set down on the cooler. Be careful not to tension the cables.
- Feed the cable for the status signal through the front left and the cable for the supply voltage through the front centre cable fitting.
- Connect according to the drawing in the appendix. The insulation of the individual conductors only need to be stripped by 5 mm. Do not use cable end sleeves.
- The earth connection is placed on a copper rail, see drawing 41/170-10-3. The screw together with the pressure piece should be screwed into the copper rail at a tightening torque of 2.2 Nm.
- Now close the housing, remembering:
  - Tighten the 4 screws to a tightening torque of approx. 4 Nm.
  - No foreign objects, contaminants or moisture may be inside the junction box of the sample gas cooler. Close the box dust- and waterproof (be sure not to crush any cables!). Use the original seal when closing the junction box. Openings not being used must be covered with approved plugs per Atex. Tighten all screw connections.
- ⏚ Connect the potential equalisation of the cooler (threaded bolts below the terminal box) to the potential equalisation on site. Stray electric currents may not flow through this connection.
- Run the lines so the insulation will not be damaged. If necessary, secure the lines with suitable means and ensure the adequate cable relief of the connecting cable.

5.5 Testing insulation resistance

CAUTION

High voltage

Insulation test will damage the device
Do not test the electric strength if the entire unit is under high voltage!

If you wish to check the electric strength again yourself, only do so on the following individual components using 500 VDC. Please note the following items.

When testing the cooler electronics disconnect the earth connection from the cooler electronics. Short circuit L and N and carry out the high voltage test against the housing.

NOTICE

Following this test be sure to reconnect the earth!

To test the compressor, disconnect its supply line from the controller electronics. Do not disconnect the earth. Short circuit the main winding, secondary winding and N, and carry out the electric strength test against earth. After completing the test, reconnect the compressor.

To test the Starting capacitors, disconnect its supply line from the controller electronics. Do not disconnect the earth. Short circuit the supply lines, then carry out the electric strength test against earth. After testing is completed, reconnect the starting capacitor(s).

6 Operation and controls

NOTICE

The device must not be operated beyond its specifications.

CAUTION

Hot surface

Risk of burns
Depending on the operating parameters, the air heat exchanger at the back of the cooler can reach a temperature of up to 80 °C during operation.

6.1 Switching on the sample gas cooler

Before switching on the unit, check:

- tube- and electrical connections are undamaged and correctly installed.
- no parts of the sample gas cooler have been removed (e.g. terminal box cover).
- protection- and monitoring devices are in place and function (protective motor switch).
- ambient parameters are met.
- Please note rating plate information!
- the motor voltage and frequency matches the mains values.
- electrical connections are securely connected and monitoring devices are connected and set as prescribed!
- air inlets and cooling surfaces are clean, and the air passage is not obstructed (see notices under "Installation site requirements")!
- the earth is proper and functional.
- the cooler is properly secured (see chapter Installation and connection)!
- the junction box cover is closed and the cable glands properly sealed.
- the protective motor switch must be adjusted to the rated current (see chapter Technical Data [> page 33]).
- the condensate path is clear. particularly on the option with condensate pump, whether it is controlled together with the cooler.

Switching on the unit

After switching on the cooler, the block temperature will be displayed.

Once the temperature range has been reached (after approx. 10 minutes, depending on the ambient temperature), the temperature display will be steady, and the status contact will switch over.

If the display flashes during operation or an error message appears, please refer to chapter Troubleshooting [> page 26].

Please refer to chapter Appendices [> page 33] for performance data and limits.

6.2 Use of menu functions

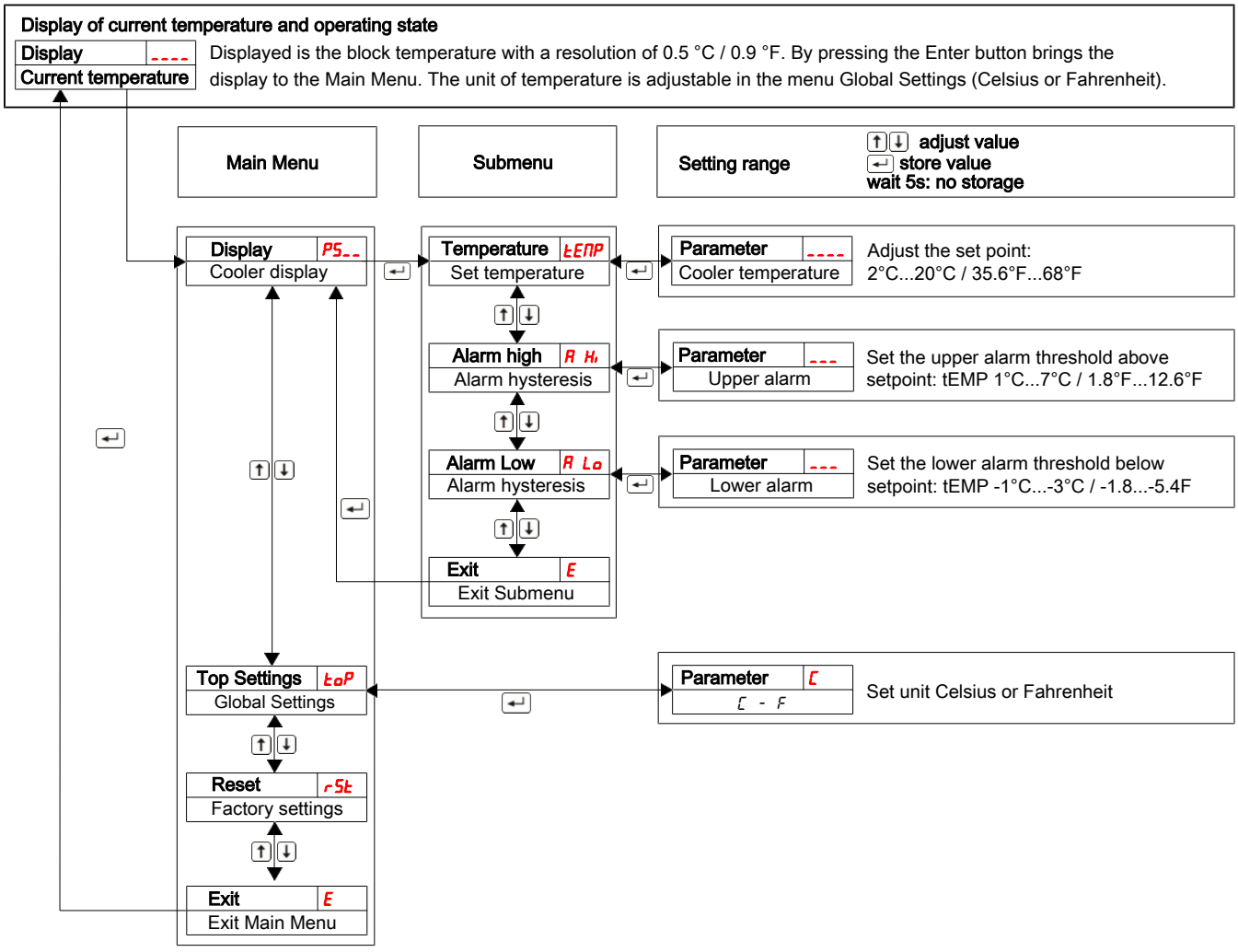
Overview of the operational principal:

Use this short description if you have experience with the device.

Operation is carried out by only the keys with the following functions:

Key	Function
↵	– Switch from measurement display to main menu – Selection of the display menu item – Accepting the changed value or selection
↑	– Switch to the upper menu item – Increase of the value of switching the selection – Temporary display of the alternative measurement display (if option is installed)
↓	– Switch to lower menu item – Decrease of the value of switching the selection – Temporary display of the alternative measurement display (if option is installed)

6.2.1 Menu navigation overview



6.2.2 Detailed description of the operational principle

The detailed description will guide you through the menu step by step.

Connect the unit to the power supply and wait for the startup procedure to complete. At first the software version implemented on the unit will be displayed for a brief period. The unit will then switch directly into measured value display.

↵ Pressing the button will take you from display mode to the main menu. (The control will continue running whilst in menu mode.)

↑↓ Use these buttons to navigate the main menu.

↵ After confirming a main menu item the associated submenu will open

Here you can configure operating parameters:

↑↓ Cycle through the submenu to configure the parameters,

↵ then confirm the menu item to be changed.

↑↓ You can now set values within specific limits.

↵ After confirming the value the system will save it. This will automatically return you to the submenu.

If no button is pushed for approx. 5 s, the unit will automatically return to the submenu. Changes to values will not be saved.

The same applies to the sub- and main menu. The system will automatically return to display mode without saving the (last) value changed. Parameters which were previously changed and saved will be retained and not reset.

NOTICE! After saving values with the Enter key they will be applied to the control.

E To exit the main or submenu, select menu item E (Exit).

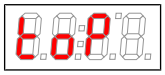
6.3 Description of menu functions

6.3.1 Main menu

Cooler

From here you will be able to access to all relevant cooler settings. The related submenu allows you to select the target temperature and alarm thresholds.

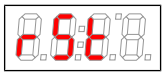
Globale settings (ToP Settings)



Selection of the global temperature unit, either degree Celsius (C) or degree Fahrenheit (F).

Note: This menu item has no sub-item. The temperature unit is directly selected.

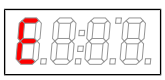
Factory setting -> Reset (rSt)



Resets operating parameters to the default values. Reboot..

Exit main menu

Display → *E*



Selecting this will return you to display mode.

6.3.2 Submenu

Cooler -> nominal temperature (temperature)

	This setting determines the nominal temperature for the cooler temperature. The value can be set to a range from 2 °C (35.6 °F) to 20 °C (68 °F).
Note:	The standard value at delivery is 5 °C (41 °F) (unless otherwise agreed). If the temperature is changed the indicator may blink, until the new operating range has been reached.

Cooler -> upper alarm limit (alarm high)

	Here you can set the upper threshold for the visual signal and the alarm relay. The alarm limit is set to a range from 1 °C (1.8 °F) to 7 °C (12.6 °F) in relation to the cooler temperature setting.
Note:	The standard value at delivery is 3 °C (5.4 °F) (unless otherwise agreed).

Cooler -> lower alarm limit (alarm low)

	Here you can set the lower threshold for the visual signal and the alarm relay. The alarm limit is set to a range from -1 °C (-1.8 °F) to -3 °C (-5.4 °F) in relation to the cooler temperature setting.
Note:	The standard value at delivery is -3 °C (-5.4 °F) (unless otherwise agreed).

Exit submenu

	Selecting this item returns to the main menu.

7 Maintenance

During maintenance, remember:

- The equipment must be maintained by a professional familiar with the safety requirements and risks.
- Only perform maintenance work described in these operating and installation instructions.
- Observe the respective safety regulations and operating specifications when performing any type of maintenance.
- Always use genuine spare parts.
- Defective parts must be replaced immediately, and the unit, or the gas circuit, switched off.

DANGER

Electrical voltage

Electrocution hazard.

a) Disconnect the device from power supply.

b) Make sure that the equipment cannot be reconnected to mains unintentionally.

c) The device must be opened by trained staff only.

d) Regard correct mains voltage.

DANGER

Toxic, acidic gasses

Sample gas can be harmful.

a) Switch off the gas supply before performing maintenance and, if necessary, flush the gas lines with air.

b) If necessary, ensure a safe gas discharge.

c) Protect yourself from toxic / acidic gasses when performing maintenance. Wear appropriate protective equipment.

CAUTION

Gas emanation

The heat exchangers mustn't be pressurised when being removed.

CAUTION

Tipping hazard

Equipment damage.
Secure the device against tipping, sliding and falling.

CAUTION

Hot surface

Risk of burns
Depending on the operating parameters, the air heat exchanger at the back of the cooler can reach a temperature of up to 80 °C during operation.
Allow the unit to cool down before performing maintenance.

NOTICE

- Wait at least one minute before opening the terminal box.
- Always shut off the gas supply before disconnecting the gas connection or condensate drain components.
- Immediately replace defective parts, and switch off the cooler or the sampling path.
- The functionality of the safety circuits must be tested annually. If the test outcome is negative, the unit must be sent to the manufacturer.
- Always transport the cooler upright.
- Always observe the requirements of the examination certificate (see attached).

7.1 Maintenance Schedule

Component	Interval*	Work to be performed	To be performed by
Pressure switch	every 8,000 h or 1 year	Test per chapter Testing the pressure monitoring circuit [> page 21]	Customer
Starting capacitor	every 8,000 h or 1 year	check for damages	Customer
Condenser (air heat exchanger)	every 8,000 h or 1 year	If ribs/cover is covered with dust or deposits, clean with compressed air per chapter Cleaning the condenser (air heat exchanger) [> page 21]	Customer
Motor CP X1	after ~30,000 h	Replace motor	Service technician/ Bühler Technologies
	during operation	to changes in how the motor sounds during operation	Customer
Bearing CP X1	after ~30,000 h	Change bearing	Service technician/ Bühler Technologies
	when replacing the hose	visually inspect for contamination.	Customer
	during operation	to changes in operating noise	Customer
Pump head CP X1	every 24,000 h or 3 years	Visually inspect for tears/cracks	Customer
	every 8,000 h or 1 year	Visually inspect for contamination from abrasion	Customer
Rotor CP X1	every 16,000 h or 2 years	Visually inspect for tears/cracks	Customer
Pressure rollers CP X1	every 12,000 h or 1.5 years	Visually inspect for abrasion	Customer
Pressure spring CP X1	every 12,000 h or 1.5 years	Visually inspect for wear/loss in clamping action	Customer
Pump hose CP X1	every 4,000 h or 6 months	Visually inspect for abrasion + leaks	Customer
	every 8,000 h or 1 year	Replace hose	Customer
Pump cover CP X1	every 16,000 h or 2 years	Visually inspect for cracks in the cover	Customer
Knurled nuts CP X1	when replacing the hose	retighten all knurled nuts hand tight	Customer

*When operating hours/years is specified, whichever comes first applies.

7.2 Maintenance

DANGER

Danger to life and explosion during installation and maintenance

The unit must not be worked on (assembly, installation, maintenance) in explosive atmospheres.

The following checks and, if necessary, cleaning must be performed at least once a year. No additional maintenance is required. A maintenance record should be kept. A master operations diary can be found at the end of the operating instructions for copying.

DANGER

Spark formation due to electrostatic charge

Always clean plastic housing parts and decals with a damp cloth.
Connect metal housings with earth potential (PE) conductive!

7.2.1 Testing the pressure monitoring circuit

The cooler must be operating and within the operating range (indicator green).

– Press the "Test1" button. The cooler will switch off and the display will flash, indicating the current temperature and the message “StoP“.
– Press the "Start1" button. The cooler will switch back on and the steady display will indicate the current temperature.
– Press the "Test2" button. The cooler will switch off and the display will flash, indicating the current temperature and the message “StoP“.
– Press the "Start2" button. The cooler will switch back on and the steady display will indicate the current temperature.

7.2.2 Cleaning the condenser (air heat exchanger)

Looking from the top, at the back of the sample gas cooler you will see the ribs of the condenser, protected by a cover. These should be clean to ensure heat is removed adequately. They only need to be cleaned if large amounts of dust or deposits are visible. Carefully clean with compressed air. Never use harsh cleaning agents.

7.3 Parts replacement

NOTICE

In general, no parts of the sample gas cooler should be defective. We recommend only having the Pt100, electronics, or starting capacitor replaced by the manufacturer's works or trained customer service. You may perform the replacement according to the following instructions. However, in this event Bühler Technologies GmbH is not responsible for improper replacement.

7.3.1 Replacing the heat exchanger

For the heat exchanger model, please refer to the item number under chapter Introduction.

Heat exchangers only need to be replaced when clogged or damaged. If they are clogged, we recommend checking if using a filter will avoid future occurrences.

Please note the warnings under chapter Maintenance.

– De-energise and depressurise the system.
– Disconnect the gas connections and condensate drain.
– Pull the heat exchanger up and out.
– Clean the cooling nest (hole inside the cooler block).
– Apply silicone grease to the cooled outer surface of the new heat exchanger.
– Reinsert the heat exchanger into the cooling nest with a rotating movement.
– Reconnect according to chapter Electrical connections and potential equalisation.

7.3.2 Replacing the Pt100

Item no.: 45 90 999 6

- Observe the warnings in chapter Maintenance [> page 19].
- De-energise (supply and status outlet) and depressurise the system.
- Loosen the four screws in the corners of the front on the black terminal box.
- Carefully lift of cover: The control elements are attached to the to the electronics with cables.
- Turn the cover and put down on the cooler. Be careful not to tension the cables.
- Remove the conductors of the Pt100 from the terminals (top tow, far left, see drawing 47/170-10-3 in the appendix) and measure the resistance. Depending on its temperature it should be between approx. 102...110 Ohm. If the measurement differs significantly, it is defective.
- Remove the cover for the pressure controls. To do so, remove the two screws, carefully pull the lower section forward, and slide the cover upward. You will now see the two pressure controls.
- Loosen the screw connection of the Pt100 beneath the cooler block and carefully pull out the Pt100.
- Loosen the screw connection for the Pt100 cable at the terminal box and pull the cable out of the terminal box.
- Loosen the screw connection from the bracket below the pressure controls, carefully pull the cable out to the left.
- Insert the new Pt100 sensor through the screw connection using a little silicone grease – Do not yet tighten the screw connection.
- Feed the cable down through the screw connection, behind the pressure controls, and into the screw connection on the terminal box. Do not forget the nuts and rubber rings.
- Connect the Pt100 (see drawing 47/170-10-3 in the appendix).
- Arrange the cable so it is without tension.
- Tighten the three cable glands at 2 Nm.
- Reattach the cover for the pressure controls and tighten the screw connection at 1.85 Nm.
- Close the terminal box observing the following items: No foreign objects, contaminants or moisture may be inside it. Tighten the terminal box at a tightening torque of 4 Nm, dust- and waterproof (be sure not to crush any cables!).
- Now restart the cooler per chapter Operation and controls [> page 15]. Monitor if the cooler runs in the operating range.

7.3.3 Replacing the electronics

Note the correct voltage:

230 V: Item no.: 45 92 989 7 MC

115 V: Item no.: 45 93 989 7 MC

- Observe the warnings in chapter Maintenance [> page 19].
- De-energise (supply and status outlet) and depressurise the system.
- Loosen the four screws in the corners of the front on the black terminal box.
- Carefully lift of cover: The control elements are attached to the to the electronics with cables.
- Turn the cover and put down on the cooler. Be careful not to tension the cables.
- Disconnect all cables. Although the cables are colour coded, you should mark the conductors if you are unsure.
- Loosen the 4 screws at the top of the board. The electronics can now be removed.
- Install the new electronics using the 4 screws.
- Reconnect all wires per drawing 47/170-10-3 in the appendix; the cable colours are specified.
- Close the terminal box observing the following items: No foreign objects, contaminants or moisture may be inside it. Tighten the terminal box at a tightening torque of 4 Nm, dust- and waterproof (be sure not to crush any cables!).
- Now restart the cooler per chapter Operation and controls [> page 15].
- Test per chapter Testing the pressure monitoring circuit [> page 21].
- Allow the cooler to operate and check if it reaches the operating range.

7.3.4 Replacing the starting capacitor

Item no.: 91 0407 0001

- Observe the warnings in chapter Maintenance [> page 19].
- De-energise (supply and status outlet) and depressurise the system.
- Disconnect gas connections.
- Remove the cooler and put in a safe location.
- Loosen the four screws in the corners of the front on the black terminal box.
- Carefully lift of cover: The control elements are attached to the to the electronics with cables.
- Turn the cover and put down on the cooler. Be careful not to tension the cables.
- Test the capacitor voltage. If defective, the capacitor may take considerably longer to discharge.
- Disconnect the capacitor cable(s), disconnect from the earth rail. (see drawing 47/170-10-3 in the appendix).
- Loosen the screw connection of the capacitor and remove the cable.
- Remove the back panel of the cooler.
- Loosen the starting capacitor retaining plate at the bottom left.
- Remove the retaining plate with the capacitors.
- Loosen the nut of the capacitor to be replaced and remove the capacitor.
- Cut the cable of the new capacitor to that of the old, but do not yet crimp on the cable lug.
- Install the new capacitor with the nut, but do not yet tighten the nut all the way
- Feed the cable(s) through the grommets of the stack.
- Slide the retaining plate and capacitor(s) into the stack.
- Attach the angle bracket. Tighten the screw connection to 1.85 Nm
- Attach the back panel with 6x M4 screws at a torque of 1.85 Nm.
- Feed the cables through the screw connections, tighten the nut with rubber ring to 6 Nm.
- Crimp the cable lug to the earth wire.
- Connect the capacitor(s) per drawing 47/170-10-3 in the appendix.
- The earth must be assembled as specified in the drawing! The screw together with the pressure piece should be screwed into the copper rail at a tightening torque of 2.2 Nm.
- Close the terminal box observing the following items: No foreign objects, contaminants or moisture may be inside it. Tighten the terminal box at a tightening torque of 4 Nm, dust- and waterproof (be sure not to crush any cables!).
- Now restart the cooler per chapter Operation and controls [> page 15].
- Test per chapter Testing the pressure monitoring circuit [> page 21].
- Allow the cooler to operate and check if it reaches the operating range.

7.3.5 Replacing the display

- Observe the warnings in chapter Maintenance [> page 19].
- De-energise (supply and status outlet) and depressurise the system.
- Loosen the four screws in the corners of the front on the black terminal box.
- Carefully lift of cover: The control elements are attached to the to the electronics with cables.
- Turn the cover and put down on the cooler. Be careful not to tension the cables.
- Disconnect all cables. Although the cables are colour coded, you should mark the conductors if you are unsure.
- Remove the display cable. To do so, undo the safety catch of the X4 plug and unplug the flat plug.
- Loosen the three screws at the back of the display board and remove the display including cable from the terminal box cover.
- Disconnect the ribbon cable from the display.
- Attach the cable to the replacement display and secure the plug connection from accidentally coming undone.
- Attach the display to the terminal box cover and secure with three screws (tightening torque 0.4 Nm).
- Attach the display cable to the electronics and secure the X4 plug connection.
- Reconnect all wires per drawing 47/170-10-3 in the appendix; the cable colours are specified.
- Close the terminal box observing the following items: No foreign objects, contaminants or moisture may be inside it. Tighten the terminal box at a tightening torque of 4 Nm, dust- and waterproof (be sure not to crush any cables!).
- Now restart the cooler per chapter Switching on the sample gas cooler [> page 15].
- Test per chapter Maintenance [> page 19].
- Allow the cooler to operate and check if it reaches the operating range.

7.3.6 Replacing the hoses of the peristaltic pump (option)

- Close gas supply.
- Switch off peristaltic pump(s) and disconnect all plugs.
- Disconnect supply and discharge tube on peristaltic pump (**observe safety notes!**).
- Loosen but do not remove centre knurled nut. Flip the screw upward.
- Pull the cover cap off to the bottom.
- Unplug external connections and remove hose.
- Replace hose (Bühler spare part) and install peristaltic pump in reverse order.
- Restore the power and gas supply.

7.3.7 Replacing the Peristaltic Pump (Optional)

- Close gas supply.
- Switch off peristaltic pump(s) and disconnect all plugs.
- Disconnect supply and discharge tube on peristaltic pump (**observe safety notes!**).
- Unscrew condensate pump from the adapter plate
- Attach the new condensate pump to the adapter plate and connect to the heat exchanger (tighten screw/nut connection M6 with 6.3 Nm).
- Restore the power and gas supply.

8 Service and repair

This chapter contains information on troubleshooting and correction should an error occur during operation.

Repairs to the unit must be performed by Bühler authorised personnel.

Please contact our Service Department with any questions:

Tel.: +49-(0)2102-498955 or your agent

For further information about our services and customised maintenance visit http://www.buehler-technologies.com/service.

If the equipment is not functioning properly after correcting any malfunctions and switching on the power, it must be inspected by the manufacturer. Please send the equipment inside suitable packaging to:

Bühler Technologies GmbH

- Reparatur/Service -

Harkortstraße 29

40880 Ratingen

Germany

Please also attach the completed and signed RMA decontamination statement to the packaging. We will otherwise be unable to process your repair order.

You will find the form in the appendix of these instructions, or simply request it by e-mail:

service@buehler-technologies.com.

8.1 Troubleshooting

CAUTION

Risk due to defective device

Personal injury or damage to property

a) Switch off the device and disconnect it from the mains.

b) Repair the fault immediately. The device should not be turned on again before elimination of the failure.

Problem / Malfunction	Possible cause	Action
Indicator doesn't light	– No power supply	– Connect to power
	– Protective device (protective motor switch) was triggered	– see item "protective device is triggering" in this table
	– Electronics defective	– Replace or have replaced; If the error recurs, check the power supply for malfunctions
Display flashes "Stop"	– Pressure monitor was triggered	
	– During first start-up	– see description in chapter Press switches respond during initial start-up [> page 28]
	– Later, during operation	– Reset pressure switch (see chapter Checking/Resetting Pressure Monitoring Switches [> page 27])
Temperature display flashing	– Operating range not yet reached	– Wait a few minutes
	– Heat input from sample gas is too high: Dew point/flow rate/gas temperature or combination thereof too high	– Observe/check specifications
	– Ambient temperature too high	– Observe/check specifications
	– Cooler ventilation restricted	– Observe the information in chapter Installation site requirements
	– Insufficient temperature: Sensor or electronics defective	– Remove and send in cooler
Condensate inside the gas output	– Condensation trap full	– Empty condensation trap
	– Valve inside the automatic condensate drain is stuck	– Flush in both directions
	– Cooler / heat exchanger overloaded	– Maintain limits
Reduced gas flow rate	– Gas circuit clogged	– Remove and clean or replace heat exchanger per chapter Replacing the starting capacitor
	– Heat exchanger iced over	– Remove and send in cooler
Protective device is triggering	– Coil- and terminal short circuit	– Measure insulation resistance
	– Start-up time exceeded	– Check start-up requirements
	– Starting capacitor defective	– Check capacitor and replace if necessary (see chapter Replacing the starting capacitor)
Error Messages in the Display		
The display alternates between the temperature and error message		
 Error 01	– Interruption	– Temperature sensor failure: Send in cooler
 Error 02	– Short circuit	– Temperature sensor failure: Send in cooler

Tab. 1: Troubleshooting

For additional information, see chapter Parts replacement [> page 21].

8.2 Safety instructions

- The device must be operated within its specifications.
- All repairs must be carried out by Bühler authorised personnel only.
- Only perform modifications, servicing or mounting described in this manual.
- Only use original spare parts.

DANGER **Electrical voltage**

Electrocution hazard.

a) Disconnect the device from power supply.

b) Make sure that the equipment cannot be reconnected to mains unintentionally.

c) The device must be opened by trained staff only.

d) Regard correct mains voltage.

DANGER **Toxic, corrosive gas/condensate**

Sample gas/condensate may be hazardous to health.

a) If necessary, ensure a safe gas/condensate discharge.

b) Always disconnect the gas supply when performing maintenance or repairs.

c) Protect yourself from toxic/corrosive gasses/condensate when performing maintenance. Wear appropriate protective equipment.

8.3 Checking/Resetting Pressure Monitoring Switches

- Observe the warnings under Maintenance.
- Switch off the cooler power supply and secure against restarting.
- Remove the cover for the pressure controls, between the cooling block and electronics housing.
- Remove cover. To do so unscrew the two screws beneath, carefully pull the lower section forward and slide the cover up. You will now see the two pressure controls.
- Wait approx. 3 minutes after switching off the pressure controls before testing.
- Very carefully press the face of the green button n the upper pressure control. If you feel a click, the pressure control had been triggered. Do the same with the lower pressure control. The actual cause for the trigger must be analysed (for assistance see chapter Troubleshooting).
- If neither of the two pressure controls were triggered or the pressure controls cannot be reset, **do not restart the cooler** but send it in for repair.
- Attach the cover and secure at a tightening torque of 1.85 Nm.
- The power supply can now be switched on again and the cooler restarted per chapter Operation and controls [> page 15].

8.4 Press switches respond during initial start-up

DANGER

Explosion hazard

The following description does **not** apply if the pressure controls **on the cooler are triggered** within the first minute. In this case there is a serious malfunction, resulting in a potential explosion hazard!

After transport in some cases more coolant can be dissolve in the compressor oil than required to safely operate the refrigerant circuit. After startup the cooler will then suddenly enter error mode (flashing red) after a few minutes.

In this case reset the pressure control(s) according to chapter Checking / resetting the pressure monitor switch and start the cooler. This may be required up to three times before the refrigerant circuit and particularly the compressor have warmed up sufficiently for n adequate amount of coolant to be in the circuit.

8.5 Checking the Starting Capacitor

Open the device per chapter Replacing the starting capacitor [> page 23]. Ensure the capacitor is discharged before testing!

– Check the capacity of the capacitor, which should be 55 µF.
– Test the internal resistance of the capacitor, which should be 200 kR.

8.6 Spare Parts

Please also specify the model and serial number when ordering parts.

Upgrade and expansion parts can be found in our catalog.

Available spare parts:

Item no.	Description
45909996	Pt100
45929897MC	Electronics 230 V
45939897MC	Electronics 115 V
9104070001	Capacitor
9100111124	Display
44920035011	Condensate pump hose, Tygon (Norprene), straight hose nipple
44920035014	Condensate pump hose, Tygon (Norprene), screw connection (metric)
44920035015	Condensate pump hose, Tygon (Norprene), screw connection (US)

The options the cooler is equipped with depend on this configuration. This is determined based on the information in chapter Ordering instructions [> page 4].

Item no.	Heat exchanger	Material
4510023	Single-leg heat exchanger TS	Stainless steel 1.4571
4510023I	Single-leg heat exchanger TS-I	Stainless steel 1.4571
4501023	Two-leg heat exchanger DTS-6	Stainless steel 1.4571
4501023I	Two-leg heat exchanger DTS-6-I	Stainless steel 1.4571
4501026	Two-leg heat exchanger DTS	Stainless steel 1.4571
4501026I	Two-leg heat exchanger DTS-I	Stainless steel 1.4571
4510013	Single-leg heat exchanger TG	Duran glass
4501027	Two-leg heat exchanger DTG	Duran glass
4501004	Single leg heat exchanger TV-SS	PVDF plastic
4501004I	Single-leg heat exchanger TV-SS-I	PVDF plastic
4501028	Two-leg heat exchanger DTV	PVDF plastic
4501028I	Two-leg heat exchanger DTV-I	PVDF plastic

When connecting, please note the specific values of the cooler, and the correct version when order spare parts (example: heat exchanger or electronics).

8.6.1 Spare Parts and Accessories

Item no.	Description
9132020009	Protective motor switch for installation outside Ex area 230 V, 50/60 Hz
9132020029	Protective motor switch for installation outside Ex area 115 V, 50/60 Hz
9132020032	Protective motor switch for installation inside Ex area 230 V, 50/60 Hz
9132020035	Protective motor switch for installation inside Ex area 115 V, 50/60 Hz
9110000078	Microfuse 125 mA, interrupt rating 1500 A
9120020139	Relay 24 VDC, 2 changeover contacts
9120020143	Relay 230 VAC, 2 changeover contacts
9146030314	Fuse clip
4410005	Condensate trap GL 1; glass, 0.4 L
4410019	Condensate trap GL 2; glass, 1 L
45099919	Mounting kit for peristaltic pump X1
44920035011	Condensate pump hose, Tygon (Norprene), straight hose nipple
44920035014	Condensate pump hose, Tygon (Norprene), screw connection (metric)
44920035015	Condensate pump hose, Tygon (Norprene), screw connection (US)

9 Disposal

The refrigerant circuit of the cooler contains R134a refrigerant.

The applicable national laws must be observed when disposing of the products. Disposal must not result in a danger to health and environment.

The crossed out wheelie bin symbol on Bühler Technologies GmbH electrical and electronic products indicates special disposal notices within the European Union (EU).

The crossed out wheelie bin symbol indicates the electric and electronic products bearing the symbol must be disposed of separate from household waste. They must be properly disposed of as waste electrical and electronic equipment.

Bühler Technologies GmbH will gladly dispose of your device bearing this mark. Please send your device to the address below for this purpose.

We are obligated by law to protect our employees from hazards posed by contaminated devices. Therefore please understand that we can only dispose of your waste equipment if the device is free from any aggressive, corrosive or other operating fluids dangerous to health or environment. **Please complete the "RMA Form and Decontamination Statement", available on our website, for every waste electrical and electronic equipment. The form must be applied to the packaging so it is visible from the outside.**

Please return waste electrical and electronic equipment to the following address:

Bühler Technologies GmbH
WEEE
Harkortstr. 29
40880 Ratingen
Germany

Please also observe data protection regulations and remember you are personally responsible for the returned waste equipment not bearing any personal data. Therefore please be sure to delete your personal data before returning your waste equipment.

10 Durability list

Heat exchanger:			TS, DTS	TG, DTG	TV, DTV
Formula	**Medium**	**Concentration**	**V4A**	**Glass (Teflon coated seal)**	**PVDF**
CH_3COCH_3	Acetone		1/1	1/1	3/4
C_6H_6	Benzol		1/1	1/1	1/3
Cl_2	Chlorine	10 % wet	4/4	1/1	2/2
Cl_2	Chlorine	97 %	1/1	1/0	1/1
C_2H_6	Ethane		2/0	1/0	2/0
C_2H_5OH	Ethanol	50 %	1/0	1/1	1/1
C_2H_4	Ethylene		1/0	1/0	1/0
C_2H_2	Ethyne		1/0	1/0	1/0
$C_6H_5C_2H_5$	Ethylbenzene		1/0	1/0	1/1
HF	Hydrofluoric acid		3/4	1/0	2/2
CO_2	Carbon dioxide		1/1	1/1	1/1
CO	Carbon monoxide		1/1	1/0	1/1
CH_4	Methane	technically pure	1/1	1/1	1/0
CH_3OH	Methanol		1/1	1/1	1/1
CH_3Cl_2	Methylene chloride		1/1	1/0	1/0
H_3PO_4	Phosphoric acid	1-5 %	1/1	1/1	1/1
H_3PO_4	Phosphoric acid	30 %	1/1	1/1	1/1
C_3H_8	Propane	gaseous	1/0	1/1	1/1
C_3H_6O	Propylene oxide		1/0	1/0	2/4
HNO_3	Nitric acid	1-10 %	1/1	1/1	1/1
HNO_3	Nitric acid	50 %	1/2	1/1	1/1
HCl	Hydrochloric acid	1-5 %	2/4	1/1	1/1
HCl	Hydrochloric acid	35 %	2/4	1/1	1/1
O_2	Oxygen		1/1	1/1	1/1
SF_6	Sulphur hexafluoride		0/0	1/0	0/0
H_2SO_4	Sulfuric acid	1-6 %	1/2	1/1	1/1
H_2S	Hydrogen sulphide		1/1	1/1	1/1
N_2	Nitrogen		1/0	1/1	1/1
$C_6H_5C_2H_3$	Styrene		1/0	1/1	1/0
$C_6H_5CH_3$	Toluol (methylbenzene)		1/1	1/1	1/1
H_2O	Water		1/1	1/1	1/1
H_2	Hydrogen		1/0	1/0	1/0

Tab. 2: Durability list

0 - no information available

1 - durability/suitability very good

2 - durability/suitability good

3 - limited suitability

4 - not suitable

Two values are specified per medium. Left number = value at +20°C, right number = value at +50°C.

Important information

The tables were listed based on specifications from various raw material manufacturers. The values solely refer to laboratory tests using raw materials. Components made from these are often subject to impacts which cannot be determined in laboratory testing (temperature, pressure, material strain, impacts of chemical agents, design features, etc.). The values specified can therefore only serve as a guideline. When in doubt, we recommend performing a test. These specifications do not infer a legal claim, we exclude any warranty and liability. The chemical and mechanical durability alone do not suffice to determine the usage property of a product, particularly e.g. the regulations for liquid fuels (Ex-protection) must be observed.

Durability to other mediums available upon request.

11 User book (Please make copies)

Maintained on	Unit no.	Operating hours	Remarks	Signature

12 Appendices

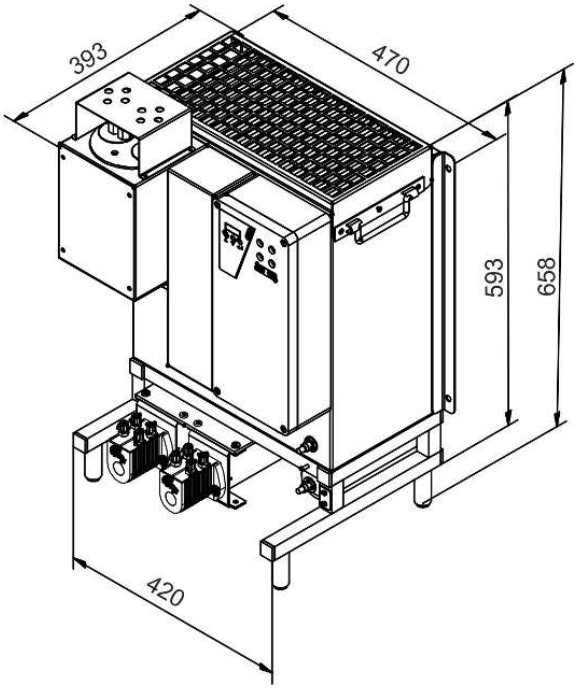
12.1 Technical Data

Gas cooler technical data	
ATEX approval:	Ⓔx II 2 G Ex pxb eb mb q [ia] IIC T4 Gb
IECEx approval:	Ex pxb eb mb q [ia] IIC T4 Gb
Ready for operation:	after max. 20 minutes
Rated cooling capacity (at 25 °C):	> 615 kJ/h (170 W)
Ambient temperature:	5 °C to 45 °C
Gas outlet dew point preset: adjustable:	 5 °C 2 °C to 20 °C
Alarm threshold adjustable around dew point upper alarm threshold: lower alarm threshold:	 1 °C to 7 °C, factory setting 3 °C -1 °C to -3 °C, factory setting -3 °C
Dew point fluctuations static: in the entire specification range:	 ±0.2 K (with stainless steel), ±0.5 K (with PVDF), ±0.5 K (with glass) ±2 K
Electrical protection class:	IP 54
Housing:	Stainless steel/Polyester
Weight incl. heat exchanger:	approx. 37 kg
Electric supply:	115 V or 230 V, 50/60 Hz, terminals
Power input:	250 VA (230 V) or 300 VA (115 V)
Protection:	Protective motor switch (breaking capacity 1.5 kA or higher) 115 V version: 3.2 A 230 V version: 1.3 A
Status output fuse:	Breaking capacity 1.5 kA or higher. Dimensioned per the status contact switching capacity and customer application (see type examination certificate, item 15.3.1.2).
Potential-free status output ("fail safe"):	230 V/3 A AC 115 V/3 A AC 24 V/1 A DC
Installation:	Stand-alone or wall-mounted
Packaging dimensions:	700 x 520 x 520 mm, on pallet (dimensions: 800 x 600)

Description

The flashing display and the status relays indicate the conditions are below or above the configured warning range (e.g. after switching on). If the cooler is stopped or in the event of service, an error code will appear.

12.2 Dimensions



Mounting holes

445 x 420 x Ø10 (wide x high x diameter)

12.3 Heat exchanger

12.3.1 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, (inlet) dew point τ_e (moisture content) and volume flow v. The outlet dew point rises with increasing energy content of the gas. The approved energy load from the gas is therefore determined by the tolerated rise in the dew point.

The following limits are specified for a normal standard operating point of τ_e = 65 °C and ϑ_G = 90 °C. The maximum volume flow v_{max} in Nl/h of cooled air is indicated, so after moisture has condensed.

If the values fall below τ_e and ϑ_G, the flow v_{max} may be increased. For example, on the TG heat exchanger the parameter triple τ_e = 65 °C, ϑ_G = 90 °C and v = 280 Nl/h may also be used in place of τ_e = 50 °C, ϑ_G = 80 °C and v = 380 Nl/h

Please contact our experts for clarification or refer to our design program.

12.3.2 Heat exchanger overview

Heat exchanger	TS TS-I [2]	TG TG	TV-SS TV-SS-I [2]	DTS (DTS-6 [3]) DTS-I (DTS-6-I [3]) [2]	DTG DTG	DTV [3] DTV-I [2] [3]
Materials in contact with media	Stainless steel	Glass PTFE	PVDF	Stainless steel	Glass PTFE	PVDF
Flow v_{max} [1]	530 L/h	280 L/h	125 L/h	2 x 250 L/h	2 x 140 L/h	2 x 115 L/h
Inlet dew point $\tau_{e,max}$ [1]	80 °C	80 °C	65 °C	80 °C	65 °C	65 °C
Gas inlet temperature $\vartheta_{G,max}$	130 °C (180 °C) [5]	130 °C	130 °C	130 °C (180 °C) [5]	130 °C	130 °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	5 mbar each	5 mbar each	15 mbar each
Dead volume V_{tot}	69 ml	48 ml	129 ml	28/25 ml	28/25 ml	21/21 ml
Gas connections (metric)	G1/4" i	GL 14 (6 mm) [4]	DN 4/6	6 mm tube	GL14 (6 mm) [4]	DN 4/6
Gas connections (US)	NPT 1/4" i	GL 14 (1/4") [4]	1/4"-1/6"	1/4" tube	GL14 (1/4") [4]	1/4"-1/6"
Condensate out connection (metric)	G3/8" i	GL 25 (12 mm) [4]	G3/8" i	Tube 10 mm (6 mm)	GL18 (10 mm) [4]	DN 5/8
Condensate out connection (US)	NPT 3/8" i	GL 25 (1/2") [4]	NPT 3/8" i	Tube 3/8" (1/4")	GL18 (3/8") [4]	3/16"-5/16"

[1] Max. cooling capacity of the cooler must be considered.

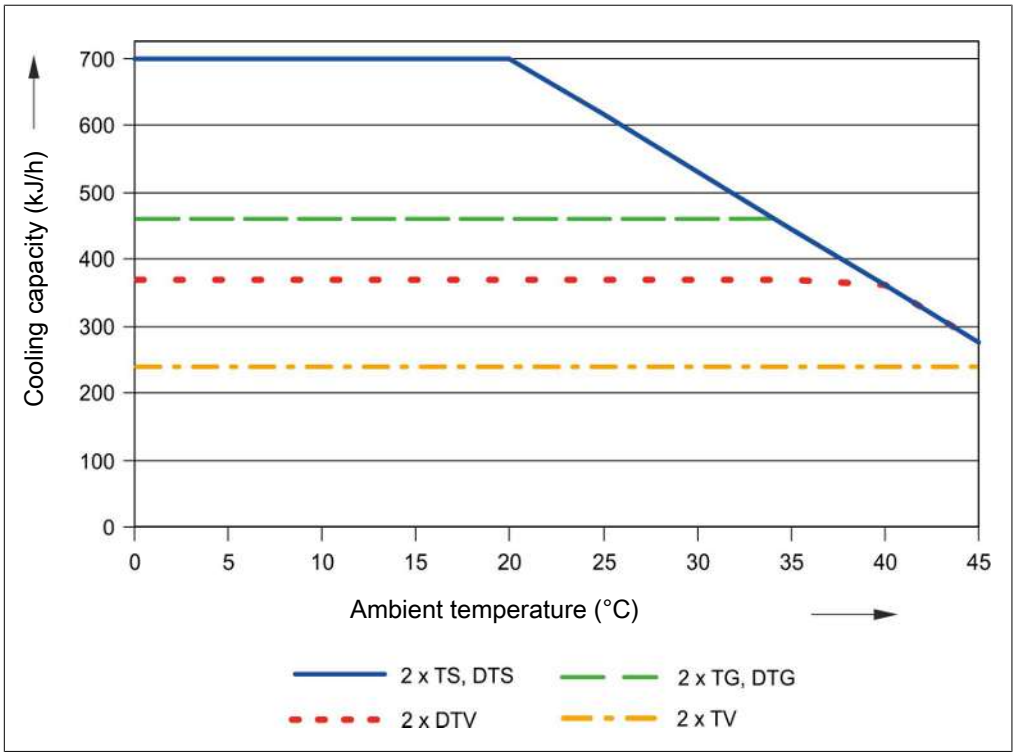
[2] Models marked I have NPT threads or US tubes, respectively.

[3] Condensate drain only possible with condensate pump

[4] Gasket inside diameter

[5] With temperature class T3 gases the permissible gas inlet temperature is max. 180 °C.

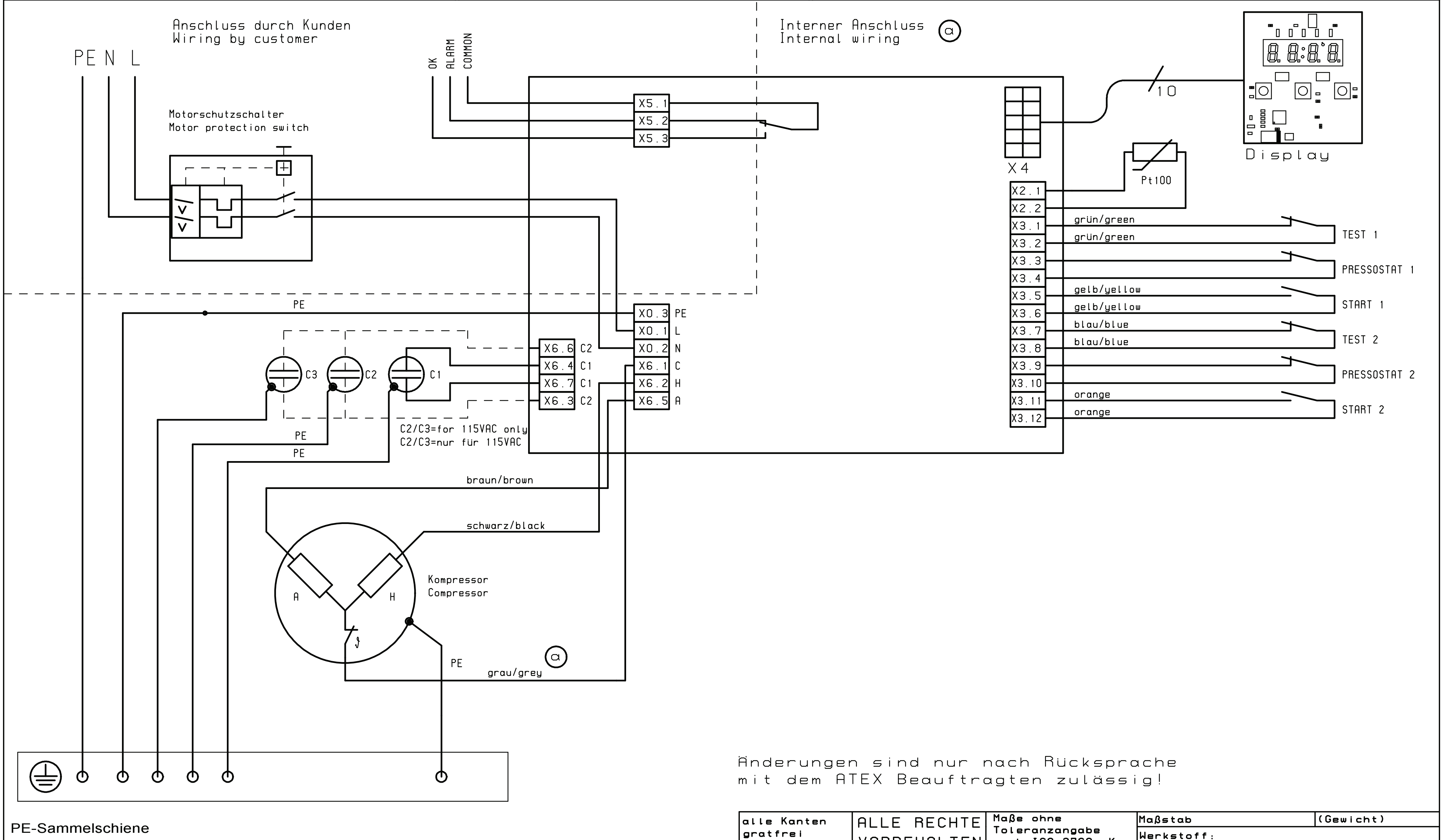
12.4 Performance data



Note: The limit curves for the heat exchangers exchanger apply to a dew point of 65 °C.

13 Attached documents

- Wiring diagram: 47/170-10-3
- Declaration of Conformity KX450007
- Gas Cooler Examination Certificate
- Examination Certificate for Components
- RMA - Decontamination Statement



Änderungen sind nur nach Rücksprache
mit dem ATEX Beauftragten zulässig!

alle Kanten gratfrei	ALLE RECHTE VORBEHALTEN			Maße ohne Toleranzangabe nach ISO 2768-mK	Maßstab	(Gewicht)
Oberflächenbearbeitungszeichen					Werkstoff:	
				Datum / Name	Benennung:	
$\surd$ = $\surd$ Roh				Bearb. 01.03.19 Brinkmann	Verdrahtungsplan EGK 2A Ex mit BR104 MC	
$\surd^{X}$ = $\surd$ R_z 63				Gepr.		
$\surd^{Y}$ = $\surd$ R_z 16				BUHLER Meß+Regeltechnik Ratingen	Zeichng.-Nr. 47/170-10-3A	
$\surd^{Z}$ = $\surd$ R_z 4	a	2x	06.10.21	Ir	Art.-Nr.	
	Zust.	Änd.	Datum	Name	Ers für	ARBEITSANWEISUNG:

EU-Konformitätserklärung
EU Declaration of conformity

Hiermit erklärt Bühler Technologies GmbH, dass die nachfolgenden Produkte „Geräte" im Sinne der Richtlinie

Herewith declares Bühler Technologies GmbH that the following products are "equipment" according to Directive

2014/34/EU
(Atex)

in ihrer aktuellen Fassung sind.

in its actual version.

Folgende Richtlinien wurden berücksichtigt:

The following directives were regarded:

2014/30/EU (EMV/EMC)
2014/35/EU (NSR/LVD)
2011/65/EU (RoHs)

Die Vorschriften zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten und die Änderung der delegierten Richtlinie 2015/863 wurden berücksichtigt und erfüllt.
The product is in conformity with the restriction of the use of certain hazardous substances in electrical and electronic equipment and the amending through the directive 2015/863 was regarded.

Produkt / products: Messgaskühler / *Sample gas cooler*
Typ / type: EKG 2A Ex

Die Produkte tragen entsprechend den Vorgaben der benannten Stelle folgende Kennzeichnung:
The products are marked according to the guidelines for the notified body as follows:

Ⓔx II 2 G Ex pxb eb mb q [ia] IIC T4 Gb

Zur Beurteilung der Konformität wurden folgende harmonisierte Normen herangezogen:
For the assessment of conformity the following standards have been used:

EN IEC 60079-0: 2018
EN IEC 60079-7:2015 + A1:2018
EN 61010-1:2010
EN 60079-2: 2014
EN 60079-11:2012
EN 50581:2012
EN 60079-5:2015
EN 60079-18: 2015 + A1:2017

Baumusterprüfbescheinigungs-Nr. | *Type-examination certificate no.:* BVS 03 ATEX E 301 X, 1., 2. und 3. Nachtrag (1st, 2nd and 3rd supplement)

Eingeschaltete notifizierte Stelle | *Engaged notified Body*: DEKRA Testing and Certification GmbH
Dinnendahlstraße 9
44809 Bochum, Germany

Kennummer | *Identification Number*: 0158

Eingeschaltete benannte Stelle für das Qualitätssicherungssystem:| *Engaged notified body for the quality assurance system* DEKRA Testing and Certification GmbH
Dinnendahlstraße 9
44809 Bochum, Germany

Kennummer | *Identification Number*: 0158

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.
This declaration of conformity is issued under the sole responsibility of the manufacturer.

Dokumentationsverantwortlicher für diese Konformitätserklärung ist Herr Stefan Eschweiler mit Anschrift am Firmensitz.
The person authorised to compile the technical file is Mr. Stefan Eschweiler located at the company's address.

Ratingen, den 24.06.2021

Stefan Eschweiler
Geschäftsführer – *Managing Director*

Frank Pospiech
Geschäftsführer – *Managing Director*

Bühler Technologies GmbH, Harkortstr. 29, D-40880 Ratingen,
Tel. +49 (0) 21 02 / 49 89-0, Fax. +49 (0) 21 02 / 49 89-20
Internet: www.buehler-technologies.com

EXAM
BBG Prüf- und Zertifizier GmbH

Translation

(1) # EC-Type Examination Certificate

(2) **- Directive 94/9/EC -**
Equipment and protective systems intended for use in potentially explosive atmospheres

(3) ## BVS 03 ATEX E 301 X

(4) **Equipment:** **Sample Gas Cooler Type EGK 2-Ex fitted with control unit**

(5) **Manufacturer:** **BÜHLER MESS- UND REGELTECHNIK GMBH**

(6) **Address:** **D 40831 Ratingen**

(7) The design and construction of this equipment and any acceptable variation thereto are specified in the schedule to this type examination certificate.

(8) The certification body of Deutsche Montan Technologie GmbH, notified body no. 0158 in accordance with Article 9 of the Directive 94/9/EC of the European Parliament and the Council of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.
The examination and test results are recorded in the test and assessment report BVS PP 03.2291 EG.

(9) The Essential Health and Safety Requirements are assured by compliance with:

EN 50014:1997+A1-A2	General requirements	EN 50016:2002	Pressurized apparatus 'p'
EN 50019:2000	Increased safety 'e'	EN 50020:2002	Intrinsic safety 'i'
EN 50028:1987	Encapsulation'm'		

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to Directive 94/9/EC.
Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate

(12) The marking of the equipment shall include the following:

II 2G EEx p e m [ia] IIC T4

Deutsche Montan Technologie GmbH
Bochum, dated December 18. 2003

Signed: Dr. Jockers
Certification body

Signed: Schumann
Special services unit

Dinnendahlstrasse 9 44809 Bochum Germany Phone +49 201 172-3947 Fax +49 201 172-3948
(until 31.05.2003: Deutsche Montan Technologie GmbH Am Technologiepark 1 45307 Essen)

EXAM
BBG Prüf- und Zertifizier GmbH

(13) Appendix to

(14) # EC-Type Examination Certificate

BVS 03 ATEX E 301 X

(15) 15.1 Subject and type

Sample Gas Cooler Type EGK 2-Ex fitted with control unit

15.2 Description

The Sample Gas Cooler is designated for cooling purposes of gas and consists of a metal rack fitted with an electrically operated cooler-assembly, a mechanical heat exchanger and an electrical control unit.

The cooler assembly consists of a compressor (including cooling circuit) designed in type of protection "Pressurized Apparatus", fitted with connection facilities designed in type of protection "increased safety" for the permanently connected motor cable. A starting capacitor for the compressor motor is mounted additionally according to the associated EC Type Examination Certificate.

The control unit providing type of protection EEx e m [ia] IIC T4, consists of an enclosure designed in type of protection "increased safety" containing an electronic module embedded in casting compound and fitted with terminals for the interconnection of the intrinsically safe and non intrinsically safe circuits of the control unit.

Operation- and indicator-facilities are mounted in the cover of the control unit enclosure.

15.3 Parameters

15.3.1 Non intrinsically safe circuits

15.3.1.1 Mains interface

Nominal voltage	AC 115 / 230 V (60 / 50 Hz)
Nominal current	2,5 / 1 A
Nominal power consumption	170 / 110 W
Motor protective switch adjusted to rated value	2,9 / 1,1 A

15.3.1.2 Status relay contact

Alternating-/ Direct current	AC	DC	DC	DC	DC
Voltage	250 V	24 V	60 V	110 V	220 V
Current	5 A	5 A	1 A	0,4 A	0,3 A
Power	100 VA	100 W			

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(until 31.05.2003: Deutsche Montan Technologie GmbH Am Technologiepark 1 45307 Essen)

15.3.2 Intrinsically safe control circuit

	Circuit			
Parameters of each part of the circuit	PT100	Adjust-potentiometer	Light-emitting diode(s)	switching contact / Button Start 1 / 2 Test 1 / 2 Pressostat 1 / 2
Voltage U_o	7,9 V	7,9 V	7,9 V	7,9 V
Current I_o	5,5 mA	5,5 mA	25 mA	17 mA

Minimum-pressure above atmospheric conditions 0,2 bar

15.3.3 Ambient temperature range $-20°C \leq T_a \leq +45°C$

(16) Test and assessment report
BVS PP 03.2291 EG as of 18.12.2003

(17) Special conditions for safe use

17.1 Fuses providing a braking capacity of 4 kA and a suitable motor protection switch shall be inserted in the mains supply circuit of the Sample Gas Cooler.

17.2 A fuse (braking capacity 4 kA) providing a rated value adapted to the AC/DC switching parameters of the contact shall be inserted in the status-relay-contact circuit (see parameters).

17.3 The special conditions for safe use listed in the associated certificate of the optionally applied starting capacitor shall be taken into account.

We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

44809 Bochum, 03.05.2004
BVS-Scha/Mi E 0743/04

EXAM BBG Prüf- und Zertifizier GmbH

Certification body

Special services unit

Dinnendahlstrasse 9 44809 Bochum Germany Phone +49 201 172-3947 Fax +49 201 172-3948
(until 31.05.2003: Deutsche Montan Technologie GmbH Am Technologiepark 1 45307 Essen)

BBG Prüf- und Zertifizier GmbH

Translation

1st Supplement

(Supplement in accordance with Directive 94/9/EC Annex III number 6)

to the EC-Type Examination Certificate
BVS 03 ATEX E 301 X

Equipment: **Sample Gas Cooler Type EGK 2-Ex fitted with control unit**

Manufacturer: **BÜHLER MESS- UND REGELTECHNIK GMBH**

Address: **40880 Ratingen, Germany**

Description

The Sample Gas Cooler Type EGK 2-Ex fitted with control unit can be modified according to the descriptive documents as mentioned in the pertinent test and assessment report.

The Sample Gas Cooler Type EGK 2-Ex fitted with control unit is subjected optionally to some small changes with regard to electric circuitry and parameters of the associated motor protective switch.

The Essential Health and Safety Requirements of the modified equipment are assured by compliance with:

EN 50014:1997+A1-A2	General requirements
EN 50016:2002	Pressurized apparatus ´p´
EN 50019:2000	Increased safety ´e´
EN 50020:2002	Intrinsic safety ´i´
EN 50028:1987	Encapsulation´m´

The marking of the equipment shall include the following:

II 2G EEx p e m [ia] IIC T4

Parameters

1. Non intrinsically safe circuits

1.1 Mains interface

Nominal voltage	AC 115 / 230 V (60 / 50 Hz)
Nominal current	2.5 / 1 A
Nominal power consumption	170 / 110 W
Motor protective switch adjusted to rated value	3.2 / 1.3 A

Dinnendahlstrasse 9 44809 Bochum Germany Phone +49 234/3696-105 Fax +49 234/3696-110

1.2 Status relay contact

No change

1.2 Intrinsically safe control circuit

No change

Special conditions for safe use

No change

Test and assessment report
BVS PP 03.2291 EG as of 05.10.2005

EXAM BBG Prüf- und Zertifizier GmbH
Bochum, dated 05.October 2005

Signed: Migenda
Certification body

Signed: Dr.Eickhoff
Special services unit

We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

44809 Bochum, 05.10.2005
BVS-Scha/Mi A 20050529

EXAM BBG Prüf- und Zertifizier GmbH

Certification body

Special services unit

Dinnendahlstrasse 9 44809 Bochum Germany Phone +49 234/3696-105 Fax +49 234/3696-110

Translation

(1) # 2. Supplement to the EC-Type Examination Certificate

(2) Equipment and protective systems intended for use in potentially explosive atmospheres - Directive 94/9/EC
Supplement accordant with Annex III number 6

(3) No. of EC-Type Examination Certificate: **BVS 03 ATEX E 301 X**

(4) Equipment: **Sample Gas Cooler Type EGK 2*-Ex fitted with control unit**

(5) Manufacturer: **BÜHLER TECHNOLOGIES GMBH**

(6) Address: **40880 Ratingen**

(7) The design and construction of this equipment and any acceptable variation thereto are specified in the appendix to this supplement.

(8) The certification body of DEKRA EXAM GmbH, notified body no. 0158 in accordance with Article 9 of the Directive 94/9/EC of the European Parliament and the Council of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive. The examination and test results are recorded in the test and assessment report BVS PP 03.2291 EG.

(9) The Essential Health and Safety Requirements are assured by compliance with:

EN 60079-0:2009	**General requirements**	
EN 60079-2:2007	**Pressurized apparatus**	**´p´**
EN 60079-5:2007	**Powder filling**	**'q'**
EN 60079-7:2007	**Increased safety**	**´e´**
EN 60079-11:2007	**Intrinsic safety**	**´i´**
EN 60079-18:2009	**Encapsulation**	**´m´**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the appendix to this certificate.

(11) This supplement to the EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to Directive 94/9/EC.
Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

II 2G Ex px e mb q [ia] IIC T4 Gb

DEKRA EXAM GmbH
Bochum, dated 07.06.2011

Signed: Simanski
Certification body

Signed: Dr. Eickhoff
Special services unit

DEKRA EXAM GmbH Dinnendahlstrasse 9 44809 Bochum Phone +49.234.3696-105 Fax +49.234.3696-110 zs-exam@dekra.com

(13) Appendix to

(14) **2. Supplement to the EC-Type Examination Certificate BVS 03 ATEX E 301 X**

(15) 15.1 Subject and type

Sample Gas Cooler type EGK 2*-Ex fitted with control unit

15.2 Description

The Sample Gas Cooler can be modified according to the descriptive documents as mentioned in the pertinent test and assessment report and receives the marking:

Sample Gas Cooler type EGK 2-Ex fitted with control unit (prior models)
Sample Gas Cooler type EGK 2a-Ex fitted with control unit (modified models)

The internal circuitry of Sample Gas Cooler type EGK 2-Ex fitted with control unit is subjected to modification optionally.

The new models provide a display- and keyboard (4-digit LED-display and push buttons) replacing the prior status indicator.

Status of applied standards according to (9) and marking according to (12) apply to prior models as well as to new models.

15.3 Parameters

15.3.1 Non intrinsically safe circuits (Sample Gas Cooler type EGK 2a-Ex fitted with control unit)

15.3.1.1 Mains interface

Nominal voltage	AC 115 / 230 V (60 / 50 Hz)
Nominal current	2,5 / 1 A
Nominal power consumption	170 / 110 W

Motor protective switch adjusted to rated value 3,2 / 1,3 A

15.3.1.2 Status relay contact

Alternating-/ Direct current	AC	DC	DC	DC	DC
Voltage	250 V	24 V	60 V	110 V	220 V
Current	5 A	5 A	1 A	0,4 A	0,3 A
Power	100 VA	100 W			

15.3.2 Intrinsically safe control circuit

Sample Gas Cooler type EGK 2-Ex fitted with control unit

Circuit				
Parameters of each part of the circuit	PT100	Adjust-potentiometer	Light-emitting diode(s)	switching contact / Button Start 1 / 2 Test 1 / 2 Pressostat 1 / 2
Voltage U_o	7,9 V	7,9 V	7,9 V	7,9 V
Current I_o	5,5 mA	5,5 mA	25 mA	17 mA

DEKRA EXAM GmbH Dinnendahlstrasse 9 44809 Bochum Phone +49.234.3696-105 Fax +49.234.3696-110 zs-exam@dekra.com

Sample Gas Cooler type EGK 2a-Ex fitted with control unit

Circuit				
Parameters of each part of the circuit	PT100	Adjust-potentiometer	4-digit LED display	switching contact / Button Start 1 / 2 Test 1 / 2 Pressostat 1 / 2
Voltage U_o	7 V	not provided	7 V	7 V
Current I_o	≤ 5,5 mA	not provided	≤ 270 mA ≤ 1.4 A_s	≤ 40 mA

15.3.3 Minimum-pressure above atmospheric conditions 0.2 bar

15.3.4 Ambient temperature range $-20\ °C \leq T_a \leq +45\ °C$

(16) Test and assessment report

BVS PP 03.2291 EG as of 07.06.2011

(17) Special conditions for safe use

17.1 Fuses providing a braking capacity of 1.5 kA and a suitable motor protection switch shall be inserted in the mains supply circuit of the Sample Gas Cooler.

17.2 A fuse (braking capacity 1.5 kA) providing a rated value adapted to the AC / DC switching parameters of the status relay contact shall be inserted in the status-relay-contact circuit (see parameters).

17.3 The special conditions for safe use listed in the associated certificate of the optionally applied starting capacitor shall be taken into account.

We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

DEKRA EXAM GmbH
44809 Bochum, 07.06.2011
BVS-Scha/Sch A 20110031

Certification body

Special services unit

DEKRA EXAM GmbH Dinnendahlstrasse 9 44809 Bochum Phone +49.234.3696-105 Fax +49.234.3696-110 zs-exam@dekra.com

Translation

1 # EU-Type Examination Certificate Supplement 3

Change to Directive 2014/34/EU

2 **Equipment intended for use in potentially explosive atmospheres Directive 2014/34/EU**

3 EU-Type Examination Certificate Number: **BVS 03 ATEX E 301 X**

4 Product: **Sample Gas Cooler type EGK 2A Ex**

5 Manufacturer: **Bühler Technologies GmbH**

6 Address: **Harkortstr. 29, 40880 Ratingen, Germany**

7 This supplementary certificate extends EC-Type Examination Certificate No. BVS 03 ATEX E 301 X to apply to products designed and constructed in accordance with the specification set out in the appendix of the said certificate but having any acceptable variations specified in the appendix to this certificate and the documents referred to therein.

8 DEKRA Testing and Certification GmbH, Notified Body number 0158, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.
The examination and test results are recorded in the confidential Report No. BVS PP 03.2291 EU.

9 The Essential Health and Safety Requirements are assured in consideration of:

EN IEC 60079-0:2018	**General requirements**
EN 60079-2:2014	**Pressurized enclosure "p"**
EN 60079-5:2015	**Powder filling "q"**
EN IEC 60079-7:2015 + A1:2018	**Increased Safety "e"**
EN 60079-11:2012	**Intrinsic Safety "i"**
EN 60079-18:2015+A1:2017	**Encapsulation "m"**

10 If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Special Conditions for Use specified in the appendix to this certificate.

11 This EU-Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

12 The marking of the product shall include the following:

Ⓔx II 2G Ex pxb eb mb q [ia] IIC T4 Gb

DEKRA Testing and Certification GmbH
Bochum, 2019-04-04

Signed: Jörg-Timm Kilisch

Managing Director

DEKRA Testing and Certification GmbH, Handwerkstr. 15, 70565 Stuttgart, Germany
Certification body: Dinnendahlstr. 9, 44809 Bochum, Germany
Phone +49.234.3696-400, Fax +49.234.3696-401, e-mail DTC-Certification-body@dekra.com

13 **Appendix**

14 **EU-Type Examination Certificate**

BVS 03 ATEX E 301 X
Supplement 3

15 **Product description**

15.1 **Subject and type**

Sample Gas Cooler type EGK 2A Ex

15.2 **Description**

With this supplement the certificate is changed to Directive 2014/34/EU.
(Annotation: In accordance with Article 41 of Directive 2014/34/EU, EC-Type Examination Certificates referring to 94/9/EC that were in existence prior to the date of application of 2014/34/EU (20 April 2016) may be referenced as if they were issued in accordance with Directive 2014/34/EU. Supplementary Certificates to such EC-Type Examination Certificates, and new issues of such certificates, may continue to bear the original certificate number issued prior to 20 April 2016.)

Reason for the supplement:
- Change to Directive 2014/34/EU
- Update of applied standards
- Designation changed from EGK 2a Ex to EGK 2A Ex

Description of the product
The Sample Gas Cooler is designated for cooling purposes of gas and consists of a metal rack fitted with an electrically operated cooler-assembly, a mechanical heat exchanger and an electrical control unit.

The cooler-assembly consists of a compressor (including cooling circuit) designed in type of protection "Pressurized Apparatus", fitted with connection facilities designed in type of protection "increased safety" for the permanently connected motor cable. A starting capacitor for the compressor motor is mounted additionally according to the associated EC Type Examination Certificate.

The control unit providing type of protection Ex eb mb [ia] IIC T4, consists of an enclosure designed in type of protection "increased safety" containing an electronic module embedded in casting compound and fitted with terminals for the interconnection of the intrinsically safe and non-intrinsically safe circuits of the control unit.

Operation- and indicator-facilities are mounted in the cover of the control unit enclosure and comprise of a display- and keyboard unit (4-digit LED-display and push buttons for programming purposes).

The starting capacitor for the compressor motor in type of protection Powder Filling „p" and the compressor motor in type of protection Flameproof Enclosure "d" are subject to other Ex-equipment certificates.

Listing of all components used referring to optionally older standards

Subject and type	Certificate	Standards
Housing of controller unit: Empty Enclosure type series 26.******	PTB 01 ATEX 1061 U Edition 1	EN 60079-0:2012+A11:2013 EN 60079-7:2015
	IECEx PTB 08.0003U Issue No. 4	IEC 60079-0:2011 IEC 60079-7:2015
Alternate housing of controller unit: BPG Range of Enclosures	SIRA 99 ATEX 3172 U Edition 7	EN 60079-0:2012 EN 60079-7:2007
	IECEx SIR 06.0086U Issue No. 3	IEC 60079-0:2011 IEC 60079-7:2006
Ex motor capacitor type series 27-***_***_**	SEV 17 ATEX 0165 X Edition 0	EN 60079-0:2012+A11:2013 EN 60079-5:2015
	IECEx SEV 17.0021X Issue No. 0	IEC 60079-0:2011 IEC 60079-5:2015

DAkkS Deutsche Akkreditierungsstelle D-ZE-17438-02-00

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Phone +49.234.3696-400, Fax +49.234.3696-401, e-mail DTC-Certification-body@dekra.com

Subject and type	Certificate	Standards
Terminal strips Wago type 236-501	PTB 06 ATEX 1061 U	EN 60079-0:2012+A11:2013 EN 60079-7:2015
	IECEx PTB 06.0042U Issue No. 2	IEC 60079-0:2011 IEC 60079-7:2015
Cable gland type series HSK-K-Ex 1.292.**** .**	BVS 14 ATEX E 025 X 1. Nachtrag	EN 60079-0:2012+A11:2013 EN 60079-7:2015
	IECEx BVS 14 0020X Issue No. 1	IEC 60079-0:2011 IEC 60079-7:2015
Alternate cable gland: type series: SKINTOP® MS-M** ATEX ****	IBExU 01 ATEX 1041X 7th Supplement	EN 60079-0:2011 EN 60079-7:2007
	IECEx IBE 13.0026X Issue No. 0	IEC 60079-0:2011 IEC 60079-7:2006

15.3 **Parameters**

15.3.1 Non intrinsically safe circuits

15.3.1.1 Mains interface

Nominal voltage	AC 115 / 230 V (60 / 50 Hz)
Nominal current	2.5 /1 A
Nominal power consumption	170 / 110 W
Motor protective switch adjusted to rated value	3.2 /1.3 A

15.3.1.2 Status relay contact

Parameters	AC	DC	DC	DC	DC
Voltage	250 V	24 V	60 V	110 V	220 V
Current	5 A	5 A	1 A	0.4 A	0.3 A
Power	100 VA	100 W			

15.3.2 Intrinsically safe control circuit

	Circuit		
Parameters	PT100	4-digit LED display	switching contact / Button Start 1 / 2 Test 1 / 2 Pressostat 1 / 2
Voltage U_o	7 V	7 V	7 V
Current I_o	≤ 5.5 mA	≤ 270 mA ≤ 1.4 A_s	≤ 40 mA

15.3.2 Minimum-pressure above atmospheric conditions 0.2 bar

15.3.2 Ambient temperature range -20 °C ≤ T_a ≤ +45 °C

DAkkS Deutsche Akkreditierungsstelle D-ZE-17438-02-00

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16 **Report Number**

BVS PP 03.2291 EU, as of 2019-04-04

17 **Special Conditions for Use**

17.1 Fuses providing a braking capacity of 1.5 kA and a suitable motor protection switch shall be inserted in the mains supply circuit of the Sample Gas Cooler.

17.2 A fuse (braking capacity 1.5 kA) providing a rated value adapted to the AC / DC switching parameters of the status relay contact shall be inserted in the status-relay-contact circuit (see parameters).

17.3 The special conditions for safe use listed in the associated certificate of the optionally applied starting capacitor shall be taken into account.

18 **Essential Health and Safety Requirements**

The Essential Health and Safety Requirements are covered by the standards listed under item 9.

For this product the standard EN IEC 60079-0:2018 is equivalent to the harmonized standard EN 60079-0:2012 + A11:2013 in terms of safety.

19 **Drawings and Documents**

Drawings and documents are listed in the confidential report.

We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

DEKRA Testing and Certification GmbH
Bochum, 2019-04-04
BVS-Scha/VKA A20180938

Managing Director

DAkkS Deutsche Akkreditierungsstelle D-ZE-17438-02-00

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eurofins | Electrosuisse Product Testing

(1) # EU-Type Examination Certificate

(2) Equipment or protective system intended for use in potentially explosive atmospheres - **Directive 2014/34/EU**

(3) Certificate number: **SEV 17 ATEX 0165 X**

(4) Product: EX motor capacitor Type 27-***-***-**

(5) Manufacturer: Süko Kondensatorenbau GmbH & Co.

(6) Address: Robert-Bosch-Strasse 2, 72411 Bodelshausen, GERMANY

(7) The equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) Eurofins Electrosuisse Product Testing AG, notified body No. 1258, in accordance with article 17 of Directive 2014/34/EU of the European parliament and of the council, dated 26 February 2014, certifies that this product has been found to comply with the essential health and safety requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report no 17-Ex-0097.01

(9) Compliance with the essential health and safety requirements has been assured by compliance with:

EN 60079-0:12 + A11:13 **EN 60079-31:14** **EN 60079-5:15**

Except in respect of those requirements listed at item 18 of the schedule.

(10) If the sign «X» is placed after the certificate number, it indicates that the product is subjected to special conditions for safe use specified in the schedule to this certificate.

(11) This EU type examination certificate relates only to design and construction of the specified product. Further requirements of this directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

(12) The marking of the product shall include the following:

II 2 G Ex q IIC T6 Gb
II 2 D Ex tb IIIC T65 °C Db

Eurofins Electrosuisse Product Testing AG
ATEX Notified Body 1258

Martin Plüss
Product Certification

(13) # Appendix

(14) **EU-Type Examination Certificate no. SEV 17 ATEX 0165 X**

(15) **Description of product**

The Ex-Motor Capacitor Type 27-***-***-** is a capacitors incorporated in an aluminum beaker in the type of protection "Encapsulation".

Ratings:
U_N = 280 VAC in combination with C_N 1 ... 55 µF
U_N = 470 VAC in combination with C_N 1 ... 30 µF

Classification of installation and use:	stationary
Ingress protection:	IP64
Rated ambient temperature range (°C):	-20 °C ... +50 °C
Rated service temperature range (°C) for Ex Components:	---

List of types:

No. begin	to	No. end	Description
27-010-280**	to	27-550-280-**	1 uF to 55 uF, 280 VAC
27-010-420-**	to	27-300-420-**	1 uF to 30 uF, 420 VAC
27-010-470-**	to	27-300-470-**	1 uF to 30 uF, 470 VAC
27 010 470 **			Basic type Number of capacitors size e.g. 010 Rating voltage in VAC e.g. 280, 420 or 470 Expression for cable length 200 to 2000 mm

(16) **Report number** 17-Ex-0097.01

(17) **Specific conditions of use**

- Ex- capacitors may only be used for fixed installations.
- An additional strain relief for the cable must be provide to prevent pulling and twisting forces to the inner parts.
- The Ex- capacitors must be protected against UV light.

(18) **Essential health and safety requirements**

In addition to the essential health and safety requirements (EHSRs) covered by the standards listed at item 9, the following are considered relevant to this product, and conformity is demonstrated in the report:

Clause **Subject**
None

(19) **Drawings and Documents**

See test report "Manufacturer's Documents"

1 **EC TYPE-EXAMINATION CERTIFICATE**

2 Component intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

3 Certificate Number: **Sira 99ATEX3172U** Issue: **6**

4 Component: **BPG Range of Enclosures**

5 Applicant: **ABTECH Limited**

6 Address: Sanderson Street
Lower Don Valley
Sheffield S9 2UA
UK

7 This component and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

8 Sira Certification Service, notified body number 0518 in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, certifies that this component has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of a component intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential reports listed in Section 14.2.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule to this certificate, has been assured by compliance with the following documents:

IEC 60079-0:2011 EN 60079-7:2007 EN 60079-11:2012 EN 60079-31:2009

This report may be issued against standards that do not appear on the UKAS Scope of Accreditation, but have been added through Sira's flexible scope of accreditation. Sira's flexible scope is available on request.

10 The sign 'U' is placed after the certificate number to indicate that the product assessed is a component and may be subject to further assessment when incorporated into equipment. Any special conditions for safe use are listed in the schedule to this certificate.

11 This EC type-examination certificate relates only to the design and construction of the specified component. If applicable, further requirements of this Directive apply to the manufacture and supply of this component.

12 The marking of the component shall include the following:

II 2 G D
Ex e IIC Gb
Ex tb IIIC Db IP6X

Or

II 2 G D
Ex ib IIC Gb
Ex tb IIIC Db IP6X

Project Number 25164

C Ellaby
Deputy Certification Manager

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13 **DESCRIPTION OF COMPONENT**

The BPG range of enclosures are manufactured from polyester in the following sizes:

BPG Reference	Length (mm)	Width (mm)	Height (mm)
1	80	75	55
2	110	75	55
3	160	75	55
4	190	75	55
5	230	75	55
6	122	120	90
7	220	120	90
8	160	160	90
9	260	160	90
10	360	160	90
11	560	160	90
12	255	250	120
13	400	250	120
13.5	400	250	160
14	600	250	120
15	400	405	120

The enclosures may also be manufactured to sizes not specified in the table. This assumes that any given dimension is not larger than the respective dimension of the largest enclosure or smaller than the respective dimension of the smallest enclosure. The enclosure lids may be hinged or detachable and are retained captive screws. All boxes are fitted with closed cell silicone rubber gaskets. Entries may be provided either through the side walls or the rear of the box and external and internal earthing facilities are provided.

Variation 1 (dated 28 September 2001) - This variation introduced the following changes:

i. The recognition of a minor revision of the information marked on the label.

Variation 1 (dated 10 March 2008) - This variation introduced the following changes:

i. The BPG 13.5 enclosure was added to the range.

Variation 2 - This variation introduced the following changes:

i. The option to fit slotted trunking inside the enclosures, this trunking may be sited as required. The instructions were modified to recognise additional restrictions associated with this change and a new Condition of Manufacture was introduced.
ii. The recognition of minor drawing modifications including the introduction of a new company logo; these amendments are administrative or involve changes to the design that do not affect the aspects of the product that are relevant to explosion safety.
iii. The materials used to construct these enclosures were clarified and are recorded below:
   - BPG is used for all colours except black
   - Anti-static BPGC is the black version

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Variation 3 - This variation introduced the following changes:

i. Following appropriate re-assessment to demonstrate compliance with the requirements of the EN 60079 series of standards, the documents previously listed in section 9, EN 50014:1997, EN 50019:1994 and EN 50281-1-1:1999, were replaced by those currently listed, the markings in section 12 were updated accordingly. In addition, the enclosure was allowed to be used for intrinsically safe applications and EN 60079-11:2012 was included in the list of supporting standards.
ii. The Description of Component and Condition of Certification were amended to recognise that closed cell polychloroprene gaskets are no longer used.
iii. The Conditions of Certification and Special Condition for Safe Use were rationalised to bring them into line with IECEx SIR 06.0086U which is also associated with this enclosure.

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Sira Reports and Certificate History

Issue	Date	Report/File no.	Comment
0	19 January 2000	R51X6055E	The release of prime certificate.
1	28 September 2001	53V7936	The introduction of Variation 1.
2	23 July 2002	R53A9009A	The prime certificate was re-issued to permit the following: • The incorporation of variation 1. • The lower ambient temperature range was confirmed as –65°C. • The introduction of the changes included in Sira report number R53A9009A.
3	10 March 2008	R51A17881A	This Issue covers the following changes: • All previously issued certification was rationalised into a single certificate, Issue 3, Issues 0 to 2 referenced above are only intended to reflect the history of the previous certification and have not been issued as documents in this format. • The change of the Applicant's name, first recognised 31 January 2007, was re-confirmed. • The introduction of Variation 1.
4	03 April 2012	R26585A/00	The introduction of Variation 2.
5	11 June 2012	R26585A/01	Report R26585A/01 replaced report R26585A/00.
6	9 October 2012	R25164A/00	The introduction of Variation 3.

15 SPECIAL CONDITIONS FOR SAFE USE

15.1 The Enclosures shall not be used outside the temperature range -65°C to +90°C.

16 ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II (EHSRs)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in the reports listed in Section 14.2.

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17 CONDITIONS OF CERTIFICATION

17.1 The use of this certificate is subject to the Regulations Applicable to Holders of Sira Certificates.

17.2 Holders of EC type-examination certificates are required to comply with the production control requirements defined in Article 8 of directive 94/9/EC.

17.3 If the Enclosures are supplied with blanking plugs, reducers, adapters and breather drains, then the manufacturer shall ensure that:

- The device does not adversely affect the minimum IP rating of the enclosure.
- There are no special conditions of for safe use (conditions of certification) associated with the device that will impinge upon the use and installation of the Enclosure, e.g. “These components shall not be used for applications where there is a ‘high’ risk of mechanical damage”.
- The coding reflects the “worst case” item fitted.

17.4 The manufacturer shall take all reasonable steps to ensure that the following items used in the construction of the Enclosure are used within the minimum and maximum service temperature stated in the condition for safe use, in addition, the manufacturer shall provide the user/installer with a copy of the certificate associated with any blanking plugs, reducers, adapters and breather drains:

Item: Solid silicone rubber gasket
Blanking plugs, reducers, adapters and breather drains

17.5 When trunking is fitted, it may be sited as required and the minimum creepage and clearance distances shall still be met.

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Certificate Annexe

Certificate Number: **Sira 99ATEX3172U**

Component: **BPG Range of Enclosures**

Applicant: **ABTECH Limited**

Issue 0 and 1: The drawings associated with these Issues were rationalised by those listed in Issue 2.

Issue 2

Number	Sheet	Rev.	Date	Description
ABT 10259	1 of 1	C	25 Jun 02	External Label (BPG)
ABT 10305	1 of 1	A	16 Nov 99	BPG Enclosures
ABT 10304	1 of 1	A	16 Nov 99	BPG Manufacturing Specification

Issue 3

Number	Sheet	Rev.	Date (Sira stamp)	Description
ABT 10305	1 of 1	B	07 Mar 08	BPG Enclosures

Issue 4

Number	Sheets	Rev.	Date (Sira Stamp)	Description
ABT 10259	1 of 1	D	30 Mar 12	BPG Nameplate – Empty Enclosures
ABT 10304	1 of 1	B	30 Mar 12	BPG Manufacturing specification

Issue 5 (No new drawings were introduced.)

Issue 6

Number	Sheets	Rev.	Date (Sira Stamp)	Description
ABT 10259	1 of 1	E	30 Sept 12	BPG Nameplate – Empty Enclosures
ABT 10304	1 of 1	C	30 Sept 12	BPG Manufacturing specification
ABT 10305	1 of 1	C	30 Sept 12	BPG Range of Enclosures

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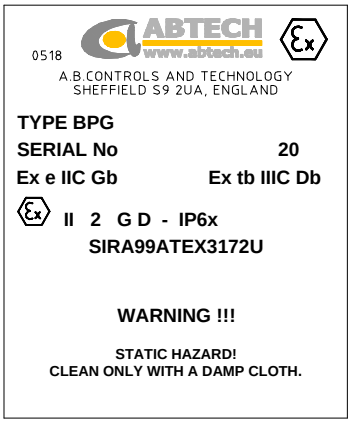
INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS FOR ABTECH 'BPG' Range Enclosures – SIRA 99ATEX3172U



Marking

The marking shown is for a component certified enclosure. The user must submit the completed unit for type examination if it is to be used in a hazardous area.

The Ex e marking may be replaced by Ex ia or Ex ib. Enclosures marked Ex ia or Ex ib may only be used for terminating intrinsically safe circuits.

When the box is black it is anti-static and the 'STATIC HAZARD' warning will be missing.

Static hazard

Glass reinforced polyester resin has a surface resistance greater than 10E9 Ohms. They can present a hazard from static electricity. CLEAN ONLY WITH A DAMP CLOTH

Carbon loaded glass reinforced polyester, coloured black and identified by the suffix 'C', (e.g. BPGC9), have a surface resistance between 10E6 and 10E9 Ohms. They do not present a hazard from static electricity.

Installation

These instructions assume that the required cable entries have been pre-drilled. Cable entries may be threaded. All cable entry devices must be appropriately certified to the latest standards and match the certification of the box. i.e. ATEX certified devices are required for ATEX certified enclosures and IECEx certified devices are required for IECEx certified enclosures. If trunking is fitted, non-metalic slotted trunking may be used for T6 rated applications. If the box is rated other than T6 then metallic slotted trunking must be used.

1) Using the mounting dimensions data provided, either in the product catalogue data sheets or on the drawings supplied, (as part of the project documentation), mark out the positions for the mounting holes on the surface where installation is required.

2) Drill the mounting holes for M4 fixing studs (for size BPG1 to BPG5) or for M6 fixing studs (for size BPG6 to BPG15) as applicable.

3) Tap thread into mounting holes if required.

4) Place a mounting screw through one mounting hole in the box so that the thread of the screw protrudes from the back of the box. Lift the enclosure into position using such assistance as may be necessary to avoid injury and:-

   a) If clearance mounting holes are used, insert the protruding thread through the appropriate clearance hole and secure with a nut on the other side of the mounting surface.

   Or

   b) If threaded holes are used, locate the end of the mounting screw over the thread hole and, using an appropriate screwdriver tighten the screw.

5) Rotate the box to line up the remaining mountings and repeat (4) above until all mounting screws have been fitted.

6) Where slotted trunking has been supplied (solid trunking is not permitted) ensure that it is suitable for the proposed T classification of the final certified product. Where the T6 is the proposed rating and no windows are fitted any polymeric or metallic slotted trunking may be used. For other T classifications

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Sanderson Street, Lower Don Valley, Sheffield S9 2UA

and where a window is fitted metallic slotted trunking must be used. Trunking may be mounted in any orientation in the box, vertically, horizontally or diagonally.

7) Secure the lid by closing the lid and tightening the lid fixing screws.

Earthing/Grounding

The enclosure may be provided with an external earth/ground connection. If such a connection is provided it must be connected to the appropriate earth bonding circuit before electrical power is connected to the contents of the enclosure.

Operation

1. The lid must be secured using all of the lid screws provided in order to maintain the IP rating.
2. No attempt must be made to remove the enclosure lid whilst electrical power is connected to the contents of the enclosure.
3. If the enclosure if fitted with an external earth/ground facility it must be connected to the earth bonding circuit at all times when power is connected to the enclosure contents.

Maintenance

Routine maintenance is likely to be a requirement of local Health and Safety legislation. The laws of the applicable country must be considered and maintenance checks carried out accordingly

Additional periodic checks that are advisable to ensure the efficiency of ABTECH range enclosures are:-

Activity		Frequency
1	Check that the lid seal is in place and not damaged	Each time the enclosure is opened
2	Check that all lid fixing screws are in place and secured	Each time the enclosure is closed
3	Check that the mounting bolts are tight and free of corrosion	Annually
4	Check the security of all cable glands	Annually
5	Check enclosure for damage	Annually

Chemical attack

The ABTECH BPG range of enclosures are manufactured using the following materials:-

glass reinforced polyester resin, (with or without carbon loading),

Polychloroprene or Silicone rubber,

316 stainless steel

Brass

Consideration should be given to the environment in which these enclosures are to be used to determine the suitability of these materials to withstand any corrosive agents that may be present.

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RMA-Formular und Erklärung über Dekontaminierung
RMA-Form and explanation for decontamination

RMA-Nr./ RMA-No.

Die RMA-Nr. bekommen Sie von Ihrem Ansprechpartner im Vertrieb oder Service. Bei Rücksendung eines Altgeräts zur Entsorgung tragen Sie bitte in das Feld der RMA-Nr. "WEEE" ein./ You may obtain the RMA number from your sales or service representative. When returning an old appliance for disposal, please enter "WEEE" in the RMA number box.

Zu diesem Rücksendeschein gehört eine Dekontaminierungserklärung. Die gesetzlichen Vorschriften schreiben vor, dass Sie uns diese Dekontaminierungserklärung ausgefüllt und unterschrieben zurücksenden müssen. Bitte füllen Sie auch diese im Sinne der Gesundheit unserer Mitarbeiter vollständig aus./ This return form includes a decontamination statement. The law requires you to submit this completed and signed decontamination statement to us. Please complete the entire form, also in the interest of our employee health.

Firma/ Company

Firma/ Company	
Straße/ Street	
PLZ, Ort/ Zip, City	
Land/ Country	

Ansprechpartner/ Person in charge

Name/ Name	
Abt./ Dept.	
Tel./ Phone	
E-Mail	

Gerät/ Device	
Anzahl/ Quantity	
Auftragsnr./ Order No.	

Serien-Nr./ Serial No.	
Artikel-Nr./ Item No.	

Grund der Rücksendung/ Reason for return

- ☐ Kalibrierung/ Calibration
- ☐ Modifikation/ Modification
- ☐ Reklamation/ Claim
- ☐ Reparatur/ Repair
- ☐ Elektroaltgerät/ Waste Electrical & Electronic Equipment (WEEE)
- ☐ andere/ other

bitte spezifizieren/ please specify

Ist das Gerät möglicherweise kontaminiert?/ Could the equipment be contaminated?

☐ Nein, da das Gerät nicht mit gesundheitsgefährdenden Stoffen betrieben wurde./ No, because the device was not operated with hazardous substances.

☐ Nein, da das Gerät ordnungsgemäß gereinigt und dekontaminiert wurde./ No, because the device has been properly cleaned and decontaminated.

☐ Ja, kontaminiert mit:/ Yes, contaminated with:

☐ explosiv/ explosive	☐ entzündlich/ flammable	☐ brandfördernd/ oxidizing	☐ komprimierte Gase/ compressed gases	☐ ätzend/ caustic	☐ giftig, Lebensgefahr/ poisonous, risk of death	☐ gesundheitsgefährdend/ harmful to health	☐ gesundheitsschädlich/ health hazard	☐ umweltgefährdend/ environmental hazard

Bitte Sicherheitsdatenblatt beilegen!/ Please enclose safety data sheet!

Das Gerät wurde gespült mit:/ The equipment was purged with:

Diese Erklärung wurde korrekt und vollständig ausgefüllt und von einer dazu befugten Person unterschrieben. Der Versand der (dekontaminierten) Geräte und Komponenten erfolgt gemäß den gesetzlichen Bestimmungen.

This declaration has been filled out correctly and completely, and signed by an authorized person. The dispatch of the (decontaminated) devices and components takes place according to the legal regulations.

Falls die Ware nicht gereinigt, also kontaminiert bei uns eintrifft, muss die Firma Bühler sich vorbehalten, diese durch einen externen Dienstleister reinigen zu lassen und Ihnen dies in Rechnung zu stellen.

Should the goods not arrive clean, but contaminated, Bühler reserves the right, to comission an external service provider to clean the goods and invoice it to your account.

Firmenstempel/ Company Sign

Datum/ Date

rechtsverbindliche Unterschrift/ Legally binding signature

Bühler Technologies GmbH, Harkortstr. 29, D-40880 Ratingen
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Internet: www.buehler-technologies.com

Vermeiden von Veränderung und Beschädigung der einzusendenden Baugruppe

Die Analyse defekter Baugruppen ist ein wesentlicher Bestandteil der Qualitätssicherung der Firma Bühler Technologies GmbH. Um eine aussagekräftige Analyse zu gewährleisten muss die Ware möglichst unverändert untersucht werden. Es dürfen keine Veränderungen oder weitere Beschädigungen auftreten, die Ursachen verdecken oder eine Analyse unmöglich machen.

Umgang mit elektrostatisch sensiblen Baugruppen

Bei elektronischen Baugruppen kann es sich um elektrostatisch sensible Baugruppen handeln. Es ist darauf zu achten, diese Baugruppen ESD-gerecht zu behandeln. Nach Möglichkeit sollten die Baugruppen an einem ESD-gerechten Arbeitsplatz getauscht werden. Ist dies nicht möglich sollten ESD-gerechte Maßnahmen beim Austausch getroffen werden. Der Transport darf nur in ESD-gerechten Behältnissen durchgeführt werden. Die Verpackung der Baugruppen muss ESD-konform sein. Verwenden Sie nach Möglichkeit die Verpackung des Ersatzteils oder wählen Sie selber eine ESD-gerechte Verpackung.

Einbau von Ersatzteilen

Beachten Sie beim Einbau des Ersatzteils die gleichen Vorgaben wie oben beschrieben. Achten Sie auf die ordnungsgemäße Montage des Bauteils und aller Komponenten. Versetzen Sie vor der Inbetriebnahme die Verkabelung wieder in den ursprünglichen Zustand. Fragen Sie im Zweifel beim Hersteller nach weiteren Informationen.

Einsenden von Elektroaltgeräten zur Entsorgung

Wollen Sie ein von Bühler Technologies GmbH stammendes Elektroprodukt zur fachgerechten Entsorgung einsenden, dann tragen Sie bitte in das Feld der RMA-Nr. „WEEE“ ein. Legen Sie dem Altgerät die vollständig ausgefüllte Dekontaminierungserklärung für den Transport von außen sichtbar bei. Weitere Informationen zur Entsorgung von Elektroaltgeräten finden Sie auf der Webseite unseres Unternehmens.

Avoiding alterations and damage to the components to be returned

Analysing defective assemblies is an essential part of quality assurance at Bühler Technologies GmbH. To ensure conclusive analysis the goods must be inspected unaltered, if possible. Modifications or other damages which may hide the cause or render it impossible to analyse are prohibited.

Handling electrostatically conductive components

Electronic assemblies may be sensitive to static electricity. Be sure to handle these assemblies in an ESD-safe manner. Where possible, the assembles should be replaced in an ESD-safe location. If unable to do so, take ESD-safe precautions when replacing these. Must be transported in ESD-safe containers. The packaging of the assemblies must be ESD-safe. If possible, use the packaging of the spare part or use ESD-safe packaging.

Fitting of spare parts

Observe the above specifications when installing the spare part. Ensure the part and all components are properly installed. Return the cables to the original state before putting into service. When in doubt, contact the manufacturer for additional information.

Returning old electrical appliances for disposal

If you wish to return an electrical product from Bühler Technologies GmbH for proper disposal, please enter "WEEE" in the RMA number box. Please attach the fully completed decontamination declaration form for transport to the old appliance so that it is visible from the outside. You can find more information on the disposal of old electrical appliances on our company’s website.

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