



## Sample gas probes

GAS 222.21

# Installation and Operation Instructions

Original instructions





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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

The sample gas probe is intended for installation into gas analysis systems in commercial applications.

Sample gas probes are among the main components in a gas conditioning system.

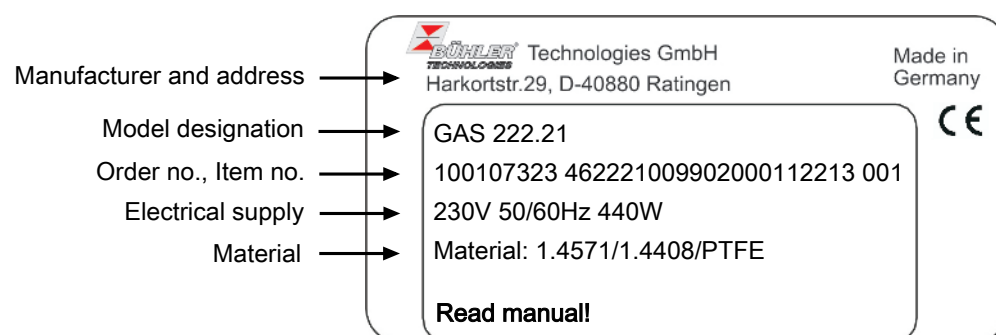
- Therefore also note the related drawing in the data sheet in the appendix.
- Before installing the device, verify the listed technical data meet the application parameters.
- Further verify all contents are complete.

Please refer to the type plate to identify your model. In addition to the job number/ID number, this also contains the article number and model designation.

Please note the specific values of the device when connecting, and the correct versions when ordering spare parts.

## 1.2 Type Plate

### Example:



## 1.3 Scope of Delivery

- 1 x Sample gas probe
- 1 x Flange gasket and screws
- Product documentation
- Connection and mounting accessories (only optional)

## 1.4 Ordering Instructions

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

| 4622221 | X | 9 | 9 | 0 | X | X | X | X | X | X | X | X | X | X | SN | Product characteristic                                                    |
|---------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|---------------------------------------------------------------------------|
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | <b>Flange</b>                                                             |
|         |   |   |   | 0 |   |   |   |   |   |   |   |   |   |   |    | DIN DN65 PN6                                                              |
|         |   |   |   | 2 |   |   |   |   |   |   |   |   |   |   |    | ANSI 3"-150 lbs - without CSA C & US approval                             |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | <b>Probe voltage</b>                                                      |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | 115 V                                                                     |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | 230 V                                                                     |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | <b>Calibrating gas connection</b>                                         |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | No calibrating gas connection                                             |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | 6 mm                                                                      |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | 6 mm + check valve                                                        |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | 1/4"                                                                      |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | 1/4" + check valve                                                        |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | <b>Connection of heated extension</b>                                     |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | No                                                                        |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | Yes                                                                       |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | <b>Built-in temperature controller for heated extension <sup>1)</sup></b> |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | No                                                                        |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | Yes                                                                       |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | <b>Blowback with air reservoir <sup>2)</sup></b>                          |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | <b>Air reservoir heating</b>                                              |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | Yes                                                                       |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | No                                                                        |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | <b>Built-in blowback control <sup>1)</sup></b>                            |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | Internal controller                                                       |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | No                                                                        |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | <b>Compressed air valve / valve voltage information</b>                   |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | Manual                                                                    |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | 115 V                                                                     |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | 230 V                                                                     |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | 24 V                                                                      |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | None (if no blowback requested)                                           |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | <b>Pneumatic drive for ball valve</b>                                     |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | Monostable pressure-free open                                             |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | Monostable pressure-free closed                                           |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | Bi-stable                                                                 |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | None                                                                      |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | <b>Limit switch for pneumatic drive</b>                                   |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | Yes                                                                       |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | No                                                                        |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | <b>Control valve for pneumatic drive</b>                                  |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | 3/2-way valve                                                             |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | 5/2-way valve <sup>3)</sup>                                               |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | No control valve                                                          |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | <b>Glass coating of parts in contact with media</b>                       |
|         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | SN SilcoNert® 2000 <sup>4)</sup>                                          |

<sup>1)</sup> The electronics can either be equipped with temperature controller for heated extension or blowback control.

<sup>2)</sup> For flammable sample gas, always use inert gas for blowback. Probe blowback prohibited when using explosive gases!

<sup>3)</sup> Only possible with ball valve in combination with bistable pneumatic drive.

<sup>4)</sup> Extends delivery time by approx. 6 weeks.

## 1.5 Product Description

| Probe       | Description                                                                             |
|-------------|-----------------------------------------------------------------------------------------|
| GAS 222.21  | Probe with inlet and/or outlet filter, shut-off valve and blowback connection           |
| Accessories | Please refer to the data sheet at the end of this manual for accessories for this probe |

## 2 Safety instructions

### 2.1 Important advice

The device may only be operated if:

- the product is used under the conditions described in the operating and installation manual, in accordance with the type label, and for the intended applications; Any unauthorised modifications to the device will void the warranty provided by Bühler Technologies GmbH,
- the information and markings on the type plates are observed,
- the limit values specified in the data sheet and in this operating and installation manual are observed,
- the device is not operated outside its specification,
- monitoring/protective devices are correctly connected,
- Service and repairs not described in these instructions is performed by Bühler Technologies GmbH,
- Using genuine replacement parts.

These operation instructions are a part of the equipment. The manufacturer reserves the right to change performance, specification or design data without prior notice. Keep this manual 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 include the following warnings:



General warning sign



General mandatory sign



Voltage warning



Unplug from mains



Warning not to inhale toxic gases



Wear respiratory equipment



Warning of corrosive substances



Wear a safety mask



Warning of explosion hazard



Wear gloves



Warning of hot surfaces

## 2.2 General hazard warnings

The device may only be installed by qualified specialist personnel who are familiar with the safety requirements and associated risks. In addition, through their professional training, they possess knowledge of the relevant standards and regulations.

Be sure to observe the safety regulations relevant to the installation location and the generally accepted rules of technology. Prevent malfunctions and thereby avoid personal injury and damage to property.

### The operator of the system must ensure that:

- Safety instructions and operating manuals are available and observed,
- the respective national accident prevention regulations are observed,
- the permissible data and operational conditions are maintained,
- protective devices are used and the required maintenance is performed,
- the device is disposed of according to the law,
- valid national installation regulations are observed,

### 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

##### Toxic, corrosive gases

The measuring gas led through the equipment can be hazardous when breathing or touching it.



- a) Check tightness of the measuring system before putting it into operation.
- b) Take care that harmful gases are exhausted to a safe place.
- c) Before maintenance turn off the gas supply and make sure that it cannot be turned on unintentionally.
- d) Protect yourself during maintenance against toxic / corrosive gases. Use suitable protective equipment.



#### DANGER

##### Use in potentially explosive atmospheres

Explosion hazard if used in hazardous areas.

The device is not suitable for operation in hazardous areas with potentially explosive atmospheres.

Do not expose the device to combustible or explosive gas mixtures.



### 3 Transport and storage

Only transport the product inside the original packaging or a suitable alternative.

The equipment must be protected from moisture and heat when not in use. They must be stored in a covered, dry and dust-free room at a temperature between -20 °C to 50 °C (-4 °F to 122 °F).

## 4 Installation and connection

### 4.1 Installation site requirements

Sample gas probes are intended for flange mounting.

- Installation site and installation position are determined based on requirements specific to the application.
- If necessary, the connection piece should be slightly tilted toward the centre of the channel.
- The installation site should be protected from the weather. Protect the device from dust, falling objects, and external blows.
- In addition, adequate and safe access for installation and future maintenance work should be provided. In particular, note the length required to uninstall the probe tube!

If the probe is transported to the installation site in pieces, it will first need to be assembled.

### 4.2 Installing the sampling tube (optional)

The sampling tube, if necessary with the fitting extension, must be screwed in. The probe is then attached to the mating flange using the included seal and nuts.

### 4.3 Installing the downstream filter (optional)

#### NOTICE



The downstream filter and the O-ring for the handle must be inserted prior to first start-up.

**Operating without downstream filter prohibited!**



Attach an O-ring suitable for the expected ambient temperature to the handle.

Attach the downstream filter to the handle. Then carefully insert the handle with filter in the gas probe and turn 90° to secure.

Verify the handle is seated correctly. When seated correctly it locks onto the filter housing.

### 4.4 Installing the upstream filter (Optional)

The upstream filter, if necessary with matching extension, must be screwed in. The probe is then attached to the mating flange using the included seals and screws.

### 4.5 Insulation

On heated probes completely insulate any exposed flange areas and, if applicable, the connection piece to absolutely prevent thermal bridges. The insulating material must meet the application requirements and be weatherproof.

## 4.6 Connecting the Gas Line

The sample gas line must be carefully and properly connected using a suitable fitting.

This table provides an overview of the sample gas probe connections:

|                                   | Probe<br>GAS 222                      | Reservoir<br>PAV01 | Ball valve<br>pneumatic drive | Control valve<br>3/2-way solenoid valve |
|-----------------------------------|---------------------------------------|--------------------|-------------------------------|-----------------------------------------|
| Connecting flange <sup>1)</sup>   | DN65/PN6/DN3"-150 <sup>2)</sup>       |                    |                               |                                         |
| Sample gas inlet                  | G3/4                                  |                    |                               |                                         |
| Sample gas outlet                 | NPT 1/4                               |                    |                               |                                         |
| Blowback connection               | G3/8                                  |                    |                               |                                         |
| Test gas connection <sup>1)</sup> | Tube Ø6 mm<br>Tube Ø1/4 <sup>2)</sup> |                    |                               |                                         |
| Filling port                      |                                       | NPT 1/4            |                               |                                         |
| Condensate                        |                                       | G1/2               |                               |                                         |
| Bypass                            |                                       | NPT 1/4            |                               |                                         |
| Control air                       |                                       |                    | G1/8                          | G1/4<br>NPT 1/4                         |

Tab. 1: Gas Probe Connections (Varies by Model)

<sup>1)</sup> Varies by version.

<sup>2)</sup> Only GAS 222.xx ANSI and GAS 222.xx AMEX

### WARNING



#### Gas emanation

**Sample gas can be harmful to the health!**

Check the lines for leaks.

### 4.6.1 Blowback Connection

Without accessories installed for the blowback device, the blowback connection comes with a sealed G3/8 screw-in connection. If you require blowback, you will need to undo this screw-in connection and ensure the blowback line is connected properly and tight.

### DANGER



#### Toxic, corrosive gasses

Explosive or toxic gases can develop due to a leaking or open blowback connection.

## 4.6.2 Connecting the Gas Line

Please note the following items when connecting the sample gas line (NPT 1/4") on heated probes to prevent thermal bridges:

- Choose the shortest possible screw connection.
- Shorten the connection pipe for the sample gas line as much as possible. To do so, remove the insulation around the sample gas line. This is done by loosening the fixing bolts.

### CAUTION



#### Fragile

The insulation is fragile. Handle with care, do not drop.

After connecting the sample gas line it must be braced and secured with the clamp.

Long sample gas lines may require additional support clamps along the way to the analysis system! Once all lines have been connected and checked for leaks, carefully reinstall and secure the insulation.

### WARNING



#### Gas emanation

**Sample gas can be harmful to the health!**

Check the lines for leaks.

## 4.6.3 Connecting the calibrating gas line (optional)

Connecting the calibrating gas line requires a Ø 6 mm or Ø 1/4" pipe fitting.

If the calibrating gas connection was ordered with check valve, a Ø 6 mm or Ø 1/4" pipe can be connected directly to the check valve.

## 4.7 Connecting the Blowback and Pressure Vessel (Optional)

The air lines must be connected carefully and properly, using suitable fittings.

If the probe is equipped with pressure vessel for efficient blowback (optional), a manual shut-off valve (ball valve) must be installed in the air supply, immediately upstream from the pressure vessel.

### NOTICE



The operating pressure of the compressed air (inert gas) required for blowback must always be higher than the process pressure.  
Required pressure differential min. 3 bar (44 psi).

### DANGER



#### Broken pressure vessel

**Gas leak, danger due to flying parts.**

Maximum operating pressure of the pressure vessel 10 bar (145 psi)!

The operating pressure reduces based on the operating voltage (see solenoid valve type plate).

## 4.8 Electrical connections

### WARNING



#### Hazardous electrical voltage

The device must be installed by trained staff only.

### CAUTION



#### Wrong mains voltage

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

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
- be easy to reach by the operator
- comply with IEC 60947-1 and IEC 60947-3

separate all live conductors of the supply connection and the status output, and must not be installed in the power cable

The mains supply of the device must be fused according to the specifications in the technical data.

### 4.8.1 Connection via Terminal Strip

The probe has regulated, adjustable heating. The supply voltage is 115 V AC, 50/60Hz or 230 V AC, 50/60 Hz (see type plate).

The device is already wired to the controller.

Inside the controller housing is a terminal block for connecting the mains supply and the alarm output. The connection to the included terminal blocks is shown in the attached connection diagram. For this purpose the plugs can be removed from their sockets and reinserted once wired. The pin assignment is also printed onto the board.

If the heat dissipation is very high near the probe due to the application, the customer must install a shield to protect the probe and regulator.

### 4.8.2 Heated Pressure Vessel (Optional)

A heated compressed air tank can optionally be used for blowback. Heated via self-regulating PTC heating cartridge to protect against frost.

If the heater was ordered with the probe, it is pre-wired.

When retrofitting with a heater, it can be powered by the probe control unit.

Connect the connecting cable for the heater (mains connection 115/230 V AC) per the enclosed wiring diagram.

### 4.8.3 Heated Extension (Optional)

The unit can optionally be ordered with heated extension. Heated via regulated heating tape with Pt100, preventing falling below the sample gas dew point at the sample point. The unit cannot be retrofit with a heated extension.

The connection cable for the heated extension (mains connection 115 or 230 V AC) must be connected per the enclosed connection diagram.

## 5 Operation and Control

### NOTICE



The device must not be started or operated outside the specifications!

### WARNING



#### Housing or component damage

Never exceed the maximum working pressure and temperature range of the drive.

### CAUTION



#### Hot surface

#### Risk of burns

Surface temperatures may be high during operation. Depending on the installation conditions on site, these areas may require a warning sign.

## 5.1 Basic function of the probe controller

### 5.1.1 Regulator Functions

After switching on the combination the probe is heated up. The display with the current temperature will light up on the controller. As long as the set operating range is has not yet been reached, the display will flash and the status contact is in Alarm position. Once the working range has been reached, the status contact switches and the display is steady.

The target temperature, the working range of the probe and the temperature unit (°C/°F) are set using the three control buttons on the controller. This is described in chapter "Operation and use".

The factory settings are: Unit: °C; target temperature: 180 °C; working range: ±15 °C

### 5.1.2 Advanced Functions with Built-In Regulator for Heated Extension (Optional)

The display will alternating between "**Prob**"– adapter temperature – "**AdOn**"– extension temperature.

### 5.1.3 Advanced functions for built-in blowback control (optional)

After switching on the probe, blowback will always first be initiated.

Blowback is always indicated by the display alternating between the temperature and "**bbon**" (blow back on).

## 5.2 Use of menu functions

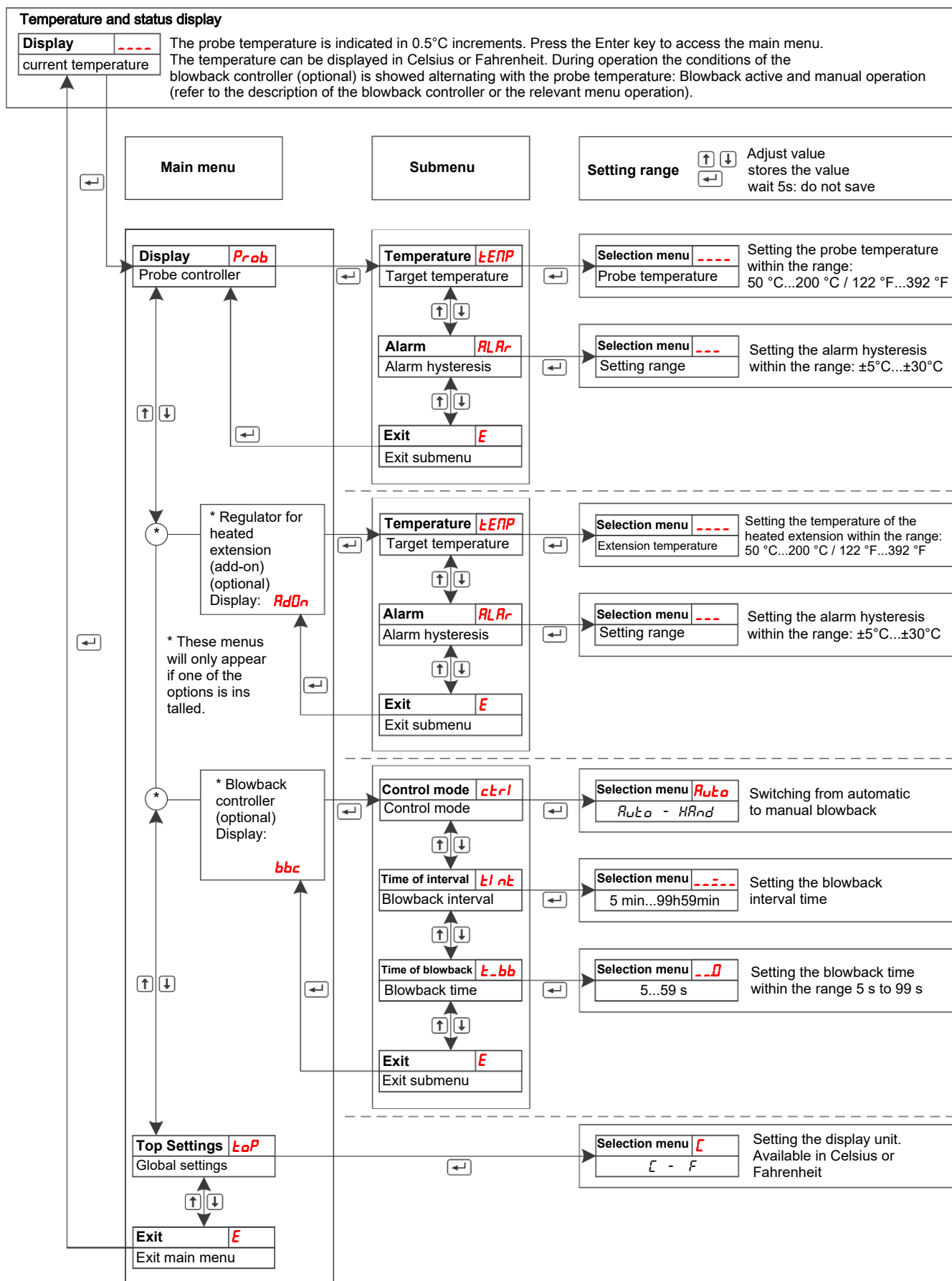
### Overview of the operational principal:

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                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <ul style="list-style-type: none"> <li>– Switch from measurement display to main menu</li> <li>– Selection of the display menu item</li> <li>– Accepting the changed value or selection</li> </ul>                                         |
|  | <ul style="list-style-type: none"> <li>– Switch to the upper menu item</li> <li>– Increase of the value of switching the selection</li> <li>– Temporary display of the alternative measurement display (if option is installed)</li> </ul> |
|  | <ul style="list-style-type: none"> <li>– Switch to lower menu item</li> <li>– Decrease of the value of switching the selection</li> <li>– Temporary display of the alternative measurement display (if option is installed)</li> </ul>     |

## 5.2.1 Menu Navigation Overview



## 5.2.2 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.

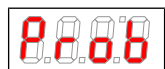
**NOTICE! After saving values with the Enter key they will be applied to the control.**

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

## 5.3 Description of menu functions

### 5.3.1 Main Menu

#### Regulator (probe)



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

#### Regulator for heated extension (add-on; only appears if option is installed)



From here you can access all relevant settings for the temperature regulator of the heated extension. The related submenu allows you to select the target temperature and alarm thresholds.

#### Blow back control Only appears if option is installed)



From here you will be able to access all relevant settings for the probe blowback controller. You can select the control mode, blowback interval and blowback time from the submenu.

#### 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.

#### Exit main menu

Display → **E**



Selecting this will return you to display mode.

## 5.3.2 Probe Controller Submenu [Display: Prob]

### Controller -> Target temperature (Temperature)



This setting defines the target cooling block temperature. The value can be set within a range from 50 °C (122 °F) to 200 °C (392 °F).

Note: The default value on delivery is 180 °C (356 °F).

### Controller -> Alarm range



This item allows setting of the alarm range threshold for the optical alarm as well as for the alarm relay. The alarm threshold may be set in the range from  $\pm 5$  °C ( $\pm 9$  °F) to  $\pm 30$  °C ( $\pm 54$  °F) with respect to the nominal value.

Note: Default value at delivery is  $\pm 15$  °C ( $\pm 27$  °F).

### Exit submenu 1

Display → Submenu → **E**



Selecting this will return you to the main menu.

## 5.3.3 Regulator Submenu for Heated Extension [Display: Adon] (Optional)

### Controller -> Target temperature (Temperature)



This setting defines the target cooling block temperature. The value can be set within a range from 50 °C (122 °F) to 200 °C (392 °F).

Note: The default value on delivery is 180 °C (356 °F).

### Controller -> Alarm range



This item allows setting of the alarm range threshold for the optical alarm as well as for the alarm relay. The alarm threshold may be set in the range from  $\pm 5$  °C ( $\pm 9$  °F) to  $\pm 30$  °C ( $\pm 54$  °F) with respect to the nominal value.

Note: Default value at delivery is  $\pm 15$  °C ( $\pm 27$  °F).

### Exit submenu 1

Display → Submenu → **E**



Selecting this will return you to the main menu.

### 5.3.4 Submenu Blowback control [Display: bbc] (optional)

#### Blowback control -> Control mode



Under this menu item you can switch between automatic blowback and manual operation.

When selecting Hand, the display will alternate between displaying the temperature and "Hand".

#### Blowback control -> Blowback interval (Time of interval)



Used to set the total blowback interval time.

The setting range is 5 minutes to 99 hours 59 minutes.

Use the and keys to set each digit and confirm with . The digit being set will flash.

Entry errors can be corrected after pressing the key. Exit the menu and return to it.

Note:

1) The default value on delivery is 10 minutes.

2) After selecting and confirming this value with a blowback cycle will automatically be initiated and the interval will start.

3) Only applicable in automatic mode.

#### Blowback control -> Blowback time (Time of blowback)



Sets the time of the actual blowback.

The setting range is 5 to 59 seconds.

Use the and keys to adjust the settings.

Note:

The default value on delivery is 10 seconds.

#### Exit submenu 1

Display → Submenu →



Selecting this will return you to the main menu.

## 6 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.
- The appliance must be checked for external damage and soiling at regular intervals.
- The particle filter may need to be replaced, depending on how dirty it is.
- Any dirty surfaces should be cleaned with a damp cloth.

### DANGER

#### Electrical voltage

Electrocution hazard.



- Disconnect the device from power supply.
- Make sure that the equipment cannot be reconnected to mains unintentionally.
- The device must be opened by trained staff only.
- Regard correct mains voltage.



### DANGER

#### The gas inside the filter, condensate and used filter elements may be caustic or corrosive.

Sample gas can be harmful.



- Before maintenance turn off the gas supply and surge with air if necessary.
- Exhaust sample gas to a safe place.
- Protect yourself against toxic / corrosive gas during maintenance. Wear appropriate personal protection equipment.



### CAUTION

#### Hot surface



Risk of burns

Depending on the operating parameters, the housing temperature may reach over 100 °C during operation.

Allow the unit to cool down before performing maintenance.

### CAUTION

#### Excess pressure



The unit mustn't be pressurised or energised when opened.

If necessary, close the gas supply and ensure a safe pressure on the process end before opening.

### CAUTION

#### Drive pressurised



Never loosen or remove the cover or any accessories with the drive pressurised.

### CAUTION

#### Never open the drive with the function "single-acting"!



This may only be done at the manufacturer's plant.

**CAUTION****Do not attach levers or tools to the drive's spindle!**

Levers and tools on the spindle can flap around when switching the compressed air or control voltage back on and cause serious injury or damage!

**NOTICE**

Under normal operating and ambient conditions the slew drive maintenance free.

## 6.1 Maintaining the filter element

The probes feature a particle filter which needs to be changed as it becomes dirty.

To do so, disconnect the voltage supply and if applicable close the shut-off valve to the process or switch off the process.

**CAUTION! Do not damage the rear filter seat.**

**NOTICE**

**Ceramic filter elements** are very brittle by nature. Handle them with care, don't let them fall.

**Filter elements made out of sintered stainless steel** can be cleaned in an ultrasonic bath and be used several times as long as both seals are still in proper conditions.

### 6.1.1 Replacing the downstream filter

- Unlock and lift up the weather hood.
- Turn the handle at the back end of the probe by 90° (handle must then be horizontal), pushing in slightly, and remove.
- Remove the dirty filter element and check the sealing surfaces.
- Before installing the new filter element, replace the seal on the handle plug (seal included with the filter element).
- Then carefully insert the handle with new filter, push in slightly and turn 90° (handle must then be vertical). Pull on the handle to verify the filter element is firmly seated.
- With the filter removed, if necessary also need clean the inside of the sampling tube by blowing it out or using a cleaning wand.

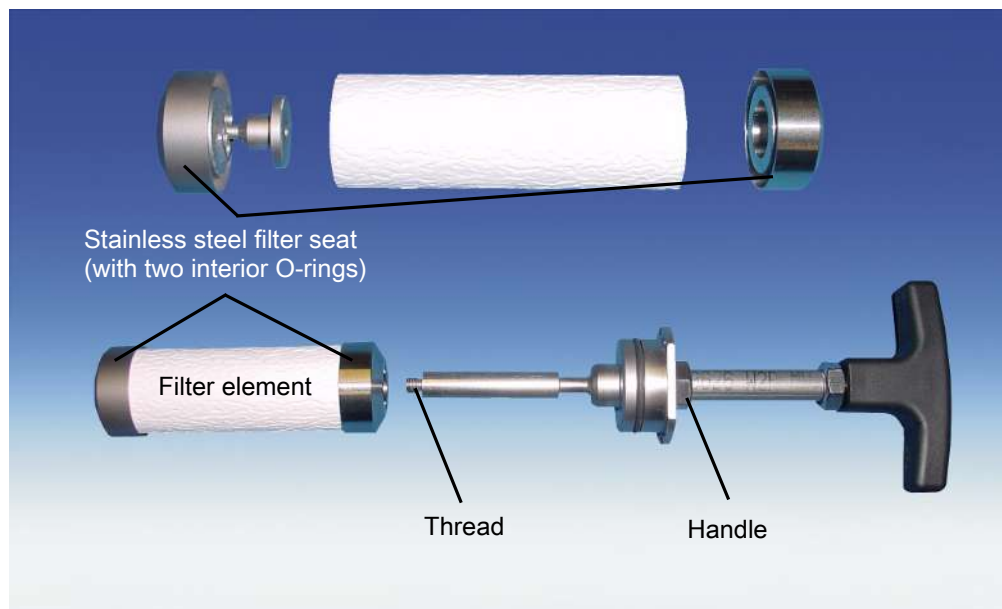
**NOTICE**

The weather hood can only be closed again when the handle is completely vertical. In order to do so, loosen the hood from the locking supports by lifting slightly and then fold down. Ensure that the hood lock clicks into place correctly.

## 6.1.2 Replacing the Outlet Filter with Micro-Fibreglass Filter Element

- Turn the handle at the rear end of the probe by 90° (handle must be horizontal), pushing in slightly, and remove.
- Unscrew the dirty filter element counter-clockwise from the thread of the handle.
- Pull both stainless steel filter seats off the filter element.
- Before installing the new filter element, replace the seal on the handle and inside the stainless steel filter seats (seals are included with the filter element).
- Then turn the handle with the new filter by 90° (handle must be vertical), pushing in slightly.

**CAUTION! Do not damage the rear filter seat.**



With the filter removed, you may also clean the inside of the sampling tube if necessary by blowing it out or using a cleaning wand.

## 6.1.3 Replacing the upstream filter

The probe can be equipped with both an upstream filter as well as an downstream filter. When sampling flammable gases, nitrogen (inert gas) must be used for blowback. Blowback of explosive gases is prohibited.

The effectiveness of cleaning a filter within a process is directly influenced by the available airflow (amount of gas). We therefore recommend using a pressure vessel directly on the probe.

With sufficient upstream filter blowback (within the process stream) the probes are maintenance-free. However, due to process conditions the filter may clog over time. In this case the filter element will need to be replaced.

To do so, the probe must be completely removed and reinstalled after changing the element. If the probe is equipped with an downstream filter, it must be replaced.

### NOTICE



**Ceramic filter elements** are very brittle by nature. Handle them with care, don't let them fall.

**Filter elements made out of sintered stainless steel** can be cleaned in an ultrasonic bath and be used several times as long as both seals are still in proper conditions.

### NOTICE



The weather hood can only be closed again when the handle is completely vertical. In order to do so, loosen the hood from the locking supports by lifting slightly and then fold down. Ensure that the hood lock clicks into place correctly.

## Condensate inside the pressure vessel

Depending on the installation site and application conditions a small amount of condensate may form inside the blowback air pressure vessel. Open the drain screw at the bottom of the vessel and drain the condensate at least once a year.

If the probe needs to be serviced more frequently due to operating conditions, we recommend also draining the condensate at these intervals.

### CAUTION



#### High pressure

Pressure vessel under pressure.

Before opening the condensate drain, close the air supply to the blowback control and drain the vessel by manual blowback.

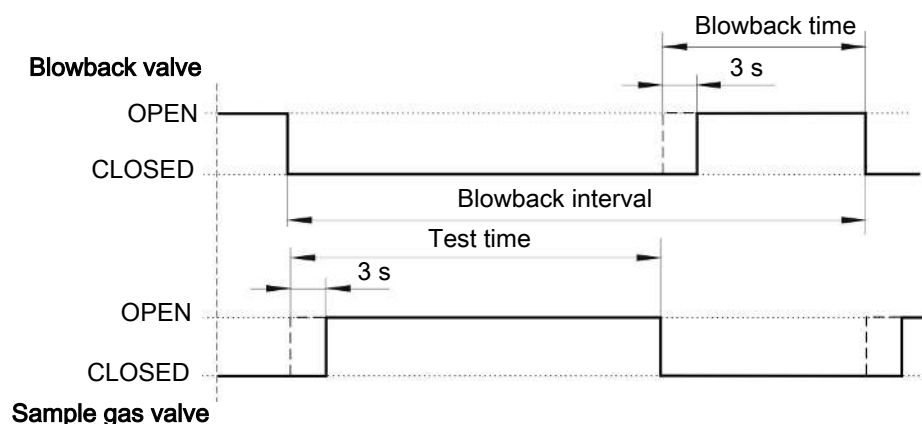
Pressing the main switch for the blowback control to interrupt the voltage supply.

## 6.2 Inlet filter blowback (within the process stream)

Be sure to use filtered air with a minimum rating of PNEUROP / ISO Class 4 for blowback:

| Class | Particles / m <sup>3</sup><br>Particle size:<br>(1 to 5) µm | Pressure dew point<br>[°C] | Residual oil content<br>[mg / m <sup>3</sup> ] |
|-------|-------------------------------------------------------------|----------------------------|------------------------------------------------|
| 4     | to 1000<br>(no particles ≥ 15 µm)                           | ≤ 3                        | ≤ 5                                            |

The following illustrations are intended to explain the context of the terms blowback time and blowback interval:



### 6.2.1 Manual Blowback (Without Blowback Control)

The shut-off valve in the air supply to the pressure vessel must be open. The optional pressure gauge on the pressure vessel shows the current operating pressure.

- To blowback, first close the shut-off valve in the gas probe (handle below the probe / weather hood).
- Then **abruptly** open the ball valve inside the connecting line from the pressure vessel to the probe until the display on the pressure gauge has dropped to the lowest reading.
- After blowback, close the ball valve and open the shut-off valve in the probe.

### 6.2.2 Automatic Blowback (External Blowback Control)

For automatic blowback, the shut-off valve in the probe must have a pneumatic control (optional). The control unit for the system is designed for sequential valve control, i.e.:

1. Close the shut-off valve in the probe using the pneumatic control.
2. Open the solenoid valve between the pressure vessel and probe for approx. 10 seconds.
3. Open the shut-off valve in the probe.

Blowback can also be set as a closed process at intervals ranging from several minutes to hours or even days based on requirements.

### 6.2.3 Built-In Blowback Control (Optional)

All required parts are already built into the probe based on your purchase order.

Switching on the probe will first automatically trigger blowback. The set blowback interval will then start.

The display will indicate blowback. During the process the display will alternate between displaying the temperature and "bbon" (blow back on).

#### Automatic blowback

Please refer to the menu description for how to change the blowback interval or blowback time. The factory settings are: Blow-back interval: 10 minutes; blowback time 10 seconds.

#### Manual blowback – access via keys

Open the menu and set the built-in blowback control to manual blowback.

The display will alternate between the probe temperature and the "Hand" status (hand = manual). To start blowback, press one of the keys  or  during normal operation (temperature being displayed).

The probe menus must be closed. During blowback the display will alternate between the probe temperature and "bbon".

#### Manual blowback – external control

Manual blowback may also be externally triggered at any time. This requires connecting a key (not included) per the connection diagram in the appendix. The key must supply the probe with a 24 V DC voltage signal. The external controller does not affect the parameter settings.

## 7 Service and repair

If an error occurs during operation, you will find troubleshooting and corrective information in this chapter.

Repairs to the equipment may only be performed by Bühler authorised personnel.

If you have any questions, please contact our service department:

**Tel.: +49-(0)2102-498955** or your local representative.

Further information about our individual service solutions for repair, modification and commissioning can be found at <https://www.buehler-technologies.com/service>.

If, after rectifying any faults and switching on the mains voltage, the device does not function correctly, it must be checked by the manufacturer. Please send the equipment inside suitable packaging to:

**Bühler Technologies GmbH – BZL**

**Halle A1 – Aircompark**

**Halskestr. 24**

**40880 Ratingen**

**Germany**

In addition, please attach the completed and signed RMA decontamination declaration to the packaging. Otherwise, your repair order cannot be processed. You can find the form in the appendix of these instructions, or simply request it by e-mailing:

**[service@buehler-technologies.com](mailto:service@buehler-technologies.com)**

## 7.1 Troubleshooting

### CAUTION



#### Risk due to defective device

Personal injury or damage to property

- Switch off the device and disconnect it from the mains.
- Repair the fault immediately. The device should not be turned on again before elimination of the failure.



| Problem / Malfunction                                                                        | Possible cause                                                                                                                                                               | Action                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No or reduced gas flow                                                                       | <ul style="list-style-type: none"> <li>Filter element clogged</li> <li>Gas circuit clogged</li> <li>Ball valve closed</li> <li>Blowback (optional) not responding</li> </ul> | <ul style="list-style-type: none"> <li>Clean or replace filter element, clean sampling tube</li> <li>Ball valve open</li> <li>Check compressed air supply</li> <li>Check solenoid valve, check pneumatic control</li> </ul> |
| Temperature alarm                                                                            | <ul style="list-style-type: none"> <li>Heat-up not yet completed</li> <li>Pt100 failure</li> <li>Heater / controller failure</li> </ul>                                      | <ul style="list-style-type: none"> <li>Wait for heat-up to complete</li> <li>Send in probe for repair</li> <li>Send in probe for repair</li> </ul>                                                                          |
| No heat output / no display                                                                  | <ul style="list-style-type: none"> <li>No / incorrect voltage</li> <li>Controller failure</li> </ul>                                                                         | <ul style="list-style-type: none"> <li>Power supply</li> <li>Send in probe for repair</li> </ul>                                                                                                                            |
| Condensation forming                                                                         | <ul style="list-style-type: none"> <li>Heater failure</li> <li>Thermal bridges at the sampling point</li> </ul>                                                              | <ul style="list-style-type: none"> <li>Send in probe for repair</li> <li>Insulate to eliminate thermal bridges</li> </ul>                                                                                                   |
| Error messages on the display                                                                |                                                                                                                                                                              |                                                                                                                                                                                                                             |
|  Error 01 | <ul style="list-style-type: none"> <li>Probe temperature too high, line Pt100 disconnected</li> </ul>                                                                        | <ul style="list-style-type: none"> <li>Check Pt100 connection inside the controller or send probe in for repair</li> </ul>                                                                                                  |
|  Error 02 | <ul style="list-style-type: none"> <li>Probe temperature too low, Pt100 short-circuit</li> </ul>                                                                             | <ul style="list-style-type: none"> <li>Send in probe for repair</li> </ul>                                                                                                                                                  |
|  Error 03 | <ul style="list-style-type: none"> <li>Heated extension temperature too high, line Pt100 disconnected</li> </ul>                                                             | <ul style="list-style-type: none"> <li>Check Pt100 connection inside the controller or send probe in for repair</li> </ul>                                                                                                  |
|  Error 04 | <ul style="list-style-type: none"> <li>Heated extension temperature too low, Pt100 short-circuit</li> </ul>                                                                  | <ul style="list-style-type: none"> <li>Send in probe for repair</li> </ul>                                                                                                                                                  |
|  Error 13 | <ul style="list-style-type: none"> <li>Limit switch not responding</li> </ul>                                                                                                | <ul style="list-style-type: none"> <li>Check limit switch connection inside the controller or send probe in for repair</li> </ul>                                                                                           |

Tab. 2: Troubleshooting

## 7.2 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                                                               |
|------------|---------------------------------------------------------------------------|
| 9110000001 | Fuse 115 V/230 V: 800 mA delayed action                                   |
| 9009105    | Measuring outlet seal                                                     |
| 9009079    | Flange seal DN65 PN6                                                      |
| 9009068    | Flange seal FD 40 WS                                                      |
| 46222012   | O-ring kit for filter element and probe, material: Viton                  |
| 46222024   | O-ring kit for filter element and probe, material: Perfluoroelastomer     |
|            | Please see the accessories data sheet in the appendix for filter elements |

## 8 Disposal

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 – BZL  
WEEE  
Halle A1 – Aircompark  
Halskestr. 24  
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.

## 9 Appendices

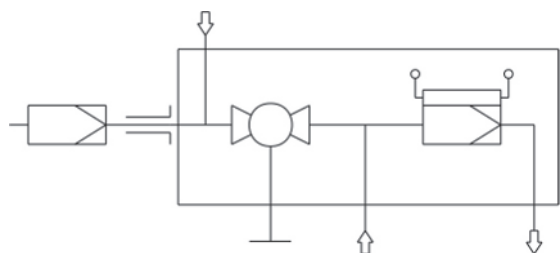
### 9.1 Technical Data

#### Gas Probe Technical Data

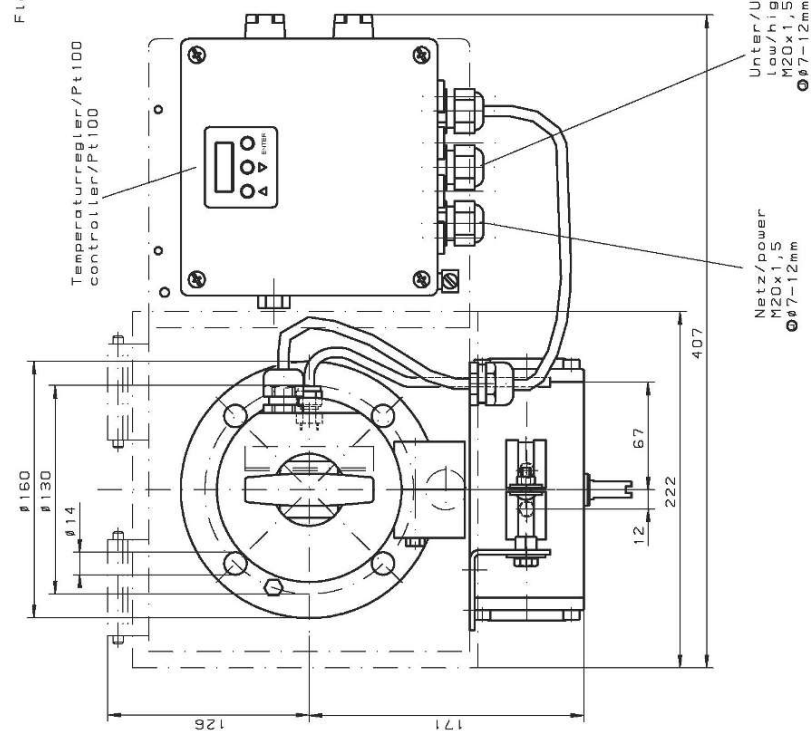
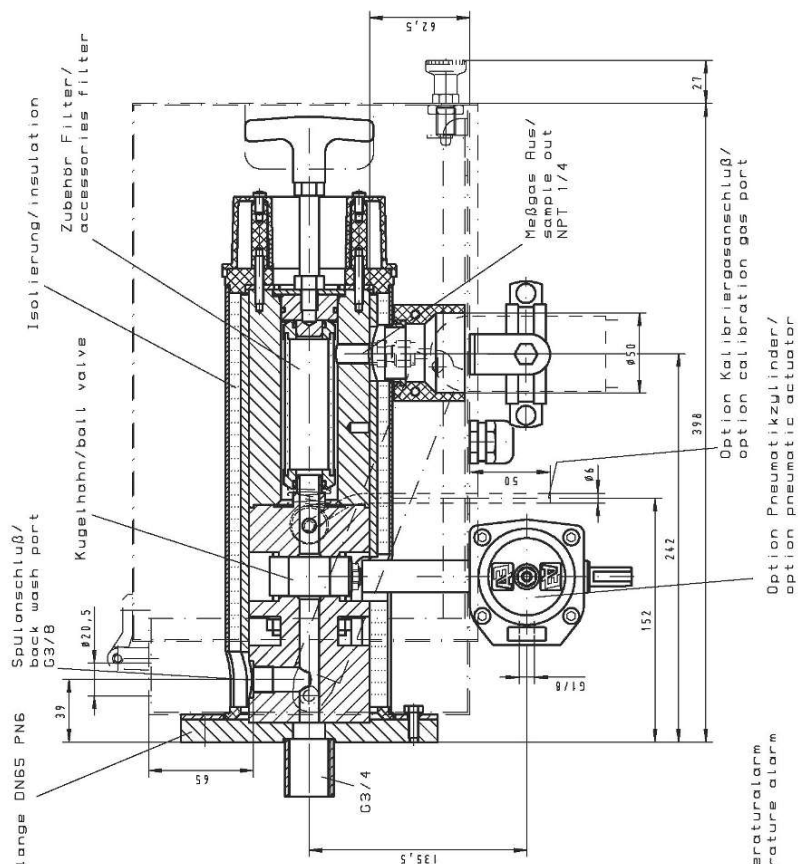
|                                          |                                                                                                |                                     |
|------------------------------------------|------------------------------------------------------------------------------------------------|-------------------------------------|
| Probe operating temperature:             | max. 200 °C                                                                                    |                                     |
| Ambient temperature without accessories: | -20 to +70 °C                                                                                  |                                     |
| Ambient temperature with accessories:    | <b>Component</b>                                                                               | <b>Ambient temperature range</b>    |
|                                          | Compressed air valve:                                                                          | -10 °C < T <sub>amb</sub> < +55 °C  |
|                                          | Pneumatic drive:                                                                               | -20 °C < T <sub>amb</sub> < +80 °C  |
|                                          | Limit switch:                                                                                  | -20 °C < T <sub>amb</sub> < +100 °C |
|                                          | Solenoid valve for pneumatic drive:                                                            | -10 °C < T <sub>amb</sub> < +55 °C  |
| Medium temperature (blowback):           | <b>Component</b>                                                                               | <b>Medium temperature range</b>     |
|                                          | Compressed air valve:                                                                          | -10 °C to +80 °C                    |
|                                          | Solenoid valve for pneumatic drive:                                                            | -10 °C to +100 °C                   |
| Regulator setting range:                 | +50 to +200 °C                                                                                 |                                     |
| Low/high temperature alarm:              | Alarm adjustable ±5.....30 K from setpoint, factory preset to 15 K, max. switching current 1 A |                                     |
| Electrical data:                         | 230 V, 2.0 A, 50/60 Hz<br>115 V, 3.8 A, 50/60 Hz                                               |                                     |
| Protection class:                        | IP54                                                                                           |                                     |
| Max. operating pressure:                 | 6 bar                                                                                          |                                     |
| Materials in contact with media          |                                                                                                |                                     |
| Flange:                                  | Stainless steel 1.4571                                                                         |                                     |
| Probe body:                              | Stainless steel 1.4571                                                                         |                                     |
| Ball valve:                              | Stainless steel 1.4408/1.4462/PTFE                                                             |                                     |
| Seal:                                    | Stainless steel 1.4404/graphite/and see filter<br>Optional coating with SilcoNert® 2000 *      |                                     |

\*The SilcoNert® 2000 coating forms a layer of hydrogenated, amorphous silicon on the surfaces of the measuring gas probe that are in contact with media. It is applied by chemical vapour deposition (CVD), which creates a uniformly thin layer on the surface. SilcoNert® 2000 is temperature-resistant up to 400 °C, chemically inert and hydrophobic. The coating is resistant to many chemically corrosive liquids. If you are unsure about the suitability for specific gas matrices, please contact Bühler Technologies GmbH.

### 9.2 Flow chart



## 9.3 Dimensions



| Art. Nr. / part-no.                                                 | 4622221                                                   | 4622225          |
|---------------------------------------------------------------------|-----------------------------------------------------------|------------------|
| Werkstoffe/materials                                                |                                                           |                  |
| -Flansch, Körper / flange, body                                     | 1 4571                                                    |                  |
| -Kugelhahn / ball valve                                             | 1.4408 / 1.4462 / PTFE                                    |                  |
| Betriebstemperatur Sonde/<br>operating temperature probe            | max. 200°C / 392°F                                        |                  |
| Heizung / heater                                                    |                                                           |                  |
| -Temperaturbereich / temperature range                              | 230V 50/60Hz 440W                                         | 115 50/60Hz 425W |
| -Alarm einstellbar / alarm adjustable                               | 50 ... 200°C / 122 ... 392°F<br>15 ... 30°C / 59 ... 84°F |                  |
| werkseitig eingestellt / factory set                                | vom Sollwert / from set-point                             |                  |
| max. Schaltstrom / max. current                                     | 15°C / 127°F                                              |                  |
| -Schutzart / degree of protection                                   | 1A                                                        |                  |
| -Umgebungstemperatur / ambient temperature                          | IP54                                                      |                  |
| Steuerdruck Pneumatikzylinder/<br>pilot pressure pneumatic actuator | -20 ... +70°C / -4 ... +158°F                             |                  |
|                                                                     | 6 bar                                                     |                  |

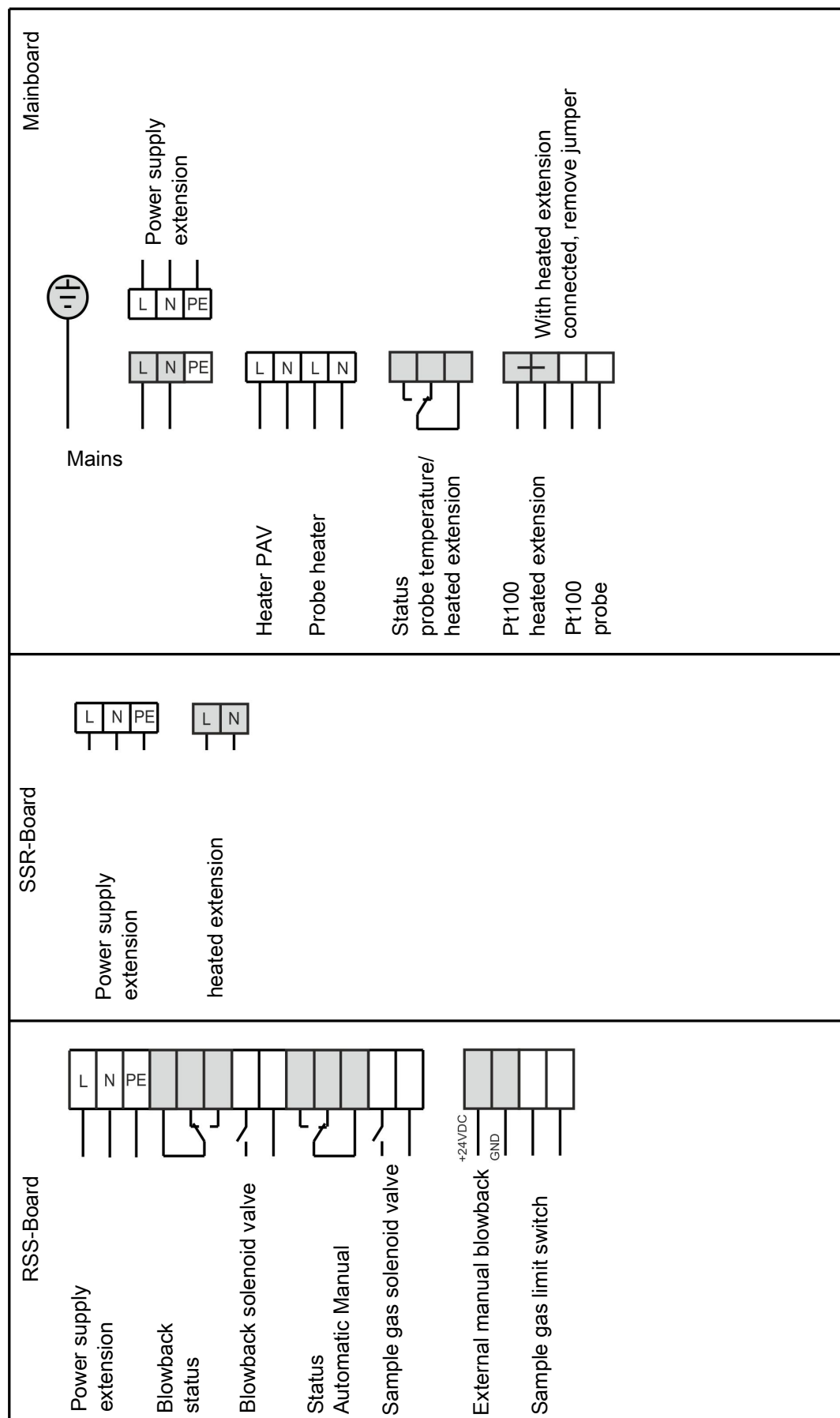
[illegible]



## 9.5 Connection Diagram

The circuit boards installed in the controller are marked in yellow in the pin assignment in the controller cover.

Terminals to be connected by the customer are shown in grey.

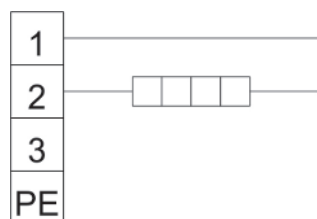


## 9.6 Connection diagram heated pressure vessel

Heater

Operating voltage

115-230 V AC 200 W



**9.7 User book (Please make copies)**

| Maintained on | Unit no. | Operating hours | Remarks | Signature |
|---------------|----------|-----------------|---------|-----------|
|               |          |                 |         |           |

## **10 Attached Documents**

- Declaration of Conformity KX460012
- Resistance table
- Accessories Data Sheet 461099
- RMA - Decontamination Statement

**EU-Konformitätserklärung**  
**EU-declaration of conformity**



Hiermit erklärt Bühler Technologies GmbH,  
dass die nachfolgenden Produkte den  
wesentlichen Anforderungen der Richtlinie

*Herewith declares Bühler Technologies GmbH  
that the following products correspond to the  
essential requirements of Directive*

**2014/35/EU**  
**(Niederspannungsrichtlinie / low voltage directive)**

in ihrer aktuellen Fassung entsprechen.

*in its actual version.*

Folgende Richtlinie wurde berücksichtigt:

*The following directive was regarded:*

**2014/30/EU (EMV/EMC)**

**Produkt / products:** Beheizte Messgassonden / *Heated Sample Gas Probes*  
**Typ / types:** GAS 222.14, GAS 222.15, GAS 222.17, GAS 222.20, GAS 222.21, GAS 222.31,  
GAS 222.35, GAS 222.40

Die Betriebsmittel sind zur Gasentnahme aus dem Abgasstrom oder einem laufenden Prozess  
bestimmt.

*The equipment is intended for gas sampling from flue gas or a running process.*

Das oben beschriebene Produkt der Erklärung erfüllt die einschlägigen  
Harmonisierungsrechtsvorschriften der Union:

*The object of the declaration described above is in conformity with the relevant Union harmonisation  
legislation:*

**EN 61326-1:2013**

**EN 61010-1:2010/A1:2019/AC:2019-04**

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 authorized to compile the technical file is Mr. Stefan Eschweiler located at the company's  
address.*

Ratingen, den 09.05.2023

Stefan Eschweiler  
Geschäftsführer – *Managing Director*

Frank Pospiech  
Geschäftsführer – *Managing Director*

# UK Declaration of Conformity



The manufacturer Bühler Technologies GmbH declares, under the sole responsibility, that the product complies with the requirements of the following UK legislation:

## Electrical Equipment Safety Regulations 2016

The following legislation were regarded:

## Electromagnetic Compatibility Regulations 2016

**Products:** Heated Sample Gas Probes  
**Types:** GAS 222.14, GAS 222.15, GAS 222.17, GAS 222.20, GAS 222.21, GAS 222.31,  
GAS 222.35, GAS 222.40

The equipment is intended for gas sampling from flue gas or a running process.

The object of the declaration described above is in conformity with the relevant designated standards:

**EN 61010-1:2010/A1:2019/AC:2019-04**

**EN 61326-1:2013**

Ratingen in Germany, 09.05.2023

A handwritten signature in blue ink, appearing to read 'Stefan Eschweiler', written over a horizontal line.

Stefan Eschweiler  
Managing Director

A handwritten signature in black ink, appearing to read 'Frank Pospiech', written over a horizontal line.

Frank Pospiech  
Managing Director

# Resistance table

## Gas Analysis

| Formula                                                     | Medium                 | Concentration    | Teflon®<br>PTFE | PCTFE | PEEK | PVDF | FEP | FFKM | Viton®<br>FPM | V4A | Glass |
|-------------------------------------------------------------|------------------------|------------------|-----------------|-------|------|------|-----|------|---------------|-----|-------|
| CH <sub>3</sub> COCH <sub>3</sub>                           | Acetone                |                  | 1/1             | 1/3   | 1/1  | 3/4  | (1) | 1/1  | 4/4           | 1/1 | 1/1   |
| C <sub>6</sub> H <sub>6</sub>                               | Benzol                 |                  | 1/1             | 1/3   | 1/1  | 1/3  | 1/1 | 1/1  | 3/3           | 1/1 | 1/1   |
| Cl <sub>2</sub>                                             | Chlorine               | 10% wet          | 1/1             | 0/0   | 4/4  | 2/2  | 1/1 | 1/1  | 3/0           | 4/4 | 1/1   |
| Cl <sub>2</sub>                                             | Chlorine               | 97%              | 1/0             | 1/3   | 4/4  | 1/1  | 1/1 | 1/0  | 1/1           | 1/1 | 1/0   |
| C <sub>2</sub> H <sub>6</sub>                               | Ethane                 |                  | 1/0             | 0/0   | 1/0  | 2/0  | -   | 1/0  | 1/0           | 2/0 | 1/0   |
| C <sub>2</sub> H <sub>5</sub> OH                            | Ethanol                | 50%              | 1/1             | 1/3   | 1/1  | 1/1  | 1/1 | 1/1  | 2/2           | 1/0 | 1/1   |
| C <sub>2</sub> H <sub>4</sub>                               | Ethylene               |                  | 1/0             | 0/0   | 0/0  | 1/0  | 1/1 | 1/0  | 1/0           | 1/0 | 1/0   |
| C <sub>2</sub> H <sub>2</sub>                               | Ethyne                 |                  | 1/0             | 0/0   | 0/0  | 1/0  | 1/1 | 1/0  | 2/0           | 1/0 | 1/0   |
| C <sub>6</sub> H <sub>5</sub> C <sub>2</sub> H <sub>5</sub> | Ethylbenzene           |                  | 1/0             | 0/0   | 0/0  | 1/1  | 1/1 | 1/0  | 2/0           | 1/0 | 1/0   |
| HF                                                          | Hydrofluoric acid      |                  | 1/0             | 0/0   | 0/0  | 2/2  | (1) | 2/0  | 4/0           | 3/4 | 1/0   |
| CO <sub>2</sub>                                             | Carbon dioxide         |                  | 1/1             | 0/0   | 1/0  | 1/1  | (1) | 1/0  | 1/1           | 1/1 | 1/1   |
| CO                                                          | Carbon monoxide        |                  | 1/0             | 0/0   | 1/1  | 1/1  | -   | 1/0  | 1/0           | 1/1 | 1/0   |
| CH <sub>4</sub>                                             | Methane                | technically pure | 1/1             | 0/0   | 1/1  | 1/0  | 1/1 | 1/0  | 1/1           | 1/1 | 1/1   |
| CH <sub>3</sub> OH                                          | Methanol               |                  | 1/1             | 1/1   | 1/1  | 1/1  | 1/1 | 1/1  | 3/4           | 1/1 | 1/1   |
| CH <sub>3</sub> Cl <sub>2</sub>                             | Methylene chloride     |                  | 1/0             | 2/0   | 1/0  | 1/0  | 1/1 | 1/0  | 3/0           | 1/1 | 1/0   |
| H <sub>3</sub> PO <sub>4</sub>                              | Phosphoric acid        | 1–5%             | 1/1             | 1/1   | 1/1  | 1/1  | 1/1 | 1/1  | 1/1           | 1/1 | 1/1   |
| H <sub>3</sub> PO <sub>4</sub>                              | Phosphoric acid        | 30%              | 1/1             | 1/1   | 1/1  | 1/1  | 1/1 | 1/1  | 1/1           | 1/1 | 1/1   |
| C <sub>3</sub> H <sub>8</sub>                               | Propane                | gaseous          | 1/1             | 0/0   | 1/0  | 1/1  | 1/1 | 1/0  | 1/0           | 1/0 | 1/1   |
| C <sub>3</sub> H <sub>6</sub> O                             | Propylene oxide        |                  | 1/0             | 0/0   | 0/0  | 2/4  | 1/1 | 2/0  | 4/0           | 1/0 | 1/0   |
| HNO <sub>3</sub>                                            | Nitric acid            | 1–10%            | 1/1             | 1/0   | 1/1  | 1/1  | 1/1 | 1/0  | 1/1           | 1/1 | 1/1   |
| HNO <sub>3</sub>                                            | Nitric acid            | 50%              | 1/1             | 1/0   | 3/3  | 1/1  | 1/1 | 1/0  | 1/0           | 1/2 | 1/1   |
| HCl                                                         | Hydrochloric acid      | 1–5%             | 1/1             | 1/1   | 1/0  | 1/1  | 1/1 | 1/1  | 1/1           | 2/4 | 1/1   |
| HCl                                                         | Hydrochloric acid      | 35%              | 1/1             | 1/1   | 1/0  | 1/1  | 1/1 | 1/1  | 1/2           | 2/4 | 1/1   |
| O <sub>2</sub>                                              | Oxygen                 |                  | 1/1             | 0/0   | 1/0  | 1/1  | 1/1 | 1/1  | 1/2           | 1/1 | 1/1   |
| SF <sub>6</sub>                                             | Sulphur hexafluoride   |                  | 1/0             | 0/0   | 1/0  | 0/0  | 0/0 | 1/0  | 2/0           | 0/0 | 1/0   |
| H <sub>2</sub> SO <sub>4</sub>                              | Sulfuric acid          | 1–6%             | 1/1             | 1/1   | 2/2  | 1/1  | 1/1 | 1/1  | 1/1           | 1/2 | 1/1   |
| H <sub>2</sub> S                                            | Hydrogen sulphide      |                  | 1/1             | 1/1   | 0/0  | 1/1  | 1/0 | 1/1  | 4/4           | 1/1 | 1/1   |
| N <sub>2</sub>                                              | Nitrogen               |                  | 1/1             | 0/0   | 1/0  | 1/1  | 1/1 | 1/0  | 1/1           | 1/0 | 1/1   |
| C <sub>6</sub> H <sub>5</sub> C <sub>2</sub> H <sub>3</sub> | Styrene                |                  | 1/1             | 0/0   | 1/0  | 1/0  | 1/0 | 1/0  | 3/0           | 1/0 | 1/1   |
| C <sub>6</sub> H <sub>5</sub> CH <sub>3</sub>               | Toluol (methylbenzene) |                  | 1/1             | 0/0   | 1/0  | 1/1  | 1/1 | 1/1  | 3/3           | 1/1 | 1/1   |
| H <sub>2</sub> O                                            | Water                  |                  | 1/1             | 0/0   | 1/1  | 1/1  | 1/1 | 1/1  | 1/1           | 1/1 | 1/1   |
| H <sub>2</sub>                                              | Hydrogen               |                  | 1/0             | 1/0   | 1/0  | 1/0  | (1) | 1/0  | 1/0           | 1/0 | 1/0   |

0 – no information available

1 – durability/suitability very good

2 – durability/suitability good

3 – limited suitability

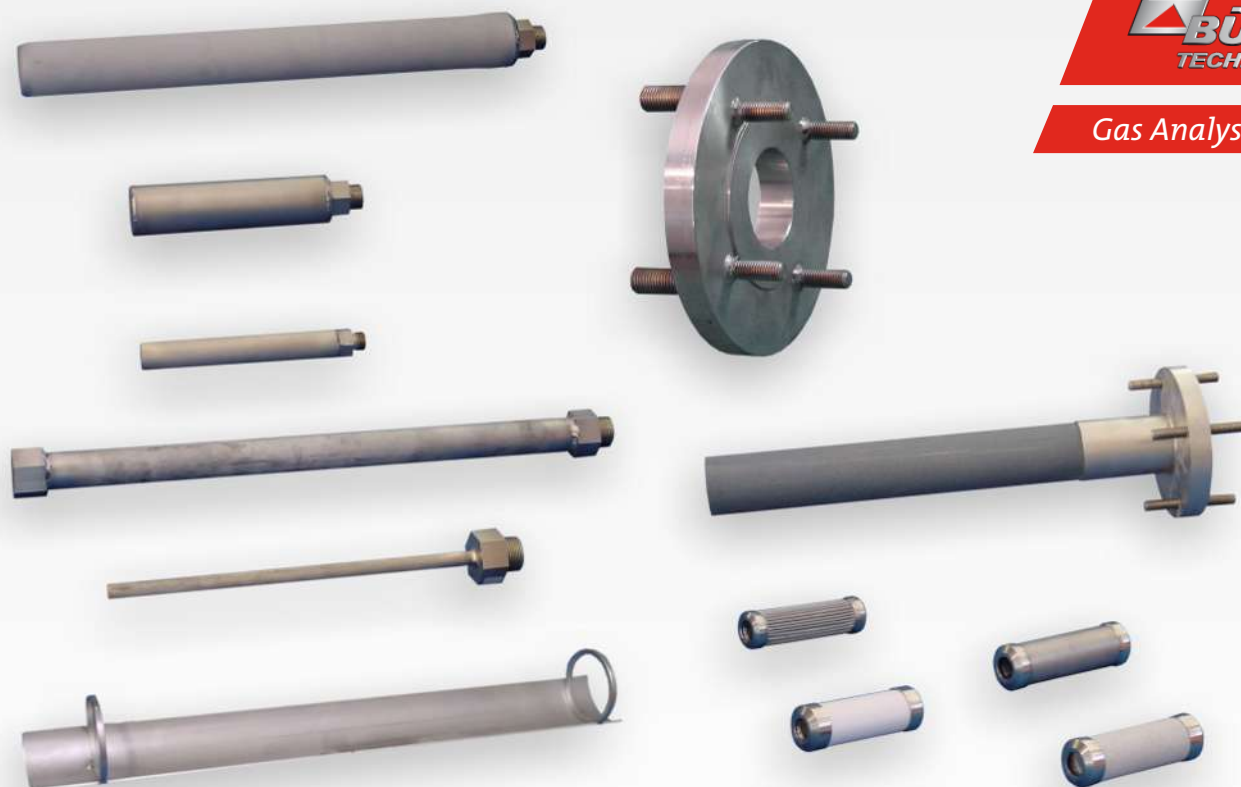
4 – not suitable

( ) – estimate

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

Source: Bürkle GmbH: List of chemical resistances, <https://www.buerkle.de> [accessed on 12.02.2026].





## Accessories for Sample Gas Probe GAS 222

In many applications gas analysis is key for safe and efficient control of process flows, environmental protection, and quality assurance. In extractive gas analysis the selection of the gas sampling point is crucial for the reproducibility and accuracy of the analysis results.

The specific filter capacity, corrosion resistance and functional equipment requirements for the probe are determined by the composition of the sample gas. To meet these requirements, there is a wide range of accessories available for the GAS probe series.

Sampling tubes

Upstream filters

Extensions

Downstream filters

Adapter flanges

Blowback controls



### Overview and functionality of the accessories

#### Blowback (optionally heated)

If the sample gas has a high dust content, particles will settle in the filter over time. To prevent clogging, the upstream filter can be fitted with a blowback device that flushes it with compressed air either at fixed intervals or manually, ensuring effective cleaning.

#### Gas connection

A purge gas connection is provided on the probes for purging the probe with inert gas or instrument air.

#### Demister

A demister or droplet separator is always recommended if the process gas has a high water content or aerosols. It consists of a wire mesh on which liquid droplets condense due to their higher inertia, while the gas flows through unhindered, and the condensate flows back into the process.

#### Adapter flanges

The probe can be fitted with a DIN or ANSI flange. Numerous adapter flanges are available to ensure adaptation to the process connection.

#### Downstream filter

The downstream filter is located in the probe head and is suitable for dust loads up to  $2 \text{ g/m}^3$ . It can be used in combination with an upstream filter, thereby increasing operational reliability. The filter can be exchanged easily and without tools, using the handle.

#### Extension

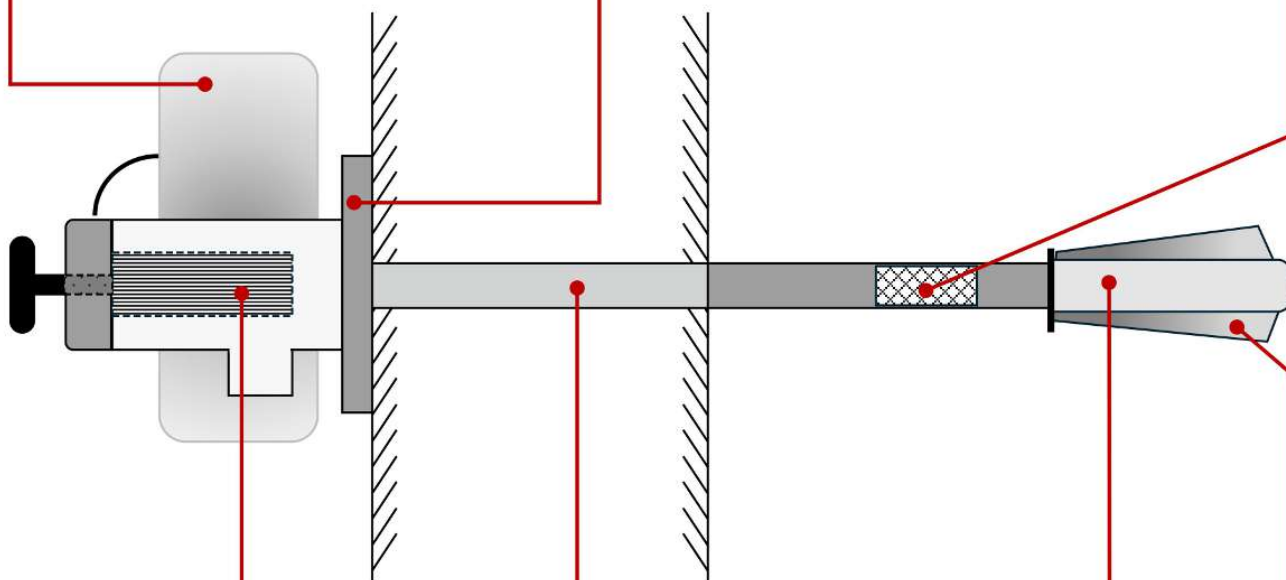
The extension is located between the probe and the sampling tube or upstream filter. It serves as a bridge between the process connection of the probe and the sampling point (e.g. through a chimney wall). The extension can also be heated to prevent condensate cold spots.

#### Sampling tube (opt. upstream filter)

The sampling tube extends into the process stream and is available for various temperature and media resistance levels. An upstream filter can be connected here to remove particles from the process gas. In the case of very high dust concentrations, a blowback system can be used to clean the upstream filter.

#### Deflector

To protect the upstream filter from abrasion and deposits caused by particles, a deflector can be attached to the filter to divert the flow.



## Ordering instructions

The following pages list the accessories that, together with the basic probe type, result in a functional probe. The basic probe type determines which options are available for a probe. The options for the blowback control are already defined by the item number. Further accessories are listed in the corresponding tables:

**Table 1: Blowback control and extensions**

**Table 2: Sampling tubes**

**Table 3: Downstream filter**

**Table 4: Upstream filters**

**Table 5: Accessories - adapter flanges, fittings**

**Table 6: Spare parts and accessories**

An overview of the individual accessories and their functions is shown in the diagram on the previous page.

## Restrictions and notes

### Blowback control integrated in the probe controller

A blowback control integrated in the probe controller is standard. Parameters such as the time and duration of the blowback are set once on the probe, after which the process is carried out automatically. The status of the controller and the condition of the blowback can be read electrically. If required, a separate RSS blowback control can also be connected to the probe, which facilitates manual blowback and is separate from the probe.

### Limitations categories/zones due to accessories

For safe operation of our Ex probes for use in potentially explosive areas, we strongly recommend the accessories marked with the Ex symbol. These have been subjected to thorough safety testing in combination with our Ex probes. Bühler assumes no responsibility for explosion protection, function or conformity if accessories or components not approved by Bühler are used. The use of accessories not listed may compromise safety and is at your own risk. Statutory liability provisions remain unaffected by this.

| GAS 222 models                                      | with accessories:                                                                               | Gas             | Dust            | Gas and dust<br>(separate zones)         |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------|-----------------|-----------------|------------------------------------------|
| Sampling zone/operating zone                        |                                                                                                 |                 |                 |                                          |
| 11 Ex1, 21 Ex1, 30 Ex1,<br>31 Ex1, 35 Ex1, 35-U Ex1 | Pressure vessel PAV 01<br>(item no. 46222PAV and accessories)                                   | Zone1***/Zone 1 | Zone 20/Zone 21 | Zone 20/Zone 1                           |
| 11 Ex1, 21 Ex1, 30 Ex1,<br>31 Ex1                   | Deflectors for upstream filters                                                                 | Zone 1/Zone 1   | Zone 21/Zone 21 | Zone 1/Zone 21                           |
| 11 Ex1, 21 Ex1, 30 Ex1,<br>31 Ex1                   | Ceramic upstream filters*<br>(item no.: 46222307, 46222307F, 46222307C,<br>46222330, 46222330C) | Zone 2/Zone 1   | Zone 20/Zone 21 | Zone 20/Zone 1<br>or<br>Zone 2 / Zone 21 |
| 11 Ex1, 20 Ex1, 21 Ex1                              | Ceramic downstream filters*<br>(item no.: 46222026 / 46222026P)                                 | Zone 2/Zone 1   | Zone 20/Zone 21 | Zone 20/Zone 1<br>or<br>Zone 2 / Zone 21 |
| 11 Ex1, 20 Ex1, 21 Ex1                              | Sampling tubes<br>(item no.: 46222001XXXX, 46222006XXXX,<br>46222004XXXX, 46222016XXXX)         | Zone 0/Zone 1   | No zone/Zone 21 | Zone 0/Zone 21                           |
| 11 Ex1, 20 Ex1, 21 Ex1                              | Ceramic sampling tubes**<br>(item no.: 46222002XXXX)                                            | Zone 2/Zone 1   | No zone/Zone 21 | Zone 2/Zone 21                           |

\* Accessories are not suitable for sampling highly ignitable dusts with a minimum ignition energy (MIE) of < 3 mJ.

\*\* When extracting gas from Zone 2, ceramic sampling tubes may only be used if application- and process-related electrostatic charging can be ruled out.

\*\*\* Blowback of explosive atmosphere/gases is prohibited.

## General accessories

| Probe models:                                                                                                                    |             |            |            |            |            |            |            |            |            |            |               |
|----------------------------------------------------------------------------------------------------------------------------------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------|
| Unheated/heated extension                                                                                                        | Length [mm] | GAS 222.10 | GAS 222.11 | GAS 222.15 | GAS 222.17 | GAS 222.20 | GAS 222.21 | GAS 222.30 | GAS 222.31 | GAS 222.35 | Item no.      |
|  G 3/4<br>Unheated<br>Stainless steel (1.4571)  | 200         | •          | •          | •          | •          | •          | •          | •          | •          |            | 4622230320200 |
|                                                                                                                                  | 400         | •          | •          | •          | •          | •          | •          | •          | •          |            | 4622230320400 |
|                                                                                                                                  | 500         | •          | •          | •          | •          | •          | •          | •          | •          |            | 4622230320500 |
|                                                                                                                                  | 700         | •          | •          | •          | •          | •          | •          | •          | •          |            | 4622230320700 |
|                                                                                                                                  | 1000        | •          | •          | •          | •          | •          | •          | •          | •          |            | 4622230321000 |
|                                                                                                                                  | 1200        | •          | •          | •          | •          | •          | •          | •          | •          |            | 4622230321200 |
|                                                                                                                                  | 1500        | •          | •          | •          | •          | •          | •          | •          | •          |            | 4622230321500 |
|                                                                                                                                  | 2000        | •          | •          | •          | •          | •          | •          | •          | •          |            | 4622230322000 |
|  G 1/2<br>Unheated<br>Stainless steel (1.4571) | 250         |            |            |            |            |            |            |            |            | •          | 4622235910250 |
|                                                                                                                                  | 500         |            |            |            |            |            |            |            |            | •          | 4622235910500 |
|                                                                                                                                  | 700         |            |            |            |            |            |            |            |            | •          | 4622235910700 |
|                                                                                                                                  | 1500        |            |            |            |            |            |            |            |            | •          | 4622235911500 |
| GF<br>heated, 230 V<br>Stainless steel (1.4571)                                                                                  | 500         |            |            |            |            | •          | •          |            | •          |            | 462223036     |
|                                                                                                                                  | 1000        |            |            |            |            | •          | •          |            | •          |            | 462223033     |
| GF<br>heated, 115 V<br>Stainless steel (1.4571)                                                                                  | 500         |            |            |            |            | •          | •          |            | •          |            | 462223136     |
|                                                                                                                                  | 1000        |            |            |            |            | •          | •          |            | •          |            | 462223133     |
| GF ANSI<br>heated, 115 V<br>Stainless steel (1.4571)                                                                             | 500         |            |            |            |            | •          | •          |            | •          |            | 462223036C1   |
|                                                                                                                                  | 1000        |            |            |            |            | •          | •          |            | •          |            | 462223033C1   |
| GF<br>heated, 230 V<br>Hastelloy                                                                                                 | 1000        |            |            |            |            | •          | •          |            | •          |            | 462223033H    |
|                                                                                                                                  |             |            |            |            |            |            |            |            |            |            |               |
| Blowback control                                                                                                                 |             |            |            |            |            |            |            |            |            |            |               |
| Blowback control 24 V                                                                                                            |             |            | •          |            |            |            | •          | •          | •          | •          | 46222199      |
| Blowback control 115/230 V                                                                                                       |             |            | •          |            |            |            | •          | •          | •          | •          | 46222299      |

 Recommended accessories for use in hazardous areas.

Tab. 1: Blowback control and extensions

| Probe models:                                                                                                                                                       |      | Length<br>[mm] | GAS 222.10 | GAS 222.11 | GAS 222.15 | GAS 222.17 | GAS 222.20 | GAS 222.21 | GAS 222.30 | GAS 222.31 | GAS 222.35 | Item no.      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------|
| Sampling tubes                                                                                                                                                      |      |                |            |            |            |            |            |            |            |            |            |               |
|  Hastelloy/1.4571 <sup>1)</sup><br>ø12 mm<br>T <sub>max</sub> : 400 °C             | 500  |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 462220060500  |
|                                                                                                                                                                     | 1000 |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 462220061000  |
|                                                                                                                                                                     | 1500 |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 462220061500  |
|                                                                                                                                                                     | 2000 |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 462220062000  |
|  Stainless steel <sup>1)</sup><br>ø12 mm<br>T <sub>max</sub> : 600 °C              | 300  |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 462220010300  |
|                                                                                                                                                                     | 500  |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 462220010500  |
|                                                                                                                                                                     | 1000 |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 462220011000  |
|                                                                                                                                                                     | 1500 |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 462220011500  |
|                                                                                                                                                                     | 2000 |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 462220012000  |
|  Stainless steel <sup>1)</sup><br>ø20 mm<br>T <sub>max</sub> : 600 °C              | 500  |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 462220160500  |
|                                                                                                                                                                     | 1000 |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 462220161000  |
|                                                                                                                                                                     | 1500 |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 462220161500  |
|                                                                                                                                                                     | 2000 |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 462220162000  |
|  Inconel/1.4571 <sup>1)</sup><br>ø21 mm<br>T <sub>max</sub> : 1050 °C              | 500  |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 462220040500  |
|                                                                                                                                                                     | 1000 |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 462220041000  |
|                                                                                                                                                                     | 1500 |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 462220041500  |
|                                                                                                                                                                     | 2000 |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 462220042000  |
| Kanthal/1.4571<br>ø15 mm<br>T <sub>max</sub> : 1400 °C                                                                                                              | 500  |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 462220170500  |
|                                                                                                                                                                     | 1000 |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 462220171000  |
|                                                                                                                                                                     | 2000 |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 462220172000  |
|  Ceramic/1.4571 <sup>1)</sup><br>ø24 mm<br>T <sub>max</sub> : 1600 °C            | 500  |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 4622200205    |
|                                                                                                                                                                     | 1000 |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 4622200210    |
|                                                                                                                                                                     | 1500 |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 4622200215    |
|  Sampling tube with demister<br>Material: 1.4571<br>T <sub>max</sub> : 400 °C    | 100  |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 4622204201    |
|                                                                                                                                                                     | 300  |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 4622204203    |
|                                                                                                                                                                     | 500  |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 4622204205    |
|                                                                                                                                                                     | 600  |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 4622204206    |
|                                                                                                                                                                     | 800  |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 4622204208    |
|                                                                                                                                                                     | 1000 |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 4622204210    |
|  Sampling tube with demister<br>Material: Hastelloy<br>T <sub>max</sub> : 400 °C | 500  |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 4622201290500 |
|                                                                                                                                                                     | 750  |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 4622201290750 |
|                                                                                                                                                                     | 1000 |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 4622201291000 |
| Sampling tube with demister<br>Material: PVDF/ETFE<br>T <sub>max</sub> : 120 °C                                                                                     | 200  |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 462220400200  |
|                                                                                                                                                                     | 650  |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 462220400650  |
|                                                                                                                                                                     | 800  |                | •          | •          | •          | •          | •          | •          | •          | •          |            | 46222040      |

1) Restrictions for the approved Ex zones for sampling and operation apply. Details can be found in the table at the beginning of the data sheet.

 Recommended accessories for use in hazardous areas.

Tab. 2: Sampling tubes

## Accessories for probes with downstream filter

| Probe models:                                                                                                               |                        |            |            |            |            |            |            |                          |
|-----------------------------------------------------------------------------------------------------------------------------|------------------------|------------|------------|------------|------------|------------|------------|--------------------------|
|  Downstream filter                         | average pore size [µm] | GAS 222.10 | GAS 222.11 | GAS 222.15 | GAS 222.17 | GAS 222.20 | GAS 222.21 | Item no.                 |
|  Sintered stainless steel<br>O-ring: Viton | 0,5                    | •          | •          | •          | •          | •          | •          | 46222010F <sup>4)</sup>  |
|                                                                                                                             | 5                      | •          | •          | •          | •          | •          | •          | 46222010                 |
|  Sintered stainless steel<br>O-ring: FFKM  | 0,5                    | •          | •          | •          | •          | •          | •          | 46222010FP <sup>4)</sup> |
|                                                                                                                             | 5                      | •          | •          | •          | •          | •          | •          | 46222010P                |
|  Ceramic <sup>1)</sup><br>O-ring: Viton    | 3                      | •          | •          | •          | •          | •          | •          | 46222026                 |
|  Ceramic <sup>1)</sup><br>O-ring: FFKM     | 3                      | •          | •          | •          | •          | •          | •          | 46222026P                |
| Sintered stainless steel<br>O-ring: Viton                                                                                   | 15                     | •          | •          | •          | •          | •          | •          | 462220139                |
| Sintered stainless steel<br>O-ring: FFKM                                                                                    | 15                     | •          | •          | •          | •          | •          | •          | 462220139P               |
| Micro-strand glass fibre with<br>silicate binder<br>O-ring: Viton<br>(matching handle)                                      |                        | •          | •          | •          | •          | •          | •          | 462220671<br>(46222067)  |
| Micro-strand glass fibre with<br>silicate binder<br>O-ring: FFKM<br>(matching handle)                                       |                        | •          | •          | •          | •          | •          | •          | 462220671P<br>(46222067) |
| Cover piece<br>incl. tube, filter wool<br>O-ring: Viton                                                                     |                        | •          | •          | •          | •          | •          | •          | 46222163                 |
| Cover piece<br>incl. tube, filter wool<br>O-ring: FFKM                                                                      |                        | •          | •          | •          | •          | •          | •          | 46222163P                |
| Cover piece<br>incl. tube, steel wool<br>O-ring: Viton                                                                      |                        | •          | •          | •          | •          | •          | •          | 46222163001              |

1) Restrictions for the approved Ex zones for sampling and operation apply. Details can be found in the table at the beginning of the data sheet.

4) Upon request.

 Recommended accessories for use in hazardous areas.

Tab. 3: Downstream filter

## Accessories for probes with upstream filter

| Probe models:                                                                                      |                        | GAS 222.11 | GAS 222.21 | GAS 222.30 | GAS 222.31 | GAS 222.35 | Item no.                    |
|----------------------------------------------------------------------------------------------------|------------------------|------------|------------|------------|------------|------------|-----------------------------|
|  Upstream filters | average pore size [µm] |            |            |            |            |            |                             |
| Stainless steel/1.4404/1.4571<br>Length: 229 mm<br>T <sub>max</sub> : 600 °C                       | 0,5                    |            |            |            |            | •          | 46222359F <sup>4)</sup>     |
|                                                                                                    | 5                      |            |            |            |            | •          | 46222359                    |
| Stainless steel/1.4571<br>Length: 237 mm<br>T <sub>max</sub> : 600 °C                              | 0,5                    | •          | •          | •          | •          |            | 46222303F <sup>4)</sup>     |
|                                                                                                    | 5                      | •          | •          | •          | •          |            | 46222303                    |
| Stainless steel with displacer<br>Length: 237 mm<br>T <sub>max</sub> : 600 °C                      | 0,5                    | •          | •          | •          | •          |            | 462223031F <sup>4)</sup>    |
|                                                                                                    | 5                      | •          | •          | •          | •          |            | 462223031                   |
| Stainless steel/1.4571<br>Length: 538 mm<br>T <sub>max</sub> : 600 °C                              | 0,5                    | •          | •          | •          | •          |            | 46222304F <sup>4)</sup>     |
|                                                                                                    | 5                      | •          | •          | •          | •          |            | 46222304                    |
| Stainless steel with displacer<br>Length: 538 mm<br>T <sub>max</sub> : 600 °C                      | 0,5                    | •          | •          | •          | •          |            | 462223041F <sup>4)</sup>    |
|                                                                                                    | 5                      | •          | •          | •          | •          |            | 462223041                   |
| Hastelloy<br>Length: 237 mm<br>T <sub>max</sub> : 400 °C                                           | 0,5                    | •          | •          | •          | •          |            | 46222303HF <sup>4)</sup>    |
|                                                                                                    | 5                      | •          | •          | •          | •          |            | 46222303H                   |
| Hastelloy<br>Length: 538 mm<br>T <sub>max</sub> : 400 °C                                           | 0,5                    | •          | •          | •          | •          |            | 46222304HF <sup>4)</sup>    |
|                                                                                                    | 5                      | •          | •          | •          | •          |            | 46222304H                   |
| Hastelloy with displacer<br>Length: 237 mm<br>T <sub>max</sub> : 400 °C                            | 0,5                    | •          | •          | •          | •          |            | 462223031HF <sup>4)</sup>   |
|                                                                                                    | 5                      | •          | •          | •          | •          |            | 462223031H                  |
| Hastelloy with displacer<br>Length: 538 mm<br>T <sub>max</sub> : 400 °C                            | 0,5                    | •          | •          | •          | •          |            | 462223041HF <sup>4)</sup>   |
|                                                                                                    | 5                      | •          | •          | •          | •          |            | 462223041H                  |
| Ceramic/1.4571 <sup>1)</sup><br>Length: 478 mm<br>T <sub>max</sub> : 1000 °C                       | 0,3                    | •          | •          | •          | •          |            | 46222307F <sup>2)</sup>     |
|                                                                                                    | 2                      | •          | •          | •          | •          |            | 46222307 <sup>2)</sup>      |
|                                                                                                    | 2                      | •          | •          | •          | •          |            | 46222307C <sup>2), 3)</sup> |
| Ceramic/1.4571 <sup>1)</sup><br>Length: 978 mm<br>T <sub>max</sub> : 1000 °C                       | 2                      | •          | •          | •          | •          |            | 46222330 <sup>2)</sup>      |
|                                                                                                    | 2                      | •          | •          | •          | •          |            | 46222330C <sup>2), 3)</sup> |
|                                                                                                    |                        |            |            |            |            |            |                             |
|  Deflectors     |                        |            |            |            |            |            |                             |
| For upstream filters 03 <sup>1)</sup>                                                              |                        | •          | •          | •          | •          |            | 462223034                   |
| For upstream filters 04 <sup>1)</sup>                                                              |                        | •          | •          | •          | •          |            | 462223044                   |

1) Restrictions for the approved Ex zones for sampling and operation apply. Details can be found in the table at the beginning of the data sheet.

2) Furnace gas filtration: oxidising atmosphere max. 750 °C, reducing atmosphere max. 600 °C;  
Not suitable for extracting ignition-sensitive dusts with minimum ignition energy < 3 mJ.

3) For probes with ANSI flanges

4) Upon request.

 Recommended accessories for use in hazardous areas.

Tab. 4: Upstream filters

| Probe models:                                                                                                                                     |                        | GAS 222.10 | GAS 222.11 | GAS 222.15 | GAS 222.17 | GAS 222.20 | GAS 222.21 | GAS 222.30 | GAS 222.31 | GAS 222.35 | Item no.  |
|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-----------|
|                                                                  | Accessories - fittings |            |            |            |            |            |            |            |            |            |           |
| Sample gas connection for Ø 6 mm pipe                                                                                                             |                        | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | 9029000   |
| Sample gas connection for Ø 8 mm pipe                                                                                                             |                        | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | 9029001   |
| Purge gas connection Ø 12 mm pipe                                                                                                                 |                        |            | ●          |            |            |            | ●          | ●          | ●          | ●          | 9029002   |
| Sample gas connection for Ø 1/4" pipe                                                                                                             |                        | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | 9008584   |
| Sample gas connection for Ø 3/8" pipe                                                                                                             |                        | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | 9029011   |
| Purge gas connection Ø 1/2" pipe                                                                                                                  |                        |            | ●          |            |            |            | ●          | ●          | ●          | ●          | 9008582   |
|                                                                                                                                                   |                        |            |            |            |            |            |            |            |            |            |           |
|  Accessories – adapter flanges - selection - others upon request |                        |            |            |            |            |            |            |            |            |            |           |
| Probe                                                                                                                                             | .....► Process         |            |            |            |            |            |            |            |            |            |           |
| DIN DN 65 PN 6                                                                                                                                    | ANSI DN 1 1/4" 150 lb. | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | 46222501  |
| DIN DN 65 PN 6                                                                                                                                    | ANSI DN 2" 150 lb.     | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | 46222314  |
| DIN DN 65 PN 6                                                                                                                                    | ANSI DN 2" 300 lb.     | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | 46222502  |
| DIN DN 65 PN 6                                                                                                                                    | ANSI DN 2 1/2" 150 lb. | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | 46222068  |
| DIN DN 65 PN 6                                                                                                                                    | ANSI DN 3" 150 lb.     | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | 46222014  |
| DIN DN 65 PN 6                                                                                                                                    | ANSI DN 3" 300 lb.     | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | 46222034  |
| DIN DN 65 PN 6                                                                                                                                    | ANSI DN 4" 150 lb.     | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | 46222035  |
| DIN DN 65 PN 6                                                                                                                                    | DIN DN150 PN 6         | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | 462220140 |
| DIN DN 65 PN 6                                                                                                                                    | ANSI DN 6"-150 lb.     | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | 462220127 |
| ANSI DN 3"-150 lb.                                                                                                                                | ANSI DN 4" 150 lb.     | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | ●          | 46222058  |

 Recommended accessories for use in hazardous areas.

Tab. 5: Accessories - adapter flanges, fittings

## Spare parts and accessories

| Probe models:                                                                                                                                                      | GAS 222.10 | GAS 222.11 | GAS 222.15 | GAS 222.17 | GAS 222.20 | GAS 222.21 | GAS 222.30 | GAS 222.31 | GAS 222.35 | Item no.                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------------------------|
|  <b>Downstream filter</b>                                                         |            |            |            |            |            |            |            |            |            |                            |
| Filter wool                                                                                                                                                        | •          | •          | •          | •          | •          | •          |            |            |            | 46222167                   |
|  O-ring set Viton incl. installation grease                                       | •          | •          | •          | •          | •          | •          |            |            |            | 46222012                   |
|  O-ring set LT 170 incl. installation grease                                      | •          | •          | •          | •          | •          | •          |            |            |            | 462220100011               |
|  O-ring set FFKM incl. installation grease                                        | •          | •          | •          | •          | •          | •          |            |            |            | 46222024                   |
|                                                                                                                                                                    |            |            |            |            |            |            |            |            |            |                            |
| <b>Sampling tubes</b>                                                                                                                                              |            |            |            |            |            |            |            |            |            |                            |
| Demister ETFE<br>T <sub>max</sub> : 120 °C<br>(matching safety pin)                                                                                                | •          | •          | •          | •          | •          | •          | •          | •          |            | 462220402<br>(462220403)   |
|  Demister stainless steel<br>T <sub>max</sub> : 400 °C<br>(matching safety pin) | •          | •          | •          | •          | •          | •          | •          | •          |            | 4611004<br>(462220421)     |
|  Demister Hastelloy<br>T <sub>max</sub> : 400 °C<br>(matching safety pin)       | •          | •          | •          | •          | •          | •          | •          | •          |            | 4622201291<br>(4622201292) |

 Recommended accessories for use in hazardous areas.

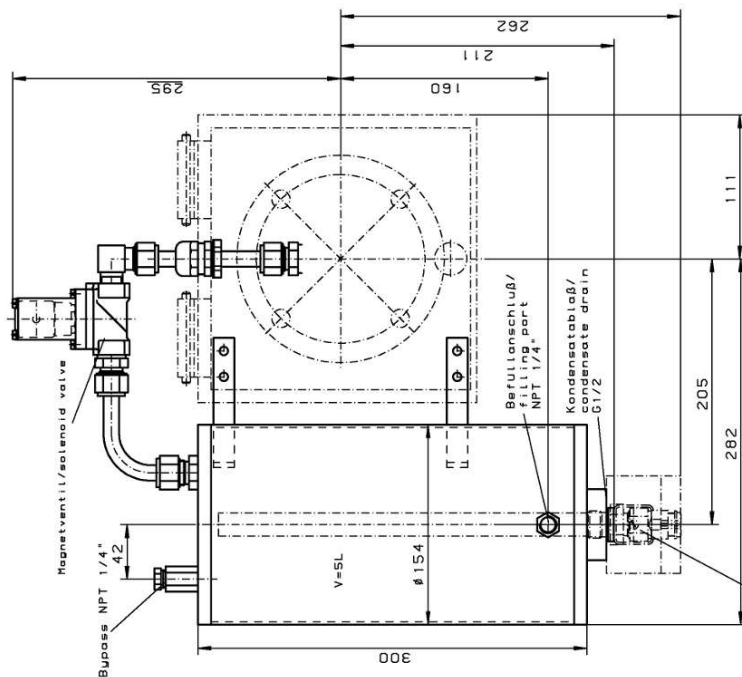
Tab. 6: Spare parts and accessories

## Verlängerungen / extensions

## Eintrittsfilter / in-situ filters

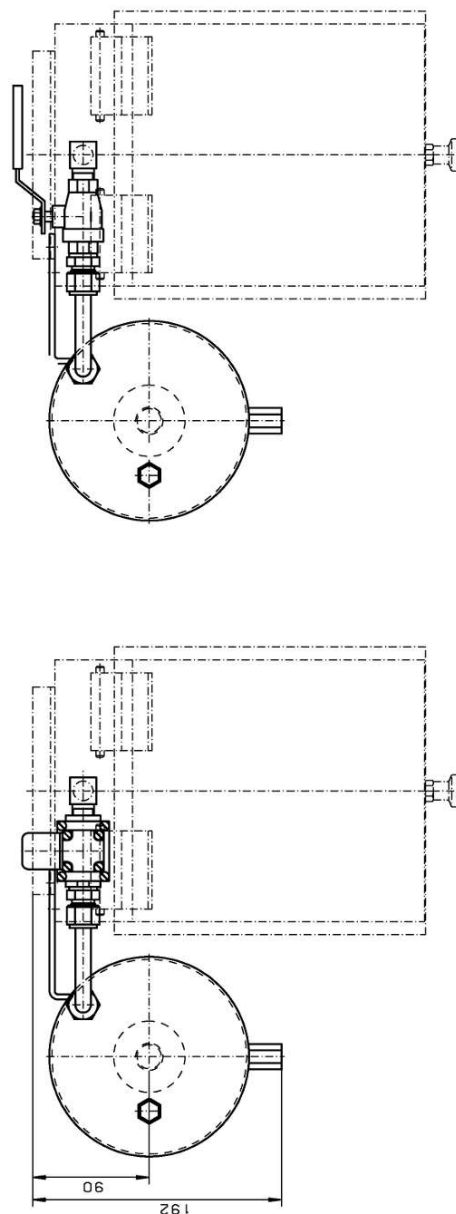
Abweisblech / protection shield

|                                                                                     |                                    |                                                          |                    |                  |
|-------------------------------------------------------------------------------------|------------------------------------|----------------------------------------------------------|--------------------|------------------|
| <b>ALLE KONTEN<br/>GRATIFRAL</b>                                                    | <b>ALLE RECHTE<br/>VORBEHALTEN</b> | <b>Maße ohne<br/>Toleranzangabe<br/>nach ISO 2768-mK</b> | <b>Maßstab 1:5</b> | <b>(Gewicht)</b> |
| <b>Überflächenbear-<br/>beitungszeichen</b>                                         |                                    |                                                          | <b>Werkstoff:</b>  |                  |
| $\checkmark = \sqrt{\quad}$                                                         |                                    | <b>Datum</b>                                             | <b>Nam.</b>        |                  |
| X / = $\nabla_{R_1 R_2}$                                                            |                                    | Bearb.                                                   | Br.-Intern         |                  |
| Y / = $\nabla_{R_1 R_2}$                                                            |                                    | Grpr.                                                    |                    |                  |
| Z / = $\nabla_{R_1 R_2}$                                                            |                                    |                                                          |                    |                  |
|                                                                                     |                                    |                                                          |                    |                  |
|                                                                                     |                                    |                                                          |                    |                  |
|                                                                                     |                                    |                                                          |                    |                  |
|                                                                                     |                                    |                                                          |                    |                  |
| a neu 23.09.05 Br-                                                                  |                                    |                                                          |                    |                  |
| Zust. End. Datum Name                                                               |                                    |                                                          |                    |                  |
| <b>ARBEITSANWEISUNG:</b>                                                            |                                    |                                                          |                    |                  |
|  |                                    |                                                          |                    |                  |
| <b>BUHLER</b>                                                                       |                                    |                                                          |                    |                  |
| Zeichng.-Nr. 46/107-Z01-01-3A                                                       |                                    |                                                          |                    |                  |
| Art.-Nr.                                                                            |                                    |                                                          |                    |                  |



|  | max. Betriebsdruck/operating pressure         | 10 bar |
|--|-----------------------------------------------|--------|
|  | max. Betriebstemperatur/operating temperature | 50 °C  |

"Änderungen nur nach Rücksprache  
mit dem ATEXbeauftragten zulässig"

[illegible]

# 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

Gerät/ Device

Anzahl/ Quantity

Auftragsnr./ Order No.

### Ansprechpartner/ Person in charge

Name/ Name

Abt./ Dept.

Tel./ Phone

E-Mail

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

Handelt es sich bei dem Gerät um ein sogenanntes Bühler O2-Ready Produkt (Artikelnummer endet mit „-O2“)?/ Is the device a Bühler O2-Ready product (item number ending with "-O2")?

- ☐ Nein/ No ☐ Ja/ Yes

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, Lebensge-  
fahr/  
poisonous, risk of  
death



☐  
gesundheitsge-  
fährdend/  
harmful to health



☐  
gesund-  
heitsschädlich/  
health hazard



☐  
umweltge-  
fährdend/  
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.

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.

Firmenstempel/ Company Sign

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.

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

Datum/ Date

rechtsverbindliche Unterschrift/ Legally binding signature



### 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.

### Vermeidung von Kontaminationen bei Produkten für hochreine Sauerstoffapplikationen (O2-Ready)

Handelt es sich bei dem Gerät um ein sogenanntes Bühler O2-Ready Produkt (Artikelnummer endet mit „-O2“), so ist dafür zu sorgen, dass es vom Ausbau des Artikels bis zur Anlieferung bei Firma Bühler zu keiner Kontamination medienberührender Teile kommt. Verschießen Sie Öffnungen und verpacken Sie das Gerät in ein luftdichtes Behältnis. Kennzeichnen Sie die Ware deutlich, insbesondere durch Angabe der vollständigen Artikelnummer (.....-O2) auf der ersten Seite dieses Formulars. Hierdurch wird sichergestellt, dass es auch unsererseits zu keiner unnötigen Kontamination kommt.

### 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.*

### *Avoidance of contamination in products for high-purity oxygen applications (O2-Ready)*

*If the device is a Bühler O2-Ready product (item number ending with “-O2”), it must be ensured that there is no contamination of parts in contact with the medium from the time the item is removed until it is delivered to Bühler. Seal openings and pack the device in an airtight container. Mark the goods clearly, in particular by stating the full item number (.....-O2) on the first page of this form. This ensures that there is no unnecessary contamination on our part either.*

### *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 assemblies 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.*

