BÜHLER TECHNOLOGIES

*Gas Analysis*


# NOx-Converter

# BÜNOx 2+

## Installation and Operation Instructions

Original instructions

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

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

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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# Contents

# 1 Introduction

## 1.1 Intended Use

Burning fossil fuels in most cases requires monitoring the accrued nitric oxides by law.

BÜNOx converters are suitable for use in gas analysis systems for industrial applications. It allows for easy and cost-efficient detection of significant NOx components ($NO_x$ = NO + $NO_2$) in waste gas. Using exchangeable reactor cartridges the unit converts 100 % of the $NO_2$ content of sample gas to NO. This allows for cost-efficient direct measurement of the gas component $NO_x$ = NO + $NO_2$ and indirect measurement of $NO_2$ using conventional IR analysers.

One should generally note the BÜNOx converter is intended for "cold gas conversion" (inlet dew point < 10 °C).

## 1.2 Improper use

The converters must not be used

- if failure or malfunction thereof jeopardises the safety and health of individuals.
- in explosive areas,
- to pass flammable or explosive gasses, as well as
- at a sample gas dew point (inlet dew point) > 10 °C.

## 1.3 Technical description

The gas converter BÜNOx 2+ allows for detection of significant $NO_x$ components (NO + $NO_2$). Sample gas is passed through the exchangeable gas reactor cartridge for this purpose. A well thermally insulated tubular furnace holding the exchangeable reactor cartridge is located inside the housing. The special tubular furnace closure with cartridge holder allowing for quick and easy reactor cartridge changes is located on the front panel.

The tubular furnace temperature can be adjusted via the front panel keyboard for the controller. Please note the optimal Operating temperatures of the different cartridges:

| Cartridge | Item no. | Display | Operating temperature | Description |
|---|---|---|---|---|
| -- | -- | non | 0 °C | No cartridge selected |
| MC | 553 199 90 | Mc | 400 °C | Metal-based catalyst |
| MC-LL | 553 199 70 | McLL | 400 °C | Long-life version |

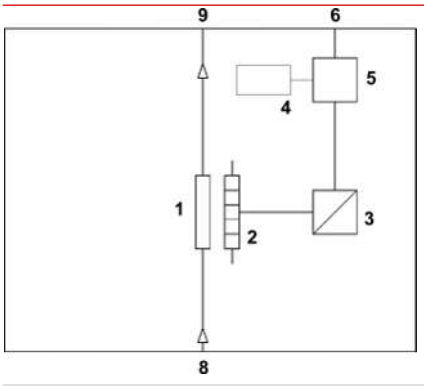
*Tab. 1:* Optimal operating temperature of the converter cartridge

**CAUTION! Temperatures > 425 °C may damage the converter cartridge.**

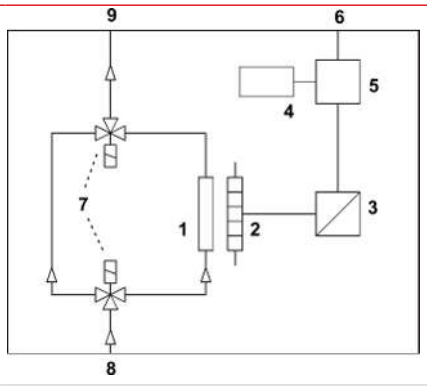
The converter temperature is regulated via microcontroller.

On the version without solenoid valve the sample gas flows directly through the converter cartridge to the sample gas outlet (conversion mode). At the converter operating temperature nearly 100 % of $NO_2$ is converted to NO. The NO concentration measurable at the gas outlet therefore corresponds with the sum of the $NO_2$ and NO concentration.

**Converter without solenoid valves**




**Converter with Solenoid valves**




**Legend**

1: Reactor cartridge
2: Tubular furnace
3: Temperature controller
4: Temperature display
5: BÜNOx 2+ control unit
6: Signal inputs and outputs
7: 3/2 directional solenoid valves
8: Gas inlet
9: Gas outlet

On the version with 3/2 way solenoid valves the sample gas flow can be conducted through the converter cartridge (conversion mode) or past it (bypass mode). In bypass mode, $NO_2$ is not converted into NO. The operating mode can be selected manually via the controller menu or via external control. A status LED on the front panel indicates the operating mode selected.

So a downstream IR analyser either measures only the NO content in gas (bypass mode) or the $NO_x$ concentration (sum of NO and $NO_2$ concentration, conversion mode). Back-to-back bypass and conversion measurement is directly indicative of the $NO_2$ content in sample gas. This requires determining the difference between NOx concentration (≈ NO concentration in conversion mode) and the NO concentration in bypass mode ($NO_2 \approx NO_x$ – NO"Bypass").

At the back of the unit is the connector for the analogue output (actual temperature on the converter), the inputs and outputs (status signals, control solenoid valves) and the power connection as well as the gas inlet and outlet.

## 1.4 Contents

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

## 1.5 Ordering instructions

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

| 553 | 1 | XX | XX | X | Product characteristic |
|---|---|---|---|---|---|
| | | | | | **Solenoid valves option** |
| | | 00 | | | without solenoid valves |
| | | 10 | | | with solenoid valves |
| | | | | | **Power supply** |
| | | | 99 | | 230 V AC, 50-60 Hz |
| | | | 98 | | 115 V AC, 50-60 Hz |
| | | | | | **Gas connections** |
| | | | | | Standard 6 mm |
| | | | | I | 1/4" |

# 2 Safety instructions

## 2.1 Important advice

Operation of the device is only permitted if:

- the product is used under the conditions described in the installation- and operation instruction, the intended application according to the type plate and the intended use. In case of unauthorized modifications done by the user Bühler Technologies GmbH can not be held responsible for any damage,
- when complying with the specifications and markings on the nameplates.
- the performance limits given in the datasheets and in the installation- and operation instruction are obeyed,
- monitoring devices and safety devices are installed properly,
- service and repair is carried out by Bühler Technologies GmbH,
- only original spare parts are used.

This manual is part of the equipment. The manufacturer keeps the right to modify specifications without advanced notice. Keep this manual for later use.

**Sample gas conditioning**

- Condensation inside the unit must be prevented as the reactor cartridge may become unusable. If the sample gas contains condensable components, the BÜNOx 2+ must have suitable upstream sample gas conditioning (inlet dew point < 10 °C).

**Maintaining the device parameters**

- Be sure to maintain the approved operating and ambient temperatures and the technical specifications.
- The unit must be set up protected from weather.

**Personnel**

- The unit must only be installed, operated and maintained by qualified personnel.

### 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

In this manual, the following warning signs are used:

| | | | |
|---|---|---|---|
|  | Warning against hazardous situations |  | General notice |
|  | Warning against electrical voltage |  | Disconnect from mains |
|  | Warning against respiration of toxic gases |  | Wear respirator |
|  | Warning against acid and corrosive substances |  | Wear eye/face protection |
|  | Warning against potentially explosive atmospheres |  | Wear protection gloves |
|  | Warning against hot surface | | |

## 2.2 General hazard warnings

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

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

### The operator of the system must ensure:

- Safety notices and operating instructions are available and observed,
- The respective national accident prevention regulations are observed,
- The permissible data and operational conditions are maintained,
- Safety guards are used and mandatory maintenance is performed,
- Legal regulations are observed during disposal,
- compliance with national installation regulations.

### 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 | **Electric voltage** |
|---|---|
|  | Risk of electric shock<br>a) Disconnect all poles of the unit from the mains for any maintenance on electric components.<br>b) Secure the equipment from accidental restarting.<br>c) The unit may only be opened by trained, competent personnel.<br>d) Ensure the correct voltages supply. |

**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 save 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**

**Potentially explosive atmosphere**


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 Installation and connection

## 3.1 Installation site requirements

| DANGER | **Potentially explosive atmosphere** |
|---|---|
|  | Explosion hazard if used in hazardous areas.<br>The device is not suitable for operation in hazardous areas with potentially explosive atmospheres.<br>Do not expose the device to combustible or explosive gas mixtures. |

### 19” installation

The unit is only suitable for use in enclosed areas (protection class IP20) in a 19” rack and must be protected from exposure to fluids. The unit must rest on support rails when installed in a 19” rack. The mechanical strain is too high when mounted solely via the front panel.

### Cooling

The unit is forced-air cooled via a fan at the back. To ensure air can circulate freely, maintain a distance to other objects or walls of at least 3 cm at the top and 10 at the back.

### Ambient temperature

The approved ambient temperature must be observed during operation (see chapter Technical Data). Avoid exposing the unit to direct sunlight for extended periods.

**Sample gas conditioning**

– Condensation inside the unit must be prevented as the reactor cartridge may become unusable. If the sample gas contains condensable components, the BÜNOx 2+ must have suitable upstream sample gas conditioning (inlet dew point < 10 °C).

**Maintaining the device parameters**

– Be sure to maintain the approved operating and ambient temperatures and the technical specifications.
– The unit must be set up protected from weather.

**Personnel**

– The unit must only be installed, operated and maintained by qualified personnel.

### Special notices regarding the NOx converter

Store the reactor cartridge dry and only remove from the packaging film shortly before installation.

## 3.2 Sample gas conditioning

The BÜNOx 2+ converter is only part of the gas measurement system. Trouble-free, low maintenance measurement operation producing good measurements requires a sensible design of the entire measuring system. Selecting the correct gas sampling point, sample gas conditioning, as well as careful installation are just as crucial to the success of a measurement as the converter and the analysis instrument.

Therefore please consult our Customer Service Department regarding your measuring task. They will recommend an adapted sample gas conditioning.

One should generally note the BÜNOx 2+ converter is intended for "cold gas conversion". The inlet dew point of the sample gas therefore must not exceed 10 °C. The unit must further have a suitable upstream particle filter to prevent contaminating the reactor cartridge.

## 3.3 Gas connections

**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 save 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.

When connecting gas lines to the unit, please note:

– The connected must be made by a qualified professional.

– Suitable sample gas conditioning is required upstream from the unit.

The sample gas inlet and outlet are located at the back of the BÜNOx converter.

The sample gas lines must be carefully and properly connected via the available fittings (for connecting a hose with 4 mm inside diameter). For the approved sample gas volume flow rate please refer to the technical data in the appendix.

## 3.4 Electrical connections

### 3.4.1 Electric supply

**DANGER** **Electric voltage**

Risk of electric shock

a) The unit must be connected by trained, expert personnel.

b) Disconnect all poles of the unit from the mains prior to installation.

c) Secure the system from accidental restarting.

d) Ensure the correct supply voltage.

e) Only use the included power cord or a power cord with the specifications indicated.

**CAUTION** **Wrong mains voltage**

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

**WARNING** **High voltage**

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

The BÜNOx converter features a DIN 43650 plug for power supply. The pin assignments are listed below. The numbers specified correspond with those on the plugs.

The supply voltage is 230 V AC, 50/60 Hz or 115 V AC, 50/60 Hz (see type plate). Select a connection cable with a wire cross-section suitable for the load of the unit (see chapter Technical Data).

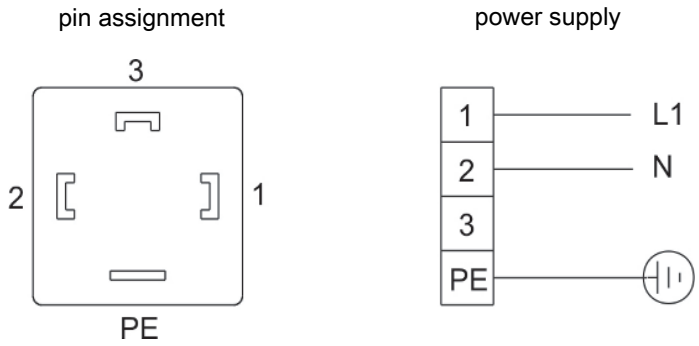



*Fig. 1: Electric supply BÜNOx 2+*

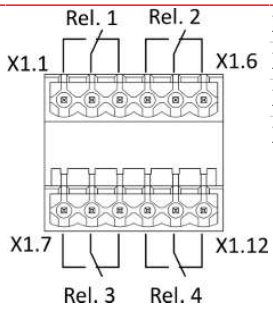
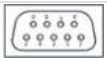
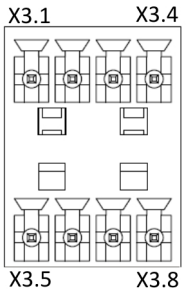
## 3.4.2 Signal inputs and outputs

The connection must be made by a trained professional.

Please observe the local laws.

Be sure to observe the limits specified in the technical data.

The plug for the input and output signals is located at the back of the unit. The following image shows the assignment:

| Plug | | Terminal | Relay | Description |
|---|---|---|---|---|
| **X1** |   | X1.1 ...X1.3 | Rel. 1 | Operating mode status conversion / bypass |
| | | X1.4...X1.6 | Rel. 2 | Status: Excess/low temperature alarm |
| | | X1.7...X1.9 | Rel. 3 | Status: Service alert |
| | | X1.10...X1.12 | Rel. 4 | Option |
| **X2** |  | | | reserved |
| **X3** |   | X3.1 | | PE / cable shield |
| | | X3.2 | | External solenoid valve switchover (potential-free) |
| | | X3.3 | | |
| | | X3.4 | | N/C |
| | | X3.5 | | PE / cable shield |
| | | X3.6 | | +; analogue output |
| | | X3.7 | | -; analogue output |
| | | X3.8 | | N/C |

**NOTICE**

**Controlling the solenoid valve**

The bypass solenoid valve (for installed option only) is controlled externally via plug X3, terminals X3.2 and X3.3, as well as internally via the control menu.

# 4 Initial operation

Prior to initial operation, please verify

- hose connections are correct and tight,
- electrical connections are correct and undamaged,
- the converter is not operated outside the specifications,
- no parts on the converter have been removed,
- ambient parameters and gas inlet requirements are met.
- the unit has suitable upstream sample gas conditioning.

Do not put a damaged unit into operation.

Familiarise yourself with the BUENOx 2+ menu structure in chapter Operation and control, then perform the following steps.

1. Install the reactor cartridge as described in chapter Replacing the converter cartridge [> page 20].
2. Switch on the unit.
   - Units without solenoid valves will start in conversion mode, units with solenoid valves (optional) will start in bypass mode. The respective LED on the front panel will light up.
   - The display will show the software version installed (e.g. d 10 1).
3. Until the target temperature has been reached, the temperature and one of the following status messages will alternate flashing:

   byPA: This message only appears on units with solenoid valves (optional): bypass mode was configured manually, continue with item 4.

   cArt: the converter cartridge has not yet been configured, the unit is not yet heating, continue with item 5.

   InIt: the converter cartridge is already configured, the unit begins to heat, continue with item 6.
4. Configure “Conversion Mode” as described in chapter Main Menu (Gas Path).
   - Return to item 3.
5. Select the cartridge as described in chapter Submenu NOx Calculator.
   - Return to item 3.
6. To activate the calculator, set the parameters OFFS and/or PPM and FLOW as described in chapter Submenu NOx Calculator.
7. Verify the sample gas conditioning is working correctly and open the gas supply.

# 5 Operation and control

## 5.1 Normal mode

In normal mode the display will show the current converter temperature. With the calculator activated the remaining converter cartridge life will be displayed by pressing the ▼ key. Also use this button to advance the display to the next parameter. This will briefly show the parameter type before showing the value, e.g. "ch 1" for the temperature on the converter, then "285 C" as the current value.

| Display text | Meaning |
|---|---|
| ch 1 | Channel 1 / Converter temperature |
| CALC | Remaining cartridge life |

### Possible status messages

Only the highest priority status message will be displayed. The chart lists messages in ascending order by priority

| Status message | Description |
|---|---|
| init | The unit is heating up after being switched on. |
| CALC | Remaining converter cartridge life exceeded. |
| cArt | No converter cartridge selected. Specify the cartridge as described in menu CALC, see chapter Submenu NOx Calculator. |
| byPA | The unit is in bypass mode (only applies with "solenoid valves" option installed and when manually invoking bypass mode). |
| Err | An equipment error has occurred, also see chapter Service and repair.<br>Press the ▲ button to display the error codes. |

### Equipment status

The status in indicated on status output X1 as well as via three LEDs at the front:

| LED description | Colour | Status |
|---|---|---|
| CONVERSION $NO_2$ → NO | green | The BÜNOx 2+ is in conversion mode. $NO_2$ is being converted to NO |
| BYPASS | yellow | The BÜNOx 2+ is in bypass mode. Sample gas is being routed past the converter |
| SERVICE | orange | – Advance warning on the remaining cartridge life expiring (only applies if NOx calculator enabled), also see chapter Maintenance and repair.<br>– No cartridge type defined. |

## 5.2 Bypass mode

Bypass mode can only be used if the unit is equipped with option "solenoid valves". In this case, the unit is in this operating mode during initialisation after being switched on and will switch to conversion mode once the converter temperature has been reached.

Bypass mode is also suitable for maintenance, e.g. when replacing the converter cartridge. Conversion mode is switched to bypass mode either via the menu (dir → byPA) or externally via the signal input.

We recommend the following steps to operate the unit in **Bypass** mode for an extended period:

1. Reduce the converter temperature to approx. 100 °C. This can extend the life of the cartridge.
2. Flush the converter cartridge with air or inert gas. Keep the flushing time short, no more than a few minutes. Flushing with air for too long of a period will significantly reduce the cartridge life.
3. Then activate bypass mode.

The "BYPASS" LED will light up, the "CONVERSION $NO_2$ → NO" LED will not light up. At the same time the respective signal is sent at the status output. The display will only additionally alternate between showing the current temperature and the status "byPA" after activating bypass mode from the menu.

For safety reasons this operating mode always takes priority over normal mode; i.e.:

– Once switched via external control this must also be used to switch the unit back to "conversion" mode. It cannot be switched back via the controller menu.
– The same applies when activating bypass mode manually. In this case it cannot be switched back externally via the signal input (e.g. from a control room).

  This prevents inadvertently routing sample case through the cartridge when replacing the cartridge.

# 5.3 Using the BÜNOx 2+ controller

## 5.3.1 Brief description of the operating principle

### Brief description of the operating principle:

The unit is operated using 5 keys. Their functions are:

| Button | Section | Functions |
|---|---|---|
| ↵ or OK | Display | – Switches from the measurement display to the main menu |
| | Menu | – Selects the menu item displayed |
| | Enter | – Applies an edited value or a selection |
| ▲ | Display | – temporarily switches to the alternative measurement display (if option installed) |
| | Menu | – Back |
| | Enter | – Increase value or browse selection<br>– Note:<br>– Press button 1 x = changes parameter / value by one;<br>– Hold button = fast mode (numerical values only)<br>– Display flashes: modified parameter/value<br>– Steady display: original display/value |
| ▼ | Display | – temporarily switches to the alternative measurement display (if option installed) |
| | Menu | – Next |
| | Enter | – Reduce value or browse selection |
| ESC | Menu | – Move one level up |
| | Enter | – Return to menu<br>Changes will not be saved! |
| F or Func | | – Sets a menu to favourite.<br>(Note: The favourite menu will also be activated with the menu locked!) |

## 5.3.2 Lock Menu

Some menus can be locked to prevent inadvertently changing the settings of the unit. This requires setting a code. For information on setting up or disabling the menu lock please refer to "Global Settings" (toP) under menu item toP > Loc.

The menu lock is **not** enabled at the time of delivery, all menu items can be accessed.

With the menu locked, only the following menu items will be visible without entering the correct code:

| Menu item | Explanation |
|---|---|
| toP > unit | Temperature unit selection (°C or °F). |
| cAlc > trSt | Resets the calculated remaining life after replacing the converter cartridge. |
| dir | Only with solenoid valves installed (optional):<br>Bypass or conversion mode selection. |
| Func | Accessing the favourite menu<br>**NOTICE! This menu may be one that is normally locked.**<br>Fore more information, please refer to chapter Adding a favourite menu. |

## 5.3.3 Menu overview

When pressing the **OK** button in normal mode, the display will show the prompt code if the menu is locked. Use the ▲ and ▼ buttons to enter the correct code and press **OK**.

If an incorrect code or no code is entered, the menu will not be unlocked and you will not be able to access all menu items.

If you forgot the password you can always enter master code 287 to access the menu; the menu will be unlocked.

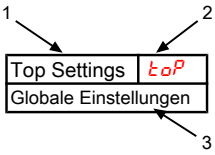
The following image shows an overview of the menu structure.

Items with a dashed frame will only appear with the respective settings or with the respective status messages.

The factory defaults and settings ranges are specified in the overview as well as under the respective menu item. The factory defaults apply unless otherwise agreed.

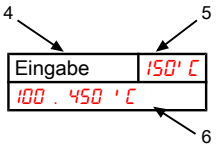
You can cancel entries and menu selections without saving by pressing the **ESC** key.

**Menu:**

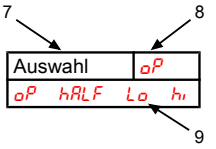



1. Menu designation
2. Display
3. Brief description

**Parameter:**

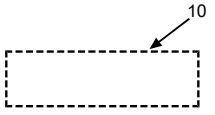



4. Value input
5. Factory preset
6. Parameter range




7. Selecting from the list of values
8. Factory preset
9. Parameter range/selection

**Optional menu navigation:**




10. dashed box = Optional

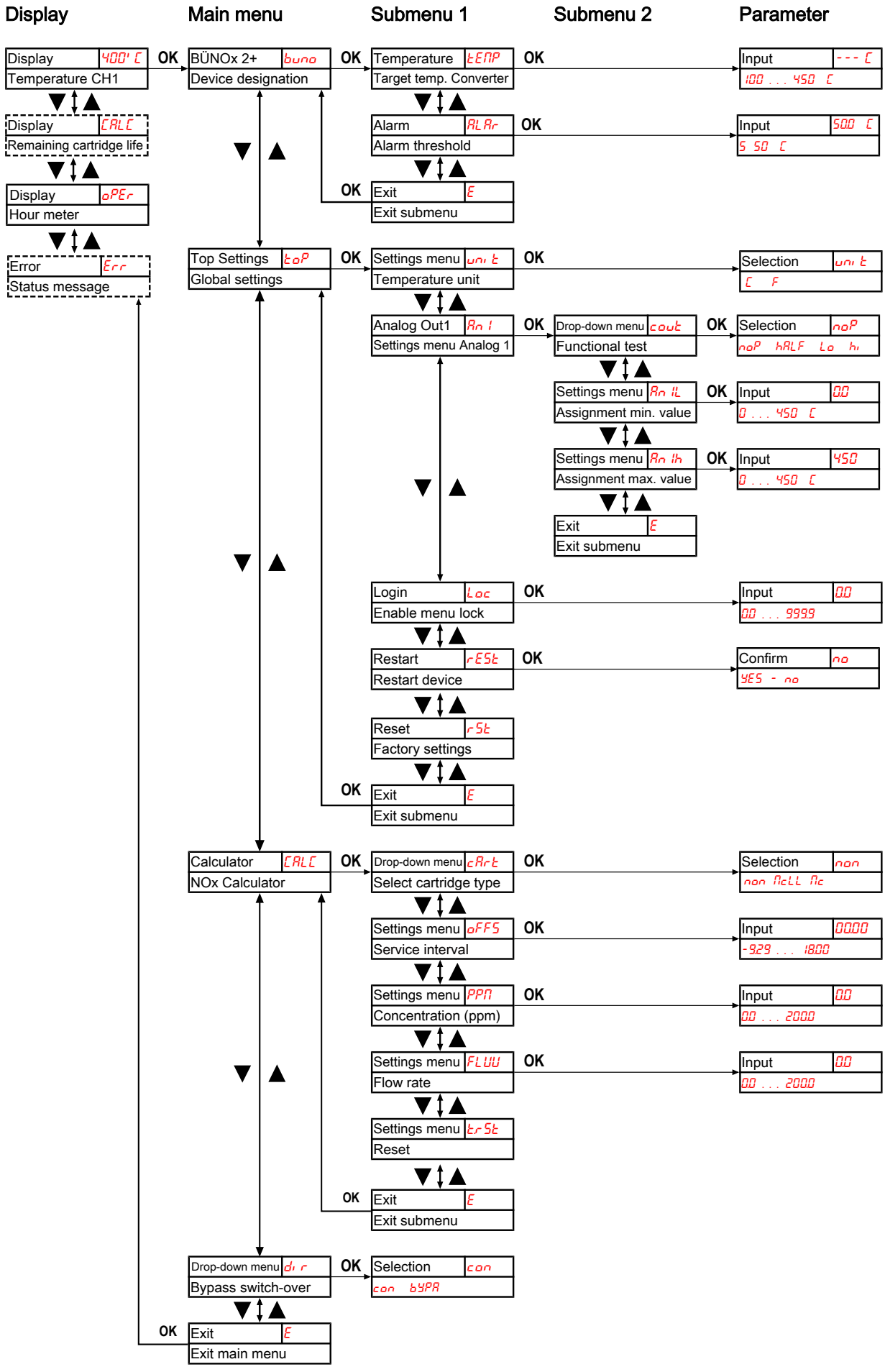


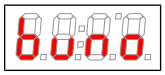

*Fig. 2: Overview display and menu*

## 5.3.4 Main menu

The main menu contains the following items:

### NOx Converter BÜNOx 2+ (buno)

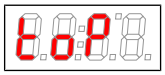
Display → buno



This will take you to the converter target temperature and the tolerance range setting (alarm threshold).

### Global setting (ToP Settings)

Display → toP



This menu is used to configure the BÜNOx 2+ global settings.

### NOx Calculator (calc)

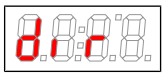
Display → cALc

This menu is used to configure the BUENOx 2+ global settings such as cartridge type, service interval, concentration or flow rate.

### Gas path (dir)

This menu is only available with solenoid valves (optional) installed. It has no submenus. Here you can directly select the gas path / operating mode.

Display → dir

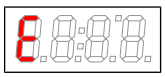


This is used to set the operating mode.

| | |
|---|---|
| Parameter range: | con: Conversion mode; sample gas is routed through the converter.<br>byPA: Bypass mode; sample gas is routed past the reactor cartridge. |
| Factory setting: | con |

### Exit main menu

Display → E



Selecting this will return you to display mode.

## 5.3.4.1 Submenu BÜNOx 2+

### Converter target temperature

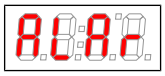
Display → buno → tEMP

This setting specifies the target temperature for the converter temperature.

| | |
|---|---|
| Parameter range: | 100 °C to 450 °C (212 °F to 842 °F) |
| Factory setting: | 0 °C / 400 °C, varies by cartridge installed;<br>select the cartridge under cALc → cArt. |
| Note: | This menu item is hidden if the keylock is enabled. |

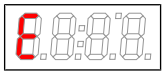
### Alarm threshold (alarm)

Display → buno → RLAr

| | |
|---|---|
|  | Used to specify the threshold for the alarm with respect to the converter target temperature. If the temperature measured is outside this interval, the temperature display will flash and the alarm relay will trip. |
| Parameter range | ±5 °C to ±50 °C (±9 °F to ±90 °F). |
| Factory setting: | ±25 °C (±45 °F) |
| Note: | This menu item is hidden if the keylock is enabled. |

### Exit submenu 1

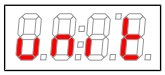
Display → Submenu → E

| | |
|---|---|
|  | Selecting this will return you to the main menu. |

## 5.3.4.2 Submenu global settings

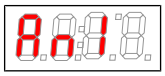
### Temperature unit

Display → toP → unit

| | |
|---|---|
|  | Used to select the temperature display unit. |
| Parameter range: | C, F |
| Factory setting: | C |

### Analog output

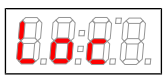
Display → toP → An1

| | |
|---|---|
|  | This submenu is used to specify the settings for analog output 1, see chapter Submenu 2 (Analog Output 1) |
| Note: | This menu will be hidden if the menu is locked. |

### Lock Menu

To protect the menu from unauthorised use, enter a value for the lock code. Menu items can then only be accessed after entering the correct code.

Display → toP → Loc

| | |
|---|---|
|  | This setting will cancel/enable the menu lock. |
| Parameter range: | 0 to 9999 |
| Factory setting: | 0 (keylock cancelled) |
| Note: | This menu will be hidden if the menu is locked. |

### Restart

Display → toP → rESt

(rESt = restart)

The device will restart, all settings are saved. All error messages will be reset.
The moisture detector will be reset, irrespective of the settings in menus hi tc and hMoi .

| | |
|---|---|
| Parameter range: | YES: Restart. The display will show the software version for the device and returns to measurement display.<br>no: Exit menu without restarting. |
| Note: | The user settings will be saved. |

### Factory settings

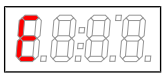
Display → toP → rSt

This setting restores the factory settings.

| | |
|---|---|
| Parameter range: | YES: factory settings restored.<br>no: Exit menu without making changes. |
| Factory setting: | no |
| Note: | This menu will be hidden if the menu is locked. |

### Exit submenu 1

Display → Submenu → E



Selecting this will return you to the main menu.

## 5.3.4.2.1 Submenu analogue output 1

The analogue output will display the actual converter cartridge temperature.

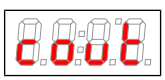
### Signal behaviour

In normal mode (noP) the measuring point will output the actual temperature. For testing purposes you can generate constant values hi , Lo or HALF. The analogue output will output a constant signal with a value as specified in the table.

| Constant | Current output<br>4 – 20 mA |
|---|---|
| hi | 20 mA |
| Mi | 12 mA |
| Lo | 4 mA |
| noP | 4 – 20 mA |

After testing, the signal behaviour must be changed back to normal mode (noP).

Display → toP → An 1 → cout



This setting determines how the analogue output will behave.

| | |
|---|---|
| Parameter range: | noP = Operation (normal mode), hi , Lo, HALF |
| Factory setting: | noP |
| Note: | This menu will be hidden if the menu is locked. |

### Smallest value

Display → toP → An 1 → An iL

This setting specifies the smallest (temperature) value corresponding with the starting value 4 mA or 0 V.

| | |
|---|---|
| Parameter range: | 0 °C to 450 °C |
| Factory setting: | 0 °C |
| Note: | This menu will be hidden if the menu is locked. |

### Highest value

Display → toP → An 1 → An ih

This setting specifies the highest (temperature) value corresponding with 20 mA or 10 V.

| | |
|---|---|
| Parameter range: | 0 °C to 450 °C |
| Factory setting: | 450 °C |
| Note: | This menu will be hidden if the menu is locked. |

## 5.3.4.3 Submenu NOx Calculator

The installed converter cartridge must be selected in submenu CALC. The selection impacts the converter target temperature default. **Be sure your settings here matches the actual cartridge used.** The cartridge may otherwise be damaged or ruined.

The NOx calculator further calculates the remaining converter cartridge life based on a saved standard curve. Once the life has been reached a service prompt will be generated. Since the life of the cartridge varies by process or the gas conditions, you can control the interval.

Use parameter OFFS to shorten or extend the interval by the time specified (months.days). A positive value will extend, a negative value shorten the maintenance interval.

You can further enter the sample gas conditions to be considered when calculating the remaining life. To do so, enter the respective flow rate value and the sample gas concentration in parameters PPM and FLOW.

The calculator is active if OFFS and/or PPM and FLOW are set.

### Cartridge type

Display → CALC → CArt

This menu is used to select the converter cartridge. The selection must match the actual cartridge type installed.

| | |
|---|---|
| Parameter range | non (none), Nc, NcLL |
| Factory setting | non (The converter will not be heated!) |
| Note: | This menu will be hidden if the menu is locked. |

Changing the parameters will adjust the converter target temperature and the unit will restart.

### Service interval

Display → CALC → OFFS

This setting is used to specify the service interval. The entry is made in format MM.DD (months.days). A negative value will shorten the interval, a positive value extend it.

Example: entering -3.15 will shorten the service interval by 3 months and 15 days; entering 02.10 will extend it by 2 months and 10 days.

| | |
|---|---|
| Parameter range: | -9.29 to 18.00 |
| Factory setting: | 00.00 |
| Note: | This menu will be hidden if the menu is locked. |

### Concentration

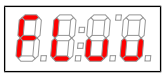
Display → CALC → PPM

This setting is used to specify which $NO_2$ sample gas concentration to include in calculating the remaining cartridge life.

| | |
|---|---|
| Parameter range: | 0 to 200 ppm |
| Factory setting: | 0 |
| Note: | If a value is entered here, a value must also be entered under menu item FLOW.<br>This menu will be hidden if the menu is locked. |

### Flow rate

Display → CALC → FLOW

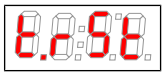


This setting specifies which sample gas flow rate to include in calculating the remaining cartridge life.

| | |
|---|---|
| Parameter range: | 0 to 200 l/h |
| Factory setting: | 0.0 |
| Note: | If a value is specified here, a value must also be entered under menu item PPM.<br>This menu will be hidden if the menu is locked. |

### Reset remaining life

Display → CALC → trSt



This setting will reset the timer settings for calculating the remaining cartridge life.

| | |
|---|---|
| Parameter range: | No parameter, press **OK** to promptly reset the remaining cartridge life. |

## 5.3.5 Set favourite menu

Use the **F** or **Func** (function) key to set a favourite menu to later open it with just the push of a button.

– Open the menu you wish to set as the favourite. This menu can also be a lockable menu.
– Press the function key for more than 3 sec.
  The current menu has been set as the favourite. The display will briefly show the message Func.
– Press **ESC** or E (Exit) to return to the display.

To now access the favourite menu, press the **F** or **Func** key.

**NOTICE! The favourite menu can also be accessed if the menu is locked.**

# 6 Maintenance and repair

## 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** **Electric voltage**

Risk of electric shock

a) Disconnect all poles of the unit from the mains for any maintenance on electric components.

b) Secure the equipment from accidental restarting.

c) The unit may only be opened by trained, competent personnel.

d) Ensure the correct voltages supply.

**DANGER** **Toxic, acidic gasses**

Sample gas can be harmful.

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

b) If necessary, ensure a safe gas discharge.

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

## 6.1 Replacing the microfuse

- Disconnect the unit from power by removing the plug connection!
- Remove the cover of the unit. The fuse is located on the main board
- Remove the insulator cap from the fuse holder for the fuse.
- Replace the fuse and reinstall the insulator cap.
- Restore power by plugging in the plug connection.

## 6.2 Replacing the converter cartridge

**DANGER** **Equipment and converter cartridge surfaces will be hot (up to 450 °C).**

Touching the housing / converter cartridge may cause severe burns.

a) Switch off the unit.

⇨⇨ Since the fan is no longer running now, the temperature of the unit/converter will initially continue to rise!

b) Allow adequate time for the unit to cool down (at least 1 h)

c) Wear suitable safety gloves and protect the hot converter cartridge from being touched.

Replace the converter cartridge when levels are below the required $NO_2$ => NO conversion rate. The converter cartridge can be replaced quickly without tools. We recommend switching the unit off before replacing the cartridge and allowing it to cool down adequately, at least 1 h. This will reduce the risk of burns. However, the cartridge can generally also be replaced with the unit heated.

## Procedure for replacing the converter cartridge:

- Stop the sample gas supply (e.g. switch to bypass mode).
- Before opening the reactor closure, be sure there are no toxic or hazardous gasses or components in the gas path (e.g. first flush the gas path with inert gas or air).
- Turn the closure cap at the front of the device to the left to the end of the thread.
- Carefully pull out the cover cap with converter cartridge.
- If necessary, allow the converter cartridge to cool down.
- Carefully pull the cartridge out of the cover piece (wear safety gloves).
- Remove 2 x O-rings on the cover piece.
- Clean sealing surfaces.
- Lightly grease O-rings with high-temperature grease (O-rings and grease included)
- Install O-rings on new converter cartridge and cover piece.
- If necessary, remove grease residue from the cover piece and the cartridge.
- Carefully slide the converter cartridge into the cover piece.
- Carefully slide the cartridge into the reactor opening and screw in the cover cap to the right to the end of the thread.

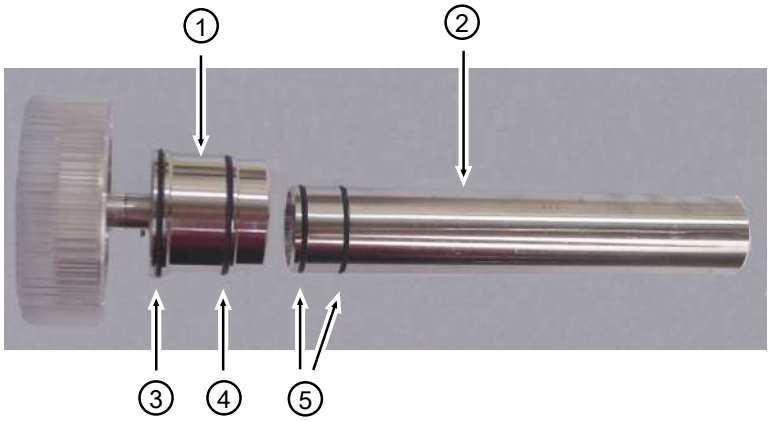



*Fig. 3: BUENOx converter cartridge and cover piece with O-rings*

| | | | |
|---|---|---|---|
| 1 | Cover piece | 2 | Reactor cartridge |
| 3 | 1 x O-ring Ø 38 mm | 4 | 1 x O-ring Ø 36 mm |
| 5 | 2 x O-ring Ø 27.5 mm | | |

- Reset the $NO_x$ calculator if enabled (menu: CALC → trSt)

**A preheating time of 30 min is required after installing a new converter cartridge to allow the cold cartridge to heat up to the target temperature.**

**NOTICE**

**Contamination**

Ensure cleanliness when replacing the reactor cartridge. Contamination on the cartridge (e.g. due to grease) can e.g. result in CO, $CO_2$ being produced when restarting the unit.
**We recommend flushing the reactor cartridge with inert gas or air for a few minutes after restarting.**

# 7 Service and repair

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

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

Please contact our Service Department with any questions:

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

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

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

**Bühler Technologies GmbH**

**- Reparatur/Service -**

**Harkortstraße 29**

**40880 Ratingen**

**Germany**

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

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

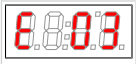
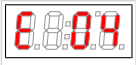
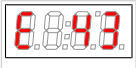
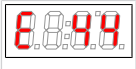
**service@buehler-technologies.com**.

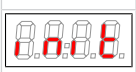
## 7.1 Troubleshooting

If an error occurs, the display will read "Err". Press the "▲" button to show the error number(s).

Error messages will appear until the unit has been restarted or the error is cleared using the "Func" button. It can only be cleared if the cause for the error has been corrected.

**Causes / Action: The following is a list of the most common causes and actions for the respective error. If the actions listed do not resolve the problem, please contact Service.**

| Problem / Malfunction | | Possible cause | Action |
|---|---|---|---|
| No display | | – No voltage<br>– Loose connecting cable<br>– Display defective | – Check the supply cable<br>– Check fuse<br>– Check connections |
|  (permanent) | D1.02 | (The software version for the display will appear).<br>– Not communicating with the controller | – Check connections |
|  | Error | – An error has occurred | – Read the error number as described above |
|  | Error 01 | – Controller malfunction | – Clear error (temporary fault)<br>– Disconnect from power for approx. 5 s<br>– Contact service |
|  | Error 03 | – Microcontroller Fault / MCP2 | – Contact service |
|  | Error 04 | – EEPROM error | – Contact service |
|  | Error 40 | – General error temperature sensor 1 | – Sensor possibly defective |
|  | Error 41 | – Low temperature / short-circuit temperature sensor 1 | – Check temperature sensor connection |
|  | Error 42 | – Excess temperature / short-circuit temperature sensor 1 | – Check temperature sensor connection |
|  | Error 43 | – Measurement fluctuation temperature sensor 1 | – Check temperature sensor connection |
|  | Error 44 | – Unit not heating / not heating fast enough<br>– No converter cartridge defined<br>– Temperature fuse tripped | – Define cartridge type<br>– Reset temperature fuse<br>– Temperature value unchanged since being switched on?<br>– Contact service |
|  | Error 45 | – Unit not heating / not heating fast enough<br>– No converter cartridge defined<br>– Temperature fuse tripped | – Define cartridge type<br>– Reset temperature fuse<br>– Temperature value unchanged since being switched on?<br>– Contact service |

| Status text | | Possible cause | Action |
|---|---|---|---|
|  | Bypa | – The unit was manually switched to bypass | – Change the operating mode under menu dir |
|  | Cart | – No converter cartridge defined | – Define the cartridge type under menu cArt |
|  | Calc | – The computed life of the converter cartridge has been exceeded | – Replace the cartridge and reset the counter<br>– Deactivate the counter<br>– Adjust the operating parameter in the Nox counter |
|  | init | – The unit is heating up | – Wait for the converter to reach the target temperature |

## 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 |
|---|---|
| 9110000031 | Micro-fuse 115 V, 5 x 20 mm, 5 A, delayed action |
| 9110000013 | Micro-fuse 230 V, 5 x 20 mm, 2.5 A, delayed action |

### 7.2.1 Consumables and accessories

| Item no. | Description |
|---|---|
| **metal-based material** | |
| 55319970 | Long-Life cartridge MC |
| 55319990 | Cartridge MC |
| **Accessories** | |
| 553199992 | Set of Gaskets |
| 55300001 | Wall bracket for Bünox 2+ and Bünox |

# 8 Shut-down

**DANGER**

**Equipment and converter cartridge surfaces will be hot (up to 450 °C).**

Touching the housing / converter cartridge may cause severe burns.

a) Switch off the unit.

⇨⇨Since the fan is no longer running now, the temperature of the unit/converter will initially continue to rise!

b) Allow adequate time for the unit to cool down (at least 1 h)

c) Wear suitable safety gloves and protect the hot converter cartridge from being touched.

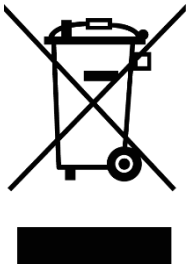
Proceed as follows to completely shut down the unit (e.g. for maintenance work) (also see chapter Maintenance):

– Interrupt sample gas supply.
– Unplug the unit from the mains.
– Flush the reactor cartridge with air or inert gas for a few minutes.

## 8.1 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
WEEE
Harkortstr. 29
40880 Ratingen
Germany

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

# 9 Appendices

## 9.1 Technical Data

### General

| | 19" Rack mount |
|---|---|
| Operating temperature | 400 °C * |
| Ready for operation | after approx. 30 min (max. 45 min) heat up time |

* varies by converter material

### Gas inlet conditions

| | |
|---|---|
| Sample gas pressure | up to 1.5 bar absolute |
| Sample gas flow rate | up to 120 L/h (2 L/min) |
| Sample gas temperature | 5 °C to 80 °C |
| Dew point after cooler | < 10 °C |

### Ambient conditions

| | |
|---|---|
| **during operation** | |
| Ambient temperature | 5 °C to 50 °C |
| **in storage** | |
| Ambient temperature | -20 °C to 70 °C |
| Humidity | < 80 % rel. humidity |

### Electrical specifications

| | |
|---|---|
| Power supply | 115 V AC or 230 V AC; 50/60 Hz |
| Power input | < 500 W |
| Thermal load | 85 W at an oven temperature of 400 °C |

### Signal inputs and outputs

| | |
|---|---|
| Status outputs: | |
| – Service / NOXCal | Changeover contact max. 230 V AC / DC, 1 A |
| – Operating mode | Changeover contact max. 230 V AC / DC, 1 A |
| – Temperature | Changeover contact max. 230 V AC / DC, 1 A |
| Analogue output | Temperature 4-20 mA |
| Signal input | Solenoid valve control, 24 V DC, 1 mA via external switch |

### Structural specifications

| | |
|---|---|
| Dimensions (w x h x d) | 483 x 133 x 285 mm |
| Weight | approx. 10.2 kg |
| Protection class per EN 60529 | IP20 |

## Reactor cartridge

| | Model MC |
|---|---|
| Filling material | metal-based |
| Life | see diagram |
| Conversion factor $NO_2 \rightarrow NO$ | ≧ 97 % when cartridge new |
| Max. $NO_2$ capacity at 70 l/h | 300 ppm |
| Max. conversion temperature * | 425 °C |

* The converter temperature should only be increased if the conversion level drops below 95 % with the cartridge almost depleted.

## Service life (laboratory operation)

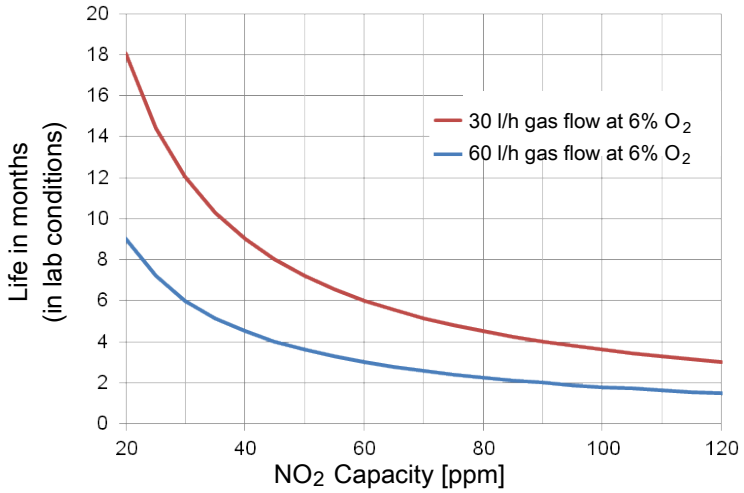


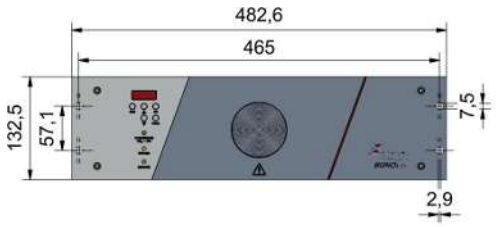

*Fig. 4: Diagram converter cartridge life in lab conditions*

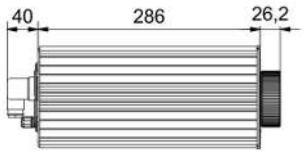
Life of standard cartridges MC shown.

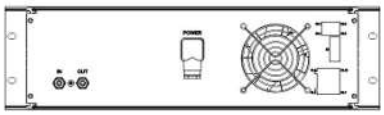
When using the long-life cartridge the life increases significantly.

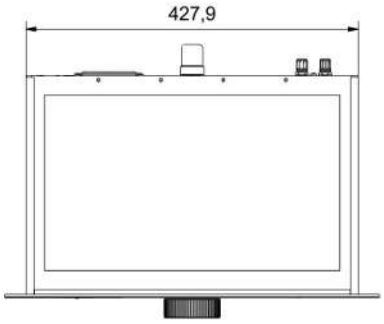
Values determined in lab conditions. Actual life during operation may differ.

## 9.2 Dimensions

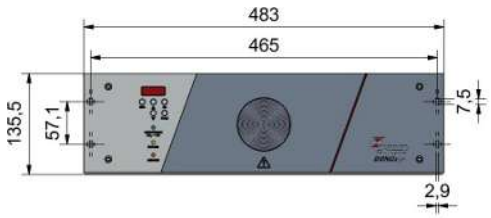


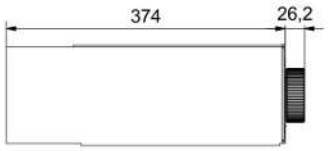



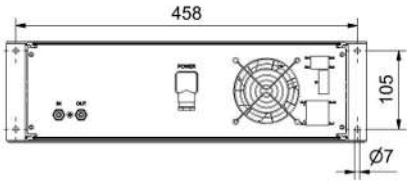



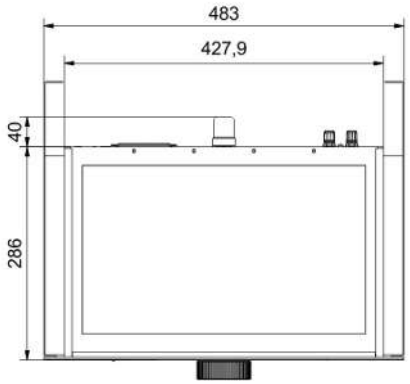


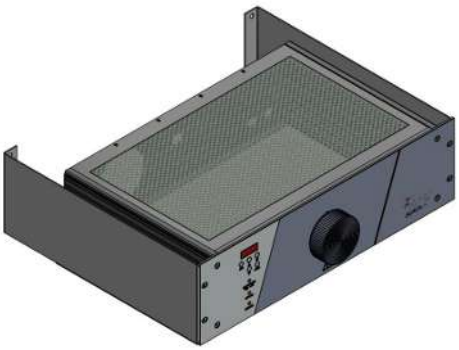

### Option wall bracket



# 10 Attached documents

- Declaration of Conformity KX550013
- 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:** Gaskonverter / gas converter
**Typ / type**: BÜNOx 2+

Das Betriebsmittel dient zur Überwachung der anfallenden Stickoxide bei der Verbrennung fossiler Brennstoffe.
*The equipment is used for the detection of nitrogen dioxides produced by combustion fossil fuels.*

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 17.02.2023

Stefan Eschweiler
Geschäftsführer – *Managing Director*

Frank Pospiech
Geschäftsführer – *Managing Director*



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

# 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**

**Product:** Gas converter
**Type:** BÜNOx 2+

The equipment is used for the detection of nitrogen dioxides produced by combustion fossil fuels.

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, 17.02.2023

Stefan Eschweiler
*Managing Director*

Frank Pospiech
*Managing Director*



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

RMA-Nr./ RMA-No.

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

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

**Firma/ Company**

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

**Ansprechpartner/ Person in charge**

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

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

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

**Grund der Rücksendung/ Reason for return**

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

bitte spezifizieren/ please specify

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

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

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

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

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

**Bitte Sicherheitsdatenblatt beilegen!/ Please enclose safety data sheet!**

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

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

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

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

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

Firmenstempel/ Company Sign

Datum/ Date

rechtsverbindliche Unterschrift/ Legally binding signature



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### Vermeiden von Veränderung und Beschädigung der einzusendenden Baugruppe

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

### Umgang mit elektrostatisch sensiblen Baugruppen

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

### Einbau von Ersatzteilen

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

### Einsenden von Elektroaltgeräten zur Entsorgung

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

### Avoiding alterations and damage to the components to be returned

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

### Handling electrostatically conductive components

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

### Fitting of spare parts

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

### Returning old electrical appliances for disposal

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



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