Fine dust monitor
BDA 15

Installation and Operation Instructions
Original instructions
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 fine dust monitor is an optical sensor to continuously measure and monitor fine dust concentrations. It can be integrated in various applications.

The product outlined in this manual was developed, manufactured, inspected and documented in compliance with the relevant safety standards. When observing the handling instructions and safety information outlined for planning, installation, specified normal operation and service the device therefore normally poses no dangers with respect to property damage or to the personal health.

Proper and safe operation of this device further requires extremely appropriate transport, proper storage, set-up and installation, as well as careful operation and service.

To keep the device in good condition and ensure proper and safe operation it may only be used as described by the manufacturer. Any use not described in these operating instructions is considered improper use and may result in personal injury or property damage.

Improper use will void the warranty.

1.2 Scope of delivery

The respective scope of delivery according to the purchase agreement is specified in the shipping documents included with delivery. Verify the shipment is complete and intact. Keep the packaging material in the event of a return shipment.

Scope of delivery:

– 1 x fine dust monitor
– 1 x product documentation

The technical design may vary depending on the configuration ordered.

1.3 Product description

1.3.1 Function

The fine dust monitor is an optical sensor to continuously measure and monitor fine dust concentrations. It can be integrated in various applications.

The fine dust monitor determines the dust content based on the principle of light-scattering measurement. It is factory calibrated and can be used for a measuring range of up to 1500 µg/m³. The device has two conditioned scattered light sensors for improved stability. The incoming air is preheated to 50 °C (122 °F). A built-in fan ensures a forced flow (2 L/min). The sample gas is set to a speed which allows representative particle detection.

The fine dust monitor periodically analyses and corrects the zero point and reference point. Analysis of the internal measurement signals ensures high zero point stability.

A pre-separator for analysing alveolar particle fractions (PM₂.₅) and an electrostatic filter for zeroing in highly contaminated environments can optionally be built into the device.

In addition to the standard Modbus interface, an optional 4…20 mA current loop or integrated WiFi module can be used for communication.
1.3.2 Layout

The BDA 15 fine dust monitor has a compact aluminium housing for all the necessary components. At the core of the device are two infrared scattered light sensors. The housing also holds a regulated heater, a fan, analysis display electronics and the power supply.

![Diagram of BDA 15 fine dust monitor layout](image)

**Fig. 1: Layout**

<table>
<thead>
<tr>
<th>1</th>
<th>Locking clamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Housing cover</td>
</tr>
<tr>
<td>3</td>
<td>Housing cover bracket</td>
</tr>
<tr>
<td>4</td>
<td>Air outlet</td>
</tr>
<tr>
<td>5</td>
<td>Sample gas inlet</td>
</tr>
</tbody>
</table>
**Fig. 2: Internal layout (standard)**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Locking clamp</td>
</tr>
<tr>
<td>2</td>
<td>Screws for mounting the sensor module inside the housing (2x)</td>
</tr>
<tr>
<td>3</td>
<td>Analysis electronics</td>
</tr>
<tr>
<td>4</td>
<td>Fuse 5 A / 240 V</td>
</tr>
<tr>
<td>5</td>
<td>Power connection 240 V AC</td>
</tr>
<tr>
<td>6</td>
<td>Power supply</td>
</tr>
<tr>
<td>7</td>
<td>Cable guides</td>
</tr>
<tr>
<td>8</td>
<td>Housing cover open</td>
</tr>
<tr>
<td>9</td>
<td>Wall mounting screws (4x)</td>
</tr>
<tr>
<td>10</td>
<td>Sample gas inlet</td>
</tr>
<tr>
<td>11</td>
<td>Sample gas hose</td>
</tr>
<tr>
<td>12</td>
<td>Fan</td>
</tr>
<tr>
<td>13</td>
<td>Sensor module with regulated heater along with measuring and reference sensor (behind the analysis electronics)</td>
</tr>
</tbody>
</table>
1.3.2.1 Options

1.3.2.1.1 Built-in pre-separator

Alveolar particle fractions ($PM_{2.5}$) are analysed by built-in pre-separator.

Fig. 3: Internal layout with pre-separator (optional)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pre-separator with regulated heater</td>
</tr>
<tr>
<td>2</td>
<td>Residual dust bin</td>
</tr>
</tbody>
</table>
1.3.2.1.2 Electrostatic filter

The unit is designed for electrostatic filter with built-in high-voltage module for setting a zero point in heavily contaminated environments.

**DANGER**

**Electric voltage**

Risk of electric shock

a) Parts of the device may be under high voltage.
b) Always disconnect the unit from the mains before working on it.
c) Any work on the device must be performed by trained professionals.

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*Fig. 4: Internal layout with electrostatic filter (optional)*

| 1 | Electrostatic filter |
2 Safety instructions

2.1 Important notices

Operation of the device is only valid 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.

Signal words for warnings

**DANGER**
Signal word for an imminent danger with high risk, resulting in severe injuries or death if not avoided.

**WARNING**
Signal word for a hazardous situation with medium risk, possibly resulting in severe injuries or death if not avoided.

**CAUTION**
Signal word for a hazardous situation with low risk, resulting in damaged to the device or the property or minor or medium injuries if not avoided.

**NOTICE**
Signal word for important information to the product.

Warning signs

These instructions use the following warning signs:

- **General information**

- **Wear respiratory equipment**

- **Wear safety mask**

- **Wear gloves**

- **Voltage warning**
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.

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.

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**

**Use in explosive areas**

The equipment is **not** suitable for use in explosive areas.

---

**DANGER**

**Toxic, corrosive gasses**

Toxic or corrosive gases can result in serious health damage or death. Irritation of the eyes, skin or respiratory system may occur.

a) Take all necessary safety precautions (e.g. personal protective equipment) to ensure safe handling near flue gas systems.
b) If contact with the skin or eyes occur, clean the affected area immediately!
c) Thoroughly clean objects which have come into contact with irritating or corrosive gases or substances.
d) If necessary, ensure safe gas discharge.

---

**CAUTION**

**Hot surface**

Some device components may become very hot. Burns may result!

Wear protective gloves to prevent potential injuries.
2.3 Additional notices

Assemblies
The device and the individual assemblies may only be operated in the original state. Always replace parts with OEM parts. Assemblies are configured specific to the device and are therefore not interchangeable between the different devices.

Electronic components
Electrostatic discharge can damage electronic components. Take the following precautions:
- Electronic components must be stored in their original packaging until ready to use.
- Touch electronic components by the housing. Do not touch contacts.
- Keep electronic components and boards away from static surfaces (PVC plastic, plastic bags, etc.).
- Wear a special ESD wrist strap or use an earthed, anti-static worktop.

Configuration settings
Modifying the configuration may affect the safety and functionality of the device. Configuration settings may only be modified by an authorised service technician or the manufacturer’s factory staff.
3 Transport and storage

Only transport the product inside the original packaging.
The device comes in a special transport crate. This is generally protected against mild shock during transport.

CAUTION
Transport

Significant shock during transport (e.g. falling) can damage delicate components. Choose suitable transportation.

– Check the device and the packaging for transport damage.
– Document any damage.

Ambient conditions for proper device storage:
– Ambient temperature: 0 ... +50 °C (32...122 °F),
– Relative humidity: max. 90 % (non-condensing),
– Out of direct sunlight,
– Store indoors (outdoor storage prohibited),
– Protect from moisture.
4 Installation and connection

4.1 Installation site requirements

**DANGER**  **Use in explosive areas**

The equipment is **not** suitable for use in explosive areas.

Ambient conditions for proper device operation:

- Ambient temperature: -20...+50 °C (-4 ...122 °F),
- Relative humidity: 0...100 %,
- Location with representative dust loads,
- Protected from drafts,
- Out of direct sunlight,
- Vibration-free location.

**NOTICE**

An additional heater may be installed in lower ambient temperatures. Please contact us for a custom solution.

4.2 Installation

*Fig. 5: Bore size for wall mounting, in mm (inch)*

- Select a suitable location for wall-mounting and place the bores per the drawing.

**NOTICE**

The device must be mounted upright. The gas inlet and outlet along with the cable guides must face downward.

To ensure correct mounting the device will automatically check the installation position. The service message "Alignment Error" will appear when mounted incorrectly.

- Open the housing cover. Loosen the locking clamp at the top of the device for this purpose.
- Secure the fine dust sensor using the four screws inside the housing.
- Use the cable guides to feed all necessary cables into the device.
- Connect the cables for the external power supply to the power supply connection on the power supply.
- Pin assignment see chapter Connections on the power supply connection of the power supply (100-240 VAC supply, standard) [> page 14].
- Make any other connections depending on the device version.
- Tighten the cable guides until all cables are fixed and secure.
- Close the housing cover and secure with the locking clamp.
4.3 Electrical connections

4.3.1 Power supply information

**DANGER**

**Electric voltage**

Risk of electric shock

a) Parts of the device may be under high voltage.

b) Always disconnect the unit from the mains before working on it.

c) Any work on the device must be performed by trained professionals.

- The power supply must be installed and fused in accordance with the relevant safety laws and regulations.
- Use a prefuse of at least 5 A.
- Only connect the device to the supply voltage specified in the type plate.
- This device was manufactured to ensure protective separation of primary and secondary circuits. Connected extra-low voltages must also be generated through protective separation.

**Earth contact**

- The device must always be earthed. Only operate using a power supply with earth contact.
- Never cut or disconnect the earth conductor inside the device or of the mains supply.
- Do not use an extension cord without earth conductor, eliminating the protection. Any disconnection in the earth conductor inside or outside the device is dangerous and prohibited.
- If inadequately earthed or the earth conductor is damaged, remove the device from service and secure against improper or accidental use.

**Fuses**

- Only replace fuses with the same type and rating as the old fuses.
- Never substitute fuses.
- Never short-circuit fuse holders.
- Route cables to prevent accident hazards due to tripping or getting caught.

**Covers**

- Never operate the device if covers or other parts have been removed due to exposed live components during operation.
- Unless expressly specified, never work on internal components.
- Always use the prefuse to switch off power before opening the device.
- Any work required with the device open (adjustments, service, etc.) must be performed by trained personnel familiar with dangerous areas and how to avoid hazards with suitable safeguards.

**Electrical safety**

If the electrical safety of the device is no longer guaranteed, it must be removed from service and secured against improper or accidental use.

The device is no longer electrically safe if:

- External damage is visible,
- It is not working correctly,
- It was stored in improper or unfavourable conditions for extended periods,
- It was exposed to improper loads during transport.

4.3.2 Pin assignment

The device comes standard with analysis electronics located directly behind the housing cover. It requires an external 100-240 VAC voltage supplied via the built-in power supply. An optional 12-24 VDC power supply is also available.
4.3.3 Connections on the power supply connection of the power supply (100-240 VAC supply, standard)

The external power supply connects to the power supply connection on the power supply. It has a 5 A fuse.

**Pin assignment**

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>External power supply (100-240 V AC, 0.7 A, 50-60 Hz)</td>
</tr>
<tr>
<td>PE</td>
<td>External power supply (100-240 V AC, 0.7 A, 50-60 Hz)</td>
</tr>
<tr>
<td>L</td>
<td>External power supply (100-240 V AC, 0.7 A, 50-60 Hz)</td>
</tr>
</tbody>
</table>

*Tab. 1: Connections on the power supply connection of the power supply – pin-assignment*

4.3.4 Analysis electronics connections

![Fig. 6: Analysis electronics connections](image)

<table>
<thead>
<tr>
<th>I</th>
<th>Power supply connection (12 VDC supply)</th>
<th>VI</th>
<th>Expansion port (e.g. for version with mA out)</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>Supply connection for heating resistor and fan</td>
<td>VII</td>
<td>Temperature sensor connection</td>
</tr>
<tr>
<td>III</td>
<td>Status indicator LED</td>
<td>VIII</td>
<td>RS485 port (Modbus interface)</td>
</tr>
<tr>
<td>IV</td>
<td>Service Port 1</td>
<td>IX</td>
<td>RS485 load resistor (jumper)</td>
</tr>
<tr>
<td>V</td>
<td>Service Port 2</td>
<td>X</td>
<td>WiFi port (for version with WiFi module)</td>
</tr>
</tbody>
</table>

**NOTE!** The operating status LED (III) will flash during normal operation.

Depending on the device version the analysis electronics will have an expansion module with additional connections (e.g. for mA out) and/or WiFi module.
## Pin assignment

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PE</td>
</tr>
<tr>
<td>2</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>+</td>
</tr>
<tr>
<td>4</td>
<td>–</td>
</tr>
<tr>
<td>5</td>
<td>+</td>
</tr>
<tr>
<td>6</td>
<td>–</td>
</tr>
<tr>
<td>7</td>
<td>+</td>
</tr>
<tr>
<td>8</td>
<td>GND _A</td>
</tr>
<tr>
<td>9</td>
<td>+</td>
</tr>
<tr>
<td>10</td>
<td>+</td>
</tr>
<tr>
<td>11</td>
<td>A</td>
</tr>
<tr>
<td>12</td>
<td>B</td>
</tr>
<tr>
<td>13</td>
<td>GND _M</td>
</tr>
</tbody>
</table>

- **1**: Housing earth
- **2**: Power supply (1.8 A)
- **3**: Power supply (12 V DC)
- **4**: Heating resistor power supply
- **5**: Heating resistor power supply
- **6**: Fan power supply
- **7**: Fan power supply
- **8**: Temperature sensor analogue earth
- **9**: Temperature sensor analogue input
- **10**: Analogue input (not allocated)
- **11**: RS485 (Modbus)
- **12**: RS485 (Modbus)
- **13**: RS485 (Modbus), shield

*Tab. 2: Analysis electronics connections – pin assignment*
5 Operation and control

5.1 Initial operation

**DANGER** Electric voltage

- Risk of electric shock
  a) Parts of the device may be under high voltage.
  b) Always disconnect the unit from the mains before working on it.
  c) Any work on the device must be performed by trained professionals.

- Connect the external power supply.
  - The LED on the analysis electronics will flash.
  - The fan will start.
  - The sensor is being heated.
- Wait until the sensor is heated up and the device is ready for use (10-30 min depending on ambient temperature).

**NOTICE**! By default the device will automatically zero. In some cases a zero point reset will be required.

**CAUTION** Dust load

The dust load must not exceed 50 µg/m³ during the zeroing process (approx. 1 h or longer)\(^3\) (for option with electrostatic filter max. 500 µg/m³).

- Wait for automatic zeroing to complete.
- Check the plausibility of measurements.

**NOTICE** Dust signal output:
- Measurement during normal operation: Value $\geq 2$ µg/m³
- Sensors initialising: Value $= 1$ µg/m³
- Service required: Value $\geq 2$ µg/m³ (measurements unstable)
- Fault: Value $= 0$ µg/m³ (measurements invalid)

5.2 Operation

The device is not designed for direct operation. The fine dust monitor is factory configured to ensure proper operation. If necessary, the settings of select parameters can be modified externally via Modbus interface (see chapter Digital interface - Modbus [> page 33]) or optional WiFi module.

**CAUTION** Improper operation

Improper operation can result in false measurements, malfunctions during the measuring process or device damage.

Detailed knowledge of the device function is required for safe operation. The device must be operated by trained staff.

**Diagnostics**

The LED’s on the analysis electronics, the plausibility of the dust signal, temperature regulator and messages output via Modbus interface must be checked for diagnostics purposes.

**Calibration**

The device is factory calibrated under predefined conditions. It can be adjusted to dust conditions on site using calibration constants A and D (defaults: A = 1.0; D = 0.0).

\[
St.\text{sig.} = A \cdot St.\text{sig.}´ + D
\]

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>St.\text{sig.}</td>
<td>Dust signal output by the device [µg/m³]</td>
</tr>
<tr>
<td>A</td>
<td>Calibration constant</td>
</tr>
<tr>
<td>D</td>
<td>Calibration constant [µg/m³]</td>
</tr>
<tr>
<td>St.\text{sig.}´</td>
<td>Factory calibrated dust signal [µg/m³]</td>
</tr>
</tbody>
</table>
5.2.1 Zero point reset

The zero point reset will delete the current zero point and automatically set a new zero point.

The zero point must be set:

– During initial startup (device delivered with zero point > device not at status "Initialising Sensors", dust signal = 1 µg/m³).
– After modifying the device.
– After being stored for extended periods.

### NOTICE
Deleting the zero point

The zero point can be deleted by connecting a jumper to Service Port 2 and restarting the device. The zero point will then automatically be reset.

The jumper must be disconnected for normal operation.

### CAUTION
Dust load

The dust load must not exceed 50 µg/m during the zeroing process (approx. 1 h or longer)¹ (for option with electrostatic filter max. 500 µg/m³).

---

**Fig. 7:** Analysis electronics jumper connected to Service Port 2

1 Service Port 2 with jumper connected
5.2.2 Modbus RTU (standard version)
Modbus settings see chapter Digital interface - Modbus [▶ page 33].

Connections
- Connect the Modbus transfer cable to the RS485 port (VIII, Fig. Analysis electronics connections [▶ page 14]).

**NOTICE**
The BDA 15 is configured as Modbus slave. The load resistor must be set as the last device in the RS485 string. Otherwise it needs to be removed.

- If necessary, disconnect the RS485 Load resistor (IX).

Address
On device versions with Modbus RTU (RS485, 2-wire) the device comes standard with a Modbus address defined by the last two digits in the serial number of the device.

**NOTICE**
Unknown Modbus address
If the Modbus address is unknown, it can be reset using a jumper on the top two pins at Service Port 1 and restarting the device. This will set the Modbus address to “10” (19200 Baud 8N1) and can then be reconfigured.
The jumper must be disconnected for normal operation.

**CAUTION**
Equipment damage
Connecting the jumper incorrectly will damage the analysis electronics beyond repair. Only connect the jumper to the top two pins on Service Port 1. The respective pins must be free for this purpose. Assigned Service Port 1 pins must be disconnected.

*Fig. 8: Analysis electronics with jumper connected to Service Port 1*
5.2.3 4...20 mA current loop

On versions with 4...20 mA current loop the analysis electronics are equipped with an add-on board for active mA output (galvanically isolated):

![Analysis electronics with add-on board](image)

**Fig. 9: Analysis electronics with add-on board**

<table>
<thead>
<tr>
<th>1 Add-on board</th>
<th>2 Current output 4...20 mA (max. load 450 Ω)</th>
<th>3 Switch for setting the measuring range</th>
</tr>
</thead>
</table>

**Setting the measuring range**

The measuring range for the 4...20 mA output can be set using the two switches (3) on the add-on board:

<table>
<thead>
<tr>
<th>Measuring range [µg/m³]</th>
<th>Setting switch 1</th>
<th>Setting switch 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>300</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>1000</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>3000</td>
<td>ON</td>
<td>ON</td>
</tr>
</tbody>
</table>

*Tab. 3: Setting the measuring range for the 4...20 mA output*
5.2.4 WiFi module (optional)

On versions with WiFi module you can use the integrated web-server to view and export all necessary measurements with a PC, laptop, smartphone, etc.

![Fig. 10: Analysis electronics with WiFi module](image)

The IP address of the device varies depending on the WiFi mode:
- Used as access point (AP) / BDA 15 serves as wireless access point (default):
  The default IP address is always 192.168.15.1.
- Used as station (ST) / BDA 15 connects to existing wireless access point:
  The device receives the IP address from the wireless access point. It must be determined using an IP scanner.

### NOTICE

**Password entry**

Access to parameter settings is password protected:

**WIFI password = 12345678 (default)**

The password can be changed in the respective box in the setup screen.

After dialing the necessary data will appear in the browser and the main screen of the device will open. The title of the window is the device name (defined by the respective serial number).
Changing the WiFi mode

On initial start-up or after a reset the unit will by default dial in using the IP address 192.168.15.1 as the access point.

**NOTICE! With the device set as access point it cannot be used to access other WiFi devices.**

You can change the WiFi mode in the setup screen. When using the device as a station, you can configure a WiFi name and password.

---

**NOTICE**

**Resetting the WiFi module**

The WiFi module can be reset by connecting a jumper to the top two pins of Service Port 1 and restarting the device. This will set the WiFi mode to access point (IP address 192.168.15.1) and can then be reconfigured.

The jumper must be disconnected for normal operation.

---

**CAUTION**

**Equipment damage**

Connecting the jumper incorrectly will damage the analysis electronics beyond repair. Only connect the jumper to the top two pins on Service Port 1. The respective pins must be free for this purpose. Assigned Service Port 1 pins must be disconnected.
5.2.4.1 Main screen

Fig. 11: Data output in browser - main screen

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dust values chart</td>
</tr>
<tr>
<td>2</td>
<td>Button to show/hide spreadsheet values</td>
</tr>
<tr>
<td>3</td>
<td>Table of values</td>
</tr>
<tr>
<td>4</td>
<td>Setup button</td>
</tr>
<tr>
<td>5</td>
<td>Status display</td>
</tr>
<tr>
<td>6</td>
<td>Sensor temperature display (if applicable, additional values will be shown)</td>
</tr>
<tr>
<td>7</td>
<td>Buttons for selecting the display range for the chart and table</td>
</tr>
<tr>
<td>8</td>
<td>Date and time of the last data export</td>
</tr>
<tr>
<td>9</td>
<td>Dust value from the last data export</td>
</tr>
<tr>
<td>10</td>
<td>Serial number and manufacturer information</td>
</tr>
<tr>
<td>11</td>
<td>Device IP address</td>
</tr>
<tr>
<td>12</td>
<td>Device name</td>
</tr>
</tbody>
</table>
The Chart (1) shows the trend of the last 385 averages. The output is based on the 5 min sliding average of the dust value (output interval 2 s). The values can be averaged over defined intervals. The respective buttons (7) below the chart are used to select the display range:

- "live" button:
  Pressing this button will show the chart as 10 s averages. It will show the last 64 min. The chart will automatically refresh.

- Button "min":
  Pressing this button will show the chart as 5 min averages. It will show the last 32 h. The chart needs to be refreshed manually.

- Button "hour":
  Pressing this button shows the chart as 30 min averages. It will show the last 8 days. The chart needs to be refreshed manually.

The measurements can also be output as a table of values (3). Pressing the "Show/Hide dat text" (2) button will show or hide the table of values. Here you can copy measurements for further processing (e.g. to past into a spreadsheet).

**NOTICE**

The BDA 15 does not have an internal clock. The browser time is used as the reference time. When switching the device off all values are lost. After powering on any uncalculated averages will be zero.

### 5.2.4.2 Setup screen

Device settings can be configured in the setup screen. Press the setup button to open the setup screen.

**NOTICE**

The setup screen is password protected:

**Password entry**

Setup password = 12345678 (default)

The password can be changed in the respective box in the setup screen.

After entering the password the respective setup screen will open:
Fig. 12: Output data to browser - setup screen

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Button to return to main screen (without saving changes)</td>
</tr>
<tr>
<td>2</td>
<td>Box for the setup password</td>
</tr>
<tr>
<td>3</td>
<td>Tick box for showing additional values</td>
</tr>
<tr>
<td>4</td>
<td>Fine dust measurement parameter box</td>
</tr>
<tr>
<td>5</td>
<td>Zero point reset tick box</td>
</tr>
<tr>
<td>6</td>
<td>WiFi mode tick box</td>
</tr>
<tr>
<td>7</td>
<td>WiFi password box (current password will not be shown)</td>
</tr>
<tr>
<td>8</td>
<td>Box for entering the WiFi name for the station</td>
</tr>
<tr>
<td>9</td>
<td>Box for the Modbus address</td>
</tr>
<tr>
<td>10</td>
<td>Modbus speed box</td>
</tr>
<tr>
<td>11</td>
<td>Button for writing the setup configuration to the device</td>
</tr>
<tr>
<td>12</td>
<td>Serial number and manufacturer information</td>
</tr>
<tr>
<td>13</td>
<td>Device IP address</td>
</tr>
<tr>
<td>14</td>
<td>Device name</td>
</tr>
</tbody>
</table>
Tick box for showing additional values
When selecting "Show ZP" (3) the main screen will also show the current zero points in increments.

**Fine dust measurement parameter box**
Different parameters for determining the fine dust concentration can be entered in the various boxes (4).
- “A [ ]”: Calibration constant A
- “D [µg]”: Calibration constant D
- “temp [°C]”: Device target temperature
- “repeat ZP [s]”: regular zero point interval
- “repeat ZP min [s]”: min. Zero point interval for repeated zeroing (if the last zeroing failed)
- Zero point reset tick box

Selecting "Reset Sensor (ZP, Ref)" (5) will reset the zero point. The last zero point will then be deleted and automatically reset. After writing the device will enter status “Initialising sensors”.

**NOTICE! Please contact Bühler Technologies GmbH before ticking the box (5).**

**WiFi settings**
WiFi mode tick box
Selecting the respective tick box (6) will set the device to the respective WiFi mode:
AP: Use as Access Point (AP) / BDA 15 serves as wireless access point
ST: Use as station (ST) / BDA 15 connects to an existing wireless access point

**WiFi password**
Use the box (7) to set the access password for the access point (mode “AP”) or the password for the available wireless access point (mode “ST”).

**Box for entering the WiFi name for the station**
When using the device as a station (option “ST”) you can configure the desired WiFi name in the box (8).

**NOTICE! When using the device as access point the WiFi name is always "BDA_serial number".**

**Modbus settings**
The two boxes (9, 10) are used to configure the Modbus address and the respective baud rate.

**NOTICE! By default the device will have a Modbus address defined by the last two digits in the device serial number.**

**Button for writing the setup configuration to the device**
Pressing the "write setup to BDA" button (11) will write all settings to the BDA 15.

**NOTICE! Do not disconnect the WiFi connection during the write process.**

5.3 Shut-down

**DANGER**

**Electric voltage**
Risk of electric shock
- a) Parts of the device may be under high voltage.
- b) Always disconnect the unit from the mains before working on it.
- c) Any work on the device must be performed by trained professionals.

Disconnect the device from the external power supply.
5.3.1 Disassembly

**CAUTION**

**Hot surface**

Some device components may become very hot. Burns may result! Wear protective gloves to prevent potential injuries.

- Open the housing cover. Loosen the locking clamp at the top of the device for this purpose.
- Loosen the cable guide fitting.
- Disconnect the Modbus transfer cable from the RS485 port.
- Disconnect the cables for the external power supply from the power supply connection on the power supply.
- Remove all cables from the cable guides on the device.
- Remove the fine dust sensor from the wall. Loosen the four screws inside the housing to do so.
- Close the housing cover and secure with the locking clamp.
- Store all cables in a safe location and properly store the fine dust sensor.
6 Service

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.
– When performing maintenance of any type, observe the respective safety and operation regulations.
– Service must be performed as instructed to have the device repaired under warranty.

The goal of service is:

– Maintaining the measuring accuracy of the device
– Ensuring safe operation
– Extending the life of the measuring device

6.1 Service

Required maintenance/service:

<table>
<thead>
<tr>
<th>Assembly</th>
<th>Action</th>
<th>Service interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>Functional test</td>
<td>1 year/as needed</td>
</tr>
<tr>
<td>Residual dust bin</td>
<td>Empty</td>
<td>1 year/as needed</td>
</tr>
</tbody>
</table>

Tab. 4: Maintenance/service

6.1.1 Check LED and fan functionality

– Verify the LED on the analysis electronics is flashing.
  – If the LED is not flashing, check the power supply.
  – Acoustically check the fan is functional (you can hear it running).

**NOTICE**

The fan regularly shuts off. The fan will stop approx. every 8 h. It will start again after approx. 5 min.
Please contact service if the fan is defective.

6.1.2 Empty residual dust bin

**NOTICE**

Empty residual dust bin

Regularly empty the residual dust bin. Depending on the type of dust and the dust load it may need to be emptied more than once a year.

– Open the housing cover. Loosen the locking clamp at the top of the device for this purpose.
– Disconnect the sample gas hose, if applicable including optional electrostatic filter.
– Pull the residual dust bin down and remove.
– Empty and clean the residual dust bin (e.g. with a cotton swab).
– Reinstall the residual dust bin in the designated location on the housing.
– Reattach the Sample gas hose, if applicable including optional electrostatic filter.
– Close the housing cover and secure with the locking clamp.
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

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

DANGER

Electric voltage
Risk of electric shock
a) Parts of the device may be under high voltage.
b) Always disconnect the unit from the mains before working on it.
c) Any work on the device must be performed by trained professionals.

CAUTION

Hot surface
Some device components may become very hot.
Burns may result!
Wear protective gloves to prevent potential injuries.

- New messages are output via the Modbus interface or via WiFi/web server and can be displayed on the connected output device.
- When using the 4...20 mA current loop it will only output 0 µg (= fault) or 1 µg (= initialising sensors).
- Check all messages displayed on the output device or output via Modbus interface or WiFi.
- Please see the chart in section Error and status messages [ > page 29] for the respective messages.
- Troubleshoot the respective message as indicated.
- If necessary, take additional measures for troubleshooting.
- Now briefly disconnect the power supply from the device to reset the device.
- If the error/malfunction has been corrected, the output device connected to the Modbus port will no longer show the error message.
- Verify the error message no longer appears.

NOTICE! Please contact us for any errors or malfunctions you are unable to resolve.
### 7.1.1 Error and status messages

<table>
<thead>
<tr>
<th>Message</th>
<th>Cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alignment Error</td>
<td>Device mounted incorrectly</td>
<td>– Verify the device is mounted upright.</td>
</tr>
<tr>
<td>Temperature error</td>
<td>Sensor temperature error</td>
<td>– The device will be ready 10-30 min after connecting the power supply.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– Check the location and verify it matches the ambient conditions specified for the device.</td>
</tr>
<tr>
<td>Initialising sensors</td>
<td>Resetting zero point (dust signal = 1 µg/m³)</td>
<td>– Wait for initialisation to complete.</td>
</tr>
<tr>
<td>Internal error</td>
<td>Internal sensor error, analysis electronics defective</td>
<td>– Replace the analysis electronics.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Note: You can alternatively send the device to Bühler Technologies GmbH for repair.</td>
</tr>
<tr>
<td>No zero point</td>
<td>Automatic zero point check failed, not set; invalid measuring range;</td>
<td>– Check the location and verify it matches the ambient conditions specified for the device.</td>
</tr>
<tr>
<td></td>
<td>misalignment</td>
<td>– Verify the device is mounted upright.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– Please contact Bühler Technologies GmbH.</td>
</tr>
<tr>
<td>Zero point too high</td>
<td>Automatic zero point check failed, zero point too high; invalid</td>
<td>– Check the location and verify it matches the ambient conditions specified for the device.</td>
</tr>
<tr>
<td></td>
<td>measuring range; misalignment</td>
<td>– Verify the device is mounted upright.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– Please contact Bühler Technologies GmbH.</td>
</tr>
<tr>
<td>No reference point</td>
<td>Automatic reference point check failed, not set; invalid measuring</td>
<td>– Check the location and verify it matches the ambient conditions specified for the device.</td>
</tr>
<tr>
<td></td>
<td>range; misalignment</td>
<td>– Verify the device is mounted upright.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– Please contact Bühler Technologies GmbH.</td>
</tr>
<tr>
<td>Replace sensors</td>
<td>one or more sensors defective</td>
<td>– Please contact Bühler Technologies GmbH.</td>
</tr>
<tr>
<td>Sensor test + zero point</td>
<td>Resetting valid zero and reference point active (last dust signal will</td>
<td>– Wait for the zero and reference point to be set.</td>
</tr>
<tr>
<td></td>
<td>be maintained)</td>
<td></td>
</tr>
<tr>
<td>Malfunction (status</td>
<td>New error message (dust signal = 0 µg/m³, measurements invalid)</td>
<td>– Check all other messages.</td>
</tr>
<tr>
<td>message)</td>
<td>[for 4...20 mA current loop (optional): Output = 20 mA]</td>
<td></td>
</tr>
<tr>
<td>Measuring range invalid</td>
<td>faulty or incorrect sensors installed; dust load too high; Sensors</td>
<td>– Check the location and verify it matches the ambient conditions specified for the device.</td>
</tr>
<tr>
<td></td>
<td>dirty</td>
<td>– Please contact Bühler Technologies GmbH.</td>
</tr>
<tr>
<td>Incorrect sensors</td>
<td>Incorrect sensors installed</td>
<td>– Please contact Bühler Technologies GmbH.</td>
</tr>
<tr>
<td>Service required</td>
<td>New service message (measurements unstable)</td>
<td>– Check all other messages.</td>
</tr>
<tr>
<td>(status message)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Tab. 5: Error and status messages*

### 7.1.2 Additional troubleshooting

#### 7.1.2.1 Checking the power supply

- Verify the LED on the analysis electronics is flashing.
  - The LED will flash during normal operation.
- Check all power supply connections are tight.
- Check all cables of the power supply for kinks and tears/breaks.
- Replace any damaged cables.
7.1.2.2 Checking the fan

**CAUTION**

Incorrect ventilation

Incorrect ventilation can result in measurement errors. Verify the fan inside the device housing is operating correctly.

Acoustically check the fan is functional (you can hear it running).

**NOTICE**

The fan regularly shuts off. The fan will stop approx. every 8 h. It will start again after approx. 5 min. Please contact service if the fan is defective.

7.1.2.3 Checking communication

**Modbus**

– Verify all RS485 connections are tight.
– Check all RS485 cables for kinks and tears/breaks.
– Replace any damaged cables.
– Check if the RS485 load resistor is set/removed.
– Check the Modbus transfer settings (see section Digital interface - Modbus [> page 33]).

**NOTICE**

The BDA 15 is configured as Modbus slave. The load resistor must be set as the last device in the RS485 string. Otherwise it needs to be removed. If the Modbus address is unknown it can be reset via jumper.

– Check if the RS485 load resistor is set/removed.
– Check the Modbus transfer settings.

**WiFi**

– Verify WiFi transmission is enabled on the receiver.
– Check the signal strength.

**NOTICE! The WiFi module can be reset via jumper.**

Please refer to the information in section WiFi module (optional) [> page 20].

7.1.2.4 Check the automatic zero and reference point check

The zero and reference point checks are automatic processes and performed at set intervals. In the case of a zero or reference point malfunction:

– Verify the device is mounted upright.

**NOTICE**

To ensure correct mounting the device will automatically check the installation position. The service message “Alignment Error” will appear when mounted incorrectly.

– Check the temperature in the data output via Modbus interface or displayed in the WiFi menu.
– Verify the two sensors are working correctly. To do so, check the output device for the Modbus interface for the message “Replace sensors”.
– Please contact us if the message “Replace sensors” appears.
8 Disposal

Dispose of parts so as not to endanger the health or environment. Follow the laws in the country of use for disposing of electronic components and devices during disposal.
The device must be disposed of as hazardous waste.
## 9 Appendices

### 9.1 Technical Data

#### Technical Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Compact aluminium sensor housing</td>
</tr>
<tr>
<td>Dimensions</td>
<td>130 mm x 160 mm x 90 mm (W x H x D)</td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 2 kg</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 33</td>
</tr>
<tr>
<td>Voltage</td>
<td>100-240 V AC, 0.7 A, 50-60 Hz (optional 12 V DC, 2.1 A); prefuse min. 5 A</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-20...+50 °C</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>0...95 %</td>
</tr>
<tr>
<td>Measuring principle</td>
<td>Light-scattering measurement</td>
</tr>
<tr>
<td>Sensors</td>
<td>2 x optical sensor; separate control and signal analysis</td>
</tr>
<tr>
<td>Volume flow</td>
<td>2 L/min</td>
</tr>
<tr>
<td>Port</td>
<td>RS485 (modbus), WLAN</td>
</tr>
<tr>
<td>Clip contacts</td>
<td>Max. 0.5 mm; Voltage supply connection: max. 2.5 mm</td>
</tr>
<tr>
<td>Fan</td>
<td>For forced flow</td>
</tr>
<tr>
<td>Heater</td>
<td>For sample gas conditioning (maintaining the dew point difference)</td>
</tr>
<tr>
<td>Average dust contents</td>
<td>Up to 200 μg/m³ (with electrostatic filter 500 μg)</td>
</tr>
<tr>
<td>Detection limit</td>
<td>3 μg/m³</td>
</tr>
<tr>
<td>Outlet</td>
<td>4...20 mA current loop</td>
</tr>
<tr>
<td>Optional</td>
<td>- Pre-separator with regulated heater (aerosols)</td>
</tr>
<tr>
<td></td>
<td>- Electrostatic filter (for zero point control in high fine dust pollution)</td>
</tr>
<tr>
<td></td>
<td>- Built-in pre-separator for measuring fine particles (PM$_{2.5}$)</td>
</tr>
</tbody>
</table>

### 9.2 Dimensions

![Diagram of BDA 15 Fine Dust Monitor](image)

- Height: 160 mm (6.3 in)
- Width: 130 mm (5.12 in)
- Depth: 90 mm (3.54 in)
- Diameter: Ø6.5 mm (0.26 in)
- Thickness: 107 mm (4.21 in)
9.3 Digital interface - Modbus

Terminals 11 and 12 on the analysis electronics (see VIII, Fig. Analysis electronics connections [> page 14]) are used to connect to a Modbus interface. Modbus data is analysed with standardised Modbus hardware (writer), SPS or a PC with the respective software and an RS485 adapter.

9.3.1 Communication settings

The following chart shows the general communication settings for data transfer:

<table>
<thead>
<tr>
<th>Description</th>
<th>Info</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baud rate</td>
<td>19200</td>
</tr>
<tr>
<td>Parity</td>
<td>Even</td>
</tr>
<tr>
<td>Stop bits</td>
<td>1</td>
</tr>
<tr>
<td>Data bits</td>
<td>8</td>
</tr>
<tr>
<td>Mode</td>
<td>RTU</td>
</tr>
<tr>
<td>Modbus address (preset)</td>
<td>- the last two digits in the serial number -</td>
</tr>
</tbody>
</table>

Tab. 6: Modbus transfer communication settings

9.3.2 Measurement display

The measurement to be transferred is generated as a binary floating-point number per IEEE 754 using a sign bit, an 8 bit exponent and a 23 bit significand in big-endian format as MSW-LSW (Most Significant Word - Least Significant Word).

9.3.3 Log

9.3.3.1 Overview

The following chart lists all supported function codes:

<table>
<thead>
<tr>
<th>Function code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>01h Read Coil Status</td>
<td>Read out statuses/bit strings</td>
</tr>
<tr>
<td>03h Read Holding Register</td>
<td>Read single or multiple registers</td>
</tr>
<tr>
<td>06h Write Single Register</td>
<td>Write single register</td>
</tr>
<tr>
<td>10h Write Multiple Registers</td>
<td>Write multiple registers</td>
</tr>
</tbody>
</table>

Tab. 7: Function codes overview
### 9.3.3.2 Addresses

<table>
<thead>
<tr>
<th>Description</th>
<th>Modbus number</th>
<th>Type</th>
<th>Read</th>
<th>Write</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial number</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part 1</td>
<td>0x00</td>
<td>0</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Part 2</td>
<td>0x02</td>
<td>2</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Software version</td>
<td>0x04</td>
<td>4</td>
<td>X</td>
<td>–</td>
</tr>
<tr>
<td>Dust signal [µg/m³]</td>
<td>0x06</td>
<td>6</td>
<td>X</td>
<td>–</td>
</tr>
<tr>
<td>Current heating temperature [°C]</td>
<td>0x08</td>
<td>8</td>
<td>X</td>
<td>–</td>
</tr>
<tr>
<td>Heating temperature preset [°C] (0...60), default 50.0</td>
<td>0x0A</td>
<td>10</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>A calibration constant rise, default = 1.0</td>
<td>0x0C</td>
<td>12</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>D calibration constant [µg/m³], Default = 0.0</td>
<td>0x0E</td>
<td>14</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Modbus address, 1...247</td>
<td>0x10</td>
<td>16</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Modbus speed (valid baud rates: 9600, 14400, 19200, 38400, 57600)</td>
<td>0x12</td>
<td>18</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Sensors replaced (initialising sensors)</td>
<td>0x14</td>
<td>20</td>
<td>–</td>
<td>X</td>
</tr>
<tr>
<td>Status</td>
<td>0x16</td>
<td>22</td>
<td>X</td>
<td>–</td>
</tr>
</tbody>
</table>

*Tab. 8: Modbus protocol*

**NOTICE**

**Dust signal output:**

- Measurement during normal operation: Value ≥ 2 µg/m³
- Sensors initialising: Value = 1 µg/m³
- Service required: Value ≥ 2 µg/m³ (measurements unstable)
- Fault: Value = 0 µg/m³ (measurements invalid)

**NOTICE**

Writing the Modbus settings (address, speed) will end Modbus communication. It must be reconfigured with the new settings.
<table>
<thead>
<tr>
<th>Description</th>
<th>Modbus number</th>
<th>Type</th>
<th>Read</th>
<th>Write</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor test + zero point</td>
<td>0x00</td>
<td>Bit</td>
<td>X</td>
<td>–</td>
</tr>
<tr>
<td>Service required</td>
<td>0x01</td>
<td>Bit</td>
<td>X</td>
<td>–</td>
</tr>
<tr>
<td>Malfunction</td>
<td>0x02</td>
<td>Bit</td>
<td>X</td>
<td>–</td>
</tr>
<tr>
<td>Initialising sensors</td>
<td>0x03</td>
<td>Bit</td>
<td>X</td>
<td>–</td>
</tr>
<tr>
<td>Temperature error</td>
<td>0x04</td>
<td>Bit</td>
<td>X</td>
<td>–</td>
</tr>
<tr>
<td>Alignment Error</td>
<td>0x05</td>
<td>Bit</td>
<td>X</td>
<td>–</td>
</tr>
<tr>
<td>Measuring range invalid</td>
<td>0x06</td>
<td>Bit</td>
<td>X</td>
<td>–</td>
</tr>
<tr>
<td>Replace sensors</td>
<td>0x07</td>
<td>Bit</td>
<td>X</td>
<td>–</td>
</tr>
<tr>
<td>No reference point</td>
<td>0x08</td>
<td>Bit</td>
<td>X</td>
<td>–</td>
</tr>
<tr>
<td>No zero point</td>
<td>0x09</td>
<td>Bit</td>
<td>X</td>
<td>–</td>
</tr>
<tr>
<td>Zero point too high</td>
<td>0x0A</td>
<td>Bit</td>
<td>X</td>
<td>–</td>
</tr>
<tr>
<td>Internal error</td>
<td>0x0B</td>
<td>Bit</td>
<td>X</td>
<td>–</td>
</tr>
<tr>
<td>Incorrect sensors</td>
<td>0x0C</td>
<td>Bit</td>
<td>X</td>
<td>–</td>
</tr>
<tr>
<td>free</td>
<td>0x0D</td>
<td>Bit</td>
<td>X</td>
<td>–</td>
</tr>
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<td>Bit</td>
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<td>X</td>
<td>–</td>
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</table>

Tab. 9: Device status Modbus log
10 Attached documents
- Declaration of Conformity KX08F004
- RMA - Decontamination Statement
Hiermit erklärt Bühler Technologies GmbH, dass die nachfolgenden Produkte den wesentlichen Anforderungen der Richtlinie in ihrer aktuellen Fassung entsprechen.

Folgende Richtlinie wurde berücksichtigt:

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

in ihrer aktuellen Fassung entsprechen. in its actual version.

The following directive was regarded:

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

**Produkt / products:** Feinstaubmonitor / Fine dust monitor

**Typ / type:** BDA 15

Das Betriebsmittel dient zur kontinuierlichen Messung und Überwachung von Feinstaubkonzentrationen.

This equipment is intended to continuously measure and monitor dust concentrations.

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 61010-1:2011**

**EN 61326-1:2013**

**EN 55011:2011**

Zusätzlich wurden berücksichtigt:

In addition, the following standards have been used:

**EN 61000-3-3:2015**

**EN 61000-4-3:2011**

**EN 61000-4-6:2014**

**EN 61000-3-3:2014**

**EN 61000-4-4:2013**

**EN 61000-4-11:2005**

**EN 61000-3-2:2015**

**EN 61000-4-5:2015**

**EN 61000-6-2:2006**

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 04.05.2017

Stefan Eschweiler
Geschäftsführer – Managing Director

Frank Pospiech
Geschäftsführer – Managing Director

KX 08 F004

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
Um eine schnelle und reibungslose Bearbeitung Ihres Anliegens zu erreichen, füllen Sie bitte diesen Rücksendeschein aus. Eine genaue Fehlerbeschreibung ist für die Ursachenanalyse nötig und hilft bei der schnellen Bearbeitung des Vorgangs. Die Aussage „Defekt“ hilft bei der Fehlersuche leider nicht.


Bringen Sie den Rücksendeschein mit der Dekontaminierungsersklärung bitte zusammen mit den Versandpapieren in einer Klarsichthülle außen an der Verpackung an. Ansonsten ist eine Bearbeitung Ihres Reparaturauftrages nicht möglich!

Angaben zum Absender:

<table>
<thead>
<tr>
<th>Firma / Company</th>
<th>Ansprechpartner / Contact person</th>
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</thead>
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<td>Anschrift / Address</td>
<td>Abteilung / Department</td>
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<td>Tel. / Phone</td>
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<td></td>
<td>Fax / Fax:</td>
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<table>
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<tr>
<td>Anzahl / Quantity</td>
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<table>
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<th>Vorgangsnummer des Kunden / Customer transaction number:</th>
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<tbody>
<tr>
<td>Reparatur / Repair</td>
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</tr>
<tr>
<td>Garantie / Warranty</td>
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<td>Zur Prüfung / For inspection</td>
<td></td>
</tr>
<tr>
<td>Rückgabe / Return</td>
<td></td>
</tr>
</tbody>
</table>

Fehlerbeschreibung / Description of the problem:

<table>
<thead>
<tr>
<th>Ort, Datum / Place, Date</th>
<th>Unterschrift / Stempel / Signature / Stamp:</th>
</tr>
</thead>
</table>
Bitte füllen Sie diese Dekontaminierungserklärung für jedes einzelne Gerät aus.

**Gerät / Device**

**Serien-Nr. / Serial no.**

RMA-Nr. / RMA no:

I herewith declare that the device as specified above has been properly cleaned and decontaminated and that there are no risks present when dealing with the device.

In other cases, please describe the hazards in detail:

**Aggregate state (please check):**

☐ Flüssig / Liquid

☐ Fest / Solid

☐ Pulvrig / Powdery

☐ Gasförmig / Gaseous

Please note the following warnings (please check):

 Explosiv / Explosive

 Giftig / Tödlich / Toxic / lethal

 Entzündliche Stoffe / Flammable substances

 Brandfördernd / Oxidizing

 Komprimierte Gase / Compressed gasses

 Gesundheitsgefährdend / Hazardous to health

 Gesundheitsschädlich / Harmful to health

 Umweltgefährdend / Harmful to the environment

Please include an updated data sheet of the hazardous substance!

Bitte legen Sie ein aktuelles Datenblatt des Gefahrenstoffes bei!

Ort, Datum / Place, Date:

Unterschrift / Stempel / Signature / Stamp: