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1 Safety

1.1 General information and notes for the reader

You must read these instructions carefully prior to installing and commissioning the device. These instructions are an important part of the product and must be kept for future reference. These instructions are intended as an overview and do not contain detailed information on all designs for this product or every possible aspect of installation, operation and maintenance. For additional information or if specific problems occur that are not discussed in these instructions, contact the manufacturer.

The content of these instructions is neither part of any previous or existing agreement, promise or legal relationship nor is it intended to change the same.

This product is built based on state-of-the-art technology and is operationally safe. It has been tested and left the factory in perfect working order from a safety perspective. The information in the manual must be observed and followed in order to maintain this state throughout the period of operation.

Modifications and repairs to the product may only be performed if expressly permitted by these instructions.

Only by observing all of the safety instructions and all safety/warning symbols in these instructions can optimum protection of both personnel and the environment, as well as safe and fault-free operation of the device, be ensured.

Information and symbols directly on the product must be observed. They may not be removed and must be fully legible at all times.

1.2 Intended use

Mass flow measurement of gases and gas mixtures in closed pipelines.

The device is designed for use exclusively within the values stated on the name plate and in the technical specifications (see the section titled "Specifications").

1.3 Target groups and qualifications

Installation, commissioning, and maintenance of the product may only be performed by trained specialist personnel who have been authorized by the plant operator to do so. The specialist personnel must have read and understood the manual and comply with its instructions.

Prior to using corrosive and abrasive measurement media, the operator must check the level of resistance of all parts coming into contact with the wetted parts. ABB Automation Products GmbH will gladly support you in selecting the materials, but cannot accept any liability in doing so.

The operators must strictly observe the applicable national regulations with regards to installation, function tests, repairs, and maintenance of electrical products.

1.4 Warranty provisions

Using the device in a manner that does not fall within the scope of its intended use, disregarding this instruction, using underqualified personnel, or making unauthorized alterations releases the manufacturer from liability for any resulting damage. This renders the manufacturer's warranty null and void.
1.5 Plates and symbols

1.5.1 Safety- / warning symbols, note symbols

**DANGER – <Serious damage to health / risk to life>**
This symbol in conjunction with the signal word “Danger” indicates an imminent danger. Failure to observe this safety information will result in death or severe injury.

**DANGER – <Serious damage to health / risk to life>**
This symbol in conjunction with the signal word “Danger” indicates an imminent electrical hazard. Failure to observe this safety information will result in death or severe injury.

**WARNING – <Bodily injury>**
This symbol in conjunction with the signal word “Warning” indicates a possibly dangerous situation. Failure to observe this safety information may result in death or severe injury.

**WARNING – <Bodily injury>**
This symbol in conjunction with the signal word “Warning” indicates a potential electrical hazard. Failure to observe this safety information may result in death or severe injury.

**CAUTION – <Minor injury>**
This symbol in conjunction with the signal word “Caution” indicates a possibly dangerous situation. Failure to observe this safety information may result in minor or moderate injury. This may also be used for property damage warnings.

**NOTICE – <Property damage>!**
The symbol indicates a potentially damaging situation. Failure to observe this safety information may result in damage to or destruction of the product and/or other system components.

**IMPORTANT (NOTE)**
This symbol indicates operator tips, particularly useful information, or important information about the product or its further uses. It does not indicate a dangerous or damaging situation.
# 1.6 Name plates

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Manufacturer</td>
<td>7</td>
<td>Protection class</td>
</tr>
<tr>
<td>2</td>
<td>Serial number</td>
<td>8</td>
<td>Operating temperature range</td>
</tr>
<tr>
<td>3</td>
<td>Serial number</td>
<td>9</td>
<td>Max. permissible pressure of medium for measurement</td>
</tr>
<tr>
<td>4</td>
<td>ID number (internal calibration number)</td>
<td>10</td>
<td>Type designation</td>
</tr>
<tr>
<td>5</td>
<td>Power supply</td>
<td>11</td>
<td>Refer to product documentation</td>
</tr>
<tr>
<td>6</td>
<td>Maximum power</td>
<td>12</td>
<td>CE mark (EC conformity)</td>
</tr>
</tbody>
</table>

**Fig. 1:** Standard

1. Manufacturer
2. Serial number
3. Serial number
4. ID number (internal calibration number)
5. Power supply
6. Maximum power
7. Protection class
8. Operating temperature range
9. Max. permissible pressure of medium for measurement
10. Type designation
11. Refer to product documentation
12. CE mark (EC conformity)

**Fig. 2:** With explosion protection

1. Manufacturer
2. Serial number
3. Serial number
4. ID number (internal calibration number)
5. Explosion protection labeling, e.g., ATEX
6. Year of manufacture, country of manufacture
7. Type designation
8. Power supply
9. Protection class
10. Permissible ambient temperature
11. Measured medium temperature
12. Max. operating pressure
1.7 Safety instructions for electrical installation

The electrical connection may only be made by authorized specialist personnel according to the electrical plans.
The electrical connection information in the manual must be observed; otherwise, the electrical protection type may be adversely affected.
Ground the measurement system according to requirements.

1.8 Returning devices

Use the original packaging or a secure transport container of an appropriate type if you need to return the device for repair or recalibration purposes. Fill out the return form (see the Appendix) and include this with the device.
The EU Directive governing hazardous materials dictates that the owners of any hazardous waste are also responsible for disposing of it.
All devices delivered to the manufacturer must be free from any hazardous materials (acids, alkalis, solvents, etc.).
Pipe components and flowmeter sensors contain hollow spaces. If they have been used in conjunction with hazardous materials, they must therefore be rinsed out in order to neutralize any such substances.
The owner will be charged for any costs incurred as a result of the device not having been adequately cleaned or of any failure to dispose of hazardous materials. The manufacturer reserves the right to return a contaminated device.

Please contact Customer Center Service acc. to page 2 for nearest service location.
1.9 Integrated management system

ABB Automation Products GmbH operates an integrated management system, consisting of:

• Quality management system to ISO 9001,
• Environmental management system to ISO 14001,
• Occupational health and safety management system to BS OHSAS 18001 and
• Data and information protection management system.

Environmental awareness is an important part of our company policy. Our products and solutions are intended to have minimum impact on the environment and on people during manufacturing, storage, transport, use, and disposal. This includes the environmentally-friendly use of natural resources. We conduct an open dialog with the public through our publications.

1.10 Disposal

This product is manufactured from materials that can be reused by specialist recycling companies.

1.10.1 Information on WEEE Directive 2012/19/EU (Waste Electrical and Electronic Equipment)

This product is not subject to WEEE Directive 2012/19/EU or relevant national laws (e.g., ElektroG in Germany).

The product must be disposed of at a specialist recycling facility. Do not use municipal garbage collection points. According to the WEEE Directive 2012/19/EU, only products used in private applications may be disposed of at municipal garbage facilities. Proper disposal prevents negative effects on people and the environment, and supports the reuse of valuable raw materials.

If it is not possible to dispose of old equipment properly, ABB Service can accept and dispose of returns for a fee.
2 Use in potentially explosive atmospheres

The device is available in a Zone 2 / Zone 22 certified version. Each of these units is shipped together with a EC declaration of conformity (ATEX). For the operation of Zone 2 / Zone 22 certified devices only the values written down in this declaration of conformity (ATEX) are relevant. (see appendix).

WARNING - General risks!
Operating the device in Zone 1 / 21 or Zone 0 / 20 is not permitted.

3 Design and function

3.1 LED status messages and error signals

<table>
<thead>
<tr>
<th>LED</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Unit is OK and ready for operation</td>
</tr>
<tr>
<td>Green flashing</td>
<td>Unit is OK but out of measuring range</td>
</tr>
<tr>
<td>Red</td>
<td>Unit is out of order (repair required)</td>
</tr>
<tr>
<td>Red flashing</td>
<td>Initialization sequence running</td>
</tr>
<tr>
<td></td>
<td>(approx. 30 s after start-up or parameter modification)</td>
</tr>
<tr>
<td>Red flashing 90 : 10 (ON : OFF)</td>
<td>Supply voltage too low (please check)</td>
</tr>
<tr>
<td>Red flashing 10 : 20 (ON : OFF)</td>
<td>EEPROM erased (repair required)</td>
</tr>
</tbody>
</table>
4 Electrical connections

Please use the supplied cable for the electrical connection of the flowmeter sensor. On the measuring unit, a connector is used for the coupling. Use a 24 V DC power supply with isolation according to EN 61010 and IEC 950 with a maximum output of < 150 W only.

4.1 Cable assignments

<table>
<thead>
<tr>
<th>Color of cores</th>
<th>Connector pin number</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>#1</td>
<td>Analog output +</td>
</tr>
<tr>
<td>Brown</td>
<td>#2</td>
<td>RS 232 / TxD</td>
</tr>
<tr>
<td>Green</td>
<td>#3</td>
<td>Pulse / frequency output</td>
</tr>
<tr>
<td>Yellow</td>
<td>#4</td>
<td>Power supply 24 V DC</td>
</tr>
<tr>
<td>Grey</td>
<td>#5</td>
<td>Power supply 0 V</td>
</tr>
<tr>
<td>Pink</td>
<td>#6</td>
<td>RS 232 / RxD</td>
</tr>
<tr>
<td>Blue</td>
<td>#7</td>
<td>GND / analog</td>
</tr>
<tr>
<td>Red</td>
<td>#8</td>
<td>GND / frequency + pulse + RS 232</td>
</tr>
<tr>
<td>Shielding</td>
<td>-</td>
<td>Functional earthing</td>
</tr>
</tbody>
</table>

4.2 Circuiting the signal outputs

4.2.1 Analog output

Upon selection, the analog output of the current output supplies an active signal of 0 (4) ... 20 mA, i.e. the Sensyflow FMT200-ECO2 device supplies the current independently. For this reason, do not use a 2-wire power supply unit or an active input of a PLC, but rather a passive signal receiver.

4.2.2 Digital output

The digital output offers a 24 V = HIGH signal or a 0 V = LOW Signal. The digital output can be used as active or passive output.

Active digital output wiring

The output current in the HIGH-mode must be limited to 1 mA when the active digital output is used (passive signal receiver). This is to ensure an output voltage \( U_a > 15 \) V.

Passive digital output wiring

Using the passive output (active signal receiver), the output current in the LOW-mode must be limited to -20 mA. This is to ensure an output voltage \( U_a < 2.5 \) V.

4.2.3 Compatibility to Sensyflow eco1

Sensyflow eco1 und Sensyflow FMT200-ECO2 are compatible. Using the appropriate electrical adapter, FMT200-ECO2 can be connected to existing plants. As "interface" and "digital output" functionality is not available with Sensyflow eco1, there is no wiring within the adapter for these functions.
5 Commissioning

5.1 Checking the preconditions

Accompanying every measuring system is a calibration certificate, containing all the important information (e.g. serial number, calibrated measuring range, order number, adjusted outputs at time of delivery). Please ascertain if this data corresponds to the requirements of the measuring point in question.

5.2 Selecting the installation site

- For ambient temperatures see chapter "Technical Data".
- The mounting position is arbitrary.
- To prevent negative effects on measurement accuracy, sufficient straight upstream length is required when small flange connectors ISO-KF flange DN 25, Transair, G 3/4” and G 1” are used. These entry lengths ensure elimination of flow profile irregularities before they reach the measuring point at the sensor.
- Use straight, smooth pipes with lengths of approx. 10 xD for the steadying lengths on the input side. If using the G 1/2” and G 3/8” adapters, no extra steadying lengths will be required, as flow stabilizing components have been installed on the inflow sides of the adapters. The flow straightener causes an increased pressure drop.
- Components affecting flow, such as valves or shut-off fittings should be possibly installed behind the measuring point.

5.3 Installing the process adapter into the measuring pipe

IMPORTANT (NOTE)

The variable process adapters are attached to the pipe with a fine internal threading. This connection can be carefully unscrewed, using a spanner SW 30. Before refitting, clean and lightly grease the process adapter threading. Make sure the O-ring is mounted properly.
6 Parameterization

6.1 Overview parameterization program Sensyflow FMT200-ECO2

ACTUAL SETTINGS

ANALOG OUTPUT
- CURRENT
  - 4 ... 20 mA
- VOLTAGE
  - 0 ... 10 V
  - 0 ... 5 V

DIGITAL OUTPUT
- FREQUENCY OUTPUT
  - 10 ... 1000 Hz
  - 1 ... 100 Hz
  - VARIABEL 1 ... 2500 Hz
- PULSE OUTPUT
- CONTACT OUTPUT
  - PULSE LENGHT
  - PULSE EVALUATION
  - INTEGRATOR
  - MIN. LIMIT
  - MAX. LIMIT

SERVICE
(for manufacturer's service only)

6.2 Changing the configuration

A standard PC can be used to change the device configuration (i.e., settings) to other measuring ranges, outputs, and parameters. The device also features an RS 232 standard interface.

A configuration box (order number 7962818) facilitates the simultaneous connection of a PC, power supply, and Sensyflow FMT200-ECO2.

System requirements

The configuration program has been designed for use with Microsoft Windows XP or higher. A help function contains instructions for the program.
6.3 Installing the configuration program

1. Start Windows.
2. Insert CD-ROM.
3. Launch SETUP.EXE.

The installation program creates a directory containing the required files. The directory can be modified.

![ECO2 Setup](image)

Click the computer icon to begin installation.

6.4 Language selection

![Language selection](image)

Select the relevant language.

The installation menus are in German only, but the configuration program is available in English and French.
6.5 Starting the configuration program

Start program eco2.exe in the directory selected. The program uses COM1 as the default interface. If COM1 is already occupied, please set the preferred interface via the "connection" menu.

Click OK to confirm and the program will then test the connection. If an unsuitable interface has been selected or another communication problem arises, the following message appears:

In such cases, the line connections, the selected interface, and the operational readiness of the device (continuous green light on device) need to be checked.

If the interfaces have been entered correctly and the Sensyflow FMT200-ECO2 is ready to operate, the start screen for the configuration program appears.
6.6 Tab — actual settings

This menu shows all the current settings for the device.

6.6.1 Device identification

**Serial number:**
Unique serial number of the device. This should be quoted with each query.

**Version number:**
Status of device firmware

6.6.2 Status bar

Displays current information about the connection status and help text for the action selected.

The symbol at the right edge of the window shows the connection status. Green means the connection is satisfactory; red means the connection has been interrupted.
6.6.3 Standard specification

A clearly defined standard specification must be taken into account if a volume-flow unit has been selected. The absolute pressure and reference temperature must be taken from here. There is no reference condition for mass-flow units and the field is left blank.

Fig. 10

6.6.4 Digital output

Switch option
The current measured value is monitored for fluctuation either side of an adjustable limit value.
The polarity indicates how the signal is behaving between these thresholds.

Impulse output option
The device measures the amount of gas to have flown through. Once the amount in the "value" field has been reached, the device indicates this by outputting an impulse whose length and polarity can be read from here.

Frequency output option
The current measured value is indicated by a frequency at the digital output.
- Min: This frequency equates to a flowrate of 0.
- Max: This frequency equates to the range full-scale value.

Fig. 11
Parameterization

6.6.5 Analog output

The analog output indicates the flowrate through the device as measured at a given moment. This value can be adapted in a wide variety of ways to suit quite different applications. The "actual settings" tab shows all the values set.

**Range full-scale value:**
Maximum measured value; can be parameterized

**Upper range value:**
Upper limit for device calibration, i.e., the range full-scale value cannot be set to a value beyond the calibrated range.

**Measured value:**
Current measurement result from the selected unit

**Selected output:**
Type of analog output currently being used

**Analog output:**
Current measurement result in the form of a selected electrical output signal

**Output at error:**
The Sensyflow FMT200-ECO2 indicates that an error has occurred at the analog output.

**Dumping (filter factor):**
Time delay for adjustable damping

**Offset suppression:**
Measured values below the offset suppression value are shown as a flowrate of 0.

![Image](G00965)

**Fig. 12**

**6.6.6 Measured value**

The measured value area contains a bar chart showing how much of the set measurement range is currently being used. If the "switch" option for the digital output is activated, an additional bar appears.

If the current measured value is less than the lower activated threshold, the bar turns blue; if the measured value is higher than the upper set threshold, the bar turns red. A green bar indicates the value is between the upper and lower thresholds.

![Image](G00966)

**Fig. 13**
6.6.7 The configuration menu

<table>
<thead>
<tr>
<th><strong>Factory settings:</strong></th>
<th>Shows the parameters set at the factory</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Save:</strong></td>
<td>Saves the current parameter set to the data storage medium</td>
</tr>
<tr>
<td><strong>Load:</strong></td>
<td>Downloads a saved parameter set from the data storage medium</td>
</tr>
<tr>
<td><strong>Delete:</strong></td>
<td>Deletes a parameter set from the data storage medium</td>
</tr>
<tr>
<td><strong>Print:</strong></td>
<td>Prints off the current settings at the local printer</td>
</tr>
<tr>
<td><strong>Select language:</strong></td>
<td>English, French, German</td>
</tr>
<tr>
<td><strong>Select unit:</strong></td>
<td>Activates a unit from the list</td>
</tr>
<tr>
<td><strong>Add unit:</strong></td>
<td>See chapter 6.6.7.2.</td>
</tr>
<tr>
<td><strong>Delete unit:</strong></td>
<td>See chapter 6.6.7.2.</td>
</tr>
<tr>
<td><strong>Change password:</strong></td>
<td>For information on how to activate password protection, see chapter 6.6.7.1.</td>
</tr>
<tr>
<td><strong>Exit:</strong></td>
<td>Exits the Sensyflow FMT200-ECO2 configuration software</td>
</tr>
</tbody>
</table>

Fig. 14

If parameter settings have been changed in the configuration software and this has been imported into the device via the "save device data" menu item, a save / initialization phase is performed and the pilot light flashes RED.

**IMPORTANT (NOTE)**

The supply voltage must not be switched off during the save / initialization phase.

The supply voltage may only be switched off when the pilot LED is "continuous green" once more. The modified parameters will not be saved properly if this rule is not obeyed. When the device is switched on again, a data inconsistency will be detected during the initialization phase, the pilot LED will switch to "continuous red", and the device will no longer function correctly. Even though the pilot LED is red, the configuration software can be used to resume communication. The parameter data must be saved again via the "save device data" menu item. This can only be done after the symbol indicating that a program is running disappears and the status indication for the "initialization phase" is terminated.

The pilot LED is still "continuous red" at this stage. If the hardware is reset at this point by switching the supply voltage off and on, the pilot LED switches to "continuous green" and the device is operational once more.

6.6.7.1 Password protection

This function can be used to deny access to the tabs for making changes to the analog and digital output. As a result, changes affecting output signals can only be made if a password is
entered. The "current device parameters" tab remains available. This provides an overview of the device and is used for monitoring purposes.

6.6.7.2 Freely parameterizable unit

**Freely definable unit:**
Within this context, it must be possible to represent the freely definable unit as a multiple of kg/h.

**Unit:**
User-defined text naming the unit

**Factor:**
Numerical entry
Number of kg/h of air equivalent to the new unit

**Stand. spec.:**
User-defined text giving the standard specification on which the new unit is based

**Gas type:**
User-defined text

**Save:**
Saves the new unit to the data storage medium

---

**Example:**
The display is to be based on balloons per minute.
One balloon contains 7 Nl of air, that is 0.007 Nm³.
Given that the standard density of air = 1.293 kg / Nm³, it takes 0.00905 kg to fill each balloon.
This means 1 kg/h equates to around 110 balloons / h or 1.84 balloons / min.
The standard specification on which the density is based assumes 0 °C and 1,013 mbar.
"Delete unit" in the "configuration" menu can be used to reject an incorrect entry.
6.7 Tab — analog output

This tab can be used to adapt the analog output. For the sake of transparency, both the current and amended values are displayed at the same time. The modified values are saved with "save device data". An initialization phase follows, during which no measured values are displayed and the pilot light on the device flashes RED (see 6.6.7 for information).

Fig. 16

**Analog output:**
Select an entry from the list.

**Overflow 10 %**
If overflow is active, any measured value up to 10 % above the set range full-scale value can be output at the analog and frequency output.

**Range full-scale value:**
Which flowrate value should equate to the maximum electrical output signal?

**Offset suppression:**
Which offset suppression value should no longer be recorded or evaluated?

**Dumping (filter factor):**
Which time constant should be used to damp the output signal?
**Parameterization**

**Output at error:**
How should the device behave when a fault (e.g., device error) has been detected?

**Min:** Analog output signals 0 %
**Max:** Analog output signals 100 %
**Up:** Analog output signals > 100 %
**Down:** Analog output signals < 0 %

<table>
<thead>
<tr>
<th>Signal</th>
<th>0 ... 20 mA</th>
<th>4 ... 20 mA</th>
<th>0 ... 5 V</th>
<th>0 ... 10 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min</td>
<td>0 mA</td>
<td>4 mA</td>
<td>0 V</td>
<td>0 V</td>
</tr>
<tr>
<td>Max</td>
<td>20 (22) mA</td>
<td>20 (21.6) mA</td>
<td>5 (5.5) V</td>
<td>10 (11) V</td>
</tr>
<tr>
<td>Up</td>
<td>&gt; 22.5 mA</td>
<td>&gt; 22.5 mA</td>
<td>Not supported</td>
<td>Not supported</td>
</tr>
<tr>
<td>Down</td>
<td>Not supported</td>
<td>&lt; 3.5 mA</td>
<td>Not supported</td>
<td>Not supported</td>
</tr>
</tbody>
</table>

The values in brackets apply when "overflow active" has been selected.

6.8 Tab — digital output

There are even more options for parameterizing the digital output. The output signal for the digital output is binary (0 or 24 V). Signaling polarity can be reversed.

For the sake of transparency, both the current and amended values are displayed at the same time.

The modified values are saved with "save device data".

An initialization phase follows, during which no measured values are displayed and the pilot light on the device flashes RED (see 6.6.7 for information).

The digital output can be switched between the following modes:

6.8.1 Frequency standard

In this mode, the current measured value is mapped to the digital output as a proportional frequency.

![Frequency Standard](image_url)

Fig. 17

In "frequency standard" mode, it is possible to switch between the two frequency ranges 1 ... 100 Hz and 10 ... 1,000 Hz. The lower frequency represents a flowrate equal to 0 % and the upper frequency represents a flowrate equal to 100 % of the set range full-scale value (see chapter 6.6.7.2).
6.8.2 Frequency variable

In this mode, the current measured value is mapped to the digital output as a proportional frequency.

![Image of frequency variable mode](G00971)

Fig. 18

The "frequency variable" mode allows upper and lower limiting frequencies to be entered. The maximum possible frequency is 2,500 Hz. The lower frequency represents a flowrate equal to 0 % and the upper frequency represents a flowrate equal to 100 % of the set range full-scale value (see chapter 6.6.7.2).

6.8.3 Impulse output

In this mode, the device adds up the total flowrate. Once the amount in the "value" field has been reached, the device indicates this by outputting an impulse whose length and polarity can be set here.

![Image of impulse output mode](G00972)

Fig. 19

**Value:**
Enter an amount which should flow through before an impulse is output.

**Length:**
Using the slider, the impulse length can be set in the range 1 ... 256 ms. Taken together, the length and value must allow an impulse and pause to be output at maximum flow.

**Polarity:**
This is for selecting whether a
- positive, i.e., length 0 V - impulse 24 V - length 0 V, or
- negative, i.e., length 24 V - impulse 0 V - length 24 V,
counting impulse is to be output.
Parameterization

6.8.4 Switch output

The current measured value is monitored here for fluctuation either side of the adjustable limit values. The polarity indicates how the signal is behaving between these thresholds.

![Figure 20](image)

6.8.5 No output

This function can be used to deactivate the digital output.
7  Maintenance / Service

All measuring systems are calibrated using in-house calibration equipment. The device does not require any maintenance. Occasional cleaning may be required where the air contains large amounts of dust or oil. We recommend connecting an upstream air filter for this type of application. Filters guaranteeing air quality to ISO 8573-1: Class 1-2 have proven particularly reliable in this context.

Cleaning the flowmeter sensor
Cleaning the flowmeter sensor will only remove particles; sticky or stubborn stains cannot be removed. If the flowmeter sensor becomes contaminated with oil or deposits which cannot be cleaned using air, it will have to be returned to the manufacturer for cleaning in a special solution. This will also involve a complete recalibration process.

Air-cleaning:
1. Remove the connecting cable's connector from the flowmeter sensor.
2. Check the pipeline is depressurized.
3. Dismantle the flowmeter sensor at the process connections.
4. Carefully blow through the flowmeter sensor with clean compressed air.
5. Visually inspect the flow-steadying special sieve (optional) for contamination. If necessary, replace with a new special sieve.
6. Carefully reinstall the special sieve in the flowmeter sensor.
7. Reconnect the connecting cable to the flowmeter sensor.

NOTICE - Potential damage to parts!
Under no circumstances should components like the honeycomb or sieve be removed from the flowmeter sensor, nor should they be bent or damaged in any other way. Failure to comply with the cleaning steps described above may cause the flowmeter sensor to be damaged beyond repair.
8 Specifications

Measuring principle
Thermal: hot-film anemometer

Input
Measured medium
Air

Measuring ranges
0 (1) ... 100 kg / h or 0 (12) ... 1250 Nl / min

Output
Analog output signal
0 ... 5 V 0 ... 10 V 0 / 4 ... 20 mA
Load
< 500 Ω

Error indication
< 3.5 mA or > 22 mA

Digital output
24 V, 20 mA

Frequency output
variable 1 ... 2500 Hz

Counter pulse
Pulse evaluation and pulse duration configurable

Alarm values
Minimum and maximum, adjustable

Polarity adjustable

Characteristics
Measured error
< ± 3 % of measured value

Repeatability
< ± 0.5 % of measured value

Response time
T₆₃ = 25 ms; T₉₈ = 90 ms

Influences
Temperature effect
< 0.1 % / K of measured value

Pressure effect
≤ 0.2 % / 100 kPa (/bar) of measured value

Pressure drop
< 10 kPa (100 mbar) at full scale and using the small flange adapter DN 25; decreasing quadratically for smaller flow rates.

Measured medium conditions
Measured medium temperature
-25 ... 50 °C (13 ... 122 °F)

Measured medium pressure
Standard: 10 x 10² kPa (10 bar abs.)
High pressure version: 16 x 10² kPa (16 bar abs.)

Construction
Weight
0.51 kg (accessories see ordering information)

Material
Flowmeter sensor: aluminium, Hostadur, tinned Cu, glass
Process connections: aluminium
Fittings: aluminium

Process connection
Small flange adapter ISO KF flange;
Threads G 3/8", G 3/4", G 1/2", G 1";
Legris tube adapter, Transair adapter

Electrical connection
Sub-D connector, serie 712, 8-pin, IP 65

Power supply
Voltage
24 V DC ± 10 %

Power consumption
< 15 W

Current consumption
Peak < 1 A; operation < 0.6 A
Slow-blow fuse of at least 2 A recommended

Communication interface
RS 232

Approvals for explosion protection (zone 2 and zone 22)
Gas: ATEX II 3 G EEx n A II T4 X
Dust: ATEX II 3 D T 135 °C IP 65 X

Accessories (optional)
- Inlet and outlet runs
- Pipe fittings
- Connection adapter
- Quick-clamping connectors
- Reducers
- Power supply unit
- Display unit
- Display and supply unit completely installed in an IP 65 housing

Environmental conditions
Ambient temperature for flowmeter sensor
-25 ... 50 °C (-13 ... 122 °F)

Degree of protection
IP 65

Storage temperature
-25 ... 85 °C (-13 ... 185 °F)

---

1) Approximate values are given for applications with air under atmospheric conditions. The values in brackets indicate the low limit of the measuring range for which the measured value accuracy indicated is specified.

2) It is possible to specify any unit which you can transform into a mass or standard volume flow. (Can also be written as: l / min-q₀).

3) Power supply with safe electrical separation in accordance with EN 61010 and IEC 950, with max. output power of 150 W.
9 Dimensions

9.1 Flowmeter sensor FMT200-ECO2

Fig. 21: Flowmeter sensor FMT200-ECO2 with mounted small flange adapter
9.2 Accessories

Small flange connections
KF = ISO KF flange (ISO small flange)

Process adapter flange KF DN 25, inlet run and outlet run, 2 clamp rings and 2 sealing rings

Inlet run length 10 x D, both sides with KF-DN 25 connections

Outlet run length 5 x D, both sides with KF DN 25 connections

Hose adapter for KF DN 25, incl. 1 flange, 1 clamping ring and 1 sealing ring

Fig. 22: Dimensions in mm (inch)

Straight undisturbed pipes must be provided as steadying lengths. On the inlet side they should have a length of approx. 10 x D. When using the G 1/2" and G 3/8" adapters no additional steadying lengths are required, as flow-conditioning components are implemented in the adapters on the inlet side.

Note that flow conditioner causes a considerable pressure drop. Components affecting the flow like valves or shut-off devices should be installed on the outlet side, i.e. downstream of the measuring point.
Threads and adapter

Thread G 3/8", connection for Legris-tube adapters, pair) for inlet run and outlet run; inlet run adapter includes a high-tech flow conditioner

Legris-tube adapter (pair)

Thread G 3/4", also connection for Transair system 25 mm (pair)

Transair adapter 25 mm (pair)

Thread G 1/2" (pair) for inlet run and outlet run. Inlet run adapter includes a high-tech flow conditioner

Thread G 1"

Fig. 23: Dimensions in mm (inch)
The configuration box is available as an option. It is used to simplify wiring for testing and configuration purposes. Its electrics are largely based around a star hub, which distributes the signals from the device's 8-wired connecting cable to the different input and output contacts.

1. Supply power
   The 24 V DC voltage is connected via a "5.5 mm external / 2 mm internal" plug. Polarity is irrelevant, as the configuration box features protection against polarity reversal.

2. LED
   The LED is green when a power supply is connected.

3. Analog output
   The analog signal can be read at these terminals. The analog signal represents the current measured value. 0 (4) ... 20 mA current signals (I) and 0 ... 5 (10) V voltage signals (U) can be configured.

4. Digital output
   The 24 V digital signal can be read from the BNC socket. Depending on the configuration, this can be a frequency signal, counting impulse, or logical min. / max.signal.

5. Connection to Sensyflow FMT200-ECO2
   This socket is used to connect the device via the connecting cable included in the scope of delivery for the configuration box.

6. Serial interface
   This enables a PC or laptop’s COM x interface to be connected to the configuration box via a commercially available serial cable. The configuration program can be used to customize measuring ranges and output signals in line with requirements.

Fig. 24
11 Appendix

11.1 Decommissioning and packaging

Packaging the device ready for transport or return to the manufacturer

If the original packaging material is no longer available, wrap the device in bubble wrap or corrugated cardboard and place it in a box of sufficient size lined with a shock-absorbing material (e.g., foam rubber). The thickness of the padding should be appropriate for the device weight and type of shipment. The box must be handled with care and labeled accordingly.

For overseas shipment, always add a desiccant (e.g., silica gel) and hermetically seal the device plus desiccant in a layer of polythene that is 0.2 mm thick. Use an amount of desiccant that is appropriate for the packing volume and the expected transport time (at least sufficient for 3 months). You should also line the box with a layer of union paper.

All devices returned to the manufacturer must be accompanied by a completed and signed decontamination certificate (see Appendix). Without this, ABB will not be able to process the return.

11.2 Approvals and certifications

<table>
<thead>
<tr>
<th>CE mark</th>
<th>The version of the meter in your possession meets the requirements of the following European directives:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- EMC directive 2014/30/EU</td>
</tr>
<tr>
<td></td>
<td>- Low voltage directive 2014/35/EU</td>
</tr>
<tr>
<td></td>
<td>- ATEX directive 2014/34/EU</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Explosion Protection</th>
<th>Identification for intended use in potentially explosive atmospheres according to:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- ATEX directive (marking in addition to CE marking)</td>
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</table>

<table>
<thead>
<tr>
<th>Calibration</th>
<th>DAkkS- / ILAC-accredited calibration equipment D-K-15081-01-00</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>- Example certificate</td>
</tr>
</tbody>
</table>

**IMPORTANT (NOTE)**

All documentation, declarations of conformity and certificates are available in ABB's download area.  
www.abb.com/flow
Calibration - Certificate

Customer: Muster
F-No.: 1234567890 X001

Flowmeter Data
Flowmeter: Sensyflow FMT200-ECO2
ID: 342232384
Type-Ce: 14252-

Application Data
Diameter: NW 25
Pressure range: 0 - 10 bar
Gas: Air
Selected measuring range: 100 kg/h
Calibrated (max) measuring range: 100 kg/h
Standard Conditions: (0°C / 1013 mbar)

Analog Output: 0 - 10 Volt

Calibration
The accuracy of the instrument for the calibrated range is < 3 % of reading. The repeatability is < 0.5% of reading.

Calibration setup:
- Gas: Air
- Gas Temperature: 22°C ± 2K
- Gas Pressure: 1005 ± 25 mbar
- Test reg: PSI2003
- Sensyflow reference system with accuracy < 1% of reading. The reference system is traceable to National Standards.

Final Test
We confirm, that this measuring system has been checked according to the regulations and that it complies with the technical data.

Reference - Airflow "Q Ref"
[kg/h]

<table>
<thead>
<tr>
<th>Q Ref [kg/h]</th>
<th>Δ [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.98</td>
<td>0.50</td>
</tr>
<tr>
<td>9.94</td>
<td>0.13</td>
</tr>
<tr>
<td>35.49</td>
<td>-0.01</td>
</tr>
<tr>
<td>74.79</td>
<td>0.04</td>
</tr>
</tbody>
</table>

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11.3 Return form

Statement on the contamination of devices and components
Repair and/or maintenance work will only be performed on devices and components if a statement form has been completed and submitted. Otherwise, the device/component returned may be rejected. This statement form may only be completed and signed by authorized specialist personnel employed by the operator.

Customer details:
Company:  
Address:  
Contact person: Telephone:  
Fax: Email:  

Device details:
Type: Serial no.:  
Reason for the return/description of the defect:

Was this device used in conjunction with substances which pose a threat or risk to health?  
☐ Yes ☐ No  
If yes, which type of contamination (please place an X next to the applicable items)?  
Biological ☐ Corrosive/irritating ☐ Combustible (slightly/extremely combustible) ☐  
Toxic ☐ Explosive ☐ Other Toxic substances ☐  
Radioactive ☐  

Which substances have come into contact with the device?  
1.  
2.  
3.  

We hereby state that the devices/components shipped have been cleaned and are free from any dangerous or poisonous substances.

Town/city, date Signature and company stamp