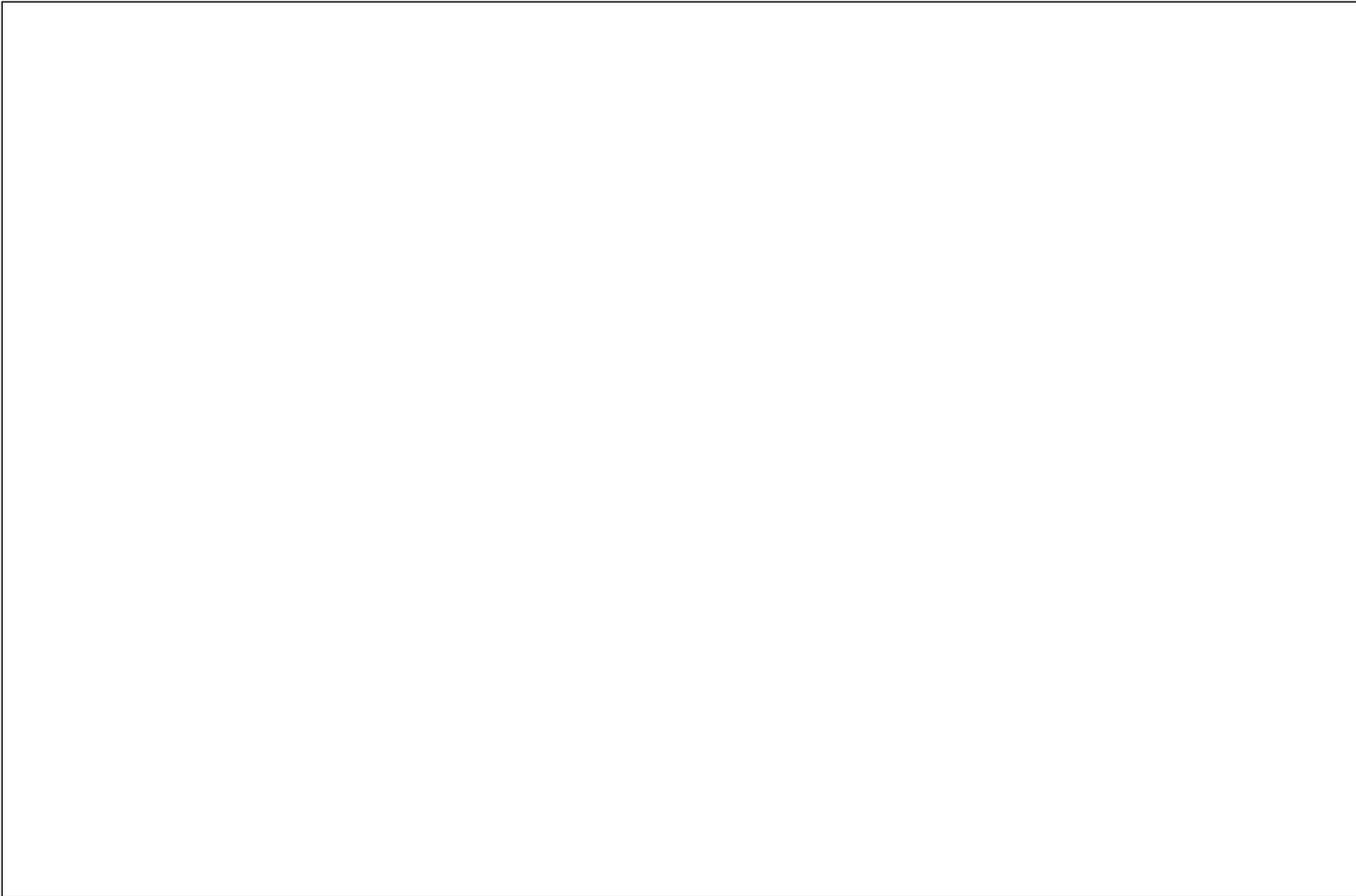


Probe 2

Operator's Manual

42/23-12 EN Rev. 9



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Preamble

Contents of this Operator's Manual

This Operator's Manual contains all information required to be able to install, put into operation, operate and maintain probe 2 with a heated or partially heated probe tube safely and as specified.

Further Information

Spare Parts

You can order spare parts via our service "Parts OnLine". You will find Parts OnLine on the Internet at "<http://www.abb.com/partsonline>".

Internet

You will find further details about the products and services of ABB Analytical on the Internet at "<http://www.abb.com/analytical>".

Service Contact

If the information in this Operator's Manual does not cover a particular situation, ABB after sales service will be pleased to provide further information.

Please contact your local service representative. For emergencies, please contact

ABB Service,
Telephone: +49-(0)180-5-222580, Telefax: +49-(0)621-38193129031,
E-mail: automation.service@de.abb.com

Symbols and Typefaces in the Operator's Manual

WARNING denotes safety instructions which must be followed when handling the device, in order to prevent danger to user.

NOTE denotes information about particular features with regard to the handling of the device and the use of this Operator's Manual.

1, 2, 3, ... denotes the reference numbers in the figures.

Specified Use

Specified Use

Gas sampling probe 2 is used for the continuous sampling of gases in processes.

Any other application is not compliant with the specified use.

Observation of this Operator's Manual is also part of the specified use.

Gas sampling probe 2 is particularly suitable for sampling gases with large gas flows, increased gas pressure, high gas humidity and high dust content.

Safety Information

Requirements for Safe Operation

In order to operate in a safe and efficient manner the device should be properly handled and stored, correctly installed and set-up, properly operated and correctly maintained.

Personnel Qualifications

Only persons familiar with the installation, set-up, operation and maintenance of comparable devices and certified as being capable of such work should work on the device.

Special Information and Precautions

These include

- The content of this operator's manual,
- The safety information affixed to the device,
- The applicable safety precautions for installing and operating electrical devices,
- Safety precautions for working with gases, acids, condensates, etc.

National Regulations

The regulations, standards and guidelines cited in this operator's manual are applicable in the Federal Republic of Germany. The applicable national regulations should be followed when the device is used in other countries.

Device Safety and Safe Operation

The device is designed and tested in accordance with EN 61010 Part 1, "Safety Provisions for Electrical Measuring, Control, Regulation and Laboratory Instruments" and has been shipped ready for safe operation. To maintain this condition and to assure safe operation, read and follow the safety information in this manual. Failure to do so can put persons at risk and can lead to device damage as well as damage to other systems and devices.

Protective Lead Connection

The protective lead (ground) should be attached to the protective lead connector before any other connection is made.

Risks of a Disconnected Protective Lead

The device can be hazardous if the protective lead is interrupted inside or outside the device or if the protective lead is disconnected.

Risks Involved in Opening the Covers

Current-bearing components can be exposed when the covers or parts are removed, even if this can be done without tools. Current can be present at some connection points.

Risks Involved in Working with an Open Device

All work on a device that is open and connected to power should only be performed by trained personnel who are familiar with the risks involved.

When Safe Operation can no Longer be Assured

If it is apparent that safe operation is no longer possible, the device should be taken out of operation and secured against unauthorized use.

The possibility of safe operation is excluded:

- If the device is visibly damaged,
- If the device no longer operates,
- After prolonged storage under adverse conditions,
- After severe transport stresses.

Guide for the Installation

Basic Steps

NOTE

Please refer to the planning documents for the installation.

Please also refer to the technical data (see chapter "Technical Data (see page 19)").

The wall tube must be installed at the sampling point before the probe is installed (see chapter "Preparing for Installation (see page 9)").

| Step | Action |
|-------------|--|
| 1 | Unpack the supplied parts (see section "Unpacking and Delivery Form (see page 12)"). |
| 2 | Install the gas sampling probe (see section "Installing Probe 2 (see page 13)"). |
| 3 | Carry out the electrical connection (see sections "Requirements and Procedures for Electrical Connection (see page 16)" and "Electrical Connections for Probe 2 (see page 17)"). |

After you have carried out these steps, probe 2 is operative.

CHAPTER 1

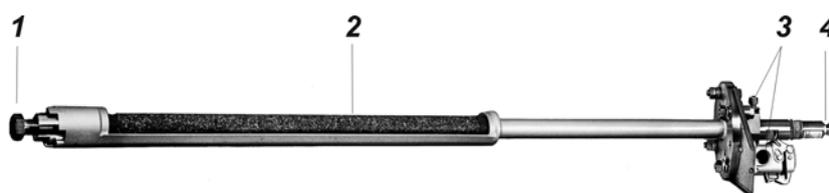
Preparing for Installation

Structure and Function

Interaction of the Components

The process gas is cleaned of dust particles by means of a ceramic inlet filter in probe 2. The sample gas is subsequently transferred to the analyzer system via a sample gas pipe.

Main Components of the Probe 2



| | |
|---|--|
| 1 | Mounting for the inlet filter |
| 2 | Ceramic inlet filter (inner filter) |
| 3 | Sample gas outlet or test gas or purge gas inlet |
| 4 | Outlet of the heating cable |

Electrically heated gas sampling tube

- Integrated heating rod for heating from the ceramic inlet filter up to the end of the sample gas outlet
- Additional connection for compressed air, can be used as a test gas/purge gas connection

Ceramic inlet filter

- High retention rate for dust
- Good cleaning action with compressed air purging

Choosing the Sampling Point

Choosing the Sampling Point

- Select a sampling point as per the planning documents which are suitable for extracting a representative sample flow.
- Install the wall tube with assembly flange (DN 65, PN 6, Form B to DIN 2573) at the sampling point in such a way that the probe tube can be easily installed and removed (see the section "Information about Installation of the Wall Tube (see page 11)").
- The probe tube must be easily accessible to allow maintenance work to be performed.

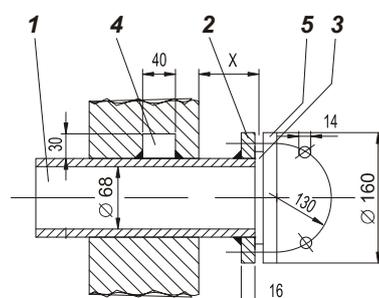
Information on the Installation of the Wall Tube

Installation of the Wall Tube

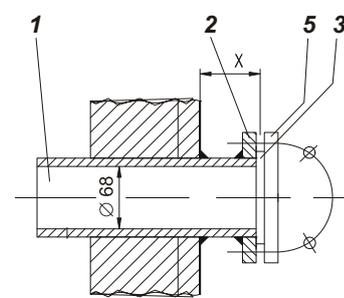
Please refer to the planning documents and the information in the chapter "Installation (see page 12)" for installation of the wall tube.

Install the wall tube dependent on the installation conditions as per the following sketches.

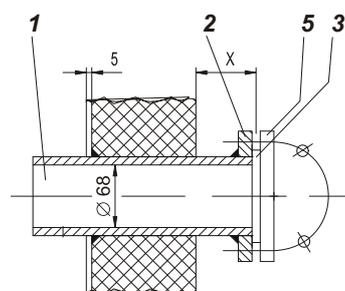
Installation of the wall tube in brickwork (dimensions in mm):



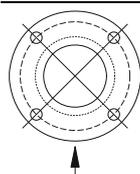
Installation of the wall tube in brickwork with metal sheeting (dimensions in mm):



Installation of the wall tube in an insulated sheet-metal channel (dimensions in mm):



| | |
|----------|---|
| 1 | Wall tube |
| 2 | Assembly flange DN 65, PN 6, Form B to DIN 2558 |
| 3 | Gasket |
| 4 | Welded-on rectangular block |
| 5 | Sampling probe flange |



The figure shows a view of the flange looking from the process to the filter. The arrow indicates the flow direction of the process gas.

Select the installation position of the wall tube, so that the holes are located in the position shown here.

CHAPTER 2

Assembly

Unpacking and Delivery Form

Unpacking

WARNING
 Danger of breakage!
 The ceramic inlet filter of probe 2 is fragile.

| Step | Action |
|------|--|
| 1 | Unpack the component parts of probe 2 (see below). |
| 2 | Make sure that any accompanying accessories do not get lost. |
| 3 | Check the contents of the delivery to ensure that it is complete by comparing the actual goods with the dispatch note. |

NOTE

Keep the packing material for possible future transport.
 If damage has occurred during transport due to improper handling, please submit a damage report to the transport institution (railway company, post office, forwarding agency) within seven days.

Delivery Form

Probe 2 is supplied in various partially pre-assembled component parts:

- Gas sampling probe with flange and internal heating rod
- Ceramic inlet filter (inner filter)
- Installation set for mounting the ceramic inlet filter (4 bolts M12 x 70 with nuts, spring washers and washers)
- Protective box (option), degree of protection IP54

Carry out the final assembly at the service location as described in the section "Installing Probe 2 (see page 13)".

Assembling Probe 2

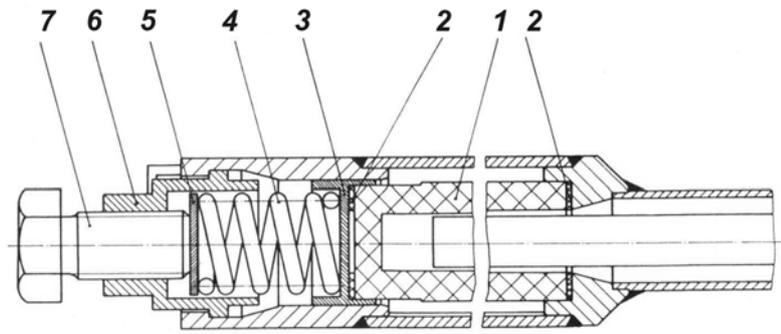
Assembly of the Ceramic Inlet Filter

WARNING

Danger of breakage!

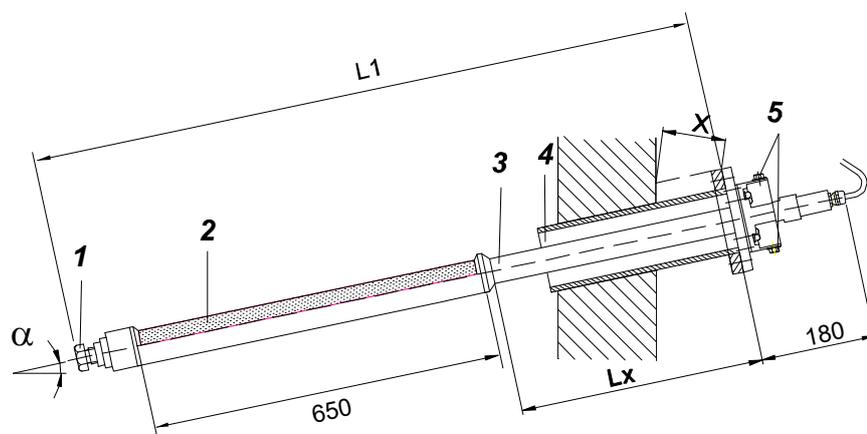
The ceramic inlet filter of probe 2 is fragile.

First of all, assemble the ceramic inlet filter as shown in the following drawing. Please note that the compression spring **4** has to be compressed by approx. 15 mm.



| | |
|----------|--------------------|
| 1 | Filter element |
| 2 | Sealing gasket |
| 3 | Bush |
| 4 | Compression spring |
| 5 | Pressure disk |
| 6 | Bush |
| 7 | Screw |

Assembly of Probe 2



| | |
|-----------|---|
| 1 | Mounting for the inlet filter |
| 2 | Inlet filter (inner filter) with internal heating rod |
| 3 | Gas sampling tube |
| 4 | Wall tube with inlet flange |
| 5 | Sample gas outlet and test gas/purge gas inlet G 1/4 |
| L1 | Fitting length |
| Lx | Length of the gas sampling tube (approx. 400 mm) |
| x | Minimum distance of the flange of probe 2 from the wall |

The following table shows the recommended mounting angle and the minimum distance x_{\min} of the assembly flange from the wall depending on the mounting angle of the probe 2:

| Mounting angle α | 10° | 15° | 20° | 25° | 30° | 35° |
|-------------------------|-----|-----|-----|-----|-----|-----|
| x_{\min}/mm | 133 | 138 | 143 | 147 | 151 | 153 |

| Step | Action |
|------|---|
| 1 | Align the gas sampling probe, so that the opening of the inlet filter (inner filter) is not directly in the process gas flow. |
| 2 | Attach probe 2 to the flange of the wall tube with the enclosed screws M12 x 70. |
| 3 | Connect the gas lines to the sample gas outlet and the test gas/purge gas inlet. |

Connect the Sample Gas Line

Connect the sample gas line to one of the two gas ports **5** at the sample gas outlet of the filter unit by means of a clamp ring screw fitting.

WARNING

Possible leakage!

When tightening the screw connection, relieve the pressure on the gas port, e.g. by holding back with a suitable spanner. Otherwise there is a danger that the gas port is twisted and becomes untight or breaks off.

Connect the Compressed Air Lines

If probe back-purging is available, connect the compressed air lines to one of the two gas ports **5**. Please note the maximum permissible pressure of 6 bar.

Electrical Installation

Requirements and Procedures for Electrical Connection

WARNING!

Please observe the relevant national safety regulations for the construction and operation of electrical installations as well as the following safety instructions.

Before connecting the power supply, check that the operating voltage on the rating plate is the same as the mains voltage.

The protective-conductor terminal must be connected to a protective conductor before any other connections are set up.

The device can be dangerous if the protective conductor is interrupted inside or outside the device or the protective-conductor terminal is disconnected.

WARNING!

You must be able to disconnect the device from the power supply! For this purpose, install a 2-pin mains isolator in the power supply line, since the device does not have its own power switch.

What material is required?

Select the required line material as per the planning documents.

Electrical Connections for Probe 2

WARNING

Corrosion risk!

The probe tube heater of probe 2 must be switched on immediately after assembly has been completed, since otherwise there is a risk of corrosion.

Design of the Electrical Connections

| Probe Version | Catalog No. | Electrical Connection |
|-------------------------|--------------------|--|
| heated, 650 W | 23022-4-0768301 | Silicone cable, $3 \times 1.5 \text{ mm}^2$, length 1000 mm |
| partially heated, 255 W | 23022-4-0768305 | Silicone cable, $3 \times 1.5 \text{ mm}^2$, length 1000 mm |

Electrical Connection

Connect the cables of the current lead to the power supply.

Inspection and Maintenance

Maintenance of the Filter Element of Probe 2

WARNING

Danger of burns!

The gas sampling probe becomes hot during operation. Touching this component can cause burns.

Interval for Cleaning the Filter Element

WARNING

Health hazard!

Dependent on the substances which it comes into contact with during operation, the filter element could be contaminated with toxic or corrosive substances. Always wear suitable protective clothing for cleaning work.

The service life of the filter depends on the operating conditions. Remove it as required, so that you can visibly eliminate the dirt accumulation mechanically or exchange it.

If the filter stone is obviously damaged, replace it with a new one. The interval also depends on the operating conditions. You can determine this during operation.

CHAPTER 5

Technical Data

Probe 2

Permissible Operating Parameters

| | |
|---|--|
| Process gas pressure p_{abs} | max. 400 kPa (4 bar) |
| Temperature | max. 450 °C (Probe tube partially heated), max. 130 °C (Probe tube heated) |
| Flow rate | max. 2000 l/h, relative to 100 kPa (1 bar) and 0 °C |
| Dust content | max. 20 g/m ³ (application recommendation), max. 100 g/m ³ with back-purging |
| Back-purging pressure | max. 600 kPa (6 bar) |
| Heating temperature of the inlet filter | ≥ 200 °C (at process gas temperature = 20 °C) |
| 90% time (T_{90}) | < 2 s at 250 l/h |
| Filter fineness | 0.3 µm |
| Ambient temperature | +5...+50 °C |
| Voltage | 230 VAC, 50...60 Hz (120 VAC on inquiry) |

Pneumatic Connections

| | |
|---|--|
| Sample gas | Gas ports with G 1/4 female thread (DIN ISO 228/1) for threaded connections <ul style="list-style-type: none"> ▪ for pipe with 6 mm outer Ø ▪ for hose with 6 mm inner Ø |
| Compressed air (purging air) or test gas | Gas ports with G 1/4 female thread (DIN ISO 228/1, provided with screw-type blank cap) |

Ceramic Inlet Filter

| | |
|-----------------------|--|
| Dimensions | Length: approx. 670 mm, area: approx. 975 cm ² , Catalog No.: 23005-4-0730705 |
| Retention rate | for particles > 5 µm 99.99 by weight % for particles 3.0...5.0 µm 99.99 by weight % for particles 1.4...3.0 µm 99.98 by weight % for particles 0.5...1.4 µm 99.5 by weight % for particles 0.3...0.5 µm 99.5 by weight % |

Putting out of Service and Packing

Putting out of Service

WARNING

Danger of burns!

The work described in this chapter requires specialist knowledge. As a result, it may only be carried out by persons who are qualified and specially trained. The metal parts may have high temperatures as a result of operation.

WARNING

Electric shock!

You must disconnect the voltage for the current circuit, in which the heating rod of probe 2 is integrated, before putting the device out of service. Otherwise, there is the danger of electric shock.

| Step | Action |
|-------------|---|
| 1 | Disconnect the power supply to the sample gas pump. |
| 2 | Disconnect the power supply to probe 2. |
| 3 | Clean the filter. |

Packing for Return

Packing Probe 2

- 1** If the original packing material is no longer available, wrap the device in bubble foil or corrugated cardboard. When shipping overseas, also heat-seal the device air-tight in 0.2 mm thick polyethylene, including a desiccant (e.g. silica gel). The amount of desiccant used should be adequate for the package volume and the probable shipping time (at least 3 months).
- 2** Pack the device in an adequately large box lined with shock absorbent material (e.g. foam material). The thickness of the cushioning material should be adequate for the weight of the device and the mode of shipping. The box should also be lined with a double layer of bitumen paper for overseas shipping.
- 3** Mark the box "Fragile! Handle with care!".

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3KXG171206R4201

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Printed in the Fed. Rep. of Germany (04.11)

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