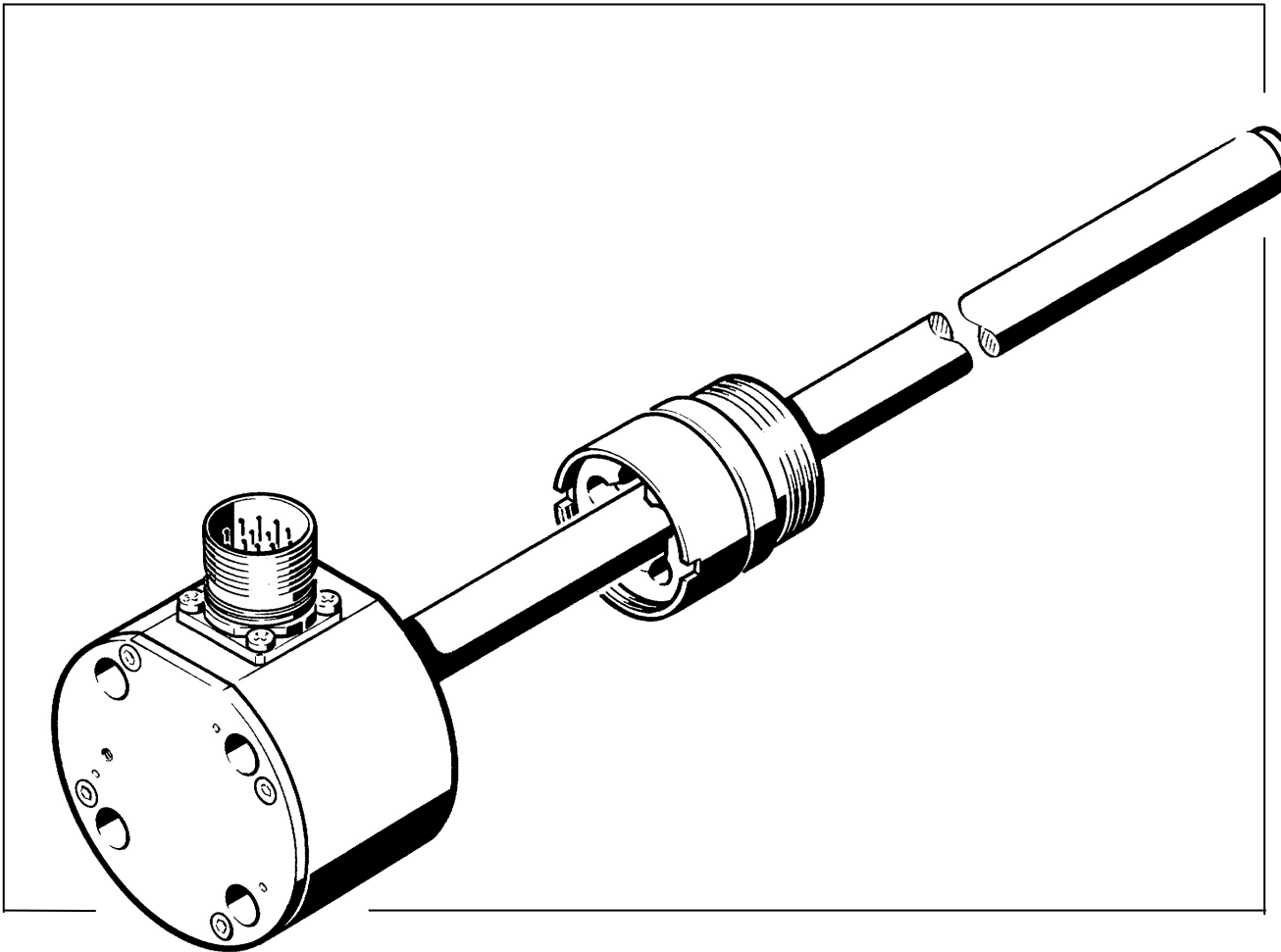


## Mounting Instructions

### H-POMUX<sup>®</sup> P 521

**Absolute length measurement system  
for installation in hydraulic cylinders**



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Issue date: 05/10

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### Documentation overview

The overall documentation on the **H-POMUX® P 521** comprises the following:

- **Product information**
- **Mounting instructions \***

\* this is the present documentation.

To request these documents, please apply to **SICK STEGMANN GmbH**

The address and the telephone/fax number will be found on the inside front cover of these Mounting instructions.

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## 1. Foreword

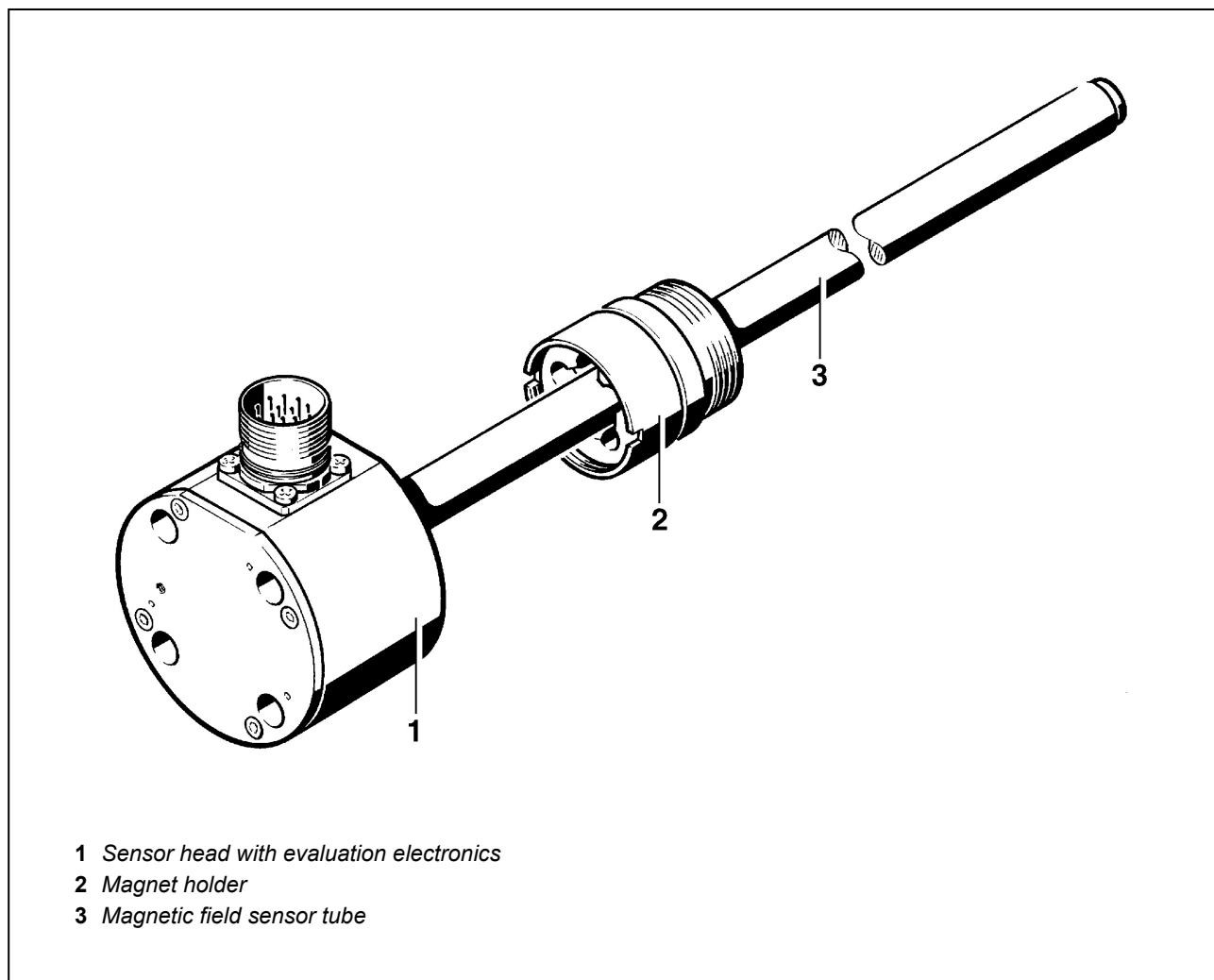


Fig. 1-1 H-POMUX<sup>®</sup> length measurement system

Dear customer,  
dear installer,

You are about to undertake the task of mounting an **H-POMUX<sup>®</sup> length measurement system** from **STEGMANN**.

These mounting instructions are intended to give you the knowledge which is necessary for you to be able to carry out the mounting rapidly and correctly.



**Please read these instructions through carefully and pay particular attention to the advice and warning notes!**

The **SICK STEGMANN H-POMUX®** (position multiplexer) is a non-contact, absolute length measurement system.

The measurement system is designed specifically for use in hydraulic cylinders.

The measurement system consists of two parts:

- the sensor head with sensor tube
- the magnet holder

### **Sensor head/sensor tube**

The tube contains a long narrow board on which the magnetic field sensors are arranged.

As a function of the position of the magnetic field, the information is registered by the sensor and forwarded to the evaluation electronics.

The position of the magnet in relation to the sensors is available as an encoded signal at the output of the sensor head.

The absolute positional data is transmitted via a cable to a controller or to a host computer.

The sensor head is mounted on the cylinder base. The sensor tube projects into the cylinder.

### **Mounting for the position transmitter permanent magnets**

The annular position transmitter permanent magnet is located in the non-ferrous metal holder.

This is screwed into the piston.

When the piston is driven into the cylinder, the mounting of the position transmitter permanent magnet slides over the magnetic field sensor tube.

A bored hole in the piston or the piston rod accommodates the magnetic field sensor tube.

If you have any questions in relation to the **H-POMUX® length measurement system**, we shall be pleased to answer them.

The telephone number will be found on the inside front cover of these mounting instructions.

Yours sincerely,

**SICK STEGMANN GmbH**

## 2. General advice

### 2.1 Validity

These mounting instructions apply to the non-contact, absolute length measurement system **H-POMUX® P 521**.

The configuration of the length measurement system is specific to the customer, that is to say the length of the system depends on the application.

### 2.2 Symbols and their meaning



Paragraphs which are identified with this symbol contain very important advice; this also includes **advice for averting health risks**.

**Observe these paragraphs without fail.**



Paragraphs which are identified with this symbol contain very important advice; this also includes **how to avoid damage to property**.

**Observe these paragraphs without fail.**



This symbol indicates paragraphs which contain comments/advice or tips.

- This bullet identifies the description of actions which you should carry out.

### 3. Safety Advice

#### 3.1 Personal protection



- Switch off all devices/machines/plant affected by mounting or repair.  
If appropriate, isolate the devices/machines/plant from the mains.
- Before mounting or repair, remove the pressure from pneumatic/hydraulic devices/machines/plant.
- If necessary, set up warning signs in order to prevent the inadvertent starting up of devices/machines/plant.
- Our length measurement system must not be commissioned
  - if any safety equipment is faulty and/or
  - if any components/subassemblies are damaged (e.g. damaged connectors).  
In these cases, isolate the system from the power supply.
- Ensure that, during mounting or repair, the device/machine/plant into which the H-POMUX<sup>®</sup> length measurement system is integrated cannot inadvertently be started up. If necessary, set up warning signs.
- After concluding the mounting/repair work, carry out a test run of the measurement system and check the correct functioning of the safety equipment.
- Never work under "floating" loads.
- Never carry out operations on a hydraulic cylinder which is under pressure.
- Never open hydraulic cylinders which are under pressure.
- Observe the professional health and safety regulations when carrying out the mounting/repair work.
- Check the correct functioning of the safety equipment (for example the emergency off switches).



### 3.2 Device safety

- The **H-POMUX® length measurement system** is a quality product which is produced in accordance with recognized industrial regulations.
- The system corresponds to the quality requirements of ISO 9001.
- The system left the manufacturer's works in a perfect safety condition.
- In order to maintain this condition, as installer you must carry out your task
  - **in accordance with the descriptions in these instructions, technically correctly and with the greatest possible precision.**
- We assume that you have fundamental knowledge in mechanical engineering, precision mechanics, hydraulics and electrical engineering.
- The length measurement system must be used only for purposes corresponding to its construction.
- **Before mounting or repair work, switch off all relevant devices/machines/plant. If appropriate, isolate the devices/machines/plant from the mains.**
- **Before mounting, remove the pressure from pneumatic/hydraulic devices/machines/plant.**
- **If necessary, set up warning signs in order to prevent the inadvertent starting up of the devices/machines/plant.**
- **Lay the data cable from the sensor head to the controller in such a way that**
  - it does not get caught up in operation;
  - it is not crushed, kinked or otherwise damaged;
  - it does not run directly alongside power lines.
- **If electrical welding operations are being carried out directly in the vicinity of the H-POMUX® length measurement system, switch off its power supply in order to exclude damage to the measurement system as a result of high induction currents.**
- **Do not open the sensor head or the sensor tube!**  
The opening of the sensor head or of the sensor tube impairs the functional safety and nullifies the guarantee.
- **Use only undamaged, fault-free tools/components for mounting operations.**
- **Do not start up the H-POMUX® length measurement system if any parts are damaged.**
- **After the mounting of the measurement system, and before releasing the devices/machines/plant affected thereby for the production process, carry out a test run.**

### 4. Checking the system components

#### 4.1 Inward monitoring

- Check
  - directly after delivery, the parts of the measurement system for any **transport damage** and deficiencies.
  - with reference to the accompanying **delivery note** the number of parts.
  - using their identification number (PMH.....), whether there is a matching magnet holder for each sensor head (for this, see Figure 4-1).  
The sensor head and the magnet holder in each case form a calibrated system and both must be identified with the same number.
- Do not leave any parts in the packaging.

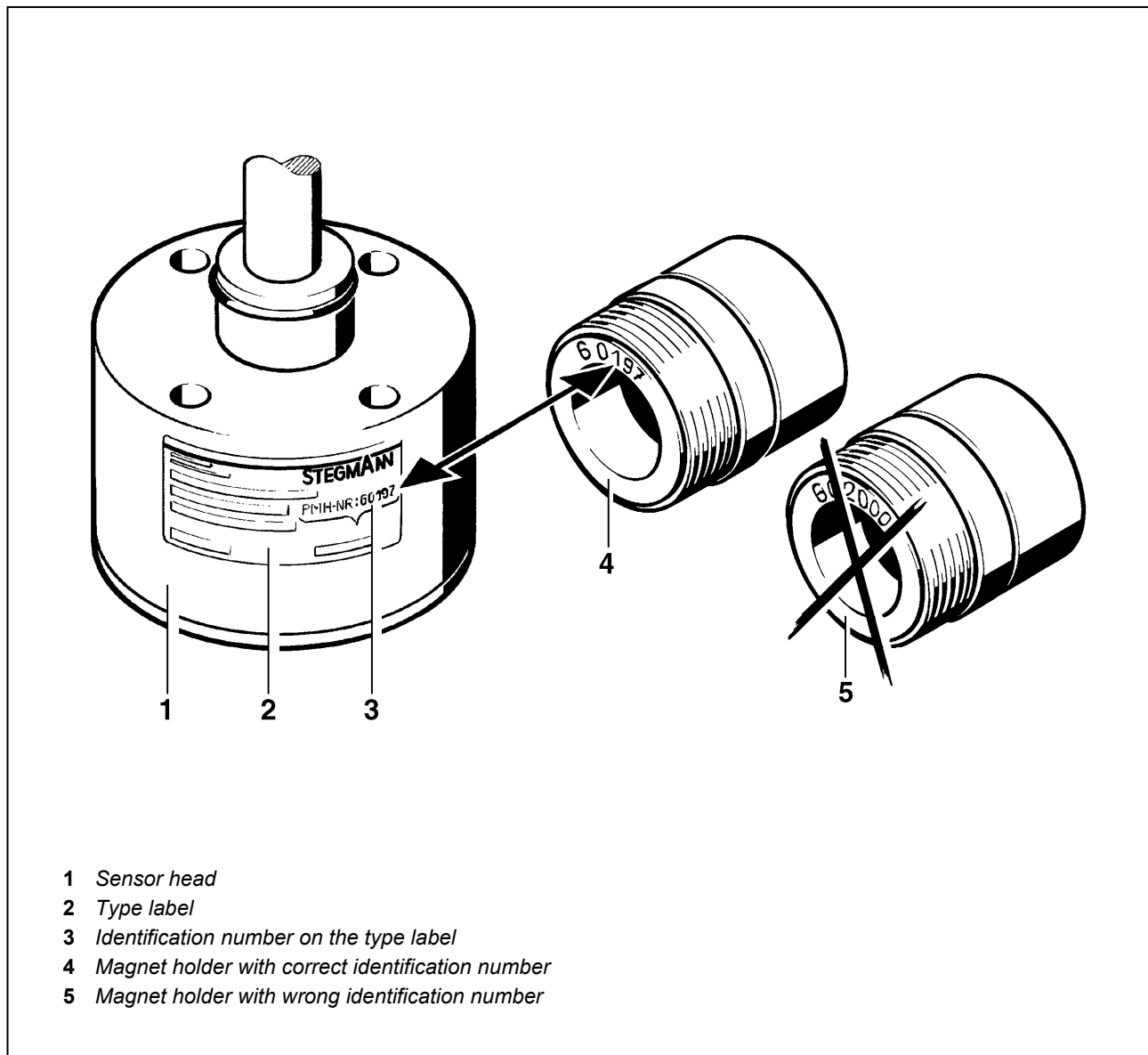


Fig. 4-1

### 4.2 Scope of supply

- Sensor head with sensor tube
- Magnet holder
- Documentation about the connection assignment of the sensor interface
- **Accessories \***
- Cable                      Item No. 6027531
- Mating connector        Item No. 6027538

\* Please order separately.

### 4.3 Complaints

Claims for replacement of damaged goods which relate to transport damage can only be considered valid if the delivery company is notified without delay.

- For returns (because of transport damage/repair), prepare a damage report immediately and send the parts back to the manufacturing plant, if possible in the original packaging.
- Attach the following information to the return:
  - Name and address of the receiver
  - Reference/order/part numbers
  - Description of the defect

### 4.4 Guarantee

For the **H-POMUX® length measurement system** we give a guarantee period in accordance with the sales contract.

The general guarantee conditions of **STEGMANN GmbH & Co. KG** apply.

### 5. Ambient conditions

The H-POMUX<sup>®</sup> length measurement system is designed for rough operating conditions.

However, some restrictions are to be observed for its mounting and subsequent operation.

- Take care that
  - the measurement system is mounted in accordance with the mounting advice listed below.
  - the measurement system is employed in accordance with the characteristic values specified in the technical data.  
The non-observance of the mounting advice or use outside the specified characteristic values can have a negative influence on the accuracy of the system.

The use of the measurement system under the influence of radioactive radiation may take place only after discussions with the manufacturer.

### 6. Mounting advice

Because of the many possible mounting arrangements of the **H-POMUX® length measurement system**, we can give you only general advice.

As a specialist, you can solve specific tasks or applications on site, or in special cases following consultation with the manufacturer.

- Observe the prescribed mounting dimensions exactly.
- For the mounting of the sensor head and of the sensor tube, use only **screws, washers** and **spring rings** made of **NF material** (non-ferrous materials).



- Do **not** open the sensor head or the sensor tube!  
**The opening of the sensor head or of the sensor tube impairs the functional safety and nullifies the guarantee!**

In the following description, we assume that the measurement system is to be installed in a hydraulic cylinder.

We assume further that the cylinder or the piston/the piston rod is constructionally suitable for the installation of the measurement system.

If you are faced with another installation situation, we trust that you, as a specialist, will adapt the following instructions and descriptions logically to your situation.



- **Handle the sensor head with the sensor tube carefully.**
- **Avoid shocks/blows to the parts.**
- **Avoid bending the magnetic field sensor tube.**  
**A bent tube must not be installed. If the tube is bent, the electronics located in it may have been destroyed; therefore, send the sensor head, including the associated magnet holder, back to the manufacturer for repair.**
- **Ensure a clean work place.**
- **Remove swarf or small parts (above all those of ferromagnetic material).**
- **Take especial care that foreign bodies (swarf, small parts etc.) stick neither to the magnetic field sensor tube nor to the magnet or magnet holder.**

## Mounting advice

---

- **Ensure that the parts of the hydraulic cylinder (piston, piston rod, cylinder etc.) are not magnetic.**
- **If appropriate, demagnetize all the parts.**
- **Ensure that the sensor head and the magnet holder which you are mounting in a hydraulic cylinder have the same identification number.**
- **Only install the measurement system in the hydraulic cylinder when the parts of the cylinder or of the piston have been finally machined and cleaned.**  
**Subsequent machining of the parts could have a negative influence on the measurement system or its accuracy.**
- **During transport, ensure that the hydraulic cylinder with the measurement system installed is not lifted using electromagnets.**
- **Identify the cylinders or the transport containers with corresponding instructions for the transport company that the content includes sensitive electronic components.**
- **Ensure that, in the case of subsequent painting of the hydraulic cylinder, the paint is not stoved, or the stoving temperature is not higher than the maximum ambient temperature specified in the technical data for the H-POMUX<sup>®</sup> length measurement system.**
- **Before painting, cover the plug connection of the sensor head.**

### 7. Mounting/Disassembly



We assume in the following description that you have read carefully through the preceding chapter and that, during mounting/disassembly operations, you will observe the safety advice and the warning notes.



- Please note that the following descriptions are only general examples, since the actual mounting situation on site is not known to us.
- Adapt the examples to your mounting situation.
- Before the mounting, please take note of the dimensions and sizes under

#### 11. Technical Data.

### 7.1 Mounting the magnet holder

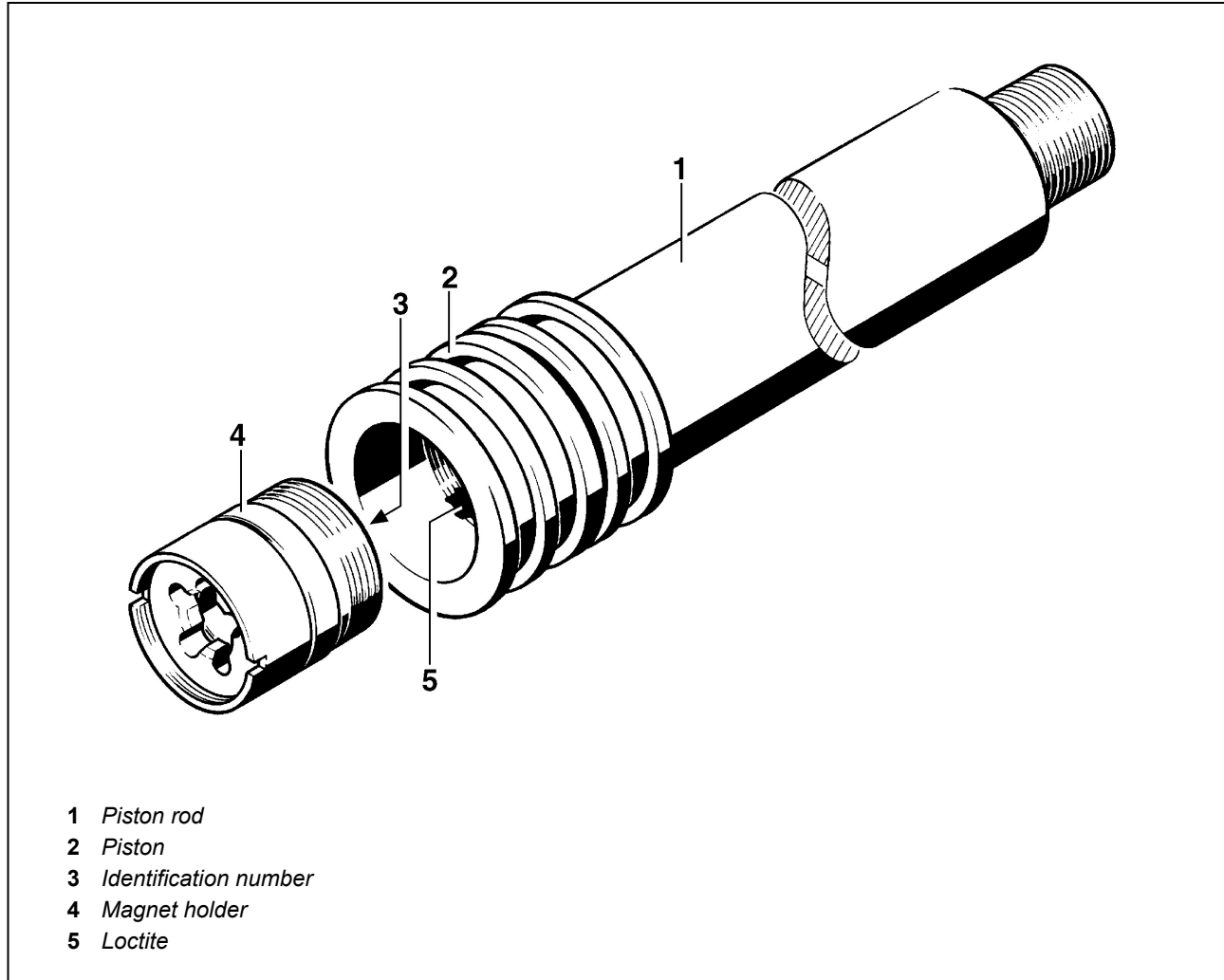


Fig. 7-1

- If you have to install several measurement systems in hydraulic cylinders, make a note of the identification number of the respective magnet holder and of the relevant sensor part. Then correct assignment of the components is ensured at all times.
- To secure the screw connection, a liquid thread securing means (e.g. Loctite) may be applied to the thread of the receiving bore for the magnet holder (in the piston).
- Screw the magnet holder into the piston. Tighten it with moderate force.

7.2 Mounting the sensor head with magnetic field sensor tube

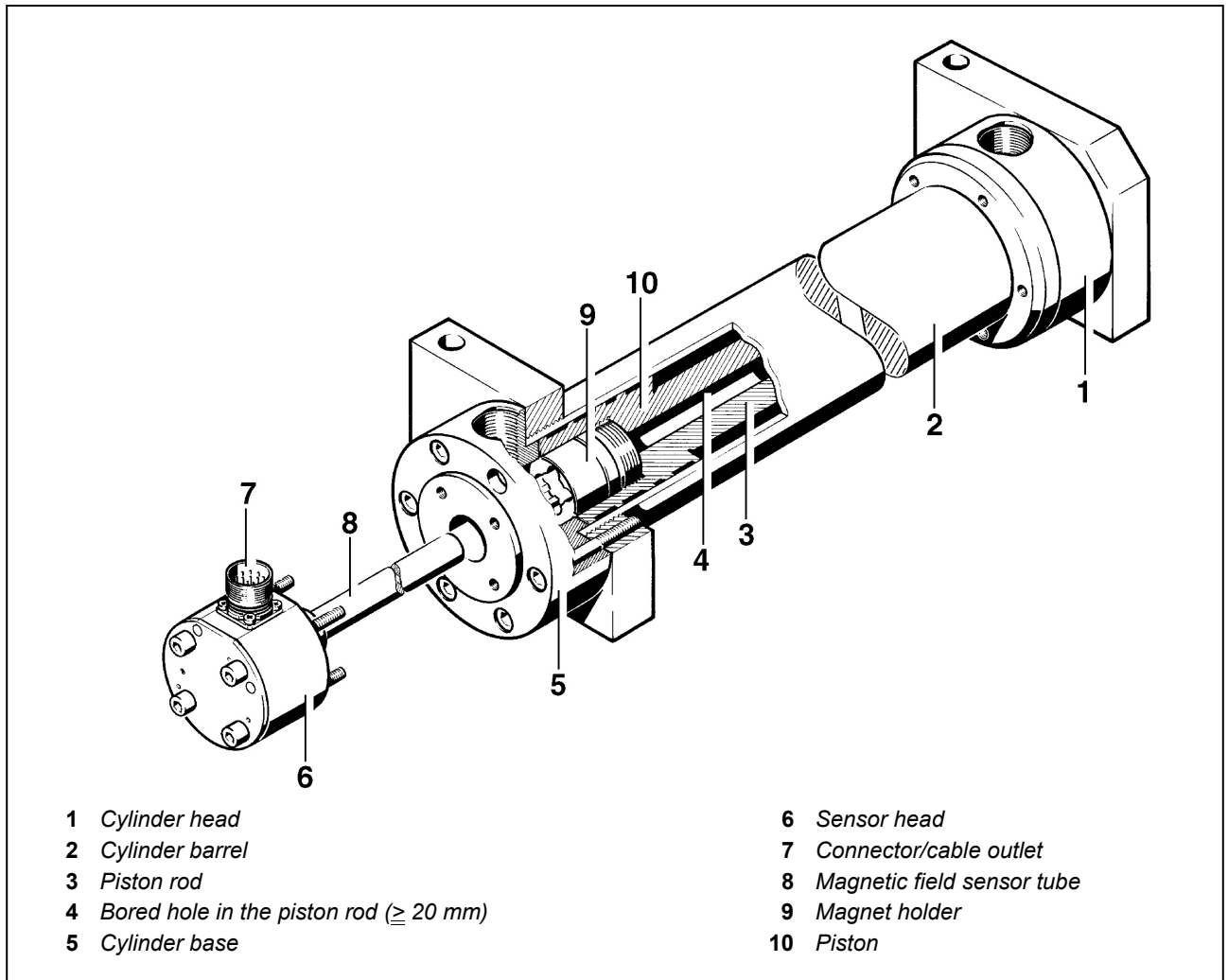


Fig. 7-2

- Insert the piston with piston rod and the installed magnet holder into the cylinder barrel.
- Mount the cylinder head and the cylinder base.
- Take the sensor head having the same identification number as the magnet holder already installed and, on the cylinder base side, guide the sensor tube through the opening in the magnet holder and push it completely into the bored hole in the piston rod.
- Take account of the correct position of the connector or cable outlet and screw the sensor head firmly to the cylinder base. Only use screws (and, if appropriate, washers/spring rings) made of non-ferromagnetic material.
- Tighten the screws firmly only to the extent that no deformation of the sensor head takes place (max. 22 Nm). Tighten screws crosswise.

This completes the mounting of the **H-POMUX® length measurement system** into a hydraulic cylinder.

### 7.3 Connection of the H-POMUX® length measurement system to the controller

After completing all the mounting operations on the hydraulic cylinder, and following the installation of the cylinder on the device/machine/plant, the measurement system must be connected to the controller.

- Screw the socket of the cable to the connector of the H-POMUX and lead the cable to the controller.
- Lay the cable
  - in such a way that it is not stretched, crushed, sheared or otherwise damaged, and that it does not impair the movement sequence of the cylinder.
  - not in the direct vicinity of other cables through which high currents or current peaks flow. The electromagnetic radiation of these cables has a negative influence on the accuracy of the measurement system.
- Fasten the cable using cable ties or the like.

### 7.4 Disassembly of the H-POMUX<sup>®</sup> length measurement system



- Before you start the disassembly or repair of the measurement system,
  - switch off all devices/machines/plant affected by the disassembly or repair.
  - if appropriate, isolate the devices/machines/plant from the mains.
  - remove the pressure from the pneumatic/hydraulic devices/machines/plant.
- Take care that the hydraulic cylinder to be disassembled or to be repaired is no longer under load/pressure/tension.
- Take into account any further, parallel acting hydraulic cylinders.
- Allow any heated hydraulic cylinders to cool down.
- If appropriate, put on protective clothing (protective spectacles, gloves, rubber apron etc.) before you open the cylinder and let the hydraulic oil out.
- Catch the hydraulic oil in a suitable vessel. Take into account the volume of the emerging oil.
- Please dispose of the oil with regard for the environment.
- If necessary, set up warning signs to prevent the inadvertent starting up of the devices/machines/plant.
- Disassemble, as appropriate,
  - the cable from the sensor head to the controller,
  - the sensor with the sensor tube or
  - the magnet holder.
- Handle the parts carefully, collect all the parts together - including the screws, nuts and so on - and keep them for any subsequent use.
- **Inform the user of the device or of the machine/plant that the measuring system has been disassembled!**

### 8. Commissioning/Test Run

Following the mounting/repair, the measurement system in the hydraulic cylinder should be subjected to a test run before it is released for the production process.

- Remove all tools, aids or the like from the working area of the cylinder or, if appropriate, place the cylinder in the test station.
- Check whether all parts of the measurement system have been correctly and firmly mounted.
- Switch on all parts of the device/machine/plant which are functionally connected to the measurement system.



- **If necessary, activate the required safety equipment (for example interlocks, warning lamps or the like).**
- Check whether the controller is receiving the data from the sensor and whether the part of the device/machine/plant to which the sensor is fitted is reacting to the control signals.



- **Check the functioning of any emergency stop push-buttons which may be present or other safety equipment.**
- Only release fault-free, functioning systems for the production process.

### 9. Faults/Repair

As in any industrial system, the **H-POMUX® length measurement system** can occasionally fail as a result of faults or can exhibit faulty functions. The causes are often of a trivial nature and easily corrected.

Before you contact us, we ask you to look independently for the cause of the fault, as a first measure.

We have listed the most frequent fault causes in the following list.

In the event of a system fault, please read carefully through the listed causes and check whether one of these is relevant.

Should this list not help you further, please telephone us. The telephone number is to be found on the inside cover of these mounting instructions.

#### 9.1 Fault causes

- Installation or parts of the installation not switched on
- Cable not (correctly) plugged in
- Cable defective
- Plugs/sockets defective
- Wrong magnet holder used (sensor head has a different identification number from the magnet holder)
- No satisfactory screening of the components

If you have clearly identified the cause of the fault, eliminate it if you are able to do so.

### 9.2 Repair



Repair operations on the **H-POMUX® length measurement system** are restricted, as far as you are concerned, to those activities which you have also undertaken during the mounting.



- Before carrying out repairs, be sure to take note of the:
  - 3. Safety advice,**
  - 6. Mounting advice and**
  - 7. Mounting/disassembly.**
- **Before carrying out the repair, switch off all the relevant parts of the device/ machine/plant!**
- Under no circumstances open the parts of the measurement system! Damaged parts must be exchanged.  
In this respect, refer to:

#### **11.1 H-POMUX® Ordering key.**

- Only use original STEGMANN spare parts as replacement parts!
- Following repair operations, carry out a test run of the measurement system.  
For this, please refer to:

#### **8. Commissioning/Test Run.**

### 10. Maintenance/Cleaning



- **Before carrying out maintenance/cleaning operations, switch off all the relevant parts of the device/machine/plant!**

#### 10.1 Maintenance

The H-POMUX<sup>®</sup> **length measurement system** is a non-contact measurement system and contains no moving parts. It is therefore in principle maintenancefree.

Under severe operating conditions corrosion can arise as a result of environmental influences.

The influences should be prevented by suitable measures before this wear and tear causes faults.

- Therefore, check the parts of the measurement system from time to time for damage.
- Replace damaged parts only with original STEGMANN spare parts.
- **Under no circumstances open the parts of the measurement system!**

#### 10.2 Cleaning



- **Do not use any abrasive or corrosive cleaning agents.**
- **Prevent liquids or moisture penetrating into the sensor.**
- **Under no circumstances open the parts of the measurement system.**

## 11. Technical data

(and characteristics in accordance with DIN 32 878)

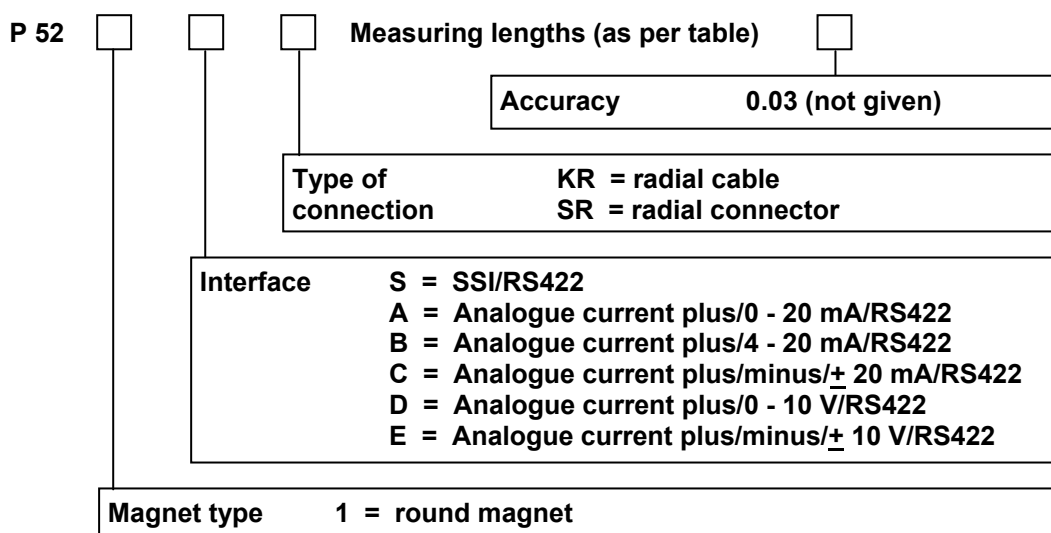
### Usable measuring lengths (in mm)

|     |     |     |     |      |      |      |
|-----|-----|-----|-----|------|------|------|
| 50  | 253 | 497 | 741 | 944  | 1188 | 1432 |
| 91  | 294 | 538 | 782 | 1026 | 1229 | 1473 |
| 131 | 375 | 579 | 822 | 1066 | 1269 | 1513 |
| 172 | 416 | 619 | 863 | 1107 | 1351 | 1554 |
| 213 | 457 | 700 | 904 | 1147 | 1391 | 1595 |

### Measuring length

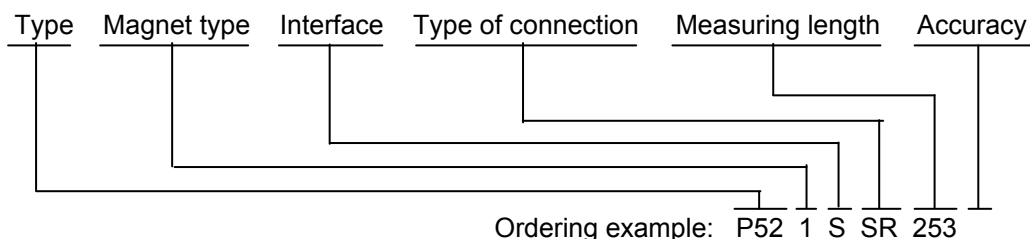
The measuring length ML is the range in which the absolute position can be determined unambiguously.

### 11.1 H-Pomux® Ordering key



### Ordering information:

The following information is required when ordering (see above):



### Scope of supply:

- H-POMUX®
- Magnet holder with permanent magnets

**Not all variants are available!**

11.2 Dimensional drawing

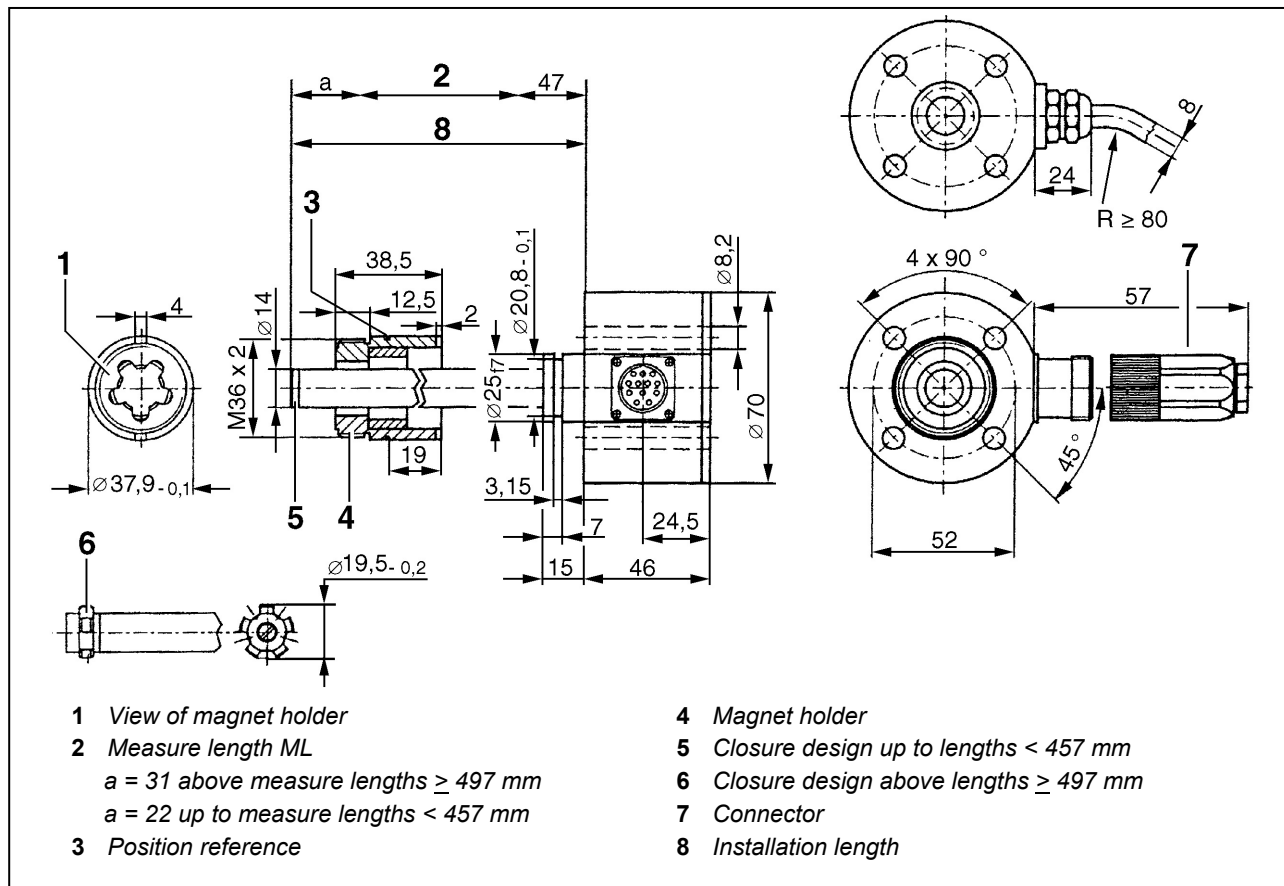


Fig. 11-1

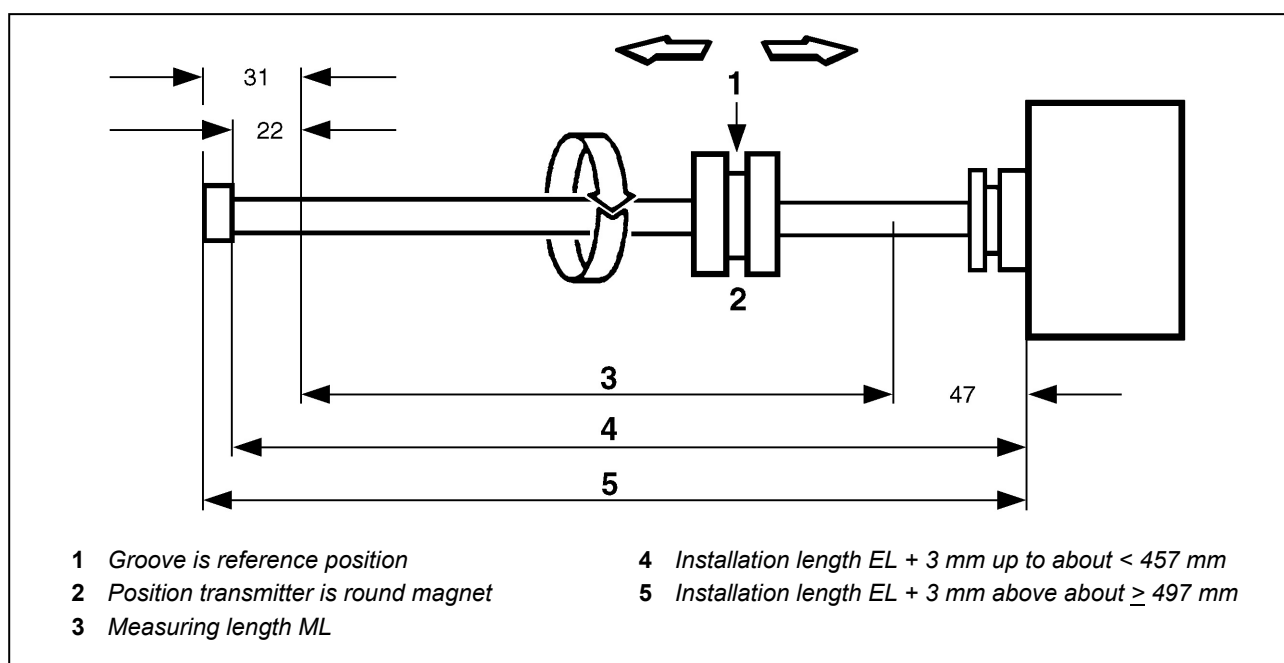

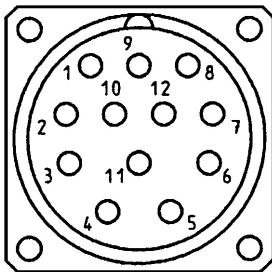


Fig. 11-2

## 11.3 Connector assignment

| Pin assignment |              | for analogue interface | for serial interface  |
|----------------|--------------|------------------------|--|
| PIN            | Colour       | Signal                 | Signal   |
| 1              | blue         | GND                    | GND  |
| 2              | white        | current/voltage +      | data +   |
| 3              | yellow       | Nc                     | clock +  |
| 4              | grey         | R x D +                | R x D +  |
| 5              | green        | R x D -                | R x D -  |
| 6              | pink         | T x D +                | T x D +  |
| 7              | black        | T x D -                | T x D -  |
| 8              | red          | + Us                   | + Us   |
| 9              | orange       | Nc                     | Nc   |
| 10             | brown        | current/voltage -      | data -   |
| 11             | violet       | Nc                     | clock -  |
| 12             | orange/black | Nc                     | Nc   |



View on plug side  
12 pole

Nc = not connected. Pins/wires with the designation "Nc" must not be wired.

11.4 Technical data

|  |  |  |
|--|--|--|
| System resolution a                                    | with digital interface<br>with analogue interface  | 10 µm<br>10 < a < ML/2048 m  |
| Reproducibility r                                      | with digital interface for measuring lengths up to 0.8 m<br>with digital interface for measuring lengths up to 1595 mm<br>with analogue interface for measuring lengths up to 0.8 m<br>with analogue interface for measuring lengths up to 1595 mm   | 30 µm<br>60 µm<br>30 ≤ r < ML/2048 µm<br>60 ≤ r < ML/2048 µm         |
| Measurement accuracy *                                 | for measuring lengths up to 0.8 m,<br>min. ± 150 + L <sub>(Tu)</sub> , typ. ± 60 + L <sub>(Tu)</sub> ,<br>for measuring lengths up to 1595 mm,<br>min. ± 250 + L <sub>(Tu)</sub> , typ. ± 100 + L <sub>(Tu)</sub> ,<br>ML = measuring length;<br>Tu = ambient temp. in °C;<br>L <sub>(Tu)</sub> = ML (25 °C-Tu) Tk | max. ± 30 + L <sub>(Tu)</sub> µm<br>max. ± 50 + L <sub>(Tu)</sub> µm |
| Coefficient of thermal expansion Tk                    |  | 15 µm/ °C/m  |
| Dimensions   | see technical drawing and table of measuring lengths   |  |
| Mass   | sensor head 300 g + sensor part 1 g/mm   |  |
| Casing material  |  | AlMgSiPbF28  |
| Measuring tube material                                |  | V2A  |
| Measuring lengths                                      | see Table page 20  |  |
| Resistance to shocks                                   | in accordance with DIN IEC 68 part 2-27  | 30/10 g/ms   |
| Resistance to vibration                                | in accordance with DIN IEC 68 part 2-6   | 5/20 ... 250 g/Hz  |
| Resistance to pressure                                 | from sealing groove over the entire measuring tube   | 500 bar  |
| Working temperature range                              |  | 0 ... 60 °C  |
| Operating temperature range                            |  | - 20 ... + 85 °C   |
| Storage temperature range                              |  | - 40 ... + 85 °C   |
| Degree of protection                                   | in accordance with DIN VDE 0470 part 1   | with plug outlet<br>IP 65<br>with cable outlet<br>IP 66              |
| Max. movement speed with continuous measurement output |  | 1.2 m/s  |

## Technical data

|                                 |  |  |
|---------------------------------|--|--|
| Sampling interval               | <b>SSI</b> /analogue   | 1.7 ms   |
| Supply voltage                  |  | 10 - 32 V  |
| Current consumption             |  | 0.3 A  |
| Interface for parameterization  | four-wire transmission, asynchronous, full duplex<br>Data format: 1 startbit, 8 databits, 1 stopbit, no parity<br>Data protocol: ASCII, Baud rate: 9600  | RS422  |
| Interface for signal processing | Digital serial<br>Analogue current output (max. burden = 400 ohm)<br>Analogue current output (max. burden = 400 ohm)<br>Analogue voltage output (min. burden = 1000 ohm)<br>Analogue voltage output (min. burden = 1000 ohm) | <b>SSI</b> 24 bit format<br>0 - 20 or 4 - 20 mA, freely programmable<br>- 20 to + 20 mA<br>0 to 10 V<br>- 10 to + 10 V |

\* The statements relating to system accuracy apply only during the operation of sensor and position transmitter (magnet holder) having identical identification number. External magnet influences may impair the achievable accuracies.

### Important note

If not expressly ordered otherwise, the following parameters are set at the factory:

#### With **SSI**-Interface:

- **Mode of operation:** Synchronous **SSI** = off
- **Parameter interface:** RS422 (asynchronous = off)
- **Start of measuring section:** Start of measuring section is at connector or cable outlet

#### With analogue interface:

- **Parameter interface:** RS422 (asynchronous = off)
- **Start of measuring section:** Start of measuring section is the smallest voltage or current value; start of measuring section is at connector or cable outlet

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