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# 1 INTRODUCTION

# pH TRANSMITTER 8205

Dear Customer,

Congratulations on your purchase of our digital pH transmitter type 8205 .

**BEFORE INSTALLING OR USING THIS PRODUCT, PLEASE TAKE OUR ADVICE AND READ THE ENTIRE MANUAL THOROUGHLY.**

This will enable you to fully profit from all of the advantages offered by this product.

## 1.1 Unpacking and Control

Please verify that the product is complete and free from any damage. The standard delivery must include:

-1 8205 digital pH transmitter either in compact version, or in panel version with mounting accessories (1 gasket, 4 spacer bolts, 1 protective plate, 4 screws, 4 lockwashers, 2 cable clips and 1 cut-away film) or in IP65 wall-mount version.

-1 Instruction Manual Ref 425533A

Compare the Type specifications on the label to the adjacent list to ensure that you have received the proper unit. If there is any loss or damage, please contact your local Bürkert subsidiary.

## 1.2 About this Manual

This manual does not contain any warranty statement. Please refer to our general terms of sale and delivery.

Only properly-trained staff should install and/or repair this product. If difficulties should occur at the time of installation, please contact your nearest Bürkert sales office for assistance.

## 1.3 User's Responsibility for Safety

Bürkert manufactures a broad range of pH transmitters (compact, wall-mounted or panel versions). While each of these products is designed to operate in a wide variety of applications, it is the user's responsibility to select a transmitter model that is appropriate for the application, install it properly, and maintain all components. Special Attention must be paid to the chemical resistance of the transmitter against the fluids which are directly contacting the product.



This symbol appears in the manual to draw special **attention** to instructions that affect the safe installation, function and use of the product.

## 1.4 Electromagnetic compatibility

This transmitter conforms to the EMC-Directive of the Council of European Communities 89/336/EEC.

In order to comply with this directive, follow the wiring instructions (§ 3).

## 2 SPECIFICATION

## pH TRANSMITTER 8205

### 2.1 Compact pH transmitter type 8205 ordering list

#### 2.1.1 Compact pH transmitter; 4-20 mA output; 12-30 VDC; without relay

Transmitter without relay			Plug G 1/2"	Plug PE 9	PE 13,5
Compact	Gasket	Electrode	Ident N° US	Ident N°	Ident N°
8205	FPM	GLS	418858H	418834R	418843S
8205	FPM	STE	418863W	418839W	418845U
8205	FPM	LEI	419284T	419266G	419272E
8205	FPM	SCH	419285U	419267H	419273F
8205	FPM	HOL	419286V	419268V	419274G
8205	EPDM	GLS	418864X	418840B	418846V
8205	EPDM	STE	418866Z	418842Z	418848F
8205	EPDM	LEI	419287W	419269K	419275H
8205	EPDM	SCH	419288F	419270Q	419276A
8205	EPDM	HOL	419289G	419271D	419277B

#### 2.1.2 Compact pH transmitter; 4-20 mA output; 12-30 VDC; with relays

Transmitter with relays			2xG 1/2"	2xPG 13,5
Compact	Gasket	Electrode	Ident N° US	Ident N°
8205	FPM	GLS	418859A	418835J
8205	FPM	STE	418869C	418853U
8205	FPM	LEI	419290D	419278L
8205	FPM	SCH	419291S	419279M
8205	FPM	HOL	419292T	419280B
8205	EPDM	GLS	418870H	418854V
8205	EPDM	STE	418872X	418856X
8205	EPDM	LEI	419293U	419281Y
8205	EPDM	SCH	419294V	419282Z
8205	EPDM	HOL	419295W	419283S

## 2 SPECIFICATION

## pH TRANSMITTER 8205

### 2.2 Specification pH transmitter type 8205 Separate

#### 2.2.1 pH transmitter Typ 8205 separate short distance < 5 m

##### pH transmitter type 8205 panel version

Type	Output	Power Supply	Order N°.
8205	4...20 mA	12-30 VDC	427937H
8205	4...20 mA, 2 Relays	12-30 VDC	427938J

##### pH transmitter type 8205 wall-mounted version

Type	Output	Power Supply.	Order N°.
8205	4...20 mA	12-30 VDC	427944Q
8205	4...20 mA, 2 Relays	12-30 VDC	427945R
8205	4...20 mA	115/230 VAC	427949V
8205	4...20 mA, 2 Relays	115/230 VAC	427950S

#### 2.2.2 pH transmitter Typ 8205 separate long distance $\geq 5$ m

##### pH transmitter type 8205 panel version

Type	Output	Power Supply	Order N°.
8205	4...20 mA	12-30 VDC	427942N
8205	4...20 mA, 2 Relays	12-30 VDC	427943P

##### pH transmitter type 8205 wall-mounted version

Type	Output	Power Supply.	Order N°.
8205	4...20 mA	12-30 VDC	427954J
8205	4...20 mA, 2 Relays	12-30 VDC	427955K
8205	4...20 mA	115/230 VAC	427956L
8205	4...20 mA, 2 Relays	115/230 VAC	427957M

pH sensor for pH transmitter type 8205 separate versions.  
See specific pH sensor type 8200 instruction manual (Ref 428937J).

### 2.3 Design and Measuring Principle

#### Design

##### pH transmitter type 8205 compact

The pH-transmitter compactly combines a pH-sensor and a transmitter with display in a splash-proof plastic IP65 enclosure.

The sensor component consists of a replaceable combination pH-electrode, screwed into the sensor housing with screw-in threads PG 13.5.

The measured signal is conveyed to the transmitter via a coax plug.

The Pt1000 for automatic temperature compensation is a standard feature in the sensor housing.

The transmitter component converts the measured signal, displays the actual value and computes the output signals.

The access to the output terminals are provided via one PG 13.5 or a 4-pole plug (transmitter without relay) or via 2 PG 13.5.

##### pH transmitter type 8205 separate

The pH transmission system combines a pH sensor type 8200, and a separate pH transmitter type 8205 with display.

The 8205 separate transmitter is available in panel mounted version and in a wall-mounted plastic IP65 enclosure for connection to the pH sensor type 8200.

##### 2 connection modes available

- short distance < 5 m.

- long distance > 5 m

The separate transmitter long distance is designed to be connected to the digital output of a pH sensor-converter type 8200 up to 500 m, with the RS485 communication protocol.

#### pH sensor type 8200 separate

A pH sensor is necessary for use with the pH transmitter type 8205 separate (long or short distance).

A wide range of pH sensors offers large capabilities of mounting and pH measurement (cf § 2.5.2).

The Pt1000 for automatic temperature compensation is available as an option feature in pH sensor housings type 8200.

The pH sensor type 8200 for pH transmitter type 8205 separate version can be easily installed into pipes using our specially designed fitting system (type S020,1500,1501).

Please refer to the pH sensor type 8200 instruction manual (Ref 428937J).

#### Measuring Principle

The most important part of a pH electrode is the glass membrane of pH-selective glass. When the electrode is immersed into the solution, an electrical charge caused by ions ( $H^+$ ) generates a cell voltage between the glass membrane and the solution. This electrode voltage is measured with reference to a reference electrode, located around the pH glass electrode. The cell voltage of the combination electrode is directly proportional to the pH value (59.16 mV per pH unit at 25°C).

The transmitter functions in a 2 wire circuit (without relay) or 3 wire circuit (with relays) and requires a power supply of 12...30 VDC (115/230 VAC in wall-mounted housing).

A 4...20 mA standard signal proportional to the pH or to the T°C is available as output signal (cf § 4.3.3).

**Option:** 2 relays output freely adjustable.

## 2 SPECIFICATION

## pH TRANSMITTER 8205

### 2.4 Dimensions of the pH transmitter type 8205 compact

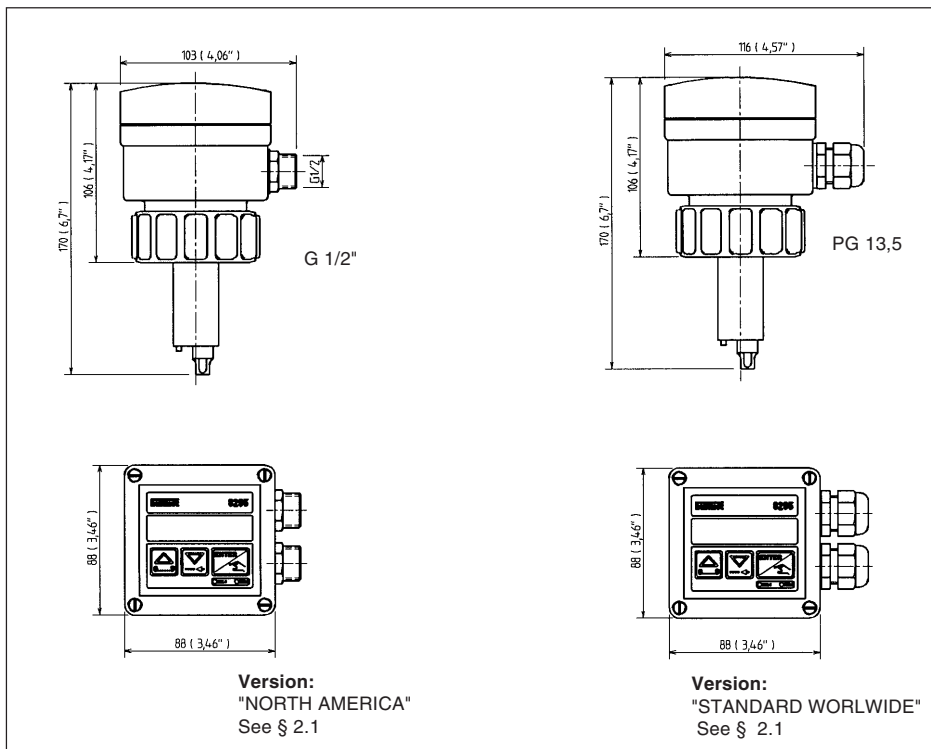


Fig. 2.3 Dimensions pH transmitter type 8205 compact housing

## 2 SPECIFICATION

## pH TRANSMITTER 8205

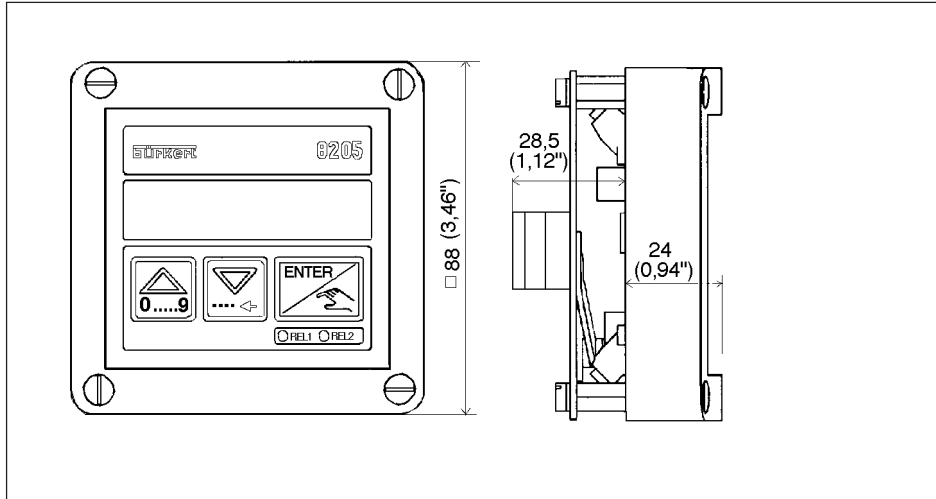


Fig. 2.4 Dimensions pH transmitter type 8205 panel version

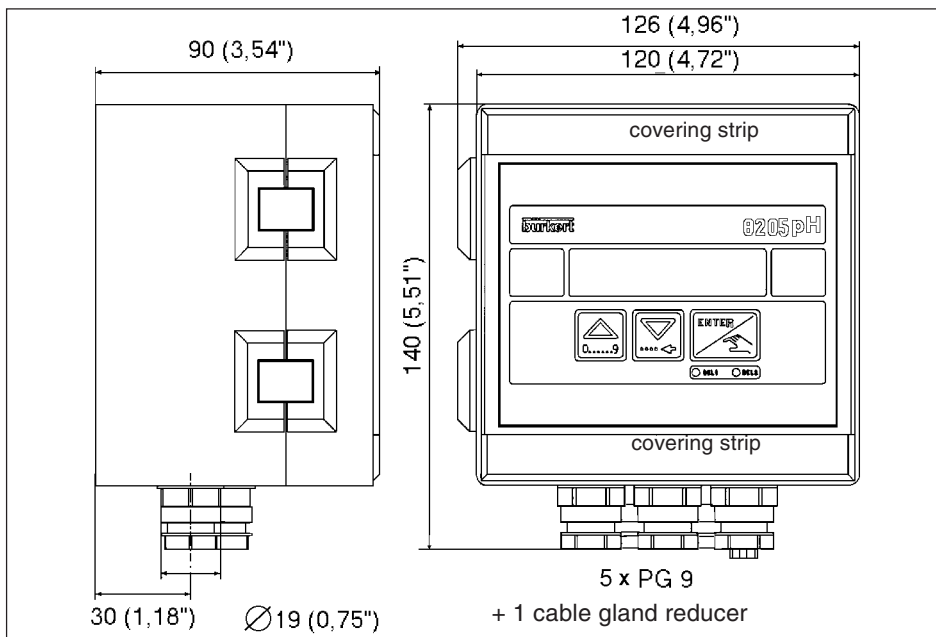


Fig. 2.5 Dimensions pH transmitter type 8205 wall-mounted version

## 2 SPECIFICATION

## pH TRANSMITTER 8205

### 2.5 Technical Data pH transmitter 8205

#### 2.5.1 pH transmitter type 8205 compact version

Measuring range	0...14 pH - Accuracy 0,02 pH
Min.mal range	0,5 pH unit (i.e 6,7 to 7.2 pH corresponding to 4-20 mA )
Measuring error	±0,2 %, depending on electrode calibration
Ambient temp.	0 to 60 °C (32 to 140 °F)
Storing temp.	0 to 60 °C (32 to 140 °F)
Relative humidity	max 80 %
Enclosure	IP 65

Temperature compensation automatic (integrated Pt1000 or user programmed)  
reference temperature 25 °C (77 °F)

Power supply:	12...30 VDC
Consumption:	20 mA (without relay); or 80 mA (with relays)
Output signal	4...20 mA programmable; proportional to pH or T°C
Load max.	700 Ω at 30 V; 400 Ω at 24 V; 100 Ω at 15 V
Display	15 x 60 mm LCD 8 digits, alphanumeric, 15 segments, 9 mm high
Relays (option)	2 relays, 3 A, 230 V, freely adjustable

Sensor housing PVDF; O-rings FPM/EPDM  
Pt1000 SS 1.4571 (Ti 316)  
Electronic housing PC; front plate polyester

Electrodes 0-14 pH	GLS	STE
Housing	glass shaft	glass shaft
Fluid pressure	0-6 bar (0-87 psi)	0-3 bar (0-44 psi)
Fluid temperature	0-90 °C (32-194 °F)	0-130 °C (32-266 °F)
Max. pressure at max. temperature	4 bar (58 psi)	2 bar (29 psi)
Diaphragm	zirkondioxide	zirkondioxide
Reference electrolyte	gel	gel

Electrodes 0-14pH	LEI	SCH	HOL
Housing	glass shaft	glass shaft	glass shaft
Fluid pressure	0-2 bar (0-29 psi)	0-2 bar (0-29 psi)	0-6 bar (0-87 psi)
Fluid temperature	0-60 °C (32-140 °F)	0-40 °C (32-104 °F)	0-90 °C (32-194 °F)
Max. pressure at max. temperature	2 bar (29 psi)	2 bar (29 psi)	4 bar (58 psi)
Diaphragm	3 x zirkondioxide	none	none
Reference electrolyte	KCl 3-Molar	polymerised	polymerised



## 2 SPECIFICATION

## pH TRANSMITTER 8205

### 2.5.2 pH transmitter type 8205 separate versions

Measuring range	0...14 pH Accuracy 0,02 pH
Minimum range	0,5 pH unit (i.e 6,7 to 7.2 pH corresponding to 4-20 mA )
Measuring error	±0,2 %, depending on electrode calibration
Ambient temp.	0 to 60 °C (32 to 140 °F)
Storing temp.	0 to 60 °C (32 to 140 °F)
Relative humidity	max 80 %
Enclosure	<b>Wall-mounted version</b> IP 65; ABS <b>Panel version</b> IP 20 (rear plate); IP65 (front plate); PC
<u>Temperature compensation</u>	automatic (integrated Pt1000 or user programmed) reference temperature 25°C (77°F)
Power supply:	12...30 VDC (115/230 VAC - 50/60 Hz wall-mounted option)
<u>Consumption:</u>	
Short distance	20 mA (without relay); or 80 mA (with relays)
Long distance	60 mA (without relay); or 100 mA (with relays)
Output signal	4...20 mA programmable; proportional to the pH or T°C
<u>Load max:</u>	
Short distance	700 Ω at 30 V; 400 Ω at 24 V; 100 Ω at 15 V
Long distance	1100 Ω at 30 V; 910 Ω at 24 V; 470 Ω at 15 V
Display	15 x 60 mm LCD 8 digits, alphanumeric, 15 segments, 9 mm high
Relays (option)	2 relays, 3 A, 230 V, freely adjustable

#### Accessories:

#### pH sensor type 8200

(see pH sensor type 8200 reference manual (Ref 428937J))

#### Cables for Pt1000 and pH sensor

Length	pH	Pt1000
2 m	427024H	427110Q
5 m	427025A	427113F

## 3 INSTALLATION

## pH TRANSMITTER 8205

### 3.1 Installation Guidelines

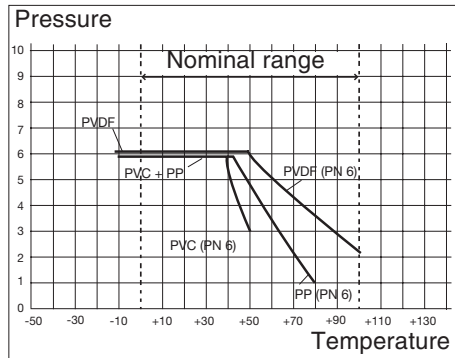


The transmitter must be calibrated with buffer solutions (see § 4.2) prior to installation.

**Before first electrode calibration, immerse it for 2 hours at least in buffer solution pH=7 or in a solution of KCl 3M (223,6 g/l) or in drinking water.**

#### Pressure-Temperature-Diagram

Mind pressure-temperature dependence according to the respective fitting materials.



#### Installation Guidelines

Mount the compact pH transmitter (or pH sensor) in vertical position (max.  $\pm 75^\circ$ ) into a horizontal pipe (cf fig. 3.1).

The electrode must continuously be immersed into the measuring fluid in order to protect it from drying out.

The transmitter must be protected from constant heat radiation and other environmental influences, such as direct exposure to sunlight.

#### 3.1.1 Compact pH transmitter type 8205 installation

The pH transmitter can be easily installed in pipes using our specially designed fitting system. Remove protective cap of the sensor and keep it for storage.

1. The fitting **4** must be installed into the pipe according to the installation specifications in section 3.1.
2. Insert plastic nut **3** into fitting, and let plastic ring **2** snap into guide bush **5**.
3. Carefully insert the pH transmitter **1** into the fitting. If installed properly, the transmitter cannot be rotated.
4. Tighten transmitter housing to fitting with plastic nut **3**.



**CAUTION!** Plastic nut must only be tightened by hand!

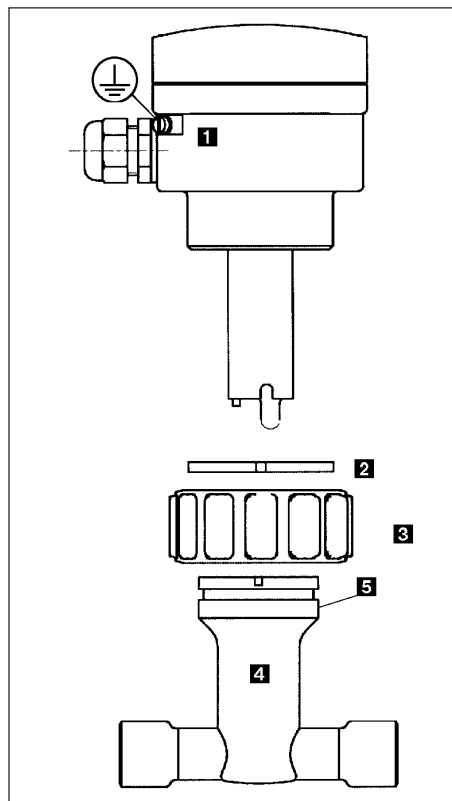


Fig. 3.1 Compact transmitter installation

## 3 INSTALLATION

## pH TRANSMITTER 8205

### 3.1.2 pH transmitter type 8205 panel installation

For the cut-away of the front panel, follow the instructions on the enclosed delivery film. Install the transmitter as follows:

1. Put gasket **2** on the cover **1** and place the complete unit in the panel cut-away.
2. Screw the spacer bolts **3** on the panel fixing screws **4**.
3. Insert the cable clips **10**, to hold the different cables (power supply, outputs, sensor) of the transmitter, into plate **7**.
4. If a PLC is connected to the transmitter, set the switch SW1 of the electronic card (if required)(cf § 3.2.3)
5. Plug connector **5** on socket **6** and fasten plate **7** with screws **9** on bolts **3**, tightening the lockwashers **8**.

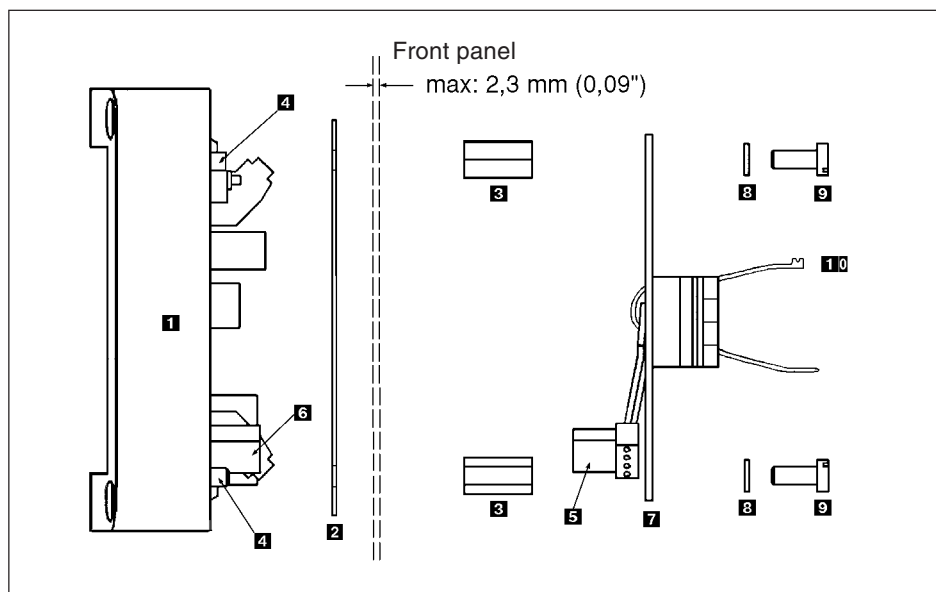


Fig. 3.2 Installation pH transmitter type 8205 panel version

## 3 INSTALLATION

## pH TRANSMITTER 8205

### 3.1.3 pH transmitter type 8205 Wall-mounted version installation

The pH transmitter in wall-mounted version has 4 fixing holes in the bottom enclosure. Remove the white blanking strips and the cover to access to fixing holes **1**.

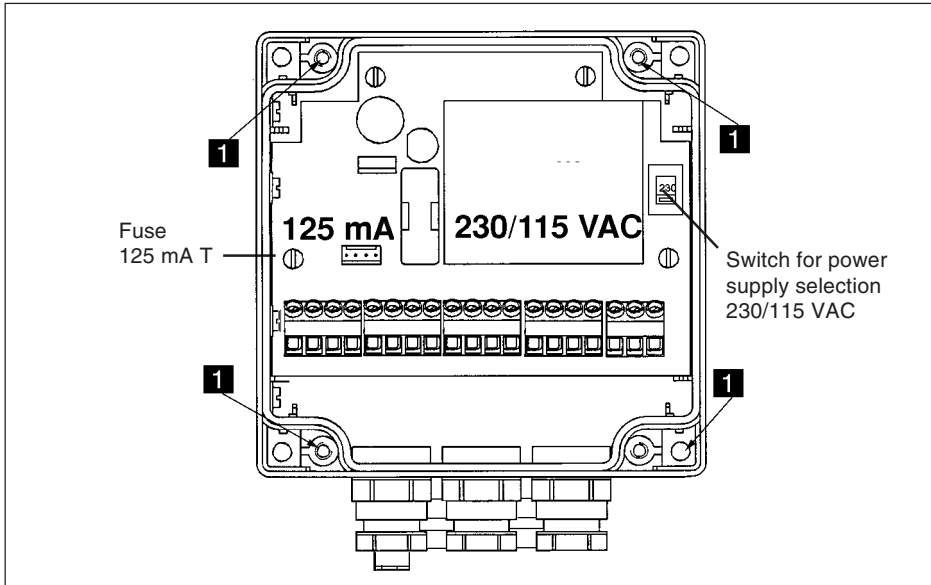


Fig. 3.3 Installation pH transmitter type 8205 wall-mounted version

### 3.2 Electrical connection

#### 3.2.1 General electrical requirements

The connecting cable conducts the measuring signal and must not be installed in combination with high voltage or high frequency carrying lines. If a combined installation cannot be avoided, either keep a min. space of 30 cm (approx. 1 ft) or use shielded cables. When using shielded cables ensure continuous grounding of the shield. For normal operating conditions, the 4-20 mA output, and relays signals can be transmitted by a simple cable of 0.75 mm<sup>2</sup>. In case of doubt, always use a shielded cable.

The power supply must be of good quality (filtered and regulated).



For EMC purposes, the earth must be connected to the earth of the transmitter or to the earth terminal (separate version)

## 3 INSTALLATION

## pH TRANSMITTER 8205

### 3.2.2 Electrical wiring pH transmitter 8205 compact

#### 3.2.2.1 Transmitter without relay

Electrical wiring either via cable plug according to DIN 43 650 or PG 13.5, (or G1/2" US Version) cable gland .

##### Wiring via cable plug

Standard DIN 43 650 plug connector with PG9-cable glands, pipe cross section max. 1.5 mm<sup>2</sup>, IP65 rating.

1. To open the connector remove screws (Fig. 3.4).
2. Remove the internal part **3** from the external part **4**.
3. Connect according to pin assignment in Fig. 3.5.
4. When re-assembling, the internal part **3** may be inserted into the external part **4** in 90°-step intervals as required.

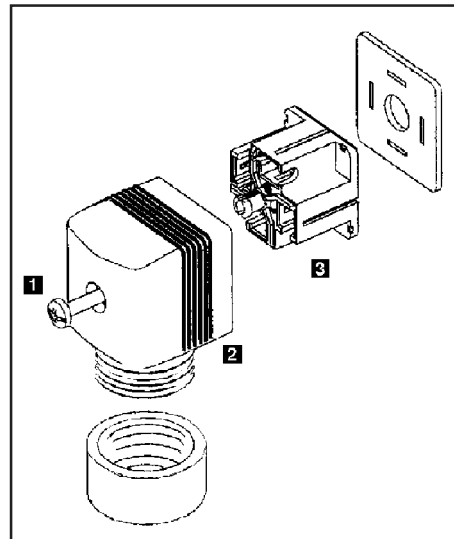


Fig. 3.4 Plug assembly Type 2508  
DIN 43650 form A

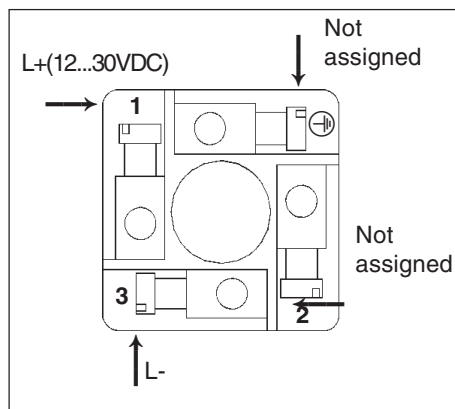


Fig.3.5 Pin assignment

**Note:** The 4-20mA output of the transmitter can easily be connected to a PLC (terminals 1-3), whatever the PLC type (sinking or sourcing) (cf. Fig.3.7).

## 3 INSTALLATION

## pH TRANSMITTER 8205

### 3.2.2.1.2 Transmitter without relay wiring with PG 13,5

Remove the cover, pull the cable through the cable gland and wire according to following pin assignment (Fig. 3.6).

- 1: Not assigned
- 2: L+ (12...30 VDC)
- 3: L-
- 4: Earth (earth lug)



For EMC purposes, the earth must be connected to the earth of the transmitter. It must be connected locally, and ideally together with the grounding of pipe or tank.

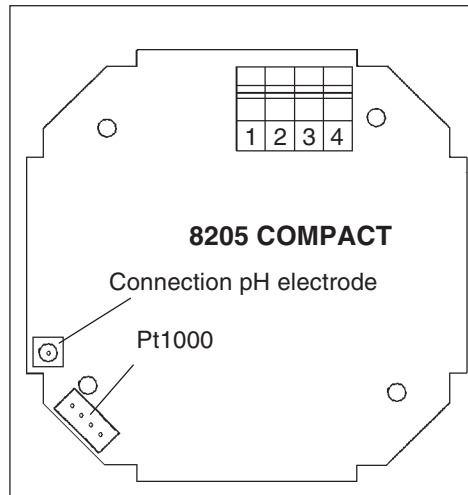


Fig. 3.6 Pin assignment of 8205 compact

**Note:** The transmitter can easily be connected to a PLC, ( terminals 2-3), whatever the PLC type (sinking or sourcing) (cf. Fig.3.7).

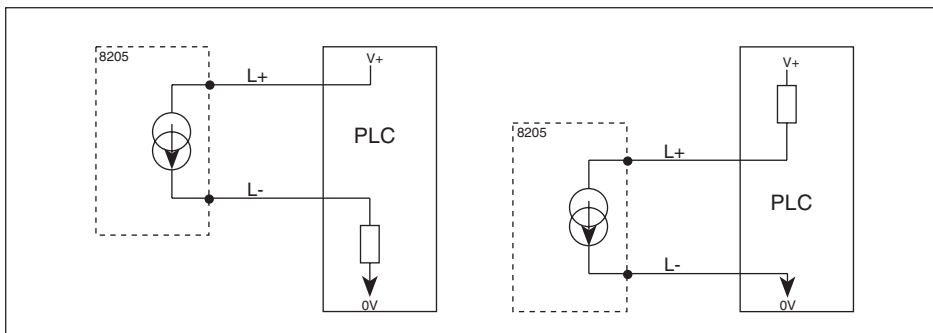


Fig. 3.7 Connection of 4-20 mA output to a PLC

### 3 INSTALLATION

### pH TRANSMITTER 8205

#### 3.2.2.2 Transmitter compact with relays

The electrical connections are made via 2 cable glands.  
Remove cover, pull cable through PG 13.5 and wire according to pin assignment (Fig. 3.8).

- 1: Current output 4...20 mA
- 2: L+ (12...30 VDC)
- 3: L-
- 4: Earth (earth lug)
- 5: Relay 2
- 6: Relay 2
- 7: Relay 1
- 8: Relay 1



If the 4-20 mA output is used, remove the strap 1-3 (cf Fig 3.8).

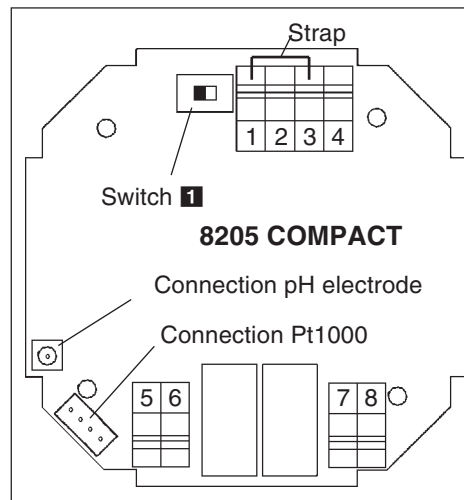


Fig. 3.8 Connection of 8205 with relays



For EMC purposes, the earth must be connected to the earth of the transmitter. It must be connected locally, and ideally together with the grounding of pipe or tank.

**Note:** PLC-connection. Depending on the PLC-version, the switch **1** on the circuit board must be put to position A or B (see Fig.3.8 and 3.9).

**In this case remove the strap (see Fig. 3.8).**

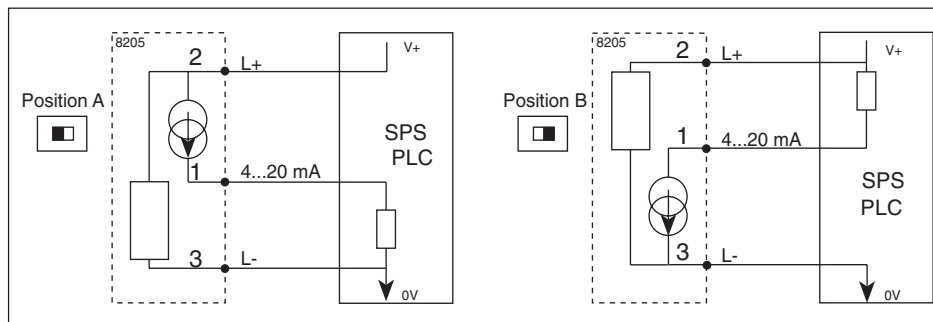


Fig. 3.9 Connection of the transmitter type 8205 to a PLC

### 3 INSTALLATION

### pH TRANSMITTER 8205

#### 3.2.3 Connection pH transmitter type 8205 panel short distance

##### 3.2.3.1 pH transmitter type 8205 panel short distance without relay

Install the transmitter (see Fig 3.2), then wire according to pin assignment of the following figure (Fig. 3.10).

Terminals:

- 1: not connected
- 2: L+ (12...30 VDC)
- 3: L-
- 4: Earth (earth lug)



For EMC purposes, the earth must be connected to the earth of the transmitter.

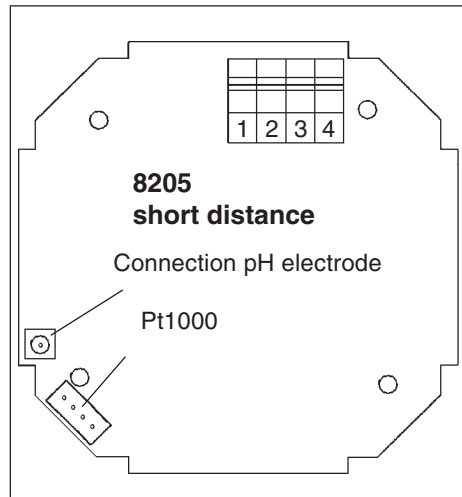


Fig. 3.10 Electronic card type 8205 panel without relay

**Note:** The 4-20mA output of the transmitter can easily be connected to a PLC, (terminals 2-3), whatever the PLC type (sinking or sourcing) (cf. Fig. 3.7).

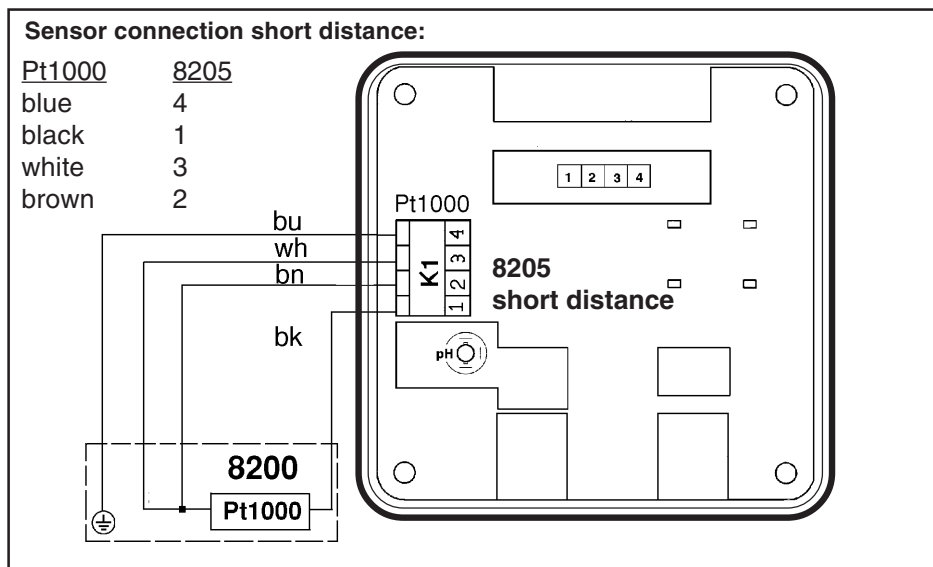


Fig. 3.11 Connection card pH transmitter type 8205 panel without relay



## 3 INSTALLATION


## pH TRANSMITTER 8205

### 3.2.3.2 pH transmitter type 8205 panel short distance with relays

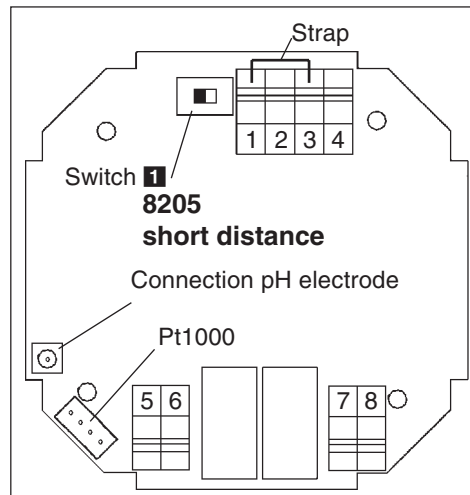
Install the transmitter (see Fig 3.2), then wire according to pin assignment of the following figure (Fig. 3.10).

Terminals:

- 1: Current output 4...20 mA
- 2: L+ (12...30 VDC)
- 3: L-
- 4: Earth (earth lug)
- 5: Relay 2
- 6: relay 2
- 7: Relay 1
- 8: Relay 1

 If the 4-20 mA output is connected, remove the strap 1-3 (fig 3.12)

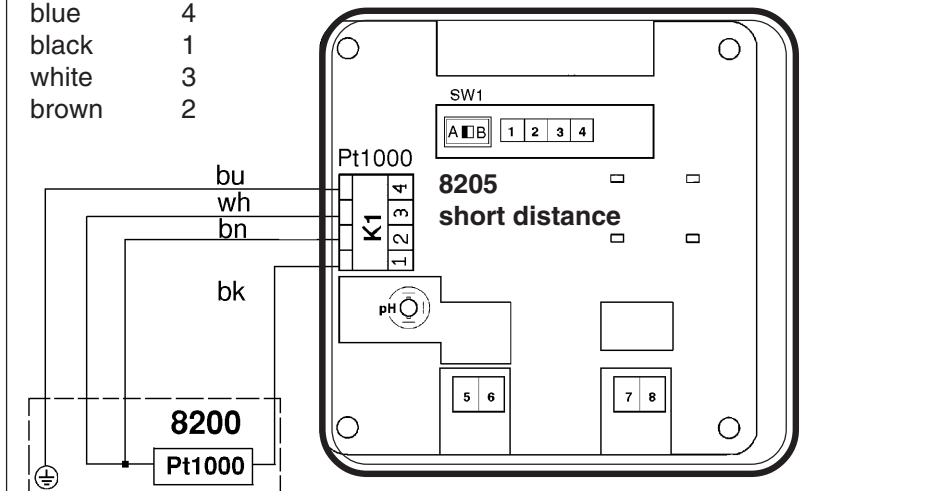
**Note:** PLC-connection, depending on the PLC-version, the switch **1** on the circuit board must be set in position A or B (see Fig. 3.9 and 3.12).



**Fig. 3.12 Electronic card type 8205 panel with relays**

**Sensor connection short distance:**

Pt1000	8205
blue	4
black	1
white	3
brown	2



**Fig. 3.13 Connection card pH transmitter type 8205 panel with relays**

### 3 INSTALLATION

### pH TRANSMITTER 8205

#### 3.2.4 Electrical wiring 8205 wall-mounted - short distance -12-30 VDC

Connect the pH sensor to the coaxial connector on the electronic board.

⚠ Use the cable gland reducer for the pH cable.  
If the 4-20 mA output is connected, remove the strap 10-12.

##### 3.2.4.1 Transmitter 8205 wall-mounted - short distance - without relay

Open the cover to access to the terminals. Wire according to the figure 3.14

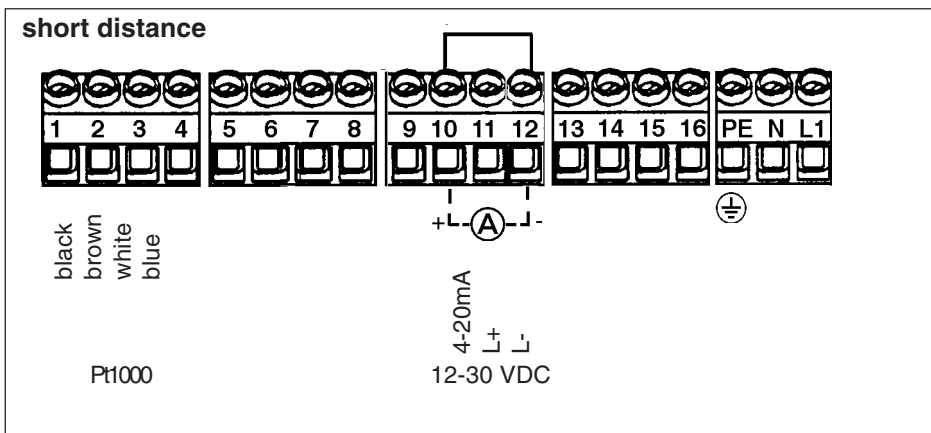


Fig. 3.14 Connection 8205 Wall mounted - short distance- 12..30 VDC without relay

##### 3.2.4.2 Transmitter 8205 wall-mounted - short distance - with relays

Open the cover to access to the terminals. Wire according to the figure 3.15.

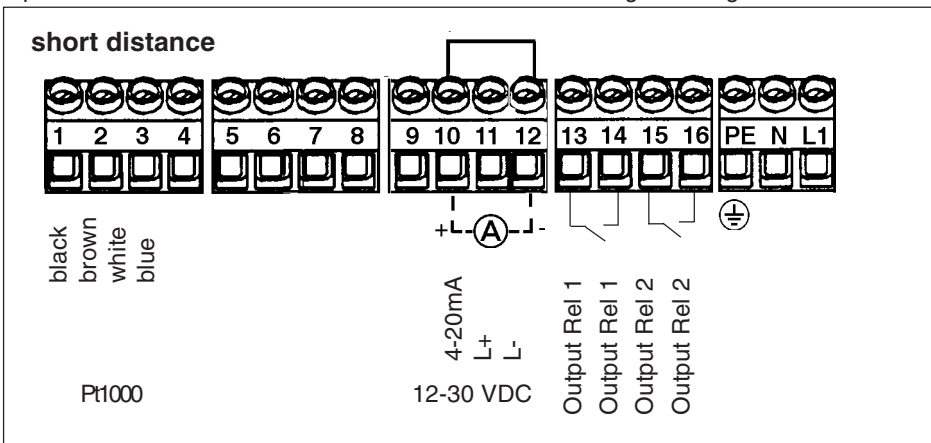


Fig. 3.15 Connection 8205 Wall mounted - short distance- 12..30 VDC with relays

### 3 INSTALLATION

### pH TRANSMITTER 8205

#### 3.2.5 Electrical wiring 8205 wall-mounted short distance 115/230 VAC

Connect the pH sensor to the coaxial connector on the electronic board.

⚠ Use the cable gland reducer for the pH cable.

⚠ If the 4-20 mA output is connected, remove the strap 10-12.

##### 3.2.5.1 Transmitter 8205 wall-mounted -115/230 VAC- without relay

Open the cover to access to the terminals. Wire according to the figure 3.16).

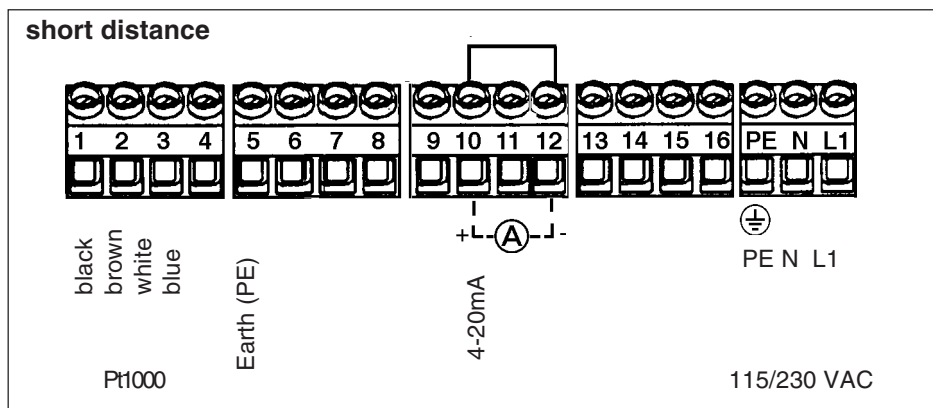


Fig. 3.16 Type 8205 Wall mounted - short distance- 115/230 VAC without relays

##### 3.2.5.2 Transmitter 8205 wall-mounted -115/230 VAC- with relays

Open the cover to access to the terminals. Wire according to the figure 3.17.

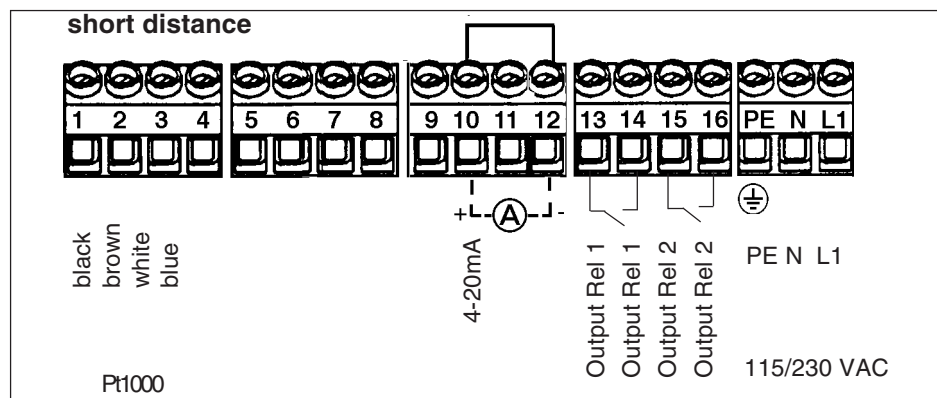


Fig. 3.17 Connection 8205 Wall mounted - short distance- 115/230 VAC with relays

⚠ Warning: Check the position of the power supply selection switch, before switching on the transmitter(Fig. 3.3).

## 3 INSTALLATION

## pH TRANSMITTER 8205

### 3.2.6 Connection pH sensor/transducer type 8200 to the pH transmitter 8205 Long distance

The pH sensor-converter type 8200 digital is necessary when the distance between the measuring point of the pH and the Transmitter type 8205 exceeds 5 m.

A 4 wire cable (2 wires data, 2 wires power supply) transmits alternatively the pH and temperature values according to RS485 protocol.

For mounting and setting of the sensor-converter type 8200 digital long distance, refer to the Instruction Manual ref. 430530U.

#### 3.2.6.1 Connection pH sensor type 8200 with PG 13.5 - Long distance

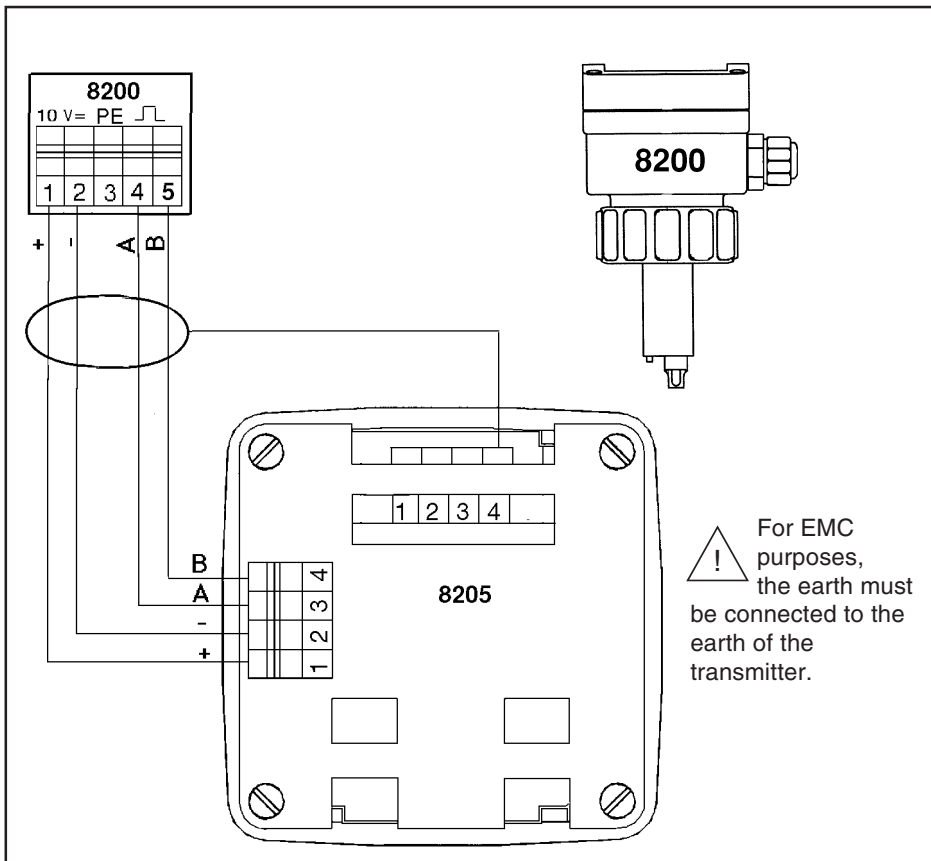


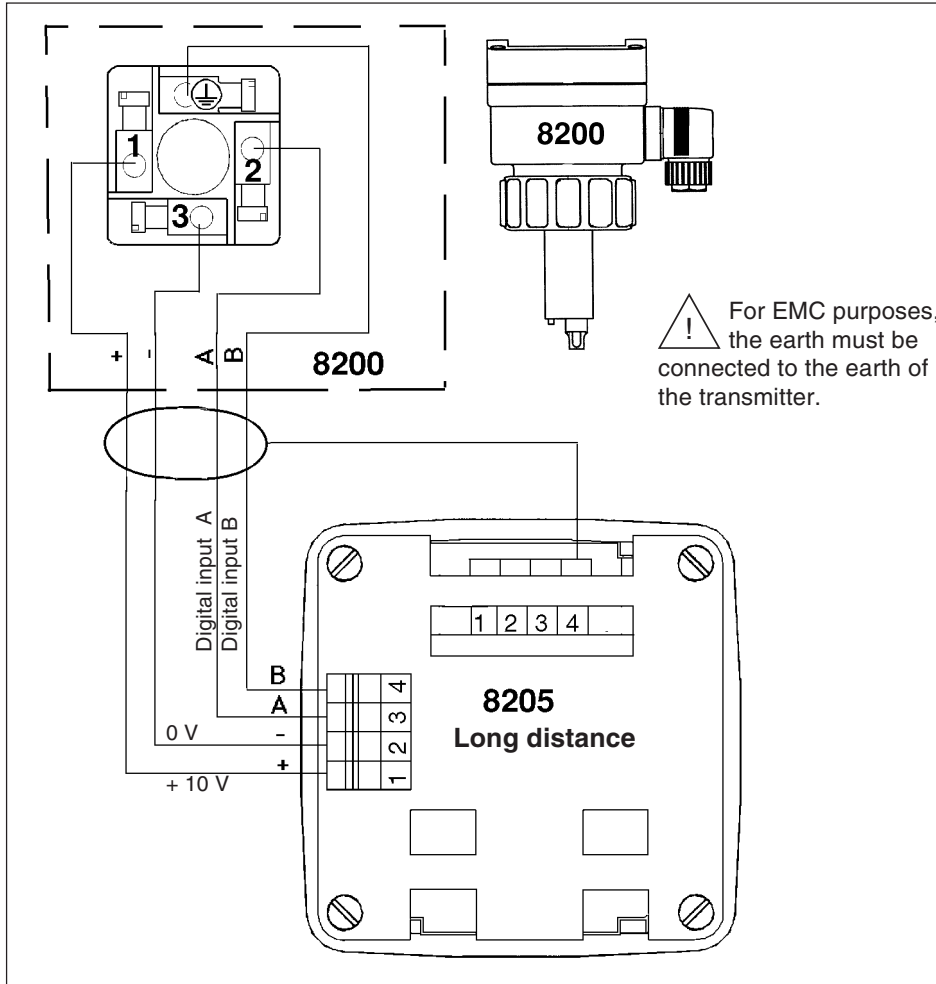
Fig. 3.18 Sensor type 8200 with PG connection Long distance.

Connect the digital output of the sensor-converter type 8200 to the pH transmitter 8205 with a 4 wire shielded cable (max. length 500 m).

### 3 INSTALLATION

### pH TRANSMITTER 8205

#### 3.2.6.2 Connection pH sensor type 8200 with plug - Long distance



**Fig. 3.19 Sensor type 8200 with plug connection - Long distance.**

Connect the digital output of the sensor-converter type 8200 to the standard DIN 43650 cable plug connector according to the above figure. (max. length 500 m).

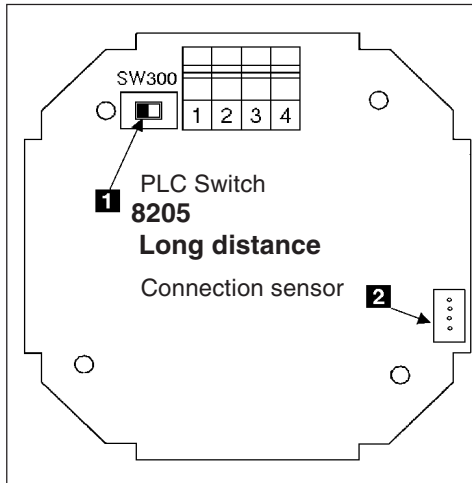
1. To open the connector remove the central screw .
2. Remove the internal part of the connector from the external part.
3. Connect according to above pin assignment.
4. When re-assembling, the internal part may be inserted into the external part in 90°-step intervals as required.

## 3 INSTALLATION

## pH TRANSMITTER 8205

### 3.2.7 Transmitter 8205 panel - Long distance

#### 3.2.7.1 Transmitter 8205 panel without relay - Long distance



Install the transmitter (see fig 32), then wire according to pin assignment (Fig. 3.10).

Terminals:

- 1: 4-20 mA
- 2: L+ (12...30 VDC)
- 3: L-
- 4: Earth (earth lug)

Connection to the sensor see fig. 3.18  
Connect the plug of the sensor terminal in the connector **2**.

**Note:** PLC-connection, depending on the PLC-version, the switch **1** on the circuit board must be set in position A or B (see Fig. 3.9 and 3.20).

Fig. 3.20 Electronic card 8205 without relay - Long distance

#### 3.2.7.2 Transmitter 8205 panel with relays - Long distance

Electronic card connection

Terminals:

- 1: 4-20 mA
- 2: L+ (12-30 VDC)
- 3: L-
- 4: Earth (PE)
- 5: Relays 2
- 6: Relays 2
- 7: Relays 1
- 8: Relays 1

Connection to the sensor see fig. 3.18  
Connect the plug of the sensor terminal in the connector **2**.

**Note:** PLC-connection, depending on the PLC-version, the switch **1** on the circuit board must be set in position A or B (see Fig. 3.9 and 3.21).

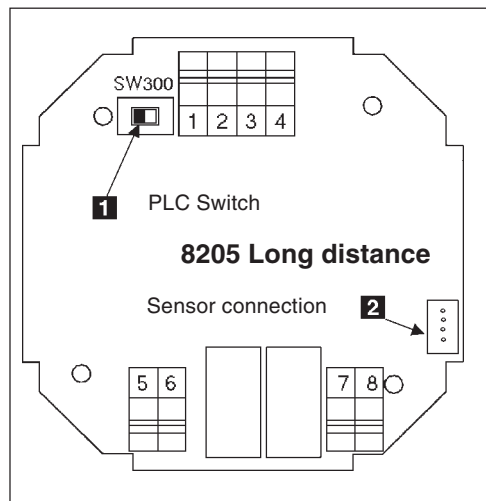


Fig. 3.21 Electronic card 8205 with relays

### 3 INSTALLATION

### pH TRANSMITTER 8205

#### 3.2.8 Electrical wiring 8205 wall-mounted -12-30 VDC- long distance

##### 3.2.8.1 Transmitter 8205 wall-mounted - without relay - long distance

Open the cover to access to the terminals. Wire according to the figure 3.22

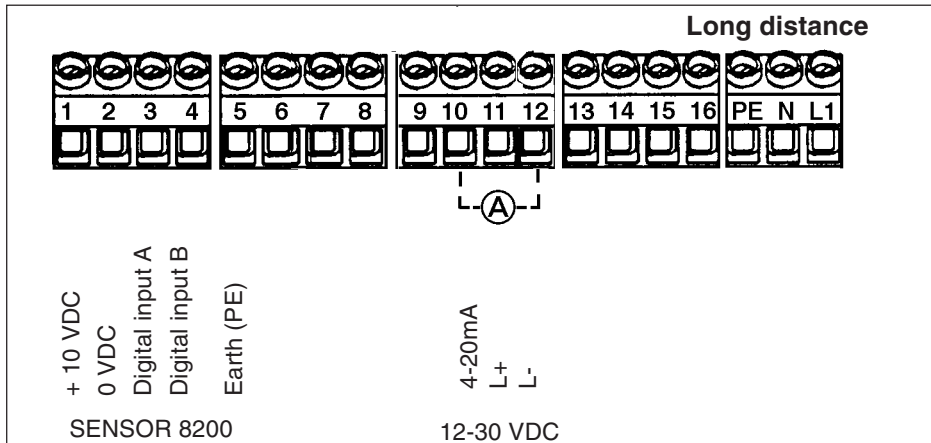


Fig. 3.22 Connection 8205 Wall mounted -long distance- 12..30 VDC without relay

##### 3.2.8.2 Transmitter 8205 wall-mounted - with relays- long distance

Open the cover to access to the terminals. Wire according to the figure 3.23

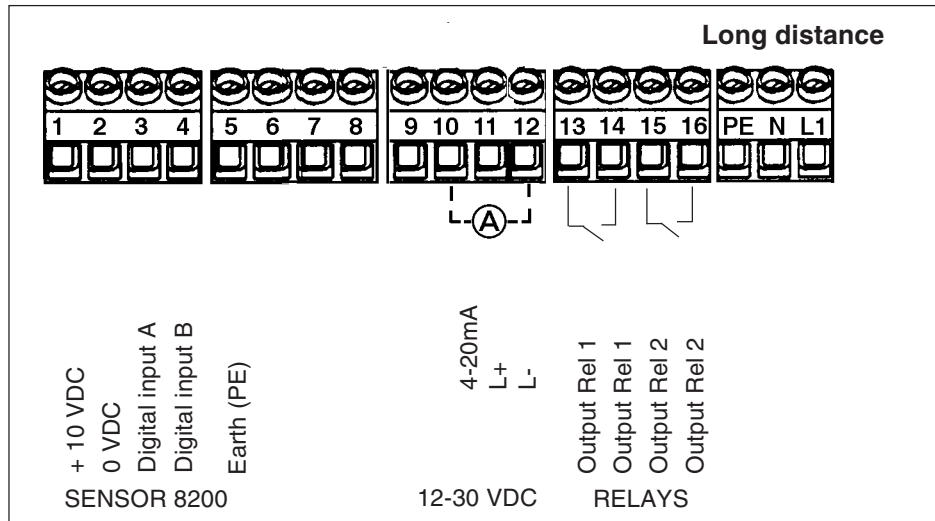


Fig. 3.23 Connection 8205 Wall mounted - long distance- 12-30 VDC with relays

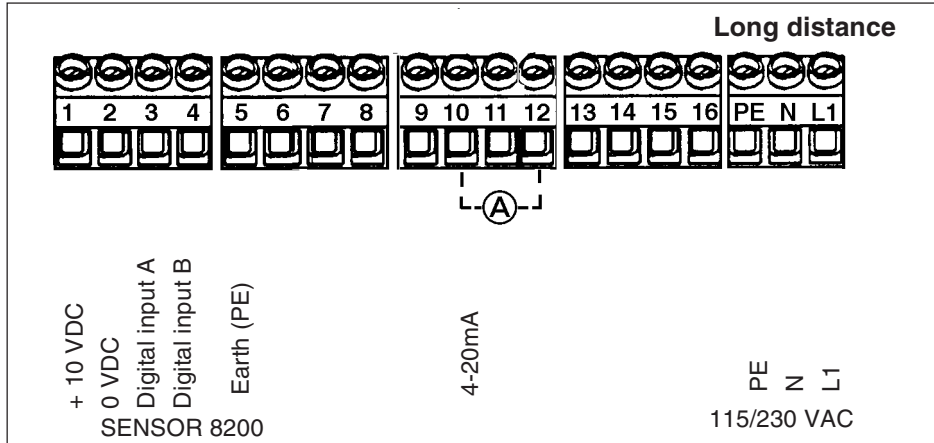
### 3 INSTALLATION

### pH TRANSMITTER 8205

#### 3.2.9 Electrical wiring 8205 wall-mounted - 115/230 VAC- long distance

##### 3.2.9.1 Transmitter 8205 wall-mounted -115/230 VAC- without relay

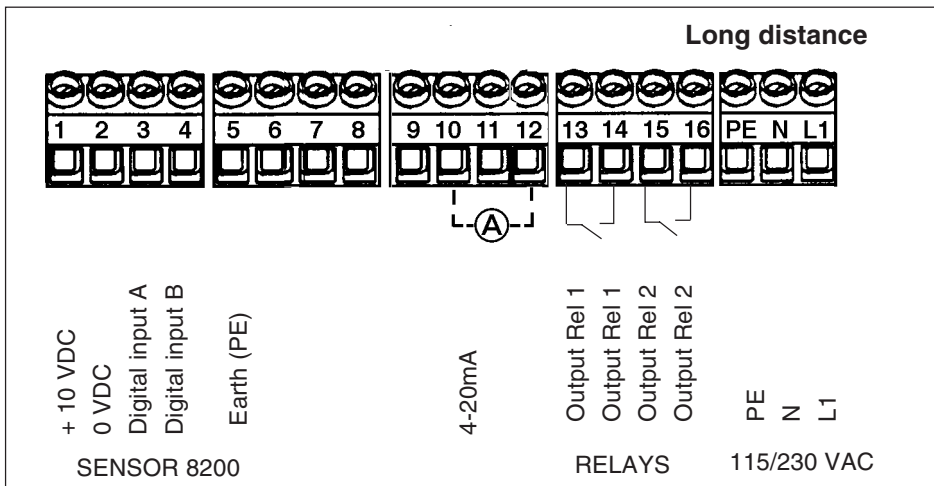
Open the cover to access the terminals. Wire according to the figure 3.24.



**Fig. 3.24 Connection 8205 Wall mounted -long distance- 115/230 VAC without relay**

##### 3.2.9.2 Transmitter 8205 wall-mounted -115/230 VAC- with relays

Open the cover to access the terminals. Wire according to the figure 3.25



**Fig. 3.25 Connection 8205 Wall-mounted - Long distance - 115/230 VAC with relays**



Warning: Check the position of the power supply selection switch before switching on the transmitter(Fig. 3.3). Connect the shield of the signal cable to the terminal 5.



## 4 OPERATION

## pH TRANSMITTER 8205

The operation of the pH transmitter is classified according to 3 levels.

### Main Menu

pH, temperature and output current are displayed in the normal function mode.

The "HOLD" function and electrode calibration ("PH CALIB") can be accessed . (§ 4.2)

### Calibration Menu

The calibration mode allows adjustments of all pH (or temperature) measurement parameters:

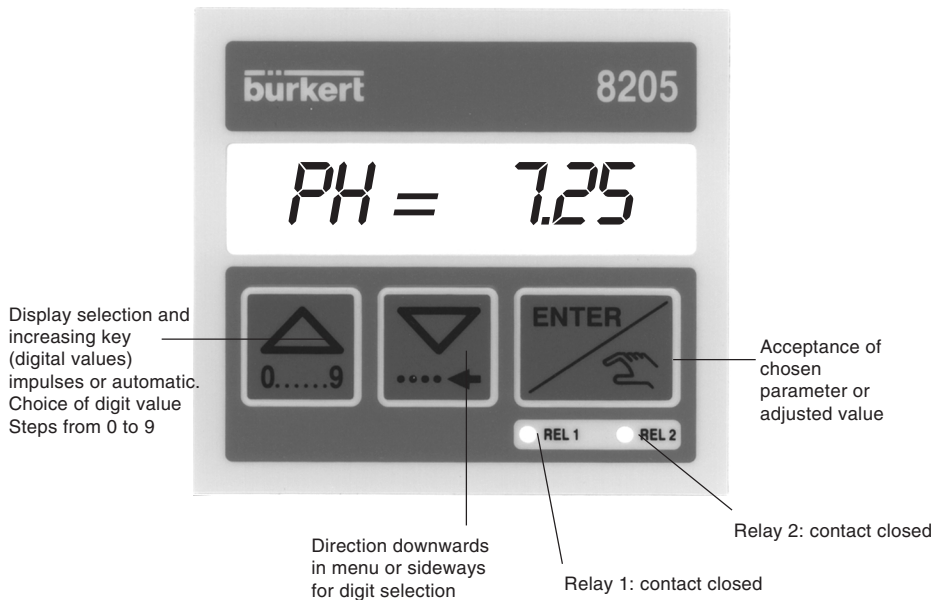
language, units, 4...20 mA output, relays thresholds (option), temperature compensation mode, instantaneous electrode voltage display, and filter selection (§ 4.3).

### Test Menu

The test menu allows the basic setting of the transmitter: Offset (4 mA), Span (20 mA), temperature adjustment.

A pH or temperature value can be simulated via this menu, allowing the process to be tested in the "dry condition" (§ 4.4)

### 4.1 Transmitter Operating and Control Elements

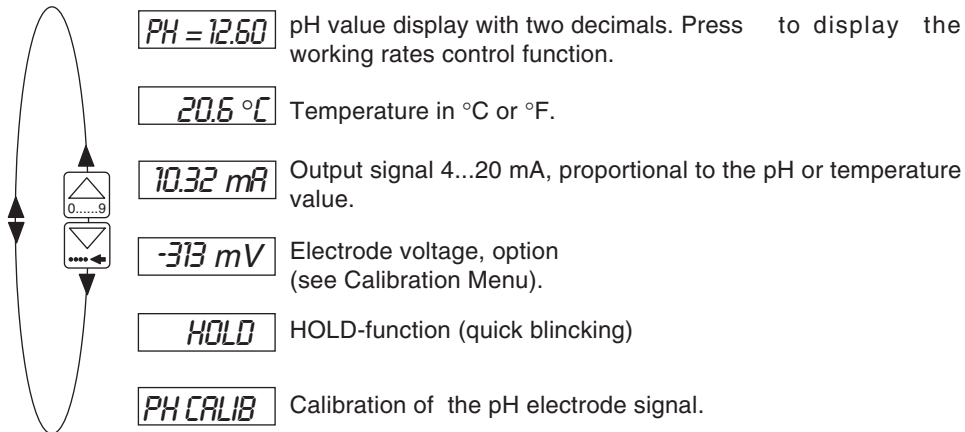


## 4 OPERATION

## pH TRANSMITTER 8205

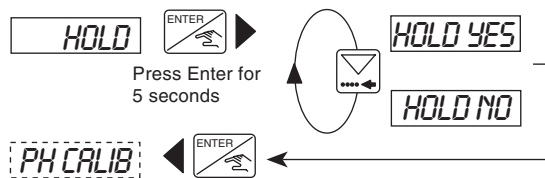
### 4.2 Operation Mode Display

The following process values are displayed in the display operation mode.



#### 4.2.1 HOLD function

A continuous 4-20 mA output corresponding to the last value measured before this option was entered is generated. The relays are locked in their last state. This allows the electrode to be cleaned without interruption of the process. The display in the operation mode is flashing and there is no access to the parameter definition or the test menu, as long as the HOLD-function is activated. To deactivate HOLD function, enter again "HOLD" option and confirm "HOLD NO".



### 4.2.2 Calibration of pH electrode

In order to obtain reliable measurements, it is necessary to perform regular calibrations of the pH electrode.

1 or 2 measuring point calibration methods are available.

**1 measuring point method:** enables a quick control calibration with pH=7 buffer solution.

**2 measuring points method:** enables a precise calibration of zero and slope of the pH electrode. 2 buffer solutions are required. The first solution is usually pH=7.

Use the second buffer solution as close as possible to the assumed final pH value. Before each calibration, clean the electrode (see §5.2). The temperatures of the buffer solutions must be equal. The pH transmitter must be calibrated regularly.

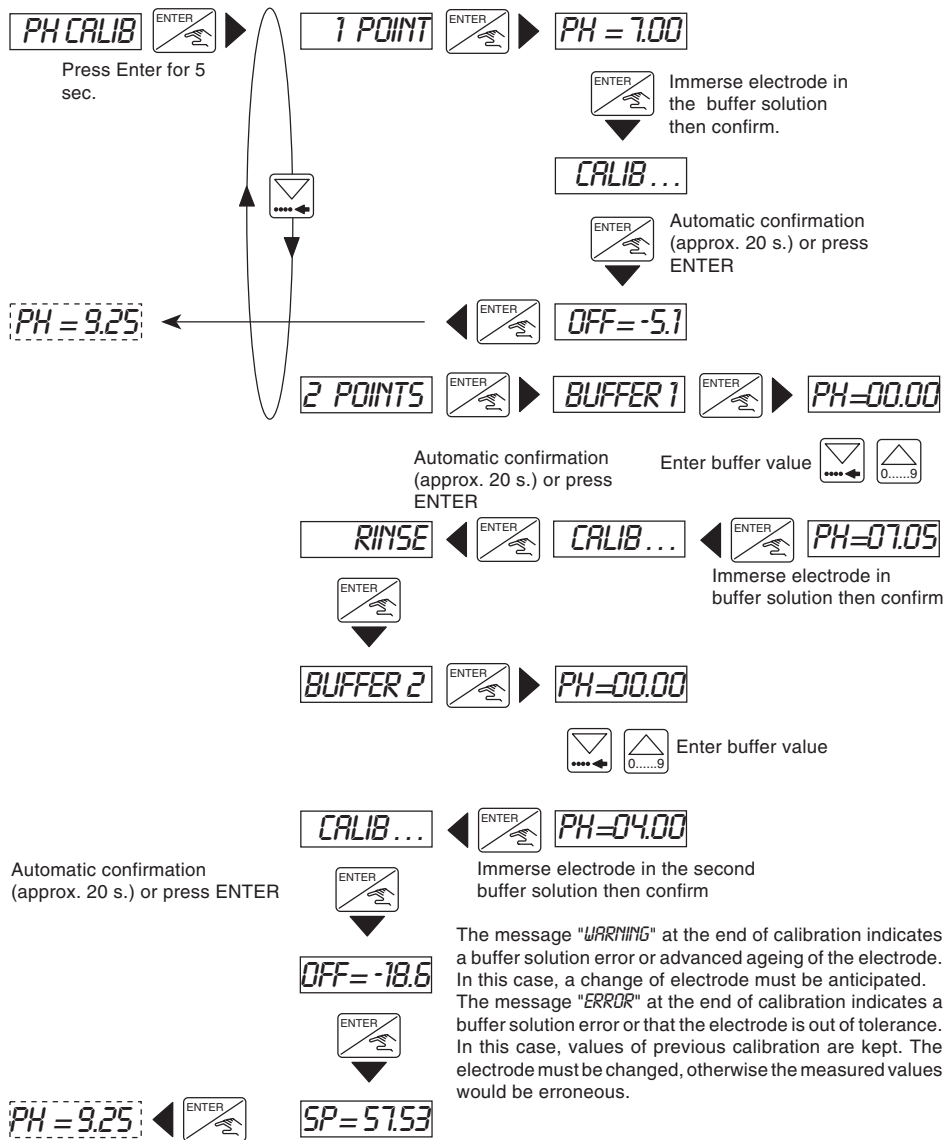
This maintenance procedure is very important to ensure a reliable control operation.

The frequency of calibrations depends upon the degree of contamination of the measuring fluid: in normal conditions, calibration should be repeated once a week.

A "**WARNING**" message points on that the electrode passed the half of its lifetime.

## 4 OPERATION

## pH TRANSMITTER 8205



The message "WARNING" at the end of calibration indicates a buffer solution error or advanced ageing of the electrode. In this case, a change of electrode must be anticipated. The message "ERROR" at the end of calibration indicates a buffer solution error or that the electrode is out of tolerance. In this case, values of previous calibration are kept. The electrode must be changed, otherwise the measured values would be erroneous.

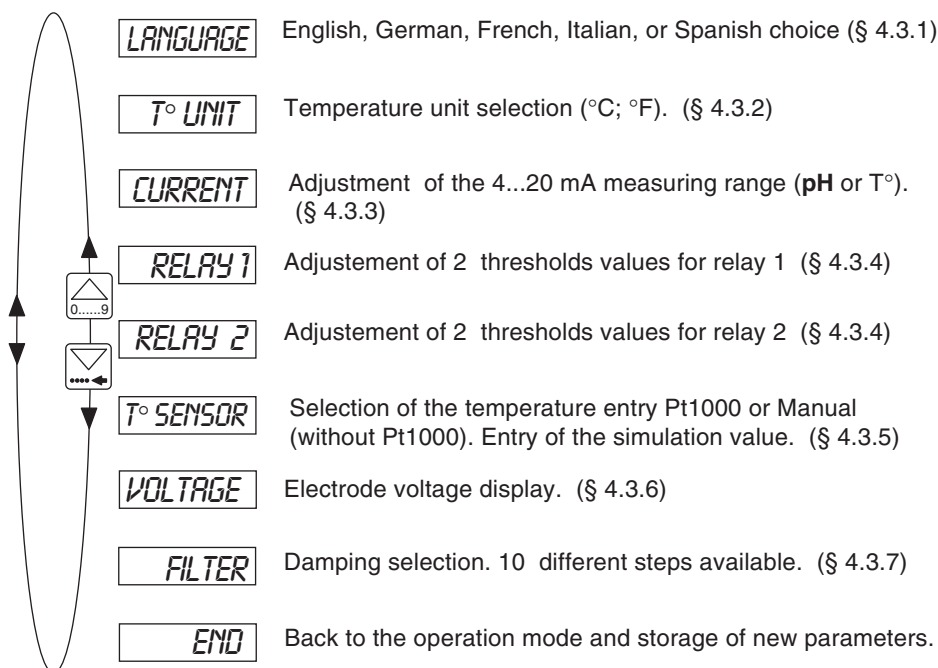
To escape electrode calibration, press + simultaneously for 2s. Previous calibration values are kept.

## 4 OPERATION

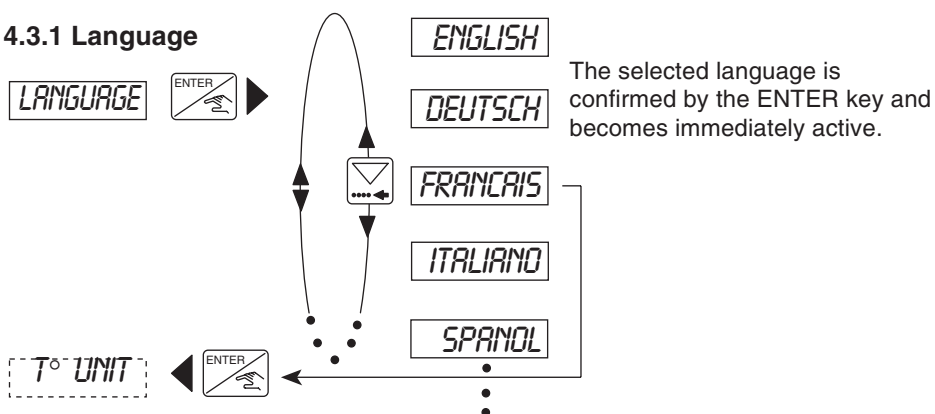
## pH TRANSMITTER 8205

4.3 Calibration Mode: Press   simultaneously for 5 seconds

The following adjustments are set in the calibration mode display:



### 4.3.1 Language

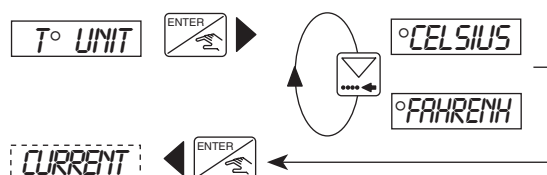


## 4 OPERATION

## pH TRANSMITTER 8205

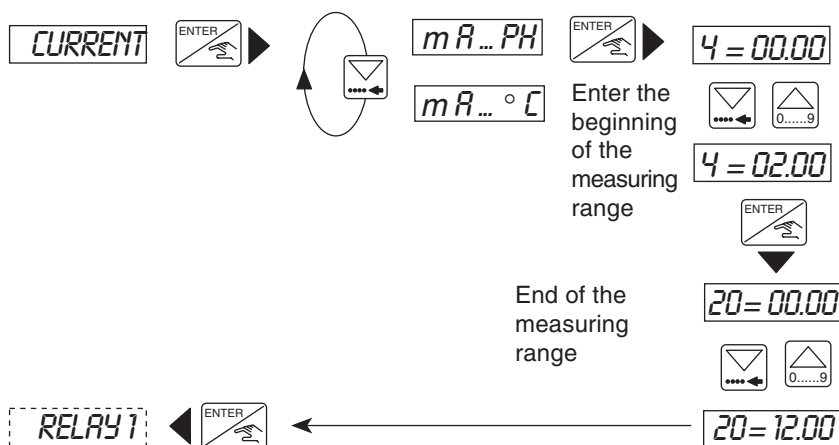
### 4.3.2 Temperature units

The temperature can be displayed in °Celsius or in °Fahrenheit.



### 4.3.3 Output Current

Enter the measuring range corresponding to the 4...20 mA output. First select the unit pH or T°current then, enter the limit values. E.g. 2 to 12 pH corresponding to 4...20 mA. The beginning of the measuring range might be larger than the end of it, e.g. 2 to 12 pH corresponds to 20...4 mA (inverted output signal).



The minimum measuring range is 0,5 pH. If the beginning of the measuring range equals the end of it, there will be no display of the current value in the operation mode display (§4.2)

## 4 CONFIGURATION

## pH TRANSMITTER 8205

### 4.3.4 Relays threshold selection

#### Relay 1:

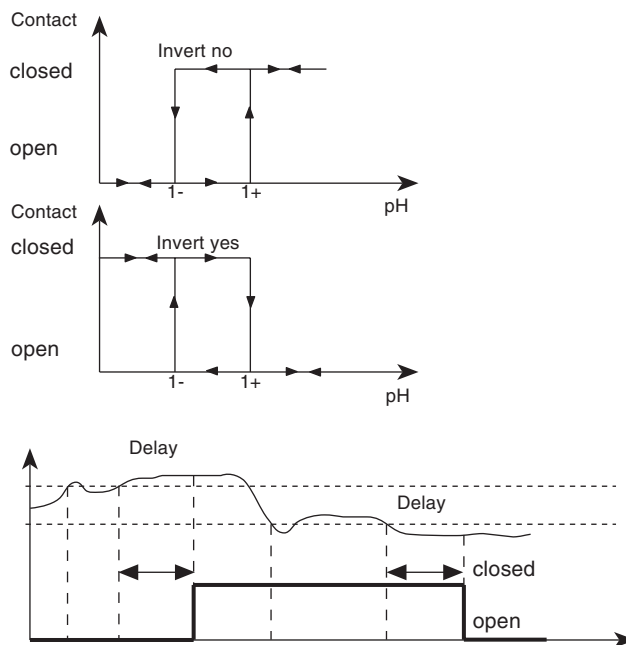
Select the entry to be controlled (pH or temperature).

Enter both thresholds of the selected relay 1- and 1+.

Options to invert the relay (NO/NC, and set a delay between 0 and 999 seconds are available.

The delay prevents the relay from operating too fast, e.g. when time for homogenization is required (measurements in tanks with agitator). If the pH(or T°) exceeds a threshold, the transmitter awaits the delay before activating the relay. No alarm will be provided, if the measured pH(or T°) returns to a normal value before the delay is elapsed.

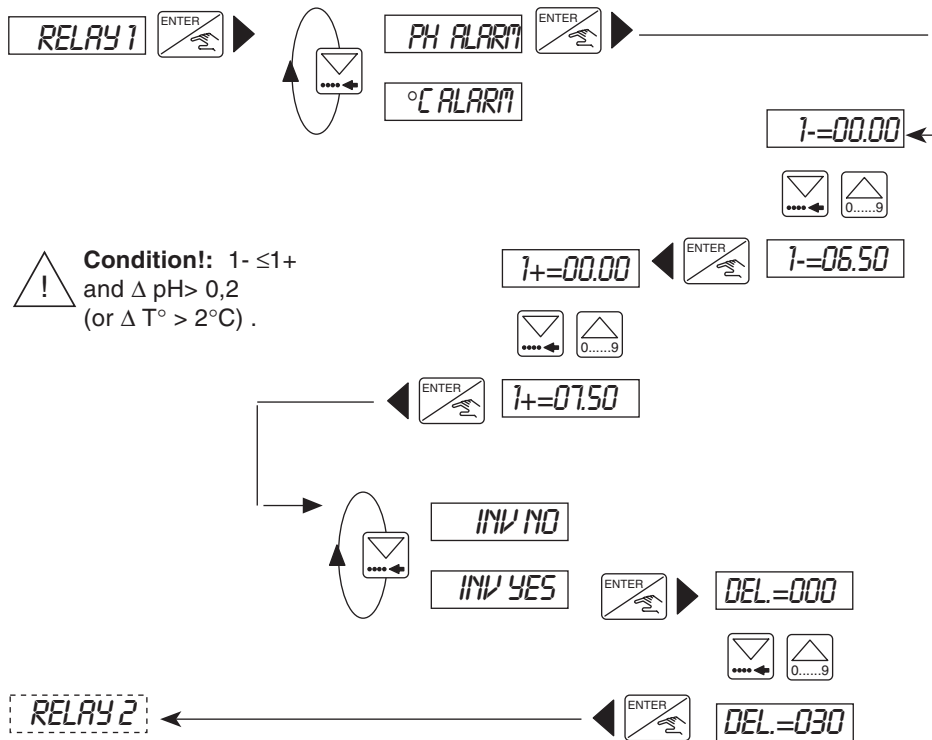
**Caution!** The following condition must be maintained  $1- \leq 1+$ ; and  $\Delta \text{pH} > 0,2$  (or  $\Delta T^\circ > 2^\circ\text{C}$ ).



## 4 CONFIGURATION

## pH TRANSMITTER 8205

### Relay 1



### Relay 2

The programming mode of the relay 2 is identical to the relay 1.  
Type of measurement (pH/temperature); thresholds of relay 2 (2- and 2+), direction (NO/NC) and delay of action.

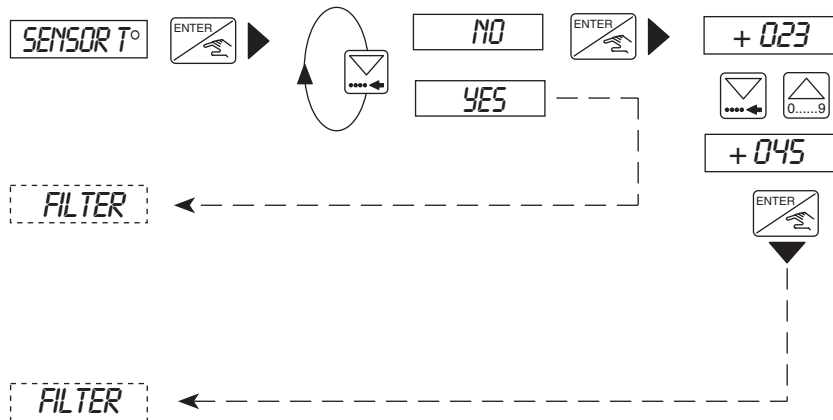


## 4 OPERATION

## pH TRANSMITTER 8205

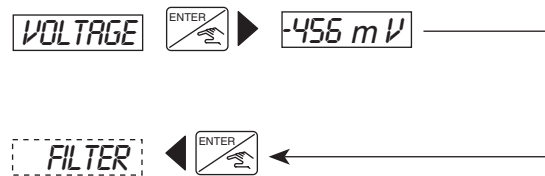
### 4.3.5 Temperature Compensation Mode

If the Pt1000 is not used for temperature measurement, select SENSOR NO and enter the temperature value of the fluid.



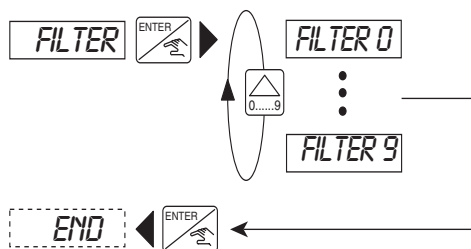
### 4.3.6 Display of electrode voltage

Display of the instantaneous value of the electrode voltage.



### 4.3.7 Filter Function

The damping is set in this sub-menu, which prevents display and output current fluctuations. There are 10 steps available. However, the first step ("FILTER 0") has no damping function.

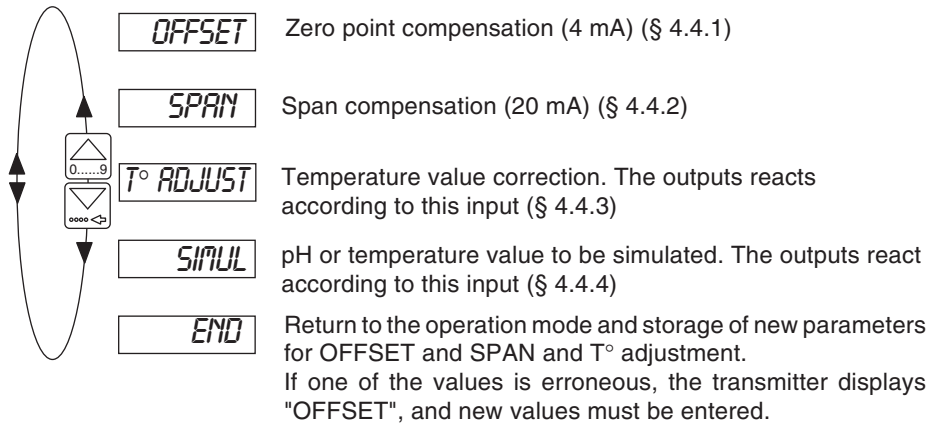


## 4 OPERATION

## pH TRANSMITTER 8205

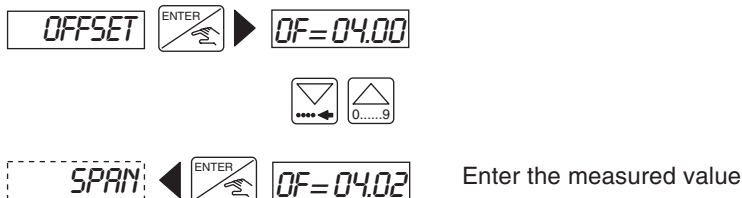
4.4 Test Menu: Press    simultaneously for 5 seconds

The following compensations and controls are carried out in the Test menu:



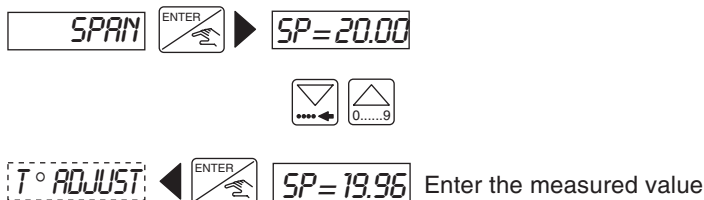
### 4.4.1 Offset-Compensation

In order to check and modify the basic setting of 4 mA, connect an ammeter in the output circuit. Press ENTER when "OFFSET" is displayed, the transmitter generates 4 mA. If the measured value is different from 4 mA, enter the measured value as offset value.



### 4.4.2 Span-Compensation

Check and modify the basic setting of 20 mA. The procedure is identical to the Offset-compensation. The transmitter generates 20 mA, if the ENTER key is pressed when "OFFSET" is displayed. Correct the span value by entering the measured value if necessary.



## 4 OPERATION

## pH TRANSMITTER 8205

### 4.4.3 Temperature adjustment

The temperature value measured by the Pt1000 can be corrected. Enter the required offset of temperature (within the limit  $\pm 5^\circ\text{C}$ ), then validate.

The temperature unit is as selected in previous parameter menu. The selected temperature value influences the computed pH value.



Enter the temperature offset value ( $^\circ\text{C}$  or  $^\circ\text{F}$ )

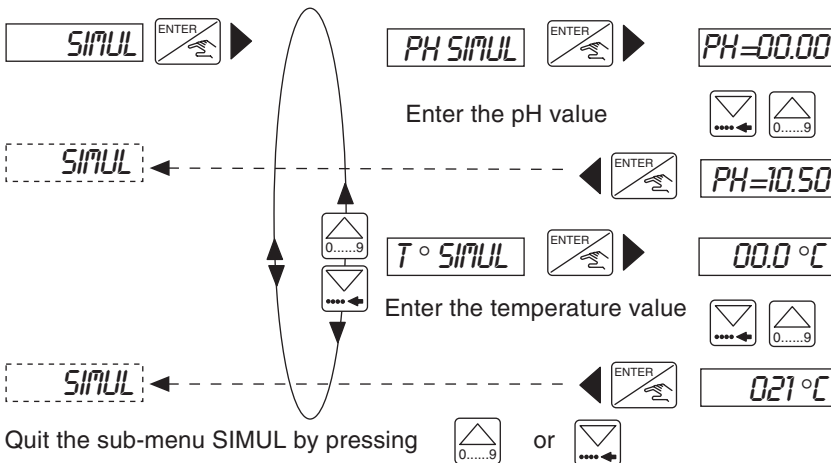


The temperature adjustment remains active until another value is entered. The temperature adjustment is not valid within the manual temperature compensation mode (refer to § 4.3.5).

### 4.4.4 pH Simulation

A pH (or  $T^\circ$ ) value can be simulated in this menu, to test the entire system without liquid. The simulated value influences the current and relays outputs.

The simulation mode also allows the sensor to be removed without interruption of the process.



The simulation remains active until the user enters another sub-menu.

### 5.1 Replacement of the pH electrode

pH-electrodes have a limited service life, depending upon many parameters, such as the chemical composition of the handled fluid, temperature, pressure, etc.

The electrode must be replaced if it shows visible damage (broken glass, fractures, etc.) or if the messages "WARNING" or "ERROR" are displayed at the end of calibration.

For replacement, proceed as follows:

#### Transmitter 8205 compact



1. Disconnect supply voltage and make sure that there is no pressure on pipe or tank.
2. Remove the transmitter from the pipe or submersion assembly.
3. Unscrew the cover and open it slightly.
4. Pull out connectors **1** and **2**.
5. Pull sensor assembly **3** out of the enclosure.
6. Screw electrode out of assembly **3** with SW17 wrench.
7. Screw new electrode into assembly and tighten with SW17 wrench.  
Reassemble in reverse order.

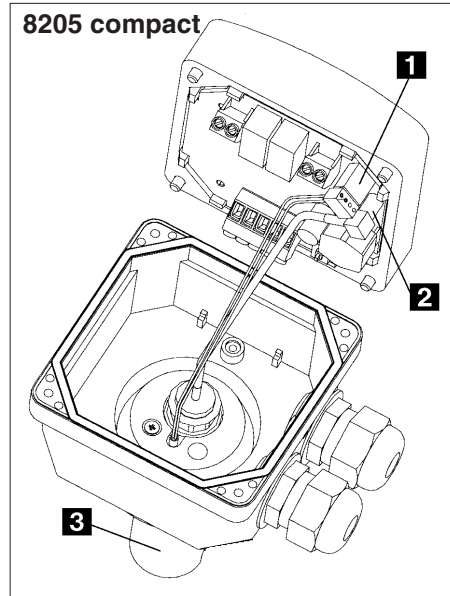


Fig. 5.1 Replacement of pH electrode

### 5.2 Storing and cleaning of the electrode

When not in operation, the electrode should be stored in a 3 molar potassium chloride solution (223,6 g/l), providing a regenerative effect. Is there no such solution available, normal tap water will also do for short measuring interruptions of max. 2 - 3 days.

The electrode must not be stored in distilled or deionized water, which may be used for rinsing purposes only!

Experience has shown, that the majority of failures in pH electrode measurements and long response times originate from contaminated electrodes or diaphragms. Since the contamination is subject to the application, there is no general detergent available yet. The following detergents, however, can be recommended for most application cases:

- Greasy or oily deposits must be removed with a tenside-containing agent.
- Chalky deposits and metal hydroxide layers require diluted hydrochloric acid (10 %).
- Sulphide-containing deposits (purification systems) are removed with a detergent mixture of diluted hydrochloric acid (10 %) and saturated pepsin.
- For very slow pH-electrodes dip the electrode for 1 minute into a 2 % HF and 5% HCl solution and rinse thoroughly.



Observe safety regulations, when handling acid-containing solutions. Always rinse electrode with deionized water and leave for approx. 10 minutes in a 3 molar potassium chloride solution or in tap water.

**5.3 Error messages**

"*ERROR*" on the display (except in electrode calibration function) indicates that calibration data are lost. By pressing ENTER, the user can access the main menu but the transmitter works with the factory settings (see §5.4). The transmitter needs re-calibration. If this message recurs, please return the transmitter to your supplier.

**B) Transmitter short and long distance :**

**Temperature:** If "----°C" or "----° F" is displayed, temperature is out of range (-40...+150) or connection with Pt1000 is interrupted. In this case "*PH = --*" is displayed. For the outputs (current and relays) pH=0 is fixed.

**pH values out of range:** pH>14 or pH<0, "*PH = --*" is displayed. For the outputs (current and relays) pH=14, respectively pH=0, are fixed.

**Electrode voltage:** >+575 mV or <-575 mV. "*PH = --*" and "---- mV" are displayed. For the outputs (current and relays) pH=0, respectively pH=14, are fixed.

**Power failure:** In case of power failure, the display turns off, 4-20 mA and pulse output to 0, alarm relays open. When the power supply is turned on, the transmitter is set to the previous configuration and to operation resumes.

**B) Transmitter long distance :**

*ERROR 1* : Connection interrupted between the pH-sensor and the transmitter.

*ERROR 2* : Electronic failure of the transmitter.

In case of communication failure with the sensor, the output current is set to 22 mA.

**5.4 Factory-setting of pH transmitter type 8205 at delivery**

Language:	English	<b>Relay 2:</b>	<b>Type pH</b>	
Temperature Unit:	°C		2-:	00.00
<b>4-20 mA Output:</b>	<b>pH</b>		2+:	00.00
4 mA:	00.00		DEL2:	000
20 mA:	00.00		INV:	No
<b>Relay 1:</b>	<b>Type pH</b>			
1-:	00.00	Pt1000:	Yes	
1+:	00.00	U electr:	No	
DEL1:	000	Filter:	Filter 2	
INV:	No			

## 5 MAINTENANCE

## pH TRANSMITTER 8205

### 5.5 Spare Parts List Transmitter type 8205 compact

Position	Specification	Order-No.
1	Complete sensor housing with plug connector, ring and union nut	425524H
2	Complete sensor housing with ring, union nut and one flat packing	425525A
3	Complete sensor housing with ring, union nut and two flat packings	425526B
4	Cable plug Worldwide version	424205Z
5	Cable plug North America version	424206S
6	PG 13.5 Worldwide version	418339Q
7	PG 13.5 North America version (G 1/2 ")	418340M
8	Cover with screws, sheeting and printed circuit board Transmitter without relay	425531G
9	Cover with screws, sheeting and printed circuit board Transmitter with relays	425532H
10	Ring	619205L
11	Union nut	619204K
12	pH electrode 0...90 °C, 0...6 bar (GLS)	634505Y
13	pH electrode 0...60 °C, 0...0,5 bar (KST)	
14	pH electrode 0...130 °C, 0...3 bar (STE)	634506Z
	pH electrode 0...60 °C, 0...2 bar (LEI)	418341A
	pH electrode 0...40 °C, 0...2 bar (SCH)	418343C
	pH electrode 0...90 °C, 0...6 bar (HOL)	420101Z
15	Electrode housing with Pt1000 stainless steel Electrode housing with Pt1000Ti	634756A 418890W
16	FPM seal kit EPDM seal kit	425554P 425555Q
17	Operating instructions manual (D, GB, F)	425533A

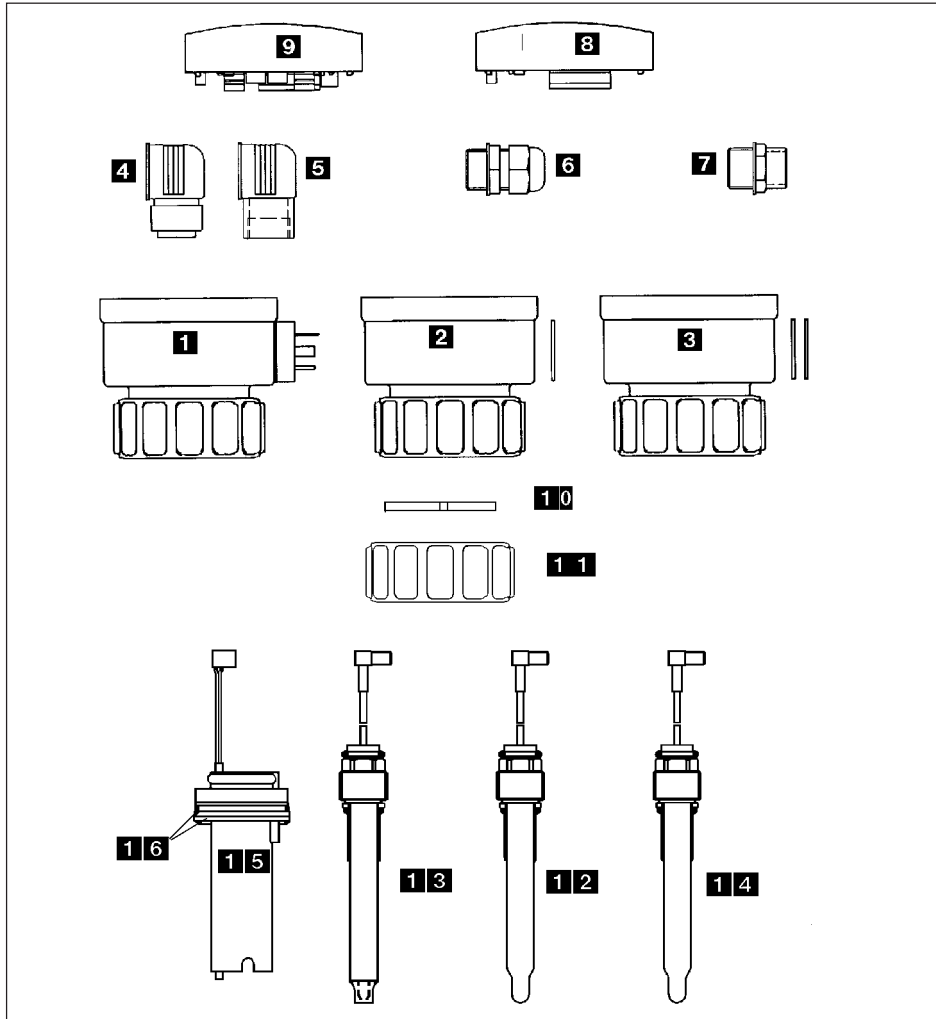


Fig 5.3 Spare parts explosion drawing type 8205 panel version

Buffer solution pH=4, 500 ml Buffer solution pH=7, 500 ml Buffer solution pH=10, 500 ml Storage solution for electrodes (KCl 3M), 250 ml	418540E 418541T 418543V 418557T
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## 5 MAINTENANCE

## pH TRANSMITTER 8205

### 5.5.2 Spare parts pH-transmitter type 8205 panel version

Item	Designation	Order N°	Short	Long Distance
1	Cover with screws, front panel and electronic card Transmitter 8205 panel version without relay.		425531G	430759M
2	Cover with screws, front panel and electronic card Transmitter 8205 panel version with relays		425532H	430760J
3	Gasket		419350Q	419350Q
4	Protective plate		419779J	419779J
5	Mounting accessories (screws, lockwashers, spacer bolts, cable clips)		418388A	418388A
	Instruction manual		425533A	425533A

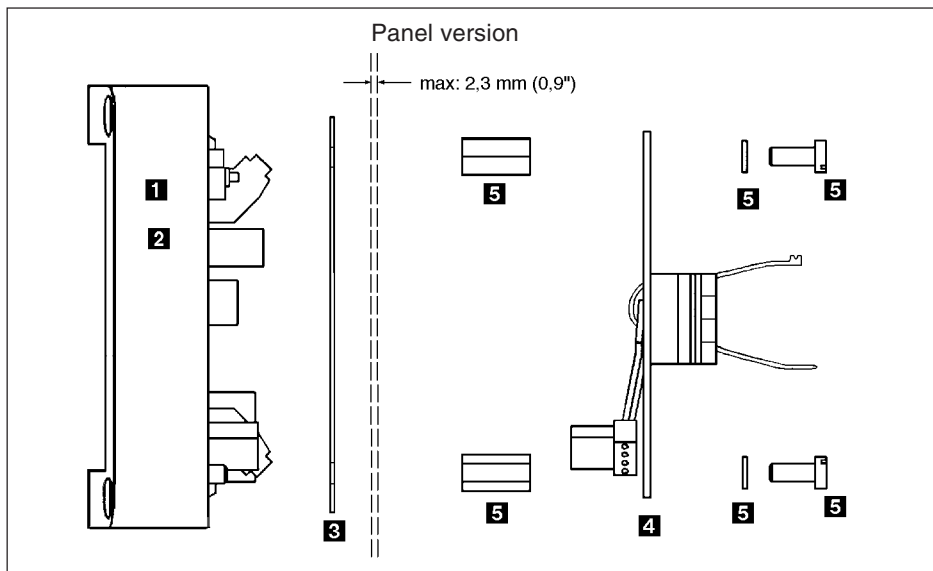


Fig 5.3 Spare parts explosion drawing type 8205 panel version



## 5 MAINTENANCE

## pH TRANSMITTER 8205

### 5.5.3 Spare parts pH-transmitter type 8205 wall-mounted version

Item	Designation	Order N°	Short	Long Distance
6	Electronic card 8205 wall-mounted without relay with software		418059B	427103N
7	Electronic card 8205 wall-mounted with relays and software		418060G	427104P
8	Power card 12...30 VDC Power card 230/115 VAC		419879F 419877V	419879F 419877V
9	Connection cable between power card and electronic card		420403Y	420403Y
10	Complete IP65 enclosure		427096A	427096A
	Instruction manual		425533A	425533A

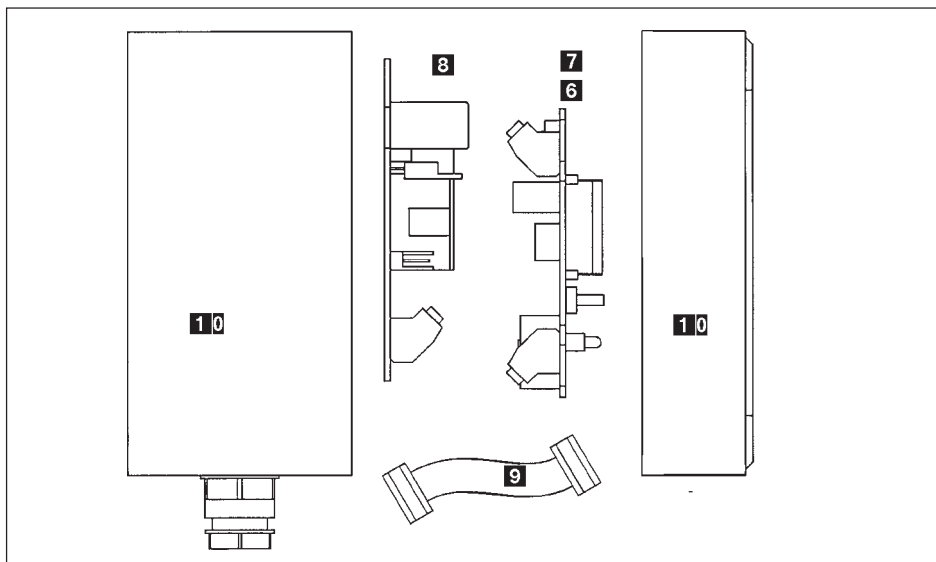
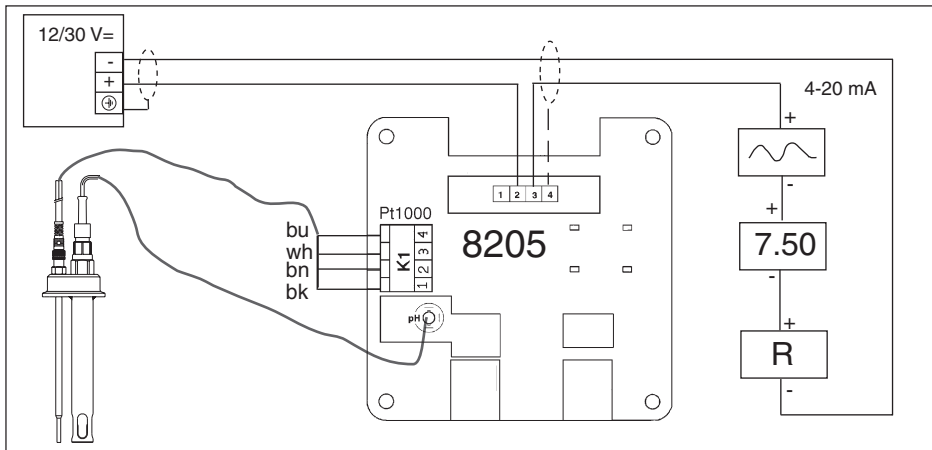


Fig 5.4 Spare Parts Explosion type 8205 Drawing Wall-mounted Version

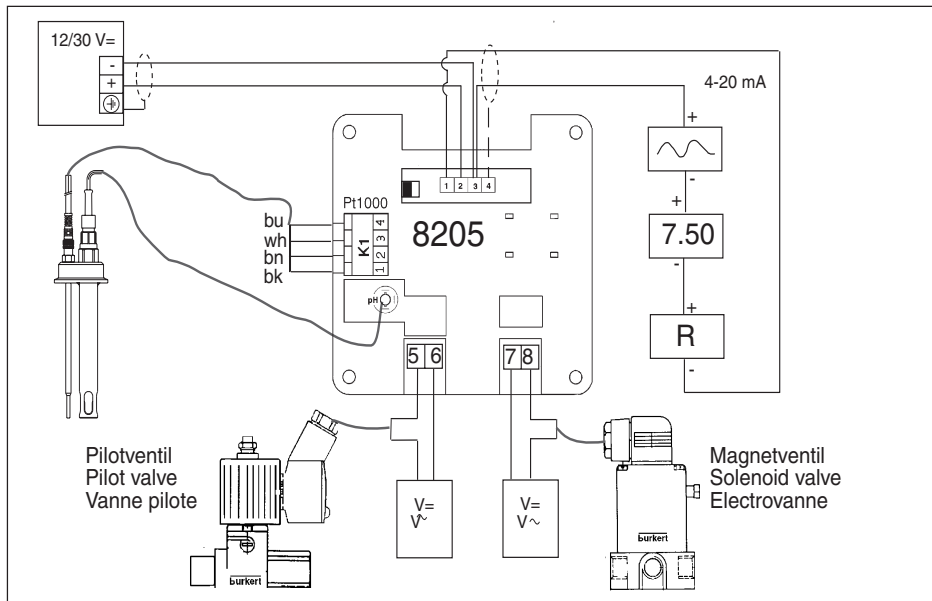


**Beispiel - Example - Exemple:** *Easy LINK*

Anschluss pH-Transmitter 8205 Schalttafel-Montage 12/30VDC ohne Relais

Connection pH transmitter 8205 panel 12/30 VDC without Relays

Connexion transmetteur de pH 8205 encastré 12-30 VCC sans relais

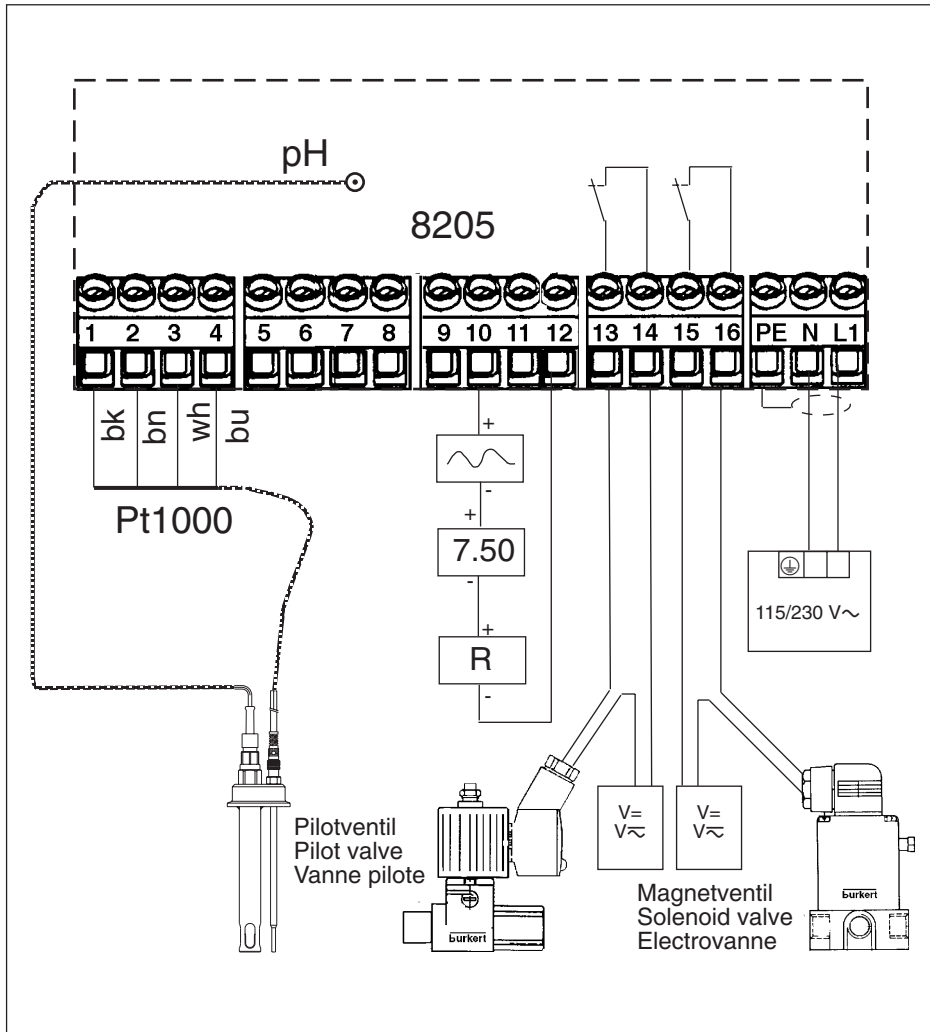


**Beispiel - Example - Exemple:** *Easy LINK*

Anschluss pH-Transmitter 8205 Schalttafel-Montage 12/30VDC mit Relais

Connection pH transmitter 8205 panel 12/30 VDC with relays

Connexion transmetteur de pH 8205 encastré 12-30 VCC avec relais



**Beispiel - Example - Exemple:** *Easy LINK*

Anschluss pH-Transmitter 8205 Wandmontage 115-230 VAC mit Relais  
 Connection pH transmitter 8205 wall-mounted 115-230 VAC with relays  
 Connexion transmetteur de pH 8205 mural 115-230 VAC avec relais

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