

## VLM30 In-Line Vortex Flowmeter Repair Instructions

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2. Replacing the LCD indicator
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6. Replacing the remote connection board (RCB)

# 1. Safety Information

## Intended use

These instructions are an important part of the product and must be retained for future reference.

The intention of this document is to assist with the replacement of components relating to the VLM30 flow meters.

Only trained specialist personnel who have been authorised by the plant operator accordingly are permitted to modify products. The specialist personnel must have read and understood the manual (IM-P736-02) and must comply with its instructions.

For additional information or if specific problems occur that are not discussed in these instructions, contact Spirax Sarco for technical assistance.

The content of these instructions is neither part of nor an amendment to any previous or existing agreement, promise or legal relationship.

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

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

At all times, any national regulations relating to the installation, function testing, repair and maintenance of electrical products comply and must be adhered to.

Spirax Sarco are not not liable for deterioration or loss of performance, malfunctions or damages which result from the modification described here. Any existing liability for defects of the equipment ends with the modification which is not carried out by the manufacturer.

The manufacturer is not liable under any circumstances for lost profits, production stoppage, capital costs, loss of data, replacement purchase of energy, or for indirect or consequential damages or loss, regardless of type.

Spirax Sarco recommend that any modifications are performed by qualified factory trained service technicians.

## 2. Replacing the LCD indicator

### 2.1 Required tools

Slotted screwdriver with 5 to 8 mm blade width.

### 2.2 Change the LCD indicator

1. Switch off the power supply.
2. First twist off the cover counterclockwise to get access to the display module.



Fig. 1

3. Use a slotted screwdriver (1) and pull the LCD indicator (display) (2) in a straight way off. Another way to remove the LCD indicator is to pull off by hands carefully and in a straight way.

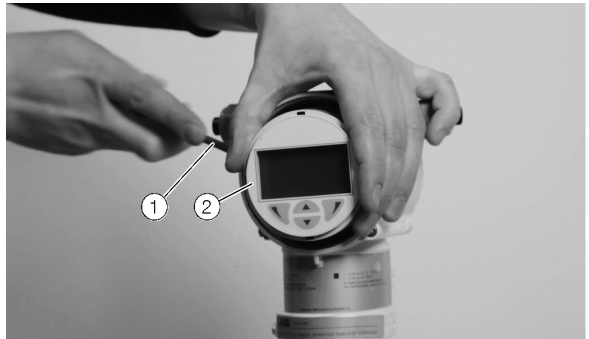


Fig. 2



#### Note

Be aware that there are two different LCD indicators available. One with handling through the glass and one with push buttons. For the replacement make sure that the right display module will be changed.

4. It is possible to connect the LCD indicator in four different positions (1) .

Make sure that the connector (2) is applied to the right position on the LCD indicator.

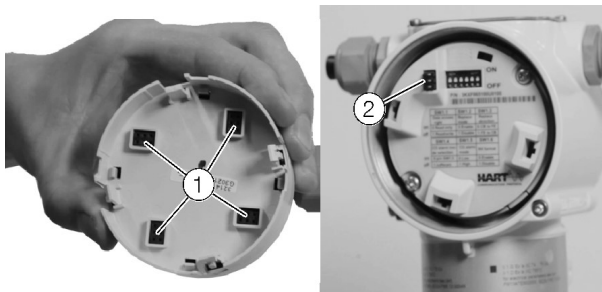


Fig. 3

5. Snap the new LCD indicator into the Communication board.
6. Close the cover on the transmitter head.



Fig. 4

## 3. Replacing the communication board (CB)

### 3.1 Required tools

- Slotted screwdriver with 5 to 8 mm blade width.
- Cross screwdriver PH2

### 3.2 Change the communication board (CB)

#### Remove the LCD indicator

1. Switch off the power supply.
2. Remove the LCD indicator as described in **Replacing the LCD indicator** on page 3.

#### Remove the communication board

3. To pull off the communication board use a cross screwdriver to untighten the screws (1) .



Fig. 5

3. Use a slotted screwdriver (1) at the one o'clock position to loosen and then remove the communication board (2).

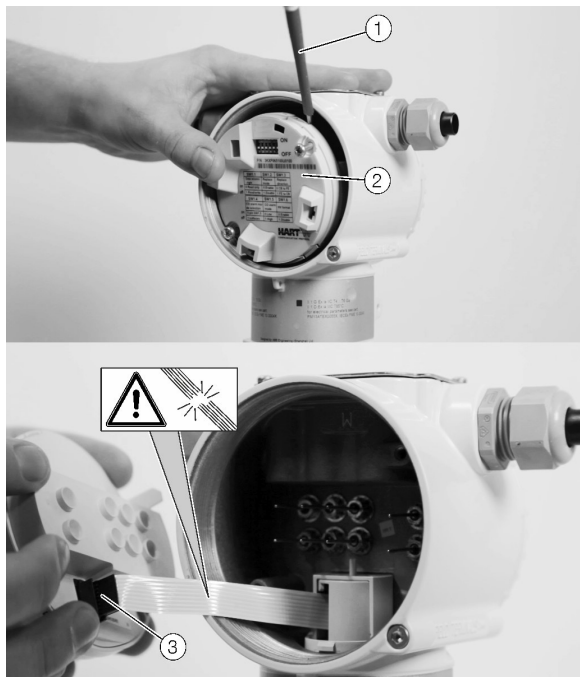


Fig. 6



### Note

**Take care to avoid damaging the device**

A ribbon cable is connected to the backplane of the communication board.

- Disconnect the ribbon cable (3) and remove the communication board.

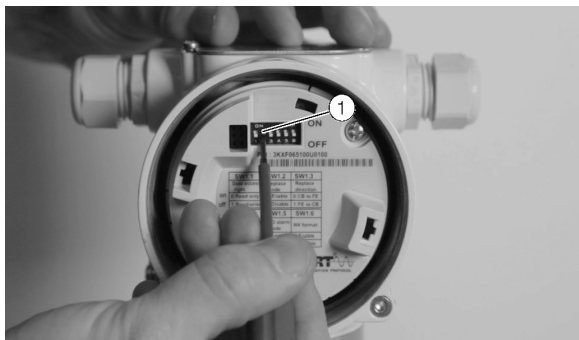
## Install the communication board

5. To install a new communication board follow the steps 5. to 3. in opposite order.

## Transfer the system data to the new communication board

6. Set DIP switch (1) SW 1.2 (HART)/SW 1.1 (Modbus®)/DIP 2 (PROFIBUS®, FOUNDATION Fieldbus®) to 'ON'.

Fig. 7



7. Switch on the power supply.
8. Wait at least 60 seconds and then switch off the power supply.
9. Set DIP switch SW 1.2 (HART)/SW 1.1 (Modbus)/DIP 2 (PROFIBUS, FOUNDATION Fieldbus) to 'OFF'.

The system data must be transferred from the sensor to the new communication board. Only the following CB parameters are transferred from the Frontendboard:

- All configurations done in the "Easy Setup", despite Qmax (setting for 20 mA).
- All totaliser values and units.
- K factors and their related frequency.
- SAP no and the function passwords.

All other parameters need to be checked for the new CB.



### Note

Please check carefully and adjust, if needed, the Qmax value for 20 mA after the exchange in "Easy-Setup" menu!

## Install the LCD indicator

10. Install the LCD indicator as described in **Replacing the LCD indicator** in section 2.

## 4. Replacing the frontend board (FEB)

### 4.1 Required tools

- Allen key 2.5 mm, 3 mm and 5 mm
- Cross screwdriver PH3 and PZ3.
- Needle-nosed pliers

### 4.2 Change the frontend board (FEB)

#### Remove the LCD indicator

1. Switch off the power supply.
2. Remove the LCD indicator as described in **Replacing the LCD indicator** in section 2.

#### Remove the communication board (CB)

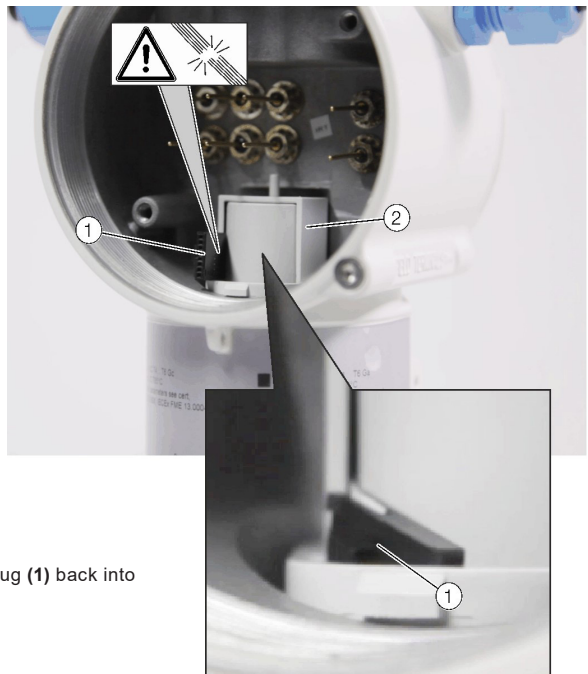
3. Remove the communication board as described in **Remove the communication board** in section 3.

#### Remove the frontend board (FEB)

After removing the front cover, LCD indicator and CB you will see the transmitter head and the ribbon cable (1).

The ribbon cable connects the communication board to the frontend board via the spring loaded ribbon cable interface (2).

Fig. 8



4. Put the black plastic ribbon cable plug (1) back into the plastic cap.

5. Loosen the screw (1) to unscrew the transmitter head from the device with a 3 mm Allen Key.
6. Carefully turn the transmitter housing (2) anti-clockwise and observe at each turn the position of the black plastic ribbon cable plug until you can remove the transmitter housing completely.

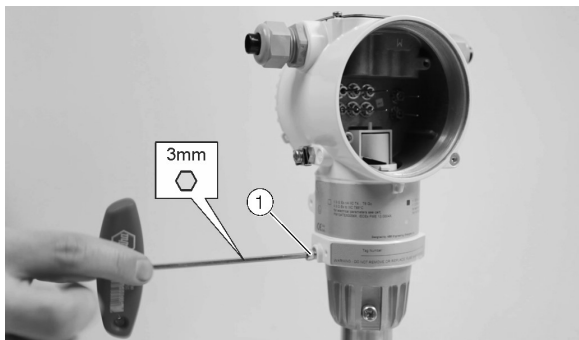


Fig. 9

7. Remove the plastic cap (1) from the ribbon cable and the plastic disc (2) from the frontend board.

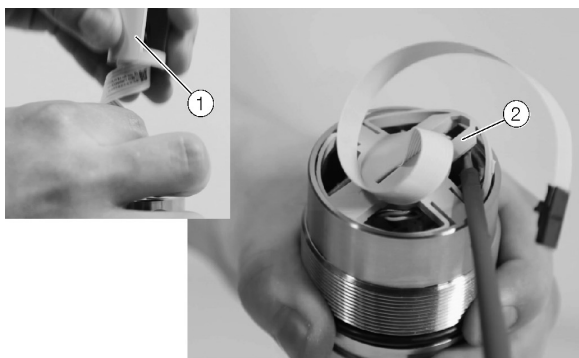


Fig. 10

8. Carefully pull the plug (2) of the piezo sensor cable out of the socket (3) on the frontend board (1).
9. Adjust the sensor cable and the plug in an upright position.



Fig. 11

10. Use a 5 mm Allen key to remove the 3 x M6 screws on the frontend board housing (1).
11. Pull carefully of the entire frontend board housing (2) from the sensor neck (3).  
**Take care not to damage the sensor cables (4) !**

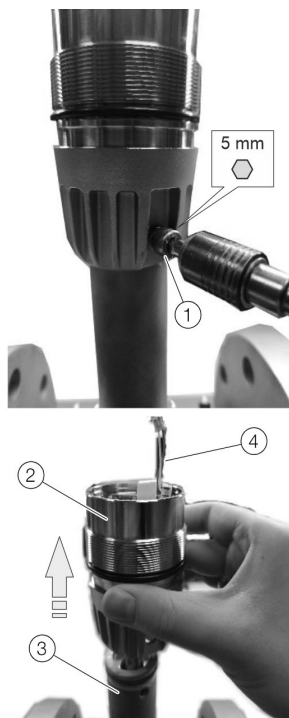


Fig. 12

## Install the new frontend board (FEB)

12. Remove the plastic adapter (1) from the old frontend board housing.
13. Place the plastic adapter (1) on the sensor neck (2) .
14. Feed the front end board sensor wires (4) through the frontend board housing (3).

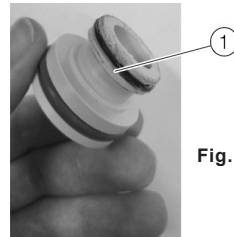


Fig. 13

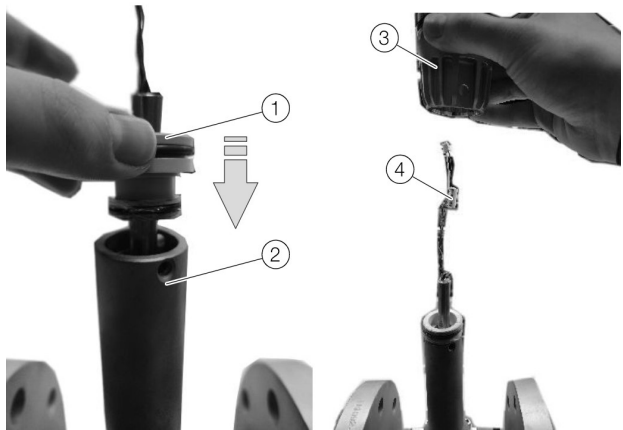


Fig. 14

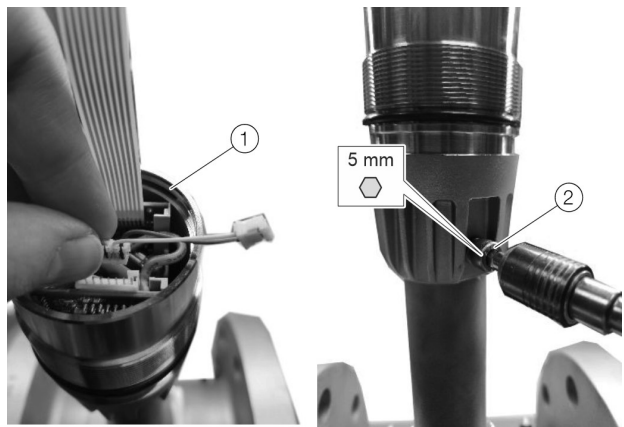


Fig. 15

18. Refit the plastic disc (1) on the frontend board.

19. Depending on the mounting position the frontend board can be mounted differently:

**A** - If the ribbon cable (2) is on the front board bend the cable clockwise.

**B** - If the ribbon cable (2) is on the rear site bend the cable anti clockwise.

20. Refit and coil the ribbon cable (3) through the spring loaded ribbon cable interface.

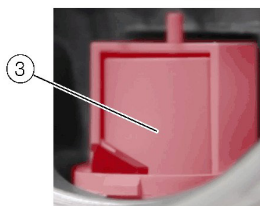
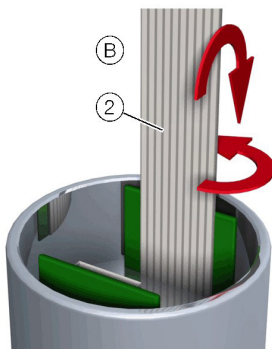
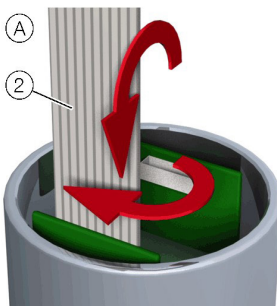


Fig. 16

21. Carefully turn the transmitter housing (1) clockwise and observe at each turn the position of the black plastic ribbon cable plug.
22. Tighten the screw (2) with a 3 mm Allen key.

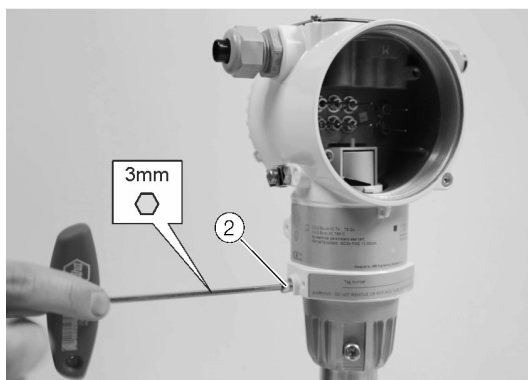
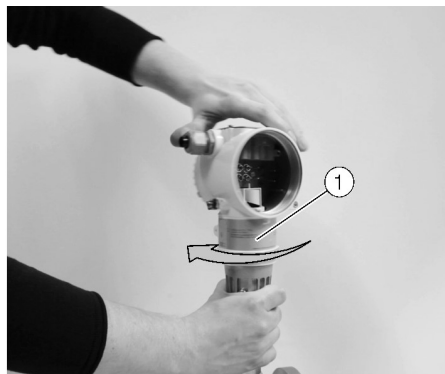


Fig. 17

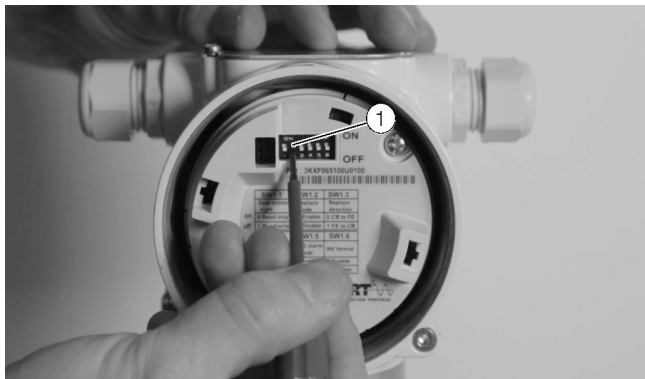
## Install the communication board (CB)

23. Install the communication board as described in **Install the communication board** in section 3.

## Install the LCD indicator

24. Install the LCD indicator as described in **Change the LCD indicator** in section 2.

## Transfer the system data to the new frontend board



**Fig. 18**

25. Set DIP switch 1 SW 1.2 (HART)/SW 1.1 (Modbus®)/DIP 2 (PROFIBUS®, FOUNDATION Fieldbus®) to 'ON'.
26. Set DIP switch 1 SW 1.3 (HART)/SW 1.2 (Modbus®)/DIP 3 (PROFIBUS®, FOUNDATION Fieldbus®) to 'ON'.
27. Switch on the power supply.
28. Wait at least 60 seconds and then switch off the power supply.
29. Set DIP switch SW 1.2 (HART)/SW 1.1 (Modbus)/DIP 2 (PROFIBUS, FOUNDATION Fieldbus) to 'OFF'.
30. Set DIP switch SW 1.3 (HART)/SW 1.2 (Modbus®)/DIP 3 (PROFIBUS®, FOUNDATION Fieldbus®) to 'OFF'.

The system data has now been transferred from the transmitter to the sensor.  
All other parameters need to be checked for the new FEB via the HMI.

## 5. Replacing the piezo sensor

### 5.1 Required tools

#### Standard tools

- Allen key 2.5 mm, 3 mm and 5 mm
- Cross screwdriver PH3 and PZ3.
- Torque wrench 1 to 10 Nm
- Needle-nosed pliers

#### Special tools

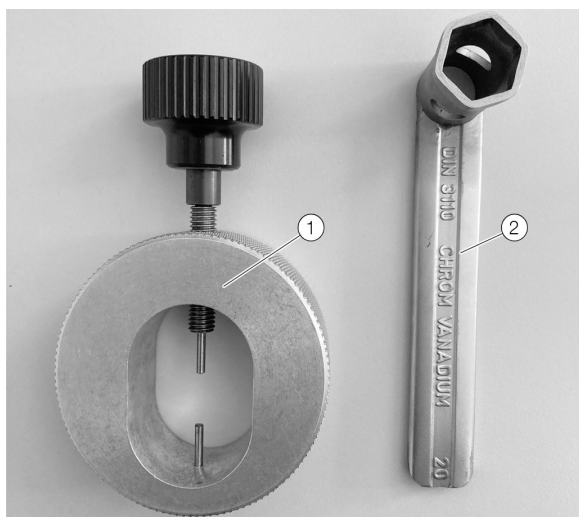


Fig. 19

- (1) SXS Centering tool; Part number: 1000006369
- (2) Modified 17 mm hexagon socket wrench; Part number: 1000006370

## 5.2 Replace the piezo sensor

### Remove the LCD indicator

1. Switch off the power supply.
2. Remove the LCD indicator as described in **Change the LCD indicator** in section 2.

### Remove the communication board (CB)

3. Remove the communication board as described in **Remove the communication board** in section 3.

### Remove the frontend board (FEB) housing

4. Remove the frontend board as described in **Remove the frontend board (FEB)** in section 4.

### Remove the piezo sensor

5. Place the centering tool (1) on the sensor neck (2) and tighten it in the centering holes (3).
6. Use the modified 17 mm hexagon socket wrench (4) to lose the union nut (5) in the sensor neck.
  - Pay special attention while you're untighten the screw there are loose wires inside the tower. These loose wires can be damaged quickly.
7. CAREFULLY remove the union nut from the sensor neck using needle-nose pliers.

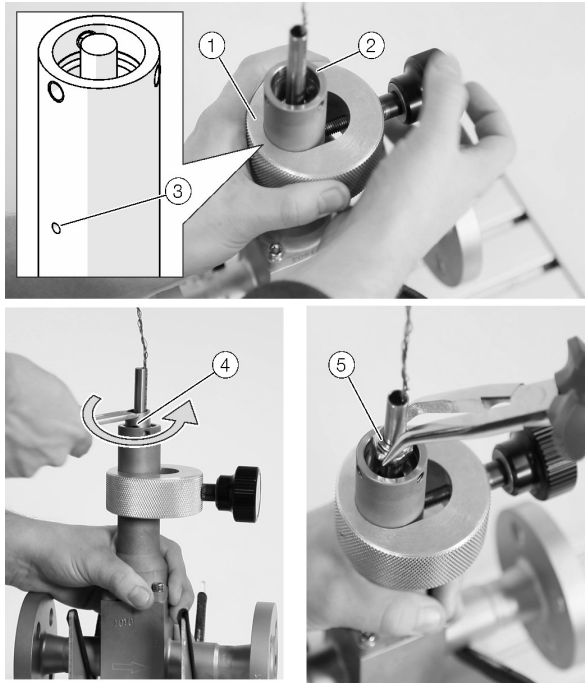


Fig. 20

8. CAREFULLY remove the seal (1) from the sensor neck using needle-nose pliers and pull it over the sensor cable by hand.

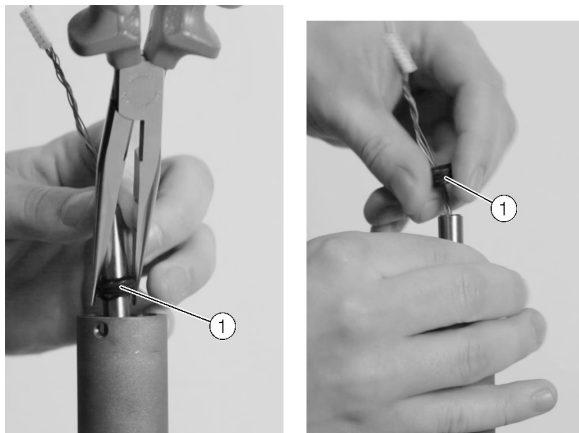


Fig. 21

9. Remove the four hexagon socket screws (1) of the sensor neck with a 4 mm Allen key.
10. Carefully pull the sensor neck upwards.
- Pay special attention to the loose wires (2) inside the tower. These loose wires can be damaged quickly.

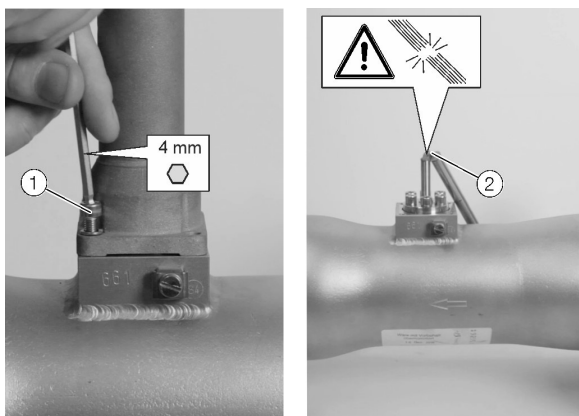


Fig.22

11. Remove the six hexagon socket screws (1) of the piezo sensor (2) with a 5 mm Allen key.
12. Pull out the piezo sensor upwards.

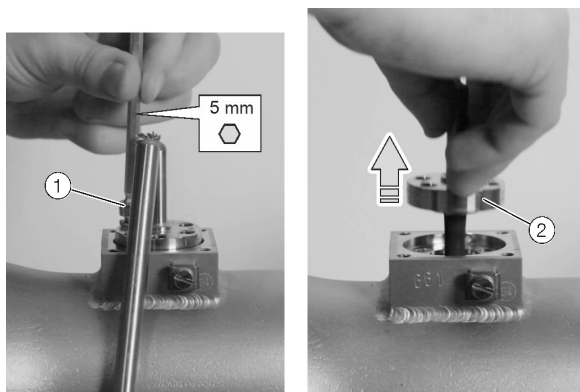


Fig. 23

## 5.3 Install the piezo sensor

Consider that the new piezo sensor has no sealing ring. The sealing ring has to be mounted on the sensor holding manually.

1. Press the sealing ring (1) firmly into the groove on the piezo sensor 2.
2. Insert the piezo sensor. Ensure that the notch 3 is aligned either in or against the flow direction.

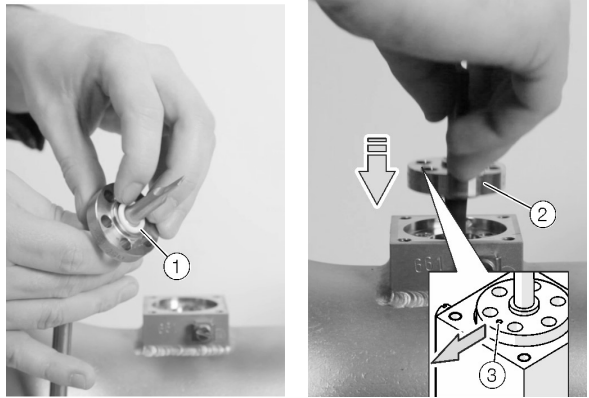


Fig. 24

3. To fix the sensor holding tighten the six screws (1) with a torque wrench.

- Required is a tightening torque of 8 Nm for an O-ring sealing.

- For the graphite sealing all screws should be tightened with 9 Nm, then loose the screws again and tighten them finally with 8 Nm.

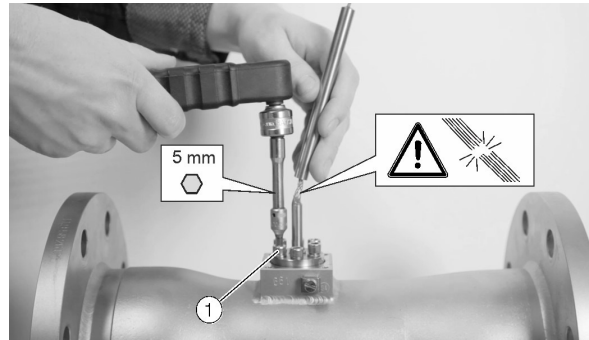


Fig. 25

4. Carefully slide the sensor neck (1) over the sensor cable.
  - Pay special attention to the loose wires. These loose wires can be damaged quickly.
5. Tighten the four screws (2) with a 4 mm Allen key.

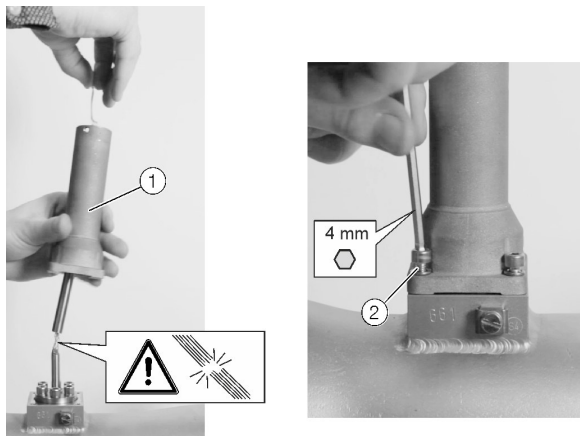


Fig. 26

6. Place the centering tool (1) on the sensor neck (2) and tighten it in the centering holes (3).
7. Carefully slide the union nut (4) over the sensor cable/metal sheath, and ease down into the housing (5) and (6).
8. Use the modified 17 mm hexagon socket wrench (7) to tighten the union nut (4) in the sensor neck.

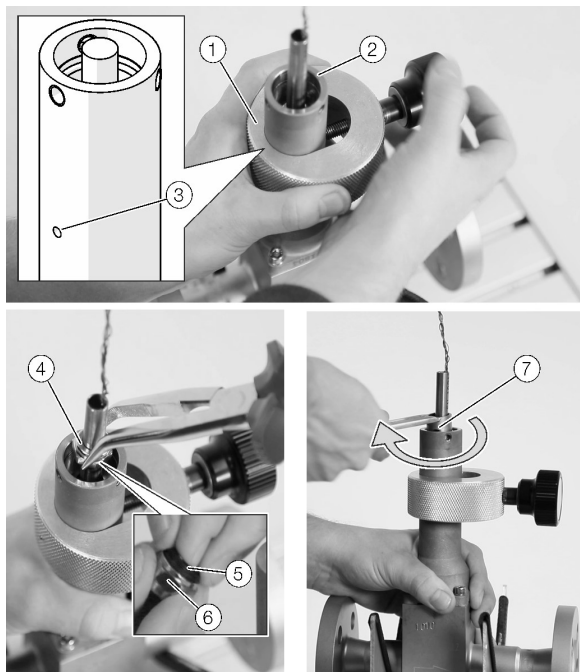


Fig. 27

## Install the frontend board (FEB) housing

9. Pull the sensor cable (1) through the frontend board housing (3) .
10. For electromagnetic protection twist the sensor cable and put it on the frontend board socket (2) .
11. Carefully attach the FEB housing to the sensor neck.
  - ▀ Pay special attention to the loose wires. These wires can easily be damaged.
12. Use a 5 mm Allen key to fix the 3 x M6 screws (3) on the frontend board housing.
13. Continue the assembly of the front end board according to step 18.

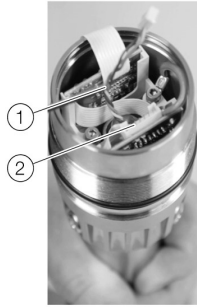


Fig. 28

## Install the communication board (CB)

14. Install the communication board as described in **Install the communication board** in section 3.

## Install the LCD indicator

15. Install the LCD indicator as described in **Change the LCD indicator** in section 2.

## 6. Replacing the remote connection board (RCB)

### 6.1 Required tools

#### Standard tools

- Allen key 4 mm and 5 mm
- Cross screwdriver PH3 and PZ3.
- Needle-nosed pliers

### 6.2 Replace the remote connection board (RCB)

#### Remove the LCD indicator



Fig. 29

1. Switch off the power supply.
2. Remove the LCD indicator as described in **Change the LCD indicator** in section 2.

#### Remove the communication board (CB)

3. Remove the communication board as described in **Remove the communication board** in section 3.

## Remove the remote connection board (RCB)

4. Loosen the screw (1) to unscrew the transmitter head from the device with a 3 mm Allen Key.
5. Carefully turn (anti-clockwise) the transmitter housing (2) and observe at each turn the position of the black plastic ribbon cable plug until you can remove the transmitter housing completely.

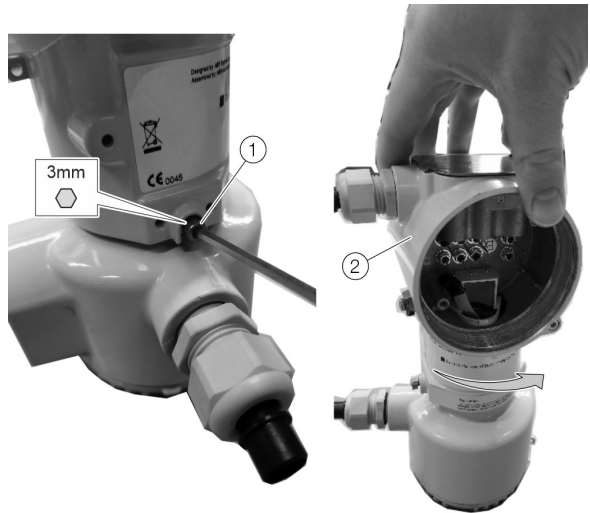
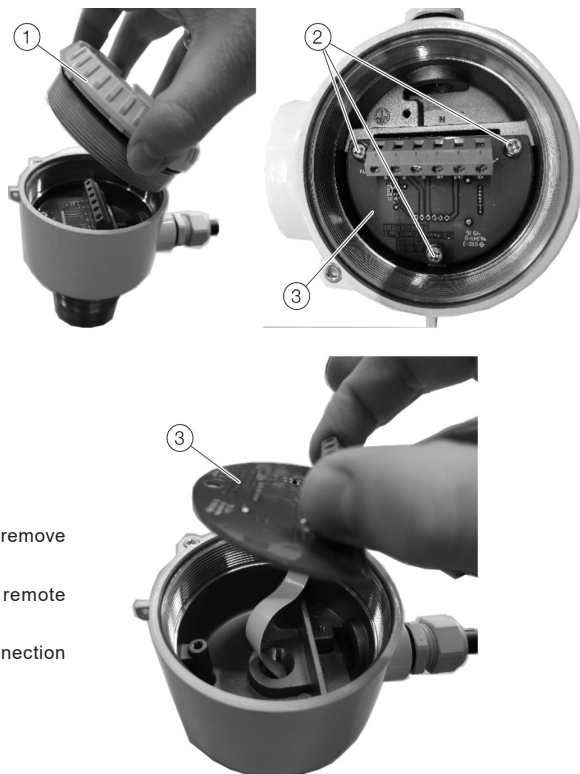


Fig. 30

6. Remove the plastic cap (1) from the ribbon cable and the plastic disc (2) from the socket.



Fig. 31



7. Turn over the housing, unscrew and remove the cover (1).
8. Loosen the 3 screws (2) of the remote connection board (3).
9. Carefully remove the old remote connection board to be exchanged.

**Fig. 32**

## Install the remote connection board (RCB)

10. Insert the wire of the remote connection board (1) through the hole (2) from the bottom of the socket.
11. Store the wire (3) to prevent damaged while turning over the socket.
12. Mount the remote connection board with the three screws (4) in the socket from the bottom.
13. Close the socket with mounting the cover (5) .

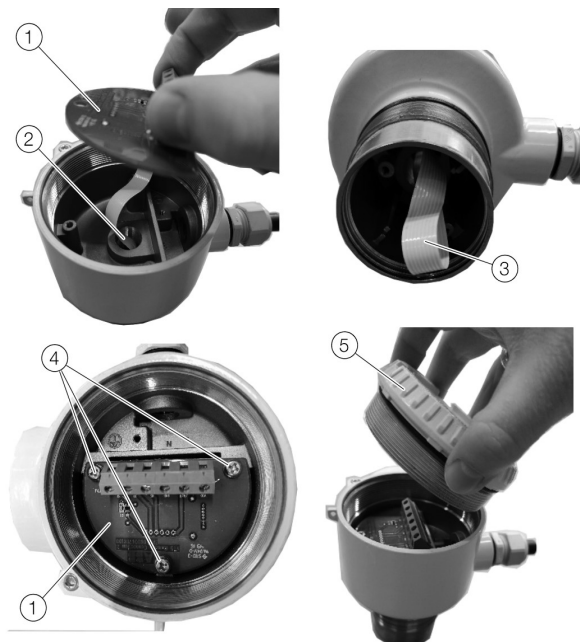


Fig. 33

14. Mount the plastic disc (1) on the socket.
15. Mount the transmitter housing (2) on the base, and screw into position. Take care that you do not over rotate the ribbon cable (3).
16. Tighten the screw (4) with a 3 mm Allen key.

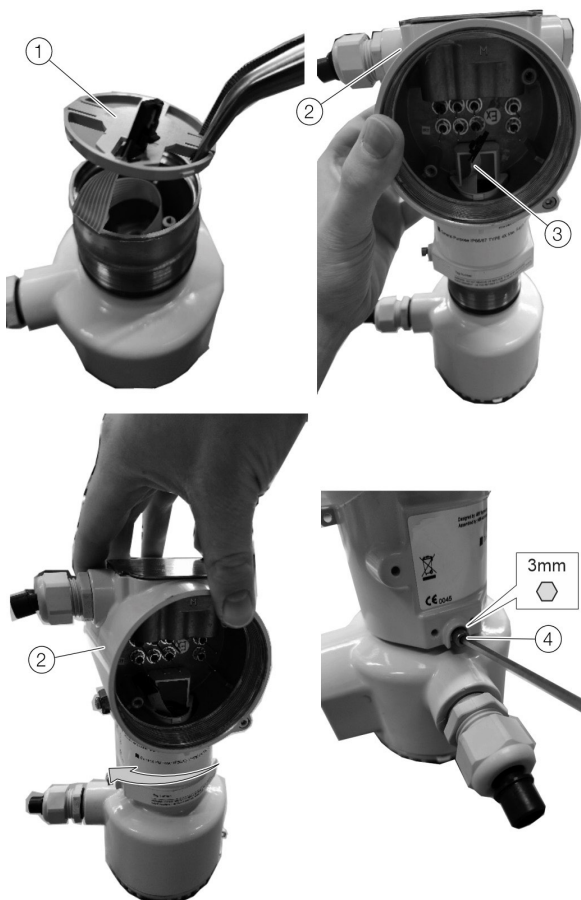


Fig. 34

### Install the communication board (CB)

17. Install the communication board as described in **Install the communication board** in section 3.

### Install the LCD indicator

18. Install the LCD indicator as described in **Replacing the LCD indicator** on page in section 2.



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