

Endura AZ40

Sensor assembly



CO sensor kit
Kit reference: AZ400 754

Measurement made easy

Endura AZ40
sensor assembly

1 Introduction

This publication details the replacement procedure for the AZ40 CO sensor (AZ400 754) fitted to Endura AZ40 sensor assemblies. Before carrying out any procedures, read Section 3. These procedures must be carried out by a suitably-trained technician.

Kit contains:

- CO sensor kit
- This publication

Tools required

- Transmitter door key (supplied with transmitter)
- Operating instruction [OI/AZ40-EN](#)*
- Small flat-bladed screwdriver
- Medium flat-bladed screwdriver
- Cross-headed screwdriver
- Anti-seize compound (suitable for temperatures up to 200 °C [392 °F])

*Operating instruction [OI/AZ40-EN](#) contains mandatory safety information and can be downloaded from the link (above) or by scanning this code:



2 For more information

Further information is available from:
www.abb.com/analytical

or by scanning these codes:



Sales



Service

3 Health & Safety

3.1 Safety precautions

Be sure to read, understand and follow the instructions contained within this document before and during use of the equipment. Failure to do so could result in bodily harm or damage to the equipment.



WARNING – Bodily injury Installation, operation, maintenance and servicing must be performed:

- by suitably trained personnel only
- in accordance with the information provided in this document
- in accordance with relevant local regulations

3.2 Potential safety hazards

3.2.1 Process conditions and requirements



WARNING – Bodily injury

Environmental conditions



– High air / equipment / structure temperatures, poor air quality and adverse environmental conditions may be present when the process is running.



– It is recommended that the process is shut down before performing these procedures.



– The process must be cool enough to enable shutdown, disconnection and removal of the sensor in a safe manner and in accordance with relevant local regulations.

– Appropriate PPE, including mask and goggles must be worn when preparing the process for these procedures.

3.2.2 Endura AZ40 sensor – fibrous material in probe assembly



WARNING – Serious damage to health

Fibrous material



– The sensor and probe assemblies (standard and high temperature versions) contain fibrous material that can be a health hazard if airborne.



– The material, predominantly – aluminosilicate refractory fibres, CAS 142844-00-6. Refractory ceramic fibres (RCF) are classified as:



– Category 1B carcinogen under regulation (EC) No 1272/2008 – the classification, labelling and packaging regulations.

– Category 2B carcinogen by inhalation by The International Agency for Research on Cancer (IARC).

– When removing the sensor cover and subsequent maintenance activities, exposure to the airborne fibres could occur. ABB have conducted air sampling assessments within the breathing zone of the operator and have identified that an exposure limit of 1 fibre / cubic centimetre is unlikely to occur.

– Exposure to any carcinogen must be kept as low as reasonably practicable.

– Appropriate PPE defined below, must be worn when working with probe assemblies (all installation, replacement, maintenance procedures):

– A face fit tested, half mask conforming to EN140 (or equivalent) with a level 3 particulate filter conforming to EN 143 (or equivalent).

– Disposable protective coveralls in accordance with Type 5 ISO 13982-1:2004 (or equivalent).

– Goggles and gloves.

3.2.3 Endura AZ40 sensor / probe – installation to pressurized process



DANGER – Serious damage to health / risk to life
Pressurized equipment – do not install / remove / the sensor / probe if the process is at positive pressure

Installation, operation, maintenance and servicing of pressurized equipment must be performed:

– by suitably trained personnel only

– in accordance with the information provided in this document

– in accordance with relevant local regulations

– when process conditions are suitable to allow enough to enable installation / maintenance

3.2.4 Endura AZ40 sensor – high operational temperature on exposed parts



WARNING – Bodily injury
High temperature on exposed surfaces – see Fig. 3.1

- During operation, exposed sensor surfaces can reach 200 °C (392 °F).
- Ensure suitable PPE is available and is worn before handling the sensor.
- Do not touch exposed surfaces until the sensor / probe is cool enough to handle with PPE.

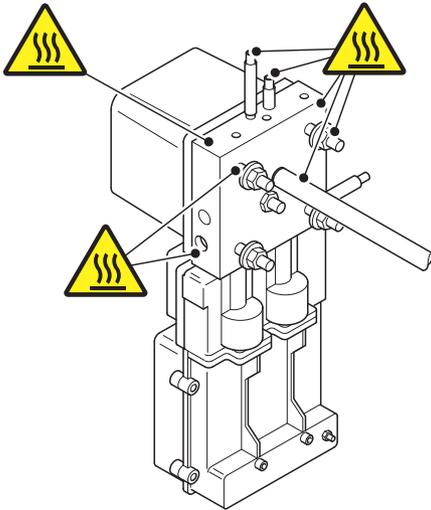


Fig. 3.1 High temperature points on exposed sensor surfaces during operation

3.2.5 Endura AZ40 sensor – weight



WARNING – Bodily injury

- The sensor weighs 9.0 kg (20 lb). When fitted with a probe / filter assembly, the combined sensor / probe weight is dependent on probe length / type plus filter option – refer to Operating instruction OI/AZ40-EN for weight details.
- The sensor / probe assembly must be mounted in accordance with the information supplied in Operating instruction OI/AZ40-EN.
- Suitable lifting equipment must be available when installing / removing the sensor / probe from the process.

3.2.6 Endura AZ40 analyzer – electrical



WARNING – Bodily injury

To ensure safe use when operating this equipment, the following points must be observed:

- up to 240 V AC may be present. Ensure the supply is isolated before removing the terminal cover
- normal safety precautions must be taken to avoid the possibility of an accident occurring when operating in conditions of high pressure and / or temperature

Safety advice concerning the use of the equipment described in this document or any relevant Material Safety Data Sheets (where applicable) can be obtained from the Company, together with servicing and spares information.

Endura AZ40 transmitter – weight



WARNING – Bodily injury

- The transmitter weighs 7.6 kg (17 lb) and must be mounted in accordance with the information supplied in Operating instruction OI/AZ40-EN.
- Suitable lifting equipment must be available when installing / removing the transmitter from the mounting.

4 Isolating the transmitter

Referring to Fig. 4.1.

1. Isolate transmitter (A) from incoming mains power supplies (B).



DANGER – Serious damage to health / risk to life

The transmitter must be isolated from mains power supplies before performing this procedure.

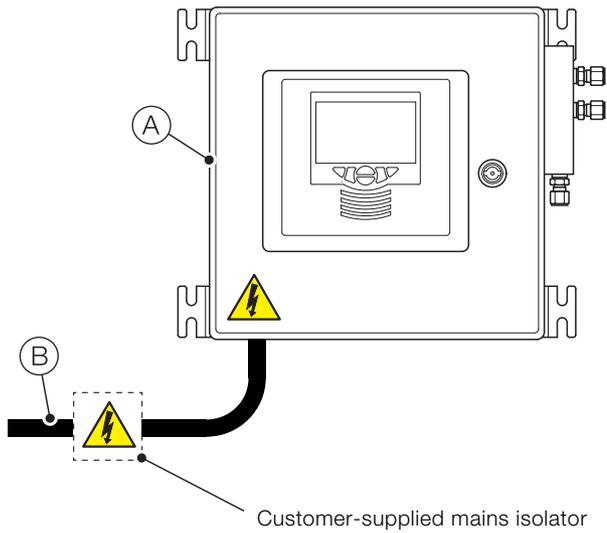


Fig. 4.1 Isolating the transmitter from incoming mains power supplies

5 Shutting down / removing the sensor assembly from the process



DANGER – Serious damage to health / risk to life
Allow sufficient time for the sensor assembly to cool before performing these procedures.

5.1 Shutting the sensor assembly down at the process

Referring to Fig. 5.1.

1. Close the air supply valve (A) and shut down the test gas line (B) at the supply.

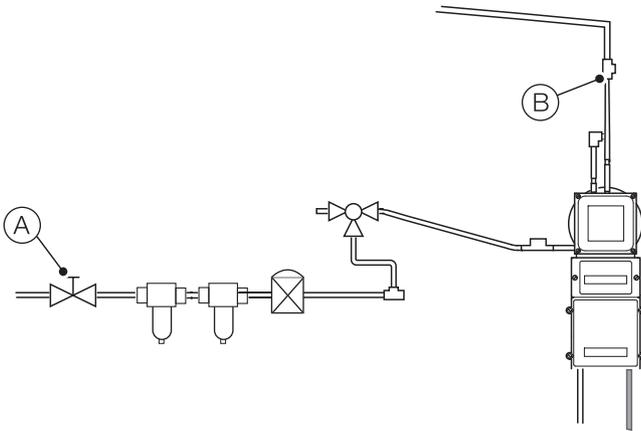


Fig. 5.1 Shutting down instrument air and test gas supplies

5.2 Disconnecting the sensor air and test gas supplies at the process

Referring to Fig. 5.2:

1. Disconnect air line (B) and test gas line (C) at sensor (D).

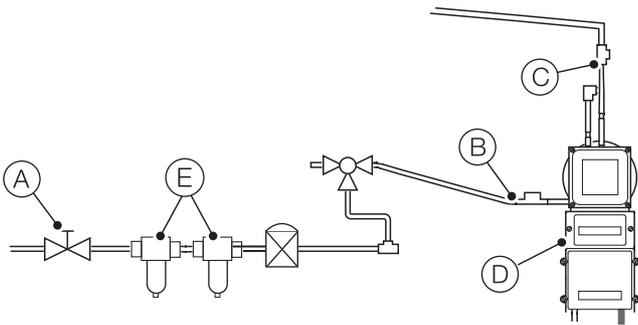


Fig. 5.2 Disconnecting instrument air and test gas supplies

5.3 Disconnecting the sensor electrical power and signal cables at the process



DANGER – Serious damage to health / risk to life
Allow sufficient time for the sensor assembly to cool before performing this procedure.



DANGER – Serious damage to health / risk to life
The transmitter must be isolated from mains power supplies before performing this procedure.

Referring to Fig. 5.3:

1. Use a medium flat-bladed screwdriver to unscrew 4 (captive) cover screws (A) and remove cover (B) from sensor assembly (C).
2. Disconnect mains cable (D) from terminal block (E).
3. Disconnect signal cable (F) from terminal block (G).
4. Disconnect thermocouple cables (H) from terminal block (I).
5. If optional blowback is fitted, disconnect cable (J) from terminal block (K).

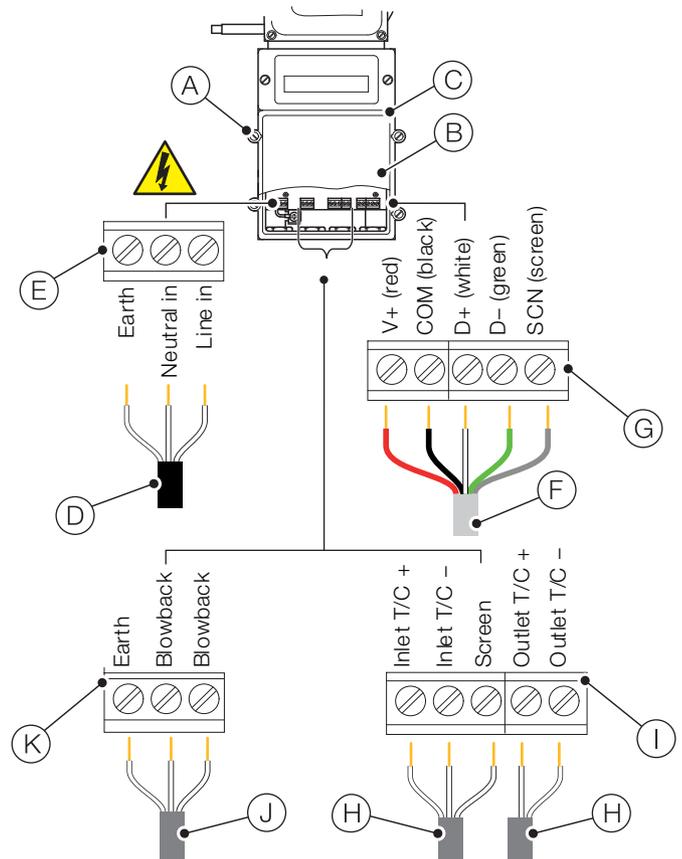


Fig. 5.3 Disconnecting sensor cables

5.4 Removing the sensor assembly from the process



DANGER – Serious damage to health / risk to life

Allow sufficient time for the sensor assembly to cool before performing this procedure.

Referring to Fig. 5.4:

1. Use a 10 in. adjustable spanner (wrench) to remove 4 nuts, washers and lockwashers (A) securing sensor assembly (B) to mounting flange (C). Set items aside for re-use.
2. Carefully remove the sensor assembly and the attached probe (including filter assembly) from the process.
3. Temporarily cover process opening until the sensor assembly is ready to be re-installed.

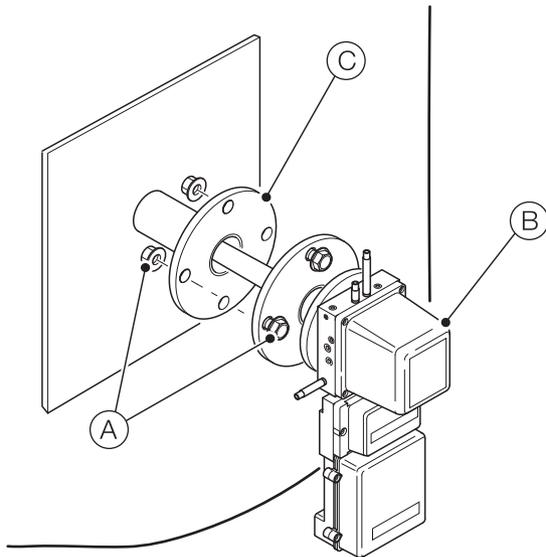


Fig. 5.4 Removing the sensor assembly from the process

6 Replacement procedure

6.1 Removing the sensor covers

Referring to Fig. 6.1:

1. Use a medium flat-bladed screwdriver to unscrew 4 (captive) sensor cover retaining screws (A) and remove sensor cover (B).
2. Use a medium flat-bladed screwdriver to unscrew 2 (captive) sensor terminal cover retaining screws (C) and remove sensor terminal cover (D). Retain sensor cover (B) and sensor terminal cover (D) for re-use.



IMPORTANT (NOTE)

Check the seals fitted to each cover. If they need replacing or seals have bonded to the mating surfaces of the sensor assembly, replace them. Refer to INS/ANAINST/007-EN for the sensor cover seals replacement procedure.

3. Proceed to Section 6.2, to disconnect the CO sensor.

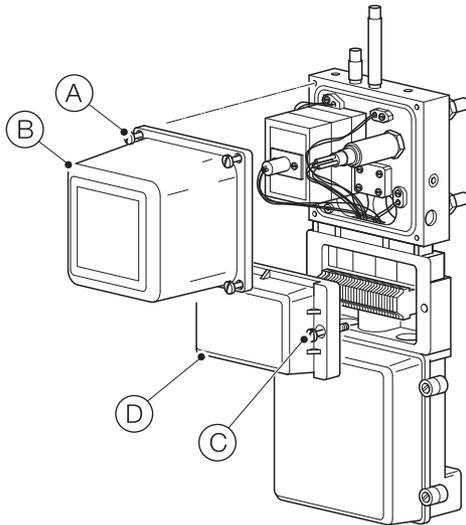


Fig. 6.1 Removing the sensor covers

6.2 Disconnecting the CO sensor

Referring to Fig. 6.2:

1. Use a small flat-bladed screwdriver to depress the spring connector in each upper terminal 11, 12, 13. Withdraw the wires from the terminal housing.
2. Proceed to Section 6.3, page 8 to replace the CO sensor.

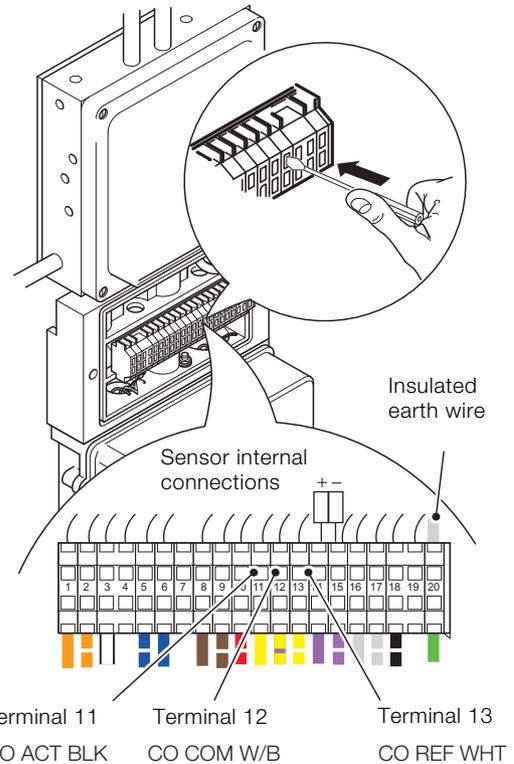


Fig. 6.2 Disconnecting the CO sensor

6.3 Replacing the CO sensor

Referring to Fig. 6.3:

1. Unscrew CO sensor cover mounting screws (x2) (A) using a cross-headed screwdriver and remove CO clamp plate (B).
 2. Withdraw and discard CO sensor (C) and sensor gasket (D).
 3. Fit the new CO clamp plate (B) over new CO sensor shaft (E) and fit gasket (F) to new sensor.
-
7. Place CO clamp plate (B) on the CO mounting block with the screw holes aligned correctly and use a cross-headed screwdriver bit to tighten 2 CO clamp plate mounting screws (A) to a torque of 1.1 ± 0.1 Newton meters (10. ± 1 in. lb).
 8. Twist 1 black CO sensor wire (K) and 1 white CO sensor wire (L) together to make a twisted pair.



CAUTION – Damage to equipment

A protective cap is fitted to the new CO sensor. Leave the cap in place until the CO sensor is ready to be fitted into the housing. Temperature sensor elements (G) are extremely fragile. Do not touch them at any time.

4. Align CO sensor identification mark (H) with the top of sensor assembly (I).
 5. Carefully slide the CO sensor with sensor gasket attached into the CO sensor housing on mounting block (J).
 6. Apply a light coating of an anti-seize compound (suitable for temperatures up to 200 °C [392 °F]) to the threads of both CO clamp plate mounting screws (A).
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CAUTION – Damage to equipment

DO NOT contaminate any part of sensor elements (G) with anti-seize compound.

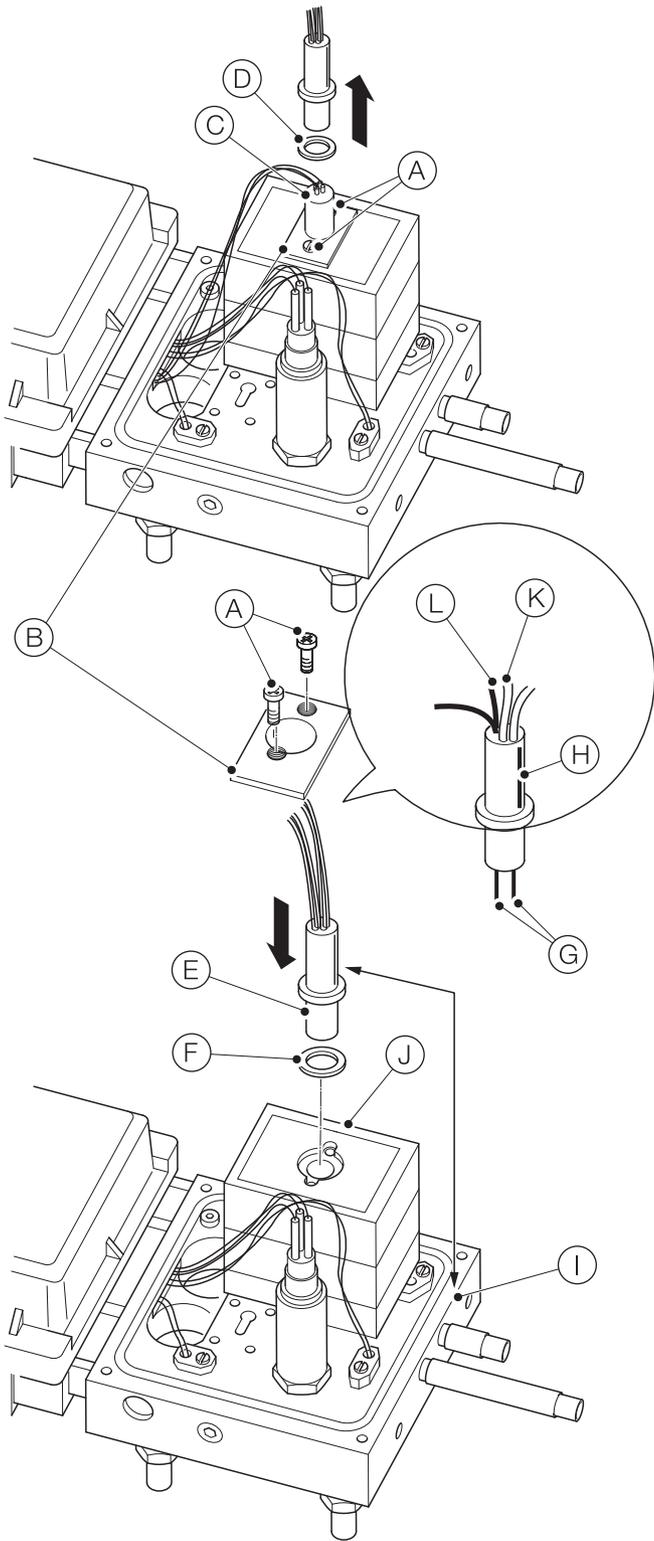


Fig. 6.3 Replacing the CO sensor

Referring to Fig. 6.4

9. Feed the 3 CO sensor wires through the right side (A) of the flange manifold.
10. Use a small flat-bladed screwdriver to depress each spring connector in top terminal connectors 11, 12 and 13 to make O₂ sensor connections as follows:
 - terminal 11, black (CO ACT BLK)
 - terminal 12, white / black (CO COM W/B) / twisted pair
 - terminal 13, white (CO REF WHT)
11. Proceed to Section 6.4 to refit the sensor covers.

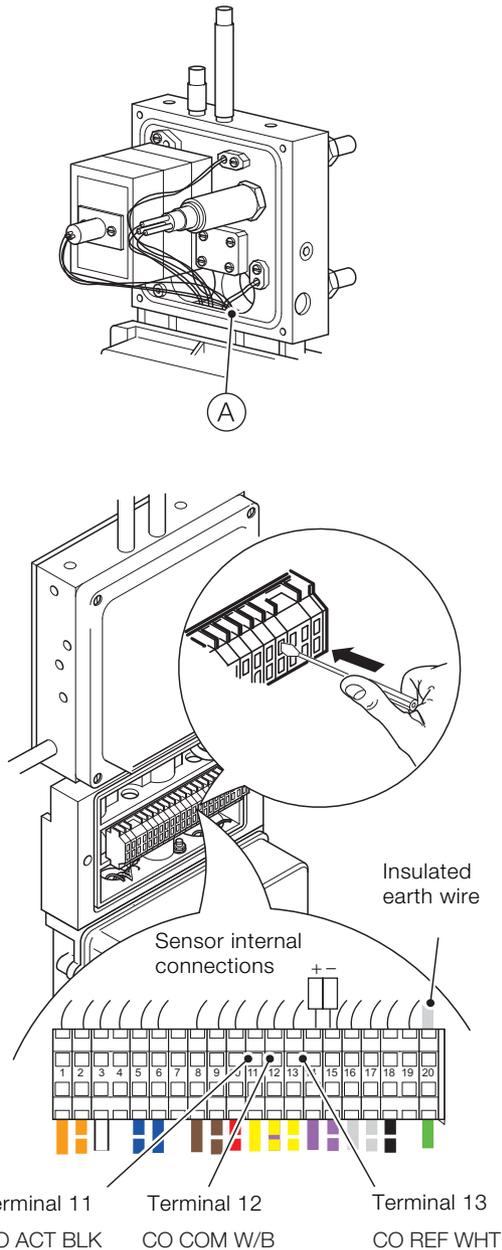


Fig. 6.4 Connecting the CO sensor

6.4 Refitting the sensor covers

Referring to Fig. 6.5:

1. Apply a light coating of an anti-seize compound (suitable for temperatures up to 200 °C [392 °F]) to the thread of each captive cover screw.
2. Position sensor terminal cover (A) over the sensor terminal block and secure 2 (captive) cover retaining screws (B) using a medium flat-bladed screwdriver.



CAUTION – Minor injuries

Do not overtighten.

3. Position sensor cover (C) over the sensor manifold block and secure 2 (captive) cover retaining screws (D) using a medium flat-bladed screwdriver.
4. Prepare the sensor assembly for operation by reversing the shutdown procedure – refer to Section 4, page 4.
5. Refer to Operating instruction OI/AZ40-EN to restore the analyzer to full operational condition and perform a calibration routine.

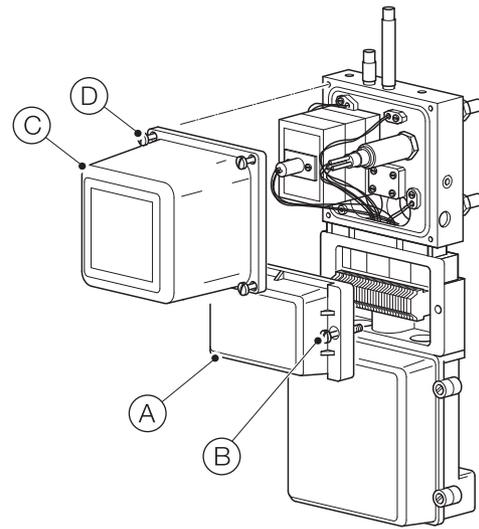


Fig. 6.5 Refitting the sensor covers

Notes

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