

Installation Instructions

Replacement of measurement components

J22 TDLAS gas analyzer



Table of Contents

1	Overview of spare part sets	3	8.1	Tools and materials	10
2	Designated use	4	8.2	Cleaning the mirror	10
3	Personnel authorized to carry out repair	5	9	Sample cell replacement	13
4	Safety instructions	6	9.1	Tools and materials	13
5	Symbols	7	9.2	Remove the sample cell	13
5.1	Symbols for certain types of information	7	10	Optical head replacement	15
5.2	Safety symbols	7	10.1	Important points to review prior to replacement	15
6	Tools list	8	10.2	Items received with a calibrated optical head replacement kit	15
7	Digital pressure sensor replacement .	9	10.3	Tools required	15
8	Mirror cleaning and replacement	10	10.4	Replace the optical head	15
			11	Disposal	20

1 Overview of spare part sets

The installation instructions apply to the following spare parts sets:

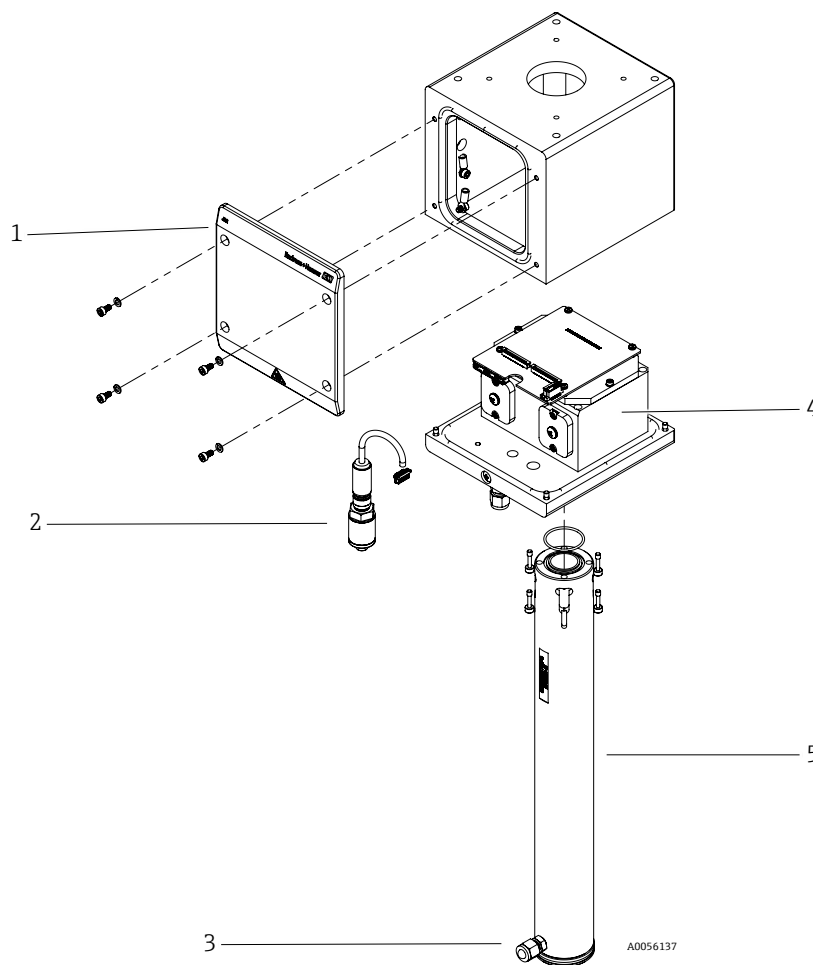


Figure 1. J22 analyzer spare parts

#	Endress+Hauser Material Number	Description	2-year quantity
1	70188820	Kit, Cover, Optical Head Enclosure	
2	70188825	Kit, Pressure Sensor, Digital	1
3	70188822	Kit, Mirror, Flat	
4	70188824	Kit, Optical Head 01, Calibrated	
5	70188821	Kit, Cell Tube and Mirror, 0.8 m	
	70188827	Kit, Service Tools	1
	70188826	Kit, spectrometer seals	1



- The order number of the spare part set (on the product label on the package) can differ from the production number (on the label directly on the spare part).
- You can locate the spare parts by entering in the order code/product root/serial number into the spare parts finder tool under product tools at Endress.com.
- Always keep the installation instructions together with the packaging.

2 Designated use

- A defective unit can only be replaced with a functioning unit of the same type.
- Use only original parts designed by Endress+Hauser.

3 Personnel authorized to carry out repair

Authorization to carry out repairs depends on the measuring device's approval type. The table below shows the authorized group of people in each case.



Whoever carries out the repairs has full responsibility to ensure that work is carried out safely and to the required quality standard and must guarantee the safety of the device following repair.

Measuring device approval	Personnel authorized to perform repairs
Without approval	1,2,3
With approval (such as IECEx)	1,2,3
For custody transfer	4

1 = Qualified specialist on the customer side

2 = Service technician authorized by Endress+Hauser

3 = Endress+Hauser (return measuring device to manufacturer)

4 = Check with local approval center if installation/alteration must be performed under supervision

4 Safety instructions









- Check that the spare part matches the labeling on the measuring device as described on the cover page.
- The spare part sets and installation instructions are used to replace a faulty unit with a functioning unit of the same type. Only use original parts from Endress+Hauser.
- Comply with national regulations governing mounting, electrical installation, commissioning, maintenance, and repair procedures.
- The following requirements must be met with regard to specialized technical staff for the mounting, electrical installation, commissioning, maintenance and repair of the measuring devices:
 - Specialized technical staff must be trained in instrument safety.
 - They must be familiar with the individual operating conditions of the devices.
 - In the case of Ex-certified measuring devices, they must also be trained in explosion protection.
- The measuring device is energized. There is a risk of fatal injury from electric shock. Open the measuring device only when the device is de-energized.
- For measuring devices intended for use in hazardous locations, please observe the guidelines in the Ex documentation (XA).
- In the case of measuring devices in safety-related applications in accordance with IEC 61508 or IEC 61511: Commission in accordance with operating instructions after repair. Document the repair procedure.
- Before removing the device: set the process to a safe state and purge the pipe of dangerous process substances.
- There is a danger of burns due to hot surfaces. Before commencing work, allow the system and measuring device to cool down to a touchable temperature.
- The operating instructions for the device must be followed.
- There is a risk of damaging the electronic components.
 - Ensure you have a working environment protected from electrostatic discharge.
 - After removing the electronics compartment cover, there is a risk of electrical shock due to missing touch protection.
- Turn the measuring device off before removing internal covers.
- Modifications to the measuring device are not permitted.
- Only open the housing for a brief period. Avoid the penetration of foreign bodies, moisture, or contaminants.
- Replace defective seals only with original seals from Endress+Hauser.
- If threads are damaged or defective, the measuring device must be repaired.
- Threads (such as the electronics compartment cover and connection compartment cover) must be lubricated if an abrasion-proof dry lubricant is not available. Use acid-free, non-hardening lubricant.
- If spacing is reduced or the dielectric strength of the measuring device cannot be guaranteed during repair work, perform a test after work is complete (such as a high-voltage test in accordance with the manufacturer's instructions).
- Do not connect the service plug in explosive atmospheres.
- Observe the instructions for transporting and returning the device outlined in the operating instructions





If you have any questions, please contact your Endress+Hauser service organization. Refer to our website (endress.com/contact) for the list of local sales channels in your area.

5 Symbols

5.1 Symbols for certain types of information

Symbol	Description
	The High Voltage symbol alerts people to the presence of electric potential large enough to cause injury or damage. In certain industries, high voltage refers to voltage above a certain threshold. Equipment and conductors that carry high voltage warrant special safety requirements and procedures.
	Failure to follow all directions may result in analyzer damage/malfunction or injury to personnel.
	PROTECTIVE EARTH GROUND - Symbol indicates the connection point of the ground wire from the main power source.
	Alerts people to the presence of visible and invisible radiation. Avoid direct exposure to the beam and do not disconnect the system while active.
	The skull and crossbones symbol alerts people to the presence of poisonous substances.
	Permitted Procedures, processes or actions that are permitted.
	Forbidden Procedures, processes or actions that are forbidden.
	Tip Indicates additional information.
1., 2., 3. ...	Series of steps

5.2 Safety symbols

Structure of Information	Meaning
 WARNING Causes (/consequences) Consequences of noncompliance (if applicable) ► Corrective action	This symbol alerts you to a dangerous situation. Failure to avoid the dangerous situation can result in a fatal or serious injury.
 CAUTION Causes (/consequences) Consequences of noncompliance (if applicable) ► Corrective action	This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or more serious injuries.
NOTICE Cause/situation Consequences of noncompliance (if applicable) ► Action/note	This symbol alerts you to situations which may result in damage to property.

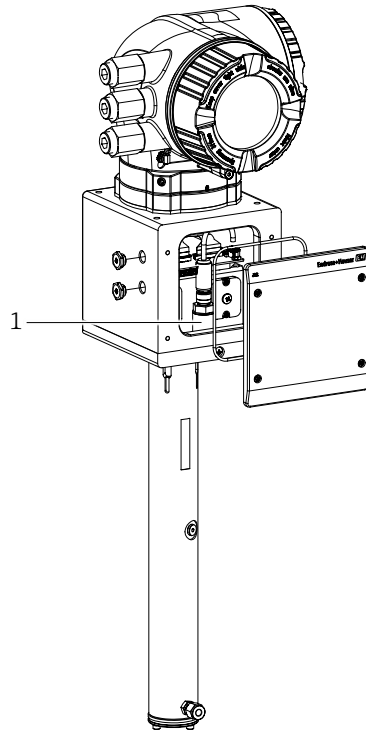
6 Tools list

Reference part number 70188827 service tools kit. Included in the kit are the following:

- T10 torx, 3" overall
- Flex driver, 156 in-lbf max
- ¼" hex shank, 3mm hex size

7 Digital pressure sensor replacement

1. Disconnect the power to the analyzer.
2. Remove the cover of the optical head assembly to access the pressure sensor.



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Figure 2. Pressure sensor location after the optical head is removed (1)

3. Unthread the M12 cable connection from the pressure sensor.
4. Remove the existing pressure sensor using a 19 mm ($\frac{3}{4}$ ") wrench.
5. Detach the existing cable assembly from the circuit board.
6. Lubricate the G 1/8 mounting threads with Syntheso GLEP 1 or equivalent.
7. Reinstall a new cable at the connector on the circuit board.
8. Finger-tighten the pressure sensor plus one-quarter turn to approximately 2 Nm torque.
9. Reinstall the M12 cable connection to the pressure sensor.

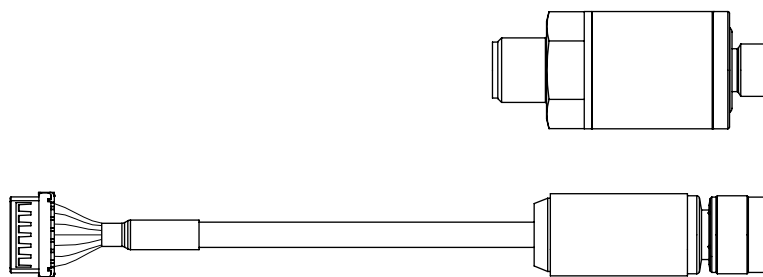


Figure 3. Pressure sensor kit

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#	Description
1	Pressure Sensor, Digital
2	Cable Assembly, Pressure, Digital

8 Mirror cleaning and replacement

A fault occurs if contamination makes its way into the cell and accumulates on the internal optics. Consult the firmware manual for the actual alarm message.

Use the following procedure to clean the mirrors if contamination is suspected.

⚠ WARNING

Use this procedure only when necessary and is not part of routine maintenance.

- ▶ To avoid compromising the system warranty, contact Service before cleaning mirrors.

⚠ WARNING

INVISIBLE LASER RADIATION - The sample cell assembly contains a low- power, 10 mW maximum, CW Class 3B invisible laser with a wavelength between 750-3000 nm.

- ▶ Never open the sample cell flanges or the optical assembly unless the power is turned off.

8.1 Tools and materials

- Lens cleaning cloth (Cole Parmer® EW-33677-00 TEXWIPE® Alphawipe® Low-Particulate Clean Room Wipes or equivalent)
- Reagent-grade isopropyl alcohol (ColeParmer® EW-88361-80 or equivalent)
- Small drop dispenser bottle (Nalgene® 2414 FEP Drop Dispenser Bottle or equivalent)
- Acetone-impenetrable gloves (North NOR CE412W Nitrile Chemsoft™ CE Clean room Gloves or equivalent)
- Hemostat (Fisherbrand™ 13-812-24 Rochester-Pean Serrated Forceps or equivalent)
- Bulb blower or dry compressed air/nitrogen
- Torque wrench
- 3 mm hex driver
- Non-outgassing grease
- Flashlight

8.2 Cleaning the mirror

8.2.1 Remove the mirror assembly

1. Power down the analyzer following the instructions in the applicable firmware manual.
2. Isolate the SCS from the process sample tap.

⚠ CAUTION

- ▶ Operate all valves, regulators, and switches in accordance with site lockout/tagout procedures.
3. Purge the measurement cell with nitrogen for 10 minutes, if possible.

⚠ WARNING

Process samples may contain hazardous material in potentially flammable or toxic concentrations. Personnel must have a thorough knowledge and understanding of the physical properties and safety precautions for the sample contents before operating the SCS.

4. If the sample system is enclosed, look for a plate on the underside of the SCS enclosure. Remove the plate covering the sample cell located inside the enclosure and set aside. Retain screws.

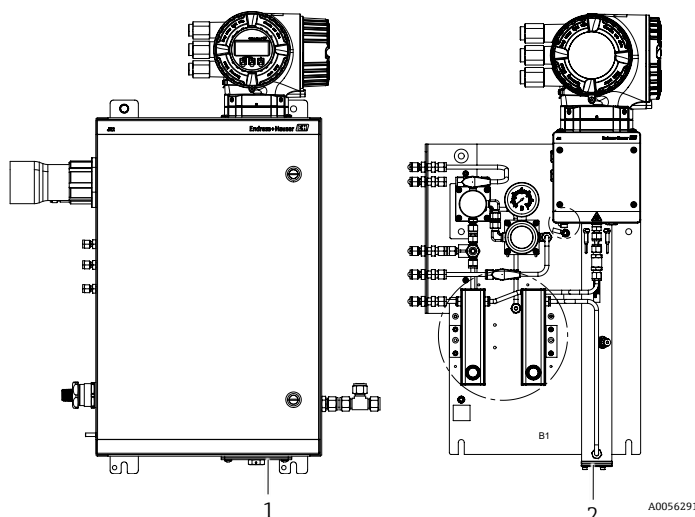


Figure 4. Enclosed J22 with cell plate (1) and panel mount J22 with exposed measurement cell (2)

5. Gently remove the mirror assembly from the cell using a 3 mm hex driver to remove the socket-head cap screws and set on a clean, stable, and flat surface.
 - a. For enclosed J22, the cell plate must be removed for mirror access.
 - b. For panel mount J22, the mirror is accessible at the bottom of the cell tube.

WARNING

INVISIBLE LASER RADIATION - The sample cell assembly contains a low power, 10 mW maximum, CW Class 3B invisible laser with a wavelength between 750 to 3000 nm.

- ▶ Never open the sample cell flanges or the optical assembly unless the power is turned off.

CAUTION

Never touch the coated surfaces of the mirror.

- ▶ Always handle the optical assembly by the edge of the mount.

8.2.2 Clean the mirror

1. Look inside the sample cell at the top window using a flashlight to ensure that there is no contamination on the top window.
2. Put on clean acetone-impenetrable gloves.
3. Double fold a clean sheet of lens cleaning cloth. Using hemostats or your fingers, clamp near and along the fold to form a “brush.”
4. Place a few drops of isopropyl alcohol onto the mirror and rotate the mirror to spread the liquid evenly across the mirror surface.
5. With gentle, uniform pressure, wipe the mirror from one edge to the other with the cleaning cloth only once and only in one direction to remove the contamination. Discard the cloth.

CAUTION

Never rub an optical surface, especially with dry tissues.

- ▶ This can mar or scratch the coated surface.
6. Repeat with a clean sheet of lens cleaning cloth to remove the streak left by the first wipe. Repeat, if necessary, until there is no visible contamination on the mirror. If the mirror shows any signs of corrosion, discoloration, or other damage then it must be replaced.

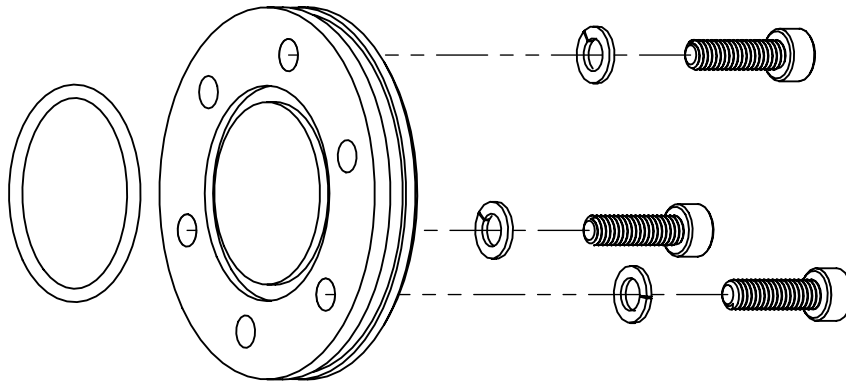


Figure 5. Mirror Replacement Kit

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Mirror Replacement Kit

- Mirror, 0.8 m
- Socket head screw, M4-0.7 x 14 (3)
 - When installing the mirror onto the cell tube assembly, torque the screws to 2.6 Nm (23 in lbf).
- Lock washer (3)
- O-ring, Viton lubricated with Syntheso Glep 1, or equivalent lubricant, prior to installing.

9 Sample cell replacement

NOTICE

- ▶ Use this procedure only when necessary and not part of routine maintenance. To avoid compromising the system warranty, contact Service before replacing the sample cell.

WARNING

INVISIBLE LASER RADIATION - The sample cell assembly contains a low power, 10 mW maximum, CW Class 3B invisible laser with a wavelength between 750 to 3000 nm.

- ▶ Never open the sample cell flanges or the optical assembly unless the power is turned off.

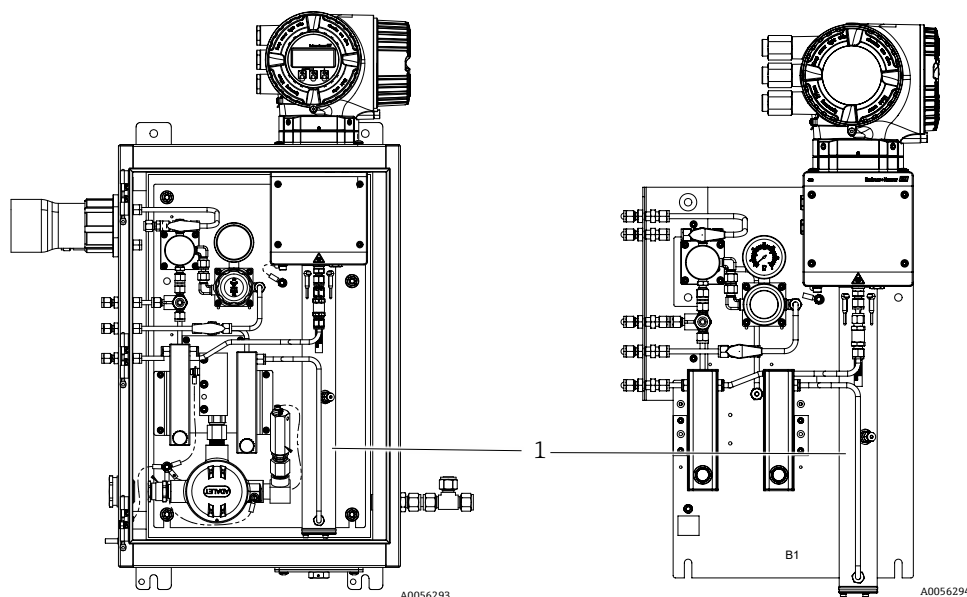


Figure 6. J22 TDLAS gas analyzer measurement cell location for enclosed and panel mount versions (1)

9.1 Tools and materials

- Lens cleaning cloth (Cole Parmer® EW-33677-00 TEXWIPE® Alphawipe® Low-Particulate Clean Room Wipes or equivalent)
- Reagent-grade isopropyl alcohol (ColeParmer® EW-88361-80 or equivalent)
- M4 allen head wrench

9.2 Remove the sample cell

1. Power down the analyzer following the instructions in the applicable firmware manual.
2. Isolate the SCS from the process sample tap.

WARNING

- ▶ Operate all valves, regulators, and switches in accordance with site lockout/tagout procedures.
3. If possible, purge the system with nitrogen for 10 minutes.

WARNING

Process samples may contain hazardous material in potentially flammable and/or toxic concentrations. Personnel must have a thorough knowledge and understanding of the physical properties and safety precautions for the sample contents before operating the SCS.

1. Use a 9/16" open end wrench to loosen the tubing connection at the bottom of the cell tube to disconnect the sample tubing.
2. Loosen the four M4 hex screws that attach the cell tube assembly to the transition plate at the bottom of the optical head.
3. Gently remove the cell tube from the analyzer assembly.

4. Inspect the optical window in the transition plate. Remove any dust with isopropyl alcohol and wipes.
5. Wet a wipe with isopropyl alcohol and clean the inside of the replacement cell tube assembly. Use care not to scratch the polished inside of the cell tube or mirror. Once clean, blow clean air into the tube to dry any excess alcohol.
6. Reinstall the captive M4 screws and lock washers into the replacement cell tube.
7. Lightly grease the Viton O-ring with Syntheso GLEP 1 or similar lubricant.
8. If traditional split lock washers are used, torque each of the four screws to 4.5 Nm (39.8 in-lbf). If conical style Belleville washers are used, torque the M4 screws to 4.0 (35.4 in-lbf).

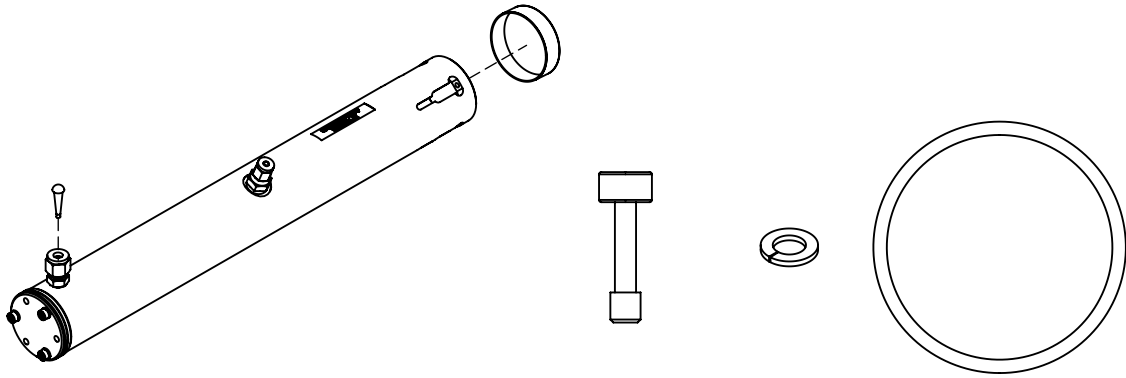


Figure 7. Cell tube and mirror replacement kit

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Cell Tube and mirror replacement Kit Materials

1. Cell tube assembly
2. Socket head screw, M4-0.7 x 16 (4)
3. Lock washer (4)
4. O-ring, Viton
5. Tapered vinyl plug
6. Vinyl cap

10 Optical head replacement

Replacement of the optical head is only recommended for customers or service personnel that have completed advanced TDLAS service training. Please contact Optical Analysis service department for more details.

10.1 Important points to review prior to replacement

1. Ordering of the optical head requires the original analyzer serial number. The optical head ships pre-configured from the factory to match the original analyzer specifications.
2. Ensure that you have the latest firmware on the J22 analyzer. Refer to the J22 firmware upgrade installation instructions for a detailed procedure on how to upgrade to the latest firmware.
3. Ensure you have all necessary downloads from the current analyzer, such as the parameter list, trend, and spectrum information, for comparison purposes.
4. Replacing the optical head may add some minor offset up to +/- 2ppmv or 2% of reading accuracy of the analyzer.
5. The optical head carries the calibration of the laser so no change in parameter or configuration is required.
6. A hard shell, Pelican case is provided with the new optical head kit. If desired, return the replaced old optical head to the factory to repair.

10.2 Items received with a calibrated optical head replacement kit

- Fitted Pelican case
- Calibrated optical head with pressure sensor
- Pressure sensor cable
- O-ring
- Calibration certificate

10.3 Tools required

- Flat head screwdriver
- Cross head screwdriver
- 9/16" wrench
- M4 Allen key
- Digital multimeter

10.4 Replace the optical head

10.4.1 Power down the analyzer

1. Power down the analyzer.
2. Isolate the SCS from the process sample tap.

 **WARNING**

INVISIBLE LASER RADIATION - The sample cell assembly contains a low power, 10 mW maximum, CW Class 3B invisible laser with a wavelength between 750 to 3000 nm.

- ▶ Never open the sample cell flanges or the optical assembly unless the power is turned off.

 **WARNING**

- ▶ Operate all valves, regulators, and switches in accordance with site lockout/tagout procedures.
3. If possible, purge the system with nitrogen for 10 minutes.

10.4.2 Access the optical head

1. Access the optical head.
 - a. For analyzers with an enclosure, open enclosure door.

- b. For panel mount analyzers, there is direct access to the optical head.

WARNING

Process samples may contain hazardous material in potentially flammable and/or toxic concentrations. Personnel must have a thorough knowledge and understanding of the physical properties and safety precautions for the sample contents before operating the SCS.

2. Use 9/16" wrench to remove tube fittings connecting to sample cell.

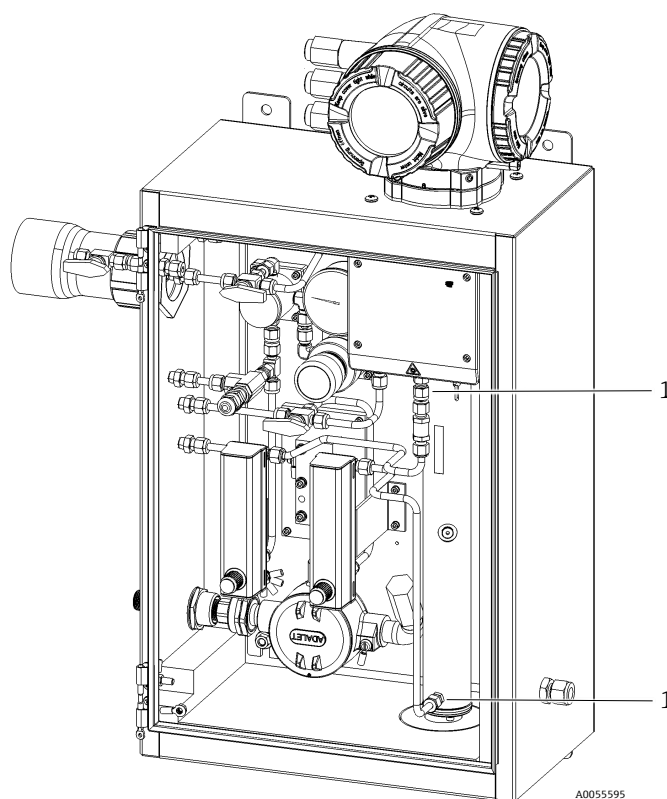


Figure 8. Loosen sample tubing connections at the optical head and sample cell. (1)

3. If the sample system is enclosed, look for a plate on the underside of the SCS enclosure. Remove and set aside the plate that covers the sample cell. Retain screws.
4. Use M4 Allen key to remove the 4 screws from the optical head cover.

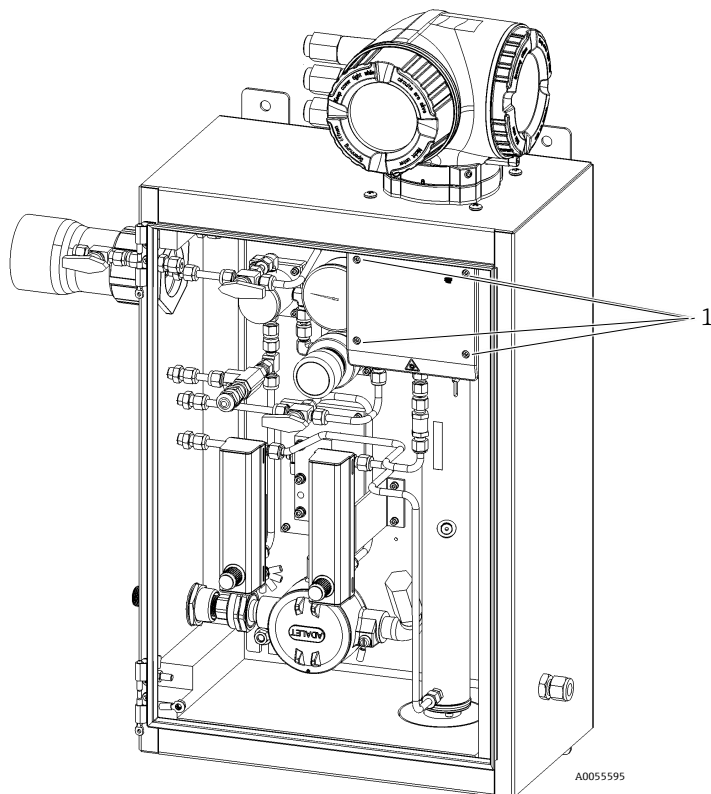


Figure 9. Optical head screw location (1)

5. Use an M4 Allen key to remove the grounding screw from the cover.
6. Inside the optical enclosure, remove both brown ribbon cables from the circuit board. You will need to pull up on both ends of the black plastic connector to release each ribbon cable. These two brown cables need to be disconnected before moving on to the next step.

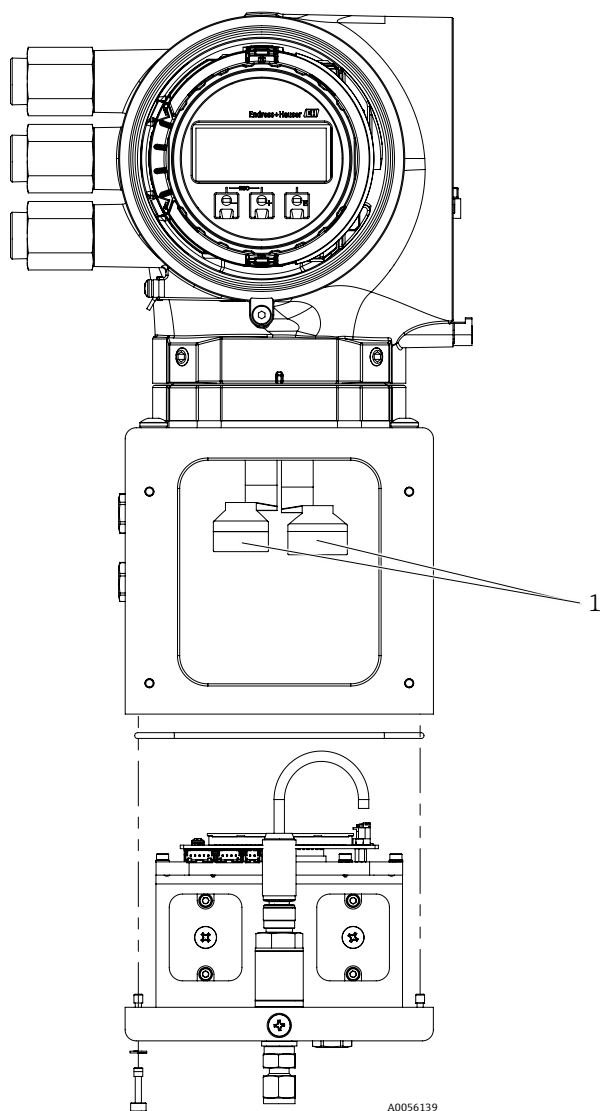


Figure 10. Ribbon cables that connect the optical head to the analyzer electronics (1).

7. Use an M5 Allen key to remove both grounding screws (one from the optical plate and one from enclosure) and an M4 Allen key to remove the four screws that attach the optical plate to the enclosure.

NOTICE

- Be careful to support the optical plate and sample cell when removing the screws due to the weight of the assembly.

10.4.3 Replace optical head

1. Place the sample cell with the optical head on a work bench and use an M4 Allen key to remove the four screws that hold the sample cell.
2. The optical head comes with a pressure sensor that is not installed. Install the new pressure sensor on the new optical head.

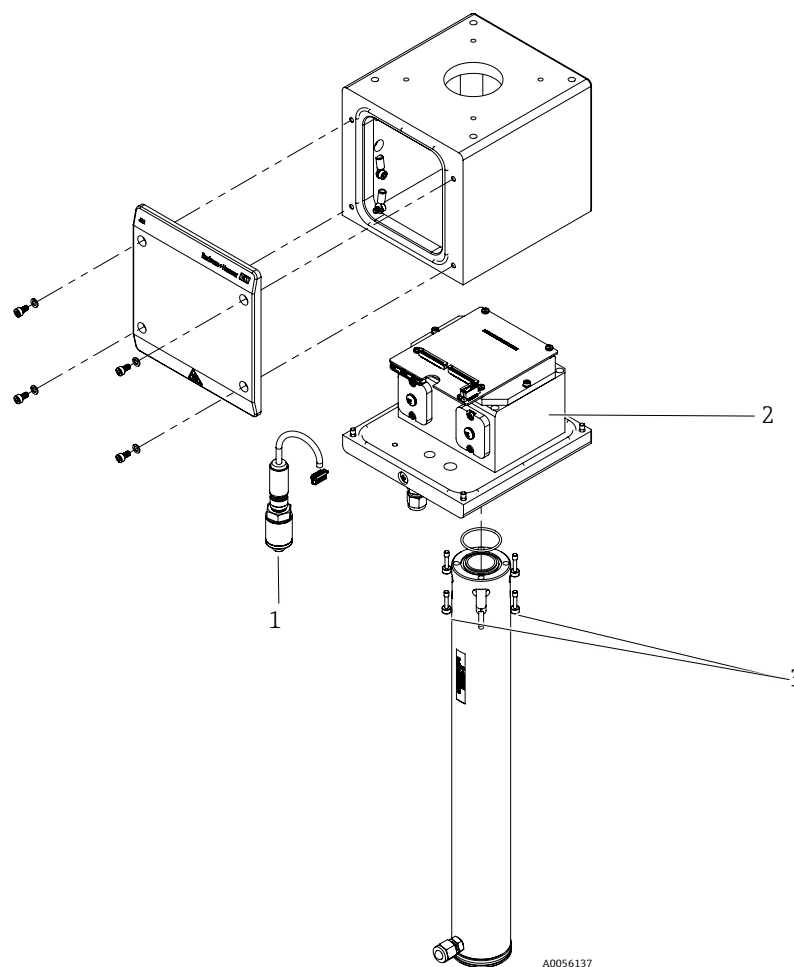


Figure 11. Sample cell and pressure sensor on replacement Optical Head

#	Description
1	Pressure sensor
2	Optical head assembly
3	(4) M4 screws for sample cell

3. Attach the new optical head to the sample cell. Refer to the *Sample cell replacement* → section.
4. Once the new optical head is attached to the existing sample cell, you need to install it back to its original location.
 - a. Use the 4 M4 screws to mount the optical head and sample cell. Torque to 2.6 Nm (23 in-lb).
 - b. Use the 2 screws to reinstall the grounding wire (1 at enclosure, 1 at optical head plate).
 - c. Connect the 2 brown ribbon cables in place. This is a delicate procedure because the black plastic connectors are fragile. To connect the ribbon cables, you will need to lift on the black connector, insert each ribbon cable, then push down on the black connector to lock the cable in place.
 - d. Attached 1 screw for the grounding wire on the optical head cover. Use the 4 screws to mount the optical head cover.
 - e. Attach all sample tubing to the sample cell.
 - f. Use the 4 screws to mount the external cover on the enclosure for the sample cell port.
5. Power on the unit and ensure it is operating normally.
6. Ensure all settings are configured, such as modbus communication, current out, relays, and heartbeat. If there are any issues, contact service.

11 Disposal



If required by the Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), the product is marked with the depicted symbol in order to minimize the disposal of WEEE as unsorted municipal waste. Do not dispose of products bearing this marking as unsorted municipal waste. Instead, return them to Endress+Hauser for disposal under the applicable conditions.

www.addresses.endress.com
