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Installation Instructions
Scrubber and scrubber indicator replacement
JT33 TDLAS gas analyzer

Endress+Hauser
People for Process Automation

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1 Overview of spare parts sets

The JT33 is a TDLAS gas analyzer system which includes a spectrometer and a sample conditioning system (SCS). This document will review the requirements to replace the scrubber and indicator in the sample conditioning system.

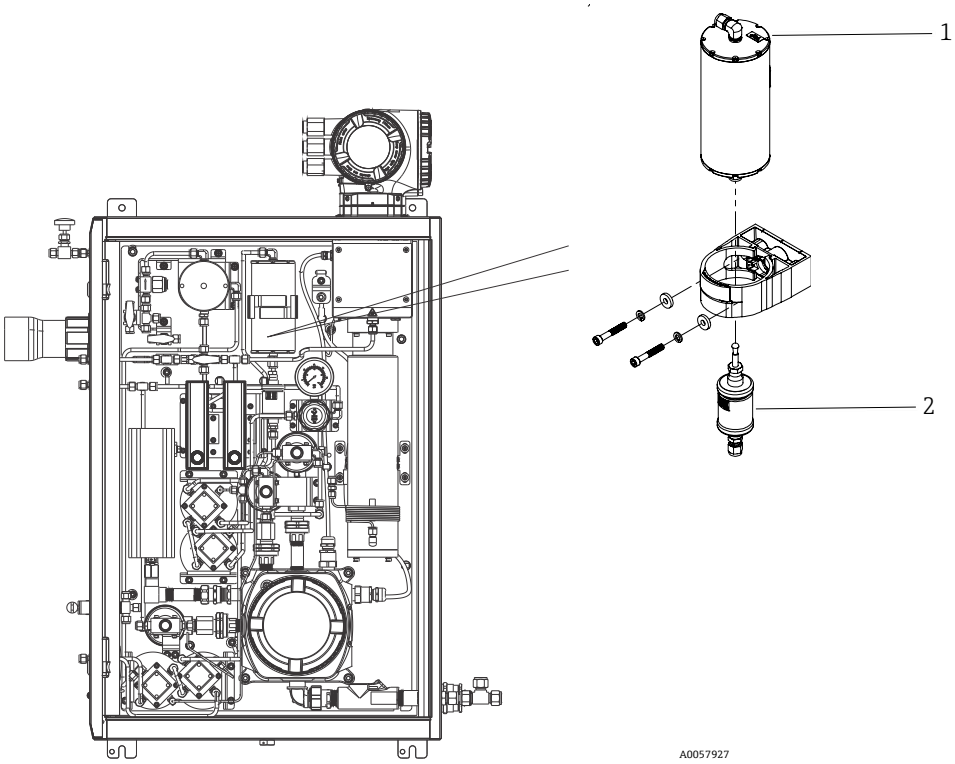

Figure 1. Scrubber and scrubber indicator

#	Endress+Hauser Material Number	Description
1	71656831	Kit, JT33 scrubber
2	71656832	Kit, JT33 indicator

- 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).
- Always keep the installation instructions together with the packaging.

2 Intended 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 repairs

Authorization to perform repairs depends on the measuring device's approval type. The table below shows the authorized group of people in each case. The scrubber and indicator have a service level of 3. It is recommended the measuring device be returned to the manufacturer for maintenance or service of the scrubber and indicator.

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

1 = Qualified specialist on the customer side
2 = Service technician authorized by Endress+Hauser
3 = Endress+Hauser (return measuring device to manufacturer)

4 Safety instructions

Review the following Safety Instructions before attempting scrubber maintenance tasks.

General safety

- 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.

Technical staff safety

- 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.

Electrical safety

- 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.

Process safety

- 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.

Device safety

- 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

6.1 Tools and materials

Reference part number 71656073 service tools kit. Included in the kit are the following:

- $^{9}/_{16}$" open ended wrench

7 Maintenance/service

Technicians are expected to be educated in the handling of hazardous gas and shall follow all safety protocols established by the customer that are necessary for servicing the analyzer. This may include, but is not limited to:

- Lockout/tagout procedures
- Toxic gas monitoring protocols
- Personal protective equipment (PPE) requirements
  - Personnel shall use protective gear, such as gloves, masks, etc., while exposed to gases or vapor streams.
- Hot work permits
- Other precautions that address safety concerns related to performing service on process equipment located in hazardous areas

To clean the JT33 TDLAS gas analyzer exterior

The housing should be cleaned only with a moist cloth to avoid electrostatic discharge.

WARNING

▶ Never use vinyl acetate, acetone, or other organic solvents to clean any painted surfaces or labels.

7.1 Scrubber maintenance

The H_2S scrubber contains material that gradually loses its scrubbing ability with use. The lifetime of the material depends on the concentration of H_2S that flows through the scrubber over time (gas composition) and how often the scrubber is used (switching frequency). Thus, scrubber lifetime is application-specific. The analyzer system predicts the remaining scrubber capacity by using the actual H_2S concentration measurements and dry cycle durations to calculate how much cumulative H_2S has been removed by the scrubber. Scrubber lifetimes have been simulated for typical natural gas and fuel gas applications. As shown in the figure below, under normal operating conditions a scrubber in a natural gas application with an average H_2S concentration of 4 ppmv lasts for many years, whereas a scrubber in a fuel gas application with an average H_2S concentration of 100 ppmv is expected to last approximately 190 days.

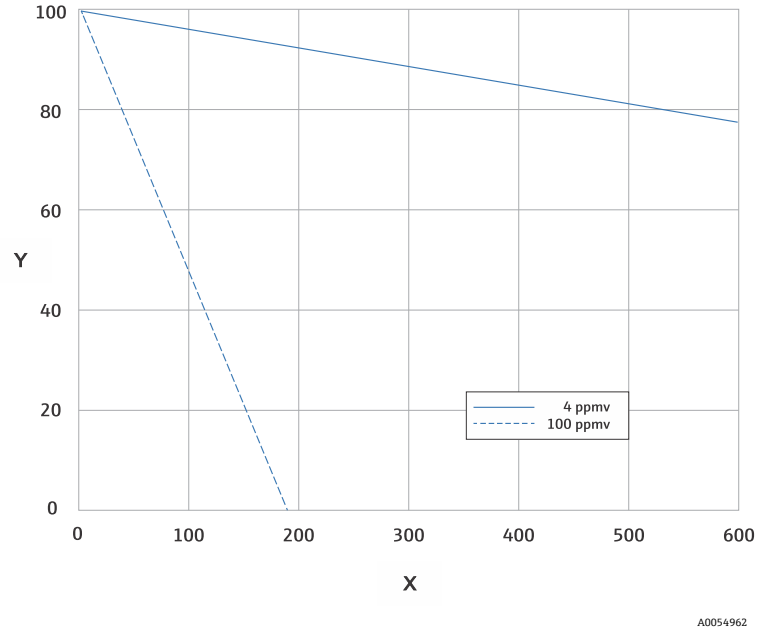

Figure 2. Predicted scrubber lifetime based on average H_2S load

Axis	Description
X	Days
Y	Remaining capacity [%]

As an added precaution for H_2S systems, a scrubber efficiency indicator is mounted at the outlet of the scrubber. This is shown in the scrubber and scrubber efficiency indicator image below. The powder material in the scrubber efficiency indicator changes color from turquoise to dark grey when there is H_2S breakthrough. Alternatively, regular validation of the system with an appropriate gas standard indicates when the scrubber needs to be replaced.

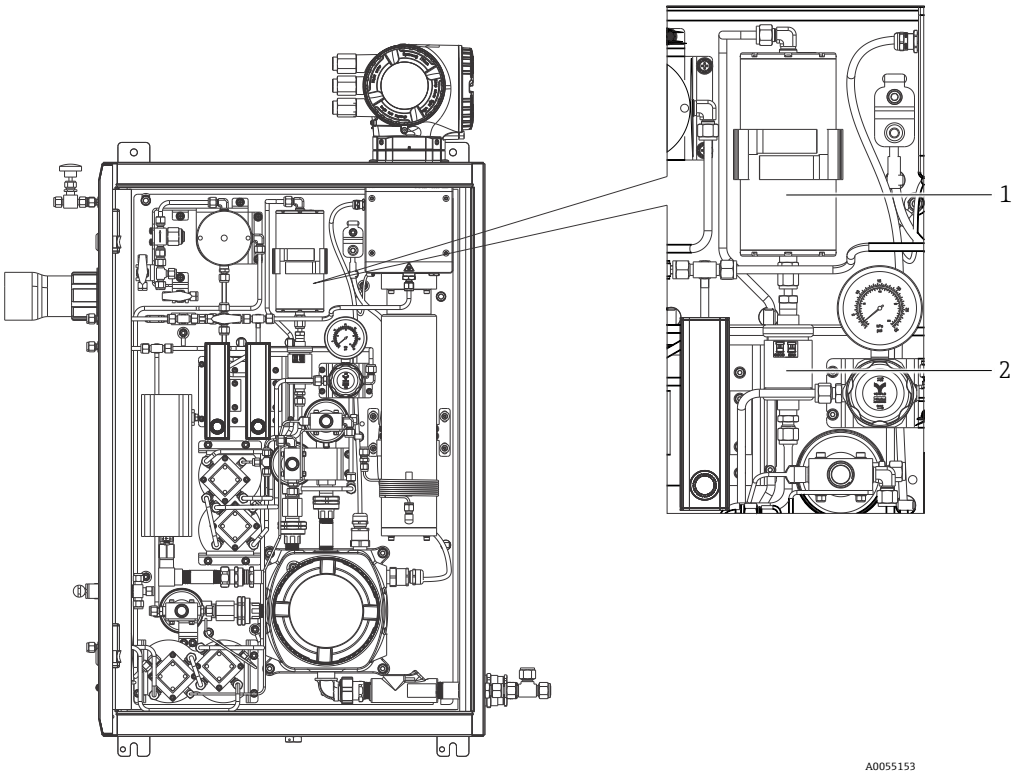

Figure 3. Scrubber and scrubber efficiency indicator

#	Description
1	Scrubber
2	Scrubber efficiency indicator

Review scrubber diagnostics

The system activates a scrubber diagnostic message to indicate when it is time to replace the scrubber and scrubber efficiency indicator.

1. Check the scrubber capacity using one of the following:
   - Rely on the scrubber capacity algorithm that is coded into the analyzer.
   - Visually inspect the scrubber indicator installed below the scrubber in the SCS.
   - Use a known gas composition as a source of validation.
2. Reset the scrubber use monitor for the active diagnostic from the diagnostic behavior menu.

If scrubber replacement is necessary, refer to *Replacing the scrubber* → 🖹.

7.1.1 Replacing the scrubber

To replace the sample conditioning system scrubber, please visit www.endress.com/contact or contact your local sales center.

1. Close the sample supply valve. Powering off the analyzer is optional.
2. Open the Sample Conditioning System enclosure door.
3. Using a 9⁄16" open ended wrench, loosen the fitting at the top and bottom of the scrubber and indicator.
4. Remove the scrubber from the bracket.

5. Insert the new scrubber into the bracket.
6. Connect the nut at the top of the scrubber to finger-tight.
7. Install the indicator onto the outlet at the bottom of the scrubber.
8. Connect the nut to the gas line on the outlet of the indicator.
9. Using a $^{9}/_{16}$" wrench, tighten the nuts ⅛" turn from finger tight.

7.2 Spare parts

All spare parts for the analyzer, along with their order codes, are listed in the spare parts finder tool on the Endress+Hauser website.

Spare parts finder tool: www.endress.com/product-tools

8 Disposal

If required by the Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), the product is marked with the depicted symbol. Do not dispose of products bearing this marking as unsorted waste. Instead, send them to separate collection facilities for recovery and recycling.

8.1.1 Disposal of used scrubbers and scrubber efficiency indicators

CAUTION

Depleted H_2S scrubbers and scrubber indicators contain predominantly Copper (II) Sulfide [CAS# 1317-40-4] with some remaining Copper (II) Oxide [CAS# 1317-38-0] and basic cupric carbonate [CAS# 12069-69-1].

- These substances are dark, odorless powders that require few special precautions other than avoiding contact with the internal substances, keeping the scrubber tightly sealed, and protecting the contents against humidity.
- Discard used scrubber and scrubber indicator in an appropriate leak-proof receptacle.

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