



DOC023.52.03230

UVAS sc

User Manual

1/2023 Edition 5

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Specifications are subject to change without notice.

The product has only the approvals listed and the registrations, certificates and declarations officially provided with the product. The usage of this product in an application for which it is not permitted is not approved by the manufacturer.

Table 1 UVAS *plus* sc tank sensors

| | UVAS <i>plus</i> sc |
|-----------------------------------|--|
| Measuring technique | UV absorption measurement (2-beam technique), reagent-free |
| Measuring method | SAC 254 in accordance with DIN 38404 C3 |
| Measuring path | 1, 2, 5 and 50 mm |
| Measuring range | 0.01-60 m ⁻¹ (50 mm) 0.1-600 m ⁻¹ (5 mm) 0-1500 m ⁻¹ (2 mm) 2-3000 m ⁻¹ (1 mm) Can be calibrated to the total parameter COD depending on the application |
| Compensation | 550 nm |
| Measuring interval (≥ min) | ≥1 min |
| Cable length | 10 m (33 ft) standard Optional extension cables available in 5, 10, 15, 20, 30, 50 m Total maximum length: 60 m (196 ft) |
| Control function | PID, time control, 2-point controller |
| Probe pressure limit | max. 0.5 bar |
| Ambient temperature | +2 °C to +40 °C |
| Dimensions D × L | Approx. 70 mm x 333 mm |
| Mass | approx. 3.6 kg |
| Inspection interval | 6 months |
| User maintenance | 1 h / month, typical |

Table 2 UVAS *plus* sc bypass sensors

| | UVAS <i>plus</i> sc (in the bypass) |
|---|---|
| Measuring path | 2, 5 and 50 mm |
| Measuring range With NO₃-N standard solutions | 0.01-60 m ⁻¹ (50 mm) 0.1-600 m ⁻¹ (5 mm) 0-1500 m ⁻¹ (2 mm) Can be calibrated to the total parameter COD depending on the application |
| Cable length | 10 m (33 ft) standard Optional extension cables available in 5, 10, 15, 20, 30, 50 m Total maximum length: 60 m (196 ft) |
| Sample flow rate | At least 0.5 L/h sample |
| Pressure limit | max. 0.5 bar |
| Sample connection | Hose ID 4 mm / OD 6 mm |

Specifications

| | |
|---------------------------|---------------------------------------|
| Sample temperature | +2 °C to +40 °C |
| Dimensions | see Figure 4, page 14 |
| Warranty | 2 years |

Table 3 UVAS *plus* sc sensor-material

| Component | Material |
|--|--|
| Probe probehousing wiper axis fitting profile joist 2 mm wiperarm 5 mm / 50 mm | stainless steel 1.4571 stainless steel 1.4571 stainless steel 1.4305 stainless steel 1.4310 stainless steel 1.4581 |
| Wiper Profile measuring window seal for housing seal for fitting probe cable | silicone SUPRASIL (silica glass) silicone PVDF SEMOFLEX (PUR) |
| Leverage probe adapter leverage | stainless steel 1.4308 stainless steel 1.4301 |
| Bypass measuring cell seals fittings tube | PVC EPDM PVDF PVC |

2.1 Safety information

Please read this entire manual before unpacking, setting up, or operating this equipment. Pay attention to all danger and caution statements. Failure to do so could result in serious injury to the operator or damage to the equipment.

To prevent any impairment of the instrument's safety features, it must not be used or installed in any manner other than that specified in this manual.

| |
|---|
| ⚠ DANGER |
| Do not use the probe in hazardous area. |

2.1.1 Hazard information in this manual

| |
|--|
| ⚠ DANGER |
| Indicates a potentially or imminently hazardous situation which, if not avoided, will result in death or serious injury. |

| |
|---|
| ⚠ WARNING |
| Indicates a potentially or imminently hazardous situation which, if not avoided, could result in death or serious injury. |




| |
|--|
| ⚠ CAUTION |
| Indicates a potentially hazardous situation that may result in minor or moderate injury. |

| |
|--|
| NOTICE |
| Indicates a situation which, if not avoided, may cause damage to the instrument. Information that requires special emphasis. |




Note: Information that supplements points in the main text.

2.1.2 Warning labels

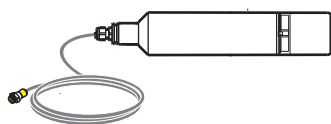
Read all labels and notices attached to the equipment. Personal injury or damage to the equipment could occur if they are not observed. Any symbol on the equipment will appear along with a caution statement in the manual.

| | |
|---|---|
|  | This symbol, if noted on the instrument, references the user manual for operation and/or safety information. |
|  | This symbol, when noted on a product enclosure or barrier, indicates that a risk of electrical shock and/or electrocution exists. |
|  | This symbol may appear on the product and indicates the need for protective eye wear. |

General information

| | |
|---|--|
|  | <p>This symbol may appear on the product and identifies the connection point for the protective ground.</p> |
|  | <p>When this symbol appears on the product, it identifies the location of a fuse or a current limiter.</p> |
|  | <p>Electrical equipment marked with this symbol may not be disposed of in European domestic or public disposal systems. Return old or end-of-life equipment to the manufacturer for disposal at no charge to the user.</p> |

2.2 Applications

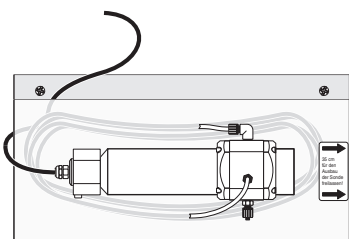


UVAS *plus sc*:

immersed directly in the medium, without pumping or preparation of a sample, the sensor measures the content of dissolved organic compounds in activated sludge tanks in municipal sewage treatment plants, surface water, untreated water and treated drinking water. The system can also be used for checking the outlet of waste water treatment plants.

Bypass accessories for UVAS *plus sc*:

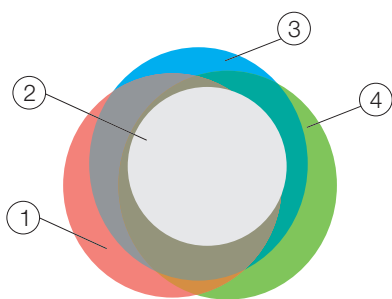
the through-flow variant of the high-precision UVAS *plus sc* sensor is used wherever direct measurement in the medium is not possible for construction-related reasons or the medium load makes it necessary to measure a filtered sample (very high TS contents, sewage treatment plant inlet, waste dump seepage,...).



NOTICE

Any use other than use in accordance with requirements defined in the user manual leads to the loss of the warranty claims and can lead to personal injury and property damage, for which the manufacturer assumes no liability.

2.3 Measuring principle



Substance groups measured

| | |
|--------|--------|
| 1. COD | 3. SAC |
| 2. BOD | 4. TOC |

Organic compounds dissolved in water in general absorb UV light, for this reason the measurement of UV absorption represents an independent total parameter for dissolved organic substance water load. In drinking water treatment this method of determination of the quality of water without chemicals using laboratory photometers and filtered samples has a long tradition.

DIN 38402 C2 stipulates for the measurement of the UV absorption, the measuring wavelength of 254 nm and characterises the measured value for a filtered sample as a spectral absorption coefficient at 254 nm (SAC254 for short), which is to be converted to extinctions per metre. In this way straightforward comparability of the measured results from photometers with different cuvette intensities is achieved and the units 1/m or m^{-1} are obtained.

The UVAS immersed probe comprises a multiple beam absorption photometer with effective turbidity compensation. The related controller controls the process of the measurement using a flash lamp photometer, the mechanical cleaning of the measuring window by a wiper, and also displays the measured values as SAC254 in 1/m.

For other total parameters such as COD or TOC etc. there is a correlation for the SAC254 of the same quality as, e.g., between COD and TOC. Very high availability of measured values, minimum investment, minimum effort for installation and maintenance or upkeep are therefore often key reasons for the

decision in favour of the UVAS sensor if an online measurement is to be used for a total parameter.

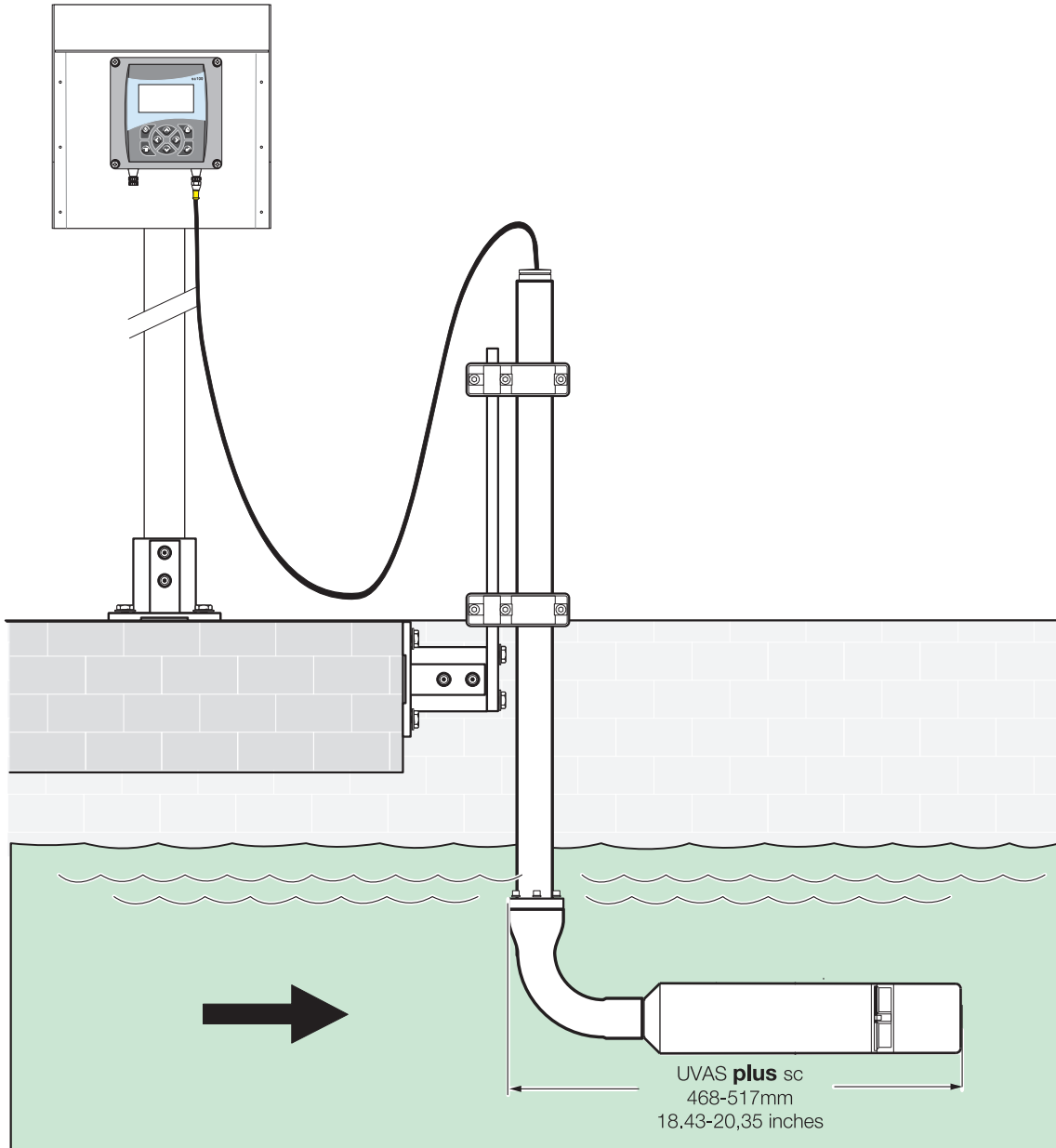
For media containing solids, the SAC measurement with UVAS should always be supplemented with a solids or turbidity measurement (SOLITAX sc, ULTRATURB sc).

The maintenance effort for the user is minimal and is limited to a straightforward inspection that, depending on the medium, is due at the most weekly.

3.1 Installation overview

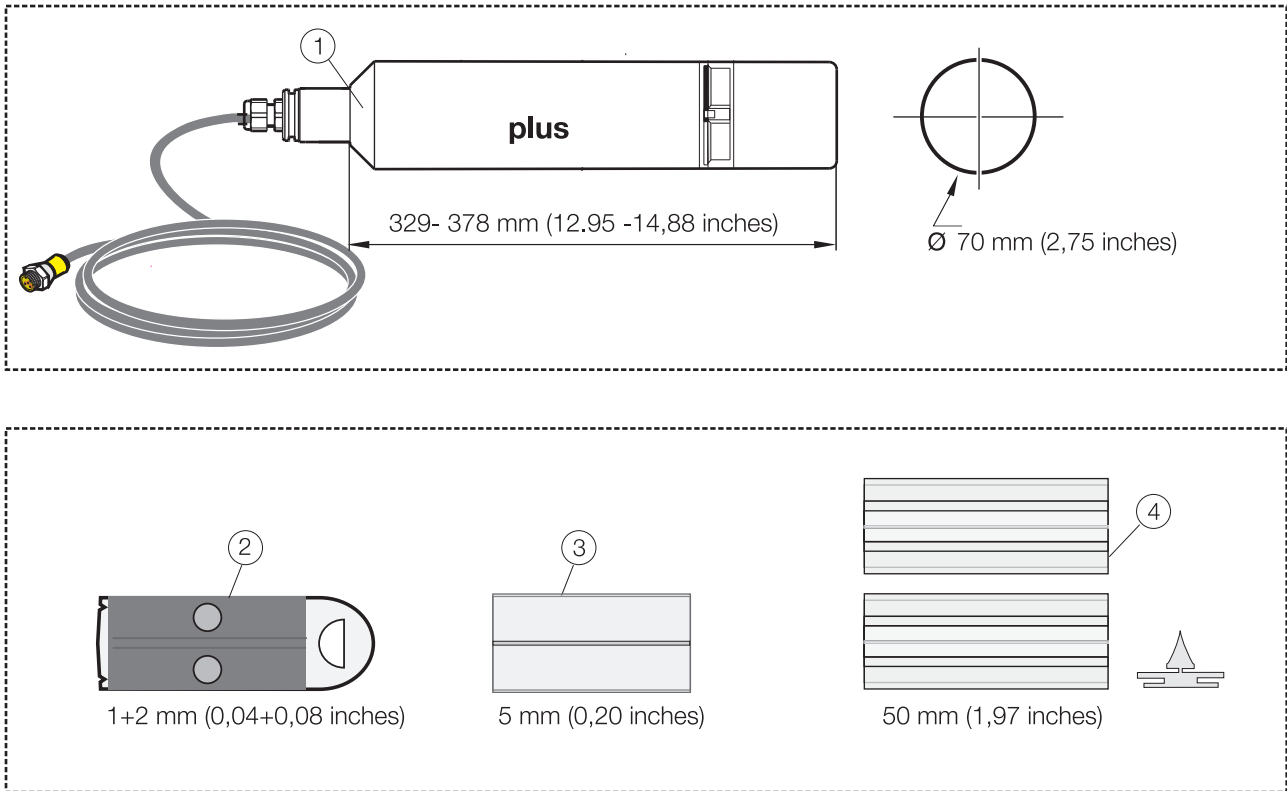
⚠ CAUTION
Installation of this system may only be carried out by qualified experts in accordance with all local safety regulations. See the mounting instruction sheet for more information.

Figure 1 Installation example with optional accessories



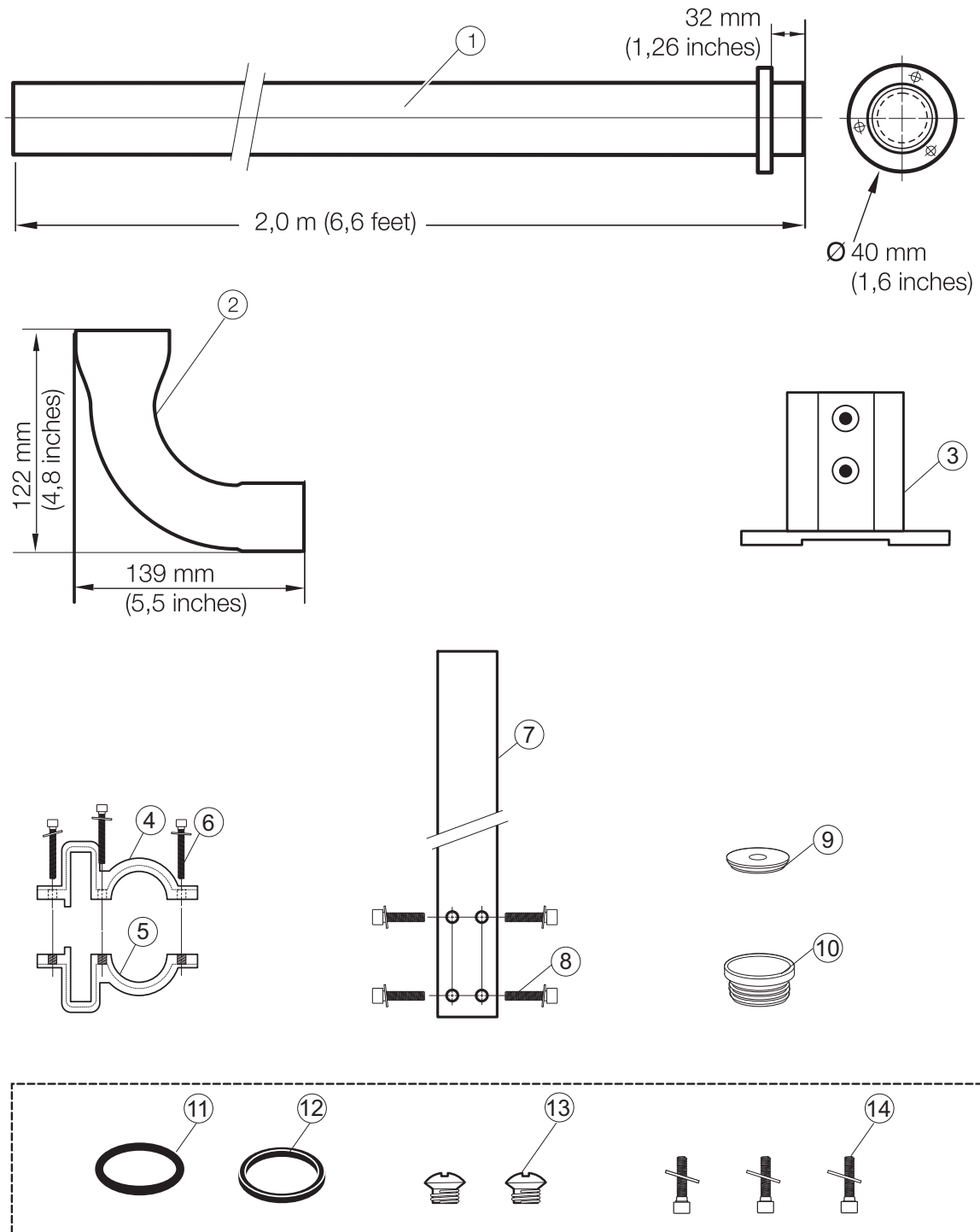
3.2 Sensor

Figure 2 Sensor accessory components



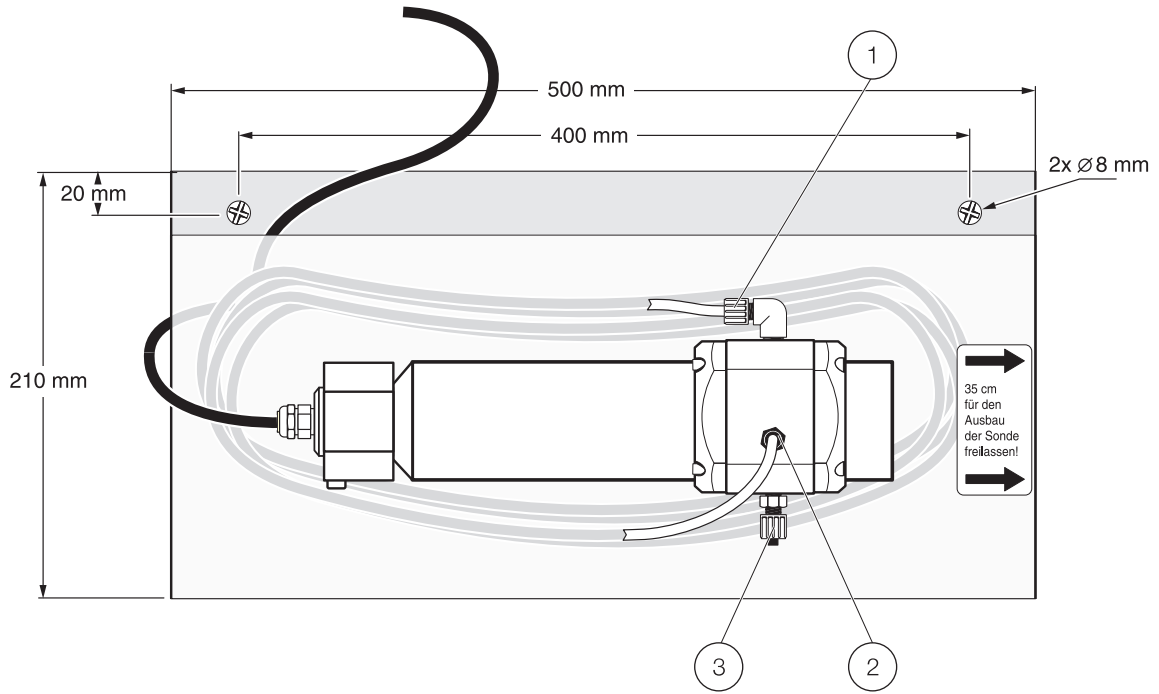
| | |
|-------------------------------|--------------------------|
| 1. UVAS sc sensor | 3. Wiper profile (5 mm) |
| 2. Wiper profile (1 and 2 mm) | 4. Wiper profile (50 mm) |

Figure 3 Sensor bracket components



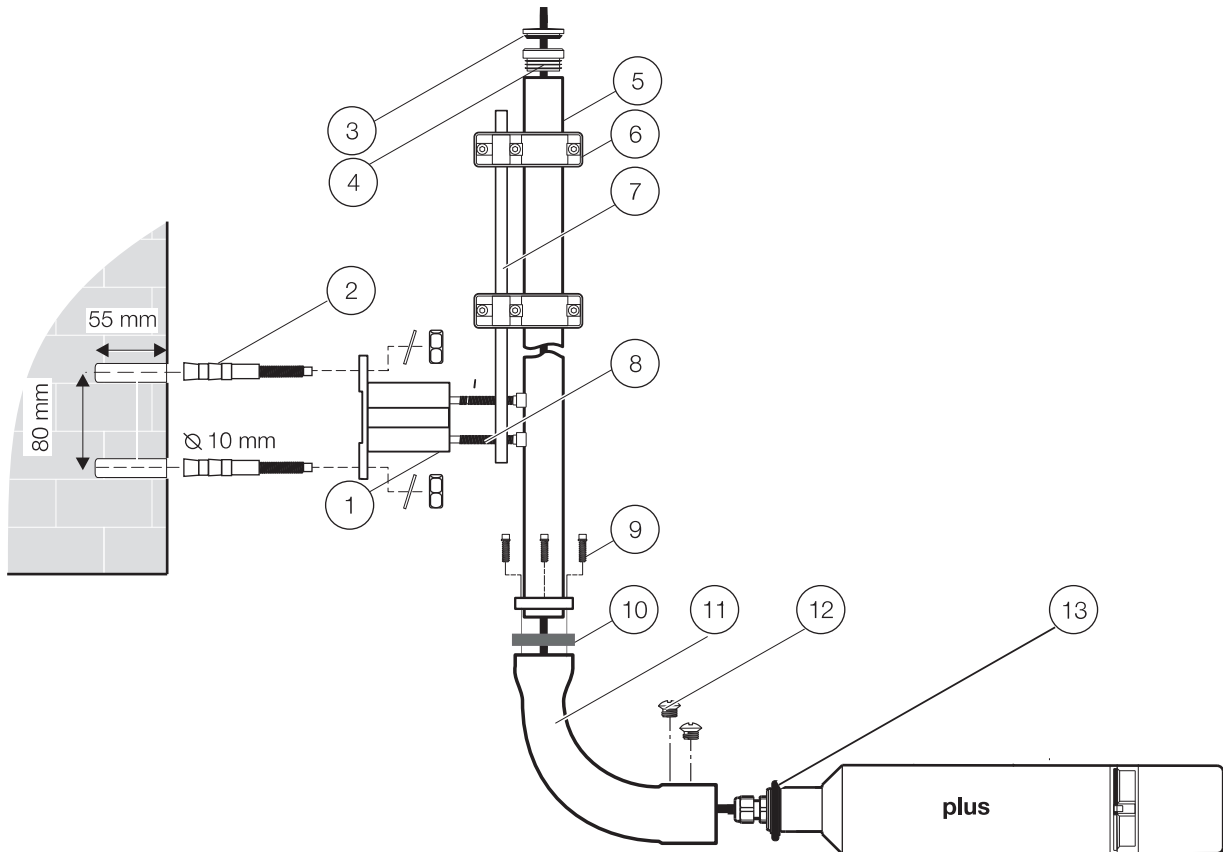
| | |
|---------------------------------|--------------------------------------|
| 1. Mounting pipe 2.0 m | 8. Cheese head bolt M8 x 40 (4) |
| 2. 90° adapter | 9. Sealing plug |
| 3. Base | 10. Plug |
| 4. Clamp half (2) | 11. O-ring EPDM |
| 5. Clamp half with thread (2) | 12. Flat seal |
| 6. Cheese head bolt M5 x 20 (6) | 13. Countersunk head bolt M6 x 8 (2) |
| 7. Fastening lug | 14. Cheese head bolt M3 x 10 (3) |

Figure 4 UVAS *plus* sc bypass accessories



| | | |
|-----------------|----------------|---------------|
| 1. Sample waste | 2. Sample feed | 3. Drain plug |
|-----------------|----------------|---------------|

Figure 5 Installation overview, sensor bracket



| | |
|------------------------|---|
| 1. Base | 8. Cheese head bolt M8 x 40 (4) |
| 2. (Anchors) | 9. Cheese head bolt with washer M3 x 10 (3) |
| 3. Sealing plug | 10. Flat seal |
| 4. Plug | 11. Adapter 90° |
| 5. Mounting pipe 2.0 m | 12. Countersunk head bolt M6 x 8 (2) |
| 6. Retaining clamp (2) | 13. O-ring EPDM |
| 7. Fastening lug | |

3.3 Attaching the Sensorcable

3.4 Wiring safety information

⚠ WARNING

Electrical shock hazard. Always disconnect power to the instrument when making any electrical connections.

3.4.1 Sensor connection and wiring

⚠ CAUTION

Before power is applied, refer to the controller operation instructions.

The sensor cable is supplied with a keyed quick-connect fitting for easy attachment to the controller. Retain the connector cap to seal the connector opening in case the sensor must be removed. Optional extension cables may be purchased to extend the sensor cable length.

Figure 6 Attaching the Sensor using the Quick-connect Fitting

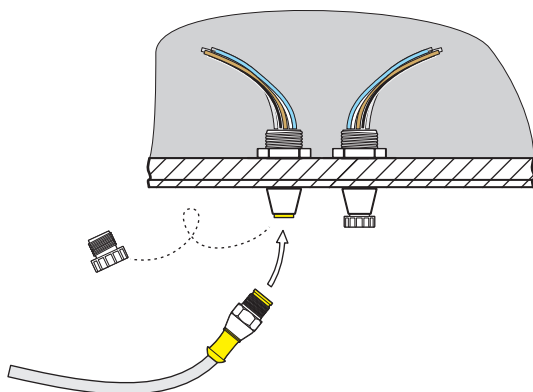
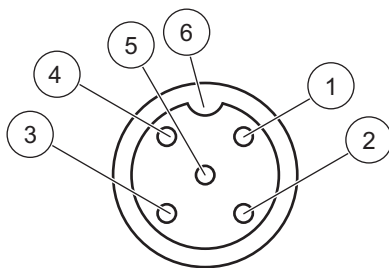


Figure 7 Quick-connect Fitting pin assignment



| Number | Designation | Wire Color |
|--------|----------------|---|
| 1 | +12 VDC | Brown |
| 2 | Circuit Common | Black |
| 3 | Data (+) | Blue |
| 4 | Data (-) | White |
| 5 | Shield | Shield (grey wire in existing quick-disconnect fitting) |
| 6 | Groove | |

4.1 sc controller operation

The sensor can be operated with all sc controllers. Become familiar with the functionality of the sc controller before using the sensor. Learn how to navigate the menu and execute the corresponding functions.

4.2 Sensor setup

When the sensor is connected for the first time, the sensor serial number is displayed as the sensor name. The sensor name can be changed as follows.

1. Open the MAIN MENU.
2. Press SENSOR SETUP and confirm.
3. Select the corresponding sensor and confirm.
4. Select CONFIGURE and confirm.
5. Press EDITED NAME and confirm.
6. Edit the names and confirm to return to the CONFIGURE menu.

Complete the system configuration in the same way by defining settings for the following menu items:

- SET PARAMETER
- MEAS UNIT
- MEAS INTERVAL
- CORRELATION
- REFERENCE
- MEAS INTERVAL
- RESPONSE TIME
- CLEANING
- WIPER MODE
- BYPASS
- SET DEFAULTS

4.3 Sensor data logger

A data storage unit and an event memory unit are provided for each sensor. The data storage unit stores measurement data at predefined time intervals, while the event memory unit stores events such as configuration changes, alarms and warning conditions. Both storage units can be output in CSV format (refer to sc controller manual).

4.4 Menu structure

4.4.1 SENSOR STATUS

| | |
|--|---|
| SELECT SENSOR (if there is more than one sensor) | |
| ERRORS | |
| | Possible error messages: MOIST, R < M, DEXT < 0.0, W. POS. UNKNOWN., W. BLOCKED, FLASH FAILURE, R TOO HIGH |
| WARNINGS | |
| | Possible warnings: EM TOO HIGH, CONC. TOO HIGH, CHECK KALIBR., REPLACE PROFILE, SERVICE REQUIRED, REPLACE SEALS, REPL. MOTOR S. |

Note: Refer to [Section 6 Troubleshooting, page 31](#) for a list of all error and warning messages as well as a description of all necessary corrective actions.

4.4.2 SENSOR setup

| | | | |
|--|--------------|---|--|
| SELECT SENSOR (if there is more than one sensor) | | | |
| CALIBRATION | | | |
| FACTOR | | | Adjustable from 0.80-1.20 for matching the comparison measurements |
| OFFSET | | | Adjustable from -250 to +250 mE for zero point correction |
| ZERO CAL | | See 4.5.2 Zero point calibration, page 23 | |
| 1 SAMPLE CAL | | See 4.5.3 1 point calibration, page 23 | |
| VERIFY | | See 4.6.1 Zero point adjustment, page 24 | |
| CAL. CONFIG | OUTPUT MODE | ACTIVE | Behaviour of the outputs during calibration or zero point setting |
| | | HOLD | |
| | | TRANSFER | |
| | | SELECTION | |
| | CAL INTERVAL | Counter for customer cal. 0-30 d, default setting: 0 d | |
| SET CAL DEFLT | | | |

4.4.2 SENSOR setup

| SELECT SENSOR (if there is more than one sensor) | | | |
|--|---|--|--|
| CONFIGURATION | | | |
| EDIT NAME | 10-character | | |
| PARAMETER | SAK254, SAC254, Ext254, Abs254, T/cm, BODuv, BSBuv, CSBuv, CODuv, DOCuv, TOCuv, ... | | |
| MEAS UNIT | 1/m, mE, AU, %, mg/l, ppm | | |
| CORRELATION | 2 value pairs: 1[1/m] and 1[mg/l] - 2[1/m] and 2[mg/l] | | |
| REFERENCE | ON/OFF | | |
| MEAS INTERVAL | 15, 20, 30 sec; 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30 min | | |
| RESPONSE TIME | 1-12 x MEAS INTERVAL | Indication of the actual response time in min. | |
| CLEANING | 1/measurement, 1, 2, 3, 5, 6, 10, 12, 15, 20, 30 min, 1, 2, 3, 4, 6, 12 h, 10:00h | | |
| WIPER MODE | SINGLE | Normal setting | |
| | DOUBLE A-B-A | Double wiping frequency | |
| | DOUBLE B-A-B | Double wiping frequency | |
| BYPASS | yes/no | | WIPER MODE: B Inhibit wiper "extension" |
| SET DEFAULTS | ARE YOU SURE? | MEAS INTERVAL: 5 min RESPONSE TIME: 15 min WIPER MODE: B-A-B | Reset to the factory configuration. |

4.4.2 SENSOR setup

| SELECT SENSOR (if there is more than one sensor) | | | |
|--|-----------------|------------------------------|---|
| MAINT.PROC | | | |
| PROBE INFO | UVAS plus sc | | Instrument name |
| | EDIT NAME | | |
| | SERIAL NUMBER | | |
| | FILTER DATA | | Measuring and reference wavelengths |
| | RANGE | | |
| | PATHLENGTH | | Width of the measuring path |
| | WIPER P/N | | Item number |
| | MODEL NUMBER | | Item number |
| | CODE VERSION | | Sensor software |
| | DRIVER VERS | | |
| | PRODUCTION DATE | | Production date |
| CAL. DATA | OFFSET | | Adjustable on the CALIBRATION menu |
| | FACTOR | | |
| | a | | Internal factor |
| | b | | Internal factor |
| | DATE | | Date of the last change of OFFSET and/or FACTOR |
| | STD.: 3000 mE | | Internal calibration data |
| | DEXT 100% | | |
| | DEXT 50% | | |
| | DEXT 25% | | |
| | GAIN | | Instrument factor |
| | CAL. | | Date of the last factory calibration |
| | r | | Internal calibration data |
| | m | | |
| | ir | | |
| im | | | |
| COUNTERS | TOTAL TIME | Counters | |
| | REPLACE PROFILE | Counter 50000-0-neg. number | Negative if passed |
| | CHECK CALIBR. | Counter for test interval | |
| | SERVICE | Counter 180 d-0-neg. number | |
| | SEALS | Counter 365 d-0-neg. number | |
| | SHAFTSEALS | Counter 500000-0-neg. number | |
| | MOTOR | Counters | |
| | FLASH | Counters | |

4.4.2 SENSOR setup

| SELECT SENSOR (if there is more than one sensor) | | | |
|--|-------------------------|---------------------------------------|--|
| MAINT.PROC | OUTPUT MODE information | REPLACE PROFILE | See 5.3 Changing wiper profile, page 29 |
| | | WIPERTEST | WIPE (<i>wiping process</i>) |
| | | | DRIVE OUT WIPER <i>(wiper profile extends, on bypass versions inhibited: see 5.2 Cleaning measuring path, page 28</i>) |
| | | | MOTOR CURRENT (<i>motor current during the wiping process</i>) |
| | | SIGNALS <i>(Measurement 1/sec)</i> | Average value |
| | | | Individual measured value |
| | | | Single measured value for AQS (FACTOR = 1, OFFSET = 0) |
| | | | W.POS (<i>wiper position</i>) |
| | | | DEXT (<i>delta extinction EM-ER</i>) |
| | | | EM (<i>extinction measuring channel</i>) |
| | | | ER (<i>extinction reference channel</i>) |
| | | | M (<i>measured level</i>) |
| | | | R (<i>reference level</i>) |
| | | | IM (<i>intensity measuring channel</i>) |
| | | | IR (<i>intensity reference channel</i>) |
| | | | rd (<i>dark value reference</i>) |
| | | | md (<i>dark value measuring channel</i>) |
| | | extd (<i>dark value extinction</i>) | |
| | | MOIST | |
| | | OUTPUT MODE | Behaviour of the instrument outputs when the Maint.Proc. menu is opened |

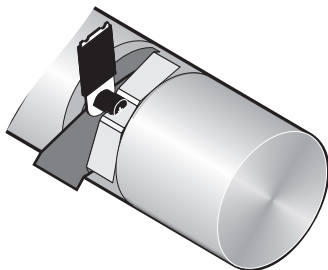
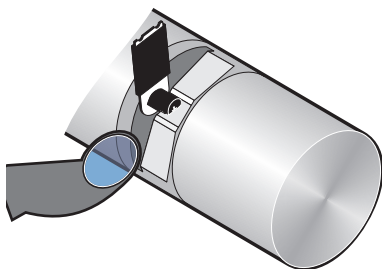
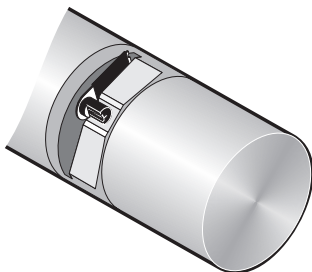
4.5 Calibration

The instrument has been carefully calibrated before delivery and the calibration will not change for a long time.

It is recommended to regularly check the calibration ([4.5.1 Verifying, page 22](#)) with a test glass. In case of large deviations, first a zero point calibration ([4.5.2 Zero point calibration, page 23](#)) must be performed to compensate for a zero point offset, before the gradient is allowed to be changed with the 1 point calibration ([4.5.3 1 point calibration, page 23](#)).

During the calibration only mE values are displayed. The setpoint adjustment is also referred to the unit of measure mE. This setpoint is noted on the filter for the verification, liquid standards must be measured with an external spectral photometer and the measured values converted to the sensor layer thickness.

4.5.1 Verifying



1. Open the MAIN MENU.
2. Press SENSOR SETUP and confirm.
3. Press SELECT SENSOR (if there is more than one sensor) and confirm.
4. Press CALIBRATION and confirm.
5. Remove sensor from the tank and rinse measuring path with water.
6. Press VERIFY and confirm. The wiper will come out.
7. Confirm INSERT FILTER PRESS ENTER TO CONTINUE...
8. Confirm WHEN STABLE PRESS ENTER X.X
9. Press CALIBRATION and confirm.
10. Edit in 1 SAMPLE-CAL. (+x.x) the setpoint adjustment according to the test glass and confirm.
11. Confirm FACTOR: X.XX.
12. The corrected measured value is displayed. Confirm WHEN STABLE PRESS ENTER X.X.
13. Press FINISH and confirm.
14. Confirm REMOVE FILTER PRESS ENTER.
Then the wiper moves out . Immerse sensor at the measuring location.
15. Press the back-button to leave the menu CALIBRATE.
16. Confirm RETURN PROBE TO PROCESS.
17. Confirm READY. Automatic wiping action and back to measurements.

4.5.2 Zero point calibration

1. Open the MAIN MENU.
2. Press SENSOR SETUP and confirm.
3. Press SELECT SENSOR (if there is more than one sensor) and confirm.
4. Press CALIBRATION and confirm.
5. Select ZERO CAL and confirm.
6. Remove sensor from the tank and rinse measuring path with water. Align measuring path horizontally and completely fill with distilled water. Confirm FILL IN AQUA DEST PRESS ENTER TO CONTINUE.
7. Confirm WHEN STABLE PRESS ENTER DEXT: +/- X.X mE.
8. Press CALIBRATION and confirm.
9. Select OFFSET: X.X mE.
10. Confirm WHEN STABLE PRESS ENTER +/- X.X.
11. Press FINISH and confirm.
12. Press the back-button to leave the menu CALIBRATE.
13. Immerse sensor at the measuring location and confirm RETURN PROBE TO PROCESS.
14. Confirm READY. Automatic wiping action and back to measurements.

4.5.3 1 point calibration

1. Open the MAIN MENU.
2. Press SENSOR SETUP and confirm.
3. Press SELECT SENSOR (if there is more than one sensor) and confirm.
4. Press CALIBRATION and confirm.
5. Select 1 SAMPLE CAL and confirm.
6. Remove sensor from the tank and rinse measuring path with water. Align measuring path horizontally and completely fill with a reference sample. Confirm FILL IN CAL STANDARD PRESS ENTER.
7. Confirm WHEN STABLE PRESS ENTER x. x.
8. Press CALIBRATION and confirm.
9. Edit in 1 SAMPLE-CAL. (+x.x) the setpoint adjustment according to the reference sample and confirm.

10. Confirm FACTOR: X.XX.
11. Confirm WHEN STABLE PRESS ENTER X.X.
12. Press FINISH and confirm.
13. Press the back-button to leave the menu CALIBRATE.
14. Immerse sensor at the measuring location and confirm RETURN PROBE TO PROCESS.
15. Confirm READY. Automatic wiping action and back to measurements.

4.6 Adjusting measured values

If the comparative measurements in the laboratory do not provide adequate agreement with the measured values from the probe, electronic measured value adjustment (zero point and factor) can be performed as a provisional measure until the next customer service visit.

The settings should also only be made when a zero point check after cleaning the measuring window and the verification have been unsatisfactory.

4.6.1 Zero point adjustment

1. Open the MAIN MENU.
2. Press SENSOR SETUP and confirm.
3. Press SELECT SENSOR (if there is more than one sensor) and confirm.
4. Press CALIBRATION and confirm.
5. Press OFFSET and confirm.
6. Make a manual zero point offset by editing xx mE and confirm.
7. Press the back-button to leave the menu CALIBRATE.
8. Immerse sensor at the measuring location and confirm RETURN PROBE TO PROCESS.
9. Confirm READY. Automatic wiping action and back to measurements.

4.6.2 Setting factor

1. Open the MAIN MENU.
2. Press SENSOR SETUP and confirm.
3. Press SELECT SENSOR (if there is more than one sensor) and confirm.
4. Press CALIBRATION and confirm.
5. Press FACTOR and confirm.

6. Edit the Factor x.xx and confirm. The current measured value is multiplied by this factor, from 0.80-1.20, before it appears as a calculated value on the display.
7. Press the back-button to leave the menu CALIBRATE.
8. Immerse sensor at the measuring location and confirm RETURN PROBE TO PROCESS.
9. Confirm READY. Automatic wiping action and back to measurements.

4.7 Conversion into other total parameters

SAC 254 is an independent total parameter for the dissolved organic content of water and evaluates, like all other total parameters, only ever a specific fraction of the water load. Despite their major similarities, total parameters can only be converted from one to another within certain limits. However, if a correlation is found between SAC 254 and another total parameter, the converted measured values from UVAS probes can be displayed as mg/l TOCuv, CSBuv etc.

To determine the correlation, first a measurement of the SAC curve should be made over a few days. Only a regular daily curve with pronounced low and high load times such as with municipal waste water offers a good basis for satisfactory conversion.

At the times of day found for low and high load

- A representative sample should be taken at the UVAS probe location,
- The related SAC value should be read and
- A laboratory measurement of the parameter to be correlated should be made.

Example:

Sample 1 SAC 254: 105 1/m ; TOC: 150 mg/l:

Sample 2 SAC 254: 35 1/m ; TOC: 38 mg/l:

| | | | |
|---------------------|----------------------|----------------------|--|
| SENSOR SETUP | | | |
| | CONFIGURATION | | |
| | | SET PARAMETER | TOCuv |
| | | MEAS UNIT | mg/l |
| | | CORRELATION | PAIR 1 1 [1/m] = 105 1 [mg/l] = 150 PAIR 2 2 [1/m] = 35 2 [mg/l] = 38 |

The correlation entered should be regularly checked by means of comparative measurements in the laboratory.

⚠ CAUTION

Pinch Hazard. Only qualified personnel should conduct the tasks described in this section of the manual.

The cleanliness of the two measuring windows in the sensor measuring path is crucial for correct measured results!

The measuring windows should be checked weekly for soiling and the wiper profile checked for wear.

NOTICE

The seals must be replaced annually by the manufacturer's customer service! If the seals are not changed regularly, water may enter the probe head and seriously damage the instrument!

5.1 Maintenance schedule

| Maintenance task | |
|-------------------------|---|
| Visual inspection | weekly |
| Check calibration | Comparative measurement weekly <i>(depending on the ambient conditions)</i> |
| Inspection | six months (counter) |
| Seal change | annually (counter) |
| Wiper profile change | as per counter |

| Consumables | | |
|--------------------|--------------------------|-----------------------|
| Number | Designation | Average service life* |
| 1 | Wiper sets | 1 year |
| 1 | Wiper motor | 5 years |
| 1 | Seal set | 1 year |
| 1 | Flash lamp | 10 years |
| 2 | Measuring windows | 5 years |
| 1 | Filter set | 5 years |
| 2 | O-ring through-flow unit | 1 year |

* On operation as per factory settings and correct use

5.2 Cleaning measuring path

DANGER

Potential danger with contact with chemical/biological substances.
Working with chemical samples, standards and reagents can be dangerous.
Make yourself familiar with the necessary safety procedures and the correct handling of the chemicals before use and read and follow all relevant safety data sheets.

Normal operation of this device may require the use of chemicals or samples that are biologically unsafe.

- Observe all cautionary information printed on the original solution containers and safety data sheets prior to their use.
- Dispose of all consumed solutions in accordance with the local and national regulations and laws.
- Select the type of protective equipment suitable to the concentration and quantity of the dangerous material being used.

If the wiper interval is set correctly and the wiper profile is changed on time, additional cleaning of the measuring path is not necessary.

1. Open the MAIN MENU.
2. Press SENSOR SETUP and confirm.
3. Press SELECT SENSOR (if there is more than one sensor) and confirm.
4. Press DIAG/TEST and confirm.
5. Press TEST/MAINT and confirm.
6. Press SIGNALS and confirm.
7. Remove sensor from the tank.
Depending on the degree and nature of the soiling, clean using window cleaner, grease remover or 5 % hydrochloric acid (operating the wiper arm using the Enter key can help the cleaning process.)

After leaving to soak for 5–10 minutes, you must carefully clean the measuring path with distilled water. Objective: [ER] and [EM] < 500

Confirm ENTER=WIPE.

8. Press the back-button to leave the menu SIGNALS.
9. Press the back-button to leave the menu TEST/MAINT. Confirm RETURN PROBE TO PROCESS.
10. Confirm READY. Automatic wiping action and back to measurements.

5.3 Changing wiper profile

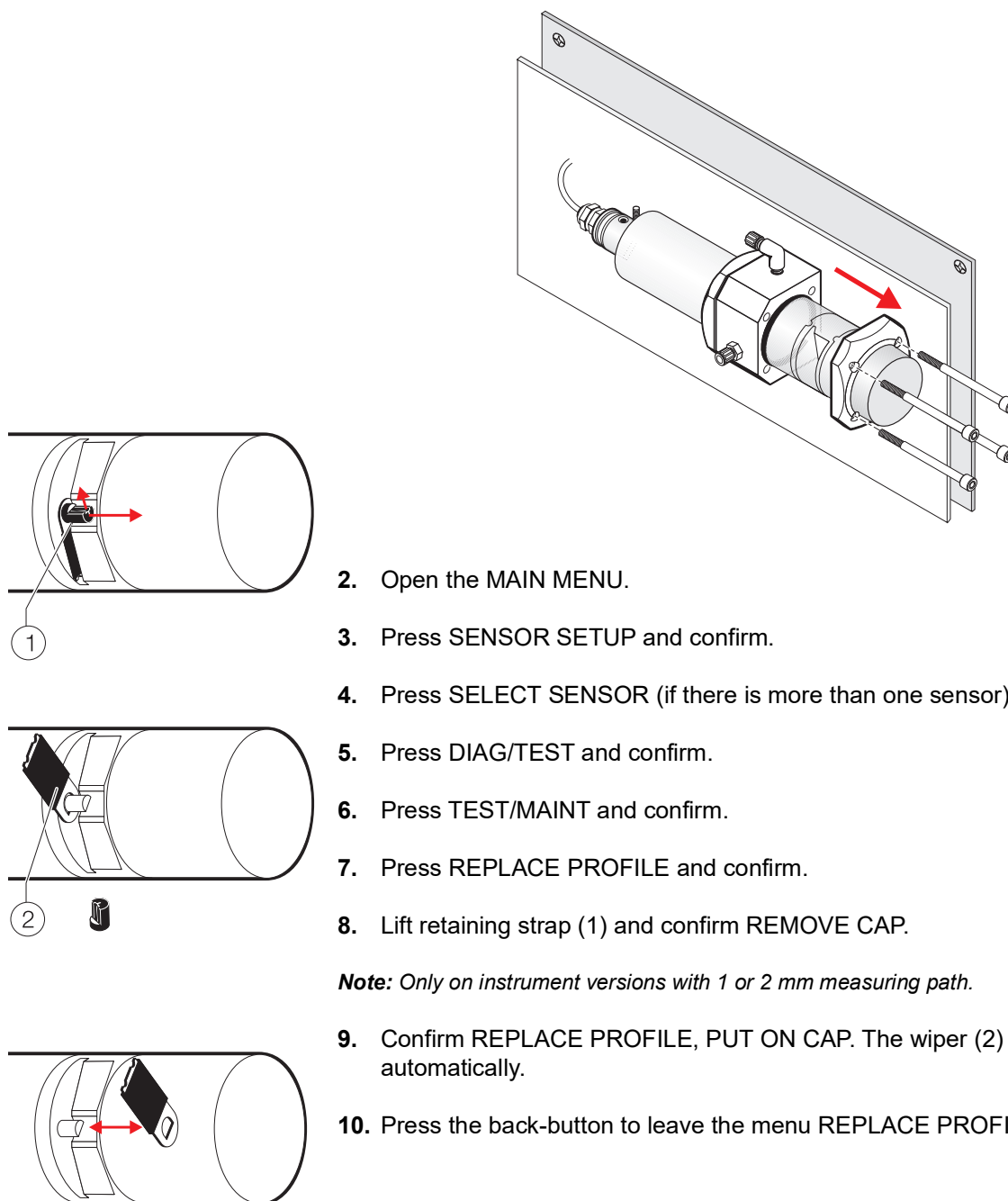
⚠ CAUTION

Obey the locally applicable accident prevention regulations. Wear protective gloves where necessary during the change of the wiper rubber.

Note: Note for bypass version: First slide the sensor out of the through-flow cell until the measuring path is visible and the wiper can be extended without resistance!

1. For this purpose on the menu SENSOR SETUP, CONFIGURATION, Set BYPASS to "no"!

Figure 8 Changing wiper profile

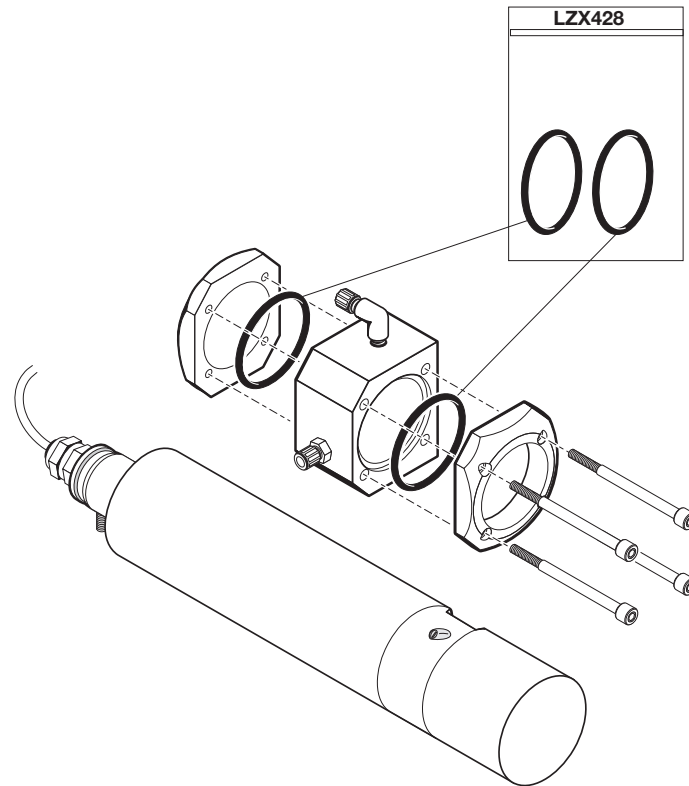


2. Open the MAIN MENU.
 3. Press SENSOR SETUP and confirm.
 4. Press SELECT SENSOR (if there is more than one sensor) and confirm.
 5. Press DIAG/TEST and confirm.
 6. Press TEST/MAINT and confirm.
 7. Press REPLACE PROFILE and confirm.
 8. Lift retaining strap (1) and confirm REMOVE CAP.
- Note:** Only on instrument versions with 1 or 2 mm measuring path.
9. Confirm REPLACE PROFILE, PUT ON CAP. The wiper (2) moves out automatically.
 10. Press the back-button to leave the menu REPLACE PROFILE.

11. Immerse sensor at the measuring location and confirm RETURN PROBE TO PROCESS.
12. Confirm READY. Automatic wiping action and back to measurements.

5.4 Seal change (bypass version)

5.4.1 UVAS *plus* sc



6.1 Error messages

Possible sensor error messages are displayed by the sc controller.

Table 4 Error messages

| Error displayed | Rectification |
|-----------------|---|
| NONE | |
| MOIST | Check MOIST value on the SENSOR SETUP menu, TEST/MAINT, MAINT.PROC., SIGNALS. Remove sensor from the tank and call service |
| R < M | Call service |
| DEXT < 0.0 | Check calibration, call service |
| W.POS. UNKNOWN | Check measuring path, call service |
| W. BLOCKED | Check measuring path, call service |
| FLASH FAILURE | Call service |
| R TOO HIGH | Call service |

6.2 Warnings

Possible sensor warning messages are displayed by the sc controller.

Table 5 Warnings

| Warning displayed | Cause | Rectification |
|-------------------|--|-------------------------------------|
| NONE | Correct measuring operation | |
| EM TOO HIGH | Turbidity, organic content or nitrate concentration too high, measuring range exceeded as a result | Check measurement in the laboratory |
| CONC. TOO HIGH | Nitrate concentration too high, as a result measuring range exceeded | Check measurement in the laboratory |
| CHECK KALIBR. | Test interval elapsed | Check calibration |
| REPLACE PROFILE | Counter elapsed | Change wiper profile |
| SERVICE REQUIRED | Counter elapsed | Call service |
| REPLACE SEALS | Counter elapsed | Call service |
| SHAFT SEALS REPL. | Counter elapsed | Call service |

| | |
|-----------------------------------|-----------------|
| UVAS <i>plus</i> sc (1 mm) | LXV418.00.10001 |
| UVAS <i>plus</i> sc (2 mm) | LXV418.00.20001 |
| UVAS <i>plus</i> sc (5 mm) | LXV418.00.50001 |
| UVAS <i>plus</i> sc (50 mm) | LXV418.00.90001 |
| User Manual | DOC023.52.03230 |

Accessories

| | |
|---|-----------------|
| Cable extension set (5 m)..... | LZX848 |
| Cable extension set (10 m)..... | LZX849 |
| Cable extension set (15 m)..... | LZX850 |
| Cable extension set (20 m)..... | LZX851 |
| Cable extension set (30 m)..... | LZX852 |
| Cable extension set (50 m)..... | LZX853 |
| Cable extension set (100 m)..... | LZY339 |
| Sensor bracket incl. 90° adapter | LZY714.99.53520 |
| Comprising: | |
| Base | LZY827 |
| Fastening lug..... | LZY804 |
| Retaining clamp (2x)..... | LZX200 |
| Mounting pipe 2 m..... | LZY714.99.00020 |
| Hardware HS..... | LZY823 |
| Extension pipe 1.8 m..... | LZY714.99.00040 |
| Extension pipe 1.0 m..... | LZY714.99.00030 |
| Second fastening point (incl. retaining clamp)..... | LZY714.99.03000 |
| Probe adapter 90° | LZY714.99.50000 |
| Hardware, sensor fastening..... | LZY822 |

Consumables

| | |
|-------------------------------------|--------|
| Wiper profile 1 mm (5 pcs.) | LZX148 |
| Wiper profile 2 mm (5 pcs.) | LZX012 |
| Wiper profile 5 mm (5 pcs.) | LZX117 |
| Wiper profile 50 mm (20 pcs.) | LZX119 |

Table 6 Sensor ModBUS Registers

| Group Name | Register # | Data Type | Length | R/W | Description |
|-----------------------|------------|------------------|--------|-----|-----------------------------------|
| measurement | 40001 | Float | 2 | R | diplayed measurement value |
| unit | 40003 | Unsigned Integer | 1 | R/W | unit : mg/l = 0 : g/l = 1 |
| parameter | 40004 | Unsigned Integer | 1 | R/W | parameter |
| Measure interval | 40005 | Unsigned Integer | 1 | R/W | measuring interval |
| correction | 40006 | Float | 2 | R/W | correction |
| offset | 40008 | Float | 2 | R/W | offset |
| integration | 40010 | Unsigned Integer | 1 | R/W | integration, always 1 |
| cleaning_interval | 40011 | Unsigned Integer | 1 | R/W | cleaning interval |
| wiper mode | 40012 | Unsigned Integer | 1 | R/W | wiper mode |
| wiper state | 40013 | Unsigned Integer | 1 | R/W | wiper state |
| resp time | 40014 | Unsigned Integer | 1 | R/W | response time |
| drv_struct_ver | 40015 | Unsigned Integer | 1 | R | driver structure version |
| drv_firmw_ver | 40016 | Unsigned Integer | 1 | R | driver firmware version |
| drv_cont_ver | 40017 | Unsigned Integer | 1 | R | driver content version |
| location | 40018 | String | 5 | R/W | location |
| path length | 40023 | Float | 2 | R | path length |
| profile | 40025 | Integer | 2 | R | profile counter |
| motor_cycles | 40027 | Integer | 2 | R | motor cycles |
| flash_counter | 40029 | Integer | 2 | R | flash counter |
| sealing_counter | 40031 | Integer | 2 | R | sealing counter |
| service_counter | 40033 | Integer | 2 | R | service counter |
| operating_hours | 40035 | Integer | 2 | R | operating hours |
| shaft_sealing_counter | 40037 | Integer | 2 | R | shaft sealing counter |
| profile reset val | 40039 | Integer | 2 | R/W | profile reset val |
| seals reset val | 40041 | Integer | 2 | R/W | seals reset val |
| service reset val | 40043 | Integer | 2 | R/W | service reset val |
| shaft seal reset val | 40045 | Integer | 2 | R/W | shaft seal reset val |
| des_measurement | 40047 | Float | 2 | R | desired measurement value |
| meas_single_value | 40049 | Float | 2 | R | measurement single value |
| dext | 40051 | Float | 2 | R | delta extinction |
| EM | 40053 | Float | 2 | R | m - extinction |
| ER | 40055 | Float | 2 | R | r - extinction |
| M | 40057 | Float | 2 | R | m |
| R | 40059 | Float | 2 | R | r |
| intensity_mes | 40061 | Float | 2 | R | m - intensity |
| intensity_ref | 40063 | Float | 2 | R | r - intensity |
| humidity_main | 40065 | Float | 2 | R | humidity - main |
| conc_blank | 40067 | Float | 2 | R | concentration whithout correction |
| cal_date | 40069 | Time | 2 | R | calibration time and date |
| user_cal_date | 40071 | Time | 2 | R | user calibration time and date |
| std_s3 | 40073 | Float | 2 | R | standard S3 |
| cal_L1 | 40075 | Float | 2 | R | cal. point 1 |

ModBUS Register Information

Table 6 Sensor ModBUS Registers

| | | | | | |
|-------------------|-------|------------------|---|-----|---|
| cal_L2 | 40077 | Float | 2 | R | cal. point 2 |
| cal_L3 | 40079 | Float | 2 | R | cal. point 3 |
| cal_mes | 40081 | Float | 2 | R | m - calibration |
| cal_ref | 40083 | Float | 2 | R | r - calibration |
| cal_intensity_mes | 40085 | Float | 2 | R | intensity m - calibration |
| cal_intensity_ref | 40087 | Float | 2 | R | intensity r - calibration |
| cal_ext | 40089 | Float | 2 | R | extinction - calibration |
| process | 40091 | Unsigned Integer | 1 | R/W | process register |
| menu | 40092 | Unsigned Integer | 1 | R | menu state |
| gain_ref | 40093 | Integer | 1 | R | low byte = gain ref-channel, high byte = second cap. on/off |
| gain_mes | 40094 | Integer | 1 | R | low byte = gain mes-channel, high byte = second cap. on/off |
| wiper_lim_a | 40095 | Integer | 1 | R | wiper limit a |
| wiper_lim_b | 40096 | Integer | 1 | R | wiper limit b |
| wiper_lim_out | 40097 | Integer | 1 | R | wiper limit out |
| prg_vers | 40098 | String | 4 | R | program version |
| ser_no | 40102 | Integer | 2 | R | serial number |
| cal_out_cfg | 40104 | Integer | 1 | R | cal. Output mode |
| user_cal_int | 40105 | Integer | 1 | R/W | user calibration interval |
| wiper_current | 40106 | Integer | 1 | R | wiper motor current in mA |
| resp_time_min | 40107 | Integer | 1 | R | response time in min |
| flash_per_fil | 40108 | Integer | 2 | R | flash per filter |
| cm1 | 40110 | Float | 2 | R/W | meas. Cap 1 |
| cm2 | 40112 | Float | 2 | R/W | meas cap 2 |
| cr1 | 40114 | Float | 2 | R/W | ref cap1 |
| cr2 | 40116 | Float | 2 | R/W | ref cap2 |
| lambda_m | 40118 | Float | 2 | R/W | lambda meas |
| lambda_r | 40120 | Float | 2 | R/W | lambda ref |
| transm_m | 40122 | Float | 2 | R/W | transmission meas |
| transm_r | 40124 | Float | 2 | R/W | ransmission ref |
| cal_menu | 40126 | Unsigned Integer | 1 | R/W | cal menu |
| wiper_menu | 40127 | Unsigned Integer | 1 | R/W | wiper menu |
| maint_menu | 40128 | Unsigned Integer | 1 | R/W | maint_menu |
| service_menu | 40129 | Unsigned Integer | 1 | R/W | service menu |
| flash_repl | 40130 | Unsigned Integer | 1 | R/W | flash replaced question |
| edit_menu | 40131 | Unsigned Integer | 1 | R/W | edit menu |
| def_menu | 40132 | Unsigned Integer | 1 | R/W | default menu |
| filter_data_menu | 40133 | Unsigned Integer | 1 | R/W | filter data menu |
| prod_date | 40134 | Time | 2 | R | production date |
| sensor_type | 40136 | String | 8 | R/W | sensor type |
| filter_set | 40144 | String | 3 | R/W | filter set |
| user_cal_counter | 40147 | Integer | 1 | R | user cal. Counter |
| pos_out_en | 40148 | Unsigned Integer | 1 | R/W | pos. Out enable |

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