HACH AV9000 Submerged Area Velocity Sensor User Manual

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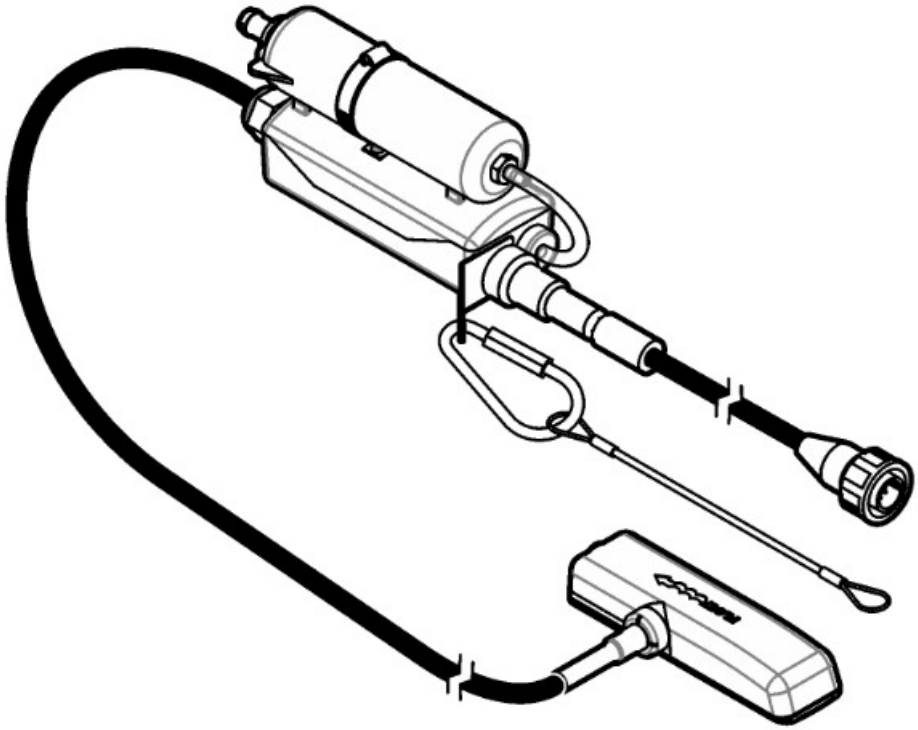
Submerged Area/Velocity Sensor and AV9000
06/2023, Edition 10
User Manual



Contents

Section 1 Specifications

Specifications are subject to change without notice.

1.1 Specifications—Submerged area velocity sensor

Performance will vary depending on channel size, channel shape and site conditions.

Velocity measurement	
Method	Doppler ultrasonic
Transducer type:	Twin 1 MHz piezoelectric crystals
Typical minimum depth for velocity	2 cm (0.8 in.)
Range	-1.52 to 6.10 m/s (-5 to 20 ft/s)
Accuracy	± 2% of reading (in water with uniform velocity profile)
Level measurement	
Method	Pressure transducer with stainless steel diaphragm
Accuracy (static)	• ±0.16% full scale ±1.5% of reading at constant temp (±2.5 ºC) • ±0.20% full scale ±1.75% of reading from 0 to 30 ºC (32 to 86 ºF) • ±0.25% full scale ±2.1% of reading from 0 to 70 ºC (32 to 158 ºF)
Velocity-induced depth error	Compensated based on flow velocity
Level range	• Standard: 0–3 m (0–10 ft) • Extended: 0–9 m (0–30 ft)
Allowable level	• Standard: 10.5 m (34.5 ft) • Extended: 31.5 m (103.5 ft)
General attributes	
Air intake	Atmospheric pressure reference is desiccant protected
Operating temperature	0 to 70 ºC (32 to 158 ºF)

Level compensated temperature range	0 to 70 ºC (32 to 158 ºF)
Material	Noryl® outer shell with epoxy potting within
Power consumption	Less than or equal to 1.2 W @ 12 VDC
Cable	Urethane sensor cable with air vent
Connector	Hard anodized, satisfies Military Spec 5015
Cable lengths available	• Standard: 9, 15, 23 and 30.5 m (30, 50, 75, 100 ft) • Custom: 30.75 m (101 ft) to 76 m (250 ft) maximum
Cable diameter	0.91 cm (0.36 in.)
Dimensions	2.3 cm H x 3.8 cm W x 13.5 cm L (0.9 in. H x 1.5 in. W x 5.31 in. L)
Compatible instruments	Sigma 910, 920, 930, 930 T, 950, 900 Max samplers and the AV9000 interface modules for the FL series flow loggers and AS950 samplers

1.2 Specifications—AV9000 interface module

Velocity measurement	
Measurement method	1 MHz Doppler Ultrasound
Doppler Analysis Type	Digital Spectral Analysis -1.52 to 6.10 m/s (-5 to 20 ft/s) ± 2% of reading or 0.05 fps (uniform velocity profile, known salinity, positi ve flow. Field performance is site specific.)
Doppler Accuracy	±1% of reading or 0.025 fps(with electronically simulated Doppler signal, -25 to +25 fps equivalent velocity). Refer to Configure the sensor on page 14.
Power requirements	
Supply voltage	9-15 VDC
Maximum current	<130 mA @ 12 VDC with submerged area velocity sensor
Energy per measurement	<15 Joules (typical)
Operating temperature	
-18 to 60 ºC (0 to 140 ºF) at 95% R H	
Enclosure	
Dimensions (W x H x D)	AV9000: 13 x 17.5 x 5 cm (5.0 x 6.875 x 2.0 in.) AV9000S: 12.01 x 14.27 x 6.86 cm (4.73 x 5.62 x 2.70 in.)
Environmental Rating	NEMA 6P, IP68
Enclosure material	PC/ABS

Section 2 General information

In no event will the manufacturer be liable for damages resulting from any improper use of product or failure to comply with the instructions in the manual. The manufacturer reserves the right to make changes in this manual and the products it describes at any time, without notice or obligation.
Revised editions are found on the manufacturer's website.

2.1 Safety information

The manufacturer is not responsible for any damages due to misapplication or misuse of this product including, without limitation, direct, incidental and consequential damages, and disclaims such damages to the full extent permitted under applicable law. The user is solei responsible to identify critical application risks and install appropriate mechanisms to protect processes during a possible equipment malfunction.
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.
Make sure that the protection provided by this equipment is not impaired. Do not use or install this equipment in any manner other than that specified in this manual.

2.1.1 Use of hazard information

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.

2.1.2 Precautionary labels

Read all labels and tags attached to the instrument. Personal injury or damage to the instrument could occur if not observed. A symbol on the instrument is referenced in the manual with a precautionary statement.

	This is the safety alert symbol. Obey all safety messages that follow this symbol to avoid potential injury. If on the instrument, refer to the instruction manual for operation or safety information.
	This symbol indicates the presence of devices sensitive to Electro-static Discharge (ESD) and indicates that care must be taken to prevent damage with the equipment.
	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.

2.1.3 Confined space precautions

DANGER

Explosion hazard. Training in pre-entry testing, ventilation, entry procedures, evacuation/rescue procedures and safety work practices is necessary before entering confined spaces.

The information that follows is supplied to help users understand the dangers and risks that are associated with entry into confined spaces.

On April 15, 1993, OSHA's final ruling on CFR 1910.146, Permit Required Confined Spaces, became law. This standard directly affects more than 250,000 industrial sites in the United States and was created to protect the health and safety of workers in confined spaces.

Definition of a confined space:

A confined space is any location or enclosure that has (or has the immediate potential for) one or more of the following conditions:

- An atmosphere with an oxygen concentration that is less than 19.5% or more than 23.5% and/or a hydrogen sulfide (H2S) concentration that is more than 10 ppm.
- An atmosphere that can be flammable or explosive due to gases, vapors, mists, dusts or fibers.
- Toxic materials which upon contact or inhalation can cause injury, impairment of health or death.

Confined spaces are not designed for human occupancy. Confined spaces have a restricted entry and contain known or potential hazards. Examples of confined spaces include manholes, stacks, pipes, vats, switch vaults and other similar locations.

Standard safety procedures must always be obeyed before entry into confined spaces and/or locations where hazardous gases, vapors, mists, dusts or fibers can be present. Before entry into a confined space, find and read all procedures that are related to confined space entry.

2.2 Product overview

The submerged area velocity (AV) sensor is used with Sigma flow meters, FL series flow loggers and AS950 samplers to measure the flow rate in open channels. Refer to Figure 1.

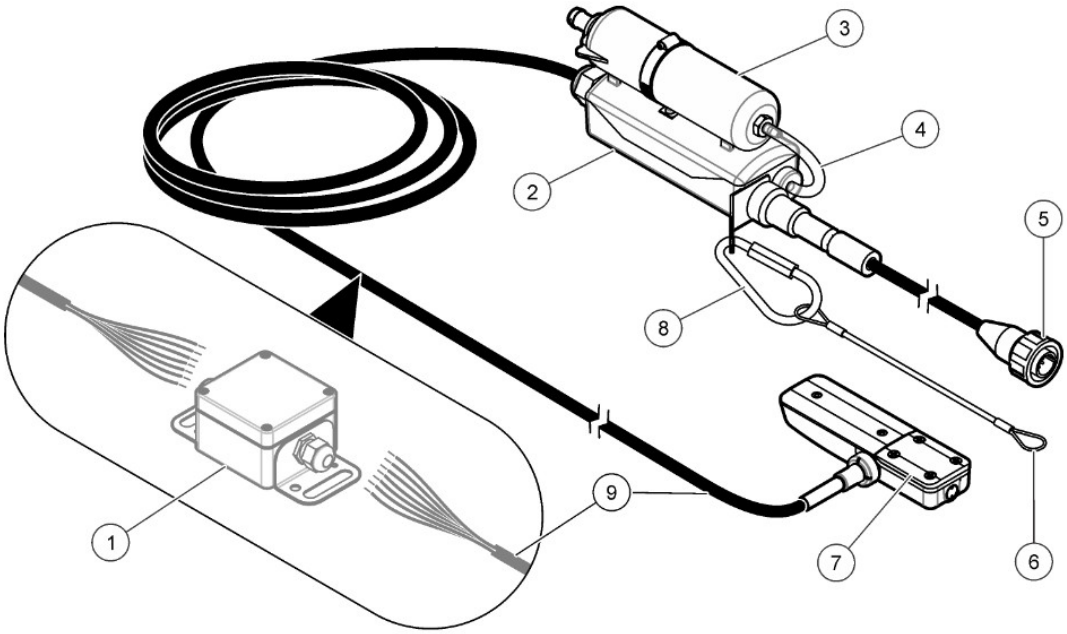
The sensor is available in oil-filled and non-oil-filled versions. The non-oil sensor is used for reasonably clear sites, or sites where the pipe may become dry. The oil-filled sensor is used for sites with high levels of biological growth, grit or silt.

Note: Do not use an oil-filled sensor in a pipe that may become dry.

The submerged AV sensor connects to a FL series flow logger or AS950 sampler through an AV9000 interface module. Refer to Replacement parts and accessories on page 20 to identify the applicable AV9000 model for the flow logger or sampler.

Note: The submerged AV sensor connects directly to Sigma flow meters. An AV9000 interface module is not necessary.

Figure 1 Submerged area velocity sensor



1	Junction box (optional)	**6**	Lanyard
2	Desiccant hub	**7**	Submerged AV sensor
3	Desiccant container	**8**	Carabiner clip
4	Air reference tube	**9**	Sensor cable
5	Connector		

2.3 Theory of operation

The sensor operates as an area velocity sensor and follows the continuity equation.

Flow rate = wetted area x average velocity

A pressure transducer in the sensor converts the pressure of the water to a level measurement. The level measurement and the user-entered channel geometry are used to calculate the wetted area of the flow stream.

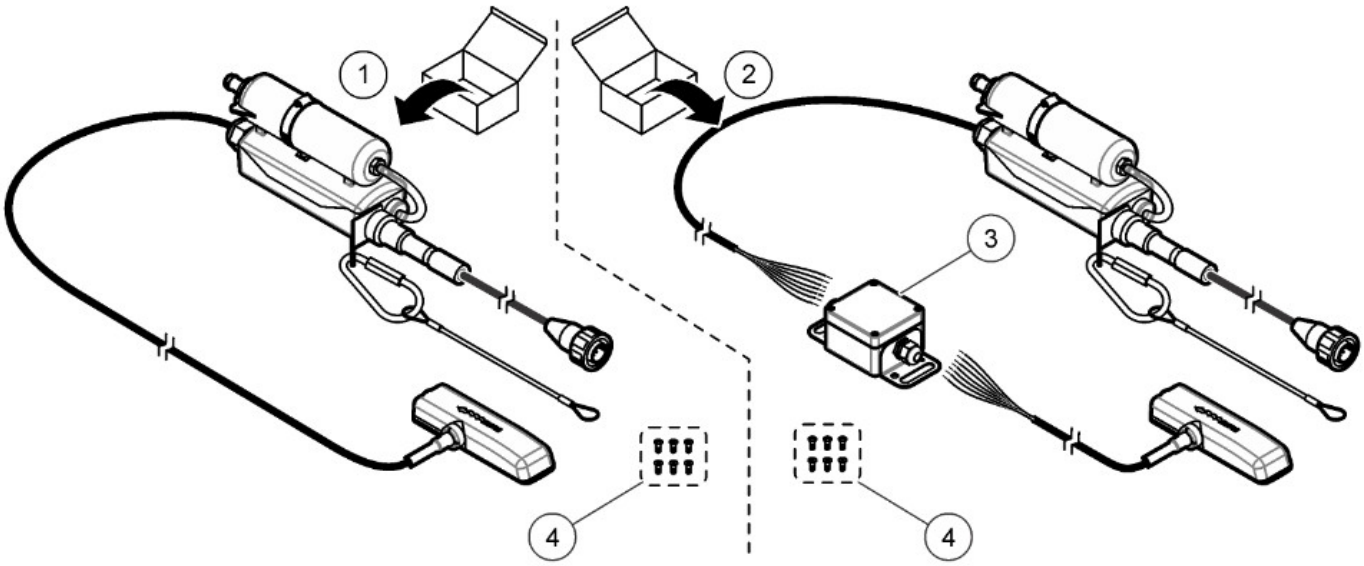
The sensor also contains two ultrasonic transducers: one is a transmitter and the other is a receiver.

A 1 MHz signal is transmitted and reflected off of particles in the flow stream. The reflected signal is received and its frequency is offset by the Doppler shift proportional to the velocity of the particles in the flow stream. The flow logger converts the doppler shift in the returned ultrasound signals to a velocity measurement.

2.4 Product components

Figure 2 shows the items in the shipment package. Contact the manufacturer if any components are damaged or missing.

Figure 2 Product components



1 Submerged AV sensor	**3** Junction box
2 Submerged AV sensor with junction box	**4** Mounting screws (6x)

Section 3 Installation

3.1 Installation guidelines

DANGER

Explosion Hazard. The non-IS AV sensors (770xx-xxx P/Ns) are not rated for use in classified Hazardous Locations. For classified Hazardous Locations, use IS AV sensors (880xx-xxx PNs) installed per the control drawings in 911/940 IS Blind Flow Meter manuals.

DANGER

Potential confined space hazards. Only qualified personnel should conduct the tasks described in this section of the manual.

- Do not install more than one sensor in pipes with a diameter of less than 61 cm (24 inches). Multiple sensors in smaller pipes can create turbulent or accelerated flows near the sensors, which may cause inaccurate measurements.
- Mount the sensor as close as possible to the bottom of the pipe invert. This will give the most accurate low-velocity-level measurements.
- Do not monitor flows in the manhole invert. The best location for the sensor is 3 to 5 times the sewer diameter/height upstream of the invert.
- Put monitoring sites as far from inflow junctions as possible to avoid interference caused by combined flows.
- Objects such as rocks, pipe joints, or valve stems create turbulence and generate high-speed flows near the object. Make sure the area 2 to 4 pipe diameters in front of the sensor installation is clear of obstructions. Best accuracy is obtained when there are no flow disruptions within 5 to 10 pipe diameters.
- Do not use sites with low-velocity flows that create silt buildup in the invert or channel. Buildup of silt near the sensor can inhibit the Doppler signal and cause inaccurate sensor readings and depth measurements.
- Do not use sites with deep rapid flows where sensor installation would be difficult or dangerous.
- Do not use sites with high-velocity, low-depth flows. Splash-over and excessive turbulence around the sensor

can cause inaccurate data.

3.2 Interference

The AV9000 interface module includes a sensitive radio-frequency receiver capable of the detecting very small signals. When connected to a flow logger or sampler communications or auxiliary power ports, some line-powered equipment can add electrical noise that interferes with Doppler velocity measurements. Interference with measurements is uncommon in typical sites.

The AV9000 is most sensitive to noise falling within its Doppler analysis span of 1 MHz ± 13.3 kHz.

Noise at other frequencies typically does not cause interference.

Some laptop computers can cause interference problems when operated from external AC power adapters. If such a device has an effect on the measurements, operate the laptop computer with batteries or disconnect the cable between the laptop computer and the flow logger or sampler.

3.3 Install the AV9000 interface module

The submerged AV sensor connects to a FL series flow logger or AS950 sampler through an AV9000 interface module. Refer to Replacement parts and accessories on page 20 to identify the applicable AV9000 interface module for the flow logger or sampler.

Note: The submerged AV sensor connects directly to Sigma flow meters. An AV9000 interface module is not necessary.

1. Install the AV9000 interface module. Refer to the AV9000 documentation for instructions.
2. Connect the sensor cable to the AV9000 interface module. Refer to the AV9000 documentation for instructions.
3. Connect the AV9000 cable to a sensor port (or terminal) on the flow logger or sampler. Refer to the flow logger or sampler documentation for instructions.

3.4 Attach the desiccant hub

Attach the desiccant hub to the flow logger or sampler to give strain relief to the sensor cable and the connector. Refer to Figure 3 to Figure 5.

For the best performance, make sure to install the desiccant container vertically with the end cap pointed down. Refer to Figure 3 to Figure 5.

Figure 3 Attach the desiccant hub—FL900 flow logger

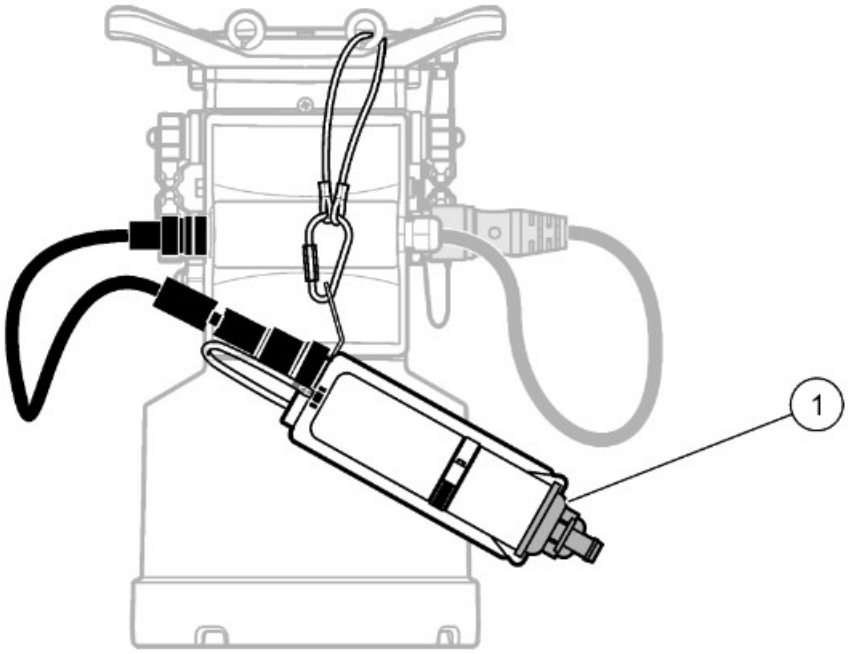
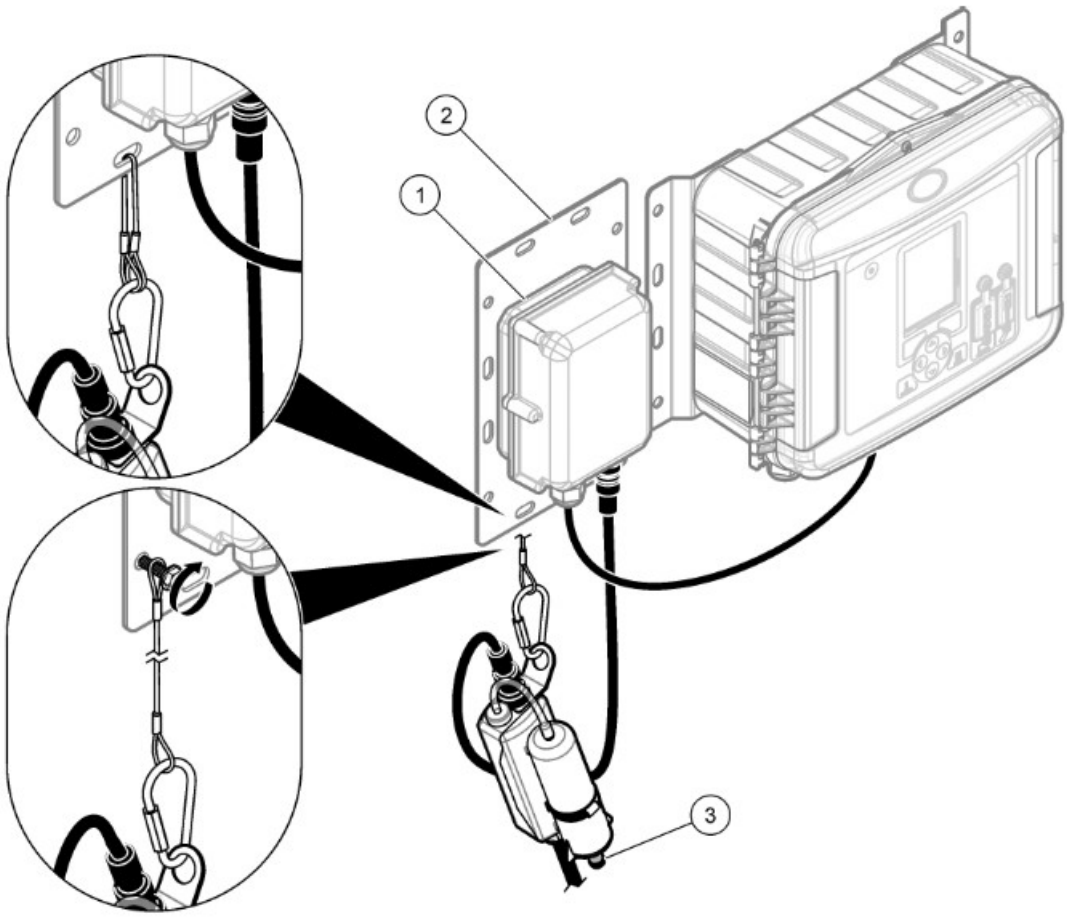
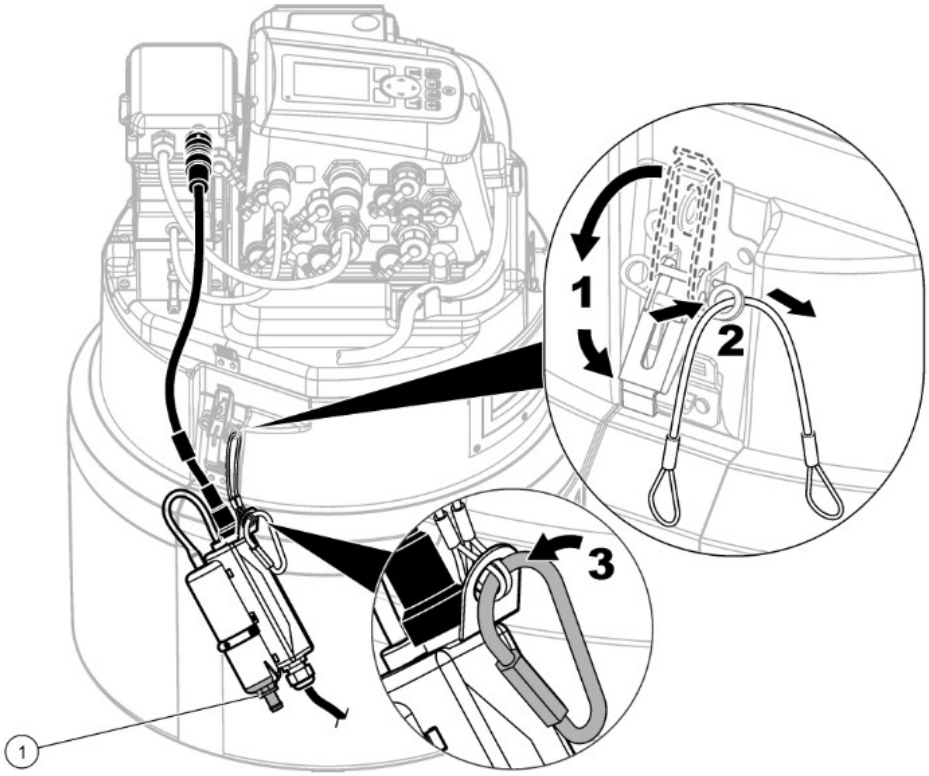


Figure 4 Attach the desiccant hub—FL1500 flow logger



1. AV9000S with bare-wire connection
2. Accessories mounting plate
3. End cap

Figure 5 Attach the desiccant hub—AS950 portable sampler



1. End cap

3.5 Zero level calibration

If one or more of the statements that follow are correct, do a zero level calibration before the sensor is installed.

- The installation location is a dry channel.
- It is not possible to get an accurate level in the flow because the level changes too rapidly.
- It is not possible to get an accurate level in the flow because of physical hazards.

Note: The sensor is factory-calibrated for the specified range and temperature.

3.5.1 Zero level calibration (FL series flow logger or sampler)

To do a zero level calibration with an FL900 flow logger, do a zero level calibration (zero calibration in air) with the FSDATA Desktop Setup Wizard. Refer to the FSDATA Desktop documentation for instructions. As an alternative, do a manual zero level calibration (zero calibration in air) with FSDATA Desktop.

To do a zero level calibration with the FL1500 flow logger or sampler, refer to the FL1500 flow logger or sampler documentation for instructions. As an alternative, do a zero level calibration with the FSDATA Desktop Setup Wizard when the sensor is connected to an FL1500 flow logger.

Make sure that the sensor is out of the water and on a flat, level, horizontal surface.

Note: If the sensor is replaced, removed for maintenance or moved to another instrument, do a zero level calibration.

3.5.2 Zero level calibration (Sigma 910 to 950 flow meters)

Do a zero level calibration as follows:

Note: If the sensor is replaced, removed for maintenance or moved to another instrument, do a zero level calibration again.

1. Connect the flow meter to a computer with Insight software. Refer to the flow meter documentation for instructions.
2. Start the InSight software on the computer.
3. Select Remote Programming.
4. From the Real Time Operations list, select the level sensor.
5. Remove the probe from the liquid and place the sensor flat on the tabletop or floor with the sensor (the plate with holes) face down.
6. Push OK on the dialog box when complete.

3.6 Attach the sensor to the mounting band

Mounting bands have pre-drilled holes for direct mounting of the sensor to the band. Refer to the steps and the figures to mount the sensor on the mounting band.

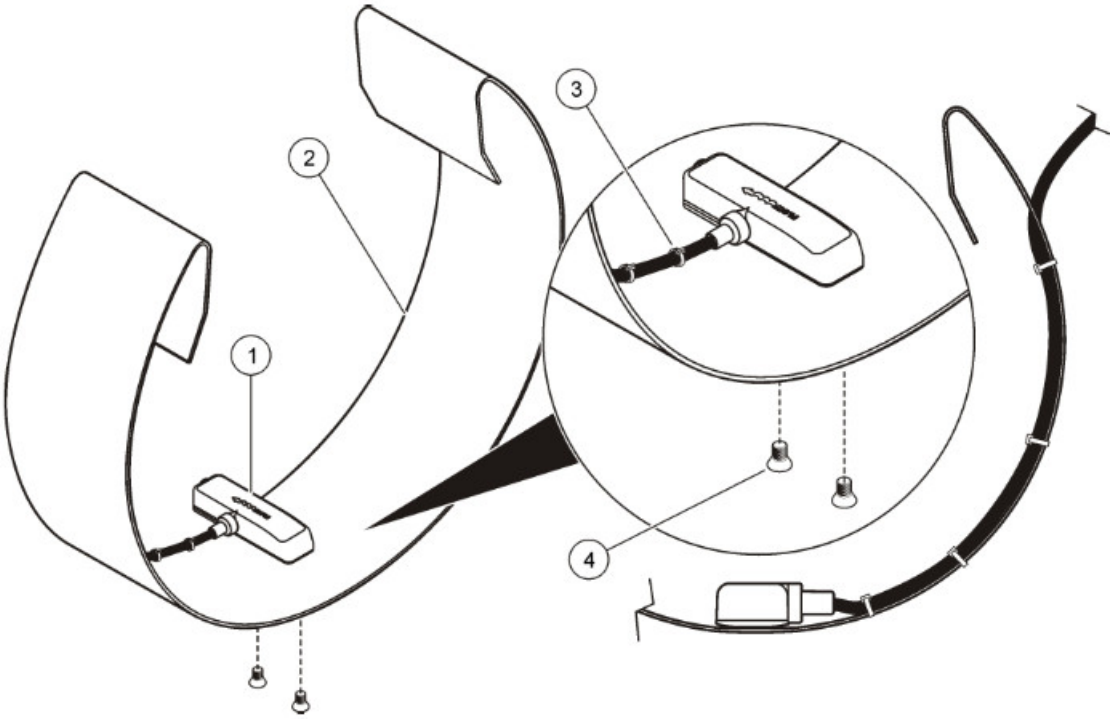
Note: If the sensor is the oil-filled type, make sure the sensor is filled with oil before mounting the sensor to the mounting band. Refer to the Fill sensor oil section of this manual.

1. Attach the sensor to the spring ring (Figure 6). Mount the sensor so that the pressure transducer extends past the edge of the ring.
2. Route the cable along the edge of the band (Figure 6).
3. Use nylon-wire ties to fasten the cable to the mounting band.

   The cable should exit the tied area at or near the top of the pipe.

   Note: If a large amount of silt exists in the bottom of the pipe, rotate the band until the sensor is out of the silt (Figure 8 on page 14). Make sure the sensor remains below the minimum expected water level at all times. Silt must be measured frequently but not disturbed.

Figure 6 Attach the sensor to the mounting band

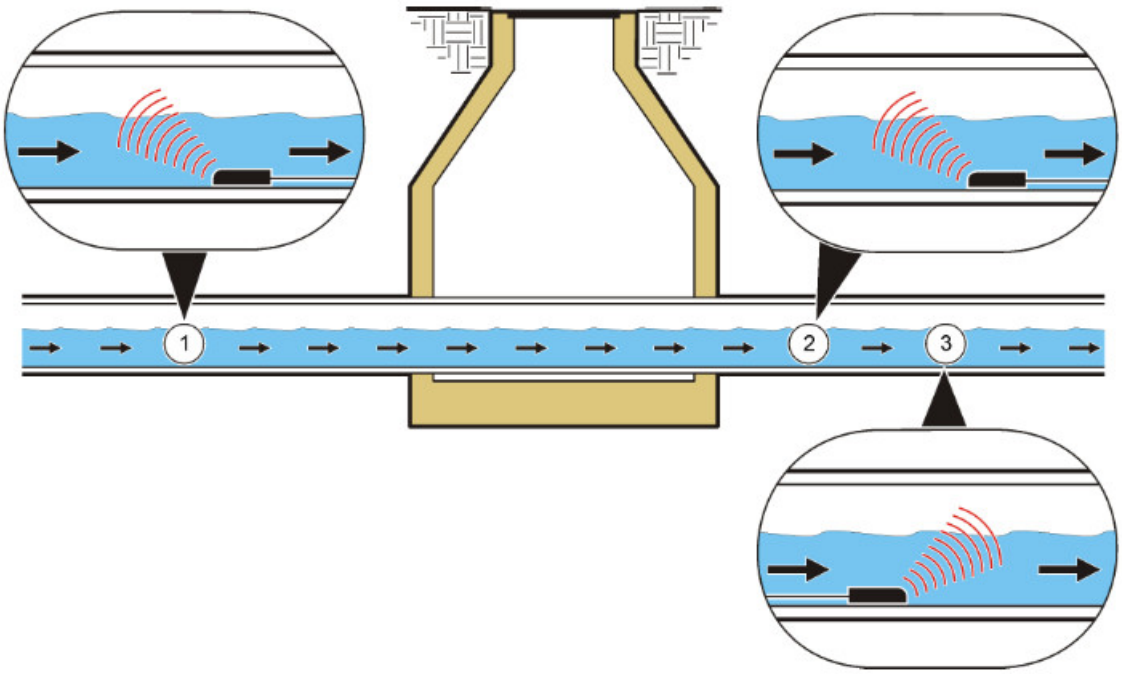


1 Sensor	**3** Sensor cable
2 Spring ring	**4** Screws (2)

3.7 Place the sensor and mounting band in the pipe

1. Position the sensor in the flow. Figure 7 shows a standard upstream configuration, a standard downstream configuration and a downstream sensor-reversed configuration. To help determine the best configuration for the site, refer to Table 1. For more information on configurations, refer to the appropriate logger manual.
2. Slide the mounting band inside the pipe as far as possible to prevent drawdown effects near the end of the pipe.
3. Place the sensor at the bottom-most point in the channel. If excessive silt is present on the bottom of the pipe, rotate the band in the pipe until the sensor is out of the silt. Refer to Figure 8.

Figure 7 Sensor positions

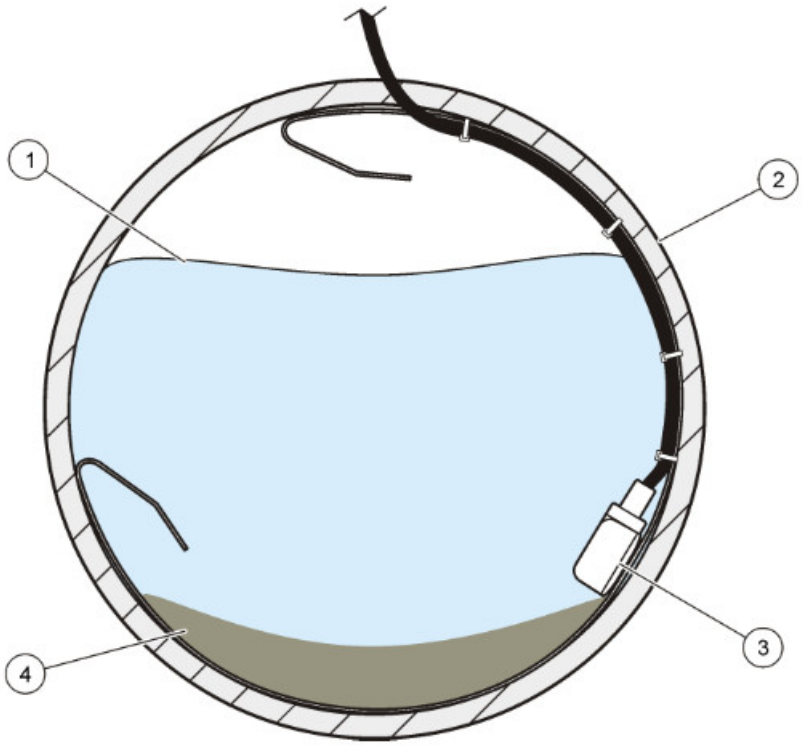


1. Upstream, facing flow
2. Downstream, facing flow
3. Downstream, reversed

Table 1 Selecting probe direction

Option	Description
Upstream	Recommended for most applications. The flow stream over the sensor should be as straight as possible with no drops or turns near the measurement point.
	Mount the sensor in the pipe with the beveled edge pointed toward the flow where the flow stream enters the measurement area.
Downstream	Use this option when the sensor is installed downstream of the measurement point (where t he flow stream exits the site). This option is useful when more than one flow stream enters a site and the combined flow of all streams is measured at a single exit point. This option can also be used if there are hydraulics preventing the sensor from being mounted in upstre am area. Mount the sensor facing the flow.
Downstream (rev ersed sensor)	Use this option when Option B will not work due to poor flow uniformity in the vault. The ma ximum velocity read in this kind of installation is 5 fps when the AV9000 interface module is not used. Mount the sensor in the downstream direction. The manufacturer recommends ve rifying the velocity by profiling flow and using a velocity site multiplier, if required, for more a ccurate reading. ***Note:*** When the AV9000 interface module and submerged AV sensor are used with the FL9 00 logger, the user has the option to select Reversed Sensor on the Sensor Port Set Up me nu.

Figure 8 Avoiding silt when mounting the sensor



1 Water	**3** Sensor
2 Pipe	**4** Silt

Section 4 Operation

For sensors connected to an FL900 flow logger, connect a computer with FSDATA Desktop software to the flow logger to configure, calibrate and collect data from the sensors. Refer to the FSDATA Desktop documentation to configure, calibrate and collect data from the sensor.
For sensors connected to an FL1500 flow logger, refer to the FL1500 flow logger documentation to configure, calibrate and collect data from the sensors. As an alternative, connect a computer with FSDATA Desktop software to the flow logger to configure, calibrate and collect data from the sensors. Refer to the FSDATA Desktop documentation to configure, calibrate and collect data from the sensor.
For sensors connected to an AS950 sampler, refer to the AS950 sampler documentation to configure, calibrate and collect data from the sensors.
For sensors connected to a Sigma 910, 911, 920, 930 or 940 flow meter, connect a computer with Insight software to the Sigma flow meter to configure, calibrate and collect data from the sensors.

4.1 Install the software

Make sure that the latest version of the FSDATA Desktop software or Insight software is installed on the computer as applicable. Download the software from **http://www.hachflow.com**. Click Support, then select Software Downloads.

4.2 Configure the sensor

For sensors connected to an FL900 flow logger, configure the sensors with the FSDATA Desktop Setup Wizard. Refer to the FSDATA Desktop documentation for instructions.
For sensors connected to an FL1500 flow logger or AS950 sampler, refer to the FL1500 flow logger or sampler documentation to configure the sensors. As an alternative, configure the sensors with the FSDATA Desktop Setup Wizard when the sensors are connected to an FL1500 flow logger.
For sensors connected to a Sigma flow meter, do the steps in Level calibration for Sigma flow meters on page 15.
N**o**te: If a sensor is replaced, removed for maintenance or moved to another instrument, do a level calibration.

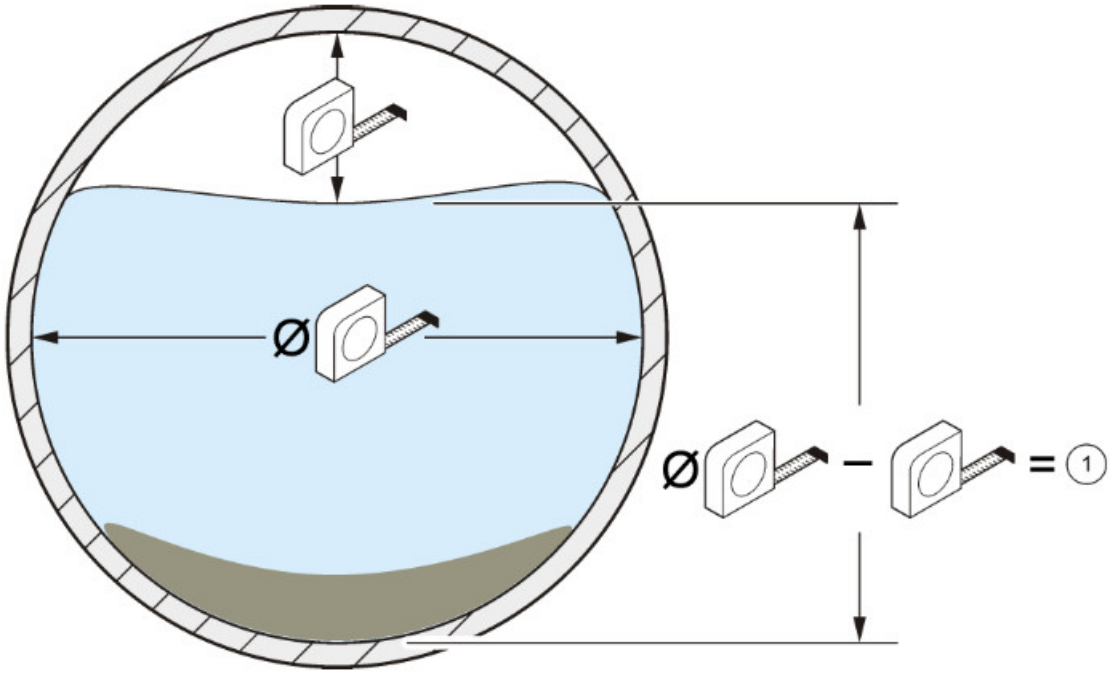
4.2.1 Level calibration for Sigma flow meters

1. With the sensor installed in the flow, monitor the Current Status with a PC using Insight software or a flow

meter display.

2. Physically measure the distance from the top of the pipe to the surface of the water. Refer to Figure 9.
3. Subtract the number from step 2 from the pipe diameter. Refer to Figure 9. The result is the water depth. Refer to Figure 9.
4. Use the Adjust Level function of the software to enter the physically-measured water depth.

Figure 9 Measure the water level



1. Water level

Section 5 Maintenance

CAUTION

Multiple hazards. Only qualified personnel must conduct the tasks described in this section of the document.

5.1 Clean the sensor

Clean the transducer port when:

- Unexpected increases or decreases in flow or level trends occur
- Level data are missing or incorrect but velocity data are valid
- Excessive silt deposits have built up between the transducer and the protective cover

Notes

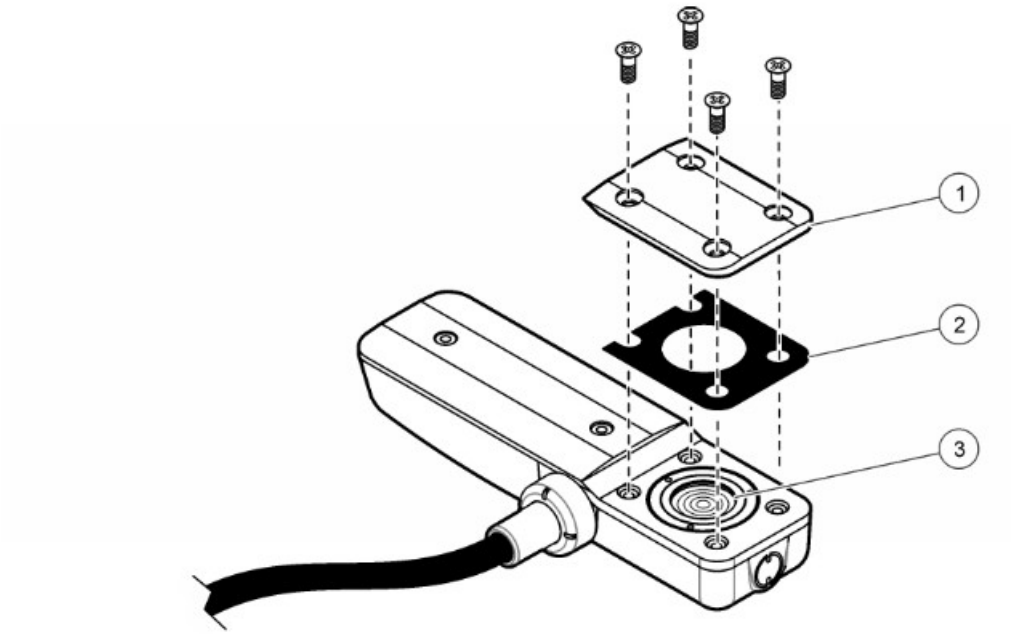
- Do not touch the sensor transducer as this will cause damage and incorrect sensor operation.
- Use only approved cleaning solutions as listed in Table 2. Do not use any type of brush or rag to clean the pressure transducer as this will cause damage and incorrect sensor operation. If there are debris, spray the membrane with water and use a Q-tip to carefully remove the buildup.
- If the gasket is missing or damaged, install a new one. A damaged or missing gasket will cause inaccurate readings.

- After cleaning the sensor, clean the gasket and protective cover before they are installed.
- After cleaning an oil-filled sensor, replenish the sensor oil.
- If a sensor must be taken out of service for an extended period, do not store the sensor on a dry shelf. The manufacturer recommends that the sensor be stored with the sensor head in a bucket of water to keep the oil debris from crusting in the pressure transducer canal.

To clean the sensor:

1. Soak the sensor in soapy water.
2. Remove the screws from the protective cover. Refer to Figure 10.
3. Remove the cover and gasket. Refer to Figure 10.
4. Carefully swirl the sensor in an appropriate cleaning solution to remove soil. Use a spray or squeeze bottle to wash away heavier deposits.
5. Clean the gasket and cover.
6. Attach the gasket and cover. tighten the screws until the gasket starts to compress.

Figure 10 Sensor protective cover and gasket



1. Protective cover
2. Gasket
3. Sensor

Table 2 Acceptable and unacceptable cleaning solutions

Acceptable	Do not use
Dish detergent and water	Concentrated bleach
Window cleaner	Kerosene
Isopropyl alcohol	Gasoline
Dilute acids	Aromatic hydrocarbons

5.2 Replace the desiccant

CAUTION

Chemical exposure hazard. Obey laboratory safety procedures and wear all of the personal protective equipment appropriate to the chemicals that are handled. Refer to the current safety data sheets (MSDS/SDS) for safety protocols.

CAUTION

Chemical exposure hazard. Dispose of chemicals and wastes in accordance with local, regional and national regulations.

NOTICE

Do not operate the sensor without desiccant beads or with green desiccant beads. Permanent damage to the sensor can occur.

Immediately replace the desiccant when it changes to green. Refer to Figure 11.

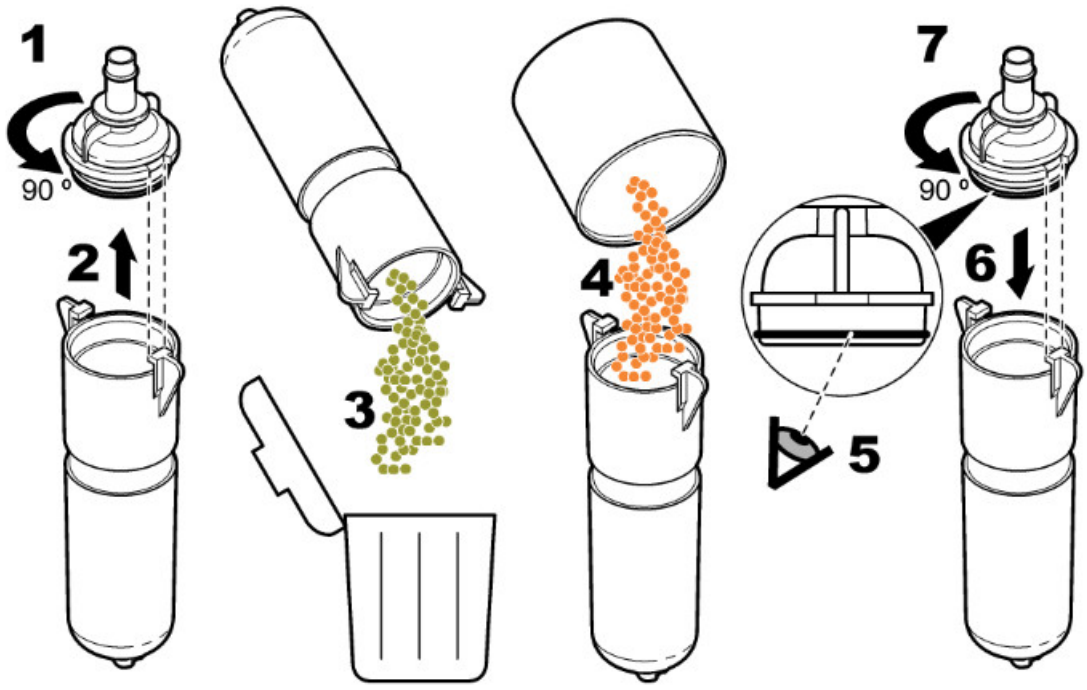
Note: It is not necessary to remove the desiccant container from the desiccant hub to install new desiccant.

At step 5 of Figure 11, make sure that the O-ring is clean and has no dirt or debris. Examine the Oring for cracking, pits or sign of damage. Replace the O-ring if it has damage. Apply grease to dry or new O-rings to make installation easier, to get a better seal and to increase the life of the O-ring.

For the best performance, make sure to install the desiccant container vertically with the end cap pointed down. Refer to Attach the desiccant hub on page 8.

Note: When the beads just begin to turn green, it may be possible to rejuvenate them by heating. Remove the beads from the canister and heat them at 100-180 ºC (212-350 ºF) until they turn orange. Do not heat the canister. If the beads do not turn orange, they must be replaced with new desiccant.

Figure 11 Replace the desiccant

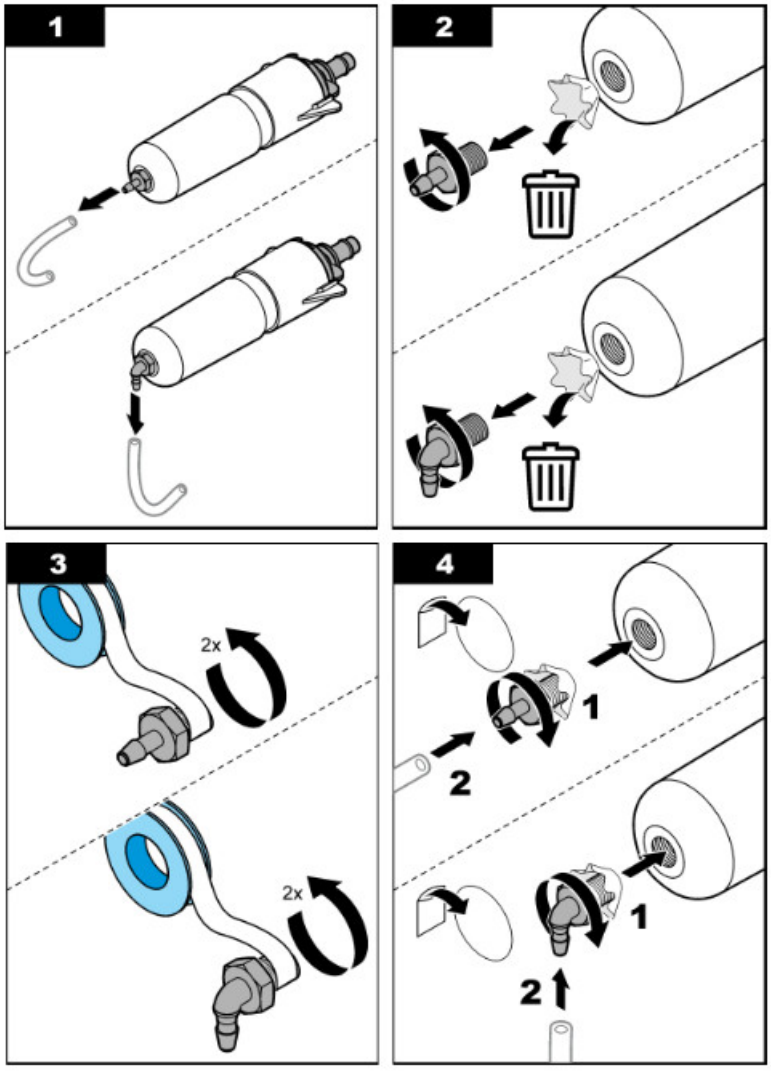


5.3 Replace the hydrophobic membrane

Replace the hydrophobic membrane when:

- Unexpected increases or decreases in level trends occur.
- Level data is missing or incorrect, but the velocity data is valid.
- The membrane is torn or has become saturated with water or grease. Refer to the illustrated steps that follow to replace the membrane. At step 4, make sure that the following occurs:
- The smooth side of the hydrophobic membrane is against the inner surface of the desiccant container.
- The hydrophobic membrane bends up and goes fully into the thread until it is not seen.
- The hydrophobic membrane turns with the nipple when the nipple in the desiccant container turns. If the membrane does not turn, it has damage. Start the procedure again with a new membrane.

For the best performance, make sure to install the desiccant container vertically with the end cap pointed down. Refer to Attach the desiccant hub on page 8.



5.4 Replenish the sensor oil

Inspect the oil in the sensor for large air bubbles during customer-scheduled service duty cycles.
Large bubbles can reduce the anti-fouling properties of the oil. Small bubbles (< ¼-in. diameter) do not affect the oil properties.
To replenish the sensor oil, refer to the documentation supplied with the silicone oil refill kit. Refer to Replacement parts and accessories on page 20 for ordering information.

Section 6 Replacement parts and accessories

WARNING

Personal injury hazard. Use of non-approved parts may cause personal injury, damage to the instrument or equipment malfunction. The replacement parts in this section are approved by the manufacturer.

Note: Product and Article numbers may vary for some selling regions. Contact the appropriate distributor or refer to the company website for contact information.

Replacement parts

Description	Item number
Desiccant beads, bulk, 1.5 pound canister	8755500
Desiccant container	8542000
Hydrophobic membrane	3390
O-ring, desiccant container end cap, 1.176 ID x 0.070 OD	5252
Silicon oil, includes two 50-mL oil packs to refill 100 sensors	7724700
Silicon oil refill kit, includes: dispensing tool, two 50-mL oil pack, instruction sheet and miscell aneous hardware	7724800
Desiccant hub1	7722800

Accessories

Description	Item numbe r
AV9000 interface module, FL900 flow loggers	8531300
AV9000S interface module with bare-wire connection, FL1500 flow loggers	9504601
AV9000S interface module, AS950 portable samplers	9504600
Accessories mounting plate, FL1500 flow loggers	8309300
Custom cable, sensor to junction box, 0.3 to 30 m (1 to 99 ft)	77155-PRB
Custom cable, junction box to desiccant hub, 0.3 to 30 m (1 to 99 ft)	77155-HUB
Silicone potting gel kit for junction box	7725600
Gel fill, silicone potting2	7729800
Gel fill, dispenser gun3	7715300
Retrofit kit, change a sensor with a non-oil cover plate to a sensor with an oil-filled cover plate, i ncludes 7724800	7730000

1. Use part number 77155-HUB to select the cable length after the desiccant hub.
2. Order three to fill one junction box.
3. Can also be used as a silicone oil fill gun

Description	Item number
Insertion tool, street-level installation of mounting rings	9574
Mounting ring for ∅ 15.24 cm (6 in.) pipe4	1361
Mounting ring for ∅ 20.32 cm (8 in.) pipe4	1362
Mounting ring for ∅ 25.40 cm (10 in.) pipe4	1363
Mounting ring for ∅ 30.48 cm (12 in.) pipe5	1364
Mounting ring for ∅ 38.10 cm (15 in.) pipe5	1365
Mounting ring for ∅ 45.72 cm (18 in.) pipe5	1366
Mounting ring for ∅ 50.8 to 53.34 cm (20 to 21 in.) pipe 5	1353
Mounting ring for ∅ 61 cm (24 in.) pipe5	1370

6.1 Mounting band selection chart

Pipe diameter	Mounting Band Selection6			
	Item number 1473–6.25″ (15.85 cm) long, adds 2″ (5.08 cm) to band diameter	**Item number 1525–9.5″ (24.13 cm) long, adds 3″ (7.62 cm) to band diameter**	**Item number 1759–19″ (48.26 cm) long, adds 6″ (15.24 cm) to band diameter**	**Item number 1318–50.25″ (127 cm) long, adds 16″ (40.64 cm) to band diameter**
8″ (20.32 cm)	0	0	1	0
10″ (25.4 cm)	1	0	1	0
12″ (30.48 cm)	0	1	1	0
15″ (38.1 cm)	0	2	1	0
18″ (45.72 cm)	0	1	2	0
21″ (53.34 cm)	0	2	2	0
24″ (60.96 cm)	0	1	3	0
27″ (68.58 cm)	1	0	1	1
30″ (76.2 cm)	1	1	1	1
33″ (83.2 cm)	1	0	2	1
36″ (91.44 cm)	1	1	2	1
42″ (1.06 m)	1	1	3	1
45″ (1.14 m)	1	1	1	2
48″ (1.21 m)	1	0	2	2

4. Requires item number 3263
5. The sensor attaches directly to band.
6. In addition to the band segments shown below, a complete mounting band assembly requires one AV Sensor Mounting Clip (3263) and one Scissors Jack Assembly (3719).

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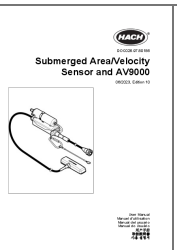
Documents / Resources

	HACH AV9000 Submerged Area Velocity Sensor [pdf] User Manual AV9000 Submerged Area Velocity Sensor, AV9000, Submerged Area Velocity Sensor, Area Velocity Sensor, Velocity Sensor, Sensor

References

- Flow - Online Instruments | Hach
- Flow - Online Instruments | Hach
- User Manual