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AS950 AWRS, R600a

05/2026, Edition 4

Installation and Maintenance

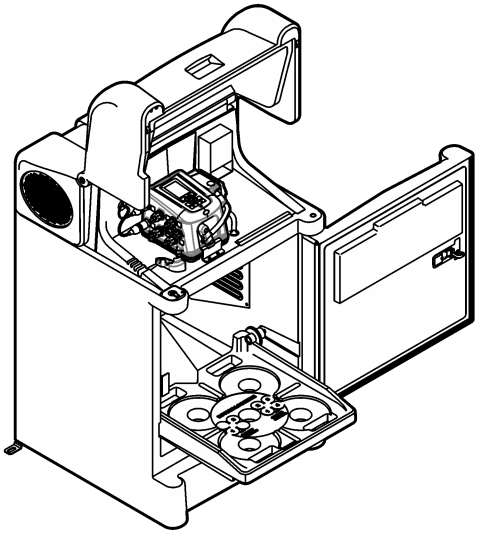


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Section 1 Product overview

⚠ DANGER

Chemical or biological hazards. If this instrument is used to monitor a treatment process and/or chemical feed system for which there are regulatory limits and monitoring requirements related to public health, public safety, food or beverage manufacture or processing, it is the responsibility of the user of this instrument to know and abide by any applicable regulation and to have sufficient and appropriate mechanisms in place for compliance with applicable regulations in the event of malfunction of the instrument.

⚠ CAUTION

Fire hazard. This product is not designed for use with flammable samples.

The sampler collects liquid samples at specified intervals and keeps the samples in a refrigerated cabinet. Use the sampler for a wide variety of aqueous sample applications and also with toxic pollutants and suspended solids. Refer to Figure 1.

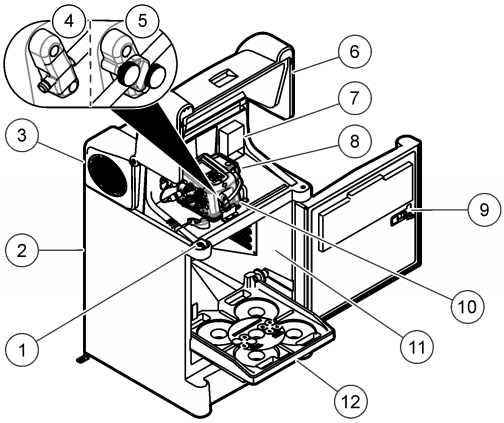
Lockable cabinet door

Push the round button in the center of the latch to open the door. Flip the latch to close the door tight. Two keys are supplied for the door lock. Over time, it may be necessary to tighten the adjustment screw on the door latch.

Controller compartment heater

The controller compartment heater is a factory-installed option. The heater prevents liquid from freezing in the tubing, extends the life of the tubing and pump components and prevents the collection of ice and snow on the cover.

Figure 1 AWRS



1 Cover latch	**5** Non-contacting liquid detector	**9** Door latch
2 AWRS	**6** Controller cover	**10** Controller
3 Access cover	**7** Compartment heater option	**11** Refrigerated cabinet
4 Liquid detector	**8** Pump	**12** Bottle tray

Section 2 Specifications

Specifications are subject to change without notice.

2.1 All Weather Refrigerated Sampler (AWRS)

Specification	AWRS
Dimensions (W x D x H)[1]	76 x 81 x 130 cm (30 x 32 x 51 in.)
Weight	86 kg (190 lb)
Power requirements (includes compressor)	115 VAC, 60 Hz, 4.2 A or 6.4 A with controller compartment heater 230 VAC, 50 Hz, 2.7 A or 4.1 A with controller compartment heater
Overload protection	115 VAC: 7.5 A circuit breaker 230 VAC: 5.0 A circuit breaker
Compressor	115 VAC, 60 Hz, 6.0 A peak start current 230 VAC, 50 Hz, 3.0 A peak start current
Operating temperature	0 to 50 °C (32 to 122 °F); with AC battery backup: 0 to 40 ºC (32 to 104 ºF); with controller compartment heater: –40 to 50 °C (–40 to 122 °F); with controller compartment heater and AC battery backup: –15 to 40 ºC (5 to 104 ºF)
Storage temperature	–30 to 60 °C (–22 to 140 °F)
Relative humidity	0 to 95%
Overvoltage category	II
Pollution degree	2
Protection class	I
Altitude	2000 m (6562 ft) maximum
Temperature control	4 (±0.8) °C (39 (±1.5) °F)[2]
Enclosure	IP24, low-density polyethylene with UV inhibitor
Sample bottle capacity	Single bottle: 10 L (2.5 gal) glass or polyethylene, or 21 L (5.5 gal) polyethylene
	Multiple bottles: two 10 L (2.5 gal) polyethylene and/or glass, four 10 L (2.5 gal) polyethylene and/or glass, eight 2.3 L (0.6 gal) polyethylene and/or 1.9 L (0.5 gal) glass, twelve 2 L (0.5 gal) polyethylene, twenty-four 1 L (0.3 gal) polyethylene and/or 350 mL (12 oz.) glass
Certifications	AC power supply: cETLus, CE

2.2 AS950 controller

Specification	Details
Dimensions (W x H x D)	31.1 x 18.9 x 26.4 cm (12.3 x 7.4 x 10.4 in.)
Weight	4.6 kg (10 lb) maximum
Enclosure	PC/ABS blend, NEMA 6, IP68, corrosion and ice resistant

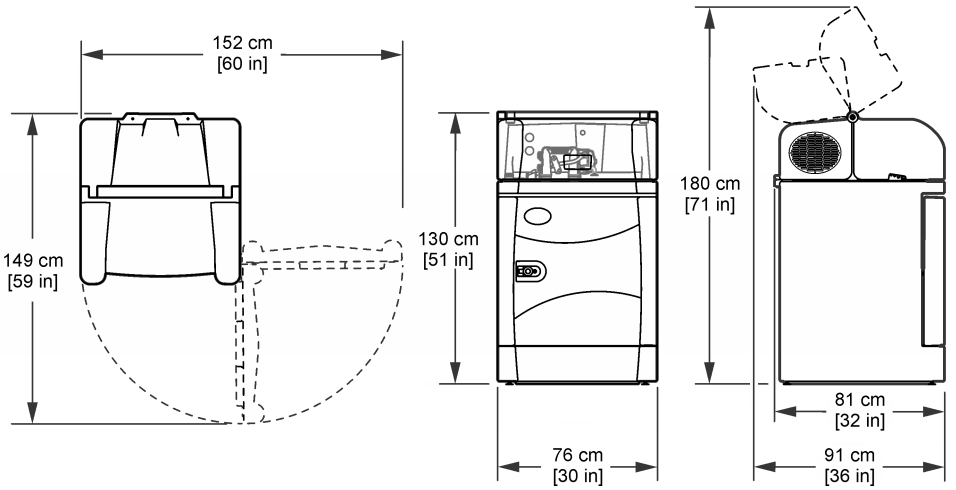
[1] Refer to Figure 2 on page 6 for the sampler dimensions.

[2] Radio frequency interference in the 30 to 50 MHz range can cause a maximum temperature change of 1.3 °C (34.3 °F). Adjust the set point temperature to 2 to 10 °C (35.6 to 50 °F) to correct this interference.

Specification	Details
Overvoltage category	II
Pollution degree	3
Protection class	II
Display	¼ VGA, color
Power requirements	15 VDC supplied by an integral power supply
Overload protection	7 A, DC line fuse for the pump
Operating temperature	AWRS with controller compartment heater: –40 to 50 °C (–40 to 122 °F); AWRS with controller compartment heater and AC battery backup: –15 to 40 °C (5 to 104 °F)
Storage temperature	–30 to 60 °C (–22 to 140 °F)
Storage/operating humidity	100% condensing
Pump	Peristaltic high speed with spring-mounted Nylatron rollers
Pump enclosure	Polycarbonate cover
Pump tubing	9.5 mm ID x 15.9 OD mm ($^{3}/_{8}$-in. ID x $^{5}/_{8}$-in. OD) silicone
Pump tubing life	20,000 sample cycles with: 1 L (0.3 gal) sample volume, 1 rinse, 6-minute pacing interval, 4.9 m (16 ft) of $^{3}/_{8}$-in. intake tube, 4.6 m (15 ft) of vertical lift, 21 °C (70 °F) sample temperature
Vertical sample lift	8.5 m (28 ft) for 8.8 m (29 ft) maximum of $^{3}/_{8}$-in. vinyl intake tube at sea level at 20 to 25 °C (68 to 77 °F)
Pump flow rate	4.8 L/min (1.25 gpm) at 1 m (3 ft) vertical lift with $^{3}/_{8}$-in. intake tube typical
Sample volume	Programmable in 10-mL (0.34 oz) increments from 10 to 10,000 mL (3.38 oz to 2.6 gal)
Sample volume repeatability (typical)	±5% of 200 mL sample volume with: 4.6 m (15 ft) vertical lift, 4.9 m (16 ft) of $^{3}/_{8}$-in. vinyl intake tube, single bottle, full bottle shut-off at room temperature and 1524 m (5000 ft) elevation
Sample volume accuracy (typical)	±5% of 200 mL sample volume with: 4.6 m (15 ft) vertical lift, 4.9 m (16 ft) of $^{3}/_{8}$-in. vinyl intake tube, single bottle, full bottle shut-off at room temperature and 1524 m (5000 ft) elevation
Sampling modes	Pacing: Fixed Time, Fixed Flow, Variable Time, Variable Flow, Event Distribution: Samples per bottle, bottles per sample and time based (switching)
Run modes	Continuous or non-continuous
Transfer velocity (typical)	0.9 m/s (2.9 ft/s) with: 4.6 m (15 ft) vertical lift, 4.9 m (16 ft) of $^{3}/_{8}$-in. vinyl intake tubing, 21 °C (70 °F) and 1524 m (5000 ft) elevation
Liquid detector	Ultrasonic. Body: PEI NSF ANSI standard 51 approved, USP Class VI compliant. Contacting liquid detector or optional non-contact liquid detector
Air purge	An air purge is done automatically before and after each sample. The sampler automatically compensates for different intake tube lengths.
Tubing	Intake tubing: 1.0 to 30.0 m (3.0 to 99 ft) length, ¼-in. or $^{3}/_{8}$-in. ID vinyl or $^{3}/_{8}$-in. ID PTFE-lined polyethylene with protective outer cover (black or clear)
Wetted materials	Stainless steel, polyethylene, PTFE, PEI, silicone
Memory	Sample history: 4000 records; Data log: 325,000 records; Event log: 2000 records
Communications	USB and optional RS485 (Modbus)

Specification	Details
Electrical connections	Power, auxiliary, optional sensors (2x), USB, distributor arm, optional rain gauge
Analog outputs	**AUX port:** none; **optional IO9000 module**: Three 0/4–20 mA outputs to supply the recorded measurements (e.g., level, velocity, flow and pH) to external instruments
Analog inputs	**AUX port:** One 0/4–20 mA input for flow pacing; **optional IO9000 module**: Two 0/4–20 mA inputs to receive measurements from external instruments (e.g., third-party ultrasonic level)
Digital outputs	**AUX port:** none; **optional IO9000 module**: Four low voltage, contact closure outputs that each supply a digital signal for an alarm event
Relays	**AUX port:** none; **optional IO9000 module**: Four relays controlled by alarm events
Certifications	CE

Figure 2 AWRS dimensions



Section 3 General information

In no event will the manufacturer be liable for direct, indirect, special, incidental or consequential damages resulting from any defect or omission in this manual unless otherwise required by applicable law or contract between the parties. 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.

3.1 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 solely 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.

If the equipment is used in a manner that is not specified by the manufacturer, the protection provided by the equipment may be impaired. Do not use or install this equipment in any manner other than that specified in this manual.

3.1.1 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.

3.1.2 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 that a risk of electrical shock and/or electrocution exists.
	This symbol indicates that a risk of fire is present.
	This symbol indicates that the marked item can be hot and should not be touched without care.
	This symbol indicates that the item is to be protected from fluid entry.
	This symbol indicates that the marked item should not be touched.
	This symbol indicates a potential pinch hazard.
	This symbol indicates that the object is heavy.

	This symbol indicates that the marked item requires a protective earth connection. If the instrument is not supplied with a ground plug on a cord, make the protective earth connection to the protective conductor terminal.
	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.

3.2 Icons used in illustrations


Manufacturer supplied parts

3.3 EMC compliance

⚠ CAUTION

This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

CE (EU)

The equipment meets the essential requirements of EMC Directive 2014/30/EU.

UKCA (UK)

The equipment meets the requirements of the Electromagnetic Compatibility Regulations 2016 (S.I. 2016/1091).

Canadian Radio Interference-Causing Equipment Regulation, ICES-003, Class A:

Supporting test records reside with the manufacturer.

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de classe A répond à toutes les exigences de la réglementation canadienne sur les équipements provoquant des interférences.

FCC Part 15, Class "A" Limits

Supporting test records reside with the manufacturer. The device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

1. The equipment may not cause harmful interference.
2. The equipment must accept any interference received, including interference that may cause undesired operation.

Changes or modifications to this equipment not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their expense. The following techniques can be used to reduce interference problems:

1. Disconnect the equipment from its power source to verify that it is or is not the source of the interference.
2. If the equipment is connected to the same outlet as the device experiencing interference, connect the equipment to a different outlet.
3. Move the equipment away from the device receiving the interference.
4. Reposition the receiving antenna for the device receiving the interference.
5. Try combinations of the above.

3.4 Product components

⚠ WARNING



Fire hazard. This product contains a flammable refrigerant. Do not damage or puncture the refrigeration circuit.

⚠ WARNING

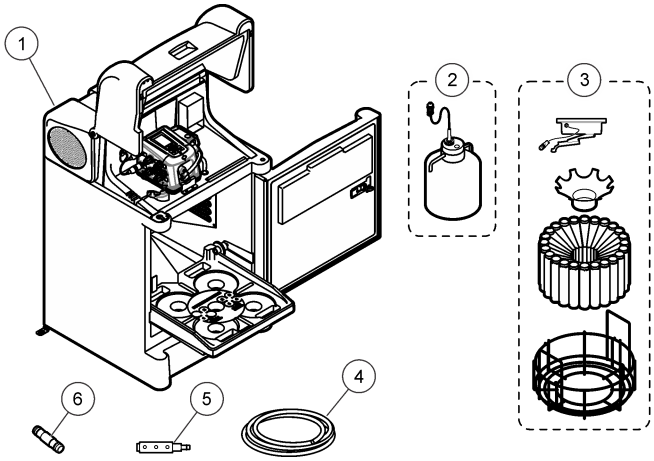


Personal injury hazard. Instruments or components are heavy. Use assistance to install or move.

The instrument weighs a maximum of 86 kg (190 lb). Do not try to unpack or move the instrument without sufficient equipment and people to do it safely. Use correct lifting procedures to prevent injury. Make sure that all used equipment is rated for the load, for example, a hand truck must be rated for a minimum of 90 kg (198 lb). Do not move the sampler when filled sample bottles are in the refrigerated cabinet.

Make sure that all components have been received. Refer to Figure 3. If any items are missing or damaged, contact the manufacturer or a sales representative immediately.

Figure 3 Sampler components



1 All Weather Refrigerated Sampler (AWRS)	**4** Intake tubing, vinyl or PTFE-lined
2 Components for single-bottle option	**5** Strainer
3 Components for multiple-bottle option	**6** Tubing coupler[3]

[3] Supplied with controllers with the non-contacting liquid detector only.

3.5 Intended use

The All Weather Refrigerated Sampler (AWRS) is intended for use by individuals who collect water samples in locations where temperature control is necessary for sample preservation. The AWRS does not treat or alter water.

Section 4 Installation

⚠ DANGER

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

4.1 Site installation guidelines

⚠ DANGER

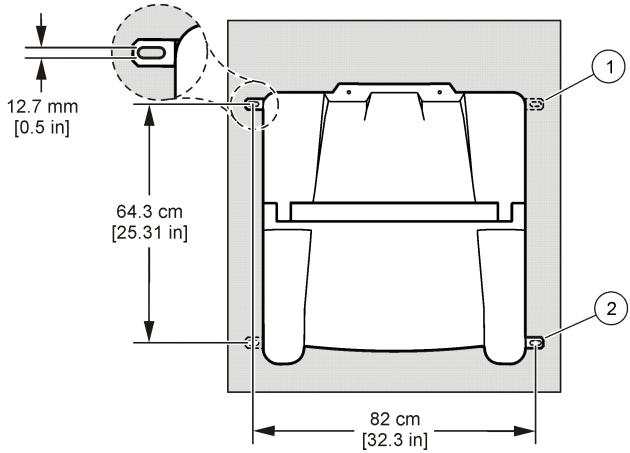
Explosion hazard. The instrument is not approved for installation in hazardous locations.

⚠ WARNING

Fire hazard. This product contains a flammable refrigerant. Do not damage or puncture the refrigeration circuit. Make sure that all airflow openings in the instrument and in the structure (if applicable) are not blocked.

- Install the AWRS in an indoor or outdoor location.
- Make sure that the temperature at the location is in the specification range. Refer to Specifications on page 4.
- Install the sampler on a level surface. Adjust the sampler feet to make the sampler level. Refer to Figure 2 on page 6 for the sampler dimensions.
- Use the installed anchor brackets and user-supplied $^{3}/_{8}$-in. bolts for the AWRS. Refer to Figure 4.
- Plumb a drain tube to the ½ in.-14 NPT female connector on the bottom of the sampler.

Figure 4 AWRS anchor bracket locations with mounting dimensions



1 Optional anchor brackets	**2** Anchor brackets (2x)

4.2 Prepare the sampler

4.2.1 Clean the sample bottles

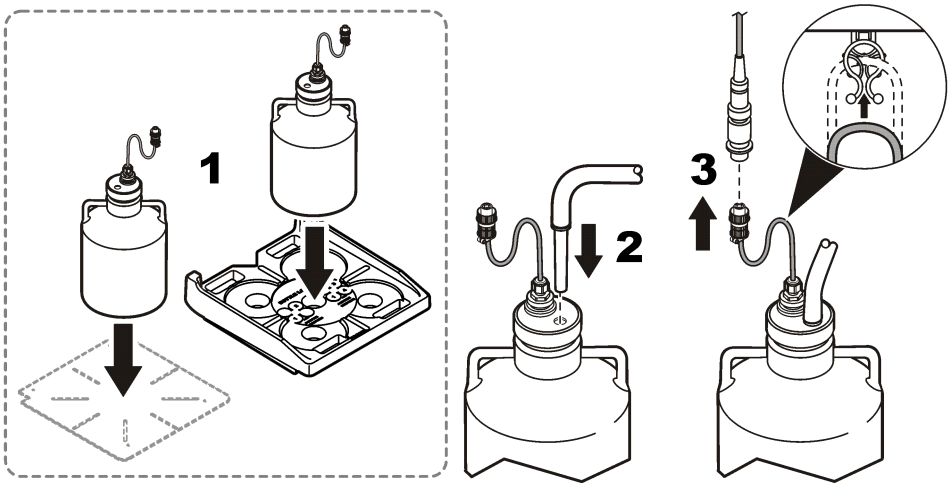
Clean the sample bottles and caps with a brush, water and a mild detergent. Flush the sample bottles with fresh water followed by a distilled water rinse.

4.2.2 Install a single bottle

When a single bottle is used to collect one composite sample, do the steps that follow. When multiple bottles are used, refer to Install multiple bottles on page 11.

When the bottle is full, the full bottle shut-off stops the sampling program. Install the sample bottle as shown in Figure 5.

Figure 5 Single bottle installation

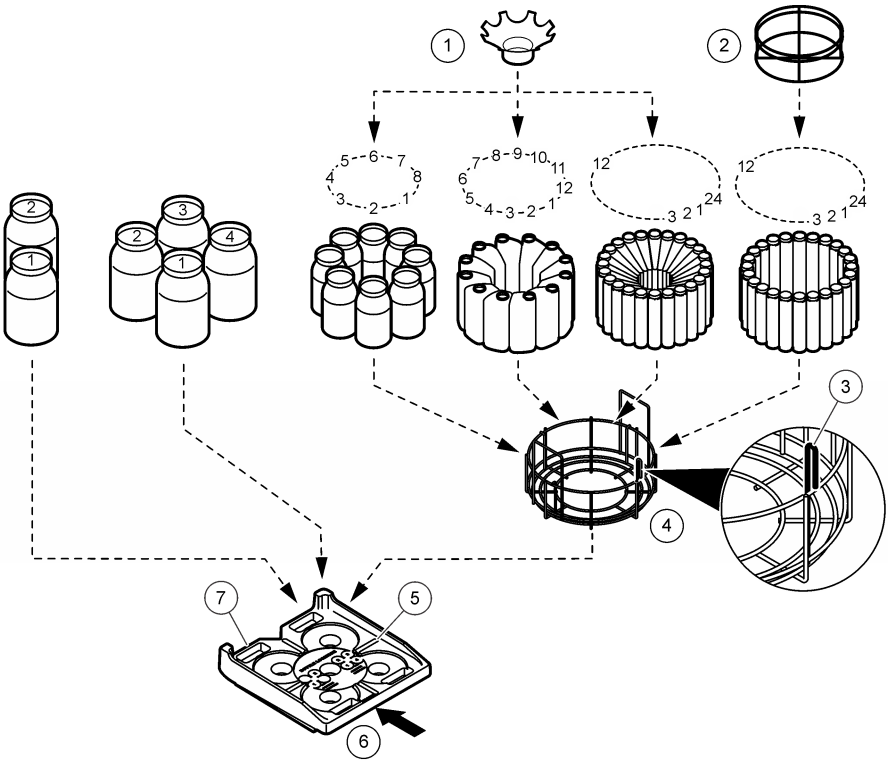


4.2.3 Install multiple bottles

When multiple bottles are installed, a distributor arm moves the sample tube over each bottle. Sample collection automatically stops when the specified number of samples are collected.

1. Assemble the sample bottles as shown in Figure 6. For eight or more bottles, make sure that the first bottle is near the bottle one indicator in the clockwise direction.
2. Put the bottle assembly in the sampler. For eight or more bottles, align the wires in the slots in the bottom tray.

Figure 6 Multiple bottle installation



1 Retainer for 24 1-L poly bottles	**4** Bottle tray for 8 to 24 bottles	**7** Removable tray
2 Retainer for 24 350-mL glass bottles	**5** Slot for bottle tray	
3 Bottle one indicator	**6** Front of sampler	

4.3 Plumb the sampler

Install the intake tube in the middle of the sample stream (not near the surface or bottom) to make sure that a representative sample is collected.

1. For a sampler with the standard liquid detector, connect the tubing to the sampler as shown in Figure 7.

   Note: *When PTFE-lined tubing is used, use the tubing connection kit for PTFE-lined PE tubing.*

2. For a sampler with the optional non-contacting liquid detector, connect the tubing to the sampler as shown in Figure 8.

   Note: *When PTFE-lined tubing is used, use the tubing connection kit for PTFE-lined PE tubing.*

3. Install the intake tube and strainer in the main stream of the sample source where the water is turbulent and well-mixed. Refer to Figure 9.

   - Make the intake tube as short as possible. Refer to Specifications on page 4 for the minimum intake tubing length.

- Keep the intake tube at a maximum vertical slope so that the tube drains completely between samples.
  Note: *If a vertical slope is not possible or if the tube is pressurized, disable the liquid detector. Calibrate the sample volume manually.*
- Make sure that the intake tube is not pinched.

Figure 7 Plumbing—Standard liquid detector

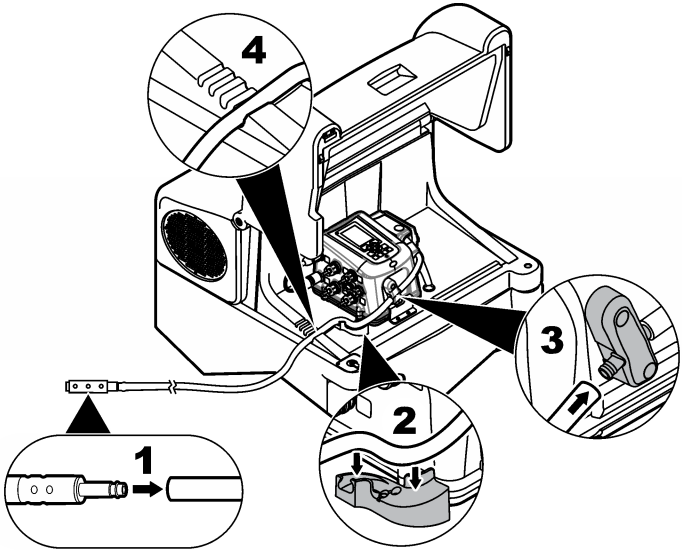


Figure 8 Plumbing—Non-contacting liquid detector

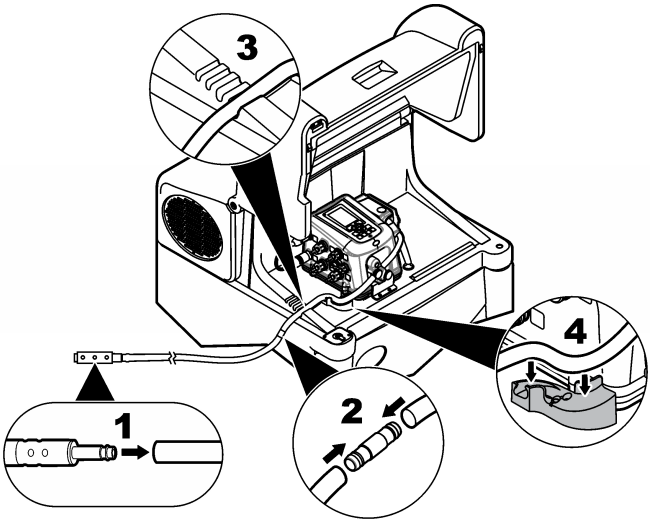
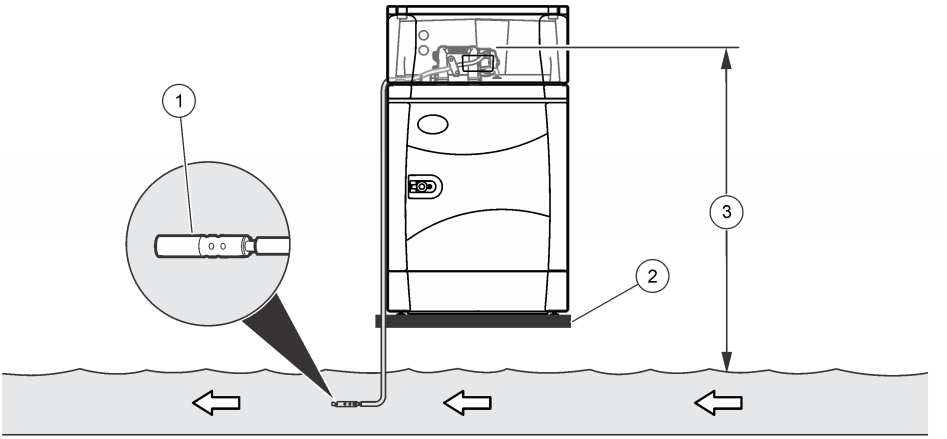


Figure 9 Site installation



1 Strainer	**2** Mounting surface	**3** Vertical lift

4.4 Electrical installation

4.4.1 Connect the sampler to power

⚠ DANGER

Electrocution hazard. If this equipment is used outdoors or in potentially wet locations, a Ground Fault Circuit Interrupt (GFCI/GFI) device must be used for connecting the equipment to its main power source.

⚠ DANGER

Fire hazard. Install a 15 A circuit breaker in the power line. A circuit breaker can be the local power disconnect, if located in close proximity to the equipment.

⚠ DANGER

Electrocution hazard. Protective Earth Ground (PE) connection is required.

⚠ WARNING

Electrocution hazard. Make sure that there is easy access to the local power disconnect.

Connect the power cord on the AWRS. The refrigerator starts after a 5-minute delay. Use a power line filter or connect the power cord for the controller to a different branch circuit to decrease the possibility of electrical transients.

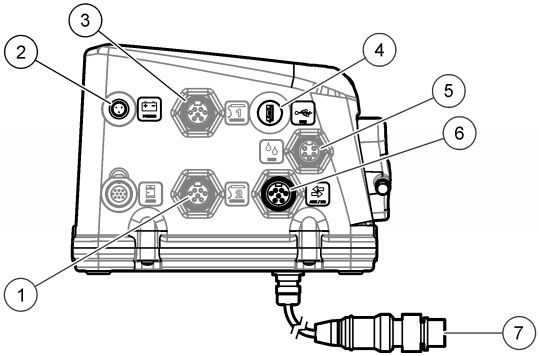
4.4.2 Controller connections

⚠ WARNING

Electrical shock hazard. Externally connected equipment must have an applicable country safety standard assessment.

Figure 10 shows the electrical connectors on the controller.

Figure 10 Controller connections



1 Sensor 2 port (optional)	**5** USB connector
2 Thermal unit port	**6** Rain gauge/RS485 port (optional)
3 Power supply port	**7** Auxilliary I/O port
4 Sensor 1 port (optional)	**8** Distributor arm/Full bottle shut-off port

4.4.3 Connect a Sigma 950 or FL900

If sample pacing is flow based, supply the controller with a flow input signal (pulse or 4–20 mA). Connect a Sigma 950 or an FL900 Flow Logger to the AUX I/O port.

As an alternative, connect a flow sensor to a sensor port. Refer to Connect a sensor on page 18.

Item to collect: Multi-purpose auxiliary full cable, 7 pin

1. Connect one end of the cable to the flow meter. Refer to the flow meter documentation.
2. Connect the other end of the cable to the AUX I/O port on the controller.

4.4.4 Connect a non-Hach flow meter

To connect a non-Hach flow meter to the AUX I/O port, do the steps that follow.

Items to collect: Multi-purpose auxiliary half cable, 7 pin

1. Connect one end of the cable to the AUX I/O port on the controller.
2. Connect the other end of the cable to the flow meter. Refer to Figure 11 and Table 1.

   Note: *In some installations, it is necessary to connect external equipment to the Pulse input, Special output and/or Program Complete output with long cables. Since these are ground-referenced pulse interfaces, false signaling can be caused by transient ground differences between each end of the cable. High ground differentials are typical in heavy industrial environments. In such environments, it may be necessary to use third-party galvanic isolators (e.g., optocouplers) in line with the affected signal(s). For the Analog input, external ground isolation is typically not necessary because the 4–20 mA transmitter typically supplies isolation.*

Figure 11 Auxiliary connector



Table 1 Half cable wiring information

Pin	Signal	Color[4]	Description	Rating
1	+12 VDC power output	White	Power supply positive output. Only use with pin 2.	Battery power to the I/O module: 12 VDC nominal; Power supply to the I/O module: 15 at 1.0 A maximum.
2	Common	Blue	Negative return of power supply. When the power supply is used, pin 2 is connected to earth ground[5].	
3	Pulse input or Analog input	Orange	This signal is a sample collection trigger from the flow logger (pulse or 4–20 mA) or a simple floating (dry) contact closure.	**Pulse input**—Reacts to a positive pulse with respect to pin 2. Termination (pulled low): pin 2 through a series 1 kΩ resistor and 10 kΩ resistor. A 7.5 zener diode is in parallel with the 10 kΩ resistor as a protection device. **Analog input**—Reacts to the analog signal that enters pin 3 and returns on pin 2. Input burden: 100 Ω plus 0.4 V; Input current (internal limit): 40 to 50 mA maximum[6] Absolute maximum input: 0 to 15 VDC with respect to pin 2. Signal to make the input active: 5 to 15 V positive-going pulse[7] with respect to pin 2, 50 millisecond minimum.

[4] The wire color refers to the colors of multi-purpose cables. Refer to Accessories on page 28.
[5] All mains powered equipment that connects to the controller terminals must be NRTL listed.
[6] Long-term operation in this state voids the warranty.
[7] Source impedance of the driving signal must be less than 5 kΩ.

Table 1 Half cable wiring information (continued)

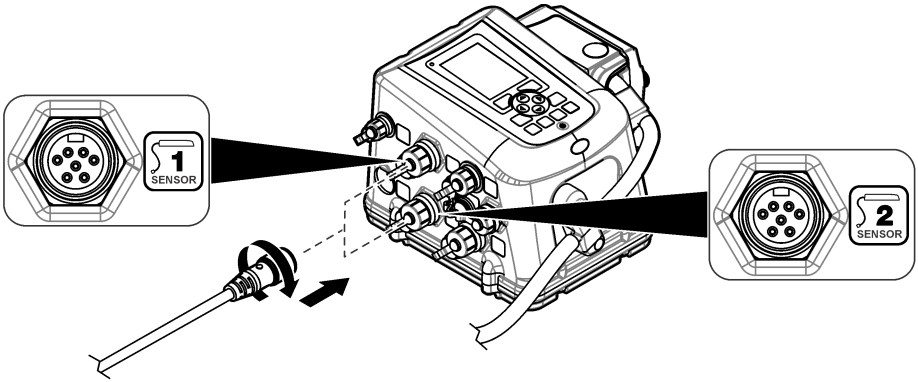
Pin	Signal	Color[4]	Description	Rating
4	Liquid level input or Auxiliary control input	Black	**Liquid level input**—Start or continue the sampling program. A simple float level switch can supply input. **Auxiliary control input**—Start a sampler after the sampling program on another sampler ends. As an alternative, start a sampler when a trigger condition occurs. For example, when a high or low pH condition occurs, the sampling program starts.	Termination (pulled high): internal +5 V supply through an 11 kΩ resistance with a series 1 kΩ resistor and 7.5 V zener diode terminated to pin 2 for protection. Trigger: High to low voltage with a low pulse of 50 milliseconds minimum. Absolute maximum input: 0 to 15 VDC with respect to pin 2. Signal to make the input active: external logic signal with 5 to 15 VDC power source. The drive signal must be typically high. The external driver must be able to sink 0.5 mA at 1 VDC maximum at the logic low level. A logic high signal from a driver with a power source of more than 7.5 V will source current into this input at the rate of: I = (V – 7.5)/1000 where I is the source current and V is the power supply voltage of the driving logic. Dry contact (switch) closure: 50 millisecond minimum between pin 4 and pin 2. Contact resistance: 2 kΩ maximum. Contact current: 0.5 mA DC maximum
5	Special output	Red	This output goes from 0 to +12 VDC with respect to pin 2 after each sample cycle. Refer to the Mode setting of the hardware settings for the AUX I/O port. Refer to the AS950 operations documentation.	This output has protection against short circuit currents to pin 2. External load current: 0.2 A maximum Active high output: 15 VDC nominal with AC power to the AS950 controller or a 12 VDC nominal with battery power to the AS950 controller.
6	Program Complete output	Green	Typical state: open circuit. This output goes to ground for 90 seconds at the end of the sampling program. Use this output to start another sampler or to signal an operator or data logger at the end of the sampling program.	This output is an open drain output with 18 V zener clamp diode for over-voltage protection. The output is active low with respect to pin 2. Absolute maximum ratings for the output transistor: sink current = 200 mA DC maximum; external pull-up voltage = 18 VDC maximum
7	Shield	Silver	The shield is a connection to earth ground when AC power is supplied to a sampler to control RF emissions and susceptibility to RF emissions.	The shield is not a safety ground. Do not use the shield as a current carrying conductor. The shield wire of cables that are connected to the AUX I/O port and are more than 3 m (10 ft) should connected to pin 7. Only connect the shield wire to earth ground at one end of the cable to prevent ground loop currents.

[4] The wire color refers to the colors of multi-purpose cables. Refer to Accessories on page 28.

4.4.5 Connect a sensor

To connect a sensor (e.g., pH or flow sensor) to a sensor port, refer to Figure 12.

Figure 12 Connect a sensor



Section 5 Startup

5.1 Set the instrument to on

The refrigerator starts after a 5-minute delay when power is supplied to the sampler. The refrigerator continues to operate when the controller is set to off or the power is removed from the controller.

Push the **POWER** key on the controller to set the controller to on.

To set the refrigerator to off, push the **POWER** key on the controller. Then, disconnect the power cord on the AWRS.

5.2 Preparation for use

Install the analyzer bottles and stir bar. Refer to the operations manual for the startup procedure.

Section 6 Maintenance

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

⚠ DANGER	
	Electrocution hazard. Remove power from the instrument before doing maintenance or service activities.

⚠ WARNING	
	Fire hazard. This product contains a flammable refrigerant. Do not damage or puncture the refrigeration circuit. Do not use a mechanical device or other procedure to increase the speed of a defrost cycle.

⚠ WARNING



Biohazard exposure. Obey safe handling protocols during contact with sample bottles and sampler components.

⚠ WARNING



Multiple hazards. The technician must make sure that the equipment operates safely and correctly after maintenance procedures.

NOTICE

Do not disassemble the instrument for maintenance. If the internal components must be cleaned or repaired, contact the manufacturer.

6.1 Clean the instrument

⚠ CAUTION



Fire hazard. Do not use flammable agents to clean the instrument.

NOTICE

Do not clean the controller compartment heater with liquids of any kind.

If water is not sufficient to clean the controller and the pump, disconnect the controller and move the controller away from the sampler. Allow sufficient time for the controller and pump to dry before the parts are re-installed and put back into service.

Clean the sampler as follows:

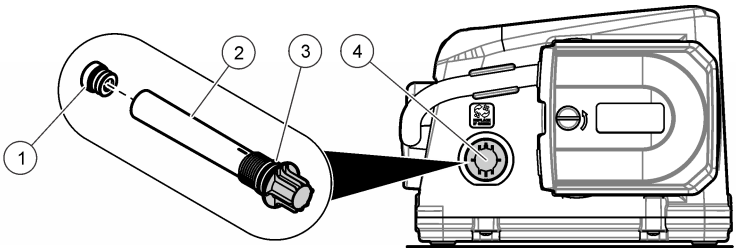
- Refrigerator—clean the condenser fins and coils as needed with a brush or vacuum.
  Note: *The controller sets the temperature of the evaporator for frost-free operation. Do not use a mechanical device or other procedure to increase the speed of a defrost cycle.*
- Sampler cabinet and tray—clean the internal and external surfaces of the sampler cabinet with a damp cloth and mild detergent. Do not use abrasive cleaners or solvents.

6.2 Replace the desiccant

A desiccant cartridge in the controller absorbs moisture and prevents corrosion. Monitor the desiccant color through the window. Refer to Figure 13. Fresh desiccant is orange. When the color is green, replace the desiccant.

1. Unscrew and remove the desiccant cartridge. Refer to Figure 13.
2. Remove the plug and discard the spent desiccant.
3. Fill the desiccant tube with fresh desiccant.
4. Install the plug.
5. Apply silicone grease to the O-ring.
6. Install the desiccant tube in the controller.

Figure 13 Desiccant cartridge



1 Plug	**3** O-ring
2 Desiccant tube	**4** Desiccant window

6.3 Pump maintenance

⚠ CAUTION



Pinch hazard. Remove power from the instrument before maintenance or service activities are done.

6.3.1 Replace the pump tubing

NOTICE

Use of tubing other than that supplied by the manufacturer can cause excessive wear on mechanical parts and/or poor pump performance.

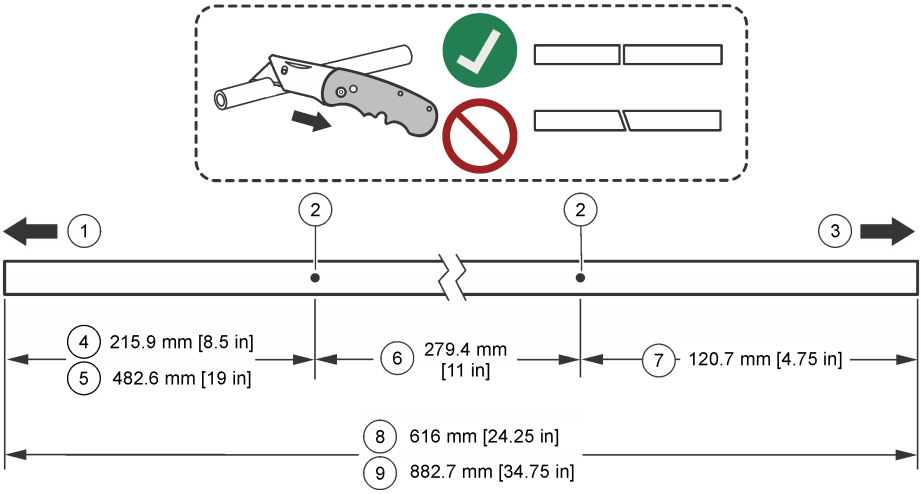
Examine the pump tubing for wear where the rollers rub against the tubing. Replace the tubing when the tubing shows signs of wear.

Pre-requisites:

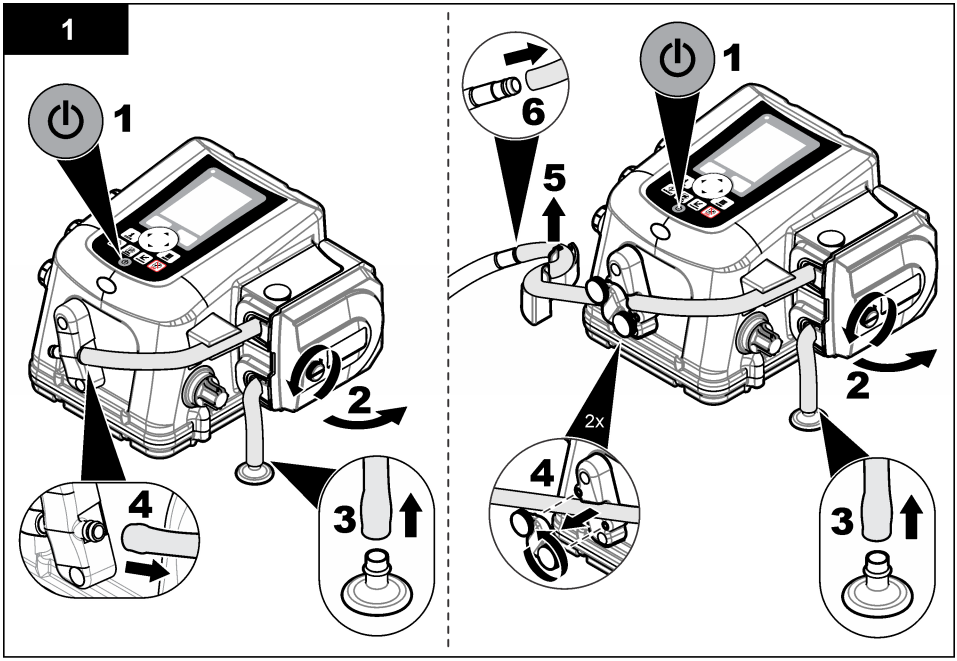
- Pump tubing—pre-cut or bulk 4.6 m or 15.2 m (15 ft or 50 ft)

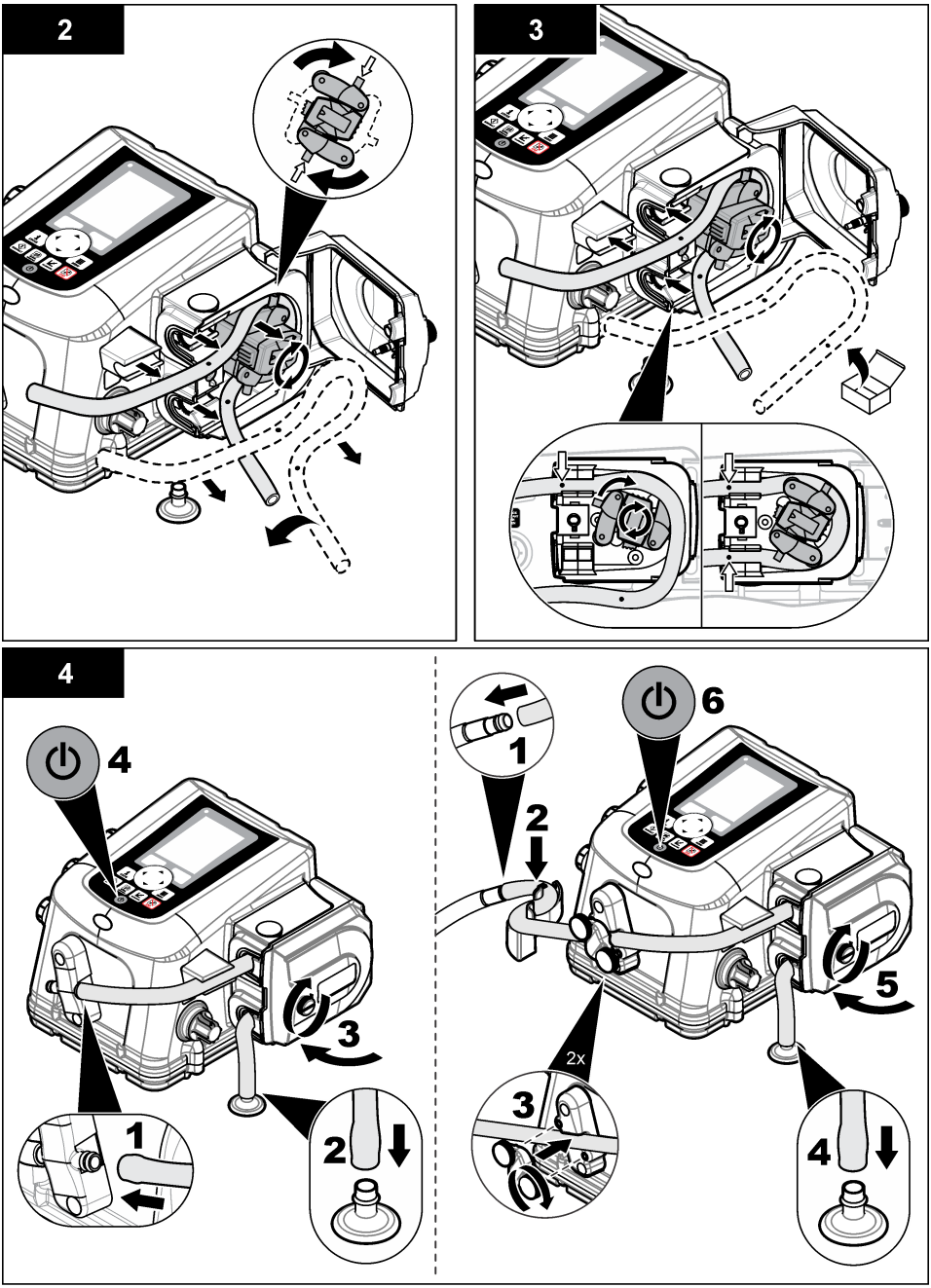
1. Disconnect the power to the controller.
2. If the bulk tubing is used, cut the tubing and add alignment dots. Refer to Figure 14.
3. Remove the pump tubing as shown in the illustrated steps that follow.
4. Clean the silicone residue from the interior of the pump housing and from the rollers.
5. Install the new pump tubing as shown in the illustrated steps that follow.

Figure 14 Pump tubing preparation



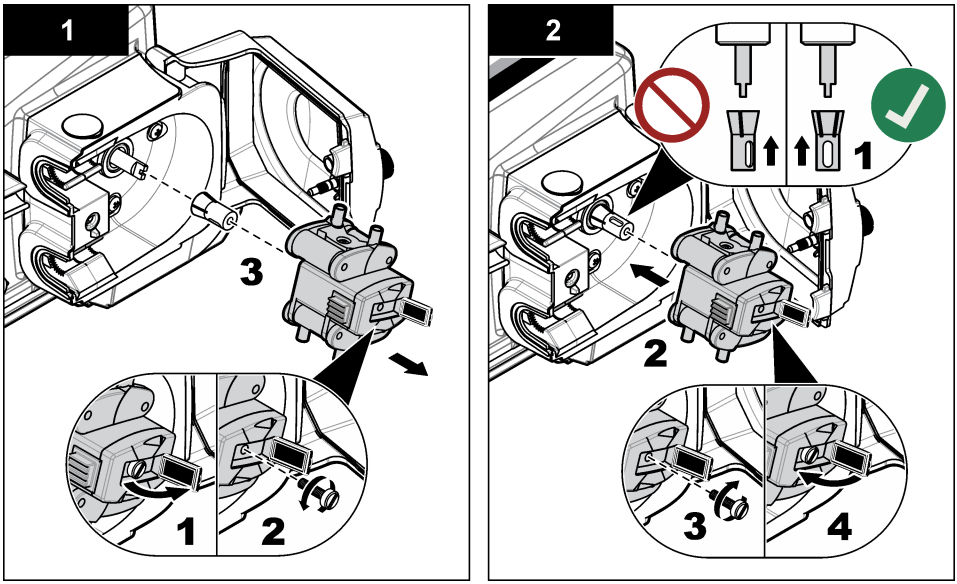
1 To intake tubing	**6** Length inside the pump
2 Alignment dots	**7** Length for the AWRS
3 To fitting on sampler base	**8** Length for AWRS and controller with standard liquid detector
4 Length for controller with standard liquid detector	**9** Length for AWRS and controller with non-contacting liquid detector
5 Length for controller with optional non-contacting liquid detector	




2
3
4
4
3
1
2
1
6
2
5
2x
3
4

6.3.2 Clean the rotor

Clean the rotor, pump tube tracks and pump housing with a mild detergent. Refer to Replace the pump tubing on page 20 and the illustrated steps that follow.



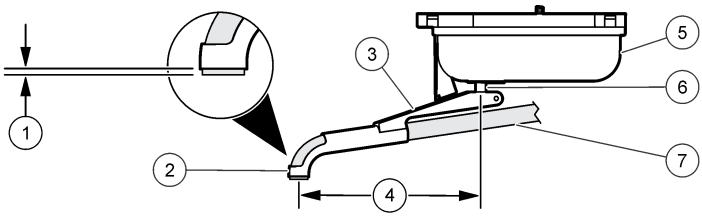
6.4 Replace the distributor arm tube

The distributor arm moves over each bottle during multiple bottle sampling. Replace the tube in the distributor arm when the tube is worn. Make sure that the correct tube is used for the correct distributor and distributor arm.

Note: *The distributor tubing is not the same as the pump tubing. The pump tubing installed in the distributor assembly can damage the distributor. Also, samples can be missed because the distributor arm cannot move easily.*

1. Remove the tube from the distributor arm and from the ceiling of the .
2. Insert the new tube into the distributor arm. Extend the tube past the end of the distributor arm 4.8 mm (3/16 in.) or 19 mm (3/4 in.) as shown in item 1 of Figure 15.
3. Insert the other end of the tube into the fitting on the ceiling of the .
4. Complete the diagnostic test for the distributor to make sure that the operation is correct.

Figure 15 Distributor assembly



1 Tube extension	**4** Distributor arm lengths: 152.4 mm (6.0 in.), 177.8 mm (7.0 in.) or 190.8 mm (7.51 in.)	**7** Distributor tube
2 Nozzle	**5** Distributor motor	
3 Distributor arm	**6** Shaft	

6.5 Disposal

⚠ DANGER

Child entrapment hazard. Remove the doors on the refrigerated cabinet before disposal.

⚠ CAUTION

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

⚠ CAUTION

Fire and explosion hazard. This product contains a flammable refrigerant. Dispose of chemicals and wastes in accordance with local, regional and national regulations.

Section 7 Troubleshooting

7.1 General troubleshooting

Table 2 shows causes and corrective actions for several common problems.

Table 2 Troubleshooting table

Problem	Possible cause	Solution
No instrument power	Problem with the main power source.	Make sure that AC power gets to the electrical outlet.
	Defective controller	Contact technical support.

Table 2 Troubleshooting table (continued)

Problem	Possible cause	Solution
Sampler does not have sufficient lift.	Strainer is not completely submerged.	Install the shallow depth strainer (2071 or 4652).
	Intake tube has a leak.	Replace the intake tube.
	Pump tube is worn.	Replace the pump tubing on page 20.
	Pump roller assembly is worn.	Contact technical support.
Sample volume is not correct.	Incorrect volume calibration	Repeat the volume calibration.
	Incorrect tube length is specified in the sampling program.	Make sure that the correct tube length is in the sampling program.
	Intake tube does not purge completely.	Make sure that the intake tube is as vertical and as short as possible.
	Strainer is not completely submerged.	Install the shallow depth strainer (2071 or 4652).
	Worn pump tubing and/or roller assembly.	Replace the pump tube and/or roller assembly.
	The liquid detector is disabled.	Turn the liquid detector on and complete a volume calibration.
	Liquid detector does not operate properly.	Calibrate the liquid detector with the same liquid that is sampled.

Section 8 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.*

8.1 Bottle kits—AWRS

Description	Quantity	Item no.
Single bottle kits (includes bottle and full bottle shut off):		
21-L (5.5-gal) poly bottle and full bottle shut off	1	AW010060
Multi-bottle kits (include bottle, retainer and distributor arm):		
10-L (2.5-gal) poly bottles, retainer and distributor arm	4	AW040030
2-L (67.6-oz) poly bottles, retainer and distributor arm	12	AW122000
350-mL (11.8-oz) glass bottles, retainer and distributor arm	24	AW240350
1-L (33.8-oz) poly bottles, retainer and distributor arm	24	AW241000

8.2 Bottle sets—AWRS

Description	Quantity	Item no.
Bottle, 10-L (2.5-gal) glass with cap	1	6559
Bottle, 10-L (2.5-gal) poly with cap	1	1918
Bottle, 21-L (5.5-gal) poly with cap	1	6498
Bottle set, 2-L (67.6-oz) poly with caps (AWRS only)	12	9495600
Bottle set, 1-L (33.8-oz) poly with caps	24	737
Bottle set, 350-mL (11.8-oz) glass with caps	24	732
Bottle set, 2.3-L (0.6-gal) poly with caps	8	657
Bottle set, 1.9-L (0.5-gal) glass with caps	8	1118
Bottle set, 10-L (2.5-gal) glass with caps	4	2317
Bottle set, 10-L (2.5-gal). poly with caps	4	2315
Bottle set, 10-L (2.5-gal) glass with caps	2	2318
Bottle set, 10-L (2.5-gal) poly with caps	2	2316

8.3 Replacement parts—AWRS

Description	Quantity	Item no.
AS950 controller retrofit kit, AWRS	1	9504900
Bottle tray, 8 to 24 bottles	1	1511
Desiccant, refill	0.56 kg (1.5 lb)	8755500
Desiccant cap assembly	1	8754900
Desiccant tube	1	8742100
Desiccant tube assembly	1	8741500
Desiccant tube assembly with silicone grease packet	1	8755600
Pump cover	1	8755400
Pump, replacement assembly	1	6262000
Full bottle shut-off	1	8996
Power supply, North America, NEMA 5-15P plug, 103.5–124.5 VAC	1	8754500US
Power supply, Europe, CCE 7/7 plug, 207–253 VAC	1	8754500EU
Power supply, Australia, AS3112 plug, 207–253 VAC	1	8754500AU
Retainer for 24 1-L poly bottles	1	1322
Retainer for 24 350-mL glass bottles	1	1056
Tray, removable, AWRS	1	5697600
Tubing, pump, AWRS with non-contacting liquid detector	7.6 m (25 ft)	9501500
Tubing, pump	4.6 m (15 ft)	4600-15
Tubing, pump	15.2 m (50 ft)	4600-50
Tubing, black, soft PVC, intake 10 mm ID, 15 mm OD	7.8 m (25.5 ft)	6633500

8.3 Replacement parts—AWRS (continued)

Description	Quantity	Item no.
Tubing, black, soft PVC, intake 10 mm ID, 15 mm OD	selected when ordered	6627200
Tubing, PTFE-lined intake 3/8-in.	3 m (10 ft)	921
Tubing, PTFE-lined intake 3/8-in.	7.6 m (25 ft)	922
Tubing, PTFE-lined intake 3/8-in.	30.5 m (100 ft)	925
Tubing, vinyl intake 3/8-in.	7.6 m (25 ft)	920
Tubing, vinyl intake 3/8-in.	30.5 m (100 ft)	923
Tubing, vinyl intake, 3/8-in.	152.4 m (500 ft)	924
Tubing connection kit for PTFE-lined PE tubing	1	2186

8.4 Accessories—AWRS

Description	Quantity	Item no.
Assembly, A/C Power Backup, 3P, 736.6 mm (29 in.) CBL	1	5698200
All Weather Refrigerated Cabinet, 115 VAC	1	9503600
All Weather Refrigerated Cabinet, 230 VAC	1	9503700
Controller compartment lock	1	5697700
Anchor mounting bracket kit	1	6613100
Distributor assembly with arm for 24 bottles	1	8841
Distributor assembly with arm for 8 bottles	1	8842
Distributor assembly with arm for 2 or 4 bottles	1	8843
Distributor arm for assembly 8841, with tubing	1	8844
Distributor arm for assembly 8842, with tubing	1	8845
Distributor arm for assembly 8843, with tubing	1	8846
Distributor arm for assembly 8841	1	8822
Distributor arm for assembly 8842	1	1785
Distributor arm for assembly 8843	1	1789
Distributor arm tubing, 546.1 mm (21.5-in.), for assembly 8841 (arm 8822)	1	8579
Distributor arm tubing, 546.1 mm (21.5-in.), for assembly 8842 (arm 1785)	1	8850
Distributor arm tubing, 5.8 mm (20-in.), for assembly 8843 (arm 1789)	1	8852
Pull-out tray	1	5697600
Tubing for peristaltic pump, pre-cut for all weather refrigerated sampler	1	8753900
Door assembly	1	6607700
Front lid assembly	1	6607500
Rear lid assembly	1	6607600
Replacement gasket for lid (fits front and back lids)	1	6611600

8.4 Accessories—AWRS (continued)

Description	Quantity	Item no.
Replacement gasket for door	1	6611500
Tube support with tube	1	8838

8.5 Accessories

Description	Item no.
AV9000 interface, subAV sensor	8531300
Cable, auxiliary, cascade sampling or synchronized sampling	9505100
Cable, auxiliary, Sigma 950 to AUX port, 2.7 m (9 ft)	8528400
Cable, auxiliary, Sigma 950 to AUX port, 7.6 m (25 ft)	8528401
Cable, auxiliary, multi-purpose half, 7 pin, 2.7 m (9 ft)	8528500
Cable, auxiliary, multi-purpose half, 7 pin, 7.6 m (25 ft)	8528501
Cable, Cascade/Syncho cable	9505100
Cable, FL900 logger to AUX port, 7 pin, 2.7 m (9 ft)	9500700
Cable, FL900 logger to AUX port, 7 pin, 2.7 m (25 ft)	9500701
Cable, pHD sensor, used with DPD2P1	9501200
Cable, USB, Type A–A, 2 m (6.5 ft)	9504700
Flow-thru module	2471
Full-bottle shutoff	8847
IO9004 module	9494600
IO9001 module (one high voltage relay)	9494500
Junction box with auxiliary cable	9501000
Rain gauge, tipping bucket, includes 30.5 m (100 ft) 7-pin cable	8542800
Sensor, pHD, digital, used with 9501200	DPD2P1
Sensor, US9001, downlooking ultrasonic	9487100
Sensor, US9001B, downlooking ultrasonic	9088800
Sensor, US9003, in-pipe ultrasonic	9497300
Sensor, subAV, used with AV9000 interface	77065-030
Silicone grease, 7 g (0.25 oz)	000298HY
Strainer, all 316 stainless steel, 152 mm long x 10.3 mm OD (6.0 in. long x 0.406 in. OD)	2071
Strainer, all 316 stainless steel, 201.7 mm long x 25.4 mm OD (7.94 in. long, x 1.0 in. OD)	2070
Strainer, stainless steel, 99.1 mm long x 10.3 mm OD (3.9 in. long x 0.406 in. OD)	4652
Strainer, PTFE/stainless steel, 139.7 mm long x 22.2 mm OD (5.5 in. long x 0.875 in. OD)	926

8.5 Accessories (continued)

Description	Item no.
Strainer, PTFE/stainless steel, 279.4 mm long x 22.2 mm OD (11.0 in. long x 0.875 in. OD)	903
Adapter fitting, tubing	9503200



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