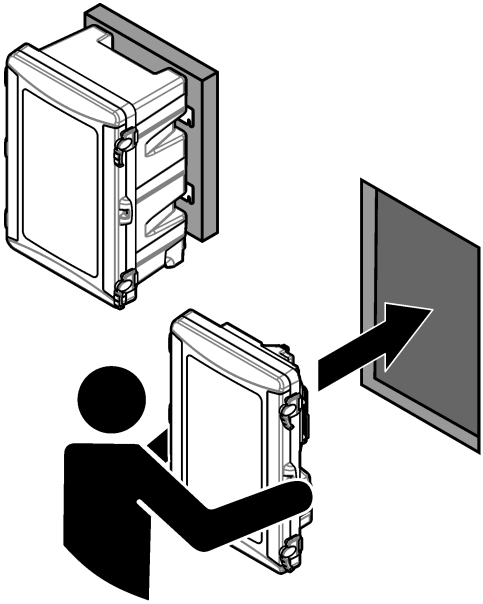
DOC023.97.80593

Polymetron NA9600 sc Na^+

06/2022, Edition 6



Installation
安装

Table of Contents

Table of Contents

Section 1 Specifications

Specifications are subject to change without notice.

Table 1 General specifications

Specification	Details
Dimensions (W x H x D)	Analyzer with enclosure: 45.2 x 68.1 x 33.5 cm (17.8 x 26.8 x 13.2 in.) Analyzer without enclosure: 45.2 x 68.1 x 25.4 cm (17.8 x 26.8 x 10.0 in.)
Enclosure	Analyzer with enclosure: NEMA 4/IP65 Analyzer without enclosure: IP65, PCBA housing Materials: Polyol case, PC door, PC hinges and latches, 304/316 SST hardware
Weight	Analyzer with enclosure: 20 kg (44.1 lb) with empty bottles, 21.55 kg (47.51 lb) with full bottles Analyzer without enclosure: 14 kg (30.9 lb) with empty bottles, 15.55 kg (34.28 lb) with full bottles
Mounting	Analyzer with enclosure: wall, panel or table Analyzer without enclosure: panel
Protection class	1
Pollution degree	2
Installation category	II
Power requirements	100 to 240 VAC, 50/60 Hz, ± 10%; 0.5 A nominal, 1.0 A maximum; 80 VA maximum
Operating temperature	5 to 50 °C (41 to 122 °F)
Operating humidity	10% to 80% relative humidity, non-condensing
Storage temperature	-20 to 60 °C (-4 to 140 °F)
Number of sample streams	1, 2 or 4 with programmable sequence
Analog outputs	Six isolated; 0–20 mA or 4–20 mA; load impedance: 600 Ω maximum Connection: 0.644 to 1.29 mm^2 (24 to 16 AWG) wire; 0.644 to 0.812 mm^2 (24 to 20 AWG) recommended, twisted pair shielded wire
Relays	Six; type: not powered SPDT relays, each rated at 5 A resistive, 240 VAC maximum Connection: 1.0 to 1.29 mm^2 (18 to 16 AWG) wire; 1.0 mm^2 (18 AWG) stranded recommended, 5–8 mm OD cable. Make sure that the field wiring insulation is rated 80 °C (176 °F) minimum.
Digital inputs	Six, non-programmable, isolated TTL type digital input or as a relay/open-collector type input 0.644 to 1.29 mm^2 (24 to 16 AWG) wire; 0.644 to 0.812 mm^2 (24 to 20 AWG) stranded recommended
Fuses	Input power: T 1.6 A, 250 VAC Relays: T 5.0 A, 250 VAC

Table 1 General specifications (continued)

Specification	Details
Fittings	Sample line and sample bypass drain: 6-mm OD push-to-connect fitting for plastic tubing Chemical and case drains: 7/16-in. ID slip-on fitting for soft plastic tubing
Certifications	CE-compliant, CB, cETLus, TR CU-compliant, RCM, KC EAC

Table 2 Sample requirements

Specification	Details
Sample pressure	0.2 to 6 bar (3 to 87 psi)
Sample flow rate	100 to 150 mL/minute (6 to 9 L/hour)
Sample temperature	5 to 45 °C (41 to 113 °F)
Sample pH	Analyzers without cationic pump: 6 to 10 pH Analyzers with cationic pump: 2 to 10 pH
Sample acidity (equivalent $CaCO_3$)	Analyzers without cationic pump: Less than 50 ppm Analyzers with cationic pump: Less than 250 ppm
Suspended solids in sample	Less than 2 NTU, no oil, no grease

Table 3 Measurement specifications

Specification	Details
Electrode type	Sodium ISE (ion specific electrode) electrode and reference electrode with KCl electrolyte
Measurement range	Analyzers without cationic pump: 0.01 to 10,000 ppb Analyzers with cationic pump: 0.01 ppb to 200 ppm
Accuracy	Analyzers without cationic pump: • 0.01 ppb to 2 ppb: ± 0.1 ppb • 2 ppb to 10,000 ppb: ± 5% Analyzers with cationic pump: • 0.01 ppb to 40 ppb: ± 2 ppb • 40 ppb to 200 ppm: ± 5%
Precision/Repeatability	Less than 0.02 ppb or 1.5% (the larger value) with ± 10 °C (50 °F) sample difference
Interference phosphate 10 ppm	Measurement interference is less than 0.1 ppb
Response time	Refer to Table 4.
Stabilization time	Startup: 2 hours; Sample temperature variation: 10 minutes from 15 to 30 °C (59 to 86 °F) Use the optional heat exchanger when the temperature difference between samples is more than 15 °C (27 °F).
Calibration time	50 minutes (typical)
Calibration	Automatic calibration: known addition method; Manual calibration: 1 or 2 points
Minimum detection limit	0.01 ppb

Table 3 Measurement specifications (continued)

Specification	Details
Auto calibration solution	Approximately 500 mL of 10-ppm Sodium Chloride is used in 3 months with a 7-day calibration interval. Container: 0.5 L, HDPE with polypropylene caps
Reactivation solution	Approximately 500 mL of 0.5M Sodium Nitrate is used in 3 months with a 24-hour reactivation interval. Container: 0.5 L, HDPE with polypropylene caps
3M KCl electrolyte	Approximately 200 mL of 3M KCl electrolyte is used in 3 months. Container: 200 mL, polycarbon
Conditioning solution	Analyzers without cationic pump: Approximately 1 L of Diisopropylamine (DIPA) is used in 2 months at 25 °C (77 °F) for a sample pH target of 11.2. Approximately 1 L of DIPA is used in approximately 13 weeks at 25 °C (77 °F) for a sample pH target of 10 to 10.5. Analyzers with cationic pump: The usage rate of DIPA is dependent on the selected Tgas/Twater ratio. With a ratio of 100% (i.e., the volume of sample is equal to the volume of gas) the consumption of DIPA is approximately 90 mL/day. Container: 1 L, glass with cap, 96 x 96.5 x 223.50 mm (3.78 x 3.80 x 8.80 in.)

Table 4 Average response times

T90% ≤ 10 minutes			
Concentration change from one channel to another	Maximum temperature difference (°C)	Time to accuracy 0.1 ppb or 5%	
		Up (minutes)	Down (minutes)
0.1 ↔ 5 ppb	3	9	27
0.1 ↔ 50 ppb	3	11	41
0.1 ↔ 200 ppb	3	9	45
< 0.1 ↔ 1 ppb[1]	3	29	36
0.1 ↔ 50 ppb	15	11	41

Section 2 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. 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 soley 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.

[1] Experiment was done with ultra pure water (estimated at 50 ppt) and 1 ppb standard.

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.

2.2 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.

2.3 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.

	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.
	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 the need for protective eye wear.
	This symbol indicates that the marked item can be hot and should not be touched without care.
	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.

2.4 Compliance and certification

⚠ CAUTION

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

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.

2.5 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.

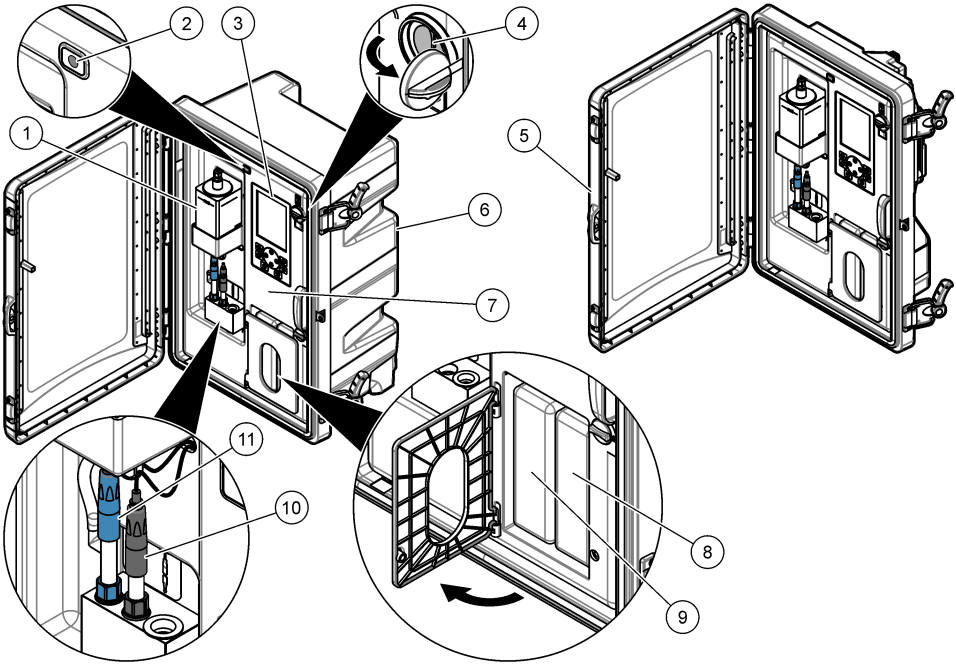
The sodium analyzer continuously measures very low concentrations of sodium in ultra-pure water. Refer to Figure 1 and Figure 2 for an overview of the analyzer components.

The sodium analyzer is available with or without an enclosure. The analyzer with an enclosure is for wall, panel or table mounting. The analyzer without an enclosure is for panel mounting. Refer to Figure 1.

The sodium analyzer uses a sodium ISE (ion specific electrode) electrode and a reference electrode to measure the sodium concentration of the water sample. The difference in potential between the sodium and reference electrode is directly in proportion to the logarithm of sodium concentration as shown by Nernst law. The analyzer increases the pH of the sample to a constant pH between 10.7 and 11.6 with a conditioning solution before the measurement to prevent interference from temperature or other ions on the sodium measurement.

The door can be easily removed for better access during installation and maintenance procedures. The door must be installed and closed during operation. Refer to Figure 3.

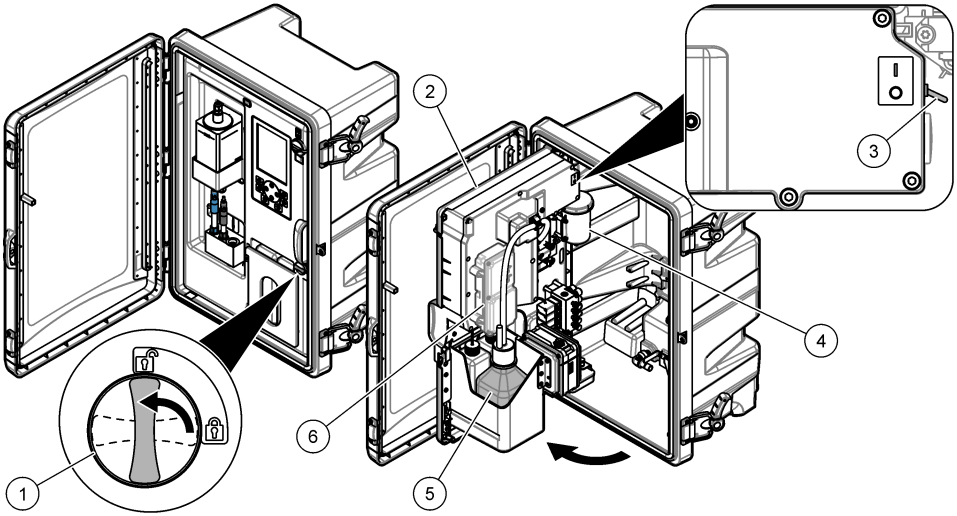
Figure 1 Product overview—external view



1 Overflow vessel	**7** Analytics panel
2 Status indicator light (refer to Table 5 on page 10)	**8** Calibration standard bottle[2]
3 Display and keypad	**9** Reactivation solution bottle
4 SD card slot	**10** Sodium electrode
5 Analyzer without enclosure (panel mount)	**11** Reference electrode
6 Analyzer with enclosure (wall, panel or table mount)	

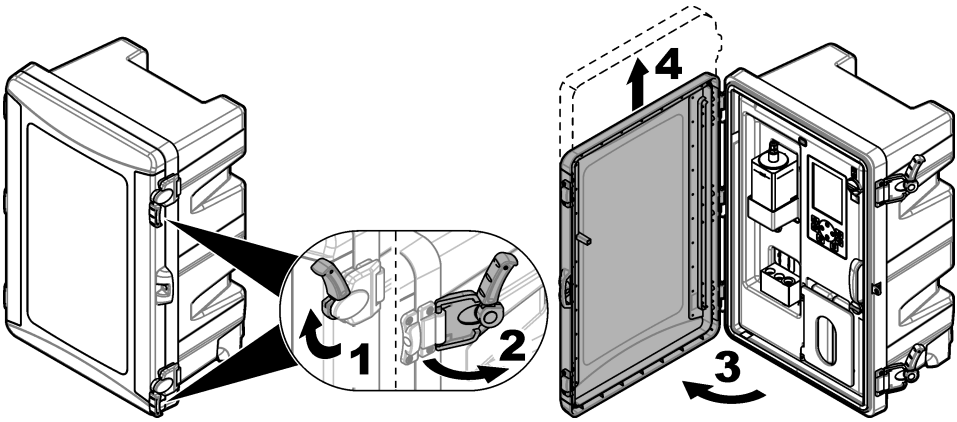
[2] Only supplied with analyzers with the auto calibration option.

Figure 2 Product overview—internal view



1 Latch to open analytics panel	**4** KCl electrolyte reservoir
2 Analytics panel (open)	**5** Conditioning solution bottle
3 Power switch	**6** Optional cationic pump[3]

Figure 3 Door removal



[3] The optional cationic pump is necessary for accurate measurements if the sample(s) plumbed to the analyzer is less than pH 6.

2.5.1 Status indicator light

The status indicator light shows the status of the analyzer. Refer to Table 5. The status indicator light is above the display.

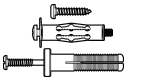
Table 5 Status indicator description

Color	Status
Green	The analyzer is in operation with no warnings, errors or reminders.
Yellow	The analyzer is in operation with active warnings or reminders.
Red	The analyzer is not in operation due to an error condition. A serious problem has occurred.

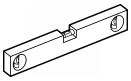
2.6 Items to collect

Collect the items that follow to install the instrument. The items that follow are supplied by the user.

In addition, collect 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.



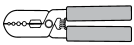
Fasteners to mount the analyzer on a wall if applicable (4x)[4]



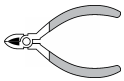
Level

Tape measure

Drill



Wire strippers



Wire cutters

Deionized water (or sample water)

0.5M Sodium Nitrate, 500 mL

10-mg/L Sodium Chloride Standard, 500 mL

3M KCl electrolyte, 150 mL

Diisopropylamine, 99%, 1 L (or Ammonia 28%, 1 L)

100 µm filter for each sample line (optional)

Section 3 Installation

⚠ CAUTION

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

3.1 Installation guidelines

Install the analyzer:

- Indoors in a clean, dry, well-ventilated and temperature-controlled location.
- In a location with minimum mechanical vibrations and electronic noise.
- As close to the sample source as possible to decrease analysis delay.
- Near an open chemical drain.
- Away from direct sunlight and heat sources.

[4] Use fasteners applicable to the mounting surface (¼-in. or 6 mm SAE J429-Grade 1 bolts or stronger).

- So that the power cable plug is visible and easily accessible.
- In a location with sufficient space in front of it to open the door.
- In a location where there is sufficient clearance around it to make plumbing and electrical connections.

This instrument is rated for an altitude of 2000 m (6562 ft) maximum. Use of this instrument at an altitude higher than 2000 m can slightly increase the potential for the electrical insulation to break down, which can result in an electric shock hazard. The manufacturer recommends that users with concerns contact technical support.

3.2 Mechanical installation

⚠ DANGER

Risk of injury or death. Make sure that the wall mounting is able to hold 4 times the weight of the equipment.

⚠ WARNING

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

The object is heavy. Make sure that the instrument is securely attached to a wall, table or floor for a safe operation.

Mount the analyzer indoors, in a non-hazardous environment.

Refer to the supplied mounting documentation.

3.3 Electrode installation

3.3.1 Install the reference electrode

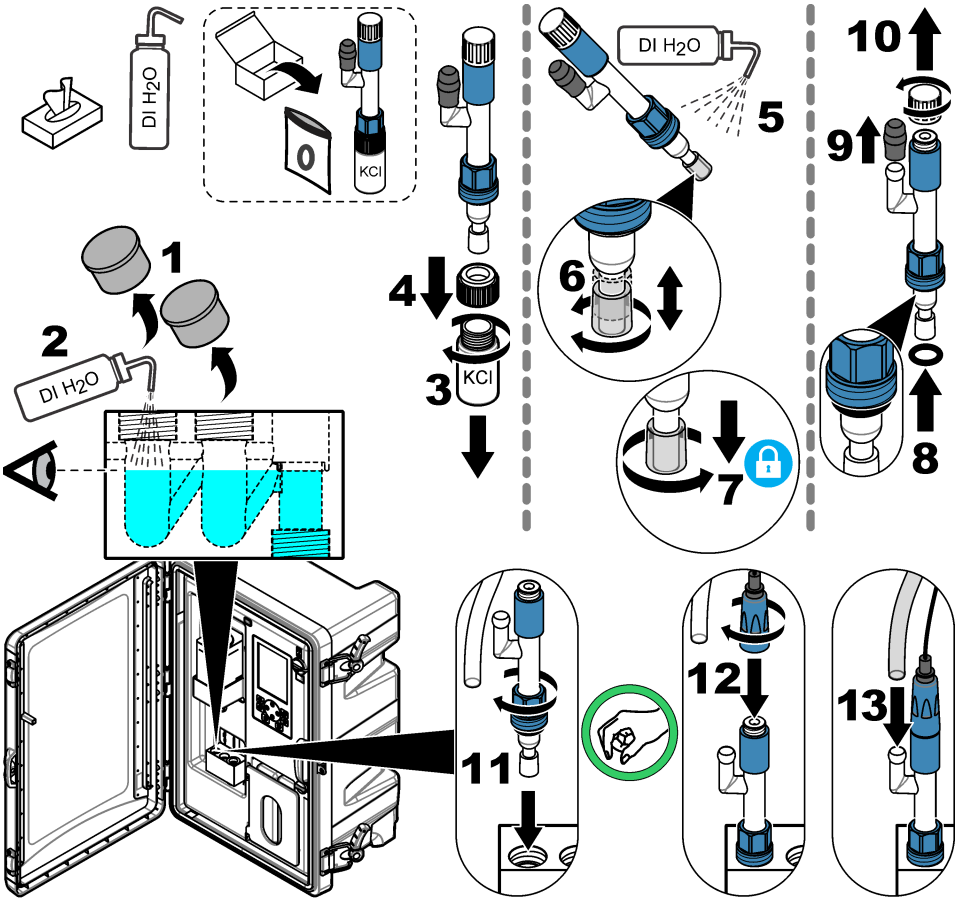
Install the reference electrode as shown in the illustrated steps that follow.

At illustrated step 6, carefully turn the collar to break the seal. Then, move the collar up and down and turn it clockwise and counter-clockwise.

At illustrated step 7, push the collar down and turn the collar less than 1/4 of a turn to lock the collar. When the collar is locked, the collar does not turn. If the collar is not locked, the KCl electrolyte will flow too fast from the reference electrode into the measurement cell.

At illustrated step 12, make sure to connect the cable with the blue connector to the reference electrode.

Keep the storage bottle and caps for future use. Rinse the storage bottle with deionized water.



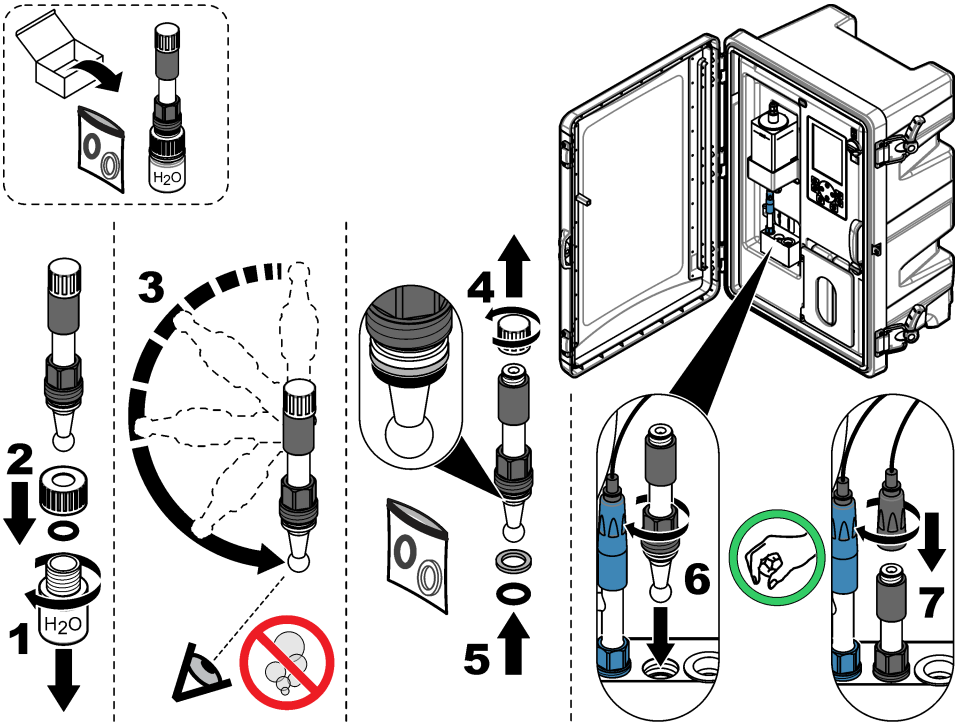
3.3.2 Install the sodium electrode

Install the sodium electrode as shown in the illustrated steps that follow.

At illustrated step 3, hold the top of the electrode and point the glass bulb up. Then, quickly invert the electrode to push liquid down into the glass bulb until there is no air in the glass bulb.

At illustrated step 7, make sure to connect the cable with the black connector to the sodium electrode.

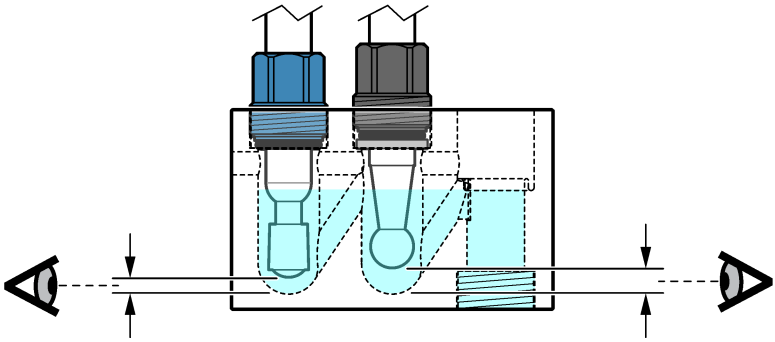
Keep the storage bottle and caps for future use. Rinse the storage bottle with deionized water.



3.3.3 Examine the electrodes

Make sure that the reference and sodium electrodes do not touch the bottom of the measurement cell. Refer to Figure 4.

Figure 4 Examine the electrodes



3.3.4 Fill the KCl electrolyte reservoir

⚠ WARNING

Chemical exposure hazard. Obey laboratory safety procedures and wear all of the personal protective equipment appropriate to the chemicals that are handled. Read the safety data sheet from the supplier before bottles are filled or reagents are prepared. For laboratory use only. Make the hazard information known in accordance with the local regulations of the user.

⚠ CAUTION

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

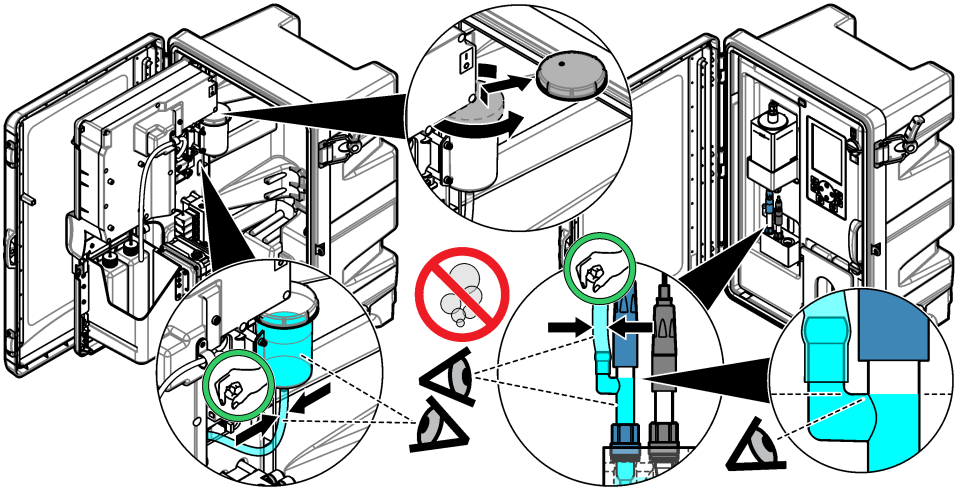
Note: *To prepare 3M KCl electrolyte, refer to* Prepare KCl electrolyte *on page 36*.

Fill the KCl electrolyte reservoir with 3M KCl electrolyte as follows:

1. Put on the personal protective equipment identified in the safety data sheet (MSDS/SDS).
2. Turn the latch on the analytics panel to the unlocked position. Open the analytics panel.
3. Remove the lid from the KCl electrolyte reservoir. Refer to Figure 5.
4. Fill the reservoir (approximately 200 mL).
5. Install the lid.
6. From the front of the analytics panel, squeeze the KCl electrolyte tube with thumb and finger to push the air bubbles up the tube to the reservoir. Refer to Figure 5.

   When an air bubble is near the reservoir, use two hands to squeeze the tube on both sides of the analytics panel to push the air bubble up.
7. Continue to squeeze the tube until the KCl electrolyte in the reference electrode is at the top of the glass junction where the KCl electrolyte enters the electrode. Refer to Figure 5.
8. Close the analytics panel. Turn the latch on the analytics panel to the locked position.

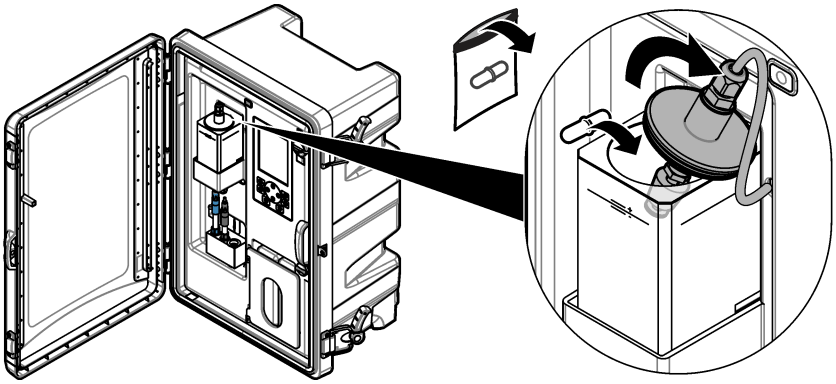
Figure 5 Fill the KCl electrolyte reservoir



3.4 Install the stir bar

Put the supplied stir bar in the overflow vessel. Refer to Figure 6.

Figure 6 Install the stir bar



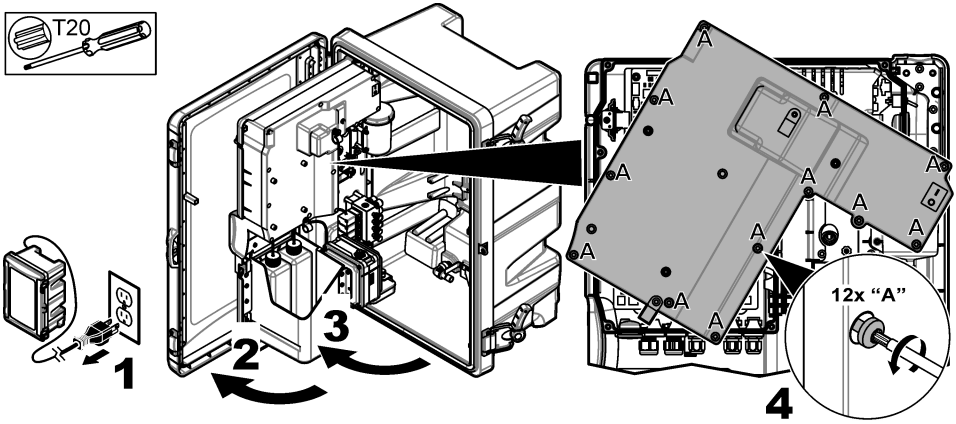
3.5 Electrical installation

⚠ DANGER

Electrocution hazard. Always remove power to the instrument before making electrical connections.

3.5.1 Remove the electrical access cover

Refer to the illustrated steps that follow.



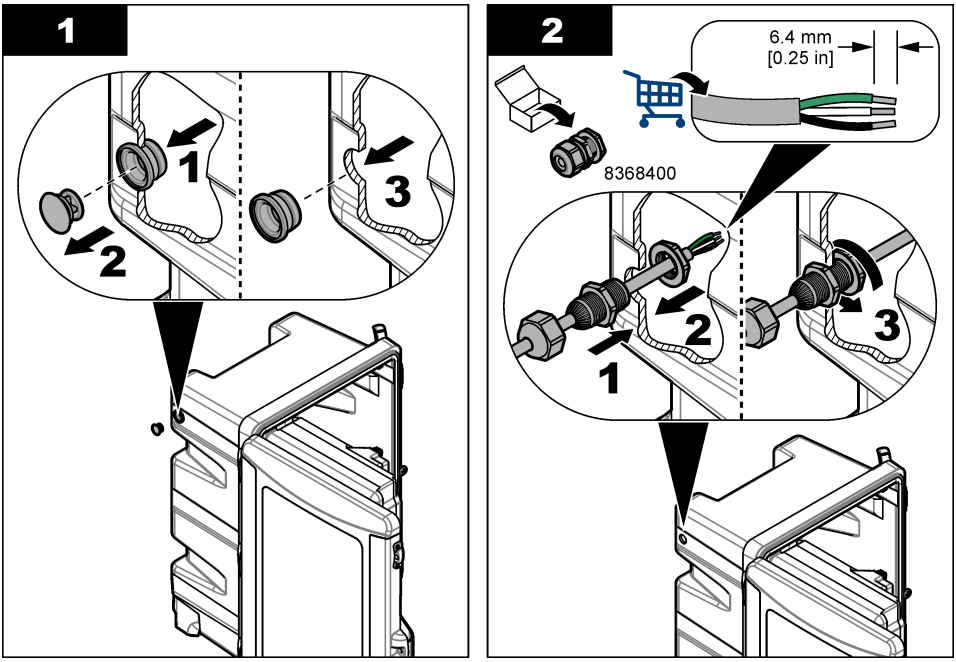
3.5.2 Connect a power cord—Analyzer with enclosure

The analyzer is available with or without an enclosure. If the analyzer does not have an enclosure, go to Connect a power cord—Analyzer without enclosure on page 19.

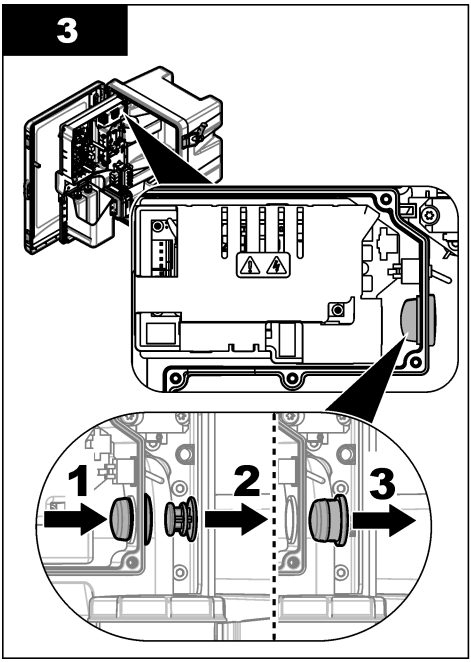
Note: *Do not use conduit to supply power.*

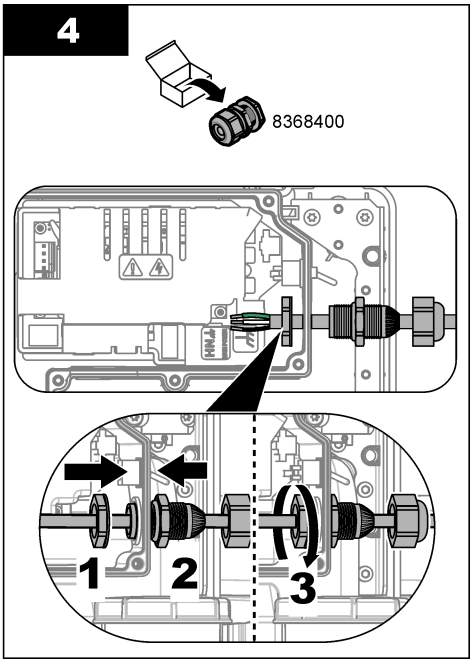
Item supplied by user: Power cord[5]

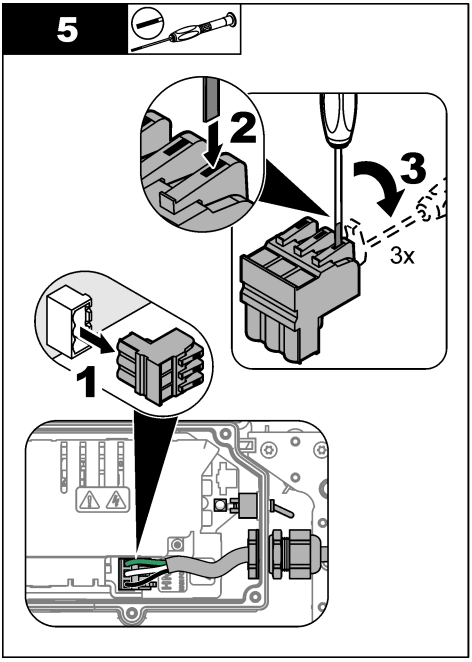
1. Remove the electrical access cover. Refer to Remove the electrical access cover on page 15.
2. Connect a power cord. Refer to the illustrated steps that follow.
3. Install the electrical access cover.
4. Do not connect the power cord to an electrical outlet.



[5] Refer to Power cord guidelines on page 21.


3
1
2
3


4
8368400
1
2
3


5
2
3
3x
1

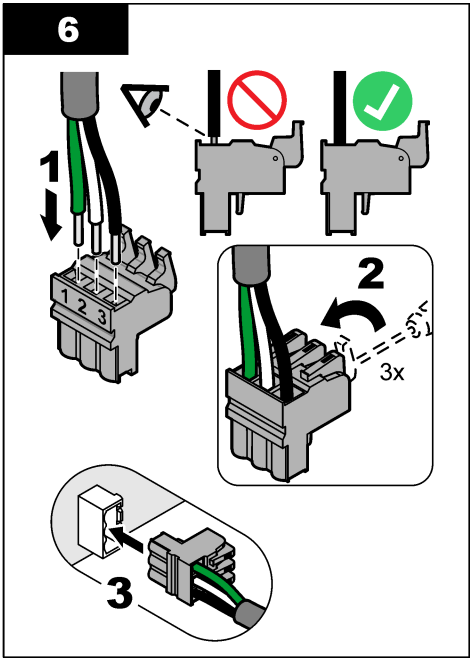

6
1
1 2 3
2
3x
3

Table 6 AC wiring information

Terminal	Description	Color—North America	Color—EU
1	Protective Earth (PE) Ground	Green	Green with yellow stripe
2	Neutral (N)	White	Blue
3	Hot (L1)	Black	Brown

Note: *As an alternative, connect the ground (green) wire to the chassis ground. Refer to* Figure 7.

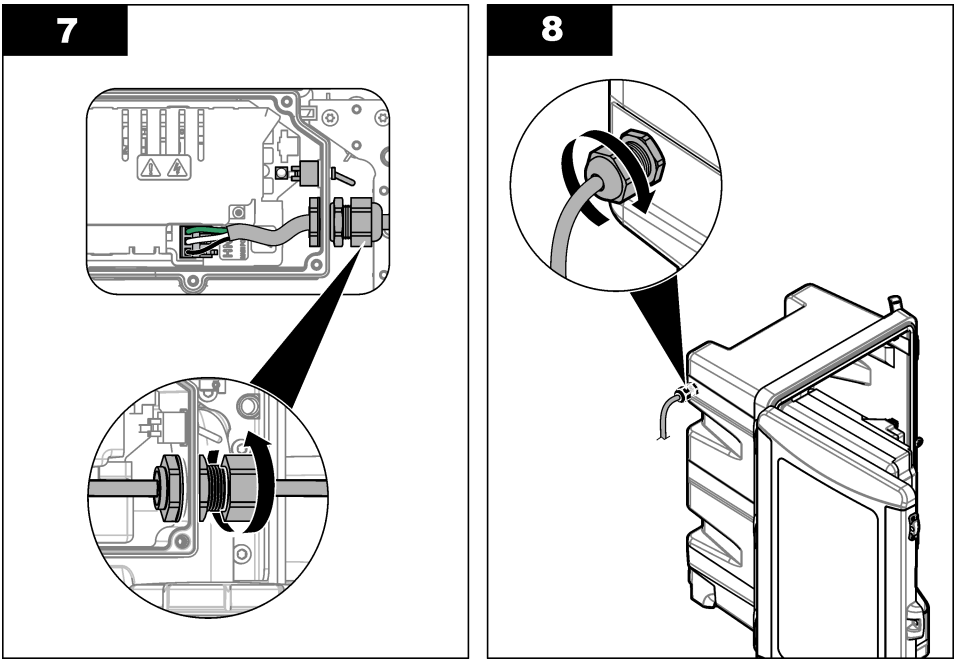
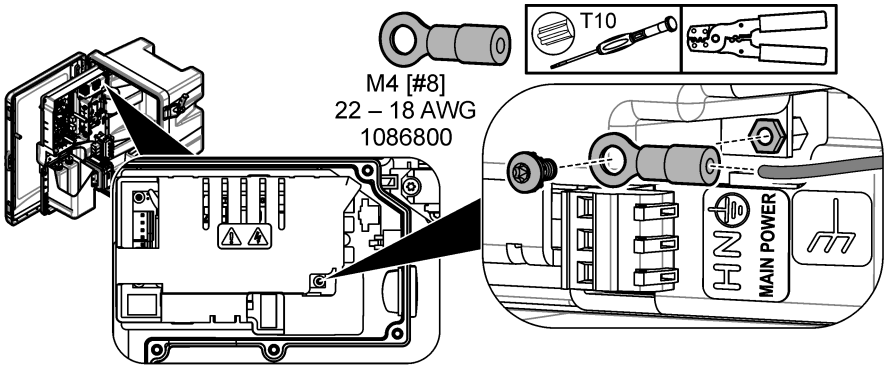


Figure 7 Alternative ground (green) wire connection

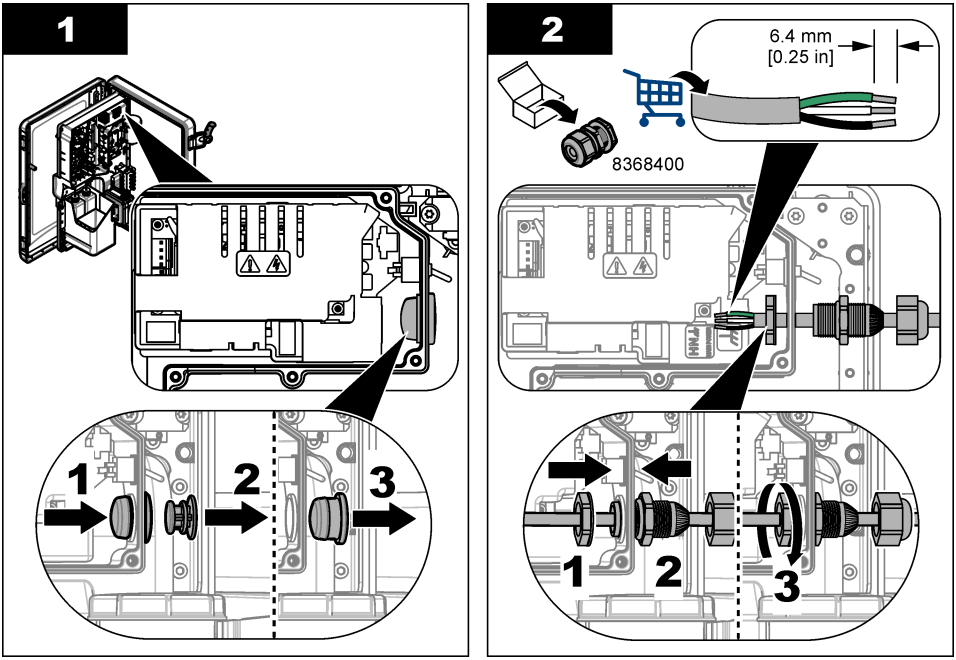


3.5.3 Connect a power cord—Analyzer without enclosure

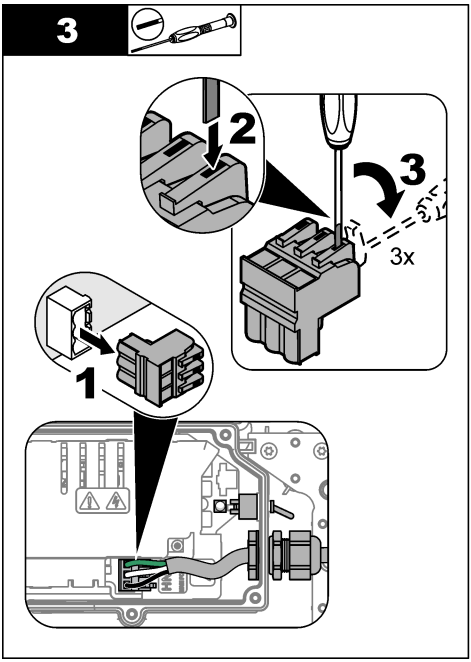
Note: *Do not use conduit to supply power.*

Item supplied by user: Power cord[6]

1. Remove the electrical access cover. Refer to Remove the electrical access cover on page 15.
2. Connect a power cord. Refer to the illustrated steps that follow.
3. Install the electrical access cover.
4. Do not connect the power cord to an electrical outlet.



[6] Refer to Power cord guidelines on page 21.



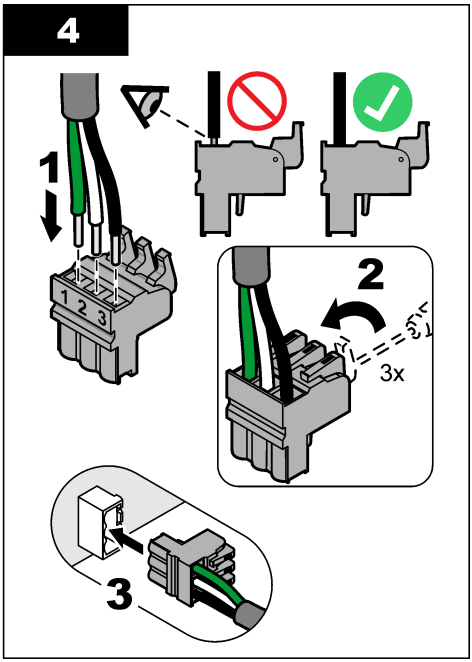
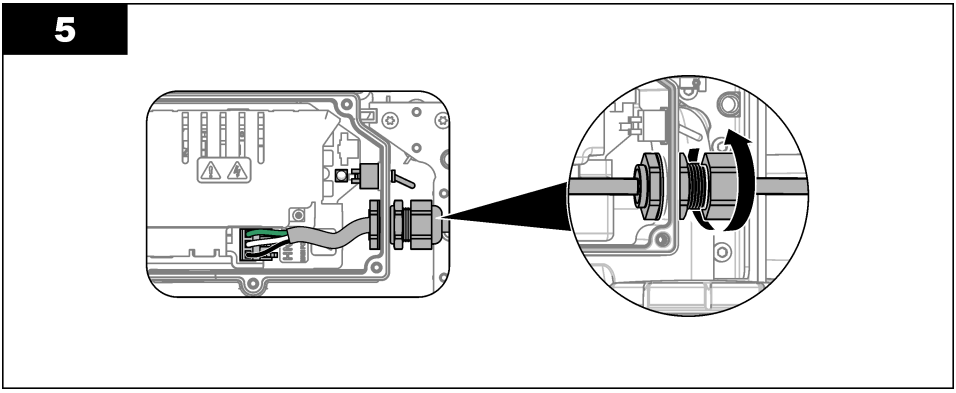


Table 7 AC wiring information

Terminal	Description	Color—North America	Color—EU
1	Protective Earth (PE) Ground	Green	Green with yellow stripe
2	Neutral (N)	White	Blue
3	Hot (L1)	Black	Brown

Note: *As an alternative, connect the ground (green) wire to the chassis ground. Refer to* Figure 7 *on page 18.*



3.5.4 Power cord guidelines

⚠ WARNING

Electrical shock and fire hazards. Make sure that the user-supplied power cord and non-locking plug meet the applicable country code requirements.

⚠ WARNING

Electrocution hazard. Make sure that the protective earth conductor has a low impedance connection of less than 0.1 ohm. The connected wire conductor must have the same current rating as the AC mains line conductor.

NOTICE

The instrument is used for a single phase connection only.

Note: *Do not use conduit to supply power.*

The power cord is supplied by the user. Make sure that the power cord is:

- Less than 3 m (10 ft) in length.
- Rated sufficient for the supply voltage and current. Refer to Specifications on page 3.
- Rated for at least 60 °C (140 °F) and applicable to the installation environment.
- Not less than 1.0 mm^2 (18 AWG) with applicable insulation colors for local code requirements.
- A power cord with a three-prong plug (with ground connection) that is applicable to the supply connection.
- Connected through a cable gland (cable strain relief) that holds the power cable securely and seals the enclosure when tightened.
- Does not have a locking type device on the plug.

3.5.5 Connect to the relays

⚠ DANGER

Electrocution hazard. Do not mix high and low voltage. Make sure that the relay connections are all high voltage AC or all low voltage DC.

⚠ WARNING

Potential Electrocution Hazard. Power and relay terminals are designed for only single wire termination. Do not use more than one wire in each terminal.

⚠ WARNING

Potential fire hazard. Do not daisy-chain the common relay connections or jumper wire from the mains power connection inside the instrument.

⚠ CAUTION

Fire hazard. Relay loads must be resistive. Always limit current to the relays with an external fuse or breaker. Obey the relay ratings in the Specifications section.

NOTICE

Wire gauge less than 1.0 mm^2 (18 AWG) is not recommended.

The analyzer has six non-powered relays. The relays are rated at 5 A, 240 VAC maximum.

Use the relay connections to start or stop an external device such as an alarm. Each relay changes state when the selected trigger for the relay occurs.

Refer to Connect to an external device on page 23 and Table 8 to connect an external device to a relay. Refer to the Operations manual to configure the relay.

The relay terminals accept 1.0 to 1.29 mm^2 (18 to 16 AWG) wire (as determined by load application)[7]. Wire gauge less than 18 AWG is not recommended. Use wire with an insulation rating of 300 VAC or higher. Make sure that the field wiring insulation is rated 80 °C (176 °F) minimum.

Use the relays at either all high voltage (greater than 30 V-RMS and 42.2 V-PEAK or 60 VDC) or all low voltage (less than 30 V-RMS and 42.2 V-PEAK, or less than 60 VDC). Do not configure a combination of both high and low voltage.

Make sure to have a second switch available to remove power from the relays locally if there is an emergency or for maintenance.

Table 8 Wiring information—relays

NO	COM	NC
Normally open	Common	Normally closed

3.5.6 Connect to the analog outputs

The analyzer has six isolated 0–20 mA or 4–20 mA analog outputs. The loop maximum resistance is 600 Ω.

Use the analog outputs for analog signaling or to control other external devices. Each analog output supplies an analog signal (e.g., 4–20 mA) that represents the analyzer reading for a selected channel.

Refer to Connect to an external device on page 23 to connect an external device to an analog output. Refer to the Operations manual to configure the analog output.

The analog output terminals accept 0.644 to 1.29 mm^2 (24 to 16 AWG) wire[8]. Use twisted pair shielded wire for the 4–20 mA output connections. Connect the shield at the recorder end. Use of non-shielded cable can result in radio frequency emission or susceptibility levels higher than the allowed levels.

Notes:

- The analog outputs are isolated from the other electronics and isolated from each other.
- The analog outputs are self-powered. Do not connect to a load with voltage that is independently applied.
- The analog outputs cannot be used to supply power to a 2-wire (loop-powered) transmitter.

3.5.7 Connect to the digital inputs

The analyzer can receive a digital signal or contact closure from an external device that causes the analyzer to skip a sample channel. For example, a flow meter can send a high digital signal when the sample flow is low and the analyzer skips the applicable sample channel. The analyzer continues to skip the applicable sample channel until the digital signal stops.

Note: *All of the sample channels cannot be skipped with Digital Inputs 1 to 4. A minimum of one sample channel must be in use. To stop all of the measurements, use Digital Input 6 (DIG6) to put the analyzer in standby mode.*

Refer to Table 9 for the digital input functions. The digital inputs are not programmable.

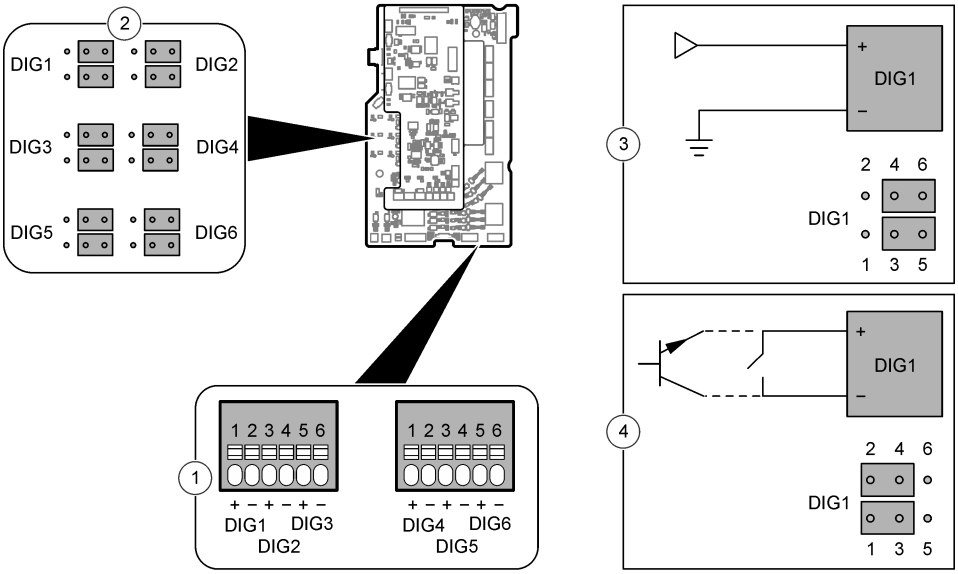
The digital input terminals accept 0.644 to 1.29 mm^2 (24 to 16 AWG) wire[9].

Each digital input can be configured as an isolated TTL type digital input or as a relay/open-collector type input. Refer to Figure 8. By default, the jumpers are set for isolated TTL type digital input.

Refer to Connect to an external device on page 23 to connect an external device to a digital input.

[7] 1.0 mm^2 (18 AWG) stranded wire is recommended.
[8] 0.644 to 0.812 mm^2 (24 to 20 AWG) wire is recommended.
[9] 0.644 to 0.812 mm^2 (24 to 20 AWG) wire is recommended.

Figure 8 Isolated TTL type digital input



1 Digital input connectors	**3** Isolated TTL type digital input
2 Jumpers (12x)	**4** Relay/Open-collector type input

Table 9 Digital input functions

Digital input	Function	Notes
1	Channel 1—disable or enable	High: disable, Low: enable
2	Channel 2—disable or enable	High: disable, Low: enable
3	Channel 3—disable or enable	High: disable, Low: enable
4	Channel 4—disable or enable	High: disable, Low: enable
5	Start calibration	High: start auto calibration
6	Start analyzer	High: start analyzer Low: stop analyzer (standby mode)
High = relay/open-collector on or TTL input high (2 to 5 VDC), 30 VDC maximum Low = relay/open-collector off or TTL input low (0 to 0.8 VDC)		

3.5.8 Connect to an external device

Note: *To keep the enclosure rating, make sure that all of the external and internal electrical access ports that are not used are sealed. For example, put a plug in a strain relief fitting that is not used.*

1. Remove the electrical access cover. Refer to Remove the electrical access cover on page 15.
2. For analyzers **with** an enclosure, install a strain-relief fitting in one of the external ports for external device connections. Refer to Figure 9.
3. For all analyzers, put the external device cable through the rubber plug of one of the internal ports for external device connections. Refer to Figure 10.
4. Connect the cable wires to the applicable terminals on the main circuit board. Refer to Figure 11.
   Refer to Specifications on page 3 for wiring requirements.

5. If the cable has a shield wire, connect the shield wire to the ground stud. Use the ring terminal supplied with the analyzer. Refer to Figure 12.
6. Install the electrical access cover.

Figure 9 Remove an external plug and install a strain-relief fitting

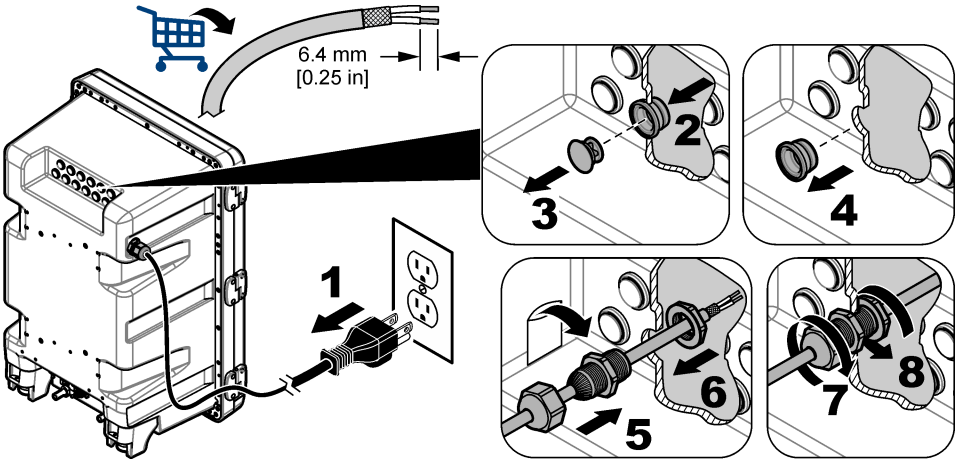


Figure 10 Put the cable through an internal port plug

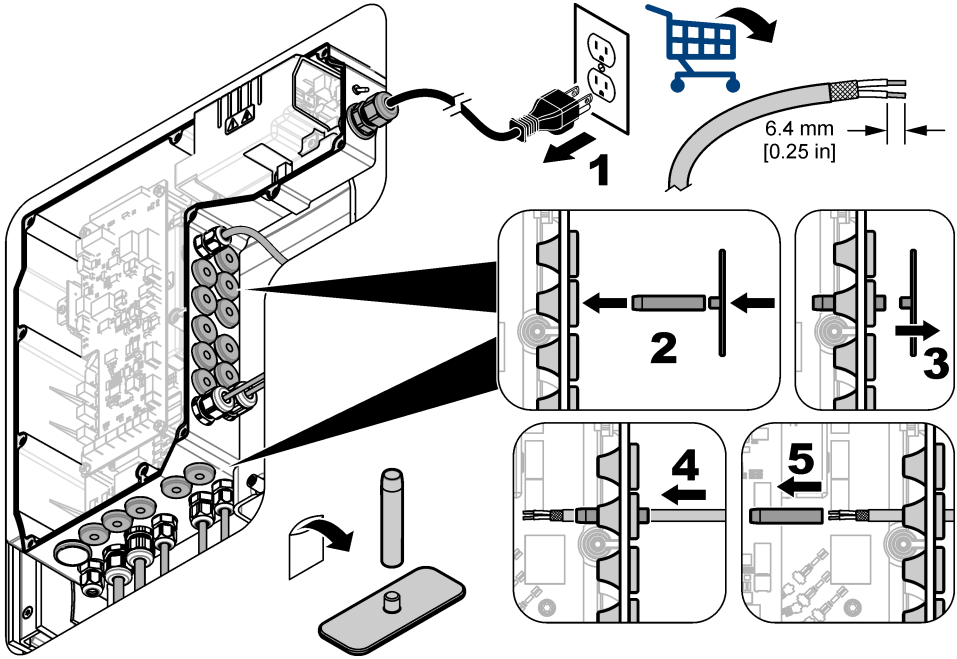
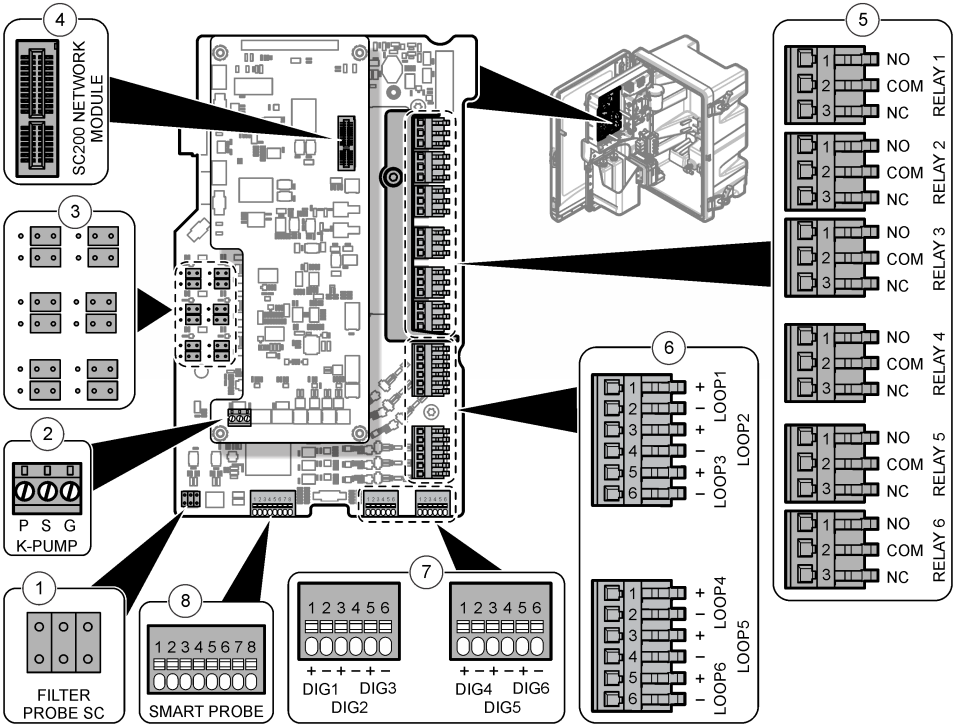
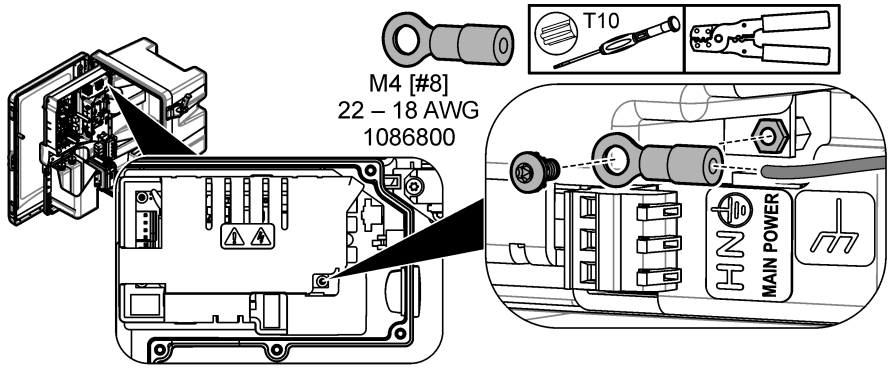


Figure 11 Wiring connections—main circuit board



1 Filter probe sc connection	**4** Module connection	**7** Digital input connections
2 Cationic pump connection	**5** Relay connections	**8** Smart probe connection
3 Jumpers for the digital inputs	**6** 4–20 mA output connections	

Figure 12 Connect the shield wire



3.5.9 Connect external sensors

External digital sc sensors can connect to the analyzer with the optional Smart Probe Adapter (9321000). Refer to the Smart Probe Adapter documentation.

3.5.10 Install modules

Add modules for additional output communications options. Refer to the documentation that is supplied with the module.

3.6 Plumbing

3.6.1 Connect the drain lines

⚠ CAUTION

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

Connect the supplied $^{11}/_{16}$-in. OD (larger) tubing to the chemical drain and case drain.

For analyzers **with** an enclosure, refer to Figure 14 on page 28.

For analyzers **without** an enclosure, refer to Figure 15 on page 29.

Note: *Analyzers without enclosures do not have a case drain.*

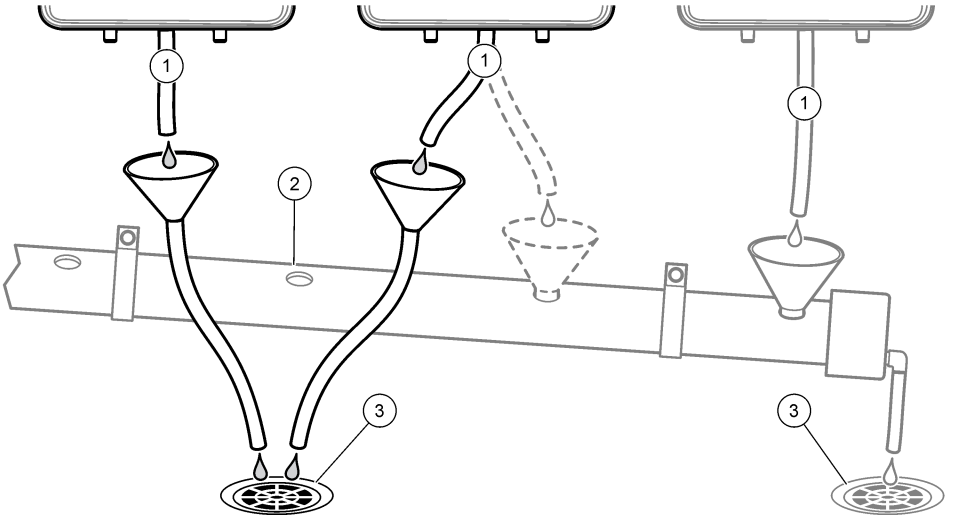
3.6.2 Drain line guidelines

NOTICE

Incorrect installation of the drain lines can cause liquid to go back into the instrument and cause damage.

- Make sure that the drain lines are open to air and are at zero back pressure. Refer to Figure 13.
- Make the drain lines as short as possible.
- Make sure that the drain lines have a constant slope down.
- Make sure that the drain lines do not have sharp bends and are not pinched.

Figure 13 Drain lines open to air



1 Sample drain tubing	**2** Drain pipe	**3** Floor drain

3.6.3 Sample line guidelines

Select a good, representative sampling point for the best instrument performance. The sample must be representative of the entire system.

To prevent erratic readings:

- Collect samples from locations that are sufficiently distant from points of chemical additions to the process stream.
- Make sure that the samples are sufficiently mixed.
- Make sure that all chemical reactions are complete.

3.6.4 Sample requirements

The water from the sample source(s) must agree with the specifications in Specifications on page 3.

Keep the sample flow rate and operating temperature as constant as possible for best performance.

3.6.5 Plumb the sample lines

⚠ CAUTION

Explosion hazard. Use only the supplied regulator from the manufacturer.

1. Connect the sample lines as follows:
   a. Identify the sample inlet and the sample bypass drain for Channel 1.

      For analyzers **with** an enclosure, refer to Figure 14.

      For analyzers **without** an enclosure, refer to Figure 15.
   b. Use the supplied tubing cutter to cut a piece of 6 mm OD (smaller) tubing for the sample inlet line. Make sure that the tube length is sufficiently long to connect the sample inlet to the sample source. Keep the sample inlet line as short as possible.
   c. Use the supplied tubing cutter to cut a piece of 6 mm OD (smaller) tubing for the sample bypass line. Make sure that the tube length is sufficiently long to connect the sample bypass drain to an open chemical drain.

      Note: *As an alternative, use ¼-in. OD tubing and tubing adapters (6 mm to ¼-in. OD) to plumb the sample inlet line(s) and sample bypass line(s).*
   d. Push the tubes into the sample inlet and sample bypass drain. Push the tubes in 14 mm (0.55 in.) to make sure that the tubes are pushed to the stop.
   e. Do step 1 again for another channel(s) as necessary.

      For analyzers **with** an enclosure, refer to Figure 16 on page 30 to identify the sample inlet and sample bypass drain for each channel.

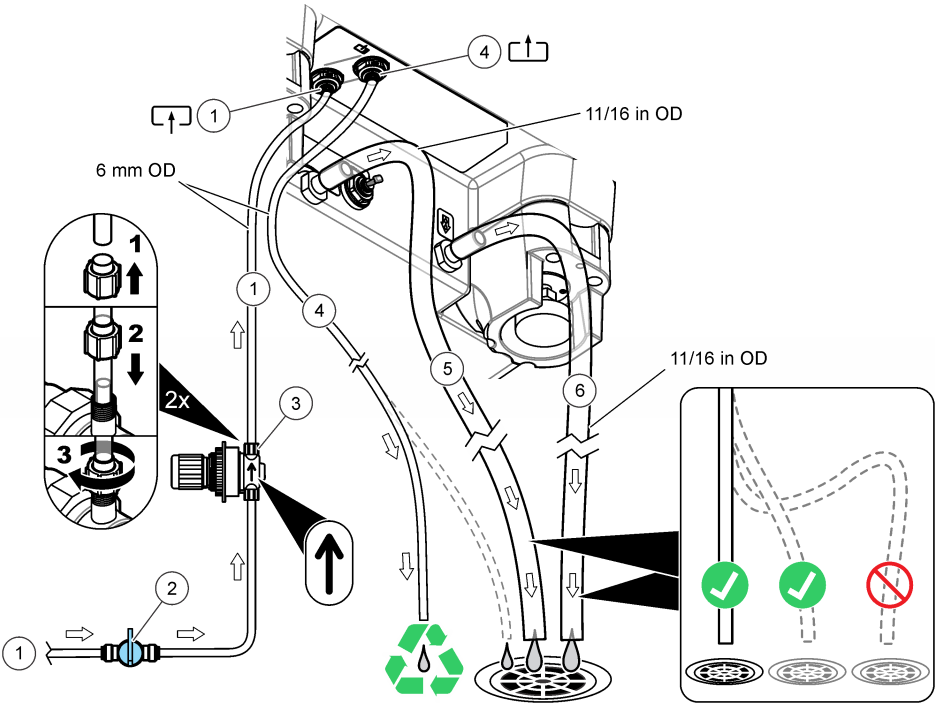
      For analyzers **without** an enclosure, refer to Figure 17 on page 30 to identify the sample inlet and sample bypass drain for each channel.
2. To keep the enclosure rating, install the supplied, red plugs in the sample inlets and sample bypass drains that are not used.

   Do not install a red plug in the DIPA exhaust port.
3. Connect the sample inlet lines to the optional heat exchanger if the temperature difference between the samples is more than 15 °C (27 °F). Refer to the documentation supplied with the heat exchanger for instructions.
4. Install a pressure regulator on each sample inlet line. For analyzers **with** an enclosure, refer to Figure 14.

   For analyzers **without** an enclosure, refer to Figure 15.
5. Make sure that the water pressure to the pressure regulator is less than 6 bar (87 psi) or a blockage at the pressure regulator can occur.
6. Install a shut-off valve on each sample inlet line before the pressure regulator.
7. If the sample turbidity is more than 2 NTU or the sample contains iron particulates, oil or grease, install a 100 um filter on each sample inlet line. Refer to *Replacement parts and accessories* in the maintenance and troubleshooting manual for ordering information.
8. Connect each sample line to a sample source.

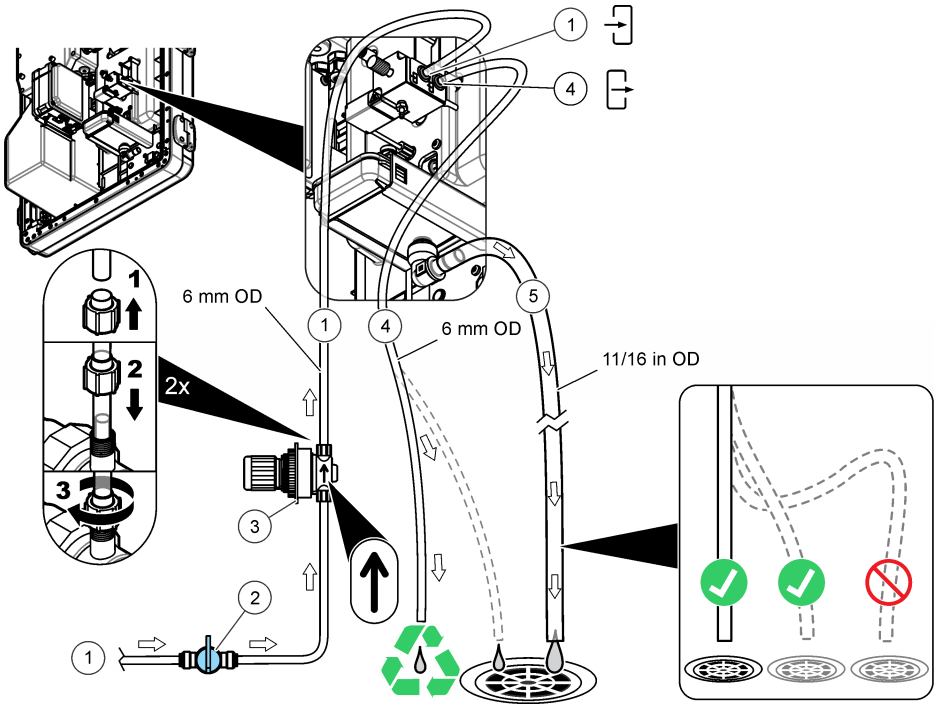
9. Turn the shut-off valve(s) to the open position.
10. Make sure that there are no leaks at the tubing connections. If there is a leak at a fitting, push the tube farther into the fitting.

Figure 14 Sample and drain lines—Analyzer with enclosure



1 Sample inlet for Channel 1	**3** Pressure regulator (0.276 bar or 4 psi), non-adjustable	**5** Case drain
2 Shut-off valve	**4** Sample bypass drain for Channel 1	**6** Chemical drain

Figure 15 Sample and drain lines—Analyzer without enclosure



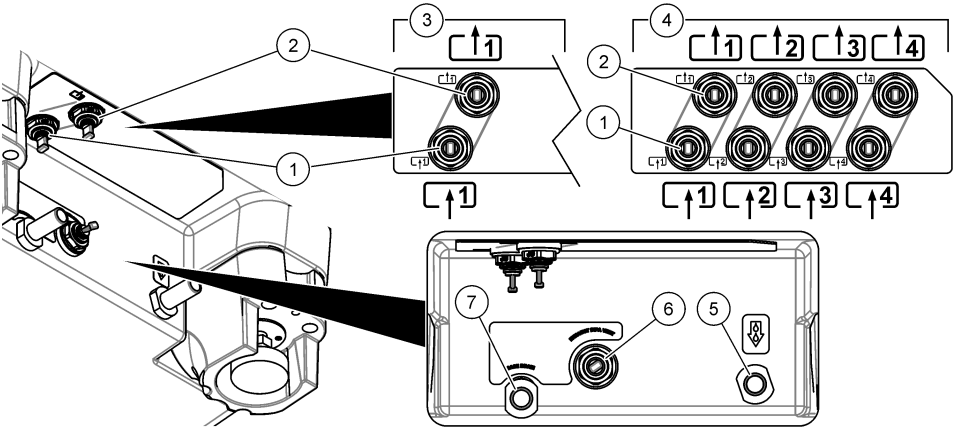
1 Sample inlet for Channel 1	**3** Pressure regulator (0.276 bar or 4 psi), non-adjustable	**5** Chemical drain
2 Shut-off valve	**4** Sample bypass drain for Channel 1	

3.6.6 Plumbing ports

Figure 16 shows the sample line, drain line and DIPA exhaust vent connections for analyzers **with** an enclosure.

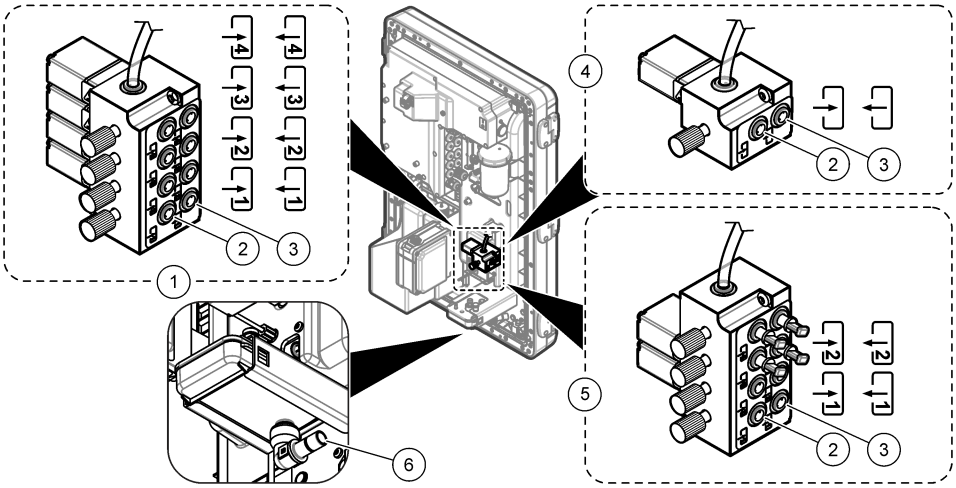
Figure 17 shows the sample line and drain line connections for analyzers **without** an enclosure.

Figure 16 Plumbing ports—Analyzer with enclosure



1 Sample inlets (bottom row)	**4** Plumbing ports for 2- or 4-channel analyzers	**7** Case drain for spills or leaks
2 Sample bypass drains (top row)	**5** Chemical drain	
3 Plumbing ports for 1-channel analyzers	**6** DIPA exhaust vent	

Figure 17 Plumbing ports—Analyzer without enclosure



1 Plumbing ports for 4-channel analyzers	**4** Plumbing ports for 1-channel analyzers
2 Sample inlets (left column)	**5** Plumbing ports for 2-channel analyzers
3 Sample bypass drains (right column)	**6** Chemical drain

3.6.7 Remove the plug from the air purge fitting

Note: *Only do this task if the analyzer has an enclosure and does not have the optional cationic pump. Refer to Figure 2 on page 9 to identify the cationic pump.*

1. Remove the plug from the air purge fitting. Refer to Figure 19 on page 32.
2. To keep the NEMA rating of the enclosure, do the steps that follow:
   a. Connect a 0.3 m (1 ft) length of the supplied 6-mm tubing to the DIPA exhaust vent. Refer to Figure 16 on page 30 to identify the DIPA exhaust vent.
   b. Connect a 0.3 m (1 ft) length of the supplied 6-mm tubing to the air purge fitting.

3.6.8 Plumb the DIPA exhaust

⚠ WARNING

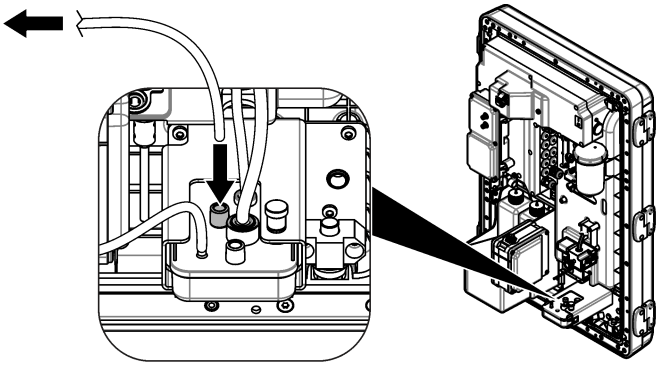
Gas inhalation hazard. Plumb the DIPA exhaust vent to outside air or a fume hood to prevent exposure to toxic gas.

Note: *Only do this task if the analyzer has the optional cationic pump. Refer to Figure 2 on page 9 to identify the cationic pump.*

For analyzers **with** an enclosure, use the supplied 6-mm OD tubing to connect the DIPA exhaust vent to outside air or a fume hood. Refer to Figure 16 on page 30 to identify the DIPA exhaust vent.

For analyzers **without** an enclosure, use the supplied 6-mm OD tubing to connect the DIPA exhaust port to outside air or a fume hood. Refer to Figure 18.

Figure 18 DIPA exhaust port—analyzer without enclosure

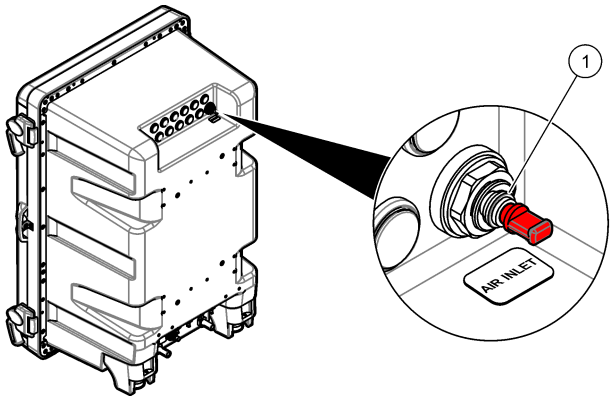


3.6.9 Connect the air purge (optional)

Note: *Only do this optional task if the analyzer has an enclosure.*

To keep dust and corrosion out of the instrument enclosure, supply clean, dry instrument-quality air at 0.425 m^3/hour (15 scfh) to the air purge fitting with 6-mm OD plastic tubing. Refer to Figure 19.

Figure 19 Air purge fitting



1	Air purge fitting

3.7 Install the analyzer bottles

⚠ WARNING

Chemical exposure hazard. Obey laboratory safety procedures and wear all of the personal protective equipment appropriate to the chemicals that are handled. Read the safety data sheet from the supplier before bottles are filled or reagents are prepared. For laboratory use only. Make the hazard information known in accordance with the local regulations of the user.

⚠ CAUTION

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

3.7.1 Install the conditioning solution

⚠ WARNING

Inhalation hazard. Do not breathe Diisopropylamine (DIPA) or ammonia fumes. Exposure may result in severe injury or death.

⚠ WARNING

Diisopropylamine (DIPA) and ammonia are a flammable, corrosive and toxic chemical. Exposure may result in severe injury or death.

The manufacturer recommends the use of Diisopropylamine (DIPA) 99% for the conditioning solution. As an alternative, use ammonia (more than 28%) if the specification limitations of this amine are understood. Table 10 shows the comparisons of detection limit, accuracy, repeatability and consumption.

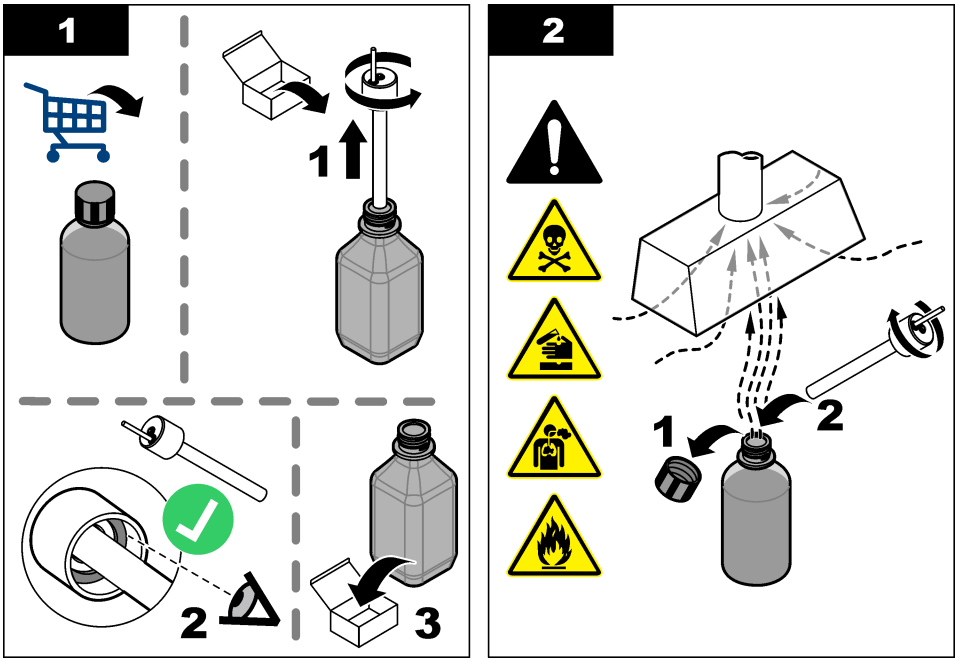
Items supplied by the user:

- Personal protective equipment (refer to MSDS/SDS)
- Diisopropylamine (DIPA) 99%, 1 L bottle
- Bottle adapter for Merck® or Orion® DIPA bottles if applicable

Install a DIPA bottle as follows:

1. Put on the personal protective equipment identified in the safety data sheet (MSDS/SDS).
2. Turn the latch on the analytic panel to the unlock position. Open the analytics panel.
3. Install the DIPA bottle. For analyzers **with** an enclosure, refer to the illustrated steps in Figure 20.
   For analyzers **without** an enclosure, refer to the illustration steps in Figure 21.
   Do illustrated step 2 under a fume hood if available. Do not breathe DIPA fumes.
4. For analyzers with the optional cationic pump, remove the short tube from the cap. Put the outlet tube from the cationic kit in the cap. Refer to Figure 2 on page 9 to identify the cationic pump.

Figure 20 DIPA bottle installation—Analyzer with enclosure



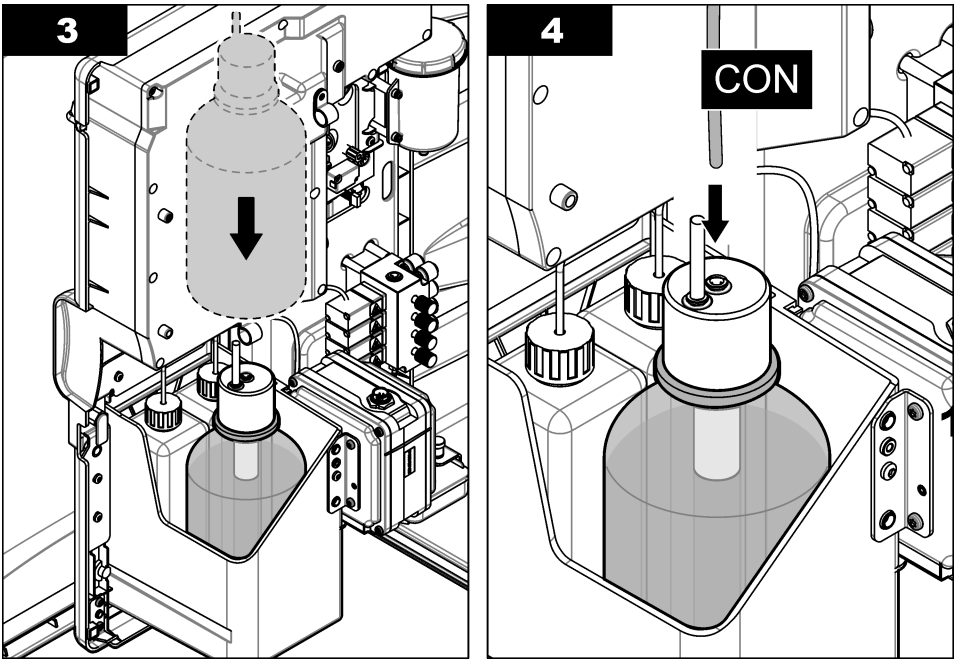
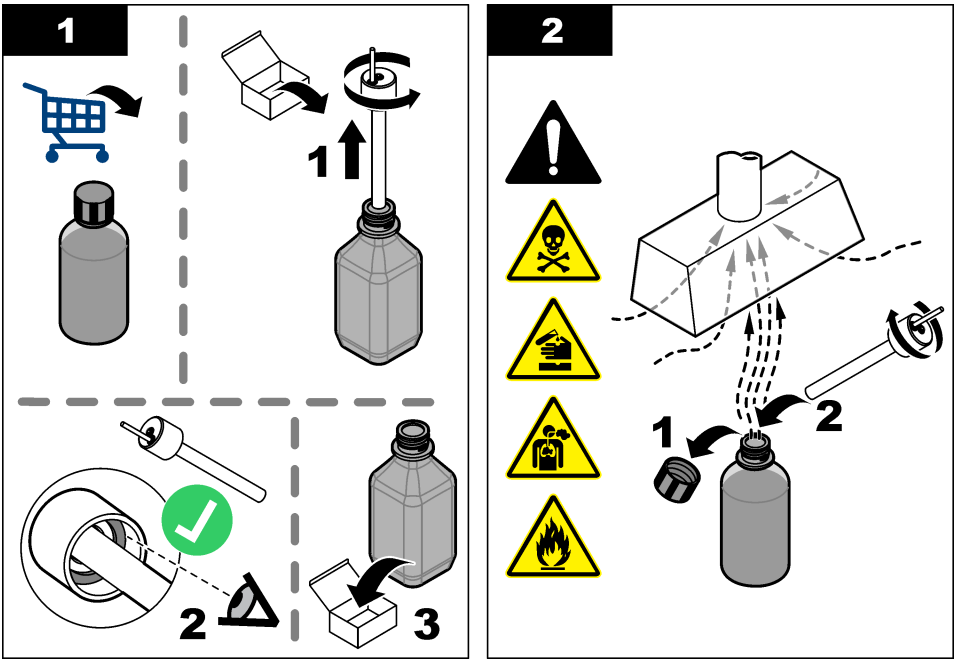


Figure 21 DIPA bottle installation—Analyzer without enclosure



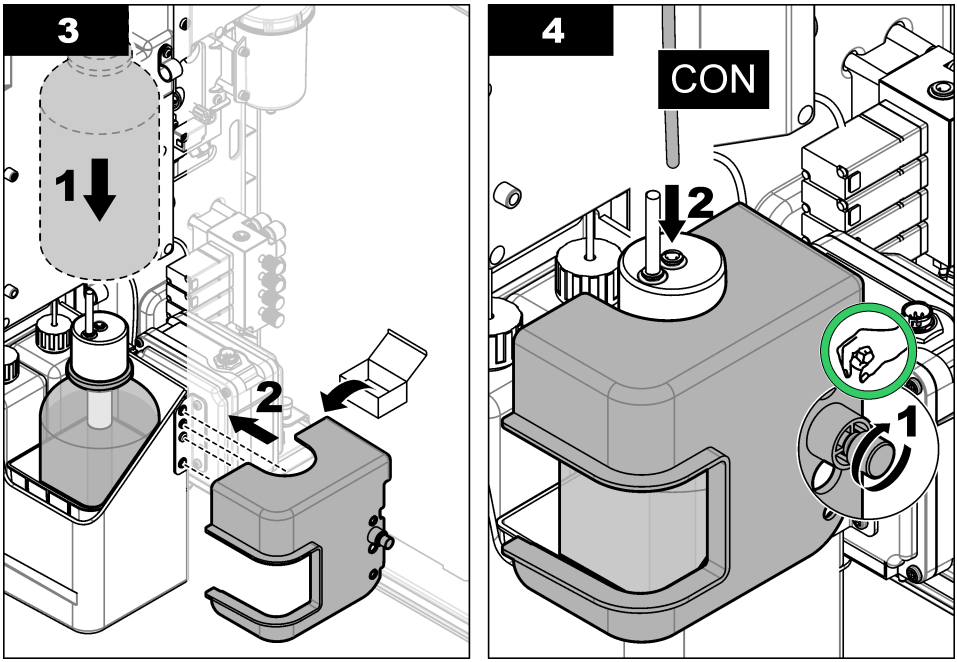


Table 10 Comparison of conditioning solutions

	DIPA ($C_6H_{15}N$)	Ammonia (NH_3)
Lowest detection limit	0.01 ppb	2 ppb
Accuracy (analyzer without cationic pump)	±0.1 ppb or ±5% (the larger value)	±1 ppb or ±5% (the larger value)
Accuracy (analyzer with cationic pump)	±2 ppb or ±5% (the larger value)	±2 ppb or ±5% (the larger value)
Repeatability with a 10 °C (18 °F) variation	< 0.02 ppb or 1.5% (the larger value)	< 0.1 ppb or 1.5% (the larger value)
Consumption of 1 L at 25 °C (77 °F) for a pH measurement of 10 to 10.5	13 weeks (approximately)	3 weeks (approximately)

3.7.2 Fill the reactivation solution bottle

Put on the personal protective equipment identified in the safety data sheet (MSDS/SDS). Then fill the reactivation solution bottle with 500 mL of 0.5M Sodium Nitrate ($NaNO_3$).

Note: *The reactivation bottle has a label with a red stripe. A red "REACT" label is attached to the reactivation bottle tubing.*

If prepared solution **is** available, go to the next section.

If prepared solution **is not** available, prepare 500 mL of 0.5M Sodium Nitrate as follow:

Items supplied by the user:

- Personal protective equipment (refer to MSDS/SDS)
- Volumetric flask, 500 mL
- $NaNO_3$, 21.25 g

- Ultra pure water, 500 mL

1. Put on the personal protective equipment identified in the safety data sheet (MSDS/SDS).
2. Rinse the volumetric flask with ultra pure water three times.
3. Add approximately 21.25 g of $NaNO_3$ to the volumetric flask.
4. Add 100 mL of ultra pure water to the volumetric flask.
5. Shake the volumetric flask until the powder is fully dissolved.
6. Add ultra pure water to the 500-mL mark.
7. Shake the volumetric flask to fully mix the solution.

   Note: *The approximate shelf life of the prepared solution is 3 months.*

3.7.3 Rinse and fill the calibration standard bottle

Add a small quantity of calibration standard to the calibration standard bottle. Swirl the bottle to rinse the bottle, then discard the calibration standard. Fill the calibration standard bottle with 10-mg/L (10-ppm) Sodium Chloride (NaCl) standard.

Note: *Not all analyzers have a calibration bottle. The calibration standard bottle has a label with a yellow stripe. A yellow "CAL" label is attached to the tubing for the calibration standard bottle.*

If prepared solution **is** available, go to the next section.

If prepared solution **is not** available, prepare 10-mg/L NaCl standard as follows. All volumes and quantities used to prepare the calibration standard must be precise.

Items supplied by the user:

- Volumetric flask (2x), 500 mL, Class A
- NaCl, 1.272 g
- Ultra pure water, 500 mL
- 1–10 mL TenSette pipet and tips

1. Prepare 500 mL of 1-g/L NaCl standard as follows:

   a. Rinse the volumetric flask with ultra pure water three times.
   b. Add 1.272 g NaCl to the volumetric flask.
   c. Add 100 mL of ultra pure water to the volumetric flask.
   d. Shake the volumetric flask until the powder is fully dissolved.
   e. Add ultra pure water to the 500-mL mark.
   f. Shake the volumetric flask to fully mix the solution.
2. Prepare 500 mL of 10-mg/L NaCl standard as follows:

   a. Rinse the other volumetric flask with ultra pure water three times.
   b. Use a pipet to add 5 mL of the 1-g/L calibration standard to the volumetric flask. Put the pipet in the flask to add the solution.
   c. Add ultra pure water to the 500-mL mark.
   d. Shake the volumetric flask to fully mix the solution.

   Note: *The approximate shelf life of the prepared solution is 3 months.*

Section 4 Preparation for use

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

Section A Appendix

A.1 Prepare KCl electrolyte

To prepare 500 mL of 3M KCl electrolyte, do the steps that follow:

Items supplied by the user:

- Personal protective equipment (refer to MSDS/SDS)
- Volumetric flask, 500 mL
- KCl, 111.75 g
- Ultra pure water, 500 mL

1. Put on the personal protective equipment identified in the safety data sheet (MSDS/SDS).
2. Rinse the volumetric flask with ultra pure water three times.
3. Add approximately 111.75 g of KCl to the volumetric flask.
4. Add 100 mL of ultra pure water to the volumetric flask.
5. Shake the volumetric flask until the powder is fully dissolved.
6. Add ultra pure water to the 500-mL mark.
7. Shake the volumetric flask to fully mix the solution.
8. Put the unused KCl electrolyte in a clean plastic bottle. Put a label on the bottle that identifies the solution and the date it was prepared.

   Note: *The approximate shelf life of the prepared electrolyte is 3 months.*

目录

第 1 节 规格

产品规格如有变化，恕不另行通知。

表 1 一般技术指标

规格	详细信息
尺寸 (W x H x D)	带有外壳的分析仪：45.2 x 68.1 x 33.5 cm (17.8 x 26.8 x 13.2 in) 不带外壳的分析仪：45.2 x 68.1 x 25.4 cm (17.8 x 26.8 x 10.0 in)
外壳	带有外壳的分析仪：NEMA 4/IP65 不带外壳的分析仪：IP65，PCBA 外罩 材料：硬质聚氨酯的箱体，PC 材料的门，PC 材料的铰链，不锈钢 304 五金件
重量	带有外壳的分析仪：空瓶时为 20 kg (44.1 lb)，满瓶时为 21.55 kg (47.51 lb) 不带外壳的分析仪：空瓶时为 14 kg (30.9 lb)，满瓶时为 15.55 kg (34.28 lb)
安装方式	带有外壳的分析仪：墙壁、面板或台面安装 不带外壳的分析仪：面板安装
防护等级	1
污染等级	2
安装类别	II
电源要求	100 - 240 VAC，50/60 Hz，± 10%；标称 0.5 A，最高 1.0 A；最高 80 VA
工作温度	5 到 50 °C（41 到 122 °F）
工作湿度	相对湿度 10% - 80%，无冷凝
存储温度	-20 到 60°C（-4 到 140 °F）
样品流数量	1、2 或 4 个，带可编程序列
模拟输出端	6 个隔离型；0–20 mA 或 4–20 mA；负载阻抗：最大 600 Ω 接线：0.644 ～ 1.29 mm^2 (24 ～ 16 AWG) 电线；推荐使用 0.644 ～ 0.812 mm^2 (24 ～ 20 AWG) 双绞屏蔽线
继电器	6 个；类型：无源 SPDT 继电器，额定电流 5 A（电阻负载），最大电压 240 VAC 接线：1.0 ～ 1.29 mm^2 (18 ～ 16 AWG) 电线；推荐使用 1.0 mm^2 (18 AWG) 绞线，线缆外径 5–8 mm。请确保现场所用电缆线的绝热性不低于 80 °C (176 °F)。
数字输入端	6 个，不可编程，隔离型 TTL 数字输入端，或作为继电/开集式输入端 0.644 - 1.29 mm^2 (24 - 16 AWG) 电线；推荐使用 0.644 - 0.812 mm^2 (24 - 20 AWG) 绞线
保险丝	电源输入：T 1.6 A，250 VAC 继电器：T 5.0 A，250 VAC
接头	样品入口和样品旁通排放口：接 6 mm 外径硬管的推入式快接接头 化学品和壳体排放口：7/16-in。内径软管的推入式接头
认证	CE、CB、cETLus、TR CU、RCM、KC EAC

表 2 采样要求

规格	详细信息
样品压力	0.2 至 6 bar (3 至 87 psi)
样品流速	100 - 150 mL/min (6 - 9 L/h)
样品温度	5 到 45 °C（41 到 113 °F）
样品 pH 值	未配备阳床泵的分析仪：pH 6 - 10 配备阳床泵的分析仪：pH 2 - 10
样品酸度（以 $CaCO_3$ 计）	未配备阳床泵的分析仪：小于 50 ppm 配备阳床泵的分析仪：小于 250 ppm
样品中的悬浮固体	小于 2 NTU，无油脂

表 3 测量规格

规格	详细信息
电极类型	钠 ISE 电极（离子选择性电极）和 KCl 电解液参比电极
测量范围	未配备阳床泵的分析仪：0.01 - 10,000 ppb 配备阳床泵的分析仪：0.01 ppb - 200 ppm
准确度	未配备阳床泵的分析仪： • 0.01 ppb 至 2 ppb：± 0.1 ppb • 2 ppb 至 10,000 ppb：± 5% 配备阳床泵的分析仪： • 0.01 ppb 至 40 ppb：± 2 ppb • 40 ppb 至 200 ppm：± 5%
准确度/可重复性	样品温差为 ± 10 °C (50 °F) 时，小于 0.02 ppb 或的 1.5%（取大值）
干扰磷酸盐 10 ppm	测量干扰小于 0.1 ppb
响应时间	请参见表 4。
稳定时间	开机：2 小时；样品温度变化：从 15 °C 升到 30 °C（从 59 °F 升到 86 °F）需要 10 分钟 当样品温差超过 15 °C (27 °F) 时，使用选装热交换器。
校准时间	50 分钟（典型值）
校准	自动校准：两点已知添加法；手动校准：1 或 2 个点
最低检测极限	0.01 ppb
自动校准液	约 500 mL 10 ppm 氯化钠，使用期不超过 3 个月，校准间隔 7 天。 容器：0.5 L，HDPE 材料，带聚丙烯盖
活化液	约 500 mL 0.5M 硝酸钠，使用期不超过 3 个月，活化间隔 24 小时。 容器：0.5 L，HDPE 材料，带聚丙烯盖

表 3 测量规格 （续）

规格	详细信息
3M KCl 电解液	约 200 mL 3M KCl 电解液，使用期不超过 3 个月。 容器：200 mL，聚碳酸酯
调节液	未配备阳床泵的分析仪：在 25 °C (77 °F) 环境下，将样品 pH 值调节到 11.2，1 L 的二异丙胺 (DIPA) 可使用近 2 个月。在 25 °C (77 °F) 环境下，将样品 pH 值调节到 10 - 10.5，1 L 的 DIPA 可使用近 13 周。 配备阳床泵的分析仪：DIPA 用量取决于所选 Tgas/Twater 比率。比率为 100% 时（样品体积与气体体积相同），DIPA 用量约为 90 mL/天。 容器：1 L，带盖玻璃容器，96 x 96.5 x 223.50 mm (3.78 x 3.80 x 8.80 in)

表 4 平均响应时间

T90% ≤ 10 分钟			
浓度变化（通道切换）	最大温差 (°C)	达到 0.1 ppb 或 5% 的准确度时间	
		上升时间（分钟）	下降时间（分钟）
0.1 ↔ 5 ppb	3	9	27
0.1 ↔ 50 ppb	3	11	41
0.1 ↔ 200 ppb	3	9	45
< 0.1 ↔ 1 ppb[1]	3	29	36
0.1 ↔ 50 ppb	15	11	41

第 2 节 基本信息

对于因本手册中的任何不足或遗漏造成的直接、间接、特别、附带或结果性损失，制造商概不负责。制造商保留随时更改本手册和手册中描述的产品的权利，如有更改恕不另行通知或承担有关责任。修订版可在制造商的网站上找到。

2.1 安全信息

对于误用或滥用本产品造成的任何损坏，包括但不限于直接、附带和从属损害，制造商概不负责，并且在适用法律允许的最大范围内拒绝承认这些损害。用户自行负责识别关键应用风险并安装适当的保护装置，以确保在设备可能出现故障时保护工艺流程。

请在拆开本设备包装、安装或使用前，完整阅读本手册。特别要注意所有的危险警告和注意事项。否则，可能导致操作员受到严重伤害或设备受到损坏。

请确保产品拆开时的完整无损伤。请勿以本手册指定方式之外的其它方式使用或安装本设备。

2.2 危害指示标识说明

⚠ 危险

表示潜在的或紧急的危险情况，如果不加以避免，将会导致死亡或严重伤害。

⚠ 警告

表示潜在的或紧急的危险情况，如果不加以避免，将会导致死亡或严重伤害。

⚠ 警告

表示潜在的危险情形，可能导致轻度或中度人身伤害。

[1] 实验使用超纯水（约 50 ppt）和 1 ppb 标准液。

注意
表明如不加以避免可能会导致仪器损坏的情况。此信息需要特别强调。

2.3 警示标签

请阅读贴在仪器上的所有标签和标记。如未遵照这些安全标签的指示操作，则可能造成人身伤害或仪器损坏。仪器上的符号在手册中通过警告说明参考。

	标有此符号的电气设备在欧洲不能通过家庭或公共垃圾系统进行处理。请将老旧或报废设备寄回至制造商处进行处置，用户无需承担费用。
	这是安全警报标志。请遵守此标志后面的所有安全信息，以避免可能造成的伤害。如果仪器上有此标志，则请参见仪器手册，了解操作或安全信息。
	此标志指示存在电击和/或触电死亡危险。
	此符号指示需要戴上防护眼镜。
	此符号指示标记的部件可能很热，接触时务必小心谨慎。
	此标志指示标记的项目需要保护性接地连接。如果仪器的电绳没有随附接地式插头，需确保保护导体端子连接了保护接地连接。

2.4 合规性和证明

⚠ 警告
本设备不适合在住宅环境中使用，在此类环境中可能无法为无线电接收提供充分的保护。

加拿大无线电干扰产生设备法规（Canadian Radio Interference-Causing Equipment Regulation），ICES-003，A 类：

支持性测试结果在制造商处保存。

此 A 类数字设备符合加拿大由于无线电干扰所产生的设备法规的所有要求。

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

FCC 第 15 部分，“A”类限制

支持性测试结果在制造商处保存。该设备符合 FCC 规定第 15 部分的要求。设备操作满足以下两个条件：

1. 本设备不会造成有害干扰。
2. 设备会接收任何干扰，包括可能造成意外的干扰。

若未经负责出具符合声明的一方明确同意擅自对本设备进行改动或改装，可能会导致取消用户操作该设备的权限。本设备已经过测试，符合 FCC 规定第 15 部分中确定的 A 类数字设备限制。这些限制专门提供当设备在商业环境下工作时针对有害干扰的合理保护。该设备产生、使用和放射无线电射频能

量，如果不按照说明手册的要求对其进行安装和使用，可能会对无线电通讯造成有害干扰。本设备在居民区工作时可能会产生有害干扰，这种情况下用户须自行承担费用消除这种干扰。以下方法可用于减少干扰问题：

1. 断开设备的电源，以便确证它是干扰源与否。
2. 如果设备与遭受干扰的仪器连接到相同的插座，将设备连接到其他插座。
3. 将设备从接受干扰的仪器边上移开。
4. 重新定位受干扰仪器的接收天线。
5. 同时尝试以上多项措施。

2.5 产品概述

⚠ 危险

化学或生物危害。如果该仪器用于监测处理过程和/或监测有法规限制以及有与公众健康、公众安全、食品或饮料制造或加工相关监测要求的化学药物添加系统时，仪器的使用者有责任了解并遵守所有适用的法规，并且要建立适当的机制，确保在仪器发生故障的时候也不会违法这些法规。

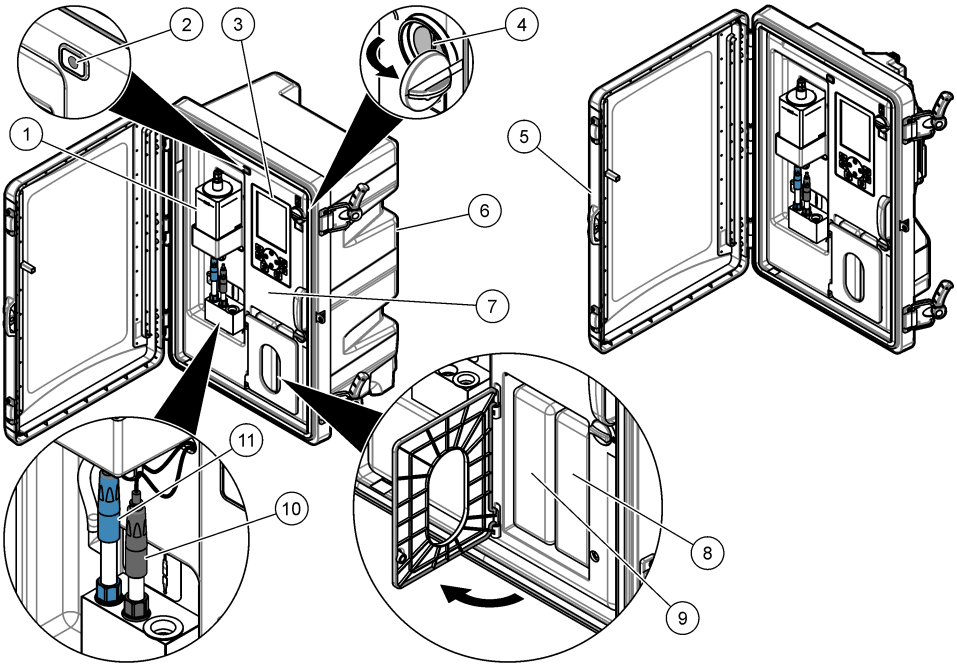
钠分析仪可持续测量超纯水中很低浓度的钠离子。请参阅 图 1 和 图 2 以概览分析仪部件。

钠分析仪可以带有或不带外壳。带有外壳的分析仪适合墙壁、面板或台面安装。不带外壳的分析仪适合面板安装。请参见图 1。

钠分析仪使用一个钠 ISE（离子选择性电极）和一个参比电极来测量水样中的钠离子浓度。按照能斯特定律，钠电极和参比电极之间的电位差与钠离子浓度的对数成正比。分析仪会在测量之前通过调节液将样品的 pH 值增加到 10.7 至 11.6 之间，以防温度或其它离子对钠离子测量产生干扰。

外门可以轻松地拆下，以便更好地执行安装和维护过程。仪器运行期间，必须将外门装上并关好。请参见图 3。

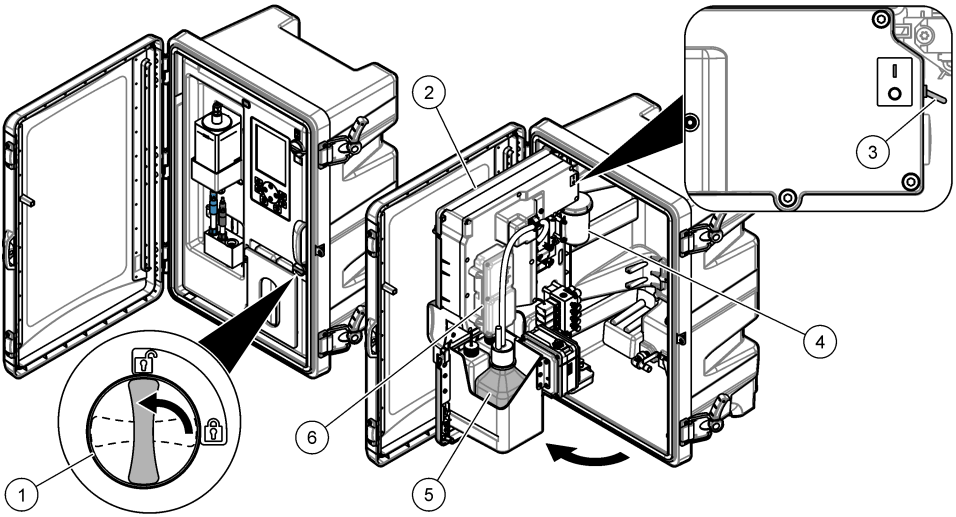
图 1 产品概述 — 外部视图



1 溢流容器	**7** 分析面板
2 状态指示灯（请参阅 表 5 第 45 页）	**8** 校准标准液瓶 [2]
3 显示屏和键盘	**9** 活化液瓶
4 SD 卡槽	**10** 钠电极
5 不带外壳的分析仪（面板安装）	**11** 参比电极
6 带有外壳的分析仪（墙壁、面板或台面安装）	

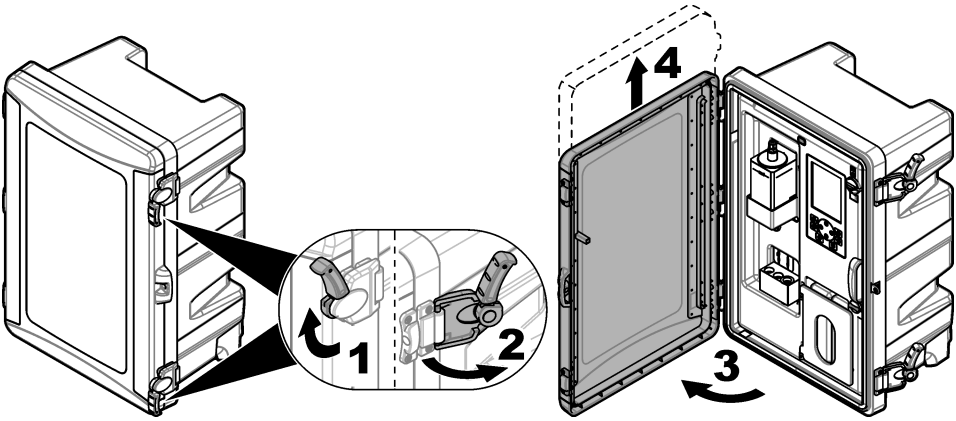
[2] 仅适用于选装自动校准功能的分析仪。

图 2 产品概述 — 内部视图



1 分析面板闩锁	**4** KCl 电解液储罐
2 分析面板（打开）	**5** 调节液瓶
3 电源开关	**6** 阳床泵选件 [3]

图 3 拆卸门



[3] 如果进入分析仪的样品的 pH 值小于 6，则必须选配阳床泵以确保获得准确的测量结果。

2.5.1 状态指示灯

状态指示灯显示分析仪的状态。请参阅 表 5。状态指示灯在显示屏上方。

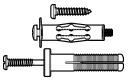
表 5 状态指示灯描述

颜色	“状态”
绿色	分析仪正在运行，无警告、错误或提醒。
黄色	分析仪正在运行，有警告或提醒被激活。
红色	分析仪未在运行，因为出现错误状况。发生了一个严重问题。

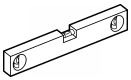
2.6 需准备的物品

准备下列物品以用于安装仪器。下列物品由用户提供。

此外，还要针对所处理的化学品备齐所有个人防护装备。有关安全规程，请参阅当前适用的安全数据表 (MSDS/SDS)。



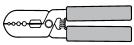
分析仪壁挂紧固件（若适用，共 4 件）[4]



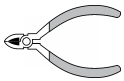
水平仪

卷尺

钻具



剥线钳



钢丝钳

去离子水（或样品水）

0.5M 硝酸钠，500 mL

10 mg/L 氯化钠标准液，500 mL

3M KCl 电解液，150 mL

二异丙胺，99%，1 L（或 28% 氨水 1 L)

每根样品管线 100 µm 过滤器（选装）

第 3 节 安装

⚠ 警告

多重危险。只有符有资质的专业人员才能从事文档本部分所述的任务。

3.1 安装指南

安装分析仪：

- 安装在室内清洁、干燥、通风良好且温度可控的位置.
- 安装在机械振动和电子噪音最小的位置.
- 尽可能接近样品源以降低分析延迟。
- 靠近敞开的化学废液排放口。
- 远离阳光直晒和热源。
- 使电源线插头容易辨认和接近。
- 位于空间宽敞的位置，便于从前面打开外门。

[4] 使用适合安装面的紧固件（¼ in 或 6 mm SAE J429 1 级或更强螺栓）。

- 周围留有足够间隙进行管路敷设和电气连接。

本仪器的工作海拔为最高 2000 m (6562 ft)。在高于 2000 m 的条件下使用本仪器会略微增大电气绝缘失效的风险，从而可能导致触电危险。制造商建议，用户如有疑虑，请联系技术支持。

3.2 机械安装

⚠ 危险

受伤或死亡风险。确保墙式安装能够承受设备 4 倍的重量。

⚠ 警告

人身伤害危险。
仪器或部件很重。使用协助资源进行安装或移动。
该物较重。确保仪器牢固安装在墙上、桌面或地面上，以便安全操作。

在室内非危险性环境中安装分析仪。

请参阅随附的安装文档。

3.3 电极安装

3.3.1 安装参比电极

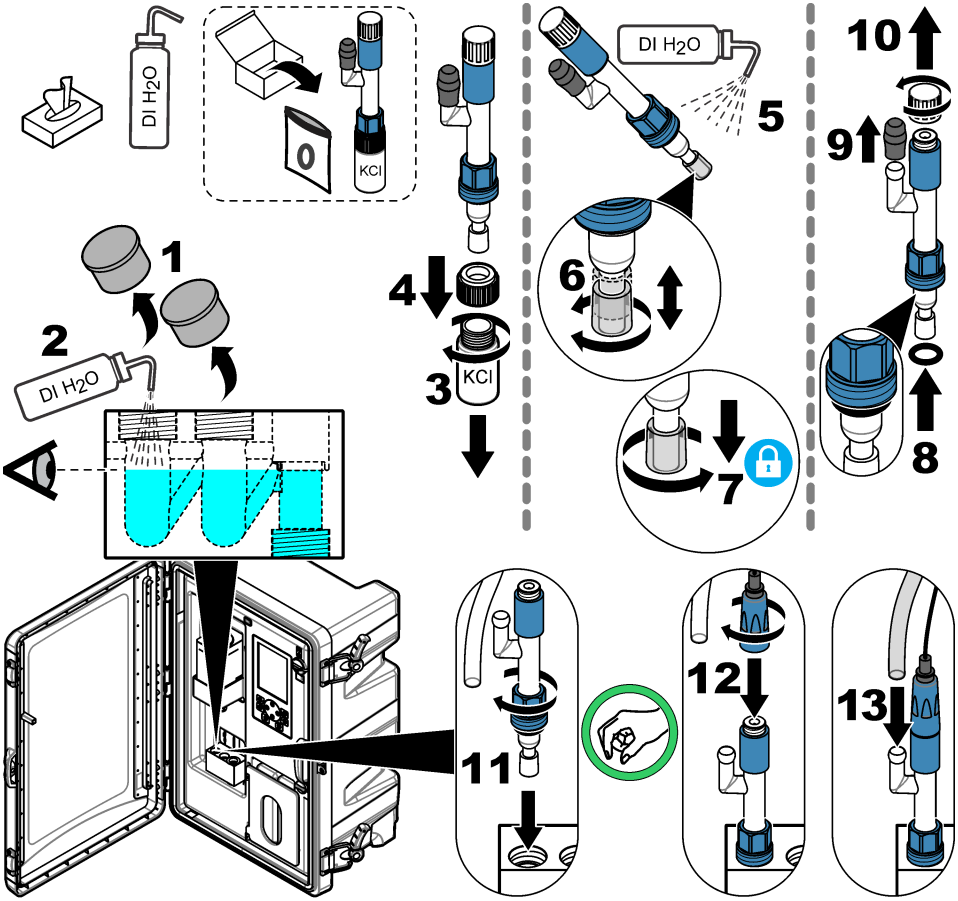
按照如下所示的图示步骤安装参比电极。

在图示步骤 6 中，仔细转动箍圈以旋开密封。然后上下移动箍圈，并左右转动。

在图示步骤 7 中，按下箍圈并旋转不到 1/4 圈，以锁紧箍圈。箍圈锁紧后将无法转动。如果箍圈未锁紧，KCl 电解液将从参比电极过快地流到测量池。

在图示步骤 12 中，确保将带有蓝色接头的线缆接到参比电极。

保留储液瓶和瓶盖以备将来使用。用去离子水冲洗储液瓶。



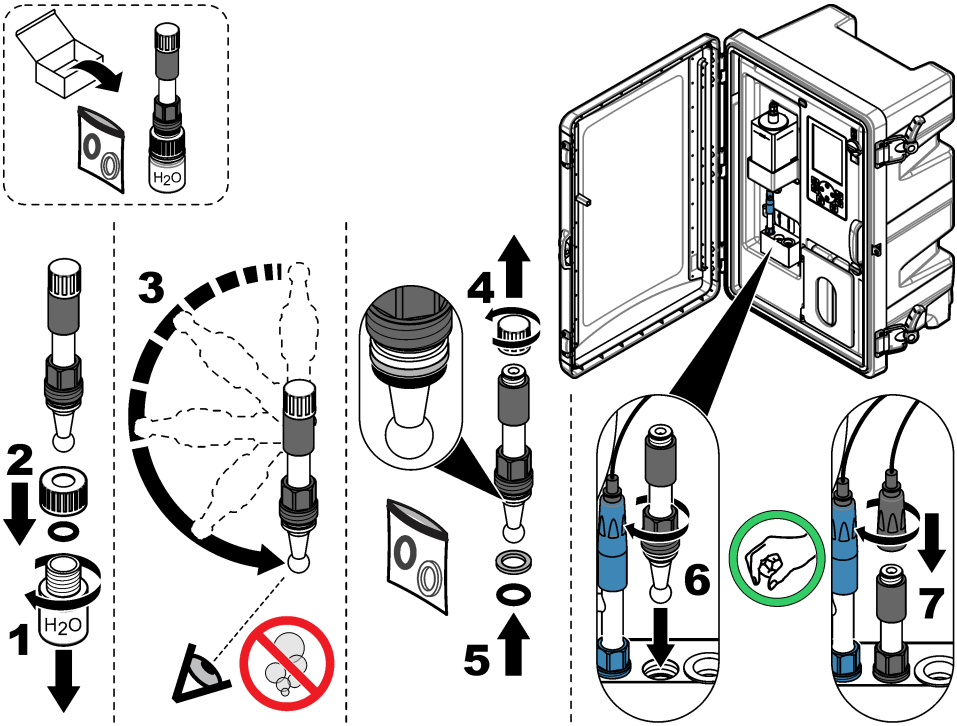
3.3.2 安装钠电极

按照如下所示的图示步骤安装钠电极。

在图示步骤 3 中，握住电极的顶部并使玻璃泡朝上。然后快速倒转电极，将液体向下甩入玻璃泡，直到玻璃泡中没有空气。

在图示步骤 7 中，确保将带有黑色接头的线缆接到钠电极。

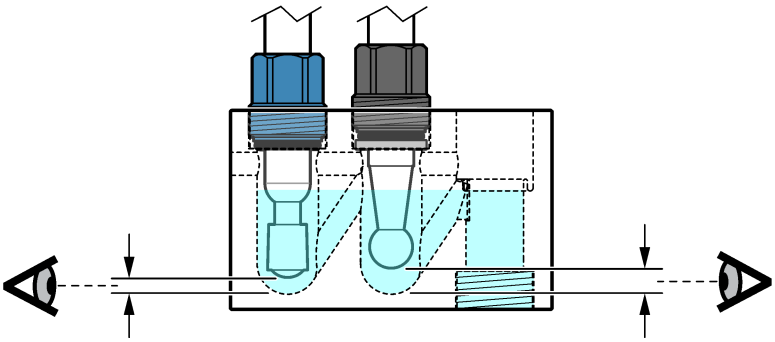
保留储液瓶和瓶盖以备将来使用。用去离子水冲洗储液瓶。



3.3.3 检查电极

确保参比电极和钠电极不会接触测量池的底部。请参阅 图 4。

图 4 检查电极



3.3.4 加注 KCl 电解液储罐

⚠ 警告

化学品暴露风险。遵守实验室安全规程，穿戴适用于所处理化学品的所有个人防护装备。请在加注瓶子或制备试剂之前阅读供应商的安全数据表。仅供实验室使用。请按照用户当地法规的要求公开危险信息。

⚠ 警告

化学品暴露风险。请遵循地方、区域和国家法规处置化学品和废弃物。

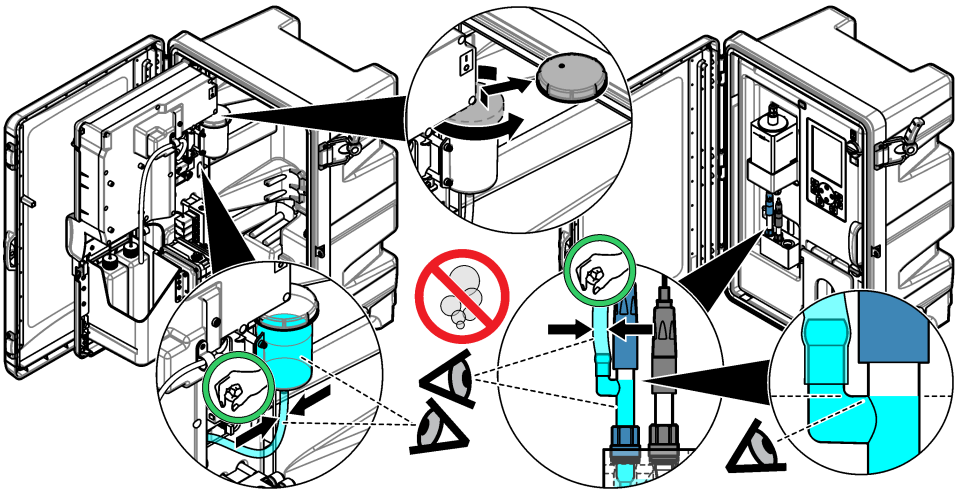
注： *要制备 3M KCl 电解液，请参阅* 制备 KCl 电解液 *第 71 页*。

按如下方式为 KCl 电解液储罐添加 3M KCl 电解液：

1. 穿戴安全数据表 (MSDS/SDS) 中标明的个人防护装备。
2. 将分析面板上的闩锁转到解锁位置。打开分析面板。
3. 取下 KCl 电解液储罐的盖子。请参见图 5。
4. 加注储罐（约 200 mL）。
5. 装回盖子。
6. 从分析面板的前侧用拇指和其它手指挤压 KCl 电解液管，使气泡沿着管子向上进入储罐中。请参见图 5。

   当气泡接近储罐时，在分析面板的两侧用双手挤压管子，以使气泡向上移动。
7. 继续挤压管子，直到参比电极中的 KCl 电解液位于玻璃接头（KCl 电解液从这里进入电极）的顶部。请参见图 5。
8. 关闭分析面板。将分析面板上的闩锁转到锁定位置。

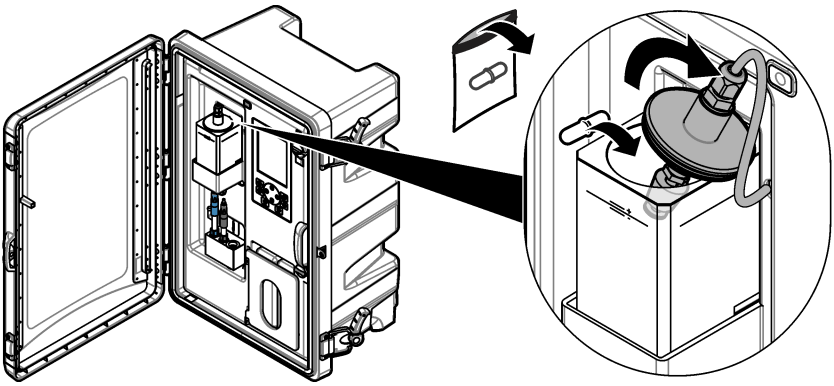
图 5 加注 KCl 电解液储罐



3.4 安装搅拌子

将随附的搅拌子放入溢流容器内。请参见图 6。

图 6 安装搅拌子



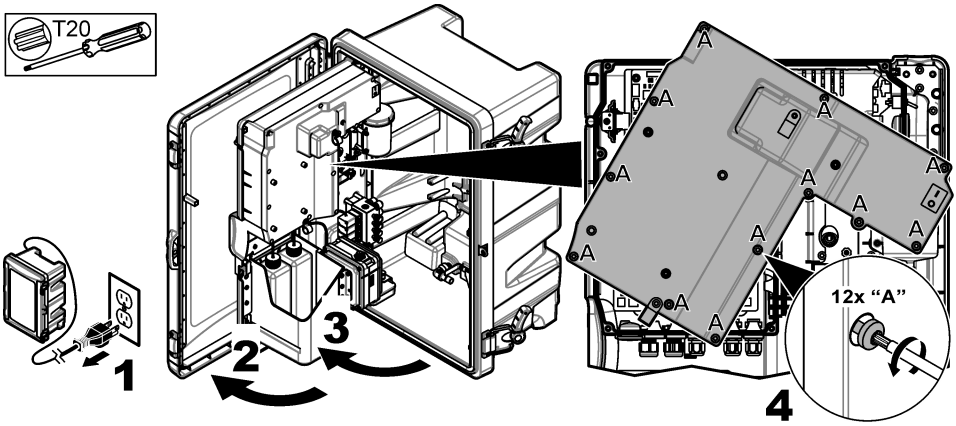
3.5 电气安装

⚠ 危险

电击致命危险。进行电气连接前，务必断开仪器的电源。

3.5.1 卸下电气检修盖

请参阅以下图示步骤。



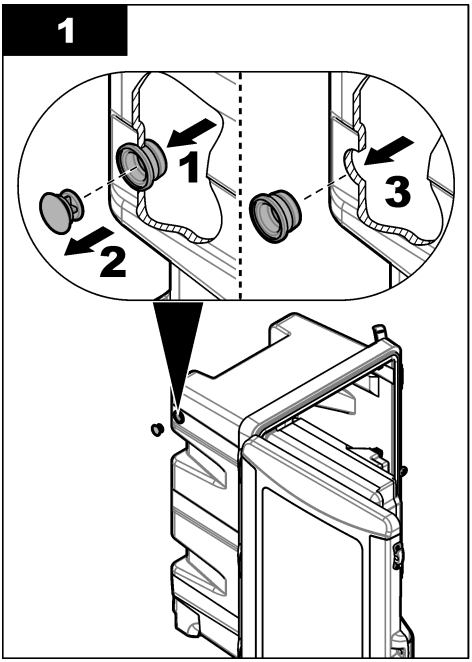
3.5.2 连接电源线 — 带有外壳的分析仪

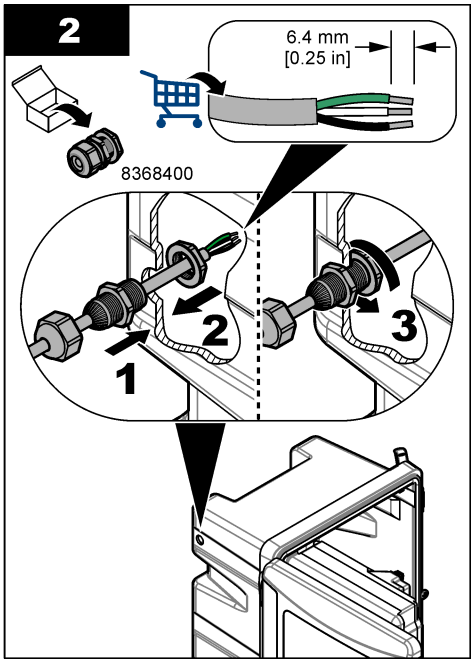
分析仪可以带有或不带外壳。如果分析仪不带外壳，请转到连接电源线 — 不带外壳的分析仪 第 54 页。

注： *切勿使用导管方式供电。*

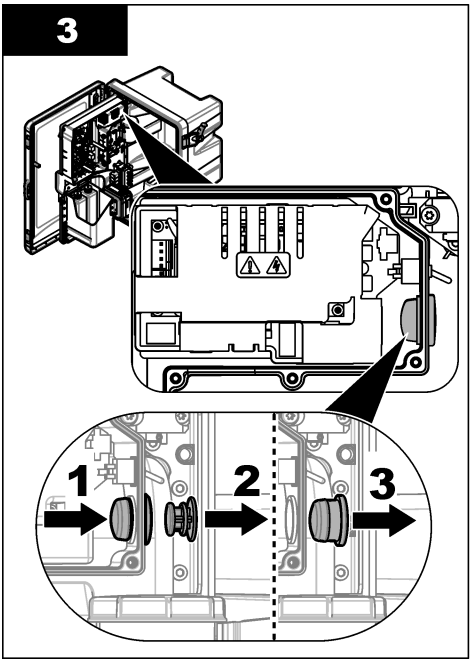
用户提供的物品： 电源线 [5]

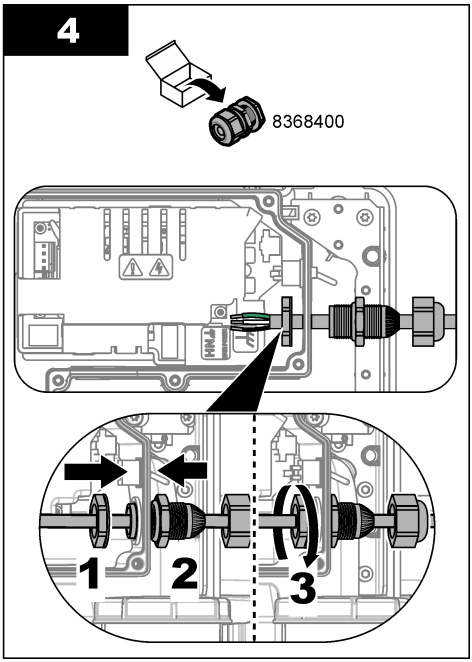
1. 卸下电气检修盖。请参见卸下电气检修盖 第 50 页。
2. 连接电源线。请参见以下图示步骤。
3. 装上电气检修盖。
4. 切勿将电源线插入插座中。

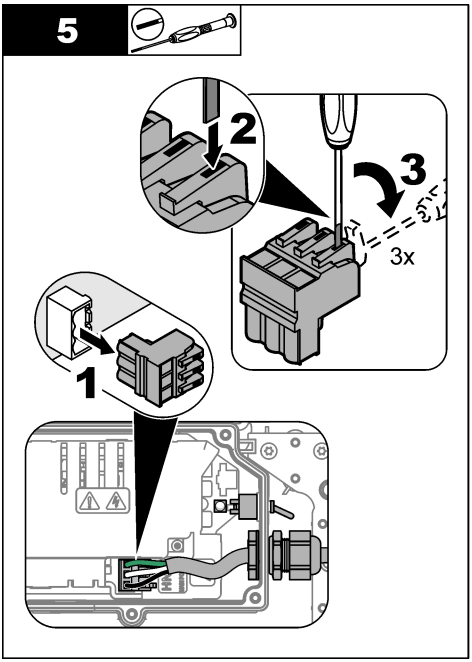




[5] 请参见电源线准则 第 56 页。


3
1
2
3


4
8368400
1
2
3


5
2
3
3x
1

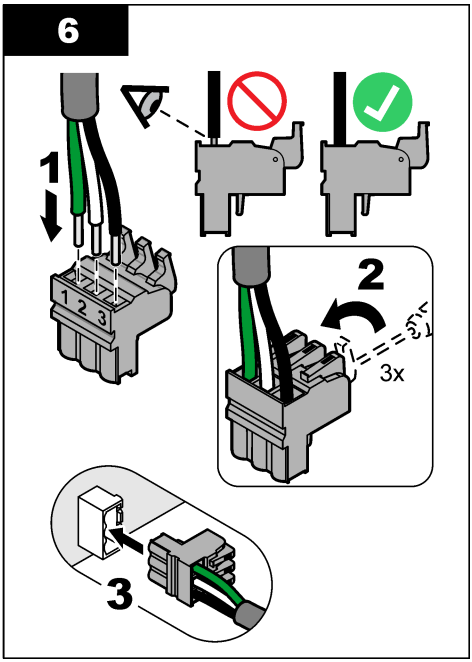

6
1
2
3x
3

表 6 交流接线信息

端子	说明	颜色 — 北美	颜色 — 欧盟
1	保护性接地 (PE)	绿色	带有黄色条纹的绿色
2	中性线 (N)	白色	蓝色
3	火线 (L1)	黑色	棕色

注： *作为替代方案，可以将接地线（绿色）连接到机箱接地端。请参见图 7。*

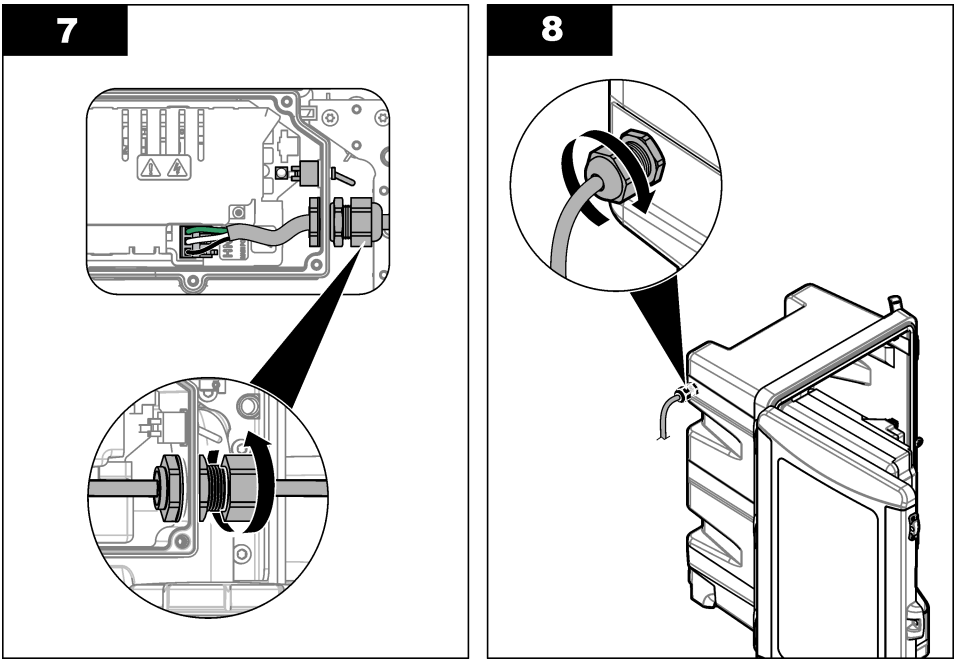
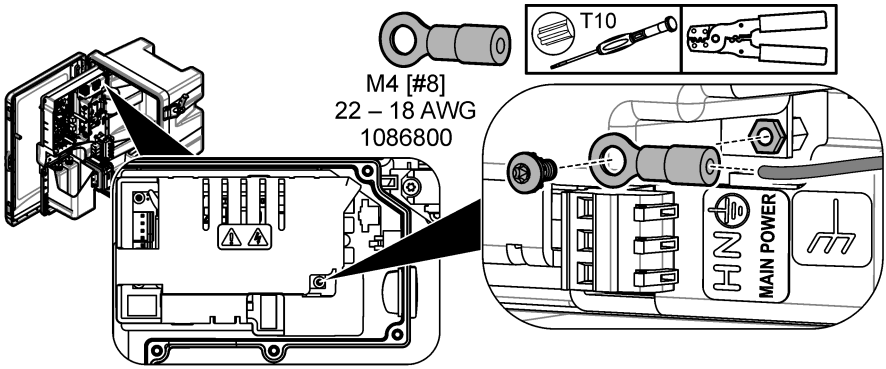


图 7 接地线（绿色）连接替代方案

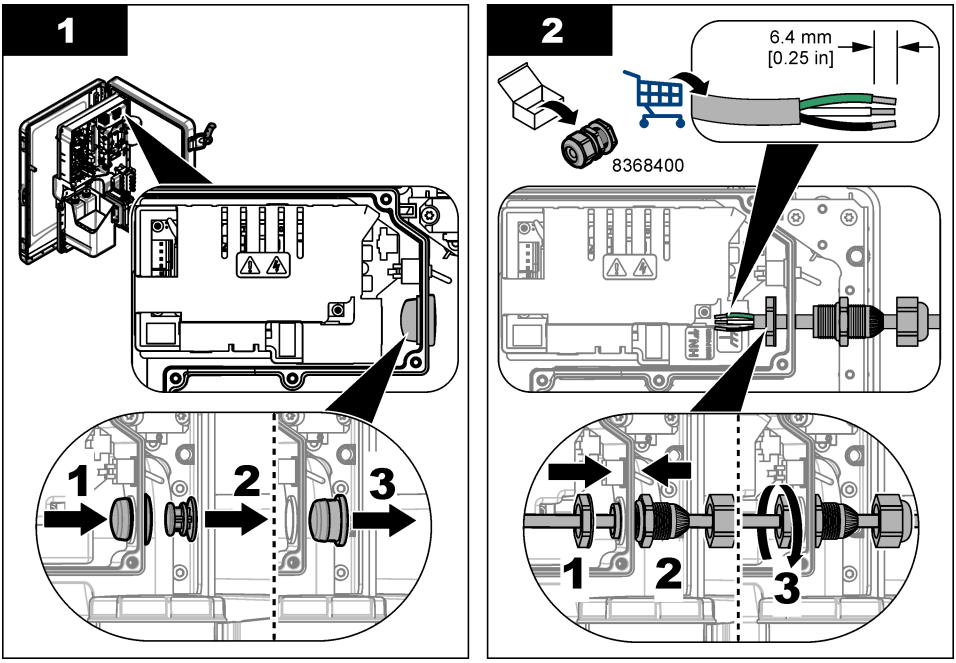


3.5.3 连接电源线 — 不带外壳的分析仪

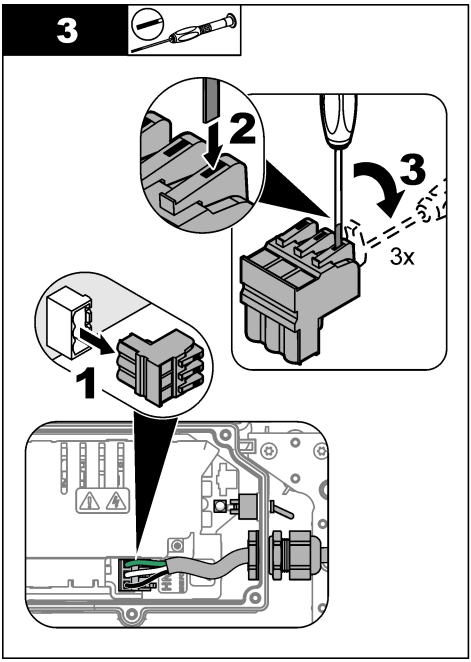
注： *切勿使用导管方式供电。*

用户提供的物品：电源线 [6]

1. 卸下电气检修盖。请参见卸下电气检修盖 第 50 页。
2. 连接电源线。请参见以下图示步骤。
3. 装上电气检修盖。
4. 切勿将电源线插入插座中。



[6] 请参见电源线准则 第 56 页。



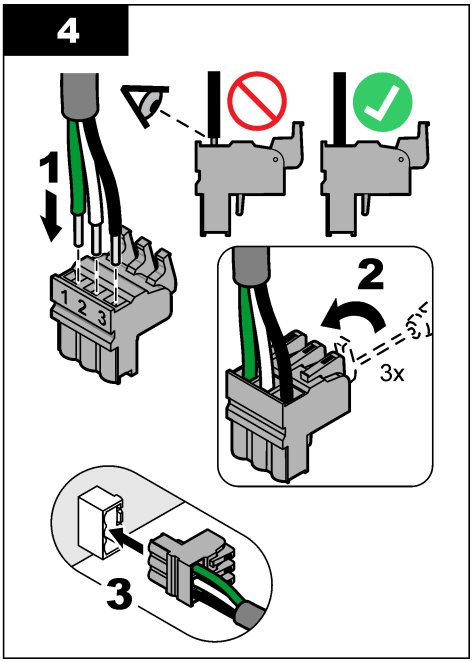
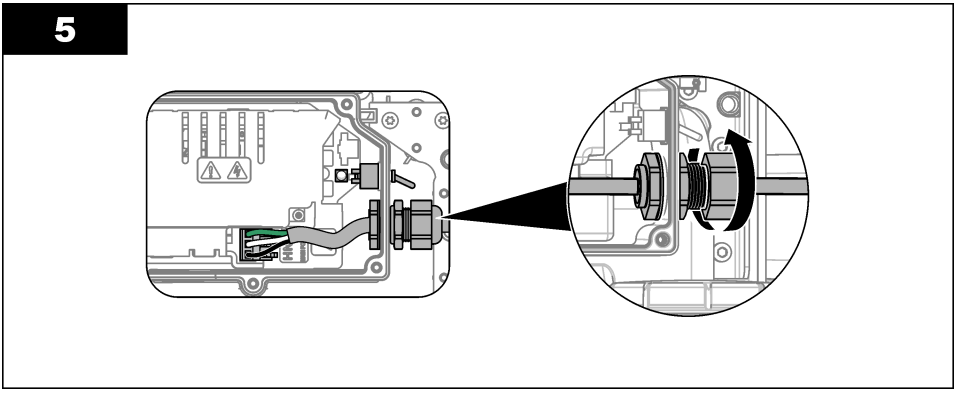


表 7 交流接线信息

端子	说明	颜色 — 北美	颜色 — 欧盟
1	保护性接地 (PE)	绿色	带有黄色条纹的绿色
2	中性线 (N)	白色	蓝色
3	火线 (L1)	黑色	棕色

注： *作为替代方案，可以将接地线（绿色）连接到机箱接地端。请参见*图 7 *第 53 页**。*



3.5.4 电源线准则

⚠ 警告

电击和火灾危险。确保由用户提供的电线和非锁定插头符合相关国家/地区的适用标准。

⚠ 警告

电击致命危险。确保保护接地导体具有小于 0.1 Ω 的低阻抗连接。连接的导线必须与交流电源导线具有相同的额定电流。

注意

本仪器只能连接单相电源。

注： *切勿使用导管方式供电。*

电源线由用户提供。确保电源线：

- 长度小于 3 m (10 ft).
- 电源电压和电流达到额定值。请参见规格 第 38 页。
- 额定工作温度至少为 60 °C (140 °F)，并且适用于安装环境.
- 线规不小于 1.0 mm^2 (18 AWG)，采用符合当地规范要求的绝缘颜色.
- 采用三脚插头式（带有接地端）电源线。
- 通过电缆接头（电缆应力消除装置）进行连接，以便在拧紧后牢固地固定电源线并密封外壳。
- 插头上不含锁紧装置。

3.5.5 连接继电器

⚠ 危险

电击致命危险。请勿混用高电压和低电压。确保继电器全部连接高压交流或全部连接低压直流。

⚠ 警告

可能存在电击致命危险。电源和继电器的端子仅适用于单线端接。请勿在每个端子连接多根电线。

⚠ 警告

可能存在火灾危险。请勿在分析仪内部将继电器公共端或跳线以菊花链形式连接到仪器内部的主电源。

⚠ 警告

火灾危险。继电器负载必须为电阻负载。确保使用外部保险丝或者断路器限制继电器电流。遵守“规格”部分的继电器额定值。

注意

不推荐使用截面积小于 1.0 mm^2（18 号）的电线。

分析仪具有六个无源继电器。继电器额定电流为 5 A，最高电压 240 VAC。

连接继电器以启动或停止警报器等外部设备。为继电器选定的触发因素出现时，每个继电器将会改变状态。

请参阅 连接外部设备 第 58 页 和 表 8 将外部设备连接到继电器。请参阅操作手册来配置继电器。

继电器端子可使用 1.0 - 1.29 mm^2 (18 - 16 AWG) 电线（取决于负载应用）[7].不推荐使用线号小于 18 AWG 的电线。使用绝缘额定值为 300 VAC 或更高的电线。请确保现场所用电缆线的绝热性不低于 80 °C (176 °F)。

所有继电器可用于高电压（高于 30 V-RMS 和 42.2 V-PEAK 或高于 60 VDC），也可用于低电压（低于 30 V-RMS 和 42.2 V-PEAK，或低于 60 VDC）。但是，切勿配置高电压与低电压的组合。

确保有一个辅助开关可以在紧急情况下或进行维护时就近断开继电器的电源。

表 8 接线信息 — 继电器

NO	COM	NC
常开	公用	常闭

3.5.6 连接模拟输出端

分析仪具有六个隔离的 0–20 mA 或 4–20 mA 模拟输出端。回路最大电阻为 600 Ω。

模拟输出端用于输出模拟信号或控制其它的外部装置。每个模拟输出端供应一个模拟信号（例如 4–20 mA），用于表示分析仪选定通道的读数。

请参阅 连接外部设备 第 58 页 将外部设备连接到模拟输出端。请参阅操作手册来配置模拟输出端。

模拟输出端子可使用 0.644 -1.29 mm^2 (24 - 16 AWG) 电线 [8].利用双绞屏蔽线连接 4–20 mA 输出端。将屏蔽线接到记录仪一端。使用无屏蔽电缆会导致无线电频率发射或敏感性高于容许值。

注：

- 模拟输出端与分仪器的其他电子部分电气隔离，自身也相互隔离。
- 模拟输出端为自供电式。请勿与独立供电的负载相连。
- 模拟输出端不能用来为双线（环路供电）变送器供电。

3.5.7 连接数字输入端

分析仪可接收数字信号或外部设备的触点闭合信号，这些信号可以使分析仪禁用样品通道。例如，流量计可在样品流量低时发送高数字信号，分析仪会禁用适用的样品通道。分析仪可持续禁用适用的样品通道，直至数字信号停止。

注： *数字输入端 1 至 4 无法禁用所有的样品通道。必须至少有一个样品通道处于使用中。要停止所有测量，使用数字输入端 6 (DIG6) 使分析仪处于待机模式。*

请参阅 表 9 了解数字输入功能。数字输入端不可编程配置。

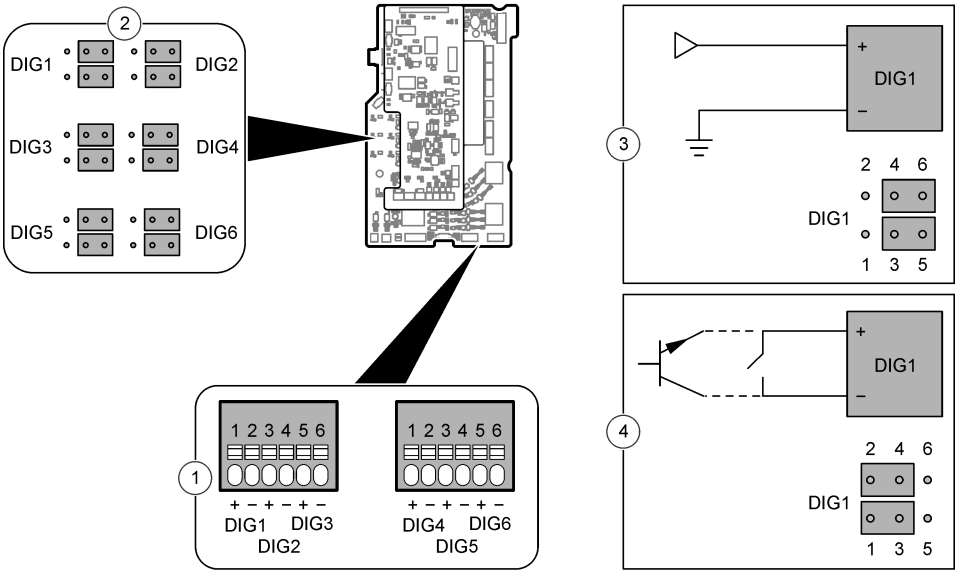
数字输入端子可使用 0.644 -1.29 mm^2 (24 - 16 AWG) 电线 [9].

每个数字输入端可以配置成一个隔离型 TTL 数字输入端或中继/开集型输入端。请参阅 图 8。默认情况下为隔离型 TTL 数字输入端设置跳线。

请参阅 连接外部设备 第 58 页 将外部设备连接到数字输入端。

[7] 推荐使用 1.0 mm^2 (18 AWG) 绞线。
[8] 推荐使用 0.644 - 0.812 mm^2 (24 - 20 AWG) 电线。
[9] 推荐采用 0.644 - 0.812 mm^2 (24 - 20 AWG) 电线。

图 8 隔离型 TTL 数字输入端



1 数字输入接头	**3** 隔离型 TTL 数字输入端
2 跳线 (12x)	**4** 中继/开集型输入端

表 9 数字输入功能

数字输入	功能	注释
1	通道 1 — 禁用或启用	高：禁用，低：启用
2	通道 2 — 禁用或启用	高：禁用，低：启用
3	通道 3 — 禁用或启用	高：禁用，低：启用
4	通道 4 — 禁用或启用	高：禁用，低：启用
5	启动校准	高：启动自带校准
6	启动分析仪	高：启动分析仪 低：停止分析仪（待机模式）
高 = 继电/开集式输入接通或 TTL 输入高电压 (2 - 5 VDC)，最大电压 30 VDC 低 = 继电/开集式输入关闭或 TTL 输入低电压 (0 - 0.8 VDC)		

3.5.8 连接外部设备

注： *为了保持外壳防护等级，请确保密封所有未使用的外部和内部电气接入端口。例如，将一个堵头塞入未使用的应力消除接头中。*

1. 卸下电气检修盖。请参见卸下电气检修盖 第 50 页。
2. 对于**带有**外壳的分析仪，在用于连接外部设备的其中一个外部端口上安装一个电缆固定接头。请参见图 9。
3. 对于所有分析仪，使外部设备的线缆穿过相应的一个内部端口上的橡胶塞。请参见图 10。
4. 将线缆电线接到主电路板上的适用端子。请参见图 11。
   有关接线要求，请参阅规格 第 38 页。

5. 如果电缆含有屏蔽线，请将屏蔽线连接到接地螺柱。使用分析仪自带的环形端子进行连接。请参见图 12。
6. 装上电气检修盖。

图 9 拆下一个外部堵头，装上一个电缆固定接头

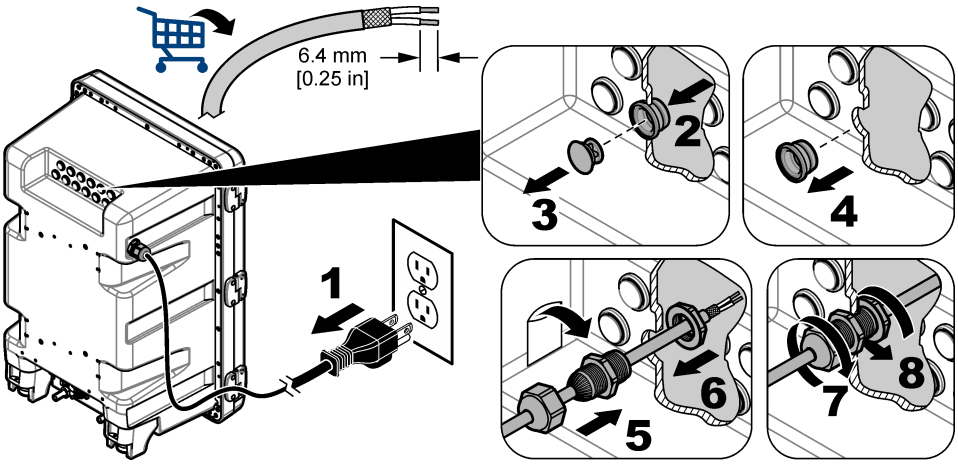


图 10 使线缆穿过内部端口塞子

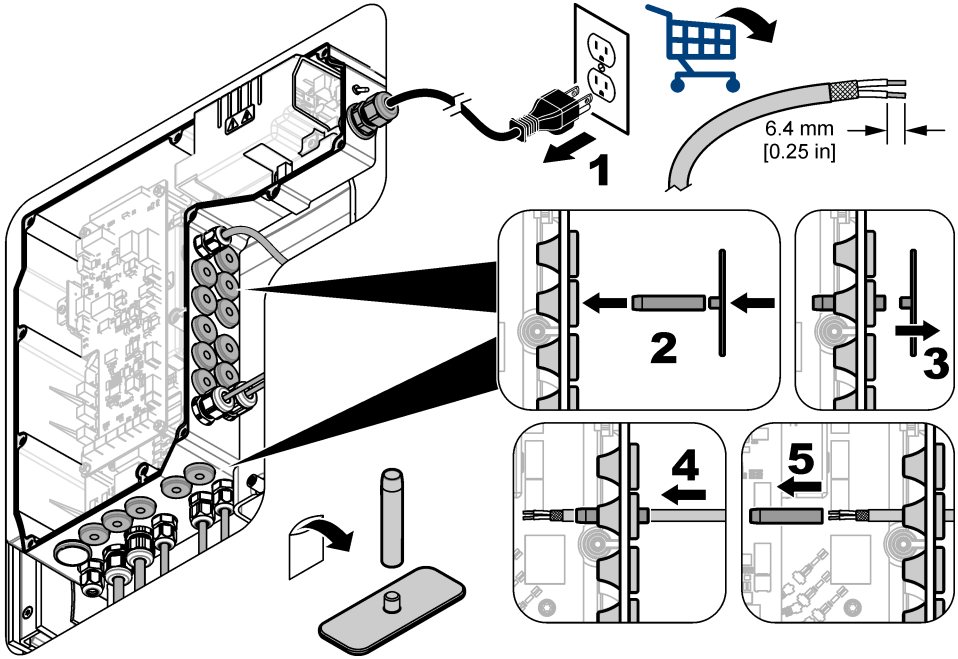
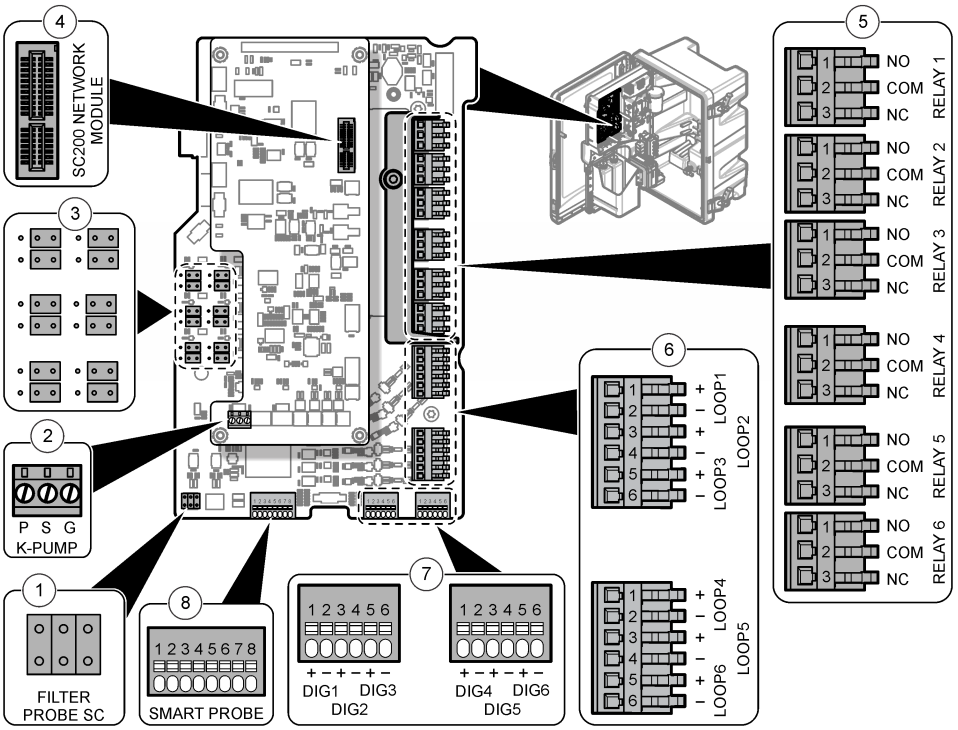
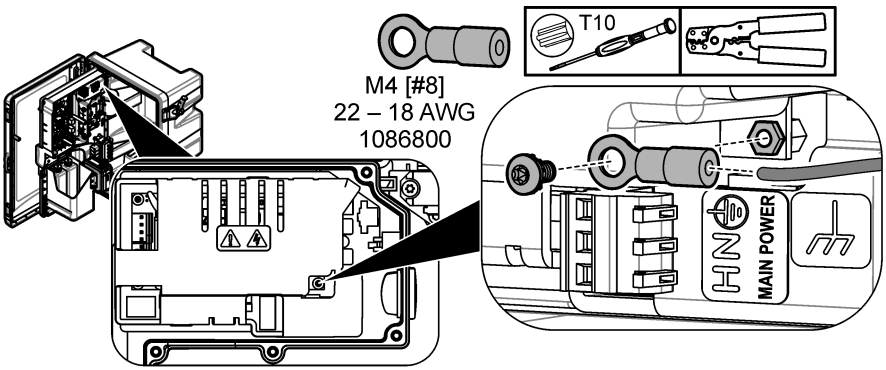


图 11 接线 — 主电路板



1 过滤器探头 SC 连接	**4** 模块连接	**7** 数字输入连接
2 阳床泵接头	**5** 继电器连接	**8** 智能探头接头
3 数字输入跳线	**6** 4-20 mA 输出连接	

图 12 连接屏蔽线



3.5.9 连接外部传感器

外部数字 sc 传感器可通过可选智能探头适配器 (9321000) 连接至分析仪。请参考智能探头适配器文档。

3.5.10 安装模块

若需要其它通信接口，请安装相应通信模块。请参阅模块随附文档。

3.6 装设管道

3.6.1 连接废液管

⚠ 警告
化学品暴露风险。请遵循地方、区域和国家法规处置化学品和废弃物。

将随附的外径 $^{11}/_{16}$ in 的管子（大管）连接到化学废液排放口和漏液排放口。

对于**带有**外壳的分析仪，请参见图 14 第 63 页。

对于**不带**外壳的分析仪，请参见图 15 第 64 页。

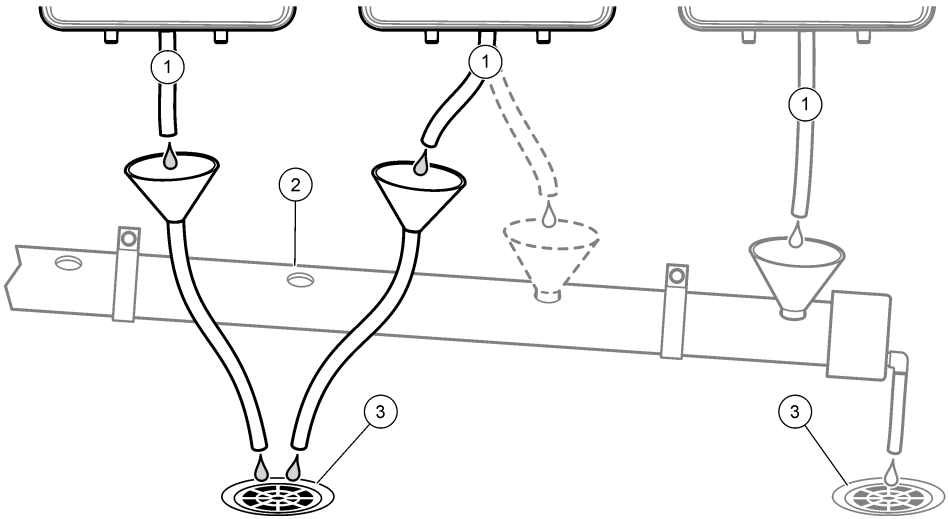
注： *不带外壳的分析仪没有漏液排放口。*

3.6.2 排样管线指南

注意
排样管线安装不当可能导致液体流回仪器，造成仪器损坏。

- 确保排样管线与大气相通且处于零背压状态。请参见图 13。
- 使排样管线尽可能短。
- 确保排样管线连续向下倾斜。
- 确保排样管线没有急弯或未受到挤压。

图 13 排样管线与大气相通



1 排样管	**2** 排放管	**3** 地漏

3.6.3 取样线指南

选取良好代表性的采样点使仪器性能最佳。此试样在整个系统中具有代表性。

避免不稳定读数：

- 在远离过程样品流的化学添加剂的地点进行采样。
- 确保样品充分混合。
- 确保所有化学反应已完成。

3.6.4 取样要求

样品源中所取水样必须符合 规格 第 38 页 中的规格要求。

尽可能保持样品流量和工作温度恒定，以获得最佳性能。

3.6.5 连接样品管线

⚠ 警告

爆炸危险。仅限使用制造商提供的稳压器。

1. 按如下方式连接样品管线：
   a. 识别通道 1 的样品入口和样品旁通排放口。

      对于**带有**外壳的分析仪，请参见图 14。

      对于**不带**外壳的分析仪，请参见图 15。
   b. 使用随附的切管器为样品入口管线切出一段外径 6 mm 的管子（小管）。确保管子长度足以将样品入口连接到样品源。尽可能缩短样品入口管线。
   c. 使用随附的切管器为样品旁通管线切出一段外径 6 mm 的管子（小管）。确保管子长度足以将样品旁通排放口连接到敞开的化学废液排放口。

      注： *作为替代方法，可以使用外径 ¼ in 管子和管子转接头（外径 6 mm 转 ¼ in）来连接样品入口管线和样品旁通管线。*
   d. 将管子插入样品入口和样品旁通排放口。将管子插入 14 mm (0.55 in)以确保插入到止动位。
   e. 必要时为另一通道重复执行步骤 1。

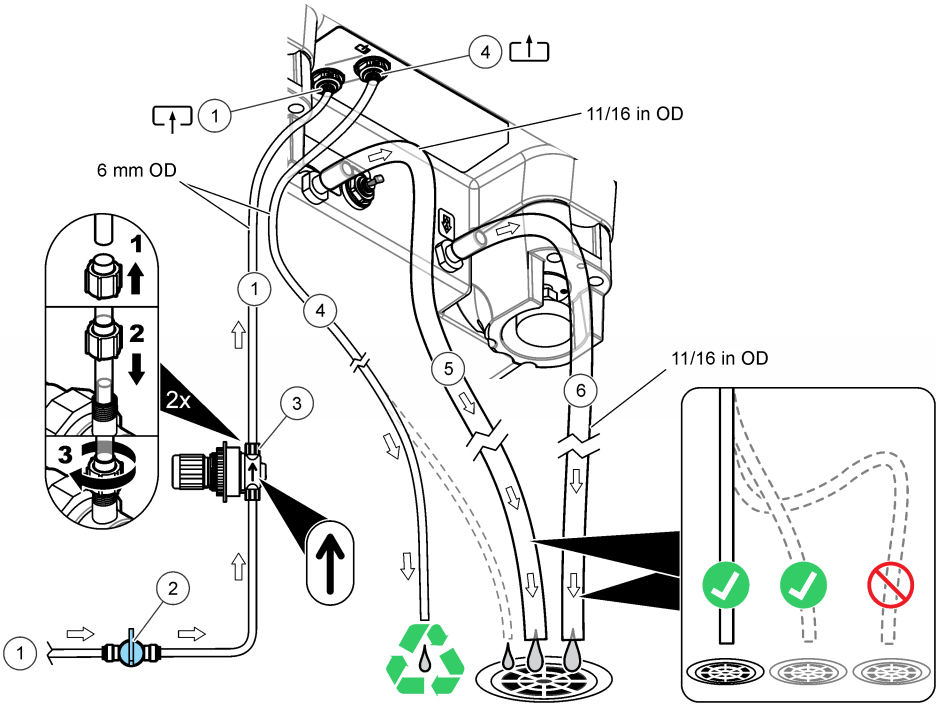
      对于**带有**外壳的分析仪，请参考图 16 第 65 页 来识别每个通道的样品入口和样品旁通排放口。

      对于**不带**外壳的分析仪，请参考图 17 第 65 页 来识别每个通道的样品入口和样品旁通排放口。
2. 为了保持外壳的防护等级，在未使用的样品入口和样品旁通排放口塞入随附的红色堵头。

   不要在 DIPA 排气口塞入红色堵头。
3. 如果样品之间的温差超过 15 °C (27 °F)，请将样品入口管子连接到热交换器选件。相关说明请参阅热交换器随附的文档。
4. 为每根样品入口管线安装一个调压阀。对于**带有**外壳的分析仪，请参见图 14。

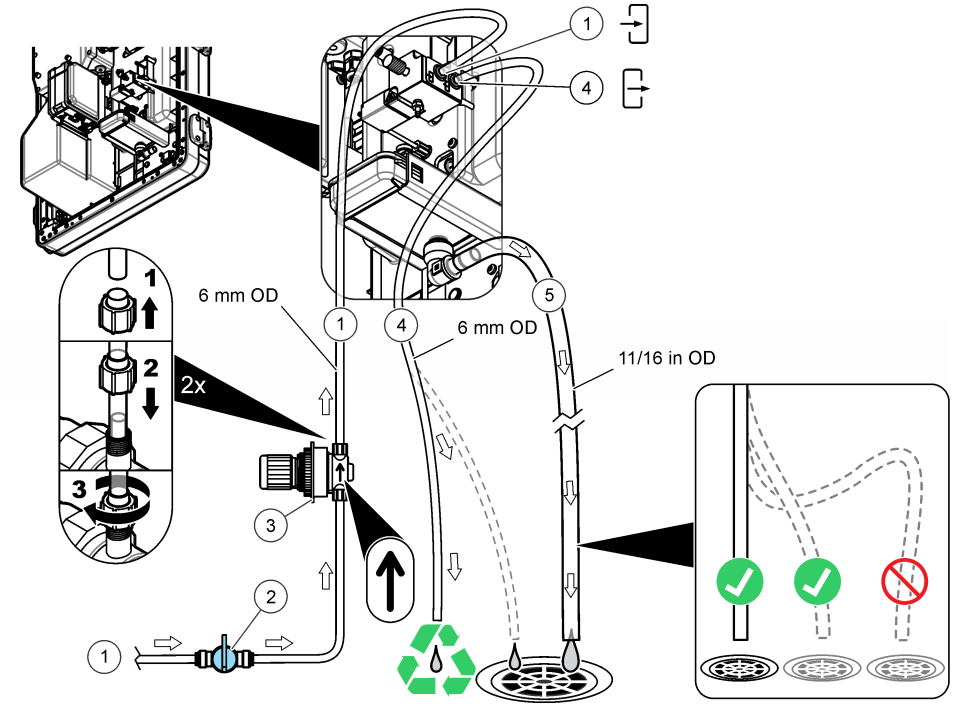
   对于**不带**外壳的分析仪，请参见图 15。
5. 确保调压阀承受的水压低于 6 bar (87 psi)，否则可能会导致调压阀堵塞。
6. 在每根样品入口管线的调压阀前面安装一个截止阀。
7. 如果样品浊度超过 2 NTU 或样品中含有铁颗粒、油脂，请在每条样品入口管路中安装一个 100 um 过滤器。有关订购信息，请参阅维护和故障排除手册中的*备件和附件*部分。
8. 将每根样品管线连接到样品源。
9. 将截止阀转到打开位置。
10. 确保管子接头处没有泄漏。如果接头出现泄漏，将管子推入接头中，确保到位。

图 14 样品管和排放管 — 带有外壳的分析仪



1 通道 1 的样品入口	**3** 调压阀（0.276 bar 或 4 psi，不可调）	**5** 漏液排放口
2 截止阀	**4** 通道 1 的样品旁通排放口	**6** 化学废液排放口

图 15 样品管和排放管 — 不带外壳的分析仪



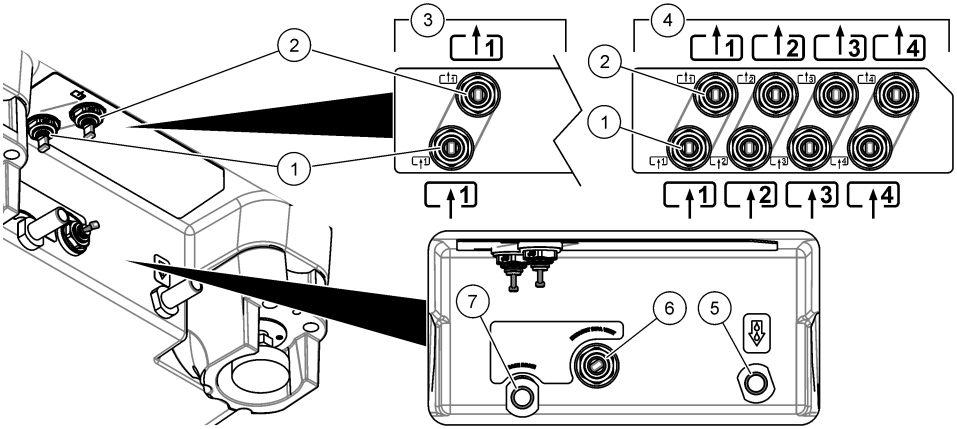
1 通道 1 的样品入口	**3** 调压阀（0.276 bar 或 4 psi，不可调）	**5** 化学废液排放口
2 截止阀	**4** 通道 1 的样品旁通排放口	

3.6.6 管线口

图 16 显示了**带有**外壳的分析仪的样品管、排放管和 DIPA 排气口连接。

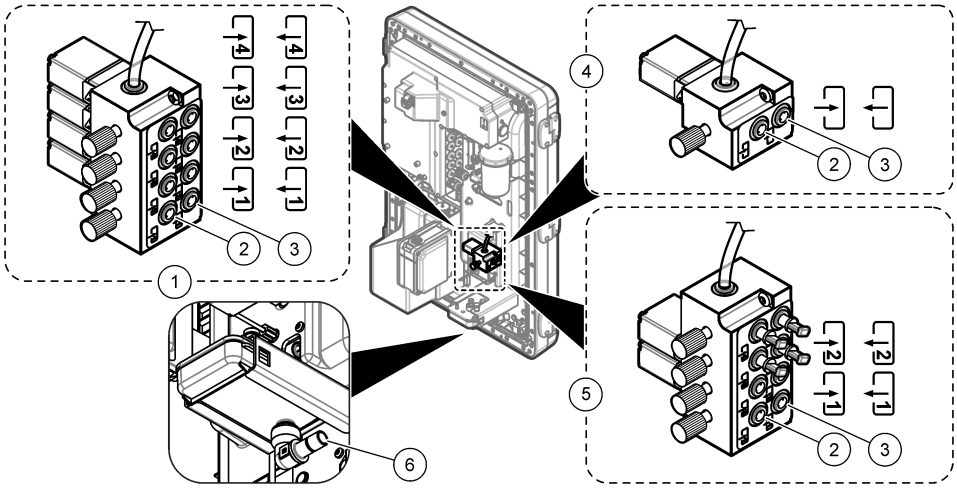
图 17 显示了**不带**外壳的分析仪的样品管和排放管连接。

图 16 管线口 — 带有外壳的分析仪



1 样品入口（底排）	**4** 2 或 4 通道分析仪的管线口	**7** 漏液排放口（排放溅出或泄漏液）
2 样品旁通排放口（顶排）	**5** 化学废液排放口	
3 单通道分析仪的管线口	**6** DIPA 排气口	

图 17 管线口 — 不带外壳的分析仪



1 4 通道分析仪的管线口	**4** 单通道分析仪的管线口
2 样品入口（左列）	**5** 2 通道分析仪的管线口
3 样品旁通排放口（右列）	**6** 化学废液排放口

3.6.7 从空气吹扫接头中取下堵头

注： *仅当分析仪带有外壳且未选配阳床泵时才需要执行此任务。请参考图 2 第 44 页 来识别阳床泵。*

1. 从空气吹扫接头中取下堵头。请参见图 19 第 67 页。
2. 为了保持外壳的 NEMA 防护等级，请执行以下步骤：
   a. 将随附的 0.3 m (1 ft) 长、6 mm 粗的管子连接到 DIPA 排气口。请参考 图 16 第 65 页 来识别 DIPA 排气口。
   b. 将随附的 0.3 m (1 ft) 长、6 mm 粗的管子连接到空气吹扫接头。

3.6.8 连接 DIPA 排气管

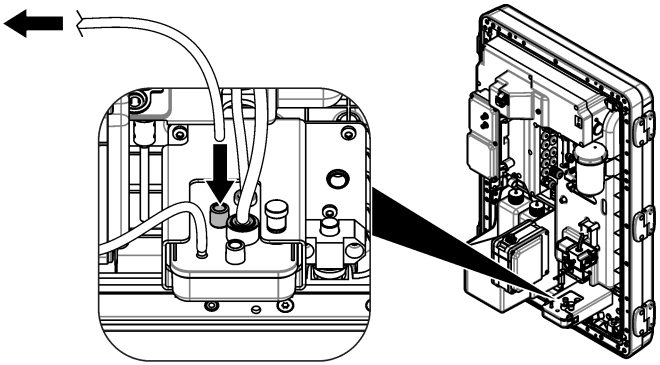
⚠ 警告	
	气体吸入危险。用管子将 DIPA 排气口连接到外部大气或通风柜中，以防接触有毒气体。

注： *仅当分析仪选配了阳床泵时才需要执行此任务。请参考图 2 第 44 页 来识别阳床泵。*

对于**带有**外壳的分析仪，使用随附的外径 6 mm 管子将 DIPA 排气口连接到外部大气或通风柜中。请参考 图 16 第 65 页 来识别 DIPA 排气口。

对于**不带**外壳的分析仪，将随附的外径 6 mm 管子连接到 DIPA 排气口上，使该排气口通向外部大气或通风柜。请参见图 18。

图 18 DIPA 排气口 — 不带外壳的分析仪

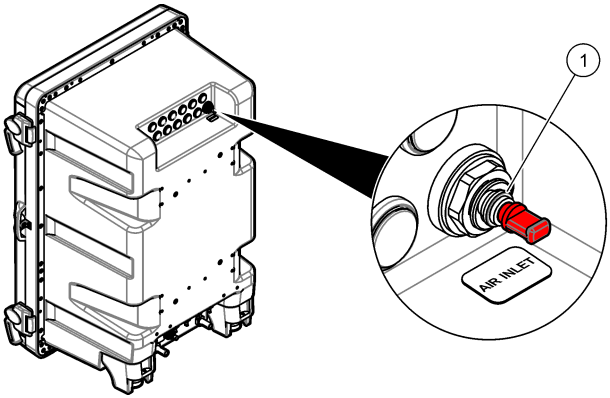


3.6.9 连接空气吹扫（可选）

注： *仅当分析仪带有外壳时才需要执行此可选任务。*

为了将灰尘和腐蚀挡在仪器外壳之外，可使用外径 6 mm 塑料管为空气吹扫接头供应 0.425 m^3/h (15 scfh) 清洁、干燥的仪表质量空气。请参见图 19。

图 19 空气吹扫接头



1	空气吹扫接头

3.7 安装分析仪试剂瓶

⚠ 警告

化学品暴露风险。遵守实验室安全规程，穿戴适用于所处理化学品的所有个人防护装备。请在加注瓶子或制备试剂之前阅读供应商的安全数据表。仅供实验室使用。请按照用户当地法规的要求公开危险信息。

⚠ 警告

化学品暴露风险。请遵循地方、区域和国家法规处置化学品和废弃物。

3.7.1 安装调节液瓶

⚠ 警告

吸入危害。切勿吸入二异丙胺 (DIPA) 蒸气或氨气。接触后可能导致严重伤害甚至死亡。

⚠ 警告

二异丙胺 (DIPA) 和氨气均为易燃、具有腐蚀性和毒性的化学品。接触后可能导致严重伤害甚至死亡。

生产商推荐使用 99% 二异丙胺 (DIPA) 溶液作为调节液。如果了解氨水对仪器性能的影响，也可以采用氨水（浓度大于 28%）作为替代品。表 10 比较了采用不同调节液情况下仪器的检测限制、准确度、可重复性和试剂用量。

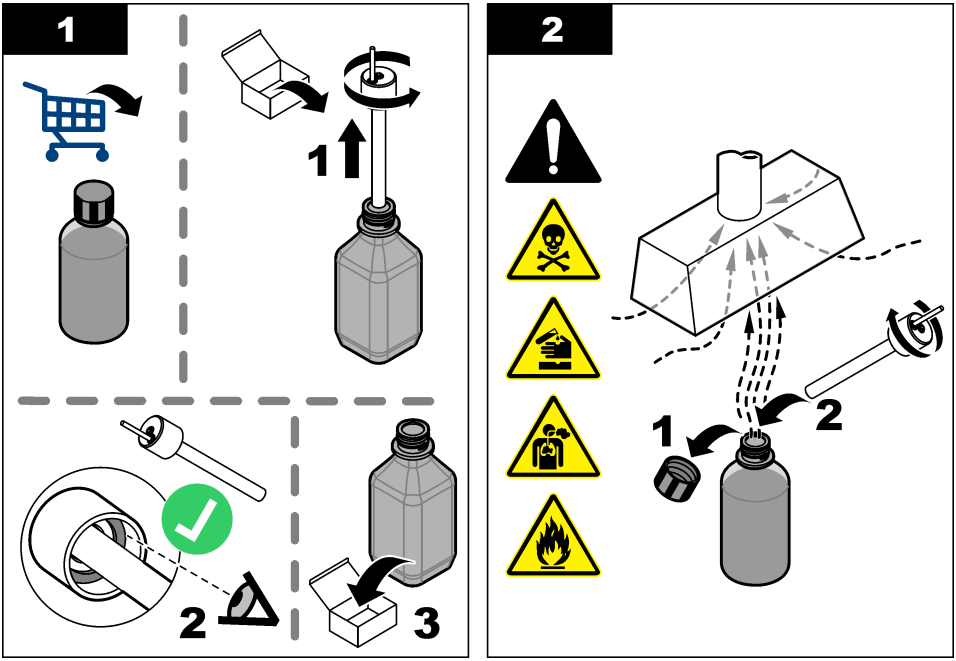
用户提供的物品：

- 个人防护装备（请参阅 MSDS/SDS）
- 二异丙胺 (DIPA)，99%，1 L 瓶装
- Merck® 或 Orion® DIPA 瓶转接头（若适用）

按如下方式安装 DIPA 瓶：

1. 穿戴安全数据表 (MSDS/SDS) 中标明的个人防护装备。
2. 将分析面板上的闩锁转到解锁位置。打开分析面板。
3. 安装 DIPA 瓶。对于**带有**外壳的分析仪，请参见图 20 中所示的步骤。
   对于**不带**外壳的分析仪，请参见图 21 中所示的步骤。
   如果条件允许，应在通风柜中执行图示步骤 2。切勿吸入 DIPA 蒸气。
4. 对于选配阳床泵的分析仪，从瓶盖上拔出短管。将阳床套件中的出口管插入瓶盖中。请参考图 2 第 44 页 来识别阳床泵。

图 20 DIPA 瓶子安装 — 带有外壳的分析仪



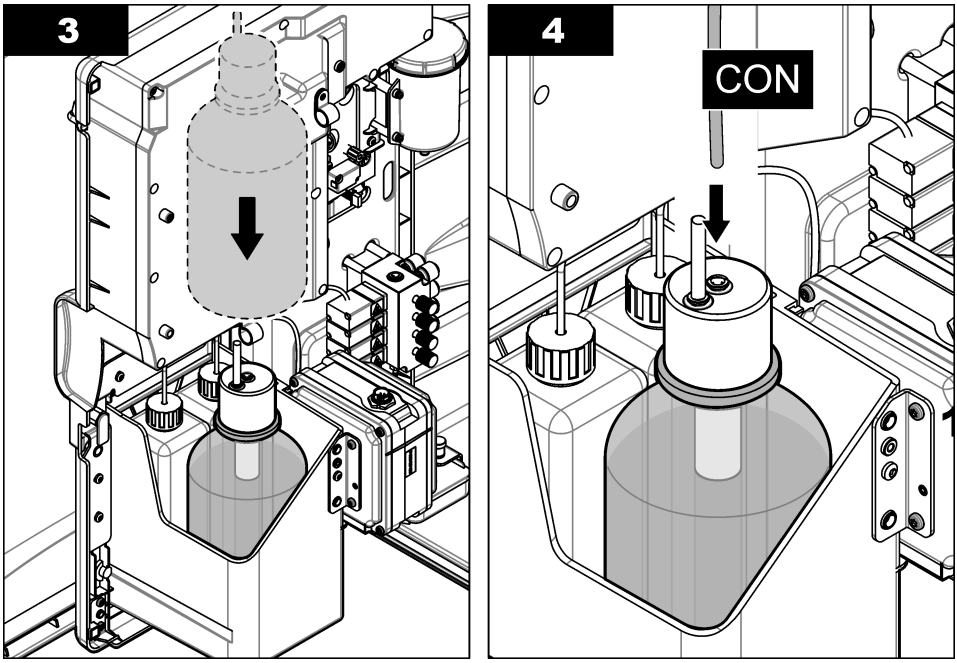
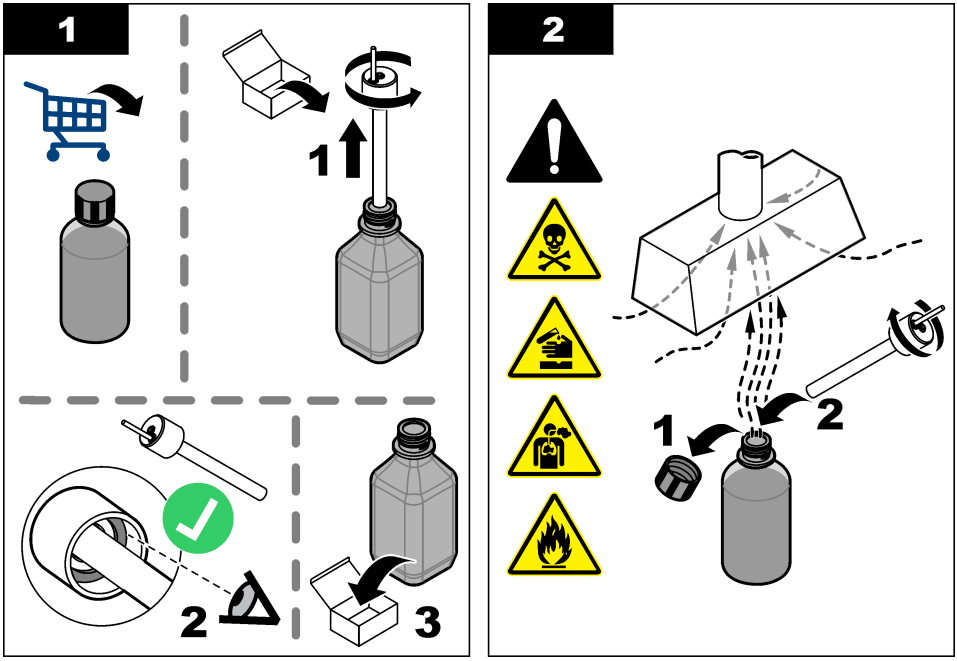


图 21 DIPA 瓶子安装 — 不带外壳的分析仪



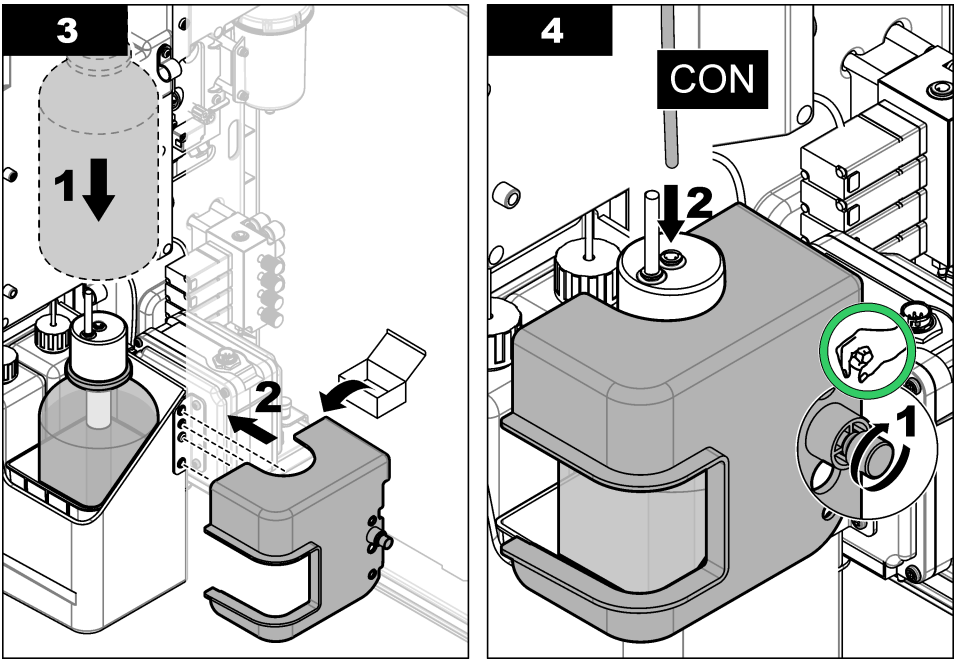


表 10 调节液比较

	DIPA ($C_6H_{15}N$)	氨水 (NH_3)
检测下限	0.01 ppb	2 ppb
准确度（未配备阳床泵的分析仪）	±0.1 ppb 或 ±5%（取大值）	±1 ppb 或 ±5%（取大值）
准确度（配备阳床泵的分析仪）	±2 ppb 或 ±5%（取大值）	±2 ppb 或 ±5%（取大值）
10 °C (18 °F) 温差下的可重复性	< 0.02 ppb 或 1.5%（取大值）	< 0.1 ppb 或 1.5%（取大值）
在 25 °C (77 °F) 和 pH 测量范围为 10 - 10.5 时使用 1 L 溶液	约为 13 周	约为 3 周

3.7.2 加注活化液瓶

穿戴安全数据表 (MSDS/SDS) 中标明的个人防护装备。然后向活化液瓶中加入 500 mL 0.5M 硝酸钠 ($NaNO_3$) 溶液。

注： *活化液瓶贴有带红色条纹的标签。活化液瓶管子上贴有红色 "REACT" 标签。*

如果**有**现成的已制备溶液，请转到下一节。

如果**没有**现成的已制备溶液，请按如下方法制备 500 mL 的 0.5M 硝酸钠溶液：

用户提供的物品：

- 个人防护装备（请参阅 MSDS/SDS）
- 容量瓶，500 mL
- $NaNO_3$，21.25 g
- 超纯水，500 mL

1. 穿戴安全数据表 (MSDS/SDS) 中标明的个人防护装备。
2. 用超纯水冲洗容量瓶三次。
3. 向容量瓶中加入约 21.25 g $NaNO_3$。
4. 向容量瓶中加入 100 mL 超纯水。
5. 摇晃容量瓶，直到粉末完全溶解。
6. 添加超纯水至 500 mL 标记处。
7. 摇晃容量瓶，使溶液混合均匀。

   注： *所制备的溶液保质期约为 3 个月。*

3.7.3 冲洗和加注校准标准液瓶

向校准标准液瓶中加入少量的校准标准液。摇晃瓶子以冲洗瓶子，然后倒掉校准标准液。向校准标准液瓶中加注 10 mg/L (10 ppm) 的氯化钠 (NaCl) 标准液。

注： *并非所有分析仪都配有校准瓶。校准标准液瓶贴有带黄色条纹的标签。校准标准液瓶管子上贴有黄色 "CAL" 标签。*

如果**有**现成的已制备溶液，请转到下一节。

如果**没有**现成的已制备溶液，请按如下方法制备 10 mg/L NaCl 标准液。制备校准标准液时，所有的称量体积和质量必须十分精确。

用户提供的物品：

- 容量瓶 (2x)，500 mL，A 级
- NaCl，1.272 g
- 超纯水，500 mL
- 1–10 mL TenSette 移液管和吸头

1. 按如下方式制备 500 mL1 g/L NaCl 标准液：

   a. 用超纯水冲洗容量瓶三次。
   b. 向容量瓶中加入 1.272 g NaCl。
   c. 向容量瓶中加入 100 mL 超纯水。
   d. 摇晃容量瓶，直到粉末完全溶解。
   e. 添加超纯水至 500 mL 标记处。
   f. 摇晃容量瓶，使溶液混合均匀。
2. 按如下方法制备 500 mL 的 10 mg/L NaCl 标准液：

   a. 用超纯水冲洗另一个容量瓶三次。
   b. 使用移液管将 5 mL 1 g/L 校准标准液添加到容量瓶中。将移液管放入容量瓶中以添加溶液。
   c. 添加超纯水至 500 mL 标记处。
   d. 摇晃容量瓶，使溶液混合均匀。

      注： *所制备的溶液保质期约为 3 个月。*

第 4 节 准备就绪

安装分析仪瓶和搅拌棒。有关启动步骤，请参阅操作手册。

第 A 节 附录

A.1 制备 KCl 电解液

要制备 500 mL 3M KCl 电解液，请执行以下步骤：

用户提供的物品：

- 个人防护装备（请参阅 MSDS/SDS）
- 容量瓶，500 mL

- KCl，111.75 g
- 超纯水，500 mL

1. 穿戴安全数据表 (MSDS/SDS) 中标明的个人防护装备。
2. 用超纯水冲洗容量瓶三次。
3. 向容量瓶中加入约 111.75 g KCl。
4. 向容量瓶中加入 100 mL 超纯水。
5. 摇晃容量瓶，直到粉末完全溶解。
6. 添加超纯水至 500 mL 标记处。
7. 摇晃容量瓶，使溶液混合均匀。
8. 将未使用的 KCl 电解液放入清洁的塑料瓶中。将一个标签贴在瓶子上，注明电解液及其制备日期。
   注： *所制备的电解液保质期约为 3 个月。*

HACH COMPANY World Headquarters
P.O. Box 389, Loveland, CO 80539-0389 U.S.A.
Tel. (970) 669-3050
(800) 227-4224 (U.S.A. only)
Fax (970) 669-2932
orders@hach.com
www.hach.com

HACH LANGE GMBH
Willstätterstraße 11
D-40549 Düsseldorf, Germany
Tel. +49 (0) 2 11 52 88-320
Fax +49 (0) 2 11 52 88-210
info-de@hach.com
www.de.hach.com

HACH LANGE Sàrl
6, route de Compois
1222 Vésenaz
SWITZERLAND
Tel. +41 22 594 6400
Fax +41 22 594 6499