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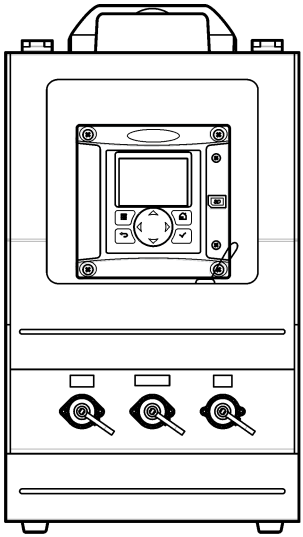
Polymetron 9526 Conductivity Certification System

05/2015, Edition 4

User Manual



Additional information

Additional information is available on the manufacturer's website.

Specifications

Specifications are subject to change without notice.

Analyzer

Specification	Details
Dimensions	Height: 450 mm; Width: 250 mm; Depth: 460 mm
Weight	7 kg (15.4 lb)
Casing protection	IP 65 / NEMA4X
Power supply	Standard version: 100-240 VAC 50/60 Hz
	Low voltage version: 13-30 VAC 50/60 Hz, 18-42 VDC
	Consumption: 25 VA
	Measurement category: I (overvoltage less than 1,500 V)
Sample flow rate	20 liters/hour minimum
Sample tubing	Sample inlet and outlet: Diameter 8 mm (or 5/16") semi-rigid tubing. We recommend the use of PE tubing if sample temperature is inferior to 70 °C, and PTFE if superior to 70 °C
Connections	Power supply: Use the connector provided in the drawer
	Analog output: Use the recommended POLYMETRON cable
Ambient temperature	-20 to 60 °C (-4 to 140 °F)
Maximum temperature	100 °C (at atmospheric pressure)
Maximum pressure	10 bar at ambient temperature
Relative humidity	10—90%
Precision	Conductivity: ± 2% of the displayed value
	Temperature: ± 0.2 °C
Measurement range	Conductivity: 0.01 µS/cm to 200 µS/cm
	Resistivity: 100 MΩ.cm to 5 kΩ.cm
	Temperature: -20 to 200 °C (-4 to 392 °F)
Display resolution	0.001 µS/cm or 0.1 MΩ.cm
Outputs	Analog output (temperature, conductivity/resistivity): 2 × 0/4-20 mA (linear, bilinear, logarithmic) ± 0.1 mA
	Alarms: 2 × thresholds or limits according to USP
Certifications	EN 61326-1: 2006; EN 61010-1: 2010

Sensor

Specification	Details
Sensor body material	Black PSU
Conductivity electrodes, internal and external	Stainless steel 316L

Specification	Details
Cell constant K	0.01 (cm^{-1})
Conductivity range	0.01—200 $\mu S.cm^{-1}$; Resistivity range: 5k Ω.cm—100 MΩ.cm
Maximum pressure	10 bar
Maximum temperature	125 °C (257 °F)
Accuracy	< 2%
Temperature response	< 30 seconds
Insulator	PSU
Connector	Glass polyester (IP65)

Controller

Specification	Details
Component description	Microprocessor-controlled and menu-driven controller that operates the sensor and displays measured values.
Operating temperature	-20 to 60 ºC (-4 to 140 ºF); 95% relative humidity, non-condensing with sensor load <7 W; -20 to 50 ºC (-4 to 104 ºF) with sensor load <28 W
Storage temperature	-20 to 70 ºC (-4 to 158 ºF); 95% relative humidity, non-condensing
Enclosure[1]	NEMA 4X/IP66 metal enclosure with a corrosion-resistant finish
Power requirements	**AC powered controller:** 100-240 VAC ±10%, 50/60 Hz; Power 50 VA with 7 W sensor/network module load, 100 VA with 28 W sensor/network module load (optional Modbus, RS232/RS485, Profibus DPV1 or HART network connection).
	24 VDC powered controller: 24 VDC—15%, + 20%; Power 15 W with 7 W sensor/network module load, 40 W with 28 W sensor/network module load (optional Modbus, RS232/RS485, Profibus DPV1 or HART network connection).
Altitude requirements	Standard 2000 m (6562 ft) ASL (Above Sea Level)
Pollution degree/Installation category	Polution Degree 2; Installation Category II
Outputs	Two analog (0-20 mA or 4-20 mA) outputs. Each analog output can be assigned to represent a measured parameter such as pH, temperature, flow or calculated values. Optional module supplies three additional analog outputs (5 total).
Relays	Four SPDT, user-configured contacts, rated 250 VAC, 5 Amp resistive maximum for the AC powered controller and 24 VDC, 5A resistive maximum for the DC powered controller. Relays are designed for connection to AC Mains circuits (i.e., whenever the controller is operated with 115 - 240 VAC power) or DC circuits (i.e., whenever the controller is operated with 24 VDC power).
Dimensions	½ DIN—144 x 144 x 180.9 mm (5.7 x 5.7 x 7.12 in.)
Weight	1.7 kg (3.75 lb)
Compliance information[2]	CE approved (with all sensor types). Listed for use in general locations to UL and CSA safety standards by ETL (with all sensor types). Certain AC mains powered models are listed for use in general safety locations to UL and CSA safety standards by Underwriters Laboratories (with all sensor types).

[1] Units that have the Underwriters Laboratories (UL) certification are intended for indoor use only and do not have a NEMA 4X/IP66 rating.
[2] DC powered units are not listed by UL.

Specification	Details
Digital communication	Optional Modbus, RS232/RS485, Profibus DPV1 or HART network connection for data transmission
Data logging	Secure Digital Card (32 GB maximum) or special RS232 cable connector for data logging and performing software updates. The controller will keep approximately 20,000 data points per sensor.
Warranty	2 years

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.

Safety information

NOTICE

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.

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.

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.

Precautionary labels

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

	This symbol, when noted on a product, indicates a potential hazard which could cause serious personal injury and/or death. The user should reference this instruction manual for operation and/or safety information.
	This symbol, when noted on a product enclosure or barrier, indicates that a risk of electrical shock and/or electrocution exists and indicates that only individuals qualified to work with hazardous voltages should open the enclosure or remove the barrier.

	This symbol, when noted on the product, indicates the presence of devices sensitive to electrostatic discharge and indicates that care must be taken to prevent damage to them.
	This symbol, when noted on a product, indicates the instrument is connected to alternate current.
	Electrical equipment marked with this symbol may not be disposed of in European public disposal systems. In conformity with European local and national regulations, European electrical equipment users must now return old or end-of-life equipment to the manufacturer for disposal at no charge to the user. ***Note:*** *For return for recycling, please contact the equipment producer or supplier for instructions on how to return end-of-life equipment, producer-supplied electrical accessories, and all auxiliary items for proper disposal.*
	Products marked with this symbol indicates that the product contains toxic or hazardous substances or elements. The number inside the symbol indicates the environmental protection use period in years.
	Products marked with this symbol indicates that the product conforms to relevant South Korean EMC standards.

EMC compliance statement (Korea)

Type of equipment	Additional information
A 급 기기 (업무용 방송통신기자재)	이 기기는 업무용 (A 급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.
Class A equipment (Industrial Broadcasting and Communication Equipment)	This equipment meets Industrial (Class A) EMC requirements. This equipment is for use in industrial environments only.

Certification

Canadian Radio Interference-Causing Equipment Regulation, IECS-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.

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.

Product components

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

Accessories

The following accessories are provided with the product and are located in the drawer:

- Laminated quick reference guide
- User manual
- Certification of the product factory calibration
- Socket for mains power connection
- Tool for removing plugs and sample tubes
- 2 x DN8 to DN6 reduction sleeves to connect DN6 tubes to the product
- 2 plugs for the IN and OUT sockets to prevent measurement cell contamination

Product overview

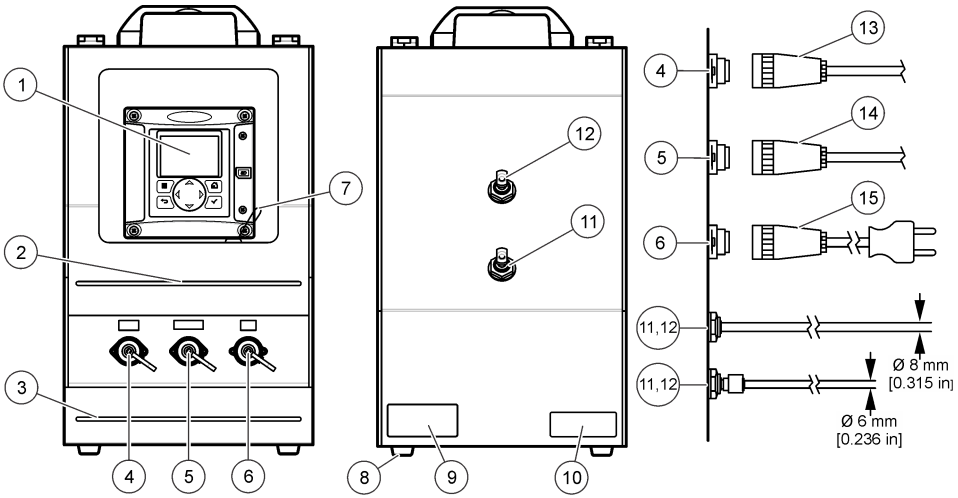
The conductivity certification system is a portable test bed for rapidly and accurately calibrating and verifying in-line conductivity measurement loops through direct use of the process sample and comparison with our reference system.

It is particularly appropriate for pure and ultra pure water applications with weak conducting solutions for which there is no reliable calibration solution. Indeed, any solution whose conductivity is inferior to 100 µs/cm is not stable in contact with air, as the dissolution of the CO_2 from ambient air leads to an increase in the order of 1 to 2 µS/cm. It is therefore impossible to calibrate a conductivity loop dedicated to pure water measurements of <10 µS/cm using a calibration solution of known similar conductivity (KCl solution).

Any deviation observed between the value displayed by the system and that displayed by the conductivity loop under validation/calibration can be due to several factors including:

- Fouling of the conductivity sensor under test due to the accumulation of insulating layers on the electrode surface leading to a change of the cell constant
- Sampling issues such as poor sensor installation, insufficient immersion, air bubbles, etc.
- Incorrect controller resistivity/conductivity and/or temperature input calibration
- Long cables leading to capacitive effects not taken into account during controller electronic calibration

Figure 1 Front and rear view



1 Controller	**6** IP 67 socket for electric power supply	**11** Sample inlet
2 Protective hood	**7** Lead seal	**12** Sample outlet
3 Accessory drawer	**8** Waterproof feet	**13** Analog output cable (option)
4 IP 67 socket for analog output	**9** Product type label	**14** Cable to external controller
5 IP 67 socket for calibration	**10** Calibration label	**15** Power supply connector

The unit is made up of a conductivity controller (1) and a flow chamber containing a high precision conductivity sensor, all contained in a high resistant ABS casing. A hood (3) protects the display panel whose backlit surface provides optimum visibility. A drawer (7) is used for storing accessories and documentation. The unit should be placed on a flat surface, preferably in a clean and dry environment.

Accuracy and benefits

The system is a certified standard guaranteeing a high degree of measurement accuracy conforming to all the required standards used in pure water conductivity measurements (ASTM D 1125, D 5391 and USP).

Accurate electrical calibration

The measurement of conductivity requires the use of a high frequency current to minimize electrolytic reactions at the surface of the electrodes. In addition, the use of a long cables for measurements can generate a capacitance causing errors when measuring the value of a resistance.

The Polymetron 9526 avoids this problem by performing an electrical calibration at the end of the product's conductivity sensor cable using a certified electrical resistance (precision ± 0.1%).

Accurate temperature measurement

Accurate temperature measurement is essential in ultra pure water as the variation in conductivity is very high (ratio of around 5.2%/°C). The Polymetron 9526 uses a class "A" temperature sensor mounted at the end of the internal electrode. Ambient temperature has no effect as the sensor and internal flow chamber are thermally insulated.

To eliminate any electrical resistance, an electrical calibration at the end of the cable using precision resistors has been performed in our factory . A calibration is then performed with a certified thermometer on the whole loop at a temperature of approximately 20 °C. The temperature measurement is therefore fully calibrated.

The product also uses an accurate temperature compensation algorithm taking account of the pure water dissociation and of any components such as NaCl or HCl. By default, the NaCl curve is activated into the system as it is representative of the majority of impurities present in pure water.

Finally, in order to comply with the USP standard, it is possible to easily deactivate any temperature compensation curve during operation. Conductivity and resistivity measurements are then no longer referenced to a given temperature (25 °C in general).

Accurate determination of the cell constant
The conductivity of pure water should be accurately identified. As there are no reliable low conductivity calibration solutions, the measurement of pure water conductivity must be performed by comparison with a reference system in compliance with the prevailing standards.

The conductivity sensor integrated in the Polymetron 9526 has a cell constant K that has been accurately (± 2%) defined in our factory, with water having a conductivity < 10 µS/cm, and by comparison with a reference conductivity sensor whose constant complies with the ASTM D 1125 standard (with NIST traceability by using a certified precision thermometer).

The 9526 is therefore a reliable standard allowing the certification of other in-line sensors, when the sample taken is representative of the process (flow rate, composition and temperature).

Optimized design
When starting the sampling, the sample tube, which is initially empty, may have some bubbles in it. The same applies to the fluid that expands or heats up in the measurement cell. Air bubbles on the electrode will reduce the active surface, leading to a non-representative low conductivity value (high resistivity).

The 9526 flow chamber contains no protrusions or dead zones and has been designed to avoid air bubble retention. Its conductivity sensor, used only for measurements in ultra pure water, has electro-polished electrodes that also prevent the retention of air bubbles. A minimum flow rate of 20 L/h (ideally 60 L/h) is required in order to facilitate the extraction of air bubbles but also to obtain a temperature that is identical to that of the process sample. It is important that the sampling system does not pollute the sample being analyzed (no contamination with ambient air or impurities).

After being carefully calibrated in our facility, the 9526 is operated for 30 minutes in ultra pure water (grade 1 and ISO 3696/BS3978) before being protected by plugs to avoid any contamination of the conductivity cell. Sample connections are designed to meet the requirements of pure and ultra pure water sampling.

Calibration guidelines
As stated in the ISO 100012-1 Standard, a time period should be defined between each system calibration. Hach Lange can perform this operation in our facility to guarantee traceability to national certified standards.

NOTICE

In order to meet technical specifications as closely as possible, Hach Lange recommends calibrating the 9526 once a year in our facility to guarantee the validity of the certification for one year, if and only if, important components of the unit have not been modified or accessed in any way. A system of seals is placed on each component of the unit to validate this.

Installation

⚠ CAUTION

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

Hydraulic connections

NOTICE

Sockets **No. 4**, **5** and **6** in Figure 1 on page 8 are all IP 67 therefore it is essential the connectors are tightened firmly before using the instrument. In addition, it is also important to replace the protection caps on the sockets after use.

The sample to be tested enters the instrument through the port labelled "IN" (**No. 11** in Figure 1 on page 8). Its resistivity is measured by the conductivity sensor located inside the instrument. The sample is then evacuated through the port labelled "OUT" (**No. 12** in Figure 1 on page 8).

Note: *For improved system operation, the sample supply and drain should ideally be located above the "IN" and "OUT" ports.*

Sample IN connection

1. Push the retaining collar on the "IN" port using the key provided.
2. Remove the plug while keeping pressure on the collar.
3. Make a clean cut (90°) at one end of an 8 mm semi-rigid tube (or 6 mm if you are using the D8 to D6 reduction sleeve). Use a PTFE tube for temperatures above 70 °C.
4. Insert the tube into the "IN" port.
5. Connect the other end of the tube to the sample supply.

Sample OUT connection

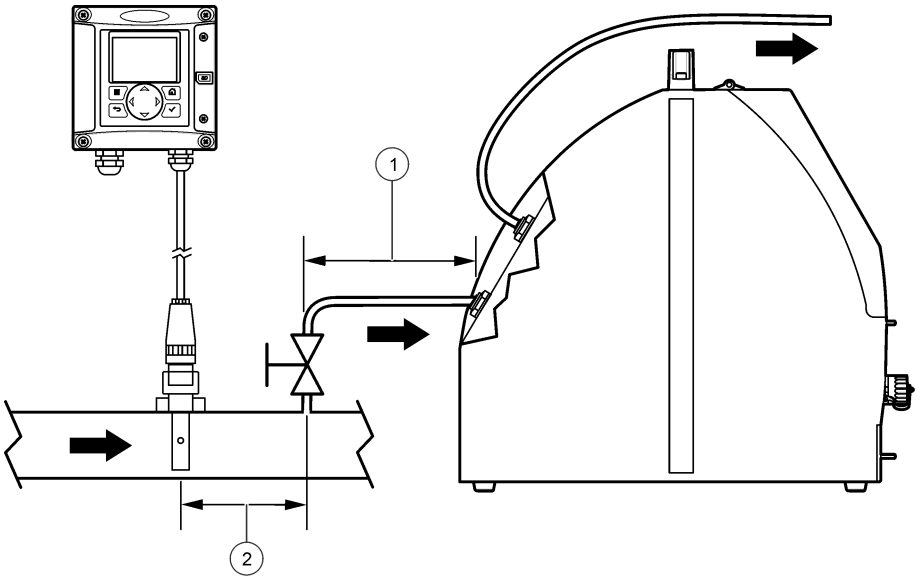
1. Push the retaining collar on the "OUT" port using the key provided.
2. Remove the plug while keeping pressure on the collar.
3. Make a clean cut (90°) at one end of an 8 mm semi-rigid tube (or 6 mm if you are using the D8 to D6 reduction sleeve). Use a PTFE tube for temperatures above 70 °C.
4. Insert the tube into the "OUT" port.
5. Connect the other end of the tube to the drain for an in-line installation or the flow chamber containing the sensor being tested for an off-line installation.

Installation in-line

If the system is in operation the instrument must be connected to the sample using a shut-off valve to extract the sample. This requires a total distance D1 + D2 (see Figure 2) of less than 2 meters and a flow rate exceeding 20 L/hour (ideally 60 L/hour).

After opening the sample valve, wait at least 30 minutes to ensure all parts in contact with the sample have been well rinsed and that the optimal thermal equilibrium between the sample, flow chamber and conductivity sensor has been reached.

Figure 2 Installation in-line



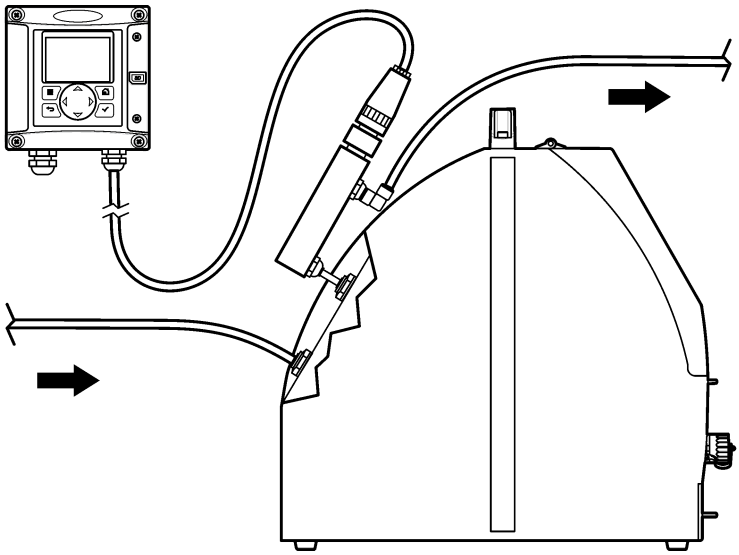
1 D1	**2** D2

Installation off-line

Place the sensor in a flow chamber and connect the flow chamber to the "OUT" port on the instrument using a small piece of plastic tubing. The sample is evacuated through tubing attached the outlet port on the flow chamber.

A flow rate exceeding 20 L/hour (ideally 60 L/hour) is required. After opening the sample valve, wait at least 30 minutes to ensure all parts in contact with the sample have been well rinsed and that the optimal thermal equilibrium between the sample, flow chamber and conductivity sensor has been reached.

Figure 3 Installation off-line



Mains connection

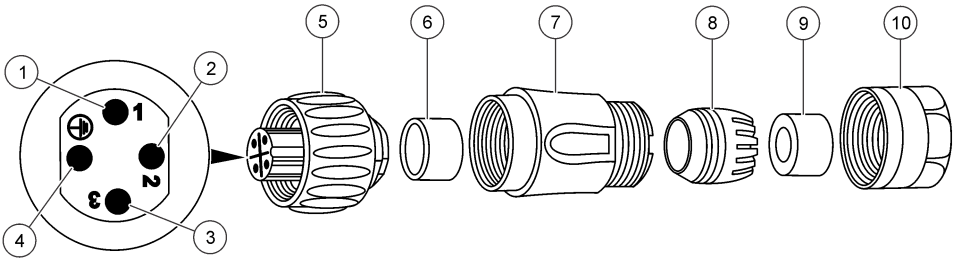
⚠ WARNING

The installation of the instrument should be performed exclusively by personnel specialized and authorized to work on electrical installations, in accordance with relevant local regulations. In addition, and in accordance with safety standards, it must be possible to disconnect the power supply of the instrument in its immediate vicinity.

Use a three wire mains supply cable (live, neutral and earth) with a cross-section between 0.35 and 2 mm^2 (AWG 22 to 14) rated at 105 °C minimum. The external cable insulation should be cut as close as possible to the terminal block.

The connector for the mains power cable is delivered with the instrument (see Figure 4) and can be found in the accessory drawer (**No. 7** in Figure 1 on page 8) at the front of the instrument.

Figure 4 Mains power cable connector



1 Live wire	**5** Female contact with locking nut	**9** Rubber gasket
2 Neutral wire	**6** Rubber gasket	**10** Cable tightening nut
3 Not used	**7** Main connector body	
4 Earth wire	**8** Clamping ring	

Disassemble the connector by unscrewing the two ends of the connector (Nos. **1** and **6** in Figure 4) from the main body. Pass the power cable through the connector components numbers **6** through to **2**. Then connect the power cable to the female contact (**No. 1** in Figure 4).

Reassemble the connector and power the instrument according to the specifications on the product label (**No. 9** in Figure 1 on page 8). Connect the power cable connector to the instrument power supply socket (**No. 6** in Figure 1 on page 8) after first unscrewing the socket protection cap.

Analog outputs

The analog output is used to record the measurements provided by the instrument (conductivity or temperature). It is recommended to use a standard cable (reference 08319=A=0005) that can be purchased through your local Hach Lange representative. This cable should be wired as follows:

- White: pin 1+
- Red: pin 1-
- Blue: pin 2+
- Black: pin 2-
- Orange: do not use

Connect to the 4-20 mA outputs socket (**No. 4** in Figure 1 on page 8) after first unscrewing the socket protection cap.

Electrical conductivity calibration connection

Electrical calibration is used to eliminate any electronic error of the system being tested, in accordance with standard ASTM D 5391. The conductivity calibration socket connector (**No. 5** in Figure 1 on page 8) is connected to a certified precision resistor (200 kΩ) in order to simulate the resistivity of ultra pure water.

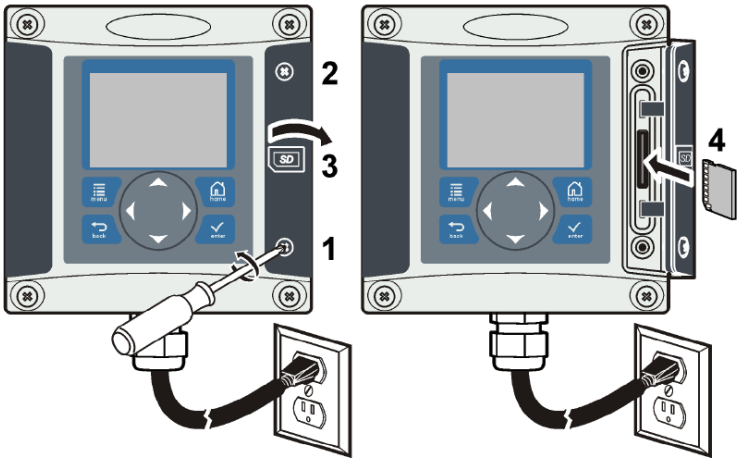
Only systems using the Polymetron sensor models 8310, 8314 and 8315 have a cable and connector able to achieve this type of calibration. In this case, simply disconnect the cable from the sensor and connect it to the instrument conductivity calibration socket after first unscrewing the socket protection cap. Then follow the instructions in the user manual of the system being tested to perform an electronic calibration with a value of 200 kΩ.

Install a Secure Digital (SD) memory card

For instructions on how to install an SD card in the controller, refer to Figure 5. Information on how to use the SD memory card can be found in Using the secure digital memory (SD) card on page 19.

To remove an SD card, push down on the edge of the card and release, then pull the card up and out of the slot. After the card is removed, close the slot cover and tighten the cover screws.

Figure 5 SD card installation



Startup

Make sure that the flow rate and pressure do not exceed the values in Specifications on page 3.

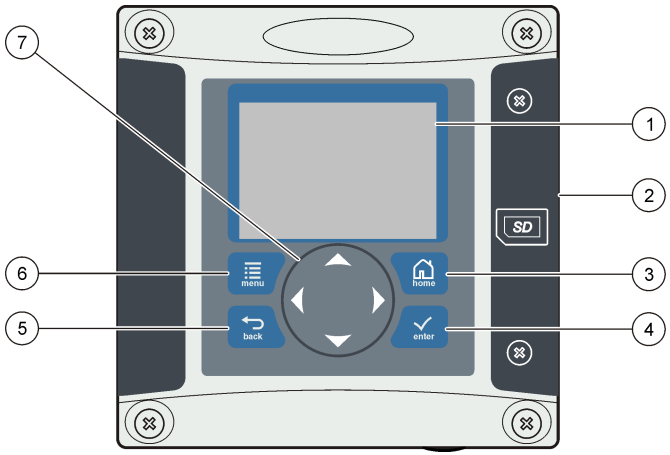
1. Open the valve on the sample line to let sample flow through the analyzer.
2. Turn the knob on the flow meter to set the flow rate.
3. Examine the plumbing for leaks and stop any leaks if found.
4. Apply power to the controller.
5. Make the applicable menu selections when the controller starts.

User interface and navigation

User interface

The keypad has four menu keys and four directional keys as shown in Figure 6.

Figure 6 Keypad and front panel overview



1 Instrument display	**5** **BACK** key. Moves back one level in the menu structure.
2 Cover for secure digital memory card slot	**6** **MENU** key. Moves to the Settings Menu from other screens and submenus.
3 **HOME** key. Moves to the Main Measurement screen from other screens and submenus.	**7** Directional keys. Used to navigate through the menus, change settings, and increment or decrement digits.
4 **ENTER** key. Accepts input values, updates, or displayed menu options.	

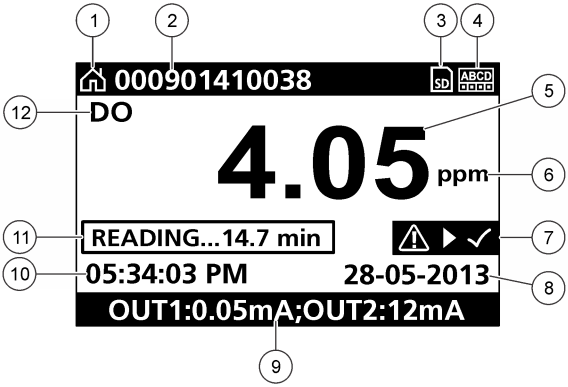
Inputs and outputs are set up and configured through the front panel using the keypad and display screen. This user interface is used to set up and configure inputs and outputs, create log information and calculated values, and calibrate sensors. The SD interface can be used to save logs and update software.

Display

Figure 7 shows an example of the main measurement screen with the sensor connected to the controller.

The front panel display screen shows sensor measurement data, calibration and configuration settings, errors, warnings and other information.

Figure 7 Example of Main Measurement screen



1 Home screen icon	**7** Warning status bar
2 Sensor name	**8** Date
3 SD Memory card icon	**9** Analog output values
4 Relay status indicator	**10** Time
5 Measurement value	**11** Progress bar
6 Measurement unit	**12** Measurement parameter

Table 1 Icon descriptions

Icon	Description
Home screen	The icon may vary depending on the screen or menu being displayed. For example, if an SD card is installed, an SD card icon appears here when the user is in the SD Card Setup menu.
SD memory card	This icon appears only if an SD card is in the reader slot. When a user is in the SD Card Setup menu, this icon appears in the upper left corner.
Warning	A warning icon consists of an exclamation point within a triangle. Warning icons appear on the right of the main display below the measurement value. Push the **ENTER** key then select the device to view any problems associated with that device. The warning icon will no longer be displayed once all problems have been corrected or acknowledged.
Error	An error icon consists of an exclamation point within a circle. When an error occurs, the error icon and the measurement screen flash alternately in the main display. To view errors, push the **MENU** key and select **Diagnostics**. Then select the device to view any problems associated with that device.

Additional display formats

- From the Main Measurement screen push the **UP** and **DOWN** arrow keys to switch between measurement parameters
- From the Main Measurement screen push the **RIGHT** arrow key to switch to a split display of up to 4 measurement parameters. Push the **RIGHT** arrow key to include additional measurements. Push the **LEFT** arrow key as needed to return to the Main Measurement screen
- From the Main Measurement screen push the **LEFT** arrow key to switch to the graphical display (see Graphical display on page 16 to define the parameters). Push the **UP** and **DOWN** arrow keys to switch measurement graphs

Graphical display

The graph shows concentration and temperature measurements for each channel in use. The graph supplies easy monitoring of trends and shows changes in the process.

1. From the graphical display screen use the up and down arrow keys to select a graph and push the **HOME** key.
2. Select an option:

Option	Description
MEASUREMENT VALUE	Set the measurement value for the selected channel. Select between Auto Scale and Manually Scale. For manual scaling enter the minimum and maximum measurement values
DATE & TIME RANGE	Select the date and time range from the available options

System startup

When initially powered up, the LANGUAGE, DATE FORMAT and DATE/TIME screens appear in order. After these options are set, the controller performs a device scan and displays the message **SCANNING FOR DEVICES. PLEASE WAIT...** If a new device is found, the controller performs an installation process before displaying a main measurement screen.

If the scan finds previously installed devices without configuration changes, the main measurement screen of the device in the number one position appears immediately after the scan is complete.

If a device has been removed from the controller or is not found during the next power-cycled or menu-driven scan, the controller displays a **DEVICE MISSING** message and prompts to delete the missing device.

If no sensor is connected to an installed analog module, the controller will indicate an error. If devices are connected but not found by the controller, refer to the **Troubleshooting** section of this manual.

Set the language, date and time for the first time

The controller displays the language, date and time edit screens when the controller is powered on for the first time, and when it is powered on after the configuration settings have been set to their default values.
After the language, date and time options are set for the first time, update the options as necessary through the setup menu.

1. In the LANGUAGE screen, highlight a language in the options list and push the **enter** key. English is the default language for the controller.
2. In the DATE FORMAT screen, highlight a format and push the **enter** key.
3. In the DATE/TIME screen, push the **right** or **left** arrow keys to highlight a field, then push the **up** and **down** arrow keys to update the value in the field. Update the other fields as necessary.
4. Push the **enter** key. The changes are saved and the controller performs a start-up scan for devices. If connected devices are found, the controller displays the main measurement screen for the device in the number one position. If the controller fails to find connected devices, refer to the **Troubleshooting** section of this manual.

Controller configuration information

General information about configuration options is listed in the table.

1. Push the **menu** key and select Polymetron 9500 SETUP.

Option	Description
SECURITY SETUP	Sets the passcode preferences.
OUTPUT SETUP	Configures the controller analog outputs.
RELAY SETUP	Configures the controller relays.

Option	Description
DISPLAY SETUP	Configures the controller display. ADJUST ORDER—View and modify the measurement display order. • SEE CURRENT ORDER—View the current display order • ADD MEASUREMENTS—Add selected measurements to the display • REMOVE MEASUREMENTS—Remove selected measurements from the display • REORDER LIST—Select one or more measurements and change their order in the display • SEE DEFAULT ORDER—View the default display order • SET TO DEFAULT—Set the display order to the default configuration ***Note:*** *Some of the above will not be available if no adjustment is possible for that option (e.g. REORDER LIST and REMOVE MEASUREMENTS will not be available if only one measurement is selected for display).* DISPLAY CONTRAST—Adjusts the contrast of the controller display. EDIT NAME—Assigns a name to the controller.
SET DATE/TIME	Sets the controller time and date.
DATALOG SETUP	Configures data logging options. Available only if CALCULATION has been setup.
MANAGE DATA	Select the device from the list of installed components and then select VIEW DATA LOG or VIEW EVENT LOG depending on the type of log entry to view. Specify the selection period to list all log entries matching the selection criteria. Push the **up** and **down** arrows to select an entry and then push **enter** to view more details.
ERROR HOLD MODE	HOLD OUTPUTS—Holds outputs at last known value when controller loses communication with the sensor. TRANSFER OUTPUTS—Switches to transfer mode when controller loses communication with the sensor. Outputs transfer to a pre-defined value.
CALCULATION	Configures the controller math function. SET VARIABLE X—Selects the sensor for the x variable. SET PARAMETER X—Selects the sensor measurement for the x variable. SET VARIABLE Y—Selects the sensor for the y variable. SET PARAMETER Y—Selects the sensor measurement for the y variable. SET FORMULA—Select the math function to implement: • None—Disables the math function • X-Y—Subtraction function • X+Y—Addition function • X/Y—Division function • [X/Y]%—Percentage function • [X+Y]/2—Average function • [X*Y]—Multiplication function • [X-Y]%/X—Difference function DISPLAY FORMAT—Selects the number of digits and decimal points. SET UNITS—Selects the units for the calculated reading. SET PARAMETER—Selects the parameter for the calculated reading.
DISCRETE INPUT SETUP	Configures three discrete input channels.
LANGUAGE	Assigns the language used in the controller.

2. Select an option and push **enter** to activate the menu item.

Using the secure digital memory (SD) card

An SD card must be installed in the controller.

- The SD card can be used to update software and firmware and to download event and data logs. If the SD card is installed while the controller is in the main menu, push the **home** key and then the **menu** key to verify the option is visible. The SD icon will also be visible in the upper status bar of the main measurement screen when a card is installed.
- Data log files on the SD card are available in XML and binary formats.
- DataCom is used to convert files from binary to CSV format. Refer to the DataCom manual for more information on how to use the application. For a copy of the DataCom manual, software updates or other downloadable resources, go to http://www.hach-lange.com or http://www.hach.com and search *DataCom*.

Updating software

Notes:

- The controller does not automatically transfer information to or from an SD card.
- When the SD card is put in multiple controllers, each controller has a separate set of folders in the SD card memory. To make sure software updates are in the correct folder for the controller in use, it is best to use a separate dedicated SD card for each controller.

1. Push the **menu** key and select SD CARD SETUP.
2. Select UPGRADE SOFTWARE and push the **enter** key.

   Note: *If the UPGRADE SOFTWARE option does not appear, perform the steps in* Firmware updates with SD cards *on page 21*.
3. Select a device from the list and push the **enter** key. The list of options includes the controller and all connected devices that have software placed in the appropriate folder on the SD card.
4. If more than one version of the upgrade software is available, select the version with the highest number and push the **enter** key.
5. Push the **enter** key to begin the software transfer. The display will show "TRANSFERRING FILES. PLEASE WAIT..." The percentage of completion appears in the bottom left corner of the display. The upgrade cannot be halted once it has begun.

   - When the transfer is successful, the display will show "TRANSFER COMPLETE" along with a prompt to push **enter** to restart the controller or to push the **back** key and exit to the SD CARD SETUP menu. Controller updates take effect when the controller is restarted. A restart is not necessary for sensor updates.
   - If the transfer is unsuccessful, the display will show "TRANSFER FAILED" and an error message. Push the **enter** key to acknowledge the warning and exit out of the menu. Error messages are different for each sensor. Refer to the applicable sensor manual.

Save data and event logs with SD cards

Notes:

- Data and event logs can be downloaded to an SD card and viewed with any device capable of reading an SD card.
- Data logs store the measurement data at selected intervals in a packed binary format (.flg file).
- Event logs store a variety of events that occur on the devices such as configuration changes, alarms, and warning conditions. Event logs are set up during the sensor or module configuration process. Event logs are stored in a CSV format.

1. Push the **menu** key and select SD CARD SETUP>SAVE LOGS.
2. If more than one device appears on the screen, all devices are selected by default. To deselect an item, highlight the selection and push the left arrow key. Select the devices from which logs will be saved and push the **enter** key.

3. Select the time period from which logs are to be saved.

Option	Description
LAST DAY	All logs from the last full 24 hours, starting from 12:00 a.m., and any additional time remaining on the current day.
LAST WEEK	All logs from the last full week (7 days) starting from 12:00 a.m., and any additional time remaining on the current day.
LAST MONTH	All logs from the last full month (30 days) starting from 12:00 a.m., and any additional time remaining on the current day.
ALL	Save all logs in memory.
NEW	All logs that are new since the last time logs were saved to the SD card.

4. Push the **enter** key to confirm the choice, and push the **enter** key again to begin the file transfers.
5. Allow time for the files to transfer. The display will show TRANSFERRING FILES. PLEASE WAIT... and the percentage of files transferred. If the transfer is successful, the display will show "TRANSFER COMPLETE". If the transfer is not successful, the display will show "TRANSFER FAILED".
6. Push the **enter** key to return to the SD CARD SETUP menu.

Access data and event log files on the SD card

A PC, a USB or other SD card reader device, Excel 2003 or higher (for XML files) or the DataCom application (for binary flg files) are necessary to view the event and data logs stored on an SD card.

Data logs have the following structure: Device Name, Device Serial Number, Device Identification, Data Log, Time Stamp.

Event logs have the following structure: Device Name, Device Serial Number, Device Identification, Event Log, Time Stamp.

To view data or event log files stored on the SD card:

1. Attach the card reader device to the PC (if necessary) and install the SD card that contains the files in the reader device.
2. In the SD card directory, open the HACH folder.
3. Select the Logs folder.
4. Select a device folder.
   The event and data log files in the folder are shown.
5. To view XML data log files:
   a. Make sure the HachDatalog.xsl style sheet exists in the device folder.
   b. Open the Excel application.
   c. Go to File, Open.
   d. Select the data log file.
   e. In the Import XML dialog box, select **Open the file with the following style sheet applied** and select **HachDatalog.xml**.
   f. Click OK to view the data.
6. To view binary data log (.flg) files:
   a. Make sure the device driver (.flg.drv) file exists in the device folder.
   b. Open DataCom.
   c. In the File Viewer section, click Open.
   d. Select the data log file.
      The data log file is shown in the box and a comma separated values (csv) file with the same file name is created. This csv file can be opened in Excel.

Firmware updates with SD cards

The latest firmware updates can be placed on an SD card. The SD card can then be used to update the controller or device firmware.

A PC and a USB card reader or other device capable of reading an SD card are necessary.

1. Find the zip file at http://www.hach-lange.com or http://www.hach.comand copy it to the PC.
2. Extract file(s) from the zip folder and save them to the SD card.
3. Remove the SD card and update the controller and device firmware. Refer to Updating software on page 19.

Backup settings to an SD card

Saves the configuration of a device to the SD card.

1. Push the **menu** key and select SD CARD SETUP>MANAGE CONFIGURATION>BACKUP SETTINGS.
2. Select the devices to be backed up. All devices are selected by default. To deselect an item, highlight the selection and push the left arrow key. Push **enter** to begin the file transfers. If backup files already exist on the SD card, a confirmation window appears. Select the devices again and push **enter**. Wait for the "TRANSFER COMPLETE" message.
3. Push **enter** again to return to the MANAGE CONFIGURATION menu.

Restore settings to the controller

This menu selection only appears if a (serial number-specific) backup file for the controller or one of the sensors connected to it exists on the SD Card. This menu selection loads the configuration of a specific device from the SD card to the same device (serial number-controlled function).

1. Push the **menu** key and select SD CARD SETUP>MANAGE CONFIGURATION>RESTORE SETTINGS.
2. Select the device that will be restored. All devices are selected by default. To deselect an item, highlight the selection and push the left arrow key. Push **enter** to begin the file transfers.
3. To have the settings take effect immediately, push **enter** to restart the controller or push the **back** key to return to the MANAGE CONFIGURATION menu.

Transfer settings to another device

Allows the configuration settings for a device to be transferred to an SD card and then to another device of the same type.

1. Push the **menu** key and select SD CARD SETUP>MANAGE CONFIGURATION>TRANSFER SETTINGS.
2. Two options appear:
   - RETRIEVE SETTINGS
   - COPY SETTINGS
3. To retrieve settings from the controller (or a device connected to it) and put the settings on the SD card:
   a. Select RETRIEVE SETTINGS and push **enter**.
   b. Select the devices that contain the information to be transferred. All devices are selected by default. To deselect an item, highlight the selection and push the left arrow key. Push **enter** to begin the file transfers. Wait for the "TRANSFER COMPLETE" message.
   c. If files already exist on the SD card, a confirmation window appears. Select the devices again and push **enter**. Wait for the "TRANSFER COMPLETE" message.

d. Push **enter** to return to the MANAGE CONFIGURATION menu.

4. To copy settings from the SD card to a controller (or a device connected to it):

   a. Select COPY SETTINGS and push **enter**.
   b. Select the devices on the SD card. All devices are selected by default. To deselect an item, highlight the selection and push the left arrow key. Push **enter** to begin the file transfers. Wait for the "TRANSFER COMPLETE" message.
   c. When the transfer is complete, push **enter** to restart the connected devices.
   d. Push **enter** to restart the controller or push **back** to return to the MANAGE CONFIGURATION menu.

Operation

Configure the sensor under test

Use the CONFIGURE menu to enter identification information about the sensor under test.

1. Push the **menu** key and select SENSOR SETUP>CONFIGURE.
2. Select an option and push **enter**. To enter numbers, characters or punctuation, push and hold the **up** or **down** arrow keys. Push the **right** arrow key to advance to the next space.

Option	Description
EDIT NAME	Changes the name that corresponds to the sensor on the top of the measure screen. The name is limited to 16 characters in any combination of letters, numbers, spaces or punctuation. Only the first 12 characters are displayed on the controller.
SENSOR S/N	Allows the user to enter the serial number of the sensor, limited to 16 characters in any combination of letters, numbers, spaces or punctuation.
SELECT MEASURE	Changes the measured parameter to CONDUCTIVITY (default) or RESISTIVITY. All other configured settings are reset to the default values. Set to the same parameter as the controller under test.
DISPLAY FORMAT	Changes the number of decimal places that are shown on the measure screen. When set to auto, the number of decimal places changes automatically with changes in the measured value. Set to the same parameter as the controller under test.
MEAS UNITS	Changes the units for the selected measurement. Set to the same parameter as the controller under test.
TEMP UNITS	Sets the temperature units to °C (default) or °F. Set to the same parameter as the controller under test.
T-COMPENSATION	Adds a temperature-dependent correction to the measured value. Enter the same details as those configured on the controller under test.
CABLE PARAM	This option is reserved for Hach Lange service technicians.
TEMP ELEMENT	Sets the temperature element to PT100 for automatic temperature compensation. If no element is used, the type can be set to MANUAL and a value for temperature compensation can be entered.
FILTER	Sets a time constant to increase signal stability. The time constant calculates the average value during a specified time—0 (no effect) to 60 seconds (average of signal value for 60 seconds). The filter increases the time for the sensor signal to respond to actual changes in the process.
LOG SETUP	Sets the time interval for data storage in the data log—5, 30 seconds, 1, 2, 5, 10, 15 (default), 30, 60 minutes.
RESET DEFAULTS	Sets the configuration menu to the default settings. All sensor information is lost.

Calibration

About sensor calibration

There are no calibration options available from the menus of the 9526 instrument. All calibrations are performed from the controller of the sensor under test. For detailed information on these calibration procedures refer to the associated manuals delivered with the sensor and controller under test.

NOTICE

After turning on the 9526 instrument and initiating sample circulation, wait for at least 30 minutes in order to allow correct rinsing of the whole system. This also enables the temperature equilibration between the sample, the flow chamber and the sensor.

After 30 minutes of sample circulation, compare the measurement value displayed on the controller under test against the measurement value displayed on the 9526 instrument. If these values are **outside** ± 5% of each other than a calibration is required. If these values are **within** ± 5% of each other than a calibration is not necessary but can still be performed.

Before calibrating the sensor under test, make sure to perform a temperature calibration first.

Calibration process

All calibrations are made using the controller and sensor under test. Follow the instructions in the associated controller and sensor user manuals.

The process can be different according to the Polymetron controller under test. Perform the calibration process in the following sequence.

1. Temperature calibration

The following equipment is required for a temperature calibration:

- Pt100 simulator (< 0.1 °C) for a 2-point electrical calibration
- Certified precision thermometer (< 0.1 °C) if connected in-line
- None if mounted off-line as the 9526 is used as the reference

	Polymetron controller model under test		
	9500	**9125**	**Others**
2-point electrical calibration	NO	YES (100 and 172 Ω)	NO
Process calibration	YES	YES	YES

2. Electrical calibration

Polymetron controller model under test		
9500 / 9125	**9125 (< V1.12) / 8925 / Others**	**8920**
R∞[3] and 200 kΩ[4]	NO	R∞[3]

3. Conductivity calibration

Polymetron controller model under test		
9500 / 9125 / 8920	**9125 (< V1.12) / 8925**	**Others**
K calculation (see K Calculation on page 24). On the controller under test, enter the K Cell value computed by the Polymetron 9526	Process: R∞ and comparative measurement with 9526[5]	Process: Comparative measurement with 9526[5]

[3] Cable disconnected from the sensor or sensor exposed to air
[4] Use the precision resistance on the 9526
[5] Adjust the displayed value of the transmitter under test to that of the 9526 value

K Calculation

Use this option to re-calculate the cell constant K value for the sensor under test.

1. Push the **menu** key and select SENSOR SETUP>K CALCULATION.

Option	Description
K CALCULATION	This option is only valid if the last sensor calibration date is within one month of the current date. The following parameters are required: • SITE ID—The name of the site ID is limited to 10 characters in any combination of letters, numbers, spaces or punctuation • CONDUCTIVITY— Enter the measurement value from the controller under test • TEMPERATURE— Enter the sample temperature from the controller under test • CELL K VALUE— Enter the cell constant K value from the controller under test • CALIBRATION SLOPE— Enter the slope value from the controller under test The new K value is calculated and displayed and should be entered into the controller under test. ***Note:*** *The calculation will fail if the new value is outside ±10% of the original value.*
K CALCULATION LOG	Lists all log files sorted by date and time. Use the arrow keys to select a log file and push **enter** to view the calculation details.
RESET K CALC LOG	Enter the factory pass code and select **YES** to delete the existing log file. Push **enter** to continue.

Maintenance

⚠ DANGER

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

Cleaning and decontamination

⚠ DANGER

Always remove power from the controller before performing maintenance activities.

The analyzer does not normally require any cleaning or decontamination. If needed, clean the exterior of the instrument with a moist cloth and a mild soap solution. Never use cleaning agents such as turpentine, acetone or similar products to clean the instrument, including the display and any accessories.

Clean the sensor

⚠ WARNING

Chemical hazard. Always wear personal safety protection in accordance with the Material Safety Data Sheet for the chemical that is used.

⚠ WARNING

Personal injury hazard. Removal of a sensor from a pressurized vessel can be dangerous. Reduce the process pressure to below 10 psi before removal. If this is not possible, use extreme caution. Refer to the documentation supplied with the mounting hardware for more information.

Pre-requisite: Prepare a mild soap solution with a non-abrasive dishwashing detergent that does not contain lanolin. Lanolin leaves a film on the electrode surface that can degrade the sensor performance.

Examine the sensor periodically for debris and deposits. Clean the sensor when there is a buildup of deposits or when performance has degraded.

1. Use a clean, soft cloth to remove loose debris from the end of the sensor. Rinse the sensor with clean, warm water.
2. Soak the sensor for 2 to 3 minutes in a soap solution.
3. Use a soft bristle brush to scrub the entire measuring end of the sensor.
4. If debris remains, soak the measuring end of the sensor in a dilute acid solution such as < 5% HCl for a maximum of 5 minutes.
5. Rinse the sensor with water and then return to the soap solution for 2 to 3 minutes.
6. Rinse the sensor with clean water.

Always calibrate the sensor after maintenance procedures.

Fuse replacement

Fuses are not user-serviceable items. The need for fuse replacement in controllers indicates severe technical failure and is therefore considered to be a service activity. If a blown fuse is suspected, contact Technical Support.

Battery replacement

The lithium ion backup battery is not user replaceable. Contact Technical Support for replacement.

Troubleshooting

Test and maintenance menu

1. Push the **menu** key and select TEST/MAINT.

Option	Description
SCAN DEVICES	Performs a scan for active and missing devices.
OUTPUT CAL • **OUTPUT 1** • **OUTPUT 2**	Lets the user calibrate the 4–20 mA outputs with a 250 ohm resistor in series to the mA output terminals. The settings for each output are adjusted until the correct value (4 mA or 20 mA) is supplied. CAL 4 mA output (Min: 0 Max: 25000) CAL 20 mA output (Min: 35000 Max: 65533)
HOLD OUTPUTS	Sets the value the controller sends to an external system for a defined period of time. After the time period, the instrument goes back to reporting real time values. ACTIVATION—LAUNCH or RELEASE SET OUTMODE—HOLD OUTPUTS (default) or TRANSFER OUTPUTS SET CHANNELS—ALL (default) or select from hardware list
TEST OUTPUT • **OUTPUT 1** • **OUTPUT 2**	Lets the user select a mA value that is sent by the controller for verification. Min: 0 mA (default +04.00) Max: 25.00 mA
STATUS	View status of all modules, sensors and relays.
TEST RELAY—A, B, C, D	ENERGIZE or DE-ENERGIZE the selected relay.
OVERFEED RESET	Resets the overfeed timer.
RESET DEFAULT CONFIG	Resets the controller configuration settings to the default values (language, date and time, relay function and data output function).
RESTART	Performs a controller restart.

Option	Description
SIMULATION (only displays if sensors or modules are connected)	After the SIM VALUE is entered, the controller outputs this value as if it was the value sent from the sensor. The simulation stops after the user exits the screen. SELECT SOURCE— • <Module 1> • <Module 2> (footer displays current source selection) SET PARAMETER—Source measurement type (footer displays current source selection) SET SIM VALUE—Use arrow keys to change value (footer displays current source selection)
MODBUS STATS	Displays Error and Good count stats for selected port. • Sensor port 1, 2, 3 or 4 • Network port • Service port • Clear stats
SYSTEM DATA	Displays the current system current, temperature and voltage data.

Sensor diagnostic and test menu

The sensor diagnostic and test menu shows current and historical information about the instrument. Refer to Table 2.

To access the sensor diagnostic and test menu, push the **menu** key and select SENSOR SETUP>DIAG/TEST.

Table 2 Sensor DIAG/TEST menu

Option	Description
MODULE INFORMATION	Shows information about the sensor module.
SENSOR INFORMATION	Shows the name and serial number that was entered by the user.
CAL DAYS	Shows the number of days since the last calibration.
CAL HISTORY	Shows a list of all calibrations by date/time stamp. Use the arrows keys to select a calibration and push **enter** to view the details.
RESET CAL HISTORY	Resets the calibration history for the sensor (requires service-level passcode). All previous calibration data is lost.
POLARIZATION	Contacting conductivity sensors only. Shows information about the electrode polarization, the cable capacitance and the time before the next measurement.
SENSOR SIGNALS	Shows the current sensor signal information.
FACTORY CAL	Reserved for service technicians only.
DIAG MEAS	Shows diagnostic information about the current measurement.

Warning and error conditions

Follow the steps below to acknowledge controller warnings.

1. Push the **menu** key and select DIAGNOSTICS.
2. Select the device (controller, sensor, network card) with the warning or error and push **enter**.
3. Select the warning, error or event list and push **enter**.
4. Select YES and push **enter** to acknowledge the warning.
   Note: *Errors cannot be acknowledged.*

Warning list

A warning icon consists of an exclamation point within a triangle. Warning icons appear on the right of the main display below the measurement value. A warning does not affect the operation of menus, relays and outputs. To view warnings, push the **menu** key and select DIAGNOSTICS. Then select the device to view any problems associated with that device. The warning icon will no longer be displayed once the problem has been corrected or acknowledged.

A list of possible warnings is shown in Table 3.

Table 3 Warning list for conductivity sensors

Warning	Description	Resolution
MEAS TOO HIGH	The measured value is > 2 S/cm, 1,000,000 ppm, 200% or 20,000 ppt	Make sure that the display format is set for the correct measurement range
MEAS TOO LOW	The measured value is < 0 µS/cm, 0 ppm, 0% or 0 ppt	Make sure that the sensor is configured for the correct cell constant.
ZERO TOO HIGH	The zero calibration value is too high	Make sure that the sensor is held in air during zero calibration and is not located near radio frequency or electromagnetic interference. Make sure that the cable is shielded by metal conduit.
ZERO TOO LOW	The zero calibration value is too low	
TEMP TOO HIGH	The measured temperature is > 200 °C	Make sure that the sensor is configured for the correct temperature element.
TEMP TOO LOW	The measured temperature is < -20 °C	
CAL OVERDUE	The Cal Reminder time has expired	Calibrate the sensor.
NOT CALIBRATED	The sensor has not been calibrated	Calibrate the sensor.
REPLACE SENSOR	The sensor has been in operation > 365 days	Calibrate the sensor with a reference solution and reset the sensor days. Refer to Sensor diagnostic and test menu on page 26. If the calibration fails, call technical support.
CAL IN PROGRESS	A calibration was started but not completed	Return to calibration.
OUTPUTS ON HOLD	During calibration, the outputs were set to hold for a selected time.	The outputs will become active after the selected time period.
WRONG LINEAR TC	The user-defined linear temperature compensation is out of range	The value must be between 0 and 4%/°C; 0 to 200 °C.
WRONG TC TABLE	The user-defined temperature compensation table is out of range	The temperature is above or below the temperature range defined by the table.
WRNG USER CONC TABLE	The concentration measurement is outside of the range of the user table	Make sure that the user table is set for the correct measurement range.

Table 3 Warning list for conductivity sensors (continued)

Warning	Description	Resolution
WRNG BLT-IN TEMP TABLE	The measured temperature is outside of the range of the built-in temperature compensation table	Make sure that the temperature compensation is configured correctly.
WRNG BLT-IN CONC TABLE	The concentration measurement is outside of the range of the built-in concentration table	Make sure that the concentration measurement is configured for the correct chemical and range.

Error list

Errors may occur for various reasons. An error icon consists of an exclamation point within a circle. When an error occurs, the error icon and the measurement screen flash alternately in the main display. All outputs are held when specified in the controller menu. To view errors, push the **menu** key and select DIAGNOSTICS. Then select the device to view any problems associated with that device.

A list of possible errors is shown in Table 4.

Table 4 Error list for conductivity sensors

Error	Description	Resolution
ADC FAILURE	The analog to digital conversion failed	Make sure that the sensor module is fully inserted into the controller connector. Replace the sensor module.
SENSOR MISSING	The sensor is missing or disconnected	Examine the wiring and connections for the sensor and for the module. Make sure that the terminal block is fully inserted into the module.
SENS OUT RANGE	The sensor signal is outside of the accepted limits (2 S/cm)	Make sure that the display format is set for the correct measurement range.

Replacement parts and accessories

Refer to the replacement parts and accessories section of the controller documentation for controller parts and accessories.

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

Replacement parts and accessories

Description	Item no.
Kit of 3 protection caps for instrument front panel connectors	09126=A=8010
Kit of 2 adapters D6/8 to DN4/6	09126=A=8020
Kit of 2 black protection caps for sample input and output connectors	09126=A=8030
Power supply connector	350=500=004
Tool for disconnecting in/out sampling tubes	578=507=602
DN8 semi-rigid PTFE tubing (per meter)	590=060=080
DN8 semi-rigid PE tubing (per meter)	151400,22387
Cable for the 4-20 mA output (5 meters)	08319=A=0005
Cable for the 4-20 mA output (10 meters)	08319=A=0010

Replacement parts and accessories (continued)

Description	Item no.
Cable for the 4-20 mA output (20 meters)	08319=A=0020
¾'' NPT flow chamber in PP with fittings	09126=A=0100
Pt100 temperature simulator (0.1°C accuracy)	037=000=001
Cable for connecting the Pt100 temperature simulator	09125=A=8020
Yearly re-calibration in our factory	09526=A=1000

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