



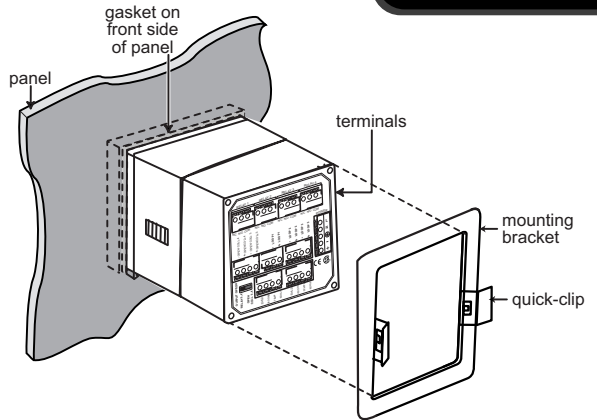
CAUTION!

- Remove power to unit before wiring input and output connections.
- Follow instructions carefully to avoid personal injury.
- This product should only be used for the purposes and in the manner described in this manual.



Installation

1. Punch out panel and de-burr edges. Recommended clearance on all sides between instruments is 1 inch.
2. Place gasket on instrument, and install in panel.
3. Slide mounting bracket over back of instrument until quick-clips snap into latches on side of instrument.
4. Connect wires to terminals.
5. To remove, secure instrument temporarily with tape from front or grip from rear of instrument. **DO NOT RELEASE.** Press quick-clips outward and remove.
6. If cleaning is necessary, wipe the front of the unit with a damp cloth.
7. The live contacts on the back of this unit must be covered to avoid accidental shock hazard.



Specifications

General

Compatible electrodes: **+GF+ SIGNET 3-28XX-1** Standard or Certified Conductivity/Resistivity Sensors

Sensor input range:

- Conductance: 0.055 $\mu\text{S}/\text{cm}$ to 400.00 mS/cm
- Resistivity: 10 $\text{K}\Omega\cdot\text{cm}$ to 18.26 $\text{M}\Omega\cdot\text{cm}$
- TDS: 0.0 to 999999. ppm
- Temperature: -25 to 120°C (-13 to 248°F) PT 1000; 25°C = 1096 Ω

Accuracy:

- Conductivity/Resistivity: $\pm 2\%$ of reading
- Temperature: $\pm 0.5^\circ\text{C}$ (0 to 100 $^\circ\text{C}$)

Power requirements:

- 3-8860-AC: 100 to 240 VAC $\pm 10\%$, 50-60 Hz, 20VA or 11 to 24 VDC $\pm 10\%$, regulated, 0.5 A max
- 3-8860: 11 to 24 VDC $\pm 10\%$, regulated, 0.5 A max

Display (Alphanumeric 2 x 16 LCD) :

- Contrast: User selected, 5 levels
- Update rate: 1.5 seconds

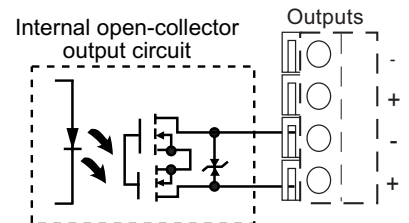
Current outputs (3 available):

- 4 to 20 mA, isolated, fully adjustable and reversible
- Max loop impedance:
 - 150 Ω @ 12 V
 - 450 Ω @ 18 V
 - 750 Ω @ 24 V
- Update rate: ≈ 100 ms
- Accuracy: ± 0.03 mA @ 25°C, 24 VDC

Open-collector outputs (2 available):

- Operational settings: Hi, Lo, Pulse, Off, USP
- Hysteresis: Adjustable
- Time delay: 0 to 6400 s.

- Max pulse rate: 400 pulses/min.
- 50 mA sink or source, 30 VDC max. pull-up voltage



Alarm contacts (up to 4 SPDT relays available)

Max voltage rating: 5 A @ 250 VAC, 5 A @ 30 VDC, resistive

- Operational settings: Hi, Lo, USP, Pulse, Off
- Hysteresis: Adjustable
- Time delay: 0 to 6400 s.
- Max pulse rate: 400 pulses/min.
- isolation: between open contacts: 500 V Minimum

Enclosure:

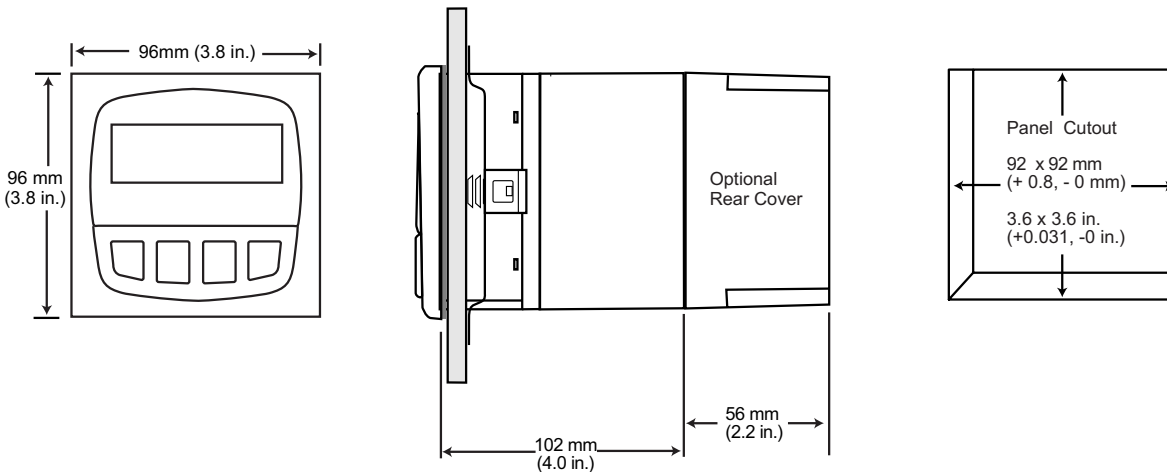
- Rating: NEMA 4X/IP65 front (NEMA 4X Rear cover available)
- Materials: Window: Polyurethane-coated polycarbonate
Keypad: Sealed 4-key silicone rubber
- Weight: 8860-AC: 1.28 lb/ 0.58 kg 8860: 1.2 lb/0.55 kg

Environmental

- Ambient operating temperature: -10 to 55°C (14 to 131°F)
- Storage temperature: -15 to 80°C (5 to 176°F)
- Relative humidity: 0 to 95%, non-condensing
- Maximum altitude: 2000 m (6562 ft)

Standards and Approvals

- CSA, CE, UL listed
 - Immunity: EN50082-2
 - Emissions: EN55011
 - Safety: EN61010
- Manufactured under ISO 9001, ISO 14001
- Insulation category: II
- Pollution degree: 2



Electrical Connections



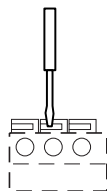
Caution: Failure to fully open terminal jaws before removing wire may permanently damage instrument. This product must be provided with a means to disconnect all current carrying conductors connected to the main AC line, or, as part of the building installation.

Wiring Procedure

1. Remove 0.35- 0.47 in. (9-12 mm) of insulation from wire end.
2. Press the orange terminal lever downward with a small screwdriver to open terminal jaws.
3. Insert exposed (non-insulated) wire end in terminal hole until it bottoms out.
4. Release orange terminal lever to secure wire in place. Gently pull on each wire to ensure a good connection.

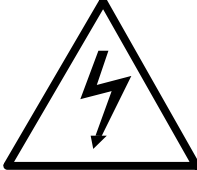
Wiring Removal Procedure

1. Press the orange terminal lever downward with a small screwdriver to open terminal jaws.



Wiring Tips:

- Do not route sensor cable in conduit containing AC power wiring - electrical noise may interfere with sensor signal.
- Routing sensor cabling in grounded metal conduit may prevent moisture damage, electrical noise, and mechanical damage.
- Seal cable entry points to prevent moisture damage.
- Do not insert two wires into a single terminal. If necessary, splice the wires together before inserting into the terminal.



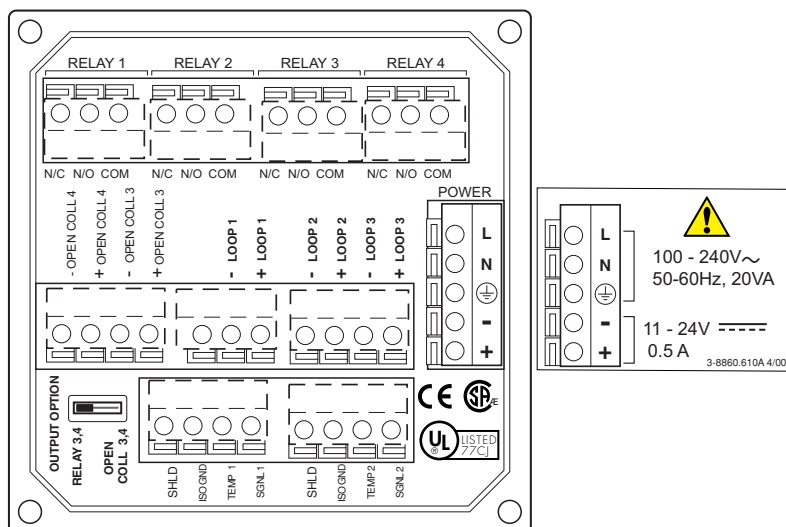
Caution:
Electrical shock hazard exists!

◆

Never connect live AC lines to the instrument.

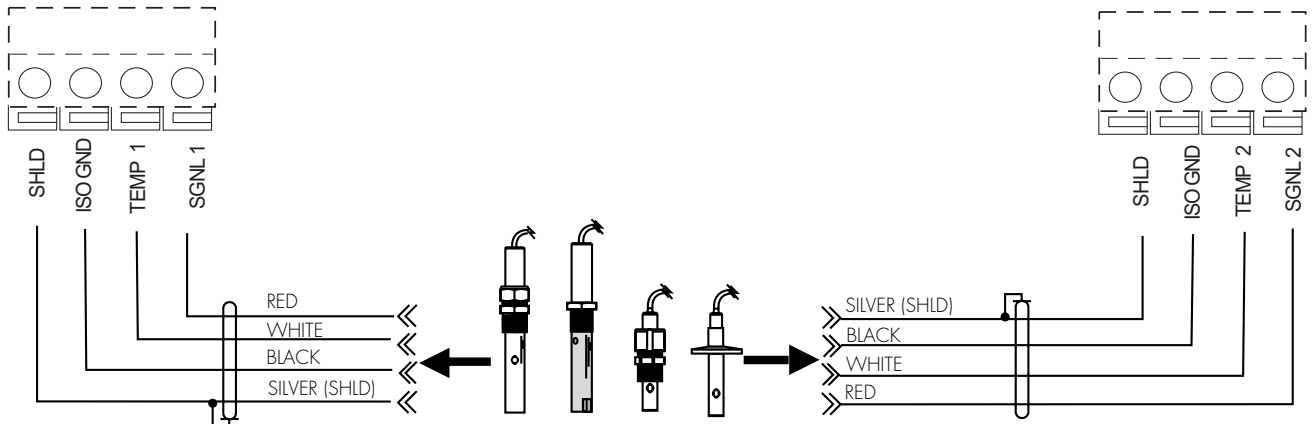
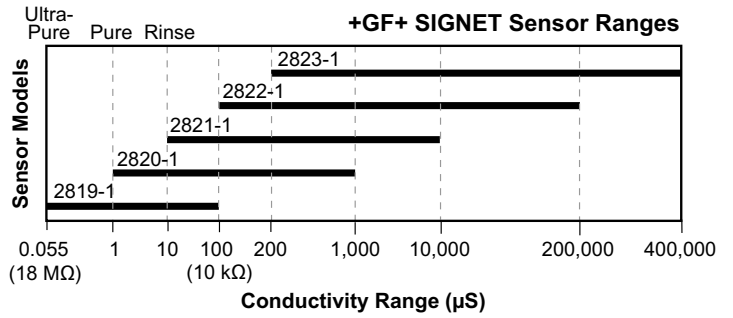
◆

Always connect a ground wire to the ground terminal* when using AC power.



Sensor Input Connections

- The 8860 will accept two independent sensor input signals. The two sensors may be of different cell constant values.
- Do not route sensor cable in any conduit containing AC power wiring - electrical noise may interfere with the signal.
- Use three conductor shielded cable for cable extensions up to 30 m (100 ft) max.
- Cable shield **MUST** be maintained through cable splice.
- Resistivity measurements from 10 MΩ to 18 MΩ are limited to solution temperatures from 20 °C to 100 °C.



Relay and Open Collector Functions

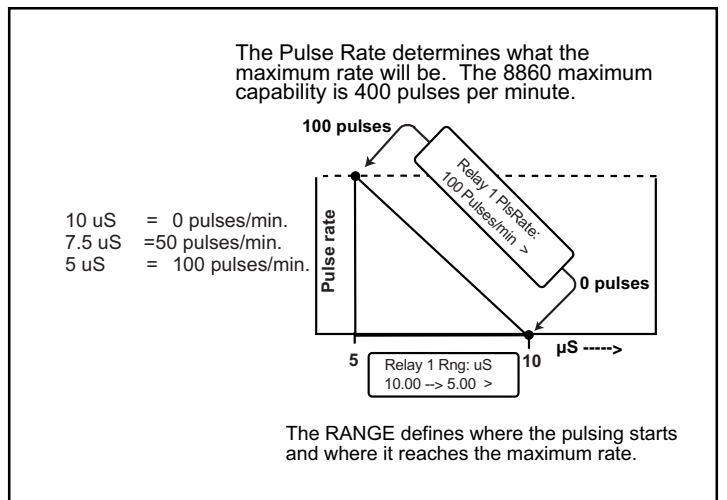
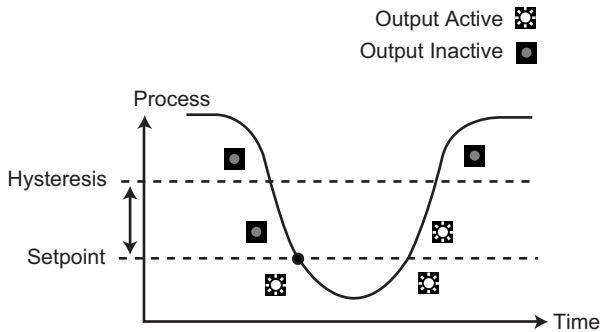
The 8860 is equipped with 4 SPDT relays that can be configured for High alarm, Low alarm, Proportional pulse or USP operation.

- **Low:** Output triggers when process variable is less than setpoint.
- **High:** Output triggers when process variable is higher than setpoint.
- **Off:** Disables output pulse.

Pulse Operation

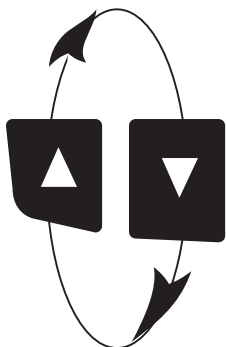
The output emits a 100 mS pulse at a rate defined by the Source, Pulse Range and Max PlsRate settings, and by the process condition. The maximum pulse rate is 400 pulses per minute.

Example: As the process falls below 10 µS the output will start pulsing in relation to the process value, the max pulse endpoint and the programmed pulses/min. Pulse rate will increase as the process approaches the programmed endpoint.



Navigating the VIEW menu:

- ◆ The VIEW menu is Normal Operation. You can select from 7 different information displays at any time without interrupting the system.
- ◆ To change the display in VIEW mode, press the UP or DOWN arrow keys. The seven displays will scroll in a continuous loop.
- ◆ You cannot make any changes to the system from the VIEW menu.
- ◆ No access code is necessary to change the display.



View Menu

Display	Description
C1 1000.00 µS/cm C2 30.00 µS/cm	Monitor C1 Conductivity and C2 Conductivity simultaneously. This is the factory preset view when Channel 2 is ON.
C1 1000.00 µS/cm 25.0 °C	Monitor Channel 1 Conductivity and Channel 1 Temperature. This is the factory preset view when Channel 2 is OFF.
C2 30.00 µS/cm 25.0 °C	Monitor Channel 2 Conductivity and Channel 2 Temperature. This view is available only when Channel 2 is ON.
Ratio C1: C2 97.00%	Monitor Percent Reject, Difference, or Ratio (Channel 1 to Channel 2 or Channel 2 to Channel 1)
Loop 1 12.03 mA Loop 2 5.69 mA	Monitor Loop 1 and Loop 2mA output simultaneously. This display will revert to the factory preset after 10 minutes.
Loop 3 13.7 mA R3 ON R4 PLS	Monitor Loop 3 and status of Relays 3 and 4 (Open Collector 3 and 4). This display will revert to the factory preset after 10 minutes.
Last Cal 6-30-00	Monitor date for scheduled maintenance or date of last calibration. This display will revert to the factory preset after 10 minutes.

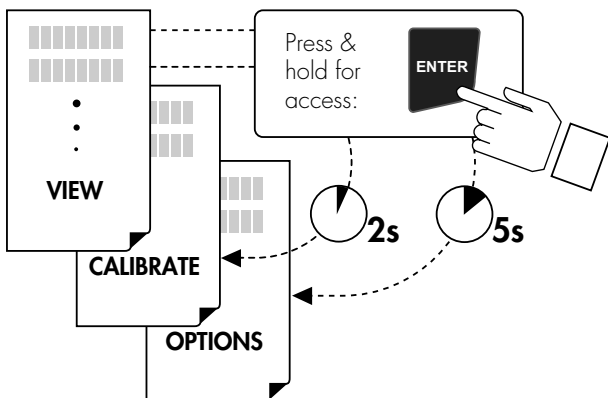
Navigating the CALIBRATE and OPTIONS menus

Access Code

Both the CALIBRATE and OPTIONS menus require the entry of the ACCESS CODE to prevent unauthorized access.

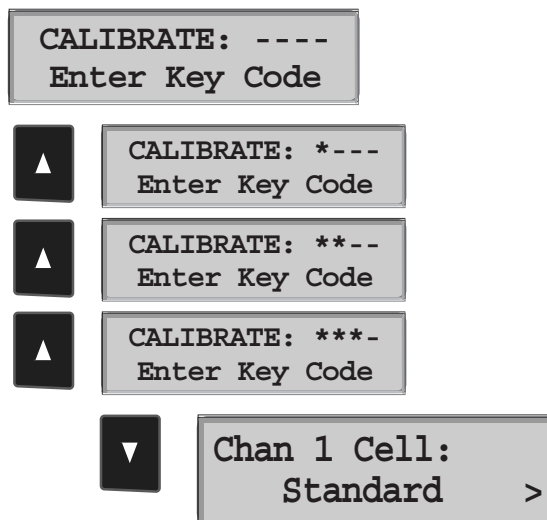
1.

Press the ENTER key for 2 seconds to access the CALIBRATE menu, or for 5 seconds to access the OPTIONS menu.



2.

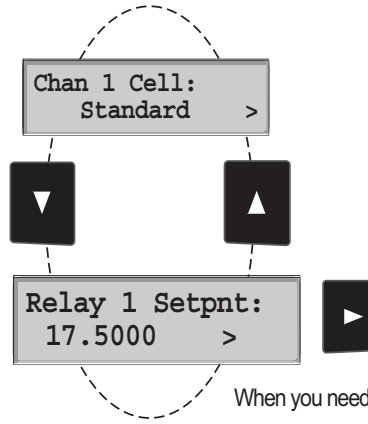
Access code: Press UP-UP-UP-DOWN in sequence.




The ACCESS CODE will take you to the first item in the CALIBRATE or OPTIONS menu

3.

Use UP and DOWN keys to scroll through the items in the CALIBRATE or OPTIONS menus.



When you need to edit a setting press the RIGHT ARROW key.


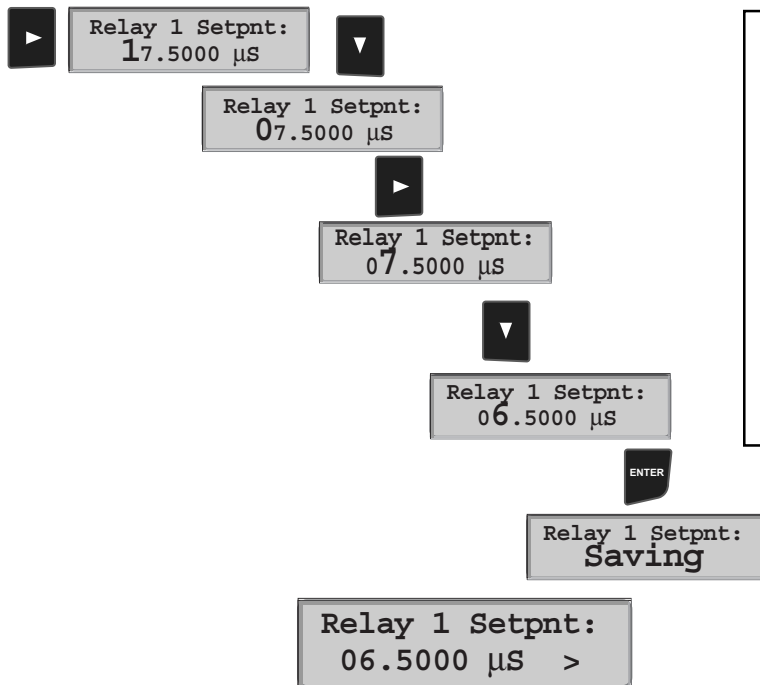


Finished Editing?
Press the UP and DOWN keys simultaneously from this display to return to the VIEW menu and normal operation.

4.

The display will have a flashing element. Use the UP and DOWN keys to change the setting. The RIGHT ARROW key advances the flashing element.

The example below illustrates editing the Relay 1 Setpoint from a setting of 17.5000 μS to a new setting of 6.5000 μS .



Made an Error?
Press the UP and DOWN keys simultaneously during any flashing display to revert to the last saved value.

Repeat steps 3 and 4 until all necessary changes are complete.

- All output functions remain active during calibration, except:

If the "...Set Conductivity" or "...Set Temperature" values are changed, all output functions related to that value will be held until the unit returns to normal operation.

This menu enables you to tailor the 8860 functions for your application.

Calibrate Menu				
Display	Description			
Chan 1 Cell: Standard >	Select CUSTOM only if you are connecting a certified conductivity sensor. Select STANDARD for all other systems.			
Chan 1 Cell: 1.0 >	For STANDARD sensors: Select from these options: 0.01, 0.1, 1.0, 10.0 or 20.0.			
Chan 1 Cell: 1.015 >	For CUSTOM sensors: Enter the precise cell constant from the certificate provided with your sensor, or from the information label on the sensor.			
Chan 1 Set: Temperature >	Adjust the temperature of the system based on an accurate external reference.	NOTE: Enter "0" (all zeroes) in the "Set Conductivity" field to restore factory values to both TEMPERATURE and CONDUCTIVITY calibration. All Outputs and displays associated with this setting will be held until you return to VIEW menu and normal operation.		
Chan 1 Set: Conductivity >	For use with STANDARD sensors: Perform this single-point wet calibration for most accurate results. Not required for CUSTOM sensors except for periodic system accuracy confirmation.			
Chan 1 Units: $\mu\text{S}/\text{cm}$ >	Select from the following options: $\mu\text{S}/\text{cm}$, mS/cm , $\text{k}\Omega\cdot\text{cm}$, $\text{M}\Omega\cdot\text{cm}$, PPB, PPM			
Chan 1 TDS: 2.0000 $\mu\text{S}/\text{PPM}$ >	If the Units selection is PPM or PPB, you can set the ratio of Total Dissolved Solids to μS . See section 3 of this manual for additional information.	The TDS factor can only be set in PPM.		
When Channel 2 is active (see OPTIONS menu) all the settings above are repeated				
Function: Ratio C1:C2 >	Calculate the relationship between C1 and C 2: Percent Reject C1 to C2 or C2 to C1 Ratio C1/C2 or C2/C1 Difference C1-C2 or C2-C1			
Set the Source and Range for 3 Current Loop Outputs				
Loop 1 Source Chan 1 Cond	Select the INPUT SIGNAL (or calculated FUNCTION) represented by this 4-20 mA output: Chan 1 Cond, Chan 2 Cond, Chan 1 Temp, Chan 2 Temp, Function			
Loop 1 Range: μS 0.0000-100.000 >	Make sure that the value entered here is consistent with the UNITS of the SOURCE.			
Repeat Settings for LOOP 2 and LOOP 3				

Select the Mode and Setpoints for 4 output relays	
Relay 1 Mode: LOW >	Select the desired mode of operation for this relay output: OFF, LOW, HIGH, USP or PULSE.
Relay 1 Source: Chan 1 Cond >	Select the INPUT SIGNAL (or FUNCTION) monitored by this relay output: Cond 1, Cond 2, Temp 1, Temp 2, Function
Relay 1 Setpoint: 100.000 µS >	Set the value where you want this relay output to be activated. The maximum value acceptable is 999999.
Relay 1 Hysteresis: 0.5 µS >	Relay will be deactivated at setpoint ± Hysteresis (depending on High or Low selection).
Relay 1 Delay: 00.0 seconds >	Set a delay time up to 6400 seconds maximum. When the source value reaches the SETPOINT, the RELAY will not be activated until this time has elapsed.
Relay 1 Rng: µS 100.000 1000.00 >	If this output is set for PULSE mode, set the range for the pulses to increase, from 0 to MAX RATE (see below.)
Relay 1 PlsRate: 120 pulses/min >	Set the maximum pulse rate for this output. The relay will pulse at this rate when the SOURCE value is equal to the maximum PULSE RANGE.
Repeat Settings for Relays 2, 3 and 4	
Last Cal 06-30-00 >	Use this "notepad" to record important dates, such as annual recertification or scheduled maintenance.

If Relay mode is USP, then the SOURCE must be Cond 1 or Cond 2 and Temp Comp (see OPTIONS menu) must be set to None

If you see "- - -" in this setting, review the SOURCE and make sure it is consistent with the setpoint value.

When the relay Mode is USP (defined as a HIGH alarm):
 • The setpoint value is a percentage below the USP limit.
 Hysteresis is displayed in µS.

NOTE: If the SOURCE value returns to within the SETPOINT value before this time has elapsed, the RELAY will not be activated.

The maximum PULSE rate is 400 pulses per minute.

USP Limits

USP (United States Pharmacopoeia) has defined a set of conductivity values (limits) to be used for pharmaceutical water monitoring. This standard requires non-temperature compensated conductivity measurement be used to warn if the conductance approaches the USP limit. The limits vary according the temperature of the sample.

The 8860 has the USP limits stored in memory. It will automatically determine the proper USP limit based on the measured temperature.

Using the USP function

In the 8860, USP setpoints are defined as a percentage below the USP limit, so a USP alarm is always a HIGH alarm.. The 8860 can be set to warn you if the conductivity approaches within a set percentage of the USP limit.

The following settings and conditions are required for a USP relay function:

- In the CALIBRATE menu:
 - RELAY MODE must be set to **USP**.
 - RELAY SOURCE must be **Chan 1 or Chan 2 Cond**.
 - SOURCE UNITS must be set to **µS**.
 - In the OPTIONS menu:
 - The TC Mode of the USP channel must be set to **None**.
- (Service tip: If a relay is constantly on, check these settings.)**

Example:

- The USP setpoint is 40%.
- The water temperature is 19 °C, so the USP limit is 1.0 µS.
- The relay will be activated when the conductivity value reaches 0.6 µS, or 40% below the 1.0 USP limit.
- If the water temperature drifts to more than 20°C, the 8860 will automatically adjust the USP limit to 1.1.
- The relay will now be activated when the conductivity value reaches 40% below 1.1 µS, or 0.66 µS.

Read "From zero to less than 5°C."

Temp range	USP limit (µS):
0 to < 5 °C	0.6
5 to < 10 °C	0.8
10 to < 15 °C	0.9
15 to < 20 °C	1
20 to < 25 °C	1.1
25 to < 30 °C	1.3
30 to < 35 °C	1.4
35 to < 40 °C	1.5
40 to < 45 °C	1.7
50 to < 55 °C	1.8
55 to < 60 °C	2.1
60 to < 65 °C	2.2
65 to < 70 °C	2.4
70 to < 75 °C	2.5
75 to < 80 °C	2.7
80 to < 85 °C	2.7
85 to < 90 °C	2.7
90 to < 95 °C	2.7
95 to < 100 °C	2.9
100 to < 105 °C	3.1

This menu contains setup and display features for minor display or output adjustments.

Options Menu			
Display	Description		
Contrast: 3 >	Adjust the LCD contrast for best viewing. A setting of 1 is lower contrast, 5 is higher. In general, select lower contrast if the display is in warmer ambient surroundings.		
Temp Display: °C >	Select your temperature scale: °Celsius or °Fahrenheit		
Channel 2: ON >	Turn CH 2 OFF if not in use. This will remove all menu functions related to CH 2.		
Power: 60 Hz >	Select 50 Hz or 60 Hz electrical noise suppression, according to the AC power used in your area.	Select the proper setting for all applications, whether AC or DC powered.	
Ch 1 TC Mode: Pure Water >	Set the method for temperature compensation to NONE, LINEAR or PURE WATER. You must select NONE for USP systems.	Select LINEAR for applications where the water is less than 5 MΩ (or greater than 0.2 μS). Select PURE WATER for applications where the water is greater than 5 MΩ (or less than 0.2 μS).	
Ch 1 TC Slope: 2.00 % >	For LINEAR or PURE WATER temperature compensation, select a % per °C slope. Maximum slope setting is 9.99 % per °C. If your Temp Comp setting is NONE, this menu item will not be displayed.	If TC Slope is zero, select NONE.	
These settings will repeat if CHAN 2 is ON.			
Averaging: Low >	OFF provides the most instantaneous response to changes in the water. It is the preferred option in systems where the measurement is very stable. Select LOW or HIGH averaging if your process experiences frequent or extreme fluctuations in conductivity.		
Chan 1 Decimal ****.* >	Set the decimal to the best resolution for your application. The display will automatically scale up to this restriction. Select ****., *****, ****.* **** or *****		
These settings will repeat if Channel 2 is ON.			
Loop 1 Adjust: 4.00 mA >	Adjust the minimum and maximum current output. The display value represents the precise current output. Adjustment limits: • 3.80 mA < 4.00 mA > 5.00 mA • 19.00 mA < 20.00 mA > 21.00 ma		
Loop 1 Adjust: 20.00 mA >	Use this setting to match the system output to any external device.		
Repeat for LOOP 2 and LOOP 3			
Relay 3 Active: High >	Select active HIGH or active LOW operation for relays 3 and 4.	Active HIGH: No power applied to relay coil during normal operation. Power is applied to relay coil when process value reaches the SETPOINT. Active LOW reverses these conditions.	
Relay 4 Active: High >	Recommended: Use active LOW only if relays 3 and 4 are set for OPEN COLLECTOR operation.		
Test Loop 1: >	Manually enter any output current value from 3.6 mA to 21.00 mA to test the output loop. Hold UP or DOWN keys to scroll the output value.		
Repeat for LOOP 2 and LOOP 3			
Test Relay 1 >	Press UP and DOWN keys to manually toggle the relay output state.		
Repeat for all output relays			

Calibration Procedure

The 8860 has been electronically calibrated at the factory. The calibration accuracy can be verified using procedure A, described below. Procedure B describes the "wet" calibration, which can be used to provide a complete system calibration. The use of NIST traceable solutions is required for this procedure.

A) Accuracy Verification with Precision Resistors (Electronic Calibration):

The use of precision resistors ($\pm 0.1\%$) connected to the rear "Temp In", "Signal IN", and "Iso Gnd" terminals in place of the sensor, can be used to electronically verify that the 8860 is accurately calibrated.:

- 1) Select a standard cell constant based on desired range of operation.
- 2) Place a 1096Ω (25°C) resistor between "Temp IN" and "Iso. Gnd" terminals.
Note: Temperature simulation errors can adversely effect calibration: $3.85 \Omega = 1^\circ\text{C}$.
- 3) Calculate the required simulation resistor that represents a value within the selected cell range. The formula for determining the required simulation resistance is:

$$\text{Resistance} = \frac{\text{Cell:}}{\text{Desired conductivity (Siemens*)}} \quad \text{e.g.} \quad \frac{0.1 \text{ Cell}}{0.000020 \text{ (Siemens*)}} = 5,000 \Omega \text{ or } 5 \text{ K}\Omega$$

$$\text{Conductivity} = \frac{\text{Sensor cell}}{\text{Simulation resistance } (\Omega)} \quad \text{e.g.} \quad \frac{0.1 \text{ Cell}}{100,000 (\Omega)} = 0.000001 \text{ Siemens*} \text{ or } 1\mu\text{S/cm}$$

(*Conversion: $1 \mu\text{S} = 1 \times 10^{-6}$ Siemens or 0.000001 Siemens)

- 4) Place the calculated simulation resistance between the "Signal IN" and "Iso Gnd" terminals as shown.
- 5) Set temperature and set conductivity. (Optional: enter zero to reset factory calibration (zero must be re-entered if currently displayed to reset factory calibration.)

B) Calibration with NIST Traceable Solutions (Wet Calibration):

When using NIST traceable standards, ensure the sensor and test solution are at the solution temperature specified on the test solution label. Prevent contamination of the calibration solution.

1. Enter ACCESS CODE and scroll to "..SET Temperature" or "..Set Conductivity"
- 2 Press the RIGHT ARROW key.
 - ◇ All output functions related to this channel are held at their current value.
 - ◇ You must press another key within 10 minutes or the 8860 will return to the main CALIBRATE menu automatically.
 - ◇ After an additional 10 minutes, the 8860 will exit the CALIBRATE menu and return to normal operation.
3. Remove the sensor from the system. Thoroughly rinse the sensor in a small amount of test solution (outside of the calibration solution container)
- 4 Place the sensor into the test solution. Place an accurate thermometer into the same solution.
 - ◇ Allow sufficient time for the temperature to stabilize.
5. Adjust the temperature value based on the external temperature measurement. (Follow the steps detailed on page 5, step 4.)
6. Press the UP and DOWN keys simultaneously to exit the CALIBRATE menu and return to normal operation.

Temperature Effects

Conductivity measurement is highly dependent on temperature. The basic rule is that higher temperatures result in greater conductance (less resistance).

Temperature effects are expressed as the percentage of conductivity change (in μS) per $^{\circ}\text{C}$. The conductivity value is generally referenced to 25°C . The 8860 has three temperature compensation options:

None

USP standards for pharmaceutical waters require that the measurement be made without temperature compensation. USP limits are discussed on page 7.

Pure Water (Standard Compensation)

This selection is used for measurements of very clean water, less than $0.2\ \mu\text{S}$. Temperature effects are not linear in this range, so the temperature coefficient is not easily determined. This selection is recommended for all Resistivity applications measuring from $5\ \text{M}\Omega$ to $18\ \text{M}\Omega$. This selection conforms to ASTM standard D1125 and D5391.

Linear

This selection allows you to calculate a custom temperature compensation value for Conductivity measurements in the range of $0.2\ \mu\text{S}$ and greater (Resistivity applications measuring less than $5\ \text{M}\Omega$). The procedure is outlined in the section on the right.

TDS Factor

Some industries need to display a conductivity value as Total Dissolved Solids (TDS), measured in units of parts per million (PPM) or parts per billion (PPB).

- ◆ 1 PPM is equivalent to 1 mg per liter.
- ◆ 1 PPB is equivalent to 1 μg per liter.
- ◆ The 8860 calculates PPM or PPB by dividing the μS value by a TDS Factor that you define. The 8860 will accept a TDS factor from 0.01 to 99999.9 μS per PPM.
(factory preset = $2.00\ \mu\text{S}$ per PPM).
- ◆ TDS factors can vary widely, ranging from $1.50\ \mu\text{S}$ per PPM. Methods for establishing a TDS factor are beyond the scope of this manual.

NOTE: The TDS factor is always set in PPM.

TDS Factor = Conductivity (μS) \div Total dissolved solids (PPM)
PPM = Solution conductivity (μS) \div TDS Factor

Example:

- Solution conductivity = $150\ \mu\text{S}$
- TDS = 80 PPM
- TDS Factor = $150\ \mu\text{S} \div 80\ \text{PPM} = 1.88\ \mu\text{S per PPM}$

Calculating a Linear Temperature Coefficient

1. Set TC Mode to NONE (see OPTIONS menu, page 8).
2. Heat a sample solution close to the maximum process temperature. Place sensor in the sample solution and allow several minutes for stabilization. Record the 8860 temperature and conductivity values in the spaces provided:

Displayed temperature: T1 = _____ $^{\circ}\text{C}$

Displayed conductivity: C1 = _____ $^{\circ}\text{C}$

3. Cool the sample solution close to the minimum process temperature. Place sensor in the sample solution allowing several minutes for stabilization. Record displayed temperature and conductivity values in the spaces provided:

Displayed temperature: T2 = _____ $^{\circ}\text{C}$

Displayed conductivity: C2 = _____ $^{\circ}\text{C}$

(A 10% change in conductivity between steps 2 and 3 is recommended.)

4. Substitute recorded readings (steps 2 and 3) into the following formula:

$$\text{TC Slope} = \frac{100 \times (C1 - C2)}{(C2 \times (T1 - 25)) - (C1 \times (T2 - 25))}$$

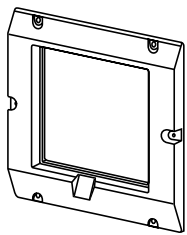
Example: A sample solution has a conductivity of $205\ \mu\text{S}$ @ 48°C . After cooling the solution, the conductivity was measured at $150\ \mu\text{S}$ @ 23°C . (C1 = 205, T1 = 48, C2 = 150, T2 = 23)

The TC is calculated as follows:

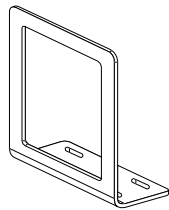
$$\text{TC Slope} = \frac{100 \times (205 - 150)}{(150 \times (48 - 25)) - (205 \times (23 - 25))} = \frac{5500}{3860} = 1.42\%/^{\circ}\text{C}$$

Troubleshooting and display messages

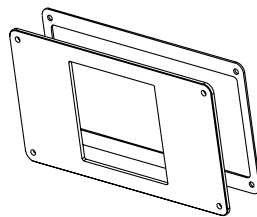
Display	Explanation	Action
"- . . ."	Display is over range. This may be a normal condition if your process operates at/near the limits of the sensor range.	Check sensor for correct range. Check Decimal setting in OPTIONS menu. Check Calibrate menu settings for incompatible SOURCE and RANGE values.
"Value Must be 100 or less"	The menu item being set is a percentage value and must be less than 100.	Select a value from 0 to 100.
"Value must be more than 0"	The menu item being set cannot be zero or a negative value.	Select a value greater than zero.
"Value must be 400 or less"	The Pulse Rate for Relay and Open Collector outputs cannot be greater than 400 pulses per minute.	Select a pulse rate less than 400
"Reset to Factory Calibration"	A value of "0" is being set into ".. Set: Conductivity" menu item.	This will remove any user calibration from the "..Set Conductivity" and "..Set Temperature" items in the Calibrate menu.
"Too Much Error CHECK SENSOR"	The calibration offset entered is beyond the allowable tolerances of the instrument.	Check calibration procedure for accuracy. Check sensor for proper operation. Check any cable extensions for poor splices or termination.



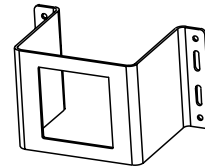
5x5 inch
Adapter Plate



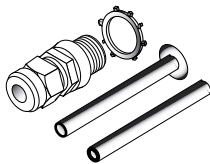
Surface Mount Bracket



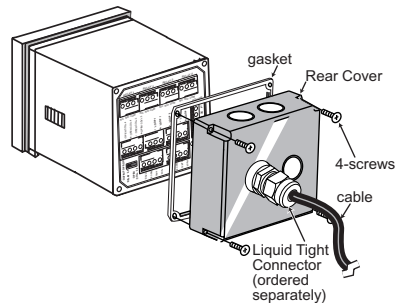
200 Retrofit Adapter



Heavy Duty Wall Mount
Bracket



Liquid Tight Connector Kit



NEMA 4X/IP65 Rear Cover Kit

Accessories

Part Number	Description	Code
7300-7524	7.5W 24V Power Supply	159000687
7300-1524	15W 24V Power Supply	159000688
7300-3024	30W 24V Power Supply	159000689
7300-5024	50W 24V Power Supply	159000690
7300-1024	100W 24V Power Supply	159000691
3-8050.395	NEMA 4X Rear Cover	159000186
3-9000.392	Liquid Tight Connector Kit	159000368
3-8050.392	Model 200 Retrofit Adapter	159000640
3-5000.399	5x5 in. Adapter Plate	198840224
3-0000.596	Heavy Duty Wall Mount	159000641
3-5000.598	Surface Mount Bracket	198840225
3-8050.396	RC Filter Kit (for relay use)	159000617
3-2830	Conductivity Certification Tool	159000628

+GF+ SIGNET

Signet Scientific Company, 3401 Aerojet Avenue, El Monte, CA 91731-2882 U.S.A. • Tel. (626) 571-2770 • Fax (626) 573-2057
For Worldwide Sales and Service, visit our website: www.gfsignet.com • Or call (in the U.S.): (800) 854-4090