+GF+ SIGNET 9040 Intelek-Pro

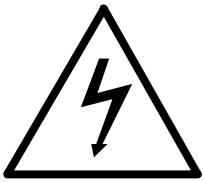
ORP Controller

Instruction Manual

GEORGE FISCHER +GF+

Important Safety Information!

CAUTION: Remove AC power to unit prior to wiring input and output connections.



Remove AC power before opening unit. Electrical shock hazard exists

Table of Contents

Unpacking and Inspection

Your ORP controller package includes the following items:

- +GF+ SIGNET 9040 Intelek-Pro ORP Controller
- Two stainless steel mounting brackets
- Mounting Instructions w/self-adhesive template
- Panel gasket
- Instruction manual w/warranty card

Please fill out and return warranty card as soon as possible.

Warranty Record

For your protection, record your unit's purchase date and serial number for future reference. The serial number decal is located on the instrument's rear panel.

Model: +GF+ SIGNET 9040 Intelek-Pro ORP Controller

Purchase Date: _____

Serial Number: _____

Purchased From: _____

Purchase Order Number: _____

Chapter 1

Introduction

1.1 Introduction

Your new +GF+ SIGNET 9040 Intelek-Pro ORP Controller has been specifically designed for ORP measurement in process control applications. The controller's compact 1/4 DIN enclosure (front) is NEMA 4X/IP65 rated and ideal for installation into instrumentation panels with limited space.

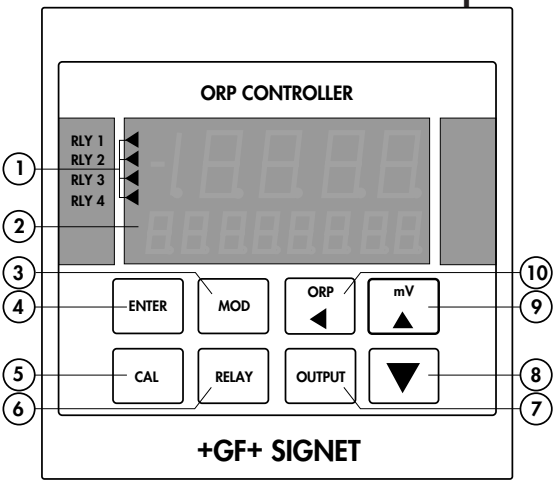
Modular "plug-in" input/output option cards allow you to customize your ORP controller to your system's requirements. The controller's unique "slide-out" chassis design makes option installation fast and simple. Smart self-configuring microprocessor based circuitry automatically inventories installed options during power-up, allowing you to upgrade your system in seconds without the need for additional equipment.

The unit's front panel features a highly visible 4.5-digit (seven segment) and 8-digit (alpha-numeric) liquid crystal display with adjustable contrast. Active ORP and alarm relay status information is quickly accessed at a glance. During calibration the user is prompted with clear step-by-step instructions on the unit's front panel display.

The +GF+ SIGNET 9040 Intelek-Pro ORP Controller is fully compatible with all +GF+ SIGNET ORP sensor products, yet also accepts other analog inputs, such as 4 to 20 mA or 0 to 5 VDC etc.

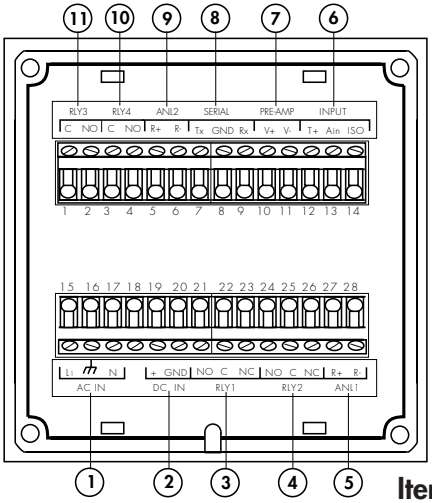
The technical data given in this publication is for general information purposes only. It implies no warranty of any kind.

1.2 Front Panel Description



Item	Function
1. Relay Annunciators:	Indicate activation status of optional output "alarm" relays 1 & 2 and additional relays 3 & 4 (proportional or on/off control)
2. LCD Display:	Shows ORP, raw sensor mV, and relay activation status information
3. MOD	A) Accesses one of three calibration menus: CAL, RELAY, OUT B) Enables a calibration parameter for modification C) Restores a calibration parameter to it's original value during calibration.
4. ENTER	A) Stores a calibration value into memory after modification B) Used to display available input/output options during normal operation.
5. CAL	A) Accesses the CAL "view-only" menu B) Used in conjunction with MOD key to access the main CAL menu
6. RELAY	A) Accesses the RELAY "view-only" menu B) Used in conjunction with MOD key to access the RELAY calibration menu
7. OUTPUT	A) Accesses the OUTPUT "view-only" menu B) Used in conjunction with the "MOD" key to access the OUTPUT calibration menu
8. ▼	Decreases the value of a selected calibration digit
9. mV ▲	A) Displays raw sensor mV B) Increases the value of a selected calibration digit
10. ORP ◀	A) Returns the unit to normal operation mode B) Selects a digit for modification during calibration.

1.3 Rear Panel Description



Note: *Rear terminals accept 18 to 22 AWG wire*

Item	Function
1. AC IN	90 to 132 VAC or 180 to 264 VAC system power connection
2. DC IN	17 to 30 VDC system power connection
3. RLY1	Alarm relay #1 (COM, NO, NC) contact set for external device control (optional)
4. RLY2	Alarm relay #2 (COM, NO, NC) contact set for external device control (optional)
5. ANL1	Analog output #1 from option socket #1 (optional)
6. INPUT	ORP sensor input connections **Note:** Terminal #12 (T+) not used for ORP measurement
7. PRE-AMP	±5 VDC @ 1 mA power output for ORP sensor pre-amp circuit
8. SERIAL	Serial outputs (future availability)
9. ANL2	Analog output #2 from option socket #2 (optional)
10. RLY4	Proportional control relay #4 (COM, NO) contact set for external device control (optional)
11. RLY3	Proportional control relay #3 (COM, NO) contact set for external device control (optional)

Chapter 2

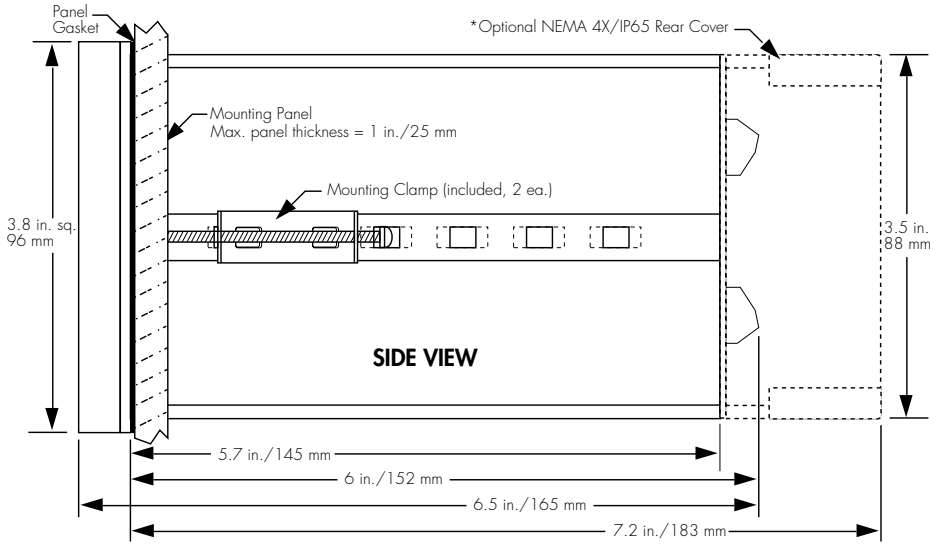
Installation and Operation

2.1 Mounting Instructions

The +GF+ SIGNET Intelek-Pro ORP Controller's 1/4 DIN enclosure is specifically designed for panel mounting. Adjustable mounting brackets allow mounting in panels up to one inch (25 mm) thick. An adhesive template and instructions are included to insure proper installation.

For outdoor and/or stand alone installations the splash-proof NEMA 4X/IP65 back cover kit is recommended (ordered separately).

Figure 1
External dimensions



Panel Cutout Instructions

Recommended panel cutout 3.54 inch (90 mm) square. Maximum panel cutout 3.62 inch (92 mm) square, DO NOT exceed. Use adhesive backed template (included)

2.2 Power Connections

AC Power Connections

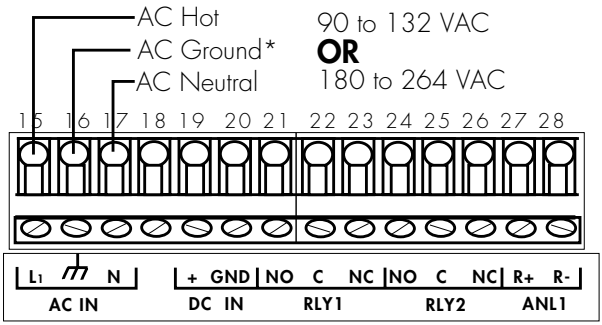


Figure 2
AC power wiring

Note: DC power recommended when ground fault interruption devices (GFI's) are used.

Instructions

1. Jumper selectable for 90 to 132 ***OR*** *180 to 264 VAC operation. Confirm AC power configuration before applying power. See section 4.2*

*2. *A direct or low impedance AC ground (earth ground) MUST be used for proper operation.*

3. To reduce the possibility of noise interference, AC power lines must be isolated from signal lines.

DC Power Connections

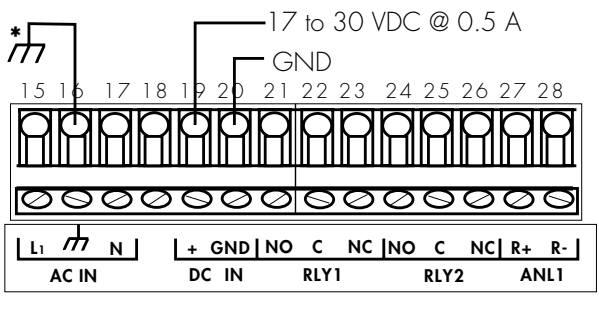


Figure 3
DC power wiring

Note: AC/DC power can be connected simultaneously, using DC power as an uninterrupted power source.

**A direct or low impedance earth ground must be used for optimum performance*

2.3 Input Connections

Three input options are available, providing a wide range of compatibility for most applications.

ORP Input Card

Note: *See section 4.6 for a listing of available input cards*

Provides isolated ORP sensor input capability, requiring no internal configuration.

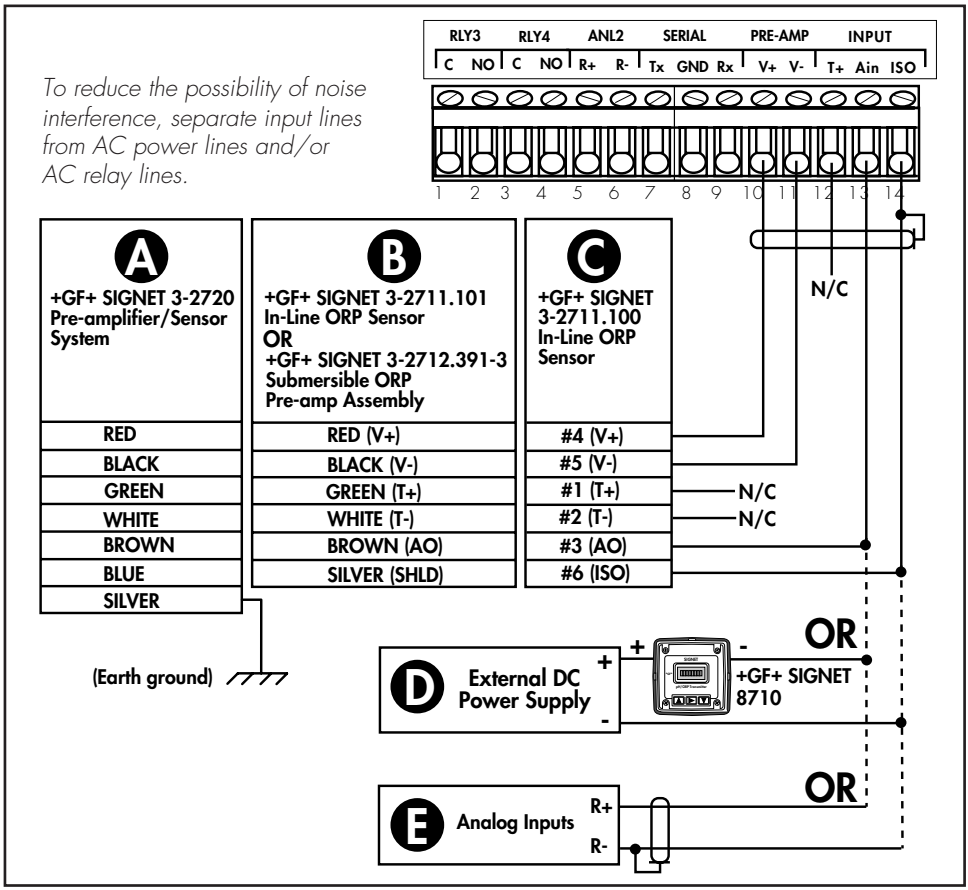
Analog Input Cards

Two analog input options available:

- Analog (isolated) current, 4 to 20/0 to 20 mA
- Analog (isolated) voltage, 0 to 5/0 to 10 VDC

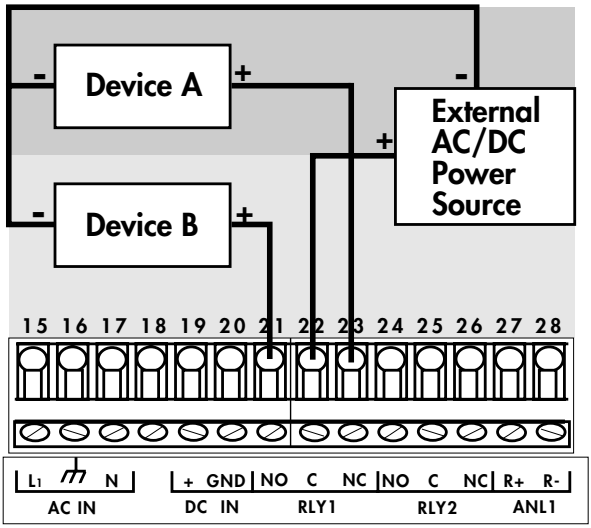
Input ranges are software selectable, requiring no internal configuration.

Figure 4
Input Wiring



2.4 2-Relay Output Connections

The 2-Relay option provides two relays for external device control. Each relay's contacts are rated for a 5 A maximum. Both NO and NC contacts may be used simultaneously or individually as shown.



Note: *Relay contacts are rated as 5 A @ 250 VAC or 5 A @ 30 VDC maximum load.*

Figure 5
2-Relay wiring

Device A is powered during normal operation. Power is discontinued when relay is energized. Device B is not powered during normal operation. Power is applied after relay is energized.

To reduce the possibility of noise interference, separate AC relay lines from input/ output lines.

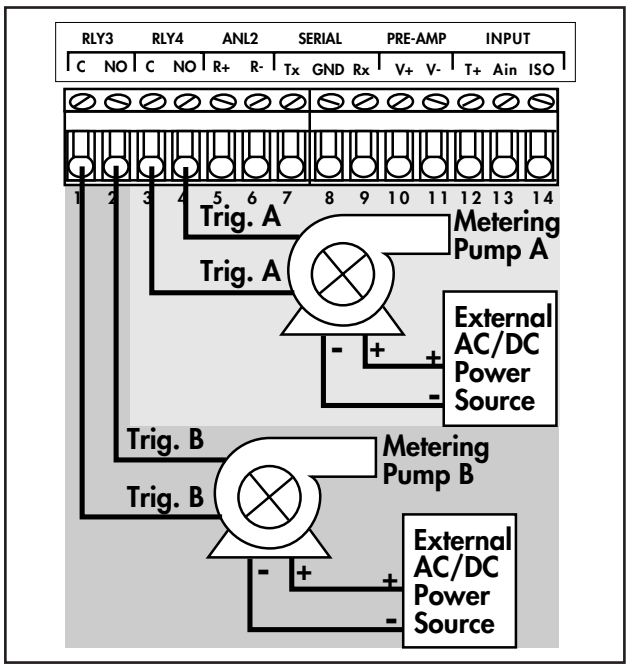
2.5 Dual Proportional Relay Connections

The Dual Proportional Relay Card provides two relays (relays 3 and 4) for external device control. Proportional or alarm operation is selectable during calibration. Both relays MUST be like configured, meaning one relay cannot be selected for proportional operation while the other is selected for alarm operation.

If alarm operation is selected, relays 3 and 4 operate as on/off controls similar to relays 1 and 2. The main distinction is the lack of the normally closed (NC) contact, see section 2.4 Figure 5.

If proportional operation is selected, relays 3 and 4 are configured to provide a varying pulse rate to control metering pumps. Relay 3 is dedicated to low range control and relay 4 to high range control.

Figure 6
Proportional Control Wiring



Note: *Relay contacts are rated as 5 A @ 250 VAC or 5 A @ 30 VDC maximum load.*

To reduce the possibility of noise interference, separate AC relay lines from input/ output lines.

2.6 Verifying Analog Outputs

Installed output options can be configured to either of the unit's rear analog output terminals: ANL1 or ANL2. Configuration is determined by which sockets the options are installed. Options installed in option socket #1 are configured to the rear ANL1 terminals, options installed in socket #2 are configured to the rear ANL2 terminals, see section 4.4.

Prior to connection, determine which options are configured to terminals ANL1 and ANL2 as follows:

1. Apply power to unit.

2. Press: ENTER Available input/output options are individually prompted on the display.

3. Record option configurations for ANL1 and ANL2 in the spaces provided. This information is necessary for wiring analog outputs in the next section.

ANL1=
(i.e. 4 to 20 mA)

ANL2=
(i.e. N/A)

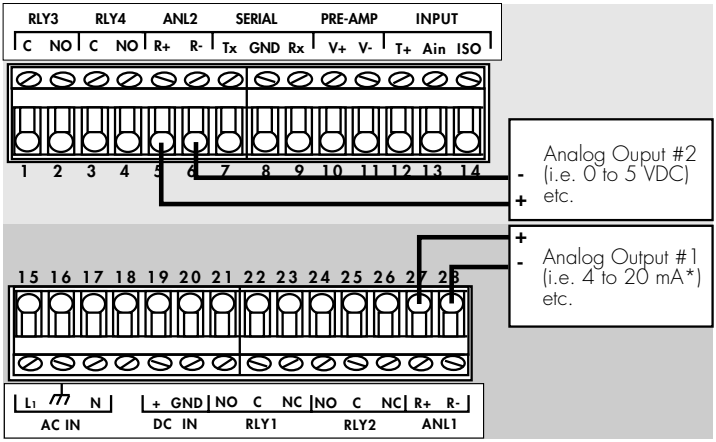
Option Record

Note: *The unit display's N/A for unavailable options*

2.7 Analog Output Connections

0 to 20/4 to 20 mA isolated or non-isolated output as well as 0 to 5/0 to 10 VDC isolated or non-isolated outputs are available. See section 4.6 for a list of available output cards.

Figure 7
Analog output wiring



**The 4 to 20 mA option is jumper configurable for 0 to 20 mA operation, see section 4.7.*

Note: *The maximum loop impedance for the 4 to 20 mA/0 to 20 mA output is 425 Ω. The minimum load impedance for the 0 to 5/0 to 10 V output is 1 kΩ (1000 Ω). To reduce the possibility of noise interference, separate output lines from AC power/relay lines.*

Chapter 3

System Configuration

3.1 Introduction

All the functions which can be modified are contained in three menus:

The CAL (calibrate) menu contains those functions which pertain to the input signal and how it is interpreted by the instrument (i.e. ORP standard, ORP slope). The CAL menu also provides access to the security code and display contrast features.

The RELAY menu contains all the functions necessary to control any output relays, such as relay

setpoint, hysteresis etc.

The Output menu provides access to the functions which define and control all analog output signals, i.e. 4 to 20 mA, 0 to 5 VDC etc.

CAL Menu [CAL]

(Sensor input)
- ORP standard
- ORP slope
- Sensor gain
- Contrast adjust
- Security code

(Analog)
- Range select
- Minimum ORP setpoint
- Maximum ORP setpoint
- Contrast adjust
- Security code

RELAY Menu [RELAY]

(LO/HI)
- Relay 1 LO/HI
- Relay 1 setpoint
- Relay 1 hysteresis
- Relay 2 LO/HI
- Relay 2 setpoint
- Relay 2 hysteresis

(Proportional)
- Relay 3 and 4 Pulse
- Relay 3 setpoint
- Relay 3 deviation
- Relay 3 pulse value
- Relay 4 setpoint
- Relay 4 deviation
- Relay 4 pulse value

OUTPUT Menu [OUTPUT]

- Minimum ORP value
- Maximum ORP value
- Low output adjust
- High output adjust

Note: *A security function is provided which allows the user to "lock out" the calibration menus, restricting access to calibration settings, see section 4.3 for additional information.*

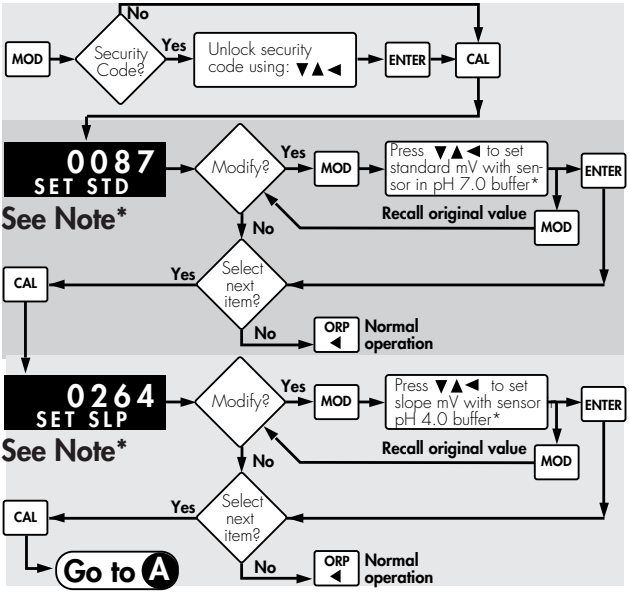
All menus are loop type menus which repeat until [ORP ◀] is pressed.

All menus operate using a standard sequence:

1. Press: [MOD] to enable calibration sequence.
2. Enter security code (when active) using: [mV ▲] [▼] [ORP ◀]; press: [ENTER]
3. Select menu: [CAL] [RELAY] [OUTPUT]; press menu key to select item.
4. Press: [MOD] to enable modifying item.
5. Alter item using: [mV ▲] [▼] [ORP ◀]; press: [ENTER] to save entry.
6. Press corresponding menu key to advance to next menu item.
7. Repeat steps 4-6 for each menu item. Exit menu by pressing: [ORP ◀]

If you ever replace your input card, a special input card introduction mode MUST be accessed. This function is used to compensate for component level tolerances between cards, see section 4.5. **Factory installed input cards are pre-configured and DO NOT require this procedure.**

3.2 Calibration Menu, ORP Sensor Inputs

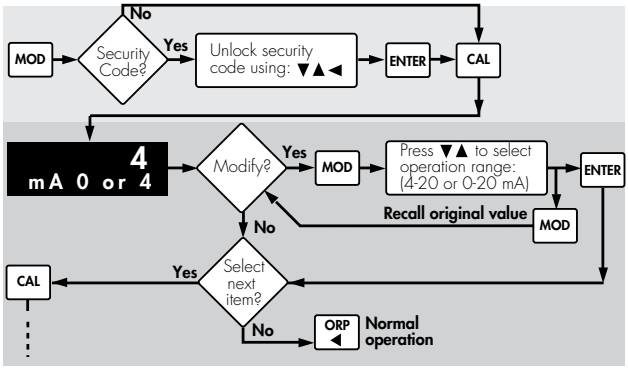


**Sensor inputs require wet calibration using pH buffers saturated with Quinhydrone. +GF+ SIGNET offers a pH buffer kit, see section 4.6.*

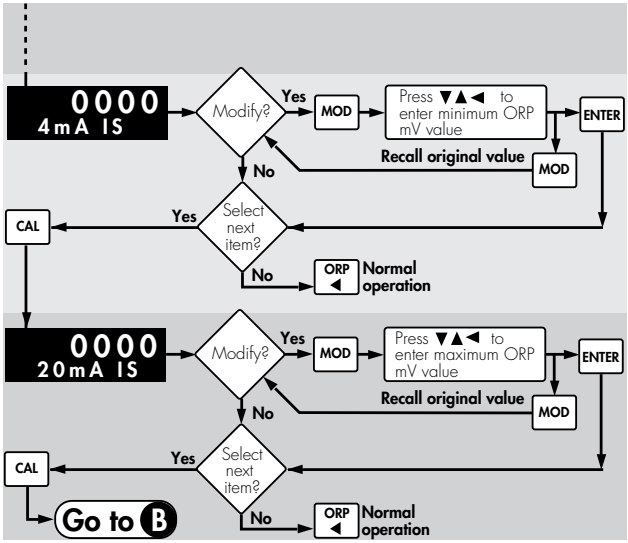
The negative "-" sign only displays when selected. Remove or select by shifting selected digit to far left position.

3.3 Calibration Menu, Analog Inputs

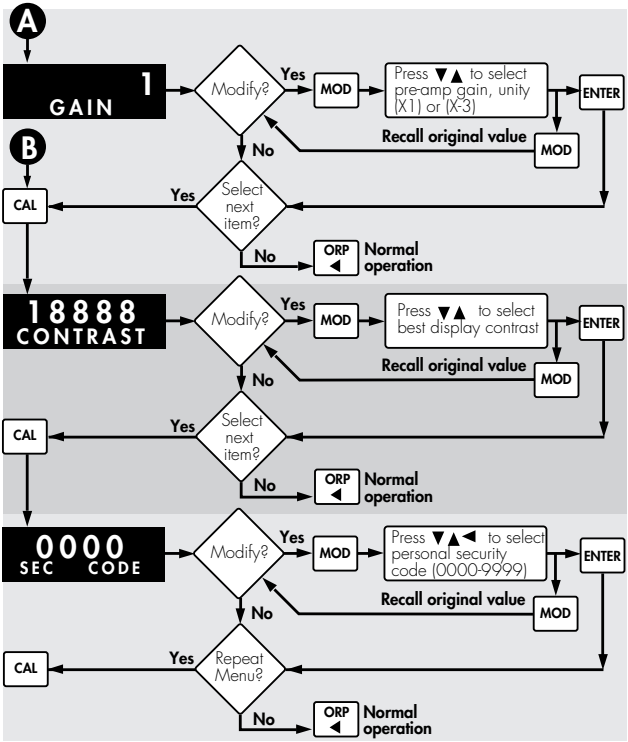
4 to 20 mA option illustrated



Note: *The unit's software recognizes which input card/ configuration is inserted, therefore displaying the corresponding calibration value.*



Note: *The negative "-" sign only displays when selected. Remove or select by shifting the selected digit to far left position.*



- ***Use x 1*** *gain for +GF+ SIGNET 3-2720 Pre-amplifier/sensor systems or other unity gain pre-amplifier inputs*

- ***Use x -3*** *gain for +GF+ SIGNET 2711 ORP Sensors/ 3-2712.391-3 Submersible Pre-amplifier/sensor systems.*

Note: *Menu repeats until* ORP ◄ *is pressed.*

Figure 8
***LO** relay operation mode*

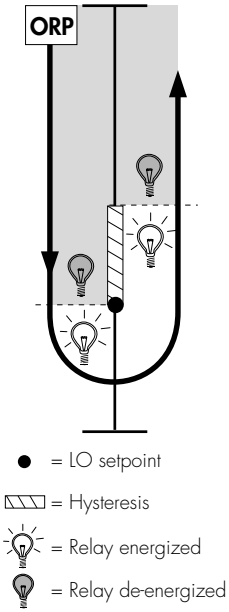
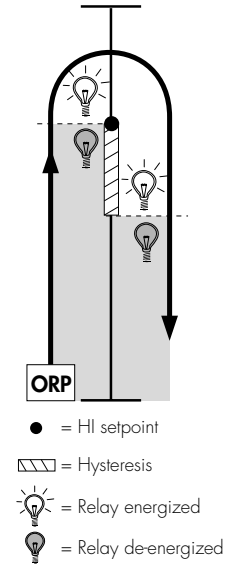


Figure 9
***HI** relay operation mode*



3.4 2-Relay Operation

The 2-Relay option allows you to configure individual setpoints, LO or HI operation, and hysteresis values for two independent on/off relays.

- Relay Setpoints: Setpoints represent the ORP at which each relay is energized.

- Relay Hysteresis: Hysteresis values directly effect the LO and HI relay modes, specifying how far the ORP will rise above (LO Relay Mode) or fall below (HI Relay Mode) each relay's setpoint prior to de-energizing the relay. The main purpose for hysteresis is to eliminating relay "chatter", caused by a ORP hovering around a relay's setpoint. Hysteresis values are programmed in direct ORP units and must be less than the corresponding relay setpoint, maximum 500 mV. Hysteresis only applies when exiting an alarm condition.

- LO Relay Operation: In LO operation, the relay is energized when the ORP drops below the setpoint, and is de-energized when the ORP rises above the setpoint plus hysteresis, see Figure 8

- HI Relay Operation: In HI operation, the relay is energized when the ORP rises above the setpoint and is de-energized when the ORP falls below the setpoint plus hysteresis, see Figure 9

3.5 Dual Proportional Relay Operation

The dual proportional relay option allows you to configure relays 3 and 4 to operate as dual proportional control (pulse) relays or as on/off relays which operate identical to the 2-Relay option.

The dual proportional relay configuration is primarily designed to control external metering pumps. Setpoints, deviation ranges, and maximum pulse rates are selected via the relay menu.

- Setpoint: ORP value at which relay pulsing begins. Relay 3 setpoint must be less than or equal to relay 4 setpoint.
- Deviation: ORP mV range from setpoint to maximum pulse rate. Deviation values cannot extend beyond the ±3000 mV range*.
- Pulse Rate: Pulse rate selected from 0 to 120 pulses per minute maximum.

***Note:** *+GF+ SIGNET 3-2720 pre-amplifier/sensor inputs and other unity gain sensor inputs require the x 1 gain selection. Sensor deviation is limited to ±3000 mV.*

+GF+ SIGNET 2711 ORP sensors/3-2712.391-3 Pre-amplifier inputs require the x -3 gain selection. Sensor deviation is limited to ±1000 mV range.

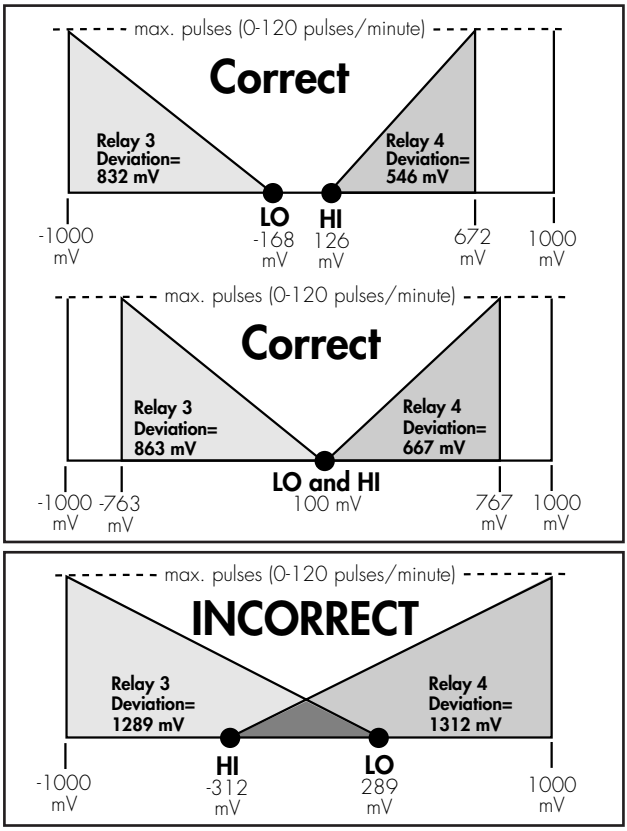
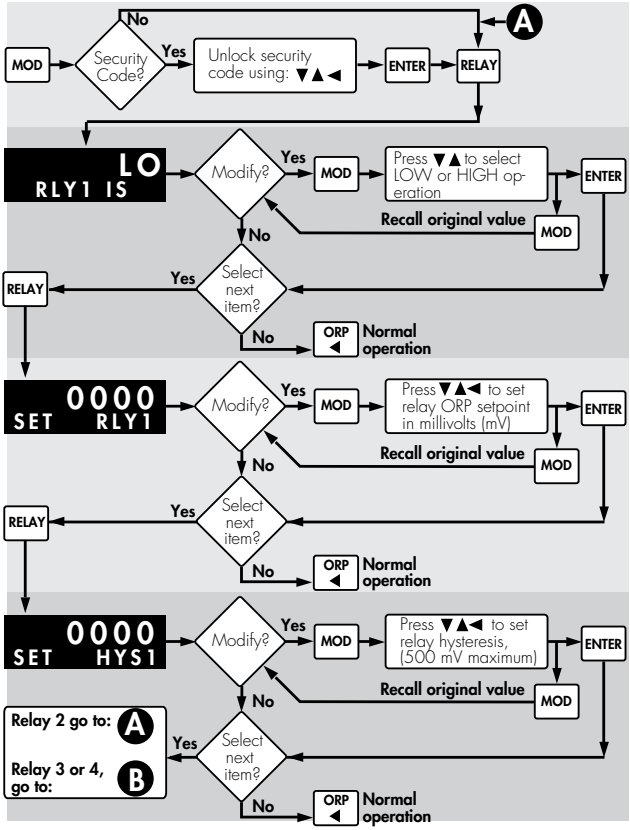
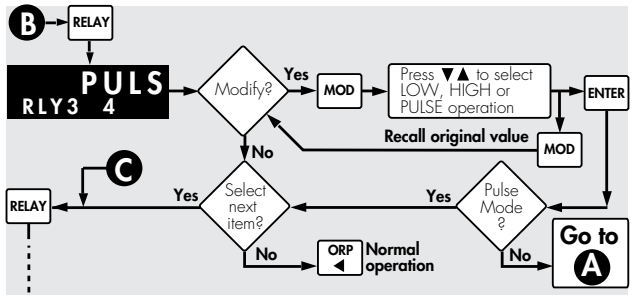


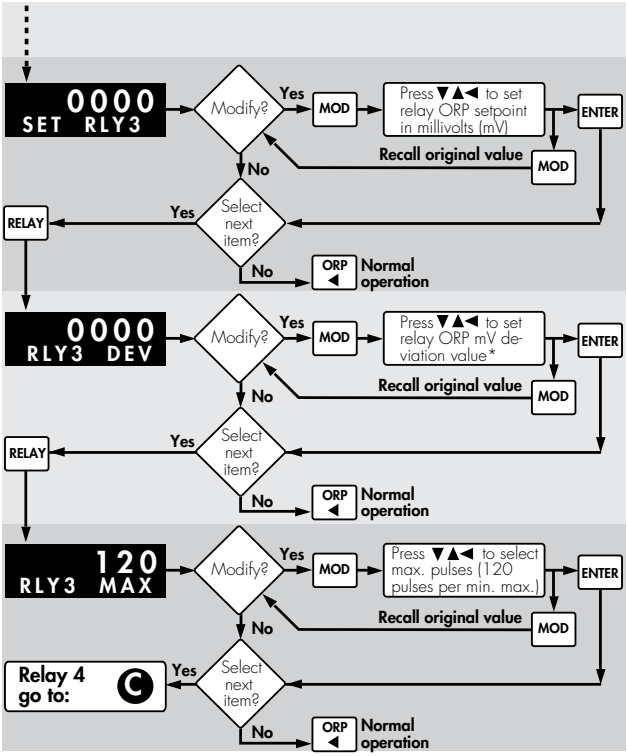
Figure 10
Dual Proportional relay examples

Note: *Relay 3 setpoint cannot exceed relay 4 setpoint*

3.6 Calibration Menu, Relay Outputs





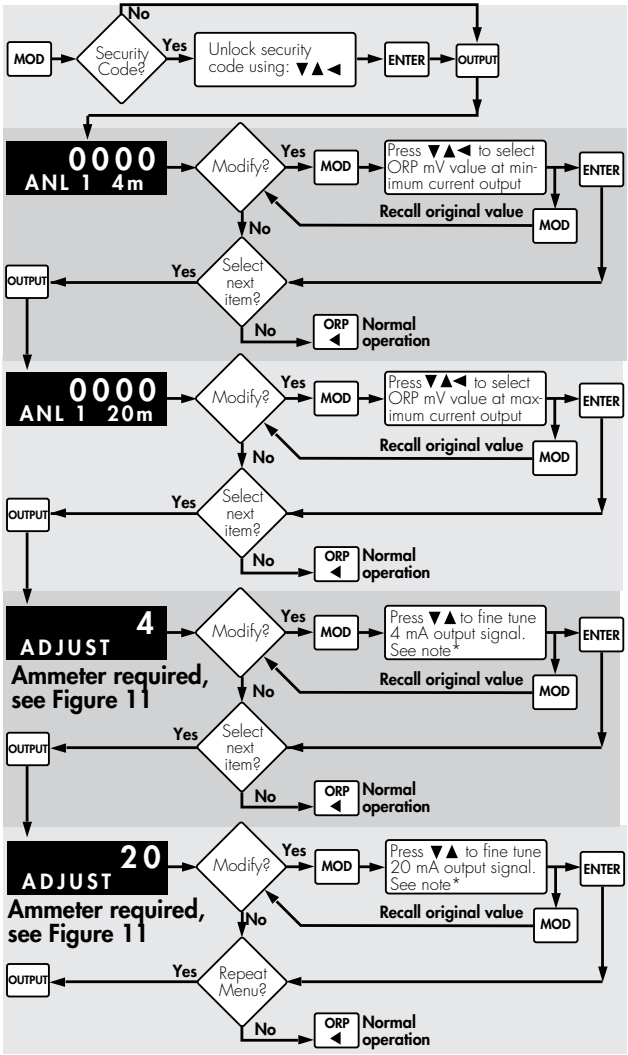


***Note:** *Relay deviation (mV) value must be less than corresponding relay setpoint, see section 3.5.*

Note: *Menu repeats until* ORP ◄ *is pressed.*

3.7 Calibration Menu, Analog Outputs

4 to 20/0 to 20 mA (iso/non-iso) option illustrated



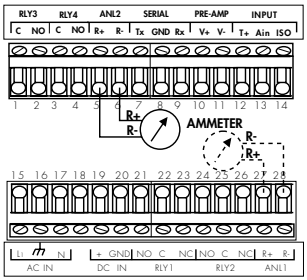
***Note:** *Press:* ORP ◄ *to quickly access the minimum or maximum current output signal*

Press: mV ▲ ▼ *to fine tune the current output signal*

Exiting menu: *Menu repeats until* ORP ◄ *is pressed.*

Figure 11

The min. and max. current adjusent steps require an external ammeter for monitoring the current output.



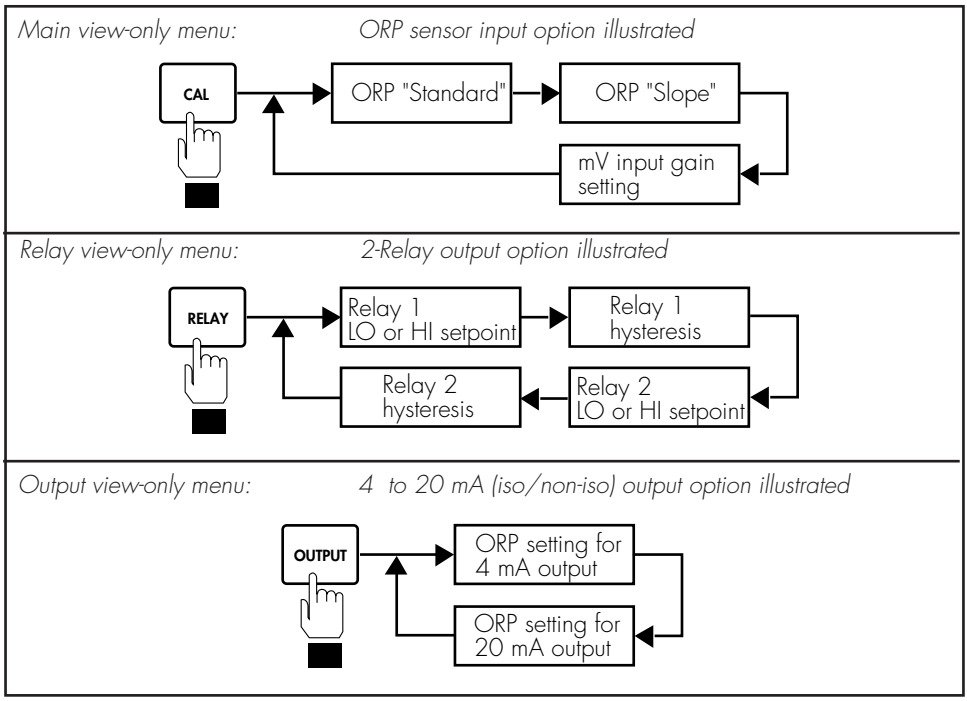
3.8 View-Only Menus

Three "view-only" menus (CAL, RELAY, and OUTPUT) are available during normal operation. Each view only menu provides the operator a means of browsing through calibration settings without disturbing system calibration and/or the ORP measurement process. When used in conjunction with the security feature, the view only menus allow an operator to view most calibration information on the front display, excluding the ability to change system parameters without the supervisors approval and personal security code.

Note: *The view-only menus are designed for viewing only and DO NOT permit access for calibration of any kind. Menus will vary depending upon installed options.*

Access each of the three view only menus by pressing it's corresponding menu key. After entering each of the three view only menus, each calibration parameter is sequentially displayed on the main and lower displays by successively pressing it's corresponding menu key as follow:

Exiting Menus: *Exit view only menus at any time by pressing:* ORP ◀



Chapter 4

Technical Support

4.1 Accessing Internal Options

1. Remove bezel (1) by placing a coin in the notch (2), twist coin to remove the bezel from the instrument casing. See Figure 12

2. **Loosen the four front bracket screws (3)**, then loosen the center "jack-screw" (4). See Figure 13

3. Slide the electronics assembly (5) from the instrument casing. See Figure 14

4. Lift upper retainer with adhesive gasket to install/remove plug-in cards. Be sure plug-in cards are properly seated in slots before reassembling instrument. See Figure 14

Figure 12

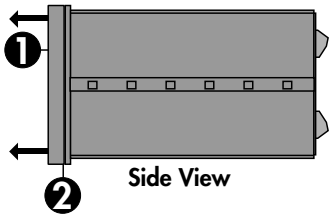


Figure 13

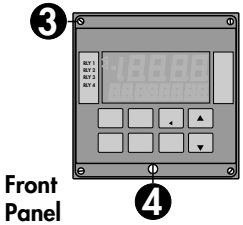
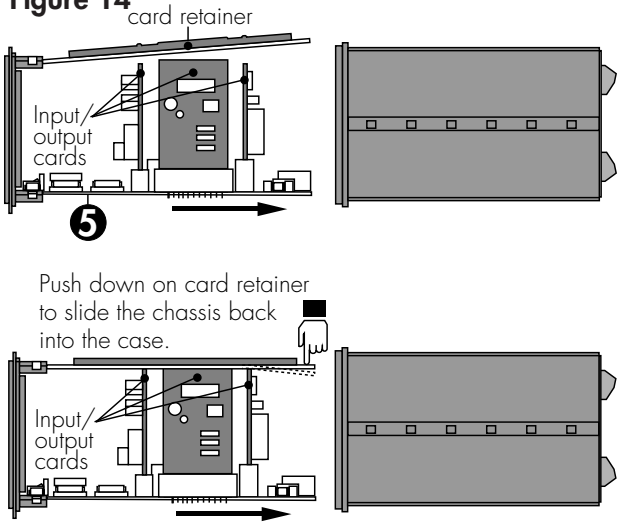


Figure 14

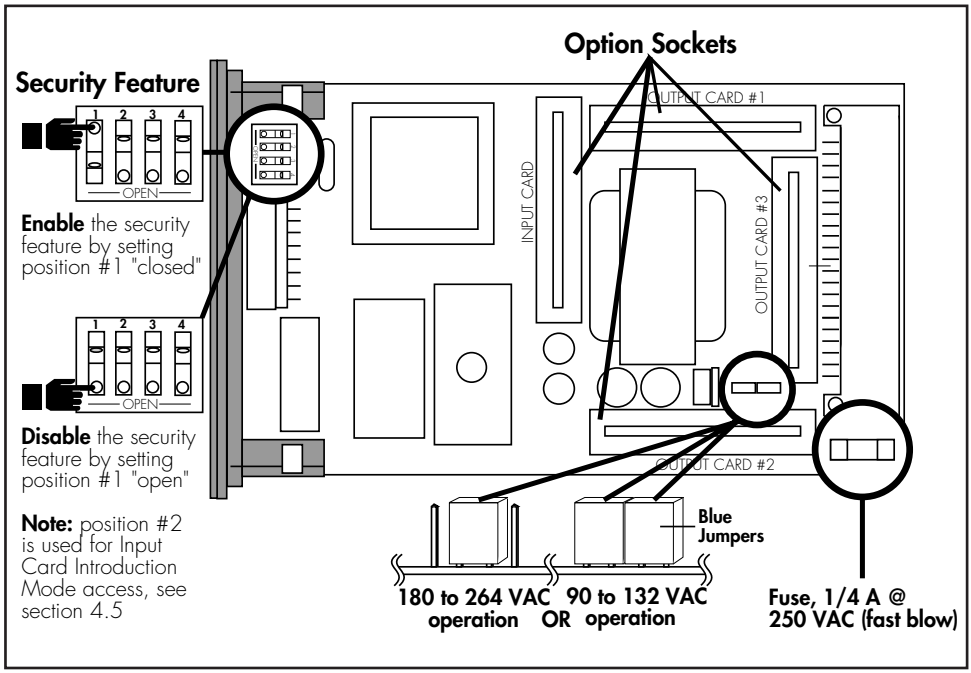


4.2 AC Power Configurations

Two AC power options are possible; 90 to 132 VAC, or 180 to 264 VAC. Each power option is selectable via internal jumpers on the main pc board.

Warning: *Check AC configuration before applying power.*

Figure 15
Main PC Board



4.3 Security Code Function

The security function prompts the operator for a 4-digit code during setup menu access, when enabled. This function prohibits unauthorized entry and/or alterations to system parameters.

The security function can be completely disabled by changing an internal dip switch setting as illustrated in Figure 15. The security function is no longer prompted during setup menu access, when disabled.

4.4 Installing Input/Output Options

Input/output option cards are "keyed" for proper insertion four sockets. Sockets are located on the unit's main pc board and are clearly marked. See Figure 15 and table below:

Socket Labeled	Compatible Options
Input Card	Dedicated for input option cards
Output Card #1	Accepts all analog option cards, except the Dual Proportional Relay card.
Output Card #2	Accepts all analog option cards and Dual Proportional Relay Card
Output Card #3	Dedicated for the 2-Relay option card.

Factory installed input cards are pre-configured and DO NOT require this procedure.

4.5 Input Card Introduction Mode

The first time an input card is installed in any unit, a special "introduction" must be made. This procedure tells the microprocessor exactly what to expect from the input card, and makes minor adjusents to allow for component level tolerances between cards. This procedure is accessed via an internal dip switch on the main pc board. Accessing this procedure adds two additional steps to the standard "CAL" menu.

The introduction procedure involves two simple steps. First, you must input a mV value near the LOW end of the ORP mV range, and tell the microprocessor the precise value in millivolts (or mA, if you are using the 4 to 20/0 to 20 mA Input Card). The second step is to input a mV value near the HIGH end of the ORP mV range, and to tell the microprocessor the precise value of the second signal. Inputs must be simulated with an external mV generator for optimum system performance. **The specific values used are not critical,**

but you must be able to monitor them with an external digital multimeter (DMM) and enter the precise input value to the microprocessor.

Since a wider range provides better resolution, +GF+ SIGNET recommends using the minimum and maximum ORP range values as inputs, whenever possible. Figure 16 illustrates the required wiring for each input option.

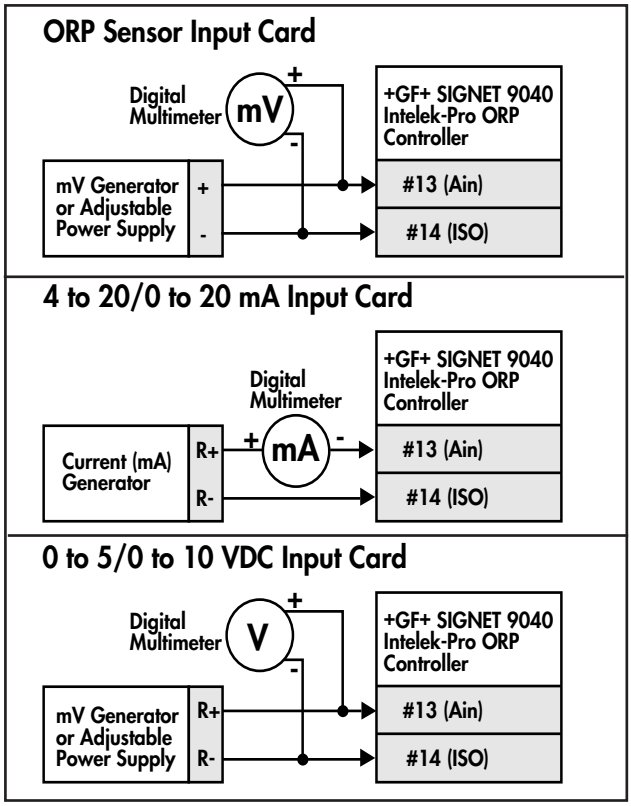


Figure 16
Simulated input wiring

Note: *Observe proper polarity for all simulation equipment/DMM connections.*

Factory installed input cards are pre-configured and DO NOT require this procedure.

Figure 17
ORP Sensor Gain Selection

Gain option displayed only when ORP sensor input card is installed

Input Card Introduction Procedure

1. Access main pc board and set dip switch position #2 to the "closed" position. Refer to section 4.2 Figure 15. Re-assemble unit in reverse order.

2. Wire inputs and external digital multimeter (DMM) to unit per Figure 16.

3. Access the calibration menu. See sections 3.2 or 3.3.

- Scroll through menu pressing the CAL key until the ORP sensor gain selection step is displayed, Figure 17. For analog input cards, skip to step 4.
- Set ORP sensor gain as follows:
  x 1 for +GF+ SIGNET 3-2720 Pre-amplifier/ sensor system inputs.
  x -3 for +GF+ SIGNET 2711 ORP Sensor, or +GF+ SIGNET 3-2712.391-3 Pre-amplifier inputs.

4. Advance through the calibration menu by repeatedly pressing the CAL key until one of the following introduction mode displays are shown:

ORP Sensor (mV) Input Card Display | 4 to 20/0 to 20 mA Input Card Display | 0 to 5/0 to 10 VDC Input Card Display

5. Follow the appropriate instructions below to input signal representing the low end of the ORP range.

ORP Sensor Input Card

Simulate the low ORP input with an external mV generator or adjustable power supply as follows:

- Input approximately -1000 mV (for x 1 gain)
- Input approximately 3000 mV (for x -3 gain)

4 to 20/0 to 20 mA Input Card
Simulate the low ORP current input with an external current (mA) generator as follows:

- Input approximately 4.0 mA (4 to 20 mA inputs)
- Short rear terminals Ain #13 and ISO #14 together (0 to 20 mA inputs). Disconnect mA generator input during this step.

0 to 5/0 to 10 VDC Input Card
Simulate the low ORP voltage input (0 VDC) as follows:

- Short terninals Ain #13 and ISO #14 together. Disconnect external power supply during this step.

0 to 5/0 to 10 VDC Input Card
Simulate the low ORP voltage input (0 VDC) as follows:

- Short terninals Ain #13 and ISO #14 together. Disconnect external power supply during this step.

6. Enter the **exact** input signal value displayed on the digital multimeter as follows:
- Press the MOD key to enable the display for update (the right-most digit will flash).
- Enter exact value displayed on digital multimeter using the LEFT, UP, and DOWN arrow keys. Enter 0000 for shorted inputs. **See Note$_1$ and Note$_2$**
- Press the ENTER key to confirm.

7. Press the CAL key (once). The display will show one of the following:

ORP Sensor (mV) Input Card Display | 4 to 20/0 to 20 mA Input Card Display | 0 to 5/0 to 10 VDC Input Card Display

Note$_1$: *Signal polarity MUST be observed. Display the negative polarity indicator for negative inputs, by shifting the selected digit to the far left position. De-select the polarity indicator for positive inputs by shifting the selected digit to the far left position for a second time.*

Note$_2$: *All voltage inputs are entered into memory in mV format, i.e. -1.000 VDC= -1000 mV.*

8. Follow the appropriate instructions below to input signal representing the high end of the ORP range.

ORP Sensor Input Card
Simulate the high ORP input with an external mV generator or adjustable power supply as follows:
- Input approximately 1000 mV (for x 1 gain)
- Input approximately -3000 mV (for x -3 gain)

4 to 20/0 to 20 mA Input Card
Simulate the high ORP current input with an external current (mA) generator as follows:
- Input approximately 20.0 mA (4 to 20 mA inputs)
- Remove short between terminals Ain #13 and ISO #14 (0 to 20 mA inputs). Re-connect mA generator input. Input approximately 20.0 mA.

0 to 5/0 to 10 VDC Input Card
Remove short between terminals Ain #13 and ISO #14. Re-connect mV generator or external power supply input. Simulate the high ORP voltage input as follows:
- Input approximately 5.0 VDC (0 to 5 VDC inputs)
- Input approximately 10.0 VDC (0 to 10 VDC inputs)

9. Repeat step #6.

10. Access main pc board and return dip switch position #2 to the "open" position. After completing this procedure, re-calibrate your ORP system. See sections 3.2 or 3.3.

4.6 Option Cards and Accessories

Part Number	Input Cards
3-9030.400-2	ORP sensor (mV) input card (isolated)
3-9030.400-3	4 to 20/0 to 20 mA input (isolated)
3-9030.400-4	0 to 5/0 to 10 VDC input (isolated)
Part Number	**Output Cards**
3-9000.450-1 (Requires configuration) See section 4.7	4 to 20/0 to 20 mA (non-isolated)
3-9000.450-2	0 to 5 VDC (non-isolated)
3-9000.450-3	0 to 10 VDC (non-isolated)
3-9000.460-1 (Requires configuration) See section 4.7	4 to 20/0 to 20 mA (isolated)
3-9000.460-2	0 to 5 VDC (isolated)
3-9000.460-3	0 to 10 VDC (isolated)
3-9000.440-1	2-Relay card
3-9000.400-1	Dual Proportional Relay Card
Part Number	**Accessories**
3-5000.399	+GF+ SIGNET mounting adapter plate for +GF+ Signet retrofit
3-5000.395	NEMA 4X/IP65 back cover kit
3-9000.392	Conduit connector kit for NEMA 4X back cover kit (includes 3 connectors)
3-5000.598	Surface mount bracket

(continued)

3-0700.390	*pH buffer kit, pH 4.0, 7.0, 10.0 (1 capsule each)

***Note:** Saturate pH buffers with Quinhydrone for ORP use (customer supplied).

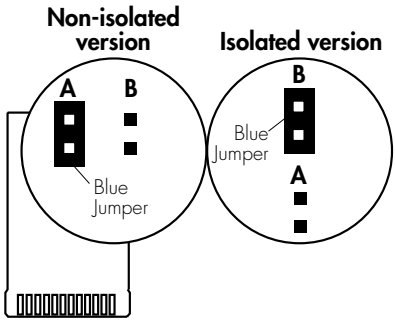
Part Number	Spare Parts
3-9000.525-1	Front bezel
3-9000.575	Panel mounting gasket
3-9000.560	Mounting Clamp
2400-0404	Front cover screws (4 each)
3-9000.570	Front cover gasket
6400-0019	Fuse, 1/4 A @ 250 VAC (fast blow)

4.7 Output Card Configurations

Each 4 to 20/0 to 20 mA (iso or non-iso) output card contains jumper selections for it's operation range. See instructions below and Figure 18

- Placing the blue jumper in the "**A**" position configures the card for 4 to 20 mA operation.
- Placing the blue jumper in the "**B**" position configures the card for 0 to 20 mA operation.

Figure 18
4 to 20/0 to 20 mA output cards

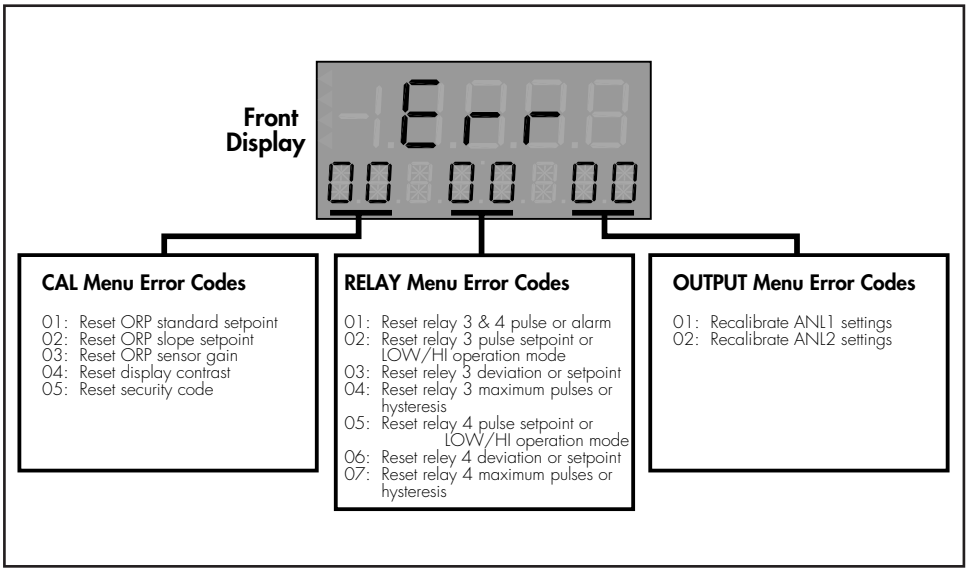


4.8 Troubleshooting

Error codes will be shown on the display after an abnormal occurrence, such as large amounts of electromagnetic interference or a large voltage transient on the AC power line occur.

Displayed error codes represent corrupted setup data in the internal memory which must be re-entered by the operator. See Figure 19

Figure 19
Displayed error codes



Specifications

Power Requirements
17 to 30 VDC @ 0.5 A max. and/or
90 to 132 VAC @ 50 to 60 Hz, or
180 to 264 VAC @ 50 to 60 Hz (jumper selectable)

Operating Temperature
32 to 130 °F/0 to 55 °C

Relative Humidity
95% R.H. max., non-condensing

Enclosure
Materials: ABS plastic
NEMA 4X/IP65 front, **optional** NEMA 4X/IP65 rear cover

Dimensions: 88 x 88 x 165 mm
(3.5 x 3.5 x 6.5 in.)

Memory Backup
Non-volatile RAM

Liquid Crystal Display
4.5 digits, 0.5 in. high (upper)
8 digits, 0.3 in. high (lower)
Range: ORP ±3000 mV (x 1 gain setting)
ORP ±1000 mV (x -3 gain setting)
Temperature -10 to 110 °C (14 to 230 °F)

Noise Immunity
Meets IEC 801-3

Compatible +GF+ SIGNET Pre-amplifier/Sensor System

3-2720	Pre-amplifier
3-2715	Flat Surface ORP Sensor
3-2717	General Purpose ORP Sensor

ORP Input (iso)
ORP range: ±3000 mV (x 1 gain setting)
±1000 mV (x -3 gain setting)
Isolation: 500 VDC to earth ground

Current and Voltage Input (iso)
Input range: 4 to 20 mA or 0 to 20 mA
0 to 5 VDC or 0 to 10 VDC
Isolation: 500 VDC to earth ground

2-Relay Output Card
2 SPDT contact outputs 5 A @ 250 VAC or
30 VDC maximum load

Dual Proportional Output Card
2 SPST contact outputs 5 A @ 250 VAC or
30 VDC maximum load

4 to 20/0 to 20 mA Output Card
Jumper selectable on card, section 4.7
Response time: 2.5 s max. for 100% change
Max. loop resistance: 425 Ω
Isolation: 500 VDC to earth ground (iso. version)

0 to 5 or 0 to 10 VDC Output Card
Response time: 2.5 s max. for 100% change
Min. load resistance: 1 kΩ
Isolation: 500 VDC to earth ground (iso. version)

Accuracy
Display: ORP ±0.1% of full scale
Analog output: ±0.5% of full scale

Warranty

Limited Two-Year Warranty

Signet Scientific Company warrants its instruments to be free from defects in material and workmanship under normal use for a period of two years from the date of purchase by the initial owner, or three years from date of manufacture, whichever comes first, as described in the following paragraphs.

This warranty does not cover defects caused by abuse or electrical damage. Signet Scientific Company will not cover under warranty any instruments damaged during shipment to the factory less case or if improperly packed. Repair attempts by anyone other than authorized service personnel will void the warranty. Proof of date of purchase will be required before warranty repairs can begin. Transducers and cables will not be covered after installation.

Parts which prove to be defective in the first year will be repaired or replaced free of charge including labor, shipped F.O.B. our factory or a designated service center (addresses furnished upon request).

Only non-moving parts, such as electrical components, which prove defective during the second year are warranted. Meter movements will not be covered. All units qualifying for warranty service after one year are subject to a service charge for replacement of non-moving parts.

Items returned for warranty repair must be shipped prepaid and insured. Warranty claims are processed on the condition that prompt notification of a defect is given to Signet Scientific Company within the warranty period.

Signet Scientific Company shall have the sole right to determine whether in fact a warranty situation exists.

Signet Scientific Company is continually making design changes and improvements that adapt to the original circuit configuration. These will be incorporated as required in older units on a minimal charge basis while under warranty.

Consequential Damages
Signet Scientific Company shall not be liable for special consequential damages of any nature with respect to any merchandise or service sold, rendered or delivered.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

Notes:

+GF+ SIGNET

Sales Offices:

USA George Fischer, Inc., 2882 Dow Avenue, Tustin, CA 92780/USA,
Tel. (714) 731-8800, Fax (714) 731-6201

Switzerland Georg Fischer Rohrleitungssysteme AG, P.O. Box 671, CH-8201 Schaffhausen/Switzerland,
Tel. 052/631 1111, Fax 052/631 2830

Singapore George Fischer Pte. Ltd., 15 Kaki Bukit Road 2, KB Warehouse Complex, Singapore 1441,
Tel. 65/747 0611, Fax 65/747 0577

Japan Kubota George Fischer, 2-47 Shikitsuhigashi, 1-Chome, Naniwa-Ku, Osaka, 556-91 Japan,
Tel. 816/648 2545, Fax 816/648 2565

China Georg Fischer Ltd., Rm 1503, Business Residence Bldg. of Asia Plaza, 2-3 Bldg. No. 5th
Qu Anzhenxili, Chaoyang Qu, Beijing 100029, P.R. China,
Tel. 86/10 6443 0577, Fax 86/10 6443 0578

Australia George Fischer Pty. Ltd., Suite 3, 41 Stamford Road, Oakleigh, Victoria 3166, Australia,
Tel. 61/3 9568 0966, Fax 61/3 9568 0988

Signet Scientific Company, 3401 Aerojet Avenue, El Monte, CA 91731-2882 U.S.A.,
Tel. (626) 571-2770, Fax (626) 573-2057

GEORGE FISCHER +GF+ Piping Systems

PRINTED ON RECYCLED PAPER

Printed in U.S.A.

3-9040.090
E-8/97