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Instruction Manual
PN 51-1055OZ/rev.K
February 2006

Model SOLU COMP® II

Ozone Analyzer



ROSEMOUNT® Analytical

EMERSON™ Process Management

ESSENTIAL INSTRUCTIONS

READ THIS PAGE BEFORE PROCEEDING!

Your purchase from Rosemount Analytical, Inc. has resulted in one of the finest instruments available for your particular application. These instruments have been designed, and tested to meet many national and international standards. Experience indicates that its performance is directly related to the quality of the installation and knowledge of the user in operating and maintaining the instrument. To ensure their continued operation to the design specifications, personnel should read this manual thoroughly before proceeding with installation, commissioning, operation, and maintenance of this instrument. If this equipment is used in a manner not specified by the manufacturer, the protection provided by it against hazards may be impaired.

- Failure to follow the proper instructions may cause any one of the following situations to occur: Loss of life; personal injury; property damage; damage to this instrument; and warranty invalidation.
- Ensure that you have received the correct model and options from your purchase order. Verify that this manual covers your model and options. If not, call 1-800-854-8257 or 949-757-8500 to request correct manual.
- For clarification of instructions, contact your Rosemount representative.
- Follow all warnings, cautions, and instructions marked on and supplied with the product.
- Use only qualified personnel to install, operate, update, program and maintain the product.
- Educate your personnel in the proper installation, operation, and maintenance of the product.
- Install equipment as specified in the Installation section of this manual. Follow appropriate local and national codes. Only connect the product to electrical and pressure sources specified in this manual.
- Use only factory documented components for repair. Tampering or unauthorized substitution of parts and procedures can affect the performance and cause unsafe operation of your process.
- All equipment doors must be closed and protective covers must be in place unless qualified personnel are performing maintenance.
- If this equipment is used in a manner not specified by the manufacturer, the protection provided by it against hazards may be impaired.



WARNINGS

RISK OF ELECTRICAL SHOCK

⧈ Equipment protected throughout by double insulation.

- Installation of cable connections and servicing of this product require access to shock hazard voltage levels.
- Main power and relay contacts wired to separate power source must be disconnected before servicing.
- Do not operate or energize instrument with case open!
- Signal wiring connected in this box must be rated at least 240 V.
- Non-metallic cable strain reliefs do not provide grounding between conduit connections! Use grounding type bushings and jumper wires.
- Unused cable conduit entries must be securely sealed by non-flammable closures to provide enclosure integrity in compliance with personal safety and environmental protection requirements. Unused conduit openings must be sealed with NEMA 4X or IP65 conduit plugs to maintain the ingress protection rating (NEMA 4X).
- Electrical installation must be in accordance with the National Electrical Code (ANSI/NFPA-70) and/or any other applicable national or local codes.
- Operate only with front and rear panels fastened and in place over terminal area.
- Safety and performance require that this instrument be connected and properly grounded through a three-wire power source.
- Proper relay use and configuration is the responsibility of the user.



CAUTION

This product generates, uses, and can radiate radio frequency energy and thus can cause radio communication interference. Improper installation, or operation, may increase such interference. As temporarily permitted by regulation, this unit has not been tested for compliance within the limits of Class A computing devices, pursuant to Subpart J of Part 15, of FCC Rules, which are designed to provide reasonable protection against such interference. Operation of this equipment in a residential area may cause interference, in which case the user at his own expense, will be required to take whatever measures may be required to correct the interference.



WARNING

This product is not intended for use in the light industrial, residential or commercial environments per the instrument's certification to EN50081-2.

Emerson Process Management

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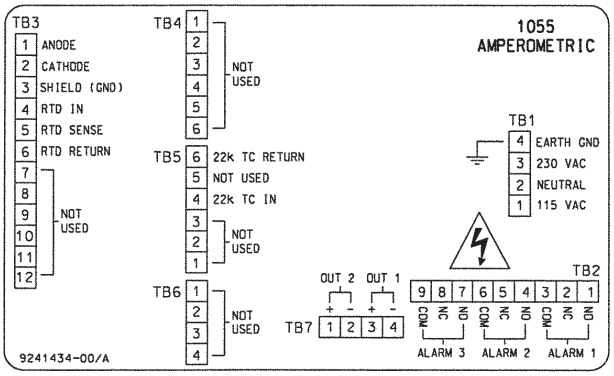
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QUICK START GUIDE

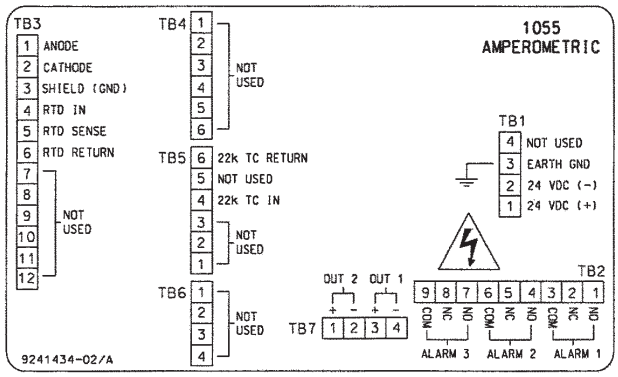
FOR MODEL SOLU COMP II OZONE ANALYZER

(Model Option 1055-26)

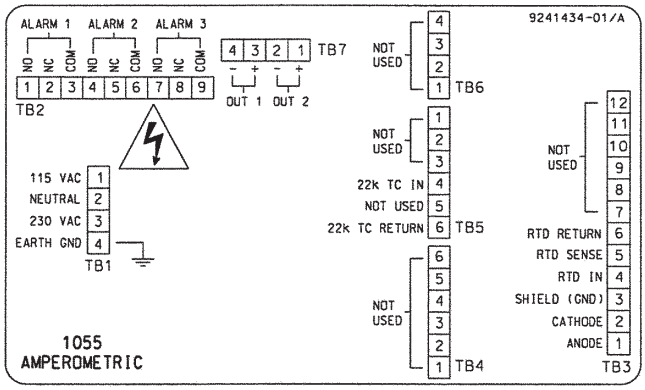
1. Refer to page 6 for installation instructions.
2. Wire ozone sensor to the analyzer. See the drawings below. Refer to the sensor instruction sheet for details. Make alarm, output, and power connections as shown below.



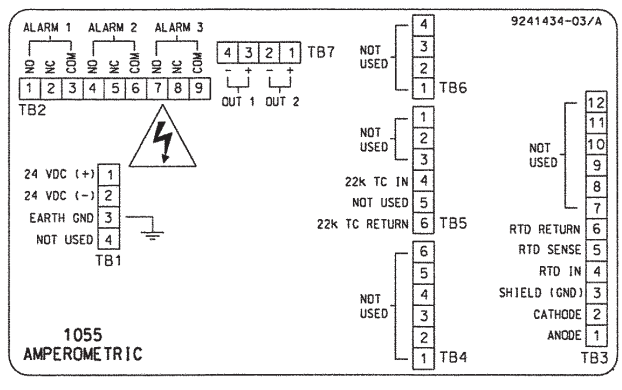
Wiring Connections for Solu Comp II Model 1055-01-10 (Panel Mount with 115/230 Vac Power)



Wiring Connections for Solu Comp II Model 1055-02-10 (Panel Mount with 24 Vdc Power)



Wiring Connections for Solu Comp II Model 1055-01-11 (Surface/Pipe Mounting with 115/230 Vac Power)



Wiring Connections for Solu Comp II Model 1055-02-11 (Surface/Pipe Mounting with 24 Vdc Power)

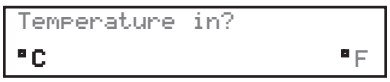
3. Once connections are secured and verified, apply power to the analyzer.

CONTINUED ON THE FOLLOWING PAGE

4. When the analyzer is powered up for the first time, **Quick Start** screens appear. Using **Quick Start** is easy.
   a. A blinking field shows the position of the cursor.
   b. Use the ◀ or ▶ key to move the cursor left or right. Use the ▲ or ▼ key to move the cursor up or down or to increase or decrease the value of a digit. Use the ▲ or ▼ key to move the decimal point.
   c. Press ENTER to store a setting. Press EXIT to leave without storing changes. Pressing EXIT also returns the display to the previous screen.



5. Choose the desired language. Choose **>>** to show more choices.



6. Choose temperature units.

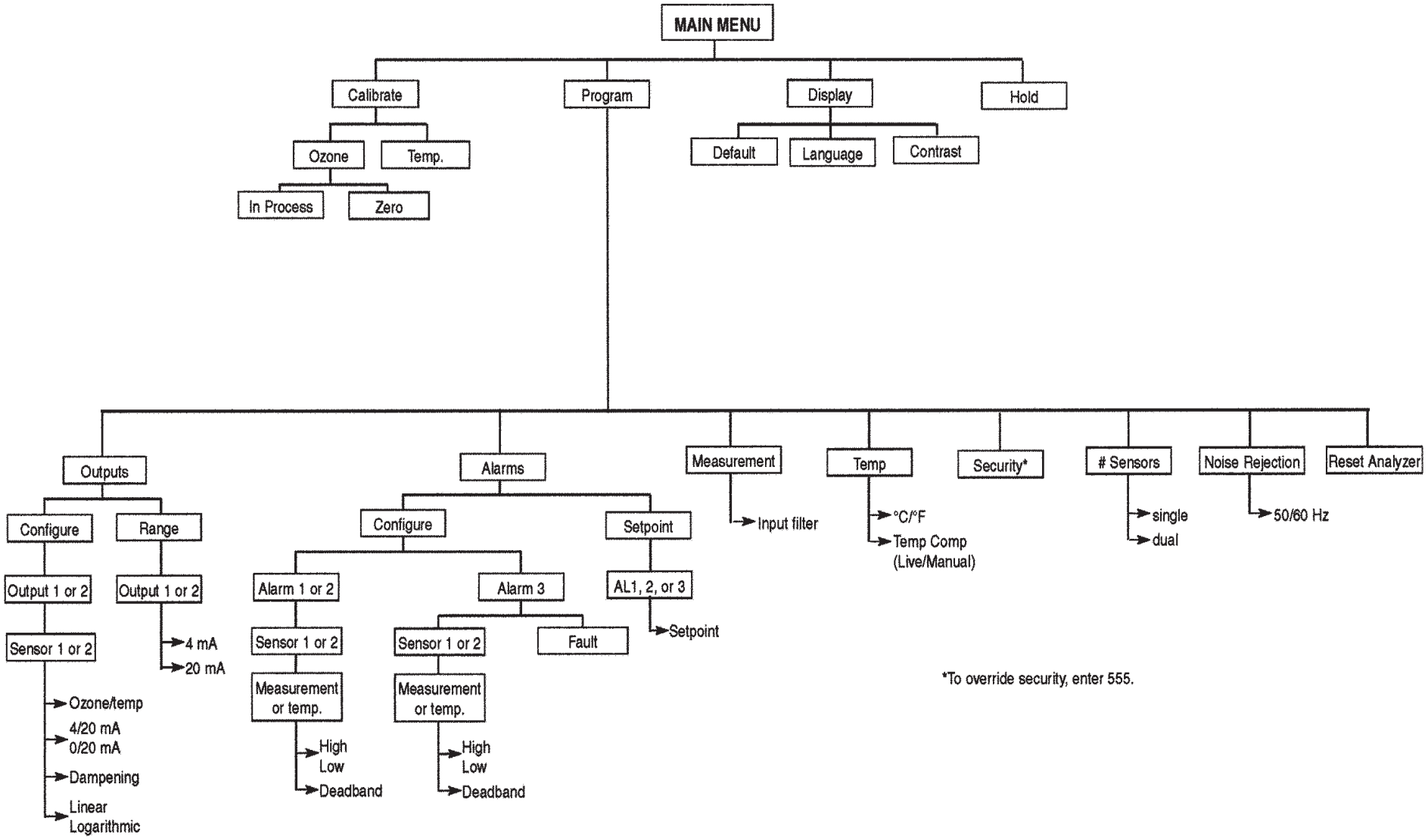
7. The main display appears. The outputs and alarms are assigned to default values.

8. To change outputs, alarms, and temperature-related settings, go to the main menu and choose **Program**. Follow the prompts. For a guide to the Program menu, see the menu tree on the following page.

9. To return the analyzer to the default settings, choose **Initialize** in the **Program** menu.

QUICK REFERENCE GUIDE

MENU TREE FOR OZONE MEASUREMENTS



*To override security, enter 555.

MODEL SOLU COMP II DUAL INPUT OZONE ANALYZER

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About This Document

This manual contains instructions for installation and operation of the Solu Comp II Model 1055 Ozone Analyzer.

The following list provides notes concerning all revisions of this document.

Rev. Level	Date	Notes
A	9/02	This is the initial release of the product manual. The manual has been reformatted to reflect the Emerson documentation style and updated to reflect any changes in the product offering.
B	11/02	Deleted option code -41.
C	4/03	Updated CE info.
D	8/03	Minor textual revisions to pages 6, 19, 34, 38.
E	12/03	Updated troubleshooting section 8.1.
F	3/04	Revised H2SO4 specs & recommended sensors on pages 4 & 6.
G	10/04	Updated mounting drawings on pages 13 & 14.
H	11/04	Updated mounting drawing on page 12.
I	12/04	Revised USP references.
J	4/05	Revised panel mount drawing.
K	2.06	Revised Case and Analog Output specifications on page 2.

SECTION 1.0. DESCRIPTION AND SPECIFICATIONS

1.1 FEATURES AND APPLICATIONS
1.2 SPECIFICATIONS
1.3 ORDERING INFORMATION AND ACCESSORIES

1.1 FEATURES AND APPLICATIONS

The Solu Comp II analyzers offer the choice of single or dual sensor input with measurement choices of pH/ORP, resistivity/conductivity/TDS, % concentration, ratio conductivity, total and free ozone, ozone, dissolved ozone, flow and temperature. Dual measurement analyzers offer a wide choice of measurement combinations thus reducing the cost per loop and needed panel space.

FIELD COMMISSION OPTION: The Solu Comp II can be ordered with the ability to commission measurements in the field. This added flexibility can greatly reduce the number of spare instruments required for field servicing.

QUICK START PROGRAMMING: Exclusive Quick Start screens appear the first time the Solu Comp II is powered up. Screen prompts direct the user to register the number of sensors, the measurement unit(s) and the language to display. Some measurement specific prompts are also displayed. The measurement loop is ready for use in a matter of minutes.

MENUS: Menu screens for calibrating and registering choices are simple and intuitive. Plain language prompts guide the user through the procedures. There are no service codes to enter before gaining access to menus.

DUAL SENSOR INPUT AND OUTPUT: The Solu Comp II accepts single or dual sensor input. The two 4-20 mA outputs can be independently programmed to correspond to any selected measurement or temperature. Output damping and linear or log output may also be field selected.

ALARMS: The Solu Comp II has three fully programmable alarm relays that can be assigned to any selected measurement or temperature. Alarms can be configured as high, low, or USP[1]. The third relay has the additional choice of fault alarm operation. When selected, a fault alarm will activate the relay when a sensor or analyzer fault occurs.

ENCLOSURE: The panel mount version fits standard ½ DIN panel cutouts, and its shallow depth is ideally suited for easy mounting in Hoffman-type enclosures. A panel mount gasket is included to maintain the weather rating of the panel. Surface/pipe mount enclosure includes self-tapping screws for surface mounting. A pipe mounting accessory kit is available for mounting to a 2-inch pipe.

DISPLAY: The two-line, 16-character, back-lit display can be customized to meet user requirements. All operations and descriptive messages can be field selected for English, French, German, Italian, Spanish, or Portuguese. Informative screens, which permit data not shown in the regular display, may be seen at the push of a button.

TEMPERATURE: Most measurements (except ORP and flow) require temperature compensation. The Solu Comp II will automatically recognize either a Pt100 or Pt1000 RTD, normally built into the sensor. When this RTD is present, the Solu Comp II can be set up to display the temperature in °C or °F as well as set any one or more of the alarms and/or outputs to respond to this sensor input. If two measurements with temperature are present either can be chosen for each alarm and output selected.

[1]USP alarm applies to conductivity/resistivity only.

1.2 SPECIFICATIONS - General

Case: ABS (panel-mount), polycarbonate (pipe- and surface-mount). All versions are NEMA 4X/CSA 4 (IP65).

Dimensions

Panel (code -10): 6.10 x 6.10 x 3.72 in. (155 x 155 x 94.5 mm)

Surface/Pipe (code -11): 6.23 x 6.23 x 3.23 in. (158 x 158 x 82 mm); see page 5 for dimensions of pipe mounting bracket.

Conduit openings: Accepts PG13.5 or 1/2 in. conduit fittings

Display: Two line, 16-character, back-lit display. Character height: 4.8 mm. Display can be customized to meet individual requirements. Depending on number of sensors, as many as 14 display screens are available.

Ambient temperature and humidity: 0 to 50°C, (32 to 122°F) RH 5 to 95% (non-condensing)

Note: The analyzer is operable from -20 to 60°C (-4 to 140°F) with some degradation in display performance.

Power:

Code -01: 115/230 Vac ±15%, 50/60 Hz ±6%, 8.0W
Code -02*: 24 Vdc ±15%, 6.0W
Installation Category II

* *For +24Vdc Power Supply use only devices meeting NEC Class II or UL recognized (UL 1950).*

Equipment protected throughout by double insulation.

Hazardous Location:

C SP US –LR 34186 Class I, Division 2, Groups A, B, C, & D

FM APPROVED

POLLUTION DEGREE 4: Extended Environment Outdoor use where conductive contamination such as rain, snow, or dust may be present. (Hazardous Location only)

Ordinary Location: (-68 only)

UL LISTED

12RN

POLLUTION DEGREE 2: Normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected.

RFI/EMI: EN-61326
LVD: EN-61010-1 CE

Input: Choice of single or dual sensor input with measurement choices of pH/ORP, conductivity/resistivity, toroidal conductivity, flow, chlorine, dissolved oxygen, and dissolved ozone. Field-commissioned units allow user to change measurements on either or both inputs. See combination guide for valid combinations. For contacting conductivity measurements, temperature element must be a Pt 1000 RTD. For other measurements, use either a Pt100 RTD, Pt1000 RTD, or 22k NTC (D.O. only).

Outputs: Two 4-20 mA or 0-20 mA isolated outputs. Continuously adjustable. Linear or logarithmic. Maximum load 500 ohms. Output dampening with time constant of 5 sec is user-selectable.

Alarms: Three alarm relays for process measurement(s) or temperature. Alarm 3 can be configured as a fault alarm, instead of a process alarm. Each relay can be configured independently. Alarm logic (high or low activation or USP*) and deadband are user-programmable. The USP* alarm can be programmed to activate when the conductivity is within a user-selectable percentage of the limit.

**conductivity/resistivity measurement only*

Relays: Form C, single pole double throw, epoxy sealed

	Resistive	Inductive
28 Vdc	5.0 A	3.0 A
115 Vac	5.0 A	3.0 A
230 Vac	5.0 A	1.5 A

Terminal Connections Rating: 26-14 AWG wire size

Weight/Shipping weight (rounded up to nearest lb or nearest 0.5 kg)**:** 3 lb (1.5 kg)/4 lb (2.0 kg)

CONTACTING CONDUCTIVITY (Codes -20 and/or -30)

Measures conductivity in the range 0 to 20,000 µS/cm. Display choices are conductivity, resistivity, and TDS (total dissolved solids). Three temperature corrections are available: high purity water (dilute sodium chloride), cation conductivity (dilute hydrochloric acid), and adjustable linear temperature coefficient (0 to 5.00%/°C). Temperature correction can be disabled, allowing the analyzer to display raw conductivity.

PERFORMANCE SPECIFICATIONS -

Range	Cell constant (/cm)	Accuracy[1,2]
0.055 - 9.99 µS/cm	0.01	0.9% of reading or ±0.002 µS/cm
10 - 50 µS/cm	0.01	±2% of reading
0.055 - 500 µS/cm	0.1	±2% of reading or ±0.1 µS/cm
0.055 - 5000 µS/cm	1.0	±2% of reading or ±1 µS/cm
0 - 5 mS/cm	1.0	±2% of reading or ±0.001 mS/cm
0 - 20 mS/cm	10	±2% of reading or ±0.01 mS/cm

ANALYZER (CONDUCTIVITY INPUT)

Accuracy (Resistivity):** 0.9% of reading

Accuracy (Temperature):** ±0.1°C between 5°C and 100°C; ±1°C between 101°C and 200°C

Stability: 0.5% of reading/month

Ambient Temperature Effect: ±0.05% of reading/°C

Output Accuracy: ±0.1 mA

Temperature correction: High purity water (dilute sodium chloride), cation conductivity (dilute hydrochloric acid), linear temperature coefficient (0.0 to 5.00%/°C), or none. High purity water and cation conductivity temperature correction apply between 0 and 100°C. Linear temperature coefficient can be applied between -5 and 200°C.

Measurement Range: 0.0 to 20,000 µS/cm, 0.05 to 20 MΩ-cm, or 0 to 10,000 ppm TDS

Temperature Range: -5°C to 200°C (23°F to 392°F)



[1] whichever is greater
[2] Accuracy values pertain to Endurance Model 400 Series conductivity sensors only

RECOMMENDED SENSORS FOR CONDUCTIVITY:

The Solu Comp II is intended for use with the ENDURANCE Model 400 series conductivity sensor (Pt 1000 RTD).

Model 400 Screw-in/Insertion

Model 400VP Screw-in/Insertion with 6.0 VP connector

Model 401 Screw-in/Insertion (except 401-15)

Model 402 Retractable

Model 402VP Retractable with 6.0 VP connector

Model 403 Sanitary Flanged

Model 403VP Sanitary Flanged with 6.0 VP connector

Model 404 Flow-Through

The analyzer can also be used with Rosemount Analytical conductivity sensor Models 140, 141, 142, and 150 having a Pt 100 RTD.

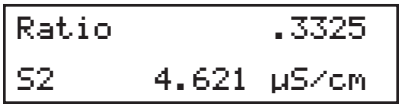
Refer to the table to select the appropriate cell constant.

Range, µS/cm	Cell constant, /cm
0.0 to 50	0.01
5 to 500	0.1
50 to 5,000	1.0
500 to 20,000	10

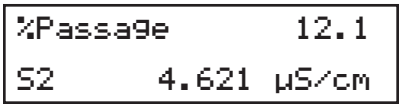
Ratio Conductivity (Codes -20-30):

The Dual Conductivity Solu Comp II can function as a ratio analyzer or recovery device (% passage or % rejection). Product sensor 2's conductivity reading is always displayed.

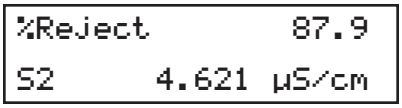
Ratio



%Pass



%Reject



TOROIDAL CONDUCTIVITY (Codes -21 and/or -31)

When used with Model Series 200 Toroidal Conductivity Sensors, display choices are conductivity, resistivity, and percent concentration. The percent concentration selection includes the choice of four common solutions (0-12% NaOH, 0-15% HCl, and 0-25% or 96-99.7% H_2SO_4). The conductivity-concentration algorithms for these solutions are fully temperature compensated. For other solutions, a simple-to-use menu allows the customer to enter his own data. The analyzer accepts as many as five (5) data points and fits either a linear (two [2] points) or a quadratic function (three [3] or more points) to the data. Reference temperature and linear temperature slope may also be adjusted for optimum results.

RECOMMENDED SENSORS:

Model 222 Flow-through conductivity sensor

Model 225 Clean-in-place conductivity sensor

Model 226 Large bore conductivity sensor

Model 228 Toroidal conductivity sensor

Model 242 Flow-through conductivity sensor

Model 247 Economy conductivity sensor

PERFORMANCE SPECIFICATIONS -

Measurement Range: see table below

Accuracy: ± 1% of reading and ± 0.01 mS/cm

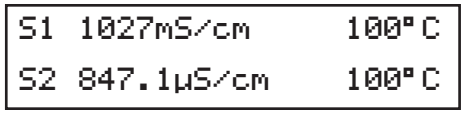
Repeatability: ± 0.5% of reading and ± 0.005 mS/cm

Stability: ± 0.25% of reading and ± 0.005 mS/cm/month, noncumulative

Ambient Temperature Effect: ± 0.05% of reading/°C

Temperature Compensation: -15 to 200°C (5 to 392°F) automatic or manual. Automatic requires a Pt100/1000 RTD

Temperature correction: Linear temperature coefficient (0.0 to 5.00%/°C) neutral salt (dilute sodium chloride) or none



INDUCTIVE SENSORS					
Conductivity Sensor Model Number	**226**	**228**	**225**	**222 (1in.)**	**222 (2 in.)**
Cell Constant*	**1.0**	**3.0**	**3.0**	**6.0**	**4.0**
Minimum Range	**50**	**250**	**250**	**500**	**500**
Maximum Range	**1,000,000**	**2,000,000**	**2,000,000**	**2,000,000**	**2,000,000**
* Typical	**FULL SCALE MICROSIEMENS/cm**				

pH/ORP (Codes -22 and/or -32)

For use with any standard pH or ORP sensor and all Uniloc sensors and junction boxes with built-in diagnostic style preamplifiers, display choices are pH, ORP or Redox. The automatic buffer recognition feature uses stored buffer values and their temperature curves for the most common buffer standards available worldwide. The analyzer will recognize the value of the buffer being measured and perform a self stabilization check on the sensor before completing the calibration. Manual or automatic temperature compensation is keypad selectable. Change in pH due to process temperature can be compensated using a programmable temperature coefficient or isopotential point. Measurement and display of pH glass and reference impedance helps alert the user to sensor maintenance needs.

**reference impedance is suppressed with amperometric/pH combinations (-24, -25, -26)*

PERFORMANCE SPECIFICATIONS - ANALYZER (pH INPUT)

Measurement Range [pH]: 0 to 14 pH

Accuracy: ±0.01 pH

Repeatability: ±0.01 pH

Stability: ±0.01 pH/month, non-cumulative

Temperature Coefficient: ±0.003 pH/°C

Temperature Compensation: Pt100/Pt1000 RTD, Automatic or Manual -15 to 100°C (5 to 212°F)

Temperature Correction: Choose from standard measurement compensation, solution temperature correction for high purity or dilute base solutions, and custom temperature correction.

PERFORMANCE SPECIFICATIONS - ANALYZER (ORP INPUT)

Measurement Range [ORP]: -1400 to +1400 mV

Accuracy: ±2.0 mV

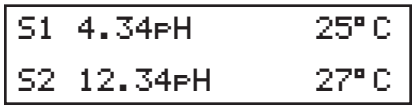
Repeatability: ±1.0 mV

Stability: ±1.0 mV/month, non-cumulative

Temperature Coefficient: ±0.2 mV/°C

Temperature Measurement: -15 to 100°C (5 to 212°F)

Temperature Correction: none required



RECOMMENDED SENSORS FOR pH:

Model 320B Flow Through pH
Model 320HP High Purity pH
Model 328A Steam Sterilizable pH
Model 370 and 371 EuroSenz pH
Model 381+ Insertion/Submersion/Flow Through pH
Model 385+ Insertion/Submersion/Retractable pH
Model 389 Insertion/Submersion pH
Model 396 Insertion/Submersion pH
Model 396VP Insertion/Submersion pH with VP 6.0 connector
Model 396P Insertion/Submersion pH
Model 396PVP Insertion/Submersion pH with VP 6.0 connector
Model 396R Retractable pH
Model 396RVP Retractable pH with VP 6.0 connector
Model 397 Quik Disconnect pH
Model 398 Insertion/Submersion pH
Model 398VP Insertion/Submersion with VP 6.0 connector
Model 398R Retractable pH
Model 398RVP Retractable pH with VP 6.0 connector
Model 399 Insertion/Submersion pH
Model Hx338 Steam Sterilizable pH
Model Hx348 Steam Sterilizable pH

When used with conductivity (-20-32 or -22-30):

Model 320HP High Purity pH
Model 381+ Insertion/Submersion/Flow Through pH
Model 385+ Insertion/Submersion/Retractable pH
Model 396P Insertion/Submersion pH
Model 396PVP Insertion/Submersion pH with VP 6.0 connector
Model 396R Retractable pH
Model 396RVP Retractable pH with VP 6.0 connector

RECOMMENDED SENSORS FOR ORP:

Model 330 Flow Through ORP
Model 371 EuroSenz ORP
Model 381+ Insertion/Submersion/Flow Through ORP
Model 385+ Insertion/Submersion/Retractable pH
Model 389 Insertion/Submersion ORP
Model 396P Insertion/Submersion ORP
Model 396PVP Insertion/Submersion ORP with VP 6.0 connector
Model 396R Retractable ORP
Model 398 Insertion/Submersion ORP
Model 398VP Insertion/Submersion with VP 6.0 connector
Model 398R Retractable ORP
Model 398RVP Retractable ORP with VP 6.0 connector

When used with conductivity (-20-32 or -22-30):

Model 320HP High Purity ORP
Model 381+ Insertion/Submersion/Flow Through ORP
Model 385+ Insertion/Submersion/Retractable ORP
Model 396P Insertion/Submersion ORP
Model 396PVP Insertion/Submersion ORP with VP 6.0 connector
Model 396R Retractable ORP
Model 396RVP Retractable ORP with VP 6.0 connector

FLOW
(Standard on all models or stand alone, Code -23 and/or -33)

For use with most pulse signal flow sensors, the Solu Comp II's user selectable units of measure include flow rates in GPM (Gallon per minute), LPM (liters per minute), or m3/hr (cubic meters per hour), and velocity in ft/sec or m/sec. When configured to measure flow, the unit also acts as a totalizer in the chosen unit (gallons, liters, or cubic meters).

Dual flow instruments can be configured as a % recovery device or a flow difference device.

PERFORMANCE SPECIFICATIONS

Frequency Range: 0.5 - 4000 Hz

Flow Rate: 0 - 9999 GPM, LPM, m3/hr

Totalized Flow: 0 - 9,999,999 Gallons; 37,850,000 Liters; 37,850 m3

Accuracy: ±1% (±1.5% from 3000 to 4000 Hz)

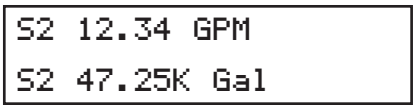
Repeatability: ±1%

RECOMMENDED SENSORS

+GF+ Signet 515 Rotor-X Flow sensor Model 515/8510-XX (PN P51530-PO)

Fluidyne Flow Sensor Model 2300A (PN Hydro-Flow-2300-A-10-5R-3-1-1)

Consult factory for other pulse type sensor compatibility.



FREE AND TOTAL CHLORINE (Code -24)

When used with a chlorine specific membrane-covered amperometric sensor, display choices are free chlorine or total chlorine. (Total chlorine measurement requires the use of the Model SCS921 or other sample conditioning system). Because the permeability of the membrane is a function of temperature, a correction is necessary when the sensor is used at a temperature different from the one at which it was calibrated. The Solu Comp II automatically applies the temperature correction factor. The process temperature is measured by an RTD in the sensor. An input filter allows the user to configure the analyzer for rapid response or low noise. The low noise option is recommended for samples containing less than 0.1 ppm ozone.

pH is also a factor in the measurement of free chlorine. An aqueous solution of free chlorine is a mixture of hypochlorous acid and hypochlorite ion. The relative amount of each depends on the temperature and pH. Generally, increasing the pH and temperature reduces the amount of hypochlorous acid in the mixture. Because the response of the sensor to hypochlorous acid is greater than its response to hypochlorite, accurate determination of chlorine requires knowledge of the pH and temperature of the sample. If the pH is relatively constant, a fixed pH correction factor can be entered into the analyzer. If the pH is greater than 7 and fluctuates by more than 0.2, continuous measurement of the pH and automatic pH correction is necessary. For automatic pH correction, select code -32 and an appropriate pH sensor.

PERFORMANCE SPECIFICATIONS

Measurement Range: 0-20 ppm (mg/L) chlorine (as Cl_2)

Resolution: 0.001 ppm

Automatic pH Correction (requires Code -32): 5.0 to 9.5 pH

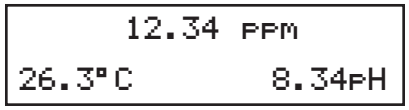
Temperature Correction: Automatic (with Pt100 RTD in sensor) or manual 0-50°C. Can be disabled if desired.

Input filter: time constant 1 - 999 sec

RECOMMENDED SENSORS

Chlorine: 499A CL-01 Free Chlorine or 499A CL-02 Total Residual Chlorine (requires sample conditioning)

pH: 399-09-62, 399VP-09, 399-14



DISSOLVED OXYGEN (Code -25)

The Solu Comp II is compatible with the Model 499ADO, 499ATrDO, Hx438, and Gx438 dissolved oxygen sensors. The sensors are membrane-covered amperometric sensors. For more information concerning the use and operation of the amperometric oxygen sensors, refer to the product data sheets. The Solu Comp II displays dissolved oxygen in ppm, ppb, or percent saturation.

The Solu Comp II fully compensates oxygen readings for changes in membrane permeability caused by temperature changes. In the Model 499ADO and 499ATrDO sensors, temperature is measured by a Pt 100 RTD. The Hx438 and Gx438 sensors use a 22kNTC.

Calibration is easy. Simply expose the sensor to water saturated air. Wait until readings are stable and press a few keys. The analyzer measures the temperature and barometric pressure and automatically completes the calibration. If removing the sensor from the process liquid is impractical, the analyzer can be calibrated against a standard instrument. Calibration can be corrected for process salinity.

PERFORMANCE SPECIFICATIONS

Measurement Range: 0-20 ppm (mg/L) dissolved oxygen; 0- 250% saturation

Resolution: 0.01 ppm; 0.1 ppb for 499A TrDO sensor (when O_2 <1.00 ppm); 0.1%

Temperature Correction for Membrane Permeability: Automatic (with Pt100 RTD in sensor) or manual 0-50°C. Can be disabled if desired.

Input filter: time constant 1 - 999 sec

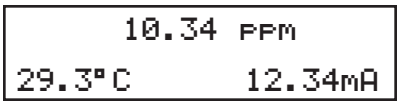
RECOMMENDED SENSORS

Model 499A DO Dissolved Oxygen Sensor

Model Hx438 Steam Sterilizable Dissolved Oxygen Sensor

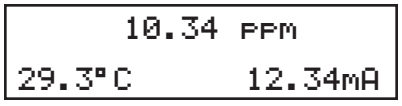
Model Gx438 Steam Sterilizable Dissolved Oxygen Sensor

Model 499A TrDO Trace Dissolved Oxygen Sensor



DISSOLVED OZONE (Code -26)

For use with an ozone permeable membrane-covered amperometric sensor. Because the permeability of the membrane is a function of temperature, a correction is necessary when the sensor is used at a temperature different from the one at which it was calibrated. The Solu Comp II automatically applies the temperature correction factor. The process temperature is measured by an RTD in the sensor. The Solu Comp II is calibrated taking a measurement of the ozone level in the process by an independent chemical method and setting the display equal to the measured value. An input filter allows the user to configure the analyzer for rapid response of low noise. The low noise option is recommended for samples containing less than 0.1 ppm dissolved ozone.



PERFORMANCE SPECIFICATIONS

Measurement Range: 0-10 ppm (mg/L)

Resolution: 0.001 ppm dissolved ozone

Temperature Correction for Membrane Permeability: Automatic (with Pt100 RTD in sensor) or manual 0-35°C. Can be disabled if desired.

Input filter: time constant 1 - 999 sec

RECOMMENDED SENSOR

Model 499A OZ Dissolved Ozone Sensor

LOOP SPECIFICATIONS WITH A MODEL 499A OZ SENSOR

Loop Accuracy: ±5% of reading or ± 3 ppb at 25°C, whichever is greater

Repeatability: ±2% of reading at a constant temperature

1.3 ORDERING INFORMATION

The Solu Comp II analyzers offer the choice of single or dual sensor input with measurement choices of pH/ORP, conductivity/resistivity, toroidal conductivity, flow, ozone, dissolved oxygen, and dissolved ozone. See combination guide (on the following page) for valid combinations. Standard features include two isolated outputs, three alarm relays, customizable two-line display, and temperature correction.

MODEL 1055 SOLU COMP II ANALYZER	
CODE	POWER
01	115/230 Vac, 50/60 Hz
02	24 Vdc

CODE	MOUNTING
10	Panel mounting enclosure
11	Pipe/Surface mounting enclosure (Pipe mounting requires accessory kit PN 23820-00)

CODE	MEASUREMENT 1 (Required Selection)
20	Contacting Conductivity
21	Toroidal Conductivity
22	pH/ORP
23	Flow
24	Ozone
25	Dissolved Oxygen
26	Ozone

CODE	MEASUREMENT 2 (Optional)
30	Contacting Conductivity
31	Toroidal Conductivity
32	pH/ORP
33	Flow

CODE	OPTIONAL
68	UL Approval

Field Commisssioned Suites option offers the user the ability to commission the Solu Comp II to any valid measurement combination. This feature provides the benefit of a reduction in the number of spare instruments required to meet emergency inventory needs. Please refer to the Suites tables (on the following page) for valid measurement combinations. Suites include a complete set of instrument wiring labels.

MODEL 1055 SOLU COMP II ANALYZER	
CODE	POWER
01	115/230 Vac, 50/60 Hz
02	24 Vdc

CODE	MOUNTING
10	Panel mounting enclosure
11	Pipe/Surface mounting enclosure (Pipe mounting requires accessory kit PN 23820-00)

CODE	FIELD-COMMISSIONED SUITES (Optional) see tables below
S1	Suite 1 - Field Commissioned Measurement (basic)
S1A	Suite 1 - Field Commissioned Measurement (includes amperometric)
S2	Suite 2 - Field Commissioned Measurement (basic)
S2A	Suite 2 - Field Commissioned Measurement (includes amperometric)

CODE	OPTIONAL
DM	Dual Measurement

CODE	OPTIONAL
68	UL Approval

COMBINATION GUIDE

Measurement Choices

Measure 1 \ Measure 2	None	pH/ORP	Flow	Conductivity	
				Toroid	Contact
pH/ORP					
Contacting conductivity					
Flow					
Toroidal Conductivity					
Dissolved Oxygen					
Chlorine					
Ozone					

Available
Not available

Field Commissioned Measurement Choices Suite 1

	Measure 1 \ Measure 2	None	Dual Measurement (DM)		
			pH/ORP	Flow	Contacting Conductivity
Basic	pH/ORP				
Basic	Contacting conductivity				
Amperometric	Dissolved Oxygen *				
Amperometric	Chlorine				
Amperometric	Ozone				
	Toroidal Conductivity				

Available
Not available

Field Commissioned Measurement Choices Suite 2

	Measure 1 \ Measure 2	None	Dual Measurement (DM)			
			pH/ORP	Flow	Conductivity	
					Toroid	Contact
Basic	pH/ORP					
Basic	Flow					
Basic	Contacting conductivity					
Basic	Toroidal Conductivity					
Amperometric	Dissolved Oxygen *					
Amperometric	Chlorine					
Amperometric	Ozone					

Available
Not available

* For D.O. sensors with 22k thermistor, use Suite 1 only.

ACCESSORIES (Weights are rounded up to nearest whole lb or 0.5 kg)

PART NUMBER	DESCRIPTION	WEIGHT	SHIPPING WT.
23820-00	Pipe mounting kit, includes U-bolts, mounting bracket, nuts, washers, and screws (complete)	2 lb (1.0 kg)	4 lb (2.0 kg)
23554-00	Gland fittings, PG 13.5, 5 per package	1 lb (0.5 kg)	2 lb (1.0 kg)
9240048-00	Tag, stainless steel (specify marking)	1 lb (0.5 kg)	1 lb (0.5 kg)
	pH INPUT		
9210012	Buffer Solution, 4.01 pH, 16 oz.	1 lb (0.5 kg)	2 lb (1.0 kg)
9210013	Buffer Solution, 6.86 pH, 16 oz.	1 lb (0.5 kg)	2 lb (1.0 kg)
9210014	Buffer Solution, 9.18 pH, 16 oz.	1 lb (0.5 kg)	2 lb (1.0 kg)
	CONDUCTIVITY INPUT		
SS-1	Conductivity Standard, 1409 µS/cm at 25°C, 1 quart (945 mL)	2 lb (1.0 kg)	4 lb (2.0 kg)
SS-1A	Conductivity Standard, 1409 µS/cm at 25°C, 1 gallon (3785 mL)	9 lb (4.0 kg)	11 lb (5.0 kg)
SS-5	Conductivity Standard, 1000 µS/cm at 25°C, 1 quart (945 mL)	2 lb (1.0 kg)	4 lb (2.0 kg)
SS-5A	Conductivity Standard, 1000 µS/cm at 25°C, 1 gallon (3785 mL)	9 lb (4.0 kg)	11 lb (5.0 kg)
SS-6	Conductivity Standard, 200 µS/cm at 25°C, 1 quart (945 mL)	2 lb (1.0 kg)	4 lb (2.0 kg)
SS-6A	Conductivity Standard, 200 µS/cm at 25°C, 1 gallon (3785 mL)	9 lb (4.0 kg)	11 lb (5.0 kg)
SS-7	Conductivity Standard, 5000 µS/cm at 25°C, 1 quart (945 mL)	2 lb (1.0 kg)	4 lb (2.0 kg)
SS-7A	Conductivity Standard, 5000 µS/cm at 25°C, 1 gallon (3785 mL)	9 lb (4.0 kg)	11 lb (5.0 kg)

SECTION 2.0. INSTALLATION

2.1 UNPACKING AND INSPECTION
2.2 INSTALLATION

2.1 UNPACKING AND INSPECTION

Inspect the shipping container. If it is damaged, contact the shipper immediately for instructions. Save the box. If there is no apparent damage, unpack the container. Be sure all items shown on the packing list are present. If items are missing, notify Rosemount Analytical immediately.

2.2 INSTALLATION

2.2.1 General Information

1. Although the analyzer is suitable for outdoor use, do not install it in direct sunlight or in areas of extreme temperatures.
2. Install the analyzer in an area where vibrations and electromagnetic and radio frequency interference are minimized or absent.
3. Keep the analyzer and sensor wiring at least one foot from high voltage conductors. Be sure there is easy access to the analyzer.
4. **AC power and relay wiring should not enter via top conduit openings and should be kept separated from other wiring in the analyzer after installation.**
5. The analyzer is suitable for panel, pipe, or surface mounting. Refer to the table below.
6. See Section 3.1 for removal of conduit knockouts.

Type of Mounting	Section
Panel	2.2.2
Pipe	2.2.3
Surface	2.2.4

7. To reduce the likelihood of stress on wiring connections, the hinged front panel (-11 models) shall not be removed from the base during wiring installation, and there shall be sufficient wire leads to avoid stress on conductors.
8. For UL-approved models (-68), the clear wiring shield must be installed prior to operation.

2.2.2 Panel Mounting.

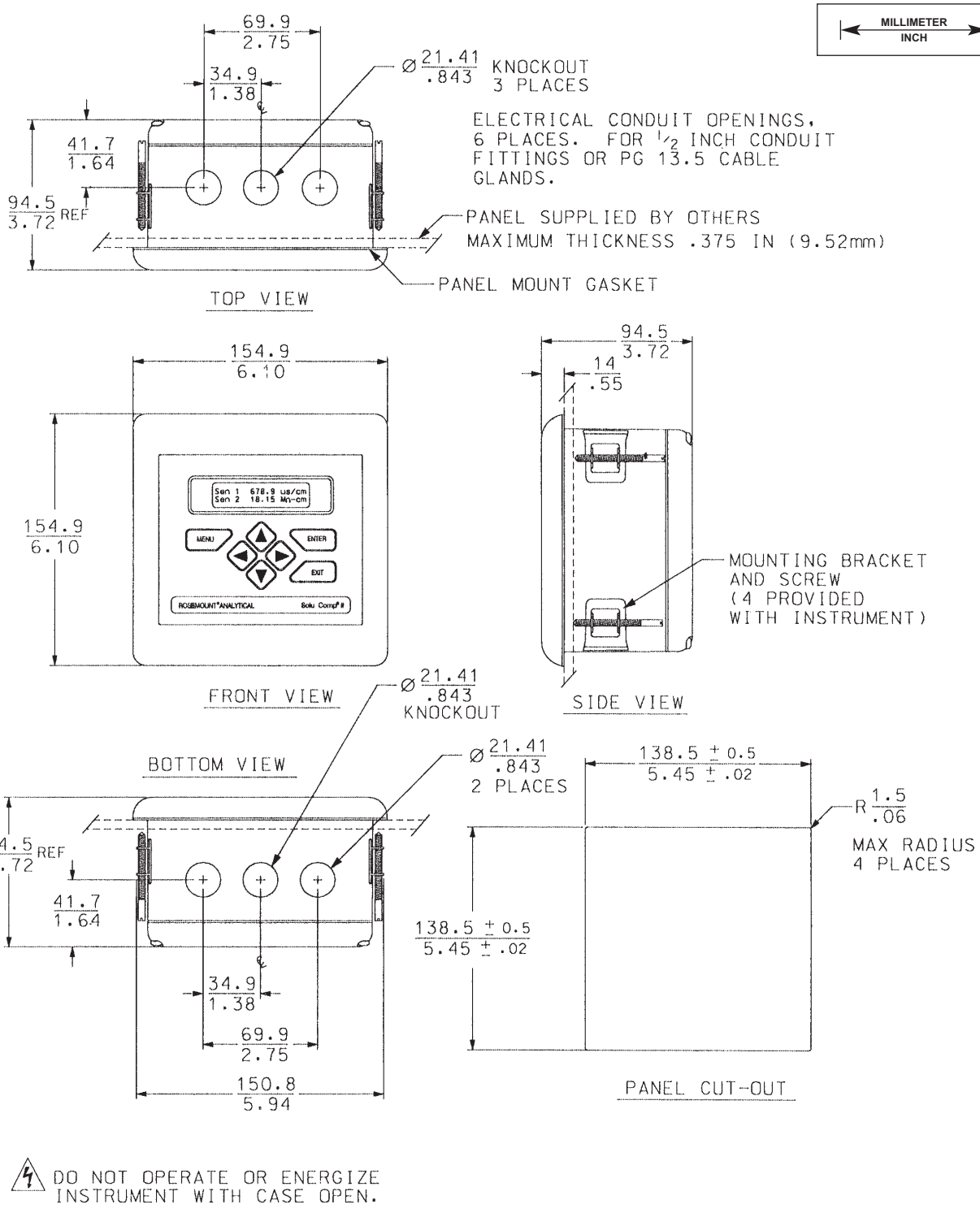


FIGURE 2-1. Panel Mount Installation

Access to the wiring terminals is through the rear cover. Four screws hold the cover in place.

2.2.3 Pipe Mounting.

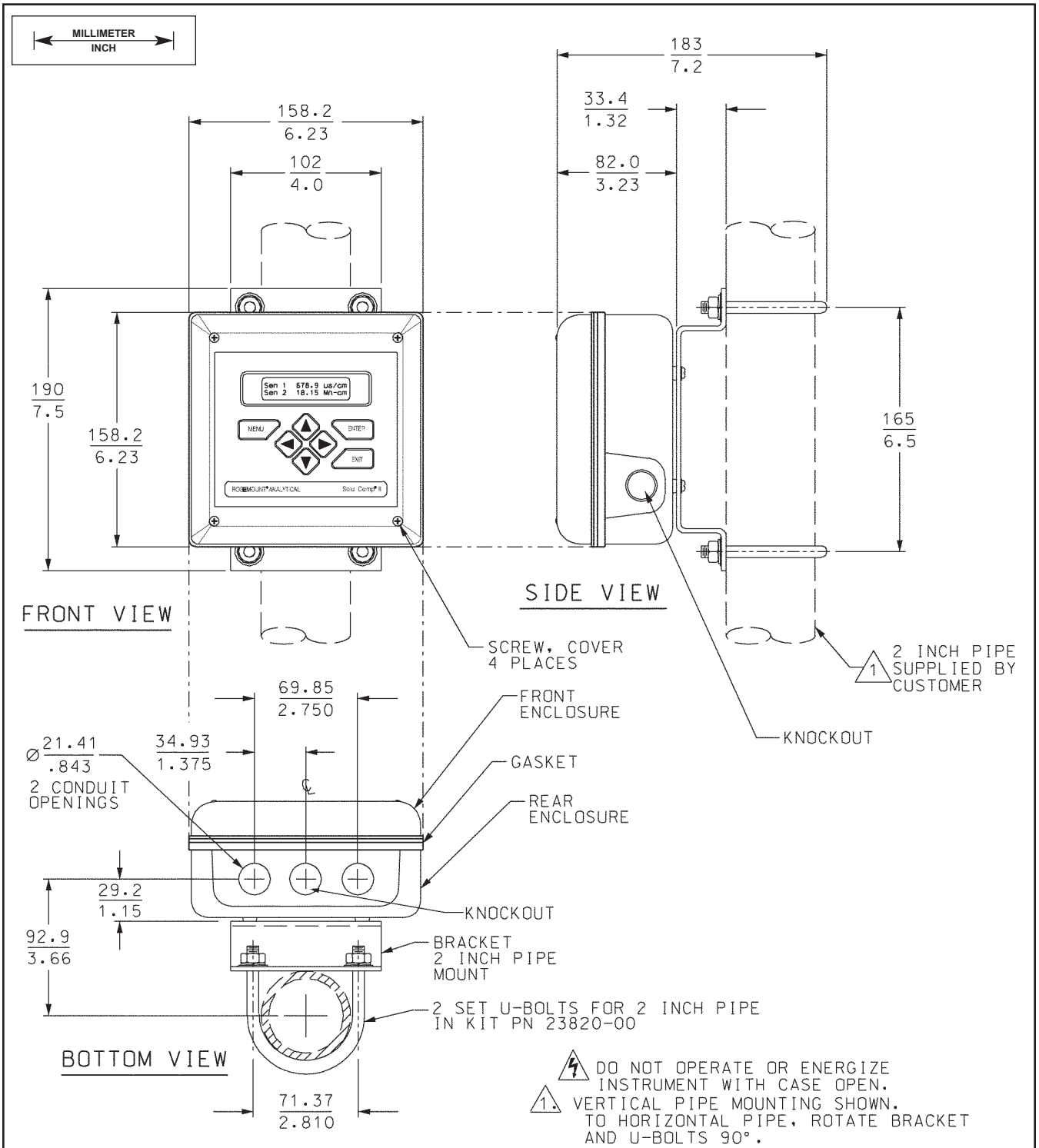


FIGURE 2-2. Pipe Mount Installation

The front panel is hinged at the bottom. The panel swings down for access to the wiring terminals.

2.2.4 Surface Mounting.

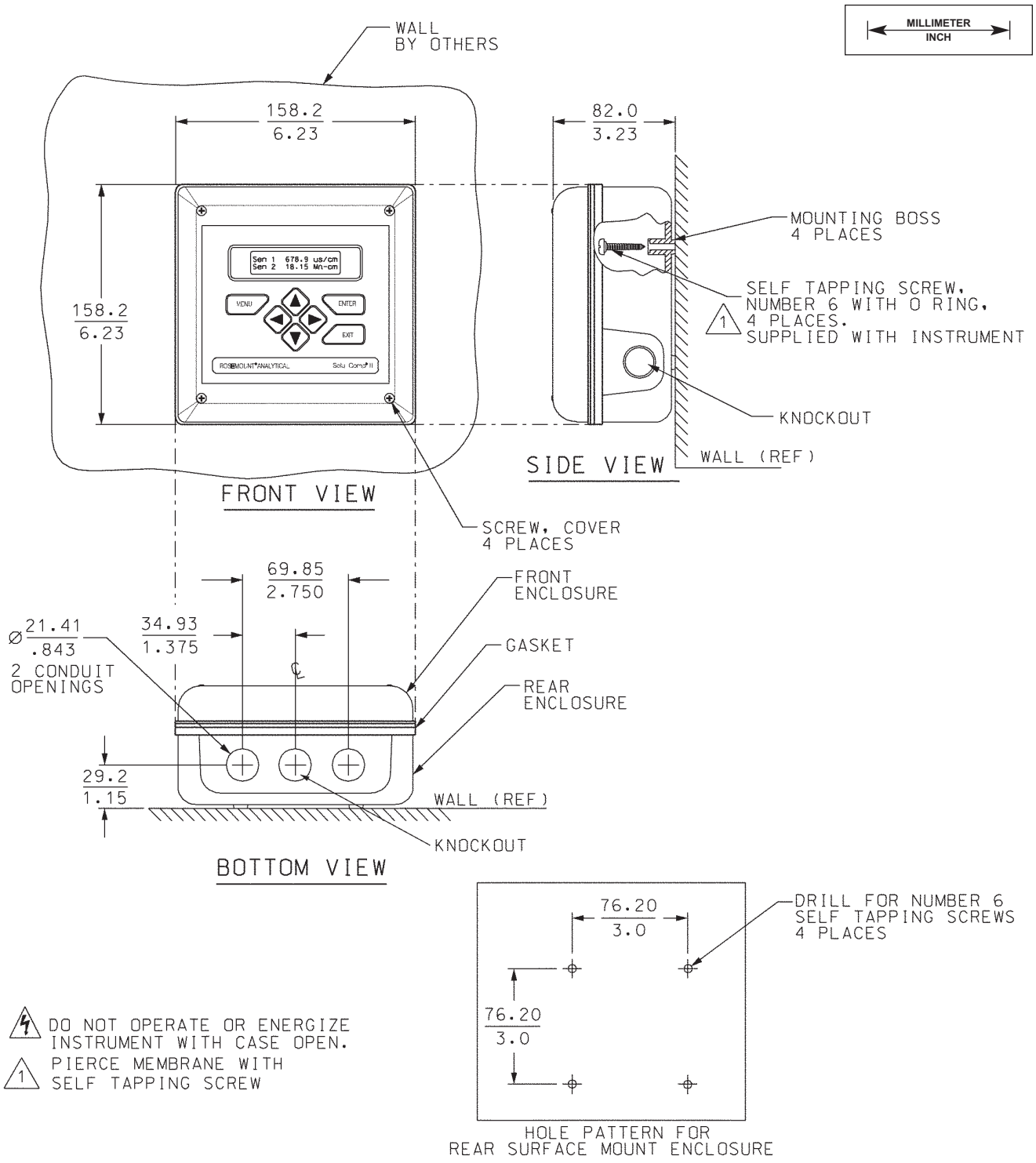


FIGURE 2-4. Surface Mount Installation

The front panel is hinged at the bottom. The panel swings down for access to the wiring terminals.

SECTION 3.0.
WIRING

3.1 PREPARING CONDUIT OPENINGS
3.2 POWER, ALARM, AND OUTPUT CONNECTIONS
3.3 SENSOR CONNECTIONS

3.1 PREPARING CONDUIT OPENINGS

The number of conduit openings and the location depend on the model.

Model	Description	Conduit openings
1055-10	panel mount	two open, three knockouts
1055-11	surface or pipe mount	three open, no knockouts

Conduit openings accept 1/2-inch conduit fittings or PG 13.5 cable glands. To keep the case watertight, block unused openings with NEMA 4X or IP65 conduit plugs.

NOTE

Use watertight fittings and hubs that comply with the requirements of UL514B. Connect the conduit hub to the conduit before attaching the fitting to the analyzer (UL508-26.16).

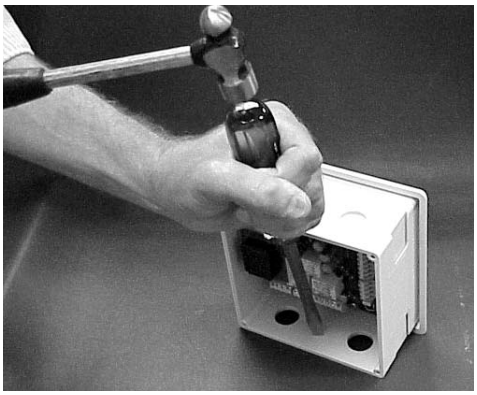


FIGURE 3-1. Removing the Knockouts

Figure 3-1 shows how to remove the knockouts. The knockout grooves are on the outside of the case. Place the screwdriver blade on the inside of the case and align it approximately along the groove. Rap the screwdriver sharply with a hammer until the groove cracks. Move the screwdriver to an uncracked portion of the groove and continue the process until the knockout falls out. Use a small knife blade to remove the flash from the inside of the hole.

3.2 POWER, ALARM, AND OUTPUT CONNECTIONS

3.2.1 General.

The Solu Comp II is available in two mounting configurations. The positions of the power, alarm, output, and sensor terminals are different in each. Refer to the table below to find the correct drawing.

MODEL	MOUNTING	POWER	FIGURE
1055-01-10	Panel	115/230 Vac	3-2
1055-02-10		24 Vdc	3-3
1055-01-11	Surface/Pipe	115/230 Vac	3-4
1055-02-11		24 Vdc	3-5

For best EMI/RFI protection use shielded output signal cable enclosed in an earth-grounded metal conduit. Connect the shield to earth ground at terminal 4 on TB1.

AC wiring should be 14 gauge or greater. Provide a switch or breaker to disconnect the analyzer from the main power supply. Install the switch or breaker near the analyzer and label it as the disconnecting device for the analyzer.

Keep sensor and output signal wiring separated from power wiring. Do not run sensor and power wiring in the same conduit or close together in a cable tray.

WARNING:
RISK OF ELECTRICAL SHOCK

AC connections and grounding must be in compliance with UL 508 or local electrical code. DO NOT apply power to the analyzer until all electrical connections are verified and secure.

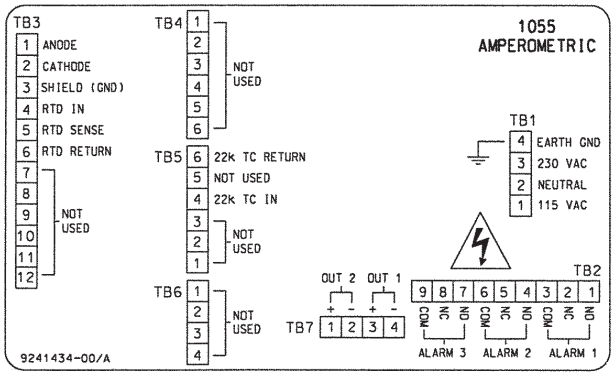


FIGURE 3-2. Wiring Connections for Solu Comp II Model 1055-01-10 (Panel Mount with 115/230 Vac Power)

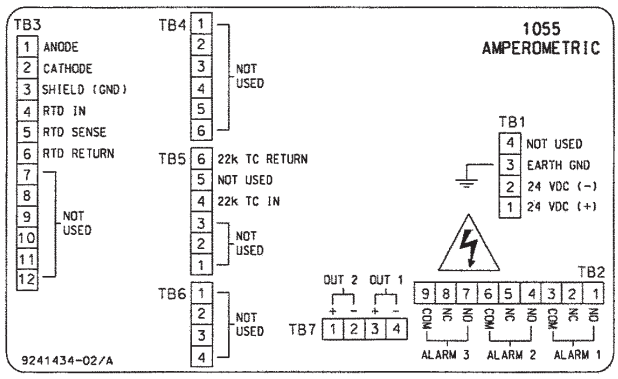


FIGURE 3-3. Wiring Connections for Solu Comp II Model 1055-02-10 (Panel Mount with 24 Vdc Power)

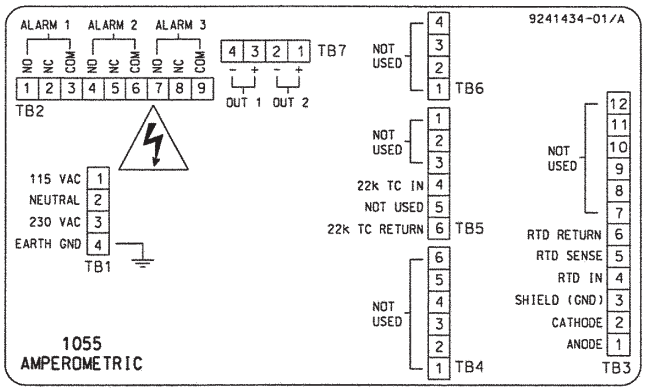


FIGURE 3-4. Wiring Connections for Solu Comp II Model 1055-01-11 (Surface/Pipe Mounting with 115/230 Vac Power)

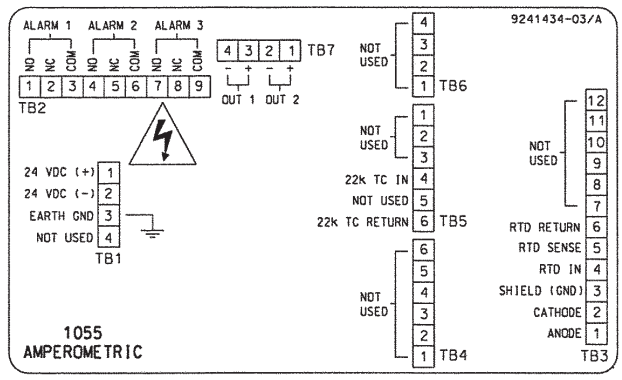


FIGURE 3-5. Wiring Connections for Solu Comp II Model 1055-02-11 (Surface/Pipe Mounting with 24 Vdc Power)

3.3 SENSOR CONNECTIONS

Refer to the table to select the correct wiring diagram.

1055 configuration	Sensor cable	Figure
Panel mounting	Standard	3-6
	EMI/RFI; Variopol	3-7
Wall/pipe mounting	Standard	3-8
	EMI/RFI; Variopol	3-9

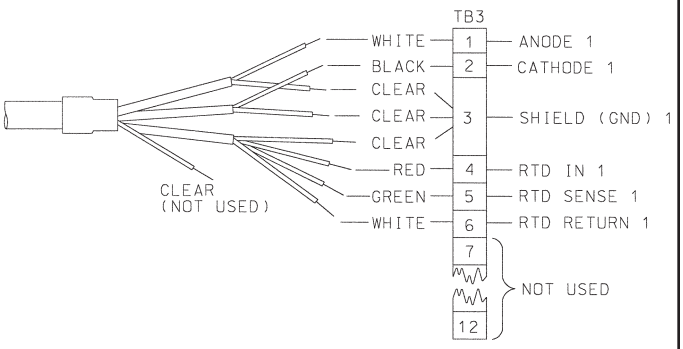


FIGURE 3-6. Wiring Sensor with Standard Cable to Model 1055 Analyzer (panel mount)

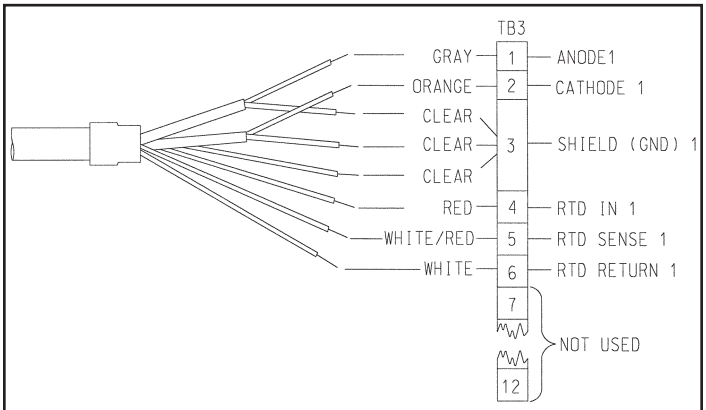


FIGURE 3-7. Wiring Sensor with Optimum EMI/RFI or Variopol Cable to Model 1055 Analyzer (panel mount)

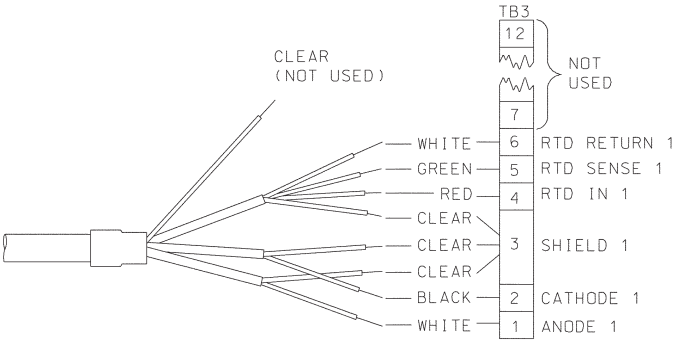


FIGURE 3-8. Wiring Sensor with Standard Cable to Model 1055 Analyzer (pipe/wall mount)

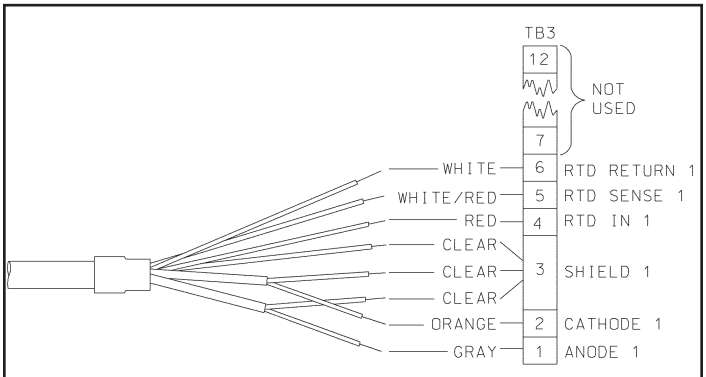


FIGURE 3-9. Wiring Sensor with Optimum EMI/RFI or Variopol Cable to Model 1055 Analyzer (pipe/wall mount)

SECTION 4.0
DISPLAY AND OPERATION

4.1 DISPLAY
4.2 KEYPAD
4.3 PROGRAMMING AND CALIBRATING THE SOLU COMP II - TUTORIAL
4.4 SECURITY
4.5 USING HOLD

4.1. DISPLAY

The Solu Comp II has a two-line display. The display can be customized to meet user requirements (see Section 5.10). Figure 4-1 shows the default screen.

The Solu Comp II has information screens that supplement the data in the main display. Press ▲ or ▼ to view the information screens. **The last information screen is the software version.**

During calibration and programming, key presses cause different displays to appear. The displays are self-explanatory and guide the user step-by-step through the procedure.

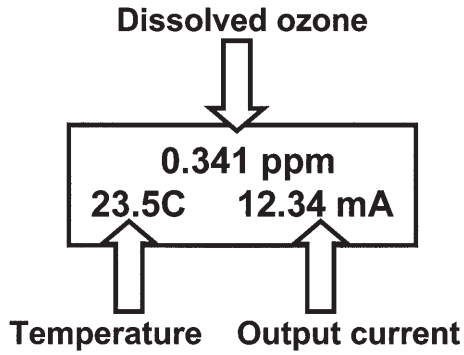


FIGURE 4-1. Default Display During Normal Operation

4.2 KEYPAD

Figure 4-2 shows the Solu Comp II keypad.

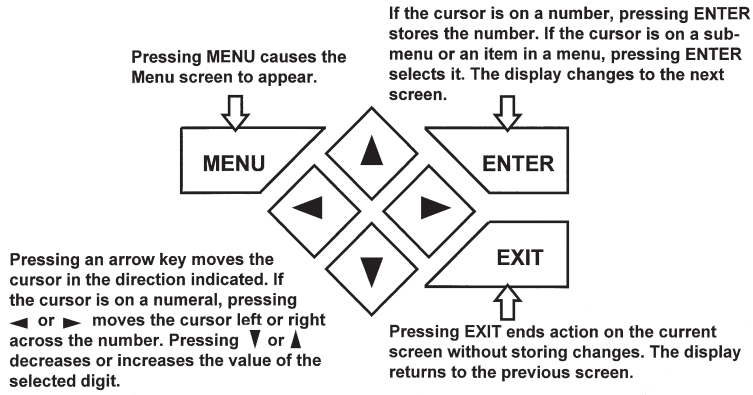


FIGURE 4-2. Solu Comp II Keypad

Four arrow keys move the cursor around the screen. A blinking word or numeral show the position of the cursor. The arrow keys are also used to change the value of a numeral. Pressing ENTER stores numbers and settings and moves the display to the next screen. Pressing EXIT returns to the previous screen without storing changes. Pressing MENU always causes the main menu screen to appear. Pressing MENU followed by EXIT causes the main display to appear.

4.3 PROGRAMMING AND CALIBRATING THE SOLU COMP II - TUTORIAL

Setting up and calibrating the Solu Comp II is easy. The following tutorial describes how to move around in the programming menus. For practice, the tutorial also describes how to assign chlorine values to the 4 and 20 mA outputs for sensor 1.



1. If the MENU screen (shown at the left) is not already showing, press MENU. **Calibrate** is blinking, which means the cursor is on **Calibrate**.



2. To assign chlorine or pH values to current outputs, the **Program** sub-menu must be open. Press ▼. The cursor moves to **Program** (**Program** blinking). Press ENTER. Pressing ENTER opens the **Program** sub-menu.

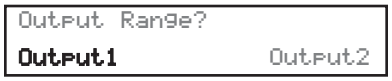


3. The **Program** sub-menu permits the user to set outputs, alarms, automatic or manual temperature compensation, and a security code. When the sub-menu opens, **Outputs** is blinking, which means the cursor is on Outputs. Press ▼ or ▶ (or any arrow key) to move the cursor around the display. Move the cursor to **>>** and press ENTER to cause a second screen with more program items to appear. There are three screens in the **Program** menu. Pressing **>>** and ENTER in the third screen causes the display to return to the first screen (**Outputs**, **Alarms**, **Measurement**).

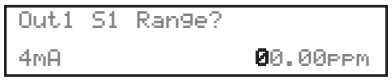
4. For practice, assign values to the 4 and 20 mA outputs for sensor 1. Move the cursor to **Outputs** and press ENTER.



5. The screen shown at left appears. The cursor is on **Output Range** (blinking). Output range is used to assign values to the low and high current outputs. Press ENTER.



6. The screen shown at left appears. The Solu Comp II has two outputs, output 1 and output 2. Move the cursor to the desired output and press ENTER. For purposes of the example, choose **Output 1**.

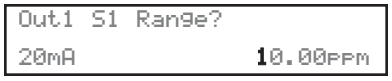


7. The screen shown at left appears. **Out1 S1** in the top line means output 1 (**Out1**) is assigned to sensor 1 (**S1**). Either output can be assigned to either sensor (sensor and output assignments are made under the **Output Configure** menu shown in step 5). Use the **Out1 S1 Range?** screen to assign a chlorine concentration to the **4 mA** output.

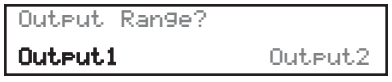
   a. Use the arrow keys to change the concentration to the desired value. Press ◀ or ▶ to move the cursor from digit to digit. Press ▲ or ▼ to increase or decrease the value of the digit. Holding ▲ or ▼ down causes the numeral to continuously scroll up or down.

   b. To move the decimal point, press ◀ or ▶ until the cursor is on the decimal point. Press ▲ to move the decimal point to the right. Press ▼ to move the decimal point to the left.

   c. Press ENTER to store the setting.



8. The screen shown at left appears. Use this screen to assign a full scale chlorine concentration to the **20 mA** output. Use the arrow keys to change the chlorine to the desired value. Press ENTER to store the setting.



9. The screen shown at left appears. To assign values to the low and high currents for output 2, select **Output 2** and follow the prompts.

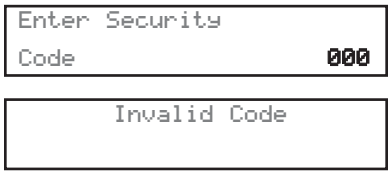
10. To return to the main menu, press MENU. To return to the main display press MENU then EXIT, or press EXIT repeatedly until the main display appears. To return to the previous display press EXIT.

NOTE
To store values or settings, press ENTER before pressing EXIT.

4.4 SECURITY

4.4.1 How the Security Code Works

Use the security code to prevent accidental or unwanted changes to program settings, displays, and calibration.



1. If a security code has been programmed, pressing MENU causes the security screen to appear.
2. Enter the three-digit security code.
3. If the entry is correct, the main menu screen appears. If the entry is incorrect, the **Invalid Code** screen appears. The **Enter Security Code** screen reappears after 2 seconds.

4.4.2 Bypassing the Security Code

Enter 555. The main menu will open.

4.4.3 Setting a Security Code

See Section 5.6.

4.5 USING HOLD

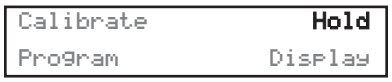
4.5.1 Purpose

The analyzer output is always proportional to the measured ozone. To prevent unwanted alarms and improper operation of control systems or dosing pumps, place the analyzer in hold before removing the sensor for calibration and maintenance. Be sure to remove the analyzer from hold once calibration is complete. During hold, both outputs remain at the last value. **Once in hold, the analyzer remains there indefinitely.** While in hold, the screen shown to the left appears periodically.

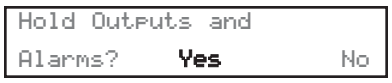


4.5.2 Using the Hold Function

To choose a menu item, move the cursor to the item and press ENTER.
To store a number or setting, press ENTER.



1. Press MENU. The main menu screen appears. Choose **Hold**.



2. The **Hold Outputs and Alarms ?** screen appears. Choose **Yes** to place the analyzer in hold. Choose **No** to take the analyzer out of hold.
3. The main display screen will appear.

SECTION 5.0
PROGRAMMING THE ANALYZER

5.1 GENERAL
5.2 CHANGING STARTUP SETTINGS
5.3 CONFIGURING AND RANGING THE OUTPUTS
5.4 CONFIGURING ALARMS AND ASSIGNING SETPOINTS
5.5 SETTING THE INPUT FILTER
5.6 CHOOSING TEMPERATURE UNITS AND MANUAL OR AUTOMATIC TEMPERATURE COMPENSATION
5.7 SETTING A SECURITY CODE
5.8 NOISE REJECTION
5.9 RESETTING FACTORY CALIBRATION AND FACTORY DEFAULT SETTINGS
5.10 SELECTING A DEFAULT SCREEN, LANGUAGE, AND SCREEN CONTRAST

5.1 GENERAL

This section describes how to do the following:

1. configure and assign values to the current outputs
2. configure and assign setpoints to the alarm relays
3. set the sensor current input filter
4. choose temperature units and manual or automatic temperature mode
5. set a security code
6. tell the analyzer the frequency of the ac power (needed for optimum noise rejection)
7. reset the analyzer to factory calibration and default settings
8. select a default display screen

Default settings are shown in Table 5-1 on the following page. To change a default setting, refer to the section listed in the table. To restore default settings, see Section 5.9.

5.2 CHANGING STARTUP SETTINGS

When the Solu Comp II is powered up for the first time, startup screens appear that enable the user to make some basic settings. If incorrect settings were made at start-up, they can be changed now.

TABLE 5-1. DEFAULT SETTINGS

1. OTHER OUTPUT SETTINGS

Output	Assignment	Range	Current	Dampening	Mode	Section
1	ozone	0 - 10 ppm	4 - 20 mA	off	linear	5.3 and 5.9
2	temperature	0 - 100°C	4 - 20 mA	off	linear	5.3 and 5.9

2. ALARM CONFIGURATION AND SETPOINTS

	Alarm			If AL3 is a	
	1	2	3	sensor alarm	Section
Assigned to	Ozone	Ozone	Fault	Temperature	5.4
High or low	High	Low	NA	Low	5.4
Deadband	0.00	0.00	NA	0.00	5.4
Setpoint	10 ppm	0 ppm	NA	0.00°C	5.4

3. MISCELLANEOUS SETTINGS

Setting	Default	Section
Temperature unites	°C	5.6
Automatic temperature correction	On	5.6
Sensor input filter	5 sec	5.5
Language	English	5.10
Hold	Off	4.5
Security code	000	5.7
AC power frequency	60 Hz	5.8

5.3 CONFIGURING AND RANGING THE OUTPUTS.

5.3.1 Purpose

The Solu Comp II has two current outputs. This section describes how to configure and range the outputs. **CONFIGURE THE OUTPUTS FIRST.**

1. Configuring an output means
   a. Selecting either a 4-20 mA or 0-20 mA output,
   b. Assigning either the ozone reading (measurement) or temperature to output 1 or output 2,
   c. Turning on or turning off output current dampening,
   d. Choosing a linear or logarithmic output.
2. Ranging the outputs means assigning values to the low (0 or 4 mA) and high (20 mA) outputs.

5.3.2 Definitions

1. CURRENT OUTPUTS. The analyzer provides either a continuous 4-20 mA or 0-20 mA output current directly proportional to the ozone concentration or temperature.
2. ASSIGNING OUTPUTS. The Solu Comp II has two analog outputs. The ozone reading or temperature can be assigned to either output.
3. DAMPEN. Output dampening smooths out noisy readings. It also increases the response time of the output. With output dampening the time to reach 63% of final reading following a step change is 5 sec. Output dampening does not affect the response time of the display.
4. MODE. The current output can be made directly proportional to the displayed value (linear mode) or directly proportional to the common logarithm of the displayed value (log mode).

5.3.3. Procedure: Configure Outputs.

To choose a menu item, move the cursor to the item and press ENTER.
To store a number or setting, press ENTER.



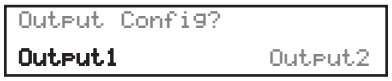
1. Press MENU. The main menu screen appears. Choose **Program**.



2. Choose **Outputs**.



3. Choose **Output Configure**.



4. Choose **Output1** or **Output2**.



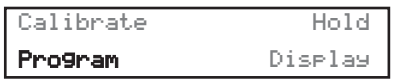
5. Choose **Measurement** or **Temp**. **Measurement** means ozone.

6. Make the appropriate settings:
   a. Choose **4-20 mA** or **0-20 mA**.
   b. Choose **Yes** or **No** for output dampening.
   c. Choose **Linear** or **Log** output.

7. The display returns to the **Output Config?** screen. Select the other output or press EXIT to return to the previous screen. To return to the main display, press MENU followed by EXIT.

5.3.4. Procedure: Assigning Values to the Low and High Current Outputs (Output Ranging)

To choose a menu item, move the cursor to the item and press ENTER.
To store a number or setting, press ENTER.



1. Press MENU. The main menu screen appears. Choose **Program**.



2. Choose **Outputs**.



3. Choose **Output Range**. Choose **Output1** or **Output2**.
4. Make the appropriate settings.
   a. Assign a value to the low current (**0 mA** or **4 mA**) output.
   b. Assign a value to the high current (**20 mA**) output.
5. The display returns to the **Output Range** screen. Select the other output or press EXIT to return to the previous screen. To return to the main display, press MENU followed by EXIT.

5.4 CONFIGURING ALARMS AND ASSIGNING SETPOINTS

5.4.1 Purpose

This section describes how to do the following:

1. assign an alarm relay to the ozone reading or temperature or use it to signal a fault condition,
2. set the alarm logic to high or low,
3. assign values to the alarm setpoints,
4. set the alarm deadbands.

ALARM RELAYS MUST BE CONFIGURED BEFORE ASSIGNING SETPOINTS.

5.4.2 Definitions

1. ASSIGNING ALARMS. There are three alarms (**AL1**, **AL2**, and **AL3**). Alarms 1 and 2 are for the sensor. They can be made to activate on either the ozone reading or the temperature. Alarm 3 can be assigned to the sensor or it can be used as a fault alarm. The fault alarm activates when a fault exists in the sensor or analyzer.
2. FAULT ALARM. A fault condition exists when the Solu Comp II detects a problem with a sensor or with the analyzer that is likely to cause seriously erroneous readings. If Alarm 3 was programmed as a fault alarm, the alarm 3 relay will activate. The word **Fault** will appear alternately in the display with the reading.
3. ALARM LOGIC, SETPOINTS, AND DEADBANDS. See Figures 5-1 and 5-2.

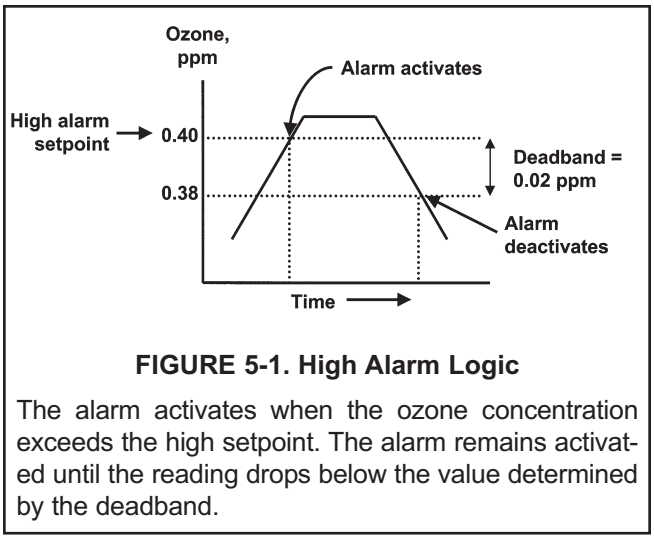


FIGURE 5-1. High Alarm Logic

The alarm activates when the ozone concentration exceeds the high setpoint. The alarm remains activated until the reading drops below the value determined by the deadband.

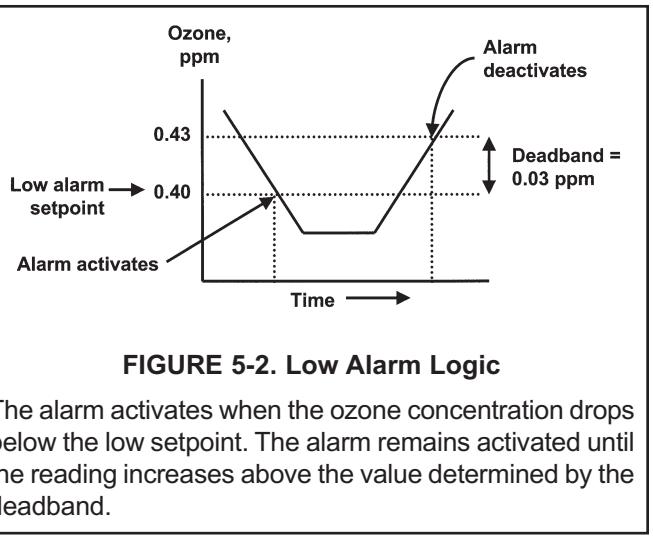


FIGURE 5-2. Low Alarm Logic

The alarm activates when the ozone concentration drops below the low setpoint. The alarm remains activated until the reading increases above the value determined by the deadband.

Alarm relays are single pole-double throw (SPDT). When an alarm is activated, the coil is energized.

When an alarm activates, **AL1**, **AL2**, or **AL3** (as appropriate) appears periodically in the display.

5.4.3 Procedure: Configuring Alarms

To choose a menu item, move the cursor to the item and press ENTER.
To store a number or setting, press ENTER.



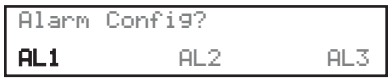
1. Press MENU. The main menu screen appears. Choose **Program**.



2. Choose **Alarms**.



3. Choose **Alarm Configure**.



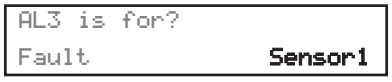
4. Choose Alarm 1 (**AL1**), Alarm 2 (**AL2**), or Alarm 3 (**AL3**).

5. For **AL1** or **AL2**
   a. Choose **Measurement** or **Temp**.
   b. Choose **High** or **Low**.
   c. Set the alarm **Deadband**.



6. The display returns to the **Alarm Configure?** screen. Select another alarm or press EXIT to return to the previous screen. To return to the main display, press MENU followed by EXIT.

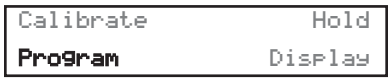
7. For **AL3**
   a. Choose **Sensor1** (ozone) or **Fault**.
   b. For sensor 1, choose **Measurement** or **Temp**.
   c. Choose **High** or **Low**. Set the deadband.
   d. Choosing **Fault** means **AL3** will activate when a sensor or analyzer fault exists. There is no user setting to make.



8. The display returns to the **Alarm Configure?** screen. Select another alarm or press EXIT to return to the previous screen. To return to the main display, press MENU followed by EXIT.

5.4.4 Procedure: Programming Alarm Setpoints

To choose a menu item, move the cursor to the item and press ENTER.
To store a number or setting, press ENTER.



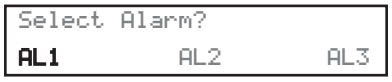
1. Press MENU. The main menu screen appears. Choose **Program**.



2. Choose **Alarms**.



3. Choose **Alarm Setpoints**.



4. Choose Alarm 1 **(AL1**), Alarm 2 (**AL2**), or Alarm 3 (**AL3**).



5. The display shows the alarm selected (**AL1**) and the configuration. The alarm is for Sensor 1 (**S1**), and the logic is high. Use the arrow keys to change the alarm setpoint.

6. The display returns to the **Select Alarm?** screen. Select another alarm or press EXIT to return to the previous screen. To return to the main display, press MENU followed by EXIT.

5.5 SELECTING THE AMOUNT OF FILTERING

5.5.1 Purpose

This section describes how to change the amount of electronic filtering of the sensor current.

5.5.2 Definitions

INPUT FILTER. Before converting the sensor current to a ozone reading, the Solu Comp II applies an input filter. The filter reduces noisy readings, but increases the response time. The level of filtering is selected by choosing the amount of time required for the display to reach 63% of a step change.

5.5.4 Procedure.

To choose a menu item, move the cursor to the item and press ENTER.
To store a number or setting, press ENTER.



1. Press MENU. The main menu screen appears. Choose **Program**.



2. Choose **Measurement**.



3. Choose the amount of filtering desired.

5.6 CHOOSING TEMPERATURE UNITS AND MANUAL OR AUTOMATIC TEMPERATURE COMPENSATION

5.6.1 Purpose

This section describes how to do the following:

1. Choose temperature display units (°C or °F).
2. Choose automatic or manual temperature compensation for membrane permeability.
3. Enter a temperature for manual temperature compensation.

5.6.3 Definitions

1. AUTOMATIC TEMPERATURE COMPENSATION

   The ozone sensor is a membrane-covered amperometric sensor. The permeability of the membrane is a function of temperature. As temperature increases, membrane permeability increases. Thus, an increase in temperature will cause the sensor current and the analyzer reading to increase even though the ozone level remained constant. A correction equation in the analyzer software automatically corrects for changes in membrane permeability caused by temperature. In automatic temperature compensation, the analyzer uses the temperature measured by the sensor for the correction.

2. MANUAL TEMPERATURE COMPENSATION. In manual temperature compensation, the analyzer uses the temperature entered by the user for membrane permeability. It does not use the actual process temperature. Do NOT use manual temperature compensation unless the measurement and calibration temperatures differ by no more than about 2°C. Manual temperature compensation is useful if the sensor temperature element has failed an a replacement sensor is not available.

5.6.3 Procedure.

To choose a menu item, move the cursor to the item and press ENTER.
To store a number or setting, press ENTER.



1. Press MENU. The main menu screen appears. Choose **Program**.



2. Choose **>>**.



3. Choose **Temp.**



4. Choose **°C/F** to change temperature units. Choose **Live/Manual** to turn on (Live) or turn off (Manual) automatic temperature compensation.
   a. If **°C/F** is chosen, select **°C** or **°F** in the next screen.
   b. If **Live/Manual** is chosen, select **Live** or **Manual** in the next screen.
   c. If **Manual** is chosen, enter the temperature in the next screen. The temperature entered in this step will be used in all subsequent measurements, no matter what the process temperature is.

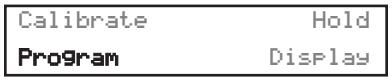
5.7 SETTING A SECURITY CODE

5.7.1 Purpose.

This section describes how to set a security code. The security code prevents program and calibration settings from accidentally being changed. Refer to Section 4.4 for additional information.

5.7.2 Procedure.

To choose a menu item, move the cursor to the item and press ENTER.
To store a number or setting, press ENTER.



1. Press MENU. The main menu screen appears. Choose **Program**.



2. Choose **>>**, then **Security**.



3. Enter a three digit security code. The security code takes effect two minutes after the last key stroke.

4. The display returns to the security menu screen. Press EXIT to return to the previous screen. To return to the main display, press MENU followed by EXIT.

5.8 NOISE REJECTION

5.8.1 Purpose.

For maximum noise rejection, the frequency of the ac power must be entered in the analyzer.

5.8.2. Procedure.

To choose a menu item, move the cursor to the item and press ENTER.
To store a number or setting, press ENTER.



1. Press MENU. The main menu screen appears. Choose **Program**.



2. Choose **>>**.



3. Choose **>>**.



4. Choose **Noise Rejection**.

5. Enter the mains frequency, 50 Hz or 60 Hz.

6. The display returns to the **Noise Rejection** screen. To return to the main menu, press EXIT. To return to the main display, press MENU followed by EXIT.

5.9 RESETTING FACTORY CALIBRATION AND FACTORY DEFAULT SETTINGS

5.9.1 Purpose.

This section describes how to re-install factory calibration and default values. The process also clears all fault messages and returns the display to the first quick start screen.

5.9.2. Procedure.

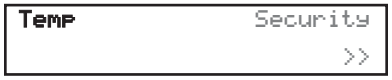
To choose a menu item, move the cursor to the item and press ENTER.
To store a number or setting, press ENTER.



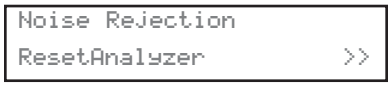
1. Press MENU. The main menu screen appears. Choose **Program**.



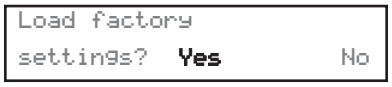
2. Choose **>>**.



3. Choose **>>**.



4. Choose **ResetAnalyzer**.



5. Choose **Yes** or No. If **Yes** is selected, previous settings are cleared and the **Quick Start Menu** appears.

5.10 SELECTING A DEFAULT SCREEN, LANGUAGE, AND SCREEN CONTRAST

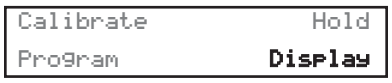
5.10.1 Purpose

This section describes how to do the following:

1. set a default display screen (The default display screen is the screen shown during normal operation.)
2. select a language
3. change the screen contrast

To choose a menu item, move the cursor to the item and press ENTER.
To store a number or setting, press ENTER.

5.10.2 Procedure: Selecting a Display Screen

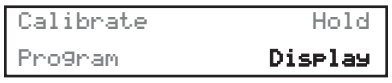


1. Press MENU. The main menu screen appears. Choose **Display**.



2. Choose **Default Display**.
3. Press ▲ or ▼ until the desired display appears. Press ENTER.
4. The display returns to the screen in step 2. To return to the main menu, press MENU. To return to the main display, press MENU followed by EXIT.

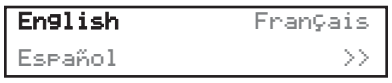
5.10.3 Procedure: Choosing a Language



1. Press MENU. The main menu screen appears. Choose **Display**.

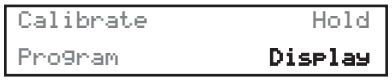


2. Choose **Language**.



3. Choose English, Français, Español, Deutsch, Italiano, or Portugues.
4. The display returns to the screen in step 2. To return to the main menu, press MENU. To return to the main display, press MENU followed by EXIT.

5.10.2 Procedure: Changing Screen Contrast



1. Press MENU. The main menu screen appears. Choose **Display**.



2. Choose **Contrst**.



3. Press ▲ or ▼ to increase or decrease the screen contrast. As contrast increases, the number increases.
4. The display returns to the screen shown in step 2. To return to the main menu, press MENU. To return to the main display, press MENU followed by EXIT.

SECTION 6.0
CALIBRATION

6.1 INTRODUCTION
6.2 CALIBRATING TEMPERATURE
6.3 CALIBRATING OZONE

6.1 INTRODUCTION

The Calibrate Menu allows the user to calibrate the ozone sensor. Both the ppm reading and the temperature can be calibrated.

Ozone sensors require periodic full-scale calibration. The purpose of the full-scale standard is to establish the slope of the calibration curve. Because stable ozone standards do not exist, **the sensor must be calibrated against a test run a grab sample of the process liquid.** Several manufacturers offer portable test kits for this purpose.

New ozone sensors must be zeroed before being placed in service. Sensors should also be zeroed every time the electrolyte solution is replaced. Zeroing involves placing the sensor in an ozone-free sample until the sensor current drops to its lowest stable value.

6.2 CALIBRATING TEMPERATURE

6.2.1 Purpose

The ozone sensor is a membrane-covered amperometric sensor. As the sensor operates, ozone diffuses through the membrane and is consumed at an electrode immediately behind the membrane. The reaction produces a current that depends on the rate at which ozone diffuses through the membrane. The diffusion rate, in turn, depends on the concentration of ozone and how easily it passes through the membrane (the membrane permeability). Because membrane permeability is a function of temperature, the sensor current will change if either the concentration or temperature changes. To account for changes in sensor current caused by temperature alone, the analyzer automatically applies a membrane permeability correction. The membrane permeability changes about 3%/°C at 25°C, so a 1°C error in temperature produces about a 3% error in the reading.

Without calibration the accuracy of the temperature measurement is about ±0.4°C. Calibrate the sensor/analyzer unit if

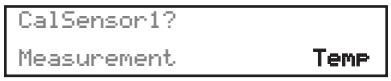
1. ±0.4°C accuracy is not acceptable
2. the temperature measurement is suspected of being in error. Calibrate temperature by making the analyzer reading match the temperature measured with a **standard thermometer**.

6.2.2 Procedure

1. Remove the sensor from the process. Place it in an insulated container of water along with a **calibrated thermometer**. Submerge at least the bottom two inches of the sensor. Stir continuously.
2. Allow the sensor to reach thermal equilibrium. The time constant for a change in temperature is 5 min., so it may take as long as 30 min. for temperature equilibration.
3. If the sensor cannot be removed from the process, measure the temperature of a flowing sample taken from a point as close to the sensor as possible. Let the sample continuously overflow an insulated container holding a **calibrated thermometer**.
4. Change the Solu Comp II display to match the **calibrated thermometer** using the procedure below.



a. Press MENU. The main menu screen appears. Choose **Calibrate**.



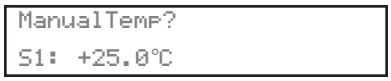
b. Choose **Temp**.



c. If the analyzer was programmed in Section 5.6 to use the actual process temperature, the screen at left will appear. To calibrate the temperature, change the number in the second line to match the temperature measured with the **standard thermometer**. Press ENTER. Go to step e.

   If the calibration temperature is more than 2 or 3°C different from the live reading, see Section 8.4.1.

   If the analyzer was programmed to use a temperature entered by the user, go to step d.



d. The screen at left will appear. Change the temperature to the desired value, then press ENTER. The analyzer will use the temperature entered in this step in all measurements and calculations, no matter what the true temperature is.

e. To return to the main display, press MENU followed by EXIT.

6.3 CALIBRATION — OZONE

As Figure 6-1 shows, an ozone sensor generates a current directly proportional to the concentration of ozone in the sample. Calibrating the sensor requires exposing it to a solution containing no ozone (zero standard) and to a solution containing a known amount of ozone (full-scale standard).

The zero standard is necessary because ozone sensors, even when no ozone is in the sample, generate a small current called the residual current. The analyzer compensates for the residual current by subtracting it from the measured current before converting the result to an ozone value. New sensors require zeroing before being placed in service, and sensors should be zeroed whenever the electrolyte solution is replaced. Either of the following makes a good zero standard:

- Deionized water.
- Tap water known to contain no ozone. Expose tap water to ozone-free air for several hours.

The purpose of the full-scale standard is to establish the slope of the calibration curve. Because stable ozone standards do not exist, **the sensor must be calibrated against a test run on a grab sample of the process liquid.** Several manufacturers offer portable test kits for this purpose. Observe the following precautions when taking and testing the grab sample.

- Take the grab sample from a point as close to the sensor as possible. Be sure that taking the sample does not alter the flow of the sample to the sensor. It is best to install the sample tap just downstream from the sensor.
- Ozone solutions are unstable. Run the test immediately after taking the sample. Try to calibrate the sensor when the ozone concentration is at the upper end of the normal operating range.

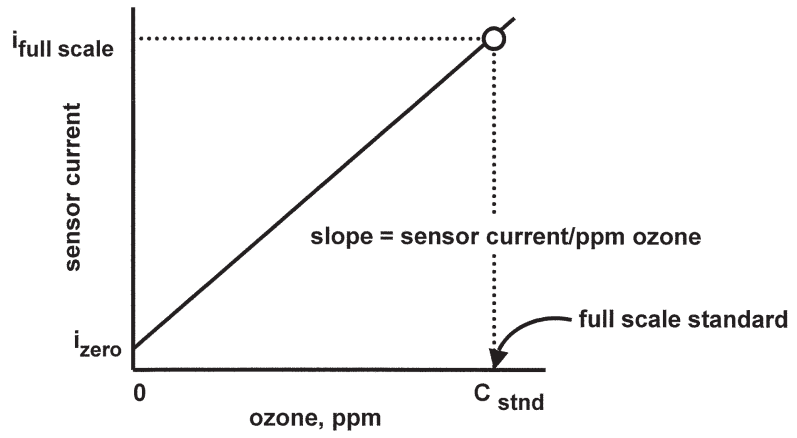


FIGURE 6-1. Sensor Current as a Function of Ozone Concentration

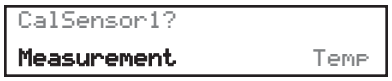
6.3.2 Procedure — Zeroing the sensor.

1. Place the sensor in the zero standard. Be sure no air bubbles are trapped against the membrane. The sensor current will drop rapidly at first and then gradually reach a stable zero value. To monitor the sensor current, go to the main display and press ▼ until the sensor input current is showing. Typical zero current for an ozone sensor is -10 to +10 nA.

   A new sensor or a sensor in which the electrolyte solution has been replaced may require several hours (occasionally as long as overnight) to reach a minimum zero current. DO NOT START THE ZERO ROUTINE UNTIL THE SENSOR HAS BEEN IN ZERO SOLUTION FOR AT LEAST TWO HOURS.



2. Press MENU. The main menu screen appears. Choose **Calibrate**.



3. Choose **Measurement**.



4. Choose **Zero**.



5. The screen at left appears. The top line is the current ozone reading based on the previous calibration or, for a first time calibration, the default sensitivity.

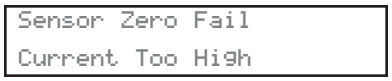


6. Once the reading is stable, the screen at left appears. Sensor zero is complete and the analyzer has stored the zero current. The screen remains until the operator presses MENU then EXIT to return to the main display.

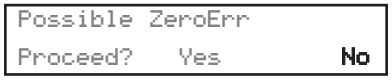
   NOTE

   Pressing ENTER during the zero step will cause the analyzer to use the present sensor current as the zero current. If the sensor is zeroed before the current has reached a minimum stable value, subsequent readings will be in error.

   After zeroing, leave the sensor in the zero solution and verify that the sensor current is between -10 and +10 nA. To display the sensor current, go the the main display and press ▼until the input current is showing.



7. This screen appears if the zero current is extremely high. See Section 8.3 for troubleshooting. To repeat the zero step, press EXIT and choose **Zero**.



8. This screen appears if the zero current is moderately high. To continue, choose **Yes**. To repeat the zero step, choose **No**. See Section 8.3 for troubleshooting.

6.3.3 Procedure — Calibrating the sensor

1. Place the sensor in the process liquid. Adjust the sample flow until it is in the range recommended for the ozone sensor. Refer to the sensor instruction sheet.
2. Adjust the ozone concentration until it is near the upper end of the operating range. Wait until the analyzer reading is stable before starting the calibration.



3. Press MENU. The main menu screen appears. Choose **Calibrate**.



4. Choose **Measurement**.



5. Choose **InProcess**.



6. The screen shown at left appears. The top line is the current ozone reading based on the previous calibration.

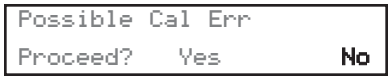
   Sample the process liquid. Make a note of the reading before taking the sample. Immediately determine free ozone. Note the analyzer reading again. If the present reading (X) differs from the reading when the sample was taken (Y), calculate the value to enter (C) from the following formula:

   $$C = (X/Y)\ (A)$$

   where A is the concentration of ozone in the grab sample.

   Change the reading in the second line to match the results of the grab sample test.

7. During calibration, the analyzer stores the measured current and calculates the sensitivity. Sensitivity is sensor current in nA divided by the concentration of ozone. The sensitivity of a 499AOZ (ozone) sensor is 250-350 nA/ppm at 25°C.



8. This screen appears if the sensitivity is much higher or lower than expected. See Section 8.3. for troubleshooting. To repeat the calibration step, press EXIT and choose **InProcess**.



9. This screen appears if the sensitivity is moderately higher or lower than expected. To continue, choose **Yes**. To repeat the calibration, choose **No**. For troubleshooting assistance, see Section 8.3.

SECTION 7.0
MAINTENANCE

7.1 OVERVIEW
7.2 REPLACEMENT PARTS

7.1 OVERVIEW

The Solu Comp II analyzer needs little routine maintenance. The calibration of the analyzer and sensor should be checked periodically. To recalibrate the analyzer and sensor, see Section 6.0.

Clean the analyzer case and front panel by wiping with a clean soft cloth dampened with water **ONLY**. Do not use solvent, like alcohol, that might cause a buildup of static charge.

7.2 REPLACEMENT PARTS

Only a few components of the analyzer are replaceable. Refer to the table below to find the correct parts diagram.

Model	Description	See Figure
1055-10	Panel mounting enclosure	7-1
1055-11	Pipe/surface mounting enclosure	7-2

Circuit boards are not replaceable.

TABLE 7-1. Replacement Parts for Solu Comp II (Panel Mount Version)

Location in Figure 7-1	PN	Description	Shipping Weight
1	23823-00	Panel mounting kit, includes four brackets and four set screws	2 lb/1.0 kg
2	23837-00	Enclosure, front, for panel mount version, includes keypad	3 lb/1.0 kg
3	33654-00	Gasket, front, for panel mount version	2 lb/1.0 kg
4	note	Screw, 2-56 x 0.187 in., with integral washer	
5	23822-00	Display board, LCD	2 lb/1.0 kg
6	note	PCB, microprocessor	
7	note	Screw, self-tapping, #4 x 0.375 in.	
8	note	PCB, power supply, 115/230 Vac or 24 Vdc	
9	note	Screw, 4-40 x 0.31 in., with integral washer	
10	33658-00	Gasket, rear cover, for panel mount version	2 lb/1.0 kg
11	23838-00	Enclosure cover, rear, for panel mount version, 115/230 Vac	2 lb/1.0 kg
11	23838-01	Enclosure cover, rear, for panel mount version, 24 Vdc	2 lb/1.0 kg
12	note	Self-tapping screws, #6 x 1.25 in.	

Note: Information about circuit boards and size of screws and washers is for information only. Circuit boards (other than the display board) and screws and washers cannot be purchased from Rosemount Analytical.
Shipping weights are rounded up to the nearest whole lb or 0.5 kg.

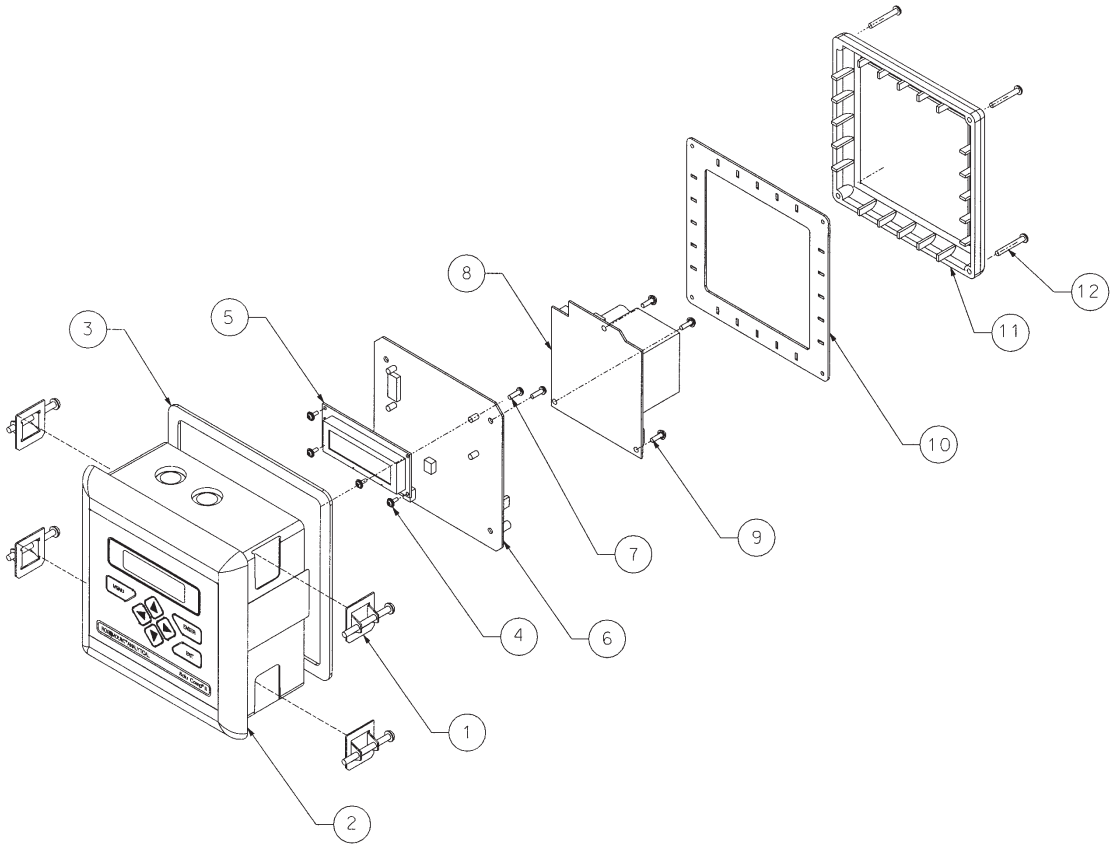


FIGURE 7-1. Exploded View of Solu Comp II (Panel Mount Version)

TABLE 7-2. Replacement Parts for Solu Comp II (Pipe/Surface Mount Version)

Location in Figure 7-2	PN	Description	Shipping Weight
1	note	Screw, 6-32 x 1.38 in.	
2	note	Washer	
3	23834-00	Enclosure, front, for pipe/surface mount version, includes keypad and hinge	2 lb/1.0 kg
4	33655-00	Gasket for pipe/surface mount version	2 lb/1.0 kg
5	note	Screw, 2-56 x 0.187 in., with integral washer	
6	23822-00	Display board, LCD	2 lb/1.0 kg
7	note	PCB, microprocessor	
8	note	Self-tapping screw, #4 x 0.375 in.	
9	note	PCB, power supply, 115/230 Vac or 24 Vdc	
10	note	Screw, 4-40 x 0.31 in., with integral washer	
11	23836-00	Enclosure, rear, for pipe/surface mount version, includes standoffs and hinge brackets	3 lb/1.5 kg
not shown	23833-00	Surface mount kit; consists of four self-tapping screws #6 x 1.75 in. and four O-rings	1 lb/0.5 kg

Note: Information about circuit boards and size of screws and washers is for information only. Circuit boards (other than the display board) and screws and washers cannot be purchased from Rosemount Analytical.
Shipping weights are rounded up to the nearest whole lb or 0.5 kg.

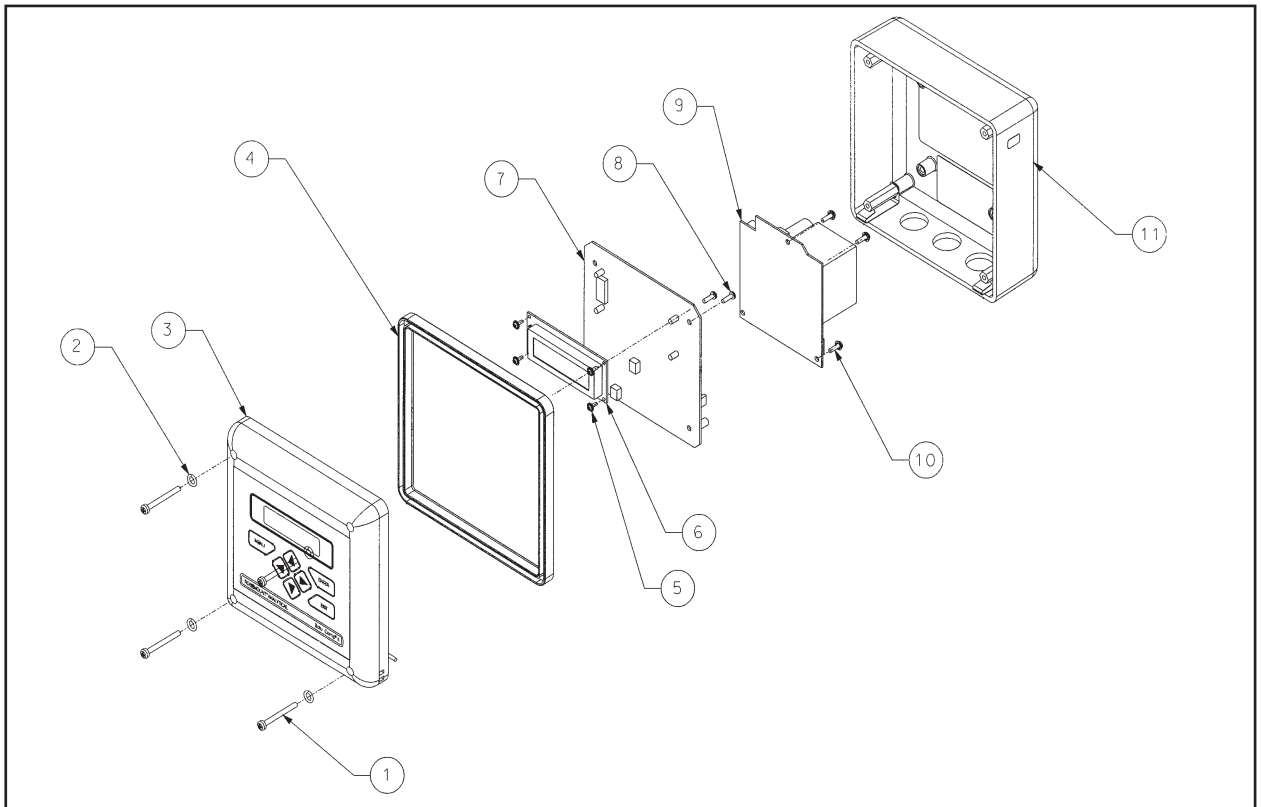


FIGURE 7-2. Exploded View of Solu Comp II (Pipe/Surface Mount Version)

SECTION 8.0
TROUBLESHOOTING

8.1 OVERVIEW
8.2 TROUBLESHOOTING USING FAULT CODES
8.3 TROUBLESHOOTING WHEN NO ERROR MESSAGE IS SHOWING — OZONE
8.4 TROUBLESHOOTING WHEN NO ERROR MESSAGE IS SHOWING — GENERAL
8.5 SIMULATING INPUTS
8.6 SIMULATING TEMPERATURE

8.1 OVERVIEW

The Solu Comp II continuously monitors itself and the sensor for faults. When the analyzer detects a fault, the word *fault* appears in the display alternately with the measurement. If alarm 3 was configured as a fault alarm, the alarm relay will energize. The outputs do not change during a fault condition. They continue to reflect the measured ozone or temperature. **Press ▲ to display the fault codes.**

NOTE

A large number of information screens are available to aid troubleshooting. The most useful of these are raw sensor current and sensitivity and zero current at last calibration. To view the information screens, go to the main display and press the ▼ key.

8.2 TROUBLESHOOTING USING FAULT CODES

Fault Code	Explanation	See Section
S1 Out of Range	Sensor current exceeds 210 μA	8.2.1
TC1 Open	RTD for sensor 1 (ozone) is open	8.2.2
TC1 Shorted	RTD for sensor 1 (ozone) is shorted	8.2.2
S1 Sense Line Open	RTD sense line for sensor 1 (ozone) is open	8.2.3
EEPROM Failure	EEPROM failure	8.2.4

8.2.1 Sensor Current Exceeds 210 μA

Excessive sensor current implies that the sensor is miswired or the sensor has failed.

8.2.2 RTD for Sensor 1 is Open or Shorted.

There is an open or short in the sensor RTD or wiring.

A. If sensor is being installed for the first time, check the wiring connections. See Section 3.2.
B. Disconnect the sensor from the analyzer and measure the resistance between the RTD lead wires. See the sensor manual to identify the RTD leads. If there is an open or short circuit, replace the sensor.
C. If there is no open or short, check the analyzer. See Section 8.5.

8.2.3 RTD Sense Line for Sensor 1 is Open.

The Solu Comp II measures temperature using a three-wire RTD. See Figure 8-4. The in and return leads connect the RTD to the measuring circuit in the analyzer. A third wire, called the sense line, is connected to the return line at the sensor. The sense line allows the analyzer to correct for the resistance of the in and return leads and to correct for changes in lead wire resistance with temperature.

A. Verify that all wiring connections are secure.

B. The analyzer can be operated with the sense line open. The measurement will be less accurate because the analyzer can no longer correct for lead wire resistance and for changes in lead wire resistance with ambient temperature. However, if the sensor is to be used at approximately constant temperature, the lead wire resistance error can be eliminated by calibrating the sensor at the measurement temperature. Errors caused by changes in lead wire resistance with changes in ambient temperature cannot be eliminated.To make the error message disappear, connect the RTD sense and return terminals with a jumper.

8.2.4 EEPROM Failure.

Call the factory at (800) 854-8257.

8.3 TROUBLESHOOTING WHEN NO ERROR MESSAGE IS SHOWING — OZONE

Problem	See Section
Zero current was accepted, but the current is outside the range -10 to 10 nA	8.3.1
Error or warning message appears while zeroing the sensor (zero current is too high)	8.3.1
Zero current is unstable	8.3.2
Sensor can be calibrated, but the current is less than about 250 nA/ppm at 25°C	8.3.3
Process readings are erratic	8.3.4
Readings drift	8.3.5
Sensor does not respond to changes in ozone level	8.3.6
Ozone readings are too low	8.3.7

8.3.1 Zero current is too high

A. Is the sensor properly wired to the analyzer? See Section 3.3.

B. Is the zero solution ozone-free? Take a sample of the solution and test it for ozone. The concentration should be less than 0.01 ppm.

C. Has adequate time been allowed for the sensor to reach a minimum stable residual current? It may take several hours, sometimes as long as overnight, for a new sensor to stabilize.

D. Check the membrane for damage and replace it if necessary.

8.3.2 Zero current is unstable

A. Is the sensor properly wired to the analyzer? See Section 3.3. Verify that all wiring connections are tight.

B. Readings are often erratic when a new or rebuilt sensor is first placed in service. Readings usually stabilize after about an hour.

C. Is the space between the membrane and cathode filled with electrolyte solution and is the flow path between the electrolyte reservoir and membrane clear? Often the flow of electrolyte and be started by simply holding the sensor with the membrane end pointing down and sharply shaking the sensor a few times as though shaking down a clinical thermometer.

   If shaking does not work, try clearing the holes around the cathode stem. Hold the sensor with the membrane end pointing up. Unscrew the membrane retainer and remove the membrane assembly. Use the end of a straightened paper clip to clear the holes at the base of the cathode stem. Replace the membrane.

   Verify that the sensor is filled with electrolyte solution. Refer to the sensor instruction manual for details.

8.3.3 Sensor can be calibrated, but the current is too low

A. Is the temperature low? Sensor current is a strong function of temperature. The sensor current decreases about 3% for every °C drop in temperature.

B. Sensor current depends on the rate of sample flow past the sensor tip. If the flow is too low, ozone readings will be low. Refer to the sensor instruction sheet for recommended sample flows.

C. Low current can be caused by lack of electrolyte flow to the cathode and membrane. See step D in Section 8.3.2.

D. Is the membrane fouled or coated? A dirty membrane inhibits diffusion of ozone through the membrane, reducing the sensor current and increasing the response time. Clean the membrane by gently wiping it with a soft tissue.

E. If cleaning the membrane does not improve the sensor response, replace the membrane and electrolyte solution. If necessary, polish the cathode. See the sensor instruction sheet for details.

8.3.4 Process readings are erratic

A. Readings are often erratic when a new sensor or a rebuilt sensor is first placed in service. The current usually stabilizes after a few hours.

B. Is the sample flow within the recommended range? High sample flow may cause erratic readings. Refer to the sensor instruction sheet for recommended flow rates.

C. Are the holes between the membrane and the electrolyte reservoir open. Refer to Section 8.3.2.

D. Verify that wiring is correct. Pay particular attention to shield and ground connections.

E. Is the membrane in good condition and is the sensor filled with electrolyte solution? Replace the fill solution and electrolyte. Refer to the sensor instruction manual for details.

8.3.5 Readings drift

A. Is the sample temperature changing? Membrane permeability is a function of temperature. The time constant for the 499AOZ sensor is about five minutes. Therefore, the reading may drift for a while after a sudden temperature change.

B. Is the membrane clean? For the sensor to work properly, ozone must diffuse freely through the membrane. A coating on the membrane will interfere with the passage of ozone, resulting in slow response. Clean the membrane by gently wiping it with a soft tissue.

C. Is the sample flow within the recommended range? Gradual loss of sample flow will cause a downward drift.

D. Is the sensor new or has it been recently serviced? New or rebuilt sensors may require several hours to stabilize.

8.3.6 Sensor does not respond to changes in ozone level.

A. Is the grab sample test accurate? Is the grab sample representative of the sample flowing to the sensor?

B. Is the membrane clean? Clean the membrane and replace it if necessary. Check that the holes at the base of the cathode stem are open. Use a straightened paper clip to clear blockages. Replace the electrolyte solution.

C. Replace the sensor.

8.3.7 Ozone readings are too low.

A. Was the sample tested as soon as it was taken? Ozone solutions are unstable. Test the sample immediately after collecting it.

B. Low readings can be caused by zeroing the sensor before the residual current has reached a stable minimum value. Residual current is the current the sensor generates even when no ozone is in the sample. Because the residual current is subtracted from subsequent measured currents, zeroing before the current is a minimum can lead to low results.

   Example: The true residual current for an ozone sensor is 4 nA, and the sensitivity is 350 nA/ppm. Assume the measured current is 200 nA. The true concentration is (200-4)/350 or 0.560 ppm. If the sensor was zeroed prematurely when the current was 10 nA, the measured concentration will be (200-10)/350 or 0.543 ppm. The error is 3.6%. Suppose the measured current is 100 nA. The true concentration is 0.274 ppm, and the measured concentration is 0.257 ppm. The error is now 6.2%. The absolute difference between the reading remains the same, 0.017 ppm.

C. Sensor response depends on flow. If the flow is too low, readings will be low and flow sensitive. Verify that the flow past the sensor equals or exceeds the minimum value. See the sensor instruction manual for recommended flows.

8.4 TROUBLESHOOTING WHEN NO ERROR MESSAGE IS SHOWING — GENERAL

Problem	See Section
New temperature during calibration more than 2-3ºC different from the live reading	8.4.1
Current output is too low	8.4.2
Alarm relays do not operate when setpoint is exceeded	8.4.3
Display is unreadable — too faint or all pixels dark	8.4.4

8.4.1 Difference Between Solut Comp II and Standard Thermometer is Greater than 3ºC.

A. Is the reference thermometer, RTD, or thermistor accurate? General purpose thermometers, particularly ones that have been mistreated, can have surprisingly large errors.

B. Review Section 6.2.2.

8.4.2 Current Output Too Low.

Load resistance is too high. Maximum load is 600 Ω.

8.4.3 Alarm Relays Do Not Work

Verify the relays are properly wired.

8.4.4 Display is Unreadable.

While holding down the MENU key, press ▲ or ▼ until the display has the correct contrast.

8.5 SIMULATING INPUTS — OZONE

To check the performance of the analyzer, use a decade box and battery to simulate the current from the sensor. The battery, which opposes the polarizing voltage, is necessary to ensure that the sensor current has the correct sign.

A. Disconnect the anode and cathode leads from terminals 1 and 2 on TB3 and connect a decade box and battery as shown in Figure 8-1. It is not necessary to disconnect the RTD leads.

B. Set the decade box to the resistance shown below.

Sensor	Polarizing Voltage	Resistance	Expected Current
499AOZ (ozone)	250 mV	2.7 MΩ	500 nA

C. Note the sensor current. It should be close to the value in the table. The actual value depends on the voltage of the battery. To view the sensor current, go to the main display and press ▼ until the sensor current is displayed.

D. Change the decade box resistance and verify that the correct current is shown. Calculate current from the equation:

$$\text{current (nA)} = \frac{V_{battery} - V_{polarizing}\ (mV)}{\text{resistance (k}\Omega)} \cdot 1000$$

The voltage of a fresh 1.5 volt battery is about 1.6 volt (1600 mV).

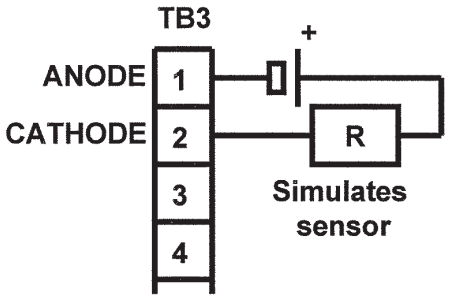


FIGURE 8-1. Simulating Ozone

8.6 SIMULATING TEMPERATURE

8.6.1 General.

The Solu Comp II accepts a Pt100 RTD. The Pt100 RTD is in a three-wire configuration. See Figure 8-2.

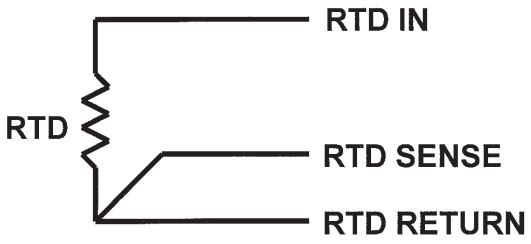


FIGURE 8-2. Three-Wire RTD Configuration.

Although only two wires are required to connect the RTD to the analyzer, using a third (and sometimes fourth) wire allows the analyzer to correct for the resistance of the lead wires and for changes in the lead wire resistance with temperature.

8.6.2 Simulating temperature

To simulate the temperature input, wire a decade box to the analyzer or junction box as shown in Figure 8-3.

To check the accuracy of the temperature measurement, set the resistor simulating the RTD to the values indicated in the table and note the temperature readings. The measured temperature might not agree with the value in the table. During sensor calibration an offset might have been applied to make the measured temperature agree with a standard thermometer. The offset is also applied to the simulated resistance. The Solu Comp II is measuring temperature correctly if the difference between measured temperatures equals the difference between the values in the table to within ±0.1°C.

For example, start with a simulated resistance of 103.9 Ω, which corresponds to 10.0°C. Assume the offset from the sensor calibration was -0.3 Ω. Because of the offset, the analyzer calculates temperature using 103.6 Ω. The result is 9.2°C. Now change the resistance to 107.8 Ω, which corresponds to 20.0°C. The analyzer uses 107.5 Ω to calculate the temperature, so the display reads 19.2°C. Because the difference between the displayed temperatures (10.0°C) is the same as the difference between the simulated temperatures, the analyzer is working correctly.

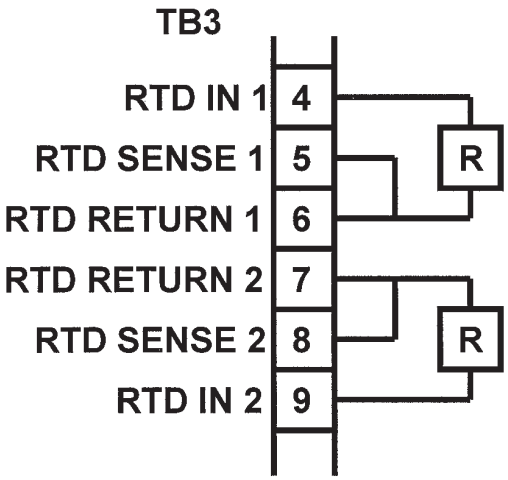


FIGURE 8-3. Simulating RTD Inputs.

Temp. (°C)	Pt 100 (Ω)
0	100.0
10	103.9
20	107.8
25	109.7
30	111.7
40	115.5
50	119.4
60	123.2
70	127.1
80	130.9
85	132.8
90	134.7
100	138.5

SECTION 9.0
RETURN OF MATERIAL

9.1 GENERAL
9.2 WARRANTY REPAIR
9.3 NON-WARRANTY REPAIR

9.1 GENERAL.

To expedite the repair and return of instruments, proper communication between the customer and the factory is important. Before returning a product for repair, call 1-949-757-8500 for a Return Materials Authorization (RMA) number.

9.2 WARRANTY REPAIR.

The following is the procedure for returning instruments still under warranty:

1. Call Rosemount Analytical for authorization.
2. To verify warranty, supply the factory sales order number or the original purchase order number. In the case of individual parts or sub-assemblies, the serial number on the unit must be supplied.
3. Carefully package the materials and enclose your “Letter of Transmittal” (see Warranty). If possible, pack the materials in the same manner as they were received.
4. Send the package prepaid to:

   Emerson Process Management, Liquid Division
   Liquid Division
   2400 Barranca Parkway
   Irvine, CA 92606

   Attn: Factory Repair

   RMA No. _____

   Mark the package: Returned for Repair

   Model No. ____

9.3 NON-WARRANTY REPAIR.

The following is the procedure for returning for repair instruments that are no longer under warranty:

1. Call Rosemount Analytical for authorization.
2. Supply the purchase order number, and make sure to provide the name and telephone number of the individual to be contacted should additional information be needed.
3. Do Steps 3 and 4 of Section 9.2.

NOTE

Consult the factory for additional information regarding service or repair.

WARRANTY

Seller warrants that the firmware will execute the programming instructions provided by Seller, and that the Goods manufactured or Services provided by Seller will be free from defects in materials or workmanship under normal use and care until the expiration of the applicable warranty period. Goods are warranted for twelve (12) months from the date of initial installation or eighteen (18) months from the date of shipment by Seller, whichever period expires first. **Consumables, such as glass electrodes, membranes, liquid junctions, electrolyte, o-rings, catalytic beads, etc., and Services are warranted for a period of 90 days from the date of shipment or provision.**

Products purchased by Seller from a third party for resale to Buyer ("Resale Products") shall carry only the warranty extended by the original manufacturer. Buyer agrees that Seller has no liability for Resale Products beyond making a reasonable commercial effort to arrange for procurement and shipping of the Resale Products.

If Buyer discovers any warranty defects and notifies Seller thereof in writing during the applicable warranty period, Seller shall, at its option, promptly correct any errors that are found by Seller in the firmware or Services, or repair or replace F.O.B. point of manufacture that portion of the Goods or firmware found by Seller to be defective, or refund the purchase price of the defective portion of the Goods/Services.

All replacements or repairs necessitated by inadequate maintenance, normal wear and usage, unsuitable power sources, unsuitable environmental conditions, accident, misuse, improper installation, modification, repair, storage or handling, or any other cause not the fault of Seller are not covered by this limited warranty, and shall be at Buyer's expense. Seller shall not be obligated to pay any costs or charges incurred by Buyer or any other party except as may be agreed upon in writing in advance by an authorized Seller representative. All costs of dismantling, reinstallation and freight and the time and expenses of Seller's personnel for site travel and diagnosis under this warranty clause shall be borne by Buyer unless accepted in writing by Seller.

Goods repaired and parts replaced during the warranty period shall be in warranty for the remainder of the original warranty period or ninety (90) days, whichever is longer. This limited warranty is the only warranty made by Seller and can be amended only in a writing signed by an authorized representative of Seller. Except as otherwise expressly provided in the Agreement, THERE ARE NO REPRESENTATIONS OR WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, AS TO MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE, OR ANY OTHER MATTER WITH RESPECT TO ANY OF THE GOODS OR SERVICES.

RETURN OF MATERIAL

Material returned for repair, whether in or out of warranty, should be shipped prepaid to:

Emerson Process Management
Liquid Division
2400 Barranca Parkway
Irvine, CA 92606

The shipping container should be marked:

Return for Repair
Model _____

The returned material should be accompanied by a letter of transmittal which should include the following information (make a copy of the "Return of Materials Request" found on the last page of the Manual and provide the following thereon):

1. Location type of service, and length of time of service of the device.
2. Description of the faulty operation of the device and the circumstances of the failure.
3. Name and telephone number of the person to contact if there are questions about the returned material.
4. Statement as to whether warranty or non-warranty service is requested.
5. Complete shipping instructions for return of the material.

Adherence to these procedures will expedite handling of the returned material and will prevent unnecessary additional charges for inspection and testing to determine the problem with the device.

If the material is returned for out-of-warranty repairs, a purchase order for repairs should be enclosed.

The right people,
the right answers,
right now.

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CUSTOMER SUPPORT CENTER
1-800-854-8257

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Emerson Process Management

Liquid Division
2400 Barranca Parkway
Irvine, CA 92606 USA
Tel: (949) 757-8500
Fax: (949) 474-7250

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