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Instruction Manual
PN 51-1054BC/rev.B
April 2003

Model 1054B C

Conductivity Microprocessor Analyzer



ROSEMOUNT® Analytical

EMERSON™ Process Management

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ESSENTIAL INSTRUCTIONS

READ THIS PAGE BEFORE PROCEEDING!

Rosemount Analytical designs, manufactures, and tests its products to meet many national and international standards. Because these instruments are sophisticated technical products, you must properly install, use, and maintain them to ensure they continue to operate within their normal specifications. The following instructions must be adhered to and integrated into your safety program when installing, using, and maintaining Rosemount Analytical products. 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.

- Read all instructions prior to installing, operating, and servicing the product. If this Instruction Manual is not the correct manual, telephone 1-949-757-8500 and the requested manual will be provided. Save this Instruction Manual for future reference.
- If you do not understand any of the instructions, contact your Rosemount representative for clarification.
- Follow all warnings, cautions, and instructions marked on and supplied with the product.
- Inform and educate your personnel in the proper installation, operation, and maintenance of the product.
- Install your equipment as specified in the Installation Instructions of the appropriate Instruction Manual and per applicable local and national codes. Connect all products to the proper electrical and pressure sources.
- To ensure proper performance, use qualified personnel to install, operate, update, program, and maintain the product.
- When replacement parts are required, ensure that qualified people use replacement parts specified by Rosemount. Unauthorized parts and procedures can affect the product's performance and place the safe operation of your process at risk. Look alike substitutions may result in fire, electrical hazards, or improper operation.
- Ensure that all equipment doors are closed and protective covers are in place, except when maintenance is being performed by qualified persons, to prevent electrical shock and personal injury.

WARNING
ELECTRICAL SHOCK HAZARD

Making cable connections to and servicing this instrument require access to shock hazard level voltages which can cause death or serious injury.

Relay contacts made to separate power sources must be disconnected before servicing.

Electrical installation must be in accordance with the National Electrical Code (ANSI/NFPA-70) and/or any other applicable national or local codes.

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.

For safety and proper performance this instrument must be connected to a properly grounded three-wire power source.

Proper relay use and configuration is the responsibility of the user.

Do not operate this instrument without front cover secured. Refer installation, operation and servicing to qualified personnel.

Be sure to disconnect all hazardous voltage before opening the enclosure.

The unused conduit openings need to be sealed with NEMA 4X or IP65 conduit plugs to maintain the ingress protection rating (IP65).

No external connection to the instrument of more than 43V peak allowed with the exception of power and relay terminals. Any violation will impair the safety protection provided.

WARNING

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

Emerson Process Management

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WARNING

HAZARDOUS VOLTAGE

Can cause severe injury or death. Disconnect power before servicing.

CAUTION

The analyzer has a metalized enclosure. Ground conduit to metal stiffener or to metal enclosure. Use non-flammable watertight conduit fittings/plugs to preserve rating.

VYSTRAHA

NEBEZPECNE NAPETI

Muze zpusobit vazne zraneni nebo smrt. Odpojte napajeni pred udrzbou

VAROVANI

Zemnici vodic musi byt vodive spojen s kostrou pristroje. Pouzivejte nehorlave vodotesne pruchodky, abyste zachovali stupen kryti pristroje.

AVISO

VOLTAJE PELIGROSO

Puede causar severas lesiones o muerte. Desconecte la alimentación antes del mantenimiento.

ATENCION

La toma a tierra debe hacerse a un contrafuerde metal o a la caja metálica.Utilice accesorios/enchufes no inflamables y estancos al agua para preservar las especificaciones de la caja.

ADVARSEL

FARLIG SPÆNDING

Kan forårsage alvorlige kvæstelser eller død.

Afbryd spænding før servicering

FORSIGTIG

Jordforbindelse til metal kapsel.

Brug uantændelig vandtæt forskruning som sikkerhed for bevaring af kapslings klasse.

ATTENTION

HAUTE TENSION

Peut provoquer des blessures graves ou la mort. Déconnecter l'alimentation avant manipulation.

ATTENTION

Raccorder le tube à la masse métallique d'une entretoise ou du coffret.Utiliser des raccords et des bouchons étanches ininflammables afin de preserver la classification du boîtier.

OSTRZEZENIE

NIEBEZPIECZNE NAPIECIE

Moze spowodowac uszkodzenie ciala lub smierc.Odlacz zasilanie przed przystapieniem do prac.

UWAGA

Uziemij przewod do metalowego plaskownika lub obudowy. Aby zachowac stopien szczelnosci obudowy stosuj niepalne, wodoszczelne dlawiki.

WARNUNG

GEFAEHRLICHE SPANNUNG

Am Geraet liegt eine gefaehrliche Spannung an. Schalten Sie immer vor dem Oeffnen des Geraetes alle Zuleitungen spannungsfrei.

ACHTUNG

Der Analysator ist vorschriftsmaessig zu erden. Um die Schutzart des Geraetes sicherzustellen ist es mit den entsprechenden Kabelverschraubungen und Blindkappen auszuruesten.

Waarschuwing

GEVAARLIJKE SPANNING

Kan ernstig of dodelijk letsel veroorzaken. Schakel de voeding uit voordat u onderhoudswerk zaamheden uitvoert.

Voorzichtig

Aardleiding naar metalen profiel of naar metalen behuizing. Gebruik onbrandbare, waterdichte wartels en pluggen orn de beschermingsklasse te handhaven.

Attenzione

ALTA TENSIONE

Può causare grave lesione o morte. Disattivare le tensioni prima di effettuare la manutenzione.

Attenzione

Tubo di protezione per messa a terra con elemento di ingresso in metallo o con custodia in metallo.

Utilizzare accessori/connettori del tubo di protezione a tenuta stagna, non infiammabili, per assicurare i limiti di resistenza della custodia

ADVARSEL

FARLIG SPENNING

Kan føre til alvorlige skader eller dødsulykker. Spenningstilførsel må frakobles før service utføres.

ADVARSEL

Kabelinnføring må jordes til metallavstiver eller til metallkapslingen. Bruk flammesikre og vanntette nipler\plugger slik at kapslingens tetthetsgrad opprettholdes.

VARNING

LIVSFARLIG SPÄNNING

Kan medföra allvarlig skada eller dödsfall.

Bryt spänning innan service utföres.

IAKTTAG FÖRSIKTIGHET

Anslutningspunkt är jordad till chassi. Använd brandsäker, vattentät kabelanslutning för att bevara klassificering av apparatskåp.

AVISO

TENSÃO PERIGOSA

Pode causar lesões graves ou a morte. Desligar a energia antes de proceder a trabalhos de manutenção.

ATENÇÃO

Ligar a conducta de cabos à terra através de suporte ou invólucro metálicos. Utilize bucins e acessórios ignífugos e estanques para preservação da estanquecidade.

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MODEL 1054B CONDUCTIVITY MICROPROCESSOR ANALYZER

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SECTION 1.0
DESCRIPTION AND SPECIFICATIONS

- SELF DIAGNOSTICS with a user selectable fault alarm.
- KEYBOARD SECURITY is user selectable.
- NO BATTERY BACK-UP REQUIRED. Non-volatile EEPROM memory.
- DUAL ALARMS WITH PROGRAMMABLE LOGIC. A third relay is provided with timer functions.
- PROGRAMMABLE OUTPUT AND RELAY DEFAULTS for hold and fault modes.
- NEMA 4X (IP65) WEATHERPROOF CORROSION-RESISTANT ENCLOSURE.

1.1 FEATURES AND APPLICATIONS

The Model 1054B Microprocessor Analyzers, with the appropriate sensors, are designed to continuously measure and control pH, ORP, conductivity, resistivity, ratio, percent concentration, dissolved oxygen, ozone or total free chlorine in industrial and municipal processes.

The Model 1054B Conductivity Analyzers are housed in a NEMA 4X (IP65) weatherproof, corrosion-resistant, flame retardant enclosure suitable for panel, pipe or wall mounting. All functions are accessed through the front panel membrane keyboard which features tactile feedback. Measurement data may be read at any time. However, settings may be protected against accidental or unauthorized changes by a user selectable security code. The display indicates the measured value in engineering units as well as temperature, alarm status, hold output and fault conditions.

The 1054B transmits a user selected isolated current output which is continuously expandable over the measurement range for either direct or reverse action and can be displayed in milliamps or percent. Output dampening of 0-255 sec. is user selectable.

The output and relay default settings are user selectable for hold or fault mode operation. The hold output function allows manual control during routine sensor maintenance.

Continuous self diagnostics alert the operator to faults due to analyzer electronics, integral RTD failures, open wiring and process variable range problems. In the event of a fault condition or hold mode diagnosed by the analyzer, the output will be set to a preset or last process value and the relays will be set to their default settings.

Dual alarms are a standard feature on the Model 1054B and are programmable for either high or low operation. Alarm 2 may be programmed as a fault alarm. Both alarms feature independent setpoints, adjustable hysteresis and time delay action. The time delay is convenient when an alarm is used for corrective action, such as shutting down a demineralizer for regeneration. Time delay will ignore a temporary breakthrough and prevent shutting down a demineralizer unit prematurely. A dedicated interval timer with relay is also provided.

Automatic or manual temperature compensation is keyboard selectable. The process temperature is accurately measured from an integral RTD in the sensor assembly and is read on the display. For greater accuracy, the temperature indication may be standardized to the process temperature. The temperature may be configured to read in °C or °F.

Calibration is easily accomplished by simply immersing the sensor in a known solution and entering the value. With a two point calibration, the Model 1054B will automatically calculate the temperature slope of the solution. Upon routine standardization a sensor cell factor value is calculated, and a trend of this value can be used to track sensor coating.

The Model 1054B Microprocessor Analyzer comes standard with an LCD display. An LED display is available as an option.

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1.2 SPECIFICATIONS -

Enclosure: Black, ABS, NEMA 4X, IP65,
CSA Enclosure 4
144 X 144 X 192 mm
(5.7 X 5.7 X 7.6 in.)

Wall Mount Enclosure: NEMA 4X, Heavy duty fiberglass, reinforced thermoplastic.
356.4 X 450.1 X 180.2 mm* (14 X 17.7 X 7.1 in.*)

Front Panel: Membrane keyboard with tactile feedback and user selectable security

Digital Display: LCD, black on grey
Optional, red LED
Character Height: 18 mm (0.7 in.)

Electrical Classification:
FM Class I, Div. 2, Group A thru D
28 Vdc relays - 5.0 amps resistive only
150 mA - Groups A & B; 400 mA - Group C ; 540 mA - Group D; Ci = 0; Li = 0
CSA Class I, Div. 2, Group A thru D.
28 Vdc, 110 Vac & 230 Vac relays
5.0 Amps resistive only
Wall Mount Enclosure: General Purpose

Power: 100 - 127 VAC, 50/60 Hz ±6%, 4.0 W
200 - 253 VAC, 50/60 Hz ±6%, 4.0 W

Current Output: Isolated, 0-20 mA or 4-20 mA into 600 ohms maximum load at 115/230 Vac *or* 550 ohms maximum load at 100/200 Vac, Direct or Reverse
Output Dampening: 0-255 seconds

Code -20 Wall Mount Enclosure does not meet CE requirements
*Includes latches and mounting feet

EMI/RFI: EN61326 CE
LVD: EN61010-1

Ambient Temperature: -20 to 65°C (-4 to 149°F)

Ambient Humidity: LED max 95% RH
(LCD max 85% RH @ 50°C)

Alarms: Dual, field selectable High/Low, High/High, Low/Low
Alarm 2 configurable as a fault alarm
Time Delay 0 to 254 seconds
Dual Setpoints, continuously adjustable
Hysteresis is adjustable up to 25% full scale for low side/High Alarm and high side/Low Alarm

Interval Timer: Interval: 10 min. to 2999 days
On Counts: 1 to 60
On Duration: 1 to 299.9 seconds
Off Duration: 1 to 299.9 seconds
Wait Duration: 1 to 299.9 seconds
Controls dedicated relay

Relay Contacts: Epoxy Sealed Form A contacts, SPST, Normally Open.

	Resistive	Inductive
28 VDC	5.0 Amps	3.0 Amps
115 VAC	5.0 Amps	3.0 Amps
230 VAC	5.0 Amps	1.5 Amps

Weight/Shipping Weight: 1.1 kg/1.6 kg (2.5 lb/3.5 lb)

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The **Model 1054B Conductivity Analyzer** measures over the range of 0-2 µS/cm to 0-1,000 mS/cm. Temperature slope may be adjusted anywhere between 0 and 5% to provide greater accuracy in chemical concentration control. The temperature slope is factory set at 2% as a representative value, but each conductive solution has its own set of temperature vs. concentration curves. The Model 1054B C will automatically calculate the temperature slope for any given solution, or permit manual adjustment of the temperature slope if already known. On calibration the analyzer will also automatically correct for cell constant variations for better measurement accuracy.

ANALYZER SPECIFICATIONS @ 25°C

Measurement Range: (See Table 1)

Output Scale: Zero suppression: up to 90% full scale.
Span: from 10% to 100% full scale

Accuracy: ±0.5% of reading

Repeatability: ±0.25% of reading

Stability: ±0.25% month, non-cumulative

Temperature Effect: 0.02% of reading/°C

Temperature Compensation: -20 to 200°C (-4 to 392°F) (automatic or manual)

Temperature Slope Adjustment: 0-5%/°C

RECOMMENDED SENSORS:

Model 140 Retractable Conductivity
Model 150 Insertion/Submersion Conductivity
Model 400 Screw-in Conductivity
Model 401-14 Screw-in Conductivity
Model 402 Retractable Conductivity
Model 403 Sanitary Flange Conductivity
Model 404 Low Flow Conductivity

TABLE 1-1. CONDUCTIVITY RANGE

Conductivity Sensor Model Number	150 400 402/403 404	140	150	140 150 400/402/403
Cell Constant	0.1	0.2	0.5	1.0
Min. Range	2	4	100	200
Max. Range*	2,000	4,000	10,000	20,000
	FULL SCALE MICROSIEMENS/cm			

* Values shown are absolute conductivity. Maximum range will be reduced for compensated conductivity at elevated process temperatures.

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1.3 ORDERING INFORMATION

The Model 1054B Microprocessor Analyzer: Housed in a corrosion resistant, weatherproof enclosure and operates on either 115 or 230 VAC, 50/60 Hz power. Standard features include digital display, isolated current output, dual alarms, and automatic and manual temperature compensation.

MODEL 1054B	**MICROPROCESSOR ANALYZER** (3.5 lbs/1.5 kg)
Code	Measurement
C	Contacting Conductivity
T	Toroidal Conductivity

CODE	STANDARD ENCLOSURE OPTIONS
01	LCD Display
02	LED Display
CODE	OPTIONS
20	Wall Mount Enclosure
1054BC 01 20	**EXAMPLE**

TABLE 1-2. Replacement Parts

P/N	DESCRIPTION
22966-00	PCB, LCD Digital Display
23025-01	Panel Mounting Kit
23739-00	PCB, Power Supply
23664-01	PCB, CPU, Conductivity
23245-01	PCB, LED Digital Display
23740-00	PCB, Motherboard
23695-04	Keyboard Overlay, LCD Version
23695-05	Keyboard Overlay, LED Version
33469-00	Enclosure, Body
33470-00	Enclosure, Rear Cover
32938-00	Gasket, Rear Cover
9100157	Fuse, 0.1A, 3AB, 250V, Slo-Blow
9100160	Fuse, .250A, 125V
9100189	Fuse, .750A, 125V

TABLE 1-3. Accessories

P/N	DESCRIPTION
2001492	Tag, Stainless Steel, Specify Marking
23053-00	Mounting Bracket, 2-inch Pipe
23054-01	Mounting Bracket, Wall, with Junction Box
23268-01	Heater, 115 VAC, 50/60 Hz, 1054B (Code 20 Only)
23268-02	Heater, 230 VAC, 50/60 Hz, 1054B (Code 20 Only)

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SECTION 2.0
INSTALLATION

2.1 GENERAL. Installation must be performed by a trained technician. This analyzer's enclosure is suitable for outdoor use. However, it should be located in an area where temperature extremes and vibrations are minimized or absent. Installation must be performed by a trained technician.

2.2 UNPACKING AND INSPECTION. Inspect the analyzer for shipping damage. If damaged, notify the carrier immediately. Confirm that all items shown on the packing list are present. Notify Rosemount Analytical if items are missing.

2.3 MECHANICAL INSTALLATION. Select an installation site that is at least one foot from any high voltage conduit, has easy access for operating personnel, and is not in direct sunlight. Mount the analyzer as follows:

1. Remove the four screws that secure the rear cover of the enclosure.
2. Remove the four screws holding the front panel assembly of the enclosure and carefully pull the front panel and connected printed circuit boards straight out.
3. Follow the procedure for the appropriate mounting configuration: Section 2.3.1 for panel mounting, Section 2.3.2 for wall mounting, Section 2.3.3 for pipe mounting.

2.3.1 Panel Mounting (Standard). The Model 1054B is designed to fit into a DIN standard 137.9 mm x 137.9 mm (5.43 in. x 5.43 in.) panel cutout (Refer to Figure 2-1 and Figure 2-2).

1. Prepare the analyzer as described in Section 2.3.
2. Install the mounting latches as described in Figure 2-2 (latches are shown oversize for clarity). If the latches are not installed exactly as shown, they will not work correctly. The screws provided are self-tapping. Tap the screw the full depth of the mounting latch (refer to side view) leaving a gap greater than the thickness of the cutout panel.
3. Align the latches as shown and insert the analyzer enclosure through the front of the panel cutout. Tighten the screws for a firm fit. To avoid damaging the mounting latches, do not use excessive force.
4. Replace the front panel assembly. Circuit boards must align with the slots on the inside of the enclosure. Assure that the continuity wire is connected to the rear cover and the interface board's closest mounting screw. Replace the door and four front panel screws.

2.3.2 Wall Mounting Plate with Junction Box (P/N 23054-01). Refer to Figure 2-3 and Figure 2-4.

1. Prepare the analyzer as described in Section 2.3.
2. Mount the junction box and bracket to the analyzer with the hardware provided. All wiring can be brought to the terminal strip prior to mounting the analyzer.
3. Place the metal stiffener on the inside of the analyzer and mount the two 1/2-inch conduit fittings using two each weather seals as shown. Mount NEMA 4X conduit plug (included) into center conduit hole.
4. Mount the analyzer to the junction box using the 1/2-inch conduit fittings.
5. Complete wiring from the analyzer to the junction box (Refer to Figure 2-4).

NOTE

Run sensor wiring out of the left opening (From front view) to J-Box. All others out right opening to J-Box.

2.3.3 Pipe Mounting (P/N 23053-00). The 2-inch pipe mounting bracket includes a metal plate with a cutout for the analyzer (Refer to Section 2.3 for mounting the analyzer into the plate). Mounting details are shown in Figure 2-5.

2.3.4 Wall Mount Enclosure (option -20). See Figure 2-7 for installation details.

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2.4 ELECTRICAL WIRING. The Model 1054B has three conduit openings in the bottom rear of the analyzer housing which will accommodate 1/2-inch conduit fittings. From the front view, the conduit opening on the left is for sensor wiring; the center is for signal output and the opening on the right is for timer, alarm, and AC connections. Sensor wiring should always be run in a separate conduit from power wiring. AC power wiring should be 14 gauge or greater.

NOTE

For maximum EMI/RFI protection the output cable should be shielded and enclosed in an earth grounded, rigid metal conduit. When wiring directly to the instrument connect the output cable's outer shield to the transmitter's earth ground via terminal 8 on TB3. When wiring to the wall mounting junction box connect the output cable's outer shield to the earth ground terminal on TB-A.

The sensor cable should also be shielded. When wiring directly to the instrument connect the sensor cable's outer shield to the transmitter's earth ground via terminal 8 of TB-2. If the sensor cable's outer shield is braided an appropriate metal cable gland fitting may be used to connect to braid to earth ground via the instrument case. When wiring to the wall mounting junction box connect the sensor cable's outer shield to the earth ground terminal on TB-A.

The user must provide a means to disconnect the main power supply in the form of circuit breaker or switch. The circuit breaker or the switch must be located in close proximity to the instrument and identified as the disconnecting device for the instrument.

2.4.1 Power Input Wiring. The Model 1054B can be configured for either 115 VAC or 230 VAC power.

Connect AC power to TB1-8 and -9 (115 VAC) or TB1-7 and -8 (230 VAC) ground to the ground terminal at TB3-8 (refer to Figure 2-6).

CAUTION

The sensitivity and stability of the analyzer will be impaired if the input wiring is not grounded. DO NOT apply power to the analyzer until all electrical connections are verified and secure. The following precautions are a guide using UL 508 as a safeguard for personnel and property.

1. AC connections and grounding must be in compliance with UL 508 and/or local electrical codes.
2. The metal stiffener is required to provide support and proper electrical continuity between conduit fittings.
3. This type 4/4X enclosure requires a conduit hub or equivalent that provides watertight connect, REF UL 508-26.10.
4. Watertight fittings/hubs that comply with the requirements of UL 514B are to be used.
5. Conduit hubs are to be connected to the conduit before the hub is connected to the enclosure, REF UL 508-26.10.
6. If the metal support plate is not used, plastic fittings must be used to prevent structural damage to the enclosure. Also, appropriate grounding lug and awg conductor must be used with the plastic fittings.

2.4.2 Output Wiring. The signal output and alarm connections are made to terminals 1 through 6 of TB1 and TB3-1 and 2. (Refer to Figure 2-6).

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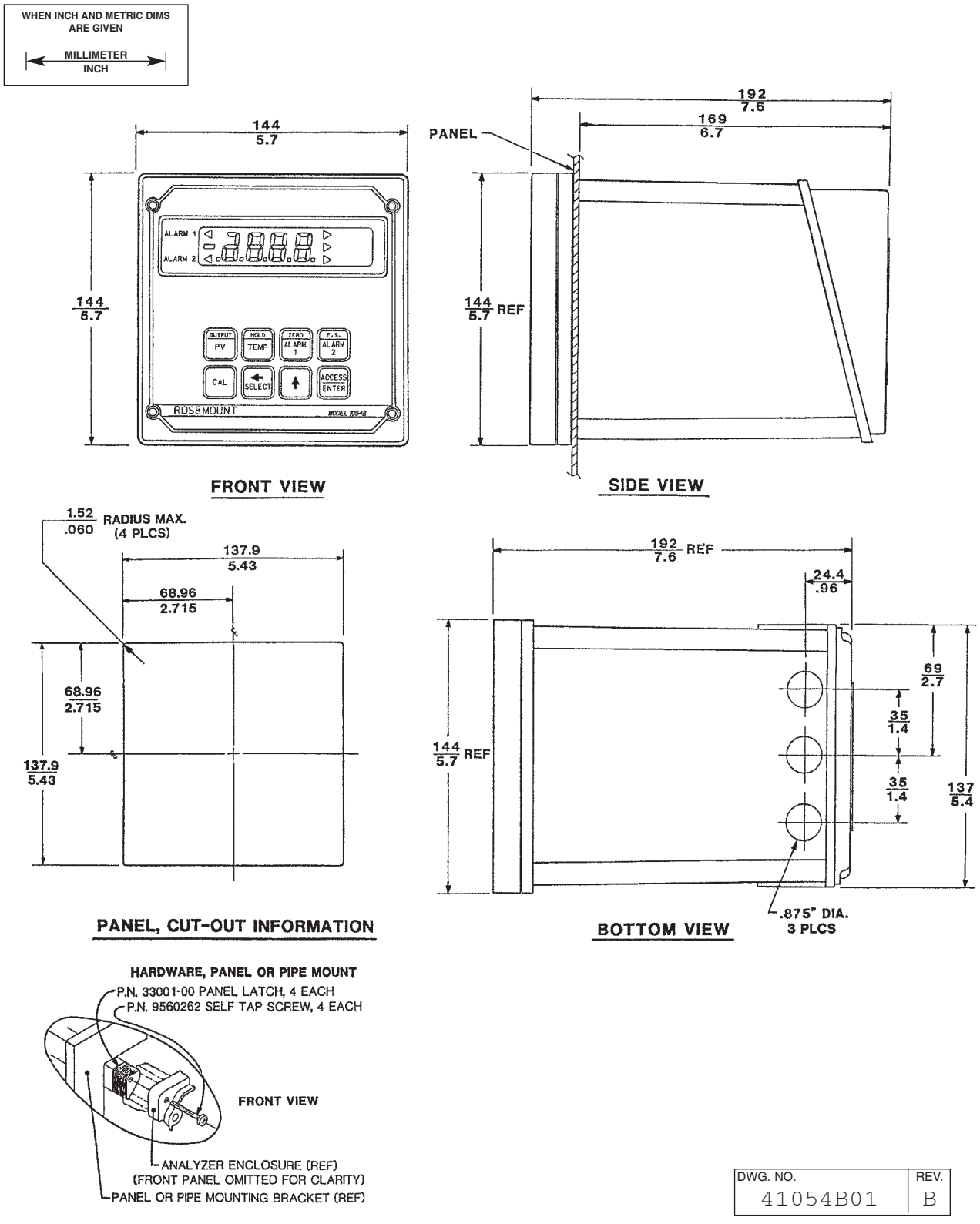
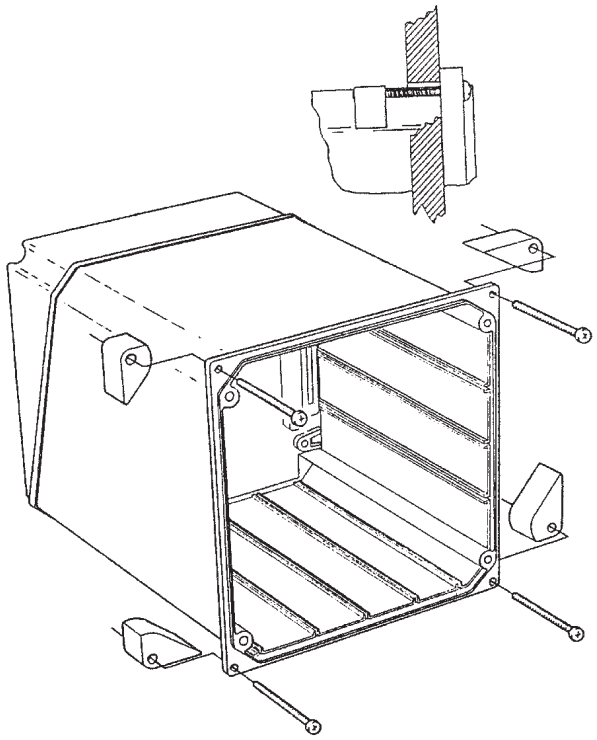


FIGURE 2-1. Panel Mounting Cutout

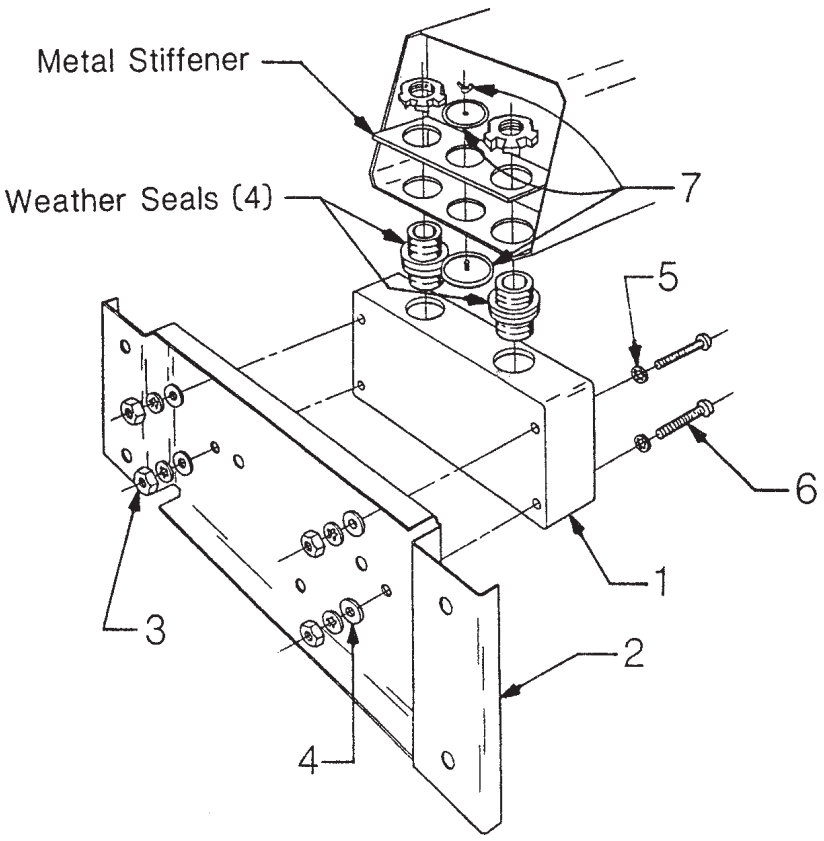
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FIGURE 2-2. Panel Mounting Tab Installation

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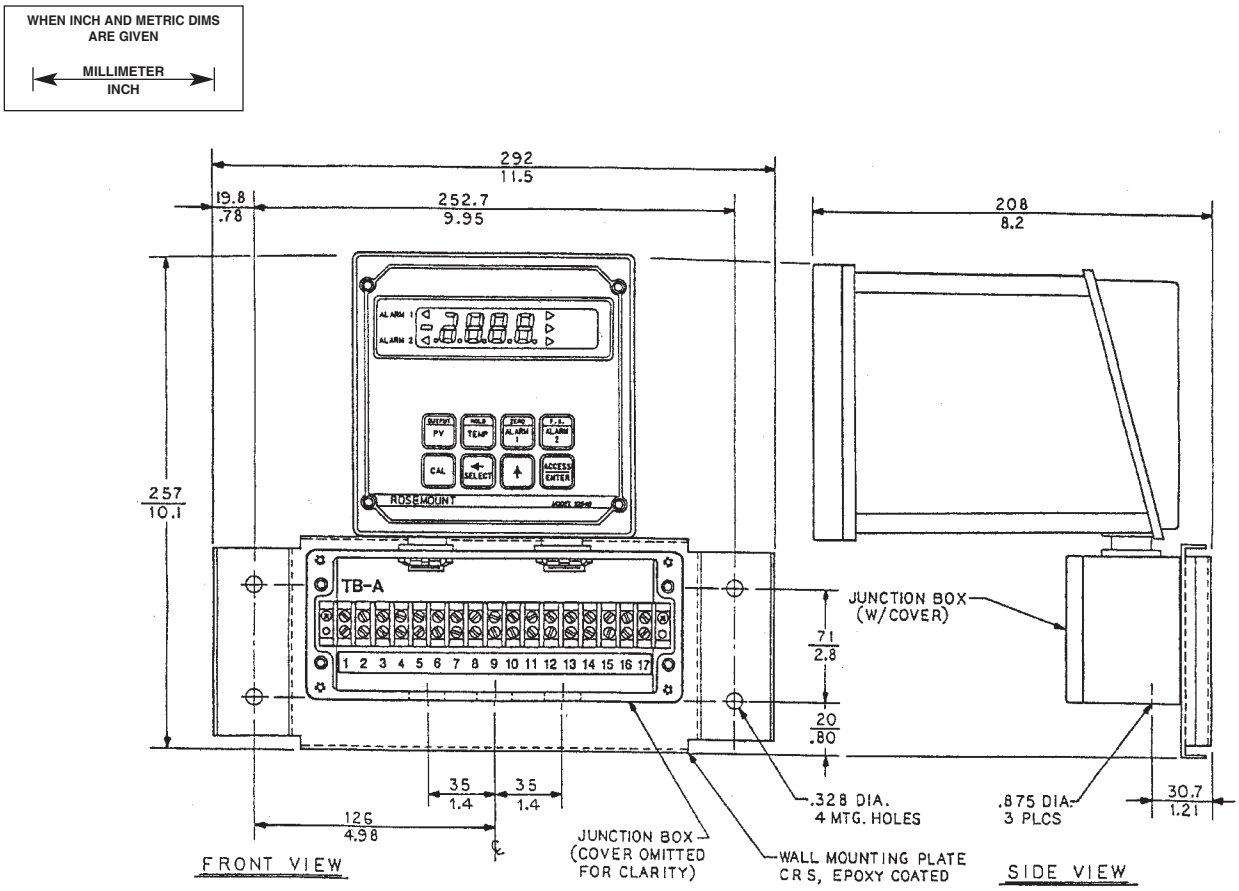


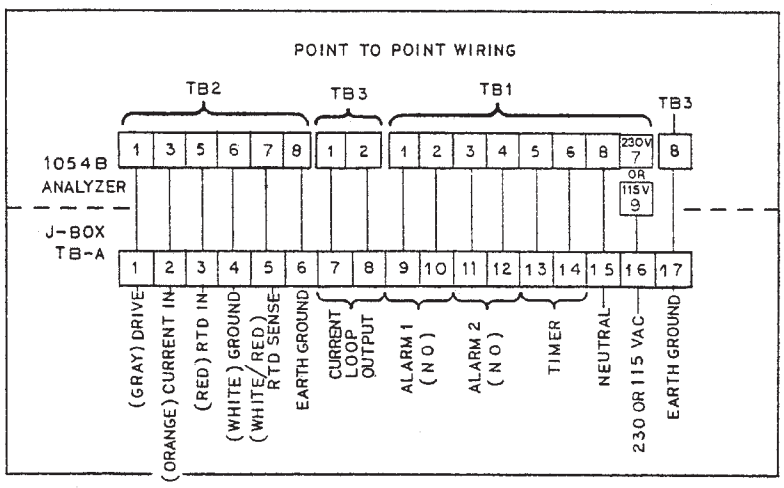
ITEM	PART NUMBER	DESCRIPTION	QTY
1	23058-01	S Assy, J-Box	1
2	33030-00	Bracket, wall mtg	1
3	9900600	Nut, 6-32 Hex	4
4	9910600	Washer, Flat #6	4
5	9910610	Washer, Lock Int. #6	8
6	9600612	Screw, 6-32 X .75	4
7	9510048	Seal, Weathertight	1

DWG. NO.	REV.
41054A27	A

FIGURE 2-3. Wall Mounting J-Box Installation

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DWG. NO.	REV.
41054B14	B

FIGURE 2-4. Wall Mounting J-Box Wiring

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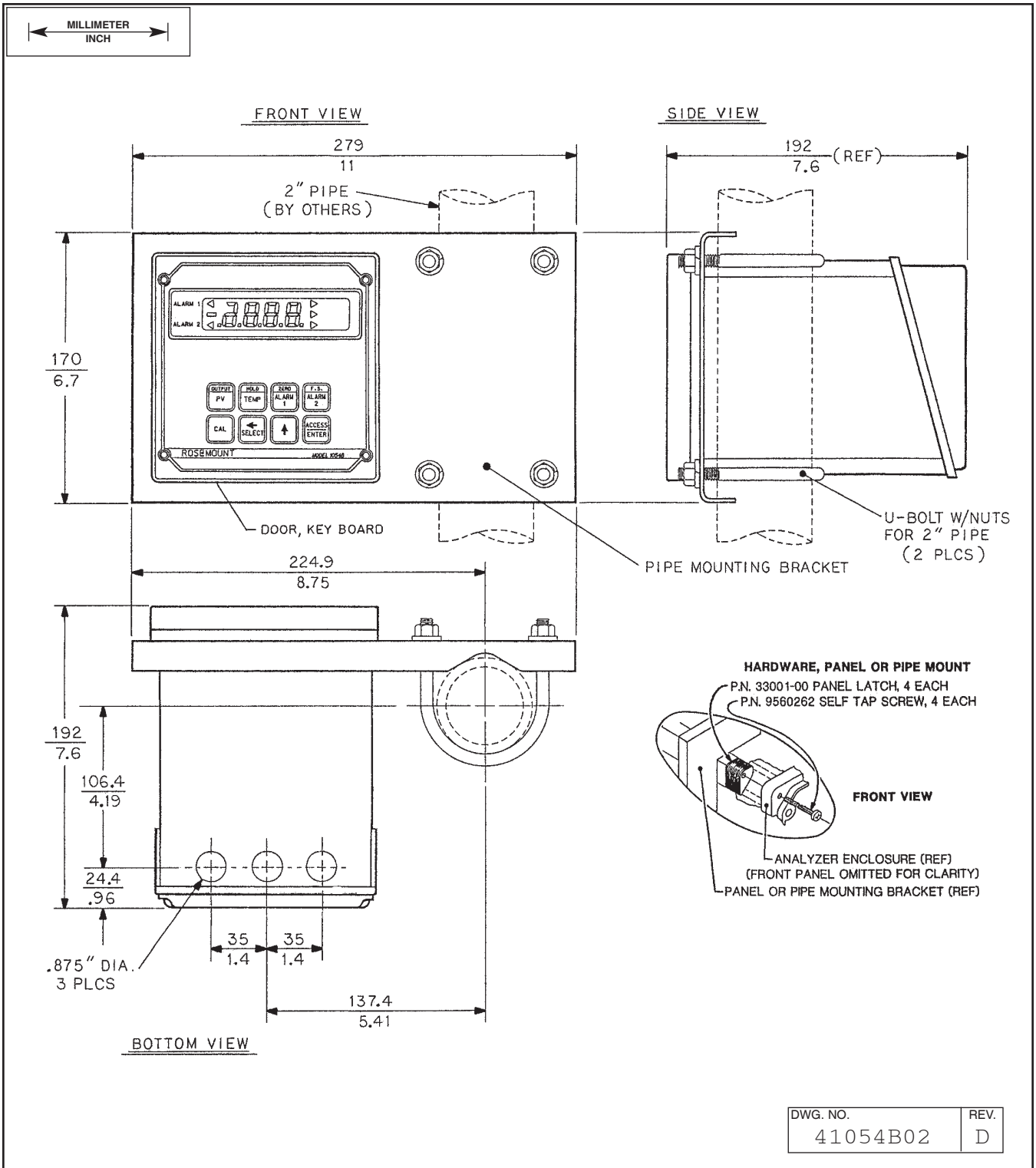
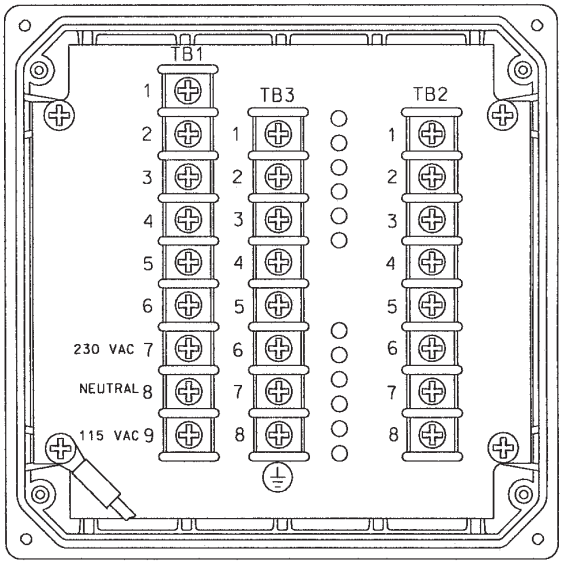
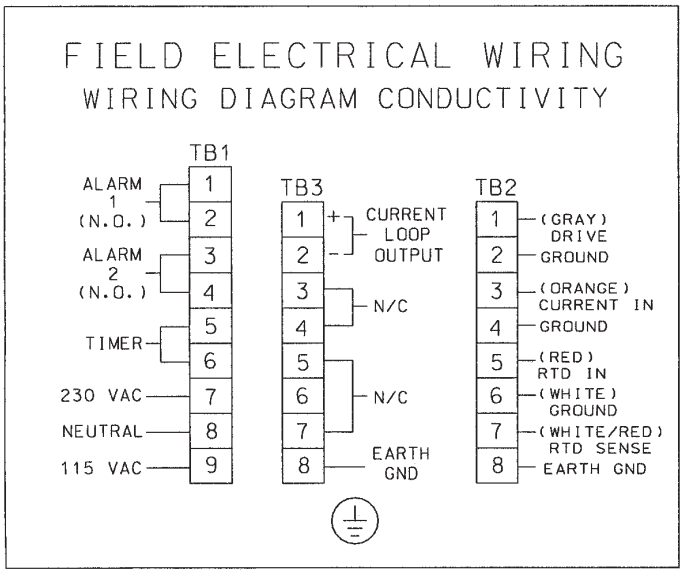


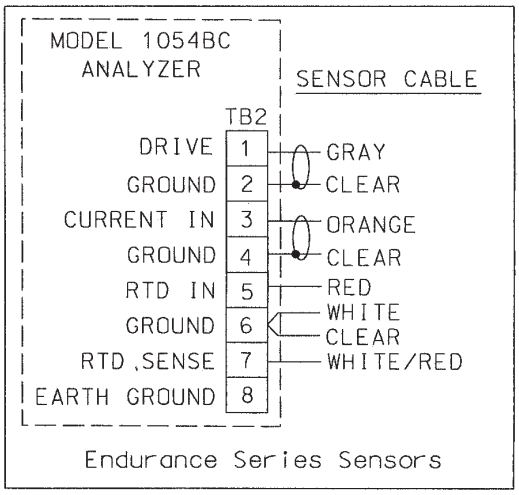
FIGURE 2-5. Pipe Mounting Installation

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BACK VIEW / COVER OMITTED





DWG. NO.	REV.
41054B04	D

FIGURE 2-6. Electrical Wiring

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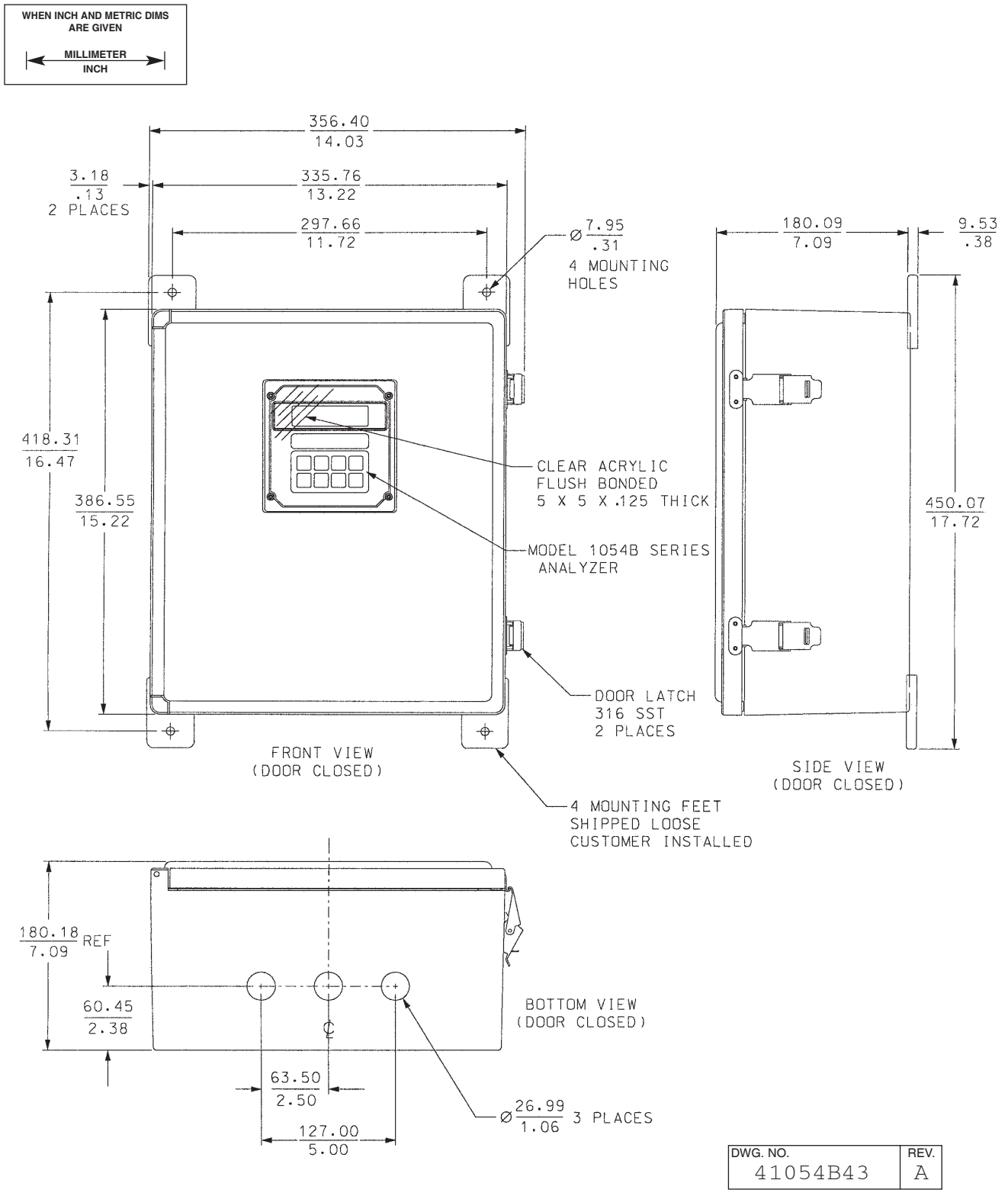


FIGURE 2-7. Wall Mount Enclosure (Option -20)

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SECTION 3.0
DESCRIPTION OF CONTROLS

3.1 KEYBOARD FUNCTIONS. All operations of the Model 1054B microprocessor Analyzer are controlled by the eight (8) keypads on the front of the instrument. These keypads are used to do the following:

1. Display parameters other than the primary parameter.
2. Edit setpoints for alarms, set up specific output current value for simulation, calibrate, temperature, conductivity, etc.
3. Configure display for temperature units, for automatic temperature compensation, alarm usage, setting timer functions, security, and output range.

To view and not change parameters other than the primary parameter requires only a simple keystroke routine. As shown in Figure 3-1, a single keypress accesses the lower function printed on the keypad. Quick, double keypresses access the top function printed on the keypad.

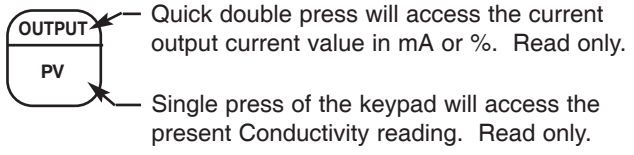


FIGURE 3-1. Function Select on Keypad.

Editing any of these parameters requires one more operation. After displaying the value associated with the parameter selected, press the SELECT keypad. As seen in Figure 3-2, this will display the numerical value, and the first digit will be flashing to indicate this value may be edited.

All changes to the operating program that set-up the instrument display are made through the set menu program. See Figure 3-5 at the end of this section.

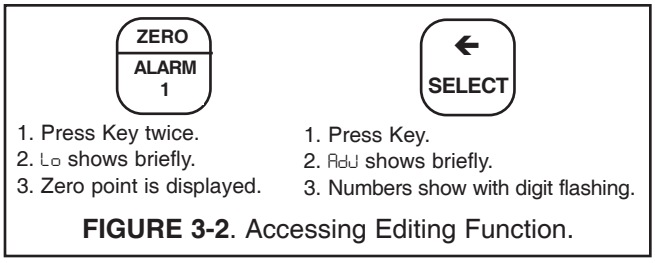


FIGURE 3-2. Accessing Editing Function.

Configuration is all accomplished through a series of menus located within the set mode menu. To access these set mode menus the ACCESS keypad is pressed **TWICE** in **RAPID** succession.

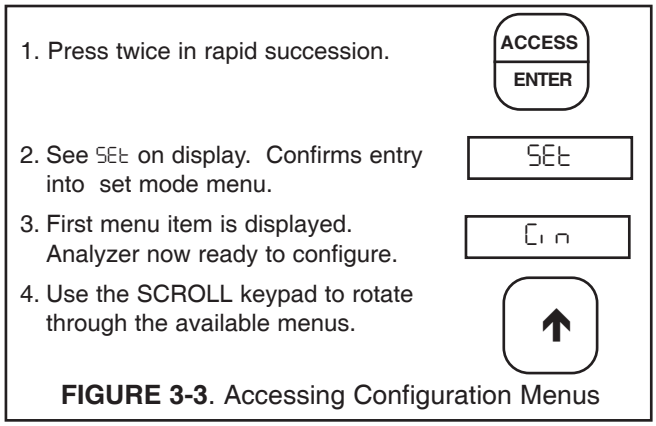


FIGURE 3-3. Accessing Configuration Menus

Once inside the Set mode menu, use the scroll keypad to scroll through the menu list. When the menu desired is displayed, release the scroll keypad.

To enter the submenus press the SELECT keypad. If the submenu allows editing, the item will flash that can be edited. If not, use the scroll keypad to scroll through the next list of submenus. SELECT will enter this submenu and if it is editable, the field will flash.

To exit the menu and SAVE the new value, press the ENTER keypad.

To exit the menu without saving the edited value, press the PV keypad to jump out of the set menu program with out saving value. To change other parameters will require re-entering the set menu program.

Figure 3-4 explains the various fields surrounding the Primary process on the LC display.

Table 3-1 describes the functions accessible with the eight (8) keypads, the number of times to press the keypad to access, and its function when used with the select keypad and set menu.

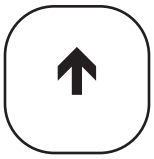
Table 3-2 and Table 3-3 describe the meaning of the various mnemonics used on the display. They are categorized by their use in either menus or as process information.

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3.2 Item Selection and Value Adjustment Keys. The three keys located on the lower right side of the keypad are used for menu navigation, value adjustment and entry, and item selection. These keys perform the following functions:



A. SELECT/Shift (←) Key. This key is used to select the displayed menu, or for shifting to the next digit in the Numeric Display.



B. SCROLL Key (↑). This key is used to scroll through menu when selected, or scroll through digits on the active (flashing) Numeric Display, or move the decimal point and µS/mS display. Holding key down auto scrolls display.



C. ACCESS/ENTER Key. This key is used to **ACCESS** the Set Mode (Section 4.1.2) and to **ENTER** the displayed value into memory (from Numeric Display).

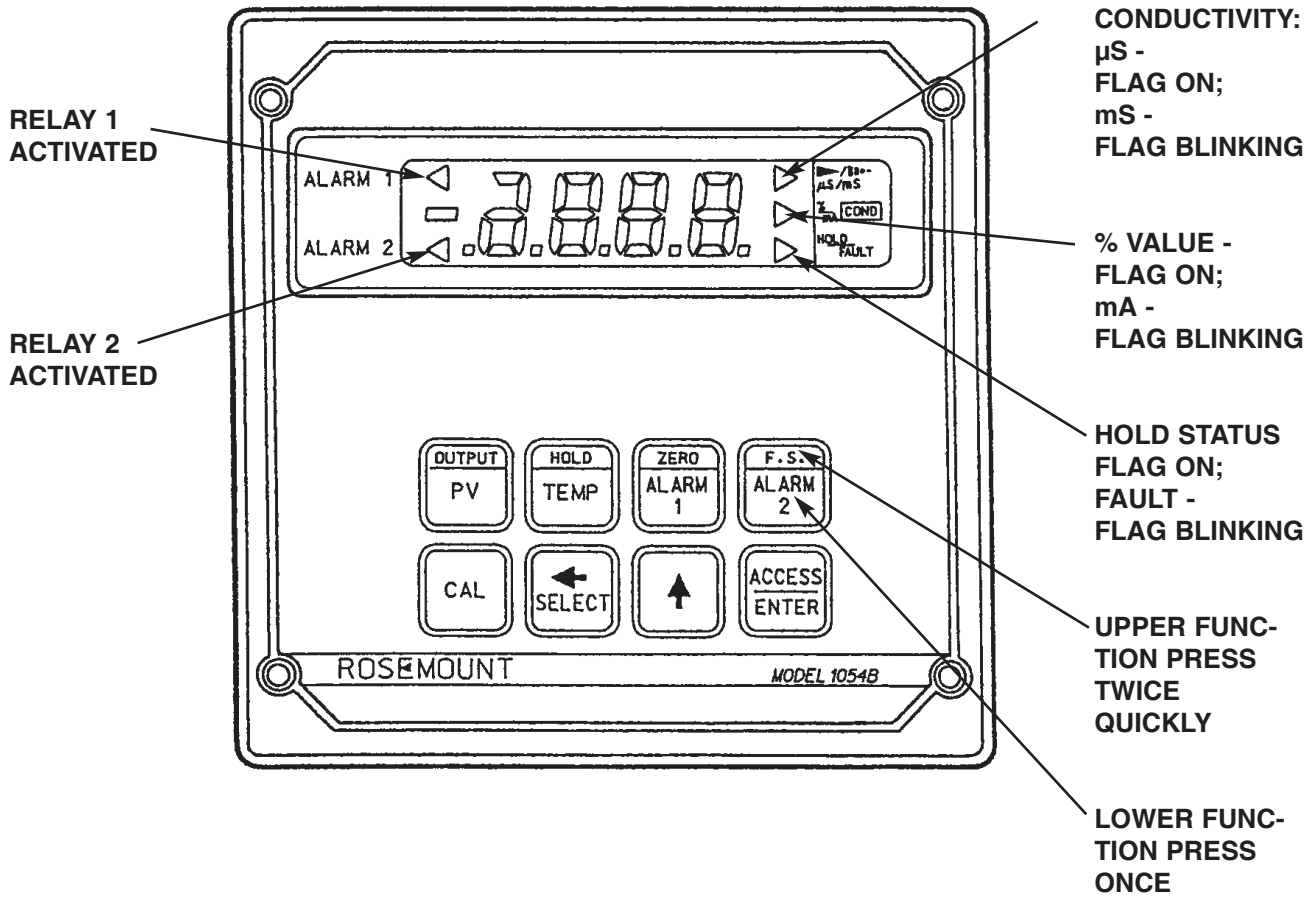


FIGURE 3-4. LCD Display

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TABLE 3-1. Key Description

	MAIN FUNCTION (PRESS ONCE)	SECOND FUNCTION (PRESS TWICE QUICKLY)
OUTPUT / PV	Displays - conductivity. Set Function (w/SELECT) - One point standardization of conductivity. (PV= Process Variable)	Displays - current output (mA or % full scale). Set Function (w/SELECT) - Simulates current output.
HOLD / TEMP	Displays - process temperature (°C or °F). Set Function (w/SELECT) - One point standardization of temperature.	Initiates or removes analyzer from hold condition.
ZERO / ALARM 1	Displays - Alarm 1 setpoint. Set Function (w/SELECT) - Sets Alarm 1 setpoint.	Displays - low current setpoint. Set Function (w/SELECT) - Sets low current point.
F.S. / ALARM 2	Displays - Alarm 2 setpoint. Set Function (w/SELECT) - Sets Alarm 2 setpoint.	Displays - full scale output setpoint. Set Function (w/SELECT) - Sets full scale output point.
CAL	Two Point temperature slope calibration.	Displays - temperature slope in percent. Set Function (w/SELECT) - manually sets temperature slope.

← SELECT	Select sub menu (mnemonic display). Shift to next digit (numeric display).
↑	Scroll through menu (mnemonic display). Scroll digits (numeric display). Scroll decimal position, µS/mS display. Holding key down auto scrolls the main set menu and each digit in the numeric display.
ACCESS / ENTER	Press twice to access set-up menu. Enter displayed value into memory. Enter displayed menu item (flashing) into memory.

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TABLE 3-2. Information Mnemonics

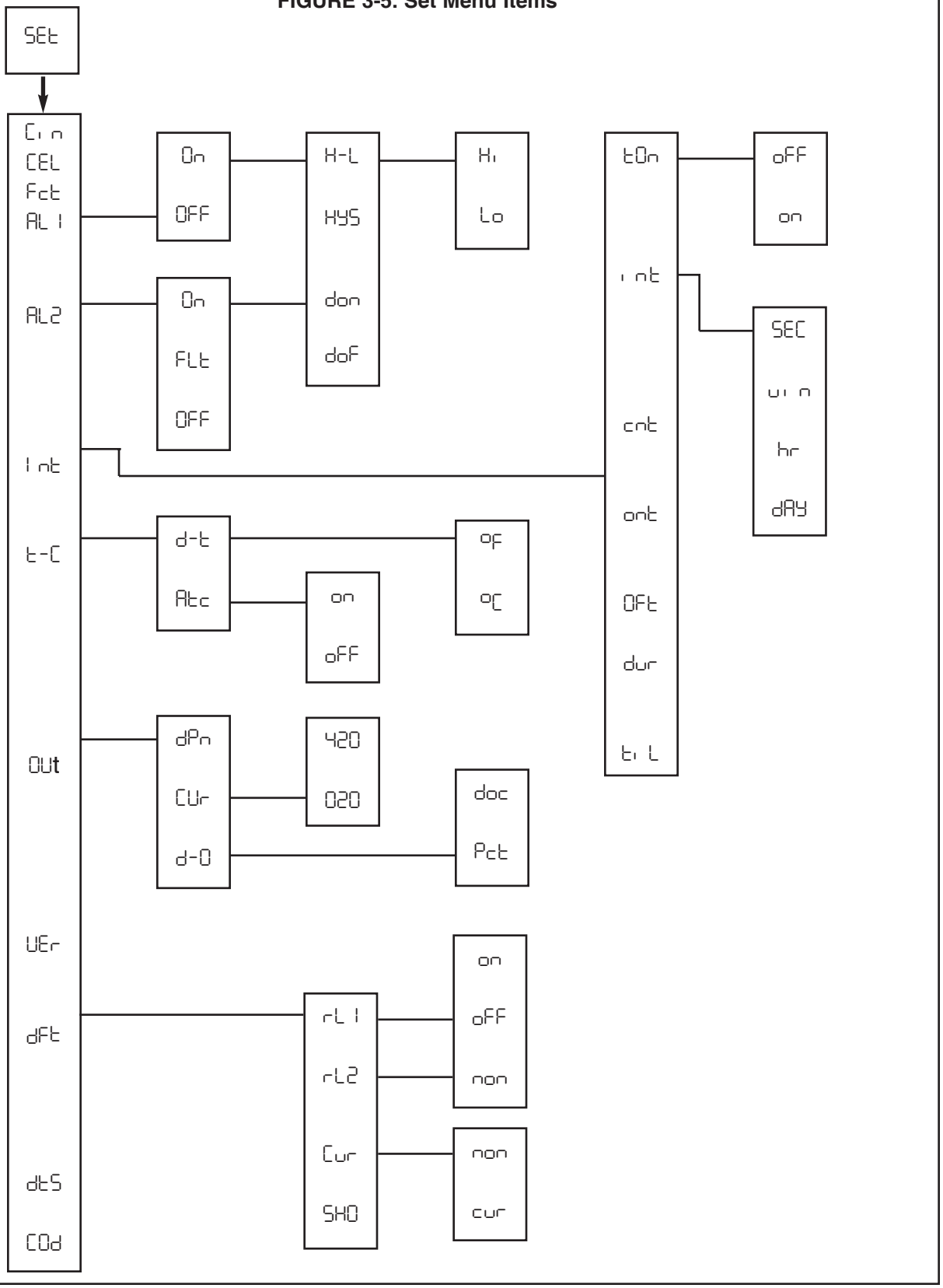
MNEMONIC	DESCRIPTION
AdJ	Adjustment to value reading
bAd	Incorrect entry
Con	Conductivity Display
dOC	Displays conductivity output (mA)
HLd	Analyzer in Hold Position
HI	Displays high range value for current output
ıtr	Interval timer activated
LO	Displays low range value for current output
LOC	Access locked – enter security code
Pct	Displays conductivity output (percent)
SEt	Set mode
Si P	Simulates current output (percent)
Si C	Simulates current output (mA)
SLP	Displays temperature slope in percent
SP 1	Displays Alarm 1 setpoint
SP2	Displays Alarm 2 setpoint
Std	Standardize conductivity
tP 1	Calibration Point 1
tP2	Calibration Point 2

TABLE 3-3. Set Function Mnemonics

AL 1	Alarm 1 setup	dtS	LCD/LED Display test	OFt	Timer off time
AL2	Alarm 2 setup	dur	Timer duration	OUt	Current output
Atc	Automatic temp. comp.	dF	Temperature °F	Pct	Display output in percent
CEL	Cell Constant	Fct	Calibration Factor	rL 1	Relay 1 fault setup
dC	Temperature °C	FLt	Use alarm as fault alarm	rL2	Relay 2 fault setup
Cın	Display Sensor input	Hı	Relay action - high	SEC	Seconds
COd	Security Code	H-L	Alarm logic	SHO	Show fault history
cnt	Timer count	Hr	Hours	t-C	Temperature config.
CUr	Config. current output	HYS	Hysteresis	tıL	Timer - time remaining
Cur	Config. fault output	ınt	Interval period	tOn	Timer status
cur	Default current setpoint	Int	Timer setup	UEr	User version
dAY	Days	Lo	Relay action - low	uın	Minutes
dFt	Fault Configuration	non	No action on fault	420	4mA to 20mA output
d-O	Display output	oFF	Relay open on fault	020	0mA to 20mA output
d-t	Display temperature	OFF	Alarm not used		
doc	Display output in mA	ont	Timer on time		
doF	Delay off time	on	Relay closed on fault		
don	Delay on time	On	Use alarm as process alarm		
dPn	Dampen output				

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FIGURE 3-5. Set Menu Items



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SECTION 4.0
CONFIGURATION

4.1 GENERAL. This section details all of the items available in the Set Mode to configure the analyzer to a specific application.

4.1.1. Configuration Worksheet. The configuration worksheet on the following page should be filled out before proceeding with the analyzer's configuration. This sheet gives a brief parameter description, the factory setting, and a space for user setting.

4.1.2 Set Mode Display Mnemonic SEt**.** Most of the analyzer's configuration is done while in the Set Mode. Please refer to Figure 3-5 for the layout of all menu items. All menu variables are written to the analyzer's EEPROM (memory) when selected and remain there until changed. As these variables remain in memory even after the analyzer's power is removed, the analyzer configuration may be performed prior to installing it.

1. Power up the analyzer. Only power input wiring is required for analyzer configuration (Refer to Section 2.4.1). The analyzer's display will begin showing values and/or fault mnemonics. All fault mnemonics will be suppressed while the analyzer is in Set Mode (the fault flag will continue to blink).

2. Enter Set Mode. Pressing the **ACCESS** key twice in rapid succession will place the analyzer in Set Mode. The display will show SEt to confirm that it is in Set Mode. It will then display the first item in the set menu. The analyzer is now ready for user configuration.

   NOTE:
   If LOC displays, the Keyboard Security Code must be entered to access the Set Mode. (Refer to Section 6.0.)

3. Analyzer variables can be entered in any order. On initial configuration, however, it is recommended that the variables be entered in the order shown on the worksheet. Refer to the configuration worksheet (Table 4-1). This will reduce the chance of accidentally omitting a needed variable.

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TABLE 4-1.
CONFIGURATION WORKSHEET

Use this worksheet to assist in the configuration of the analyzer. Date: _____

	RANGE	FACTORY SET	USER SET
A. Alarm 1 Setup (AL 1)			
1. Alarm Configuration (On/OFF)		On	_____
2. High or Low (H-L) (Hi /Lo)		Lo	_____
3. Hysteresis (HYS)	0-25 % of setpoint	0.00%	_____
4. Delay Time On (don)	0-255 sec.	000 Seconds	_____
5. Delay Time Off (doF)	0-255 sec.	000 Seconds	_____
B. Alarm 2 Setup (AL2)			
1. Alarm Configuration (On/FLt/OFF)		On	_____
2. High or Low (H-L) (Hi /Lo)		Hi	_____
3. Hysteresis (HYS)	0-25 % of setpoint	0.00%	_____
4. Delay Time On (don)	0-255 sec	000 Seconds	_____
5. Delay Time Off (doF)	0-255 sec	000 Seconds	_____
C. Interval Timer (I nt)			
1. Active Status (tOn) (oFF/on)		oFF	_____
2. Interval Time (i nt)	minimum 10 minutes	1 Day	_____
3. Count (cnt)	1 to 60	5	_____
4. On Time (ont)	0 to 299.9 sec	1 Second	_____
5. Off Time (OFt)	0 to 299.9 sec	1 Second	_____
6. Duration (dur)	0 to 299.9 sec	2 Seconds	_____
D. Temperature Setup (t-C)			
1. Display Temperature (d-t) (°C/°F)		°C	_____
2. Automatic Temperature Compensation (Atc) (on/oFF)		on	_____
a. Manual Temp. Value	-20°C to 200°C		_____
E. Current Output Setup (OUt)			
1. mA Output (CUr) (020/420)		420	_____
2. Display Current Output (d-O) (Pct/doc)		doc	_____
3. Dampen Current Output (dPn)	0-255 sec.	0.0 Seconds	_____
F. Default Setup (dFt)			
1. Relay 1 Default (rL 1) (non/oFF/on)		non	_____
2. Relay 2 Default (rL2) (non/oFF/on)		non	_____
3. Current Output Default (Cur) (non/cur)		non	_____
G. Keyboard Security Setup (COd)			
1. Keyboard Security Required	001-999	_	_____
2. Keyboard Security Not Required	000	000	_____
Alarm Set Points			
1. Alarm 1 (SP 1)	0-1999 mS	0.00 mS	_____
2. Alarm 2 (SP2)	0-1999 mS	1,000 mS	_____
Current Output			
1. Zero (0 or 4 mA) (Lo)	0-1,000 mS	0.00 mS	_____
2. F.S. (20 mA) (HI)	0-1,000 mS	1,000 mS	_____

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4.2. ALARM 1 AND 2. Display Mnemonic AL 1 or AL2. Used to set alarm relay logic. The alarms may be used to perform on-off process control. See note below.

A. ON. Display Mnemonic On. Select this item if Alarm 1 or 2 is to be used as a process alarm. See Steps D through G for further configuration.

B. OFF. Mnemonic OFF. Select this item if alarm 1 or 2 will not be used or to temporarily disable the alarm. Alarm 1 or 2 setpoint will display oFF if this item is selected. Omit Steps D through G.

C. Fault. Display Mnemonic FLt. (Alarm 2 only). Select to make Alarm 2 a fault alarm. Relay 2 will energize when the unit shows a fault condition. See Table 8-1 for a listing of the fault mnemonics and their descriptions. Alarm 2 setpoint will display FLt if this item is selected. Omit Steps D through G.

D. Alarm Logic. Mnemonic H-L. Select this item for high or low alarm logic. High logic activates the alarm when the reading is greater than the set point value. Low logic activates the alarm when the reading is less than the set point value.

E. Relay Hysteresis. Display Mnemonic HyS. Sets the relay hysteresis (dead band) for deactivation after reading has passed the alarm set point. May be set from 0 to 25%. Use hysteresis when a specific conductivity should be reached before alarm deactivation.

F. Delay Time On. Display Mnemonic don. Sets time delay for relay activation after alarm set point is reached. May be set from 0 to 255 seconds.

G. Delay Time Off. Display Mnemonic doF. Sets time delay for relay deactivation after alarm set point is reached. May be set from 0 to 255 seconds. Alarm state restarts time from zero. Use when a fixed time should pass before relay deactivation occurs.

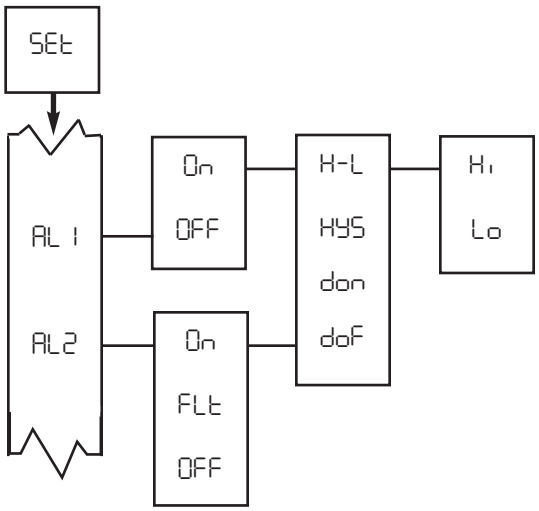
4.2.1 Alarm Configuration (AL 1/AL2). Refer to Figure 4-1.

1. Enter Set Mode by pressing **ACCESS** key twice.
2. **SCROLL** (↑) until AL 1 or AL2 appears on the display.
3. **SELECT** to move to the next menu level. On, OFF or (AL2 only) FLt will display.
4. **SCROLL** (↑) to display desired item then **SELECT**.
5. If OFF is selected, display will show oFF to acknowledge. Press **ENTER** key to return to AL 1 or AL2, concluding routine. Skip to Step 11.

   If On is selected, display will show on to acknowledge, then display H-L. Proceed to Step 6.

   If FLt is selected, display will show FLt to acknowledge. Press **ENTER** key to return to AL2.
6. **SELECT** H-L. Hi or Lo will display (flashing).
7. **SCROLL** (↑) to the desired item and ENTER it into memory. Display will return to H-L. If changes to relay activation logic are desired, proceed to Step 8, otherwise Step 12.
8. **SCROLL** (↑) to display HyS, don or doF then **SELECT** desired item. Numerical display will flash to indicate that a value is required.
9. Use **SCROLL** (↑) and **SHIFT** (←) to display the desired value.
10. **ENTER** value into memory. The analyzer will acknowledge and return to display of last item selected. Repeat Step 8 if further changes are desired, otherwise Step 12.
11. Repeat Step 3 for the other Alarm's settings as required.
12. To return to the first level of the Set Mode, Press the **ACCESS** key.

Figure 4-1. Alarm 1 and Alarm 2 Configuration



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4.3 INTERVAL TIMER. Display Mnemonic int. This item is used to set the interval timer's relay logic. The timer can be used for sensor maintenance, such as a wash cycle to clean the sensor in a bypass line. Choices are:

A. Interval Timer Enable/Disable. Display Mnemonic tOn. Select this item to begin interval cycle on or disable interval cycle oFF.

B. Interval Period. Display Mnemonic int. Select this item to set the time period between control cycles. SEC for seconds, min for minutes, hr for hours, and dAY for days. May be set from a minimum of 10 minutes.

C. On Periods Per Cycle. Display Mnemonic cnt. Select this item to enter the number of on periods per cycle. May be set from 1 to 60 on periods.

D. Duration of On Periods. Display Mnemonic ont. Select this item to enter the relay activation time for each on period. May be set from 0.1 to 299.9 seconds.

E. Duration of OFF Periods. Display Mnemonic OFt. Select this item to enter the relay deactivation time between each on period during the control cycle. Valid when cnt is 2 or greater. May be set from 0 to 299.9 seconds.

F. Sensor Recovery Time. Display Mnemonic dur. Select this option to enter the duration time after the last on period in a cycle. May be set from 0 to 299.0 seconds. The wait duration can be used for electrode recovery after a wash cycle.

G. Interval Time remaining. Display Mnemonic tiL. Select this item to display the time remaining to the next control cycle. If selected during the control cycle, display will show ---.

NOTE

The Model 1054B is placed *on hold* during the control cycle (from first on period through the wait duration). The analyzer will simulate a fault condition and briefly show itr every eight seconds. The display will continue to show the measured value.

4.3.1 Interval Timer Configuration (int).

Refer to Figure 4-2 and Figure 4-3.

1. Enter Set Mode by pressing **ACCESS** Key twice.
2. **SCROLL** (↑) until int appears on the display.
3. **SELECT** to move to the next menu level. tOn will display.

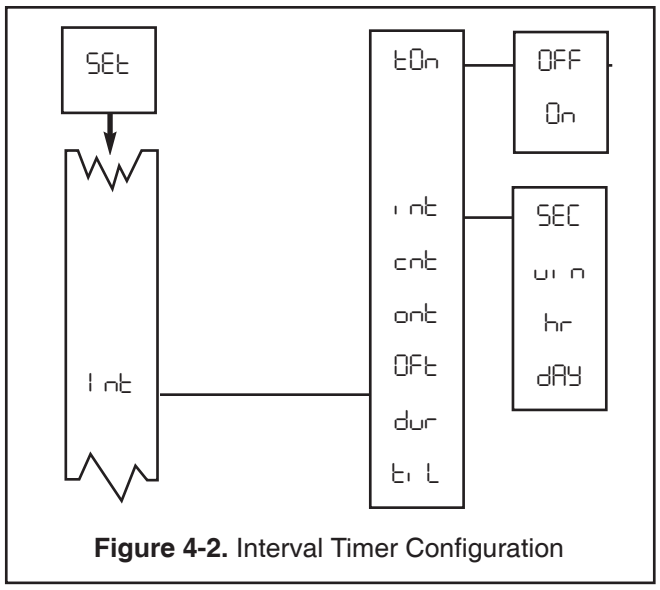


Figure 4-2. Interval Timer Configuration

4. **SCROLL** (↑) to display on or oFF and **ENTER** it into memory. If interval configuration is required, proceed to Step 5, otherwise Step 10.
5. **SCROLL** (↑) to display desired menu item. If int is selected, go to Step 6, otherwise Step 10.
6. **SCROLL** (↑) to display desired interval period and **SELECT** it. Numerical Display will flash.
7. **SCROLL** (↑) and **SHIFT** (←) to display the desired value and **ENTER** it into memory. Display will return to interval period menu.
8. Repeat Steps 6 and 7 as needed.
9. Press the **ENTER** key to return to the main timer menu.
10. **SELECT** the desired item. The Numerical Display will flash.
11. **SCROLL** (↑) and **SHIFT** (←) to display the desired value and **ENTER** it into memory.
12. Repeat Steps 5, 10, and 11 as required.
13. Press the **ENTER** key to return to Set Menu.

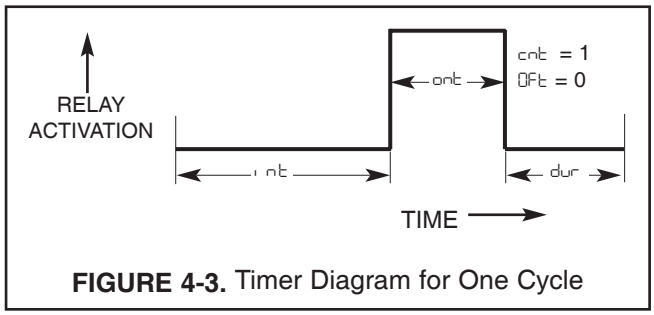


FIGURE 4-3. Timer Diagram for One Cycle

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4.4 TEMPERATURE. Display Mnemonic t-C. Select this item for temperature reading and compensation choices.

A. Temperature Display. Display Mnemonic d-t. Select this item to toggle between °F and °C temperature display. The analyzer will show all temperatures in units selected until the selection is changed.

B. Automatic Temperature Compensation. Display Mnemonic Atc. The analyzer will use the temperature input from the sensor for temperature correction when on is selected. When oFF is selected, the analyzer will use the value entered by the user for temperature correction. This manual temperature option is useful if the temperature sensor is faulty or not on line. Temperature specific faults will be disabled (refer to Section 8.0).

4.4.1 Temperature Configuration t-C**.** Refer to Figure 4-4.

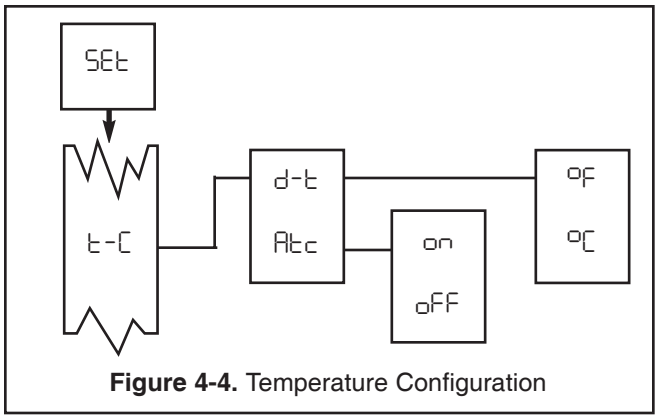


Figure 4-4. Temperature Configuration

1. Enter Set Mode by pressing **ACCESS** key twice
2. **SCROLL** (↑) until t-C appears on the display.
3. **SELECT** to move to the next menu level. d-t will display.
4. **SCROLL** (↑) to display desired item then **SELECT** it.
5. If d-t is selected, display will show °C or °F.

   If Atc is selected, display will show on or oFF.
6. **SCROLL** (↑) then **ENTER** desired item into memory.
7. If °C, °F or on are entered, display will return to the previous level (proceed to Step 9).

   If oFF is selected, numerical display will flash indicating that a process temperature value is required (proceed to Step 8).
8. Use **SCROLL** (↑) and **SHIFT** (←) to display the desired value. **ENTER** value into memory.
9. Repeat Steps 4-8 as required for other item.
10. Press the **ENTER** key to return to Set Menu.

4.5 CURRENT OUTPUT. Display Mnemonic is Out. This item is used to configure the output signal.

A. Output Dampening. Display Mnemonic dPn. Dampens the response of the signal output. This option is useful to minimize the effect of a noisy reading. The number entered is the sample time (in seconds) for an averaged output. Zero to 255 seconds may be entered.

B. mA Output Range. Display Mnemonic CUr. Selection of this item will allow choice of 0 to 20 mA or 4 to 20 mA output range.

C. Display Output. Display Mnemonic d-0. This item is used to select logic of output display. Selecting this item will allow the analyzer to display current output as mA (doc) or as a percent of full scale output range (Pct).

4.5.1 Current Output Configuration Out**.** Refer to Figure 4-5.

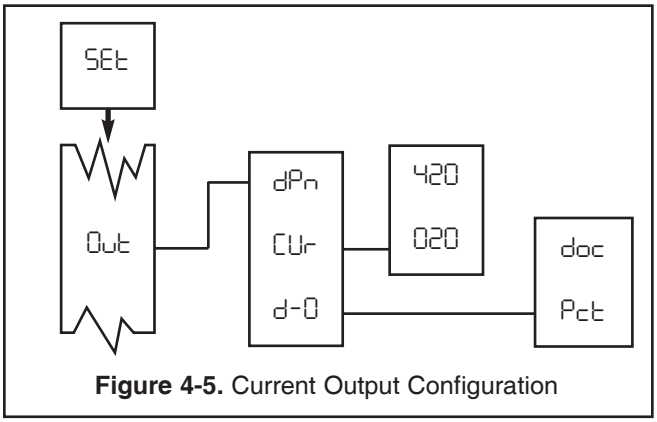


Figure 4-5. Current Output Configuration

1. Enter Set Mode by pressing the **ACCESS** key twice.
2. **SCROLL** (↑) until Out appears on the display.
3. **SELECT** to move to the next menu level. dPn will display.
4. **SCROLL** (↑) then **SELECT** desired item.
5. If dPn is selected, numerical display will flash indicating that a value is required (proceed to Step 6).

   If CUr or d-0 is selected, proceed to Step 7.
6. **SCROLL** (↑) then **SHIFT** (←) to display the desired value. **ENTER** into memory
7. **SCROLL** (↑) then **ENTER** desired item.
8. Repeat Steps 4-7 as required.
9. Press the **ENTER** key to return to the Set Menu.

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4.6 DEFAULTS. Display Mnemonic dFt. This item is used to set the configuration of relays and output default conditions during fault or hold status. See Table 8-1 for a listing of the possible fault conditions which can be diagnosed by the analyzer. A hold status is initiated by pressing the **HOLD** key twice. (Press twice again to remove the hold.)

A. Relay 1 and 2. Display Mnemonic rL1 and rL2. The relays can be set to activate on, deactivate oFF, or hold present status non. See Table 4-2.

B. Current Output. Display Mnemonic Cur.The current output is held non or goes to a specified value cur during a fault condition. cur will probably be the most informative selection.

C. Fault History. Display Mnemonic SHO. Selecting this item will display the most recent detected faults. Press the **SCROLL** key once for each previous fault history. Pressing **ACCESS** will clear SHO history.

4.6.1 Default Configuration (dFt).
Refer to Figure 4-6.

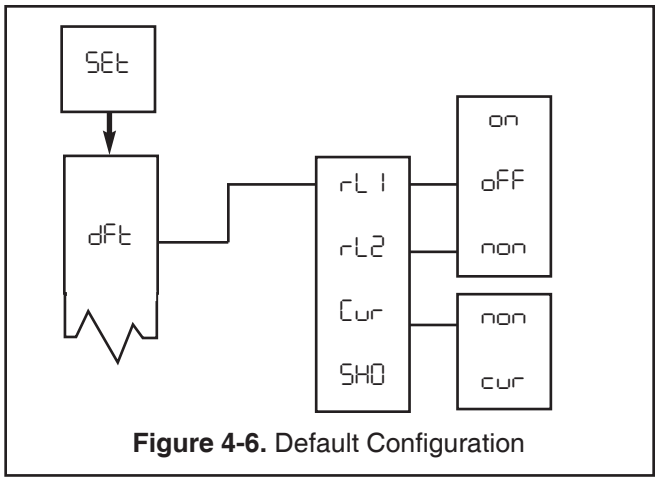


Figure 4-6. Default Configuration

1. Enter Set Mode by pressing the **ACCESS** key twice.
2. **SCROLL** (↑) until dFt appears on the display.
3. **SELECT** to move to the next menu level. rL1 will display.
4. **SCROLL** (↑) then **SELECT** desired item.
5. Display will show next item selection. **SCROLL** (↑) and **ENTER** desired item.
6. Repeat Steps 4 and 5 as required for other default settings rL2 and Cur. If cur is selected for Cur, press **ENTER** then use the **SCROLL** (↑) and **SHIFT** (←) keys to enter the desired current value in mA.
7. Press the **ENTER** key to return to Set Menu.

TABLE 4-2. Relay States for Various Conditions and Alarm/Default Configurations

Set Menu default (dFt) setting rL1 rL2	ANALYZER CONDITION								
	NORMAL			HOLD			FAULT		
	Set menu AL1 AL2 setting			Set menu AL1 AL2 setting			Set menu AL1 AL2 setting		
	On	OFF	FLt (Alarm 2 only)	On	OFF	FLt (Alarm 2 only)	On	OFF	FLt (Alarm 2 only)
on	Proc. det.	–	–	+	–	–	+	–	+
oFF	Proc. det.	–	–	–	–	–	–	–	+
non	Proc. det.	–	–	Proc. det.	–	–	Proc. det.	–	+

Proc. det.: Alarm state is determined by the process value.
+ : Relay will activate.
– : Relay will not activate.

Example: If you want the analyzer to activate relay 1 in hold mode during calibration, set AL1 to On in Section 4.3, and set rL1 to on.

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4.7 ALARM SETPOINT. The alarm setpoints should be adjusted after completing the configuration procedure outlined in Sections 4.1 to 4.6 (Refer to Figure 4-7).

1. Press the **PV** key to ensure that the analyzer is not in Set Mode.

2. Press the **ALARM 1** or **ALARM 2** key. SP 1 or SP2 will show briefly, followed by the Alarm 1 or Alarm 2 Setpoint.

   NOTE:
   If the alarm is set to OFF or FAULT (Alarm 2 only), the analyzer will display oFF or FIt respectively (refer to Section 4.2, Alarm Configuration).

3. Press **SELECT** to adjust the value. The display will acknowledge briefly with AdJ followed by the Numeric Display with digit flashing.

4. **SCROLL** (↑) and **SHIFT** (←) to display the desired value.

5. **ENTER** value into memory.

6. Repeat Steps 2 to 5 for the second setpoint.

   NOTE
   Selection of µS/mS and decimal positions is achieved by pressing **SHIFT** (←) until the µS/mS flag flashes, then **SCROLL** (↑) until the desired combination of decimal position and mS (quick flashing)/µS (slow flashing) flag are displayed.

   NOTE
   Alarm logic may be changed from normally open (N.O.) to normally closed (N.C.) by cutting circuits (W5, W7 & W9) on the power supply PCB and adding jumpers (W4, W6, & W8).

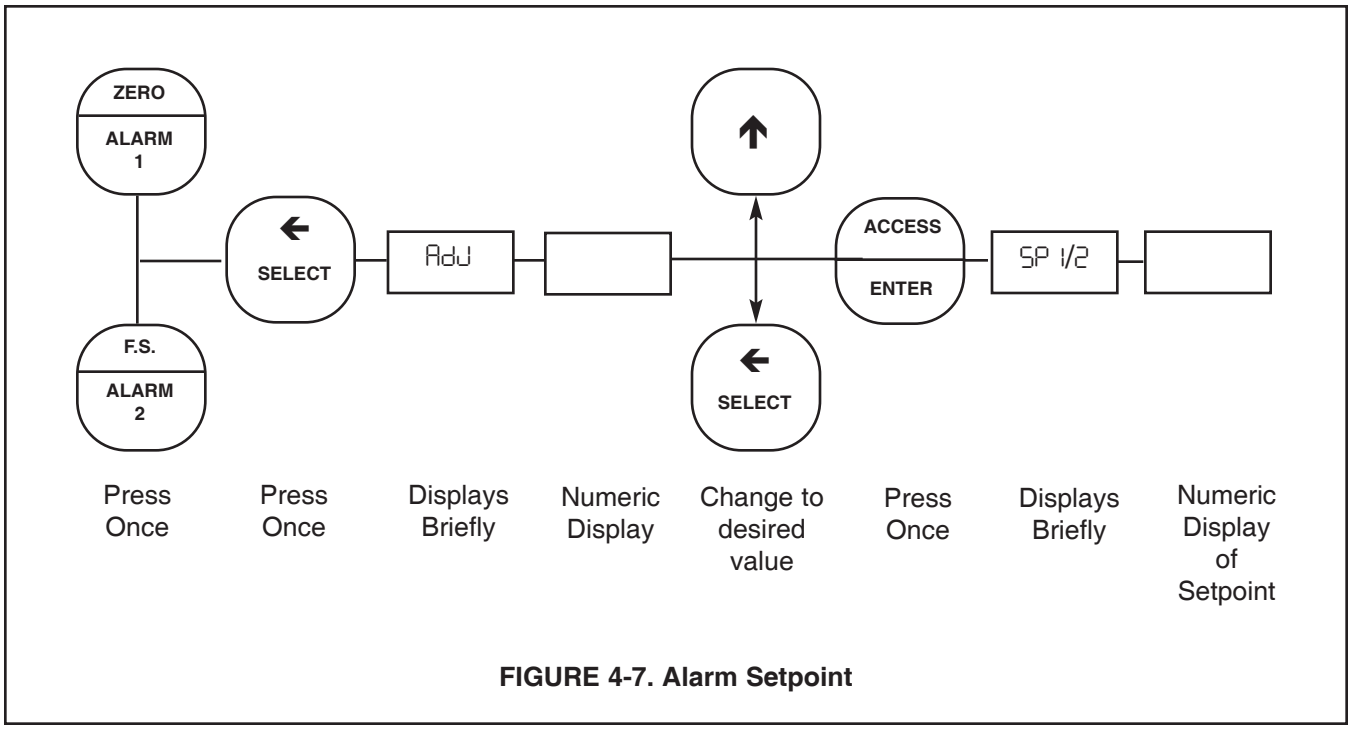


FIGURE 4-7. Alarm Setpoint

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4.8 OUTPUT SCALE EXPANSION. This section should be followed if it is desired to scale the current output range other than the factory setting of 0-20 millisiemen. The output zero and full scale value should be adjusted after completing the configuration procedure as outlined in Sections 4.1 to 4.6 (refer to Figure 4-8).

A. ZERO POINT (0 mA or 4 mA) (LO)

1. Press the **PV** key to ensure that the unit is not in Set Mode.
2. Press the **ALARM 1** key twice. The display will show LO briefly then display the ZERO point.
3. Press **SELECT** to adjust the value. The display will acknowledge briefly with AdJ followed by the Numeric Display with digit flashing.
4. **SCROLL** (↑) and **SHIFT** (←) to display the desired value.
5. **ENTER** value into memory. The display will show LO and display the entered value.

B. Full Scale (F.S.) Point (20 mA) (HI)

1. Press the **PV** key to ensure that the analyzer is not in Set Mode.
2. Press the **ALARM 2** key twice. The display will show HI briefly then display the FULL SCALE point.
3. Press **SELECT** to adjust the value. The display will acknowledge briefly with AdJ followed by the Numeric Display with digit flashing.
4. **SCROLL** (↑) and **SHIFT** (←) to display the desired value.
5. **ENTER** value into memory. The display will show HI and display the entered value.

NOTE

For a reverse output, enter the higher value for zero, and the lower value for the Full Scale.

NOTE

Selection of µS/mS and decimal positions is achieved by pressing **SHIFT** (←) until the µS/mS flag flashes, then **SCROLL** (↑) until the desired combination of decimal position and mS (quick flashing)/µS (slow flashing) flag are displayed.

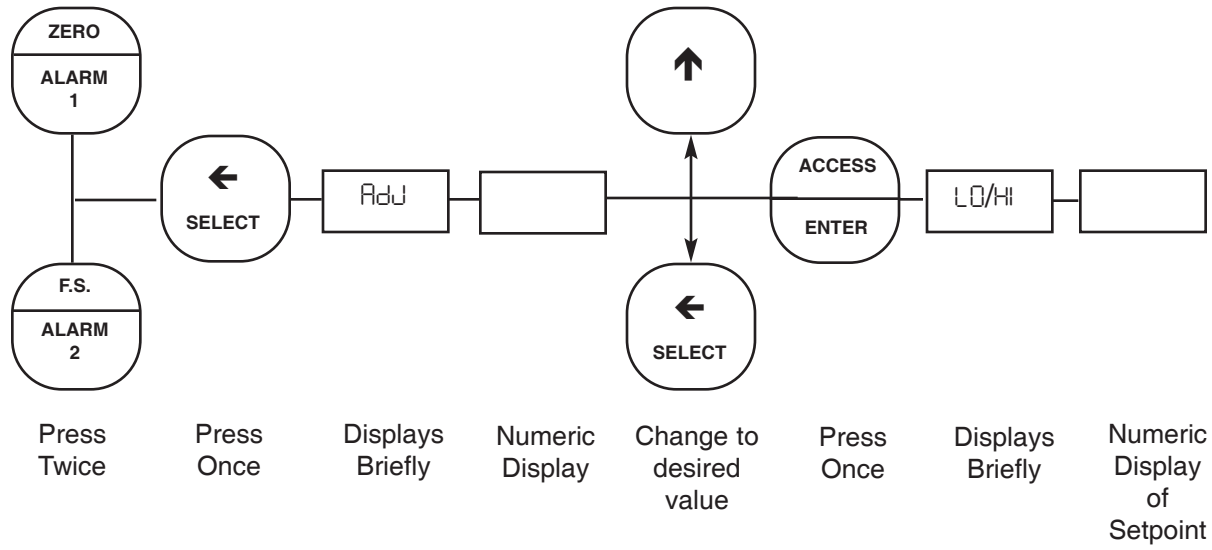


FIGURE 4-8. Output Scale Expansion

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4.9 SIMULATE CURRENT OUTPUT. The output can be simulated to check the operation of devices such as valves, pumps, or recorders. The output can be simulated in either current (mA) or percent of full scale, depending on how the output display d-O was configured in Section 4.5 (Refer to Figure 4-9).

A. Simulate Output in Percent SI P. The output can be simulated in percent if d-O in Section 4.5 was configured to display percent Pct.

1. Press the **PV** key once to insure that the analyzer is not in the Set Mode.
2. Press the **OUTPUT** key twice. The display will show Pct briefly, then display the output value in percent of full scale.
3. Press **SELECT** to simulate the output. The display will briefly acknowledge with SI P followed by the Numeric Display with digit flashing.
4. **SCROLL** (↑) and **SHIFT** (←) to display the desired value.
5. **ENTER** value into memory. The display will show Pct and display the entered value. Also, the display will flash to acknowledge that the analyzer is placed on hold HLd. In hold mode the relays will be set as determined in Section 4.6.
6. To remove the analyzer from hold, press the **HOLD** key twice. The hold flag on the display will be removed and the display will stop flashing.

B. Simulate Output in Current SI C. The output can be simulated in mA units if d-O in Section 4.5 was configured to display current doc.

1. Press the **PV** key once to insure that the analyzer is not in the Set Mode.
2. Press the **OUTPUT** key twice. The display will show dOC briefly, then display the output value in mA.
3. Press **SELECT** to simulate the output. the display will briefly acknowledge with SI c followed by the Numeric Display with digit flashing.
4. **SCROLL** (↑) and **SHIFT** (←) to display the desired value.
5. **ENTER** value into memory. The display will show dOC and display the entered value. Also, the display will flash to acknowledge that the analyzer is placed on hold HLd. In hold mode the relays will be set as determined in Section 4.6.
6. To remove the analyzer from hold, press the **HOLD** key twice. The hold flag on the display will be removed and the display will stop flashing.

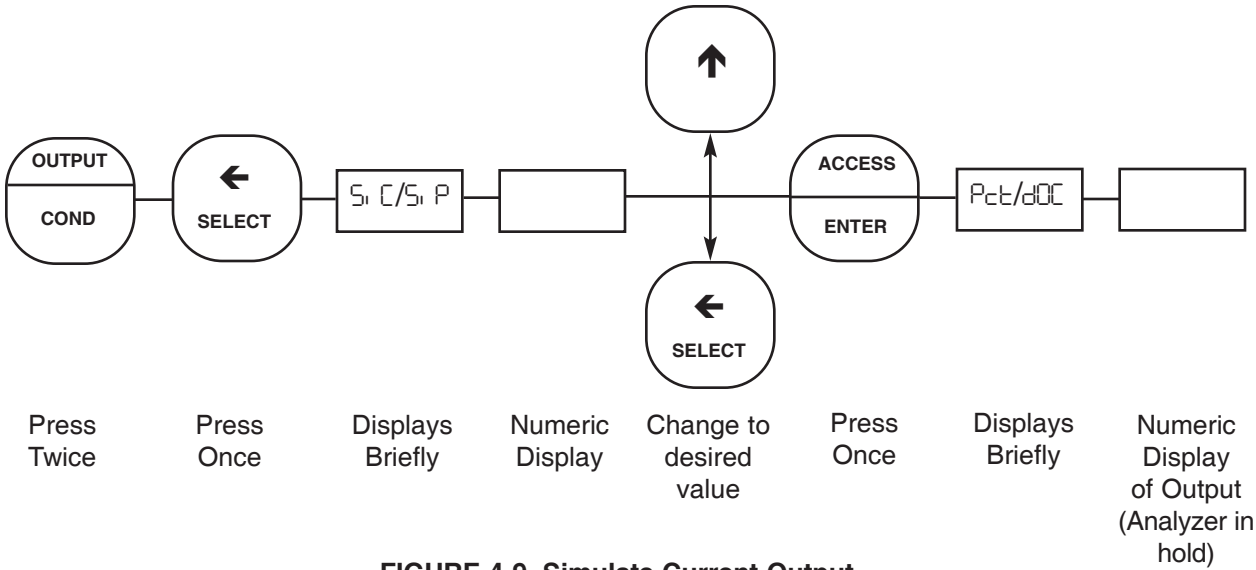


FIGURE 4-9. Simulate Current Output

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SECTION 5.0
START-UP AND CALIBRATION

5.1 GENERAL. Calibration and operation of the Model 1054B should begin only after completion of the configuration of the analyzer. The sensor must be wired (including J-box and interconnecting cable) as it will be in operation.

NOTE
READ THE ENTIRE CALIBRATION SECTION TO DETERMINE THE CALIBRATION PLAN MOST SUITABLE FOR YOUR NEEDS.

5.2 Entering the Cell Constant. The first time the analyzer is calibrated and any time there is a sensor change, the sensor cell constant must be entered into memory. Entering a cell constant into memory will reset the cell factor FCt to 1.0 and will initiate the analyzer (the cell factor gives an indication of sensor scaling. Refer to Section 8.2.3).

1. Enter the Set Mode. Press the **ACCESS** key twice in rapid succession. The analyzer will display SEt briefly then display Con.
2. **SCROLL** (↑) the menu until CEL is displayed, then **SELECT** it. The Numerical display will flash to indicate that a value is desired.
3. Use **SCROLL** (↑) and **SHIFT** (←) to display the correct sensor cell constant and **ENTER** it into memory. This value can be found on the cable label (i.e., Sensor K= 1.00).

NOTE
Only adjust the cell constant when the conductivity sensor is replaced or serviced. Then always perform a restandardization. See Section 5.5.

5.3 Temperature Calibration. For accurate temperature correction, the temperature reading may need adjusting. The following steps must be performed with the sensor in the process or in a grab sample. For the most accurate results, standardization should be performed at or near operating temperature.

1. Observe the analyzer temperature reading by pressing the **TEMP** key. Allow the reading to stabilize to insure that the sensor has acclimated to the process temperature.
2. Compare the analyzer reading to a calibrated temperature reading device. If the reading requires adjusting, proceed to Step 3, otherwise, go to Section 5.4.
3. Press the **TEMP** key then the **SELECT** key to correct the temperature display. The analyzer will display AdJ briefly, then the Numeric Display will show with digit flashing.
4. **SCROLL** (↑) and **SHIFT** (←) to display the correct value and **ENTER** it into memory. Proceed to Section 5.4.

5.4 Initial Loop Calibration. Please read the entire calibration section before proceeding to determine the best plan to follow.

A. Two Point Calibration - Standard Method. This is the recommended procedure for the initial calibration if the process's temperature slope is unknown. If any of the steps below are impossible or impractical, refer to the alternate Section 5.4 B.

1. Obtain a grab sample of the process to be measured.
2. Determine the sample's conductivity using a calibrated bench or portable analyzer. The analyzer must be able to reference the conductivity to 25°C, or the solution must be measured at 25°C. **Note** the reading. Insure that the analyzer is in hold. Press the **HOLD** key twice and observe the solid flag.
3. Immerse the analyzer's sensor into the process solution. The sensor body must be held away from the bottom and sides of the sample's container and the sensor cable must not be allowed to contact the solution. Shake the sensor to ensure that no air bubbles are present.
4. Adjust the sample's temperature to either the normal high or normal low temperature of the process. To raise the sample's temperature, a hot plate with stirrer is recommended. To lower the process temperature, place the grab sample's container in an ice bath or let it slowly cool down.

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A. Two Point Calibration. (continued)

5. Allow the sensor to acclimate to the solution. (The temperature reading should be stable.)
6. Press the **CAL** key. 1St displays briefly (if 2nd displays, press **CAL** again), then the Numeric Adjustment window displays.
7. **SCROLL** (↑) and **SHIFT** (←) to display the grab sample's conductivity value at 25°C as noted in Step 2, then **ENTER** into memory.
8. Adjust the sample's temperature to the other normal temperature extreme of the process. To raise the sample's temperature, a hot plate with stirrer is recommended. To lower the process temperature, place the grab sample container in an ice bath.
9. Allow the sensor to acclimate to the solution. (The temperature reading should be stable.)
10. Press the **CAL** key. 1St displays briefly (If 2nd displays, press **CAL** again), then the Numeric Adjustment window displays.
11. **SCROLL** (↑) and **SHIFT** (←) to display the grab sample's conductivity value 25°C as noted in Step 2, then **ENTER** into memory.

The analyzer will then calculate the true cell constant and the temperature slope then return to reading conductivity. The temperature slope of the process can now be read. Press the **CAL** key twice. The display will show SLP briefly then the calculated slope for the two calibration points. Place the sensor in the process, then remove the analyzer from hold by pressing the **HOLD** key twice again.

The slope may be calculated from the following formula:

$$\%\ \text{SLOPE/°C} = \frac{\left(\frac{\text{Conductivity } T^{max}}{\text{Conductivity } T^{min}} - 1\right) X100}{\Delta T}$$

Where: Conductivity T^{max} is the conductivity at the maximum process temperature, Conductivity T^{min} is the conductivity at the lower process temperature, and the ³T is the difference between the maximum and minimum process temperature.

EXAMPLE:

$$\%\ \text{SLOPE/°C} = \frac{\left(\frac{45K}{35K} - 1\right) X100}{60\text{-}50=10} = 2.8\%/\text{°C}$$

B. Single Point Calibration - Slope Known. This is the recommended procedure for the initial calibration if the temperature slope of the process is known.

If you do not know the exact temperature slope value, but wish to approximate it, refer to the following guide. However, the conductivity reading may have reduced accuracy compared to the value if the procedure in Section A is performed.

Acids: 1.0 to 1.6% per °C
Bases: 1.8 to 2.2% per °C
Salts: 2.2 to 3.0% per °C
Water: 2.0% per °C

1. Press the **CAL** key twice. The analyzer will display SLP briefly, then show the temperature slope in memory.
2. **SELECT** to change the value. The analyzer will display AdJ briefly, then show the Numeric Display window.
3. **SCROLL** (↑) and **SHIFT** (←) to display the proper temperature slope for the process to be measured, then **ENTER** into memory.
4. Obtain a grab sample of the process to be measured.
5. Determine the conductivity of the sample using a calibrated bench instrument or portable analyzer. The instrument must be able to reference the conductivity to 25°C or the solution must be measured at 25°C. Note the reading. Insure that the analyzer is in hold. Press the **HOLD** key twice and observe the solid flag.
6. Press the **PV** key once then press the **SELECT** key once. Std will display followed by the Numeric Display with digit flashing.
7. **SCROLL** (↑) and **SHIFT** (←) to display the conductivity value you noted in Step 5, then **ENTER** it into memory.
8. Install the sensor in the process, then remove the analyzer from hold by pressing the **HOLD** key twice.

The analyzer will calculate the true cell constant after the initial calibration.

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5.5 Routine Standardization. The sensor should be standardized routinely if it is suspected that the process might degrade or coat the sensor. When a sensor cell constant is entered CEL is set to this value and the cell factor FCt is set to 1.000. The first standardization recalculates the cell constant CEL. Subsequent standardizations will change the cell factor FCt. Refer to Section 8.2.3 for a description of the cell factor.

To perform a standardization do the following:

1. Take a grab sample which is as close to the sensor as possible. Write down the value the analyzer is reading at this time (C1).
2. Measure the conductivity of the grab sample using a calibrated bench analyzer referenced to 25°C/77°F or measured at 25°C. Write down this value (C2).
3. Before entering the reference value, note the value the analyzer is reading now (C3) and compare it to the value in Step 1. This accounts for the change while the grab sample is being measured.
4. Press the **PV** key once, then press **SELECT**. Std will display briefly followed by the Numeric display with flashing digit.
5. The corrected conductivity reference value may be determined by multiplying the value in Step 2 (C_2) by the value noted in Step 3 (C_3) and dividing the product by the analyzer value from Step 1 (C_1):

$$\frac{C_2 \times C_3}{C_1} = C_{RV}$$

   Enter this corrected reference value in the analyzer using the **SCROLL** (↑) and **SHIFT** (←) keys. Then press **ENTER**.
6. Note the cell factor value FCt. Press the **ACCESS** key twice quickly. **SCROLL** (↑) to FCt press **SELECT** and note this value. Keep track of this value to determine a sensor cleaning schedule.

5.6 Sensor Maintenance. Before performing maintenance or cleaning of the sensor, the Model 1054B C should be placed in hold. This will place the current output and relays in the states determined in Section 4.6. Before removing the sensor from the process, press the **HOLD** key twice. The **HOLD** flag will show to indicate the hold condition.

Always reenter the cell constant (Section 5.2) and restandardize (Section 5.5) after cleaning or replacement of the sensor.

Replace the sensor back into the process and press the **HOLD** key twice again to remove the analyzer from hold. The hold flag will disappear.

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SECTION 6.0
KEYBOARD SECURITY

6.1 GENERAL. Display Mnemonic COd. Select this feature to display the user defined security code. Any three digit number may be used for this code. 000 will disable the security feature. This item is used to prevent accidental changes to the calibration and configuration of the analyzer. When activated, the analyzer will allow all read functions to read normally. If an attempt is made to change a value, LOC will display followed by the Numeric Display ready for the code to be entered. A proper code will unlock the analyzer and the analyzer will return to the last function attempted. Any incorrect value will result in bAd briefly displaying. The analyzer will then return to numeric display and await the entry of the code. Once unlocked, the analyzer will allow access to all functions until the analyzer is either powered down or no keystrokes are made for a period of two (2) minutes. If the code should be forgotten, pressing and holding the **ACCESS** key for five (5) seconds will result in display of the code. Releasing the **ACCESS** key, then pressing **ENTER** will unlock the analyzer.

6.2 ACCESS CODE (COd).

1. Enter Set Mode by pressing **ACCESS** key twice.
2. **SCROLL** (↑) until COd appears on the display.
3. Press **SELECT.**
4. **SCROLL** (↑) and **SHIFT** (←) to display the desired value, then **ENTER** it into memory.

NOTE

Entering 000 disables the keyboard security.

NOTE

Security feature will not activate until two (2) minutes without keyboard activity or power is removed from the analyzer then restored.

SECTION 7.0
THEORY OF OPERATION

THEORY OF OPERATION. This section is a general description of how the analyzer operates. This section is for those users who desire a greater understanding of the analyzer's operation.

A square wave measurement circuit in the Model 1054B C Analyzer replaces the typical bridge circuit used in most conductivity analyzers, resulting in improved linearity, accuracy and a broad measurement range. The analyzer measures the absolute conductivity of the measured process. The analyzer then corrects the conductivity to 25°C by accurately measuring the process temperature by means of a PT-100 RTD located in the conductivity sensor. The microprocessor also adjusts the amount of correction required for temperature compensation by means of a temperature slope adjustment.

The slope may be adjusted between 0-5%/°C either manually via the keyboard or automatically during bench or process calibration. This slope controls the amount of correction required in the temperature compensation circuit, and is specific to the process, giving you the most accurate conductivity reading possible.

The Model 1054B C analyzer can provide conductivity measurements as low as 1 uS/cm and as high as 1000 mS/cm full scale over a process temperature range of 0 to 200°C.

Rosemount Analytical also offers a booklet titled Conductance Data for Commonly Used Chemicals. This booklet includes measurement theory and conductance information for commonly used chemicals.

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SECTION 8.0
DIAGNOSTICS AND TROUBLESHOOTING

8.1 DIAGNOSTICS. The Model 1054B analyzer has a diagnostic feature which automatically searches for fault conditions that would cause an error in the measured conductivity value. If such a condition occurs, the current output and relays will act as configured in default and the fault flag and display will flash. A fault code mnemonic will display at frequent intervals. If more than one fault condition exists, the display will sequence the faults at one second intervals. This will continue until the cause of the fault has been corrected. Display of fault mnemonics is suppressed when in Set Mode. Selecting the SHO item will display a history of the two most recent fault conditions unless SHO was cleared (Refer to Section 4.6).

NOTE

If the analyzer is in hold and a fault occurs, the mnemonic HLd will display during the fault sequence.

8.1.1 Fault Mnemonics. Table 8-1 (below) lists the fault mnemonics and describes the meaning of each.

TABLE 8-1. Fault Mnemonics

Display	Description
EEP	**EEPROM write error (bad EEPROM chip).**
CHS	**ROM failure (check sum error) (bad ROM chip).**
Orn	**Overrange.**
SEn	**Sensor line error or wire length error.**
COP	**Computer not operating properly.**
tcH	**High temperature compensation error.**
tcL	**Low temperature compensation error.**
Ein	**Input shorted.**
cin	**Sensor miswired.**
FAC	**Factory calibration required.**

8.1.2 Temperature Compensation. Table 8-2 (below) is a ready reference of RTD resistance values at various temperatures. These are used for test and evaluation of the sensor.

TABLE 8-2. RTD Resistance Values

Temperature	Resistance
0°C	**100 ohms**
10°C	103.90 ohms
20°C	107.70 ohms
25°C	109.62 ohms
30°C	111.67 ohms
40°C	115.54 ohms
50°C	**119.40 ohms**
60°C	123.24 ohms
70°C	127.07 ohms
80°C	130.89 ohms
90°C	134.70 ohms
100°C	**138.50 ohms**
110°C	142.29 ohms
120°C	146.06 ohms
130°C	149.82 ohms
140°C	153.58 ohms
150°C	**157.31 ohms**
160°C	161.04 ohms
170°C	164.76 ohms
180°C	168.46 ohms
190°C	172.16 ohms
200°C	**175.84 ohms**

NOTE

Ohmic values are read across the T.C. element and are based on the stated values (R_O ± .12%). Allow enough time for the T.C. element to stabilize to the surrounding temperature. Each 1°C change corresponds to a change of 0.385 ohms.

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8.2 TROUBLESHOOTING. The Model 1054B analyzer is designed with the state of the art microprocessor circuitry. This design incorporates programmed features that provide constant monitoring for fault conditions, and the reporting of these faults via Mnemonics on the instrument display screen. This aids in determining where to start checking for the cause of failures, and in some instances, the ability to see changes that can be used to predict future degeneration of assemblies before their complete failure.

8.2.1 Installation Failure. After completion of installation the instrument should be checked for operation. Normally this would consist of Powering up the instrument and checking for:

1. A self diagnostic fault display. Refer to Table 8-1 for brief description of problem indicated by mnemonic. Table 8-3 provides a more comprehensive problem explanation and actions that may help solve the problem.
2. A conductivity reading that is approximately correct (depending upon sensor installation in either air or process). Refer to Section 8.2.3 for sensor checks.
3. Pressing several of the keypads to determine whether programming appears to be operational. Table 8-3 explains problems and actions that may be helpful in solving them.
4. Checking output for 4-20 mA output current.

8.2.2 After Operation. Troubleshooting this instrument after previous operation should follow normal troubleshooting procedures. Check display. If power is O.K. the display mnemonic will direct you to the basic area of malfunction (Sensor, Printed Circuit Boards, calibration, or temperature compensation).

Use Table 8-1 and Table 8-3 to determine area, possible problem and actions to take to remedy fault.

Evaluate instrument electronics. This can be accomplished by simulating a known conductivity input and observation of instrument operation. To simulate sensor operation with known conductivity inputs, use the following procedures.

1. Disconnect the Sensor input leads from TB2-1, 3, 6, and 7.
2. Install decade box or resistor leads to TB2-1 and 3. (If decade box is not available, simulate desired conductivity input by either calculating using the formula given in Figure 8-1, or by using the Conductivity vs. resistance Table in Figure 8-1.)
3. Install a jumper between TB2-6 and 7. Check wiring with Figure 8-1.
4. Power up instrument and enter SEt menu.
5. Turn Atc to oFF.
6. Set manual temperature compensation to 25°C (See Section 4.4 and Figure 4-4).
7. Set Cell constant to 1.0 (See Section 5.1.1).
8. Evaluate analyzer response with previous responses.

Faulty display. If a faulty display is suspected, enter the **SET** menu and scroll through to the dtS option. This option will activate all display segments. See Figure 3-4.

Output Circuit Testing. To check for problems in the output circuit, bypass the sensor input and analyzer calculations by setting a known output current and checking item driven by output current and checking the operation of valves, pumps, recorders, etc. For directions on how to set output current, refer to Section 4.9.

8.2.3 Sensor Troubleshooting. In addition to the sensor fault mnemonics, the analyzer can display information pertinent to determining if sensor has become coated, or if there is a conductivity versus temperature problem, or an application problem.

Sensor Coated. As the cell becomes coated, or affected by the process, the cell factor will change. Tracking this change in cell factor will prevent use of a sensor that has lost its sensitivity because of contamination or damage.

CAUTION

Standardizing the instrument results in the cell factor being returned to 1.0.

This instrument tracks the change in calculated cell factor from the initial cell factor value of 1.0 every time the unit is standardized. The cell factor should be checked and tracked to set up a regular maintenance schedule and can be seen in the following manner:

1. Press **ACCESS** key twice.
2. SEt will be displayed briefly followed by Cin.
3. **SCROLL** (↑) to display FCt and press **SELECT**.
4. To return to normal operation, press **PV**.

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TABLE 8-3. Troubleshooting Guide

SYMPTOM	PROBLEM	ACTION
FCt below 0.5 or above 2.0. Actual range determined by user.	1. Old or coated sensor.	1. Clean or replace sensor.
Analyzer value not the same as grab sample of process.	1. Grab sample incorrect. 2. Unclear what is correct. 3. Analyzer out of calibration.	1. Re-evaluate sample technique and equipment. 2. Bench test analyzer. 3. Recalibrate per Start-up and Calibration Section.
Fault code tcH/tcL/rIn.	1. Miswire. 2. Open or shorted RTD.	1. Check wiring between the sensor and analyzer. 2. Replace sensor.
Fault code Orn.	1. Process conductivity too high for sensor in use. 2. Process upset.	1. Replace sensor with a sensor which has a higher cell constant (see Table 1-1). 2. Check for process control problem.
Fault code SEn.	1. Open wire between sensor and analyzer. 2. Cable length has been exceeded. Maximum cable length 250 ft.	1. Repair wire/check connection. 2. Locate analyzer within 250 ft. of sensor.
Fault code EEP.	1. Defective EEPROM.	1. Replace CPU PCB.
Fault code CHS.	1. Defective CPU.	1. Replace CPU PCB.
No alarm relay closure.	1. Defective power card. 2. Defective CPU.	1. Replace power PCB. 2. Replace CPU PCB.
No output current.	1. Defective power board. 2. Miswired.	1. Replace power PCB. 2. Check for short.
Low output current.	1. Circuit loading with excessive resistance on output.	1. Consult output loading limits Model 1054B C specifications (600 ohms max load).
Zero conductivity reading.	1. Sensor miswired. 2. Solids coating sensor. 3. Open wire in sensor.	1. Repair wire/connection. 2. Clean sensor. 3. Replace sensor or tube.
Fault code Ern. Very high conductivity reading.	1. Sensor miswired. 2. Shorted sensor.	1. Repair wire connection. 2. Replace sensor or tube.

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Absolute Conductivity. As an aid in determining whether a problem exists in the conductivity section of the sensor or analyzer, or the temperature compensating circuits, the absolute conductivity (the uncorrected conductivity value, without temperature compensation) of the process can be displayed. To do so:

1. Press **ACCESS** key twice.
2. SEt will be displayed briefly followed by Cın.
3. **SELECT** Cın to read the absolute conductivity.
4. To return to normal operation, press **PV**.

Temperature Sensor accuracy. If the temperature sensor in the conductivity sensor is suspect, measuring the resistance across the T.C. element and comparing the corresponding temperature reading can be used in the evaluation of the sensor. Allow enough time for the T.C. element to stabilize to the surrounding temperature. Each 1°C change corresponds to a change of 0.385 ohms.

8.2.4 Subassembly Replacement Considerations.

CPU Board Replacement. If a problem exists on the CPU board, and replacement is required, specific procedures included with the new board must be followed or the microprocessor will be improperly programmed. Should this occur, it will be necessary to return the analyzer to the factory for reprogramming.

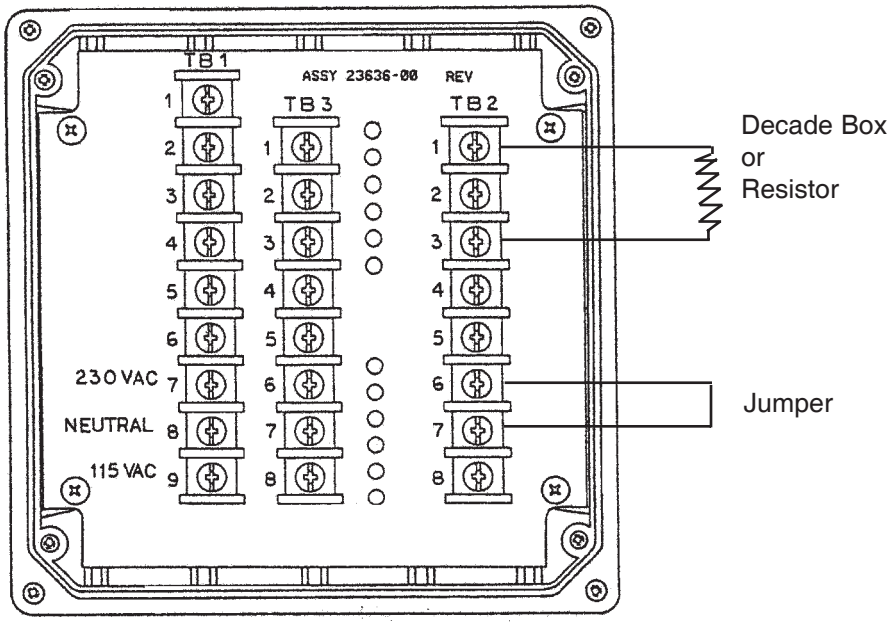
Power Board Replacement. If it becomes necessary to replace the power board, the CPU board will need to be recalibrated following the specific procedures that are included with the power board. Failure to follow these procedures exactly will cause the microprocessor to be improperly programmed and require the return of the analyzer to the factory for reprogramming.

8.2.5 Instrument Electronic Check. This procedure will allow the operation of the analyzer to be evaluated by simulating a known conductivity input.

1. Disconnect the conductivity sensor input leads from TB2-1, 3, 6 and 7. Install decade box or resistor leads to TB2-1 and 3 and a jumper to TB2-6 and 7 (see Figure 8-1).
2. With instrument power on, enter the SEt menu and turn Atc to oFF. Set manual temperature compensation to 25°C (see Section 4.4 and Figure 4-3).
3. Set cell constant to 1.0 (see Section 5.1.1).
4. To simulate a desired conductivity input, an appropriate resistance value may be calculated by Formula or selected from the conductivity (µmhos) vs resistance (ohms) table (see Figure 8-1).
5. Simulate conductivity input and evaluate the analyzer response.

8.3 INSTRUMENT MAINTENANCE. To maintain the appearance and extend the life of the enclosure, it should be cleaned on a regular basis using a mild soap and water solution followed by a clean water rinse.

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Formula:

$$\text{Conductivity} = \frac{1}{\text{Resistance}} \times 1{,}000{,}000$$

Table:

Conductivity (µmhos)	vs	Resistance (ohms)
10		100,000
100		10,000
1,000		1,000
10,000		100
20,000		50

FIGURE 8-1. Simulate Conductivity Input

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SECTION 9.0
RETURN OF MATERIAL

9.1 GENERAL. To expedite the repair and return of instruments, proper communication between the customer and the factory is important. A return material authorization (RMA) number is required. Call (949) 757-8500. The Return of Materials Request form is provided for you to copy and use in case the situation arises. The accuracy and completeness of this form will affect the processing time of your materials.

9.2 WARRANTY REPAIR. The following is the procedure for returning instruments still under warranty.

1. Contact the factory for authorization.
2. Complete a copy of the Return of Materials Request form as completely and accurately as possible.
3. 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 mother unit must be supplied.
4. Carefully package the materials and enclose your Letter of Transmittal and the completed copy of the Return of Materials Request form. If possible, pack the materials in the same manner as it was received.

IMPORTANT

Please see second section of Return of Materials Request Form. Compliance to the OSHA requirements is mandatory for the safety of all personnel. MSDS forms and a certification that the instruments have been disinfected or detoxified are required.

5. Send the package prepaid to:

   Rosemount Analytical Inc.
   Uniloc Division
   2400 Barranca Parkway
   Irvine, CA 92606

   Attn: Factory Repair

   Mark the package: Returned for Repair

   RMA# _____

   Model No. _____

9.3 NON WARRANTY REPAIR.

1. Contact the factory for authorization.
2. Fill out a copy of the Return of Materials Request form as completely and accurately as possible.
3. Include a purchase order number and make sure to include the name and telephone number of the right individual to be contacted should additional information be needed.
4. Do Steps 4 and 5 of Section 9.2.

NOTE

Consult the factory for additional information regarding service or repair.

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RETURN OF MATERIALS REQUEST

•IMPORTANT!
This form must be completed to ensure expedient factory service.

CUSTOMER

FROM: _____

_____

_____

RETURN _____

_____

_____

BILL TO: _____

_____

_____

NOTICE TO SENDER

CUSTOMER/USER MUST SUBMIT MATERIAL SAFETY SHEET (MSDS) OR COMPLETE STREAM COMPOSITION, AND/OR LETTER CERTIFYING THE MATERIALS HAVE BEEN DISINFECTED AND/OR DETOXIFIED WHEN RETURNING ANY PRODUCT, SAMPLE OR MATERIAL THAT HAVE BEEN EXPOSED TO OR USED IN AN ENVIRONMENT OR PROCESS THAT CONTAINS A HAZARDOUS MATERIAL **ANY OF THE ABOVE THAT IS SUBMITTED TO ROSEMOUNT ANALYTICAL WITHOUT THE MSDS WILL BE RETURNED TO SENDER C.O.D.** FOR THE SAFETY AND HEALTH OF OUR EMPLOYEES. WE THANK YOU IN ADVANCE FOR COMPLIANCE TO THIS SUBJECT.

SENSOR OR CIRCUIT BOARD ONLY:
(Please reference where from in MODEL / SER. NO. Column)

1. PART NO._____	1. MODEL_____	1. SER. NO._____
2. PART NO._____	2. MODEL_____	2. SER. NO._____
3. PART NO._____	3. MODEL_____	3. SER. NO._____
4. PART NO._____	4. MODEL_____	4. SER. NO._____

REASON FOR RETURN

PLEASE CHECK ONE:

☐ REPAIR AND CALIBRATE

☐ EVALUATION

☐ REPLACEMENT REQUIRED? ☐ YES ☐ NO

☐ DEMO EQUIPMENT NO. _____

☐ OTHER (EXPLAIN) _____

_____

DESCRIPTION OF MALFUNCTION:

_____

_____

_____

REPAIR STATUS

WARRANTY REPAIR REQUESTED:

☐ YES-REFERENCE ORIGINAL ROSEMOUNT ANALYTICAL ORDER NO. _____

CUSTOMER PURCHASE ORDER NO. _____

☐ NO-PROCEED WITH REPAIRS-INVOICE AGAINST P.O. NO. _____

☐ NO-CONTACT WITH ESTIMATE OF REPAIR CHARGES: LETTER ☐ _____

PHONE ☐ _____

NAME _____ PHONE _____

ADDRESS _____

_____ ZIP _____

RETURN AUTHORITY FOR CREDIT ADJUSTMENT [Please check appropriate box(s)]

☐ WRONG PART RECEIVED

☐ DUPLICATE SHIPMENT

☐ RETURN FOR CREDIT

☐ REPLACEMENT RECEIVED

REFERENCE ROSEMOUNT ANALYTICAL SALES ORDER NO. _____

RETURN AUTHORIZED BY: _____

WARRANTY DEFECT_____

_____

24-6047

Emerson Process Management

Rosemount Analytical Inc.
2400 Barranca Parkway
Irvine, CA 92606 USA
Tel: (949) 757-8500
Fax: (949) 474-7250

http://www.RAuniloc.com

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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.

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the right answers,
right now.

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Emerson Process Management

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

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