Model 2054C

Conductivity Microprocessor Analyzer

ROSEMOUNT ANALYTICAL

FISHER-ROSEMOUNT™ Managing The Process Better™
USING THIS MANUAL

This instruction manual is designed to assist in installing, operating and maintaining the Rosemount Analytical Model 2054 Conductivity Microprocessor Analyzer.

This manual has been sectioned into three parts.

Part I (Sections 1 and 2) consists of general description, specifications, and installation information for the Model 2054 Analyzer.

Part II (Sections 3 through 8) describes the operation and maintenance of the Model 2054 Analyzer without the Rosemount Model 268 SMART FAMILY® Interface.

Part III (Sections 9 through 16) is designed to assist in operating and maintaining the Model 2054 Analyzer with the Rosemount Model 268 SMART FAMILY® Interface.
# MODEL 2054 C
## MICROPROCESSOR ANALYZER

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<td>A-19</td>
</tr>
<tr>
<td>A-20</td>
<td>2054 Cond. Review Key Screen</td>
<td>A-20</td>
</tr>
<tr>
<td>A-22</td>
<td>2054 Cond. Format Branch Analog Output Trim</td>
<td>A-22</td>
</tr>
<tr>
<td>A-23</td>
<td>2054 Cond. Return of Material</td>
<td>A-23</td>
</tr>
</tbody>
</table>
PART I
SECTION 1.0 DESCRIPTION AND SPECIFICATIONS

• PART OF THE ROEMOUNT SMART FAMILY® OF INSTRUMENTS.
• TWO INDEPENDENT OUTPUTS for Conductivity and Temperature.
• SELF DIAGNOSTICS with a user selectable fault alarm.
• NEMA 4X (IP65) WEATHERPROOF CORROSION-RESISTANT ENCLOSURE.
• DUAL ALARMS WITH PROGRAMMABLE LOGIC. A third relay is provided with timer functions.
• HOLD OUTPUT FUNCTION is programmable to default to a preset or process value.
• UTILIZES HART® COMMUNICATIONS.

1.1 FEATURES AND APPLICATIONS. The Model 2054 Smart Microprocessor Analyzers, with the appropriate sensor, are designed to continuously measure and control pH and conductivity in industrial and municipal processes. These analyzers are members of the Rosemount SMART FAMILY® of instruments, all of which are designed to communicate with the handheld Model 268 Smart Family Interface and Rosemount System 3™ and RMV 9000™ process control systems. The Model 2054 design permits remote configuration, interrogation, and testing.

The analyzer is 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, conductivity and temperature output values, and fault conditions.

The Model 2054 C features two independent, galvanically isolated current outputs, one for conductivity and one for temperature. Both outputs continuously expandable over the measurement ranges in either direct or reverse action and may be displayed in either milliamps or percent. Users have the benefit of a separate, inexpensive temperature output whether or not advantage is taken of the smart analyzer capabilities. Output dampening is user selectable.

The hold output and relay defaults are user selectable. The hold output function allows manual control during routine sensor maintenance.

Dual alarms are a standard feature on the Model 2054 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. For example, time delay will ignore a temporary breakthrough and prevent shutting down a demineralizer unit prematurely. An interval timer with dedicated relay is also provided.

Automatic or manual temperature compensation is keyboard selectable. The process temperature is accurately measured at the sensor assembly by an integral RTD and is available for output as well as 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 two point calibration, the analyzer will automatically calculate the temperature slope of the solution.

The analyzer comes standard with an LCD display. An LED display is available as an option.

Continuous self diagnostics alert the operator to ROM, EEPROM, temperature, sensor and open wiring faults.

The analyzer communicates via the HART® protocol, which uses an industry standard Bell 202 frequency shift keying (FSK) technique. Communication is accomplished by superimposing a high frequency signal on top of the 4-20mA output signal. The Rosemount implementation of this technique allows simultaneous communication and output without compromising loop integrity.
1.2 PHYSICAL SPECIFICATIONS - GENERAL.
Panel Mount Enclosure: Black, ABS, NEMA 4X, IP65, 144 X 144 X 192mm (5.7 X 5.7 X 7.6 inches).

Wall Mount Enclosure: Weatherproof, Thermoplastic. 300 X 330 X 190mm (11.75 X 13 X 7.5 inches).

Front Panel: Membrane keyboard with tactile feedback and user selectable security. Blue and gray on black.

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

Electrical Classification:
Group I Panel Mount Enclosure:
FM: Class 1 Div. Group A thru D, 28 Vdc relays - 6.0 amps resistive only, 150 mA - Groups A & B: 400 mA - Group C; 540 mA - Group D; Cl=O:O=O
CSA: Class 1, Div. 2. Group A thru D, 28 Vdc 110 Vac & 230 Vac relays 6.0 Amps resistive only.
Group II Wall Mount Enclosure: General Purpose

Power: 115 VAC, ± 10%, 50/60 Hz ± 6%, 4.0 W
230 VAC, ± 10%, 50/60 Hz ± 6%, 4.0 W

Current Outputs (Conductivity and Temperature):
Galvanically isolated, 0-20 mA or 4-20 mA into 600 ohms maximum load, Direct or Reverse.

Output Dampening: 0-299 seconds.

Ambient Temperature: -10 to 65°C (14 to 149°F)

Ambient Humidity: 0-95%

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% of setpoint

for low side/High Alarm and high side/Low Alarm.

Interval Timer: Interval: minimum 10 minutes.
On Counts: 1 to 60
On Duration: 0 to 299 seconds
Off Duration: 0 to 299 seconds
Wait Duration: 0 to 299 seconds
Controls dedicated relay

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

<table>
<thead>
<tr>
<th>Resistive</th>
<th>Inductive</th>
</tr>
</thead>
<tbody>
<tr>
<td>28 Vdc</td>
<td>6.0 Amps</td>
</tr>
<tr>
<td>115 Vac</td>
<td>6.0 Amps</td>
</tr>
<tr>
<td>230 Vac</td>
<td>6.0 Amps</td>
</tr>
</tbody>
</table>

Weight/Shipping Weight: 1.1 kg/1.6 kg (2.5 lbs/3.5 lbs.)

1.3 INSTRUMENT SPECIFICATIONS @ 25°C.
Measurement Range: See Table 1-1

Output Scale Expansion: (Conductivity and Temperature)
Zero suppression: up to 90% full scale
Span: from 10% to 100% full scale

Accuracy: ±0.5% of measured range

Repeatability: ±0.25% of output range

Stability: ±0.25% of output range/month, non-cumulative

Temperature Coefficient: Input: ±0.03% of reading/°C
Output: ±0.04% of reading/°C

Temperature Compensation: -10 to 200°C (14 to 392°F)
(automatic or manual)

Temperature Slope Adjustment: 0-5%/°C

RECOMMENDED SENSORS:
Model 112 Insertion Conductivity Sensor
Model 140 Retractable Conductivity Sensor
Model 141 Insertion Conductivity Sensor
Model 142 Insertion Conductivity Sensor
Model 150 Insertion/Submersion Conductivity Sensor
Model 160 Insertion/Submersion Conductivity Sensor

<table>
<thead>
<tr>
<th>Conductivity Sensor Model Number</th>
<th>142</th>
<th>145</th>
<th>140</th>
<th>145</th>
<th>140,141</th>
<th>150</th>
<th>160</th>
<th>160</th>
<th>112</th>
<th>112</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell Constant</td>
<td>0.01</td>
<td>0.1</td>
<td>0.2</td>
<td>0.5</td>
<td>1.0</td>
<td>2.0</td>
<td>5.0</td>
<td>20.8</td>
<td>58.0</td>
<td></td>
</tr>
<tr>
<td>Range Multiplier</td>
<td>X20</td>
<td>X20</td>
<td>X20</td>
<td>X20</td>
<td>X20</td>
<td>X20</td>
<td>X20</td>
<td>X20</td>
<td>X20</td>
<td>X20</td>
</tr>
<tr>
<td></td>
<td>N/A</td>
<td>2</td>
<td>4</td>
<td>10</td>
<td>20</td>
<td>40</td>
<td>100</td>
<td>400</td>
<td>1,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>20</td>
<td>40</td>
<td>100</td>
<td>200</td>
<td>400</td>
<td>1,000</td>
<td>4,000</td>
<td>10,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>200</td>
<td>400</td>
<td>1,000</td>
<td>2,000</td>
<td>4,000</td>
<td>10,000</td>
<td>40,000</td>
<td>100,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>2,000</td>
<td>4,000</td>
<td>10,000</td>
<td>20,000</td>
<td>40,000</td>
<td>100,000</td>
<td>400,000</td>
<td>1,000,000</td>
<td></td>
</tr>
</tbody>
</table>

FULL SCALE MICROSIEMENS/cm
1.4 ORDERING INFORMATION. The Model 2054 Conductivity Analyzer is housed in a NEMA 4X weatherproof, corrosion-resistant housing suitable for panel, pipe or wall mounting. The analyzer operates on 115 Vac, 60 Hz unless otherwise specified. Standard features include digital communications capability, LCD digital display, galvanically isolated current outputs for toroidal conductivity and temperature, dual alarms, and automatic temperature compensation.

<table>
<thead>
<tr>
<th>CODE</th>
<th>GROUP I: PANEL MOUNT ENCLOSURE OPTIONS (Select from either Group I or Group II, not both)</th>
</tr>
</thead>
<tbody>
<tr>
<td>02</td>
<td>Red LED Display</td>
</tr>
<tr>
<td>05</td>
<td>220 Vac, 50/60 Hz Power</td>
</tr>
<tr>
<td>07</td>
<td>Wall Mounting Plate with Junction Box</td>
</tr>
<tr>
<td>08</td>
<td>Two-Inch Pipe Mounting Bracket</td>
</tr>
<tr>
<td>11</td>
<td>Stainless Steel Tag (specify marking)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CODE</th>
<th>GROUP II: WALL MOUNT ENCLOSURE OPTIONS (Select from either Group I or Group II, not both)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>LCD Display, 115 Vac, 50/60 Hz</td>
</tr>
<tr>
<td>21</td>
<td>LCD Display, 230 Vac, 50/60 Hz</td>
</tr>
<tr>
<td>51</td>
<td>Enclosure heater for Code 20</td>
</tr>
<tr>
<td>52</td>
<td>Enclosure heater for Code 21</td>
</tr>
<tr>
<td>11</td>
<td>Stainless Steel Tag (specify marking)</td>
</tr>
</tbody>
</table>

**NOTE:** SELECT OPTIONS FROM GROUP I OR GROUP II, NOT BOTH.
SECTION 2.0 INSTALLATION

2.1 GENERAL. This analyzer’s enclosure is suitable for outdoor use. However, it should be located in an area where temperature extremes, vibrations, electromagnetic and radio frequency interferences are minimized or absent.

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.

NOTE
Before installing the analyzer it should be decided how the analyzer will be configured. The options are:

A. Calibration and Setup using the Rosemount Model 268 (Revision 6.0) before installation is complete. Refer to Part III, Section 9.0 for an explanation of the Models 268/2054 specific instructions. Before on-line configuration (Section 13) return to this section for installation instructions.

B. The Model 2054 will not be used with the Rosemount Model 268. Bench configuration and calibration will be performed before installation. Refer to Part II, Section 3.0. After calibration return to this section for installation instructions.

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 Model 2054 C as follows:

1. Remove the four screws that secure the rear cover of the enclosure. (Not required for wall mounting, options 20/21). The latching hardware for panel and pipe mounting is inside the rear cover.

2. (Not required for wall mounting configuration.) 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 plate with junction box, Section 2.3.3 for pipe mounting, or Section 2.3.4 for wall mounting enclosure.

2.3.1 Panel Mounting (Standard). The analyzer is designed to fit into a DIN standard 137.9 mm X 137.9 mm (5.43 inch X 5.43 inch) panel cutout. (Refer to Figures 2-1 and 2-2.)

1. Prepare the analyzer as described in Section 2.3.

2. Install the mounting latches as shown 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. Replace the door and four front panel screws.
2.3.2 Wall Mounting Plate with Junction Box (Option-07). (Refer to Figures 2-3 and 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 ½-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 ½-inch conduit fittings.

5. Complete wiring from the analyzer to the junction box (Figure 2-4).

2.3.3 Pipe Mounting (Option-08). The 2" 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 Mounting Enclosure (Options-20, 21). (Refer to Figure 2-6.) In this configuration the analyzer is housed in NEMA 4X heavy duty enclosure and may be mounted on a wall or handrail. Installation procedures as outlined in Section 2.3 should be followed when installing the wall mount enclosure. Sufficient clearance should be provided in front of the enclosure to permit opening the door, which is hinged on the left side.

2.4 ELECTRICAL WIRING. The analyzer has three conduit openings in the bottom rear of the analyzer housing which will accommodate ½-inch conduit fittings. From a back view, the conduit opening on the left is for timer, alarm, and AC connections; the center is for signal output and the opening on the right is for sensor wiring. Sensor wiring should always be run in a separate conduit from power wiring.

NOTE
Option-07 wall mount, use opening on the left for sensor wiring. (Refer to Figure 2-4 for wiring).

2.4.1 Power Input Wiring. The Model 2054 C has been configured at the factory for either 115 VAC or 230 VAC power. Operating power can be changed by a selector switch located on the power supply board (P/N 23056-02/03). To access this switch, remove the four screws from the front keyboard and pull the electronic assembly straight out.

Connect AC power to TB1-7 and -8, ground to the ground terminal at TB3-8 (refer to Figure 2-7).

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. AC connections and grounding must be in compliance with UL 508 and/or local electrical codes. The metal stiffener is a requirement for electrical bonding.

2.4.2 Output Wiring. The signal output and alarm connections are made to terminals 1 through 6 of TB1 and terminals 1 through 4 of TB3. (Refer to Figure 2-6).
FIGURE 2-1. Panel Mounting Cutout
FIGURE 2-2. Panel Mounting Tab Installation
<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>23058-01</td>
<td>S Assy, J-Box</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>33030-00</td>
<td>Bracket, wall mtg</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>9900600</td>
<td>Nut, 6-32 Hex</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>9910600</td>
<td>Washer, Flat #6</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>9910610</td>
<td>Washer, Lock Int. #6</td>
<td>8</td>
</tr>
<tr>
<td>6</td>
<td>9600612</td>
<td>Screw, 6-32 X .75</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>9510048</td>
<td>Seal, Weathertight</td>
<td>1</td>
</tr>
</tbody>
</table>

FIGURE 2-3. Wall Mounting J-Box Installation
FIGURE 2-4. Wall Mounting J-Box Wiring
FIGURE 2-5. Pipe Mounting Installation
FIGURE 2-6. Wall Mount Enclosure Dimensions and Mounting
FIELD TERMINAL BOARD CONNECTIONS

TB1
1  ALARM 1 (N.O.)
2
3  ALARM 2 (N.O.)
4
5  TIMER
6  HOT 115/230 VAC NEUTRAL
7
8

TB2
3  CURRENT LOOP OUTPUT 1 (HART®)
4
5
6  N/C
7
8

TB3
1  DRIVE, BLACK
2  N/C
3  CURRENT IN, WHITE
4  N/C
5  RTD IN, GREEN
6  REF GROUND, SHIELD
7  RTD SENSE, RED
8  EARTH GND

FIGURE 2-7. Electrical Wiring
PART II
SECTION 3.0 DESCRIPTION OF CONTROLS

3.1 KEYBOARD FUNCTIONS. All functions of the analyzer are accessed through keyboard entry routines. The analyzer uses no switches or potentiometers.

The four keys across the top row and the CAL and ENTER keys are dual function. One press of the key will display the value of the function shown on the lower portion of the key. A quick double press of the key will display the value of the function shown on the upper portion of the key. Each of these keys have read functions that can be accessed without security code entry. Each key also has a calibration or set function when used with the SELECT key. This function requires entry of the security code when the security feature is active. (Refer to Section 8.0 for keyboard security.)

NOTE
When no key is pressed for a period of 60 seconds the unit will default to reading conductivity.

CAUTION
The HOLD function and the CAL function are not read functions. Refer to Sections 5.5 and 5.6 respectively.

A. Standardize Conductivity Standardization of the conductivity sensor is achieved by pressing the COND key once, followed immediately by pressing the SELECT key. "Set" displays to acknowledge the standardize function, followed by the Numeric Display for user input. Entering the known conductivity at 25°C of the measured solution will cause the analyzer to restandardize the sensor. The temperature slope value will not be changed. Refer to Section 5.6.

B. Standardize Temperature. Standardization of the temperature is achieved by pressing the TEMP key once, followed immediately by pressing the SELECT key. "Set" displays to acknowledge the standardization function, followed by the Numeric Display for user input. Entering the known temperature of the measured solution will cause the Model 2054 C to restandardize the integral temperature sensor. Refer to Section 5.3.

C. Alarm 1 and Alarm 2 Setpoint. The alarm setpoint may be adjusted by pressing the ALARM 1 or ALARM 2 key once, followed by pressing the SELECT key. "Set" displays, followed by the Numeric Display for user input. Refer to Section 4.7.

D. Output Current – Zero Setpoint. The zero point (0 or 4 mA) of the conductivity or temperature output range is adjusted by pressing the ZERO key twice, followed by pressing the SELECT key. "Set" displays, followed by the Numeric Display for user input. The zero key can be pressed twice again to display the zero setpoint for the other output. Refer to Section 4.8.

E. Output Current – F.S. Setpoint. The Full Scale point (20 mA) of the conductivity or temperature output range is adjusted by pressing the F.S. key twice, followed by pressing the SELECT key. "Set" displays, followed by the Numeric Display for user input. The F.S. key can be pressed twice again to display the full scale setpoint for the other output. Refer to Section 4.8.

F. Two Point Calibration. A two point temperature slope calibration is initiated by pressing the CAL key once. Refer to Section 5.4.1.

G. Temperature Slope. The percent of conductivity change per °C is adjusted by pressing the SLOPE key twice, followed by pressing the SELECT key once. "Set" displays, followed by the Numeric Display for user input. Refer to Section 5.4.1.

H. Simulate Current Output. The conductivity and temperature outputs can be simulated by pressing the OUTPUT key twice, followed by pressing the SELECT key once. The Numeric Display appears for user input. The OUTPUT key can be pressed twice again to display the output value of the other output. Refer to Section 4.9.
3.1.1 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, scroll through digits on the active (flashing) Numeric Display, or move the decimal point and μS/mS display. Holding key down auto scrolls through the main menu and Numeric 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).

![Conductivity Analyzer Diagram](image-url)

**FIGURE 3-1. Keyboard Overlay**
# TABLE 3-1. Key Description

<table>
<thead>
<tr>
<th>MAIN FUNCTION (PRESS ONCE)</th>
<th>SECOND FUNCTION (PRESS TWICE QUICKLY)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OUTPUT</strong></td>
<td>Displays - conductivity and temperature output values (mA or % full scale).</td>
</tr>
<tr>
<td><strong>COND</strong></td>
<td>Set Function (w/SELECT) - Simulates conductivity and temperature current outputs.</td>
</tr>
<tr>
<td><strong>HOLD</strong></td>
<td>Displays - process temperature (°C or °F).</td>
</tr>
<tr>
<td><strong>TEMP</strong></td>
<td>Set Function (w/SELECT) - One point standardization of temperature.</td>
</tr>
<tr>
<td><strong>ZERO</strong></td>
<td>Initiates hold or removes analyzer from hold condition. Outputs and relays are changed to default settings.</td>
</tr>
<tr>
<td><strong>ALARM 1</strong></td>
<td>Displays - (0 or 4 mA) conductivity and temperature current output setpoints.</td>
</tr>
<tr>
<td><strong>F.S.</strong></td>
<td>Set Function (w/SELECT) - Sets low current output setpoints (0 or 4 mA).</td>
</tr>
<tr>
<td><strong>ALARM 2</strong></td>
<td>Displays - conductivity and temperature output setpoints (20 mA).</td>
</tr>
<tr>
<td><strong>SLOPE</strong></td>
<td>Set Function (w/SELECT) - Sets conductivity and temperature full scale (20 mA) setpoints.</td>
</tr>
<tr>
<td><strong>CAL</strong></td>
<td>Displays - temperature slope in percent.</td>
</tr>
<tr>
<td></td>
<td>Set Function (w/SELECT) - manually sets temperature slope.</td>
</tr>
</tbody>
</table>

- **SELECT**
  - Select sub menu (mnemonic display).
  - Shift to next digit (numeric display).

- **ACCESS**
  - Press twice to access set-up menu.
  - Enter displayed value into memory.
  - Enter displayed menu item (flashing) into memory.

- **UP**
  - Scroll through menu (mnemonic display).
  - Scroll digits (numeric display).
  - Scroll decimal position and μS/mS flag.
  - Holding key down autoscrolls digits or set menu items.
### TABLE 3-2. Information Mnemonics

<table>
<thead>
<tr>
<th>MNEMONIC</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADJ</td>
<td>Adjustment to value reading</td>
</tr>
<tr>
<td>bfd</td>
<td>Incorrect entry</td>
</tr>
<tr>
<td>con</td>
<td>Conductivity Display</td>
</tr>
<tr>
<td>dc1</td>
<td>Displays conductivity output value in mA</td>
</tr>
<tr>
<td>dc2</td>
<td>Displays temperature output value in mA</td>
</tr>
<tr>
<td>hi1</td>
<td>Displays 20 mA setpoint (conductivity)</td>
</tr>
<tr>
<td>hi2</td>
<td>Displays 20 mA setpoint (temperature)</td>
</tr>
<tr>
<td>hld</td>
<td>Analyzer in hold mode</td>
</tr>
<tr>
<td>rel</td>
<td>Interval timer activated</td>
</tr>
<tr>
<td>ldi</td>
<td>Displays 0 or 4 mA setpoint (conductivity)</td>
</tr>
<tr>
<td>lod</td>
<td>Displays 0 or 4 mA setpoint (temperature)</td>
</tr>
<tr>
<td>loc</td>
<td>Access locked – enter security code</td>
</tr>
<tr>
<td>pc1</td>
<td>Displays conductivity output in percent</td>
</tr>
<tr>
<td>pc2</td>
<td>Displays temperature output in percent</td>
</tr>
<tr>
<td>set</td>
<td>Set mode</td>
</tr>
<tr>
<td>sp1</td>
<td>Simulates conductivity output (percent)</td>
</tr>
<tr>
<td>sp2</td>
<td>Simulates temperature output (percent)</td>
</tr>
<tr>
<td>sc1</td>
<td>Simulates conductivity output (mA)</td>
</tr>
<tr>
<td>sc2</td>
<td>Simulates temperature output (mA)</td>
</tr>
<tr>
<td>slp</td>
<td>Displays temperature slope</td>
</tr>
<tr>
<td>sp1</td>
<td>Displays Alarm 1 setpoint</td>
</tr>
<tr>
<td>sp2</td>
<td>Displays Alarm 2 setpoint</td>
</tr>
<tr>
<td>std</td>
<td>Standardize conductivity</td>
</tr>
<tr>
<td>slk</td>
<td>Calibration Point 1</td>
</tr>
<tr>
<td>std</td>
<td>Calibration Point 2</td>
</tr>
</tbody>
</table>

### TABLE 3-3. Set Function Mnemonics

| RL1     | Alarm 1 setup |
| RL2     | Alarm 2 setup |
| ate     | Automatic temp. comp. |
| cel     | Cell Constant |
| tca     | Temperature °C |
| cni     | Display Sensor input |
| ccd     | Security Code |
| ctn     | Timer count |
| cur     | Config. current output |
| cur1    | Config. fault output 1 |
| cur2    | Config. fault output 2 |
| curn    | Default current setpoint |
| dfy     | Days |
| dfh     | Fault Configuration |
| d-o     | Display output |
| d-t     | Display temperature |
| doc     | Display output in mA |
| dof     | Delay off time |
| don     | Delay on time |
| d PN    | Dampen output |
| dt5     | LCD/LED Display test |
| dur     | Timer duration |
| df     | Temperature °F |
| FCM     | Calibration Factor |
| FLT     | Fault alarm set |
| H       | Relay action - high |
| H-L     | Alarm logic |
| HYS     | Hysteresis |
| I-P     | Interval period |
| L0      | Relay action - low |
| LO      | Relay action - low |
| L0      | Relay action - low |
| NON     | No action on fault |
| OFF     | Alarm not used |
| OFF     | Relay open on fault |
| ON      | Timer on time |
| On      | Use alarm as process alarm |
| on      | Relay closed on fault |
| df     | Timer off time |
| d41     | Config. output 1 (cond.) |
| d42     | Config. output 2 (temp.) |
| PCT     | Display output in percent |
| R1L     | Relay 1 fault setup |
| R2L     | Relay 2 fault setup |
| SEC     | Seconds |
| shd     | Show fault history |
| T-C     | Temperature config. |
| t-L     | Timer - time remaining |
| tON     | Timer status |
| UFR     | User version |
| uni     | Minutes |
| V20     | 4mA to 20mA output |
| D20     | 0mA to 20mA output |
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 page 4-3 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 (SET). Most of the analyzer’s configuration is done while in the Set Mode. Please refer to Figure 4-1 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 flash).

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 “-L,n-”. The analyzer is now ready for user configuration.

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

3. (Refer to the configuration worksheet on page 4-3). Analyzer variables can be done in any order. On initial configuration, however, it is recommended that the variables be entered in the order shown on the worksheet. This will reduce the chance of accidentally omitting a needed variable.
<table>
<thead>
<tr>
<th>Configuration Worksheet</th>
<th>RANGE</th>
<th>FACTORY SET</th>
<th>USER SET</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Alarm 1 Setup (RL1)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Alarm Configuration (On/Off)</td>
<td></td>
<td>On</td>
<td></td>
</tr>
<tr>
<td>2. High or Low (H-L) (H / Lo)</td>
<td></td>
<td>Lo</td>
<td></td>
</tr>
<tr>
<td>3. Hysteresis (HYS)</td>
<td></td>
<td>0-25% of setpoint</td>
<td>0.00%</td>
</tr>
<tr>
<td>4. Delay Time On (don)</td>
<td></td>
<td>0-255 sec.</td>
<td>000 Seconds</td>
</tr>
<tr>
<td>5. Delay Time Off (doF)</td>
<td></td>
<td>0-255 sec.</td>
<td>000 Seconds</td>
</tr>
<tr>
<td><strong>B. Alarm 2 Setup (RL2)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Alarm Configuration (On/FLt/Off)</td>
<td></td>
<td>On</td>
<td></td>
</tr>
<tr>
<td>2. High or Low (H-L) (H / Lo)</td>
<td></td>
<td>Lo</td>
<td></td>
</tr>
<tr>
<td>3. Hysteresis (HYS)</td>
<td></td>
<td>0-25% of setpoint</td>
<td>0.00%</td>
</tr>
<tr>
<td>4. Delay Time On (don)</td>
<td></td>
<td>0-255 sec.</td>
<td>000 Seconds</td>
</tr>
<tr>
<td>5. Delay Time Off (doF)</td>
<td></td>
<td>0-255 sec.</td>
<td>000 Seconds</td>
</tr>
<tr>
<td><strong>C. Interval Timer (I nT)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Active Status (fOn) (off/on)</td>
<td></td>
<td>fFF</td>
<td></td>
</tr>
<tr>
<td>2. Interval Time (nT)</td>
<td></td>
<td>Minimum 10 minutes</td>
<td>1 Day</td>
</tr>
<tr>
<td>3. Count (cnt)</td>
<td></td>
<td>1 to 60</td>
<td>5</td>
</tr>
<tr>
<td>4. On Time (onT)</td>
<td></td>
<td>0 to 299.9 sec</td>
<td>1 Second</td>
</tr>
<tr>
<td>5. Off Time (offT)</td>
<td></td>
<td>0 to 299.9 sec</td>
<td>1 Second</td>
</tr>
<tr>
<td>6. Duration (dur)</td>
<td></td>
<td>0 to 299.9 sec</td>
<td>2 Seconds</td>
</tr>
<tr>
<td><strong>D. Temperature Setup (k-ℂ)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Display Temperature (d-℃) (℃/℉)</td>
<td></td>
<td>℃</td>
<td></td>
</tr>
<tr>
<td>2. Automatic Temperature Compensation ( RTC ) (on/off)</td>
<td></td>
<td>on</td>
<td></td>
</tr>
<tr>
<td>a. Manual Temp. Value</td>
<td></td>
<td>-10°C to 200°C (-4°F to 392°F)</td>
<td></td>
</tr>
<tr>
<td><strong>E. Current Output Setup (I T 1/O2)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. mA Output (UmA) (020/020)</td>
<td></td>
<td>020</td>
<td></td>
</tr>
<tr>
<td>2. Display Current Output (d-O) (Pct/dcr)</td>
<td></td>
<td>dcr</td>
<td></td>
</tr>
<tr>
<td>3. Dampen Current Output (dPn)</td>
<td></td>
<td>0-255 sec.</td>
<td>0.0 Seconds</td>
</tr>
<tr>
<td><strong>F. Default Setup (dFF)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Relay 1 Default (rL1) (on/off/on)</td>
<td></td>
<td>non</td>
<td></td>
</tr>
<tr>
<td>2. Relay 2 Default (rL2) (on/off/on)</td>
<td></td>
<td>non</td>
<td></td>
</tr>
<tr>
<td>3. Conductivity Output Default (C1 I ) (on/cr)</td>
<td></td>
<td>non</td>
<td></td>
</tr>
<tr>
<td>4. Temperature Output Default (C2 r) (on/cr)</td>
<td></td>
<td>non</td>
<td></td>
</tr>
<tr>
<td><strong>G. Keyboard Security Setup (I IJu)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Keyboard Security Required</td>
<td></td>
<td>001-999</td>
<td></td>
</tr>
<tr>
<td>2. Keyboard Security Not Required</td>
<td></td>
<td>000</td>
<td></td>
</tr>
<tr>
<td><strong>Alarm Set Points</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Alarm 1 (SP1)</td>
<td></td>
<td>0-1,000 mS/cm</td>
<td>0.00 mS/cm</td>
</tr>
<tr>
<td>2. Alarm 2 (SP2)</td>
<td></td>
<td>0-1,000 mS/cm</td>
<td>1,000 mS/cm</td>
</tr>
<tr>
<td><strong>Current Outputs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Zero (0 or 4 mA) (L1) Conductivity (℃)</td>
<td></td>
<td>0-1,000 mS/cm</td>
<td>0.00 mS/cm</td>
</tr>
<tr>
<td>2. F.S. (100 mA) (H2) Conductivity (℃)</td>
<td></td>
<td>0-1,000 mS/cm</td>
<td>1,000 mS/cm</td>
</tr>
<tr>
<td>3. F.S. (20 mA) (H2) Temperature</td>
<td></td>
<td>-10°C to 200°C</td>
<td>0°C</td>
</tr>
<tr>
<td>4. F.S. (30 mA) (H2) Temperature</td>
<td></td>
<td>-10°C to 200°C</td>
<td>100°C</td>
</tr>
</tbody>
</table>

4-3
4.2 ALARM 1 AND 2. Display Mnemonic “RL 1” or “RL 2”. Used to set alarm relay logic. The alarms may be configured to perform On-Off process control.

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. Display Mnemonic “OFF”. Select this item if Alarm 1 or 2 will not be used as a process alarm or to temporarily disable the alarm. Alarm 1 or 2 sepoint will display “OFF” if this item is selected. Omit Steps D through G.

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

D. Alarm Logic. Display Mnemonic “H-L”. Select this item for high or low alarm logic. High logic activates the alarm when the reading is greater than the setpoint 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 setpoint. 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 setpoint 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 setpoint 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 Setup (RL 1/RL 2).

1. Enter Set Mode by pressing ACCESS key twice.

2. SCROLL (▲) until “RL 1” or “RL 2” appears on the display.

3. SELECT to move to the next menu level. “On”, “OFF” or (RL 2 only) “FLL” will display.

4. SCROLL (▲) to display desired item then SELECT.

5. If “OFF” is selected, display will show “OFF” to acknowledge. Press ENTER to return to “RL 1” or “RL 2”, concluding routine. Skip to Step 11.

6. SELECT “H-L”. “H” or “L” 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 2.

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. Analyzer will acknowledge and return to display of last item selected. Repeat Step 3 if further changes are desired, otherwise Step 2.

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.
4.3 INTERVAL TIMER. Display Mnemonic "t nt". 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 for the sensor.

A. Interval Timer Enable/Disable. Display Mnemonic "t 0 n". Select this item to begin interval cycle "on" or disable interval cycle "off".

B. Interval Period. Display Mnemonic "t nt". Select this item to set the time period between control cycles. "sEL" for seconds, "m n" for minutes, "h r" for hours, and "dR" for days. May be set from a minimum of 10 minutes.

C. "On" Periods Per Cycle. Display Mnemonic "c n k". 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 "o n k". Select this item to enter the relay activation time for each "on" period. May be set from 0 to 299 seconds.

E. Duration of "Off" Periods. Display Mnemonic "o n k". Select this item to enter the relay deactivation time between each "on" period during the control cycle. Valid when "c n k" is 2 or greater. May be set from 0 to 299 seconds.

F. Sensor Recovery Time. Display Mnemonic is "d ur". Select this option to enter the duration time after the last "on" period in a cycle. May be set from 0 to 299 seconds. The duration time can be used for sensor recovery after a wash cycle.

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

4.3.1 Interval Timer Set Up (t nt).

1. Enter Set Mode by pressing ACCESS key twice.

2. SCROLL (▲) until "t nt" appears on the display.

3. SELECT to move to the next menu level. "t 0 n" will display.

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 "t nt" 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 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.

NOTE
The analyzer 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 "t R L" every eight seconds. The display will continue to show the measured value.

FIGURE 4-3A. Timer Diagram for One Wash Cycle
4.4 TEMPERATURE CONFIGURATION. Display Mnemonic "t°C". Select this item for temperature reading and compensation choices.

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

B. Automatic Temperature Compensation. Display Mnemonic "RTC". The Model 2054 C 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 8.1).

4.4.1 Temperature Setup (t°C).
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°F" will display.
4. SCROLL (▲) to display desired item then SELECT it.
5. If "d°F" is selected, display will show "0°F" or "99°F". If "RTC" is selected, display will show "on" or "off".
6. SCROLL (▲) then ENTER desired item into memory.
7. If "0°F", "99°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 “DO I” (conductivity output) and “DO T” (temperature output). 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 299 seconds may be entered.

B. mA Output Range. Display Mnemonic “Lr-”. 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 (“dox”) or as a percent of full scale output range (“Percent”).

4.5.1 Output Setup (DO I/DO T).

1. Enter Set Mode by pressing the ACCESS key twice.
2. SCROLL (▲) until “DO I” 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 “Lr-” 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.
10. Repeat this process for “DO T”.
4.6 DEFAULTS. Display Mnemonic “dFl”. 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. Relay 1 and 2. Display Mnemonic “rL 1” and “rL 2”. The relays can be set to activate “on”, deactivate “off”, or hold present status “non”. See Table 4-2.

B. Current Output. Display Mnemonic “Cu 1” (conductivity output default current) and “Cu 2” (temperature output default current). The current output is held “non” or goes to a specified value “cur” during a fault condition. “cur” is the most informative selection for the user.

C. Fault History. Display Mnemonic “5H0”. Selecting this item will sequence the display through all faults detected in most recent fault mode. Press the SCROLL (▲) key once for previous fault mode list. Pressing ACCESS will clear “5H0” history.

4.6.1 Default Setup (dFl).

1. Enter Set Mode by pressing the ACCESS key twice.
2. SCROLL (▲) until “dFl” appears on the display.
3. SELECT to move to the next menu level. “rL 1” 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 “rL 2”, “Cu 1”, and “Cu 2”. If “cur” is selected for “Cu 1” or “Cu 2”, press ENTER, then use the SCROLL (▲) and SHIFT (◄) keys to enter the desired default current value.
7. Press the ENTER key to return to Set Menu.

---

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

<table>
<thead>
<tr>
<th>Set menu default (dFl) setting</th>
<th>NORMAL</th>
<th>ANALYZER CONDITION</th>
<th>HOLD</th>
<th>FAULT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>dFl</td>
<td>RL 1/RL2 setting</td>
<td>RL 1/RL2 setting</td>
<td>RL 1/RL2 setting</td>
</tr>
<tr>
<td></td>
<td>Dn</td>
<td>OFF</td>
<td>Dn</td>
<td>OFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flk (Alarm 2 only)</td>
<td>Flk</td>
<td>Flk</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dn</td>
<td>OFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Flk</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>on</td>
<td>Proc. det.</td>
<td></td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>off</td>
<td>Proc. det.</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>non</td>
<td>Proc. det.</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Example:** If you want the analyzer to activate relay 1 in hold mode during sensor removal for maintenance, set “rL 1” to “on” in Section 4.2 and set “rL 1” to “on” here.
FIGURE 4-6. Default Set-Up
4.7 ALARM SETPOINTS. The alarm setpoints should be adjusted after completing the configuration procedure outlined in Sections 4.1.1 to 4.6.

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

2. Press the **ALARM 1** or **ALARM 2** key. "SP 1" or "SP 2" 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 "flt" respectively. (Refer to Section 4.2, Alarm Setup.)

3. **SELECT** to adjust the value. The display will acknowledge briefly with "Rd" followed by the Numeric Display with digit flashing. Zero to 2,000 mS/cm may be entered. (A smaller range may be required by the sensor specifications.)

4. **SCROLL (▲)** and **SHIFT (▼)** to display the desired value.

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

5. **ENTER** value into memory.

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

---

**FIGURE 4-7. Alarm Setpoint**
4.8 OUTPUT SCALE EXPANSION. The output zero (0 or 4 mA) and full scale (20 mA) values for both conductivity and temperature should be adjusted after completing the configuration procedure as outlined in Sections 4.1.1 to 4.6.

A. ZERO POINT (0 mA or 4 mA) “L0 1”/“L0 2”

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

2. Press the ALARM 1 key twice. The display will show “L0 1” briefly, then show the conductivity ZERO setpoint.

3. SELECT to adjust the value. The display will acknowledge briefly with “Rdu” followed by the Numeric Display with digit flashing. Zero to 2,000 mS/cm may be entered. (A smaller range may be required by the sensor specifications.)

4. SCROLL (▲) and SHIFT (◄) to display the desired value. See note below.

5. ENTER value into memory. The display will show “HI 1” and display the entered value.

6. Press the ALARM 1 key twice again. The display will show “L0 2” briefly, then show the temperature ZERO setpoint. (Range: -10°C to 200°C)

7. Repeat Steps 3 through 5 for “HI 2”.

B. Full Scale (F.S.) Point (20 mA) “HI 1”/“HI 2”

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

2. Press the ALARM 2 key twice. The display will show “HI 1” briefly then display the conductivity Full Scale point.

3. SELECT to adjust the value. The display will acknowledge briefly with “Rdu” followed by the Numeric Display with digit flashing. Zero to 2,000 mS/cm may be entered. (A smaller range may be required by the sensor specifications.)

4. SCROLL (▲) and SHIFT (◄) to display the desired value. See note below.

5. ENTER value into memory. The display will show “HI 1” and display the entered value.

6. Press the ALARM 2 key twice again. The display will show “HI 2” briefly, then show the temperature Full Scale setpoint. (Range: -10°C to 200°C)

7. Repeat Steps 3 through 5 for “HI 2”.

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

NOTE
For a reverse output, enter the higher value for zero, and the lower value for the F.S.

FIGURE 4-8. Output Scale Expansion
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-0", was configured in Section 4.5.

4.9.1 Simulate Output in Percent "5P1/5P2". The output can be simulated in percent if "d-0" in Section 4.5 was configured to display percent "Pc1/Pc2" for output 1/output 2.

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

2. Press the OUTPUT key twice. The display will show:
   a. "Pc 1" for conductivity (output 1) OR
   b. "Pc 2" for temperature (output 2)
   If the correct output is not displayed, press the OUTPUT key twice again.

3. SELECT to simulate the output. The display will acknowledge briefly with "5P1" (conductivity output) or "5P2" (temperature output) followed by the Numeric Display with digit flashing.

4. SCROLL (▲) and SHIFT (▼) to display the desired value and ENTER value into memory. The display will show "Pc 1" or "Pc 2" and display the entered value.

5. The display will flash to acknowledge that the analyzer is placed on hold "HLD". Since the analyzer is in hold the relays will behave as configured in Section 4.7.

6. To remove the analyzer from hold, press the HOLD key twice again.

4.9.2 Simulate Output in Current "5C 1/5C 2". The output can be simulated in mA if "d-0" in Section 4.5 was configured to display current "dC1/dC2" for output 1/output 2.

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

2. Press the OUTPUT key twice. The display will show:
   a. "dC 1" for conductivity (output 1) OR
   b. "dC 2" for temperature (output 2)
   If the correct output is not displayed, press the OUTPUT key twice again.

3. SELECT to simulate the output. The display will acknowledge briefly with "5C 1" (conductivity output) or "5C 2" (temperature output) followed by the Numeric Display with digit flashing.

4. SCROLL (▲) and SHIFT (▼) to display the desired value and ENTER value into memory. The display will show "dC 1" or "dC 2" and display the entered value.

5. The display will flash to acknowledge that the analyzer is placed on hold "HLD". Since the analyzer is in hold the relays will behave as configured in Section 4.7.

6. To remove the analyzer from hold, press the HOLD key twice again.

Press Twice  Press Once  Displays Briefly  Numeric Display  Change to desired value  Press Once  Displays Briefly  Simulated output value (analyzer in hold)

FIGURE 4-9. Simulate Current Output
SECTION 5.0 START-UP AND CALIBRATION

5.1 START-UP AND CALIBRATION. Calibration and operation of the Model 2054 C 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 8.2.6.

**NOTE**
The cell constant (K) will be found on all sensor labels (i.e. K = 0.1, K = 1.00) located on the cable or J-Box plate.

1. Enter the Set Mode. Press the **ACCESS** key twice in rapid succession. The analyzer will display “Sct” briefly then display “Cn”.

2. **SCROLL (▲)** through the menu until “Fct” 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.

**NOTE**
Only adjust the cell constant when the conductivity sensor is replaced or cleaned. Then always perform a restandardization.

5.3 TEMPERATURE CALIBRATION. For accurate temperature correction, the temperature reading may need adjusting. The following steps must be performed with the sensor in a grab sample. Ideally, the standardization will be performed at or near the operating temperature.

1. Observe the 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 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 “964” 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. Also, please check the appropriate sensor manual calibration section for any specific instructions.

5.4.1 Initial Calibration

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 B.

1. Obtain a grab sample of the process to be measured.

2. Determine the sample's conductivity 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. Write down the reading. Insure that the analyzer is in hold. Press the HOLD key twice and observe the solid flag.

3. Immerse the sensor into the process 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 container in an ice bath or let it slowly cool down.

5. Allow the sensor to acclimate to the solution. (The temperature reading should be stable.)

6. Press the CAL key. "15k" displays briefly (if "2 nd" 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 it 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. "2 nd" displays briefly (if "15k" displays, press CAL again), then the numeric adjustment window displays.

11. SCROLL (▲) and SHIFT (▼) to display the grab sample’s conductivity value at 25°C as noted in Step 2, then ENTER it 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 SLOPE key twice. The display will show "5LP", then the calculated slope for the two calibration points. Install the sensor in the process, then remove the analyzer from hold by pressing the hold key twice again.

12. Proceed to Section 5.5 to perform an on-line standardization.

B. Single Point Calibration - Temperature 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 the Section A is performed.

<table>
<thead>
<tr>
<th></th>
<th>1.0 to 1.6% per °C</th>
<th>1.8 to 2.2% per °C</th>
<th>2.2 to 3.0% per °C</th>
<th>2.0% per °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acids</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bases</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Press the SLOPE key twice. The analyzer will display "5LP" briefly, then show the temperature slope in memory.

2. Press SELECT to change the value. The analyzer will display "RdJ" 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 it into memory.
B. Single Point Calibration - Temperature Slope Known (Continued).

4. Obtain a grab sample of the process to be measured.

5. Determine the sample's conductivity 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. Write down the reading. Insure that the analyzer is in hold. Press the HOLD key twice and observe the solid flag.

6. With the sensor in sample, press the COND key once, then press the SELECT key once. "Fel" will display, followed by the Numeric Display with digit flashing.

7. SCROLL (▲) and SHIFT (▼) to display the conductivity value you wrote down 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 Model 2054 C will calculate the true cell constant after the initial calibration.

9. Proceed to Section 5.5 to perform an in-line standardization.

5.5 ROUTINE STANDARDIZATION. The sensor should be standardized in-line initially, and then routinely if it is suspected that the process might degrade or coat the sensor. Sensor cell constant is entered "Fel" is set to this value and the cell factor "Fel" is set to 1.000. The first standardization recalculates the cell constant "Fel". Subsequent standardizations will change the cell factor "Fel". Refer to Section 8.2.6 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.

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.

3. Before entering the standardized value, compare the value the analyzer is reading now to the value in Step 1. This accounts for the change while the grab sample is being measured.

4. Press the COND key once, then press the SELECT key. "Fel" will show followed by the Numeric Display with digit flashing.

5. The corrected conductivity reference value may be determined by multiplying the value in Step 2 (C2) by the value noted in Step 3 (C1) and dividing the product by the analyzer value from Step 1 (C1):

   \[ \frac{C_2 \times C_3}{C_1} = Crv \]

Enter this corrected reference value in the analyzer using the SCROLL (▲) and SHIFT (▼) keys. Then press ENTER.

6. Note the Cell Factor value ("Fel"). Press the ACCESS key twice quickly. "Fel" appears. SCROLL (▲) to "Fel" 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 analyzer should be placed in hold. This will place the current output and relays in the state set in the default setup (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 re-enter the cell constant and restandardize after cleaning or replacement of the sensor. Replace the sensor back into the process and press the HOLD key twice again to remove the hold condition.
SECTION 6.0 KEYBOARD SECURITY

6.1 GENERAL. Display Mnemonic "Cd". 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, "LoE" will display followed by the numeric display ready for the code to be entered. A proper code will unlock the analyzer and will return to the last function attempted. Any incorrect value will result in "bCd" 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 2 minutes.

NOTE
If the code should be forgotten, pressing and holding the ACCESS key for 5 seconds will result in display of the code. Releasing the ACCESS key, then pressing ENTER will unlock the analyzer.

6.1.1 Keyboard Security ("Cd").

1. Enter Set Mode by pressing ACCESS key twice.
2. SCROLL (▲) until "Cd" appears on the display.
3. 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 2 minutes without keyboard activity or power is removed from the analyzer then restored.
SECTION 7.0 THEORY OF OPERATION

7.1 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 2054 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 2054 C analyzer can provide conductivity measurements as low as 1 μS/cm and as high as 1000 mS/cm full scale over a process temperature range of -10 to 200°C.

Rosemount Analytical also offers a booklet titled "Conductance Data for Commonly Used Chemicals." This booklet includes conductance information for commonly used chemicals.
SECTION 8.0 DIAGNOSTICS AND TROUBLESHOOTING

8.1 DIAGNOSTICS. The Model 2054 C 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 “SHD” item will display a history of the two most recent fault conditions unless “SHD” was cleared. Refer to Section 4.6.

NOTE
If the 2054 C is in hold and a fault occurs, the mnemonic “HLD” will display during the fault sequence.

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

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

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

NOTE
Ohmic values are read across the T.C. element and are based on the stated values ($R_0 = \pm 12\%$). 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.
8.2 TROUBLESHOOTING. The Model 2054 C Analyzer is designed with state-of-the-art microprocessor circuitry, making troubleshooting simple and direct. Subassembly replacement, i.e. printed circuit board replacement, is all that is usually required.

8.2.1 Installation Failure. If failure does occur, complete the following steps:

1. Check for a fault flag. If a fault condition exists, refer to Table 8-1 for the fault mnemonic explanation.
2. Check for sensor failure.
3. Check wiring connections for proper installation.
4. The following Troubleshooting Table 8-3 is a guide to problems which may occur during normal usage. The table is arranged with the most common problems listed first.

8.2.2 Display Test. Display Mnemonic "dE5". Selecting this option will activate all the display segments. This item is used if a faulty display is suspected. Refer to Figure 3-1 Keyboard Overlay.

A. Press the ENTER key twice to access Set Menu, then SCROLL (▲) through to "dE5" and SELECT.

8.2.3 Software Version. Display Mnemonic "uE-r". Selection of this item will display the software revision level of the CPU. This number may be requested by factory service personnel if troubleshooting is required.

A. Press the ENTER key twice to access Set Menu, then SCROLL (▲) through to "uE-r" and SELECT (i.e. 12.0.1 displayed)

8.2.4 Sensor Troubleshooting. In addition to the fault mnemonics that directly relate to a possible sensor problem ("5Eh", "7Eh", "cE7"), the analyzer can display the absolute conductivity of the process. This information can aid in determining conductivity versus temperature and application problems.

Rosemount Analytical's "Conductance Data for Commonly Used Chemicals" is available for further information.

8.2.5 Absolute Conductivity. Display Mnemonic "cE n". When selected the uncorrected (absolute) conductivity of the process is displayed. The displayed value is not temperature corrected.

To read the absolute conductivity of the process, do the following:

1. Press the ACCESS key twice. "5Eh" will briefly display followed by "cE n". Not required if already in set menu.

2. SELECT "cE n" to read the absolute conductivity.

3. Press the COND key to return to normal operation.

8.2.6 Cell Factor. Display Mnemonic "fE-c". When selected after a standardization or calibration, displays a value showing the change in the calculated cell constant since the initial calibration. Initial cell factor value is 1.0. This value will change as sensor coating occurs. Keep a trend of this value to determine a sensor maintenance schedule (see Table 8-3).

1. Press the ACCESS key twice. "5Eh" will briefly display followed by "cE n".

2. SCROLL (▲) to display "fE-c" and SELECT it.

3. Press COND key to return to normal operation.

8.2.7 CPU Board Replacement. If there is a problem with the CPU board resulting in its replacement, specific procedures included with the CPU board for calibrating the new board and must be followed exactly or the microprocessor will be improperly programmed. Should this occur, it will be necessary to return the analyzer to the factory for reprogramming.

8.2.8 Power Board Replacement. If it becomes necessary to replace the power board, the CPU board will need to be recalibrated following 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.
8.2.9 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 “Rtc” to “off”. Set manual temperature compensation to 25°C (see Section 4.4 and Figure 4-4).

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.

Formula:

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

Table:

<table>
<thead>
<tr>
<th>Conductivity (μmhos)</th>
<th>VS</th>
<th>Resistance (ohms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td></td>
<td>100,000</td>
</tr>
<tr>
<td>100</td>
<td></td>
<td>10,000</td>
</tr>
<tr>
<td>1,000</td>
<td></td>
<td>1,000</td>
</tr>
<tr>
<td>10,000</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>20,000</td>
<td></td>
<td>50</td>
</tr>
</tbody>
</table>

FIGURE 8-1. Simulate Conductivity Input
<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>PROBLEM</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Fct&quot; below 0.5 or above 2.0. Actual range determined by user.</td>
<td>1. Old or coated sensor. 2. A preceding standardization was incorrect.</td>
<td>1. Clean or replace sensor. 2. Re-evaluate sample technique and equipment. 3. Recalibrate per Start-Up and Calibration Section (Section 5.).</td>
</tr>
<tr>
<td>Analyzer reading not the same as grab sample of process.</td>
<td>1. Grab sample incorrect. 2. Unclear what is correct. 3. 2054 T out of calibration.</td>
<td>1. Re-evaluate sample technique and equipment. 2. Bench test analyzer. 3. Recalibrate per Start-Up and Calibration Section (Section 5.).</td>
</tr>
<tr>
<td>Fault code &quot;tCt&quot;/&quot;tL&quot;/&quot;r r n&quot;.</td>
<td>1. Miswire. 2. Open or shorted RTD.</td>
<td>1. Check wiring between the sensor and 2054 C. 2. Replace sensor</td>
</tr>
<tr>
<td>Fault code &quot;0rn&quot;.</td>
<td>1. Process conductivity too high for sensor in use. 2. Process upset.</td>
<td>1. Replace sensor with a sensor which has a higher cell constant. 2. Check for process control problem.</td>
</tr>
<tr>
<td>Fault code &quot;5n&quot;.</td>
<td>1. Open wire between sensor and analyzer. 2. Cable length has been exceeded (maximum cable length 200 ft.).</td>
<td>1. Repair wire/check connection. 2. Locate analyzer within 200 ft. of sensor.</td>
</tr>
<tr>
<td>Fault code &quot;EEP&quot;.</td>
<td>1. Defective EEPROM.</td>
<td>1. Replace CPU PCB.</td>
</tr>
<tr>
<td>Fault code &quot;CH5&quot;.</td>
<td>1. Defective CPU.</td>
<td>1. Replace CPU PCB.</td>
</tr>
<tr>
<td>No alarm relay closure.</td>
<td>1. Defective power board. 2. Defective CPU.</td>
<td>1. Replace power PCB. 2. Replace CPU PCB.</td>
</tr>
<tr>
<td>Low output current.</td>
<td>1. Circuit loading with excessive resistance on output.</td>
<td>1. Consult output loading limits 2054 C specifications (600 ohms max load).</td>
</tr>
<tr>
<td>Fault code &quot;r n&quot;, very high conductivity reading.</td>
<td>1. Sensor miswired. 2. Shorted sensor.</td>
<td>1. Repair wire/check connection. 2. Replace sensor.</td>
</tr>
<tr>
<td>P/N</td>
<td>DESCRIPTION</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>-----------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>22966-00</td>
<td>PCB, LCD Digital Display</td>
<td></td>
</tr>
<tr>
<td>23025-01</td>
<td>Panel Mounting Kit (Group I Only)</td>
<td></td>
</tr>
<tr>
<td>23053-00</td>
<td>Mounting Bracket, 2-inch Pipe (Group I Only)</td>
<td></td>
</tr>
<tr>
<td>23054-01</td>
<td>Wall Mounting Bracket and Junction Box (Group I Only)</td>
<td></td>
</tr>
<tr>
<td>23056-02</td>
<td>PCB, 115V Power Supply</td>
<td></td>
</tr>
<tr>
<td>23056-03</td>
<td>PCB, 230V Power Supply</td>
<td></td>
</tr>
<tr>
<td>23124-08</td>
<td>PCB, CPU, 2054 Conductivity</td>
<td></td>
</tr>
<tr>
<td>23133-33</td>
<td>Keyboard Cover, 2054 Conductivity (Group I Only)</td>
<td></td>
</tr>
<tr>
<td>23245-01</td>
<td>PCB, LED Digital Display</td>
<td></td>
</tr>
<tr>
<td>23268-01</td>
<td>Kit, Heater, 115V, Wall Mounting Enclosure (Group II Only)</td>
<td></td>
</tr>
<tr>
<td>23268-02</td>
<td>Kit, Heater, 230V, Wall Mounting Enclosure (Group II Only)</td>
<td></td>
</tr>
<tr>
<td>23271-01</td>
<td>PCB, Communication</td>
<td></td>
</tr>
<tr>
<td>23316-00</td>
<td>PCB, Motherboard</td>
<td></td>
</tr>
<tr>
<td>23369-01</td>
<td>Front Panel, 2054 Conductivity</td>
<td></td>
</tr>
<tr>
<td>32934-00</td>
<td>Enclosure</td>
<td></td>
</tr>
<tr>
<td>32936-00</td>
<td>Enclosure, Rear Cover (Group I Only)</td>
<td></td>
</tr>
<tr>
<td>32937-00</td>
<td>Gasket, Rear Cover (Group I Only)</td>
<td></td>
</tr>
<tr>
<td>9100153</td>
<td>Fuse, 0.125, 2AG, 250V</td>
<td></td>
</tr>
<tr>
<td>9100157</td>
<td>Fuse, 0.1A, 3AG, 250V, Slo Blo</td>
<td></td>
</tr>
</tbody>
</table>
PART III
SECTION 9.0 THE MODEL 268 SMART FAMILY INTERFACE

9.1 GENERAL

The Model 2054 C Conductivity Analyzer is designed for compatibility with the Rosemount Model 268 SMART FAMILY® Interface. The Model 268 can be used to interrogate, configure, test, or format this transmitter, as well as other products in the Rosemount family of microprocessor-based instruments. Moreover, the Model 268 can communicate with the Model 2054 C from the control room, from the transmitter site, or from any other wiring termination point in the loop where a minimum of 250 ohms resistance exists between the connection and the power supply. Before using the Model 268 in conjunction with the transmitter, be sure to read this section.

NOTE
Henceforth in this manual the Model 2054 C will be referred to as Model 2054 Cond or as “transmitter”.

The Model 268 communicates with a Rosemount transmitter using the Bell 202 standard Frequency Shift Keying technique. The Rosemount implementation of this technique uses high-frequency digital signals superimposed on the standard 4–20 mA transmitter output to communicate over the loop. Because the net energy added to the loop is zero, communication does not disturb the 4–20 mA signal.

This section introduces the Model 268 display, keypad, and the different memory locations in the transmitter and Model 268.

9.2 MODEL 268 DISPLAY

The display is a four-line by twenty-character dot-matrix LCD that allows flexible and easy communication between the transmitter and the user. The top two lines display user prompts, information about the communication session, and user-entered values. The bottom two lines generally display dynamic labels for the four software-defined keys directly below the display. These labels reflect currently available choices, and lead you through the operation sequences involved in communication between the Model 268 and transmitter.

9.3 KEYBOARD FUNCTIONS

9.3.1 DEDICATED KEYS

ON/OFF

This turns the unit on and off. When the Model 268 is turned ON, it first performs its self-diagnostic routines, and then searches for a smart transmitter in the 4–20 mA loop. If no smart transmitter is found, the Model 268 offers the opportunity to try again, select “MULT DROP” (Section 14.5) or OFF-LINE. Under OFF-LINE the user can test the Model 268, or perform off-line configuration (Section 14). If no key is pressed on the Model 268 keypad for 20 minutes, the unit automatically shuts itself OFF. However, this shutoff function is disabled while the Model 268 is displaying the process variable or an error message.

Process Variable

displays up-to-date process variable readings from the transmitter in engineering units and the transmitter output in millamps. The displayed process variable is updated approximately once every two seconds.
Review
allows you to step through all the information currently held in the four memory locations in the transmitter and Model 268: SAFE MEM, OFLN MEM, WORK REG, and XMTR MEM. These four memory locations are described in detail later in this section.

Help
explains the software-defined key functions (F1–F4) in greater detail. You can step through the help screens by pressing the HELP CONT prompter. You can end a help session and return to the original screen by pressing HELP END.

Restart
allows you to initiate communication with a smart transmitter while the Model 268 is still turned on. Upon connection to a new transmitter, pressing this key loads information from the new transmitter into the Model 268 Working Register.

Previous Function
returns you to the last decision level and allows you to select a different software-defined key function. For instance, if you want to configure the transmitter but press TEST on the top-level function menu by accident, the PREVIOUS FUNCTION key returns you to the previous menu and lets you choose again.

The PREVIOUS FUNCTION key is also useful for returning to a familiar menu when you lose your place in an unfamiliar operation.

FIGURE 9-1. Model 268 Keypad
9.3.2 MEMORY LOCATIONS

Together, the transmitter and Model 268 contain four memory storage locations. Three reside in the Model 268, and one in the transmitter itself. Figure 9-2 depicts these memory locations, and the allowable data transfer paths. Note that the only direct path for data between the Model 268 and Transmitter Memory is through the Working Register.

FIGURE 9-2. Memory Locations

SAFE MEM

is the memory location in the Model 268 where existing transmitter information parameters can be saved upon start-up. If you make changes to the transmitter configuration that you want to "undo," you can recall the information from the Safe Memory, and return the transmitter to its original configuration. Keep in mind that the Safe Memory does not store digital trim information, and that such information cannot be "undone" in this manner. Also, the Safe Memory can be used only to restore data to the same individual transmitter from which it was obtained. The data in the Safe Memory is nonvolatile; it remains even if the Model 268 is turned OFF. However, if the battery pack in the Model 268 becomes discharged or is removed, the contents of the Safe Memory will be lost.

OFLN MEM

stores configuration information that was entered in the Model 268 off line for later downloading to a transmitter. This location can also be used to clone a transmitter by uploading its configuration data, and then downloading it to a number of other transmitters. The data in the Off-line Memory is nonvolatile; that is, it remains even if the Model 268 is turned OFF. However, if the battery pack in the Model 268 becomes discharged or is removed, the contents of the Off-line Memory will be lost.

WORK REG

is the memory location in the Model 268 that stores data as it is being entered. It receives the transmitter's configuration data upon start-up or restarting. Configuration changes are first made in the Working Register. The data in the Working Register is not automatically sent to the transmitter, but must be transferred using the SEND DATA software-defined key.
XMTR MEM
is the nonvolatile memory in the transmitter. The transmitter uses the contents of this memory to determine how it operates. Data in the Transmitter Memory is never accessed directly: Data must be uploaded into the Working Register before it may be reviewed or changed.

The information in the Transmitter Memory may be different from that in the Working Register, since the Working Register may contain changed data that has not yet been sent to the transmitter. Therefore the Model 268 will warn that reviewing this location will erase the information currently held in the Model 268 Working Register.

9.3.3 SOFTWARE-DEFINED KEYS

The four software-defined keys just below the screen of the Model 268—marked F1 through F4—are used for functions appropriate to the screen currently displayed. This allows the Model 268 to perform many functions with only a few keys and a minimum of confusion. The functions of these keys are explained in later sections of this manual.

9.3.4 ALPHANUMERIC KEYS

The alphanumeric keys are used to enter information into the Model 268 when updating transmitter parameters. Pressing a key by itself will enter the value of that key, indicated in large print in the center of the key.

To enter an alphabetic character, first press the Shift key that corresponds to the position of the letter you want on the alphanumeric key, and then press the alphanumeric key. For example, to enter the letter R, first press the right-hand shift key, then the "5" key. Refer to Figure 9-1. Do not press these keys simultaneously, but one after the other.

9.4 MODEL 268 CONNECTIONS

The Model 268 can interface with the transmitter from the control room, the transmitter site, or any other wiring termination point in the loop provided there is a minimum of 250 ohms between the connection and the power supply. To communicate, it must be connected in parallel with the transmitter; the connections are non-polarized. Figure 9-3 illustrates the wiring connections for direct interface at the bench or transmitter site for the Model 2054 Cond. The Model 268 can be used for remote access from any terminal strip as well.

NOTE
For the Model 268 to function properly, there must be a minimum of 250 ohms resistance in the loop.
FIGURE 9-3. Connection Points for Direct Transmitter Interface

Model 268 may be connected at any termination point in the signal loop. Signal loop must have 250 ohm minimum load for communications.
9.5 POWER SUPPLY

The Model 268 is available with a battery pack that holds five "AA" alkaline cells, or with a rechargeable nickel-cadmium power pack.

Battery life:
alkaline: approximately 150 hours
nickel-cadmium: approximately 60 hours

A low-battery indicator "LB" will appear in the lower right-hand corner of the display when there is approximately one-half hour of battery life remaining.

To conserve battery life, the Model 268 automatically shuts itself OFF after 20 minutes without a key press. This automatic shutoff function is disabled while the Model 268 is displaying the process variable or an error message. Figure 9-4 shows battery installation and removal.

FIGURE 9-4. Battery Installation and Removal
SECTION 10.0 START-UP AND COMMISSIONING

10.1 GENERAL

Before putting the Model 2054 Cond into operation, you should commission the instrument using the Model 268. Commissioning consists of testing the transmitter and loop, and verifying transmitter configuration data. This section discusses the procedure step-by-step. For more information on changing transmitter configuration data - both output-related (such as range, output, damping, and units) and non-output-related (such as tag, temperature compensation, and temperature units) - refer to Section 13 - On-line Configuration.

10.2 GETTING STARTED:
INITIATING
COMMUNICATIONS

Checking for Xmtr
--WAIT--

Model: 2054 Cond
Tag: Xxxxxxx
Loading XMTR Mem
to the WORK Regs

WARNING-Xmtr/268 not
in communication
Re-
try

Drop
Off-
line

Save data in or
Recall from SAFE Mem
Save
Re-
call
Pro-
ceed

After the bench check equipment is connected as shown in Figure 9-3, turn on the Model 268 by pressing the ON/OFF key. The Model 268 displays its software revision levels and conducts a self-test each time it is turned on. After the test is complete, the Model 268 tries to determine if it is connected to a Rosemount Smart Transmitter.

If a transmitter is detected, the Model 268 briefly displays the transmitter model and tag number, if applicable.

If the following message appears, check the connections and press RETRY (F1).

If the message appears again, or if any other error message appears, refer to Section 15 - Software Diagnostics for specific instructions.

A NOTE ON COMMUNICATIONS

In using the Model 268, you will notice that after you push certain keys, the character "φ" appears in the lower right corner of the display. While it is on the screen, the Model 268 is in the process of sending or receiving data (or trying to). If the transmitter sends a message indicating that it is temporarily busy, the "φ" sign changes to a "0" to pass this information on to the user.

The Model 268 asks whether you want to save the transmitter data in the Model 268. Press SAVE (F2).

It is a good practice to save the Transmitter Memory in this way whenever you connect the Model 268. By doing this, you always have a record of the original configuration, and may freely make and erase changes during configuration without worrying about losing data. If you have saved the Transmitter Memory in this way, the original transmitter configuration can then be recalled and then sent back to the transmitter, returning it to its original state.

To recall the Safe Memory screen at any point in communicating with a transmitter, press PREVIOUS FUNCTION repeatedly until the Safe Memory screen, shown above, reappears. Then press RECALL (F3). This copies the contents of the Safe Memory into the Working Register. The Working Register, containing the original transmitter configuration, can then be sent to the Transmitter Memory as described in Section 13 - On-line Configuration.

After you press SAVE, the display will tell you to wait while the data is being saved. Then the top-level function menu will appear.
FIGURE 10.1. Decision Tree

- **2054 C/T SMART**
  - **Recall**
  - **Proceed**
    - **Configure**
      - **Change VO**
      - **XMTR info**
      - **Send Data**
      - **Other Functions**
        - **Characterize**
          - **Digital Trim**
        - **Output Trim**
          - **Sensor Calibration**
          - **Temperature Standardization**
          - **End**
        - **End**
      - **Exit**
      - **Save**
      - **Recall**
      - **Abort**
    - **Format**
      - **Alarm Status, Setpoint, Hys, Delay time**
      - **Tag, Desc, Mag, Date, Sensor**
      - **PV eng units, PV percent**
      - **Temp Units, Cell Constant, Xstr S/N**
      - **Temperature Compensat**
      - **Two outputs: LRV, URV, Units, Damping**
      - **Two relays: default action**
      - **All dynamic variables eng units**
      - **Other Scale, 4/20mA, Abort**
      - **Two outputs: primary mA**
      - **All dynamic variables and primary mA**
      - **Auto Zero (MUX only)**
    - **Loop Test**
      - **Test Mode on, off**
      - **Lo output, Hi output, Other, End**
      - **End**
    - **Loop Test**
      - **Output 1, Output 2**
      - **End**
    - **XMTR Test**
      - **End**
    - **208 Test**
      - **End**
    - **Test 208**
      - **XMTR Tests**
      - **End**
    - **Off-Line**
      - **Abort**
      - **Exit**
    - **Off-Line Conf**
      - **Frequency**
      - **Retry**
      - **Multi-drop**
      - **Test Keypad**
    - **Select Tag Number**
      - **Select XMTR address**
      - **Poll**
      - **End**
    - **End**

- **Test Keypad**
  - **Tag, Desc, Mag, Date, Sensor, Alarm Status, Setpoint, Hys, Delay time, Temperature Compensat**
  - **Two outputs: LRV, URV, Units, Damping**
  - **Two relays: default action**
  - **Two outputs: default action**

- **2054 C/T SMART**
  - **Recall**
  - **Proceed**

10-2
The top-level function screen provides access to the three primary functions of the Model 2054 Cond. Before going further, carry out the following test procedures to ensure that the transmitter and Model 268 are functioning properly.

Test functions verify that the transmitter, the Model 268, and the loop are in good working order. Testing is recommended whenever you suspect component failure or a problem with loop performance. To initiate the test function, press TEST (F2) on the top-level function screen.

Press 268 TEST (F1).

This display allows you to continue to test the Model 268 or first review all of the transmitters/software revision levels with which the Model 268 can communicate. Press TEST 268 (F2).

The next display will tell you that the test is taking place.

If the Model 268 passes the self-test, this message will follow. Press PROCEED (F4). If a message indicating 268 failure appears, refer to Section 15 - Software Diagnostics.

After you press PROCEED, an additional display will appear, giving you the option to test each key on the keypad. To bypass this test, press ABORT (F3). However, if you suspect a problem with one or more keys, initiate the test by pressing PROCEED (F4).

A help display will appear. Press PROCEED (F4).

To test the keypad, press any key suspected of malfunctioning, and check to see whether that number or character appears in the bracketed field. Note that the display shows the designated character that will appear for each dedicated key, such as v for PROCESS VARIABLE.
To end the keypad test, press PREVIOUS FUNCTION. Then the display returns to the "Test 268, XMTR REV, End" screen. You may perform other tests or press END (F4) to end the test session.

Pressing XMTR REV (F3) will display the list of the transmitters and software revision levels.

**NOTE**

If the desired transmitter or transmitter software revision level is not displayed, the Model 268 software will need to be updated. This can be done by returning the Model 268 to the nearest Rosemount Service Center.

To exit XMTR REV, press PREVIOUS FUNCTION and then END (F4). The top-level test screen will appear.

If you press EXIT, the Model 268 warns you to return the loop to automatic control. Although testing the Model 268 by itself would not require that the loop be set to manual, the message appears as a precaution, because the transmitter and loop tests do alter the transmitter output. Press PROCEED (F4).

The display will then return to the top-level function screen.

Although the Model 2054 Cond performs continuous self-diagnostic, a more extensive diagnostic routine can be initiated with the transmitter test function. The transmitter test routine can identify an electronics failure. Press TEST (F2) on the top-level function screen.

Then press XMTR TEST (F2) on the top-level test menu.

Because these tests will affect the output of the transmitter, a message will appear to remind you to set the loop to manual. If the transmitter is being tested on the bench, or is otherwise not installed in a control loop, this will be unnecessary. After the loop is set to manual, press PROCEED (F4).

The display will indicate that the test is taking place.

If the transmitter tests PASS, this message will appear. Press PROCEED (F4). The display will return to the top-level test menu.

If the transmitter test detects a problem, messages to indicate the source of the problem will be displayed. Refer to Section 15 - Software Diagnostics if any such messages appear.
You may perform a loop test or press EXIT (F4) to end the test session.

If you press EXIT, the Model 268 warns you to return the loop to automatic control. Press PROCEED (F4).

The display will then return to the top-level function screen.

The loop test allows you to verify the outputs of the transmitter, the integrity of the loop, and the operation of any recorders or similar devices. The loop test also allows you to place the transmitter in hold mode or remove it from hold. In hold mode the transmitter sets the current outputs and relays to the state configured (see On-Line Configuration Sections 13.8 and 13.9). If you are commissioning the transmitter on the bench, you should repeat this test after the transmitter has been installed in the field. Press LOOP TEST (F3).

The display allows you to choose whether you would like to check current output 1 (conductivity), current output 2 (temperature), or initiate or remove a hold condition. Press NEXT OPTN (F1) to scroll through the choices. For example, select current output 1 and press ENTR (F4).

A message will appear to remind you to set the loop to manual. Do so, and press PROCEED (F4). The next display allows you to select a discrete milliamp level for the transmitter to output. To command the transmitter to output 0 or 4 mA, for example, press LO OPUT (F1). A zero (0) mA output option is only available with output 2. See Section 13.7 On-line Configuration or Section 14 Off-line Configuration for setting the output to 0-20 mA. Then return to this section.

The Model 268 notifies you that it is about to tell the transmitter to set its output to 4 mA (or 0 mA - output 2 only). Press PROCEED (F4) to confirm. (Pressing ABORT (F3) would cancel the procedure and allow you to choose a different milliamp level.)

Check the current meter installed in the test loop to verify that it reads 4 mA (or 0 mA). If so, press END (F4). If the output is not 4 mA (or 0 mA), then the transmitter requires a digital trim, as described in Section 16.6 - Maintenance.

The display will return to the loop test screen, and allow you to choose another output value. In addition to 4 (or 0) and 20 mA settings, you can specify a value between these by pressing OTHR (F3) and using the alphanumeric keys to enter that value.

In each case, the test procedure is the same as in the 4mA example here. After completing the loop test for output 1, return to the select output menu shown above and check output 2 in the same manner. Press END (F4) and then press END (F4) again. The Model 268 will notify you that it is returning the transmitter to its original output.
10.3.3.2 HOLD MODE

HOLD MODE – To initiate a hold or remove the transmitter from hold, select hold mode on the select output screen and press ENTR (F4). A warning screen will appear stating that setting hold mode on may affect other control outputs/operations. There are two settings: On to initiate a hold, and Off to remove a hold. If the setting is appropriate press ENTR (F4). Otherwise, press NEXT OPTN (F1), followed by ENTR (F4) to enter a new setting. Press PREVIOUS FUNCTION.

The display will then return to the test function menu. Press EXIT (F4).

The display will prompt you to return the loop to automatic control. Do so, and press PROCEED (F4).

This will recall the top-level function menu.

NOTE
When the transmitter is in hold mode the Model 268 will periodically display a warning screen with this message. Press OVERRIDE (F3) on this screen to continue.

10.4 REVIEWING TRANSMITTER CONFIGURATION DATA

It is a good idea to review the transmitter configuration parameters as set at the factory. To do this, press the REVIEW key.

The display will offer a menu of the different data storage locations that can be reviewed. Since no changes to the Working Register have yet been made with the Model 268, the contents of the Working Register are still identical to the contents of the Transmitter Memory. This means that reviewing the Working Register is the same as reviewing the Transmitter Memory. Press WORK REGS (F3).

The display will indicate which memory location was selected, and will automatically step through all the configuration data, including:

Transmitter Model*
Tag
Descriptor
Date
Message
Sensor Information
Temperature Slope
Cell Factor
Cell Constant
Temperature Units
Temperature Compensation
Manual Temperature
Transmitter S/N
Transmitter Address
Software Revision*
Conductivity 1) and Temperature 2)
Outputs:
Upper/Lower Range Values
Units
Range
Damping
Default Action
Default Current
Two Alarm Relays:
Logic (Hi, Lo, Off, or Fault)
Setpoint
Hysteresis
Delay Time On/Off
Default Action

* An asterisk denotes information that you cannot change by reconfiguring the transmitter.
The display will advance automatically through this list once, moving to the next data display every few seconds or so. To stop the automatic advance, press STOP LIST (F1). To move forward or backward manually, one screen at a time, press NEXT ITEM (F3) or LAST ITEM (F4). To resume automatic display advance, press STRT LIST (F2). Reviewing other memory locations produces a similar, but not necessarily identical list of parameters.

After all the transmitter data has been shown, the transmitter type/tag display will reappear. If you need to double-check the data you have reviewed, press STRT LIST (F1) or NEXT ITEM (F3) to recall the information display by display. To escape the review function, press the PREVIOUS FUNCTION key once to back out of the REVIEW sequence. Press the PREVIOUS FUNCTION key until the top-level function screen illustrated here appears.

Now is the time to make any changes in transmitter data that you noticed were needed during the REVIEW session. If you need to make changes, refer to Section 13 – On-line Configuration.

The last step of start-up and commissioning is to check the transmitter output. To obtain process variable readings in engineering and milliamps, press the PROCESS VARIABLE dedicated screen.

The following variables are accessible:

- PV: Conductivity in micromhos (μmhos = microsiemens)  
- SV: Temperature in °C or °F  
- TV: Absolute Conductivity  
- Output 1): (Conductivity) in mA  
- Output 2): (Temperature) in mA

The PV and Output 1) listing is the top level process variable screen.

The displayed process variable is updated approximately once every two seconds as indicated by the flashing "*" communications indicator located in the lower right-hand corner of the display. Pressing PROCESS VARIABLE simply interrupts the normal screen flow, and can be done at any time, except when the Model 268 is in another dedicated key routine.

Pressing XMTR VARS (F1) then MORE VARS (F4) scrolls through the conductivity, sensor temperature, and absolute values. In each case ABORT (F3) and the PREVIOUS FUNCTION key takes you back to the top level screen.

Pressing VARS MAP (F2) on the top level screen will give you the listing of the primary, secondary, and tertiary variable values and their descriptions.

Pressing MORE VARS (F4) scrolls through the listing and back to the top level process variable screen.
Pressing OPUT VARS (F4) on the top level screen will give you the listing of primary, secondary, and tertiary variable values (PV, SV, and TV) and the outputs associated with these variables.

Pressing MORE VARS (F4) scrolls through the listing and back to the top level process variable screen.

NOTE
No transmitter security is available through the Model 268 to protect the Model 2054 Cond against unauthorized changes. The Model 2054 Cond has a security feature to protect it against changes made from its own keyboard, but changes made from the Model 268 can override the Model 2054 Cond security feature.
SECTION 11.0 INITIAL TRANSMITTER SET-UP

11.1 GENERAL

Several parameters need to be set up in the Model 2054 Cond when it is initially commissioned. These include the temperature units selection, sensor cell constant, and transmitter serial number. These parameters are set up using the Format function. They will be changed in the transmitter immediately upon entering. Press FORMAT at the top-level function screen. The Model 268 warns you that the control loop should be manual.

The top-level Format screen appears.

Press CHARACTERIZE (F2).

NOTE
You can exit the characterize function of the format mode any time by pressing PREVIOUS FUNCTION, then the RESTART key. Pressing the RESTART key reinitializes the system.

NOTE
The configuration data sheet (Table 11-1) at the end of this section is a handy checklist for recording transmitter configuration data and options.

11.2 CHANGING TEMPERATURE UNITS

The temperature units desired must be selected before configuring other temperature related parameters. The options are degrees Celsius (deg C) or degrees Fahrenheit (deg F). If the desired units selection does not appear, press CHANGE (F3). Otherwise, press ENTER (F4).

To change the temperature units, press NEXT OPTN (F1). Then press ENTR (F4).
11.3 ENTERING THE CELL CONSTANT

The cell constant must be entered. The constant may be found on the cable label of each sensor or you can use the values listed below. For example, K=1.0 means the sensor has a approximate cell constant of 1.0.

The following lists cell constants by model numbers for various sensors:

<table>
<thead>
<tr>
<th>Electrode Conductivity</th>
<th>Sensor Constants</th>
</tr>
</thead>
<tbody>
<tr>
<td>140-04/05</td>
<td>0.2</td>
</tr>
<tr>
<td>140-06/07</td>
<td>1.0</td>
</tr>
<tr>
<td>141-04</td>
<td>0.2</td>
</tr>
<tr>
<td>141-06</td>
<td>1.0</td>
</tr>
<tr>
<td>142-01</td>
<td>0.01</td>
</tr>
<tr>
<td>142-03</td>
<td>0.1</td>
</tr>
<tr>
<td>150-03</td>
<td>0.1</td>
</tr>
<tr>
<td>150-06</td>
<td>1.0</td>
</tr>
<tr>
<td>150-09</td>
<td>0.5</td>
</tr>
<tr>
<td>160-06</td>
<td>1.0</td>
</tr>
<tr>
<td>160-07</td>
<td>2.0</td>
</tr>
<tr>
<td>160-08</td>
<td>5.0</td>
</tr>
</tbody>
</table>

To change the cell constant press CHNG (F3).

A screen appears with brackets around the value to indicate that the cell constant may be changed. Press ← (F1) or → (F2) to move the underline cursor left or right. The alphanumeric keys may then be used to change the value of the digit the cursor is under. Pressing CLR (F3) will clear the currently entered value, or let you enter a new one using the alphanumeric keypad.

Later, upon calibration (Section 12), the transmitter will calculate the true constant of the sensor.

**NOTE**
The appropriate cell constant will need to be reentered in this manner every time the sensor is changed or cleaned.
11.4 CHANGING THE TRANSMITTER SERIAL NUMBER

The serial number can be changed with the characterize function. After entering the cell constant the serial number screen will appear. To input or change the serial number press CHNG (F3). A warning message will appear.

NOTE
Only numeric characters may be entered. Ignore the first letter of the serial code and the hyphen on the Model 2054 Cond. Only the last seven digits of the serial number on the transmitter may be entered.

Enter the last seven digits of the serial number, using <- (F1) and -> (F2) to move the underline cursor if necessary. Pressing CLR (F3) will clear the currently entered value.

NOTE
The transmitter serial number only needs to be changed if the transmitter is changed. Pressing the RESTART key will reset the cell factor to 1.000. See Section 16.2 - Maintenance.

After you press ENTR (F4), whether or not you have made a change to the transmitter serial number, the Model 268 informs you that the loop may be returned to automatic control. You must press the RESTART dedicated key to load the transmitter memory into the working register.

The Model 268 asks whether you want to save the transmitter data in the Model 268. Press SAVE (F2).

The Model 268 will tell you to wait while the data is being saved. Then the top level function screen will appear.

You are now ready to calibrate the Model 2054 Cond and sensor.
**TABLE 11-1. Model 2054 Cond SMART Transmitter Configuration Data Sheet**

<table>
<thead>
<tr>
<th>Customer</th>
<th>P.O.#</th>
<th>SO#</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model#</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SST Tag#</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software Tag#</td>
<td>(8 characters)</td>
<td>Date</td>
</tr>
</tbody>
</table>

**INITIAL TRANSMITTER SETUP: (Software Selectable)**

<table>
<thead>
<tr>
<th>Temperature Units:</th>
<th>°F</th>
<th>°C</th>
<th>Transmitter Serial Number: (8 characters)</th>
</tr>
</thead>
</table>

**INPUT / OUTPUT INFORMATION: (Software Selectable)**

**Alarm 1 Configuration:**
- Hi
- Lo
- Off
- Setpoint: _________ μMhos (microsiemens)
- Hysteresis: _________ % of setpoint
- Delay Time On: _________ sec
- Delay Time Off: _________ sec

**Alarm 2 Configuration:**
- Hi
- Lo
- Off
- Fault
- Setpoint: _________ μMhos
- Hysteresis: _________ % of setpoint
- Delay Time On: _________ sec
- Delay Time Off: _________ sec

**Temperature Compensation:**
- Auto
- Manual (manual temperature: _________)

**Current Output 1) (Conductivity):**
- LRV: _________ μMhos
- URV: _________ μMhos
- Units: mA
- Percent (only affects transmitter display)
- Damping: _________ sec

**Current Output 2) (Temperature):**
- LRV: _________ deg C/F
- URV: _________ deg C/F
- Units: mA
- Percent (only affects transmitter display)
- Damping: _________ sec
- Range: 4-20 mA
- 0-20 mA

**Output Defaults:**
- Output 1 Default Type: Crnt (Current: _________ mA)
- None
- Output 2 Default Type: Crnt (Current: _________ mA)
- None

**TRANSMITTER INFORMATION: (Software Selectable)**

<table>
<thead>
<tr>
<th>Tag: (8 characters)</th>
<th>Date: DD/MM/YY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Descriptor: (16 characters)</td>
<td>Cell Factor:</td>
</tr>
<tr>
<td>Message: (32 characters)</td>
<td>Date: DD/MM/YY</td>
</tr>
<tr>
<td>Sensor Info: (32 characters)</td>
<td>Cell Factor:</td>
</tr>
</tbody>
</table>

Suggested use of the following is to track standardizations:

<table>
<thead>
<tr>
<th>Date: DD/MM/YY</th>
<th>Cell Factor:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date: DD/MM/YY</td>
<td>Cell Factor:</td>
</tr>
</tbody>
</table>
SECTION 12.0 CALIBRATION

12.1 GENERAL

The Model 2054 Cond can be calibrated by its integral keyboard or by using the Model 268. If you use the Model 2054 Cond keyboard, refer to Section 5. Section 12 describes how to use the Model 268 to calibrate the Model 2054 Cond. A bench calibration should be performed if the temperature slope is not known (see Section 12.4) or if you need a very accurate temperature display and a process reference temperature is not available. Otherwise, an on-line calibration is possible.

The calibration procedures appear in the Format function of the Model 268. The following calibration procedures are available under the Format mode - digital trim function.

SNSR CAL: Sensor calibration which includes:

- 2-pt cal: automatic two point temperature slope calibration and "manual" temperature slope input capability.
- Stoize: a procedure for standardizing the conductivity reading to a reference value.
- Auto zero: a procedure for electronically zeroing the toroidal conductivity transmitter and sensor loop. Omit this if you have a Model 2054 C.
- TEMP CAL: A procedure for standardizing the temperature to a reference or process value.
- OUT TRIM: A procedure for digitally trimming the conductivity and temperature outputs with a current meter. (See Section 16 - Maintenance.) This has been factory set prior to shipment of the transmitter.

Press FORMAT (F3) at the top level function screen. A warning screen will appear to indicate that the control loop should be in manual. Press PROCEED (F4).

NOTE

Under the FORMAT XMTR screen, OTHR FCNS (F1), is a procedure for turning burst mode on and off. If your control system has burst mode, please consult your control system documentation for further explanation.

Press DGTLC TRIM (F3) to access the calibration procedures. Omit the system electronic zero in the next section if you have a Model 2054 Conductivity Transmitter.

12.2 ELECTRONICALLY ZEROING THE SYSTEM

IMPORTANT NOTE

The Model 2054 Toroidal Conductivity must calibrate the process zero point before the sensor is placed into the process. This procedure must be omitted for the Model 2054 Conductivity (Electrode type).

In order to perform this procedure, the toroidal sensor cannot be placed in the process, or in a solution. This is very important.

Press SNSR CAL (F3) to initiate this procedure.

Then press AUTO ZERO (F3) on the sensor calibration screen.
Press PROCEED (F4) if the sensor is in air and not in solution or process. If not, press ABORT (F3), dry the sensor off, and start over.

You will get this message if the lower range value is not set for zero. Just press OVERRIDE (F3) to proceed.

This message and a "PLEASE WAIT" notice will appear until the electronic zero is complete, at which time the notice "FUNCTION COMPLETE" will appear.

After this is done, press END (F4) and proceed to the next step.

For the most accurate temperature compensation, the temperature reading should be standardized to a known process or reference temperature. Ideally, the standardization should be performed at or near the operating temperature.

Place the sample in the process or solution. Allow the temperature reading to stabilize using the calibrated temperature device.

Press TEMP CAL (F3) to perform the standardization.

The reference temperature input screen will appear. Use the numeric keys to input the value, then press ENTR (F4). A message screen will appear: "Temp Stabilizing PLEASE WAIT".

A screen will display which confirms the temperature being read by the Model 2054 Cond. If these agree, press PROCEED (F4); otherwise press RETRY (F1) to redo the standardization.

Pressing the PROCEED (F4) key in the last step takes you to this screen. Press SNSR CAL (F2) to perform the calibration for temperature slope.
12.4 AUTOMATIC TEMPERATURE SLOPE CALIBRATION

Two-point temperature slope calibration must be performed in order to compensate for the effect of temperature on the conductivity reading when the temperature in your process changes. Press 2-PT CAL (F1) to initiate the temperature slope calibration. If you already know the temperature slope, or wish to approximate it, see Section 12.5.

The procedure described in Section 12.4 will provide the most accurate conductivity reading possible with this system. Obtain a representative grab sample of the process to be measured. Determine the conductivity of this sample using a calibrated portable analyzer which can reference the conductivity to 25°C (77°F). Or measure the conductivity of the sample at 25°C. Write down this reading.

NOTE
Check the appropriate sensor manual - calibration section - for any special instructions.

Obtain a hot plate or devise a method of heating the sample. Place the Rosemount Analytical conductivity sensor in the process sample and heat up the sample to the normal low temperature of the process. Shake the sensor to ensure that no bubbles are present.

Press AUTO ADJ (F2) to continue.

When the temperature reading on a thermometer is stable at this normal low temperature of the process, proceed.

Press PROCEED (F4). A message will appear briefly stating that the conductivity is stabilizing.

Input the same conductivity value you wrote down from the calibrated portable analyzer earlier on this section. This value was referenced to 25°C (77°F). Press ENTR (F4).

Heat the sample to the normal high temperature of the process. This temperature should be at least 8°C (14°F) higher. Press PROCEED (F4) on this screen when this higher temperature is stable, according to a thermometer.

Again, input the same conductivity value you wrote down from the calibrated portable analyzer earlier in this section. Press ENTR (F4).
You are finished with the temperature slope adjustment. The true cell constant will also be calculated. To check the slope calculated by the Model 2054 Cond, press 2-PT CAL (F1) and MAN ADJ (F1) on the next screens.

After observing the temperature slope value press PREVIOUS FUNCTION twice. Then END (F4). Skip Section 12.5 and proceed to Section 12.6.

12.5 CALIBRATION IF TEMPERATURE SLOPE IS KNOWN

If you already know the temperature slope, press MAN ADJ (F1). If you do not know the exact temperature slope value, but wish to approximate it, use the following guide. However, the conductivity reading may have reduced accuracy compared to the value if the procedure in Section 12.4 is performed.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Conductivity Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acids</td>
<td>1.0 to 1.6% per °C</td>
</tr>
<tr>
<td>Bases</td>
<td>1.8 to 2.2% per °C</td>
</tr>
<tr>
<td>Salts</td>
<td>2.2 to 3.0% per °C</td>
</tr>
<tr>
<td>Water</td>
<td>2.0% per °C</td>
</tr>
</tbody>
</table>

Press CHNG (F3), then simply enter the slope value enclosed in brackets. Press ENTR (F4) on the temp. slope screen, then END (F4) on the next screen. Proceed to Section 12.6.

12.6 ON-LINE CONDUCTIVITY STANDARDIZATION

Next, you need to perform an on-line standardization. Return to Section 2 to complete the Model 2054 Cond (and sensor) installation. When you obtain a representative grab sample of the process to be measured write down the transmitter conductivity value using the PROCESS VARIABLE key. Determine the conductivity of this sample using a calibrated portable analyzer which can reference the conductivity to 25°C (77°F). Or measure the conductivity of the sample at 25°C.

NOTE
Check the appropriate sensor manual - calibration section - for any special instructions.

After determining the reference value from the portable analyzer, note the transmitter conductivity again using the PROCESS VARIABLE key again. Correct the reference value for the change in the transmitter reading from the time the sample was collected.

Press STDIZE (F2) on this screen.

Then using the keypad, enter this reference value obtained as outlined above. A message on the screen will say "Cond Stabilizing PLEASE WAIT". The next screen confirms that the value read by the sensor is the conductivity value of the known solution. Press RETRY (F1) if this procedure needs to be repeated. Otherwise press PROCEED (F4), then END (F4).

You will need to periodically repeat this procedure (see note in Section 16.2) to maintain a reliable signal.
SECTION 13.0 ON-LINE CONFIGURATION

13.1 GENERAL

Configuration consists of setting parameters that determine how the transmitter operates. The Model 2054 Cond can be configured in two ways: on-line or off-line. During on-line configuration, the transmitter is connected to the Model 268. Configuration data is entered in the Model 268 Working Register and later sent directly to the transmitter.

Off-line configuration involves storing configuration data in the Model 268 while it is not connected to a transmitter. Data is stored in nonvolatile Off-line Memory and can be recalled and downloaded to the transmitter at a later time. Section 14 - Off-line Operation discusses this procedure.

13.2 ON-LINE CONFIGURATION

This top-level function screen provides access to the three primary functions of the Model 2054 Cond. Press CONFIG (F3).

This top-level configure screen appears.
The following operations are available from this main configure menu:

OFLN DATA - F1: Provides access to the Off-line Memory and allows you to save or recall configuration data.

CHNG I/O - F2: Allows you to change input and output-related information:

- Alarm 1
  - Relay Logic (off, hi, lo)
  - Setpoint
  - Hysteresis
  - Delay Time on/off
- Alarm 2
  - Relay Logic (off, fault, hi, lo)
  - Setpoint
  - Hysteresis
  - Delay Time on/off
- Temperature
  - Temperature Compensation (auto/manual)
  - Manual Temperature (manual compensation only)
- Current Output 1) — Conductivity
  - Lower/Upper (0 or 4/20 mA) range values
  - Units (mV/percent)
  - Damping
- Current Output 2) — Temperature
  - Lower/Upper (0 or 4/20 mA) range values
  - Units (mV/percent)
  - Damping
- Output Defaults
  - Output 1 Default Action (none/current)
  - Output 2 Default Action (none/current)
- Relay Defaults
  - Alarm 1 Default Action (none/on/off)
  - Alarm 2 Default Action (none/on/off)

XMTR INFO - F3: Allows you to change transmitter information that does not affect output:

- Tag (8-character)
- Descriptor (16-character)
- Message (32-character)
- Date (DD-MMM-YY)
- Sensor Information (32-character)

SEND DATA - F4: Allows you to send the contents of the Working Register to the transmitter.
13.2.1 END CHGS vs. NEXT OPTN

During a particular configuration session it is possible to change one parameter—such as range—or to change a series of parameters—such as date, tag, and damping.

Two key commands are NEXT OPTN and END CHGS. NEXT OPTN will allow you to step through parameters until you reach the one you want to change. For example: to change pH (output 1) damping, you would select CHNG I/O on the top-level configuration display, press NEXT OPTN to scroll until current output 1) appears on the display, press CHNG once and NEXT OPTN until 1) Damp appears on the display.

END CHGS is the command to use when you are finished changing configuration data. It recalls the top-level configuration screen, from which the SEND DATA function can be initiated. Remember, though, that END CHGS by itself does not send data to the transmitter; it simply calls up the menu that contains the SEND DATA command.

13.2.2 SETTING THE LOOP TO MANUAL

Whenever you are preparing to send or request data that would disrupt the loop or change the output of the transmitter, the Model 268 will give you a prompter display.

Keep in mind that acknowledging this prompter does not set the loop to manual. It's only a reminder; you have to set the loop to manual yourself, as a separate operation. After you do so, press PROCEED (F4).
13.3 CHANGING INPUT/OUTPUT RELATED INFORMATION (CHNG I/O)

Under the CHNG I/O key in the configuration mode, you can configure the two alarms, the temperature input, analog output 1 (conductivity), analog output 2 (temperature), output defaults, and relay defaults. Press CHNG I/O (F2).

13.4 CONFIGURING ALARMS 1 AND 2

The use of alarm relays 1 and 2 is optional. However, they may be programmed to perform on-off process control when a contact output is used to control a pump or valve, for high or low process alarms, or for a fault alarm (Relay 2 only).

If you would like to program the Alarm 1 relay, press CHNG (F3). Otherwise, press NEXT OPTN (F1) to move to the Alarm 2 Relay for programming, or press NEXT OPTN (F1) again to configure the temperature input. If temperature is chosen, go to Section 13.5.

If Alarm 1 is selected the screen will show:
• High or Lo If the relay will be used for a process alarm or process control. High logic activates the relay when the reading is greater than the setpoint value. Lo logic activates the alarm if the reading is less than the setpoint value.

• Off if the alarm will not be used.

• Filt (Alarm 2 only) if the relay will be used to activate on a fault condition. See Section 15.6 for a listing of the possible fault conditions which are self diagnosed by the transmitter.

To change the logic of the alarm to something other than what is displayed, press CHNG (F3). Then scroll though the choices by pressing NEXT OPTN (F1) until the desired choice is displayed. Then press ENTR (F4).
If the alarm is programmed for off or fault action, no further configuration is possible, so press END CHGS (F4). If the alarm is programmed for high or low logic, press NEXT OPTN (F1).

Complete alarm configuration requires input of the setpoint, hysteresis, relay delay time on, and relay delay time off. You can scroll through these using the NEXT OPTN (F1) key.

To input the alarm setpoint, press CHNG (F3). Brackets appear around the setpoint to indicate that it may be changed. Use the numeric keys and the underline cursor movement keys (F1 and F2) to enter the value. The conductivity setpoint can only be displayed in micromhos (microelectrons), so note that the correct number of digits are entered. A floating point decimal place is employed. Press ENTR (F4) when the correct setpoint is displayed. You will return to the proceeding screen to verify the entered value. Press NEXT OPTN (F1).

The alarm hysteresis represents the deadband around the activation of the alarm point. A normal setting to start with is 1.0% of the alarm setpoint. This should prevent minor fluctuations in the measured variables from causing nuisance alarms. Press CHNG (F3) to input a value.

The alarm delay time on programs a time delay between when the alarm setpoint is reached and when the alarm is to be activated. This filters out momentary process conditions which do not prove to be a problem. Typical entries are 5-30 seconds. Press CHNG (F3) to input the value.

The alarm delay time off programs a time delay between when the condition ceases to exist and when the alarm is deactivated. Normally this value will be zero. Press CHNG (F3) to input a value, if desired. Use the alphanumeric and F1/F2 function keys to enter the value, then press ENTR (F4). The previous screen will appear. Press END CHGS (F4).

Repeat this process for Alarm 2. The only difference between the two alarms is that Alarm 2 can be configured as a fault alarm (F1). See Section 15.6 for a description of the fault conditions.
13.5 CONFIGURING THE TEMPERATURE COMPENSATION

After configuring Alarm 2, press END CHGS (F4). You will return to the select option screen. Press NEXT OPTN (F1) to display the word temperature in brackets, then press CHNG (F3).

The temperature configuration screen appears. The transmitter is factory set to auto for automatic temperature compensation of the conductivity reading to 25°C (77°F). Auto should normally be the setting. Press END CHGS (F4).

The only exception to this is if the sensor RTD is faulty (see Section 15.6 for temperature fault diagnostic messages). Only in this case press CHNG (F3). The setting will appear in brackets. Press NEXT OPTN (F1), then ENTR (F4). The preceding temperature compensation configuration screen will reappear. Press CHNG (F3) and enter the appropriate temperature of your process using the numeric keypad and the four function keys. Press ENTR (F4). The transmitter will correct the conductivity reading so that it is right at the temperature. Press END CHGS (F4). Replace the sensor or RTD as soon as possible.

NOTE
The transmitter always compensates the conductivity reading for “apparent” conductivity changes due to temperature changes. This is why the absolute, or uncompensated conductivity, is always referenced to 25°C. If for some reason you want to read absolute conductivity, the temperature slope (normally determined in the calibration Section 12.4 or 12.5) should be set to zero.

There are two outputs:
- conductivity—current output 1)
- temperature—current output 2)

Press NEXT OPTN (F1) to scroll from select option: [temperature] to [(current opt 1)]. Press CHNG (F3) to configure the conductivity output.

The first item that appears is the display of the conductivity 4mA value (Lower Range Value) and the 20mA value (Upper Range Value). Press CHNG (F3) to input the desired range values.

A screen appears which allows you to change the LRV (F1) and URV (F2). Press (F1) to enter the 4mA value. Brackets appear around the setpoint to indicate that it may be changed.

Use the numeric keys and the underline cursor keys (F1 and F2) to enter the value. The conductivity value can only be input in micromhos, so note that the correct decimal point location is displayed. You will return to the previous screen to verify the value. Press CHNG URV (F2) and repeat this process for the 20mA value. After this is done, press END (F4). The display will show the two range values you entered. Press NEXT OPTN (F1).
A screen will show a request for the output unit desired. The choices are mA and percent of full scale. Leave this configuration at mA unless you want to see the output in percent of full scale on the Model 2054 Cond. From the Model 268 you will only be able to read the output in mA.

Press NEXT OPTN (F1) on the screen to proceed.

A screen appears which will allow you to change the damping value. Damping filters out insignificant fluctuations in the process conductivity, providing a steadier signal. A suggested starting value is about 30 seconds.

The value appears in brackets showing it may be changed. Input the number and press ENTR (F4). The display will return to the previous screen. Press END CHGS (F4) on this screen. The display will return to the select option screen. Press NEXT OPTN (F1) to configure current output 2), the temperature output.

**13.7 CONFIGURING THE TEMPERATURE CURRENT OUTPUT**

Configure the temperature output in the same manner as the conductivity output. The only difference is that after the output unit configuration, you may configure the output range as 4-20mA or 0-20mA. The conductivity output must be 4-20mA.

Press CHNG (F3) to configure the output as 0-20 mA. Press ENTR (F4), then NEXT OPTN (F1) on the screen to configure the output defaults.

After the temperature output 2) is configured, press END CHGS (F4). The display will return to the select option screen. Press NEXT OPTN (F1) on this screen to configure the output defaults.

The conductivity and temperature outputs can be programmed to states that they should default to if and when a process problem occurs. If the Model 268 displays a fault message, or if the operator puts the Model 2054 Cond into a hold mode. For a description of the possible fault messages, see Section 15.7.

The outputs can be programmed to either go to a specific current value upon default or hold, or retain the value of the output when the fault/hold condition occurs. Press CHNG (F3) to program the output default states.

This screen asks you about the conductivity output default type. “Crnt” means the default value should be a specific current value. None means the output value will be retained upon the fault/hold condition. The setting “Crnt” will probably be the most informative.

If “Crnt” is the desired default type, and it is displayed, press NEXT OPTN (F1) to input the specific conductivity output default current.
If none is the desired default type and it is displayed, press NEXT OPTN (F1) to program the default type for the temperature output 2.

To input the specific default current press CHNG (F3), input the value, and press ENTR (F4). Then press NEXT OPTN (F1) to program the defaults type for the temperature output 2.

Repeat this process for the temperature output 2. After completing this process press END CHGS (F4) to return to the select option menu.

Press NEXT OPTN (F1) to program the relay default states or, if you are not using the relays, press PREVIOUS FUNCTION to the config mode screen where F4 says SEND DATA. See the end of this section for instructions on sending the data.

The relays can be programmed to states they should default to if and when a problem occurs and the Model 263 displays a fault message (see Section 15.7), or if the operator puts the Model 2054 Cond into hold mode (section 10.3.3.2). To program the relay default states, press CHNG (F3).

The relays can be set for three possible states. See Table 13-1:

1) On - This setting will activate the alarm in a fault or hold condition.
2) Off - This setting will keep the alarm off in a fault or hold condition.
3) None - This setting will retain the status of the relay prior to the fault or hold condition.

Press CHNG (F3) to change the default state for relay 1. The present setting will appear in brackets indicating that it may be changed.

Use the NEXT OPTN (F1) key to scroll to the desired setting, then press ENTR (F4). The Model 263 will return the previous screen. Press NEXT OPTN (F1) on this screen to program the default setting for relay 2.

Repeat this process for relay 2.

After completing the programming for relay 2, press END CHGS (F4) to return to the select option screen. Press END CHGS (F4) on this screen to return to the configuration mode screen. You are now ready to program the Model 2054 Cond with other transmitter information (XMTR INFO).

### TABLE 13-1 Relay States For Various Transmitter Conditions and Alarm/Default Configurations

<table>
<thead>
<tr>
<th>Relays 1 and 2 Default Settings (Section 13.9)</th>
<th>NORMAL</th>
<th>ANALYZER CONDITION</th>
<th>FAULT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Alarm Setting</td>
<td>Alarm Setting</td>
<td>Alarm Setting</td>
</tr>
<tr>
<td></td>
<td>High/Lo Off Fault (Alarm 2 only)</td>
<td>High/Lo Off Fault (Alarm 2 only)</td>
<td>High/Lo Off Fault (Alarm 2 only)</td>
</tr>
<tr>
<td>On</td>
<td>Proc. det.</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Off</td>
<td>Proc. det.</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>None</td>
<td>Proc. det.</td>
<td>–</td>
<td>Proc. det.</td>
</tr>
</tbody>
</table>

Proc. det.: Alarm state is determined by the process value

+ : Relay will activate
– : Relay will activate

Example: If you want the transmitter to activate relay 1 in hold mode during sensor maintenance, set Alarm 1 to High or Lo (Section 13.4) and set relay 1 default to "on" (Section 13.9).
13.10 CHANGING NON-OUTPUT RELATED TRANSMITTER INFORMATION (XMTR INFO)

The Model 2054 Cond contains several configuration parameters that do not directly affect the transmitter output. These parameters are accessed through the TRANSMITTER INFORMATION function. Press XMTR INFO (F3).

The transmitter tag is the first item that appears. The tag is an eight-character alphanumeric field for identification of the transmitter. To change the tag number, press CHNG (F3).

Brackets appear around the tag field to indicate that it may be changed. Use the shift and alphanumeric keys to select the tag number desired. F1 and F2 move the cursor to the left or right; F3 CLEARs the tag field; F4 ENTERs the selected tag.

You can access other transmitter information fields in the same way. To get from one to another, simply press XMTR INFO (F3) on the top-level configuration menu, and then press NEXT OPTN (F1) until the desired field appears on the display. In each case, press CHNG (F3) to alter a value, and END CHNGS (F4) to end the configuration session and return to the top-level configuration screen from which the SEND DATA function is available. Remember, you must use the SEND DATA command described in the following paragraphs to make the changes permanent in the transmitter.

DES (Descriptor): A 16-character field for additional identification of the transmitter, use, or location.

MSG (Message): A 32-character field for transmitter location, service record, scratch pad, etc.

DATE: A field that holds a single date of significance, such as installation, last standardization, or next maintenance. The date format is dd/mmm/yy.

Use the following abbreviations for month:

<table>
<thead>
<tr>
<th>JAN</th>
<th>FEB</th>
<th>MAR</th>
<th>APR</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAY</td>
<td>JUN</td>
<td>JUL</td>
<td>AUG</td>
</tr>
<tr>
<td>SEP</td>
<td>OCT</td>
<td>NOV</td>
<td>DEC</td>
</tr>
</tbody>
</table>

SNSR (Sensor Information): A 32-character field for information about the sensor, such as the model number and options, and any special description listed on the order, such as the Special Quote number.

13.11 SENDING DATA FROM THE WORKING REGISTER TO THE TRANSMITTER (SEND DATA)

Whenever you update transmitter configuration data using the Model 268, the data you enter goes into the Model 268 Working Register, and not directly to the transmitter. No matter what kind of configuration change you are making, getting the information into the transmitter always requires a SEND DATA operation. Since this is such a frequent procedure, it is a good idea to become familiar with it.
Depending on the task, an option such as ENTR (enter the data) or END CHGS (exit the procedure and prepare to send data to the transmitter) will appear at the end of a configuration function. Pressing this key will not send the data to the transmitter, but it will call up the top-level configuration display that contains the SEND DATA command. When this display appears, press SEND DATA (F4).

A prompter screen will remind you to set the loop to manual, because the new configuration data may alter the transmitter output. This must be done as a separate operation. After doing so, press PROCEED (F4).

For verification purposes, another display will appear to double-check that you want to send data to the transmitter.

If you decide not to send data, press ABORT (F3). A prompter display will then remind you to return the loop to automatic control, and the Model 268 will then return to the top-level configuration display.

To proceed with sending data, press SEND DATA (F4).

While the Model 268 is sending the data, this display will appear.

If you accidentally try to send data without making any configuration changes, a prompter display will appear, indicating "No Data Modified to Send." Otherwise, the display will let you know the transmission was successful.

Then a final prompter will appear to remind you to reset the loop to automatic control. Do so, then press PROCEED (F4).

The top-level function menu will reappear. It is a good practice to review updated parameters after a SEND DATA sequence. This can be accomplished by pressing the REVIEW dedicated key and reviewing XMTR MEM (F4).

Pressing OFLN DATA (F1) at the top-level configure screen gives access to the Off-line Memory function of the Model 268. The Off-line Memory is a storage area that holds configuration data. This may be data that was entered off line and stored for downloading to one or more transmitters. Or it may be data that was saved from the Working Register in order to be sent to other transmitters in a process known as cloning.

NOTE

Only the Off-line Memory may be used to transfer data between transmitters of the same model type. The Safe Memory stores the serial number and other transmitter-specific information, and can only be used to restore data to the same transmitter it was saved from.

Section 14 - Off-line Operation explains off-line configuration.
SECTION 14.0 OFF-LINE OPERATION

14.1 GENERAL

One of the features of the Model 268 is that it can manipulate and store transmitter configuration data while it is not connected to a transmitter. This section describes the various off-line operations that are available.

14.2 OFF-LINE CONFIGURATION

The Model 268 can be used off line — without being connected to a transmitter — to enter and store configuration data for one transmitter. This data is stored in the non-volatile Off-line Memory, and can be sent to a transmitter at a later time.

The REVIEW dedicated key allows you to look at the data stored in the Off-line Memory and Safe Memory while the Model 268 is off line.

To enter data off line, turn on the Model 268 without a transmitter connected. When the display indicates that no transmitter is connected, press OFF LINE (F4).

The off-line function screen will appear. Press OFLN CONF (F2) to enter off-line configuration.

The Model 268 warns you that pressing PROCEED (F4) will clear the contents of the Off-line Memory. The next display asks if you want to build the Off-line Memory or exit. Press PROCEED (F4) if you wish to change or build the Off-line Memory.

To perform off-line configuration, the Model 268 first must determine which type of transmitter the configuration data is for. The following display indicates the transmitter type that the Model 268 is set to configure. If the transmitter indicated on the display is not the model desired, press CHNG (F3) and then NEXT OPTN (F1) to step through a sequence of screens that allows you to choose the transmitter models. Although the transmitter model appears in the REVIEW sequence, it is not a user-changeable part of the XMTR INFO in the configuration mode. It is impossible, for example, to download conductivity transmitter data into a pH transmitter.

Press ENTR (F4) when the desired transmitter appears. Changing transmitter models will erase the current contents of the OFLN DATA. If you do not change transmitter models in this way, the values that appear during off-line configuration will represent the default values or the values that are currently available in OFLN DATA in the Configuration Mode.
During off-line configuration, the Model 268 presents all the items that may be modified for the type of transmitter selected. The procedure for altering any value in off-line configuration is much the same as for on-line. Configuration for all parameters are explained in the on-line configuration section. Please note that the manual temperature parameter can be omitted if the temperature compensation parameter is set to auto.

**NOTE**

Do not turn the Model 268 OFF during this procedure, or the contents of the Off-line Memory will be lost. To save the entered data before you reach the end of the list, press PREVIOUS FUNCTION.

All of the same parameters may be changed. However, note these variations in the commands used:

- Pressing OMIT ITEM (F2) when a parameter (such as range) is displayed prevents that parameter from being saved in the Off-line Memory. The parameter will not be changed in the Transmitter Memory.

- As with on-line configuration, pressing CHNG when a parameter is displayed puts the parameter in brackets and allows the value to be changed.

- Pressing ENTR saves the parameter value in the Off-line Memory for later downloading to the transmitter. The Model 268 will then display the next parameter.

To end the off-line configuration session, press PREVIOUS FUNCTION dedicated key or OMIT ITEM until you reach the display shown here. Press EXIT (F4).

The Model 268 will return to the "WARNING — XMTR/268 not in communication" screen.

Remember, the Model 268 Configuration Memory can hold configuration data for only one transmitter at a time; however, you can copy this data to as many different transmitters as you wish. Performing another off-line configuration session or changing to a different transmitter type at the beginning of off-line configuration will erase the data just entered.

The configuration data is now saved in the nonvolatile Off-line Memory, and the Model 268 may be connected to the transmitter that is to receive the data. Alternatively, the Model 268 may be turned OFF, and the data transferred later. To transfer the data to the transmitter, follow the downloading instructions in Section 14.3.
14.3 DOWNLOADING DATA FROM THE MODEL 268 TO A TRANSMITTER

To download data from the Model 268 Off-line Memory to the transmitter, first connect the Model 268 to the transmitter. Turn on the Model 268 if it is not already turned on; press RESTART if it is turned on. When the display gives you the option to save or recall transmitter data in the Safe Memory, press SAVE (F2).

When the top-level function menu appears, press CONFIG (F3).

When the configuration menu appears, press OFLN DATA (F1) to access the data stored in the Model 268 Off-line Memory.

The following display offers the choices of saving or recalling data. Press RECALL (F3).

This replaces the data in the Working Register with the data from the Model 268 Off-line Memory, thus erasing the connected transmitter’s configuration data. The Model 268 checks the Off-line Memory against the connected transmitter type, and will not allow incompatible data to be transferred. Now the data is ready to be sent to the transmitter. When the configuration screen appears again, press SEND DATA (F4) to download the data to the Transmitter Memory.

The Model 268 will warn you to set the loop to manual. After doing so, press PROCEED (F4). A final verification message appears to make sure that you want to send the data. Press SEND DATA (F4). The Model 268 instructs you to wait while the data is sent and changes are made permanent. The Model 268 then warns you to return the loop to automatic control. If an error message appears, see Section 15 – Software Diagnostics.

The new configuration data now resides in the transmitter. You may verify this by reviewing the Transmitter Memory. Repeat the same series of steps to download the data to other transmitters.
14.4 USING OFF-LINE DATA TO "CLONE" TRANSMITTER DATA

The OFLN DATA function also can be used to store the contents of one transmitter for subsequent copying to one or more other transmitters. This is especially useful if you work with a large number of transmitters that require the same configuration data.

To "clone" transmitter configurations in this way, start by connecting the Model 268 to the transmitter that contains the data you want to clone. The Model 268 will offer the opportunity to save the transmitter configuration in the Safe Memory. Don't confuse Safe Memory with Off-line Memory. The display allows you to SAVE transmitter information for safe-keeping but not for the purpose of copying the data to other transmitters. (Data you put in the Safe Memory can only be downloaded to the transmitter from which it is taken.)

To store information — in the Off-line Memory — that you want to load to other transmitters, you must first load the desired transmitter configuration data into the Model 268 Working Register. If you haven't done this through a normal start-up, press RESTART. Then press CONFIG (F3) at the top-level function menu.

Press OFLN DATA (F1) at the configuration menu.

Next, save the connected transmitter's configuration data in the Model 268 Off-line Memory by pressing SAVE (F2).

A prompter screen will indicate that the data is being saved in the Off-line Memory.

After the data is saved, the display will return to the top-level configuration menu. At this point, disconnect the Model 268 from the transmitter, and connect to the first transmitter that will be receiving the cloned configuration data. Press the RESTART key. Then follow the downloading instructions in Section 14.3.

NOTE
You must press either RESTART or OFF to prepare the Model 268 to communicate with a different transmitter, or an error message will appear.
14.5 MULTIDROP COMMUNICATION

"Multidropping" transmitters refers to the connection of several transmitters to a single communications transmission line. Communication between the host and the transmitters takes place digitally with the analog output of the transmitters deactivated. Many of the Rosemount SMART FAMILY® transmitters can be multidropped. With the HART® smart communications protocol, up to 15 transmitters can be connected on a single twisted pair of wires or over leased phone lines.

The application of a multidrop installation requires consideration of the update rate necessary from each transmitter, the combination of transmitter models, and the length of the transmission line. Multidrop installations are not recommended where intrinsic safety is a requirement. Communications with the transmitters can be accomplished with commercially available Bell 202 modems and a host implementing the HART protocol. Each transmitter is identified by a unique address (1-15) and responds to the commands defined in the HART protocol.

Figure 14-1 shows a typical multidrop network. This figure is not intended as an installation diagram. Contact Rosemount product support with specific requirements for multidrop applications.

The Model 268 can test, configure, and format a multidropped Model 2054 Cond in the same way as it can a Model 2054 Cond in a standard point-to-point installation.

NOTE
The Model 2054 Cond is set to address 0 at the factory, allowing it to operate in the standard point-to-point manner with a 4-20 mA output signal. To activate multidrop communication, the transmitter address must be changed to a number from 1 to 15. This change deactivates the 4-20 mA analog output, sending it to 4 mA.

IMPORTANT NOTE
In order for the Model 2054 Cond to operate in multidrop mode, a double throw switch on its communication board must be charged. Remove the four screws from the Model 2054 Cond front panel and pull out the electronics assembly. On the communications board (middle one) is a red double throw switch labeled "shunt" and "source". Move the switch to the "shunt" position. If the transmitter will not be used in multidrop, the switch must be in the "source" position.
14.5.1 CHANGING A TRANSMITTER ADDRESS

To change the transmitter address, disconnect the Model 268 from the transmitter/loop and turn on the Model 268 by pressing the ON/OFF button.

The "WARNING-Xmtr/268 not in communication" screen appears. Press MULT DROP (F2). Connect to the transmitter/loop.

Press POLL (F3).

A prompt will appear momentarily asking you to please wait. Then the transmitter model number and address will be displayed. Press CHG ADRS (F4).

A prompt will appear indicating that proceeding will affect operation of the transmitter. Press PROCEED (F4). The prompt "PLEASE WAIT" will appear as the Model 268 searches for multidropped transmitters.

Using the NEXT OPTN (F1) and LAST OPTN (F2) keys, enter the current address of the transmitter whose address you wish to change. Press F1 or F2 until the proper address appears. Then press ENTR (F4).

Now use the NEXT OPTN (F1) and LAST OPTN (F2) keys to enter the new address. Press ENTR (F4). If a prompt appears indicating the transmitter is in output mode, press PROCEED (F4).

You may now communicate with a multidropped transmitter by pressing SELECT (F2), poll a multidropped loop by pressing POLL (F3), or exit the multidrop mode by press END (F4).

To communicate with a multidropped transmitter for the purpose of testing, configuring, or formatting, first disconnect the Model 268 from the transmitter/loop. Turn on the Model 268 by pressing the ON/OFF button.

The "WARNING - Xmtr/268 not in communication" screen appears. Connect the Model 268 to the transmitter/loop. Press MULT DROP (F2).

14.5.2 COMMUNICATING WITH A MULTIDROPPED TRANSMITTER
Press SELECT (F2).

To communicate with the desired transmitter, press the NEXT OPTN (F1) or LAST OPTN (F2) button until the desired address appears. Press ENTR (F4).

The prompt "Checking the transmitter" appears momentarily, followed by the message, "WARNING - Xmt in output mode." Press PROCEED (F4). The Model 268 will now communicate with the transmitter as described in the preceding sections of this manual.

14.5.3 POLLING A MULTIDROPPED LOOP

Polling a multidropped loop determines the mode, address, and number of transmitters on the given loop. To poll the loop, disconnect the Model 268 from the transmitter/loop. Turn on the Model 268 by pressing the ON/OFF button.

The "WARNING -XMT/268 not in communication" screen appears. Connect the Model 268 to the transmitter/loop. Press MULT DROP (F2).

Press POLL (F3).

A prompt appears momentarily asking you to please wait. Then the display scrolls through the transmitter model numbers and addresses. Pressing STOP POLL (F1) stops the scrolling. Pressing START POLL (F2) restarts the scrolling. Pressing SELECT (F3) enables communications with the transmitter selected. Pressing CHNG ADRS (F4) allows you to change the transmitter address.

14.5.4 "SPECIFY TAG" FUNCTION

The "Specify tag" function appears as an option on the top-level multidrop display. In certain non-standard transmitter installations it may be necessary to specify the transmitter tag number to initiate communications.
SECTION 15.0 SOFTWARE DIAGNOSTICS

15.1 GENERAL

In the course of using the Model 268 to communicate with Rosemount transmitters, you will encounter a variety of software diagnostic messages. Some indicate problems in the equipment itself, others indicate mistakes you may have made in entering data. Some simply provide reminders to you.

Notice that this section is divided into two parts. The first part lists all possible Model 268 diagnostic messages alphabetically, and identifies the message type and where to find more information about each message.

The second part of this section discusses all the diagnostic messages in each of the six message categories, and explains generally why they occur, with helpful instructions for responding to each message. This section explains only diagnostic messages displayed by the Model 268. For information on diagnostic messages displayed by the 2054 Cond, see Section 8.

15.2 ALPHABETICAL LIST OF ALL DIAGNOSTIC MESSAGES

This list gives every diagnostic message that you may encounter while using the Model 268 with the Model 2054 Cond. The diagnostic category is listed after each message. Once you find the message you are looking for in this list, note its number and refer to the complete description under the applicable diagnostic category or categories later in this section.

Caution - Progressing will clear Ofln Mem ........................................ G-13
Checking again ................................................................. N-5
Data saved in OF LN Mem for downloading............................... M-9
Different Xmtr type connected - XMTR Mem not changed.............. M-4
End of list ................................................................. T-10
ERR - Excess corrections ......................................................... I-16
ERR - Hard/software is not compatible ............................... 268-1
ERR - Not in output mode .............................................. I-18
ERR - Not xmtr command .................................................. M-6
ERR - Out of range ......................................................... I-17
ERR - Process not properly set to zero ................................ I-19
ERR - PV out of limits ....................................................... I-20
ERR - Update failure ........................................................ I-21
ERR - Value was too hi ...................................................... I-14
ERR - Value was too lo ...................................................... I-15
ERR - 268 Data err ......................................................... 268-6
Errors Detected - XMTR Mem not changed ........................................... N-2
FAILURE - Electronics ........................................................................ T-4
General failure - No. 1 ........................................................................ 268-3
Making changes permanent - PLEASE WAIT ........................................ N-1
No answer, may be busy. Press any key to quit trying ......................... N-4
No data modified to send ..................................................................... N-3
No data saved in OFLN Mem ................................................................. M-7
No data saved in SAFE Mem ................................................................. M-8
Ofln Mem not compatible with WORK REGS - Data not transferred .... M-1
SAFE Mem from diff Xmt than WORK Regs - Data not transferred ...... M-3
SAFE Mem not compatible with WORK Regs - Data not transferred .... M-2
The Xmt has returned an error ............................................................... I-2
WARN - Value entered is illegal, re-enter .............................................. G-1
WARN - Value out of limits, altered by 268, re-check data ...................... G-2
WARNING - Analog output outside range points ................................ T-5
WARNING - Control loop should be in manual ..................................... G-7
WARNING - Data transmission error ........................................................ G-3
WARNING - Device is in hold state ......................................................... T-9
WARNING - Function not for this transmitter ........................................ G-16
WARNING - Incorrect wiring ................................................................. T-3
WARNING - Loop may be returned to auto ............................................. G-8
WARNING - Match xmt S/N to nameplate S/N ...................................... G-18
WARNING - Non primary out of limits ................................................... T-6
WARNING - Not on line ......................................................................... G-11
WARNING - Process has been aborted .................................................. G-17
WARNING - PV out of range ................................................................. T-2
WARNING - Some of the changes were not saved in the xmt mem ...... G-14
WARNING - Temperature too high or TC open ................................ T-7
WARNING - Temperature too low or TC shorted ................................. T-8
WARNING - This address already being used........................................... G-15
WARNING - this will erase work reg......................................................... G-9
WARNING - Xmtr In output mode ............................................................. G-12
WARNING - Xmtr Is not communicating ................................................... G-4-G-6
WARNING - Xmtr Mem at defaults ............................................................ T-6
WARNING - 268 does not know this Xmtr ................................................ G-10
XMTR Mem diff than WORK Regs - XMTR Mem not changed ...................... M-5
Xmtr still busy ......................................................................................... N-6
268 Failure - No.1 ................................................................................. 268-4
268 Failure - No.2 ................................................................................. 268-5
268 Test: FAIL ...................................................................................... 268-2
15.3 DIAGNOSTIC MESSAGES BY CATEGORY

The diagnostic messages that appear on the Model 268 display are divided into six categories:

<table>
<thead>
<tr>
<th>Message Category</th>
<th>Number prefix</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notification messages</td>
<td>N-</td>
<td>15.4</td>
</tr>
<tr>
<td>General warning detection messages</td>
<td>G-</td>
<td>15.5</td>
</tr>
<tr>
<td>Memory and register transfer screens</td>
<td>M-</td>
<td>15.6</td>
</tr>
<tr>
<td>Transmitter diagnostic messages</td>
<td>T-</td>
<td>15.7</td>
</tr>
<tr>
<td>Model 268 diagnostic messages</td>
<td>268-</td>
<td>15.8</td>
</tr>
<tr>
<td>Model 268/transmitter interface errors</td>
<td>I-</td>
<td>15.9</td>
</tr>
</tbody>
</table>

For each category there is a description of the general type of message in the category, any special procedures for dealing with the messages in that category, and detailed descriptions of each message.

Each diagnostic message has a number for cross-reference purposes. The first part of this number identifies the message type; the second part identifies the individual message of that message type. When you look up the message in the alphabetical listing at the beginning of this section, note the message number to help you find it in the following list.

15.4 NOTIFICATION MESSAGES

These messages let you know what's happening during communications transactions. Most of them will appear momentarily while a transaction is being completed.

Making changes permanent
- PLEASE WAIT -

Errors detected
XMTR Mem not changed

No data modified to send
Pro-ceed

No answer, may be busy.
Press any key to quit trying

N-1
This message appears any time the Model 268 sends data to be stored in the non-volatile memory of the transmitter. It indicates that the data was accepted by the transmitter.

N-2
This screen notifies you that the transmitter did not accept the data sent by the Model 268. This happens whenever data with non-permissible values is sent from the Working Register. This display will be followed by others detailing the errors detected. These errors must be corrected before the transmitter will accept the data.

N-3
This notifies you that you have tried to send data to the transmitter without having changed any data in the Working Register. Press PROCEED (F4) to remove the message.

N-4
OR
N-5
OR
N-6
When the Model 268 tells the transmitter to complete a task, the transmitter cannot always respond immediately. Some tasks, for instance, require computations or diagnostic routines that take several seconds. Since the Model 268 does not take into account how long the transmitter takes to do something, it may ask the transmitter for a result before one is available. In that case, the above displays will appear. You can cancel the task when the "No answer, may be busy" screen is displayed by pressing any key. To cancel the task when the other screens are displayed, press the PREVIOUS FUNCTION key.

These messages offer reminders and alert you to conditions that have arisen from interfacing the Model 268 with a transmitter. These messages do not indicate failure within either the transmitter or Model 268.

G-1
You have entered a numerical value the Model 268 will not accept. This screen appears for a moment, and is replaced by the screen where the illegal entry was made. Re-enter an acceptable value.

G-2
The Model 268 could not store the value you entered, so it changed that value to the maximum value it will accept. The range of acceptable values is listed in the section that corresponds to the task you're performing.

G-3
The previous communication attempt between the Model 268 and transmitter was not successful. You can select RETRY (F4) to repeat the attempt, or ABORT (F3) to cancel the attempt. If this message appears regularly, check the loop for a source of noise that could be corrupting the signal.

G-4
or

G-5
The Model 268 did not get an answer from the transmitter. Check the connections between the Model 268 and the transmitter, and check that power is reaching the transmitter. Also, check that there is a minimum of 250 ohms resistance in the loop. Push PROCEED (F4) to try again, or ABORT (F3) to proceed with other tasks. (If you see this display while you are trying to REVIEW transmitter data, only the PROCEED option will appear.)

G-6
The Model 268 cannot find a Rosemount Smart Transmitter in the 4–20 mA loop. You can retry, perform an off-line configuration, test the Model 268, or enter EXIT for multidrop use.
G-7
This message appears whenever the possibility exists that the next communication
with the transmitter will affect the 4–20 mA output signal. You can move to the next
decision level by pressing PROCEED (F4), but remember that doing so does not set
the loop to manual. You have to do that as a separate operation.

G-8
After you complete a communication that required you to set the loop to manual, this
display reminds you to return the loop to automatic control. Again, this must be done
as a separate operation. Do so, then press PROCEED (F4).

G-9
You are about to replace data in the Working Register with data from another mem-
ory location. If that is what you want to do, press PROCEED (F4). If you don’t want to
change the Working Register, press ABORT (F3).

G-10
The Model 268 recognizes a Rosemount smart transmitter in the loop, but cannot
communicate with it. This message usually indicates a software revision level incomp-
tability between the Model 268 and the transmitter. Contact your nearest
Rosemount Service Center.

G-11
You have pressed a dedicated key that is not applicable for off-line configuration
tasks. Press PROCEED (F4).

G-12
This screen appears only during start-up and restart operations. It is to remind you
that the transmitter’s milliamp output value does not reflect the process variable,
because the transmitter output has been locked to a specific milliamp level. To unlock
the output and resume normal operation, press PROCEED (F4) and enter the Loop
Test (F3) mode of the test function (Section 10.3.3). When the loop test screen
appears, press END TEST (F4). The output is unlocked when the message
“Returning transmitter to original output” appears.

G-13
OFLN Memory is cleared allowing the operator to store new information in it. The
next screen will allow you to abort or proceed.

G-14
The transmitter did not receive all of the configuration changes made. Press REVIEW
and then “XMTR MEM.” Note any differences from the desired configuration and
reconfigure the transmitter accordingly.

G-15
This screen appears in Multidrop. Another transmitter is using the address
selected. Re-enter a new address.
G-16
The function selected is appropriate for another Rosemount smart instrument and is invalid for the Model 2054 Cond.

G-17
When performing a transmitter self-test, the operator may exit the test by pushing any key on the Model 268. A message will then appear indicating that the test has been aborted.

G-18
This screen appears during characterization, and indicates that the transmitter serial number entered must match that on the transmitter nameplate (except that the first letter should be omitted).

These messages appear when an error occurs in the transfer of data from one memory location to another or between memory locations and the Working Register. (These locations are discussed in Section 9 - The Model 268 SMART FAMILY Interface.)

M-1
The data stored in Off-line Memory is from a different Smart Family member than the data stored in the Working Register, or there is no data in the Off-line Memory to transfer. For example, there might be temperature transmitter data stored in the OFLN MEM, and pressure transmitter data in the Working Register. The Model 268 won’t let you recall incompatible data. To call up the contents of the Off-line Memory, you must connect to a transmitter of the same type. If you are unsure what kind of data is in the Off-line Memory, you can find out by pressing PROCEED (F4), REVIEW, and OFLN MEM (F2).

M-2
This message means the Model 268 is connected to a different SMART FAMILY member or to a transmitter with a different unique identifier than is held in the Safe Memory. The message may also indicate that there is no data in the Safe Memory. To recall data from the Safe Memory into the Working Register, the unique identifiers must match. To find out what is in the Safe Memory, press PROCEED (F4), then REVIEW, and then SAFE MEM (F1). Then connect the Model 268 to the corresponding transmitter and press RESTART.

M-3
The data stored in the Safe Memory is from a different smart pressure transmitter than the data in the Working Register. The Model 268 will not let you recall the Safe Memory. To find out which transmitter the data in the Safe Memory is from, press PROCEED (F4), then REVIEW, and then SAFE MEM (F1). The configuration data will appear, screen by screen. Note the transmitter serial number: this number uniquely identifies the transmitter. Once you know the serial number, connect the Model 268 to that transmitter and press RESTART.
Different Xmt type
connected XMTR Mem not
changed | Proceed

XMTR Mem diff than
WORK regs XMTR Mem not
changed | Proceed

ERR - Not xmt command | Override Proceed

No data saved in
OFLN Mem | Proceed

No data saved in
SAFE Mem

Data saved in OFLN
Mem for downloading

M-4
The transmitter did not accept the data you sent it because that data is intended for a
different SMART FAMILY member. Push RESTART to update the Working Register
with the contents of the transmitter the Model 268 is connected to.

M-5
The data sent from the Working Register did not have the same unique transmitter
identifier as the connected transmitter, and the Model 268 will not transfer the data. It
is likely that the Model 268 was connected to a different transmitter without a
RESTART or power-off/power-on sequence. Either press RESTART to erase the old
Working Register and start over with new data, or save the Working Register in the
Off-line Memory and recall it for downloading to the connected transmitter.

M-6
The transmitter does not understand the command it was given by the Model 268.
The problem may be that you have moved the Model 268 from one SMART FAMILY
member to another without pressing RESTART. If so, press PROCEED (F4) and then
RESTART. If this message appears in other settings, you may have a software
incompatibility between the transmitter and the Model 268. Pressing OVERRIDE (F3)
will suppress this error message for a few communications to give you the chance to
press REVIEW and check the transmitter's software revision level. Then contact your
nearest Rosemount Service Center.

M-7
You cannot review the data in the Off-line Memory because none is currently stored
there.

M-8
You cannot review the data in the Safe Memory because none is currently stored
there.

M-9
After you finish an off-line configuration session, this display will appear, verifying that
the data has been saved in the Off-line Memory. Unless you see this message at the
end of the session, the data has not been saved in Off-line Memory. To further con-
firm that the data was saved, you may press REVIEW, then OFLN MEM (F2).

These messages are related to the internal workings of the transmitter. They may
indicate a hardware failure in the transmitter, or they may simply alert you that the
transmitter is being subjected to pressures or temperatures beyond specifications.

During communication between the Model 268 and the transmitter, the transmitter
may return an error code to the Model 268. This error code tells the Model 268 that
there is a problem with the transmitter, but does not reveal the extent or nature of the
problem. The Model 268 may display the following screen:
Rosemount Analytical Model 2054 C Analyzer – Part III

T-1
If this screen appears, perform the transmitter self-test as described in Section 10 - Start-up and Commissioning. The transmitter self-test should produce a list of transmitter diagnostic messages. These diagnostic messages appear in a standard screen format:

- Returns to higher level.
- Inhibits diagnostic messages for next few communications.

More screens may appear.

For each message:
- Pressing NEXT ERR (F1) steps to the next diagnostic message. Be sure to view all errors in the list before attempting to proceed.
- Pressing OVERRIDE (F3) inhibits transmitter diagnostic messages for approximately ten communications, to allow you to correct the problem without interruption.
- Pressing PROCEED (F4) returns the Model 268 to the last decision level before the error message appeared, to help determine the error still exists.

NOTE:
If T-3, T-4, T-7, or T-8 transmitter diagnostic messages warning messages appear the Model 2054 Cond will be placed in hold mode and the outputs and relays will act as configured in sections 13.8 and 13.9. When the cause of the fault has been corrected, the transmitter will be removed from the hold condition. If Alarm 2 is configured as a fault alarm and any of the above referenced messages appear, the relay will activate.

The following transmitter diagnostic message may appear as a result of a transmitter self-test, or at other times during communications:

T-2
This display means that the transmitter’s conductivity process variable information exceeds its sensor limits. You should verify this by pressing OVERRIDE (F3) and PROCESS VARIABLE. Either the transmitter is miswired or the sensor or integral RTD is shorted. If you cannot fix the problem by rewiring, replace the sensor.

T-3
This display means that the conductivity input is shorted or open, either due to incorrect wiring or a shorted sensor. The interconnection cable length could also be exceeded (maximum length is 200 feet).

T-4
The transmitter electronics set has undergone a component or software failure. You will probably have to replace the CPU, power board, or communications board. Specific procedures included with the replacement boards must be followed or the Model 2054 Cond will have to be returned to the factory and reprogrammed. See Section 16.6. Alternatively, contact your field Service Center.

T-5
This message indicates that the temperature or conductivity process variable information seen by the transmitter is outside the 4-20 mA range points. It does not necessarily indicate any malfunction in the transmitter. To remove this message, re-range the transmitter so that the process variables do not cause outputs that are outside the 4-20 mA range values. If this doesn't help, the sensor could be shorted or open or the integral temperature compensation element could be shorted.
T-6
This message indicates that the temperature limit of the transmitter has been exceeded. The Model 2054 Cond Sensors contain integral temperature compensation elements (RTD's) which could be shorted or open. Unless the error is due to an extreme process temperature, the sensor (or temperature compensation element) must be replaced.

T-7
If this message appears the temperature compensation element (RTD) is shorted or the process temperature is below the limit of this element. Replace the sensor or temperature compensation element if necessary.

T-8
If this message appears, the temperature compensation element (RTD) is open or the process temperature is above the limit of the element. Replace the sensor or temperature compensation element if necessary.

T-9
The Model 268 will display this message when the transmitter is in a hold state, where the outputs and relays are set to their default states (Sections 13.8 and 13.9). This will occur in fault conditions listed in this section, or if the transmitter has been manually put into hold (Section 10.3.3.2).

T-10
This message indicates the end of a list of diagnostic messages, and appears momentarily before the Model 268 returns to the top of the list.

15.8 MODEL 268 DIAGNOSTIC MESSAGES

ERR - Hard/software is not compatible

268 Test: Fail

Gen failure - No. 1

These messages reflect the internal workings of the Model 268. They may indicate a hardware failure, a software anomaly, or an incompatibility between the hardware and the software.

268-1
The transmitter has received an inquiry from the Model 268 that it cannot interpret. This message could indicate a malfunction in the Model 268 or in the transmitter. To pinpoint the source of the problem, perform a transmitter test as described in Section 10.3.2. If the transmitter tests OK, make note of the conditions under which the failure occurred, and the keystroke sequence that preceded the failure. Contact your Rosemount Service Center.

268-2
The Model 268 has diagnosed that it is not functioning properly. This screen appears upon start-up or after a Model 268 self-test. The unit will be inoperable. Turn the unit OFF and contact your Rosemount Service Center for an appropriate board set replacement.

268-3
The transmitter has given an improper response to an inquiry. This message could indicate a malfunction in the Model 268 or in the transmitter. To pinpoint the source of the problem, perform a transmitter test as described in Section 10.3.2. If the transmitter tests OK, make note of the conditions under which the failure occurred, and the keystroke sequence that preceded the failure. Try to replicate the keystroke sequence that led to the failure. Contact the nearest Rosemount Service Center.
268-4
or
268-5
The Model 268 has detected a bug in its software. Make note of the conditions under which the failure occurred, and the keystroke sequence that preceded the failure. Try to replicate the keystroke sequence that led to the failure. Contact your Rosemount Service Center.

268-6
The transmitter has received an inquiry from the Model 268 that it cannot interpret. This message could indicate a malfunction in the Model 268 or in the transmitter. To pinpoint the source of the problem, perform a transmitter test as described in Section 10.3.2. If the transmitter tests OK, make note of the conditions under which the failure occurred, and the keystroke sequence that preceded the failure. Try to replicate the keystroke sequence that led to the failure. Contact your Rosemount Service Center.

15.9 MODEL 268/TRANSMITTER INTERFACE ERRORS
Configuration

These errors are detected when the contents of the Working Register are sent to the Transmitter Memory with the SEND DATA operations. If errors are detected, only the error-free data from the Working Register is saved in the Transmitter Memory, and the following sequence of screens appears. The Model 268 offers the opportunity to correct each error in turn, and once all errors are corrected, allows the corrected data to be sent to the transmitter.

These error screens may appear whenever unacceptable data is sent to the transmitter during configuration:

I-1
This screen appears momentarily

I-2
One or more error screens appear.

Confirms and sends data.
Returns to screen where error was entered.

This screen appears momentarily.
I-3 or I-4
For each error screen, press NEXT ERR (F1) to step to the next error screen, if any. When you reach the end of the list, the Model 268 will return to the top of the list. All of the Model 268/Transmitter interface error screens have a similar format:

XXXX = Configuration parameter, such as 20 mA point, or damping.

YYYY = Value of that parameter that was sent to the transmitter and rejected.

<<ERROR MESSAGE>> = Why the parameter value was unacceptable.

Be sure to view all errors in the list before attempting to proceed.

This screen indicates the end of the error screens from the present SEND DATA operation. This screen appears momentarily before the Model 268 returns to the first error in the list. Press END (F4) to send the data to the Transmitter Memory.

These error screens may appear whenever unacceptable data is sent to the transmitter during a test or digital trim, or when the PROCESS VARIABLE dedicated key is used.

Since these errors are detected immediately after an attempted change, and not as a result of a SEND DATA command, they appear singly, rather than in a list. The error screen will not have explicit options for fixing the error or stepping to the next screen. When one of these error messages appears, press PROCEED (F4). The Model 268 will then return to the previous screen, where the unacceptable data was entered. Correct the error and continue with the operation.

If the operation where the error was detected would have resulted in the storage of data in the Transmitter Memory, the message "ERRORS DETECTED - XMTR Mem not changed" will appear momentarily before the actual error screen. This is intended as a warning that only error-free data was accepted by the transmitter. This screen does not appear if the operation does not involve the storage of data. If the operation is not concerned with data storage, the actual error screen will appear without the preface.

May appear momentarily if operation deals with data storage in transmitter.

15.10 TEST, DIGITAL TRIM, CHARACTERIZE, & PV DEDICATED KEY ERRORS
The following error messages appear during testing, digital trim, characterization, or use of the PROCESS VARIABLE dedicated key:

ERR - Value was too high
I-14
or
ERR - Value was too low
I-15
Refer to specific instructions for limits on the operation you were performing. Re-enter the value that was too high or too low.

ERR - Excess correction
I-16
During digital trim, the trim value entered exceeded the factory-characterized value by more than 10% of the upper range limit. Re-enter an acceptable value.

ERR - Out of range
I-17
The value chosen is outside the sensor range limits. Re-enter an acceptable value.

ERR - Not in output mode
I-18
The operation requires that the transmitter be put in output mode. The transmitter did not accept the command from the Model 268 to set its mA output to a specific value. This screen will also appear if the transmitter takes itself out of output mode for another reason, such as a loss of power. Press PROCEED (F4) to try again.

ERR - Process not properly set to zero
I-19
During digital trim, the sensor is not indicating a zero conductivity value as required.

ERR - PV out of limits
I-20
The transmitter may be indicating a sensor failure.

ERR - Update failure
I-21
This screen appears while you are using the PROCESS VARIABLE dedicated key. It indicates that while reading the process variable from the transmitter, the Model 268 has missed several communications from the transmitter. Check for noise on the loop that could be garbling communications. If no noise is present, test the Model 268 and transmitter.
SECTION 16.0 MAINTENANCE AND TROUBLESHOOTING

16.1 GENERAL

In order to maintain a reliable signal the conductivity loop needs to be routinely standardized. No general statement can be made regarding standardization frequency except that if it is suspected that the process might degrade or coat the sensor, a more frequent standardization is desirable for the greatest accuracy. If you suspect that the conductivity value is less than it should be, a nonconductive coating may be forming on the sensor, and it is time for a standardization.

16.2 ONE-POINT STANDARDIZATION

If you perform a standardization with a grab sample, make sure the sample is taken as close to the sensor as possible. For the most accurate reading, write down the process conductivity value (PROCESS VARIABLE key) read by the transmitter at the time of grab sample collection. Then note how much this value changes during the time of laboratory conductivity determination. Just before performing the transmitter standardization, note the value again, and add or subtract this change in conductivity to the value you determined in the lab.

Perform the one-point standardization as described in Section 12.6.

16.3 USING THE CELL FACTOR

You can use the cell factor to track how the sensor is being coated or degraded with time. The cell factor is updated every time a one point standardization is performed.

Look at the cell factor after each standardization. Press PREVIOUS FUNCTION from wherever you are to the top level screen. Then press the REVIEW key.

Press WORK REGS (F3) to look at the cell factor stored in the work registers.

The Model 268 will automatically scroll through all the stored data.

Press STOP LIST (F1) when the display reaches the cell factor listing. The cell constant will also be shown on this screen.

When the cell constant is entered upon startup in the characterize function of the Format mode (Section 11.2) the cell factor is set to 1.000, or the measure of a clean new sensor. When the sensor becomes degraded or coated, this value will decrease or increase from 1.000. You can keep track of how this value changes to determine a schedule for sensor maintenance. Suggested limits are 0.850 to 1.150. When the sensor reaches these limits or other limits you determine, the sensor should be cleaned or replaced.

Press PREVIOUS FUNCTION to return to the top level screen.

NOTE
It is very important to reenter the cell constant (Section 11.2) to reset the cell factor back to 1.000 every time you clean or replace the sensor.
16.4 TRIMMING THE ANALOG OUTPUTS

The analog outputs have been trimmed at the factory, and only in very rare circumstances need additional trimming. If you think they should be trimmed follow the instructions listed here.

After the microprocessor conditions the sensor signals, it outputs a digital word. The output digital-to-analog (D/A) circuitry converts the word to an analog signal for the 4 to 20 mA communications line. After a period of time and use, it may be necessary to check and trim this circuitry. The output trim function can also be used to make adjustments to allow for peculiarities of a particular readout device in the loop.

To determine whether you need to trim the output, first connect the following equipment in the loop: the Model 268 and a precision milliamp meter capable of reading ±1 microamp.

Next, enter the LOOP TEST mode, as described in Section 10.3.3 - Startup and Commissioning. Follow the loop test procedure and set the transmitter to a 4 mA output. Then check the milliamp meter. The reading should be within ±3 microamps of 4 mA.

Then set the transmitter to a 20 mA output and check the milliamp meter. The reading should be within ±15 microamps of 20 mA output and check the milliamp meter. The reading should be within ±15 microamps of 20 mA. If the values on the meter exceed this tolerance range, you should trim the output.

When you trim the output, you make adjustments to the output circuitry. The appropriate shift will be made for all intermediate points between 4 and 20 mA. The Model 268 will allow you to trim the D/A converter by using a current meter or voltage meter. If you are using a current meter, follow the sequence outlined in "4-20 mA Trim." If using a voltage meter, or if meter's display does not read output in 4-20 mA, follow the sequence outlined in "4-20 mA trim - other scale."
16.4.1 4-20 mA TRIM

To trim the output, press OPUT TRIM (F1) on the top-level Digital Trim menu. The next screen allows you to select output 1 or output 2. Enter the desired output.

The Model 268 will allow you to trim whether your read-out device is in millamps or some other scale such as a voltage meter. If you use a voltage meter, refer to "4-20 mA trim - other scale" in this section. If you wish to trim the transmitter using a current meter, press "4-20 mA" (F2).

The next display instructs you to connect a precision current meter capable of reading ± 1 microamp, just as you did in checking whether an output trim was needed. After doing so, press PROCEED (F4).

A confirmation display appears. Press PROCEED (F4).

When the next display appears, enter the value shown on the millamp meter and press ENTR (F4). If necessary, use the ← and → keys to move the underline cursor, and enter the value using the alphanumeric keys of the Model 268. Press CLR (F3) to clear the number and start over. Press ENTR (F4) after you key in the value.

The next display seeks verification that the changes are correct. If the output reading on the display is within ± 15 μA of that on the current meter, press YES (F4). If the reading is not identical, press NO (F1). The previous display will appear, allowing you to enter the current meter value again. Repeat this process until the readings are within ± 15 μA.

Once the 4 mA point is set, press PROCEED (F4). The same sequence of displays will appear for setting the 20 mA point.

Enter the value shown on the millamp meter and press ENTR (F4). If necessary, use the ← and → keys to move the underline cursor. Press CLR (F3) to clear the entry and start over.
16.4.2 4-20 mA TRIM OTHER SCALE

If the output reading on the display is identical to that on the current meter, press YES (F4). If the readings are not within ±15 μA, press NO (F1). The previous display will reappear, allowing you to enter the current meter value again. Repeat this process until the readings are within ±15 μA.

To trim the output using a voltage or other meter, connect the voltage meter across a resistor in the loop. (For best accuracy, use a precision resistor. You can also use the scaling function detailed below if your meter displays other units, such as 0-100%.)

**NOTE**
If a resistor is added to the loop, before proceeding, ensure that the power supply is sufficient to power the transmitter to a 20 mA output with the additional loop resistance.

Press 4-20 TRIM (F1).

Press OTHR SCAL (F1).

To scale the 4-20 mA reading to correspond to the desired voltage reading, press CHNG (F3).

Press CLR (F3), then using the keypad on the Model 288, type in the meter reading that would be displayed with a 4 mA signal. For example, the voltage across a 500-ohm resistor will be 2.000 V at 4 mA, and 10.000 V at 20 mA. (The actual values displayed will be within ±7.5 millivolts of these theoretical values). Press ENTR (F4).

Press CLR (F3), and type in the correct meter reading for a 20 mA signal. Press ENTR (F4).

The next display instructs you to connect a precision voltage meter capable of reading ±10 microvolts, just as you did in checking whether an output trim was needed. After doing so, press PROCEED (F4).

A confirmation display appears. Press PROCEED (F4).
When the next display appears, enter the value shown on the meter and press ENTR (F4). If necessary, use the < – and – > keys to move the underline cursor, and enter the value using the alphanumeric keys of the Model 266. Press CLR (F3) to clear the number and start over. Press ENTR (F4) after you key in the value.

The next display seeks verification that the changes are correct. If the output reading on the display is within ±15 µA converted to the scale of the meter, press YES (F4). If the readings are not identical, press NO (F1). The previous display will reappear, allowing you to enter the meter value again. Repeat until the readings are within the allowable error band.

Once the 4 mA point is set, press PROCEED (F4). The same sequence of displays will appear for setting the 20 mA point.

Enter the value shown on the meter and press ENTR (F4). If necessary, use the < – and – > keys to move the underline cursor. Press CLR (F3) to clear the entry and start over.

If the output reading on the display is within ±15 µA converted to the scale of the meter, press YES (F4). If the readings are not identical, press NO (F1). The previous display will reappear, allowing you to enter the meter value again. Repeat until the readings are within the allowable error band.

Refer to Table 3.4.

For replacement of the CPU and power circuit boards, refer to sections 8.2.6 and 8.2.7. Replacement of one of these boards requires a digital trim of the matched boards to optimize instrument accuracy.

For optimum instrument accuracy it is recommended that the CPU, and power circuit boards be replaced at Rosemount Analytical Irvine.
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* Denotes Major Domestic and Canadian Service Centers.
FIGURE A-2. 2054 Cond. Test Branch
FIGURE A-8. 2054 Cond. On-Line Configure Branch (continued)
Model 268 Rev. 6.0

* NOTE: BRANCH TO OTHER ALARM 2 PARAMETERS ONLY IF ALARM 2 CONFIGURATION IS HI OR LO
FIGURE A-10. 2054 Cond. On-Line Format Branch
Model 268 Rev. 5.0

*NOTE: Auto zero function is only for use with Model 2054 Toroidal Conductivity.
FIGURE A-11. 2054 Cond. Off-Line Configure Branch
Model 268 Rev. 6.0

CONTINUED FROM FIGURE A-18

CONTINUED

1. THIS ITEM WILL NOT BE ENTERED IN OFLN MEM IF THE 'OMIT ITEM' SOFTKEY IS PUSHED

XXX – Not Applicable
XXXX – SEE FIGURE A-2
XXXXX – SEE FIGURE A-1
FIGURE A-12. 2054 Cond. Off-Line Configure Branch (continued)

Model 268 Rev. 6.0
FIGURE A-14. 2054 Cond. Off-Line Configure Branch (continued)

Model 258 Rev. 6.0

CONTINUED TO FIGURE A-11

CONTINUED FROM FIGURE A-13

I = THIS ITEM WILL NOT BE ENTERED IN OFLN MEM IF THE "OMIT ITEM" SOFTKEY IS PUSHED
FIGURE A-15. 2054 Cond. Off-Line Configure Branch (continued)

CONTINUED FROM
FIGURE A-14

CONTINUED TO FIGURE A-11

I = THIS ITEM WILL NOT BE ENTERED IN OFLN MEM
IF THE "OMIT ITEM" SOFTKEY IS PUSHED
FIGURE A-16. 2054 Cond. Off-Line Configure Branch (continued)

Model 268 Rev. 6.0

I = THIS ITEM WILL NOT BE ENTERED IN OFLN MEM
IF THE "OMIT ITEM" SOFTKEY IS PUSHED
I = THIS ITEM WILL NOT BE ENTERED IN OFLN MEM IF THE "OMIT ITEM" SOFTKEY IS PUSHED
FIGURE A-18. 2054 Cond. Off-Line Configure Branch (continued)

Model 258 Rev. 6.0

I = THIS ITEM WILL NOT BE ENTERED IN OFLN MEM IF THE "OMIT ITEM" SOFTKEY IS PUSHED
FIGURE A-19. 2054 Cond. Process Variable Key Screen
Model 268 Rev. 6.0

17
WARNING: XMT_258 NOT IN COMMUNICATION
Retry Multi Drop Test Off Line

43
CHECK LOOP FOR OTHER DEVICES 1
Freq Envoy Mult Drop Exit

44
SELECT ADDRESS OR POLL ALL ADDRESSES
Spec Tag Select Poll End

46
PUSH ENTER TO SELECT XMTR ADDRESS [XX]
Next Optn Last Optn Chng Ads

NOTICE: NO MULTI-DROP XMTRS DETECTED

WARNING: This will affect Transmitter Operation
--See Manual--

ADDRESS TO CHANGE IS XMTR ADDRESS [XX]
Next Optn Last Optn

X

WARNING: THIS ADDRESS ALREADY BEING USED
Abort Proceed

(OR)

XMTR ADDRESS: XX INTO XMTR ADDRESS: [XX]
Next Optn Last Optn

A-21
APPENDIX - A-23 RETURN OF MATERIAL

A-23.1 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 714 863-1181. 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.

A-23.2 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.

5. Send the package prepaid to:
   Rosemount Analytical Inc.
   2400 Barranca Parkway
   Irvine, CA 92714
   Attn: Factory Repair
   Mark the package: Returned for Repair RMA# ______
   Model No. _____

A-23.3 NON WARRANTY REPAIR. Contact Factory For Authorization

1. Fill out a copy of the "Return of Materials Request" form as completely and accurately as possible.
2. 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.
3. Do Steps 4 and 5 of Section A-23.2.

NOTE
Consult the factory for additional information regarding service or repair.

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.
**RETURN OF MATERIALS REQUEST**

**FROM:**

**RETURN:**

**BILL TO:**

**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)

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>MODEL</th>
<th>SER. NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
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<td>3.</td>
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</tr>
<tr>
<td>4.</td>
<td>4.</td>
<td>4.</td>
</tr>
</tbody>
</table>

**please check one:**

☐ repair and calibrate

☐ demo equipment no.

☐ evaluation

☐ other (explain)

☐ replacement required? ☐ yes ☐ no

**description of malfunction:**


**Reason for return**


**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 ☐

**饺修状态**


**name:**


**Address:**


**zip:**


**return authority for credit adjustment** [please check appropriate box(s)]

☐ wrong part received

☐ replacement received

☐ duplicate shipment

reference rosemount analytical sales order no.

☐ return for credit

return authorized by:


---

Rosemount Analytical Inc.
2400 Barranca Parkway
Irving, CA 92714 USA
Tel: (714) 963-1184

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Goods and part(s) (excluding consumables) manufactured by Seller are warranted to be free from defects in workmanship and material under normal use and service for a period of twelve (12) months from the date of shipment by Seller. Consumables, pH electrodes, membranes, liquid junctions, electrolyte, O-rings, etc. are warranted to be free from defects in workmanship and material under normal use and service for a period of ninety (90) days from date of shipment by Seller. Goods, part(s) and consumables proven by Seller to be defective in workmanship and / or material shall be replaced or repaired, free of charge. F.O.B. Seller's factory provided that the goods, parts(s), or consumables are returned to Seller’s designated factory, transportation charges prepaid, within the twelve (12) month period of warranty in the case of goods and part(s), and in the case of consumables, within the ninety (90) day period of warranty. This warranty shall be in effect for replacement or repaired goods, part(s) and consumables for the remaining portion of the period of the twelve (12) month warranty in the case of goods and part(s) and the remaining portion of the ninety (90) day warranty in the case of consumables. A defect in goods, part(s) and consumables of the commercial unit shall not operate to condemn such commercial unit when such goods, parts(s) or consumables are capable of being renewed, repaired or replaced.

The Seller shall not be liable to the Buyer, or to any other person, for the loss or damage, directly or indirectly, arising from the use of the equipment; or goods, from breach of any warranty or from any other cause. All other warranties, expressed or implied are hereby excluded.

IN CONSIDERATION OF THE STATED PURCHASE PRICE OF THE GOODS, SELLER GRANTS ONLY THE ABOVE STATED EXPRESS WARRANTY, NO OTHER WARRANTIES ARE GRANTED INCLUDING, BUT NOT LIMITED TO, EXPRESS AND IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

RETURN OF MATERIAL

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

Rosemount Analytical Inc.
2400 Barranca Parkway
Irvine, CA 92714

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.
$20.00 U.S. Dollars