iSeries

Process / Strain Gauge Monitor / Limit Alarm (-AL)

Operator’s Manual

NEWPORT Electronics, Inc.
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This device is marked with the international caution symbol. It is important to read the Setup Guide before installing or commissioning this device as it contains important information relating to safety and EMC.
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NOTES, WARNINGS and CAUTIONS

Information that is especially important to note is identified by following labels:

- NOTE
- WARNING or CAUTION
- IMPORTANT
- TIP

**NOTE:** Provides you with information that is important to successfully setup and use the Programmable Digital Meter.

**CAUTION or WARNING:** Tells you about the risk of electrical shock.

**CAUTION, WARNING or IMPORTANT:** Tells you of circumstances or practices that can effect the instrument’s functionality and must refer to accompanying documents.

**TIP:** Provides you helpful hints.
PART 1
INTRODUCTION
1.1 Description

Note

This device can be purchased as monitor (read process value only), limit alarm with alarm menu but no PID control (specify -AL option), or as a controller.

- The iSeries Strain and Process monitors can measure a wide variety of DC voltage and current inputs for all common load cells, pressure transducers and strain gauge type of transducer. The voltage /current inputs are fully scaleable to virtually all engineering units, with selectable decimal point, perfect for use with pressure, flow or other process input.

- The iSeries monitor features a large, three color programmable display with capability to change a color every time when Alarm is triggered. The standard features include built-in excitation for transducers, selectable as 10V @ 60 mA or 5 V @ 40 mA. (Built-in excitation is not available with optional isolated RS-232/485 Serial Communication). Universal power supply accepts 90 to 240. Low voltage power option accepts 24 Vac or 12 to 36 Vdc.

- Options include programmable RS-232 or RS-485 serial communication and ethernet with an embedded web server.
1.2 Safety Considerations

This device is marked with the international caution symbol. It is important to read this manual before installing or commissioning this device as it contains important information relating to Safety and EMC (Electromagnetic Compatibility).

This instrument is a panel mount device protected in accordance with EN 61010-1:2001, electrical safety requirements for electrical equipment for measurement, control and laboratory. Installation of this instrument should be done by qualified personnel. In order to ensure safe operation, the following instructions should be followed.

This instrument has no power-on switch. An external switch or circuit-breaker shall be included in the building installation as a disconnecting device. It shall be marked to indicate this function, and it shall be in close proximity to the equipment within easy reach of the operator. The switch or circuit-breaker shall not interrupt the Protective Conductor (Earth wire), and it shall meet the relevant requirements of IEC 947–1 and IEC 947-3 (International Electrotechnical Commission). The switch shall not be incorporated in the main supply cord.

Furthermore, to provide protection against excessive energy being drawn from the main supply in case of a fault in the equipment, an overcurrent protection device shall be installed.

• Do not exceed voltage rating on the label located on the top of the instrument housing.
• Always disconnect power before changing signal and power connections.
• Do not use this instrument on a work bench without its case for safety reasons.
• Do not operate this instrument in flammable or explosive atmospheres.
• Do not expose this instrument to rain or moisture.
• Unit mounting should allow for adequate ventilation to ensure instrument does not exceed operating temperature rating.
• Use electrical wires with adequate size to handle mechanical strain and power requirements. Install without exposing bare wire outside the connector to minimize electrical shock hazards.

EMC Considerations
• Whenever EMC is an issue, always use shielded cables.
• Never run signal and power wires in the same conduit.
• Use signal wire connections with twisted-pair cables.
• Install Ferrite Bead(s) on signal wires close to the instrument if EMC problems persist.

Failure to follow all instructions and warnings may result in injury!
1.3 Before You Begin

Inspecting Your Shipment:

Remove the packing slip and verify that you have received everything listed. Inspect the container and equipment for signs of damage as soon as you receive the shipment. Note any evidence of rough handling in transit. Immediately report any damage to the shipping agent. The carrier will not honor damage claims unless all shipping material is saved for inspection. After examining and removing the contents, save the packing material and carton in the event reshipment is necessary.

Customer Service:

If you need assistance, please call the nearest Customer Service Department, listed in this manual.

Manuals, Software:

The latest Operation and Communication Manual as well as free software and ActiveX controls are available at the website listed on the cover page of this manual or on the CD-ROM enclosed with your shipment.

For first-time users: Refer to the QuickStart Manual for basic operation and set-up instructions.

If you have the Serial Communications/Ethernet Option you can easily configure the controller on your computer or on-line.

To Reset the Meter:

When the monitor is in the "MENU" Mode, push once to direct monitor one step backward of the top menu item.

Push twice to reset monitor, prior to resuming "Run" Mode except after "Alarms", that will go to the "Run" Mode without resetting the monitor.
PART 2
SETUP

2.1 Front Panel

Figure 2.1 Front Panel Display

Table 2.1 Front Panel Annunciators

<p>| | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>Θ</td>
<td>/MENU</td>
<td>/PK/GRS</td>
<td>/TARE</td>
<td>/ENTER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Setpoint 1/ Alarm 1 indicator</td>
<td>Setpoint 2/ Alarm 2 indicator</td>
<td>Changes display to Configuration Mode and advances through menu items*</td>
<td>Used in Program Mode and Peak or Gross Recall*</td>
<td>Used in Program Mode and to tare your reading*</td>
<td>Accesses submenus in Configuration Mode and stores selected values*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* See Part 3 Operation: Configuration Mode

2.2 Rear Panel Connections

The rear panel connections are shown in Figures 2.2 and 2.3.

Figure 2.2 Rear Panel Power Connections

Output 1 and 2 are for -AL Limit Alarm Option only.

Refer to the Quick Start Guide for assembly and disassembly instructions.
**Figure 2.3 Rear Panel Input Connections**

**Table 2.2 Rear Panel Connector**

<table>
<thead>
<tr>
<th>POWER</th>
<th>AC/DC Power Connector: All models</th>
</tr>
</thead>
<tbody>
<tr>
<td>INPUT</td>
<td>Input Connector: All models PR (Process) / ST (Strain)</td>
</tr>
<tr>
<td>OUTPUT 1</td>
<td>Based on one of the following models: Relay SPDT, Solid State Relay, Pulse</td>
</tr>
<tr>
<td>OUTPUT 2</td>
<td>Based on one of the following models: Relay SPDT, Solid State Relay, Pulse</td>
</tr>
<tr>
<td>OPTION</td>
<td>Based on one of the following models: RS-232C or RS-485 programmable Excitation</td>
</tr>
</tbody>
</table>

*Note:* Output 1 and 2 are for -AL Limit Alarm Option only.
2.3 Electrical Installation

2.3.1 Power Connections

Caution: Do not connect power to your device until you have completed all input and output connections. Failure to do so may result in injury!

Connect the main power connections as shown in Figure 2.4.

![Figure 2.4 Main Power Connections]

Table 2.3 Fuse Requirements

<table>
<thead>
<tr>
<th>FUSE</th>
<th>Connector</th>
<th>Output Type</th>
<th>For 115Vac</th>
<th>For 230Vac</th>
<th>DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUSE 1</td>
<td>Power</td>
<td>N/A</td>
<td>100 mA(T)</td>
<td>100 mA(T)</td>
<td>100 mA(T)</td>
</tr>
<tr>
<td>FUSE 2</td>
<td>Power</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>400 mA(T)</td>
</tr>
</tbody>
</table>

For the low voltage power option, in order to maintain the same degree of protection as the standard high voltage input power units (90 - 240 Vac), always use a Safety Agency Approved DC or AC source with the same Overvoltage Category and pollution degree as the standard AC unit (90 - 240 Vac).

The Safety European Standard EN61010-1 for measurement, control, and laboratory equipment requires that fuses must be specified based on IEC127. This standard specifies for a Time-lag fuse, the letter code “T”. The above recommended fuses are of the type IEC127-2-sheet III. Be aware that there are significant differences between the requirements listed in the UL 248-14/CSA 248.14 and the IEC 127 fuse standards. As a result, no single fuse can carry all approval listings. A 1.0 Amp IEC fuse is approximately equivalent to a 1.4 Amp UL/CSA fuse. It is advised to consult the manufacturer’s data sheets for a cross-reference.
2.3.2 Process Current

The figure below shows the wiring hookup for Process Current 0 – 20 mA.

![Process Current Wiring Hookup](image)

**Figure 2.5 Process Current Wiring Hookup (Internal and External Excitation)**

2.3.3 Process Voltage

The figure below shows the wiring hookup for Process Voltage 0 – 100 mV, 0 – 1 V, 0 – 10 V.

![Process Voltage Wiring Hookup](image)

**Figure 2.6 a) Process Voltage Wiring Hookup b) Process Voltage Wiring Hookup with Sensor Excitation without Sensor Excitation**

**RL** - Voltage limited resistor, which allows to convert 24 Vdc internal excitation voltage to the appropriate process input value. For instance: if the potentiometer value is equal to 10 kΩ, the minimum RL is 14 kΩ for 10 V process input.

When configuring your instrument, select Process Type in the Input Type Menu (see Part 3).
2.3.4 Strain Gauge

The figure below shows the wiring hookup for 4-wire bridge input.

![Figure 2.7](image)

In 4-Wire connections the voltage drop across long excitation lead wires of strain gauge bridge may cause measurement errors. The output of a strain gauge bridge also depends on the stability of excitation voltage. To correct for voltage drop and changes in excitation voltage, 6-wire input configuration and ratio measurement are used.

![Note](image)

In order for the Ratiometric to work properly, the External Excitation should not drop below 4.6 Vdc.

The figure below shows 6-wire hookup for 6-wire bridge input.

![Figure 2.8](image)
The figure below shows Voltage (bridge with amplified output) input with internal excitation.

**Figure 2.9  4-Wire Voltage Input (Bridge with Amplified Output) with Internal Excitation**


**2.3.5 Wiring Outputs**

This meter, if ordered with -AL Limit Alarm Option, has two, factory installed, outputs. The SPDT Mechanical Relay, SPST Solid State Relay and Pulse Output Connection are shown below.

**Figure 2.10**

**a) Mechanical Relay and SSR Outputs Wiring Hookup**

**b) Pulse Outputs Wiring Hookup**

Use copper conductors only for power connections.
This device may have a programmable communication output. The RS-232 and RS-485 Output Connection are shown below.

![RS-232 and RS-485 Connections](image)

**Note:** External RS-232 connections are not available with -EI or C4EI options.

**Figure 2.11**

a) RS-232 Output Wiring Hookup  
b) RS-485 Output Wiring Hookup

This meter is capable of supplying 5 or 10 Vdc sensor excitation. The excitation output connection and location of S2 pin selection jumper are shown below.

**Note:** Excitation is not available if Serial Communication (-C24) or Ethernet (-C4EI) or Low Voltage Power Supply (-DC) options are installed.

![Excitation Output](image)

**Figure 2.12**

a) Excitation Output  
b) Top View Location of S2

Install jumpers according to the table below.

<table>
<thead>
<tr>
<th>Excitation Output</th>
<th>S2</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 V Close Open</td>
<td>A</td>
</tr>
<tr>
<td>5 V Open Close</td>
<td>B</td>
</tr>
</tbody>
</table>

Factory default is 10 V.
PART 3
OPERATION: CONFIGURATION MODE

3.1 Introduction

The instrument has two different modes of operation. The first, Run Mode, is used to display values for the Process Variable, and to display or clear Peak and Valley values. The other mode, Menu Configuration Mode, is used to navigate through the menu options and configure the controller. Part 3 of this manual will explain the Menu Configuration Mode. For your instrument to operate properly, the user must first "program" or configure the menu options.

Turning your Device On for the First Time

The device becomes active as soon as it is connected to a power source. It has no On or Off switch. The device at first momentarily shows the software version number, followed by reset \texttt{RST}, and then proceeds to the Run Mode.

For first-time users: Refer to the QuickStart Manual for basic operation and set-up instructions.

If you have the Serial Communications/Ethernet Option you can easily configure the controller on your computer or on-line.

Table 3.1 Button Function in Configuration Mode

<table>
<thead>
<tr>
<th>Button</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>MENU</td>
<td>To enter the Menu, the user must first press ( \bullet ) button. Use this button to advance/navigate to the next menu item. The user can navigate through all the top level menus by pressing ( \bullet ). While a parameter is being modified, press ( \bullet ) to escape without saving the parameter.</td>
</tr>
<tr>
<td>PK/GRS (UP)</td>
<td>Press the up ( \bullet ) button to scroll through “flashing” selections. When a numerical value is displayed press this key to increase value of a parameter that is currently being modified. Holding the ( \bullet ) button down for approximately 3 seconds will speed up the rate at which the set point value increments. In the Run Mode press ( \bullet ) causes the display to flash the PEAK or GROSS value – press again to return to the Run Mode.</td>
</tr>
<tr>
<td>TARE (DOWN)</td>
<td>Press the down ( \bullet ) button to go back to a previous Top Level Menu item. Press this button twice to reset the instrument to the Run Mode. When a numerical value is flashing (except set point value) press ( \bullet ) to scroll digits from left to right allowing the user to select the desired digit to modify. When a setpoint value is displayed press ( \bullet ) to decrease value of a setpoint that is currently being modified. Holding the ( \bullet ) button down for approximately 3 seconds will speed up the rate at which the setpoint value is decremented. In the Run Mode press ( \bullet ) causes the display to flash the TARE value to tare your reading (zeroing). Press again to return to the Run Mode.</td>
</tr>
<tr>
<td>ENTER</td>
<td>Press the enter ( \bullet ) button to access the submenus from a Top Level Menu item. Press ( \bullet ) to store a submenu selection or after entering a value — the display will flash a ( \text{STRD} ) message to confirm your selection. To reset flashing Peak or Valley press ( \bullet ). In the Run Mode, press ( \bullet ) twice to enable Standby Mode with flashing ( \text{STBY} ).</td>
</tr>
</tbody>
</table>

Reset: Except for Alarms, modifying any settings of the menu configuration will reset the instrument prior to resuming Run Mode.
3.2 Menu Configuration

Figure 3.1 Flow Chart for ID and Set Points Menu
3.2.1 ID Number Menu

SEE ID MENU SELECTION IN CONFIGURATION SECTION FOR ENABLE/DISABLE OR CHANGE ID CODE.

If ID Code is Disabled or set as Default (0000) the menu will skip ID step to Set Point Menu.

If ID Code is set to Full Security Level and user attempts to enter the Main Menu, they will be prompted for an ID Code.

If ID Code is set to Setpoint/ID Security Level and user attempts to enter the Configuration Menu, they will be prompted for an ID Code.

ENTERING YOUR NON-DEFAULT FULL SECURITY ID NUMBER.

Press 1) Display shows Id.
Press 2) Display advances to _____.
Press & 3) Press to increase digit 0-9. Press to activate next digit (flashing). Continue to use and to enter your 4-digit ID Code.
Press 4) If the correct ID Code is entered, the menu will advance to the Setpoint 1 Menu, otherwise an error message ERR will be displayed and the instrument will return to the Run Mode.

To change ID Code, see ID Menu in the Configuration section.

ENTERING YOUR NON-DEFAULT SETPOINT/ID SECURITY ID NUMBER.

Press 5) Display shows SP1 Setpoint 1 Menu.
Press 6) Display shows SP2 Setpoint 2 Menu.
Press 7) Display shows Id ID Code Menu.
Press 8) Display advances to _____.
Press & 9) Use and to change your ID Code.
Press 10) If correct ID Code is entered, the display will advance to the Input Menu, otherwise the error message ERR will be displayed and the monitor will return to the Run Mode.

To prevent unauthorized tampering with the setup parameters, the instrument provides protection by requiring the user to enter the ID Code before allowing access to subsequent menus. If the ID Code entered does not match the ID Code stored, the monitor responds with an error message and access to subsequent menus will be denied.

Use numbers that are easy for you to remember. If the ID Code is forgotten or lost, call customer service with your serial number to access and reset the default to 0000.
### 3.2.2 Set Points Menu

**SETPOINT 1:**

1. Press \( \mathbb{Q} \), if necessary until \( \text{SP1} \) prompt appears.
2. Display shows previous value of “Setpoint 1” with 1st digit flashing.
3. Press \( \mathbb{A} \) and \( \mathbb{V} \) to increase or decrease Setpoint 1 respectively.

\*Note:* Holding \( \mathbb{A} \) & \( \mathbb{V} \) buttons down for approximately 3 seconds will speed up the rate at which the set point value increments or decrements.

4. Continue to use \( \mathbb{A} \) and \( \mathbb{V} \) to enter your 4-digit Setpoint 1 value.
5. Display shows \( \text{STRd} \) stored message momentarily and then advance to \( \text{SP2} \) only, if a change was made, otherwise press \( \mathbb{Q} \) to advance to \( \text{SP2} \) Setpoint 2 Menu.

**SETPOINT 2:**

6. Display shows previous value of “Setpoint 2” with 1st digit flashing.
7. Press \( \mathbb{A} \) and \( \mathbb{V} \) to increase or decrease Setpoint 2 respectively.

\*Note:* Holding \( \mathbb{A} \) & \( \mathbb{V} \) buttons down for approximately 3 seconds will speed up the rate at which the setpoint value increments or decrements.

8. Display shows \( \text{STRd} \) stored message momentarily and then advances to \( \text{CNFG} \) only, if a change was made, otherwise press \( \mathbb{Q} \) to advance to \( \text{CNFG} \) Configuration Menu.
3.2.3 Configuration Menu

![Configuration Menu Flow Chart]

**Figure 3.2 Flow Chart for Configuration Menu**

**Enter Configuration Menu:**

- Press ☰ 1) Press ☰, if necessary, until **CNFG** prompt appear.
- Press ☰ 2) Display advance to **INPT** Input Menu.
- Press ☰ 3) Press and release ☰ to scroll through all available menus of Configuration section.

3.2.4 Input Type Menu

![Input Type Menu Flow Chart]

**Figure 3.3 Flow Chart for Input Type Menu**
ENTER INPUT TYPE MENU:

Press ☑ 1) Press ☑, if necessary, until **CNFG** prompt appears.
Press ☑ 2) Display advances to **INPT** Input Menu.
Press ☑ 3) Display flashes **0-0.1**, **0-1.0**, **0-10** or **0-20** (0 to 100 mV, 0 to 1 V, 0 to 10 V or 0 to 20 mA).

INPUT TYPE MENU:

Press ☑ 4) Scroll through the available selection of input ranges **0-0.1**, **0-1.0**, **0-10** or **0-20** to the selection of your choice.
Press ☑ 5) Display shows **STRD** stored message momentarily and then advances to the **RT1B** Ratiometric operation submenu.

Input Types: 100 mV 1 V 10 V 0 – 20 mA
Display: 0-0.1 0-1.0 0-10 0-20

Note: To have ±100 mV you need to connect to 0-1 V.

RATIOMETRIC OPERATION SUBMENU:

Press ☑ 6) Display flashes previous selection of **EHBL** Enable or **DSBL** Disable.
Press ☑ 7) Scroll through the available selection **EHBL** or **DSBL** (flashing).
Press ☑ 8) Display shows **STRD** stored message momentarily and then advances to **RESO** Input/Reading Resolution Submenu.

The Ratiometric operations are typically used for Strain gauge monitor. If your instrument is configured as Process (voltage and current), set **RT1B** to **DSBL** to disable Ratiometric operations.

If **EHBL** Ratiometric operations **Enabled** was selected, the changes to the excitation voltage will be compensated through Ratio measurement. If **DSBL** Ratiometric operation **Disabled** was selected, any changes to the excitation voltage will effect the output of strain gauge bridge and, as a result, a reading of the instrument.

INPUT/READING RESOLUTION SUBMENU:

Press ☑ 9) Display flashes previous selection of **LO** Low or **HI** High resolution.
Press ☑ 10) Scroll through the available selection **LO** or **HI** (flashing).
Press ☑ 11) Display shows **STRD** stored message momentarily and then advances to **BUTN** Button Selection Submenu.

Note: If **LO** Low Resolution was selected the resolution of the display is 10 µV. If **HI** High Resolution was selected the resolution of the display is 1 µV. In case of High Resolution, the maximum input signal is 10 mV.
BUTTON SELECTION SUBMENU:

Press 12) Display flashes previous selection of GROS Gross or PEAK Peak.
Press 13) Scroll through the available selection GROS or PEAK to the selection of your choice.
Press 14) Display shows STEP stored message momentarily and then advances to RDG Reading Configuration Menu.

If GROS was selected, in the Run Mode pressing button causes the display to flash Gross value (value measured without zeroing of the display).
If PEAK was selected, in the Run Mode pressing button causes the display to flash Peak value.

0 - 20 mA current input used for process measurement only. For 4 - 20 mA Input select 0 - 20 mA and adjust the Input/Reading accordingly. To adjust 4 - 20 mA input, see example under INPUT/READING Submenu.

3.2.5 Reading Configuration Menu

Figure 3.4 Flow Chart for Reading Configuration Menu
ENTER READING CONFIGURATION MENU:

Press 1) Press ENTER, if necessary, until CHG prompt appears.
Press 2) Display advances to INPUT Input Menu.
Press 3) Display advances to RdG Reading Configuration Menu.
Press 4) Display advances to DEC Decimal Point.

DECIMAL POINT SUBMENU:

Press 5) Display flashes previous selection for Decimal location.
Press 6) Scroll though the available selections and choose Decimal location: FFFF, FFF.F, FF.FF or F.FFF
Press 7) Display shows STRD stored message momentarily only, if changes were made, otherwise press ENTER to advance to LOAD Known/Unknown Loads Submenu.

Note: Decimal Point is passive.

KNOWN/UNKNOWN LOADS SUBMENU:

Press 8) Display flashes previous selection of ENBL Enable or DSBL Disable.
Press 9) Scroll though the available selection of ENBL or DSBL (flashing).
Press 10) Display shows STRD stored message momentarily and then advances to L.PNT Linearization Points Submenu.

Note: If ENBL Known Loads scaling method was selected, calculate the input values to the instrument based on the actual signal being received. If DSBL Without Known Loads scaling method was selected, calculate input values to the instrument based on the transducer specification.

LINEARIZATION POINTS SUBMENU:

Press 11) Display flashes previous selection of Linearization Points Submenu.
Press 12) Scroll though the available selections: 0002, 0003, 0004, 0005, 0006, 0007, 0008, 0009, 0010 - up to 10 Linearization Points can be selected. Default is 0002.

Note: If display flashes NONE, your instrument has only 2 linearization points.
Press 13) Display shows STRD stored message momentarily only, if a change was made, otherwise press ENTER to advance to the FILTER Filter Constant Submenu.

Linearization Points allow users to customize the Transducer curve.
FILTER CONSTANT SUBMENU:

Press 14) Display flashes previous selection for Filter Constant.
Press 15) Scroll though the available selections: 0001, 0002, 0004, 0008, 0016, 0032, 0064, 0128. - Default is 0004
Press 16) Display shows STERED stored message momentarily only, if a change was made, otherwise press  to advance to INPUT/READING Submenu.

The Filter Constant Submenu allows the user to specify the number of readings stored in the Digital Averaging Filter.

Note: For PID control select filter value 0001-0004. A filter value of 2 is approximately equal to 1 second RC low pass time constant.
3.2.6 Input/Reading (Scale and Offset) Menu

Input voltage or current can be converted or scaled into values appropriate for the process or signal being measured. So, a reading may be displayed, for example, in units of weight or velocity instead of in amperes and volts. The instrument determines scale and offset values based on two user-provided input values entered with the corresponding readings.

There are two methods to scale this meter to display readings in engineering units. The first method is to scale with known loads. Do this by applying known loads to a transducer connected to a meter, or by simulating the output of the transducer with voltage or current simulator.

The second method is to scale without known inputs. Do this by calculating input values based on transducer specifications and manually entering them through the front panel push-buttons.

Example 1: Scaling with Known Loads (On-Line Calibration).

When entering the input or reading values, disregard the position of the decimal point.

If Enabled Load Submenu was selected, instrument is ready for scaling with Known Loads method.

Apply a known load equal to approximately 0% of the transducer range.

Press 17) Press \( \Delta \) at the Input 1 Submenu.

Press 18) Display shows the actual signal being received.

Press 19) Display advances to Reading 1 Submenu.

Press 20) Display shows last stored Reading 1 value with 1st digit flashing.

Press & 21) Use \( \Delta \) and \( \nabla \) buttons to enter Reading value.

This value corresponds to Input 1 in terms of some meaningful engineering units. To show Input 1 as zero percent enter Reading value = 0000.

Press 22) Display shows Input 2 Submenu.

Apply a known load equal to approximately 100% of the transducer range.

Press 23) Display shows the actual signal being received.

Press 24) Display advances to Reading 2 Submenu.

Press 25) Display shows last stored Reading 1 value with 1st digit flashing.

Press & 26) Use \( \Delta \) and \( \nabla \) buttons to enter Reading value.

This value corresponds to Input 2 in terms of some meaningful engineering units. To show Input 2 as 100% enter Reading value = 0100.

This scaling method based on 2 input values entered with 2 corresponding reading. Up to 10 linearization points can be selected to customize the transducer curve. To select linearization points see “L.PNt” Submenu.
Max scale should not be more than 50% FS because of noise related issues.

Press \( \text{Strd} \) 27) Display flashes \( \text{ALR1} \) stored message momentarily and then advances to \( \text{ALR1} \) only, if a change was made, otherwise advances to \( \text{ALR1} \) Alarm 1 Menu.

Example 2: Scaling without Known Loads.

If \( \text{DSBL} \) Disabled Load Submenu was selected, instrument is ready for scaling Without Known Loads method.

To scale without known inputs, calculate inputs based on transducer specifications and manually enter them on the via front panel push-buttons. The following example assumes load cells with this specification:

- Maximum Load: 100.0 lb
- Output: 3.0 mV/V
- Sensor Excitation: 10 V
- Maximum Sensor Output = 3.0 (mV/V) x 10 (V) = 30 mV

1. Determine the correct values for Inputs (IN1 and IN2).
   Calculate IN1 and IN2 using the following equation:

   \[ \text{IN} = (\text{Sensor Output}) \times (\text{Conversion Number}) \times (\text{Multiplier}) \]

   Conversion number is a coefficient of conversion between input values and real full display range (10000 counts). See Table 3.2 below for proper conversion number.

<table>
<thead>
<tr>
<th>INPUT RANGE</th>
<th>CONVERSION NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ~ 100 mV</td>
<td>10000 / (100 x 1) = 100 cts/mV</td>
</tr>
<tr>
<td>0 ~ 1 V</td>
<td>10000 / (1000 x 1) = 10 cts/mV</td>
</tr>
<tr>
<td>0 ~ 10 V</td>
<td>10000 / (1000 x 10) = 1 cts/mV</td>
</tr>
<tr>
<td>0 ~ 20 mA</td>
<td>10000 / (20 x 1) = 500 cts/mV</td>
</tr>
</tbody>
</table>

   Example = 0 - 1 V = 0 - 100.0
   \( \text{In} 1 = 0 \)
   \( \text{Rd} 1 = 0 \)
   \( \text{Inp} 2 = 9999 \)
   \( \text{Rd} 2 = 100.0 \)

   Multiplier determined by the Input Resolution setting (Reso in the INPT Menu). See Table 3.3 below for proper multiplier.

<table>
<thead>
<tr>
<th>INPUT RANGE</th>
<th>RESOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LOW</td>
</tr>
<tr>
<td>0 ~ 100 mV</td>
<td>1.0</td>
</tr>
<tr>
<td>0 ~ 1 V</td>
<td>1.0</td>
</tr>
<tr>
<td>0 ~ 10 V</td>
<td>1.0</td>
</tr>
<tr>
<td>0 ~ 20 mA</td>
<td>1.0</td>
</tr>
</tbody>
</table>
Determine \( I_{H1} \) and \( I_{H2} \) Input Range and Resolution. For our transducer select 0 ~ 100 mV range and LOW resolution (10 µV)

\[
I_{H1} = 0 \text{ (mV)} \times 100 \text{ (cts/mV)} \times 1.0 = 0 \\
I_{H2} = 30 \text{ (mV)} \times 100 \text{ (cts/mV)} \times 1.0 = 3000
\]

2. Determine correct values for Display Reading (\( R_{D1} \) and \( R_{D2} \)). In most cases, \( R_{D1} \) and \( R_{D2} \) are equal to the minimum and the maximum of the transducer output range.

\[
R_{D1} = 0000 \\
R_{D2} = 100.0
\]

3. Scaling the controller.

Press \( \downarrow \) \( 28 \) Press \( \downarrow \) at the \( I_{H} R_{D} \) prompt. Display shows \( I_{H} \) Input 1 Submenu.
Press \( \downarrow \) \( 29 \) Display shows last stored Input 1 value with 1st digit flashing.
Press \( \uparrow \) & \( \downarrow \) \( 30 \) Use \( \uparrow \) and \( \downarrow \) buttons to enter \( I_{H1} \) value (0000).
Press \( \downarrow \) \( 31 \) Display advances to \( R_{D1} \) only, if a change was made, otherwise press \( \uparrow \) to advance to \( R_{D1} \) Reading 1 Submenu.
Press \( \downarrow \) \( 32 \) Display shows last stored Reading 1 value with 1st digit flashing.
Press \( \uparrow \) & \( \downarrow \) \( 33 \) Use \( \uparrow \) and \( \downarrow \) buttons to enter \( R_{D1} \) value (0000).
Press \( \downarrow \) \( 34 \) Display \( I_{H2} \) Input 2 Submenu.
Press \( \downarrow \) \( 35 \) Display shows last stored Input 2 value with 1st digit flashing.
Press \( \uparrow \) & \( \downarrow \) \( 36 \) Use \( \uparrow \) and \( \downarrow \) buttons to enter \( I_{H2} \) value (3000).
Press \( \downarrow \) \( 37 \) Display advances to \( R_{D2} \) only, if a change was made, otherwise press \( \uparrow \) to advance to \( R_{D2} \) Reading 2 Submenu.
Press \( \downarrow \) \( 38 \) Display shows last stored Reading 2 value with 1st digit flashing.
Press \( \uparrow \) & \( \downarrow \) \( 39 \) Use \( \uparrow \) and \( \downarrow \) buttons to enter \( R_{D2} \) value (1000).
Press \( \downarrow \) \( 40 \) Display flashes \( S_{T R} \) stored message momentarily and then advances to \( A_{L R} \) only, if a change was made, otherwise advances to \( A_{L R} \) Alarm 1 Menu.

*Note*

This scaling method based on 2 input values entered with 2 corresponding reading. Up to 10 linearization points can be selected to customize the transducer curve. To select linearization points see “L.PNt” Submenu.
Example 3: Scaling with Current/Voltage Transducer (Process) Input.

The following example include details for a specific scenario in which a 4 - 20 mA input is to be represented as a measurement of 0 - 100 percent.

Press 41) Press at the Input 1 prompt. Display shows Input 1 Submenu.
Press 42) Display shows Input 1 value with 1st digit flashing.
Press  & 43) Use  and  buttons to enter value.

The value = min. input value x conversion number from Table 3.1
Enter 4 mA as 4 (mA) x 500 = 2000

Press 44) Display advances to Reading 1 Submenu.
Press  & 45) Use  and  buttons to enter value.

This value corresponds to Input 1 in terms of some meaningful engineering units. To show 4 mA as zero percent enter value = 0000.

Press 46) Display Input 2 Submenu.
Press 47) Display shows Input 2 value with 1st digit flashing.

The value = max. input value x conversion number from Table 3.1
Enter 20 mA as 20 (mA) x 500 = 10000 (entered as 9999)

Press & 48) Use  and  buttons to enter value.
Press 49) Display advances to Reading 2 Submenu.
Press & 50) Use  and  buttons to enter value.

To show 20 mA as 100 percent enter value = 0100

Press 51) Display flashes stored message momentarily and then advances to only, if a change was made, otherwise advances to Alarm 1 Menu.
3.2.7 Alarm 1 Menu

Figure 3.5 Flow Chart for Alarm 1 Menu

ENTER ALARM 1 MENU:

Press ☀ 1) Press ☀, if necessary, until CNFG prompt appears.
Press ☀ 2) Display advances to INPT Input Menu.
Press ☀ 3) Press ☀, if necessary, until Display advances to ALR 1 Alarm 1 Menu.
Press ☀ 4) Display advances to Alarm 1 ENBL Enable or DSBL Disable Submenu and flashes the previous selection.
ALARM 1 ENABLE/DISABLE SUBMENU:

Press \( \uparrow \) 5) Scroll though the available selection until \( \text{ENbl} \) displays to use Alarm 1.

Press \( \downarrow \) 6) Display shows \( \text{STRd} \) stored message momentarily and then advances to \( \text{Absa} \) only if it was changed, otherwise press \( \rightarrow \) to advance to \( \text{Absa} \) Alarm 1 Absolute/Deviation Submenu.

If \( \text{DSbl} \) Alarm 1 Disabled was selected, all submenus of Alarm 1 Menu will be skipped and meter advances to \( \text{ALR2} \) Alarm 2 Menu.

ALARM 1 ABSOLUTE/DEVIATION SUBMENU:

Press \( \uparrow \) 7) Display flashes previous selection. Press \( \uparrow \) to \( \text{AbSa} \) Absolute or \( \rightarrow \) Deviation.

Press \( \downarrow \) 8) Display shows \( \text{STRd} \) stored message momentarily and then advances to \( \text{LtcH} \) only if it was changed, otherwise press \( \rightarrow \) to advance to \( \text{LtcH} \) Alarm 1 Latch/Unlatch Submenu.

Absolute Mode allows Alarm 1 to function independently from Setpoint 1. If the process being monitored does not change often, then "Absolute" Mode is recommended.

Deviation Mode allows changes to Setpoint 1 to be made automatically to Alarm 1. Deviation Mode is typically the ideal mode if the process value changes often. In Deviation Mode, set Alarm 1 a certain number of degrees or counts away from Setpoint 1 — this relation remains fixed even if Setpoint 1 is changed.

ALARM 1 LATCH/UNLATCH SUBMENU:

Press \( \uparrow \) 9) Display flashes previous selection. Press \( \uparrow \) to \( \text{LtcH} \) Latched or \( \rightarrow \) Unlatched.

Press \( \downarrow \) 10) Display shows \( \text{STRd} \) stored message momentarily and then advances to \( \text{ACTV} \) only, if it was changed, otherwise press \( \rightarrow \) to advance to \( \text{ACTV} \) Active Submenu.

Latched Mode: Alarm remains "latched" until reset. To reset already latched alarm, select Alarm Latch and press \( \uparrow \) twice (i.e. Unlatch and then back to Latch).

Unlatched Mode: Alarm remains latched only as long as the alarm condition is true.
ACTIVE SUBMENU:

Press 13) Display flashes previous selection. Press to scroll through the available selections: Above, Below, HI/Lo, HI/Low and Band. (Band is active if Deviation was selected).

Press 14) Display shows stored message momentarily and then advances to Alarm Enable/Disable at Power On Submenu.

Above: Alarm 1 condition triggered when the process variable is greater than the Alarm Hi Value (Low value ignored).

Below: Alarm 1 condition triggered when the process variable is less than the Alarm Low Value (Hi value ignored).

Hi/Low: Alarm 1 condition triggered when the process variable is less than the Alarm Low Value or above the Hi Value.

Band: Alarm 1 condition triggered when the process variable is above or below the "band" set around Setpoint 1. Band equals Hi Value (Low Value ignored). A "band" is set around the set point by the instrument only in the "Deviation" Mode.

The Band for the AL 1 would be following the Setpoint 1 value

The Band for the AL 2 would be following the Setpoint 2 value.

The Band or the Deviation Value should be entered under:

- AL1 High (if they want Alarm 1)
- AL2 High (if they want Alarm 2)
- AL Low value is ignored in the Band mode.

Example: if customer requires a Deviation Value of ±10 degrees around a setpoint (using Output 2 as alarm)

- Alarm 2: - Deviation
- Contact Closure type: Deviation---Band
- AL2 High: 10 (Band they want around Setpoint 2)

Then the Band Value is to be entered under AL2 HI: 10 not 80+10 = 90
ALARM ENABLE/DISABLE AT POWER ON:

Press 15) Display flashes previous selection. Press ▲ to ENBL enable or ▼ to DSBL disable.
Press 16) Display shows STRD stored message momentarily and then advances to ALR.L only if it was changed, otherwise press ▼ to advance to the ALR.L Alarm 1 Low Value Submenu.

Note: If the alarm is enabled at Power On, the alarm will be active right after reset. If the alarm is disabled at Power On, the alarm will become enabled when the Process Value enters the non alarm area. The alarm is not active while the Process Value is approaching Setpoint 1.

ALARM 1 LOW VALUE SUBMENU:

Press 17) Display flashes 1st digit of previous value. Use ▲ and ▼ to enter new value.
Press & 18) Use ▲ and ▼ to enter Alarm 1 Low Value.
Press 19) Display shows STRD storage message momentarily and then advances to ALR.H only, if it was changed, otherwise press ▼ to advance to ALR.H Alarm 1 HI Value Submenu.

ALARM 1 HI VALUE SUBMENU:

Press 20) Display flashes 1st digit of previous value. Use ▲ and ▼ to enter new value.
Press & 21) Use ▲ and ▼ to enter Alarm1 HI Value.
Press 22) Display shows STRD stored message momentarily and then advances to the next menu only, if it was changed, otherwise press ▼ to advance to the next menu.

Note: If the input wires of the meter get disconnected or broken, it will display + OL Input (+) Overload message. For safety purposes you can set up your alarm to be triggered when input is open.
3.2.8 Alarm 2 Menu

**Figure 3.6 Flow Chart for Alarm 2 Menu**

**ENTER ALARM 2 MENU:**

1. Press 
2. Display advances to **INPT** Input Menu.
3. Press , if necessary, until display advances to **ALR2** Alarm 2 Menu.
4. Display advances to Alarm 2 **ENBL** Enable or **DSBL** Disable Submenu.

**ALARM 2 ENABLE/DISABLE SUBMENU:**

5. Display flashes previous selection. Press until **ENBL** displays to use Alarm 2.
6. Display shows **STRD** stored message momentarily and then advances to **Abs** only if it was changed, otherwise press to advance to **Abs** Absolute/Deviation Submenu.

If **DSBL** Alarm 2 **Disabled** was selected, all submenus of Alarm 2 will be skipped and meter advances to **LOOP** Loop Break Time Menu.

The remaining Alarm 2 menu items are identical to Alarm 1 Menu. Modifying Alarm Settings will not reset the instrument.
3.2.9 Setpoint Deviation Menu

Figure 3.7 Flow Chart for Setpoint Deviation Menu

ENTER SETPOINT DEVIATION MENU:

1) Press if necessary, until CNFG prompt appears.
2) Display advances to INPT Input Menu.
3) Press if necessary, until Display advances to SP.dV Setpoint Deviation Submenu.

SETPOINT DEVIATION ENABLE/DISABLE SUBMENU:

13) Display advances to Setpoint Deviation ENBL Enable or DSBL Disable Submenu and flashes the previous selection.
14) Scroll through the available selections: ENBL or DSBL.
15) Display shows STRD stored message momentarily and then advances to OUT1 Output 1 Menu.

Set Point Deviation Submenu, if “enabled”, allows changes to Setpoint 1 to be made automatically to Setpoint 2. This mode is very helpful if the Process Value changes often. In Set Point Deviation Mode, set SP2 a certain number of counts away from SP1 - this relation remains fixed when SP1 is changed. For instance: Setting SP1=200 and SP2=20 and enabling SP.dV means that the absolute value of SP2=220. Moving SP1 to 300, the absolute value of SP2 becomes 320.
3.2.10 ID Code Menu

**Figure 3.8 Flow Chart for ID Code Menu**

**ENTER ID CODE MENU:**

1) Press \(\uparrow\), if necessary, until \(\text{CNFG}\) prompt appears.
2) Display advances to \(\text{INPT}\) Input Menu.
3) Press \(\uparrow\), if necessary, until display advances to \(\text{ID}\) ID Code Menu.

**ENTERING OR CHANGING YOUR (NON-DEFAULT) ID CODE:**

4) Display advances to \(\_\_\_\_\) with 1st under score flashing.
5) Press \(\uparrow\) and \(\downarrow\) to enter your 4-digit “ID Code” number.
6) Display advances to \(\text{CH. ID}\) Change ID Code Submenu.

- **Note:** If entered “ID Code” is incorrect display shows \(\text{ERR}\) Error message momentarily and then skips to the Run Mode.

7) Display flashes the first digit of previous entered “ID Code” number.
8) Press \(\uparrow\) and \(\downarrow\) buttons to enter your new “ID Code” number.
9) Display shows \(\text{STRD}\) stored message momentarily and then advances to the \(\text{FULL}\) Full Security Submenu.
ENTERING OR CHANGING YOUR (DEFAULT) ID CODE:

Enter Id menu (Repeat steps from 1 to 3).

Press ☞ 10) Display advances to CH. Id Change ID Code Submenu.
Press ☞ 11) Display shows 0000 message with flashing 1st digit.

If you want to change your default “ID Code” you can do it now, otherwise press ☞ and menu will skip to Full Full Security Submenu.

Press ▲ & ▼ 12) Press ▲ and ▼ buttons to enter your new “ID Code” number.
Press ☞ 13) Display shows STRD stored message momentarily and then advances to Full Full Security Submenu.

FULL SECURITY LEVEL SUBMENU:

Press ☞ 14) Display flashes ENbl Enable or DSbl Disable.
Press ▲ 15) Scroll through the available selections: “Enable” or “Disable”.
Press ☞ 16) Display shows STRD stored message momentarily and then advances to Sp.Id Setpoint/ID Submenu.

If "Full" Security Level is "Enabled" and the user attempts to enter the Main Menu, they will be prompted for an ID Code. The ID Code should be correct to enter the instrument Menu item.

SETPOINT/ID SECURITY LEVEL SUBMENU:

This Security Level can be functional only if Full Security Level is Disabled.

Press ☞ 17) Display flashes ENbl Enable or DSbl Disable.
Press ▲ 18) Scroll through the available selections: “Enable” or “Disable”.
Press ☞ 19) Display shows STRD stored message momentarily and then advances to Comm Communication Submenu.

If "Setpoint/ID" Security Level is "Enabled" and the user attempts to advance into the CNFG Configuration Menu, he will be prompted for ID Code number. The ID Code should be correct to proceed into the Configuration Menu, otherwise display will show an Error and skip to the Run Mode.

If “Full” and “Setpoint/ID” Security Levels are "Disabled", the ID code will be “Disabled” and user will not be asked for ID Code to enter the Menu items (“ID” Submenu will not show up in “ID/Setpoint” Menu).
3.2.11 Communication Option Menu

Purchasing the instrument with Serial Communications permits an instrument to be configured or monitored from an IBM PC compatible computer using software available from the website listed on the cover page of this manual or on the CD-ROM enclosed with your shipment. For complete instructions on the use of the Communications Option, refer to the Serial Communications Reference Manual.

External RS-232 connections are not available with -EI or -C4EI options.

* Valid only for -C24 and -EI options.
** Valid only for -C24 and -C4EI options.

Figure 3.9 Flow Chart for Communication Option Menu
ENTER COMMUNICATION OPTION MENU:

Press 1) Press 1, if necessary, until CNFG prompt appears.
Press 2) Display advances to INPT Input Menu.
Press 3) Press 1, if necessary, until display advances to COMM Communication Options Menu.
Press 4) Display advances to C.PAR Communication Parameters Submenu.

If Communication Option is not installed, the display shows NONE and skips to the Color Display Menu.

COMMUNICATION PARAMETERS SUBMENU:

Allows the user to adjust Serial Communications Settings of the instrument. When connecting an instrument to a computer or other device, the Communications Parameters must match. Generally the default settings (as shown in Section 5) should be utilized.

Press 5) Display advances to BAUD Baud Submenu.

BAUD SUBMENU:

Press 6) Display flashes previous selection for BAUD value.
Press 7) Scroll through the available selections: 300, 600, 1200, 2400, 4800, 9600, 19.2K.
Press 8) Display shows STRD stored message momentarily and then advances to PRTY only, if it was changed, otherwise press 1 to advance to PRTY Parity Submenu.

PARITY SUBMENU:

Press 9) Display flashes previous selection for “Parity”.
Press 10) Scroll through the available selections: NO, ODD, EVEN.
Press 11) Display shows STRD stored message momentarily and then advances to DATA only, if it was changed, otherwise press 1 to advance to DATA Data Bit Submenu.

DATA BIT SUBMENU:

Press 12) Display flashes previous selection for “Data Bit”.
Press 13) Scroll through the available selections: 7-BIT, 8-BIT.
Press 14) Display shows STRD stored message and then advances to STOP only, if it was changed, otherwise press 1 to advance to STOP Stop Bit Submenu.
STOP BIT SUBMENU:

Press 15) Display flashes previous selection for “Stop Bit”.
Press 16) Scroll through the available selections: 1-BIT, 2-BIT.
Press 17) Display shows stored message momentarily and then advances to only, if it was changed, otherwise press to advance to Bus Format Submenu.

BUS FORMAT SUBMENU:

Determines Communications Standards and Command/Data Formats for transferring information into and out of the monitor via the Serial Communications Bus. Bus Format submenus essentially determine how and when data can be accessed via the Serial Communications of the device.


MODBUS PROTOCOL SUBMENU:

Press 19) Display flashes previous selection for Modbus.
Press 20) Scroll through the available selections: NO, YES.
Press 21) Display shows stored message momentarily and then advances to only, if it was changed, otherwise press to advance to Line Feed submenu.

To select iSeries Protocol, set Modbus submenu to “No”.
To select Modbus Protocol, set Modbus submenu to “Yes”.

If Modbus Protocol was selected, the following Communications Parameters must be set as: No Parity, 8-bit Data Bit, 1-Stop Bit. Do not attempt to change these parameters.

LINE FEED SUBMENU:

Determines if data sent from the instrument will have a Line Feed appended to the end - useful for viewing or logging results on separate lines when displayed on communications software at a computer.

Press 22) Display flashes previous selection for “Line Feed”.
Press 23) Scroll through the available selections: NO, YES.
Press 24) Display shows stored message momentarily and then advances to only, if it was changed, otherwise press to advance to Echo Submenu.
ECHO SUBMENU:
When valid commands are sent to the instrument, this determines whether the command will be echoed to the Serial Bus. Use of echo is recommended in most situations, especially to help verify that data was received and recognized by the monitor.

Press \( \uparrow \) 25) Display flashes previous selection for “Echo”.
Press \( \uparrow \) 26) Scroll through the available selections: NO, YES.
Press \( \downarrow \) 27) Display flashes \( \text{STRD} \) stored message momentarily and then advances to \( \text{STND} \) only if it was changed, otherwise press \( \uparrow \) to advance to \( \text{STND} \) Communication Standard Submenu.

COMMUNICATION INTERFACE STANDARD SUBMENU:
Determines whether device should be connected to an RS-232C serial port (as is commonly used on IBM PC-compatible computers) or via an RS-485 bus connected through appropriate RS-232/485 converter. When used in RS-485 Mode, the device must be accessed with an appropriate Address Value as selected in the Address Submenu described later.

Press \( \uparrow \) 28) Display flashes previous selection for “Standard”.
Press \( \uparrow \) 29) Scroll through the available selections: 232C, 485.
Press \( \downarrow \) 30) Display shows \( \text{STRD} \) stored message momentarily and then advances to \( \text{MODE} \) only, if it was changed, otherwise press \( \uparrow \) to advance to \( \text{MODE} \) Data Flow Mode Submenu.

DATA FLOW MODE SUBMENU:
Determines whether the instrument will wait for commands and data requests from the Serial Bus or whether the instrument will send data automatically and continuously to the Serial Bus. Devices configured for the RS-485 Communications Standard operate properly only under Command Mode.

Press \( \uparrow \) 31) Display flashes previous selection for “Mode”.
Press \( \uparrow \) 32) Scroll through the available selections: \( \text{CMD} \) “Command”, \( \text{CONT} \) “Continuous”.
Press \( \downarrow \) 33) Display shows \( \text{STRD} \) stored message momentarily and then advances to \( \text{SEPR} \) only, if it was changed, otherwise press \( \uparrow \) to advance to \( \text{SEPR} \) Data Separation Submenu.
DATA SEPARATION CHARACTER SUBMENU:

Determines whether data sent from the device in Continuous Data Flow Mode will be separated by spaces or by Carriage Returns.

Press 🔄 34) Display flashes previous selection for “Separation” Submenu.
Press ▲ 35) Scroll through the available selections: SPACE “Space” or CR “Carriage Return”.
Press 🔄 36) Display shows STRD stored message momentarily and then advances to DAT.F only, if it was changed, otherwise press 🔄 to advance to DAT.F Data Format Submenu.

DATA FORMAT SUBMENU:

Preformatted data can be sent automatically or upon request from the monitor. Use the Data Format Submenus to determine what data will be sent in this preformatted data string. Refer to the iSeries Communications Manual for more information about the data format. At least one of the following suboptions must be enabled and hence output data to the Serial Bus.

Note: This menu is applicable for Continuous Mode of RS-232 communication.

Press 🔄 37) Display advances to STAT Alarm Status Submenu.

ALARM STATUS SUBMENU:

Includes Alarm Status bytes in the data string.

Press 🔄 38) Display flashes previous selection for “Status” (alarm status).
Press ▲ 39) Scroll through the available selections: NO, YES.
Press 🔄 40) Display shows STRD stored message momentarily and then advances to RDNG only, if it was changed, otherwise press 🔄 to advance to RDNG Reading Submenu.

MAIN READING SUBMENU:

Includes Main Reading in the data string.

Press 🔄 41) Display flashes previous selection for “Reading”.
Press ▲ 42) Scroll through the available selections: NO, YES.
Press 🔄 43) Display shows STRD stored message momentarily and then advances to PEAK only, if it was changed, otherwise press 🔄 to advance to PEAK Peak Submenu.
PEAK VALUE SUBMENU:
Includes Peak Value in the data string.

Press 44) Display flashes previous selection for PEAK Submenu.
Press 45) Scroll through the available selections: NO, YES.
Press 46) Display shows stored message momentarily and then
     advances to GROS only, if it was changed, otherwise press  to
     advance to GROS Gross Submenu.

GROSS VALUE SUBMENU:
Includes Gross Value in the data string.

Press 47) Display flashes previous selection for “Gross”.
Press 48) Scroll through the available selections: NO, YES.
Press 49) Display shows stored message momentarily and then
     advances to UNIT only, if it was changed, otherwise press  to
     advance to UNIT Unit Submenu.

UNIT SUBMENU (not applicable):

Press 50) Display flashes previous selection for UNIT.
Press 51) Scroll through the available selections: NO, YES.
Press 52) Display shows stored message momentarily and then
     advances to ADDR only, if it was changed, otherwise press  to
     advance to ADDR Address Setup Submenu.

ADDRESS SETUP SUBMENU:

This menu is applicable to the RS-485 Option only.

Press 53) Display advances to “Address Value” (0000 to 0199)
     Submenu.

ADDRESS VALUE SUBMENU:

Press 54) Display flashes 1st digit of previously stored Address Value.
Press 55) Press  and  to enter new “Address Value”.
Press 56) Display shows stored message momentarily and then
     advances to TR.TM only, if it was changed, otherwise press  to
     advance to TR.TM Transmit Time Interval Submenu.
TRANSMIT TIME INTERVAL SUBMENU:

This menu is applicable if “Continuous” Mode was selected in the “Data Flow Mode” Submenu and the device is configured as an RS-232C Standard device. Also, one or more options under the Data Format Submenu must be enabled.

Press 57) Display advances to “Transmit Time Value” Submenu.

TRANSMIT TIME INTERVAL VALUE SUBMENU:

Determines the interval at which data will be emitted to the RS-232 Serial Bus when the instrument is in Continuous Data Flow Mode.


Press & 59) Press and to enter new “Transmit Time Value”, e.g. 0030 will send the data every 30 seconds in Continuous Mode.

Press 60) Display shows stored message momentarily and then advances to only, if it was changed, otherwise press to advance to Color Display Selection Menu.

For more details, refer to the Communication Manual available at the website listed on the cover page of this manual or on the CD-ROM enclosed with your shipment.
3.2.12 Display Color Selection Menu

The menu below allows the user to select the color of the display.

![Flow Chart for Display Color Selection Menu]

**Figure 3.10 Flow Chart for Display Color Selection Menu**

**ENTER DISPLAY COLOR SELECTION MENU:**

Press 🅳 1) Press 🅳, if necessary, until CHFD prompt appears.
Press 🅳 2) Display advances to INPT Input Menu.
Press 🅳 3) Press 🅳, if necessary, until Display advances to COLR Display Color Selection Menu.
Press 🅳 4) Display advances to N.CLR Normal Color Submenu.

**NORMAL COLOR DISPLAY SUBMENU:**

Press 🅳 5) Display flashes the previous selection for “Normal Color”.
Press 🅳 6) Scroll through the available selections: GRN, RED or AMBR.
Press 🅳 7) Display shows STRD stored message momentarily and then advances to 1.CLR only, if it was changed, otherwise press 🅳 to advance to 1.CLR Alarm 1 Display Color Submenu.

The menu below allows the user to change the color of display when alarm is triggered.

**ALARM 1 DISPLAY COLOR SUBMENU:**

Press 🅳 8) Display flashes previous selection for “Alarm 1 Color Display”.
Press 🅳 9) Scroll through the available selections: GRN, RED or AMBR.
Press 🅳 10) Display shows STRD stored message momentarily and then advances to 2.CLR only, if it was changed, otherwise press 🅳 to advance to 2.CLR Alarm 2 Display Color Submenu.
ALARM 2 DISPLAY COLOR SUBMENU:

Press d11) Display flashes previous selection for “Alarm 2 Color Display”.
Press a12) Scroll through the available selections: GRN, RED, or AMBR.
Press d13) Display shows STRD stored message momentarily and then momentarily shows the software version number, followed by RST Reset, and then proceeds to the Run Mode.

IN ORDER TO DISPLAY ONE COLOR, SET THE SAME DISPLAY COLOR ON ALL THREE SUBMENUS ABOVE.

If user wants the Display to change color every time that both Alarm 1 and Alarm 2 are triggered, the Alarm values should be set in such a way that Alarm 1 value is always on the top of Alarm 2 value, otherwise value of Alarm 1 will overwrite value of Alarm 2 and Display Color would not change when Alarm 2 is triggered.

Example 1:
Alarm Setup: Absolute, Above, Alarm 2 HI Value “ALR.H” = 200, Alarm 1 HI Value “ALR.H” = 400

Display Colors change sequences:

<table>
<thead>
<tr>
<th>GREEN</th>
<th>RED</th>
<th>AMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>AL2.H = 200</td>
<td>AL1.H = 400</td>
</tr>
</tbody>
</table>

Example 2:
Alarms Setup: Absolute, Below, Alarm 2 Low Value “ALR.L” = 300, Alarm 1 Low Value “ALR.L” = 100
Color Display Setup: "N.CLR" = Green, "1.CLR" = Amber, "2.CLR" = Red

Display Colors change sequences:

<table>
<thead>
<tr>
<th>AMBER</th>
<th>RED</th>
<th>GREEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>AL1.L = 100</td>
<td>AL2.L = 300</td>
</tr>
</tbody>
</table>
Example 3:
Setpoint 1: 200
Setpoint 2: 200
Alarm 1 & 2 Setup: Deviation, Band, “ALR.H” = 10

Display Colors change sequences:

<table>
<thead>
<tr>
<th>AMBER</th>
<th>AMBER</th>
<th>AMBER</th>
<th>GREEN</th>
<th>AMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>190</td>
<td>200</td>
<td>210</td>
<td>290</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>300</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>310</td>
</tr>
</tbody>
</table>

Alarm 1 is designed to monitor the Process Value around the Setpoint 1.
Alarm 2 is designed to monitor the Process Value around the Setpoint 2.

Example 4:
Setpoint 1: 200
Setpoint 2: 200
Alarm 1 Setup: Deviation, Band, “ALR.H” = 20
Alarm 2 Setup: Deviation, Hi/Low, “ALR.H” = 10, “ALR.L” = 5

Display colors change sequences:

<table>
<thead>
<tr>
<th>AMBER</th>
<th>RED</th>
<th>GREEN</th>
<th>GREEN</th>
<th>RED</th>
<th>AMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>180</td>
<td>195</td>
<td>200</td>
<td>210</td>
<td>220</td>
</tr>
</tbody>
</table>

Reset: The instrument automatically resets after the last menu of the Configuration Mode has been entered. After the instrument resets, it advances to the Run Mode.
PART 4
SPECIFICATIONS

Accuracy
0.03% reading

Resolution
10 / 1 µV

Temperature Stability
50 ppm/°C

NMRR
60 dB

CMRR
120 dB

A/D Conversion
Dual slope

Reading Rate
3 samples per second

Digital Filter
Programmable

Display
Single 4-digit, 9-segment LED;
• 10.2 mm (0.4" for i/32 and i/16),
• 21 mm (0.83" for i/8);
red, green and amber programmable colors for process variable and set points

Warm up to Rated Accuracy
30 min.

INPUT
Input Types
Analog Voltage, Analog Current

Voltage Input
0 to 100 mV
0 to 1 V (+100 mV)
0 to 10 Vdc

Input Impedance:
10 MΩ for 100 mV
1 MΩ for 1 V or 10 Vdc

Current Input
0 to 20 mA (5 ohm load)

Linearization Points
Up to 10 Linearization Points

Configuration
Single-ended

Polarity
Unipolar

Step Response
0.7 sec for 99.9%

Decimal Selection
None, 0.1, 0.01 or 0.001

Setpoint Adjustment
-1999 to 9999 counts

Span Adjustment
0.001 to 9999 counts

Offset Adjustment
-1999 to +9999

NETWORK AND
COMMUNICATIONS
(Optional -C24, -C4EI, -EI not available with excitation)

Ethernet:
Standards Compliance
IEEE 802.3 10Base-T
Supported Protocols: TCP/IP, ARP, HTTPGET

RS-232/RS-422/RS-485/MODBUS:
Selectable from menu; both ASCII and modbus protocol selectable from menu. Programmable 300 to 19.2 K baud; complete programmable setup capability; program to transmit current display, alarm status, min/max, actual measured input value and status.

RS-485
Addressable from 0 to 199

Connection
Screw terminals
**ALARM 1 & 2**  
Programmable to Display Color Change  
Relay*  
250 Vac or 30 Vdc @ 3 A  
(Resistive Load)  
Output 1*: SPDT type, can be configured as Alarm 1 output  
Output 2*: SPDT type, can be configured as Alarm 2 output  
SSR*  
20-265 Vac @ 0.05-0.5 A  
(Resistive Load); continuous  
DC Pulse*  
Non-Isolated; 10 Vdc @ 20 mA  
* Only with -AL Limit Alarm Option  
Operation  
High/low, above/below, band, latch/unlatch, normally open/normally closed and process/deviation; front panel configurations  

**EXCITATION**  
(optional in place of Communication)  
5 Vdc @ 40 mA  
10 Vdc @ 60 mA  
Not available for Low Power Option  

**INSULATION**  
Power to Input/Output  
2300 Vac per 1 min. test  
1500 Vac per 1 min. test,  
(Low Voltage/Power Option)  
RS-232/485 to Inputs/Outputs  
500 Vac per 1 min. test  
(no isolation is provided for Strain units)  

**Approvals**  
UL, C-UL and see CE Approval Section  

**GENERAL**  
Line Voltage/Power  
90-240 Vac +/-10%, 50-400 Hz*  
110-375 Vdc, equivalent voltage, 4 W  
* No CE compliance above 60 Hz  

**Low Voltage/Power Option**  
12-36 Vdc, 3 W**  
External power source must meet Safety Agency Approvals.  
** Units can be powered safely with 24 Vac but, No Certification for CE/UL are claimed.  

**External Fuse Required**  
Time-Delay, UL 248-14 listed:  
100 mA/250 V  
400 mA/250 V (Low Voltage/Power Option)  
Time-Lag, IEC 127-3 recognized:  
100 mA/250 V  
400 mA/250 V (Low Voltage/Power Option)  

**Environmental Conditions**  
All models: 0 to 55°C (32 to 131°F), 90% RH non-condensing  
iS8C models: 0 to 50°C (32 to 122°F) for UL only. 90% RH non-condensing  

**Protection**  
NEMA-4x/Type 4x/IP65 front bezel:  
i32, i16D, i8C  
NEMA-1/Type 1 front bezel: i8, i8DH, i8DV  

**Dimensions**  
i/8 Series: 48 H x 96 W x 127 mm D  
(1.89 x 3.78 x 5")  
i/8 Compact Series:  
48 H x 96 W x 74 mm D  
(1.89 x 3.78 x 2.91")  
i/16 Series: 48 H x 48 W x 127 mm D  
(1.89 x 1.89 x 5")  
i/32 Series: 25.4 H x 48 W x 127 mm D  
(1.0 x 1.89 x 5")  

**Panel Cutout**  
i/8 Series: 1/8 DIN  
45 H x 92 W mm (1.772" x 3.622 ")  
i/16 Series: 1/16 DIN  
45 mm (1.772") square  
i/32 Series: 1/32 DIN  
22.5 H x 45 W mm (0.886" x 1.772")  

**Weight**  
i/8 Series: 295 g (0.65 lb)  
i/16 Series: 159 g (0.35 lb)  
i/32 Series: 127 g (0.28 lb)
### Table 5.1 Factory preset value

<table>
<thead>
<tr>
<th>MENU ITEMS</th>
<th>FACTORY PRESET VALUES</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set Point 1 (SP1)</td>
<td>000.0</td>
<td></td>
</tr>
<tr>
<td>Set Point 2 (SP2)</td>
<td>000.0</td>
<td></td>
</tr>
<tr>
<td>Input:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Type (INPT)</td>
<td>0 TO 100 MV (0-0.1)</td>
<td></td>
</tr>
<tr>
<td>Ratiometric Operation (RTIO)</td>
<td>Enable (ENBL)</td>
<td></td>
</tr>
<tr>
<td>Input/Reading Resolution (RESO)</td>
<td>Low (LO)</td>
<td></td>
</tr>
<tr>
<td>Button</td>
<td>Peak (PEAK)</td>
<td></td>
</tr>
<tr>
<td>Reading Configuration (RDG):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decimal Point (DEC.P)</td>
<td>FFF.F</td>
<td></td>
</tr>
<tr>
<td>Linearization Points (L.PNt)</td>
<td>0002</td>
<td></td>
</tr>
<tr>
<td>Filter Value (FLTR)</td>
<td>0004</td>
<td></td>
</tr>
<tr>
<td>Input/Reading (IN.RD)</td>
<td>0-100 mV = 0-9999</td>
<td></td>
</tr>
<tr>
<td>Scale and Offset</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alarm 1 &amp; 2:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alarm 1 (ALR1), Alarm 2 (ALR2)</td>
<td>Disable (DSBL)</td>
<td></td>
</tr>
<tr>
<td>Absolute/Deviation (ABSO/DEV)</td>
<td>Absolute (ABSO)</td>
<td></td>
</tr>
<tr>
<td>Latch/Unlatch (LTCH/UNLT)</td>
<td>Unlatch (UNLT)</td>
<td></td>
</tr>
<tr>
<td>Contact Closure (CT.CL)</td>
<td>Normally Open (N.O.)</td>
<td></td>
</tr>
<tr>
<td>Active (ACTV)</td>
<td>Above (ABOV)</td>
<td></td>
</tr>
<tr>
<td>Alarm At Power On (A.P.ON)</td>
<td>Disable (DSBL)</td>
<td></td>
</tr>
<tr>
<td>Alarm Low (ALR.L)</td>
<td>-100.0</td>
<td></td>
</tr>
<tr>
<td>Alarm High (ALR.H)</td>
<td>400.0</td>
<td></td>
</tr>
<tr>
<td>Setpoint Deviation:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setpoint Deviation</td>
<td>Disable (DSBL)</td>
<td></td>
</tr>
<tr>
<td>ID:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ID Value</td>
<td>0000</td>
<td></td>
</tr>
<tr>
<td>Full ID (FULL)</td>
<td>Disable (DSBL)</td>
<td></td>
</tr>
<tr>
<td>Set Point ID (ID.SP)</td>
<td>Disable (DSBL)</td>
<td></td>
</tr>
</tbody>
</table>
Table 5.1 Factory preset value -- continued

<table>
<thead>
<tr>
<th>MENU ITEMS</th>
<th>FACTORY PRESET VALUES</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Communication Parameters:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baud Rate (BAUD)</td>
<td>9600</td>
<td></td>
</tr>
<tr>
<td>Parity (PRTY)</td>
<td>Odd</td>
<td></td>
</tr>
<tr>
<td>Data bit (DATA)</td>
<td>7 bit</td>
<td></td>
</tr>
<tr>
<td>Stop Bit</td>
<td>1 bit</td>
<td></td>
</tr>
<tr>
<td>Modbus Protocol (M.BUS)</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Line Feed (LF)</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Echo (ECHO)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Standard Interface (STND)</td>
<td>RS-232 (232C)</td>
<td></td>
</tr>
<tr>
<td>Command Mode (MODE)</td>
<td>Command (CMD)</td>
<td></td>
</tr>
<tr>
<td>Separation (SEPR)</td>
<td>Space (SPCE)</td>
<td></td>
</tr>
<tr>
<td>Alarm Status (STAT)</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Reading (RDNG)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Peak</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Gross (GROS)</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Units (UNIT)</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Multipoint Address (ADDR)</td>
<td>0001</td>
<td></td>
</tr>
<tr>
<td>Transmit Time (TR.TM)</td>
<td>0016</td>
<td></td>
</tr>
<tr>
<td><strong>Display Color (COLR):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal Color (N.CLR)</td>
<td>Green (GRN)</td>
<td></td>
</tr>
<tr>
<td>Alarm 1 Color (1.CLR)</td>
<td>Red (RED)</td>
<td></td>
</tr>
<tr>
<td>Alarm 2 Color (2.CLR)</td>
<td>Amber (AMBR)</td>
<td></td>
</tr>
</tbody>
</table>
PART 6
CE APPROVALS INFORMATION

This product conforms to the EMC directive 89/336/EEC amended by 93/68/EEC, and with the European Low Voltage Directive 72/23/EEC.

Electrical Safety EN61010-1:2001
Safety requirements for electrical equipment for measurement, control and laboratory.

Double Insulation
Pollution Degree 2
Dielectric withstand Test per 1 min
• Power to Input/Output: 2300Vac (3250Vdc)
• Power to Input/Output: 1500Vac (2120Vdc)
  (Low Voltage dc Power Option*)
• Power to Relays/SSR Output: 2300Vac (3250Vdc)
• Ethernet to Inputs: 1500Vac (2120Vdc)
• Isolated RS232 to Inputs: 500Vac (720Vdc)
• Pulse to Inputs: No Isolation

Measurement Category I
Category I are measurements performed on circuits not directly connected to the Mains Supply (power). Maximum Line-to-Neutral working voltage is 50Vac/dc. This unit should not be used in Measurement Categories II, III, IV.

Transients Overvoltage Surge (1.2 / 50uS pulse)
• Input Power: 2500V
• Input Power: 1500V
  (Low Voltage dc Power Option*)
• Ethernet: 1500V
• Input/Output Signals: 500V

Note: *Units configured for external low power dc voltage, 12-36Vdc

Immunity and Emissions requirements for electrical equipment for measurement, control and laboratory.
• EMC Emissions Table 4, Class B of EN61326
• EMC Immunity** Table 1 of EN61326

Note: **I/O signal and control lines require shielded cables and these cables must be located on conductive cable trays or in conduits. Furthermore, the length of these cables should not exceed 30 meters

Refer to the EMC and Safety installation considerations (Guidelines) of this manual for additional information.
Warranty/Disclaimer

NEWPORT Electronics, Inc. warrants this unit to be free of defects in materials and workmanship for a period of one (1) year from the date of purchase. In addition to NEWPORT’s standard warranty period, NEWPORT Electronics will extend the warranty period for four (4) additional years if the warranty card enclosed with each instrument is returned to NEWPORT.

If the unit should malfunction, it must be returned to the factory for evaluation. NEWPORT’s Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by NEWPORT, if the unit is found to be defective it will be repaired or replaced at no charge. NEWPORT’s WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of NEWPORT’s control. Components which wear are not warranted, including but not limited to contact points, fuses, and triacs.

NEWPORT is pleased to offer suggestions on the use of its various products. However, NEWPORT neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by NEWPORT, either verbal or written. NEWPORT warrants only that the parts manufactured by it will be as specified and free of defects. NEWPORT MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive and the total liability of NEWPORT with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall NEWPORT be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by NEWPORT is not intended to be used, nor shall it be used: (1) as a “Basic Component” under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, or used on humans, or misused in any way, NEWPORT assumes no responsibility as set forth in our basic WARRANTY / DISCLAIMER language, and additionally purchaser will indemnify NEWPORT and hold NEWPORT harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

Return Requests/Inquiries

Direct all warranty and repair requests/inquiries to the NEWPORT Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO NEWPORT, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM NEWPORT’S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR WARRANTY RETURNS, please have the following information available BEFORE contacting NEWPORT:
1. P.O. number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR NON-WARRANTY REPAIRS, consult NEWPORT for current repair charges. Have the following information available BEFORE contacting NEWPORT:
1. P.O. number to cover the COST of the repair,
2. Model and serial number of product, and
3. Repair instructions and/or specific problems relative to the product.

NEWPORT’s policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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