Counters
Frequency Meters
PID Controllers
Clock/Timers
Printers
Process Meters
On/Off Controllers
Recorders
Relative Humidity
Transmitters
Thermocouples
Thermistors
Wire
Rate Meters
Timers
Totalizers
Strain Gauge Meters
Voltmeters
Multimeters
Soldering Iron Testers
pH pens
pH Controllers
pH Electrodes
RTDs
Thermowells
Flow Sensors

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It is the policy of NEWPORT to comply with all worldwide safety and EMC/EMI regulations that apply. NEWPORT is constantly pursuing certification of its products to the European New Approach Directives. NEWPORT will add the CE mark to every appropriate device upon certification.

The information contained in this document is believed to be correct but NEWPORT Electronics, Inc. accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

WARNING: These products are not designed for use in, and should not be used for, patient connected applications.

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PATENT NOTICE: This product is covered by one or more of the following patents: U.S. Pat. No. Des. 336,895; 5,274,577; 6,243,021 / CANADA 2052599; 2052600/ ITALY 1249456; 1250938 / FRANCE BREVET No. 91 12756 / SPAIN 2039150; 2048066 / UK PATENT No. GB2 249 837; GB2 248 954 / GERMANY DE 41 34398 C2. The ™ is a Trademark of OMEGA Engineering, Inc. Used Under License. Other US and International Patents pending or applied for.

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.
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 Temperature/Process monitors offer unparalleled flexibility in process measurement. Each unit allows the user to select the input type, from 10 thermocouple types (J, K, T, E, R, S, B, C, N and J DIN), Pt RTDs (100, 500 or 1000 $\Omega$, with either 385 or 392 curve), analog voltage or current input. The voltage/current inputs are fully scalable to virtually all engineering units, with selectable decimal point, perfect for use with pressure, flow or other process input.

- The iSeries device features a large, three color programmable display with capability to change a color every time the Alarm is triggered. The standard features include isolated analog voltage or current output. Options include programmable RS232 or RS485 serial communication and excitation. Analog Output is fully scaleable and configured as retransmission to follow your display. Universal power supply accepts 90 to 240 Vac. Low voltage power option accepts 24 Vac or 20 to 36 Vdc.
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 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 configuration software are available at the website listed on the cover page of this manual.

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

If you have the Serial Communications Option you can easily configure the controller on your computer.

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 "Set Points" and "Alarms", that will go to the "Run" Mode without resetting the monitor.
PART 2
SETUP
2.1 Front Panel

Table 2.1 Front Panel Annunciators

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Setpoint 1/Alarm 1 indicator (inactive)</td>
</tr>
<tr>
<td>2</td>
<td>Setpoint 2/Alarm 2 indicator</td>
</tr>
<tr>
<td>°C</td>
<td>°C unit indicator</td>
</tr>
<tr>
<td>°F</td>
<td>°F unit indicator</td>
</tr>
<tr>
<td>☄</td>
<td>Changes display to Configuration Mode and advances through menu items*</td>
</tr>
<tr>
<td>↑</td>
<td>Used in Program Mode and Peak Recall*</td>
</tr>
<tr>
<td>↓</td>
<td>Used in Program Mode and Valley Recall*</td>
</tr>
<tr>
<td>➤</td>
<td>Accesses submenus in Configuration Mode and stores selected values*</td>
</tr>
</tbody>
</table>

* See Part 3 Operation: Configuration Mode

Figure 2.1 1⁄8 and 1⁄16 DIN Front Panel Display

Figure 2.2 1⁄8 and 1⁄16 DIN Rear View
2.2 ⅛ DIN Rear Panel Connections

The rear panel connections are shown in Figure 2.3.

Output 2 is for -AL Limit Alarm Option only.

Figure 2.3 ⅛ DIN Rear Panel Input Connections

Table 2.2 ⅛ DIN 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 TC, PR (Process), RTD</td>
</tr>
<tr>
<td>OUTPUT 1</td>
<td>Not available</td>
</tr>
<tr>
<td>OUTPUT 2</td>
<td>Based on one of the following models: Relay SPDT, Solid State Relay, Pulse. For -AL Limit Alarm Option only</td>
</tr>
<tr>
<td>OUTPUT 3</td>
<td>Isolated Analog (Output Voltage and Current)</td>
</tr>
<tr>
<td>OPTION</td>
<td>Based on one of the following models:</td>
</tr>
<tr>
<td></td>
<td>• RS232C or RS485 programmable</td>
</tr>
<tr>
<td></td>
<td>• Excitation</td>
</tr>
</tbody>
</table>
2.3 \( \frac{1}{16} \) DIN Rear Panel Connections

The rear panel connections are shown in Figure 2.4.

![Diagram of DIN rear panel connections]

**Table 2.3 \( \frac{1}{16} \) DIN Rear Panel Connector**

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>POWER</strong></td>
<td>AC/DC Power Connector: All models</td>
</tr>
<tr>
<td><strong>INPUT</strong></td>
<td>Input Connector: All models TC, PR (Process), RTD</td>
</tr>
<tr>
<td><strong>OUTPUT 1</strong></td>
<td>Not available</td>
</tr>
</tbody>
</table>
| **OUTPUT 2** | Based on one of the following models: For -AL limit option only  
• Relay SPDT  
• Solid State Relay  
• Pulse |
| **OUTPUT 3** | Isolated Analog (Output Voltage and Current) |
| **OPTION** | Based on one of the following models:  
• RS232C or RS485 programmable  
• Excitation |

*Note:* Output 2 is for -AL Limit Alarm Option only.
2.4 Electrical Installation

2.4.1 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 2.5.

![Figure 2.5 Main Power Connections](image)

**Table 2.4 Fuse Requirements (see Specifications)**

<table>
<thead>
<tr>
<th>FUSE</th>
<th>Connector</th>
<th>Output Type</th>
<th>For 115 Vac</th>
<th>90 - 240 Vac</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.
2.4.2 Thermocouple

The figure below shows the wiring hookup for any thermocouple type. For example, for Type K hookup, connect the yellow wire to the "2" terminal and the red wire to the "1(-)" terminal.

When configuring your monitor, select Thermocouple and Thermocouple Type in the Input Type menu (see Part 3).

![Figure 2.6 Thermocouple Wiring Hookup](image)

**Table 2.4 TC Wire Color Chart**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>Input Connector</th>
<th>Jacket (external insulation)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Terminal 1 (-)</td>
<td>Terminal 2 (+)</td>
</tr>
<tr>
<td>J</td>
<td>Red</td>
<td>White</td>
</tr>
<tr>
<td>K</td>
<td>Red</td>
<td>Yellow</td>
</tr>
<tr>
<td>T</td>
<td>Red</td>
<td>Blue</td>
</tr>
<tr>
<td>E</td>
<td>Red</td>
<td>Purple</td>
</tr>
<tr>
<td>N</td>
<td>Red</td>
<td>Orange</td>
</tr>
</tbody>
</table>

If the input wires of the meter get disconnected or broken, it will display "Input (+) Open" message. For safety purpose you may want to set up your alarm to be triggered when input is open. Be sure to set your Alarm correctly (see Alarm 2 chapter for details).
2.4.3 Two/Three/Four-Wire RTD

The figures below show the input connections and input connector jumpers (shown in bold lines) required to hookup a 2-, 3- or 4-wire RTD.

![Diagram of RTD wiring options](image)

**Figure 2.7 a) RTD-1000 ohm and 500 ohm Wiring Hookup**

The **two-wire** connection is simplest method, but does not compensate for lead-wire temperature change and often requires calibration to cancel lead-wire resistance offset.

The **three-wire** connection works best with RTD leads closely equal in resistance. The device measures the RTD, plus upper and lower lead drop voltage and the subtracts twice the measured drop in the lower supply current lead producing excellent lead-resistance cancellation for balanced measurements.

The **four-wire** RTD hookup is applicable to unbalanced lead resistance and enables the device to measure and subtract the lead voltage, which produces the best lead-resistance cancellation.

When configuring your instrument, select RTD type and RTD value in the Input Type menu (see Part 3).

**Note**

If the input wires of the meter get disconnected or broken, it will display **“Input (+) Open”** message except in case of 500/1000 Ω 2-wire RTD. In this case the display shows **“Input (-) Open”** message. For safety purpose you may want to set up your alarm to be triggered when input is open. Be sure to set your Alarm correctly (see Alarm 2 chapter for details).
2.4.4 Process Current

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

![Figure 2.8 Process Current Wiring Hookup (Internal and External Excitation)](image)

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

2.4.5 Process Voltage

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

![Figure 2.9 Process Voltage Wiring Hookup](image)

**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).
2.4.6 Wiring Outputs

This meter, if ordered with -AL Limit Alarm Option, has one factory installed output, located at “Output 2”. The SPDT Mechanical Relay, SPST Solid State Relay and Pulse Output Connection are shown below.

![Figure 2.10](image1)

**a) Relay & SSR Output Wiring Hookup**

**b) Pulse Output Wiring**

This device has analog output. The Analog Output Connections are shown below.

![Figure 2.11](image2)

**Analog Output Wiring Hookup**

Use copper conductors only for power connections.

This device may also have a programmable communication output. The RS232 and RS485 Output Connection are shown below.

![Figure 2.12](image3)

**a) RS232 Output Wiring Hookup**

**b) RS485 Output Wiring Hookup**

This meter is capable of supplying 24 Vdc sensor excitation. The excitation output connection is shown below. This option is not available for low voltage power supply.

![Figure 2.13](image4)

**Excitation Output**

If your meter has an excitation option, then communication is not available.
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 instrument. 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 Instrument 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 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 Option you can easily configure the controller on your computer.

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 button. Use this button to advance/navigate to the next menu item. The user can navigate through all the top level menus by pressing . While a parameter is being modified, press to escape without saving the parameter.</td>
</tr>
<tr>
<td>(UP)</td>
<td>Press the up 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 button down for approximately 3 seconds will speed up the rate at which the set point value increments. In the Run Mode press causes the display to flash the PEAK value – press again to return to the Run Mode.</td>
</tr>
<tr>
<td>(DOWN)</td>
<td>Press the down button to go back to a previous Top Level Menu item. Press this button twice to reset the monitor to the Run Mode. When a numerical value is flashing (except set point value) press to scroll digits from left to right allowing the user to select the desired digit to modify. When a setpoint value is displayed press to decrease value of a setpoint that is currently being modified. Holding the button down for approximately 3 seconds will speed up the rate at which the setpoint value is decremented. In the Run Mode press causes the display to flash the VALLEY value – press again to return to the Run Mode.</td>
</tr>
<tr>
<td>ENTER</td>
<td>Press the enter button to access the submenus from a Top Level Menu item. Press to store a submenu selection or after entering a value — the display will flash a STRD message to confirm your selection. To reset flashing Peak or Valley press .</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
3.2.1 ID Number

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.**

1. Press **1)** Display shows **Id**.
2. Press **2)** Display advances to **_____**.
3. Press **3)** Press **a** to increase digit 0-9. Press **b** to activate next digit (flashing). Continue to use **a** and **b** to enter your 4-digit ID code.
4. 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.**

5. Press **5)** Display shows **SP2** Setpoint 2 Menu.
6. Press **6)** Display shows **Id** ID Code Menu.
7. Press **7)** Display advances to **_____**.
8. Press **8)** Use **a** and **b** to change your ID Code.
9. Press **9)** If correct ID Code is entered, the display will advance to the **INPT** Input Menu, otherwise the error message **ERR** will be displayed and the instrument 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 instrument responds with an error message and access to subsequent menus will be denied.**

**Tip**

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

SETPOINT 2:

*Note*  For this model with isolated Analog Output the Setpoint 1 is inactive.

Press 1) Press  if necessary until SP2 prompt appears.
Press 2) Display shows previous value of “Setpoint 2” with 1st digit flashing.
Press 3) Press and  to increase or decrease Setpoint 2 respectively.

*Note*  Holding  &  buttons down for approximately 3 seconds will speed up the rate at which the setpoint value increments or decrements.

Press 4) Display shows ST Rd stored message momentarily and then advances to CNFG only, if a change was made, otherwise press  to advance to CNFG Configuration Menu.
3.2.3 Configuration Menu

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) Pressing and releasing ☛ to scroll through all available menus of Configuration section.

3.2.4 Input Type Menu

Figure 3.3 Flow Chart for Input Type Menu
**Input Type (Thermocouple)**

**ENTER INPUT TYPE MENU:**

Press 🔄 1) Press 🔄, if necessary, until **CNFG** prompt appears.
Press 🔄 2) Display advance to **Input Menu**.
Press 🔄 3) Display flashes **T.c, RTD or PROC** (Thermocouple, RTD or Process). If the displayed input type is **T.c**, press 🔄 to skip to step 6 (**T.c stops flashing**).

**THERMOCOUPLE SUBMENU:**

Press 🔄 4) Scroll through the available selection to **T.c** (flashing).
Press 🔄 5) Display shows **STRD** stored message momentarily and then **T.c** (not flashing).
Press 🔄 6) Display flashes previous thermocouple type selection. i.e. **J** (see below for types).
Press 🔄 7) Scroll through the available thermocouple types to the selection of your choice.
Press 🔄 8) Display shows **STRD** stored message momentarily and then advances to the **RDG** Reading Configuration Menu.

---

**Note**

Use the Input Type (Thermocouple) (RTD) or (Process) and verify your Electrical Installation (see Section 2.3).
See the following pages for (TC), (RTD), (Process) menus.

**Thermocouple Types:**


**Display:**

Input Type (RTD)

ENTER INPUT TYPE MENU:

Press 1) Press 2, if necessary, until \textit{CHFG} prompt appears.
Press 2) Display advances to \textit{INPT} Input Menu.
Press 3) Display flashes T.c., RTD or \textit{PROC} (Thermocouple, RTD or Process). If the displayed input type is RTD, press 2 to skip to step 6 (RTD stops flashing).

RTD SUBMENU:

Press 4) Scroll through the available selection to RTD (flashing).
Press 5) Display shows STRD stored message momentarily and then RTD (not flashing).
Press 6) Display flashes previous RTD type selection i.e. 392.2 (see below for RTD types selection).
Press 7) Scroll through the available RTD types to the selection of your choice.
Press 8) Display shows STRD stored message momentarily and then advances to RTD RTD value.

\textbf{RTD Types:} \textbf{392} \hspace{1cm} \textbf{385} \hspace{1cm} Two, Three or Four-wire
\textbf{Display:} \textbf{392.2, 392.3, 392.4, 385.2, 385.3, 385.4}

\textit{Note} Last digit indicates: 2-, 3- or 4-wire input.

RTD VALUE SUBMENU:

Press 9) Display flashes previous RTD value selection i.e. 100_ (see below for RTD value selection).
Press 10) Scroll through the available RTD values to the selection of your choice.
Press 11) Display shows STRD stored message momentarily and then advances to RDG Reading Configuration Menu.

\textbf{RTD Values:} \textbf{100 ohm} \hspace{1cm} \textbf{500 ohm} \hspace{1cm} \textbf{1000 ohm}
\textbf{Display:} \textbf{100_, 500_, 1000}
Input Type (Process)

ENTER INPUT TYPE MENU:

Press 1) Press , if necessary, until prompt appears.
Press 2) Display advance to Input Menu.
Press 3) Display flashes (Thermocouple, RTD or Process). If the displayed input type is PROC, press to skip to step 6 (PROC stops flashing).

PROCESS SUBMENU:

Press 4) Scroll through the available selection to PROC (flashing).
Press 5) Display shows stored message momentarily and then PROC (not flashing).
Press 6) Display flashes previous Process type selection. i.e. 0-10 (see below for Process types selection).
Press 7) Scroll through the available Process types to the selection of your choice.
Press 8) Display shows stored message and then advances to Reading Configuration Menu.

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

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:**

1. Press \( \text{CHFG} \), if necessary, until \( \text{CNFG} \) prompt appears.
2. Display advances to \( \text{INPT} \) Input Menu.
3. Display advances to \( \text{RDG} \) Reading Configuration Menu.
4. Display advances to \( \text{DEC} \) Decimal Point.

**DECIMAL POINT SUBMENU:**

5. Display flashes previous selection for Decimal location.
6. Scroll though the available selections and choose Decimal location: \( \text{FFFF} \) or \( \text{FFF.F} \) (also \( \text{FF.FF} \) and \( \text{F.FFF} \) — if \( \text{PROC} \) Process type was selected in the Input Type Menu).
7. Display shows \( \text{STRD} \) stored message momentarily and then advances to \( \text{TEMP} \) Temperature Unit.

*Note:* Decimal Point for Process Input Type is passive.
TEMPERATURE UNIT SUBMENU:

Press ↘ 8) Display flashes previous Temperature Unit selection.
Press ↗ 9) Scroll through the available selections to the Temperature Unit of your choice: °F or °C.
Press ↘ 10) Display shows STRD stored message momentarily and then advances to FILTER Filter Constant.

FILTER CONSTANT SUBMENU:

Press ↘ 11) Display flashes previous selection for Filter Constant.
Press ↗ 12) Scroll through the available selections: 0001, 0002, 0004, 0008, 0016, 0032, 0064, 0128. - Default is 0004
Press ↘ 13) Display shows STRD stored message momentarily only, if a change was made, otherwise press ↗ to advance to the next menu.

Note:

If Process was selected in the Input Type Menu the display will advance to IN.RD Input/Reading Submenu, otherwise the display advances to the ALR Alarm Menu.

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

Tip:

For PID control select filter value 0001-0004. A filter value of 2 is approximately equal to 1 second RC low pass time constant.
Reading Configuration (If Process was selected)

INPUT/READING (SCALE AND OFFSET) SUBMENU:

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 or volts.

The instrument determines Scale and Offset values based on two user-provided input values entered with the corresponding readings. Note that Input 1 and Input 2 are represented and entered as a product of the input voltage/current and the conversion number from the Table 3.2.

The following instructions include details for a specific scenario in which a 4-20 mA input (in the 20 mA Process Mode) is to be represented as a measurement of 0-100 percent.

Press 14) Press at the Input 1 prompt. Display shows Input 1 Submenu.
Press 15) Display shows Input 1 value with 1st digit flashing.
Press & 16) Use and buttons to enter Input 1 value.
The Input 1 value = min. input value * conversion number.

Note: Disregard the position of the decimal point (2000 counts may actually appear as 2000, 200.0, 20.00, or 2.000). Example: 4 mA as 4(mA) x 500 = 2000.

Press 17) Display advances to Reading 1 Submenu.
Press & 18) Use and buttons to enter Reading 1 value.
This value represents Input 1 in terms of some meaningful engineering units. To show the 4 mA as zero percent enter Reading 1 value = 0000.
Example: Reading 1 value = 0000.

Press 19) Display Input 2 Submenu.
Press 20) Display shows Input 2 value with 1st digit flashing.
The Input 2 value = max. input value * conversion number.
Example: 20(mA) x 500 = 10000 (9999).

Press & 21) Use and buttons to enter Input 2 value.
Press 22) Display advances to Reading 2 Submenu.
Press & 23) Use and buttons to enter Reading 2 value.
Example: Reading 2 value = 0100.

Press 24) Display flashes stored message momentarily and then advances to Alarm Menu.

Example:
Conversion number is a coefficient of conversion between input values and real full display range (10000 counts, shown as 9999). See Table 3.2 below for proper conversion number.

### Table 3.2 Conversion Table

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

Example =

0 - 1 V = 0 - 100.0

In 1 = 0
Rd 1 = 0

Inp 2 = 9999
Rd 2 = 100.0
3.2.6 Analog Output (Retransmission)

ENTER ANALOG OUTPUT MENU:

Press 1) Press \[1\] if necessary, until \text{CNFG} prompt appears.
Press 2) Display advances to \text{INPT} Input Menu.
Press 3) Press \[2\], if necessary, until Display advances to \text{ANLG} Analog Output Menu.
Press 4) Display advances to Analog Output \text{CURR} or \text{VoLT} Current/Voltage Submenu and flashes the previous selection.

CURRENT/VOLTAGE SUBMENU:

Press 5) Display flashes \text{CURR} Current or \text{VoLT} Voltage.
Press 6) Scroll through the available selection: Current or Voltage. (Example \text{VoLT}).
Press 7) Display shows \text{STRd} stored message momentarily and then advances to \text{RD 1} Submenu only if it was changed, otherwise press \[2\] to advance to \text{RD 1} Reading 1 Submenu.

READING 1:

Press 8) Display flashes 1\text{st} digit of previous “Reading 1” value.
Press \& 9) Enter “Reading 1” value. (Example \text{0000}).
Press \[2\] 10) Display advances to \text{OUT.1} Out 1 Submenu.

OUT 1:

Press 11) Display flashes 1\text{st} digit of previous “Out 1” value.
Press \& 12) Enter “Out 1” value. (Example \text{00.00}).
Press \[2\] 13) Display advances to \text{RD 2} Reading 2 Submenu.
READING 2:

Press 14) Display flashes 1st digit of previous “Reading 2” value.
Press 15) Enter “Reading 2” value. (Example 9999).
Press 16) Display advances to OUT.2 Out 2 Submenu.

OUT 2:

Press 17) Display flashes 1st digit of previous “Out 2” value.
Press 18) Enter “Out 2” value. (Example 10.00)
Press 19) Display advances to the ALR.2 Alarm 2 Menu.

Note The above example is for 0-10 V output of the entire range of the Process Input and Analog Output. For 0-20 mA output you need to set “Analog Type” to Current and OUT 2 to 20.00.
3.2.7 Alarm 1

For this model with Isolated Analog Output, Alarm 1 is inactive.

3.2.8 Alarm 2

---

**Figure 3.6 Flow Chart for Alarm 2**

**ENTER ALARM MENU:**

- Press (1) Press (2), if necessary, until **CNFG** prompt appears.
- Press (2) Display advances to **INPT** Input Menu.
- Press (3) Press (4), if necessary, until Display advances to **ALR2** Alarm Menu.
- Press (4) Display advances to the **ABS** Absolute/Deviation Submenu.
ALARM ABSOLUTE/DEVIATION SUBMENU:

Press 5) Display flashes previous selection. Press ▲ to Absolute or ▼ Deviation.

Press 6) Display shows STRD stored message momentarily and then advances to LTcH only, if it was changed, otherwise press ◄ to advance to LTcH Alarm Latch/Unlatch Submenu.

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

ALARM 2 LATCH/UNLATCH SUBMENU:

Press 7) Display flashes previous selection. Press ▲ to LTcH Latched or ▼ Unlatched.

Press 8) Display shows STRD stored message momentarily and then advances to Ct.CL only, if it was changed, otherwise press ◄ to advance to Ct.CL Contact Closure Submenu.

**Latched Mode**: Relay remains "latched" until reset. To reset already latched alarm, select Alarm Latch and press Max twice (i.e. Unlatch and then back to Latch) or from a Run Mode, push ◄ twice to put the instrument in Standby Mode and then push ◄one more time to return to the Run Mode.

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

Press (9) Display flashes previous selection. Press ↑ to scroll through the available selections: Above, Below, Hi/Low and Band. (Band is active if Deviation was selected).

Press (10) Display shows stored message momentarily and then advances to only, if it was changed, otherwise press ↑ to advance to Alarm Low Value Submenu.

Above: Alarm 2 condition triggered when the process variable is greater than the Alarm Hi Value (Low value ignored).

Below: Alarm 2 condition triggered when the process variable is less than the Alarm Low Value (Hi value ignored).

Hi/Low: Alarm 2 condition triggered when the process variable is less than the Alarm Low Value or above the Hi Value.

Band: Alarm 2 condition triggered when the process variable is above or below the "band" set around Setpoint 2. Band equals Hi Value (Low Value ignored). A "band" is set around the Setpoint by the instrument only in the "Deviation" Mode.

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

The Band or the Deviation Value should be entered under:

- 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)

- Output 2: disabled (this enables the Alarm 2)
- 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 LOW VALUE SUBMENU:

Press 11) Display flashes 1st digit of previous value. Use and to enter new value.
Press & 12) Use and to enter Alarm Low Value.
Press 13) Display shows storage message momentarily and then advances to only, if it was changed, otherwise press to advance to Alarm Hi Value Submenu.

ALARM HI VALUE SUBMENU:

Press 14) Display flashes 1st digit of previous value. Use and to enter new value.
Press & 15) Use and to enter Alarm Hi Value.
Press 16) Display shows stored message momentarily and then advances to the next menu only, if it was changed, otherwise press to advance to the next menu.
3.2.9 Reading Adjust Menu / Field Calibration

ENTER READING ADJUST 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 R.ADJ Reading Adjust Menu.

READING ADJUST VALUE SUBMENU:
Press 4) Display flashes 1st digit of previous Reading Adjust value.
Press & 5) Press and buttons to enter a new Reading Adjust value (-1999 to 9999).
Press 6) Display shows stored message momentarily and then advances to the CAL Menu.

Note For Temperature Reading only, not Process

Reading Offset Adjust allows the user to fine tune a minor error of the transducer, however some applications may require a large offset adjust. (Displayed Process Value = Measured Process Value ±R.ADJ).
Reading Adjust value is adjustable between -1999 to 9999.

THERMOCOUPLE FIELD CALIBRATION SUBMENU:

CAUTION: Do not perform the following steps until you fully understand this entire section.

Note RTD and Process are perfectly calibrated. This section is applicable to Thermocouple (TC) calibration only.

Be sure that the TC being used to calibrate the meter is of the type selected in the TC submenu. Place the TC in an ice-bath (or other 0°C / 32°F environment). In ambient temperature conditions: connect the TC to the meter, apply power to the meter.

CAUTION: Do not proceed with TC calibration unless the above conditions have been in effect for at least one hour.

Press 7) Display shows CAL
Press 8) Display shows flashing 0000
Press 9) Display will still show flashing 0000
Press 10) Display shows OUT (meaning Calibration is complete)

* If you accidently engage the flashing (CAL° alert) simply re-press the last button you pressed, to avoid unintentionally mis-calibrating your meter.
3.2.10 ID CODE

ENTER ID CODE MENU:

Press ☛ 1) Press ☛, if necessary, until CHFG prompt appears.
Press ☛ 2) Display advances to INPF Input Menu.
Press ☛ 3) Press ☛, if necessary, until Display advances to ID ID Code Menu.

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

Press ☛ 4) Display advances to ____. with 1st under score flashing.
Press ☛ & ☛ 5) Press ☛ and ☛ to enter your 4-digit “ID Code” number.

Note: If entered “ID Code” is incorrect display shows ERR Error message momentarily and then skips to the Run Mode.

Press ☛ 7) Display flashes the first digit of previous entered “ID Code” number.
Press ☛ & ☛ 8) Press ☛ and ☛ buttons to enter your new “ID Code” number.
Press ☛ 9) Display shows STRD stored message momentarily and then advances to the 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 **θ** and menu will skip to **FULL Full Security Submenu**.

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

FULL SECURITY LEVEL SUBMENU:

Press **14)** Display flashes **ENBL Enable or DNBL 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 DNBL 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

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

![Flow Chart for Communication Option](image-url)

**Figure 3.9 Flow Chart for Communication Option**
ENTER COMMUNICATION OPTION 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 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 stored message momentarily and then advances to PRTY only, if it was changed, otherwise press ☀️ to advance to DATA 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 stored message momentarily and then advances to DATA only, if it was changed, otherwise press ☀️ 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 stored message and then advances to STOP only, if it was changed, otherwise press ☀️ 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 BUS.F only, if it was changed, otherwise press to advance to BUS.F Bus Format Submenu.

BUS FORMAT SUBMENU:
Determines Communications Standards and Command/Data Formats for transferring information into and out of the instrument 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 LF only, if it was changed, otherwise press to advance to LF 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 ECHO only, if it was changed, otherwise press to advance to ECHO 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 instrument.

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

COMMUNICATION INTERFACE STANDARD SUBMENU:

Determines whether device should be connected to an RS232C serial port (as is commonly used on IBM PC-compatible computers) or via an RS485 bus connected through appropriate RS232/485 converter. When used in RS485 Mode, the device must be accessed with an appropriate Address Value as selected in the Address Submenu described later.

Press 28) Display flashes previous selection for “Standard”.
Press 30) Display shows stored message momentarily and then advances to only, if it was changed, otherwise press to advance to 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 RS485 Communications Standard operate properly only under Command Mode.

Press 31) Display flashes previous selection for “Mode”.
Press 32) Scroll through the available selections: Command, Continuous”.
Press 33) Display shows stored message momentarily and then advances to only, if it was changed, otherwise press to advance to 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 instrument. 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 RS232 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 $d$ 44) Display flashes previous selection for PEAK Submenu.
- Press $a$ 45) Scroll through the available selections: NO, YES.
- Press $d$ 46) Display shows STRD stored message momentarily and then advances to VALY only, it was changed, otherwise press $t$ to advance to VALY Valley Submenu.

**VALLEY VALUE SUBMENU:**
Includes Valley Value in the data string.

- Press $d$ 47) Display flashes previous selection for “Valley”.
- Press $a$ 48) Scroll through the available selections: NO, YES.
- Press $d$ 49) Display shows STRD stored message momentarily and then advances to $UH\,\,IT$ only, if it was changed, otherwise press $t$ to advance to $UH\,\,IT$ Temperature Unit Submenu.

**TEMPERATURE UNIT SUBMENU:**
Includes a byte in the data string to indicate whether reading is in Celsius or Fahrenheit.

- Press $d$ 50) Display flashes previous selection for $UH\,\,IT$.
- Press $a$ 51) Scroll through the available selections: NO, YES.
- Press $d$ 52) Display shows STRD stored message momentarily and then advances to $Addr$ only, if it was changed, otherwise press $t$ to advance to $Addr$ Address Setup Submenu.

**ADDRESS SETUP SUBMENU:**
- Note: This menu is applicable to the RS485 Option only.

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

**ADDRESS VALUE SUBMENU:**

- Press $d$ 54) Display flashes 1st digit of previously stored Address Value.
- Press $a$ & $v$ 55) Press $a$ and $v$ to enter new “Address Value”.
- Press $d$ 56) Display shows STRD stored message momentarily and then advances to ER.TM only, if it was changed, otherwise press $t$ to advance to ER.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 RS232C 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 RS232 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.
3.2.12 DISPLAY COLOR SELECTION

This submenu allows the user to select the color of the display.

**NORMAL COLOR DISPLAY SUBMENU:**

Press **↓**

Press **↓**, if necessary, until **CHFD** prompt appears.

Press **↓**

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.

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 **2_CLR** only, if it was changed, otherwise press **↓** to advance to **2_CLR** Alarm 2 Display Color Submenu.

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

**ALARM 2 COLOR**

**NORMAL COLOR**

**GREEN**

**RED**

**AMBER**

**Figure 3.10 Flow Chart for Display Color Selection**
ALARM 2 DISPLAY COLOR SUBMENU:

Press 8) Display flashes previous selection for “Alarm Color Display”.
Press 9) Scroll through the available selections: GRN, RED or AMBR.
Press 10) 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 BOTH SUBMENUS ABOVE.

Example 1:

Alarm 2 Setup: Absolute, Above, Alarm 2 HI Value “ALR.H” = 200,
Color Display Setup: Normal Color “N.CLR” = Green, Alarm 2 Color “2.CLR” = Red

Display Colors change sequences:

GREEN | RED
0     AL2.H = 200

Example 2:

Alarm 2 Setup: Absolute, Below, Alarm 2 Low Value “ALR.L” = 300,
Color Display Setup: ”N.CLR” = Green, ”2.CLR” = Red

Display Colors change sequences:

RED | GREEN
0     AL2.L = 300
Example 3:

Setpoint 2: 200

Alarm 2 Setup: Deviation, Band, “ALR.H” = 10

Color Display Setup: “N.CLR” = Green, “2.CLR” = Amber

Display Colors change sequences:

<table>
<thead>
<tr>
<th>AMBER</th>
<th>GREEN</th>
<th>AMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>190</td>
<td>200</td>
</tr>
</tbody>
</table>

Example 4:

Setpoint 2: 200

Alarm 2 Setup: Deviation, Hi/Low, “ALR.H” = 10, “ALR.L” = 5

Color Display Setup: “N.CLR” = Green, “2.CLR” = Red

Display colors change sequences:

<table>
<thead>
<tr>
<th>RED</th>
<th>GREEN</th>
<th>RED</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>195</td>
<td>200</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
±0.5°C temp; 0.03% reading process

Resolution
1°/0.1°; 10 μV process

Temperature Stability
1) RTD: 0.04°C/°C
2) TC @ 25°C (77°F): 0.05°C/°C
- Cold Junction Compensation
3) Process: 50 ppm/°C

NMRR
60 dB

CMRR
120 dB

A/D Conversion
Dual slope

Reading Rate
3 samples per second

Digital Filter
Programmable

Display
4-digit, 9-segment LED,
21 mm (0.83") ⅝ DIN
10.2 mm (0.40") ⅛ DIN
red, green and amber programmable colors for process variable, set point and temperature units

Warm up to Rated Accuracy
30 min.

INPUT
Input Types
Thermocouple, RTD, Analog Voltage, Analog Current

Thermocouple Type (ITS90)

Thermocouple Lead Resistance
100 ohm max

RTD Input (ITS 68)
100/500/1000 Ω Pt sensor, 2-, 3- or 4-wire; 0.00385 or 0.00392 curve

Voltage Input
0 to 100 mV, 0 to 1 V, 0 to 10 Vdc

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

Current Input
0 to 20 mA (5 ohm load)

Configuration
Single-ended

Polarity
Unipolar

Step Response
0.7 sec for 99.9%

Decimal Selection
None, 0.1 for temperature
None, 0.1, 0.01 or 0.001 for process

Setpoint Adjustment
-1999 to 9999 counts

Span Adjustment
0.001 to 9999 counts

Offset Adjustment
-1999 to +9999

ANALOG OUTPUT (programmable)
Isolated, Retransmission 0 to 10 Vdc or 0 to 20 mA, 500 Ω max.
Accuracy is 1% of FS, for Scaling Gain from 0.03 to 100 mV per count
Isolation is 1000 Vdc
Linearity is 0.2%
INSULATION
Power to Input/Output,
2300 Vac per 1 min. test,
1500 Vac per 1 min. test,
(Low Power Option)
Power to Relays/SSR Outputs,
2300 Vac per 1 min. test
Relays/SSR to Relay/SSR Outputs,
2300 Vac per 1 min. test
RS232/485 to Inputs/Outputs,
500 Vac per 1 min. test

GENERAL
Line Voltage/Power
90-240 Vac +/-10%, 50-400 Hz*
110-375 Vdc, equivalent voltage
5 W, power consumption
* No CE compliance above 60 Hz
Low Voltage/Power Option
20-36 Vdc, 4 W**, power consumption
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
0 to 55°C (32 to 131°F),
90% RH non-condensing
0 to 50°C (32 to 122°F) for UL only.
90% RH non-condensing

Protection
NEMA 1 (Type 1) front bezel \( \frac{1}{8} \) DIN
NEMA 4 (IP65) front bezel \( \frac{1}{16} \) DIN

COMUNICATIONS
(Optional in place of excitation)
RS232/RS422/RS485/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.

RS485
Addressable from 0 to 199

ALARM 2 (programmable):
Type
Programmable to display color change
Relay*
250 Vac or 30 Vdc @ 3 A
(Resistive Load)
Output 1: not available
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, latch/unlatch,
normally open/normally closed and
process/deviation; front panel
configurations

EXCITATION
(optional in place of Communication)
24 Vdc @ 25 mA
Not available for Low Power Option

APPROVALS
FM, UL, C-UL, and
see CE Approval Section
4.1 Mounting

**TOP VIEW**

- Dimensions: 48 H x 96 W x 127 mm D (1.89 x 3.78 x 5"")
- Panel Cutout: 45 H x 92 W mm (1.772" x 3.622"")
- Weight: 295 g (0.65 lb)

**PANEL CUTOUT**

- 3.622 +0.032/-0.000 (92.00 +0.81/-0.00)
- 1.772 +0.024/-0.000 (45.00 +0.61/-0.00)
- R0.060 [R1.52] 4 PLCS
- PANEL THICKNESS 0.25 (6.4) MAX
- 0.03 (0.8) MIN

**REAR VIEW**

- Hole in rear panel for isolated analog option board "tab"

**FRONT VIEW**

- 3.78 [96.01]
- 1.89 [48.01]

**DIAGRAMS**

- Diagrams showing top, panel cutout, and front views of the device.
4.2 ⅛ DIN Mounting

Dimensions
48 H x 48 W x 127 mm D (1.89 x 1.89 x 5”)

Panel Cutout
45 mm (1.772”) square

Weight
159 g (0.35 lb)
<table>
<thead>
<tr>
<th>TC</th>
<th>Input Type</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>Iron-Constantan</td>
<td>-210 to 760°C</td>
<td>0.4°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-346 to 1400°F</td>
<td>0.7°F</td>
</tr>
<tr>
<td>K</td>
<td>CHROMEGA®-ALOMEGA®</td>
<td>-270 to -160°C</td>
<td>1.0°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-160 to 1372°C</td>
<td>0.4°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-454 to -256°F</td>
<td>1.8°F</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-256 to 2502°F</td>
<td>0.7°F</td>
</tr>
<tr>
<td>T</td>
<td>Copper-Constantan</td>
<td>-270 to -190°C</td>
<td>1.0°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-190 to 400°C</td>
<td>0.4°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-454 to -310°F</td>
<td>1.8°F</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-310 to 752°F</td>
<td>0.7°F</td>
</tr>
<tr>
<td>E</td>
<td>CHROMEGA®-Constantan</td>
<td>-270 to -220°C</td>
<td>1.0°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-220 to 1000°C</td>
<td>0.4°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-454 to -364°F</td>
<td>1.8°F</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-364 to 1832°F</td>
<td>0.7°F</td>
</tr>
<tr>
<td>R</td>
<td>Pt/13%Rh-Pt</td>
<td>-50 to 40°C</td>
<td>1.0°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>40 to 1788°C</td>
<td>0.5°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-58 to 104°F</td>
<td>1.8°F</td>
</tr>
<tr>
<td></td>
<td></td>
<td>104 to 3250°F</td>
<td>0.9°F</td>
</tr>
<tr>
<td>S</td>
<td>Pt/10%Rh-Pt</td>
<td>-50 to 100°C</td>
<td>1.0°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100 to 1768°C</td>
<td>0.5°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-58 to 212°F</td>
<td>1.8°F</td>
</tr>
<tr>
<td></td>
<td></td>
<td>212 to 3214°F</td>
<td>0.9°F</td>
</tr>
<tr>
<td>B</td>
<td>30%Rh-Pt/6%Rh-Pt</td>
<td>200 to 640°C</td>
<td>1.0°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>640 to 1820°C</td>
<td>0.5°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>212 to 1184°F</td>
<td>1.8°F</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1184 to 3308°F</td>
<td>0.9°F</td>
</tr>
<tr>
<td>C</td>
<td>5%Re-W/26%Re-W</td>
<td>0 to 2354°C</td>
<td>0.4°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>32 to 4253°F</td>
<td>0.7°F</td>
</tr>
<tr>
<td>N</td>
<td>Nicrosil-Nisil</td>
<td>-250 to -100°C</td>
<td>1.0°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-100 to 1300°C</td>
<td>0.4°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-418 to -148°F</td>
<td>1.8°F</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-148 to 2372°F</td>
<td>0.7°F</td>
</tr>
<tr>
<td>L</td>
<td>J</td>
<td>-200 to 900°C</td>
<td>0.4°C</td>
</tr>
<tr>
<td></td>
<td>DIN</td>
<td>-328 to 1652°F</td>
<td>0.7°F</td>
</tr>
<tr>
<td>RTD</td>
<td>Pt, 0.00385, 100 Ω, 500 Ω, 1000 Ω</td>
<td>200 to 900°C</td>
<td>0.4°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-328 to 1652°F</td>
<td>0.7°F</td>
</tr>
<tr>
<td>RTD</td>
<td>Pt, 0.00392, 100 Ω, 500 Ω, 1000 Ω</td>
<td>-200 to 850°C</td>
<td>0.4°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-328 to 1562°F</td>
<td>0.7°F</td>
</tr>
<tr>
<td>PROCESS</td>
<td>Voltage</td>
<td>0 to 100 mV, 0 to 1 V, 0 to 10 Vdc</td>
<td>0.03% rdg</td>
</tr>
<tr>
<td>PROCESS</td>
<td>Current</td>
<td>0 to 20 mA, 4 to 20 mA</td>
<td>0.03% rdg</td>
</tr>
</tbody>
</table>
## PART 5
### FACTORY PRESET VALUES

#### 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 2 (SP2)</td>
<td>000.0</td>
<td></td>
</tr>
<tr>
<td><strong>Input:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Type (INPT)</td>
<td>TC, type K</td>
<td></td>
</tr>
<tr>
<td><strong>Reading Configuration (RDG):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decimal Point (DEC.P)</td>
<td>FFF,F</td>
<td></td>
</tr>
<tr>
<td>Temperature unit (TEMP)</td>
<td>°F</td>
<td></td>
</tr>
<tr>
<td>Filter value (FLTR)</td>
<td>0004</td>
<td></td>
</tr>
<tr>
<td><strong>ANALOG OUTPUT (Retransmission):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current/Voltage (CURR/VOLT)</td>
<td>Voltage (VOLT)</td>
<td></td>
</tr>
<tr>
<td>Scale and Offset</td>
<td>Reading: 0 - 999.9 cts, Output: 0 - 10 V</td>
<td></td>
</tr>
<tr>
<td><strong>Alarm:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alarm 2 (ALR2)</td>
<td>Enable (ENBL)</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>Active (ACTV)</td>
<td>Above (ABOV)</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><strong>Reading Adjust Value (R.ADJ):</strong></td>
<td>000.0</td>
<td></td>
</tr>
<tr>
<td><strong>Field Calibration (CAL°)</strong></td>
<td>0000</td>
<td></td>
</tr>
<tr>
<td><strong>ID:</strong></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>
<tr>
<td><strong>Communication Parameters:</strong></td>
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<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>RS232 (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>Valley (VALY)</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 2 Color (2.CLR)</td>
<td>Amber (AMBR)</td>
<td></td>
</tr>
</tbody>
</table>
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)
- Isolated Analog to Inputs: 500Vac (720Vdc)
- Analog/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, 20-36Vdc


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.
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.

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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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