1. Mechanical installation

- Prepare panel cutout.
- Install the optional front panel gasket if required. Remove the backing from the gasket and apply it around the panel cutout on the outside of the panel.
- Slide instrument sleeve into the cutout from the front of the panel.
- Position the mounting bracket on the rear of the instrument sleeve with the 2 clips facing the rear and positioned on the top and bottom of the sleeve.
- While holding the sleeve, slide the mounting bracket towards the panel until the clips engage on the ratchets. While still pulling back on the sleeve, press on the upper left and lower right hand corners of the bracket to seat the mounting bracket. Another push on the clips with a screwdriver might be necessary to secure the installation.

Dimensions
Panel depth: with rear terminal cover: 4.96" (126.1mm), with gasket fitted: less 0.060" (1.5mm)

2. Electrical connections

WARNING! Ensure that the maximum voltage which is applied to the unit power supply, between any two isolated circuits, or between any isolated circuit and ground does not exceed 264Vac.

Power
- Respect the polarity of the AC power supply: line wire must be connected to terminal 12, and the neutral must be connected to terminal 11.

Alarm relay(s)
- The alarm outputs are failsafe: the relays are de-energized during the alarm condition or power down. The attached alarm circuit should be designed for failsafe operation and fused appropriately. A snubber may be required; see below.

Snubbers
- Connect snubbers (22nF + 1000Ω) across the appropriate alarm relay contacts when driving AC inductive loads (mechanical contactors and solenoids). Do not use snubbers when driving high impedance loads. The snubber passes 1mA in 120Vac circuits, and 2mA in 240Vac circuits; this is sufficient to hold in certain relays with high impedance coils and should not be used in such installations.

WARNING! When an alarm contact is to be implemented as part of a failsafe alarm scheme, it is the user's responsibility to verify that the effect of the snubber does not interfere with the operation of the circuit. Consider high impedance circuits are not able to detect a contact opening when the snubber is placed across the contact. In these cases the snubber should not be installed across the alarm contacts.

Reset Input (latching configurations only)
- Connect momentary contact, normally open pushbutton to terminals 6 and 7. Keep wiring run shorter than 3' (1m) and well away from noise generating circuits.

Input
- WARNING! This alarm unit must have its own input sensor. Never connect the Input terminals 9 and 10 in parallel with the Input of any other instrument, e.g. recorder, controller, etc. The paralleled inputs of other instruments interfere with proper operation of the sensor break detection circuitry and may also impair the measurement accuracy.

NOTE: The input circuit is NOT isolated from the reset input (terminals 6 and 7).

NOTE: See p. 4 for wiring of linear inputs.
3. Configuration

Procedure
1. Cycle power OFF and ON.
2. Touch and hold secret key when 4-digit configuration code appears after self test to enter configuration mode.
3. Enter new code (refer to Configuration code table): ▼ = select digit position (1 through 4) ▲ = modify digit value.
4. To exit configuration mode do one of these:
   - Secret key = accept new configuration; parameter value check follows.
   - ▼ = abort; return to previous configuration.

Configuration code
1st (left) and 2nd digits:
- 0: Disabled
- 1: Latching operation: alarm 1 and alarm 2 functions
- 2: Deviation low alarm
- 3: Deviation high alarm
- 4: Full scale low alarm
- 5: Sensor break alarm
- 6: Full scale high alarm
- 7: Rate-of-change alarm

non-latching operation:
- 9: Deviation low alarm
- A: Deviation high alarm
- B: Deviation band alarm
- C: Full scale low alarm
- D: Sensor break alarm
- E: Full scale high alarm
- F: Rate-of-change alarm

3rd digit
- full specified range
- °F min °F max °C min °C max
- 0: RTD—1000 Ω Pt, DIN3760
- 1: Pt-30% Rh/Pt-65%Rh
- 2: C-W-5%/Rh/W-25%Re (Hoskins)
- 3: E-Chrome™/Adams constantan
- 4: J-Chromel™/constantan
- 5: K-Chromel™/Adams constantan
- 6: L—Fe/Konstantan
- 7: N: NiCrSiNiSi
- 8: Platinum II™
- 9: Pt-13%Rh/Pt
- A: Pt-10%Rh/Pt
- B: Cu/Adams constantan
- C: Linear a—2-point entry scaling
- D: Linear b—point-and-span entry scaling

4th (right) digit
- PWR fail display remote ok alarm
- 0: AL1 & 2
- 1: AL1 & 2
- 2: AL1
- 3: AL1
- 4: AL2
- 5: AL2
- 6: AL1 & 2
- 7: AL1 & 2
- 8: AL1
- 9: AL1
- A: AL1
- B: AL2

4. Operation

Basic operation
Open list procedures:
- Measured value is displayed when unit is unattended.
- Depress ▼ once to view display units.
- Depress ▼ again to view AL 1 (roc1) and ▲ or ▼ for display values.
- Depress ▼ again to view AL 2 (roc2), ▲ or ▼ for display values.
- To acknowledge (or reset) deviation alarms (flashing red AL 1 or AL 2 lamp): use ▼ until AL 1 (AL 2) appears, hold ▲ or ▼ for 5 seconds until CLR appears, then press the button again.

Protected list procedures:
- To enter protected list: use ▼ until units display (°F, °C or Lin), then “secret key”. Continue with ▼ to view parameter mnemonics.
- Push ▲ or ▼ to view parameter value. Push ▲ or ▼ to modify parameter value.
- To return to measured value display: use “secret key”.

3. Configuration

Display secret key

Configuration example
8646:
1st digit (6): full scale (absolute) high latching alarm (AL 1).
2nd digit (6): full scale (absolute) high latching alarm (AL 2).
3rd digit (4): type J thermocouple input.
4th digit (6): display units in °F, remote alarm acknowledgement for both alarms, and power fail alarm disabled.

4. Operation

Basic operation
Open list procedures:
- Measured value is displayed when unit is unattended.
- Depress ▼ once to view display units.
- Depress ▼ again to view AL 1 (roc1). Push ▲ or ▼ to view alarm 1 setpoint.
- Depress ▼ again to view AL 2 (roc2). Push ▲ or ▼ to view alarm 2 setpoint.
- To acknowledge (or reset) deviation alarms (flashing red AL 1 or AL 2 lamp): use ▼ until AL 1 (AL 2) appears. Hold ▲ or ▼ for 5 seconds until CLR appears, then press the button again.

Protected list procedures:
- To enter protected list: use ▼ until units display (°F, °C or Lin), then “secret key”. Continue with ▼ to view parameter mnemonics.
- Push ▲ or ▼ to view parameter value. Push ▲ or ▼ to modify parameter value.
- To return to measured value display: use “secret key”.

NOTE: Parameters not pertinent to the unit configuration do not appear in the scroll list.

ALARM OPERATION
Temperature and process alarms:
If the measured value enters an alarm condition (defined by the configuration and code and parameter values), then the appropriate red lamp, AL 1 or AL 2, lights and the corresponding relay de-energizes. The alarm operation is configurable as latching or non-latching.

NOTE: Deviation alarm setpoints (d-1 and d-2) are in reference to the alarm setpoints (AL 1 and AL 2).

Examples: deviation low alarm setpoint = AL 2 - d-2, deviation high alarm setpoint = AL 1 + d-1.

Rate-of-change alarms (configuration codes "0" or "F")
Configured alarm channels go into the alarm condition if the rate of change of the measured value exceeds the alarm setpoint. This applies for both positive and negative changes of the measured value. Modifications to the setpoint take effect after the pushbutton-tones extinguish.

LATCHING ALARMS:

<table>
<thead>
<tr>
<th>Alarm condition</th>
<th>Active</th>
<th>Cleared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before resetting (unacknowledged)</td>
<td>lamp flashing relay de-energized</td>
<td>lamp flashing relay de-energized</td>
</tr>
<tr>
<td>After resetting (acknowledged)</td>
<td>lamp steady ON relay de-energized</td>
<td>lamp OFF relay energized</td>
</tr>
</tbody>
</table>

NON-LATCHING ALARMS:

<table>
<thead>
<tr>
<th>Alarm condition</th>
<th>Active</th>
<th>Cleared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before resetting (unacknowledged)</td>
<td>lamp flashing relay de-energized</td>
<td>lamp OFF relay energized</td>
</tr>
<tr>
<td>After resetting (acknowledged)</td>
<td>lamp steady ON relay de-energized</td>
<td>lamp OFF relay energized</td>
</tr>
</tbody>
</table>
Adjustable parameters

<table>
<thead>
<tr>
<th>Mnemonic</th>
<th>Parameter</th>
<th>Adjustable range</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPEN LIST</td>
<td>Display units</td>
<td>View only</td>
<td>Display units selected in configuration.</td>
</tr>
<tr>
<td>AL 1 (roc1)</td>
<td>Alarm 1 setpoint (rate-of-change setpoint)</td>
<td>View only</td>
<td>To acknowledge latching alarms: Hold UP or DOWN button until &quot;CL&quot; appears, release, then press the button again. Value adjustable in protected list, below.</td>
</tr>
<tr>
<td>AL 2 (roc2)</td>
<td>Alarm 2 setpoint (rate-of-change setpoint)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PROTECTED LIST

<table>
<thead>
<tr>
<th>Conf</th>
<th>Configuration code</th>
<th>View only</th>
<th>Can be changed upon power up only.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Id</td>
<td>Instrument modal ident.</td>
<td>View only: &quot;92&quot;</td>
<td></td>
</tr>
<tr>
<td>dp</td>
<td>Decimal point position for linear inputs a and b</td>
<td>0 to 2 decimal places. Formats: XXXX, XXX.X or XX.XX</td>
<td>Appears for linear inputs only. Affects all parameters displayed in process units.</td>
</tr>
<tr>
<td>AL 1 (roc1)</td>
<td>Alarm 1 setpoint (rate-of-change setpoint)</td>
<td>Full scale alarm setpoints and deviation alarm reference levels: configured input sensor range. Rate of change alarm: 1 to 3000°C/min.; 1 to 5400°F/min.; 1 to 3000, 0.1 to 300, 0 or 0.01 to 30.0 process units/min.</td>
<td>Alarm function selected in configuration. &quot;AL 1&quot; setting irrelevant for sensor break alarms: configuration codes &quot;5&quot; and &quot;D&quot;. To test alarm operation: Hold UP or DOWN button until &quot;EST&quot; appears, release, then press the button again. Alarm state should toggle.</td>
</tr>
<tr>
<td>HY 1</td>
<td>Alarm 1 hysteresis</td>
<td>1°C (or 1°F) to upper range limit Linear inputs: 1 to 9999, 0.1 to 999, 0.01 to 99.99</td>
<td></td>
</tr>
<tr>
<td>-d-1</td>
<td>Deviation alarm offset from &quot;AL1&quot;</td>
<td>1°C (or 1°F) to upper range limit Linear inputs: 1 to 9999, 0.1 to 999, 0.01 to 99.99</td>
<td>Appears for deviation configurations only. For deviation band alarms, &quot;HY1&quot; must be less than &quot;-d-1&quot;.</td>
</tr>
<tr>
<td>AL 2 (roc2)</td>
<td>Alarm 2 setpoint (rate-of-change setpoint)</td>
<td>Same as alarm 1.</td>
<td>Same as alarm 1.</td>
</tr>
<tr>
<td>HY 2</td>
<td>Alarm 2 hysteresis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-d-2</td>
<td>Deviation alarm offset from &quot;AL2&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OFSR</td>
<td>Calibration offset</td>
<td>-50.0 to 50.0°C</td>
<td>Appears for temperature inputs only.</td>
</tr>
<tr>
<td>LinE</td>
<td>Line frequency</td>
<td>50 Hertz: &quot;50&quot;, 60 Hertz: &quot;60&quot;</td>
<td>Set to line frequency upon installation.</td>
</tr>
</tbody>
</table>

Display messages

<table>
<thead>
<tr>
<th>Message</th>
<th>Display condition</th>
<th>User action/comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>INPUT STATUS MESSAGES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SnSr FAIL</td>
<td>Sensor fail, input open or reversed; measured value outside of configured range.</td>
<td>Verify input sensor and connections. Message disappears when input signal is re-established.</td>
</tr>
<tr>
<td>FAIL</td>
<td>Display overrange or out of specified accuracy range.</td>
<td>Unit should not be used in this range.</td>
</tr>
</tbody>
</table>

SELF DIAGNOSTIC MESSAGES

| iEST 1111 | Internal self test upon power up. | Replace unit if all four "1"s do not light up or fails to go on to "8888" display. Do not touch front panel during self test. |
| 8888 | Display test after above self test. Lasts for approximately 3 seconds. | Cycle power. Verify and correct all parameter and configuration values. If display persists, replace unit. |
| EE FAIL | Memory corruption. | |
| Fail | Unit failure. | Replace unit. |
LINEAR INPUT SETUP

Electrical connections
For all inputs use a shielded twisted pair.
- Millivolts inputs (-10 to 70mV)
- Connect signal leads directly to input terminals 9 (●) and 10 (●).
- 0-20mA and 4-20mA inputs.
  Connect 3.01Ω across input terminals 9 (●) and 10 (●).
- Higher voltage inputs. Voltage divider network is required (resistors supplied by user). Refer to table for suggested values. Resistor specifications: 1%, 0.125W minimum, ±100ppm metal or metal oxide film.

CAUTION: Use of the shunt or voltage divider inhibits operation of the sensor break detection feature.

9

3.01Ω

10

0-20mA and 4-20mA input

Scaling procedure
There are 2 methods for entering and scaling linear inputs:
- Linear a: 2-point scaling (configuration code “C”).
- Linear b: point and span scaling (configuration code “D”).

Linear a and Linear b
1. Set display decimal point position parameter, DP, to desired value.
2. If reading the input signal directly from the source, connect source (from signal generator or sensor) to input terminals. Apply a signal equal to a known low value for the first setpoint.
3. Scroll through the protected set until In.Lo. Press and hold on ▲ or ▼ until rEd appears, release, then push the button again. [Alternatively, if no input signal is required or the exact value is known, the input value in millivolts can be set in with ▲ or ▼.]
4. Scroll to dSLo. Then set in the corresponding display value with ▲ or ▼.
5. Again, if reading the input signal directly from the source, apply a signal equal to a known high value for the second setpoint.
6. Scroll through the protected set until In.Hi. Press on ▲ or ▼ until rEd appears, release, then push the button again. [Alternatively, if no input signal is required or the exact value is known, the input value in millivolts can be set in with ▲ or ▼.]
7. Access dshi. Then set in the corresponding display value with ▲ or ▼.
8. Access In.Sn. With ▲ or ▼ set in the input signal span in millivolts.

LINEAR INPUT SCALING

(Replaces “OFSh” parameter in previous list)

<table>
<thead>
<tr>
<th>In.Lo</th>
<th>Input for low setpoint</th>
<th>-9.99 to 70.00mV input signal range</th>
<th>Both linear a and b inputs. To read input signal value from rear terminals: Hold Up or Down until “rEd” appears, release, then press the button again.</th>
</tr>
</thead>
<tbody>
<tr>
<td>dSLo</td>
<td>Display value for low setpoint</td>
<td>-999 to 999, -99.9 to 99.9, or -9.99 to 9.99 process units</td>
<td>Both linear a and b inputs.</td>
</tr>
<tr>
<td>In.Hi</td>
<td>Input for high setpoint</td>
<td>-9.99 to 70.00mV input signal range</td>
<td>Linear a inputs only. To read input signal value from rear terminals: See procedure for “In.Lo.” above.</td>
</tr>
<tr>
<td>dSHI</td>
<td>Display value for high setpoint</td>
<td>-999 to 999, -99.9 to 99.9, or -9.99 to 9.99 process units</td>
<td>Linear a inputs only.</td>
</tr>
<tr>
<td>In.Sn</td>
<td>Input signal span</td>
<td>0.00 to 70.00mV</td>
<td>Linear b inputs only.</td>
</tr>
<tr>
<td>dSSn</td>
<td>Display span</td>
<td>-999 to 999, -99.9 to 99.9, or -9.99 to 9.99 process units</td>
<td>Linear b inputs only.</td>
</tr>
</tbody>
</table>

CAUTION!
Before installing, operating or servicing this unit supplied by Newport Electronics, please read the following:

INSTRUCTION FOR SAFE USE OF NEWPORT ELECTRONICS EQUIPMENT
(Note: These instructions represent good engineering principles and are applicable to all control equipment of the same type, whether from Newport Electronics or any other supplier.)

ENCLOSURE OF LIVE PARTS
This unit should be installed inside a suitable grounded metal enclosure to prevent live parts being accessible to human hands and metal tools. It is recommended that rear terminal covers (available as an option) be fitted.

WIRING
It is important to connect the unit correctly in accordance with the installation data on this sheet. Wiring should conform to appropriate standards of good practice and local codes and regulations. Conductors should be commensurate with voltage and current ratings of the units.

OUT-OF-LIMITS ALARMS
In applications where excessive deviation of a controlled parameter due to equipment failure could cause damage to machinery or materials, or injury to personnel, it is strongly recommended that an additional separate unit with its own input sensor be used to give alarm indication or to shut down the process or both, as may be appropriate. (Note: The alarm function built into controllers may not give sufficient protection in these circumstances). When the controller alarm function or separate alarm units are used they should be checked for correct operation at regular intervals.

CONFIGURATION
Most instrument functions are user selectable from the front panel. It is the user's responsibility to verify that the instrument configuration is correct. Personal injury, property loss and equipment damage could result from an improperly configured instrument.

GROUNDING
This instrument has internal circuits which are isolated or “floating.” This is necessary to prevent the occurrence of a “ground loop” in signal circuits. To avoid possible shock hazards in the event of an internal fault causing breakdown of insulation, it is recommended that all equipment connected to this unit be enclosed in a grounded metal enclosure. Sheaths of thermocouples (or other sensors) should be properly grounded by a separate conductor (instead of being dependent on grounding via the machine framework).

ESD PRECAUTIONS
This instrument contains static sensitive components. Care should be taken to avoid electrostatic discharge (ESD) and thus reduce the risk of damage to the instrument when removed from its case. Any manipulation of an unsheathed instrument should be performed on a conductive surface with the personnel in contact with the surface by means of a grounded, metal or conductive plastic wrist strap with a 1MΩ series resistor.

SUPPLY ISOLATORS
Every electrical system should be provided with means for isolating the system from the AC supply to allow safe working during repair and maintenance. SCRs and triacs are not adequate means of isolating the supply, and should always be backed by a suitable mechanical disconnect switch.

HAZARDOUS ATMOSPHERES
This unit is not suitable for use in hazardous atmospheres. No Newport Electronics products should be connected to a circuit which passes into or through a hazardous area unless appropriate precautions are taken (even though the instrument itself may be located in a safe area). Such an installation should conform to the requirements of the relevant Authority. (In the USA: Factory Mutual Research Corporation and Underwriters' Laboratories, Inc.)

PROCEDURE IN THE EVENT OF TROUBLE
Before beginning any investigation of a fault, the electrical supplies to all equipment concerned should be switched off and isolated. Units suspected of being faulty should be disconnected and removed to a properly equipped workshop for testing. There are no user- serviceable parts inside this unit.

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