Operator Pushbuttons and Indicators

**Lower Display**
(3 Orange 7-Segment LEDs)
For setpoint value. During configuration, shows code of the selected parameter.

**Upper Display**
(3 Green 7-Segment LEDs)
For process temperature. During configuration, shows the

<table>
<thead>
<tr>
<th>LED</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAIN</td>
<td>Main Control Output is on</td>
</tr>
<tr>
<td>AL1/COOL</td>
<td>Cooling Output is on or Alarm 1 is on</td>
</tr>
<tr>
<td>AL2</td>
<td>Alarm 2 is on</td>
</tr>
<tr>
<td>SMRT</td>
<td>SMART tuning is active</td>
</tr>
</tbody>
</table>

**Indicators Red LEDs**
- **MAIN**
- **AL1/COOL**
- **AL2**
- **SMRT**

**NEMA 4X Splashproof**
Front Faceplate

**ISO 9001 Certified**
Quality Construction and Reliability
Manufactured with SMT and verified with long burn-in times and temperature cycling, the 8003 is guaranteed for reliability and long, maintenance-free service.

**Programming Security Levels**
Access to programmed parameters is protected by 4 security levels:
- **Level 1** Setpoint and SMART self-tuning
- **Level 2** All control parameters and alarm setpoint with optional user defined security code
- **Level 3** Main configuration level
- **Level 4** Special functions configuration

**Operator Parameters**
Push the **FUNC** pushbutton. The lower display shows the cue, the upper display shows the value of the selected parameter.

<table>
<thead>
<tr>
<th>Cue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>Control Setpoint, range from &quot;rL&quot; to &quot;rH&quot;.</td>
</tr>
<tr>
<td>nnn</td>
<td>Software key for parameter protection set in Conf mode P18.</td>
</tr>
<tr>
<td>A1</td>
<td>Alarm 1 Setpoint, range from Conf mode P2 to P3.</td>
</tr>
<tr>
<td>A2</td>
<td>Alarm 2 Setpoint, range from Conf mode P2 to P3.</td>
</tr>
<tr>
<td>H1</td>
<td>Alarm 1 hysteresis (deadband) 0.1 to 10.0% of alarm span.</td>
</tr>
<tr>
<td>H2</td>
<td>Alarm 2 hysteresis (deadband) 0.1 to 10.0% of alarm span.</td>
</tr>
<tr>
<td>Pb</td>
<td>Proportional Band, range from 1.0 to 99.9% of span for heating output, 1.5 to 99.9% of span for heating/cooling output. If Pb = 0, ON/OFF control is enabled and ti, td, C, C2, rC, OLP, OLH and tOL are not displayed.</td>
</tr>
<tr>
<td>HS</td>
<td>Hysteresis (deadband) for ON/OFF control (active if Pb = 0), range 0.1 to 10.0% of span.</td>
</tr>
<tr>
<td>ti</td>
<td>Integral time (automatic reset), range 1 minute and 20 seconds to 20 minutes and 00 seconds, or if blank integral is disabled.</td>
</tr>
<tr>
<td>td</td>
<td>Derivative (rate), range 1 second to 9 minutes and 59 seconds. If 0, derivative is disabled.</td>
</tr>
<tr>
<td>LC</td>
<td>Heating cycle time, range 1 to 200 seconds (30 seconds or greater recommended for relay outputs).</td>
</tr>
<tr>
<td>C2</td>
<td>Cycle Time for Output 2 (heat/cool control selected), range 1 to 200 seconds (30 seconds or greater recommended for relay outputs).</td>
</tr>
<tr>
<td>rC</td>
<td>Relative cooling gain (for heat/cool) control range 0.20 to 1.00.</td>
</tr>
<tr>
<td>OLP</td>
<td>Overlap/Deadzone (for heat/cool). Positive value is amount of overlap; negative value is separation between heat and cool Pbs, range -20 to 50% of Pb.</td>
</tr>
<tr>
<td>OLH</td>
<td>Output power max. value, range 0 to 100% heating, -100 to 100% heat/cool, limits power on startup per tOL settings or continuously (tOL = blank).</td>
</tr>
<tr>
<td>rL</td>
<td>SP minimum value (low limit)</td>
</tr>
<tr>
<td>rH</td>
<td>SP maximum value (high limit)</td>
</tr>
<tr>
<td>rP</td>
<td>Ramp on setpoint changes, range 1 to 100 degrees/minute or blank (step change).</td>
</tr>
<tr>
<td>OLH</td>
<td>Output power max. value, range 0 to 100% heating, -100 to 100% heat/cool, limits power on startup per tOL settings or continuously (tOL = blank).</td>
</tr>
<tr>
<td>tOL</td>
<td>Time interval for OLH power output limit, range 1 to 100 minutes or if blank infinite. The timer starts if the actual temperature is less than P15 (threshold value).</td>
</tr>
</tbody>
</table>
**Configuration Codes**

**P1 = Input Type and Standard Range**

<table>
<thead>
<tr>
<th>Range</th>
<th>TC type</th>
<th>J</th>
<th>K</th>
<th>N</th>
<th>RTD type 100</th>
<th>RTD type 100</th>
<th>TC type</th>
<th>TC type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L</td>
<td>J</td>
<td>J</td>
<td>J</td>
<td>-800 / 800 °C</td>
<td>-800 / 800 °C</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>-800 / 800 °C</td>
<td>-800 / 800 °C</td>
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<td>-800 / 800 °C</td>
<td>-800 / 800 °C</td>
<td>-800 / 800 °C</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
</tr>
</tbody>
</table>

**P2 = Initial Scale Value**

Not present when P1 = 5

The initial and full scale values are used by the PID algorithm to calculate the input span.

**P3 = Full Scale Value**

Not present when P1 = 5

The initial and full scale values are used by the PID algorithm to calculate the input span.

**P4 = Output Configuration**

H = Heating
HC = Heating / cooling

**P5 = Heating Output Type**

eL = Relay
SSr = SSR

**P6 = Cooling Element**

Available only when P4 = HC
Afr = Air
OIL = Oil
H2O = Water

**P7 = Alarm 1 Type**

Available only when P4 = H
0 = None
1 = Process alarm (absolute)
2 = Band alarm (+ and - deviation)
3 = Deviation alarm

**P8 = Alarm 1 Operation**

Available only when P7 is different from 0
H = High Alarm (outside if band alarm)
L = Low Alarm (inside if band alarm)

**P9 = Alarm 1 Inhibit**

Available only when P7 is different from 0.
OFF = inhibit disabled
ON = inhibit enabled

**P10 = Alarm 2 Type**

0 = Not provided
2 = Band alarm
1 = Process alarm
3 = Deviation alarm

**P11 = Alarm 2 Operation**

Available only when P10 is different from 0.
H = High Alarm
L = Low Alarm

**P12 = Alarm 2 Inhibit**

Available only when P10 is different from 0.
OFF = Inhibit disabled
ON = Inhibit enabled

**P13 = Type of OFFSET Applied to the Measured Value**

When P13 = 0, P14 is constant OFFSET (P14) all over the range.
When P13 is different from 0, P14 shows the application point of the offset value set by P14 parameter.

**P14 = OFFSET Value**

When P13 = 0, P14 is programmable, in engineering units, from -20 % to +20 % of the input range.
When P13 is different from 0, P14 is programmable from -20 % to +20 % of P13 value.

**P15 = Threshold of the “Soft Start” Function**

Enter the threshold value, in °F or °C, for the automatic start of the “Soft Start” function (output power limit). The range of this setting is determined by the range of the sensor selected in P1 (i.e., if type J T/C °F is selected in P1, range is 0-999).

If the unit powers-up below the threshold value, the “Soft Start” function is enabled and limits the power output to “OLH” for “tOL” minutes. “OLH” and “tOL” are setup in the Operator Mode.

**P16 = Not used**

**P17 = Not used**

**P18 = User Defined Security Code**

0 = Security lock disabled (all Operator Mode parameters may be adjusted)
1 = Security lock enabled (only setpoints may be adjusted)

From 2 to 499 = SP parameter may be modified via “nnn,” other Operator Mode parameters may be accessed.

From 500 to 999 = SP, A1 and A2 parameters may be modified via “nnn,” other Operator Mode parameters may be accessed.

**P19 = Main Output Action, Reverse or Direct**

ON = Inhibit enabled
OFF = Inhibit disabled

**P20 = Not Used**

**P21 = Alarm 1 Relay Action**

**P22 = Alarm 2 Relay Action**

**P23 = Automatic Adjustment of “Relative Cooling Gain”**

**P24 = Output Maximum Rate of Change**

**P25 = Protected Parameter Viewing**

**P26 = SMART Pushbutton**

Enabled/Disabled

**P27 = Proportional Band Maximum Limit is Adjustable**

**P28 = Proportional Band Minimum Limit is Adjustable**

**P29 = Proportional Band Minimum Value is Adjustable**

**SMART Function**

SMART automatically determines the best PID control parameters for your application.

To enable the SMART function, push the SMART pushbutton. The SMRT LED will light or flash according to the algorithm automatically selected.

When the SMART function is enabled, it is possible to display, but not to modify, the control parameters (PB, TI, TD and rC).

When the traditional PID control is desired, push the SMART pushbutton again. The instrument maintains the last set of SMART PID control parameters and enables parameter modification.

Notes:

1. When ON/OFF control is programmed (PB = 0), the SMART function is disabled.
2. The SMART enabling/disabling is protected by security code.

**End of Configuration**

- Push the FUNC pushbutton. The instrument will return to the beginning of the configuration procedure.