1. IMPORTANT SAFEGUARDS

**WARNING**

**ELECTRIC SHOCK HAZARD:** Read and understand all instructions before installing, servicing or operating this controller. Failure to do so could result in equipment or property damage as well as personal injury and even death.

**CAUTION**

Installation should be only performed by technically competent personnel. It is the responsibility of the installing engineer to ensure that the configuration is safe. Local regulations regarding electrical installation & safety must be observed - e.g. US National Electrical Code (NEC) and/or Canadian Electrical Code. Impairment of protection will occur if the product is used in a manner not specified by the manufacturer.

**WARNING**

**HIGH VOLTAGE** is used in the operation of this equipment. DEATH ON CONTACT may result if personnel fail to observe safety precautions. Learn the areas containing high-voltage connections when installing or operating this equipment.

**WARNING**

Be careful not to contact high-voltage connections when installing or operating this equipment. Before working inside the equipment, turn power off and ground all points of high voltage potential before touching.

**WARNING**

**ELECTRIC SHOCK HAZARD.** Any installation involving control equipment must be performed by a qualified person and must be effectively grounded in accordance with the National Electrical Code to eliminate shock hazard.

2. INSTALLATION

Installation Guidance

- Standards compliance shall not be impaired when fitted into the final installation.
- Designed to offer a minimum of Basic Insulation only.
- Ensure that supplementary insulation suitable for Installation Category II is achieved when fully installed.
- To avoid possible hazards, accessible conductive parts of the final installation should be protectively earthed in accordance with EN61010 for Class 1 Equipment.
- Output wiring should be within a Protectively Earthed cabinet.
- Do not to position the equipment so that it is difficult to operate the disconnecting device.

Panel-Mounting

The mounting panel must be rigid, and may be up to 6.0mm (0.25inch) thick. Cutout sizes are:
1/16: Width = 45mm, Height = 45mm, 1/8: Width = 45mm, Height = 92mm

For multiple instruments mounted side-by-side, cut-out width W is 48n-4mm.

**CAUTION**

Make sure the sensor sheath is bonded to protective earth or not be accessible.

**CAUTION**

High parts should not be accessible without the use of a tool.

**CAUTION**

Sensor sheaths should be bonded to protective earth or not be accessible.

Output wiring should be within a Protectively Earthed cabinet.

To avoid possible hazards, accessible conductive parts of the final installation must be performed by a qualified person and must be effectively grounded in accordance with the National Electrical Code to eliminate shock hazard.

3. REAR TERMINAL WIRING

This diagram shows all possible option combinations. Check the product configuration before wiring.

**CAUTION**

For an effective IP65 seal against dust and moisture, ensure gasket is well compressed against the panel, with the 4 tongues located in the same ratchet slot.

4. FRONT PANEL

Display and Indication

-外壳应连接在接地装置上，以消除静电影响。

5. MODE AND MENU STRUCTURE

There are 3 main modes (or menus) on the controller – User Mode, Setup Mode and Advanced Configuration Mode.

- **User Mode** – the live screen used for normal operation. The process variable can always be seen in this mode.
- **Setup Mode** – allows access to the most often used parameters.
- **Advanced Configuration Mode** – access all parameters via sub-menus.

To navigate to Setup or Advanced Configuration from User Mode:

Press and hold **HOLD** and press **ADVANCED**, then press **ADVANCED** and **MODE** for Advanced Configuration Mode.

Returning to User Mode from other modes:

After 120 seconds without key activity the unit returns automatically to the 1st User mode screen – Or - Press and hold **HOLD** and press **ADVANCED** to move back up one level.

Advanced Configuration Mode

The Advanced Configuration Menu provides access to all of the features available in these controllers. Here you will find the following sub-menus: User (User), Input (Input), Calibration (Cal), Output (Outlet), Control (Control), Setpoint (Setpoint), Alarm (Alarm), Communications (Comm), Display (Display) and Product Information (Product).

Please refer to the Full Installation & Operation Manual for these additional sub-menus and their settings.

6. ACCESSORIES

Separate lock codes can be set for the Setup Mode and for the Advanced Configuration Mode (Ad).

- **SLoc** Setup Mode lock code – default 10.
- **RLoc** Advanced Configuration Mode lock code – default 20.
6. DEFAULT SETTINGS

Two Default Settings profiles exist for the 20 Series controllers, which is contingent upon the Output 1 Selection: SSR Drive or Relay. Many of these settings are found in Section 7 - Setup Mode. Please see the table below for the default settings for each profile type:

<table>
<thead>
<tr>
<th>Output 1:</th>
<th>SSR Relay</th>
<th>Output 1:</th>
<th>SSR Relay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Type</td>
<td>J / T / C</td>
<td>Input Type</td>
<td>F</td>
</tr>
<tr>
<td>Resolution (Decimal Places)</td>
<td>No Decimal</td>
<td>Heat Proportional Band</td>
<td>25°F</td>
</tr>
<tr>
<td>Input Scale, Upper Limit</td>
<td>1000</td>
<td>Heat Cycle Time</td>
<td>1 sec</td>
</tr>
<tr>
<td>Input Scale, Lower Limit</td>
<td>0</td>
<td>Heat Power Limit</td>
<td>100%</td>
</tr>
<tr>
<td>Output 1 Use</td>
<td>Heat Output</td>
<td>Auto Tune</td>
<td>Off</td>
</tr>
<tr>
<td>Output 2 Use</td>
<td>Alarm 1 Manual Control</td>
<td>Off</td>
<td></td>
</tr>
<tr>
<td>Output 3 Use (if present)</td>
<td>Alarm 2 Setpoint Upper Limit</td>
<td>100°F</td>
<td></td>
</tr>
<tr>
<td>Alarm 1 Value</td>
<td>Off</td>
<td>Setpoint Lower Limit</td>
<td>0°F</td>
</tr>
<tr>
<td>Alarm 2 Value</td>
<td>Off</td>
<td>Setpoint Lock Code</td>
<td>0</td>
</tr>
</tbody>
</table>

Default Settings Note: The above profiles were established to provide the most efficient settings for those users with Temperature applications. If one was to execute a “Reset to Defaults” action, as found in the Display (p 41), then the above settings would be replaced with the original factory parameter values. In this case, please refer to the full manual for procedures to complete the programming.

7. SETUP MODE

The Setup Menu contains commonly used parameter settings. To edit settings found in the Setup Menu (below), such as Setpoint, one must enter the Setup Menu Table.

From User Mode: Press and hold down * and press A for Setup Mode

R. Loc Advanced Configuration Mode lock code - default 20.

Once in the Setup Menu, press ▲ or ▼ keys to navigate between parameters. To edit a parameter, press *. The Parameter name (lower display) flashes when the parameter above can be edited. Press ▲ or ▼ to change the parameter value (upper display). To confirm the change, press * within 60 seconds otherwise the change is rejected.

To change a setting not found in the Setup Menu Table, navigate to the Setup Mode Table, then the above settings would be replaced with the original factory parameter values. In this case, please refer to the full manual for procedures to complete the programming.

8. MESSAGES & ERROR CODES

Some messages provide useful information about the process, others indicate error, or problem with the process variable signal or its wiring.

<table>
<thead>
<tr>
<th>Screen Name</th>
<th>Lower Display</th>
<th>Upper Display</th>
<th>Adjustment Range &amp; Description</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Units</td>
<td>°F</td>
<td>°C</td>
<td>Temperature displayed as °F.</td>
<td>°C</td>
</tr>
<tr>
<td>Input Scale, Upper Limit</td>
<td>Sc.u</td>
<td>Sc.u</td>
<td>Scale input Upper limit +100 display units to range maximum. (Only visible in Setup Mode when a DC linear type is selected.)</td>
<td>0000</td>
</tr>
<tr>
<td>Input Scale, Lower Limit</td>
<td>Sc.l</td>
<td>Sc.l</td>
<td>Range minimum to Scale Input Upper Limit -100 display units. (Only visible in Setup Mode when a DC linear type is selected.)</td>
<td>0000</td>
</tr>
<tr>
<td>Output 1 Usage</td>
<td>Out 1</td>
<td>Out 1</td>
<td>Heat Power</td>
<td>H.T.</td>
</tr>
<tr>
<td>Output 2 Usage</td>
<td>Out 2</td>
<td>Out 2</td>
<td>Cool Power</td>
<td>C.P.</td>
</tr>
<tr>
<td>Output 3 Usage</td>
<td>Out 3</td>
<td>Out 3</td>
<td>Alarm 1</td>
<td>A.1</td>
</tr>
<tr>
<td>Alarm 1 Adjust</td>
<td>AL1</td>
<td>AL1</td>
<td>Range minimum to range maximum</td>
<td>Off</td>
</tr>
<tr>
<td>Alarm 2 Adjust</td>
<td>AL2</td>
<td>AL2</td>
<td>Range minimum to range maximum</td>
<td>Off</td>
</tr>
<tr>
<td>Setpoint Adjust</td>
<td>SP</td>
<td>SP</td>
<td>Target Setpoint adjustable between Setpoint upper and lower limits</td>
<td>0</td>
</tr>
<tr>
<td>Automatic Tuning Start/Stop</td>
<td>Tun</td>
<td>Tun</td>
<td>Use current PID control terms or tuning</td>
<td>OFF</td>
</tr>
<tr>
<td>Setpoint Ramp</td>
<td>SRP</td>
<td>Normal</td>
<td>Setpoint ramp is active (with or without a sensor break).</td>
<td></td>
</tr>
<tr>
<td>Control Output</td>
<td>Off</td>
<td>Off</td>
<td>Control output is off.</td>
<td></td>
</tr>
<tr>
<td>Control Delay</td>
<td>Off</td>
<td>Off</td>
<td>Control output is delayed by Delayed Start Time</td>
<td></td>
</tr>
<tr>
<td>Automatic Tuning</td>
<td>TunE</td>
<td>Normal</td>
<td>Tuning is active (altaloudwithsetpoint).</td>
<td></td>
</tr>
</tbody>
</table>

9. SPECIFICATIONS

UNIVERSAL INPUT

Thermocouple Calibration: ±0.25% of full range, ±1LSBD (±1°C for Thermocouple CJC). BS4937, NSB125 & IEC684.

PT100 Calibration: ±0.25% of full range, ±1LSBD. BS1904 & DIN43760 (0.0035°C/Ω).

DC Calibration: ±0.2% of full range, ±1LSL.

Sampling Rate: 4 per second.

Impedance: >10MΩ resistive, except DC mA (50) and V (476kΩ).

Sensor Break Detection: Thermocouple, RTD, 4 to 20mA, 2 to 10V and 1 to 5V ranges only. Control outputs turn off.

Isolation: From all outputs (except SSR driver) by at least 1000V isolation. Universal input must not be connected to operator accessible circuits if relay outputs are connected to a hazardous voltage source. Supplementary insulation or input grounding would then be required. Isolated from Mains Power input by basic isolation.

RELAYS (OPTIONAL)

Drive Capability: SSR drive voltage >10V at 20mA

Series Communications (Optional):

Physical: RS485, at 1200, 2400, 4800, 9600, 19200 or 38400 bps.

Protocols: Modbus RTU.

Basic safety isolation from Universal input and SSR outputs.

BASIC isolation to Mains and Relay Circuits.

Operating Conditions

Usage: For indoor use only, mounted in suitable enclosure

Ambient Temperature: 0°C to 55°C (Operating), -20°C to 85°C (Storage).

Relative Humidity: 20% to 95% non-condensing.

Altitude: <2000m

Supply Voltage and Power: 100 to 240VAC ±10%, 50/60Hz, 7.5VA (for mains powered versions), or 24VAC ±10% or 50/60Hz 7.5VA or 24VDC ±10% ±15% SW (for low voltage versions).

Environmental:

EMI: Complies with EN61326 (Susceptibility and Emissions).

Safety Considerations: Complies with EN61010-1

Front Panel Sealing: IP65 when correctly mounted, Rear of panel to IP20.

Physical:

Front Bezel Size: 1/16 Din = 48 x 48 mm, 1/8 Din = 48 x 96 mm

Depth Below Panel: 67mm with sealing gasket fitted.

Weight: 0.029kg maximum