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While this information is presented in good faith and is believed to be accurate, Burns Engineering cannot guarantee satisfactory results from reliance upon this information.

For complete warranty information, please request a copy of Burns Engineering form #0475143 "Terms and Conditions of Sale"

# Burns Connection Head Models #22, #23 & #24 with Battery Powered LCD Indicator Instruction Manual

## Introduction

### -General

The Burns #22, #23 and #24 connection heads use either the RTD or Thermocouple version of the battery powered process indicator with a 4-digit red LCD display.

The instrument configuration settings are selectable via a simple to use menu system, which is navigated by the use of three push bottom keys located on the rear of the indicator display.

The indicator assembly is sealed into a cap that fits directly onto Burns #22, #23 and #24 connection heads.

### -Receiving

Please inspect the packaging and instrument thoroughly for any signs of transit damage. If the part has been damaged, please notify your supplier immediately.

## Specifications

### -General

- Display: 4 digit, 7.6mm, red LCD
- Decimal Point: Programmable
- Display Capability: -1999 to 9999
- Password protection
- Battery Standard: ANSI AA ER14505: IEC ER6
- Type: 3.6 V Lithium Thionyl Chloride (2.4 A/Hr.)
- Operating Current: 80mA average
- Battery Life: > 2 years
- EMC Emissions: BS EN61326
- RTD Sensor Type: 3-wire Pt100 or Ni120
- Thermocouple Sensor Type: K, T, J, N, R, S, E, F
- Ambient Humidity: 10 to 90% RH

### -RTD At 20°C

- Resolution: 0.1 °C
- Accuracy:  $\pm 0.2^{\circ}\text{C} \pm 0.1\%$  of reading (plus sensor error)
- Lead Effect: 10W per leg insignificant effect
- Measuring Range: -100 to 800°C
- Stability Zero:  $\pm 0.01^{\circ}\text{C}/^{\circ}\text{C}$
- Stability Span: 50 ppm/°C
- Ambient Temperature: -10° to 70°C
- Ambient Storage: -20° to 85°C

### -Thermocouple At 20°C

- Resolution: 0.1 °C
- Accuracy:  $\pm 0.1\%$  of FS  $\pm 0.5^{\circ}\text{C}$  (plus sensor error)
- Measuring Range: Type K: -200 to 1370°C  
Type T: -210 to 400°C  
Type J: -100 to 1200°C  
Type N: -130 to 1300°C  
Type R: -10 to 1760°C  
Type S: -10 to 1760°C  
Type E: -200 to 1000°C  
Type F: -100 to 600°C
- Stability Zero:  $\pm 0.02^{\circ}\text{C}/^{\circ}\text{C}$
- Stability Span: 100 ppm/°C
- Ambient Temperature: -10° to 70°C
- Ambient Storage: -20° to 85°C

### -Mechanical

- Connection: Three way screw terminal block
- Wire Size: 18 - 22 AWG typical
- Dimensions: Diameter 14.5mm, length 50.5mm
- Environmental Rating: IP67
- Approval (Burns#22): FM explosion proof
- Approval (Burns #23): NEMA 4X

- Material (Burns#22): Aluminum, blue polyester powder coating
- Material (Burns #23): Polycarbonate
- Material (Burns #24): Stainless Steel

Figure 2  
Burns Connection Head #22 Dimensions

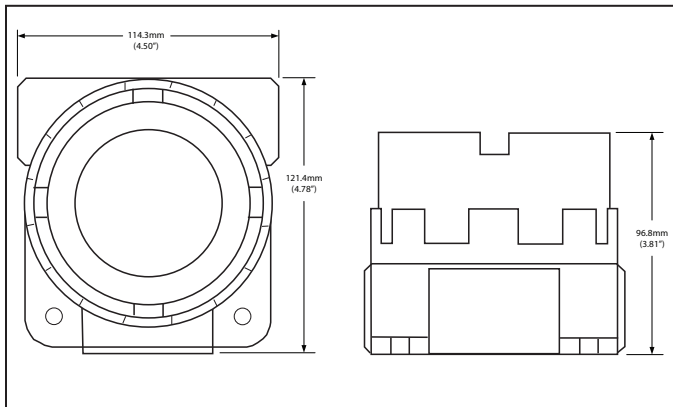


Figure 3  
Burns Connection Head #23  
Dimensions

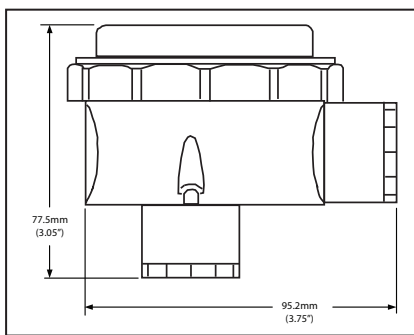


Figure 4  
Burns Connection Head #24  
Dimensions

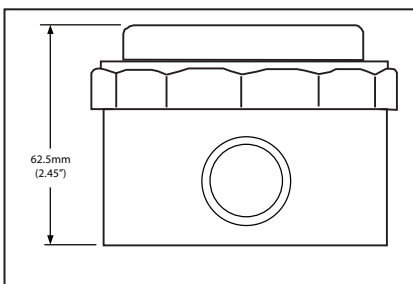
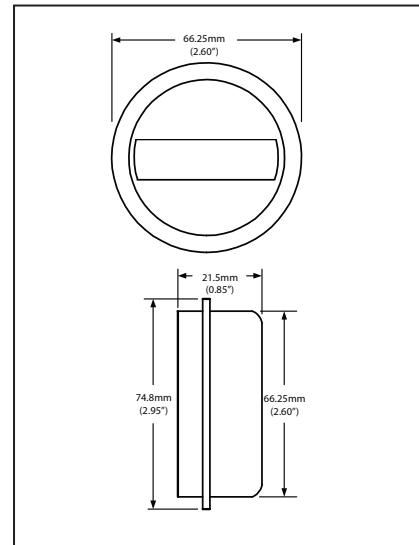


Figure 1  
Indicator Dimensions



## Installation Mechanical -Mounting

The entire indicator assembly is sealed in the cap that fits directly into the Burns #22 Explosion proof, #23 NEMA 4X, and #24 Stainless Steel connection heads. The sensor may be fixed directly to the connection head, or remotely connected using cable and gland. Cable length must be no longer than 65 feet to comply with certifications. All external cabling/sensor entries must maintain IP67 rating.

## -Temperature Environment

The indicator assembly will operate within specifications for ambient temperatures in the range of -10°C to 70°C (14°F to 158°F). It can be stored without damage at temperatures in the range of -20°C to 85°C (-4°F to 185°F).

## -Moist or Corrosive Atmospheres

The Burns Connection Head Model #23 has been designed to resist moisture and corrosive environments. However, during prolonged exposure, corrosion of the screws can occur. Significant corrosion to the screws can increase the contact resistance between the PRT/power supply leads and the terminal block, causing

## Burns Connection Head Models #22, #23 & #24 with Battery Powered LCD Indicator Instruction Manual

erroneous readings and/or complete lack of output. Replacing and/or cleaning the screws will usually remedy the problem

### -Hazardous Locations

The Burns Connection Head Model #22 is FMRC approved as an intrinsically safe device when used with properly selected FMRC approved assemblies.

### Installation Electrical

#### -General Recommendations

Please observe the battery warning. Ensure the instrument is installed with adequate protection against the environment. IP67 rating must be maintained. Avoid installing the equipment close to sources of extreme temperature and electromagnetic interference.

#### -Battery Installation

To install battery, first gain entrance to the battery by unscrewing the connection head cap retaining nut and removing cap from base. To remove old battery, ease out the positive end of the battery from the holder, using a screw driver blade. To fit battery, insert battery negative into the spring contact end of the battery holder BH1, then press battery into place.

The device monitors their batteries. When the battery approaches the end of it's lifetime (over 2 years under normal conditions), the display will toggle the message "LO BAT".

#### -Battery Warning

- NEVER short circuit the battery
- Fire, Explosion and severe burn hazard, DO NOT Recharge, Crush, Disassemble, Heat above 100°C (212°F), Incinerate or expose contents to water.
- Disposal, the battery may be regulated by national and local regulations. Please follow the instructions of the proper regulator.

### -Wiring

The terminal block accepts 18 AWG to 22 AWG wire. See Figure 5 for proper RTD connections and Figure 6 for proper Thermocouple connections. Use correct compensating wire. All external cabling/sensor entries must maintain IP67 rating.

Figure 5  
RTD Connection

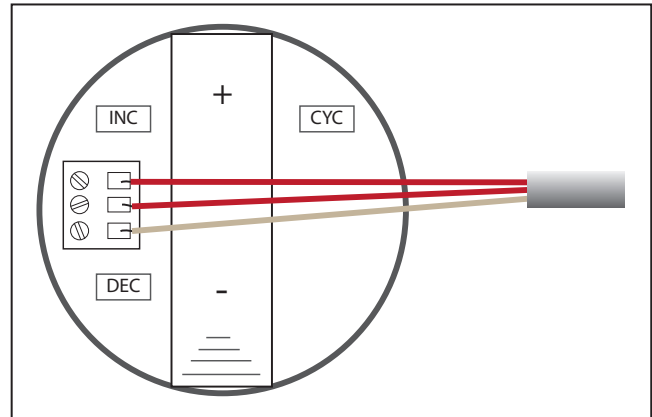
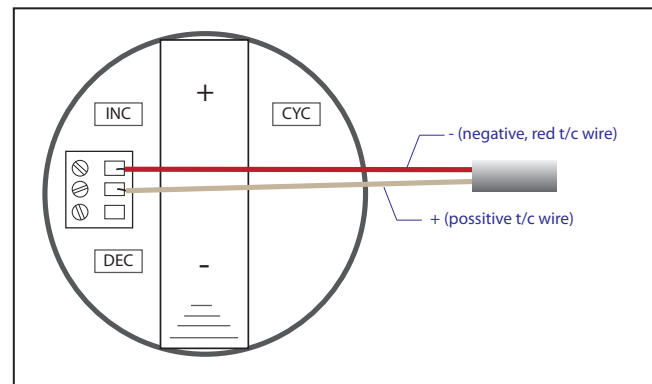


Figure 6  
Thermocouple Connection

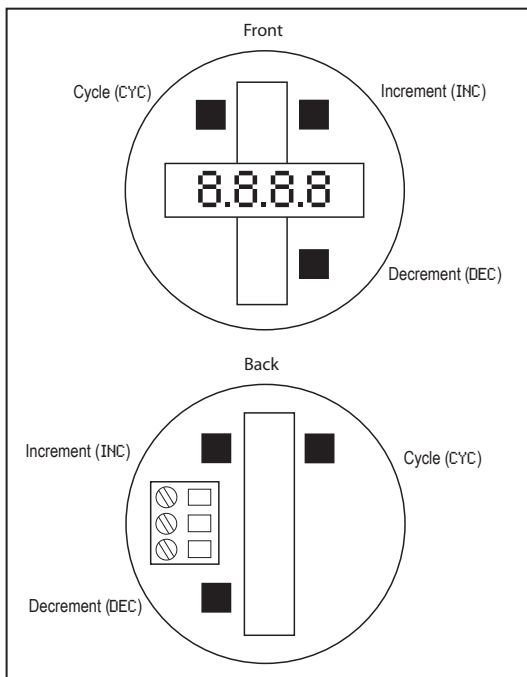


### Configuration Menu

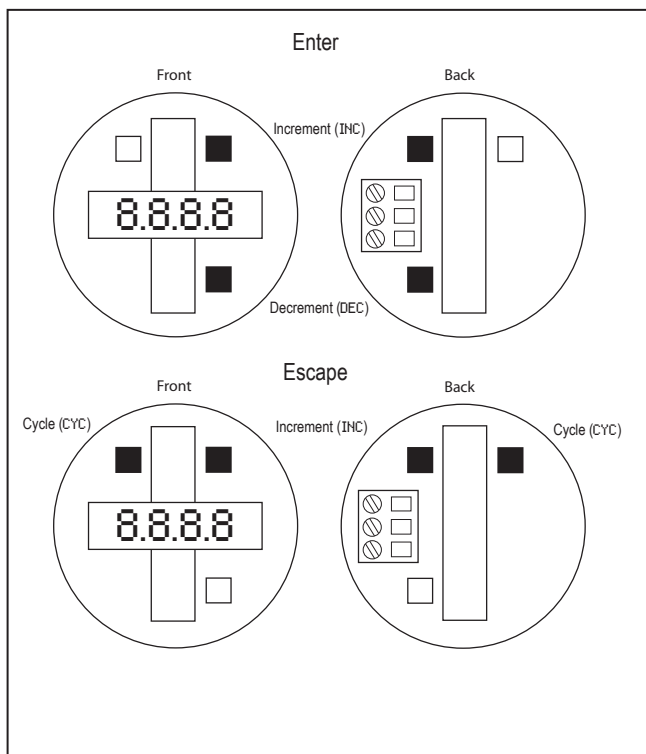
#### -General

There are three buttons, which the operator must press in various combinations in order to configure the device. These buttons are located on the underside of the indicators circuit board. Viewed from the front the three buttons, cycle (CYC), Increment (INC) and Decrement (DEC) are shown in black, figure 7. Pressing two buttons simultaneously causes enter (ENT) or escape (ESC) actions, figure 8. If no buttons are pressed for a minute or more, the device assumes run-time mode. The LCD shows the

**Figure 7  
Switch Location**



**Figure 8  
Enter and Escape Schematic**

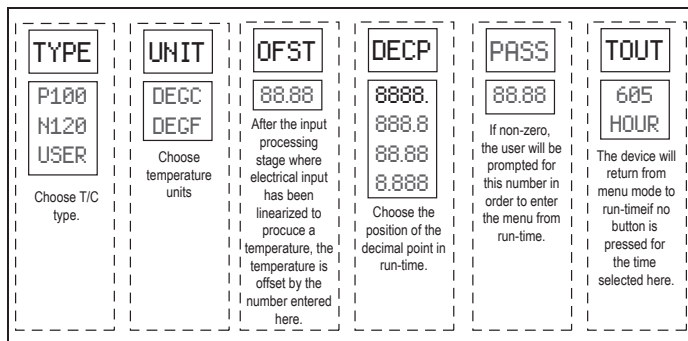


temperature (if the input is in range) or shows - - - - or - - - - to indicate over/under range. In order to access menu configuration mode, the user must press enter (figure 8) followed immediately by cycle (figure 7). In order to exit the menu and return to run-time, a user must press escape (figure 8).

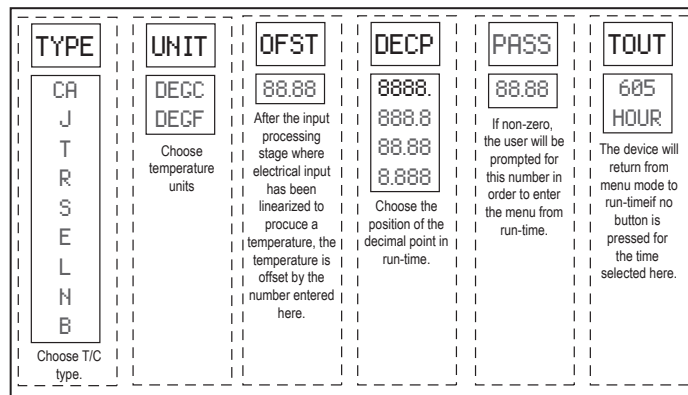
**-Menu**

When cycling around menu, the title (e.g. TYPE, UNIT etc.) is displayed for a second, then the menu entry is displayed ready for editing. See figure 9 below for RTD menu details and Figure 10 for Thermocouple details. Then use INC/DEC to move through the entries in a list, or to edit a real number.

**Figure 9  
RTD Menu Schematic**



**Figure 10  
Thermocouple Menu Schematic**



## **Maintenance**

Apart from configuration this equipment requires no maintenance. Any cleaning of the instrument should be carried out using a mild detergent and soft cloth. No solvents or abrasive cleaner should be used. If re-calibration is required please contact Burns Engineering for assistance (800-328-3871).

## **Repair and Warranty Service**

Repair and warranty service is available directly from Burns Engineering. Note: Failure analysis is an important part of product improvement. If you have a failure even if out of warranty, please contact us. We will do our best to help you. When returning goods, first call toll free 1-800-328-3871 and obtain an RMA number.

Always include a letter of transmittal and the RMA number with the shipment. Providing the following information in the letter will expedite service.

- Type of service and length of time the part has been in service.
- Description of the problem, and circumstances of the failure.
- Name and telephone number of the person who can answer questions about the returned part.
- Complete shipping instructions for return delivery.
- Request for warranty service if appropriate.

For more information please contact us at:

Burns Engineering Inc.  
10201 Bren Road East  
Minnetonka, Minnesota 55343  
1-800-328-3871