



## Installation and Operating Instructions for the Model DT-8300EX

*BATTERY OPERATED DIGITAL TEMPERATURE INDICATOR*



User Manual

**AMETEK**<sup>®</sup>

**ISO 9001:2008**  
CERTIFIED

[www.ametekusg.com](http://www.ametekusg.com)



## Model DT-8300EX

### DESCRIPTION

AMETEK Model DT-8300EX battery operated digital temperature indicator is a compact, rugged and reliable indicating instrument which is self-contained and specifically designed for accurate temperature measurement applications, in areas without power availability. It is an ideal single unit substitute to conventional analog indicators because of its inherent accuracy in process measurement and other superior characteristics such as extremely low power consumption, immunity to shocks, dust, ambient temperatures, humidity and corrosive atmospheres. Its main advantage is its minimal power operation providing several months of uninterrupted indication of the measured temperature.

AMETEK Model DT-8300EX is manufactured using selected high-grade components which guarantee reliability and long operation. It has no moving parts, which greatly enhances its versatility and carries a one (1) year performance guarantee against manufacturing and workmanship defects.

The unit is designed for use in process industries where vibration, inclement weather and corrosive environments prevail. The electronics are enclosed in low copper epoxy coated Aluminum housing; and for more aggressive environments, 316 Stainless Steel housing is optionally available (please contact customer service for more information). Both housings meet the requirements of NEMA 4X. The NEMA 4X rating provides total immunity to corrosive atmospheres, high humidity (including condensation) and dust.

The instrument is micro-controller based and operates on battery power, having provision for two Type AA batteries in series configuration. It is specifically designed to operate on minimal power consumption and provides temperature readings for extensive period on battery power alone. While the micro-controller is continuously sampling the input signal, it refreshes the display at approximately ten-second intervals with the updated internal readings.

The indicator accepts any of the following Temperature Sensors as direct input :

| Sensor Number | Temperature Sensor      | Calibrated Range |                  |
|---------------|-------------------------|------------------|------------------|
|               |                         | °C               | °F               |
| 1             | RTD Pt-100 (three-wire) | -100.0 to 500.0  | - 148.0 to 932.0 |
| 2             | Thermocouple Type J     | -50 to 750       | -58 to 1382      |
| 3             | Thermocouple Type K     | -50 to 1000      | -58 to 1832      |

The instrument displays the actual temperature value calibrated in the desired units, on a linear scale on a 4-Digit seven-segment LCD digital display module.

A Power-On switch is provided to switch off the instrument when not in use, thereby saving battery life. Further, the temperature reading is available in both, degree Celsius and Fahrenheit units. A switch is provided for selecting the desired unit.

#### The principal of operation is briefly as follows:

- The input signal from the selected temperature sensor is passed through a series of amplification and conditioning stages.
- Initially, the signal is conditioned internally and fed to a signal converter and amplifier circuit.
- Then, the transduced signal output is fed into an A/D converter before being finally passed through a Decoder/ Driver digitizing circuit which displays the input signal in the form of decimal digits on a seven-segment display module.



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## **INSTALLATION**

AMETEK Model DT-8300EX is designed to be mounted in the field, either on a 2" pipe or wall/panel. AMETEK carries both types of 316 SST mounting brackets.

All inter-connections to the instrument should be made with strong multi-strand wire of the order of 1.5 sq. mm. The ends of the wires should be properly ferruled and suitable lugs must be used for effective termination. The Cables carrying the Input Temperature sensor signal should be compensating type cable for the specific Sensor only. Care must be taken to properly isolate this Cable from any Power Line cables in the vicinity (even separate router channels) to prevent any induced voltages or electromagnetic "noise" interferences in the input signal readings from disturbances in the Main Power Line. It is recommended that the polarities of the input signal be double-checked for correctness before energizing the instrument. The maximum recommended distance of the Temperature Sensor from the indicating instrument is 15 meters.

## **OPERATION**

Remove the electronics from the outer housing and loosen the two screws on the face plate to access the switches on the back of the electronics.

Upon switching on the Power switch, the digital display will immediately indicate the actual process temperature value in the selected units. A switch on the rear of the instrument allows for switching of the units from ° F to ° C.

The temperature display is factory calibrated for the individual Thermocouples (J or K type) and RTD (Pt 100); and no settings are required to be done by the user. The display will update at intervals of ten seconds. If the Switch for selecting the temperature units is used, the display will update with the selected units after the 10 seconds period.

The Batteries to be used for the instrument are the commonly available type AA (1.5V), in series configuration.

It is strongly recommended that only competent and authorized personnel should attempt any settings, alterations or rectifications in the instrument.



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## CONFIGURATION

All settings and adjustments must be done from the rear side of the electronics unit, after it has been removed from the outer housing by unscrewing the lid and loosening the screws on the face plate.

## CONNECTIONS

- Locate the green terminals on the lower rear section of the unit.
- Connect the RTD (3 wire Pt 100) or the Thermocouple sensor input at these terminals in the correct polarity.
- Minimize the number of junctions between the Thermocouple and the Indicator.

## PROGRAM USING ONLY 4 DIP SWITCHES

- The DIP Switch settings are as follows :



| Pin Number | Function in "Off" Position | Function in "On" Position |
|------------|----------------------------|---------------------------|
| 1          | Power Off                  | Power On                  |
| 2          | RTD Sensor                 | Thermocouple Sensor       |
| 3          | Thermocouple J type        | Thermocouple K type       |
| 4          | Degrees Fahrenheit         | Degrees Centigrade        |

- Switch No. 1 is used to turn the unit ON or OFF. This switch is provided to save battery life when the unit is not in use for an extended period of time.
- Switch No. 2 is a selector switch which allows the user to select between a RTD sensor (Pt 100) input or a Thermocouple input. If an RTD is used, this switch should be in the "OFF" position.
- Switch No. 3 allows selection between a Type J or Type K thermocouple input, when switch no. 2 is in the "ON" position. This switch is not used when RTD sensor (Pt 100) is selected.
- Switch No. 4 is a selector switch which allows the user to display temperature in either degrees C or degrees F. The "OFF" position of this switch will display degrees F.



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### PROGRAM USING FRONT PANEL

Insure that switch 1 is in the "ON" position and switch No. 4 is in the desired position for correct indication of temperature ("ON" = deg C, "OFF" = deg F). The three keys on the front panel are as follows:

**PROG**  
**P**

The PROG or PROGRAM key is the central coordinating key to browse the settings of the instrument. Pressing this key allows the operator to sequentially view, change, and save the parameters.

**INC**  
↑

The INC or Incrementing key allows the operator to select the numeral in the digit being set on an increasing scale. The digit will sequentially display 0, 1, 2, ...9 on each pressing of the INC key.

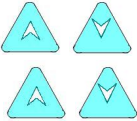

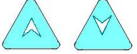

**DEC**  
↓

The DEC or Decrementing key allows the operator to select the numeral in the digit being set on a decreasing scale. The digit will sequentially display 9, 8, 7,...1 on each pressing of the INC key.

### SET-UP

The unit is factory calibrated using a RTD sensor, so the display will be in deg C or deg F (as selected) if an RTD sensor has been connected. If a thermocouple is connected, then the display will be "Err".

The sequence of settings is as follows:

| Key Press   | Display           | Description  |
|---|-------------------|--|
|  |                   | Press both keys simultaneously for at least 10 seconds.  |
|  | SEn / rtd / rtd i | The display alternates between Sen (sensor) and the sensor options. The desired sensor may be selected at this point. To select a particular sensor, the increment or decrement key should be pressed (as required) for one cycle time.  |
|   | rtd               | Alternate display for RTD / RTD.1 option.  |
|   | Err / 000         | After selecting the sensor, say RTD, the PROG key should be pressed.   |
|  |                   | Error correction of the display can be done at this stage. The display will alternate between ErrC and 000. The indicated temperature can be forced up or down on the temperature scale by 20 degrees for any corrections in non-linearity or errors on account of long Cables, Sensor faults etc. |
|  |                   |  |
|   | Err               | This indicates an Error condition. It could mean either a broken sensor, or open sensor or abnormally high temperature, or wrong sensor input.   |



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### **SELECTION SWITCHES ON DIP SWITCH (SEE TABLE 1)**

- Switch the Power Supply switch (Pin no. 1 on DIP Switch), to the ON position.
- Select the desired Temperature Sensor by using Pin no. 2 of the DIP Switch as per the table given below.
- If Thermocouple Sensor is selected on Pin no. 2, then the type of Thermocouple may be selected by Pin no. 3 of the DIP Switch.
- Select the desired temperature units between ° F and ° C by means of Pin no. 4 of the DIP switch.
- The display will update to the selected units after the measurement cycle of approximately ten seconds.
- The indicator will immediately indicate the process temperature on the LCD display.

### **BATTERY REPLACEMENT**

- Two nos. Batteries (type AA, 1.5V).
- The instrument has minimal power requirements. However, when the LOW BATT sign appears on the display, it is time to replace the batteries.
- When LOW BATT is indicated, or if the instrument has been unused or Power OFF condition for an extended period, the batteries must be replaced immediately.

### **USER SETTINGS**

- On the rear card, there is a four-way DIP switch. The settings are as follows:-



| Table 1 - Selection Switches |                            |                           |
|------------------------------|----------------------------|---------------------------|
| Pin Number                   | Function in "Off" Position | Function in "On" Position |
| 1                            | Power Off                  | Power On                  |
| 2                            | RTD Sensor                 | Thermocouple Sensor       |
| 3                            | Thermocouple J type        | Thermocouple K type       |
| 4                            | Degrees Fahrenheit         | Degrees Centigrade        |

### **NOTES:**

- The Model DT-8300EX has a scan Cycle Time of 10 seconds to extend Battery life. This means that the LCD display is updated every ten seconds. Because of this, the keys may appear to respond slowly at times.





# Model DT-8300EX

## SPECIFICATIONS

| Technical Specification           |   |
|-----------------------------------|---|
| <b>Model</b>                      | DT-8300EX   |
| <b>Type</b>                       | Micro-controller based Digital Battery-powered temperature Indicator  |
| <b>Input Signal</b>               | Thermocouple sensor or RTD Pt 100 (3 – wire) sensor.  |
| <b>Thermocouple type</b>          | J (Fe-Ko element)<br>K (Cr-Al element)  |
| <b>Indication</b>                 | 4 digit seven-segment LCD display   |
| <b>Indication Accuracy</b>        | Better than $\pm 0.5$ °C  |
| <b>Display Height</b>             | 12.5 mm (1/2")  |
| <b>Scale Range</b>                | -999 to 9999  |
| <b>Calibrated Scale</b>           | K-type Thermocouple (-50 to 1000 °C)<br>J-type Thermocouple (-50 to 750 °C)<br>RTD Pt-100 (3-wire) (-100 to 500 °C) |
| <b>Over-Range Indication</b>      | Err [indicating "Error"]  |
| <b>Power Supply</b>               | Two batteries, type AA, 3VDC  |
| <b>Switch Selections</b>          | Power (On / Off)<br>Temperature units (°C / °F)\<br>Type of Sensor<br>Type of Thermocouple.                         |
| <b>Cold Junction Compensation</b> | Provided  |
| <b>Response Time</b>              | Typically 75 mS   |
| <b>Display Update Time</b>        | 10 Seconds  |
| <b>Linearization</b>              | Provided for both TC types, eight-point   |
| <b>Minimum Resolution</b>         | 0.1 Degree C/F  |

## CONDITION OF ACCEPTABILITY

This equipment must be powered by a Non-Hazardous live source in accordance with CAN/CSA-C22.2 No. 61010-1-04 (eg. SELV source), or a Class 2 Source.



## Model DT-8300EX

### WARRANTY

AMETEK USG (AMETEK) for the effective period of the warranty set out below, warrants that its standard products will be free from defects in materials and workmanship under normal use and service.

AMETEK's obligation under this warranty shall not arise until Buyer returns the defective product, freight prepaid to AMETEK's facility. Please contact customer service for a RMA#, [usg.sales@ametek.com](mailto:usg.sales@ametek.com) or 215-293-4100.

The only responsibility of AMETEK under this warranty is, at its option and sole discretion, to replace or repair, free of charge any defective component part of such product.

### EFFECTIVE PERIOD OF WARRANTY

**1 year** from date of invoice for new products. For repairs the warranty shall be **1 year** from the date of shipment.

### LIMITATION OF WARRANTY

The warranty set forth herein does not extend to and shall not apply to:

Products which have been repaired or altered by other than AMETEK's personnel, unless Buyer has properly altered or repaired the products in accordance with procedures previously approved in writing by AMETEK.

Products, which have been subject to misuse, neglect, accident, or improper installation or operation.

Products, which have been mechanically damaged.

The warranty and remedies set forth above are in lieu of all other warranties expressed or implied, oral or written, either in fact or by operation of law, statutory or otherwise, including warranties of merchantability and fitness for a particular purpose, which AMETEK specifically disclaims.

AMETEK neither assumes nor recognizes any other liability in connection with the sales, installation or use of its products.

AMETEK shall have no liability for incidental or consequential damages of any kind arising out of the sale, installation or use of its product.

The AMETEK address to which notices, authorizations, and approvals and written communications pertaining to this warranty are to be delivered is:

AMETEK USG  
205 Keith Valley Road  
Horsham, PA 19044  
Tel: 215.293.4100  
Fax: 215.323.9450  
E-mail: [usg.sales@ametek.com](mailto:usg.sales@ametek.com)

Please refer to our website for other locations around the world. [www.ametekusg.com](http://www.ametekusg.com)