

FIELD MOUNTED 2 WIRE TRANSMITTER WITH HART®

8088HT

- High Accuracy
- Two Wires, 4-20mA Output with Direct Digital Communication. (HART® Protocol)
- Build-in Thermocouples, Thermal Resistance and Linearization Algorithm
- Excellent Stability
- High EMI-RFI Immunity
- Configurable by PC or Hand-Held Terminal
- Inputs: Thermocouple, RTD, Ohm and mV
- Input/Output Isolated
- Optional 4 ½ Digit LCD Display
- Explosion Proof Certified
- 3 Year Warranty



Introduction

IME Model 8088HT is a digital, PC/Hand-Held programmable, isolated 2-wire transmitter with HART® protocol. The unit converts 8 types of thermocouples; 5 types of RTDs, confabulated as 2, 3 and 4 wires; potentiometer, resistor and millivolt inputs into process current loop.

Description

IME Model 8088HT Universal Input Transmitters are designed for use in process industries where vibration, inclement weather and corrosive atmospheres prevail. The electronics are enclosed in a low copper epoxy coated Aluminum housing and for more aggressive environments, a SS316 housing is optionally available. The housings meet the requirements of NEMA4X and IP67, and are also certified Explosion Proof by FM/CSA and ATEX(CENELEC)

Exceptional digital accuracy of typical $\pm 0.1^{\circ}\text{C}$ is provided for all the sensors regardless of the calibrated span. Extremely accurate cold-junction temperature measurement provides precise compensation throughout the entire ambient range. The unit also accurately measures and compensates the RTD sensor leads in the 3-wire connection.

The transmitter is fully configurable by connecting to a PC or a Hand-Held. The configuration parameters are stored in a non volatile memory.

Detection of sensor breakage or disconnection of input leads, forces the output to a pre-defined up/down scale value. The unit continuously monitors the sensor and automatically returns to normal operation mode when the sensor is recovered.

In applications where no local indication is required, the tempered glass cover is replaced by a solid cover and no LCD indicator is provided.

Functional Specifications

Sensor

Thermo Sensor Type B, E, J, K, N, R, S, T, Cu50, Cu100, Pt50, Pt100, Pt1000

Basic Accuracy

$\pm 0.1\%$ of F.S

Output Signal

4~20mA with HART® protol (2 wire)

Optional Output

5V, 0.7mA

Isolation

500V AC between input and output

Burnout Protection

Upscale / Downscale Programmable

Supply Voltage

12~45V DC

Operating Temperature

Circuit Board: $-40\sim+85^{\circ}\text{C}$

LCD: $-20\sim+70^{\circ}\text{C}$

Weight

0.9Kg (2Lb) for Aluminum unit and 1.4Kg for SS316 Unit

Material of Construction

Enclosure Blue Epoxy painted Low Copper Aluminum or SS316

O Rings

Buna N

SPECIFICATIONS 1

Thermocouple and Millivolts

Type	Standard	Input Range		Input Range		Minimum Span		Digital Accuracy	Digital/Analog Accuracy ²
		°C		°F		°C	°F	°C	
B Pt30Rh Pt16Rh	IEC584-1 1995	100	~ 1800	212	~ 3272	50	/ 122	+/-0.75	+/-0.1% FS
E NiCr-Con	IEC584-1 1995	-100	~ 1000	-148	~ 1832	50	/ 122	+/-0.2	+/-0.1% FS
J Fe-Con	IEC584-1 1995	-210	~ 1200	-346	~ 2192	50	/ 122	+/-0.25	+/-0.1% FS
K NiCr-Ni	IEC584-1 1995	-200	~ 1370	-328	~ 2498	50	/ 122	+/-0.25	+/-0.1% FS
N NiCrSi-NiSi	IEC584-1 1995	-200	~ 1300	-328	~ 2372	50	/ 122	+/-0.4	+/-0.1% FS
R Pt13Rh-Pt	IEC584-1 1995	0	~ 1750	32	~ 3182	50	/ 122	+/-0.6	+/-0.1% FS
S Pt10Rh-Pt	IEC584-1 1995	0	~ 1760	32	~ 3200	50	/ 122	+/-0.5	+/-0.1% FS
T Cu-Con	IEC584-1 1995	-200	~ 400	-328	~ 752	50	/ 122	+/-0.25	+/-0.1% FS
Resistance Input		0	~ 100Ω			1Ω		+/-0.01Ω	+/-0.1% FS
		0	~ 200Ω			2Ω		+/-0.02Ω	+/-0.1% FS
		0	~ 400Ω			4Ω		+/-0.04Ω	+/-0.1% FS
		0	~ 4000Ω			40Ω		+/-0.4Ω	+/-0.1% FS
Voltage Input		-20	~ 20mV			0.4mV		+/-0.003mV	+/-0.1% FS
		-80	~ 80mV			1.6mV		+/-0.008mV	+/-0.1% FS

Total probable accuracy for T/C measurement equals to: $[C.J.E^2 + DA^2 + (\text{span} \times 2 \times 10^{-4})^2]^{0.5}$

Where C.J.E is the cold-junction error and DA is the digital accuracy value for the specific T/C

Note: For maximum accuracy for T/C input, all the above error components should be accumulated.

$$\alpha = 0.00428 \Omega / \Omega$$

Resistor Temperature Detector (RTD)

Type	Standard	Input Range		Input Range		Minimum Span		Digital Accuracy	Digital/Analog Accuracy ²
		°C		°F		°C	°F	°C	
Pt-50	IEC-751 $\alpha=0.00385\Omega/\Omega$ (ITS-90) 1995	-200	~ 850	-328	~ 1562	10	/ 50	+/-0.1	+/-0.1% FS
Pt-100		-200	~ 850	-328	~ 1562	10	/ 50	+/-0.1	+/-0.1% FS
Pt-1000		-200	~ 850	-328	~ 1562	10	/ 50	+/-0.1	+/-0.1% FS
Cu-50	$\alpha=0.00428\Omega/\Omega$	-50	~ 150	-58	~ 302	10	/ 50	+/-0.1	+/-0.1% FS
Cu-100		-50	~ 150	-58	~ 302	10	/ 50	+/-0.1	+/-0.1% FS
Resistor	Potentiometer	0~2KΩ		0~2KΩ					
Connection Type	2, 3 or 4 Wire								
Mode	Single sensor				Dual-differential				
Sensor Current	<0.3mA								
Sampling Rate	Single sensor; 4, Differential; 2 (S/sec)				Potentiometer; 3S/sec				

Example: Pt-100 sensor input, with a 0~50°C span: The digital accuracy would be +/-0.1°C, the accuracy would be +/-50X0.02/100=+/-0.01°C. Total maximum accuracy= +/-0.11°C.

- Note:
1. The recommended minimum range is 20°C
 2. The general analog accuracy is the sum of digital accuracy plus digital/analog accuracy.
 3. Digital accuracy of thermocouple=digital accuracy+/-0.25°C (additional error of cold terminal temperature compensation.)
 4. Digital accuracy of thermocouple B is +/-2°C between 100°C and 300°C.
 5. Digital accuracy of thermocouple K is +/-0.5°C between -80°C and 0°C.

SPECIFICATIONS 2

Output

Output Signal	4~20mA with HART protocol (two wires)
Optional Output	+5V, 0.7mA
Under Range	Linear to 3.9mA
Over Range	Linear to 21mA
Burnout	<3.9mA or >21mA (User configurable)
Isolation	Isolation (500V AC) between input and output
Output Linearity	For temperature sensors - linear with temp For potentiometer - linear with potentiometer ratio For millivolt input - linear with the measured voltage
Maximum Loop Resistance	According to $R_{max} (\Omega) = (V_{supply}-13)/0.02$
Calibration Accuracy	At 24V supply, at room temperature: 0.05% of span
Damping Factor	1~32s adjustable
Analog Step-Response	200~500ms (Depends on the sensor and the mode of operation)
Setup Time	5 seconds after power on

Supply

Supply Voltage	12~45V DC
Supply Variation Effect	0.05%/VCMR
Polarity Protection	Yes
CMR	

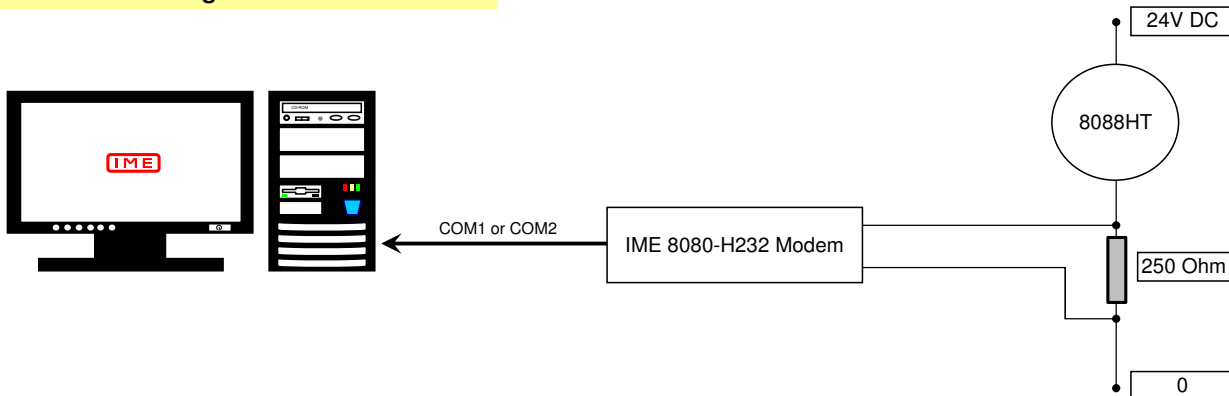
Environmental Influence

Operating Temperature Range	-50~+85°C / -122~185°F
Operating Temperature Range (LCD)	-20~+70°C / -68~158°F
Temperature Stability	<0.1%/year
Humidity	20%~90% (40°C)
EMC	

Programming

Software Package	8080-H232 PC Modem Communication System
Modem	IME Model 8080-H232, HART® Smart Transmitter Config/Debug System with 9-pin D-Type Connector
Configured Parameters	Tag information, Sensor type, Input range, Selection of connection type, Output Offset, Damping factor, Burnout Type, Output current mode, Sensor Calibration.

Transmitter Configuration



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Both the Aluminum and the SS316 housing are certified NEMA4X and IP67. As indicated below. All IME model 8088HT and HN can be optionally provided with certification and a stainless steel name plate for use in Hazardous Area applications.

FM/CSA EX PROOF CERTIFICATIONS

**Class I Div I Groups B, C and D
Class II Div I Groups E, F and G**

CENELEC (ATEX) EX PROOF CERTIFICATIONS

Eexd IIC ATEX 2G T 6

FM IS CERTIFICATIONS

Class I Div 1&2 Group A-D

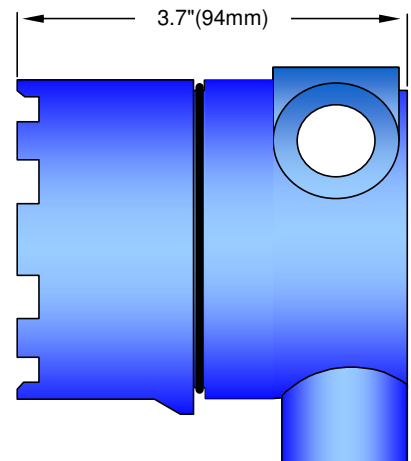
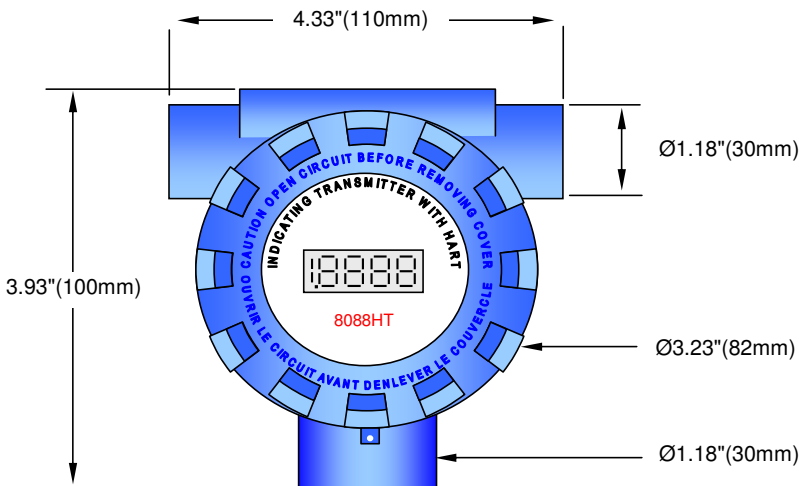
CSA IS CERTIFICATIONS

CLASS 1 Zone 0/1 Gr II C

Ordering Information

Model	Description																										
8088HT	Indicating Field Mounted 2 wire Transmitter with HART®																										
8088HN	Non-Indicating Field Mounted 2 wire Transmitter with HART®																										
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*Some Certifications pending at time of publication



Conduit Size & Instrument Connection As Per Specified