TT7S10E-XP

Field Mounted HART Temperature Transmitter

TT7S10E-XP
(Single Comapartment)

TT7S10E-XP
(Dual Comapartment)

User Programmable
Ranges, Units & Input Types

Touch Key Pad

Password Protected
Configuration

HART Protocol
Supported

Masibus Model TT7S10E-XP is a 2-Wire Loop Powered & fully programmable Universal field mounted HART Temperature Transmitter with Display, designed for Isolated and accurate temperature measurements and signal conditioning applications.

Model TT7S10E-XP is Ex-proof transmitter available in Wall or 2" Pipe mount option. TT7S10E-XP is programmable for Thermocouples, Pt-100 RTD, mV and Resistance/Potentiometer. Output signal is standard 4-20mA in 2-wire mode. A built-in 4-digit LED display facilitates the user to monitor process value and helps in instantaneous configuration and calibration. Transmitters have Process Temperature value display setting for °C, °F & K.

Model TT7S10E-XP also supports HART protocol version 7 functionality with HART 5 compatibility for seamless communication, enabling easy configuration and monitoring.

Programming of the Transmitter is done either by touch keys or HART modem or user friendly mTRAN windows-based configuration software.

TT7S10E-XP Transmitter is built using the latest technology to deliver high performance in accuracy, resolution, stability and isolation. Transmitter is equipped with Zero/Span adjustments, sensor break detection, Downscale/Upscale output and Reverse Loop Polarity protection.

Software techniques like polynomial linearization and digital filtering gives linearized and stable output in harsh industrial conditions, high level of isolation between input and output prevents ground loop errors and protects costly measurement and control systems under fault conditions.

Configuration access of device is protected by assigning a Password in order to ensure a high degree of protection against unauthorized modification to configuration and calibration.

Features

- Universal input
  - √ RTD (3W / 4W)
  - √ Thermocouple
  - √ Resistance
  - √ mV
- User friendly configuration and calibration using
  - √ Touch keys
  - √ Windows based mTran software
  - √ HART COMMUNICATOR
- Easy to read - 0.4", 4-digit LED display for efficient monitoring
- HART 7 functionality with HART 5 compatibility
- 1.5 KV RMS Isolation between Input & Output
- Linearized Output
- PV bias for input correction
- Digital Filter
- Built in Reverse polarity protection
- Selectable Direct / Reverse output
- Sensor breaks detection as per NAMUR NE43
- Ex-proof Transmitter with Wall mount and Pipe mount

Applications

- Power Plants
- Metal Industry
- Oil & Gas
- Chemical
- Glass Industry
- Cement
- Fertilizer
- Paper/Pulp

TECHNICAL SPECIFICATIONS

PV Input

Input Type	
RTD	PT100 3/4-Wire
Resistance/Potentiometer	0-2500Ω
Thermocouple	E, J, K, T, B, R, S, N with internal CJC (ANSI standard)
Linear	0 to 75mv/500mVDC, 0/4 - 20 mA
RTD/Resistance/Potentiometer Excitation Current	~0.2 mA
Input Impedance for mV Input	≥ 1M Ω
Input Impedance for mA Input	≤ 10 Ω
Sensor Burnout Current	< 1 uA
Input Range	Refer Table -1
Zero / Span Adjust	Adjustable either from TouchKeys, mTRAN Software or HART Modem
Accuracy (A/D)	±0.6 °C for E, J, K, T, N.
	±0.5 °C PT100.
	±1.5 °C for B, R, S.
	±0.020 mV for Linear (0 - 75mV).
	±0.400 mV for Linear (0 - 500mV).
	±1.5 Ω for Resistance (0 - 2500 Ω).
	±0.008 mA for mA (0 - 20 & 4 - 20 mA).
CJC Error	±2 °C
ADC Resolution	17 bits
Stability	±0.1% per year
Response Time	≤ 250ms
Digital Filter	0-20 User programmable
Allowable Wiring Resistance for RTD	Maximum 15 ohms/wire (Resistance between all wires should be equal)
CMRR	>120 dB
NMRR	~40 dB
Temp-co	<100 PPM

Table-1: Display Range

Input Type		Ranges
Thermocouple	E	-200 to 1000°C
	J	-200 to 1200°C
	K	-200 to 1370°C
	T	-200 to 400°C
	B	450 to 1800°C
	R	0 to 1750°C
	S	0 to 1750°C
	N	-200 to 1300°C
RTD	Pt100 3/4 wire	-200 to 850.0°C
Linear V	0 to 75mV / 0 to 500mV DC	-1999 to 9999
Linear mA	0 to 20mA / 4 to 20mA	-1999 to 9999
Resistance/ Potentiometer	0-2500Ω	-1999 to 9999

Display & Keys

Display Type	0.4", 4 Digit 7 Segment Red LED
Touch Keys	3 Touch keys (ENT, ESC, INC) for configuration, calibration and Operation

Output

mA Output (2 wire)	4-20mA or 20-4mA (User programmable)
Output Accuracy (D/A)	± 0.04% of Full Span
Sensor Break Output	≤ 3.6 or ≥21.0mA programmable.
Output Load	R load = (V supply - 12.5)/0.021 Ohm
Total Accuracy	(A/D Accuracy / Span + D/A Accuracy). **Example:** when selecting Pt100 with measurement range of 0 to 800 °C 0.5°C/800°C ×100% of span +0.04% of span = 0.1% of span

Power Supply

Standard	12.5 – 36 VDC

Environmental

Standard Operating Temperature	0 to 80°C
Storage Temperature	-20 to 85 °C
Humidity	30% to 95% RH(Non-condensing)

Physical

	TT7S10E-XP (Single Compartment)	TT7S10E-XP (Dual Compartment)
Mounting	Wall (Std) or 2" Pipe mount (optional)	Wall (Std) or 2" Pipe mount (optional)
Dimensions in mm	140(H) x 145(W) x 80(D)	100(H) x 100(W) x 145(D)
Weight (Without mounting clamps)	1 Kg	1.65 Kg
Enclosure Material	Aluminium Alloy LM-6	
Ingress Protection	IP65	IP66
Area Classification	Zone 1 & 2, Gas Group: IIA & IIB	
Cable Entry Size	2 nos. of M20 double compression cable glands	

HART Functionality*

HART Protocol Versions	HART 7
HART Physical Layer	FSK 1200
Baud Rate	1200bps
NAMUR Compliance	Output limit and failure current acc. To NAMUR NE 43
Available Command	Device information, Range, Unit, Damping value, Polling address, Output trimming, Tag, Message, Descriptor, Date.
Identified Commands	Generic mode: 0, 1, 3, 6, 12, 13,14, 17, 18, 34, 35, 40, 42, 44, 45, 46.

Generic Command	Discription
0	Device Information
1	Read PV
3	Read PV,Ambient Temprature & Loop Current
6	Write Polling Address
12	Read Massage
13	Read TAG, DESCRIPTOR, DATE
14	Read Primary variable sensor information
17	Write Message
18	Write TAG, DESCRIPTOR, DATE
34	Write Primary Variable Damping Value
35	Write Primary Variable Range Value
40	Enter/Exit Fixed Primary Variable Current Mode
42	Perform Master Reset
44	Write Primary Variable Units
45	Trim Primary Variable Current DAC Zero
46	Trim Primary variable Current DAC Gain

*Note: Features available only in Dual Compartment

Ordering Code

Model		Input type		Mounting	
TT7S10E-XP	X		X		
	1	E	SW	Wall mount Single Compartment	
	2	J	SP	Pipe mount Single Compartment	
	3	K	DW	Wall mount Dual Compartment	
	4	T	DP	Pipe mount Dual Compartment	
	5	B			
	6	R			
	7	S			
	8	N			
	9	Pt100			
	C	4-20mA			
	D	0-20mA			
	U	0-75mV			
	H	0-500mV	Option: TT7SCC - Configuration cable@ extra cost	
	I	0-2500Ω	mTRAN Software: Website download	

All specifications are subject to change without notice due to continuous improvements.
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