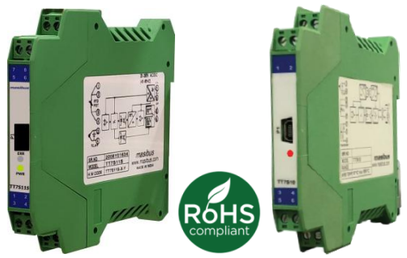
User's Manual

Doc. Ref. No. mttB/om/101
Issue no. 10

TT7S Series Temperature Transmitters



- **TT7S10 : Loop Powered DIN Rail Mount**
- **TT7S10-H: Loop Powered Head Mount**
- **TT7S11S : Aux Powered DIN Rail Mount**

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Masibus Automation and Instrumentation Pvt. Ltd.

INTRODUCTION

TT7S series Transmitters are designed for Isolated, reliable and accurate Temperature measurements and signal conditioning Applications. Model TT7S10 is 2 Wire Loop powered Din Rail Mount Transmitter, Model TT7S10-H is 2-wire Loop powered Head Mount Transmitter and Model TT7S11S is 4-wire Auxiliary powered Transmitter.

All models are programmable for variety of field sensors like Thermocouples, Pt-100 RTD, mV and Resistance/Potentiometer. Output signal is standard 4-20mA in 2-wire & mA or Volts in 4-wire. Programming of the Transmitters is easy by means of user friendly mTRAN windows based configuration software.

TT7S11S is available with Front Green LED that Indicates Power ON and the Red LED Indicates Open Input Sensor/Error at Input. TT7S10 DIN Rail available with Front Red Power ON LED.

FEATURES

- Universal Input and Output
- Linearized Output
- Highly Accurate
- Fully Programmable for Input type, Input Range & Output type
- Fast Response time: <500 ms
- Digital Filter
- Windows mTRAN software for Configuration, Calibration & Monitoring
- Direct/Reverse output
- Sensor break detection
- Extended Power Supply Range of 20 to 265VDC/AC for TT7S11S Model

APPLICATION

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

SPECIFICATION

INPUT

Input Type	
RTD	Pt100 3-Wire (3/4 Wire in TT7S11S)
Resistance/Potentiometer	0 to 2500Ω
Sensor Current	~0.2mA
Thermocouple	E,J,K,T,B,R,S,N with internal CJC (ANSI standard)
mV	0-75 mV/ 0-500 mV DC
Input Impedance	> 1M Ohms
Sensor burn out current	<1 uA
Input Sensor Range	Refer Table 1
Zero & Span Adjust	Through mTRAN Software
Accuracy	±0.1% Full Span, ± 1 Degree for E, J, K, T, N, PT100. ±0.25% Full Span, ± 1 Degree for B, R, S. ±0.1% Full Span, ± 1 Unit for mV and Resistance/Potentiometer input.
CJC Error	±2 °C for E, J, K, T, N TC & ±3 °C for B, R, S TC
Stability	±0.1% per year
Response time	<500 mSec
Digital Filter	0-20 settable through software (2 default)
Sensor open Detection	Available
Allowable wiring resistance for RTD	Maximum 15 ohms/wire (Resistance of each wire should be equal)
CMRR	>120 dB
NMRR	~40 dB
Temp-co	≤150 ppm/°C

OUTPUT
TT7S10 & TT7S10-H

Output type	4-20 mA or 20-4 mA (User Selectable)
Output Direction	Direct / Reverse (User Selectable)
Output Accuracy	± 0.25% of Full Span
Resolution	1 uA
Sensor break Output	≤ 3.4 or ≥20.8 mA (User Selectable)
Output load	R load= (Voltage supply - 10)/0.021 Ohm (TT7S10) R load= (Voltage supply - 8.5)/0.021 Ohm (TT7S10-H)

TT7S11S

Output type	0/4-20 mA, 0/1-5 V, 0/2-10 V (User Selectable)
Output Direction	Direct / Reverse (User Selectable)
Output Accuracy	± 0.25% of Full Span
Resolution : **Current** **Voltage**	 1 uA 0.25 mV (0/1-5 V), 0.5 mV(0/2-10 V)
Sensor break Output	≤ 1.9 or ≥20.8 mA (User Selectable)
Output load	mA: Load Voltage ≤ 15V (e.g. for 4-20 mA: 15 V/20 mA ≤ 750Ω) V: Load Current ≤ 1.25 mA (e.g. for 0-5 V: 5 V/1.25 mA ≥ 4 KΩ)

POWER SUPPLY

TT7S10	10-36 VDC 2-Wire
TT7S10-H	8.5-36 VDC 2-Wire
TT7S11S	20-265 VDC/AC (50-60Hz) ≤3W

ISOLATION
TT7S10 & TT7S10-H

Input to Output	Galvanic Isolation of 1.5KVAC for 1 minute

TT7S11S

Power to Input and Output	Reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 3KVAC (For CE marked Model)
	Galvanic Isolation of 3KVAC for 1 minute (For CE marked and Non-CE Model)
Input to Output	Functional insulation according to IEC/EN 61010-1, rated insulation voltage 1.5KVAC (For CE marked Model)
	1.5KVAC Galvanic for 1 minute (For CE marked and Non-CE Model)

PHYSICAL

Mounting	TT7S10 & TT7S11S: 35 mm DIN Rail TT7S10-H: Sensor Head (35 mm DIN Rail-Optional Accessory)
Dimensions in mm	TT7S10 & TT7S11S: 12.5(W)x100.2(H)x115.2(D) mm TT7S10-H: 28(H)x46(D)
Enclosure Material	TT7S10 & TT7S11S: PA66 TT7S10-H: Polycarbonate
Weight	100 gms Approx.

ENVIRONMENTAL

Operating temperature	TT7S10: -40 to 55 °C TT7S10-H: -40 to 85 °C TT7S11S: 0 to 55 °C
Storage temperature	-20 to 85 °C
Humidity	30% to 95% RH(Non-condensing)

TERMINAL DETAIL

Terminal Block	UL,CSA standard & CE certified
Terminal Cable Size	2.5mm²

DIRECTIVE CONFORMITY (Applicable only for TT7S11S CE Marked Model)

Electromagnetic compatibility Directive 2014/30/EU	IEC 61326-1:2012
Low voltage Directive 2014/35/EU	IEC 61010-1:2010

Table 1

Input	Input Type	Range
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°C
Linear mV	0 to 75 mV / 0 to 500 mV DC	-1999 to 9999
Resistance/ Potentiometer	0 to 2500Ω	-1999 to 9999

Input Type	Span Adjustment
0-2500 Ohms	>1K Ohms (1uA Resolution)
	>200 Ohms (5uA Resolution)
	>400 Ohms (5uA Resolution)
0-75 mV	>30 mV (1uA Resolution)
	>10 mV (5uA Resolution)
0-500 mV	>200 mV (1uA Resolution)
	>50 mV (5uA Resolution)

NOTICE

The contents of this manual are subject to change without notice as a result of continual improvements to the instrument's performance and functions.

Every effort has been made to ensure accuracy in the preparation of this manual. Should any errors or omissions come to your attention, however, please inform Masibus Sales office or sales representative. Under no circumstances may the contents of this manual, in part or in whole, be transcribed or copied without our permission

SAFETY/WARNING PRECAUTIONS

ESD precautions: Before Installing or Operating the Instrument, always make sure to discharge the static electricity that might be available on your body to prevent any damages to Instrument.

Caution: Never carry out work when the Power is turned ON, this is dangerous. This indicates a danger that may result in minor or moderate injury or a physical damage, if not avoided.

Wiring must be carried out by personnel, who have basic electrical knowledge and practical experience. To minimize the possibility of fire or shock hazards, do not expose this instrument to rain or excessive moisture.

Do not use this instrument in areas under hazardous conditions such as excessive shock, vibration, dirt, moisture, corrosive gases or oil. The ambient temperature of the areas should not exceed the maximum rating specified.
Instruments suspected of being faulty must be disconnected and removed first and it is recommended to send Instrument to Masibus Customer Support Division for testing and repair.

Before start-up, it is particularly important to ensure:

- Terminal wiring: check that all cables are connected correctly and are according to the connection diagram.
- All wiring must confirm to appropriate standards of good practice and local codes and regulations. Wiring must be suitable for voltage, current and temperature rating of the system. Beware not to over-tighten the terminal screws.
- Unused control terminals should not be used as jumper points as they may be internally connected, which may cause damage to the unit.

After installation the terminal area must be covered to provide sufficient protection against unauthorized Access to live parts. This is ensured by installing the device in the control Cabinet or distributor box.

WARRANTY

Warranty does not apply to defects resulting from action of the user such as misuse, improper wiring, operation outside of specification, improper maintenance or repair, or unauthorized modification.

Masibus is not liable for special, indirect or consequential damages or for loss of profit or for expenses sustained as a result of a device malfunction, incorrect application or adjustment.

Masibus total liability is limited to repair or replacement of the product. The warranty set forth above is inclusive and no other warranty, whether written or oral, is expressed or implied.

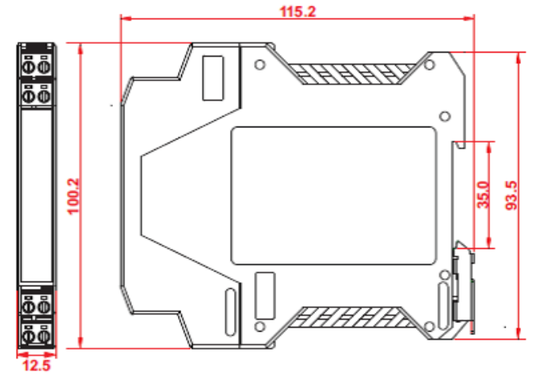
CONFIGURATION

TT7S10, TT7S10-H and TT7S11S are configurable using Configuration Cable mentioned in Accessories and through PC based configuration software "mTRAN" available in Download section at Masibus Website.

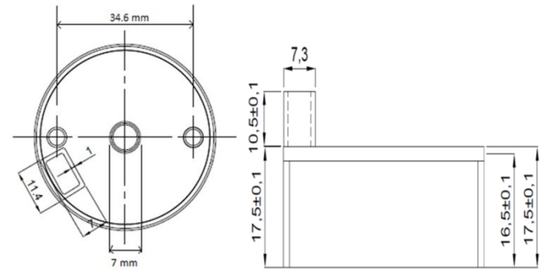
Configuration and calibration should be done in non-hazardous area.
Once configuration is done, parameters are changed.

OVERALL DIMENSIONS (In mm)

TT7S10 & TT7S11S

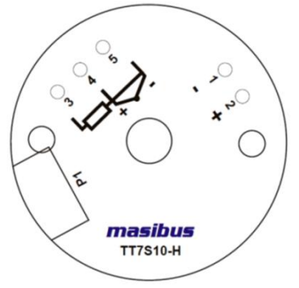


TT7S10-H



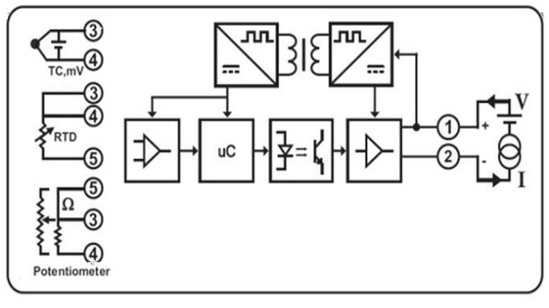
CONNECTION DETAILS

TT7S10-H



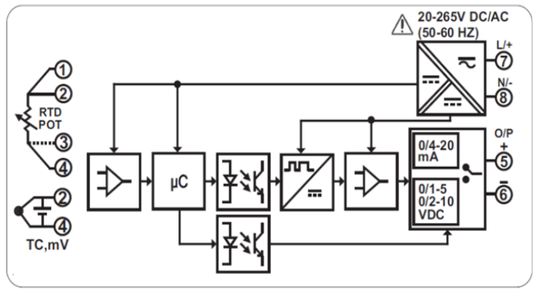
Terminal 3, 4 & 5: For RTD/Resistance/Potentiometer Input
Terminal 4 & 5: For T/C & Linear Input
Terminal 1 & 2: For Loop Power and Output

TT7S10



Terminal 3, 4 & 5: For RTD/Resistance/Potentiometer Input
Terminal 3 & 4: For T/C & Linear Input
Terminal 1 & 2: For Loop Power and Output

TT7S11S



Terminal 1, 2, 3 & 4: For RTD/Resistance/Potentiometer Input
Terminal 2 & 4: For T/C & Linear Input
Terminal 5 & 6: For Output
Terminal 7 & 8: For Power Supply Input

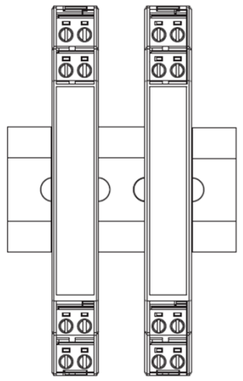
INSTALLATION

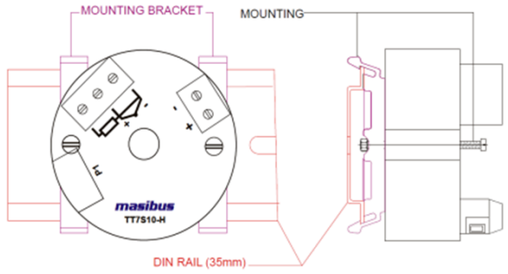
Din Rail Mounting:

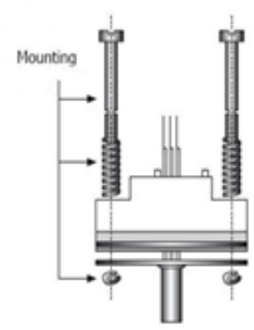
The unit can be snapped onto all DIN rails (35mm) According to EN60715. The device must be mounted horizontally (Supply terminal blocks facing upper wards)
The housing is mounted on the DIN rail by swivelling it into place. Adequate Air circulation must be considered between each Aux Powered devices to maintain their Operating temperature ranges, by keeping some space between each devices.

Removal:

Release the snap-on catch using a screwdriver and then detach the module from the bottom edge of the DIN Rail.







ACCESSORIES

Sr. No.	Description	Part No.	Qty
1	Configuration cable	m-cb-5-4-7-10-0-0-1-1	01

TROUBLE SHOOTING

- **Unit Not Turning ON?**

TT7S10 & TT7S10-H - If transmitter is not delivering loop current, check the circuit from Power supply, two wire transmitter & receiving device. If still transmitter is not delivering loop current, check the supply connections and polarity of terminals.
TT7S11S - If GREEN LED at the front side is not turned "ON", the device is not getting sufficient supply or the connections are not as per terminal details.

One must take care while dealing with Power wirings because it may create electrical shock

- **Output not matching with expected value?**

Make sure the load on output of device is as per specification criteria.

- **Communication with PC is not proper (for all models)**

The reason can be, in PC the driver is not installed, PC Commutation port is not properly selected, or connection from PC to unit is loose.

ORDERING CODE

Model	Transmitter Type		Input Type		Output		CE Compliance	
TT7S	X		X		X		X	
	10	Loop-Powered Din Rail Mount	1	E	1	4-20mA	N	No
	11S	Aux-Powered Din Rail Mount	2	J	2*	0-20mA	Y*	Yes
	10-H	Loop-Powered Head Mount	3	K	3*	1-5V		
			4	T	4*	0-10V		
			5	B	5*	0-5V		
			6	R	6*	2-10V		
			7	S				
			8	N				
			9	Pt-100				
			U	0-75mV				
			H	0-500mV				
			I	0-2500Ω				

***Available in Aux Powered TT7S11S model Only**

SERVICE

For All Service related matters, Contact Masibus at below address.

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