

Programmable Transmitters w/ HART® Protocol



TT511/TT521

TT531

Overview

Models TT511, TT521 and TT531 are programmable transmitters designed for process control and other applications. All three models use HART® communication protocol and are PC programmable to accept a signal from a thermocouple, a Resistance Temperature Detector (RTD), or a millivolt signal. Model TT511/TT521 transmitter can be mounted at the field location in a standard DIN form B head or on a DIN rail inside a local box (with an AC807 Minco DIN rail adapter). Model TT531 can be mounted vertically or horizontally on a DIN rail.

- T/C, RTD, or mV input
- HART® 7/5 Communication Protocol
- PC and field-programmable
- Galvanically isolated
- FM Approved Intrinsically Safe
- Single temperature measurement
- Difference temperature measurement
- Average temperature measurement

HART® Communication

By way of 2-wire HART® communication between the process computer and the TT511, TT521 or TT531, the transmitter is programmable, readable, and controllable.

- Up to 63 transmitters can be controlled in a multidrop system. (Parallel connection of all transmitters on 2 wires).
- Set-up, configuration and control can be done from a central monitoring room.

When each transmitter is connected to a 2-wire cable, a standard 4-20 mA signal can be used at the same time as the HART® communication.

Specifications

Common Specifications:

Supply voltage: 8.0 - 30 VDC

Specifications subject to change

Communication interface: HART® 7/5 and PC interface

Temperature coefficient: $< \pm 0.005\%$ of span/ °C

Effect of supply voltage change: $< 0.005\%$ of span/ VDC

Max. wire size: AWG14 (1.5 mm²)

Air humidity: 0 - 95% RH

Dimensions:

TT511/TT521: Ø1.73 x 0.84 in (Ø44 x 20.2mm)

TT531: 4.29 x .0.93 x 4.09 in (109 x 23.5 x 104mm)

Tightness (enclosure/terminal):

TT511/TT521: IP 68 / IP00 TT531: IP50 / IP20

Weight:

TT511/TT521: 50 g

TT531: 145 g

AC205817 USB Loop Link Programmer:

TT511/TT521 and TT531 transmitters are preconfigured for ease of use. The AC205817 USB Loop Link Programmer allows the user to reconfigure the transmitter using free, Windows-based software.

TC Input:

Minimum measurement range:

Type E, J, K, T : 50°C

Max. offset: 50% of selected max. value

Basic accuracy:

Type E, J, K, T : $\pm 0.5^\circ\text{C}$

Cold junction compensation (CJC): $\leq \pm 1.0^\circ\text{C}$

Temperature coefficient:

Type E, J, K, T : $\pm 0.025^\circ\text{C} / ^\circ\text{C}_{\text{amb}}$

Sensor error detection: yes

RTD-input:

RTD type	Minimum value	Maximum value	Minimum span.
PD (Pt100)	-200°C	+850°C	25°C
PF (Pt1000)	-200°C	+850°C	25°C

Basic accuracy PD/PF (Pt100/1000): $\leq \pm 0.1^\circ\text{C}$

Temperature coefficient: $\leq \pm 0.005^\circ\text{C} / ^\circ\text{C}$

Current output:

Signal range: 4 - 20 mA

Load resistance: $< (V_{\text{sup}} - 8) / 0.023 [\Omega]$

Intrinsic Safety data: FM Approved Intrinsically Safe for Class 1, Div. 1, Groups A-D, Entity Approval (pending)

V_{max} : 30.0 VDC C_i : 1 nF

I_{max} : 120 mADC L_i : 10 μH

P_{max} : 0.84 W

Europe: ATEX II 1 G

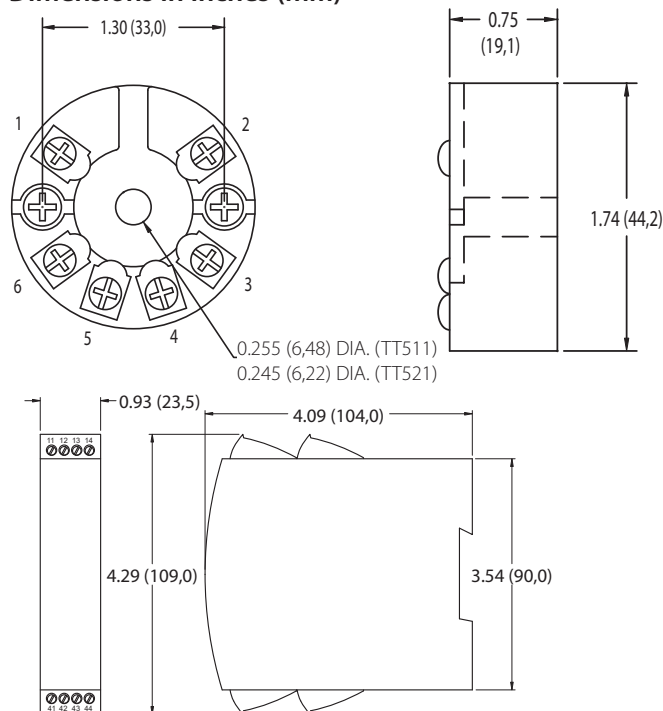
Meets these European requirements:

EMC 2004/108/EC: Standard EN 61326-1

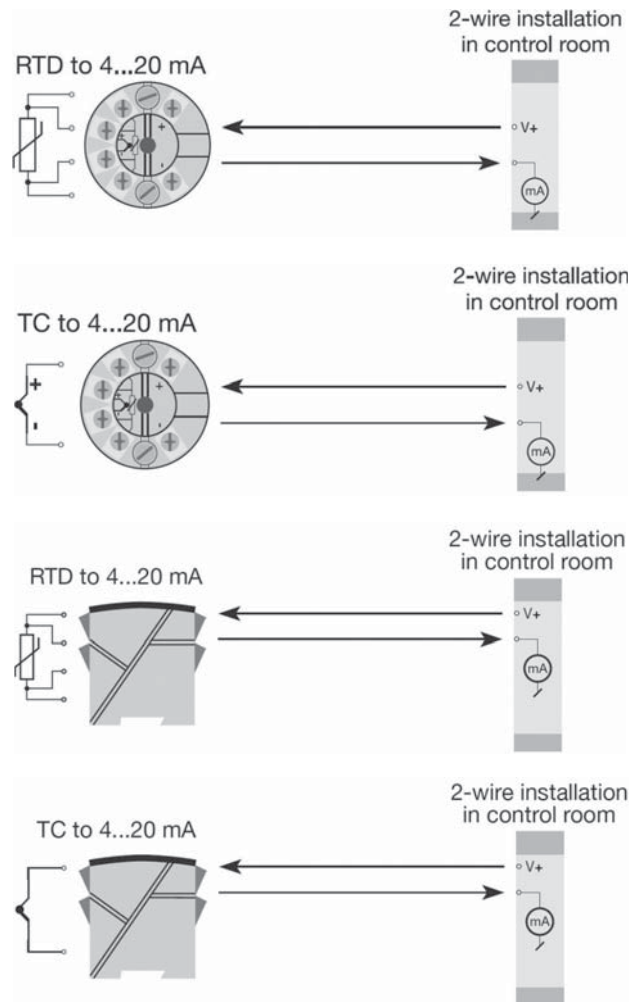
Specifications and order options

TT521	Model Number: TT511 No Approvals, Temperature Transmitter with HART® protocol, fits .250" Probe Max TT521 Temperature Transmitter with HART® Protocol, fits .236" Probe Max TT531 DIN Rail Temperature Transmitter with HART® Protocol
PD	Sensor Type: PD = 100Ω Platinum RTD (0.00385) PF = 1000Ω Platinum RTD (0.00385) E = Type E Thermocouple J = Type J Thermocouple K = Type K Thermocouple T = Type T Thermocouple
(-25/200)	Temperature Range: Specify temperature range in either °C or °F. For example, -25° to +200°C = 4 to 20 mA.
C	Temperature Units: C = Celsius F = Fahrenheit
1	Calibration: 1 = Nominal 2 = Matched to sensor ±0.75% span For other calibration options, contact Minco
Y	Sensor Leads: Y = 2-lead RTD (or thermocouple) Z = 3-lead RTD X = 4-lead RTD
TT521PD(-25/200)C1Y = Sample part number	

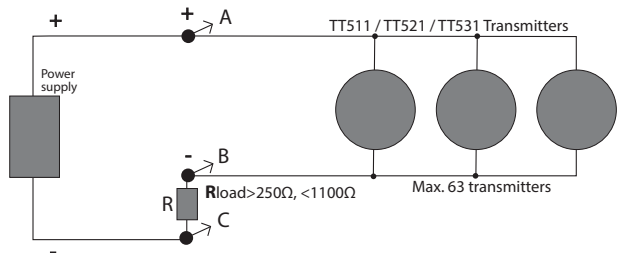
Dimensions in inches (mm)



Wiring Diagrams



HART® Multidrop Wiring Diagram



▼ = STANDARD OPTIONS
 Specifications subject to change

Temptran™ Temperature Ranges

Below is a list of commonly selected Temptran temperature ranges. The endpoints of the temperature range correspond to the Temptran's 4 and 20 mA signals. Choose the smallest possible span for best accuracy. Be sure to check the temperature limits of the sensor you specify.

If you do not find the temperature range required by your application, go to www.minco.com for a complete list of temperature ranges. Custom ranges are also available for a small setup charge. Contact Minco Sales and Customer Service for more information.

For more temperature ranges (over 400 options) go to www.minco.com

Range code	Temperature Range				RTD Temptrons			Thermocouple Temptrons	
	Zero °F	Span °F	Zero °C	Span °C	TT111, TT115, TT211, TT829		TT246, TT220	TT221	TT205
					Platinum elements*	Other elements	Elements	T/C types	T/C types
MH	-328	-148	-200.0	-100.0	PA PB PD PE				
HG	-325	100	-198.3	37.8	PA PB PD PE PF PW			JT	
QS	-300	150	-184.4	65.6			PA PB PD PE		
EZ	-148	32	-100.0	0.0	PA PB PD PE PF PW		PA PB PD PE		
LN	-148	212	-100.0	100.0	PA PB PD PE				
SA	-140	100	-95.6	37.8			PA PB PD PE		
UL	-103	752	-75.0	400.0				K	
M	-58	122	-50.0	50.0	PA PB PD PE PF PW		PA PB PD PE		
EO	-58	212	-50.0	100.0	PA PB PD PE	NA	PA PB PD PE	T	ET
JD	-58	302	-50.0	150.0	PA PB PD PE		PA PB PD PE	J	
MR	-58	500	-50.0	260.0			PA PB PD PE CA NA		
SD	-50	100	-45.6	37.8	PA PB PD PE				
MI	-50	150	-45.6	65.6	PA PB PD PE		PA PB PD PE	T	
AI	-50	275	-45.6	135.0	PA PB PD PE PF PW	FB FC FL NA	PA PB PD PE		
MS	-50	650	-45.6	343.3	PA PB PD PE		PA PB PD PE		
AD	-40	120	-40.0	48.9	PA PB PD PE	FB FC	PA PB PD PE		
AK	-40	140	-40.0	60.0	PA PB PD PE PU		PA PB PD PE		
BE	-40	160	-40.0	71.1	PA PB PD PE	FB	PA PB PD PE		
GH	-40	212	-40.0	100.0	PA PB PD PE		PA PB PD PE		
UE	-40	302	-40.0	150.0	PA PB PD PE		PA PB PD PE		
L	-30	120	-34.4	48.9	PA PB PD PE PF PW	FB FC			
AS	-30	130	-34.4	54.4	PA PB PD PE PF PW	FB	PA PB PD PE		
R	-30	150	-34.4	65.6	PA PB PD PE	FB FC	PA PB PD PE		
DN	-22	122	-30.0	50.0	PA PB PD PE		PA PB PD PE		
EE	-22	302	-30.0	150.0	PA PB PD PE		PA PB PD PE		
DO	-20	120	-28.9	48.9	PA PB PD PE PF PW	ND	PA PB PD PE		
EN	-20	140	-28.9	60.0	PA PB PD PE PF PW	FB	PA PB PD PE		
B	-20	180	-28.9	82.2	PA PB PD PE	FB FC NA	PA PB PD PE CA		
BP	-4	104	-20.0	40.0	PA PB PD PE	FC	PA PB PD PE		
SH	-4	122	-20.0	50.0	PA PB PD PE				
DB	-4	212	-20.0	100.0	PA PB PD PE		PA PB PD PE		
JZ	0	65	-17.8	18.3	PA PB PD PE		PA PB PD PE		
S	0	100	-17.8	37.8	PA PB PD PE PF PG PW	FB	PA PB PD PE PW		
JH	0	120	-17.8	48.9	PA PB PD PE PF PW	FC	PA PB PD PE		
HD	0	130	-17.8	54.4	PA PB PD PE PF PW		PA PB PD PE		
DV	0	150	-17.8	65.6	PA PB PD PE	FB	PA PB PD PE		
EI	0	160	-17.8	71.1	PA PB PD PE				
AC	0	200	-17.8	93.3	PA PB PD PE PF PW	FB NA	PA PB PD PE CA	EJKT	T
EY	0	250	-17.8	121.1	PA PB PD PE PF PW	NA	PA PB PD PE	JK	JKT
AN	0	300	-17.8	148.9	PA PB PD PE PF PW	FB FC NA	PA PB PD PE CA NA	EJKT	K
JA	0	350	-17.8	176.7	PA PB PD PE		PA PB PD PE	KJ	
DS	0	400	-17.8	204.4	PA PB PD PE	NA	PA PB PD PE CA NA	JK	
AG	0	500	-17.8	260.0	PA PB PD PE PF PW	NA	PA PB PD PE CA	EJT	JKT
QN	0	550	-17.8	287.8	PA PB PD PE		PA PB PD PE		
AB	0	600	-17.8	315.6	PA PB PD PE PF PW	NA	PA PB PD PE	EJK	J
AA	0	800	-17.8	426.7	PA PB PD PE PF PW		PA PB PD PE	J	JK
BZ	0	1000	-17.8	537.8	PA PB PD PE		PA PB PD PE	JK	EJ

* Element codes (PA, PB, PD, PE, etc.) are defined in the Resistance/Temperature Tables on page 11-11

Specifications subject to change



For more temperature ranges (over 400 options) go to www.minco.com

Range code	Temperature Range				RTD Temptrans				Thermocouple Temptrans	
	Zero °F	Span °F	Zero °C	Span °C	TT111, TT115, TT211, TT829		TT246, TT220		TT221	TT205
					Platinum elements*	Other elements	Elements	T/C types	T/C types	
HU	0	1300	-17.8	704.4					K	
BY	14	104	-10.0	40.0	PA PB PD PE		PA PB PD PE			
AJ	14	122	-10.0	50.0	PA PB PD PE		PA PB PD PE			
AP	20	70	-6.7	21.1	PA PB PD PE PF PW		PA PB PD PE			
GV	20	100	-6.7	37.8	PA PB PD PE PF PW		PA PB PD PE			
A	20	120	-6.7	48.9	PA PB PD PE PF PW	FA FB FC NA	PA PB PD PE PF			
HE	20	240	-6.7	115.6	PA PB PD PE					
AF	20	320	-6.7	160.0	PA PB PD PE	FA FB				
QE	22	122	-5.6	50.0	PA PB PD PE					
GW	23	131	-5.0	55.0	PA PB PD PE					
U	30	80	-1.1	26.7	PA PB PD PE PF PW	FB FC	PA PB PD PE			
DA	30	90	-1.1	32.2	PA PB PD PE PF PW	FC	PA PB PD PE			
DP	30	100	-1.1	37.8	PA PB PD PE PF PW					
BI	30	130	-1.1	54.4	PA PB PD PE PF PW		PA PB PD PE PF PW			
DQ	30	150	-1.1	65.6	PA PB PD PE	FB	PA PB PD PE			
KK	30	180	-1.1	82.2	PA PB PD PE					
EV	30	230	-1.1	110.0	PA PB PD PE		PA PB PD PE			
BN	30	240	-1.1	115.6	PA PB PD PE PF PW	FB	PA PB PD PE			
BJ	30	250	-1.1	121.1	PA PB PD PE PF PW	NA	PA PB PD PE FA			
GQ	32	100	0.0	37.8	PA PB PD PE PF PW		PA PB PD PE			
EG	32	104	0.0	40.0	PA PB PD PE PF PW		PA PB PD PE			
N	32	122	0.0	50.0	PA PB PD PE PF PW	FB FC	PA PB PD PE			
HL	32	167	0.0	75.0	PA PB PD PE		PA PB PD PE			
C	32	212	0.0	100.0	PA PB PD PE PF PW	FB FC NA	PA PB PD PE CA NA	JT		
QR	32	257	0.0	125.0	PA PB PD PE					
DL	32	280	0.0	137.8	PA PB PD PE		PA PB PD PE			
J	32	302	0.0	150.0	PA PB PD PE PF PU PW	FC NA	PA PB PD PE CA	J		J
K	32	392	0.0	200.0	PA PB PD PE PU	NA	PA PB PD PE CA	JK		J
LX	32	400	0.0	204.4	PA PB PD PE					
BW	32	482	0.0	250.0	PA PB PD PE	NA	PA PB PD PE	EJKT		J
LF	32	572	0.0	300.0	PA PB PD PE		PA PB PD PE	JT		
JW	32	932	0.0	500.0	PA PB PD PE		PA PB PD PE	JK		K
HA	32	1112	0.0	600.0	PA PB PD PE PF PW			K		
GF	32	1472	0.0	800.0	PA PB PD PE		PA PB PD PE	K		K
SG	33.8	123.8	1.0	51.0	PA PB PD PE					
H	40	90	4.4	32.2	PA PB PD PE PF PW	FB	PA PB PD PE			
BU	40	100	4.4	37.8	PA PB PD PE PF PW					
QL	40	120	4.4	48.9	PF PW	FC				
BK	40	140	4.4	60.0	PA PB PD PE PF PW	FB	PA PB PD PE			
KH	40	240	4.4	115.6	PA PB PD PE PF PW		PA PB PD PE			
KP	42	92	5.6	33.3	PA PB PD PE					
DU	45	95	7.2	35.0	PA PB PD PE		PA PB PD PE			
DX	50	100	10.0	37.8	PA PB PD PE PF PW		PA PB PD PE			
AH	50	110	10.0	43.3	PA PB PD PE	FB	PA PB PD PE			
ED	50	120	10.0	48.9	PA PB PD PE PF PW	FB				
V	50	150	10.0	65.6	PA PB PD PE PF PW	FA FB NA	PA PB PD PE			
AV	50	230	10.0	110.0	PA PB PD PE PF PW		PA PB PD PE	J		
BF	50	250	10.0	121.1	PA PB PD PE PF PW		PA PB PD PE PF PW	ET		
AO	50	300	10.0	148.9	PA PB PD PE		PA PB PD PE CA FA			
KF	50	400	10.0	204.4	PA PB PD PE		PA PB PD PE			
D	70	220	21.1	104.4	PA PB PD PE PF PW	FB FC	PA PB PD PE			
E	100	500	37.8	260.0	PA PB PD PE PF PW		PA PB PD PE			
BH	122	302	50.0	150.0	PA PB PD PE		PA PB PD PE	T		
BL	200	500	93.3	260.0	PA PB PD PE PF PW			K		

* Element codes (PA, PB, PD, PE, etc.) are defined in the Resistance/Temperature Tables on page 11-11

Specifications subject to change

