



Omniterm TXB Programmable Transmitter

Model C2401B 24Vdc powered Universal four-wire transmitter

Model Number

C2401B

DATASHEET

- TC/mV/VC/RB universal input in one product
- 0-20mA / 0- 10V / 0- 10mA universal output
- 24Vdc powered
- Three port isolation to 1500Vac
- Software configurable
- Sensor linearisation standard
- Output overload detection
- Fully configurable with Omniset



Features

- DIN Rail or surface mountable
- Narrow 22.5mm module width
- 20 - 30V dc powered.
- 1500Vac Isolation Input/Output/Power Supply
- Output overload Indicator

- User friendly configuration software
- Wide operating temperature range
- Linearised for all standard input types
- Special function options included as standard
- Designed to meet IEC 61508 SIL1 criteria.

Overview

The **OMNITERM TXB** Universal four-wire transmitter is designed for the widest range of signal conditioning applications in a single off-the-shelf product, using advanced state-of-the-art digital measurement techniques, combined with extremely user friendly software configurability.

The input will accommodate most thermocouple and resistance bulb types, as well as voltages and currents from 1mV minimum to 10Vdc maximum input span and slidewire inputs. (Extended ranges are available – see Order Codes)

The output can be configured for unipolar or bipolar outputs of current or voltage from 1mA to 10mA; 0-20mA; or 1V to 10V.

Full isolation (input/output/power supply) to 1500Vac ensures trouble-free accurate measurement.

Combined with the **OMNISET Configuration software** package, this product provides extremely low life-cycle costs by reducing spares stock-holding requirements, and reducing specialist technical expertise required for field support, module replacement and field configuration. This new holistic approach to instrumentation asset management ensures reliable performance and minimal down-time.

Using advanced sigma-Delta A/D technology combined with sophisticated digital filtering techniques, the TXB offers 16

bit measurement resolution with increased dynamic range, tailored for noisy plant environments.

Configuration Management

The powerful but intuitive Omniset configuration software ensures the maximum instrument flexibility with reliable configuration management to ensure all instruments on the plant are always correctly configured to the design requirements specification.

High Reliability

This product has been designed with high reliability applications in mind. The output stage has built in overload indication to detect overloaded output circuits – whether from a wire break or just excess resistance in the line.

This product has been designed to meet the criteria of IEC61508 for SIL1 applications..

Typical Applications

- Isolate instruments in the same current loop
- Prevent ground loops and eliminate loop errors
- Isolate RTU's, PLC's, SCADA I/O from the field loop.



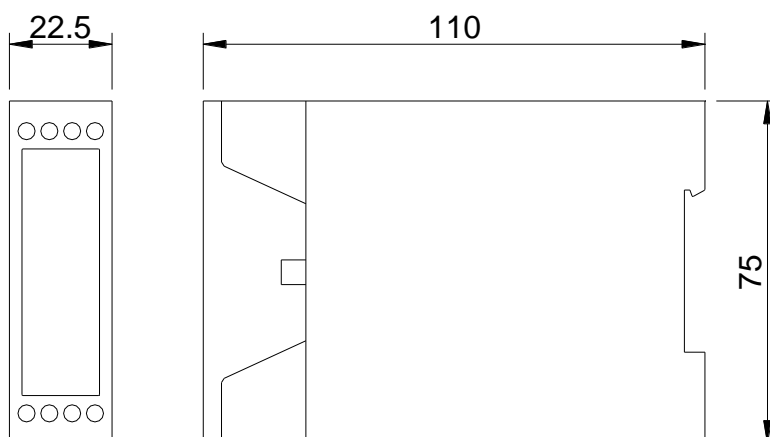


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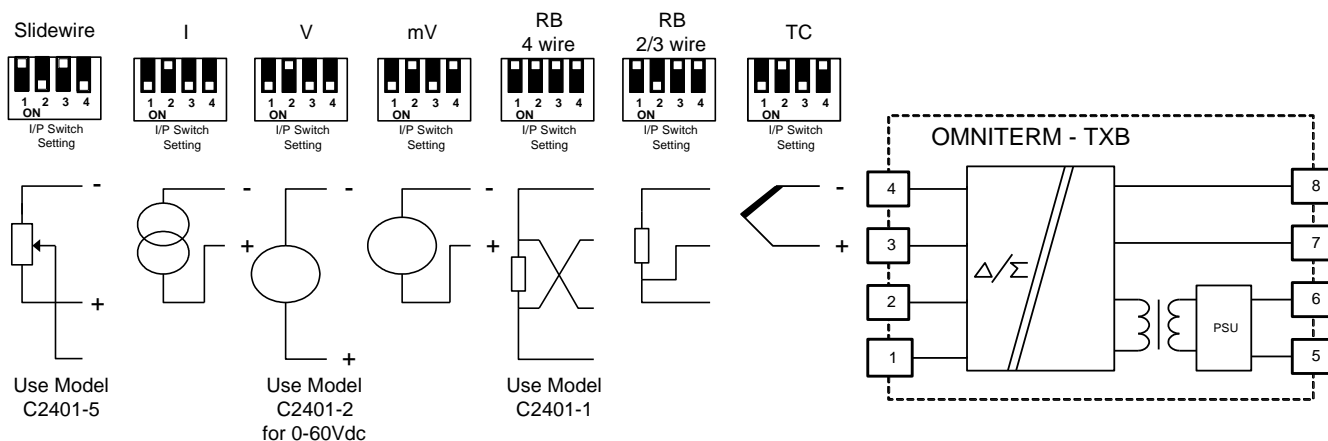
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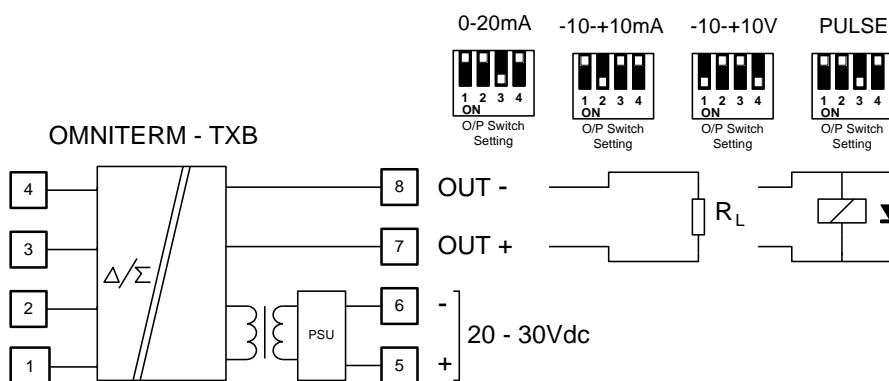
Mechanical Layout



Connection Diagram



INPUT RANGE SELECTION AND CONNECTIONS



OUTPUT RANGE SELECTION AND CONNECTIONS





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Specifications

Digital Inputs (Models C2302 and C2303 only)

Measurement Types and Ranges

Unless otherwise stated, all specifications refer to Model C2401-0

THERMOCOUPLES (TC Input Ranges covered)

Open Circuit Voltage	24Vdc nominal (power supply voltage)
Closed Circuit Current	3mA nominal
Guaranteed On Voltage	Less than 0.5Vdc
Guaranteed Off Voltage	Greater than 10Vdc
Type B (Pt30Rh-Pt6Rh)	400 – 1820 °C (400 °C min. span*)
Type E (NiCr-CuNi)	-150 – 1000 °C (80 °C min. span*)
Type J (Fe-CuNi)	-210 – 1200 °C (100 °C min. span*)
Type K (NiCr-NiAl)	-270 – 1372 °C (100 °C min. span*)
Type N (NiCrSi-NiSiMg)	0 – 1300 °C (175 °C min. span*)
Type R (Pt13Rh-Pt)	-50 – 1767 °C (500 °C min. span*)
Type S (Pt10Rh-Pt)	-50 – 1767 °C (500 °C min. span*)
Type T (Cu-CuNi)	-270 – 400 °C (100 °C min. span*)
Type W ()	1000 – 2500 °C (1000 °C min. span*)
Type W5 (Re/W26-Re)	0 – 2320 °C (300 °C min. span*)
Type W3 (Re/W25-Re)	0 – 2500 °C (300 °C min. span*)
*Minimum Span	May be lower but with reduced accuracy overall
Cold Junction Compensation	Internal
CJC Accuracy	< 0.5 °C over 0 – +40 °C < 1 °C over -10 – +60 °C
TC Burnout Detection	Settable upscale or downscale

RESISTANCE THERMOMETERS (RB Input Ranges)

Model C2401-0	2 or 3 wire connection
Model C2401-1	True 4-wire connection
Measuring Current	200 A nominal 20 A for Model C2401-3 1000 A for Model C2401-4
Lead Resistance	100 ohms per lead
Pt100 (IEC60751/DIN43760)	-200 – 850 °C (50 °C min. span)
Pt500	-200 – 380 °C (50 °C min. span)
Pt500 (model C2401B-3)	-200 – 630 °C (50 °C min. span)
Pt1000 (model C2401B-3)	-200 – 630 °C (50 °C min. span)
Ni100 (DIN43760)	-60 – 250 °C (50 °C min. span)
Ni120	-80 – 320 °C (50 °C min. span)
Cu10 (model C2401B-4)	-100 – 260 °C (150 °C min. span)
Ni100 (DIN43760)	-60 – 250 °C (50 °C min. span)

POTENTIOMETER/SLIDEWIRE (Model C2401B-5)

Model C2401B-5	3 wire slide-wire connection
Excitation	1.70V nominal
Potentiometer Resistance	500 ohms min; 10kOhms max
Minimum Span	10%

Maximum Zero	90%
VOLTS (V Input Ranges)	
Model C2401-0	-1 – +10V (min. span 0.1V)
Model C2401-2	-1 – +60V (min. span 5V)
Input Impedance	> 1MΩ
MILLIVOLTS (mV Input Ranges)	
Millivolts	-10 – 100mV (min. span 1mV)
Input Impedance	>10 MΩ
CURRENT (I Input Range)	
Current	0 – 25mA (0.2 mA min. span)
Current Input Burden	<5 ohms
CURRENT (I Input Range)	
Custom Sensor Ranging	Many additional ranges are User Configurable using the Configuration Software

Output

Measurement Types and Ranges

THERMOCOUPLES (TC Input Ranges covered)

Output Voltage Max. Range	-10 – +10V max (min span 1V)
Load Resistance	1kohm
UNIPOLAR CURRENT (TC Input Ranges covered)	
Output Current Max. Range	0 – 20 mA (min span 1mA)
Load Resistance	1kohm

BIPOLAR CURRENT

Output Current Max. Range	-10 – +10 mA (min span 1mA)
Load Resistance	1kohm

PULSE

Pulse Rates available	Low Range: 100-1000 pulses/hr (pulse output width 500ms) High Range: 1000-10000 pulses/hr (pulse output width 60ms)
Transistor switched output	20V min; 30V max. designed to operate with a 24V relay or equivalent.
Load Resistance	860 ohms

Accuracy

Initial Error	<0.1%
Non-linearity	<0.1%
Temperature Drift	< 150ppm/ °C
TC linearisation error (types B, E, J, K, N, T)	<0.25 °C or 0.1% of reading (whichever is greater) <0.5 °C below -100 °C
TC linearisation error (types R, S, W3, W5)	<2.0 °C
TC linearisation error (type W)	<2.5 °C

Power Supply

Supply Voltage	24 Volts -15% / +25% (20-30Vdc)
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Current Consumption	65mA max. plus output current
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Selectable Computation Functions

1. Signal Inversion
2. Square Root
3. Integration output pulses instead of analogue output

Configuration

Input Type	Field selectable via 4 way DIP switch (Accessed from top of module)
Output Type	Field selectable via 4 way DIP switch (Accessed from bottom of module)
Range	Field selectable via programming port on front of unit with the aid of a PC and configuration software package.16

Environmental Conditions

Operating Temperature	-10°C – 60 °C (+14°F – 140°F)
Storage Temperature	-25°C – 85 °C (-13°F – 185°F)

Compliance to Standards

Safety	EN 60950:1995
Emissions	EN 55011 EN50081-2:1994 Group I, Class A EN50082-2
Immunity – ESD	IEC 61000-4-2:1995, level 3
Immunity – RF Fields	IEC 61000-4-3:1995, level 3
Immunity – Fast Transients	IEC 61000-4-4:1995 2 kV – DC power port 1 kV – input/output lines
Insulation	Basic Insulation between isolated circuits per IEC950
Insulation Test Voltage	Input/Output/Supply 100% tested to 1500Vac

Functional Safety to (IEC 61508)	Suitable for use in SIL1 Applications. See separate Reliability Datasheet RDC2401
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Mechanical

Width	22.5mm
Height	75mm
Depth	110mm
Mounting	Snaps on to DIN rail EN50022-35 Or screws to vertical surface
Housing	Shock resistant ABS
Flammability	UL94-HB (Housing) UL94-V0 (Terminals)
Terminal/wire size	0.14 – 2.5mm2 stranded

Weight

Unpacked	250gm approx.
Packed	350gm approx.

Ordering Infomation

C2401-0	Omniterm TXB Universal Four-Wire Transmitter – Standard model
C2401-1	Omniterm TXB Four-Wire Transmitter with 4 wire RTD input
C2401-2	Omniterm TXB Four-Wire Transmitter with Hi Voltage Input Range
C2401-3	Omniterm TXB Four-Wire Transmitter with low current excitation for Pt1000 etc.
C2401-4	Omniterm TXB Four-Wire Transmitter with high current excitation for Cu10 etc.
C2401-5	Omniterm TXB Four-Wire Transmitter for 3 wire Slide-Wire Input

Accessories

C1178A	Isolated USB to Mini Jack Programming. Cable
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