



OMNITERM TFX SPECIAL FUNCTION MODULE

Model C2404B 24Vdc powered Special Function Module with isolated output.

DATASHEET

- Select from a wide range of computation functions
- Fully configurable by the user
- Accepts two 4-20mA or 1-10Vdc inputs
- Ratio and “Rate of Change” monitoring built-in
- One universal 0-20mA / 0-±10V / 0-±10mA or pulse output
- Output isolation to 1500Vac
- Output overload detection
- 24Vdc powered



Features

- Select from a wide range of functions:
- Average, Deviation, Difference, Multiplication, Ratio, Minimum, Maximum, Track and Hold, Peak, Valley, Rate of Change, Ramp Limited, Log etc.
- 1500Vac Isolated Analogue Output
- Output overload Indicator
- User friendly configuration software
- Wide operating temperature range
- DIN Rail or surface mountable
- Narrow 22.5mm module width
- Designed to meet IEC 61508 SIL1 criteria.

OVERVIEW

The OMNITERM TFX Special Function Module is ideal for those special applications where mathematical computations are required on your analogue signals. The TFX accepts two 1-5V (up to 1-10V) or 4-20mA inputs and provides one universal output.

The output can be configured for unipolar or bipolar outputs of current or voltage from ±1mA to ±10mA; 0-20mA; or ±1V to ±10V, as well as pulse outputs for totaliser and frequency translation applications.

This module uses advanced state-of-the-art digital measurement techniques, combined with extremely user friendly software configurability for best ease of use without factory required setup when ordering.

Full output isolation to 1500Vac ensures trouble-free installations.

MATHEMATICAL FUNCTIONS

The Omniterm TFX comes equipped with a wide selection of common mathematical functions. When combined with the user configurable 32 point linearisation

table, this powerful computation module can be used to solve a wide range of signal processing applications such as belt slip monitoring, dual-redundant analogue inputs, ratio monitoring, rate-of-change monitoring etc. etc..

LOW LIFE CYCLE COSTS

The OMNITERM TFX 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.

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 – eg. from a wire break or excess resistance when configured as a current loop, or too low a load resistance when configured as a voltage output.

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

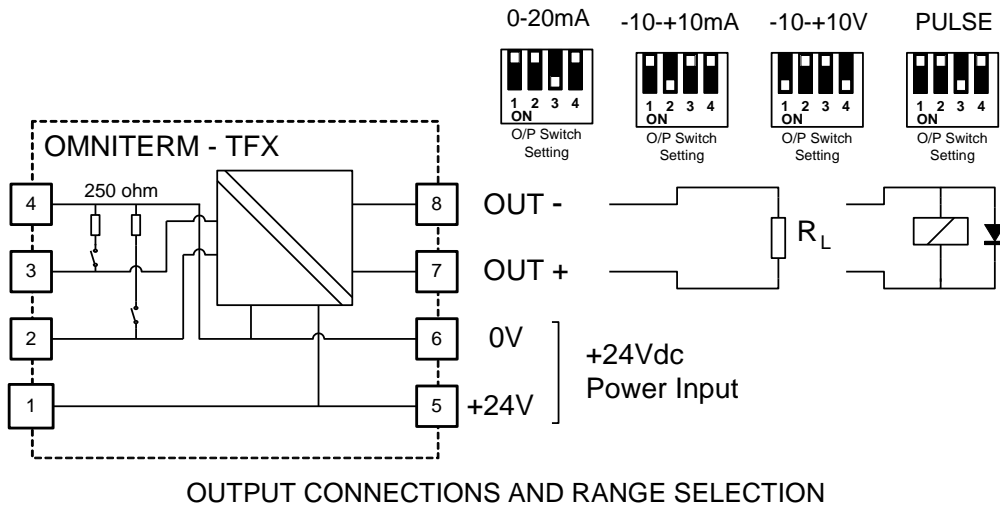
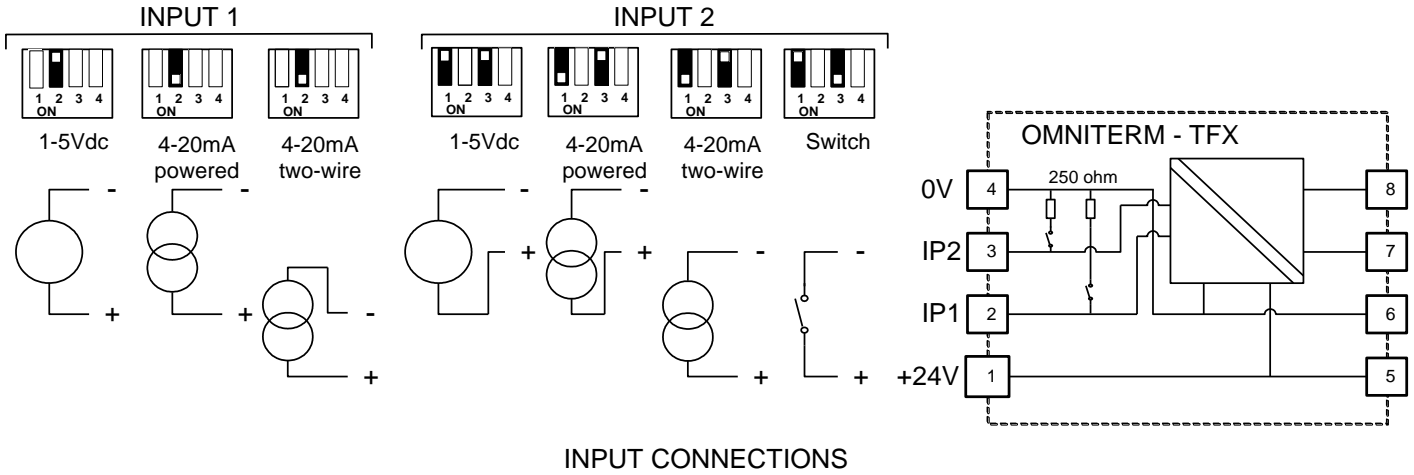




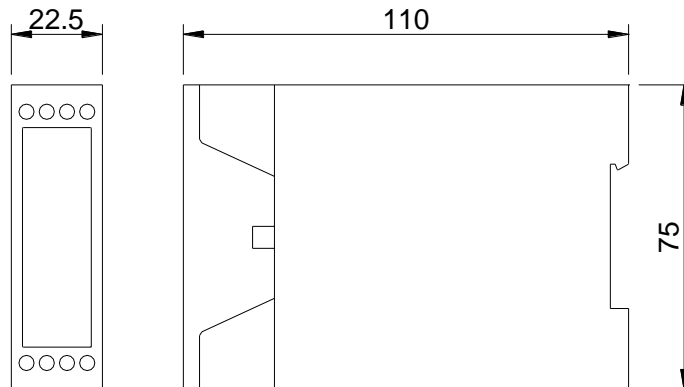
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Electrical Connections



Mechanical Details





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Specifications

Input

ANALOGUE INPUTS

Number of Inputs	2
Type	4-20mA (switch selected) 1-5V with ext. 250Ω or 1-10V
Input Impedance (1-5V)	1MΩ
Input Impedance (4-20mA)	250Ω

INPUT 2 AS DIGITAL INPUT

Input 2 OFF Voltage	1 Volt max
Input 2 ON Voltage	5 Volts min
Input 2 Maximum Voltage	28Volts max
Input 2 Input Impedance	6.8 kΩ to 0 Volts

Output

Output Types and Ranges

VOLTAGE

Output Voltage Max. Range	-10 – +10V max (min span 1V)
Load Resistance	≥1kohm

UNIPOLAR CURRENT

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

Mathematical Functions

INPUT FUNCTIONS

Each input is converted to a 16 bit integer (user selectable, but usually 0 – 10000). Input1 and Input2 are called X1 and X2 respectively in the following functions after this conversion.

The output from the chosen Input Function, Y, can then be linearised and scaled to the required physical output values.

The value K3 in these functions is a 16 bit user selectable constant.

Average	$Y = (X1 + X2) / 2 + K3$
Deviation	$Y = X1 - X2 + K3 $ (ie. The result is the absolute value of the difference between the two inputs, offset by K3(ie always positive))

Difference	$Y = X1 - X2 + K3$ (ie. The result can be positive or negative depending whether X1 is greater or less than X2)
Multiply	$Y = X1 \times X2 / 10000 + K3$
Ratio	$Y = 10000 \times X1 / X2 + K3$
Minimum	Y is the smaller of (X1 + K3) and (X2 + K3)
Maximum	Y is the greater of (X1 + K3) and (X2 + K3)

LINEARISATION FUNCTIONS

The Linearisation Function is achieved using a 32-point breakpoint table. Standard Linearisation tables are provided, but any custom table may be downloaded to the Omniterm TFX module.

Standard Tables provided	Square-root; Log ₁₀ , Antilog, sin, cos. Spherical tank, Cylindrical tank.
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TFX LINEARISATION FUNCTIONS - ACCURACY SPECIFICATIONS

Log (log 10)	<5 or 0.25% of reading
Antilog	<0.25% of reading
Square Root	<5 (0.05% of F.S.)
Sine	<0.1% of reading
Cosine	<0.1% of reading
Cylindrical Tank	<5 (0.05% of F.S.)
Spherical Tank	<5 (0.05% of F.S.)

RATE FUNCTIONS

Ramp Limiter	The rate of change of the output is limited to the rate of change set by the user.
Rate-of-Change	The output is proportional to the Rate of Change of the input.

TRACK FUNCTIONS

NOTE: When a Track Function is enabled, the Input Function Selection is disabled and the default Input Function Y = X1 is selected. X2 is used as a digital input to control the selected Track Function.

Track and Hold	The output tracks Input 1 while Input 2 is OFF. When Input 2 is ON, the output is frozen at its last value.
Peak	While Input 2 is OFF the output reflects the highest value that Input 1 has reached since the last time Input 2 was turned ON. When Input 2 is ON, the output is equal to Input 1
Valley	While Input 2 is OFF the output reflects the lowest value that Input 1 has reached since the last time Input 2 was turned ON. When Input 2 is ON, the output is equal to Input 1

Accuracy

Initial Error	<0.1%
Non-linearity	<0.1%
Temperature Drift	< 150ppm/°C

Power Supply

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





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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.

Environmental Conditions

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

Reliability Data

MTBF	44.6 years
PFD (TI = 2 years)	3.15×10^{-3}
SFF	86%

Compliance with Standards

Safety	EN 60950
Emissions	EN 55011
Immunity – ESD	IEC 61000-4-2:2008, 4kV
Immunity – RF Fields	IEC 61000-4-3:2010, 10V/m
Immunity – Fast Transients	IEC 61000-4-4:2011 1 kV

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 – 2.5mm ² stranded

Weight

Unpacked	130gm approx.
Packed	160gm approx.

Ordering Information

ORDER CODE	DESCRIPTION
C2404B	Omniterm TFX Special Function Module
ACCESSORIES	
C1168	Omniflex Miniature Jack Programming Cable.

