

**General Description**  
The TDMTC transmitter converts a temperature signal read by a thermocouple in to a normalised voltage/current output.  
The module's main features are it's compact size (just 6,2mm!), 35mm DIN rail mounting, bus-conductor power supply option for "hot swappable" usage, spring loaded terminals for quick wiring and easy configuration in the field by DIP-switch.

**Technical Features**

Power supply :	19,2 - 30 Vdc max 24 mA at 24 Vdc
Input :	K, T, J, E, N, R, S & B (to BS EN 60584.1)
Measurement Range :	Settable via DIP-switch (see Range and Input Table)
Minimum span :	100 °C
Impedance :	10 M $\Omega$
Test Current :	<50 nA
CMRR <sup>(1)</sup> :	>135 dB (referred to power-supply side)
DMRR <sup>(1)(2)</sup> :	>40 dB

<sup>(1)</sup> The values are valid at the set rejection frequency, with filter ON.  
<sup>(2)</sup> For disturbance values such as the input signal peak does not exceed the limit of acceptability.

Range and Precision of the Input			
Thermocouple	Admitted Range	Mean Error	Resolution
J	-210...1200 °C	0,025 % + 0,29 °C	0,12 °C
K	-200...1372 °C	0,025 % + 0,4 °C	0,17 °C
E	-200...1000 °C	0,025 % + 0,2 °C	0,92 °C
N	-200...1300 °C	0,025 % + 1,42 °C	0,19 °C
S	-50...1768 °C	0,025 % + 1,34 °C	0,66 °C
R	-50...1768 °C	0,025 % + 1,19 °C	0,59 °C
B	250...1820 (°) °C	0,025 % + 1,87 °C	0,9 °C
T	-200...400 °C	0,025 % + 0,31 °C	0,13 °C

(\*) Up to 250 °C, the output is considered equivalent to a null temperature.

Voltage Output :	0 - 5 Vdc, 1 - 5 Vdc, 0 - 10 Vdc and 10 - 0 Vdc
Current Output :	0 - 20 mA, 4 - 20 mA, 20 - 0 mA and 20 - 4 mA
Maximum Voltage :	Maximum load resistance 500 $\Omega$
Maximum Current :	Approximately 12,5 V
Resolution :	Approximately 25 mA
Error :	1 mV for voltage output, 2 $\mu$ A for current output mA or 5 V output: 350 ppm of the end scale 10 V output : 200 ppm of the end scale

Static Aux Output :	Applicable Voltage : 24 Vac Nominal Current: 60 mA Max
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ADC :	14 bits
Class/Base Prec. :	0,1 %
Thermal Drift :	120 ppm/K
Response Time : (10 - 90 %) :	< 25 ms (without filter) < 55 ms (with repeat filter 50 Hz)
Cold junction error :	1,5 °C Max

Insulation Voltage :	1,5 kV (50 Hz for 1 min)
Protection Index :	IP20
Operating Conditions :	Temperature -20 to +65 °C Humidity 10 - 90 % at 40 °C non-condensing.
Storage Temperature :	-40 to +85 °C
LED Signalling :	Fault/Anomaly, state of the auxiliary output
Connections :	Spring terminals
Conductor Section :	0,2 - 2,5 mm <sup>2</sup>
Wire stripping :	8 mm
Altitude :	Up to 2000m above sea level

Box :	PBT (black)
Dimensions, Weight :	6,2 x 93,1 x 102,5 mm, 46 g.

Standards : EN61000-6-4/2002 (electromagnetic emission, industrial surroundings)  
EN1000-6-2/2005 (electromagnetic immunity, industrial surroundings)  
EN61010-1/2001 (safety)  
All the circuits must be provided with double insulation from the circuits under dangerous voltage. The power supply transformer must be built to compliance with EN60742: "Insulation transformers and Safety transformers".  
Notes:  
- Use with copper conductor.  
- Use in Pollution Degree 2 Environment.  
- Power Supply must be Class 2.  
- When supplied by an Isolated Limited Voltage/Limited Current power supply a fuse rated max 2.5A shall be installed in the field.



**AUXILIARY OUTPUT**

**Description**

The auxiliary output has been designed to pilot an indicator, a relay of greater power or the input of a supervisor control system. With this output the TDMTC transmitter can generate an alarm or be utilized like a thermostat. The state of the output depends on the fault configuration of the primary output, and is set by dip-switch SW2.7 (see table below).  
When configuring the setpoint for the aux output the primary output assumes the value of the setpoint. This must be read by a multimeter or similar instrument. The setpoint value is given in the scale of the chosen output. The aux output switches when the setpoint is reached.

To configure the setpoint you must press a button found under the front cover that can be reached with a small screwdriver. The configuration has to be performed when the module is connected to the power supply. The setting procedure is as follows:  
- Press and release the button. The primary output starts to represent the value of the setpoint. At this point the red led flashes slowly.  
- If the button is not pressed again within 5 seconds the system returns to normal.  
- On every further press there is an increase or decrease of approximately 0,2 %, the direction of the variation depends on the Normal state of the output (dip-switch SW2.7).  
- If the button is not released but continues to be pressed, after 2 seconds a continuous increment of 3% starts.  
- When the value reaches the maximum/minimum value of the chosen scale the cycle starts again.  
- During the setpoint configuration the auxiliary output will follow its normal function opening and closing at any previously configured setpoint.  
- After 5 seconds of inactivity the set value is memorized and both outputs continue with normal operation.

Note:  
The setpoint cannot be modified in case of internal fault. If the power supply is not sufficient during configuration or before the 5 seconds of inactivity are elapsed the new value will not be memorized.

*Details of Dip-Switch SW2.7*

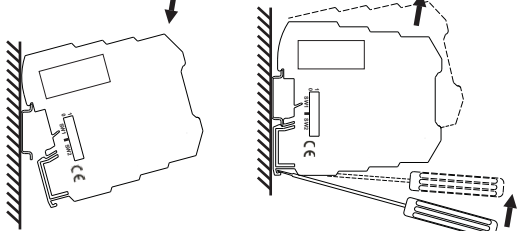
SW2.7	Regulation Type	Fault	Normal State	Set Threshold
OFF	Furnace (*)	Towards the high	Closed (led ON)	Decrement
ON	Refrigerator (*)	Towards the bottom	Opened (led OFF)	Increment

(\*) In case of choice of direct output (0/4 - 20 mA), 0/1 - 5/10 V

**Installation rules**

This module has been designed for mounting on a DIN 46277 rail. Mounting in a vertical position is recommended in order to increase the module's ventilation. No raceways or other objects that compromise aeration must be positioned in the vicinity.  
Do not position the module above equipment that generates heat; we recommend positioning the module in the lower part of the control panel or container compartment. We recommend rail-type assembly using the corresponding bus adaptor (Code 748-540) eliminating the need to connect a power supply to each module.

Inserting the module in the rail      Removing the module from the rail



- Attach the module in the upper part of the rail.
- Apply leverage using a screwdriver (as shown in the figure).
- Press the module downwards.
- Rotate the module upwards.

**Using the 748-540**



- Connect the 748-540 adaptors as required in order to obtain the number of positions necessary (each 748-540 can accommodate 2 modules).
  - Attach the 748-540 adaptors to the rail by positioning them on the upper side of the rail and then rotating them downwards.
- IMPORTANT:** Pay particular attention to the position of the terminals of the adaptor. The 748-540 must be inserted in the guide with the terminals on the left (as shown in the figure) otherwise the adaptors are installed upside down.

- Never connect the power supply directly to the bus connector on the DIN rail.
- Never tap power supply from the bus connector either directly or by using the module's terminals.

**SETTING OF THE DIP-SWITCHES**

**Factory setting**

All the module DIP switches are at pos. 0 as default configuration. This set corresponds to the following default configuration:

Thermocouple Type :	J
Line Rejection :	50 Hz
Input Filter :	Present
Measurement Range :	0 - 1000 °C
Output Signal :	4 - 20 mA
Output Signal in case of fault :	Towards the top of the output range
Over-Range :	YES: a 2.5% over-range value is acceptable; a 5% over-range value is considered a malfunction.

Auxiliary Output Threshold : 0% of the nominal scale

This configuration is valid only with all the DIP switches at position 0. If one Dip is moved it is necessary to set all the other parameters as indicated on the following tables.

Note: for all following tables  
The indication ● indicates that the DIP-switch is set in Position 1 (ON).  
No indication is provided when the DIP-switch is set in Position 0 (OFF).

THERMOCOUPLE TYPE				LINE REJECTION			
SW1	1	2	3	SW1	4	5	6
●				●			
●					●		
●						●	
●							●
●							
●							
●							
●							
●							

(\*) The input filter stabilizes the measurement but slows down the response time. If the maximum response speed is not required, it is advisable to activate it.

MEASUREMENT RANGE START											
SW1	6	7	8	J Type	K Type	R Type	S Type	T Type	B Type	E Type	N Type
●				0 °C	100 °C	100 °C	100 °C	50 °C	400 °C	100 °C	100 °C
●				100 °C	200 °C	200 °C	200 °C	100 °C	500 °C	200 °C	200 °C
●				200 °C	400 °C	300 °C	300 °C	200 °C	600 °C	300 °C	300 °C
●				300 °C	600 °C	400 °C	400 °C	-50 °C	800 °C	400 °C	500 °C
●				500 °C	800 °C	600 °C	600 °C	-150 °C	1000 °C	500 °C	700 °C
●				-100 °C	-100 °C	800 °C	800 °C	-100 °C	1200 °C	-100 °C	-100 °C
●				-200 °C	-200 °C	1000 °C	1000 °C	-200 °C	1400 °C	-200 °C	-200 °C

\* If all the dip-switches are set to OFF position, the default configuration is valid; otherwise the value of this parameter is 0 °C, as for the other thermocouple types.

MEASUREMENT RANGE END											
SW2	1	2	3	J Type	K Type	R Type	S Type	T Type	B Type	E Type	N Type
				1200 °C	1350 °C	1750 °C	1750 °C	400 °C	1800 °C	1000 °C	1300 °C
●				1000 °C	1200 °C	1500 °C	1500 °C	350 °C	1600 °C	800 °C	1200 °C
●				800 °C	1000 °C	1300 °C	1300 °C	300 °C	1500 °C	600 °C	1000 °C
●				600 °C	800 °C	1100 °C	1100 °C	250 °C	1300 °C	500 °C	800 °C
●				500 °C	700 °C	900 °C	900 °C	200 °C	1100 °C	400 °C	600 °C
●				400 °C	500 °C	700 °C	700 °C	150 °C	900 °C	300 °C	500 °C
●				300 °C	300 °C	500 °C	500 °C	100 °C	700 °C	200 °C	400 °C
●				200 °C	200 °C	300 °C	300 °C	50 °C	500 °C	100 °C	200 °C

OUTPUT				OUTPUT SIGNAL IN CASE OF FAULT			
SW2	4	5	6	SW2	7	8	9
●				●			
●				●			
●				●			
●				●			
●				●			
●				●			
●				●			
●				●			
●				●			

(\*) See the table below for the corresponding values.

Output Signal Limits		
Nominal Value	Over-range $\pm$ 2,5 %	Over-range $\pm$ 5 %
20 mA	20,5 mA	21 mA
4 mA	3,5 mA	3 mA
0 mA	0 mA	0 mA
10 Vdc	10,25 Vdc	10,5 Vdc
5 Vdc	5,125 Vdc	5,25 Vdc
1 Vdc	0,875 Vdc	0,75 Vdc
0 Vdc	0 Vdc	0 Vdc

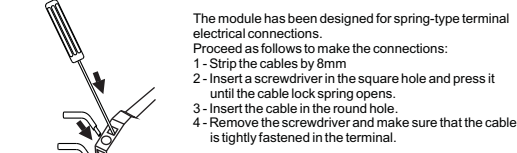
**LED indications on the front**

Red LED	Meaning	Output Fault
Fast flashing	Internal fault: power supply not sufficient, out of range offset or reference. Error on reading or writing in flash (at the start or on threshold setting)	YES
Slow flashing	DIP-switch setting error Set Threshold in progress	YES NO (*)
Steady light	Disconnected thermocouple, out of range input or temperature compensation Output limiting in progress	YES NO

(\*) In this modality the output signal represents the value of the threshold.

Yellow LED	Meaning
ON	The auxiliary output is closed
OFF	The auxiliary output is opened

**Electrical Connections**



The module has been designed for spring-type terminal electrical connections.  
Proceed as follows to make the connections:  
1 - Strip the cables by 8mm  
2 - Insert a screwdriver in the square hole and press it until the cable lock spring opens.  
3 - Insert the cable in the round hole.  
4 - Remove the screwdriver and make sure that the cable is tightly fastened in the terminal.

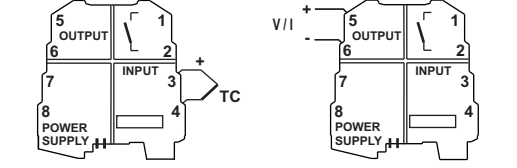
**Power supply**

There are various ways to provide the 19,2..30 Vdc transmitter with power.

- Direct 24Vdc power supply to Terminals 7(+) and 8(-) of each module.
- Using the 784-540 bus adaptor, eliminating the need to connect power supply to each module. The bus can be supplied from any of the modules; the total absorption of the bus must be less than 400mA. Higher absorption values can damage the module. An appropriately sized fuse must be connected in series to the power supply.

**Input**

The module accepts input from the following types of thermocouples: K, T, J, E, N, R, S & B  
The use of shielded cables is recommended.



**Auxiliary Output**

The auxiliary output has been designed to pilot an indicator or a relay of greater power or the input of a supervisor control system.

**Disposal of Electrical & Electronic Equipment (Applicable throughout the European Union and other European countries with separate collection programs)**  
This symbol, found on your product or on its packaging, indicates that this product should not be treated as household waste when you wish to dispose of it. Instead, it should be handed over to an applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences to the environment and human health, which could otherwise be caused by inappropriate disposal of this product. The recycling of materials will help to conserve natural resources. For more detailed information about the recycling of this product, please contact your local city office, waste disposal service or the retail store where you purchased this product.