

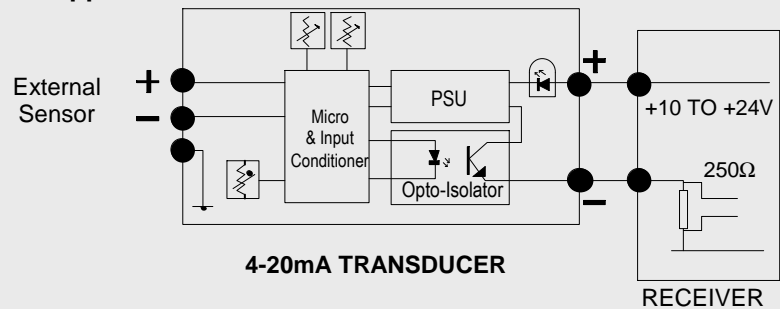
The **Micha Temperature to 4-20mA Transducer (PN: 102065)** has been designed for use where a 4-20mA signal is required to indicate temperature, either as detected by the internal sensor, or by use of an external device such as the MSR_x Temperature Sensor, for example **PN 101302 (10M)**.

The control circuitry is powered directly from the 4-20mA loop and no separate power source is required.

The on-board microcontroller allows the selection of several ranges for maximum flexibility, and two LED's give continuous status; a Blue LED indicating operating status and a Green LED shows current flowing through the output loop.

The transducer is housed in a plastic enclosure with integral clips for symmetric (35 x 7.5mm) and asymmetric (32 x 15mm) DIN rails.

Typical application:



Connections and Setup:

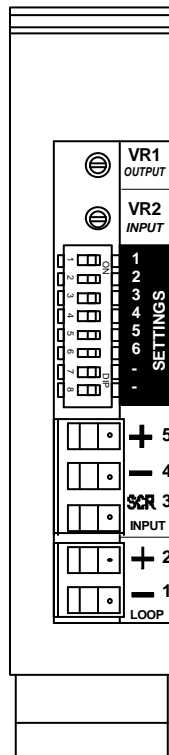
If the internal temperature sensor is to be used, only the loop connection is required as power for the circuit is derived from this supply.

A remote sensor, such as the Micha Temperature Sensor used for the MSR_x range, may be connected for external temperature monitoring, or any equivalent device passing 1 μ A/K (273.2 μ A at 0°C and 293.2 μ A at 20°C). The negative and positive connections should be made to terminals 4 and 5 respectively, with the optional Screen connection (terminal 3) left un-connected if not used.

The temperature range representing the 4-20mA output can be selected by setting the appropriate switches.

The temperature sensor to be measured is set by Switch 4, and an 'Extended Range', set by Switch 5, allows a 'fault' signal (<4mA) to be produced.

Note: Power for this module is derived from the 4-20mA loop which is therefore not isolated from the sensor.



Micha www.micha.co.uk TEMPERATURE to 4-20mA TRANSDUCER (LOOP-POWERED) PN: 102065

VR1: Calibrate 20mA Output
REFER TO MANUAL FOR FULL USER INSTRUCTIONS.

VR2: Calibrate External Input

STATUS LED

1 x OK
2 x UNDER-RANGE
3 x OVER-RANGE

DIP SWITCH SETTINGS:

0 = OFF 1 = ON

SET SWITCHES FOR REQUIRED SCALE:
EXAMPLE: 011 1 00
0°C to +50°C; Ext. Sensor: Normal mode

SWITCHES 5 & 6:
Set to xx xx 11 xx for fixed 20mA output for calibration.

123: Range

000	: -10°C to +40°C	<input type="checkbox"/>
001	: 0°C to +40°C	<input type="checkbox"/>
010	: -10°C to +50°C	<input type="checkbox"/>
011	: 0°C to +50°C	<input type="checkbox"/>
100	: +10°C to +50°C	<input type="checkbox"/>
101	: -10°C to +70°C	<input type="checkbox"/>
110	: 0°C to +70°C	<input type="checkbox"/>
111	: +10°C to +70°C	<input type="checkbox"/>

4: Sensor

0 : Internal

1 : External

56: Mode

00 : Normal

01 : Ext: <3mA to 20mA

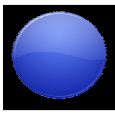
10 : Fixed 4mA

11 : Fixed 20mA

Switches 7&8 not used.

LOOP VOLTAGE: 10-24VDC

Made in the U.K.



Setting the Range:

The microprocessor allows the user to set a variety of ranges for both the internal and external sensors to cover popular requirements. Typical switch settings are shown below:

Example 1: to set a range of -10°C to +50°C, using the internal sensor, normal mode:

Sw1: 0	Sw2: 1	Sw3: 0	Sw4: 0	Sw5: 0	Sw6: 0
Range = -10°C to +50°C		Internal		Mode = Normal	

Example 2: to set a range of 0°C to +40°C with an external sensor, extended mode:

Sw1: 0	Sw2: 0	Sw3: 1	Sw4: 1	Sw5: 0	Sw6: 1
Range = 0°C to +40°C		External		Mode = Extended	

Example 3: to set a range of +10°C to +70°C with an external sensor, normal mode:

Sw1: 1	Sw2: 1	Sw3: 1	Sw4: 1	Sw5: 0	Sw6: 0
Range = +10°C to +70°C		External		Mode = Normal	

Selection Switches

Selection Switches

123 : Range

- 000 : -10°C to +40°C
- 001 : 0°C to +40°C
- 010 : -10°C to +50°C
- 011 : 0°C to +50°C
- 100 : +10°C to +50°C
- 101 : -10°C to +70°C
- 110 : 0°C to +70°C
- 111 : +10°C to +70°C

4 : Sensor

- 0 : Internal
- 1 : External

56 : Mode

- 00 : Normal
- 01 : Extended: ~3mA to 20mA
- 10 : Fixed 4mA
- 11 : Fixed 20mA

1 = ON 0 = OFF

Mode:

For normal use, switches 5 - 6 should be set to **0 0**. If switches 5 & 6 are set to 'Extended Mode' **0 1** and the input falls below the lower value as set in the Range configuration, the output will drop to approximately 3mA. This can be useful for indicating a missing or damaged sensor. The use of the fixed 4mA and 20mA modes are for calibration only.

Indicators:

During normal operation, the blue **STATUS** LED on the top of the unit will flash once approximately once a second. If the measured temperature drops below the lower range setting, the **STATUS** LED will blink twice, and if the measured temperature exceeds the higher range setting, the **STATUS** LED will blink three times.

The **OUTPUT** LED is in series with the output loop and varies in intensity with the 4-20mA current.

Calibration:

Should it become necessary to re-calibrate to unit, this can be done as follows:

1] 20mA Output: Set DIP Switches 5 - 6 to **1 1** (fixed 20mA output).

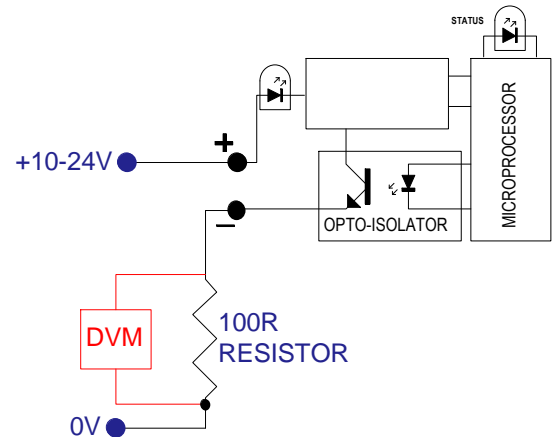
Fit a 100R resistor in series with the output and connect a voltmeter (DVM) across it. Adjust **VR1** until the DVM reads 2.00V (representing 20mA). The 4mA output can be confirmed by setting switches 5 & 6 to **1 0** and checking for a voltage of 0.40V across the resistor.

2] External Input: Set DIP Switches 5 - 6 to **0 0** and Switch 4 to **1**

Calibration of the external sensor requires it to be at a known temperature. Set a suitable range and adjust **VR2** until the DVM reads the applicable voltage. For example, if the sensor is at 25°C and the range is set to -10°C to 40°C, the meter should read 1.52V. The formula for determining the DVM voltage is:

$$(((T_{in}-T_{Lo}) / (T_{Hi}-T_{Lo})) \times 1.6) + 0.4$$ which for the example above is: **$$(((35 / 50) \times 1.6) + 0.4 = 1.52$$**

Note: if the input signal exceeds the THi setting, the output will be limited to 2.0V (20mA), and if the input is below the TLo setting, the output will be fixed at 4mA. It is not possible to recalibrate the internal sensor.



General Specification:

- Loop Voltage Range : 10VDC to 24VDC, maximum burden at 24V approx 560R
- External Sensor : 1uA/K (273.2µA at 0°C)
- Connectors : 2-part, rising-clamp, maximum cable size: 2.5mm²
- Accuracy/Linearity : Better than 1%
- Operating Temperature Range : -5°C to +55°C
- Enclosure : Self-extinguishing polyamide 6,8 (UL 94 v0)
- Dimensions : 22.5mm (W); 82mm plus terminals (D); 102mm above chassis