

MODNTC : input module for ambient temperature sensors and potentiometers

MODNTC module allows to transmit, through the **CONTATTO** bus, four temperature values measured by proper NTC sensors.

As option, MODNTC module can be provided for the connection to 2 temperature sensors and two potentiometers. The measurement range of the temperature is $-25.0 \div +60.0^{\circ}\text{C}$ with 0.1°C resolution.

MODNTC module takes only one address in a **CONTATTO** bus system, even if it provides four 12-bit analog channels.

MODNTC housing is a standard DIN 3M module. A 5-way removable terminal block on a side of the module allows the connection to the **CONTATTO** bus; on the other side a 9-way fixed terminal block allows the connection to the temperature sensors and to the potentiometers. A green LED on the front panel shows the power-on condition and a white label allows to make note of assigned address for an immediate visual identification.

The two available versions of MODNTC module are identified by a code on the front panel as follows:

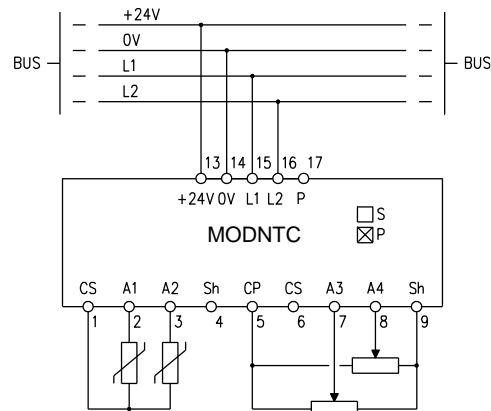
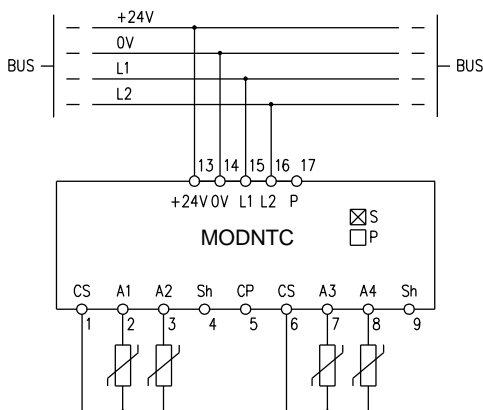
Version	Code
4 temperature sensors	S
2 sensors + 2 potentiometers	P

Address programming

MODNTC module takes only one input address, assigned by the FXPRO programmer. Each one of the four channels will be referenced in MCP program by a notation like **Ai.n**, where **i** is the module address and **n** is the channel number; e.g., **A3.2** identifies the channel 2 of the module which address is 3 (for details refer to MCP user's manual).

Wiring diagrams

The following schematic diagrams show the proper connections to be made for MODNTC module, both for S version (4 sensors) and P version (2 sensors and 2 potentiometers).



Note 1: if the cables connecting the sensors to the module are very long, it is recommended to use shielded cables; in this last case, connect the shield to Sh terminals.

Note 2: the potentiometers must be linear type and their values must be in the range 5 to 50 Kohms.

Note 3: left unconnected the unused temperature sensor inputs.

Note 4: for P version, make a jumper between the unused potentiometer inputs (A3 or A4) and the terminal Sh.

Scaling the analog values

The temperature values measured by MODNTC module are reported as Kelvin degrees multiplied by 10; in other words, 0°C will be reported as 2730, 0.1°C will be reported as 2731 and so on.

Called **x** the value read from a temperature channel of MODNTC module, the formula to convert to Celsius degrees is:

$$T(^{\circ}\text{C}) = (x - 2730) / 10$$

The temperature channels of MODNTC module report the value 32767 (3003.7°C) if the temperature sensor is short-circuited and the value 0 (-273°C) if the sensor is disconnected.

The supervision systems, normally, allow to scale a binary value to the wanted format simply setting the zero and the full scale values; for MODNTC module the correct values to scale the read value to the $^{\circ}\text{C}$ format are:

Number of bits	Zero	F.S.
12-bit	-273.0	136.5
16-bit (WORD)	-273.0	6280.5

Use the values on the 12-bit or 16-bit row according to the specifications of the supervision system (in other words the values to be used depend on the way the supervisor handles the data).

Concerning the potentiometer channels, the values read from the module will be 0 with the potentiometer at its minimum position and it will be 1000 with the potentiometer at its maximum position; as example, a value 400 means that potentiometer is placed at 40.0% of its maximum position. To convert the value read from a potentiometer channel to a percentage value, simply divide that value by 10; the zero and full scale settings on the supervisor, in this case, will be the following (depending on the way the supervisor handles the data):

Number of bits	Zero	F.S.
12-bit	0	409.5
16-bit (WORD)	0	6553.5

Temperature sensors

DUEMMEGI provides the temperature sensors properly manufactured for MODNTC module. The shape and the dimensions of these sensors allow the housing directly in a standard wall box.

The sensors are available in silver and black color.

Technical characteristics

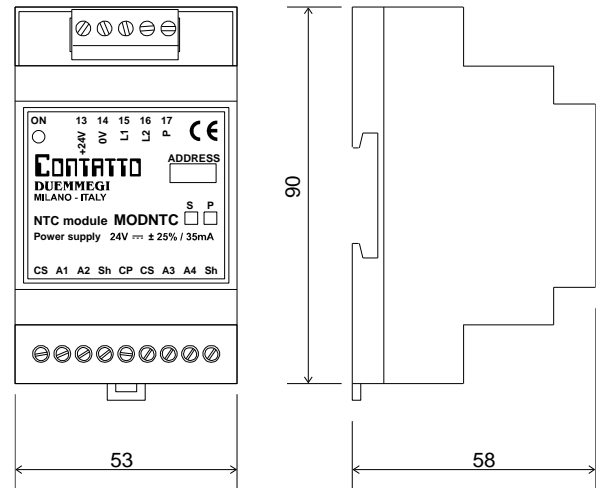
Standard version:

Supply voltage	24V \pm 25% SELV
MAX current consumption	35mA
Number of channels	
S version:	4 for NTC sensors
P version:	2 for NTC sensors and 2 for potentiometers
Temperature sensor type	NTC
Temperature measurement range	-25.0 ÷ +60.0 °C
Temperature measurement resolution	0.1 °C
MAX temperature measurement error	\pm 0.5 °C
Linearity of the temperature measurement	\pm 0.5 °C
Potentiometer measurement resolution	1000 points
Max length for sensor and potentiometer wires	10 meters
Operating temperature	-10 ÷ +50 °C
Storage temperature	-30 ÷ +85 °C
Protection degree	IP20

Warning: MODNTC module accepts NTC temperature sensors only; since many types of NTC sensors can be found on the market, each one with very different characteristics, use only the proper sensors provided by **DUEMMEGI** under request. The connection to any different sensor type will produce erroneous measurements.

Outline dimensions

Module:



Temperature sensor:

