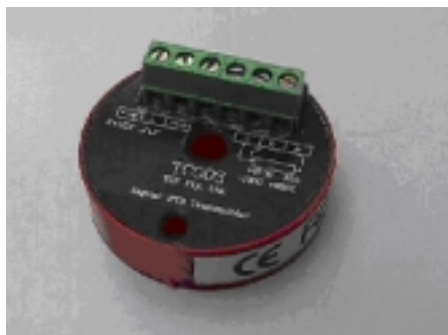


# TC-003 Digital RTD Transmitter

## What is it?

The TC-003 Digital RTD Temperature Transmitter is a unique device designed to transmit the temperature measured by a PT100 RTD sensor to a PLC digital input. Although it requires only one normal digital 24VDC input on the PLC, it provides an accurate temperature measurement for use in the PLC program.



## What does it look like?

It is packaged in a standard ANSI 2", 50mm "hockey-puck" to be installed in the head of normal industrial temperature probe assembly. The TC-003 transmitter is connected to the normal PT100 RTD.

## How does it work?

It measures the resistance of the PT100 RTD and then calculates the corresponding temperature. It

then outputs the measurement as a low speed serial pulse train to a standard PLC digital input.

The PLC receives 16 bits of data in a format ready to load into a 16 bit data register. The PLC register ends up containing the value of the measured temperature in degrees C x 10. For example if the measured temperature is -5°C the transmitted data will be -50, and if the measured temperature is +10°C the transmitted data will be 100.

## Is it compatible?

The PLC digital input does not need to be a high speed or counter type input. Any normal 24VDC digital input is suitable.

The rate of data transmission is selected to allow non-time critical operation of the receiving PLC. The shortest pulse time is 100mS, so the PLC needs to have a maximum scan time of 50mS. This is normally very easy to achieve.

A small section of ladder program collects and interprets the pulses in sequence and loads a register with the measured temperature value.

There is no particular limit to the number of TC-003 transmitters that can be used with a single PLC. It depends only on the number of inputs and program and data memory available.

## Specifications

### Data format

Start pulse and 16 data bits, 2's complement binary code, MSB first, °C x 10.

### Start pulse

500mS +ve, 100mS -ve

### Data pulse

Binary 0                    100mS +ve, 200mS -ve  
Binary 1                    200mS +ve, 100mS -ve

### Rate

One reading every 8 seconds

### Accuracy

Resistance  $\pm 0.1\%$ , equivalent to  $\pm 0.3$  °C at 0°C

### Useful Range

-100°C to +850 °C

### Resolution

0.1°C

### Power Supply

24VDC, 20mA  
min 18V, max 30V

### Connection

3-Wire  
+24VDC, 0VDC, output

### Input

RTD PT 100, 3-wire  
DIN 43760,  $\alpha = 0.00385$

### Output

- ❖ 24VDC "push-pull", 100mA.
- ❖ Output connection switches between 0V and +24VDC to operate correctly with normal PLC 24VDC sink or source input ("PNP" or "NPN").
- ❖ Output is short-circuit, overload and reverse polarity protected.

### Transient protection

- ❖ Transients above 33V are absorbed by Tranzorb surge suppressors.
- ❖ Continuous DC operation above 33V will destroy the sensor.

### Physical

- ❖ 50mm diameter ANSI standard
- ❖ Fully encapsulated electronics
- ❖ Screw terminal blocks

2<sup>nd</sup> September 1998