ELZET 80

PT100MUX8

RTD (Pt100) temperature sensor multiplexer

Ranges and resolutions

Model	Low temp. @4mA	High temp. @20mA	Current at 0˚C	Temperature span	Resolution at 12 bit ADC	Resolution at 10 Bit ADC	Offset range +/-
<124	-40˚C	123.8˚C	7.907mA	163.8 K	0.05 K/bit	0.2 K/bit	40 K
<303	-25˚C	302.6˚C	5.221mA	327.6 K	0.1 K/bit	0.4 K/bit	80 K
<505	-150˚C	505.25˚C	7.663mA	655.2 K	0,2 K/bit	0.8 K/bit	160 K
<819	0˚C	819˚C	4mA	819 K	0.25 K/bit	1 K/bit	200 K
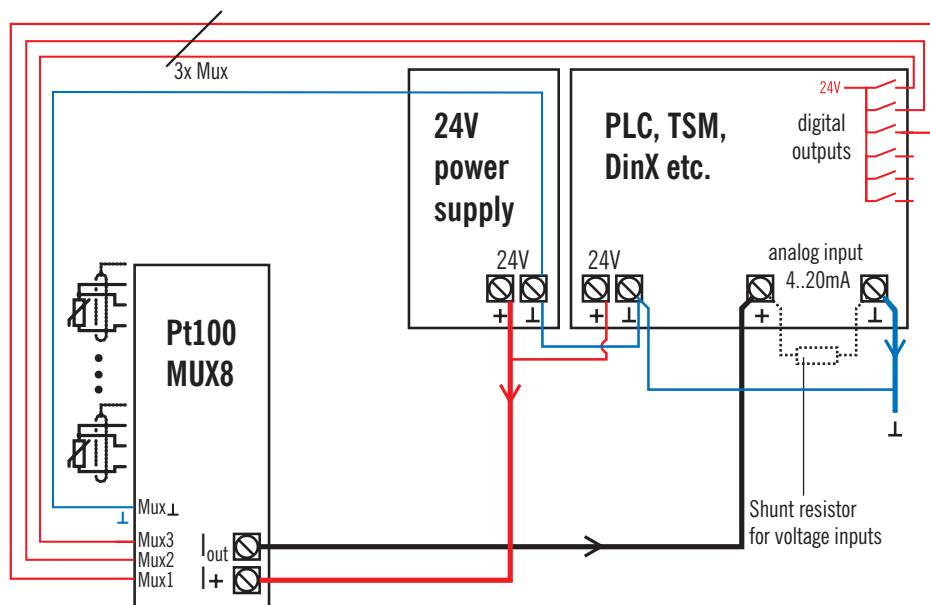
PT100MUX8 allows eight temperature sensors signals to be converted and multiplexed to a single analog output of 4..20mA. As such it is handy for temperature control using a standard PLC with few analog inputs or for ELZET80's controllers with analog voltage or current inputs. Except for an analog voltage input of 0..1 to 0..10V or a current input of 0/4..20mA, only three 24V digital outputs and a 24V/30mA supply are needed.
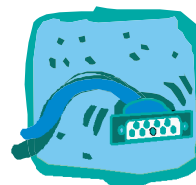
Setup

The standard version of PT100MUX8 comes pre-set for a fixed temperature range. In the adjustable version, there's a rotary switch accessible with a screwdriver from the bottom panel that selects one of four possible temperature ranges.

Voltage inputs

On analog voltage inputs, a shunt resistor is needed to measure the current drop over that resistor.

A 20mA current will result in 10V over a 500 Ohms resistor. For 0..5V inputs you need a 250 Ohms resistor and for 0..1V inputs a 50 Ohms resistor.

Same values for +/-10V etc. You'll lose half the available resolution on a +/- input. Shunt resistors of higher than 500 Ohms are not allowed.

Please select resistors with high initial accuracy (0.1% for 10 bits, 0.025 for 12 bits) and a low temperature coefficient (10 or 15 ppm)
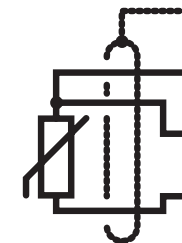
Inputs and outputs

Attach Pt100 sensors with three wires as shown to allow for line resistance compensation.

From the digital outputs of your controller, wire three active high outputs to the MUX1 to MUX3 inputs of PT100MUX8.

Selection is binary with for instance 000 choosing input 1, MUX1 and MUX2 active choosing input 4 and all active choosing input 8.

The output is a passive current output that supplies the PT100MUX8 with 24V and delivers the output current at the same time. Please apply 24V to the **I+** signal and wire the **Iout** signal to the positive analog input of your controller.

Please make sure the negative/ground analog input of your controller is on the same ground as the power supply that delivers the 24V.

Software Setup

Do not select any linearisation in your controller. PT100MUX8 provides values between 0.05˚C/bit and 1˚C/bit of the raw binary analog input. You would have to substract the 4mA value to get the low range value. On a 12 bit ADC you will get 819 as the low temperature value (corresponding to 4mA) and 4095 for full scale. On a 10 bit ADC these values are divided by four, i.e. 204/1023 and 51/255 on an 8 bit ADC.

Then, select the resolution values from the above table to add for each bit value.

Example: Model PT100MUX8<124 will give an 819 reading on a 10 bit ADC for -40˚C. 820 will mean -40˚C plus 0.2K, i.e. -39.8˚C.

Technical data

PT100 3 wire input, 4..20mA output

Sensor linearisation to 1/40 of standard Pt100 nonlinearity

Environmental temperature range -40..+85˚C

Factory calibrated to less than 0.1% offset and gain error at 20˚C

Offset drift less than 100ppm

Gain drift less than 150ppm

Total error at 0..40˚C: less than 0.3%