

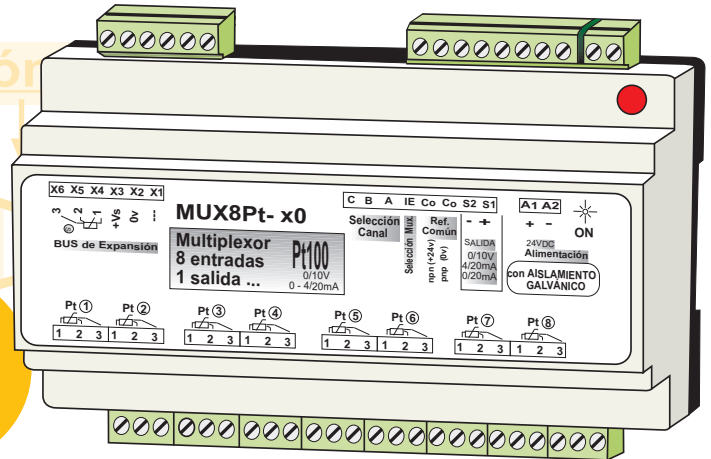
# MULTIPLEXER

## 8 input Pt100-RTD

active OUTPUT 0-4/20mA  
0/10V

WITH GALVANIC ISOLATION

EXPANSIONABLE



### DESCRIPTION

This multiplexer is an 8-channel electronic switch of Pt 100, which allows to select 8 Pt100 statically, converting the captured temperature into a proportional signal of 0-4 / 20mA active, or 0/10 V.

The Mux8pt family can be interconnected by expansion modules up to 96 channels. It brings considerable savings, both in Pt 100 converters and in analog PLC inputs.

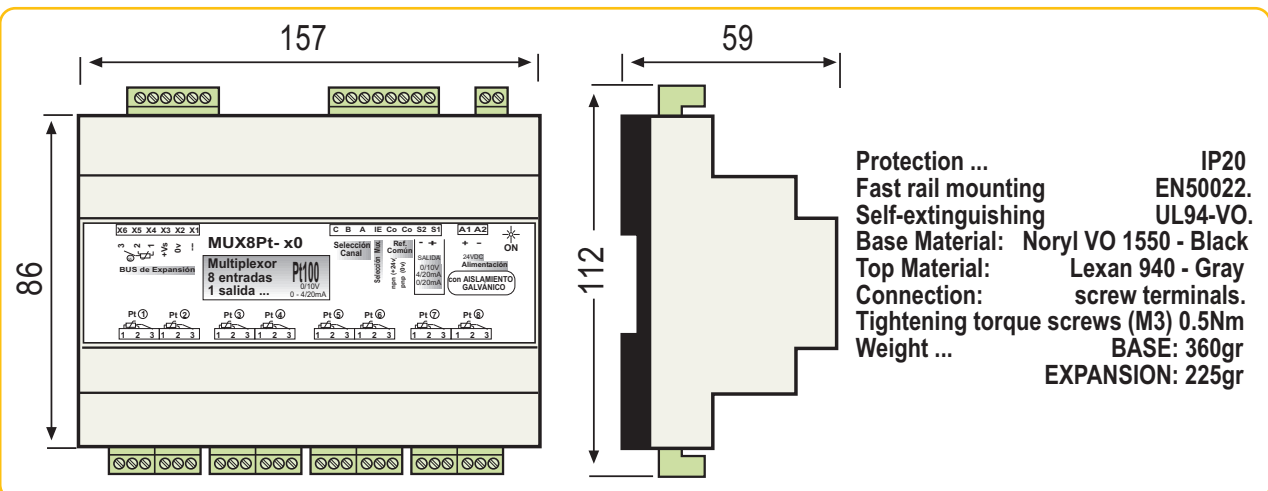
It has configuration of the temperature range and the type of output and, in addition, the output is galvanically isolated.

APPLICATIONS are indicated in all installations or processes that employ a large number of Pt 100 sensors (intelligent control, control in chemical processes, ovens, purifiers, warehouses, dryers, etc ...)

### GENERAL CHARACT.

- Static switching, fully electronic.  
(Without mechanical wear and unlimited life)
- Expandable via additional 8-channel modules: 24 VDC Up to 96 channels  
230 VAC Up to 40 channels
- Setting the temperature scale.
- Configurable isolated 0-4 / 20 mA current output, or 0 / 10V.
- Very low driving resistance.
- Input of Pt100 of 3 threads, for line compensation.
- Channel selection via 3 optocoupled digital lines configurable in terminals by NPN or PNP transistor.
- Compact modular box. Plug-in terminals by screw.

### DIMENSIONS



Protection ... IP20  
Fast rail mounting EN50022.  
Self-extinguishing UL94-VO.  
Base Material: Noryl VO 1550 - Black  
Top Material: Lexan 940 - Gray  
Connection: screw terminals.  
Tightening torque screws (M3) 0.5Nm  
Weight ... BASE: 360gr  
EXPANSION: 225gr

## GENERAL DATA

Working temp	<b>-10°C/+55°C</b>	
Max global error	<b>0,1%</b>	
Linearity error	<b>0,05%</b>	
Thermal drift	<b>Ⓜ 0,5μA/°C</b>	<b>Ⓜ 0,2mV/°C</b>
Electromagnetic Compatibility	<b>2004 / 108 / CE</b>	
Electromagnetic emissions	<b>UNE-EN 50081-2</b>	
Electromagnetic immunity	<b>UNE-EN 50082-2</b>	

## INPUT

- 8 Pt100 inputs of 2-3 wires with line compensation.	
- Maximum line resistance	50 ohm / wire
- Resistance of cable compensation	0.005°C / ohm
- Conduction resistance	Ron < 0.08 ohm.
- Maximum dispersion of	Ron < 0.02 ohm.
- Linearization according to	DIN43760 a: 0,0385
- Opto-coupled and selectable digital inputs PNP / NPN	24VDC (+/- 20%) - 4mA
- Module selection via	ENABLE / DISABLE (according to internal strap ST1)

## OUTPUT WITH GALVANIC ISOLATION

- 4/20mA, 0/20mA, ...	Max load capacity	<b>&lt; 700 ohm.</b>
- 0/10V, 0/5V, ... (Protected against shortcuts)	Max load capacity	<b>&gt; 1Kohm.</b>
- ALARMS: broken or lacking sensor	<b>Ⓜ aprox. 23mA</b>	<b>Ⓜ aprox. 12V</b>
Sensor shortcut	<b>Ⓜ 0mA</b>	<b>Ⓜ 0V</b>
- Stabilization time in each channel	<b>&lt; 100 ms</b>	
- Isolation voltage input / output	<b>1.500 V</b>	

## SUPPLY

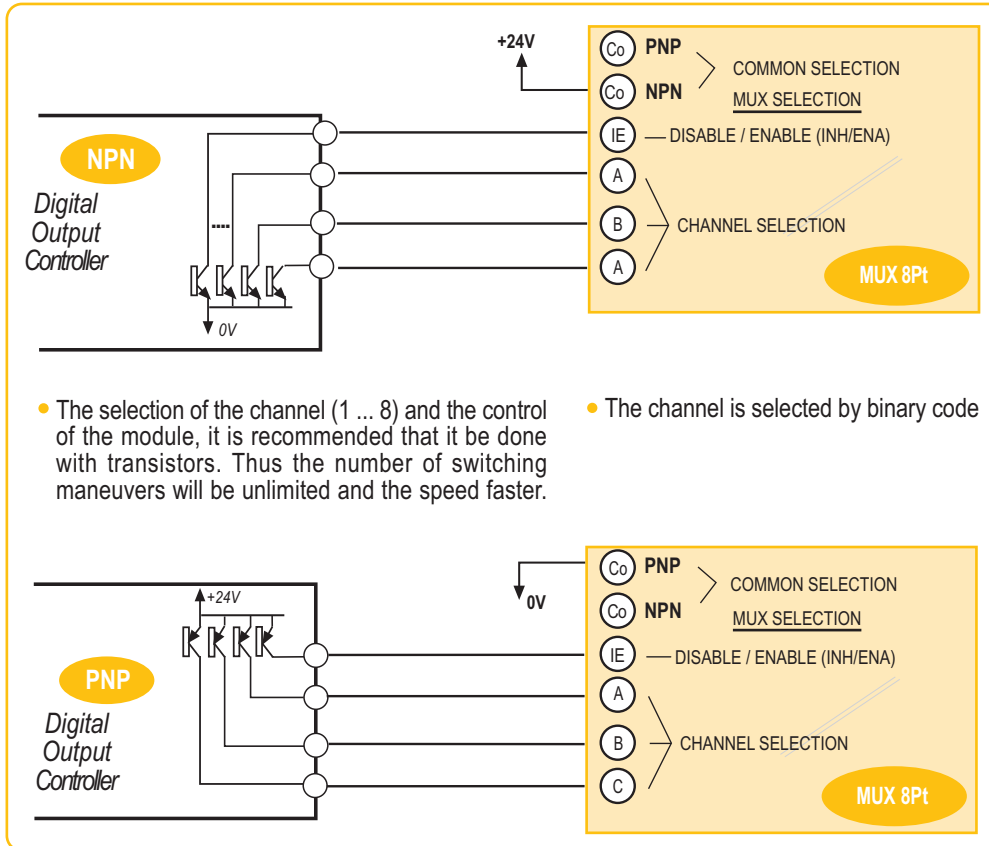
- BASE MODULE:	
DC: (MUX8Pt-x0)	<b>24VDC(+/-10%) - 55mA</b>
AC: (MUX8Pt-x2)	<b>230VAC(+/-10%) - 3VA</b>
- EXPANSION MODULE:	
- Base module supplied by expansion bus	(MUX8Pt-EXP)

## REFERENCES

DESCRIPTION		230 VAC	24 VDC
BASE module of 8 channels Pt 100	Output 4/20 mA	<b>MUX8Pt - 42</b>	<b>MUX8Pt - 40</b>
	Output 0/20mA	<b>MUX8Pt - 02</b>	<b>MUX8Pt - 00</b>
	Output 0/10 V	<b>MUX8Pt - 12</b>	<b>MUX8Pt - 10</b>
Expansion: 8 channels of Pt 100 for 0-4/20 mA and 0/10 V			

MUX 8Pt - EXP

## PNP or NPN SELECTION. Digital Lines



- The selection of the channel (1 ... 8) and the control of the module, it is recommended that it be done with transistors. Thus the number of switching maneuvers will be unlimited and the speed faster.

- The channel is selected by binary code

## MUX SELECTION (ST1)

- The Mux (IE) selection is used to extend the Pt100 inputs, using expansion modules.

- This (IE) selection can be enabled for INHIBITION signal or ENABLE signal, depending on the position of Strap ST1.

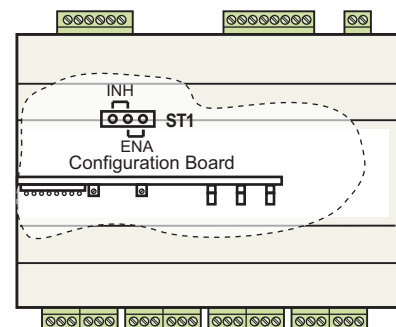
Selection ST1 - INH: OFF signal keeps selected module  
The ON signal keeps the module disabled.

Selection ST1 - ENA: The ON signal keeps the module selected.  
The OFF signal keeps the module off.

8 \* 1 Using only one Mux 8Pt select ST1 in INH. In this way, without connecting (IE) it will always remain selected.

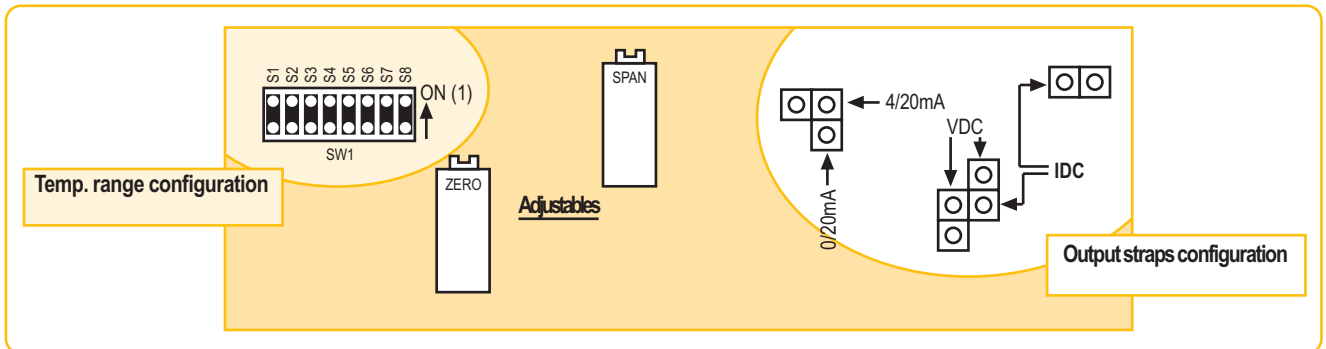
8 \* 2 Using two Mux 8Pt (base + expansion) select one module as INH and another as ENA. In this way, by connecting the same (IE) line in the two modules, you can control with a single Mux selection signal, both modules.

8 \* n Using "n" modules, select all the modules in INH or ENA according to preferences. You will need 1 control line for each module.



\* INH selected from factory

## SITUATION OF THE CONFIGURATION BOARD



## TEMP. RANGE CONFIGURATION (SW1)

(\*) The values in °C correspond to the center point of the adjustable "ZERO" and "SPAN", with a variation of - / + 10%  
 (Eg, for 238 ° C, the corresponding setting range would be 215 ° ..260 ° C)

Zero table (*)			
S 1	S 2	S 3	°C
0	0	0	0°C
0	0	1	-7,5°C
0	1	0	-15°C
0	1	1	-22,5°C
1	0	0	-30°C
1	0	1	-37,5°C
1	1	0	-45°C
1	1	1	-52,5°C

GAIN Table (*)						
			S 8	1	1	0
			S 7	1	0	0
			↑			
				630°C		
				566°C	200°C	70°C
				476°C	168°C	60°C
				400°C	140°C	50°C
				336°C	118°C	42°C
				282°C	100°C	35°C
				238°C	84°C	30°C

(\*\*)

(\*\*) The value of the Gain Table equals the increase between the min. And max. Of the operational T<sup>a</sup> range.

(Eg, -50 / + 200 ° C, the value in the GAIN table would be 250 ° C)

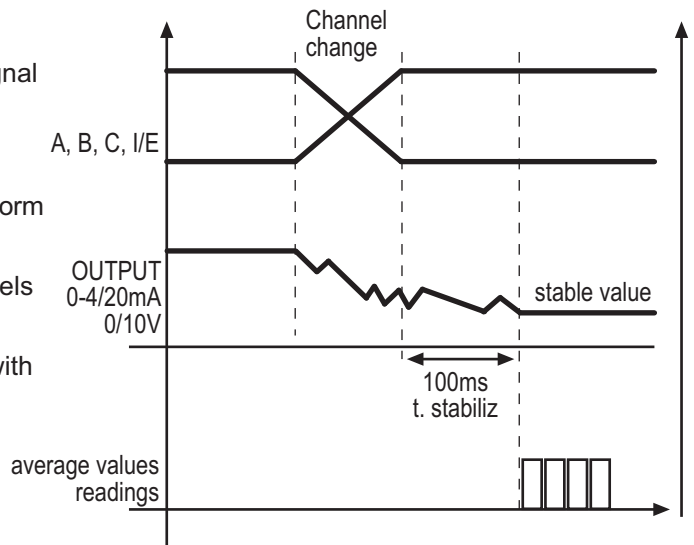
## OUTPUT STRAPS CONFIGURATION

	"VDC"	"IDC"	"4/20"	"0/20"
Output 0/10V	(2)	-	-	
Output 4/20A	-	(2)		-
Output 0/20A	-	(2)	-	

## SEQUENCE SELECTION

- 1.- Select the channel in binary (A, B, C) and the signal  $\text{IE}$  (only in case of having expansion modules).
- 2.- Wait at least the stabilization time of (100msg).
3. Capture several values of analog signal to later perform the average (will obtain a more stable uptake).
- 4.- Return to point 1, until scanning the first 8 channels of Pt100.

If you have expansion cards, select a new module with the  $\text{IE}$  signal, and return to point 1.



### \* Reading Alarms and False Alarms.

When the read signals are used to activate alarms, it is advisable to ensure that this has occurred.

Therefore, it is very important, in case of reading an alarm, to repeat the reading, to ensure if the alarm has

## CONNECTIONS FOR 8 INPUTS OF PT100 AND A PROCESS OUTPUT

8\*1

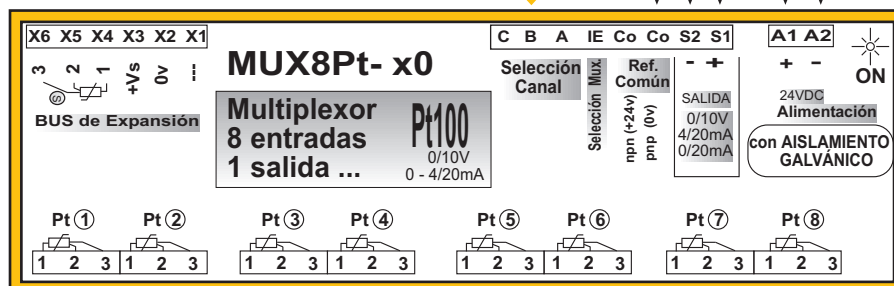
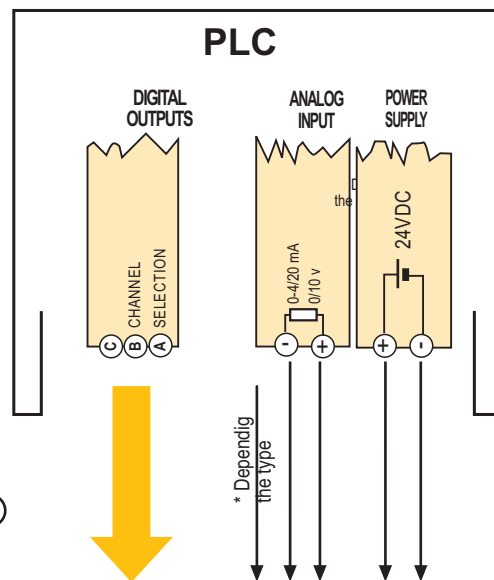
C	B	A	Nº CH
OFF	OFF	OFF	1
OFF	OFF	ON	2
OFF	ON	OFF	3
OFF	ON	ON	4
ON	OFF	OFF	5
ON	OFF	ON	6
ON	ON	OFF	7
ON	ON	ON	8



Use an internal strap **ST1** in INH

Therefore, the 8 channels they don't

$\text{IE}$



# CONNECTIONS FOR 16 PT100 INPUTS AND A PROCESS OUTPUT

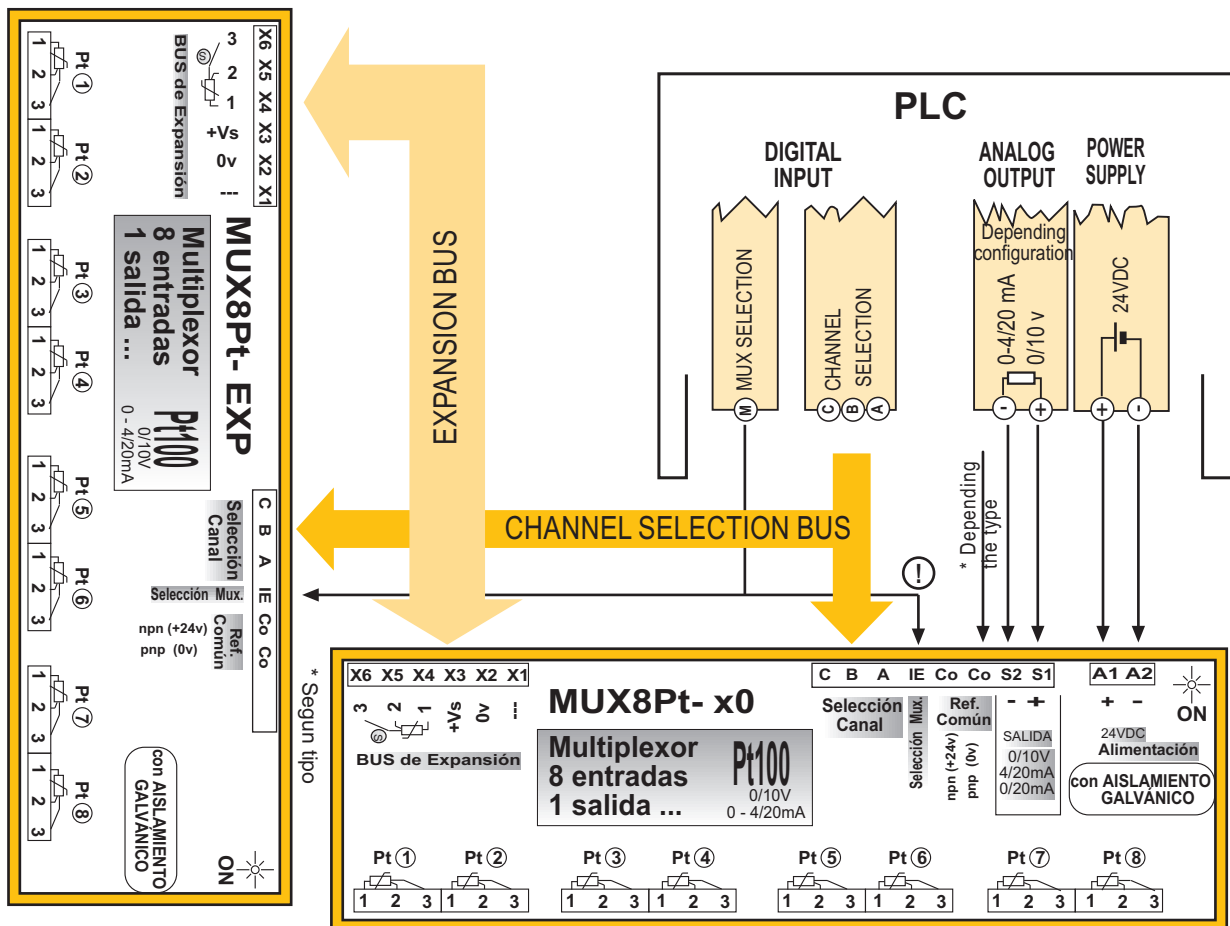
8\*2

❗ Special application for 16 Pt100 inputs

By means of the flexibility that allows to enable or to inhibit the module personalizing it by control of ENABLE or INHIBITION, the 2 terminals I / E are united and controlled by a single digital signal.

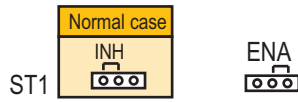
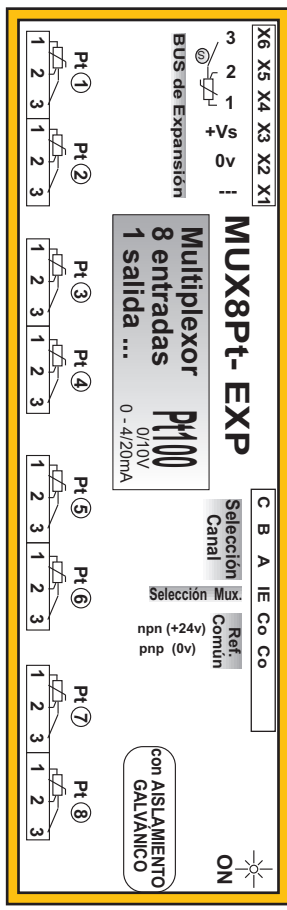
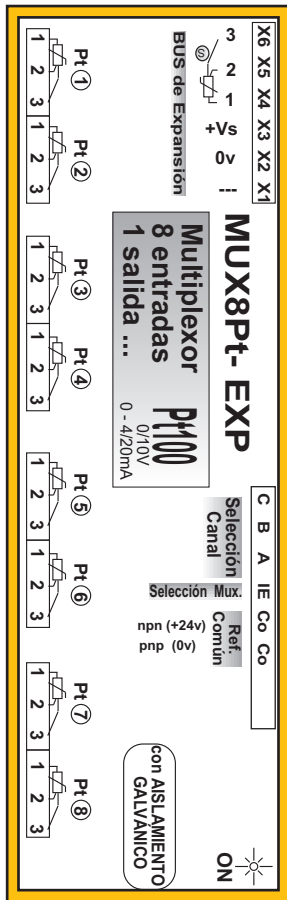
Module 1 is set to INhibition, and module 2 is ENable. In this way one will act unlike the other with the same digital line.

ENA/INH	C	B	A	Nº CH
OFF	OFF	OFF	OFF	1
OFF	OFF	OFF	ON	2
OFF	OFF	ON	OFF	3
OFF	OFF	ON	ON	4
OFF	ON	OFF	OFF	5
OFF	ON	OFF	ON	6
OFF	ON	ON	OFF	7
OFF	ON	ON	ON	8
ON	OFF	OFF	OFF	9
ON	OFF	OFF	ON	10
ON	OFF	ON	OFF	11
ON	OFF	ON	ON	12
ON	ON	OFF	OFF	13
ON	ON	OFF	ON	14
ON	ON	ON	OFF	15
ON	ON	ON	ON	16

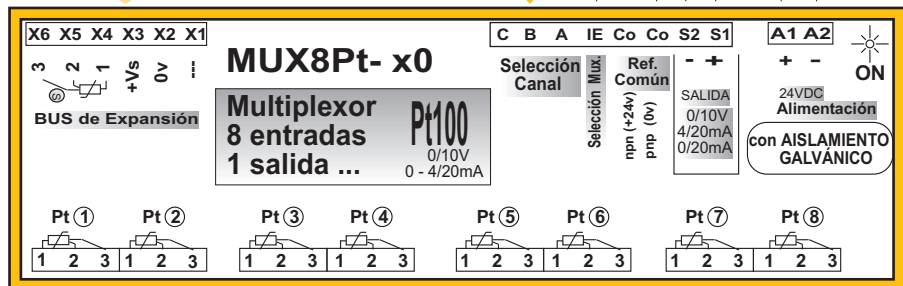
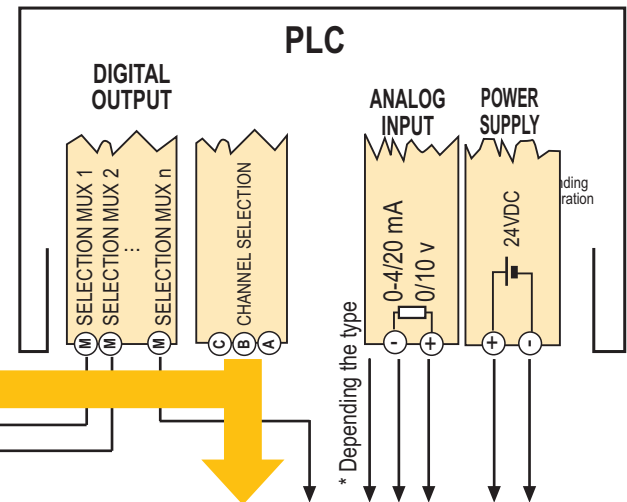
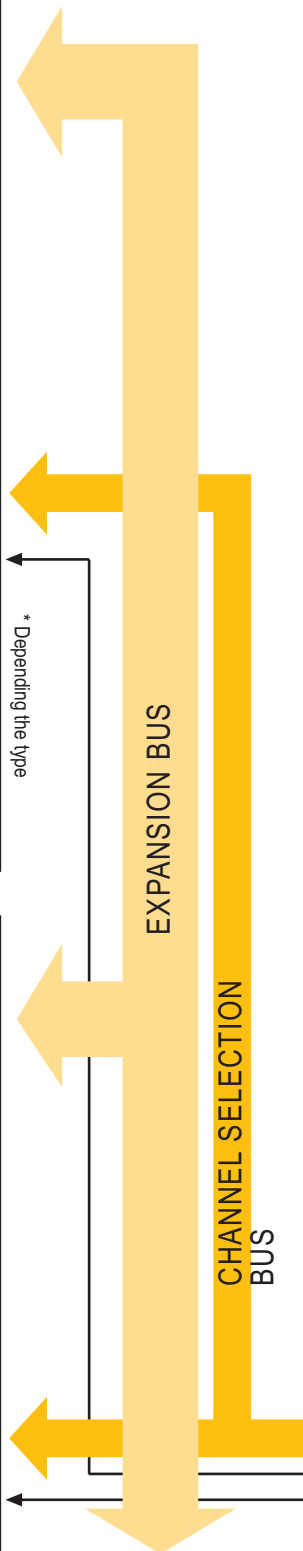


# CONNECTIONS FOR n INPUTS OF PT100 AND PROCESS OUTPUT

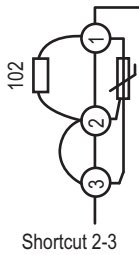
8\*n



INHIBICIÓN		ENABLE		SELECCIÓN CANAL			Nº	MÓDULO		
In	I2	I1	En	E2	E1	C	B	A	CANAL	
OFF	OFF	OFF	ON	ON	ON				NINGUNO	
ON	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	1	1
ON	ON	OFF	OFF	OFF	ON	OFF	OFF	ON	2	1
ON	ON	OFF	OFF	OFF	ON	OFF	ON	OFF	3	1
ON	ON	OFF	OFF	OFF	ON	OFF	ON	ON	4	1
ON	ON	OFF	OFF	OFF	ON	ON	OFF	OFF	5	1
ON	ON	OFF	OFF	OFF	ON	ON	OFF	ON	6	1
ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	7	1
ON	ON	OFF	OFF	OFF	ON	ON	ON	ON	8	1
ON	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF	9	2
ON	OFF	ON	OFF	ON	OFF	OFF	OFF	ON	10	2
ON	OFF	ON	OFF	ON	OFF	OFF	ON	OFF	11	2
ON	OFF	ON	OFF	ON	OFF	OFF	ON	ON	12	2
ON	OFF	ON	OFF	ON	OFF	ON	OFF	OFF	13	2
ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	14	2
ON	OFF	ON	OFF	ON	OFF	ON	ON	OFF	15	2
ON	OFF	ON	OFF	ON	OFF	ON	ON	ON	16	2
OFF	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	8n-7	n
OFF	ON	ON	ON	OFF	OFF	OFF	OFF	ON	8n-6	n
OFF	ON	ON	ON	OFF	OFF	OFF	ON	OFF	8n-5	n
OFF	ON	ON	ON	OFF	OFF	ON	OFF	OFF	8n-4	n
OFF	ON	ON	ON	OFF	OFF	ON	OFF	OFF	8n-3	n
OFF	ON	ON	ON	OFF	OFF	ON	OFF	OFF	8n-2	n
OFF	ON	ON	ON	OFF	OFF	ON	ON	OFF	8n-1	n
OFF	ON	ON	ON	OFF	OFF	ON	ON	ON	8n	n



## TEST IMPEDANCES

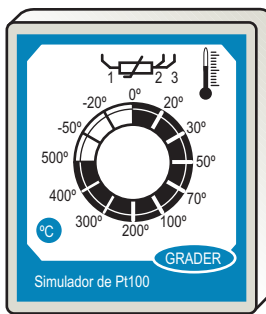


**102W resistors are supplied for various applications:**

**TESTING** Introducing it on a Pt 100 channel input is simulated A temperature  $> 0^{\circ}\text{C}$ . In this way, each entry and the Converter, whose output in V or I, will give a little more of the equivalent At  $0^{\circ}\text{C}$  ..

**INPUTS** Leave a 102 ohm resistor connected to the Pt 100 channels That are not used. If the channel number is not selected digitally, You do not need to put it on. In this way, the response time of the Converter, when detecting absence of sensor.

## PT100 SIMULATOR. GRADER



We have Pt100 simulators in  $^{\circ}\text{C}$ , model GRADER, of high precision, that will facilitate the process of calibration and tests of the multiplexer.

Its operation is very simple. It is portable, autonomous and robust. 12 temperature values are selected directly at  $^{\circ}\text{C}$  with an accuracy and stability better than  $0.08^{\circ}\text{C}$ .

### \* Reading Alarms and False Alarms.

When the read signals are used to activate alarms, it is advisable to ensure that this has occurred.

Therefore, it is very important, in case of reading an alarm, to repeat the reading, to ensure if the alarm has occurred or not.

## HOW TO CHECK A PT100 PROBE

- For the test, the probe must be disconnected from the system.
- If it does not meet any of the following, the Pt100 probe is defective.

1º) Measure with a Multimeter the impedance between the threads 2 and 3 of the Pt100.

Must indicate 0 ohms ( $R = 0$ )

2º) Measure the impedance between wires 1 and 2 of the Pt100, corresponds to the value of the following table of equivalence, with the temperature being measured.

It should indicate between 80 and 300 ohms, depending on the temperature.

E.g. At  $20^{\circ}\text{C}$ , should indicate 107.79 ohms.

3º) Check the INSULATION between wire 1 of the Pt100 probe, and the sheath, ground or earth. Must indicate infinite impedance.