OVARRO
CONNECTING TECHNOLOGIES

TBOX MS-16DIO

Version 3.06

TBOX
AN OVARRO TECHNOLOGY
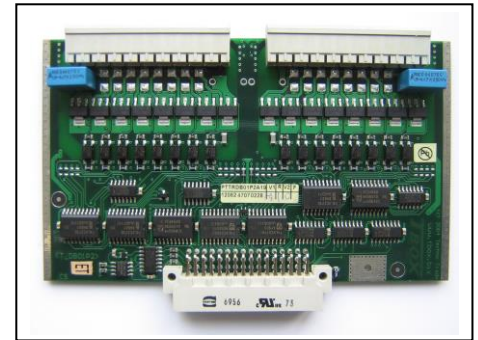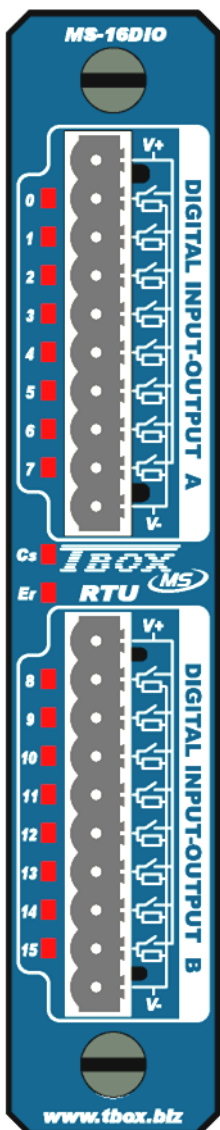
TBOX MS-16DIO

- 16 x digital Inputs/Outputs : 2 groups of 8 digital inputs/outputs
- Isolation by group of 8
- Each channel can be cabled as an input or an output

Technical Specifications

General

Quantity	16 channels. Each can be cabled as Input or Output
Consumption	40 mA
Replacement	**Hot insertable/removable.** There is no risk to damage hardware, but a reset is required.
Test	Automatic test of the access of the card by the CPU (see LED 'CS' below)
Connector	Screw connector (10x5.08mm) Wire range: 0.14 – 2.5 mm² (or max. 12 AWG)

LED

Individual	LED corresponding to the activation of each digital output. By software, possibility to disable the LED to save energy
Cs	**Card Selection:** card corresponding to card declared in TWinSoft.
ER	**Error:** card type not corresponding to the one declared in TWinSoft.

Isolation

Isolation from the Ground	Isolation from the CPU ground and the earth
2 groups isolated	Isolation by group of 8 inputs/outputs: One Common by group of 8.
Level of isolation	1500 Vrms - between groups - between inputs/outputs and ground - between inputs/outputs and earth

Environment

Temperature storage	-40°C to 85°C
Temperature working (ambient)	**Industrial Temperature:** -40°C to 70°C
Humidity	15 to 95 % without condensation
Altitude	Max. 5000 m

Dimensions

Without connector	Height x Depth x Width: **150** x **83** x **29 mm** (5.906 x 3.27 x 1.142 inches)
Weight	258 g

I/O Specifications

Inputs

Voltage at Input

Typical	24 VDC
Maximum for a LOW level	5 VDC
Minimum for a HIGH level	11 VDC
Maximum	60 VDC
Compatibility	with type 1 and 2 of **IEC61131-2**

Current

Maximum at the input	2.0 mA at 30 VDC 4.5 mA at 60 VDC
Resistance	12 kΩ

Sampling

Minimum period LOW – HIGH	Task switching between process cycle has to be taken into account, as well as cycle time itself: MS-CPU16: 10 ms. + cycle time. MS-CPU32: 4 ms. + cycle time.

Protection

RC filter	1592 Hz
Voltage inversion	Up to 55 VDC

Outputs

Voltage / Current

Working voltage on V+	12 to 60 VDC: to read back outputs to corresponding DI. 6 to 60 VDC: without read back.
Current per output	Maximum: 200 mA
Voltage per output	Maximum: 60 VDC (depending on V+)
Short-Circuit current	Minimum: 0.2 A Typical: 0.9A Maximum: 1.2A
Impedance	Typical: 1 ohm Maximum: 10 ohms

Protection

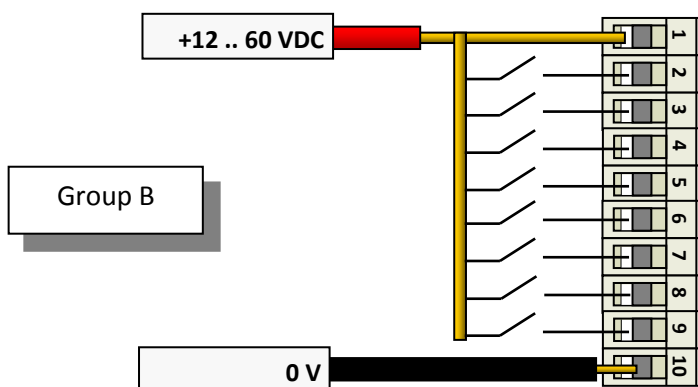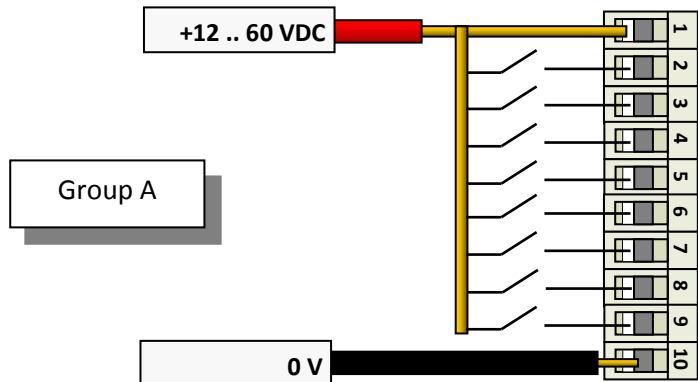|	
Protection diode	Protection against inverted voltage when working with inductive load WARNING: when the output is connected to a DC relay driving an AC relay, the AC relay must be protected with a RC circuit
Over load	Maximum: 60 VDC
Reverse voltage	Maximum: 55 VDC
Short-Circuit + Over load	Thermal protection with automatic recovery

Approvals

	CE, UL, CSA, C-Tick

Cabling Schematic

Digital Inputs

Connector: Screw connector

Pin Out:

	+12 .. 60 VDC			**1**	V+
				2	Input 0
				3	Input 1
				4	Input 2
				5	Input 3
	Group A			**6**	Input 4
				7	Input 5
				8	Input 6
				9	Input 7
	0 V			**10**	V-

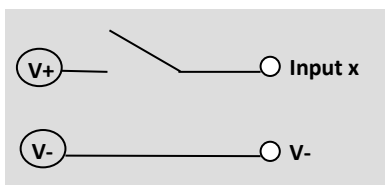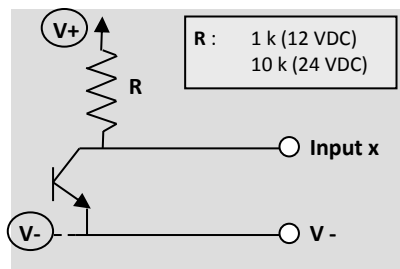|	+12 .. 60 VDC			**1**	V+
				2	Input 8
				3	Input 9
				4	Input 10
				5	Input 11
	Group B			**6**	Input 12
				7	Input 13
				8	Input 14
				9	Input 15
	0 V			**10**	V-

Each channel can be cabled individually as **Input** or as **Output**

It is **mandatory** to cable **V+** to have a proper working of input stage and **LED** operation.
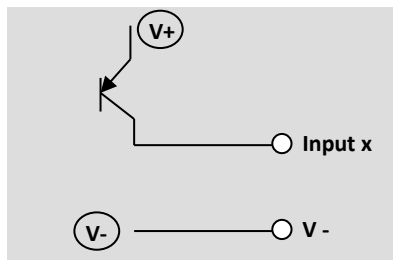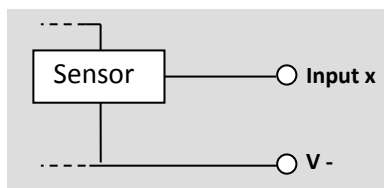
Cabling to Dry contact

V+ ———/ ○ **Input x**
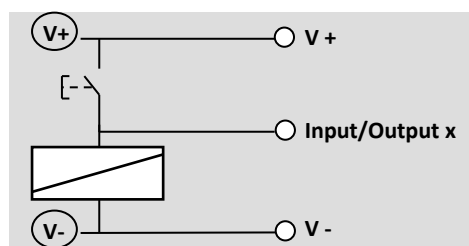
V- ———— ○ **V-**

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Technical specifications may change before prior notice   Version. 3.06

Cabling to NPN transistor

R :	1 k (12 VDC)
	10 k (24 VDC)

V+

R

Input x

V-

V -

Cabling to PNP transistor (or OPTO)

V+

Input x

V-

V -

Cabling to Voltage sensor

Sensor

Input x

V -

Cabling both Input and Output
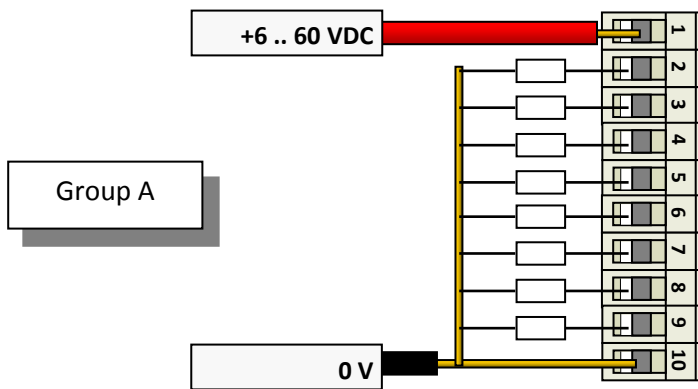
V+

V +

Input/Output x

V-

V -

This type of cabling can be used in 2 cases:

1. Manual activation of the Output: as long as the button is pressed, the output is forced.
2. Activation of the Output during a time determined in the Program. You maintain the button until it is detected by the program and has switched the output.
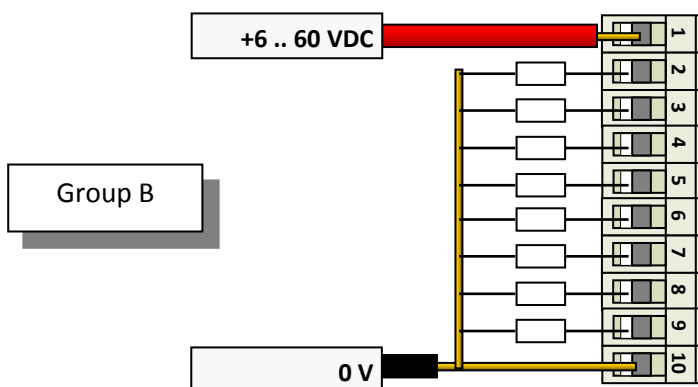
Digital Outputs

Connector: Screw connector   Pin Out:

1	V+
2	Output 0
3	Output 1
4	Output 2
5	Output 3
6	Output 4
7	Output 5
8	Output 6
9	Output 7
10	V-

+6 .. 60 VDC

Group A

0 V

1	V+
2	Output 8
3	Output 9
4	Output 10
5	Output 11
6	Output 12
7	Output 13
8	Output 14
9	Output 15
10	V-

+6 .. 60 VDC

Group B

0 V