TSX micro PLCs

TSX 3705/ 3708/ 3710/ 3720
Implementation manual
volume 2

TSX DM 37 33E eng

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Related Documentation

At a Glance

This documentation comprises three volumes.

- TSX Micro PLCs, implementation manual Volume 1,
- TSX Micro PLCs, implementation manual Volume 2,
- TSX Micro PLCs, implementation manual Volume 3,

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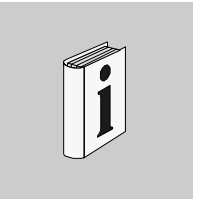
About the book



At a Glance

Document Scope

This manual describes TSX Micro PLC implementation.
It comprises 7 parts :

- 1 General introduction to a PLC station,
- 2 TSX 37 PLC,
- 3 TSX 37 PLC : mounting,
- 4 Discrete input/output modules,
- 5 Commissioning/Diagnostics/Maintenance,
- 6 Supply Process and AS-i.

Validity Note

Contents

Related Documents

Title of Documentation	Reference Number

User Comments

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Discrete input/output modules for Micro

I

At a Glance

Aim of this Part

This part introduces the range of Discrete input/output modules on Micro PLCs.

What's in this part?

This Part contains the following Chapters:

Chapter	Chaptername	Page
1	General introduction to Discrete input/output modules	19
2	General implementation rules for Discrete input/output modules	33
3	Handling of Discrete input/output module faults	53
4	The Discrete input/output mixed module TSX DMZ 64DTK	55
5	The Discrete input/output mixed module TSX DMZ 28DTK	65
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Chapter	Chaptername	Page
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22	TELEFAST 2 connection interface links for the Discrete I/O modules	223

General introduction to Discrete input/output modules

1

At a Glance

Aim of this Chapter

This chapter is a general introduction to the Discrete input/output modules.

What's in this Chapter?

This Chapter contains the following Maps:

Topic	Page
General description	20
Physical description	22
Catalog of discrete input modules	24
Catalog of discrete output modules	26
Catalog of discrete input/output mixed modules	28

General description

General

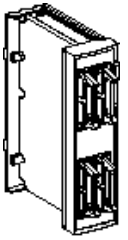
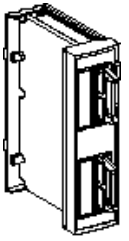
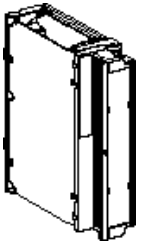
Input modules: they receive signals from the sensors and carry out acquisition functions, adaptation functions, galvanic insulation functions, filtering functions and functions protecting against parasitic signals.
Output modules: they carry out latch functions on the orders given by the processor to enable pre-actuator control through decoupling circuits and amplification circuits.

The range of discrete input and output modules meets the demands with regard to the:

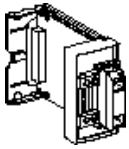
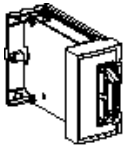
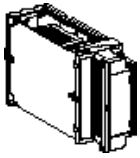
- functional level: direct or alternating inputs/outputs, positive or negative logic,
- connection via screw terminal blocks or HE10 connectors,
- Modularity

Overview

Full size input/output modules:

Modularity	Illustration	Connector
64 inputs/outputs (32 I + 32 O)		HE10 connectors
28 inputs/outputs (16 I + 12 O)		HE10 connectors
28 inputs/outputs (16 I + 12 O) or 32 inputs or 32 outputs		Screw terminal blocks

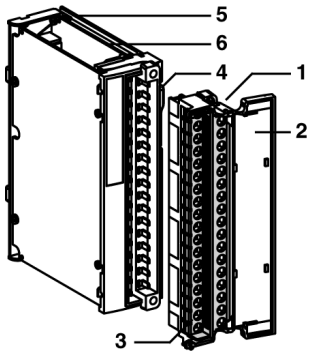
Half-size input/output mixed modules:

Modularity	Illustration	Connector
16 inputs/outputs (8 I + 8 O) (Enables direct connection to installation help systems Tego Dial and Tego Power).		HE10 connectors + tunnel terminal block for connection of power supply
12 inputs or 8 inputs or 8 outputs or 4 outputs		HE10 connectors
12 inputs or 8 inputs or 8 outputs or 4 outputs		Screw terminal blocks

Physical description

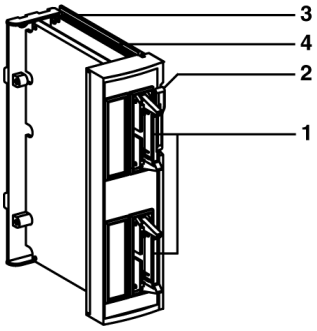
Module with screw terminal block connection

Each module is made up of the following elements:

Illustration	
	**1.** Removable screw terminal block for direct connection of inputs/outputs to sensors and pre-actuators. **2.** Access'flap to the terminal block screws which also provides a place for the'address label. **3.** Removable cover allowing' access to screws and ensuring both that' they cannot be lost and human protection. **4.** Lock which enables locking or' extraction of the module from its slot (PLC or extension), which is only retrievable when the terminal block is removed. **5.** Metallic body ensuring the following functions: ● electronic card support, ● ground connection for resistance to electromagnetic disturbances, ● ground connection electric continuity, ● control of the module in its slot. **6.** Electronic card(s).

Module connection by HE10 connector

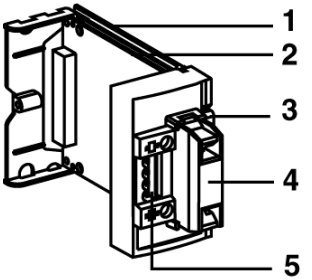
Each module is made up of the following elements:

Illustration	
	**1.** HE10 connectors, protected by a cover. They enable input/output connection with sensors and actuators either directly or'through' TELEFAST 2 connection bases. **2.** Lock enabling locking or' extraction of module from its slot (PLC or extension). **3.** Metallic body ensuring the following functions: ● electronic card support, ● ground connection for resistance to electromagnetic disturbances, ● ground connection electric continuity, ● control of the module in its slot. **4.** Electronic card(s)

Note: The description is identical for half-sized modules with screw terminal block or HE10 connector.

Module with screw terminal block connection

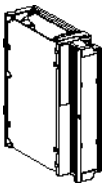
Each module is made up of the following elements:

Illustration	
	**1.** Metallic body ensuring the following functions: • electronic card support, • ground connection for resistance to electromagnetic disturbances, • ground connection electric continuity, • control of the module in its slot. **2.** Electronic card(s). **3.** Lock enabling locking or' extraction of module from its slot (PLC or extension). **4.** HE10 connector, protected by a cover. Enables input/output connection with sensors and actuators either directly or'through' Tego Dial or Tego Power connection bases. **5.** Casing terminal block for connection to 24 VDC voltage supplying inputs or outputs.

Catalog of discrete input modules

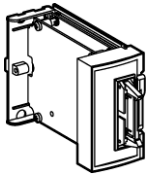
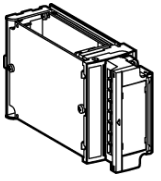
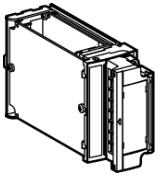
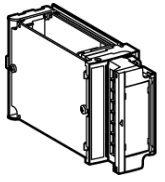
Catalog of full size input modules

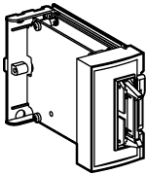
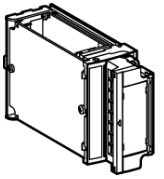
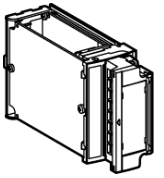
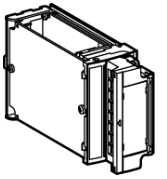
The following table describes the main characteristics of full size input and output modules:

	
Modularity	32 inputs
Type/Voltage	24 VDC input
Insulation	Isolated inputs
IEC 1131-2 conformity	Type 2
Logic	Positive
PD compatibility	All PD (IEC 947-5-2) 2 wire AC/DC PD 3 wire PD DC PNP
Configurable filtering	Built-in (0.1 to 7.5 ms by increments of 0.5 ms)
Connections	Screw terminal blocks
Product references	**TSX DEZ 32D2**

Catalog of half size input modules

The following table describes the main characteristics of half size input modules:

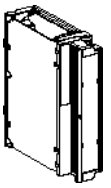
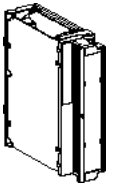
				
Modularity	12 inputs		8 inputs	
Type/Voltage	Inputs: 24 VDC		Inputs: 100...120 VAC	Inputs: 200...240 VAC
Insulation	Isolated inputs			
Product references	**TSX DEZ 12D2K**	**TSX DEZ 12D2**	**TSX DEZ 08A4**	**TSX DEZ 08A5**

				
IEC 1131-2 conformity	Type 2	Type 1 (in positive logic	Type 2	Type 1
Logic	Positive	Positive or negative		
PD compatibility	All PD: 2 wire AC/DC 3 wire DC PNP	2 wire DC PD (see compatibility) All 3 wire PD: PNP (pos. log.) NPN (neg. log.)	2 wire AC/DC PD (see compatibility)	2 wire AC PD (see compatibility)
Configurable filtering	Built-in (0.1 to 7.5 ms by increments of 0.5 ms)		Built-in, 50 or 60 Hz network	
Connections	HE10 connectors	Screw terminal block		
Product references	**TSX DEZ 12D2K**	**TSX DEZ 12D2**	**TSX DEZ 08A4**	**TSX DEZ 08A5**

Catalog of discrete output modules

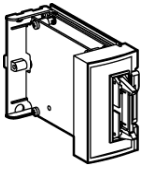
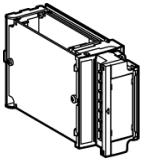
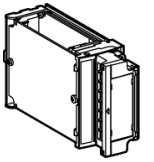
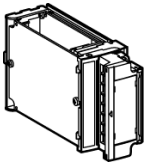
Catalog of full size output modules

The following table describes the main characteristics of full size output modules:

		
Modularity	32 outputs	
Type/Voltage	Static outputs: 24...240 VAC/24 VDC	Relay outputs
Insulation	Isolated outputs	
Current/Power	0.5 A	1 "F" contact per channel Ith = 2 A performance according to load (see characteristics)
IEC 1131-2 conformity	Yes	-
Protection	Outputs protected against overloads and short-circuits by a fast electron demagnetization circuit	Outputs are not protected
Logic	Positive	-
Output parallelization	2 outputs	-
Connections	Screw terminal block	
Product references	**TSX DEZ 32T2**	**TSX DSZ 32R5**

Catalog of half size output modules

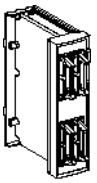
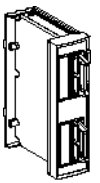
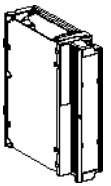
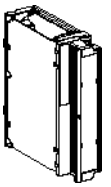
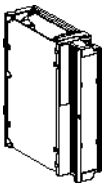
The following table describes the main characteristics of half size output modules:

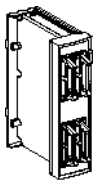
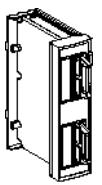
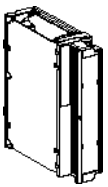
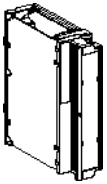
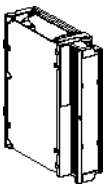
				
Modularity	8 outputs		4 outputs	8 outputs
Type/Voltage	Static outputs 24 VDC			Relay outputs: 24...240 VAC 24 VDC
Insulation	Isolated outputs			
Allowable current/power	0.5 A		2 A	1 "F" contact per channel Ith = 3 A Performance according to load (see characteristics)
Compliance IEC 1131-2	Yes			
Protection	Outputs protected against overloads and short-circuits by a fast electromagnet demagnetization circuit			Outputs are not protected
Logic	Positive			-
Output parallelization	2 outputs			-
Connections	HE10 connectors	Screw terminal block		
Product references	**TSX DSZ 08T2K**	**TSX DSZ 08T2**	**TSX DSZ 04T22**	**TSX DSZ 08R5**

Catalog of discrete input/output mixed modules

Full size mixed input/output

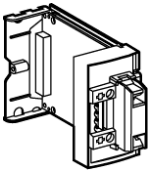
The following table describes the main characteristics of full size input/output mixed modules:

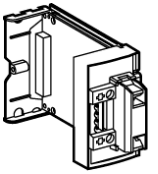
					
Modularity	32 inputs 32 outputs	16 inputs 12 outputs			
Type/Voltage	Inputs: 24 VDC Static outputs: 24 VDC			Inputs: 24 VDC Relay outputs: 24…240 VAC 24 VDC	Inputs: 110 VDC Relay outputs: 24...240 ACV 24 VDC
Inputs:					
Insulation	Isolated inputs				
Compliance IEC 1131-2	Type 1			Type 1, in positive logic	Type 2
Logic	Positive			Positive or negative	Positive
PD compatibility	2 wire DC PD (see compatibility) 3 wire DC PD (PNP with positive logic input, NPN with negative logic input)				2 wire AC PD
Configurable filtering	Built-in (0.1 to 7.5 ms by increments of 0.5 ms)				Built-in, 50 or 60 Hz network
Outputs:					
Insulation	Isolated outputs				
Current/Power	0.1 A	0.5 A		1 "F" contact per channel Ith = 3 A performance according to load (see characteristics)	
Compliance IEC 1131-2	Yes				
Protection	Outputs protected against overloads and short-circuits by a fast electro-demagnetization circuit			Outputs are not protected	
Product reference	**TSX DMZ 64DTK**	**TSX DMZ 28DTK**	**TSX DMZ 28DT**	**TSX DMZ 28DR**	**TSX DMZ 28AR**

					
Logic	Positive			-	
Output parallel-ization	3 outputs	2 outputs		-	
Connections	HE10 connectors		Screw terminal block		
Product reference	**TSX DMZ 64DTK**	**TSX DMZ 28DTK**	**TSX DMZ 28DT**	**TSX DMZ 28DR**	**TSX DMZ 28AR**

Half size mixed input/output

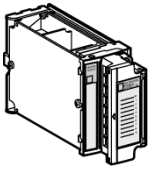
The following table describes the main characteristics of the half size input/output mixed module:

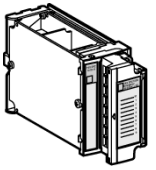
	
Modularity	8 inputs 8 outputs
Type/Voltage	24 VDC input 24 VDC static output
Inputs:	
Insulation	Isolated inputs
Compliance IEC 1131-2	Type 1
Logic	2 wire PD (see compatibility) 3 wire DC PD (PNP with positive logic input
Configurable filter-ing	Built-in (0.1 to 7.5 ms by increments of 0.5 ms)
Outputs	
Insulation	Isolated outputs
Current/power	0.5 A
Compliance IEC 1131-2	Yes
Product reference	**TSX DMZ 16DTK**

	
Protection	Outputs protected against overloads and short-circuits by a fast electron-demagnetization circuit
Logic	Positive
Output parallelization	2 outputs
Product reference	**TSX DMZ 16DTK**

Safety module for monitoring the emergency stop

The following table describes the main characteristics of the safety module (See *Emergency stop monitoring module, p. 191*) which monitors the emergency stop:

	
Modularity	8 discrete outputs (emergency stop), 1 discrete input (confirmation) 2 safety relay outputs
Type/Voltage	24 VDC input 24…240 ACV or 24 VDC relay outputs
Compliance with safety standards	EN 60204-1, EN 954-1 Category 3
Inputs:	
Insulation	Isolated outputs
Compliance IEC 1131-2	Type 1
Logic	Positive
Configurable filtering	Built-in (0.1 to 7.5 ms by increments of 0.5 ms
Outputs:	
Insulation	Isolated outputs
Product reference	**TSX DPZ 10D2A**

	
Current/power	1 "F" contact per channel, maximum current = 1.25 A performance characteristics (see characteristics)
Protection	Outputs are not protected
Connection	Screw terminal block
Product reference	**TSX DPZ 10D2A**

General implementation rules for Discrete input/output modules

2

At a Glance

Aim of this Chapter

This chapter introduces the general installation rules for Discrete input/output modules.

What's in this Chapter?

This Chapter contains the following Maps:

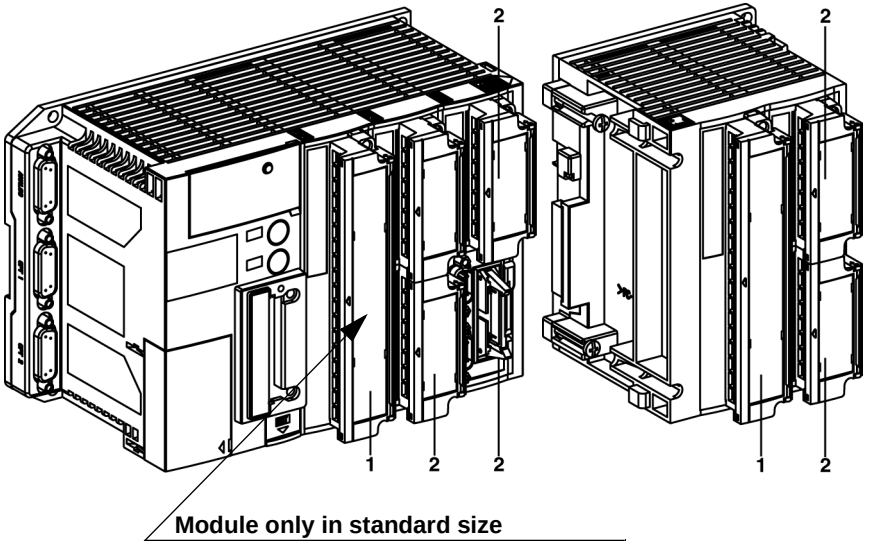
Topic	Page
Installation	34
Mounting/removing modules	35
Labeling a module with a screw terminal block	38
Labeling a full size module with an HE10 connector	40
Channel addressing	41
Precautions of use	43
General precautions and rules for wiring	46
Compatibility of sensors with inputs	49
Compatibility of pre-actuators with outputs	52

Installation

Installing a discrete I/O module

- A full size module takes up 2 positions and is mounted in an available slot:
  - at the base of a Micro PLC,
  - on a mini extension unit
- A half size module takes up 1 position and is mounted in an available slot:
  - at the base of a Micro PLC, except for the first slot,
  - on a mini extension unit

Example of installing a discrete inputs/outputs module in a Micro PLC:



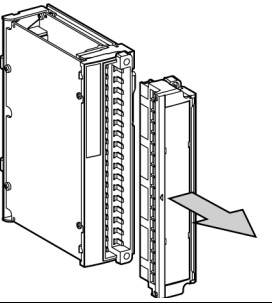
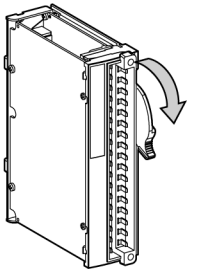
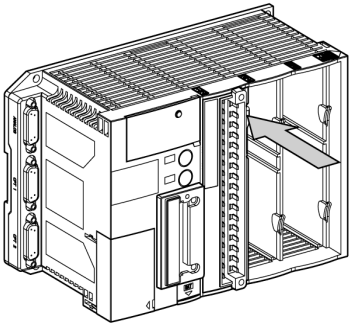
1 : Module in standard size

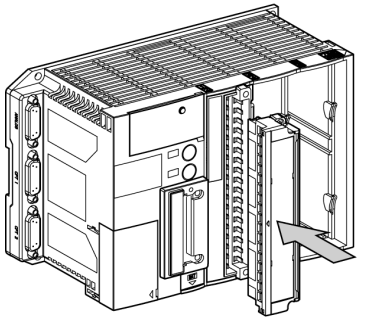
2 : Half size module

Mounting/removing modules

Mounting a module

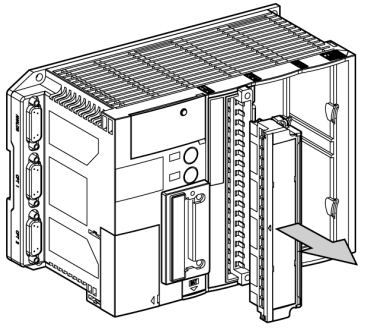
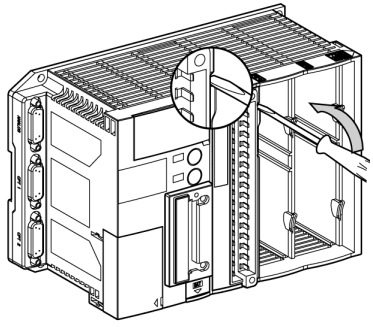
Carry out the following steps:

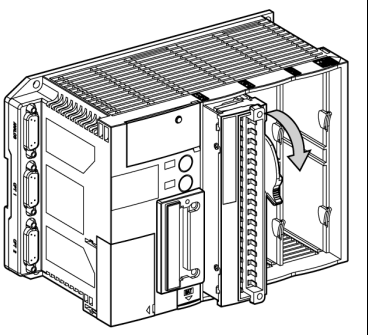
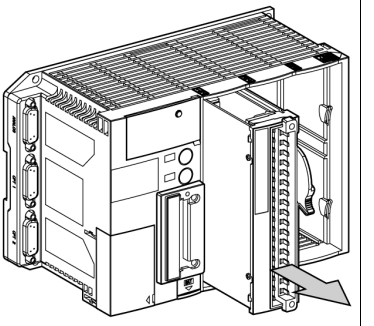
Step	Action	Figure
1	For modules with a screw terminal block, unscrew in succession the two fixing screws (undo each screw alternately a little at a time) so the terminal block becomes disconnected.	Example 
2	Set the latch into **"unlocked"** position by switching it to the bottom.	Example 
3	Slide the module into its slot (this is helped by runners) and push on its front side to connect it.	Example 
4	Switch the latch to the top.	

Step	Action	Figure
5	For modules with a screw terminal block, screw in succession the two fixing screws. Turn each screw alternately a little at a time to slowly connect the terminal block.	Example 

Removing a module

Carry out the following steps:

Step	Action	Figure
1	If a module has a terminal block, remove it.	Example 
2	Switch the latch to the bottom to disconnect the module by inserting the tip of a flat screwdriver into the groove provided and levering towards the bottom to start unlocking the module.	Example 

Step	Action	Figure
3	Finish levering the latch by hand, and this will disconnect the module.	Example 
4	Slide the module out of its slot by pulling it forwards. Switch the latch to the top and if necessary fix the terminal block back onto the module.	Example 

Labeling a module with a screw terminal block

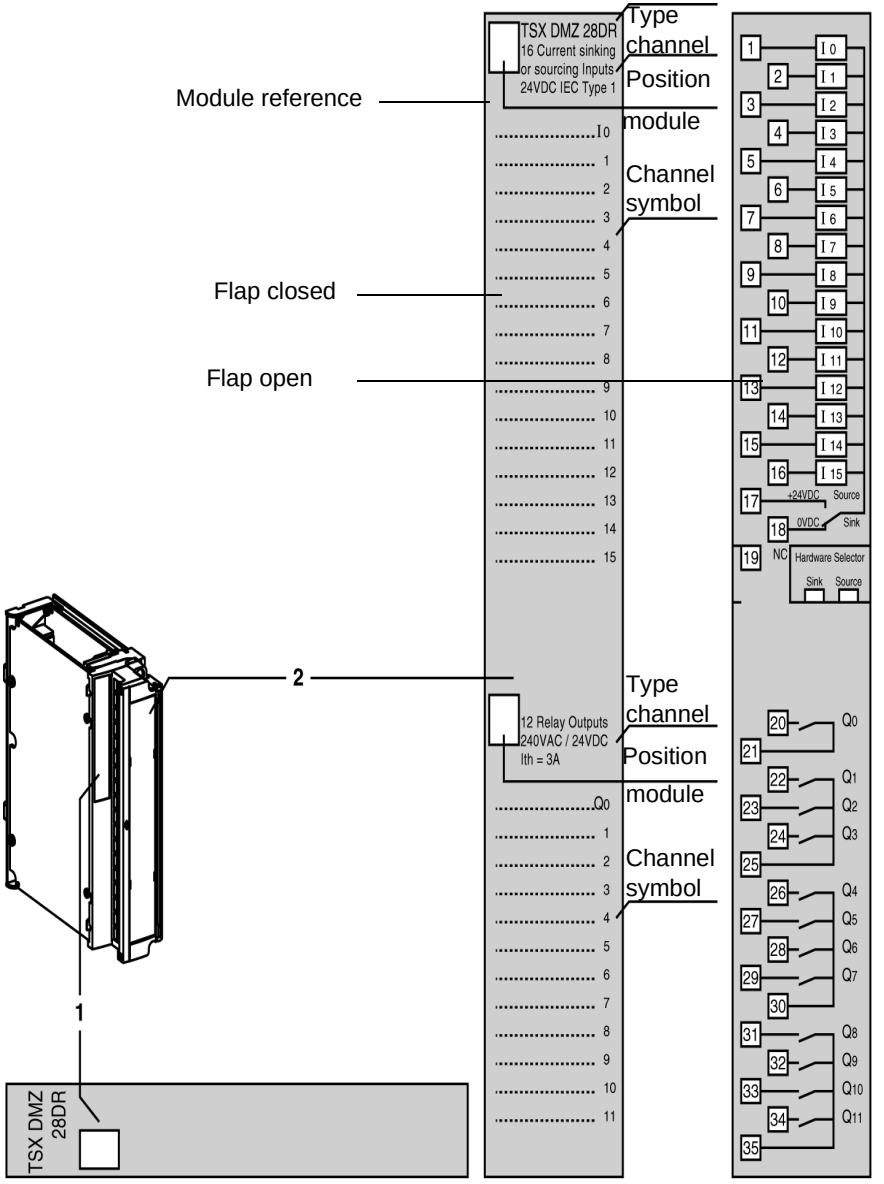
Module description

A fixed label shows the following:
- the module product reference,
- a box in which to write the module slot number.

Terminal block description

On the inside of the flap there is a removable label printed on both sides, showing the following:
- external view (closed flap):
  - the module product reference,
  - the nature of the channels,
  - a box in which to write the module position number (address),
  - the designation for each channel (symbol).
- internal view (flap open),
  - the input and output wiring plan with the channel numbers and the connection terminal number.

Illustration Example:



Labeling a full size module with an HE10 connector

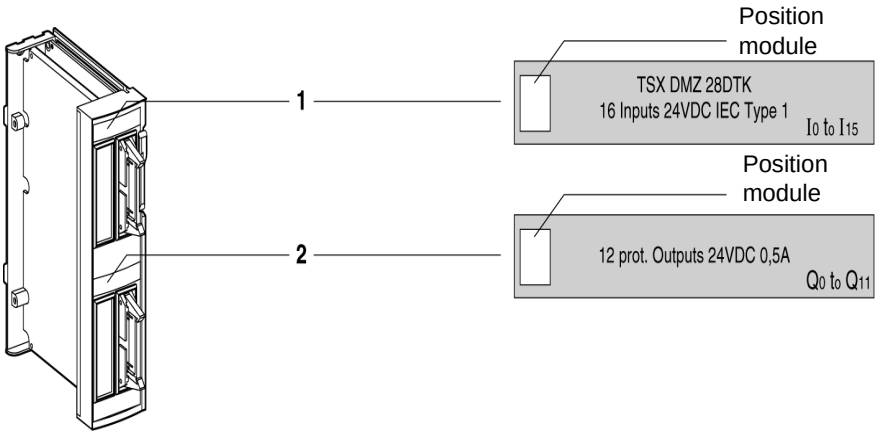
Description

There are two labels:

- the upper position identification label which has:
  - the module product reference,
  - the nature of the channels,
  - a box in which to write the module position number (address).
- the lower position identification label which has:
  - the nature of the channels,
  - a box in which to write the module position number (address).

Illustration

Example:



Note:
Half size modules only have label 1.

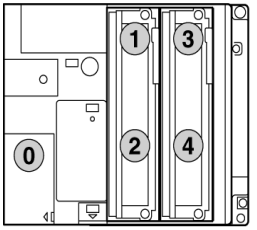
Channel addressing

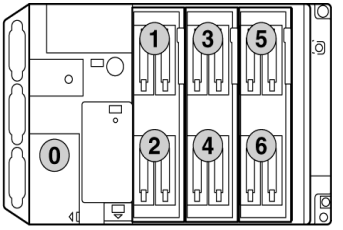
Principle

Channel addressing is **geographical** i.e. it depends on the physical position of the module in the base module or in the mini-extension rack.

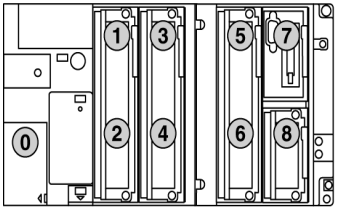
Example

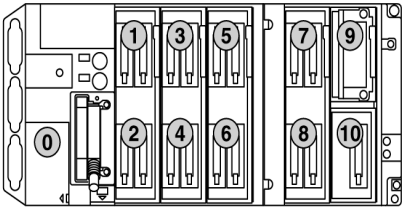
TSX37-05/10 and TSX37-08/21/22





TSX37-10 + TSX RKZ 02 and TSX37-21/22 + TSX RKZ 02





Rules

With a half size base modularity, full size modules are addressed as two half size modules placed on top of each other. The term **Position** represents either a half size module, or the upper or lower part of a full size module.
Discrete Input/Output syntax is as follows:

%	I or Q	Position	.	Channel
Symbol	I = Input Q = Output	1 to 4 (37 05/10) 1 to 6 (37 08/21/22) 1 to 8 (3710+RKZ02) 1 to 8 (37 10+RKZ02)	Pulse	i

%I1.5 signifies: Module Input 5 placed in position 1.
%Q8.3 signifies: Module Output 3 placed in position 8.

Address of channels

Full size module

		64 I/O	**32 I**	**32O**	**28 I/O**
Channel Number: i	Odd position	0 to 31	0 to 15	0 to 15	0 to 15
	Even position	0 to 31	0 to 15	0 to 15	0 to 11
Channel Address	Odd position	%Ix.0 to %Ix.31	%Ix.0 to %Ix.15	%Qx.0 to %Qx.15	%Ix.0 to %Ix.15
	Even position	%Q(x+1).0 to %Q(x+1).31	%I(x+1).0 to %I(x+1).15	%Q(x+1).0 to %Q(x+1).15	%Q(x+1).0 to %Q(x+1).31

Half size module

		16 I/O	**12 I**	**8O**	**4 I/O**
Channel Number: i	Odd or even position	I:0 to 7	0 to 11	0 to 7	0 to 3
		Q:8 to 15			
Channel Address	Odd or even position	%Ix.0 to %Ix.7	%Ix.0 to %Ix.11	%Qx.0 to %Qx.7	%Qx.0 to %Qx.3
		%Qx.8 to %Qx.15			

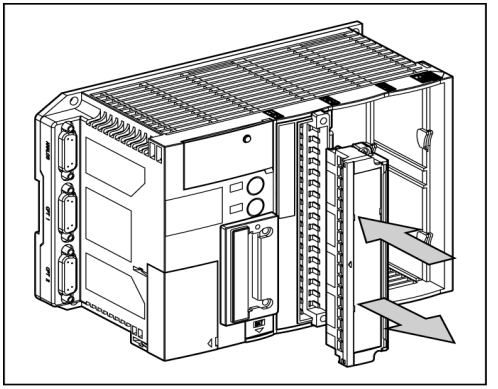
Note

If there is no I/O module declared in a position during configuration, the PL7 Micro software functions as if a 16 I/16 O half size module was present. PL7 Micro allows access to output bits %Qx.0 to %Qx.15 for each position.
When half size modules are declared, PL7 Micro allows access to input bits %Ix.0 to %Ix.15 and to output bits %Qx.0 to %Qx.15 for each position (even if the half size module has less I/O).
When full size mixed modules are declared, PL7 Micro allows access to input bits %Ix.0 to %Ix.31 for odd positions, and to output bits %Qx+1.0 to %Qx+1.31. for even positions (even if the half size module has less I/O).
Full size input or output modules are managed as if they were two half size modules occupying two positions laid on top of each other.

Precautions of use

Wiring/Unwiring screw terminal blocks or HE10 connectors

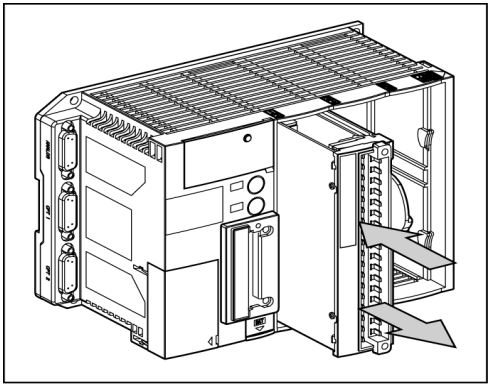
HE10 connectors or screw terminal blocks must be wired or unwired with sensor and pre-actuator power supplies disconnected.
See below:



Mounting and removing modules

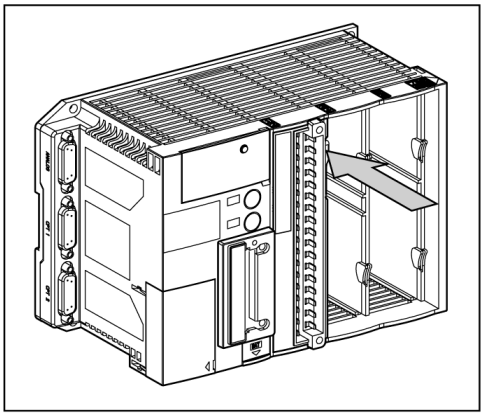
Modules must be mounted and removed with:
- the PLC power turned off,
- sensor and pre-actuator power supplies disconnected.

See below:



Locking modules into their slots

The module fixing latch must be completely engaged so that electrical contacts and ground connections are fully established.
See below:

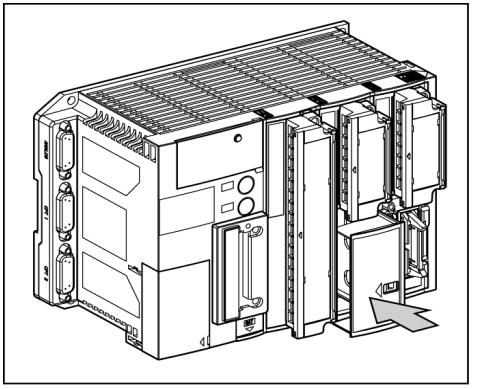


Protecting slots unused by a module

In the event where a position is not used by a module, it must be protected by a TSX RKA 01 protection cover to ensure an IP20 level protection for the PLC configuration.

Note: TSX RKA 01 protection covers are sold in batches of 10.

See below:



Selecting direct current supply modules for sensors and pre-actuators

Regulated supply modules or rectified with filtering

In the event where 24V direct current external supply modules are utilized, it is advisable to use:

- either regulated supply modules which provide better response times for outputs, particularly on the trigger,

- or non-regulated supply modules but which have filtering:
  - for 1000 MicroFarad/A in double flip-flop single-phase rectification and 500 MicroF triple-phase rectification,
  - maximum peak to peak ripple rate: 5%,
  - maximum voltage variation: -20% to + 25% of nominal voltage (ripple included).

Note:
Rectified unfiltered supply modules are banned.

Supply from Cadmium/Nickel battery

This type of supply can be used to supply sensors and pre-actuators, as well as the associated inputs/outputs which function normally with a maximum voltage of 30 VDC.

During the loading process of this type of battery, the voltage can reach 34 VDC over the course of an hour. Because of this, the group of I/O modules which function on 24 VDC can allow a 34 VDC voltage limited to 1 hour per 24 hours.

This type of functioning entails the following restrictions:

- the maximum current on 34 VDC supported by output must at no time exceed the current set for a 30 VDC voltage,
- a de-rating of temperature which limits to:
  - 80% inputs/outputs in state 1 up to 30°C,
  - 50% of inputs/outputs in state 1 at 60°C.

General precautions and rules for wiring

Introduction

Discrete inputs/outputs have built-in protection to ensure efficient operation within an industrial environment. However, certain rules must be observed.

External supply modules for sensors and pre-actuators

These supply modules must be protected against short-circuits and overloads by using fast-blow fuses.

DANGER

Important:

In the event where 24 VDC installation has not been carried out following VLSV standards (very low safety voltage), 24 VDC supply modules must have 0V connected to the frame ground, which itself is connected to the ground and as close as possible to the supply module. This restriction is necessary to ensure personnel safety should a mains phase come into contact with the 24 VDC.

Failure to observe this precaution will result in death or serious injury.

Note: If an inputs/outputs module is present (ie. its inputs/outputs are used in the PLC), it is vital that all the module sensor and pre-actuator voltages are supplied. If not, a **voltage missing** fault appears, indicated by a lit I/O LED. To avoid any I/O faults, do not declare the part of the module which is not used in a task.

Inputs

Recommendations of use:

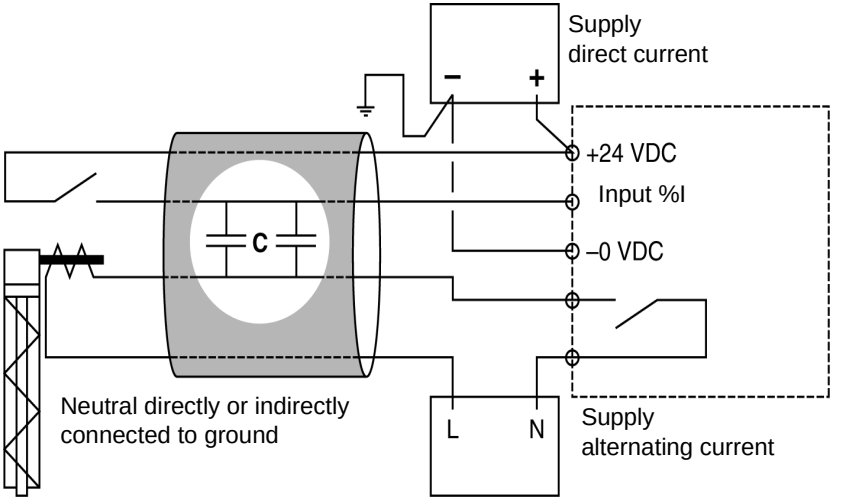
- if 24 VDC direct current inputs are used, you are advised to adapt the filtering time to the desired function,
- if the filtering time is reduced to a value less than 3ms, you are advised not to use sensors with mechanical contact outputs. This will prevent bounces being acknowledged when the contact closes,
- for the best possible performance, you are advised to use inputs and direct current sensors, as alternating current inputs have a greatly increased response time,

- on negative logic 24 VDC inputs, all the sensors are connected to the (-) on the supply module. For safety reasons, the 0V can be connected to the frame ground. If one of the input wires is disconnected by accident and comes into contact with the frame ground, there is a risk that the input will be set to state 1 and therefore could generate an unwanted command. You are therefore advised not to use negative logic inputs.

24 VDC inputs and line link-up with the alternating current network

Performance may be adversely affected by too great a link between wires carrying an alternating current and wires carrying signals for DC inputs.

Diagram showing the priniciple



When the input contact is open, an alternating current exceeding the amount of interference allowed within the wire can generate a current in the input. There is a risk that this current can set the input to 1.

Line capacities which must not be exceeded:

Modules	Maximum link-up capacity allowed with 240 VAC/50 Hz line		
	filtering 0.1 ms	filtering 3.5 ms	filtering 7.5 ms
TSXDMZ64DTK	10nf	15nf	35nf
TSXDEZ32D2	25nf	30nf	60nf
TSXDMZ28DT/DTK	15nf	25nf	35nf
TSXDMZ28DR	15nf	20nf	60nf
TSXDMZ16DTK	15nf	25nf	35nf
TSXDEZ12D2	15nf	20nf	60nf
TSXDEZ12D2K	25nf	30nf	60nf

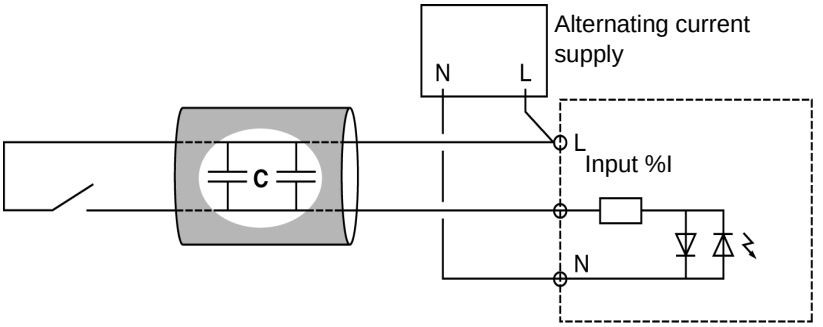
For a link-up to a different voltage, carry out the following:

$$\text{Capacity} = \frac{\text{Capacity(240VCA)} \times 240}{\text{LineVoltage}}$$

AC input and line link-up

In this case, when the line controlling input is open, the current flows within the capacity of the wire link-up

Diagram showing the principle:



Line capacities which must not be exceeded
Modules TSX DMZ 28AR/DEZ 08A4/DEZ 08A5: 55nf.

Outputs

If the currents are large, you are advised:
- to split up the starters by protecting each one with a fast-blow fuse,
- to use wires of sufficient size to avoid voltage falls and heating.

Routing cables

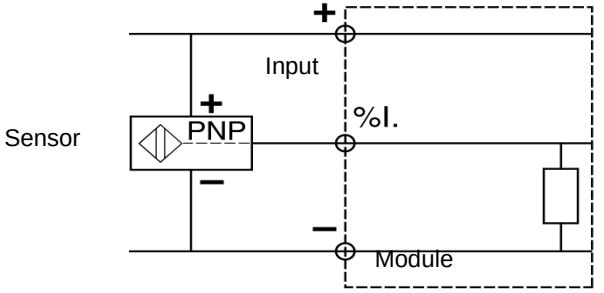
- Inside and outside the device:
  - to limit alternating current link-ups, the power circuit cables (supply modules, power switches etc.) must be separate from the input (sensors) and output (actuators) cables.
- Outside the device:
  - Input/output cables must be placed in conduits separate from those holding higher power cables. Preferably the I/O cables should be run along separate metal ducts which are connected to the ground. All cables must lie at least 100 mm from each other.

Compatibility of sensors with inputs

Compatibility of 3 wire sensors with 24 VDC inputs

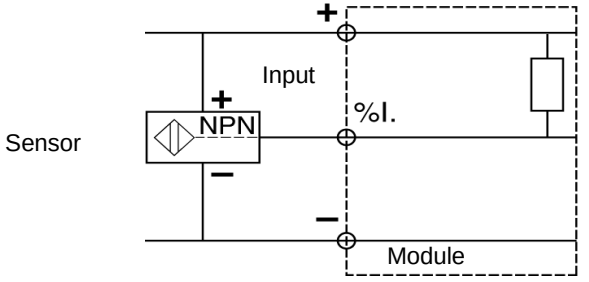
3-wire sensors and positive logic inputs (sink) IEC 1131-2 type 1 and type 2

All inductive or capacitive proximity detectors and 3-wire PNP photo-electric detectors running on 24 VDC are compatible with all positive logic inputs.
Diagram:



3-wire sensor and negative logic inputs (source)

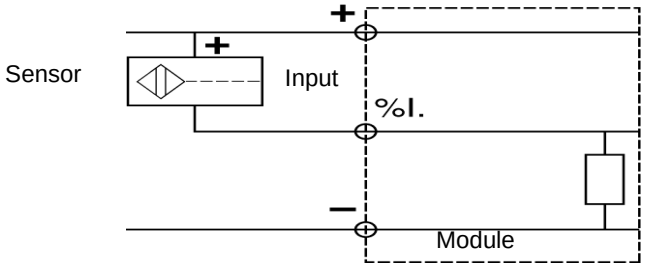
All inductive or capacitive proximity detectors and 3-wire NPN photo-electric detectors running on 24 VDC are compatible with all negative logic inputs.
Diagram



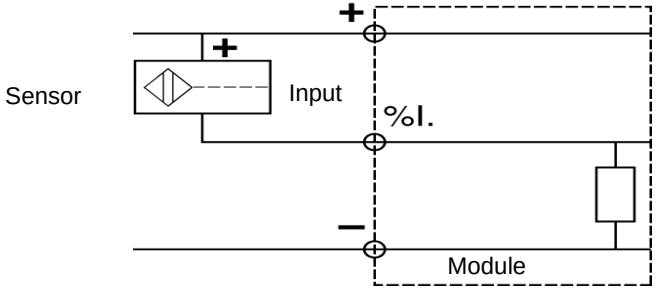
Compatibility of 3-wire sensors with 24 VDC inputs

2-wire sensors and positive logic inputs (sink) IEC 1131-2 type 1
All proximity detectors or other 2-wire sensors running on 24 VDC with the following characteristics are compatible with all type 1 positive logic 24 VDC inputs in the TSX Micro range.
Breakdown voltage when closed: <= 7V.
Minimum switched current: <= 2.5mA.
Residual current when open: <= 1.5mA.

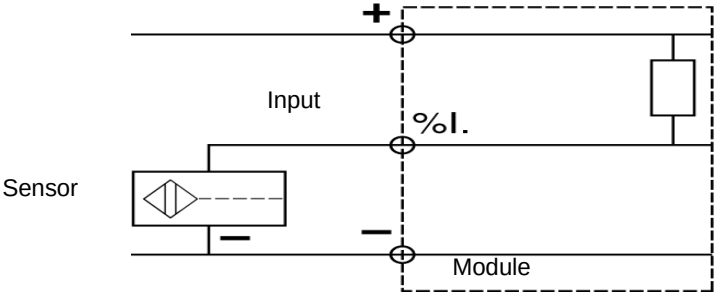
Diagram:



2-wire sensors and positive logic inputs (sink) IEC 1131-2 type 2.
All 2-wire proximity detectors running on 24 VDC and complying with standard IEC 947-5-2 are compatible with all type 2 positive logic 24 VDC inputs.
Diagram:



2-wire sensor and negative logic inputs (source)
All proximity detectors or other 2-wire sensors running on 24 VDC with the following characteristics are compatible with all type 1 negative logic 24 VDC inputs in the TSX Micro range.
Breakdown voltage when closed: <= 7V.
Minimum switched current: <= 2.5mA.
Residual current when open: <= 1.5mA.
Diagram:



Compatibility of 2-wire sensors with 100…120 VAC or 200…240 VAC inputs

All 2-wire AC or AC/DC proximity detectors complying with standard IEC 947-5-2 and other sensors supporting voltages 100...120 VAC IEC 1131-2 type 2 and 200...240 VAC IEC 1131-2 type 1.

Summary table

The table below shows a summary of the compatibility between sensors and inputs.

PD type	**Type of inputs**				
	positive logic type 1 24 VDC	**positive logic type 2 24 VDC**	**negative logic type 24 VDC**	**100...120 VAC type 2**	**100...120 VAC type 1**
All 3-wire PD (DC) PNP type	Compatible	Compatible			
All 3-wire PD (DC) NPN type			Compatible		
2-wire (DC) PD Teleméchanique make or other : Breakdown voltage when closed <= 7V Minimum switched current <= 2.5 mA Residual current when open <= 1.5 mA	Compatible	Compatible	Compatible		
2 wire (AC/DC) PD		Compatible		Compatible)	Compatible (1)
2 wire (AC) PD				Compatible	Compatible (1)
Key					
DC	Operation with direct current voltage.				
AC	Operation with alternating current voltage.				
AC/DC	Operation with direct or alternating current voltage.				
(1)	Within the 220..240 VAC nominal voltage range.				

Compatibility of pre-actuators with outputs

Compatibility of direct current pre-actuators with outputs

Be aware of the maximum current and the maximum output switch frequency, which are detailed in the characteristics table.

For pre-actuators which do not consume much power, do not forget to include the output leakage current when they are idle so that the following inequation can be checked:

$$0,1 \times \text{Inominal} \geq 5 \times \text{Ileakage}$$

Nominal I = Current consumed by the pre-actuator.
Leakage I = output leakage current when idle.

Compatibility between tungsten filament lamps and static outputs

For outputs protected against short-circuits, be aware of the maximum power of tungsten filament lamps which is detailed in the characteristics table. If you are not careful, there is a risk that output on the lamp's signaling current will trip when the lamp is lit.

Compatibility of alternating current pre-actuators with relay outputs

Inductive alternating current pre-actuators possess a signaling current which can reach 10 times the retaining current for a minimum time of 2/F seconds (F = alternating current frequency). As a result, relay outputs are installed for holding loads (Ac14 and AC15).
The characteristics table for relay outputs details the maximum power (in AC) that is allowed on the retaining current according to the number of operations.

Reminder of the definition of a thermocurrent

This is a current which can continuously accept a closed relay with an acceptable level of temperature raise. In no way can this current be switched by the relay.

Handling of Discrete input/output module faults

3

Discrete input/output diagnostics and display

At a Glance

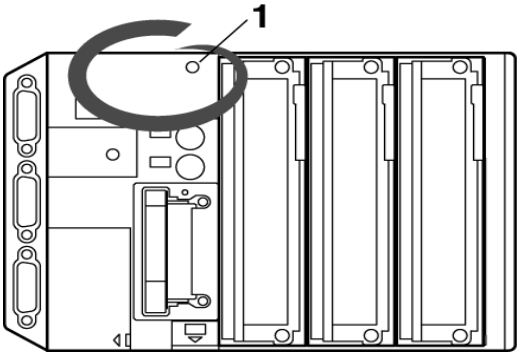
Discrete input/output diagnostics and display is carried out from:

- the I/O LED found on the front of the PLC, which groups all faults involving inputs/outputs (the LED is lit when there is a fault),
- the centralized display **1** (see picture) on the PLC, and is used:
  - when in display mode, to display the state of each input/output in the base module or the mini-extension rack,
  - when in diagnostics mode, to display module faults (all the module LEDs flash slowly) or channel faults (the LED associated with the channel flashes quickly).

For more detailed information, see (TSX micro PLCs TSX 3705/ 3708/ 3710/ 3720 Implementation manual Volume 1 - Commissioning/Diagnostics/Maintenance) .

Illustration

See the picture below:



The Discrete input/output mixed module TSX DMZ 64DTK

4

At a Glance

Aim of this Chapter

This chapter introduces the TSX DMZ 64DTK module, its characteristics and connections with different sensors and pre-actuators.

What's in this Chapter?

This Chapter contains the following Maps:

Topic	Page
Introduction to the TSX DMZ 64DTK module	56
Characteristics of the TSX DMZ64DTK module	58
Connections for the TSX DMZ64DTK module	61

Introduction to the TSX DMZ 64DTK module

At a Glance

The TSX DMZ 64TK module comprises 64 inputs/outputs distributed as follows:

- 24 VDC 32 inputs, positive logic type 1,
- 24 VDC / 0.1 A 32 static outputs.

It is equipped with 4 male HE10 connectors:

- A and B connectors on the upper part to connect inputs: A (0 to 15), B (16 to 31),
- A and B connectors on the lower part to connect outputs: A (0 to 15), B (16 to 31).

Each connector can receive:

- either a ready-wired TSX CDP i01 lead to connect directly to the terminal, sensor or pre-actuator,
- or a TSX CDP i02 ribbon cable or a TSX CDP ii3 cable for connection to the TELEFAST 2 interface.

Module:

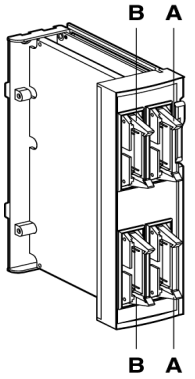
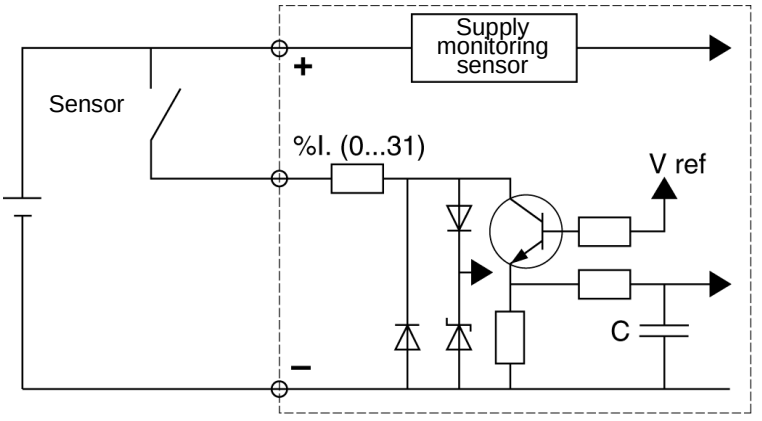
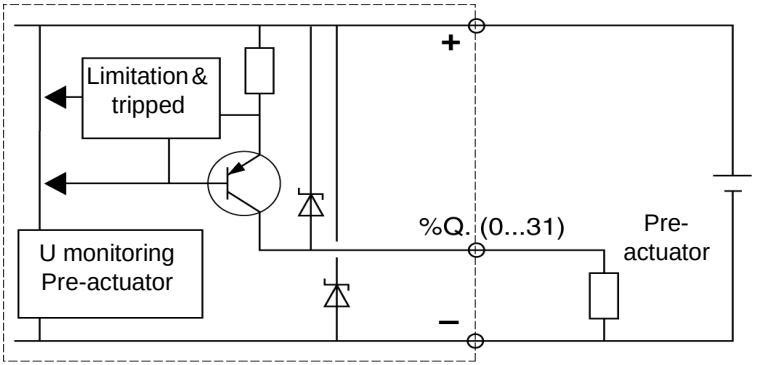


Diagram showing the principle of Inputs/Outputs

Inputs



Outputs


+
Limitation &
tripped
%Q. (0...31)
Pre-
actuator
U monitoring
Pre-actuator
–

Characteristics of the TSX DMZ64DTK module

General characteristics

Table

Modularity	Inputs 32E/24VDC.
	Static 32S outputs 24VDC/0,1A.
Current used on the internal 5V	40mA+3,5mA by output at 1.
Current used on the sensor supply	75mA+3.8mA sink inputs by input at 1.
	Source inputs.
Current used on the 24V relay	
Current used on the 24V pre-actuator (outside of load current)	75mA+4,5mA by output at 1.
Dissipated power in the module (load rate = 60%)	5W
Operating temperature	0 to 60°C
Dielectric rigidity	Input/mass or input/internal logic 1500V, effective 50/60Hz 1mn.
	Output/mass or output/internal logic 1500V, effective 50/60Hz 1mn.
Insulation resistance	>10M Ohm under 500VDC.
Hygrometry	5% to 95% without condensation.
Storage temperature	-25°C to 70°C
Operating altitude	0 to 2000 meters
Drop in temperature	The characteristics at 60°C are guaranteed for 60% of the inputs and 60% of the outputs at state 1.

Characteristics of the 24VDC inputs

Table:

Logic	Positive
Nominal input value	Voltage 24V.
	3,5mA current.
Input threshold	At state 1 ->Voltage>=11V.
	At state 1 -> Current (for U=11V) >2,5mA.
	At state 0 ->Voltage<5V.
	At state 0 Current<1,5mA.
	Sensor supply (including ripple) 19…30V (possible up to 34V limited to 1 hour in a 24-hour period)

Input impedance	6,3K Ohm
Configurable response time	State 0 at 1 ->0,1...7,5ms.
	State 1 at 0 ->0.1...7.5ms.
Sensor voltage check threshold	OK >18V.
	Default <14V.
Sensor voltage check response time	When 24V 1 ms<t<3ms disappears.
	When 24V 8ms<t<30ms appears.
Type of inputs	Resistive.
Compliance with IEC 1131-2 type1	Type 1
DDP 2 wire compatibility	See *Compatibility of 3-wire sensors with 24 VDC inputs, p. 49*
DDP 3 wire compatibility	Yes
Input common	To + from the supply.

Characteristics of the 24VDC/0,1A static outputs

Table:

Logic	Positive current emitted.
Nominal values	Voltage/current 24V/0.1A
Thresholds (U<=30 or 34V, ripple included)	Voltage 19 to 30V(possible up to 34V, limited to 1h per 24h period).
	Current/channel 0.125A.
	Current/module 1.6A.
Power of tungsten filament lamp	1.2W max.
Leakage current	At state 0 ><=0.1mA.
Waste voltage	At state 1 ><=1.5V.
Minimum load impedance	220 Ohm
Response time (1)	State of path 0 to 1 <250 Micro/Sec.
	State of path 1 to 0 <250 Micro/Sec.
Switching frequency on inductive load	<0.5/LI Hz.
Compliance with IEC 1131-2	Yes
Output parallelization	Yes, 3 outputs maximum.
Compatibility with direct current inputs	All 24VDC CEI 1131 type 1 and type 2 inputs.
Load common	To - from the supply.

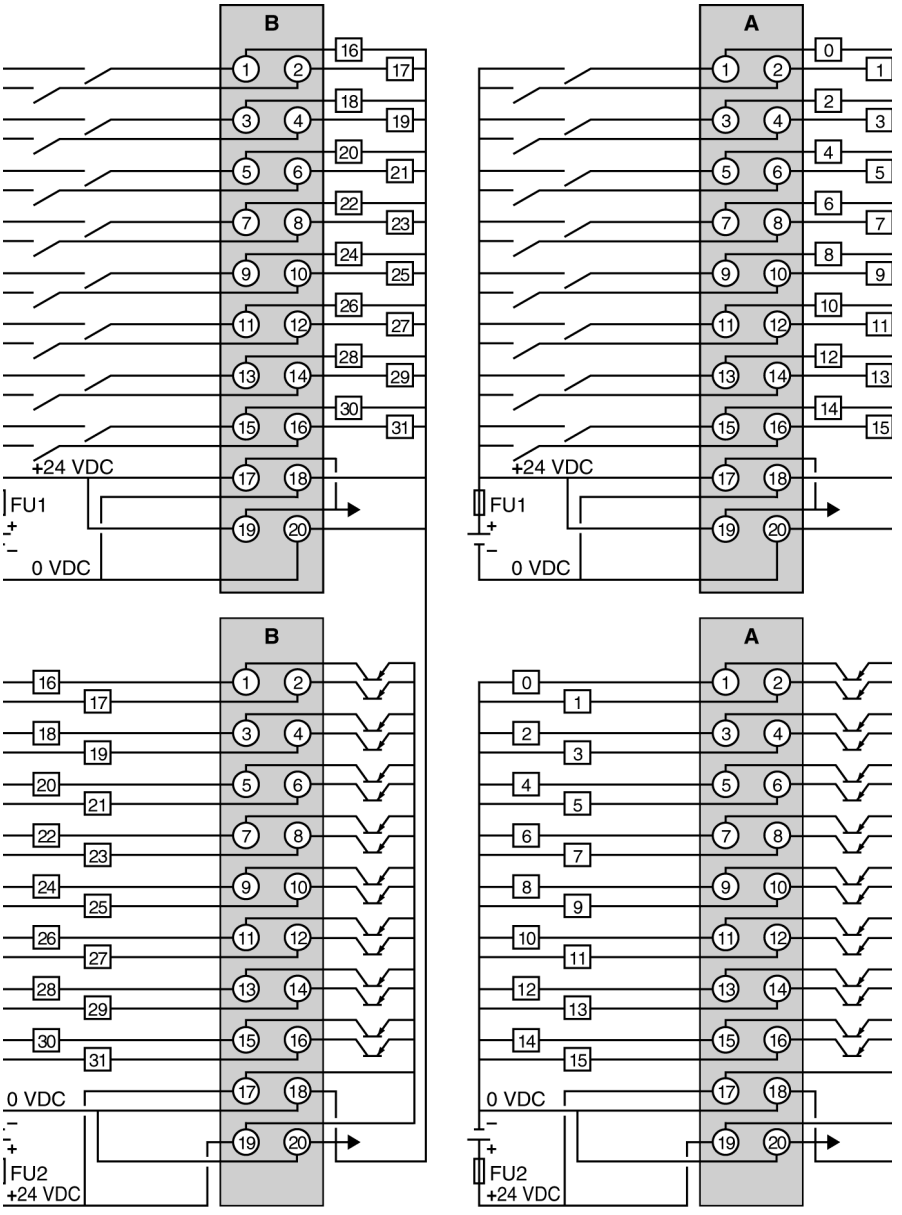
Built-in protection measures	Against overloads and short-circuits: By current limiter and electronic circuit breaker 125mA<=1d<=185mA.
	Against excess voltage: Yes, by Zener diode
	Against polarity inversions: Yes, by reverse diode on supply. Plan for a fuse on +24V of the pre-actuators' supply (2A rapid fusion type).
Pre-actuator voltage check threshold	OK >18V.
	Default <14V.
Check response time	When T<4ms appears.
	When T<30ms disappears.
Dissipated power by channel at state 1	0.07W (for U=24V).

(1): All outputs are equipped with circuits for rapid demagnetizing of solenoids. Solenoid load time < L/R.

Connections for the TSX DMZ64DTK module

Sensor/input and pre-actuator /output Wiring

Diagram:



FU1 = 0.5A fuse with rapid fusion.
FU2 = 2A fuse with rapid fusion.

Correspondence between the HE10 connector pins and the TSX CDP .01 wires with a pre-wired strand.

A and B sensor/input Wiring

Connector terminals	Wire color (sensor side)
1	White
2	Brown
3	Green
4	Yellow
5	Gray
6	Pink
7	Blue
8	Red
9	Black
10	Purple
11	Gray/Pink
12	Red/Blue
13	White/Green
14	Brown/Green
15	White/Yellow
16	Yellow/Brown
17	White/Gray
18	Gray/Brown
19	White/Pink
20	Pink/Brown

A and B pre-actuator/output connectors

Connector terminals	Wire color (pre-actuator side)
1	White
2	Brown
3	Green
4	Yellow
5	Gray
6	Pink
7	Blue
8	Red

Connector terminals	Wire color (pre-actuator side)
9	Black
10	Purple
11	Gray/Pink
12	Red/Blue
13	White/Green
14	Brown/Green
15	White/Yellow
16	Yellow/Brown
17	White/Gray
18	Gray/Brown
19	White/Pink
20	Pink/Brown

The Discrete input/output mixed module TSX DMZ 28DTK

5

At a Glance

Aim of this Chapter

This chapter introduces the TSX DMZ 28DTK module, its characteristics and connections with different sensors and pre-actuators.

What's in this Chapter?

This Chapter contains the following Maps:

Topic	Page
TSX DMZ 28DTK module	66
Characteristics of the module TSX DMZ28DTK	68
Connections of the TSX DMZ28DTK module	71

TSX DMZ 28DTK module

Introduction

The TSX DMZ 28DTK module comprises 28 inputs/outputs distributed as follows:

- 16 24VDC inputs, positive logic type 1,
- 12 static outputs 24VDC/0,5A.

The module is equipped with 2 male HE10 connectors:

- connector A to connect inputs,
- connector B to connect outputs,

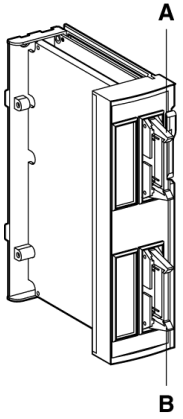
Each connector can receive:

- either a TSX CDP •01 pre-wired strand for direct connection onto the terminal, sensor or pre-actuator,
- or a TSX CDP••3 cable for connection to TELEFAST 2 wiring interface.

Note: A TSX CDP .02 antenna can be used for connection to TELEFAST 2 wiring interface, only for the input part (connector A).

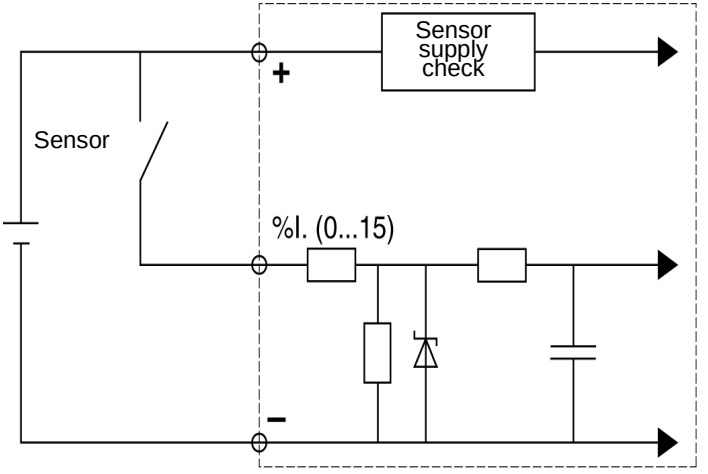
Illustration

Module:

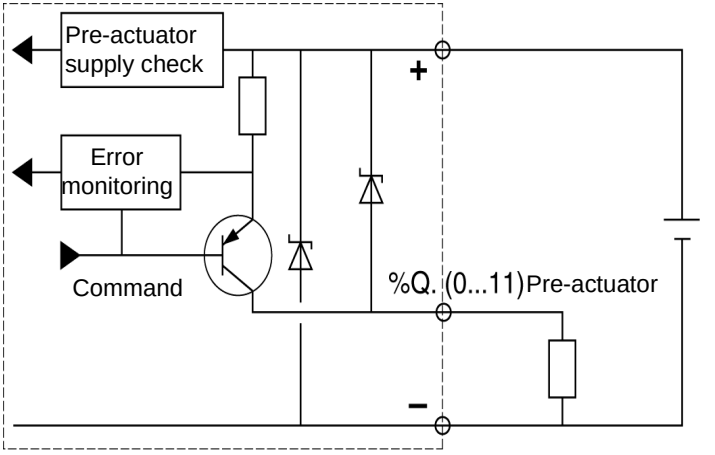


Process diagrams for inputs/outputs

Inputs:



Outputs:



Characteristics of the module TSX DMZ28DTK

General characteristics

Table

Modularity	Inputs 16E/24VDC.
	Static 12S outputs 24VDC/0.5A.
Current used on the internal 5V	30mA+3.2mA by output at 1.
Current used on the sensor supply	Sink 20mA+7mA inputs by input at 1.
	Source inputs.
Current used on the 24V relay	
Current used on the 24V pre-actuator (outside of load current)	40mA+1mA by output at 1.
Dissipated power in the module (load rate = 60%)	5W
Operating temperature	0 to 60°C
Dielectric rigidity	Input/mass or input/internal logic 1500V, effective 50/60Hz 1mn.
	Output/mass or output/internal logic 1500V, effective 50/60Hz 1mn.
Insulation resistance	>10M Ohm under 500VDC.
Hygrometry	5% to 95% without condensation.
Storage temperature	-25°C to 70°C
Operating altitude	0 to 2000 meters
Drop in temperature	The characteristics at 60°C are guaranteed for 60% of the inputs and 60% of the outputs at state 1.

Characteristics of the 24VDC inputs

Table:

Logic	Positive.
Nominal input value	Voltage 24V.
	7mA current.
Input threshold	At state 1 ->Voltage>=11V.
	At state 1 -> Current (for U=11V) >2,5mA.
	At state 0 ->Voltage<5V.
	At state 0 Current<1,5mA.
	Sensor supply (including ripple) 19…30V (possible up to 34V limited to 1 hour in a 24-hour period)

Input impedance	3.4K Ohm
Configurable response time	State 0 at 1 ->0,1...7,5ms.
	State 1 at 0 ->0.1...7.5ms.
Sensor voltage check threshold	OK >18V.
	Default <14V.
Sensor voltage check response time	When 24V 1 ms<t<3ms disappears.
	When 24V 8ms<t<30ms appears.
Type of inputs	Current wells.
Compliance with IEC 1131-2 type1	Type 2
DDP 2 wire compatibility	See *Compatibility of 3-wire sensors with 24 VDC inputs, p. 49*
DDP 3 wire compatibility	Yes
Input common	To + from the supply.

Characteristics of the 24VDC/ 0.5A static outputs

Table:

Logic	Positive current emitted.
Nominal values	Voltage/current 24V/0.0.5A.
Thresholds (U<=30 or 34V, ripple included)	Voltage 19 to 30V(possible up to 34V, limited to 1h per 24h period).
	Current/channel 0,625A.
	Current/module 6A.
Power of tungsten filament lamp	10Wmax
Leakage currents (state 0)	During normal operation <0.5mA.
	When 0V module is accidentally disconnected < 2mA.
Waste voltage	At state 1 <1V (for I=0.5A).
Minimum load impedance	48Ohm
Response time (1)	State of path 0 to 1 <500 Micro/Sec.
	State of path 1 to 0 <500 Micro/Sec.
Switching frequency on inductive load	<0.6/LI Hz.
Compliance with IEC 1131-2	Yes
Output parallelization	Yes, 2 outputs maximum.
Compatibility with direct current inputs	All the 24VDC CEI 1131 type 1 and type 2 inputs with input impedance < 15 KOhm.
Load common	To - from the supply.

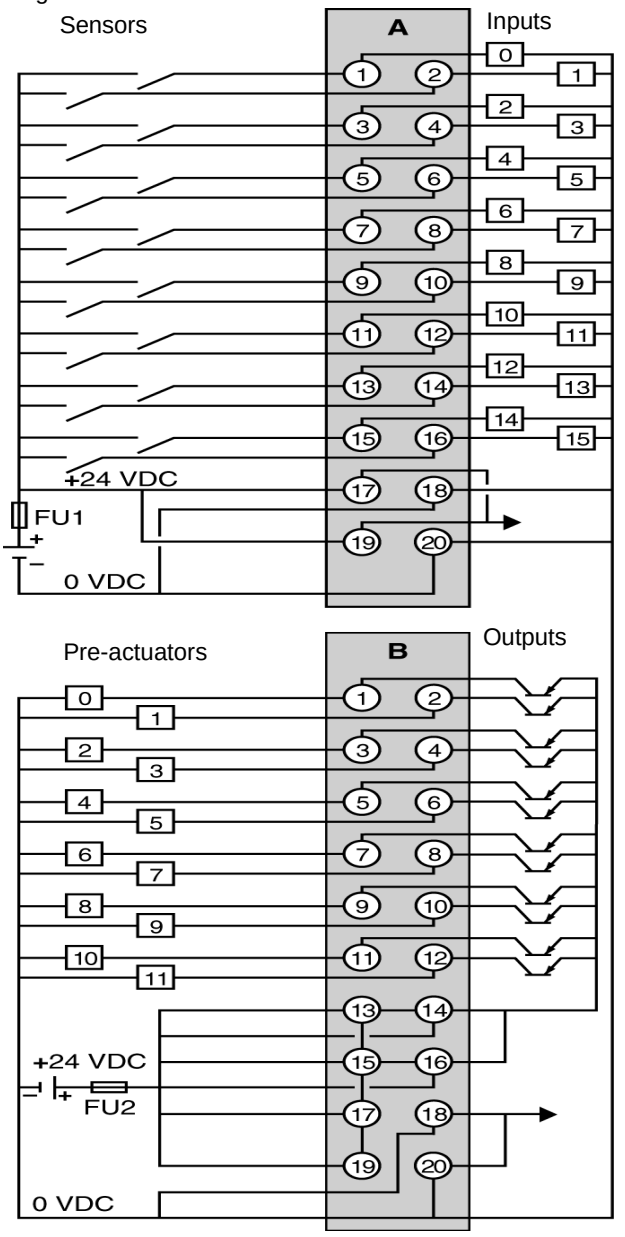
Built-in protection measures	Against overloads and short-circuits: By current limiter and thermal circuit breaker 0.75A<=1d<=2A.
	Against excess voltage: Yes, by Zener diode
	Against polarity inversions: Yes, by reverse diode on supply. Plan for a rapid fusion fuse over +24V of the 6.3A pre-actuators' supply.
Pre-actuator voltage check threshold	OK >18V.
	Default <14V.
Check response time	When T<4ms appears.
	When T<30ms disappears.
Dissipated power by channel at state 1	<0.45W (for U=24V).

(1) All outputs are equipped with circuits for rapid demagnetizing of solenoids. Solenoid discharge time < L/R.

Connections of the TSX DMZ28DTK module

Sensor/input and pre-actuator /output Wiring

Diagram:



FU1 = 0.5A fuse with rapid fusion.
FU2 = 6.3A fuse with rapid fusion.

Correspondence between the HE10 connector pins and the different TSX CDP .01 wires with a strand.

Connector A sensors/inputs

Connector terminals	Wire color (sensor side)
1	White
2	Brown
3	Green
4	Yellow
5	Gray
6	Pink
7	Blue
8	Red
9	Black
10	Purple
11	Gray/Pink
12	Red/Blue
13	White-green
14	Brown-green
15	White-yellow
16	Yellow-brown
17	White/Gray
18	Gray/Brown
19	White/Pink
20	Pink/Brown

Pre-actuator/Output B connectors

Connector terminals	Pre-actuator colored wire
1	White
2	Brown
3	Green
4	Yellow
5	Gray
6	Pink
7	Blue
8	Red

Connector terminals	Pre-actuator colored wire
9	Black
10	Purple
11	Gray/Pink
12	Red/Blue
13	White-green
14	Brown-green
15	White-yellow
16	Yellow-brown
17	White/Gray
18	Gray/Brown
19	White/Pink
20	Pink/Brown

The Discrete input/output mixed module TSX DMZ 28DT

6

At a Glance

Aim of this Chapter

This chapter describes the TSX DMZ 28DT module, its characteristics and connections with different sensors and pre-actuators.

What's in this Chapter?

This Chapter contains the following Maps:

Topic	Page
Module TSX DMZ 28DT	76
Characteristics of the module TSX DMZ28DT	78
links of the TSX DMZ28DT module	81

Module TSX DMZ 28DT

At a Glance

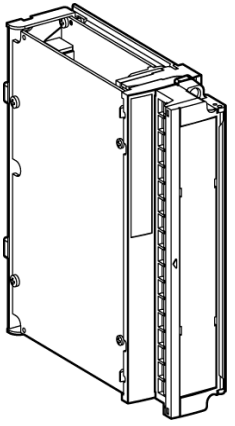
Module TSX DMZ 28DT comprises 28 inputs/outputs distributed as follows:

- 16 24VDC inputs, positive logic type 1,
- 12 static outputs 24VDC/0,5A.

The module is equipped with a 35 post screwed connection terminal block, a carriage allowing inputs and outputs to be linked:

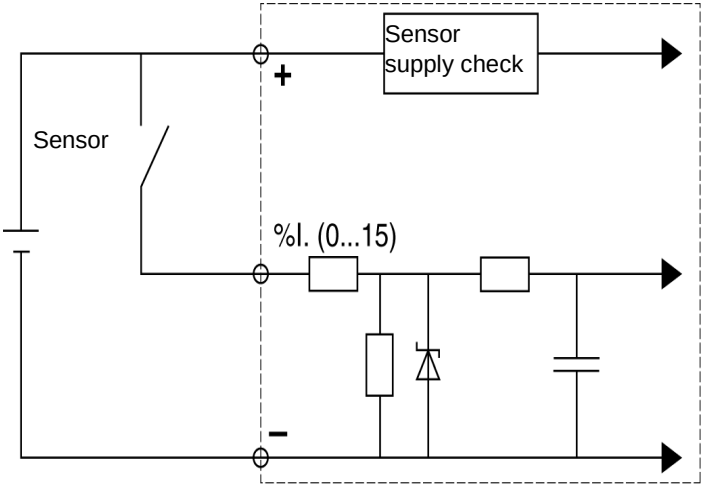
Illustration

Module:

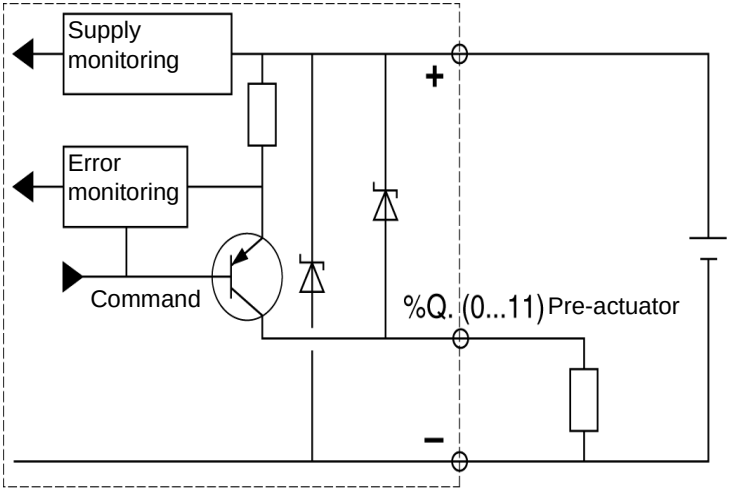


Process diagrams of inputs/outputs

Inputs:



Outputs:


Supply
monitoring
Error
monitoring
Command
+
%Q. (0...11)
Pre-actuator
–

Characteristics of the module TSX DMZ28DT

General characteristics

Table

Modularity	Inputs 16E/24VDC.
	Static 12S outputs 24VDC/0.5A.
Current used on the internal 5V	30mA+3.2mA by output at 1.
Current used on the sensor supply	Sink 20mA+7mA inputs by input at 1.
	Source inputs.
Current used on the 24V relay	
Current used on the 24V pre-actuator (outside of current load)	40mA+1mA by output at 1.
Dissipated power in the module (load rate = 60%)	5W
Operating temperature	0 to 60°C
Dielectric rigidity	Input/mass or input/internal logic 1 500V, effective 50/60Hz 1mn input/logic.
	Output/mass or output/internal logic 1 500V, effective 50/60Hz 1mn input/logic.
Insulation resistance	>10M Ohm under 500VDC.
Hygrometry	5% to 95% without condensation.
Storage temperature	-25°C to 70°C
Operating altitude	0 to 2000 meters
Drop in temperature	The characteristics at 60°C are guaranteed for 60% of the inputs and 60% of the outputs at state 1.

Characteristics of the 24VDC inputs

Table:

Logic	Positive
Nominal input value	Voltage 24V.
	7mA current.
Input threshold	At state 1 ->Voltage>=11V.
	At state 1 -> Current (for U=11V) >2,5mA.
	At state 0 ->Current<5V.
	At state 0 Current<1,5mA.
	Sensor supply (including ripple) 19…30V (possible up to 34V limited to 1 hour in a 24-hour period)

Input impedance	3.4K Ohm
Configurable response time	State 0 at 1 ->0,1...7,5ms.
	State 1 at 0 ->0.1...7.5ms.
Sensor voltage check threshold	OK >18V.
	Default <14V.
Sensor voltage check response time	When 24V 1 ms<t<3ms disappears.
	When 24V 8ms<t<30ms appears.
Type of inputs	Current wells.
Compliance with IEC 1131-2 type1	Type 2
DDP 2 wire compatibility	See *Compatibility of 3-wire sensors with 24 VDC inputs, p. 49*
DDP 3 wire compatibility	Yes
Common of the inputs	To + from the supply.

Characteristics of the 24VDC/ 0.5A static outputs

Table:

Logic	Positive current emitted.
Nominal values	Voltage/current 24V/0.0.5A.
Thresholds (U<=30 or 34V, ripple included)	Voltage 19 to 30V(possible up to 34V, limited to 1H/ 24h).
	Current/channel 0,625A.
	Current/module 6A.
Power of tungsten filament lamp	10Wmax
Leakage currents (state 0)	During normal operation <0.5mA.
	When 0V module is accidentally disconnected < 2mA.
Waste voltage	At state 1 <1V (for I=0.5A).
Small load impedance	48Ohm
Response time (1)	State of path 0 to 1 <500 Micro/Sec.
	State of path 1 to 0 <500 Micro/Sec.
Switching frequency on inductive load	<0.6/LI Hz.
Compliance with IEC 1131-2	Yes
Output parallelization	Yes, 2 outputs maximum.
Compatibility with direct inputs	All the 24VDC CEI 1131 type 1 and type 2 inputs with input impedance < 15 KOhm.
Common of loads	To - from the supply.

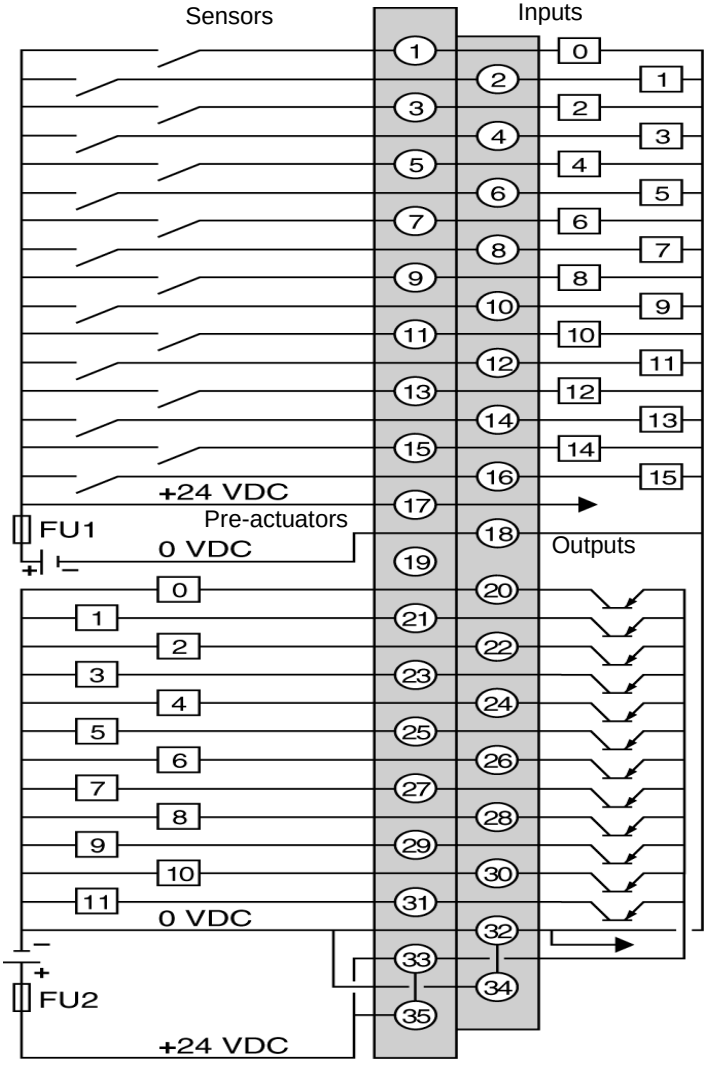
Built-in protection measures	Against overloads and short-circuits: By current limiter and thermal circuit breaker 0.75A<=1d<=2A.
	Against excess voltage: By breakdown diode
	Against polarity inversions: Yes, by reverse diode on supply. Scheduling a rapid fusion fuse over +24V of the 6.3A pre-actuators' supply.
Pre-actuator voltage check threshold	OK >18V.
	Default <14V.
Check response time	At the appearance T<4ms
	At the disappearance T<30ms.
Dissipated power by channel at state 1	<0.45W (for U=24V).

(1) All outputs are equipped with circuits for rapid demagnetizing of solenoids. Solenoid discharge time < L/R.

links of the TSX DMZ28DT module

Sensor/input connections and pre-actuator /outputs

Diagram



FU1 = 0.5A fuse with rapid fusion.
FU2 = 6.3A fuse with rapid fusion.

The Discrete input/output mixed module TSX DMZ 28DR

7

At a Glance

Aim of this Chapter

This chapter introduces the TSX DMZ 28DR module, its characteristics and connections to different sensors and pre-actuators.

What's in this Chapter?

This Chapter contains the following Maps:

Topic	Page
Module TSX DMZ 28DR	84
Characteristics of the module TSX DMZ28DR	89
links of the TSX DMZ28DR module	92

Module TSX DMZ 28DR

At a Glance

Module TSX DMZ 28DR comprises 28 inputs/outputs distributed as follows:

- 16 24VDC inputs, positive logic type 1, or negative logic,
- Relay outputs.

The module is equipped with a detachable 35 post screwed connection terminal block.

The inputs can be:

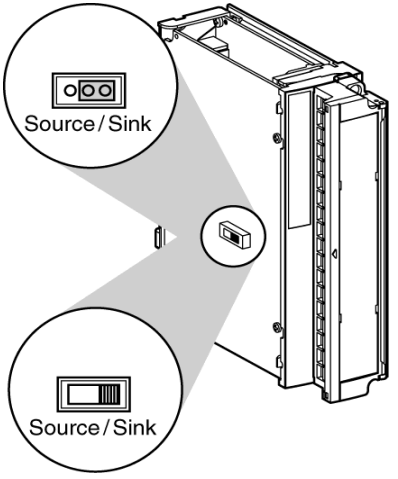
- Either positive logic (position sink), in which case all the sensors are connected to and from the positive 1'supply,
- or negative logic (source), in which case all the sensors are connected to and from the negative l'supply.

The choice is made by:

- the placement of 'a switch or'a rider on the module to enable 1' physical adaptation. By default, the material configuration is sink (positive logic),
- the software configuration in order to adapt the signals in one direction.

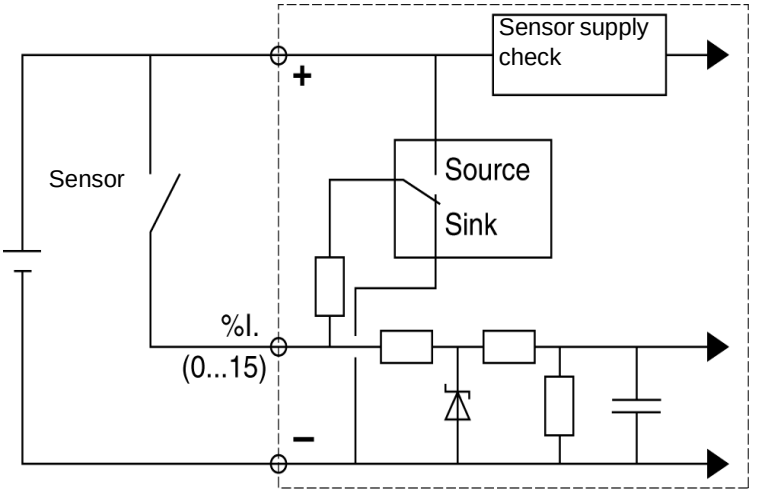
Illustration

Module:

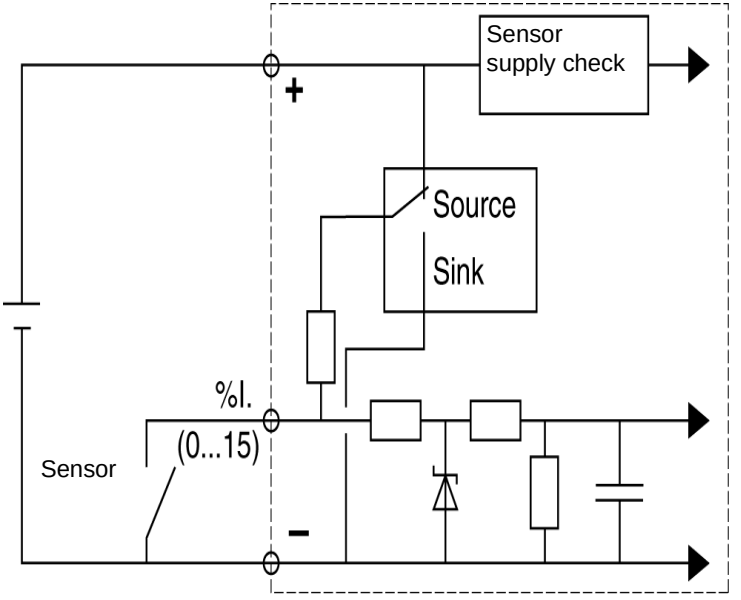


Process diagrams of inputs/outputs

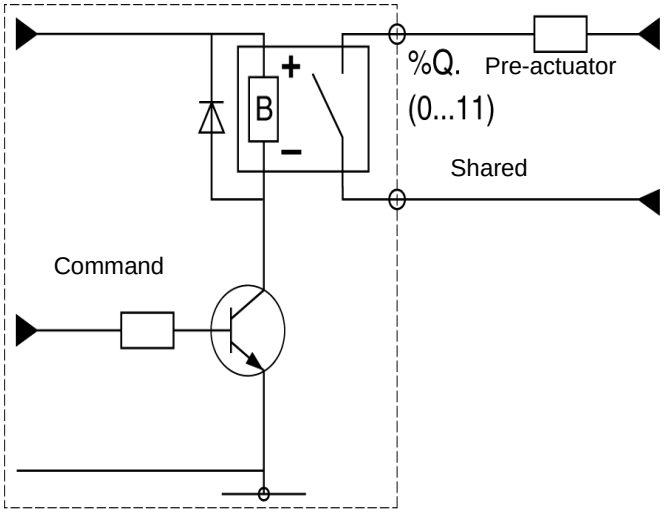
Sink positive logic inputs:



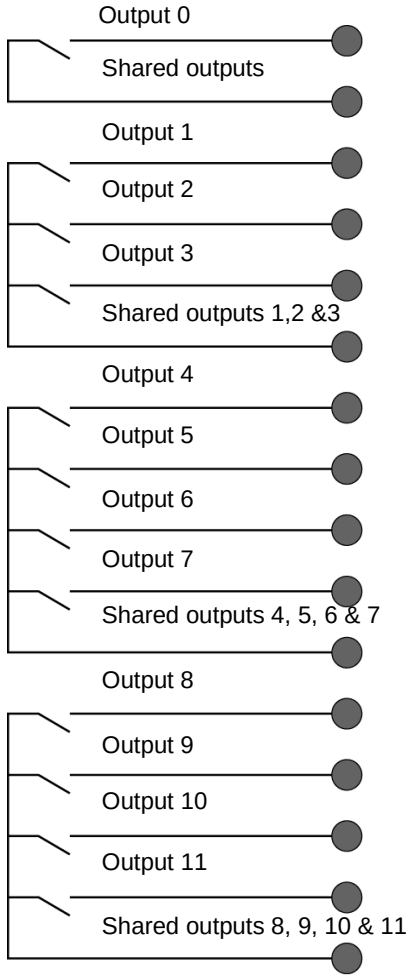
Source negative logic inputs:



Outputs:



Modularity (outputs):



WARNING

Warning:

In order to protect against contact with the relay, the following should be mounted on the pre-actuator terminals:

- an RC circuit or MOV (ZNO) suppressor for use with alternating currents,
- a discharge diode for use with direct currents.

Failure to observe this precaution can result in severe injury or equipment damage.

Characteristics of the module TSX DMZ28DR

General characteristics

Table:

Modularity	Inputs 16E/24VDC.
	Output 12S relay.
Current used on the internal 5V	45mA
Current used on the sensor supply	Sink 15mA+15mA+9mA inputs by input at 1.
	Source 35mA+6mA inputs by input at 1.
Current used on the 24V relay (1)	5mA+10mA by output at 1.
Current used on the 24V pre-actuator (outside of current load)	
Dissipated power in the module (load rate = 60%)	4.5W
Operating temperature	0 to 60°C
Dielectric rigidity	Input/mass or input/internal logic 1 500V, effective 50/60Hz 1mn input/logic.
	Output/mass or output/internal logic 2000V, effective 50/60Hz 1mn input/logic.
Insulation resistance	>10M Ohm under 500VDC.
Hygrometry	5% to 95% without condensation.
Storage temperature	-25°C to 70°C
Operating altitude	0 to 2000 meters
Drop in temperature	The characteristics at 60°C are guaranteed for 60% of the inputs and 60% of the outputs at state 1.

(1):If the 24V relay is delivered by an external supply (as in the mini-extension rack in particular), the value of this supply should comprise a maximum tolerance of 24V +/- 10%.

Characteristics of the 24VDC inputs

Table:

Logic	Positive or negative.
Nominal input value	Voltage 24V.
	9mA positive logic current.
	-6mA negative logic current.

Input threshold	At state 1 ->Positive logic voltage >=11V. At state 1 -> Negative logic voltage <=8V.
	At state 1 -> Current (as U=11V) >|2.5|mA.
	At state 0 ->Positive logic voltage <=5V. At state 0 ->Negative logic voltage >Ual-5V.
	At state 0 current<|1.5|mA
	Sensor supply (including ripple) 19…30V (possible up to 34V limited to 1 hour in a 24-hour period)
Input impedance	Positive logic 2.4K Ohm. Negative logic 4Kohm.
Configurable response time	State 0 at 1 ->0.1...7.5ms.
	State 1 at 0 ->0.1...7.5ms.
Sensor voltage check threshold	OK >18V.
	Default <14V.
Sensor voltage check response time	When 24V 1 ms<t<3ms disappears.
	When 24V 8ms<t<30ms appears.
Type of inputs	Resistive.
Compliance with IEC 1131-2 type1	Positive logic input type 1. Negative logic input not considered as standard.
DDP 2 wire compatibility	See *Compatibility of 3-wire sensors with 24 VDC inputs, p. 49*
DDP 3 wire compatibility	Yes
Common of the inputs	Positive logic to + from the positive supply. Negative logic to + from the positive supply.

Characteristics of the relay outputs

Table:

Job limit voltage	Direct/alternating 10 to 34VDC/19 to 264VAC.
Thermal current	3A
Common maximum load	5A

Alternating current load	Resistive regime AC12 alternating 110V voltage.
	Resistive, load AC12 power. 110VA (6). 220VA (4).
	Inductive regime AC14 and AC15 alternating 110V voltage.
	Inductive regime AC14 and AC15 power. 10VA (11). 50VA (7). 110VA (2).
Direct current load	Resistive regime DC12 direct 24V voltage.
	Resistive regime DC12 power. 24W (6) 40W (3)
	Inductive regime DC13 (L/R=60ms) Direct 24V voltage.
	Inductive regime DC13 (L/R=60ms) power. 10W (8) 24W (6) 110VA (2)
	Small load switchable 1mA/5V.
Response time (1)	On trigger <10ms.
	Off trigger <10ms.
Type of contact	Closing.
Built-in protection measures	Against overloads and short-circuits: None, it is essential to mounta rapid fusion fuse per channel or group of channels.
	Against alternating current inductive overcharging: None, each RC circuit or MOV (ZNO) suppressor, must be mounted parallel to the posts of each pre-actuator appropriate to the voltage.
	Against direct current inductive overcharging: None, each discharge diode must be mounted on the posts of each pre-actuator.

(2): 0.15 x 10^6 maneuvers

(4): 0.5 x 10^6 maneuvers

(6): 1x10^6maneuvers

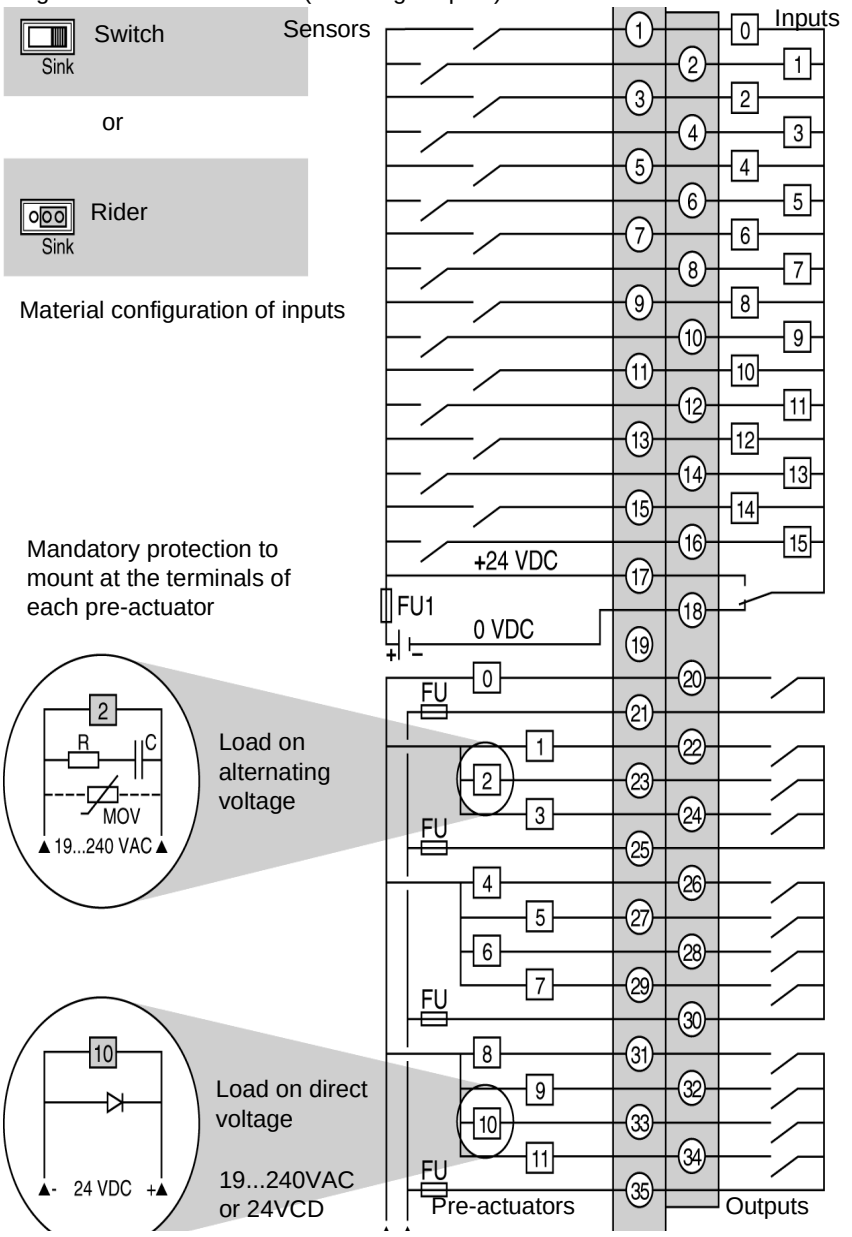
(7): 1.5x10^6maneuvers

(11): 10x10^6maneuvers

links of the TSX DMZ28DR module

Sensor/input connections and pre-actuator /outputs

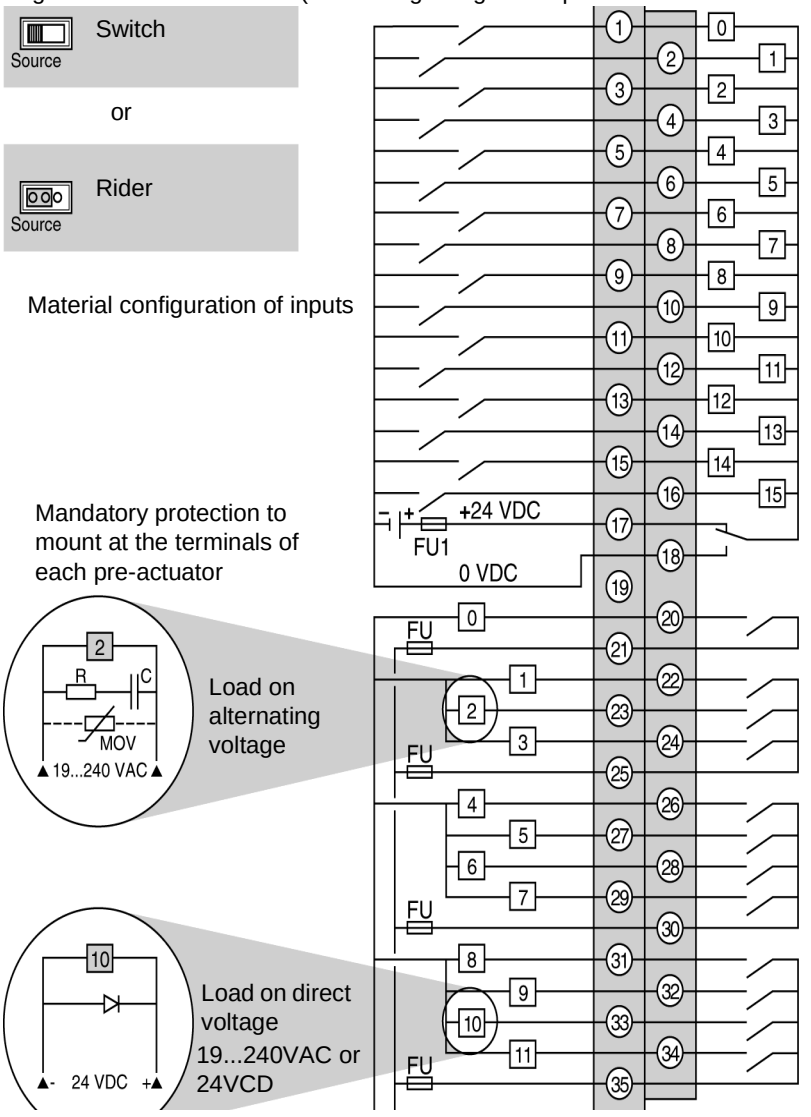
Diagram of TSX DMZ 28DR (SINK logic inputs):



FU1 = 0.5A fuse with rapid fusion.
FU = Fast blow fuses to be calibrated according to the load.

Note: In this case where the supply voltage of the pre-actuators is obtained from a triple-phase network and it is equal to or greater than 200VAC, the pre-actuators should be supplied starting at the same phase.

Diagram of TSX DMZ 28DR (Source logic negative inputs



FU1 = 0.5A fuse with rapid fusion.
FU = Fast blow fuses to be calibrated according to the load

Note: In this case where the supply voltage of the pre-actuators is obtained from a triple-phase network and it is equal to or greater than 200VAC, the pre-actuators are supplied starting at the same phase.

The Discrete input/output mixed module TSX DMZ 28AR

8

At a Glance

Aim of this Chapter

This chapter introduces the TSX DMZ 28AR module, its characteristics and connections to different sensors and pre-actuators.

What's in this Chapter?

This Chapter contains the following Maps:

Topic	Page
Module TSX DMZ 28AR	96
Characteristics of the module TSX DMZ28AR	99
links of the TSX DMZ28AR module	103

Module TSX DMZ 28AR

At a Glance

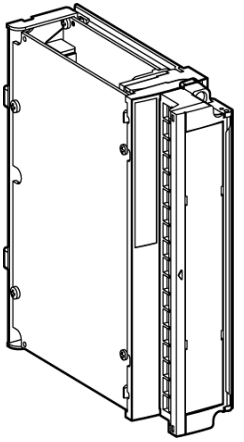
Module TSX DMZ 28AR comprises 28 inputs/outputs distributed as follows:

- 16 inputs 110/120VAC,
- 12 relay outputs.

The module is equipped with a screw terminal block, plugable and with 35 terminals, allowing the connection of inputs and outputs.

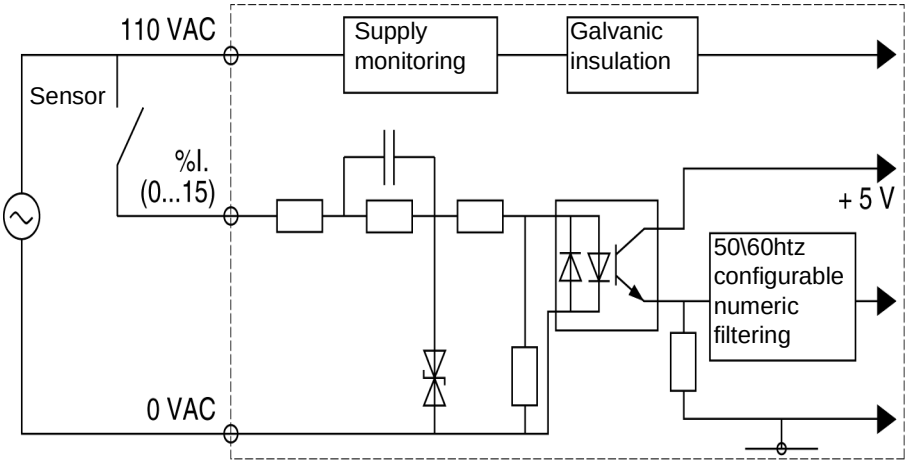
Illustration

Module:

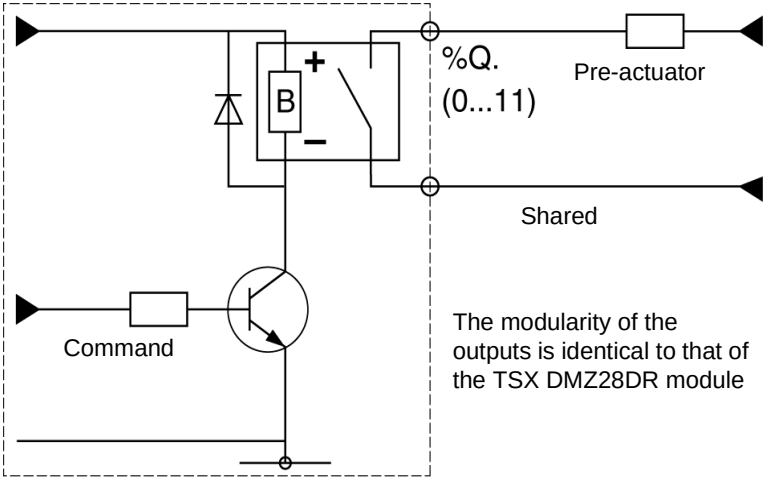


Process diagrams of inputs/outputs

Inputs:



Outputs:



The modularity of the outputs is identical to that of the TSX DMZ28DR module

WARNING

Warning

In order to protect against contact with the relay, the following should be mounted on the pre-actuator terminals:

- an RC circuit or MOV (ZNO) suppressor for use with alternating current,
- a discharge diode for use with direct current.

Failure to observe this precaution can result in severe injury or equipment damage.

Characteristics of the module TSX DMZ28AR

General characteristics

Table

Modularity	16E/110 to 120VAC inputs.
	Output 12S relay.
Current used on the internal 5V	40mA
Current used on the sensor supply	Sink 13mA+13mA inputs by input at 1.
Current used on the 24V relay (1)	5mA+10mA by output at 1.
Current used on the 24V pre-actuator (outside of current load)	
Dissipated power in the module (load rate = 60%)	5.6W
Operating temperature	0 to 60°C
Dielectric rigidity	Input/mass or input/internal logic 2 000V, effective 50/60Hz 1mn input/logic.
	Output/mass or output/internal logic 2000V, effective 50/60Hz 1mn input/logic.
Insulation resistance	>10M Ohm under 500VDC.
Hygrometry	5% to 95% without condensation.
Storage temperature	-25°C to 70°C
Operating altitude	0 to 2000 meters
Drop in temperature	The characteristics at 60°C are guaranteed for 60% of the inputs and 60% of the outputs at state 1.
Key	
(1)	If the 24V relay is delivered by an external supply (as in the mini-extension rack in particular), the value of this supply should comprise a maximum tolerance of 24V +/- 10%.

Characteristics of the 100...120VAC inputs.

Table:

Nominal input value	100 to 120VAC voltage.
	50Hz 11mA current.
	60Hz 13mA current.
	50/60Hz
Input threshold	At state 1 ->Voltage>=74V.
	At state 1 -> Current >6mA (for U=74V).
	At state 0 ->Voltage<20V.
	At state 0 Current<4mA.
	Sensor supply -> 85 to 132V.
	Frequency 47 to 63Hz.
	Peak current at the lock 160mA (RC=1KOhm/ 0.33Micro Farad).
Sensor voltage check threshold	OK >82V.
	Default <Ucom+10V (1)V.
Response time	State 0 at 1 50Hz - 11 to 18ms.
	State 0 at 1 60Hz 11 to 24Hz.
	State 1 at 0 50Hz 11 to 24Hz.
	State 1 at 0 60Hz 10 to 22Hz.
Sensor voltage check response time	At the disappearance 5ms<t<11 ms.
	At the appearance 20ms<t<50ms.
Type of inputs	Capacitive
Compliance with IEC 1131-2 type1	Type 2
DDP 2 wire compatibility (2)	Yes, see *Compatibility of 2-wire sensors with 100…120 VAC or 200…240 VAC inputs, p. 51*
Key	
(1)	Ucom = Real switching voltage of the input. This value (Ucom+10V) ensures the coherence between the threshold of the sensor voltage check and that of the inputs.
(2)	

Characteristics of the relay outputs

Table:

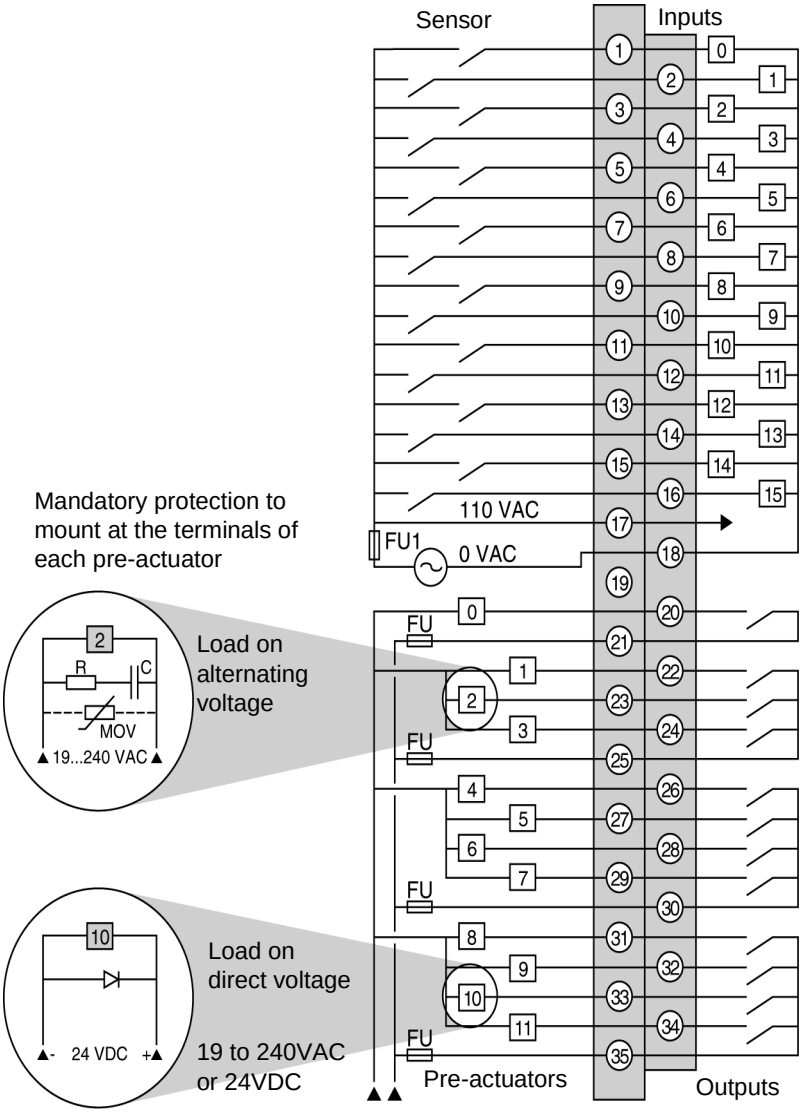
Job limit voltage	Direct/alternating 10 to 34VDC/19 to 264VAC
Thermal current	3A
Common maximum load	5A
Alternating current load	Resistive regime AC12 alternating 24V voltage.
	Resistive, load AC12 power. 50VA (5).
	Inductive regime AC14 and AC15 alternating 24V voltage.
	Inductive regime AC14 and AC15 power. 24VA (4).
Direct current load	Resistive regime DC12 direct 24V voltage.
	Resistive regime DC12 power. 24W (6) 40W (3)
	Inductive regime DC13 (L/R=60ms) Direct 24V voltage.
	Inductive regime DC13 (L/R=60ms) power. 10W (8) 24W (6) 110VA (2)
	Small load switchable 1mA/5V.
Response time (1)	On trigger <10ms.
	Off trigger <10ms.
Type of contact	Closing.
Built-in protection measures	Against overloads and short-circuits: None, it is essential to mount a rapid fusion fuse per channel or group of channels.
	Against alternating current inductive overcharging: None, each RC circuit or MOV (ZNO) suppressor, must be mounted parallel to the posts of each pre-actuator appropriate to the voltage.
	Against direct current inductive overcharging: None, each discharge diode must be mounted on the posts of each pre-actuator.
Key	
(2)	(2): 0.15 x 10^6 maneuvers.
(3)	(3): 3.3x10 maneuvers.

(4)	(4): 0.5 x 10^6 maneuvers
(5)	(5): 0.7x10^6maneuvers
(6)	(6): 1x10^6maneuvers

links of the TSX DMZ28AR module

Sensor/input connections and pre-actuator /outputs

Diagram of TSX DMZ 28AR:



FU1 = 0.5A fuse with rapid fusion.
FU = Fast blow fuses to be calibrated according to the load.

Note: In this case where the supply voltage of the pre-actuators is obtained from a triple-phase network and it is equal to or greater than 200VAC, the pre-actuators should be supplied starting at the same phase.

Discrete input module TSX DEZ 32D2

9

At a Glance

Aim of this Chapter

This chapter introduces the TSX DEZ 32D2 module, its characteristics and connections to different sensors and pre-actuators.

What's in this Chapter?

This Chapter contains the following Maps:

Topic	Page
Module TSX DEZ 32D2	106
Characteristics of the TSX DEZ32D2 module	107
links of the TSX DEZ32D2 module	109

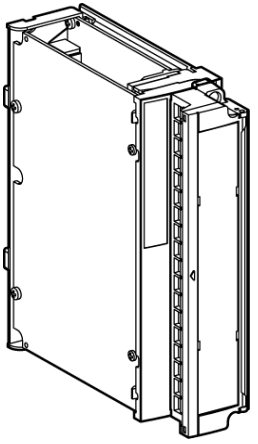
Module TSX DEZ 32D2

At a Glance

The module TSX DEZ 32D2 consists of 32 24VDC positive logic inputs, type 2. The module is equipped with a removable 35 post screwed connection terminal block, allowing sensors to be linked with supplies.

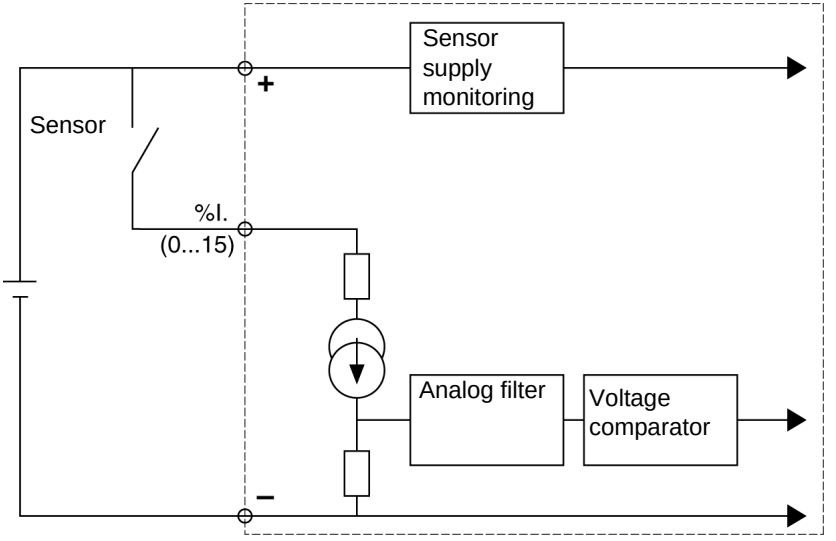
Illustration

Module:



Process diagrams for an input

Input:



Characteristics of the TSX DEZ32D2 module

General characteristics

Table

Modularity	Inputs 32E/24VDC.
Current used on the internal 5V	60mA
Current used on the sensor supply	30mA+7mA by output at 1.
Current used on the 24V relay (1)	
Current used on the 24V pre-actuator (outside of current load)	
Dissipated power in the module (load rate = 60%)	6W
Operating temperature	0 to 60°C
Dielectric rigidity	Input/mass or output/output mass/internal logic 1 500V, effective 50/60Hz 1mn.
Insulation resistance	>10M Ohm under 500VDC.
Hygrometry	5% to 95% without condensation.
Storage temperature	-25°C to 70°C
Operating altitude	0 to 2000 meters.
Drop in temperature	The characteristics at 60°C are guaranteed for 60% of the inputs and 60% of the outputs at state 1.

Characteristics of the 24VDC inputs

Table:

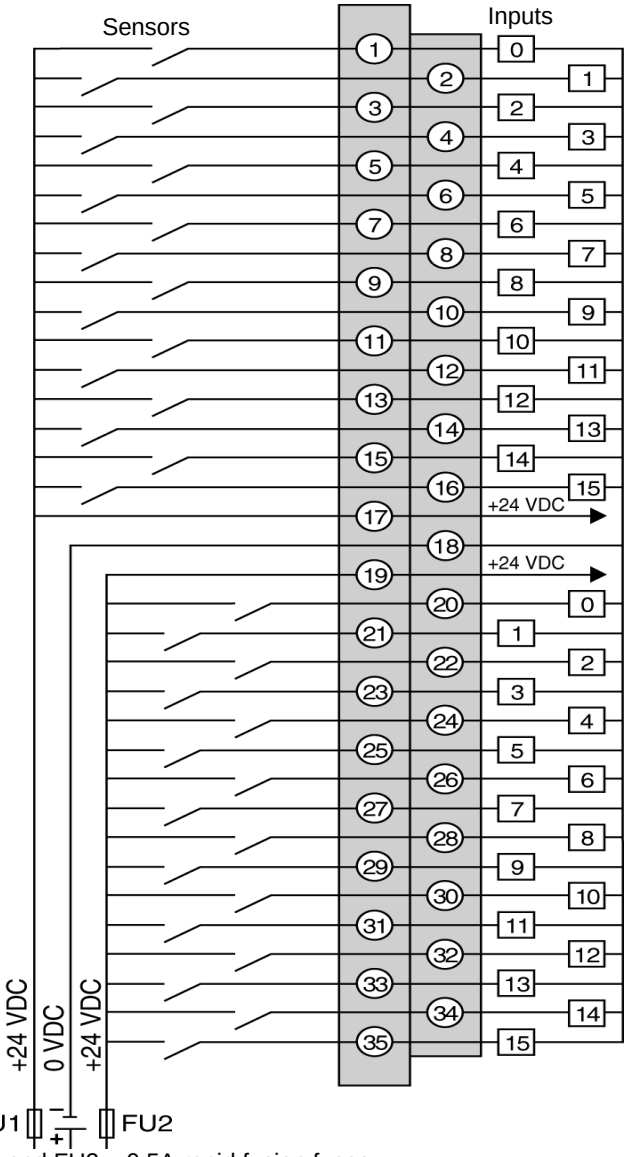
Logic	Positive
Nominal input value	Voltage 24V.
	7mA current.

Input threshold	At state 1 ->Voltage>=11V.
	At state 1 -> Current (for U=11V) >6mA.
	At state 0 ->Current<5V.
	At state 0 Current<2mA.
	Sensor supply (including ripple) 19 to 30V(possible up to 34V, limited to 1H/24h).
Input impedance	3,4K Ohm
Configurable response time	State 0 at 1 ->0.1...7.5ms.
	State 1 at 0 ->0.1...7.5ms.
Sensor voltage check threshold	OK >18V.
	Default <14V.
Sensor voltage check response time	When 24V 1 ms<t<3ms disappears.
	When 24V 8ms<t<30ms appears.
Type of inputs	Current wells.
Compliance with IEC 1131-2 type1	Type 2
DDP 2 wire compatibility	Yes
DDP 3 wire compatibility	Yes
Common of the inputs	Positive logic to + from the positive supply.

links of the TSX DEZ32D2 module

Sensor/input connections

TSX DEZ 32D2 diagram:



FU1 and FU2 = 0.5A rapid fusion fuses.

Discrete output module TSX DSZ 32T2

10

At a Glance

Aim of this Chapter

This chapter introduces the TSX DSZ 32T2 module, its characteristics and connections to different sensors and pre-actuators.

What's in this Chapter?

This Chapter contains the following Maps:

Topic	Page
Module TSX DSZ 32T2	112
Characteristics of the TSX DSZ32T2 module	114
Links of the TSX DSZ32T2 module	116

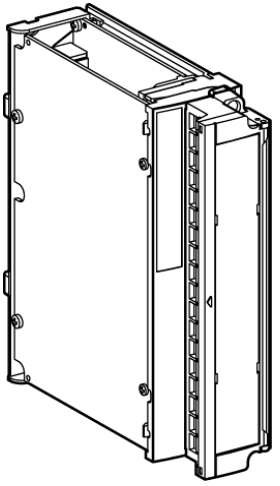
Module TSX DSZ 32T2

At a Glance

The TSX DSZ 32T2 comprises 32 24VDC/0.5A outputs.
The module is equipped with a 35 post screwed connection terminal block, a carriage allowing pre-actuators to be linked and supplies.

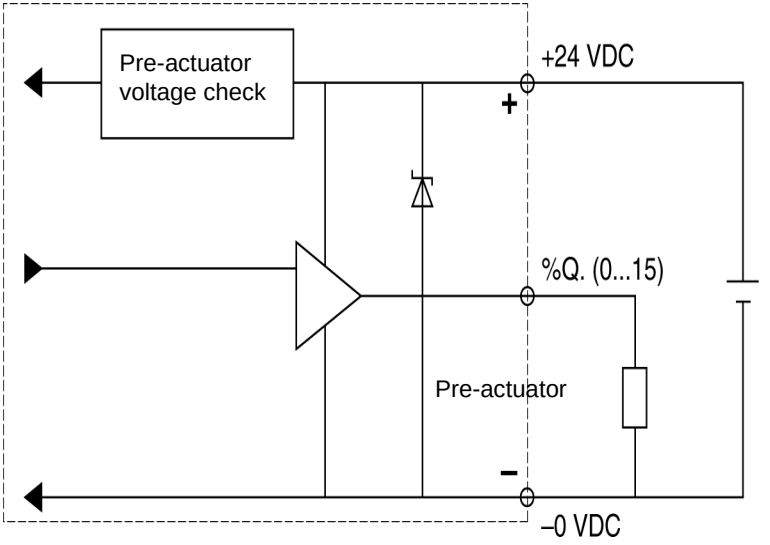
Illustration

Module:



Process diagrams for an output

Output (in even or uneven position):



Characteristics of the TSX DSZ32T2 module

General characteristics

Table

Modularity	Static 32S outputs 24VDC/0,5A.
Current used on the internal 5V	40mA+3.5mA by output at 1.
Current used on the 24V relay (1)	
Current used on the 24V pre-actuator (outside of current load)	30mA+2mA by output at 1.
Dissipated power in the module (load rate = 60%)	3.2W
Operating temperature	0 to 60°C
Dielectric rigidity	Input/mass or output/output mass/internal logic 1 500V, effective 50/60Hz 1mn.
Insulation resistance	>10M Ohm under 500VDC.
Hygrometry	5% to 95% without condensation.
Storage temperature	-25°C to 70°C
Operating altitude	0 to 2000 meters
Drop in temperature	The characteristics at 60°C are guaranteed for 60% of the inputs and 60% of the outputs at state 1.

Characteristics of the 24VDC/ 0.5A static outputs

Table

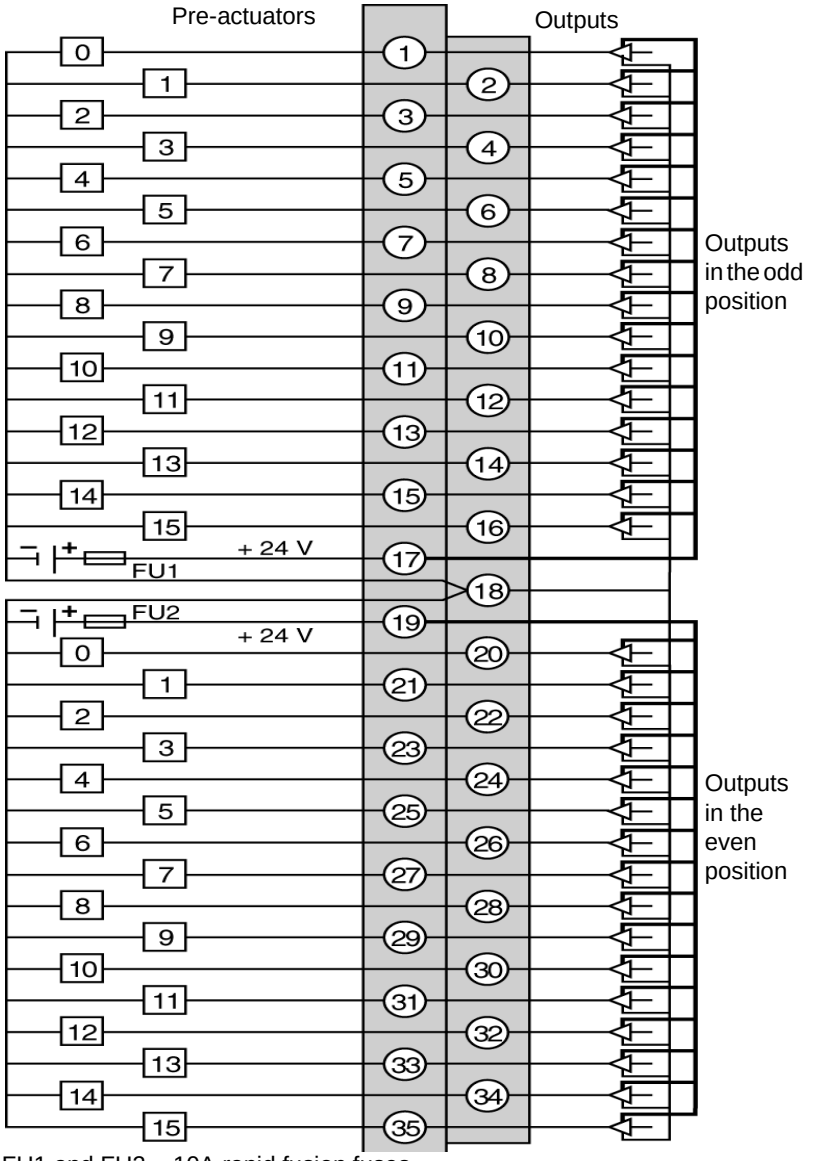
Logic	Positive, current emitted.
Voltage/Current nominal values	24V/0.5A
Thresholds (for U<=30 or 34V, ripple included)	19…30V voltage (possible up to 34V, limited at 1H/ 24h). Current/Channel -> 0.625. Current/module 7A (DSZ 32T2), 6A (DMZ 16 DTK).
Power of tungsten lamp filament	10W max.
Leakage current (state 0)	In normal functioning < 0.5 mA. When 0 V module is accidentally disconnected < 2mA.
Waste voltage (state 1)	< 0.3V (for I = 0.5A).
Small load impedance	48 Ohm

Response time (1) State 0 to 1 state 1 to 0	<500MicroFarad
Switching frequency over inductive load < 0.6/LI Hz	<0.6/LIHz
Output parallelization	Yes 2 outputs maximum.
Compatibility with direct current inputs	All the 24VDC CEI 1131-2 type 1 and type 2 inputs with input impedance < 15 KOhm.
Compliance with IEC 1131-2	Yes
Built-in protection	-Against overloads and short circuits -> By current limiter and thermal circuit breaker (0.75A<=Id<=2A). -Against excess voltage -> By breakdown diode. -Against polarity inversions -> Yes by reverse diode over supply. Scheduling a rapid fusion fuse over +24V of the pre-actuators' supply: ● 6.3A (DMZ28DT/28DTK/16DTK) ● 4A (DSZ08T2/08T2K) ● 10A DSZ 32T2)
Pre-actuator voltage check threshold	OK -> >18V. Error > <14V.
Check response time	At the appearance ->T<4ms. At the disappearance ->T<30ms.
Common of loads	To - from the supply.
Dissipated power by channel at state 1	<0.05W (for U=24V).
Key	
(1)	All outputs are equipped with circuits for rapid de-magnetizing of solenoids. Solenoid discharge time < L/R.

Links of the TSX DSZ32T2 module

Pre-actuator/ Output sensors

Diagram:



FU1 and FU2 = 10A rapid fusion fuses.

Discrete output module TSX DSZ 32R5

11

At a Glance

Aim of this Chapter

This chapter introduces the TSX DSZ 32R5 module, its characteristics and connections to different sensors and pre-actuators.

What's in this Chapter?

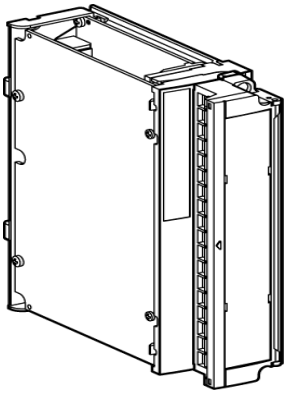
This Chapter contains the following Maps:

Topic	Page
Module TSX DSZ 32R5	118
Characteristics of the TSX DSZ32R5 module	121
Connection of the TSX DSZ32R5 module	124

Module TSX DSZ 32R5

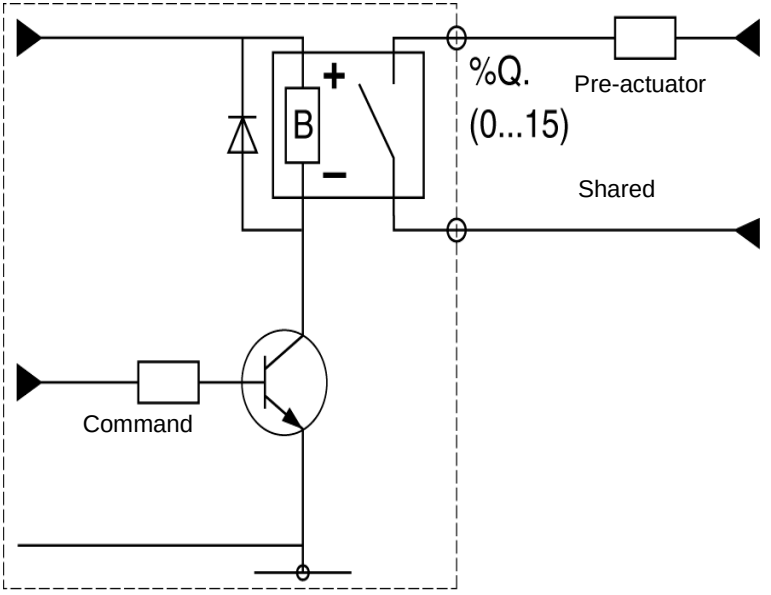
At a Glance

The TSX DSZ 08R5 comprises 32 relay outputs.
The module is equipped with a removable 35 post screwed connection terminal block, allowing pre-actuators to be linked with supplies.
Module:



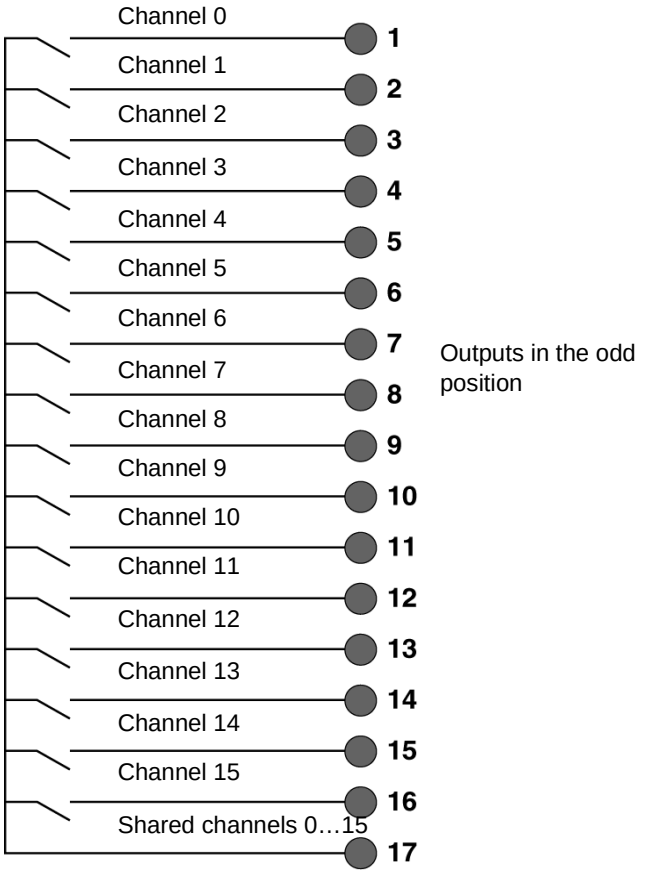
Process diagram for an output

Output:

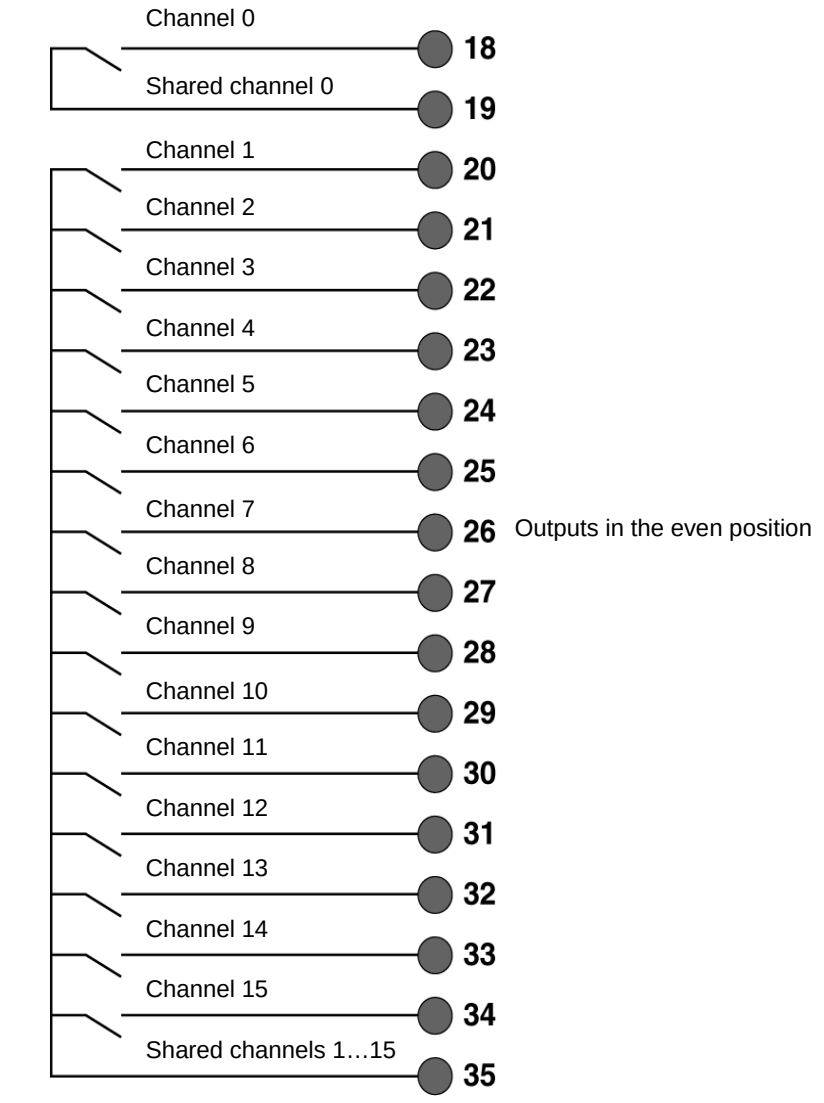


	WARNING
STOP	**WARNING** In order to protect against contact with the relay, the following should be mounted on the pre-actuator terminals: • an RC circuit or MOV (ZNO) suppressor for use with alternating current, • a discharge diode for use with direct currents. **Failure to observe this precaution can result in severe injury or equipment damage.**

Modularity



Modularity


Channel 0
18
Shared channel 0
19
Channel 1
20
Channel 2
21
Channel 3
22
Channel 4
23
Channel 5
24
Channel 6
25
Channel 7
26
Outputs in the even position
Channel 8
27
Channel 9
28
Channel 10
29
Channel 11
30
Channel 12
31
Channel 13
32
Channel 14
33
Channel 15
34
Shared channels 1…15
35

Characteristics of the TSX DSZ32R5 module

General characteristics

Table

Modularity	
	Output 32S relay.
Current used on the internal 5V	50ms
Current used on the sensor supply	
Current used on the 24V relay (1)	15mA + 5 mA via output to 1.
Current used on the 24V pre-actuators (outside of load current)	
Dissipated power in the module (load rate = 60%)	3.5W
Operating temperature	0 to 60°C
Dielectric rigidity Input/ground connection or output/ground connection or output/internal logic	2000V effective 50/60Hz-1mn.
Insulation resistance	>10MOhm under 500VDC.
Hygrometry	5% to 95% without condensation.
Storage temperature	-25° to 70°C
Operating altitude	0 to 2000 meters
Drop in temperature	The characteristics at 60°C are guaranteed for 60% of the inputs and 60% of the outputs at state 1.
Key	
(1)	If the 24V relay is delivered by an external supply (as in the mini-extension rack in particular), the value of this supply should comprise a maximum tolerance of 24V +/- 10%.

Characteristics of the relay outputs

Table

Job limit voltage		Direct/Alternating 10 to 34V/19 to 264V.
Thermal current		2A

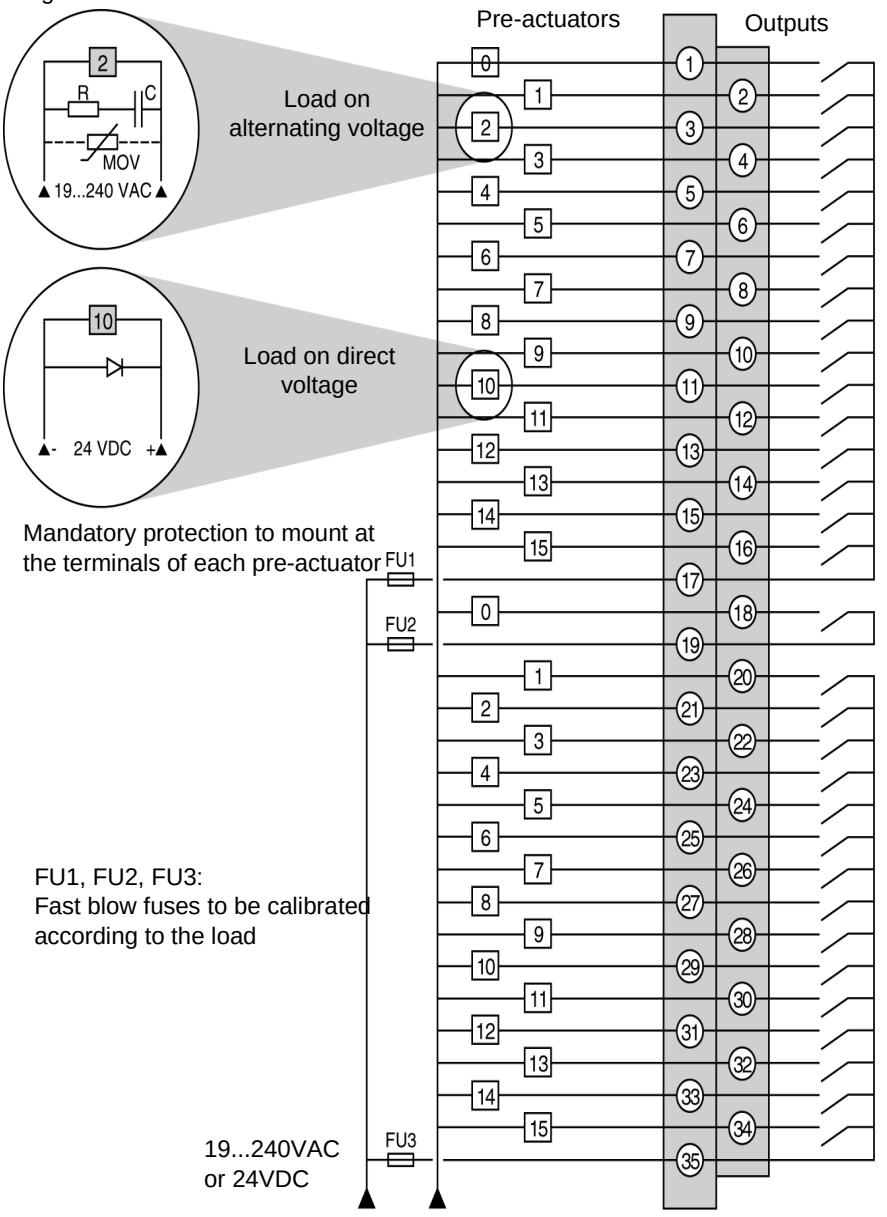
Common maximum current		2A for one single channel 7A for a group of 15 or 16 channels.
Alternating current load		Resistive, load AC12 -> Voltage 200...240V Power 200VA (5).
		Inductive
Alternating current load	Resistive load AC12	Voltage 24V 48V 100...120V 200...240V.
		Power 50VA (5) 100VA (4) 200VA (3) 200VA. (5)
	Inductive regime AC14 and AC15.	Voltage 24V 48V 100...120V 200...240V.
		Power 24VA(1) 50VA(1) 10VA(6) 10VA(7) 50VA(2) 50VA(4).
Direct current load	Resistive load DC12	Voltage 24V.
		Power 12W ($0.6x10^6$ maneuvers) 24W ($0.3x10^6$maneuvers 48W ($0.15x10^6$maneuvers
	Inductive load DC13 L/ R=60ms	Voltage 24V.
		Power 6W($0.12x10^6$ maneuvers) 12W ($0.06x10^6$maneuvers) 24W (0.10310^6maneuvers
Response time	on trigger	<10ms
	Trigger	<10ms
Type of contacts		Exiting
Built-in protection measures	Against overloads and short-circuits	None, it is essential to mount a rapid fusion fuse per channel or group of channels.
	Against alternating current inductive overcharging	None, each RC circuit or MOV (ZNO) suppressor, must be mounted parallel to the posts of each pre-actuator appropriate to the voltage.
	Against direct current inductive overcharging	None, each discharge diode must be mounted on the posts of each pre-actuator.
Key		

(1)	0.1 x 10^6 maneuvers
(2)	0.15 x 10^6 maneuvers
(3)	0.2 x 10^6 maneuvers
(4)	0.25 x 10^6 maneuvers
(5)	0.3 x 10^6 maneuvers
(6)	0.8 x 10^6 maneuvers
(7)	1.2 x 10^6 maneuvers

Connection of the TSX DSZ32R5 module

Pre-actuators/ Output connections

Diagram



Note: In this case where the supply voltage of the pre-actuators is obtained from a triple-phase network and it is equal to or greater than 200VAC, the pre-actuators should be supplied starting at the same phase.

Discrete input module TSX DEZ 12D2K

12

At a Glance

Aim of this Chapter

This chapter introduces the TSX DEZ 12D2K module, its characteristics and connections to different sensors and pre-actuators.

What's in this Chapter?

This Chapter contains the following Maps:

Topic	Page
Module TSX DEZ 12D2K	128
Characteristics of the TSX DEZ12D2K module	129
links of the TSX DEZ12D2K module	131

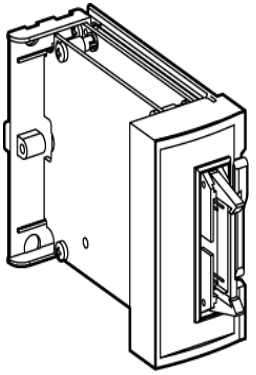
Module TSX DEZ 12D2K

At a Glance

The module TSX DEZ 12D2K consists of 12 24VDC positive logic inputs, type 2.
The module is equipped with a HE10 type connector that can receive:

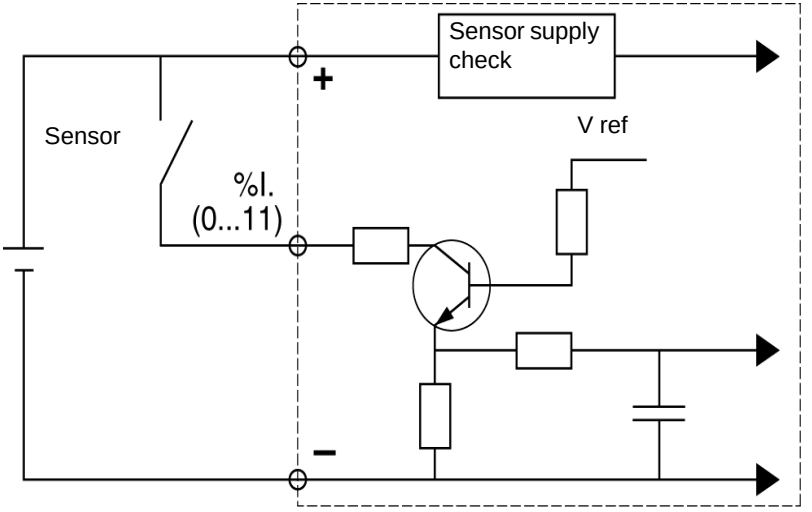
- either TSX CDP •01 pre-wired spiral for direct connection onto the post or sensor,
- either a TSX CDP•02 cable or a TSX CDP••03 cable to allow connection to the interface of the TELEFAST 2 cable.

Module:



Process diagram for an input

Diagram:



Characteristics of the TSX DEZ12D2K module

General characteristics

Table:

Modularity	Inputs 12E/24VDC.
Current consumed on internal 5V	20mA
Current consumed on sensor supply	Sink 20mA+7mA inputs per input at 1.
Dissipated power in the module (load rate = 60%)	2.7W
Functioning temperature	0 to 60°C
Dielectric rigidity	Input/ground or Input/internal logic 1500V effective 50/60Hz 1mn.
Insulation resistance	>10M Ohm under 500VDC.
Hygrometry	5% to 95% without condensation.
Storage temperature	-25°C to 70°C
Functioning altitude	0 to 2000 meters
Drop in temperature	The characteristics at 60°C are guaranteed for 60% of the inputs and 60% of the ouputs at state 1.

Characteristics of 24VDC inputs

Table :

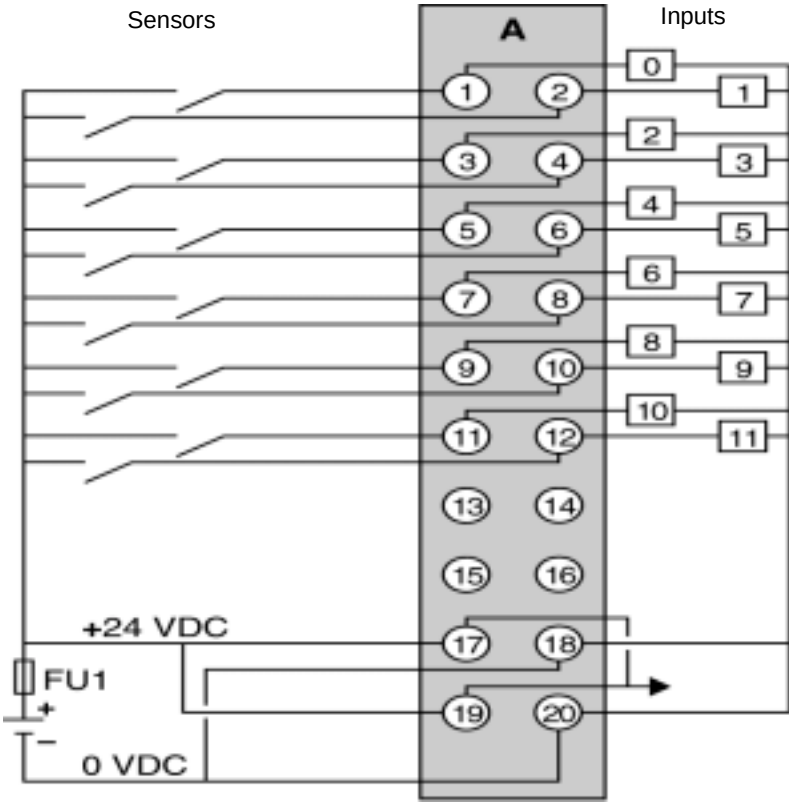
Logic	Positive
Nominal input value	Voltage 24V.
	7mA
Input threshold	At state 1 >=11V
	At state 1 -> Current (for U=11V) >6mA.
	At state 0 <=5V.
	At state 0 Current<=2mA.
	Sensor supply (including undulation) 19…30V (possible up to 34V limited to 1 hour per 24-hour period).
Input impedance	3.4K Ohm

Configurable response time	State 0 at 1 ->0.1...7.5ms.
	State 1 at 0 ->0.1...7.5ms.
Threshold of sensor voltage check	OK >18V.
	Error <14V.
Response time of voltage sensor check	When 24V 1 ms<t<3ms disappears.
	When 24V 8ms<t<30ms appears.
Type of inputs	
IEC 1131-2 type1 conformity	
PD 2 wire compatibility	Yes
PD 3 wire compatibility	Yes
Common of the inputs	To + from the supply.

links of the TSX DEZ12D2K module

Sensor/input connections

TSX DEZ 12D2K diagram:



FU1 = 0.5A fuse with rapid fusion.

Correspondence between the HE10 connector pins and the TSX CDP .01 wires with a pre-wired spiral.

Sensors/Inputs:

Binding posts	Dimensioned sensors wire color
1	White
2	Brown
3	Green
4	Yellow
5	Gray
6	Pink
7	Blue

Binding posts	Dimensioned sensors wire color
8	Red
9	Black
10	Purple
11	Gray/Pink
12	Red/Blue
13	
14	
15	
16	
17	White/Gray
18	Gray/Brown
19	White/Pink
20	Pink/Brown

Discrete input module TSX DEZ 12D2

13

At a Glance

Aim of this Chapter

This chapter introduces the TSX DEZ 12D2 module, its characteristics and connections to different sensors and pre-actuators.

What's in this Chapter?

This Chapter contains the following Maps:

Topic	Page
Module TSX DEZ 12D2	134
Characteristics of the TSX DEZ12D2 module	136
links of the TSX DEZ12D2 module	138

Module TSX DEZ 12D2

At a Glance

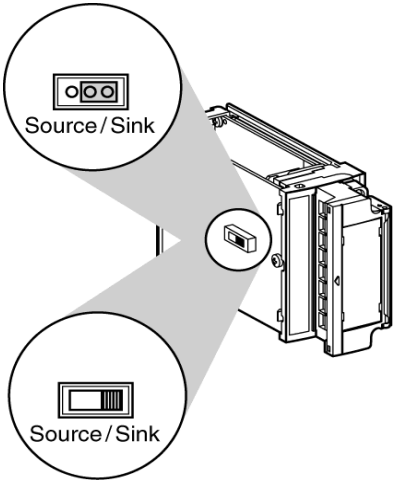
The module TSX DEZ 12D2 consists of 12 24VDC positive logic inputs, type 1 or negative logic.
The module is equipped with a removable 15 post screwed connection terminal block, allowing inputs to be connected:
The inputs can be:

- Either positive logic (position sink), as in this case, where all the sensors are connected to the to + from 1'supply,
- either negative logic (source position), in which case all the sensors are connected to the negative supply.

The choice is made by:

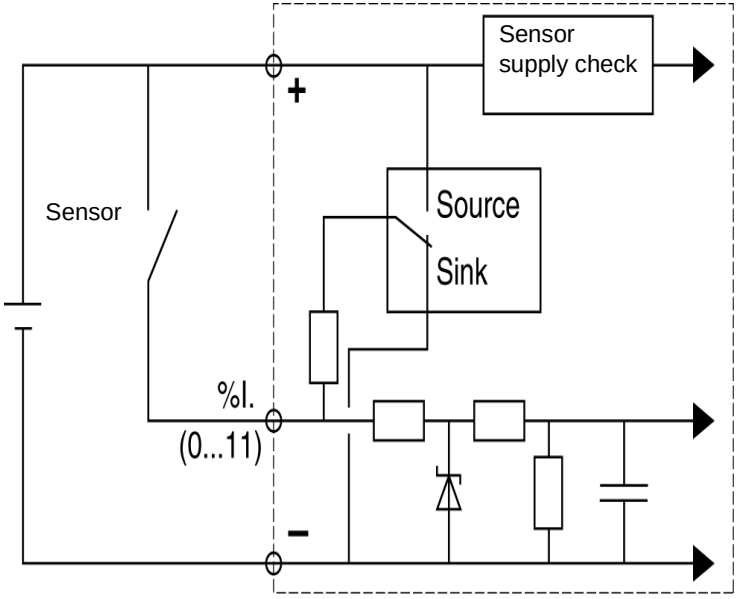
- the placement of'a switch or of'a rider positioned on the module to enable 1'physical adaptation. By default, the material configuration is sink (positive logic),
- and the software configuration in order to adapt the signals in one direction.

Module:

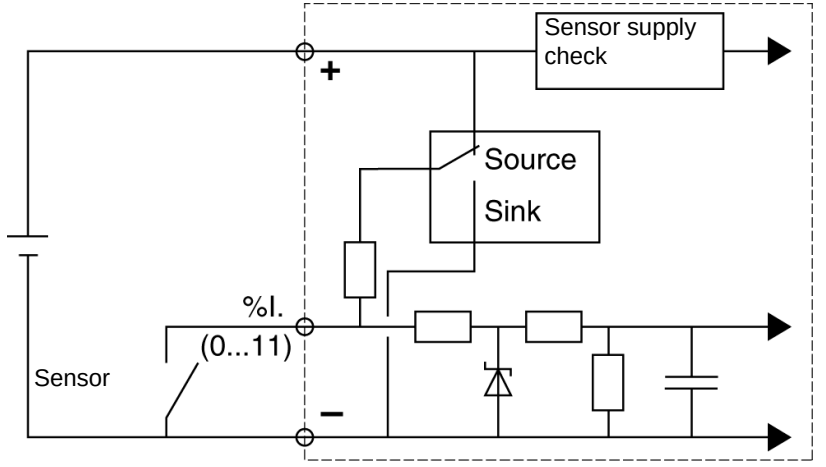


Process diagrams of inputs

Sink positive logic inputs:



Source negative logic inputs:



Characteristics of the TSX DEZ12D2 module

General characteristics

Table:

Modularity	Inputs 12E/24VDC.
Current used on the internal 5V	20mA
Current used on the sensor supply	Sink 15mA+15mA+9mA inputs by input at 1.
	Source 35mA+6mA inputs by input at 1.
Dissipated power in the module (load rate = 60%)	2W
Operating temperature	0 to 60°C
Dielectric rigidity	Input/mass or input/internal logic 1 500V, effective 50/60Hz 1mn input/logic.
Insulation resistance	>10M Ohm under 500VDC.
Hygrometry	5% to 95% without condensation.
Storage temperature	-25°C to 70°C
Operating altitude	0 to 2000 meters
Drop in temperature	The characteristics at 60°C are guaranteed for 60% of the inputs and 60% of the outputs at state 1.

Characteristics of the 24VDC inputs

Table:

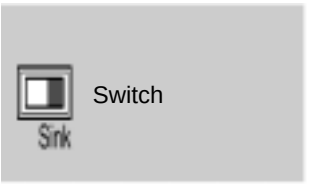
Logic	Positive or negative.
Nominal input value	Voltage 24V.
	9mA positive logic current.
	-6mA negative logic current.
Input threshold	At state 1 ->Positive logic voltage >= 11V. At state 1 ->Negative logic voltage <= 8V.
	At state 1 -> Current (as U=11V) >|2.5|mA.
	At state 0 ->Positive logic voltage <= 5V. At state 0 ->Negative logic voltage > Ual-5V.
	At state 0 current < |1.5|mA
	Sensor supply (including ripple) 19 to 30V (possible up to 34V, limited to 1H/24h).
Input impedance	Positive logic 2.4K Ohm. Negative logic 4Kohm.

Configurable response time	State 0 at 1 ->0.1...7.5ms.
	State 1 at 0 ->0.1...7.5ms.
Sensor voltage check threshold	OK >18V.
	Default <14V.
Sensor voltage check response time	When 24V 1ms<t<3ms disappears.
	When 24V 8ms<t<30ms appears.
Type of inputs	Resistive.
Compliance with IEC 1131-2 type1	Positive logic input type 1. Negative logic input not considered as standard.
DDP 2 wire compatibility	See *Compatibility of 3-wire sensors with 24 VDC inputs, p. 49*
DDP 3 wire compatibility	Yes
Common of the inputs	Positive logic to + from the positive supply. Negative logic Ai from the negative supply.

links of the TSX DEZ12D2 module

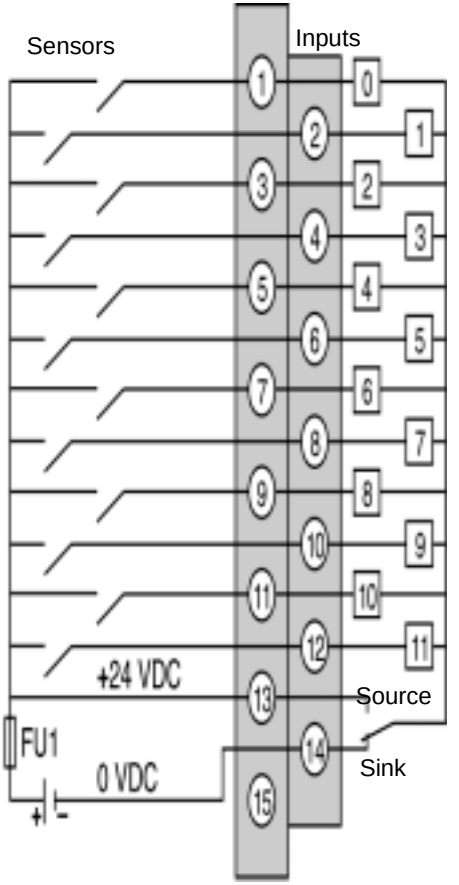
Sensor/input connections

Diagrams of TSX DEZ 12D2 (Sink positive logic inputs):



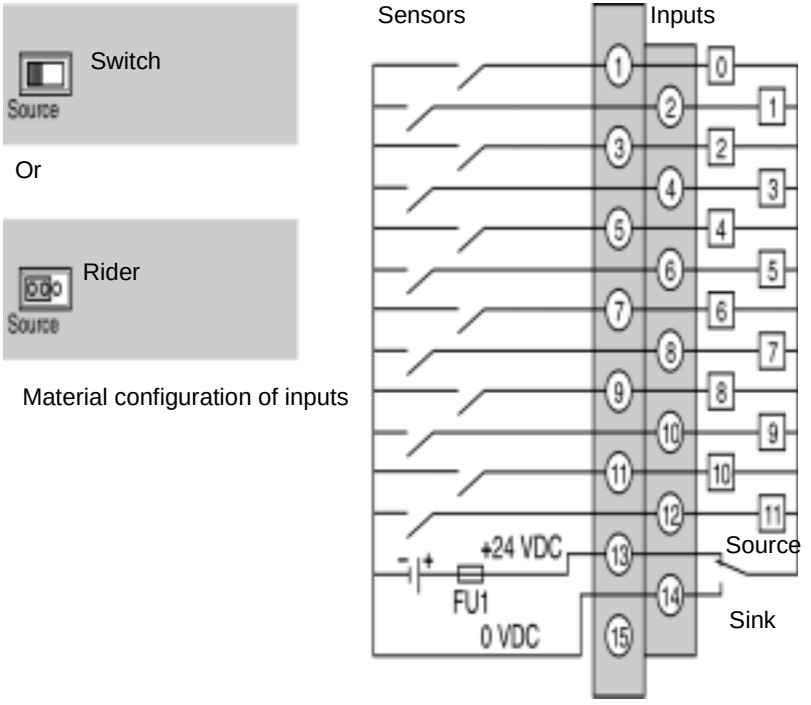
Or

Material configuration of inputs



FU1 = 0.5A fuse with rapid fusion.

Diagrams of TSX DEZ12D2 (Source negative logic input):



FU1 = 0.5A fuse with rapid fusion.

Discrete input module TSX DEZ 08A4

14

At a Glance

Aim of this Chapter

This Chapter describes the TSX DEZ 08A4 module, its characteristics and links with different sensors.

What's in this Chapter?

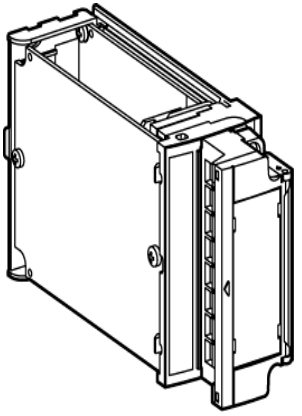
This Chapter contains the following Maps:

Topic	Page
Module TSX DEZ 08A4	142
Characteristics of the TSX DEZ08A4 module	143
links of the TSX DEZ 08A4 module	145

Module TSX DEZ 08A4

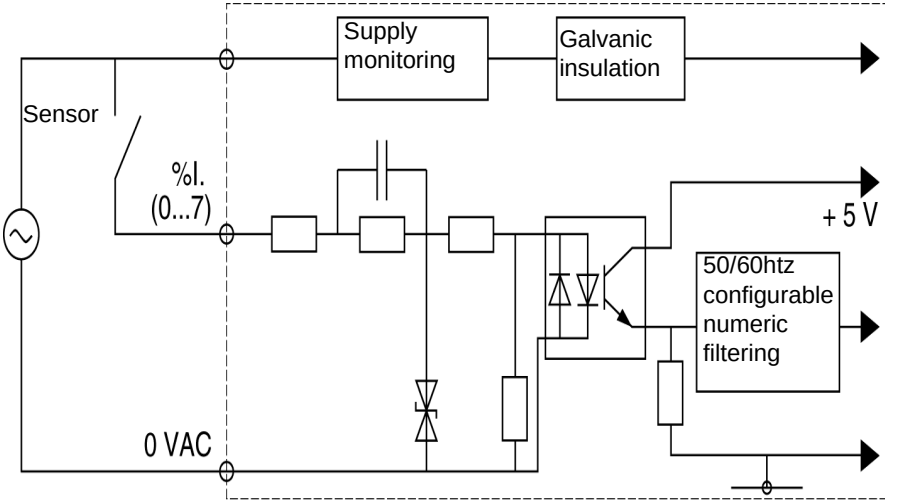
At a Glance

The TSX 08A4 module comprises 8 100…120VAC inputs.
It is equipped with a 15 post screwed connection terminal block, a carriage allowing sensors to be linked and supplies.
Module:



Process diagrams for an input

Sink positive logic inputs:



Characteristics of the TSX DEZ08A4 module

General characteristics

Table:

Modularity	8E/100...120VAC inputs.
Current used on the internal 5V	20mA
Current used on the sensor supply	Sink 13mA+13mA inputs by input at 1.
Dissipated power in the module (load rate = 60%)	1,7W
Operating temperature	0 to 60°C
Dielectric rigidity	Input/mass or input/internal logic 2 000V, effective 50/60Hz 1mn input/logic.
Insulation resistance	>10M Ohm under 500VDC.
Hygrometry	5% to 95% without condensation.
Storage temperature	-25°C to 70°C
Operating altitude	0 to 2000 meters
Drop in temperature	The characteristics at 60°C are guaranteed for 60% of the inputs and 60% of the outputs at state 1.

Characteristics of the 100...120VAC inputs.

Table:

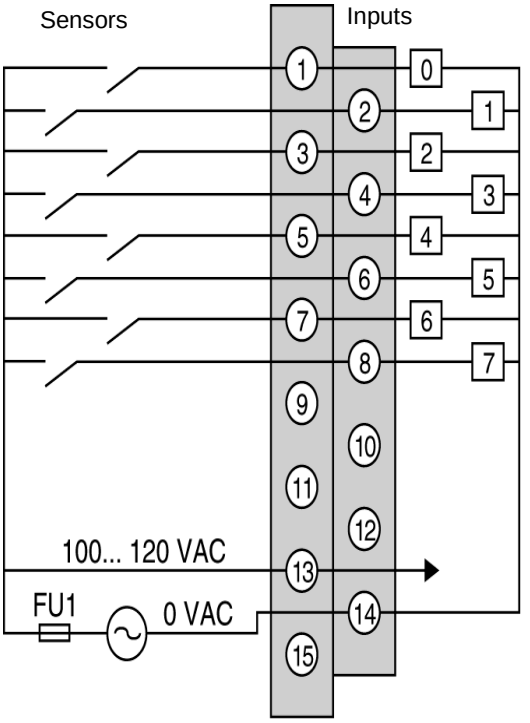
Nominal input value	100…120VV voltage
	50Hz 11mA current.
	60Hz 13mA current.
	50/60Hz frequency.
Input threshold	At state 1 ->Current>=74V.
	At state 1 -> Current >6mA (for U=74V).
	At state 0 ->Current<20V.
	At state 0 Current<4mA.
	85…132V sensor supply.
	Frequency ->47…63Hz.
	Peak current at the lock 160mA (RC=1KOhm/0.33MicroFarad).

Response time	State 0 at 1 50Hz ->11...18ms. State 0 at 1 60Hz ->9...18ms.
	State 1 at 0 50Hz ->11...24ms. State 1 at 0 60Hz ->10...22ms.
Sensor voltage check threshold	OK >82V.
	Error <UCom+10V (1).
Sensor voltage check response time	At the disappearance 5ms<t<11ms.
	At the appearance 20ms<t<50ms.
Type of inputs	Capacity.
Compliance with IEC 1131-2	Type 2
DDP 2 wire compatibility (2)	See *Compatibility of 2-wire sensors with 100…120 VAC or 200…240 VAC inputs, p. 51*
Key	
(1)	Ucom = Real commutation voltage of the input. This value (Ucom+10V) ensures the coherence between the threshold of the sensor voltage check and that of the inputs.

links of the TSX DEZ 08A4 module

Sensor/input connections

TSX DEZ08A4 diagram:



FU1 = 0.5A fuse with rapid fusion.

Discrete input module TSX DEZ 08A5

15

At a Glance

Aim of this Chapter

This Chapter describes the TSX DEZ 08A5 module, its characteristics and links with different sensors.

What's in this Chapter?

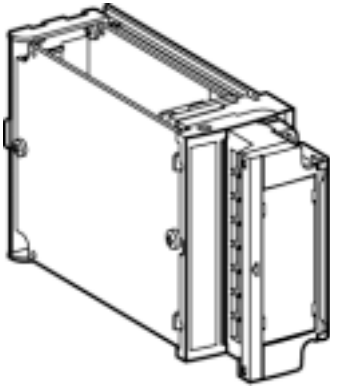
This Chapter contains the following Maps:

Topic	Page
Module TSX DEZ 08A5	148
Characteristics of the TSX DEZ08A5 module	149
links of the TSX DEZ 08A5 module	151

Module TSX DEZ 08A5

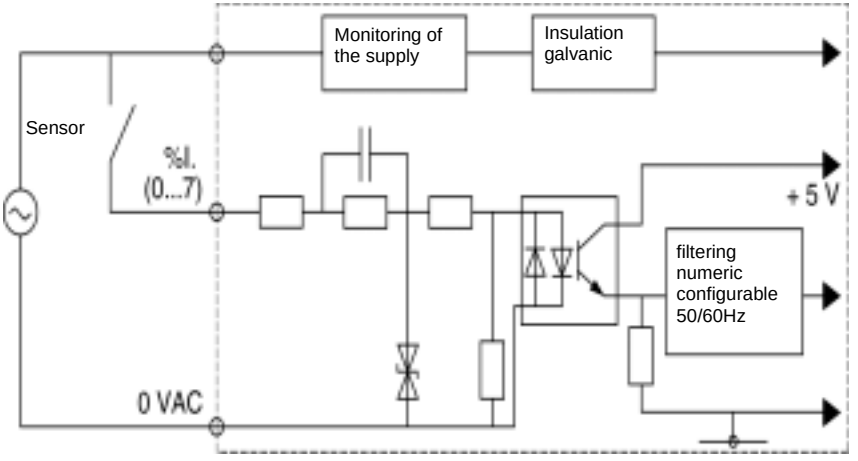
At a Glance

The TSX 08A5 module comprises 8 inputs (200 to 240VAC).
It is equipped with a 15 post screwed connection terminal block, a carriage allowing sensors to be linked and supplies.
Module:



Process diagram for an input

Sink positive logic inputs:



Characteristics of the TSX DEZ08A5 module

General characteristics

Table:

Modularity	8E/200...240VAC inputs.
Current used on the internal 5V	20mA
Current used on the sensor supply	12mA+12mA sink inputs by input at 1.
Dissipated power in the module (load rate = 60%)	1.4W
Operating temperature	0 to 60°C
Dielectric rigidity	Input/mass or input/internal logic 2 000V, effective 50/60Hz 1mn input/logic.
Insulation resistance	>10M Ohm under 500VDC.
Hygrometry	5% to 95% without condensation.
Storage temperature	-25°C to 70°C
Operating altitude	0 to 2000 meters
Drop in temperature	The characteristics at 60°C are guaranteed for 60% of the inputs and 60% of the outputs at state 1.

Characteristics of the 100...120VAC inputs.

Table:

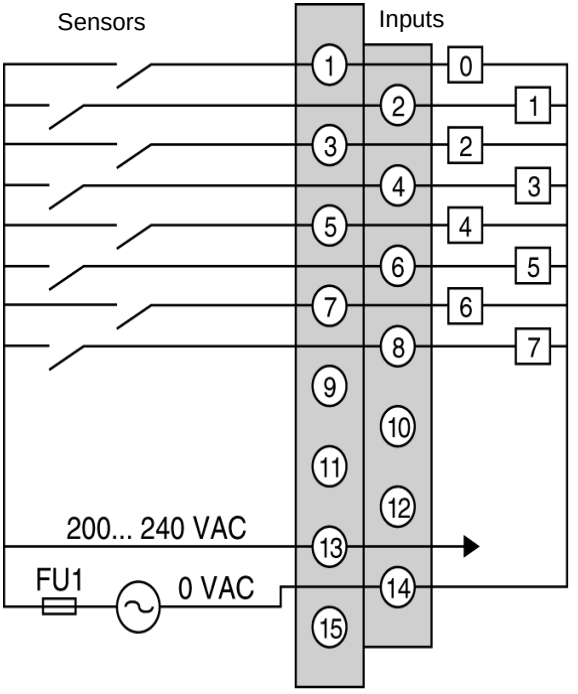
Nominal input value	100…120V voltage
	50Hz 10mA current.
	60Hz 12mA current.
	50/60Hz frequency.
Input threshold	At state 1 ->Voltage>=159V.
	At state 1 -> Current >=6mA (for U=159V).
	At state 0 ->Current<40V.
	At state 0 Current<3,5mA.
	170…264V sensor supply.
	Frequency ->47…63Hz.
	Peak current at the lock 320mA (RC=1KOhm/0.15MicroFarad).

Response time	State 0 at 1 50Hz ->11...18ms. State 0 at 1 60Hz ->9...16ms.
	State 1 at 0 50Hz ->11...24ms. State 1 at 0 60Hz ->10...22ms.
Sensor voltage check threshold	OK >164V.
	Default <UCom+10V (1).
Sensor voltage check response time	At the disappearance 5ms <t<10ms.
	At the appearance 20ms<t<50ms.
Type of inputs	Capacity.
Compliance with IEC 1131-2	Type 1
DDP 2 wire compatibility	See *Compatibility of 2-wire sensors with 100…120 VAC or 200…240 VAC inputs, p. 51*
Key	
(1)	Ucom = Real commutation voltage of the input. This value (Ucom+10V) ensures the coherence between the threshold of the sensor voltage check and that of the inputs.

links of the TSX DEZ 08A5 module

Sensor/input connections

TSX DEZ08A4 diagram :



FU1 = 0.5A fuse with rapid fusion.

Discrete output module TSX DSZ 08T2K

16

At a Glance

Aim of this Chapter

This chapter introduces the TSX DSZ 08T2K module, its characteristics and connections to different sensors and pre-actuators.

What's in this Chapter?

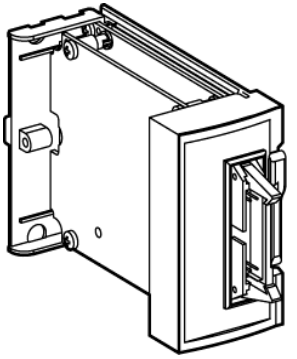
This Chapter contains the following Maps:

Topic	Page
Module TSX DSZ 08T2K	154
Characteristics of the TSX DSZ08T2K module	155
Links of the TSX DSZ08T2K module	157

Module TSX DSZ 08T2K

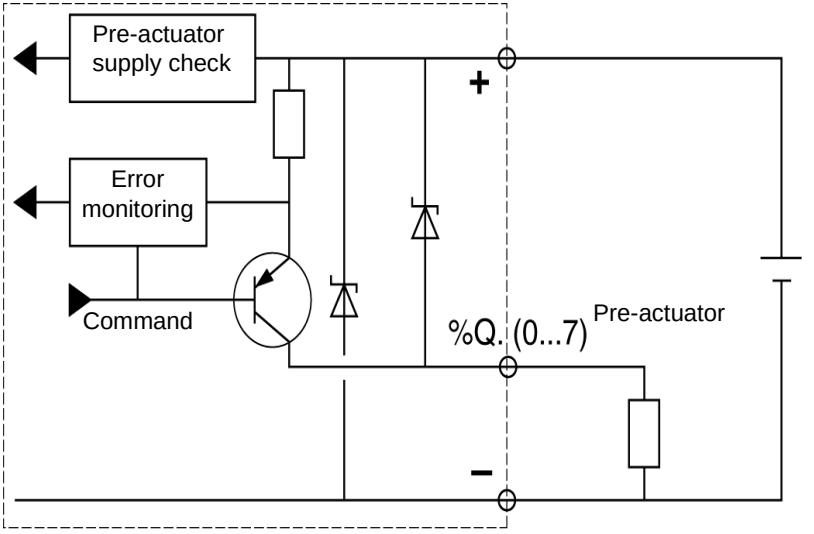
At a Glance

The TSX DSZ 08T2K comprises 8 24VDC/0.5A outputs.
The module is equipped with a male HE10 connector allowing the outputs to be connected. This connector can receive either TSX CDP•01 pre-wired spiral for direct connection onto the post, sensor or pre-actuator, or a TSX CDP••3 cable for connection onto the interface of the TELEFAST 2 wiring.
Module:



Process diagram for an output

Output:



Characteristics of the TSX DSZ08T2K module

General characteristics

Table:

Modularity	Static 8S outputs 24VDC/0.5A.
Current used on the internal 5V	30mA+3.2mA by output at 1.
Current used on the 24V relay (1)	
Current used on the 24V pre-actuator (outside of load current)	30mA+1mA by output at 1.
Dissipated power in the module (load rate = 60%)	3W
Operating temperature	0 to 60°C
Dielectric rigidity	Output/mass or output/internal logic 1 500V, effective 50/60Hz 1mn.
Insulation resistance	>10M Ohm under 500VDC.
Hygrometry	5% to 95% without condensation.
Storage temperature	-25°C to 70°C
Operating altitude	0 to 2000 meters
Drop in temperature	The characteristics at 60°C are guaranteed for 60% of the inputs and 60% of the outputs at state 1.

Characteristics of the 24VDC/ 0.5A static outputs

Table

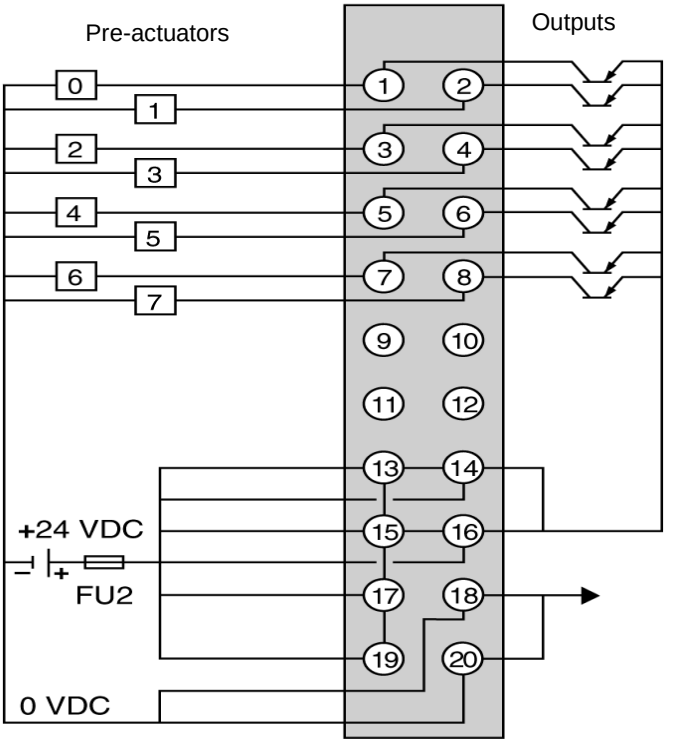
Logic	Positive, current emitted.
Voltage/Current nominal values	24V/0.5A
Value thresholds (for U<=30 or 34V, including ripple)	19…30V voltage (possible up to 34V, limited at 1H/ 24h). Current/Channel -> 0.625 Current/module 6A (DMZ 28DT/28DTK), 4A (DSZ 08 T2/08T2K).
Power of tungsten lamp filament	10W max.
Leakage current (state 0)	During normal operation < 0.5 mA When 0 V module is accidentally disconnected < 2mA.
Waste voltage (state 1)	< 1V (for I = 0,5A).
Small load impedance	48 Ohm

Response time (1) State 0 to 1 state 1 to 0	<500MicroFarad
Switching frequency over inductive load <0.6/LI Hz	<0.6/LIHz
Output parallelization	Yes 2 outputs maximum.
Compatibility with direct current inputs	All the 24VDC CEI 1131-2 type 1 and type 2 inputs with input impedance < 15 KOhm.
Compliance with IEC 1131-2	Yes
Built-in protection	-Against overloads and short circuits -> by current limiter and thermal circuit breaker (0.75A<=Id<=2A). -Against excess voltage ->by breakdown diode. -Against polarity inversions -> Yes by reverse diode over supply. Scheduling a rapid fusion fuse over +24V of the pre-actuators' supply: ● 6.3A (DMZ28DT/28DTK/16DTK) ● 4A (DSZ08T2/08T2K) ● 10A DSZ 32T2)
Pre-actuator voltage check threshold	OK -> >18V. Error > <14V.
Check response time	When ->T<4ms appears. When ->T<30ms disappears.
Common of loads	To - from the supply.
Dissipated power by channel at state 1	<0.45W (for U=24V).
Key	
(1)	All outputs are equipped with circuits for rapid de-magnetizing of solenoids. Solenoid discharge time < L/R.

Links of the TSX DSZ08T2K module

Pre-actuators/ Output connections

Diagram:



FU2 = 6.3A fuse with rapid fusion.

Note: The modules retrieve the correspondence between the HE10 connector pins and the different TSX CDP•01 wires with a pre-wired spiral..

Correspondence between the HE10 connector pins and the different TSX CDP .01 wires with pre-wired spiral.

Pre-actuators/Outputs:

Binding posts	Pre-actuator colored wire
1	White
2	Brown
3	green
4	yellow

Binding posts	Pre-actuator colored wire
5	gray
6	pink
7	blue
8	red
9	
10	
11	
12	
13	White-green
14	Brown-green
15	White-yellow
16	Yellow-brown
17	White/Gray
18	Gray/Brown
19	White/Pink
20	Pink/Brown

Discrete output module TSX DSZ 08T2

17

At a Glance

Aim of this Chapter

This chapter describes the TSX DSZ 08T2 module, its characteristics and connections to different sensors and pre-actuators.

What's in this Chapter?

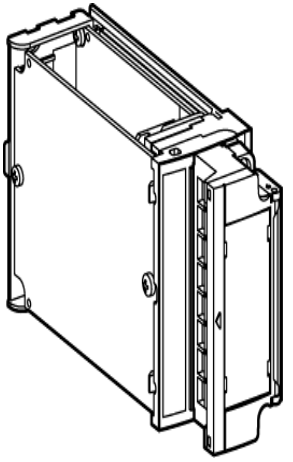
This Chapter contains the following Maps:

Topic	Page
Module TSX DSZ 08T2	160
Characteristics of the TSX DSZ08T2 module	161
Links of the TSX DSZ08T2 module	163

Module TSX DSZ 08T2

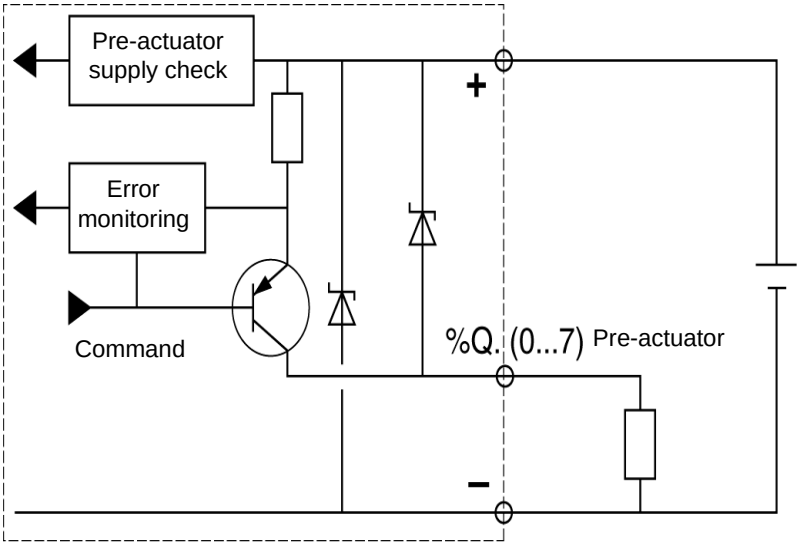
At a Glance

The TSX DSZ 08T2 comprises 8 24VDC/0.5A outputs.
The module is equipped with a removable 15 post screwed connection terminal block, allowing outputs to be connected:
Module:



Process diagram for an output

Output:



Characteristics of the TSX DSZ08T2 module

General characteristics

Table :

Modularity	Static 8S outputs 24VDC/0.5A.
Current used on the internal 5V	30mA+3.2mA by output at 1.
Current used on the 24V relay (1)	
Current used on the 24V pre-actuator (outside of load current)	30mA+1mA by output at 1.
Dissipated power in the module (load rate = 60%)	3W
Operating temperature	0 to 60°C
Dielectric rigidity	Output/mass or output/internal logic 1 500V, effective 50/60Hz 1mn.
Insulation resistance	>10M Ohm under 500VDC.
Hygrometry	5% to 95% without condensation.
Storage temperature	-25°C to 70°C
Operating altitude	0 to 2000 meters
Drop in temperature	The characteristics at 60°C are guaranteed for 60% of the inputs and 60% of the outputs at state 1.

Characteristics of the 24VDC/ 0.5A static outputs

Table :

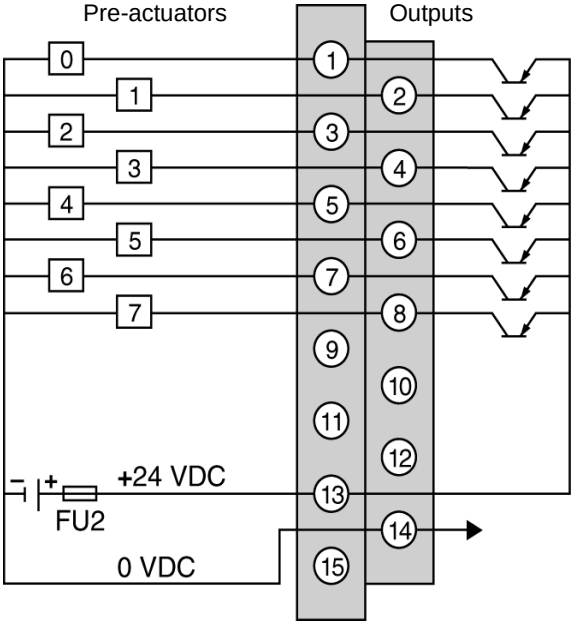
Logic	Positive, current emitted.
Voltage/Current nominal values	24V/0.5A
Value thresholds (for U<=30 or 34V, including ripple)	19…30V voltage (possible up to 34V, limited at 1H/ 24h). Current/Channel -> 0.625. Current/module 6A (DMZ 28DT/28DTK), 4A (DSZ 08 T2/08T2K).
Power of tungsten lamp filament	10W max.
Leakage current (state 0)	During normal operation < 0.5 mA When 0 V module is accidentally disconnected < 2mA.

Waste voltage (state 1)	< 1V (for I = 0.5A).
Small load impedance	48 Ohm
Response time (1) State 0 to 1 state 1 to 0	<500MicroFarad
Switching frequency over inductive load <0.6/LI Hz	<0.6/LIHz
Output parallelization	Yes 2 outputs maximum.
Compatibility with direct current inputs	All the 24VDC CEI 1131-2 type 1 and type 2 inputs with input impedance < 15 KOhm.
Compliance with IEC 1131-2	Yes
Built-in protection	-Against overloads and short circuits -> by current limiter and thermal circuit breaker (0.75A<=Id<=2A). -Against excess voltage ->by breakdown diode. -Against polarity inversions -> Yes by reverse diode over supply. Scheduling a rapid fusion fuse over +24V of the pre-actuators' supply: ● 6.3A (DMZ28DT/28DTK/16DTK) ● 4A (DSZ08T2/08T2K) ● 10A DSZ 32T2)
Pre-actuator voltage check threshold	OK -> >18V. Error > <14V.
Check response time	At the appearance ->T<4ms. At the disappearance ->T<30ms.
Common of loads	To - from the supply.
Dissipated power by channel at state 1	<0.45W (for U=24V).
Key	
(1)	All outputs are equipped with circuits for rapid de-magnetizing of solenoids. Solenoid discharge time < L/R.

Links of the TSX DSZ08T2 module

Pre-actuator/ Output connections

Diagram:



FU2 = 6.3A fuse with rapid fusion.

Discrete output module TSX DSZ 04T22

18

At a Glance

Aim of this Chapter

This chapter introduces the TSX DSZ 04T22 module, its characteristics and connections to different sensors and pre-actuators.

What's in this Chapter?

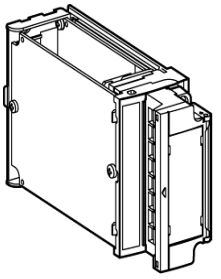
This Chapter contains the following Maps:

Topic	Page
Module TSX DSZ 04T22	166
Characteristics of the TSX DSZ04T22 module	167
Connection of the TSX DSZ04T22 module	169

Module TSX DSZ 04T22

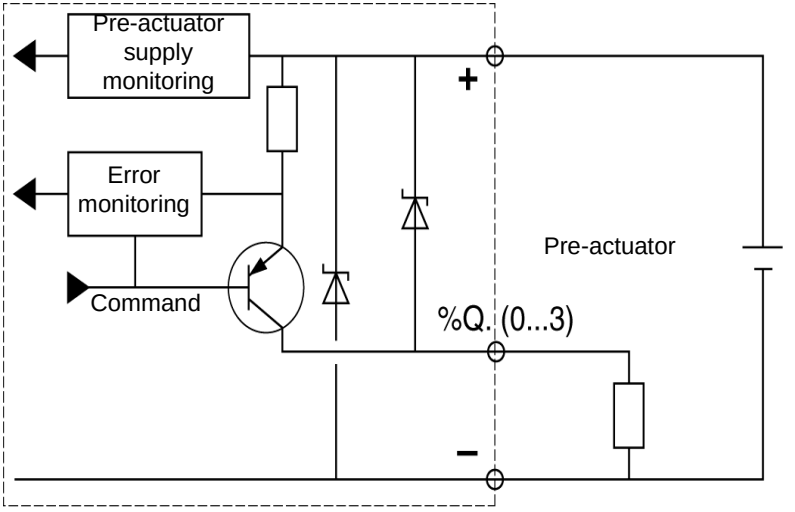
At a Glance

The TSX DSZ 04T22 comprises 4 static 24VDC/2A outputs.
The module is equipped with a removable 15 post screwed connection terminal block, allowing outputs to be connected:
Module:



Process diagram for an output

Output:



Characteristics of the TSX DSZ04T22 module

General characteristics

Table :

Modularity	Static 4S outputs 24VDC/2A.
Current used on the internal 5V	25mA
Current used on the 24V relay (1)	5mA+10mA by output at 1.
Current used on the 24V pre-actuator (outside of load current)	
Dissipated power in the module (load rate = 60%)	1.5W
Operating temperature	0 to 60°C
Dielectric rigidity	Input/mass or output/output mass/internal logic 2000V, effective 50/60Hz 1mn.
Insulation resistance	>10M Ohm under 500VDC.
Hygrometry	5% to 95% without condensation.
Storage temperature	-25°C to 70°C
Operating altitude	0 to 2000 meters
Drop in temperature	The characteristics at 60°C are guaranteed for 60% of the inputs and 60% of the outputs at state 1.
Key	
(1)	If the 24V relay is delivered by an external supply (as in the mini-extension rack in particular), the value of this supply should comprise a maximum tolerance of 24V +/- 10%.

Characteristics of the 24VDC/2A static outputs

Table

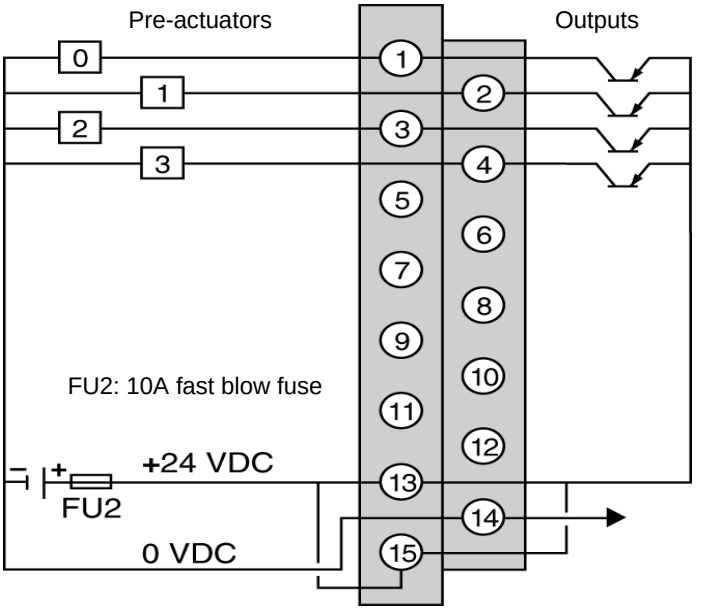
Logic	Positive, current emitted.
Voltage/Current nominal values	24V/2A
Value thresholds (for U<=30 or 34V, including ripple)	19…30V voltage (possible up to 34V, limited at 1H/ 24h). Current/channel -> 2.5A. Current/module 8A).
Power of tungsten lamp filament	15W max.

Leakage current (state 0)	<= 0.5 mA
Waste voltage (state 1)	< 0.8V (for I = 2A).
Small load impedance	12 Ohm
Response time (1) State 0 to 1 state 1 to 0	<1ms
Switching frequency on inductive load	$< 0.5/LI^2Hz$
Output parallelization	Yes 2 outputs maximum.
Compatibility with direct current inputs	All the 24VDC CEI 1131-2 type 1 and type 2 inputs with input impedance < 15 KOhm.
Compliance with IEC 1131-2	Yes
Built-in protection	-Against overloads and short circuits -> by current limiter and electronic circuit breaker (2.6A<=Id<=5A). -Against excess voltage ->by breakdown diode. -Against polarity inversions -> Yes by reverse diode over supply. Plan for a rapid fusion fuse over +24V power supply (10A at rapid fusion).
Pre-actuator voltage check threshold	OK -> >18V. Error > <14V.
Check response time	At the appearance ->T<4ms. At the disappearance ->T<30ms.
Common of loads	To - from the supply.
Dissipated power by channel at state 1	<1.15W (for U=24V).
Dielectric rigidity	Outputs/Ground 1500V effective 50/60Hz for 1mn.
Insulation resistance	>10M Ohm under 500VDC.
Key	
(1)	All outputs are equipped with circuits for rapid de-magnetizing of solenoids. Solenoid discharge time < L/R.

Connection of the TSX DSZ04T22 module

Pre-actuators/ Output connections

Diagram:



Discrete output module TSX DSZ 08TR5

19

At a Glance

Aim of this Chapter

This chapter introduces the TSX DSZ 08R5 module, its characteristics and connections to different sensors and pre-actuators.

What's in this Chapter?

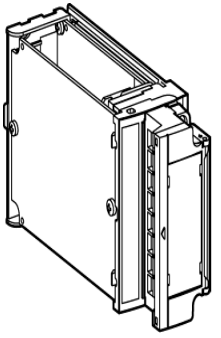
This Chapter contains the following Maps:

Topic	Page
Module TSX DSZ 08R5	172
Characteristics of the TSX DSZ08R5 module	174
connection of the TSX DSZ08R5 module	176

Module TSX DSZ 08R5

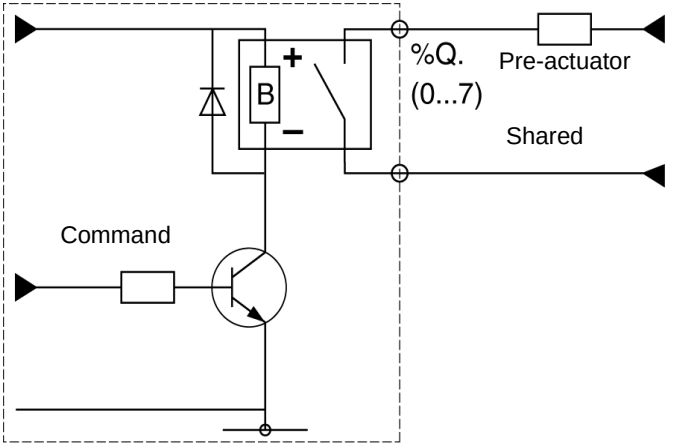
At a Glance

The TSX DSZ 08R5 comprises 8 relay outputs.
The module is equipped with a removable 15 post screwed connection terminal block, allowing outputs to be connected:
Module:

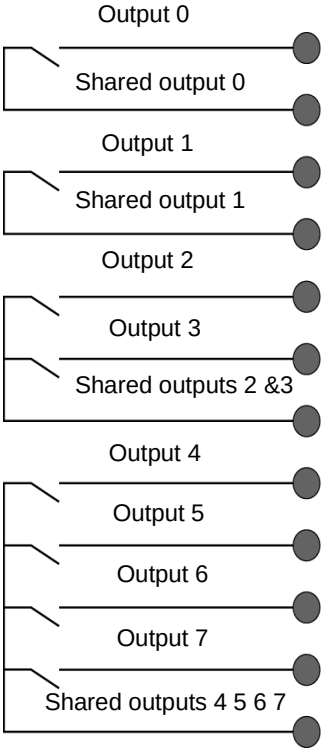


Process diagram for an output

Output:



Modularity:



STOP	**WARNING**
	WARNING In order to protect against contact with the relay, the following should be mounted on the pre-actuator terminals: • an RC circuit or MOV (ZNO) suppressor for use with alternating current, • a discharge diode for use with direct currents. **Failure to observe this precaution can result in severe injury or equipment damage.**

Characteristics of the TSX DSZ08R5 module

General characteristics

Table :

Modularity	8O/Relays.
Current used on the internal 5V	25mA
Current used on the 24V relay (1)	5mA+10mA by output at 1.
Current used on the 24V pre-actuator (outside of load current)	
Dissipated power in the module (load rate = 60%)	1.5W
Operating temperature	0 to 60°C
Dielectric rigidity	Output/mass or output/internal logic 2000V, effective 50/60Hz 1mn.
Insulation resistance	
Hygrometry	5% to 95% without condensation.
Storage temperature	-25°C to 70°C
Operating altitude	0 to 2000 meters
Drop in temperature	The characteristics at 60°C are guaranteed for 60% of the inputs and 60% of the outputs at state 1.
Key	
(1)	If the 24V relay is delivered by an external supply (as in the mini-extension rack in particular), the value of this supply should comprise a maximum tolerance of 24V +/- 10%.

Characteristics of the relay outputs

Table

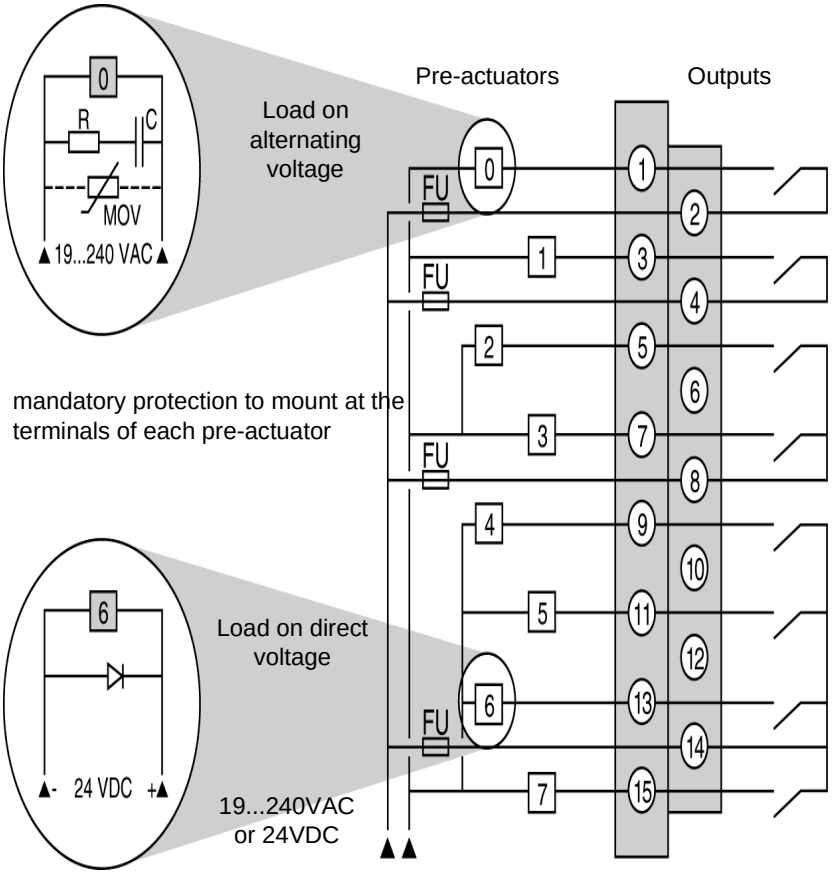
Job limit voltage	10 to 34CC/19 to 264VCA.
Thermal current	3A
Common maximum current	5A
Alternating current load	Resistive load AC12 Voltage 220V Power 220VA (6) Inductive AC14 and AC15 Voltage 220V Power 10VA (11), 50VA (9), 110VA (6), 220VA (1).

Built-in protection	-Against overloads and short circuits -> None, it is essential to mount a rapid fusion fuse per channel or group of channels. -Against alternating current inductive overcharging -> None, each RC circuit or MOV (ZNO) suppressor, must be mounted parallel to the posts of each pre-actuator appropriate to the voltage. -Against direct current inductive overcharging -> None, each discharge diode must be mounted on the posts of each pre-actuator.
Key	
(1)	0.1 x 10^6 maneuvers
(6)	1 x 10^6 maneuvers
(9)	3 x 10^6 maneuvers
(11)	10 x 10^6 maneuvers

connection of the TSX DSZ08R5 module

Pre-actuators/ Output connections

Diagram:



FU = Fast blow fuses to be calibrated according to the load.

Note: In this case where the supply voltage of the pre-actuators is obtained from a triple-phase network and it is equal to or greater than 200 VAC, the pre-actuators should be supplied starting at the same phase.

The Discrete input/output mixed module TSX DMZ 16DTK

20

At a Glance

Aim of this Chapter

This chapter introduces the TSX DMZ 16DTK module, its characteristics and connections to different sensors and pre-actuators.

What's in this Chapter?

This Chapter contains the following Maps:

Topic	Page
Module TSX DMZ 16DTK	178
Characteristics of the module TSX DMZ16DTK	180
Connection of the module TSX DMZ16DTK	183
Connections of the TSX DMZ 16DTK module to the Dialbase Tego base	184
TSX DMZ 16 DTK module connections to (Tego Power) communication module	187

Module TSX DMZ 16DTK

At a Glance

Module TSX DMZ 16DTK comprises 16 inputs/outputs distributed as follows:

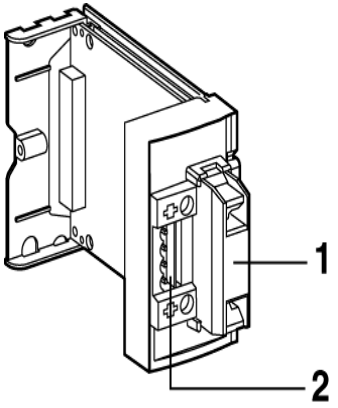
- 8 24VDC inputs, positive logic type 1,
- 8 static outputs 24VDC/0.5A.

The module is equipped:

- with a HE10 type connector (1), which can receive,
  - either a ready-wired TSX CDP•01 lead to connect directly to the terminals, sensors or pre-actuators,
  - or a TSXCDP••3 cable to connect to the Tego Dial or Tego Power wiring interface.
- with a tunnel terminal block allowing the sensors and pre-actuators to be connected if the current they use is >0.7A.

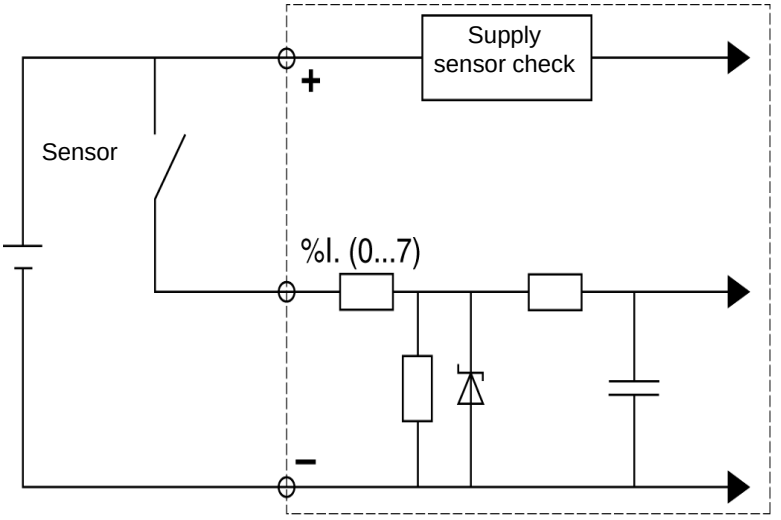
Note: If the consumption of the sensors and pre-actuators is <= 0.7A, the power supply can be cabled from the HE10 connector.

Module:



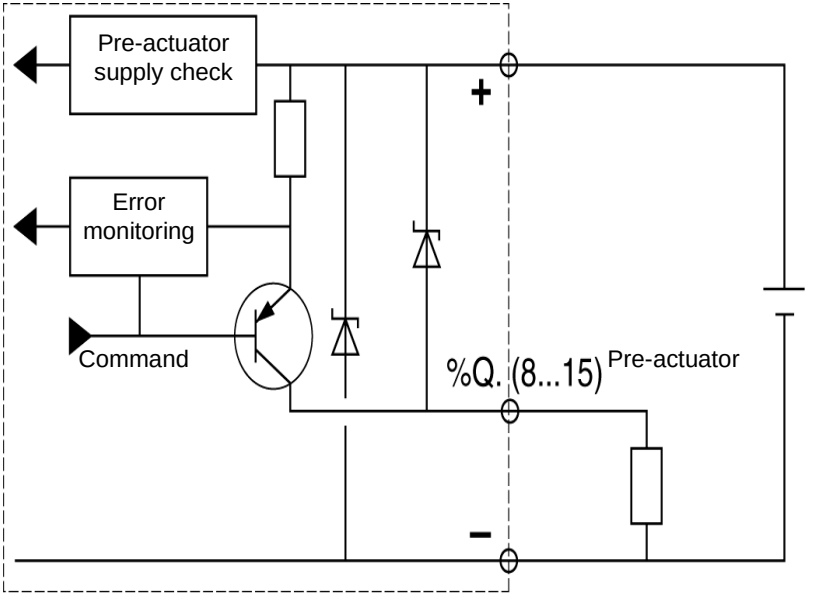
Process diagrams for an input

Input:



Process diagram for an output

Output:



Characteristics of the module TSX DMZ16DTK

General characteristics

Table :

Modularity	Inputs 8E/24VDC.
	Static 8S outputs 24VDC/0.5A.
Current used on the internal 5V	30mA+3.2mA by output at 1.
Current used on the sensor supply	20mA+7mA by output at 1.
Current used on the 24V pre-actuator (outside of load current)	30mA+1mA by output at 1.
Dissipated power in the module (load rate = 60%)	3W
Operating temperature	0 to 60°C
Dielectric rigidity	Input/mass or input/internal logic 1 500V, effective 50/60Hz 1mn input/logic.
	Output/mass or output/internal logic 500V, effective 50/60Hz 1mn input/logic.
Insulation resistance	>10M Ohm under 500VDC.
Hygrometry	5% to 95% without condensation.
Storage temperature	-25°C to 70°C
Operating altitude	0 to 2000 meters
Drop in temperature	The characteristics at 60°C are guaranteed for 60% of the inputs and 60% of the outputs at state 1.

Characteristics of the 24VDC inputs

Table :

Logic	Positive
Nominal input value	Voltage 24V.
	7mA current.
Input threshold	At state 1 ->Voltage>=11V.
	At state 1 -> Current (for U=11V) >2.5mA.
	At state 0 ->Voltage<5V.
	At state 0 Current<1.5mA.
	Sensor supply (including ripple) 19 to 30V(possible up to 34V, limited to 1H/24h).
Input impedance	3.4K Ohm

Configurable response time	State 0 at 1 ->0.1...7.5ms.
	State 1 at 0 ->0.1...7.5ms.
Sensor voltage check threshold	OK >18V.
	Default <14V.
Sensor voltage check response time	When 24V 1 ms<t<3ms disappears.
	When 24V 8ms<t<30ms appears.
Type of inputs	Current wells.
Compliance with IEC 1131-2 type1	Type 2
DDP 2 wire compatibility	See *Compatibility of 3-wire sensors with 24 VDC inputs, p. 49*
DDP 3 wire compatibility	Yes
Common of the inputs	To + from the supply.

Characteristics of the 24VDC/ 0.5A static outputs

Table :

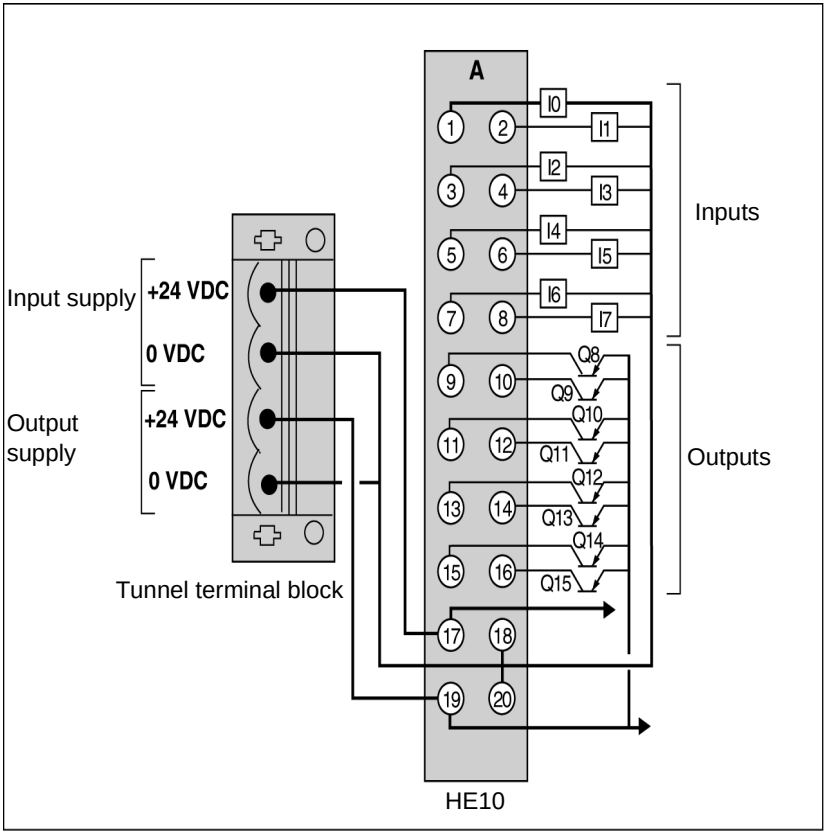
Logic	Positive current emitted.
Nominal values	Voltage/current 24V/0.0.5A.
Value thresholds (for U<=30 or 34V, including ripple)	Voltage 19 to 30V(possible up to 34V, limited to 1H/ 24h).
	Current/channel 0.625A.
	Current/module 6A.
Power of tungsten filament lamp	10Wmax
Leakage currents (state 0)	During normal operation <0.5mA.
	When 0V module is accidentally disconnected < 2mA.
Waste voltage	At state 0.3V < 1V (for I=0.5A).
Small load impedance	48Ohm
Response time (1)	State of path 0 to 1 <500 Micro/Sec.
	State of path 1 to 0 <500 Micro/Sec.
Switching frequency on inductive load	$<0.6/LI^2$ Hz
Compliance with IEC 1131-2	Yes
Output parallelization	Yes, 2 outputs maximum.
Compatibility with direct inputs	All the 24VDC CEI 1131-2 type 1 and type 2 inputs with input impedance <15KOhm.
Common of loads	To - from the supply.

Built-in protection measures	Against overloads and short-circuits: By current limiter and thermal circuit breaker 0.75A<=1d<=2A.
	Against excess voltage: By breakdown diode
	Against polarity inversions: Yes, by reverse diode on supply. Plan for a rapid fusion fuse over +24V of the 6.3A pre-actuator's supply.
Pre-actuator voltage check threshold	OK >18V.
	Default <14V.
Check response time	At the appearance T<4ms.
	At the disappearance T<30ms.
Dissipated power by channel at state 1	<0.05W (for U=24V).
Key	
(1)	All outputs are equipped with circuits for rapid demagnetizing of solenoids. Solenoid discharge time < L/R.

Connection of the module TSX DMZ16DTK

Principle of the connection between the different internal elements of the module

Diagram:



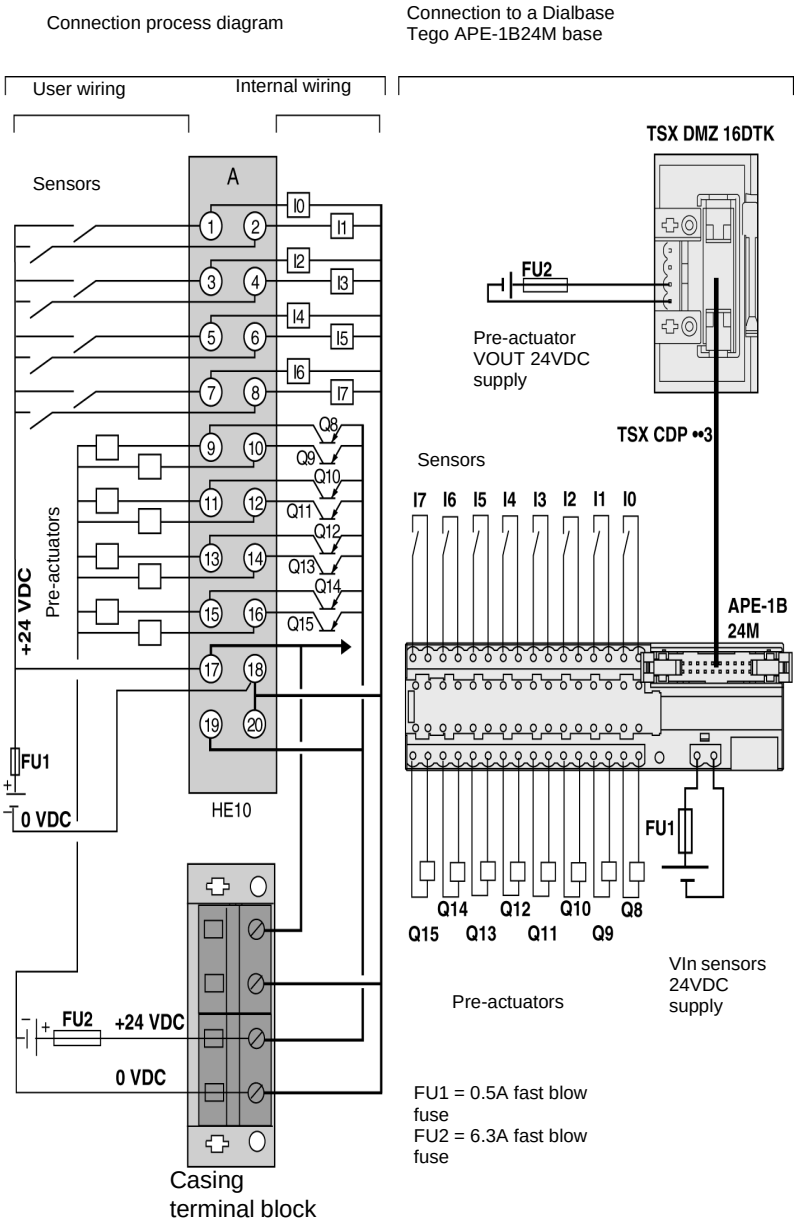
Connections of the TSX DMZ 16DTK module to the Dialbase Tego base

At a Glance

The TSX DMZ 16DTK module offers 2 possibilities for connecting the power supply of the sensors and pre-actuators:

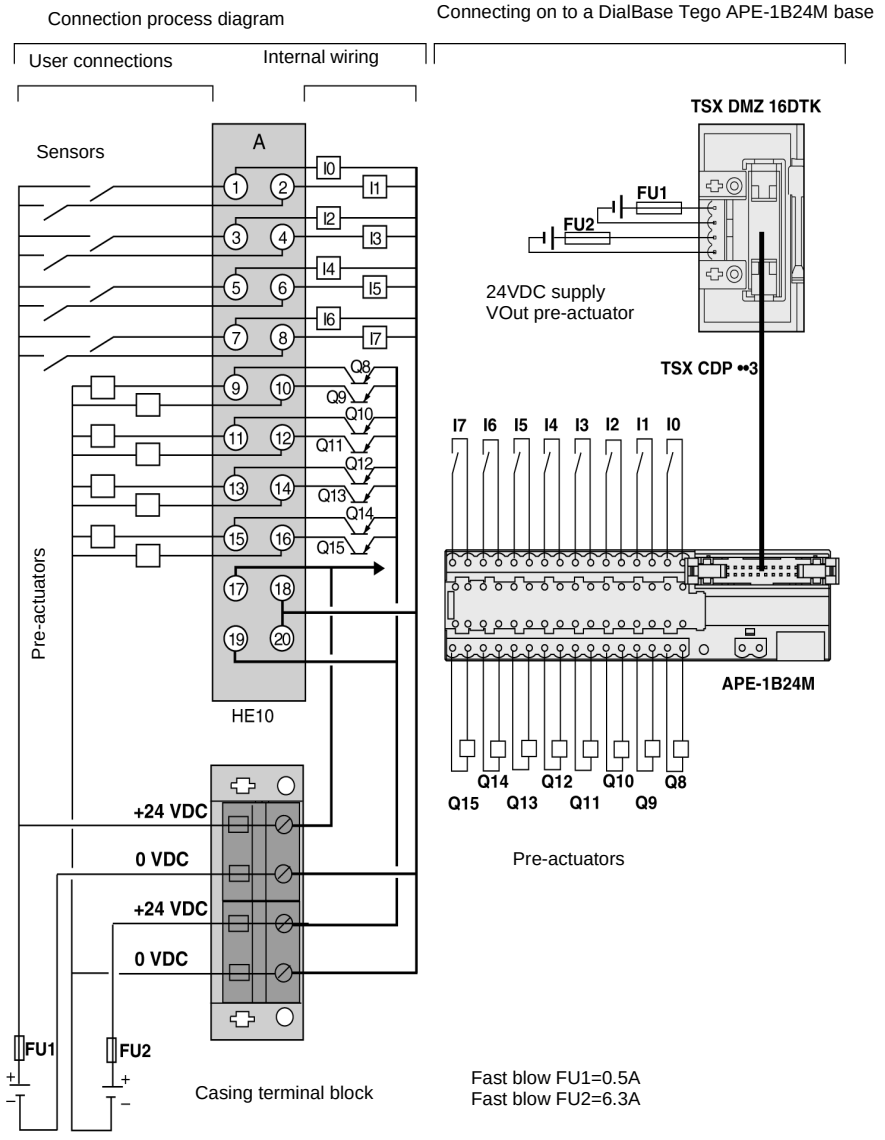
- **First possibility:**
  - connecting the power supply of the sensors from the Dialbase Tego base,
  - connecting the power supply of the pre-actuators from the tunnel terminal block. In all cases, connecting the power supply of the pre-actuators must be performed on this terminal block.

Diagram:


Connection process diagram
Connection to a Dialbase
Tego APE-1B24M base
User wiring
Internal wiring
Sensors
A
I0
I1
I2
I3
I4
I5
I6
I7
Q8
Q9
Q10
Q11
Q12
Q13
Q14
Q15
Pre-actuators
+24 VDC
FU1
0 VDC
HE10
FU2
+24 VDC
0 VDC
Casing
terminal block
TSX DMZ 16DTK
FU2
Pre-actuator
VOUT 24VDC
supply
TSX CDP •3
Sensors
I7 I6 I5 I4 I3 I2 I1 I0
APE-1B
24M
FU1
Q14 Q12 Q10 Q8
Q15 Q13 Q11 Q9
Pre-actuators
VIn sensors
24VDC
supply
FU1 = 0.5A fast blow
fuse
FU2 = 6.3A fast blow
fuse

- **Second possibility:**
  - connecting the power supply of the sensors and pre-actuators from the TSX DMZ 16DTK module tunnel terminal block.

Diagram:



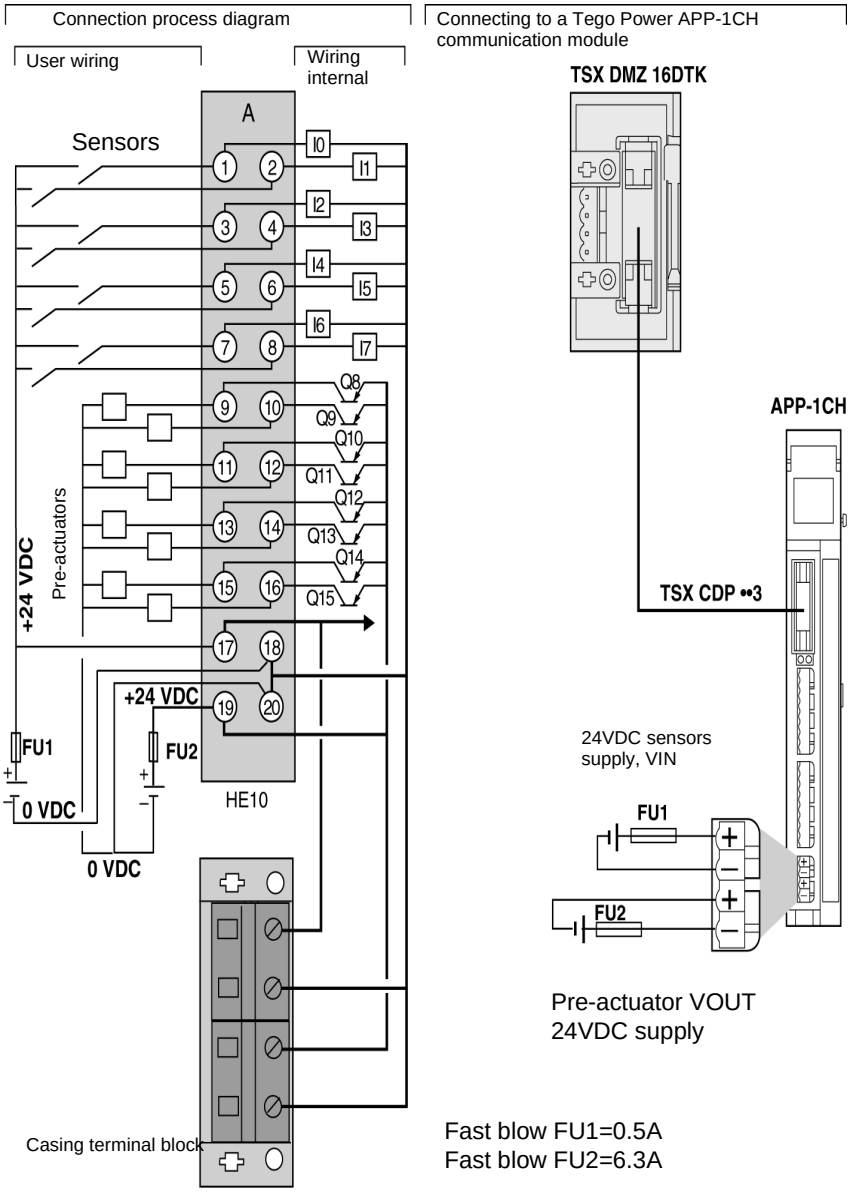
TSX DMZ 16 DTK module connections to (Tego Power) communication module

At a Glance

The TSX DMZ 16DTK module offers 2 possibilities for connecting the power supply of the sensors and pre-actuators:

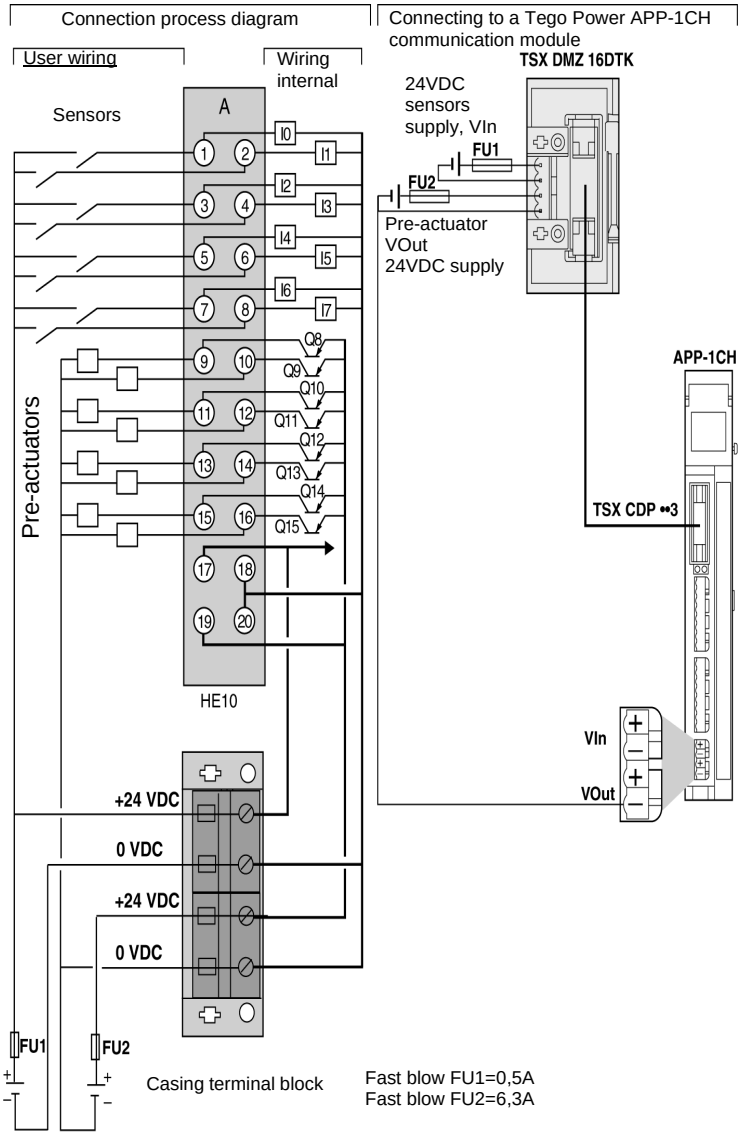
- **First possibility:**
  - connecting power supply of sensors and pre-actuators to the APP-1CH communication module. In this case, the consumption of all the pre-actuators will be <=0.7A,

Diagram:


Connection process diagram
User wiring
Wiring internal
Connecting to a Tego Power APP-1CH communication module
Sensors
A
I0
I1
I2
I3
I4
I5
I6
I7
Q8
Q9
Q10
Q11
Q12
Q13
Q14
Q15
Pre-actuators
+24 VDC
+24 VDC
FU1
FU2
0 VDC
0 VDC
HE10
Casing terminal block
TSX DMZ 16DTK
APP-1CH
TSX CDP ••3
24VDC sensors supply, VIN
FU1
FU2
Pre-actuator VOUT
24VDC supply
Fast blow FU1=0.5A
Fast blow FU2=6.3A

- **Second possibility:**
  - Connecting the power supply of the sensors and pre-actuators from the TSX DMZ 16DTK module tunnel terminal block. Connection to use if the consumption of the pre-actuators is >=0.7A.

Diagram



Emergency stop monitoring module

21

At a Glance

Aim of this chapter

This chapter describes the TSX DPZ 10 D2A emergency stop monitoring module: main functions, operating modes, troubleshooting, connecting emergency stop push buttons, detailed features, etc

What's in this Chapter?

This Chapter contains the following Sections:

Section	Topic	Page
21.1	Module for monitoring the emergency stop	193
21.2	Safety function of the emergency stop monitoring module	194
21.3	Connections and wiring examples of the emergency stop monitoring module	202
21.4	Diagnostics of the safety string of the emergency stop monitoring module	210
21.5	Monitoring and display of the emergency stop monitoring module	213
21.6	Electrical characteristics of the emergency stop monitoring module	216
21.7	Usage precautions for the emergency stop monitoring module	219

21.1 Module for monitoring the emergency stop

Introduction to the emergency stop monitoring module

Built-in security string

The security string which is built in to the TSX DPZ 10 D2A module enables the emergency stop (ES) circuits of the machines to be controlled in total security. Emergency stop monitoring is carried out via a cabled logic security block. It allows security functions up to category 3 to be covered, according to the EN 954-1 standard.

Diagnostics of the security string

The TSX DPZ module carries out the complete diagnostics of the security chain by reading the status of the push buttons or the position interrupters in the emergency stop input string, the return loop and the control of the two output circuits. This data is transmitted to the PLC processor in the form of 10 discrete input bits.

Module behavior

The TSX DPZ module behaves like a discrete input module. **The PLC cannot carry out actions when in security mode**

Module functions

The TSX DPZ module offers the following functions:

- Monitoring the emergency stop PB and the position interrupters (PI) of the mobile covers for an immediate stop (Category 0 emergency stop according to the EN 418 standard).
- Cabled security blocks, independent of the TSX Micro processor.
- Guarantees the security function, irrespective of what the first failure in a security chain component may be, by using:
  - 2 security output circuits,
  - 4 double contact input canals for emergency stop PB or PI.
- Redundant, auto-checked conception (identical to the PREVENTA XPS AL range).
- Rebooting check by activating an auxiliary input: validation input or activate PB.
- Complete troubleshooting of the security chain by:
  - Reading the status of emergency stop PB or PI inputs,
  - Reading the validation input or PB activator (return loop),
  - Reading the command of 2 security outputs.
  - Monitoring the external supply of the module.
- Possibility of modifying the filtering value of the diagnostics' discrete input bits.

Symbolization

The following symbolization is used:

- PB: Push button
- ES: Emergency Stop
- PI: Position Interrupter

21.2 Safety function of the emergency stop monitoring module

At a Glance

Aim of this section

This section introduces the safety function of the emergency stop monitoring module.

What's in this Section?

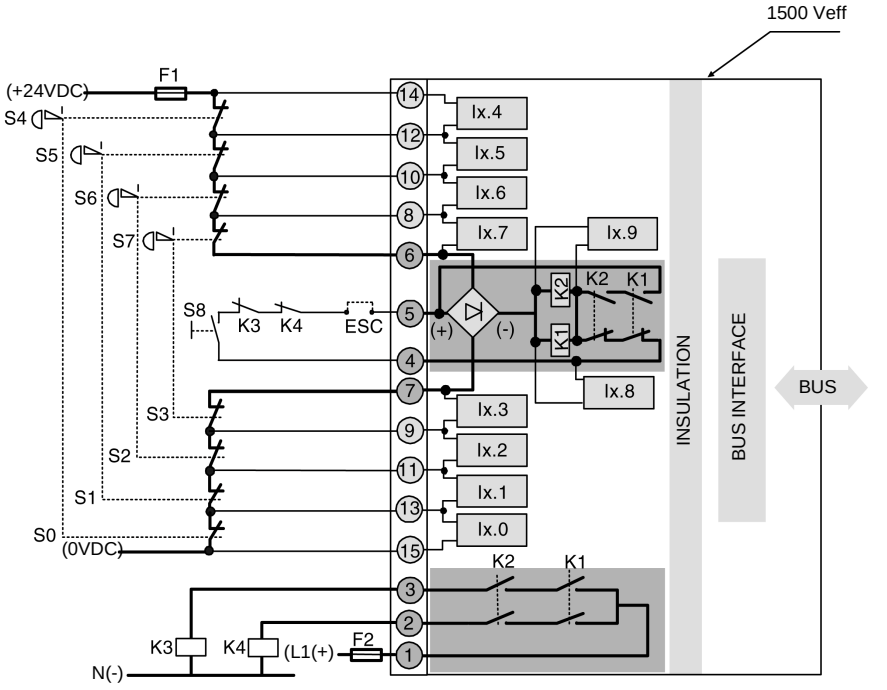
This Section contains the following Maps:

Topic	Page
Security function	195
Functional cross-section of the TSX DPZ security function module:	196
Functional diagram of the security function	198
Operating modes and troubleshooting	199
Protecting inputs and outputs	201

Security function

Functional diagram

This diagram illustrates the security function of the TSX DPZ module:



Terminal block

The following table describes the terminal block to enable module wiring:

Terminal	Description
6 - 7	Power supply for the security string
1 - 2 and 1 - 3	Security outputs, potential free
4 - 5	Return loop (ESC = supplementary validation conditions)
14 - 15	Monitoring the external 24 VDC supply of the module
14 - 12, 12 - 10, 10 - 8, 8 - 6, 7 - 9, 9 - 11, 11 - 13 and 13 - 15	8 reading channels for dry input contacts, emergency stop PB or PI

Functional cross-section of the TSX DPZ security function module:

At a Glance

The security function of the emergency stop monitoring module breaks down in the following way:

- The external supply of the module.
- The security block made up of cabled components.
- The reading blocks for automatic diagnostics which are made up of discrete components (symbolized by I x n in the functional diagram (See *Security function, p. 195*)).
- The galvanic insulation block and interface with the PLC bus.

External supply to the module

The module requires a 24 VDC supply to supply the reading blocks for the PB or PI inputs (terminals 14 and 15) and the security block (terminals 6 and 7).
It should be noted that:

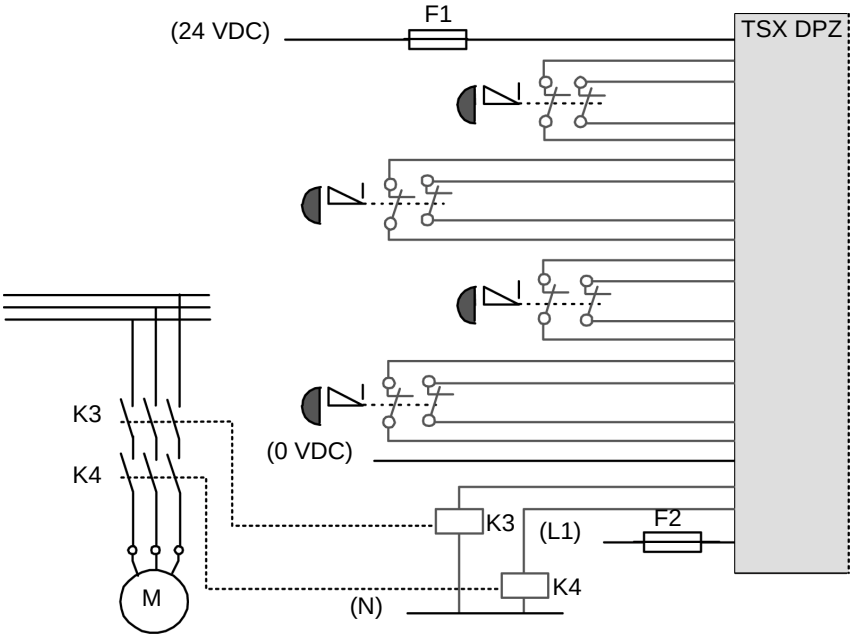
- The security outputs are potential free (terminals 1-2 and 1-3).
- The module is protected from polarity inversions.

Security block

24 VDC voltage is applied between terminals 6 and 7, via the string of position interrupters' open contacts or the emergency stop buttons. Wiring of the security string is **mandatory**.
An external supply cut or pressing one of the emergency stop buttons causes the security output circuits to open immediately.
After reactivating the emergency stop PB or closing the input string position interrupters, you must send a pulse to the validation input (terminals 4 and 5) in order to supply the K1 and K2 security relays again, and close the security output contacts (terminals 1-2 and 1-3).
In order to guarantee the security function, irrespective of what the first failure may be, it is mandatory to use:

- **In inputs: emergency stop PB or double-contact PI.**
- **In outputs: 2 guided contact relays.**
- **On the module supply: an F1 protective fuse.**

The following diagram illustrates the external wiring of the security block:



Reading blocks for PLC diagnostics

These diagnostics blocks allow the following functions to be carried out:

- Diagnostics of the input string (blocks I x 0 to I x 7). Wired in parallel to the input string contacts, these blocks read independent of each contact. Using (wiring) reading blocks depends on the number and the type (single or double contact) of inputs to go through the diagnostics process.
- Reading the validation input (block I x 8).
- Reading the status of the K1 and K2 (block I x 9) relay command.

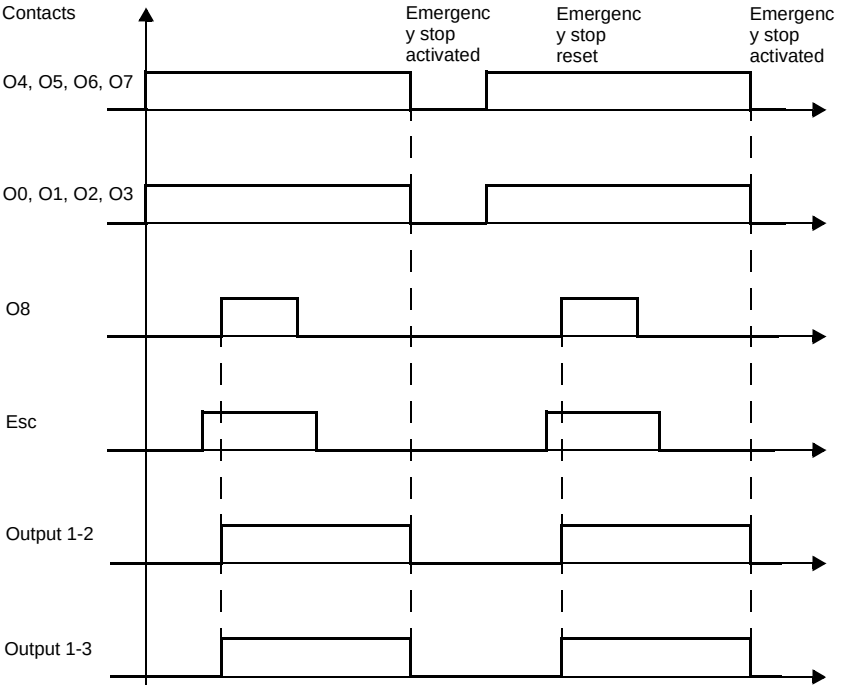
Interface block with the PLC bus

This block guarantees 1500 V eff. galvanic insulation and the interface with the PLC bus.

Functional diagram of the security function

Status of security outputs

The functional diagram of the security function is as follows:



When all the S0 to S3 and S4 to S7 contacts are closed and the conditions for re-booting (ESC) are met, pressing the S8 push button closes the 2 output security circuits.
Opening one of the S0 to S7 contacts opens the 2 output security circuits.

Operating modes and troubleshooting

Operating modes

The module is independent of the PLC. The status or change of status (Stop, Run, off, on, etc) of the PLC has no effect on the security function of the emergency stop monitoring module.

Detecting faults on the outputs

Detecting the first fault on outputs requires contactors or mechanically-linked contact relays to be used. The "O" contacts of the K3 and K4 relays must be relooped in series on the return loop (terminals 4-5). This wiring prohibits the validation of the security string on bonding of one of the two command relays (K3 or K4).

Detecting faults inside the module

When an internal component fails for the first time, the TSX DPZ module guarantees the security function by opening the output contacts (K1, K2) or by opening these contacts when next requested (opening an ES PB or PI, switched off). In this case, it becomes impossible to close the output contacts (K1, K2), therefore it is appropriate to change the module.

Detecting ground faults with an insulated supply

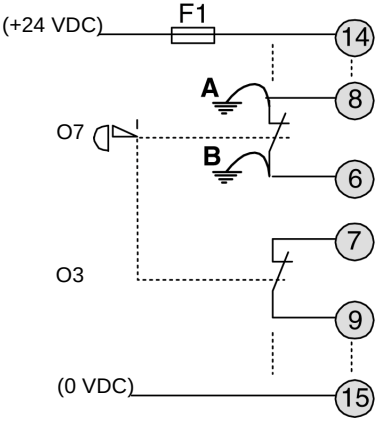
The TSX DPZ module was developed to meet the demands of the EN60204-1 standard, dealing in particular with short circuits to ground.
If a module with an external 24 VDC supply, which is insulated from the ground, is used, the **first ground fault**does not affect the operation of the module, on the other hand, the **second ground fault**causes:

- Either short-circuiting of one or several PB ES or PI (see figure 1).
- Or short-circuiting of the external 24 VDC supply (see figure 2).

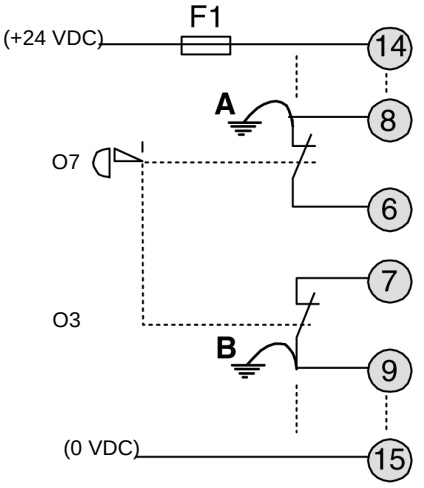
Graphic representation of the short-circuit faults

Short-circuiting of one or several PB ES or PI:

Error A	No consequence
Error B	O7 in short circuit (not detected)
Pressing BP AU	Opening the safety outputs with O3
Diagnostics	O3 and O7 inconsistent



Short-circuiting of the external 24 VDC supply:



Error A	No consequence
Error B	Opening the safety relays by destroying fuse F1

Detecting ground faults with referenced supply

If a module with an external supply of 24 VDC referenced to the ground is used (0 VDC connected to ground), the short-circuits described above occur with the **first ground fault**.

Protecting inputs and outputs

Protecting safety string inputs

It is necessary and **mandatory** to protect the safety block and module supply with a **single fuse** (F1 in the examples of wiring). This fuse is an **active element** of the safety string.

Protecting safety outputs

The safety outputs must be protected by a fuse (F2 in the examples of wiring). This fuse offers protection against short-circuits or overloading. This protection avoids fusing the internal safety relays in the TSX DPZ module.

21.3 Connections and wiring examples of the emergency stop monitoring module

At a Glance

Aim of this section

This section introduces the connections and wiring examples of the emergency stop monitoring module.

What's in this Section?

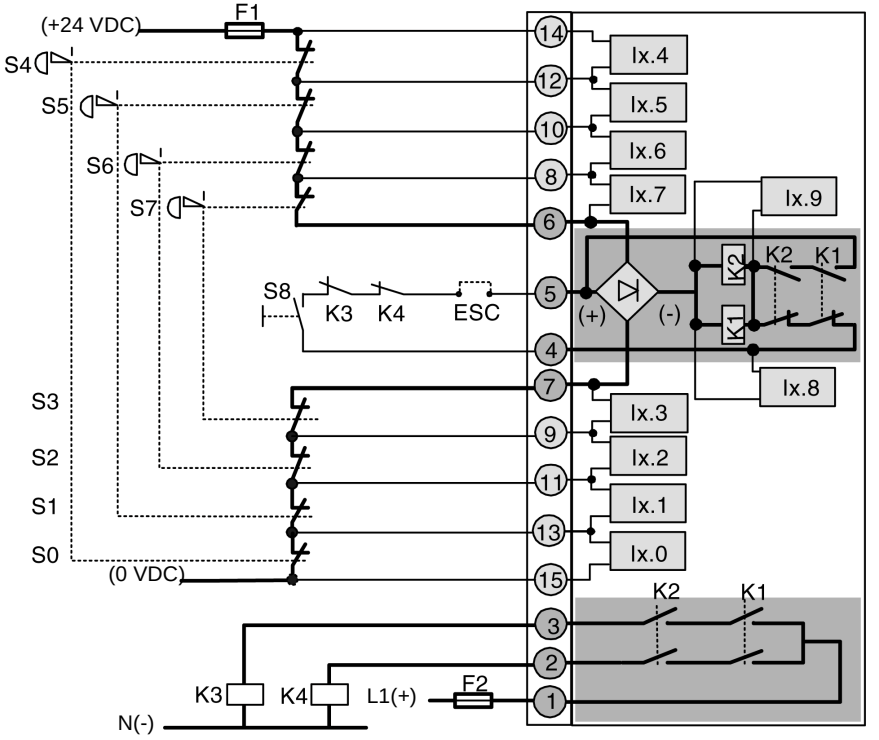
This Section contains the following Maps:

Topic	Page
Connecting an emergency stop PB or PI with 2 open contacts	203
Connecting an emergency stop PB or PI to one single open contact	205
Global diagnostics of a input string with several single contacts	207
Serialization of the emergency stop monitoring modules	209

Connecting an emergency stop PB or PI with 2 open contacts

Wiring diagram

The following category 3 wiring diagram allows the full diagnostics of an input string which can contain up to 4 double contacts.
This diagram makes it possible to diagnose all the security string contacts.
PB ES or PI with 2 open contacts.



Module channels

This table, fitting in with the wiring diagram, provides information about the terminals and the symbol associated with the different channels in the module.

Channel	Terminal	Symbol
0	13 - 15	S0
1	11 - 13	S1
2	9 - 11	S2
3	7 - 9	S3
4	14 - 12	S4

Channel	Terminal	Symbol
5	12 - 10	S5
6	10 - 8	S6
7	8 - 6	S7
8	5 - 4	Status of the S8 return loop
9	/	Status of the output command

Esc = supplementary validation conditions.

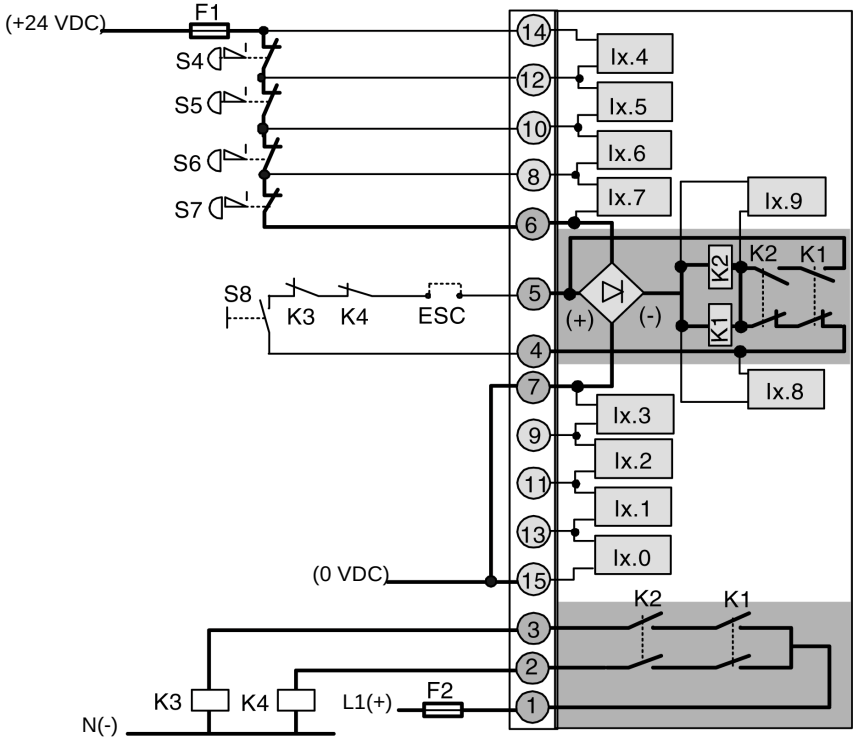
Using less than 4 double contacts

When using less than 4 double contacts, the unused input limits must be shorted-out.
For example, if contacts S0 and S4 are not used, limits 13 and 15 (S0) then 14 and 12 (S4) must be shorted-out.

Connecting an emergency stop PB or PI to one single open contact

Wiring diagram

The following wiring diagram allows the diagnostics of an input string which can contain up to 4 single contacts.
The safety string contacts are all wired on the positive pole.
PB ES or PI with 1 open contact.



Module channels

This table, fitting in with the wiring diagram, provides information about the terminals and the symbol associated with the different channels in the module.

Channel	Terminal	Symbol
0	13 - 15	Insignificant
1	11 - 13	Insignificant
2	9 - 11	Insignificant
3	7 - 9	Insignificant
4	14 - 12	S4

Channel	Terminal	Symbol
5	12 - 10	S5
6	10 - 8	S6
7	8 - 6	S7
8	5 - 4	Status of the S8 return loop
9	/	Status of the output command

Esc = supplementary validation conditions.

Using less than 4 single contacts

When using less than 4 single contacts, the unused input limits must be shorted-out. For example, if the S5 contact is not used, limits 10 and 12 must be shorted-out.

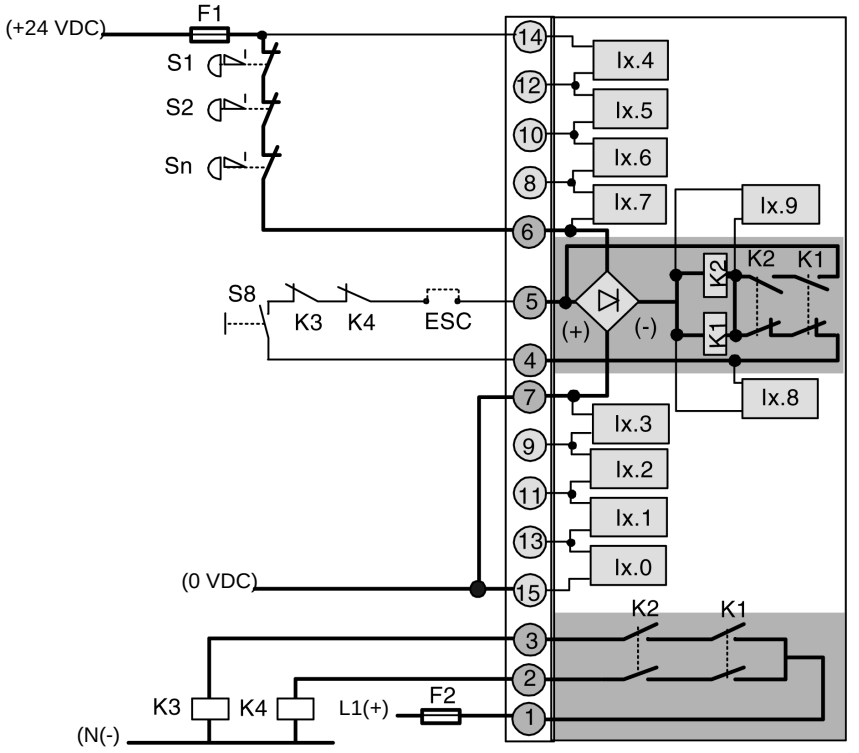
Undetected faults

All the faults are undetected. A short-circuit on a PB ES or PI is not detected. Activating this button does not make the security relays open.

Global diagnostics of a input string with several single contacts

Wiring diagram

The following wiring diagram makes it possible to implement the global diagnostics of an input string with several single contacts.



Module channels

This table, fitting in with the wiring diagram, provides information about the terminals and the symbol associated with the different channels in the module.

Channel	Terminal	Symbol
0	13 - 15	Insignificant
1	11 - 13	Insignificant
2	9 - 11	Insignificant
3	7 - 9	Insignificant
4	14 - 12	S1, S2, etc, Sn
5	12 - 10	Insignificant
6	10 - 8	Insignificant

Channel	Terminal	Symbol
7	8 - 6	Insignificant
8	5 - 4	Status of the S8 return loop
9	/	Status of the output command

Esc = supplementary validation conditions.

Undetected faults

All the faults are undetected. A short-circuit on a PB ES or PI is not detected. Activating this button does not make the security relays open.

Serialization of the emergency stop monitoring modules

Applications with more than 4 inputs

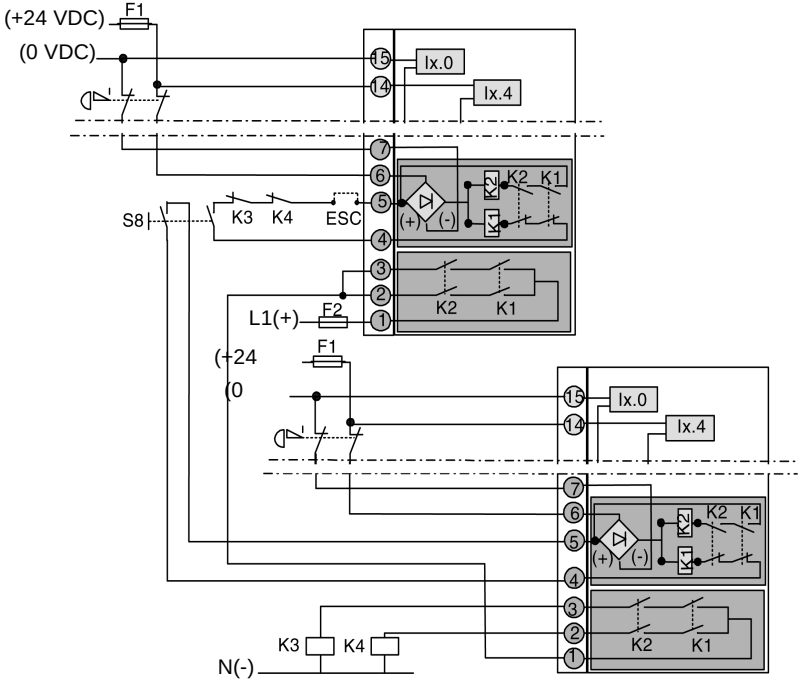
If the applications have more than 4 inputs, several serialized TSX DPZ modules can be used.
Whatever the contacts on the inputs may be (single or double contacts), the following must be cabled:

- Serialized security output modules.
- An S8 validation contact via serialized module (electrically insulated contact).

The following example illustrates the wiring, which must be performed in order to serialize 2 emergency stop monitoring modules.
The number of modules, which can be serialized varies according to the number of slots offered by the TSX Micro PLC, which can be a maximum of 8 half-size modules.

Wiring 2 modules in series

The following diagram illustrates the wiring of 2 modules in series.



Note: One fuse (F1) must be used per module.

21.4 Diagnostics of the safety string of the emergency stop monitoring module

At a Glance

Aim of this section

This section introduces the diagnostics of the security string of the emergency stop monitoring module.

What's in this Section?

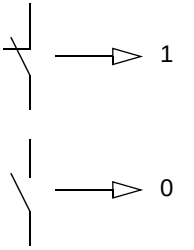
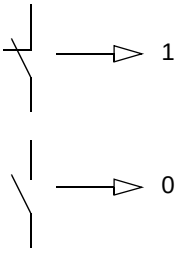
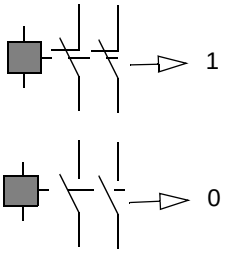
This Section contains the following Maps:

Topic	Page
Diagnostics of the safety string	211
Improving safety with software	212

Diagnostics of the safety string

Diagnostic bits

The following table describes the diagnostic bits of the channels of the emergency stop monitoring module.

Terminals	Channels	Bits	Meaning	Value
13 - 15	0	%Ix.0	ES monitoring input	1 contact 
11 - 13	1	%Ix.1		
9 - 11	2	%Ix.2		
7 - 9	3	%Ix.3		
14 - 12	4	%Ix.4		
12 - 10	5	%Ix 5		
10 - 8	6	%Ix.6		
8 - 6	7	%Ix.7		
5 - 4	8	%Ix.8	Validation input	1 contact 
/	9	%Ix.9	Status of the output command	2 contacts 

x = 3 to 10 according to the position of the module in the PLC..

Language Objects

Software implementation and the description of TSX DPZ language objects are identical to those of the discrete modules.

Improving safety with software

Diagnostics information

In addition to the security functions, which are managed by the TSX DPZ module, diagnostics information makes it possible to detect and signal faults. This information also helps you to adhere to the test manual procedures.

Signaling faults via the program

Adapted to the redundant inputs, the consistency test on the status of the contacts, which are linked to the same sensor, make it possible to detect a short circuit and find the faulty contact.
This type of detection may be performed together with the locking of validation inputs (ESC) by a potential free PLC relay output. Opening the PLC output when a fault is detected prevents the PLC from rebooting.

Monitoring the validation input

According to the needs of the application, this function consists of checking the possible short-circuit in the validation input. Checking the consistency of the validation input and the command status of the outputs makes it possible to detect this fault.

21.5 Monitoring and display of the emergency stop monitoring module

At a Glance

Aim of this section

This section introduces the monitoring, display and maintenance of the emergency stop monitoring module.

What's in this Section?

This Section contains the following Maps:

Topic	Page
Control and display	214
Maintenance	215

Control and display

Supply control

Identical to the discrete modules, the emergency stop monitoring module incorporates a control of the supply voltage for the input reading block.
Voltage lower than 16V causes a fault in the module (%Ix.MOD.ERR = 1) The input bits are no longer significant (%Ix.0 to %Ix.9 = 0). In this case, the security string remains operational, because if the voltage drops too much, then the safe position is adopted by the security outputs opening.
The validation of the security string cannot be guaranteed if the voltage becomes lower than 21.6V.

Supply fault

The supply fault is indicated by:
- A lit I/O LED.
- The %Ix.MOD.ERR module fault bit, which switches to 1.
- The %MWx.MOD.2:X9 module fault bit, which switches to 1.
- The %Ix.i.ERR channel fault bits, which all switch to 1.

Display

The status of inputs and faults of the TSX DPZ module can be accessed via the centralized display.

Maintenance

Maintenance table

This table shows the possible causes of these faults and the checks to be carried out when the faults occur.

Errors	Possible causes	Check
Unwanted opening of safety outputs	No external supply or destruction of F1 fuse	Read %Ix.MOD ERR and the I/O LEDs on the PLC
		Voltage between terminals 14 and 15 greater than 16V
	Emergency stop open	Read %Ix.0 to %Ix 7
		Check the consistency of the status of each contact
	More relay commands	Read %Ix.9
	Destruction of F2 fuse	Check the status and the characteristics of the fuse
Start up not possible	No external supply or destruction of F1 fuse	Read %Ix.MOD ERR and the I/O LEDs on the PLC
		Voltage between terminals 14 and 15 greater than 16V
	Insufficient command voltage	Voltage between terminals 6 and 7 greater than 21.6V
	Emergency stop open	Read %Ix 0 to %Ix 7
		Check the consistency of the status of each contact
	PB not functioning	Read %Ix 8 on PB action
		Check the contacts on the return loop
	Command not possible	Read %Ix 9 on PB action
	Destruction of F2 fuse	Check the status and the characteristics of the fuse
Automatic start up	Permanent validation of PB	%Ix8 = 1 whatever the status of PB
Incorrect input information	Fall in voltage over the wires	Voltage between terminals 6 and 7 must be: > 21.6 V all ES closed > 2.8 V all ES open

If the error persists after the wiring has been checked, the module must be changed.

21.6 Electrical characteristics of the emergency stop monitoring module

At a Glance

Aim of this section

This section introduces the electrical characteristics of the emergency stop monitoring module.

What's in this Section?

This Section contains the following Maps:

Topic	Page
Electrical characteristics	217
Environment characteristics	218

Electrical characteristics

Table of characteristics

The following table indicates the electrical characteristics of the TSX DPZ 10D2A emergency stop monitoring module:

Reference module				TSX DPZ 10D2A			
Modularity				8 discrete emergency stop inputs 1 discrete input (Validation) 2 safety relay outputs			
Supply							
	Nominal voltage			24 VDC (-10%, +20%)			
	Voltage limits			21,6 ... 30 VDC			
	Threshold Check			Error < 16 VDC			
	Consumption			<= 200 mA			
Module protected externally by a fuse according toIEC 947-5-1, DIN VDE 0660 part 200				1 A (gl)			
Consumption on internal 5V				20 mA			
Inputs							
	Logic			Positive			
	IEC 1131-2 conformity			Type 1			
	Insulation (test voltage)	Inputs/ground Inputs/internal logic		1500 Veff - 50/60 Hz - for 1 min			
	Configurable filtering			0,1 ... 7.5 ms			
Safety outputs							
	Job limit voltage	Alternating current		19 ... 264 VAC			
		Direct current		17 ... 250 VDC			
	Permanent maximum current			1.25 A			
	Alternating current load	Inductive	Voltage (V eff)	24	48	110	220
		AC15 load	Power (VA)	30	60	140	275
	Direct current load	Inductive	Voltage (VDC)	24			
		DC123 load (L/R = 100 ms)	Power (W)	30			
	Module protected externally by a fuse according to IEC 947-5-1, DIN VDE 0660 part 200			4 A (gl)			
	Minimum current			10 mA			
	Response time on ES activation			<= 100 ms			
	Type of contact			Ag, Ni, Au on closing			
	Insulation (test voltage)	Outputs/ground - Outputs/internal logic		2000 Veff - 50/60 Hz - for 1 min			
	Insulation resistance			> 10 MOhms at 500 VDC			

Environment characteristics

Table of characteristics

The following table indicates the environment characteristics of the TSX DPZ 10D2A emergency stop monitoring module:

Module product reference		TSX DPZ 10D2A
Operational temperature	Module	+0 Degrees C to +60 Degrees C
	Safety string	-10 Degrees C to +60 Degrees C
Storage temperature		-25 Degrees C to +70 Degrees C
Hygrometry without condensation		5 ... 95%
Altitude		0 ... 2000 m
Degree of protection according to IEC 529		Install the module in an IP54 envelope (minimum)
Power dissipated in the module		4.5 W
Ground		0.28 kg
Standards		
Machine safety		IEC 204-1, EN 292, EN 418, EN 60204-1, EN 954 category 3
PLC products		NFC 63-850, IEC 1131, UL 508, UL 746L, UL 94, CSA 22-2 number 142

Note: The current accumulated at the 2 safety outputs must not exceed 2.5A
The module is capable of switching weak loads (10mA/17V) as long as the output has never switched a large load before as this could alter the gold layer on the contacts.

21.7 Usage precautions for the emergency stop monitoring module

At a Glance

Aim of this section

This section introduces the usage precautions for the emergency stop monitoring module.

What's in this Section?

This Section contains the following Maps:

Topic	Page
General precautions for wiring	220
Standards and precautions for use	221

General precautions for wiring

General precautions and rules for wiring

Precautions relative to the use of discrete inputs/outputs can be applied to the TSX DPZ emergency stop monitoring modules.
The safety string must be wired conforming to the regulations in chapter 15 of the EN 60204-1 standard. This chapter describes the rules concerning wiring and mechanical protection of the wires.

Section and length of the wires

Each terminal can receive naked wires fitted with open or closed terminal-wire end ferrules. The capacity of each terminal being:

- A minimum of: 1 0.28mm wire^2 without wire end ferrule.
- A maximum of: 2 1mm wires^2 with wire end ferrule.

Maximum length of input string wires:

Wire section	Resistivity	Maximum length
0.28 mm^2	50 Ohms/km	360 m
1 mm^2	20 Ohms/km	900 m

Fall in voltage over the wires

Fall in voltage over wires must make the voltage between terminals 6 and 7 either greater than:

- 21.6 VDC (all ES and PI contacts closed to guarantee the operation of the safety string).
- 2.8 VDC (all ES and PI contacts open to guarantee reading of the %Ix.0 to %Ix.9 diagnostic information.)

Standards and precautions for use

Standards

The TSX DPZ module was developed to meet European and international demands for automatic industrial electronic devices and safety circuits.

PLC-specific regulations	EN 61131-2 (IEC 1131-2) CSA 22-2, UL 508
Electrical qualities	UL 746L, UL 94
Machine electrical device	EN 60204-1 (IEC 204-1)
Emergency stop device	EN 418
Machine safety – Command system pieces relative to safety	EN 954-1 PR EN 954-2

Service conditions

Service conditions relative to the TSX Micro PLCs apply to the TSX DPZ modules.

Note: The whole of the safety string, the emergency stop PB or PI, the TSX DPZ module, the protective fuses and the command relays must be incorporated into the envelopes with a minimum protection index of IP54, as prescribed in the EN 954-2 standard project.

TELEFAST 2 connection interface links for the Discrete I/O modules

22

At a Glance

Aim of this Chapter

This chapter describes the **TELEFAST 2** interface links for the Discrete input/output modules.

What's in this Chapter?

This Chapter contains the following Sections:

Section	Topic	Page
22.1	Introduction to the TELEFAST 2 connection interfaces for discrete I/O	226
22.2	Connection principles for the TELEFAST 2 interfaces for discrete I/O	237
22.3	The TELEFAST 2 ABE-7H08R10/08R11 and ABE-7H16R10/16R11 connection bases	245
22.4	The TELEFAST 2 ABE-7H12R10/12R11 connection bases	247
22.5	The TELEFAST 2 ABE-7H08R21 and ABE-7H16R20/16R21/16R23 connection bases	249
22.6	The TELEFAST 2 ABE-7H12R20/12R21 connection bases	251
22.7	TELEFAST 2 ABE-7H08S21/16S21 connection bases	253
22.8	TELEFAST 2 ABE-7H12S21 connection base	255
22.9	The TELEFAST 2 ABE-7H16R30/16R31 connection bases	257
22.10	TELEFAST 2 ABE-7H12R50 connection base	259
22.11	TELEFAST 2 ABE-7H16R50 connection base	261
22.12	TELEFAST 2 ABE-7H16F43 connection base	263
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22.14	TELEFAST2 ABE-7R08S111/16S111 connection bases	267
22.15	TELEFAST2 ABE-7R08S210/16S210 connection bases	273
22.16	TELEFAST 2 ABE-7R16S212 connection base	279

Section	Topic	Page
22.17	Connection bases TELEFAST 2 ABE-7S16E2B1/E2E1/E2E0/ E2F0/E2M0	284
22.18	TELEFAST2 ABE-7S16S2BO/S2B2 connection bases	288
22.19	TELEFAST 2 ABE-7S08S2B1connection base	291
22.20	TELEFAST 2 ABE-7S08S2B0 connection base	294
22.21	The TELEFAST2 ABE-7R16T210/P16T210 connection bases	297
22.22	The TELEFAST2 ABE-7R16T212/P16T212 connection bases	299
22.23	TELEFAST 2 ABE-7R16T230 connection base	301
22.24	TELEFAST 2 ABE-7R16T231 connection base	303
22.25	TELEFAST 2 ABE-7R16T214 connection base	305
22.26	TELEFAST 2 ABE-7R16T215 connection base	307
22.27	The TELEFAST2 ABE-7R16T330/P16T330 connection bases	309
22.28	The TELEFAST2 ABE-7R16T332/P16T332 connection bases	311
22.29	TELEFAST 2 ABE-7R16T370 linking base	313
22.30	TELEFAST 2 ABE-7R16T370 linking base	315
22.31	TELEFAST 2 ABE-7R16T318 linking base	317
22.32	The TELEFAST 2 ABE-7P16F310 connection base	319
22.33	TELEFAST 2 ABE-7P16F312 linking base	321
22.34	TELEFAST 2 connection base accessories	323

22.1 Introduction to the TELEFAST 2 connection interfaces for discrete I/O

At a Glance

Aim of this section

This section describes the range of **TELEFAST 2** products which allow the discrete input and output modules to be connected quickly to the operating pieces.

What's in this Section?

This Section contains the following Maps:

Topic	Page
General overview of TELEFAST 2 connection interfaces for discrete I/O modules	227
Catalogue of TELEFAST 2 bases	228
Associating TSX Micro input/output modules and TELEFAST 2 bases	235

General overview of TELEFAST 2 connection interfaces for discrete I/O modules

At a Glance

The **TELEFAST 2** system is a group of products which enable the discrete input and output modules to be connected quickly.
The **TELEFAST 2** system can only be connected to the modules which are fitted with **HE10** connectors and is made up of interface and linking cable bases.
Several base types can be identified:

- interface connection bases for discrete inputs/outputs, 8/12/16 channels;
- interface connection and input adaptation bases, 16 isolated channels;
- interface connection and adaptation of static outputs bases, 8 and 16 channels;
- interface connection and adaptation of relay output bases, 8 and 16 channels;
- 16-channel adapter bases to 2 x 8 channels;
- interface connection and output adaptation bases with or without removable electromagnetic or static relay, 16 channels;
- input bases for 12.5mm-wide static relays.

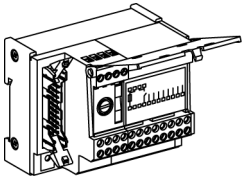
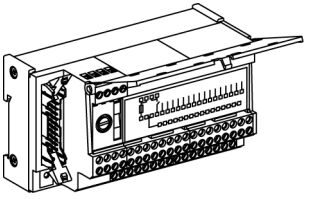
Catalogue of TELEFAST 2 bases

At a Glance

The catalog of **TELEFAST 2** bases for discrete input/output modules is shown here.

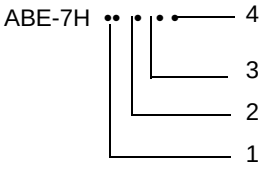
Catalog

The table below shows the catalog of interface connection bases for discrete I/O, 8/12/16 channels.

Base types	**Interface connection bases for discrete I/O, 8/12/16 channels.**						
Reference **ABE-7H••**	**08R10** **08R11** **08R21**	**08S21**	**12R50** **16R50**	**12R10** **12R11** **12R20** **12R21**	**16R10** **16R11** **16R20** **16R21** **16R23** **16R30** **16R31**	**12S21** **16S21**	**16S43** (1) **16F43** (2)
Sub groups	8-channel bases		12 and 16 compact channel bases	12 and 16 channel bases			
Illustration	TELEFAST 2 base 			TELEFAST 2 base 			
Description	-	with 1 sectionner/ channel	-	-		with 1 sectionner /channel	with 1 fuse + 1 sectionner/ channel
Key							
(1)	For inputs.						
(2)	For outputs.						

Illustration

The principle for identifying the interface connection bases for disrete I/S, 8/12/16 channel is as follows:



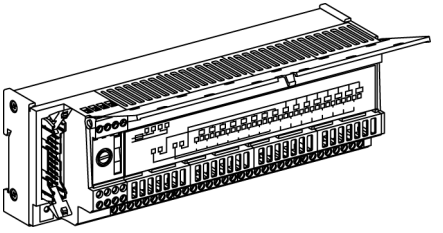
Description

The table below describes the different elements which make it possible to identify the interface connection bases for discrete I/O, 8/12/16 channels.

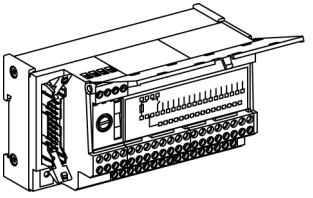
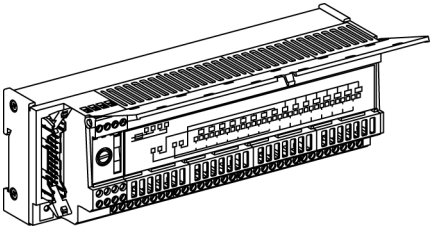
Number	Description
1	**08** = 8-channel base **12** = 12-channel base **16** = 16-channel base
2	Primary function: ● **R** = simple connection; ● **S** = sectionner/channel; ● **F** = fuse/channel.
3	**1** = with 1 screw block terminal on 1 level **2** = with 2 screw block terminals on 2 levels **3** = with 3 screw block terminals on 3 levels **4** = with 2 screw block terminals on 1 level **5** = with 1 screw block terminal on 2 levels
4	**0 or even number** = without display by channel DEL **uneven number** = with display by channel DEL

Catalog

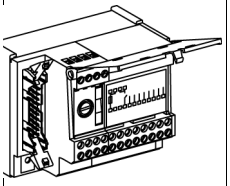
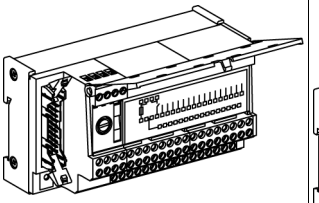
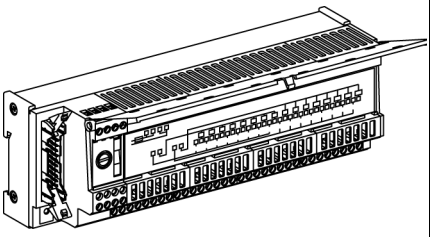
The table below shows the catalog of interface connection bases and input adaptation, 16 isolated channels.

Base types	**Interface connection bases and input adaptation, 16 isolated channels.**				
ABE-7S•• reference	**16E2B1**	**16E2E1**	**16E2E0**	**16E2F0**	**16E2M0**
Illustration	TELEFAST 2 base 				
Description	16 24 VDC inputs	16 48 VDC inputs	16 48 VAC inputs	16 110…120 VAC inputs	16 220…240 VAC inputs

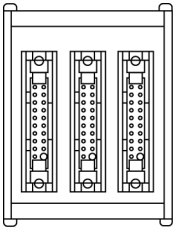
The table below shows the catalog of interface connection bases and adaptation of static outputs, 8 and 16 channels.

Base types	**Interface connection bases and adaptation of static outputs, 8 and 16 channels.**			
ABE-7S•• reference	**08S2B0**	**08S2B1**	**16S2B0**	**16S2B2**
Sub groups	**8-channel bases**		**16-channel bases**	
Illustration	TELEFAST 2 base 	TELEFAST 2 base 		
Description	8 static 24 VDC / 0.5A outputs, with error detection report to PLC.	8 static 24 VDC / 2A outputs, with error detection report to PLC.	16 static 24 VDC / 0.5A outputs, with error detection report to PLC.	16 static 24 VDC / 0.5A outputs, without error detection report to PLC.

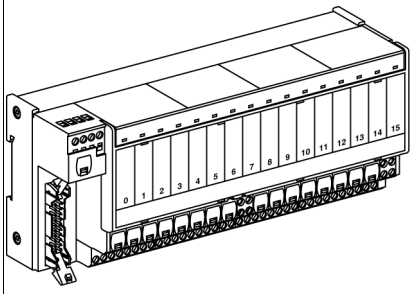
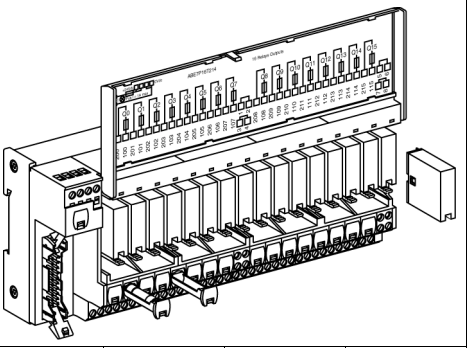
The table below shows the catalog of interface connection bases and adaptation of relay outputs, 8 and 16 channels.

Base types	**Interface connection bases and adaptation of relay outputs, 8 and 16 channels.**				
ABE-7R•• reference	**08S111**	**08S210**	**16S111**	**16S210**	**16S212**
Sub groups	**8-channel bases**		**16-channel bases**		
Illustration	TELEFAST 2 base 	TELEFAST 2 base 		TELEFAST 2 base 	
Description	8 relay outputs, 1 F with polarity + or alternative distribution.	8 relay outputs, 1 F, potential free contact.	16 relay outputs, 1 F, 2 x 8 shared + or alternative.	16 relay outputs, 1 F, potential free contact.	16 relay outputs, 1 F with distribution of the 2 polarities by 8-channel group.

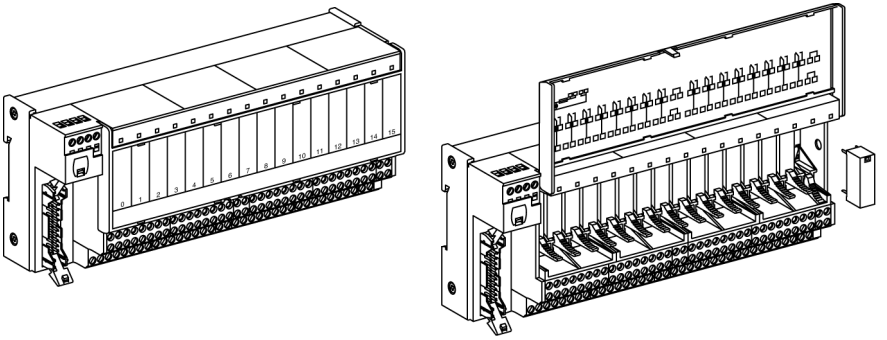
The table below displays the catalog of the 16 channel-adapter base to 2 in 8 channels.

Base types	**16-channel adapter bases to 2 x 8 channels.**
Illustration	TELEFAST 2 base 
ABE-7A•• reference	**CC02**
Description	allows the distribution of: • 16 channels as two x 8 channels; • 12 channels as 8 channels + 4 channels.

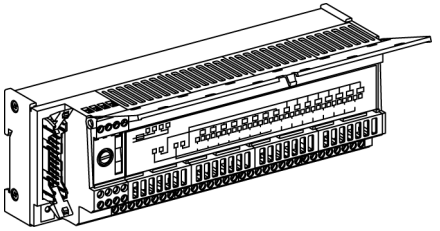
The table below shows the catalog of interface output adaptation bases with or without removable electromagnetic or static relay , 16 channels.

Base types	**Interface output adaptation bases with or without removable electromagnetic or static relay, 16 channels**						
ABE-7•• reference	**R16T210**	**P16T210**	**P16T214**	**R16T212**	**P16T212**	**P16T215**	**P16T318**
Sub groups	**Output bases, 1 F, potential free contact.**			**Output bases, 1 F, distribution of the 2 polarities by 8-channel group.**			**Output base, 1 F, distribution of the 2 polarities by 4-channel group.**
Illustration	TELEFAST 2 base  						
Description	with 10mm-wide electromagnetic relay.	10mm-wide relay, not provided.	10mm-wide relay, not provided + 1 fuse/channel.	with 10mm-wide electromagnetic relay.	10mm-wide relay, not provided.	10mm-wide relay, not provided + 1 fuse/ channel.	without electromagnetic relay, 1 fuse + 1 sectionner/ channel.

The table below shows the catalog of interface output adaptation bases with or without removable electromagnetic or static relay, 16 channels (continued).

Base types	**Interface output adaptation bases with or without removable electromagnetic or static relay, 16 channels (continued).**							
ABE-7•• reference	**R16T230**	**R16T330**	**P16T330**	**P16T334**	**R16T231**	**R16T332**	**P16T332**	**R16T370**
Sub groups	**Output bases, 1 OF, potential free contact.**				**Output bases, 1 OF, shared by 8-channel group.**	**Output bases, 1 OF, distribution of the 2 polarities by 8-channel group.**		**Output bases, 2 OF, potential free contact.**
Illustration	TELEFAST 2 base 							
Description	with 10mm-wide electro-magnetic relay.	with 12.5 mm-wide electro-magnetic relay.	12.5 mm-wide relay, not provided.	12.5 mm-wide relay, not provided + 1 fuse/ channel.	with 10 mm-wide electro-magnetic relay.	with 12.5 mm-wide electro-magnetic relay.	12.5 mm-wide relay, not provided.	with 12.5 mm-wide electro-magnetic relay.

The table below shows the input base catalog for 12.5mm-wide static relays.

Base types	**Input bases for 12.5mm-wide static relays**	
ABE-7P•• reference	**16F310**	**16F312**
Illustration	TELEFAST 2 base 	
Description	potential free.	distribution of the 2 polarities by 8-channel group.

Associating TSX Micro input/output modules and TELEFAST 2 bases

At a Glance

The possibilities for associating I/O discrete modules and **TELEFAST 2** connection bases are introduced here.

Compatibility table

The following table gives a summary of the discrete I/O modules with the **TELEFAST 2**bases.

	Discrete I/O TSX •• modules and modularity					
	DMZ 28DTK		**DMZ 64DTK**		**DEZ 12D2K**	**DSZ 08T2K**
	1 x 16E	**1 x 12S**	**2 x 16E**	**2 x 16S**	**1 x 12E**	**1 x 8S**
Bases TELEFAST 2						
Connection bases						
8 channels						
ABE-7H08R••	Yes (1)	-	Yes (1)	Yes (1)	-	Yes
ABE-7S08S21	Yes (1)	-	Yes (1)	Yes (1)	-	Yes
12 channels						
ABE-7H12R••	-	Yes	-	-	Yes	-
ABE-7H12S21	-	Yes	-	-	Yes	-
16 channels						
ABE-7H16R••	Yes	-	Yes	Yes	-	-
ABE-7H16S21	Yes	-	Yes	Yes	-	-
ABE-7H16R23	Yes	-	Yes	-	-	-
ABE-7H16F43	-	-	-	Yes	-	-
ABE-7H16S43	Yes	-	Yes	-	-	-
Input adaptation bases						
16 channels						
ABE-7S16E2••	Yes	-	Yes	-	-	-
ABE-7P16F3••	Yes	-	Yes	-	-	-
Output adaptation bases						
8 channels						
ABE-7S08S2••	-	-	-	Yes (1)	-	Yes (2)
ABE-7R08S•••	-	-	-	Yes (1)	-	Yes
16 channels						
ABE-7R16S•••	-	Yes (3)	-	Yes	-	-
ABE-7R16T•••	-	Yes (3)	-	Yes	-	-

	Discrete I/O TSX •• modules and modularity					
	DMZ 28DTK		**DMZ 64DTK**		**DEZ 12D2K**	**DSZ 08T2K**
	1 x 16E	**1 x 12S**	**2 x 16E**	**2 x 16S**	**1 x 12E**	**1 x 8S**
Bases TELEFAST 2						
ABE-7P16T•••	-	Yes (3)	-	Yes	-	-
Key						
(1)	With 16 channel adapter with 8 channels twice **ABE-7ACC02**.					
(2)	Except for **ABE-7S08S2B0**.					
(3)	The unused outputs are at state 1.					

22.2 Connection principles for the TELEFAST 2 interfaces for discrete I/O

At a Glance

Aim of this section

This section describes the connection principles for the **TELEFAST 2** products for discrete input/output modules.

What's in this Section?

This Section contains the following Maps:

Topic	Page
Ways of connecting discrete I/O modules: connecting modules to TELEFAST interfaces using an HE10 connector	238
Module/base connection principle	240
Dimensions and mounting of the TELEFAST 2 connection bases	242

Ways of connecting discrete I/O modules: connecting modules to TELEFAST interfaces using an HE10 connector

At a Glance

Connecting discrete input/output modules to **TELEFAST** interfaces for connecting and adapting fast wiring **HE10** connectors, is done with:

- a 28 gage multi-stranded sheathed cable (0.08 mm^2);
- a 22 gage connection cable (0.34 mm^2).

TSX CDP 102/ 202/302 connection cable

The 28 gage connection cable (0.08 mm^2) comes in three different lengths:

- 1 meter length: **TSX CDP 102**;
- 2 meter length: **TSX CDP 202**;
- 3 meter length: **TSX CDP 302**.

This cable is made up of 2 **HE10** connectors and a multi-stranded sheathed ribbon cable, where each wire has a cross-section area of 0.08 mm^2.
Given the small area of each of the wires, you are advised to only use it for low current inputs or outputs (< 100 mA per input or output).

TSX CDP 053/ 103/203/303 /503 connection cable

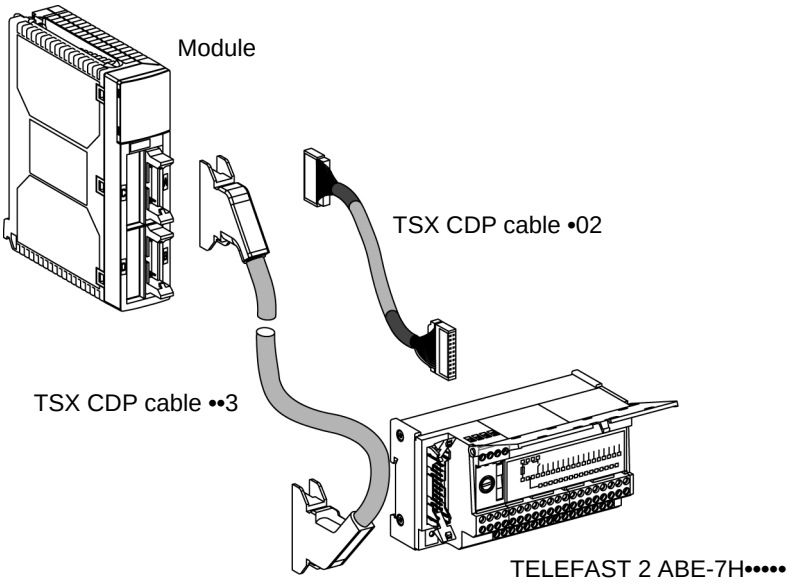
The 22 gage connection cable (0.34 mm^2) comes in five different lengths:

- 0.5 meter length: **TSX CDP 053**;
- 1 meter length: **TSX CDP 103**;
- 2 meter length: **TSX CDP 203**;
- 3 meter length: **TSX CDP 303**;
- 5 meter length: **TSX CDP 503**.

This cable is made up of 2 sheathed **HE10** connectors, and a cable with a cross-section of 0.34 mm^2, which can take higher currents (> 500 mA).

Illustration

The illustration below shows the two types of connection to the **TELEFAST** interface via multi-strand cable or other cable.



Note: The maximum screw-tightening torque for **TSX CDP** • connector cables is 0.5 N.m

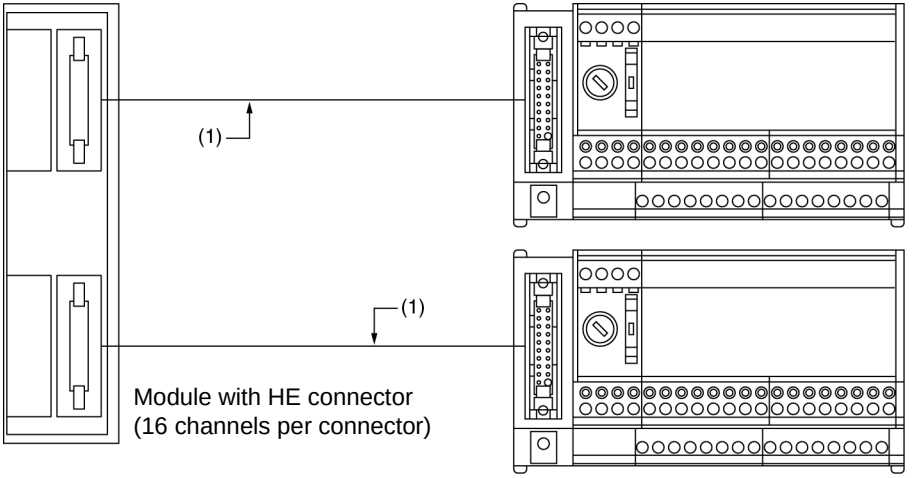
Module/base connection principle

At a Glance

The principle for connecting the discrete input/output module to a **TELEFAST 2** interface is shown here.

Illustration

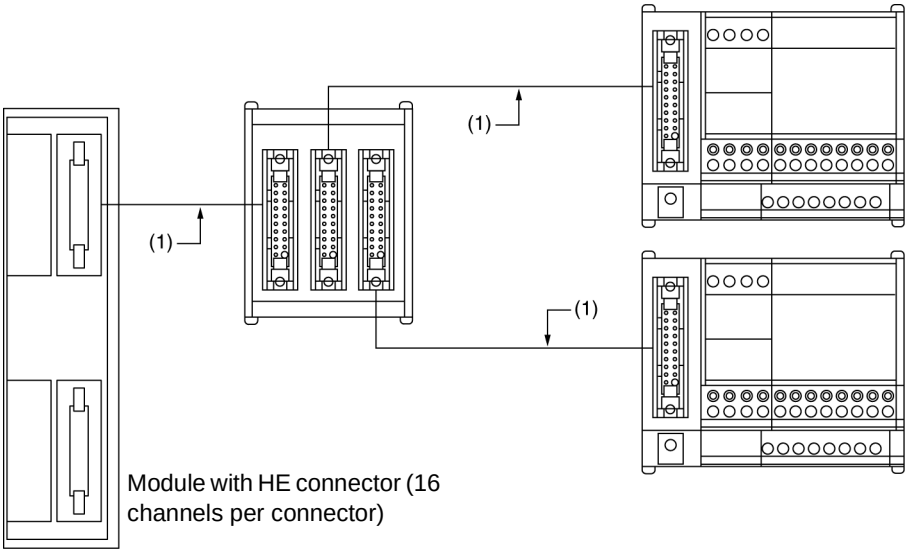
The diagram below shows the connection between a discrete I/O module with an **HE10** connector and a **TELEFAST 2** base.



(1) TSX CDP •02 cable or TSX CDP ••3 cable.

Illustration

The diagram below shows the specific case of connecting 16 channels as 8 channels twice via the **ABE-7ACC02** adapter base.



(1) TSX CDP •02 cable or TSX CDP ••3 cable.

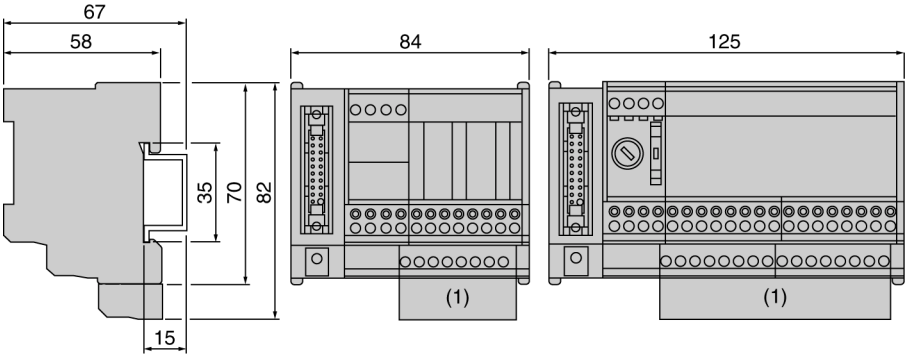
Dimensions and mounting of the TELEFAST 2 connection bases

At a Glance

Here is an overview of the dimensions of different connection **TELEFAST 2** connection products and their mounting modalities.

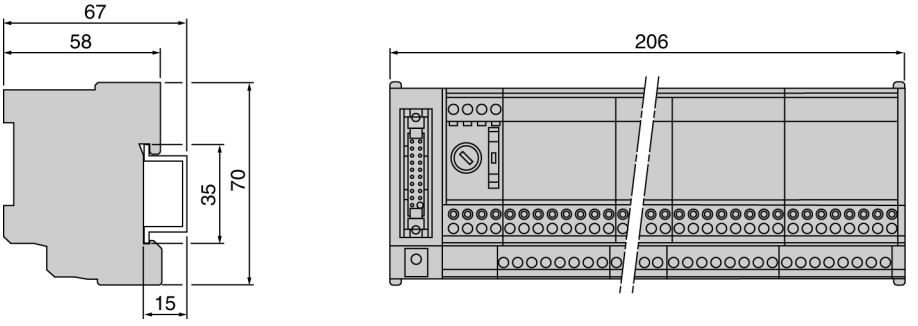
Illustration

The illustration below shows the dimensions of the products: **ABE-7H••R1•, ABE-7H••R5•, ABE-7H••2•, ABE-7H••S21, ABE-7H16R3•, ABE-7S08S2B0, ABE-7R••S1••, ABE-7R08S210**.

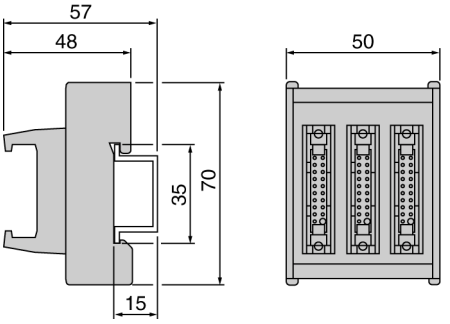


(1) Dimension with additional shunt terminal block ABE-7BV20 or ABE-7BV10.

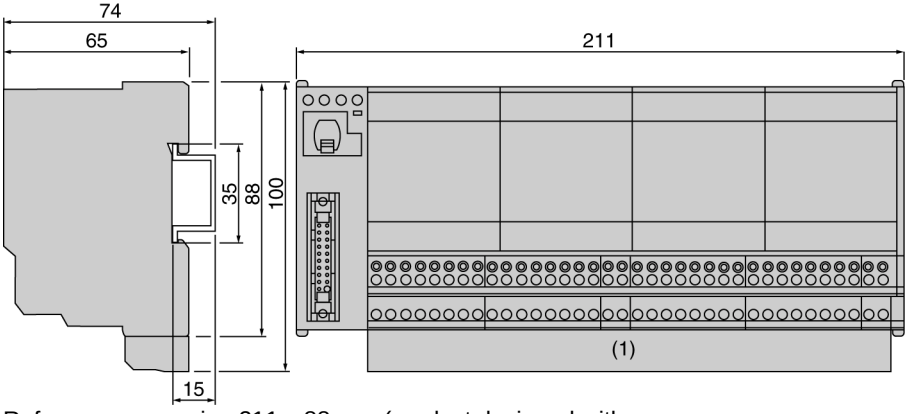
The illustration below shows the dimensions of the products: **ABE-7H16S43, ABE-7S16E2••, ABE-7S08S2B1, ABE-7S16S2B•, ABE-7H16F43•, ABE-7R16S21•**.



The illustration below shows the dimensions of the product **ABE-7ACC02**



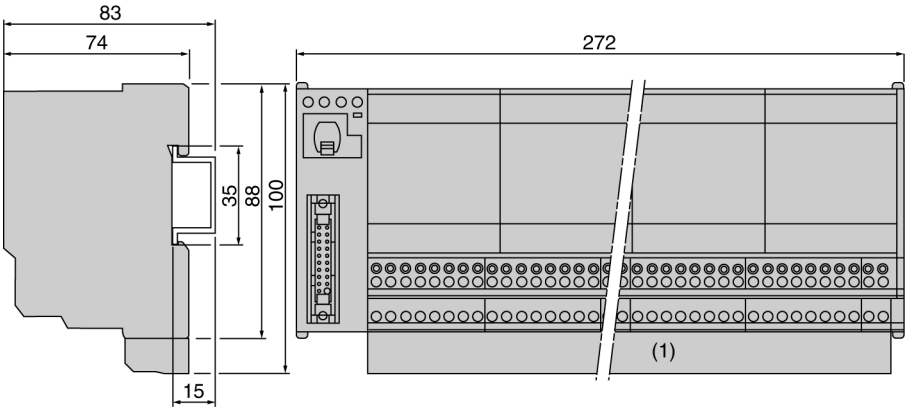
The illustration below shows the dimensions of the products: **ABE-7R16T2••, ABE-7P16T2••**.



Reference measuring 211 x 88 mm (product designed with removable relays and non-mounted screws).

(1) Dimension with additional shunt terminal block ABE-7BV20 or ABE-7BV10.

The illustration below shows the dimensions of the products: **ABE-7R16T3••, ABE-7P16T3••**.



Reference measuring 272 x 88 mm (product designed with removable relays and non-mounted screws).

(1) Dimension with additional shunt terminal block ABE-7BV20 or ABE-7BV10.

Mounting

The **TELEFAST 2** bases are mounted on 35mm-wide DIN mounting rails.

STOP	**WARNING** **General precautions for mounting** The input adaptation bases**ABE-7S16E2E1** and static output bases **ABE-7S••S2B** must be mounted vertically and in a horizontal position. **Failure to observe this precaution can result in severe injury or equipment damage.**

22.3 The TELEFAST 2 ABE-7H08R10/08R11 and ABE-7H16R10/16R11 connection bases

Sensor and pre-actuator connections on the ABE-7H08R10/R11 and ABE-7H16R10/R11 bases

At a Glance

This is an overview of the sensor and pre-actuator connections on **TELEFAST 2** bases.

WARNING

Usage precautions

At manufacture, the bases are equipped with a 2 A fast blow caliber fuse for general use. In order to guarantee an optimum level of protection, this fuse should be calibrated according to the application (connection to input or output functions) and the maximum current allowable in the base.

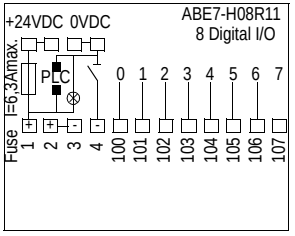
Nature and caliber of fuse to be mounted on the base:

- input functions: 0.5A fast blow;
- output functions:
  - 2A fast blow on the **ABE-7H16R••** base;
  - 6.3A fast blow on the **ABE-7H08R••** base.

Failure to observe this precaution can result in severe injury or equipment damage.

Illustration

Description of the connecting terminal blocks.



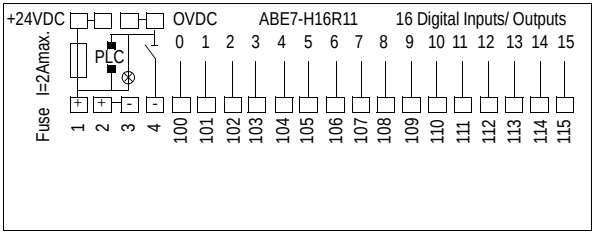
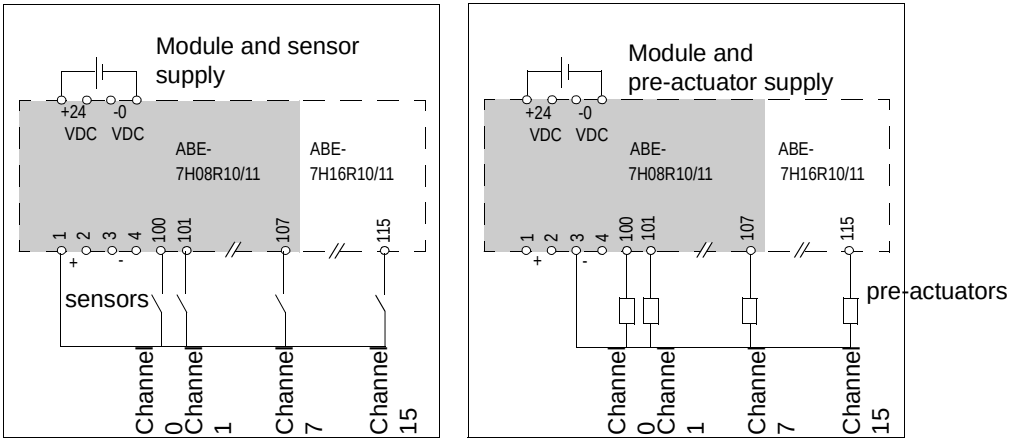


Illustration Connecting input and output functions.



Connecting shared sensors:

- onto terminals 1 or 2: sensors to the '+' of the supply (positive logic inputs).

Connecting shared pre-actuators:

- onto terminals 3 or 4: pre-actuators to the '-' of the supply (positive logic outputs).

22.4 The TELEFAST 2 ABE-7H12R10/12R11 connection bases

Sensor and pre-actuator connections on the ABE-7H12R10/R11 bases

At a Glance

This is an overview of the sensor and pre-actuator connections on **TELEFAST 2** bases.

WARNING

Usage precautions

At manufacture, the bases are equipped with a 6.3 A fast blow caliber fuse for general use. In order to guarantee an optimum level of protection, this fuse should be calibrated according to the application (connection to input or output functions) and the maximum current allowable in the base.

Nature and caliber of fuse to be mounted on the base:

- input functions: 0.5A fast blow;
- output functions: 6.3A fast blow on the **ABE-7H12R••** base.

Failure to observe this precaution can result in severe injury or equipment damage.

Illustration

Description of the connecting terminal blocks.

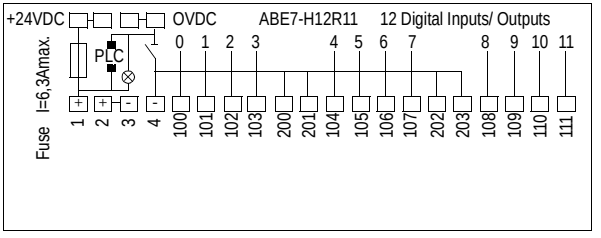
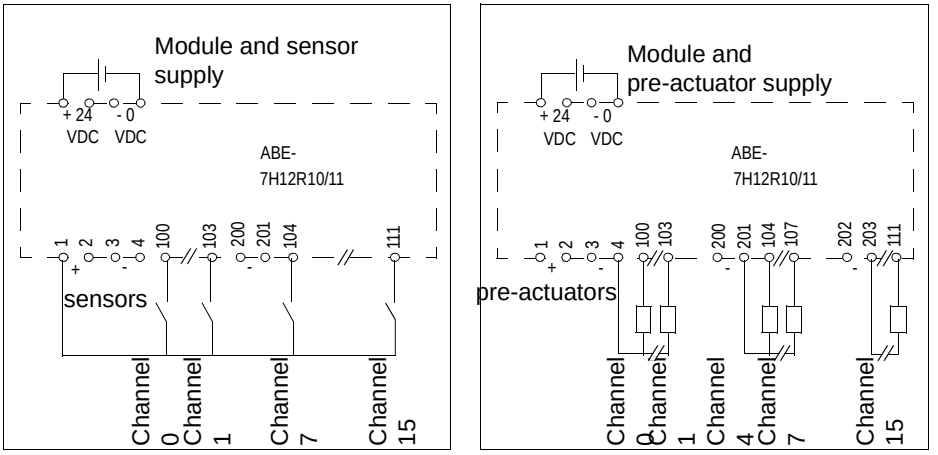


Illustration Connecting input and output functions.



Connecting shared sensors:

- onto terminals 1 or 2: sensors to the '+' of the supply (positive logic inputs).

Connecting shared pre-actuators:

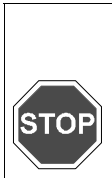
- several terminals linked to the '-' polarity (3, 4, 200, 201, 202, and 203) allowing sharing in groups of 4 or 2 channels (positive logic outputs).

22.5 The TELEFAST 2 ABE-7H08R21 and ABE-7H16R20/16R21/16R23 connection bases

Sensor and pre-actuator connections on the ABE-7H08R21 and ABE-7H16R20/R21/R23 bases for type 2 inputs

At a Glance

This is an overview of the sensor and pre-actuator connections on **TELEFAST 2** bases.



WARNING

Usage precautions

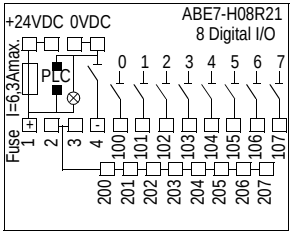
At manufacture, the bases are equipped with a 2 A fast blow caliber fuse for general use. To guarantee an optimum level of protection, this fuse should be calibrated according to the application (connection to input or output functions) and the maximum current allowable in the base. Nature and caliber of fuse to be mounted on the base:

- input functions: 0.5A fast blow;
- output functions:
  - 2A fast blow on the **ABE-7H16R••** base;
  - 6.3A fast blow on the **ABE-7H08R••** base.

Failure to observe this precaution can result in severe injury or equipment damage.

Illustration

Description of the connecting terminal blocks.



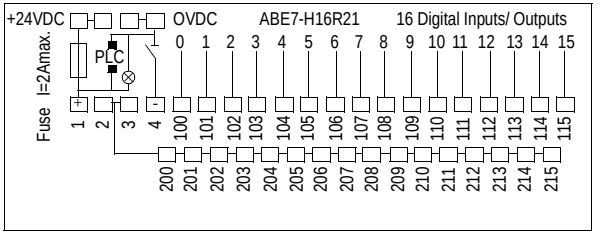
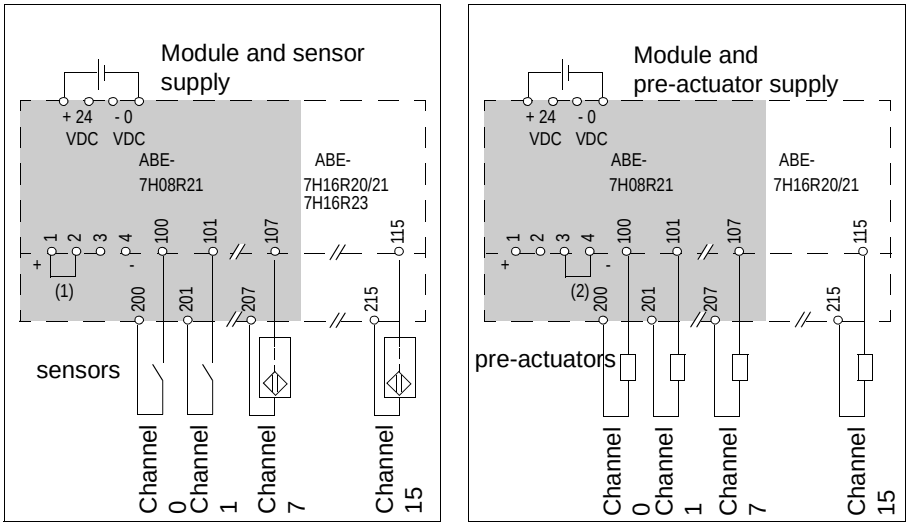


Illustration Connecting input and output functions.



Connecting shared sensors:

- in order to generate the common supply for the sensor, set the jumper wire (1) on terminals 1 and 2: terminal blocks 200 to 215 in "+" of the supply (positive logic inputs).

Shared connection of pre-actuators:

- in order to generate the common supply for the pre-actuators, set the jumper wire (2) on terminals 3 and 4: terminal blocks 200 to 215 will be in "-"of the supply (positive logic outputs).

22.6 The TELEFAST 2 ABE-7H12R20/12R21 connection bases

Sensor and pre-actuator connections on the ABE-7H12R20/R21 bases

At a Glance

This is an overview of the sensor and pre-actuator connections on **TELEFAST 2** bases.

WARNING

Usage precautions

The bases are equipped as standard with a fast blow fuse for general use of 6.3 A caliber. In order to guarantee an optimum level of protection, this fuse should be calibrated according to the application (connection to input or output functions) and the maximum current allowable in the base.

Nature and caliber of fuse to be mounted on the base:

- input functions: 0.5A fast blow;
- output functions: 6.3A fast blow on the **ABE-7H12R••** base.

Failure to observe this precaution can result in severe injury or equipment damage.

Illustration

Description of the connecting terminal blocks.

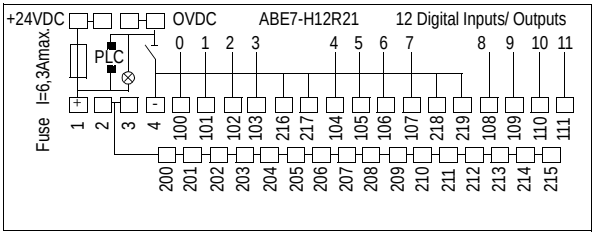
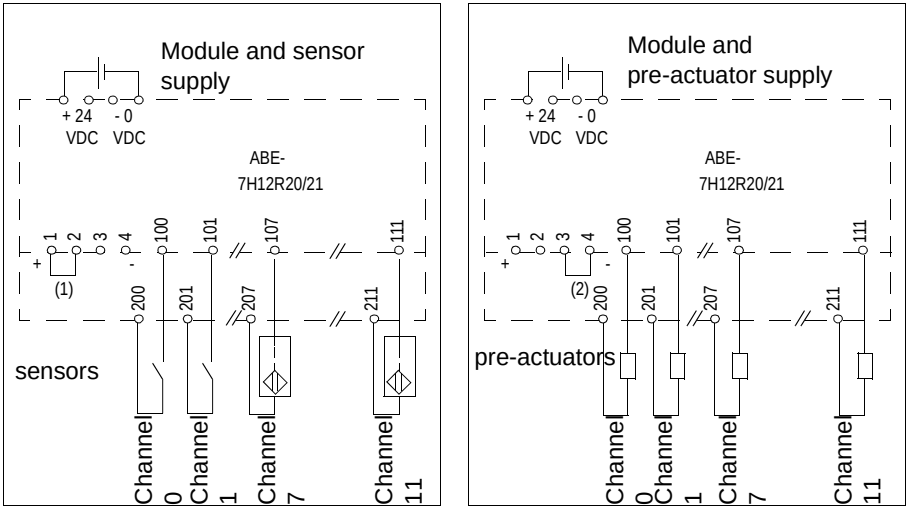


Illustration Connecting input and output functions.



Connecting shared sensors:

- in order to generate the shared sensor supply, set the jumper wire (1) on terminal blocks 1 and 2: terminal blocks 200 to 215 in "+" of the supply (positive logic inputs).

Shared connection of pre-actuators:

- in order to generate the common supply for the pre-actuators, set the jumper wire (2) on terminals 3 and 4: terminals 200 to 215 will be in "-"of the supply (positive logic outputs).

STOP	**WARNING**
	Usage precautions Terminals 216,217, 218 and 219 are linked to the '-' polarity. **Failure to observe this precaution can result in severe injury or equipment damage.**

22.7 TELEFAST 2 ABE-7H08S21/16S21 connection bases

Sensor and pre-actuator connections on ABE-7H08S21/16S21 bases with one sectionner per channel

At a Glance

This is an overview of the sensor and pre-actuator connections on **TELEFAST 2** bases.

WARNING

Usage precautions

The bases are equipped as standard with a fast blow fuse for general use of 2 A caliber. In order to guarantee an optimum level of protection, this fuse should be calibrated according to the application (connection to input or output functions) and the maximum current allowable in the base.

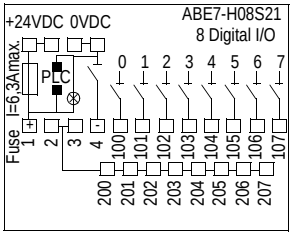
Nature and caliber of fuse to be mounted on the base:

- input functions: 0.5A fast blow;
- output functions:
  - 2A fast blow on the **ABE-7H16S21** base;
  - 6.3 A fast blow on the **ABE-7H08S21** base.

Failure to observe this precaution can result in severe injury or equipment damage.

Illustration

Description of the connecting terminal blocks.



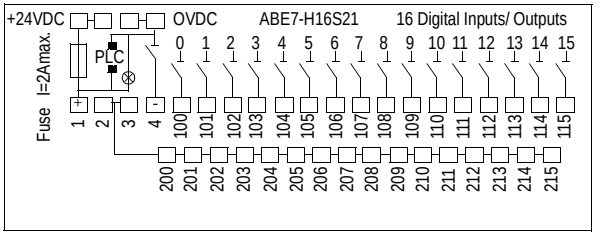
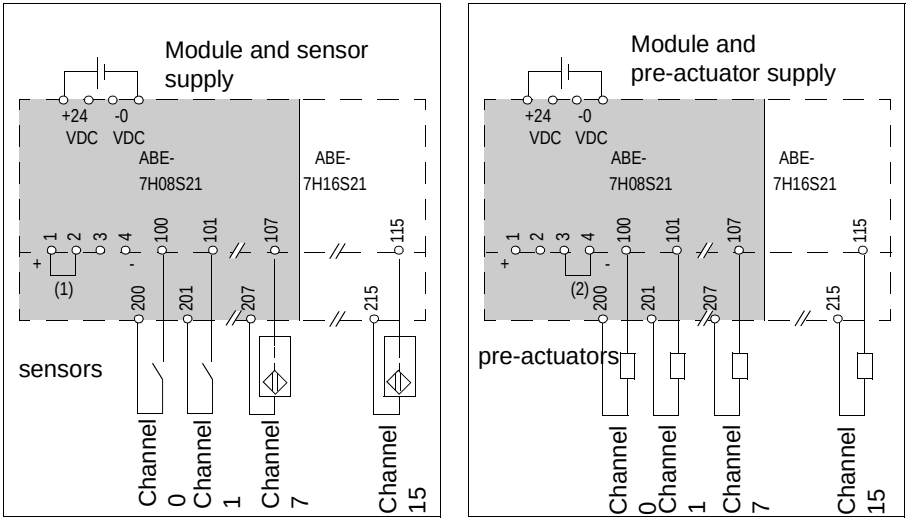


Illustration Connecting input and output functions.



Shared connection of the sensors:

- in order to generate the common supply for the sensors, set the jumper wire (1) on terminals 1 and 2: terminal blocks 200 to 215 in "+" of the supply (positive logic inputs).

Shared connection of the pre-actuators:

- in order to generate the common supply for the pre-actuators, set the jumper wire (2) on terminals 3 and 4: terminal blocks 200 to 215 will be in "-"of the supply (positive logic outputs).

22.8 TELEFAST 2 ABE-7H12S21 connection base

Sensor and pre-actuator connections on the ABE-7H12S21 base

At a Glance

This is an overview of the sensor and pre-actuator connections on the **TELEFAST 2** base.

STOP	**WARNING** **Usage precautions** At manufacture, the base is equipped with a 6.3A fast blow caliber fuse for general use. In order to guarantee an optimum level of protection, this fuse should be calibrated according to the application (connection to input or output functions) and the maximum current allowable in the base. Nature and caliber of fuse to be mounted on the base: • input functions: 0.5A fast blow; • output functions: 6.3A fast blow on the **ABE-7H12S21** base. **Failure to observe this precaution can result in severe injury or equipment damage.**

Illustration

Description of the connecting terminal blocks.

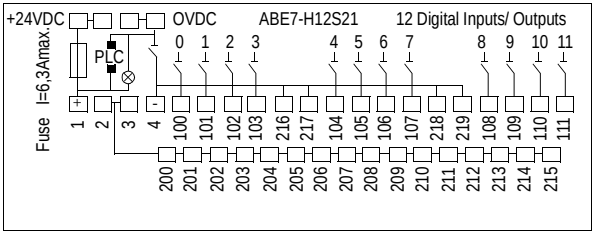
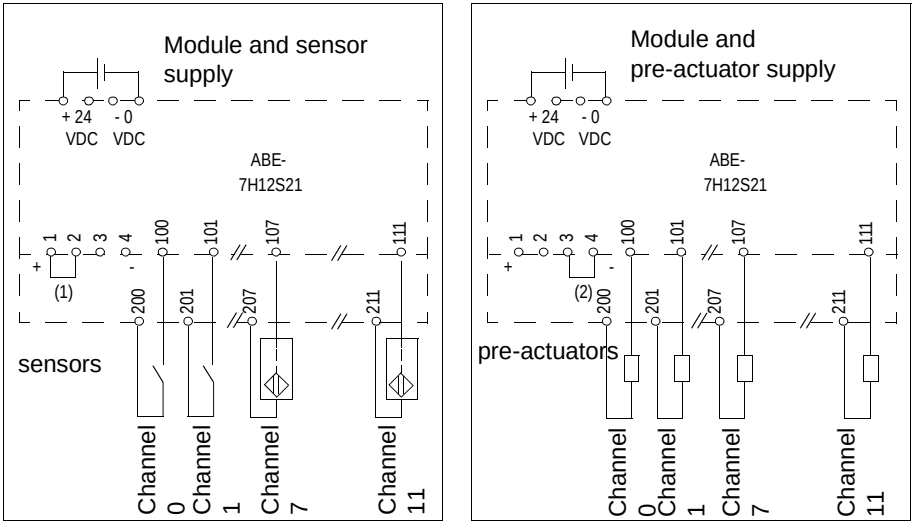


Illustration Connecting input and output functions.



Connecting shared sensors:

- in order to generate the shared sensor supply, set the jumper wire (1) on terminal blocks 1 and 2: terminal blocks 200 to 215 in "+" of the supply (positive logic inputs).

Shared connection of the pre-actuators:

- in order to generate the whole supply of the pre-actuators, set the jumper wire (2) on terminal blocks 3 and 4: terminal blocks 200 to 215 will be in "-"of the supply (positive logic outputs).

STOP	**WARNING**
	Usage precautions
	Terminals 216,217, 218 and 219 are linked to the '-' polarity.
	Failure to observe this precaution can result in severe injury or equipment damage.

22.9 The TELEFAST 2 ABE-7H16R30/16R31 connection bases

Sensor and pre-actuator connections on the ABE-7H16R30/R31 bases

At a Glance

This is an overview of the sensor connections on **TELEFAST 2** bases.

WARNING

Usage precautions

The bases are equipped as standard with a fast blow fuse for general use of 2 A caliber. To ensure optimal protection, this fuse should be calibrated according to the application and the maximum permissible current in the base.

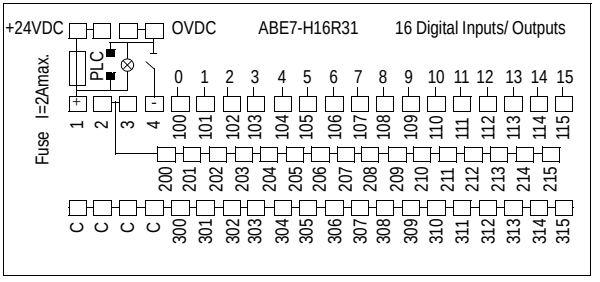
Nature and caliber of fuse to be mounted on the base:

- input functions: 0.5A fast blow.

Failure to observe this precaution can result in severe injury or equipment damage.

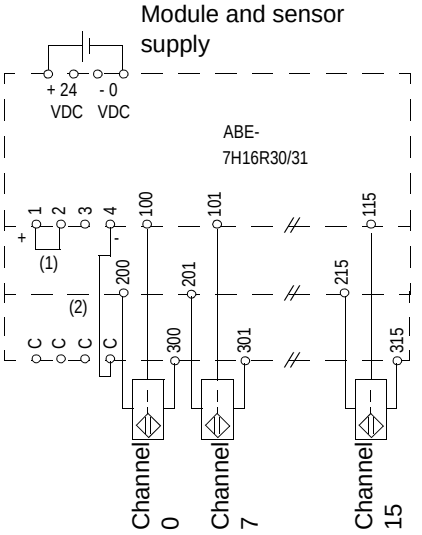
Illustration

Description of the connecting terminal blocks.



Illustration

Input function connections.



Connecting shared sensors:

- to create the shared sensor supply:
  - position the jumper wire (1) on terminals 1 and 2: terminal blocks 200 to 215 will be at the "+" of the supply;
  - link terminal 4 to one of the C terminals of the 3rd level (2): terminal blocks 300 to 315 will be at the "-" of the supply.

22.10 TELEFAST 2 ABE-7H12R50 connection base

Sensor and pre-actuator connections on the ABE-7H12R50 bases

At a Glance

This is an overview of the sensor and pre-actuator connections on the **TELEFAST 2** base.

STOP	**WARNING**
	Usage precautions At manufacture, the base is equipped with a 6.3 A fast blow caliber fuse for general use. In order to guarantee an optimum level of protection, this fuse should be calibrated according to the application (connection to input or output functions) and the maximum current allowable in the base. Nature and caliber of fuse to be mounted on the base: • input functions: 0.5A fast blow; • output functions: 6.3A fast blow on the **ABE-7H12R50** base. **Failure to observe this precaution can result in severe injury or equipment damage.**

Illustration

Description of the connecting terminal blocks.

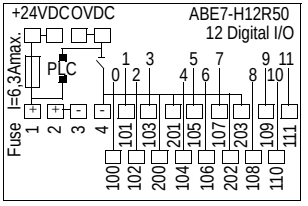
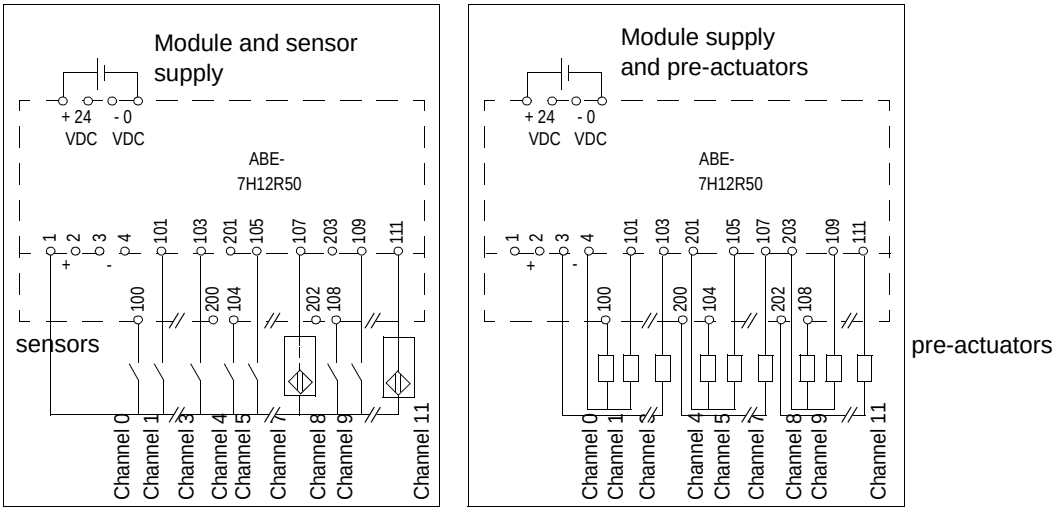


Illustration Connecting input and output functions.



Connecting shared sensors:

- onto terminals 1 or 2: sensors to the '+' of the supply (positive logic inputs).

WARNING

Usage precautions

Terminals 200, 201, 202 and 203 are linked to the '-' polarity.
Shared connection of the pre-actuators:

- several terminals linked to the '-' polarity (3, 4, 202, 202, and 203) allowing sharing in groups of 4 or 2 channels (positive logic outputs).

Failure to observe this precaution can result in severe injury or equipment damage.

22.11 TELEFAST 2 ABE-7H16R50 connection base

Sensor and pre-actuator connections on the ABE-7H16R50 base

At a Glance

This is an overview of the sensor and pre-actuator connections on the **TELEFAST 2** base.

STOP	**WARNING**
	Usage precautions At manufacture, the base is equipped with a 6.3 A fast blow caliber fuse for general use. In order to guarantee an optimum level of protection, this fuse should be calibrated according to the application (connection to input or output functions) and the maximum current allowable in the base. Nature and caliber of fuse to be mounted on the base: • input functions: 0.5A fast blow; • output functions: 2A fast blow on the **ABE-7H16R50** base. **Failure to observe this precaution can result in severe injury or equipment damage.**

Illustration

Description of the connecting terminal blocks.

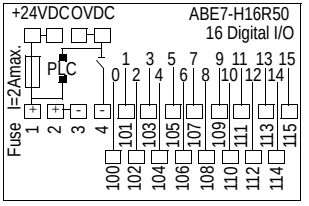
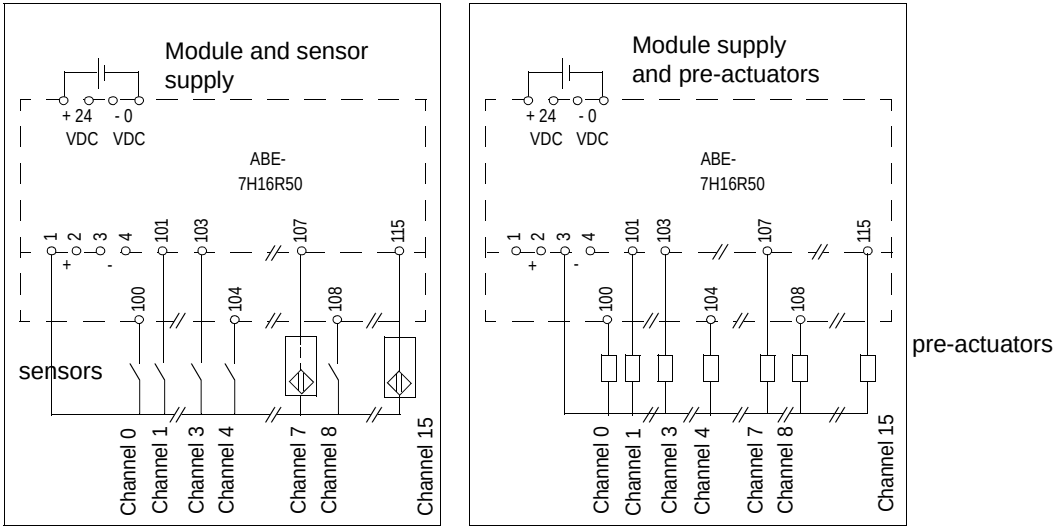


Illustration Connecting input and output functions.



Connecting shared sensors:

- onto terminals 1 or 2: sensors to the '+' of the supply (positive logic inputs).

Shared connection of the pre-actuators:

- onto terminals 3 or 4: pre-actuators to the '-' of the supply (positive logic outputs).

22.12 TELEFAST 2 ABE-7H16F43 connection base

Pre-actuator connections on ABE-7H16F43 output base with one fuse and one sectionner per channel

At a Glance This is an overview of the pre-actuator connections on **TELEFAST 2** bases.

Illustration Description of the connecting terminal blocks.

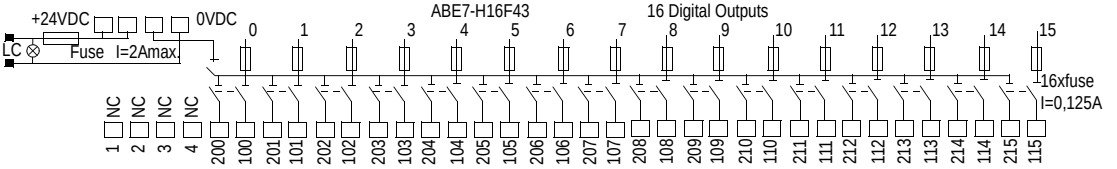
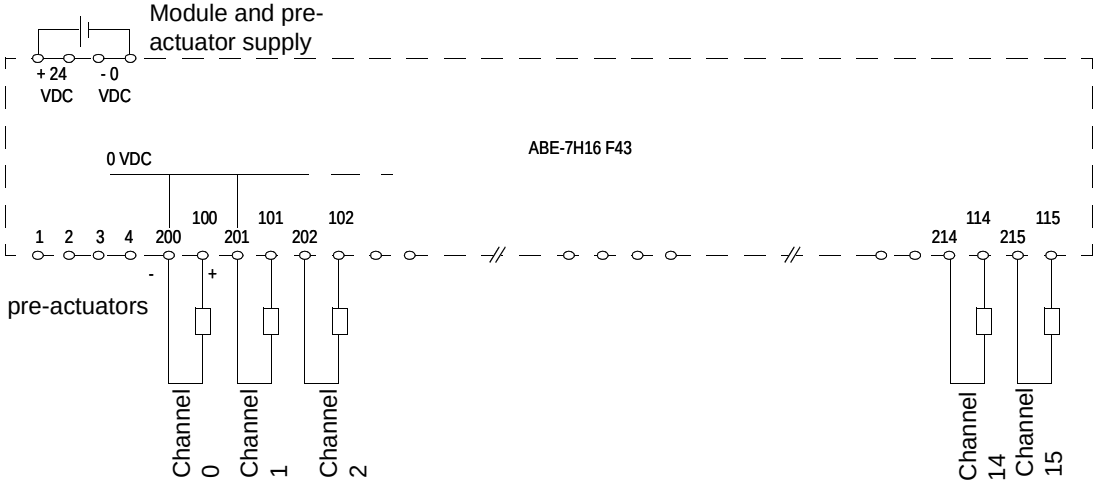


Illustration Output connection functions.



Functionality via channel:

- 0.125 A fuse original position;
- sectionner cuts simultaneously the '-' and the channel signal.

WARNING

Usage precautions

The base is originally equipped with a 2 A fast blow caliber fuse for general use.
Terminals 200..215 are connected to the '-' polarity of the supply.

Failure to observe this precaution can result in severe injury or equipment damage.

22.13 TELEFAST 2 ABE-7H16S43 connection base

Sensor connections on ABE-7H16S43 output base with one fuse and one sectionner per channel

At a Glance This is an overview of the sensor connections on **TELEFAST 2** bases.

Illustration Description of the connecting terminal blocks.

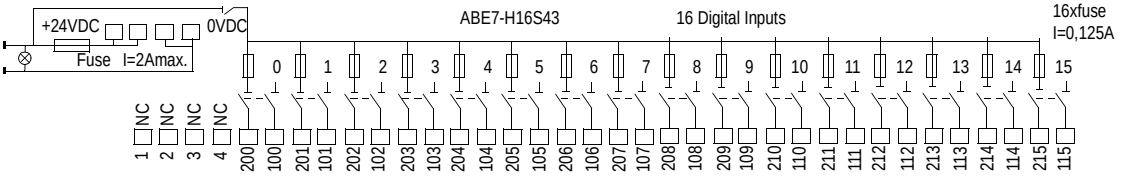
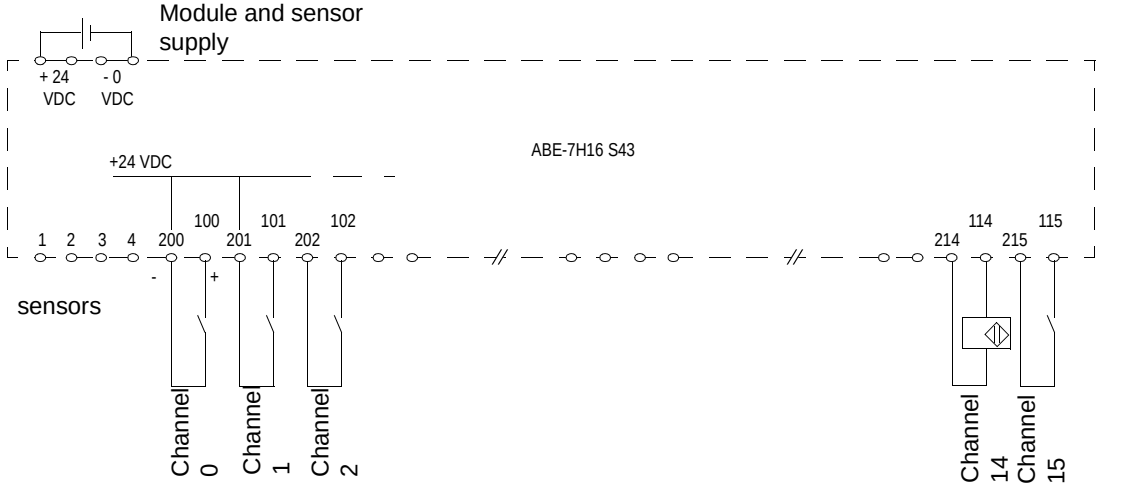


Illustration Input function connections.



Functionality via channel:

- 0.125 A fuse original position;
- sectionner cuts simultaneously the '+' and the channel signal.

WARNING

Usage precautions

The base is originally equipped with a 2 A fast blow caliber fuse for general use.
Terminals 200..215 are connected to the '+' polarity of the supply.

Failure to observe this precaution can result in severe injury or equipment damage.

22.14 TELEFAST2 ABE-7R08S111/16S111 connection bases

At a Glance

Aim of this section

This section introduces the **TELEFAST 2 ABE-7R08S111/16S111** connection bases.

What's in this Section?

This Section contains the following Maps:

Topic	Page
Pre-actuator connections on non removable relay output adaptation bases ABE-7R08S111/16S111.	268
Characteristics of non removable relay output adaptation bases ABE-7R08S111/16S111.	271

Pre-actuator connections on non removable relay output adaptation bases ABE-7R08S111/16S111.

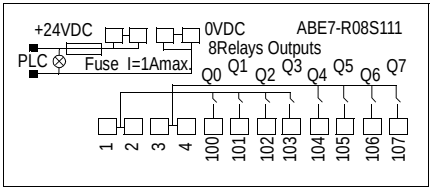
At a Glance

This is a description of the pre-actuator connections with:

- base **TELEFAST 2 ABE-7R08S111**, 8 relay outputs, 1 F twice , four common DC or AC currents;
- base **TELEFAST 2 ABE-7R16S111**, 16 relay outputs, 1 F twice , eight common DC or AC currents.

Illustration

Description of the connecting terminal blocks.



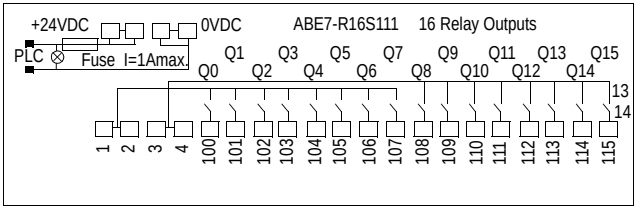
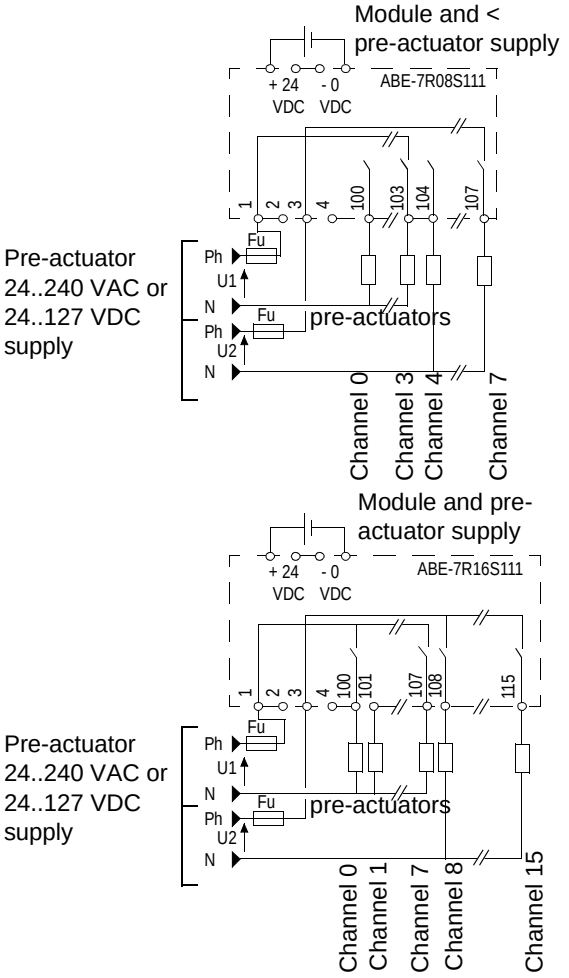


Illustration Output connection functions.



Fu Fuse caliber according to the load.

WARNING

Usage precautions

The bases are originally equipped with a fuse for general use of 1 A rapid fusion caliber.

Protection of relay contacts:

- each pre-actuator from a protection circuit must be mounted on the posts:
  - RC or MOV circuit on an alternating current;
  - discharge diode on direct current.

Failure to observe this precaution can result in severe injury or equipment damage.

Characteristics of non removable relay output adaptation bases ABE-7R08S111/16S111.

At a Glance

This section describes the general characteristics of bases **TELEFAST 2 ABE-7R08S111/16S111**.

General characteristics

This table describes the general characteristics of bases **ABE-7R08S111/16S111**

Base types			**ABE-7R08S111**	**ABE-7R16S111**
Channel number			8	16
Contact characterisitics				
Job limit voltage		Alternating	250 V	
		Direct	30 V	
Thermal current			3 A	
Alternating current load	Resistive, load AC12	Voltage	230 VAC	
		Current (1)	0.6 A	
	Inductive, load AC15	Voltage	230 VAC	
		Current (1)	0.4 A	
Direct current load	Resistive, load DC12	Voltage	24 VDC	
		Current (1)	0.6 A	
	Inductive, load DC13 (2)	Voltage	24 VDC	
		Current (1)	0.2 A	
Minimum switching		Current	1 mA	
		Voltage	5 V	
Response time		State 0 to 1	10 ms	
		State 1 to 0	6 ms	
Maximum speed of function loading			0.5 Hz	
Built-in protection measures	Against overloads and short-circuits:		None, provide one rapid fusion fuse per channel or group of channels.	
	Against alternating current inductive overcharging		None, each RC circuit or MOV (ZNO) suppressor, must be mounted on the posts of each pre-actuator appropriate to the voltage.	
	Against direct current inductive overcharging		none, each discharge diode must be mounted on the posts of each pre-actuator.	
Voltage assigned to insulation		Coil/contact	300 V	

Base types		**ABE-7R08S111**	**ABE-7R16S111**
Voltage assigned to shock resistance (1.2/50)	Coil/contact	2.5 kV	
Key			
(1)	For 0.5 x 10^6 maneuvers.		
(2)	L/R = 10 ms.		

22.15 TELEFAST2 ABE-7R08S210/16S210 connection bases

At a Glance

Aim of this section

This section introduces the **TELEFAST 2 ABE-7R08S210/16S210** connection bases.

What's in this Section?

This Section contains the following Maps:

Topic	Page
Pre-actuator connections on non removable relay output adaptation bases ABE-7R08S210/16S210.	274
Characteristics of non removable relay output adaptation bases ABE-7R08S210/16S210.	277

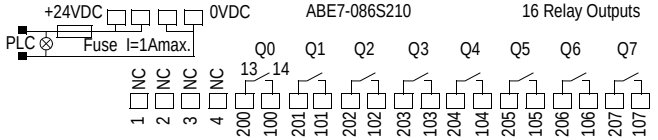
Pre-actuator connections on non removable relay output adaptation bases ABE-7R08S210/16S210.

At a Glance

The pre-actuator connections are described here on **TELEFAST 1 ABE-7R16T370** bases, 8 or 16 relay outputs, 1 OF, potential free contact.

Illustration

Description of the connecting terminal blocks.



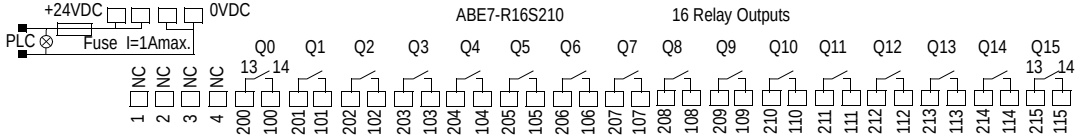
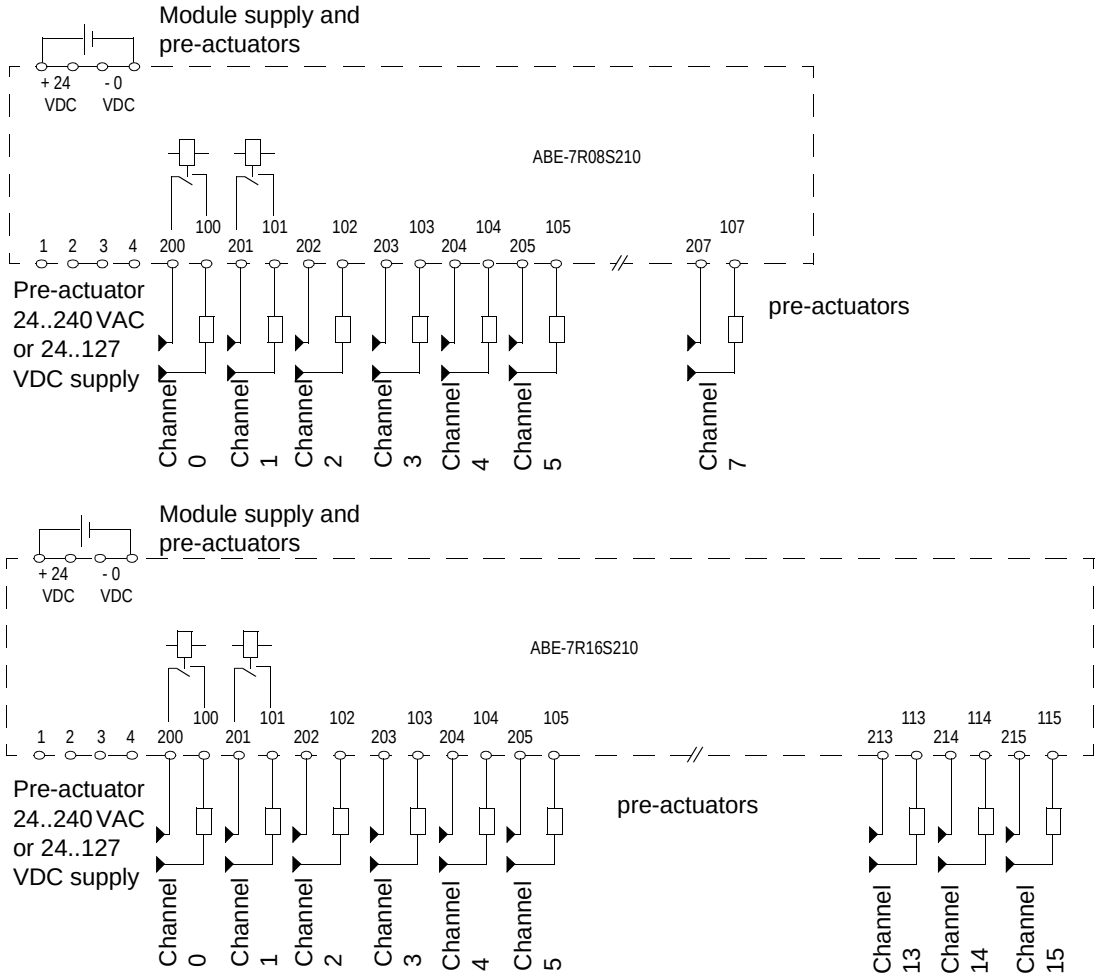


Illustration Output connection functions.



WARNING

Usage precautions

The bases are originally equipped with a fuse for general use of 1 A rapid fusion caliber.

Protection of relay contacts:

- each pre-actuator from a protection circuit must be mounted on the posts:
  - RC or MOV circuit on an alternating current;
  - discharge diode on direct current.

Provide one protection fuse per pre-actuator or per group if supplied from the same voltage.

Failure to observe this precaution can result in severe injury or equipment damage.

Characteristics of non removable relay output adaptation bases ABE-7R08S210/16S210.

At a Glance

This section describes the general characteristics of bases **TELEFAST 2 ABE-7R08S210/16S210**.

General characteristics

This table describes the general characteristics of bases **ABE-7R08S210/16S210**

Base types			**ABE-7R08S210**	**ABE-7R16S210**
Channel number			8	16
Contact characteristics				
Job limit voltage		Alternating	250 V	
		Direct	125 V	
Thermal current			5 A	
Alternating current load	Resistive, load AC12	Voltage	230 VAC	
		Current (1)	1,5 A	
	Inductive, load AC15	Voltage	230 VAC	
		Current (1)	0.9 A	
Direct current load	Resistive, load DC12	Voltage	24 VDC	
		Current (1)	1.5 A	
	Inductive, load DC13 (2)	Voltage	24 VDC	
		Current (1)	0.6 A	
Minimum switching		Current	10 mA	
		Voltage	5 V	
Response time		State 0 to 1	10 ms	
		State 1 to 0	5 ms	
Maximum speed of function loading			0.5 Hz	
Built-in protection measures	Against overloads and short-circuits:		None, provide one rapid fusion fuse per channel or group of channels.	
	Against alternating current inductive overcharging		None, each RC circuit or MOV (ZNO) suppressor, must be mounted on the posts of each pre-actuator appropriate to the voltage.	
	Against direct current inductive overcharging		None, each discharge diode must be mounted on the posts of each pre-actuator.	
Voltage assigned to insulation		Coil/contact	300 V	

Base types		**ABE-7R08S210**	**ABE-7R16S210**
Voltage assigned to shock resistance (1.2/50)	Coil/contact	2.5 kV	
Key			
(1)	For 0.5 x 10^6 maneuvers.		
(2)	L/R = 10 ms.		

22.16 TELEFAST 2 ABE-7R16S212 connection base

At a Glance

Aim of this section

This section describes the connection base **TELEFAST 2 ABE-7R16S212**.

What's in this Section?

This Section contains the following Maps:

Topic	Page
Pre-actuator connections on non removable relay output adaptation bases ABE-7R16s212.	280
Characteristics of non removable relay output adaptation bases ABE-7R16s212.	282

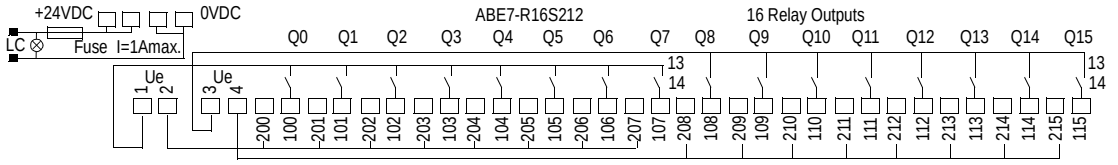
Pre-actuator connections on non removable relay output adaptation bases ABE-7R16s212.

At a Glance

The pre-actuator connections are described here for base **TELEFAST 2 ABE-7R16S212**, 16 relay outputs, 1F, with distribution of the polarities by 8 channel group.

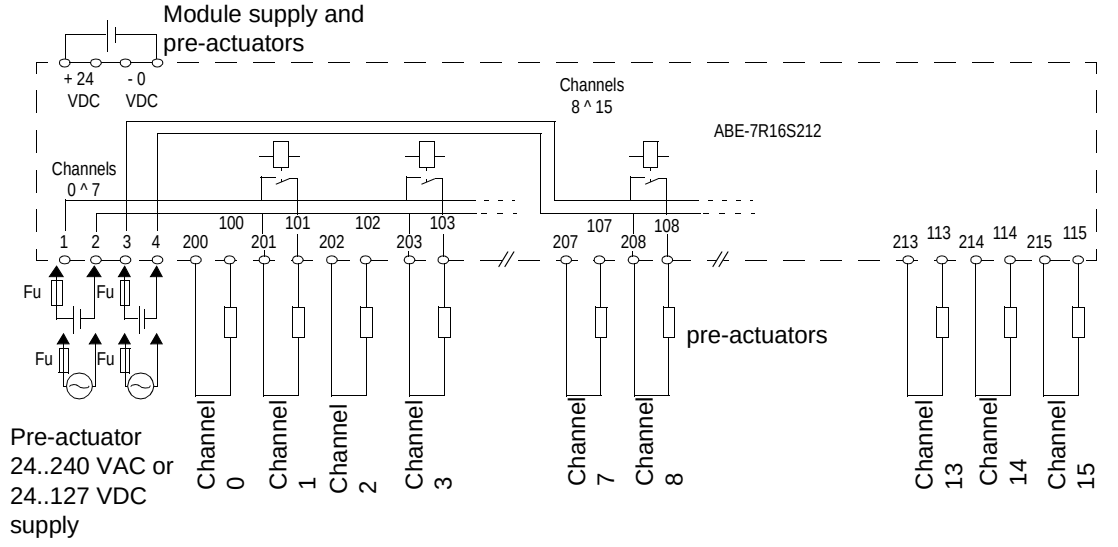
Illustration

Description of the connecting terminal blocks.



Illustration

Output connection functions.



Fu Fuse caliber according to the load.

WARNING

Usage precautions

The base is originally equipped with a 1 A fast blow caliber fuse for general use.

Protection of relay contacts:

- each protection circuit must be mounted on the posts of each pre-actuator:
  - RC or MOV circuit on an alternating current;
  - discharge diode on direct current.

Failure to observe this precaution can result in severe injury or equipment damage.

Characteristics of non removable relay output adaptation bases ABE-7R16s212.

At a Glance

This section describes the general characteristics of base **TELEFAST 2 ABE-7R16S212**.

General characteristics

This table describes the general characteristics of base **ABE-7R16S212**

Base types			**ABE-7R16S212**
Channel number			16
Contact characteristics			
Job limit voltage		Alternating	250 V
		Direct	125 V
Thermal current			5 A
Alternating current load	Resistive, load AC12	Voltage	230 VAC
		Current (1)	1.5 A
	Inductive, load AC15	Voltage	230 VAC
		Current (1)	0.9 A
Direct current load	Resistive, load DC12	Voltage	24 VDC
		Current (1)	1.5 A
	Inductive, load DC13 (2)	Voltage	24 VDC
		Current (1)	0,6 A
Minimum switching		Current	10 mA
		Voltage	5 V
Response time		State 0 to 1	10 ms
		State 1 to 0	5 ms
Maximum speed of function loading			0.5 Hz
Built-in protection measures	Against overloads and short-circuits		None, provide one rapid fusion fuse per channel or group of channels.
	Against alternating current inductive overcharging		None, each RC circuit or MOV (ZNO) suppressor, must be mounted on the posts of each pre-actuator appropriate to the voltage.
	Against direct current inductive overcharging		None, each discharge diode must be mounted on the posts of each pre-actuator.
Voltage assigned to insulation		Coil/contact	300 V
Voltage assigned to shock resistance (1.2/50)		Coil/contact	2.5 kV

Base types	**ABE-7R16S212**
Key	
(1)	For 0.5 x 10^6 maneuvers.
(2)	L/R = 10 ms.

22.17 Connection bases TELEFAST 2 ABE-7S16E2B1/E2E1/E2E0/E2F0/E2M0

At a Glance

Aim of this section

This section introduces the **TELEFAST 2 ABE-7 S16E2B1/E2E1/E2E0/E2F0/E2M0** connection bases.

What's in this Section?

This Section contains the following Maps:

Topic	Page
Sensor connections on non removable static relay input adaptation bases ABE-7S16E2B1/E2E1/E2E0/E2F0/E2M0	285
Characterisitics of non removable static relay input adaptation bases ABE-7S16E2B1/E2E1/E2E0/E2F0/E2M0	287

Sensor connections on non removable static relay input adaptation bases ABE-7S16E2B1/E2E1/E2E0/E2F0/E2M0

At a Glance This is an overview of the sensor connections on **TELEFAST 2** bases.

Illustration Description of the connecting terminal blocks.

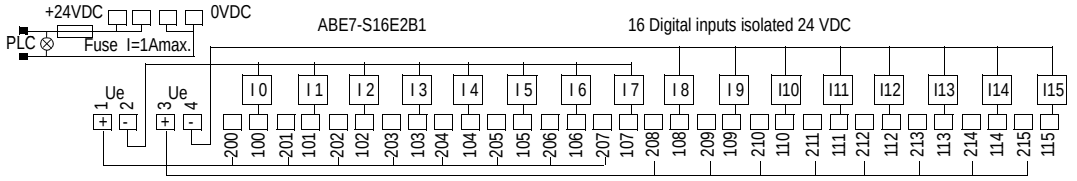
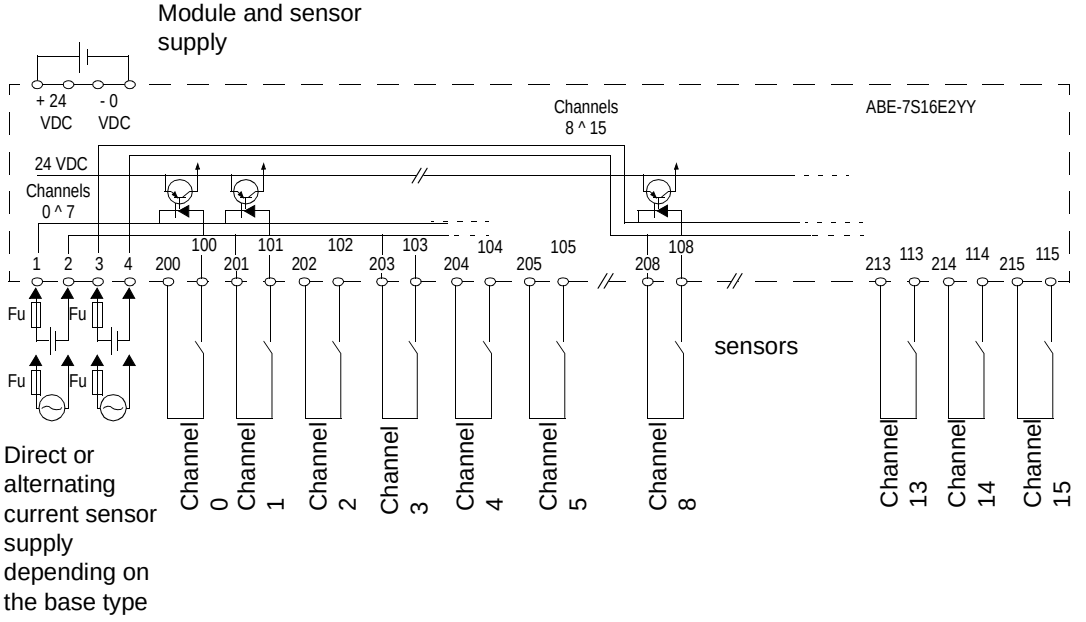


Illustration Input function connections.



Fu Fuse caliber according to the load.

WARNING

Usage precautions

The bases are originally equipped with a fuse for general use of 1 A rapid fusion caliber.
Input protection:

- by 2 A rapid fusion fuse.

Failure to observe this precaution can result in severe injury or equipment damage.

Characterisitics of non removable static relay input adaptation bases ABE-7S16E2B1/E2E1/E2E0/E2F0/E2M0

At a Glance

This section describes the general characteristics of bases **TELEFAST 2 ABE-7S16E2B1/E2E1/E2E0/E2F0/E2M0**.

General characteristics

This table describes the general characteristics of bases **ABE-7S16E2B1/E2E1/E2E0/E2F0/E2M0**

Base types			**ABE-7S16E2B1**	**ABE-7S16E2E1**	**ABE-7S16E2E0**	**ABE-7S16E2F0**	**ABE-7S16E2M0**
Channel number			16				
Command circuit characteristics (1)							
Nominal values		Voltage	24 VDC	48 VDC	48 VAC	110..130 VAC	230..240 VAC
		Current	12 mA	13 mA	12 mA	8.3 mA	8 mA
		Speed	-	-	50/60 Hz		
Input threshold	In state 1	Voltage	>= 13.7 V	>= 30 V	>= 32 V	>= 79 V	>= 164 V
		Current (1)	>= 5 mA	>= 6 mA	>= 5 mA		>= 4.5 mA
	In state 0	Voltage	<= 5 V	<= 10 V		<= 30 V	<= 40 V
		Current (1)	<= 2 mA		<= 1.5 mA	<= 2 mA	
	Speed		-	-	47/63 Hz		
	Sensor supply (ripple included)		19..30 V	38,4..60 V	38,4..53 V	96..143 V	184..264 V
Compliance with IEC 1131-2			type 1	type 2	type 1		
Response time		State 0 to 1	0.05 ms		20 ms		
		State 1 to 0	0.4ms		20 ms		
Maximum switching speed			1000 Hz		25 Hz		
Voltage assigned to insulation		Input/output	300 V				
Voltage assigned to shock resistance (1.2/50)		Input/output	2.5 kV				
Key							
(1)	Operating piece inputs.						

22.18 TELEFAST2 ABE-7S16S2BO/S2B2 connection bases

At a Glance

Aim of this section

This section introduces the **TELEFAST 2 ABE-7S16S2B0/S2B2** connection bases.

What's in this Section?

This Section contains the following Maps:

Topic	Page
Pre-actuator connections on ABE-7S16S2B0/S2B2 static output adaptation bases	289
Characteristics of static output adaptation bases ABE-7S16S2B0/S2B2	290

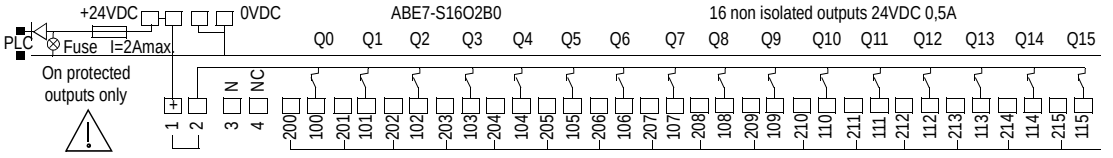
Pre-actuator connections on ABE-7S16S2B0/S2B2 static output adaptation bases

At a Glance

This is an overview of pre-actuator connections on the **TELEFAST 2 ABE-7S16S2B0/S2B2** bases, 16 static outputs, 24 VDC, 0.5 A.

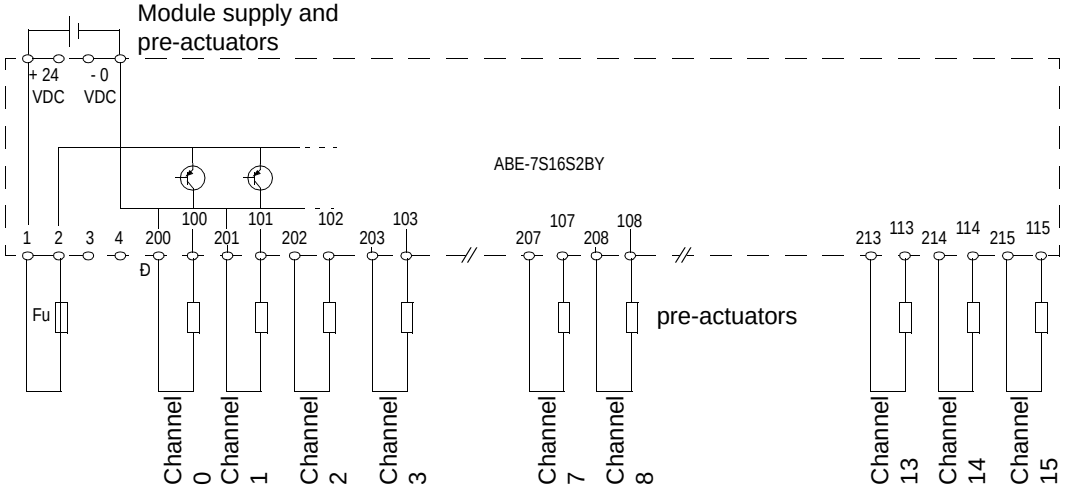
Illustration

Description of the connection terminals.



Illustration

Output function connections.



Fu Fuse caliber according to the load.

STOP	**WARNING**
	Usage precautions The bases are equipped as standard with a fuse for general use with 2 A fast blow caliber. **Failure to observe this precaution can result in severe injury or equipment damage.**

Characteristics of static output adaptation bases ABE-7S16S2B0/S2B2

At a Glance

This section describes the general characteristics of bases **TELEFAST 2 ABE-7S16S2B0/S2B2**.

General characteristics

This table describes the general characteristics of bases **ABE-7S16S2B0/S2B2**

Base types			**ABE-7S16S2B0**	**ABE-7S16S2B2**
Channel number			16	
Output circuit characteristics				
Direct current load	Resistive, load DC12	Voltage	24 VDC	
		Current	0.5 A	
	Inductive, load DC13	Voltage	24 VDC	
		Current	0.25 A	
	Filament lamp		10 W	
Thresholds		Voltage	19..30 VDC	
Leakage current at state 0			<= 0.3 mA	
Breakdown voltage at state 1			<= 0.6 V	
Minimum current through channel			1 mA	
Response time		State 0 to 1	0,1 ms	
		State 1 to 0	0.02 ms	
Built-in protection measures	Against overloads and short-circuits		Yes by current limiter and disjunctioner Id >0.75 A.	
	Against inductive voltage overflow		Yes by integrated breakdown diode.	
	Against polarity inversions		Yes by suppressor	
Switching frequency on inductive load			< 0.6 LI^2	
Error detection report			Yes	No
Voltage assigned to insulation		Input/output	300 V	
Voltage assigned to shock resistance (1.2/50)		Input/output	2.5 kV	

22.19 TELEFAST 2 ABE-7S08S2B1connection base

At a Glance

Aim of this section

This section describes the connection base **TELEFAST 2 ABE-7S08S2B1**.

What's in this Section?

This Section contains the following Maps:

Topic	Page
Pre-actuator connections on ABE-7S08S2B1 static output adaptation base	292
Characteristics of ABE-7S08S2B1 static output adaptation bases	293

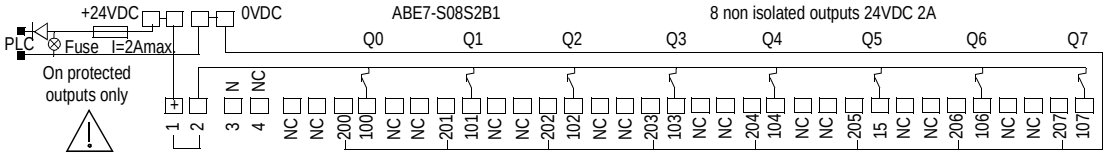
Pre-actuator connections on ABE-7S08S2B1 static output adaptation base

At a Glance

This is an overview of the pre-actuator connections on the **TELEFAST 2 ABE-7S08S2B1** bases, 8 static outputs, 24 VDC, 2 A.

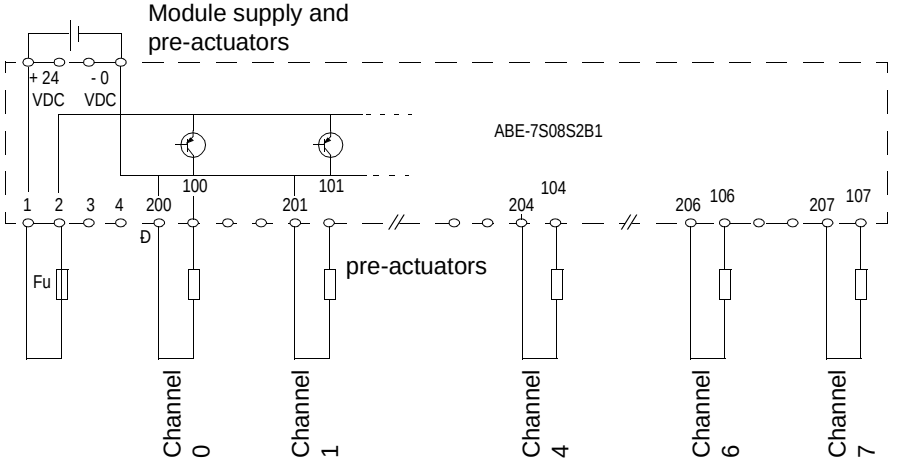
Illustration

Description of the connection terminals.



Illustration

Output function connections.



Fu Fuse caliber according to the load.

STOP	**WARNING**
	Usage precautions The bases are equipped as standard with a fuse for general use with 2 A fast blow caliber. Do not connect filament lamps. **Failure to observe this precaution can result in severe injury or equipment damage.**

Characteristics of ABE-7S08S2B1 static output adaptation bases

At a Glance

This section describes the general characteristics of **TELEFAST 2 ABE-7S08S2B1** base.

General characteristics

This table describes the general characteristics of **ABE-7S08S2B1** base.

Base type			**ABE-7S08S2B1**
Channel number			8
Output circuit characteristics			
Direct current load	Resistive, load DC12	Voltage	24 VDC
		Current	2 A (1)
	Inductive, load DC13	Voltage	24 VDC
		Current	0.5 A (1)
	Filament lamp		no
Thresholds		Voltage	19..30 VDC
Leakage current at state 0			<= 0.5 mA
Breakdown voltage at state 1			<= 0.5 V
Minimum current through channel			1 mA
Response time		State 0 to 1	0.1 ms
		State 1 to 0	0.02 ms
Built-in protection measures	Against overloads and short-circuits		Yes by current limiter and disjunctioner Id >2.6 A.
	Against inductive voltage overflow		Yes by integrated breakdown diode.
	Against polarity inversions		Yes by suppressor
Switching frequency on inductive load			< 0.5 LI^2
Error detection report			Yes
Voltage assigned to insulation		Input/output	300 V
Voltage assigned to shock resistance (1.2/50)		Input/output	2.5 kV
Key			
(1)	1 channel out of 2 alternating between 50 °C and +60 °C		

22.20 TELEFAST 2 ABE-7S08S2B0 connection base

At a Glance

Aim of this section

This section describes the **TELEFAST 2 ABE-7S08S2B0** connection base.

What's in this Section?

This Section contains the following Maps:

Topic	Page
Pre-actuator connections on the ABE-7S08S2B0 static output adaptation base	295
Characteristics of the ABE-7S08S2B0 static output adaptation bases	296

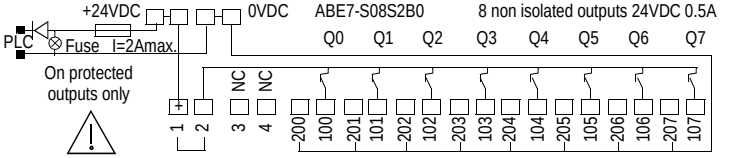
Pre-actuator connections on the ABE-7S08S2B0 static output adaptation base

At a Glance

This is an overview of the pre-actuator connections on the **TELEFAST 2 ABE-7S08S2B0** bases, 8 static outputs, 24 VDC, 0.5 A.

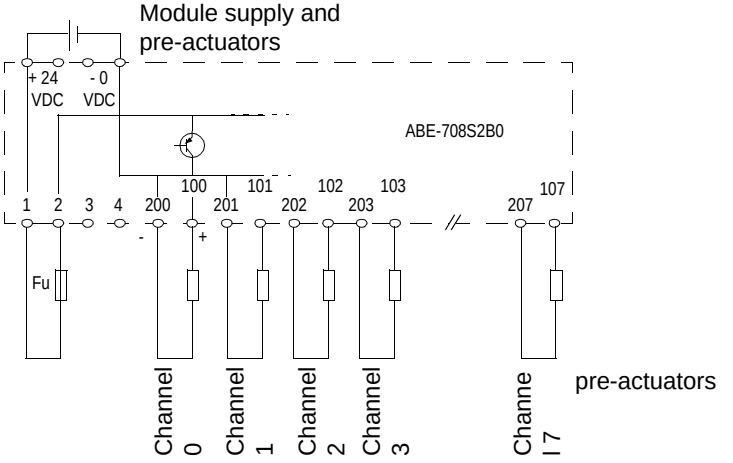
Illustration

Description of the connection terminal.



Illustration

Output function connections.



Fu Fuse caliber according to the load.

STOP	**WARNING**
	Usage precautions The bases are equipped as standard with a fuse for general use with 2 A fast blow caliber. **Failure to observe this precaution can result in severe injury or equipment damage.**

Characteristics of the ABE-7S08S2B0 static output adaptation bases

At a Glance

This section describes the general characteristics of the **TELEFAST 2 ABE-7S08S2B0** base.

General characteristics

This table describes the general characteristics of the **ABE-7S08S2B0** base.

Base type			**ABE-7S08S2B0**
Channel number			8
Output circuit characteristics			
Direct current load	Resistive, load DC12	Voltage	24 VDC
		Current	0.5 A
	Inductive, load DC13	Voltage	24 VDC
		Current	0.25 A
	Filament lamp		10 W
Thresholds		Voltage	19..30 VDC
Leakage current at state 0			<= 0.3 mA
Breakdown voltage at state 1			<= 0.6 V
Minimum current through channel			1 mA
Response time		State 0 to 1	0.1 ms
		State 1 to 0	0.02 ms
Built-in protection measures	Against overloads and short-circuits		Yes by current limiter and circuit breaker Id >0.75 A.
	Against inductive voltage overflow		Yes by integrated breakdown diode.
	Against polarity inversions		Yes by suppressor
Switching frequency on inductive load			< 0.6 LI^2
Error detection report			Yes
Voltage assigned to insulation		Input/output	300 V
Voltage assigned to shock resistance (1.2/50)		Input/output	2.5 kV

22.21 The TELEFAST2 ABE-7R16T210/P16T210 connection bases

Pre-actuator links on ABE-7R16T210/P16T210 output electromechanical relay bases (size 10 mm)

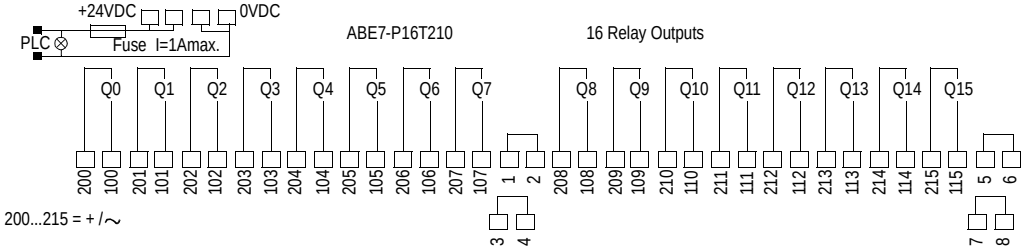
At a Glance

This is a description of the pre-actuator connections on:

- base **TELEFAST 2 ABE-7R16T210**, 16 relay outputs, 1 F, free potential contact with electromagnetic relay;
- base **TELEFAST 2 ABE-7R16T210**, 16 relay outputs, 1 F, free potential contact with relay not provided.

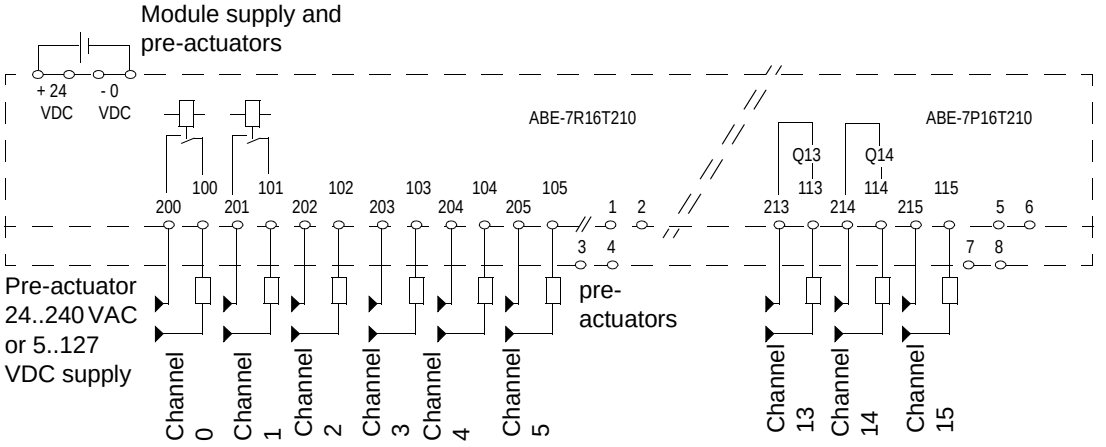
Illustration

Description of the connecting terminal blocks.



Illustration

Output connection functions



WARNING

Usage precautions

During manufacture, the bases are equipped with a fuse for general use of 1 A fast blow caliber.
Protection of relay contacts :

- each protection circuit must be mounted on the posts of each pre-actuator:
  - RC or MOV circuit on an alternating current;
  - discharge diode with direct current.

Provide one protection fuse per pre-actuator or per group if supplied from the same voltage.

Failure to observe this precaution can result in severe injury or equipment damage.

22.22 The TELEFAST2 ABE-7R16T212/P16T212 connection bases

Pre-actuator links on ABE-7R16T212/P16T212 output electromechanical relay bases (size 10 mm)

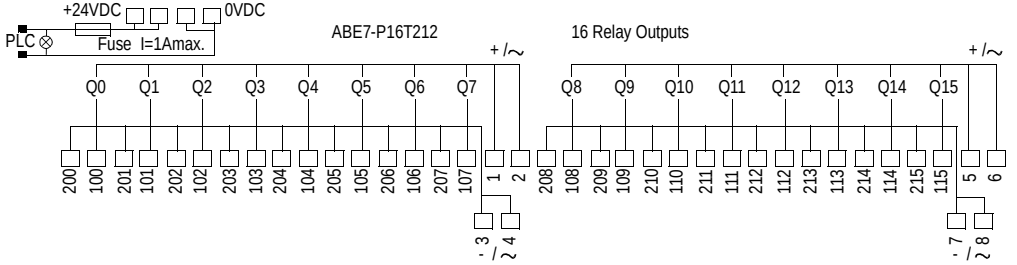
At a Glance

This is a description of the pre-actuator connections on:

- base **TELEFAST 2 ABE-7R16T212**, 16 relay outputs, 1 F, with distribution of the 2 polarities by an 8 channel group, with electromechanical relay;
- base **TELEFAST 2 ABE-7P16T212**, 16 relay outputs, 1 F, distribution of the 2 polarities by 8 channel group, relay not provided.

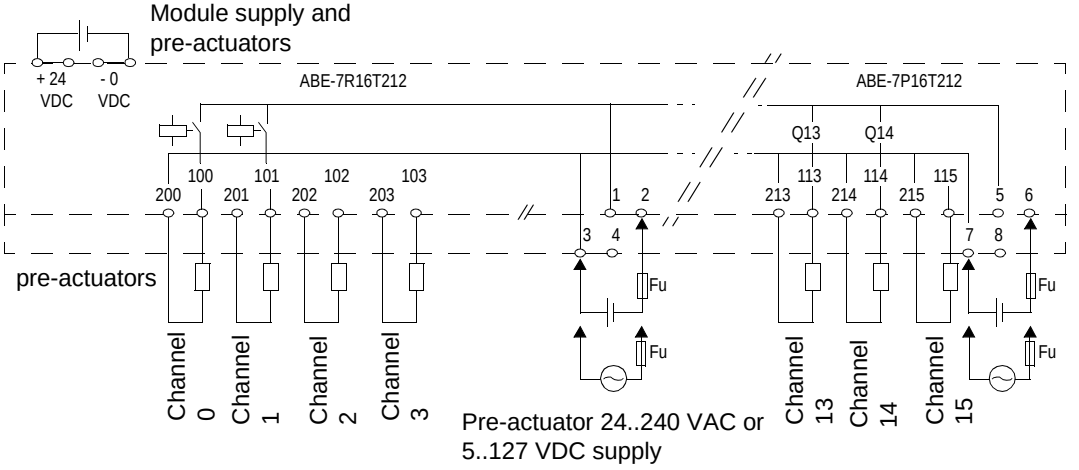
Illustration

Description of the connecting terminal blocks.



Illustration

Output connection functions.



Fu Fuse caliber according to the load.

WARNING

Usage precautions

During manufacture, the bases are equipped with a fuse for general use of 1 A fast blow caliber.
Protection of relay contacts:

- each protection circuit must be mounted on the posts of each pre-actuator:
  - RC or MOV circuit on an alternating current;
  - discharge diode with direct current.

Failure to observe this precaution can result in severe injury or equipment damage.

22.23 TELEFAST 2 ABE-7R16T230 connection base

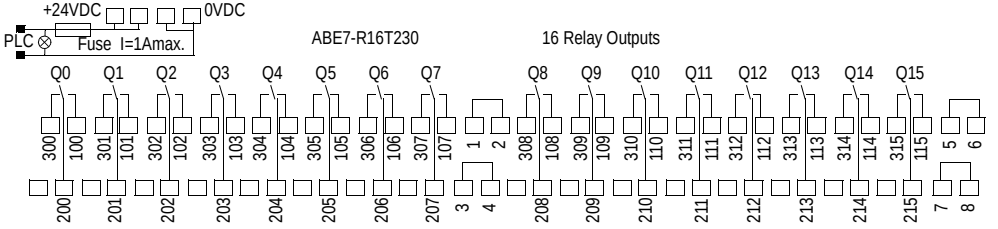
Pre-actuator links on ABE-7R16T230 output electromechanical relay bases (size 10 mm)

At a Glance

The pre-actuator links are presented here on the **TELEFAST 2 ABE-7R16T230** base, with 1 OF electromagnetic relay, potential free contact.

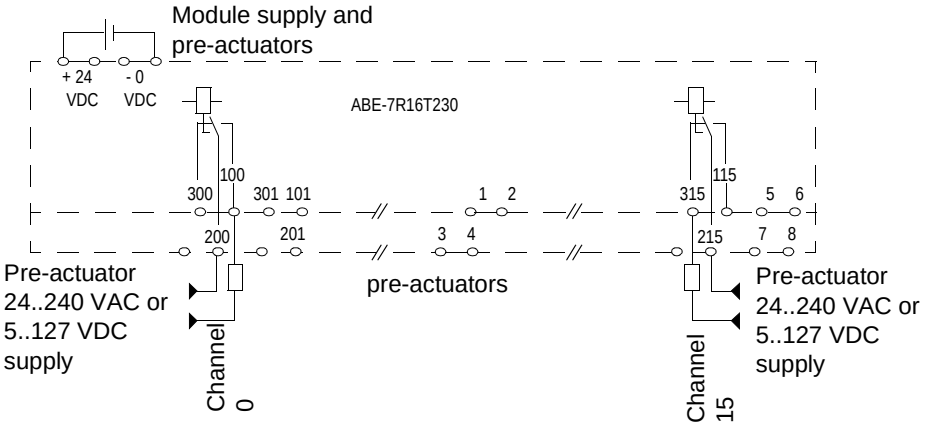
Illustration

Description of the connecting terminal blocks.



Illustration

Output connection functions.



WARNING

Usage precautions

At manufacture, the base is equipped with a 1A fast blow caliber fuse for general use.
Protection of relay contacts :

- each protection circuit must be mounted on the posts of each pre-actuator:
  - RC or MOV circuit on an alternating current;
  - discharge diode on a direct current.

Provide one protection fuse per pre-actuator or per group if supplied from the same voltage.

Failure to observe this precaution can result in severe injury or equipment damage.

22.24 TELEFAST 2 ABE-7R16T231 connection base

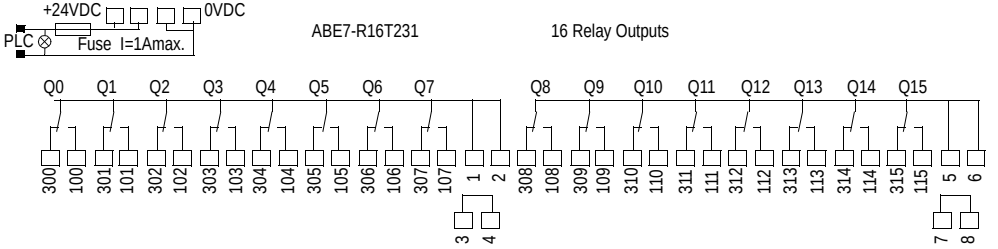
Pre-actuator links on ABE-7R16T231 output electromechanical relay bases (size 10 mm)

At a Glance

The pre-actuator connections are described here for base **TELEFAST 2 ABE-7R16S231**, with 1 OF electromechanical relays, distribution of what is shared per group of 8 channels.

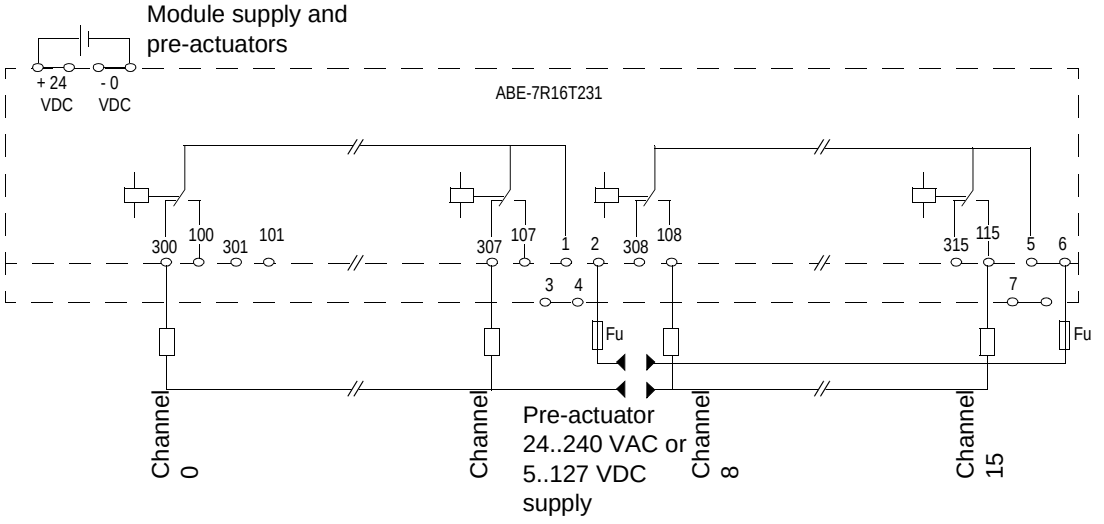
Illustration

Description of the connecting terminal blocks.



Illustration

Output connection functions.



Fu Fuse caliber according to the load.

WARNING

Usage precautions

At manufacture, the base is equipped with a 1A fast blow caliber fuse for general use.
Protection of relay contacts :

- each protection circuit must be mounted on the posts of each pre-actuator:
  - RC or MOV circuit on an alternating current;
  - discharge diode on a direct current.

Failure to observe this precaution can result in severe injury or equipment damage.

22.25 TELEFAST 2 ABE-7R16T214 connection base

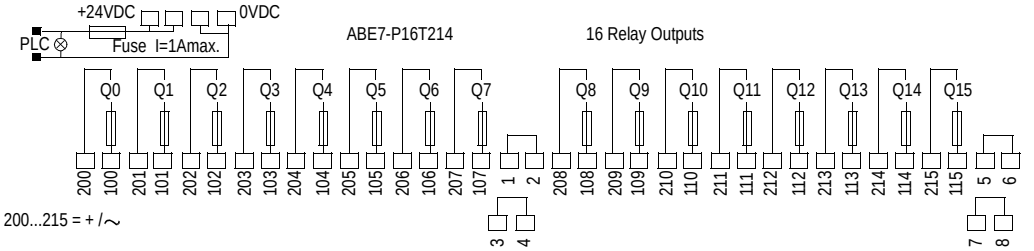
Pre-actuator links on ABE-7P16T214 output electromechanical relay bases (size 10 mm)

At a Glance

The pre-actuator links are presented here on the **TELEFAST 1 ABE-7R16T214** base, 16 relay outputs, 1 F, potential free contact, 1 fuse per channel, relay not provided.

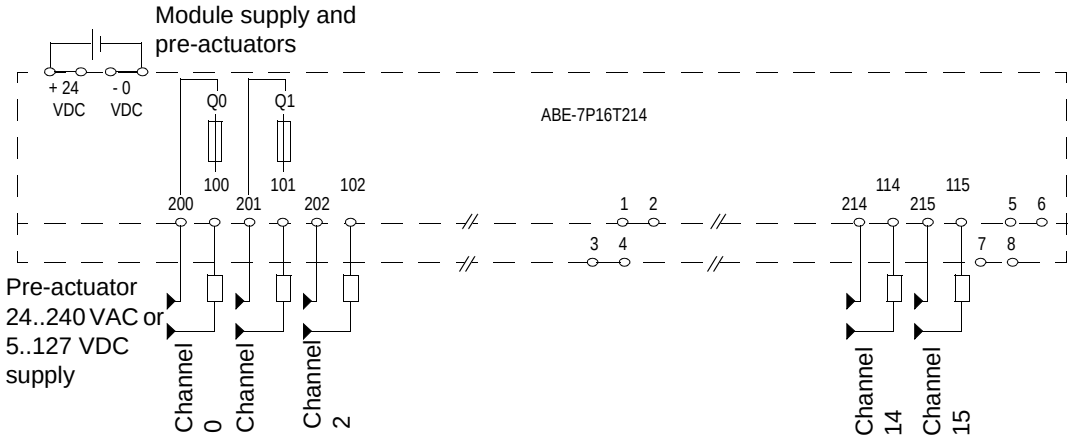
Illustration

Description of the connecting terminal blocks.



Illustration

Output connection functions.



WARNING

Usage precautions

At manufacture, the base is equipped with a 1A fast blow caliber fuse for general use.
Protection of relay contacts :

- each protection circuit must be mounted on the posts of each pre-actuator:
  - RC or MOV circuit on an alternating current;
  - discharge diode on a direct current.

Function via channel:

- 0.5 A fuse.

Provide one protection fuse per pre-actuator or per group if supplied from the same voltage.

Failure to observe this precaution can result in severe injury or equipment damage.

22.26 TELEFAST 2 ABE-7R16T215 connection base

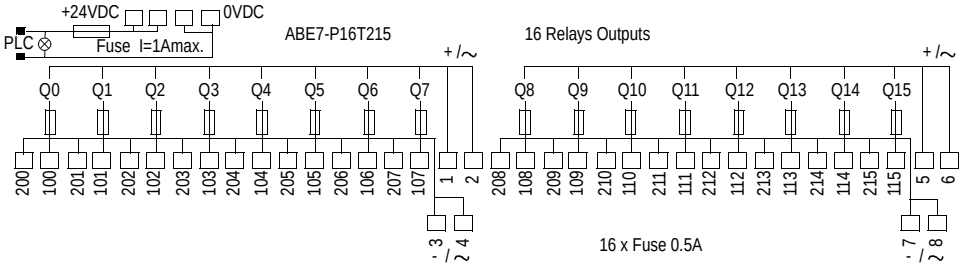
Pre-actuator links on ABE-7P16T215 output electromechanical relay bases (size 10 mm)

At a Glance

The pre-actuator links are presented here on the **TELEFAST 1 ABE-7R16T215** base, 16 relay outputs, 1 F, distribution of 2 polarities per group of 8 channels, 1 fuse per channel relay not provided.

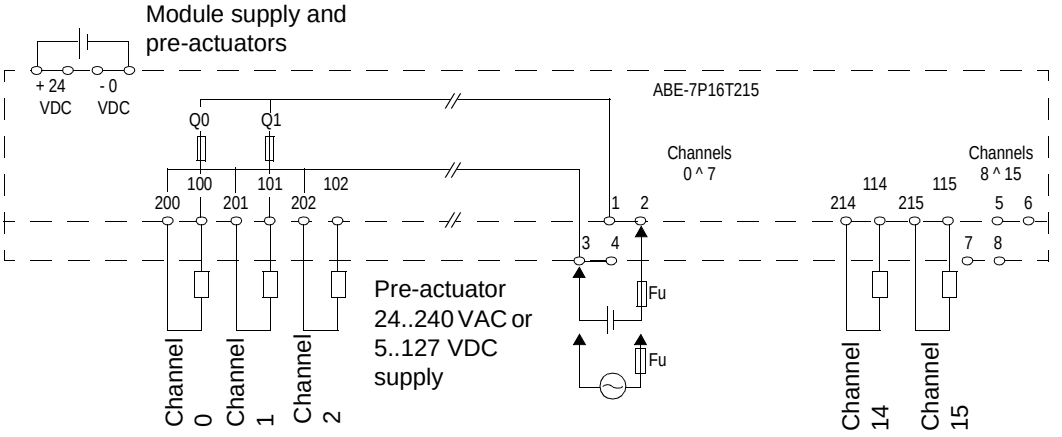
Illustration

Description of the connecting terminal blocks.



Illustration

Output connection functions.



Fu Fuse caliber according to the load.

WARNING

Usage precautions

At manufacture, the base is equipped with a 1A fast blow caliber fuse for general use.

Protection of relay contacts :

- each protection circuit must be mounted on the posts of each pre-actuator:
  - RC or MOV circuit on an alternating current ;
  - discharge diode on a direct current.

Function via channel :

- 0.5 A fuse.

Failure to observe this precaution can result in severe injury or equipment damage.

22.27 The TELEFAST2 ABE-7R16T330/P16T330 connection bases

Pre-actuator links on ABE-7R16T330/P16T330 output electromechanical relay bases (size 12.5 mm)

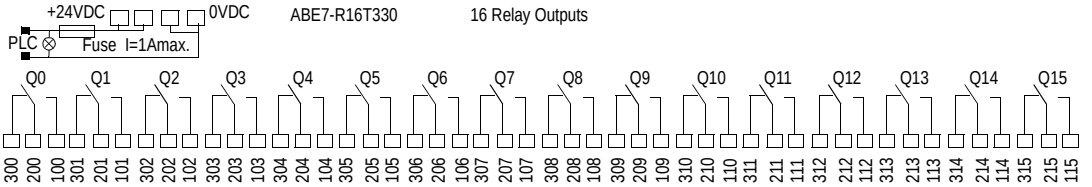
At a Glance

This is a description of the pre-actuator connections on:

- the **TELEFAST 2 ABE-7R16T330** bases, 16 relay outputs, free potential contact, with electromagnetic relay;
- the **TELEFAST 2 ABE-7R16T330** bases, 16 relay outputs, free potential contact, relay not provided.

Illustration

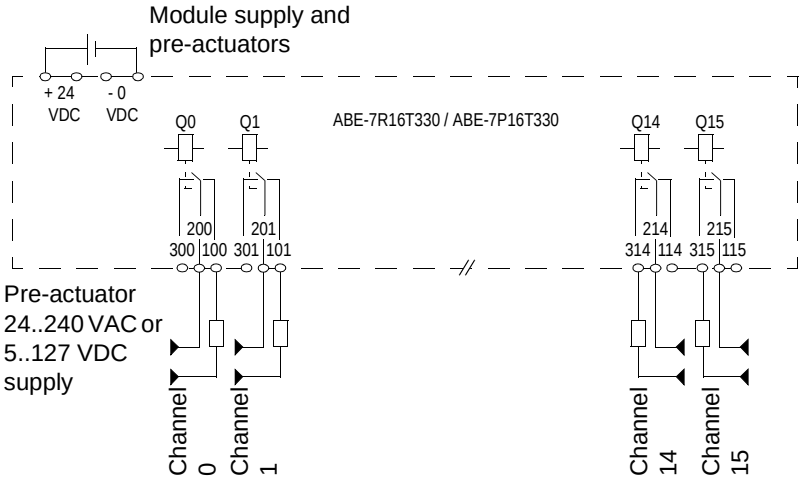
Description of the connection terminals.



ABE-7R16T330/P16T330 16 output relays, 1 OF, free potential contact, ABE-7R16T330 with electromagnetic relays, ABE-7P16T330 relays not provided.

Illustration

Output function connections.



WARNING

Usage precautions

The bases are equipped as standard with a fuse for general use with 1 A fast blow caliber.

Protection of relay contacts:

- each protection circuit must be mounted on the posts of each pre-actuator:
  - RC or MOV circuit on an alternating current ;
  - discharge diode on a direct current.

Provide one protection fuse per pre-actuator or per group if supplied from the same voltage.

Failure to observe this precaution can result in severe injury or equipment damage.

22.28 The TELEFAST2 ABE-7R16T332/P16T332 connection bases

Pre-actuator links on ABE-7R16T332/P16T332 output electromechanical relay bases (size 12,5 mm)

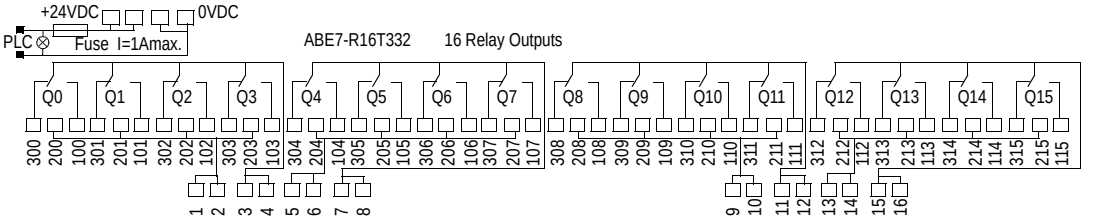
At a Glance

The pre-actuator links are presented here on:

- base **TELEFAST 2 ABE-7R16T332**, 16 relay outputs, 1 OF, distribution of the 2 polarities by a 4 channel group, with electromagnetic relays;
- base **TELEFAST 2 ABE-7P16T332**, 16 relay outputs, 1 OF, distribution of the 2 polarities by a 4 channel group, relays not provided.

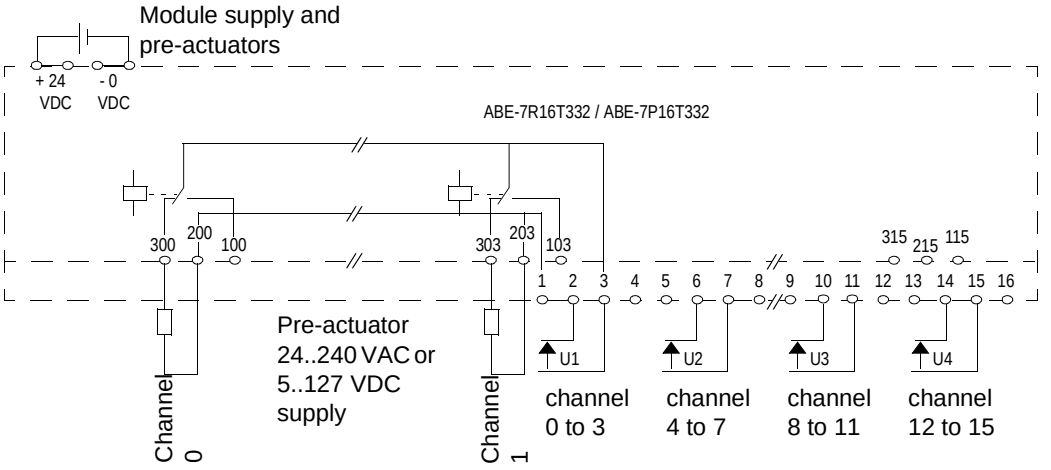
Illustration

Description of the linking posts.



Illustration

Output linking functions.



WARNING

Usage precautions

The bases are originally equipped with a fuse for general use of 1 A rapid fusion calibre.
Protection of relay contacts :

- Each pre-actuator form a protection circuit must be mounted on the posts.
  - RC or MOV circuit on an alternating current;
  - discharge diode on direct current.

Scheduling a protection fuse through the pre-actuator or group if supplied from the same voltage.

Failure to observe this precaution can result in severe injury or equipment damage.

22.29 TELEFAST 2 ABE-7R16T370 linking base

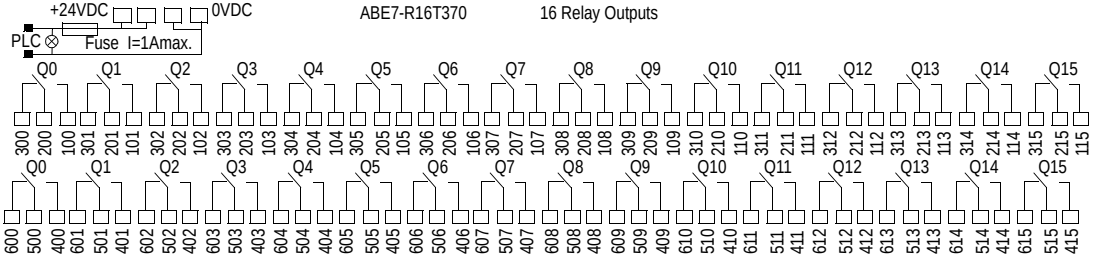
Pre-actuator links on ABE-7R16T370 output electromechanical relay bases (size 12.5 mm)

At a Glance

The pre-actuator links are presented here on the **TELEFAST 2 ABE-7R16T370** base, 16 relay outputs, 2 OF, potential free contact.

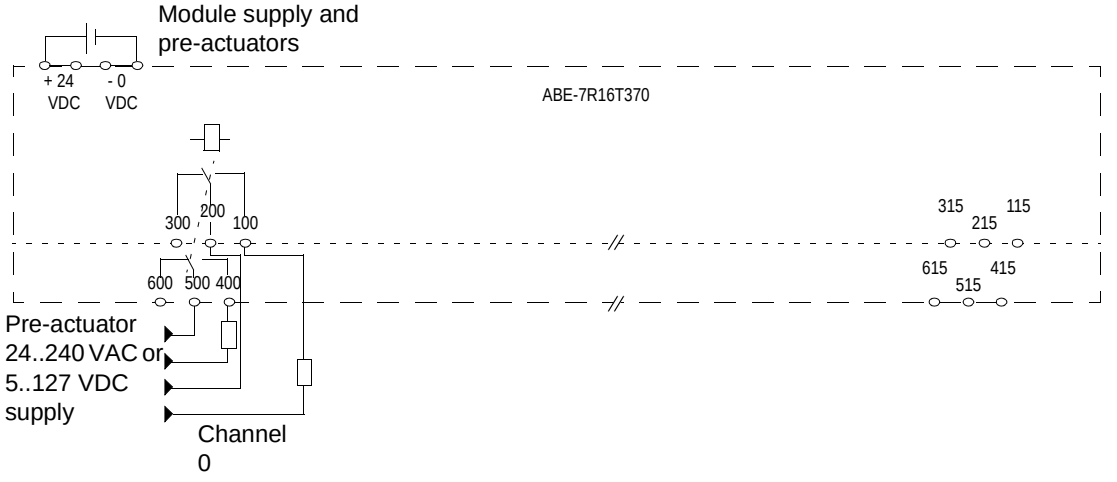
Illustration

Description of the linking posts.



Illustration

Output linking functions.



WARNING

Usage precautions

The base is originally equipped with a fuse for general use of 1 A rapid fusion caliber.

Protection of relay contacts :

- Each pre-actuator form a protection circuit must be mounted on the posts.
  - RC or MOV circuit on an alternating current;
  - discharge diode on direct current.

Scheduling a protection fuse through the pre-actuator or group if supplied from the same voltage.

Failure to observe this precaution can result in severe injury or equipment damage.

22.30 TELEFAST 2 ABE-7R16T370 linking base

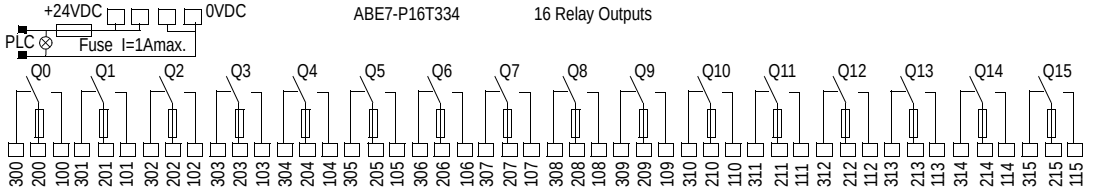
Pre-actuator links on ABE-7R16T334 output electromechanical relay bases (size 12.5 mm)

At a Glance

The pre-actuator links are presented here on the **TELEFAST 1 ABE-7R16T334** base, 16 relay outputs, 1 OF, potential free contact.

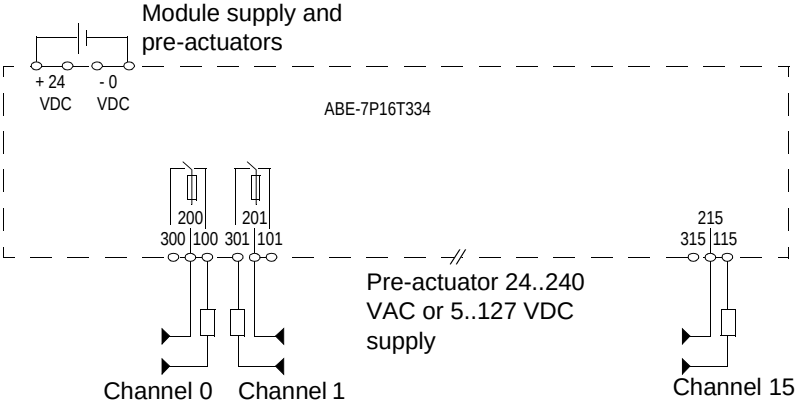
Illustration

Description of the linking posts.



Illustration

Output linking functions.



WARNING

Usage precautions

The base is originally equipped with a fuse for general use of 1 A rapid fusion caliber.

Protection of relay contacts :

- Each pre-actuator form a protection circuit must be mounted on the posts.
  - RC or MOV circuit on an alternating current;
  - discharge diode on direct current.

Functionality via channel :

- 2 A fuse.

Scheduling a protection fuse through the pre-actuator or group if supplied from the same voltage.

Failure to observe this precaution can result in severe injury or equipment damage.

22.31 TELEFAST 2 ABE-7R16T318 linking base

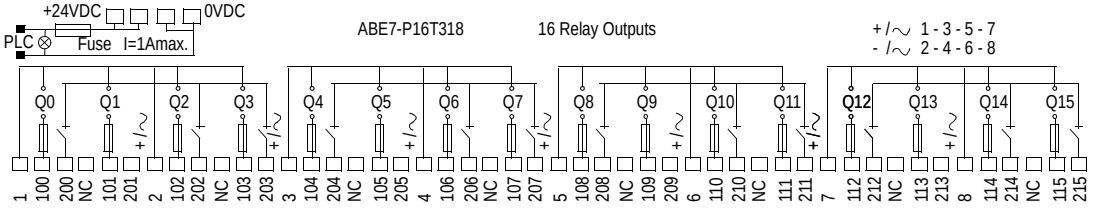
Pre-actuator connections on ABE-7P16T318 relay base, electromechanical or static output (width 12.5 mm)

At a Glance

The pre-actuator connections on the **TELEFAST 2 ABE-7P16T318** base are described here: 16 relay outputs, 1 OF, distribution of the 2 polarities per group of 4 channels, relays not provided.

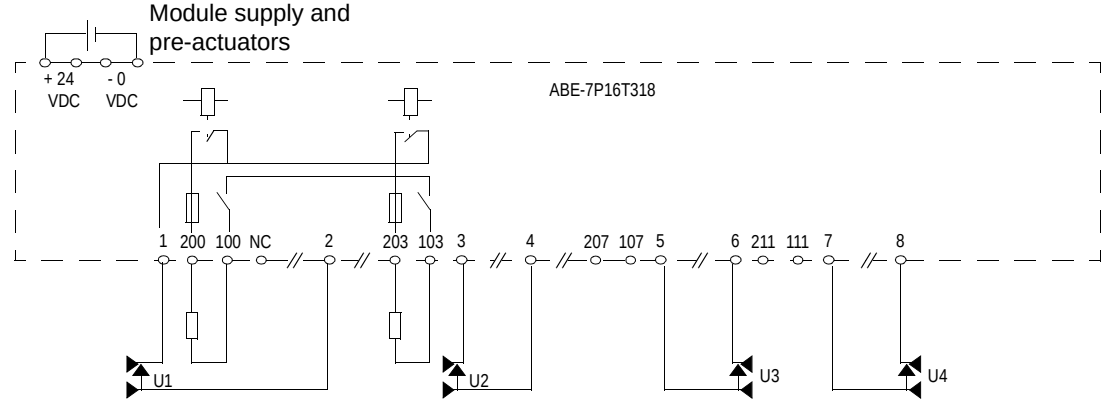
Illustration

Description of the connecting terminal blocks.



Illustration

Output connection functions.



Pre-actuator 24..240 VCA or 5..127 VDC supply

channel 0 to 3

channel 4 to 7

channel 8 to 11

channel 12 to 15

WARNING

Usage precautions

At manufacture, the base is equipped with a fuse for general use of 1 A fast blow caliber.

Protection of relay contacts:

- each pre-actuator from a protection circuit must be mounted onto the terminals:
  - RC or MOV circuit in the case of an alternating current;
  - discharge diode for a direct current.

Functionality per channel:

- 2 A fuse;
- shared division.

Provide a protection fuse on the pre-actuator supply.

Failure to observe this precaution can result in severe injury or equipment damage.

22.32 The TELEFAST 2 ABE-7P16F310 connection base

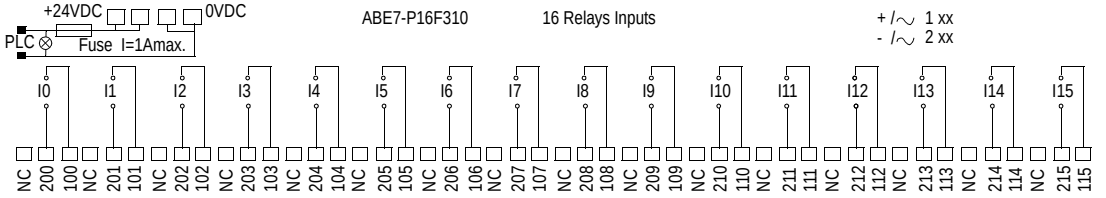
Sensor connections on ABE-7P16F310 input static relay bases (width 12.5 mm)

At a Glance

The sensor connections on the **TELEFAST 1 ABE-7P16F310** base are described here: 16 relay outputs, potential free contact, relays not provided.

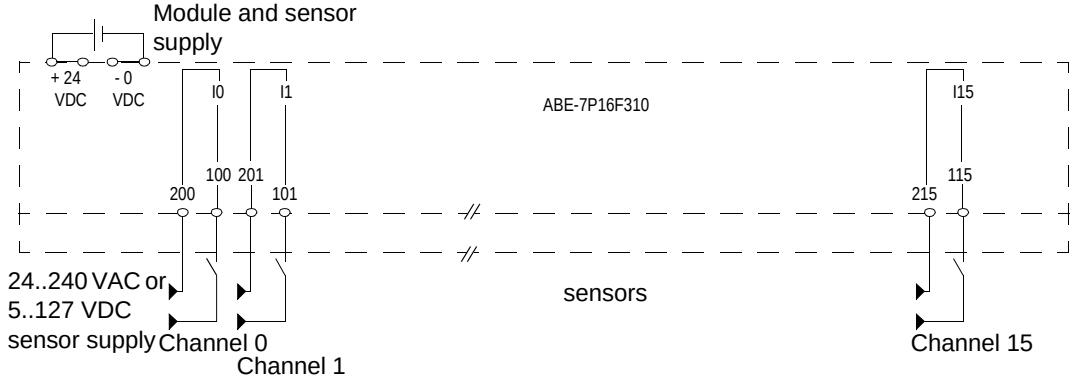
Illustration

Description of the connection terminals.



Illustration

Output function connections.



WARNING

Usage precautions

At manufacture, the base is equipped with a fuse for general use of 1A fast blow caliber.
Provide one protection fuse per group of sensors if supplied from the same voltage.

Failure to observe this precaution can result in severe injury or equipment damage.

22.33 TELEFAST 2 ABE-7P16F312 linking base

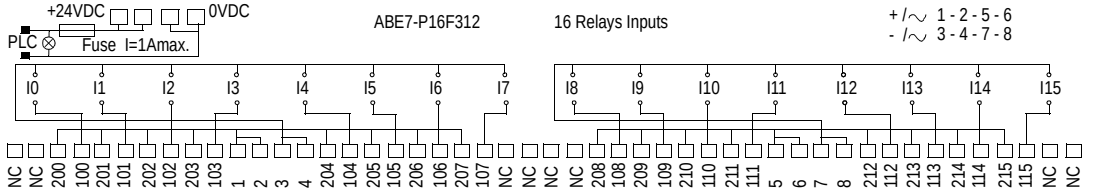
Sensor links on ABE-7P16F312 input static relay bases (size 12.5 mm)

At a Glance

The sensor links are presented here on the **TELEFAST 1 ABE-7P16F312** base, 16 relay outputs, distribution of the 2 polarities by an 8 channel group, relays not provided.

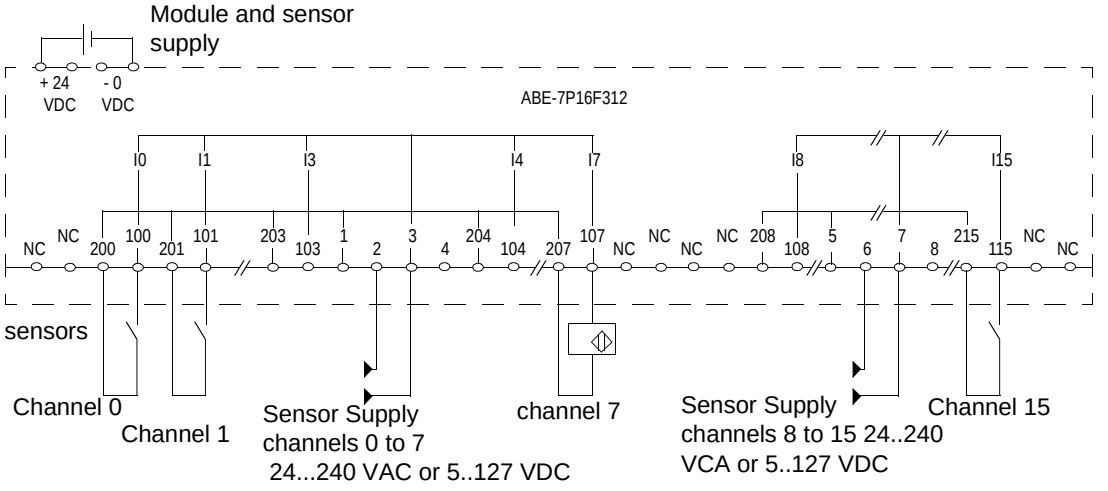
Illustration

Description of the connecting terminal blocks.



Illustration

Output connection functions.



WARNING

Usage precautions

The base is originally equipped with a 1A fast blow caliber fuse for general use.
Plan for a protection fuse for the sensor supply.

Failure to observe this precaution can result in severe injury or equipment damage.

22.34 TELEFAST 2 connection base accessories

At a Glance

Aim of this section

This section introduces the **TELEFAST 2** connection bases' range of accessories.

What's in this Section?

This Section contains the following Maps:

Topic	Page
Catalog of TELEFAST 2 connection base accessories	324
Association table for the relays on ABE-7R16T•••, ABE-7P16T••• and ABE-7P16F••• bases.	327
Characteristics of the removable ABR-7••• electromechanical output relays	329
Characteristics of the removable ABS-7E•• static input relays	330
Characteristics of the removable ABS-7S•• static output relays	331

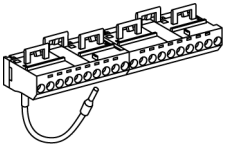
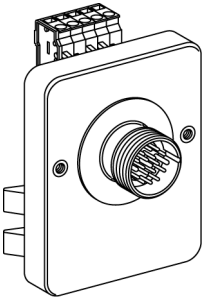
Catalog of TELEFAST 2 connection base accessories

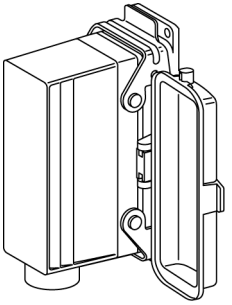
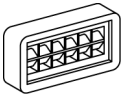
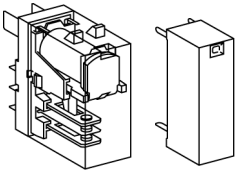
At a Glance

The catalog of connection base accessories is shown here **TELEFAST 2** for discrete I/O modules.

Catalog

The table below shows the catalog of connection base accessories **TELEFAST 2**.

Product reference	Illustration	Description
Additional shunt terminal block		
ABE-7BV10	-	Terminal block fitted with 10 screw terminal blocks.
ABE-7BV20	TELEFAST 2 accessory 	Terminal block fitted with 20 screw terminal blocks.
Adapter base		
ABE-7ACC02	-	Enables the changeover from 16 channels to 2 x 8 channels.
Mounting kit		
ABE-7ACC01	-	Allows the bases to be mounted on full boards.
Waterproof cable bushing		
ABE-7ACC84	-	Allows the enclosure to be fed through without dividing up the leads.
Enclosure feed-through		
ABE-7ACC83	-	Connectors **HE10** for 8/12 channels to M23 cylindrical connector.
ABE-7ACC82	TELEFAST 2 accessory 	Connectors **HE10** for 16 channels to M23 cylindrical connector.

Product reference	Illustration	Description
ABE-7ACC80	TELEFAST 2 accessory 	Connectors **HE10** for 32 channels to HARTING type connector.
ABE-7ACC81	-	Plug-in descriptive form for **ABE-7ACC80**.
Removable continuity module		
ABE-7ACC20	-	10mm-wide.
ABE-7ACC21		12.5 mm-wide.
Client address-labeling software		
ABE-7LOGV10	-	-
Rapid fusion 5 x 20 glass fuse		
ABE-7FU012	-	0.125 A
ABE-7FU050		0.5 A
ABE-7FU100		1 A
ABE-7FU200		2 A
ABE-7FU630		6.3 A
Self-adhesive address holder		
AR1-SB3	TELEFAST 2 accessory 	For AB1-R / AB1-G address types.
Relays for ABE-7R16T•••, ABE-7P16T••• and ABE-7P16F••• bases		
ABR-7S••• (1)	ABE-7S3•• and ABE-7S2••	Electromagnetic output relays (4).
ABR-7S••• (2)		Static output relays (4).
ABS-7SE•• (3)	-	Static output relays (4).

Product reference	Illustration	Description
Key		
(1)	For electrical characteristics, see *Characteristics of the removable ABR-7••• electromechanical output relays, p. 329*.	
(2)	For electrical characteristics, see *Characteristics of the removable ABS-7S•• static output relays, p. 331*.	
(3)	For electrical characteristics, see *Characteristics of the removable ABS-7E•• static input relays, p. 330*.	
(4)	Association table for base relays, see*Association table for the relays on ABE-7R16T•••, ABE-7P16T••• and ABE-7P16F••• bases., p. 327*.	

Association table for the relays on ABE-7R16T•••, ABE-7P16T••• and ABE-7P16F••• bases.

At a Glance

The table for comparison between the **TELEFAST 2 ABE-7R16T•••, ABE-7P16T••• and ABE-7P16F•••** link bases and the electromagnetic or static relays is described here.

Compatibility table

The table below shows the association possibilities for the electromagnetic or static relays on the **TELEFAST 2** bases.

Bases ABE-7••		**equipped with electromagnetic relays**				**not equipped with relays**			
		R16T21•	**R16T23•**	**R16T33•**	**R16T370**	**P16T21•**	**P16T33•**	**P16T318**	**P16F31•**
Electromagnetic relays from ABR-7••• output									
10 mm	**S21** 1F	Yes	-	-	-	Yes	-	-	-
	S23 1OF	Yes (1)	Yes	-	-	-	-	-	-
12.5 mm	**S33** 1OF	-	-	Yes	-	-	Yes	Yes	-
	S37 2OF	-	-	-	Yes	-	-	-	-
Static relays from ABS-S•• output									
10 mm	**C2E**	Yes (1)	-	-	-	Yes	-	-	-
	A2M	Yes (1)	-	-	-	Yes	-	-	-
12.5 mm	**C3BA**	-	-	Yes (1)	-	-	Yes (2)	Yes	-
	C3E	-	-	Yes (1)	-	-	Yes	Yes	-
	A3M	-	-	Yes (1)	-	-	Yes	Yes	-
Static relays from ABS-7E•• input									
12.5 mm	**C3AL**	-	-	-	-	-	-	-	Yes
	C3B2	-	-	-	-	-	-	-	Yes
	C3E2	-	-	-	-	-	-	-	Yes
	A3E5	-	-	-	-	-	-	-	Yes
	A3F5	-	-	-	-	-	-	-	Yes
	A3F6	-	-	-	-	-	-	-	Yes
	A3M5	-	-	-	-	-	-	-	Yes
	A3M6	-	-	-	-	-	-	-	Yes
ABE-7••• continuity block									
10 mm	**ACC20**	Yes	-	-	-	Yes	-	-	-
12.5 mm	**ACC21**	-	-	Yes	-	-	Yes	Yes	-

Bases ABE-7••	**equipped with electromagnetic relays**				**not equipped with relays**			
	R16T21•	**R16T23•**	**R16T33•**	**R16T370**	**P16T21•**	**P16T33•**	**P16T318**	**P16F31•**
Key								
(1)	Relays can be inline.							
(2)	Except on **ABE-7P16T334**.							

Characteristics of the removable ABR-7••• electromechanical output relays

At a Glance

The general characteristics of the removable **ABR-7•••** electromechanical output relays for **TELEFAST 2** bases are described in this section.

General characteristics

This table shows the general characteristics of the **ABR-7•••** relays.

ABR-7••• reference			**S21**	**S23**	**S33**	**S37**
Relay width			10 mm		12.5 mm	
Characteristics of the contacts						
Composition of the contacts			1 F	1 OF		2 OF
Max. operating voltage according to IEC 947-5-1		Alternating	250 V		264 V	
		Direct	125 V			
Thermal current			4 A		5 A	
Frequency of current used			50/60 Hz			
Alternating current load	Resistive, load AC12	Voltage	230 VAC			
		Current	1.5 A	1.2 A	3 A	2.5 A
	Inductive load AC15	Voltage	230 VAC			
		Current	0.9 A	0.7 A	1.7 A	1.3 A
Direct current load	Resistive, load DC12	Voltage	24 VDC			
		Current	1.5 A	1.2 A	3 A	2.5 A
	Inductive load DC13, L/R = 10 ms	Voltage	24 VDC			
		Current	0.6 A	0.45 A	1.4 A	1 A
Minimum switching		Current	10 mA		100 mA	
		Voltage	5 V			
Response time		State 0 to 1	10 ms		13 ms	15 ms
		State 1 to 0	5 ms		13 ms	20 ms
Maximum speed of function loading			0.5 Hz			
Voltage assigned insulation		Coil/contact	300 V			
Voltage assigned shock resistance (1.2/50)		Coil/contact	2.5 kV			
Key						
(1)	For 0.5 x 10^6 maneuvers.					

Characteristics of the removable ABS-7E•• static input relays

At a Glance

The general characteristics of the removable **ABS-7E••** static input relays for **TELEFAST 2** bases are described in this section.

General characteristics

This table shows the general characteristics of the **ABS-7E••** relays.

ABS-7E•• reference		**C3AL**	**C3B2**	**C3E2**	**A3E5**	**A3F5**	**A3M5**
Relay width		12.5 mm					
Command characteristics							
Assigned operating voltage (Us)	Direct	5 V	24 V	48 V	-		
	Alternating	-			48 V	110..130 V	230..240 V
Max. operating voltage (including ripple)		6 V	30 V	60 V	53 V	143 V	264 V
Max. current at Us		13.6 mA	15 mA		12 mA	8.3 mA	8 mA
State 1 guaranteed	Voltage	3.75 V	11 V	30 V	32 V	79 V	164 V
	Current	4.5 mA	6 mA		5 mA		4.5 mA
State 0 guaranteed	Voltage	2 V	5 V	10 V		30 V	40 V
	Current	0.09 mA	2 mA		1.5 mA	2 mA	
Maximum switching frequency (cyclic report 50%)		1000 Hz			25 Hz		
Complies with IEC1131-2		-	Type 2		Type 1		
Response time	State 0 to 1	0.05 ms			20 ms		
	State 1 to 0	0.4 ms			20 ms		
Voltage assigned to insulation	Input/output	300 V					
Voltage assigned to shock resistance (1.2/ 50)	Input/output	2.5 kV					

Characteristics of the removable ABS-7S•• static output relays

At a Glance

The general characteristics of the removable **ABS-7S••** static output relays for **TELEFAST 2** bases are described in this section.

General characteristics

This table shows the general characteristics of the **ABS-7S••** relays.

ABS-7S•• reference			**C2E**	**A2M**	**C3BA**	**C3E**	**A3M**
Relay width			10 mm		12.5 mm		
Output circuit characteristics							
Voltage assigned to job		Direct	5..48 V	-	24 V	5..48 V	-
		Alternating	-	24..240 V	-		24..240 V
Max. voltage			57.6 VDC	264 VAC	30 VDC	60 VDC	264 VAC
Alternating current load	Resistive, load AC12	Current	-	0.5 A	-		2 A
Direct current load	Resistive, load DC12	Current	0.5 A	-	2 A	1.5 A	-
	Inductive load DC13	Current	24 VDC	-		0.3 A	-
	Filament lamp load DC6		-			10 W	-
Leakage current at state 0			<= 0.5 mA	<= 2 mA	<= 0.3 mA		<= 2 mA
Breakdown voltage at state 1			<= 1 V	<= 1.1 V	<= 0.3 V	<= 1.3 V	
Minimum current through channel			1 mA	10 mA	1 mA		10 mA
Response time		State 0 to 1	0.1 ms	10 ms	0.1 ms		10 ms
		State 1 to 0	0.6 ms	10 ms	0.02 ms	0.6 ms	10 ms
Switching frequency on inductive load			-		< 0.5 LI^2	-	
Voltage assigned to insulation		Input/output	300 V				
Voltage assigned to shock resistance (1.2/50)		Input/output	2.5 kV				

Discrete I/O offset module

II

At a Glance

Aim of this Part

This part describes the discrete I/O offset modules.

What's in this part?

This Part contains the following Chapters:

Chapter	Chaptername	Page
23	TSX STZ 10 extension Bus module	335
24	AS-i bus interface module: TSX SAZ 10	347

TSX STZ 10 extension Bus module

23

At a Glance

Aim of this Chapter

This chapter describes the TSX STZ 10 extension Bus module.

What's in this Chapter?

This Chapter contains the following Maps:

Topic	Page
Operating principle	336
Link characteristics	338
Description	339
Implementation	340
Link	341
equipment addressing	343
Diagnostic on the TSX STZ 10 modules	345

Operating principle

Introduction

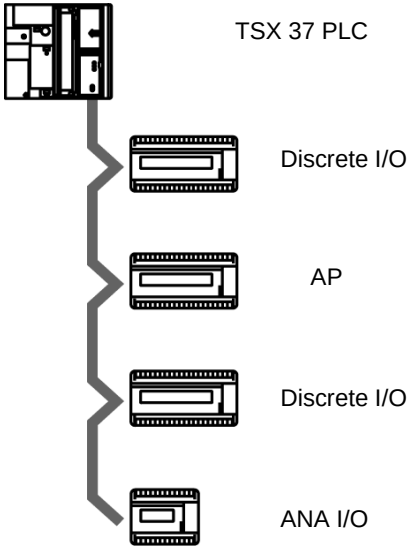
The TSX STZ 10 communication demi-module links a TSX 3710/21/22 PLC with the TSX 07 PLCs which can be used either as discrete (Discrete I/O) inputs/outputs, or as PLCs (AP) of the TSX 07 EX input/output extension modules **.** (Discrete I/O), TSX AMN4 analog input/output modules **.** (ANA. I/O).

Possibilities of connection

It is possible to connect up to a maximum of four elements to a TSX 37 PLC via this module.
These four elements can be selected from the following elements :

- either the PLCs TSX 07 20 **.**/21 **.**/30 **.**/31 **.** are used :
  - or as the offset inputs/outputs (**Discrete I/O**),
  - or as the PLCs (**AP**), (**three PLCs maximum**),
- or the TSX AMN 4 analog input/output modules **.** (**ANA I/O**) (three modules maximum),
- or the TSX 07 EX analog input/output extension modules **.** (**Discrete I/O**) (1 module maximum),

Illustration:



This type of link used as an input/output bus allows the use of the TSX 07 PLCs with an application data exchange service.

Note: the TSX 37 05 and TSX 37 08 PLCs do not accept the TSX STZ 10 module.

Link characteristics

Table of characteristics:

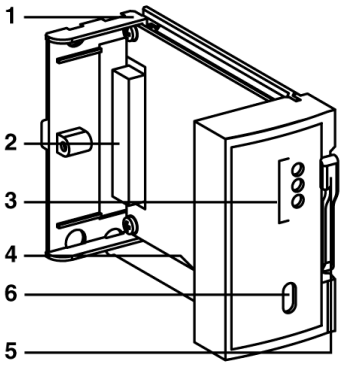
The characteristics of the nano-PLC (TSX 07) link are defined in the following table:

Structure	Physical interface Protocol	Unremote RS 485 Master-slave type
Transmission	Mode Throughput	Asynchronous in baseband 19200 Bauds with a slave PLC , or 38400 Bauds with the I/O blocks (4 max.).
	Medium	Armored twisted pair
Configuration	Number of devices	5 (1 TSX 37 - 4 TSX 07) Up until 200 meters.

Description

Illustration

The TSX STZ 10 nano-PLC link demi-module is made from various elements :



Guide table

The table describes the operating modules with different illustrated guides :

Address	Description
1	Body of module.
2	Linking connector to the PLC bus.
3	Diagnostic monitors. There are three of these and they display the function of the extension bus module. The monitors are defined as follows : ● **RUN** : indicates normal operating mode of the module (green), ● **ERR** : indicates a module or configuration error (red), ● **COM** : shows the traffic of exchange in the link (yellow).
4	Linking posts. Allow the TSX STC 050 or 200 cable to be connected to the link module. Each of the 2 posts can accept 2 wires when chaining the PLCs.
5	Locking lever. Allows the demi-module to be locked, when installed in a PLC. It also crimps the handle grip to indent the demi-module at the PLC rack.
6	Cable path.

Dimensions

The module dimensions are conformed to those of other demi-format modules in the TSX 37 range. It is imperative that the nano-PLC link module be placed at **position 4**in the PLC rack.

Implementation

General

The TSX STZ 10 module is lodged in the fourth position in the PLC rack to link up to the nano-PLC link. This mounting operation switches off the equipment.
After having inserted the module into the slot, the lever must be pushed back in order to ensure that the module is efficiently locked into the rack.
Before extracting the module from the slot, it is necessary to cut the supply from the PLC. To exit the module, turn and then pull the lever.

Link

Link module

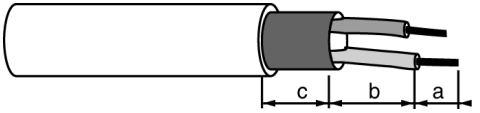
The link to the nano-PLC requires neither accessories nor special tools. Cable tightening on the posts is performed with the help of a screwdriver.
The posts in the module inner (the above part is always open) are connected electrically.

Cable preparation

To connect the cable(s) on the TSX STZ 10 module posts, the wires must be stripped by the following lengths:

Cables	Length
Core (a)	8 mm
Insulator (b)	15 mm
Armor plating (c)	10 mm

UNI-TELWAY TSX CSA 100/200 cable :



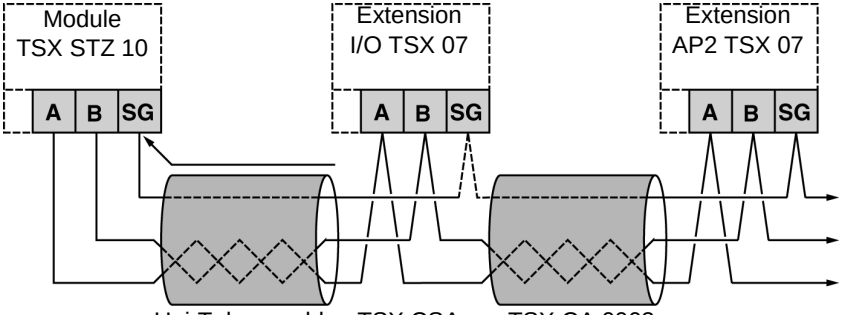
Linking operations are performed outside the rack with the module.
It is advised to put a tip on each wire (AWG 24).

Nano-PLC connecting link

To establish the link, the TSX STZ 10 module should be withdrawn from the PLC.
The following is the brocading of the linking cables :

- the A and B posts from the STZ 10 module are coupled with the A and B posts from the TSX 07 or the TSX 07 EX module **.** or the TSX AMN 4 analog module **.**,
- ground terminal strip: armor plating the cable.

Connection via chaining :

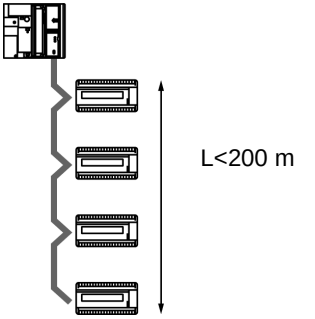
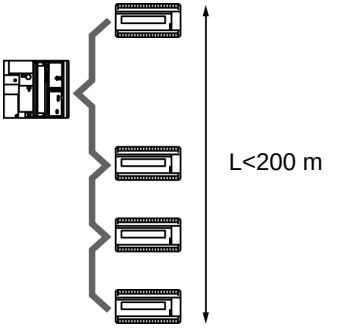


Uni-Telway cable : TSX CSA...or TSX CA 0003

Note: The different elements of the nano-PLC link cannot be removed.

Different types of links

The following table shows the different types of links:

Link	Illustration
The TSX STZ 10 link module can be connected to an extremity of the nano-PLC link.	
The module can also be mounted in the link through chaining.	

Consumption

The current consumption of the TSX STZ 10 under 5V is from:

- maximum current: Imax = 175 mA,
- typical current: Ityp = 130 mA.

Equipment addressing

General

The TSX 07 bus extension link is a multi-pin link. This is to make sure that each piece of on-line equipment can be located by an address allowing it to be identified in a unique way:

- The TSX 37 PLC is the master of the link. Number 0 is automatically assigned to it,
- the TSX 07 PLC and the TSX AMN 4 analog modules**.** are equipped with a selector, whose position determines:
  - for the TSX 07 20 PLC **.**/TSX 07 21 **.**/TSX 07 31 **.**, the role of discrete (Discrete I/O) inputs/outputs or PLC (AP) and the slave number on the link,
  - for the TSX AMN4 analog input/output modules. (ANA I/O), the slave number on the link,
- the discrete TSX 07 EX input/output extension modules **.** (EXT discrete) have in its database the slave number 1 address.

It is the slave number that will be used as the address in the application program.

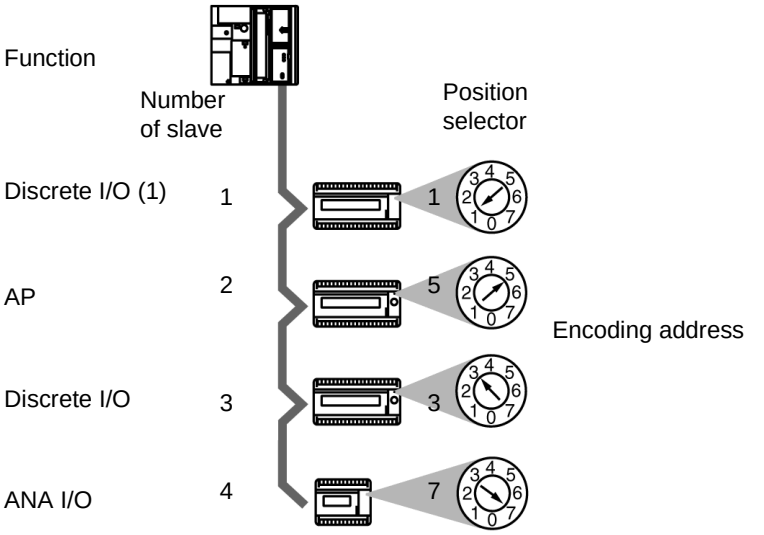
Coordination of hardware and software addresses

The following table shows the coordination of hardware and software addresses

Elements	Role	Selector position	Slave number
TSX072••/3••	Discrete I/O	1	1
TSX072••/3••	Discrete I/O	2	2
TSX072••/3••	Discrete I/O	3	3
TSX072••/3••	Discrete I/O	4	4
TSX072••/3••	AP	5	2
TSX AMN4•	ANA I/O		
TSX072••/3••	AP	6	3
TSX AMN4•	ANA I/O		
TSX072••/3••	AP	7	4
TSX AMN4•	ANA I/O		
TSX07EX•	Discrete I/O	-	1

Example of link addressing

Illustration:



Note: The acknowledgment of the slave number defined by the selector will only take effect once it has been switched on.

(1) The slave N°1 **must be** :

- either a TSX 07 PLC used uniquely in discrete I/O mode if it exists,
- or the discrete TSX 07 EX input/output extension modules **.** .

Diagnostic on the TSX STZ 10 modules

Diagnostic table

This module is fitted with 3 LED's which provide information on the operating status of the nano-PLC link.

RUN	ERR	COM	Meanings	Corrective actions
○	○	○	Module switched off	Switch on the equipment
●	○	◍	Normal operation Exchange on the Bus	
●	○	○	Normal operation No exchange on the Bus	
●	◍	○	Configuration error The software configuration is different from the configuration declared or 1 faulty equipment	Check the configuration. Find the faulty equipment.
	ou			
●	◍	◍		
●	◍	◍	Normal operation Initialization module	
◍	◍	◍	Auto-test module Normal operation	
○	●	NS	Serious fault	Replace the module

● On
NS : non significant

○ Off

◍ Blinking

AS-i bus interface module: TSX SAZ 10

24

At a Glance

Aim of this Chapter

This chapter introduces the AS-i TSX SAZ 10 bus interface module

What's in this Chapter?

This Chapter contains the following Maps:

Topic	Page
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General overview of the main elements which make up the AS-i bus	351
Main characteristics of AS-i bus	355
Description of the TSX SAZ 10 module	357
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Connecting the TSX SAZ 10 modules	359
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Display of the status of input/output bits of each slave (R I/O mode)	369
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Reminder about the AS-i bus

General

The AS-i bus is a field bus (level 0), and can be used to connect sensors/actuators. This allows "discrete" type information to run between a bus "master" and sensor/ actuator type "slaves".

AS-i is composed of 3 main base elements:
- a specific supply providing a 30 VDC voltage,
- a bus master,
- some slaves (sensors and actuators).

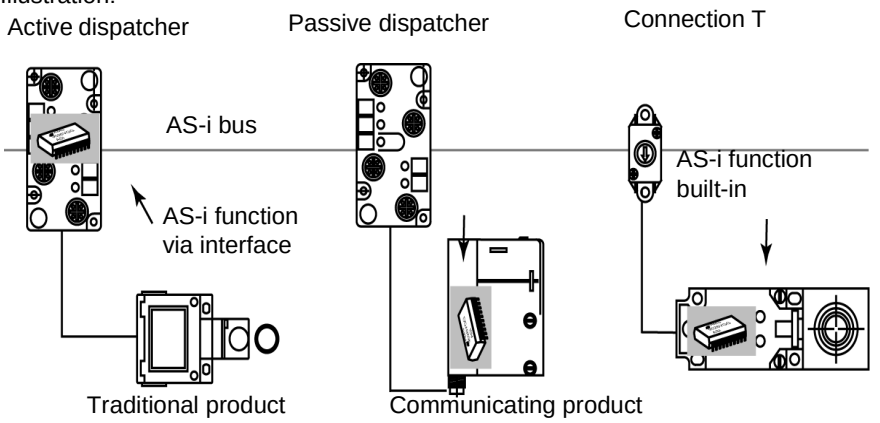
The main types of sensors /actuators

Table of the main types of sensors:

Type of sensor	Description
Communicating sensors /actuators	Thanks to the integrated AS-i feature, they connect directly to the AS-i bus via a passive dispatcher or a connection T.
The traditional IP65 sensors /actuators	They connect to the bus via an AS-i interface (active dispatcher or discrete Telefast IP 20 input/output interface bus). These interfaces connect the traditional sensors and actuators to the AS-i bus and provide them with dialog capacity on the bus.

Illustration

Illustration:



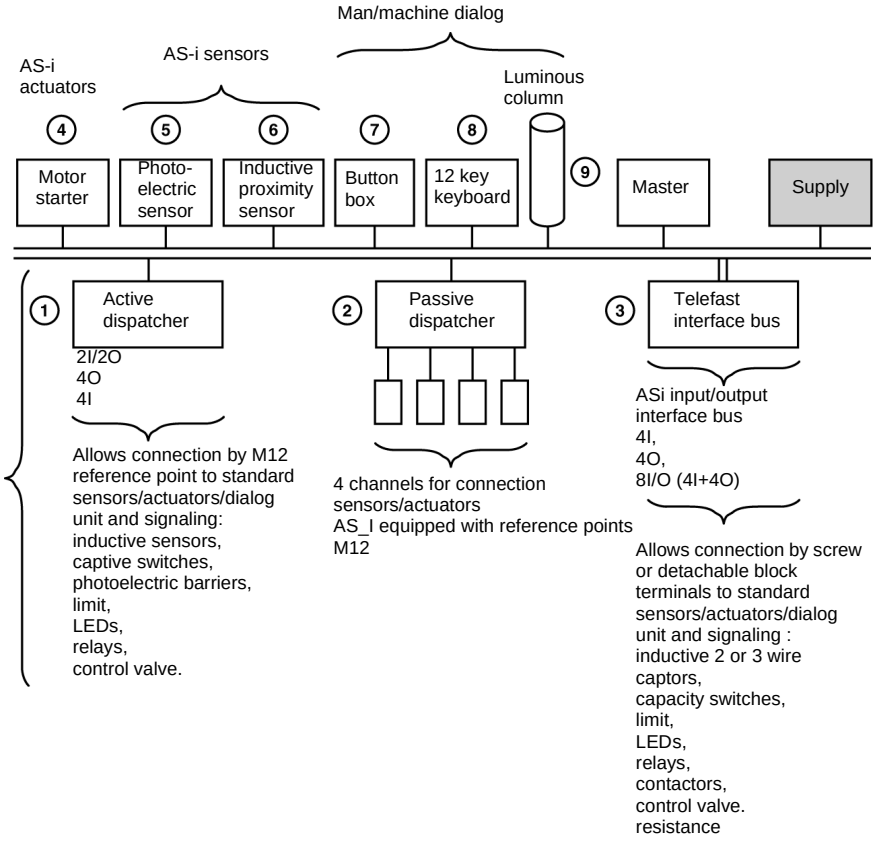
124 products maximum
(124 pieces of input information and 124 pieces of output information)

Communicating product

31 products (sensors or actuators)

Overview of a certain number of products in the Telemecanique catalogue, which can be connected to the AS-i bus

Non-exhaustive list:

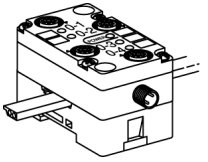
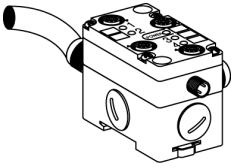
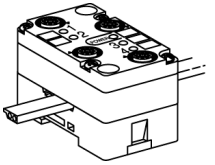
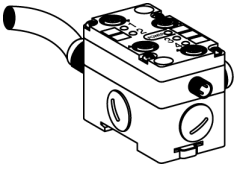
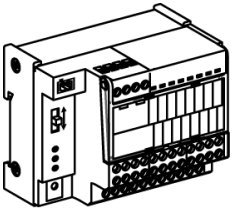


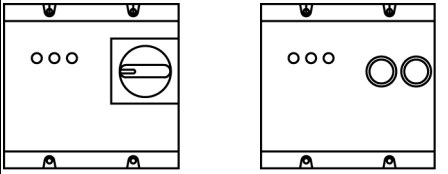
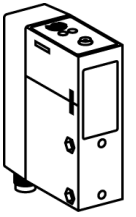
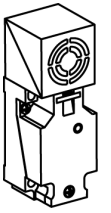
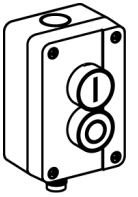
Interface for sensors and actuators

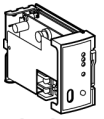
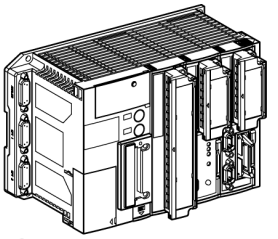
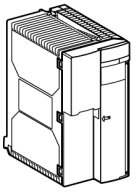
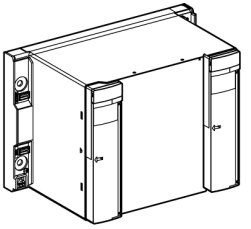
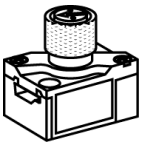
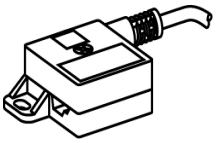
General overview of the main elements which make up the AS-i bus

General overview of the main constituent elements

The following table draws up the list of the main elements in an AS-i bus

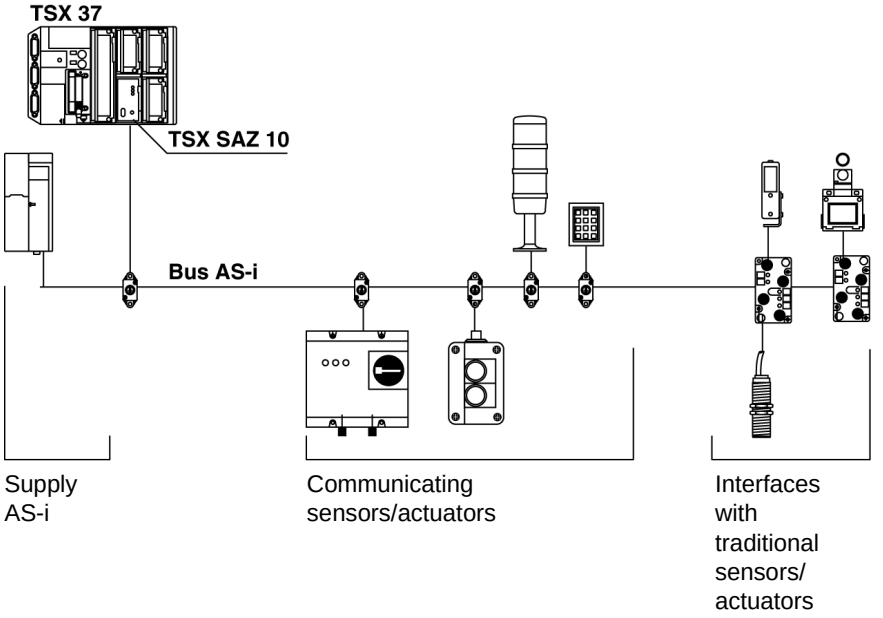
Element	Illustration
the cable It transmits the data and carries the energy. It can be made up from: ● either a flat, unshielded, polarized two-wire cable, ● or a round, standard, shielded or unshielded two-wire cable.	 Polarized flat cable  Round cable
The active and passive dispatchers IP67 waterproof interfaces for connecting sensors/actuators using M12 connectors: ● the active dispatchers, with built-in AS-i function make it possible to connect the "traditional", non-communicating sensors/actuators, ● the passive dispatchers do not have any electronics and can therefore connect the "communicating" sensors/actuators.	 Active dispatchers for flat cable  Passive dispatchers for round cable  Passive dispatchers for flat cable  Passive dispatchers for round cable
The discrete Telefast SB2 bus/inputs-outputs interface IP20 waterproof interface with built in AS-i function. It allows connection by screw terminal blocks to all types of "traditional" non-communicating sensors/actuators.	

Element	Illustration
The AS-i actuators The direct and reverser motor start-ups in waterproof boxes (IP54 and IP65) guarantee the command and protection of electrical motors up to 4KW under 400 VAC.	
The AS-i sensors ● photo-electric detectors: they guarantee the detection of all kinds of objects (opaque, reflective, etc) with 5 system databases (barrier, reflex, polarized reflex, proximity and proximity with deletion of background). They offer an IP67 protection level, ● inductive proximity detectors: they detect all metal objects and provide information on the object presence/absence test functions. They offer an IP67 protection level.	 
Dialog function products ● button boxes: they are made up of dialog tools, which are perfectly adapted to an exchange of information between operator and machine. They offer an IP65 protection level, ● keyboards: man/machine dialog tools, they have 12 touch-sensitive keys. The information delivered is coded in BCD on 4 bits. They offer an IP65 protection level.	 

Element	Illustration
Signaling elements ● illuminated columns: optical or sound signaling elements.	
The bus master Built in to a TSX 37 10/21/22 PLC, the TSX SAZ 10 module (master of AS-i bus) manages all the exchanges of data on the AS-i network.	 **TSX SAZ 10**  **TSX 37 ●●**
The AS-i supplies AS-i-specific supplies, designed to supply the components connected to the AS-i bus. The distribution of this supply uses the same medium as that used for data exchange.	 **TSX SUP A02**  **TSX SUP A05**
The connecting and branching accessories It is possible to connect to AS-i bus because of the T-connections which were planned for connections to AS-i flat cable or to flat/round cable branches.	 T-connection for flat cable  Flat cable/round cable derivation

Example of an AS-i bus topology from a TSX 37 PLC

Illustration:



Main characteristics of AS-i bus

General

AS-i is a system in which exchange management is guaranteed by a single master who calls in succession each slave (by scanning the bus) that has been detected and awaits a response.

Vehicle series communication frame:
- 4 bits of data (D0 to D3), which are the image of the inputs or outputs according to the nature of the interface,
- 4 bits of parametering (P0 to P3), which allow the operating modes of the interface to be defined.
  The P0 to P3 bits are used for "intelligent" devices, including asic AS-i, operation can be modified during runtime.

The address of the slave concerned is coded in 5 bits.
At the request of the AS-i master, the outputs are set and the inputs of the AS-i devices are given in the slave's response.

Table of main characteristics

The following table provides the main characteristics of the AS-i bus:

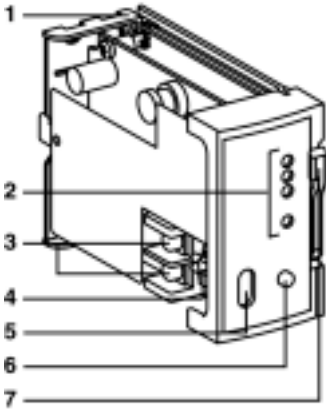
Characteristics	Description
Slave addressing	Each slave connected to the AS-i bus must have an address between 1 and 31 (coding on 5 bits). The slaves delivered from the factory have the address 0 (the address of the slave is memorized in a non-volatile way). The programming of the address is achieved using a XZMC11 (1) terminal, specifically for addressing.
Slave identification	All slave devices connected to the AS-i bus are identified by: • an I/O Code (input/output distribution code), • an identification code, which completes the functional identification of the slave. These identifications allow the AS-i master to recognize the configuration which is present on the bus. These different profiles have been developed by the AS-i association, they make it possible to distinguish the following modules – inputs, outputs, mixed modules, "intelligent" device families, etc.
Maximum number of inputs/ outputs	An AS-i bus can support a maximum of 31 slaves. Each slave having a maximum of 4 inputs and/or outputs. This makes it possible to manage a maximum of 124 inputs + 124 outputs, that is to say 248 discrete inputs/outputs, if all the active devices have 4 inputs and 4 outputs.

Characteristics	Description
AS-i cable	The AS-i cable is a two-wire link on which the communication and supply of the connected devices are transmitted. The link does not need to be shielded or twisted, the section of wires can be from 2 x 0.75mm^2 2 x 1.5mm^2 or 2 x 2.5mm^2, according to the current used by the devices.
Topology and maximum length of AS-i bus	The topology of the AS-i bus is free, it can be perfectly adapted to meet the users' needs (point to point, on line, tree topology). In every case, the cumulative length of all the branches of the bus must not exceed 100 meters without a relay.
AS-i bus cycle time (slave <-> TSX SAZ 10)	The AS-i system always transmits information, which is identical in length to each slave on the bus. The AS-i cycle time depends on the number of slaves connected to the bus (in the presence of 31 functioning slaves, this period of time will be a maximum of 5 ms).
Reliability, flexibility	The transmission process used (Manchester current and coding modulation) guarantees reliable operation. The master monitors the supply voltage from the line and data, which have been transmitted. It detects the transmission errors as well as slave failure and transmits the information to the PLC. Exchanging or connecting a new slave during operation does not disturb communication with other slaves.

Description of the TSX SAZ 10 module

Illustration

TSX SAZ 10 supply



Number table

The TSX SAZ 10 module comes in the form of a half size module and is made up of the following elements:

Number	Description
1	Body of module.
2	Module, communication and diagnostics LEDs on the AS-i bus.
3	Screw terminal block for connecting the AS-i cable.
4	Clip for blocking the AS-i cable on the module to offer a retention guarantee.
5	Polarized orifice for AS-i cable to pass through.
6	Push button for displaying AS-i at the level of the centralized display block located on the front of the TSX 37 PLC.
7	Lock enabling: ● locking of the module in its slot, ● unlocking and extraction of the module.

Installation/mounting of the TSX SAZ 10 module

General

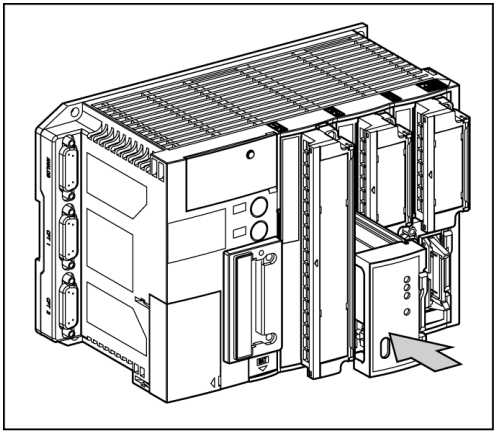
The TSX SAZ 10 **must be mounted in position 4** on the PLC version V TSX 37 10/ 37 21/ 37 22 database >= 2 0.

The insertion and extraction of the module follows the general procedure for inserting and extracting modules on TSX 37 PLCs.

Note: The module must be mounted and removed with both the PLC and the AS-i bus supplies switched off.

Illustration

Mounting a TSX SAZ 10 module in a TSX 37 2 PLC bus**.**



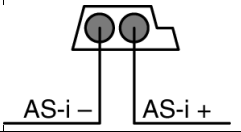
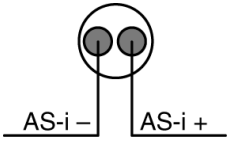
Note: A TSX 37 10/21/22 PLC station only accepts a single TSX SAZ 10 module. The TSX 37 05 and TSX 08 PLCs only accept TSX SAZ 10 modules. When a TSX SAZ 10 module is installed (position 4), the position can only receive an analog or counting half-size module, the half-size discrete inputs/outputs are no longer managed in this position.

Connecting the TSX SAZ 10 modules

AS-i bus cable

They carry the signals and supply the sensors and actuators connected to the bus electrically with 30 VDC.

Different cable types:

Description	Illustration
Polarized AS-i flat cable: yellow, with 1.5mm wire section^2.	
Standard, round cable with 1.5mm-section wires^2 or 2.5mm^2. Recommended cable: reference H05VV-F2x1.5, conforms to the DIN VDE 0281 standard. 1.5mm wire section^2.	

Routing cable:
The AS-i cable must be separated from the power cables, which carry high levels of energy.

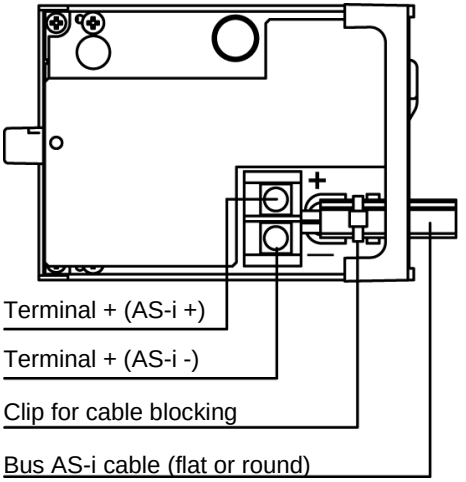
Connecting the module to the AS-i bus cable

No accessories or specific tools are needed to connect to the AS-i bus.
Cable tightening on the posts is performed with the help of a screwdriver.
The electrical connection is established on the posts, which are located inside the module.

polarity labels are screen-printed on the printed circuit:
- pole +: AS-i + connection,
- pole -: AS-i - connection,

Connecting operations are performed outside the rack with the module.
It is recommended that a tip be put on each wire.
Fix the cable to the module by using the cable-tightener.

Illustration:



Module status display

General

It is carried out via of the 4 LED's which are located on the RUN, ERR, COM, AS-i module and which by means of their status (LED off, blinking or on) provide information on the operating mode of the module:

Etat / Voyant	**Lit** 	**Blinking** 	**Off** 
RUN (Green)	Module operating normally.	Selftest module (1).	faulty module, or module switched off.
ERR (Red)	Serious internal fault, module has broken down.	Selftest module (1). Fault: system OK but • application fault or, • AS-i bus error	No internal fault.
COM (Yellow)	-	Selftest module (1). Communication on AS-i bus.	No communication on AS-i bus.
AS-i (Red)	No AS-i supply module	Selftest module (1). Fault on an AS-i bus slave.	No faults on AS-i bus.

(1) simultaneous blinking of the 4 LEDs in the selftests when the module is switched on.

Technical characteristics of TSX SAZ 10 module and of AS-i Bus

Table of characteristics

The following table describes the technical characteristics of the TSX SAZ 10 module:

AS-i bus	Maximum cycle time of AS-i bus.	5 ms
	Maximum number of slaves on the AS-i bus.	31
	Maximum length of AS-i bus (all branches mixed without relay).	100 meters
	Maximum number of inputs/outputs.	124 inputs + 124 outputs
	Nominal supply voltage for AS-i bus.	30 VDC
Module TSX SAZ 10	Programming the TSX SAZ 10 module.	from the PL7 Junior and PL7 Micro software >=1.7
	Response time with 31 slaves (1) for a PLC cycle time of 10ms.	typically 20ms 35 ms maximum
	Calculation of AS-i scanning time for n slaves (normal operation).	156 micro seconds x (n+2) if n<31 156 micro seconds x (n+1) if n=31
	Current used on the 5V PLC.	typically 100mA/150mA max.
	Current consumed on the 30V AS-i.	typically 50mA/100mA max.
	Protection from polarity reversion on AS-i bus inputs.	Yes
	Degree of protection	IP20
	Operating temperature.	0 to 60°C
	AS-i master profile.	M2
	Norms and service conditions.	conforming to those of TSX 37 PLCs.

(1) Logical response time = time between an AS-i input activated on the bus, processed in the PLC application and applied to an AS-i output.

Personnel safety

General

To guarantee personal safety, it is imperative:

- that the PLC ground terminal is connected to the ground,
- that an AS-i VLSV (very low safety voltage) supply module, nominal voltage 30 VDC is used,
- for PLCs which are connected to an alternating current network, a differential circuit breaker must be placed upstream of this network and this will cut off the PLC supply source if ground leakage is detected,
- for PLCs which are connected to a direct current supply source, you must ensure that the supply placed upstream of the PLC is VLSV,
- that certified AS-i products are used on the bus.

Because of its technology and connection, the AS-i TSX SAZ 10 module only receives 4VDC and its "zero electrical volt" is linked to the ground of the PLC.Be

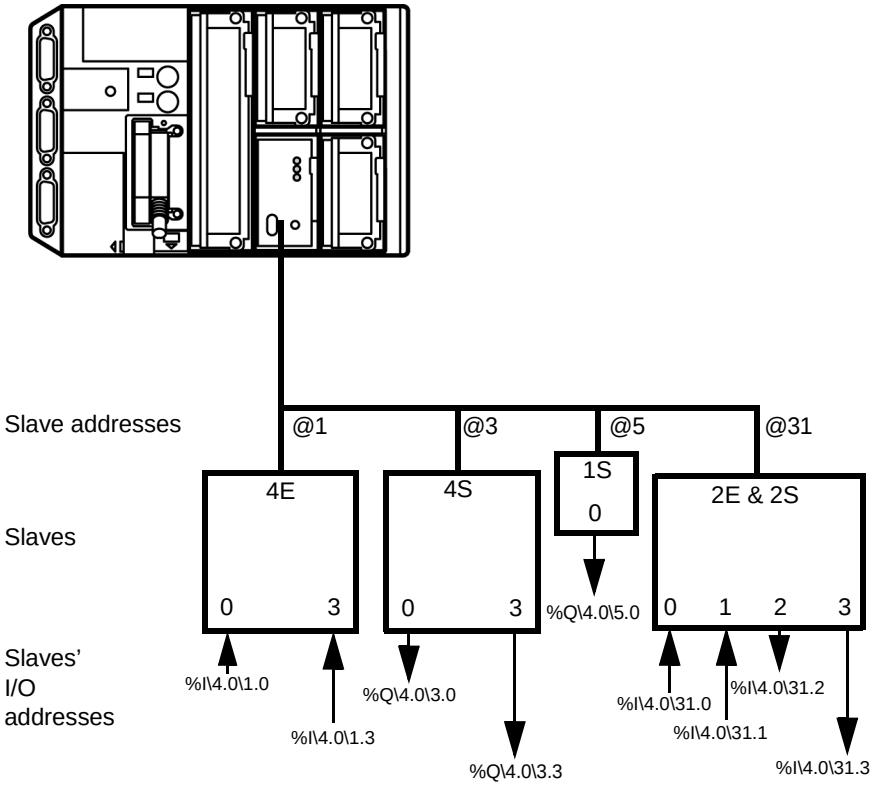
Addressing input/output objects

General

The AS-i bus is managed by channel 0 of the TSX SAZ 10 module which is always in position 4 of a TSX 37 PLC database. The syntax of the input/output data is as follows:

Inputs %I\4.0\n.rank n= number of the slave on the AS-i bus (1 to 31).

Outputs %Q\4.0\n.rank rank= number of the slave's input or output bit (0 to 3).

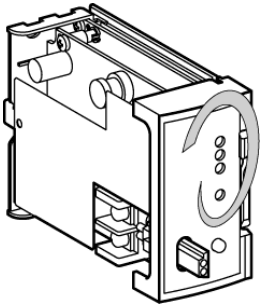


Diagnostics of TSX SAZ 10 module and AS-i bus

Diagnostics from the modules signaling LEDs

The module is fitted with LEDs, which provide the user with information on the operating status of the module and the bus.

Illustration:



LED status

Diagnostics table:

RUN	ERR	COM	AS-i	Meanings	Corrective actions
○	○	○	○	Module switched off.	Switch the device on.
●	●	●	●	Module selftests in progress.	-
●	○	●	○	Operating in protective mode (operating normally)	-
●	●	●	●	Fault on AS-i bus (self-programming impossible).	Replace the faulty slave with an identical new slave.
●	●	●	○	Fault on AS-i bus (self-programming impossible).	Connect the terminal.
●	●	○	●	AS-i supply module fault or no slave on AS-i bus.	Check the AS-i supply module and the continuity of the AS-i bus cable.

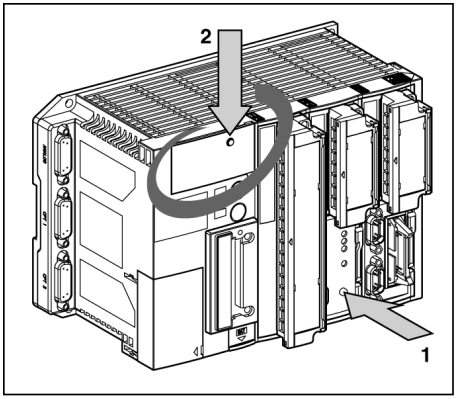
● On ○ Off ● Blincking

Diagnostics from the PLC display block

The PLC display block allows:
- the presence display of each slave on the AS-i bus, (R I/O – DIAG mode),
- the status display of the input/output bits of each slave present on the bus (R I/O mode).

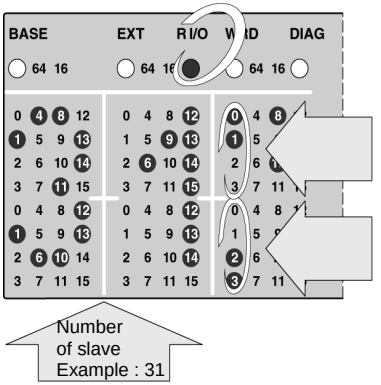
These modes can be accessed by a combination of actions on the push buttons (1) of the TSX SAZ 10 module and (2) on the PLC display panel.

Illustration:

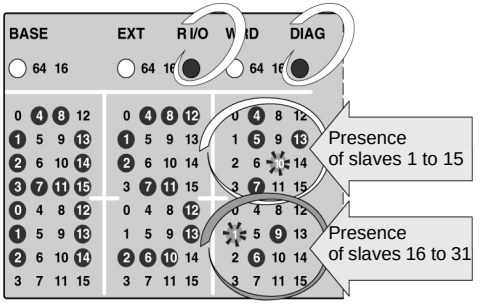


Status display of the input/output bits of each slave

Illustration:



Display of the I/O bits state for each slave (R I/O mode)



Display of the presence of each bus AS-i slave (mode R I/O - DIAG)

Display of the presence of each slave on the AS-i bus (R I/O – DIAG mode)

Introduction

This mode makes it possible to display:
- the slaves, which have been installed and detected (LED permanently lit),
- slaves, which have not been installed or detected (LEDs off),
- slaves, which have been installed but not detected or not installed but detected (LEDs lit and blinking).

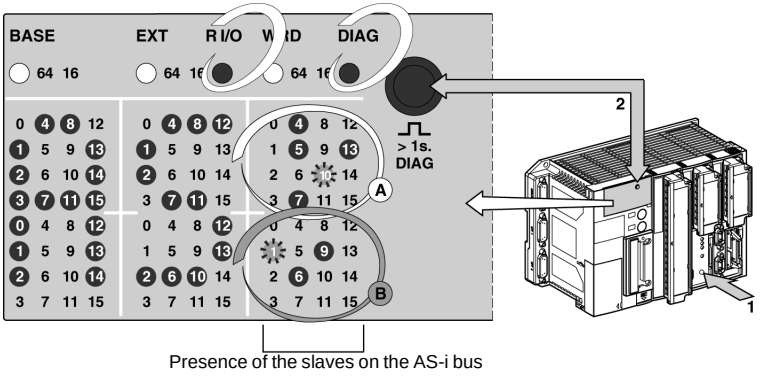
Procedure for access

Carry out the following steps:

Step	Action
1	Initial status of display panel: local input/output display mode (Base or EXT LEDs lit).
2	If you press the push button (1) briefly, the TSX SAZ 10 module changes to R I/O mode.
3	If you press the push button (2) on the PLC display block for a long time, it changes to diagnostics mode (R I/O LED lit). The image of the AS-i network is therefore displayed on the right-hand panel, with each LED representing an address of an AS-i bus slave. All the **A** LEDs represent the addresses of slaves 0 to 15, all the **B** LEDs represent addresses 16 to 31 (add + 16 to the figure displayed to get the exact address of the slave).
4	To return to the initial status: ● **a long press** on the push button **(2)**on the display panel (to exit the AS-i bus diagnostics module), ● **a short press** on the push button **(1)**on the TSX SAZ 10 module (to return to local input/output display mode).

Example

Illustration:



In the above example:

- the slaves with the addresses 4, 5, 7, 13, 22(6+16) and 25 (9+16) are operating normally (LEDs permanently lit),
- the slaves with addresses 10 and 17 (1+16) are faulty (blinking LED's),
- the LEDs which are not lit represent the empty addresses.

Display of the status of input/output bits of each slave (R I/O mode)

Introduction

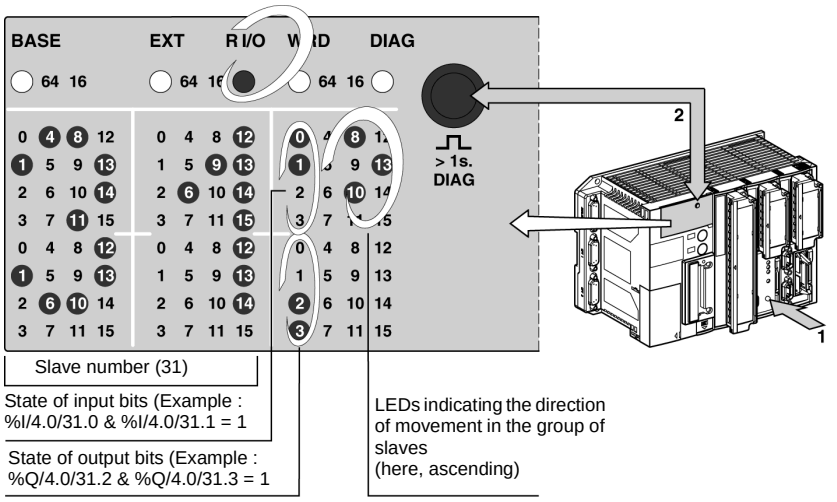
The PLC display panel enables the status of the input/output bits of each slave present on the bus to be displayed.

Procedure for access

Carry out the following steps:

Step	Action
1	Initial status of display panel: local input/output display mode (Base or EXT LEDs lit).
2	**A short press** on the push button (1) on the TSX SAZ 10 module changes to R I/O mode with display: ● of a slave address (1 to 31) on the two panels on the left-hand side (numerical display), ● of the status of the input/output bits relative to the slave displayed, on the panel on the right-hand side (LED lit = status 1 bit, LED off = status 0 bit or no input and output). The LEDs (0 to 3) at the top show the status of the input bits of the slave (maximum of 4 input bits per slave); the LEDs (0 to 3) at the bottom show the status of the output bits of the slave (maximum of 4 output bits per slave), ● the direction of movement in all the slaves which is shown by three LEDs being lit: if LEDs 8,13 and 10 are on, movement in the group of slaves takes place in ascending order, if LEDs 12, 9 and 14 are on, movement takes place in a descending order.
3	Pressing **briefly several times in succession**on the push button **(2)** of the centralized display makes it possible to change to ascending order (1 -> 31) or descending order (31 -> 1) of the number of the slave according to the direction of movement. Changing direction (ascending or descending) is achieved with **a long press** on the push button **(1)** on the TSX SAZ 10 module.
4	Returning to the initial status of the display panel is achieved by **a short press** of the push button **(1) of the** TSX SAZ 10 module.

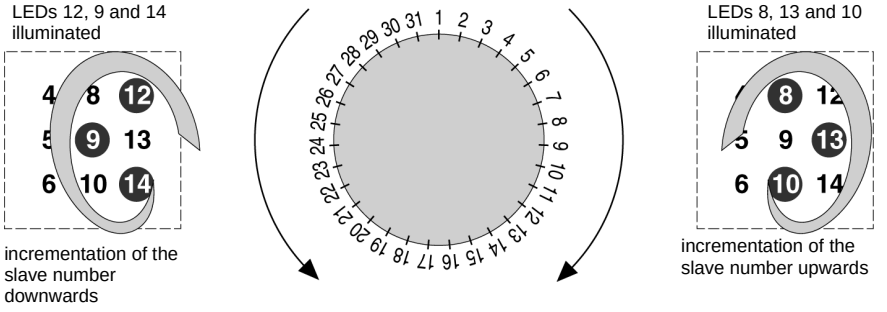
Illustration:



Incrementation of the slave number in ascending or descending order.

When the PLC display panel is in R I/O mode (display of input/output bits of each slave), the user can scan the slaves in ascending (1->31) or descending (31->1) order. The direction is shown by 3 LEDs on the level of the display panel (as indicated below) being lit. The direction can be changed by a long press of the push button (1) on the TSX SAZ 10 module.

Illustration:



Usage precautions

Fallback position

The fallback mode is defined in the configuration screen (general parameters) and can be read in the %KW4.0.19 word (%KW4.0.19.X0=0, maintenance).

The fallback mode is not guaranteed if the AS-i bus cuts out or if the AS-i supply is lost. If this occurs, and if the maintenance mode has been chosen, it is up to you to set the outputs to the desired status when the fault has disappeared.
To do this, the following language objects must be used:

- %MW4.0.2:X0 (1 = no slave present),
- %MW4.0.3:X6 (1 = loss of AS-i supply).

On changing from the AS-i channel to STOP:

- with option to reset to 0: the outputs are forced to 0, then communication stop on the medium,
- with maintenance option: the outputs are maintained, then communication stopped on the medium,

24V auxiliary supply

The disappearance of the 24V auxiliary supply is not generated by the TSX SAZ 10 module. Information on the disappearance of this supply can be accessed by using a 24V input.

multiple addressing

When one or more slaves are connected, make sure that you do not assign an address which is already being used by a slave on the bus. No information indicates an addressing error.

Process and AS-i supply

III

At a Glance

Aim of this Part

This Part describes Process and AS-i supply and their installation.

What's in this part?

This Part contains the following Chapters:

Chapter	Chaptername	Page
25	Process and AS-i supply: introduction	375
26	Process and AS-i suppliers: installation	393
27	Process supply modules: connections	403
28	Connecting AS-i supply modules	411
29	Process and AS-i supply module characteristics	419

Process and AS-i supply: introduction

25

At a Glance

Aim of this Chapter

This Chapter introduces Process and AS-i supply.

What's in this Chapter?

This Chapter contains the following Maps:

Topic	Page
General introduction to Process and AS-i supply modules	376
Physical description of TBX SUP 10 supply block	378
Physical description of the TSX SUP 1011 supply module	379
Physical description of TSX 1021/1051 supply modules	380
Physical description of the TSX SUP A02 supply module	382
Description of TSX SUP 1101/A05 supply blocks	383
Physical description of the support board	384
Catalog of 24 VDC process supply	386
Process supply: auxiliary functions	388
Catalog of AS-i supply modules	390
AS-i supply module: dedicated features	391

General introduction to Process and AS-i supply modules

General

A wide range of supply blocks and modules is offered which can be arranged to best serve your requirements:

- TBX SUP 10 and TSX SUP 1..1 process supply blocks and modules, designed to supply 24 VDC to automatic control peripheral devices, and controlled by PLCs (TSX Micro and Premium). Peripheral devices include sensors, pre-actuators, encoders, dialog terminals, controllers, LED indicators, push-buttons, pneumatic jacks, etc. . The 24 V voltage power can be supplied by a 100/240 V, 50/60 Hz alternating current.
- TSX SUP A02 and A05 supply blocks and modules are designed to supply 30 VDC to components connected to an AS-i field bus. The supply distribution uses the same conductors as those used for data exchange.

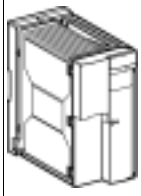
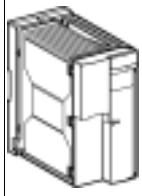
Methods of mounting these products have been studied in-depth to comply with specific mounting distance requirements for TSX Micro, TSX Premium PLCs and TBX products.

All products are mounted:

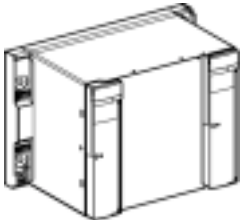
- on AM1-PA Telequick boards,
- on AM1-DP200 / DE200 central DIN rail, except for TSX SUP 1101 and TSX A05 high power supply blocks.

Introductory tables

This table introduces the different Process supplies:

Process Supply				
Network voltage 100…240 VAC or 125 VDC		Network voltage 100...120/200...240 VAC		
				
24 VDC: 1A	**24 VDC / 1A**	**24 VDC / 2A**	**24 VDC / 5A**	**24 VDC / 10A**

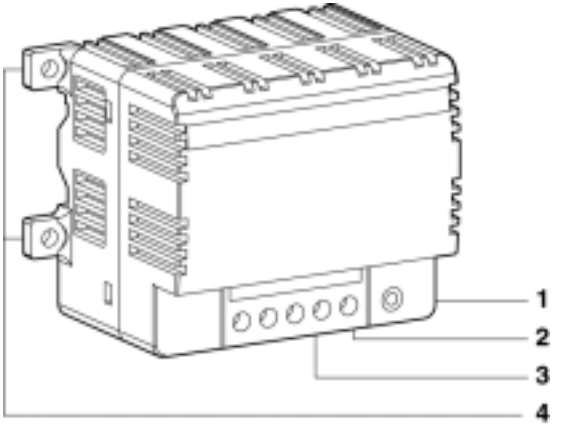
This table introduces the different AS-i supplies:

AS-i bus supply	
Network voltage 100...120 VAC or 200...240 VAC	
	
30 VDC AS-i / 2.4A	**30 VDC AS-i / 5 A & 24 VDC**

Physical description of TBX SUP 10 supply block

Illustration

Diagram and numbers:



Number table

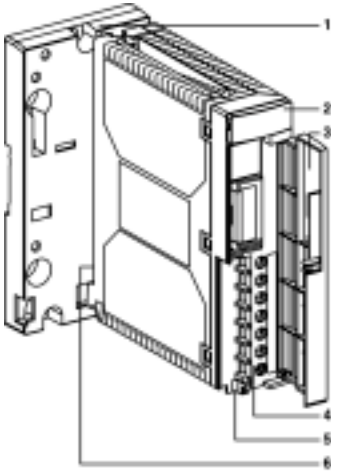
The following table shows the numbers and their corresponding descriptions from the diagram above:

Numbers	Description
1	LED showing power-up of module.
2	Screw terminal block for supply voltage wiring.
3	Identification label for the wire terminals.
4	Wings for fixing the module.

Physical description of the TSX SUP 1011 supply module

Illustration

Diagram and numbers:



Number table

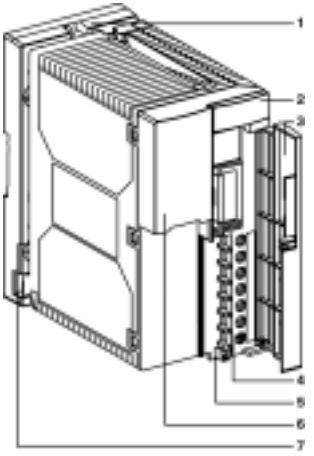
The following table shows the numbers and their corresponding descriptions from the diagram above:

Numbers	Description
1	Support board for fixing the supply module directly onto the AM1-DE200 / DP200 DIN mounting track or the AM1-PA Telequick perforated board.
2	Display block with: ● a 24 V LED (green): lit if the established internal and output voltages are correct, ● a LSH LED (orange) "power optimization mode": lit if the power supply is running in parallelization mode with power optimization.
3	Flap for protecting the terminal block.
4	Screw terminal block for connection: ● to the AC/DC supply network, ● to 24 VDC output.
5	Hole for the cable-tightening clip to go through.
6	"NOR/LSH" switch placed at the back of the module to control the power optimization system. ● NOR position: normal operation without power optimization (default position), ● LSH position: operation with power optimization with supply running in parallel.

Physical description of TSX 1021/1051 supply modules

Illustration

Diagram and numbers:



Number table

The following table shows the numbers and their corresponding descriptions from the diagram above:

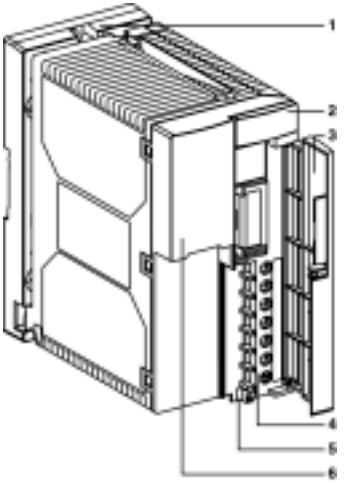
Numbers	Description
1	Support board for fixing the supply module directly onto the AM1-DE200 / DP200 DIN mounting track or the AM1-PA Telequick perforated board.
2	Display block with: ● a 24 V LED (green): lit if the established internal and output voltages are correct, ● a LSH LED (orange) only on TSX SUP 1021 "power optimization mode": lit if the power supply is running in parallelization mode with power optimization.
3	Flap for protecting the terminal block.
4	Screw terminal block for connection: ● to the AC/DC supply network, ● to 24 VDC output.
5	Hole for the cable-tightening clip to go through.
6	110/220 V voltage selector. On delivery, the selector is set at 220.

Numbers	Description
7	"NOR/LSH" switch placed at the back of the module to control the power optimization system. This switch is only present on the TSX SUP 1021 module. ● NOR position: normal operation without power optimization (default position), ● LSH position: operation with power optimization with supply running in parallel.

Physical description of the TSX SUP A02 supply module

Illustration

Diagram and numbers:



Number table

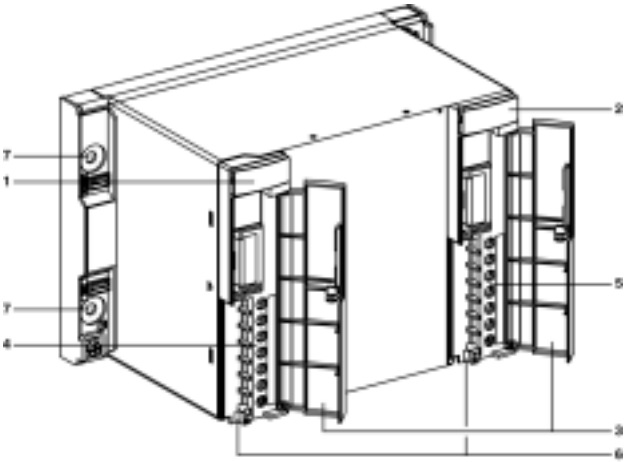
The following table shows the numbers and their corresponding descriptions from the diagram above:

Numbers	Description
1	Support board for fixing the supply module directly onto the AM1-DE200 / DP200 DIN mounting rail or the AM1-PA Telequick board.
2	Display block with: ● an AS-i LED (green): lit if the internal and output voltages are correct,
3	Flap for protecting the terminal block.
4	Screw terminal block for connection: ● to an alternating supply network, ● from AS-i 30 VDC output.
5	Hole for the cable-tightening clip to go through.
6	110/220 V voltage selector. On delivery, the selector is set at 220.

Description of TSX SUP 1101/A05 supply blocks

Illustration

Diagram and numbers:



Number table

The following table shows the numbers and their corresponding descriptions from the diagram above:

Numbers	Description
1	Display block with an ON LED (orange): lit if power supply is running.
2	Display block with: ● a 24 V LED (green): lit if 24 VDC output voltage is present and correct, ● an AS-i LED (green): lit if the AS-i 30 VDC output voltage is present and correct. This LED is only present on the TSX SUP A05.
3	Flap for protecting terminal blocks.
4	Screw terminal block for connection to alternating supply network.
5	Screw terminal block for connecting AS-i 24 VDC and 30 VDC output voltage to TSX SUP A05.
6	Holes for the cable-tightening clip to go through.
7	Four fixing holes for M6 screws.

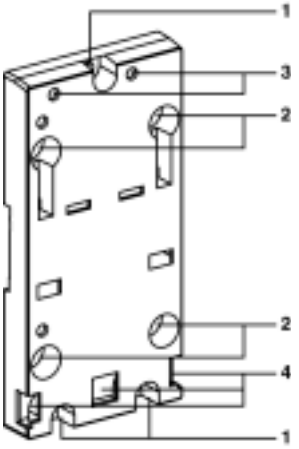
Physical description of the support board

Introduction

Each TSX SUP 10.1 and TSX SUP A02 supply module is delivered mounted on a support board. This is used to fix the supply module: either onto a DIN AM1-DE200 or AM1-DP200 mounting rail, or onto an AM1-PA Telequick perforated board. Each support board can take: either a TSX SUP 1021, TSX SUP 1051 or TSX SUP A02 module, or one or two TSX SUP 1011 modules.

Illustration

Diagram and numbers:



Number table

The following table shows the numbers and their corresponding descriptions from the diagram above:

Numbers	Description
1	Three 5.5 mm diameter holes for fixing the board onto a panel or an AM1-PA perforated board with a mounting distance of 140 mm (mounting distance for TSX 37 PLCs).
2	Four 6.5 mm diameter holes for fixing the board onto a panel or an AM1-PA perforated board with a mounting distance of 88.9 mm (mounting distance for TSX 57 PLCs).
3	Two M4 holes for fixing TSX SUP 1011/1021/1051/A02 supply module(s).
4	Holes for anchoring pins at the bottom and rear of the module.

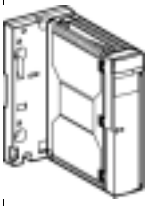
Note: Each of these supply modules can also be mounted on a TSX RKY … rack in place of another module, except in position PS. This must only be used by a TSX PSY … supply module for supplying rack modules.
The following operations require the module to be removed from the support board:

- positioning the "NOR/LSH" switch onto "LSH",
- mounting the board onto a panel or AM1-PA perforated board,
- mounting the module onto a TSX RKY … rack .

Catalog of 24 VDC process supply

Selection table

The following table provides the main characteristics of the 24 VDC process supply:

		
Input characteristics Nominal voltage	100...240 VAC or 125 VDC	
Thresholds	90..264 VAC or 88..156 VDC	85..264 VAC or 105..150 VDC
Frequency limit	47..63Hz	47..63Hz or 360..440Hz
Nominal input current	0.4A	0.4A
Output characteristics Output	24W	26W
Output voltage (direct)	24 VDC	
Nominal current	**1A**	**1A**
Auxiliary functions Very Low Safety Voltage (1)	No	Yes
Parallelization (2)	No	Yes with power optimization (3)
Redundancy (4)	No	Yes
Product references	**TBX SUP 10**	**TSX SUP 1011**

Selection table (continued)

The following table provides the main characteristics of the 24 VDC process supply:

			
Input characteristics Nominal voltage	100...120 VAC or 200...240 VAC		
Thresholds	85...132VAC or 170...264VDC		

Frequency limit	47...63Hz or 360...440Hz		
Nominal input current	0.8A	2.4A	5A
Output characteristics Output	53W	120W	240W
Output voltage (direct)	24 VDC		
Nominal current	**2.2A**	**5A**	**10A**
Auxiliary functions Very Low Safety Voltage (1)	Yes		
Parallelization (2)	Yes with power optimization (3)		
Redundancy (4)	Yes	No	
Product references	**TSX SUP 1021**	**TSX SUP 1051**	**TSX SUP 1101**

(1) Construction characteristics according to IEC 950, IEC 1131-2 standards, guaranteeing user-safety during 24V output, in terms of insulation between primary and secondary, maximum overload on output wires, and protection via the grounding circuit.
(2) Possibility of parallelizing 2 supply module outputs of the same type, to provide an output current greater than the maximum allowed by a single supply module.
(3) For 2 modules providing a total current of 100%, each module provides 50% of the total current. This extends the length of the product life.
(4) Parallelization of 2 supply module outputs of the same type, to provide a current less than the maximum allowed by a single supply module, but guaranteeing output voltage availability even if one of the modules becomes faulty.

Process supply: auxiliary functions

Parallelization mode with power optimization

The aim of parallelization is to use **two modules with the same product reference** in order to provide an output current which is greater than the maximum allowed by a single supply. The total current is the sum of the currents provided by all the supplies put together.

Power optimization is a system within the supply which is designed to distribute currents equally between parallel supplies. The resulting advantage is that the life of products is significantly extended, linked with distributed power consumption.

Dedicated supply features:

TSX SUP 1011/1021 supply	Power optimization mode is obtained by positioning the NOR/LSH switch at the rear of the modules onto LSH. To access the switch, the support board must be removed. When the orange LED (LSH) is lit, the mode is in operation. The current provided by two parallel supplies is limited to: ● 2A with 2 TSX SU 1011 supplies, ● 4A with 2 TSX SU 1021 supplies. Using this mode means output voltage can vary slightly: 24% + or - 5% instead 24 V + or - 3% in normal mode. When sharing loads, the power imbalance can reach a maximum of 25%.
TSX SUP 1051/1101 supply	Power optimization mode does not require a switch on these supply modules. A specific connection is required for these types of modules. The maximum current provided by two parallel supplies is limited to: ● 10A with 2 TSX SUP 1051 suppliers, ● 20A with 2 TSX SUP 1101 suppliers. Using this mode will lead to no loss of output voltage: When sharing loads, the power imbalance can reach a maximum of 15%.

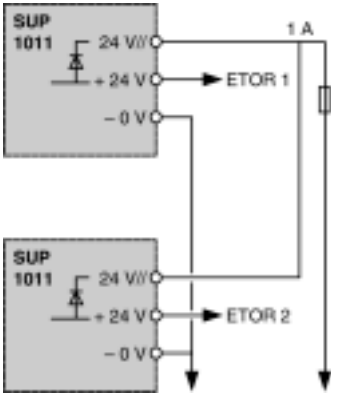
Redundancy/ Safety on TSX SUP 1011/1021 suppliers

Principle:

Ensure that the currents required for the application are available, even in the event of failure of one of the suppliers.
To do this, the two suppliers are run in parallel by setting up specific connections.

The suppliers are configured in power optimization mode.

Example: provide 1A with redundancy from 2 TSX SUP 1011 suppliers.



Note: TSX SUP 1051 and 1101 suppliers are not equipped with a serial diode, which is required for the redundancy function.

Catalog of AS-i supply modules

Selection table

The following table provides the main characteristics of AS-i supply modules:

		
Input characteristics Nominal voltage	100...120 VAC or 200...240 VAC	
Thresholds	85..132 VAC or 170..264 VCD	
Frequency limit	47..63Hz or 360..440Hz	
Nominal input current	1.3A	5A
Output characteristics Output	72W	230W
Output voltage (direct)	AS-i 30 VDC	AS-i 30 VDC / 24 VDC
Nominal current	**2.4A**	**5A(1)** / **7A(1)**
Auxiliary functions Very Low Safety Voltage (1)	Yes	
Parallelization (2)	No	
Redundancy (4)	No	Yes
Product references	**TBX SUP A02**	**TSX SUP A05**

(1) Maximum current for each output; total power is limited to 230 W.
(2) Construction characteristics according to IEC 950, IEC 1131-2 standards, guaranteeing user-safety during 24 V output, in terms of insulation between primary and secondary, maximum overload on output wires, and protection via the grounding circuit.

AS-i supply module: dedicated features

General

The simultaneous transmission of information and power down the same cable means that data transmission needs to be filtered in relation to supply.
This is why AS-i supply module has a built-in decoupling filter which supports the maximum direct current provided by the power supply. A standardized impedance is introduced into the power supply in relation to the frequency of information transmission.

Process and AS-i suppliers: installation

26

At a Glance

Aim of this Chapter

This Chapter deals with the installation of Process and AS-i supply modules.

What's in this Chapter?

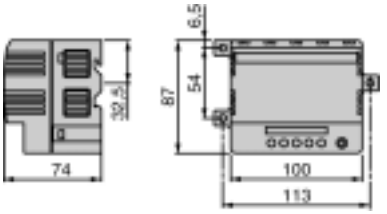
This Chapter contains the following Maps:

Topic	Page
TBX SUP dimensions/mounting/connections	394
Dimensions/mounting Process and AS-i supply modules	396
TSX SUP 1101/A05 supply block dimensions/mounting	399
Summary of mounting methods	401

TBX SUP dimensions/mounting/connections

Dimensions/ mounting

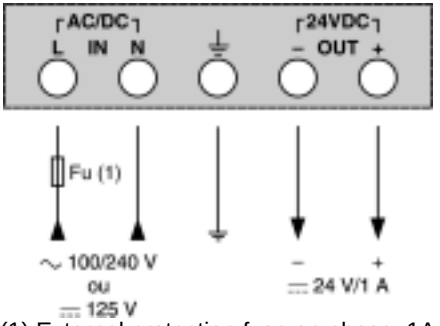
Illustration:



The TSX SUP 10 supply block must be mounted in an upright position to allow for the best possible natural air convection within the block.
It can be mounted on a panel, an AM1-PA Telequick perforated board or mounting rail.

Connections

Illustration:



(1) External protection fuse on phase: 1A time delay 250V if single supply block.

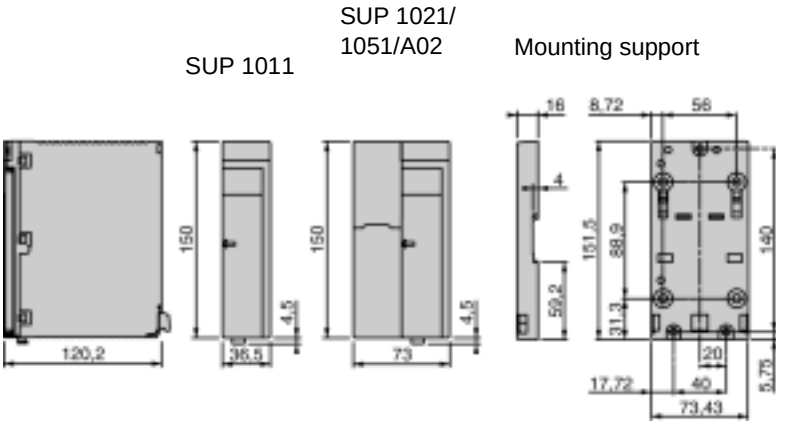
Note: Primary: if the module is supplied with a 100/240V alternating current, the phase and the neutral wire must be taken into account when wiring. On the other hand, if the module is supplied with a 125 V direct current, polarities do not need to be taken into account.
Secondary: the terminal, with 0V potential, must be connected to the ground as soon as the supply module starts to provide output.

	**DANGER**
	Personnel safety For personnel safety, the module ground terminal must be connected to the protective ground with a green/yellow wire. **Failure to observe this precaution will result in death or serious injury.**

Dimensions/mounting Process and AS-i supply modules

Dimensions

Illustration:

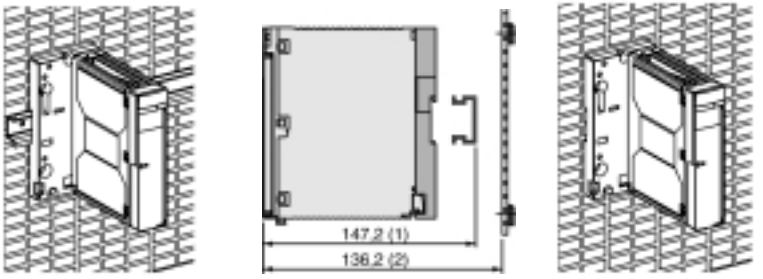


Dimensions in millimeters

Mounting on an AM1-DE200 or AM1-DP200 mounting rail or on an AM1-PA board

Each supply module is delivered fixed to a support which can be mounted in this way.

Illustration:



(1) 147.2mm (AM1-DE200
139.7mm (AM1-DP200)

(2) 136.7 mm (AM1-PA

Mounting on an AM1-D… mounting rail

Carry out the following steps:

Steps	Action
1	Check that the module is fixed to the support.
2	Fix the module + support assembly onto the mounting rail.

Mounting on an AM1-PA board

Carry out the following:

Step	Action
1	Remove the module from its support.
2	Mount the support onto the AM1-PA board.
3	Mount the module onto the support.

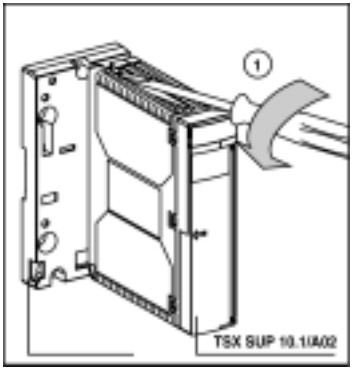
Mounting the module onto the support

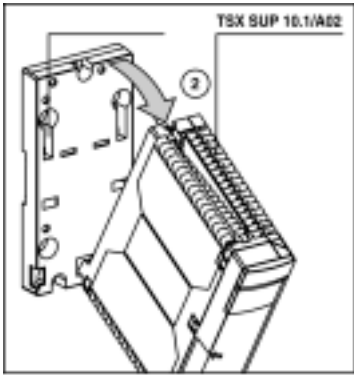
Each supply module is already provided with a support enabling it to be fixed directly onto a DIN mounting rail. The support can take one or two TSX SUP 1011 supply modules, or one TSX SUP 1021/1051/A02 supply module.

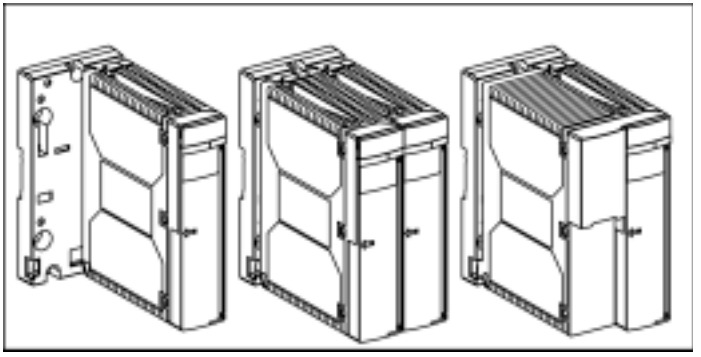
Carry out the following steps:

Step	Action
1	Anchor the module pins into the holes found at the bottom of the support.
2	Twist the module so it comes into contact with the support.
3	Tighten the screw at the top of the module to fix it firmly to the support.

Illustration:







1 module
TSX SUP 1011

2 modules
TSX SUP 1011

1 module
TSX SUP 1021/
1051/A02

Mounting on a TSX RKY … rack

TSX SUP 1011/1021/1051/A02 supply modules can be mounted in any position on the TSX RKY … rack, except in position PS which is reserved for the rack supply module. In this case, the support is not used and must be removed.

These modules are mounted in the same way as the processor modules.
See (Premium PLCs TSX 57/PCX 57 Processors Installation Manual Volume 1 - How to mount processor modules).

Note: The TSX PSY … rack supply module must be in position PS in order to supply the rack modules.

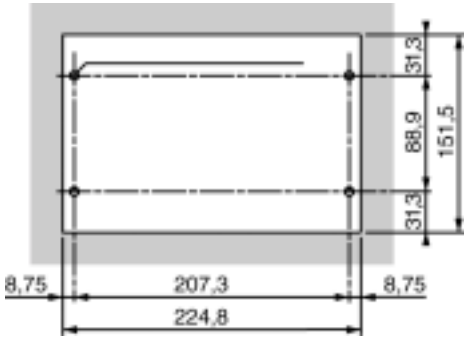
TSX SUP 1101/A05 supply block dimensions/mounting

Introduction

TSX SUP 1101 and TSX SUP A05 supply blocks can be mounted on a panel, an AM1-PA board, or DIN rail.

Panel mounting

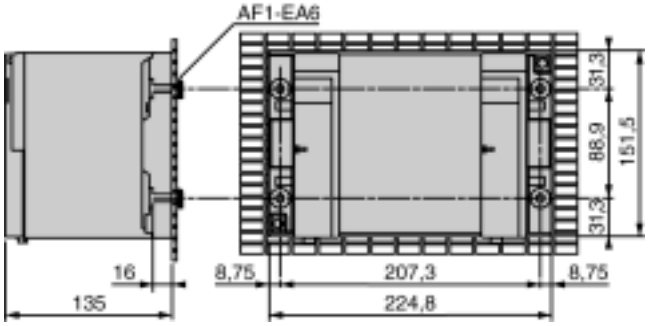
Screw-hole layout (dimensions in millimeters):



(1) The diameter of the fixing holes must be sufficient to take M6 screws.

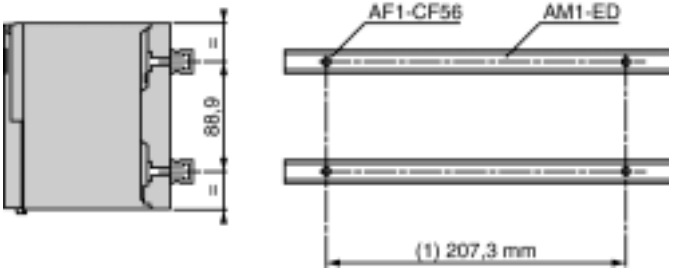
Mounting on an AM1-PA Telequick perforated board

Fix the supply block with M6 x 25 screws + washers and AF1-EA6 clips nuts (dimensions in millimeters:



Mounting on a 35 mm size DIN mounting rail

Fix the supply block using 4 M6 x 25 screws + washers and AF1-CF6 turn sliding nuts (dimensions in millimeters):



Summary of mounting methods

Summary table of mounting methods

The following table lists a summary of the different methods available for mounting Process and AS-i supply modules:

Supply module product reference	TSX SUP 10	TSX SUP 1011	TSX SUP 1021	TSX SUP 1051	TSX SUP 1101	TSX SUP A02	TSX SUP A05
AM1-PA Telequick board	X	X	X	X	X	X	X
AM1-DE200/ DP200 central DIN rail	X	X	X	X		X	
AM1-ED DIN rail with 140 mm spacing (TSX 37 PLC)		X	X	X		X	
AM1-ED DIN rail with 88.9 mm spacing (TSX 57 PLC)		X	X	X	X	X	X
TSX 57 TSX RKY rack..		X	X	X		X	

Process supply modules: connections

27

At a Glance

Aim of this Chapter

This Chapter deals with the connection of Process supply modules.

What's in this Chapter?

This Chapter contains the following Maps:

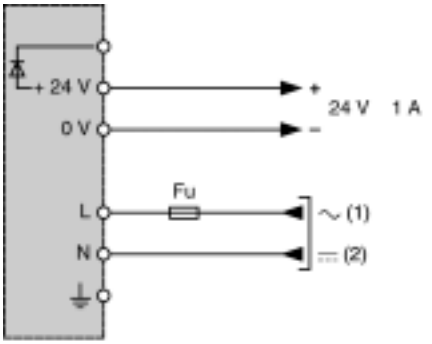
Topic	Page
Connecting TSX SUP 1011/1021 supply modules	404
Connecting TSX SUP 1051 supply modules	406
Connecting TSX SUP 1011 supply modules	408

Connecting TSX SUP 1011/1021 supply modules

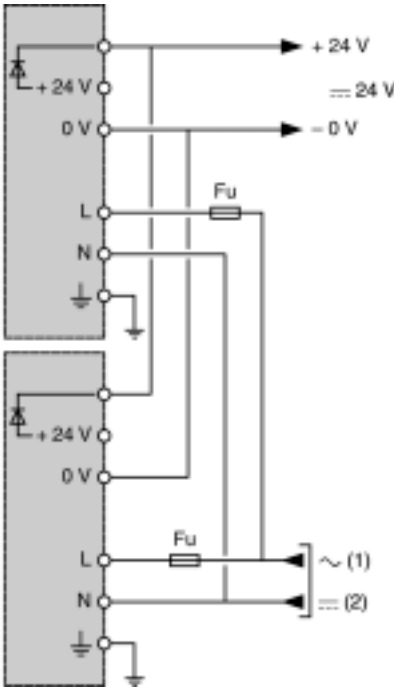
Illustration

Connection diagram:

Normal connection



Parallelization



Fu=External protection fuse
on phase (Fu) : 4A time delay 250 V.

(1) 100...240VAC on TSX SUP 1011
100...120/200..240VAC on TSX SUP 1021

(2) 125 VDC, only on TSX SUP 1011.

Rules of connection

Primary:if the module is supplied with a 100/240 V alternating current, the phase and neutral must be taken into account when wiring. On the other hand, if the module is supplied with a 125 V direct current, polarities must be taken into account.

	DANGER
	Personnel safety For personnel safety, the module ground terminal must be connected to the protective ground with a green/yellow wire. **Failure to observe this precaution will result in death or serious injury.**

The supply terminal block is protected by a flap which allows access to the wiring terminals. Wire output passes vertically to the bottom. Wiring can be maintained in position by a cable tightening clip.

To ensure insulation guaranteeing 24 V Very Low Safety Voltage, wires with the following properties are used:

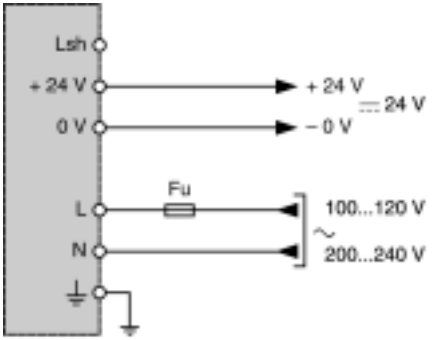
- a service voltage >= 600 VAC, with a cross-section of 1.5 mm^2 for connecting up to the power supply,
- a service voltage >= 300 VAC with a cross-section of 2.5 mm^2 for 24 V outputs and grounding.

Connecting TSX SUP 1051 supply modules

Illustration

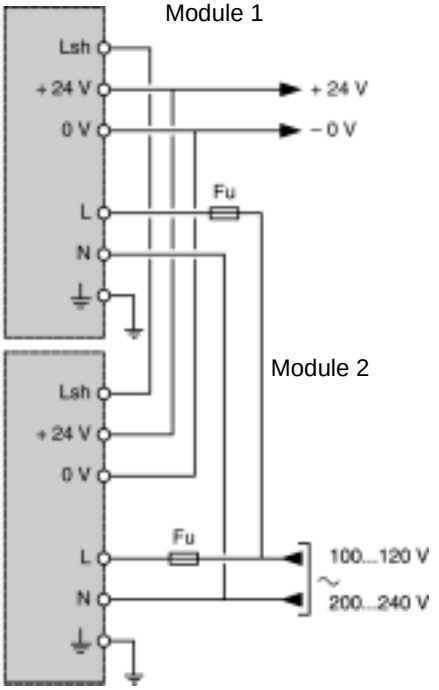
Connection diagram:

Normal connection



Fu=External protection fuse on phase (Fu) : 4A time delay 250V

Parallelization



Rules of connection

Primary: take the phase and the neutral into account when wiring.

	DANGER
	Personnel safety For personnel safety, the module ground terminal must be connected to the protective ground with a green/yellow wire. **Failure to observe this precaution will result in death or serious injury.**

The supply terminal block is protected by a flap which allows access to the wiring terminals. Wire output passes vertically to the bottom. Wiring can be maintained in position by a cable tightening clip.

To ensure insulation guaranteeing 24 V Very Low Safety Voltage, wires with the following properties are used:

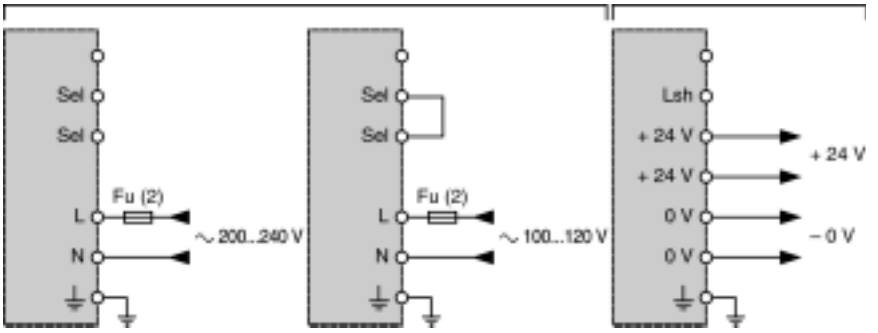
- a service voltage >= 600 VAC, with a cross-section of 1.5 mm^2 for connecting up to the power supply,
- a service voltage >= 300 VAC with a cross-section of 2.5 mm^2 for 24 V outputs and grounding.

Connecting TSX SUP 1011 supply modules

Illustration 1 Diagram showing normal connection:

input terminal block

output terminal block

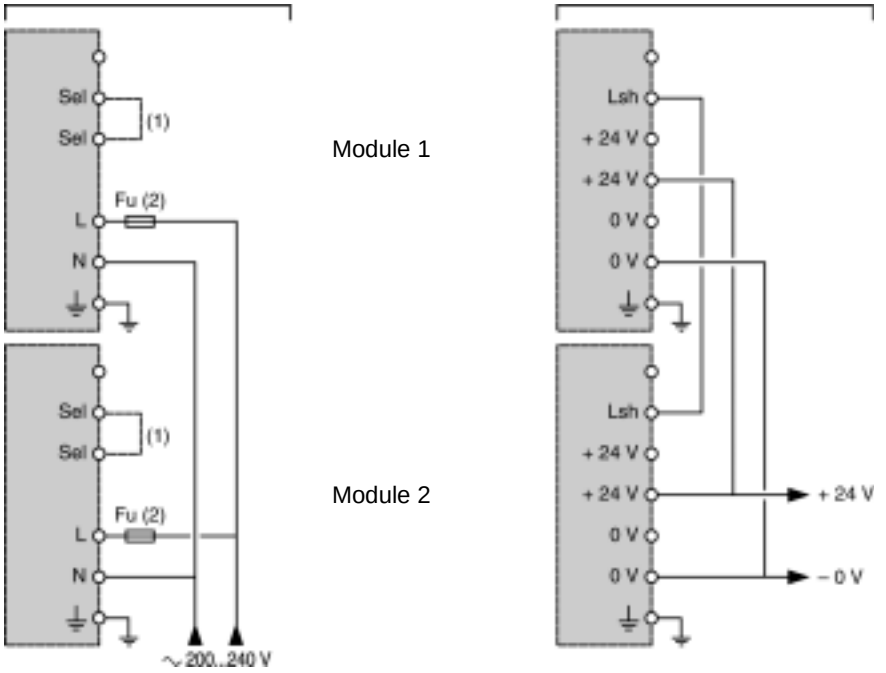


Connecting on an alternating network 200..240V

Connecting on an alternating network 100.0..120V

Connecting output 24V direc

Illustration 2 Diagram showing parallel connection (parallelization):



(1) Connection if supply is from 100…120 V alternating current network.
(2) External protection fuse on phase (Fu): 6.3A time delay 250 V.

Connecting AS-i supply modules

28

At a Glance

Aim of this Chapter

This Chapter deals with the connection of AS-i supply modules.

What's in this Chapter?

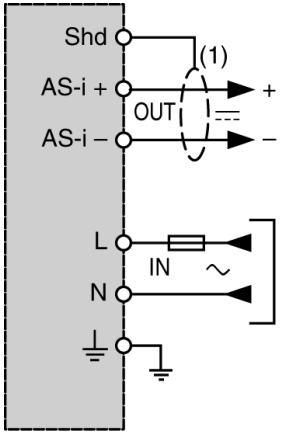
This Chapter contains the following Maps:

Topic	Page
Connecting TSX SUP A02 supply modules	412
Connecting TSX SUP A05 supply modules	414
General precautions	417

Connecting TSX SUP A02 supply modules

Illustration

Connection diagram:

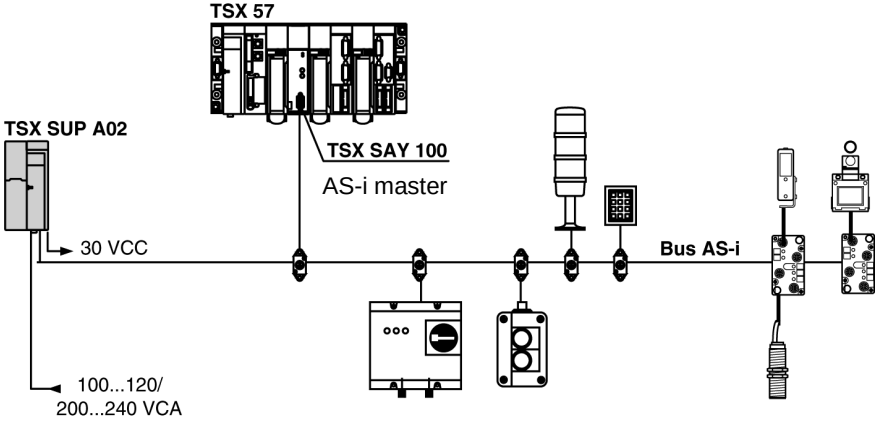


(1) Shielded AS-i cable screen in case of disrupted surroundings.

Fu=External protection fuse on phase (Fu) : 4A time delay 250 V.

Connection overview

The TSX SUP A02 supply module is designed to supply the AS-i bus, as well as the slaves which are connected to it (30 VDC/2.4Aoutput).



Rules of connection

Primary: take the phase and the neutral into account when wiring.

DANGER

Personnel safety

For personnel safety, the module ground terminal must be connected to the protective ground with a green/yellow wire.

Failure to observe this precaution will result in death or serious injury.

To ensure insulation guaranteeing 24 V Very Low Safety Voltage, wires with the following properties are used:

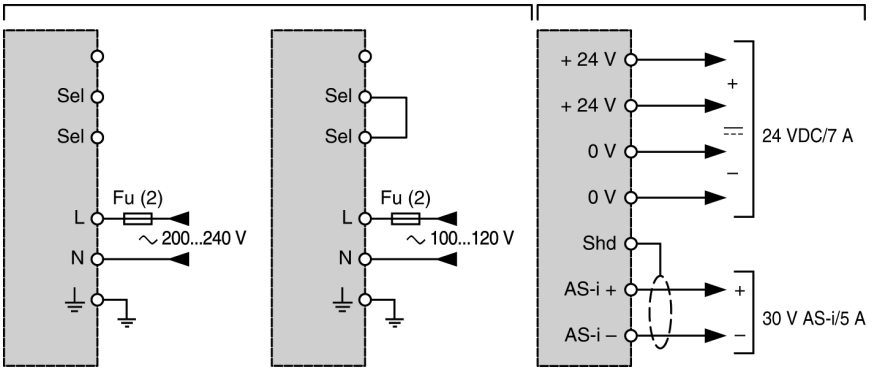
- a service voltage >= 600 VAC, with a cross-section of 1.5 mm^2 for connecting up to the power supply,
- a service voltage >= 300 VAC with a cross-section of 2.5 mm^2 for 24 V outputs and grounding.

Using a shielded cable for the AS-i bus is only necessary if the installation is overly disrupted in terms of EMC (Electro Magnetic Compatibility).

Connecting TSX SUP A05 supply modules

Illustration

Connection diagram:



Connection to alternating network 200..240 V

Connection to an alternating network 100.0..120 V

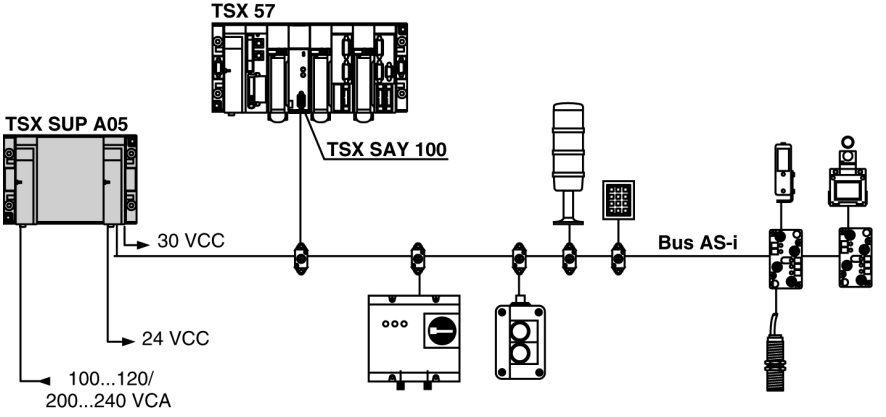
Direct output connection 24V and 30 V AS-i

(1) Connection if supply is from 100…120V alternating current network.
(2) External protection fuse on phase (Fu): 6.3A time delay 250 V.
(3) Shielded AS-i cable screen in case of disrupted environment.

Connection overview

The TSX SUP A05 supply module is designed to supply the AS-i bus, including the slaves which are connected to it (30V/5A output). It also has an auxiliary supply (24 VDC/7A) for sensors/actuators which consume large amounts of current. For this, a black AS-i ribbon cable is used.

Principle diagram:



Rules of connection

Primary: take the phase and the neutral into account when wiring.

DANGER

Personnel safety

For personnel safety, the module ground terminal must be connected to the protective ground with a green/yellow wire.

Failure to observe this precaution will result in death or serious injury.

The "alternating current network supply" and "AS-i 30 VDC and 24 VDC output" terminal blocks are protected by a flap which allows access to the wiring terminals. Wire output passes vertically to the bottom. Wiring can be maintained in position by a cable tightening clip.

Secondary:
To ensure insulation guaranteeing 24 V Very Low Safety Voltage, wires with the following properties are used:

- a service voltage >= 300 VAC, with a cross-section of 1.5 mm^2 or 2.5 mm^2 for connecting up to the power supply,
- a service voltage >= 300 VAC with a cross-section of 2.5 mm^2 for 24V outputs and grounding,
- connect the two 24V terminals in parallel, or distribute the load over the two 24V outputs when the total current to be provided is greater than 5A.

Using a shielded cable for the AS-i bus is only necessary if the installation is overly disrupted in terms of EMC (Electro Magnetic Compatibility).

Given the large current that this supply module provides, its position on the bus is very important. If the supply module is placed at one of the ends of the bus, it will provide a nominal current (e.g.5A) for the whole bus. The fall in voltage at the end of the bus is therefore proportional to the 5A. If it is placed in the middle of the bus, the fall in voltage at the end of the bus is only proportional to 2.5A, if there is equal power consumption on both sections of the bus.

If there is no slave which consumes large amounts of power, it would be better to place the supply module in the middle of the installation. Conversely, if the installation has one or several large power consumers, it would be wise to place the supply module close to them.

Note: Where there are large power consumer actuators (contactor, solenoid coils etc.) the TSX SUP A05 supply module can provide the auxiliary 24 VDC, insulated from the AS-i line.

General precautions

Introduction

While installing the yellow AS-i cable, it is essential to place it in a cable track which is separate from the power cables. It is also advisable to place it flat and not twisted. This will help make the two AS-i cable wires as symmetrical as possible.
Installing the AS-i cable on a surface connected to the electric potential of the machine (for example, the housing) complies with the requirements of the EMC (Electro Magnetic Compatibility) directive.

The end of the cable, or the ends in the case of a bus with a star-formation , must be protected either:

- by connecting it (them) to a T-derivation,
- by not allowing them to come out of their last connection point.

Important

It is important to distribute power effectively on the AS-i bus, so that each device on the bus is supplied with sufficient voltage to enable it to operate properly. To do this, certain rules must be followed.

Rule 1

Select the caliber of the supply module adapted to the total consumption of the AS-i segment. Available calibers are 2.4A (TSX SUP A02) and 5A (TSX SUP A05).
A caliber of 2.4A is generally sufficient based on an average consumption of 65mA per slave for a segment made up of a maximum of 31 slaves.

Rule 2

To minimize the effect of voltage falls and reduce the cost of the cable, you must determine the best position of the supply module on the bus, as well as the minimum size of cable appropriate for distributing power.
The voltage fall between the master and the last slave on the bus must not exceed 3V. For that purpose, the table below gives the essential points for selecting the cross-sectional measurement of the AS-i cable.

Table of characteristics:

Cross-section measurement of AS-i cable	**0.75 mm^2**	**1.5 mm^2**	**2.5 mm^2**
Linear resistance	52 milli Ohms/meter	27 milli Ohms/meter	16 milli Ohms/meter
Voltage fall for 1A over 100 meters	5.2V	2.7V	1.6V

The cable which can be used for most applications is the cable with a cross-section of 1.5 mm^2. This is the standard AS-i bus model (the cable is offered in the SCHNEIDER catalog).

Smaller cables can be used when sensors consume very little power.

Note: The maximum length of all the segments making up the AS-i bus without a relay is 100 meters. The lengths of cables which link a slave to a passive distribution box must be taken into account.

Process and AS-i supply module characteristics

29

At a Glance

Aim of this Chapter

This Chapter presents the different electrical characteristics of Process and AS-i supply modules in a table.

What's in this Chapter?

This Chapter contains the following Maps:

Topic	Page
Electrical characteristics of process supply modules: TBX SUP 10 and TSX SUP 1011	420
Electrical characteristics of process supply modules: TBX SUP 1021/1051/1101	422
Electrical characteristics of AS-i supply modules: TSX SUP A02/A05	424
Physical environmental characteristics	426

Electrical characteristics of process supply modules: TBX SUP 10 and TSX SUP 1011

Table of characteristics

The following table describes the electrical characteristics of supply modules: TBX SUP 10 and TSX SUP 1011:

Process supply module			**TBX SUP 10 24V/1A**	**TSX SUP 1011 24V/1A**
Primary				
Nominal input voltage		V	alternating 100…240 direct 125	alternating 100…240 direct 125
Input limit voltage		V	alternating 90…264 direct 88…156	
Network frequency		Hz	47...63	47...63/360...440
Nominal input current (U=100V)		A	0,4	0,4
Maximum call current (1)	to 100 V	A	3	37
	to 240 V	A	30	75
maximum it on trigger (1)	to 100 V	As	0,03	0,034
	to 240 V	As	0,07	0,067
maximum i^2t on trigger (1)	to 100 V	A^2s	2	0,63
	to 240 V	A^2s	2	2,6
Power factor			0,6	0,6
Harmonic (3)			10% (Phi=0°and 180°)	10% (Phi=0°and 180°)
Full load efficiency		%	>75	>75
Secondary				
Output (2)		W	24	26(30)
Nominal output current (2)		A	1	1,1
Output voltage /accuracy at 25°C		V	24+/-5%	24+/-3%
Residual ripple (peak to peak) Maximum HF noise (peak to peak)		mV mV	240 240	1550 240
Length of micro-power outages accepted (3)		ms	<= 10 alternating current <= 1 direct current	<= 10 alternating voltage <= 1 direct voltage

Process supply module			**TBX SUP 10 24V/1A**	**TSX SUP 1011 24V/1A**
Protection against	Short circuits and over-loads		continuous automat-ic reset	fallback to 0 and automatic reset after fault has disappeared
	Over -voltages	V	cuts off at U>36	cuts off at U>36
Parallelization			no	yes with power optimization
Serialization			no	yes
Dissipated power		W	8	9

(1) Values on initial power-up at 25°C. These elements are to be taken into account on start-up for the dimensioning of protection devices.
(2) Output power and current for an ambient temperature of 60°C. Input value ()=output in a ventilated cabinet or within a temperature range of 0…+40°C.
(3) A nominal voltage for a repetition period of 1Hz.

Electrical characteristics of process supply modules: TBX SUP 1021/1051/1101

Table of characteristics

The following table describes the electrical characteristics of supply modules: TBX SUP 10 and TSX SUP 1011:

Process supply module			**TBX SUP 1021 24V/ 2A**	**TSX SUP 1051 24V/ 5A**	**TSX SUP 1101 24V/ 10A**
Primary					
Nominal input voltage		V	alternating 100...120/200...240		
Input limit voltage		V	alternating 85...132/170...264		
Network frequency		Hz	47...63/360...440		
Nominal input current (U=100V)		A	0,8	2,4	5
Maximum call current (1)	to 100 V	A	<30	51	75
	to 240 V	A	<30	51	51
maximum it on trigger (1)	to 100 V	As	0,06	0,17	0,17
	to 240 V	As	0,03	0,17	0,17
maximum i^2t on trigger (1)	to 100 V	A^2s	4	8,6	8,5
	to 240 V	A^2s	4	8,6	8,5
Power factor			0,6	0,52	0,5
Harmonic 3			10% (Phi=0°and 180°)		
Full load efficiency		%	>75	>80	
Secondary					
Output (2)		W	53(60)	120	240
Nominal output current (2)		A	2,2	5	10
Output voltage (0°C-60°c) V			24+/-3%		24+/-1%
Residual ripple (peak to peak) Maximum HF noise (peak to peak) mV		mV mV	150 240	200 240	
Accepted length of micro-power outages (3)		ms	<=10		
Start-up time on resisting load		s	<1		
Protection against	Short circuits and overloads		fallback to 0 and automatic reset after fault has disappeared	current limit	
	Over-voltages	V	cuts off at U>36	cuts off at U>32	

Process supply module		**TBX SUP 1021 24V/ 2A**	**TSX SUP 1051 24V/ 5A**	**TSX SUP 1101 24V/ 10A**
Parallelization		yes with power optimization		
Serialization		yes		
Dissipated power	W	18	30	60

(1) Values on initial power-up at 25°C. These elements are to be taken into account on start-up for the dimensioning of protection devices.
(2) Output power and current for an ambient temperature of 60°C. Input value () = output in a ventilated cabinet or within a temperature range of 0…+40°C.
(3) A nominal voltage for a repetition period of 1Hz.

Electrical characteristics of AS-i supply modules: TSX SUP A02/A05

Table of characteristics

The following table describes the electrical characteristics of supply modules: TSX SUP A02/A05:

AS-i supply module			**TBX SUP A02 30V AS-i / 2.4A**	**TBX SUP A05 24V/7 AS-i & 30V AS-i/5A**	
Primary					
Nominal input voltage		V	alternating 100...120/ 200...240	alternating 100...120/200...240	
Input limit voltage		V	alternating 85...132/ 170...264	alternating 85...132/170...264	
Network frequency		Hz	47...63/360...440	47...63/360...440	
Nominal input current (U=100V)		A	1,3	5	
Maximum call current (1)	to 100 V	A	30	50	
	to 240 V	A	30	50	
maximum it on trigger (1)	to 100 V	As	0,06	0,17	
	to 240 V	As	0,03	0,17	
maximum i^2t on trigger (1)	to 100 V	A^2s	4	8,5	
	to 240 V	A^2s	4	8,5	
Power factor			0,6	0,51	
Harmonic 3			10% (Phi=0°and 180°)	10% (Phi=0°and 180°)	
Full load efficiency		%	>75	>80	
Secondary					
Output		W	72(84) (2)	230 (3)	
Peak nominal current	30 V AS-i output 24 V output	A A	2,4(2,8) (2) -	5 (3)(4) 7 (3)(4)	
Output voltage Global variation (-10°C to +60°C)		V V	30(AS-i) 29.5 to 31.6	24 +/-3%	30(AS-i) 29.5 to 31.6
Ripple (from 10 to 500 kHz) Ripple (from 0 to 10 kHz)		mV mV	50 300	200 240	50 300
Start-up time on resisting load		s	<2 (where C=15000 micro Farads)	<2 (where C= 15000 micro Farads)	
Length of micro power outages (5)		ms	<=10	<=10	

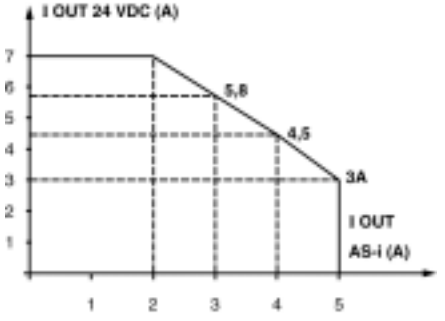
AS-i supply module			TBX SUP A02 30V AS-i / 2.4A	TBX SUP A05 24V/7 AS-i & 30V AS-i/5A
Protection against	Short circuits and overloads		fallback to 0 and automatic reset after fault has disappeared	current limit on each output
	Over-voltages	V	cuts off at U>36	cuts off at U>36
Dissipated power		W	24	60

(1) Values on initial power-up at 25°C. These elements are to be taken into account on start-up for the dimensioning of protection devices.
(2) Output and output current for an ambient temperature of 60°C. Input value () = surge output.
(3) Output and output current for a maximum ambient temperature of 55°C, if product index II = 01 (60°C if product index II > 01).
(4) See the following page for the diagram of current distribution for each output.
(5) Acceptable period at nominal voltage for a repetition period of 1 Hz.

Chart of available currents on 30 V AS-i and 24 V output from the TSX SUP A05 supply block.

The maximum power which can be delivered by the supply block is 230 W. If consumption is 5 A on the 30 V AS-i, possible flow on 24 V output is no greater than 3 A (see chart below).

Chart:



Physical environmental characteristics

Table of characteristics

The following table describes the electrical characteristics of supply modules: TBX SUP 10 and TSX SUP 1011:

Process and AS-i supply blocks/modules		**TBX SUP 10**	**TBX SUP 1011/1021 TSX SUP 1051/1101 TSX SUP A02/A05**
Connection to screw terminals Maximum capacity per terminal	 mm^2	1 terminal per output 1 x 2.5	1011/1021/1051/A02: 1 output terminal 1101 : terminal/output A05: 2 terminals/output (24 VDC) 1 terminal/output (30 VDC AS-i) 2 x 1.5 with adapter or 1 x 2.5
Temperature: Storage Operating	 °C °C	 -25 to +70 +5 to +55	-25 to +70 0 to +60 (TSX SUP 1011/1021/1051/1101) -10 to +60 (TSX SUP A02/A05) (1)
Relative humidity	%	5-95	
Cooling	%	By natural convection	
User safety		-	Very Low Voltage Safety (EN 60950 and IEC 1131-2)
Dielectric strength: Primary/secondary Primary/ground Secondary/ground	 V eff V eff V eff	50/60Hz-1 mm 1500 1500 500	 3500 2200 500
Insulation resistance Primary/secondary Primary/ground	 Mega Ohms Mega Ohms	 >=100 >=100	
Leakage current		I<=3.5 mA (EN 60950)	
Electrostatic uploading immunity		6 kV per contact/8 KV in the air (complies with IEC 1000-4-2	
Fast electric surge		2 kV (serial mode and common mode on input and output	
Electromagnetic field influence		10 V/m (80MHz to 1GHz)	
Rejected electromagnetic disturbances		(comply with FCC 15-A et EN 55022 class A Test conditions: nominal U and I, resisting load, cable: 1 meter horizontally, 0.8 meters vertically	
Shock wave		Input: 4kV MC, 2kV MS Outputs: 2kV MF, 0.5 kV MS (complies with IEC 1000-4-5)	
Vibration (2)		1 mm 3 Hz to 13.2 Hz 1g 57 Hz to 150 Hz (2g TSX SUP A02/A05) (complies with IEC 68-2-6, FC test)	

Process and AS-i supply blocks/modules		**TBX SUP 10**	**TBX SUP 1011/1021** **TSX SUP 1051/1101** **TSX SUP A02/A05**
Degree of protection		IP 20.5	IP 20.5, terminal IP 21.5
MTBF at 40°C	H	100 000	
Length of life at 50°C	H	30 000 (at nominal voltage and nominal power)	

(1) -10°C +55°C for TSX SUP A05 supply module with product index II=01.
-10°C +55°C for TSX SUP A05 supply module with product index II=01.
(2) complies with IEC 68-2-6, FC test with module or block mounted on a board or panel.

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