

Discrete I/O modules

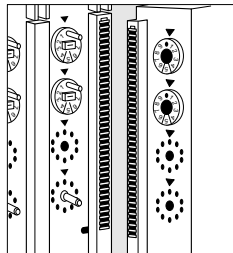
Characteristics :
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References :
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Connections :
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Functions

Discrete I/O modules provide the functions of matching, galvanic isolation, filtering and protection against induced interference, overloads and overvoltages.

Characteristics specific to this range of modules are :

Module location



- **Hardware location device**
These devices are fitted to all the modules as well as to the backplane of the rack. By enabling the user to customize each slot of the rack to receive a particular type of module, this device eliminates all risks of errors when inserting or exchanging a module. A second location device allows the user to distinguish between modules of the same type but which may have different uses or are adjusted differently.
- **Software location device**
During the configuration procedure, the software code for each module is assigned to the specific slot it must occupy. If the actual configuration does not agree with that declared, the processor is informed.

Exchange security

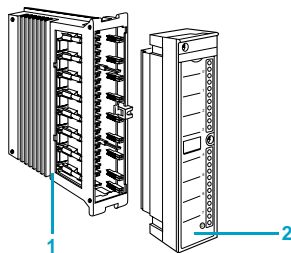
The exchange of data between the PLC processor and the I/O modules is systematically checked during each PLC scan.

- **Hardware security**
The design of the I/O bus, incorporating high level technology, complete screening and withstand to short circuits, ensures a high level of security for data exchanged over the I/O bus.
- **Software security**
During each data exchange, the processor checks (parity check) the validity of data carried on the bus. In case of error, the processor does not validate the exchange and a fault is declared. This procedure avoids disrupting the control system due to incorrect exchanges.

Installation and removal of I/O under power

- **Hardware aspect**
Special measures have been incorporated to allow discrete I/O modules and their cable connectors to be connected and disconnected while energized and while the program is being scanned, without risk of damage.
- **Software security**
The processor is informed of these interventions. This information, which can be accessed by the program, allows the user to determine the action to be taken for the machine being controlled.

Module protection



Electrical and mechanical protection : the design of the I/O modules ensures a high level of immunity to industrial interference and enables them to withstand overvoltages and polarity inversions. Most of the 4, 8, 16 or 24 channel output modules are protected by electronic overload protectors and peak limiters, or by fuses **1**.

- All faults detected by these devices are :
- displayed on the front panel of the module **2**
 - transmitted to the processor

Processing of I/O "FAULT" information

- **Hardware**
The I/O lamp on the front panel of the processor indicates an I/O fault :
 - configuration fault
 - data exchange fault
 - I/O module or cable connector disconnected
 - overload on the outputs.The fault can then be located and its cause determined by using SYSDIAG maintenance software.
- **Software**
Each I/O module has its own fault bit which can be accessed by the user. System bits specific to the I/O are also available.
Analysis and processing of all these bits by the user program eliminates any transient operation caused by the fault which may endanger the application, and can also be used to run the application in fallback mode.

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Functions

Special functions

TSX DET 4 66 Namur input module. This has 4 inputs specially designed for receiving signals from Namur proximity sensors. Volt-free contacts can also be connected to this module. Each input has a line monitoring device which detects line breaks and short-circuits.

TSX DST 4 17 output module. This has four $\overline{0}$ 24/48 V - 2 A outputs which are isolated and electronically protected against overloads and short-circuits. If any of these outputs goes to 1 when the external supply is absent, a fault bit is detected. One fault lamp per point indicates that a fault is present. One fault bit per point is then transmitted to the PLC processor.

TSX DET 32..., TSX DST 24 72 and TSX DST 32 92 modules

24 and 32-point discrete I/O modules can be combined to create configurations of 224 I/O in a single format rack (128 inputs in 32-point modules and 96 outputs in 24-point modules) or of 256 I/O (128 inputs in 32-point modules and 128 outputs in 32-point modules).

The terminal block fault bit (accessible by programming terminals or the application program) indicates the absence or incorrect voltage of the sensor (or preactuator) supply at the module.

I/O installation and addressing

I/O interface modules have 4, 8, 16, 24 or 32-point modularity.

The address of an input or output is defined by :

- 4, 8 and 16-point modules I/Oxy,i
 - 24 and 32-point modules I/Oxy,i (points 0 to 15)
I/O(x+1)y,i (points 16 to 24 or 32)
- I : input
 O : output
 y : slot n° in rack (0 to 7)
 x : n° of rack containing the module
 , : comma
 i : point n° (0 to F)

Note : PL7 software allows the user to enter and display the I/O either by the address as defined above, or by an associated 8-character mnemonic symbol (example : Close).

The rules for installing I/O interface modules are defined by the table below :

| Type | Basic configuration | | Local or remote extension | |
|--------------|---------------------|------------------|-----------------------------|------------------|
| | PLC base | Direct extension | Local/remote extension rack | Direct extension |
| Rack no. | 0/1 | 2/3 | x | x + 1 |
| 4/8 points | 0 to 7 (1) | 0 to 7 (2) | 0 to 7 (1) | 0 to 7 (2) |
| 16 points | 0 to 7 (1) | 0 to 7 (2) | 0 to 7 (1) | 0 to 7 (2) |
| 24/32 points | 0 to 7 (1) | 0 to 7 (2) | 0 to 7 (1) | imp (3) |

(1) 0 to 4 for short rack

(2) 0 to 6 for short rack

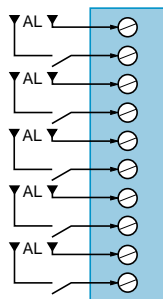
(3) If the base rack is short, it is possible to insert 24 or 32 I/O modules in slots 5, 6 and 7.

imp : installation impossible

Note : The double addressing of base racks allows 32 I/O modules to be located simultaneously in the base rack and in the direct extension racks.

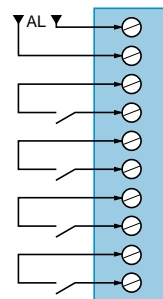
Connection principles

Independent points



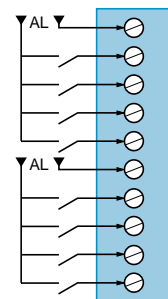
- Each point independently connected
- One power supply per point

Two wires per point



- Each point connected to the terminal block by two wires
- Power supply commons integrated in terminal block

External commons



- Each point connected to the terminal block by one wire
- Power supply commons to be made externally

There are three methods of connecting 4 or 8 point I/O modules to the sensors and preactuators, depending on the type of terminal block used :

- Independent points : no connection between points.
- Two wires per point : using commons integrated in the connection block
- External commons : made using an intermediate connection block. 16, 24 and 32-point modules can only be connected in this way.

Discrete I/O modules

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Characteristics of d.c. inputs

| Type of module | | TSX DET 32 32 | TSX DET 32 42 | TSX DET 32 52 | |
|---------------------------------|------------------------------------|------------------------|---------------|---------------|------------------|
| Nominal input values | Voltage | 24 V | 24 V | 24 V | |
| | Current | 7 mA | 7 mA | 7 mA | |
| | Sensor supply (ripple included) | 19.2...30 V | 19.2...30 V | 19.2...30 V | |
| Input limit values | At state 1 | Voltage | 11...30 V | 11...30 V | 11...30 V |
| | | Current | > 5 mA | > 5 mA | 1.7...8.8 mA |
| | At state 0 | Voltage | - 30...5 V | - 30...5 V | - 30...5 V |
| | | Current | - 15...2.5 mA | - 15...2.5 mA | - 10.3...0.98 mA |
| | Continuous reverse voltage | 30 V | 30 V | 30 V | |
| Max voltage for 1 min | ± 48 V | ± 48 V | ± 48 V | | |
| Input impedance | | 3.4 k | 3.4 k | 3.4...4.2 k | |
| Logic | | Positive current drawn | | | |
| Response time | Change from state 0 to state 1 | 2...4.5 ms | 6...10 ms | 7...20 ms | |
| | Change from state 1 to state 0 | 2...4.5 ms | 6...10 ms | 6...19 ms | |
| Coupling capacitance at ~ 220 V | | 30 nF max | 30 nF max | 30 nF max | |
| Dissipated power | Per point at state 1 | 0.17 W | 0.17 W | 0.16 W | |
| Display lamp | State of each input | Sensor side | | | |
| Sensor common | | On power supply "+" | | | |
| Compatible output modules | | TSX DST 24 72/32 92 | | | |
| External line | Line resistance | 0...500 | | | |
| | Open line leakage resistance | 30 k minimum | | | |
| Isolation | Between points or groups of points | 1500 V rms 50-60 Hz | | Not isolated | |
| | Between points and internal bus | 1500 V rms 50-60 Hz | | Not isolated | |
| | Type | Opto-coupler | | - | |

| Type of module | | TSX DET 8 14 | TSX DET 8 24 | |
|---------------------------------|------------------------------------|----------------------------|-------------------|----------|
| Nominal input values | Voltage | 130 V | 110/120 V | |
| | Current | 11.2 mA | 13.6 mA | |
| | Sensor supply (ripple included) | 100...142 V | 86...132 V | |
| Input limit values | At state 1 | Voltage | > 88 V | > 77 V |
| | | Current | > 8 mA | > 8.5 mA |
| | At state 0 | Voltage | < 25 V | 35 V |
| | | Current | < 2.2 mA | 3.5 mA |
| | Continuous reverse voltage | 142 V | 132 V | |
| Max voltage for 1 min | ± 156 V | ± 220 V | | |
| Input impedance | | 11.6...12.8 k | 8...9 k | |
| Logic | | Positive current drawn (1) | | |
| Response time | Change from state 0 to state 1 | 5...8 ms | 8.7...13.8 ms | |
| | Change from state 1 to state 0 | 2.5...4 ms | 16.7...26.3 ms | |
| Coupling capacitance at ~ 220 V | | 30 nF max | 40 nF max | |
| Dissipated power | Per point at state 1 | 1.46 W | 1.5 W | |
| Display lamp | State of each input | Sensor side | | |
| Sensor common | | On power supply "+" | | |
| Compatible output modules | | TSX DST 16 34 | TSX DST 4 17/8 17 | |
| External line | Line resistance | < 1 k | 0...500 | |
| | Open line leakage resistance | > 60 k | 30 k minimum | |
| Isolation | Between points or groups of points | 1500 V rms 50-60 Hz | | |
| | Between points and internal bus | 1500 V rms 50-60 Hz | | |
| | Type | Opto-coupler | | |

(1) Negative logic, current emitted possible for TSX DET 8 24 with independent point connections (TSX BLK 1).

Discrete I/O modules

General :
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Characteristics of d.c. inputs

| Type of module | | | TSX DET 8 13/16 13/16 33 | | | TSX DET 8 12/16 12 | |
|---------------------------------|------------------------------------|---------|----------------------------|-------------|-------------|---|-------------|
| Nominal input values | Voltage | | 48 V | | | 24 V | |
| | Current | | 10.5 mA | | | 16.5 mA | |
| | Sensor supply (ripple included) | | 38...60 V | | | 19.2...30 V | |
| Input limit values | At state 1 | Voltage | > 30 V | | | > 11 V | |
| | | Current | > 6 mA | | | > 6 mA | |
| | At state 0 | Voltage | 12 V | | | 5 V | |
| | | Current | 2.5 mA | | | 2.5 mA | |
| | Continuous reverse voltage | | 60 V | | | 30 V | |
| Max voltage for 1 min | | ± 110 V | | | ± 48 V | | |
| Input impedance | | | 4.275...4.720 k | | | 1.380...1.520 k | |
| Logic | | | Positive current drawn (1) | | | | |
| Response time | | | DET 8 13 | DET 16 13 | DET 16 33 | DET 8 12 | DET 16 12 |
| | Change from state 0 to state 1 | | 5...8 ms | 5...20 ms | 0.5...2 ms | 5...8 ms | 5...20 ms |
| | Change from state 1 to state 0 | | 2.5...4 ms | 2.5...10 ms | 0.25...1 ms | 2.5...4 ms | 2.5...10 ms |
| Coupling capacitance at ~ 220 V | | | 30 nF max | | | 30 nF max | |
| Dissipated power | Per point at state 1 | | 0.52 W | | | 0.43 W | |
| Display lamp | State of each input | | Sensor side | | | | |
| Sensor common | | | On power supply "+" | | | | |
| Compatible output modules | | | TSX DST 4 17/8 17 | | | TSX DST 4 17/8 17 TSX DST 16 12/16 82 TSX DST 8 35/8 82 | |
| External line | Line resistance | | 0...500 | | | | |
| | Open line leakage resistance | | 30 k minimum | | | | |
| Isolation | Between points or groups of points | | 1500 V rms 50-60 Hz | | | | |
| | Between points and internal bus | | 1500 V rms 50-60 Hz | | | | |
| | Type | | Opto-coupler | | | | |

| Type of module | | | TSX DET 4 66 | | | | |
|---------------------------|------------------------------------|---------|------------------------|--|--|--|--|
| Nominal input values | Voltage | | Namur (8.2 V) | | | | |
| | Current | | 4 mA | | | | |
| | Sensor supply (ripple included) | | 17...30 V | | | | |
| Input limit values | At state 1 | Current | 2.1...9 mA | | | | |
| | At state 0 | Current | 0...1.2 mA | | | | |
| Logic | | | Positive current drawn | | | | |
| Response time | Change from state 0 to state 1 | | 0.5...2 ms | | | | |
| | Change from state 1 to state 0 | | 0.5...2 ms | | | | |
| No-load voltage | Of inputs | | 7.7...9 V | | | | |
| Current | On power break | | < 0.15 mA | | | | |
| | Short-circuit | | > 6 mA | | | | |
| Resistance | Internal | | 1000 | | | | |
| | In series with conductors | | > 50 | | | | |
| | Shunt on conductors | | > 100 k | | | | |
| Display lamp | State | | 1 lamp per point | | | | |
| | Fault | | 1 lamp per point | | | | |
| Sensor common | | | On power supply "+" | | | | |
| Compatible output modules | | | - | | | | |
| External line | Line resistance | | 0...500 | | | | |
| | Open line leakage resistance | | 30 k minimum | | | | |
| Isolation | Between points or groups of points | | 1500 V rms 50-60 Hz | | | | |
| | Between points and internal bus | | 1500 V rms 50-60 Hz | | | | |
| | Type | | Opto-coupler | | | | |

(1) Negative logic, current emitted possible for TSX DET 8 12 with independent point connections (TSX BLK 1).

Discrete I/O modules

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Characteristics of d.c. outputs

| Type of module | | TSX DST 32 92 | TSX DST 24 72 |
|---------------------------------------|----------------------------------|--------------------------|---------------------|
| Loads | Voltage | 24 V | 24 V |
| | Nominal current | 100 mA | 0.5 A |
| | Limitation and detection current | – | 1.5 A |
| | Tungsten filament lamp | 1 W max | 8 W max |
| Limit values | Voltages (ripple included) | 19...30 V | 19...30 V |
| Logic | | Positive current emitted | |
| Response time | Change from state 0 to state 1 | 20 µs max | typically 10 µs |
| | Change from state 1 to state 0 | 30 µs max | typically 50 µs |
| Leakage current | At state 0 | 100 µA | 1 mA |
| Residual voltage | At state 1 | 2 V max | 1.2 V max |
| Built-in protection | Against overloads | – | Limiter |
| | Against inductive overvoltages | Discharge diode | Diode and capacitor |
| | Against reverse polarity | Series diode | Series diode |
| Current | | 150 mA | 200 mA |
| Display lamp | State of each output | PLC side | |
| Load common | | On power supply “-” | |
| Capacitance of external source | Single phase 2 half-waves | – | |
| | 3-phase 2 half-waves | – | |
| Compatible input modules | | TSX DET 32 42 | |
| Loads | | Resistive or inductive | |
| Fault display | On front panel | – | |
| Isolation | Between groups of points | 1500 V rms 50-60 Hz | |
| | Between points and internal bus | 1500 V rms 50-60 Hz | |
| | Type | Opto-coupler | |

| Type of module | | TSX DST 16 34 | TSX DST 16 32 | |
|---------------------------------|--------------------------------------|----------------------------------|----------------------------------|--------------|
| Loads | Voltage | 48...130 V | 24 V | |
| | Power | Resistive | 6 W P 50 W | 0.2 W P 50 W |
| | | Inductive (L/R < 63 ms) | 6 W P 25 W | 0.2 W P 25 W |
| | Durability | 10 ⁶ operating cycles | 10 ⁶ operating cycles | |
| Limit values | Voltages (ripple included) | 38 V U 142 V | 10 V U 30 V | |
| | Total load 40 °C | 16 relays | 16 relays | |
| | on the module 40...60 °C (derated) | 8 relays | 8 relays | |
| Logic | | Positive current emitted | | |
| Response time | Change from state 0 to state 1 | 15 ms max | 15 ms max | |
| | Change from state 1 to state 0 | 20 ms max | 20 ms max | |
| Leakage current | At state 0 | 0.2 mA max | 0.2 mA max | |
| Built-in protection | Against overloads and short-circuits | None (1) | None (1) | |
| | Against inductive overvoltages | None (2) | Included (except supply) | |
| Compatible input modules | | TSX DET 8 14 | TSX DET 16 12 | |
| Loads | | Resistive or inductive (3) | | |
| Display lamps | | State of each output | | |
| Load common | | On power supply “-” | | |
| Isolation | Between groups of points | 1500 V rms 50-60 Hz | | |
| | Between points and internal bus | 1500 V rms 50-60 Hz | | |
| | Type | Relay | | |

(1) External semi-time-delayed fuse (1.6 A for **TSX DST 16 34**, 4 A for **TSX DST 16 32**).

(2) External discharge diode. Caution, it is essential to place a diode across the load terminals to maintain the durability of the contacts.

(3) Capacitive load not allowed.

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Characteristics of a.c. inputs

| Type of module | | TSX DET 8 02 | TSX DET 8 03 | TSX DET 16 03 | |
|-----------------------------|-----------------------------------|---------------------|--------------|---------------|---------|
| Loads | Voltage | 24 V | 42/48 V | 48 V | |
| | Current | 21.5 mA | 18...20.5 mA | 22...26 mA | |
| | Sensor supply | 20.4...26.5 V | 35.7...53 V | 40...53 V | |
| Input limit values | At state 1 | Voltage | > 12 V | > 25 V | > 30 V |
| | | Current | > 7.6 mA | > 8 mA | > 16 mA |
| | At state 0 | Voltage | 5 V | 11 V | 14 V |
| | | Current | 3 mA | 3 mA | 6 mA |
| Frequency | | 47...63 Hz | 47...63 Hz | 47...63 Hz | |
| Input impedance | | 1.1...1.25 k | 2.1...2.4 k | 1.5...3 k | |
| Response time | Change from state 0 to state 1 | 11...20 ms | 12...21 ms | 11...32 ms | |
| | Change from state 1 to state 0 | 14...23 ms | 12...22 ms | 10...22 ms | |
| Coupling capacitance | Open line | 300 nF max | 220 nF max | 420 nF | |
| | Open line at ~ 220 V | 30 nF max | 220 nF max | 80 nF | |
| Dissipated power | Per point at state 1 | 0.35 W | 1 W | 0.5 W | |
| Display lamp | State of each input | Sensor side | | | |
| External line | Line resistance | 0.. 500 | | | |
| | Open line leakage resistance | 30 k minimum | | | |
| Isolation | Between points or group of points | 1500 V rms 50-60 Hz | | | |
| | Between points and internal bus | 1500 V rms 50-60 Hz | | | |
| | Type | Opto-coupler | | | |

| Type of module | | TSX DET 16 04 | TSX DET 8 24 | TSX DET 8 05 | |
|-----------------------------|------------------------------------|---------------------|--------------|----------------|----------|
| Nominal input values | Voltage | 110/120 V | 115 V | 220/240 V | |
| | Current | 16...20.5 mA | 13.6 mA | 14.5...15.8 mA | |
| | Frequency | 50-60 Hz | 50-60 Hz | 50 Hz | |
| | Sensor supply | 93.5...132 V | 93.5...132 V | 187...264 V | |
| Input limit values | At state 1 | Voltage | > 74 V | > 75 V | > 154 V |
| | | Current | > 6 mA | > 8 mA | > 9.4 mA |
| | At state 0 | Voltage | 20 V | 33 V | 67 V |
| | | Current | 4 mA | 3.5 mA | 4.9 mA |
| Frequency | | 47...63 Hz | 47...63 Hz | 47...53 Hz | |
| Input impedance | | 5.5...7.8 k | 8...8.9 k | 14.4...16.6 k | |
| Response time | Change from state 0 to 1 | 12...23 ms | 12...22 ms | 12...28.6 ms | |
| | Change from state 1 to 0 | 12...22 ms | 12...23 ms | 12...22 ms | |
| Coupling capacitance | Open line | 100 nF max | 100 nF max | 80 nF max | |
| | Open line at ~ 220 V | 40 nF max | 40 nF max | 80 nF max | |
| Dissipated power | Per point at state 1 | 0.3 W | 1.45 W | 0.5 W | |
| No-load voltage | Of inputs | – | – | 7.7...9 V | |
| Current | Breaking | – | – | < 0.15 mA | |
| | Short-circuit | – | – | > 6 mA | |
| Resistance | Internal | – | – | 1000 | |
| | In series with conductors | – | – | > 50 | |
| | Shunt on conductors | – | – | > 100 k | |
| Display lamp | State of each input | Sensor side | | | |
| External line | Line resistance | 0...500 | | | |
| | Open line leakage resistance | 30 k minimum | | 60 k minimum | |
| Isolation | Between points or groups of points | 1500 V rms 50-60 Hz | | | |
| | Between points and internal bus | 1500 V rms 50-60 Hz | | | |
| | Type | Opto-coupler | | | |

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Characteristics of a.c. outputs

| Type of module | | TSX DST 8 04 | TSX DST 16 04 | TSX DST 8 05 |
|---------------------------------|--------------------------------------|--------------------------|--------------------|------------------------|
| Loads | Voltage | 110/127 V | 110/120 V | 110/240 V |
| | Current | 2 A | 1 A | 2 A |
| | Frequency | 50-60 Hz | 50-60 Hz | 50-60 Hz |
| Limit values | Voltage | 93.5...140 V | 93.5...140 V | 93.5...264 V |
| | Peak switch-on current | 15 A (1) | 10 A (1) | 15 A (1) |
| | Minimum current | 10 mA | 25 mA | 20 mA |
| | Total load | 16 A | 8 A max | 16 A |
| | in the module | 40 °C 60 °C (derated) | 0.4 A/°C | 0.1 A/°C |
| Response time | Change from state 0 to state 1 | < 0.5 ms | 0.5 ms | < 1/2 period |
| | Change from state 1 to state 0 | < 1/2 period | < 1/2 period | < 1/2 period |
| Leakage current | At state 0 | 4 mA max at 140 V | 3 mA max at 140 V | 6 mA max at 264 V |
| Residual voltage | At state 1 | I < 35 mA : 1.4 V | I < 50 mA : 3 V | I < 50 mA : 8 V |
| | | I > 35 mA : 11 V | I > 25 mA : 13 V | I > 300 mA : 2 V |
| Display lamp | State of each output | PLC side | | |
| Built-in protection | Against overloads and short-circuits | 3.15 A fuses | – | 3.15 A fuses |
| | Against inductive overvoltages | RC and G MOV | RC and G MOV | RC and G MOV |
| Triac switch-on | At zero voltage | No | No | Yes |
| Compatible input modules | | TSX DET 8 24/16 04 | TSX DET 8 24/16 04 | TSX DET 8 05 |
| Loads | | Inductive | Inductive | Resistive or inductive |
| Fault display | On front panel | 1 lamp | – | 1 lamp |
| Isolation | Between points or groups of points | 1500 V rms 50-60 Hz | | |
| | Between points and internal bus | 1500 V rms 50-60 Hz | | |
| | Type | Optotriac | Optotriac | Opto-coupler |

| Type of module | | TSX DST 8 35 | TSX DST 16 35 | TSX DST 16 33 |
|---------------------------------|--------------------------------------|--|--|--|
| Loads | Voltage | 24...240 V | 24...240 V | 24...240 V |
| | Current | U 127 V : 2 A (2) U 240 V : 1 A (2) | U 127 V : 1.1 A (3) U 240 V : 1 A (3) | Resistive : 0.2 A (4) Inductive : 0.2 A (5) |
| Limit values | Switch on current | 10 In for 2 cycles category AC-15 | 10 In for 2 cycles category AC-15 | – |
| | Total load | 8 relay | 16 relay | 16 relay |
| | in the module | 40 °C 60 °C (derated) | 8 relay | 8 relay |
| Response time | Change from state 0 to state 1 | 3...15 ms | 15 ms max | 15 ms max |
| | Change from state 1 to state 0 | 3...18 ms | 20 ms max | 20 ms max |
| Leakage current | At state 0 | 2.5 mA max | 2.5 mA max | 0.1 mA max |
| Display lamp | State of each output | PLC side | | |
| Built-in protection | Against overloads and short-circuits | 3.15 A fuses | – | – |
| | Against inductive overvoltages | RC and G MOV | RC and G MOV | – |
| Compatible input modules | | TSX DET 8 02/8 03/8 05/8 24 and 16 04 | | TSX DET 8 05 |
| Loads | | Resistive or inductive | | |
| Fault display | On front panel | 1 lamp | – | – |
| Isolation | Between points or groups of points | 1500 V rms 50-60 Hz | | |
| | Between points and internal bus | 1500 V rms 50-60 Hz | | |
| | Type | Relay | | |

(1) Over 2 cycles once per second

(2) Permissible current for 1×10^6 operations; for 1.5×10^6 operations : U 48 V : 2 A - U 127 V : 1 A - U 240 V : 0.50 A

(3) Permissible current for 0.35×10^6 operations; for 1×10^6 operations : U 127 V : 0.35 A - U 240 V : 0.25 A

(4) Category AC-12 : 0.2 A for 2×10^6 operations; 1 A for 0.4×10^6 operations

(5) Category AC-15 : 0.2 A for 1×10^6 operations; 1 A for 0.3×10^6 operations

Discrete I/O modules

Discrete inputs

General :
pages 42304/2 and 42304/3
Characteristics :
pages 42304/4 to 42304/9
Connections :
pages 42304/12 to 42304/15

References



TSX DET 8 ●●



TSX BLK 1



TSX MNC 16

Discrete inputs

| Type of current | Input voltage | Modularity (no. of points) | Compatibility CENELEC 2-wire prox. sens. | Reference | Weight kg |
|---------------------|---------------|----------------------------|--|----------------------|---------------------|
| = | 24 V | 8 | Yes | TSX DET 8 12 | 0.350 |
| | | 16 | Yes | TSX DET 16 12 | 0.360 |
| | | 32 fast (1) | Yes (IEC 1131 type 2) | TSX DET 32 32 | 0.410 |
| | | 32 (1) | Yes (IEC 1131 type 2) | TSX DET 32 42 | 0.410 |
| | 48 V | 32 (1) (3) | No (2) | TSX DET 32 52 | 0.410 |
| | | 8 | Yes | TSX DET 8 13 | 0.350 |
| | | 16 | Yes | TSX DET 16 13 | 0.360 |
| | 130 V | 16 (4) | Yes | TSX DET 16 33 | 0.360 |
| | | 8 | Yes | TSX DET 8 14 | 0.350 |
| | ~ 50-60 Hz | 24 V | 8 | No (2) | TSX DET 8 02 |
| 42/48 V | | 8 | Yes | TSX DET 8 03 | 0.360 |
| 48 V | | 16 | No (2) | TSX DET 16 03 | 0.450 |
| 110/120 V | | 16 | Yes | TSX DET 16 04 | 0.440 |
| ~ 50 Hz | 220/240 V | 8 | Yes | TSX DET 8 05 | 0.400 |
| | = or ~ | = 110 V | 8 | Yes | TSX DET 8 24 |
| ~ 115 V 50/60 Hz | | | | | |
| = | 24 V | 4 | Namur proximity switch and line check | TSX DET 4 66 | 0.530 |

Connection terminal blocks

| Type of connection | Number of points | Reference | Weight kg |
|----------------------------|------------------|------------------|-----------|
| Independent points | 4 and 8 | TSX BLK 1 | 0.350 |
| Two wires per point | 4 and 8 | TSX BLK 2 | 0.350 |
| External commons | 4, 8 and 16 | TSX BLK 1 | 0.350 |
| | 8 (5) | TSX BLK 3 | 0.200 |
| | 32 inputs | TSX BLK 7 | 0.200 |

Simulation blocks

| Use | Number of points | Reference | Weight kg |
|----------------------------|------------------|-------------------|-----------|
| For discrete inputs | 4 and 8 | TSX MNC 15 | 0.400 |
| | 16 | TSX MNC 16 | 0.450 |

(1) When a direct extension assembly is connected to a local or remote extension rack, or a TSX 47-10/20/25 base configuration, placing a 24 or 32-point module in slot n of the local or remote extension rack prohibits the use of the corresponding slot n in the TSX RKE● direct extension assembly.

(2) Telemecanique compatibility :

- TSX DET 8 02 : 2-wire proximity sensor d.c. non-polarised
- TSX DET 16 03 : 2-wire proximity sensor a.c.
- TSX DET 32 52 : 2-wire proximity sensor d.c.

(3) Inputs not isolated.

(4) TSX DET 16 33 : do not use with volt-free contacts (response time 0.5 to 2 ms).

(5) The TSX BLK 3 terminal block reduces external wiring of the commons.

Discrete I/O modules

Discrete outputs

General :
pages 42304/2 and 42304/3
Characteristics :
pages 42304/4 to 42304/9
Connections :
pages 42304/12 to 42304/15

References



TSX DST 16 ●●



TSX DST 32 92



TSX BLK 1



TSX BLK 9

Discrete outputs

| Type of current | Output voltage | Modularity (no. of points) | Characteristics of points | Reference | Weight kg |
|-----------------------|-----------------------|----------------------------|---|---|----------------------|
| = transistor | 5/12/24 V | 16 | 0.4 A - 24 V non-protected negative logic | TSX DST 16 12 | 0.580 |
| | 24 V | 8 | 2 A protected | TSX DST 8 82 | 0.700 |
| | | 16 | 0.5 A protected | TSX DST 16 82 | 0.680 |
| | | 24 (1) | 0.5 A protected | TSX DST 24 72 | 0.410 |
| | 24/48 V | 32 (1) | 0.1 A non-protected | TSX DST 32 92 | 0.420 |
| 4 | | 2 A protected | TSX DST 4 17 | 0.620 | |
| | | 0.5 A protected | TSX DST 8 17 | 0.600 | |
| = relay | | 48/130 V | 16 relay 1 "N/O" | Non-protected 50 W resistive 25 W inductive | TSX DST 16 34 |
| | 24 V | 16 relay 1 "N/O" | Non-protected 2 A resistive 1 A inductive | TSX DST 16 32 | 0.660 |
| ~ transistor 50/60 Hz | 110/127 V | 8 | 2 A protected | TSX DST 8 04 | 0.660 |
| | 110/120 V | 16 | 1 A non-protected | TSX DST 16 04 | 0.660 |
| | 110/240 V | 8 | 2 A protected | TSX DST 8 05 | 0.660 |
| ~ relay | ~ 24/240 V and = 24 V | 4 relay 1 "N/O" | Protected | TSX DST 8 35 | 0.350 |
| | | 4 relay 1 "C/O" | | | |
| | 24/240 V | 16 relay 1 "N/O" | Non-protected | TSX DST 16 35 | 0.370 |
| | | | Non-protected (2) | TSX DST 16 33 | 0.360 |

Connection terminal blocks

| Type of connection | Number of points | Reference | Weight kg |
|----------------------------|------------------|------------------|-----------|
| Independent points | 4 and 8 (3) | TSX BLK 1 | 0.350 |
| Two wires per point | 4 and 8 | TSX BLK 2 | 0.350 |
| External commons | 4, 8 and 16 | TSX BLK 1 | 0.350 |
| | 8 (4) | TSX BLK 3 | 0.200 |
| | 24 outputs | TSX BLK 8 | 0.200 |
| | 32 outputs | TSX BLK 9 | 0.200 |

(1) When a direct extension assembly is connected to a local or remote extension rack, or a TSX 47-10/20/25 base rack, placing a 24 or 32-point module in slot n of the rack prohibits the use of the corresponding slot n in the TSX RKE● direct extension rack.

(2) Low leakage current module, this requires a protection device (RC or peak limiter) to be placed across the terminals of each load.

(3) TSX DST 8 17/8 82 modules cannot be used as independent points.

(4) The TSX BLK 3 terminal block reduces external wiring of the commons.

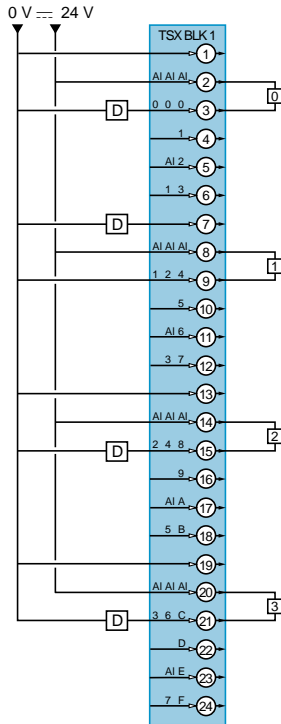
Discrete I/O modules

General :
 Pages 42304/2 and 42304/3
 Characteristics :
 Pages 42304/4 to 42304/9
 References :
 Pages 42304/10 and 42304/11

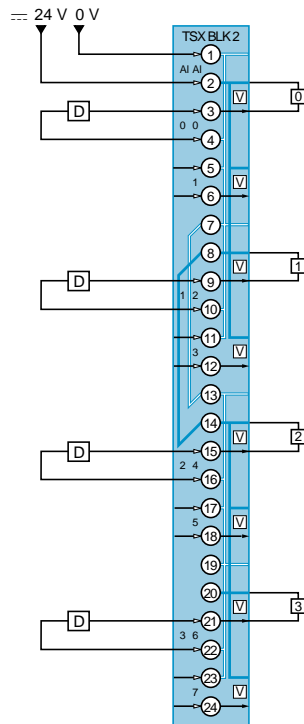
Connections

Connections for 4-point modules

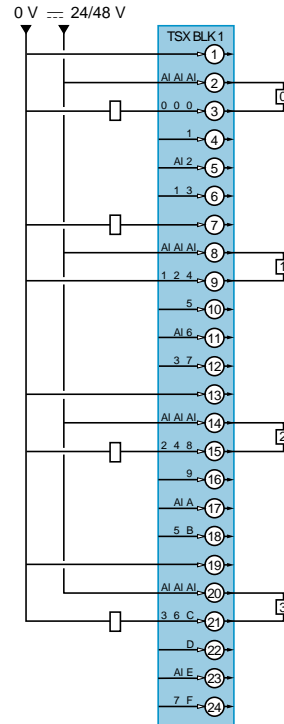
Grouped points
TSX DET 4 66 (1)



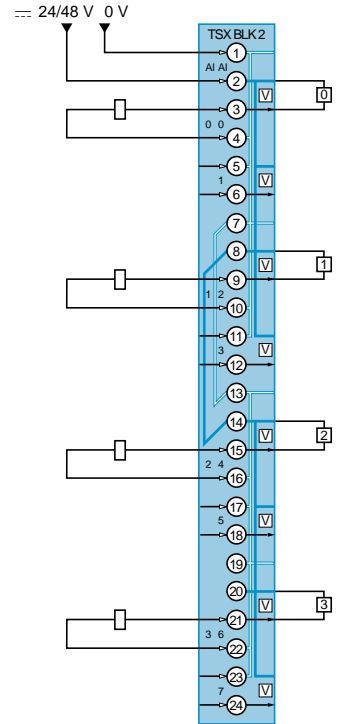
2 wires per point
TSX DET 4 66



Grouped points
TSX DST 4 17 (1)



2 wires per point
TSX DST 4 17

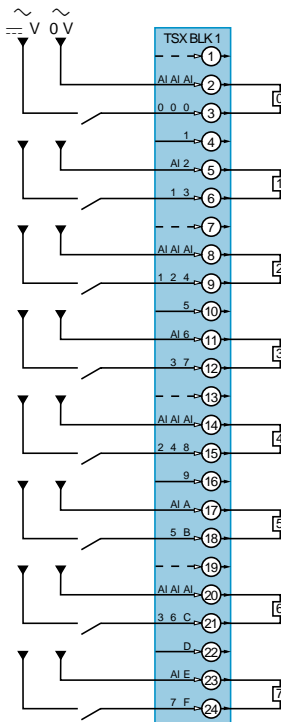


(1) The TSX BLK 1 terminal block enables points to be connected independently.

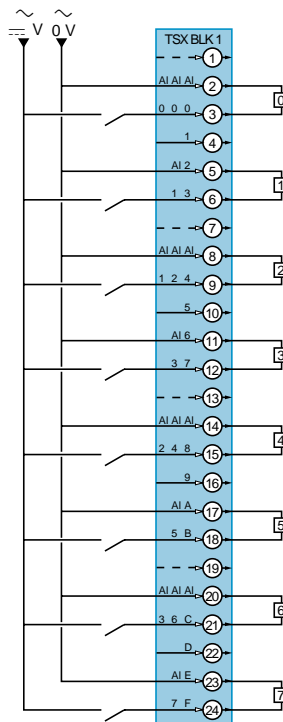
Connections for 8-point input modules

d.c. and a.c. inputs

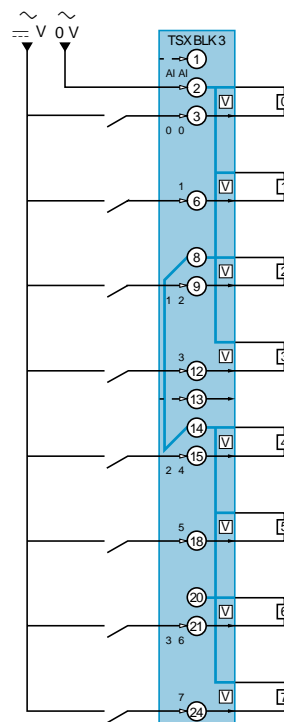
Independent points
TSX DET 8 12/8 13/8 14
TSX DET 8 02
TSX DET 8 03/8 05
TSX DET 8 24



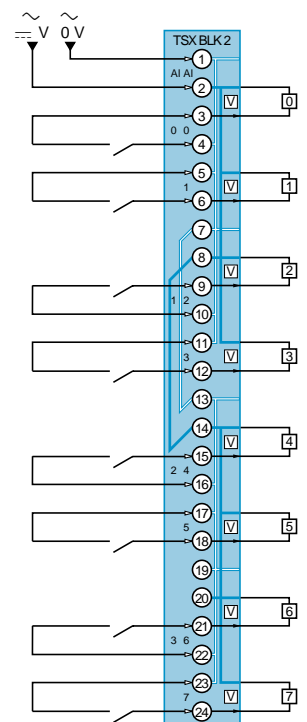
Grouped points
TSX DET 8 12/8 13/8 14
TSX DET 8 02
TSX DET 8 03/8 05
TSX DET 8 24



Commons in terminal block
TSX DET 8 12/8 13/8 14
TSX DET 8 02
TSX DET 8 03/8 05
TSX DET 8 24



2 wires per point
TSX DET 8 12/8 13/8 14
TSX DET 8 02
TSX DET 8 03/8 05
TSX DET 8 24



Discrete I/O modules

General :
 Pages 42304/2 and 42304/3
 Characteristics :
 Pages 42304/4 to 42304/9
 References :
 Pages 42304/10 and 42304/11

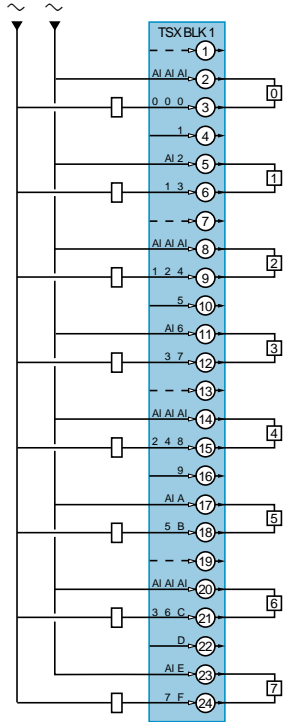
Connections

Connections for 8-point output modules

a.c. relay outputs

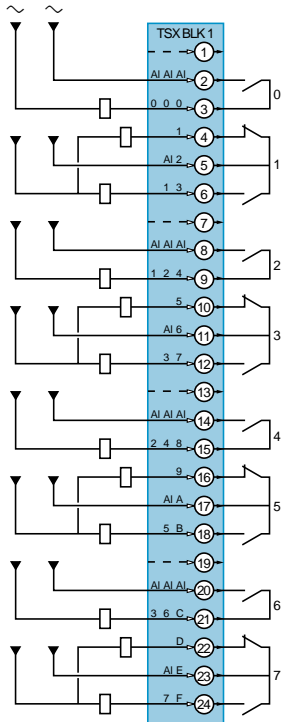
External commons

TSX DST 8 04/8 05 (1)

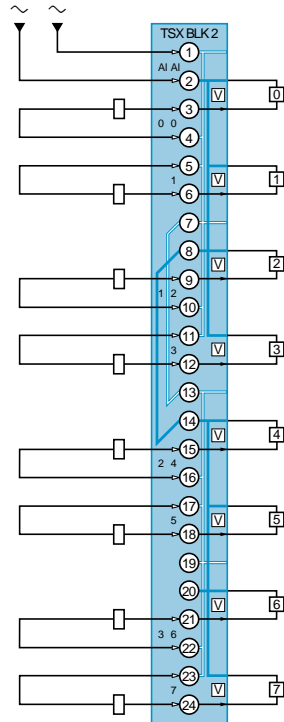


Independent points - Relay outputs

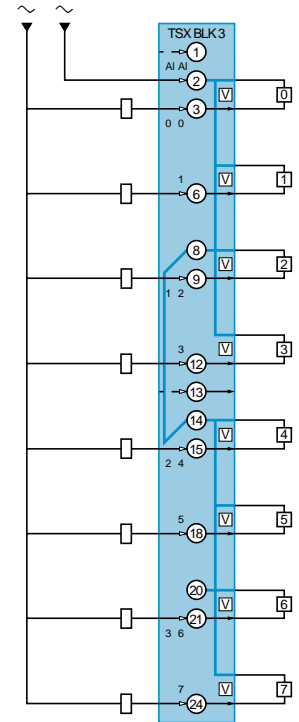
TSX DST 8 35 (2)



2 wires per point
TSX DST 8 04/8 05
TSX DST 8 35



Commons in terminal block
TSX DST 8 04/8 05
TSX DST 8 35



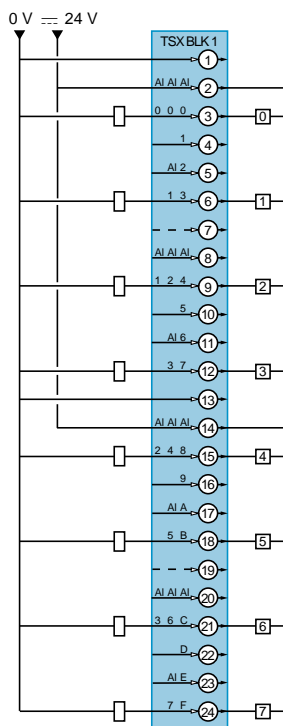
- (1) The TSX BLK 1 terminal block enables points to be connected independently.
- (2) Use "N/C" contacts.

Connections for 8-point output modules

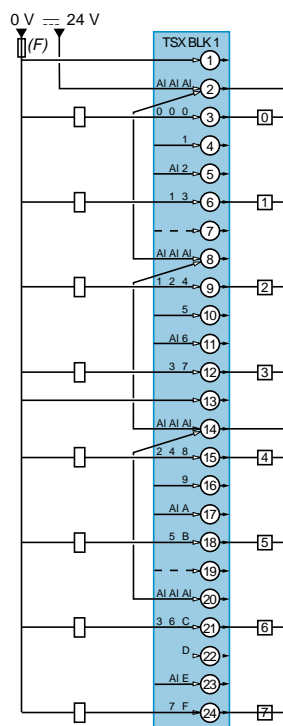
d.c. outputs

External commons

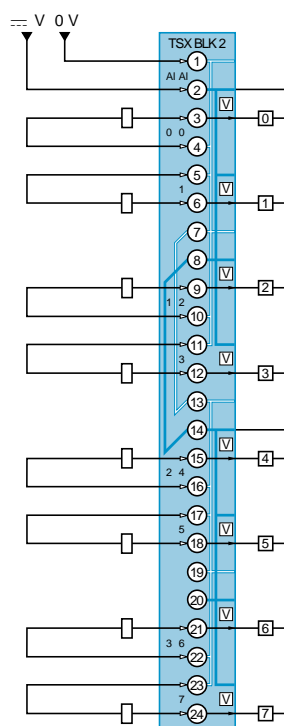
TSX DST 8 17 (1)



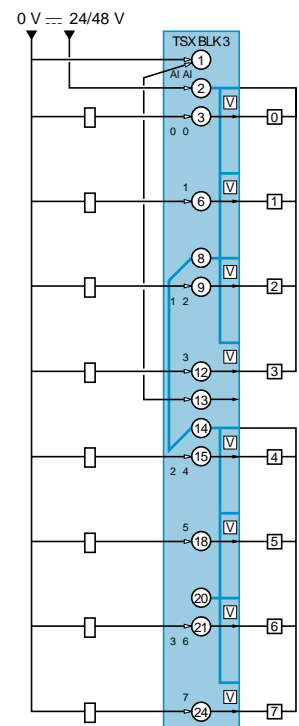
TSX DST 8 82



2 wires per point
TSX DST 8 17



Commons in terminal block
TSX DST 8 17



- (1) The TSX BLK 1 terminal block enables points to be connected independently.

Discrete I/O modules

General :
 Pages 42304/2 and 42304/3
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Connections (continued)

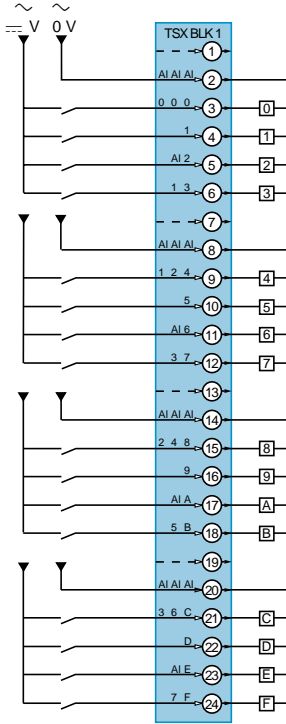
Connections for 16-point modules

d.c. and a.c. inputs

TSX DET 16 12

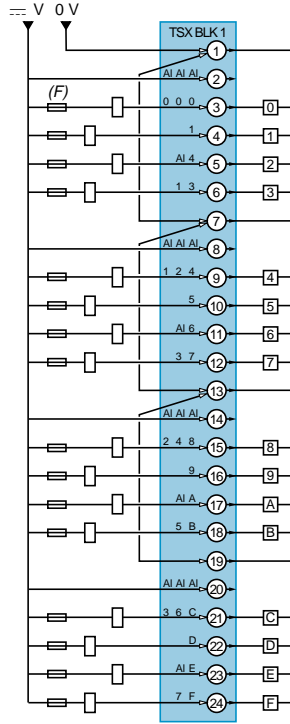
TSX DET 16 13/16 33

TSX DET 16 03/16 04



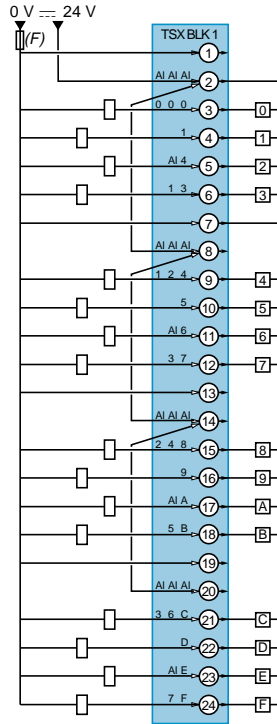
Negative logic d.c. outputs

TSX DST 16 12



Positive logic d.c. outputs

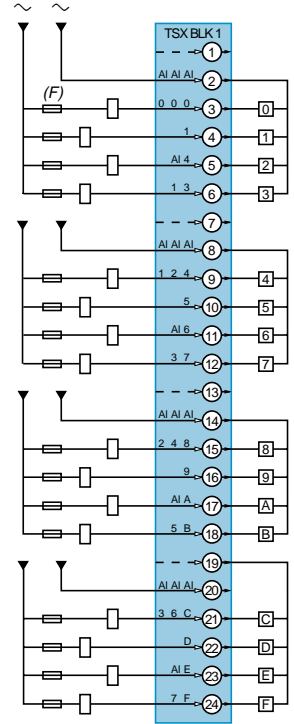
TSX DST 16 82



Relay and a.c. outputs

TSX DST 16 35

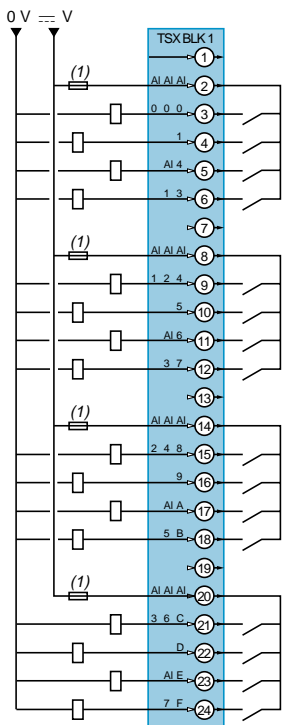
TSX DST 16 04



d.c. inputs

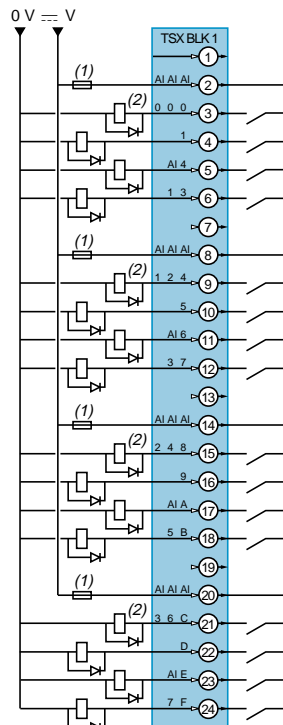
Resistive loads

TSX DST 16 34



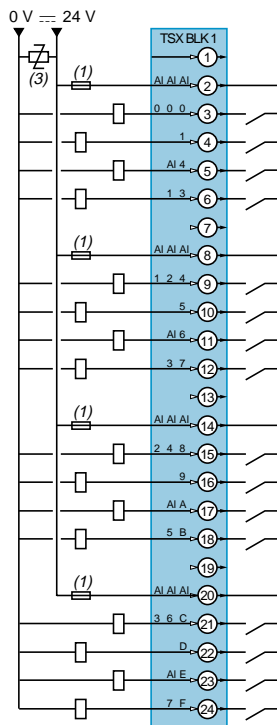
Inductive loads

TSX DST 16 34

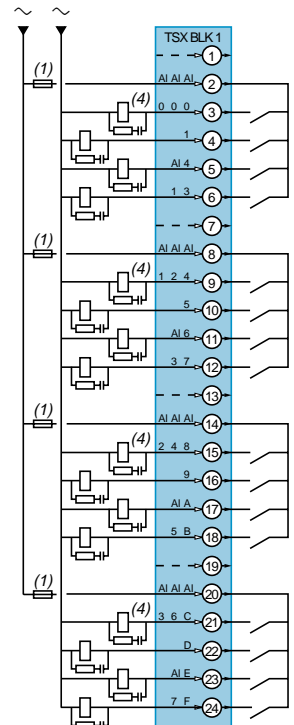


Resistive or inductive loads

TSX DST 16 32



TSX DST 16 33



(1) External semi-time-delayed fuse (1.6 A for TSX DST 16 34, 4 A for TSX DST 16 32).

(2) External discharge diode. Caution, it is essential to place a diode across the terminals to maintain the durability of the contacts.

(3) Peak limiter supplied with module TSX DST 16 32.

(4) Protection device (RC or peak limiter not supplied) essential with inductive loads. Not required with resistive loads.

Discrete I/O modules

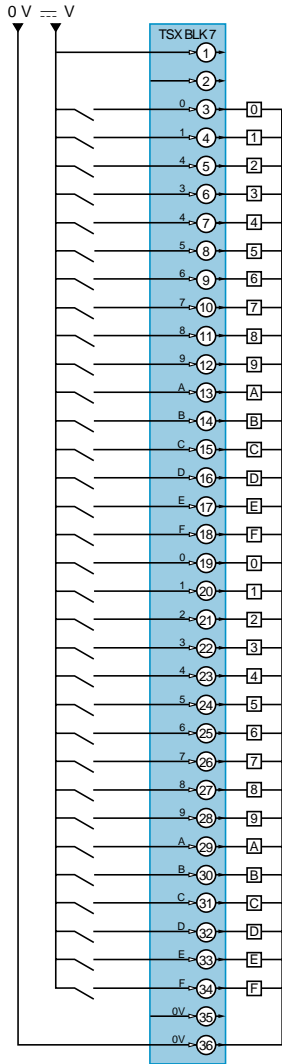
General :
 Pages 42304/2 and 42304/3
 Characteristics :
 Pages 42304/4 to 42304/9
 References :
 Pages 42304/10 and 42304/11

Connections

Connections for 24 and 32-point modules

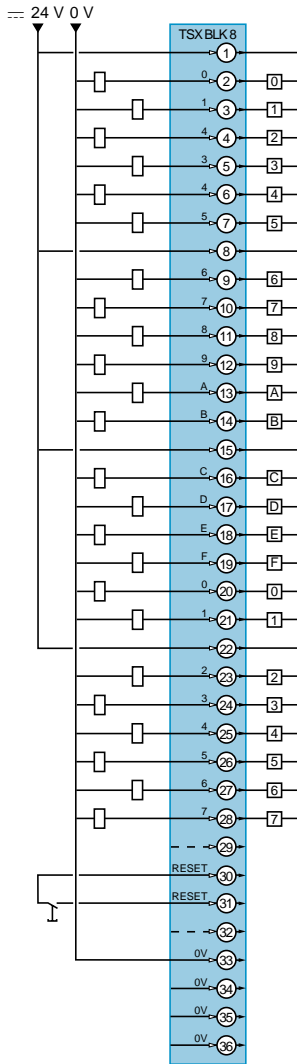
d.c. inputs

TSX DET 32 32/32 42/32 52



d.c. outputs

TSX DST 24 72



TSX DST 32 92

