



### Glavno

|                           |  |
|---------------------------|--|
| Range of product          | Modicon M221                                       |
| Product or component type | Logic controller                                   |
| [Us] rated supply voltage | 100...240 V AC                                     |
| Discrete input number     | 24 discrete input conforming to IEC 61131-2 Type 1 |
| Analogue input number     | 2 at input range: 0...10 V                         |
| Discrete output type      | Relay normally open                                |
| Discrete output number    | 16 relay   |
| Discrete output voltage   | 5...125 V DC<br>5...250 V AC                       |
| Discrete output current   | 2 A  |

### Komplementarno

|                                |   |
|--------------------------------|---|
| Discrete I/O number            | 40  |
| Number of I/O expansion module | <= 7for relay output  |
| Supply voltage limits          | 85...264 V  |
| Network frequency              | 50/60 Hz  |
| Inrush current                 | <= 40 A   |
| Power consumption in VA        | <= 67 VA at 100...240 V with max number of I/O expansion module<br><= 37 VA at 100...240 V without I/O expansion module   |
| Power supply output current    | 0.52 A at 5 Vfor expansion bus<br>0.24 A at 24 Vfor expansion bus   |
| Discrete input logic           | Sink or source (positive/negative)  |
| Discrete input voltage         | 24 V  |
| Discrete input voltage type    | DC  |
| Analogue input resolution      | 10 bits   |
| LSB value                      | 10 mV   |
| Conversion time                | 1 ms per channel + 1 controller cycle timefor analog input  |
| Permitted overload on inputs   | +/- 30 V DCfor analog input with 5 min maximum<br>+/- 13 V DCfor analog input permanent   |
| Voltage state 1 guaranteed     | >= 15 Vfor input  |
| Voltage state 0 guaranteed     | <= 5 Vfor input   |
| Discrete input current         | 7 mAfor discrete input<br>5 mAfor fast input  |
| Input impedance                | 4.9 kOhmfor fast input<br>3.4 kOhmfor discrete input<br>100 kOhmfor analog input  |
| Response time                  | 10 ms turn-on operationfor output<br>35 µs turn-off operationfor input; I2...I5 terminal<br>10 ms turn-off operationfor output<br>5 µs turn-on operationfor fast input; I0, I1, I6, I7 terminal<br>35 µs turn-on operationfor input; other terminals terminal<br>5 µs turn-off operationfor fast input; I0, I1, I6, I7 terminal<br>100 µs turn-off operationfor input; other terminals terminal |
| Configurable filtering time    | 0 msfor input<br>12 msfor input<br>3 msfor input  |
| Output voltage limits          | 125 V DC<br>277 V AC  |
| Current per output common      | 7 A   |
| Absolute accuracy error        | +/- 1 % of full scalefor analog input   |

Informacije dane u ovoj dokumentaciji sadrže opće opise i/ili tehničke karakteristike o performansama ovdje sadržanih proizvoda. Ova dokumentacija nije namijenjena kao zamjena za niti bi se trebala koristiti za određivanje prikladnosti ili pouzdanosti predmetnih proizvoda za konkretne korisničke primjene. Svaki takav korisnik ili integrator dužan je provesti odgovarajuću i potpunu analizu rizika, procjenu i ispitivanje proizvoda u odnosu na odgovarajuću specifičnu primjenu ili uporabu istog. Niti društvo Schneider Electric Industries SAS niti bilo koje od njegovih povezanih poduzeća ili podružnica neće preuzeti obvezu ili snositi odgovornost za pogrešnu upotrebu ovdje sadržanih informacija.

|                                    |   |
|------------------------------------|---|
| Electrical durability              | Inductive AC-15, (cos phi = 0.35) 240 V/ 120 VA: 100000 cycles<br>Resistive DC-12, 24 V/ 48 W: 100000 cycles<br>Resistive AC-12, 120 V/ 240 VA: 100000 cycles<br>Inductive AC-15, (cos phi = 0.35) 240 V/ 36 VA: 300000 cycles<br>Resistive AC-12, 120 V/ 80 VA: 300000 cycles<br>Inductive (L/R = 7 ms) DC-13, 24 V/ 24 W: 100000 cycles<br>Resistive DC-12, 24 V/ 16 W: 300000 cycles<br>Inductive (L/R = 7 ms) DC-13, 24 V/ 7.2 W: 300000 cycles<br>Inductive AC-14, (cos phi = 0.7) 240 V/ 240 VA: 100000 cycles<br>Inductive AC-15, (cos phi = 0.35) 120 V/ 60 VA: 100000 cycles<br>Inductive AC-14, (cos phi = 0.7) 240 V/ 72 VA: 300000 cycles<br>Inductive AC-15, (cos phi = 0.35) 120 V/ 18 VA: 300000 cycles<br>Resistive AC-12, 240 V/ 480 VA: 100000 cycles<br>Inductive AC-14, (cos phi = 0.7) 120 V/ 120 VA: 100000 cycles<br>Resistive AC-12, 240 V/ 160 VA: 300000 cycles<br>Inductive AC-14, (cos phi = 0.7) 120 V/ 36 VA: 300000 cycles |
| Switching frequency                | 20 switching operations/minute with maximum load  |
| Mechanical durability              | >= 20000000 cycles for relay output   |
| Minimum load                       | 1 mA at 5 V DC for relay output   |
| Protection type                    | Without protection at 5 A   |
| Reset time                         | 1 s   |
| Memory capacity                    | 256 kB for user application and data RAM with 10000 instructions<br>256 kB for internal variables RAM   |
| Data backed up                     | 256 kB built-in flash memory for backup of application and data   |
| Data storage equipment             | 2 GB SD card optional   |
| Battery type                       | BR2032 lithium non-rechargeable, battery life: 4 yr   |
| Backup time                        | 1 year at 25 °C by interruption of power supply   |
| Execution time for 1 K instruction | 0.3 ms for event and periodic task  |
| Execution time per instruction     | 0.2 µs Boolean  |
| Exct time for event task           | 60 µs response time   |
| Maximum size of object areas       | 512 %M memory bits<br>8000 %MW memory words<br>512 %KW constant words<br>255 %TM timers<br>255 %C counters  |
| Realtime clock                     | With  |
| Clock drift                        | <= 30 s/month at 25 °C  |
| Regulation loop                    | Adjustable PID regulator up to 14 simultaneous loops  |
| Counting input number              | 4 fast input (HSC mode) (counting frequency: 100 kHz), counting capacity: 32 bits   |
| Control signal type                | A/B<br>Pulse/direction<br>Single phase  |
| Integrated connection type         | USB port with connector mini B USB 2.0<br>Non isolated serial link "serial 1" with connector RJ45 and interface RS485<br>Non isolated serial link "serial 2" with connector RJ45 and interface RS232/RS485  |
| Supply                             | Serial serial link supply at 5 V 200 mA   |
| Transmission rate                  | 1.2...115.2 kbit/s (115.2 kbit/s by default) for bus length of 15 m - communication protocol: RS485<br>1.2...115.2 kbit/s (115.2 kbit/s by default) for bus length of 3 m - communication protocol: RS232<br>480 Mbit/s - communication protocol: USB   |
| Communication port protocol        | USB port: USB protocol - SoMachine-Network<br>Non isolated serial link: Modbus protocol master/slave - RTU/ASCII or SoMachine-Network   |
| Local signalling                   | 1 LED red for module error (ERR)<br>1 LED green for PWR<br>1 LED green for RUN<br>1 LED green for SD card access (SD)<br>1 LED red for BAT<br>1 LED green for SL1<br>1 LED green for SL2<br>1 LED per channel green for I/O state   |
| Electrical connection              | Mini B USB 2.0 connector for a programming terminal<br>Terminal block, 3 terminal(s) for connecting the 24 V DC power supply<br>Connector, 4 terminal(s) for analogue inputs<br>Removable screw terminal block for inputs<br>Removable screw terminal block for outputs   |

|                                |   |
|--------------------------------|---|
| Cable distance between devices | Shielded cable: 10 mfor fast input<br>Unshielded cable: 30 mfor output<br>Unshielded cable: 30 mfor digital input<br>Unshielded cable: 1 mfor analog input  |
| Insulation                     | 2300 V AC between output and internal logic<br>Non-insulated between analogue inputs<br>500 V AC between input and internal logic<br>Non-insulated between analogue input and internal logic<br>1500 V AC between supply and ground<br>500 V AC between sensor power supply and ground<br>500 V AC between input and ground<br>1500 V AC between output and ground<br>2300 V AC between supply and internal logic<br>500 V AC between sensor power supply and internal logic<br>500 V AC between Ethernet terminal and internal logic<br>2300 V AC between supply and sensor power supply |
| Marking                        | CE  |
| Sensor power supply            | 24 V DC at 250 mA supplied by the controller  |
| Mounting support               | Top hat type TH35-15 rail conforming to IEC 60715<br>Top hat type TH35-7.5 rail conforming to IEC 60715<br>Plate or panel with fixing kit   |
| Height                         | 90 mm   |
| Depth                          | 70 mm   |
| Width                          | 160 mm  |
| Product weight                 | 0.456 kg  |

## Okolina

|                                       |   |
|---------------------------------------|---|
| standards                             | EN/IEC 60664-1<br>EN/IEC 61131-2<br>EN/IEC 61010-2-201  |
| product certifications                | ABS<br>CSA<br>CULus<br>LR<br>IACS E10<br>RCM<br>EAC<br>DNV-GL   |
| environmental characteristic          | Ordinary and hazardous location   |
| resistance to electrostatic discharge | 4 kV on contact conforming to EN/IEC 61000-4-2<br>8 kV in air conforming to EN/IEC 61000-4-2  |
| resistance to electromagnetic fields  | 10 V/m ( 80 MHz...1 GHz) conforming to EN/IEC 61000-4-3<br>3 V/m ( 1.4 GHz...2 GHz) conforming to EN/IEC 61000-4-3<br>1 V/m ( 2...2.7 GHz) conforming to EN/IEC 61000-4-3   |
| resistance to magnetic fields         | 30 A/m 50/60 Hz conforming to EN/IEC 61000-4-8  |
| resistance to fast transients         | 2 kVfor power lines conforming to EN/IEC 61000-4-4<br>2 kVfor relay output conforming to EN/IEC 61000-4-4<br>1 kVfor Ethernet line conforming to EN/IEC 61000-4-4<br>1 kVfor serial link conforming to EN/IEC 61000-4-4<br>1 kVfor I/O conforming to EN/IEC 61000-4-4   |
| surge withstand                       | 2 kVfor power lines (AC) in common mode conforming to EN/IEC 61000-4-5<br>2 kVfor relay output in common mode conforming to EN/IEC 61000-4-5<br>1 kVfor I/O in common mode conforming to EN/IEC 61000-4-5<br>1 kVfor shielded cable in common mode conforming to EN/IEC 61000-4-5<br>0.5 kVfor power lines (DC) in differential mode conforming to EN/IEC 61000-4-5<br>1 kVfor power lines (AC) in differential mode conforming to EN/IEC 61000-4-5<br>1 kVfor relay output in differential mode conforming to EN/IEC 61000-4-5<br>0.5 kVfor power lines (DC) in common mode conforming to EN/IEC 61000-4-5 |
| resistance to conducted disturbances  | 10 Vrms (0.15...80 MHz) conforming to EN/IEC 61000-4-6<br>3 Vrms (0.1...80 MHz) conforming to Marine specification (LR, ABS, DNV, GL)<br>10 Vrms (spot frequency (2, 3, 4, 6.2, 8.2, 12.6, 16.5, 18.8, 22, 25 MHz)) conforming to Marine specification (LR, ABS, DNV, GL)   |
| electromagnetic emission              | Conducted emissionsconforming to EN/IEC 55011 power lines (AC), 0.15...0.5 MHz :<br>79 dB $\mu$ V/m QP/66 dB $\mu$ V/m AV<br>Conducted emissionsconforming to EN/IEC 55011 power lines (AC), 0.5...300 MHz :<br>73 dB $\mu$ V/m QP/60 dB $\mu$ V/m AV<br>Conducted emissionsconforming to EN/IEC 55011 power lines, 10...150 kHz :<br>120...69 dB $\mu$ V/m QP<br>Conducted emissionsconforming to EN/IEC 55011 power lines, 1.5...30 MHz : 63 dB $\mu$ V/m QP  |

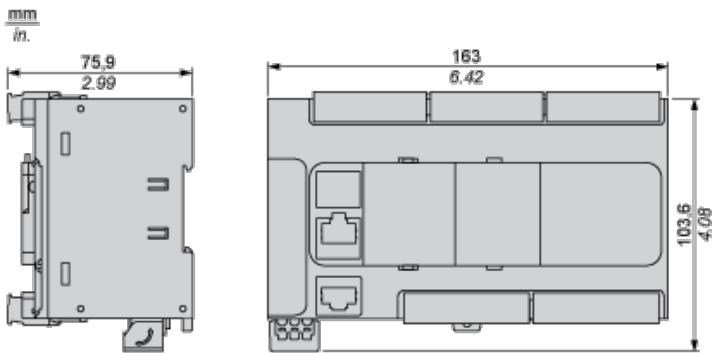
Radiated emissions conforming to EN/IEC 55011 class A 10 m, 30...230 MHz : 40 dB $\mu$ V/m QP  
 Conducted emissions conforming to EN/IEC 55011 power lines, 150...1500 kHz: 79...63 dB $\mu$ V/m QP  
 Radiated emissions conforming to EN/IEC 55011 class A 10 m, 200...1000 MHz: 47 dB $\mu$ V/m QP

|                                       |  |
|---------------------------------------|--|
| immunity to microbreaks               | 10 ms  |
| ambient air temperature for operation | -10...55 °C for horizontal installation<br>-10...35 °C for vertical installation   |
| ambient air temperature for storage   | -25...70 °C  |
| relative humidity                     | 10...95 % without condensation in operation<br>10...95 % without condensation in storage   |
| IP degree of protection               | IP20 with protective cover in place  |
| pollution degree                      | <= 2   |
| operating altitude                    | 0...2000 m   |
| storage altitude                      | 0...3000 m   |
| vibration resistance                  | 3.5 mm (vibration frequency: 5...8.4 Hz) on symmetrical rail<br>1 gn (vibration frequency: 8.4...150 Hz) on symmetrical rail<br>3.5 mm (vibration frequency: 5...8.4 Hz) on panel mounting<br>1 gn (vibration frequency: 8.4...150 Hz) on panel mounting |
| shock resistance                      | 98 m/s <sup>2</sup> (test wave duration: 11 ms)  |

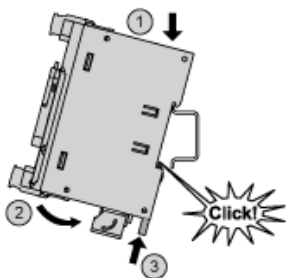
### Offer Sustainability

|   |   |
|---|---|
| Green Premium product   | Green Premium product   |
| Compliant - since 1415 - Schneider Electric declaration of conformity | Compliant - since 1415 - Schneider Electric declaration of conformity |
| Reference not containing SVHC above the threshold                     | Reference not containing SVHC above the threshold                     |
| Available   | Available   |
| Available   | Available   |

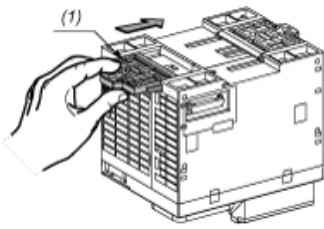
### Dimensions



### Mounting on a Rail

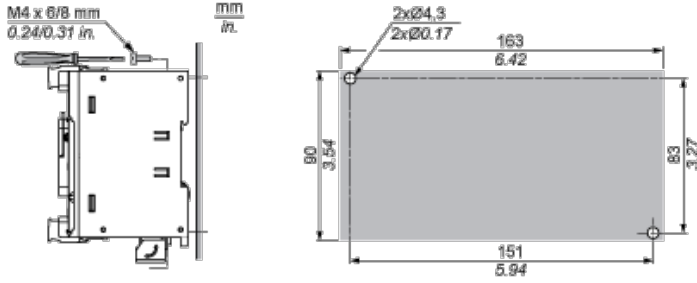


### Direct Mounting on a Panel Surface



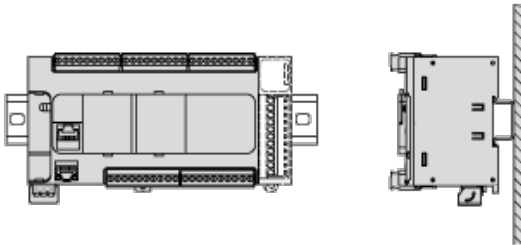
(1) Install a mounting strip

### Mounting Hole Layout

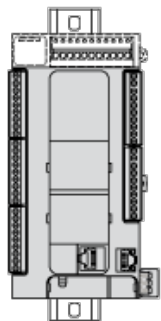


### Mounting

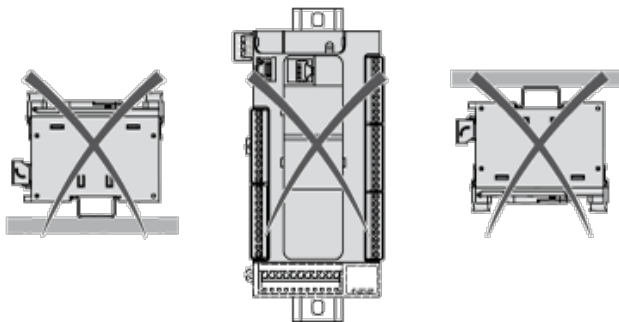
#### Correct Mounting Position



#### Acceptable Mounting Position

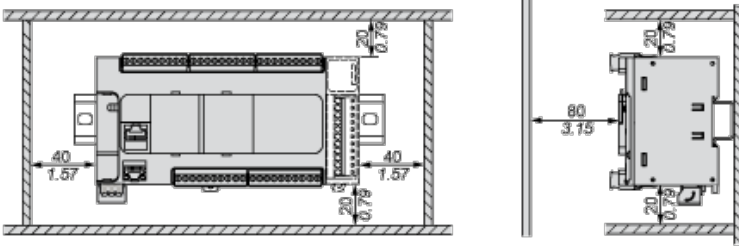


#### Incorrect Mounting Position



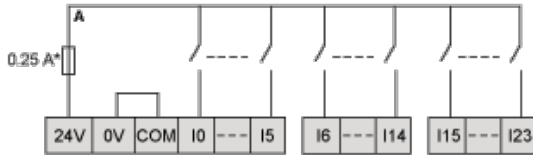
### Clearance

mm  
in.



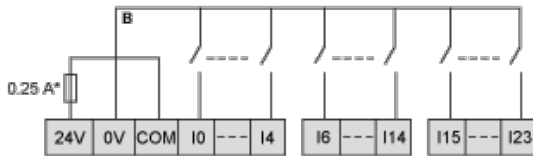
## Digital Inputs

### Wiring Diagram (Positive Logic)



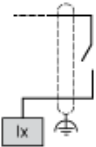
(\*) Type T fuse

### Wiring Diagram (Negative Logic)



(\*) Type T fuse

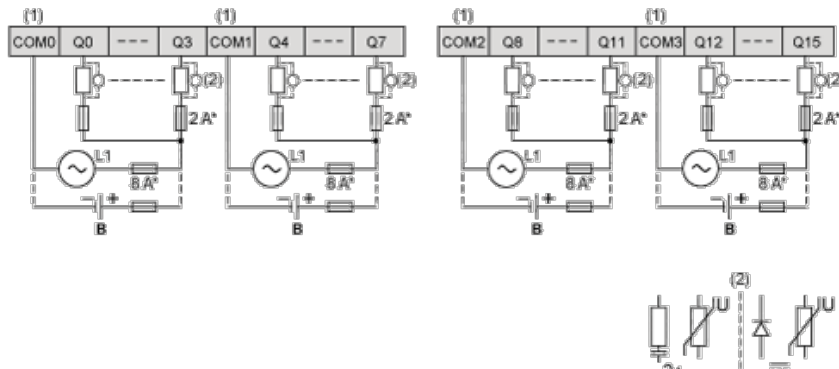
### Connection of the Fast Inputs



I0, I1, I6, I7

## Relay Outputs

### Negative Logic (Sink)



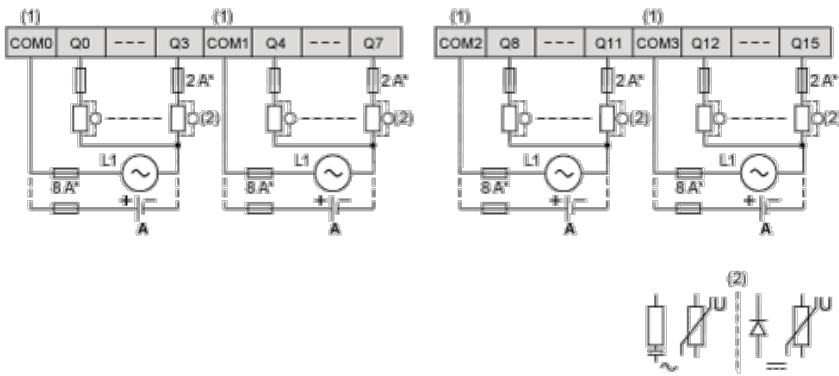
(\*) Type T fuse

(1) The COM0, COM1, COM2 and COM3 terminals are not connected internally.

(2) To improve the life time of the contacts, and to protect from potential inductive load damage, you must connect a free wheeling diode in parallel to each inductive DC load or an RC snubber in parallel of each inductive AC load

B Sink wiring (negative logic)

### Positive Logic (Source)



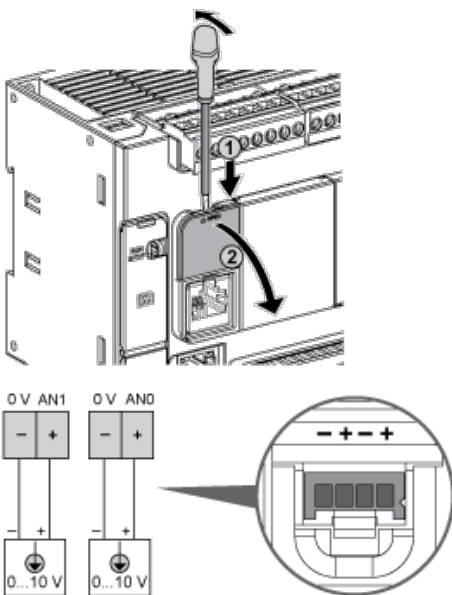
(\*) Type T fuse

(1) The COM0, COM1, COM2 and COM3 terminals are not connected internally.

(2) To improve the life time of the contacts, and to protect from potential inductive load damage, you must connect a free wheeling diode in parallel to each inductive DC load or an RC snubber in parallel of each inductive AC load

A Source wiring (positive logic)

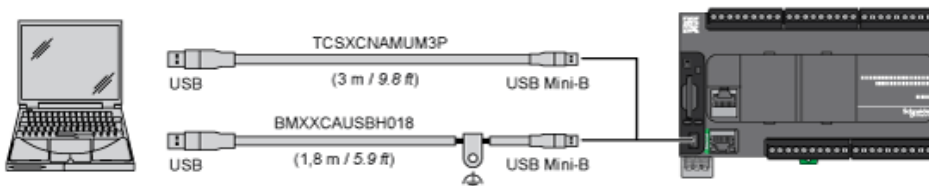
## Analog Inputs



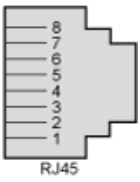
The (-) poles are connected internally.

| Pin | Wire Color |
|-----|------------|
| 0 V | Black      |
| AN1 | Red        |
| 0 V | Black      |
| AN0 | Red        |

## USB Mini-B Connection



## SL1 Connection



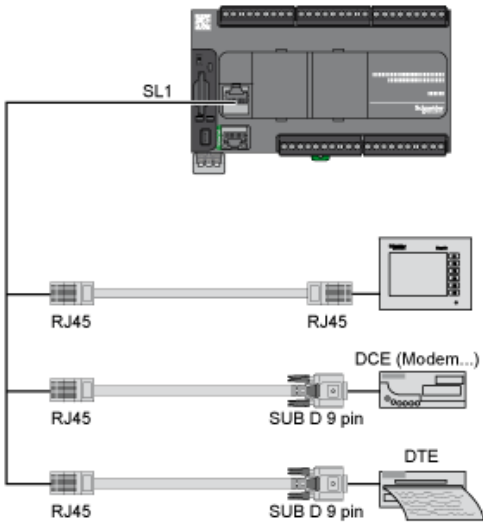
RJ45

SL1

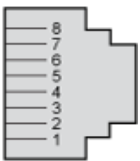
| N ° | RS 232 | RS 485 |
|-----|--------|--------|
| 1   | RxD    | N.C.   |
| 2   | TxD    | N.C.   |
| 3   | RTS    | N.C.   |
| 4   | N.C.   | D1     |
| 5   | N.C.   | D0     |
| 6   | CTS    | N.C.   |
| 7   | N.C.*  | 5 Vdc  |
| 8   | Common | Common |

N.C.: not connected

\* : 5 Vdc delivered by the controller. Do not connect.



SL2 Connection



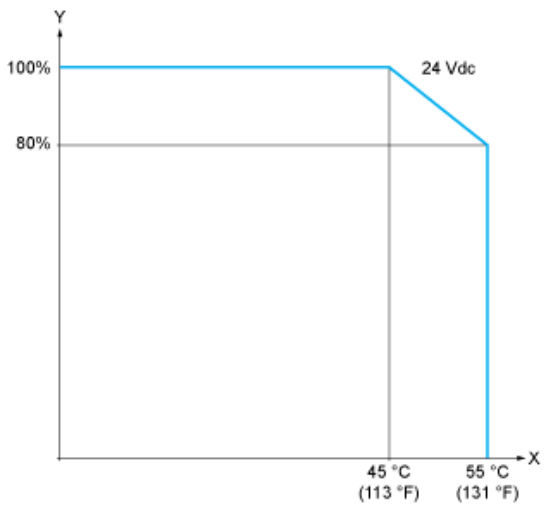
RJ45

| N ° | RS 485 |
|-----|--------|
| 1   | N.C.   |
| 2   | N.C.   |
| 3   | N.C.   |
| 4   | D1     |
| 5   | D0     |
| 6   | N.C.   |
| 7   | N.C.   |
| 8   | Common |



## Derating Curves

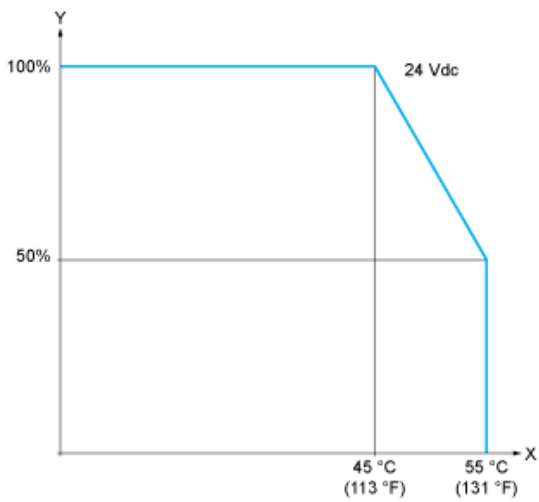
### Embedded Digital Inputs (No Cartridge)



X : Ambient temperature

Y : Input simultaneous ON ratio

### Embedded Digital Inputs (with Cartridge)



X : Ambient temperature

Y : Input simultaneous ON ratio