



### Main

|                           |                                                    |
|---------------------------|----------------------------------------------------|
| Range of Product          | Modicon M221                                       |
| Product or Component Type | Logic controller                                   |
| [Us] rated supply voltage | 24 V DC                                            |
| Discrete input number     | 16, discrete input 4 fast input IEC 61131-2 Type 1 |
| Analogue input number     | 2 0...10 V                                         |
| Discrete output type      | Transistor                                         |
| Discrete output number    | 16 transistor 2 fast output                        |
| Discrete output voltage   | 24 V DC                                            |
| Discrete output current   | 0.1 A                                              |

### Complementary

|                                        |                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Discrete I/O number                    | 32                                                                                                                                                                                                                                                                                                                                              |
| Maximum number of I/O expansion module | 7 relay output                                                                                                                                                                                                                                                                                                                                  |
| Supply voltage limits                  | 20.4...28.8 V                                                                                                                                                                                                                                                                                                                                   |
| Inrush current                         | 35 A                                                                                                                                                                                                                                                                                                                                            |
| Maximum power consumption in W         | 23.2 W 24 V with max number of I/O expansion module)<br>4.2 W 24 V without I/O expansion module)                                                                                                                                                                                                                                                |
| Power supply output current            | 0.52 A 5 V expansion bus<br>0.48 A 24 V 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 time analog input                                                                                                                                                                                                                                                                                         |
| Permitted overload on inputs           | +/- 30 V DC 5 min maximum)analog input<br>+/- 13 V DC permanent)analog input                                                                                                                                                                                                                                                                    |
| Voltage state 1 guaranteed             | >= 15 V input                                                                                                                                                                                                                                                                                                                                   |
| Voltage state 0 guaranteed             | <= 5 V input                                                                                                                                                                                                                                                                                                                                    |
| Discrete input current                 | 7 MA discrete input<br>5 mA fast input                                                                                                                                                                                                                                                                                                          |
| Input impedance                        | 100 kOhm analog input<br>3.4 kOhm input<br>4.9 kOhm fast input                                                                                                                                                                                                                                                                                  |
| Response time                          | 35 µs turn-off, I2...I5 input<br>5 µs turn-on, I0, I1, I6, I7 fast input<br>35 µs turn-on, other terminals input<br>5 µs turn-off, I0, I1, I6, I7 fast input<br>100 µs turn-off, other terminals input<br>5 µs turn-on, turn-off, Q0...Q1 output<br>50 µs turn-on, turn-off, Q2...Q3 output<br>300 µs turn-on, turn-off, other terminals output |
| Configurable filtering time            | 0 ms input<br>3 ms input<br>12 ms input                                                                                                                                                                                                                                                                                                         |
| Discrete output logic                  | Positive logic (source)                                                                                                                                                                                                                                                                                                                         |
| Maximum current per output common      | 1.6 A                                                                                                                                                                                                                                                                                                                                           |
| Output Frequency (sync to mains)       | 100 KHz fast output (PWM/PLS mode) Q0...Q1<br>5 KHz output Q2...Q3<br>0.1 KHz output Q4...Q15                                                                                                                                                                                                                                                   |
| Absolute accuracy error                | +/- 1 % of full scale analog input                                                                                                                                                                                                                                                                                                              |

The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Schneider Electric Industries SAS nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein.

|                                   |                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Maximum leakage current           | 0.1 mA transistor output                                                                                                                                                                                                                                                                                                      |
| Maximum voltage drop              | <1 V                                                                                                                                                                                                                                                                                                                          |
| Mechanical durability             | 20000000 cycles transistor output                                                                                                                                                                                                                                                                                             |
| Maximum tungsten load             | <2.4 W output and fast output                                                                                                                                                                                                                                                                                                 |
| Protection type                   | Short-circuit and overload protection with automatic reset<br>Short-circuit protection on output<br>Overload and short-circuit protection 1 A                                                                                                                                                                                 |
| Reset time                        | 1 s automatic reset                                                                                                                                                                                                                                                                                                           |
| Memory capacity                   | 256 kB user application and data RAM 10000 instructions<br>256 kB internal variables RAM                                                                                                                                                                                                                                      |
| Data backed up                    | 256 kB built-in flash memory backup of application and data                                                                                                                                                                                                                                                                   |
| Data storage equipment            | 2 GB SD card optional)                                                                                                                                                                                                                                                                                                        |
| Battery type                      | BR2032 lithium non-rechargeable 4 year(s)                                                                                                                                                                                                                                                                                     |
| Backup time                       | 1 year 77 °F (25 °C) by interruption of power supply)                                                                                                                                                                                                                                                                         |
| Execution time for 1 KInstruction | 0.3 Ms event and periodic task<br>0.7 ms other instruction                                                                                                                                                                                                                                                                    |
| Execution time per instruction    | 0.2 µs Boolean                                                                                                                                                                                                                                                                                                                |
| Exct time for event task          | 60 µs response time                                                                                                                                                                                                                                                                                                           |
| Application structure             | 1 cyclic auxiliary task<br>1 configurable freewheeling/cyclic master task<br>8 interrupt tasks                                                                                                                                                                                                                                |
| Maximum size of object areas      | 255 %C counters<br>512 %M memory bits<br>512 %KW constant words<br>8000 %MW memory words<br>255 %TM timers                                                                                                                                                                                                                    |
| Realtime clock                    | With                                                                                                                                                                                                                                                                                                                          |
| Clock drift                       | <= 30 s/month 77 °F (25 °C)                                                                                                                                                                                                                                                                                                   |
| Regulation loop                   | Adjustable PID regulator up to 14 simultaneous loops                                                                                                                                                                                                                                                                          |
| Positioning functions             | PTO 2 pulse/direction 100 kHz)<br>PTO 1 CW/CCW 100 kHz)                                                                                                                                                                                                                                                                       |
| Function Available                | Frequency generator<br>PWM<br>PLS                                                                                                                                                                                                                                                                                             |
| Counting input number             | 4 fast input (HSC mode) 100 kHz 32 bits                                                                                                                                                                                                                                                                                       |
| Counter function                  | Single phase<br>A/B<br>Pulse/direction                                                                                                                                                                                                                                                                                        |
| Integrated connection type        | USB port mini B USB 2.0<br>Non isolated serial link serial 1 RJ45 RS232/RS485<br>Ethernet RJ45                                                                                                                                                                                                                                |
| Supply                            | Serial 1)serial link supply 5 V, <200 mA                                                                                                                                                                                                                                                                                      |
| Transmission rate                 | 1.2...115.2 kbit/s (115.2 kbit/s by default) 49.21 ft (15 m) RS485<br>1.2...115.2 kbit/s (115.2 kbit/s by default) 9.84 ft (3 m) RS232<br>480 Mbit/s USB                                                                                                                                                                      |
| Communication port protocol       | USB port USB - SoMachine-Network<br>Non isolated serial link Modbus master/slave - RTU/ASCII or SoMachine-Network<br>Ethernet                                                                                                                                                                                                 |
| Port Ethernet                     | 10BASE-T/100BASE-TX 1 328.08 ft (100 m) copper cable                                                                                                                                                                                                                                                                          |
| Communication Service             | Modbus TCP slave device<br>Modbus TCP server<br>Modbus TCP client<br>Ethernet/IP adapter<br>DHCP client                                                                                                                                                                                                                       |
| Local signalling                  | For PWR 1 LED (green)<br>For RUN 1 LED (green)<br>For module error (ERR) 1 LED (red)<br>For SD card access (SD) 1 LED (green)<br>For BAT 1 LED (red)<br>For I/O state 1 LED per channel (green)<br>For SL 1 LED (green)<br>For ACT Ethernet network activity (green)<br>For Link (Link Status) Ethernet network link (yellow) |

|                                        |                                                                                                                                                                                                                                                                               |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Electrical connection                  | Terminal block, 3 for connecting the 24 V DC power supply<br>Connector, 4 for analogue inputs<br>Mini B USB 2.0 connector for a programming terminal<br>HE-10 connector, 20 for inputs<br>HE-10 connector, 20 for outputs                                                     |
| Maximum cable distance between devices | Shielded cable <32.81 ft (10 m) fast input<br>Unshielded cable <98.43 ft (30 m) output<br>Unshielded cable <98.43 ft (30 m) digital input<br>Unshielded cable <3.28 ft (1 m) analog input<br>Shielded cable <9.84 ft (3 m) fast output                                        |
| Insulation                             | Between input and internal logic 500 V AC<br>Between fast input and internal logic 500 V AC<br>Non-insulated between inputs<br>Between output and internal logic 500 V AC<br>Non-insulated between analogue input and internal logic<br>Non-insulated between analogue inputs |
| Marking                                | CE                                                                                                                                                                                                                                                                            |
| Mounting support                       | Top hat type TH35-15 rail IEC 60715<br>Top hat type TH35-7.5 rail IEC 60715<br>Plate or panel with fixing kit                                                                                                                                                                 |
| Height                                 | 3.54 in (90 mm)                                                                                                                                                                                                                                                               |
| Depth                                  | 2.76 in (70 mm)                                                                                                                                                                                                                                                               |
| Width                                  | 2.76 in (70 mm)                                                                                                                                                                                                                                                               |
| Net Weight                             | 0.60 lb(US) (0.27 kg)                                                                                                                                                                                                                                                         |

## Environment

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Standards                             | EN/IEC 61010-2-201<br>EN/IEC 60664-1<br>EN/IEC 61131-2                                                                                                                                                                                                                                                                                                                                                                                      |
| Product Certifications                | ABS<br>DNV-GL<br>LR<br>CULus<br>IACS E10<br>EAC<br>RCM<br>CSA                                                                                                                                                                                                                                                                                                                                                                               |
| Environmental characteristic          | Ordinary and hazardous location                                                                                                                                                                                                                                                                                                                                                                                                             |
| Resistance to electrostatic discharge | 8 kV in air EN/IEC 61000-4-2<br>4 kV on contact EN/IEC 61000-4-2                                                                                                                                                                                                                                                                                                                                                                            |
| Resistance to electromagnetic fields  | 9.14 V/m (10 V/m) 80 MHz...1 GHz EN/IEC 61000-4-3<br>2.74 V/m (3 V/m) 1.4 GHz...2 GHz EN/IEC 61000-4-3<br>0.91 V/m (1 V/m) 2...2.7 GHz EN/IEC 61000-4-3                                                                                                                                                                                                                                                                                     |
| Resistance to magnetic fields         | 98.43 A/m (30 A/m) 50/60 Hz EN/IEC 61000-4-8                                                                                                                                                                                                                                                                                                                                                                                                |
| Resistance to fast transients         | 2 kV EN/IEC 61000-4-4 power lines)<br>2 kV EN/IEC 61000-4-4 relay output)<br>1 kV EN/IEC 61000-4-4 I/O)<br>1 kV EN/IEC 61000-4-4 Ethernet line)<br>1 kV EN/IEC 61000-4-4 serial link)                                                                                                                                                                                                                                                       |
| Surge withstand                       | 2 kV power lines (AC) common mode EN/IEC 61000-4-5<br>2 kV relay output common mode EN/IEC 61000-4-5<br>1 kV I/O common mode EN/IEC 61000-4-5<br>1 kV shielded cable common mode EN/IEC 61000-4-5<br>0.5 kV power lines (DC) differential mode EN/IEC 61000-4-5<br>1 kV power lines (AC) differential mode EN/IEC 61000-4-5<br>1 kV relay output differential mode EN/IEC 61000-4-5<br>0.5 kV power lines (DC) common mode EN/IEC 61000-4-5 |
| Resistance to conducted disturbances  | 10 V 0.15...80 MHz EN/IEC 61000-4-6<br>3 V 0.1...80 MHz Marine specification (LR, ABS, DNV, GL)<br>10 V spot frequency (2, 3, 4, 6.2, 8.2, 12.6, 16.5, 18.8, 22, 25 MHz) Marine specification (LR, ABS, DNV, GL)                                                                                                                                                                                                                            |

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Electromagnetic emission              | Conducted emissions 79 dBµV/m QP/66 dBµV/m AV power lines (AC))0.15...0.5 MHz EN/IEC 55011<br>Conducted emissions 73 dBµV/m QP/60 dBµV/m AV power lines (AC))0.5...300 MHz EN/IEC 55011<br>Conducted emissions 120...69 dBµV/m QP power lines)10...150 kHz EN/IEC 55011<br>Conducted emissions 63 dBµV/m QP power lines)1.5...30 MHz EN/IEC 55011<br>Radiated emissions 40 dBµV/m QP class A 10 m)30...230 MHz EN/IEC 55011<br>Conducted emissions 79...63 dBµV/m QP power lines)150...1500 kHz EN/IEC 55011<br>Radiated emissions 47 dBµV/m QP class A 10 m)200...1000 MHz EN/IEC 55011 |
| Immunity to microbreaks               | 10 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Ambient air temperature for operation | 14...131 °F (-10...55 °C) horizontal installation)<br>14...95 °F (-10...35 °C) vertical installation)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Ambient Air Temperature for Storage   | -13...158 °F (-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...6561.68 ft (0...2000 m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Storage altitude                      | 0.00...9842.52 ft (0...3000 m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Vibration resistance                  | 3.5 mm 5...8.4 Hz symmetrical rail<br>3.5 mm 5...8.4 Hz panel mounting<br>1 gn 8.4...150 Hz symmetrical rail<br>1 gn 8.4...150 Hz panel mounting                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Shock resistance                      | 147 m/s² 11 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## Ordering and shipping details

|                       |                              |
|-----------------------|------------------------------|
| Category              | 22533-M2XX PLC & ACCESSORIES |
| Discount Schedule     | MSX                          |
| GTIN                  | 3606480611346                |
| Nbr. of units in pkg. | 1                            |
| Package weight(Lbs)   | 14.81 oz (420.0 g)           |
| Returnability         | Yes                          |
| Country of origin     | TW                           |

## Packing Units

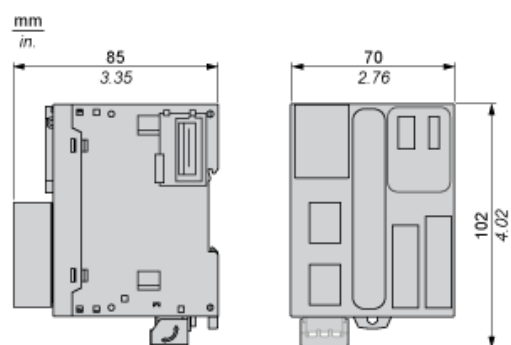
|                              |                          |
|------------------------------|--------------------------|
| Unit Type of Package 1       | PCE                      |
| Package 1 Height             | 4.25 in (10.8 cm)        |
| Package 1 width              | 3.94 in (10 cm)          |
| Package 1 Length             | 4.96 in (12.6 cm)        |
| Unit Type of Package 2       | S04                      |
| Number of Units in Package 2 | 24                       |
| Package 2 Weight             | 23.54 lb(US) (10.678 kg) |
| Package 2 Height             | 11.81 in (30 cm)         |
| Package 2 width              | 15.75 in (40 cm)         |
| Package 2 Length             | 23.62 in (60 cm)         |

## Offer Sustainability

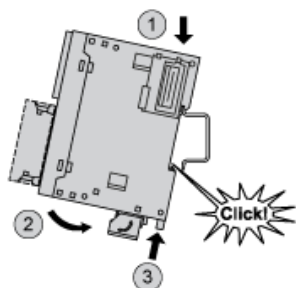
|                            |                                                                                                                                                                                                                                                                                             |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sustainable offer status   | Green Premium product                                                                                                                                                                                                                                                                       |
| California proposition 65  | WARNING: This product can expose you to chemicals including: Lead and lead compounds, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to <a href="http://www.P65Warnings.ca.gov">www.P65Warnings.ca.gov</a> |
| REACH Regulation           |  <a href="#">REACH Declaration</a>                                                                                                                                                                       |
| EU RoHS Directive          | Pro-active compliance (Product out of EU RoHS legal scope)  <a href="#">EU RoHS Declaration</a>                                                                                                        |
| Mercury free               | Yes                                                                                                                                                                                                                                                                                         |
| RoHS exemption information |  <a href="#">Yes</a>                                                                                                                                                                                     |

|                          |                                                                                                                                 |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| China RoHS Regulation    | <a href="#"> China RoHS Declaration</a>         |
| Environmental Disclosure | <a href="#"> Product Environmental Profile</a> |
| Circularity Profile      | <a href="#"> End Of Life Information</a>       |
| WEEE                     | The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins.    |
| PVC free                 | Yes                                                                                                                             |

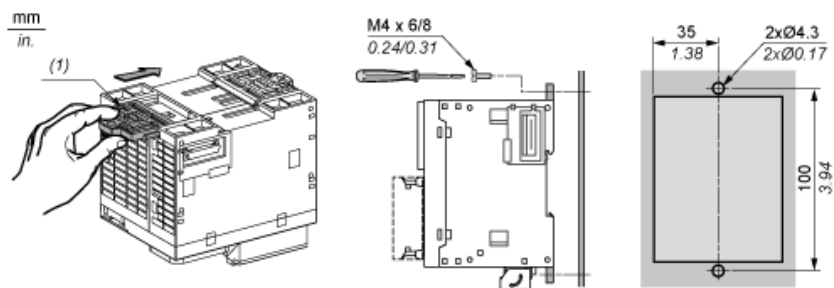
## Dimensions



## Mounting on a Rail



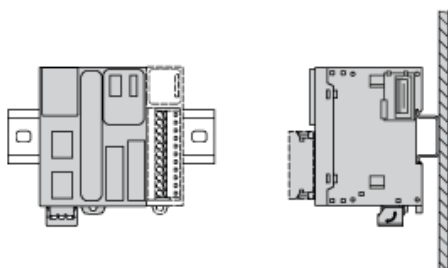
## Direct Mounting on a Panel Surface



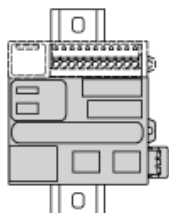
(1) Install a mounting strip

## Mounting

### Correct Mounting Position



### Acceptable Mounting Position

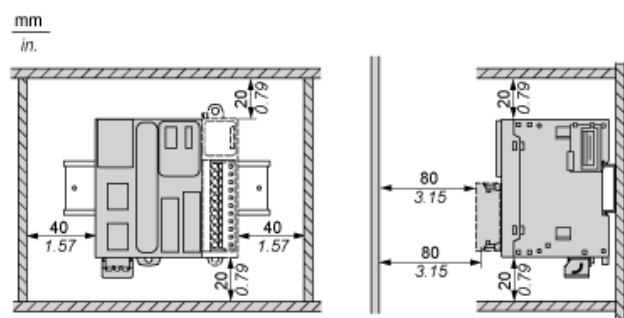


## Incorrect Mounting Position

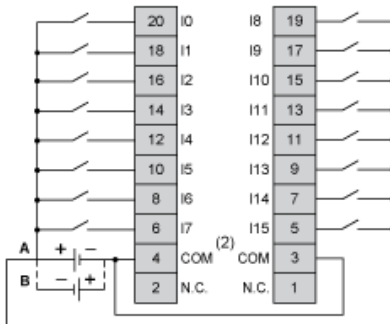


## Clearance

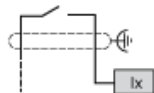
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## Digital Inputs

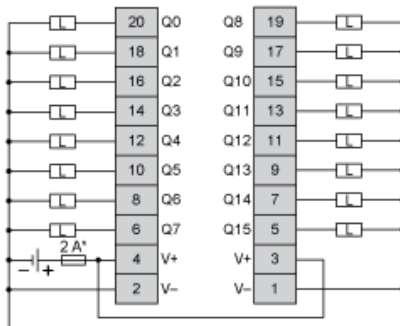


- (1) The COM terminals are not connected internally.  
A : Sink wiring (positive logic).  
B : Source wiring (negative logic).

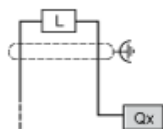


Ix I0, I1, I6, I7

## Digital Outputs

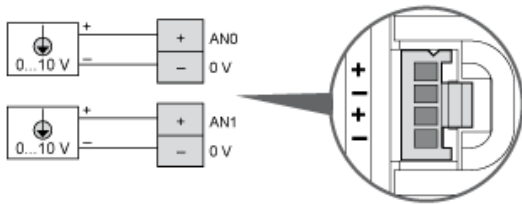
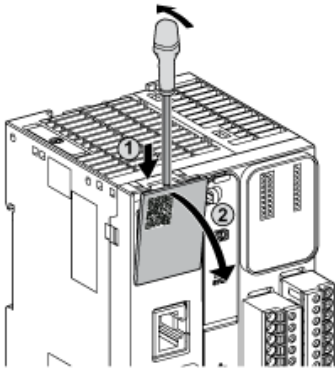


- (\*) Type T fuse  
(1) The V+ terminals are connected internally.



Qx Q0, Q1

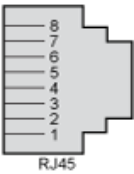
## Analog Inputs



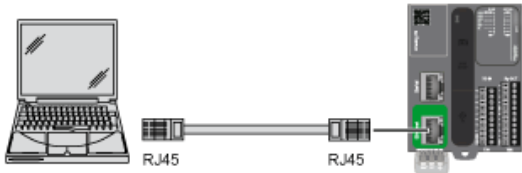
The (-) poles are connected internally.

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

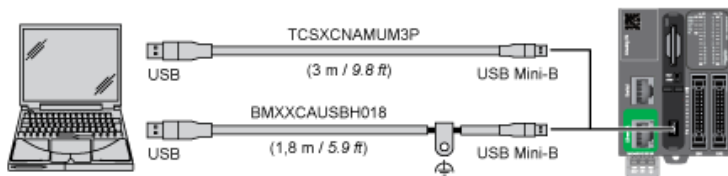
### Ethernet Connection



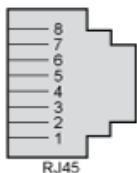
| Pin N ° | Signal |
|---------|--------|
| 1       | TD+    |
| 2       | TD-    |
| 3       | RD+    |
| 4       | -      |
| 5       | -      |
| 6       | RD-    |
| 7       | -      |
| 8       | -      |



### USB Mini-B Connection



## SL1 Connection

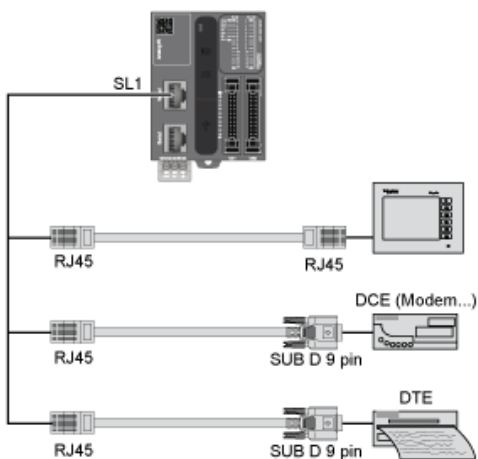


SL1

| 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 |

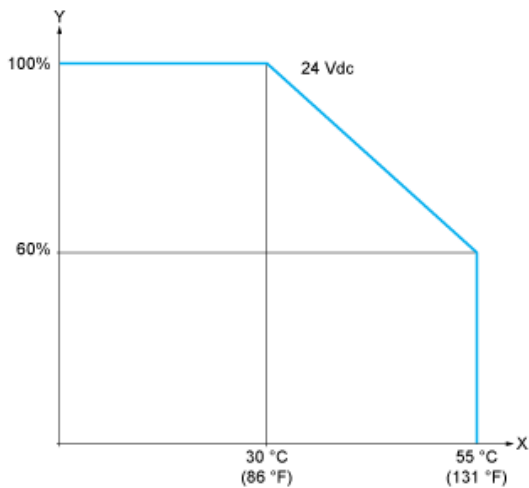
N.C.: not connected

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



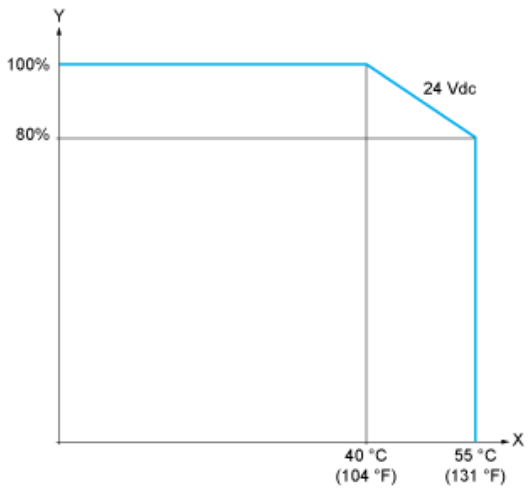
Derating Curves

Embedded Digital Inputs



X : Ambient temperature  
Y : Input simultaneous ON ratio

Embedded Digital Outputs



X : Ambient temperature  
Y : Output simultaneous ON ratio