

Product datasheet

Specifications



controller M221 24 IO transistor PNP Ethernet

TM221CE24T

Main

| | |
|---------------------------|--|
| Range Of Product | Modicon M221 |
| Product Or Component Type | Logic controller |
| [Us] Rated Supply Voltage | 24 V DC |
| Discrete Input Number | 14, discrete input 4 fast input conforming to IEC 61131-2 Type 1 |
| Analogue Input Number | 2 at 0...10 V |
| Discrete Output Type | Transistor |
| Discrete Output Number | 10 transistor 2 fast output |
| Discrete Output Voltage | 24 V DC |
| Discrete Output Current | 0.5 A |

Complementary

| | |
|--|--|
| Discrete I/O Number | 24 |
| Maximum Number Of I/O Expansion Module | 7 (local I/O-Architecture) 14 (remote I/O-Architecture) |
| Supply Voltage Limits | 20.4...28.8 V |
| Inrush Current | 35 A |
| Maximum Power Consumption In W | 14 W at 24 V (with max number of I/O expansion module) 4.8 W at 24 V (without I/O expansion module) |
| Power Supply Output Current | 0.52 A 5 V for expansion bus 0.2 A 24 V for 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 for analogue input analog input |
| Permitted Overload On Inputs | +/- 30 V DC for 5 min (maximum) for analog input +/- 13 V DC (permanent) for analog input |
| Voltage State 1 Guaranteed | >= 15 V for input |
| Voltage State 0 Guaranteed | <= 5 V for input |
| Discrete Input Current | 7 mA for discrete input 5 mA for fast input |
| Input Impedance | 3.4 kOhm for discrete input 100 kOhm for analog input 4.9 kOhm for fast input |

Price is "List Price" and may be subject to a trade discount – check with your local distributor or retailer for actual price.

| | |
|--|---|
| Response Time | 35 µs turn-off, I2...I5 terminal(s) for input 5 µs turn-on, I0, I1, I6, I7 terminal(s) for fast input 35 µs turn-on, other terminals terminal(s) for input 5 µs turn-off, I0, I1, I6, I7 terminal(s) for fast input 100 µs turn-off, other terminals terminal(s) for input 5 µs turn-on, turn-off, Q0...Q1 terminal(s) for output 50 µs turn-on, turn-off, Q2...Q3 terminal(s) for output 300 µs turn-on, turn-off, other terminals terminal(s) for output |
| Configurable Filtering Time | 0 ms for input 3 ms for input 12 ms for input |
| Discrete Output Logic | Positive logic (source) |
| Maximum Current Per Output Common | 5 A |
| Output Frequency | 100 kHz for fast output (PWM/PLS mode) at Q0...Q1 5 kHz for output at Q2...Q3 0.1 kHz for output at Q4...Q9 |
| Absolute Accuracy Error | +/- 1 % of full scale for analog input |
| Maximum Leakage Current | 0.1 mA for transistor output |
| Maximum Voltage Drop | <1 V |
| Mechanical Durability | 20000000 cycles for transistor output |
| Maximum Tungsten Load | <12 W for output and fast output |
| Protection Type | Overload and short-circuit protection at 1 A |
| Reset Time | 1 s automatic reset |
| Memory Capacity | 256 kB for user application and data RAM with 10000 instructions 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 or CR2032X lithium non-rechargeable |
| Backup Time | 1 year at 25 °C (by interruption of power supply) |
| Execution Time For 1 Kinstruction | 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 | 255 %C counters 512 %M memory bits 8000 %MW memory words 512 %KW constant words 255 %TM timers |
| Realtime Clock | With |
| Clock Drift | <= 30 s/month at 25 °C |
| Regulation Loop | Adjustable PID regulator up to 14 simultaneous loops |
| Positioning Functions | Position PTO 2 axe(s)pulse/direction mode (100 kHz) Position PTO 1 axe(s)CW/CCW mode (100 kHz) |
| Function Available | Frequency generator PLS PWM |
| Counting Input Number | 4 fast input (HSC mode) at 100 kHz 32 bits |
| Counter Function | A/B Single phase Pulse/direction |
| Integrated Connection Type | USB port with mini B USB 2.0 connector Non isolated serial link serial 1 with RJ45 connector and RS232/RS485 interface Ethernet with RJ45 connector |

| | |
|---|---|
| Supply | (serial)serial link supply: 5 V, <200 mA |
| Transmission Rate | 1.2...115.2 kbit/s (115.2 kbit/s by default) for bus length of 15 m for RS485 1.2...115.2 kbit/s (115.2 kbit/s by default) for bus length of 3 m for RS232 480 Mbit/s for USB |
| Communication Port Protocol | USB port: USB - SoMachine-Network Non isolated serial link: Modbus master/slave - RTU/ASCII or SoMachine-Network Ethernet |
| Port Ethernet | 10BASE-T/100BASE-TX 1 port with 100 m copper cable |
| Communication Service | Modbus TCP slave device Modbus TCP server Modbus TCP client Ethernet/IP adapter DHCP client |
| Local Signalling | 1 LED (green) for PWR 1 LED (green) for RUN 1 LED (red) for module error (ERR) 1 LED (green) for SD card access (SD) 1 LED (red) for BAT 1 LED per channel (green) for I/O state 1 LED (green) for SL Ethernet network activity (green) for ACT Ethernet network link (yellow) for Link (Link Status) |
| Electrical Connection | removable screw terminal block for inputs removable screw terminal block for outputs terminal block, 3 terminal(s) for connecting the 24 V DC power supply connector, 4 terminal(s) for analogue inputs Mini B USB 2.0 connector for a programming terminal |
| Maximum Cable Distance Between Devices | Shielded cable: <10 m for fast input Unshielded cable: <30 m for output Unshielded cable: <30 m for digital input Unshielded cable: <1 m for analog input Shielded cable: <3 m for fast output |
| Insulation | Between input and internal logic at 500 V AC Between fast input and internal logic at 500 V AC Non-insulated between inputs Between output and internal logic at 500 V AC Non-insulated between analogue input and internal logic Non-insulated between analogue inputs |
| Marking | CE |
| Mounting Support | Top hat type TH35-15 rail conforming to IEC 60715 Top hat type TH35-7.5 rail conforming to IEC 60715 plate or panel with fixing kit |
| Height | 90 mm |
| Depth | 70 mm |
| Width | 110 mm |
| Net Weight | 0.395 kg |

Environment

| | |
|-------------------------------|---|
| Standards | IEC 61131-2 UL 508 CAN/CSA C22.2 No. 213 IACS E10 ANSI/ISA 12-12-01 |
| Product Certifications | ABS EAC RCM cULus LR DNV-GL CE UKCA cULus HazLoc |

| | |
|--|---|
| Environmental Characteristic | Ordinary and hazardous location |
| Resistance To Electrostatic Discharge | 8 kV in air conforming to IEC 61000-4-2 4 kV on contact conforming to IEC 61000-4-2 |
| Resistance To Electromagnetic Fields | 10 V/m 80 MHz...1 GHz conforming to IEC 61000-4-3 3 V/m 1.4 GHz...2 GHz conforming to IEC 61000-4-3 1 V/m 2...2.7 GHz conforming to IEC 61000-4-3 |
| Resistance To Magnetic Fields | 30 A/m 50/60 Hz conforming to IEC 61000-4-8 |
| Resistance To Fast Transients | 2 kV (power lines) conforming to IEC 61000-4-4 2 kV (relay output) conforming to IEC 61000-4-4 1 kV (I/O) conforming to IEC 61000-4-4 1 kV (Ethernet line) conforming to IEC 61000-4-4 1 kV (serial link) conforming to IEC 61000-4-4 |
| Surge Withstand | 2 kV power lines (AC) common mode conforming to IEC 61000-4-5 2 kV relay output common mode conforming to IEC 61000-4-5 1 kV I/O common mode conforming to IEC 61000-4-5 1 kV shielded cable common mode conforming to IEC 61000-4-5 0.5 kV power lines (DC) differential mode conforming to IEC 61000-4-5 1 kV power lines (AC) differential mode conforming to IEC 61000-4-5 1 kV relay output differential mode conforming to IEC 61000-4-5 0.5 kV power lines (DC) common mode conforming to IEC 61000-4-5 |
| Resistance To Conducted Disturbances | 10 V 0.15...80 MHz conforming to IEC 61000-4-6 3 V 0.1...80 MHz conforming to Marine specification (LR, ABS, DNV, GL) 10 V 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 emissions - test level: 79 dB μ V/m QP/66 dB μ V/m AV (power lines (AC)) at 0.15...0.5 MHz conforming to IEC 55011 Conducted emissions - test level: 73 dB μ V/m QP/60 dB μ V/m AV (power lines (AC)) at 0.5...300 MHz conforming to IEC 55011 Conducted emissions - test level: 120...69 dB μ V/m QP (power lines) at 10...150 kHz conforming to IEC 55011 Conducted emissions - test level: 63 dB μ V/m QP (power lines) at 1.5...30 MHz conforming to IEC 55011 Radiated emissions - test level: 40 dB μ V/m QP class A (10 m) at 30...230 MHz conforming to IEC 55011 Conducted emissions - test level: 79...63 dB μ V/m QP (power lines) at 150...1500 kHz conforming to IEC 55011 Radiated emissions - test level: 47 dB μ V/m QP class A (10 m) at 200...1000 MHz conforming to IEC 55011 |
| Immunity To Microbreaks | 10 ms |
| Ambient Air Temperature For Operation | -10...55 °C (horizontal installation) -10...35 °C (vertical installation) |
| Ambient Air Temperature For Storage | -25...70 °C |
| Relative Humidity | 10...95 %, without condensation (in operation) 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 at 5...8.4 Hz on symmetrical rail 3.5 mm at 5...8.4 Hz on panel mounting 1 gn at 8.4...150 Hz on symmetrical rail 1 gn at 8.4...150 Hz on panel mounting |
| Shock Resistance | 147 m/s ² for 11 ms |

Packing Units

| | |
|-------------------------------------|-----------|
| Unit Type Of Package 1 | PCE |
| Number Of Units In Package 1 | 1 |
| Package 1 Height | 11.133 cm |

| | |
|-------------------------------------|-----------|
| Package 1 Width | 14.136 cm |
| Package 1 Length | 15.607 cm |
| Package 1 Weight | 621.0 g |
| Unit Type Of Package 2 | CAR |
| Number Of Units In Package 2 | 20 |
| Package 2 Height | 29.7 cm |
| Package 2 Width | 39.8 cm |
| Package 2 Length | 57.0 cm |
| Package 2 Weight | 13.211 kg |
| Unit Type Of Package 3 | P12 |
| Number Of Units In Package 3 | 240 |
| Package 3 Height | 105.0 cm |
| Package 3 Width | 120.0 cm |
| Package 3 Length | 80.0 cm |
| Package 3 Weight | 94 kg |

Sustainability

Green Premium™ label is Schneider Electric's commitment to delivering products with best-in-class environmental performance. Green Premium promises compliance with the latest regulations, transparency on environmental impacts, as well as circular and low-CO₂ products.

Guide to assessing product sustainability is a white paper that clarifies global eco-label standards and how to interpret environmental declarations.

[Learn more about Green Premium >](#)

[Guide to assess a product's sustainability >](#)



Transparency RoHS/REACH

Well-being performance

Mercury Free

Rohs Exemption Information Yes

Pvc Free

Certifications & Standards

Reach Regulation

[REACH Declaration](#)

Eu Rohs Directive

Pro-active compliance (Product out of EU RoHS legal scope)

China Rohs Regulation

[China RoHS declaration](#)

Environmental Disclosure

[Product Environmental Profile](#)

Weee

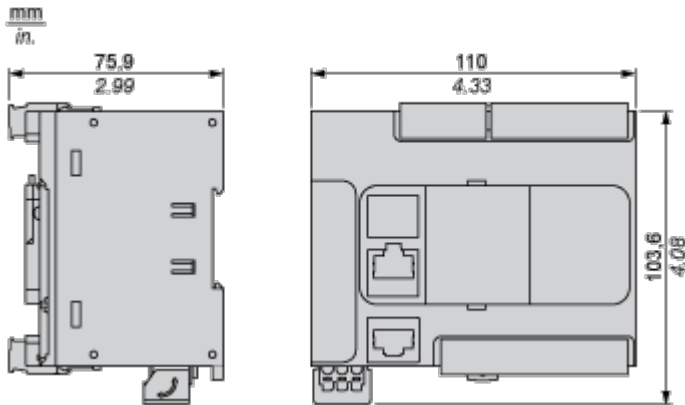
The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins

Circularity Profile

[End of Life Information](#)

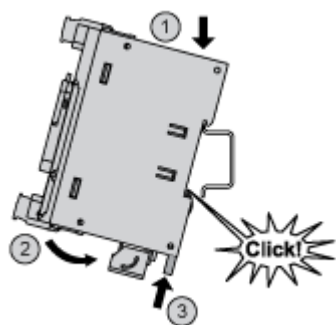
Dimensions Drawings

Dimensions

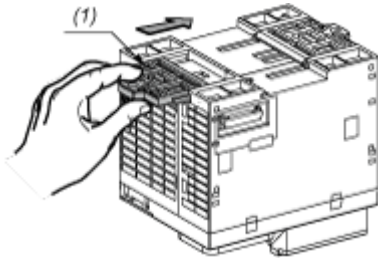


Mounting and Clearance

Mounting on a Rail

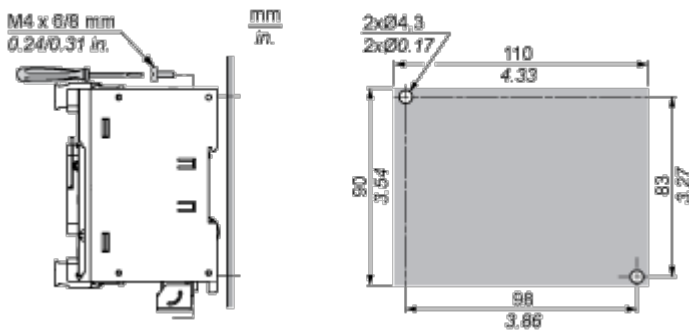


Direct Mounting on a Panel Surface



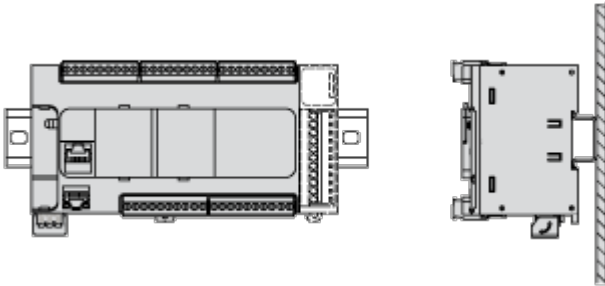
(1) Install a mounting strip

Mounting Hole Layout

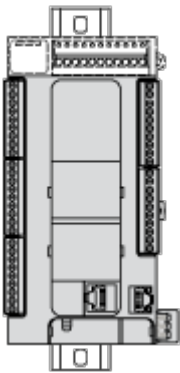


Mounting

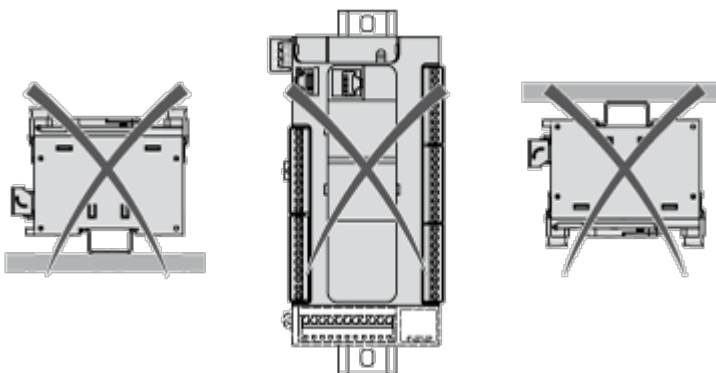
Correct Mounting Position



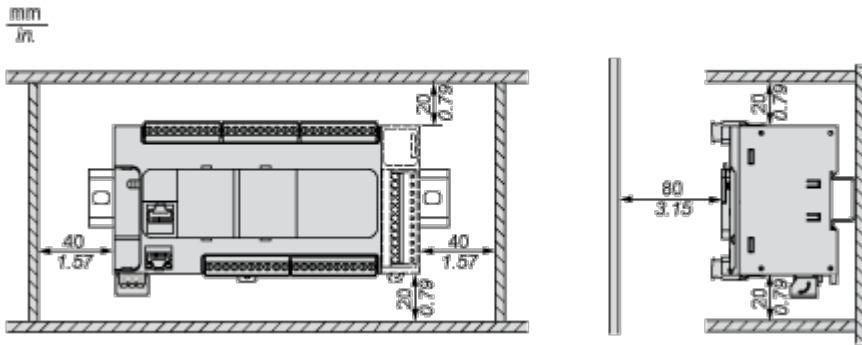
Acceptable Mounting Position



Incorrect Mounting Position

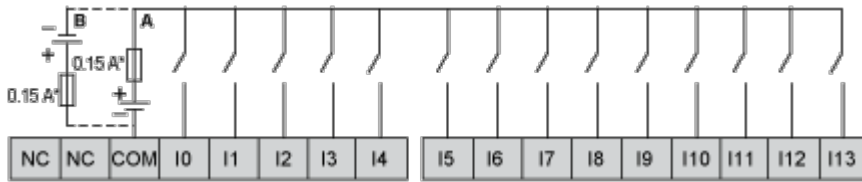


Clearance



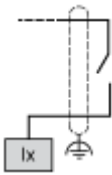
Connections and Schema

Digital Inputs



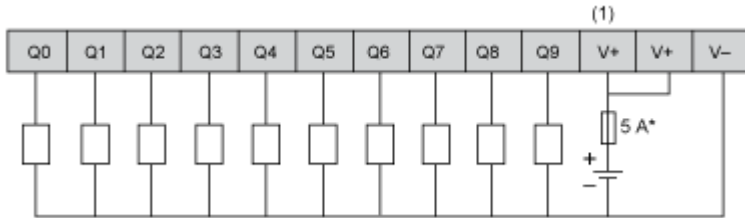
- (*) Type T fuse
- (A) Sink wiring (positive logic).
- (B) Source wiring (negative logic).

Connection of the Fast Inputs



I0, I1, I6, I7

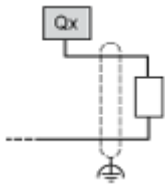
Transistor Outputs



(*) Type T fuse

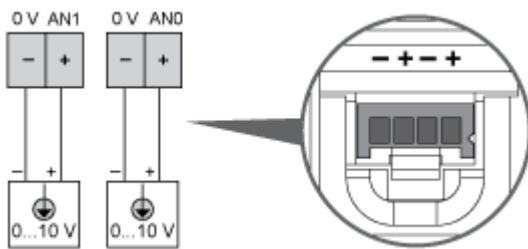
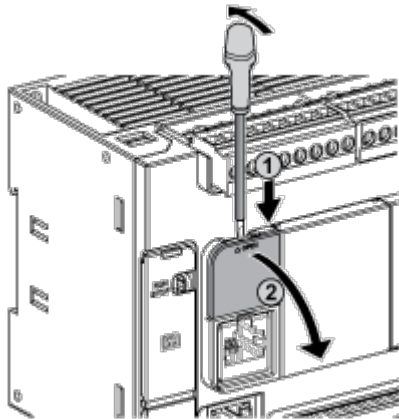
(1) The V+ terminals are connected internally.

Connection of the Fast Outputs



Q0, Q1

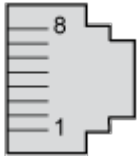
Analog Inputs



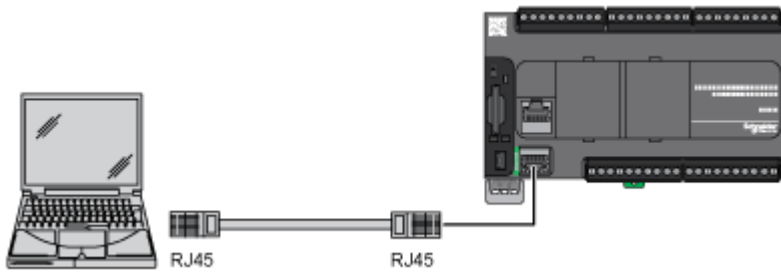
The (-) poles are connected internally.

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

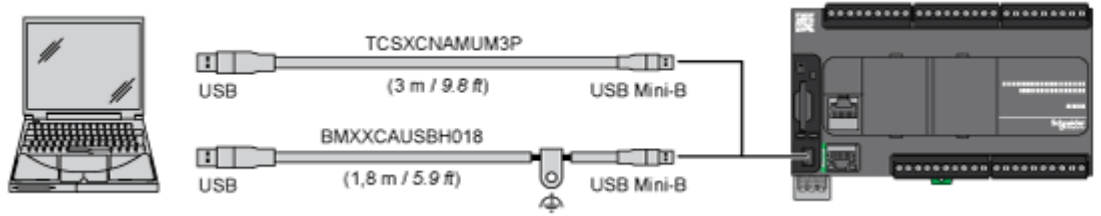
Ethernet Connection



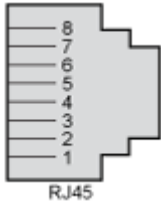
| Pin N° | Signal |
|--------|--------|
| 1 | TD+ |
| 2 | TD- |
| 3 | RD+ |
| 4 | - |
| 5 | - |
| 6 | RD- |
| 7 | - |
| 8 | - |



USB Mini-B Connection



SL1 Connection

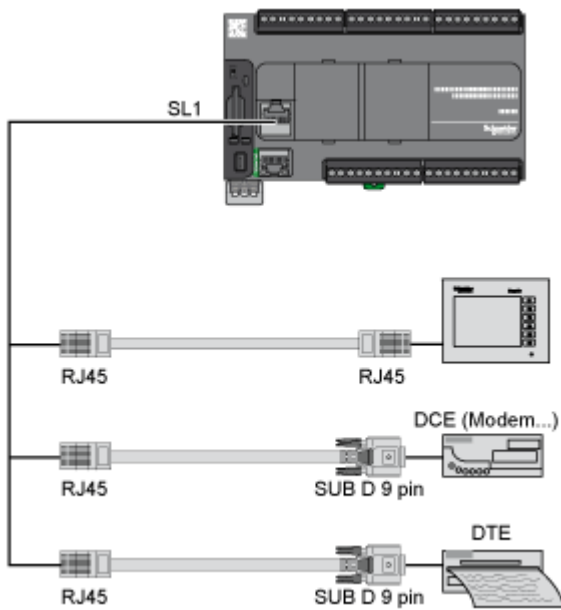


SL1

| 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

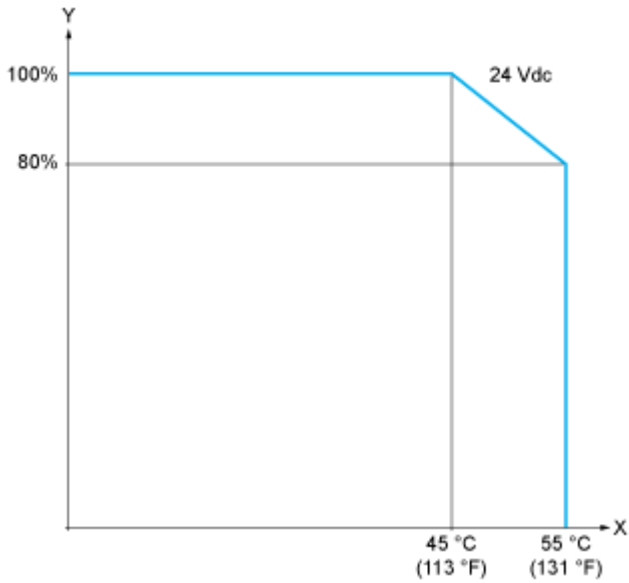
* : 5 Vdc delivered by the controller. Do not connect.



Performance Curves

Derating Curves

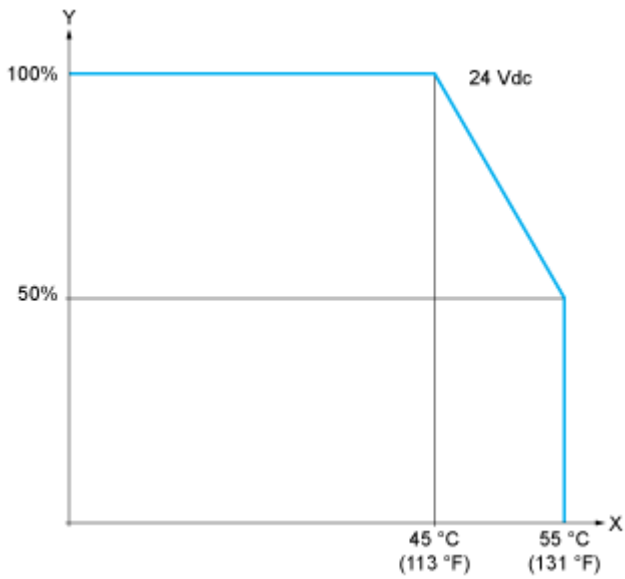
Embedded Digital Inputs (No Cartridge)



X : Ambient temperature

Y : Input simultaneous ON ratio

Embedded Digital Inputs (with Cartridge)

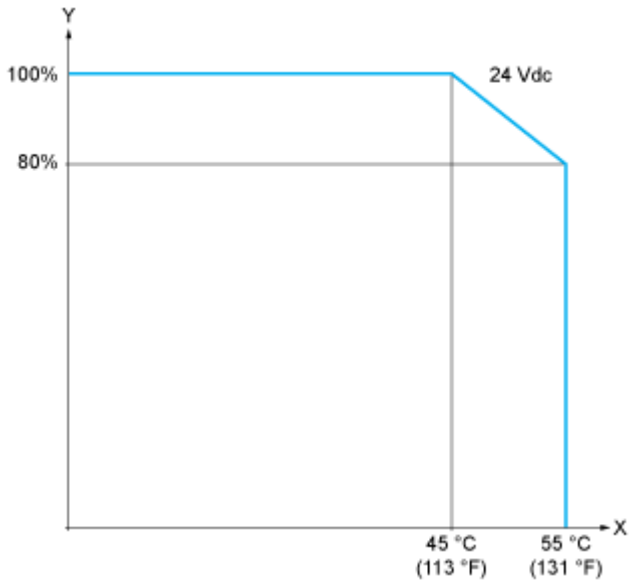


X : Ambient temperature

Y : Input simultaneous ON ratio

Derating Curves

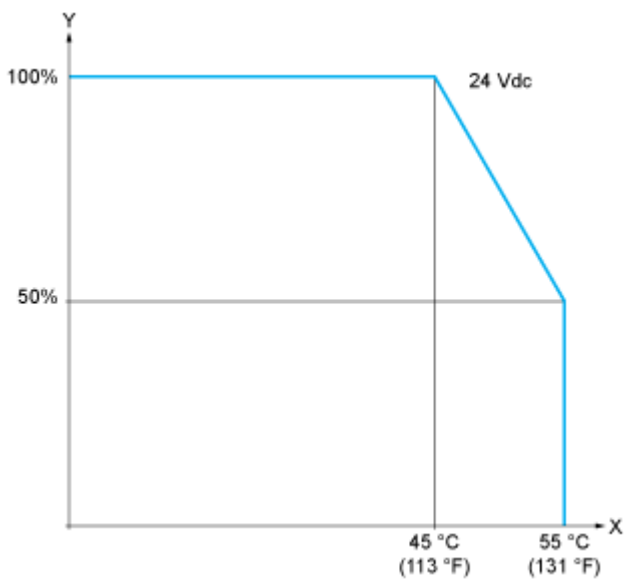
Embedded Digital Outputs (No Cartridge)



X : Ambient temperature

Y : Output simultaneous ON ratio

Embedded Digital Outputs (with Cartridge)



X : Ambient temperature

Y : Output simultaneous ON ratio