



Main

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|---------------------------|---|
| Range of product | Modicon M221 |
| Product or component type | Logic controller |
| [Us] rated supply voltage | 24 V DC |
| Discrete input number | 24 discrete input conforming to IEC 61131-2 Type 1 including 4 fast input |
| Analogue input number | 2 at input range: 0...10 V |
| Discrete output type | Transistor |
| Discrete output number | 16 transistor including 4 fast output |
| Discrete output voltage | 24 V DC |
| Discrete output current | 0.5 A |

Complementary

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|--------------------------------|--|
| Discrete I/O number | 40 |
| Number of I/O expansion module | <= 7 relay output |
| Supply voltage limits | 20.4...28.8 V |
| Inrush current | <= 35 A |
| Power consumption in W | <= 4.1 Wat 24 V without I/O expansion module <= 16 Wat 24 V with max number of I/O expansion module |
| Power supply output current | 0.52 A at 5 V expansion bus 0.3 A at 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 analog input with 5 min maximum +/- 13 V DC analog input permanent |
| Voltage state 1 guaranteed | >= 15 V input |
| Voltage state 0 guaranteed | <= 5 V input |

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| Discrete input current | 7 mA discrete input 5 mA fast input |
| Input impedance | 4.9 kOhm fast input 3.4 kOhm discrete input 100 kOhm analog input |
| Response time | 35 µs turn-off operation input; I2...I5 terminal 5 µs turn-on operation fast input; I0, I1, I6, I7 terminal 35 µs turn-on operation input; other terminals terminal 5 µs turn-off operation fast input; I0, I1, I6, I7 terminal 100 µs turn-off operation input; other terminals terminal 300 µs turn-on, turn-off operation output; other terminals terminal 5 µs turn-on, turn-off operation output; Q0...Q3 terminal |
| Configurable filtering time | 0 ms input 12 ms input 3 ms input |
| Discrete output logic | Negative logic (sink) |
| Current per output common | 4 A |
| Output frequency | 0.1 kHz output at Q4...Q15 terminal 100 kHz fast output (PWM/PLS mode) at Q0...Q3 terminal |
| Absolute accuracy error | +/- 1 % of full scale analog input |
| Leakage current | 0.1 mA transistor output |
| Voltage drop | <= 1 V |
| Mechanical durability | >= 20000000 cycles transistor output |
| Tungsten load | <= 12 W output and fast output |
| Protection type | Without protection |
| Memory capacity | 256 kB user application and data RAM with 10000 instructions 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, battery life: 4 yr |
| Backup time | 1 year at 77 °F (25 °C) by interruption of power supply |
| Execution time for 1 KInstruction | 0.3 ms 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 8000 %MW memory words 512 %KW constant words 255 %TM timers 255 %C counters |
| Realtime clock | With |
| Clock drift | <= 30 s/month at 77 °F (25 °C) |
| Regulation loop | Adjustable PID regulator up to 14 simultaneous loops |
| Positioning functions | Position PTO 4 axe(s) pulse/direction mode (100 kHz) Position PTO 2 axe(s) CW/CCW mode (100 kHz) |
| Function available | PWM PLS Frequency generator |
| Counting input number | 4 fast input (HSC mode) (counting frequency: 100 kHz), counting capacity: 32 bits |
| Counter function | A/B Pulse/direction Single phase |
| Integrated connection type | USB port with connector mini B USB 2.0 Non isolated serial link "serial 1" with connector RJ45 and interface RS485 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 1.2...115.2 kbit/s (115.2 kbit/s by default) for bus length of 9.84 ft (3 m) - communication protocol: RS232 480 Mbit/s - communication protocol: USB |
| Communication port protocol | USB port: USB protocol - SoMachine-Network Non isolated serial link: Modbus protocol master/slave - RTU/ASCII or SoMachine-Network |

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|--------------------------------|---|
| Local signalling | 1 LED green SD card access (SD) 1 LED red BAT 1 LED green SL1 1 LED green SL2 1 LED per channel green I/O state 1 LED red module error (ERR) 1 LED green PWR 1 LED green RUN |
| Electrical connection | Mini B USB 2.0 connector for a programming terminal Terminal block, 3 terminal(s) for connecting the 24 V DC power supply Connector, 4 terminal(s) for analogue inputs Removable screw terminal block for inputs Removable screw terminal block for outputs |
| 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 | 500 V AC between fast input and internal logic Non-insulated between inputs Non-insulated between analogue inputs 500 V AC between output and internal logic 500 V AC between input and internal logic Non-insulated between analogue input and internal logic |
| 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 | 3.54 in (90 mm) |
| Depth | 2.76 in (70 mm) |
| Width | 6.3 in (160 mm) |
| Product weight | 1.39 lb(US) (0.63 kg) |

Environment

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|---------------------------------------|---|
| Standards | EN/IEC 60664-1 EN/IEC 61131-2 EN/IEC 61010-2-201 |
| Product certifications | ABS CSA cULus LR IACS E10 RCM EAC DNV-GL |
| Environmental characteristic | Ordinary and hazardous location |
| Resistance to electrostatic discharge | 4 kV on contact conforming to EN/IEC 61000-4-2 8 kV in air conforming to EN/IEC 61000-4-2 |
| Resistance to electromagnetic fields | 9.14 V/yd (10 V/m) (80 MHz...1 GHz) conforming to EN/IEC 61000-4-3 2.74 V/yd (3 V/m) (1.4 GHz...2 GHz) conforming to EN/IEC 61000-4-3 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 kV power lines conforming to EN/IEC 61000-4-4 2 kV relay output conforming to EN/IEC 61000-4-4 1 kV Ethernet line conforming to EN/IEC 61000-4-4 1 kV serial link conforming to EN/IEC 61000-4-4 1 kV I/O conforming to EN/IEC 61000-4-4 |
| Surge withstand | 2 kV power lines (AC) in common mode conforming to EN/IEC 61000-4-5 2 kV relay output in common mode conforming to EN/IEC 61000-4-5 1 kV I/O in common mode conforming to EN/IEC 61000-4-5 1 kV shielded cable in common mode conforming to EN/IEC 61000-4-5 0.5 kV power lines (DC) in differential mode conforming to EN/IEC 61000-4-5 1 kV power lines (AC) in differential mode conforming to EN/IEC 61000-4-5 1 kV relay output in differential mode conforming to EN/IEC 61000-4-5 0.5 kV 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 3 Vrms (0.1...80 MHz) conforming to Marine specification (LR, ABS, DNV, GL) |


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)

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|---------------------------------------|--|
| Electromagnetic emission | Conducted emissions conforming to EN/IEC 55011 power lines (AC), 0.15...0.5 MHz: 79 dB μ V/m QP/66 dB μ V/m AV Conducted emissions conforming to EN/IEC 55011 power lines (AC), 0.5...300 MHz: 73 dB μ V/m QP/60 dB μ V/m AV Conducted emissions conforming to EN/IEC 55011 power lines, 10...150 kHz: 120...69 dB μ V/m QP Conducted emissions conforming to EN/IEC 55011 power lines, 1.5...30 MHz: 63 dB μ V/m QP Radiated emissions conforming to EN/IEC 55011 class A 10 m, 30...230 MHz: 40 dB μ V/m QP Conducted emissions conforming to EN/IEC 55011 power lines, 150...1500 kHz : 79...63 dB μ V/m QP Radiated emissions conforming to EN/IEC 55011 class A 10 m, 200...1000 MHz : 47 dB μ V/m QP |
| Immunity to microbreaks | 10 ms |
| Ambient air temperature for operation | 14...131 °F (-10...55 °C) horizontal installation -10...35 °C vertical installation |
| Ambient air temperature for storage | -13...158 °F (-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...6561.68 ft (0...2000 m) |
| Storage altitude | 0...9842.52 ft (0...3000 m) |
| Vibration resistance | 3.5 mm (vibration frequency: 5...8.4 Hz) on symmetrical rail 1 gn (vibration frequency: 8.4...150 Hz) on symmetrical rail 3.5 mm (vibration frequency: 5...8.4 Hz) on panel mounting 1 gn (vibration frequency: 8.4...150 Hz) on panel mounting |
| Shock resistance | 147 m/s ² (test wave duration:11 ms) |

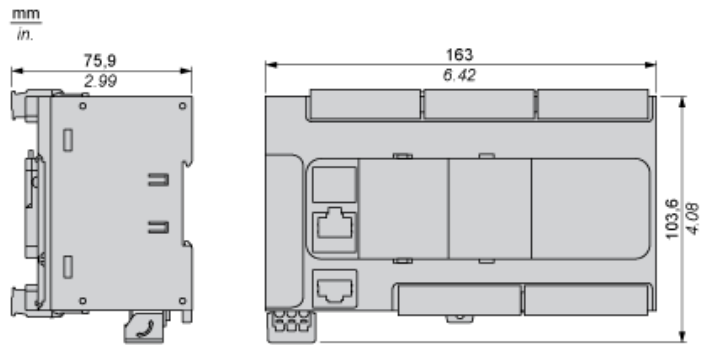
Ordering and shipping details

| | |
|-----------------------|--------------------------------|
| Category | 22533 - M2XX PLC & ACCESSORIES |
| Discount Schedule | MSX |
| GTIN | 003606485408637 |
| Nbr. of units in pkg. | 1 |
| Package weight(Lbs) | 0.63 |
| Returnability | N |
| Country of origin | TW |

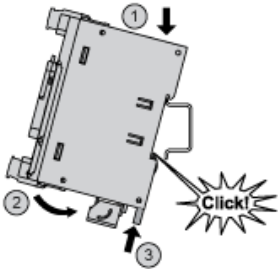
Offer Sustainability

| | |
|----------------------------------|---|
| Sustainable offer status | Green Premium product |
| RoHS (date code: YYWW) | Compliant - since 1608 - Schneider Electric declaration of conformity  Schneider Electric declaration of conformity |
| REACH | Reference not containing SVHC above the threshold Reference not containing SVHC above the threshold |
| Product environmental profile | Available |
| Product end of life instructions | Available |
| California proposition 65 | WARNING: This product can expose you to chemicals including: |
| ----- Substance 1 | Lead and lead compounds, which is known to the State of California to cause cancer and birth defects or other reproductive harm. |
| ----- More information | For more information go to www.p65warnings.ca.gov |

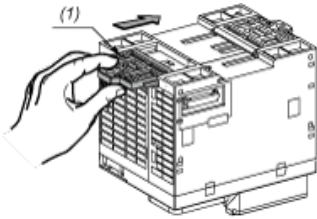
Dimensions



Mounting on a Rail

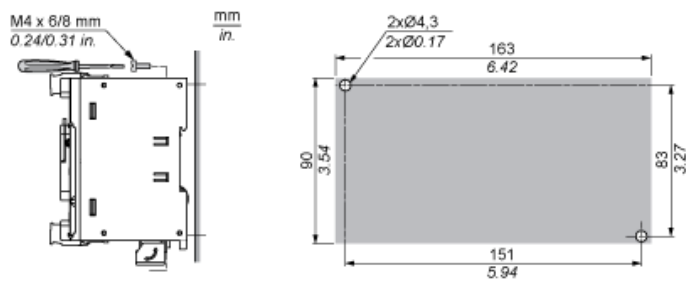


Direct Mounting on a Panel Surface



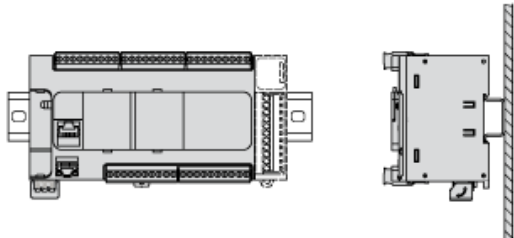
(1) Install a mounting strip

Mounting Hole Layout

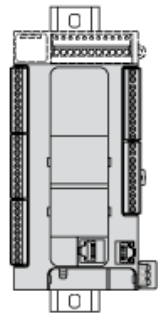


Mounting

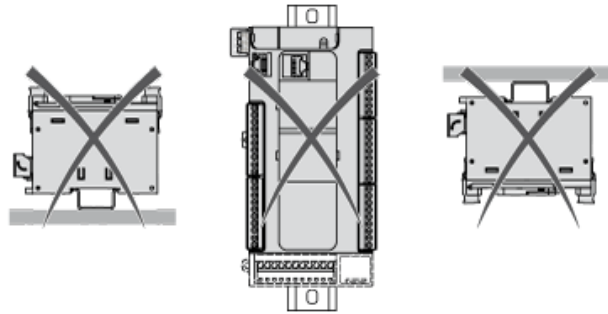
Correct Mounting Position



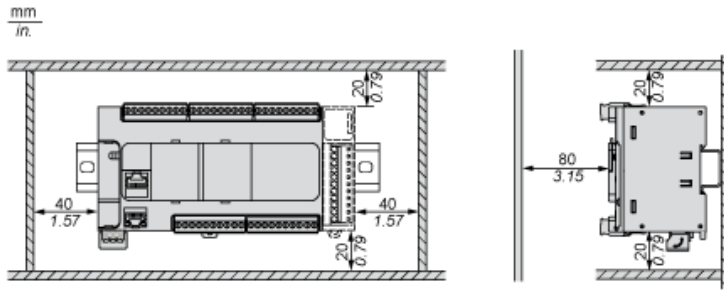
Acceptable Mounting Position



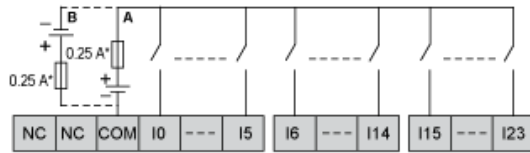
Incorrect Mounting Position



Clearance

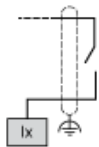


Digital Inputs



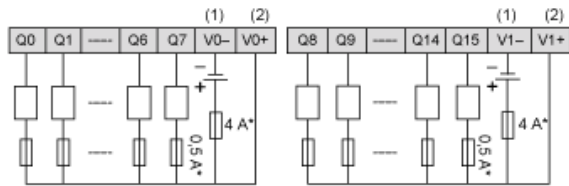
- (*) Type T fuse
- (A) Sink wiring (positive logic).
- (B) Source wiring (negative logic).

Connection of the Fast Inputs



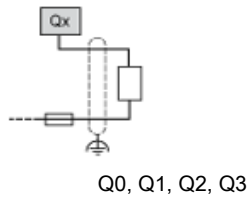
I0, I1, I6, I7

Transistor Outputs

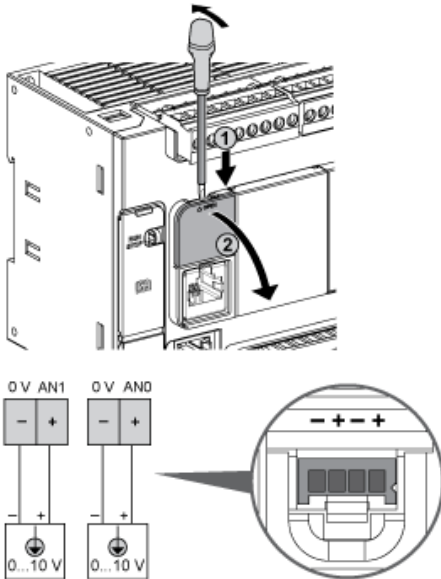


- (*) Type T fuse
- (1) The V0- and V1- terminals are not connected internally.
- (2) The V0+ and V1+ terminals are not connected internally.

Connection of the Fast Outputs



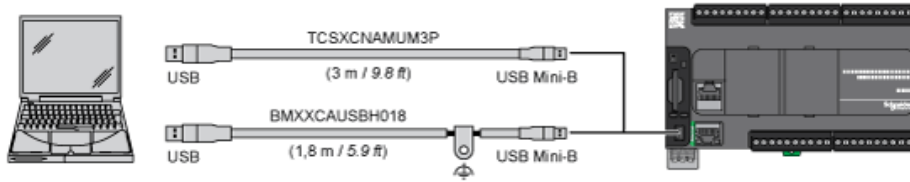
Analog Inputs



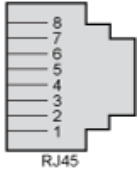
The (-) poles are connected internally.

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

USB Mini-B Connection



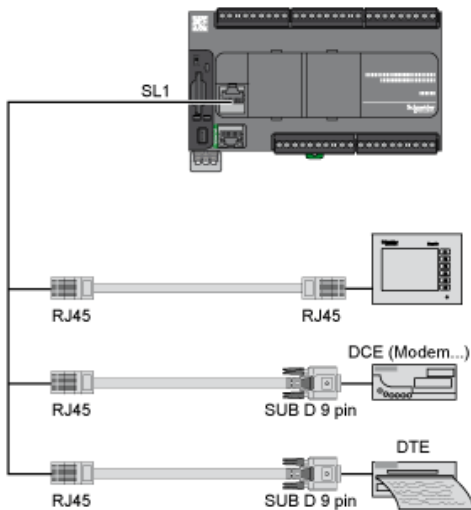
SL1 Connection



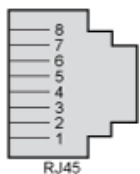
| N ° | RS 232 | RS 485 |
|-----|--------|--------|
| 1 | RxD | N.C. |
| 2 | TxD | N.C. |
| 3 | RTS | N.C. |
| 4 | N.C. | D1 |
| 5 | N.C. | D0 |
| 6 | CTS | N.C. |
| 7 | N.C.* | 5 Vdc |
| 8 | Common | Common |

N.C.: not connected

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



SL2 Connection

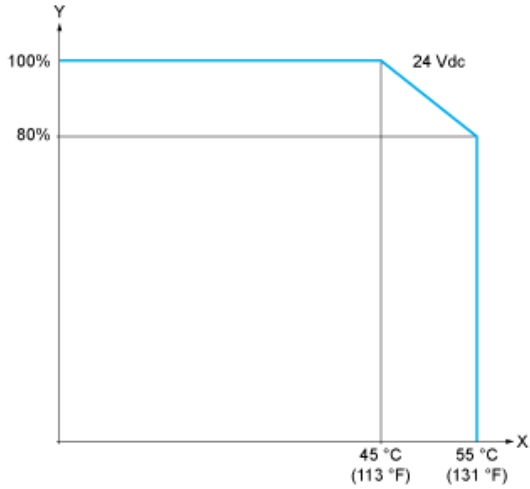


| N ° | RS 485 |
|-----|--------|
| 1 | N.C. |
| 2 | N.C. |
| 3 | N.C. |
| 4 | D1 |
| 5 | D0 |
| 6 | N.C. |
| 7 | N.C. |
| 8 | Common |

N.C.: not connected

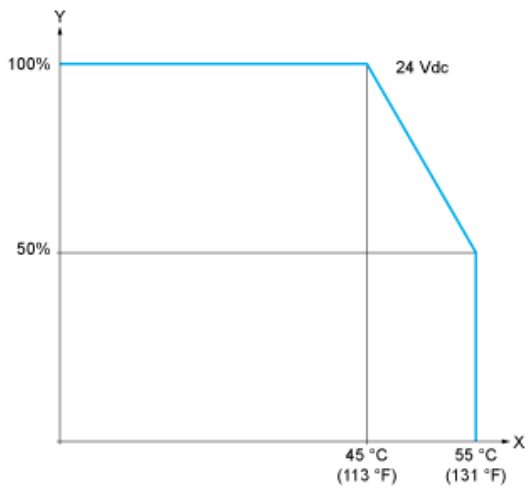
Derating Curves

Embedded Digital Inputs (No Cartridge)



X : Ambient temperature
Y : Input simultaneous ON ratio

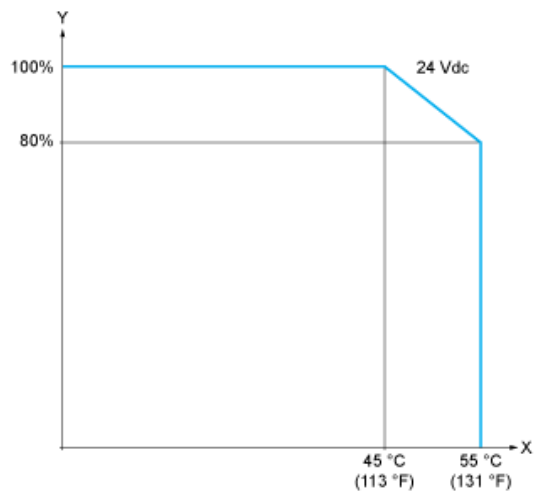
Embedded Digital Inputs (with Cartridge)



X : Ambient temperature
Y : Input simultaneous ON ratio

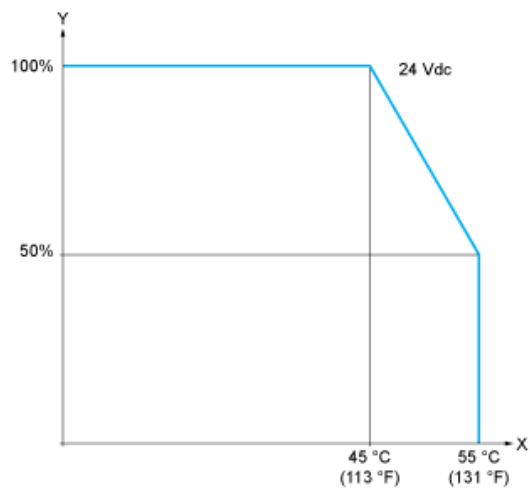
Derating Curves

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