



### Main

Range of Product	Modicon M221
Product or Component Type	Logic controller
[Us] rated supply voltage	24 V DC
Discrete input number	9, discrete input 4 fast input IEC 61131-2 Type 1
Analogue input number	2 0...10 V
Discrete output type	Transistor
Discrete output number	7 transistor 2 fast output
Discrete output voltage	24 V DC
Discrete output current	0.5 A

### Complementary

Discrete I/O number	16
Maximum number of I/O expansion module	4 transistor output 4 relay output
Supply voltage limits	20.4...28.8 V
Inrush current	35 A
Maximum power consumption in W	10 W 24 V with max number of I/O expansion module) 3.9 W 24 V without I/O expansion module)
Power supply output current	0.325 A 5 V expansion bus 0.15 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 +/- 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 5 mA fast input
Input impedance	3.4 kOhm discrete input 100 kOhm analog input 4.9 kOhm fast input
Response time	35 µs turn-off, I2...I5 input 5 µs turn-on, I0, I1, I6, I7 fast input 35 µs turn-on, other terminals input 5 µs turn-off, I0, I1, I6, I7 fast input 100 µs turn-off, other terminals input 5 µs turn-on, turn-off, Q0...Q1 output 50 µs turn-on, turn-off, Q2...Q3 output 300 µs turn-on, turn-off, other terminals output
Configurable filtering time	0 ms input 3 ms input 12 ms input
Discrete output logic	Negative logic (sink)
Maximum current per output common	3.5 A
Output Frequency (sync to mains)	100 KHz fast output (PWM/PLS mode) Q0...Q1 5 KHz output Q2...Q3 0.1 KHz output Q4...Q6

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Absolute accuracy error	+/- 1 % of full scale analog input
Maximum leakage current	0.1 mA transistor output
Maximum voltage drop	<1 V
Mechanical durability	20000000 cycles transistor output
Maximum tungsten load	<12 W output and fast output
Protection type	Without protection
Memory capacity	256 kB user application and data RAM 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 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
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 255 %TM timers 512 %KW constant words 8000 %MW memory words 512 %M memory bits
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) PTO 1 CW/CCW 100 kHz)
Function Available	PLS Frequency generator PWM
Counting input number	4 fast input (HSC mode) 100 kHz 32 bits
Counter function	Pulse/Direction Single phase A/B
Integrated connection type	USB port mini B USB 2.0 Non isolated serial link serial 1 RJ45 RS485 Non isolated serial link serial 2 RJ45 RS232/RS485
Supply	Serial)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 1.2...115.2 kbit/s (115.2 kbit/s by default) 9.84 ft (3 m) RS232 480 Mbit/s USB
Communication port protocol	USB port USB - SoMachine-Network Non isolated serial link Modbus master/slave - RTU/ASCII or SoMachine-Network
Local signalling	For PWR 1 LED (green) For RUN 1 LED (green) For module error (ERR) 1 LED (red) For SD card access (SD) 1 LED (green) For BAT 1 LED (red) For SL1 1 LED (green) For SL2 1 LED (green) For I/O state 1 LED per channel (green)
Electrical connection	Removable screw terminal block for inputs Removable screw terminal block for outputs Terminal block, 3 for connecting the 24 V DC power supply Connector, 4 for analogue inputs Mini B USB 2.0 connector for a programming terminal
Maximum cable distance between devices	Shielded cable <32.81 ft (10 m) fast input Unshielded cable <98.43 ft (30 m) output Unshielded cable <98.43 ft (30 m) digital input Unshielded cable <3.28 ft (1 m) analog input Shielded cable <9.84 ft (3 m) fast output
Insulation	Between input and internal logic 500 V AC Between fast input and internal logic 500 V AC Non-insulated between inputs Between output and internal logic 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 IEC 60715 Top hat type TH35-7.5 rail IEC 60715 Plate or panel with fixing kit
Height	3.54 in (90 mm)
Depth	2.76 in (70 mm)
Width	3.74 in (95 mm)
Net Weight	1.23 lb(US) (0.558 kg)

## Environment

Standards	EN/IEC 61131-2 EN/IEC 61010-2-201 EN/IEC 60664-1
Product Certifications	DNV-GL RCM ABS CULus LR CSA IACS E10 EAC
Environmental characteristic	Ordinary and hazardous location
Resistance to electrostatic discharge	8 KV in air EN/IEC 61000-4-2 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 2.74 V/m (3 V/m) 1.4 GHz...2 GHz EN/IEC 61000-4-3 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) 2 KV EN/IEC 61000-4-4 relay output) 1 KV EN/IEC 61000-4-4 I/O) 1 KV EN/IEC 61000-4-4 Ethernet line) 1 kV EN/IEC 61000-4-4 serial link)
Surge withstand	2 KV power lines (AC) common mode EN/IEC 61000-4-5 2 KV relay output common mode EN/IEC 61000-4-5 1 KV I/O common mode EN/IEC 61000-4-5 1 KV shielded cable common mode EN/IEC 61000-4-5 0.5 KV power lines (DC) differential mode EN/IEC 61000-4-5 1 KV power lines (AC) differential mode EN/IEC 61000-4-5 1 KV relay output differential mode EN/IEC 61000-4-5 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 3 V 0.1...80 MHz 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) Marine specification (LR, ABS, DNV, GL)
Electromagnetic emission	Conducted emissions 79 dB $\mu$ V/m QP/66 dB $\mu$ V/m AV power lines (AC))0.15... 0.5 MHz EN/IEC 55011 Conducted emissions 73 dB $\mu$ V/m QP/60 dB $\mu$ V/m AV power lines (AC))0.5... 300 MHz EN/IEC 55011 Conducted emissions 120...69 dB $\mu$ V/m QP power lines)10... 150 kHz EN/IEC 55011 Conducted emissions 63 dB $\mu$ V/m QP power lines)1.5...30 MHz EN/IEC 55011 Radiated emissions 40 dB $\mu$ V/m QP class A 10 m)30...230 MHz EN/IEC 55011 Conducted emissions 79...63 dB $\mu$ V/m QP power lines)150... 1500 kHz EN/IEC 55011 Radiated emissions 47 dB $\mu$ V/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) 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) 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 3.5 mm 5...8.4 Hz panel mounting 1 gn 8.4...150 Hz symmetrical rail 1 gn 8.4...150 Hz panel mounting
Shock resistance	147 m/s <sup>2</sup> 11 ms

## Ordering and shipping details

Category	22533 - M2XX PLC & ACCESSORIES
Discount Schedule	MSX
GTIN	3606485408590
Nbr. of units in pkg.	1
Package weight(Lbs)	19.19 oz (544 g)
Returnability	No
Country of origin	TW

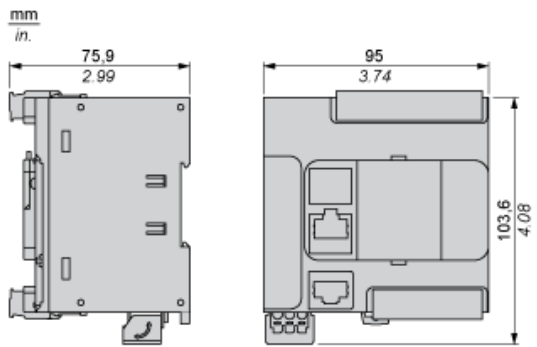
## Packing Units

Unit Type of Package 1	PCE
Package 1 Height	4.41 in (11.2 cm)
Package 1 width	5.63 in (14.3 cm)
Package 1 Length	5.51 in (14 cm)
Unit Type of Package 2	CAR
Number of Units in Package 2	1
Package 2 Weight	20.14 oz (571 g)
Package 2 Height	4.33 in (11 cm)
Package 2 width	5.51 in (14 cm)
Package 2 Length	5.51 in (14 cm)
Unit Type of Package 3	S04
Number of Units in Package 3	20
Package 3 Weight	27.94 lb(US) (12.672 kg)
Package 3 Height	11.81 in (30 cm)
Package 3 width	15.75 in (40 cm)
Package 3 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



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Mounting on a Rail

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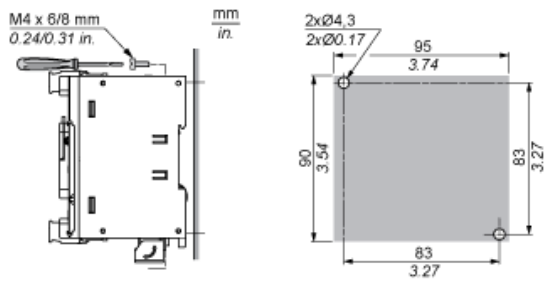
Direct Mounting on a Panel Surface

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- (1) Install a mounting strip

Mounting Hole Layout



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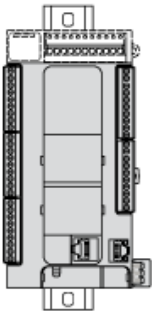
Mounting

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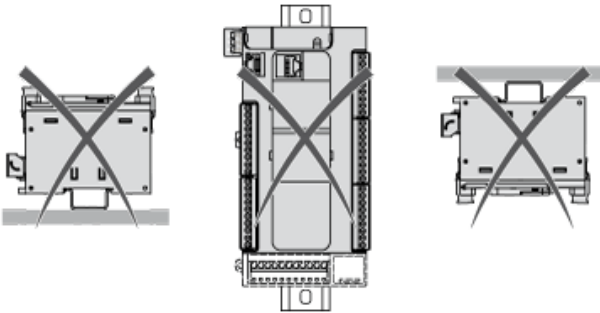
Correct Mounting Position



## Acceptable Mounting Position

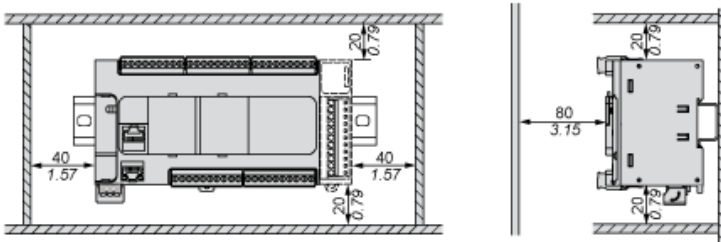


## Incorrect Mounting Position

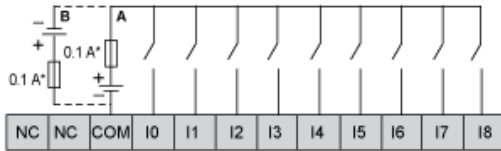


## Clearance

mm  
in.

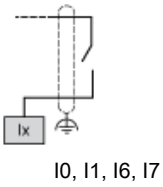


### Digital Inputs

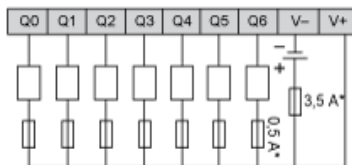


- (\*) Type T fuse
- (A) Sink wiring (positive logic).
- (B) Source wiring (negative logic).

### Connection of the Fast Inputs

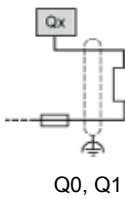


### Transistor Outputs

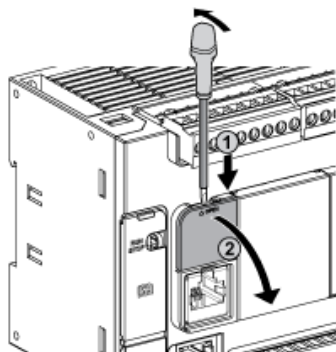


- (\*) Type T fuse

### Connection of the Fast Outputs



### Analog Inputs



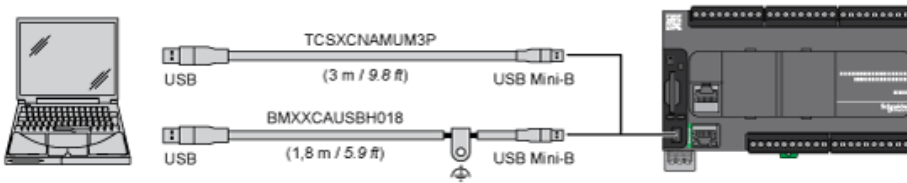




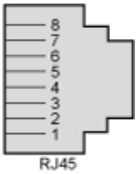
The (-) poles are connected internally.

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

## USB Mini-B Connection



## SL1 Connection

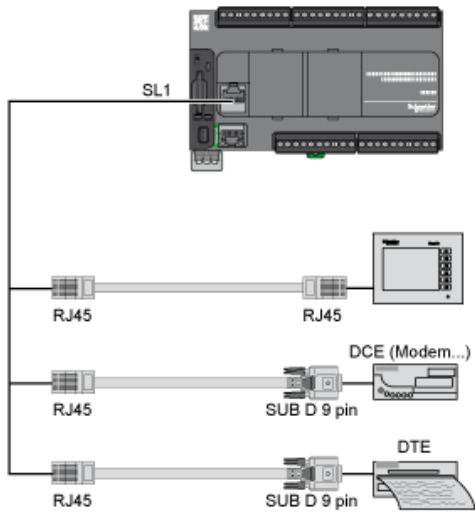


### SL1

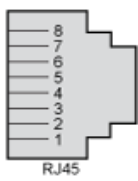
N °	RS 232	RS 485
1	RxD	N.C.
2	TxD	N.C.
3	RTS	N.C.
4	N.C.	D1
5	N.C.	D0
6	CTS	N.C.
7	N.C.*	5 Vdc
8	Common	Common

N.C.: not connected

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



## SL2 Connection



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

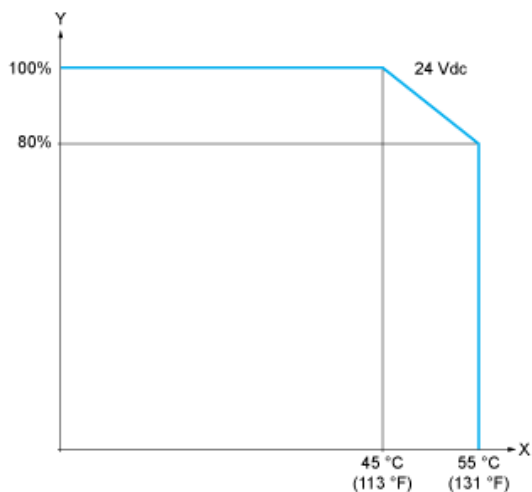
N.C.: not connected

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Derating Curves

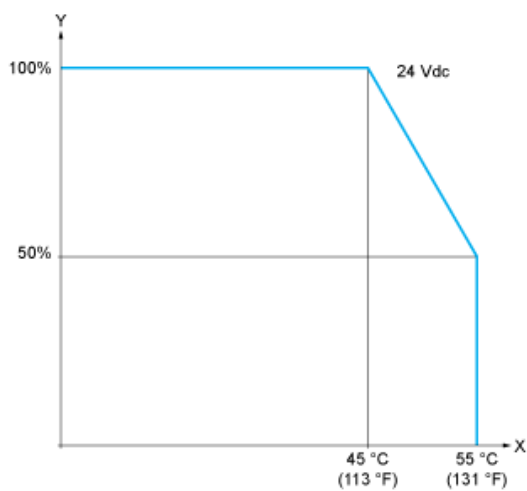
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Embedded Digital Inputs (No Cartridge)



X : Ambient temperature  
Y : Input simultaneous ON ratio

Embedded Digital Inputs (with Cartridge)



X : Ambient temperature  
Y : Input simultaneous ON ratio

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Derating Curves

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### 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