



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 | 8, discrete input conforming to IEC 61131-2 Type 1 |
| Analogue input number | 2 at 0...10 V |
| Discrete output type | Relay normally open |
| Discrete output number | 8 relay |
| Discrete output voltage | 5...125 V DC 5...250 V AC |
| Discrete output current | 2 A |

Complementary

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| Discrete I/O number | 16 |
| Maximum number of I/O expansion module | 7 for relay output |
| Supply voltage limits | 20.4...28.8 V |
| Inrush current | 35 A |
| Maximum power consumption in W | 23.3 W at 24 V (with max number of I/O expansion module) 4.3 W at 24 V (without I/O expansion module) |
| Power supply output current | 0.52 A 5 V for expansion bus 0.46 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 | 100 kOhm for analog input 3.4 kOhm for input 4.9 kOhm for fast input |
| 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 |
| Output voltage limits | 125 V DC 277 V AC |
| Maximum current per output common | 7 A |
| Absolute accuracy error | +/- 1 % of full scale for 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.

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| Electrical durability | 100000 Cycles AC-12, 120 V, 240 VA, resistive 100000 Cycles AC-12, 240 V, 480 VA, resistive 300000 Cycles AC-12, 120 V, 80 VA, resistive 300000 Cycles AC-12, 240 V, 160 VA, resistive 100000 Cycles AC-15, cos phi = 0.35, 120 V, 60 VA, inductive 100000 Cycles AC-15, cos phi = 0.35, 240 V, 120 VA, inductive 300000 Cycles AC-15, cos phi = 0.35, 120 V, 18 VA, inductive 300000 Cycles AC-15, cos phi = 0.35, 240 V, 36 VA, inductive 100000 Cycles AC-14, cos phi = 0.7, 120 V, 120 VA, inductive 100000 Cycles AC-14, cos phi = 0.7, 240 V, 240 VA, inductive 300000 Cycles AC-14, cos phi = 0.7, 120 V, 36 VA, inductive 300000 Cycles AC-14, cos phi = 0.7, 240 V, 72 VA, inductive 100000 Cycles DC-12, 24 V, 48 W, resistive 300000 Cycles DC-12, 24 V, 16 W, resistive 100000 Cycles DC-13, 24 V, 24 W, inductive (L/R = 7 ms) 300000 cycles DC-13, 24 V, 7.2 W, inductive (L/R = 7 ms) |
| Switching frequency | 20 switching operations/minute with maximum load |
| Mechanical durability | 20000000 cycles for relay output |
| Minimum load | 1 mA at 5 V DC for relay output |
| Protection type | Without protection at 5 A |
| Reset time | 1 s |
| Memory capacity | 256 kB for user application and data RAM with 10000 instructions 256 kB for internal variables RAM |
| Data backed up | 256 kB built-in flash memory for backup of application and data |
| Data storage equipment | 2 GB SD card (optional) |
| Battery type | BR2032 lithium non-rechargeable, battery life: 4 year(s) |
| 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 0.7 ms for other instruction |
| Execution time per instruction | 0.2 µs Boolean |
| Exct time for event task | 60 µs response time |
| Application structure | 8 interrupt tasks 1 cyclic auxiliary task 1 configurable freewheeling/cyclic master task |
| Maximum size of object areas | 512 %KW constant words 8000 %MW memory words 255 %TM timers 255 %C counters 512 %M memory bits |
| Realtime clock | With |
| Clock drift | <= 30 s/month at 25 °C |
| Regulation loop | Adjustable PID regulator up to 14 simultaneous loops |
| Function available | Frequency generator PWM PLS |
| Counting input number | 4 fast input (HSC mode) at 100 kHz 32 bits |
| Counter function | Pulse/Direction Single phase A/B |
| 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 1)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 | Ethernet/IP adapter Modbus TCP client DHCP client Modbus TCP server Modbus TCP slave device |

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| 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 | 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 Removable spring terminal block, 10 terminal(s) for inputs Removable spring terminal block, 11 terminal(s) for outputs |
| 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 Between output groups 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 | 70 mm |
| Net weight | 0.264 kg |

Environment

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|---------------------------------------|---|
| Standards | EN/IEC 61131-2 EN/IEC 61010-2-201 EN/IEC 60664-1 |
| Product certifications | IACS E10 ABS RCM EAC CSA DNV-GL LR cULus |
| Environmental characteristic | Ordinary and hazardous location |
| Resistance to electrostatic discharge | 8 kV in air conforming to EN/IEC 61000-4-2 4 kV on contact conforming to EN/IEC 61000-4-2 |
| Resistance to electromagnetic fields | 10 V/M 80 MHz...1 GHz conforming to EN/IEC 61000-4-3 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 (I/O) 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 |
| Surge withstand | 2 kV power lines (AC) common mode conforming to EN/IEC 61000-4-5 2 kV relay output common mode conforming to EN/IEC 61000-4-5 1 kV I/O common mode conforming to EN/IEC 61000-4-5 1 kV shielded cable common mode conforming to EN/IEC 61000-4-5 0.5 kV power lines (DC) differential mode conforming to EN/IEC 61000-4-5 1 kV power lines (AC) differential mode conforming to EN/IEC 61000-4-5 1 kV relay output differential mode conforming to EN/IEC 61000-4-5 0.5 kV power lines (DC) common mode conforming to EN/IEC 61000-4-5 |
| Resistance to conducted disturbances | 10 V 0.15...80 MHz conforming to EN/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) |

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| Electromagnetic emission | <p>Conducted emissions - test level: 79 dBμV/m QP/66 dBμV/m AV (power lines (AC)) at 0.15...0.5 MHz conforming to EN/IEC 55011</p> <p>Conducted emissions - test level: 73 dBμV/m QP/60 dBμV/m AV (power lines (AC)) at 0.5...300 MHz conforming to EN/IEC 55011</p> <p>Conducted emissions - test level: 120...69 dBμV/m QP (power lines) at 10...150 kHz conforming to EN/IEC 55011</p> <p>Conducted emissions - test level: 63 dBμV/m QP (power lines) at 1.5...30 MHz conforming to EN/IEC 55011</p> <p>Radiated emissions - test level: 40 dBμV/m QP class A (10 m) at 30...230 MHz conforming to EN/IEC 55011</p> <p>Conducted emissions - test level: 79...63 dBμV/m QP (power lines) at 150...1500 kHz conforming to EN/IEC 55011</p> <p>Radiated emissions - test level: 47 dBμV/m QP class A (10 m) at 200...1000 MHz conforming to EN/IEC 55011</p> |
| 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 | <p>3.5 mm at 5...8.4 Hz on symmetrical rail</p> <p>3.5 mm at 5...8.4 Hz on panel mounting</p> <p>1 gn at 8.4...150 Hz on symmetrical rail</p> <p>1 gn at 8.4...150 Hz on panel mounting</p> |
| Shock resistance | 98 m/s ² for 11 ms |

Packing Units

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|------------------------------|-----------|
| Unit Type of Package 1 | PCE |
| Number of Units in Package 1 | 1 |
| Package 1 Weight | 440.0 g |
| Package 1 Height | 10.7 cm |
| Package 1 width | 12.7 cm |
| Package 1 Length | 9.8 cm |
| Unit Type of Package 2 | S04 |
| Number of Units in Package 2 | 24 |
| Package 2 Weight | 11.182 kg |
| Package 2 Height | 30.0 cm |
| Package 2 width | 40.0 cm |
| Package 2 Length | 60.0 cm |

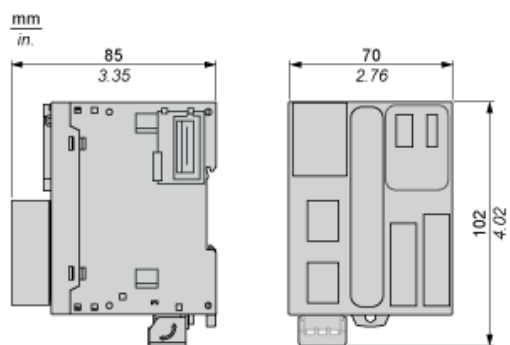
Offer Sustainability

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|----------------------------|---|
| Sustainable offer status | Green Premium product |
| REACH Regulation | REACH Declaration |
| EU RoHS Directive | Pro-active compliance (Product out of EU RoHS legal scope) EU RoHS Declaration |
| Mercury free | Yes |
| RoHS exemption information | Yes |
| China RoHS Regulation | China RoHS Declaration |
| Environmental Disclosure | Product Environmental Profile |
| Circularity Profile | End Of Life Information |
| WEEE | The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins |
| PVC free | Yes |

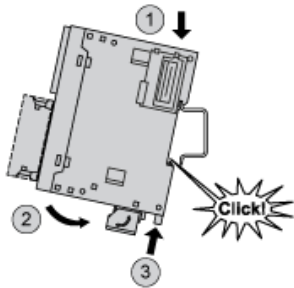
Contractual warranty

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| Warranty | 18 months |
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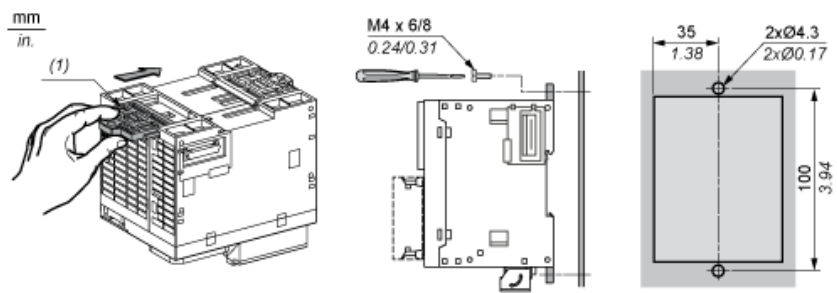
Dimensions



Mounting on a Rail



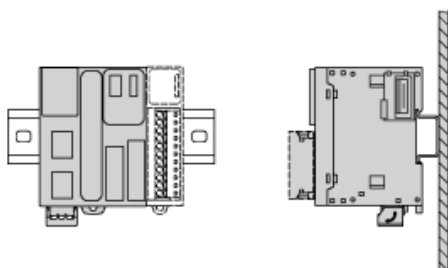
Direct Mounting on a Panel Surface



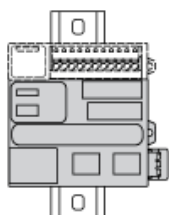
(1) Install a mounting strip

Mounting

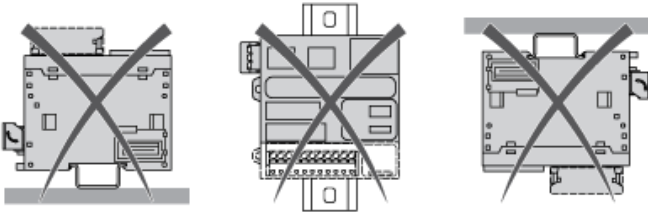
Correct Mounting Position



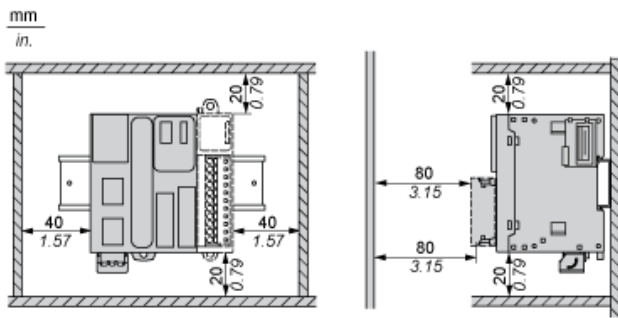
Acceptable Mounting Position



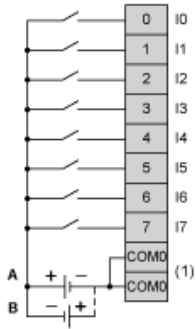
Incorrect Mounting Position



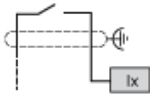
Clearance



Digital Inputs

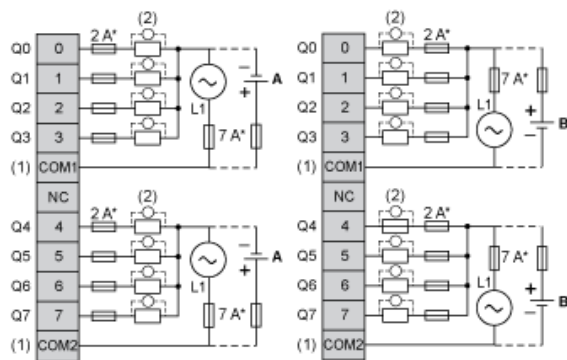


- (1) The COM0 terminals are connected internally.
- A : Sink wiring (positive logic).
- B : Source wiring (negative logic).

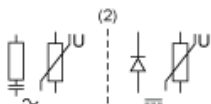


Ix I0, I1, I6, I7

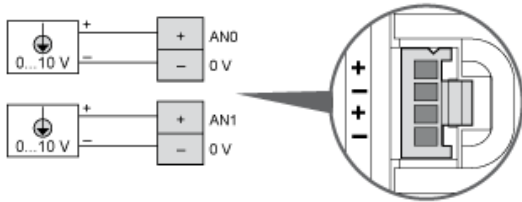
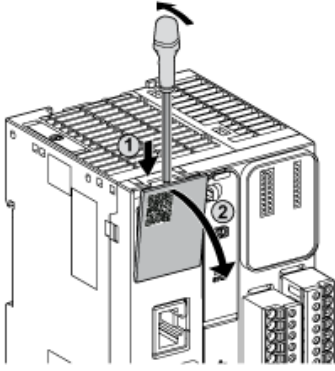
Digital Outputs



- (*) Type T fuse
- (1) The COM1 and COM2 terminals are not connected internally.
- (2) To improve the life time of the contacts, and to protect from potential inductive load damage, you must connect a free wheeling diode in parallel to each inductive DC load or an RC snubber in parallel of each inductive AC load
- A : Source wiring (negative logic).
- B : Sink wiring (positive logic).



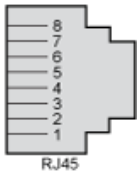
Analog Inputs



The (-) poles are connected internally.

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

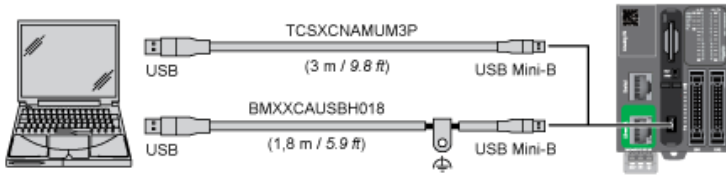
Ethernet Connection



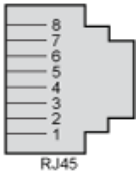
| Pin N ° | Signal |
|---------|--------|
| 1 | TD+ |
| 2 | TD- |
| 3 | RD+ |
| 4 | - |
| 5 | - |
| 6 | RD- |
| 7 | - |
| 8 | - |



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.

