Specifications





Modicon M221, Logic controller, 40 IO relay

TM221C40R

Main

Range Of Product	Modicon M221
Product Or Component Type	Logic controller
[Us] Rated Supply Voltage	100240 V AC
Discrete Input Number	24, discrete input conforming to IEC 61131-2 Type 1
Analogue Input Number	2 at 010 V
Discrete Output Type	Relay normally open
Discrete Output Number	16 relay
Discrete Output Voltage	5125 V DC 5250 V AC
Discrete Output Current	2 A

Complementary

· · · · · · · · · · · · · · · · · ·	
Discrete I/O Number	40
Maximum Number Of I/O Expansion Module	7 (local I/O-Architecture) 14 (remote I/O-Architecture)
Supply Voltage Limits	85264 V
Network Frequency	50/60 Hz
Inrush Current	40 A
Maximum Power Consumption In Va	67 VA at 100240 V with max number of I/O expansion module 37 VA at 100240 V without I/O expansion module
Power Supply Output Current	0.52 A 5 V for expansion bus 0.24 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	
Response Time	35 µs turn-off, I2I5 terminal(s) for input	
	10 ms turn-on for output	
	10 ms turn-off for output 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, IO, I1, I6, I7 terminal(s) for fast input	
	100 µs turn-off, other terminals terminal(s) for input	
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	
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 Froquency		
Switching Frequency	20 switching operations/minute with maximum load	
Mechanical Durability	2000000 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 or CR2032X lithium non-rechargeable	
Backup Time	1_{1} (see at 25 °C (by interruption of neuron supply)	
	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 For 1 Kinstruction Execution Time Per Instruction		
	0.3 ms for event and periodic task	
Execution Time Per Instruction	0.2 μs Boolean	
Execution Time Per Instruction Exct Time For Event Task	0.3 ms for event and periodic task 0.2 μs Boolean 60 μs response time 512 %M memory bits 512 %KW constant words	
Execution Time Per Instruction Exct Time For Event Task	0.3 ms for event and periodic task 0.2 µs Boolean 60 µs response time 512 %M memory bits 512 %KW constant words 8000 %MW memory words	
Execution Time Per Instruction Exct Time For Event Task	0.3 ms for event and periodic task 0.2 μs Boolean 60 μs response time 512 %M memory bits 512 %KW constant words	
Execution Time Per Instruction Exct Time For Event Task	0.3 ms for event and periodic task 0.2 μs Boolean 60 μs response time 512 %M memory bits 512 %KW constant words 8000 %MW memory words 255 %C counters	
Execution Time Per Instruction Exct Time For Event Task Maximum Size Of Object Areas	0.3 ms for event and periodic task 0.2 µs Boolean 60 µs response time 512 %M memory bits 512 %KW constant words 8000 %MW memory words 255 %C counters 255 %TM timers	
Execution Time Per Instruction Exct Time For Event Task Maximum Size Of Object Areas Realtime Clock	0.3 ms for event and periodic task 0.2 µs Boolean 60 µs response time 512 %M memory bits 512 %KW constant words 8000 %MW memory words 255 %C counters 255 %TM timers With	

Counter Function	Single phase
	Pulse/direction
	A/B
Integrated Connection Type	
integrated connection type	USB port with mini B USB 2.0 connector Non isolated serial link serial 1 with RJ45 connector and RS485 interface
	Non isolated serial link serial 1 with RJ45 connector and RS485 interface
Supply	(serial)serial link supply: 5 V, <200 mA
Transmission Rate	1.2115.2 kbit/s (115.2 kbit/s by default) for bus length of 15 m for RS485
	1.2115.2 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
Local Signalling	1 LED (green) for PWR
5	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 (green) for SL1
	1 LED (green) for SL2
	1 LED per channel (green) for I/O state
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	Shielded cable: <10 m for fast input
Between Devices	Unshielded cable: <30 m for output
	Unshielded cable: <30 m for digital input
	Unshielded cable: <1 m for analog input
Insulation	Between input and internal logic at 500 V AC
	Non-insulated between analogue input and internal logic
	Non-insulated between analogue inputs
	Between supply and ground at 1500 V AC
	Between sensor power supply and ground at 500 V AC
	Between input and ground at 500 V AC
	Between output and ground at 1500 V AC
	Between supply and internal logic at 2300 V AC
	Between sensor power supply and internal logic at 500 V AC
	Between output and internal logic at 2300 V AC
	Between Ethernet terminal and internal logic at 500 V AC
	Between supply and sensor power supply at 2300 V AC
Marking	CE
Sensor Power Supply	24 V DC at 250 mA supplied by the controller
Mounting Support	Top hat type TH35-15 rail conforming to IEC 60715
meaning ouppoint	Top hat type TH35-7.5 rail conforming to IEC 60715
	plate or panel with fixing kit
Height	90 mm
Depth	70 mm
Width	160 mm
Net Weight	0.456 kg

Environment

Standards

IEC 61131-2 UL 508 CAN/CSA C22.2 No. 213 IACS E10 ANSI/ISA 12-12-01

Product Certifications	RCM	
	LR	
	cULus	
	DNV-GL	
	ABS EAC	
	CE	
	UKCA	
	cULus HazLoc	
Environmental Characteristic	Ordinary and hazardous location	
Resistance To Electrostatic	8 kV in air conforming to IEC 61000-4-2	
Discharge	4 kV on contact conforming to IEC 61000-4-2	
Resistance To Electromagnetic	10 V/m 80 MHz1 GHz conforming to IEC 61000-4-3	
Fields	3 V/m 1.4 GHz2 GHz conforming to IEC 61000-4-3	
	1 V/m 22.7 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	10 V 0.1580 MHz conforming to IEC 61000-4-6	
Disturbances	3 V 0.180 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 amissions test loval: 70 dBuV/m OD/66 dBuV/m AV/ (power lines (AC))	
Electromagnetic Emission	Conducted emissions - test level: 79 dBµV/m QP/66 dBµV/m AV (power lines (AC)) at 0.150.5 MHz conforming to IEC 55011	
	Conducted emissions - test level: 73 dBµV/m QP/60 dBµV/m AV (power lines (AC))	
	at 0.5300 MHz conforming to IEC 55011	
	Conducted emissions - test level: 12069 dBµV/m QP (power lines) at 10150 kHz	
	conforming to IEC 55011	
	Conducted emissions - test level: 63 dB μ V/m QP (power lines) at 1.530 MHz	
	conforming to IEC 55011	
	Radiated emissions - test level: 40 dBµV/m QP class A (10 m) at 30230 MHz	
	conforming to IEC 55011 Conducted emissions - test level: 7963 dBµV/m QP (power lines) at 1501500	
	kHz conforming to IEC 55011	
	Radiated emissions - test level: 47 dBµV/m QP class A (10 m) at 2001000 MHz	
	conforming to IEC 55011	
Immunity To Microbreaks	10 ms	
Ambient Air Temperature For	-1055 °C (horizontal installation)	
Operation	-1035 °C (vertical installation)	
Ambient Air Temperature For Storage	-2570 °C	
Relative Humidity	1095 %, without condensation (in operation) 1095 %, without condensation (in storage)	
Ip Degree Of Protection	IP20 with protective cover in place	
Pollution Degree	<= 2	
Operating Altitude	02000 m	
Storage Altitude	03000 m	
Vibration Resistance	3.5 mm at 5 8.4 Hz on symmetrical rail	
Visration nesistance	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 8.4150 Hz on symmetrical rail	
	1 gn at 8.4150 Hz on panel mounting	
	· -	

Shock Resistance

98 m/s² for 11 ms

Packing Units

Unit Type Of Package 1	PCE
Number Of Units In Package 1	1
Package 1 Height	10.92 cm
Package 1 Width	14.48 cm
Package 1 Length	21.08 cm
Package 1 Weight	850 g
Unit Type Of Package 2	CAR
Number Of Units In Package 2	12
Package 2 Height	29.4 cm
Package 2 Width	39.5 cm
Package 2 Length	55.7 cm
Package 2 Weight	11.021 kg
Unit Type Of Package 3	P12
Number Of Units In Package 3	144
Package 3 Height	105.0 cm
Package 3 Width	120.0 cm
Package 3 Length	80.0 cm
Package 3 Weight	146 kg

Sustainability Screen Premium

Green PremiumTM label is Schneider Electric's commitment to delivering products with best-inclass 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.

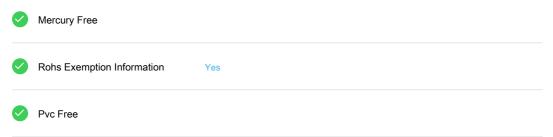
Learn more about Green Premium >

Guide to assess a product's sustainability >



Transparency RoHS/REACh

Well-being performance

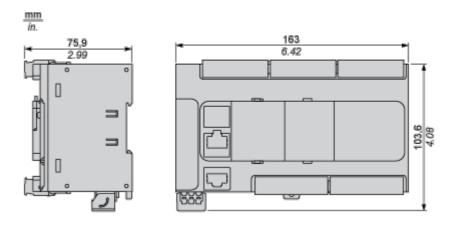


Certifications & Standards

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

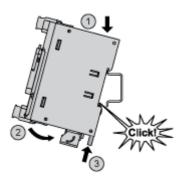
Dimensions Drawings

Dimensions

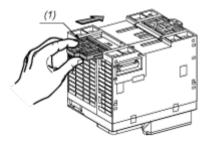


Mounting and Clearance

Mounting on a Rail

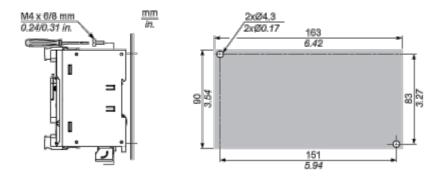


Direct Mounting on a Panel Surface



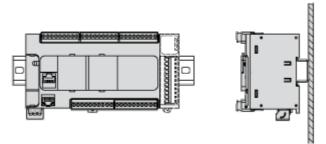
(1) Install a mounting strip

Mounting Hole Layout

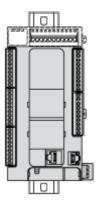


Mounting

Correct Mounting Position

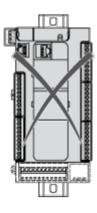


Acceptable Mounting Position



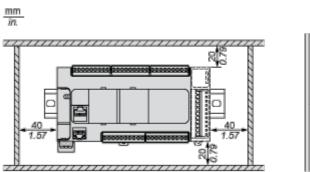
Incorrect Mounting Position

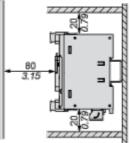






Clearance

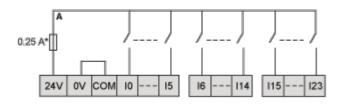




Connections and Schema

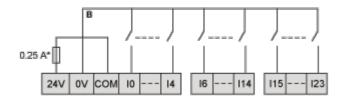
Digital Inputs

Wiring Diagram (Positive Logic)



(*) Type T fuse

Wiring Diagram (Negative Logic)



(*) Type T fuse

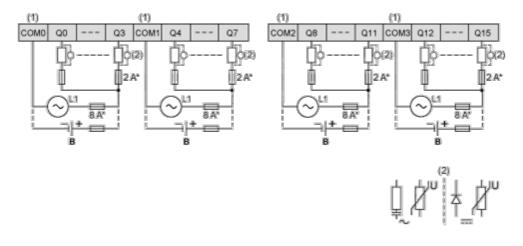
Connection of the Fast Inputs



10, 11, 16, 17

Relay Outputs

Negative Logic (Sink)

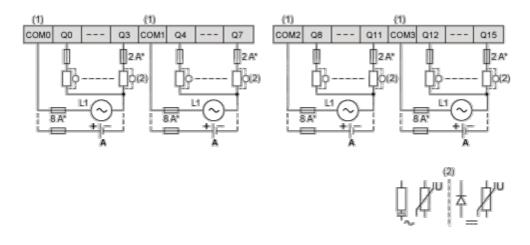


- (*) Type T fuse
- (1) The COM0, COM1, COM2 and COM3 terminals are not connected internally.

(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

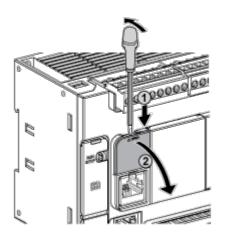
B Sink wiring (negative logic)

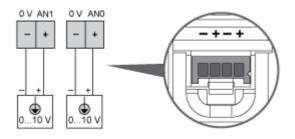
Positive Logic (Source)



- (*) Type T fuse
- (1) The COM0, COM1, COM2 and COM3 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 (positive logic)

Analog Inputs

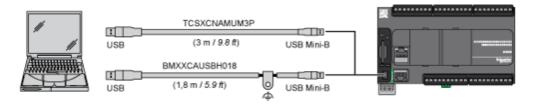




The (-) poles are connected internally.

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

USB Mini-B Connection



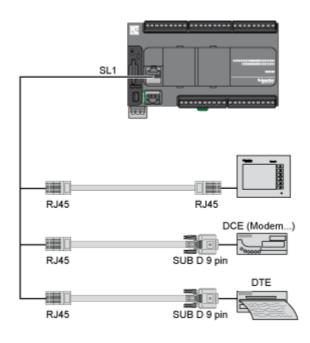
SL1 Connection

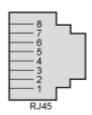


SL1		
Ν°	RS 232	RS 485
1	RxD	N.C.
2	TxD	N.C.
3	RTS	N.C.
4	N.C.	D1
5	N.C.	D0
6	стѕ	N.C.
7	N.C*.	5 Vdc
8	Common	Common

N.C.: not connected

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





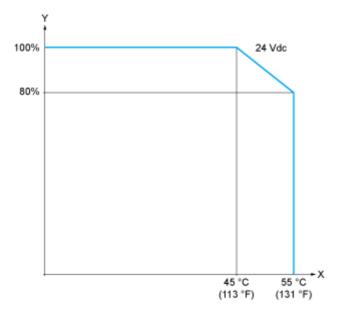
N°	RS 485
1	N.C.
2	N.C.
3	N.C.
4	D1
5	D0
6	N.C.
7	N.C.
8	Common

N.C.: not connected

Performance Curves

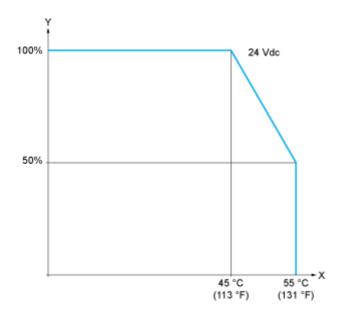
Derating Curves

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