Product data sheet

Specification





logic controller, Modicon M221, 16 IO, 9 DI, 7 DO, relay, Ethernet

TM221CE16R

Product availability: Non-Stock - Not normally stocked in distribution facility

Price*: 289.00 USD

Main

Range Of Product	Modicon M221
Product Or Component Type	Logic controller
[Us] Rated Supply Voltage	100240 V AC
Discrete Input Number	9, discrete input IEC 61131-2 Type 1
Analogue Input Number	2 010 V
Discrete Output Type	Relay normally open
Discrete Output Number	7 relay
Discrete Output Voltage	5125 V DC 5250 V AC
Discrete Output Current	2 A

Complementary

Discrete I/O Number	16
Maximum Number Of I/O Expansion Module	4 (local I/O-Architecture) 11 (remote I/O-Architecture)
Supply Voltage Limits	85264 V
Network Frequency	50/60 Hz
Inrush Current	40 A
Maximum Power Consumption In Va	49 VA 100240 V with max number of I/O expansion module 33 VA 100240 V without I/O expansion module
Power Supply Output Current	0.325 A 5 V expansion bus 0.12 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

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

Input Impedance	3.4 kOhm discrete input
	100 kOhm analog input
	4.9 kOhm fast input
Response Time	35 μs turn-off, I2I5 input
	10 ms turn-on output
	10 ms turn-off output
	5 μs turn-on, I0, I1, I6, I7 fast input 35 μs turn-on, other terminals input
	5 μs turn-off, 10, 11, 16, 17 fast input
	100 μs turn-off, other terminals input
Configurable Filtering Time	0 ms input
	3 ms input
	12 ms input
Output Voltage Limits	125 V DC
	277 V AC
Maximum Current Per Output	6 A COM 1
Common	7 A COM 0
Absolute Accuracy Error	+/- 1 % of full scale 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 Frequency	20 switching operations/minute with maximum load
Mechanical Durability	20000000 cycles relay output
Minimum Load	1 mA 5 V DC relay output
Protection Type	Without protection 5 A
Reset Time	1 s
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 or CR2032X lithium non-rechargeable
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
•	512 %KW constant words
	255 %TM timers
	512 %M memory bits
	8000 %MW memory words
Realtime Clock	With
Clock Drift	<= 30 s/month 77 °F (25 °C)
Regulation Loop	Adjustable PID regulator up to 14 simultaneous loops

Counting Input Number 4 fast input (HSC mode) 100 kHz 32 bits		
Counter Function	Pulse/direction A/B Single phase	
Integrated Connection Type	USB port mini B USB 2.0	
,	Non isolated serial link serial 1 RJ45 RS232/RS485 Ethernet RJ45	
Supply	Serial)serial link supply 5 V, <200 mA	
Transmission Rate	1.2115.2 kbit/s (115.2 kbit/s by default) 49.21 ft (15 m) RS485 1.2115.2 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 Ethernet	
Port Ethernet	10BASE-T/100BASE-TX 1 328.08 ft (100 m) copper cable	
Communication Service	DHCP client Ethernet/IP adapter Modbus TCP server Modbus TCP slave device Modbus TCP client	
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 I/O state 1 LED per channel (green) for SL 1 LED (green) for ACT Ethernet network activity (green) for Link (Link Status) Ethernet network link (yellow)	
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	
Insulation	Between input and internal logic 500 V AC Non-insulated between analogue input and internal logic Non-insulated between analogue inputs Between supply and ground 1500 V AC Between sensor power supply and ground 500 V AC Between input and ground 500 V AC Between output and ground 1500 V AC Between supply and internal logic 2300 V AC Between sensor power supply and internal logic 500 V AC Between output and internal logic 2300 V AC Between Ethernet terminal and internal logic 500 V AC Between supply and sensor power supply 2300 V AC	
Marking	CE	
Sensor Power Supply	24 V DC 250 mA supplied by the controller	
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	0.76 lb(US) (0.346 kg)	

Environment

-	
Standards	IEC 61131-2
	UL 508
	CAN/CSA C22.2 No. 213 IACS E10
	ANSI/ISA 12-12-01
Product Certifications	cULus
	LR
	RCM
	EAC
	ABS DNV-GL
	CE
	UKCA
	cULus HazLoc
Environmental Characteristic	Ordinary and hazardous location
Resistance To Electrostatic	8 kV in air IEC 61000-4-2
Discharge	4 kV on contact IEC 61000-4-2
Resistance To Electromagnetic	9.14 V/m (10 V/m) 80 MHz1 GHz IEC 61000-4-3
Fields	2.74 V/m (3 V/m) 1.4 GHz2 GHz IEC 61000-4-3
	0.91 V/m (1 V/m) 22.7 GHz IEC 61000-4-3
Resistance To Magnetic Fields	98.43 A/m (30 A/m) 50/60 Hz IEC 61000-4-8
Resistance To Fast Transients	2 kV IEC 61000-4-4 power lines)
	2 kV IEC 61000-4-4 relay output)
	1 kV IEC 61000-4-4 I/O)
	1 kV IEC 61000-4-4 Ethernet line)
	1 kV IEC 61000-4-4 serial link)
Surge Withstand	2 kV power lines (AC) common mode IEC 61000-4-5
	2 kV relay output common mode IEC 61000-4-5
	1 kV I/O common mode IEC 61000-4-5
	1 kV shielded cable common mode IEC 61000-4-5
	0.5 kV power lines (DC) differential mode IEC 61000-4-5
	1 kV power lines (AC) differential mode IEC 61000-4-5 1 kV relay output differential mode IEC 61000-4-5
	0.5 kV power lines (DC) common mode IEC 61000-4-5
Resistance To Conducted	10 V 0.1580 MHz IEC 61000-4-6
Disturbances	3 V 0.180 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 dBµV/m QP/66 dBµV/m AV power lines (AC))0.150.5
-	MHz IEC 55011
	Conducted emissions 73 dBµV/m QP/60 dBµV/m AV power lines (AC))0.5300 MHz
	IEC 55011
	Conducted emissions 12069 dBμV/m QP power lines)10150 kHz IEC 55011
	Conducted emissions 63 dBµV/m QP power lines)1.530 MHz IEC 55011 Radiated emissions 40 dBµV/m QP class A 10 m)30230 MHz IEC 55011
	Conducted emissions 7963 dBµV/m QP power lines)1501500 kHz IEC 55011
	Radiated emissions 47 dBµV/m QP class A 10 m)2001000 MHz IEC 55011
Immunity To Microbreaks	10 ms
Ambient Air Temperature For	14131 °F (-1055 °C) horizontal installation)
Operation	1495 °F (-1035 °C) vertical installation)
Ambient Air Temperature For Storage	-13158 °F (-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	06561.68 ft (02000 m)
Storage Altitude	0.009842.52 ft (03000 m)
Vibration Resistance	3.5 mm 5 8.4 Hz symmetrical rail
	3.5 mm 58.4 Hz symmetrical rail 3.5 mm 58.4 Hz panel mounting
	1 gn 8.4150 Hz symmetrical rail
	1 gn 8.4150 Hz panel mounting

Ordering and shipping details

Category	US10MSX22533
Discount Schedule	0MSX
Gtin	3606480648755
Returnability	No
Country Of Origin	TW

Packing Units

PCE
1
4.26 in (10.829 cm)
5.53 in (14.04 cm)
5.58 in (14.181 cm)
20.81 oz (590.0 g)
CAR
20
11.38 in (28.9 cm)
15.55 in (39.5 cm)
22.60 in (57.4 cm)
28.16 lb(US) (12.771 kg)
P12
240
41.34 in (105.0 cm)
47.24 in (120.0 cm)
31.50 in (80.0 cm)
361.56 lb(US) (164 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

Ø	Mercury Free	
	Rohs Exemption Information	Yes
	Pvc Free	

Certifications & Standards

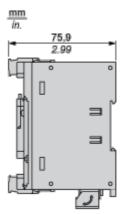
Reach Regulation	REACh Declaration	
Eu Rohs Directive	Pro-active compliance (Product out of EU RoHS legal scope)	
China Rohs Regulation	China RoHS declaration	
Environmental Disclosure	Product Environmental Profile	
Weee	The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins.	
Circularity Profile	End of Life Information	
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 www.P65Warnings.ca.gov	

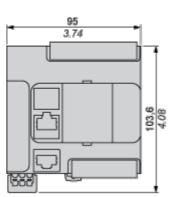
Product data sheet

TM221CE16R

Dimensions Drawings

Dimensions



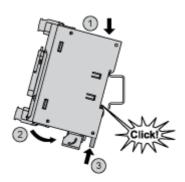


Product data sheet

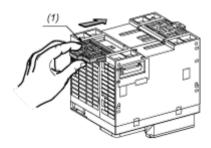
TM221CE16R

Mounting and Clearance

Mounting on a Rail

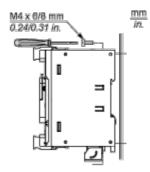


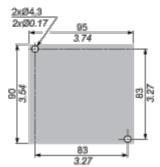
Direct Mounting on a Panel Surface



(1) Install a mounting strip

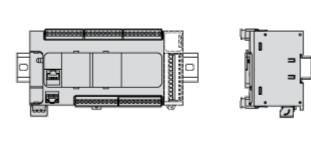
Mounting Hole Layout



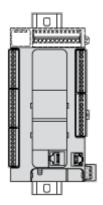


Mounting

Correct Mounting Position

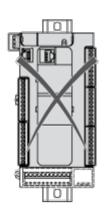


Acceptable Mounting Position



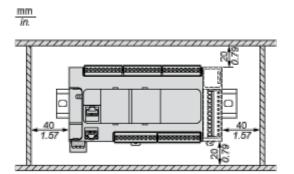
Incorrect Mounting Position

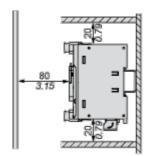






Clearance

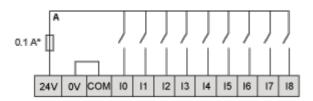




Connections and Schema

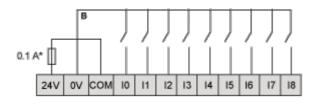
Digital Inputs

Wiring Diagram (Positive Logic)



(*) Type T fuse

Wiring Diagram (Negative Logic)



(*) Type T fuse

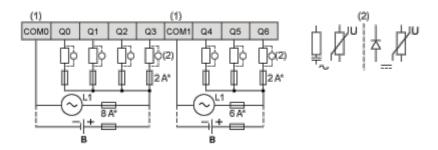
Connection of the Fast Inputs



10, 11, 16, 17

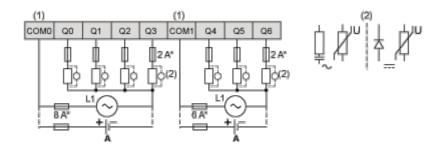
Relay Outputs

Negative Logic (Sink)



- (*) Type T fuse
- (1) The 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
- B Sink wiring (negative logic)

Positive Logic (Source)

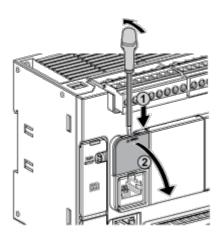


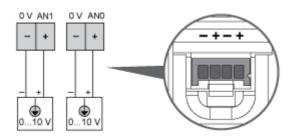
(*) Type T fuse

May 30, 2024

- (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 (positive logic)

Analog Inputs





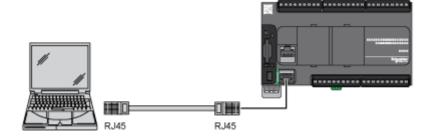
The (-) poles are connected internally.

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

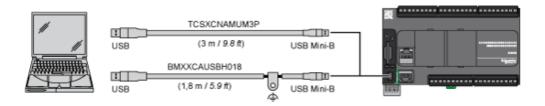
Ethernet Connection



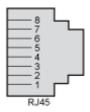
Pin N°	Signal
1	TD+
2	TD-
3	RD+
4	-
5	-
6	RD-
7	-
8	-



USB Mini-B Connection



SL1 Connection

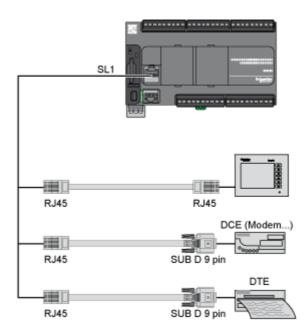


SL1

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

 $[\]ensuremath{^*}$: 5 Vdc delivered by the controller. Do not connect.

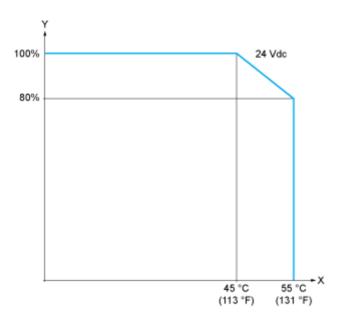


17

Performance Curves

Derating Curves

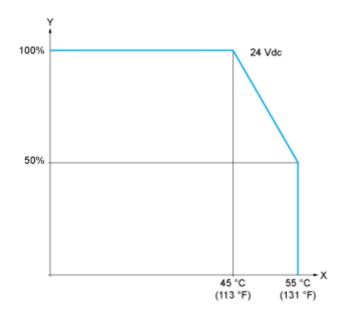
Embedded Digital Inputs (No Cartridge)



X: Ambient temperature

Y: Input simultaneous ON ratio

Embedded Digital Inputs (with Cartridge)



X: Ambient temperature

Y: Input simultaneous ON ratio