



### Main

Range of product	Modicon M221
Product or component type	Logic controller
[Us] rated supply voltage	100...240 V AC
Discrete input number	9, 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	7 relay
Discrete output voltage	5...125 V DC 5...250 V AC
Discrete output current	2 A

### Complementary

Discrete I/O number	16
Maximum number of I/O expansion module	4 for transistor output 4 for relay output
Supply voltage limits	85...264 V
Network frequency	50/60 Hz
Inrush current	40 A
Maximum power consumption in VA	49 VA at 100...240 V with max number of I/O expansion module 33 VA at 100...240 V without I/O expansion module
Power supply output current	0.325 A 5 V for expansion bus 0.12 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

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Response time	35 µs turn-off, I2...I5 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, I0, 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	6 A at COM 1 7 A at COM 0
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 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
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 at 25 °C
Regulation loop	Adjustable PID regulator up to 14 simultaneous loops
Counting input number	4 fast input (HSC mode) at 100 kHz 32 bits
Control signal type	Pulse/Direction A/B Single phase
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)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	DHCP client Ethernet/IP adapter Modbus TCP server Modbus TCP slave device Modbus TCP client
Local signalling	1 LED (green)PWR: 1 LED (green)RUN: 1 LED (red)module error (ERR): 1 LED (green)SD card access (SD): 1 LED (red)BAT: 1 LED per channel (green)I/O state: 1 LED (green)SL: Ethernet network activity (green)ACT: Ethernet network link (yellow)Link (Link Status):
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 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
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 Top hat type TH35-7.5 rail conforming to IEC 60715 plate or panel with fixing kit
Height	90 Mm
Depth	70 Mm
Width	95 Mm
Net weight	0.346 Kg

## Environment

Standards	EN/IEC 61010-2-201 EN/IEC 60664-1 EN/IEC 61131-2
Product certifications	CSA CULus LR RCM IACS E10 EAC ABS DNV-GL
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)
Electromagnetic emission	Conducted emissions - test level: 79 dB $\mu$ V/m QP/66 dB $\mu$ V/m AV ( power-lines (AC)) at 0.15...0.5 MHz conforming to EN/IEC 55011 Conducted emissions - test level: 73 dB $\mu$ V/m QP/60 dB $\mu$ V/m AV ( power-lines (AC)) at 0.5...300 MHz conforming to EN/IEC 55011 Conducted emissions - test level: 120...69 dB $\mu$ V/m QP ( power-lines) at 10...150 kHz conforming to EN/IEC 55011 Conducted emissions - test level: 63 dB $\mu$ V/m QP ( power lines) at 1.5...30 MHz conforming to EN/IEC 55011 Radiated emissions - test level: 40 dB $\mu$ V/m QP class A ( 10 m) at 30...230 MHz conforming to EN/IEC 55011 Conducted emissions - test level: 79...63 dB $\mu$ V/m QP ( power-lines) at 150...1500 kHz conforming to EN/IEC 55011 Radiated emissions - test level: 47 dB $\mu$ V/m QP class A ( 10 m) at 200...1000 MHz conforming to EN/IEC 55011
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	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 8.4...150 Hz on symmetrical rail 1 gn at 8.4...150 Hz on panel mounting
Shock resistance	98 m/s <sup>2</sup> for 11 ms

## Offer Sustainability

Sustainable offer status	Green Premium product
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

Product Life Status : **Commercialised**