



### Main

Range of product	Modicon M221
Product or component type	Logic controller
[Us] rated supply voltage	24 V DC
Discrete input number	8, discrete input 4 fast input IEC 61131-2 Type 1
Analogue input number	2 0...10 V
Discrete output type	Transistor
Discrete output number	8 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	7 relay output
Supply voltage limits	20.4...28.8 V
Inrush current	35 A
Maximum power consumption in W	22.9 W 24 V with max number of I/O expansion module) 4 W 24 V without I/O expansion module)
Power supply output current	0.52 A 5 V expansion bus 0.49 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

Disclaimer: 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

	+/- 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	100 kOhm analog input 3.4 kOhm 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	Positive logic (source)
Maximum current per output common	4 A
Output frequency	100 kHz fast output (PWM/PLS mode) Q0...Q1 5 kHz output Q2...Q3 0.1 kHz output Q4...Q6
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	Short-circuit and overload protection with automatic reset Short-circuit protection on output Overload and short-circuit protection 1 A
Reset time	1 s automatic reset
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 0.7 ms other instruction
Execution time per instruction	0.2 µs Boolean
Exct time for event task	60 µs response time
Application structure	1 cyclic auxiliary task 8 interrupt tasks 1 configurable freewheeling/cyclic master task
Maximum size of object areas	512 %M memory bits 255 %C counters 8000 %MW memory words 512 %KW constant words 255 %TM timers
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

	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 1)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 Ethernet
Port Ethernet	10BASE-T/100BASE-TX 1 328.08 ft (100 m) copper cable
Communication service	Ethernet/IP adapter Modbus TCP server Modbus TCP client Modbus TCP slave device DHCP client
Local signalling	PWR 1 LED green) RUN 1 LED green) Module error (ERR) 1 LED red) SD card access (SD) 1 LED green) BAT 1 LED red) I/O state 1 LED per channel green) SL 1 LED green) ACT Ethernet network activity green) Link (Link Status) Ethernet network link yellow)
Electrical connection	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 removable spring terminal block, 10 for inputs removable spring terminal block, 11 for outputs
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	2.76 in (70 mm)
Net weight	0.58 lb(US) (0.264 kg)

## Environment

Standards	EN/IEC 60664-1 EN/IEC 61010-2-201 EN/IEC 61131-2
Product certifications	LR IACS E10 CULus DNV-GL EAC RCM CSA ABS
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/yd (10 V/m) 80 MHz...1 GHz EN/IEC 61000-4-3 2.74 V/yd (3 V/m) 1.4 GHz...2 GHz EN/IEC 61000-4-3 0.91 V/yd (1 V/m) 2...2.7 GHz EN/IEC 61000-4-3
Resistance to magnetic fields	98.43 A/ft (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...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

## Packing Units

Package 1 Weight	14.81 oz (420.000 g)
Package 1 Height	4.25 in (108.000 mm)
Package 1 width	3.94 in (100.000 mm)
Package 1 Length	4.96 in (126.000 mm)

## 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
PVC free	Yes

---