

Scheinder Electric TM221M16R

controller M221 16 IO relay
TM221M16R

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 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

Discrete I/O number 16

Maximum number of I/O
expansion module

7 (local I/O-Architecture)

14 (remote I/O-Architecture)

Supply voltage limits 20.4...28.8 V

Inrush current 35 A

Maximum power consumption in
W

22.5 W at 24 V (with max number of I/O expansion module)

3.6 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

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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 μ s turn-off, I2...I5 terminal(s) for input
10 ms turn-on for output
10 ms turn-off for output
5 μ s turn-on, I0, I1, I6, I7 terminal(s) for fast input
35 μ s turn-on, other terminals terminal(s) for input
5 μ s turn-off, I0, I1, I6, I7 terminal(s) for fast input
100 μ s 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 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

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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 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 1 configurable freewheeling/cyclic master task
1 cyclic auxiliary task
8 interrupt tasks
Maximum size of object areas 255 %TM timers
8000 %MW memory words
255 %C counters
512 %M memory bits
512 %KW constant 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
counter function 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 RS485 interface
Non isolated serial link serial 2 with RJ45 connector and RS232/RS485 interface
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
Communication service Modbus slave
Modbus master
Local signalling 1 LED (green) for PWR
1 LED (green) for RUN

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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 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 screw terminal block, 10 terminal(s) for inputs
removable screw 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
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

Product certifications DNV-GL

ABS
LR
cULus
RCM
EAC
CE
UKCA

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cULus HazLoc

Environmental characteristic Ordinary and hazardous location

Resistance to electrostatic
discharge

8 kV in air conforming to IEC 61000-4-2

4 kV on contact conforming to IEC 61000-4-2

Resistance to electromagnetic
fields

10 V/m 80 MHz...1 GHz conforming to IEC 61000-4-3

3 V/m 1.4 GHz...2 GHz conforming to IEC 61000-4-3

1 V/m 2...2.7 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
disturbances

10 V 0.15...80 MHz conforming to 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 μ V/m QP/66 dB μ V/m AV
(power lines (AC))

at 0.15...0.5 MHz conforming to IEC 55011

Conducted emissions - test level: 73 dB μ V/m QP/60 dB μ V/m AV (power lines (AC))

at 0.5...300 MHz conforming to IEC 55011

Conducted emissions - test level: 120...69 dB μ V/m QP (power lines) at 10...150 kHz
conforming to IEC 55011

Conducted emissions - test level: 63 dB μ V/m QP (power lines) at 1.5...30 MHz
conforming to IEC 55011

Radiated emissions - test level: 40 dB μ V/m QP class A (10 m) at 30...230 MHz

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conforming to IEC 55011

Conducted emissions - test level: 79...63 dB μ V/m QP (power lines) at 150...1500 kHz conforming to IEC 55011

Radiated emissions - test level: 47 dB μ V/m QP class A (10 m) at 200...1000 MHz conforming to 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 $\leq$ 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/s² for 11 ms

Packing Units

Unit Type of Package 1 PCE

Number of Units in Package 1 1

Package 1 Height 10.041 cm

Package 1 Width 10.83 cm

Package 1 Length 12.81 cm

Package 1 Weight 440.0 g

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