

## Scheinder Electric TM221CE24R

TM221CE24R

controller M221 24 IO relay Ethernet

Main

Range of product Modicon M221

Product or component

type

Logic controller

[Us] rated supply voltage

100...240 V AC

Discrete input number 14 discrete input conforming to IEC 61131-2 Type 1

Analogue input number 2 at input range: 0...10 V

Discrete output type Relay normally open

Discrete output number 10 relay

Discrete output voltage 5...250 V AC

5...125 V DC

Discrete output current 2 A

Complementary

Discrete I/O number 24

Number of I/O expansion module  $\leq 7$  for relay output

$\leq 7$  for transistor output

Supply voltage limits 85...264 V

Network frequency 50/60 Hz

Inrush current  $\leq 40$  A

Power consumption in VA  $\leq 35$  VA at 100...240 V without I/O expansion module

$\leq 58$  VA at 100...240 V with max number of I/O expansion module

Power supply output current 0.16 A at 24 V for expansion bus

0.52 A at 5 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 analog input

Permitted overload on inputs  $\pm 13$  V DC for analog input permanent

$\pm 30$  V DC for analog input with 5 min maximum

Voltage state1 guaranteed  $\geq 15$  V for input

Current state 1 guaranteed  $\geq 4.2$  mA for discrete input

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$\geq 2.6$  mA for fast input  
Voltage state 0 guaranteed  $\leq 5$  V for input  
Current state 0 guaranteed  $\leq 0.6$  mA for fast input  
 $\leq 1.3$  mA for discrete input  
Discrete input current 5 mA for fast input  
7 mA for discrete input  
Input impedance 4.9 kOhm for fast input  
100 kOhm for analog input  
3.4 kOhm for discrete input  
Response time 100  $\mu$ s turn-off operation for input; other terminals terminal  
5  $\mu$ s turn-off operation for fast input; I0, I1, I6, I7 terminal  
35  $\mu$ s turn-on operation for input; other terminals terminal  
5  $\mu$ s turn-on operation for fast input; I0, I1, I6, I7 terminal  
10 ms turn-off operation for output  
10 ms turn-on operation for output  
35  $\mu$ s turn-off operation for input; I2...I5 terminal

Configurable filtering time 12 ms for input  
3 ms for input  
0 ms for input  
Output voltage limits 277 V AC  
125 V DC  
Current per output common 7 A at COM 1 terminal  
7 A at COM 0 terminal  
4 A at COM 2 terminal  
Absolute accuracy error  $\pm 1\%$  of full scale for analog input  
Electrical durability Inductive (L/R = 7 ms) DC-13, 24 V / 7.2 W : 300000 cycles  
Inductive (L/R = 7 ms) DC-13, 24 V / 24 W : 100000 cycles  
Resistive DC-12, 24 V / 16 W : 300000 cycles  
Resistive DC-12, 24 V / 48 W : 100000 cycles  
Inductive AC-14, ( $\cos \phi = 0.7$ ) 240 V / 72 VA : 300000 cycles  
Inductive AC-14, ( $\cos \phi = 0.7$ ) 120 V / 36 VA : 300000 cycles  
Inductive AC-14, ( $\cos \phi = 0.7$ ) 240 V / 240 VA : 100000 cycles  
Inductive AC-14, ( $\cos \phi = 0.7$ ) 120 V / 120 VA : 100000 cycles  
Inductive AC-15, ( $\cos \phi = 0.35$ ) 240 V / 36 VA : 300000 cycles  
Inductive AC-15, ( $\cos \phi = 0.35$ ) 120 V / 18 VA : 300000 cycles  
Inductive AC-15, ( $\cos \phi = 0.35$ ) 240 V / 120 VA : 100000 cycles  
Inductive AC-15, ( $\cos \phi = 0.35$ ) 120 V / 60 VA : 100000 cycles  
Resistive AC-12, 240 V / 160 VA : 300000 cycles  
Resistive AC-12, 120 V / 80 VA : 300000 cycles  
Resistive AC-12, 240 V / 480 VA : 100000 cycles

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Resistive AC-12, 120 V / 240 VA : 100000 cycles  
Switching frequency 20 switching operations/minute with maximum load  
Mechanical durability  $\geq$  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 internal variables RAM  
256 kB for user application and data RAM with 10000 instructions  
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 yr  
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  $\mu$ s Boolean  
Exct time for event task 60  $\mu$ s response time  
Maximum size of object areas 512 %M memory bits  
8000 %MW memory words  
512 %KW constant words  
255 %TM timers  
255 %C counters  
Realtime clock With  
Clock drift  $\leq$  30 s/month at 25 ° C  
Regulation loop Adjustable PID regulator up to 14 simultaneous loops  
Counting input number 4 fast input (HSC mode) (counting frequency: 100 kHz), counting capacity:  
32  
bits  
Counter function A/B  
Pulse/Direction  
Single phase  
Integrated connection type Ethernet with connector RJ45  
Non isolated serial link "serial 1" with connector RJ45 and interface RS232/  
RS485  
USB port with connector mini B USB 2.0  
Supply Serial serial link supply at 5 V 200 mA  
Transmission rate 480 Mbit/s - communication protocol: USB  
1.2...115.2 kbit/s (115.2 kbit/s by default) for bus length of 3 m - communication  
protocol: RS232  
1.2...115.2 kbit/s (115.2 kbit/s by default) for bus length of 15 m - communication  
protocol: RS485  
Communication port protocol : Ethernet protocol  
Non isolated serial link : Modbus protocol master/slave - RTU/ASCII or SoMachine-Network

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USB port : USB protocol - SoMachine-Network  
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 client  
Modbus TCP slave device  
Local signalling Ethernet network link yellow for Link (Link Status)  
Ethernet network activity green for ACT  
1 LED green for SL  
1 LED per channel green for I/O state  
1 LED red for BAT  
1 LED green for SD card access (SD)  
1 LED red for module error (ERR)  
1 LED green for RUN  
1 LED green for PWR  
Electrical connection Mini B USB 2.0 connector for a programming terminal  
Connector, 4 terminal(s) for analogue inputs  
Terminal block, 3 terminal(s) for connecting the 24 V DC power supply  
Removable screw terminal block for outputs  
Removable screw terminal block for inputs  
Cable length <= 1 m unshielded cable for analog input  
<= 30 m unshielded cable for digital input  
<= 30 m unshielded cable for output  
<= 10 m shielded cable for fast input  
Insulation 2300 V AC between supply and sensor power supply  
500 V AC between Ethernet terminal and internal logic  
2300 V AC between output and internal logic  
500 V AC between sensor power supply and internal logic  
2300 V AC between supply and internal logic  
1500 V AC between output and ground  
500 V AC between input and ground  
500 V AC between sensor power supply and ground  
1500 V AC between supply and ground  
Non-insulated between analogue inputs  
Non-insulated between analogue input and internal logic  
500 V AC between input and internal logic  
Marking CE  
Sensor power supply DC at 250 mA supplied by the controller  
Mounting support Plate or panel with fixing kit

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Top hat type TH35-7.5 rail conforming to IEC 60715

Top hat type TH35-15 rail conforming to IEC 60715

Height 70 mm

Depth 70 mm

Width 110 mm

Product weight 0.395 kg

Environment

Standards EN/IEC 60664-1

EN/IEC 61131-2

EN/IEC 61010-2-201

Product certifications CSA

CULus

LR

IACS E10

RCM

EAC

DNV-GL

Environmental characteristic Ordinary and hazardous location

Resistance to electrostatic discharge 4 kV on contact conforming to EN/IEC 61000-4-2

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

Resistance to electromagnetic fields 1 V/m ( 2...2.7 GHz) conforming to EN/IEC 61000-4-3

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

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

Resistance to magnetic fields 30 A/m at 50...60 Hz conforming to EN/IEC 61000-4-8

Resistance to fast transients 1 kV for serial link conforming to EN/IEC 61000-4-4

1 kV for Ethernet line conforming to EN/IEC 61000-4-4

1 kV for I/O conforming to EN/IEC 61000-4-4

2 kV for relay output conforming to EN/IEC 61000-4-4

2 kV for power lines conforming to EN/IEC 61000-4-4

Surge withstand 0.5 kV for power lines (DC) in common mode conforming to EN/IEC 61000-4-5

1 kV for relay output in differential mode conforming to EN/IEC 61000-4-5

1 kV for power lines (AC) in differential mode conforming to EN/IEC 61000-4-5

0.5 kV for power lines (DC) in differential mode conforming to EN/IEC 61000-4-5

1 kV for shielded cable in common mode conforming to EN/IEC 61000-4-5

1 kV for I/O in common mode conforming to EN/IEC 61000-4-5

2 kV for relay output in common mode conforming to EN/IEC 61000-4-5

2 kV for power lines (AC) in common mode conforming to EN/IEC 61000-4-5

Resistance to conducted disturbances, induced by

radio frequency fields

10 Vrms (spot frequency (2, 3, 4, 6.2, 8.2, 12.6, 16.5, 18.8, 22, 25 MHz)) conforming to Marine

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specification (LR, ABS, DNV, GL)

3 Vrms (0.1...80 MHz) conforming to Marine specification (LR, ABS, DNV, GL)

10 Vrms (0.15...80 MHz) conforming to EN/IEC 61000-4-6

Electromagnetic emission Radiated emissions conforming to EN/IEC 55011 class A 10 m, 200 MHz...1

GHz : 47 dB  $\mu$  V/m QP

Radiated emissions conforming to EN/IEC 55011 class A 10 m, 30...230 MHz :

40 dB  $\mu$  V/m QP

Conducted emissions conforming to EN/IEC 55011 power lines, 1.5...30 MHz : 63

dB  $\mu$  V/m QP

Conducted emissions conforming to EN/IEC 55011 power lines, 150 kHz...1.5

MHz : 79...63 dB  $\mu$  V/m QP

Conducted emissions conforming to EN/IEC 55011 power lines, 10...150 kHz :

120...69 dB $\mu$ V/m QP

Conducted emissions conforming to EN/IEC 55011 power lines (AC), 0.5...300

MHz : 73 dB  $\mu$  V/m QP/60 dB  $\mu$  V/m AV

Conducted emissions conforming to EN/IEC 55011 power lines (AC), 0.15...0.5

MHz : 79 dB  $\mu$  V/m QP/66 dB  $\mu$  V/m AV

Immunity to microbreaks 10 ms

Ambient air temperature for operation -10...35 ° C for vertical installation

-10...55 ° C for horizontal installation

Ambient air temperature for storage -25...70 ° C

Relative humidity 10...95 % without condensation in storage

10...95 % without condensation in operation

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 1 gn (vibration frequency: 8.4...150 Hz) on panel mounting

1 gn (vibration frequency: 8.4...150 Hz) on symmetrical rail

3.5 mm (vibration frequency: 5...8.4 Hz) on panel mounting

3.5 mm (vibration frequency: 5...8.4 Hz) on symmetrical rail

Shock resistance 98 m/s<sup>2</sup> (test wave duration:11 ms)

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