# Scheinder Electric  TM221C16R

Logic controller, Modicon M221, 16 inputs/outputs, 7 relay outputs, 100...240 V AC
TM221C16R

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 input range: 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
Number of I/O expansion module <= 4 transistor output
<= 4 relay output
Supply voltage limits 85...264 V
Network frequency 50/60 Hz
Inrush current <= 40 A
Power consumption in VA <= 46 VAat 100...240 V with max number of I/O expansion module
<= 31 VAat 100...240 V without I/O expansion module
Power supply output current 0.325 A at 5 V expansion bus
0.12 A at 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 analog input with 5 min maximum
+/- 13 V DC analog input permanent
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 4.9 kOhm fast input

3.4 kOhm discrete input
100 kOhm analog input
Response time 10 ms turn-on operation output
35 µs turn-off operation input; I2...I5 terminal
10 ms turn-off operation output
5 µs turn-on operation fast input; I0, I1, I6, I7 terminal
35 µs turn-on operation input; other terminals terminal
5 µs turn-off operation fast input; I0, I1, I6, I7 terminal
100 µs turn-off operation input; other terminals terminal
Configurable filtering time 0 ms input
12 ms input
3 ms input
Output voltage limits 125 V DC
277 V AC
Current per output common 6 Aat COM 1 termnal
7 A at COM 0 termnal
Absolute accuracy error +/- 1 % of full scale analog input

Electrical durability Inductive AC-15, (cos phi = 0.35) 240 V/ 120 VA: 100000 cycles
Resistive DC-12, 24 V/ 48 W: 100000 cycles
Resistive AC-12, 120 V/ 240 VA: 100000 cycles
Inductive AC-15, (cos phi = 0.35) 240 V/ 36 VA: 300000 cycles
Resistive AC-12, 120 V/ 80 VA: 300000 cycles
Inductive (L/R = 7 ms) DC-13, 24 V/ 24 W: 100000 cycles
Resistive DC-12, 24 V/ 16 W: 300000 cycles
Inductive (L/R = 7 ms) DC-13, 24 V/ 7.2 W: 300000 cycles
Inductive AC-14, (cos phi = 0.7) 240 V/ 240 VA: 100000 cycles
Inductive AC-15, (cos phi = 0.35) 120 V/ 60 VA: 100000 cycles
Inductive AC-14, (cos phi = 0.7) 240 V/ 72 VA: 300000 cycles
Inductive AC-15, (cos phi = 0.35) 120 V/ 18 VA: 300000 cycles
Resistive AC-12, 240 V/ 480 VA: 100000 cycles
Inductive AC-14, (cos phi = 0.7) 120 V/ 120 VA: 100000 cycles
Resistive AC-12, 240 V/ 160 VA: 300000 cycles
Inductive AC-14, (cos phi = 0.7) 120 V/ 36 VA: 300000 cycles
Switching frequency 20 switching operations/minute with maximum load
Mechanical durability >= 20000000 cycles relay output
Minimum load 1 mA at 5 V DC relay output
Protection type Without protection at 5 A
Reset time 1 s
Memory capacity 256 kB user application and data RAM with 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, battery life: 4 yr
Backup time 1 yearat 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 512 %M memory bits
8000 %MW memory words
512 %KW constant words
255 %TM timers
255 %C counters
Realtime clock With
Clock drift <= 30 s/monthat 77 ° F (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
Control signal type Single phase
Dual phase (pulse/direction)
Dual phase (quadrature)
Frequency meter
Integrated connection type USB port with connector mini B USB 2.0
Non isolated serial link "serial 1" with connector RJ45 and interface RS485
Non isolated serial link "serial 2" with connector RJ45 and interface RS232/RS485
Supply Serial serial link supplyat 5 V 200 mA
Transmission rate 1.2...115.2 kbit/s (115.2 kbit/s by default) for bus length of 15 m - communication
protocol: RS485
1.2...115.2 kbit/s (115.2 kbit/s by default) for bus length of 9.84 ft (3 m) -
communication protocol: RS232
480 Mbit/s - communication protocol: USB
Communication port protocol USB port: USB protocol - SoMachine-Network
Non isolated serial link: Modbus protocol master/slave - RTU/ASCII or SoMachineNetwork
Local signalling 1 LED red module error (ERR)
1 LED green PWR
1 LED green RUN
1 LED green SD card access (SD)
1 LED red BAT
1 LED green SL1
1 LED green SL2
1 LED per channel green I/O state

Electrical connection Mini B USB 2.0 connector for a programming terminal
Terminal block, 3 terminal(s) for connecting the 24 V DC power supply
Connector, 4 terminal(s) for analogue inputs
Removable screw terminal block for inputs
Removable screw terminal block for outputs

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 2300 V AC between output and internal logic
Non-insulated between analogue inputs
500 V AC between input and internal logic
Non-insulated between analogue input and internal logic
1500 V AC between supply and ground
500 V AC between sensor power supply and ground
500 V AC between input and ground
1500 V AC between output and ground
2300 V AC between supply and internal logic
500 V AC between sensor power supply and internal logic
500 V AC between Ethernet terminal and internal logic
2300 V AC between supply and sensor power supply
Marking CE
Sensor power supply 24 V DCat 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 3.54 in (90 mm)
Depth 2.76 in (70 mm)
Width 3.74 in (95 mm)
Product weight 0.76 lb(US) (0.346 kg)
Environment
standards EN/IEC 60664-1
EN/IEC 61131-2
EN/IEC 61010-2-201
product certifications ABS
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 9.14 V/yd (10 V/m) ( 80 MHz...1 GHz) conforming to EN/IEC 61000-4-3
2.74 V/yd (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 Ethernet line conforming to EN/IEC 61000-4-4
1 kV serial link conforming to EN/IEC 61000-4-4
1 kV I/O conforming to EN/IEC 61000-4-4
surge withstand 2 kV power lines (AC) in common mode conforming to EN/IEC 61000-4-5
2 kV relay output in common mode conforming to EN/IEC 61000-4-5
1 kV I/O in common mode conforming to EN/IEC 61000-4-5
1 kV shielded cable in common mode conforming to EN/IEC 61000-4-5
0.5 kV power lines (DC) in differential mode conforming to EN/IEC 61000-4-5
1 kV power lines (AC) in differential mode conforming to EN/IEC 61000-4-5
1 kV relay output in differential mode conforming to EN/IEC 61000-4-5
0.5 kV power lines (DC) in common mode conforming to EN/IEC 61000-4-5
resistance to conducted disturbances 10 Vrms (0.15...80 MHz) conforming to EN/IEC 61000-4-6
3 Vrms (0.1...80 MHz) conforming to Marine specification (LR, ABS, DNV, GL)
10 Vrms (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 conforming to EN/IEC 55011 power lines (AC), 0.15...0.5 MHz:
79 dB µ V/m QP/66 dB µ V/m AV
Conducted emissions conforming to EN/IEC 55011 power lines (AC), 0.5...300 MHz:
73 dB µ V/m QP/60 dB µ V/m AV
Conducted emissions conforming to EN/IEC 55011 power lines, 10...150 kHz:
120...69 dBµV/m QP
Conducted emissions conforming to EN/IEC 55011 power lines, 1.5...30 MHz: 63 dB µ V/m QP

Radiated emissions conforming to EN/IEC 55011 class A 10 m, 30...230 MHz: 40 dB µ V/m QP
Conducted emissions conforming to EN/IEC 55011 power lines, 150...1500 kHz :

79...63 dB µ V/m QP
Radiated emissions conforming to EN/IEC 55011 class A 10 m, 200...1000 MHz : 47 dB µ V/m QP
immunity to microbreaks 10 ms
ambient air temperature for operation 14...131 ° F (-10...55 ° C) horizontal installation
-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...6561.68 ft (0...2000 m)
storage altitude 0...9842.52 ft (0...3000 m)
vibration resistance 3.5 mm (vibration frequency: 5...8.4 Hz) on symmetrical rail
1 gn (vibration frequency: 8.4...150 Hz) on symmetrical rail
3.5 mm (vibration frequency: 5...8.4 Hz) on panel mounting
1 gn (vibration frequency: 8.4...150 Hz) on panel mounting
shock resistance 98 $m/s^2$ (test wave duration:11 ms)
Offer Sustainability
Green Premium product Green Premium product
Compliant - since 1415 - Schneider Electric declaration of conformity
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Reference not containing SVHC above the threshold Reference not containing SVHC above the threshold
Available Available
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