Product datasheet

Specifications

Green Premium™

controller M221 32 IO transistor PNP

TM221M32TK

Main

Range Of Product	Modicon M221
Product Or Component Type	Logic controller
[Us] Rated Supply Voltage	24 V DC
Discrete Input Number	16, discrete input 4 fast input conforming to IEC 61131-2 Type 1
Analogue Input Number	2 at 0...10 V
Discrete Output Type	Transistor
Discrete Output Number	16 transistor 2 fast output
Discrete Output Voltage	24 V DC
Discrete Output Current	0.1 A

Complementary

Discrete I/O Number	32
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	22.3 W at 24 V (with max number of I/O expansion module) 3.5 W at 24 V (without I/O expansion module)
Power Supply Output Current	0.52 A 5 V for expansion bus 0.48 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

Response Time	35 µs turn-off, I2...I5 terminal(s) for input
	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
	5 µs turn-on, turn-off, Q0...Q1 terminal(s) for output
	50 µs turn-on, turn-off, Q2...Q3 terminal(s) for output
	300 µs turn-on, turn-off, other terminals terminal(s) for output
Configurable Filtering Time	0 ms for input
	3 ms for input
	12 ms for input
Discrete Output Logic	Positive logic (source)
Maximum Current Per Output Common	1.6 A
Output Frequency	100 kHz for fast output (PWM/PLS mode) at Q0...Q1
	5 kHz for output at Q2...Q3
	0.1 kHz for output at Q4...Q15
Absolute Accuracy Error	+/- 1 % of full scale for analog input
Maximum Leakage Current	0.1 mA for transistor output
Maximum Voltage Drop	<1 V
Mechanical Durability	20000000 cycles for transistor output
Maximum Tungsten Load	<2.4 W for output and fast output
Protection Type	Short-circuit and overload protection with automatic reset
	Short-circuit protection on output
	Overload and short-circuit protection at 0.2 A
Reset Time	1 s automatic reset
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	8000 %MW memory words
	255 %TM timers
	512 %KW constant words
	512 %M memory bits
	255 %C counters
Realtime Clock	With
Clock Drift	<= 30 s/month at 25 °C
Regulation Loop	Adjustable PID regulator up to 14 simultaneous loops
Positioning Functions	Position PTO 2 axe(s)pulse/direction mode (100 kHz)
	Position PTO 1 axe(s)CW/CCW mode (100 kHz)
Function Available	PLS
	PWM
	Frequency generator
Counting Input Number	4 fast input (HSC mode) at 100 kHz 32 bits

Counter Function	Single phase A/B Pulse/direction
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 master Modbus slave
Local Signalling	1 LED (green) for PWR 1 LED (green) for RUN 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 HE-10 connector, 20 terminal(s) for inputs HE-10 connector, 20 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 Shielded cable: <3 m for fast output
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 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	0.27 kg

Environment

Standards	IEC 61131-2 UL 508 CAN/CSA C22.2 No. 213 IACS E10 ANSI/ISA 12-12-01

Product Certifications	cULus LR RCM DNV-GL EAC ABS CE UKCA 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 dBµV/m QP/66 dBµV/m AV (power lines (AC)) at 0.15…0.5 MHz conforming to IEC 55011 Conducted emissions - test level: 73 dBµV/m QP/60 dBµV/m AV (power lines (AC)) at 0.5…300 MHz conforming to IEC 55011 Conducted emissions - test level: 120...69 dBµV/m QP (power lines) at 10…150 kHz conforming to IEC 55011 Conducted emissions - test level: 63 dBµV/m QP (power lines) at 1.5…30 MHz conforming to IEC 55011 Radiated emissions - test level: 40 dBµV/m QP class A (10 m) at 30…230 MHz conforming to IEC 55011 Conducted emissions - test level: 79...63 dBµV/m QP (power lines) at 150…1500 kHz conforming to IEC 55011 Radiated emissions - test level: 47 dBµV/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	<= 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	147 m/s² for 11 ms

Packing Units

Unit Type Of Package 1	PCE
Number Of Units In Package 1	1
Package 1 Height	10.8 cm
Package 1 Width	12.6 cm
Package 1 Length	10.0 cm
Package 1 Weight	420.0 g
Unit Type Of Package 2	S04
Number Of Units In Package 2	24
Package 2 Height	30 cm
Package 2 Width	40 cm
Package 2 Length	60 cm
Package 2 Weight	11.063 kg
Unit Type Of Package 3	P12
Number Of Units In Package 3	288
Package 3 Height	105.0 cm
Package 3 Width	120.0 cm
Package 3 Length	80.0 cm
Package 3 Weight	141 kg

Sustainability ![Green Premium]

Green Premium^{TM} label is Schneider Electric's commitment to delivering products with best-in-class environmental performance. Green Premium promises compliance with the latest regulations, transparency on environmental impacts, as well as circular and low-CO_2 products.

Guide to assessing product sustainability is a white paper that clarifies global eco-label standards and how to interpret environmental declarations.

Learn more about Green Premium >

Guide to assess a product's sustainability >

Transparency   RoHS/REACh

Well-being performance

✓ Mercury Free

✓ Rohs Exemption Information   Yes

✓ Pvc Free

Certifications & Standards
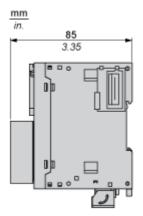
Reach Regulation   REACh Declaration

Eu Rohs Directive   Pro-active compliance (Product out of EU RoHS legal scope)

China Rohs Regulation   China RoHS declaration

Environmental Disclosure   Product Environmental Profile

Weee   The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins

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Circularity Profile   End of Life Information

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Dimensions Drawings

Dimensions
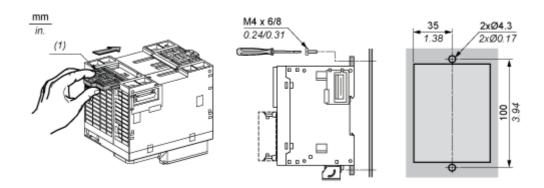
Mounting and Clearance

Mounting on a Rail
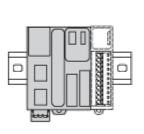
Direct Mounting on a Panel Surface
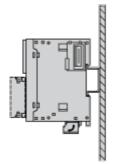
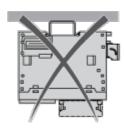(1)   Install a mounting strip
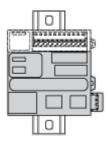
Mounting

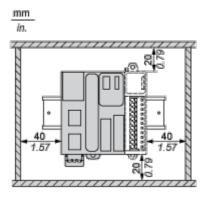### Correct Mounting Position
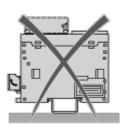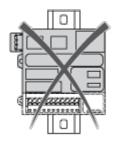
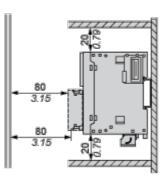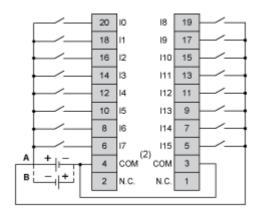### Acceptable Mounting Position

Incorrect Mounting Position

Clearance

Connections and Schema

Digital Inputs
_____
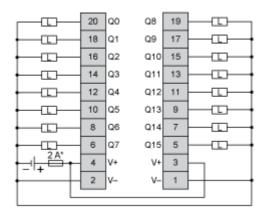

(1)   The COM terminals are not connected internally.

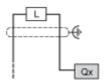A :   Sink wiring (positive logic).

B :   Source wiring (negative logic).

Ix   I0, I1, I6, I7

Digital Outputs
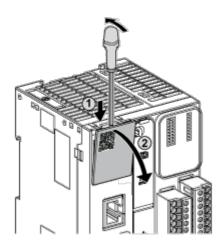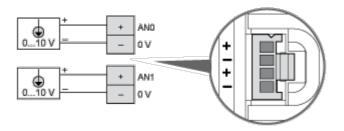
(*)   Type T fuse

(1)   The V+ terminals are connected internally.
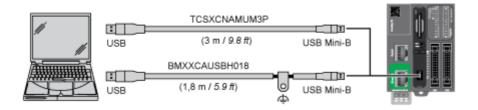

Qx   Q0, Q1

Analog Inputs

The (-) poles are connected internally.

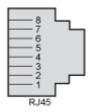| Pin	Wire Color
AN0 / AN1	Red
0 V	Black

USB Mini-B Connection

SL1 Connection

RJ45

SL1
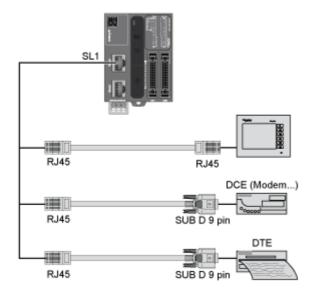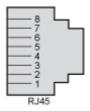
N °	RS 232	RS 485
1	RxD	N.C.
2	TxD	N.C.
3	RTS	N.C.
4	N.C.	D1
5	N.C.	D0
6	CTS	N.C.
7	N.C.*	5 Vdc
8	Common	Common

N.C.: not connected
* : 5 Vdc delivered by the controller. Do not connect.

SL1

RJ45　　　　RJ45

DCE (Modem...)

RJ45　　　　SUB D 9 pin

DTE

RJ45　　　　SUB D 9 pin

SL2 Connection

RJ45
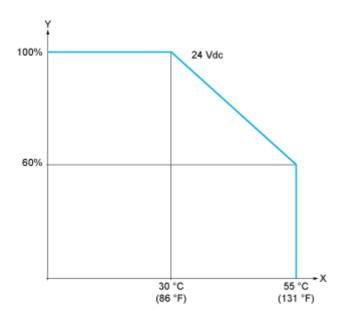
N°	RS 485
1	N.C.
2	N.C.
3	N.C.
4	D1
5	D0
6	N.C.
7	N.C.
8	Common

N.C.: not connected

Product datasheet

TM221M32TK

Performance Curves
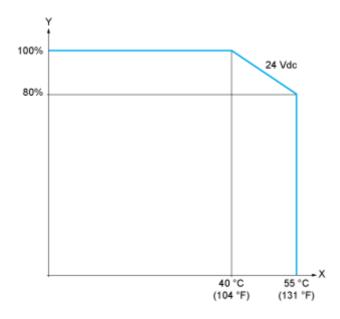
Derating Curves

Embedded Digital Inputs

X : Ambient temperature

Y : Input simultaneous ON ratio

Embedded Digital Outputs

X : Ambient temperature

Y : Output simultaneous ON ratio

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