Product datasheet

Specification





controller M221 16 IO transistor PNP spring

TM221M16TG

EAN Code: 3606480611308

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 conforming to IEC 61131-2 Type 1
Analogue input number	2 at 010 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

oompromentary	
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	20.428.8 V
Inrush current	35 A
Maximum power consumption in W	22 W at 24 V (with max number of I/O expansion module) 3.2 W at 24 V (without I/O expansion module)
Power supply output current	0.52 A 5 V for expansion bus 0.49 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	100 kOhm for analog input 3.4 kOhm for input 4.9 kOhm for fast input

Response time	35 µs turn-off, 1215 terminal(s) for input 5 µs turn-on, 10, 11, 16, 17 terminal(s) for fast input 35 µs turn-on, other terminals terminal(s) for input 5 µs turn-off, 10, 11, 16, 17 terminal(s) for fast input 100 µs turn-off, other terminals terminal(s) for input 5 µs turn-on, turn-off, Q0Q1 terminal(s) for output 50 µs turn-on, turn-off, Q2Q3 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	4 A
Output frequency	100 kHz for fast output (PWM/PLS mode) at Q0Q1 5 kHz for output at Q2Q3 0.1 kHz for output at Q4Q6
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	<12 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 1 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	cyclic auxiliary task configurable freewheeling/cyclic master task interrupt tasks
Maximum size of object areas	8000 %MW memory words 255 %C counters 512 %KW constant words 255 %TM timers 512 %M memory bits
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	PWM PLS 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
g.a.ca.ca.ca.cypc	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	1.2115.2 kbit/s (115.2 kbit/s by default) for bus length of 15 m for RS485
	1.2115.2 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
	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 (green) for I/O state
Electrical connection	terminal block, 3 terminal(s) for connecting the 24 V DC power supply
Liecti icai connection	connector, 4 terminal(s) for analogue inputs
	Mini B USB 2.0 connector for a programming terminal
	removable spring terminal block, 10 terminal(s) for inputs
	removable spring terminal block, 11 terminal(s) for outputs
Maximum cable distance between	Shielded cable: <10 m for fast input
devices	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
	Between output groups at 500 V AC Non-insulated between analogue input and internal logic
	Non-insulated between analogue inputs
	Between fast output and internal logic at 500 V AC
	Non-insulated between outputs
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
	90 mm
Depth	70 mm
Width	70 mm
net weight	0.264 kg

Environment

IEC 61131-2 UL 508 Standards

CAN/CSA C22.2 No. 213 IACS E10 ANSI/ISA 12-12-01

Product certifications	ABS
	LR
	RCM
	cULus DNV-GL
	EAC
	CE
	UKCA
	cULus HazLoc
Environmental characteristic	Ordinary and hazardous location
Resistance to electrostatic	8 kV in air conforming to IEC 61000-4-2
discharge	4 kV on contact conforming to IEC 61000-4-2
Resistance to electromagnetic	10 V/m 80 MHz1 GHz conforming to IEC 61000-4-3
fields	3 V/m 1.4 GHz2 GHz conforming to IEC 61000-4-3
	1 V/m 22.7 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
	i ny (salialilin) collicitility to IEC 0 1000-4-4
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	10 V 0.1580 MHz conforming to IEC 61000-4-6
disturbances	3 V 0.180 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 toot level: 70 dPvV/m OD/66 dPvV/m AV/ never lines (ACV)
Liectromagnetic emission	Conducted emissions - test level: 79 dBμV/m QP/66 dBμV/m AV (power lines (AC)) at 0.150.5 MHz conforming to IEC 55011
	Conducted emissions - test level: 73 dBµV/m QP/60 dBµV/m AV (power lines (AC))
	at 0.5300 MHz conforming to IEC 55011
	Conducted emissions - test level: 12069 dBµV/m QP (power lines) at 10150 kHz
	conforming to IEC 55011
	Conducted emissions - test level: 63 dBµV/m QP (power lines) at 1.530 MHz
	conforming to IEC 55011
	Radiated emissions - test level: 40 dBμV/m QP class A (10 m) at 30230 MHz
	conforming to IEC 55011
	Conducted emissions - test level: 7963 dBµV/m QP (power lines) at 1501500 kHz conforming to IEC 55011
	Radiated emissions - test level: 47 dBµV/m QP class A (10 m) at 2001000 MHz
	conforming to IEC 55011
Immunity to microbreaks	10 ms
Ambient air temperature for	-1055 °C (horizontal installation)
operation	-1035 °C (vertical installation)
Ambient air temperature for	-2570 °C
storage	
Relative humidity	1095 %, without condensation (in operation) 1095 %, without condensation (in storage)
IP degree of protection	IP20 with protective cover in place
Pollution degree	<= 2
Operating altitude	02000 m
Storage altitude	03000 m
Vibration resistance	3.5 mm at 5 8.4 Hz on symmetrical rail
TIM GUOTI I COIOLAITE	3.5 mm at 58.4 Hz on symmetrical rail 3.5 mm at 58.4 Hz on panel mounting
	1 gn at 8.4150 Hz on symmetrical rail
	1 gn at 8.4150 Hz on panel mounting

Packing Units

Unit Type of Package 1	PCE
Number of Units in Package 1	1
Package 1 Height	10.8 cm
Package 1 Width	10.0 cm
Package 1 Length	12.6 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	10.606 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	134.44 kg

Contractual warranty

Warranty 18 months



Green PremiumTM label is Schneider Electric's commitment to delivering products with best-inclass environmental performance. Green Premium promises compliance with the latest regulations, transparency on environmental impacts, as well as circular and low-CO₂ 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	
②	Rohs Exemption Information	Yes
	Pvc Free	

Certifications & Standards

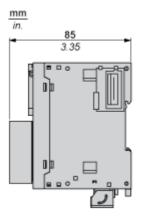
Reach Regulation	Pro-active compliance (Product out of EU RoHS legal scope)	
Eu Rohs Directive		
China Rohs Regulation	China RoHS declaration	
Environmental Disclosure	Product Environmental Profile	
Weee	The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins	
Circularity Profile	End of Life Information	

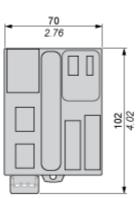
Product datasheet

TM221M16TG

Dimensions Drawings

Dimensions



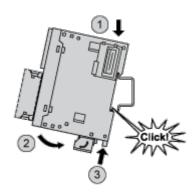


Product datasheet

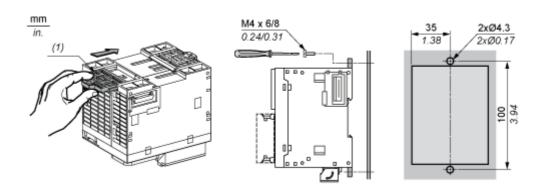
TM221M16TG

Mounting and Clearance

Mounting on a Rail



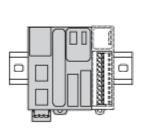
Direct Mounting on a Panel Surface

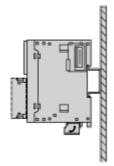


(1) Install a mounting strip

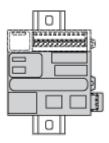
Mounting

Correct Mounting Position



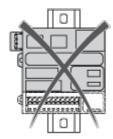


Acceptable Mounting Position



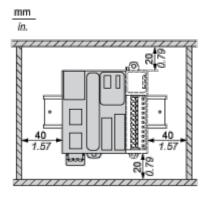
Incorrect Mounting Position

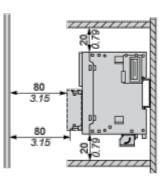






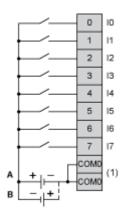
Clearance





Connections and Schema

Digital Inputs



(1) The COM0 terminals are connected internally.

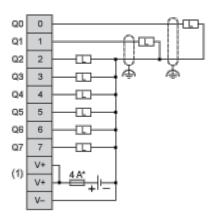
A: Sink wiring (positive logic).

B: Source wiring (negative logic).

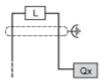


lx 10, 11, 16, 17

Digital Outputs

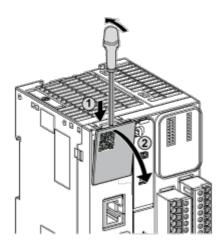


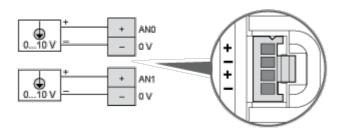
- (*) Type T fuse
- (1) The V+ terminals are connected internally.



Qx Q0, Q1

Analog Inputs

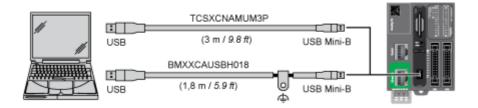




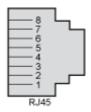
The (-) poles are connected internally.

Pin	Wire Color
AN0 / AN1	Red
0 V	Black

USB Mini-B Connection



SL1 Connection

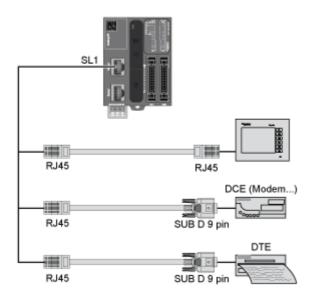


SL1

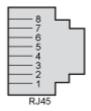
Ν°	RS 232	RS 485
1	RxD	N.C.
2	TxD	N.C.
3	RTS	N.C.
4	N.C.	D1
5	N.C.	D0
6	стѕ	N.C.
7	N.C.*	5 Vdc
8	Common	Common

N.C.: not connected

 $[\]ensuremath{^*}$: 5 Vdc delivered by the controller. Do not connect.



SL2 Connection



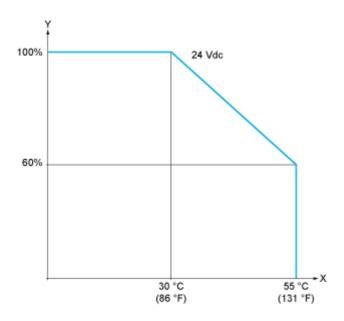
Ν°	RS 485
1	N.C.
2	N.C.
3	N.C.
4	D1
5	D0
6	N.C.
7	N.C.
8	Common

N.C.: not connected

Performance Curves

Derating Curves

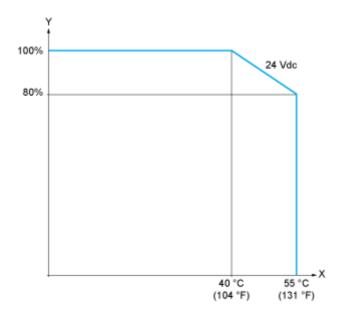
Embedded Digital Inputs



X: Ambient temperature

Y: Input simultaneous ON ratio

Embedded Digital Outputs



X: Ambient temperature

Y: Output simultaneous ON ratio