

Modicon M2xx Logic Controllers

Modicon M221



Modicon M251



SoMachine
for M241 & M251



SoMachine Basic
for M221



Modicon M241



www.schneider-electric.com/msx

สนใจติดต่อ

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บริษัทฯ ขอสงวนสิทธิ์ในการเปลี่ยนแปลงแก้ไขตัวเลขและข้อความต่างๆ โดยไม่ต้องแจ้งให้ทราบล่วงหน้า

Modicon M221 and M221 Book logic controllers

Applications

Control of simple machines



Supply voltage

Inputs/outputs

■ Logic inputs/outputs

□ No. and type of inputs

□ No. and type of outputs

□ Connection of logic I/O

■ Analog inputs

□ Connection of analog inputs

I/O extension

Max. number of I/O expansion modules that can be connected with bus expansion modules

Embedded communication

Ethernet link

Serial link

Functions

Process control

Counting

Position control

Format

W x H x D

Options

■ Cartridges

Number of cartridge slots

■ Display unit

Mounting

Software programming

Logic controller type

Controllers without Ethernet port

Controllers with embedded Ethernet port

100-240 V ~ 24 V --- 100-240 V ~ 24 V --- 100-240 V ~ 24 V ---

16 logic I/O

9 sink/source 24 V --- inputs, inc. 4 high-speed inputs

7 relay outputs 7 source transistor outputs, inc. 2 high-speed outputs

With removable screw terminal block

2 x 0...10 V analog inputs (10 bits resolution)

On dedicated removable terminal block

- 7 Modicon TM3 expansion modules, along with limited number of outputs (Please refer to SoMachine programming software catalogue (n° DIA3ED2140110FR) on our website www.schneider-electric.com)
- 14 Modicon TM3 expansion modules with the use of bus expansion modules (transmitter and receiver), along with limited number of outputs (Please refer to SoMachine programming software catalogue (n° DIA3ED2140110FR) on our website www.schneider-electric.com)
- Possible use of Modicon TM2 expansion modules with restrictions.

1 Ethernet port on TM221CE●●● controllers: Modbus TCP communication (client & server), Modbus TCP slave, Dynamic DHCP client Configuration, Programming, downloading, monitoring

1 serial link port (RJ 45 connector) RS232/485 with + 5 V supply [One optional RS485 cartridge (terminal) available]

PID (13 Loops maximum)

Up to 4 high-speed counter inputs (HSC), 100 kHz frequency

- On TM221C●●T and TM221CE●●T controllers only:
 - pulse width modulation (PWM)
 - pulse generator (PLS)
 - 2 P/D pulse train outputs (PTO) with trapezoidal profile and S curve, 100 kHz frequency

3 controller sizes:

95 x 90 x 70 mm/ 3.74 x 3.54 x 2.75 in. 110 x 90 x 70 mm/ 4.33 x 3.54 x 2.75 in. 163 x 90 x 70 mm/ 6.41 x 3.54 x 2.75 in.

- 3 analog I/O expansion cartridges
- 1 additional serial link communication cartridge
- 3 application cartridges
 - for control of hoisting applications
 - for control of packaging applications
 - for control of conveying applications

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TMH2GDB remote graphic display: visualization and monitoring

Mounting on symmetrical rail or panel with specific mounting kit TMAM2

With SoMachine Basic software (Please refer to SoMachine programming software catalogue on our website www.schneider-electric.com)

Modicon M221

TM221C16R TM221C16T TM221C24R TM221C24T TM221C40R TM221C40T

TM221CE16R TM221CE16T TM221CE24R TM221CE24T TM221CE40R TM221CE40T

Control of simple machines



24 V ---

24 V ---

24 V ---

16 logic I/O

8 sink/source 24 V --- inputs, inc. 4 high-speed inputs

8 relay outputs

With removable screw terminal block or spring terminal block (1)

2 x 0...10 V analog inputs (10 bits resolution)

On dedicated removable terminal block

- 7 Modicon TM3 expansion modules, along with limited number of outputs (Please refer to SoMachine programming software catalogue (n° DIA3ED2140110FR) on our website www.schneider-electric.com)
- 14 Modicon TM3 expansion modules with the use of bus expansion modules (transmitter and receiver), along with limited number of outputs (Please refer to SoMachine programming software catalogue (n° DIA3ED2140110FR) on our website www.schneider-electric.com)
- Possible use of Modicon TM2 expansion modules with restrictions.

1 Ethernet port on TM221ME●●● controllers: Modbus TCP (client & server), Modbus TCP slave, dynamic DHCP client Configuration, Programming, downloading, monitoring

1 serial link port (RJ 45 connector) RS232/485 with + 5 V supply
1 additional serial link port on TM221M●●● controllers (RJ 45 connector) RS485

PID (13 Loops maximum)

Up to 4 high-speed counter inputs (HSC), 100 kHz frequency

- On TM221M16T/TG, TM221ME16T/TG, TM221M32TK and TM221ME32TK controllers only:
 - pulse width modulation (PWM)
 - pulse generator (PLS)
 - 2 P/D pulse train outputs (PTO) with trapezoidal profile and S curve, 100 kHz frequency

1 size only:

70 x 90 x 70 mm/ 2.75 x 3.54 x 2.75 in.

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TMH2GDB remote graphic display: visualization and monitoring

Mounting on symmetrical rail or panel with specific mounting kit TMAM2

With SoMachine Basic software (Please refer to SoMachine programming software catalogue on our website www.schneider-electric.com)

Modicon M221 Book

TM221M16R TM221M16RG (1)

TM221M16T TM221M16TG (1)

TM221M32TK

TM221ME16R TM221ME16RG (1)

TM221ME16T TM221ME16TG (1)

TM221ME32TK

(1) Spring terminal block on references ending in the letter G.

Applications	Control of simple motion Control of control loops		
			
Supply voltage	100-240 V ~		
Inputs/Outputs	24 logic inputs/outputs		
■ Logic inputs/outputs			
□ No. and type of inputs	14 sink/source 24 V ~ inputs, inc. 8 high-speed inputs	14 sink/source 24 V ~ inputs, inc. 8 high-speed inputs	14 sink/source 24 V ~ inputs, inc. 8 high-speed inputs
□ No. and type of outputs	10 outputs: with 4 source transistor high-speed outputs and 6 relay outputs	10 source transistor outputs, inc. 4 high-speed outputs	10 sink transistor outputs, inc. 4 high-speed outputs
Connection of logic inputs/outputs	With removable screw terminal block		
I/O extension	□ 7 Modicon TM3 expansion modules □ 14 Modicon TM3 expansion modules with the use of bus expansion modules (transmitter and receiver) □ Possible use of Modicon TM2 expansion modules with restrictions		
Embedded communication	1 Ethernet port on TM241CE24● and TM241CEC24● controllers: Modbus TCP (client & server), Modbus TCP slave, dynamic DHCP Client Configuration, Programming, download monitoring Updated firmware, data exchange - NGVL and IEC VAR ACCESS, WEB server, IP Ethernet adapter SNMP network management, MIB2, FTP file transfer		
Ethernet link			
CANopen	1 CANopen port on TM241CEC24● controllers (1 screw terminal block): 63 slaves, 252 TPDO/252 RPDO		
Serial link	2 serial link ports: □ 1 port SL1 (RJ 45), RS232/485 with +5 V supply □ 1 port SL2 (screw terminal) RS485		
Functions	PID		
Process control			
Counting	8 high-speed counter (HSC) inputs, 200 kHz frequency		
Position control	4 position control outputs: □ P/D, CW and CCW pulse train (PTO) with trapezoidal profile and S curve (▲), 100 kHz frequency □ pulse width modulation (PWM) □ frequency generator (FG)		
Format	24 I/O 150 X 90 X 95 mm/ 5.90 X 3.54 X 3.74 in		
Options	■ Cartridges		
	□ 3 I/O expansion cartridges: - with 2 voltage/current analog inputs - with 2 inputs for temperature probes - with 2 voltage/current analog outputs □ 2 application cartridges: - for control of hoisting applications - for control of packaging applications		
Number of cartridge slots	1		
■ Communication modules	□ 1 Ethernet port Modicon TM4 module with switch function and 4 integrated ports for TM241C24● □ 1 Modicon TM4 module for slave Profibus DP link		
Mounting	Mounting on 15 symmetrical rail or panel		
Software programming	With SoMachine software (please refer to our website www.schneider-electric.com)		
Controller type	with serial links	TM241C24R	TM241C24T
	with embedded Ethernet port and serial links	TM241CE24R	TM241CE24T
	with embedded Ethernet and CANopen ports, and serial links	TM241CEC24R	TM241CEC24T
			TM241C24U
			TM241CE24U
			TM241CEC24U

Control of simple motion Control of control loops	Control of modular machines on distributed architectures		
			
100-240 V ~	24 V ~		24 V ~
40 logic inputs/outputs			
24 sink/source 24 V ~ inputs, inc. 8 high-speed inputs	24 sink/source 24 V ~ inputs, inc. 8 high-speed inputs	24 sink/source 24 V ~ inputs, inc. 8 high-speed inputs	
16 outputs: with 4 source transistor high-speed outputs and 12 relay outputs	16 source transistor outputs, inc. 4 high-speed outputs	16 sink transistor outputs, inc. 4 high-speed outputs	
With removable screw terminal block			
□ 7 Modicon TM3 expansion modules □ 14 Modicon TM3 expansion modules with the use of bus expansion modules (transmitter and receiver) □ Possible use of Modicon TM2 expansion modules with restrictions	■ 7 Modicon TM3 expansion modules ■ 14 Modicon TM3 expansion modules with the use of bus expansion modules (transmitter and receiver) ■ Possible use of Modicon TM2 expansion modules with restrictions.		
1 Ethernet port on TM241CE40● and TM241CEC40● controllers: Modbus TCP (client & server), Modbus TCP slave, dynamic DHCP Client Configuration, Programming, download monitoring Updated firmware, data exchange - NGVL and IEC VAR ACCESS, WEB server, IP Ethernet adapter SNMP network management, MIB2, FTP file transfer	■ Ethernet 1: 2 ports connected by a switch, "Machine" or "Factory" network (2 RJ 45 connectors) ■ Ethernet 2: 1 "fieldbus" Ethernet port (1 RJ 45 connector)(TM251MESE) Modbus TCP (client & server), Modbus TCP slave, dynamic DHCP Client Configuration, Programming, download monitoring. Updated firmware, data exchange - NGVL and IEC VAR ACCESS, WEB server, IP Ethernet adapter SNMP network management, MIB2, FTP file transfer		
–	■ 1 master CANopen port (1 x 9-way SUB-D connector)(TM251MESC)		
2 serial link ports: □ 1 port SL1 (RJ 45), RS232/485 with +5 V supply □ 1 port SL2 (screw terminal) RS485	■ 1 serial link port (RJ 45), RS232/485 with +5 V supply		
PID			
8 high-speed counter (HSC) inputs, 200 kHz frequency			
4 position control outputs: □ P/D, CW and CCW pulse train (PTO) with trapezoidal profile and S curve (▲), 100 kHz frequency □ pulse width modulation (PWM) □ frequency generator (FG)			
40 I/O 190 X 90 X 95 mm/ 7.40 X 3.54 X 3.74 in	54 X 90 X 95 mm 2.13 X 3.54 X 3.74 in		
□ 3 I/O expansion cartridges: - with 2 voltage/current analog inputs - with 2 inputs for temperature probes - with 2 voltage/current analog outputs □ 2 application cartridges: - for control of hoisting applications - for control of packaging applications	■ 1 Ethernet port Modicon TM4 module with switch function and 4 integrated ports ■ 1 Modicon TM4 module for slave Profibus DP link		
2			
□ 1 Ethernet port Modicon TM4 module with switch function and 4 integrated ports for TM241C24● □ 1 Modicon TM4 module for slave Profibus DP link			
Mounting on 15 symmetrical rail or panel	Mounting on 15 symmetrical rail or panel		
With SoMachine software (please refer to our website www.schneider-electric.com)	With SoMachine software		
TM241C40R	TM241C40T	TM241C40U	TM251MESE
TM241CE40R	TM241CE40T	TM241CE40U	TM251MESC
–	–	–	

Expansion modules

Modicon TM3 digital I/O modules



References						
Modicon TM3 digital input modules						
Number of logic inputs	Input type		Term. block for input conn. (1) Thread (mm/in.)	References	Weight kg lb	
8 inputs	sink/source 24 V ∴		screw 5.08/0.2	TM3DI8	0.110 0.243	
			spring 5.08/0.2	TM3DI8G	0.095 0.209	
	120 V ∼		screw 5.08/0.2	TM3DI8A	0.110 0.243	
			spring 5.08/0.2			
16 inputs	sink/source 24 V ∴		screw 3.81/0.15	TM3DI16	0.105 0.231	
			spring 3.81/0.15	TM3DI16G	0.095 0.209	
		HE 10 connector	TM3DI16K	0.075 0.165		
		—	TM3DI32K	(2) 0.110 0.243		
32 inputs	sink/source 24 V ∴		HE 10 connector	TM3DI32K	(2) 0.110 0.243	
			—			
Modicon TM3 digital output modules						
Number of logic outputs	Output type	Output current	Term. block for output conn. (1) Thread (mm/in.)	References	Weight kg lb	
8 outputs	Relay	2 A	screw 5.08/0.2	TM3DQ8R	0.130 0.287	
			spring 5.08/0.2	TM3DQ8RG	0.115 0.254	
			screw 5.08/0.2	TM3DQ8T	0.110 0.243	
			spring 5.08/0.2	TM3DQ8TG	0.095 0.209	
	Transistor, source	0.5 A	screw 5.08/0.2	TM3DQ8U	0.110 0.243	
			spring 5.08/0.2	TM3DQ8UG	0.095 0.209	
			screw 5.08/0.2			
			spring 5.08/0.2			
	16 outputs	Relay	2 A	screw 3.81/0.15	TM3DQ16R	0.140 0.309
				spring 3.81/0.15	TM3DQ16RG	0.130 0.287
				screw 3.81/0.15	TM3DQ16T	0.105 0.231
				spring 3.81/0.15	TM3DQ16TG	0.095 0.209
Transistor, source		0.5 A	HE 10 connector	TM3DQ16TK	0.075 0.165	
			—	TM3DQ16TK	(2) 0.165	
			screw 3.81/0.15	TM3DQ16U	0.105 0.231	
			spring 3.81/0.15	TM3DQ16UG	0.095 0.209	
Transistor, sink		0.1 A	HE 10 connector	TM3DQ16TK	0.075 0.165	
			—	TM3DQ16TK	(2) 0.165	
			screw 3.81/0.15	TM3DQ16U	0.105 0.231	
			spring 3.81/0.15	TM3DQ16UG	0.095 0.209	
32 outputs	Transistor, source	0.1 A	HE 10 connector	TM3DQ32TK	0.115 0.254	
			—	TM3DQ32TK	(2) 0.254	
	Transistor, sink	0.1 A	HE 10 connector	TM3DQ32UK	0.115 0.254	
			—	TM3DQ32UK	(2) 0.254	
Modicon TM3 digital mixed I/O modules						
No. of logic I/O	Number and type of inputs	Number and type of outputs	Term. block for output conn. (1) Thread (mm/in.)	References	Weight kg lb	
8 inputs/outputs	4 sink/source 24 V ∴ inputs	4 relay outputs 2 A	screw 5.08/0.2	TM3DM8R	0.120 0.265	
			spring 5.08/0.2	TM3DM8RG	0.100 0.220	
24 inputs/outputs	16 sink/source 24 V ∴ inputs	8 relay outputs 2 A	screw 3.81/0.15	TM3DM24R	0.165 0.364	
			spring 3.81/0.15	TM3DM24RG	0.155 0.342	
Separate parts						
Designation	Description			Reference	Weight kg lb	
Mounting kit Sold in lots of 10	For plate or panel mounting of digital I/O modules			TMAM2	0.065 0.143	
Set of terminal blocks for connecting the I/O	4 x 10-way and 4 x 11-way removable terminal blocks with screw terminals for TM3DI16, TM3DQ16R, TM3DQ16T and TM3DQ16U modules			TMAT2MSET	0.127 0.280	
	4 x 10-way and 4 x 11-way removable terminal blocks with spring terminals for TM3DI16G, TM3DQ16RG, TM3DQ16TG and TM3DQ16UG modules			TMAT2MSETG	0.127 0.280	

(1) Removable screw or spring-type terminal blocks, supplied.

(2) Modules compatible with the Telefast Modicon ABE7 pre-wired system (on our website www.schneider-electric.com).

Expansion modules

Modicon TM3 analog I/O modules

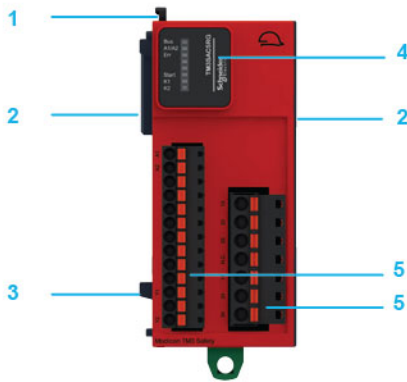


References						
Modicon TM3 analog I/O modules						
Number and type of channels	Input range	Output range	Resolution	Conn. block for the inputs ⁽¹⁾ Pitch (in.)	Reference	Weight kg lb
2 voltage/current inputs	- 10...+ 10 VDC, 0...+ 10 VDC/ 0...20 mA, 4...20 mA	—	16 bits or 15 bits + sign	Screw 5.08/0.2	TM3AI2H	0.115 0.254
				Spring 5.08/0.2	TM3AI2HG	0.100 0.220
4 voltage/current inputs	- 10...+ 10 VDC, 0...+ 10 VDC/ 0...20 mA, 4...20 mA	—	12 bits or 11 bits + sign	Screw 3.81/0.15	TM3AI4	0.110 0.243
				Spring 3.81/0.15	TM3AI4G	0.100 0.220
4 voltage/current or temperature inputs	□ Thermocouples (J, K, R, S, B, T, N, E, C) □ Temperature probes (RTDs) (Ni100, Ni1000, PT100, PT1000) □ - 10...+ 10 VDC, 0...+ 10 VDC/ /0...20 mA, 4...20 mA)	—	16 bits or 15 bits + sign	Screw 3.81/0.15	TM3TI4	0.110 0.243
				Spring 3.81/0.15	TM3TI4G	0.100 0.220
8 voltage/current inputs	- 10...+ 10 VDC, 0...+ 10 VDC/ 0...20 mA, 4...20 mA	—	12 bits or 11 bits + sign	Screw 3.81/0.15	TM3AI8	0.110 0.243
				Spring 3.81/0.15	TM3AI8G	0.100 0.220
8 temperature inputs	□ Thermocouples (J, K, R, S, B, T, N, E, C) □ NTC and PTC thermistors	—	16 bits or 15 bits + sign	Screw 3.81/0.15	TM3TI8T	0.110 0.243
				Spring 3.81/0.15	TM3TI8TG	0.100 0.220
Modicon TM3 analog output modules						
2 voltage/current outputs	—	- 10...+ 10 VDC, 0...+ 10 VDC/ 0...20 mA, 4...20 mA	12 bits or 11 bits + sign	Screw 5.08/0.2	TM3AQ2	0.115 0.254
				Spring 5.08/0.2	TM3AQ2G	0.100 0.220
4 voltage/current outputs	—	- 10...+ 10 VDC, 0...+ 10 VDC/ 0...20 mA, 4...20 mA	12 bits or 11 bits + sign	Screw 5.08/0.2	TM3AQ4	0.115 0.254
				Spring 5.08/0.2	TM3AQ4G	0.100 0.220
Modicon TM3 analog mixed I/O modules						
2 temperature or voltage/current inputs and 1 voltage/current output	□ Thermocouples (J, K, R, S, B, T, N, E, C) □ Temperature probes (RTDs) (Ni100, Ni1000, PT100, PT1000) □ - 10...+ 10 VDC, 0...+ 10 VDC/ /0...20 mA, 4...20 mA)	- 10...+ 10 VDC, 0...+ 10 VDC/ 0...20 mA, 4...20 mA	16 bits or 15 bits + sign (for I) 12 bits or 11 bits + sign (for O)	Screw 5.08/0.2	TM3TM3	0.115 0.254
				Spring 5.08/0.2	TM3TM3G	0.100 0.220
4 voltage/current inputs and 2 voltage/current outputs	- 10...+ 10 VDC, 0...+ 10 VDC/ 0...20 mA, 4...20 mA	- 10...+ 10 VDC, 0...+ 10 VDC/ 0...20 mA, 4...20 mA	12 bits or 11 bits + sign (for I and O)	Screw 3.81/0.15	TM3AM6	0.110 0.243
				Spring 3.81/0.15	TM3AM6G	0.100 0.220

References			
Modicon TM3 bus expansion system			
Designation	Characteristics	Reference	Weight kg lb
Transmitter module	Data transmission module Power supply: using the TM3 bus	TM3XTRA1	0.065 0.143
Receiver module	Data reception module Power supply: 24 V $\overline{\text{---}}$ (with external power supply)	TM3XREC1 (1)	0.075 0.165

Expansion modules

Modicon TM3 functional safety modules
(Powered by **Preventa** technology)



Description

Modicon TM3 functional safety modules

- 1 Adjacent module locking latch.
- 2 TM3 bus connectors (one on each side). These are designed to provide continuity of the link between connected modules.
- 3 Symmetrical rail locking clip.
- 4 Display block (6 LEDs – green, red) for the module channels and diagnostics.
- 5 Removable spring or screw-type terminal blocks (depending on the model) for connecting the safety channels and the power supply.

References

Designation	Maximum achievable safety level	Term. block for input conn. (1)	Reference	Weight kg lb
24 V power supply				
Functional Safety modules for control of ☐ emergency stops ☐ switches	PLd/Category 3 conforming to EN/ISO 13849-1 SILCL2 conforming to EN/IEC 61508 and EN/IEC 62061	screw	TM3SAC5R ▲	0.190 0.420
		spring	TM3SAC5RG ▲	0.190 0.420
Functional Safety modules for control of ☐ emergency stops ☐ switches	PLe/Category 4 conforming to EN/ISO 13849-1 SILCL3 conforming to EN/IEC 61508 and EN/IEC 62061	screw	TM3SAF5R ▲	0.190 0.420
		spring	TM3SAF5RG ▲	0.190 0.420
Functional Safety modules for control of ☐ emergency stops ☐ switches ☐ safety light curtains with solid-state outputs	PLd / Category 3 conforming to EN/ISO 13849-1 SILCL2 conforming to EN/IEC 61508 and EN/IEC 62061	screw	TM3SAFL5R ▲	0.190 0.420
		spring	TM3SAFL5RG ▲	0.190 0.420
Functional Safety modules for control of ☐ emergency stops ☐ switches ☐ safety light curtains with solid-state outputs ☐ pressure-sensitive mats or edges	PLe/Category 4 conforming to EN/ISO 13849-1 SILCL3 conforming to EN/IEC 61508 and EN/IEC 62061	screw	TM3SAK6R ▲	0.190 0.420
		spring	TM3SAK6RG ▲	0.190 0.420
Separate parts				
Designation	Description		Reference	Weight kg lb
Mounting kit Sold in lots of 10	For mounting Functional Safety modules on a plate or panel		TMAM2	0.065 0.143

(1) Removable terminal blocks equipped with screw terminals or spring terminals, supplied with the controller.

References

Modicon M221 logic controllers

Options, separate parts, software, cordsets



TMH2GDB



TCSXCNAMUM3P

References

Common options for Modicon M221 and M221 Book logic controllers

Common options for M221 and M221 Book logic controllers				
Description	Function	Reference	Weight kg/lb	
Graphic display unit	Display and modification of data	TMH2GDB ▲		
Replacement parts				
Description	Details	Unit reference	Weight kg/lb	
Set of terminal blocks for connecting the power supply on M221 and M221 Book logic controllers	8 removable screw terminal blocks	TMAT2PSET	0.127/ 0.280	
Set of terminal blocks for connecting the I/O on M221 controllers	Removable screw terminal connectors: 8 different connectors for equipping a TM221C●●●● logic controller (8 x I/O)	TMAT2CSET	0.127/ 0.280	
Set of terminal blocks for connecting the I/O on M221 Book controllers	4 x 10-way and 4 x 11-way removable terminal blocks with screw terminals	TMAT2MSET	0.127/ 0.280	
	4 x 10-way and 4 x 11-way removable terminal blocks with spring terminals	TMAT2MSETG	0.127/ 0.280	
Cordsets				
Description	For use	Length m/ft	Reference	Weight kg/lb
Programming cables	From the PC USB port to the USB mini-B port on M221 and M221 Book controllers	3/ 0.98	TCSXCNAMUM3P	0.065/ 0.143
		1.8/ 5.90	BMXXCAUSBH018	0.065/ 0.143
Cable for connecting the analog inputs embedded in M221 and M221 Book controllers	Equipped with 1 dedicated removable connector at one end and bare wires at the other end	1/ 3.28	TMACBL1	0.024/ 0.053