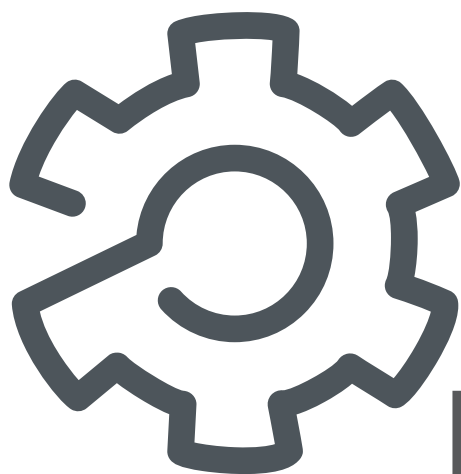


Machine  truxure™

Modbus for Machines

Catalog

February **2016**



MODBUS
MODBUS

Schneider
 Electric

General content

Modbus for Machines

Modbus Serial links

■ with Modicon M221 and M221 Book logic controllers

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Presentation

RS 232/RS 485 serial links offer a simple solution to the communication needs of compact machines.

Modbus and ASCII standard communication protocols are used to connect numerous equipment items such as: HMIs, printers, energy meters, variable speed drives, motor starters, remote I/O (RIO), etc. Thanks to the I/O Scanner function, this equipment is just as easy to integrate into the application as the local I/O.

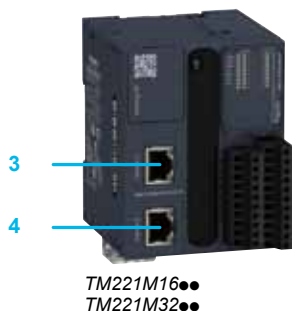
Description

■ Modicon M221 Book logic controllers with 16, 24 or 40 I/O have the following on the front panel:

- 1 A serial link port with an RJ 45 connector delivering a voltage of 5 V (200 mA) to supply an HMI or Bluetooth® adapter with power.
- 2 A slot for a 2nd serial link port (with connection on screw terminals) by inserting the **TMC2SL1** communication cartridge or the **TMC2CONV01** application cartridge (1).

■ Modicon M221 Book logic controllers with 16 or 32 I/O have the following on the front panel:

- 3 A serial link port with an RJ 45 connector delivering a voltage of 5 V (200 mA) to supply an HMI or Bluetooth® adapter with power
- 4 A 2nd serial port also equipped with an RJ 45 connector for **TM221M16●●** and **TM221M32●●** controllers (controllers without embedded Ethernet).

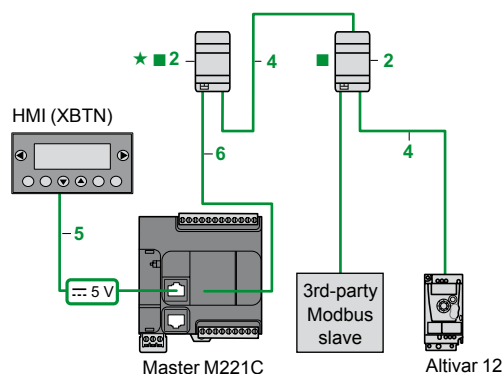


Controller Type	Embedded Ports		Optional Port (1 max. per controller)
	"Serial" or Serial 1" port, RJ 45 connector	"Serial 2" port, RJ 45 connector	
TM221C●●●●	RS 232/RS 485 with 5 V (200 mA) power supply for HMI or Bluetooth communication adapter (items 1/3)	—	On TMC2SL1 or TMC2CONV01 option cartridges, connection on screw terminals
TM221M●●●●	—	RS 485 (item 4)	RS 232/RS 485 (item 2)
TM221ME●●●●	—	—	—

(1) TM221C40●●●● controllers have 2 slots for a cartridge; only one cartridge, TMC2SL1 or TMC2CONV01, can be used per controller. The other slot remains available for an analog I/O cartridge or an application cartridge.

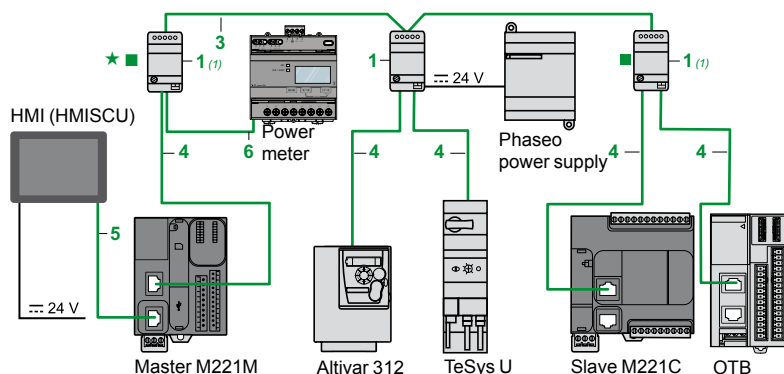
Modbus serial link wiring system

Non-isolated bus



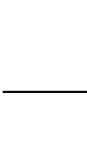
- Total length of cables between M221 and ATV 12: ≤ 30 m (98.425 ft)
- Length of cable 4: ≤ 10 m (32.808 ft)
★ Line polarization active. ■ Line termination

Isolated bus (recommended for bus > 10 m/32.808 ft)



- Total length of cables between isolation boxes 1: ≤ 1,000 m (3,280.840 ft)
- Length of drop cables 4 or 5: ≤ 10 m (32.808 ft)
★ Line polarization active. ■ Line termination
(1) Box powered by the logic controller.

References

Tap-off and adapter components for RS 485 serial link						
Designation	Description	Item	Length	Unit reference	Weight kg lb	
 TWDXCAISO	T-junction box with line isolation Screw terminal block for trunk cable 2 x RJ 45 for tap-off	☐ Isolation of the RS 485 link (1) ☐ Line termination (RC 120 Ω, 1 nF) ☐ Line pre-polarization (2 R 620 Ω) ☐ Power supply: 24 V $\pm$ (screw terminals) or 5 V $\pm$ (via RJ 45) ☐ Mounting on 35 mm (1.378 in.) $\perp$	1	—	TWDXCAISO	0.100 0.220
 TWDXCAT3RJ	T-junction box 1 RJ 45 for trunk cable 2 x RJ 45 for tap-off	☐ Line termination (RC 120 Ω, 1 nF) ☐ Line pre-polarization (2 R 620 Ω) ☐ Mounting on 35 mm (1.378 in.) $\perp$	2	—	TWDXCAT3RJ	0.080 0.176
 LU9GC3	Modbus splitter box Screw terminal block for trunk cable 10 x RJ 45 for tap-off	☐ Mounting on 35 mm $\perp$, on plate or panel	—	—	LU9GC3	0.500 1.102
 VW3A8306TF03	T-junctions 2 x RJ 45 for trunk cable	1 integrated cable with RJ 45 connector for tap-off dedicated to Altivar variable speed drive	—	0.3 m 0.984 ft	VW3A8306TF03	—
			—	1 m 3.281 ft	VW3A8306TF10	—
 TSXSACA50	Passive T-junction box	☐ 1-channel line extension and tap-off on screw terminals ☐ Line termination	—	—	TSXSACA50	0.520 1.146
 XGSZ24	RS 232C/RS 485 line converter	☐ Max. data rate 19.2 Kbps. No modem signals ☐ 24 V $\pm$ /20 mA power supply ☐ Mounting on 35 mm (1.378 in.) $\perp$	—	—	XGSZ24	0.100 0.220
Cables and cordsets for RS 485 serial link						
 TSXCSA100	RS 485 double shielded twisted pair trunk cables	Modbus serial link, supplied without connector	3	100 m 328.064 ft	TSXCSA100	5.680 12.522
				200 m 656.168 ft	TSXCSA200	10.920 24.074
				500 m 1,640.420 ft	TSXCSA500	30.000 66.139
 VW3A8306R03	Modbus RS 485 cordsets	2 x RJ 45 connectors	4	0.3 m 0.984 ft	VW3A8306R03	0.030 0.066
				1 m 3.281 ft	VW3A8306R10	0.050 0.110
				3 m 9.840 ft	VW3A8306R30	0.150 0.331
		1 x RJ 45 connector and 1 end with flying leads	6	1 m 3.281 ft	TWDXCAFJ010	0.060 0.132
				3 m 9.843 ft	VW3A8306D30	0.150 0.331
 XBTZ9980	Controller to Magelis HMI cordsets	2 x RJ 45 connectors Compatible with: ☐ Com Port 1 on XBTN200/N400/R400/RT500 (2) ☐ Com Port 1 on XBTRT511/HMISTO/STU/SCU ☐ Com Port 2 on XBTGT2●●0...7●●0 and HMIGTO	5	2.5 m 8.202 ft	XBTZ9980	0.230 0.507
		1 x RJ 45 connector and 1 x 25-way SUB-D connector Compatible with: ☐ Com Port 1 on XBTN410/N410 and XBTR410/R411	5	10 m 32.81 ft	XBTZ9982	—
			—	2.5 m 8.202 ft	XBTZ938	0.210 0.463
		1 x RJ 45 connector and 1 x 9-way SUB-D connector Compatible with: ☐ Com Port 1 on XBTGT2●●0...7●●0	—	2.5 m 8.202 ft	XBTZ9008	—
VW3A8306D30	TMC2SL1 cartridge to Magelis HMI cordsets	1 x RJ 45 connector and stripped wires Compatible with: ☐ Com Port 1 on XBTRT511/HMISTO/STU/SCU ☐ Com Port 2 on XBTGT2●●0...7●●0 and HMIGTO	—	3 m 9.843 ft	VW3A8306D30	0.150 0.331
VW3A8306RC	Line end adapter Sold in packs of 2	For RJ 45 connector R = 120 Ω, C = 1 nF	—	—	VW3A8306RC	0.200 0.441
Cordsets for RS 232 serial link						
TCSMCN3M4F3C2	Cordset for DTE terminal (printer) (3)	Serial link for DTE (2) 1 x RJ 45 connector and 1 x 9-way female SUB-D connector		3 m 9.843 ft	TCSMCN3M4F3C2	0.150 0.331
TCSMCN3M4M3S2	Cordset for DCE terminal (modem, converter)	Serial link for point to point device (DCE) 1 x RJ 45 connector and 1 x 9-way male SUB-D connector		3 m 9.843 ft	TCSMCN3M4M3S2	0.150 0.331

(1) Line isolation recommended for line distances > 10 m (32.808 ft).

(2) Can only be connected to the controller SL or SL1 ports in order to supply the Magelis terminal with power.

(3) If the terminal is equipped with a 25-way SUB-D connector, you will also need to order the 25-way female/9-way male SUB-D adapter TSXCTC07.

Modbus for Machines

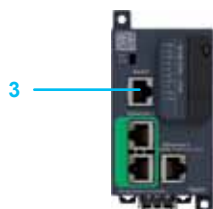
with Modicon M241 and Modicon M251 logic controllers

Presentation

RS 232/RS 485 serial links offer a simple solution to the communication needs of machines.

Modbus and ASCII standard communication protocols are used to connect numerous equipment items such as: HMIs, printers, energy meters, variable speed drives, motor starters, remote I/O (RIO), etc.

Description



Modicon **M241** logic controllers have the following on their upper surface:

- 1 A "Serial 1" serial link port with an RJ45 connector delivering a 5 V/200 mA power supply which allows the use of a Magelis HMI, the Bluetooth® communication adaptor or other devices.
- 2 A 2nd "Serial 2" serial link port (with connection on screw terminals).

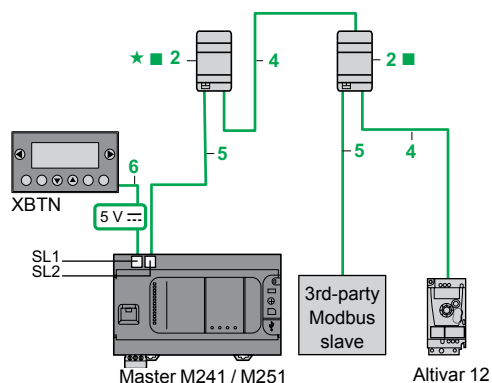
Controller Type	Embedded Ports	
	"Serial 1" port, RJ45 connector	"Serial 2" port, connection on screw terminals
TM241 ●●●●	RS 232/RS 485 with 5V (200 mA) power supply for HMI or Bluetooth communication adaptor (item 1)	RS 485 (item 2)

Modicon **M251** logic controllers have on their front a serial link port with an RJ45 connector delivering a 5 V/200 mA power supply which allows the use of a Magelis HMI, the Bluetooth® communication adaptor or other devices.

- 3 A serial link port (RJ 45 connector (RS 232 or RS 485)).

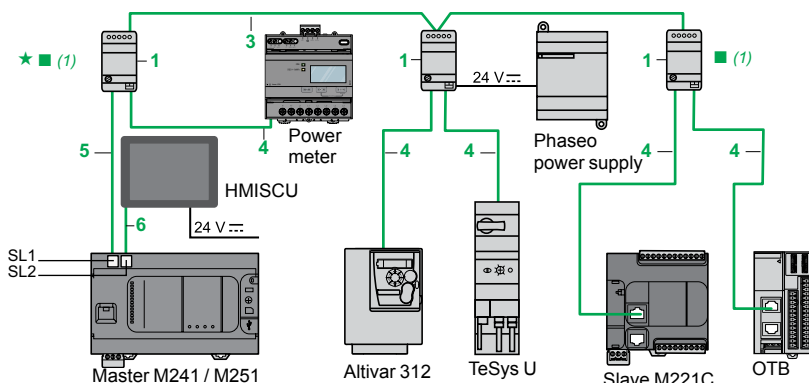
Modbus serial link wiring system

Non-isolated bus



- Total length of cables between M241/M251 and ATV12: ≤ 30 m (98.425 ft)
- Length of cable 4: ≤ 10 m (32.808 ft)
- ★ Line polarization active. ■ Line termination

Isolated bus (recommended for bus > 10 m (32.808 ft))



- Total length of cables between isolation boxes 1: ≤ 1000 m (3280.840 ft)
- Length of drop cables 4 or 5: ≤ 10 m (32.808 ft)
- ★ Line polarization active. ■ Line termination
- (1) Box powered by the logic controller.

References



TWDXCAISO TWDXCAT3RJ

Tap-off and adaptor components for RS 485 serial link

Designation	Description	Item	Length	Unit reference	Weight kg lb
T-junction and isolation box Screw terminals for trunk cable 2 x RJ45 for tap-off	☐ Isolation of the RS 485 link (1) ☐ Line termination (RC 120 Ω, 1nF) ☐ Line pre-polarization (2 R 620 Ω) ☐ 24 V power supply (screw terminals) or ☐ 5 V power supply (via RJ45) ☐ Mounting on 35 mm (1.378 in.)	1	—	TWDXCAISO	0.100 0.220
T-junction box 1 x RJ45 for trunk cable 2 x RJ45 for tap-off	☐ Line termination (RC 120 Ω, 1nF) ☐ Line pre-polarization (2 R 620 Ω) ☐ Mounting on 35 mm (1.378 in.)	2	—	TWDXCAT3RJ	0.080 0.176

(1) Line isolation recommended for line distances > 10 m (32.808 ft).

Modbus for Machines

with Modicon M241 and Modicon M251 logic controllers



LU9GC3



TSXSCA50



XGSZ24

References (continued)

Designation	Description	Item	Length	Reference	Weight kg lb
Tap-off and adaptor components for RS 485 serial link					
Modbus splitter box Screw terminals for trunk cable 10 x RJ45 for tap-off	☐ Mounting on 35 mm (1.378 in.) $\perp$, on plate or panel	—	—	LU9GC3	0.500 1.102
T-junctions 2 x RJ45 for trunk cable	1 integrated cable with RJ45 connector for tap-off dedicated to Altivar variable speed drive	—	0.3 m 0.984 ft 1 m 3.281 ft	VW3A8306TF03 VW3A8306TF10	— —
Passive T-junction box	☐ 1-channel line extension and tap-off on screw terminals ☐ Line termination	—	—	TSXSCA50	0.520 1.146
RS 232C/RS 485 line converter	☐ Max. data rate 19.2 Kbps, No modem signals ☐ 24 V $\pm$ /20 mA power supply ☐ Mounting on 35 mm (1.378 in.)	—	—	XGSZ24	0.100 0.220
Cables and cordsets for RS 232 serial link					
RS 485 double shielded twisted pair trunk cables	Modbus serial link, supplied without connector	3	100 m 328.084 ft	TSXCSA100	5.680 11.023
			200 m 656.168 ft	TSXCSA200	10.920 24.074
			500 m 1640.420 ft	TSXCSA500	30.000 66.139
Modbus RS 485 cordsets	2 x RJ45 connectors	4	0.3 m 0.984 ft 1 m 3.281 ft 3 m 9.843 ft	VW3A8306R03 VW3A8306R10 VW3A8306R30	0.030 0.066 0.050 0.110 0.150 0.331
			1 x RJ 45 connector and 1 end with flying leads	5	
			1 m 3.281 ft 3 m 9.843 ft	TWDXCAFJ010 VW3A8306D30	0.060 0.132 0.150 0.331
	2 x RJ45 connectors Compatible with: ☐ Com Port 1 on XBTN200/N400/R400/RT500 (1) ☐ Com Port 1 on XBTRT511 and HMISTO/STU/SCU ☐ Com Port 2 on XBTGT2...7...0 and HMIGTO	6	2.5 m 8.202 ft	XBTZ9980	0.230 0.507
			10 m 32.81 ft	XBTZ9982	—
		—	2.5 m 8.202 ft	XBTZ938	0.210 0.463
		—	2.5 m 8.202 ft	XBTZ9008	—
Cordsets: used from M241 (SL1), M251 controllers to Magelis HMI	1 x RJ45 connector and 1 x 25-way SUB-D connector Compatible with: ☐ Com Port 1 on XBTN410/N410 and XBTR410/R411	—	2.5 m 8.202 ft	XBTZ938	0.210 0.463
	1 x RJ45 connector and 1 x 9-way SUB-D connector Compatible with: ☐ Com Port 1 on XBTGT2...7...0	—	2.5 m 8.202 ft	XBTZ9008	—
Cordsets: used from M241 (SL2) controllers to Magelis HMI	1 x RJ45 connector and stripped wires Compatible with: ☐ Com Port 1 on XBTRT511 and HMISTO/STU/SCU ☐ Com Port 2 on XBTGT2...7...0 and HMIGTO	—	3 m 9.843 ft	VW3A8306D30	0.150 0.331
Line end adapter Sold in packs of 2	For RJ45 connector R = 120 Ω , C = 1 nf	—	—	VW3A8306RC	0.200 0.441
Cordsets for RS 232 serial link					
Cordset for DTE terminal (printer) (2)	Serial link for Data Terminal Equipment (DTE) 1 x RJ45 connector and 1 x 9-way female SUB-D connector	—	3 m 9.843 ft	TCSMCN3M4F3C2	0.150 0.331
Cordset for DCE terminal (modem, converter)	Serial link for point to point device (DCE) 1 x RJ45 connector and 1 x 9-way male SUB-D connector	—	3 m 9.843 ft	TCSMCN3M4M3S2	0.150 0.331

(1) If the terminal is equipped with a 25-way SUB-D connector, you will also need to order the **TSXCTC07** 25-way female / 9-way male SUB-D adaptor.

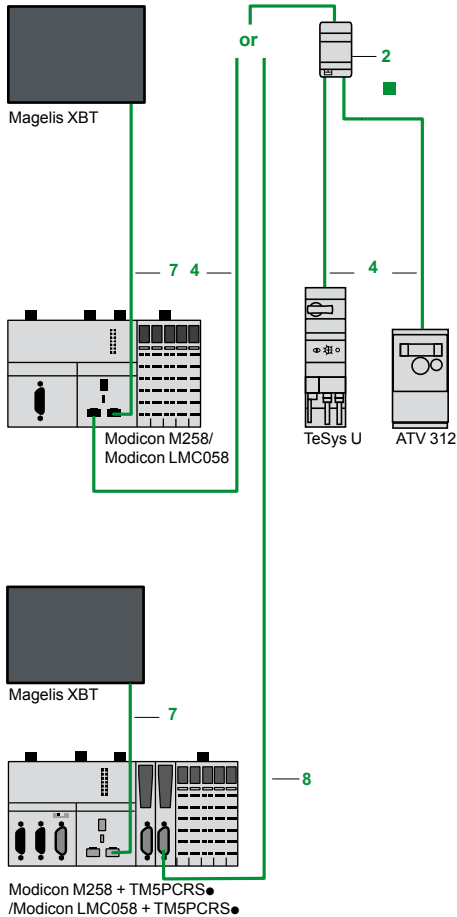
(2) Can only be connected to the controller SL or SL1 ports in order to supply the Magelis terminal with power.

Modbus for Machines

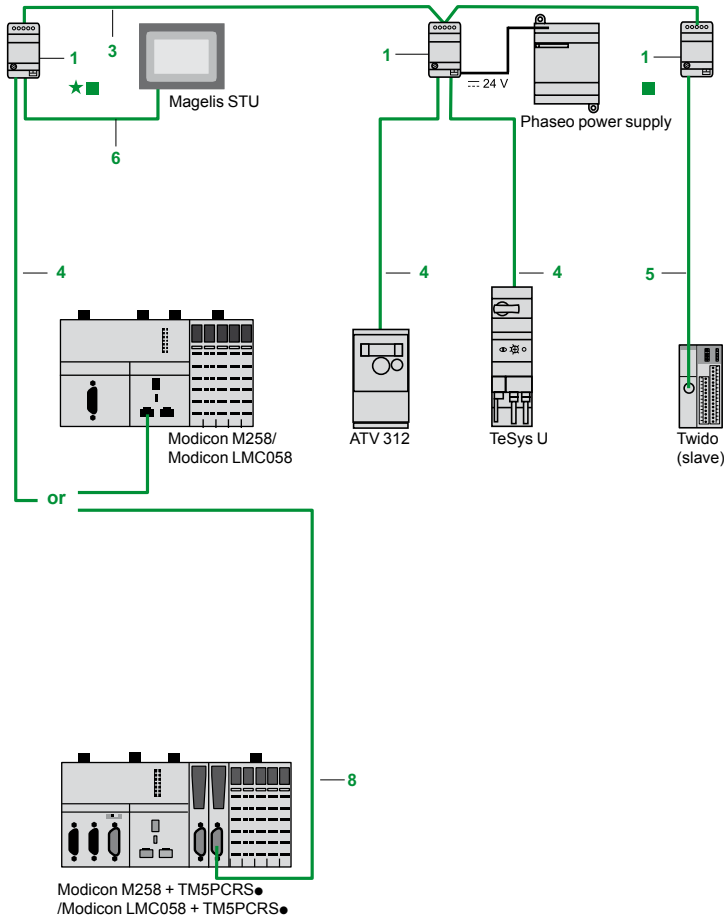
with Modicon M258 logic controller,
and Modicon LMC058 motion controller

Modbus cabling system

Non-isolated link
(Modicon M258, LMC058 master)



Isolated link
(Modicon M258, LMC058 master)



- Length of cables between Modicon M258 and Altivar:
≤ 30 m (98.43 ft) max.
★ Line polarization active
■ Line termination

- Total length of cables between isolation boxes 1: ≤ 1000 m (3281 ft)
- Length of tap cables 4, 5 or 6: ≤ 10 m (32.81 ft)

References

Extension and adaptation elements

Designation	Description	No.	Length m/ft.	Unit reference	Weight kg/lb
Isolation box Screw terminal block for trunk cable 2 x RJ45 connectors for tap-off	- Isolation of the RS485 link (1) - Line termination (RC 120 Ω, 1 nF) - Line pre-polarization (2 R 620 Ω), - Power supply 24 V [DC symbol] (screw terminal block) or 5 V [DC symbol] (via RJ45), - Mounting on 35 mm $\perp$ (1.378 in.)	—	—	TWDXCAISO	0.100 0.220
Junction box 1 RJ45 for trunk cable 2 x RJ45 for tap-off	- Line termination (RC 120 Ω, 1 nF) - Line pre-polarization (2 R 620 Ω), - Mounting on 35 mm $\perp$ (1.378 in.)	—	—	TWDXCAT3RJ	0.080 0.176
Modbus splitter box Screw terminal block for trunk cable 10 x RJ45 for tap-off	Mounting on 35 mm $\perp$ (1.378 in.) on plate or panel (2 x— Ø 4 mm screws)	—	—	LU9GC3	0.500 1.102
T-junction boxes 2 x RJ45 for trunk cable	1 integrated cable with RJ45 connector for tap-off dedicated to Altivar variable speed drive	—	0.3/ 0.984 1/ 3.281	VW3A8306TF03 VW3A8306TF10	— —
Passive T-junction box	- 1-channel line extension and tap-off on screw terminal block - Line termination	—	—	TSXSACA50	0.520 1.146

(1) Line isolation recommended for line distances > 10 m (32.81 ft).



Modbus for Machines

with Modicon M258 logic controller,
and Modicon LMC058 motion controller



XGS Z24

References					
Cables and cordsets for RS 485 serial link					
Designation	Description	No.	Length m / ft.	Unit reference	Weight kg/lb
RS 232C/RS 485 line converter	- Max. data rate 19.2 Kbps - No modem signals 24 V $\overline{\text{---}}$ /20 mA power supply, Mounting on 35 mm U_L	—	—	XGSZ24	0.100 0.220
RS 485 double shielded twisted pair trunk cables	Modbus serial link, supplied without connector	3	100/ 328.064	TSXCSA100	5.680 12.522
			200/ 656.168	TSXCSA200	10.920 24.074
			500/ 1640.420	TSXCSA500	30.000 66.139
Modbus RS 485 cordsets	2 x RJ45 connectors	4	0.3/ 0.984	VW3A8306R03	0.030 0.066
			1/ 3.281	VW3A8306R10	0.050 0.110
			3/ 9.840	VW3A8306R30	0.150 0.331
	1 x RJ45 connector and 1 end with flying leads	—	1/ 3.281	TWDXCAFJ010	0.060 0.132
			3/ 9.840	VW3A8306D30	0.150 0.331
	1 x mini-DIN connector for Twido controller and 1 x RJ45 connector	—	0.3/ 0.984	TWDXCARJ003	0.040 0.088
			1/ 3.281	TWDXCARJ010	0.090 0.198
			3/ 9.840	TWDXCARJ030	0.160 0.352
	1 x mini-DIN connector for Twido controller and 1 x RJ45 connector (1) (2)	5	0.3/ 0.984	TWDXCARJP03	0.027 0.059
	1 x mini-DIN connector for Twido controller and 1 x RJ45 connector Dedicated to Programming protocol (2) (3)	—	0.3/ 0.984	TWDXCARJP03P	0.027 0.059
	1 mini-DIN connector for Twido controller and 1 end with flying leads	—	1/ 3.281	TWDXCAFD010	0.062 0.137
			10/ 32.81	TSXCX100	0.517 1.14
Cordsets, from Modicon M258 (SL1, SL2) to Magelis display unit and terminal	2 x RJ45 connectors (XBT N200/R400, XBT RT500/511, XBTGT11●●/1335)	7	2.5/ 8.202	XBTZ9980	0.230 0.507
	1 x RJ45 connector and 1 x 25-way SUB-D connector (Small Panel XBTN401/410, XBTR410/411)	6, 7	2.5/ 8.202	XBTZ938	0.210 0.463
	1 x RJ45 connector and 1 x 9-way SUB-D connector (Advanced Panel XBTGT2●●0...7340 et XBTGK●●●0)	7	2.5/ 8.202	XBTZ9008	0.150 0.331
Cordset for Magelis Small Panel display unit and terminal	2 x RJ45 connectors (Small Panel XBTN200/R400, XBT RT500/511)	6	3/ 9.843	VW3A8306R30	0.150 0.331
Line terminator <i>Sold in lots of 2</i>	For RJ45 connector, R = 120 Ω , C = 1 nF—	—	—	VW3A8306RC	0.200 0.441
Cordsets for RS 232 serial link					
Designation	Description	No.	Length m / ft.	Reference	Weight kg/lb
Cordset for DTE terminal (printer) (4)	Serial link for DTE equipment (2) 1 x RJ45 connector and 1 x 9-way female SUB-D connector	8	3/ 9.843	TCSMCN3M4F3C2	0.150 0.331
Cordset for DCE terminal (modem, converter)	Serial link for DCE 1 x RJ45 connector and 1 x 9-way male SUB-D connector	8	3/ 9.843	TCSMCN3M4M3S2	0.150 0.331

(1) Forces configuration of the Twido controller built-in RS 485 port with the TwidoSuite programming protocol parameters.

(2) Carries the 5 V $\overline{\text{---}}$ voltage (supplied by the Twido controller built-in RS 485 port) required by the TWDXCAISO isolation box, thus avoiding the need for a 24 V $\overline{\text{---}}$ external power supply.

(3) Allows the Twido controller built-in RS 485 port to be used with the parameters described in the configuration.

(4) If the terminal is equipped with a 25-way SUB-D connector, you will also need to order the 25-way female/9-way male SUB-D adaptor TSXCTC07.

L		VW3A8306TF10	3
LU9GC3	3		5
	5		6
	6		
		X	
T		XBTZ938	3
TCSMCN3M4F3C2	3		5
	5		7
	7	XBTZ9008	3
TCSMCN3M4M3S2	3		5
	5		7
	7	XBTZ9980	3
TSXCSA100	3		5
	5		7
	7	XBTZ9982	3
TSXCSA200	3		5
	5	XGSZ24	3
	7		5
TSXCSA500	3		7
	5		
	7		
TSXCX100	7		
TSXSCA50	3		
	5		
	6		
TWDXCAFD010	7		
TWDXCAFJ010	3		
	5		
	7		
TWDXCAISO	3		
	4		
	6		
TWDXCARJ003	7		
TWDXCARJ010	7		
TWDXCARJ030	7		
TWDXCARJP03	7		
TWDXCARJP03P	7		
TWDXCAT3RJ	3		
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VW3A8306D30	3		
	5		
	7		
VW3A8306R03	3		
	5		
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VW3A8306R10	3		
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	7		
VW3A8306R30	3		
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VW3A8306RC	3		
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VW3A8306TF03	3		
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The Next Generation



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