Twido Programmable controller

Catalogue

2009

Schneider Electric

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Software

Advantys Telefast ABE 7 pre-wired I/O system

Technical information

Twido programmable controller
Compact, modular and Extreme base controllers

Applications		Compact base controllers IP 20			
					
Discrete I/O	Basic	10	16	24	40
	Number of inputs	6 sink/source ⎓ 24 V inputs *(1)*	9 sink/source ⎓ 24 V inputs *(1)*	14 sink/source ⎓ 24 V inputs *(1)*	24 sink/source ⎓ 24 V inputs *(1)*
	Number of outputs	4 relay outputs	7 relay outputs	10 relay outputs	14 relay outputs 2 source transistor outputs
	Type of connection	Non-removable screw terminal block			
Extension I/O	Number of extension modules			4 modules max. *(2)*	7 modules max. *(2)*
	Discrete I/O modules			15 types of module: input, output, mixed 8, 16, 24, 32 channels, connection by screw or spring terminals or by HE 10 connector	
	Analogue I/O modules			10 types of module: input, output, mixed 2, 4 or 8 channels, connection by screw terminals	
	Communication			CANopen bus master module, AS-Interface master module (2 max)	
Maximum number of I/O per configuration (base controller with I/O extension modules)		10	16	88/120/152 according to whether I/O extension has: screw terminals*(3)*/spring terminals/HE 10 connector	152/184/248 according to whether I/O extension has: screw terminals/spring terminals/ HE 10 connector
Integrated counting and positioning	Counting 5 kHz	3 x 16 bit counting channels *(5)*			4 x 16 bit counting channels *(4)*
	Counting 20 kHz	1 x 16 bit counting channel (on dedicated discrete inputs)	1 x 32 bit counting channel (on dedicated discrete inputs)		2 x 32 bit channels (on dedicated discrete inputs)
	7 kHz positioning				2 x PWM/PLS function channels
Functions	PID			Yes	
	Event processing			Yes	
Commu-nication	Integrated	1 RS 485 serial port	1 RS 485 serial port, 1 optional RS 232C/RS 485 serial port		Ethernet port (on TWD LC●E)
	Ethernet TCP/IP	TwidoPort interface module (via RS 485 serial port)			
	Extension			CANopen or AS-Interface see above	
Supply voltage		∿ 100...240 V for TWD LCA● (⎓ 24 V discrete sensors powered by the base controller), ⎓ 19.2…30 V for TWD LCD●			
Program-ming	Application memory	700 instructions	2000 instructions	3000 instructions	3000 instructions, 6000 with memory extension
	Internal bits	128 bits	128 bits	256 bits	
	Internal words *(5)*	3000			
	Standard function blocks *(5)*	64 timers, 128 counters		128 timers, 128 counters	
	Double words		Yes		
	Floating, Trigonometrical				Yes
	Real-time clock	Optional real time clock cartridge, using 16 real-time clock blocks			Integrated
Twido base controller models	Standard	**TWD LC●A 10DRF** *(6)*	**TWD LC●A 16DRF** *(6)*	**TWD LC●A 24DRF** *(6)*	**TWD LC●A 40DRF** *(6)*
	With integrated Ethernet port				**TWD LC●E 40DRF** *(6)*
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(1) Sink input: positive logic. Source input: negative logic.
(2) Within the consumption limit controlled by TwidoSuite software.
(3) With maximum of 42 relay outputs (on base controller and I/O extensions).

Modular base controllers IP 20			Extreme base controller IP 67
			
20		40	41
12 sink/source ⎓ 24 V inputs *(1)*		24 sink/source ⎓ 24 V inputs *(1)*	11 sink/source ⎓ 12/24 V source 2 inputs ⎓ 12/24 V sink
8 sink or source transistor outputs (depending on model)	6 relay outputs and 2 source transistor outputs	16 sink or source transistor outputs (depending on model)	2 source transistor outputs ⎓ 12/24 V 14 (⎓ 12 V) or 11 (⎓ 24 V) sink transistor outputs 1 PWM input + 3 PWM/PLS outputs
By HE 10 connector or Modicon Telefast ABE 7 pre-wired system (with base controller TWD LMDA 20DTK)	By removable screw terminal block	By HE 10 connector or Modicon Telefast ABE 7 pre-wired system (with base controller TWD LMDA 40DTK)	By 70-way connector
4 modules max. *(2)*	7 modules max. *(2)*		–
15 s of module: input, output, mixed 8, 16, 24, 32 channels, connection by screw or spring terminals or by HE 10 connector			–
10 types of module: input, output, mixed 2, 4 or 8 channels connection by screw terminals			Integrated: 8 inputs
CANopen bus master module, AS-Interface master module (2 max)			–
84/116/148 according to whether I/O extension has: screw terminals/spring terminals/ HE 10 connector	132/164/228 according to whether I/O extension has: screw terminals/spring terminals/ HE 10 connector	152/184/248 according to whether I/O extension has: screw terminals/spring terminals/ HE 10 connector	–
2 x 16 bit counting channels *(4)*			1 counting channel (10 kHz)
2 x 32 bit channels (on dedicated discrete inputs)			–
2 x PWM/PLS function channels			3 x PWM/PLS function channels
Yes			Yes
Yes			Yes
1 RS 485 serial port, 1 optional RS 232C/RS 485 serial port			1 RS 485 serial port
TwidoPort interface module (via RS 485 serial port)			2 integrated CANopen & CAN J1939 ports
CANopen or AS-Interface see above			Via Ethernet box **XGS Z33 ETH**
⎓ 19.2 V…30 V			⎓ 12 or 24 V (limited ⎓ 9…32 V)
3000 instructions	3000 instructions, 6000 with memory extension		3000 instructions
256 bits			
3000			
128 timers, 128 counters			
Yes			
	Yes		
Optional real time clock cartridge, using 16 real-time clock blocks			–
TWD LMDA 20D●K *(7)*	**TWD LMDA 20DRT**	**TWD LMDA 40D●K** *(7)*	**TWD LEDCK1**
21			32

(4) Dedicated ⎓ 24 V discrete inputs of the base controller and up/down counting with preset.
(5) The maximum values of the internal words and function blocks cannot be cumulated.
(6) Replace the ● in the reference with **A**: ∿ *supply,* **D:** ⎓ *supply.*
(7) Replace the ● in the reference with **T**: *source transistor outputs,* **U:** *sink transistor outputs.*

Twido programmable controller
Compact base controllers

564493-3-3

TWD LC●A 10DRF

564493-3-3

TWD LC●A 16DRF

564494-3-3

TWD LC●A 24DRF

121114-49-M

TWD LC●A/LC●E 40DRF

Presentation

The Twido range of compact programmable controllers offers an “all-in-one” solution in a compact overall size: 80 to 157 x 90 x 70 mm. Ten compact base controllers are available, differing in their processing capacity and in their number of ⎓ 24 V inputs and number of relay and transistor outputs (10, 16, 24 and 40 I/O).
These base controllers use:
□ an a.c. supply between ∿ 100 and 240 V (providing the ⎓ 24 V supply to the sensors),
□ or a d.c. supply between ⎓ 19.2 and 30 V (an external auxiliary supply must be provided for supply to the sensors).

This type of compact base controller offers the following advantages:
■ A significant number of I/O (up to 40 I/O) in a small overall size, so reducing the size of consoles or panels for applications where space is an important factor.

■ For 24 and 40 I/O models, a variety of extension options and product options offer the user a degree of flexibility which is generally only available with larger automation platforms:
□ with 24 I/O compact base controllers **TWD LC●A 24DRF**, up to 4 discrete and/or analogue I/O extension and/or communication modules.
□ with 40 I/O compact base controllers **TWD LC●● 40DRF**, up to 7 extension modules (discrete and/or analogue I/O and/or communication).

■ An optional modules, such as digital display, memory extension cartridge, real-time clock cartridge and additional RS 485 or RS 232C communication port.

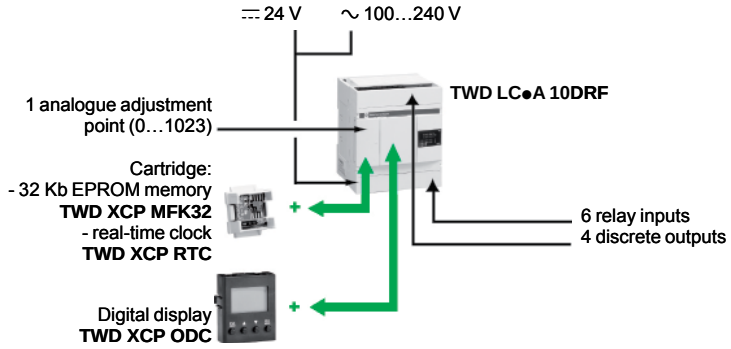
For further details, see page 7

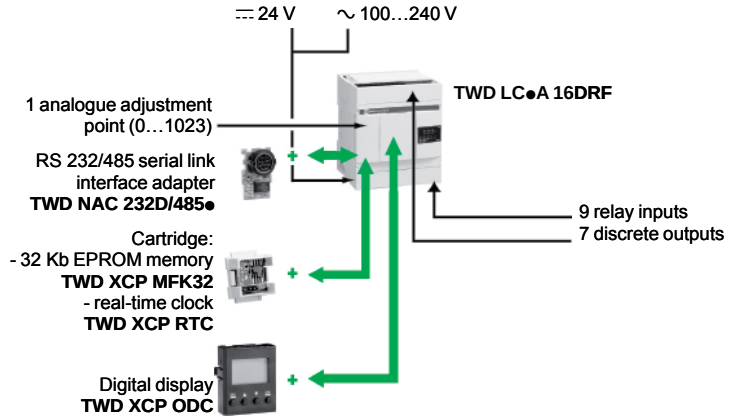
■ The compact controller solution also allows great wiring flexibility. For discrete I/O extension modules (with base controllers **TWD LC●A 24DRF** and **TWD LC●● 40DRF**) several possible types of connection are offered, such as removable screw terminal blocks and spring type connections which allow simple, fast and safe wiring. The Modicon Telefast ABE 7 pre-wired system allows the connection of modules with HE 10 connectors to:
□ pre-formed cables with free wires at one end for direct connection to sensors/preactuators,
□ the Modicon Telefast ABE 7 pre-wired system for Twido controller (connection cable and ABE 7 sub-base assembly).

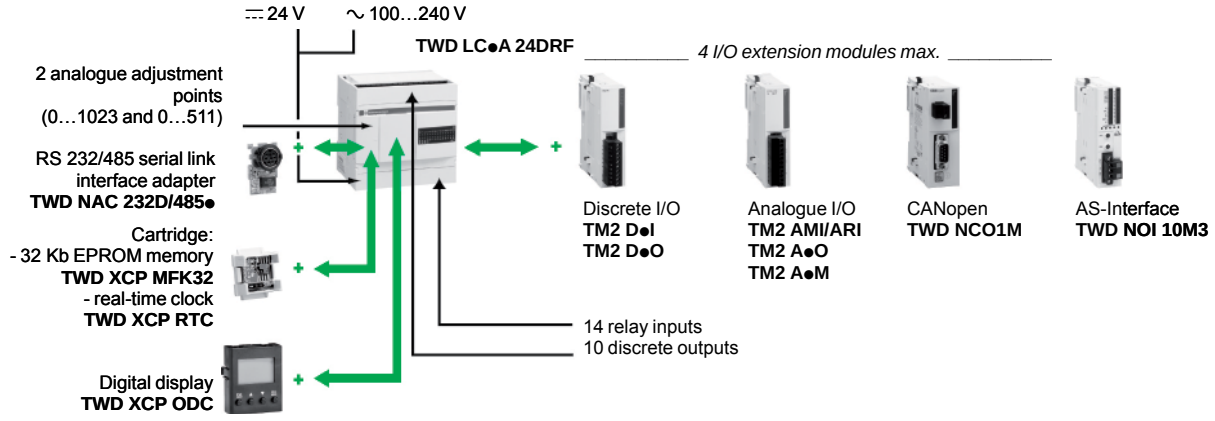
■ The display and plug-in memory options allow easy adjustment, transfer and backup of applications:
□ the digital display can be used as a local display and adjustment tool,
□ the EEPROM technology in the memory cartridges allows backup and transfer of programs to any Twido compact or modular controller.

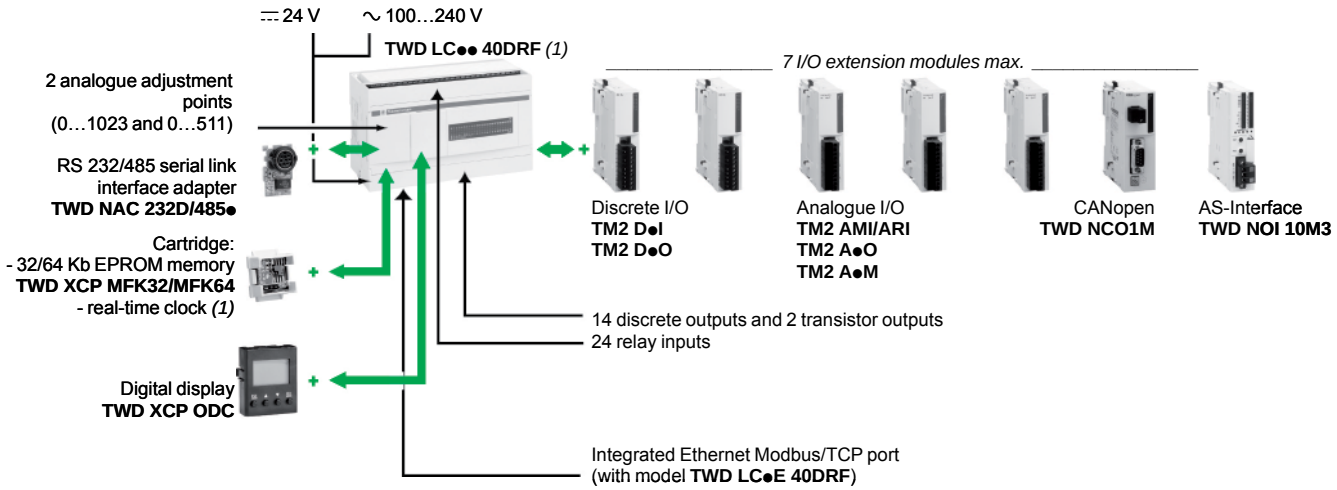
■ TwidoSuite software allows easy programming using instruction list language instructions or ladder language graphic objects.

Configuration of compact base controllers



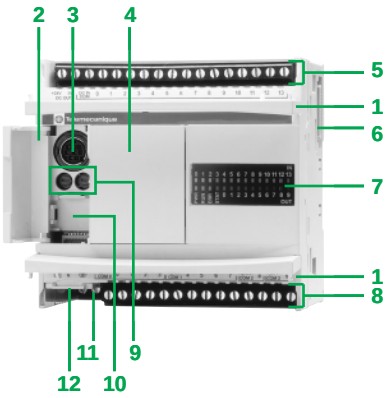






(1) Real-time clock function integrated base controllers **TWD LC•• 40DRF**.

Twido programmable controller
Compact base controllers



Description

Compact base controllers TWD LC●A ●●DRF (without integrated Ethernet port)

Twido **TWD LC●A ●●DRF** compact programmable base controllers comprise :

1 Two hinged connection terminal block covers for access to the terminals.

2 A hinged access door.

3 A mini-DIN type RS 485 serial port connector (allowing connection of the programming terminal).

4 A slot (protected by a removable cover) for digital diagnostic/maintenance display module **TWD XCP ODC**.

5 A screw terminal block for ⎓ 24 V supply to the sensors *(1)* and for connection of the input sensors.

6 A connector for I/O extension modules **TM2 D●●**, **TM2 A●●** and communication modules **TWD NOI 10M3/NCO1M** (maximum of 4 modules on 24 I/O base controllers and 7 modules on 40 I/O base controllers).

7 A display block showing:
- the status of the base controller by means of 3 pilot lights (PWR, RUN, ERR),
- the status of the inputs and outputs (IN● and OUT●),
- a user pilot light (STAT), to be controlled by the application programme according to user requirements.

8 A screw terminal block for connection of the output preactuators.

9 Two analogue adjustment points (one point for 10 and 16 I/O models).

10 An extension connector for the addition of a 2nd RS 232C/RS 485 serial port using adapter **TWD NAC ●●●** (for 16, 24 and 40 I/O models).

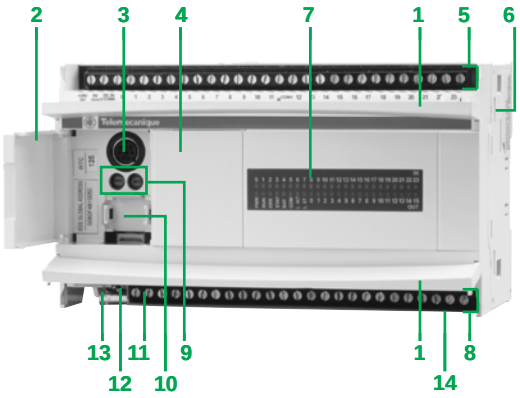
11 A screw terminal block for connection of the ∿ 100...240 V mains or ⎓ 19.2...30 V power supply.

With access through the bottom of the controller:

12 A connector for:
- 32 Kb memory cartridge **TWD XCP MFK32** or real-time clock cartridge **TWD XCP RTC** for base controllers **TWD LC●A** 10/16/24DRF,
- 64 Kb memory cartridge **TWD XCP MFK64** for base controllers **TWD LC●A 40DRF**.

Compact base controllers can be mounted as standard on a symmetrical ⊔ rail, mounting plate or panel (2 x 4.3 Ø holes).

(1) ⎓ 24 V sensor supply only with base controller **TWD LCAA ●●DRF** *(∿ 100…240 V mains supply)*



Description

Compact base controllers TWD LCAE / LCDE 40 DRF (with integrated Ethernet port)

Twido **TWD LCAE 40DRF** and **TWD LCDE 40DRF** compact programmable base controllers with integrated Ethernet Modbus/TCP port comprise:

1 Two hinged connection terminal block covers for access to the terminals **5**.

2 A hinged access door.

3 A mini-DIN type RS 485 serial port connector (allowing connection of the programming terminal).

4 A slot (protected by a removable cover) for digital diagnostic/maintenance display module **TWD XCP ODC**.

5 A screw terminal block for ⎓ 24 V *(1)* supply to the sensors and for connection of the input sensors.

6 A connector for I/O extension module **TM2 D●●**, **TM2 A●●** and communication module **TWD NOI10M3/NCO1M** (maximum 7 modules).

7 A display block showing:
- the status of the base controller by means of 7 pilot lights (PWR, RUN, ERR, BAT, COM, LACT and L ST),
- the status of the inputs and outputs (IN● and OUT●),
- a user pilot light (STAT), to be controlled by the application programme according to user requirements.

8 A screw terminal block for connection of the output preactuators.

9 Two analogue adjustment points.

10 An extension connector for the addition of a 2nd RS 232C/RS 485 serial port using adapter **TWD NAC ●●●**.

11 A screw terminal block for connection of the ∿ 100...240 V mains or ⎓ 19.2...30 V supply.

With access through the bottom of the controller:

12 A connector for 32/64 Kb memory card **TWD XCP MFK32/MFK64**.

13 An RJ45 connector (accessed through the bottom of the controller) for connection to the Ethernet Modbus/TCP network.

14 A slot to take the optional backup battery for the base controller's internal RAM.

Compact base controllers can be mounted as standard on a symmetrical ⊥ rail, mounting plate or panel (2 x 4.3 Ø holes).

(1) ⎓ 24 V sensor supply only with base controller **TWD LCAE 40DRF** *(model with ∿ 100…240 V mains supply)*

Twido programmable controller
Compact base controllers

Environment

Base controller type				TWD LC•A 10DRF	TWD LC•A 16DRF	TWD LC•A 24DRF	TWD LCA• 40DRF
Temperature	Operation		**°C**	0…+ 55			
	Storage		**°C**	- 25…+ 70			
Relative humidity				30 to 95 %, without condensation			
Degree of protection				IP 20			
Altitude	Operation		**m**	0…2000			
	Storage		**m**	0…3000			
Vibration resistance	Mounted on 15 mm ⊥ rail		**mm**	Amplitude 3.5 at 5…8.4 Hz			
			m/s²	Acceleration 9.8 (1 gn) at 8.4…150 Hz			
	Plate or panel mounted (using fixing kit TWD XMT5)		**mm**	Amplitude 1.6 at 2…25 Hz			
			m/s²	Acceleration 39.2 (4 gn) at 25…100 Hz			
Shock resistance			**m/s²**	147 (15 gn) for 11 ms			
Characteristics of compact base controllers							
Inputs/outputs	Number of inputs			6 ⎓ 24 V inputs	9 ⎓ 24 V inputs	14 ⎓ 24 V inputs	24 ⎓ 24 V inputs
	Number and type of outputs			4 relay	7 relay	10 relay	14 relay + 2 transistor
	Connection of I/O			Non-removable screw terminal block			
Voltages available supplied by the base *(1)*	⎓ 5 V for I/O extension modules		**mA**	–		450	450
	Max. ⎓ 5 V for relay			–		42 relay (base + extensions)	110 relay (base + extensions)
I/O extension modules	Max. number of modules			–		4	7
	Max. number of I/O	Screw terminal		–		88	152
		Spring terminal		–		120	208
		HE10 connector		–		152	248 *(2)*
	AS-Interface bus			–		Management of slave devices: 62 discrete devices, 7 analogue devices	
	CANopen bus			–		16 slave devices (max. 16 TPDO and 16 RPDO)	
Backup battery	Data backed up			Internal RAM: internal variables, internal bits and words, timers, counters, shift registers...			
	Type	Internal battery		Lithium battery, not interchangeable			
		Optional battery		–			TSX PLP 01 lithium thionyl chloride
	Autonomy	Internal battery	**day**	Approximately 30 at 25 °C with fully charged battery			
		Optional battery	**year**	–			3 *(3)*
	Charging time	Internal battery	**h**	Approximately 15 to charge from 0...90% of the full charge			
	Life	Internal battery	**year**	3 to 10 depends on temperature			
Application memory capacity				700 instructions	2000 instructions	3000 instructions	3000 and 6000 instructions with memory extension
Cycle time	Processing time		**ms**	1 for 1000 logic instructions			
	System overhead		**ms**	0.5			
Data memory	Internal bits			128		256	
	Internal words *(4)*			3000			
	Timers *(4)*			64		128	
	Counters *(4)*			128			
	Double words			–	Yes		
	Floating, trigonometrical			–			Yes

(1) In case of important configuration (I/O extensions or relay modules), it is necessary to create a power consumption table on the ⎓ 5 V voltage (max. 450 mA) and/or to verify the max. number of used relay (42 for 24 I/O base, 110 for 40 I/O base).
(2) With 6 extension modules (32 inputs) and one extension module (16 inputs or 16 outputs).
(3) 2 weeks from when the BAT light comes on.
(4) The maximum values cannot be cumulated.

Supply

⎓ compact base controller type				TWD LCDA 10DRF	TWD LCDA 16DRF	TWD LCDA 24DRF	TWD LCDA 40DRF TWD LCDE 40DRF
Voltage	Nominal		**V**	⎓ 24			
	Limit (including ripple)		**V**	⎓ 20.4...28.8			
⎓ 24 V output for sensors				–			
Max. inrush current at ⎓ 24 V			**A**	35		40	35
Duration of microbreaks			**ms**	10 max			
Recommanded protection by external fuse				1 A type T	1 A type T	1 A type T	2 A type T
Max. consumption			**W**	3.9	4.6	8.7	17.2
Dielectric strength	Between supply and earth terminals		**V rms**	500 for 1 min			
	Between I/O and earth terminals		**V rms**	1500 for 1 min			
Insulation resistance	Between supply and earth terminals		**MΩ**	> 10 (⎓ 500 V)			
	Between I/O and earth terminals		**MΩ**	> 10 (⎓ 500 V)			

∿ compact base controller type				TWD LCAA 10DRF	TWD LCAA 16DRF	TWD LCAA 24DRF	TWD LCAA 40DRF TWD LCAE 40DRF
Voltage	Nominal		**V**	∿ 100...240			
	Limit (including ripple)		**V**	∿ 85...264			
Frequencies	Nominal/limit		**Hz**	50-60/47-63			
⎓ **24 V output** for sensors			**mA**	250	250	250	400
Current	Nominal input I rms at ∿ 85 V		**A**	0.25	0.30	0.45	0.79
	Max. inrush		**A**	35	35	40	35
Duration of microbreaks			**ms**	10 max			
Recommanded protection by external fuse				1 A type T	1 A type T	1 A type T	2 A type T
Maximum consumption		at ∿ 100 V	**VA**	20	22	33	65
		at ∿ 264 V	**VA**	30	31	40	77
Dielectric strength	Between supply and earth terminals		**V rms**	1500 - 50/60 Hz for 1 min			
	Between I/O and earth terminals		**V rms**	1500 - 50/60 Hz for 1 min			
Insulation resistance	Between supply and earth terminals		**MΩ**	> 10 (⎓ 500 V)			
	Between I/O and earth terminals		**MΩ**	> 10 (⎓ 500 V)			

Communication

Base controller type			TWD	LC●A 10DRF	LC●A 16DRF	LC●A 24DRF	LC●A 40DRF	LC●E 40DRF
Integrated connections	Serial link	Type		1 x RS 485 serial link, not isolated, 38.4 Kbit/s				
		Protocol		- Half-duplex terminal port - Modbus master/slave RTU/ASCII or character mode - "Remote link" decentralised I/O (Twido base controllers used as I/O extension or as local "reflex" controller) see page 81				
		Connection		8-way mini-DIN connector				
	Ethernet Modbus/TCP	Type		–				10BASE-T/ 100BASE-TX
		Connection		–				RJ45 connect.
Connections via adapter or communication modules	Serial link	Type		–	One RS 232C or RS 485 adapter, 1.2…38.4 Kbit/s			
		Connection		–	Mini-DIN or terminal block (RS 485 only)			
	AS-Interface	Type		–		One or 2 master modules (standard and extended addressing), 62 slaves		
		Connection		–		Removable screw terminal block		
	CANopen	Type		–		One master module (class M10), 125...500 Kbit/s, 16 slaves max.		
		Connection		–		9-way SUB-D male connector		
	Ethernet Modbus/TCP	Type		One TwidoPort 10BASE-T/100BASE-TX interface module				
		Connection		RJ45 connector. Supply to the module via integrated RS 485 link connector				

Integrated functions

Counting	Number of channels			4 and 6 for TWD LCA● 40DRF
	Frequency			3 channels at 5 kHz (function FCi), 1 channel at 20 kHz (function VFCi) 4 channels at 5 kHz (function FCi), 2 channels at 20 kHz (function VFCi) for TWD LCA● 40DRF
	Capacity			16 bits FC (function FCi), 32 bits (function VFCi)
Positioning (for base controllers TWD LCA● 40DRF)	Number of channels			2
	Frequency		**kHz**	7
	Functions			PWM, pulse width modulation output; PLS, pulse generator output
PID	24 I/O and 40 I/O base controllers			Yes
Event processing	24 I/O and 40 I/O base controllers			Yes
Analogue adjustment points	10 I/O and 16 I/O base controllers			1 point adjustable from 0…1023 points
	24 I/O and 40 I/O base controllers			1 point adjustable from 0…1023 points + 1 point adjustable from 0…511 points

⎓ input characteristics

Base controller type			TWD LC•A 10DRF	TWD LC•A 16DRF	TWD LC•A 24DRF	TWD LC•A 40DRF	TWD LC•E 40DRF
Number of input channels			6	9	14	24	
Nominal input voltage		**V**	⎓ 24 sink/source (positive or negative logic)				
Commons			1			2	
Input voltage range		**V**	⎓ 20.4...28.8			⎓ 20.4...26.4	
Nominal input current			11 mA for I0.0 and I0.1, 7 mA for other inputs I0.i			11 mA for I0.0, I0.1, I0.6 and I0.7, 7 mA for I0.2 to I0.5 and I0.8 to I0.23	
Input impedance			2.1 kΩ for I0.0 and I0.1, 3.4 kΩ for other inputs I0.i			2.1 kΩ for I0.0, I0.1, I0.6 and I0.7, 3.4 kΩ for I0.2 to I0.5 and I0.8 to I0.23	
Filter time	At state 1		35 µs + programmed filter time for I0.0…I0.5, 40 µs + programmed filter time for other inputs I0.i				
	At state 0		45 µs + programmed filter time for I0.0…I0.5, 150 µs + programmed filter time for other inputs I0.i			40 µs + programmed filter time for I0.0…I0.5, 150 µs + programmed filter time for other inputs I0.i	
Isolation	Between channels		None				
	Between channels and internal logic	**V rms**	∼ 500 for 1 min				

Output characteristics

Number of output channels			4 relay	7 relay	10 relay	16 (14 relay + 2 transistor)	
Output currents	Nominal	**A**	2 per channel, 8 per common			2 (relay) 1 (transistor)	
	Surge per channel		5 max.			–	
Commons	Common 0		3 N/O contacts	4 N/O contacts	4 N/O contacts	–	
	Common 1		1 N/O contact	2 N/O contacts	4 N/O contacts	–	
	Common 2		–	1 N/O contact	1 N/O contact	4 N/O contacts	
	Common 3		–	–	1 N/O contact	4 N/O contacts	
	Common 4		–	–	–	4 N/O contacts	
	Common 5		–	–	–	1 N/O contact	
	Common 6		–	–	–	1 N/O contact	
Minimum switching load		**mA**	0.1 per ⎓ 0.1 V (reference value)				
Contact resistance	When new	**mΩ**	30 max				
Loads on relay outputs	Resistive (e.g.: heating element)	**A**	2 at ∼ 240 V or 2 at ⎓ 30 V (with 1800 operations/hour max.): - minimum electrical life: 1 x 10^5 operations - minimum mechanical life: 20 x 10^6 operations				
	inductive with protection device *(1)* (e.g.: relay, solenoid valve)						
	Inductive without protection device		Use of relay outputs not guaranteed (reduction of life). For this type of application, **it is advisable to use the transistor outputs** of compact base controllers TWD LC•• 40DRF or of extension modules TM2 DDO ●●●●				
	Capacitive (e.g.: TeSys U starters, Festo solenoid valves)						
Insulation voltage	Between channels and internal logic	**V rms**	∼ 500 for 1 min				
Consumption for all the outputs	At state 0 ⎓ 5 V	**mA**	5	5	5	70	170
	At state 0 ⎓ 24 V	**mA**	–	–	–	5	5
	At state 1 ⎓ 5 V	**mA**	24	30	36	90	190
	At state 1 ⎓ 24 V	**mA**	26	40	55	128	128
	At state 1 + inputs ON ⎓ 5 V	**mA**	–	–	–	140	240
	At state 1 + inputs ON ⎓ 24 V	**mA**	–	–	–	128	128

Real-time clock cartridge (optional) *(2) (3)*

Precision	**s/mth.**	+ 30 at 25 °C
Autonomy	**days**	approximately 30 at 25 °C with fully charged battery
Backup battery		See page 10

Memory cartridge (optional) *(2)*

Cartridge type		TWD XCP MFK32	TWD XCP MFK64
Memory type		EEPROM	
Memory capacity	**Kb**	32	64
Save/transfer program and internal words		Yes	
Program size increase		No	6000 instructions with compact base controllers TWD LC•• 40DRF

(1) Inductive load fitted with a protection device such as an RC peak limiter or flywheel diode.
(2) Compact base controllers **TWD LC•A 10DRF/16DRF/24DRF** *have only one cartridge slot, therefore only one type of cartridge (real-time clock or memory) can be used.*
(3) Integrated real-time clock function for compact base controllers **TWD LC•• 40DRF**.

Twido programmable controller
Compact base controllers

TWD LC●A 10DRF/16DRF

References

Number of I/O	Inputs sink/source	Outputs	No. of I/O extension modules	No. of program memory instructions	Integrated Ethernet port	Reference	Weight kg
Compact base controllers, ∼ supply							
10 I/O	6 ⎓ 24 V inputs	4 relay outputs	–	700	–	**TWD LCAA 10DRF**	0.230
16 I/O	9 ⎓ 24 V inputs	7 relay outputs	–	2000	–	**TWD LCAA 16DRF**	0.250
24 I/O	14 ⎓ 24 V inputs	10 relay outputs	4	3000	–	**TWD LCAA 24DRF**	0.305
40 I/O	24 ⎓ 24 V inputs	14 relay outputs and 2 transistor outputs	7	3000 *(1)*	–	**TWD LCAA 40DRF**	0.525
					Yes	**TWD LCAE 40DRF**	0.525
Compact base controllers, ⎓ supply							
10 I/O	6 ⎓ 24 V inputs	4 relay outputs	–	700	–	**TWD LCDA 10DRF**	0.230
16 I/O	9 ⎓ 24 V inputs	7 relay outputs	–	2000	–	**TWD LCDA 16DRF**	0.250
24 I/O	14 ⎓ 24 V inputs	10 relay outputs	4	3000	–	**TWD LCDA 24DRF**	0.305
40 I/O	24 ⎓ 24 V inputs	14 relay outputs and 2 transistor outputs	7	3000 *(1)*	–	**TWD LCDA 40DRF**	0.525
					Yes	**TWD LCDE 40DRF**	0.525

TWD XCP MFK32/MFK64

TWD XCP RTC

TWD NAC ●●●●

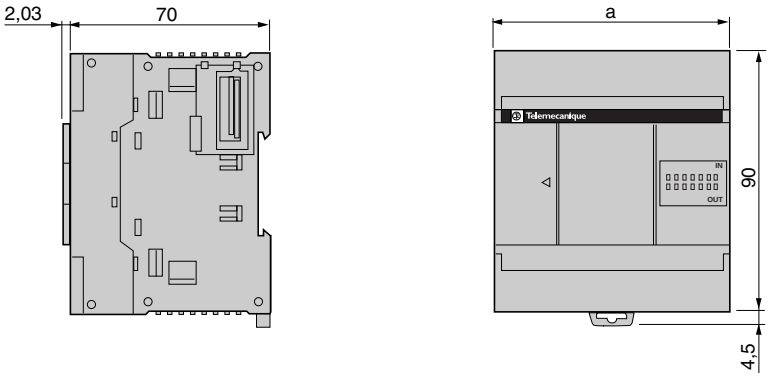
TWD XCP ODC

Description		Application	Type	Reference	Weight kg
Separate components					
Cartridges	32 Kb memory	For all compact base controllers: - Application backup - Program transfer	EEPROM	**TWD XCP MFK32**	0.005
	64 Kb memory	For compact base controllers TWD LC●● 40DRF: - Memory extension - Application backup - Program transfer	EEPROM	**TWD XCP MFK64**	0.005
	Real-time clock	For base controllers TWD LC●A 10/16/24DRF Date-stamping RTC based programming	–	**TWD XCP RTC**	0.005
Serial interface adapters		Mini-DIN connector	RS 232C	**TWD NAC 232D**	0.010
			RS 485	**TWD NAC 485D**	0.010
		Screw terminals	RS 485	**TWD NAC 485T**	0.010
Digital display		Data display and modification	–	**TWD XCP ODC**	0.020
Input simulators		6 inputs	–	**TWD XSM 6**	–
		9 inputs	–	**TWD XSM 9**	–
		14 inputs	–	**TWD XSM 14**	–
Optional backup batteries		For compact base controllers TWD LC●● 40DRF	Sold individually	**TSX PLP 01**	–
			Sold in lots of 10	**TSX PLP 101**	–

(1) 6000 instructions with memory extension cartridge **TWD XCP MFK64**.

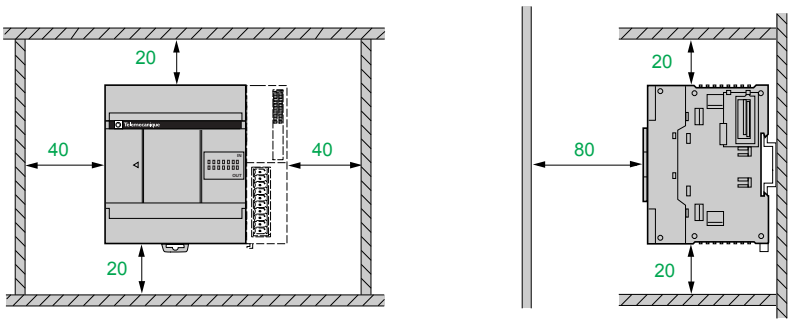
Dimensions

TWD LC●A 10DRF/16DRF/24DRF and TWD LCA● 40DRF



	a
TWD LC●A 10DRF	80
TWD LC●A 16DRF	80
TWD LC●A 24DRF	95
TWD LC●A 40DRF	157
TWD LC●E 40DRF	157

Installation rules



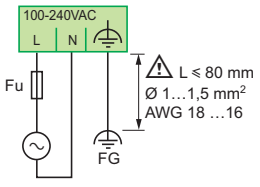
Important:
- Vertical mounting: not permissible for temperatures ≥ 40° C;
- "Upside down" flat mounting: not permissible.
- Avoid placing devices which generate heat (transformers, power supplies, power contactors...) beneath the controller.

Connections

Connection of power supplies

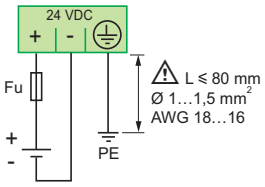
TWD LCA● ●●DRF

~ 100…240 V supply



TWD LCA● ●●DRF

⎓ 24 V supply



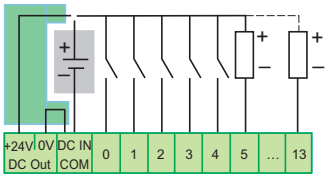
Fu : *Type T fuse, see page 11*

Connections (continued)

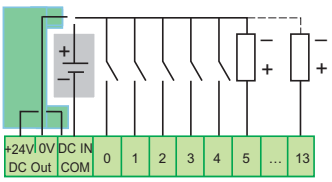
Connection of ⎓ 24 V inputs

TWD LC•A 10DRF/16DRF/24DRF

Connection to sink inputs (positive logic)

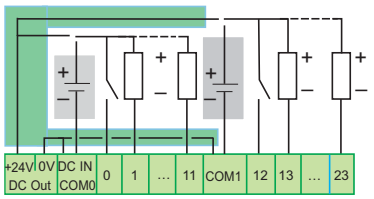


Connection to source inputs (negative logic)

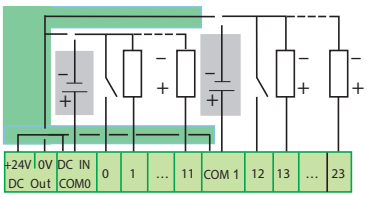


TWD LC•A 40DRF

Connection to sink inputs (positive logic)

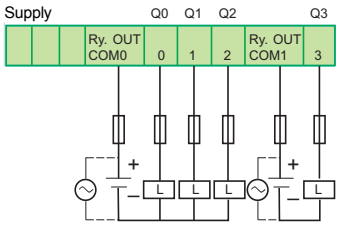


Connection to source inputs (negative logic)

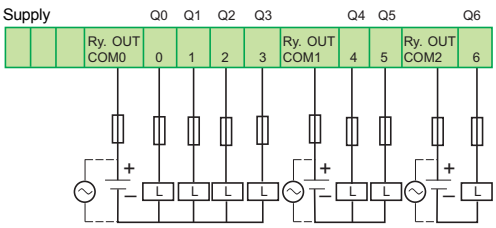


Connection of outputs

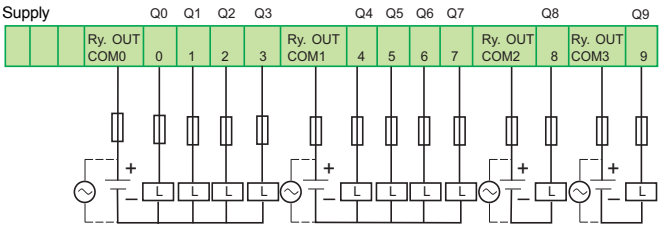
TWD LC•A 10DRF



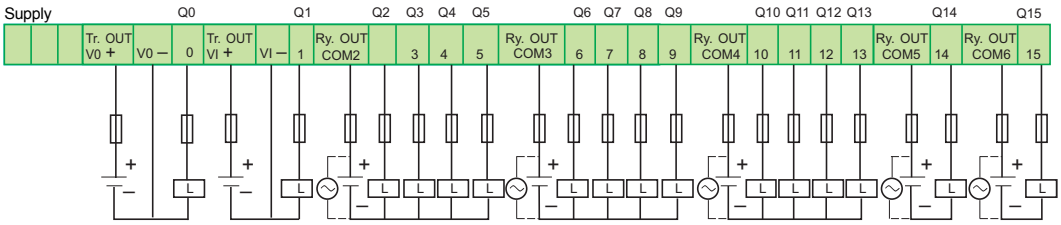
TWD LC•A 16DRF



TWD LC•A 24DRF



TWD LC•A 40DRF/TWD LC•E 40DRF



Sensors powered via ⎓ 24 V internal supply provided by base controllers **TWD LCA• ••DRF** *(supplied with ∿ 100…240V): max. 250 mA (except 400 mA with 40 I/O base controller).*

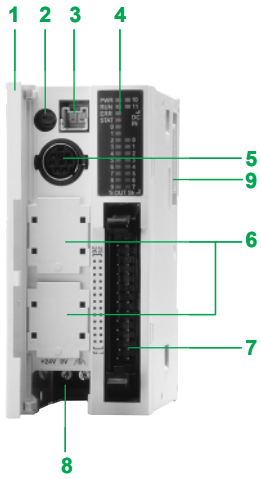
Sensors powered by external ⎓ 24 V supply.

Twido programmable controller
Modular base controllers

TWD LMDA 20DTK/20DUK

TWD LMDA 20DRT

TWD LMDA 40DTK/40DUK



Presentation

The modular programmable controller range includes ve base controllers, which differ in their processing capacity and their number and type of I/O (20 or 40 I/O with connection by screw terminal block or HE 10 connector, with relay or sink/source transistor outputs). They can be tted with any of the I/O extension modules in the range (27 discrete and analogue modules). All these modular base controllers use a ⎓ 24 V power supply.

These modular base controllers offer:
■ A modular design to adapt to the needs of the application by using a base controller which can be tted with up to 4 or 7 discrete or analogue I/O extension modules (depending on the model).
■ A variety of options which offer the user a degree of exibility which is generally only available with larger automation platforms. **TWD LMDA** modular base controllers can be tted simultaneously with an optional memory cartridge module, a real-time clock cartridge module and a digital display module or serial interface module; both of the latter two modules allow the addition of a second RS 485 or RS 232C communication port.
■ The modular controller solution also allows great wiring exibility. Several types of connection are offered, such as removable screw terminal blocks, spring type connections or HE 10 connectors which allow simple, fast and safe wiring. The Advantys Telefast ABE 7 system provides a pre-wired cabling solution, allowing connection of modules with HE 10 connectors to:
□ pre-formed cables with free wires at one end for direct connection to sensors/preactuators,

TwidoSuite software allows easy programming using instruction list language instructions or ladder language graphic objects.

Description

Twido **TWD LMDA ●0 D●●** modular programmable base controllers comprise:

On the front panel:
1 A hinged access door.
2 An analogue adjustment point.
3 A connector for connection of the integrated analogue input.
4 A display block showing:
- the status of the base controller by means of 7 pilot lights (PWR, RUN, STP, NCF, HLT and NEX)
- the status of the inputs and outputs (IN● and OUT●).

5 A mini-DIN type RS 485 serial port connector (allowing connection of the programming terminal).
6 Two slots (protected by a removable cover) for memory cartridge **TWD XCP MFK32/MFK64** and real-time clock cartridge **TWD XCP RTC**.
7 One (or more) HE 10 connector(s) (26-way) or screw terminal block (with module **TWD LMDA 20DRT**) for connection of the input sensors/output preactuators.
8 Screw terminals for connection of the ⎓ 24 V mains power supply.

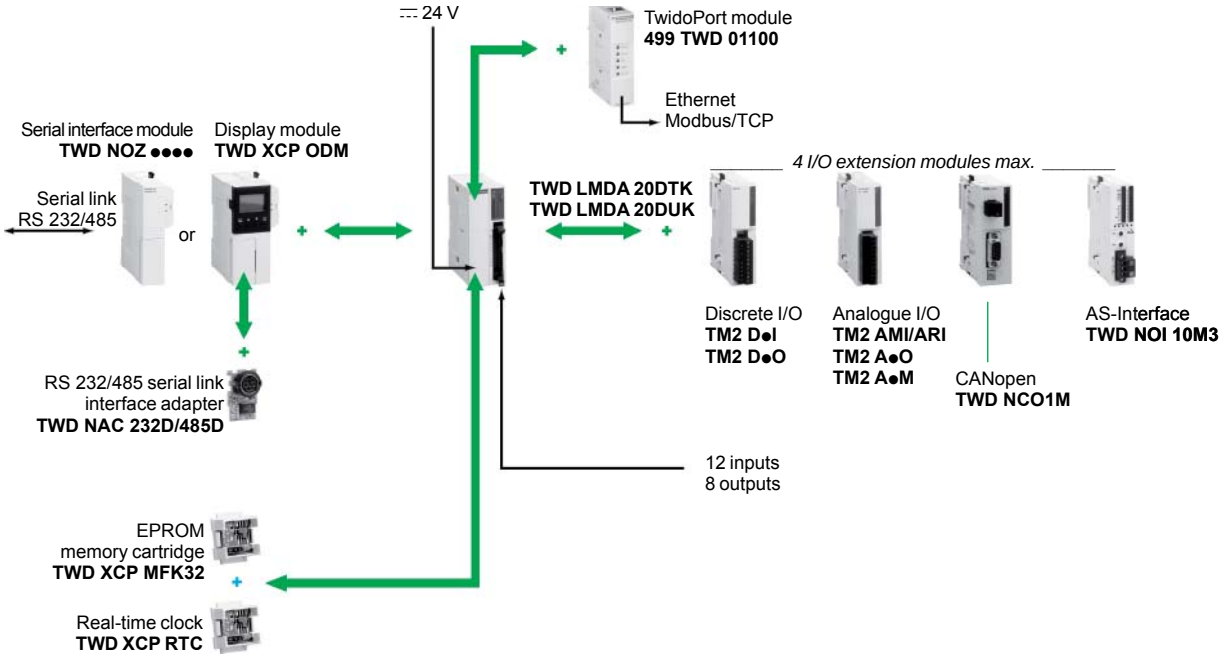
On the right-hand side panel:
9 A connector for I/O extension modules **TM2 D●●**, **TM2 A●●** and communication modules **TWD NOI 10M3/NCO1M** (4 or 7 depending on the model).

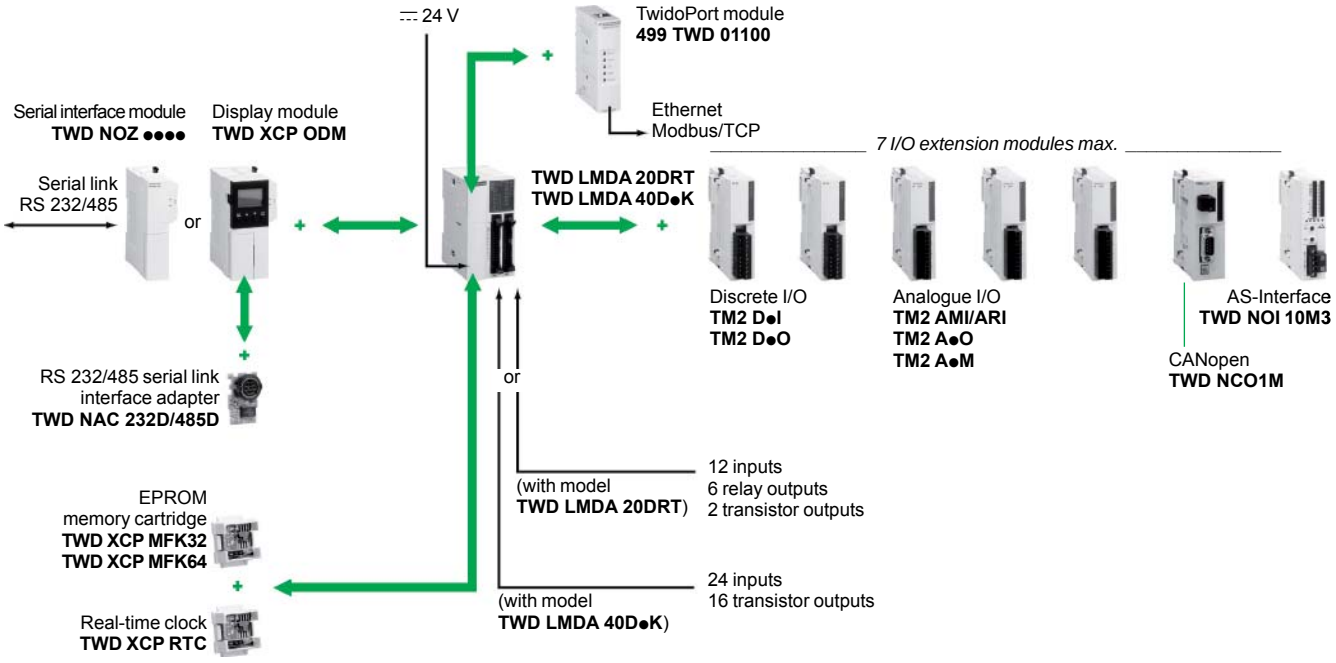
On the left-hand side panel:
A connector (not visible) for display module **TWD XCP ODM** or serial interface module **TWD NOZ ●●●●**.

Modular base controllers are mounted on a symmetrical ⊔ rail. Fixing kit **TWD XMT5** (sold in lots of 5) allows plate or panel mounting.

Description (continued)

Configuration of modular base controllers





Twido programmable controller
Modular base controllers

Environment

Base controller type		TWD		LMDA 20DTK	LMDA 20DUK	LMDA 20DRT	LMDA 40DTK	LMDA 40DUK
Temperature	Operation		**°C**	0…+ 55				
	Storage		**°C**	- 25…+ 70				
Relative humidity				30 to 95 %, without condensation				
Degree of protection				IP 20				
Altitude	Operation		**m**	0…2000				
	Storage		**m**	0…3000				
Vibration resistance	Mounted on 15 mm ⊥⌐ rail		**mm**	Amplitude 3.5 at 5…8.4 Hz				
			m/s²	Acceleration 9.8 (1 gn) at 8.4…150 Hz				
	Plate or panel mounted (using xing kit TWD XMT5)		**mm**	Amplitude 1.6 at 2…25 Hz				
			m/s²	Acceleration 39.2 (4 gn) at 25…100 Hz				
Shock resistance			**m/s²**	147 (15 gn) for 11 ms				

General characteristics of modular base controllers

Inputs/outputs	Number of ⎓ 24 V inputs			12			24	
Outputs	Number and type of outputs *(1)*			8 source transistor	8 sink transistor	6 relay and 2 source transistor	16 source transistor	16 sink transistor
	Connection of I/O			HE 10 connector		Removable screw terminal block	HE 10 connector	
Voltage available supplied by the base *(2)*	⎓ 5 V for I/O extension modules		**mA**	450				
	Max. ⎓ 5 V for relay			64 relay (extensions)		102 relay (base + extensions)	96 relay (extensions)	
I/O extension modules	Max. number of modules			4		7		
	Max. number of I/O (base included)	Screw terminal		84		132	152	
		Spring terminal		116		164 *(3)*	184 *(3)*	
		HE10 connect.		148		228 *(4)*	248 *(4)*	
	AS-Interface			Management of slave modules: 62 discrete slaves , 7 analogue slaves				
	CAnopen bus			16 slave devices (max. 16 TPDO and 16 RPDO)				
Backup battery	Data backed up			Internal RAM: internal variables, internal bits and words, timers, counters, shift registers...				
	Battery type			Lithium battery, not interchangeable				
	Autonomy		**days**	Approximately 30 at 25 °C with fully charged battery				
	Charging time		**h**	Approximately 15 to charge from 0...90% of the full charge				
	Life		**years**	3…10 depends on temperature				
Application memory capacity				3000 instructions		3000 instructions, 6000 with memory cartridge TWD XCP MFK64		
Cycle time	Processing time		**ms**	1 for 1000 logic instructions				
	System overhead		**ms**	0.5				
Data memory	Internal bits			256				
	Internal words *(5)*			3000				
	Timers *(5)*			128				
	Counters *(5)*			128				
	Double words			Yes				
	Floating, trigonometrical			–		Yes		

(1) Source output: positive logic, sink output: negative logic.
(2) In case of important configuration (I/O extensions or relay modules), it is necessary to create a power consumption table on the ⎓ 5 V voltage (max. 450 mA) and/or to verify the max. number of used relay.
(3) With 6 extension modules 24 I/O with spring terminal.
(4) With 6 extension modules 32 I and 1 extension module 16 I or 16 O.
(5) The maximum values cannot be cumulated.

Supply

Base controller type				TWD LMDA 20DTK TWD LMDA 20DUK	TWD LMDA 20DRT	TWD LMDA 40DTK TWD LMDA 40DUK
Voltage	Rated		**V**	⎓ 24		
	Limit (including ripple)		**V**	⎓ 20.4...26.4		
⎓ 24 V output for sensors				–		
Power at ∿ 26.4 V			**W**	15 (base + 4 extension modules)	19 (base + 7 extension modules)	
Maximum inrush current at ⎓ 24 V			**A**	50		
Duration of microbreaks			**ms**	10 max		
Recommanded protection by external fuse				2 A type T		
Dielectric strength	Between supply and earth terminals		**V rms**	500 for 1 mn		
	Between I/O and earth terminals		**V rms**	1500 for 1 mn		
Insulation resistance	Between supply and earth terminals		**MΩ**	> 10 (⎓ 500 V)		
	Between I/O and earth terminals		**MΩ**	> 10 (⎓ 500 V)		

Communication

Base controller type				TWD LMDA 20DTK TWD LMDA 20DUK	TWD LMDA 20DRT	TWD LMDA 40DTK TWD LMDA 40DUK
Integrated connection	Serial link	Type		1 x RS 485 serial link, not isolated, 38,4 Kbit/s		
		Protocol		-Half-duplex terminal port -Modbus master/slave RTU/ASCII or character mode -"Remote link" decentralised I/O (Twido base controllers used as I/O extension or as local "re ex" controller) see page 81		
		Connection		8-way mini-DIN connector		
Connections via adapter or communication modules	Serial link	Type		One RS 232C or RS 485 adapter, 1.2…38.4 Kbit/s *(1)*		
		Connection		Mini-DIN or terminal block (RS 485 only)		
	AS-Interface	Type		One or 2 master modules (standard and extended addressing), 62 slaves		
		Connection		Removable screw terminal block		
	CANopen	Type		One master module (class M10), 125...500 Kbit/s, 16 slaves max.		
		Connection		9-way SUB-D male connector		
	Ethernet Modbus/TCP	Type		One TwidoPort 10BASE-T/100BASE-TX interface module (class A10)		
		Connection		RJ45 connector. Supply to the module via integrated RS 485 link connector		

Integrated functions

Counting	Number of channels		4
	Frequency		2 channels at 5 kHz (function FCi), 2 channels at 20 kHz (function VFCi)
	Capacity		16 bits (function FCi), 32 bits (function VFCi)
Positioning	Number of channels		2
	Frequency	**kHz**	7
	Functions		PWM, pulse width modulation output; PLS, pulse generator output
Analogue input	Number of channels		1 channel
	Range		0…10 V
	Resolution		9 bits (0…511 points)
	Input impedance	**kΩ**	100
PID			Yes
Event processing			Yes
Analogue adjustment points			1 point adjustable from 0…1023 points

(1) Adapter included in serial interface module **TWD NOZ ●●●●**, *or adapter* **TWD NAC ●●●●** *to be fitted into integrated display module* **TWD XCP ODM**.

⎓ input characteristics

Base controller type		TWD		LMDA 20DTK	LMDA 20DUK	LMDA 20DRT	LMDA 40DTK	LMDA 40DUK
Number of input channels				12			24	
Rated input voltage			**V**	⎓ 24 sink/source (positive or negative logic)				
Commons				1			2	
Input voltage range			**V**	⎓ 20.4...26.4				
Rated input current			**mA**	4.5 for I0.0 and I0.1, I0.6 and I0.7, 7 for other inputs I0.i				
Input impedance			**kΩ**	5.3 for I0.0 and I0.1, I0.6 and I0.7, 4,7 for other inputs I0.i				
Filter time	At state 1		**µs**	35 for I0.0 and I0.1, I0.6 and I0.7, 40 for other inputs I0.i				
	At state 0		**µs**	45 for I0.0 and I0.1, I0.6 and I0.7, 150 for other inputs I0.i				
Isolation	Between channels			None				
	Between channels and internal logic		**V rms**	∿ 500 for 1 min				

Transistor output characteristics

Number of output channels				8		2	16	
Output logic *(1)*				Source	Sink	Source		Sink
Commons				1			2	
Nominal output values	Voltage		**V**	24				
	Current		**A**	0.3				
Output voltage range	Voltage		**V**	20.4…28.8				
	Current per channel		**A**	0.36				
	Current per common		**A**	1				
Response time	At state 1		**µs**	5 for Q 0.0 and Q0.1, 300 for other outputs Q 0.i				
	At state 0		**µs**	5 for Q 0.0 and Q0.1, 300 for other ouputs Q 0.i				
Residual voltage	At state 1		**V**	1 max				
Maximum inrush current			**A**	1				
Leakage current			**mA**	0.1				
Overvoltage protection			**V**	39				
Maximum power of filament lamp			**W**	8				
Isolation	Between channels			None				
	Between channels and internal logic		**V rms**	∿ 500 for 1 min				

Characteristics of relay outputs for base controller TWD LMDA 20DRT

Number of output channels				6
Output currents	Normal		**A**	2 per channel, 8 per common
	Surge per channel		**A**	5 max.
Commons	Common 1			3 N/O contacts
	Common 2			2 N/O contacts
	Common 3			1 N/O contact
Minimum switching load			**mA**	0.1 per ⎓ 0.1 V (reference value)
Contact resistance	When new		**mΩ**	40 max
Loads on relay output	Resistive (e.g.: heating element)		**A**	2 at ∿ 240 V or 2 at ⎓ 30 V (with1800 operations/hour max.): - minimum electrical life: 1 x 10^5 operations - minimum mechanical life: 20 x 10^6 operations
	Inductive with protection device *(2)* (e.g.: relay, solenoid valve)			
	Inductive without protection device			Use of relay outputs not guaranteed (reduction of life). For this type of application, **it is advisable to use the transistor outputs** of modular base controllers TWD LMDA 20/40DTK/20/40DUK or of extension modules TM2 DDO ●●●●
	Capacitive (e.g..: TeSys U starters, Festo solenoid valves)			
Insulation voltage	Between channels & int. logic		**V rms**	∿ 500 for 1 min
Consumption for all the outputs	At state 1	⎓ 5 V	**mA**	30
		⎓ 24 V	**mA**	40
	At state 0	⎓ 5 V	**mA**	5

Real-time clock cartridge (optional)

Precision	**s/mth.**	+ 30 at 25 °C
Autonomy	**days**	approximately 30 at 25 °C with fully charged battery
Backup battery		See page 18

Memory cartridge (optional)

Cartridge type		TWD XCP MFK32	TWD XCP MFK64
Memory type		EEPROM	
Memory capacity	**Kb**	32	64
Save/transfer program and internal words		All modular base controllers	Base controllers TWD LMDA 20DRT/40D●K
Program size increase		–	6000 instructions with base controllers TWD LMDA 20DRT/40D●K

(1) Source output: positive logic, sink output: negative logic.
(2) Inductive load fitted with a protection device such as an RC peak limiter or flywheel diode.

Twido programmable controller
Modular base controllers


TWD LMDA 20DTK/20DUK


TWD LMDA 40DTK/40DUK

References

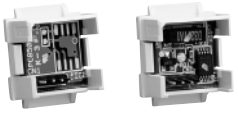
Modular base controllers, 20 I/O

Sink/source inputs	Outputs	No. of I/O extension modules	No. of program memory instructions	Reference	Weight kg
12 ⎓ 24 V inputs	8 source transistor outputs	4	3000	**TWD LMDA 20DTK** *(2)*	0.140
	8 sink transistor outputs	4	3000	**TWD LMDA 20DUK** *(2)*	0.140
	6 relay outputs 2 source transistor outputs	7	3000 *(1)*	**TWD LMDA 20DRT**	0.185


TWD LMDA 20DRT

Modular base controllers, 40 I/O

24 ⎓ 24 V inputs	16 source transistor outputs	7	3000 *(1)*	**TWD LMDA 40DTK** *(2)*	0.180
	16 sink transistor outputs	7	3000 *(1)*	**TWD LMDA 40DUK** *(2)*	0.180


TWD XCP MFK ●●

Separate components

Description		Applications	Type	Reference	Weight kg
Cartridges	32 Kb memory	For modular base controllers TWD LMDA 20/40D●●: - Application backup - Program transfer	EEPROM	**TWD XCP MFK32**	0.005
	64 Kb memory	For modular base controllers TWD LMDA 20DRT/40D●K: - Memory extension - Application backup - Program transfer	EEPROM	**TWD XCP MFK64**	0.005
	Real-time clock	For modular base controllers TWD LMDA 20/40D●●: Date-stamping RTC based programming	–	**TWD XCP RTC**	0.005
Integrated display module		For modular base controllers TWD LMDA 20/40D●● Mounted on left-hand side of base controller. Enables adjustment and diagnostics of the controller. Can take a serial adapter TWD NAC ●●●●	–	**TWD XCP ODM**	0.105
Fixing kit Sold in lots of 5		For plate or panel mounting of modular base controllers or extensions	–	**TWD XMT5**	–
Serial interface adapters		Integrated display module TWD XCP ODM	Mini-DIN type connector RS 232C	**TWD NAC 232D**	0.010
			RS 485	**TWD NAC 485D**	0.010
			Screw terminals RS 485	**TWD NAC 485T**	0.010
Modules with integrated serial link adapter		Modular base controllers TWD LMDA 20/40D●●	Mini-DIN type connector RS 232C	**TWD NOZ 232D**	0.085
			RS 485	**TWD NOZ 485D**	0.085
			Screw terminals RS 485	**TWD NOZ 485T**	0.085

TWD XCP RTC


TWD XCP ODM


TWD NAC 232D/485D


TWD NAC 485T

Spare parts

Screw terminal blocks Sold in lots of 2	Base controller TWD LMDA 20DRT, 13 contacts	–	**TWD FTB 2T13**	–
	Base controller TWD LMDA 20DRT, 16 contacts	–	**TWD FTB 2T16**	–
Analogue input cable	For integrated analogue input. Length 1 m	–	**TWD XCA 2A10M**	–
Pre-formed cables	Base controller TWD LMDA ●0DTK Base controller TWD LMDA ●0DUK	–	See page 102	–

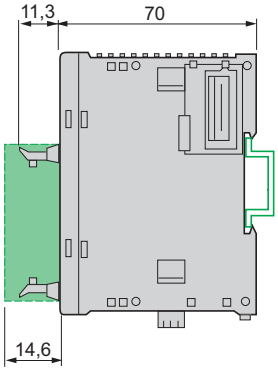

TWD NOZ ●●●

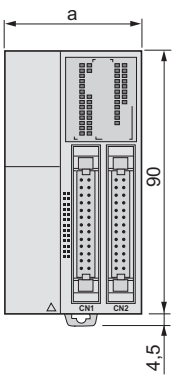
(1) 6000 instructions with memory extension cartridge **TWD XCP MFK64***.*
(2) Connection by HE10 connector, allowing use of the Modicon Telefast ABE 7 pre-wired system (see page 102).

Twido programmable controller
Modular base controllers

Dimensions

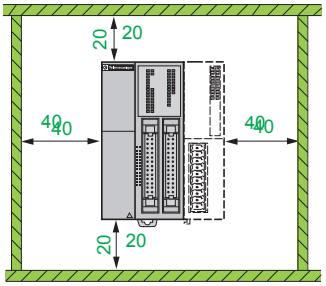
TWD LMDA 20D●K/20DRT/40D●K

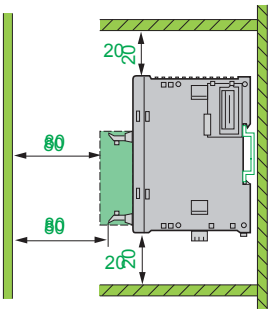




TWD	a
LMDA 20DTK/DUK	35.4
LMDA 20DRT	47.5
LMDA 40DTK/DUK	47.5

Installation rules

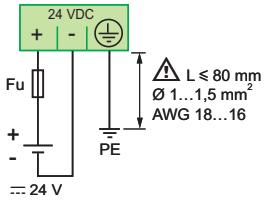




Important:
- Horizontal or at mounting: not permissible.
- Avoid placing devices which generate heat (transformers, power supplies, power contactors...) beneath the controller.

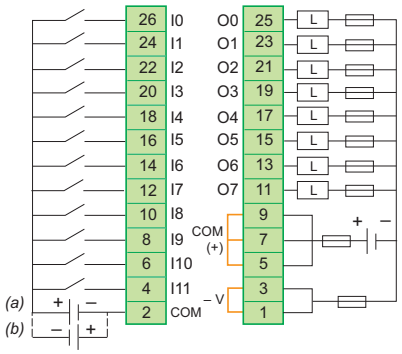
Connections

Power supply for modular base controllers TWD LMDA 20/40D●●

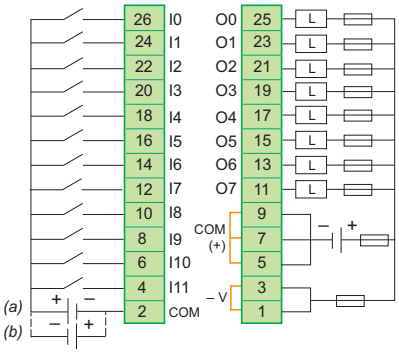


Fu: *Type T fuse, see page 11*

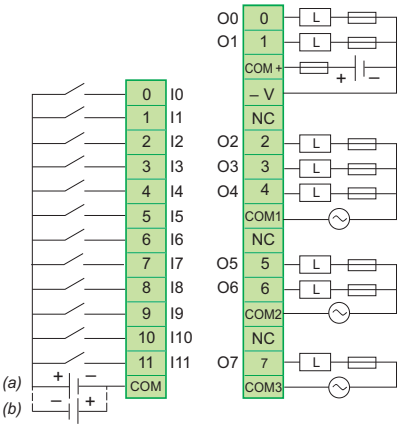
TWD LMDA 20DTK
(8 source transistor outputs)



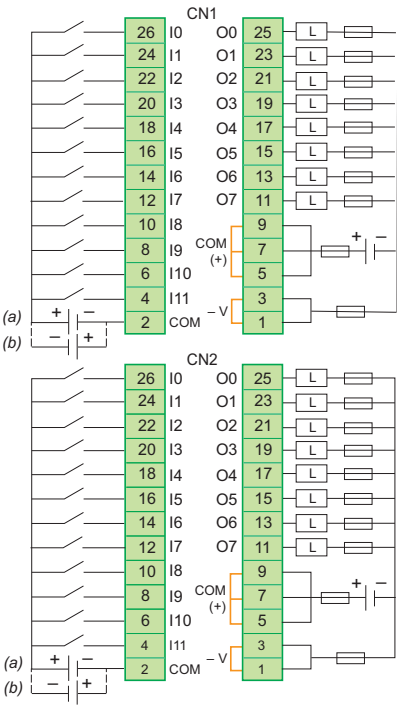
TWD LMDA 20DUK
8 sink transistor outputs)



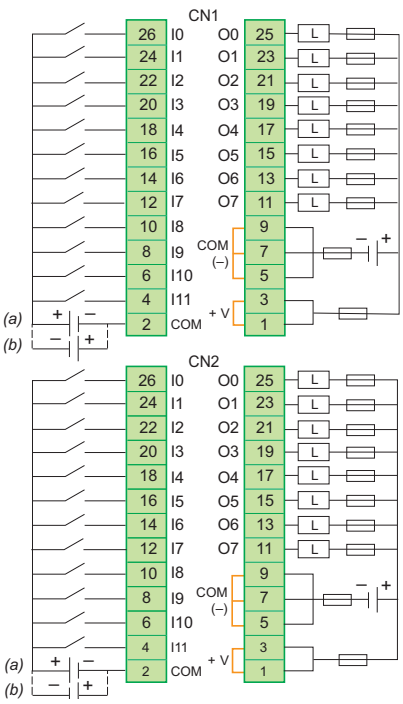
TWD LMDA 20DRT
(2 source transistor outputs Q0-Q1)



TWD LMDA 40DTK
(16 source transistor outputs)



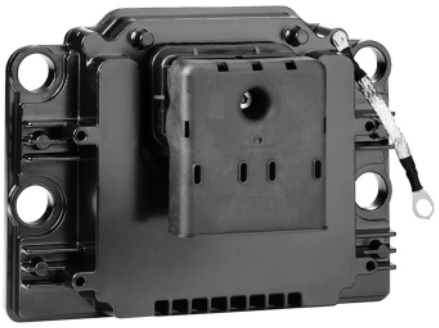
TWD LMDA 40DUK
16 sink transistor outputs)



(a) Connection of the ⎓ 24 V supply for sink inputs (positive logic).
(b) Connection of the ⎓ 24 V supply for source inputs (negative logic).
Internal module links.

Twido programmable controller
Extreme base

564493-3-3



TWD LEDCK1

Presentation

The Twido Extreme range of programmable controllers offers a solution for applications subjected to severe environmental conditions in terms of temperature, vibrations, oil splashing, and impacts, for example.
It comprises a **TWD LEDCK1** controller for integration in fixed-installation machines (in external pump management or waste water treatment applications, for example) or for on-board mobile equipment, such as in specialist vehicles (garbage trucks, fire trucks, etc.).

The Twido Extreme controller is powered with 12 V ⎓ or 24 V ⎓ supplied by a buffer battery, the vehicle battery or a UPS device. It has a wide operating range extending from 9…16 V or 18…32 V.

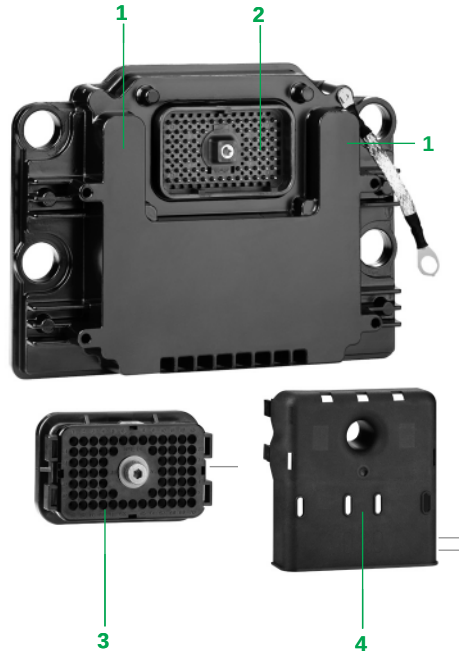
It offers an “all-in-one” solution in a metal casing with IP 67 protection index. This controller does not have an extension module.

The Twido Extreme controller has:
- 22 inputs:
  - 13 discrete inputs
  - 7 analog inputs
  - 1 analog input (configurable as PWM)
  - 1 PWM input
- 1 fast counter (10 kHz)
- 19 outputs:
  - 16 discrete outputs protected against short-circuits
  - 3 PWM (pulse width modulation) or PLS (pulse generation) outputs

TwidoSuite programming software

The Twido Extreme controller has three communication ports:
- One Modbus serial port
- One CANopen port
- One CAN J1939 port

TwidoSuite software (version ⩾ 1.20) is used to program and debug the Twido Extreme controller. The Twido Extreme controller is compatible with application programs for Twido Compact and Modular bases.



Description

The Twido Extreme controller **TWD LEDCK1** comes in a metal housing with IP 67 dust and damp protection 1 equipped with a 70-way male connector 2 (for all the connections).

It is mounted using the fixing kit **TWD XMTK4**.

To be ordered separately:
- **TWD FCNK70:** One connector kit for assembly comprising one 70-way female connector 3, 80 pins, 80 plugs and one cover 4

or
- **TWD FCWK70L015:** One 70-way female connector 3 equipped with a 1.5 m cable (and flying leads at the other end) and one cover 4

Characteristics: pages 25 to 27 | Functions: pages 28 and 29 | Dimensions: page 30 | Connections: page 31 | References: pages 32 and 33

Twido programmable controller
Extreme base

Type of controller base			TWD LEDCK1
Environment			
Conformity to standards	Automotive directives		2004/104/EC directive (“e” marking), ECE R10 rules (“E” marking)
	Low voltage directive according to 73/23/EEC		Amended by directive 93/68/EEC: IEC/EN 61131-2 (“e” marking)
	EMC directives according to 89/336/EMC		Amended by directives 93/31/EEC and 93/68/EEC: IEC/EN 61131-2, IEC/EN 61000-6-2, IEC/EN 61000-6-4 (CE marking)
Product certification			Pending: UL, CSA
Temperature According to IEC/EN 60068-2-1 & 2	Operation	**°C**	- 40…+110
	Storage	**°C**	- 55…+155
Altitude	Operation	**m**	0…3600
Relative humidity	According to IEC/EN 60068-2-30	**%**	90 at 1.12 Un, non-condensing
Degree of protection	According to IEC/EN 60529		IP 67
Immunity to splashing of chemical products *(1)*			Fuel oil, hydraulic oil, motor oil, SAE J1455 chemical substances, solvent, antifreeze, cleaning agent
Environmental testing			
Description of test	**Standards**		**Levels**
Immunity to Low Frequency (L.F.) disturbance *(1)*			
DC voltage variation	IEC/EN 61131-2		0.85 Un...1.2 Un for 30 min with 5% ripple (peak values)
Short interruptions	IEC/EN 61131-2		1 ms with ⎓ power supply
Voltage dips and pick-ups	IEC/EN 61131-2		Un-0-Un; Un for 60 s; 3 separate cycles of 10 s Un-0-Un; Un for 5 s; 3 separate cycles of 1 to 5 s Un-0.9 Udl; Un for 60 s; 3 separate cycles of 1 to 5 s *Where Un = nominal voltage and Udl = undervoltage detection level*
Immunity to High Frequency (H.F.) disturbance *(2)*			
Electrical fast transients/Bursts	IEC/EN 61000-4-4 IEC/EN 61131-2 zone B IEC/EN 61000-6-2		Primary power supply: 2 kV in common mode Communication data: 1 kV in common mode
Surges	IEC/EN 61000-4-5 IEC/EN 61131-2 zone B IEC/EN 61000-6-2		Primary power supply: 0.5 kV in differential mode and 1 kV in common mode Communication data: 1 kV in common mode
Electrostatic discharge	IEC/EN 61000-4-2 IEC/EN 61131-2 zone B IEC/EN 61000-6-2		4 kV contact, 8 kV air
Radiated electromagnetic field	IEC/EN 61000-4-3 IEC/EN 61131-2 zone B IEC/EN 61000-6-2		10 V/m: 80 MHz...1 GHz, 10 V/m: 1.4…2 GHz, 1 V/m: 2…2.7 GHz
Radio frequency in common mode	IEC/EN 61000-4-6 IEC/EN 61131-2 zone B IEC/EN 61000-6-2		10 V: 0.15…80 MHz
Electromagnetic emissions *(2)*			
Conducted emissions	EN 55011, Class A IEC/EN 61131-2 IEC/EN 61000-6-4		150 kHz...500 kHz: quasi-peak 79 dB (µV); average 66 dB (µV) 500 kHz...30 MHz: quasi-peak 73 dB (µV); average 60 dB (µV)
Radiated emissions	EN 55011, Class A IEC/EN 61131-2 IEC/EN 61000-6-4		30 MHz...230 MHz: quasi-peak 40 dB (measured at 10 m), quasi-peak 50 dB (measured at 3 m) 230 MHz...1 GHz: quasi-peak 47 dB (measured at 10 m), quasi-peak 57 dB (measured at 3 m)
Immunity to climatic variations			
Damp heat, cyclic	IEC/EN 60068-2-30 Db	**°C**	55 - 25 with 93% relative humidity with 2 cycles of 12 hrs on/12 hrs off
Cyclic temperature variations	IEC/EN 60068-2-14 Na and Nb	**°C**	- 40...110 with 100 cycles of 2 hrs on/2 hrs off
Ruggedness to climatic variations			
Dry heat when not operating	IEC/EN 60068-2-2 Bb	**°C**	155 for 0.5 hr
Cold when not operating	IEC/EN 60068-2-1 Ab and Ad IEC/EN 60068-2-48	**°C**	- 55 for 8 hrs
Thermal shocks when not operating	IEC/EN 60068-2-14 Na	**°C**	- 40...120 with 4 cycles of 2 hrs on/2 hrs off and a transfer time < 1 min
Immunity to mechanical stress *(2) (3)* (during operation)			
Sinusoidal vibration	IEC/EN 60068-2-6 Fc IEC/EN 61131-2		5...150 Hz with 3.5 mm amplitude at 1 g, endurance: 10 cycles of 1 octave/min per axis 9.45 g, frequency 24 Hz…2 kHz for 6 hrs per plane on each of the 3 orthogonal planes
Shock	IEC/EN 60068-2-27 Ea		15 g/11 ms; 3 shocks/direction/axis 50 g/5 ms vertical, 20 g/5 ms horizontal with number of shocks < 10

(1) Values applicable to the base **TWD LEDCK1**, *the fixing kit* **TWD XMTK4** *and the connector to be assembled* **TWD FCNK70**. *For the preformed connector* **TWD FCWK70L015**: *operating and storage temperatures: - 40…+75°C and no immunity to splashing of chemical products.*
(2) Devices must be installed and wired in accordance with the instructions in the setup manual for the Twido Extreme controller.
(3) The controller is mounted using the fixing kit **TWD XMTK4**.

Type of controller base			TWD LEDCK1	
Characteristics of the Extreme base				
Input/output voltage			**12 V ⎓**	**24 V ⎓**
Inputs	Number		22, see page 27 for details	
Outputs	Number		19, see page 27 for details	11, see page 27 for details
PLC scan			Normal (cyclic) or periodic (constant) from 2…150 ms	
Application memory capacity			3,000 instructions	
I/O connection			On a single 70-way connector	
Scan time	Execution time	**ms**	10 for 1,000 logical or numerical instructions	
	System overhead	**ms**	0.7	
Data memory	Internal bits		256	
	Internal words		3,000 (single, double, floating point and trigonometric words)	
	Timers		128	
	Counters		128	
Backup battery			Backup by external battery with key switch mechanism	
Power supply	Nominal voltage	**V ⎓**	12	24
	Limit values	**V ⎓**	9…16	18…32
	Maximum inrush current	**A**	50 for 20 ms max.	
Maximum power consumption		**VA**	96 (100% of outputs at state 1 and at full load)	

Communication					
Function			**Serial link**	**CANopen**	**CAN J1939**
Type of port			RS 485	CAN	CAN
Maximum data rate		**Kbps**	38.4	500	250
Slave devices	Number		–	16 max.	–
Object variables	Number		–	16 PDO variables in read mode 16 PDO variables in write mode *(PDO: Process Data Object)*	32 PGN variables in read/write mode *(PGN: Parameter Group Number)*
Connection of programming terminal			Half-duplex terminal port	–	–
Communication protocols			Modbus RTU Master/Slave ASCII character model	Master Conformity class M10	J1939

Integrated functions			
Counting	Number of channels		1, see details on pages 27 and 87
	Frequency	**kHz**	10
	Capacity		16 bits or 32 bits
Position control	Number of channels		3 outputs configurable as either PWM or PLS
	Frequency	**kHz**	1 for 2 outputs 5 for 1 output
	Functions		PWM, pulse width modulation output PLS, pulse generator output
Process control (PID)			Yes
Event processing			Yes

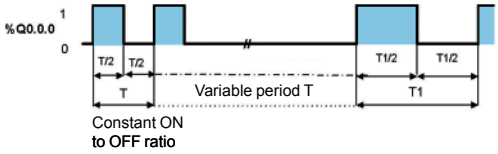
Type of controller base				TWD LEDCK1				
Characteristics of discrete, analog and PWM inputs								
Battery voltage				**12 V ⎓**			**24 V ⎓**	
Total number of inputs				22				
Discrete inputs	Number	Total		13				
		Negative logic *(source)*		11, connected to ground (I0.0...I0.10 addressing)				
		Positive logic *(sink)*		2, connected to the battery + (I0.11...I0.12 addressing)				
	Nominal input voltage		**V ⎓**	12 ⎓ positive or negative logic *(sink/source)*			24 ⎓ positive or negative logic *(sink/source)*	
	Common			1 (+ polarity in positive logic) or 1 (- polarity in negative logic)				
	Max. permitted voltage		**V ⎓**	32				
	Limit voltages, positive logic	At state 1	**V ⎓**	≥ 0.85 U battery (pull-down R = 10 kΩ)				
		At state 0	**V ⎓**	≤ 0.65 U battery (pull-down R = 10 kΩ)				
	Limit voltages, negative logic	At state 1	**V ⎓**	≥ 3.75 (pull-up R = 2 kΩ)				
		At state 0	**V ⎓**	≤ 0.8 (pull-up R = 2 kΩ)				
	Filter time	At state 1	**ms**	0, 3 or 12 by configuration				
		At state 0	**ms**	0, 3 or 12 by configuration				
	Isolation	Between channels		None				
		With internal logic		None				
Analog inputs	Number	Total		7 x 0…5 V, used as threshold detector inputs				
		Active sensors		4 (IW0.0...IW0.3 addressing)				
		Passive sensors		3 (IW0.4...IW0.6 addressing)				
	Analog/digital conversion			10 bits				
	Conversion error		**mV**	±125 max.				
Analog input or PWM input (configurable)	Number			1 x 0…5 V input or 1 x PWM input with operating range from 90…600 Hz (IW0.7 addressing)				
	Accuracy		**%**	1 on the PWM measurement				
PWM input	Number			1				
	Accuracy	Frequency measurement	**%**	1 max. at 10 kHz				
				50 Hz	1 kHz	3 kHz	5 kHz	10 kHz
		Typical cyclic ratio	%	2	2	10	–	
		Typical pulse width	**%**	2	2	14	–	
Characteristics of the counter input								
Fast counter input	Number			1 (FC input addressing)				
	Nominal input voltage		**V ⎓**	12, positive logic *(sink)*			24, positive logic *(sink)*	
	Counting frequency		**kHz**	10				
Characteristics of the outputs								
Battery voltage				**12 V ⎓**			**24 V ⎓**	
Total number of outputs				19			11	
Discrete outputs	Output current	Positive logic *(source)*		1 x 1 A (Q0.4 addressing)				
				1 x 50 mA (Q0.3 addressing)				
		Negative logic *(sink)*		14 x 300 mA (Q0.5...Q0.18 addressing) *(1)*			6 x 300 mA (Q0.5 and Q0.18 addressing) *(1)*	
PWM/PLS outputs positive logic (sink)	Q0.0 and Q0.1 addressing	Number		2 PWM/PLS				
		Frequency	**Hz**	10…1000				
		Typical cyclic ratio	**%**	5…95				
		Current	**mA**	35				
		Typical cyclic ratio accuracy	**%FS** *(2)*	10 Hz	1 kHz			
				2				
	Q0.2 addressing	Number		1 PWM/PLS				
		Frequency	**Hz**	10…5000				
		Typical cyclic ratio	**%**	20…80				
		Current	**mA**	40				
		Typical cyclic ratio accuracy	**%FS** *(2)*	10 Hz	1 kHz	3 kHz	5 kHz	
				2	4	25	–	
Power consumption	All outputs	At state 0	**A**	1				
		At state 1	**A**	4 (at full load)				

(1) Q0.18: 300 mA discrete output in reverse state

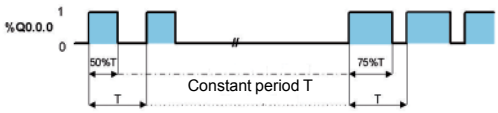
(2) %FS: As a percentage of Full Scale

Twido programmable controller
Extreme base

Example of control lever with 1 or 2 electronic shafts



Constant ON to OFF ratio



Variable ON to OFF ratio

PWM function: Pulse Width Modulation

PWM inputs

The Twido Extreme controller has two PWM inputs for receiving data from the sensors delivering proportional signals. This type of signal transmits data reliably in severe environments (because of its excellent immunity to interference).

These inputs can be used to connect the control lever to one or two electronic shafts.

PWM/PLS outputs

The Twido Extreme controller PWM/PLS outputs are used to connect devices in extremely tough environments which demand proportional data.

This involves a special function that can be assigned to the 3 controller outputs (Q0.0, Q0.1 or Q0.2).

Outputs	Frequency range	Cyclic ratio
Q0.0 and Q0.1	10 Hz…1 kHz	5…95%
Q0.2	10 Hz…5 kHz	20…80%

The Twido Extreme controller PWM outputs can be used in hydraulic mode to control proportional valves.

PLS function

PLS function blocks generate pulses of fixed ratio. In some cases, the frequency can be fixed and in others it is variable (as in control of slopes when driving a stepper motor). The %PLS function block can be programmed to generate a specific number of pulses.

%PLS function blocks are assigned to the 3 outputs Q0.0, Q0.1 and Q0.2 on the Twido Extreme controller.

The pulse generator signal has a variable period, but with a constant duty cycle which establishes an ON to OFF ratio of 50% of the period (see illustration opposite).

PWM function

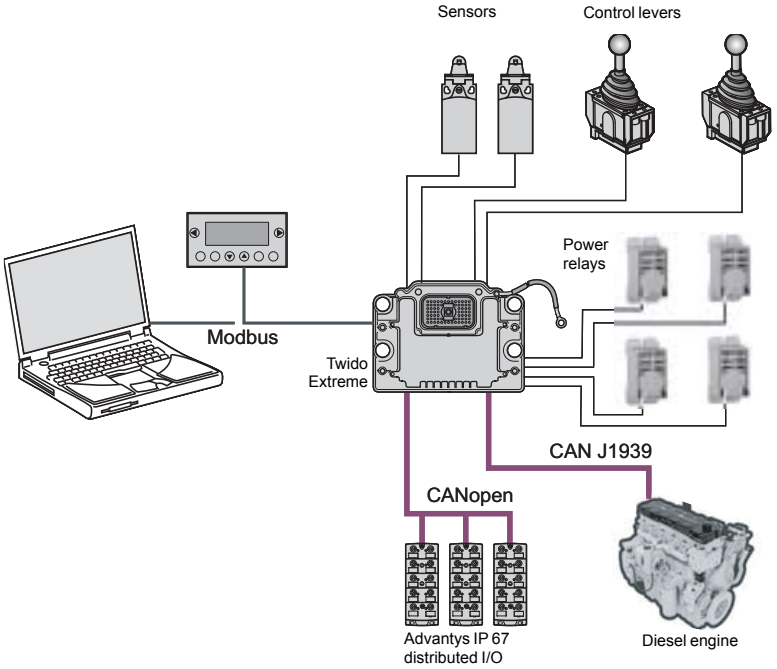
PWM function blocks generate pulses of fixed frequency, with a variable ON to OFF ratio for the output signal. The cyclic ratio (ON to OFF duration) is a dynamic variable called %PWM.R.

The user-defined %PWM function blocks generate signals for the 3 outputs Q0.0, Q0.1 and Q0.2 of the Twido Extreme controller (see illustration opposite).

Twido programmable controller
Extreme base

Communication

The Twido Extreme controller has three communication ports, including the CAN J1939 port described below:



CAN J1939 communication protocol

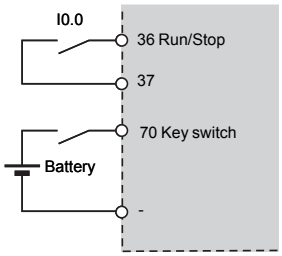
The Twido Extreme controller has been designed to enable direct communication with external devices, such as diesel engines. CAN J1939 is a recognized protocol in automotive applications.

TwidoSuite software takes account of the CAN J1939 bus configuration in a simple way.

Communication between the controller and the external device (the diesel engine in the example above), takes place via exchange of implicit data (such as engine speed, engine temperature, fuel level, etc.) in the form:

IWCx, y, z, QWCx, y, z, where:
- *x* represents the cable number
  - = 1 for the CANopen bus
  - = 0 for the CAN J1939 bus
- *y* represents the object number in the object list
- *z* represents the sub-object number

The CAN J1939 architecture of a Twido Extreme system consists of:
- 32 CAN J1939 objects, maximum addresses: 0 to 255.



Key switch function

The Key switch is used to set the Twido Extreme controller to standby or to exit standby mode, in order to minimize battery consumption during lengthy periods when the application is stopped.

In standby mode, if the battery power supply is not interrupted, this special input can be used to save the controller data context.

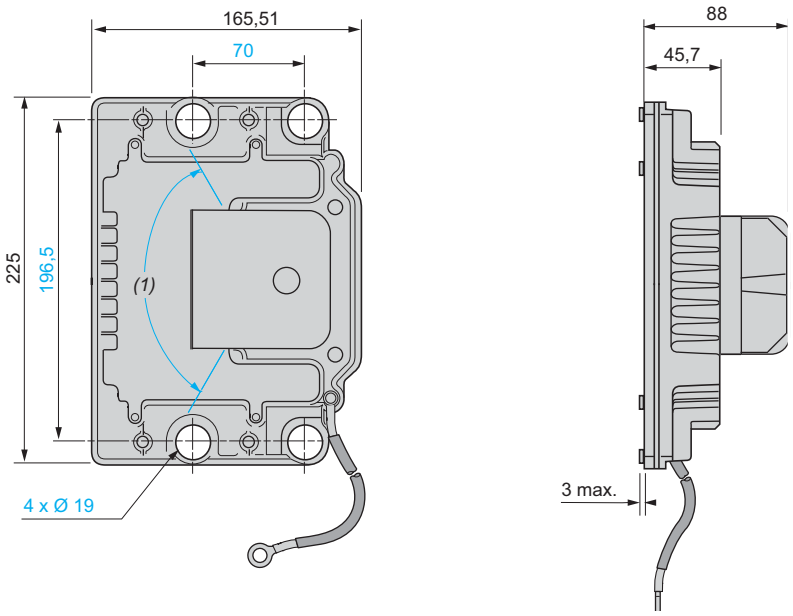
When exiting standby mode and starting the application (RUN), the application will resume its cycle at the state it was in at the time of stopping (before setting to standby).

In the event of a power failure, the data context reverts to its initial state, including the date and time, which causes the application to perform a cold restart.

Twido programmable controller
Extreme base

Dimensions

TWD LEDCK1 (dimensions in mm)



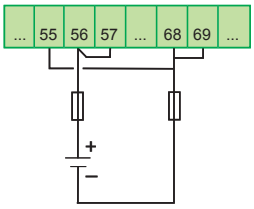
(1) Area of the conductors output

Twido programmable controller
Extreme base

Connections

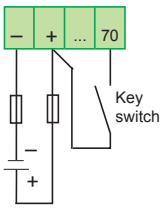
Connecting the 12 or 24 V ⎓ power supply

TWD LEDCK1



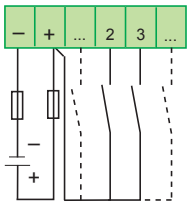
Connecting the inputs *(1)*

Key switch input

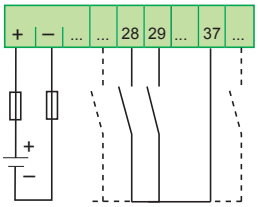


Discrete inputs

Positive logic

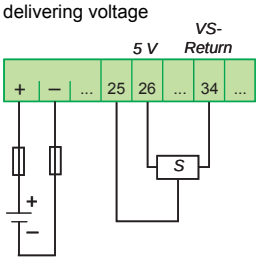


Negative logic



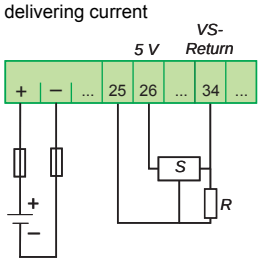
Analog inputs

Active sensors delivering voltage



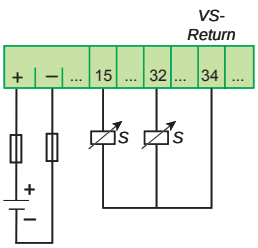
S: analog sensor
R: 250 Ω, 5 V/20 mA

Active sensors delivering current

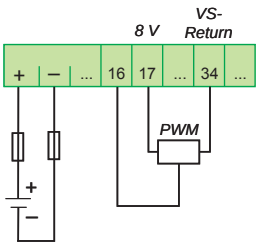


Analog inputs (continued)

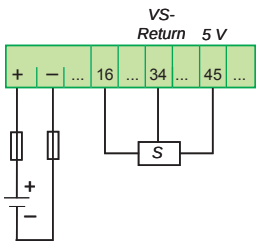
Passive sensors



Analog or PWM input: PWM mode

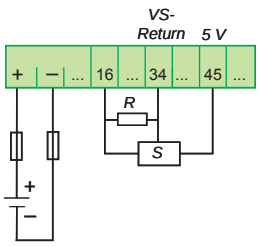


Analog or PWM input: analog mode, voltage sensor

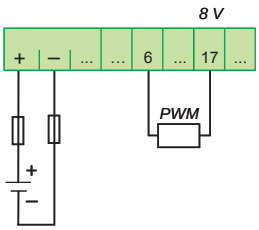


S: analog sensor
R: 250 Ω, 5 V/20 mA

Analog or PWM input: analog mode, current sensor



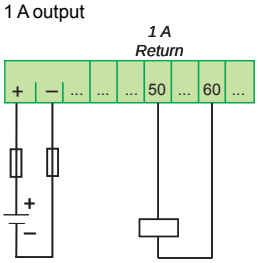
PWM input



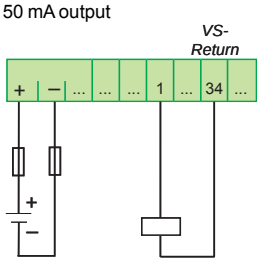
Connecting the outputs *(1)*

Discrete outputs

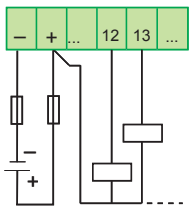
1 A output



50 mA output

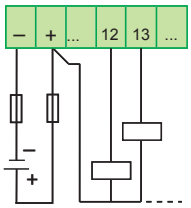


12 V ⎓ - 300 mA outputs



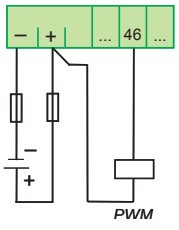
12 V 14 outputs max. *(2)*

24 V ⎓ - 300 mA outputs



24 V 16 outputs max. *(2)*

PWM/PLS outputs negative logic



(1) These diagrams illustrate an example of how to connect each input/output.
(2) Number of outputs depending on the voltage, see page 27.

Twido programmable controller
Extreme base


TWD LEDCK1

References

Twido Extreme base

Designation	Inputs	Outputs	Program memory	Reference	Weight kg
Twido Extreme controller base	13 x 12 V ⎓ 9 x 0…5 V ⎓	14 x 300 mA ⎓ 1 x 50 mA ⎓ 1 x 1 A ⎓ 3 PWM/PLS	3,000 instructions	**TWD LEDCK1**	1.300


TWD FCNK70

Components for fixing and connection *(to the sensors and actuators)*

Designation	Use	Reference	Weight kg
Fixing kit	4 spacers, 8 washers, 8 shock mounts	**TWD XMTK4**	0.150
IP 67 70-way connectors No. 2, see page 33	For mounting *(1)* with 80 pins, 80 plugs, 1 cover	**TWD FCNK70**	0.200
	Preformed with a 1.5 m cable and flying leads at the other end	**TWD FCWK70L015**	2.920


RPF 2●●D

Separate parts for Twido Extreme controller

Designation	Use	Reference	Weight kg
Crimping pliers	Crimping wires onto the 70-way connector pins	**TWD XMTCT**	–

Designation	Control voltage	Number and type of contacts	Order in multiples of	Unit reference	Weight kg
IP 40 power relay (thermal current Ith 30 A) *(2)*	12 V ⎓	2 "N/O"	10	**RPF 2AJD**	0.086
		2 "C/O"	10	**RPF 2BJD**	0.086
	24 V ⎓	2 "N/O"	10	**RPF 2ABD**	0.086
		2 "C/O"	10	**RPF 2BBD**	0.086


XGS Z33 ETH

Components for connection to the Ethernet TCP/IP network

Designation	Use	Length	Reference	Weight kg
3-channel Ethernet box Integrated Ethernet port (10/100 Mbps) Modbus TCP/IP protocol Class A10	Connecting the Twido Extreme controller to the Ethernet TCP/IP network	–	**XGS Z33 ETH**	1.060
Modbus shielded cables Male M12 connector-flying leads	Connection between the Ethernet box XGS Z33ETH and a Twido Extreme controller	2 m	**TCS MCN1F2**	0.115
		5 m	**TCS MCN1F5**	0.270
		10 m	**TCS MCN1F10**	0.520
Ethernet switches 5 x 10BASE-T/100BASE-TX Unmanaged	IP 67, M12 connectors (type D)	–	**TCS ESU 051 F0**	0.210
	IP 20, RJ45 connectors	–	**499 NES 251 00**	0.190


TCS ESU 051 F0


499 NES 251 00

Components for connection to the CANopen network

Designation	Use	Length	Reference	Weight kg
CANopen preformed cordsets for Advantys FTB/FTM IP67 distributed I/O	Preformed cordsets with two 5-way M12 A-coded angled connectors (one male connector and one female connector)	0.3 m	**FTX CN 3203**	0.040
		0.6 m	**FTX CN 3206**	0.070
		1 m	**FTX CN 3210**	0.100
		2 m	**FTX CN 3220**	0.160
		3 m	**FTX CN 3230**	0.220
		5 m	**FTX CN 3250**	0.430


FTX CN32●●

(1) Requires the use of crimping pliers **TWD XMTCT**.
(2) Ith = 30 A for mounting with a space of 13 mm between two relays, Ith = 25 A for side-by-side mounting. Operating temperature range around the product: - 40…85°C.

TWD NADK70P

TSX CUSB 485

VW3 A8 114

VW3 A8 115

References (continued)

Components for connecting to the PC programming terminal

Designation	Description	No.	Reference	Weight kg
70-way connector with RJ45 connector	The RJ45 (RS 485) connector integrated in the 70-way connector can be used to connect the Twido Extreme controller to a programming PC via the RJ45 connector 12 V or 24 V ⎓ power supply on 2 screw terminals	1	**TWD NADK70P**	0.200

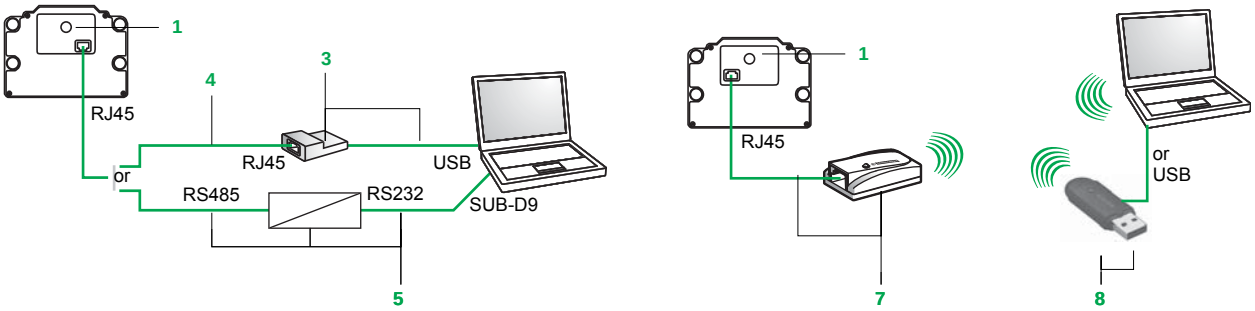
Designation	From	To	Length	No.	Reference	Weight kg
USB/RS485 converter	PC USB port	RS485 cable 4 VW3 A8 306 R●●	0.4 m	3	**TSX CUSB 485**	0.144
RS 485 cables RJ45-RJ45 connectors	USB/RS485 converter 3 TSX CUSB 485	RJ45 connector 1 TWD NADK70P	0.3 m	4	**VW3 A8 306 R03**	0.025
			1 m	4	**VW3 A8 306 R10**	0.060
			3 m	4	**VW3 A8 306 R30**	0.130
RS 485 cable RJ45 connector-flying leads	USB/RS485 converter 3 TSX CUSB 485	70-way preformed connector 2 TWD FCWK70L015	3 m	6	**VW3 A8 306 D30**	0.150
Connection kit for PC serial port *(1)*	PC RS 232 serial port, 9-way SUB-D connector	RJ45 connector 1 TWD NADK70P	3 m	5	**VW3 A8 106**	0.350
Bluetooth gateway for PC *(2)*	RJ45 connector 1 TWD NADK70P	–	0.1 m	7	**VW3 A8 114**	0.155
Bluetooth USB adaptor for PC *(3)* (range 10 m)	PC USB port	–	–	8	**VW3 A8 115**	0.290

(1) The connection kit **VW3 A8 106** *consists of:*
- *One 3 m cable with two RJ45 connectors*
- *One RS 232/RS 485 converter with 3 m cable equipped with one 9-way female SUB-D connector and one RJ45 connector*
- *Three adaptors dedicated to ATV11/38/58/58F/68 drives*

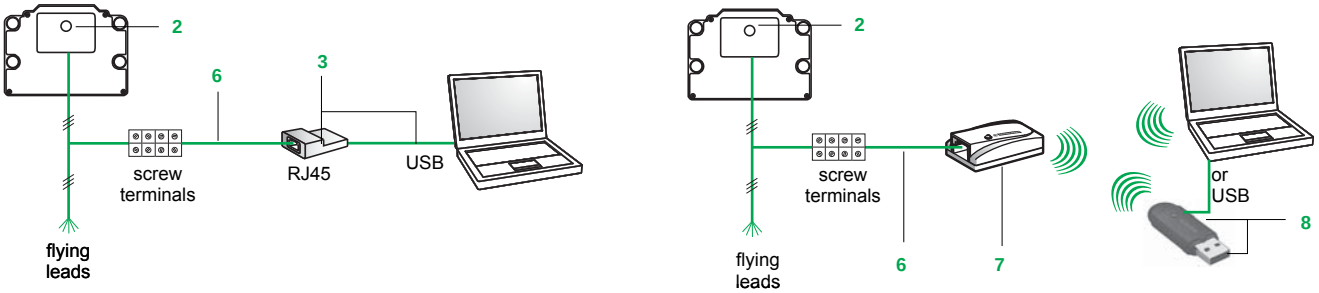
(2) The Bluetooth gateway **VW3 A8 114** *consists of:*
- *One Bluetooth adaptor (range 10 m, class 2) with an RJ45 connector*
- *One 0.1 m cable with two RJ45 connectors*
- *One cable and one adaptor dedicated to TwidoSuite and ATV11/38/58/58F/68 drives*

(3) USB-Bluetooth adaptor **VW3 A8 115** *for use on the PC USB port if it does not have Bluetooth technology.*

Connecting the PC terminal via a 70-way connector with RJ45 connector TWD NADK70P



Connecting the PC terminal via a preformed 70-way connector and cable with flying leads



Note: *No.* 2 *= IP 67 70-way connector* **TWD FCNK70** *or* **TWD FCWK70L015**, *see page 32.*

Twido programmable controller
Discrete I/O extension modules

Applications	Type of extension modules	**Discrete inputs with removable screw terminal block**		
	Compatibility	- Twido compact and modular controllers - Advantys OTB I/O distributed Interfaces		
				
Number and type		8 ⎓ 24 V inputs	8 ∿ 120 V inputs	16 ⎓ 24 V inputs
Connection		By removable screw terminal block		
Inputs	Voltage range	⎓ 20.4...28.8 V	∿ 85...132 V	⎓ 20.4...28.8 V
	Input current	7 mA per channel	7.5 mA per channel	7 mA per channel
	Input logic	Sink/source *(1)*	–	Sink/source *(1)*
	Commons	1 x 8 channels	1 x 8 channels	1 x 16 channels
	Response time □ Off-on	4 ms	25 ms	4 ms
	□ On-off	4 ms	30 ms	4 ms
Outputs	Output types			
	Voltage range			
	Commons			
	Output current □ Per output			
	□ Per group of channels			
Isolation	Between channels	None		
	Between channels and internal logic	500 V rms ∿ for 1 min	1500 V rms ∿ for 1 min	500 V rms ∿ for 1 min
I/O module type		**TM2 DDI 8DT**	**TM2 DAI 8DT**	**TM2 DDI 16DT**
Pages		42		

(1) Sink input: positive logic, source input: negative logic.

Discrete inputs with HE10 connector		Discrete I/O with removable screw terminal block	Discrete I/O with non-removable spring terminal block
- Twido compact and modular controllers - Advantys OTB I/O distributed Interfaces			
			
16 ⎓ 24 V inputs	32 ⎓ 24 V inputs	4 ⎓ 24 V inputs/4 relay outputs	16 ⎓ 24 V inputs/8 relay outputs
By HE10 connector Allows use of the Advantys Telefast ABE 7 pre-wired system		By removable screw terminal block	By non-removable spring terminal block
⎓ 20.4...28.8 V		⎓ 20.4...28.8 V	
5 mA per channel		7 mA per channel	
Sink/source *(1)*		Sink/source *(1)*	
1 x 16 channels	2 x 16 channels	1 x 4 channels	1 x 16 channels
4 ms		4 ms	
4 ms		4 ms	
		1 N/O contact	
		∿ 240 V, ⎓ 30V	
		1 x 4 channels	2 x 4 channels
		2 A (Ith)	
		7 A (Ith)	
None		None between input channels, none between output channels	
		Between input group and output groups: 1500 V rms ∿ for 1 min	
		Between output groups: 1500 V rms ∿ for 1 min	
500 V rms ∿ for 1 min		Between input channels and internal logic: 500 V rms ∿ for 1 min	
		Between output channels and internal logic: 2300 V rms ∿ for 1 min	
TM2 DDI 16DK	**TM2 DDI 32DK**	**TM2 DMM 8DRT**	**TM2 DMM 24DRF**
42			

Twido programmable controller
Discrete I/O extension modules

Applications	Type of extension modules	**8/16 outputs with removable screw terminal block**			
	Compatibility	- Twido compact and modular controllers - Advantys OTB I/O distributed Interfaces			
					
Type		8 ⎓ 24 V transistor outputs		8 relay outputs	16 relay outputs
Connection		By removable screw terminal block			
Outputs	Output types	Transistor		Relay with 1 N/O contact	
	Voltage range	⎓ 20.4..28.8 V		∿ 240 V, ⎓ 30 V	
	Logic *(1)*	Sink	Source	–	
	Commons	1 x 8 channels		2 x 4 channels	2 x 8 channels
	Output current □ Per output	0.3 A max.	0.5 A max.	2 A max.	
	□ Per group of channels	3 A at 28.8 V	4 A at 28.8 V	7 A max.	8 A max.
	Protection against overload and short-circuit	–	Yes, with automatic reactivation on elimination of the fault	–	
Isolation	Between channels	None		None	
	Between group of channels	–		1500 V rms for 1 min	
	Between channels and internal logic	500 V rms ∿ for 1 min		2300 V rms ∿ for 1 min	
Output module type		**TM2 DDO 8UT**	**TM2 DDO 8TT**	**TM2 DRA 8RT**	**TM2 DRA 16RT**
Pages		42			

(1) Source output: positive logic, sink output: negative logic.

16/32 outputs with HE 10 connectors

- Twido compact and modular controllers
- Advantys OTB I/O distributed Interfaces

16 ⎓ 24 V transistor outputs	16 ⎓ 24 V transistor outputs	32 ⎓ 24 V transistor outputs	32 ⎓ 24 V transistor outputs
By HE10 connector	By HE10 connector Allows use of the Advantys Telefast ABE 7 pre-wired system	By HE10 connector	By HE10 connector Allows use of the Advantys Telefast ABE 7 pre-wired system
Transistors			
⎓ 20.4...28.8 V			
Sink	Source	Sink	Source
1 x 16 channels		2 x 16 channels	
0.1 A max.	0.4 A max.	0.1 A max.	0.4 A max.
1 A at 28.8 V	2 A at 28.8 V	1 A at 28.8 V	2 A at 28.8 V
–	Yes, with automatic reactivation on elimination of the fault	–	Yes, with automatic reactivation on elimination of the fault
None			
–			
500 V rms ∿ for 1 min			
TM2 DDO 16UK	**TM2 DDO 16TK**	**TM2 DDO 32UK**	**TM2 DDO 32TK**
42			

Twido programmable controller
Discrete I/O extension modules

Presentation

The offer discrete I/O extension modules includes input modules, output modules and mixed input/output modules. With the 15 I/O modules offered, in addition to the I/O integrated in 24 I/O compact base controllers and modular base controllers, con gurations can be adapted to best suit application requirements, so optimising costs.

The following discrete I/O modules are available:
■ Four ⎓ 24 V discrete input modules comprising an 8, 16 and a 32-channel module, equipped with either removable screw terminal blocks or HE 10 connector, depending on the model. These modules can be either “sink or source” .
■ One ∿ 120 V discrete input module, 8 channels, equipped with a removable screw terminal block.
■ Eight discrete output modules comprising two output modules with 8 and 16 relay outputs, output modules with 8, 16 or 32-channel “sink” or “source” transistor outputs, equipped with either removable screw terminal blocks or HE 10 connector, depending on the model.
■ Two mixed discrete input and output modules, comprising one 4-channel input/4-channel relay output module with removable screw terminal block and one 16-channel input/8-channel relay output module with non-removable spring terminal block.

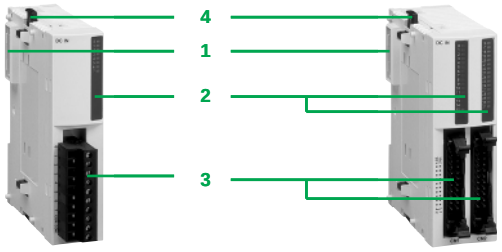
The narrow width of these I/O modules (17.5 mm, 23.5 mm, 29.7 mm or 39.1 mm) makes it possible to build Twido or Advantys OTB con gurations of up to 248 I/O with a minimal overall size of L 364.9 mm x H 90 mm x D 81.3 mm.

Discrete I/O extension modules and the analogue I/O modules are connected to the different base controller according to the following rules:
■ Twido 24 E/S compact base controllers, **TWD LC●A 24DRF**: 4 modules max.
■ Twido 40 E/S compact base controllers, **TWD LC●● 40DRF**: 7 modules max.
■ Twido 20 E/S modular base controllers, **TM2 LMDA 20D●K**: 4 modules max.
■ Twido 20 E/S and 40 E/S modular base controllers, **TM2 LMDA 20DRT/40D●K**: 7 modules max.
■ Advantys OTB Interface 20 E/S, **OTB 1●0 DM9LP**: 7 modules max.

All the discrete I/O modules are electrically isolated with the use of a photocoupler between the internal electronic circuit and the input/output channels.

Description

Discrete I/O extension modules comprise:
1 An extension connector for electrical connection to the previous module *(1)*.
2 One or two blocks for displaying the channels and module diagnostics.
3 One or two connection components of varying type, depending on the model:
■ removable screw terminal block (1 or 2) for modules whose reference ends in **T**,
■ HE 10 connector (1 or 2) for modules whose reference ends in **K**,
■ non-removable spring terminal block for module **TM2 DMM 24DRF**.
4 Latching mechanism for attachment to the previous module.



Module with removable screw terminal block

Module with HE 10 connector

These modules are mounted on a symmetrical ⊔ rail. Fixing kit **TWD XMT 5** (supplied in lots of 5) allows plate or panel mounting. For modules with removable screw terminal block, the terminal blocks are supplied with the module.

The **OTB 9ZZ 61JP** supply common distribution module (2 isolated groups of 10 terminals) simpli es the wiring of supply commons of sensors or actuators via 2 removable screw terminal blocks.

(1) A connector on the right-hand side ensures continuity of the electrical link with the next I/O module.

Characteristics : page 39 | References : pages 42 … | Dimensions : page 44 | Connections : pages 44 …

Twido programmable controller
Discrete I/O extension modules

Characteristics of ⎓ input channels

Type of modules	TM2		DAI 8DT	DDI 8DT	DDI 16DT	DDI 16DK	DDI 32DK	DMM 8DRT	DMM 24DRF
Number of input channels			8		16		32	4	16
Nominal input voltage		**V**	~ 120 V	⎓ 24 sink/source					
Connection			Removable screw terminal block			HE 10 connector		Removable screw term -inal block	Spring terminal block
Commons			1 x 8 channels		1 x 16 channels		2 x 16 channels	1 x 4 channels	1 x 16 channels
Input limit values (at states 0 and 1 garanted)		**V**	~ 85…132 V	⎓ 20.4...28.8	⎓ 20.4...28.8 *(1)*			⎓ 20.4...28.8	⎓ 20.4...28.8 *(1)*
Nominal input current		**mA**	7.5	7		5		7	
Input impedance		**kΩ**	11	3,4		4,4		3,4	
Response time	At state 1	**ms**	25	4		4		4	
	At state 0	**ms**	30	4		4		4	
Isolation	Between channels		None						
	Between input groups and output groups	**V rms**	–	–				1500 for 1 min	
	Between channels & internal logic	**V rms**	1500 for 1 min	500 for 1 min				500 for 1 min	
Max. consumption on internal extension bus	All inputs at state 1 ⎓ 5 V	**mA**	55	25	40	35	65	25 *(2)*	65 *(2)*
	All inputs at state 1 ⎓ 24 V	**mA**	0					20 *(2)*	45 *(2)*

(1) Derating temperature curves depends on nominal input voltage, see pages 45 and 47.
(2) Consumption values are indicated for all mixte inputs/output modules at state 1.

Characteristics of transistor output modules

Type of modules		TM2		DDO 8UT	DDO 8TT	DDO 16UK	DDO 16TK	DDO 32UK	DDO 32TK
Number of output channels				8		16		32	
Output logic *(1)*				Sink	Source	Sink	Source	Sink	Source
Connection				Removable screw terminal block		HE 10 connector			
Commons				1 x 8 channels		1 x 16 channels		2 x 16 channels	
Nominal output values	Voltage		**V**	24					
	Current		**A**	0,3	0,5	0,1	0,4	0,1	0,4
Output limit values	Voltage		**V**	20.4…28.8					
	Current per channel		**A**	0.36	0.6	0.12	0.48	0.12	0.48
	Current per common		**A**	3	4	1	2	1	2
Response time	State 0 to state 1		**µs**	300	450	300	450	300	450
	State 1 to state 0		**µs**	300	450	300	450	300	450
Leakage current			**mA**	–	0,1	–	0,1	–	0,1
Residual voltage	At state 1		**V**	⩽ 1	⩽ 0.4	⩽ 1	⩽ 0.4	⩽ 1	⩽ 0.4
Inductive load	L/R		**ms**	–	⩽ 10	–	⩽ 10	–	⩽ 10
Internal protection of the outputs against overload and short-circuit	with automatic reactivaton			No	Yes	No	Yes	No	Yes
Maximum power of filament lamp			**W**	8	12	8	9,6	8	9,6
Isolation	Between channels			None					
	Between channels & int. logic		**V rms**	500 for 1 min					
Max. consumption on internal extension bus	All outputs at state 1	⎓ 5 V	**mA**	10		10	15	20	25
		⎓ 24 V	**mA**	20		40	20	70	40

(1) Source output: positive logic, sink output: negative logic.

Description : page 39
References : pages 42 …
Dimensions : page 44
Connections : pages 44 …

Characteristics of relay output channels

Type of modules			TM2		DRA 8RT	DRA 16RT	DMM 8DRT	DMM 24DRF
Number of output channels					8 NO contacts	16 NO contacts	4 NO contacts	8 NO contacts
Connection					Removable screw terminal block			Non removable spring terminal block
Output currents		Current per channel		**A**	2 (5 max. surge current)			
		Max. Current per common		**A**	7	8	7	
Commons					2 x 4 channels	2 x 8 channels	1 x 4 channels	2 x 4 channels
Minimum switching load				**mA**	0,1 under ⎓ 0,1 V			
Contact resistance		When new		**mΩ**	45 max.			
Mechanical life time		Unload			20 x 10^6 operations			
Loads on relay outputs	Resistive	e.g.: heating element			Electric life time : 1 x 10^5 operations min.: - 2 A at ∿ 240 V - 2 A at ⎓ 30 V with 600 operations max./hour			
	Inductive with protection *(1)*	e.g.: relay, solenoid valve			Electric life time : 1 x 10^5 operations min.: - régime inductif AC-15 : ∿ 240 V 1 A, cos φ = 0,7 - régime inductif AC-15 : ∿ 240 V 0,5 A, cos φ = 0,35 - régime inductif DC-13 : ⎓ 24 V 1 A, L/R = 7 ms			
	Capacitive	e.g.: TeSys U starters, Festo solenoid valves			Use of relay outputs not guaranteed (reduction of life). For this type of application, **it is advisable to use the transistor outputs** of extension modules TM2 DDO ●●●●			
Response time		State 0 to state 1		**ms**	⩽ 10			
		State 1 to state 0		**ms**	⩽ 5			
Isolation voltage		Between channels		**V rms**	1500 for 1 min		None	
		Between output groups		**V rms**	1500 for 1 min			
		Between input groups and output groups		**V rms**	–		1500 for 1 min	
		Between channels & internal logic		**V rms**	2300 for 1 min			
Max. consumption on internal extension bus		All outputs at state 1	⎓ 5 V	**mA**	30	45	25 *(2)*	65 *(2)*
			⎓ 24 V	**mA**	40	75	20 *(2)*	45 *(2)*

(1) Inductive load fitted with a protection device such as an RC peak limiter or flywheel diode.
(2) Consumption values are indicated for all inputs/outputs at state 1.

Twido programmable controller
Discrete I/O extension modules

References

These discrete I/O modules are mounted as standard on symmetrical ⊔ rails to the right of the Twido base controller. The maximum number of discrete and/or analogue I/O modules which may be mounted depends on the type of base controller:

Base controller type	Twido compact TWD				Twido modular TWD			Advantys OTB Interface
	LC●A 10DRF	LC●A 16DRF	LC●A 24DRF	LC●● 40DRF	LMDA 20D●K	LMDA 20DRT	LMDA 40D●K	OTB 1●0 DM9LP
Number of modules	0	0	4	7	4	7	7	7

TM2 DDI 8DT

TM2 DDI 32DK

TM2 DDO 8●T/DRA 8RT

TM2 DDO 16●K

TM2 DDO 32●K

TM2 DRA 16RT

TM2 DDM 8DRT

TM2 DDM 24DRF

Discrete input modules

Input voltage	Nb of channels	Nb of common points	Connection	Reference	Weight kg
⎓ 24 V sink/source	8	1	Removable screw terminal block (supplied)	**TM2 DDI 8DT**	0.085
	16	1	Removable screw terminal block (supplied)	**TM2 DDI 16DT**	0.100
			HE 10 connector	**TM2 DDI 16DK** *(1)*	0.065
	32	2	HE 10 connector	**TM2 DDI 32DK** *(1)*	0.100
∼ 120 V	8	1	Removable screw terminal block (supplied)	**TM2 DAI 8DT**	0.081

Discrete output modules

Type de sortie	Nb of channels	Nb of common points	Connection	Reference	Weight kg
Transistors ⎓ 24 V	8, sink 0.3 A	1	Removable screw terminal block (supplied)	**TM2 DDO 8UT**	0.085
	8, source 0.5 A	1	Removable screw terminal block (supplied)	**TM2 DDO 8TT**	0.085
Transistors ⎓ 24 V	16, sink 0.1 A	1	HE 10 connector	**TM2 DDO 16UK**	0.070
	16, source 0.4 A	1	HE 10 connector	**TM2 DDO 16TK** *(1)*	0.070
	32, sink 0.1 A	2	HE 10 connector	**TM2 DDO 32UK**	0.105
	32, source 0.4 A	2	HE 10 connector	**TM2 DDO 32TK** *(1)*	0.105
Relay 2 A (Ith) ∼ 230 V/⎓ 30 V	8 (N/O contact)	2	Removable screw terminal block (supplied)	**TM2 DRA 8RT**	0.110
	16 (N/O contact)	2	Removable screw terminal block (supplied)	**TM2 DRA 16RT**	0.145

Discrete mixed input/output modules

Nb of I/O	Nb, type of input	Nb, type of output	Nb of common points	Connection	Reference	Weight kg
8	4 I, ⎓ 24 V sink/source	4 O, relay (N/O contact) 2 A (Ith)	Inputs: 1 common Outputs: 1 common	Removable screw terminal block (supplied)	**TM2 DMM 8DRT**	0.095
24	16 I, ⎓ 24 V sink/source	8 O, relay (N/O contact) 2 A (Ith)	Inputs: 1 common Outputs: 2 commons	Non-removable spring terminal block	**TM2 DMM 24DRF**	0.140

(1) Module that allows use of the Advantys Telefast ABE 7 pre-wired system.

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OTB 9ZZ 61JP

References

Separate components

Description	Application	Reference	Weight kg
Fixing kit Sold in lots of 5	For plate or panel mounting of the discrete modules.	**TWD XMT 5**	0.065
Commun distribution module	For distribution of supply commons. 8 A max. Connection on 2 removable screw terminal blocks	**OTB 9ZZ 61JP**	0.100
Modicon Telefast ABE 7 pre-wired system	Connection sub-bases I/O connection sub-bases Pre-wired solutions Cables and accessories	See page 103	–

Description	Number of ways	Reference	Weight kg
HE 10 female connectors Sold in lots of 5	20	**TWD FCN 2K20**	–
	26	**TWD FCN 2K26**	–

Pre-formed cables for discrete I/O modules with HE 10 connectors

Description	For use with Twido	Gauge C.s.a.	Cable length	Reference	Weight kg
Pre-formed cables 1 pre-formed cable: one end tted with HE 10 connector, one end with free wires	I/O extensions TM2 DDI 16DK/32DK TM2 DDO 16●K/32●K	AWG 22 0.035 mm²	3 m	**TWD FCW 30K**	0.405
		AWG 22 0.035 mm²	5 m	**TWD FCW 50K**	0.670

Pre-formed connecting cables *(1)*

Description	Association	Jauge Section	Longueur cordon	Reference	Weight kg
Discrete input pre-formed cables, 1 pre-formed cable: one end with 20-way HE 10 connector on TM2 side, one end with 20-way HE 10 connector on sensor side	Inputs TM2 DDI 16DK/32DK	AWG 28 0.080 mm²	1 m	**ABF TE20EP100**	0,080
		AWG 28 0.080 mm²	2 m	**ABF TE20EP200**	0.140
		AWG 28 0.080 mm²	3 m	**ABF TE20EP300**	0.210
Discrete output pre-formed cables 1 pre-formed cable: one end with 20-way HE 10 connector on TM2 side, one end with 20-way HE 10 connector on preactuator side	Outputs TM2 DDO 16TK/32TK	AWG 28 0.080 mm²	1 m	**ABF TE20SP100**	0,080
		AWG 28 0.080 mm²	2 m	**ABF TE20SP200**	0.140
		AWG 28 0.080 mm²	3 m	**ABF TE20SP300**	0.210

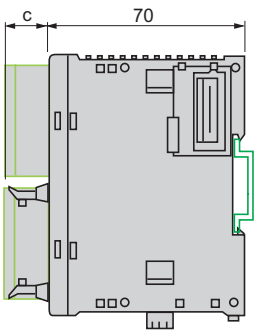
(1) Cables strictly for applications other than use of Advantys Telefast ABE 7 sub-bases with Twido controllers. For use of Advantys Telefast ABE 7 sub-bases with Twido controllers, see pages 94 to 107.

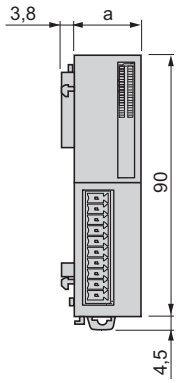
Dimensions

Discrete I/O modules

TM2	a	c
DDI 8DT/DAI 8DT	23,5	14,6
DDI 16DT	23,5	14,6
DDI 16DK	17,6	11,3
DDI 32DK	29,7	11,3
DDO 8UT/8TT	23,5	16,6
DDO 16UK/16TK	17,6	11,3
DDO 32UK/32TK	29,7	11,3
DRA 8RT/16RT	23,5	14,6
DMM 8DRT	23,5	14,6
DMM 24DRF	39,1	1,0

OTB	a	c
9ZZ 61JP	23,5	14,6





Connections

ABF TP26MP●00 *(1)*

HE 10 26-way **A**	HE 10 20-way **B**	HE 10 20-way **C**
Twido side	**Sensor side**	**Preactuator side**
1	–	18
2	20	–
3	–	20
4	12	–
5	–	17
6	11	–
7	–	19
8	10	–
9	–	–
10	9	–
11	–	8
12	8	–
13	–	7
14	7	–
15	–	6
16	6	–
17	–	5
18	5	–
19	–	4
20	4	–
21	–	3
22	3	–
23	–	2
24	2	–
25	–	1
26	1	–

ABF TE20EP●00 *(1)*

HE 10 20-way **A**	HE 10 20-way **B**
TM2 side	**Sensor side**
1	–
2	–
3	18
4	20
5	16
6	8
7	15
8	7
9	14
10	6
11	13
12	5
13	12
14	4
15	11
16	3
17	10
18	2
19	9
20	1

ABF TE20SP●00 *(1)*

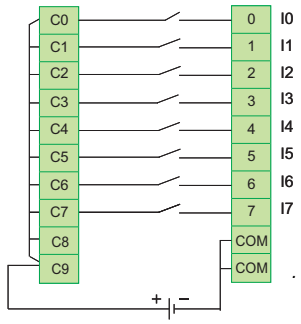
HE 10 20-way **A**	HE 10 20-way **B**
TM2 side	**Preactuator side**
1	18
2	20
3	19
4	17
5	16
6	8
7	15
8	7
9	14
10	6
11	13
12	5
13	12
14	4
15	11
16	3
17	10
18	2
19	9
20	1

(1) Cordsets do not be associated with a Advantys Telefast ABE 7 bases.
For Advantys Telefast ABE 7 bases association, see page 94 à 107.

OTB 9ZZ 61JP

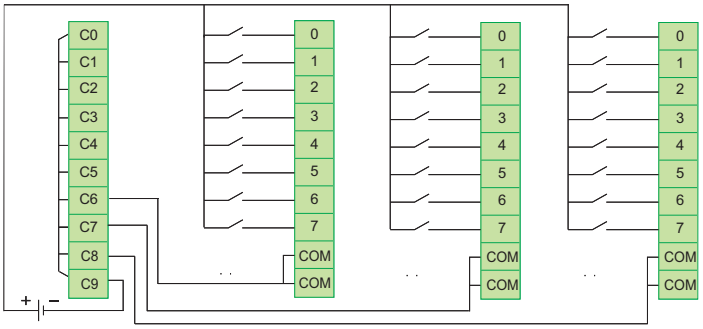
Exemples of connection: input module **TM2 DDI 8DT** with distribution module of supply commons **OTB 9ZZ 61JP**

OTB 9ZZ 61JP *(group 0)* **TM2 DDI 8DT** *(sink inputs, positive logic)*



Internal link of the **OTB 9ZZ 61JP** *module*

OTB 9ZZ 61JP **TM2 DDI 8DT** **TM2 DDI 8DT** **TM2 DDI 8DT**



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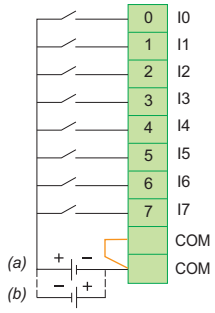
References : pages 42 …
Connections : pages 45 …

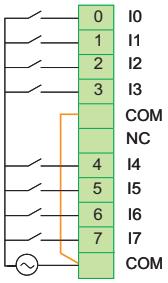
Connections

Input modules

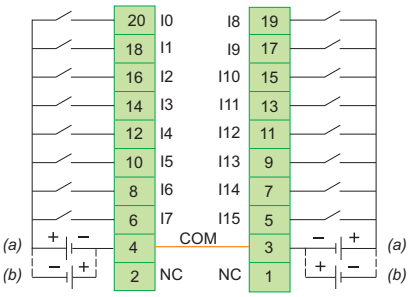
TM2 DDI 8DT (⎓ 24 V)



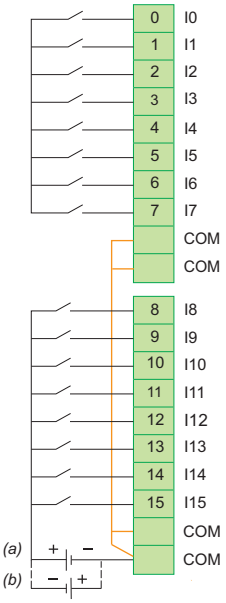
TM2 DAI 8DT (∿ 120 V)



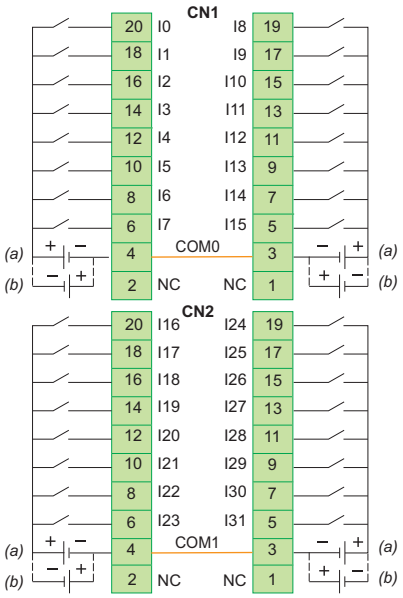
TM2 DDI 16DK (⎓ 24 V)



TM2 DDI 16DT (⎓ 24 V)



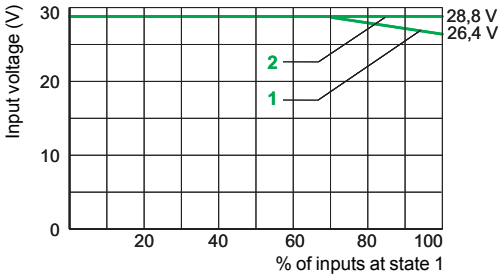
TM2 DDI 32DK (⎓ 24 V)



(a) Sink input (positive logic).
(b) Source input (negative logic).
COM or COM● internal links.

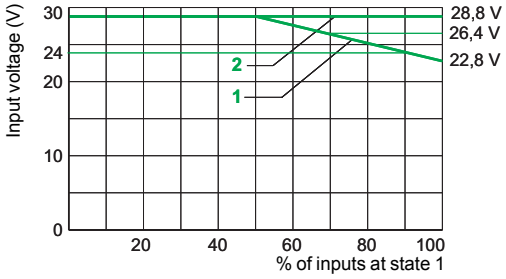
Temperature derating curves of input modules

TM2 DDI 16DT



1 Input voltage at 45 °C
2 Input voltage at 55 °C

TM2 DDI 16DK/32DK

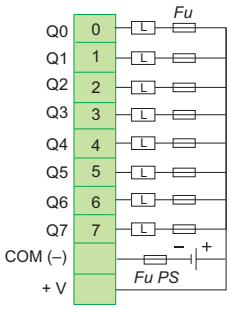


1 Input voltage at 30 °C
2 Input voltage at 55 °C

Connections (continued)

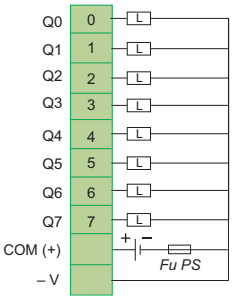
Transistor output modules

TM2 DDO 8UT



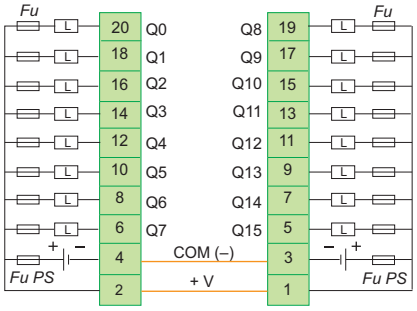
Fu: 0.3 A fast-blow fuse
Fu PS: 4 A delayed fuse

TM2 DDO 8TT



Fu PS: 4 A delayed fuse

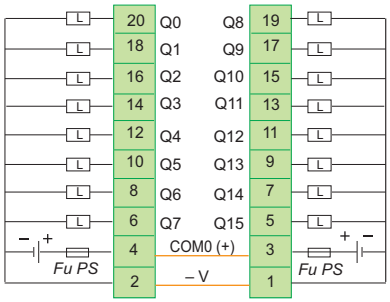
TM2 DDO 16UK



Fu:
0.1 A fast-blow fuse

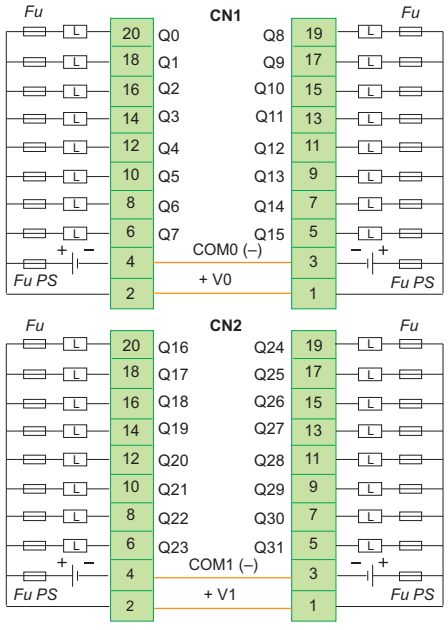
Fu PS: 1 A
delayed fuse

TM2 DDO 16TK



Fu PS: 2 A
delayed fuse

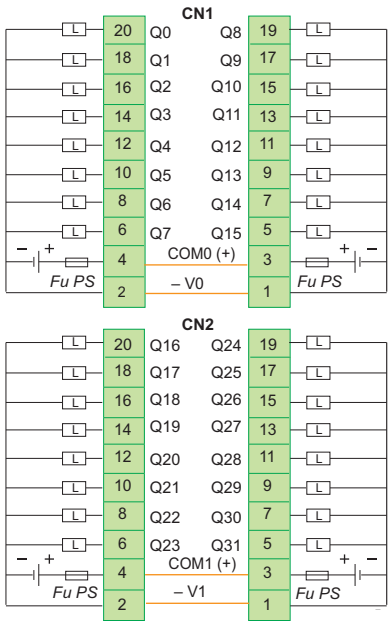
TM2 DDO 32UK



Fu:
0.1 A fast-blow fuse

Fu PS: 1 A
delayed fuse

TM2 DDO 32TK



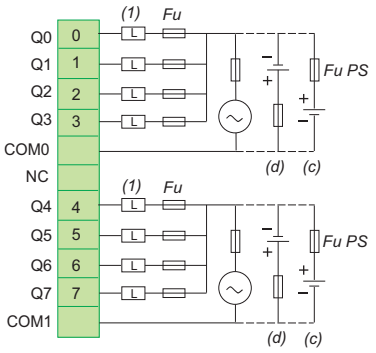
Fu PS: 2 A
delayed fuse

——— *COM● (-), COM● (+), + V● or - V● internal links.*

Connections (continued)

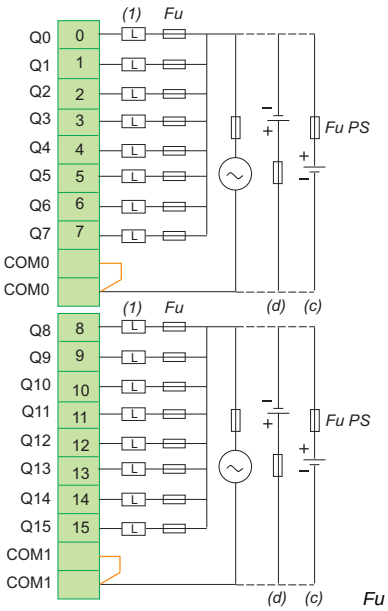
Relay output modules

TM2 DRA 8RT



Fu PS: 8 A delayed fuse

TM2 DRA 16RT

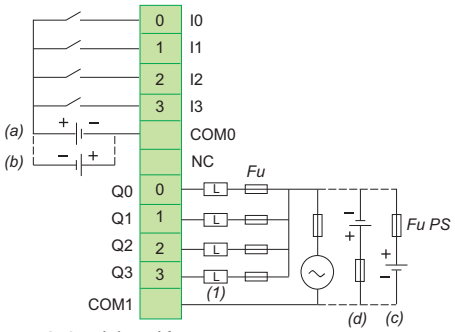


Fu PS: 8 A delayed fuse

(1) L inductive load: must be equipped with a protection device such as an RC peak limiter or flywheel diode.
(c) Sink output (negative logic).
(d) Source output (positive logic).
COM● internal links.

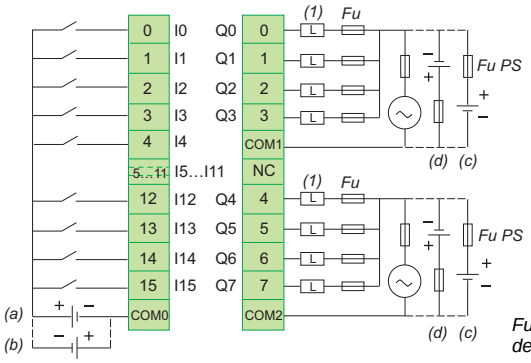
Input/output mixed modules

TM2 DMM 8DRT



Fu PS: 8 A delayed fuse

TM2 DMM 24DRF

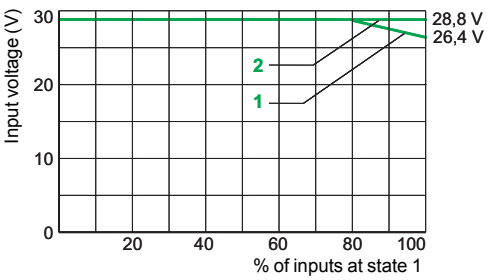


Fu PS: 8 A delayed fuse

(1) L inductive load: must be equipped with a protection device such as an RC peak limiter or flywheel diode.
(a) Sink input (positive logic).
(b) Source input (negative logic).
(c) Sink output (negative logic).
(d) Source output (positive logic).

Temperature derating curves of mixed input/output modules (continued)

TM2 DMM 24DRF



1 Input voltage at 45 °C
2 Input voltage at 55 °C

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Dimensions : page 44

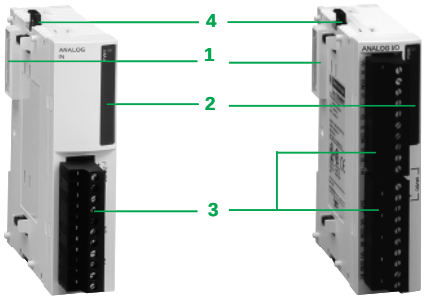
Twido programmable controller
Analogue I/O extension modules

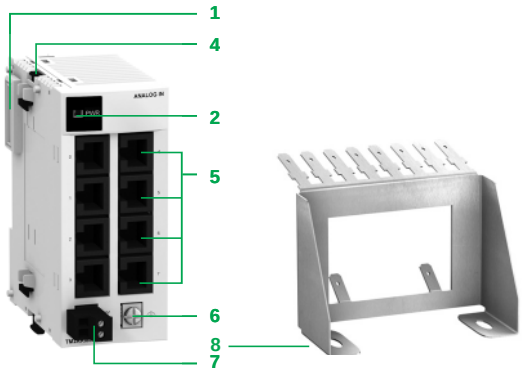
Applications	**Type of extension modules**	**Analogue inputs**			
	Compatibility	- Twido compact and modular controllers - Advantys OTB I/O distributed Interfaces			
					
Type		2 inputs		4 inputs	8 inputs
Nature		Voltage/current	Thermocouple inputs	Voltage/current Temperature probe	Voltage/current
Connection		Removable screw terminal block			
Inputs	Range	0...10 V 4...20 mA (non differential)	Thermocouple type J, K and T (differential)	0...10 V ● 0...20 mA ● Temperature probe 2, 3 or 4-wire Pt100/1000 ■ : - 200…600 °C Ni 100/1000 ■ : - 50…150 °C (non differential)	0...10 V 0...20 mA (non differential)
	Resolution	12 bits (4096 points)	12 bits (4096 points)	12 bits (4096 points)	10 bits (1024 points)
	Acquisition period	10 ms per channel + 1 controller cycle time	200 ms per channel + 1 controller cycle time	160 ms per channel ● 320 ms per channel ■ + 1 controller cycle time	160 ms per channel + 1 controller cycle time
Outputs	Range				
	Resolution				
	Transfer time				
External suplly	Nominal voltage	⎓ 24 V			
	Limit values	⎓ 20.4…28.8 V			
Isolation	Between channels	Non isolated			
	Between channels and sensor supply	∿ 500 V rms		Non isolated	
	Between channels and internal logic	∿ 500 V rms	∿ 2500 V rms	∿ 2500 V rms	
Analogue I/O module type		**TM2 AMI 2HT**	**TM2 AMI 2LT**	**TM2 AMI 4LT**	**TM2 AMI 8HT**
Pages		54			

Analogue inputs (continued)			**Analogue outputs**		**Analogue I/O**		
- Twido compact and modular controllers - Advantys OTB I/O distributed Interfaces							
	 (2)						
8 inputs			1 output	2 outputs	2 inputs/1 output		4 inputs/2 outputs
Temperature probe inputs			Voltage/current	Voltage	Voltage/current	Thermocouple/ temperature probe inputs Voltage/current output	Voltage/current
Removable screw terminal block		Removable screw terminal block and RJ11 connectors	Removable screw terminal block				
NTC probe (non differential)	PTC probe ⚠ Threshold detection (high and low) (non dif.)	Temperature probe 2 or 3-wire Pt100: - 200…600 °C Pt1000 :- 50…200 °C) (non differential)			0...10 V 4...20 mA (non differential)	Thermocouple type J, K and T Temperature probe 2 or 3-wire Pt100: - 100…500 °C (non differential)	0...10 V 4...20 mA (non differential)
10 bits (1024 pts)	**1** < range **2** = range **4** > range	12 bits (4096 points)			12 bits or 11 bits + sign (4096 points)		12 bits (4096 points)
160 ms per channel + 1 controller cycle time		320 ms per channel (1280 ms maxi.) + 1 controller cycle time			10 ms per channel + 1 controller cycle time	50 ms per channel + 1 controller cycle time	64 ms per channel + 1 controller cycle time
			0...10 V 4...20 mA	± 10 V	0...10 V 4...20 mA		
			12 bits (4096 points)	11 bits (2048 points) + sign	12 bits (4096 points)		
			10 ms + 1 controller cycle time	2 ms + 1 controller cycle time	20 ms + 1 controller cycle time		
⎓ 24 V			⎓ 24 V				
⎓ 20.4…28.8 V	⎓ 19.2…30 V		⎓ 19.2…30 V				
Non isolated							
Non isolated	∿ 500 V rms		∿ 500 V rms	Non isolated	∿ 500 V rms		∿ 800 V rms
∿ 2500 V rms			∿ 500 V rms	∿ 2500 V rms	∿ 500 V rms		∿ 1500 V rms
TM2 ARI 8HT	**TM2 ARI 8LT** *(1)* **TM2 ARI 8LRJ** *(2)*		**TM2 AMO 1HT**	**TM2 AVO 2HT**	**TM2 AMM 3HT**	**TM2 ALM 3LT**	**TM2 AMM 6HT**

(1) Connection by a removable screw terminal block.
(2) Connection by a RJ11 connector.

Twido programmable controller
Analog I/O extension modules





Presentation

Analog I/O extension modules enable the acquisition of various analog values encountered in industrial applications.
Analog output modules are used to control the preactuators in devices such as variable speed drives, valves and applications that require process control. The output current or voltage is proportional to the numerical value defined by the user program. When the controller stops, the outputs can be configured with fallback (reset to the lowest scale value or hold the last value received). This function, when set to 'hold', is useful when debugging the application or when a fault occurs, to ensure that the process being controlled is not disturbed.

The following 10 analog I/O modules are available:
- One module with 2 inputs: 0…10 V, 4…20 mA
- One module with 2 inputs for type J, K and T thermocouples
- One module with 4 inputs: 0…10 V, 0…20 mA, Pt 100/1000 range - 200…600°C, Ni100/1000 range - 50...150°C
- Two modules with 8 temperature probe inputs: Pt100 range - 200…600°C and Pt1000 range - 50…200°C (with RJ11 connectors or removable screw terminal block)
- One module with 8 inputs: 0…10 V, 0…20 mA
- One module with 8 inputs: PTC/NTC *(1)*
- One module with 1 output: 0…10 V, 4…20 mA
- One module with 2 outputs: ± 10 V
- One mixed module with 2 inputs (0…10 V, 4…20 mA) and 1 output (0…10 V, 4…20 mA)
- One mixed module with 2 thermocouple (type J, K and T) or temperature probe inputs and 1 output 0…10 V, 4…20 mA
- One mixed module with 4 inputs (0…10 V, 4…20 mA) and 2 outputs (0…10 V, 4…20 mA)

Analog extension modules offer a resolution of 10 bits, 11 bits + sign and 12 bits, with connection by removable screw terminal block. An external 24 V ⎓ power supply is required for each analog module.

Discrete I/O extension modules and analog I/O modules are connected to the different base controllers according to the following rules:
- Twido 24 I/O compact base controllers, **TWD LC●A 24DRF**: 4 modules max.
- Twido 40 I/O compact base controllers, **TWD LC●● 40DRF**: 7 modules max.
- Twido 20 I/O modular base controllers, **TM2 LMDA 20D●K**: 4 modules max.
- Twido 20 I/O and 40 I/O modular base controllers, **TM2 LMDA 20DRT/40D●K**: 7 modules max.
- Advantys OTB Interface 20 I/O, **OTB 1●0 DM9LP**: 7 modules max.

All analog I/O modules are electrically isolated with the use of a photocoupler between the internal electronic circuit and the input/output channels.

Description

Analog I/O modules comprise:
1. An extension connector for electrical connection to the adjacent module *(2)*
2. A PWR display block
3. One (or two, depending on model) removable screw terminal block(s) for connecting the 24 V ⎓ external power supply, the sensors and the preactuators
4. A latching mechanism for attachment to the adjacent module

For modules with 8 temperature probe inputs:
5. 8 RJ11 connectors. A version of this module is available with 2 removable screw terminal blocks (2 x 13 terminals)
6. A screw terminal for connecting the functional ground (FG)
7. A removable screw terminal block for connecting the 24 V ⎓ power supply

The **TM2 XMTGB** ground connection plate **8** simplifies connection of the analog sensor and actuator cable shielding. This shielding must be connected to the device's functional ground (FG).
These modules are mounted on a symmetrical ⊔ rail. Mounting kit **TWD XMT 5** (supplied in lots of 5) can be used for plate or panel mounting.

(1) With PTC probe, threshold detection inputs (high and low).
(2) A connector on the right-hand side panel ensures continuity of the electrical link with the adjacent I/O module.

Characteristics of 2 and 4-channel analog input modules

Module type			TM2 AMI 2HT		TM2 AMI 2LT	TM2 AMI 4LT		
Number of channels			2 high-level inputs		2 low-level inputs	4 inputs		
Range			Voltage	Current	Thermocouple	Voltage	Current	Temperature probe
			0…10 V	4…20 mA	Type J: - 200…760° Type K: - 270…1370°C Type T: - 270…400°C No isolation between the input channels	0…10 V	0…20 mA	Pt100/1000: - 200… 600°C Ni100/1000: - 50…150°C
Type			Non-differential		Differential	Non-differential		
Resolution			12 bits		12 bits	12 bits		
LSB value			2.5 mV	4.8 µA	Type J: 0.3°C Type K: 0.325°C Type T:0.1°C	2.5 mV	4.8 µA	0.15 ° K
Connection			Removable screw terminal block					
Sensor cabling			Shielded cable (shielding to be connected to the TM2 XMTGB ground connection plate)					
Permissible continuous overload			13 V ⎓	40 mA	± 7.5 V ⎓	40 mA	13 V	–
Input impedance			1 MΩ min.	10 Ω	1 MΩ min.	10 KΩ	470 Ω	> 10 kΩ
Maximum sampling duration		ms	10		200	160		
Acquisition period		ms	10 per channel + 1 controller cycle time		200 per channel + 1 controller cycle time	160 per channel + 1 controller cycle time		320 per channel
Measuring precision	Max. error at 25°C	% FS	± 0.2		0.2 ± 5°C *(1)*	± 0.2		± 0.4
	Temperature coefficient	% FS/°C	± 0.006		± 0.006	± 0.009		± 0.004
	Repeat accuracy after stabilization time	% FS	± 0.5		± 0.5	± 0.1		
	Nonlinearity	% FS	± 0.2		± 0.2	± 0.02		
	Total error	% FS	± 1		± 1	± 0.5		
Crosstalk			2 low significance bits max.			1 low significance bit max.		
Dielectric strength	Between channels		Non-isolated			Non-isolated		
	Between channels and external supply	V rms	500 ∿			Non-isolated		
	Between channels and internal logic	V rms	500 ∿		2500 ∿	2500 ∿		
Isolation			Photocoupler between the input and the internal circuit					
External supply		V	Nominal voltage 24 ⎓; Limit values: 20.4…28.8 ⎓ (ripple included)					
Consumption	Internal 5 V ⎓ supply	mA	50		60	50		
	External 24 V ⎓ supply	mA	40		30	60		

Characteristics of 8-channel analog input modules

Module type			TM2 ARI 8HT	TM2 AMI 8HT		TM2 ARI 8LRJ/8LT
Number of channels			8 inputs	8 inputs		8 inputs (2 groups of 4 inputs)
Range			Temperature	Current	Voltage	Temperature probe
			NTC probe, PTC probe, 100 Ω < R < 10 kΩ	0…20 mA	0…10 V	Pt100: - 200…600°C Pt1000: - 50…200°C
Type			Non-differential			
Resolution			10 bits with NTC *(2)*	10 bits		12 bits
LSB value			–	19.5 µA	9.7 mV	0.2°C (Pt 100), 0.06°C (Pt 1000)
Connection	Sensors		Removable screw terminal block			TM2 ARI 8LRJ, RJ11 connectors TM2 ARI 8LT, removable screw terminal blocks
	External supply		Removable screw terminal block			Removable screw terminal block
Sensor cabling			Shielded cable (shielding to be connected to the TM2 XMTGB ground connection plate)			
Permissible continuous overload			–	40 mA	13 V	–
Input impedance			>1 MΩ	470 Ω	> 10 kΩ	> 10 kΩ
Maximum sampling duration		ms	160			
Acquisition period		ms	160 per channel + 1 controller cycle time			320 per group of channels (channels 0…3 and channels 4…7) or 1280 max. + 1 controller cycle time
Measuring precision	Max. error at 25°C	% FS	± 0.2			± 0.5 (Pt 100), ± 0.3 (Pt 1000)
	Temperature coefficient	% FS	± 0.01			± 0.01
	Repeat accuracy after stabilization time		± 0.4% FS			± 0.1°C
	Nonlinearity	% FS	± 0.002			–
	Total error		± 1% FS			4°C (Pt 100), 1°C (Pt 1000)
Crosstalk			1 low significance bit max.			–
Dielectric strength	Between channels		Non-isolated			Non-isolated
	Between channels and external supply	V rms	Non-isolated			500 ∿
	Between channels and internal logic	V rms	2500 ∿			2500 ∿
Isolation			Photocoupler between the input and the internal circuit			
External supply	Nominal voltage	V	24 ⎓			24 ⎓
	Limit values	V	20.4…28.8 ⎓ (ripple included)			19.2…30 ⎓ (ripple included)
Consumption	Internal 5 V ⎓ supply	mA	60			90
	External 24 V ⎓ supply	mA	45			140 max.

(1) ± 5°C: Precision of cold junction compensation
(2) With PTC probe, 2 threshold detection (**1***: value ⩽ low threshold,* **2***: value included between low and high threshold,* **4***: value ⩾ high threshold)*

Characteristics of 3 and 6-channel analog input/output modules

Analog inputs

Module type			TM2 AMM 3HT		TM2 AMM 6HT		TM2 ALM 3LT	
Number of channels			2 high-level inputs		4 high-level inputs		2 low-level inputs	
Range			Voltage: 0…10 V	Current: 4…20 mA	Voltage: 0…10 V	Current: 4…20 mA	Thermocouple: Type: - J: 0…1200°C - K: 0…1300°C - T: 0…400°C; Non-isolation between input channels	Temperature probe: 3-wire Pt probe: - 100…500°C
Type			Non-differential		Non-differential		Non-differential	
Resolution			12 bits					
LSB value			2.5 mV	4.8 µA	2.5 mV	4 µA	0.1°C	0.15°C
Permissible continuous overload			13 V ⎓	40 mA	13 V ⎓	40 mA	–	
Input impedance			1 MΩ min.	10 Ω min.	1 MΩ min.	250 Ω max.	1 MΩ min.	
Maximum sampling duration		**ms**	10		16		60	20
Acquisition period		**ms**	60 + 1 controller cycle time		16 per channel, configurable software + 1 controller cycle time		60 + 1 controller cycle time	80 + 1 controller cycle time
Measuring precision	Max. error at 25°C	**% FS**	± 0.2		± 0.5		0.2 ± 4°C max. *(1)*	± 0.2
	Temperature coefficient	**% FS/°C**	± 0.006		± 0.015		± 0.006	
	Repeat accuracy after stabilization time	**% FS**	± 0.5		± 0.5		± 0.5	
	Nonlinearity	**% FS**	± 0.2		± 0.4		± 0.2	
	Total error	**% FS**	± 1		± 1		± 1	
Crosstalk			2 low significance bits max.					
Isolation			Photocoupler between the inputs and the internal circuit					

Analog outputs

Module type			TM2 AMM 3HT		TM2 AMM 6HT		TM2 ALM 3LT	
Number of channels			1 output		2 outputs		1 output	
			Voltage	Current	Voltage	Current	Voltage	Current
Range			0…10 V	4…20 mA	0…10 V	4…20 mA	0…10 V	4…20 mA
Resolution			12 bits					
LSB value			2.5 mV	4.8 µA	2.5 mV	4 µA	2.5 mV	4.8 µA
Load	Type		Resistive					
	Impedance	Ω	2000 min.	300 max.	2000 min.	300 max.	2000 min.	300 max.
Stabilization time		**ms**	20					
Recovery time		**ms**	20 + 1 controller cycle time					
External supply		**V**	Nominal voltage: 24 ⎓; Limit values: 20.4…28.8 ⎓ (ripple included)					
Measuring precision	Max. error at 25°C	**% FS**	± 0.2		± 0.9		± 0.2	
	Temperature coefficient	**% FS/°C**	± 0.015		± 0.02		± 0.015	
	Repeat accuracy after stabilization time	**% FS**	± 0.5		± 1		± 0.5	
	Output error	**% FS**	± 1					
	Nonlinearity	**% FS**	± 0.2		± 0.5		± 0.2	
	Output ripple		1 low significance bit max.					
	Total error	**% FS**	± 1		± 1.5		± 1	
Isolation			Photocoupler between the inputs and the internal circuit					

Analog I/O common

Module type			TM2 AMM 3HT	TM2 AMM 6HT	TM2 ALM 3LT
Connection			Removable screw terminal block		
Sensor and preactuator cabling			Shielded cable (shielding to be connected to the TM2 XMTGB ground connection plate)		
Dielectric strength	Between input channels		Non-isolated		
	Between input and output channels	**V rms**	500 ∿	800 ∿	500 ∿
	Between channels and external supply	**V rms**	500 ∿	800 ∿	500 ∿
	Between channels and internal logic	**V rms**	500 ∿	1500 ∿	500 ∿
External supply	Nominal voltage	**V**	24 ⎓		
	Limit values		19.2…30 ⎓ (ripple included)		
Module consumption	Internal 5 V ⎓ supply	**mA**	50	60	50
	External 24 V ⎓ supply	**mA**	50	80	50

(1) ± 4°C: Precision of cold junction compensation

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Characteristics of 1 and 2-channel analog output modules

Module type			TM2 AMO 1HT		TM2 AVO 2HT
Number of channels			1 output		2 outputs
Range			Voltage 0…10 V	Current 4…20 mA	Voltage ±10 V
Resolution			12 bits		11 bits + sign
LSB value			2.5 mV	4.8 µA	± 9.8 mV
Connection			Removable screw terminal block		
Cabling			Twisted shield cable, shield to connect to the ground connection plate mounting TM2 XMTGB		
Load	Type		Resistive		
	Impedance	Ω	2000 min.	300 max.	3000 min.
Stabilization time		**ms**	10		2
Recovery time		**ms**	10 + 1 controller cycle time		2 + 1 controller cycle time
Measuring precision	Max. error at 25°C	**% FS**	± 0.2		± 0.5
	Temperature coefficient	**% FS/°C**	± 0.015		± 0.01
	Repeat accuracy after stabilization time	**% FS**	± 0.5		± 0.1
	Nonlinearity	**% FS**	± 0.2		
	Output ripple		1 low significance bit max.		
	Total error	**% FS**	± 1		
Dielectric strength	Between channels		–		Non-isolated
	Between channel(s) and external supply	**V rms**	500 ∿		Non-isolated
	Between channel(s) and internal logic	**V rms**	500 ∿		2500 ∿
Isolation			Photocoupler between the outputs and the internal circuit		
External supply	Nominal voltage	**V**	24 ⎓		
	Limit values	**V**	19.2…30 ⎓ (ripple included)		
Module consumption	Internal 5 V ⎓ supply	**mA**	50		60
	External 24 V ⎓ supply	**mA**	40		60

Twido programmable controller
Analog I/O extension modules

References

These analog I/O extension modules are mounted on symmetrical ⊔ rails to the right of base controller below. The maximum number of I/O and/or analog modules which may be mounted depends on the type of base controller:

Base controller type	Twido compact TWD				Twido modular TWD			Advantys OTB Interface
	LC●A 10DRF	LC●A 16DRF	LC●A 24DRF	LC●● 40DRF	LMDA 20D●K	LMDA 20DRT	LMDA 40D●K	OTB 1●0 DM9LP
Number of modules	0	0	4	7	4	7	7	7


TM2 AMI 2HT


TM2 AMI 2LT


TM2 ARI 8LRJ


TM2 ARI 8LT


TM2 ALM LT


TM2 AMM 6HT


TM2 XMTGB


TM200 RSRCEMC

Analog input modules

Channel type	Input range	Output range	Resolution	Connection by	Reference	Weight kg
2 inputs	0…10 V 4…20 mA	–	12 bits	Removable screw terminal block (supplied)	**TM2 AMI 2HT**	0.085
	Thermocouple K, J, T	–	12 bits	Removable screw terminal block (supplied)	**TM2 AMI 2LT**	0.085
4 inputs	0…10 V 0…20 mA Temperature	–	12 bits	Removable screw terminal block (supplied)	**TM2 AMI 4LT**	0.085
8 inputs	0…10 V 0…20 mA	–	10 bits	Removable screw terminal block (supplied)	**TM2 AMI 8HT**	0.085
	Pt 100 Pt 1000	–	12 bits	RJ11 connector	**TM2 ARI 8LRJ**	0.190
				Removable screw terminal block (supplied)	**TM2 ARI 8LT**	0.190
	PTC/NTC	–	10 bits for NTC 2-threshold detection with PTC	Removable screw terminal block (supplied)	**TM2 ARI 8HT**	0.085

Analog output modules

1 output	–	0…10 V 4…20 mA	12 bits	Removable screw terminal block (supplied)	**TM2 AMO 1HT**	0.085
2 outputs	–	± 10 V	11 bits + sign	Removable screw terminal block (supplied)	**TM2 AVO 2HT**	0.085

Analog I/O modules

2 inputs and 1 output	0…10 V 4…20 mA	0…10 V 4…20 mA	12 bits	Removable screw terminal block (supplied)	**TM2 AMM 3HT**	0.085
	J, K, T thermocouple 3-wire Pt 100 temperature probe	0…10 V 4…20 mA	12 bits	Removable screw terminal block (supplied)	**TM2 ALM 3LT**	0.085
4 inputs and 2 outputs	0…10 V 4…20 mA	0…10 V 4…20 mA	12 bits	Removable screw terminal block (supplied)	**TM2 AMM 6HT**	0.085

Separate components

Description	Description	Reference	Weight kg
Ground connection plate	Plate equipped with male Faston connector for connecting cable shielding (via Faston clamp 6.35 mm, not supplied) and functional grounds (FG)	**TM2 XMTGB**	0.045
Shielding connection clamps	Attach and ground the shielding of the cables Sold in lots of 25 (20 for cable Ø 4.8 mm and 5 for cable Ø 7.9 mm)	**TM200 RSRCEMC**	–
Mounting kit	For plate or panel mounting of the analog modules. Sold in lots of 5	**TWD XMT 5**	0.065

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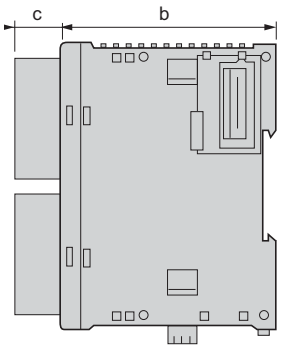
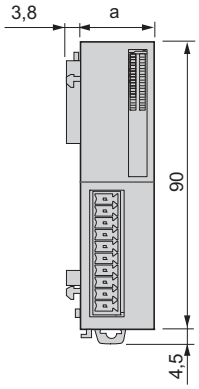
Twido programmable controller
Analog I/O extension modules

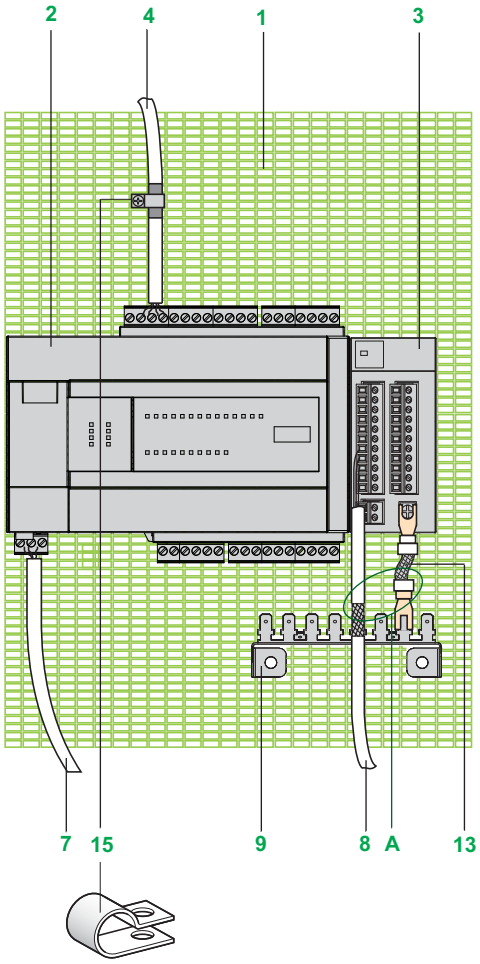
Dimensions
Analog I/O modules

TM2	a	b	c
AMI ●●T	23.5	70	14.6
ARI 8HT	23.5	70	14.6
ARI 8LT	39.1	70	14.6
ARI 8LRJ	39.1	70	14.6 *(1)*
AMO ●HT	23.5	70	14.6
A●M ●●T	23.5	70	14.6

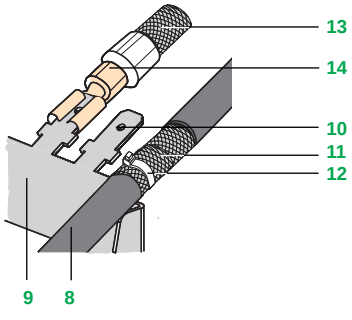
(1) Included removable screw terminal block for connecting 24 V ⎓ power supply







Detail A: *Ground connection plate TM2 XMTGB*



Note: *These shielding connections do not remove the need to connect the PE protective conductors (green-yellow) to the appropriate terminals on each unit or product.*

Connections for ensuring conformity to EMC standards

Principle

In order to protect against external interference, cables and cordsets carrying the signals below must be shielded:
- ■ Extension modules:
  - □ Sensors and actuators connected to **TM2 AMI/ARI** and **TM2 A●O/A●M** analog I/O
  - □ CANopen bus
- ■ Twido controller base:
  - □ Sensors connected to inputs with low filtering
  - □ Serial links.

The use of shielded cables requires compliance with the following wiring rules:
- ■ Shielding earthed at both ends of the cables. Metal conduit or ducting can be used for part of the shielding length, provided there is no break in the continuity of the ground connections.
- ■ Wherever possible, keep cables carrying signals of different categories separate··

Installation diagram for Twido controller

1 Metal plate connected to the device's protective earth (PE)
2 Twido programmable controller
3 Analogue I/O extension module
4 Shielded cables for connecting the fast inputs **4**
8 Shielded cable for connecting the sensors/actuators on analogue extension modules
9 Earth connection plate **TM2 XMTGB** for attaching and earthing the shielding of the cables numbered **8** in the diagram (see detail **A**)

Connecting the shielding of cables 4

Shielding of cables **4** (connection of sensors/actuators to the base) via shielding connection clamp **15** *(1)*:
- □ Attach and ground the shielding of the cables **4** as close as possible to the controller base.
- □ Strip the shielding (at the clamp **15**).
- □ Attach the cable to the metal support **1** by tightening the clamp onto the stripped part of the shielding.

The shielding must be clamped tightly enough to the metal support to ensure good contact.

Connecting the shielding of cables 8

The shielding for cables **8** (connection of the extension modules' sensors/actuators) must be attached to the ground connection plate **TM2 XMTGB** (see detail **A** opposite)

Connecting the functional ground terminals

The functional ground terminals (FG) of the:
- □ 24 V ⎓ power supply of the Twido base
- □ Analogue I/O extension modules, see detail **A**.

Installing the ground connection plate TM2 XMTGB

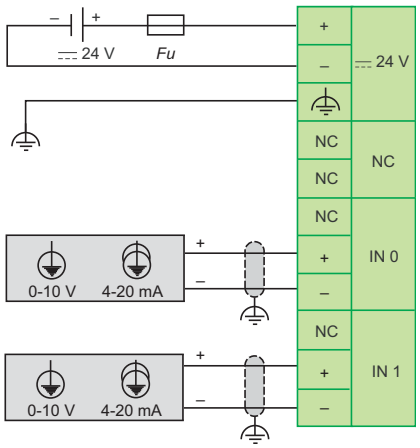
□ **8**, **9**, **10**, **11** and **12**: The shielding on cable **8** is stripped at the male Faston connector **10** for a length of 15 mm **11**, then tightly clamped on it using the Rilsan clamp **12** (width 2.5…3 mm).
□ **13** and **14**: Functional ground terminal (FG). Each earth terminal on the extension modules (analog and counter) must be connected to the **TM2 XMTGB** plate **9** via an earth braid **13** *(2)* (width **W** 2…5 mm, thickness **W/5**) and using a 6.35 mm Faston connector **14** .

(1) The shielding of cables **4** *can be attached to plate* **TM2 XMTGB**, *in the same way as cable* **8**.
(2) Earth braid supplied with **TM2 ARI 8LT/LRJ** *analog modules.*

Connections

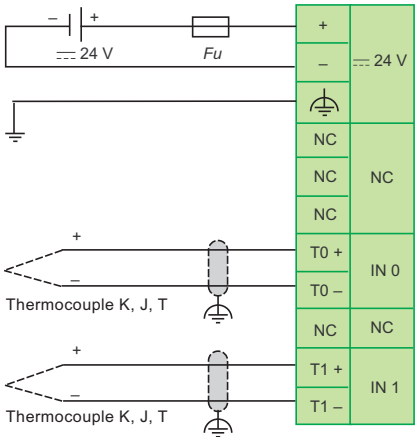
Analog input modules

TM2 AMI 2HT



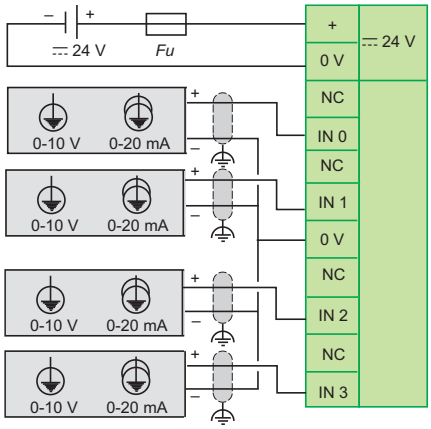
⚠ Do not connect any wires to an unused channel.

TM2 AMI 2LT

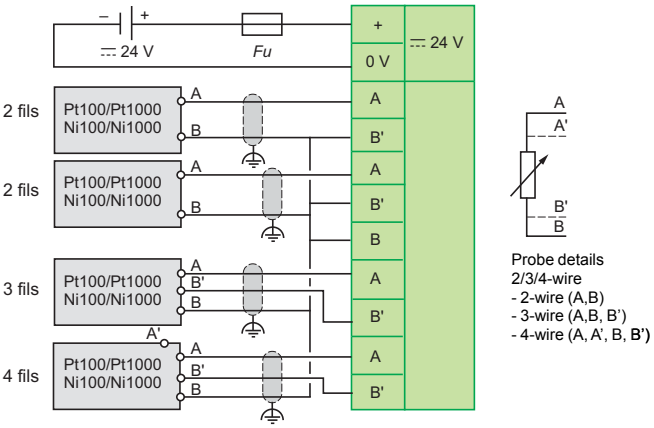


TM2 AMI 4LT

Voltage/current configuration

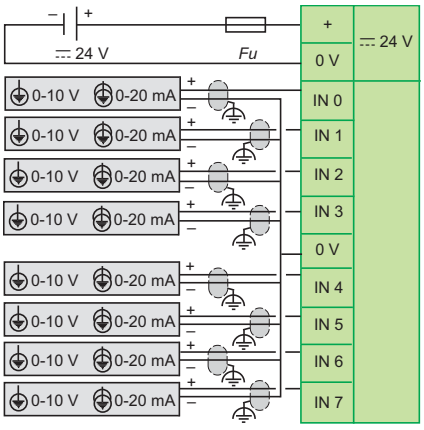


PT100/PT1000 temperature probe, Ni100/Ni1000 configuration

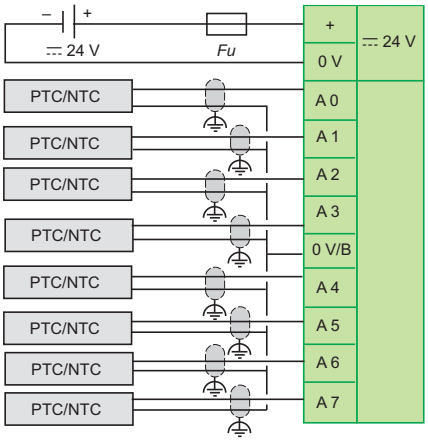


Probe details
2/3/4-wire
- 2-wire (A,B)
- 3-wire (A,B, B')
- 4-wire (A, A', B, B')

TM2 AMI 8HT



TM2 ARI 8HT



⚠ With PTC probe, threshold detection input (high and low)

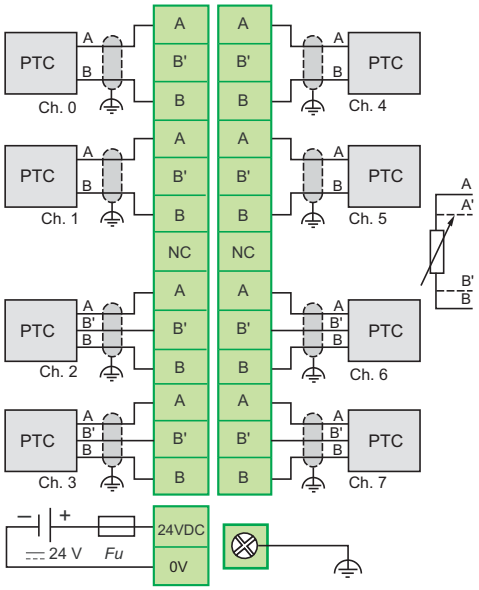
⚠ Do not connect any wires to an unused channel.

Fu: 2 A delayed fuse

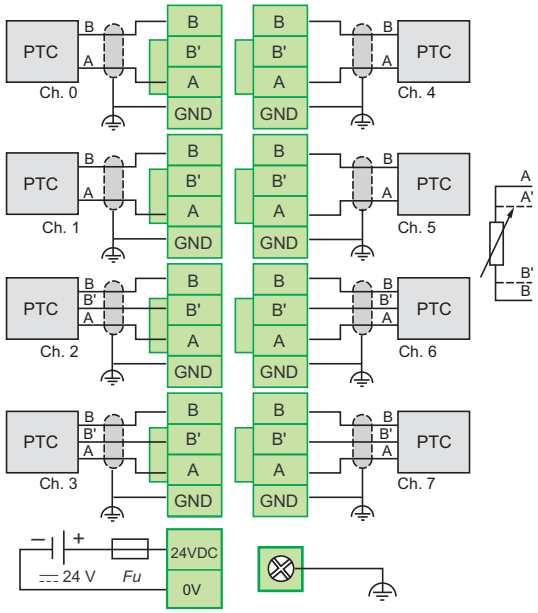
Connections (continued)

Analog input modules (continued)

TM2 ARI 8LT



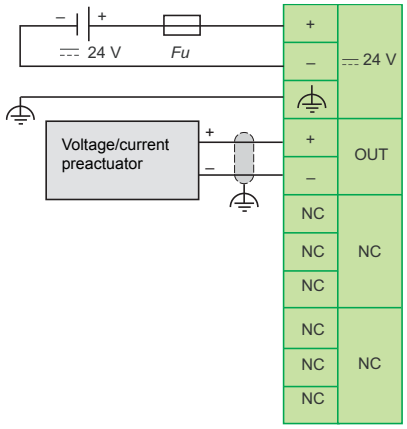
TM2 ARI 8LRJ



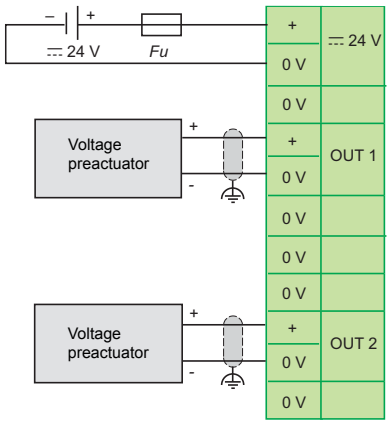
Each channel of the **TM2 ARI 8LT/8LRJ** module can be used as either 2-wire or 3-wire.

Analog output modules

TM2 AMO 1HT



TM2 AVO 2HT



⚠ Do not connect any wires to an unused channel.

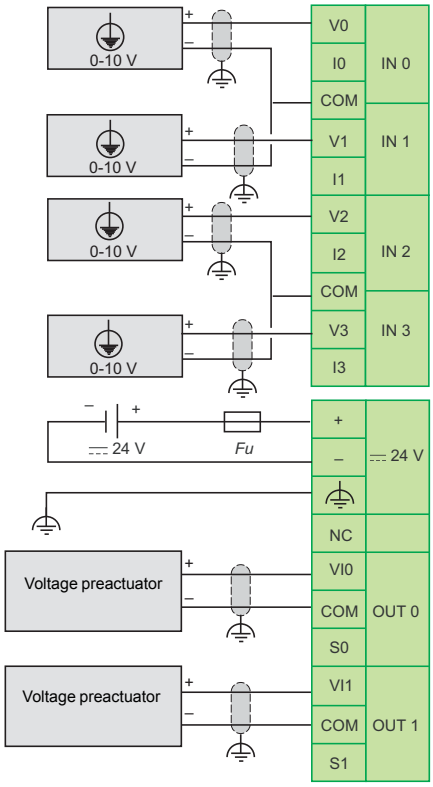
Fu: 2 A delayed fuse

Connections (continued)

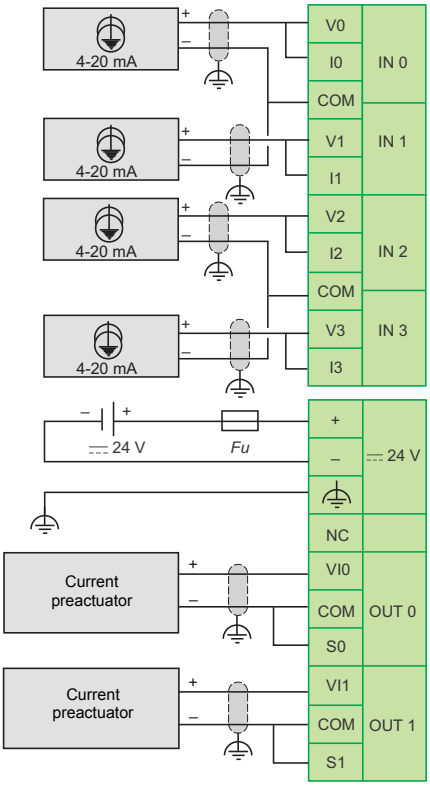
Mixed input/output modules

TM2 AMM 6HT

Voltage configuration

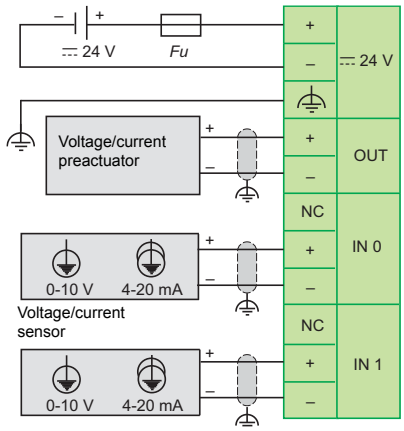


Current configuration

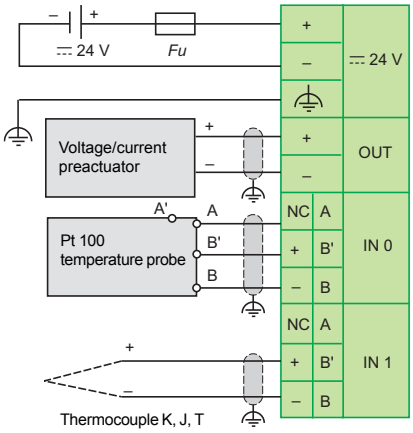


⚠ Do not connect any wires to an unused channel.

TM2 AMM 3HT



TM2 ALM 3LT



□ For a Pt 100 3-wire temperature probe (RTD), connect the three wires to terminals A, B' and B (channels IN0 and IN1).
□ For a Pt 100 2-wire temperature probe (RTD), connect the two wires to terminals A and B' and make a bridge between B' and B (channels IN0 and IN1).
□ For a thermocouple, connect the two wires to terminals B' and B (channels IN0 and/or IN1).

⚠ Do not connect any wires to an unused channel.

Fu: 2 A delayed fuse

Connection interfaces
Advantys IP67
I/O splitter boxes and interfaces

Splitter box and interface type *In combination with IP 67 Twido controller, Extreme base (see page 24)*		**Passive splitter boxes** **Advantys Telefast ABE9 splitter boxes**		
				
Fieldbus type		–		
Inpouts/Outputs	Discrete	8 I/O (4 channels), 16 I/O (8 channels)		
	Analogue	–		
Functions		Connection of 1 to 16 sensors/actuors LED indicator depending on model		
Type of connectors	Sensors/actuators	Female M12 connectors, 5-ways		
	Automation	Female M23 connectors	Multicore cable	
			Length 5 m	Length 10 m
Housing type		Plastic		
Module type		**ABE 9C12●●C23**	**ABE 9C12●●L05**	**ABE 9C12●●L10**
Pages		Please, consult our catalogue on the website, www.schneider-electric.com		

Monobloc I/O splitter boxes and interfaces				Modular I/O splitter boxes
Advantys FTB splitter boxes		**Advantys IP 67 interfaces**		**Advantys FTM splitter boxes**
				
CANopen DeviceNet, InterBus, Pro bus DP	CANopen DeviceNet, Pro bus DP	AS-Interface		CANopen DeviceNet, Pro bus DP
16 I, 8 I/8 O, 12 I/4 O, 16 con gurable I/O, 8 I + 8 con gurable I/O		4 I, 3 O, 4O, 2 I/2 O, 4 I/4 O, 4 I/3 O		8 I, 16 I, 8 con gurable I/O, 16 con gurable I/O
–		–		4 I/4 O
Connection of 1 to 16 sensors/actuors LED indicators		Connection of 1 to 8 sensors/actuors LED indicators		Connection of 1 to 256 sensors/actuors per bus module
Female M12 connectors, 5-ways		Female M12 connectors, 5-ways		Female M8 or M12 connectors, depending on model
Male and female M12 connectors Terminal block with InterBus		Direct connection on AS-Interface at cable	Male M12 connectors	Male and female M12 connectors
Plastic	Metal	Plastic		Plastic
FTB 1●●●●P●	**FTB 1●●●●S0**	**ASI 67FPP●●●**	**ASI 67FMP●●●**	**FTM 1●●10/FTM 1D●●●/FTM 1A●04**
Please, consult our catalogue on the website, www.schneider-electric.com		Please, consult our catalogue “Machine & Installations with industrial communications”		Please, consult our catalogue on the website, www.schneider-electric.com

Twido programmable controller
Communication, integrated ports and modules

Applications		40 I/O compact base controllers with integrated Ethernet TCP/IP port		TwidoPort Ethernet TCP/IP module
				
Type		**Ethernet TCP/IP**		
Structure	Physical interface	10BASE-T/100BASE-TX		
	Type of connector	RJ45		
	Access method	CSMA-CD		
	Binary rate	10/100 Mbit/s		
Medium		Double twisted pair copper cable, category CAT 5E Fibre optic via ConneXium cabling system		
Configuration	Maximum number of devices	–		
	Maximum length	100 m (copper cable), 4000 m (multimode bre optic), 32 500 m (single-mode bre optic)		
	Number of same type links per station	1 (integrated port)		1 TwidoPort interface module
	Other integrated port	Serial link		–
Basic services		Modubus TCP/IP messaging (read/write of data words)		
Conformity class		Transparent Ready class A10		
Transparent Ready communication services	FDR service	IP address assigned by FDR server		
Compatibility with Twido base controllers		–		10/16/24/40 I/O compact base controllers 20/40 I/O modular base controllers
Base controller or module type		**TWD LCDE 40DRF** supply ⎓ 24 V	**TWD LCAE 40DRF** supply ∿ 100…240 V	**499 TWD 01100**
Page		64		65

CANopen bus master module for machines and installations	AS-Interface master module for sensors/actuators *(Actuator Sensor Interface)*	Integrated and optional asynchronous serial link	
			
CANopen	**AS-Interface**	**Modbus and Character Mode**	
ISO 11898 (9-way SUB-D connector)		RS 485 not isolated	R 232/485 not isolated
9-way SUB-D	Removable screw terminal block	8-way Mini-DIN	8-way Mini-DIN or screw terminal block (RS 485)
Master CSMA/CA (multiple access)	Master AS-Interface M3 (standard and extended addressing)	Master/Slave for Modbus link, Half duplex (RS 485) / Full duplex (RS 232) in character mode	
125, 250 or 500 Kbit/s		1.2...38.4 Kbit/s	
Shielded double twisted pair copper cable	Flat cable 2 x 1.5 mm^2	Shielded double twisted pair copper cable	
16	62 discrete devices, 7 analogue devices	32 per segment	
30 m…120 m depending on binary rate	100 m without repeater, 300 m with repeaters	10 m (not isolated), 1000 m with insulation box	
1	2	1	1 optional
–	–	–	
- 16 input process data objects (receive PDO) - 16 output process data objects (transmit PDO)	Read AS-Interface sensor state Read/write AS-Interface actuator state	Read/write bits and words, diagnostics for Modbus link Transmit and receive character strings in character mode	
Class M10	Pro le M3 (except pro le S-7.4 not supported)	–	
–	–	–	
24/40 I/O compact base controller 20/40 I/O modular base controller	24/40 I/O compact base controller 20/40 I/O modular base controller	10/16/24/40 I/O compact base controllers 20/40 I/O modular base controllers	16/24/40 I/O compact base controllers 20/40 I/O modular base controllers
TWD NCO1M	**TWD NOI 10M3**	**Terminal port** integrated in the base controllers	**TWD NAC ●●●D/T** **TWD NOZ ●●●D/T** *(1)*
69	73	72	

(1) With Twido modular base controller: use a serial interface module **TWD NOZ ●●●D/T** *or a digital display module* **TWD XCP ODM** *fitted with a serial interface adapter* **TWD NAC ●●●D/T**.

Twido programmable controller

Ethernet TCP/IP network

Twido compact base controllers with integrated Ethernet port

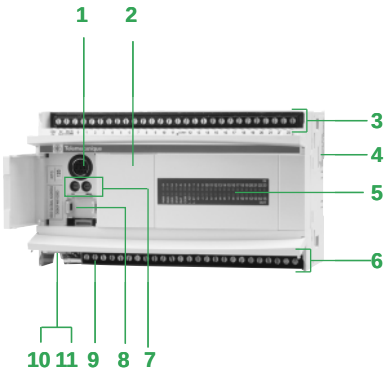
Twido compact base controller with display

The Twido programmable controller range offers 2 compact base controllers with integrated Ethernet port. Within a compact overall size of 157 x 90 x 70 mm, base controllers **TWD LCAE 40DRF** (∿ 100…240 V supply) and **TWD LCDE 40DRF** (⎓ 24 V supply) comprise the following discrete I/O:

- 24 ⎓ 24 V inputs.
- 14 relay outputs.
- 2 ⎓ 24 V transistor outputs.

These base controllers with real-time clock function can be tted with:

- Up to 7 I/O expansion modules, so increasing the I/O capacity to 152 (screw terminal version) or 264 (HE 10 connector version).
- Any of the separate components in the Twido range (memory cartridge, serial link adapters, digital display).



Description

Twido compact base controllers with integrated Ethernet port
TWD LCAE/LCDE 40DRF comprise:

1 A mini-DIN type RS 485 serial port connector (allowing connection of the programming terminal).
2 A slot for digital diagnostic/maintenance display module.
3 A screw terminal block for supply to the ⎓ 24 V sensors (only on base controller TWD LCAE 40DRF) and for connection of the input sensors (protected by hinged terminal block cover).
4 A connector for expansion modules (7 modules max.: discrete I/O, analogue I/O, CANopen bus, AS-Interface).
5 A display block.
6 A screw terminal block for connection of the output preactuators (protected by a hinged terminal block cover).
7 Two analogue adjustment points.
8 A connector for extension of the 2nd RS 232C/RS 485 serial port.
9 A screw terminal block for connection of the mains power supply (∿ or ⎓).

With access through the bottom of the controller:

10 A memory cartridge connector.
11 A standard connector for 10BASE-T/100BASE-TX (RJ45) interface module.

Characteristics

Base controller type			TWD LCAE 40DRF	TWD LCDE 40DRF
TransparentReady Services	Class		A10	
	Web services		No Web server	
	Basic Ethernet TCP/IP communication services		Modbus messaging (read/write of data words) Client BOOTP for assignment of IP address by the FDR server *(1)*	
Structure	Physical interface		10BASE-T/100BASE-TX, standard RJ45 type connector	
	Binary rate		10/100 Mbit/s with automatic recognition	
	Medium		Twisted pair	
Compact base controller	Supply voltage	Nominal	∿ 100…240 V, 50/60 Hz	⎓ 24 V
		Limits	∿ 85…264 V, 47…63 Hz	19.2…30 V
	⎓ 24 V sensor supply		250 mA	–
	Inputs		24 ⎓ 24 V inputs, 11 and 7 mA, type 1 (positive or negative logic)	
	Outputs		14 relay outputs, ∿ 230 V or ⎓ 30 V, 2 A	
			2 transistor outputs, ⎓ 24 V, 1 A (positive logic)	
	Expansion modules		7 modules max.: Discrete I/O (see page 42), analogue I/O (see page 54), CANopen bus (see page 69) and AS-Interface system (see page 73)	
	Other characteristics		See pages 10 and 12	
	LED indicator		Controller status (PWR, RUN, ERR and STAT), I/O status (IN●/OUT●) Ethernet status (LAN ST), 10 or 100 Mbit/s rate (LACT)	

References

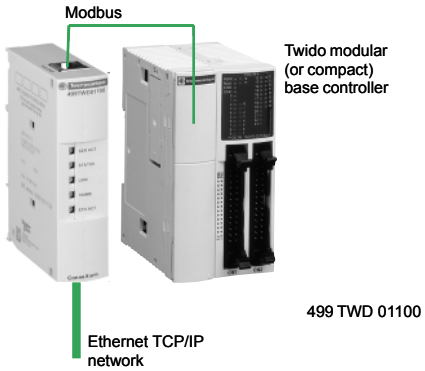
TWD LC●E 40DRF

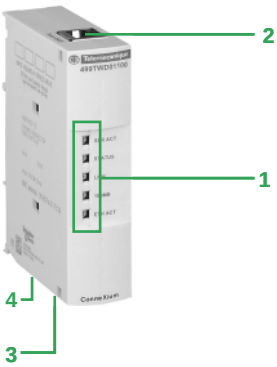
Description	No. of discrete I/O	Supply voltage	Reference	Weight kg
Compact base controllers with integrated Ethernet port Transparent Ready Class A10	24 ∿ 24 V inputs 14 relay outputs 2 solid state outputs ⎓ 24 V	∿ 100…240 V	**TWD LCAE 40DRF**	0.525
		⎓ 24 V	**TWD LCDE 40DRF**	0.525

Separate components: serial interface adapter, memory cartridge, digital display, see page 13.

(1) Auto MDI/MDX function not supported.

Twido programmable controller
Ethernet TCP/IP network
TwidoPort interface module





TwidoPort module **499 TWD 01100** is an Ethernet interface that is easy to use and dedicated to Twido compact or modular programmable controllers, version 3.0. It allows incorporation of the Twido controller into an Ethernet network as a passive device (slave). The TwidoPort module is ready for use.
When connected to the integrated RS 485 serial port of any compact or modular base controller, the TwidoPort module acts as a gateway between the Ethernet TCP/IP network and the Twido controller's Modbus serial link.
The connection cable between the base controller and the TwidoPort module is supplied with the module.

The main characteristics of the TwidoPort module are as follows:
■ Connects to the RS 485 port of the Twido controller; no external auxiliary supply is necessary.
■ Ethernet con guration:
□ takes the Ethernet con guration from the Twido application con guration (normal mode),
□ supports manual con guration using Telnet.
■ Provides Ethernet statistics via a Telnet session.

An optional RS 485 type link provides a second Modbus serial link in order to connect, for example, a Magelis XBT operator terminal. **TWD NAC 485D/485T** serial interface adapter or serial interface module **TWD NOZ 485D/485T** is required.

Description

The TwidoPort **499 TWD 01100** interface module comprises:
1 Five pilot lights indicating the status of the interface and of the TwidoPort module links.
2 An RJ45 type connector for connection of the power supply and of the link to the Twido controller's integrated RS 485 port. This connection is made using connection cable **TWD XCA RJP03P** supplied with the TwidoPort interface module.
3 An RJ45 connector (accessed through the bottom of the module) for connection to the Ethernet TCP/IP network.
4 An earthing screw (accessed through the bottom of the module).
The TwidoPort interface module can be mounted as standard on a symmetrical ⊔ rail. Fixing kit **TWD XMT5** (sold in lots of 5) allows plate or panel mounting (2 x Ø 4.3 holes).

Characteristics

TwidoPort module		499 TWD 01100
Transparent Ready Services	Class	A10
	Web services	No Web server
	Basic Ethernet TCP/IP communication services	Modbus messaging (read/write of data words) BOOTP function Auto MDI/MDX function (avoids the use of crossover cable) Supports manual con guration using Telnet.
Structure	Physical interface	10BASE-T/100BASE-TX, standard RJ45 type connector
	Binary rate	10/100 Mbit/s with automatic recognition
	Medium	Twisted pair
TwidoPort interface module	Operating temperature	0...55 °C
	Relative humidity	10…95 % (without condensation)
	Degree of protection	IP 20
	Max. consumption at ⎓ 5 V	180 mA
	Supply	5 ± 0.5 V provided by the Twido compact or modular base controller
	Conforming to standards	UL 508, CSA 1010, FCC Class A, EN 61131-2, CE
	LED indicator	Activity on the Modbus serial link (SER ACT), controller status (STATUS), Ethernet link status (LINK), binary rate 100 Mbit/s (100 MB), Ethernet network activity (ETH ACT)

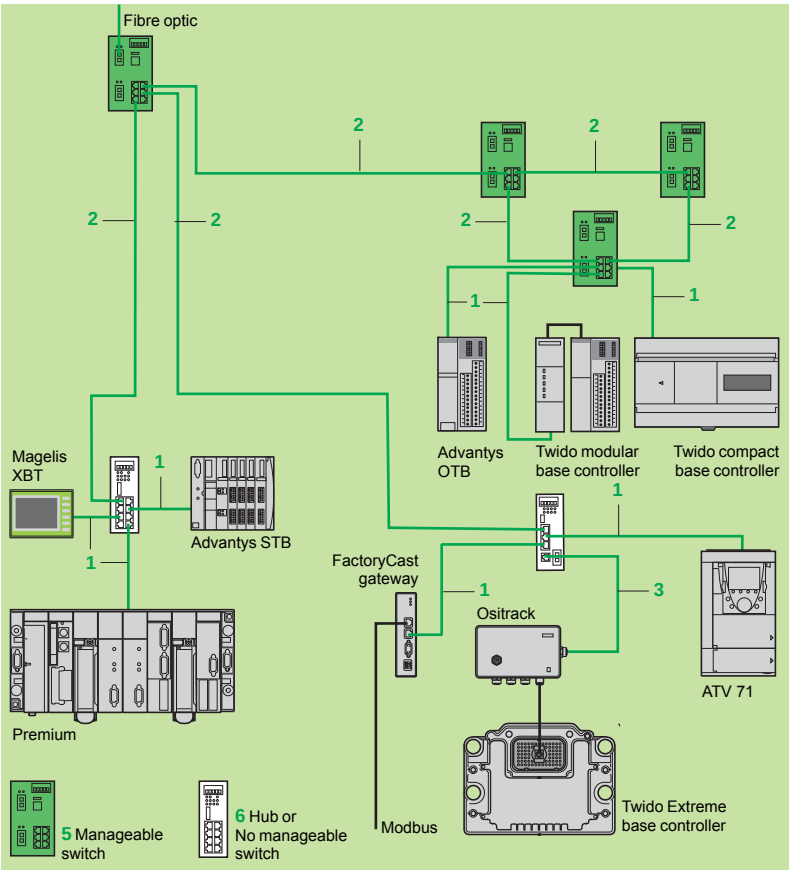
Reference


499 TWD 01100

Description	Twido base controller version ≥ 3.0	Description	Reference	Weight kg
TwidoPort interface module Class A10 Transparent Ready	Compact base controller 10/16/24/40 I/O Modular base controller 20/40 I/O	10/100 Mbit/s. Auto MDIX function. RJ45 connector. Connection cable to base controller, length 0.3 m TWD XCA RJP03P included.	**499 TWD 01100**	0.200

Modicon M238 logic controller
Ethernet Modbus/TCP network
Cabling system

Ethernet Modbus/TCP network architecture



Références *(1)*

Shielded copper connection cables

ConneXium shielded copper connection cables are available in two versions to comply with the different standards and approvals in force:

■ **Shielded twisted pair copper cables to standard EIA/TIA 568**

These cables conform to:

□ standard EIA/TIA 568, category CAT 5E,

□ standard IEC 11801/EN 50173, class D.

Their ame resistance conforms to:

□ NFC 32070# classi cation C2

□ standards IEC 322/1,

□ Low Smoke Zero Halogen (LSZH).

■ **Shielded twisted pair copper cables, UL and CSA 22.1 approved**

These cables conform to:

□ standards UL and CSA 22.1.

Their ame resistance conforms to NFPA 70.

"Do It Yourself" cable and connectors

The ConneXium "Do It Yourself" range allows the user to make up Ethernet copper cables on site and to the required length. They are designed for cabling Ethernet 10/100 Mbit/s networks. The maximum length of cables made up in this way is 80 m. They can be assembled quickly using a knife and cutting pliers (no special tools are required).

Description	Characteristics	Length	Reference	Weight kg
Ethernet copper cable 2 shielded twisted pairs 24 AWG	Conforming to the above-mentioned standards and approvals	300 m	**TCS ECN 300R2**	–
RJ 45 connector	Conforming to EIA/TIA-568-D	–	**TCS EK3 MDS**	–
M12 connector	Conforming to IEC 60176-2-101	–	**TCS EK1 MDRS**	–

(1) For other versions (fibre optic, switches, …): please consult our "Machines and Installations with Industrial Communications" catalogue.

490 NT● 000 ●●

TCS ESU 043F1N0

TCS ESM 043F2C●0

499 NMS/NSS 251 02

TCS ESM 083F2C●0

TCS ESU 051 F0

References (continued)

Shielded twisted pair cables to standard EIA/TIA568

Description	Pre-formed at both ends	Item	Length	Reference	Weight kg
Straight cables	2 x RJ45 connectors For connection to terminal equipment (DTE)	1	2 m	**490 NTW 000 02**	–
			5 m	**490 NTW 000 05**	–
			12 m	**490 NTW 000 12**	–
			40 m	**490 NTW 000 40**	–
			80 m	**490 NTW 000 80**	
Crossover cables	2 x RJ45 connectors For connection between hubs, switches and transceivers	2	5 m	**490 NTC 000 05**	–
			15 m	**490 NTC 000 15**	–
			40 m	**490 NTC 000 40**	–
			80 m	**490 NTC 000 80**	–

Shielded twisted pair cables, UL and CSA 22.1 approved

Description	Pre-formed at both ends	Item	Length	Reference	Weight kg
Straight cables	2 x RJ45 connectors For connection to terminal equipment (DTE)	1	2 m	**490 NTW 000 02U**	–
			5 m	**490 NTW 000 05U**	–
			12 m	**490 NTW 000 12U**	–
			40 m	**490 NTW 000 40U**	–
			80 m	**490 NTW 000 80U**	–
Crossover cables	2 x RJ45 connectors For connection between hubs, switches and transceivers	2	5 m	**490 NTC 000 05U**	–
			40 m	**490 NTC 000 40U**	–
			80 m	**490 NTC 000 80U**	–

Shielded twisted pair cable for IP 67 switch

Description	Pre-formed at both ends	Item	Length	Reference	Weight kg
Straight cables	1 x IP 67 4-way M12 connector and 1 x RJ45 connector	8	1 m	**TCS ECL 1M3M 1S2**	–
			3 m	**TCS ECL 1M3M 3S2**	–
			5 m	**TCS ECL 1M3M 5S2**	–
			10 m	**TCS ECL 1M3M 10S2**	–
			25 m	**TCS ECL 1M3M 25S2**	–
			40 m	**TCS ECL 1M3M 40S2**	–

ConneXium hub

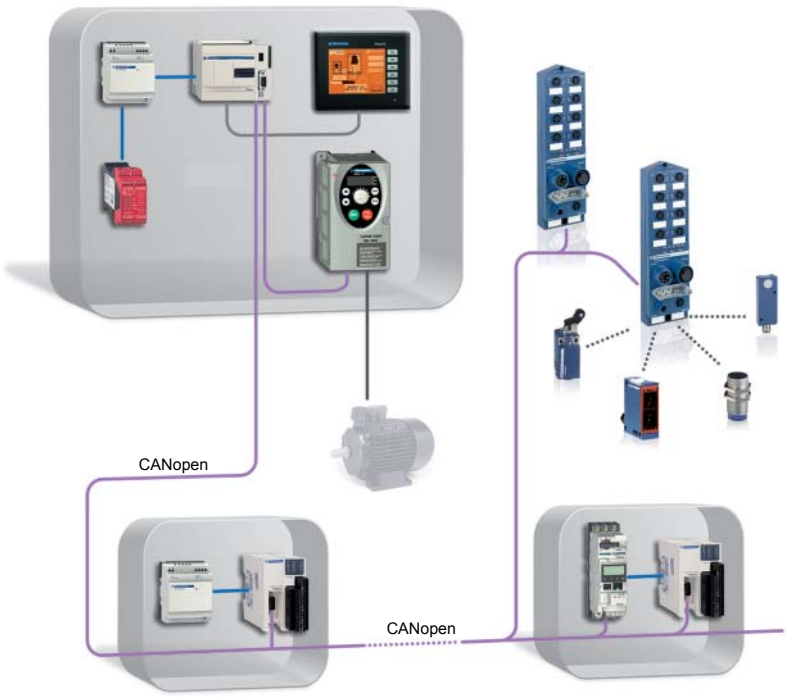
Description	Number of ports		Item	Reference	Weight kg
	Copper cable	Fibre optic			
Twisted pair hub 10BASE-T copper ports, RJ45 shielded connectors	4	–	6	**499 NEH 104 10**	0.530

ConneXium switches

Description	Number of ports		Item	Manag -eable	Reference	Weight kg
	Copper cable	Fibre optic				
Optimised twisted pair switch 10BASE-T/100BASE-TX copper ports, RJ45 shielded connectors 100BASE-FX optic port, SC connectors	3	–	6	No	**TCS ESU 033FN0**	0.113
	4	1	6	No	**TCS ESU 043FN0**	0.120
	5	–	6	No	**TCS ESU 053FN0**	0.113
Twisted pair switches 0BASE-T/100BASE-TX copper ports, RJ45 shielded connectors	8	–	6	No	**499 NES 181 00**	0.230
	8	–	5	Yes	**TCS ESM083F23F0**	0.410
Twisted pair and fibre optic switches 10BASE-T/100BASE-TX copper ports, RJ45 shielded connectors. 100BASE-FX optic ports, SC connectors	3	1, multimode	5	Yes	**TCS ESM043F1CU0**	0.400
	2	2, multimode	5	Yes	**TCS ESM043F2CU0**	0.400
	3	1, single-mode	5	Yes	**TCS ESM043F1CS0**	0.400
	2	2, single-mode	5	Yes	**TCS ESM043F2CS0**	0.400
	4	1, multimode	6	No	**499 NMS 251 01**	0.330
	3	2, multimode	6	No	**499 NMS 251 02**	0.335
	4	1, single-mode	6	No	**499 NSS 251 01**	0.330
	3	2, single-mode	6	No	**499 NSS 251 02**	0.335
	7	1, multimode	5	Yes	**TCS ESM083F1CU0**	0.410
	6	2, multimode	5	Yes	**TCS ESM083F2CU0**	0.410
	7	1, single-mode	5	Yes	**TCS ESM083F1CS0**	0.410
	6	2, single-mode	5	Yes	**TCS ESM083F2CS0**	0.410
IP 67 twisted pair switch *(1)* 10BASE-T/100BASE-TX copper ports, shielded M12 connectors (type D)	5	–	–	No	**TCS ESU 051 F0**	0.210

(1) Require special cables with M12 connectors for their ⎓ 24 V supply: **XZC P1●64L●.**

Twido programmable controller
CANopen bus
CANopen bus master module



Presentation

Master module **TWD NCO1M** for the CANopen bus allows Twido programmable controllers version ≥ 3.0, compact base controllers **TWD LC●A 24/40DRF** and modular base controllers **TWD LMDA ●0D●●**, to act as CANopen master.
The bus consists of a master station, the Twido controller and slave stations. The master is in charge of con guration, exchanges and diagnostics on the slaves.

The CANopen bus is a communication type bus and allows management of various slaves such as:
- Discrete slaves,
- Analogue slaves,
- Variable speed controllers,
- Motor starters,
- ….

The Twido CANopen master controls up to 16 slaves, each with an input PDO (*Process Data Object*) and an output PDO.
If a slave has more than one PDO, the maximum number of slaves is reduced by an equivalent number.

CANopen conformity class

Schneider Electric has de ned the conformity classes for CANopen master and slave devices. Conformity classes are used to identify the services and levels of service supported by each CANopen device or product. These services are described in section 4 of our “Machines & Installations with industrial communications” catalogue.

The table below shows product combination possibilities according to their conformity class.

Conformity class		Slave product		
		S10	S20	S30
Master product	M10			
	M20			
	M30			

Combination possible

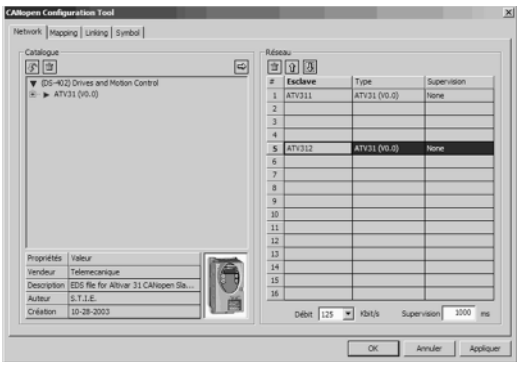
Use restriction: The use of a slave device with a master that has a lower conformity class (e.g. S20 with M10), or of a master device with a slave that has a higher conformity class (e.g. M10 with S20), limits the level of service to that of the lower conformity class.

Examples of combinations with the Twido controller

CANopen slave	CANopen master module TWD NCO1M, class M10
Preventa	
Advantys OTB	
Advantys STB	
Advantys FTB	
Advantys FTM	
TeSys T	
TeSys U	
Altivar 31	
Altivar 61	
Altivar 71	
Lexium 05	
Lexium 15	
Lexium 17D	
Twin Line	
Osicoder	

Combination possible
Use restriction
Not supported by conformity class M10

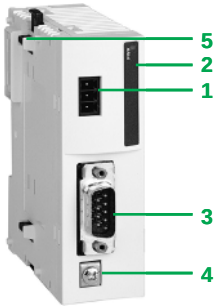
Twido programmable controller
CANopen bus
CANopen bus master module



Configuration

The Twido controller's CANopen bus is con gured using TwidoSuite software
The various services offered are:
- Selection of the slave type from a list that can be modi ed by simply importing a description le of the EDS (Electronic Data Sheet) type.
- The position of the slave on the bus: de nition of the slave number.
- Selection of variables from the list of variables managed by the slave.
- Linking of variables to the exchange data.
- Symbolization of exchange data.

For certain slaves, such as ATV 31/61/71 variable speed controllers and Lexium 05 servo variable speed controller, one or more pro les are supplied, allowing the slave to be con gured according to a mode prede ned by Schneider Electric.
The use of pro les provides the user with an operating mode that is described, without having to con gure it.



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Description

CANopen bus master module **TWD NCO1M** comprises:
1 An earthed, plug-in, 3-way, ⎓ 24 V supply connector.
2 A PWR LED, indicating module power ON or OFF.
3 A 9-way SUB-D connector for connection to the CANopen bus.
4 An earth screw.
5 A connector for connection to the Twido controller or to another I/O expansion module.

Expansion module **TWD NCO1M** can be mounted as standard on symmetrical ⊥ rail. Fixing kit **TWD XMT5** (sold in lots of 5) allows plate or panel mounting.

Characteristics

Twido programmable controller				TWD NCO1M		
CANopen services	Conformity class			M10		
	Standard			DS 301 V4.02, DR 303-2		
Structure	Physical interface			9-way SUB-D male		
	Binary rate		**Kbit/s**	125	250	500
	Maximum length of bus		**m**	500	250	100
	Cables			Shielded twisted pairs		
CANopen communication module	External supply	Nominal voltage	**⎓ V**	24		
		Voltage range	**⎓ V**	19.2…30		
	Current consumption	⎓ 5 V internal	**mA**	50		
		⎓ 24 V external	**mA**	50.5		
	Power dissipated	at ⎓ 24 V	**W**	1.2		
	Operating temperature		**°C**	0...+ 55		
	Degree of protection			IP 20		
	Relative humidity			30…95 % (without condensation)		
	LEDs			Power		
	Product certi cation			UL, CE		
	Number of modules per base controller			1		
	Maximum number	Slaves		16 slaves max.		
		Channels		16 TPDO *(Transmit Process Data Object)* 16 RPDO *(Receive Process Data Object)*		

Reference

TWD NCO1M

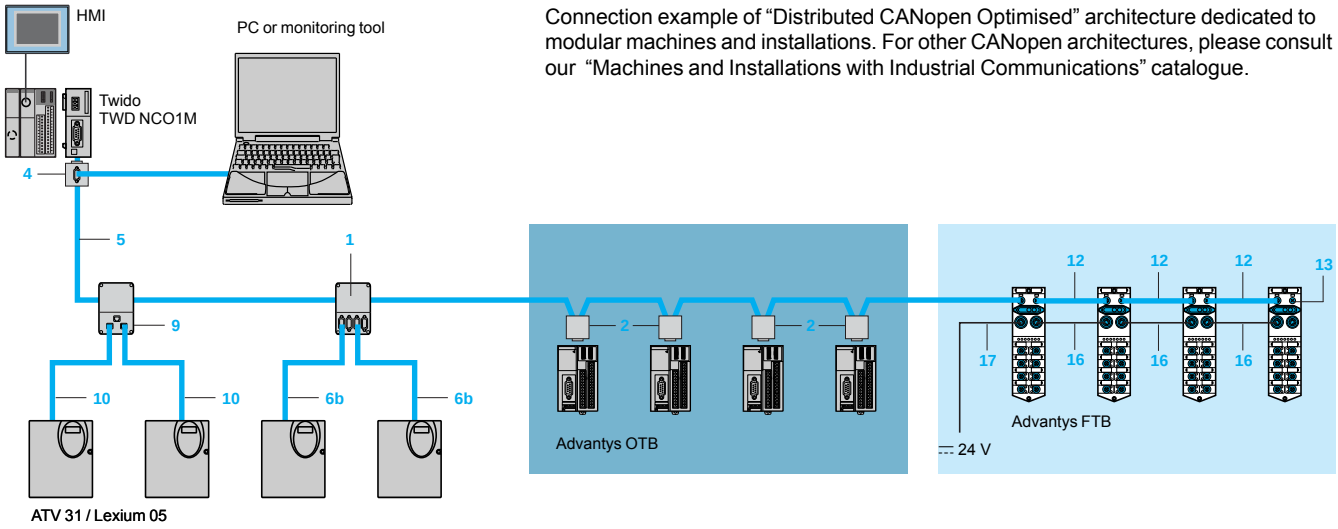
Description	No. of modules per base controller	External supply	Reference	Weight kg
CANopen bus master module for Twido base controller : - Compact TWD LC●● 24/40DRF - Modular TWD LMDA 20/40D●●	1	⎓ 24 V	**TWD NCO1M**	.

Conformity class M10

Description	Application	Reference	Weight kg
Fixing kit Sold in lots of 5	For plate or panel mounting of the module.	**TWD XMT5**	–

Twido programmable controller
CANopen bus
Cabling system

CANopen architecture



Connection example of “Distributed CANopen Optimised” architecture dedicated to modular machines and installations. For other CANopen architectures, please consult our “Machines and Installations with Industrial Communications” catalogue.

References

TSX CAN TDM4

VW3 CAN TAP2

TSX CAN KCD F90T

TSX CAN KCD F180T

TSX CAN KCD F90TP

Standard junction boxes and connectors

Description	Composition	Item	Length	Reference	Weight kg
CANopen IP 20 tap junction box	4 SUB-D ports. Screw terminal blocks for connection of main cables Line end adapter	1	–	**TSX CAN TDM4**	0.196
IP 20 connectors CANopen 9-way SUB-D female. Line end adapter switch	Elbowed (90°)	2	–	**TSX CAN KCDF 90T**	0.046
	Straight *(2)*	–	–	**TSX CAN KCDF 180T**	0.049
	Elbowed (90°) with 9-way SUB-D connector for connection to PC or diagnostic tool	4	–	**TSX CAN KCDF 90TP**	0.051
M12 connectors IP 67	Male	–	–	**FTX CN 12M5**	0.050
	Female	–	–	**FTX CN 12F5**	0.050
CANopen IP 20 tap junction box for Altivar and Lexium 05	2 x RJ45 ports	9	–	**VW3 CAN TAP2**	–

Standard IP 20 pre-formed cables

Description	Application	Item	Length	Unit reference	Weight kg
CANopen cables (2 x AWG 22 2 x AWG 24)	For standard environments *(3)*, CE marking: low fume emission. Halogen-free. Non ame propagating (IEC 60332-1)	5	50 m	**TSX CAN CA50**	4.930
			100 m	**TSX CAN CA100**	8.800
			300 m	**TSX CAN CA300**	24.560
	For standard environments *(3)*, UL certi ed, CE marking: non ame propagating (IEC 60332-2)	5	50 m	**TSX CAN CB50**	3.580
			100 m	**TSX CAN CB100**	7.840
			300 m	**TSX CAN CB300**	21.870
	For standard environments *(3)* or mobile installation, CE marking: low fume emission. Halogen-free. Non ame propagating (IEC 60332-1). Oil resistant	5	50 m	**TSX CAN CD50**	3.510
			100 m	**TSX CAN CD100**	7.770
			300 m	**TSX CAN CD300**	21.700
CANopen pre-formed cables 1 x 9-way SUB-D female connector at each end.	For standard environments *(3)*, CE marking: low fume emission. Halogen-free. Non ame propagating (IEC 60332-1)	–	0.3 m	**TSX CAN CADD03**	0.091
			1 m	**TSX CAN CADD1**	0.143
			3 m	**TSX CAN CADD3**	0.295
			5 m	**TSX CAN CADD5**	0.440
	For standard environments *(3)*, UL certi ed, CE marking: non ame propagating (IEC 60332-2)	–	0.3 m	**TSX CAN CBDD03**	0.086
			1 m	**TSX CAN CBDD1**	0.131
			3 m	**TSX CAN CBDD3**	0.268
			5 m	**TSX CAN CBDD5**	0.400

(1) Connector **VW3 CAN KCDF 180T** *may also be used for connection to a Controller Inside programmable card.*
(2) Standard environment: without any particular environmental restrictions, operating temperature between + 5 °C and + 60 °C, and for fixed installation.
(3) Harsh environments: resistant to hydrocarbons, industrial oils, detergents, solder splashes, hygrometry up to 100%, saline environment, wide temperature variations, operating temperature between - 10 °C and + 70 °C, or mobile installation.

References (continued)

Standard IP 20 pre-formed cables (continued)

Description	Composition	Item	Length	Unit reference	Weight kg
CANopen pre-formed cables	Pre-formed cables with 1 x 9-way SUB-D female connector and 1 x RJ45 connector	6b	0.5 m	**TCS CCN 4F3 M05T**	–
			1 m	**TCS CCN 4F3 M1T**	–
				VW3 M38 05 R010 *(1)*	–
			3 m	**TCS CCN 4F3 M3T**	–
	Pre-formed cables with 2 x 9-way SUB-D connectors, 1 female and 1 male	–	0.5 m	**TLA CD CBA 005**	–
			1.5 m	**TLA CD CBA 015**	–
			3 m	**TLA CD CBA 030**	–
			5 m	**TLA CD CBA 050**	–

Standard IP 67 pre-formed cables

CANopen pre-formed cables	Pre-formed cables with 2 x 5-way, elbowed, M12 connectors, A coding (1 male connector and 1 female connector)	12	0.3 m	**FTX CN 3203**	0.40
			0.6 m	**FTX CN 3206**	0.70
			1 m	**FTX CN 3210**	0.100
			2 m	**FTX CN 3220**	0.160
			3 m	**FTX CN 3230**	0.220
			5 m	**FTX CN 3250**	0.430

IP 20 connection accessories

VW3 CAN A71

CANopen connector for Altivar 71 *(2)*	9-way SUB-D female. Line end adapter switch. 180° cable entry	–	–	**VW3 CAN KCDF 180T**	–
Adapter for Altivar 71 variable speed controller	CANopen SUB-D to RJ45 adapter	–	–	**VW3 CAN A71**	–
Pre-formed CANopen cables	1 RJ45 connector at each end.	10	0.3 m	**VW3 CAN CARR03**	–
			1 m	**VW3 CAN CARR1**	–
CANopen bus adapter for Lexium 17D	Hardware interface for link conforming to the CANopen standard + 1 connector for connection of PC terminal	–	–	**AM0 2CA 001V000**	0.110
Y connector	CANopen/Modbus	–	–	**TCS CTN011M11F**	–

AM0 2CA 001V000

IP 67 connection accessories for Advantys FTB/FTM monobloc and modular splitter boxes

Description	Composition	Item	Length m	Reference	Weight kg
IP 67 line terminator	Equipped with one M12 connector (for end of bus)	13	–	**FTX CNTL12**	0.010
⎓ 24 V supply connection cables	Equipped with two 5-way, 7/8 type connectors	16	0.6	**FTX DP2206**	0.150
			1	**FTX DP2210**	0.190
			2	**FTX DP2220**	0.310
			5	**FTX DP2250**	0.750
	Equipped with one 5-way, 7/8 type connector at 1 end with free wires at the other end	17	1.5	**FTX DP2115**	0.240
			3	**FTX DP2130**	0.430
			5	**FTX DP2150**	0.700
T-connector for power supply	Equipped with two straight, 5-way, 7/8 type connectors	–	–	**FTX CNCT1**	0.100

FTX DP21●●

(1) Cable equipped with line end adapter.
(2) For variable speed controllers **ATV 71H●●●M3**, **ATV 71HD11M3X**, **HD15M3X**, **ATV 71H075N4**... **HD18N4**, *this connector can be replaced by connector* **TSX CAN KCDF 180T**.
(3) Standard environment: without any particular environmental restrictions, operating temperature between + 5 °C and + 60 °C, and for fixed installation.

Twido programmable controller
AS-Interface actuator/sensor bus
AS-Interface master module

Presentation

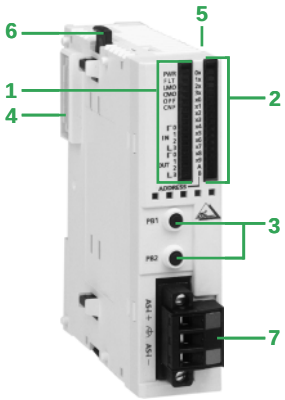
AS-Interface master module **TWD NOI 10M3** allows the Twido controller (version ≥ 2.0) to perform the function of AS-Interface master.

The AS-Interface consists of a master station (Twido controller) and slave stations. The master, which supports the AS-Interface pro le, polls each of the devices connected to the AS-Interface, in turn, and stores information gathered (sensor/actuator status, operating status of the devices) in the controller memory. Communication on the AS-Interface is managed in a way that is totally transparent to the Twido application program.

The **TWD NOI 10M3** master module manages the following with the AS-Interface M3 pro le:
- discrete slave modules (maximum of 62 slaves arranged in 2 banks, A and B, of 31 addresses each),
- analogue slaves (maximum of 7 slaves in bank A).

The AS-Interface M3 pro le supports analogue pro le 7.3 (7 slaves), but does not support analogue pro le S-7.4.
The maximum number of **TWD NOI 10M3** modules per Twido controller is 2.

An AS-Interface power supply is essential to supply the various modules on AS-Interface. It should preferably be located close to the stations with high power consumption.



Description

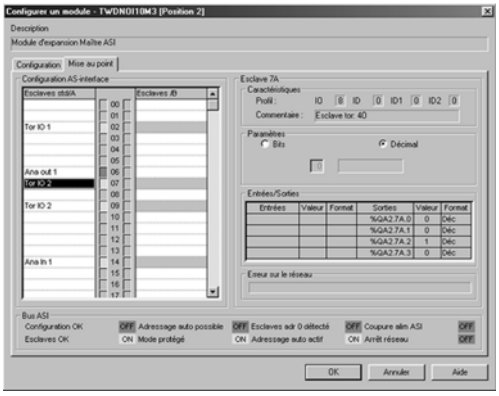
Module **TWD NOI 10M3** takes the form of a standard-size module. It is connected to a Twido base controller (compact or modular) in the same way as any I/O module.
It has the following on the front panel:

1 A display block comprising:
- 6 pilot lights indicating the module operating modes:
  - green PWR pilot light: module powered up,
  - red FLT pilot light: error in the con guration loaded,
  - green LMO pilot light: module in local mode,
  - green CMO pilot light: module in connected mode,
  - red CNF pilot light: not used,
  - red OFF pilot light: module in protected, unconnected mode.
- 6 green pilot lights, 3 for inputs, 3 for outputs.

2 A block for displaying the status of the addresses.
3 Two pushbuttons PB1 and PB2 for controlling the status of the slaves by selecting their address and changing the mode.
4 An extension connector for electrical connection to the previous module.
5 A connector (on the RH side) for I/O expansion modules **TWD D●●** and **TWD A●●** (4 or 7 depending on version).
6 A latching mechanism for attachment to the previous module.
7 A power supply removable screw terminal block.

Expansion module **TWD NOI 10M3** can be mounted as standard on symmetrical ⊔ rail. Fixing kit **TWD XMT5** (sold in lots of 5) allows plate or panel mounting.

Diagnostics



The 30 pilot lights on the front panel of the module are used in conjunction with the two pushbuttons for diagnostics by the Twido controller.
The display block on the front panel of master module **TWD NOI 10M3** allows simpli ed local diagnostics to be performed by displaying the slaves present on the AS-Interface.

Software set-up

AS-Interface is con gured using TwidoSuite *(1)* software.
The services offered are based on the principle of simplicity:
■ Management of pro le tables, parameters and data by the master, in a way that is transparent to the user.
■ Topological addressing of I/O: each AS-Interface slave de ned has a topological address assigned to it, in a way that is transparent to the user.
Each AS-Interface sensor/actuator is seen by the Twido programmable controller in the same way as any “In-rack” I/O.

Characteristics

Module type			**TWD NOI 10M3**
AS-Interface profile			AS-Interface M3, V 2.11 (pro le S-7.4 not supported)
Type of addressing			Standard and extended
Product certifications			AS-Interface n° 47801
Degree of protection			IP 20
Temperature	Operation	**°C**	0…+ 55
	Storage	**°C**	- 25…+ 70
As-Interface external power supply		**⎓ V**	29.5…31.6
Internal current	At ⎓ 5 V	**mA**	80
	At ⎓ 24 V	**mA**	0
AS-Interface consumption at ⎓ 24 V		**mW**	540
Data exchange characteristics			
AS-Interface cycle time	With 1 to 19 slaves	**ms**	3
	With 20 to 62 slaves	**ms**	0.156 x (1 + N) where N = number of active slaves
	With 31 standard slaves or slaves in banks A and B	**ms**	5
	With 62 slaves in banks A and B	**ms**	10
Max. number of modules	Analogue modules *(1)*		7
	Discrete modules *(1)*		62
Max. number of I/O	Standard slaves		248 = 124 inputs + 124 outputs
	Slaves in banks A and B		434 = 248 inputs + 186 outputs
Max. length of AS-Interface cable	Without repeater or line extension	**m**	100
	With line extension TCS ARR01M	**m**	200
	With 2 repeaters ASI RPT01	**m**	300

References

TWD NOI 10M3

Description	**No. modules per base controller**	**AS-Interface profile**	**Number of I/O** *(1)*	**Reference**	**Weight kg**
AS-Interface master module for Twido base controller - Compact TWD LC●● 24/40DRF - Modular TWD LMDA 20/40D●●	2	M3, V 2.11	62 discrete modules max. 7 analogue modules max.	**TWD NOI 10M3**	0.085

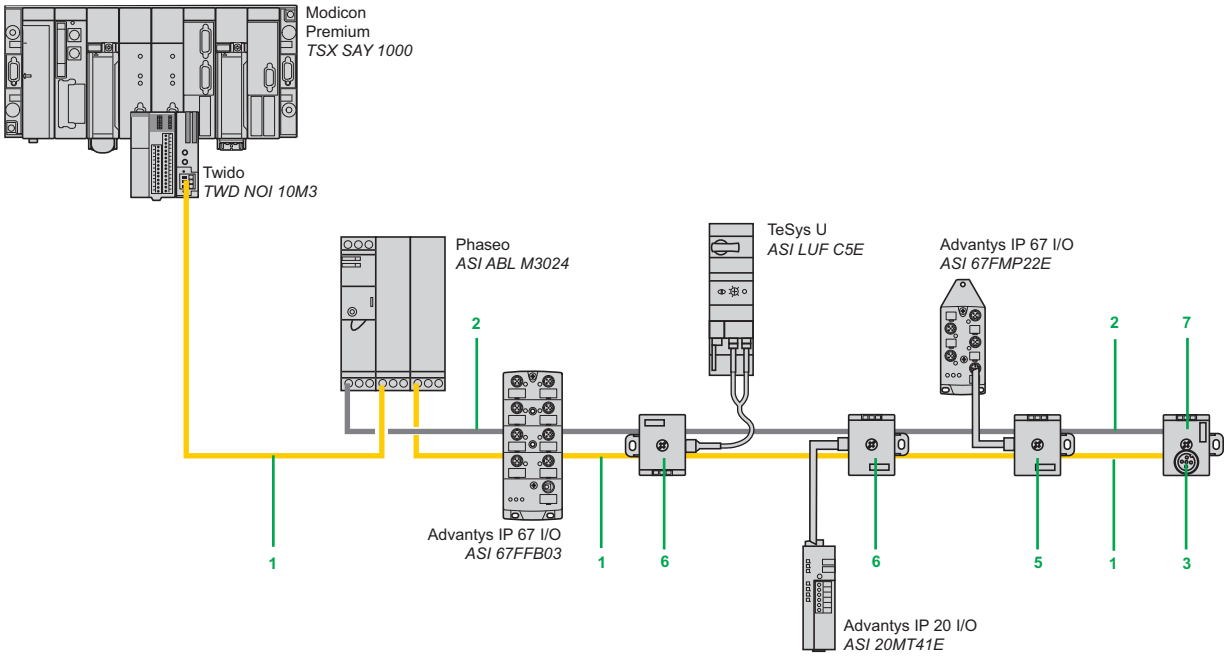
Description	**Application**	**Reference**	**Weight kg**
Fixing kit Sold in lots of 5	For plate or panel mounting of the module	**TWD XMT5**	–

(1) When analogue and discrete modules are connected simultaneously to a system, the analogue modules use addresses 1 to 31 in bank A. When an analogue module uses a certain address, the module addresses having the same number in bank B cannot be occupied by slaves in banks A/B.

Modicon Premium automation platform
AS-Interface cabling system

AS-Interface flat cables are available in two versions, yellow and black, according to the type of application: standard and TPE (resistant to splashing oil and to environments with petrol vapours). Various tap junctions are available to meet all cabling needs. They have a degree of protection of IP 67.

AS-Interface infrastructure

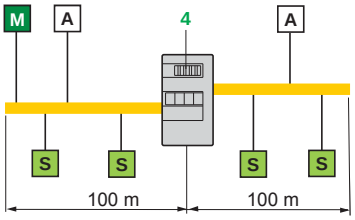


Installation

AS-Interface cable lengths

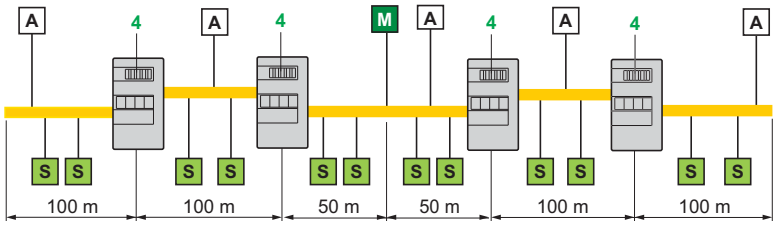
We recommend use of the flat yellow cable. The maximum length of an AS-Interface segment is 100 m, which can be extended to:

■ **200 m** by using a repeater or a line extension:



■ **300 m** with 2 repeaters.

■ **500 m** by placing the master in the centre of the network:

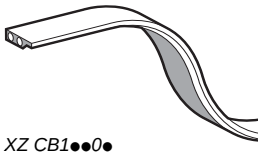


M = Master Module
A = Supply
S = Interface or component

Note: *300 m corresponds to the maximum distance between the master and the furthermost slave.*

For more information on the installation of AS-Interface, please refer to section 5 of our “Machines and Installations with Industrial Communications” catalogue.

Modicon Premium automation platform
AS-Interface cabling system

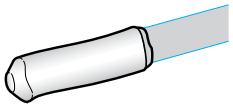


XZ CB1●●0●

TCS AAR011M

ASI RPT01

522173



ASI 67FACC2

TCS ATN011F●

TCS ATV011F●

TCS ATN011F

TCS ATN02V

Flat cables and line accessories

The special profile of these 2-core flat cables eliminates the risk of polarity reversal when connecting. Connections to the cables are made by IDCs (Insulation Displacement Connectors), see connection accessories.
The material used for the cable sheath causes the holes made by the IDCs to reseal themselves as soon as the connectors are removed, so maintaining the IP 67 degree of protection of AS-Interface cabling accessories.
The ambient temperatures which AS-Interface flat cable can withstand are as follows, according to the type of cable:
- Standard cable: 25…+ 85 °C for operation, - 40…+ 85 °C for storage.
- TPE cable (oil and vapour resistant): - 30…+ 105 °C for operation with cable flexing, - 40…+ 105 °C for non-flexing operation or storage.

Description	Sheath colour	Rep.	Length	Type of cable	Reference	Weight kg
Flat cables 2 x 1.5 mm² Ue ≤ 48 V	Yellow (for AS-Interface)	1	20 m	Standard	**XZ CB10201**	1.400
				TPE	**XZ CB10201H**	1.400
			50 m	Standard	**XZ CB10501**	3.500
				TPE	**XZ CB10501H**	3.500
			100 m	Standard	**XZ CB11001**	7.000
				TPE	**XZ CB11001H**	7.000
	Black (for separate ⎓ 24 V supply)	2	20 m	Standard	**XZ CB10202**	1.400
				TPE	**XZ CB10202H**	1.400
			50 m	Standard	**XZ CB10502**	3.500
				TPE	**XZ CB10502H**	3.500
			100 m	Standard	**XZ CB11002**	7.000
				TPE	**XZ CB11002H**	7.000

Description	Application	Rep.	Length	Order in multiples of	Unit reference	Weight kg
Line extension	Allows the length of a segment to be extended from 100 to 200 m	3	–	–	**TCS AAR011M**	0.047
Repeater	Enables an AS-Interface line to be extended by 100 m	4	–	–	**ASI RPT01**	0.190
Heat shrinkable cable end	To preserve IP 67 degree of protection at the end of the AS-Interface cable	–	–	10	**ASI 67FACC2**	0.002

Accessories for connection to AS-Interface flat cables

Degree of protection: IP 67, connection to flat cables by means of IDC's. Ue ≤ 40 V, Ie ≤ 2 A.
Ambient temperature: - 25 °C…+ 70 °C for operation, - 40…+ 85 °C for storage.

Tap-offs for connection of AS-Interface components

Description	Connection to the AS-Interface component	Rep.	Cable length	Fixing	Reference	Weight kg
Tap-offs for connection to a flat cable for AS-Interface (yellow)	Flying lead with 5-way, female, straight, M12 end connector. 2 x 0.34 mm² cable	–	1 m	Screw	**TCS ATN011F1**	0.090
			2 m	Screw	**TCS ATN011F2**	0.130
	Cable with stripped ends for terminal block. 2 x 0.34 mm² cable	–	2 m	Screw	**TCS ATN01N2**	0.215
Tap-offs for connection to two flat cables: - 1 for AS-Interface (yellow) - 1 for the separate supply (black)	Flying lead with 5-way, female, straight, M12 end connector. 4 x 0.34 mm² cable	5	1 m	Screw	**TCS ATV011F1**	0.140
			2 m	Screw	**TCS ATV011F2**	0.180
	Cable with stripped ends for terminal block. 4 x 0.34 mm² cable	6	2 m	Screw	**TCS ATV01N2**	0.265

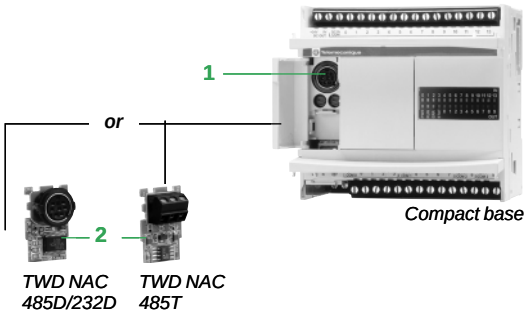
T connectors

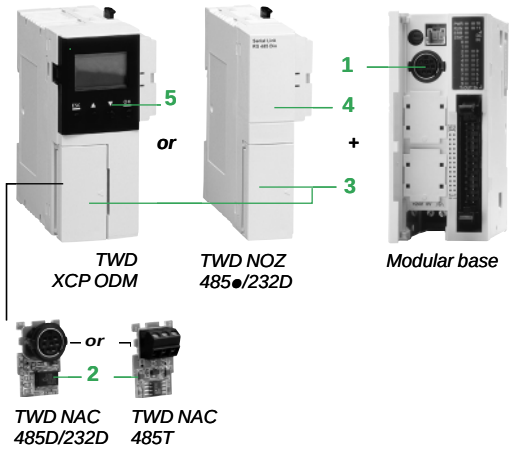
Description	Connection to the AS-Interface component	Rep.	Cable length	Fixing	Reference	Weight kg
T connector for connection to a flat cable for AS-Interface (yellow)	By 5-way female M12 connector	7	–	Screw	**TCS ATN011F**	0.026
Tap-off (or extension) for flat cables: 2 flat cables (yellow)	–	–	–	Screw	**TCS ATN02V**	0.019

Twido programmable controller

Asynchronous serial links

Modbus, character mode, remote link decentralised I/O and programming protocols





Presentation

In order to be able to communicate via serial links, Twido programmable controller modular and compact base controllers include, as standard, an RS 485 serial link principally dedicated as a programming port. These Twido base controllers, except for the 10 I/O compact base controller, are also available with an optional RS 485 or RS 232 link.

These non isolated serial ports allow Twido compact and modular base controllers to communicate according to 4 protocols:

■ **Programming**, for link with a PC (equipped with TwidoSuite programming software or TwidoAdjust adjustment software) or with a pocket PC. This link may be of the common, modem or wireless type using Bluetooth technology.

■ **Modbus**, in order to meet the needs of master/slave architectures with Schneider Electric or third party devices.

■ **ASCII** in character mode for links with serial devices (printer, modem, …)

■ **"Remote link" decentralised I/O** for Twido base controllers used as I/O extension or local "re ex" controller.

Description

16/24/40 I/O compact base controllers have the following on the front panel:

1 An RS 485 serial port, with mini-DIN connector, for connection to the programming terminal.

2 A slot for a 2nd serial port link (RS 485/RS 232) by inserting one of the three TWD NAC 485●/232D adapters.

20/40 I/O modular base controllers have the following on the front panel:

1 An RS 485 serial port, with mini-DIN connector, for connection to the programming terminal.

2 A 2nd serial link port (RS 485/RS 232) via adapters TWD NAC 485●/232. Depending on the user's needs, this adapter (accessible via the removable cover 3) is either:

- 4, included in the module with interface adapter TWD NOZ 485●/232D
- 5, to be tted into digital display module TWD XCP ODM.

The module with interface adapter or the digital display module is mounted on the left-hand side of Twido modular base controllers (only one module can be tted).

Twido controller serial ports

Integrated port	Optional port (2nd port)		
RS 485 Mini-DIN connector	**RS 485** Mini-DIN connector	**RS 232** Mini-DIN connector	**RS 485** Screw terminal block
Compact base controllers TWD LC●A 16/24DRF TWD LC●● 40DRF	TWD NAC 485D	TWD NAC 232D	TWD NAC 485T
All modular base controllers TWD LMDA ●0D●●	TWD NOZ 485D or TWD XCP ODM + TWD NAC 485D	TWD NOZ 232D or TWD XCP ODM + TWD NAC 232D	TWD NOZ 485T or TWD XCP ODM + TWD NAC 485T

Note: *if the RS 232 physical layer is used, and for a length > 10 metres, use the RS 485 physical layer and an RS 232C/RS 485 line adapter reference* **XGS Z24**.

References


TWD NAC 232D/485D


TWD NAC 485T


TWD NOZ 485●
TWD NOZ 232D

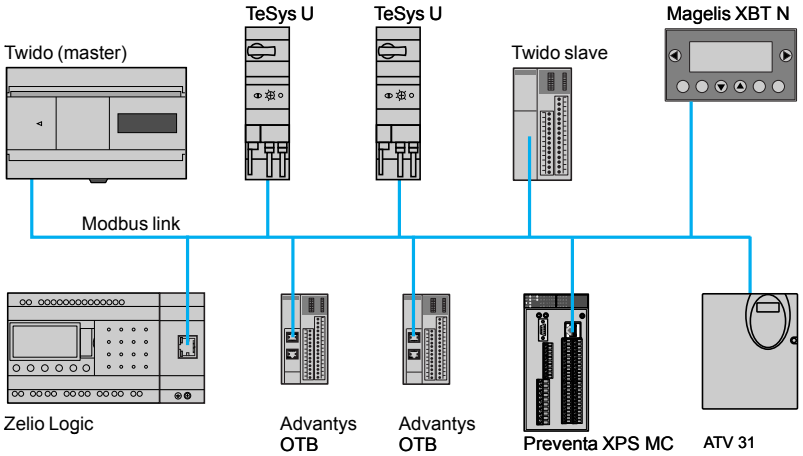
Serial link modules and adapters

All serial links for Twido controllers, whether integrated or optional, are non isolated. It is therefore recommended that isolating devices be used for bus lengths > 10 m, see page 77.

Description	Compatibility	Connection	Physical layer	Reference	Weight kg
Serial interface adapters	Compact base controllers TWD LC●A 16/24DRF and TWD LC●● 40DRF Integrated display module TWD XCP ODM	Mini-DIN connector	RS 232C	**TWD NAC 232D**	0.010
			RS 485	**TWD NAC 485D**	0.010
		Screw terminals	RS 485	**TWD NAC 485T**	0.010
Modules with integrated serial link adapter	Modular base controllers TWD LMDA 20/40D●●	Mini-DIN connector	RS 232C	**TWD NOZ 232D**	0.085
			RS 485	**TWD NOZ 485D**	0.085
		Screw terminals	RS 485	**TWD NOZ 485T**	0.085
Integrated display module	Base controllers TWD LMDA 20/40D●●. Allows a TWD NAC ●●●● serial adapter to be tted		According to TWD NAC	**TWD XCP ODM**	0.105

Twido programmable controller
Asynchronous serial links
Modbus and character mode protocols

Modbus serial link



The Modbus serial link meets the needs of master/slave architectures (it is nevertheless necessary to check that the Modbus services required for the application are implemented on the devices concerned).

The bus consists of a master station and slave stations. Only the master station can initiate the exchange (direct communication between slave stations is not possible). Two exchange methods are possible:

■Question/reply, questions from the master are addressed to a speci c slave. The master waits for the reply to be returned by the slave polled.

■ Distribution, the master distributes a message to all the slave stations on the bus. These stations execute the instruction without sending a reply.

Modbus and character mode characteristics

Protocol		Modbus		Character mode	
Structure	Type	Non isolated serial link *(1)*			
	Access method	Master/slave type		–	
	Physical interface	RS 232, 3-wire	RS 485, 3-wire	RS 232, 3-wire	RS 485, 3-wire
Transmission	Mode	Asynchronous in basic band			
	Frame	RTU/ASCII, Half duplex		Full duplex	Half duplex
	Binary rate	0.3…38.4 Kbit/s (default 19.2 Kbit/s)		0.3…38.7 Kbit/s (default 19.2 Kbit/s)	
	Format	7 or 8 data bits, 1 or 2 stop bits			
	Parity	Without, even or odd			
	Medium	Shielded twisted pair		Single or double shielded twisted pair	Shielded twisted pair
Configuration	Number of devices	2 (point to point)	32 max per segment	2 (point to point)	32 max per segment
	Max. number of link addresses	244		248	
	Max. length of bus *(1)*	15 m	10 m not isolated 1000 m isolated *(2)*	15 m	10 m not isolated 1000 m isolated *(2)*
	Max. length of a tap link	–	10 m not isolated 30 m isolated*(2)*	–	10 m not isolated 30 m isolated*(2)*
Services	Frame	250 bytes of data per request			
	Security, check parameter	One CRC on each frame (RTU) One LRC on each frame (ASCII)		One LRC on each frame (ASCII)	
	Monitoring	Diagnostic counters, event counters		–	

Modbus functions

Modbus functions available on Twido controller serial link

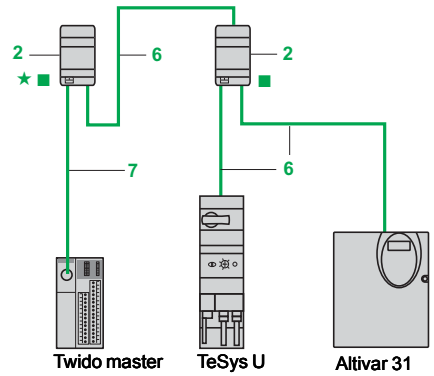
Code	**Modbus slave** (server)	**Modbus master** (client)
01	Read n internal bits %M	Read output bits
02	Read n internal bits %M	Read input bits
03	Read n internal words %MW	Read words
04	Read n internal words %MW	Read input words
05	Write 1 internal bit %M	Write 1 bit or n bits
06	Write 1 internal word %MW	Write 1 word or n words
15	Read n internal bits %M	Write n output bits
16	Write n internal words %MW	Write n output words
23	Read or write n internal words %MW, only with 40 I/O compact base controller **TWD LC●● 40DRF**	–
43	Read device identi cation	–

(1) For non isolated link, distance between the furthest devices: ⩽ 30 m.
(2) For isolated link, tap isolation box **TWD XCA ISO** *must be used.*

Twido programmable controller
Modbus and character mode serial link
Cabling system

Modbus cabling system

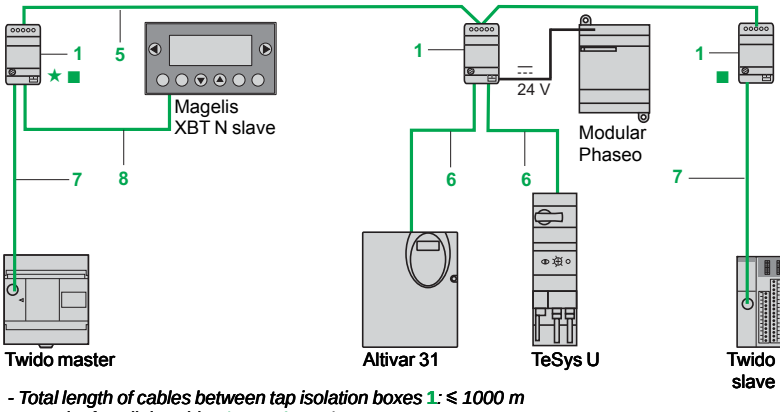
Non isolated link



- Cable length between Twido and Altivar 31: ⩽ 30 m
- Length of cable 6: ⩽ 10 m

★ *Line polarisation active*
■ *Line end adapter*

Isolated link



- Total length of cables between tap isolation boxes 1: ⩽ 1000 m
- Length of tap link cables 6, 7 or 8: ⩽ 10 m

★ *Line polarisation active*
■ *Line end adapter*

References

TWD XCA ISO

TWD XCA T3RJ

LU9 GC3

TSX SCA 50

XGS Z24

Tap-off and adapter components for RS 485 serial link

Description	Application	Item	Length	Reference	Weight kg
Tap isolation box Screw terminal block for main cable 2 x RJ45 for tap-off	- RS 485 line isolation *(1)* - Line end adapter (RC 120 Ω, 1nF) - Line pre-polarisation (2 R 620 Ω) ⎓ 24 V supply (screw terminal block) or ⎓ 5 V (via RJ45) Mounting on 35 mm ⊥	1	–	**TWD XCA ISO**	0.100
Tap junction box 1 x RJ45 for main cable 2 x RJ45 for tap-off	- Line end adapter (RC 120 Ω, 1nF) - Line pre-polarisation (2 R 620 Ω) Mounting on 35 mm ⊥	2	–	**TWD XCA T3RJ**	0.080
Modbus hub Screw terminal block for main cable 10 x RJ45 for tap-off	Mounting on 35 mm ⊥, on mounting plate or panel (2 x Ø 4 mm screws)	–	–	**LU9 GC3**	0.500
T-junction boxes 2 x RJ45 for main cable	1 integrated cable with RJ45 connector for Altivar variable speed controller dedicated tap-off	–	0.3 m 1 m	**VW3 A8 306 TF03** **VW3 A8 306 TF10**	– –
Passive tap junction box	- Line extension and single-channel tap-off on screw terminal block - Line end adapter	–	–	**TSX SCA 50**	0.520
RS 232C/RS 485 line converter	- Flow rate 19.2 Kbit/s max. - Without modem signals ⎓ 24 V/20 mA supply, Mounting on 35 mm ⊥	–	–	**XGS Z24**	0.100

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

References (continued)

Connection cables for RS 485 serial link

Description	Application	Item	Length	Unit reference	Weight kg
Main cables double shielded twisted pair RS 485	Modbus serial link, supplied without connector	5	100 m	**TSX CSA 100**	5.680
			200 m	**TSX CSA 200**	10.920
			500 m	**TSX CSA 500**	30.000
Modbus cables RS 485	2 x RJ45 connectors	6	0.3 m	**VW3 A8 306 R03**	0.030
			1 m	**VW3 A8 306 R10**	0.050
			3 m	**VW3 A8 306 R30**	0.150
	1 x RJ45 connector and 1 end with free wires	–	1 m	**TWD XCA FJ010**	0.060
			3 m	**VW3 A8 306 D30**	0.150
	1 mini-DIN connector for Twido controller and 1 RJ45 connector	–	0.3 m	**TWD XCA RJ003**	0.040
			1 m	**TWD XCA RJ010**	0.090
			3 m	**TWD XCA RJ030**	0.160
	1 mini-DIN connector for Twido controller and 1 RJ45 connector *(1) (3)*	7	0.3 m	**TWD XCA RJP03**	0.027
	1 mini-DIN connector for Twido controller and 1 RJ45 connector Dedicated programming protocol *(2) (3)*	–	0.3 m	**TWD XCA RJP03P**	0.027
	1 mini-DIN connector for Twido controller and 1 end with free wires	–	1 m	**TWD XCA FD010**	0.062
			10 m	**TSX CX 100**	0.517
Twido cables to display and Magelis compact terminal XBT N/R	1 mini-DIN connector for Twido controller and 1 RJ 45 connector for XBT N200/N400/R400	–	2.5 m	**XBT Z9780**	0180
	1 mini-DIN connector for Twido controller and 1 x 25-way SUB-D connector for: - XBT N410/N401/NU400 - XBT R410/R411	–	2.5 m	**XBT Z968**	0.210
Cables for display and Magelis compact terminal XBT N/R	2 x RJ45 connectors for XBT N200/N400/R400	8	3 m	**VW3 A8 306 R30**	0.150
	1 x RJ45 connector and 1 x 25-way SUB-D connector for: - XBT N410/N401/NU400 - XBT R410/R411	8	2.5 m	**XBT Z938**	0.210
Line end adapter	For RJ45 connector R = 120 Ω, C = 1 nf	–	Order in multiples of 2	**VW3 A8 306 RC**	0.200

Connection cables for RS 232 serial link

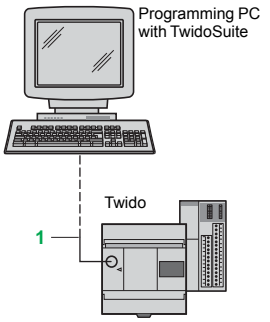
Description	Application	Length	Reference	Weight kg
Cable for DTE terminal (printer) *(4)*	Serial link for terminal device (DTE) 1 x RJ45 connector and 1 x 9-way SUB-D female connector	3 m	**TCS MCN 3M4F3C2**	0.150
Cable for DCE terminal (modem, converter)	Serial link for point to point device (DCE) 1 x RJ45 connector and 1 x 9-way SUB-D male connector	3 m	**TCS MCN 3M4M3S2**	0.150

(1) Forcing the configuration of RS 485 integrated port with programming protocol parameters.
(2) Allows the using of RS 485 integrated port with the parameters defined in configuration.
(3) Carries ⎓ 5 V voltage (supplied by RS 485 integrated port of Twido controller) for **TWD XCA ISO** *tap isolation box (not using the ⎓ 5 V external power supply).*
(4) If the terminal is equipped with a 25-way SUB-D connector, a SUB-D 25-way female/9-way male adapter **TSX CTC 07** *must also be ordered.*

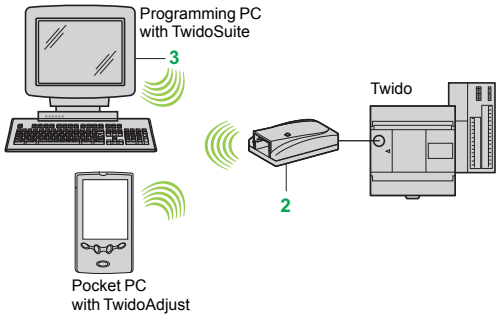
Twido programmable controller
Asynchronous serial links
Programming protocol

Terminal link cabling system (integrated port)

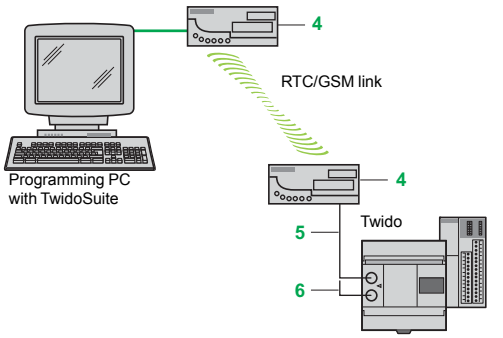
Direct link



Wireless link



Link by modem



Terminal link characteristics (integrated port)

Protocol type		
Physical layer		RS 485
Flow rate	**Kbit/s**	1.2…38.4, initial value: 19.2
Format		7 or 8 data bits, initial value: 8 - 1 or 2 stop bits, initial value: 1
Parity		Without, even or odd, initial value: without
Connection		8-way mini-DIN female connector
Compatibility		Compact base controllers TWD LC●A10/16/24DRF and TWD LC●● 40DRF Modular base controllers TWD LMDA ●0D●●

References

TSX CUSB 485

TSX PCX 1031

VW3 A8114

SR2 MOD01

SR2 MOD03

Connection components for terminal link

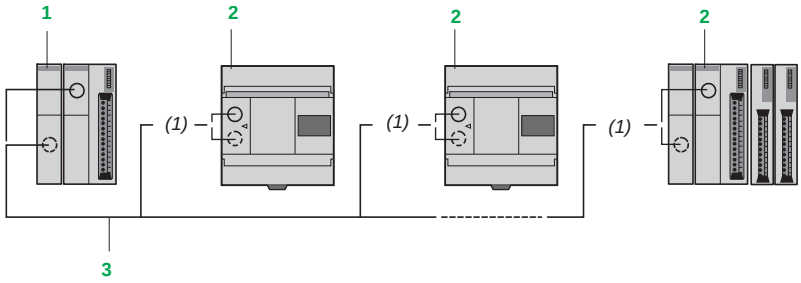
Description	Application	Item	Cable length	Reference	Weight kg
USB/RS485 converter	Allows connection of the Twido controller's integrated port to the USB port on the programming PC. To be used with mini-DIN/RJ45 cable.	1	0.4 m	**TSX CUSB 485**	0.144
RS 485 cable	Fitted with a mini-DIN connector and an RJ45 connector To be used with the USB/RS485 converter	1	2.5 m	**TSX CRJMD 25**	0.150
RS 232 cable for DTE terminal (PC serial port, printer, …)	Fitted with a mini-DIN connector and a 9-way SUB-D female connector	1 *(1)*	2.5 m	**TSX PCX 1031**	0.170
Adapter Modbus/Bluetooth®	- 1 Bluetooth® adapter (range 10 m, class 2) with RJ45 connector - 1 x 0.1 m length cable for TwidoSuite, with 1 RJ45 connector and 1 mini-DIN connector - adapter and cable for Altivar variable speed drives	2	–	**VW3 A8 114**	0.155
USB Bluetooth adapter for PC	Range 10 m For use on the PC serial port if the PC does not have Bluetooth technology	3	–	**VW3 A8115**	0.290
RTC Modem	Type SIXNET VT - Modem-5-WW Supplied with telephone cable Supply voltage ⎓ 12…36 V	4	3 m	**SR2 MOD01**	0.231
GSM/GRPS Modem *(2)*	4-band 900/1800 MHz (Europe) and 900/1900 MHz (US) IP31 box supplied with - power cable (1.5 m) - 4-band GSM antenna with cable (2.5 m) - mounting on panel or on 35 mm ⊥ Supply voltage ⎓ 5,5…24 V	4	1.5 m	**SR2 MOD03**	0.335
RS 485/232 cable for DCE terminal (modem, …)	Connection on Twido RS 485 terminal port Fitted with a mini-DIN connector and a 9-way SUB D male connector. Supplied with a **TSX CTC 09** adapter (9-way SUB-D female/25-way SUB-D male).	5	3 m	**TSX PCX 1130**	0.140
RS 232 cable for DCE terminal (modem, …)	Connection on **TWD NAC 232D** RS 232 serial interface adapter Fitted with a mini-DIN connector and a 9-way SUB D male connector.	6	3 m	**TWD XCA MD030**	0.138

(1) Depending on the type of terminal to be connected, adapter **TSX CTC 10** *(9-way SUB-D male/25-way SUB-D male) must be ordered separately.*

(2) **SR2 MOD03** *modem with Twido controller parameters. Compatible with Modicon M340 and Modicon Premium/TSX Micro platforms.*

Twido programmable controller
Asynchronous serial links
“Remote link” decentralised I/O protocol

“Remote Link” decentralised I/O



Each compact or modular base controller can be extended by means of any other Twido base controller used either as an I/O extension, or as a local “re ex” controller:
■ When used as an I/O extension, these 10, 16, 20, 24 or 40 discrete I/O base controllers cannot take any expansion modules (discrete I/O, analogue I/O or communication). The “master” base controller acquires the inputs and updates the outputs of the Twido base controllers used as remote I/O extensions
■ When used as a local “re ex” controller, these base controllers each have their own application program. They can take any of the expansion modules (discrete I/O, analogue I/O or communication). Eight internal words (4 input words %INW0.0…%INW0.3 and 4 output words %QNW0.0…%QNW0.3) are reserved in each “re ex” base controller for automatic exchange of information with the “master” controller.

1 Compact or modular base controller acting as “master”.
2 Twido compact or modular base controllers used as I/O extension or as local “re ex” controller.
3 RS 485, 3-wire cable from the integrated serial port or from the 2nd optional serial port.

(1) Connection is made either to the integrated serial port, or to the 2nd optional serial port

“Remote link” characteristics

Protocol type		“Remote link”
Flow rate	**Kbit/s**	38.4
Physical layer		RS 485
Medium		Double shielded twisted pair
Maximum length of link	**m**	200 with tap link 10 m max. Tap isolation boxes TWD XCA ISO to be used for distances ≥ 30 m
Connection to controller		To integrated serial port (mini-DIN connector) To 2nd optional serial port on compact base controllers (mini-DIN connector or screw terminal block)
Number of Twido base controllers that can be connected		1…7
Compatibility		Compact base controllers TWD LC●A 10/16/24DRF andTWD LC●● 40DRF Modular base controllers TWD LMDA ●0D●●

References

TSX SCA 50

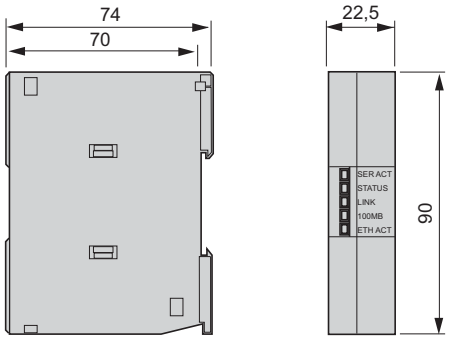
Tap-off and connection components

Description	Application	Item	Length	Reference	Weight kg
Passive tap **junction box**	- Line extension and single-channel tap-off on screw terminal block - Line end adapter	–	–	**TSX SCA 50**	0.520
Main cables double shielded twisted pair RS 485	Modbus serial link, supplied without connector	5	100 m	**TSX CSA 100**	5.680
			200 m	**TSX CSA 200**	10.920
			500 m	**TSX CSA 500**	30.000
Modbus cables RS 485	1 mini-DIN connector for Twido controller and 1 end with free wires	–	1 m	**TWD XCA FD010**	0.062
			10 m	**TSX CX 100**	0.517

Dimensions

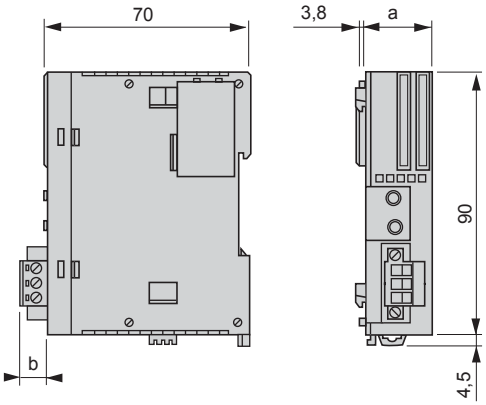
TwidoPort Ethernet module

499 TWD 01100



CANopen bus/AS-Interface expansion modules

TWD NCO1M/NOI 10M3

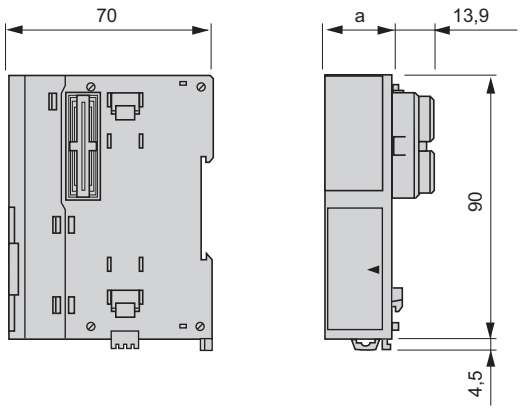


	a	b
TWD NCO1M	29.7	14.6
TWD NOI 10M3	23.5	9.4

(1) Mounted on RH side of compact and modular base controllers.

Expansion modules with serial adapter and digital display

TWD NOZ ●●●● and TWD XCP ODM *(2)*



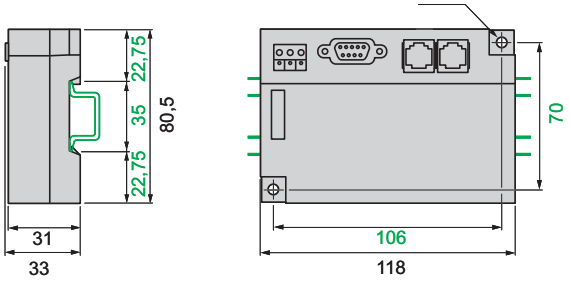
	a
TWD NOZ ●●●●	22.50
TWD XCP ODM	38

(2) Can only be mounted on LH side of modular base controllers.

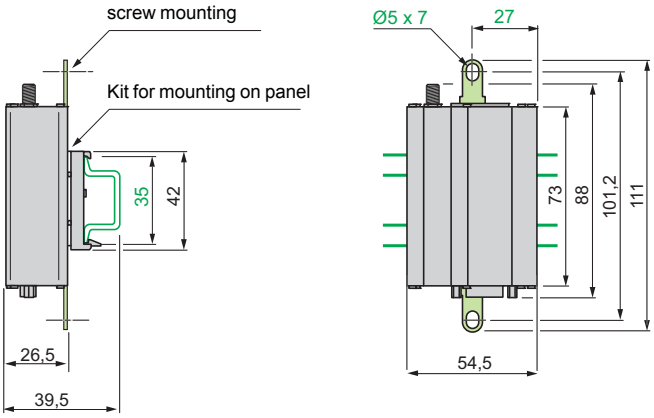
Dimensions (continued)

Modems

SR2 MOD01 (RTC)

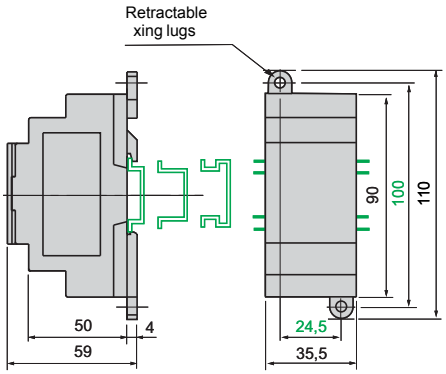


SR2 MOD03 (GSM/GPRS)



Tap boxes

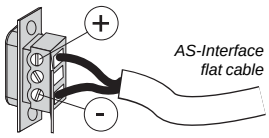
TWD XCA ISO and TWD XCA T3RJ



Connections

AS-Interface

Screw terminal block

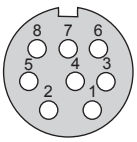


TWD NOI 10M3

+	Brown wire
-	Blue wire

Integrated serial link

RS 485
mini-DIN connector



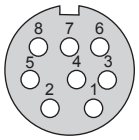
TWD LC•A 10/16/24DRF
TWD LC•• 40DRF
TWD LMDA •0D••

1	D1 (A +)
2	D0 (B -)
3	NPC
4	/DE
5	/DPT
6	NPC
7	0 V
8	5 V (180 mA)

Optional link

RS 232D
mini-DIN conn.

RS 485
mini-DIN conn.

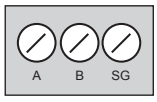


TWD NAC 232D
TWD NOZ 232D

TWD NAC 485D
TWD NOZ 485D

RTS	D1 (A +)
DTR	D0 (B -)
TXD	N/C
RXD	N/C
DSR	N/C
0 V	N/C
0 V	0 V
5 V (180 mA)	5 V (180 mA)

RS 485
screw terminal block



TWD NAC 485T
TWD NOZ 485T

A	D1 (A +)
B	D0 (B -)
SG	0 V

NC: not connected
NPC: do not connect
/DPT: 1 = master. If not connected, the Programming protocol is used for communication with PCs (at state 1, 19, 200 Kbit/s, without parity). If connected to 0 V, the communication parameters are those con gured by the TwidoSuite software

Twido programmable controller
TwidoSuite programming software

Presentation

TwidoSuite programming software is a user-friendly tool designed to help you develop projects created on Twido controllers. It provides seamless continuity for applications created using TwidoSoft.

TwidoSuite is easy-to-use and takes little or no time to learn how to use.
Its primary aim is to reduce project development time signi cantly by simplifying all necessary interventions.
TwidoSuite is the rst software tool:
■ Organized according to the project development cycle. Navigation through the software is so easy that it becomes second nature.
■ Offering an interface that is resolutely modern, pleasant and intuitive, so that getting started is:
□ More user-friendly
□ Faster - the simpli ed interface helps you nd the information you need in a matter of seconds
□ More ef cient, thanks to the numerous tools and tips on offer

TwidoSuite software runs with the following minimum con gurations:
■ Microsoft Windows® 2000, Microsoft Windows® XP (service Pack 2 recommended)
■ 466 MHz Pentium type processor, hard disk with 100 Mb space available and 128 Mb of RAM
■ Minimum screen resolution of 800 x 600 pixels

Connecting a PC to the controller

There are several ways of connecting a PC to controllers during the programming, debug and maintenance phases.

Link via connection cables

The PC is connected to the Twido bases via:
■ A USB port using the USB/RS 485 converter **TSX CUSB 485** and the 2.5 m Mini-DIN/RJ45 cable **TSX CRJMD25**
■ A RS 232 serial port via the 2.5 m 9-way Mini-DIN/SUB-D multifunction cable **TSX PCX 1031**

Link via modem

Modems are a very practical solution avoiding the need for on-site attendance for certain maintenance operations.
The modem connected to the Twido controller must be declared in the hardware con guration. It will be initialized by the controller automatically (Hayes initialization string).
At the PC end, the TwidoSuite software will associate a special modem connection that will be memorized in the project (including the telephone number to use).

Ethernet network link

Thanks to its embedded Ethernet port, the Twido compact bases controller **TWD LCAE 40DRF** and **TWD LCDE 40DRF** can be connected to a PC using the Ethernet network and the Modbus TCP/IP protocol.
The TwidoPort Plug&Play interface module **499 TWD 01100** is extremely easy to use, and can be used to incorporate all Twido controllers (rmware version ≥ 3.0) into an Ethernet TCP/IP network.

Bluetooth wireless link

The ideal solution during the debug phase, the Bluetooth wireless link provides the convenience of total freedom of movement within a radius of 10 m around the Twido controller.

Being self-powered, the Modbus - Bluetooth adaptor **VW3 A8 114** simply has to be connected to the Twido controller. If the PC does not have Bluetooth technology, the USB - Bluetooth adaptor **VW3 A8 115** should be used.

Twido programmable controller

TwidoSuite programming software

Navigation, management, description

523256

Instinctive, visual navigation

Navigation within TwidoSuite is intuitive and highly visual.

Presentation is optimized in such a way that selecting the development stage of the desired project makes the appropriate tools available.

The environment ensures nothing is overlooked, by suggesting the tasks to be performed throughout the project development cycle.

The workspace has been streamlined so that only that which is necessary and relevant to the current task is featured, without any super uous information.

An area can be used to activate additional tools in a matter of seconds.

The basic functions are permanently accessible for quick and easy navigation and access to information.

Project management

The “Project management” function is used to:
- Create a new project with the option to enter data by means of a form and attach a photo
- Open a project from the PC (hard disk, CD-Rom, USB key, etc.)
- Review a project from a Twido controller.

There is quick access to the most recently-used projects.

523257

Description of the architecture

This function is used to:
- De ne the Twido hardware used in the project (controller, I/O extension, options, etc.)
- Describe the controller environment, such as, for example:
  - The HMI terminal connected
  - The devices connected to the CANopen network
  - Etc.

This hardware context for the project is essential for explaining as clearly as possible the composition of the control system managed by the Twido controller.

A highly visual “Catalog” can be used to select the appropriate product including:
- The product reference
- The product description
- A photo of the product

A graphic editor can be used to assemble the various elements easily by a simple drag & drop.

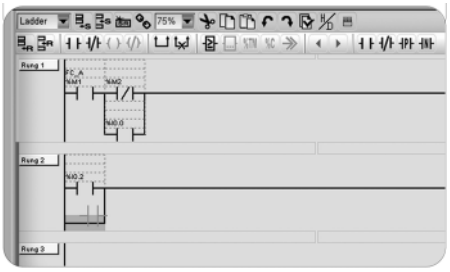
The “Parts list” tool lists all the products used and can retrieve this information in Excel format so that an order for equipment can be prepared more quickly, for example.

Twido programmable controller

TwidoSuite programming software

Con guration, programming, debugging

523258



523259

Configuration

The con guration stage is used to de ne the elements that will be available for programming. There are three types of con guration:

- Hardware con guration, which de nes, for example, the type of sensor connected to an analog extension module input or even the temperature scale to be used (°C or °F)
- Data con guration, which is used to set timer parameters and de ne the constants and the number of memory words to be used
- Behavior con guration, which speci es the start-up conditions for the application (automatically on controller power-up, or dependent on the state of an input), the scan mode, etc.

Programming

Programming is an essential step, and one which has been carefully designed to be as ef cient as possible. The program can now therefore be organized into “Sections”, which simplify reading and navigating through the program.
These sections can be programmed in LIST or LADDER language.

For enhanced productivity, a new Ladder Editor helps create the program in record time. Use of the “Data Browser” tool replaces the often tedious task of entering a memory address with a simple drag & drop.

Debugging

Often performed in dif cult conditions, debugging is now much improved.
The connection task is guided step-by-step, so that all the actions performed by TwidoSuite (choice of connection, test of the connected controller, selection of the transfer performed) can be followed.
The program is then animated, allowing modi cations to be made without stopping the controller (RUN).
Animation tables display the memory objects in a user-friendly way.
A mini oating display panel can be used to control actions on the controller.

Documentation

Because a printed dossier of the created project is still a crucial element, it is possible to con gure some project elements for printing, de ne the page layout to suit the user’s requirements, and then launch printing.
A preview function avoids wasted print jobs.

Generating an HTML folder allows the documentation to be reviewed in Microsoft Word 2000 in order to add to it and create a maintenance manual, for example.

Macros for Modbus serial link and CANopen bus

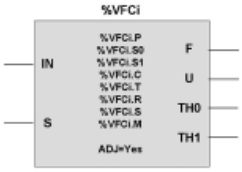
In order to make programming easier, a system of macros simpli es writing of the program and improves understanding of the code. This system is presented according to different families of equipment - generic equipment, variable speed drives (ATV 31, ATV 61, ATV 71 and Lexium 05).
For each family, a list of macros is suggested to facilitate exchanges between the Twido programmable controller and the device connected to the Modbus serial link or the CANopen bus. These macros are in the form of con gurable families to describe the network characteristics of the device involved (Modbus network or CANopen bus, slave address, etc.). The instances thus con gured can be run within the program.
For each macro, symbols for objects used can be generated automatically in order to provide further assistance in terms of readability of the application. For each macro inserted in the program, TwidoSuite software automatically generates code in Instruction List language, encapsulated in a subroutine. The macro's code call line is compiled by the TwidoSuite software by calling a subroutine.
After calling up a macro, the code generated in Instruction List language can be displayed. No modi cations to the content of subroutines generated in this way are allowed.

Counter function

The counter function allows the controller to count a large number of pulses, within one program scan cycle. The fast counters can compare the current counter value with a preset value and trigger an output when the preset value is reached. This type of counter function can be used for counting parts or events, or for measuring length or position.
The number of integrated fast counters depends on the type of base controller:

Base controller type TWD	Compact LC●A 10/16/24 DRF	Compact LCA● 40DRF LCD● 40DRF	Modular LMDA 20D●K/20DRT LMDA 40D●K	Extreme LEDCK1
VFC counter (20 kHz)	1	2	2	–
FC counter (5 kHz)	3	4	2	1 (10 kHz)

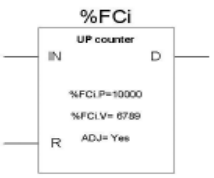
Very fast counter - VFC (20 kHz)

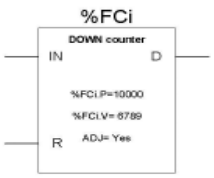


The 32-bit fast counter (VFC) is an up/down counter with the possibility of auxiliary inputs. The counter is accessed by means of the %VFCi function block programmed using TwidoSuite. The %VFCi function block can be used to execute one of the following ve functions, all with a maximum frequency of 20 kHz:
- Up/Down counter
- Up/Down counter with detection of running direction
- Single up counter
- Single down counter
- Frequency meter

The pulses to be counted may come from an incremental encoder or from two proximity sensors (up/down counting) connected to inputs I0 and I1 of Twido base controllers.

Fast counter - FC (5 or 10 kHz)

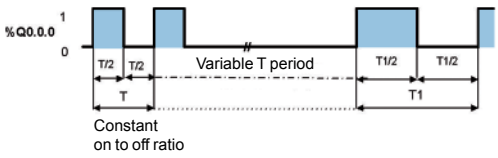


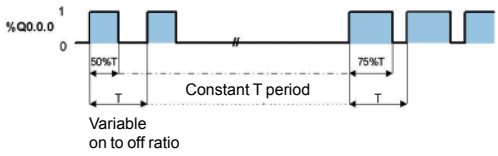


The 16-bit fast counter is available for up or down counting of pulses (rising edges) on the discrete inputs of Twido base controllers at a maximum frequency of 5 kHz. The up and down counters are accessed by means of the %FCi function block programmed using TwidoSuite. Using the con guration editor, the user must select either up or down counting mode for each function block, de ne the initial value of the preset %FCi.P and select the attribute "adjustable" in order to be able to dynamically change the preset value %FCi.P and the current value %FCi.V.
Within function block %FCi, the current value %FCi.V varies by:
- Incrementing the value 0 to the preset value %FCi.P in up counter mode
- Decrementing the preset value %FCi.P to 0 in down counter mode

(1) Requires TwidoSuite software version ≥ 1.20.

Twido programmable controller
TwidoSuite programming software
Position control, processing, PID





Position control

Twido compact (**TWD LCA● 40DRF**), modular and Extreme controllers offer two software positioning functions (frequency 7 kHz) *(1)* which can be used, for example, for controlling stepper motors:

- PLS (pulse) function - pulse generator output
- PWM function - pulse width modulation output. This function can also be used for applications with light or sound intensity control (dimmer or volume control function).

PLS function (pulse, 7 kHz) *(1)*

The PLS function block generates pulses of xed ratio. In some cases, the frequency can be xed and in others it is variable (as in control of slopes when driving a stepper motor). The %PLS function block can be programmed to generate a speci c number of pulses.

%PLS function blocks are assigned to outputs %Q0.0.0 or %Q0.0.1 on Twido base controllers.

The pulse generator signal has a variable period, but with a constant duty cycle which establishes an ON to OFF ratio of 50% of the period (see illustration opposite).

PWM function (7 kHz) *(1)*

The PWM function block generates pulses of xed frequency, with a variable ratio between the high state and low state of the output signal. The ON to OFF duration ratio is a dynamic variable called %PWM.R, with a range from 0% to 100%.

PWM function blocks are assigned to outputs %Q0.0.0 or %Q0.00.1 on a base controller. The PWM function can be used to control analog module outputs.

The user-de ned %PWM function block generates a signal on output %Q0.0.0 or %Q0.0.1 of Twido base controllers (see illustration opposite).

Event processing

- Event management by the application.
- 2 priority levels
- 3 types of source:
  - 4 event sources based on the basic inputs
  - 4 event sources based on the very fast threshold counter (VF counter)
  - 1 event source based on the periodic event (Timer)
- Command masked and enabled by the system bits
- Each event executes a single user logic subroutine
- Updating of “re ex” outputs

PID

- 14 PID programming loops
- “Autotuning” algorithm (for software version ⩾ 2.5).
- Analog/PWM output
- Linear conversion of measuring input
- 2 alarm levels (high and low) on the “measurement”
- Command output limits
- Direct and inverse action
- 2 animated modes for PID: con guration mode, debug mode

Online modification

This application can be debugged and adjusted in online mode. With this mode, the application program contained in the PC memory is identical to that in the controller memory. Program modi cations can therefore be made directly in the Twido controller.

(1) 1 or 5 kHz maximum with the Twido Extreme controller (see page 27).

Twido programmable controller
TwidoSuite programming software

TSX PCX 1031

TSX CUSB 485

VW3 A8 114

VW3 A8 115

499 TWD 01100

References

TwidoSuite bilingual software packages are for use on PCs *(1)* with Windows 2000 or Windows XP operating systems.
The software product comprises:
■ A DVD-ROM including 5 TwidoSuite bilingual software with the hardware and software setup documentation
■ Hard copy of the quick start guide

TwidoSuite software

Description	Programming languages Languages of use	Reference	Weight kg
TwidoSuite version V2.0 Multilingual (1 DVD-ROM)	Ladder and Instruction List English/Chinese, English/French, English/German, English/Spanish and English/Italian	**TWD BTF U10M**	–

Discover TwidoPack

Description	Composition	Reference	Weight kg
TwidoPack Compact	Compact base 10 I/O TWD LCAA 10DRF Real-time clock cartridge TWD XPD RTC Input simulator TWD XSM 6 USB/RS485 converter TSX CUSB 485 with cordset (0.4 m) TSX CRJMD25 TwidoSuite software on DVD-Rom TWD BTF U10M	**TWD XPD PAK6M**	–

Components for connecting a PC to the controller

Description	Use		Length	Reference	Weight kg
	From	To			
Connection cables	Compact and modular Twido controllers (Mini-DIN) *(2)*	Serial port on PC with TwidoSuite software installed	2.5 m	**TSX PCX 1031**	0.170
		RJ45 on USB/RS 485 converter *(3)*	2.5 m	**TSX CRJMD25**	0.150
USB/RS 485 converter	Cable TSX CRJMD25 (RJ45)	USB port on PC *(3)* with TwidoSuite software installed	0.4 m	**TSX CUSB 485**	0.144

Bluetooth wireless link

Description	Use	Reference	Weight kg
Bluetooth gateway	Range 10 m (class 2). Comprising: - 1 Bluetooth gateway with one RJ45 - 1 cable (length 0.1 m) with two RJ45 - 1 cable (length 0.1 m) with one RJ45 and a mini-DIN for TwidoSuite software - 1 RJ45/9-way SUB-D adaptor	**VW3 A8 114**	0.155
Bluetooth gateway for PC	Range 10 m (class 2) Required for a PC without Bluetooth technology Connection on PC USB port	**VW3 A8 115**	0.010

Ethernet network interface

Description	Characteristics	Reference	Weight kg
TwidoPort interface module for all bases version ≥ 3.0	10/100 Mbps. Auto MDIX function Ethernet network connection on RJ45 connector Supplied with connection cable for Twido base TWD XCA RJP03P	**499 TWD 01100**	0.200

(1) Minimum configurations, see page 84.
(2) For connection of Twido Extreme, see page 33.
(3) To connect the Twido controller to the USB port of a PC, you need to add two other product references: cable **TSX CRJMD25** *and USB/RS 485 converter* **TSX CUSB 485**.

Twido programmable controller
TwidoAdjust software

532634

Example of TwidoAdjust software screen

Presentation

TwidoAdjust is a software tool dedicated to the management and animation of Twido applications, using a Pocket PC.

The Pocket PC with TwidoAdjust software package can be connected to a Twido programmable controller:
- either using **TSX PCX 1031** and **TSX PCX 1130** connection cables (ensuring crossing of the Rx and Tx wires),
- or using Bluetooth wireless technology. For optimum performance, use a Pocket PC with integrated Bluetooth technology.

TwidoAdjust software requires a Pocket PC with Windows Mobile 5.0 *(1)* operating system and must be used with the stylus, since the Pocket PC buttons are not supported by TwidoAdjust software.

TwidoAdjust software is used to manage a project and allows:
- the transfer of applications,
- animation and back-up of object tables,
- back-up of object category values.

From the very first screen, TwidoAdjust software offers the possibility of displaying essential controller data, such as its reference, its status, the name of the application and version of its microprogram.

Functions

The functions offered by TwidoAdjust software are split into three groups: connection, application and system.

Connection

The connection function establishes communication between the TwidoAdjust software and the Twido programmable controller and allows disconnection and access to basic data such as references, controller status and name of the application.

Application

The application function includes the following functions:
- **transfer**, such as transfer of the application, reading of an application, “backup”, “restore”,
- **animation of object tables**, creation, editing, table animation, capture of values,
- **reading the configuration** of the application.

System

The system function makes it possible to display the physical configuration of the controller, set the RTC function clock and update the PLC’s microprogram.

The operation of TwidoAdjust software can also be customised via the “Action” and “Preferences” menus. Other types of customisation are offered, such as adding shortcuts, choice of default communication port, opening of latest project.

(1) TwidoAdjust is also compatible with Pocket PC2003 operating system.

Twido programmable controller
TwidoAdjust software

References

The multi-language software packages (English, French, German, Italian and Spanish) are for use on Pocket PCs with Windows Mobile 5.0 *(1)* operating system. These software packages include:

■ a CD-ROM containing TwidoAdjust multi-language software and multi-language documentation for hardware and software set-up,

■ depending on the model, Bluetooth gateway **VW3 A8114**.

TwidoAdjust software

Description	Processor	Language	Composition	Reference	Weight kg
TwidoAdjust software packages	Recommended processor 400 MHz Available RAM 128 or 256 Kb	Multi-language	–	**TWD SMD 1002 V30M**	–
			Supplied with Bluetooth gateway VW3 A8114	**TWD SMD 1004 V30M**	–

Separate components

Description	Composition	Reference	Weight kg
Bluetooth gateway	Range 10 m (class 2). Comprising: - 1 Bluetooth gateway with one RJ45 - 1 cable (length 0.1 m) with two RJ45 - 1 cable (length 0.1 m) with one RJ45 and a mini-DIN for TwidoSuite software - 1 RJ45/9-way SUB-D adaptor	**VW3 A8114**	0.155

VW3 A8114

Description	Application	Reference	Weight kg
Twido-Pocket PC cordsets *(3)*	With one mini-DIN connector and one female 9-way SUB-D connector 2.5 m	**TSX PCX 1031**	–
	With one mini-DIN connector and one male 9-way SUB-D connector 3 m	**TSX PCX 1130**	–

TSX PCX 1031

(1) TwidoAdjust is also compatible with Pocket PC2003 operating system.

(2) Connection schemes, see page 80.

(3) Cordset **TSX PCX 1130** *supplied with 1 SUB-D adapter* **TSX CTC 09** *(9-way female/25-way male).*

Cordset **TSX PCX 1031** *can be use for connection between Twido controler and Pocket PC, after having crossed the Rx and Tx conductors*

Connection interfaces
Advantys Telefast ABE 7 pre-wired system
Connection sub-bases for Twido controller

Applications		**Connection sub-bases for discrete inputs and outputs**		
				
Compatibility		Twido modular base controllers equipped with HE 10 connectors Not compatible with interface modules of Advantys OTB distributed I/O		
Relay amplification		–		Electromechanical and solid state, xed
Control voltage		⎓ 24 V		
Output voltage		⎓ 24 V		⎓ 24 V (solid state) ⎓ 5…30 V, ∼ 250 V (electromechanical)
Current per channel	Input	5…7 mA		5…7 mA
	Output	0.3 A		2 A (solid state) 3 A (electromechanical)
Modularity		20 (12 inputs/8 outputs)		
Type of I/O		- 12 inputs (1 common/12 channels) - 8 outputs (1 common/8 channels)	- 12 inputs (1 common/12 channels) - 8 outputs with fuse protection (1 common/8 channels) LED indication	- 12 inputs (1 common/12 channels) - 2 solid state outputs (1 common/2 channels) - 6 relay outputs (electromechanical) 1 N/O (1 common/6 channels)
Number of terminals per channel		2, 3 (with optional snap-on terminal block)		
Connection to Twido programmable controller		HE 10 connector, 26-way		
Type of terminal		Fixed screw terminal block		
Interface type		**ABE 7B20MPN20**	**ABE 7B20MPN22**	**ABE 7B20MRM20**
Pages		102	102	102

Connection sub-bases for discrete inputs	Connection sub-bases for discrete outputs		
			
Twido I/O modules with HE 10 connectors Not compatible with interface modules of Advantys OTB distributed I/O			
–			Electromechanical, xed
⎓ 24 V			
⎓ 24 V			⎓ 5…30 V, ∿ 250 V (electromechanical)
5 mA	–		–
–	0.1 A		3 A
16 inputs	16 outputs		
16 inputs (1 common/16 channels)	16 outputs (1 common/16 channels)	16 outputs with fuse protection LED indication	16 relay outputs (electromechanical) 1 N/O (1 common/4 channels)
2, 3 (with optional snap-on terminal block)			
HE 10 connector, 20-way			
Fixed screw terminal block			
ABE 7E16EPN20	**ABE 7E16SPN20**	**ABE 7E16SPN22**	**ABE 7E16SRM20**
102	102	102	102

Connection interfaces
Advantys Telefast ABE 7 pre-wired system
Connection sub-bases for Twido controller

Presentation

Relay and connection functions, with or without polarity distribution, signi cantly reduce wiring time and eliminate the risk of error.
The AdvantysTelefast ABE 7 pre-wired system allows fast, reliable and economical remote connection of I/O modules (⎓ 24 V discrete) to operative parts, partly eliminating the single-wire connection and intermediate terminal blocks.
The Telefast ABE 7 system can only be connected to Twido modules equipped with HE 10 type connectors. It consists of connecting cables and interface sub-bases.
The Telefast ABE 7 range is suitable for all types of connection found in control system devices:
- I/O located in the PLC cabinet,
- I/O located directly on the machine or in auxiliary enclosures.

All the I/O connection sub-bases comprise output terminals on 2 rows :
- 1st row: connection of the signal,
- 2nd row: connection of its common
  - ⎓ 24 V for the inputs,
  - 0 V for the outputs.

A 3rd row of optional terminals ABE 7BV●● may be added for connection of another common.

These I/O sub-bases are available in different con gurations:

Sub-bases for Twido modular base controllers

- **ABE 7B20MPN20:** sub-base with 12 inputs + 8 passive outputs.

- **ABE 7B20MPN22:** sub-base with 12 inputs + 8 passive outputs.
  - individual fuse protection for each output (0.315 A),
  - LED indication,
  - blade disconnector for the 0 V common.

- **ABE 7B20MRM20:** sub-base with 12 inputs + 8 outputs with soldered relays
  - 2 A solid state relay (1 x 4 A common/2 channels) on 2 outputs,
  - electromechanical relays (1N/O ⎓ 24 V/∿ 250 V, 3 A) on 6 outputs for adaptation of the current or voltage signal (1 x 10 A common/6 channels).

Sub-bases for Twido I/O expansion modules

- **ABE 7E16EPN20:** sub-base with 16 passive inputs.

- **ABE 7E16SPN20:** sub-base with 16 passive outputs.

- **ABE 7E16SPN22:** sub-base with 16 passive outputs.
  - individual fuse protection for each output (0.315 A),
  - LED indication
  - blade disconnector for breaking the 0 V common.

- **ABE 7E16SRM20:** sub-base with 16 soldered relay outputs
  - electromechanical relays (1N/O ⎓ 24 V/∿ 250 V, 3 A) on 16 outputs for adapting the current or voltage signal (1 x 5 A common/4 channels)

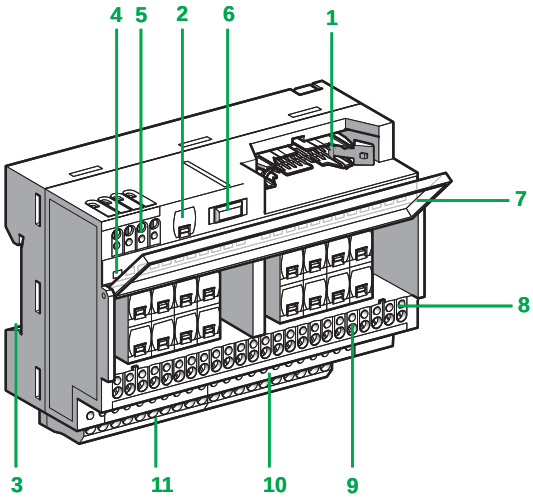
Optional terminal blocks

- **ABE 7BV20TB**
  - 12 shunted screw terminals for the input common,
  - 8 shunted screw terminals for the output common.

- **ABE 7BV20**
  - 20 shunted screw terminals for connection of a single common.

Compatibility : page 97 | Characteristics : pages 98 and 99 | Curves : pages 100 and 101 | References, dimensions : pages 102 and 103 | Schemes : pages 104 to 107

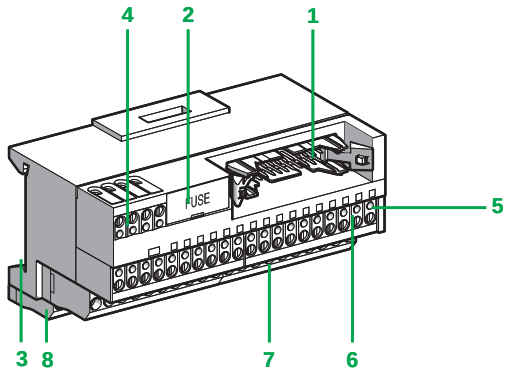
Connection interfaces
Advantys Telefast ABE 7 pre-wired system
Connection sub-bases for Twido controller



Description

Connection sub-bases ABE 7B20M●●●●, ABE 7E16SRM20 and ABE 7E16SPN22

1 HE 10 connector (20-way for ABE 7E16●●●●●, 26-way for ABE 7B20●●●●●).
2 Fuse for the ⎓ 24 V supply circuit.
3 Rail mounting.
4 LED for channel indication (only on ABE 7B20MPN22 and ABE 7E16SPN22).
5 ⎓ 24 V power supply terminal block.
6 Blade disconnector on ⎓ 0 V (only on ABE 7B20MPN22 and ABE 7E16SPN22).
7 Legend holder cover: customer marking on outside and sub-base wiring scheme on inside, providing access to fuses per channel (only on ABE 7B20MPN22 and ABE 7E16SPN22).
8 Test point for Ø 2.3 mm plug.
9 Upper terminal block for connection of signals.
10 Lower terminal block for connection of commons.
11 Optional snap-on terminal block with 20 screw terminals.



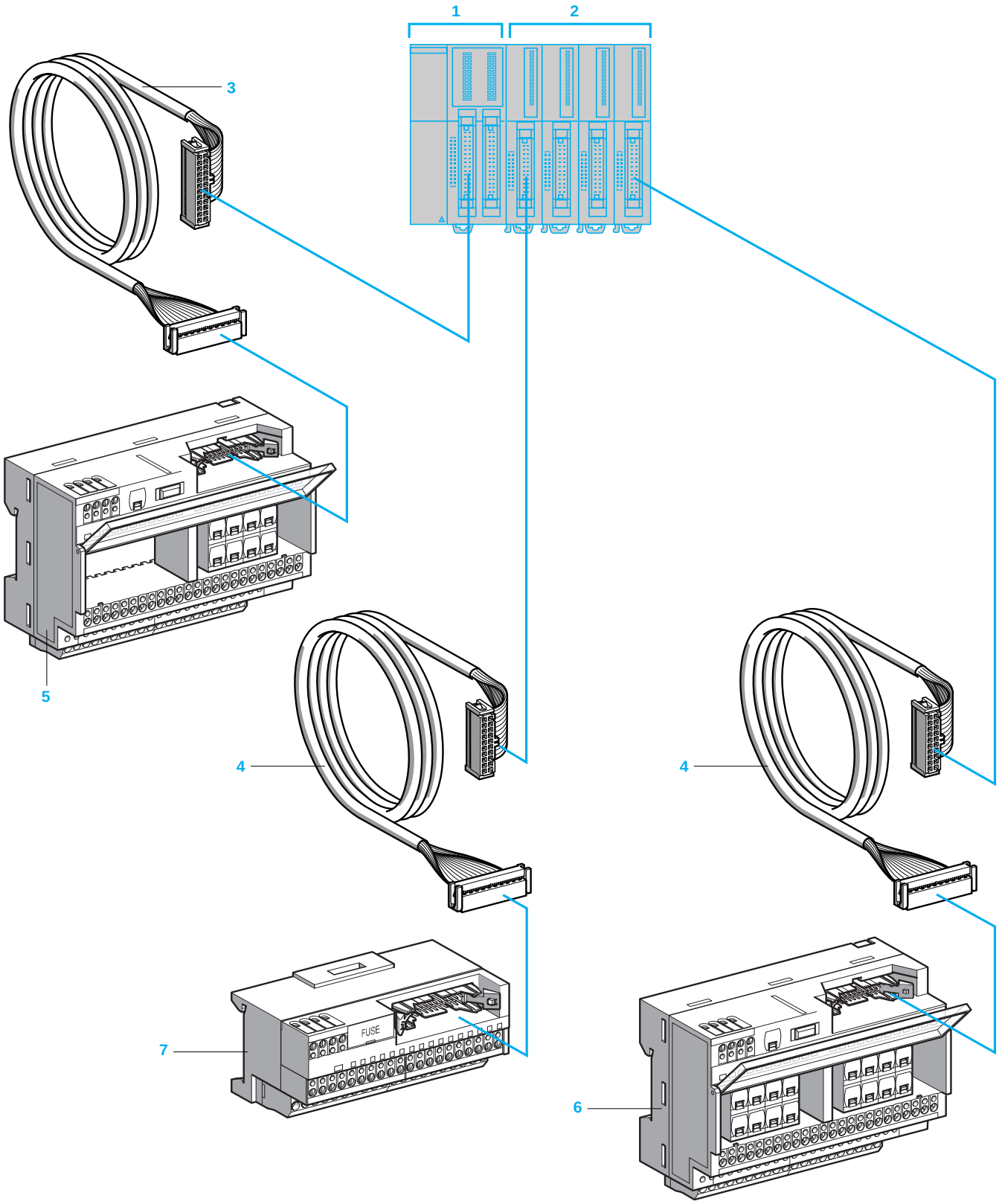
Connection sub-bases ABE 7E16EPN20 and ABE 7E16SPN20

1 HE 10 connector, 20-way,
2 Fuse for the ⎓ 24 V supply circuit.
3 Rail mounting.
4 ⎓ 24 V power supply terminal block.
5 Test point for Ø 2.3 mm plug.
6 Upper terminal block for connection of signals.
7 Lower terminal block for connection of commons.
8 Optional snap-on terminal block with 20 screw terminals.

Connection interfaces

Advantys Telefast ABE 7 pre-wired system

Pre-wired solution for Twido controller



Compatibility : page 97
Characteristics : pages 98 and 99
Curves : pages 100 and 101
References, dimensions : pages 102 and 103
Schemes : pages 104 to 107

Connection interfaces
Advantys Telefast ABE 7 pre-wired system
Pre-wired solution for Twido controller

Presentation (continued)

1 Modular base controller with 26-way HE 10 connectors. The modular sizes available are 20 or 40 I/O.
2 Input and output modules with 20-way HE 10 connectors. The modular sizes available are 16 or 32 I/O.
3 Cable (ABF T26B●●0) equipped with a 26-way HE 10 connector at each end. This cable is available in 0.5, 1 and 2 metre lengths (AWG 28/0.08 mm^2).
4 Cable (ABF T20E●●0) equipped with a 20-way HE 10 connector at each end. This cable is available in 0.5, 1, 2 and 3 metre lengths (AWG 28/0.08 mm^2).
5 20 channel sub-base (ABE 7B20MPN2● or ABE 7B20MR20) for modular base controllers.
6 16 channel sub-base (ABE 7E16SPN22 or ABE 7E16SRM20) for output extension modules.
7 16 channel sub-base (ABE 7E16EPN20 or ABE 7E16SPN20) for input or output extension modules.

Compatibility with modular base controllers and I/O expansion modules

		Modular base controllers	**Discrete I/O expansion modules**	
		Inputs/outputs (source)	Inputs	Outputs (source)
Incorporated in Twido programmable controllers		**TWD LMDA 20DTK** (12 I/8 O) **TWD LMDA 40DTK** (24 I/16 O)	**TWD DDI 16DK** (16 I) **TWD DDI 32DK** (32 I)	**TWD DDO 16TK** (16 O) **TWD DDO 32TK** (32 O)
Terminal block types		HE 10 connector, 26-way	HE 10 connector, 20-way	
Connection to Twido programmable controller		**ABF T26B●●0** (HE 10, 26-way)	**ABF T20E●●0** (HE 10, 20-way)	
Passive connection sub-bases				
20 channels	**ABE 7B20MPN2●**	■		
16 channels	**ABE 7E16EPN20**		■	
	ABE 7E16SPN2●			■
Output adapter bases				
20 channels	**ABE 7B20MRM20**	■		
16 channels	**ABE 7E16SRM20**			■

■ Compatible

Connection interfaces
Advantys Telefast ABE 7 pre-wired system
Connection sub-bases for Twido controller

Environment characteristics

Product certifications			UL, CSA	
Degree of protection	Conforming to IEC 60529		IP 2X	
Protective treatment			"TC"	
Resistance to incandescent wire	Conforming to IEC 60695-2-11	**°C**	750: extinction < 30 s	
Shock resistance	Conforming to IEC 60068-2-27	**ms**	11 (half sine wave) 15 gn (acceleration)	
Vibration resistance	Conforming to IEC 60068-2-6	**Hz**	10…150 2 gn (acceleration)	
Resistance to electrostatic discharge	Conforming to IEC 61000-4-2		Level 3	
Resistance to radiated fields	Conforming to IEC 61000-4-3	**V/m**	10 (80 MHz to 2 GHz), level 3	
Immunity to fast transient currents	Conforming to IEC 61000-4-4		Level 3	
Surge withstand	Conforming to IEC 61000-4-5	**µs**	1.2/50 - 8/20	
Ambient air temperature	Conforming to IEC 61131-2	**°C**	Operation: - 5…+ 60	
		°C	Storage: - 40…+ 80	
Dielectric test voltage (for 1 minute)	Terminals/mounting rails	**kV**	2	
Overvoltage category	Conforming to IEC 60664-1		Category II	
Degree of pollution	Conforming to IEC 60664-1		2	
Mounting	Conforming to IEC 60715		On standard ⎓ rail, height 15 mm, width 35 mm	
Connection	Flexible cable without cable end	**mm²**	1 x 0.14…2.5	–
		AWG	1 x 26…14	–
	Flexible cable with cable end	**mm²**	1 x 0.09…1.5	2 x 0.09…0.75
		AWG	1 x 28…16	2 x 28…20
	Solid cable	**mm²**	1 x 0.14…2.5	2 x 0.12…1.5
		AWG	1 x 26…12	2 x 28…16
Tightening torque		**Nm**	0.6 (with 3.5 mm at screwdriver)	

Supply characteristics (controller side)

Supply voltage	Conforming to IEC 61131-2	⎓ **V**	19…30 (Un = 24)
Maximum supply current per sub-base		⎓ **A**	2
Voltage drop on supply fuse		⎓ **V**	0.3
Supply overload and short-circuit protection by quick-blow fuse (included)		**A**	2

Characteristics of the control circuit for 1 channel (sensor/controller side)

Sub-base type			**Passive connection sub-bases for discrete signals**			**Connection sub-bases with soldered relays**	
	ABE 7		**B20MPN2●**	**E16EPN20**	**E16SPN2●**	**B20MRM20**	**E16SRM20**
Number of channels	Passive input		12	16	–	12	–
	Passive output		8	–	16	–	–
	Solid state output		–	–	–	2	–
	Relay output		–	–	–	6	16
Rated voltage Ue		⎓ **V**	24				
Min/max voltage	Conforming to IEC 61131-2	⎓ **V**	20.4/26.4		20.4/28.8	19/30	
Internal current per channel at Ue	Passive input	**mA**	– (3.2 for ABE 7 B20MPN22)	–			
	Passive output	**mA**	– (3.2 for ABE 7 B20MPN22)	–	– (3.2 for ABE 7 E16SPN22)	–	
	Solid state output	**mA**	–			4.5	–
	Relay output	**mA**	–			9	
State 1 guaranteed	Solid state output	**V/mA**	–			16/5.5	–
	Relay output	**V**	–			16.8	
State 0 guaranteed	Solid state output	**V/mA**	–			10/0.4	–
	Relay output	**V**	–			2	
Conformity	Conforming to IEC 61131-2		Type 1	Type 1	–	Type 1	–

Presentation : page 96 | Compatibility : page 97 | Curves : pages 100 and 101 | References, dimensions : pages 102 and 103 | Schemes : pages 104 to 107

Connection interfaces
Advantys Telefast ABE 7 pre-wired system
Connection sub-bases for Twido controller

Output circuit characteristics (preactuator side)

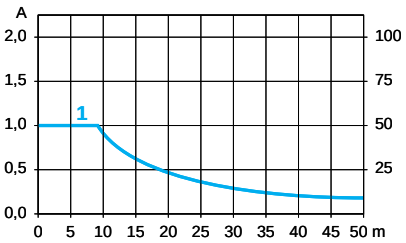
Sub-base type				Passive connection sub-bases for discrete signals			Connection sub-bases with soldered relays	
		ABE 7		B20MPN2●	E16EPN20	E16SPN2●	B20MRM20	E16SRM20
Number of channels		Passive output		8	–	16	–	–
		Solid state output		–	–	–	2	–
		Relay output		–	–	–	6	16
Contact arrangement				–			1 N/O relay	
Rated voltage at Ue		Passive output	⎓ V	24			–	
		Solid state output	⎓ V	–			24	–
		Relay output	⎓ V	–			5…30	
			∿ V	–			110…250	
Current switched per I/O channel		Passive input/output	mA	15/300	15/–	–/100	15/–	–
		Solid state output	A	–			2	–
		Relay output	A	–			3	
Maximum current per common		Passive output	A	2	–	1.6	–	
		Solid state output	A	–			4	–
		Relay output	A	–			10	5
Rated operational current (60 °C max) (for 500 000 operations)		DC 12	A	–			2/3	–/3
		DC 13	A	–			2/0.5	–/0.5
		AC 12, relay	A	–			2	
		AC 15, relay	A	–			0.4	
Minimum current			mA	–			1/100	–/100
Rated insulation voltage			V	Not isolated			300	
Maximum response time	From state 0 to state 1	Solid state output	ms	–			0.01	–
		Relay output	ms	–			5	5
	From state 1 to state 0	Solid state output	ms	–			0.4	–
		Relay output	ms	–			2.5	2.5
Channel fuse protection			mA	– (315 for ABE 7 B20MPN22)	–	– (125 for ABE 7 E16SPN22)	–	

Other characteristics (at ambient temperature of 20 °C)

Sub-base type			Passive connection sub-bases for discrete signals			Connection sub-bases with soldered relays	
	ABE 7		B20MPN2●	E16EPN20	E16SPN2●	B20MRM20	E16SRM20
Permissible leakage current without illuminating the channel LED		mA	– (1.5 for ABE 7 B20MPN22)	–	– (1.5 for ABE 7 E16SPN22)	–	
Rated impulse withstand voltage (1.2/50)	Solid state output	kV	–			2.5	–
	Relay output	kV	–			6	
Switching frequency	Solid state output	Hz	–			300	–
	Relay output	Hz	–			20	
Mechanical durability	In millions of operating cycles		–			20	

Connection interfaces
Advantys Telefast ABE 7 pre-wired system
Connection sub-bases for Twido controller

Curves for determining cable type and length according to the current

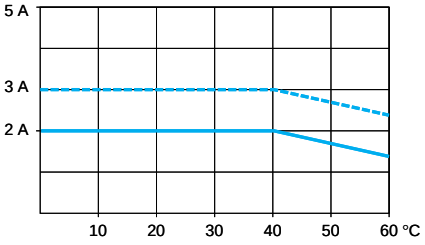


1 Cables ABF T2●●●●● c.s.a. 0.08 mm² (AWG 28)

Temperature derating curves

ABE E11SRM20, ABE 7E16SRM20

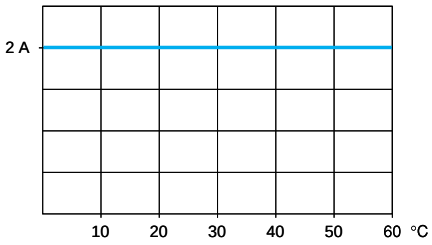
6 electromechanical relay outputs



100 % of channels used
50 % of channels used

ABE 7B20MR20

2 solid state outputs

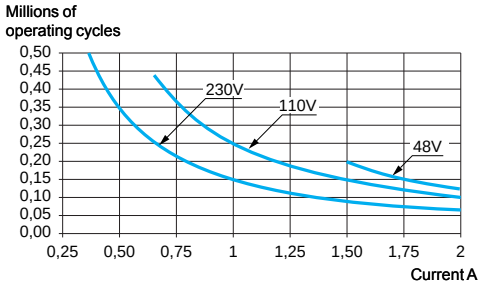


Electrical durability (in millions of operating cycles, conforming to IEC 60947-5-1)

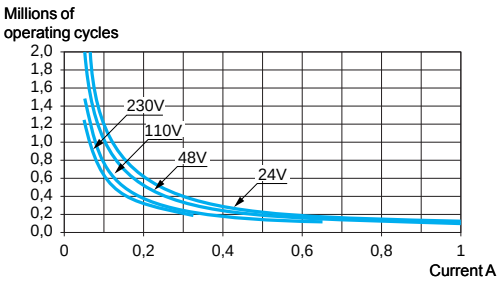
ABE 7B20MRM20 and ABE 7E16SRM20

d.c. loads

DC 12 curves *(1)*

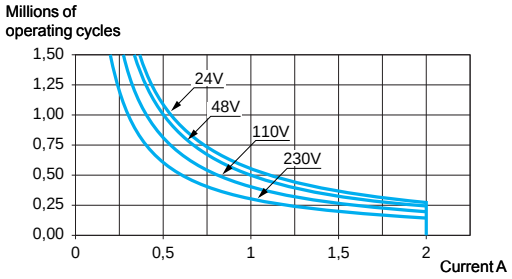


DC 13 curves *(2)*

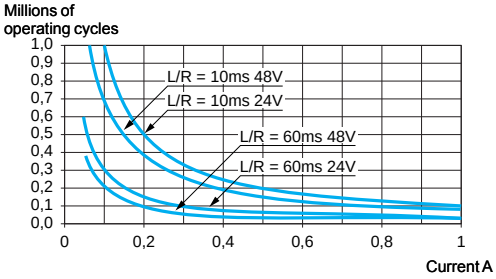


a.c. loads

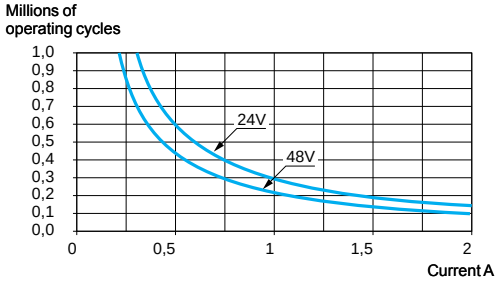
AC 12 curves *(3)*



AC 14 curves *(4)*



AC 15 curves *(5)*



(1) DC 12: control of resistive loads and of solid state loads isolated by optocoupler, L/R ≤ 1 ms.
(2) DC 13: control of electromagnets, L/R ≤ 2 x (Ue x Ie) in ms, Ue: Rated operational voltage, Ie: rated operational current (with a protective diode on the load, DC12 curves must be used with a coefficient of 0.9 applied to the number in millions of operating cycles)
(3) AC 12: control of resistive loads and of solid state loads isolated by optocoupler, cos φ ≤ 0.9.
(4) AC 14: control of small electromagnetic loads ≤72 VA, make: cos φ = 0.3, break: cos φ = 0.3.
(5) AC 15: control of electromagnetic loads > 72 VA, make: cos φ = 0.7, break: cos φ = 0.4.

Connection interfaces
Advantys Telefast ABE 7 pre-wired system
Connection sub-bases for Twido controller


ABE 7B20MPN20


ABE 7E16EPN20


ABE 7E16SRM20

References

For Twido modular base controllers

Number of I/O	Number, type of input	Number, type of output	Compatibility	LED per channel	Fuse	Reference	Weight kg
20	12, sink ⎓ 24 V	8, source ⎓ 24 V	TWD LMDA20DTK/ LMDA40DTK	No	No	**ABE 7B20MPN20**	0.430
				Yes	Yes	**ABE 7B20MPN22**	0.430
	12, sink ⎓ 24 V	2, source ⎓ 24 V, 2 A and 6, relay ⎓ 24/ ∿ 250 V, 3 A	TWD LMDA20DTK/ LMDA40DTK	No	No	**ABE 7B20MRM20**	0.430

For Twido extension modules

Number of inputs	Type of input	Compatibility	LED per channel	Fuse	Reference	Weight kg
16	Sink ⎓ 24 V	TWD DDI16DK/ DDI32DK	No	No	**ABE 7E16EPN20**	0.430

Number of outputs	Type of output	Compatibility	LED per channel	Fuse	Reference	Weight kg
16	Source ⎓ 24 V	TWD DDO16TK/ DDO32TK	No	No	**ABE 7E16SPN20**	0.450
			Yes	Yes	**ABE 7E16SPN22**	0.450
	Relay ⎓ 24/∿ 250 V, 3 A	TWD DDO16TK/ DDO32TK	No	No	**ABE 7E16SRM20**	0.430

Connection cables for Twido modular base controllers

Type of signal	Compatibility	Type of connection		Gauge/ C.s.a.	Length (1)	Reference	Weight
		Twido side	Telefast ABE 7 side				
Discrete inputs/ outputs	TWD LMDA20DTK/ LMDA40DTK	HE 10 26-way	HE 10 26-way	AWG 28 0.08 mm²	0.5 m	**ABF T26B050**	0.080
					1 m	**ABF T26B100**	0.110
					2 m	**ABF T26B200**	0.180
	TWD DDI16DK/ DDI32DK/ DDO16TK/ DDO32TK	HE 10 20-way	HE 10 20-way	AWG 28 0.08 mm²	0.5 m	**ABF T20E050**	0.060
					1 m	**ABF T20E100**	0.080
					2 m	**ABF T20E200**	0.140

Accessories

Description	Number of shunted terminals	Characteristics	Sold in lots of	Unit reference	Weight kg
Optional snap-on terminal blocks	20	–	5	**ABE 7BV20**	0.060
	12 + 8	–	5	**ABE 7BV20TB**	0.060
Quick-blow fuses 5 x 20, 250 V, UL	–	0.125 A	10	**ABE 7FU012**	0.010
		0.315 A	10	**ABE 7FU030**	0.010
		1 A	10	**ABE 7FU100**	0.010
		2 A	10	**ABE 7FU200**	0.010

(1) For lengths > 2 m, please contact us.

Presentation, description : pages 94 to 96 | Compatibility : page 97 | Characteristics : pages 98 and 99 | Dimensions : page 103 | Schemes : pages 104 to 107

Connection interfaces
Advantys Telefast ABE 7 pre-wired system
Cables for connection sub-bases and accessories for Twido controller

References (continued)

Separate components

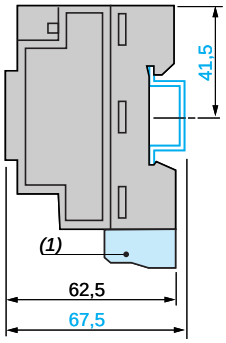
Description	Type	Compatibility	Sold in lots of	Reference	Weight kg
Connectors (sold in lots of 5)	HE 10 female 26-way	TWD LMDA20DTK/40DTK	5	**TWD FCN2K26**	–
	HE 10 female 20-way	TWD DDI16DK/DDI32DK/ DDO16TK/DDO32TK	5	**TWD FCN2K20**	–
Screw terminal blocks (sold in lots of 2)	10-way	TWD DDI●DT/DAI8DT/ DDO8●T/DRA●RT	2	**TWD FTB 2T10**	–
	11-way	TWD DMM8DRT/ AMI●●T/ARI8HT	2	**TWD FTB 2T11**	–

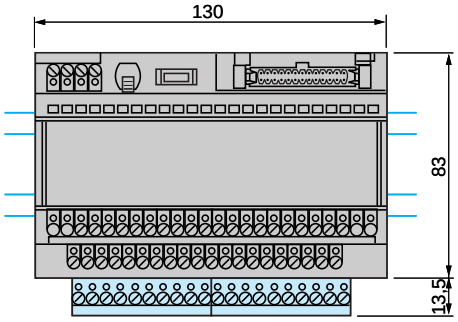
Description	Compatibility	Type of connection		Gauge/ C.s.a.	Length	Reference	Weight kg
		Twido side	Other end				
Cables for discrete I/O	TWD LMDA20DTK/ LMDA40DTK	HE 10 26-way	Bare wires	AWG 22 0.035 mm²	3 m	**TWD FCW 30M**	0.405
					5 m	**TWD FCW 50M**	0.670
	TWD DDI16DK/ DDI32DK/ DDO16TK/ DDO32TK	HE 10 20-way	Bare wires	AWG 22 0.035 mm²	3 m	**TWD FCW 30K**	0.405
					5 m	**TWD FCW 50K**	0.670
Pre-formed cable, rolled	20 conductors	–	–	AWG 28 0.08 mm²	20 m	**ABF C20R200**	1.310

Dimensions

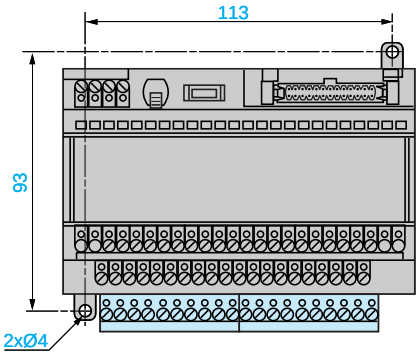
ABE 7B20MPN20, ABE 7B20MPN22, ABE 7B20MRM20, ABE 7E16SPN22, ABE 7E16SRM20

Mounting on 35 mm ⊔ rail





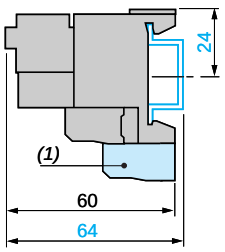
Screw fixing (retractable lugs)

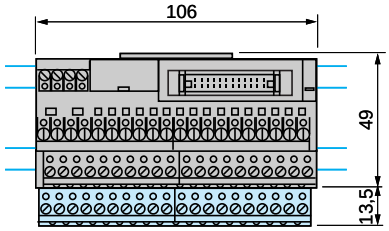


(1) **ABE 7BV20**, **ABE 7BV20TB**.

ABE 7E16EPN20, ABE 7E16SPN20

Mounting on 35 mm ⊔ rail





(1) **ABE 7BV20**, **ABE 7BV20TB**.

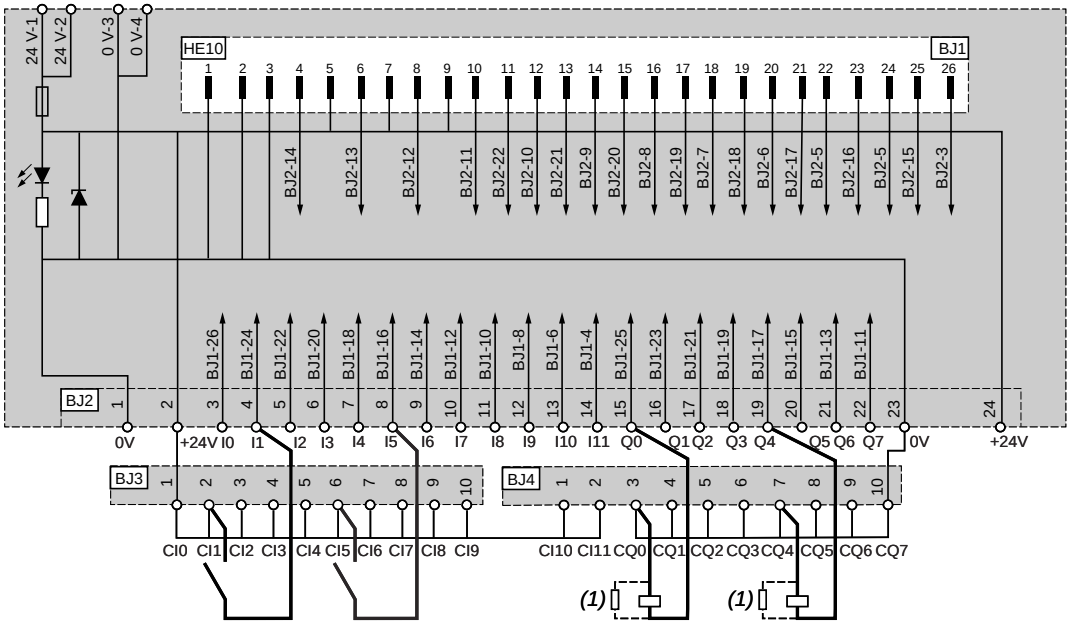
Connection interfaces

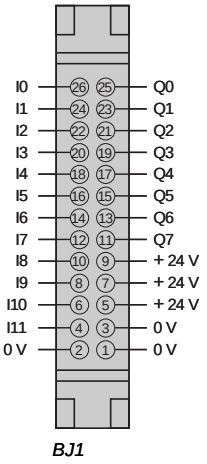
Advantys Telefast ABE 7 pre-wired system

Connection sub-bases for Twido controller

ABE 7B20MPN20

HE10, 26-way

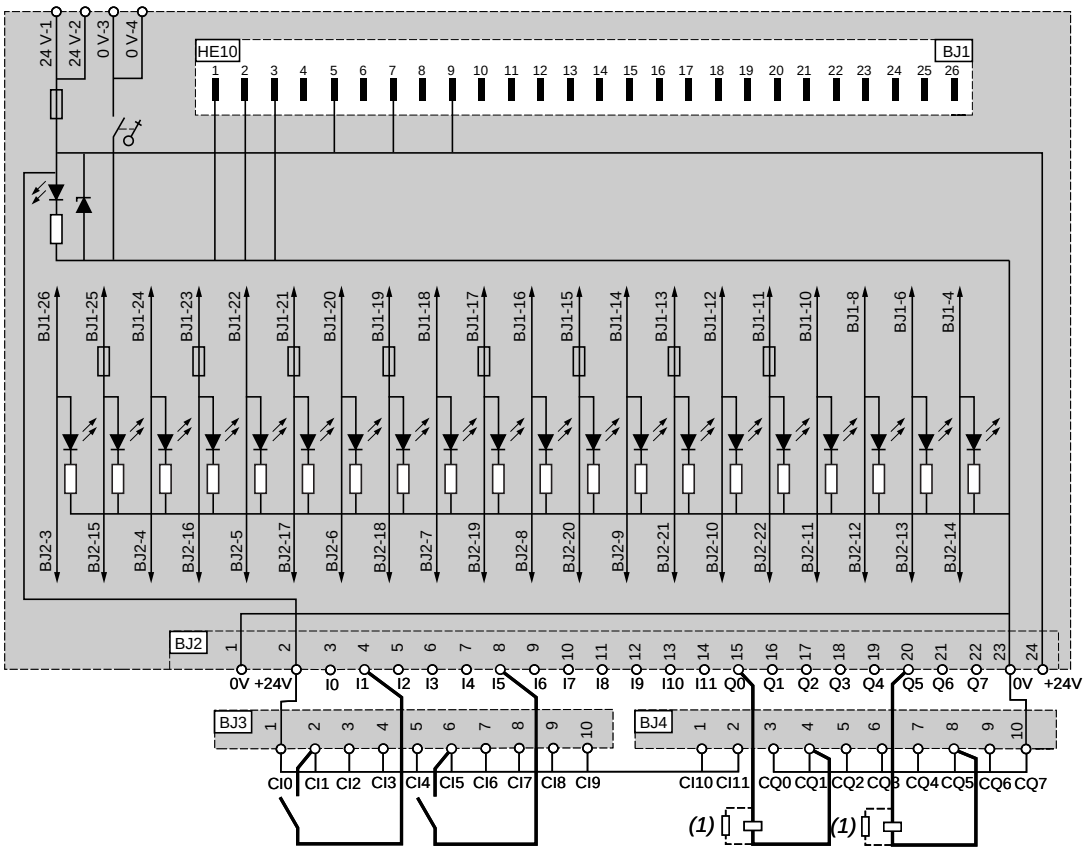


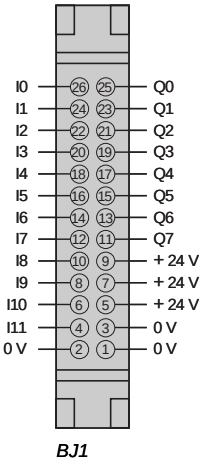


BJ1

ABE 7B20MPN22

HE10, 26-way





BJ1

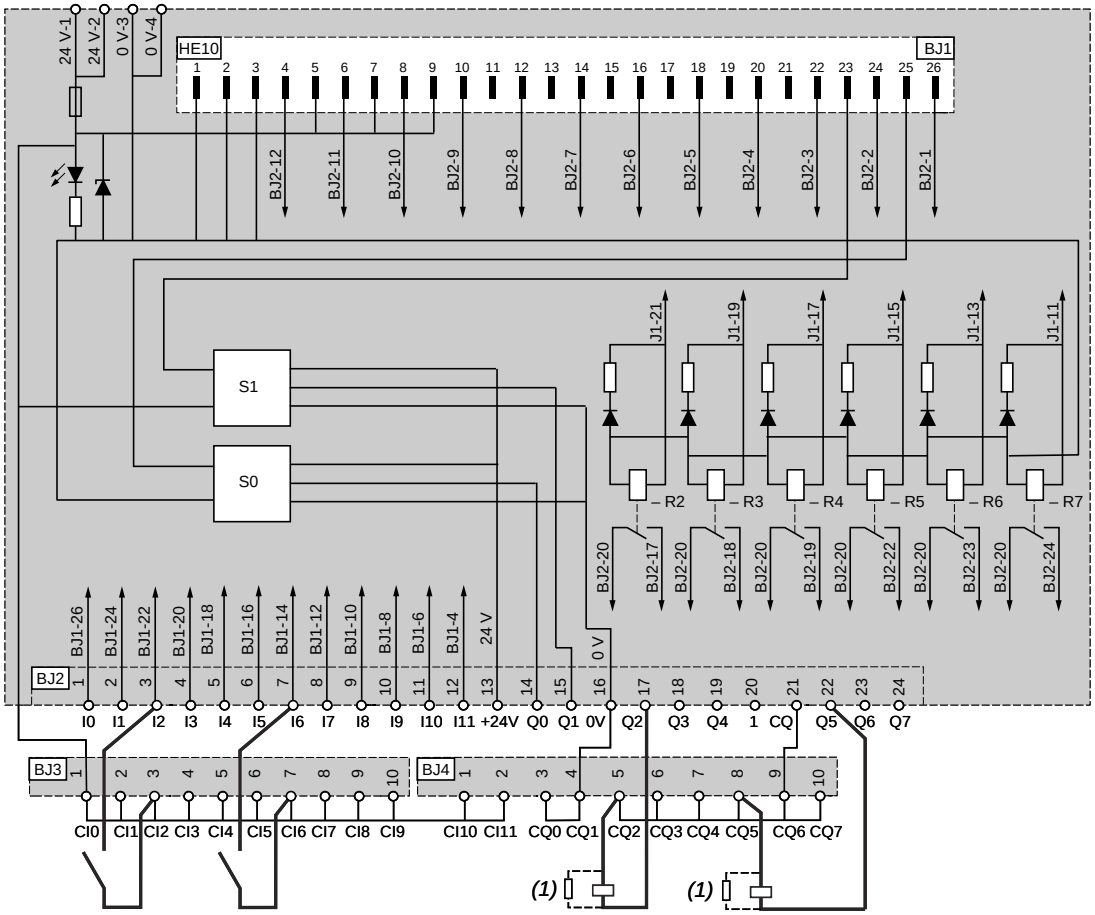
(1) Example of output connections.
When connecting an inductive load, include a diode or a varistor.

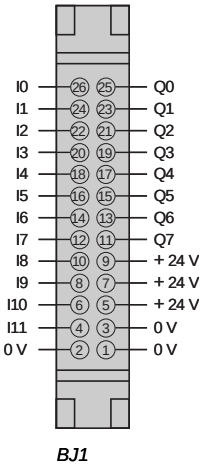
Presentation : page 96
Compatibility : page 97
Characteristics : pages 98 and 99
Curves : pages 100 and 101
References, dimensions : pages 102 and 103

Connection interfaces
Advantys Telefast ABE 7 pre-wired system
Connection sub-bases for Twido controller

ABE 7B20MRM20

HE10, 26-way



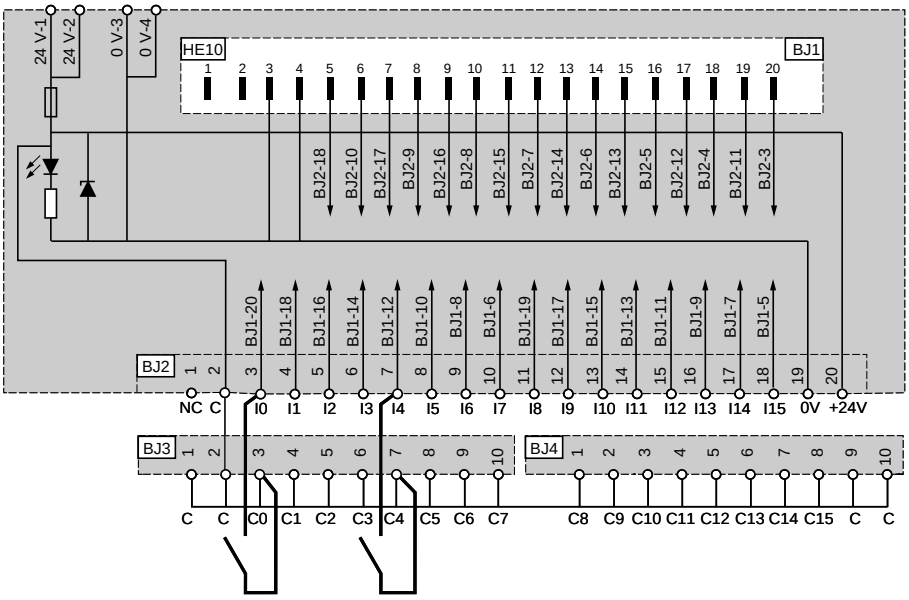


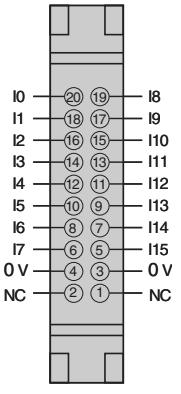
BJ1

(1) Example of output connections.
When connecting an inductive load, include a diode or a varistor.

ABE 7E16EPN20

HE10, 20-way

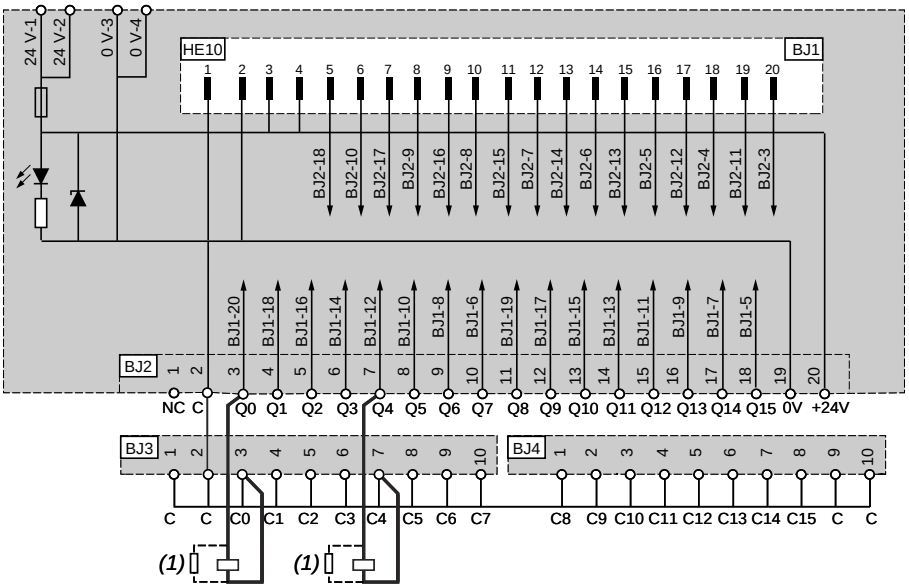




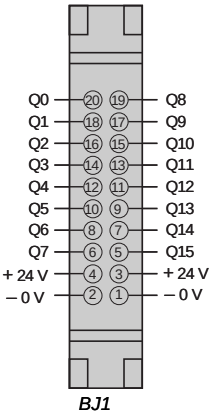
BJ1

Connection interfaces
Advantys Telefast ABE 7 pre-wired system
Connection sub-bases for Twido controller

ABE 7E16SPN20

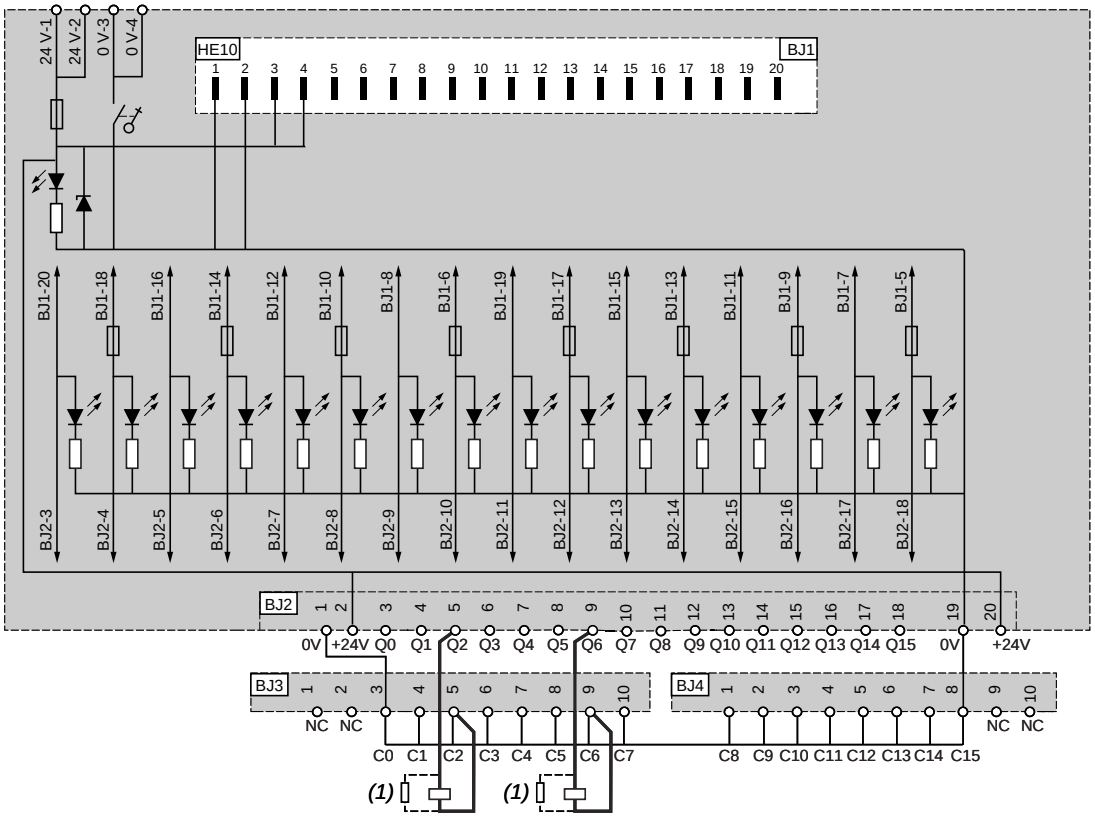


HE10, 20-way

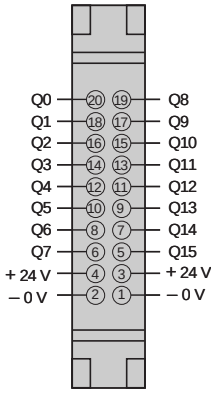


BJ1

ABE 7E16SPN22



HE10, 20-way

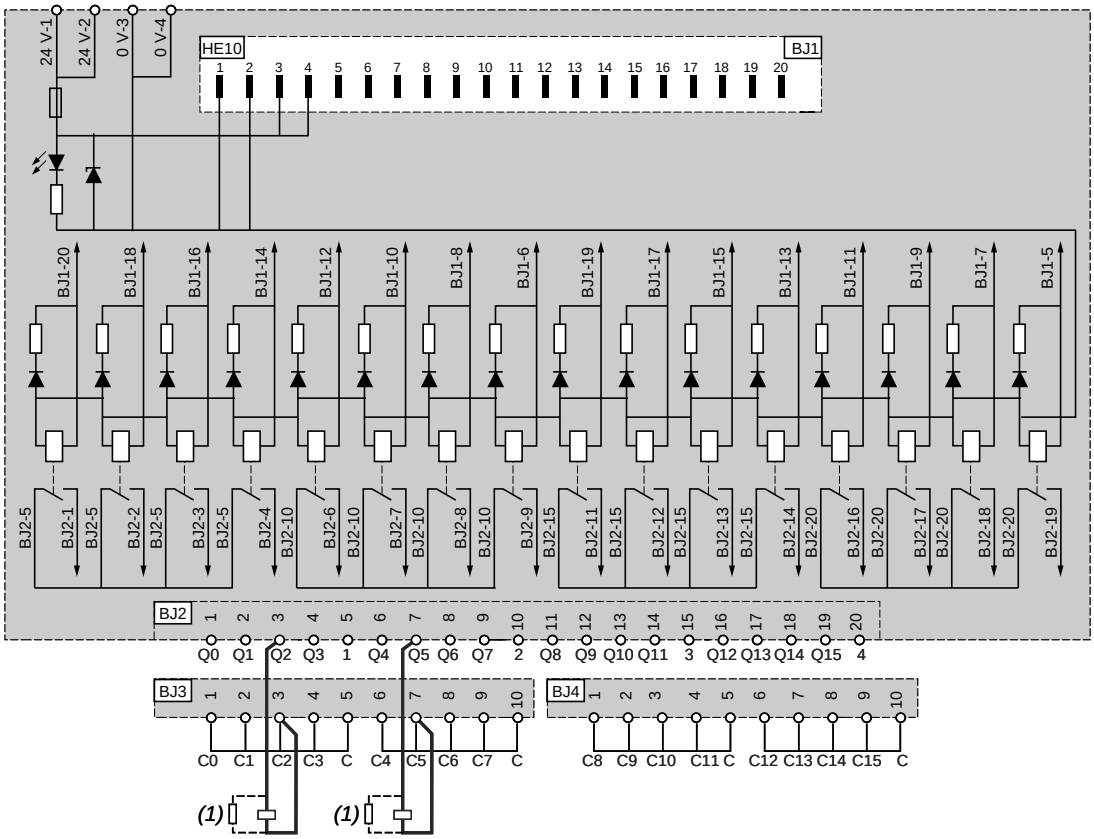


BJ1

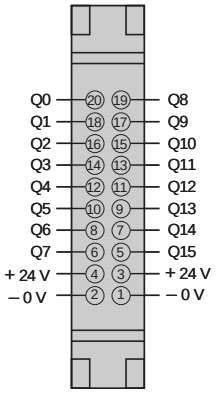
(1) Example of output connections.
When connecting an inductive load, include a diode or a varistor.

Connection interfaces
Advantys Telefast ABE 7 pre-wired system
Connection sub-bases for Twido controller

ABE 7E16SRM20



HE10, 20-way



BJ1

(1) Example of output connections.
When connecting an inductive load, include a diode or a varistor.

Power supplies and transformers
Power supplies for DC control circuits
Phaseo power supplies

Power supplies		Regulated switch mode Phaseo Modular range and Optimum range industrial power supplies			
					
Input voltage		100...240 V ∼ 120...250 V ⎓			
Connection to world-wide line supplies	United States - 120 V (in phase-to-neutral) - 240 V (in phase-to-phase)	Single-phase (N-L1) or 2-phase (L1-L2) connection			
	Europe - 230 V (in phase-to-neutral) - 400 V (in phase-to-phase)	Single-phase (N-L1) connection			
	United States - 277 V (in phase-to-neutral) - 480 V (in phase-to-phase)	–			
IEC 61000-3-2 conformity		Yes for ABL 7RP, not for ABL 8REM and not applicable for ABL 8MEM and ABL 7RM			
Protection against undervoltage		Yes			
Protection against overloads and short-circuits		Yes, voltage detection. Automatic restart on elimination on the fault			
Diagnostic relay		–			
Compatibility with function modules		–			
Power reserve (Boost)		1,25 to 1,4 In during 1 minute, depending on model (with ABL 8MEM)			No
Output voltage		5 V ⎓	12 V ⎓	24 V ⎓	48 V ⎓
Output current	0.3 A			**ABL 8MEM24003** *(Modular)*	
	0.6 A			**ABL 8MEM24006** *(Modular)*	
	1.2 A			**ABL 8MEM24012** *(Modular)*	
	2 A		**ABL 8MEM12020** *(Modular)*		
	2.5 A			**ABL 7RM24025** *(Modular)*	**ABL 7RP4803** *(Optimum)*
	3 A			**ABL 8REM24030** *(Optimum)*	
	4 A	**ABL 8MEM05040** *(Modular)*			
	4.8 A				
	5 A		**ABL 7RP1205** *(Optimum)*	**ABL 8REM24050** *(Optimum)*	
	6 A				
	10 A				
	20 A				
	40 A				
Pages		Please, consult our catalogue “Phaseo, Power supplies & transformers”			

Regulated switch mode Phaseo Universal range industrial power supplies				Regulated switch mode Phaseo range AS-Interface for AS-Interface cabling system	
					
100...120 V ∿ and 200...500 V ∿ *(1)*	380...500 V ∿	24 V ⎓		100...240 V	
Single-phase (N-L1) or 2-phase (L1-L2) connection	–	–		Single-phase (N-L1) connection	
	3-phase (L1-L2-L3) connection	–		Single-phase (N-L1) connection	
	3-phase (L1-L2-L3) connection	–		–	
Yes		–		No	Yes
Yes		–		–	Yes
Yes, current limitation or undervoltage detection		Yes, current limitation		Yes	
Yes, depending on model				–	
Yes with buffer module, battery and battery control modules, redundancy module and discriminating downstream protection module				–	
1,5 In during 4 secondes		No		No	
24 V ⎓		5 V ⎓	7...12 V ⎓	30 V ⎓	24 V ⎓
			ABL 8DCC12020 *(2)*		
				ASI ABLB3002 **ASI ABLD3002** *(3)* **ASI ABLM3024** *(4)*	
ABL 8RPS24030					**ASI ABLM3024** *(4)*
				ASI ABLB3004 **ASI ABLD3004** *(3)*	
ABL 8RPS24050					
		ABL 8DCC05060 *(2)*			
ABL 8RPS24100					
ABL 8RPM24200	**ABL 8WPS24200**				
	ABL 8WPS24400				

Please, consult our catalogue “Phaseo, Power supplies & transformers”

(1) Except **ABL 8RPM24200**. ∿ 100...120 V and ∿ 200...240 V.
(2) ⎓/⎓ converter module, requires to be associated with the Phaseo Universal range power supply.
(3) With earth fault detection.
(4) One output 30 V ⎓ and one output 24 V ⎓ ± 5 %.

Operator dialogue terminals
Magelis Small Panel

Applications		**Display of text messages**
Type of unit		**Small Panel, compact display units**
		
Display	Type	Back-lit green LCD, height 5.5 mm or Back-lit green, orange or red LCD, height 4.34…17.36 mm
	Capacity	2 lines of 20 characters or 1 to 4 lines of 5 to 20 characters
Data entry		Via keypad with 8 keys (4 customisable)
Memory capacity	Application	512 kB Flash
	Expansion by PCMCIA type II	–
Functions	Maximum number of pages	128/200 application pages 256 alarm pages
	Variables per page	40…50
	Representation of variables	Alphanumeric
	Recipes	–
	Curves	–
	Alarm logs	Depending on model
	Real-time clock	Access to the PLC real-time clock
	Alarm relay	–
Communication	Asynchronous serial link	RS 232C/RS 485
	Downloadable protocols	Uni-TE, Modbus and for PLC brands: Allen-Bradley, Omron, Mitsubishi, Siemens
	Printer link	RS 232C serial link *(1)*
Development software		Vijeo Designer Lite (on Windows 2000 and XP)
Operating system		Magelis
Terminal type		**XBT N**
Page		Consult our catalogue “Humain/Machine interfaces”

(1) Depending on model.

Display of text messages Control and parametering of data	Display of text messages and/or semi-graphics Control and parametering of data
Small Panel, compact graphic terminals with keypad	**Small Panel, touchscreen compact terminals and with keypad**
	
Back-lit green, orange or red LCD, height 4.34…17.36 mm	Back-lit green matrix LCD (198 x 80 pixels), height 4…16 mm
1 to 4 lines of 5 to 20 characters	2 to 10 lines of 5 to 33 characters
Via keypad with 12 function keys or numeric entry (depending on context) + 8 service keys	Via keypad with 4 function keys 8 service keys
	Via touchscreen and keypad with 10 function keys 2 service keys
512 kB Flash	512 kB Flash EPROM
–	–
128/200 application pages 256 alarm pages	200 application pages 256 alarm pages
40…50	50
Alphanumeric	Alphanumeric, bargraph, buttons, lights
–	–
–	Yes
Yes	Yes
Access to the PLC real-time clock	
No	No
RS 232C/RS 485	
Uni-TE, Modbus and for PLC brands: Allen-Bradley, Omron, Mitsubishi, Siemens	Uni-TE, Modbus
RS 232C serial link *(1)*	
Vijeo Designer Lite (on Windows 2000 and XP)	
Magelis	
XBT R	**XBT RT**
Consult our catalogue “Humain/Machine interfaces”	

Some countries require certain electrical components to undergo certi cation by law. This certi cation takes the form of a certi cate of conformity to the relevant standards and is issued by the of cial body in question. Where applicable, certi ed devices must be labelled accordingly. Use of electrical equipment on board merchant vessels generally implies that it has gained prior approval (i.e. certi cation) by certain shipping classi cation societies.

Abbreviated name	Certification body	Country
CSA	Canadian Standards Association	Canada
C-Tick	Australian Communication Authority	Australia, New Zealand
GOST	Scienti c research institute for GOST standards	CIS, Russia
UL	Underwriters Laboratories	USA
Abbreviated name	**Classification society**	**Country**
IACS	International Association of Classi cation Societies	International
ABS	American Bureau of Shipping	USA
BV	Bureau Veritas	France
DNV	Det Norske Veritas	Norway
GL	Germanischer Lloyd	Germany
LR	Lloyd's Register	UK
RINA	Registro Italiano Navale	Italy
RMRS	Russian Maritime Register of Shipping	CIS, Russia
RRR	Russian River Register	

The tables below provide an overview of the situation as at **01/02/2009** in terms of which certi cations (listed next to their respective bodies) have been granted or are pending for our automation products. Up-to-date information on which certi cations have been obtained by products bearing the Schneider Electric brand can be viewed on our website: www.schneider-electric.com

Product certifications

Certified / *Certification pending*	Certifications						
	UL	**CSA**	**ACA** (C-Tick)	**GOST**	**Hazardous locations** Class I, div 2 *(1)*	**ATEX**	**TÜV Rheinland**
	USA	Canada	Australia	CIS, Russia	USA, Canada	Europe	
Advantys OTB	■	■			■		
Advantys STB	■	■	■	■	FM	Cat. 3 G	
Advantys Telefast ABE 7	■	■	■				
ConneXium	■	■			*(2)*		
Magelis *i*PC, Magelis XBT GTW	*(3)*	■		*(2)*	UL	*(2)*	
Magelis XBT GT	■	■	■	*(2)*	CSA/UL	Cat. 3 G-D	
Magelis XBT GK	■	■	■	■	CSA		
Magelis XBT N/R	■	■	■	■	CSA/UL	Cat. 3 G-D	
Magelis XBT RT	■	■	■	■	CSA/UL	Cat. 3 G-D	
Modicon M340	■	■	■	■	CSA		
Modicon Momentum	■	■	■				
Modicon Premium	■	■	■	*(2)*	CSA		
Modicon Quantum	■	■	■	*(2)*	FM *(2)*		
Modicon Quantum Safety	■	■	■	*(2)*	CSA		SIL 2 *(4)*
Modicon TSX Micro	■	■	■	■	■		
Phaseo	*(3) (5)*	■	■	■			
Twido	*(6)*	*(6)*		■	CSA/UL *(6)*		

(1) ***Hazardous locations****: According to UL 1604, CSA 22.2 N° 213 and FM 3611, certified products are only approved for use in hazardous locations categorized as Class I, division 2, groups A, B, C and D, or in non-classified locations.*

(2) Depends on product; please visit our website: www.schneider-electric.com

(3) North American certification **cULus** *(Canada and USA)*

(4) According to IEC 61508. Certified by TÜV Rheinland for integration into a safety function of up to SIL2 level.

(5) Except for power supplies and function modules in the Universal range: UL certification pending

(6) Except for AS-Interface module **TWD NOI 10M3***; CE only.*

Specific certifications		
BG	Germany	Safety module **TSX DPZ 10D2A** (Modicon TSX Micro) Safety modules **TSX PAY 262/282** (Modicon Premium)
SIMTARS	Australia	Modicon TSX Micro automation platform Modicon Premium (PL7) automation platform
AS-Interface	Europe	Master module **TWD NOI 10M3** (Twido) Master module **TSX SAZ 10** (Modicon TSX Micro) Master modules **TSX SAY 1000** (Modicon Premium)

Merchant navy certifications

	Shipping classification societies							
	ABS	**BV**	**DNV**	**GL**	**LR**	**RINA**	**RMRS**	**RRR**
	USA	France	Norway	Germany	UK	Italy	CIS	CIS
Advantys OTB								
Advantys STB	*(1)*							
Advantys Telefast ABE 7								
ConneXium				*(2)*				
Magelis iPC, Magelis XBT GTW								
Magelis XBT GT								
Magelis XBT GK								
Magelis XBT N/R								
Magelis XBT RT								
Modicon M340	*(2)*	*(2)*	*(2)*	*(2)*	*(2)*	*(2)*		
Modicon Momentum								
Modicon Premium *(3)*								
Modicon Quantum	*(2)*	*(2)*	*(2)*	*(2)*	*(2)*	*(2)*	*(2)*	
Modicon TSX Micro								
Phaseo								
Twido			*(4)*	*(4)*	*(4)*			

Certified
Certification pending

(1) Also covers US Navy requirements **ABS-NRV** part 4.
(2) Depends on product; please visit our website: **www.schneider-electric.com**.
(3) Modicon Premium, also certified by KRS (Korean Register of Shipping).
(4) Except for: Compact bases **TWD LC••40DRF**, *Extreme base* **TWD LEDCK1**, *communication modules* **499 TWD 01100**, **TWD NCO1M** *and* **TWD NOI 10M3** *and tap junctions* **TWD XCA ISO/T3RJ**.
Certifications pending for I/O extension modules (discrete **TM2 D** *and analogue* **TM2 A**).

CE marking

■ The appearance of a CE mark on a product indicates the manufacturer's certi cation that the product conforms to the relevant European Directives; this is a prerequisite for placing a product which is subject to the requirements of one or more Directives on the market and for allowing its free circulation within European Union states.
■ The CE mark is intended for use by those responsible for regulating national markets.

Where electrical equipment is concerned, conformity to standards indicates that the product is t for use. Only a warranty by a well-known manufacturer can provide assurance of a high level of quality.
As far as our products are concerned, one or more Directives are likely to apply in each case; in particular:
■ The Low Voltage Directive (2006/95/EC)
■ The Electromagnetic Compatibility Directive (2004/108/EC)
■ The ATEX CE Directive (94/9/EC)

Protective treatment of Twido controller, compact and modular bases *(1)*

Twido controller (compact and modular bases) meet the requirements of “TC” treatment (Treatment for all Climates).
For installations in industrial production workshops or environments corresponding to “TH” treatment (treatment for hot and humid environments), Twido controllers must be embedded in envelopes with a minimum IP 54 protection, in compliance with IEC/EN 60664 and NF C20 040.

Twido controller themselves offer **protection to IP 20 level** and **protection against pins** (encloset equipement). They can therefore be installed without an envelope in reserved-access areas which do not exceed **pollution level 2** (control room with no dust-producing machine or activity). The pollution level 2 does not take account of more severe environmental conditions: air pollution by dust, smoke, corrosive or radioactive particles, vapours or salts, attack by fungi, insects, ...

(1) Extreme base, see page 25.

Product reference index

Schneider Electric Industries SAS

www.schneider-electric.com

Head Of ce
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