

Twido Programmable controller

Catalogue

2009



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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)			
	7 kHz positioning				2 x 32 bit channels (on dedicated discrete inputs) 2 x PWM/PLS function channels	
Functions	PID			Yes		
	Event processing			Yes		
Communication	Integrated	1 RS 485 serial port	1 RS 485 serial port, 1 optional RS 232C/RS 485 serial port			
	Ethernet TCP/IP	TwidoPort interface module (via RS 485 serial port)			Ethernet port (on TWD LC●E)	
	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●				
Programming	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)
Page		13				

(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 $\rightarrow$ 24 V inputs (1)		24 sink/source $\rightarrow$ 24 V inputs (1)	11 sink/source $\rightarrow$ 12/24 V source 2 inputs $\rightarrow$ 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 $\rightarrow$ 12/24 V 14 ($\rightarrow$ 12 V) or 11 ($\rightarrow$ 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			Integrated: 8 inputs
10 types of module: input, output, mixed 2, 4 or 8 channels connection by screw terminals			
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
$\rightarrow$ 19.2 V...30 V			$\rightarrow$ 12 or 24 V (limited $\rightarrow$ 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 $\rightarrow$ 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: $\sim$ supply, D: $\rightarrow$ supply.

(7) Replace the ● in the reference with T: source transistor outputs, U: sink transistor outputs.

564403-3-3



TWD LC●A 10DRF

564403-3-3



TWD LC●A 16DRF

564404-3-3



TWD LC●A 24DRF

12111446-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 $\sim$ 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 $\sim$ 100 and 240 V (providing the $\sim$ 24 V supply to the sensors),
- ☐ or a d.c. supply between $\sim$ 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:

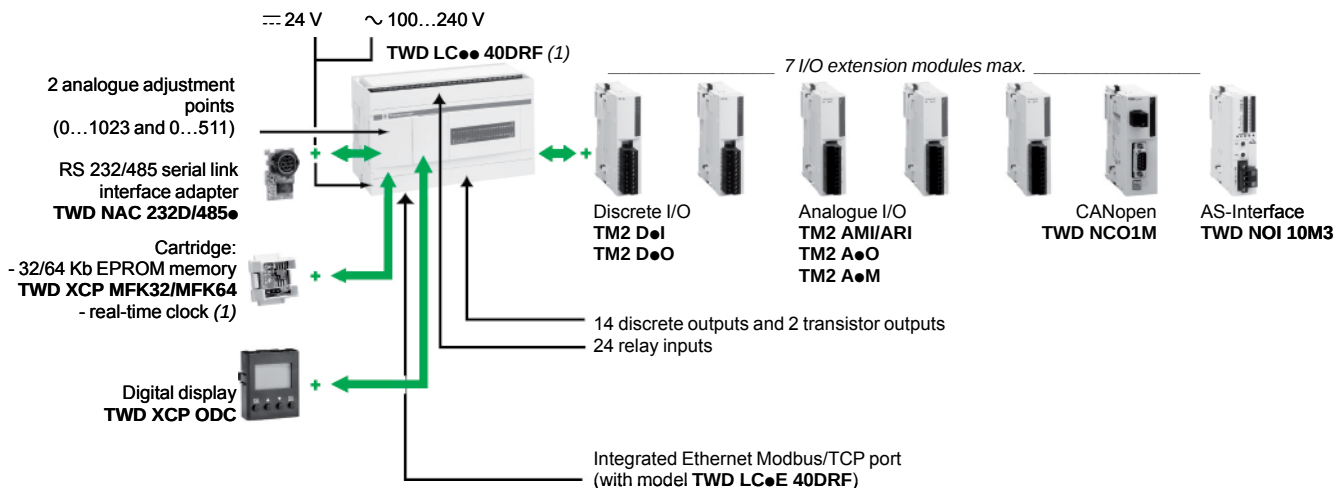
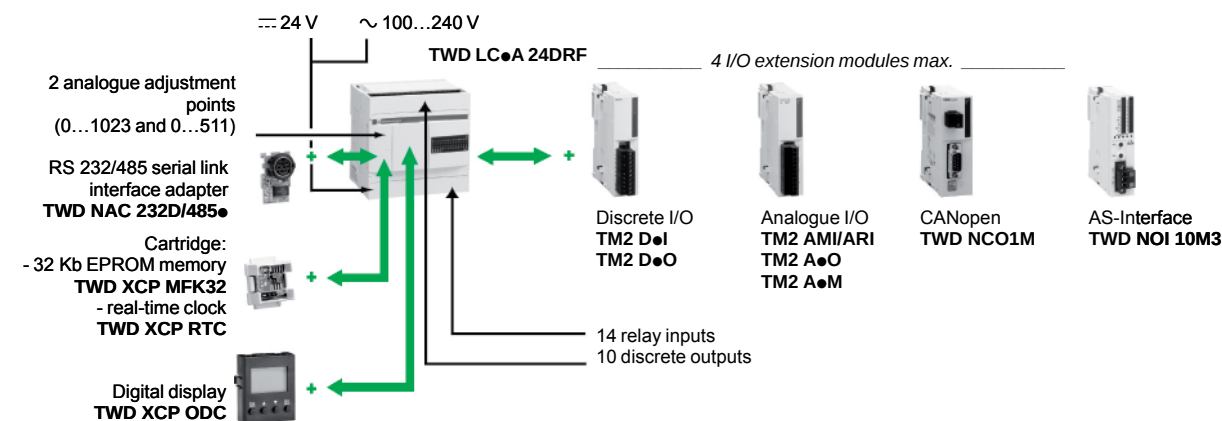
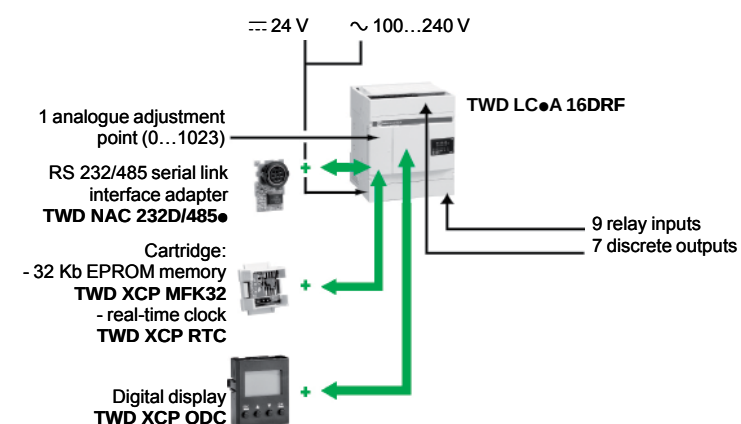
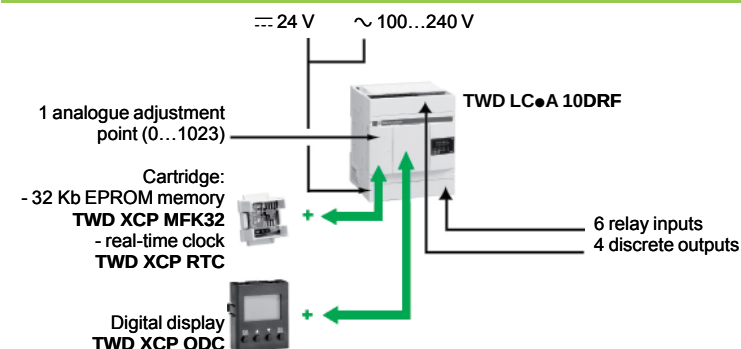
- ☐ pre-formed cables with free wires at one end for direct connection to sensors/preactuators,
- ☐ the Modicon Telefast ABE 7 pre-wired system for Twido controller (connection cable and ABE 7 sub-base assembly).

- 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.

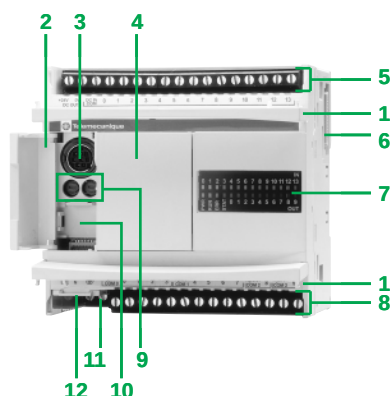
Configuration of compact base controllers



(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 :

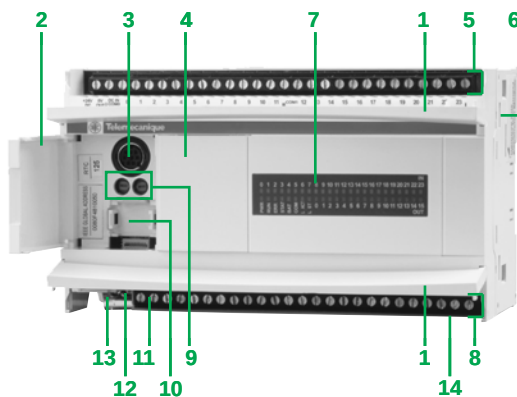
- 1 Two hinged connection terminal block covers for access to the terminals.
- 2 A hinged access door.
- 3 A mini-DIN type RS 485 serial port connector (allowing connection of the programming terminal).
- 4 A slot (protected by a removable cover) for digital diagnostic/maintenance display module **TWD XCP ODC**.
- 5 A screw terminal block for $\sim$ 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/NC01M** (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 $\sim$ 100...240 V mains or $\sim$ 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 $\sqcap$ rail, mounting plate or panel (2 x 4.3 $\varnothing$ holes).

(1) $\sim$ 24 V sensor supply only with base controller **TWD LCAA ●●DRF** ($\sim$ 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 $\sim$ 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/NC01M** (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 $\sim$ 100...240 V mains or $\sim$ 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 $\sqcap$ rail, mounting plate or panel (2 x 4.3 Ø holes).

(1) $\sim$ 24 V sensor supply only with base controller **TWD LCAE 40DRF** (model with $\sim$ 100...240 V mains supply)

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				TWD LCDA 10DRF	TWD LCDA 16DRF	TWD LCDA 24DRF	TWD LCDA 40DRF TWD LCDE 40DRF	
--- compact base controller type								
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					
Recommended 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					
Recommended 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		-				
Connection			-					
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
		--- 24 V	mA	–	–	–	5	5
	At state 1	--- 5 V	mA	24	30	36	90	190
		--- 24 V	mA	26	40	55	128	128
	At state 1 + inputs ON	--- 5 V	mA	–	–	–	140	240
		--- 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.



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 ●●●●



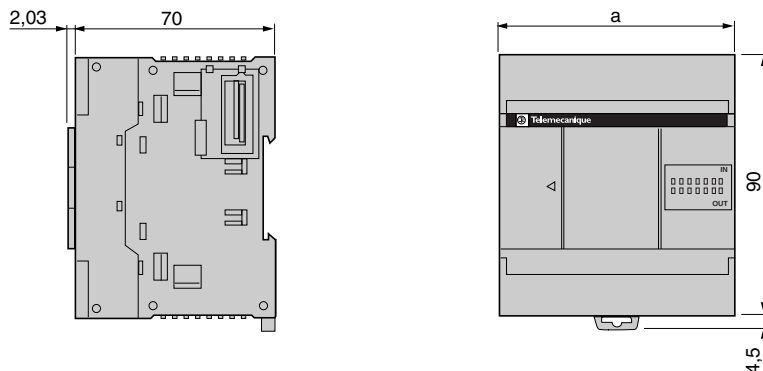
TWD XCP ODC

Separate components					
Description	Application	Type	Reference	Weight kg	
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.

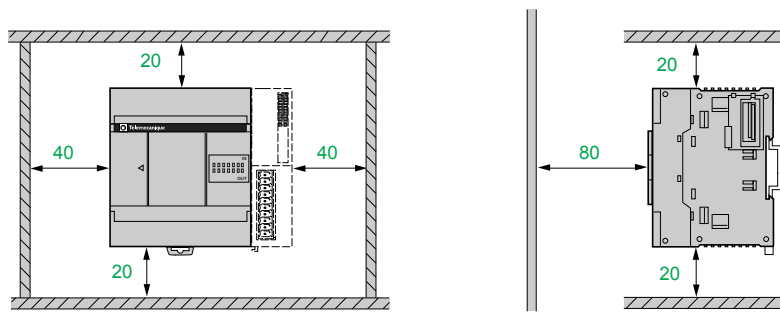
Dimensions

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:

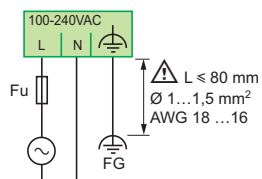
- Vertical mounting: not permissible for temperatures $\geq 40^{\circ}\text{C}$;
- "Upside down" flat mounting: not permissible.
- Avoid placing devices which generate heat (transformers, power supplies, power contactors...) beneath the controller.

Connections

Connection of power supplies

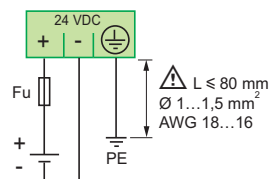
TWD LCA●●DRF

~ 100...240 V supply



TWD LCA●●DRF

24 V supply



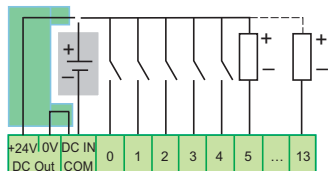
Fu : Type T fuse, see page 11

Connections (continued)

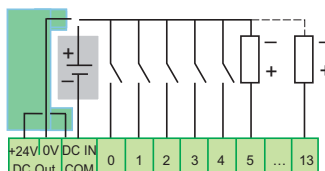
Connection of $\sim$ 24 V inputs

TWD LC●A 10DRF/16DRF/24DRF

Connection to sink inputs (positive logic)

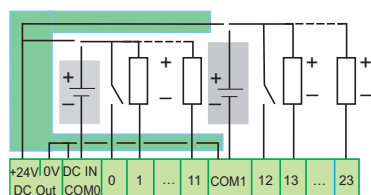


Connection to source inputs (negative logic)

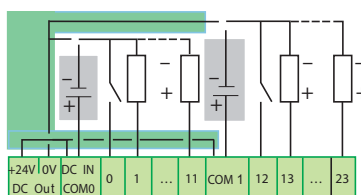


TWD LC●A 40DRF

Connection to sink inputs (positive logic)

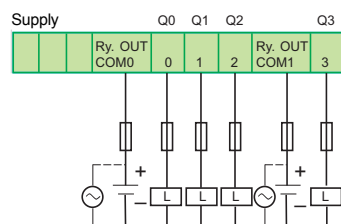


Connection to source inputs (negative logic)

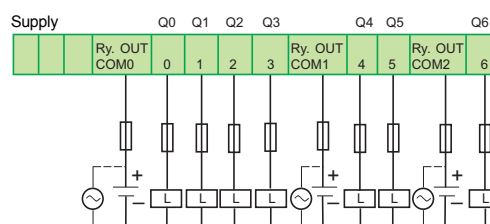


Connection of outputs

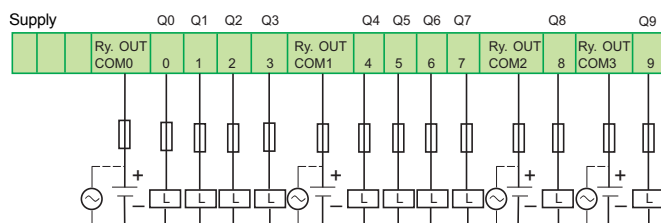
TWD LC●A 10DRF



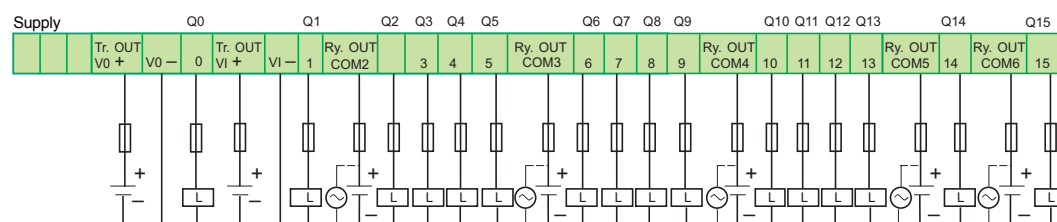
TWD LC●A 16DRF



TWD LC●A 24DRF



TWD LC●A 40DRF/TWD LC●E 40DRF



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

Sensors powered by external $\sim$ 24 V supply.



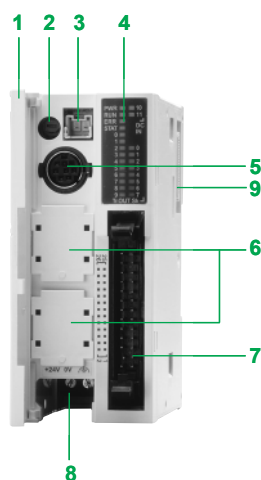
TWD LMDA 20DTK/20DUK



TWD LMDA 20DRT



TWD LMDA 40DTK/40DUK



Presentation

The modular programmable controller range includes five 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 fitted 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 fitted 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 flexibility which is generally only available with larger automation platforms. **TWD LMDA** modular base controllers can be fitted 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 flexibility. 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/NC01M** (4 or 7 depending on the model).

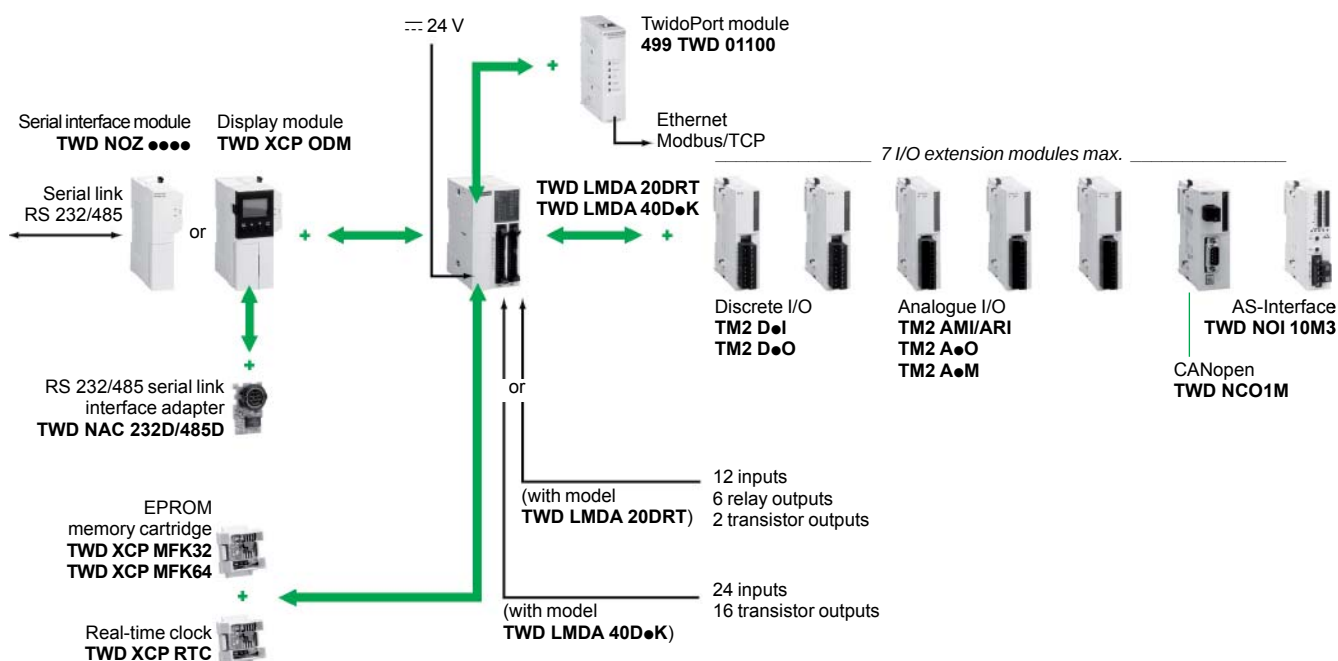
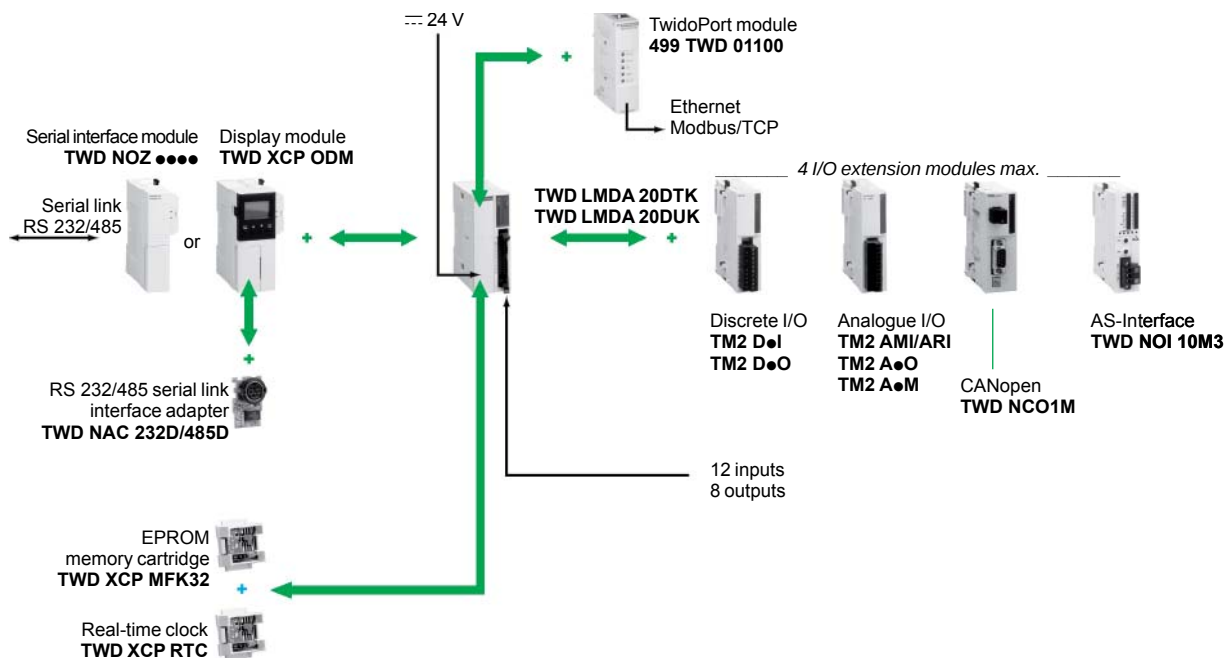
On the left-hand side panel:

A connector (not visible) for display module **TWD XCP ODM** or serial interface module **TWD NOZ ●●●●**.

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

Description (continued)

Configuration of 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 $\pm$ 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)	$\pm$ 5 V for I/O extension modules		mA	450				
	Max. $\pm$ 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 $\pm$ 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	
Recommended 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 outputs 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 (with 1800 operations/hour max.): - minimum electrical life: 1 x 10 ⁶ 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.

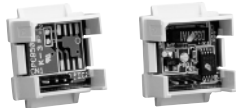
(2) Inductive load fitted with a protection device such as an RC peak limiter or flywheel diode.



TWD LMDA 20DTK/20DUK TWD LMDA 40DTK/40DUK



TWD LMDA 20DRT



TWD XCP MFK ●●



TWD XCP RTC



TWD XCP ODM



TWD NAC 232D/485D TWD NAC 485T



TWD NOZ ●●●

References

Sink/source inputs	Outputs	No. of I/O extension modules	No. of program memory instructions	Reference	Weight kg
Modular base controllers, 20 I/O					
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

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

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 <i>Sold in lots of 5</i>	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
		Screw terminals	RS 485	TWD NAC 485D	0.010
			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

Spare parts

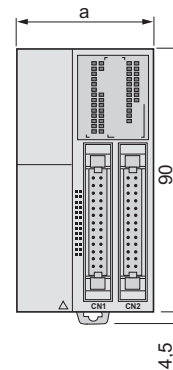
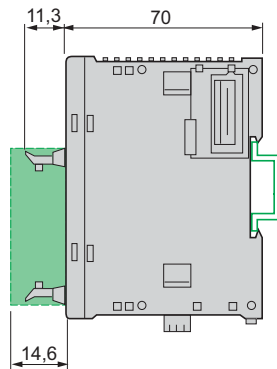
Screw terminal blocks <i>Sold in lots of 2</i>	Base controller TWD LMDA 20DRT, 13 contacts	—	TWD FTB 2T13	—
	Base controller TWD LMDA 20DRT, 16 contacts	—	TWD FTB 2T16	—
Analogue input cable	For integrated analogue input. Length 1 m	—	TWD XCA 2A10M	—
Pre-formed cables	Base controller TWD LMDA ●0DTK	—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

(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).

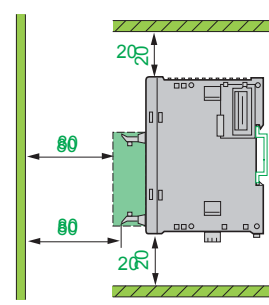
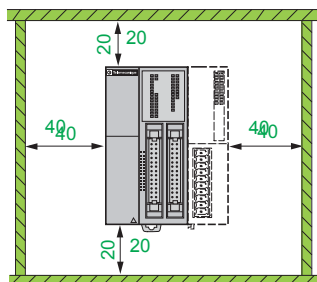
Dimensions

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

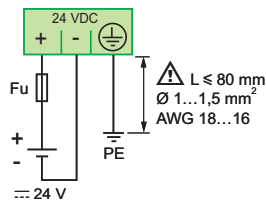


⚠ Important:

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

Connections

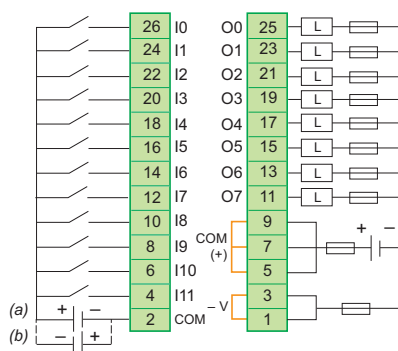
Power supply for modular base controllers TWD LMDA 20/40D●●



Fu: Type T fuse, see page 11

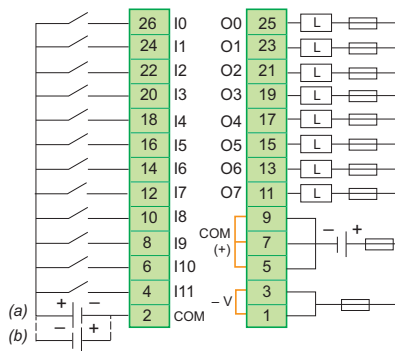
TWD LMDA 20DTK

(8 source transistor outputs)



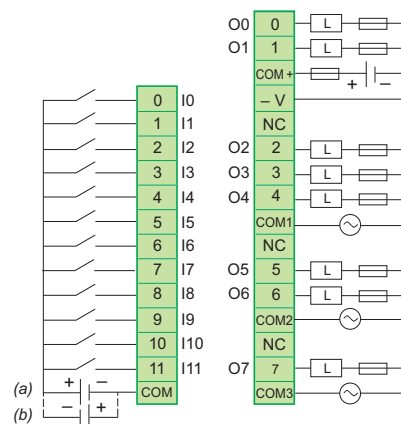
TWD LMDA 20DUK

8 sink transistor outputs



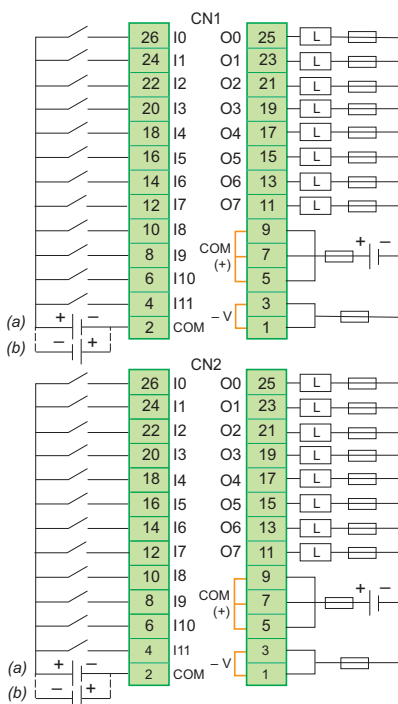
TWD LMDA 20DRT

(2 source transistor outputs Q0-Q1)



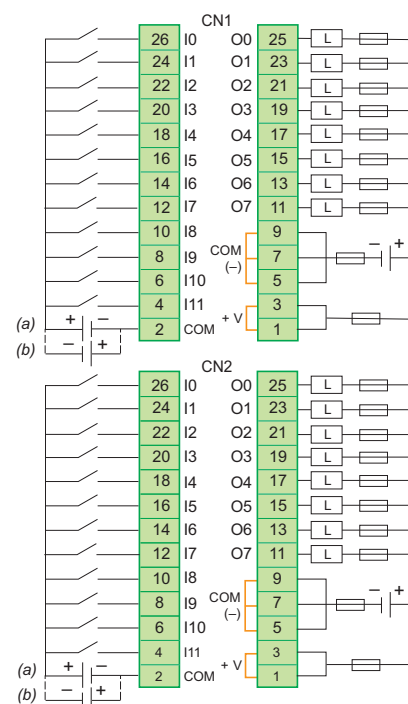
TWD LMDA 40DTK

(16 source transistor outputs)



TWD LMDA 40DUK

16 sink transistor outputs

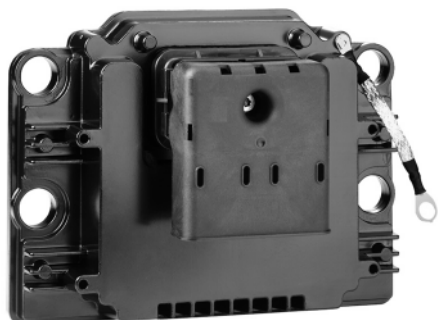


(a) Connection of the 24 V supply for sink inputs (positive logic).

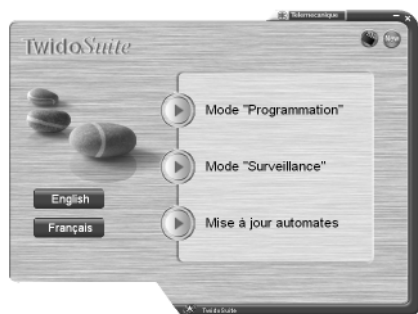
(b) Connection of the 24 V supply for source inputs (negative logic).

Internal module links.

564493-3-3



TWD LEDCK1



TwidoSuite programming software

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 DC or 24 V DC 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

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.

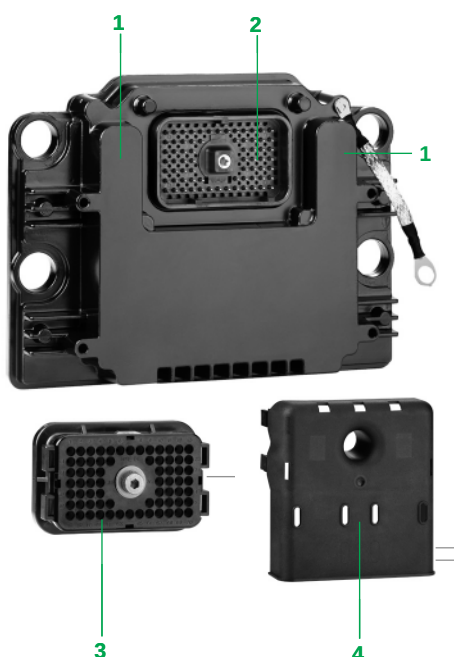
Description

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**



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	Operation	°C	- 40...+110
	According to IEC/EN 60068-2-1 & 2 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 <i>Where Un = nominal voltage and Udl = undervoltage detection level</i>
Immunity to High Frequency (H.F.) disturbance (2)			
Electrical fast transients/Bursts	IEC/EN 61000-4-4		Primary power supply: 2 kV in common mode Communication data: 1 kV in common mode
	IEC/EN 61131-2 zone B		
	IEC/EN 61000-6-2		
Surges	IEC/EN 61000-4-5		Primary power supply: 0.5 kV in differential mode and 1 kV in common mode Communication data: 1 kV in common mode
	IEC/EN 61131-2 zone B		
	IEC/EN 61000-6-2		
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	°C	- 55 for 8 hrs
	IEC/EN 60068-2-48		
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		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
	IEC/EN 61131-2		
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 $\overline{\text{DC}}$	24 V $\overline{\text{DC}}$	
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 $\overline{\text{DC}}$	12	24	
	Limit values	V $\overline{\text{DC}}$	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		

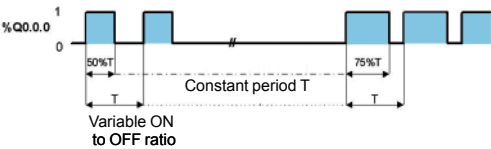
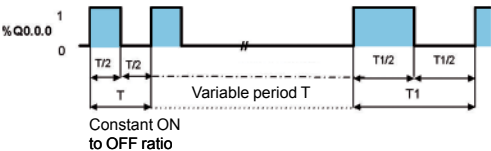
Type of controller base				TWD LEDCK1									
Characteristics of discrete, analog and PWM inputs													
Battery voltage				12 V $\overline{\text{DC}}$			24 V $\overline{\text{DC}}$						
Total number of inputs				22									
Discrete inputs	Number	Total		13									
		Negative logic (<i>source</i>)		11, connected to ground (I0.0...I0.10 addressing)									
		Positive logic (<i>sink</i>)		2, connected to the battery + (I0.11...I0.12 addressing)									
	Nominal input voltage		V $\overline{\text{DC}}$	12 $\overline{\text{DC}}$ positive or negative logic (<i>sink/source</i>)			24 $\overline{\text{DC}}$ positive or negative logic (<i>sink/source</i>)						
	Common			1 (+ polarity in positive logic) or 1 (- polarity in negative logic)									
	Max. permitted voltage		V $\overline{\text{DC}}$	32									
	Limit voltages, positive logic	At state 1	V $\overline{\text{DC}}$	≥ 0.85 U battery (pull-down R = 10 k Ω)									
		At state 0	V $\overline{\text{DC}}$	≤ 0.65 U battery (pull-down R = 10 k Ω)									
	Limit voltages, negative logic	At state 1	V $\overline{\text{DC}}$	≥ 3.75 (pull-up R = 2 k Ω)									
		At state 0	V $\overline{\text{DC}}$	≤ 0.8 (pull-up R = 2 k Ω)									
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 $\overline{\text{DC}}$	12, positive logic (<i>sink</i>)			24, positive logic (<i>sink</i>)						
	Counting frequency		kHz	10									
Characteristics of the outputs													
Battery voltage				12 V $\overline{\text{DC}}$			24 V $\overline{\text{DC}}$						
Total number of outputs				19									
Discrete outputs	Output current	Positive logic (<i>source</i>)		1 x 1 A (Q0.4 addressing)									
				1 x 50 mA (Q0.3 addressing)									
		Negative logic (<i>sink</i>)		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 (<i>sink</i>)	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



Example of control lever with
1 or 2 electronic shafts



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).

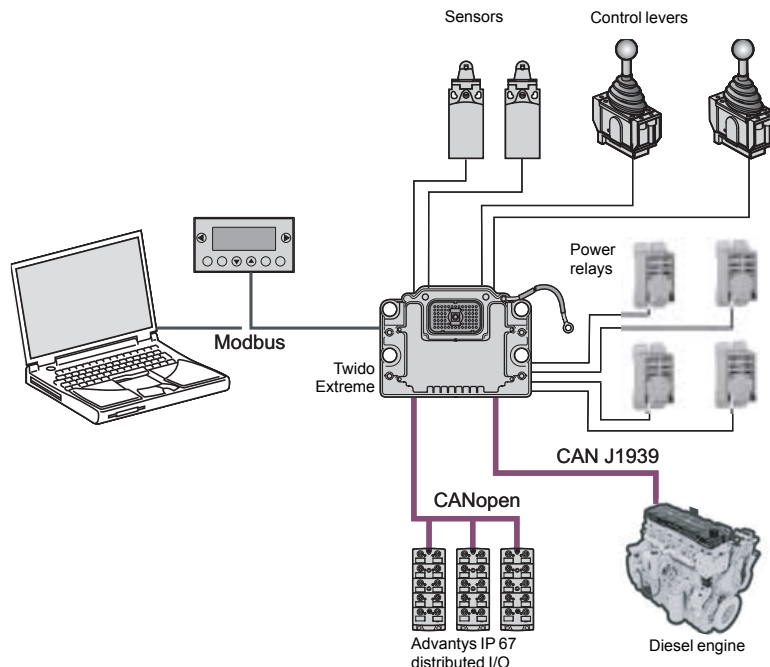
PWM function

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).

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.

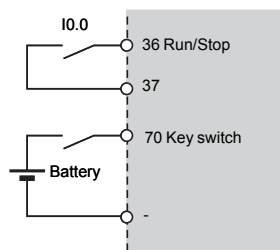
Key switch function

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.

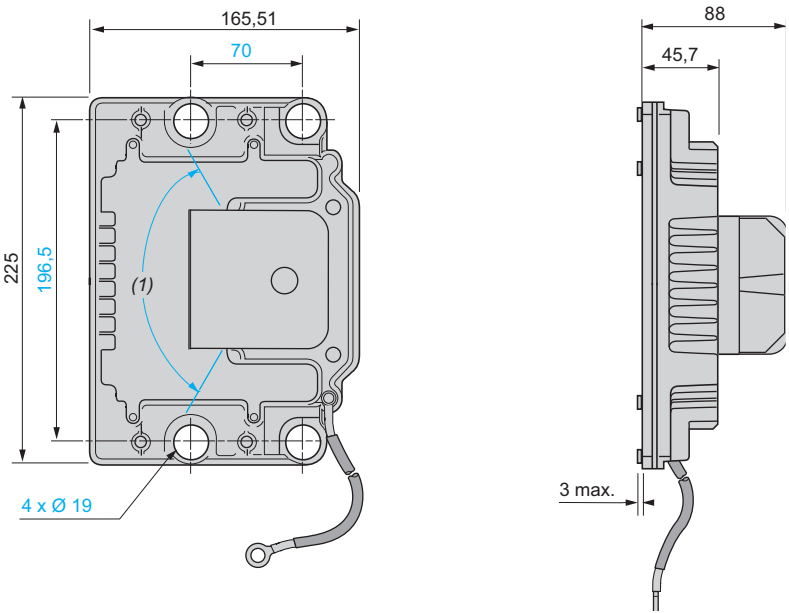
In standby mode, if the battery power supply is not interrupted, this special input can be used to save the controller data context.

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.



Dimensions
TWD LEDCK1 (dimensions in mm)

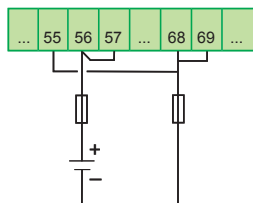


(1) Area of the conductors output

Connections

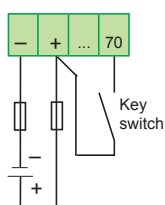
Connecting the 12 or 24 V $\overline{\text{DC}}$ power supply

TWD LEDCK1



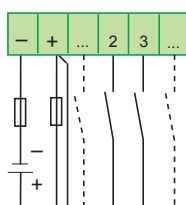
Connecting the inputs (1)

Key switch input

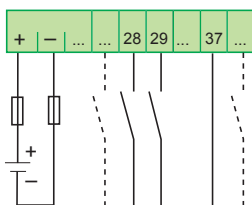


Discrete inputs

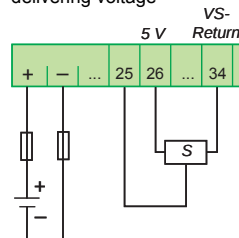
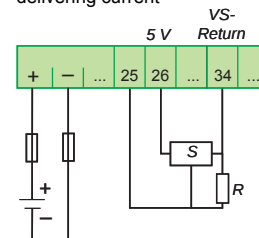
Positive logic



Negative logic

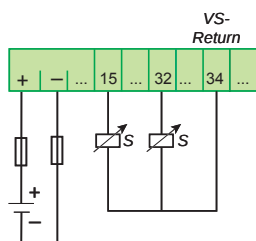
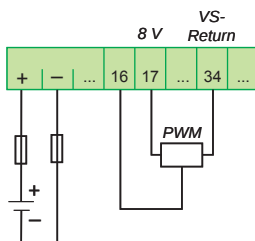
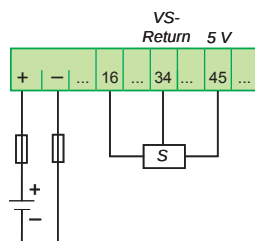
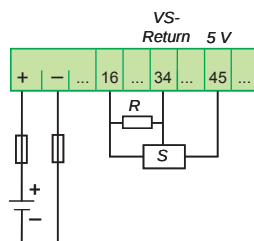


Analog inputs

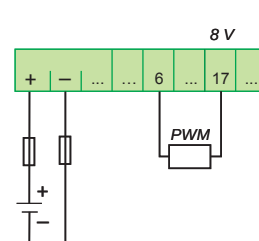
Active sensors
delivering voltageActive sensors
delivering currentS: analog sensor
R: 250 Ω , 5 V/20 mA

Analog inputs (continued)

Passive sensors

Analog or PWM input:
PWM modeAnalog or PWM input:
analog mode, voltage sensorS: analog sensor
R: 250 Ω , 5 V/20 mAAnalog or PWM input:
analog mode, current sensor

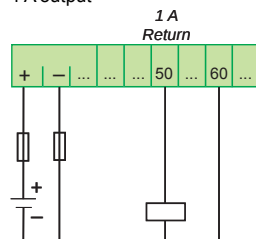
PWM input



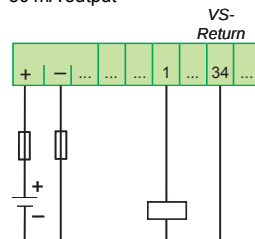
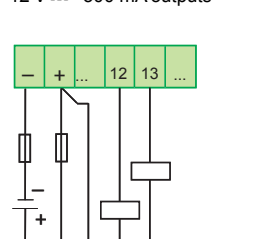
Connecting the outputs (1)

Discrete outputs

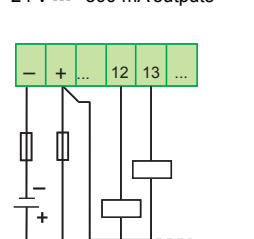
1 A output



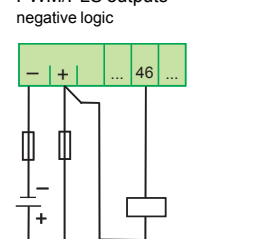
50 mA output

12 V $\overline{\text{DC}}$ - 300 mA outputs

12 V 14 outputs max. (2)

24 V $\overline{\text{DC}}$ - 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.



TWD LEDCK1



TWD FCNK70



RPF 2A2D



XGS Z33 ETH



TCS ESU 051 F0



499 NES 251 00



FTX CN3200

References

Twido Extreme base

Designation	Inputs	Outputs	Program memory	Reference	Weight kg
Twido Extreme controller base	13 x 12 V $\overline{\text{---}}$ 9 x 0...5 V $\overline{\text{---}}$	14 x 300 mA $\overline{\text{---}}$ 1 x 50 mA $\overline{\text{---}}$ 1 x 1 A $\overline{\text{---}}$ 3 PWM/PLS	3,000 instructions	TWD LEDCK1	1.300

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

Separate parts for Twido Extreme controller

Separate parts for three different conditions:					
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 $\overline{\text{---}}$	2 "N/O"	10	RPF 2AJD	0.086
		2 "C/O"	10	RPF 2BJD	0.086
	24 V $\overline{\text{---}}$	2 "N/O"	10	RPF 2ABD	0.086
		2 "C/O"	10	RPF 2BBD	0.086

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 5 m 10 m	TCS MCN1F2 TCS MCN1F5 TCS MCN1F10	0.115 0.270 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

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 0.6 m 1 m 2 m 3 m 5 m	FTX CN 3203 FTX CN 3206 FTX CN 3210 FTX CN 3220 FTX CN 3230 FTX CN 3250	0.040 0.070 0.100 0.160 0.220 0.430

(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		1	TWD NADK70P	0.200	
	12 V or 24 V --- power supply on 2 screw terminals					
Designation	From	To	Length	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	0.3 m	4	VW3 A8 306 R03	0.025
		TWD NADK70P	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

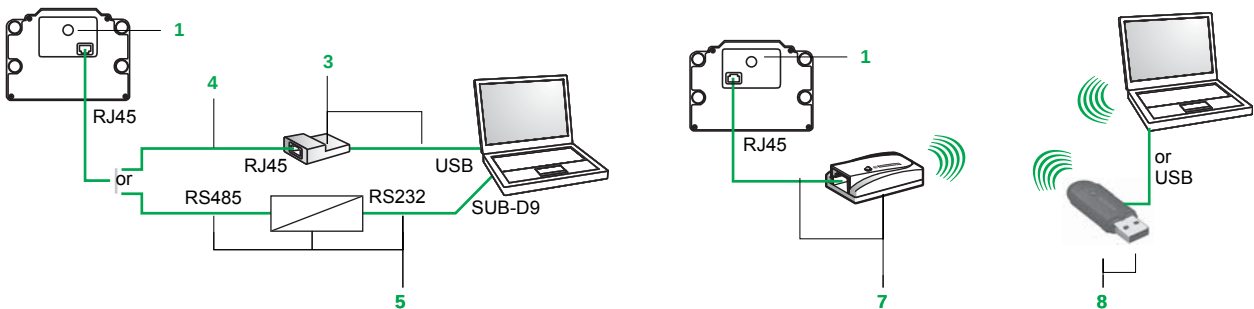
(2) The Bluetooth gateway **VW3 A8 114** consists of:

- One Bluetooth adaptor (range 10 m, class 2) with an RJ45 connector
- One 0.1 m cable with two RJ45 connectors

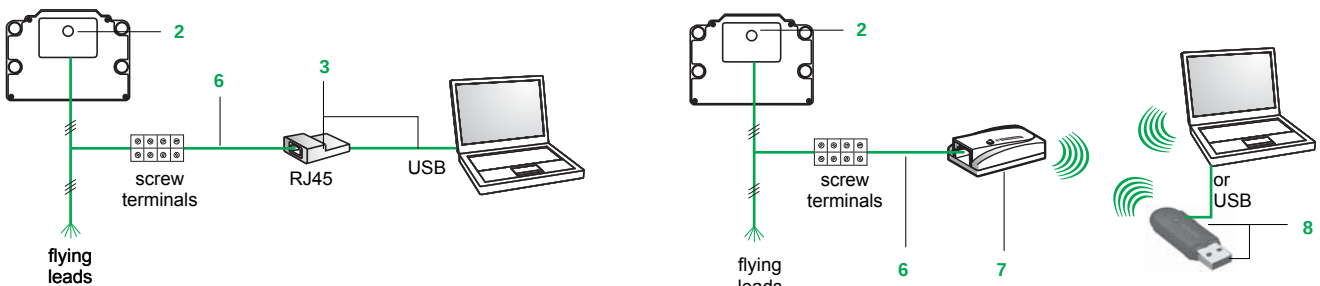
- One cable and one adaptor dedicated to TwidoSuite and ATV11/38/58/58F/68 drives

(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.

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 $\overline{\text{---}}$ 24 V inputs	8 $\sim$ 120 V inputs	16 $\overline{\text{---}}$ 24 V inputs
Connection		By removable screw terminal block		
Inputs	Voltage range	$\overline{\text{---}}$ 20.4...28.8 V	$\sim$ 85...132 V	$\overline{\text{---}}$ 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	4 ms	25 ms	4 ms
	☐ Off-on ☐ 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 $\sim$ for 1 min	1500 V rms $\sim$ for 1 min	500 V rms $\sim$ 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

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



Discrete I/O with removable screw terminal block



Discrete I/O with non-removable spring terminal block



16 $\sim$ 24 V inputs

32 $\sim$ 24 V inputs

4 $\sim$ 24 V inputs/4 relay outputs

16 $\sim$ 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

$\sim$ 20.4...28.8 V

5 mA per channel

Sink/source (1)

1 x 16 channels

2 x 16 channels

4 ms

4 ms

$\sim$ 20.4...28.8 V

7 mA per channel

Sink/source (1)

1 x 4 channels

1 x 16 channels

4 ms

4 ms

1 N/O contact

$\sim$ 240 V, $\sim$ 30V

1 x 4 channels

2 x 4 channels

2 A (lth)

7 A (lth)

None

500 V rms $\sim$ for 1 min

None between input channels, none between output channels

Between input group and output groups: 1500 V rms $\sim$ for 1 min

Between output groups: 1500 V rms $\sim$ for 1 min

Between input channels and internal logic: 500 V rms $\sim$ for 1 min

Between output channels and internal logic: 2300 V rms $\sim$ for 1 min

TM2 DDI 16DK

TM2 DDI 32DK

TM2 DMM 8DRT

TM2 DMM 24DRF

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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 $\rightarrow$ 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	$\rightarrow$ 20.4...28.8 V		$\sim$ 240 V, $\rightarrow$ 30 V	
	Logic (1)	Sink	Source	–	
	Commons	1 x 8 channels		2 x 4 channels	2 x 8 channels
	Output current	0.3 A max.	0.5 A max.	2 A max.	
	☐ Per output ☐ 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 $\sim$ for 1 min		2300 V rms $\sim$ 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.

1 A at 28.8 V

0.4 A max.

2 A at 28.8 V

0.1 A max.

1 A at 28.8 V

0.4 A max.

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

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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, configurations 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 configurations 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.

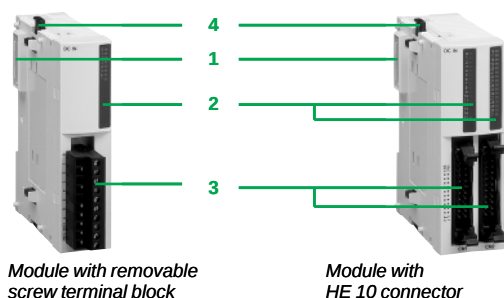
Description

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.

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) simplifies 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 of $\overline{\text{I/O}}$ 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		$\sim 120\text{ V}$	$\overline{\text{---}} 24\text{ sink/source}$					
Connection			Removable screw terminal block			HE 10 connector		Removable screw terminal 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 guaranteed)	V		$\sim 85\text{...}132\text{ V}$	$\overline{\text{---}} 20.4\text{...}28.8$	$\overline{\text{---}} 20.4\text{...}28.8$ (1)			$\overline{\text{---}} 20.4\text{...}28.8$	$\overline{\text{---}} 20.4\text{...}28.8$ (1)
Nominal input current	mA		7.5	7		5		7	
Input impedance	k Ω		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	$\overline{\text{---}} 5\text{ V}$	mA	55	25	40	35	65	25 (2)
		$\overline{\text{---}} 24\text{ V}$	mA	0					65 (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 reactivation		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	≡ 5 V	mA	10		10	15	20	25
	at state 1	≡ 24 V	mA	20		40	20	70	40

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

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 $\sim$ 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 $\sim$ 240 V - 2 A at $\sim$ 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 : $\sim$ 240 V 1 A, cos φ = 0,7 - régime inductif AC-15 : $\sim$ 240 V 0,5 A, cos φ = 0,35 - régime inductif DC-13 : $\sim$ 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 $\sim$ 5 V	mA	30	45	25 (2)	65 (2)	
		$\sim$ 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	
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 (lth) ~ 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 (lth)	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 (lth)	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.



OTB 9ZZ 61JP

References

Separate components

Description	Application	Reference	Weight kg
Fixing kit <i>Sold in lots of 5</i>	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 <i>Sold in lots of 5</i>	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 fitted with HE 10 connector, one end with free wires	I/O extensions TM2 DDI 16DK/32DK	AWG 22 0.035 mm ²	3 m	TWD FCW 30K	0.405
	TM2 DDO 16●K/32●K	AWG 22 0.035 mm ²	5 m	TWD FCW 50K	0.670

Pre-formed connecting cables (1)

Description	Association	Gauge 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 mm ²	1 m	ABF TE20EP100	0,080
		AWG 28 0.080 mm ²	2 m	ABF TE20EP200	0.140
		AWG 28 0.080 mm ²	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 mm ²	1 m	ABF TE20SP100	0,080
		AWG 28 0.080 mm ²	2 m	ABF TE20SP200	0.140
		AWG 28 0.080 mm ²	3 m	ABF TE20SP300	0.210

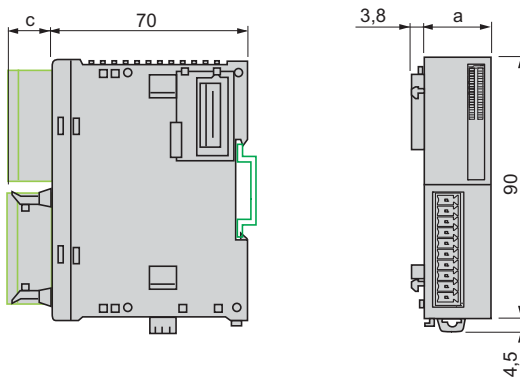
(1) Cables strictly for applications other than use of Advantys Telefast ABE 7 sub-bases with Twido controllers. For use of Advantys Telefast ABE 7 sub-bases with Twido controllers, see pages 94 to 107.

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



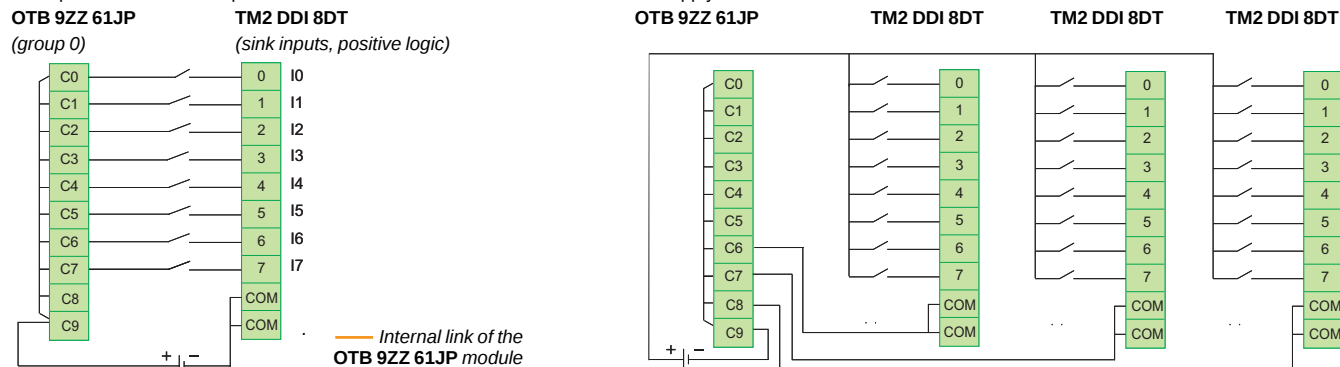
Connections

ABF TP26MP●00 (1)			ABF TE20EP●00 (1)		ABF TE20SP●00 (1)	
HE 10 26-way A	HE 10 20-way B	HE 10 20-way C	HE 10 20-way A	HE 10 20-way B	HE 10 20-way A	HE 10 20-way B
Twido side	Sensor side	Preactuator side	TM2 side	Sensor side	TM2 side	Preactuator side
1	–	18	1	–	1	18
2	20	–	2	–	2	20
3	–	20	3	18	3	19
4	12	–	4	20	4	17
5	–	17	5	16	5	16
6	11	–	6	8	6	8
7	–	19	7	15	7	15
8	10	–	8	7	8	7
9	–	–	9	14	9	14
10	9	–	10	6	10	6
11	–	8	11	13	11	13
12	8	–	12	5	12	5
13	–	7	13	12	13	12
14	7	–	14	4	14	4
15	–	6	15	11	15	11
16	6	–	16	3	16	3
17	–	5	17	10	17	10
18	5	–	18	2	18	2
19	–	4	19	9	19	9
20	4	–	20	1	20	1
21	–	3				
22	3	–				
23	–	2				
24	2	–				
25	–	1				
26	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

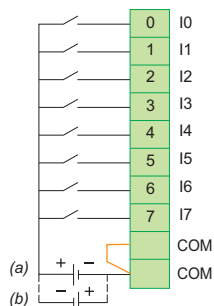
Examples of connection: input module **TM2 DDI 8DT** with distribution module of supply commons **OTB 9ZZ 61JP**



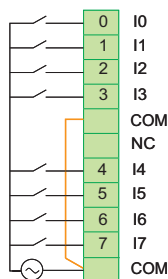
Connections

Input modules

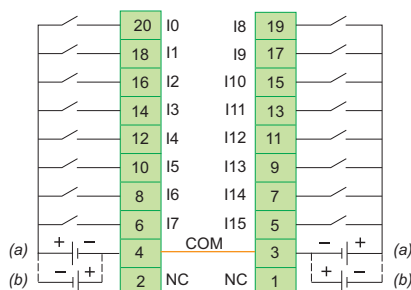
TM2 DDI 8DT (--- 24 V)



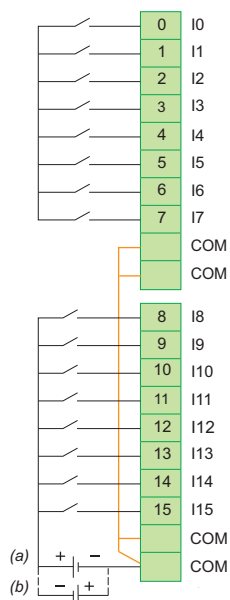
TM2 DAI 8DT (~ 120 V)



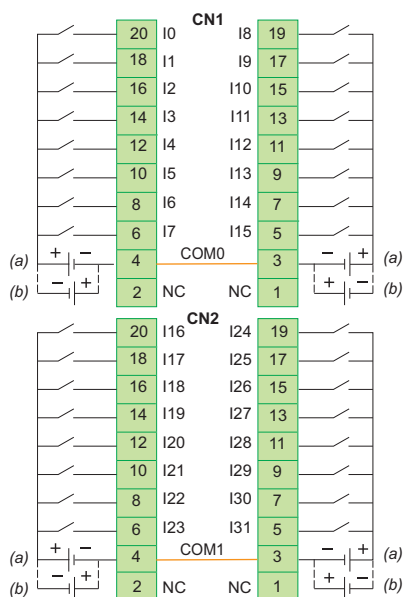
TM2 DDI 16DK (--- 24 V)



TM2 DDI 16DT (--- 24 V)



TM2 DDI 32DK (--- 24 V)



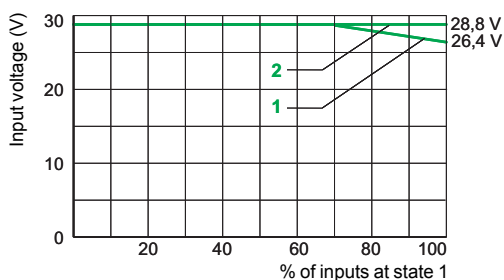
(a) Sink input (positive logic).

(b) Source input (negative logic).

— COM or COM● internal links.

Temperature derating curves of input modules

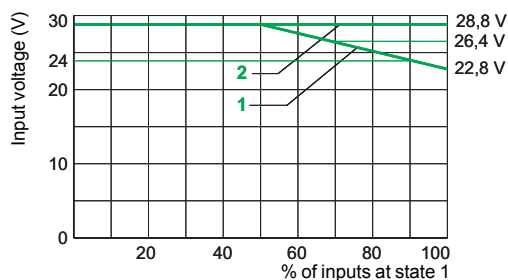
TM2 DDI 16DT



1 Input voltage at 45 °C

2 Input voltage at 55 °C

TM2 DDI 16DK/32DK



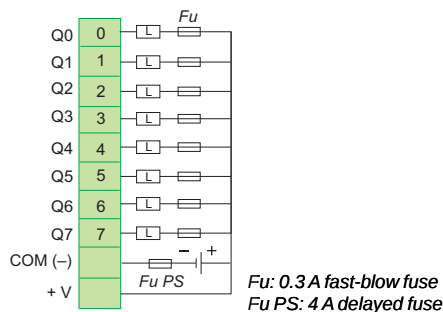
1 Input voltage at 30 °C

2 Input voltage at 55 °C

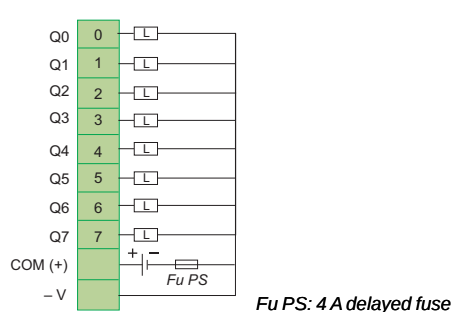
Connections (continued)

Transistor output modules

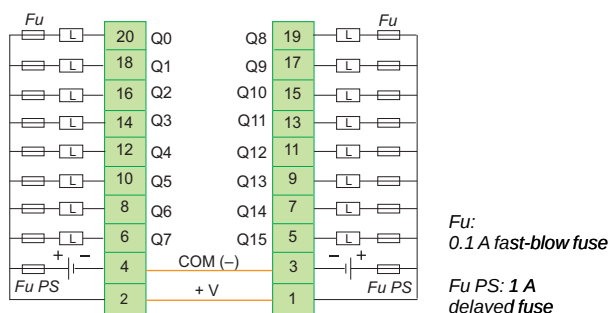
TM2 DDO 8UT



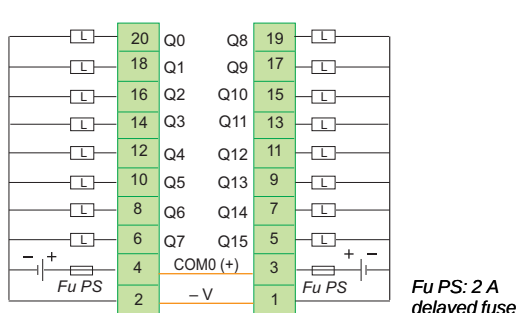
TM2 DDO 8TT



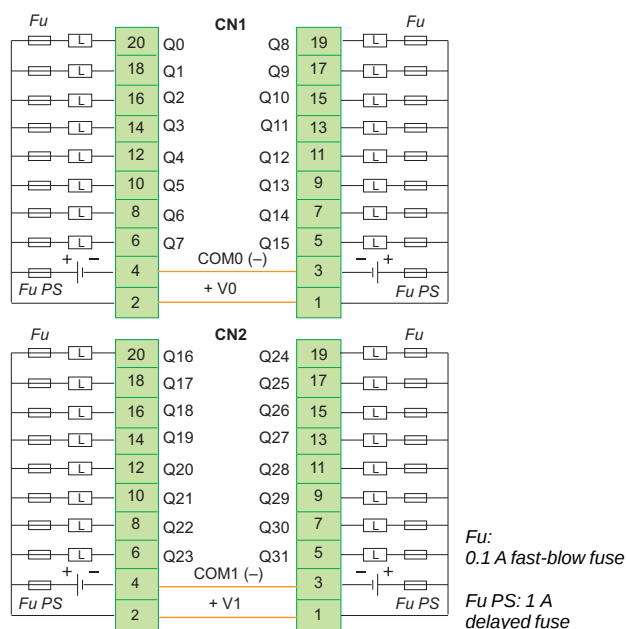
TM2 DDO 16UK



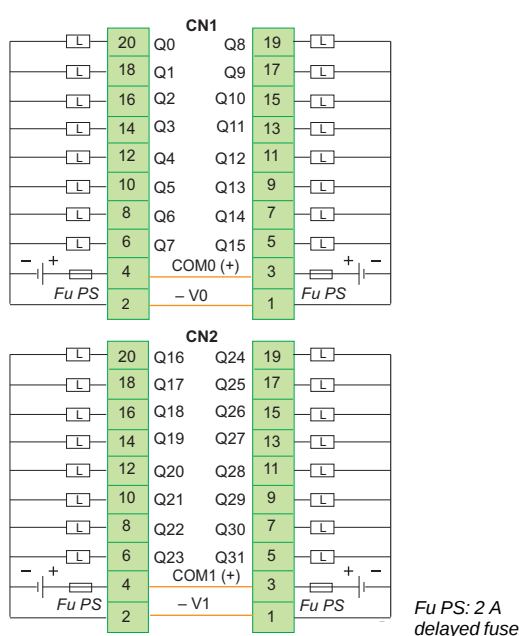
TM2 DDO 16TK



TM2 DDO 32UK



TM2 DDO 32TK

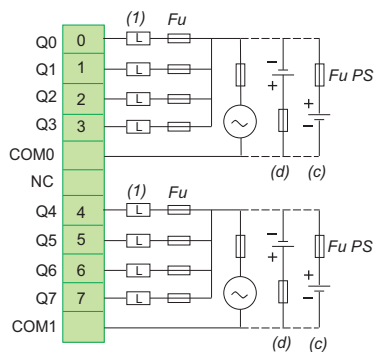


— COM●(-), COM●(+), +V● or -V● internal links.

Connections (continued)

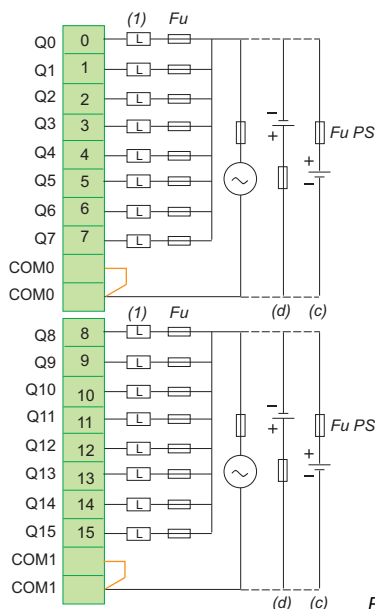
Relay output modules

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.

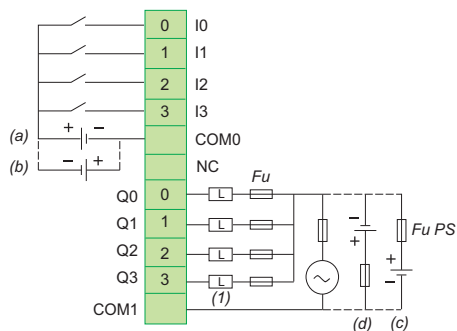
(c) Sink output (negative logic).

(d) Source output (positive logic).

COM● internal links.

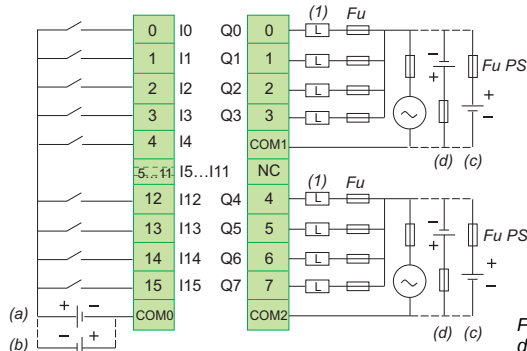
Input/output mixed modules

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).

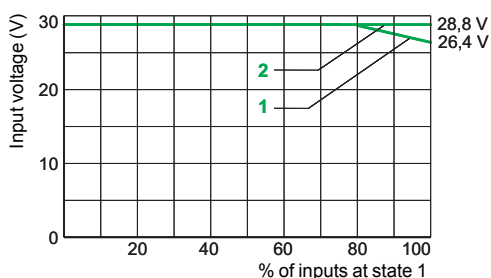
(b) Source input (negative logic).

(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

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 supply	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
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Analogue inputs (continued)	Analogue outputs	Analogue I/O
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- 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
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Temperature probe inputs	Voltage/current	Voltage	Voltage/current	Thermocouple/ temperature probe inputs Voltage/current output	Voltage/current
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Removable screw terminal block	Removable screw terminal block and RJ11 connectors	Removable screw terminal block			
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NTC probe (non diffe- rential)	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

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

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 $\pm$ 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.

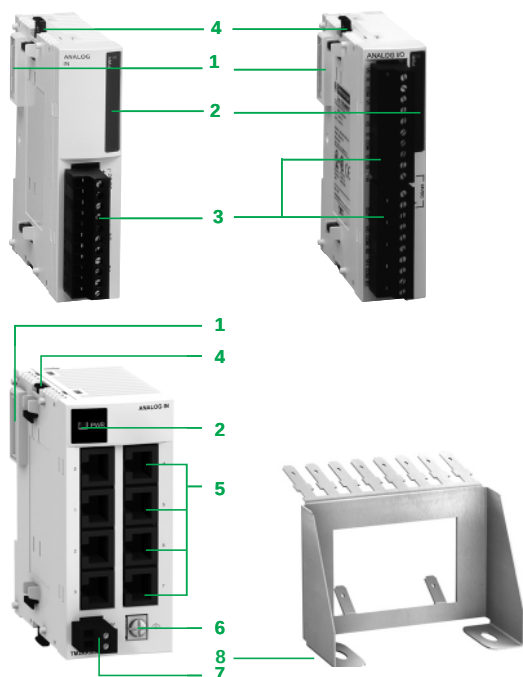
Description

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 $\pm$ 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 $\pm$ 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 $\overline{\text{---}}$	40 mA	$\pm$ 7.5 V $\overline{\text{---}}$		40 mA	13 V	—
Input impedance			1 M Ω min.	10 Ω	1 M Ω min.		10 k Ω	470 Ω	> 10 k Ω
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	$\pm$ 0.2		0.2 $\pm$ 5°C (1)		$\pm$ 0.2		$\pm$ 0.4
	Temperature coefficient	% FS/°C	$\pm$ 0.006		$\pm$ 0.006		$\pm$ 0.009		$\pm$ 0.004
	Repeat accuracy after stabilization time	% FS	$\pm$ 0.5		$\pm$ 0.5		$\pm$ 0.1		
	Nonlinearity	% FS	$\pm$ 0.2		$\pm$ 0.2		$\pm$ 0.02		
	Total error	% FS	$\pm$ 1		$\pm$ 1		$\pm$ 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 $\sim$				Non-isolated		
	Between channels and internal logic	V rms	500 $\sim$			2500 $\sim$		2500 $\sim$	
Isolation			Photocoupler between the input and the internal circuit						
External supply			V	Nominal voltage 24 $\overline{\text{---}}$; Limit values: 20.4...28.8 $\overline{\text{---}}$ (ripple included)					
Consumption	Internal 5 V $\overline{\text{---}}$ supply	mA	50		60		50		
	External 24 V $\overline{\text{---}}$ 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 k Ω		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	
	External supply		Removable screw terminal block					TM2 ARI 8LT, removable screw terminal blocks	
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 M Ω		470 Ω	> 10 k Ω	> 10 k Ω		
Maximum sampling duration			ms 160						
Acquisition period			ms 160 per channel + 1 controller cycle time						
Measuring precision	Max. error at 25°C	% FS	$\pm$ 0.2					$\pm$ 0.5 (Pt 100), $\pm$ 0.3 (Pt 1000)	
	Temperature coefficient	% FS	$\pm$ 0.01					$\pm$ 0.01	
	Repeat accuracy after stabilization time		$\pm$ 0.4% FS					$\pm$ 0.1°C	
	Nonlinearity	% FS	$\pm$ 0.002					—	
	Total error		$\pm$ 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 $\sim$	
	Between channels and internal logic	V rms	2500 $\sim$					2500 $\sim$	
Isolation			Photocoupler between the input and the internal circuit						
External supply	Nominal voltage	V	24 $\overline{\text{---}}$					24 $\overline{\text{---}}$	
	Limit values	V	20.4...28.8 $\overline{\text{---}}$ (ripple included)					19.2...30 $\overline{\text{---}}$ (ripple included)	
Consumption	Internal 5 V $\overline{\text{---}}$ supply	mA	60					90	
	External 24 V $\overline{\text{---}}$ 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	Current	Voltage	Current	Thermocouple	Temperature probe	
			0...10 V	4...20 mA	0...10 V	4...20 mA	Type: - J: 0...1200°C - K: 0...1300°C - T: 0...400°C	3-wire Pt probe: - 100...500°C	
			Non-isolation between input channels						
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 $\overline{\text{---}}$	40 mA	13 V $\overline{\text{---}}$	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									
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		
Range			Voltage	Current	Voltage	Current	Voltage	Current	
			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 $\overline{\text{---}}$; Limit values: 20.4...28.8 $\overline{\text{---}}$ (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 $\sim$		800 $\sim$		500 $\sim$		
	Between channels and external supply	V rms	500 $\sim$		800 $\sim$		500 $\sim$		
	Between channels and internal logic	V rms	500 $\sim$		1500 $\sim$		500 $\sim$		
External supply	Nominal voltage	V	24 $\overline{\text{---}}$						
	Limit values		19.2...30 $\overline{\text{---}}$ (ripple included)						
Module consumption	Internal 5 V $\overline{\text{---}}$ supply	mA	50		60		50		
	External 24 V $\overline{\text{---}}$ supply	mA	50		80		50		

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

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	Current	Voltage
			0...10 V	4...20 mA	±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

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 OTB 1●0 DM9LP
	LC●A 10DRF	LC●A 16DRF	LC●A 24DRF	LC●● 40DRF	LMDA 20D●K	LMDA 20DRT	LMDA 40D●K	
Number of modules	0	0	4	7	4	7	7	7

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



TM2 AMI 2HT



TM2 AMI 2LT



TM2 ARI 8LRJ



TM2 ARI 8LT



TM2 ALM LT



TM2 AMM 6HT



TM2 XMTGB

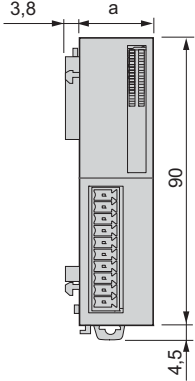
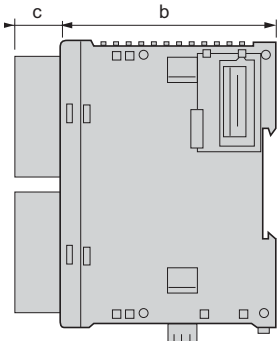


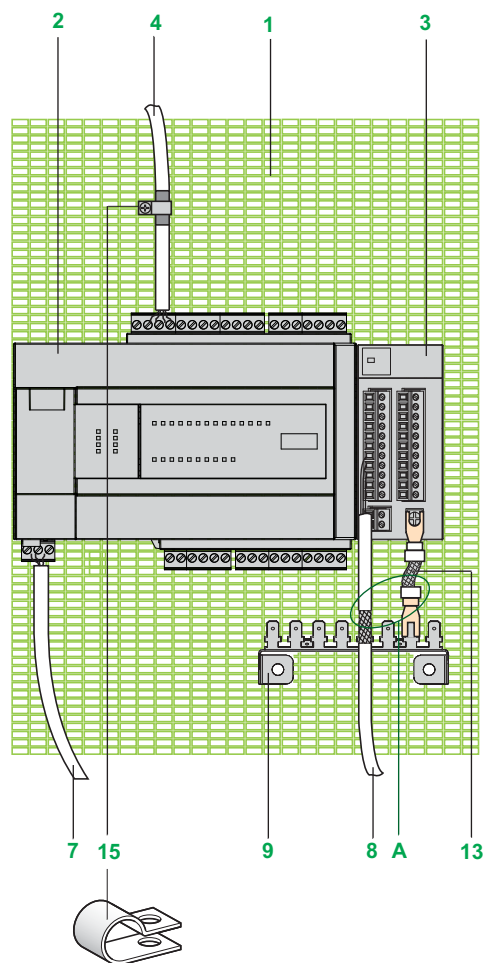
TM200 RSRCEMC

Dimensions
Analog I/O modules

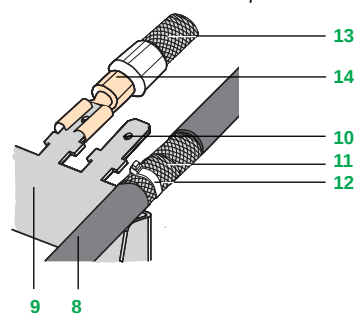
TM2	a	b	c
AMI ●●T	23.5	70	14.6
ARI 8HT	23.5	70	14.6
ARI 8LT	39.1	70	14.6
ARI 8LRJ	39.1	70	14.6 (1)
AMO ●HT	23.5	70	14.6
A●M ●●T	23.5	70	14.6

(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
- 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 $\overline{\text{---}}$ power supply of the Twido base
- Analogue I/O extension modules, see detail A.

Installing the ground connection plate TM2 XMTGB

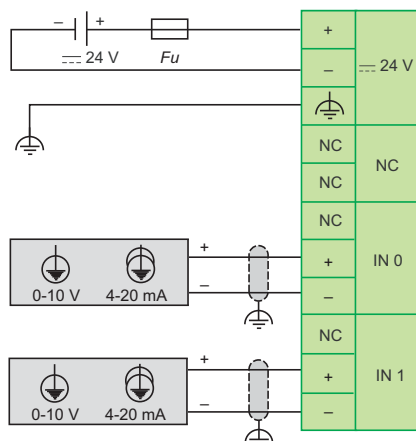
- 8, 9, 10, 11 and 12: The shielding on cable 8 is stripped at the male Faston connector 10 for a length of 15 mm 11, then tightly clamped on it using the Rilsan clamp 12 (width 2.5...3 mm).
- 13 and 14: Functional ground terminal (FG). Each earth terminal on the extension modules (analog and counter) 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.

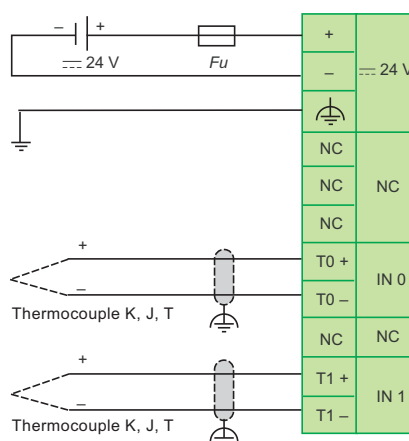
Connections

Analog input modules

TM2 AMI 2HT



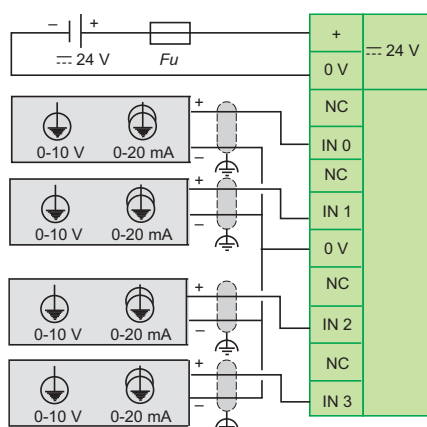
TM2 AMI 2LT



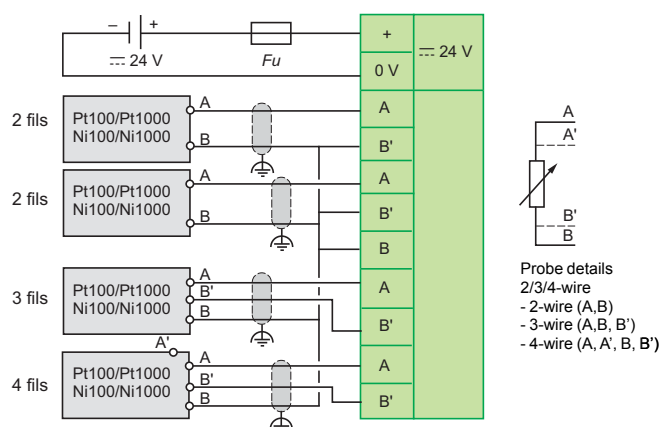
⚠ Do not connect any wires to an unused channel.

TM2 AMI 4LT

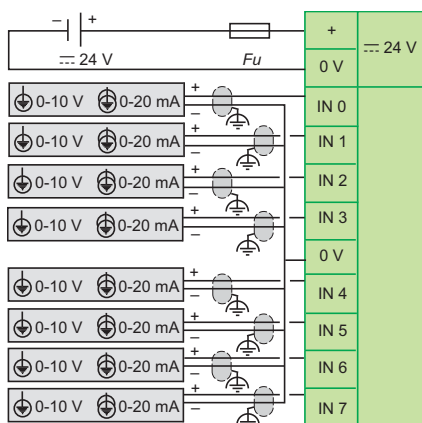
Voltage/current configuration



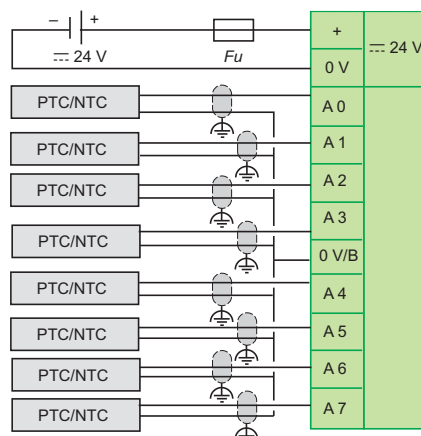
PT100/PT1000 temperature probe, Ni100/Ni1000 configuration



TM2 AMI 8HT



TM2 ARI 8HT



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

⚠ Do not connect any wires to an unused channel.

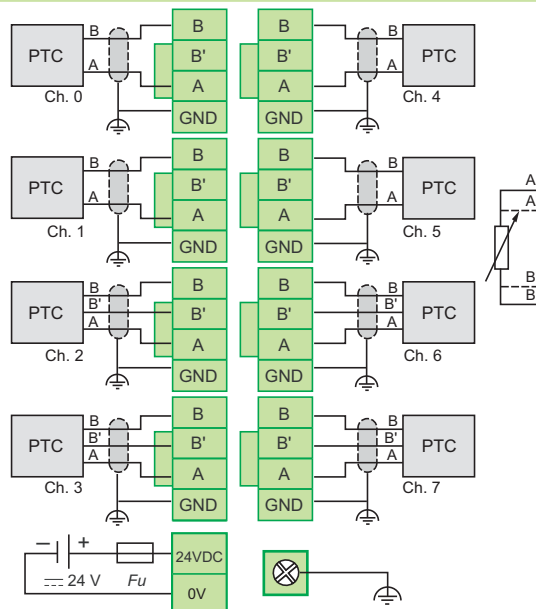
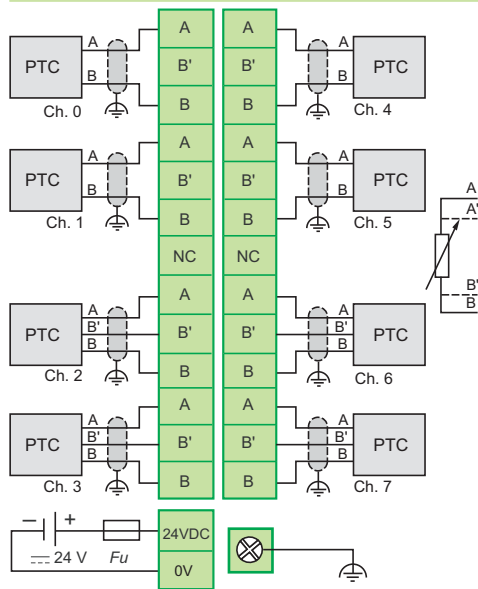
Fu: 2 A delayed fuse

Connections (continued)

Analog input modules (continued)

TM2 ARI 8LT

TM2 ARI 8LRJ

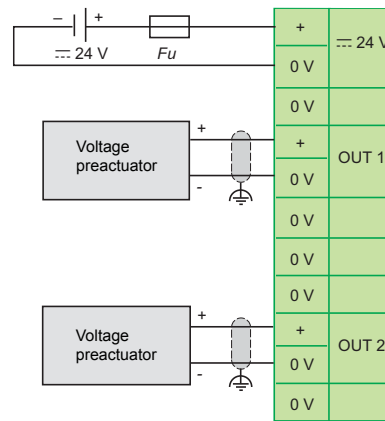
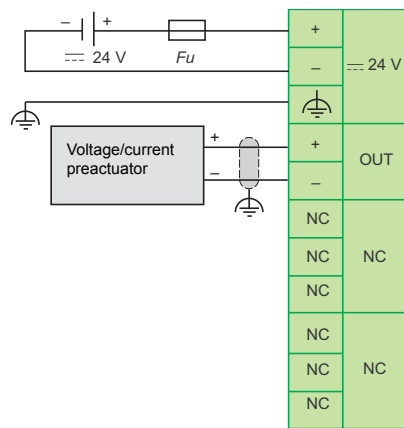


Each channel of the **TM2 ARI 8LT/8LRJ** module can be used as either 2-wire or 3-wire.

Analog output modules

TM2 AMO 1HT

TM2 AVO 2HT



⚠ Do not connect any wires to an unused channel.

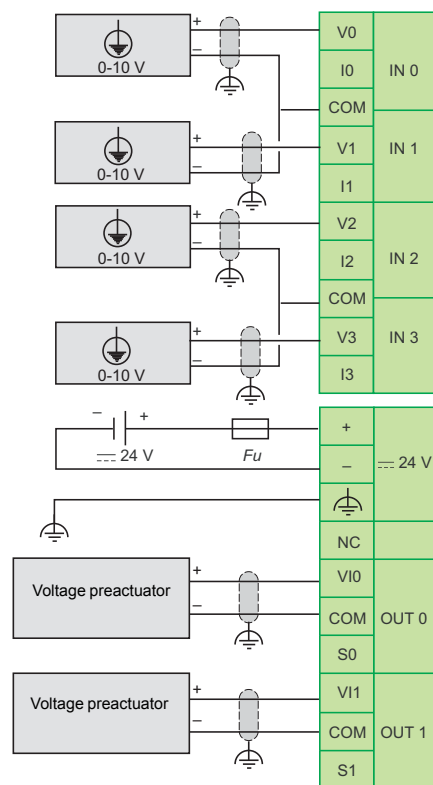
Fu: 2 A delayed fuse

Connections (continued)

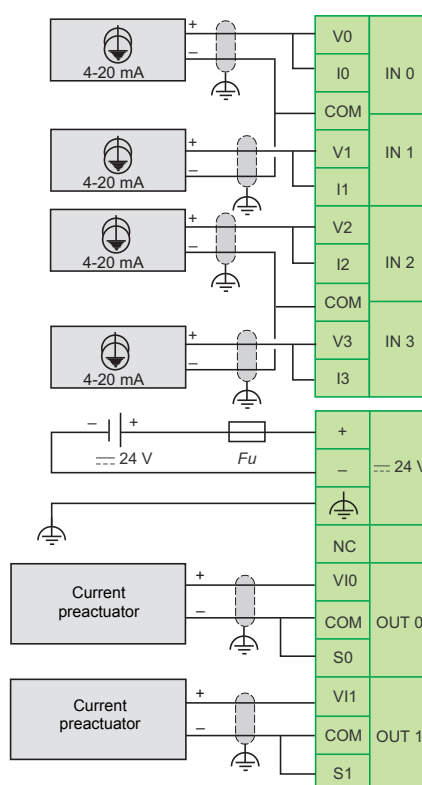
Mixed input/output modules

TM2 AMM 6HT

Voltage configuration

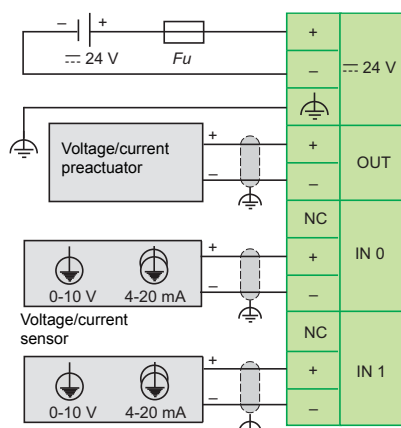


Current configuration

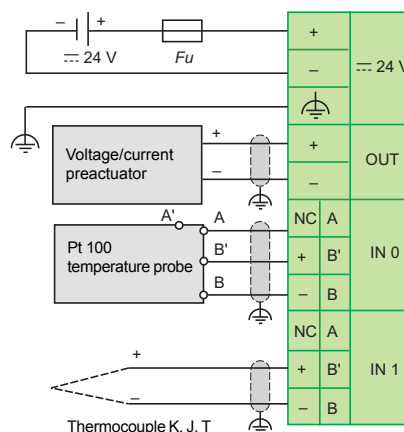


⚠ Do not connect any wires to an unused channel.

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

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

—

Inputs/Outputs	Discrete
	Analogue

8 I/O (4 channels), 16 I/O (8 channels)

—

Functions

Connection of 1 to 16 sensors/actuators
LED indicator depending on model

Type of connectors	Sensors/actuators
	Automation

Female M12 connectors, 5-ways		
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 configurable I/O, 8 I + 8 configurable I/O	4 I, 3 O, 4O, 2 I/2 O, 4 I/4 O, 4 I/3 O	8 I, 16 I, 8 configurable I/O, 16 configurable 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	
FTB 1●●●●P●	FTB 1●●●●S0	ASI 67FPP●●●	ASI 67FMP●●●
Please, consult our catalogue on the website, www.schneider-electric.com		Please, consult our catalogue "Machine & Installations with industrial communications"	
		FTM 1●●10/FTM 1D●●●/FTM 1A●04	
		Please, consult our catalogue on the website, www.schneider-electric.com	

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 fibre optic), 32 500 m (single-mode fibre optic)			
	Number of same type links per station	1 (integrated port)		1 TwidoPort interface module	
	Other integrated port	Serial link		–	
Basic services		Modbus 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	
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		Terminal port integrated in the base controllers	TWD NAC ●●●D/T TWD NOZ ●●●D/T (1)
69		72	
TWD NOI 10M3			
73			

(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**.

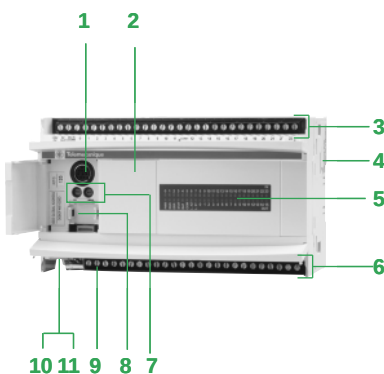
Twido programmable controller

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 fitted 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

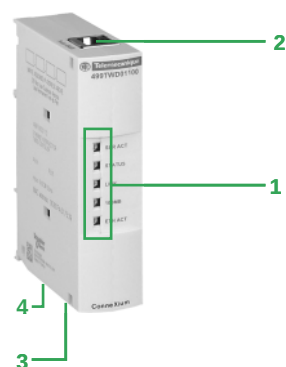
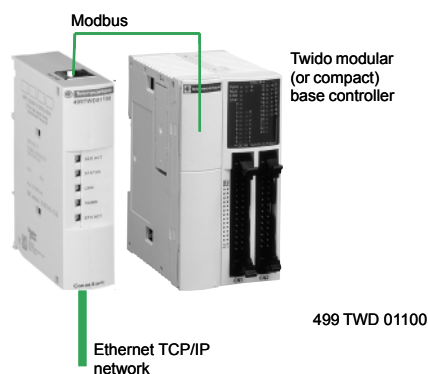


TWD LCDE 40DRF

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

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

(1) Auto MDI/MDX function not supported.



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 configuration:
 - takes the Ethernet configuration from the Twido application configuration (normal mode),
 - supports manual configuration 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 1/2 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 configuration 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 (SERACT), controller status (STATUS), Ethernet link status (LINK), binary rate 100 Mbit/s (100 MB), Ethernet network activity (ETHACT)

Reference



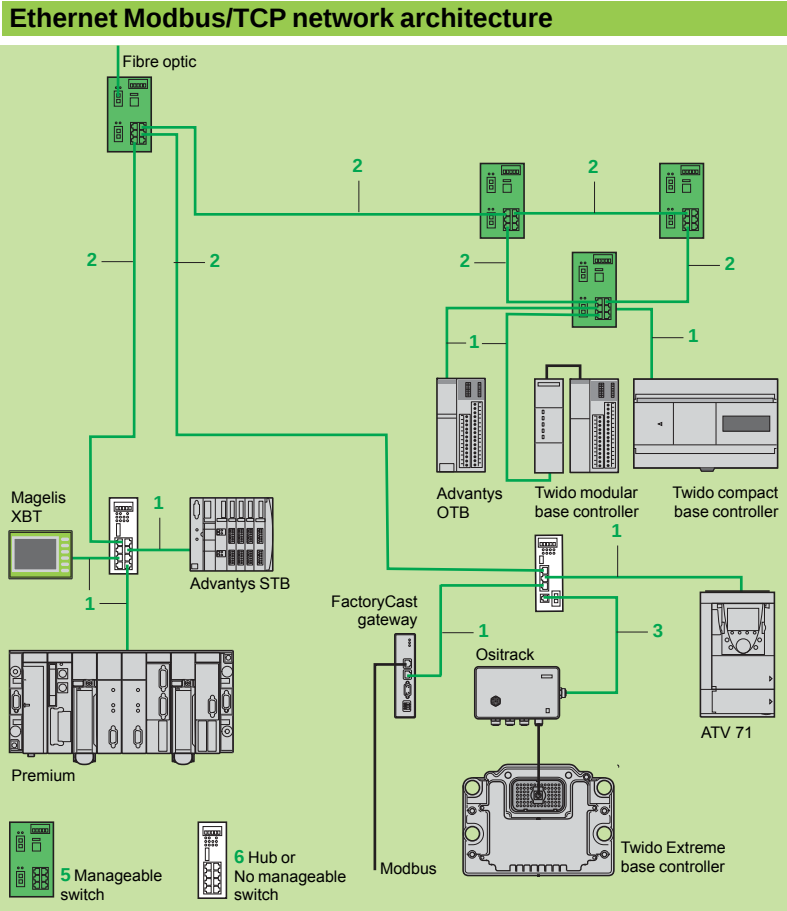
Transparent Ready

499 TWD 01100

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

499 TWD 01100





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 flame resistance conforms to:

- NFC 32070# classification 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 flame 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

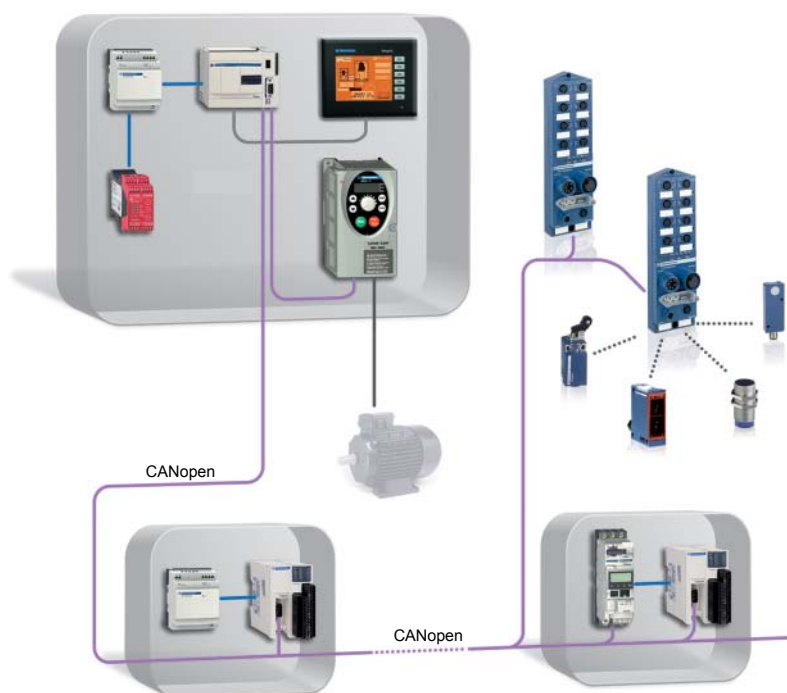
Description	Number of ports		Item	Manag-eable	Reference	Weight kg
	Copper cable	Fibre optic				
Optimised twisted pair switch 10BASE-T/100BASE-TX copper ports, RJ45 shielded connectors 100BASE-FX optic port, SC connectors	3	—	6	No	TCS ESU 033FN0	0.113
	4	1	6	No	TCS ESU 043FN0	0.120
	5	—	6	No	TCS ESU 053FN0	0.113
Twisted pair switches 10BASE-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 configuration, 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 defined 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	
Oscoder	

 Combination possible

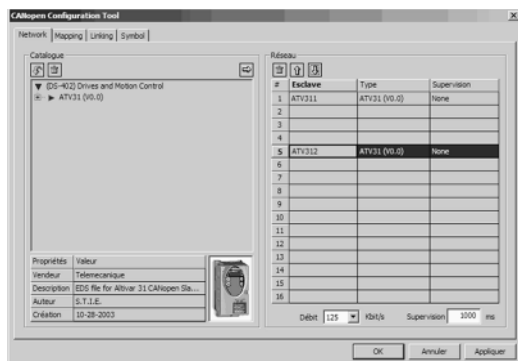
 Use restriction

 Not supported by conformity class M10

Twido programmable controller

CANopen bus

CANopen bus master module



Configuration

The Twido controller's CANopen bus is configured using TwidoSuite software. The various services offered are:

- Selection of the slave type from a list that can be modified by simply importing a description file of the EDS (Electronic Data Sheet) type.
- The position of the slave on the bus: definition 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.

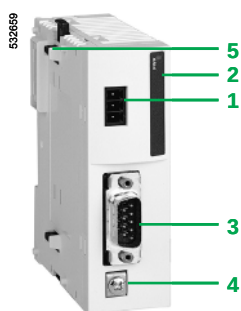
For certain slaves, such as ATV 31/61/71 variable speed controllers and Lexium 05 servo variable speed controller, one or more profiles are supplied, allowing the slave to be configured according to a mode predefined by Schneider Electric. The use of profiles provides the user with an operating mode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

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	24 V		
		Voltage range	19.2...30 V		
	Current consumption	5 V internal	50 mA		
		24 V external	50.5 mA		
	Power dissipated	at 24 V	1.2 W		
	Operating temperature		0...+ 55 °C		
	Degree of protection		IP 20		
	Relative humidity		30...95 % (without condensation)		
	LEDs		Power		
	Product certification		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



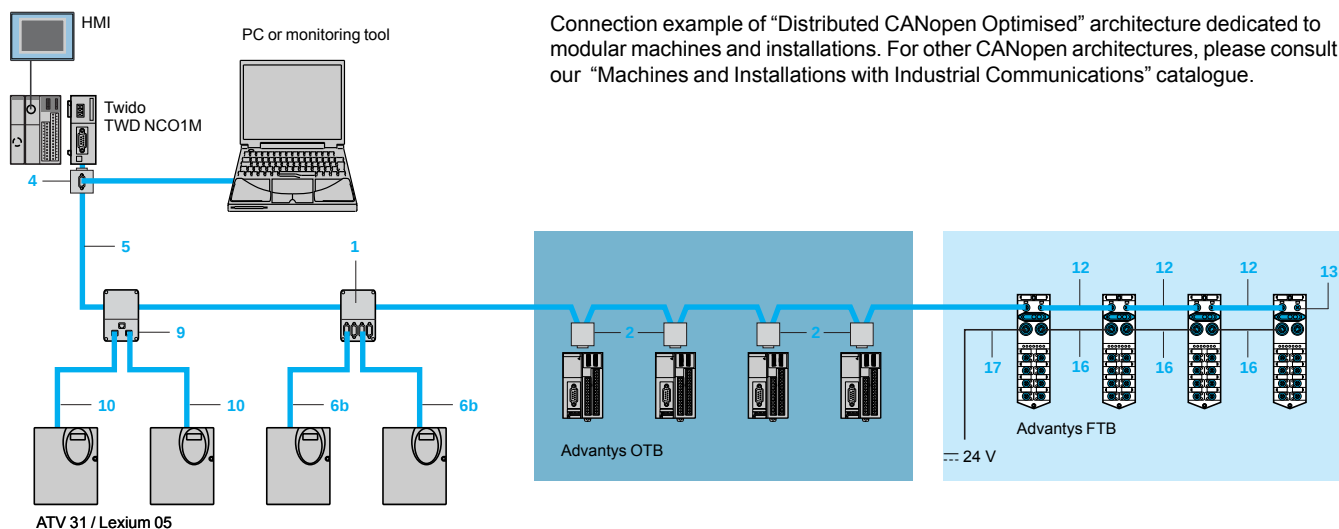
TWD NCO1M

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	

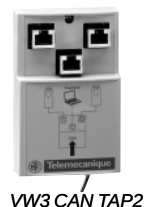
Conformity class M10

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

CANopen architecture



References



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 flame 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 certified, CE marking: non flame 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 flame 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 flame 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 certified, CE marking: non flame 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.

Twido programmable controller

CANopen bus

Cabling system

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

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	—



VW3 CAN A71



AM0 2CA 001V000



FTX DP2100

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

(1) Cable equipped with line end adapter.

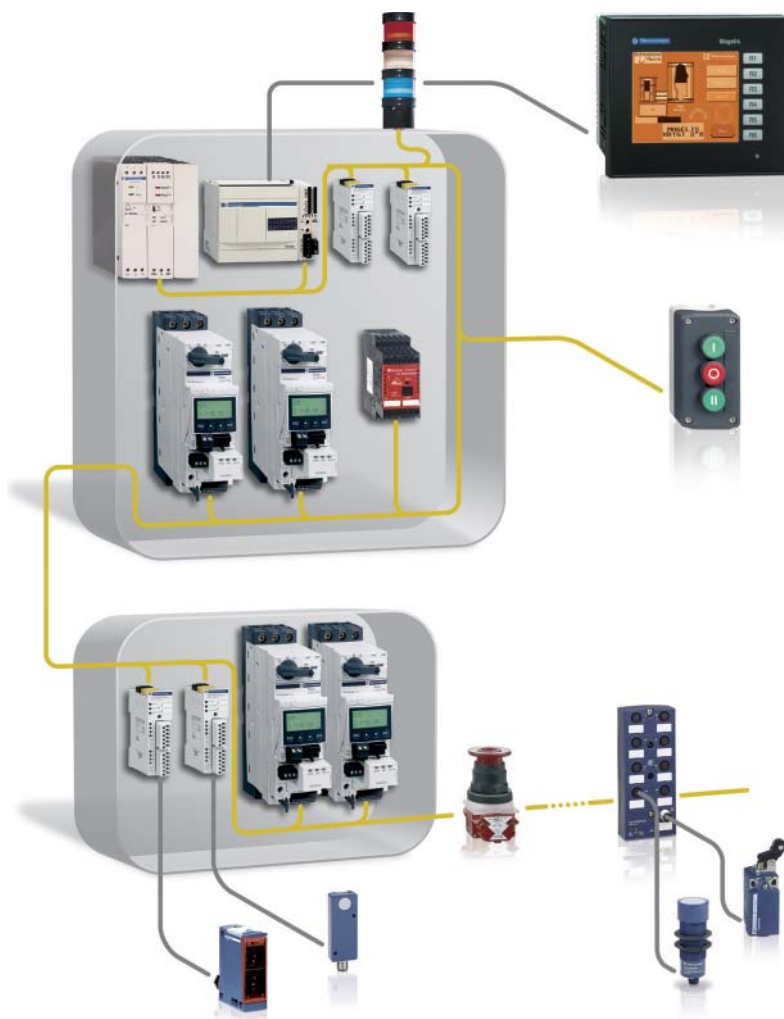
(2) For variable speed controllers ATV 71H000M3, ATV 71HD11M3X, HD15M3X, ATV 71H075N4... HD18N4, this connector can be replaced by connector TSX CAN KCDF 180T.

(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 protocol, 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.

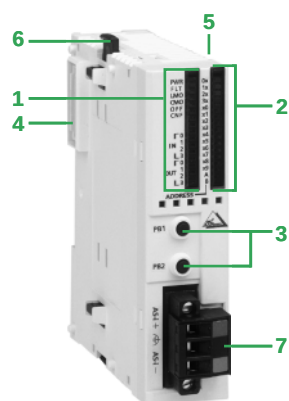
The **TWD NOI 10M3** master module manages the following with the AS-Interface M3 protocol:

- 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 protocol supports analogue protocol 7.3 (7 slaves), but does not support analogue protocol 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.



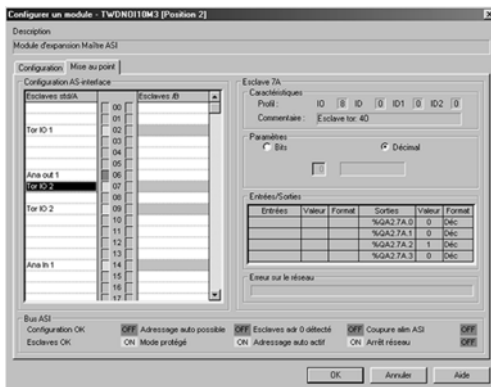
Description

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 configuration 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 simplified local diagnostics to be performed by displaying the slaves present on the AS-Interface.

Software set-up

AS-Interface is configured using TwidoSuite (1) software.

The services offered are based on the principle of simplicity:

- Management of profile 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 defined 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 (profile 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

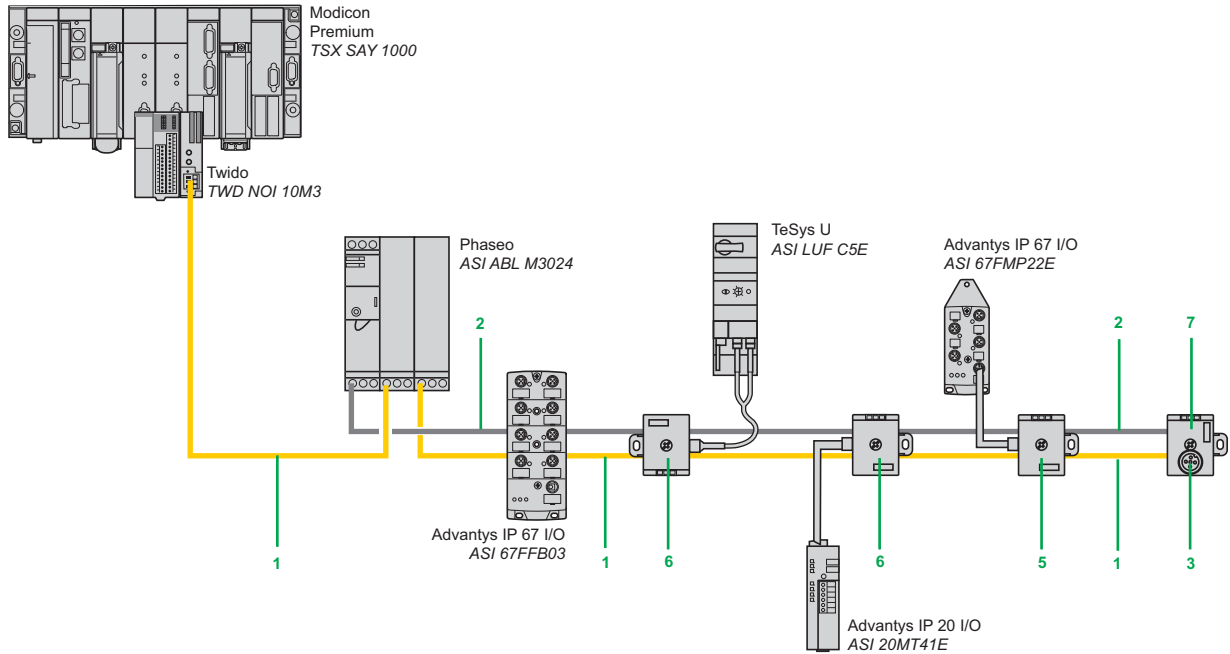
Description	No. modules per base controller	AS-Interface profile	Number of I/O (1)	Reference	Weight kg
AS-Interface master module for Twido base controller - Compact TWD LC●● 24/40DRF - Modular TWD LMDA 20/40D●●	2	M3, V 2.11	62 discrete modules max. 7 analogue modules max.	TWD NOI 10M3	0.085

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.

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

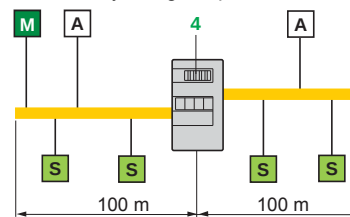


Installation

AS-Interface cable lengths

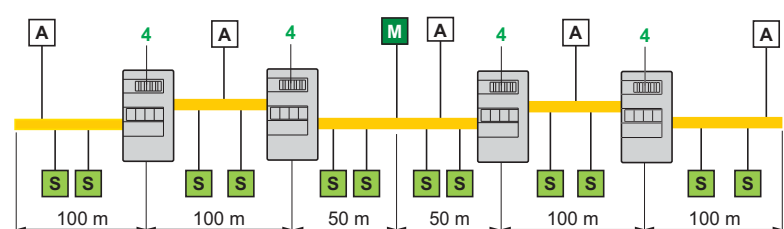
We recommend use of the flat yellow cable. The maximum length of an AS-Interface segment is 100 m, which can be extended to:

- 200 m by using a repeater or a line extension:



- 300 m with 2 repeaters.

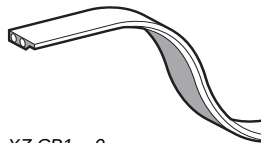
- 500 m by placing the master in the centre of the network:



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

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

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



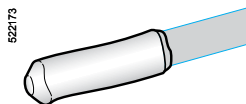
XZ CB1...00



TCS AAR011M



ASI RPT01



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 mm ² 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 mm ² 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 mm ² 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 mm ² 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 mm ² 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●/232D. 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 fitted 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 fitted).

Twido controller serial ports

Integrated port	Optional port (2 nd 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

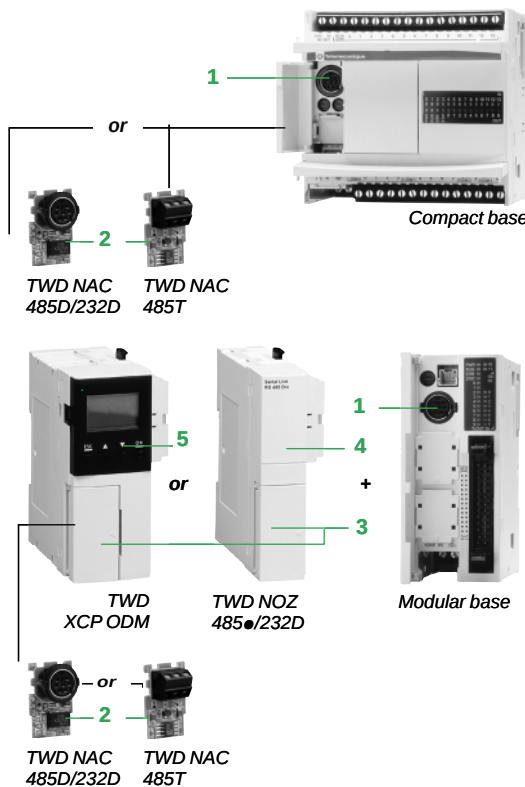
Note: if the RS 232 physical layer is used, and for a length > 10 metres, use the RS 485 physical layer and an RS 232C/RS 485 line adapter reference **XGS Z24**.

References

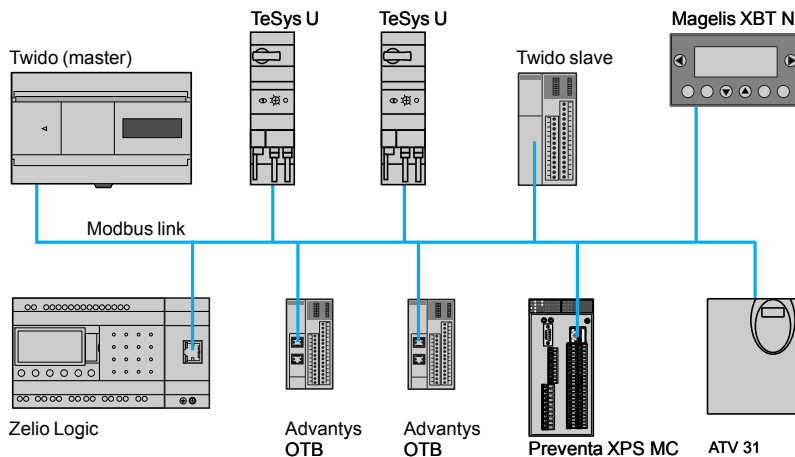
Serial link modules and adapters

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	Mini-DIN connector	RS 232C	TWD NAC 232D	0.010
			RS 485	TWD NAC 485D	0.010
	Integrated display module TWD XCP ODM	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 fitted		According to TWD NAC	TWD XCP ODM	0.105



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 specific 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

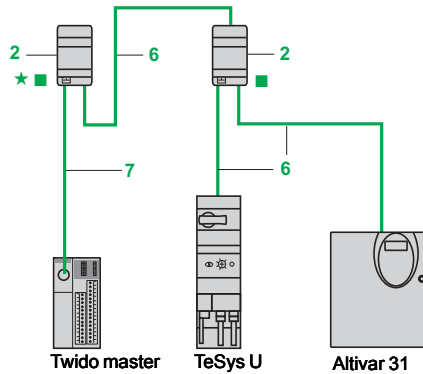
Modbus functions available on Twido controller serial link		Code	Modbus slave (server)	Modbus master (client)
		01	Read n internal bits %M	Read output bits
		02	Read n internal bits %M	Read input bits
		03	Read n internal words %MW	Read words
		04	Read n internal words %MW	Read input words
		05	Write 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 identification	–

(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.

Modbus cabling system

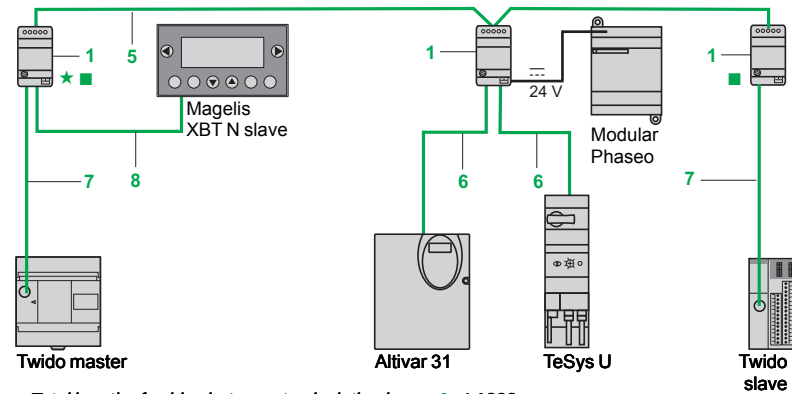
Non isolated link



- 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 U_L	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 U_L	2	—	TWD XCA T3RJ	0.080
Modbus hub Screw terminal block for main cable 10 x RJ45 for tap-off	Mounting on 35 mm U_L , on mounting plate or panel (2 x $\varnothing$ 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 U_L	—	—	XGS Z24	0.100

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

Twido programmable controller

Modbus and character mode serial link

Cabling system

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	0.180
	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
	2 x RJ45 connectors for XBT N200/N400/R400	8	3 m	VW3 A8 306 R30	0.150
Cables for display and Magelis compact terminal XBT N/R	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.

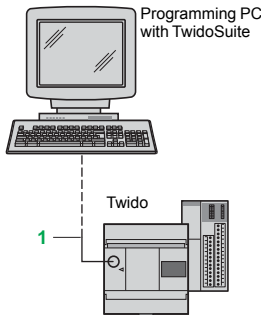
(2) Allows the using of RS 485 integrated port with the parameters defined in configuration.

(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).

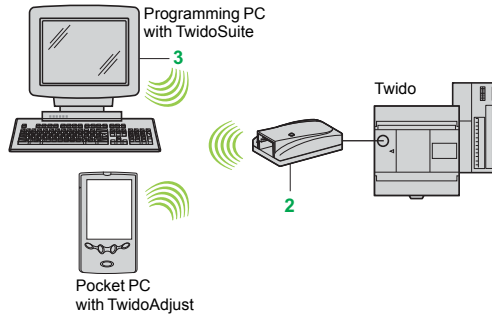
(4) If the terminal is equipped with a 25-way SUB-D connector, a SUB-D 25-way female/9-way male adapter TSX CTC 07 must also be ordered.

Terminal link cabling system (integrated port)

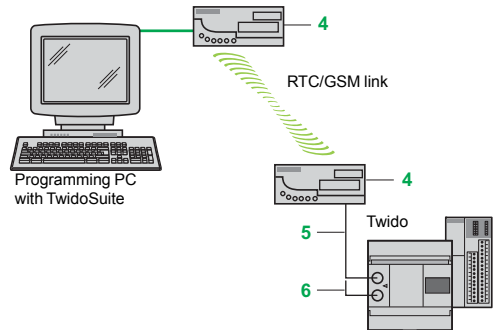
Direct link



Wireless link



Link by modem



Terminal link characteristics (integrated port)

Protocol type		RS 485
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-VWV 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 L 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.

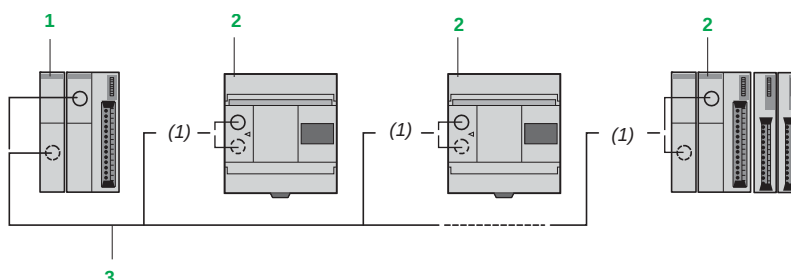
(2) SR2 MOD03 modem with Twido controller parameters. Compatible with Modicon M340 and Modicon Premium/TSX Micro platforms.

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 2 nd 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 and TWD LC●● 40DRF Modular base controllers TWD LMDA ●0D●●

References



TSX SCA 50

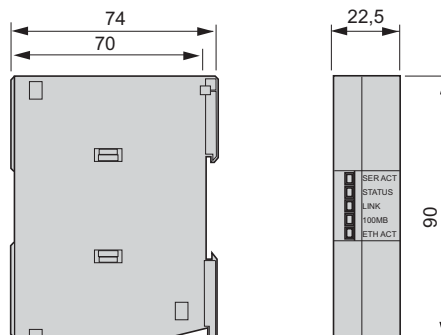
Tap-off and connection components

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

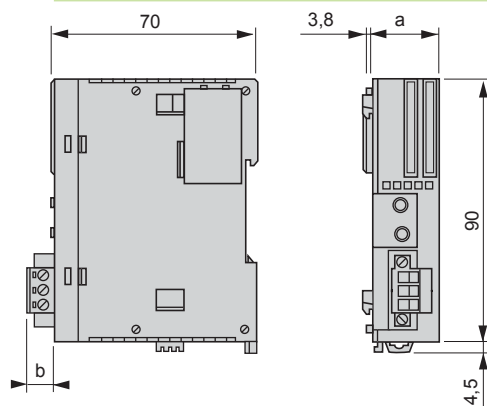
TwidoPort Ethernet module

499 TWD 01100



CANopen bus/AS-Interface expansion modules

TWD NCO1M/NOI 10M3

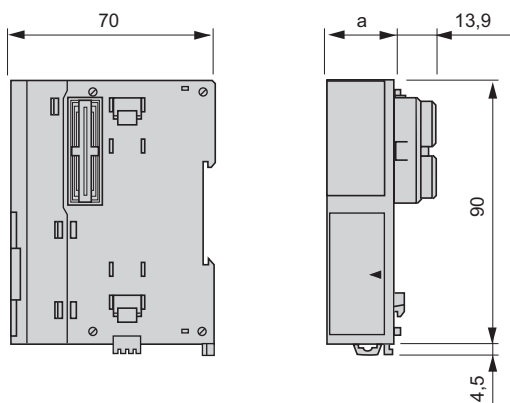


	a	b
TWD NCO1M	29.7	14.6
TWD NOI 10M3	23.5	9.4

(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)



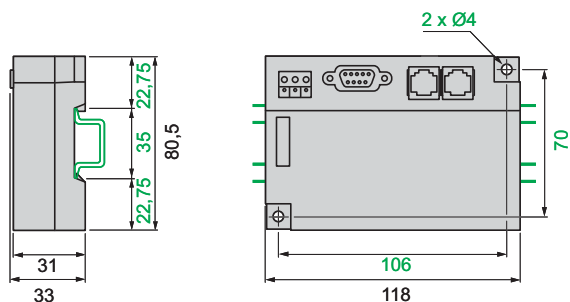
	a
TWD NOZ ●●●●	22.50
TWD XCP ODM	38

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

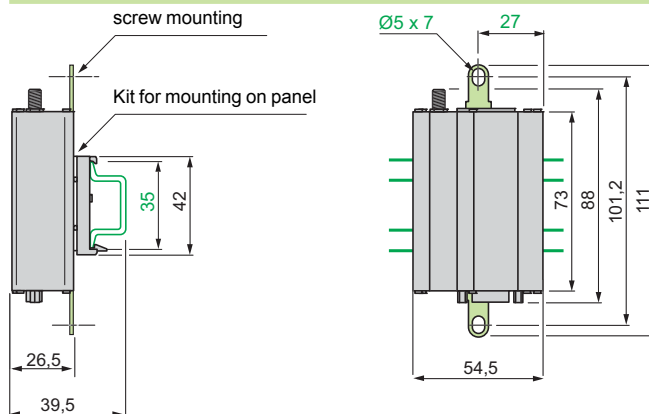
Dimensions (continued)

Modems

SR2 MOD01 (RTC)

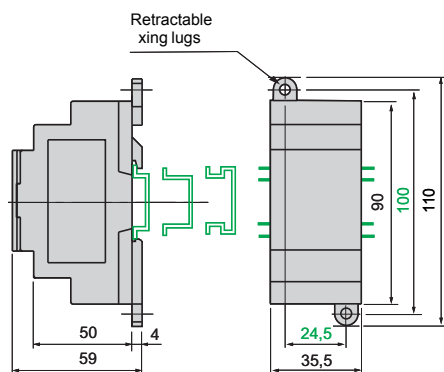


SR2 MOD03 (GSM/GPRS)



Tap boxes

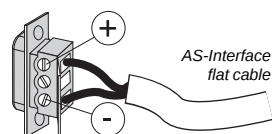
TWD XCA ISO and TWD XCA T3RJ



Connections

AS-Interface

Screw terminal block

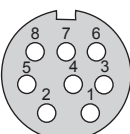


TWD NOI 10M3

- + Brown wire
- Blue wire

Integrated serial link

RS 485
mini-DIN connector

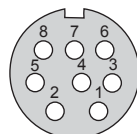


TWD LC●A 10/16/24DRF TWD LC●● 40DRF TWD LMDA ●0D●●

- 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.



TWD NAC 232D TWD NOZ 232D

- 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)

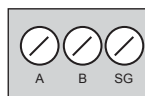
RS 485
mini-DIN conn.



TWD NAC 485D TWD NOZ 485D

- D1 (A +)
- D0 (B -)
- N/C
- N/C
- N/C
- N/C
- 0 V
- 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 configured by the TwidoSuite 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 significantly by simplifying all necessary interventions.

TwidoSuite is the first 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 simplified interface helps you find the information you need in a matter of seconds
 - More efficient, thanks to the numerous tools and tips on offer

TwidoSuite software runs with the following minimum configurations:

- 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 configuration. 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 (firmware 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 superfluous 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.

Description of the architecture

This function is used to:

- Define 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.

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Twido programmable controller

TwidoSuite programming software

Configuration, programming, debugging

Configuration

The configuration stage is used to define the elements that will be available for programming. There are three types of configuration:

- Hardware configuration, which defines, 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 configuration, which is used to set timer parameters and define the constants and the number of memory words to be used
- Behavior configuration, which specifies 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 efficient 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 difficult 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 modifications to be made without stopping the controller (RUN).

Animation tables display the memory objects in a user-friendly way.

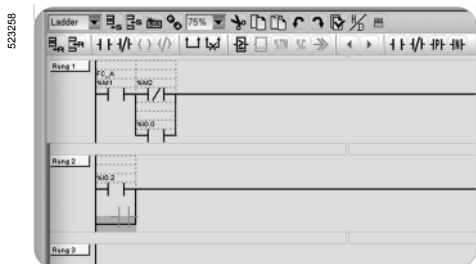
A mini-plotting display panel can be used to control actions on the controller.

Documentation

Because a printed dossier of the created project is still a crucial element, it is possible to configure some project elements for printing, define 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 simplifies 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 configurable families to describe the network characteristics of the device involved (Modbus network or CANopen bus, slave address, etc.). The instances thus configured 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 modifications 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	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 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

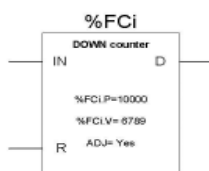
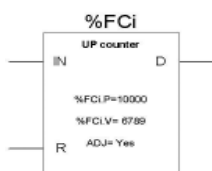
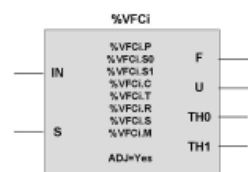
The pulses to be counted may come from an incremental encoder or from two proximity sensors (up/down counting) connected to inputs I0 and I1 of Twido base controllers.

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 configuration editor, the user must select either up or down counting mode for each function block, define 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.

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 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 outputs %Q0.0.0 or %Q0.0.1 on Twido base controllers.

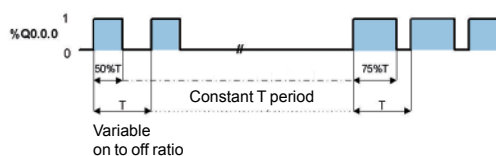
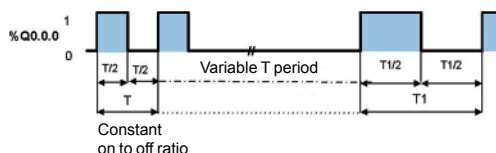
The pulse generator signal has a variable period, but with a constant duty cycle which establishes an ON to OFF ratio of 50% of the period (see illustration opposite).

PWM function (7 kHz) (1)

The PWM function block generates pulses of fixed 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 %Q0.0.1 on a base controller. The PWM function can be used to control analog module outputs.

The user-defined %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: configuration 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 modifications can therefore be made directly in the Twido controller.

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

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**.



TSX PCX 1031



TSX CUSB 485



VW3 A8 114



VW3 A8 115



499 TWD 01100

532834



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.

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



TSX PCX 1031

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

(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 used for connection between Twido controller and Pocket PC, after having crossed the Rx and Tx conductors

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 Output	5...7 mA 0.3 A	5...7 mA 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, significantly reduce wiring time and eliminate the risk of error.

The Advantys Telefast 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 configurations:

Sub-bases for Twido modular base controllers

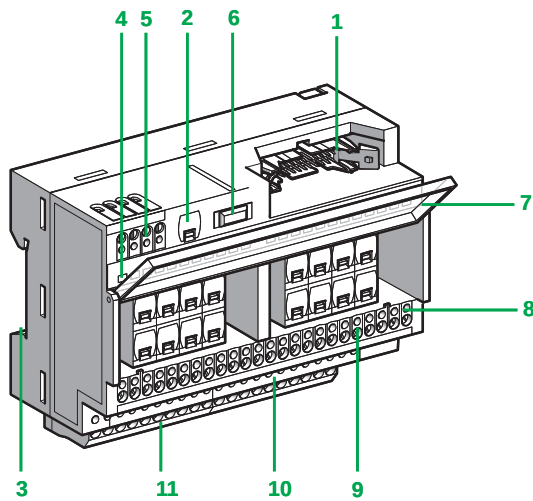
- **ABE 7B20MPN20**: sub-base with 12 inputs + 8 passive outputs.
- **ABE 7B20MPN22**: sub-base with 12 inputs + 8 passive outputs.
 - ☐ individual fuse protection for each output (0.315 A),
 - ☐ LED indication,
 - ☐ blade disconnecter for the 0 V common.
- **ABE 7B20MRM20**: sub-base with 12 inputs + 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 disconnecter 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

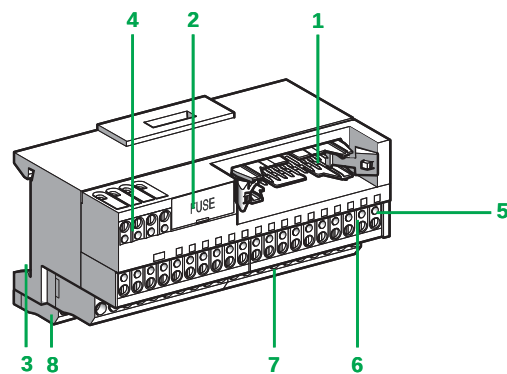
- **ABE 7BV20TB**
 - ☐ 12 shunted screw terminals for the input common,
 - ☐ 8 shunted screw terminals for the output common.
- **ABE 7BV20**
 - ☐ 20 shunted screw terminals for connection of a single common.



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 $\sim$ 24 V supply circuit.
- 3 Rail mounting.
- 4 LED for channel indication (only on ABE 7B20MPN22 and ABE 7E16SPN22).
- 5 $\sim$ 24 V power supply terminal block.
- 6 Blade disconnecter on $\sim$ 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 $\varnothing$ 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.



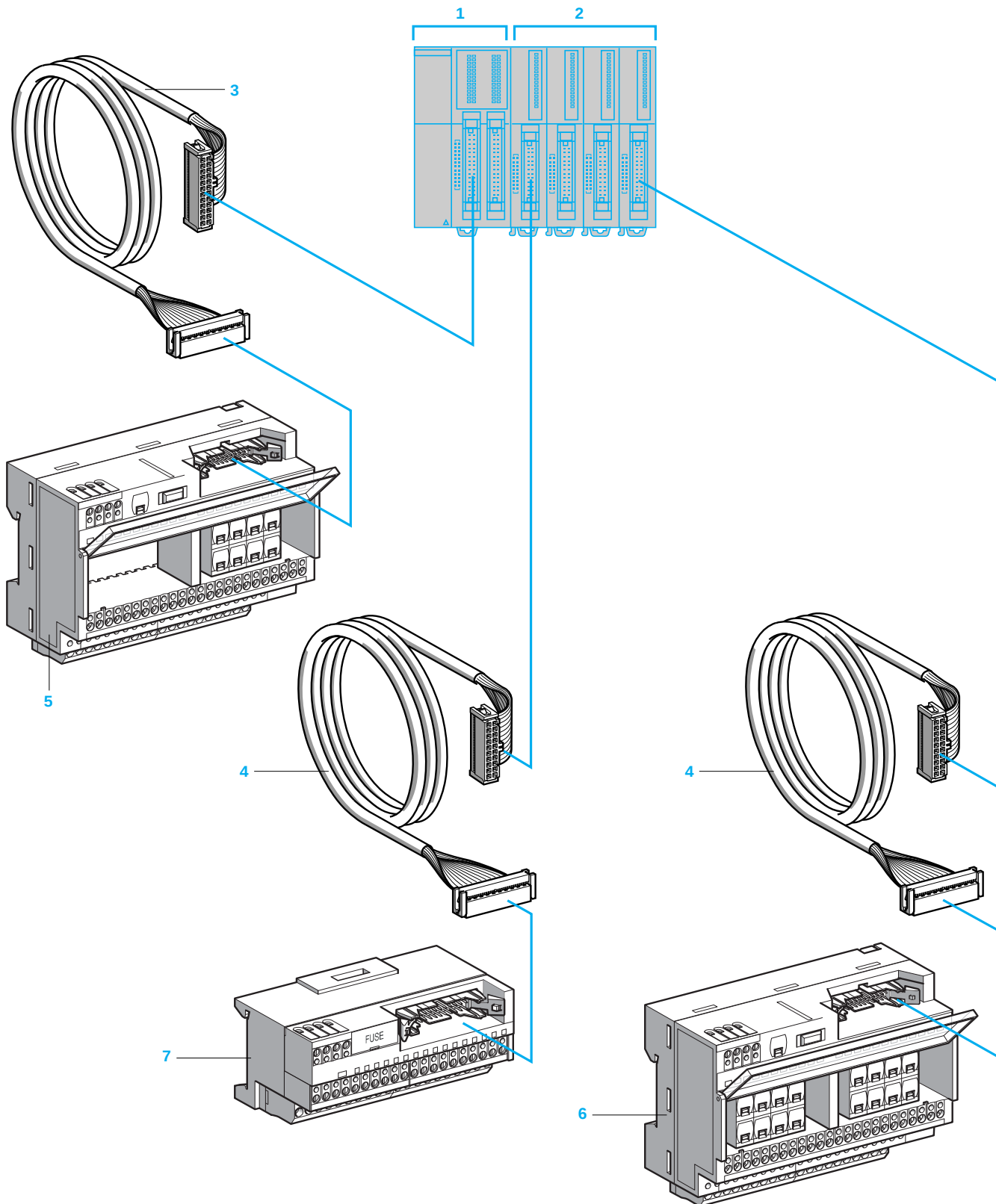
Connection sub-bases ABE 7E16EPN20 and ABE 7E16SPN20

- 1 HE 10 connector, 20-way,
- 2 Fuse for the $\sim$ 24 V supply circuit.
- 3 Rail mounting.
- 4 $\sim$ 24 V power supply terminal block.
- 5 Test point for $\varnothing$ 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



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 mm²).
- 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 mm²).
- 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

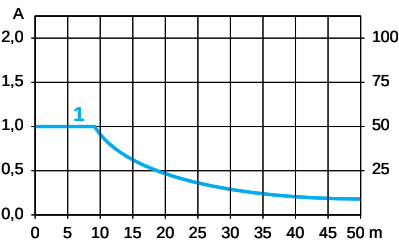
		Modular base controllers	Discrete I/O expansion modules	
		Inputs/outputs (source)	Inputs	Outputs (source)
Incorporated in Twido programmable controllers		TWD LMDA 20DTK (12 I/8 O) TWD LMDA 40DTK (24 I/16 O)	TWD DDI 16DK (16 I) TWD DDI 32DK (32 I)	TWD DDO 16TK (16 O) TWD DDO 32TK (32 O)
Terminal block 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

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 35 mm 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 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	—

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		

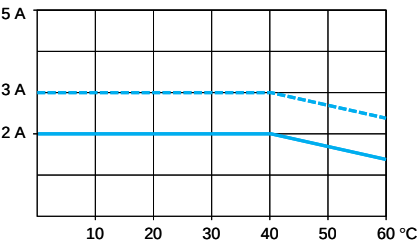
Curves for determining cable type and length according to the current



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

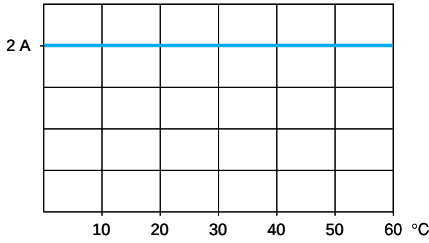
Temperature derating curves

ABE E11SRM20, ABE 7E16SRM20
6 electromechanical relay outputs



— 100 % of channels used
- - - 50 % of channels used

ABE 7B20MR20
2 solid state outputs

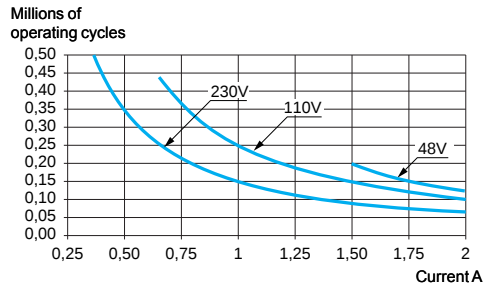


Electrical durability (in millions of operating cycles, conforming to IEC 60947-5-1)

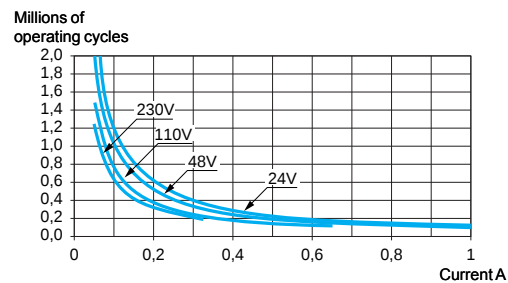
ABE 7B20MRM20 and ABE 7E16SRM20

d.c. loads

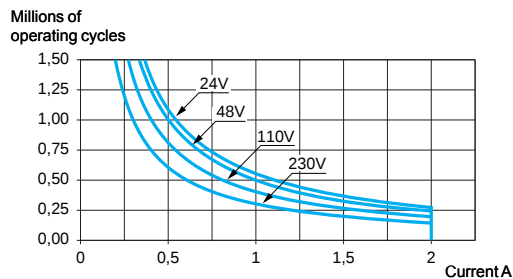
DC 12 curves (1)



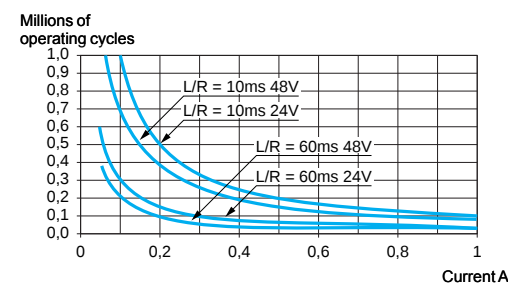
DC 13 curves (2)

**a.c. loads**

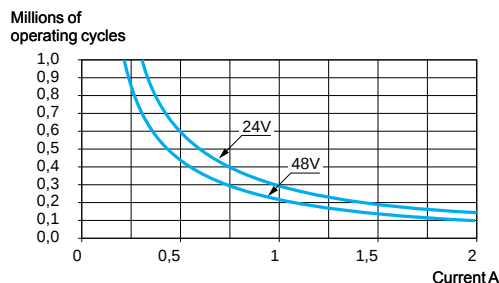
AC 12 curves (3)



AC 14 curves (4)



AC 15 curves (5)

(1) DC 12: control of resistive loads and of solid state loads isolated by optocoupler, $L/R \leq 1$ ms.(2) DC 13: control of electromagnets, $L/R \leq 2 \times (U_e \times I_e)$ in ms, U_e : Rated operational voltage, I_e : 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, $\cos \varphi \leq 0.9$.(4) AC 14: control of small electromagnetic loads ≤ 72 VA, make: $\cos \varphi = 0.3$, break: $\cos \varphi = 0.3$.(5) AC 15: control of electromagnetic loads > 72 VA, make: $\cos \varphi = 0.7$, break: $\cos \varphi = 0.4$.

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 Yes	No Yes	ABE 7B20MPN20	0.430
		2, source ~ 24 V, 2 A and 6, relay ~ 24/ ~ 250 V, 3 A	TWD LMDA20DTK/ LMDA40DTK	No	No	ABE 7B20MRM20	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 Yes	No Yes	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 mm ²	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 mm ²	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.

Connection interfaces

Advantys Telefast ABE 7 pre-wired system

Cables for connection sub-bases and
accessories for Twido controller

References (continued)

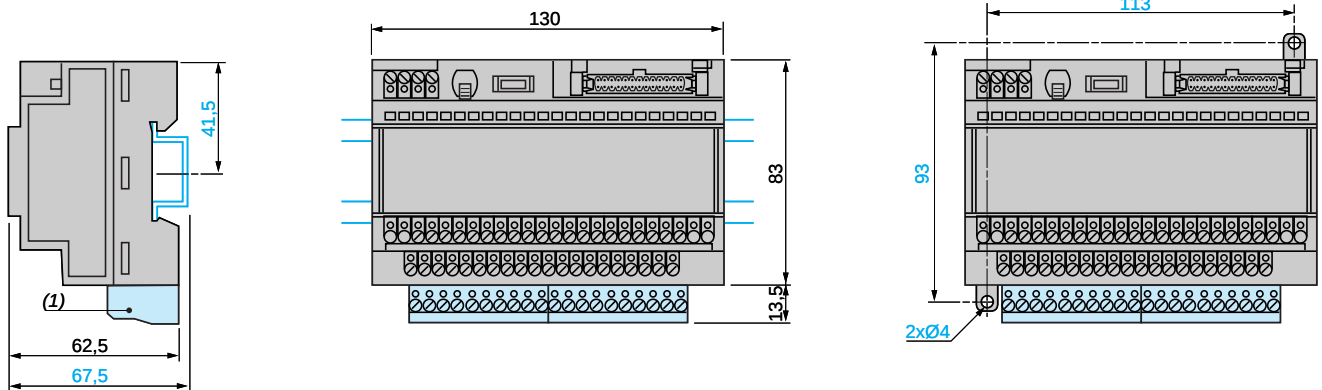
Separate components						
Description	Type	Compatibility	Sold in lots of	Reference	Weight kg	
Connectors (sold in lots of 5)	HE 10 female 26-way	TWD LMDA20DTK/40DTK	5	TWD FCN2K26	—	
	HE 10 female 20-way	TWD DDI16DK/DDI32DK/ DDO16TK/DDO32TK	5	TWD FCN2K20	—	
Screw terminal blocks (sold in lots of 2)	10-way	TWD DDI16DT/DAI8DT/ DDO8T/DRA8RT	2	TWD FTB 2T10	—	
	11-way	TWD DMM8DRT/ AMI8T/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 mm ²	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 mm ²	3 m	TWD FCW 30K 0.405
					5 m	TWD FCW 50K 0.670
Pre-formed cable, rolled	20 conductors	—	—	AWG 28 0.08 mm ²	20 m	ABF C20R200 1.310

Dimensions

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

Mounting on 35 mm rail

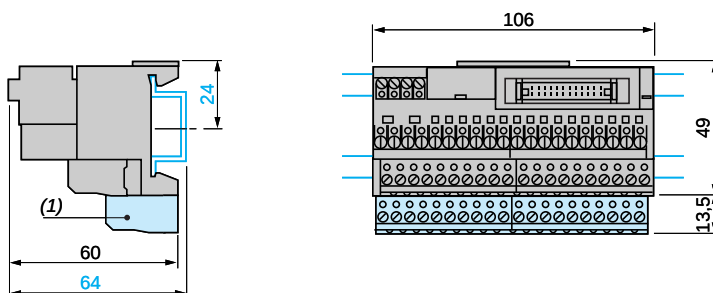
Screw fixing (retractable lugs)



(1) ABE 7BV20, ABE 7BV20TB.

ABE 7E16EPN20, ABE 7E16SPN20

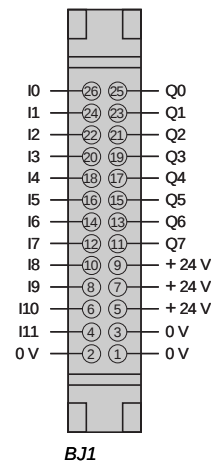
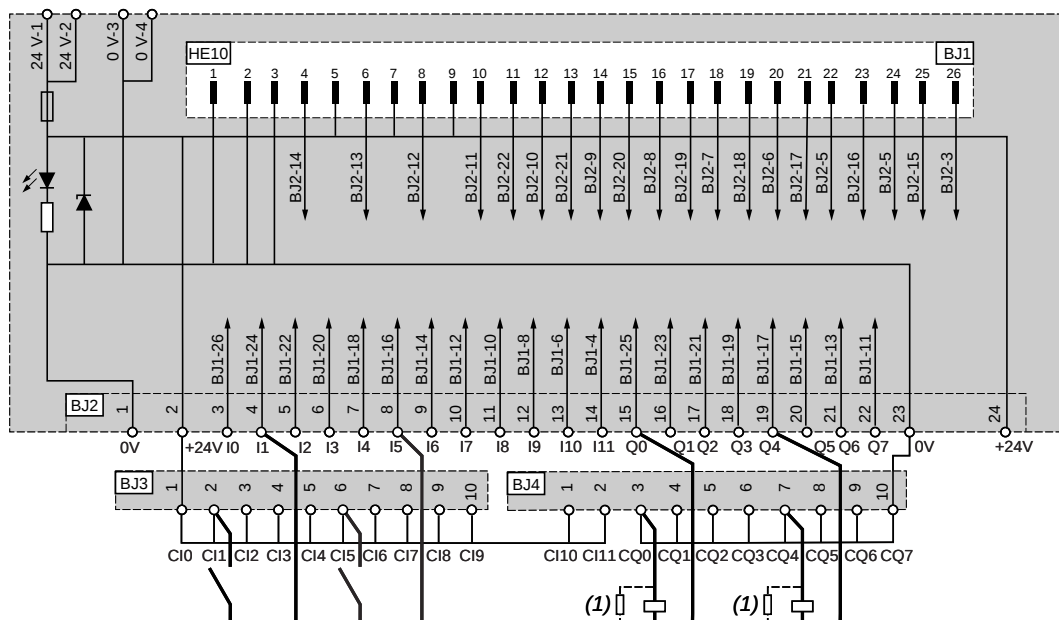
Mounting on 35 mm rail



(1) ABE 7BV20, ABE 7BV20TB.

ABE 7B20MPN20

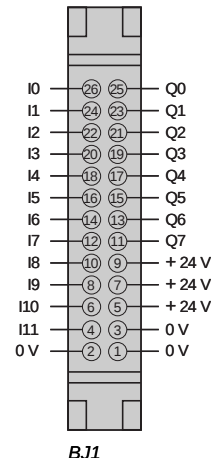
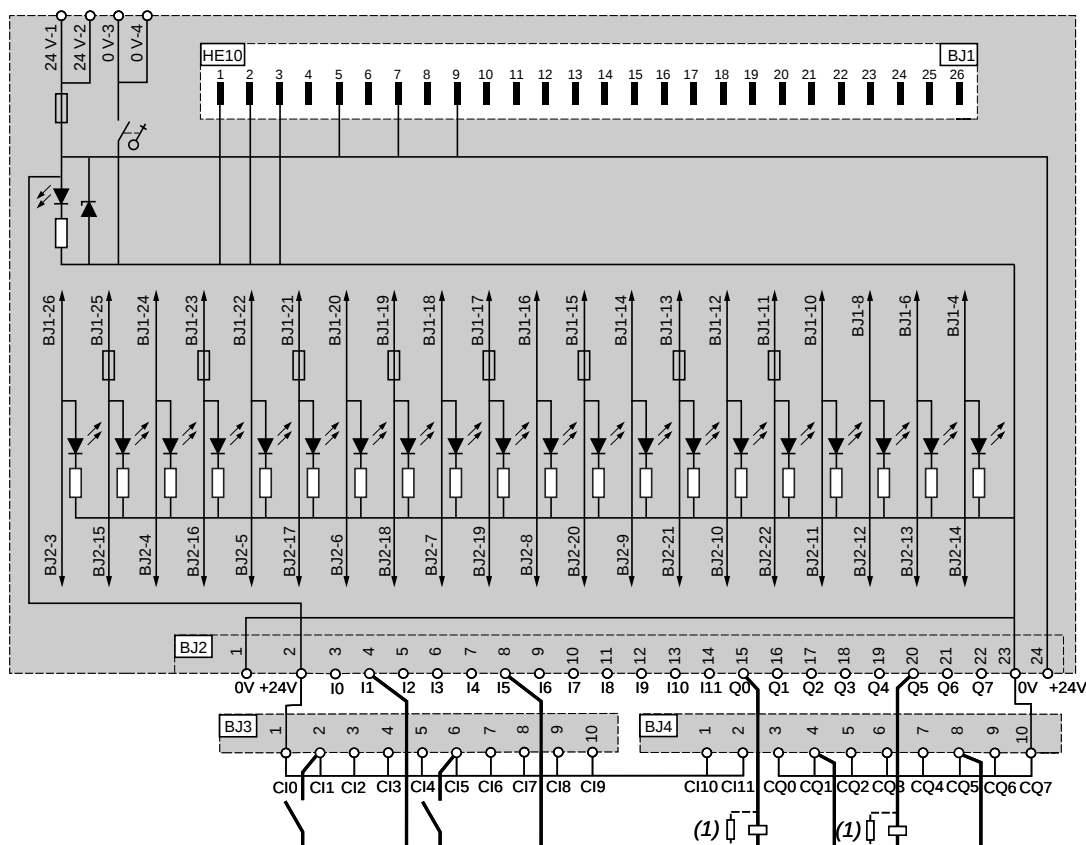
HE10, 26-way



BJ1

ABE 7B20MPN22

HE10, 26-way



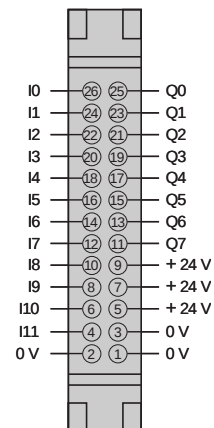
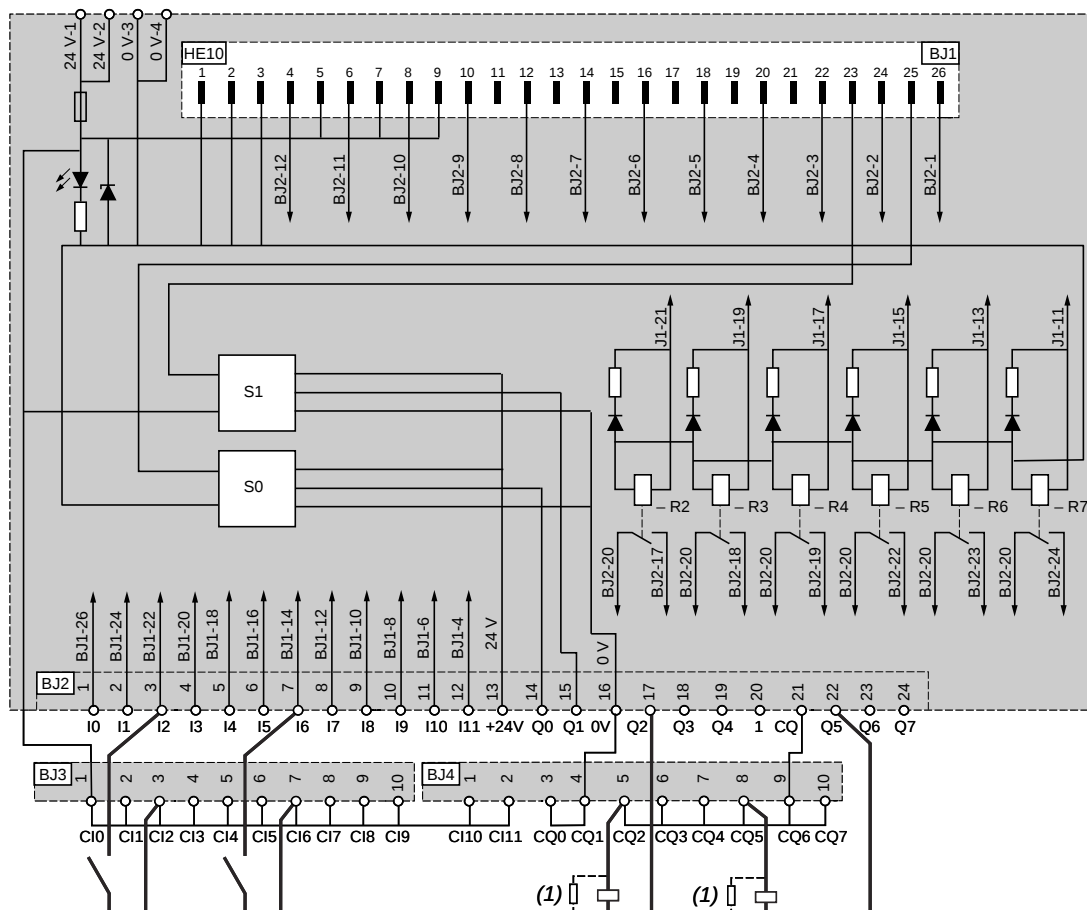
BJ1

(1) Example of output connections.

When connecting an inductive load, include a diode or a varistor.

ABE 7B20MRM20

HE10, 26-way

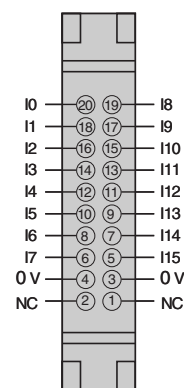
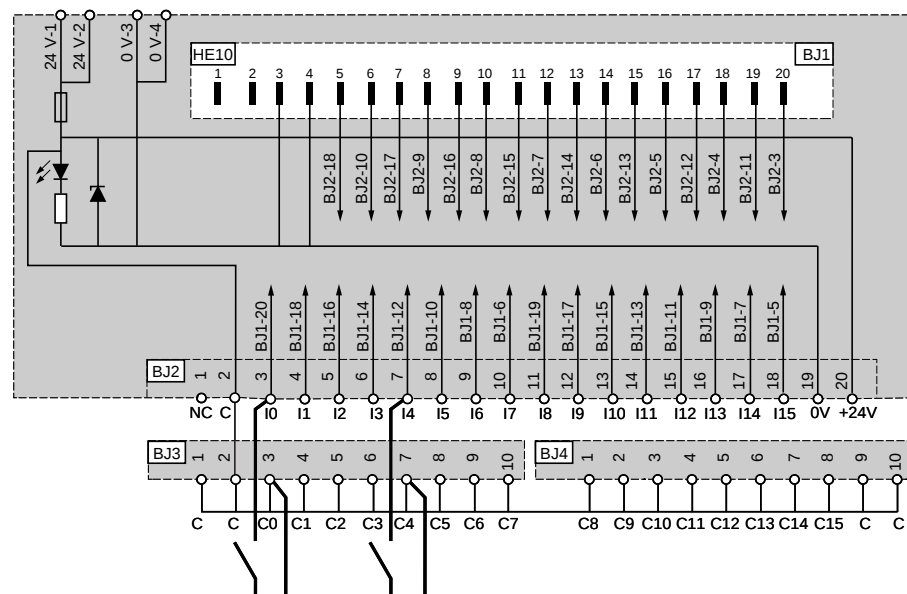


BJ1

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

ABE 7E16EPN20

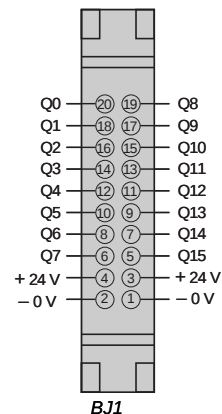
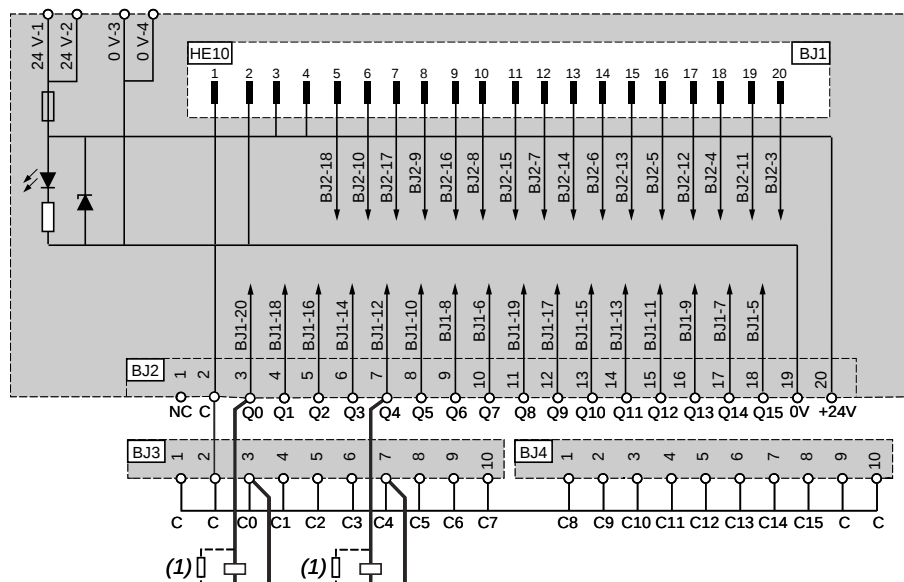
HE10, 20-way



BJ1

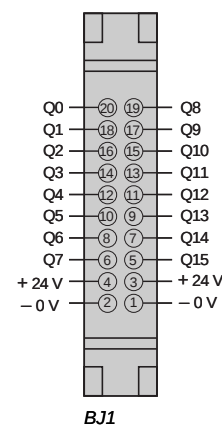
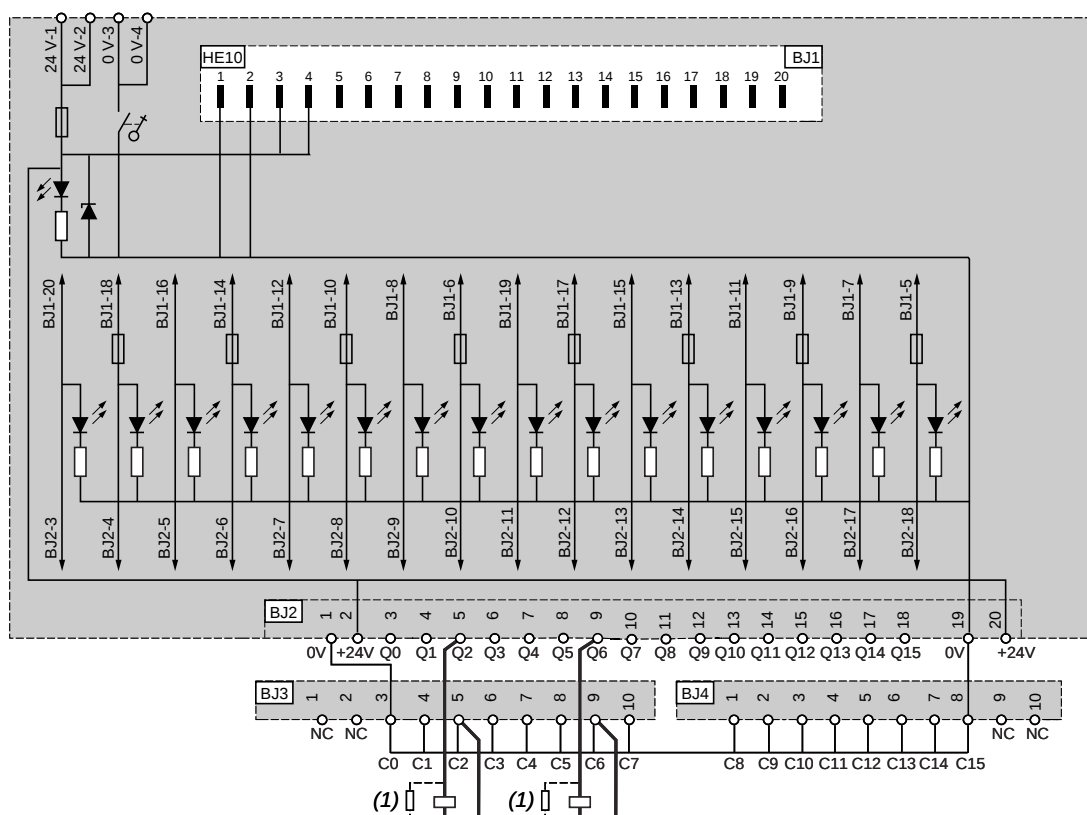
ABE 7E16SPN20

HE10, 20-way



ABE 7E16SPN22

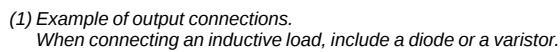
HE10, 20-way



(1) Example of output connections.

When connecting an inductive load, include a diode or a varistor.

HE10, 20-way



Power supplies

Regulated switch mode

Phaseo Modular range and Optimum range industrial power supplies



Input voltage

Connection to world-wide line supplies	United States
	- 120 V (in phase-to-neutral)
	- 240 V (in phase-to-phase)
	Europe
	- 230 V (in phase-to-neutral)
	- 400 V (in phase-to-phase)
	United States
	- 277 V (in phase-to-neutral)
	- 480 V (in phase-to-phase)

100...240 V ~
120...250 V ---

Single-phase (N-L1) or 2-phase (L1-L2) connection

Single-phase (N-L1) connection

—

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

Output current	0.3 A
	0.6 A
	1.2 A
	2 A
	2.5 A
	3 A
	4 A
	4.8 A
	5 A
	6 A
	10 A
	20 A
	40 A

5 V ---	12 V ---	24 V ---	48 V ---
		ABL 8MEM24003 (Modular)	
		ABL 8MEM24006 (Modular)	
		ABL 8MEM24012 (Modular)	
	ABL 8MEM12020 (Modular)		
		ABL 7RM24025 (Modular)	ABL 7RP4803 (Optimum)
		ABL 8REM24030 (Optimum)	
ABL 8MEM05040 (Modular)			
	ABL 7RP1205 (Optimum)	ABL 8REM24050 (Optimum)	

Pages

Please, consult our catalogue "Phaseo, Power supplies & transformers"

Regulated switch mode

Phaseo Universal range industrial power supplies



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	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 %.

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 "Humaïn/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 40...50 Alphanumeric — — Yes Access to the PLC real-time clock No		200 application pages 256 alarm pages 50 Alphanumeric, bargraph, buttons, lights — Yes Yes No	
RS 232C/RS 485 Uni-TE, Modbus and for PLC brands: Allen-Bradley, Omron, Mitsubishi, Siemens RS 232C serial link (1)		Uni-TE, Modbus	
Vijeo Designer Lite (on Windows 2000 and XP) Magelis			
XBT R		XBT RT	
Consult our catalogue “Humaïn/Machine interfaces”			

Technical information

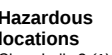
Certifications for automation products

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

Abbreviated name	Certification body	Country
CSA	Canadian Standards Association	Canada
C-Tick	Australian Communication Authority	Australia, New Zealand
GOST	Scientific research institute for GOST standards	CIS, Russia
UL	Underwriters Laboratories	USA
Abbreviated name	Classification society	Country
IACS	International Association of Classification 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 certifications (listed next to their respective bodies) have been granted or are pending for our automation products. Up-to-date information on which certifications 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	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 iPC, 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)

Technical information

Certifications for automation products

Protective treatment of Twido controller

Merchant navy certifications

Certified Certification pending	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)			

(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 certification 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 fit 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** (enclosed equipment). 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

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Due to evolution of standards and equipment, the characteristics indicated in texts and images of this document do not constitute a commitment on our part without confirmation.
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