Programmable controller
Twido

Catalogue
November
04

a brand of Schneider Electric

Telemecanique

Contents

Twido programmable controller

New

New, extended functions are offered with Twido programmable controllers versions ≥ 3.0 and with version 3.0 of TwidoSoft software:

Incorporation of the new CANopen bus master module **TWD NCO1M** in the Twido programmable controller range allows the Twido master to manage up to 16 slaves (motor starters, variable speed drives, etc.) connected to the CANopen bus.
Connection to the Ethernet network:
- an integrated RJ45 port (Modbus TCP protocol) is available on the new 40 I/O Twido compact base controller **TWD LCAE 40DRF**,
- a new TwidoPort **499 TWD 01100** interface module also allows all Twido programmable controllers, versions ≥ 3.0, to be connected to Ethernet via one of the serial ports on the controller.

A new gateway **VW3 A8114**, using Bluetooth technology, allows wireless communication between a programming PC or a Pocket PC and a Twido compact or modular programmable controller.
Four new analogue I/O expansion modules **TWD AMI 4LT/8HT, TWD ARI 8HT** and **TWD AVO 2HT** have been added to the Twido programmable controller range.
A new system of macros for managing the slaves connected on a Modbus network or a CANopen bus allows easier programming of applications with TwidoSoft software version 3.0, by simplifying writing of the program and improving comprehension of the code.
The new TwidoAdjust software package **TWD SMD 100● V30M** is a software tool dedicated to the management and animation of Twido applications, using a Pocket PC.

Twido programmable controller
Compact and modular base controllers

Applications		Compact base controllers			
					
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			
I/O expansion	Number of expansion modules			4 discrete, analogue and AS-Interface I/O modules *(2)*	7 discrete, analogue and AS-Interface I/O modules *(2)*
	Discrete I/O modules			8, 16 or 32 ⎓ 24 V inputs; 8, 16 or 32 ⎓ 24 V or relay outputs;	
	Analogue I/O modules			2 x 12 bit inputs; 1 x 12 bit output or 2 inputs/1 x 12 bit output,	
	AS-Interface *(3)*			Management of slave modules: Discrete (max. 62 modules),	
Maximum number of I/O per configuration (base controller with I/O expansion modules)		10	16	88 with screw terminal I/O expansion modules *(4)* 152 with HE 10 connector I/O expansion modules	152 with screw terminal I/O expansion module 264 with HE 10 connector I/O expansion modules
Integrated counting and positioning	5 kHz counting	3 x 16 bit counting channels *(5)*			4 x 16 bit counting channels *(5)*
	20 kHz counting	1 x 16 bit counting channel (32 bits for versions ≥ 2.5): - dedicated ⎓ 24 V discrete inputs for incremental encoder or proximity sensors - up/down counting, up counter, down counter and frequency meter			2 x 16 bit channels (32 bits for versions ≥ 2.5):
	7 kHz positioning				2 channels: PWM function
Functions	PID			For controller versions ≥ 2.0	
	Event processing			For controller versions ≥ 2.0	
Communi-cation	Integrated	1 RS 485 serial port (mini-DIN connector)	1 RS 485 serial port (mini-DIN connector), 1 optional serial port: RS 232C (mini-DIN connector) or RS 485 (mini-DIN connector or screw terminals) + RJ45 Ethernet port for **TWD LCAE 40DRF**		
	CANopen bus			With CANopen bus master module **TWD NCO1M**	
	Ethernet	With TwidoPort Ethernet network interface module **499 TWD 01100** for all controller versions ≥ 3.0			
Supply voltage		∿ 100...240 V for **TWD LCAA ●●●** and **TWD LCA● 40DRF** (⎓ 24 V discrete sensors powered by the base controller), ⎓ 19.2…30 V for **TWD LCDA ●●●**			
Program-ming	Application memory	700 instructions	2000 instructions	3000 instructions	3000 instructions, 6000 with memory extension cartridge **TWD XCP MFK64**
	Internal bits	128 bits	128 bits	256 bits	
	Internal words *(6)*	3000			
	Standard func-tion blocks *(6)*	64 timers, 128 counters		128 timers, 128 counters	
	Double words		Yes		
	Floating, Trigonometrical				Yes
	Real-time clock	Optional **TWD XCP RTC** real time clock cartridge, using 16 real-time clock blocks			Built-in
	Languages	Reversible languages: Ladder language and Instruction List language (with Grafcet instructions)			
	Software	TwidoSoft running under Windows 98 SE, Windows 2000 and Windows XP and TwidoAdjust running under Pocket PC2003			
Twido base controller models		**TWD LC●A 10DRF**	**TWD LC●A 16DRF**	**TWD LC●A 24DRF**	**TWD LCA● 40DRF**
Page		8			

(1) Sink input: positive logic. Source input: negative logic.
(2) Within the consumption limit controlled by TwidoSoft software.
(3) The AS-Interface M3 profile supports analogue profile 7.3 (7 slaves), but does not support analogue profile S-7.4.

Modular base controllers

20		40
12 sink/source ⎓ 24 V inputs *(1)*		24 sink/source ⎓ 24 V inputs *(1)*
8 sink or source transistor outputs (depending on model)	6 relay outputs and 2 transistor source outputs	16 sink or source transistor outputs (depending on model)
By HE10 type connector For **TWD LMDA 20DTK**, allows use of the Telefast pre-wired system	By removable screw terminal block	By HE10 type connector For **TWD LMDA 40DTK**, allows use of the Telefast pre-wired system
4 discrete, analogue and AS-Interface I/O modules *(2)*	7 discrete, analogue and AS-Interface I/O modules *(2)*	
4 ⎓ 24 V inputs/4 relay outputs or 16 ⎓ 24 V inputs/8 relay outputs, connection by screw or spring terminals and by HE 10 type connector		
connection by screw terminals, 8 x 10 bit inputs, 4 x 12 bit inputs, 2 x 10 bit outputs		
analogue (max. 7 modules). For all controller versions ≥ 2.0		
84 with screw terminal I/O expansion modules 148 with HE 10 connector I/O expansion modules	132 with screw terminal I/O expansion modules 244 with HE 10 connector I/O expansion modules	152 with screw terminal I/O expansion modules 264 with HE 10 connector I/O expansion modules
2 x 16 bit counting channels *(5)*		
- dedicated ⎓ 24 V discrete inputs for incremental encoders or proximity sensors - up/down counting, up counter, down counter, frequency meter		
(pulse width modulation output) and PLS function (pulse generator output)		
For all controller versions ≥ 2.0		
For all controller versions ≥ 2.0		
for controller versions ≥ 3.0		
⎓ 24 V supply		
3000 instructions	3000 instructions, 6000 with memory extension cartridge **TWD XCP MFK64**	
	Yes	
Optional **TWD XCP RTC** real time clock cartridge, using 16 real-time clock blocks		
TWD LMDA 20D●K *(7)*	**TWD LMDA 20DRT**	**TWD LMDA 40D●K** *(7)*
14		

(4) With maximum of 42 relay outputs (on base controller and I/O expansions).
(5) Dedicated ⎓ 24 V discrete inputs of the base controller and up/down counting with preset.
(6) The maximum values of the internal words and function blocks cannot be cumulated.
(7) Replace the ● in the reference with **T**: *source transistor outputs,* **U**: *sink transistor outputs.*

Twido programmable controller
Compact base controllers

564493-3-3

TWD LC●A 10DRF

564493-3-3

TWD LC●A 16DRF

564494-3-3

TWD LC●A 24DRF

1211 14-49-M

TWD LCA● 40DRF

Presentation

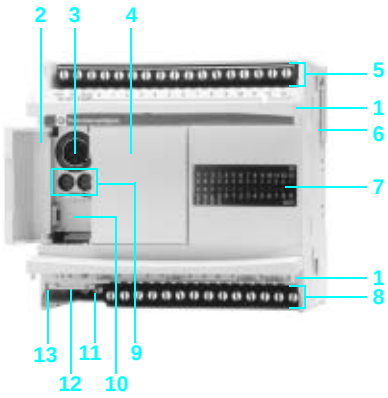
The Twido range of compact programmable controllers offers an "all-in-one" solution in a compact overall size (80/157 x 90 x 70 mm). Eight compact base controllers are available, differing in their processing capacity and in their number of ⎓ 24 V inputs and number of relay and transistor outputs (10,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

This type of compact base controller offers the following advantages:
- A significant number of I/O (up to 40 I/O) in a small overall size, so reducing the size of consoles or panels for applications where space is an important factor.
- A variety of expansion options and product options offer the user a degree of flexibility which is generally only available with larger automation platforms. 24 I/O compact base controllers TWD LC●A 24DRF can take up to 4 discrete and/or analogue I/O expansion modules, corresponding to a 64 I/O configuration; 40 I/O compact base controllers TWD LCA● 40DRF can take up to 7 modules. All compact base controllers can take optional modules such as a digital display, memory cartridge and real-time clock cartridge, as well as an additional RS 485 or RS 232C communication port (extra port not compatible with base controllers TWD LC●A 10DRF).
The compact controller solution also allows great wiring flexibility. For discrete I/O expansion modules (with base controllers TWD LC●A 24DRF and TWD LCA● 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 Telefast 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,
  - to the Telefast pre-wired system for Twido (connection cable and Telefast 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.
- TwidoSoft software allows easy programming using instruction list language instructions or ladder language graphic objects. It uses the same objects and sets of instructions as those used by PL7-07 software for Nano programmable controllers. TwidoSoft software allows existing Nano PLC applications to be reused with Twido controllers by importing an ASCII file.
- Compact controllers have 2 analogue adjustment points (only one for 10 and 16 I/O base controllers) accessible on the front panel.

Compact base controller	⎓ 24 V inputs	Outputs relay	Analogue adjustment	Serial ports	I/O expansion	Display module	Optional cartridge
TWD LC●A 10DRF	6	4	1 point 0…1023	1 x RS 485	No	Yes	1 slot: real-time clock or memory
TWD LC●A 16DRF	9	7	1 point 0…1023	1 x RS 485, option 1 x RS 232C/485	No	Yes	1 slot: real-time clock or memory
TWD LC●A 24DRF	14	10	1 point 0…1023 1 point 0…511	1 x RS 485, option 1 x RS 232C/485	Yes, 4 max *(1)*	Yes	1 slot: real-time clock or memory
TWD LCA● 40DRF	24	14 + 2 source transistor outputs	1 point 0…1023 1 point 0…511	1 x RS 485, option 1 x RS 232C/485	Yes, 7 max *(2)*	Yes	1 memory slot *(3)*

(1) i.e.: a maximum of 88 I/O with screw terminal expansion modules, with a maximum of 32 relay outputs in I/O expansion modules.
Maximum of 152 I/O with HE 10 connector expansion modules.
(2) i.e. a maximum of 152 I/O with screw terminal expansion modules. Maximum of 264 I/O with HE 10 connector expansion modules.
(3) Built-in real-time clock.

Twido programmable controller
Compact base controllers



Description

Twido **TWD LC●A ●●DRF** and **TWD LCA● 40DRF** compact programmable base controllers comprise :

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

2 A hinged access door.

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

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

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

6 A connector for I/O expansion modules TWD D●●, TWD A●● and TWD NOI 10M3 (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 controller (PWR, RUN, ERR and STAT),
- the inputs and outputs (IN● and OUT●).

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 and 24 I/O models).

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

12 A connector (access through the bottom of the controller) for:
- memory cartridge TWD XCP MFK32 or real-time clock cartridge TWD XCP RTC for base controllers TWD LC●A ●●DRF,
- memory cartridge TWD XCP MFK64 and built-in real-time clock TWD XCP RTC for base controllers TWD LCA● 40DRF.

13 An RJ45 connector (access through the bottom of the controller) for connection to the Ethernet network, only on base controller TWD LCAE 40DRF.

Modular base controllers are mounted on a symmetrical ⊓ rail. Fixing kit TWD XMT5 (supplied in lots of 5) allows plate or panel mounting (2 x Ø 4.3 holes).

Twido programmable controller
Compact base controllers

Characteristics of compact base controllers

Temperature		**°C**	Operation: 0…+ 55. Storage: - 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 ⊓ rail	**Hz**	10…57, amplitude 0.075 mm, acceleration 57…150 Hz			
		m/s²	9.8 (1 gn)			
	Plate or panel mounted (using fixing kit TWD XMT5)	**Hz**	2…25, amplitude 1.6 mm, acceleration 25…100 Hz			
		m/s²	39.2 (4 gn)			
Shock resistance		**m/s²**	147 (15 gn) for 11 ms			
Backup battery	Data backed up		Internal RAM: internal variables, internal bits and words, timers, counters, shift registers...			
	Operating time	**days**	Approximately 30 at 25 °C with fully charged battery			
	Battery type		Lithium battery, not interchangeable Optional external battery for TWD LCA● 40DRF			
	Charging time	**h**	Approximately 15 to charge from 0...90% of the full charge			
	Life		10 years and 3 years with external battery for TWD LCA● 40DRF			
Base controller type			**TWD LC●A 10DRF**	**TWD LC●A 16DRF**	**TWD LC●A 24DRF**	**TWD LCA● 40DRF**
Number of ⎓ 24 V inputs			6	9	14	24
Number and type of outputs			4 relay	7 relay	10 relay	14 relay + 2 transistor
Connection of I/O			Non-removable screw terminal block			
I/O expansion modules	Max. no. of modules		–		4	7
	Max. no. of I/O		–		88/152 *(1)*	152/264 *(1)*
	AS-Interface		–	Management of slave modules: 62 (discrete), 7 (analogue)		
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 *(2)*		3000			
	Timers *(2)*		64		128	
	Counters *(2)*		128			
	Double words		–	Yes		
	Floating, trigonometrical		–			Yes
Supply	Nominal voltage	**V**	∿ 100…240 (for TWD LCAA), ⎓ 24 (for TWD LCDA)			
	Voltage range ∿ 100…240 V	**V**	∿ 85…264			
	Voltage range ⎓ 24 V	**V**	⎓ 19.2…30			
	Maximum inrush current	**A**	35		40	45
	⎓ 24 V sensor supply	**mA**	250			400
Maximum power required	∿ 100 V	**VA**	20	22	33 (base with 4 I/O expansion modules)	77
	∿ 264 V	**VA**	30	31	40 (base with 4 I/O expansion modules)	110

Communication

Function			**Built-in serial link**		**Optional serial interface adapter** *(3)*	
Port type			RS 485		RS 232C, with adapter TWD NAC 232D RS 485, with adapter TWD NAC 485●	
Maximum data rate		**K bits/s**	38.4			
Isolation between internal circuit and serial port			Non isolated			
Programming terminal connection			Half-duplex terminal port		No	
Communication protocols			Modbus Master/Slave RTU. ASCII character mode			
"Remote Link" I/O			Yes, see page 43			

Integrated functions

Counter	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, 32 bits VFCi for versions ≥ 2.5			
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		For controller versions ≥ 2.0			
Event processing	24 I/O and 40 I/O base controllers		For controller versions ≥ 2.0			
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			

(1) The first value corresponds to the maximum number of I/O (base controller and expansion module) with screw or spring terminal expansion modules, the second value is for HE 10 connector expansion modules.
(2) The maximum values cannot be cumulated.
(3) With 16 I/O base controllers TWD LC●A 16DRF and 24 I/O base controllers TWD LC●A 24DRF.

⎓ input characteristics

Base controller type				TWD LC●A 10DRF	TWD LC●A 16DRF	TWD LC●A 24DRF	TWD LCAA 40DRF	TWD LCAE 40DRF
Number of input channels				6	9	14	24	
Rated 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	
Rated 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	
Filtering 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				No isolation between channels, isolation with internal logic by photocouplers				

Output characteristics

Number of output channels				4	7	10	16 (14 relay + 2 transistor)	
Output currents			**A**	2 per channel, 8 per common			2 (relay) 1 (transistor)	
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**	10/10 V ⎓ (reference value)				
Contact resistance (when new)			**mΩ**	30 max				
Loads (resistive, inductive)				2 A/∿ 240 V or 2 A/⎓ 30 V (with 1800 operations/hour max): - electrical life: minimum 100 000 operations, - mechanical life: minimum 20 x 106 operations.			2 A (relay) 1 A per common (transistor)	
rms insulation voltage			**V**	∿ 1 500 for 1 minute				
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) *(1) (2)*

Precision	**s/ month**	± 30 at 25 °C
Operating time	**days**	approximately 30 at 25 °C with fully charged battery
Battery type		Lithium battery, not interchangeable. Optional external battery for TWD LCA● 40DRF
Charging time	**h**	Approximately 10 to charge from 0...90 % of the full charge
Life		10 years and 3 years with external battery for TWD LCA● 40DRF

Memory cartridge (optional) *(1)*

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 LCA● 40DRF

(1) 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.
(2) Built-in real-time clock cartridge for compact base controllers TWD LCA● 40DRF.

Twido programmable controller
Compact base controllers

TWD LC●A 10DRF/16DRF

References

Number of I/O	Inputs sink/source	Outputs	Program memory	Reference	Weight kg
Compact base controllers, ∿ supply					
10 I/O	6 ⎓ 24 V inputs	4 relay outputs	700 instructions	**TWD LCAA 10DRF**	0.230
16 I/O	9 ⎓ 24 V inputs	7 relay outputs	2000 instructions	**TWD LCAA 16DRF**	0.250
24 I/O	14 ⎓ 24 V inputs	10 relay outputs	3000 instructions	**TWD LCAA 24DRF**	0.305
40 I/O	24 ⎓ 24 V inputs	14 relay outputs and 2 transistor outputs	3000 instructions *(1)*	**TWD LCAA 40DRF**	0.525
				TWD LCAE 40DRF *(2)*	0.525
Compact base controllers, ⎓ supply					
10 I/O	6 ⎓ 24 V inputs	4 relay outputs	700 instructions	**TWD LCDA 10DRF**	0.230
16 I/O	9 ⎓ 24 V inputs	7 relay outputs	2000 instructions	**TWD LCDA 16DRF**	0.250
24 I/O	14 ⎓ 24 V inputs	10 relay outputs	3000 instructions	**TWD LCDA 24DRF**	0.305

TWD XCP MFK32/RTC

TWD NAC ●●●●

TWD XCP ODC

XBT N401

ASI ABLM3024

Separate components *(3)*

Description	Application	Type	Reference	Weight kg
32 Kb memory cartridge	For all base controllers Application backup Program transfer	EEPROM	**TWD XCP MFK32**	0.005
64 Kb memory cartridge	For base controllers TWD LCA● 40DRF Memory extension Application backup Program transfer	EEPROM	**TWD XCP MFK64**	0.005
Real-time clock cartridge	Date-stamping RTC based programming	–	**TWD XCP RTC**	0.005
Serial interface adapters	See page 41	–	**TWD NAC ●●●●**	–
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**	–
External backup batteries	For base controllers TWD LCA● 40DRF	Sold singly	**TSX PLP 01**	–
		Sold in lots of 10	**TSX PLP 101**	–
Fixing kit (Sold in lots of 5)	For plate or panel mounting of compact base controllers or extensions	–	**TWD XMT5**	–

Magelis compact displays

Description	Protocol	Compatible with PLC types	Supply voltage	Reference	Weight kg
Compact display, 2 lines of 20 characters (alphanumeric display)	Uni-Telway, Modbus	Twido, Nano, TSX Micro, Premium	⎓ 5 V by terminal port on PLC	**XBT N200**	0.360
Compact displays, 4 lines of 20 characters (matrix display)	Uni-Telway, Modbus	Twido, Nano, TSX Micro, Premium	⎓ 5 V by terminal port on PLC	**XBT N400**	0.360
		Twido *(4)* Nano, TSX Micro, Premium, TSX series 7, Momentum, Quantum Other Modbus slave modules	⎓ 24 V external source	**XBT N401**	0.360
Display connection cable	Uni-Telway, Modbus	Twido, Nano, TSX Micro, Premium	–	**XBT Z978**	0.180

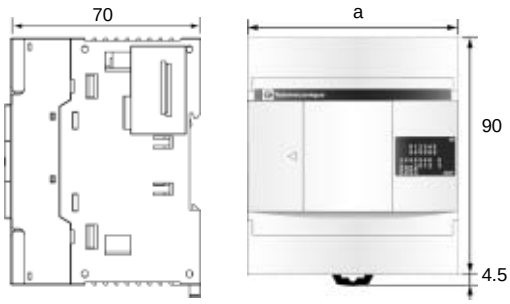
Phaseo regulated power supply

Description	Mains input voltage 47…63 Hz	Output voltage	Nominal power	Nominal current	Auto-protect reset	Reference	Weight
	V	⎓ V	W	A			kg
Regulated switch mode power supply for AS-Interface cabling system *(5)*	∿ 100…240 single-phase wide range	30 + 24	2 x 72	2.4 + 3	Auto	**ASI ABLM3024**	1.300

(1) 6000 instructions with memory extension cartridge TWD XCP MFK64.
(2) Base controller equipped with an integrated Ethernet link (RJ45 port).
(3) Other separate components, see page 44.
(4) Connection via built-in port or via optional serial port on Twido programmable controllers.
(5) With earth fault detection.

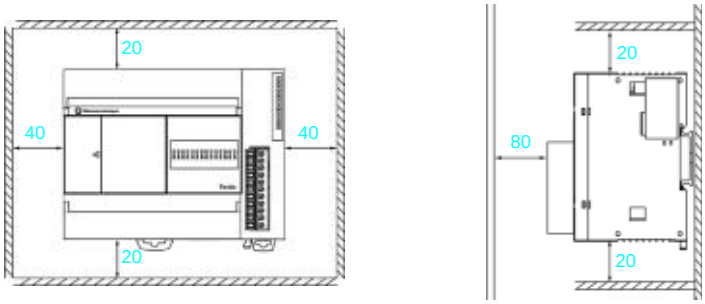
Dimensions

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 LCA● 40DRF	157

Installation rules



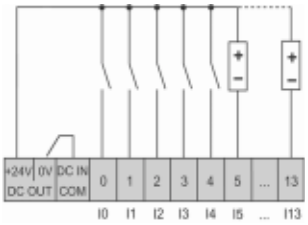
Important:
- Vertical mounting: not permissible for temperatures ⩾ 40° C, "upside down" flat mounting not permissible.
- Avoid placing devices which generate heat (transformers, power supplies, power contactors...) beneath the controller.

Connections

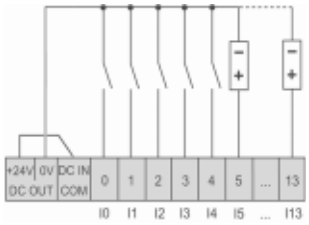
Connection of ⎓ 24 V inputs

TWD LC●A 10DRF/16DRF/24DRF

Connection to sink inputs (positive logic) with sensors powered by the base controller

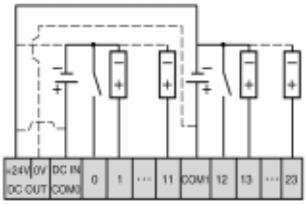


Connection to source inputs (negative logic) with sensors powered by the base controller

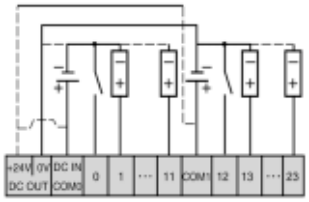


TWD LC●A 24DRF

Connection to sink inputs (positive logic) with sensors powered by the base controller

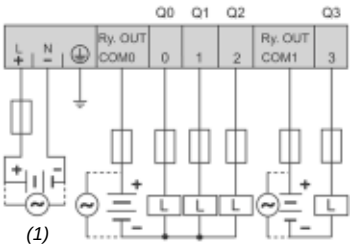


Connection to source inputs (negative logic) with sensors powered by the base controller



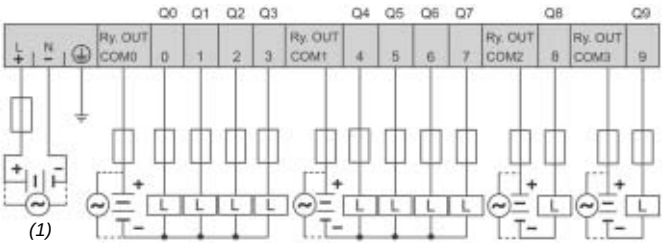
Connection of ∿ 100…240 V, ⎓ 19.2…30 V power supplies and relay outputs

TWD LC●A 10DRF



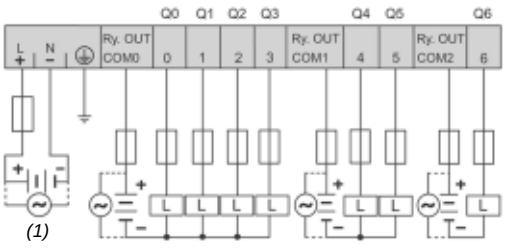
(1)

TWD LC●A 24DRF



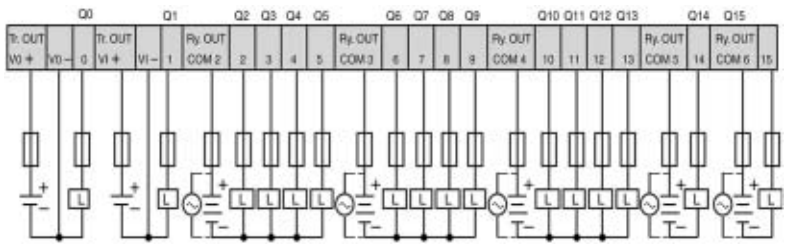
(1)

TWD LC●A 16DRF



(1)

TWD LCA● 40DRF *(2)*



(1) TWD LCAA ●●DRF: ∿ 100…240 V, TWD LCDA ●●DRF : ⎓ 19.2…30 V.
(2) ∿ 100…240 V supply only, identical to TWD LCAA ●●DRF.

Twido programmable controller
Modular base controllers

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 type connector, with relay or sink/source transistor outputs). They can be fitted with any of the I/O expansion modules in the range (18 discrete and analogue modules). All these modular base controllers use a ⎓ 24 V power supply.

These modular base controllers offer:

■ 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 expansion 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.

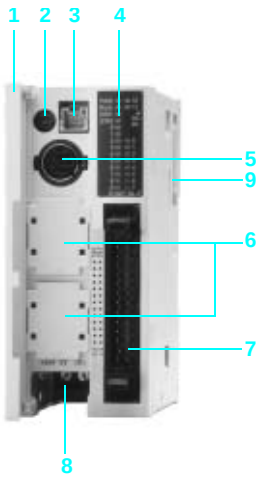
■ The modular controller solution also allows great wiring flexibility. Several types of connection are offered, such as removable screw terminal blocks, spring type connections or HE 10 type connectors which allow simple, fast and safe wiring. The TwidoFast system provides a pre-wired cabling solution, allowing connection of modules with HE 10 type connectors to:
□ pre-formed cables with free wires at one end for direct connection to sensors/preactuators,
□ TwidoFast kits (connection cables plus Telefast sub-base).

■ TwidoSoft software allows easy programming using instruction list language instructions or ladder language graphic objects. It uses the same objects and sets of instructions as those used by PL7-07 software for Nano programmable controllers. TwidoSoft software allows existing Nano PLC applications to be reused with Twido controllers by importing an ASCII file.

■ Modular base controllers include:
□ 1 analogue voltage input, 0...10 V 9 bits (512 points),
□ 1 analogue adjustment point accessible on the front panel. This point can be set to a value between 0 and 1023.

Modular base controller	⎓ 24V inputs	Outputs	Type of connection	Serial ports	I/O expansion	Interface module extension	Optional cartridge
TWD LMDA 20DTK	12 sink/source	8 source transistor	HE 10 type connector	1 x RS 485, + option of 1 x RS 232C/485	4 modules	1 module: display or serial link	2 slots: real-time clock and memory
TWD LMDA 20DUK	12 sink/source	8 sink transistor	HE 10 type connector	1 x RS 485, + option of 1 x RS 232C/485	4 modules	1 module: display or serial link	2 slots: real-time clock and memory
TWD LMDA 20DRT	12 sink/source	6 relay, 2 source transistor	Removable screw terminal block	1 x RS 485, + option of 1 x RS 232C/485	7 modules	1 module: display or serial link	2 slots: real-time clock and memory
TWD LMDA 40DTK	24 sink/source	16 source transistor	HE 10 type connector	1 x RS 485, + option of 1 x RS 232C/485	7 modules	1 module: display or serial link	2 slots: real-time clock and memory
TWD LMDA 40DUK	24 sink/source	16 sink transistor	HE 10 type connector	1 x RS 485, + option of 1 x RS 232C/485	7 modules	1 module: display or serial link	2 slots: real-time clock and memory

Twido programmable controller
Modular base controllers



Description

Twido TWD LMDA ●0 D●● base controllers comprise:

On the front panel:
1 A hinged door.

2 An analogue adjustment point.

3 A connector for connection of the built-in analogue input.

4 A display block showing:
- the status of the controller (PWR, RUN, ERR and STAT),
- the status of the inputs and outputs (INi and OUTi).

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 MFK●● and real-time clock cartridge TWD XCP RTC.

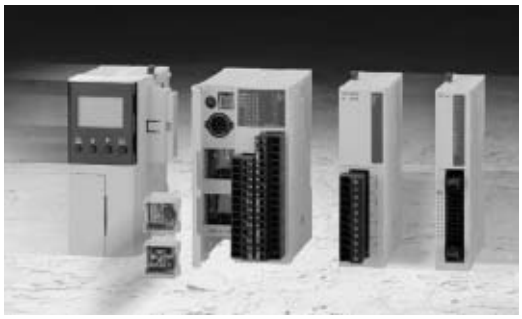
7 One (or more) HE 10 type connector(s) or screw terminal block for connection of the input sensors/output preactuators.

8 Screw terminals for connection of the ⎓ 24 V mains power supply.

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

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

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



Example of configuration with expansion modules and extension

Shown opposite, an example configuration consisting of a TWD LMDA 20DRT modular base controller with:

■ built-in display module TWD XCP ODM on the left,

■ two I/O expansion modules TWD DDI 8DT and TWD DDO 16K on the right.

The modular base controller is fitted with real-time clock cartridge TWD XCP RTC and memory extension cartridge TWD XCP MFK64.

Twido programmable controller
Modular base controllers

General characteristics of modular base controllers

Temperature		**°C**	Operation: 0…+ 55; Storage: - 25…+ 70				
Relative humidity			30 to 95 %, without condensation				
Degree of protection			IP 20				
Altitude		**m**	Operation: 0…2000; Storage: 0…3000				
Vibration resistance	Mounted on ⊓ rail	**Hz**	10…57, amplitude 0.075 mm, acceleration 57…150 Hz				
		m/s²	9.8 (1 gn)				
	Plate or panel mounted (using fixing kit TWD XMT5)	**Hz**	2…25, amplitude 1.6 mm, acceleration 25…100 Hz				
		m/s²	39.2 (4 gn)				
Shock resistance		**m/s²**	147 (15 gn) for 11 ms				
Backup battery	Data backed up		Internal RAM: internal variables, internal bits and words, timers, counters, shift registers...				
	Autonomy	**days**	Approximately 30 at 25 °C with fully charged battery				
	Battery type		Lithium battery, not interchangeable				
	Charging time	**h**	Approximately 15 to charge from 0…90% of the full charge				
	Life	**years**	10				
Base controller type		**TWD**	**LMDA 20DTK**	**LMDA 20DUK**	**LMDA 20DRT**	**LMDA 40DTK**	**LMDA 40DUK**
Number of ⎓ 24 V inputs			12			24	
Number and type of outputs *(1)*			8 source transistor	8 sink transistor	6 relay, 2 source transistor	16 source transistor	16 sink transistor
Connection of I/O			HE 10 type connector		Removable screw terminal block	HE 10 type connector	
I/O expansion modules	Maximum number of modules		4		7		
	Maximum number of I/O		84/148 *(2)*		132/244 *(2)*	152/264 *(2)*	
	AS-Interface		Management of slave modules: 62 (discrete), 7 (analogue)				
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 *(3)*		3000				
	Timers *(3)*		128				
	Counters *(3)*		128				
	Double words		Yes				
	Floating, trigonometrical		–		Yes		
Power supply	Rated voltage	**V**	⎓ 24				
	Voltage range	**V**	⎓ 20.4…26.4 including ripple				
	Maximum input current	**mA**	560 at 26.4 V		700 at 26.4 V		
	Maximum inrush current	**A**	50				
	Consumption	**W**	15 (base with 4 I/O expansion modules)		19 (base with 7 I/O expansion modules)		

Communication

Function			**Built-in serial link**	**Optional serial interface module** *(4)*
Port type			RS 485	RS 232C, with module TWD NOZ 232D RS 485, with module TWD NOZ 485●
Maximum data rate		**K bits/s**	38.4	
Isolation between internal circuit and serial port			Not isolated	
Programming terminal connection			Half-duplex terminal port	No
Communication protocols			Modbus Master/Slave RTU. ASCII character mode	
Remote Link I/O			Yes, see page 43	

Integrated functions

Counter	Number of points		4
	Frequency		2 channels at 5 kHz (function FCi), 2 channels at 20 kHz (function VFCi)
	Capacity		16 bits FC, 32 bits VFCi for versions ≥ 2.5
Positioning	Number of points		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			For controller versions ≥ 2.0
Event processing			For controller versions ≥ 2.0
Analogue adjustment points			1 point adjustable from 0…1023 points

(1) Source output: positive logic, sink output: negative logic.
(2) The first value corresponds to the maximum number of I/O (base controller and expansion module) with screw or spring terminal expansion modules, the second value is for HE 10 type connector expansion modules.
(3) The maximum values cannot be cumulated.
(4) Or with serial interface adapter TWD NAC ●●●● fitted in built-in 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			5 mA for I0.0 and 10.1, 10.6 and I0.7, 7 mA for other inputs I0.i				
Input impedance			5.7 kΩ for I0.0 and I0.1, 10.6 and 10.7, 4.7 kΩ for other inputs I0.i				
Filter time	At state 1		35 µs for I0.0 and I0.1, I0.6 and I0.7, 40 µs for other inputs I0.i				
	At state 0		45 µs for I0.0 and I0.1, I0.6 and I0.7, 150 µs other inputs I0.i				
Isolation			No isolation between channels, isolation with internal logic by photocouplers				

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		5 µs for Q 0.0 and Q 0.1, 300 µs for other outputs Q 0.i				
	At state 0		5 µs for Q 0.0 and Q 0.1, 300 µs for other outputs Q 0.i				
Residual voltage (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			No isolation between channels, isolation with internal logic by photocouplers				

Relay output characteristics

Number of output channels			–		6	–
Output currents		**A**	–		2 per channel, 8 per common	–
Commons	Common 1		–		3 N/O contacts	–
	Common 2		–		2 N/O contacts	–
	Common 3		–		1 N/O contact	–
Minimum switching load		**mA**	–		0.1/0.1 ⎓ V (reference value)	–
Contact resistance (when new)		**mΩ**	–		30 max	–
Loads (resistive, inductive)		**A**	–		2/∿ 240 V, 2/⎓ 30 V *(2)*	–
rms insulation voltage		**V**	–		∿1 500 for 1 minute	–
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/ month**	± 30 at 25 °C
Autonomy	**days**	Approximately 30 at 25 °C with fully charged battery
Battery type		Lithium battery, not interchangeable
Charging time	**h**	Approximately 10 to charge from 0...90 % of the full charge
Life	**years**	10

Memory cartridge (optional)

Cartridge type		TWD XCP MFK32	TWD XCP MFK64
Memory type		EEPROM	
Memory capacity	**Ko**	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) 2A/∿ 240 V or 2A/⎓ 30 V (with 1800 operations/hour max):
- electrical life: minimum 100 000 operations,
- mechanical life: minimum 20 x 10^6 operations.

Twido programmable controller
Modular base controllers

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

References

Sink/source inputs	Outputs	No. of I/O expansion modules	Program memory	Reference	Weight kg
Modular base controllers, 20 I/O					
12 ⎓ 24 V ⎍	8 O, source transistor	4	3000 instructions	**TWD LMDA 20DTK** *(2)*	0.140
	8 O, sink transistor	4	3000 instructions	**TWD LMDA 20DUK**	0.140
	6 O, relay 2 O, source transistor	7	3000 instructions *(1)*	**TWD LMDA 20DRT**	0.185
Modular base controllers, 40 I/O					
24 ⎓ 24 V ⎍	16 O, source transistor	7	3000 instructions *(1)*	**TWD LMDA 40DTK** *(2)*	0.180
	16 O, sink transistor	7	3000 instructions *(1)*	**TWD LMDA 40DUK**	0.180

TWD LMDA 20DRT

TWD XCP MFK ●●

Description	Application	Type	Reference	Weight kg
Separate components				
32 Kb memory cartridge	For all base controllers Application backup Program transfer	EEPROM	**TWD XCP MFK32**	0.005
64 Kb memory cartridge *(3)*	For TWD LMDA 20DRT/40D●K base controllers Memory extension Application backup Program transfer	EEPROM	**TWD XCP MFK64**	0.005
Real-time clock cartridge	Date-stamping, RTC based programming	–	**TWD XCP RTC**	0.005
Serial interface module	See page 44	–	**TWD NOZ ●●●●**	–
Digital display module	See page 44	–	**TWD XCP ODM**	–
Fixing kit (Sold in packs of 5)	For fitting modular base controllers or extensions on a mounting plate or panel	–	**TWD XMT5**	–
Replacement parts				
Screw terminal blocks (Sold in packs of 2)	Controller TWD LMDA 20DRT, 13 contacts	–	**TWD FTB 2T13**	–
	Controller TWD LMDA 20DRT, 16 contacts	–	**TWD FTB 2T16**	–
Analogue input cable	For built-in analogue input. Length 1 m	–	**TWD XCA 2A10M**	–
Pre-formed cables	–	–	See page 56	–

XBT N401

Description	Protocol	Compatible with PLC types	Supply voltage	Reference	Weight kg
Magelis compact displays					
Compact display, 2 lines of 20 characters (alphanumeric display)	Uni-Telway, Modbus	Twido, Nano, TSX Micro, Premium	⎓ 5 V by terminal port on PLC	**XBT N200**	0.360
Compact displays, 4 lines of 20 characters (matrix display)	Uni-Telway, Modbus	Twido, Nano, TSX Micro, Premium	⎓ 5 V by terminal port on PLC	**XBT N400**	0.360
		Twido *(4)*, Nano,TSX Micro, Premium, TSX series 7, Momentum, Quantum Other Modbus slave modules	⎓ 24 V external source	**XBT N401**	0.360
Display connection cable	Uni-Telway, Modbus	Twido, Nano, TSX Micro, Premium	–	**XBT Z978**	0.180

ABL 7CEM●●●●

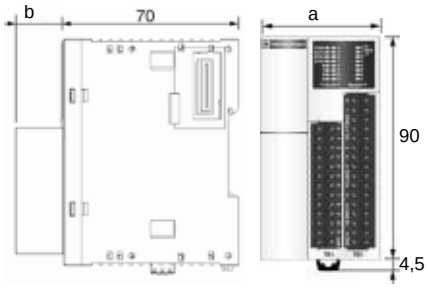
ASI ABLM3024

Description	Mains input voltage 47…63 Hz	Output voltage	Rated power	Rated current	Auto-protect reset	Reference	Weight
Phaseo regulated power supplies							
	V	⎓ V	W	A			kg
Single-phase regulated switch mode power supplies *(5)*	∿ 100…240 single-phase wide range ⎓ 110…220 *(6)*	24	15	0.6	Auto	**ABL 7CEM24006**	0.180
			30	1.2	Auto	**ABL 7CEM24012**	0.220
	∿ 100…240 single-phase wide range	24	48	2	Auto	**ABL 7RE2402**	0.520
			72	3	Auto	**ABL 7RE2403**	0.520
			120	5	Auto	**ABL 7RE2405**	1.000
Regulated switch mode power supplies for the AS-Interface cabling system *(7)*	∿ 100…240 single-phase wide range	30 + 24	2 x 72	2.4 + 3	Auto	**ASI ABLM3024**	1.300

(1) 6000 instructions with memory extension cartridge TWD XCP MFK64
(2) Connection by HE 10 type connector, allowing use of the Telefast pre-wired system (see page 56).
(3) Memory extension with base controllers TWD LMDA 20DRT/40D●K.
(4) Connection via built-in port or via optional serial port on Twido programmable controllers.
(5) These products do not conform to standard EN 61000-3-2.
(6) Compatible input voltage, not indicated on the product.
(7) With earth fault detection.

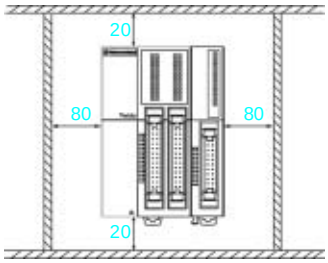
Dimensions

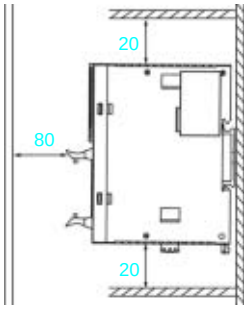
TWD LMDA 20D●K/20DRT/40D●K



	a	b
TWD LMDA 20DTK/DUK	35.4	0 (excluding connector)
TWD LMDA 20DRT	47.5	14.6
TWD LMDA 40DTK/DUK	47.5	0 (excluding connector)

Installation rules

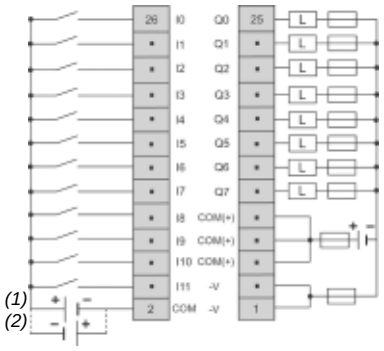




Important:
- Horizontal or flat mounting not permissible.
- Avoid placing devices which generate heat (transformers, power supplies, power contactors...) beneath the controller.

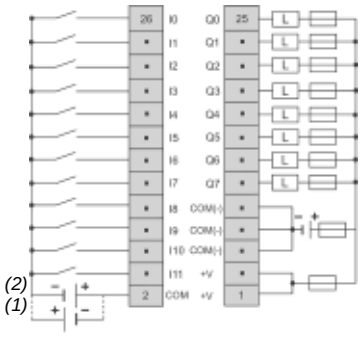
Connections

TWD LMDA 20DTK

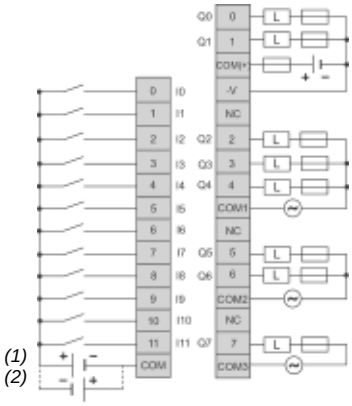


- The COM (+) and COM (-) terminals are interconnected internally.
- The COM and COM (+), COM and COM (-) terminals are independent.
- The -V and +V terminals are interconnected internally.

TWD LMDA 20DUK

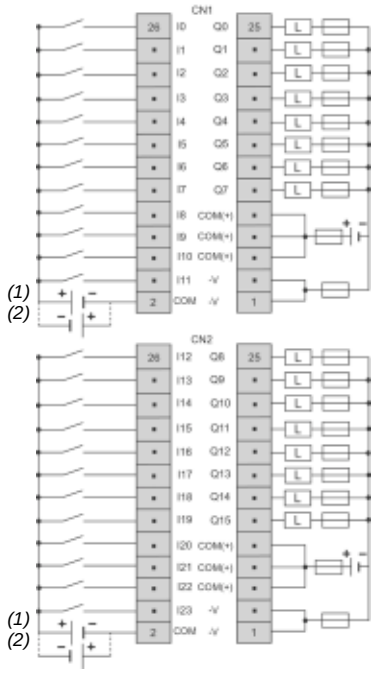


TWD LMDA 20DRT

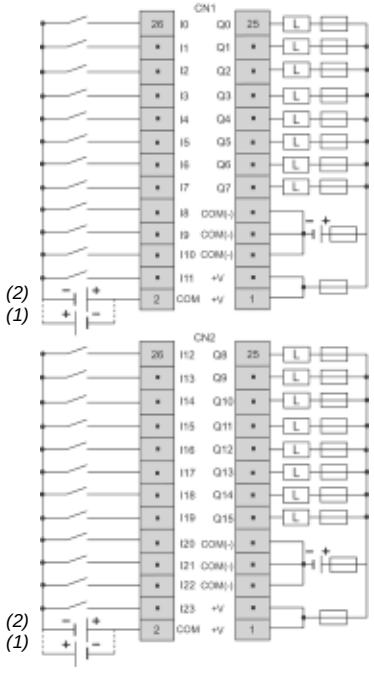


- Output channels 0 and 1 are of the source transistor type.
  Output channels 2 to 7 are of the relay type.
- The COM terminals are independent.

TWD LMDA 40DTK



TWD LMDA 40DUK



- Connectors CN1 and CN2 are independent.
- The COM (+) and COM (-) terminals are interconnected internally.
- The COM and COM (+), COM and COM (-) terminals are independent.
- The -V and +V terminals are interconnected internally.

(1) Supply connection for sink inputs (positive logic).
(2) Supply connection for source inputs (negative logic).

Twido programmable controller
Discrete I/O modules

Applications		Discrete I/O modules		
				 
Type		8 ⎓ 24 V inputs (TWD DDI 8DT) 8 ∿ 120 V inputs (TWD DAI 8DT)	16 ⎓ 24 V inputs	32 ⎓ 24 V inputs
Connection		By removable screw terminal block	By HE 10 type connector Allows use of the Telefast pre-wired system	
Inputs	Voltage ranges	⎓ 20.4...28.8 V (TWD DDI 8DT) ∿ 85...132 V (TWD DAI 8DT)		
	Input current	15 mA per point	7 mA per point	5 mA per point
	Input logic	Sink *(1)*	Sink/source *(1)*	
	Commons	1 common point (TWD DDI 8DT) 2 common points (TWD DAI 8DT)		2 common points
	Response time □ Energisation	4 ms (TWD DDI 8DT), 25 ms (TWD DAI 8DT)		
	□ De-energisation	4 ms (TWD DDI 8DT), 30 ms (TWD DAI 8DT)		
Outputs	Output types			
	Voltage range			
	Commons			
	Output current □ Per output			
	□ Per group of channels			
Isolation		Between channels : common point, Between bus and channels : by photocoupler		
I/O module type		**TWD DDI 8DT**	**TWD DDI 16DT**	**TWD DDI 16DK** **TWD DDI 32DK**
Page		22		

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

Discrete mixed I/O modules		Master module for AS-Interface cabling system
		
4 ⎓ 24 V inputs/4 relay outputs	16 ⎓ 24 V inputs/8 relay outputs	■ For controller versions ≥ 2.0 ■ Management of slave modules: □ Discrete: maximum of 62 slaves arranged in 2 banks, A/B, of 31 addresses each □ Analogue: maximum of 7 slaves in bank A ■ The AS-Interface M3 profile supports analogue profile 7.3 (7 slaves), but does not support analogue profile S-7.4
By removable screw terminal block	By non-removable spring terminal block	
⎓ 20.4...28.8 V		
7 mA per point		
Sink/source		
1 common point		
4 ms		
4 ms		
1 N/O contact		
∿ 240 V, ⎓ 30 V		
1 common point	2 common points	
2 A (Ith)		
7 A (Ith)		
Between input channels : common point, between output channels : common point Between bus and channels : by photocoupler		
TWD DMM 8DRT	**TWD DMM 24DRF**	**TWD NOI 10M3**
22		37

Twido programmable controller
Discrete I/O modules

Applications		8/16 output modules with removable screw terminal block		
				 
Type		8 ⎓ 24 V transistor outputs	8 relay outputs	16 relay outputs
Connection		By removable screw terminal block		
Inputs	Voltage range			
	Input current			
	Input logic			
	Commons			
	Response time □ Energisation			
	□ De-energisation			
Outputs	Output types	Transistor		Relay with 1 N/O contact
	Voltage range	⎓ 20.4...28.8 V		∿ 240 V, ⎓ 30 V
	Logic *(1)*	Sink	Source	–
	Commons	1 common point		2 common points
	Output current □ Per output	0.3 A nominal		2 A max.
	□ Per group of channels	3 A at 28.8 V		7 A max. / 8 A max.
Isolation		Between channels: common point Between bus and channels: by photocoupler.		Between channels: common point. Between bus and channels: ∿ 1500 V for 1 minute.
Output module type		TWD DDO 8UT	TWD DDO 8TT	TWD DRA 8RT / TWD DRA 16RT
Page		22		

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

16/32 output modules with HE 10 type connectors

			
16 ⎓ 24 V transistor outputs	16 ⎓ 24 V transistor outputs	32 ⎓ 24 V transistor outputs	32 ⎓ 24 V transistor outputs
By HE 10 type connector	By HE 10 type connector Allows use of the Telefast pre-wired system	By HE 10 type connector	By HE 10 type connector Allows use of the Telefast pre-wired system
Transistor			
⎓ 20.4...28.8 V			
Sink	Source	Sink	Source
1 common point		2 common points	
0.1 A nominal			
1 A at 28.8 V			
Between channels: common point. Between bus and channels: by photocoupler.			
TWD DDO 16UK	**TWD DDO 16TK**	**TWD DDO 32UK**	**TWD DDO 32TK**
22			

Twido programmable controller
Discrete I/O modules

Presentation

The range of Twido I/O 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 :

■ 1 ∿ 120 V discrete input module, 8 channels, fitted with a removable screw terminal block.

■ 4 ⎓ 24 V discrete input modules comprising an 8-channel module, two 16-channel modules and a 32-channel module, equipped with either removable screw terminal blocks or HE 10 type connector, depending on the model. These modules can be either “sink or source”.

■ 8 discrete output modules comprising two output modules with 8 and 16 relay outputs, three output modules with 8, 16 or 32-channel "sink" transistor outputs and three output modules with 8, 16 or 32-channel "source" transistor outputs, equipped with either removable screw terminal blocks or HE 10 type connector, depending on the model.

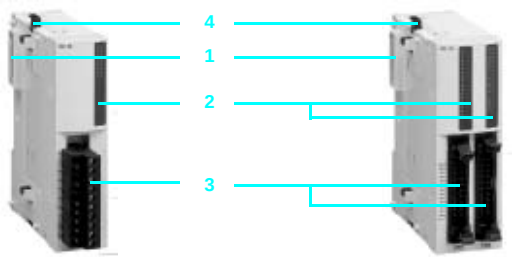
■ 2 discrete mixed input and output modules, comprising one 4-channel input/ 4-channel relay output module with removable screw terminal block and one 16-channel input/8-channel relay output module with non-removable spring terminal block.

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 configurations of up to 264 I/O with a minimal overall size of L 255.4 mm x H 90 mm x D 81.3 mm.

All these discrete I/O modules and the analogue I/O modules are connected to the base controller by stacking them on a ⊓ rail, starting from the right-hand side panel of the base controller, according to the following rules :
■ For 24 I/O compact base controllers TWD LC●A 24DRF: 4 modules max. (see characteristics page 6).
■ For 40 I/O compact base controllers TWD LCA● 40DRF: 7 modules max. (see characteristics page 6).
■ For 20 I/O modular base controllers TWD LMDA 20D●K: 4 modules max. (see characteristics page 13).
■ For 20 and 40 I/O base controllers TWD LMDA 20DRT/40D●K: 7 modules max. (see characteristics page 13).

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



Module with removable screw terminal block

Module with HE 10 type connector

Twido discrete I/O 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 type connector (1 or 2) for modules whose reference ends in **K**,
■ non-removable spring terminal block for module TWD 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.

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

Twido programmable controller
Discrete I/O modules

General characteristics

Temperature		**°C**	Operation : 0…+ 55. Storage : - 25…+ 70.
Relative humidity			30 to 95 %, without condensation
Degree of protection			IP 20
Altitude		**m**	Operation : 0…2000. Storage : 0…3000.
Vibration resistance	Mounted on ⊓ rail	**Hz**	10…57, amplitude 0.075 mm, acceleration 57…150 Hz
		m/s²	9.8 (1 gn)
	Plate or panel mounted (using fixing kit TWD XMT 5)	**Hz**	2…25, amplitude 1.6 mm, acceleration 25…100 Hz
		m/s²	39.2 (4 gn)
Shock resistance		**m/s²**	147 (15 gn) for 11 ms

Characteristics of ⎓ input channels

Module type	**TWD**		**DAI 8DT**	**DDI 8DT**	**DDI 16DT**	**DDI 16DK**	**DDI 32DK**	**DMM 8DRT**	**DMM 24DRF**
Number of input channels			8	8	16	16	32	4	16
Rated input voltage		**V**	∿ 120 V	⎓ 24 sink/source					
Connection			Removable screw terminal block			HE 10 type connector		Removable screw terminal block	Spring terminal block
Commons			2	1			2	1	
Input voltage range		**V**	∿ 85…132 V	⎓ 20.4...28.8					
Rated input current		**mA**	7.5	7		5		7	
Input impedance		**kΩ**	11	3.4		4.4		3.4	
Filter time	At state 1	**ms**	25	8					
	At state 0	**ms**	30	8					
Isolation			No isolation between channels, isolation with internal logic by photocouplers						
Internal consumption for all inputs	At state 1 ⎓ 5 V	**mA**	55	25	40	35	65	25 *(1)*	65 *(1)*
	⎓ 24 V	**mA**	0					20 *(1)*	45 *(1)*
	At state 0 ⎓ 5 V	**mA**	25	5			10	5 *(1)*	10 *(1)*

Characteristics of transistor output modules

Module type	**TWD**		**DDO 8UT**	**DDO 8TT**	**DDO 16UK**	**DDO 16TK**	**DDO 32UK**	**DDO 32TK**
Number of output channels			8		16		32	
Output logic *(2)*			Sink	Source	Sink	Source	Sink	Source
Connection			Removable screw terminal block		HE 10 type connector			
Commons			1				2	
Nominal output values	Voltage	**V**	24					
	Current	**A**	0.3		0.1			
Output voltage range	Voltage	**V**	20.4…28.8					
	Current per channel	**A**	0.36		0.12			
	Current per common	**A**	3		1			
Response time	At state 1	**µs**	300					
	At state 0	**µs**	300					
Residual voltage (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			No isolation between channels, isolation with internal logic by photocouplers					
Consumption for all the outputs	At state 1 ⎓ 5 V	**mA**	10		10		20	
	⎓ 24 V	**mA**	20		40		70	
	At state 0 ⎓ 5 V	**mA**	5		5		10	

Characteristics of relay output channels

Module type	**TWD**		**DRA 8RT**	**DRA 16RT**	**DMM 8DRT**	**DMM 24DRF**
Number of output channels			8 N/O contacts	16 N/O contacts	4 N/O contacts	8 N/O contacts
Output currents	Current per channel	**A**	2			
	Current per common	**A**	7	8	7	
Minimum switching load		**mA**	0.1/0.1 ⎓ V (reference value)			
Contact resistance (when new)		**mΩ**	30 max			
Loads (resistive, inductive)		**A**	2A/∿ 240 V or 2A/⎓ 30 V (with 1800 operations/hour max) : - electrical life : minimum 100 000 operations - mechanical life : minimum 20 x 10^6 operations			
rms insulation voltage		**V**	∿1 500 for 1 minute			
Consumption for all the outputs	At state 1 ⎓ 5 V	**mA**	30	45	See values above (input channels)	
	⎓ 24 V	**mA**	40	75	See values above (input channels)	
	At state 0 ⎓ 5 V	**mA**	5	5	See values above (input channels)	

(1) Consumption values are indicated for all inputs/outputs at state 0 or at state 1.
(2) Source output : positive logic, sink output : negative logic.

Twido programmable controller
Discrete I/O modules


TWD DDI 8DT


TWD DDI 32DK


TWD DDO 8●T/DRA 8RT


TWD DDO 16●K


TWD DDO 32●K


TWD DRA 16RT


TWD DDM 8DRT


TWD DDM 24DRF

References

These discrete I/O modules are mounted 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:

Type of TWD base	LC●A 10DRF	LC●A 16DRF	LC●A 24DRF	LCA● 40DRF	LMDA 20D●K	LMDA 20DRT	LMDA 40D●K
Number of modules	0	0	4	7	4	7	7

Discrete input modules

Input voltage	No. of channels	No. of common point	Connection	Reference	Weight kg
⎓ 24 V sink/source	8	1	Removable screw terminal block (supplied)	**TWD DDI 8DT**	0.085
	16	1	Removable screw terminal block (supplied)	**TWD DDI 16DT**	0.100
			HE 10 type connector	**TWD DDI 16DK** *(1)*	0.065
	32	2	HE 10 type connector	**TWD DDI 32DK** *(1)*	0.100
∿ 120 V	8	2	Removable screw terminal block (supplied)	**TWD DAI 8DT**	0.081

Discrete output modules

Type of output	No. of channels	No. of common point	Connection	Reference	Weight kg
Transistor ⎓ 24 V/0.3 A	8, sink	1	Removable screw terminal block (supplied)	**TWD DDO 8UT**	0.085
	8, source	1	Removable screw terminal block (supplied)	**TWD DDO 8TT**	0.085
Transistor ⎓ 24 V/0.1 A	16, sink	1	HE 10 type connector	**TWD DDO 16UK**	0.070
	16, source	1	HE 10 type connector	**TWD DDO 16TK** *(1)*	0.070
	32, sink	2	HE 10 type connector	**TWD DDO 32UK**	0.105
	32, source	2	HE 10 type connector	**TWD DDO 32TK** *(1)*	0.105
Relay 2 A (Ith) ∿ 230 V/⎓ 30 V	8 (N/O contact)	2	Removable screw terminal block (supplied)	**TWD DRA 8RT**	0.110
	16 (N/O contact)	2	Removable screw terminal block (supplied)	**TWD DRA 16RT**	0.145

Discrete mixed input/output modules

No. of I/O	No. and type of inputs	No. and type of outputs	No. of common point	Connection	Reference	Weight kg
8	4 I, ⎓ 24 V sink/source	4 O, relay (N/O contact) 2 A (Ith)	Inputs : 1 common Outputs : 1 common	Removable screw terminal block (supplied)	**TWD DMM 8DRT**	0.095
24	16 I, ⎓ 24 V sink/source	8 O, relay (N/O contact) 2 A (Ith)	Inputs : 1 common Outputs : 2 commons	Non-removable spring terminal block	**TWD DMM 24DRF**	0.140

(1) Module allowing use of the Telefast pre-wired system.

Twido programmable controller
Discrete I/O modules

References

Separate components

Application	Description	Reference	Weight kg
Fixing kit	For fitting discrete modules on a mounting plate or panel Sold in lots of 5	**TWD XMT 5**	–
Telefast pre-wired system for Twido	Connection sub-bases I/O connection sub-bases Pre-wired solutions Cables and accessories	See page 57	–

HE 10 type connectors

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

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 with HE 10 connector, one end with free wires	Modular base controllers TWD LMDA 20DTK/40DTK	22 0.035 mm²	3 m	**TWD FCW 30M**	0.405
		22 0.035 mm²	5 m	**TWD FCW 50M**	0.670
	I/O extensions TWD DDI 16DK/32DK TWD DDO 16●K/32●K	22 0.035 mm²	3 m	**TWD FCW 30K**	0.405
		22 0.035 mm²	5 m	**TWD FCW 50K**	0.670

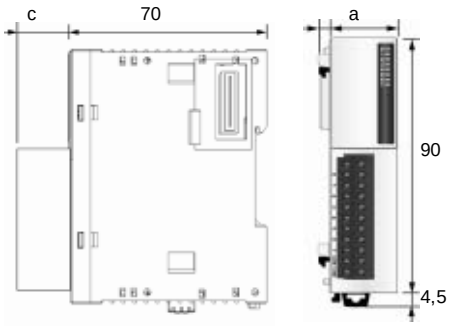
Connecting cables *(1)*

Description	For use with Twido	Gauge C.s.a.	Cable length	Reference	Weight kg
Discrete I/O pre-formed cables, 1 pre-formed cable: one end with 26-way HE 10 connector on Twido side, one end with two 20-way HE 10connectors on Telefast side	Modular base controllers TWD LMDA 20DTK/40DTK	28 0.080 mm²	1 m	**ABF TP26MP100**	0.200
		28 0.080 mm²	2 m	**ABF TP26MP200**	0.500
		28 0.080 mm²	3 m	**ABF TP26MP300**	0.800
Discrete input pre-formed cables, 1 pre-formed cable: one end with 20-way HE 10 connector on Twido side, one end with 20-way HE 10 connector on Telefast side	Inputs TWD DDI 16DK/32DK	28 0.080 mm²	1 m	**ABF TE20EP100**	0.080
		28 0.080 mm²	2 m	**ABF TE20EP200**	0.140
		28 0.080 mm²	3 m	**ABF TE20EP300**	0.210
Discrete output pre-formed cables 1 pre-formed cable: one end with 20-way HE 10 connector on Twido side, one end with 20-way HE 10 connector on Telefast side	Outputs TWD DDO 16TK/32TK	28 0.080 mm²	1 m	**ABF TE20SP100**	0.080
		28 0.080 mm²	2 m	**ABF TE20SP200**	0.140
		28 0.080 mm²	3 m	**ABF TE20SP300**	0.210

(1) Cables strictly for applications other than use of Telefast sub-bases with Twido controllers. For use of Telefast sub-bases with Twido controllers, see pages 48 to 61.

Dimensions

Discrete I/O modules



TWD	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

Connections

ABF TP26MP●00

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

ABF TE20EP●00

HE 10 26-way **A**	HE 10 20-way **B**
Twido side	**Input side**
1	–
2	–
3	18
4	20
5	16
6	8
7	15
8	7
9	14
10	6
11	13
12	5
13	12
14	4
15	11
16	3
17	10
18	2
19	9
20	1

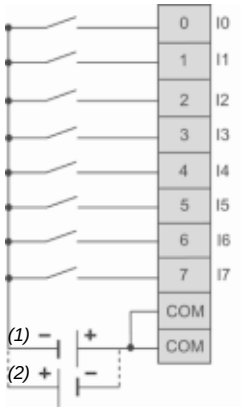
ABF TE20SP●00

HE 10 26-way **A**	HE 10 20-way **B**
Twido side	**Output side**
1	18
2	20
3	19
4	17
5	16
6	8
7	15
8	7
9	14
10	6
11	13
12	5
13	12
14	4
15	11
16	3
17	10
18	2
19	9
20	1

Connections (continued)

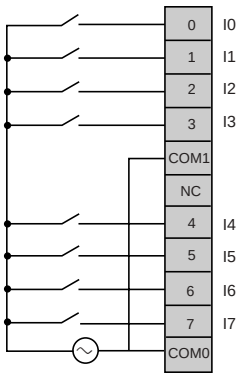
Input modules

TWD DDI 8DT (⎓ 24 V)

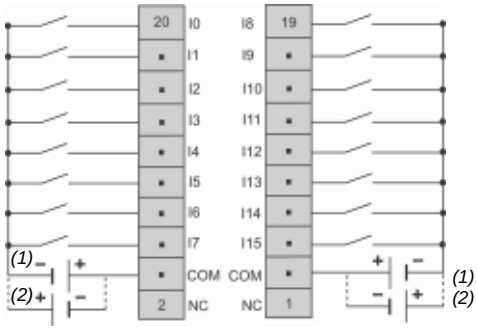


□ The COM terminals are linked internally

TWD DAI 8DT (∿ 120 V)

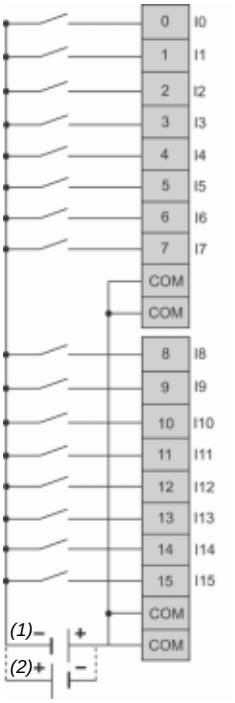


TWD DDI 16DK (⎓ 24 V)



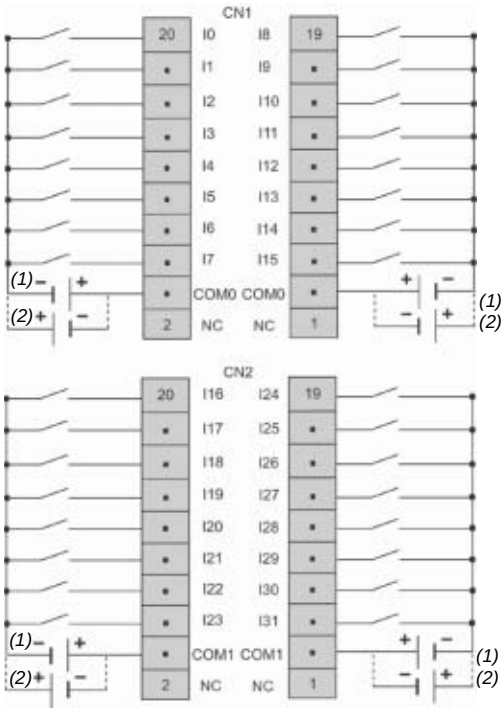
□ The COM terminals are linked internally

TWD DDI 16DT (⎓ 24 V)



□ The COM terminals are linked internally

TWD DDI 32DK (⎓ 24 V)



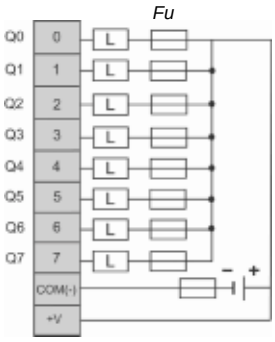
□ The COM0 terminals are linked internally.
□ The COM1 terminals are linked internally.

(1) Source input (negative logic)
(2) Sink input (positive logic).

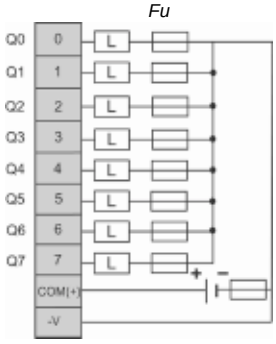
Twido programmable controller
Discrete I/O modules

Transistor output modules

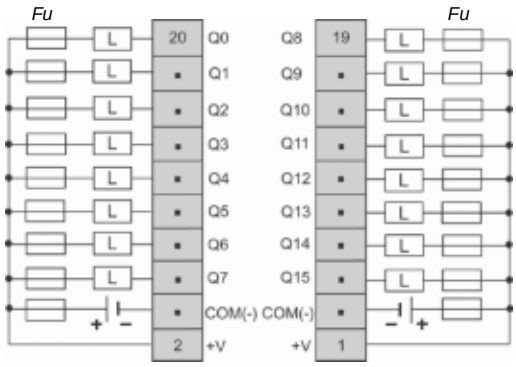
TWD DDO 8UT



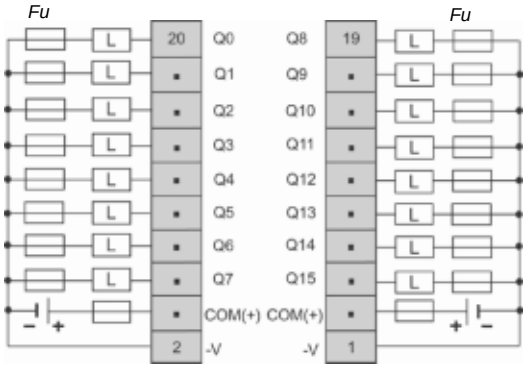
TWD DDO 8TT



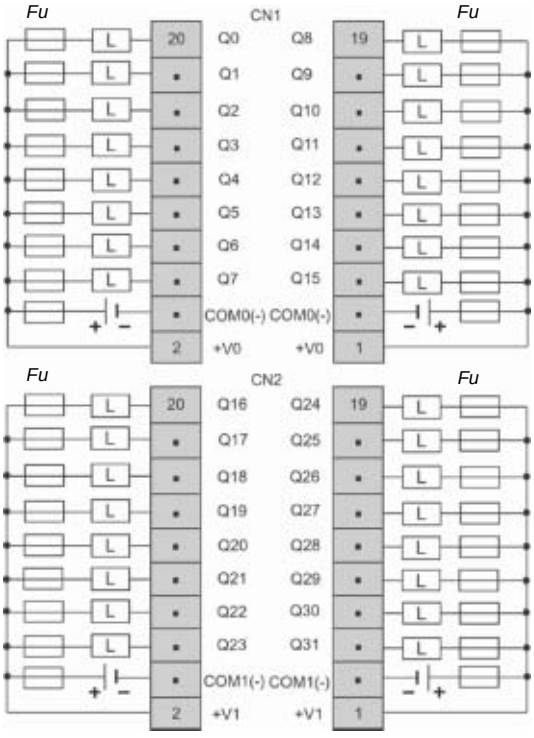
TWD DDO 16UK



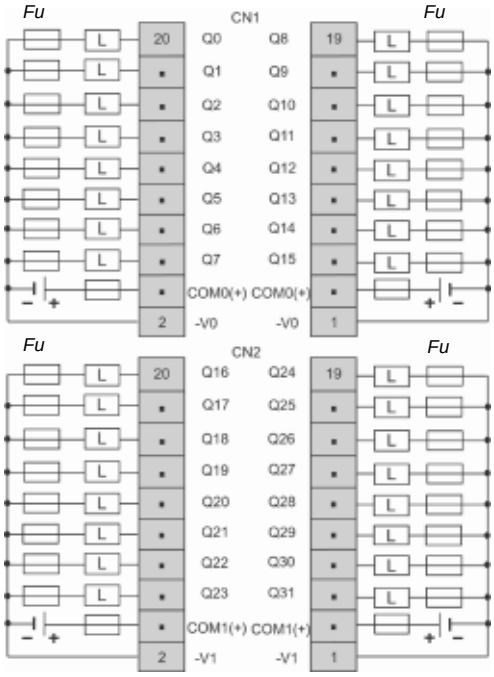
TWD DDO 16TK



TWD DDO 32UK



TWD DDO 32TK

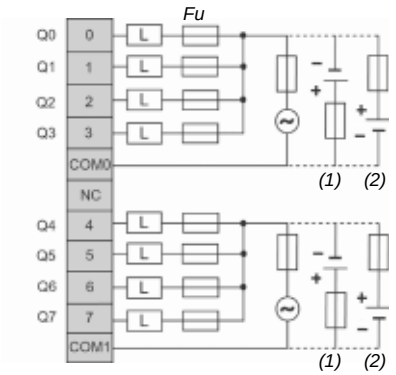


Terminals :
- COM (-) are linked internally.
- COM0 (-) are linked internally.
- COM1 (-) are linked internally.
- + V are linked internally.
- + V0 are linked internally.
- + V1 are linked internally.

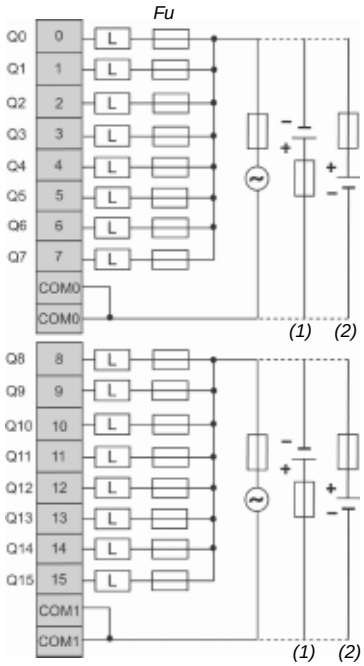
Terminals :
- COM (+) are linked internally.
- COM0 (+) are linked internally.
- COM1 (+) are linked internally.
- - V are linked internally.
- - V0 are linked internally.
- - V1 are linked internally.

Relay output modules

TWD DRA 8RT



TWD DRA 16RT

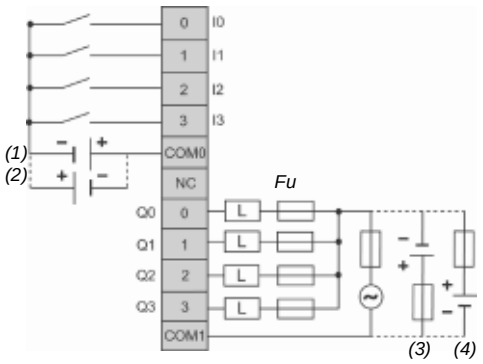


Terminals :
- COM0 are linked internally.
- COM1 are linked internally.
- COM0 and COM1 are independent

(1) Sink output (negative logic)
(2) Source output (positive logic)

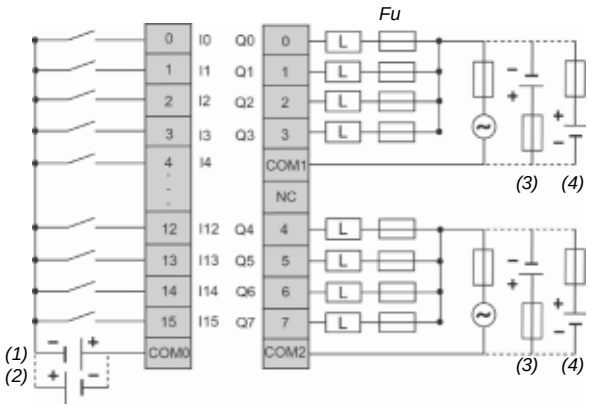
Mixed input/output modules

TWD DMM 8DRT



- The COM (+) terminals are linked internally

TWD DMM 24DRT



- Terminals COM0, COM1 and COM2 are independent
- Terminals - V are linked internally.

(1) Source input (negative logic)
(2) Sink input (positive logic)
(3) Sink output (negative logic)
(4) Source output (positive logic)

Twido programmable controller
Analogue I/O modules

Applications		Analogue input modules			
					
Number of I/O		2 inputs	4 inputs	8 inputs	8 inputs
Type		Voltage/current	Voltage/current Temperature	Voltage/current	PTC/NTC
Connection		Removable screw terminal block			
Inputs	Range	0...10 V (non differential) 4...20 mA (differential)	0...10 V (non differential) 0...20 mA (differential) Pt 100/1000 NI 100/1000	0...10 V (non differential) 0...20 mA (differential)	–
	Resolution	10 bits (1024 points)	12 bits (4096 points)	10 bits (1024 points)	
	Acquisition period	32 ms + 1 controller cycle time	160 ms		
Outputs	Range				
	Resolution				
	Transfer time				
External supply		⎓ 24 V external power supply to sensors/preactuators (voltage range 20.4…28.8 V)			
Isolation		Isolation between channels and earth: by photocoupler			
Analogue I/O module type		**TWD AMI 2HT**	**TWD AMI 4LT**	**TWD AMI 8HT**	**TWD ARI 8HT**
Pages		33			

Analogue output modules		Analogue mixed I/O modules		Master module for AS-Interface cabling system
				
1 output	2 outputs	2 inputs/1 output		■ For controller versions ≥ 2.0 ■ Management of slave modules: □ Discrete: maximum of 62 slaves arranged in 2 banks, A/B, of 31 addresses each □ Analogue: maximum of 7 slaves in bank A ■ The AS-Interface M3 profile supports analogue profile 7.3 (7 slaves), but does not support analogue profile S-7.4.
Voltage/current	Voltage	Voltage/current	Thermocouple/temperature probe inputs Voltage/current output	
Removable screw terminal block				
		0...10 V (non differential) 4...20 mA (differential)	Thermocouple type K, J and T Pt100 3-wire temperature probe	
		12 bits (4096 points)		
		32 ms + 1 controller cycle time	100 ms + 1 controller cycle time	
0...10 V 4...20 mA	± 10 V	0...10 V 4...20 mA		
12 bits (4096 points)	11 bits + sign (2048 points)	12 bits (4096 points)		
20 ms + 1 controller cycle time	0.3 ms + 1 controller cycle time	20 ms + 1 controller cycle time		
TWD AMO 1HT	**TWD AVO 2HT**	**TWD AMM 3HT**	**TWD ALM 3LT**	**TWD NOI 10M3**
33				37

Twido programmable controller
Analogue I/O modules

Presentation

Twido analogue I/O expansion modules enable the acquisition of various analogue values encountered in industrial applications.

Analogue 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 Twido 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, in order not to disturb the process being controlled.

The 8 following analogue I/O modules are available:

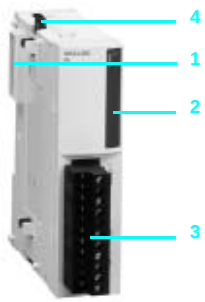
- One module with 2 inputs: 0…10 V, 4…20 mA.
- One module with 4 inputs: 0…10 V, 0…20 mA, Pt 100/1000, Ni100/1000 range 50...150 °C.
- One module with 8 inputs: 0…10 V, 0…20 mA.
- One module with 8 inputs: PTC/NTC.
- One module with 1 output: 0…10 V, 4…20 mA.
- One module with 2 outputs: ± 10 V.
- One 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 or temperature probe inputs and one 0…10 V, 4…20 mA output.

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

Like discrete I/O modules, analogue I/O modules are connected to the base controller by stacking them on a ⎵ rail, starting from the right-hand side panel of the base controller, according to the following rules:
- For 24 I/O compact base controllers TWD LC●A 24DRF: 4 modules max. (see characteristics page 6).
- For 40 I/O compact base controllers TWD LC●A 40DRF: 7 modules max. (see characteristics page 6).
- For 20 I/O modular base controllers TWD LMDA 20D●K: 4 modules max. (see characteristics page 13).
- For 40 I/O modular base controllers TWD LMDA 20DRT/40D●K: 7 modules max. (see characteristics page 13).

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

Description



Twido analogue I/O modules comprise:

1 An extension connector for electrical connection to the previous module *(1)*.
2 A block for displaying the channel and module diagnostics.
3 A removable screw terminal block for connection of the ⎓ 24 V external power supply, the sensors and the preactuators.
4 A 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.

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

Twido programmable controller
Analogue I/O modules

General characteristics

Temperature		**°C**	Operation: 0…+ 55. Storage: - 25…+ 70.
Relative humidity			30 to 95 %, without condensation
Degree of protection			IP 20
Altitude		**m**	Operation: 0…2000. Storage: 0…3000.
Vibration resistance	Mounted on rail	**Hz**	10…57, amplitude 0.075 mm, acceleration 57…150 Hz
		m/s²	9.8 (1 gn)
	Plate or panel mounted (using fixing kit TWD XMT 5)	**Hz**	2…25, amplitude 1.6 mm, acceleration 25…100 Hz
		m/s²	39.2 (4 gn)
Shock resistance		**m/s²**	147 (15 gn) for 11 ms

Analogue input characteristics

Module type			**TWD AMI 2HT/AMM 3HT**		**TWD ALM 3LT**	
Number of channels			2 high-level inputs		2 low-level inputs	
Range			Voltage 0…10 V	Current 4…20 mA	Thermocouple Type K (0…1300° C) Type J (0…1200° C) Type T (0…400° C)	Temperature probe Pt probe, 3-wire type (- 100…500° C)
Type			Non differential	Differential		
Resolution			4096 points (12 bits)			
LSB value			2.5 mV	4 µA	0.325° C (type K) 0.3° C (type J) 0.1° C (type T)	0.15° C
Connection			Removable screw terminal block			
Permissible continuous overload			⎓ 13 V	40 mA	–	
External supply		**V**	Rated voltage: ⎓ 24. Voltage range: ⎓ 20.4…28.8			
Input impedance			1 MΩ min	10 Ω	250 Ω max	5 Ω max
Maximum sampling duration		**ms**	16		50	
Sampling repetition time		**ms**	16		50	
Acquisition period		**ms**	32 + 1 controller cycle time		100 + 1 controller cycle time	
Measuring precision	Maximum error at 25° C	**% PE**	± 0.2		0.2 + precision of cold junction compensation (± 4° C max)	± 0.2
	Temperature coefficient	**% PE/°C**	± 0,006			
	Repeat accuracy after stabilisation time	**% PE**	± 0.5			
	Non linearity	**% PE**	± 0.2			
	Total error	**% PE**	± 1			
Common mode rejection			- 50 dB			
Cross talk			2 low significance bits max.			
Cabling			Twisted shielded pair recommended		–	
Dielectric strength		**V rms**	∿ 500 between the input and the supply circuit			
Type of protection			Photocoupler between the input and the internal circuit			
Consumption	Internal supply ⎓ 5 V	**mA**	50			
	External supply ⎓ 24 V	**mA**	60			

Analogue input characteristics (continued)

Module type			TWD AMI 4LT			TWD ARI 8HT	TWD AMI 8HT	
Number of channels			4 inputs			8 inputs	8 inputs	
Range			Temperature	Current	Voltage	Temperature	Current	Voltage
			PT100, PT1000, Ni100, Ni1000	0…20 mA	0…10 V	NTC, PTC, 100 Ω<R<10 kΩ	0…20 mA	0…10 V
Type			Differential	Non differential		Differential	Non differential	
Resolution			12 bits			10 bits		
LSB value			–	9 mV	20 µA	–	2.5 mA	4 µA
Connection			Removable screw terminal block					
Permissible continuous overload			–	13 V	40 mA	–	40 mA	13 V
External supply		**V**	Rated voltage: ⎓ 24. Voltage range: ⎓ 20.4…28.8					
Input impedance			>1 MΩ	470 Ω	1 MΩ	>1 MΩ	470 Ω	1 MΩ
Maximum sampling duration		**ms**	160					
Sampling repetition time		**ms**	4			8		
Acquisition period		**ms**	640 + 1 controller cycle time			1280 + 1 controller cycle time		
Measuring precision	Maximum error at 25° C	**% PE**	0.5			1		
Consumption	Internal supply ⎓ 5 V	**mA**	50			50		
	External supply ⎓ 24 V	**mA**	60			50		
Applicable load			–					
Dielectric strength			2500 V between the inputs and the internal circuit					

Analogue output characteristics

Module type			TWD AMO 1HT/AMM 3HT/ALM 3LT		TWD AVO 2HT
Number of channels			1 output		2 outputs
Range			Voltage	Current	Voltage
			0…10 V	4…20 mA	±10 V
Resolution			4096 increments (12 bits)		11 bits + sign
LSB value			2.5 mV	4 µA	± 4.8 mV
Load impedance		Ω	2000 min	300 max	3000 min
Applicable load			Resistive		
Stabilisation time		**ms**	20		0.3
Total output system transfer time		**ms**	20 + 1 controller cycle time		0.3 + 1 controller cycle time
External supply		**V**	Rated voltage: ⎓ 24. Voltage range: ⎓ 20.4…28.8		
Measuring precision	Maximum error at 25° C	**% PE**	± 0.2		
	Temperature coefficient	**% PE/°C**	± 0.015		
	Repeat accuracy after stabilisation time	**% PE**	± 0.5		
	Output error	**% PE**	± 1		
	Non linearity	**% PE**	± 0.2		
	Output ripple		1 low significance bit max.		
	Total error	**% PE**	± 1		
Cabling			Twisted shielded pair recommended		
Dielectric strength		**V rms**	∿ 500 between the input and the supply circuit		
Consumptionl (for TWD AMO 1HT)	nternal supply ⎓ 5 V	**mA**	50		50
	External supply ⎓ 24 V	**mA**	40		60
Applicable load			–		Resistive
Dielectric strength			–		2500 V between the outputs and the internal circuit

Twido programmable controller
Analogue I/O modules

References

TWD AMI 2HT

TWD ALM 3LT

These analogue I/O expansion modules are mounted on symmetrical ⎓ rails to the right of the Twido base controller. The sensors/preactuators are connected to a removable screw terminal block (supplied with each module). The maximum number of I/O and/or analogue modules which may be mounted depends on the type of base controller:

Type of TWD controller	LC●A 10DRF	LC●A 16DRF	LC●A 24DRF	LC●A 40DRF	LMDA 20D●K	LMDA 20DRT	LMDA 40D●K
Number of modules	0	0	4	7	4	7	7

Analogue input modules

Channel type	Input range	Output range	Resolution	Reference	Weight kg
2 inputs	0…10 V 4…20 mA	–	12 bits	**TWD AMI 2HT**	0.085
4 inputs	0…10 V 0…20 mA Temperature	–	12 bits	**TWD AMI 4LT**	0.085
8 inputs	0…10 V 0…20 mA	–	10 bits	**TWD AMI 8HT**	0.085
8 inputs	PTC/NTC	–	10 bits	**TWD ARI 8HT**	0.085

Analogue output modules

1 output	–	0…10 V 4…20 mA	12 bits	**TWD AMO 1HT**	0.085
2 outputs	–	±10 V	11 bits + sign	**TWD AVO 2HT**	0.085

Analogue I/O modules

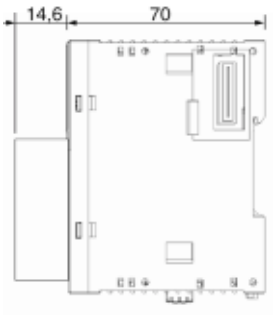
2 inputs and 1 output	0…10 V 4…20 mA	0…10 V 4…20 mA	12 bits	**TWD AMM 3HT**	0.085
	Thermocouple K, J, T Temperature probe Pt 100	0…10 V 4…20 mA	12 bits	**TWD ALM 3LT**	0.085

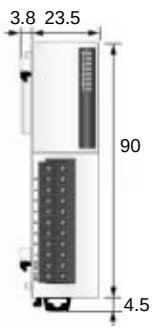
Separate components

Application	Description	Reference	Weight kg
Fixing kit	For plate or panel mounting of the analogue modules Sold in lots of 5	**TWD XMT 5**	–
Telefast® pre-wired system for Twido	Connection sub-bases I/O connection sub-bases Pre-wired solutions Cables and accessories	See page 57	–

Dimensions

Analogue I/O modules

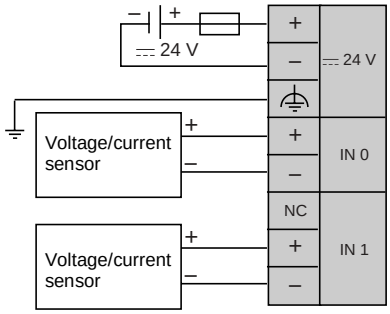




Twido programmable controller
Analogue I/O modules

Analogue input modules

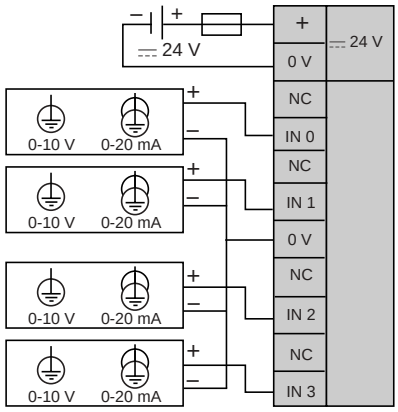
TWD AMI 2HT



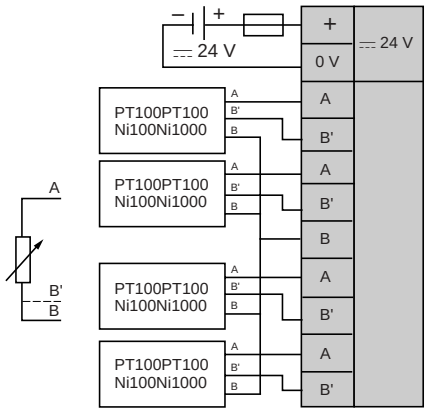
- Fit a fuse of appropriate size for the sensor type.
- Do not connect any wires to the unused channel.

TWD AMI 4LT

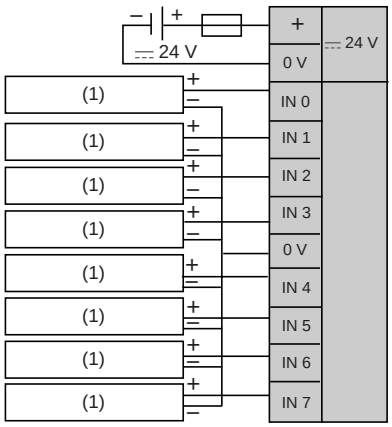
Voltage/Current configuration



PT100/PT1000 temperature probe, Ni100/Ni1000 configuration



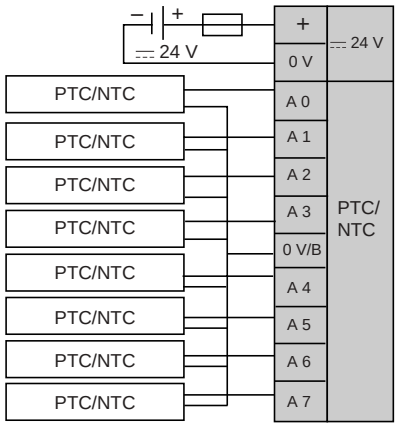
TWD AMI 8HT



(1) Analogue current/voltage output peripheral.

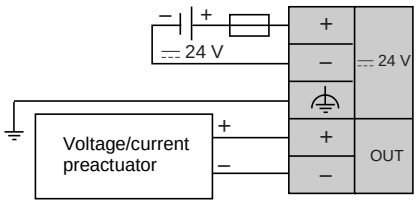
- Fit a fuse of appropriate size for the sensor type.
- Do not connect any wires to the unused channel.

TWD ARI 8HT

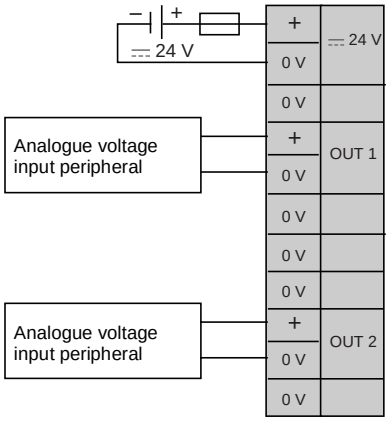


Analogue output modules

TWD AMO 1HT



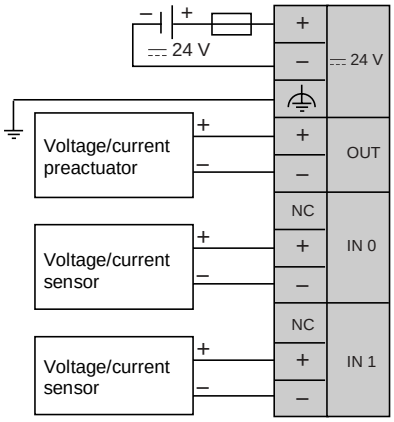
TWD AVO 2HT



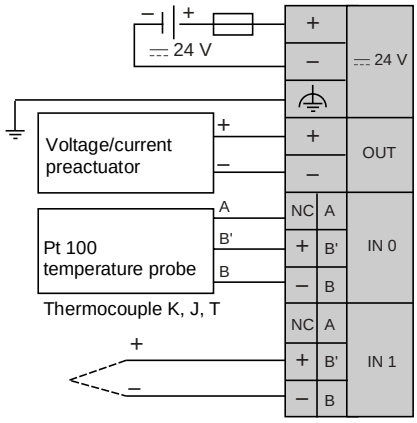
- Fit a fuse of appropriate size for the sensor type.
- Do not connect any wires to the unused channel.

Mixed input/output module

TWD AMM 3HT



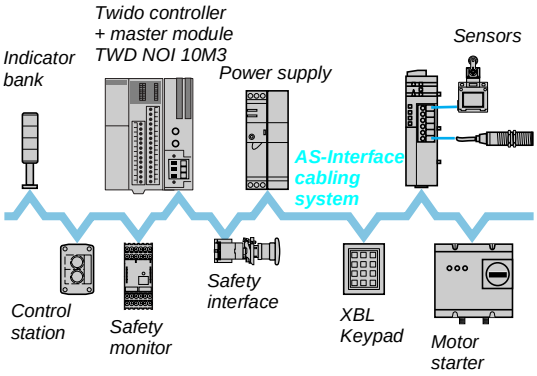
TWD ALM 3LT



- Fit a fuse of appropriate size for the sensor and preactuator types.
- 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 the + and - terminals (channels IN0 and/or IN1).
- Do not connect any wires to unused channels.

Twido programmable controller

Master module for AS-Interface cabling system



Presentation

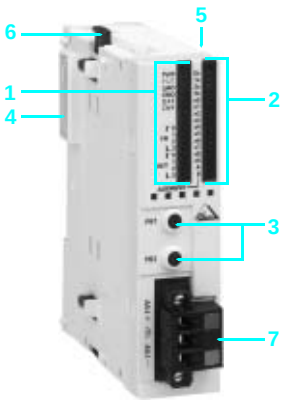
Master module TWD NOI 10M3, for AS-Interface cabling system allows the Twido controller (version ⩾ 2.0) to perform the function of AS-Interface master.

The cabling system consists of a master station (Twido controller) and slave stations. The master, which supports the AS-Interface profile, polls each of the devices connected to the AS-Interface cabling system, in turn, and stores information gathered (sensor/actuator status, operating status of the devices) in the controller memory. Communication on the AS-Interface cabling system 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 profile:

- 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 profile supports analogue profile 7.3 (7 slaves), but does not support analogue profile S-7.4.
The maximum number of TWD NOI 10M3 modules per Twido controller is 2.
7 discrete, analogue and AS-Interface I/O modules are controlled by TwidoSoft software, see pages 62 to 69.
An AS-Interface power supply is essential to supply the various modules on the cabling system. It should preferably be located close to the stations with high power consumption.
For more information on power supplies, see pages 8 and 14.

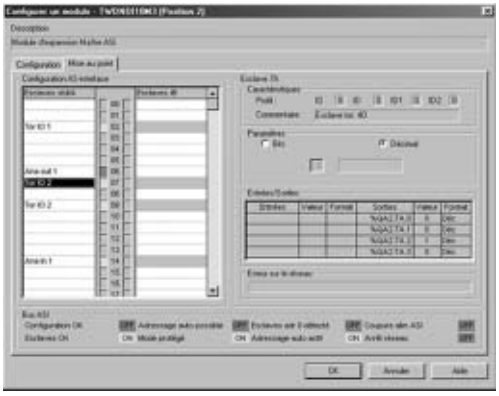


Description

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.



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 cabling system.

Software set-up

The AS-Interface cabling system is configured by the TwidoSoft software, see pages 62 to 69.
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: any AS-Interface slave defined on the cabling system has a topological address assigned to it, in a way that is transparent to the user.

Each AS-Interface module sensor/actuator is seen by the Twido programmable controller in the same way as any “In-rack" I/O.

Twido programmable controller

Master module for AS-Interface cabling system

General 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
Altitude		**m**	Operation: 0…2000. Transport: 0…3000
Temperature		**°C**	Operation: 0…+ 55. Storage: - 25…+ 70
Relative humidity			30 to 95 % (without condensation)
Degree of pollution			2 conforming to IEC 60664
Immunity to corrosion			Free of corrosive gases
Vibration resistance	Mounted on ⊓ rail	**Hz**	10…57, amplitude 0.075 mm, 57…150 (acceleration: 9.8 m/s²); for 2 hours on all 3 axes
	Plate or panel mounted (using fixing kit TWD XMT5)	**Hz**	2…25, amplitude 1.6 mm, 25…100 (acceleration: 39.2 m/s²); for 90 minutes on all 3 axes
Shock resistance		**m/s²**	147 (15 gn) duration 11 ms, on all 3 axes
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

Communication characteristics

As-Interface cabling system 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. no. of modules	Analogue modules *(1)*		7
	Discrete modules *(1)*		62
Max. no. 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 splitter block or extension	**m**	100
	With a total of 2 splitter blocks or extensions	**m**	300
AS-Interface cabling system voltage		**⎓ V**	30

References

TWD NOI 10M3

Description	Number per controller	Protocol/profile	Number of I/O *(1)*	Reference	Weight kg
AS-Interface master module for Twido programmable controllers V ⩾ 2.0	2	AS-Interface/M3	62 discrete modules max., 7 analogue modules max.	**TWD NOI 10M3**	0.085

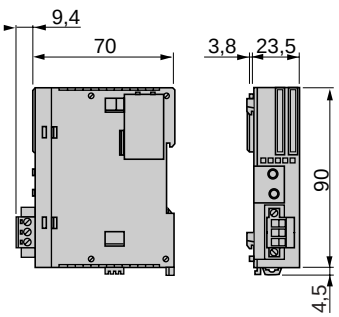
Description	Description	Reference	Weight kg
Fixing kit	For plate or panel mounting of the module Sold in lots of 5	**TWD XMT5**	–

Description	Power supply	Length m	Reference	Weight kg
Flat cable for AS-Interface cabling system (yellow)	For AS-Interface cabling system	20	**XZ CB 10201**	1.400
		50	**XZ CB 10501**	3.500
		100	**XZ CB 11001**	7.000

(1) When analogue and discrete modules are connected simultaneously to the network, 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.

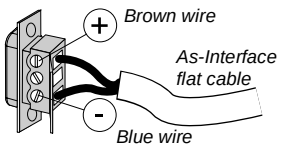
Dimensions

TWD NOI 10M3

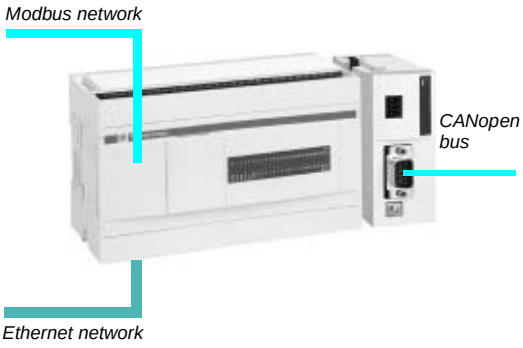


Connection

TWD NOI 10M3



Twido programmable controller
Communication



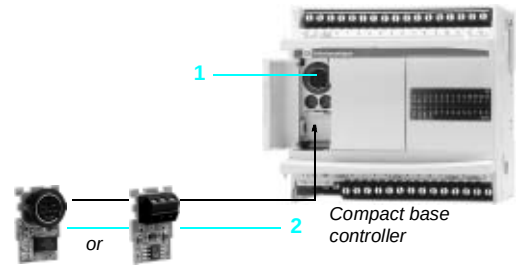
Presentation

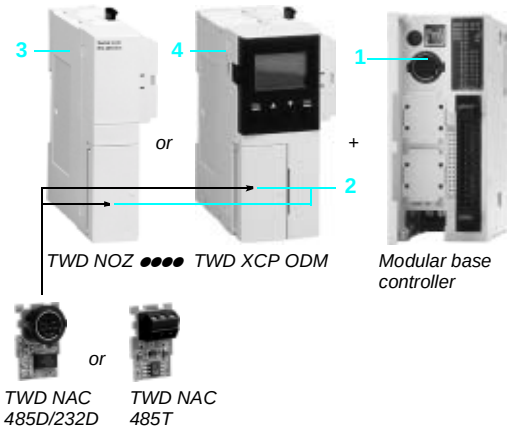
In order to communicate with an intelligent environment, Twido compact and modular programmable controllers offer an RS 485 serial communication port on the modules, an optional type RS 485 or RS 232 link and, for compact base controller TWD LCAE 40DRF, an integrated RJ45 Ethernet port (Modbus TCP).

These three ports allow Twido compact and modular controllers to use six communication protocols: Programming, Modbus, CANopen, Ethernet, ASCII and “Remote link”.

Twido compact (TWD LC●A 24DRF or TWD LCA● 40DRF) or modular base controllers can also accommodate the CANopen bus master module TWD NCO1M.

TwidoPort interface module 499 TWD 01100, used in conjunction with a compact or modular Twido programmable controller version ≥ 3.0 allows communication on the Ethernet network under Modbus TCP. This solution, which is easy to connect and configure, is transparent to the application.





Description

Compact base controllers have the following on the front panel:

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

2 A slot for fitting a 2nd optional port (RS 485/RS 232) using TWD NAC ●●● adapters.

Modular base controllers have the following on the front panel:

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

The slot for fitting a 2nd optional port (RS 485/RS 232) using adapters TWD NAC ●●● is located behind the removable cover 2 of a TWD NOZ ●●●● interface module 3 or a TWD XCP ODM display module 4.

The interface and display modules connect to the left-hand side of modular base controllers.

Twido controller communication ports

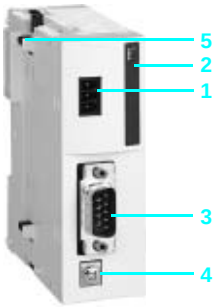
Serial port	Integrated Ethernet port	Optional port (2nd port)		
RS 485 mini-DIN	**RJ45**	**RS 485 mini-DIN**	**RS 232 mini-DIN**	**RS 485 screw terminal block**
Compact base controllers				
All compact base controllers TWD LC●A ●●●● TWD LCA● 40DRF	Compact base controller TWD LCAE 40DRF	TWD NAC 485D *(1)*	TWD NAC 232D *(2)*	TWD NAC 485T *(1)*
Modular base controllers				
All modular base controllers TWD LMDA ●●●●	–	TWD NOZ 485D *(1)* or TWD XCP ODM + TWD NAC 485D	TWD NOZ 232D *(2)* or TWD XCP ODM + TWD NAC 232D	TWD NOZ 485T *(1)* or TWD XCP ODM + TWD NAC 485T

(1) With max. cable length: 200 m.
(2) With max. cable length: 10 m.

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

Twido programmable controller
Communication
CANopen bus master module

532659



TWD NCO1M

Presentation

Master module TWD NCO1M for the CANopen bus allows Twido programmable controllers version ≥ 3.0 - compact controller models TWD LC●A 24DRF or TWD LCA● 40DRF and all modular controllers - 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 managed is reduced by that number. The Twido CANopen master can control a maximum of 16 input PDO and 16 output PDO.

Description

CANopen bus master module TWDNCO1M comprises:

1 An earthed, 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.

Configuration

The Twido controller's CANopen bus is configured using TwidoSoft software version ≥ 3.0.
The various services offered are:

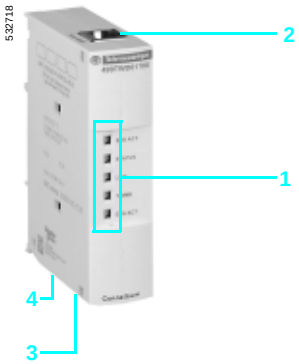
- Selection of the slave type from a list that can be modified by simply importing a description file of the EDS (Electronic Data Sheet) type.
- The position of the slave on the bus: definition of the slave number.
- Selection of variables from the list of variables managed by the slave.
- Linking of variables to the exchange data.
- Symbolization of exchange data.

For certain slaves, such as ATV 31 variable speed controllers, 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.

Characteristics

Module type			TWD NCO1M
Operating temperature		**°C**	0…55
Storage temperature		**°C**	- 25…+70
Relative humidity			30…95 % (without condensation)
Level of pollution conforming to IEC 60664-1	Housing		3
	PCB		2
Degree of protection			IP 20
Immunity to corrosion			Against corrosive gases
Altitude	Operation	**m**	0…2000
	Transport	**m**	0…3000
Vibration resistance	Rail mounting		10…57 Hz with an amplitude of 0.075 mm, 57…150 Hz with an acceleration of 9.8 m/s^2 (1 gn), Duration: 2 hours per axis on each of the three axes perpendicular to each other.
	Plate or panel mounting (using fixing kit TWD XMT5)		2…25 Hz with an amplitude of 1.6 mm, 25…100 Hz with an acceleration of 39.2 m/s^2 (4 gn), Duration: 90 min per axis on each of the three axes perpendicular to each other.
Shock resistance	Conforming to IEC 61131		147 m/s^2 (15 gn), duration 11 ms, 3 impact shocks per axis, on the three axes perpendicular to each other.
Permissible voltage variation		**⎓ V**	19.2…30
Protection against polarity inversion on the bus inputs			Yes
CANopen bus interface connector			9-way SUB-D
Current consumption	At ⎓ 5 V	**mA**	50 (internal bus)
	At ⎓ 24 V	**mA**	50.5 (internal supply)
Power dissipated		**W**	1.2 (at ⎓ 24 V)

Twido programmable controller
Communication
TwidoPort interface module



499 TWD 01100

Presentation

TwidoPort module 499 TWD 01100 is an Ethernet interface that is easy to use and dedicated to a compact or modular Twido programmable controller version ≥ 3.0. It allows incorporation of the Twido controller into an Ethernet network as a passive device (slave). With version 3.0 of TwidoSoft software and of the Twido operating system, the TwidoPort module is ready for use.
When connected to the RS 485 port of the Twido programmable controller, the TwidoPort module acts as a gateway between the Ethernet network and the Modbus network.
The connecting cable 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.
- Automatic detection of the serial link configuration.
- Ethernet interface:
  - 10/100 Mbit/s,
  - Auto MDIX function,
  - RJ45 type connector.
- Ethernet configuration:
  - takes the Ethernet configuration from the Twido application configuration (normal mode),
  - BootP function,
  - supports manual configuration using Telnet.
- Provides Ethernet statistics via a Telnet session.

Description

TwidoPort 499 TWD 01100 interface module comprises:
1. Five LEDs (SER ACT, STATUS, LINK, 100 MB, ETH ACT) indicating performances associated with the TwidoPort module.
2. An RJ45 connector for connection of the power supply and communications to the RS 485 on the Twido controller, cable **TWD XCA RJP03P** supplied *(1)*.
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).

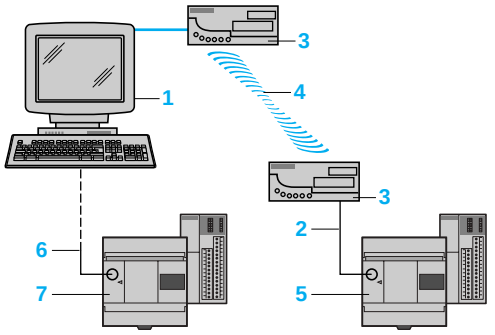
Characteristics

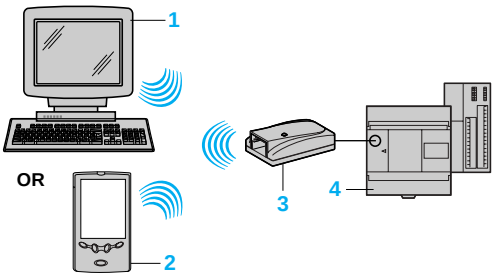
Module type			499 TWD 01100
Operating temperature		**°C**	0…55
Storage temperature		**°C**	- 40…+70
Relative humidity			10…95 % (without condensation)
Level of pollution	Conforming to IEC 60664-1		2
Degree of protection			IP 20
Immunity to corrosion			Against corrosive gases
Altitude	Operation	**m**	0…2000
	Storage	**m**	0…3040
Vibration resistance	Rail mounting		10…57 Hz with an amplitude of 0.075 mm (peak to peak), 57…100 Hz with constant acceleration of 9.8 m/s^2 (1 gn), Duration: 10 cycles at 1 octave/min for each of the 3 perpendicular axes.
Shock resistance	Conforming to IEC 61131-2		147 m/s^2 (15 gn), duration 11 ms, 3 impact shocks for each of the 3 perpendicular axes.
Max. consumption	At ⎓ 5 V	**mA**	180
Supply voltage		**⎓ V**	5 ± 0.5

*(1) Cable **TWD XCA RJP03P**, connected to port 1 on the Twido controller, forces configuration of the port according to the parameters of the Programming protocol. Using cable **TWD XCA RJP03**, sold separately, allows port 1 of the Twido controller to be used with the parameters described in the application configuration.*

Twido programmable controller
Communication
Communication protocols

Programming protocol





Link by modem

1 Remote programming PC.
2 Cable TSX PCX 1031 on serial port (Rx/Tx crossing to be made or use cable TSX PCX 1130)
3 Modem for transmitting/receiving data.
4 Telephone or radio link.
5 Twido compact or modular controller.

Link by cable

1 Programming PC.
6 Cable TSX PCX 1031 on RS 485 serial port or cable TSX PCX 3030 on USB port for Windows 2000 or XP.
7 Twido compact or modular controller.

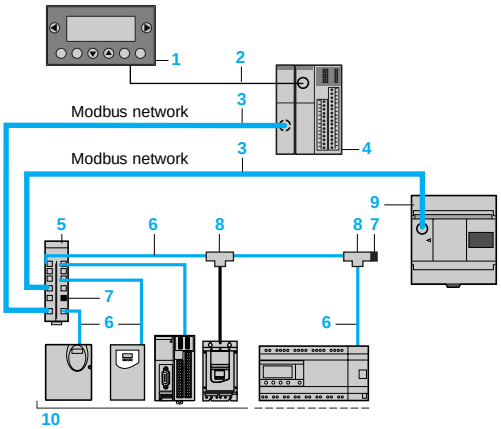
Wireless link

1 Programming PC with integrated Bluetooth technology or Bluetooth gateway for PC, reference VW3 A8115.
2 Pocket PC with TwidoAdjust software.
For optimum performance, use a Pocket PC with integrated Bluetooth technology.
3 Bluetooth gateway VW3 A8114.
4 Twido compact or modular controller.

Characteristics

Protocol type		Programming
Flow rate	Kbit/s	19.2
Physical layer		RS 485
Connection		Serial port
Compatibility		Compact base controllers TWD LC●A ●●●● and TWD LCA● 40DRF and modular base controllers TWD LMDA ●●●●

Modbus protocol



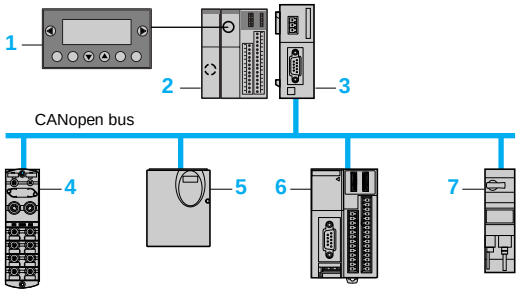
Twido controller connected directly on the Modbus network

1 Magelis compact display XBT N40●.
2 Cable XBT Z978 on serial port.
3 Cable for optional RS 485 port, reference TWD XCA RJ0●●.
4 Twido modular controller.
5 Modbus hub LU9 GC3.
6 Modbus tap link cable VW3 A8 306 R●●.
7 Line end adapters VW3 A8 306 RC.
8 Modbus T-junctions VW3 A8 306 TF●● (with cables).
9 Twido compact controller.
10 Devices: Altistart 48 starters, Altivar 28, Altivar 31 variable speed drives, Modbus OTB I/O interface module, Zelio Logic SR3 smart relay and TeSys motor starters.

Characteristics

Protocol type		Modbus
Flow rate	Kbit/s	1.2…38.4 Initial value: 19.2
Data bits		7 or 8 Initial value: 8
Stop bits		1 or 2
Parity		Without, even or odd Initial value: without
Physical layer		RS 485/RS 232 (point-to-point)
Connection		Serial port (RS 485) or optional port (RS 485/RS 232)
Compatibility		Compact base controllers TWD LC●A ●●●● and TWD LCA● 40DRF and modular base controllers TWD LMDA ●●●●

CANopen protocol



Direct connection of the Twido CANopen master module

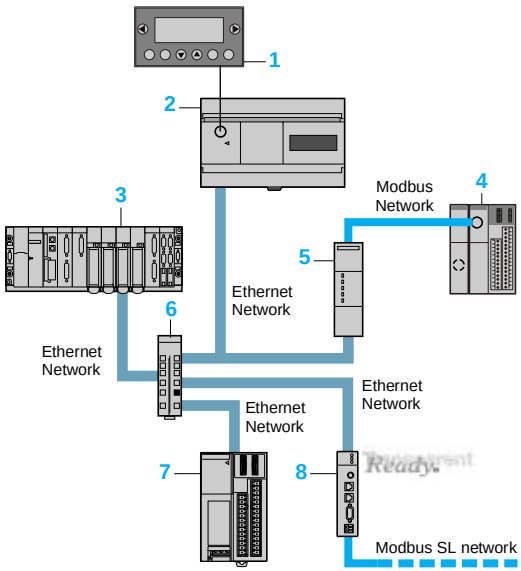
1 Magelis compact display XBT N40● and cable XBT Z978 on serial port.
2 Twido compact controllers TWD LC●A 24DRF or TWD LCA● 40DRF or Twido modular controllers, version ≥ 3.0.
3 Twido TWD NCO1M CANopen bus master module.
4 CANopen FTB I/O splitter box
5 ATV 31 starter.
6 CANopen OTB I/O interface module.
7 TeSys motor starter ▲.

▲ Available 1st quarter 2005.

Characteristics

Protocol type			CANopen
Transmission	Flow rate	**Kbit/s**	125…500
	Medium		Double shielded twisted pair
Structure	Type		EN 50325 - ISO 11898
	Method		CSMA-MA
Configuration	Maximum number of devices		16
	Maximum length of bus	**m**	1000
Compatibility			Compact base controllers TWD LC●A 24DRF and TWD LCA● 40DRF and modular base controllers TWD LMDA ●●●●, version ≥ 3.0

Ethernet protocol



Twido controller connected directly on the Ethernet network

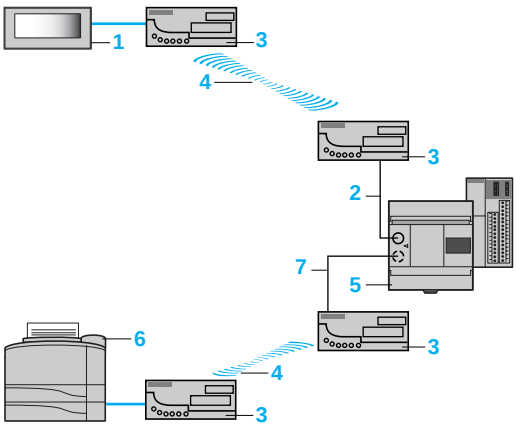
1 Magelis compact display XBT N40● and cable XBT Z978 on serial port.
2 Twido master or slave, 40 I/O compact base controller TWD LCAE 40DRF.
3 Premium automation platform *(1)*.
4 Twido slave, compact or modular base controller.
5 TwidoPort 499 TWD 01100 interface module.
6 ConneXium 499 NEH 104 10 hub or ConneXium 499 NES 251 00 switch.
7 Ethernet OTB I/O interface module.
8 Web Factory Cast Gateway TSX ETG 1000 *(2)*.

Characteristics

Protocol type			Ethernet
Transmission	Flow rate	**Mbit/s**	10…100
	Medium		Double twisted pair
Services Transparent Ready	Class		A 15 (for Twido controller TWD LCAE 40DRF and TwidoPort interface module 499 TWD 01100), C 20 (for gateway TSX ETG 1000)
	Web Server (function provided by gateway TSX ETG 1000)		Access to the product description and status and to the "Rack Viewer" island diagnostics Access to configuration functions and to "Data editor" variables Loading of user Web pages via the "Web page loader" software tool
	Ethernet TCP/IP communication management services (services supported by controllers in the Twido range)		Modubus messaging (read/write of data words) I/O Scanning (Twido controllers version ≥ 3.0)
Structure	Type		10BASE-T/100BASE-T
	Method		CSMA-CD
Configuration	Maximum number of devices		256 max per segment
	Max. length of network	**m**	500
Compatibility	Master		Compact base controller TWD LCAE 40DRF
	Slaves		Compact base controllers TWD LC●A ●●●● and TWD LCA● 40DRF and modular base controllers TWD LMDA ●●●●, version ≥ 3.0

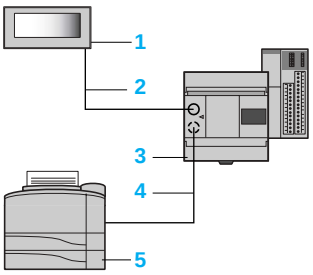
(1) Please see our "Premium automation platform" catalogue.
(2) Please see our "Ethernet TCP/IP and the Web" catalogue.

ASCII protocol



Link by modem

1 Simple ASCII display.
2 Cable TSX PCX 1031 on serial port (Rx/Tx crossing to be made or use cable TSX PCX 1130).
3 Modem for transmitting/receiving data.
4 Telephone or radio link.
5 Twido compact or modular controller.
6 ASCII printer.
7 Standard RS 485/RS 232 cable on optional port.



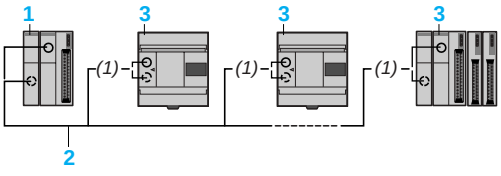
Link by cable

1 Simple ASCII display.
2 Standard RS 485 cable or cable TSX PCX 1031 for RS 232 conversion, on serial port.
3 Twido compact or modular controller.
4 Standard RS 485/RS 232 cable on optional link.
5 ASCII printer.

Characteristics

Protocol type		ASCII
Flow rate	Kbit/s	1.2…38.4 Initial value: 19.2
Data bits		7 or 8 Initial value: 8
Stop bits		1 or 2 Initial value: 1
Parity		Without, even or odd Initial value: without
Physical layer		RS 485/RS 232
Connection		Serial port (RS 485) or optional port (RS 485/RS 232)
Compatibility		Compact base controllers TWD LC●A ●●●● and TWD LCA● 40DRF and modular base controllers TWD LMDA ●●●●

"Remote link" protocol



(1) Connection is made either to the serial port, or to the optional port.

"Remote Link" decentralised I/O

Each compact or modular base controller can be extended by means of Twido base controllers used either as an I/O extension, or as a local "reflex" controller.
□ When used as an I/O extension, these base controllers cannot take any I/O extensions.
□ When used as a local “reflex” controller, these base controllers have their own application program. Internal words are reserved for automatic exchange of information between the base controllers.

1 Base controller.
2 RS 485, 3-wire cable on serial port or on optional port.
3 Twido base controllers used as I/O extension or as local "reflex" controller.

Characteristics

Protocol type		“Remote link”
Flow rate	Kbit/s	38.4
Physical layer		RS 485
Connection		Serial port or optional port only.
Number of Twido modules that can be connected		1 to 7
Compatibility		Compact base controllers TWD LC●A ●●●● and TWD LCA● 40DRF and modular base controllers TWD LMDA ●●●●

Twido programmable controller
Communication

532664

TWD NCO1M

540393

499 TWD 01100

570732

TWD NAC 232D/485D

521589

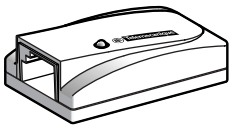
TWD NAC 485T

570711

TWD NOZ ●●●

570710

TWD XCP ODM

533234

VW3 A8114

▲ Available
2nd quarter 2005

CANopen bus master module and TwidoPort interface module

Description	Number of modules per base controller	Max. number of slaves and channels	External supply	Reference	Weight kg
CANopen bus master module for base controllers version ≥ 3.0 **TWD LC●A 24DRF/LCA● 40DRF and TWD LMDA ●●●●**	1	16 slaves max. 16 TPDO (Transmit PDO) and 16 RPDO (Receive PDO)	⎓ 24 V	**TWD NCO1M** ▲	0.100
Fixing kit (sold in lots of 5)	Plate or panel mounting of module TWD NCO1M			**TWD XMT5**	–

Description	Characteristics	Reference	Weight kg
TwidoPort interface module for all base controllers version ≥ 3.0	10/100 Mbit/s. Auto MDIX function. RJ45 connector. Cable TWD XCA RJP03P supplied.	**499 TWD 01100**	0.200
Ethernet network cables	Fitted with 2 RJ45 connectors Length *(1)*	**490 NTW 000●●**	–

Serial link modules and adapters

Description	Compatibility	Connection	Physical layer	Reference	Weight kg
Modules with integrated serial link adapter (able to take a TWD XCP ODC digital display)	Modular base controllers TWD LMDA 20/40D●●	Mini-DIN connector	RS 232C	**TWD NOZ OD 232D** ▲	0.185
			RS 485	**TWD NOZ OD 485D** ▲	0.185
		Screw terminals	RS 485	**TWD NOZ OD 485T** ▲	0.185
Serial interface adapters	Compact base controllers TWD LC●A 16/24DRF and TWD LCA● 40DRF Built-in display module TWD XCP ODM	Mini-DIN connector	RS 232C	**TWD NAC 232D**	0.010
			RS 485	**TWD NAC 485D**	0.010
		Screw terminals	RS 485	**TWD NAC 485T**	0.010
Modules with integrated serial link adapter	Modular base controllers TWD LMDA 20/40D●●	Mini-DIN connector	RS 232C	**TWD NOZ 232D**	0.085
			RS 485	**TWD NOZ 485D**	0.085
		Screw terminals	RS 485	**TWD NOZ 485T**	0.085

Built-in display module

Description	Application	Reference	Weight kg
Built-in display module	For 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

Accessories

Description	Link from	Link to	Length	Reference	Weight kg
Serial link connection cables	Serial interface adapter or serial interface module RS 485 (mini-DIN connector)	Modbus module (RJ45 connector)	0.3 m	**TWD XCA RJ003**	–
			1 m	**TWD XCA RJ010**	0.090
			3 m	**TWD XCA RJ030**	0.160
Programming protocol connection cable *(2)* supplied with the TwidoPort module	All Twido controllers (Mini-DIN connector)	Modbus module (RJ45 connector)	0.3 m	**TWD XCA RJP03P**	–
Connection cable *(2)*	All Twido controllers (Mini-DIN connector)	Modbus module (RJ45 connector)	0.3 m	**TWD XCA RJP03**	–
Cable with RJ45 connector and end with free wires	All Twido controllers	Modbus module	1 m	**TWD XCA FJ010**	–
Cable with 8-way Mini-DIN connector and end with free wires	All Twido controllers	Modbus module	1 m	**TWD XCA FD010**	–
			10 m	**TSX CX 100**	–
Adapter cable for Twido modular base controllers	Twido modular base controllers	Cable XBT Z978	12 cm	**TWD XCA XBTN010**	–
Cable for serial port	All Twido controllers	Serial port on PC with TwidoSoft software installed	2.5 m	**TSX PCX 1031**	0.225
Modem connection cable	All Twido controllers	Modem	2.5 m	**TSX PCX 1130**	0.240
Display connection cable	All Twido controllers	Magelis displays XBT N●00	2.5 m	**XBT Z978**	0.180
USB port cable	All Twido controllers	USB port on PC *(3)*	2.5 m	**TSX PCX 3030**	0.210

Description	Application	Reference	Weight kg
Bluetooth gateway	Range 10 m (class 2). Items supplied: ■ 1 Bluetooth gateway with 1 RJ45 connector, ■ 1 x 0.1 m length cable with two RJ45 connectors, ■ 1 x 0.1 m length cable with one RJ45 connector and one mini-DIN connector for TwidoSoft software, ■ 1 x RJ45/9-way SUB-D adapter.	**VW3 A8114**	0.155
Bluetooth gateway for non-equipped PC	Range 10 m (class 2). Required for a PC not equipped with Bluetooth technology. Connection to the USB port on the PC.	**VW3 A8115**	0.300

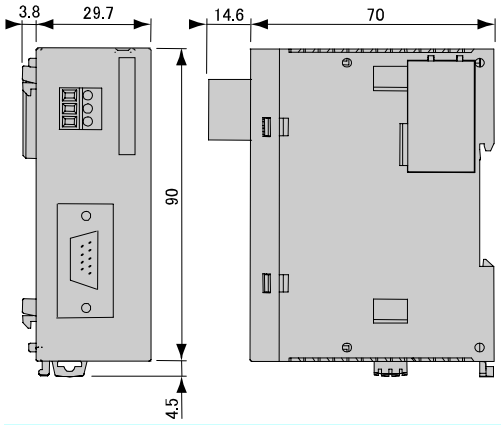
*(1) Replace the ●● in the reference with **02**: 2 m, **05**: 5 m, **12**: 12 m, **40**: 40 m and **80**: 80 m.*
*(2) Cable **TWD XCA RJP03P**, connected to port 1 on the Twido controller, forces configuration of the port according to the parameters of the Programming protocol. Using cable **TWD XCA RJP03**, sold separately, allows port 1 of the Twido controller to be used with the parameters described in the application configuration.*
(3) PC with TwidoSoft software installed and running under Windows 2000 or XP operating system only.

References (continued)

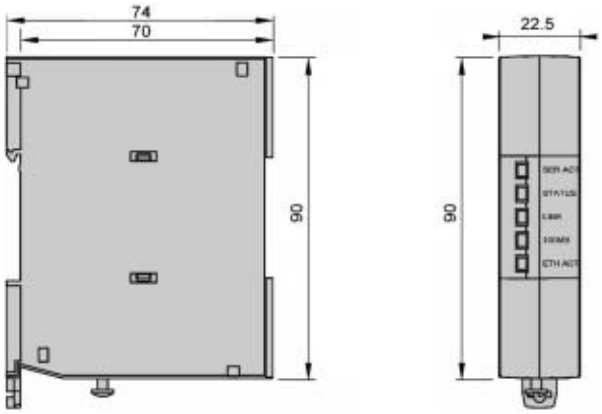
Description	Supply voltage	Reference	Weight kg
PSTN modem: type WESTERMO TD-33 / V.90, supplied with a telephone cable (length 3 m)	⎓ 12/36 V	**SR1 MOD01**	0.231
GSM modem: type WAVECOM WMOD2B dual band 900/1800 Mhz, supplied with a power cable (length 1.5 m) and clips for plate mounting	⎓ 24 V	**SR1 MOD02**	0.127
Accessory kit for GSM modem comprising: a modem cable (length 0.5 m), an antenna with cable (length 3 m), and accessories for mounting on ⊔ rail	–	**SR1 KIT02**	0.180
Line adapter RS 232C/RS 485 without modem signals Max. transmission speed 19 200 bit/s. Rail mounting	⎓ 18...30 V	**XGS Z24**	0.100

Dimensions

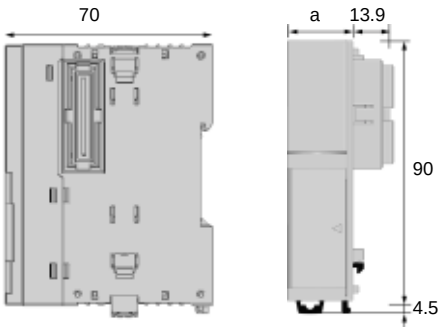
Module TWD NCO1M



Module 499 TWD 01100



Modules TWD NOZ ●●● and TWD XCP ODM

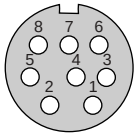


	a
TWD NOZ ●●●●	22.50
TWD XCP ODM	38

Connections

Serial link

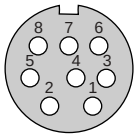
RS 485



	TWD LC●A ●●●● TWD LCA● 40DRF TWD LMDA ●●●●
1	D1 (A +)
2	D0 (B -)
3	NPC
4	/DE
5	/DPT
6	NPC
7	0 V
8	5 V (180 mA)

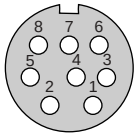
Optional link

RS 485D



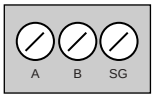
	TWD NAC 485D TWD NOZ 485D
1	D1 (A +)
2	D0 (B -)
3	NC
4	NC
5	NC
6	NC
7	0 V
8	5 V (180 mA)

RS 232D



	TWD NAC 232D TWD NOZ 232D
1	RTS
2	DTR
3	TXD
4	RXD
5	DSR
6	0 V
7	0 V
8	5 V (180 mA)

RS 485T



	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 PUNIT protocol is used for communication with PCs (at state 1, 19 200 bauds, without parity). If connected to 0 V, the communication parameters are those configured by the TwidoSoft software.

Twido programmable controller
Advantys, Telefast® pre-wired system for Twido
Connection sub-bases

Applications	**Connection sub-bases for discrete inputs and outputs**		
			
Compatibility	Twido modular base controllers equipped with HE 10 connectors		
Relay amplification	–		Electromechanical and solid state, fixed
Control voltage	⎓ 24 V		
Output voltage	⎓ 24 V		⎓ 24 V (solid state) ⎓ 5…30 V, ∿ 250 V (electromechanical)
Current per channel			
Input	5…7 mA		5…7 mA
Output	0.3 A		2 A (solid state) 3 A (electromechanical)
Modularity	20 (12 inputs/8 outputs)		
Type of I/O	□ 12 inputs (1 common/ 12 channels) □ 8 outputs (1 common/ 8 channels)	□ 12 inputs (1 common/ 12 channels) □ 8 outputs with fuse protection (1 common/ 8 channels) LED indication	□ 12 inputs (1 common/12 channels) □ 2 solid state outputs (1 common/2 channels) □ 6 relay outputs (electromechanical) 1 N/O (1 common/6 channels)
Number of terminals per channel	2 3 (with optional snap-on terminal block)		
Connection to Twido programmable controller	HE 10 connector, 26-way		
Type of terminal	Fixed screw terminal block		
Interface type	**ABE 7B20MPN20**	**ABE 7B20MPN22**	**ABE 7B20MRM20**
Pages	56	56	56

Connection sub-bases for discrete inputs	Connection sub-bases for discrete outputs		
			
Twido I/O modules equipped with HE 10 connectors			
–			Electromechanical, fixed
⎓ 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**
56	56	56	56

Twido programmable controller
Advantys, Telefast® pre-wired system for Twido I/O connection sub-bases

Presentation

Relay and connection functions, with or without polarity distribution, significantly reduce wiring time and eliminate the risk of error.
The AdvantysTelefast 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 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 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 disconnector for the 0 V common.

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

Sub-bases for Twido extension modules

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

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

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

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

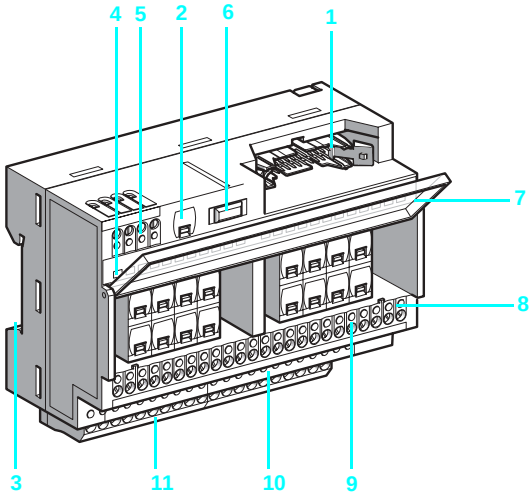
Optional terminal blocks

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

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

Twido programmable controller

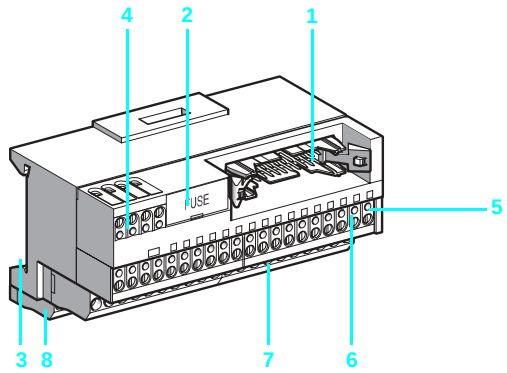
Advantys, Telefast® pre-wired system for Twido I/O connection sub-bases



Description

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

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



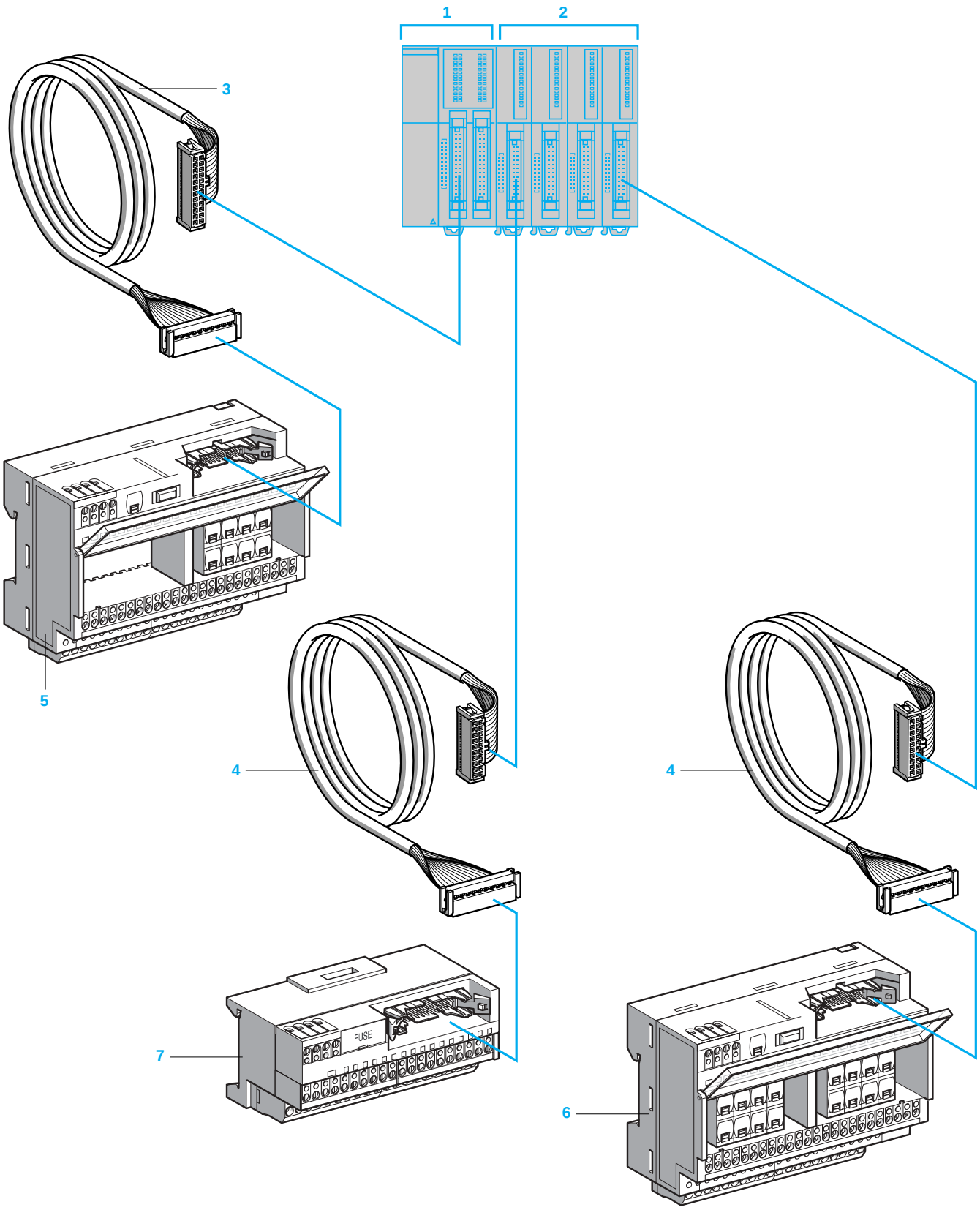
Connection sub-bases ABE 7E16EPN20 and ABE 7E16SPN20

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

Twido programmable controller

Advantys, Telefast® pre-wired system for Twido

Pre-wired solutions



Twido programmable controller
Advantys, Telefast® pre-wired system for Twido
Pre-wired solutions

Presentation (continued)

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

Compatibility with modular base controllers and I/O modules

	Modular base controllers	Discrete I/O modules	
	Inputs/outputs	Inputs	Outputs
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**			■

■ Possible combinations

Twido programmable controller
Advantys, Telefast® pre-wired system for Twido
Connection sub-bases

Environment characteristics

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

Supply characteristics (controller side)

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

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

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

Presentation : page 50 | Compatibility : page 51 | References, dimensions : pages 56 and 57 | Curves : pages 54 and 55 | Schemes : pages 58 to 61

Output circuit characteristics (preactuator side)

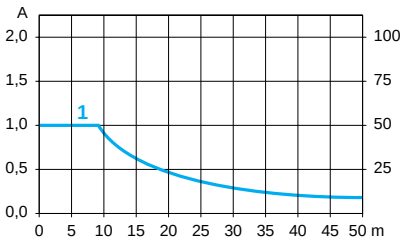
Sub-base type		ABE 7		Passive connection sub-bases for discrete signals			Connection sub-bases with soldered relays	
				B20MPN2●	E16EPN20	E16SPN2●	B20MRM20	E16SRM20
Number of channels		Passive output		8	–	16	–	–
		Solid state output		–	–	–	2	–
		Relay output		–	–	–	6	16
Contact arrangement				–			1 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	ABE 7		Passive connection sub-bases for discrete signals			Connection sub-bases with soldered relays	
			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	

Twido programmable controller
Advantys, Telefast® pre-wired system for Twido
Connection sub-bases

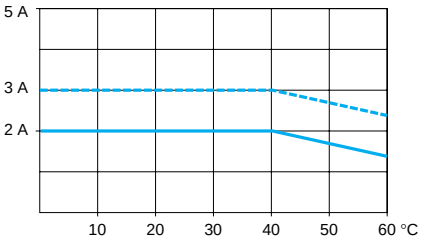
Curves for determining cable type and length according to the current



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

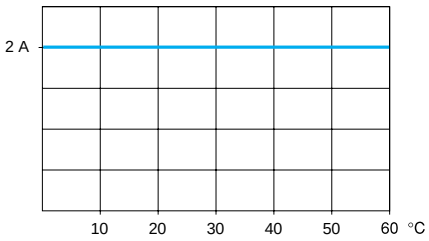
Temperature derating curves

ABE E11SRM20, ABE 7E16SRM20
6 electromechanical relay outputs



100 % of channels used
50 % of channels used

ABE 7B20MR20
2 solid state outputs

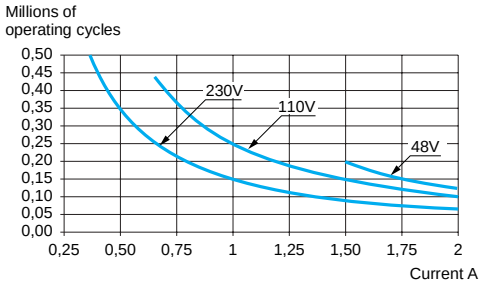


Electrical durability (in millions of operating cycles, conforming to IEC 60947-5-1)

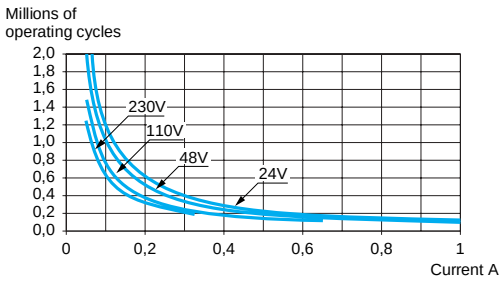
ABE 7B20MRM20 and ABE 7E16SRM20

d.c. loads

DC 12 curves *(1)*

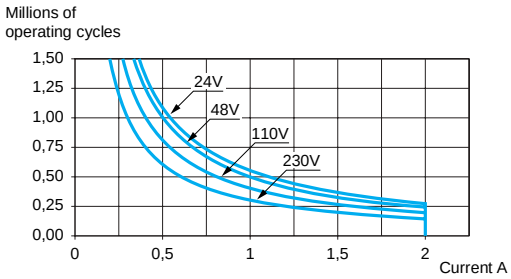


DC 13 curves *(2)*

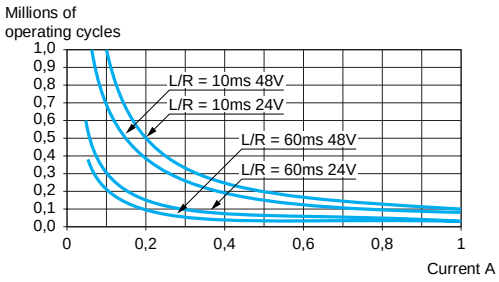


a.c. loads

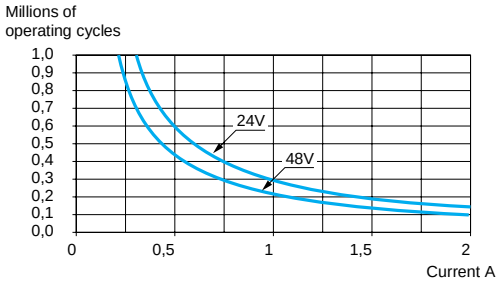
AC 12 curves *(3)*



AC 14 curves *(4)*



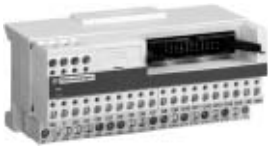
AC 15 curves *(5)*



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

Twido programmable controller
Advantys, Telefast® pre-wired system for Twido
Connection sub-bases


ABE 7B20MPN20


ABE 7E16EPN20


ABE 7E16SRM20

For Twido modular base controllers

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

For Twido extension modules

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

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

Connection cables for Twido modular base controllers

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

Accessories

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

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

Presentation, description : pages 48 and 49
Presentation, compatibility : pages 50 to 51
Characteristics : pages 52 and 53
Dimensions : page 57
Schemes : pages 58 and 61

References (continued)

Separate components

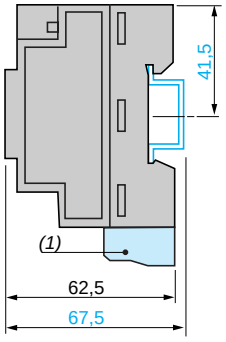
Description	Type	Compatibility	Reference	Weight kg
Connectors (sold in lots of 5)	HE 10 female 26-way	TWD LMDA20DTK/ LMDA40DTK	**TWD FCN2K26**	–
	HE 10 female 20-way	TWD DDI16DK/ DDI32DK/ DDO16TK/ DDO32TK	**TWD FCN2K20**	–
Screw terminal blocks (sold in lots of 2)	10-way	TWD DDI●DT/DAI8DT/ DDO8●T/DRA●RT	**TWD FBT2T10**	–
	11-way	TWD DMM8DRT/ AMI●●T/ARI8HT	**TWD FTB2T11**	–

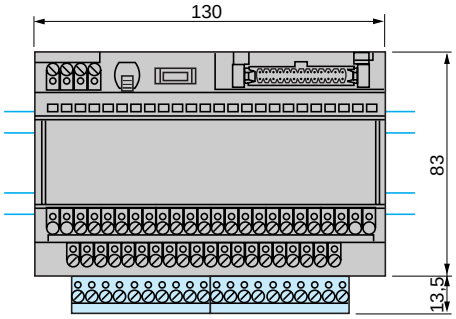
Description	Compatibility	Type of connection		Gauge/ C.s.a.	Length	Reference	Weight
		Twido side	Other end	AWG/mm²	m		kg
Cables for discrete I/O	TWD LMDA20DTK/ LMDA40DTK	HE 10 26-way	Bare wires	22/ 0.035	3.0	**TWD FCW30M**	0.405
					5.0	**TWD FCW50M**	0.670
	TWD DDI16DK/ DDI32DK/ DDO16TK/ DDO32TK	HE 10 20-way	Bare wires	22/ 0.035	3.0	**TWD FCW30K**	0.405
					5.0	**TWD FCW50K**	0.670
Pre-formed cable, rolled	20 conductors	–	–	28/ 0.08	20.0	**ABF C20R200**	1.310

Dimensions

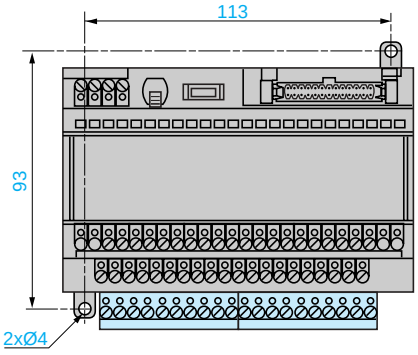
ABE 7B20MPN20, ABE 7B20MPN22, ABE 7B20MRM20, ABE 7E16SPN22, ABE 7E16SRM20

Mounting on 35 mm ⊓ rail





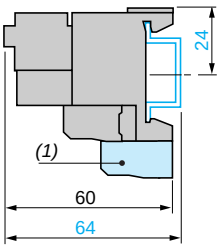
Screw fixing (retractable lugs)

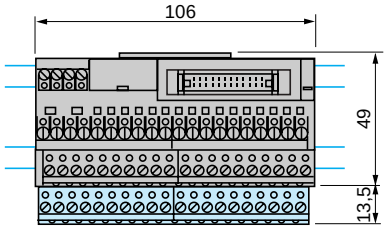


(1) ABE 7BV20, ABE 7BV20TB.

ABE 7E16EPN20, ABE 7E16SPN20

Mounting on 35 mm ⊓ rail

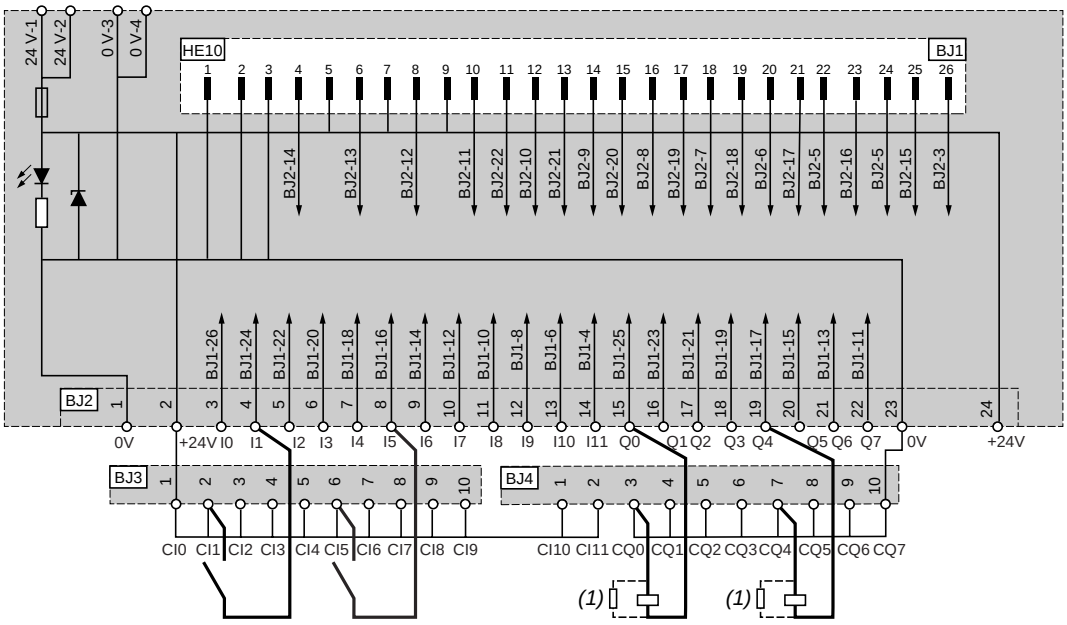




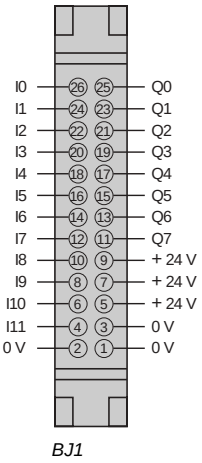
(1) ABE 7BV20, ABE 7BV20TB.

Twido programmable controller
Advantys, Telefast® pre-wired system for Twido

ABE 7B20MPN20

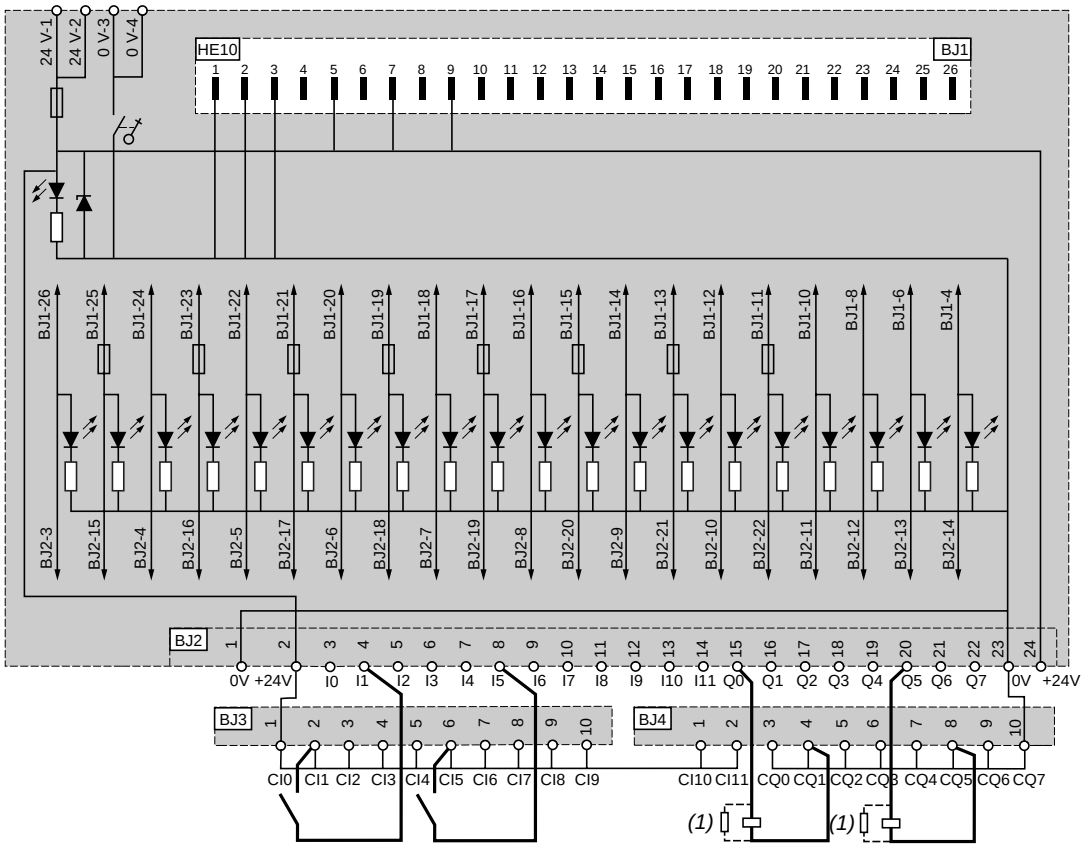


HE10, 26-way

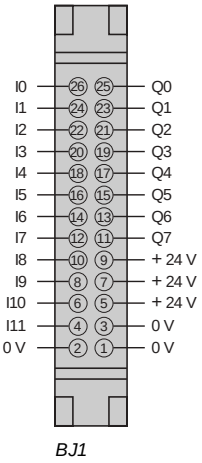


BJ1

ABE 7B20MPN22



HE10, 26-way

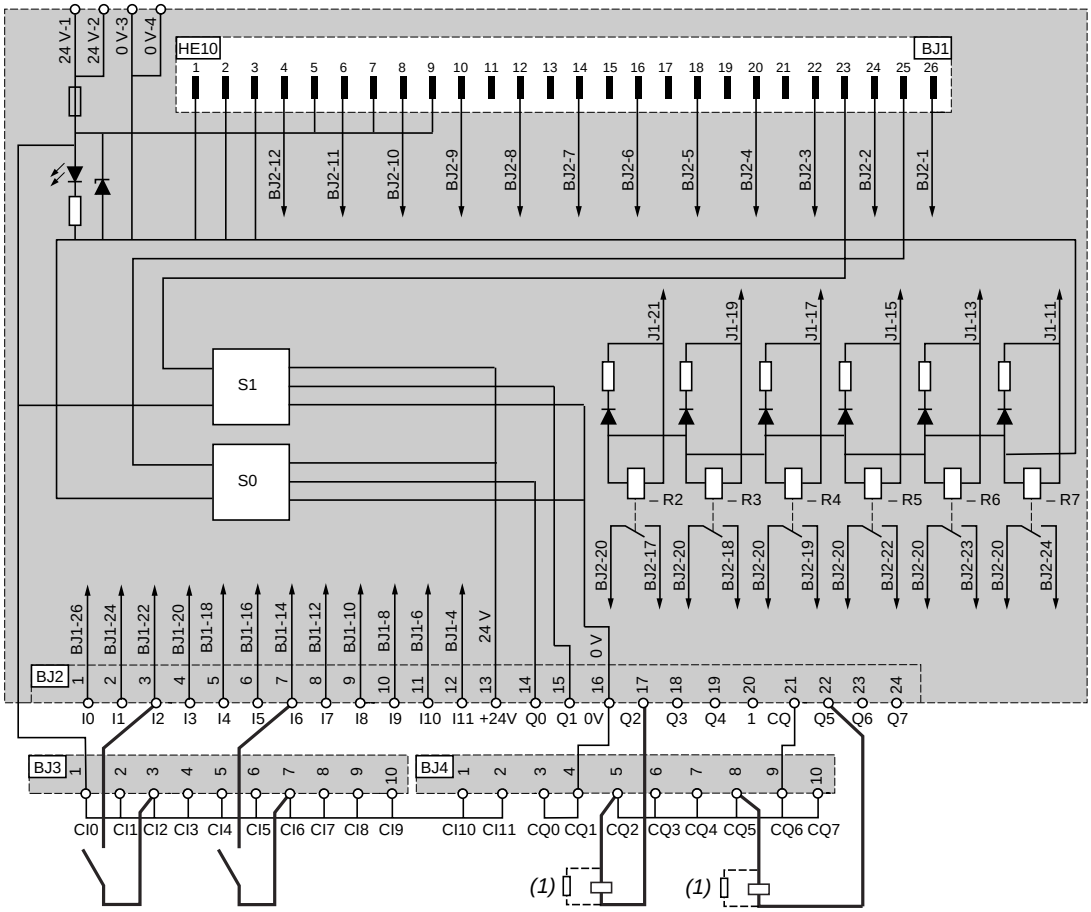


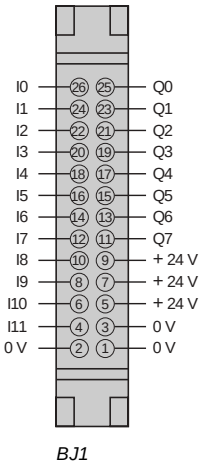
BJ1

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

ABE 7B20MRM20

HE10, 26-way



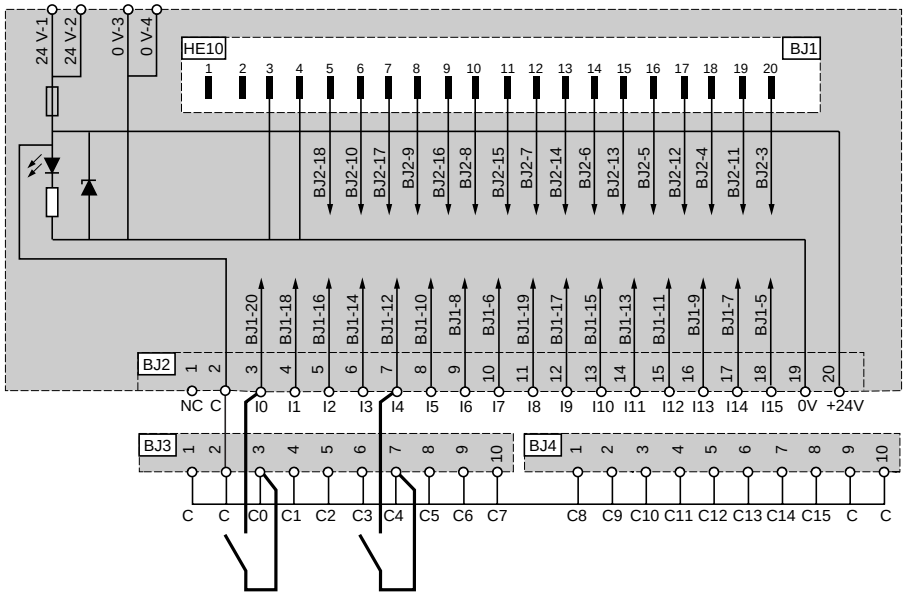


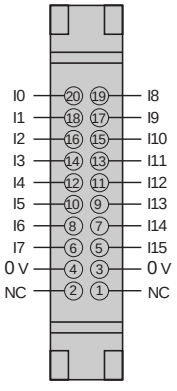
BJ1

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

ABE 7E16EPN20

HE10, 20-way



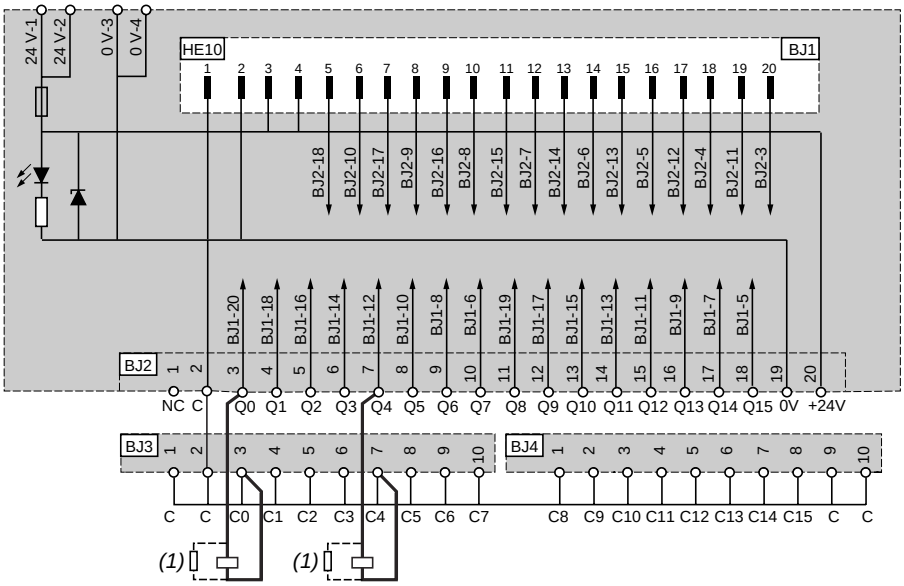


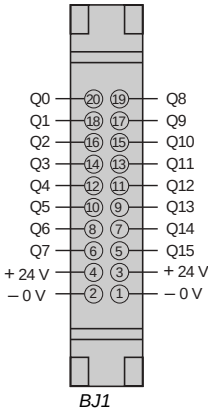
BJ1

Twido programmable controller
Advantys, Telefast® pre-wired system for Twido

ABE 7E16SPN20

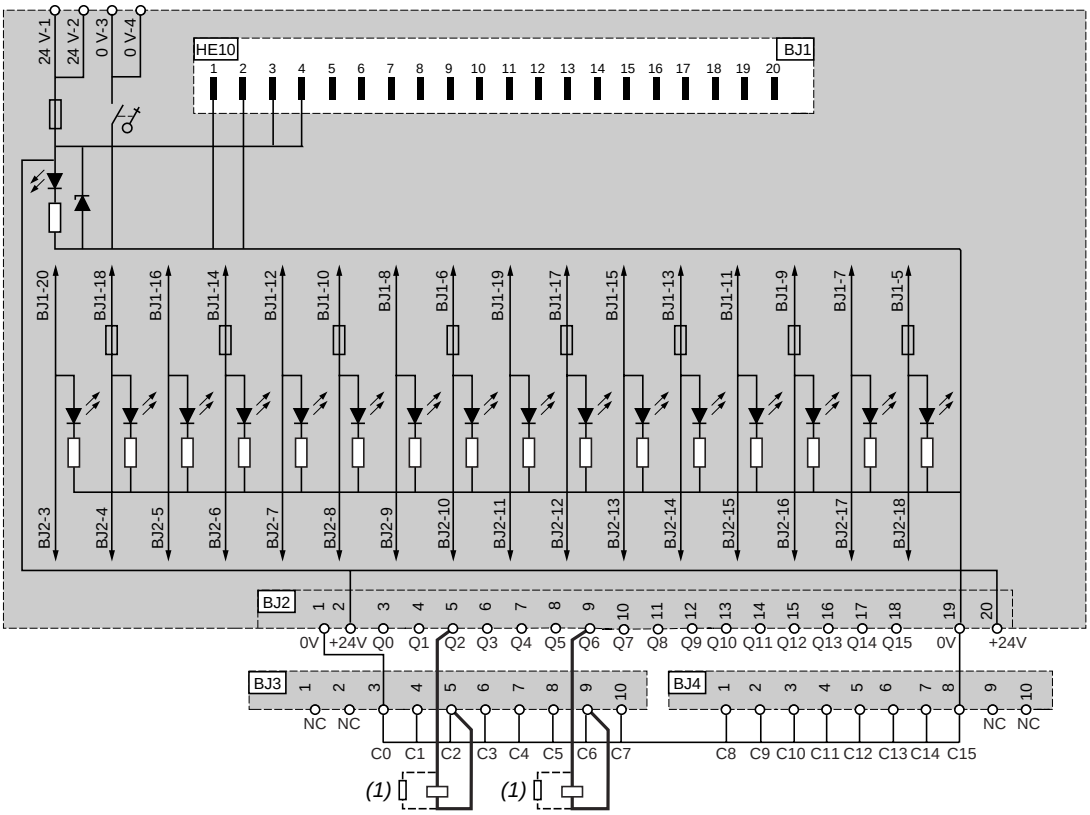
HE10, 20-way

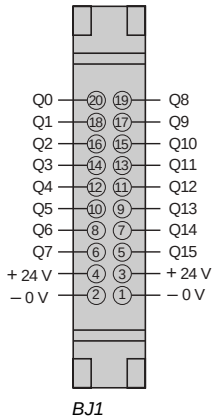




ABE 7E16SPN22

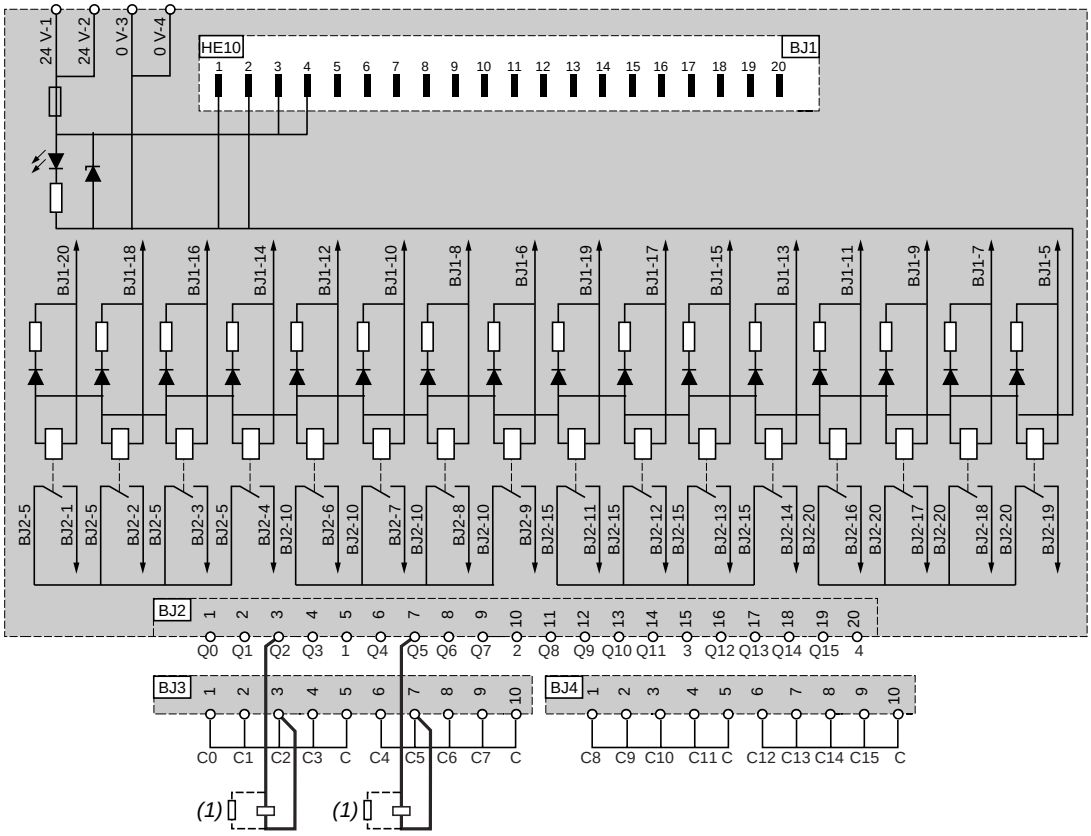
HE10, 20-way



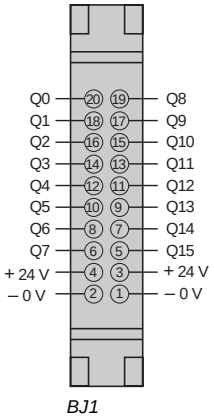


(1) Example of output connections.
When connecting an inductive load, include a diode or a varistor.

ABE 7E16SRM20



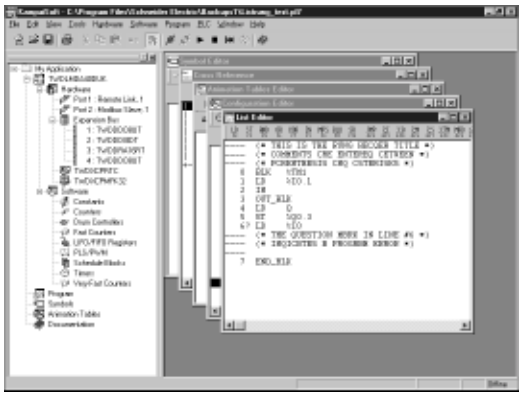
HE10, 20-way



BJ1

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

Twido programmable controller
TwidoSoft programming software

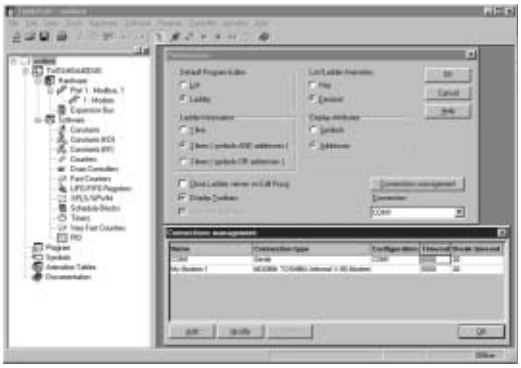


Presentation

TwidoSoft is a graphical development environment for creating, configuring and managing applications for Twido programmable controllers. TwidoSoft is a 32-bit Windows-based program which runs on a PC with Windows 98 (second edition), 2000 or XP operating system. TwidoSoft software is based on a standard interface which offers the user-friendly features of the Windows environment with which users are already familiar: windows, toolbars, pull-down menus, balloon tips, context-sensitive help, etc.

For development work, TwidoSoft provides a comprehensive set of features to simplify programming and configuration:
- Programming in instruction list or ladder language. These two languages are reversible.
- Application browser with multiple window views, aiding easy software configuration.
- Editors for main programming and configuration functions.
- Cut, copy and paste functions.
- Symbolic programming.
- Cross-referencing.
- Duplication of application programs.

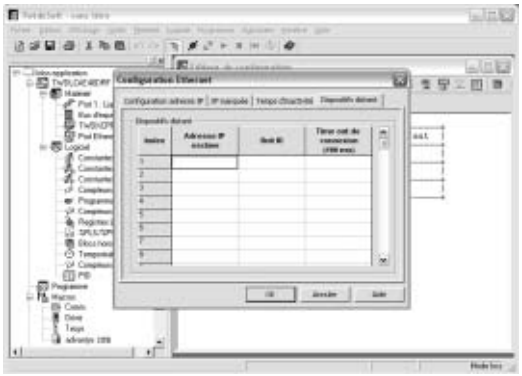
On site (on-line mode), TwidoSoft provides the following main functions:
- Real-time animation of program and/or data elements.
- Diagnostics on programmable controller operation.
- Monitoring of the application's use of memory.
- Downloading and uploading of controller programs.
- Backup of controller programs to the optional EEPROM memory cartridges.



Connecting a PC to a Twido controller

■ The PC is connected to the built-in serial port of the Twido controller by means of a TSX PCX 1031 multifunction cable or to a USB port using cable TSX PCX 3030 (Windows 2000 or XP only). It converts RS 232 output signals from the PC to RS 485 signals for the controller.
Connection of a PC, via this cable, to the built-in port of Twido base controllers automatically sets the communication protocol of this port to a protocol which is compatible with TwidoSoft.

■ It is also possible to connect the PC to the serial port of Twido base controllers via modems.
The modems used must be defined, for TwidoSoft, via the "Preferences" screen, and for the Twido controller via the hardware configuration ("Connection management" screen).
When the connection is established, TwidoSoft and the Twido controller will each initialise the modem assigned to them by sending a initialisation string of the Hayes protocol type.

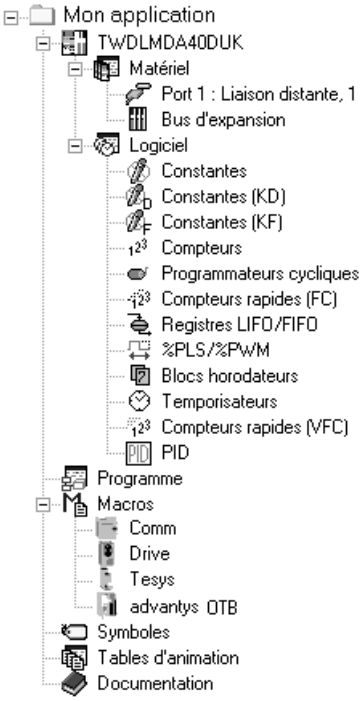


Connection to the Ethernet network

With its integrated Ethernet port, Twido compact controller TWD LCAE 40DRF can be connected to a PC using the Ethernet network and the Modbus TCP protocol. The connection management function in TwidoSoft software allows an Ethernet connection to be created for the transfer and animation of applications.
Twido compact controller TWD LCAE 40DRF also allows communication, by the application, with slaves connected to the Ethernet network. Inputting a table containing a maximum of 16 indices describes the association between the IP addresses and the Modbus addresses of each of the slaves.

TwidoPort interface module 499 TWD 01100 also provides this possibility for all controllers in the Twido range, versions ⩾ 3.0, via one of the controller's serial ports.

Twido programmable controller
TwidoSoft programming software
User interface



User interface

TwidoSoft provides an intuitive, Windows-based user interface, including balloon tips and on-line help. The Twido user interface offers the following features:

■ Application browser: this browser is a window providing the directory structure of the application. The windows and toolbars can be moved and attached to the borders of the main window. The elements of an application appear in a logical hierarchy based on their structure within the application. They are arranged as an indented tree structure which can be expanded or collapsed. The application browser can be used to view, program and manage a Twido application and to configure hardware using a graphical representation of the base controllers, I/O extensions and options.

■ Status bar: this is a panel at the bottom of the main window which displays information about the application, the controller status and the TwidoSoft software mode. This bar includes a "a memory usage indicator", indicating the percentage of total memory used by the program. A warning message is displayed when available memory is getting low.

■ Operating modes: TwidoSoft software can operate in on-line mode (PC connected to the Twido base controller) and off-line mode (PC disconnected from the Twido base controller). Off-line mode is used to develop an application in the design office. This application must then be transferred from the PC memory to the controller memory (downloaded) in order to be able to run on the controller. On-line mode is used to debug and adjust this application. In this mode, the application program in the PC memory is identical to the application in the controller memory. Program changes can therefore be made directly to the application in the Twido controller.

Editors and viewers

TwidoSoft provides special windows, called editors, for performing the main tasks necessary to develop an application. A TwidoSoft application consists of a program, configuration data, symbols allocated to the variables and documentation. These components can be used in any order when creating an application.

Developing each part of an application using separate editors makes it possible to rationalise the development process. TwidoSoft software provides:
■ Instruction List language and Ladder language editors.
■ A configuration editor.
■ Variables editors (with symbols) and animation table editors.
■ Ladder language, cross reference and program error viewers.

TwidoSoft software also provides security features to protect the integrity of programs. "Application protection" right of access prevents access to the controller application. This option prohibits unauthorised transfers of an application. Password protection is selected when an application is transferred to the controller to make access to the application secure.

Configuration of hardware and software

Configuring Twido programmable controllers consists of selecting options for the controller's hardware and software resources. These resources can be adapted at any time while creating a program :

■ Hardware resources allow the user to define the type and number of Twido components in a configuration: base controller, remote controllers, I/O expansion modules and optional modules.
■ Software resources consist of configurable and non configurable functions. Function blocks (also called variables) are blocks created in memory to execute control system functions which will be used by the program. For example, when configuring a counter function block, memory addresses in the controller are assigned to represent the values associated with the parameters of this counter (current values, preset values). Other software resources are called internal memory blocks, such as bits, words, constant words, system words, network exchange words.

These resources are configured using TwidoSoft software.

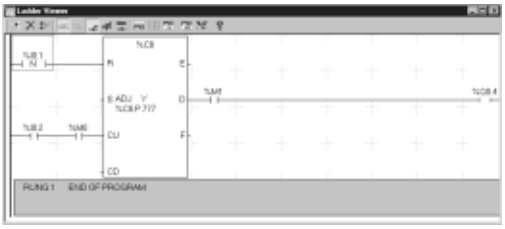
Twido programmable controller
TwidoSoft programming software
Programming

Programming

TwidoSoft allows the user to write a controller program in either Ladder language or instruction List language. The language selected depends on user preference and does not affect the application:

- Ladder language consists of a series of ladder rungs, represented graphically, together with text comments.
- Instruction List language consists of a series of text-based instructions.

In either language, the program is "written" in the logical order required to control the machine or process. It is recommended that the programs be "documented" by adding comments (explanatory text inserted at program instruction level).
These two languages are reversible, provided that a few basic rules are followed.
Carrying out modifications in on-line mode (PC connected to the Twido base controller) requires the use of TwidoSoft software V3.0 and micro-program V3.0 installed in the Twido base controller.



Ladder programming

A program written in Ladder language consists of networks of linked graphical elements (similar to electromagnetic contact diagrams), organised into rungs which are executed sequentially by the controller when it is in RUN mode.
Each rung comprises graphical elements (contacts, coils) linked by horizontal and vertical "lines", organised into a programming grid starting with a potential bar on the left and ending with a second potential bar on the right. The graphical elements are associated with:

- Controller inputs and outputs, such as sensors, pushbuttons and relays.
- Arithmetic, logic and numeric value comparison operations.
- Control system function blocks, such as timers, counters, drum controllers, registers, etc.
- Controller internal variables, such as internal bits and words.

In on-line mode (PC connected to the Twido base controller) phrases (rungs) can be modified, added or deleted. These modifications can be made when the Twido controller is in either “STOP” or "RUN” mode.

Instruction List programming

A program written in instruction List language consists of a series of instructions executed sequentially by the controller. Each instruction is represented by a single program line and consists of three components:

- Line number - line numbers are generated automatically when the instructions are entered.
- Instruction code - the instruction code is a symbol linked to an operand identifying the operation to be performed on this operand. These operations are generally of the Boolean and numerical type.
- Operand - an operand is a reference, a symbol or a number representing a piece of physical data. For example, in the program opposite, the operand %I0.4 is the reference corresponding to a controller discrete input.

In on-line mode (PC connected to the Twido base controller), program lines can be modified, added or deleted. Operations with brackets AND(, OR(,... can only be modified, added or deleted when the Twido controller is in “STOP” mode. Other modifications can be made when the Twido controller is in either “STOP” mode or "RUN” mode.

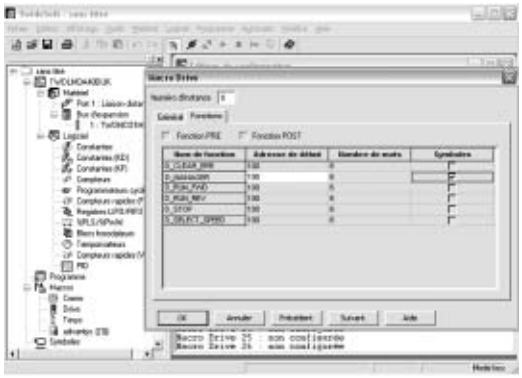
Programmable controller variables

An instruction can include from zero to three operands, depending on the type of instruction code. The operands may be:

- Sensor image inputs (detectors, control buttons, etc.)
- Preactuator output images (contactors, solenoid valves, pilot lights, etc.)
- Internal bits (equivalent to the internal relays in electromagnetic control equipment)
- Control system function blocks (timers, counters, drum controllers, registers).
- ...

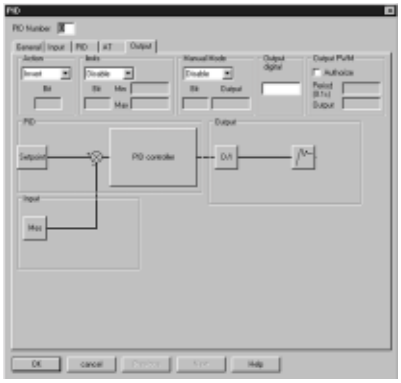
Application configuration data (%KW, timer preset, counter preset, communication port parameters) can be modified in on-line mode (PC connected to the Twido base controller).

Twido programmable controller
TwidoSoft programming software
Programming, integrated functions, software set-up



Macros for Modbus network or 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 or motor starters.
For each family, a list of macros is suggested to facilitate exchanges between the Twido programmable controller and a device connected to a Modbus network or to a 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, TwidoSoft software automatically generates code in instruction List language, encapsulated in a subroutine. The macro's code call line is compiled by the TwidoSoft 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.
This macro system requires a version of TwidoSoft software ⩾ V3.0 and a version ⩾ V3.0 of the Twido base controller micro-program.



Built-in functions for all controller versions ⩾ 2.0

PID

- 14 PID programming loops.
- "Autotuning" algorithm (for software version ⩾ 2.5).
- Analogue / 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, debugging mode.

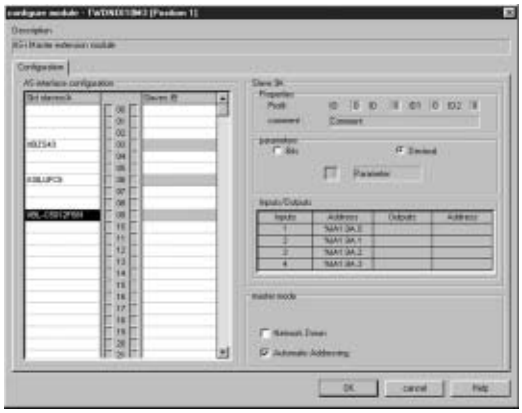
Event processing

- 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 "reflex" outputs.

Software set-up for controller versions ⩾ 2.0

The AS-Interface cabling system is configured using TwidoSoft software. The services offered are based on the principle of simplicity :

- Management of profile tables, parameters and data by the master (management transparent to the user).
- Topological addressing of I/O: any AS-Interface slave defined on the cabling system has a topological address assigned to it on the cabling system, in a way that is transparent to the user.
- Each AS-Interface module sensor/actuator is seen by Twido in the same way as any I/O.



Configuration of the AS-Interface cabling system

Configuration of all the modules present on the AS-Interface cabling system is carried out by following the on-screen instructions:

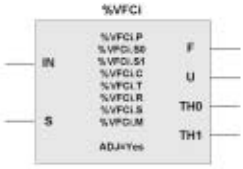
Definition of the AS-Interface cabling system master module

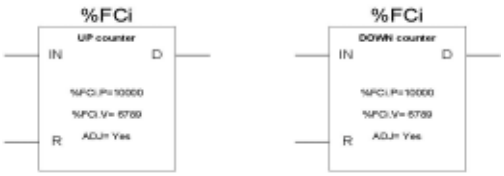
Module TWD NOI 10M3 is defined like any I/O module.

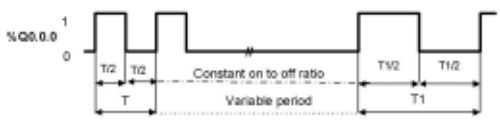
Configuration of AS-Interface slave modules

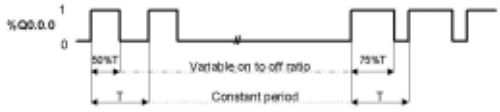
From the definition screen, it is possible to configure all the slave modules corresponding to all the I/O of the interfaces present on the AS-Interface cabling system.
The user selects the reference of the AS-Interface module shown in the Schneider Electric catalogue, among the various discrete, analogue or safety modules. This selection automatically determines the AS-Interface profile and parameters associated with each interface module.
After configuration, the I/O connected to the AS-Interface cabling system are processed by the application program in the same way as any of the PLCs "In-rack" I/O, either by their address (e.g. %I\4.0\16.2, input 2 of slave 16 on the AS-Interface cabling system), or by their associated symbol (e.g. Start_conveyor).

Twido programmable controller
TwidoSoft programming software
Integrated counter, positioning









Integrated counter function

The counter function allows the controller to count a large number of pulses, within one program scan cycle. Using its integrated 16-bit fast counters, the Twido controller can count up to 65 535 pulses generated by ⎓ 24 V sensors (with 32 bit counters, up to 4 294 967 295 pulses, for software version ≥ 2.5). It can compare the current counter value with a preset value and trigger an output when the preset value is reached. This type of counter function can be used for counting parts or events, or for measuring length or position.

The number of integrated fast-counters depends on the type of base controller:

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

Very fast counter - VFC (20 kHz)

The 20 kHz VFC (Very Fast Counter) is an up/down counter with possibility of auxiliary inputs. The counter is accessed by means of a function block (%VFCi) programmed using TwidoSoft. The %VFCi function block can be used to execute one of the following 5 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 2 proximity sensors (up/down counting) connected to inputs I0 and I1 of Twido base controllers.

Fast counter - FC (5 kHz)

The 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 a function block (%VFCi) programmed using TwidoSoft. 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 (1...65 535), (1...4 294 967 295 for software version ≥ 2.5) 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 counter mode.
- Decrementing the preset value %FCi.P to 0 in down counter mode.

Position control

Twido compact controllers TWD LCA● 40DRF and modular controllers include two positioning functions (frequency 7 kHz) which can be used, for example, for controlling step motors:

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

PLS function (pulse, 7 kHz)

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 step motors). 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)

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 analogue 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).

Twido programmable controller
TwidoSoft programming software

Characteristics

Instructions

Combinational List instructions	■ **LD**, **LDN**, **LDR**, **LDF** : read the state of a bit, (direct, inverse, rising and falling edges) ■ **ST**, **STN**, **S**, **R** : write an output (direct, inverse, set, reset) ■ **AND**, **ANDN**, **ANDR**, **ANDF** : logic AND with a bit (direct, inverse, rising and falling edges) ■ **OR**, **ORN**, **ORR**, **ORF** : logic OR with a bit (direct, inverse, rising and falling edges) ■ **LD (, AND (, OR(,)** : open and close brackets (8 possible levels) ■ **XOR**, **XORN**, **XORR**, **XORF** : exclusive OR with a bit ■ **MPS**, **MRD**, **MPP** : buffer memory management for divergence towards output bits ■ **N** : negation
Grafcet List instructions	■ **-*-i** : step (1 ≤ i ≤ 62) ■ **=*=i** : initial step (1 ≤ i ≤ 62) ■ **#i** : activate step i, after deactivation of current step ■ **#** : deactivate current step ■ **#Di** : deactivate step i after another step ■ **=*=POST** : start post-processing ■ **%Xi** : bit associated with step i
Instructions on program	■ **END**, **ENDC**, **ENDCN** : end of program (conditional or unconditional) ■ **JMP**, **JMPC**, **JMPCN** : jump to a label % L (conditional or unconditional) ■ **SRn** : call subroutine n (0 ≤ n ≤ 15) ■ **RET** : end of subroutine ■ **NOP** : non-operative instruction
List title and comments	■ **Title** : 122 characters before each **LD**, **LDN**, **LDR**, **LDF** instruction ■ **Comments** : 4 lines of 122 characters before each **LD**, **LDN**, **LDR**, **LDF** instruction ■ Possibility of associating a comment of 122 characters with each instruction
Ladder rungs	■ 10 contacts of 7 lines with 1 output per line ■ Title : 122 characters per rung ■ Comments : 4 lines of 122 characters
Ladder language graphical symbols	■ Normally open, normally closed and on edge contacts ■ Direct, inverse, SET and RESET coils ■ Program jump, subroutine call
Standard function blocks *(1)*	■ Timers :**%TMi** (0 ≤ i ≤ 31) 0 to 9999 (word) ■ Up/Down counters :**%Ci** (0 ≤ i ≤ 15) 0 to 9999 (word) ■ 4 16-bit LIFO or FIFO registers :**%Ri** (0 ≤ i ≤ 3) ■ 4 Drum controllers :**%DRi** (0 ≤ i ≤ 3) 8 steps ■ Real-time clock : **%RTCi** (0 ≤ i ≤ 15) month, day, hour, minute.
Specific function blocks (1)	■ Transmission/reception of message of 64 words maximum (internal or constant) : **EXCH** ■ Exchange control : **%MSG** available output, fault output ■ 8 shift bit registers : **%SBRi** (0 ≤ i ≤ 7), shift one step to the left or right (max. 16 steps) ■ 8 step counter blocks : **%SCi** (0 ≤ i ≤ 7), move forward or back one step (max. 256 steps) ■ Fast counter (5 kHz), Up/Down counter : **%FC** ■ Very fast counter 20 kHz, Up/Down counter, frequency meter **%VFC** ■ Pulse width modulated output : **%PWM** (with all modular base controllers and compact base controllers TWD LCA● 40DRF) ■ Pulse generator output : **%PLS** (with all modular base controllers and compact base controllers TWD LCA● 40DRF) ■
Numerical instructions	■ Assignment in word, indexed word, word table bit strings : **:=** ■ Arithmetic : **+**, **-**, **x**, **/**, **REM**, **SQRT** ■ Logic : **AND**, **OR**, **XOR**, **NOT**, **INC**, **DEC** ■ Shift operation : **SHL**, **SHR**, **ROL**, **ROR** (logic and rotate) ■ Conversion : **BTI**, **ITB** (BCD <-> Binary) ■ Comparison: **>**, **<**, **<=**, **>=**, **=**, **<>**
Specific functions	■ 1 input for controller RUN/STOP command ■ 1 Security output : controller "block" error ■ Real time display of Grafcet steps used ■ Symbol table management
Arithmetic functions with variables	■ +, -, *, / ■ SQRT ■ ABS ■ TRUNC ■ LOG ■ LN ■ EXP ■ EXPT

(1) When the numbers of objects are not indicated, see characteristics pages 6 and 12

Characteristics *(continued)*

Instructions *(continued)*

Trigonometrical functions with variable	■ COS ■ SIN ■ TAN ■ ACOS ■ ASIN ■ ATAN ■ DEG_TO_RAD ■ RAD_TO_DEG
Double word functions	■ +, -, *, / ■ SQRT ■ ABS ■ REM ■ INC ■ DEC ■ SHL ■ SHR ■ ROL ■ ROR
Other functions	■ SUM_ARR ■ EQUAL_ARR ■ FIND_EQR_FIND_GTR, FIND_LTR ■ MAX_ARR, MIN_ARR ■ OCCUR_ARR ■ SORT_ARR ■ ROR_ARR, ROL_ARR ■ LENGTH_ARR ■ L_KUP ■ MEAN ■ ITB, BTI ■ DINT_TO_REAL, REAL_TO_DINT

Addressable objects

Bit objects (1)	■ **% I/Qx.y** : I/O bits ■ **% Mi** : internal bits ■ **% Si** : 128 system bits ■ **%Xi** : 62 Grafcet steps ■ **% ●●i.j** : function block bits ■ **% ●●i:Xk** : bits extracted from internal words, system words, constant words, input and output words
Word objects (1)	■ **% MWi** : internal words ■ **% KWi**: 64 constant words ■ **% SWi** : 128 system words ■ **% INWi.j** : 4 input words per controller (exchange words for inter-controller communication) ■ **% QNWi.j** : 4 output words per controller (exchange words for inter-controller communication)
Bit string and word table objects	■ **%●i:L** : bit strings (I/O, internal, system and Grafcet bits) ■ **%●Wi:L** : word tables (internal, constant and system words)

(1) When the numbers of objects are not indicated, see characteristics pages 6 and 12

Twido programmable controller
TwidoSoft programming software

References

The multi-language software packages (English, French, German, Italian and Spanish) are for use on PCs *(1)* with Windows 98SE, Windows 2000 or Windows XP operating system.
These software packages include:
■ A CD-ROM containing TwidoSoft multi-language software and multi-language documentation for hardware and software set-up.
■ Depending on the model, a PC/Twido base controller connection cable reference TSX PCX 1031 or TSX PCX 3030, compatible with Twido, TSX Micro and TSX Premium programmable controllers (length 2.5 m) or a Bluetooth gateway VW3 A8114.

TwidoSoft software packages

Description	Reversible languages	Items supplied	Reference	Weight kg
TwidoSoft multi-language packs *(1)*	Ladder Instruction List	Without	**TWD SPU 1002 V10M**	–
		Cable TSX PCX 1031	**TWD SPU 1001 V10M**	–
		Cable TSX PCX 3030	**TWD SPU 1003 V10M**	–
		Bluetooth gateway VW3 A8114	**TWD SPU 1004 V10M**	–
TwidoAdjust software packages	–	–	See page 71	–

Separate components

Description	Application		Reference	Weight kg
	From	To		
Connection cables (length 2.5 m)	All Twido controllers	USB port on PC *(2)* with TwidoSoft software installed	**TSX PCX 3030**	0.210
		Serial port on PC with TwidoSoft software installed	**TSX PCX 1031**	0.225

TwidoPack kits

Schneider Electric offers two TwidoPack kits to help you discover and become familiar with the new range of Twido programmable controllers. TwidoPack, which is inexpensive and easy to use, is available in two versions, each comprising:
■ A Twido base controller.
■ A set of options.
■ A TwidoSoft software package TWD SPU 1001 V10M (supplied complete with cable).
■ A teach-yourself e-Learning CD-Rom.

Description	Twido base controller	Options	Reference *(3)*	Weight kg
TwidoPack Compact	Compact 10 I/O TWD LCDA 10DRF ∿ 100…240 V, relay outputs	Real-time clock cartridge TWD XCP RTC 6-input simulator TWD XSM 6	**TWD XDP PAK1●**	–
TwidoPack Modular	Modular 20 I/O TWD LMDA 20DTK ⎓ 24V supply, transistor outputs	Real-time clock cartridge TWD XCP RTC Built-in display module TWD XCP ODM Serial interface adapter TWD NAC 485T Pre-formed cable for discrete I/O (length 3 m) TWD FCW 30M	**TWD XDP PAK2●**	–

User documentation

Description	Format	Language	Reference	Weight kg
Twido installation and set-up manuals Hardware and software	Hard copy (216 x 181 mm)	English	**TWD USE 10AE**	–
		French	**TWD USE 10AF**	–
		German	**TWD USE 10AD**	–
		Spanish	**TWD USE 10AS**	–
		Italian	**TWD USE 10AI**	–

(1) Typical recommended configuration: 300 MHz processor, 128 Mb of RAM with 40 Mb of available hard disk space.
(2) PC running under Windows 2000 or XP operating system only.
(3) Replace the ● at the end of the reference with **E***: English,* **F***: french.*

Twido programmable controller
TwidoAdjust software

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 Pocket PC2003 operating system and must be used with the stylus, since the Pocket PC buttons are not supported.

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

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

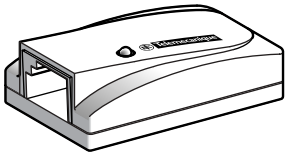
The application function includes the following functions:
- **transfer**, such as transfer of the application, reading of an application, “backup”, “restore”,
- **animation of object tables**, creation, editing, table animation, capture of values,
- **reading the configuration** of the application.

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.

Twido programmable controller
TwidoAdjust software



VW3 A8114

References

The multi-language software packages (English, French, German, Italian and Spanish) are for use on Pocket PCs with Pocket PC2003 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 space 3 Mbits	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	This gateway has a range of 10 m (class 2). It is connected to the device by means of various accessories: ■ 1 Bluetooth gateway with one RJ45 connector, ■ 1 x 0.1 m length cable with two RJ45 connectors, ■ 1 x 0.1 m length cable with one RJ45 connector and one mini-DIN connector for TwidoSoft software, ■ 1 x RJ45/9-way SUB-D adapter.	**VW3 A8114**	0.155

Description	Application	Reference	Weight kg
Connecting cables *(1)*	For connecting Twido controller to Pocket PC	**TSX PCX 1031**	–
	For connecting Twido controller to Pocket PC with crossing of Rx and Tx wires	**TSX PCX 1130**	–

(1) Connection schemes, see page 41.

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Product reference index

Community regulations

European Directives

Opening up of European markets assumes harmonisation of the regulations pertaining to each of the member countries of the European Union.
The purpose of the European Directive is to eliminate obstacles hindering the free circulation of goods within the European Union, and it applies to each member country.
Member countries are obliged to transcribe each Directive into their national legislation and to simultaneously withdraw any contradictory regulations.
The Directives, in particular those of a technical nature which concern us, only establish the objectives to be achieved, referred to as "essential requirements".
The manufacturer must take all the necessary measures to ensure that his products conform to the requirements of each Directive applicable to his production.
As a general rule, the manufacturer certifies conformity to the essential requirements of the Directive(s) for his product by affixing the CE mark.
The CE mark is affixed to our products concerned.

Significance of the CE mark

- The CE mark affixed to a product signifies that the manufacturer certifies that the product conforms to the relevant European Directive(s) which concern him; this condition must be met to allow marketing and free circulation within the countries of the European Union of any product subject to one or more of the E.U. Directives.
- The CEmark is intended solely for national market control authorities.

For electrical equipment, only conformity to standards signifies that the product is suitable for its designed function. Only the guarantee of an established manufacturer can provide a high level of quality assurance.
For our products, one or several Directives are likely to be applicable, depending on the product, and in particular:

- The Low Voltage Directive 72/23/EEC amended by Directive 93/68/EEC: under the terms of this Directive, CE marking could not be applied before 1st January 1995 and has been compulsory since 1st January 1997.
- The Electromagnetic Compatibility Directive 89/336/EEC, amended by Directives 92/31/EEC and 93/68/EEC: the CE mark on products covered by this Directive has been compulsory since 1st January 1996.

Protective treatment of equipment

Twido programmable controllers meet the requirements of "TC" treatment *(1)*.
For installations in industrial production workshops or in an environment which corresponds to "TH" treatment *(2),* Twido programmable controllers should be enclosed in casings with a minimum of IP 54 protection as defined by standards IEC 60950 or NEMA 250.
Twido programmable controllers are supplied with an IP 20 protection index. They can therefore be installed without an enclosure in locations with restricted access which do not exceed degree of pollution 2 (control room not containing machinery or dust producing activities).

(1) "TC" treatment: all climate treatment.
(2) "TH" treatment: treatment for hot and humid environments.

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