Twido programmable controller
Compact base controllers

564493-3-3

TWD LC●A 10DRF

564493-3-3

TWD LC●A 16DRF

564494-3-3

TWD LC●A 24DRF

121114-49-M

TWD LCA● 40DRF

Presentation

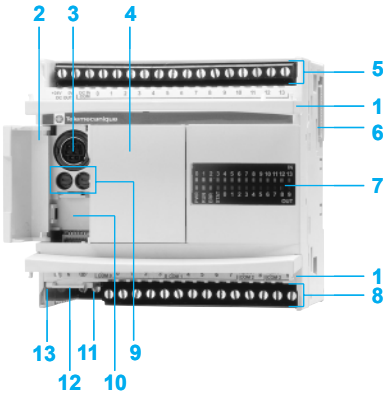
The Twido range of compact programmable controllers offers an “all-in-one” solution in a compact overall size (80/157 x 90 x 70 mm). Eight compact base controllers are available, differing in their processing capacity and in their number of ⎓ 24 V inputs and number of relay and transistor outputs (10, 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 10012/8	

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 ms + programmed filter time for I0.0…I0.5, 40 µs + programmed filter time for other inputs I0.i				
	At state 0			45 ms + programmed filter time for I0.0…I0.5, 150 µs + programmed filter time for other inputs I0.i			40 ms + 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.

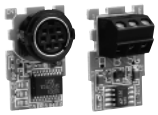
Twido programmable controller
Compact base controllers

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 10012/5	–	**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

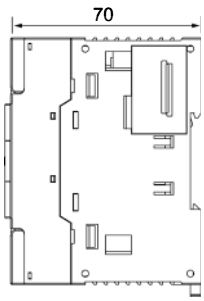
Phaseo regulated power supply

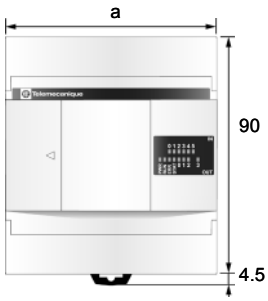
Description	Mains input voltage 47…63 Hz	Output voltage	Nominal power	Nominal current	Auto-protect reset	Reference	Weight
	V	⎓ V	W	A			kg
Regulated switch mode power supply for AS-Interface cabling system *(5)*	∼ 100…240 single-phase wide range	30 + 24	2 x 72	2.4 + 3	Auto	**ASI ABLM3024**	1.300

(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 10012/5.
(4) Connection via built-in port or via optional serial port on Twido programmable controllers.
(5) With earth fault detection.

Dimensions

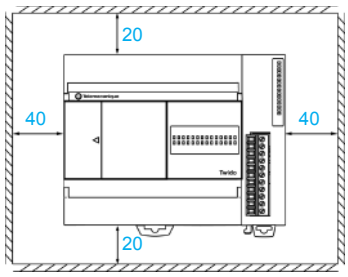
TWD LC•A 10DRF/16DRF/24DRF and TWD LCA• 40DRF

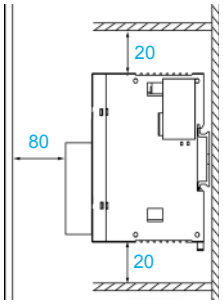




	a
TWD LC•A 10DRF	80
TWD LC•A 16DRF	80
TWD LC•A 24DRF	95
TWD LCA• 40DRF	157

Installation rules





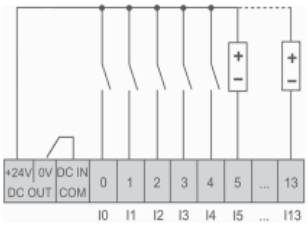
Important:
- Vertical mounting: not permissible for temperatures ≥ 40° C, “upside down” flat mounting not permissible.
- Avoid placing devices which generate heat (transformers, power supplies, power contactors...) beneath the controller.

Connections

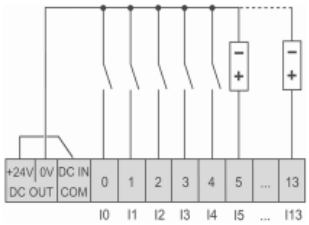
Connection of ⎓ 24 V inputs

TWD LC•A 10DRF/16DRF/24DRF

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

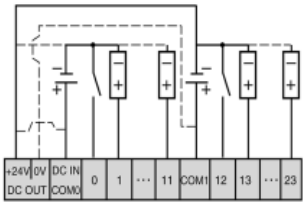


Connection to source inputs (negative logic) with sensors powered by the base controller

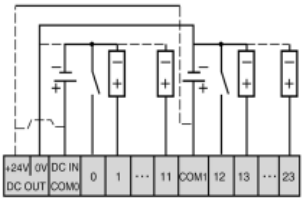


TWD LC•A 24DRF

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

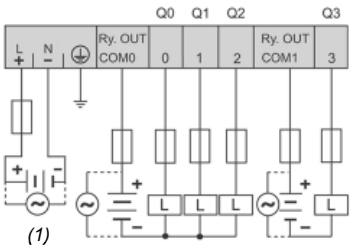


Connection to source inputs (negative logic) with sensors powered by the base controller

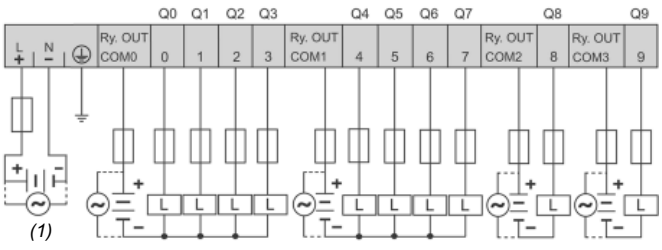


Connection of ∿ 100…240 V, ⎓ 19.2…30 V power supplies and relay outputs

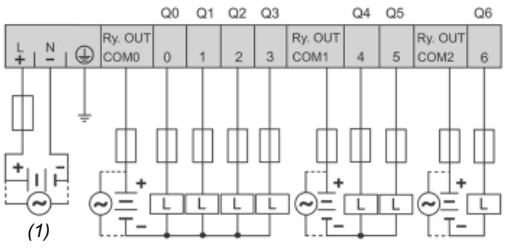
TWD LC•A 10DRF



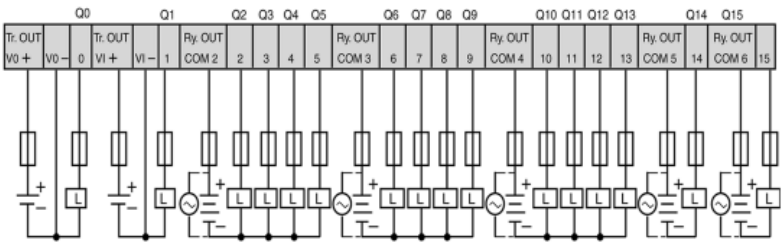
TWD LC•A 24DRF



TWD LC•A 16DRF



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.