

Automation & Control  
**Twido**  
**Programmable controller**  
*Your peace of mind*

Catalogue  
October

07



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### *Flexibility*

- Interchangeable modular functions, to better meet the requirements for extensions
- Software and accessories common to multiple product families



### *Ingenuity*

- Auto-adapts to its environment, "plug & play"
- Application functions, control, communication and diagnostics embedded in the products
- User-friendly operation either directly on the product or remotely



### *Simplicity*

- Cost effective "optimum" offers that make selection easy for most typical applications
- Products that are easy to understand for users, electricians and automation specialists
- User-friendly intuitive programming



### *Compactness*

- High functionality in a minimum of space
- Freedom in implementation



### *Openness*

- Compliance with field bus, connection, and software standards
- Enabling decentralised or remote surveillance via the web with Transparent Ready products

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# 1 - Twido programmable controller, Bases

## 1 - Twido base controllers

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| Applications   |                               | Compact base controllers IP 20   |   |  |  |     |
|--|-------------------------------|--|---|--|--|-----|
|  |                               |   |  |                      |                     |     |
| Discrete I/O   | Basic                         | 10   | 16  | 24   | 40   |     |
|  | Number of inputs              | 6 sink/source --- 24 V inputs (1)  | 9 sink/source --- 24 V inputs (1)   | 14 sink/source --- 24 V inputs (1)   | 24 sink/source --- 24 V inputs (1)   |     |
|  | Number of outputs             | 4 relay outputs  | 7 relay outputs   | 10 relay outputs   | 14 relay outputs<br>2 source transistor outputs  |     |
|  | Type of connection            | Non-removable screw terminal block   |   |  |  |     |
| I/O expansion  | Number of expansion modules   |  |   | 4 modules max. (2)   | 7 modules max. (2)   |     |
|  | Discrete I/O modules          | 15 types of module: input, output, mixed 8, 16, 24, 32 channels, connection by screw or spring terminals or by HE 10 connector |   |  |  |     |
|  | Analogue I/O modules          | 10 types of module: input, output, mixed 2, 4 or 8 channels, connection by screw terminals                                     |   |  |  |     |
|  | Communication                 | CANopen bus master module, AS-Interface master module (2 max)  |   |  |  |     |
| Maximum number of I/O per configuration (base controller with I/O expansion modules) |                               | 10   | 16  | 88/120/152 according to whether I/O expansion has: screw terminals(3)/spring terminals/HE 10 connector | 152/208/264 according to whether I/O expansion has : screw terminals/spring terminals/ HE 10 connector |     |
|  |                               |  |   |  |  |     |
| Integrated counting and positioning  | Counting 5 kHz                | 3 x 16 bit counting channels (5)   |   |  | 4 x 16 bit counting channels (4)   |     |
|  | Counting 20 kHz               | 1 x 16 bit counting channel (on dedicated discrete inputs)   | 1 x 32 bit counting channel (on dedicated discrete inputs)                        |  | 2 x 32 bit channels (on dedicated discrete inputs)   |     |
|  | 7 kHz positioning             |  |   |  | 2 x PWM/PLS function channels  |     |
| Functions  | PID                           |  |   |  | Yes  |     |
|  | Event processing              |  |   |  | Yes  |     |
| Communication  | Integrated                    | 1 RS 485 serial port   | 1 RS 485 serial port, 1 optional RS 232C/RS 485 serial port                       |  |  |     |
|  | Ethernet TCP/IP               | TwidoPort interface module   |   |  |  |     |
|  | Expansion                     |  |   |  | CANopen or AS-Interface see above  |     |
| Supply voltage   |                               | ~ 100...240 V for TWD LCA● (--- 24 V discrete sensors powered by the base controller),<br>--- 19.2...30 V for TWD LCD●         |   |  |  |     |
| Programming  | Application memory            | 700 instructions   | 2000 instructions   | 3000 instructions  | 3000 instructions, 6000 with memory extension  |     |
|  | Internal bits                 | 128 bits   | 128 bits  | 256 bits   |  |     |
|  | Internal words (5)            | 3000   |   |  |  |     |
|  | Standard function blocks (5)  | 64 timers, 128 counters  |   | 128 timers, 128 counters   |  |     |
|  | Double words                  | Yes  |   |  |  |     |
|  | Floating, Trigonometrical     |  |   |  |  | Yes |
|  | Real-time clock               | Optional real time clock cartridge, using 16 real-time clock blocks  |   |  | Integrated   |     |
|  |                               |  |   |  |  |     |
| Twido base controller models   | Standard                      | TWD LC0A 10DRF (6)   | TWD LC0A 16DRF (6)  | TWD LC0A 24DRF (6)   | TWD LC0A 40DRF (6)   |     |
|  | With integrated Ethernet port | TWD LC0E 40DRF (6)   |   |  |  |     |
| Page   | 1/8                           |  |   |  |  |     |

(1) Sink input: positive logic. Source input: negative logic.  
 (2) Within the consumption limit controlled by TwidoSuite software.  
 (3) With maximum of 42 relay outputs (on base controller and I/O expansions).

**Modular base controllers IP 20** **Extreme base controller IP 67**



|   |   |   |   |
|---|---|---|---|
| 20  |   | 40  | 41  |
| 12 sink/source --- 24 V inputs (1)  |   | 24 sink/source --- 24 V inputs (1)  | 11 sink/source --- 12/24 V source<br>2 inputs --- 12/24 V sink  |
| 8 sink or source transistor outputs<br>(depending on model)   | 6 relay outputs and 2 source transistor<br>outputs  | 16 sink or source transistor outputs<br>(depending on model)  | 2 source transistor outputs --- 12/24 V<br>14 (--- 12 V) or 11 (--- 24 V) sink<br>transistor outputs<br>1 PWM input + 3 PWM/PLS outputs |
| By HE 10 connector or<br>Advantys Telefast ABE 7 pre-wired<br>system (with base controller<br>TWD LMDA 20DTK)                 | By removable screw terminal block   | By HE 10 connector or<br>Advantys Telefast ABE 7 pre-wired<br>system (with base controller<br>TWD LMDA 20DTK) | By 70-way connector   |
| 4 modules max. (2)  | 7 modules max. (2)  |   |   |
| 15<br>s of module: input, output, mixed 8, 16, 24, 32 channels, connection by screw or spring terminals or by HE 10 connector |   |   |   |
| 10 types of module: input, output, mixed 2, 4 or 8 channels connection by screw terminals                                     |   |   | Integrated: 8 inputs  |
| CANopen bus master module, AS-Interface master module (2 max)   |   |   |   |
| 84/116/148<br>according to whether I/O expansion<br>has :<br>screw terminals/spring terminals/<br>HE 10 connector             | 132/188/244<br>I/O expansion with :<br>screw terminals/spring terminals/<br>HE 10 connector | 152/208/264<br>I/O expansion with :<br>screw terminals/spring terminals/<br>HE 10 connector                   |   |
| 2 x 16 bit counting channels (4)  |   |   | 1 counting channel (10 kHz)   |
| 2 x 32 bit channels (on dedicated discrete inputs)  |   |   |   |
| 2 x PWM/PLS function channels   |   |   | 3 x PWM/PLS function channels   |
| Yes   |   |   | Yes   |
| Yes   |   |   | Yes   |
| 1 RS 485 serial port, 1 optional RS 232C/RS 485 serial port   |   |   | 1 RS 485 serial port  |
| TwidoPort interface module  |   |   | 2 integrated CANopen & CAN J1939 ports  |
| CANopen or AS-Interface see above   |   |   | Via Ethernet box <b>XGS Z33 ETH</b>   |
| --- 19.2 V...30 V   |   |   | --- 12 or 24 V (limited--- 9...32 V)  |
| 3000 instructions   | 3000 instructions, 6000 with memory extension   |   | 3000 instructions   |
| 256 bits  |   |   |   |
| 3000  |   |   |   |
| 128 timers, 128 counters  |   |   |   |
| Yes   |   |   |   |
|   | Yes   |   |   |
| Optional real time clock cartridge, using 16 real-time clock blocks   |   |   |   |
| <b>TWD LMDA 20D●K (7)</b>   | <b>TWD LMDA 20DRT</b>   | <b>TWD LMDA 40D●K (7)</b>   | <b>TWD LEDCK1</b>   |
| 1/18  |   |   | 1/28  |

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

564493-3-3



TWD LC●A 10DRF

564493-3-3



TWD LC●A 16DRF

564494-3-3



TWD LC●A 24DRF

12114-49-M



TWD LC●A/LC●E 40DRF

### Presentation

The Twido range of compact programmable controllers offers an "all-in-one" solution in a compact overall size: 80 to 157 x 90 x 70 mm. Ten compact base controllers are available, differing in their processing capacity and in their number of  $\sim$  24 V inputs and number of relay and transistor outputs (10, 16, 24 and 40 I/O).

These base controllers use:

- an a.c. supply between  $\sim$  100 and 240 V (providing the  $\sim$  24 V supply to the sensors),
- or a d.c. supply between  $\sim$  19.2 and 30 V (an external auxiliary supply must be provided for supply to the sensors).

This type of compact base controller offers the following advantages:

- A significant number of I/O (up to 40 I/O) in a small overall size, so reducing the size of consoles or panels for applications where space is an important factor.
- For 24 and 40 I/O models, a variety of expansion options and product options offer the user a degree of flexibility which is generally only available with larger automation platforms:

- with 24 I/O compact base controllers **TWD LC●A 24DRF**, up to 4 discrete and/or analogue I/O expansion and/or communication modules.

- with 40 I/O compact base controllers **TWD LC●● 40DRF**, up to 7 expansion modules (discrete and/or analogue I/O and/or communication), optional modules, such as digital display, memory extension cartridge, real-time clock cartridge and additional RS 485 or RS 232C communication port.

- The compact controller solution also allows great wiring flexibility. For discrete I/O expansion modules (with base controllers **TWD LC●A 24DRF** and **TWD LC●● 40DRF**) several possible types of connection are offered, such as removable screw terminal blocks and spring type connections which allow simple, fast and safe wiring. The Advantys Telefast ABE 7 pre-wired system allows the connection of modules with HE 10 connectors to:

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

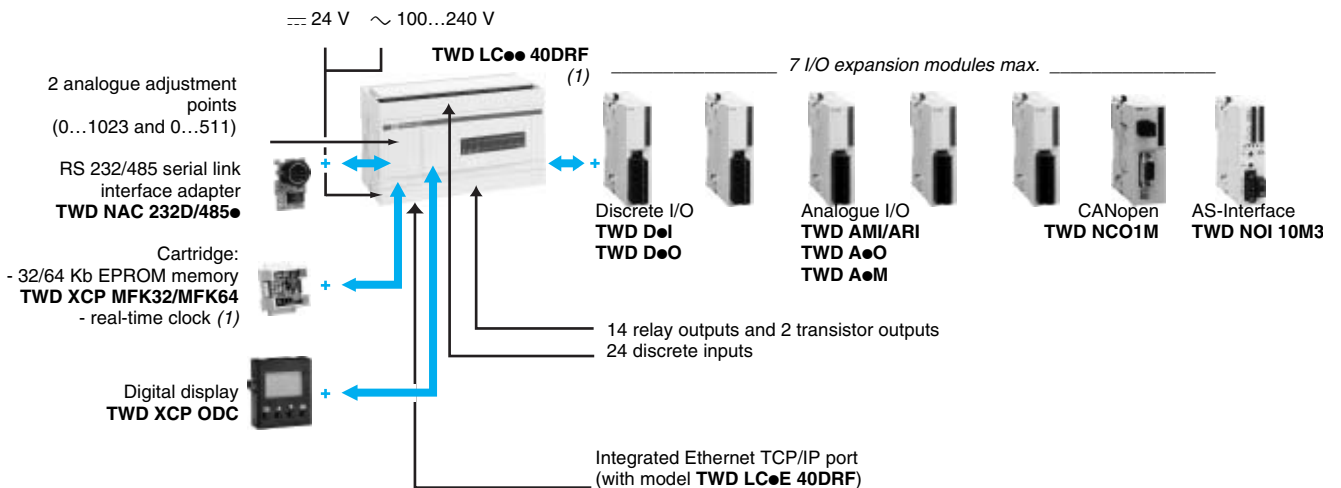
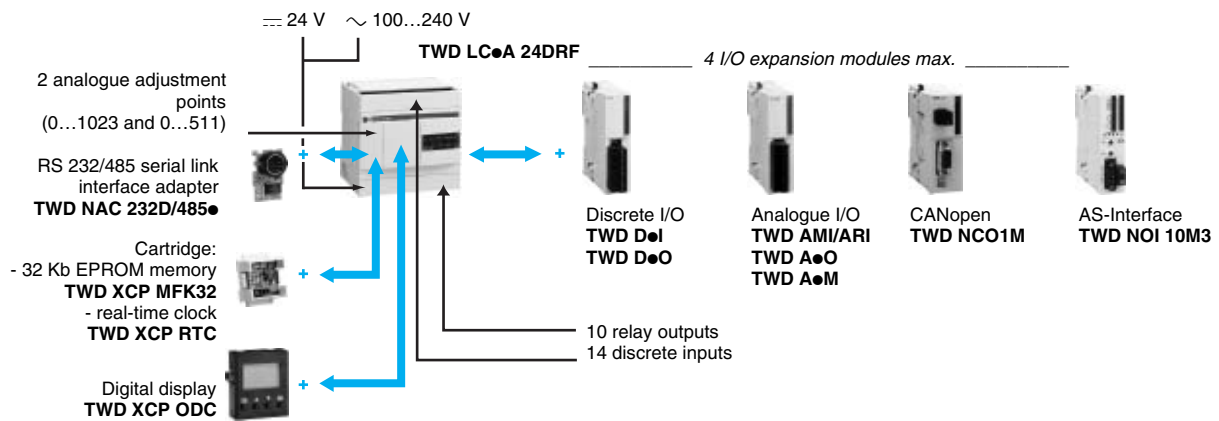
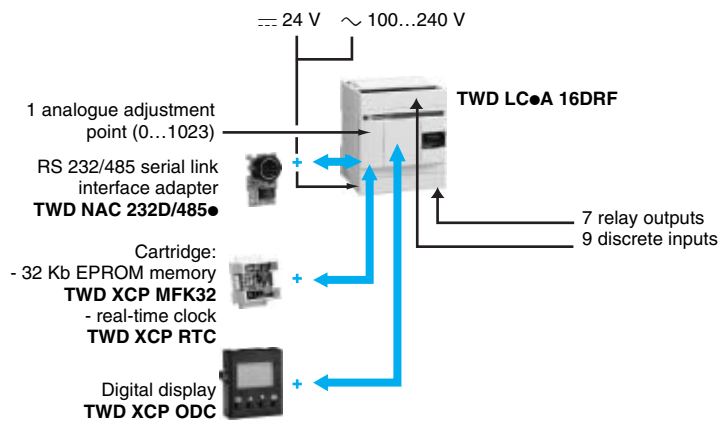
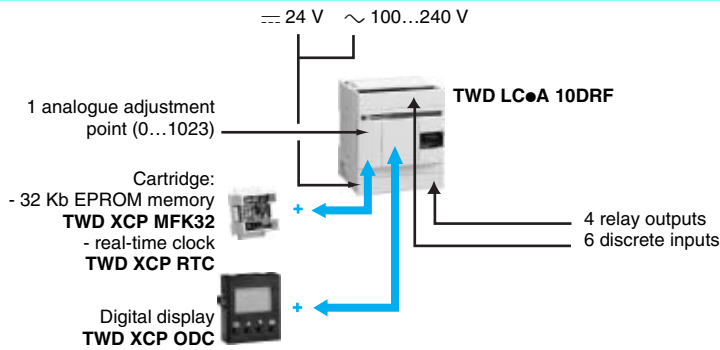
- The display and plug-in memory options allow easy adjustment, transfer and backup of applications:

- the digital display can be used as a local display and adjustment tool,
- the EEPROM technology in the memory cartridges allows backup and transfer of programs to any Twido compact or modular controller.

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



### Configuration of compact base controllers

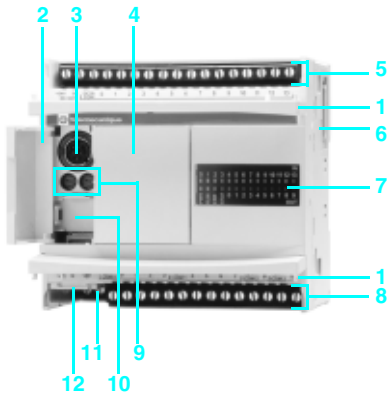


(1) Real-time clock function integrated base controllers **TWD LC●● 40DRF**.

# Twido programmable controller

## Compact base controllers

1



### Description

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

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

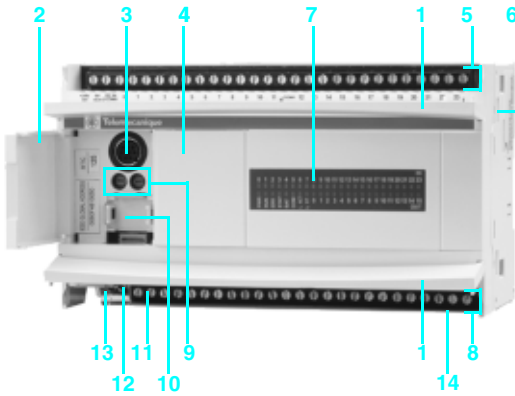
- 1 Two hinged connection terminal block covers for access to the terminals.
- 2 A hinged access door.
- 3 A mini-DIN type RS 485 serial port connector (allowing connection of the programming terminal).
- 4 A slot (protected by a removable cover) for digital diagnostic/maintenance display module TWD XCP ODC.
- 5 A screw terminal block for  $\text{---}$  24 V supply to the sensors (1) and for connection of the input sensors.
- 6 A connector for I/O expansion modules TWD D●●, TWD A●● and communication modules TWD NOI 10M3/NCO1M (maximum of 4 modules on 24 I/O base controllers and 7 modules on 40 I/O base controllers).
- 7 A display block showing:
  - the status of the base controller by means of 3 pilot lights (PWR, RUN, ERR),
  - the status of the inputs and outputs (IN● and OUT●),
  - a user pilot light (STAT), to be controlled by the application programme according to user requirements.
- 8 A screw terminal block for connection of the output preactuators.
- 9 Two analogue adjustment points (one point for 10 and 16 I/O models).
- 10 An extension connector for the addition of a 2<sup>nd</sup> RS 232C/RS 485 serial port using adapter TWD NAC ●●● (for 16, 24 and 40 I/O models).
- 11 A screw terminal block for connection of the  $\sim$  100...240 V mains or  $\text{---}$  19.2...30 V power supply.

#### With access through the bottom of the controller:

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

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

(1)  $\text{---}$  24 V sensor supply only with base controller TWD LCAA ●●DRF ( $\sim$  100...240 V mains supply)



### Description

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

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

- 1 Two hinged connection terminal block covers for access to the terminals 5.
- 2 A hinged access door.
- 3 A mini-DIN type RS 485 serial port connector (allowing connection of the programming terminal).
- 4 A slot (protected by a removable cover) for digital diagnostic/maintenance display module **TWD XCP ODC**.
- 5 A screw terminal block for  $\text{---}$  24 V (1) supply to the sensors and for connection of the input sensors.
- 6 A connector for I/O expansion module **TWD D●●**, **TWD A●●** and communication module **TWD NOI10M3/NCO1M** (maximum 7 modules).
- 7 A display block showing:
  - the status of the base controller by means of 7 pilot lights (PWR, RUN, ERR, BAT, COM, LACT and L ST),
  - the status of the inputs and outputs (IN● and OUT●),
  - a user pilot light (STAT), to be controlled by the application programme according to user requirements.
- 8 A screw terminal block for connection of the output preactuators.
- 9 Two analogue adjustment points.
- 10 An extension connector for the addition of a 2<sup>nd</sup> RS 232C/RS 485 serial port using adapter **TWD NAC ●●●**.
- 11 A screw terminal block for connection of the  $\sim$  100...240 V mains or  $\text{---}$  19.2...30 V supply.



#### With access through the bottom of the controller:

- 12 A connector for 32/64 Kb memory card **TWD XCP MFK32/MFK64**.
- 13 An RJ45 connector (accessed through the bottom of the controller) for connection to the Ethernet TCP/IP network.
- 14 A slot to take the optional backup battery for the base controller's internal RAM.

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

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

1

| Environment   |   |   |   |                   |  |
|---|---|---|---|-------------------|--|
| Base controller type  |   | TWD LC●A 10DRF                            | TWD LC●A 16DRF  | TWD LC●A 24DRF    | TWD LCA● 40DRF                                   |
| 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/s <sup>2</sup>                          | 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/s <sup>2</sup>                          | 39.2 (4 gn)   |                   |  |
| Shock resistance  |   | m/s <sup>2</sup>                          | 147 (15 gn) for 11 ms   |                   |  |
| Characteristics of compact base controllers   |   |   |   |                   |  |
| Backup battery  | Data backed up  |   | Internal RAM: internal variables, internal bits and words, timers, counters, shift registers... |                   |  |
|   | Battery type  |   | Lithium battery, not interchangeable  |                   | External battery TSX PLP 01                      |
|   | Autonomy  | days                                      | approximately 30 at 25 °C with fully charged battery  |                   | 3 years with external battery                    |
|   | Charging time   | h   | Approximately 15 to charge from 0...90% of the full charge                                      |                   |  |
|   | Life  |   | 10 years  |                   | 2 weeks from when the BAT light comes on         |
| 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. number of modules  | –   |   | 4                 | 7  |
|   | Max. number of I/O  | –   |   | 88/120/152 (1)    | 152/208/264 (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               |  |

(1) The 1<sup>st</sup> value corresponds to the maximum number of I/O (base controller and expansion module) with screw terminal expansion modules, the 2<sup>nd</sup> value is for spring terminal expansion modules and the 3<sup>rd</sup> is for HE 10 connector expansion modules.  
 (2) The maximum values cannot be cumulated.

| Supply  |                                    |   | TWD LCDA 10DRF   | TWD LCDA 16DRF  | TWD LCDA 24DRF | TWD LCDA 40DRF<br>TWD LCDE 40DRF |            |                         |
|---|------------------------------------|---|--|---|----------------|----------------------------------|------------|-------------------------|
| ☐ compact base controller type                          |                                    |   |  |   |                |                                  |            |                         |
| Voltage   | Nominal                            | V   | ☐ 24   |   |                |                                  |            |                         |
|   | Limit (including ripple)           | V   | ☐ 20.4...28.8  |   |                |                                  |            |                         |
| ☐ 24 V output for sensors                               |                                    |   | -  |   |                |                                  |            |                         |
| Max. inrush current at ☐ 24 V                           |                                    | A   | 35   | 40  | 35             |                                  |            |                         |
| Duration of microbreaks                                 |                                    | ms  | 10 max   |   |                |                                  |            |                         |
| Built-in protection                                     |                                    |   | By internal fuse   |   |                |                                  |            |                         |
| Max. consumption  |                                    | W   | 3.9  | 4.6   | 8.7            | 17.2                             |            |                         |
| Dielectric strength                                     | Between supply and earth terminals | V rms   | 500 for 1 mn   |   |                |                                  |            |                         |
|   | Between I/O and earth terminals    | V rms   | 1500 for 1 mn  |   |                |                                  |            |                         |
| Insulation resistance                                   | Between supply and earth terminals | MΩ  | > 10 (☐ 500 V)   |   |                |                                  |            |                         |
|   | Between I/O and earth terminals    | MΩ  | > 10 (☐ 500 V)   |   |                |                                  |            |                         |
| ~ compact base controller type                          |                                    |   | TWD LCAA 10DRF   | TWD LCAA 16DRF  | TWD LCAA 24DRF | TWD LCAA 40DRF<br>TWF LCAE 40DRF |            |                         |
| Voltage   | Nominal                            | V   | ~ 100...240  |   |                |                                  |            |                         |
|   | Limit (including ripple)           | V   | ~ 85...264   |   |                |                                  |            |                         |
| Frequencies   |                                    | Hz  | 50-60/47-63  |   |                |                                  |            |                         |
| ☐ 24 V output for sensors                               |                                    |   | mA   | 250   | 250            | 250                              | 400        |                         |
| Current   | Nominal input I rms at ~ 85 V      | A   | 0.25   | 0.30  | 0.45           | 0.79                             |            |                         |
|   | Max. inrush                        | A   | 35   | 35  | 40             | 35                               |            |                         |
| Duration of microbreaks                                 |                                    | ms  | 10 max   |   |                |                                  |            |                         |
| Built-in protection                                     |                                    |   | By internal fuse   |   |                |                                  |            |                         |
| Maximum consumption                                     |                                    | at ~ 100 V  | VA   | 20  | 22             | 33                               | 65         |                         |
|   |                                    | at ~ 264 V  | VA   | 30  | 31             | 40                               | 77         |                         |
| Dielectric strength                                     | Between supply and earth terminals | V rms   | 1500 - 50/60 Hz for 1 mn   |   |                |                                  |            |                         |
|   | Between I/O and earth terminals    | V rms   | 1500 - 50/60 Hz for 1 mn   |   |                |                                  |            |                         |
| Insulation resistance                                   | Between supply and earth terminals | MΩ  | > 10 (☐ 500 V)   |   |                |                                  |            |                         |
|   | Between I/O and earth terminals    | MΩ  | > 10 (☐ 500 V)   |   |                |                                  |            |                         |
| Communication   |                                    |   | TWD  | LC●A 10DRF  | LC●A 16DRF     | LC●A 24DRF                       | LC●A 40DRF | LC●E 40DRF              |
| Base controller type                                    |                                    |   |  |   |                |                                  |            |                         |
| Integrated connections                                  | Serial link                        | Type  | 1 x RS 485 serial link, not isolated, 38.4 Kbit/s  |   |                |                                  |            |                         |
|   |                                    | Protocol  | <ul style="list-style-type: none"> <li>- Half-duplex terminal port</li> <li>- Modbus master/slave RTU/ASCII or character mode</li> <li>- "Remote link" decentralised I/O (Twido base controllers used as I/O extension or as local "reflex" controller) see page 3/21</li> </ul> |   |                |                                  |            |                         |
|   |                                    | Connection  | 8-way mini-DIN connector   |   |                |                                  |            |                         |
|   | Ethernet TCP/IP                    | Type  | -  |   |                |                                  |            | 10BASE-T/<br>100BASE-TX |
|   |                                    | Connection  | -  |   |                |                                  |            | RJ45 connect.           |
| Connections via adapter or communication modules        | Serial link                        | Type  | -  | One RS 232C or RS 485 adapter, 1.2...38.4 Kbit/s                      |                |                                  |            |                         |
|   |                                    | Connection  | -  | Mini-DIN or terminal block (RS 485 only)                              |                |                                  |            |                         |
|   | AS-Interface                       | Type  | -  | One or 2 master modules (standard and extended addressing), 62 slaves |                |                                  |            |                         |
|   |                                    | Connection  | -  | Removable screw terminal block  |                |                                  |            |                         |
|   | CANopen                            | Type  | -  | One master module (class M10), 125...500 Kbit/s, 16 slaves max.       |                |                                  |            |                         |
|   |                                    | Connection  | -  | 9-way SUB-D male connector  |                |                                  |            |                         |
| Ethernet TCP/IP   | Type                               | One TwidoPort 10BASE-T/100BASE-TX interface module                        |  |   |                |                                  |            |                         |
|   | Connection                         | RJ45 connector. Supply to the module via integrated RS 485 link connector |  |   |                |                                  |            |                         |
| Integrated functions                                    |                                    |   |  |   |                |                                  |            |                         |
| Counting  | Number of channels                 |   | 4 and 6 for TWD LCA● 40DRF   |   |                |                                  |            |                         |
|   | Frequency                          |   | 3 channels at 5 kHz (function FCi), 1 channel at 20 kHz (function VFCi)<br>4 channels at 5 kHz (function FCi), 2 channels at 20 kHz (function VFCi)<br>for TWD LCA● 40DRF  |   |                |                                  |            |                         |
|   | Capacity                           |   | 16 bits FC (function FCi), 32 bits (function VFCi)   |   |                |                                  |            |                         |
| Positioning<br>(for base controllers<br>TWD LCA● 40DRF) | Number of channels                 |   | 2  |   |                |                                  |            |                         |
|   | Frequency                          |   | kHz  |   |                |                                  |            |                         |
|   | Functions                          |   | PWM, pulse width modulation output; PLS, pulse generator output  |   |                |                                  |            |                         |
| PID   | 24 I/O and 40 I/O base controllers |   | Yes  |   |                |                                  |            |                         |
| Event processing  | 24 I/O and 40 I/O base controllers |   | Yes  |   |                |                                  |            |                         |
| Analogue adjustment points                              | 10 I/O and 16 I/O base controllers |   | 1 point adjustable from 0...1023 points  |   |                |                                  |            |                         |
|   | 24 I/O and 40 I/O base controllers |   | 1 point adjustable from 0...1023 points + 1 point adjustable from 0...511 points   |   |                |                                  |            |                         |

1

### --- input characteristics

| Base controller type     |                                     | TWD LC●A<br>10DRF  | TWD LC●A<br>16DRF | TWD LC●A<br>24DRF | TWD LC●A<br>40DRF  | TWD LC●E<br>40DRF |
|--------------------------|-------------------------------------|--|-------------------|-------------------|--|-------------------|
| Number of input channels |                                     | 6  | 9                 | 14                | 24   |                   |
| Nominal input voltage    | V                                   | --- 24 sink/source (positive or negative logic)  |                   |                   |  |                   |
| Commons                  |                                     | 1  |                   |                   | 2  |                   |
| Input voltage range      | V                                   | --- 20.4...28.8  |                   |                   | --- 20.4...26.4  |                   |
| Nominal input current    |                                     | 11 mA for I0.0 and I0.1,<br>7 mA for other inputs I0.i   |                   |                   | 11 mA for I0.0, I0.1, I0.6 and I0.7,<br>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,<br>3.4 kΩ for other inputs I0.i  |                   |                   | 2.1 kΩ for I0.0, I0.1, I0.6 and I0.7,<br>3.4 kΩ for I0.2 to I0.5 and I0.8 to I0.23                       |                   |
| Filter time              | At state 1                          | 35 μs + programmed filter time for I0.0...I0.5,<br>40 μs + programmed filter time for other inputs I0.i  |                   |                   |  |                   |
|                          | At state 0                          | 45 μs + programmed filter time for I0.0...I0.5,<br>150 μs + programmed filter time for other inputs I0.i |                   |                   | 40 μs + programmed filter time for I0.0...I0.5,<br>150 μs + programmed filter time for other inputs I0.i |                   |
| Isolation                | Between channels                    | None   |                   |                   |  |                   |
|                          | Between channels and internal logic | V rms  | ~ 1500 for 1 min  |                   |  |                   |

### Output characteristics

| Number of output channels       |  | 4 relay  | 7 relay        | 10 relay       | 16 (14 relay + 2 transistor) |     |     |
|---------------------------------|--|--|----------------|----------------|------------------------------|-----|-----|
| Output currents                 | Nominal  | 2 per channel,<br>8 per common   |                |                | 2 (relay)<br>1 (transistor)  |     |     |
|                                 | Surge per channel  | 5 max.   |                |                | -                            |     |     |
| Commons                         | Common 0   | 3 N/O contacts   | 4 N/O contacts | 4 N/O contacts | -                            |     |     |
|                                 | Common 1   | 1 N/O contact  | 2 N/O contacts | 4 N/O contacts | -                            |     |     |
|                                 | Common 2   | -  | 1 N/O contact  | 1 N/O contact  | 4 N/O contacts               |     |     |
|                                 | Common 3   | -  | -              | 1 N/O contact  | 4 N/O contacts               |     |     |
|                                 | Common 4   | -  | -              | -              | 4 N/O contacts               |     |     |
|                                 | Common 5   | -  | -              | -              | 1 N/O contact                |     |     |
|                                 | Common 6   | -  | -              | -              | 1 N/O contact                |     |     |
| Minimum switching load          |  | mA 0.1 per --- 0.1 V (reference value)   |                |                |                              |     |     |
| Contact resistance              | When new   | mΩ 30 max  |                |                |                              |     |     |
| Loads on relay outputs          | Resistive (e.g.: heating element)                                  | A 2 at ~ 240 V or 2 at --- 30 V (with 1800 operations/hour max.):<br>- minimum electrical life: 1 x 10 <sup>5</sup> operations<br>- minimum mechanical life: 20 x 10 <sup>6</sup> operations |                |                |                              |     |     |
|                                 | inductive with protection device (1) (e.g.: relay, solenoid valve) |  |                |                |                              |     |     |
|                                 | Inductive without protection device                                |  |                |                |                              |     |     |
|                                 | Capacitive (e.g.: TeSys U starters, Festo solenoid valves)         |  |                |                |                              |     |     |
| Insulation voltage              | Between channels and internal logic                                | V rms ~ 1 500 for 1 min  |                |                |                              |     |     |
| Consumption for all the outputs | At state 0   | --- 5 V  | mA 5           | 5              | 5                            | 70  | 170 |
|                                 |  | --- 24 V   | mA -           | -              | -                            | 5   | 5   |
|                                 | At state 1   | --- 5 V  | mA 24          | 30             | 36                           | 90  | 190 |
|                                 |  | --- 24 V   | mA 26          | 40             | 55                           | 128 | 128 |
|                                 | At state 1 + inputs ON   | --- 5 V  | mA -           | -              | -                            | 140 | 240 |
|                                 |  | --- 24 V   | mA -           | -              | -                            | 128 | 128 |

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

|                |        |  |
|----------------|--------|--|
| Precision      | s/mth. | ± 30 at 25 °C  |
| Autonomy       | days   | approximately 30 at 25 °C with fully charged battery |
| Backup battery |        | See page 1/8   |

### Memory cartridge (optional) (2)

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

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

(2) Compact base controllers TWD LC●A 10DRF/16DRF/24DRF have only one cartridge slot, therefore only one type of cartridge (real-time clock or memory) can be used.

(3) Integrated real-time clock function for compact base controllers TWD LC●● 40DRF.



TWD LC●A 10DRF/16DRF

### References

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

### Compact base controllers, --- supply

|        |                    |   |   |          |     |                |       |
|--------|--------------------|---|---|----------|-----|----------------|-------|
| 10 I/O | 6 --- 24 V inputs  | 4 relay outputs                           | – | 700      | –   | TWD LCDA 10DRF | 0.230 |
| 16 I/O | 9 --- 24 V inputs  | 7 relay outputs                           | – | 2000     | –   | TWD LCDA 16DRF | 0.250 |
| 24 I/O | 14 --- 24 V inputs | 10 relay outputs                          | 4 | 3000     | –   | TWD LCDA 24DRF | 0.305 |
| 40 I/O | 24 --- 24 V inputs | 14 relay outputs and 2 transistor outputs | 7 | 3000 (1) | –   | TWD LCDA 40DRF | 0.525 |
|        |                    |   |   |          | Yes | TWD LCDE 40DRF | 0.525 |

### Separate components

| Description                      | Application                                    | Type  | Reference    | Weight kg     |       |
|----------------------------------|--|---|--------------|---------------|-------|
| <b>Cartridges</b>                | 32 Kb memory                                   | For all compact base controllers:<br>- Application backup<br>- Program transfer                                     | EEPROM       | TWD XCP MFK32 | 0.005 |
|                                  | 64 Kb memory                                   | For compact base controllers<br>TWD LC●● 40DRF:<br>- Memory extension<br>- Application backup<br>- Program transfer | EEPROM       | TWD XCP MFK64 | 0.005 |
|                                  | Real-time clock                                | For base controllers TWD LC●A 10/16/24DRF<br>Date-stamping RTC based programming                                    | –            | TWD XCP RTC   | 0.005 |
| <b>Serial interface adapters</b> | 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         |       |
| <b>Digital display</b>           | Data display and modification                  | –   | TWD XCP ODC  | 0.020         |       |
| <b>Input simulators</b>          | 6 inputs                                       | –   | TWD XSM 6    | –             |       |
|                                  | 9 inputs                                       | –   | TWD XSM 9    | –             |       |
|                                  | 14 inputs                                      | –   | TWD XSM 14   | –             |       |
| <b>External backup batteries</b> | For compact base controllers<br>TWD LC●● 40DRF | Sold individually   | TSX PLP 01   | –             |       |
|                                  |  | Sold in lots of 10  | TSX PLP 101  | –             |       |

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



TWD XCP MFK32/MFK64



TWD XCP RTC



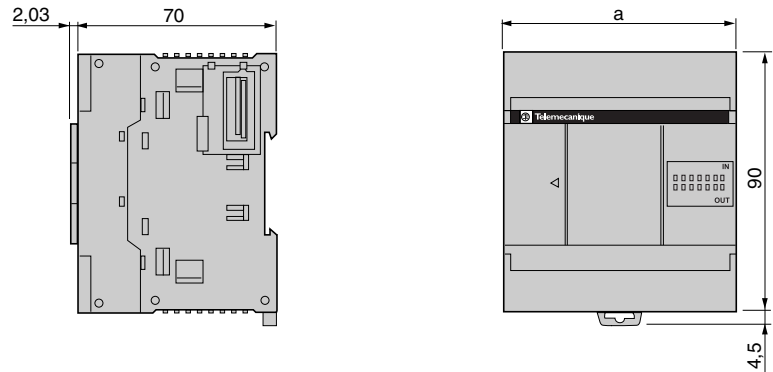
TWD NAC ●●●●



TWD XCP ODC

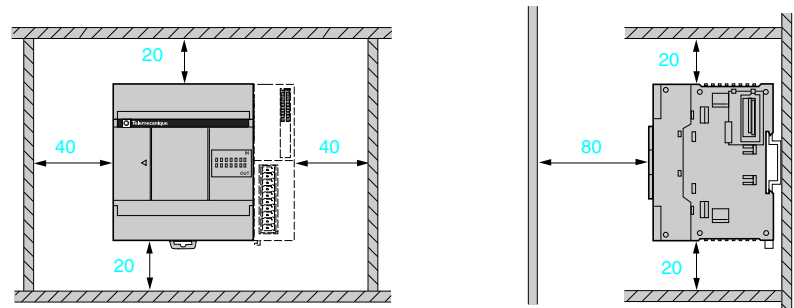
### Dimensions

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



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

### Installation rules



#### ⚠ Important:

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

### Connections

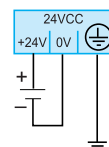
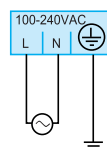
#### Connection of power supplies

TWD LCA● ●●DRF

TWD LCA● ●●DRF

~ 100...240 V supply

--- 24 V supply



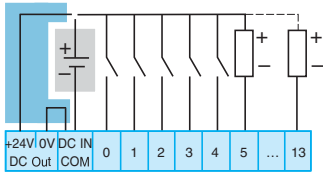


### Connections (continued)

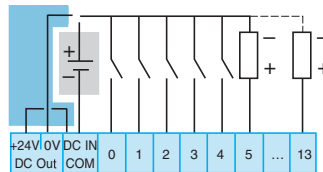
#### Connection of $\pm 24\text{ V}$ inputs

##### TWD LC●A 10DRF/16DRF/24DRF

Connection to sink inputs (positive logic)

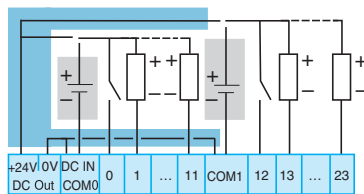


Connection to source inputs (negative logic)

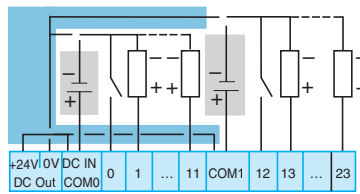


##### TWD LC●A 40DRF

Connection to sink inputs (positive logic)

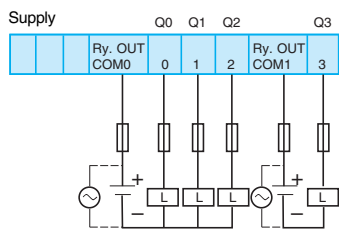


Connection to source inputs (negative logic)

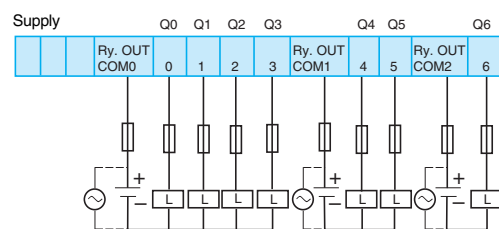


#### Connection of outputs

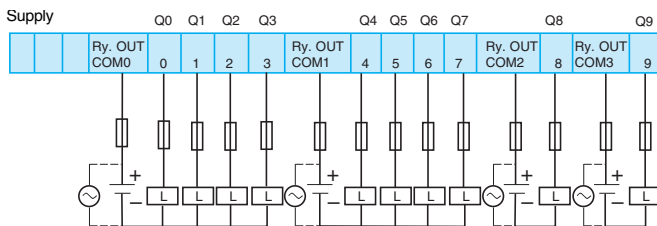
##### TWD LC●A 10DRF



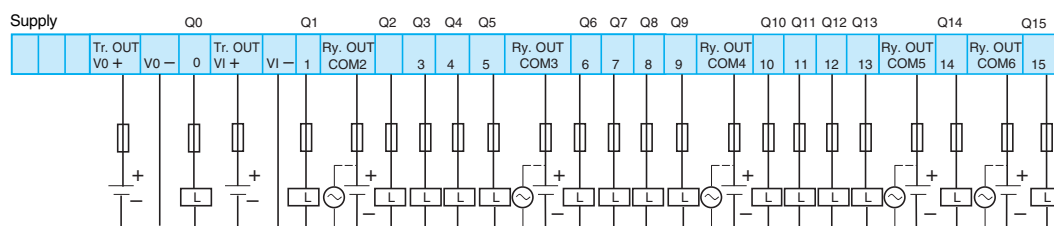
##### TWD LC●A 16DRF



##### TWD LC●A 24DRF



##### TWD LC●A 40DRF/TWD LC●E 40DRF



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

Sensors powered by external  $\pm 24\text{ V}$  supply.

1



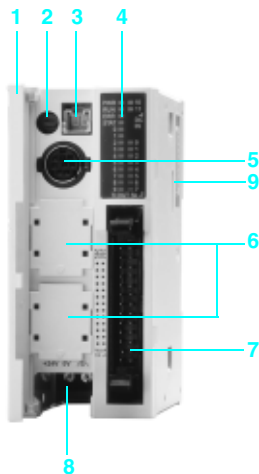
TWD LMDA 20DTK/20DUK



TWD LMDA 20DRT



TWD LMDA 40DTK/40DUK



### Presentation

The modular programmable controller range includes five base controllers, which differ in their processing capacity and their number and type of I/O (20 or 40 I/O with connection by screw terminal block or HE 10 connector, with relay or sink/source transistor outputs). They can be fitted with any of the I/O expansion modules in the range (18 discrete and analogue modules). All these modular base controllers use a  $\approx$  24 V power supply.

These modular base controllers offer:

- A modular design to adapt to the needs of the application by using a base controller which can be fitted with up to 4 or 7 discrete or analogue I/O 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 connectors which allow simple, fast and safe wiring. The Advantys Telefast ABE 7 system provides a pre-wired cabling solution, allowing connection of modules with HE 10 connectors to:
  - pre-formed cables with free wires at one end for direct connection to sensors/preactuators,

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

### Description

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

On the front panel:

- 1 A hinged access door.
- 2 An analogue adjustment point.
- 3 A connector for connection of the integrated analogue input.
- 4 A display block showing:
  - the status of the base controller by means of 7 pilot lights (PWR, RUN, STP, NCF, HLT and NEX)
  - the status of the inputs and outputs (IN● and OUT●).
- 5 A mini-DIN type RS 485 serial port connector (allowing connection of the programming terminal).
- 6 Two slots (protected by a removable cover) for memory cartridge **TWD XCP MFK32/MFK64** and real-time clock cartridge **TWD XCP RTC**.
- 7 One (or more) HE 10 connector(s) (26-way) or screw terminal block (with module **TWD LMDA 20DRT**) for connection of the input sensors/output preactuators.
- 8 Screw terminals for connection of the  $\approx$  24 V mains power supply.

On the right-hand side panel:

- 9 A connector for I/O expansion modules **TWD D●●**, **TWD A●●** and communication modules **TWD NOI 10M3/NC01M** (4 or 7 depending on the model).

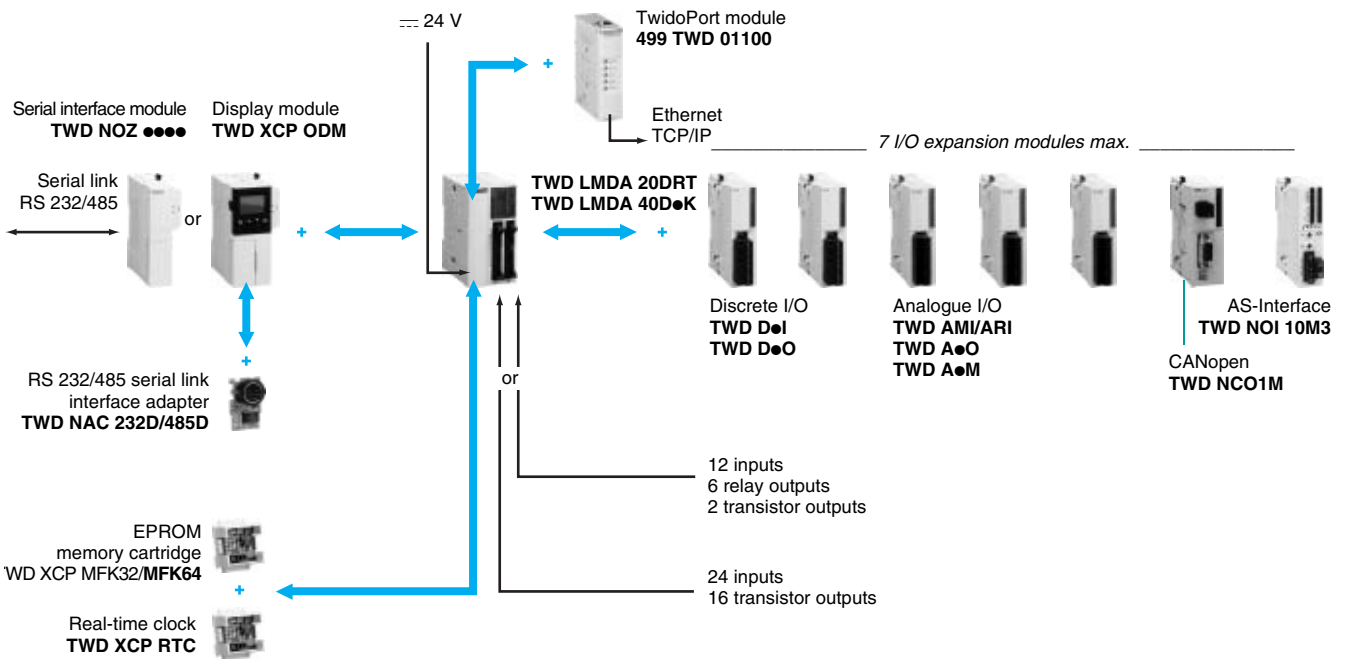
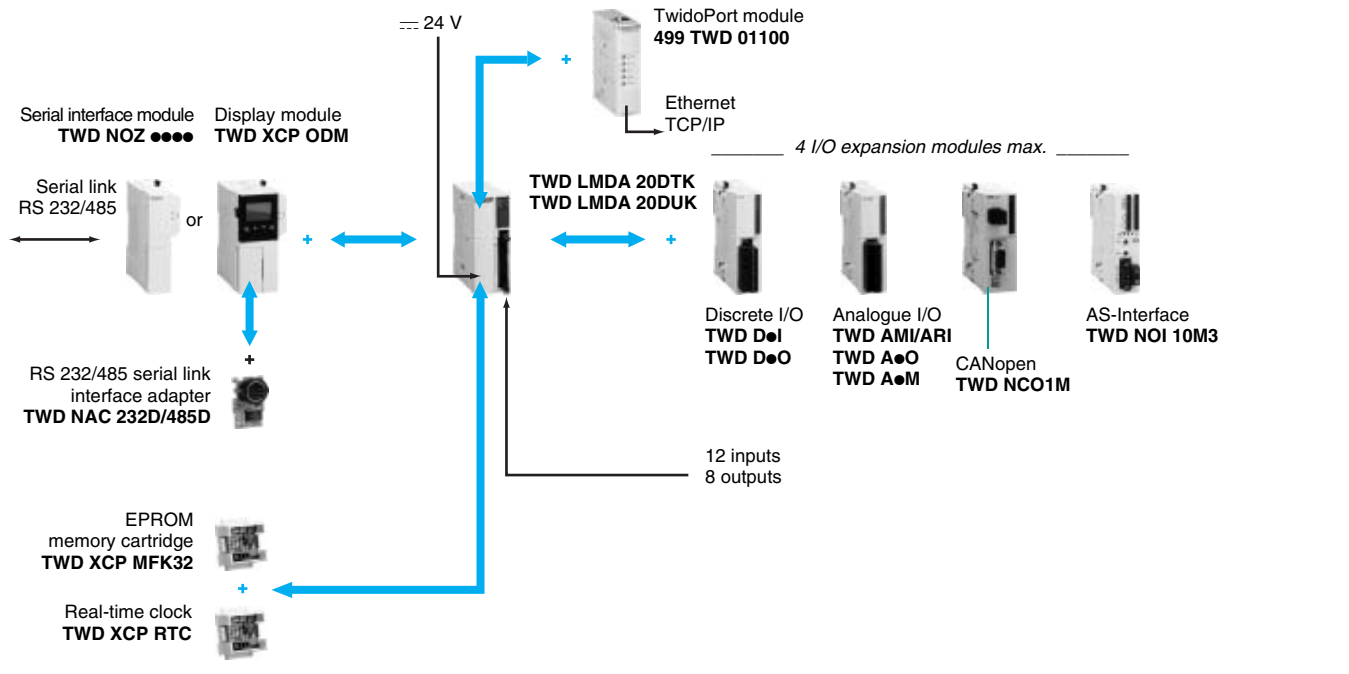
On the left-hand side panel:

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


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

**Descriptions** (continued)


**Configuration of modular base controllers**



1

| Environment                 |   | TWD              | LMDA 20DTK  | LMDA 20DUK | LMDA 20DRT | LMDA 40DTK | LMDA 40DUK |
|-----------------------------|---|------------------|---|------------|------------|------------|------------|
| <b>Base controller type</b> |   |                  |   |            |            |            |            |
| <b>Temperature</b>          |   | °C               | Operation: 0...+ 55; Storage: - 25...+ 70             |            |            |            |            |
| <b>Relative humidity</b>    |   |                  | 30 to 95 %, without condensation                      |            |            |            |            |
| <b>Degree of protection</b> |   |                  | IP 20   |            |            |            |            |
| <b>Altitude</b>             |   | m                | Operation: 0...2000; Storage: 0...3000                |            |            |            |            |
| <b>Vibration resistance</b> | Mounted on  rail | Hz               | 10...57, amplitude 0.075 mm, acceleration 57...150 Hz |            |            |            |            |
|                             |   | m/s <sup>2</sup> | 9.8 (1 gn)  |            |            |            |            |
|                             | Plate or panel mounted<br>(using fixing kit TWD XMT5)   | Hz               | 2...25, amplitude 1.6 mm, acceleration 25...100 Hz    |            |            |            |            |
|                             |   | m/s <sup>2</sup> | 39.2 (4 gn)   |            |            |            |            |
| <b>Shock resistance</b>     |   | m/s <sup>2</sup> | 147 (15 gn) for 11 ms                                 |            |            |            |            |

### General characteristics of modular base controllers

|  |                           |       |   |                 |   |                   |                 |
|--|---------------------------|-------|---|-----------------|---|-------------------|-----------------|
| <b>Backup battery</b>  | Data backed up            |       | Internal RAM: internal variables, internal bits and words, timers, counters, shift registers... |                 |   |                   |                 |
|  | Battery type              |       | Lithium battery, not interchangeable  |                 |   |                   |                 |
|  | Autonomy                  | days  | Approximately 30 at 25 °C with fully charged battery  |                 |   |                   |                 |
|  | Charging time             | h     | Approximately 15 to charge from 0...90% of the full charge                                      |                 |   |                   |                 |
|  | Life                      | years | 10  |                 |   |                   |                 |
| <b>Number of  24 V inputs</b> |                           |       | 12  |                 |   |                   |                 |
| <b>Outputs (1)</b>   | Number                    |       | 8   | 8               | 8   | 16                | 16              |
|  | Type                      |       | source transistor   | sink transistor | 6 relay and 2 source transistor                             | source transistor | sink transistor |
| <b>Connection of I/O</b>   |                           |       | HE 10 connector   |                 | Removable screw terminal block                              | HE 10 connector   |                 |
| <b>I/O expansion modules</b>   | Max. number of modules    |       | 4   |                 | 7   |                   |                 |
|  | Max. number of I/O        |       | 84/116/148 (2)  |                 | 132/188/244 (2) 152/208/264 (2)                             |                   |                 |
|  | AS-Interface              |       | Management of slave modules: 62 (discrete), 7 (analogue)  |                 |   |                   |                 |
| <b>Application memory capacity</b>   |                           |       | 3000 instructions   |                 | 3000 instructions, 6000 with memory cartridge TWD XCP MFK64 |                   |                 |
| <b>Cycle time</b>  | Processing time           | ms    | 1 for 1000 logic instructions   |                 |   |                   |                 |
|  | System overhead           | ms    | 0.5   |                 |   |                   |                 |
| <b>Data memory</b>   | Internal bits             |       | 256   |                 |   |                   |                 |
|  | Internal words (3)        |       | 3000  |                 |   |                   |                 |
|  | Timers (3)                |       | 128   |                 |   |                   |                 |
|  | Counters (3)              |       | 128   |                 |   |                   |                 |
|  | Double words              |       | Yes   |                 |   |                   |                 |
|  | Floating, trigonometrical |       | -   |                 |   | Yes               |                 |

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

(2) The 1<sup>st</sup> value corresponds to the maximum number of I/O (base controller and expansion module) with screw terminal expansion modules, the 2<sup>nd</sup> value is for spring terminal expansion modules and the 3<sup>rd</sup> is for HE 10 connector expansion modules.

(3) The maximum values cannot be cumulated.

| Supply                           |                                    |       | TWD LMDA 20DTK<br>TWD LMDA 20DUK | TWD LMDA 20DRT                  | TWD LMDA 40DTK<br>TWD LMDA 40DUK |
|----------------------------------|------------------------------------|-------|----------------------------------|---------------------------------|----------------------------------|
| Voltage                          | Rated                              | V     | ~ 24                             |                                 |                                  |
|                                  | Limit (including ripple)           | V     | ~ 20.4...26.4                    |                                 |                                  |
| ~ 24 V output for sensors        |                                    |       | -                                |                                 |                                  |
| Power at ~ 26.4 V                |                                    | W     | 15 (base + 4 expansion modules)  | 19 (base + 7 expansion modules) |                                  |
| Maximum inrush current at ~ 24 V |                                    | A     | 50                               |                                 |                                  |
| Duration of microbreaks          |                                    | ms    | 10 max                           |                                 |                                  |
| Built-in protection              |                                    |       | By internal fuse                 |                                 |                                  |
| Dielectric strength              | Between supply and earth terminals | V rms | 500 for 1 mn                     |                                 |                                  |
|                                  | Between I/O and earth terminals    | V rms | 1500 for 1 mn                    |                                 |                                  |
| Insulation resistance            | Between supply and earth terminals | MΩ    | > 10 (~ 500 V)                   |                                 |                                  |
|                                  | Between I/O and earth terminals    | MΩ    | > 10 (~ 500 V)                   |                                 |                                  |

| Communication                                    |              |   | TWD LMDA 20DTK<br>TWD LMDA 20DUK  | TWD LMDA 20DRT | TWD LMDA 40DTK<br>TWD LMDA 40DUK |
|--|--------------|---|---|----------------|----------------------------------|
| Integrated connection                            | Serial link  | Type  | 1 x RS 485 serial link, not isolated, 38,4 Kbit/s   |                |                                  |
|  |              | Protocol  | -Half-duplex terminal port<br>-Modbus master/slave RTU/ASCII or character mode<br>-"Remote link" decentralised I/O (Twido base controllers used as I/O extension or as local "reflex" controller) see page 3/21 |                |                                  |
|  | Connection   | 8-way mini-DIN connector  |   |                |                                  |
| Connections via adapter or communication modules | Serial link  | Type  | One RS 232C or RS 485 adapter, 1.2...38.4 Kbit/s (1)  |                |                                  |
|  |              | Connection  | Mini-DIN or terminal block (RS 485 only)  |                |                                  |
|  | AS-Interface | Type  | One or 2 master modules (standard and extended addressing), 62 slaves   |                |                                  |
|  |              | Connection  | Removable screw terminal block  |                |                                  |
|  | CANopen      | Type  | One master module (class M10), 125...500 Kbit/s, 16 slaves max.   |                |                                  |
|  | Connection   | 9-way SUB-D male connector  |   |                |                                  |
| Ethernet TCP/IP                                  | Type         | One TwidoPort 10BASE-T/100BASE-TX interface module (class A10)            |   |                |                                  |
|  | Connection   | RJ45 connector. Supply to the module via integrated RS 485 link connector |   |                |                                  |

| Integrated functions       |                    |   | TWD LMDA 20DTK<br>TWD LMDA 20DUK   | TWD LMDA 20DRT | TWD LMDA 40DTK<br>TWD LMDA 40DUK |
|----------------------------|--------------------|---|--|----------------|----------------------------------|
| Counting                   | Number of channels |   | 4  |                |                                  |
|                            | Frequency          |   | 2 channels at 5 kHz (function FCi), 2 channels at 20 kHz (function VFCi) |                |                                  |
|                            | Capacity           |   | 16 bits (function FCi), 32 bits (function VFCi)                          |                |                                  |
| Positioning                | Number of channels |   | 2  |                |                                  |
|                            | Frequency          | kHz                                     | 7  |                |                                  |
|                            | Functions          |   | PWM, pulse width modulation output; PLS, pulse generator output          |                |                                  |
| Analogue input             | Number of channels |   | 1 channel  |                |                                  |
|                            | Range              |   | 0...10 V   |                |                                  |
|                            | Resolution         |   | 9 bits (0...511 points)  |                |                                  |
|                            | Input impedance    | kΩ                                      | 100  |                |                                  |
| PID                        |                    | Yes                                     |  |                |                                  |
| Event processing           |                    | Yes                                     |  |                |                                  |
| Analogue adjustment points |                    | 1 point adjustable from 0...1023 points |  |                |                                  |

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

### --- input characteristics

| Base controller type     | TWD                                 | LMDA 20DTK  | LMDA 20DUK       | LMDA 20DRT | LMDA 40DTK | LMDA 40DUK |
|--------------------------|-------------------------------------|---|------------------|------------|------------|------------|
| Number of input channels |                                     | 12  |                  |            | 24         |            |
| Rated input voltage      | V                                   | --- 24 sink/source (positive or negative logic)                   |                  |            |            |            |
| Commons                  |                                     | 1   |                  |            | 2          |            |
| Input voltage range      | V                                   | --- 20.4...26.4   |                  |            |            |            |
| Rated input current      | mA                                  | 5 for I0.0 and I0.1, I0.6 and I0.7, 7 for other inputs I0.i       |                  |            |            |            |
| Input impedance          | kΩ                                  | 5.7 for I0.0 and I0.1, I0.6 and I0.7, 4,7 for other inputs I0.i   |                  |            |            |            |
| Filter time              | At state 1                          | μs 35 for I0.0 and I0.1, I0.6 and I0.7, 40 for other inputs I0.i  |                  |            |            |            |
|                          | At state 0                          | μs 45 for I0.0 and I0.1, I0.6 and I0.7, 150 for other inputs I0.i |                  |            |            |            |
| Isolation                | Between channels                    | None  |                  |            |            |            |
|                          | Between channels and internal logic | V rms   | ~ 1500 for 1 min |            |            |            |

### Transistor output characteristics

|                                |                                     |        |   |        |      |
|--------------------------------|-------------------------------------|--------|---|--------|------|
| Number of output channels      |                                     | 8      |   | 2      | 16   |
| Output logic (1)               |                                     | Source | Sink  | Source | Sink |
| Commons                        |                                     | 1      |   |        | 2    |
| Nominal output values          | Voltage                             | V      | 24  |        |      |
|                                | Current                             | A      | 0.3   |        |      |
| Output voltage range           | Voltage                             | V      | 20.4...28.8                                       |        |      |
|                                | Current per channel                 | A      | 0.36  |        |      |
|                                | Current per common                  | A      | 1   |        |      |
| Response time                  | At state 1                          | μs     | 5 for Q 0.0 and Q0.1, 300 for other outputs Q 0.i |        |      |
|                                | At state 0                          | μs     | 5 for Q 0.0 and Q0.1, 300 for other outputs Q 0.i |        |      |
| Residual voltage               | At state 1                          | V      | 1 max   |        |      |
| Maximum inrush current         |                                     | A      | 1   |        |      |
| Leakage current                |                                     | mA     | 0.1   |        |      |
| Overvoltage protection         |                                     | V      | 39  |        |      |
| Maximum power of filament lamp |                                     | W      | 8   |        |      |
| Isolation                      | Between channels                    |        | None  |        |      |
|                                | Between channels and internal logic | V rms  | ~ 1500 for 1 min                                  |        |      |

### Characteristics of relay outputs for base controller TWD LMDA 20DRT

|                                 |  |  |
|---------------------------------|--|--|
| Number of output channels       |  | 6  |
| Output currents                 | Normal   | A 2 per channel, 8 per common  |
|                                 | Surge per channel  | A 5 max.   |
| Commons                         | Common 1   | 3 N/O contacts   |
|                                 | Common 2   | 2 N/O contacts   |
|                                 | Common 3   | 1 N/O contact  |
| Minimum switching load          |  | mA 0.1 per --- 0.1 V (reference value)   |
| Contact resistance              | When new   | mΩ 40 max  |
| Loads on relay output           | Resistive (e.g.: heating element)                                  | A 2 at ~ 240 V or 2 at --- 30 V (with 1800 operations/hour max.):<br>- minimum electrical life: 1 x 10 <sup>5</sup> operations<br>- minimum mechanical life: 20 x 10 <sup>6</sup> operations |
|                                 | Inductive with protection device (2) (e.g.: relay, solenoid valve) |  |
|                                 | Inductive without protection device                                |  |
|                                 | Capacitive (e.g.: TeSys U starters, Festo solenoid valves)         |  |
| Insulation voltage              | Between channels & int. logic                                      | V rms ~ 1 500 for 1 min  |
| Consumption for all the outputs | At state 1 --- 5 V   | mA 30  |
|                                 | --- 24 V   | mA 40  |
|                                 | At state 0 --- 5 V   | mA 5   |

### Real-time clock cartridge (optional)

|                |        |  |
|----------------|--------|--|
| Precision      | s/mth. | ± 30 at 25 °C  |
| Autonomy       | days   | approximately 30 at 25 °C with fully charged battery |
| Backup battery |        | See page 1/16  |

### Memory cartridge (optional)

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

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

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



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



TWD LMDA 20DRT



TWD XCP MFK ●●



TWD XCP ODM



TWD NAC 232D/485D    TWD NAC 485T



TWD NOZ ●●●

### References

| Sink/source inputs                      | Outputs  | No. of I/O expansion modules | No. of program memory instructions | Reference          | Weight kg |
|---|--|------------------------------|------------------------------------|--------------------|-----------|
| <b>Modular base controllers, 20 I/O</b> |  |                              |                                    |                    |           |
| 12 $\equiv$ 24 V inputs                 | 8 source transistor outputs                    | 4                            | 3000                               | TWD LMDA 20DTK (2) | 0.140     |
|   | 8 sink transistor outputs                      | 4                            | 3000                               | TWD LMDA 20DUK (2) | 0.140     |
|   | 6 relay outputs<br>2 source transistor outputs | 7                            | 3000 (1)                           | TWD LMDA 20DRT     | 0.185     |

### Modular base controllers, 40 I/O

|                         |                              |   |          |                    |       |
|-------------------------|------------------------------|---|----------|--------------------|-------|
| 24 $\equiv$ 24 V inputs | 16 source transistor outputs | 7 | 3000 (1) | TWD LMDA 40DTK (2) | 0.180 |
|                         | 16 sink transistor outputs   | 7 | 3000 (1) | TWD LMDA 40DUK (2) | 0.180 |

### Separate components

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

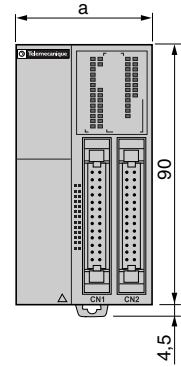
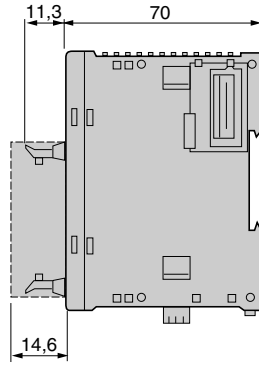
### Spare parts

|   |   |   |               |   |
|---|---|---|---------------|---|
| <b>Screw terminal blocks</b><br>(Sold in lots of 2) | Base controller TWD LMDA 20DRT, 13 contacts | – | TWD FTB 2T13  | – |
|   | Base controller TWD LMDA 20DRT, 16 contacts | – | TWD FTB 2T16  | – |
| <b>Analogue input cable</b>                         | For integrated analogue input. Length 1 m   | – | TWD XCA 2A10M | – |
| <b>Pre-formed cables</b>                            | Base controller TWD LMOA ●0DTK/DVK          | – | See page 5/12 | – |

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

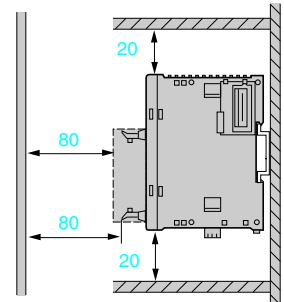
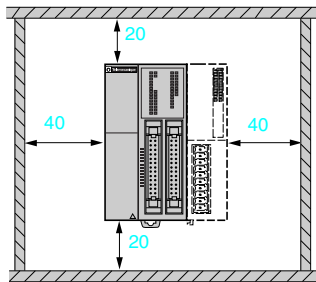
(2) Connection by HE10 connector, allowing use of the Telefast ABE 7 pre-wired system (see page 5/12).

**Dimensions**  
**TWD LMDA 20D●K/20DRT/40D●K**



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

**Installation rules**



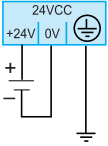
- ⚠ Important:**
- Horizontal or flat mounting: not permissible.
  - Avoid placing devices which generate heat (transformers, power supplies, power contactors...) beneath the controller.



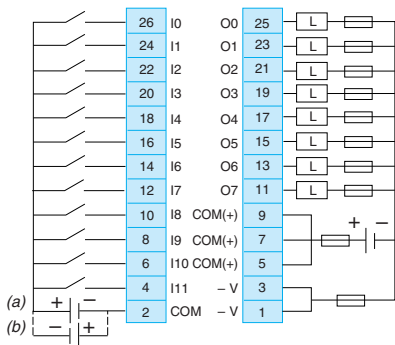
### Connections

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

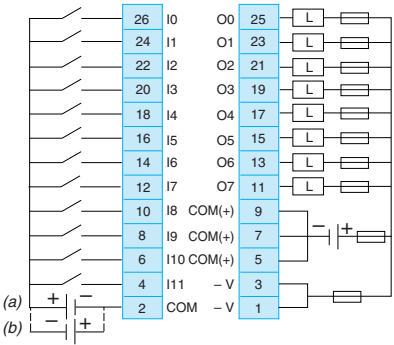
≡ 24 V supply



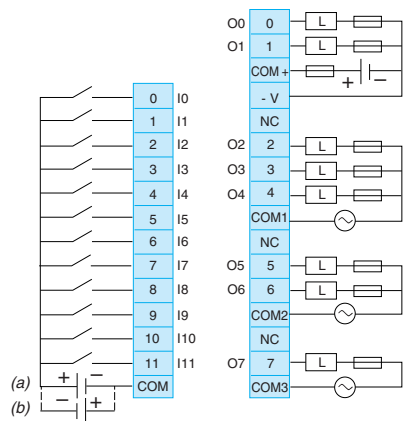
#### TWD LMDA 20DTK



#### TWD LMDA 20DUK



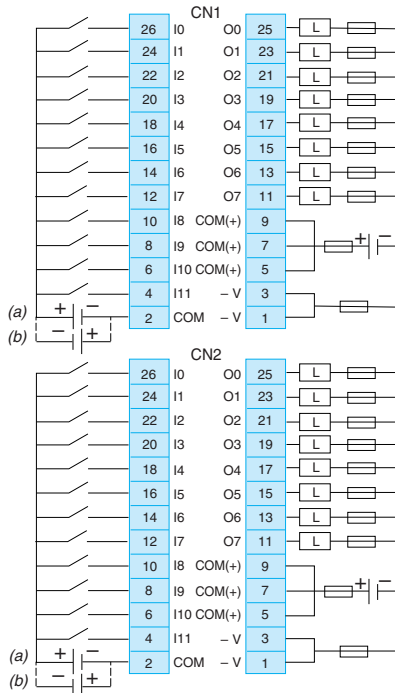
#### TWD LMDA 20DRT



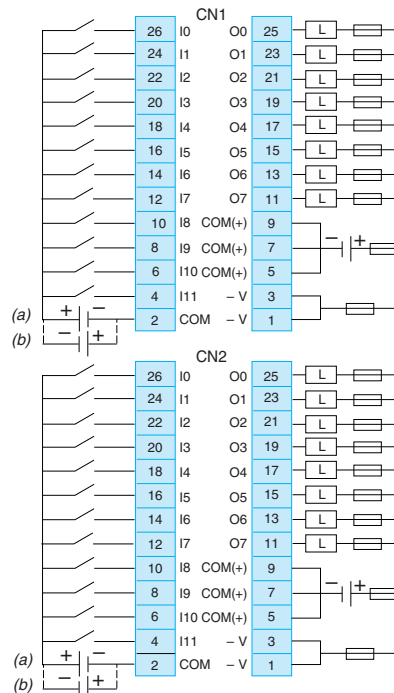
- The COM (+) and COM (-) terminals are interconnected internally.
- The COM and COM (+), COM and COM (-) terminals are independent.
- The -V and +V terminals are linked internally.

- 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



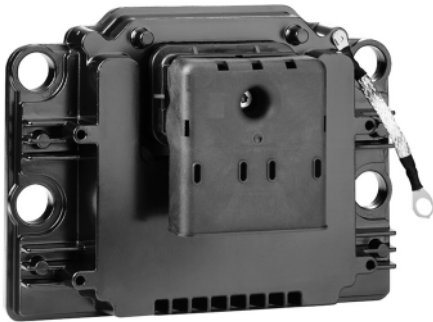
#### TWD LMDA 40DUK



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

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

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



TWD LEDCK1

### Presentation

The Twido Extreme range of programmable controllers offers a solution for applications subjected to severe environmental conditions in terms of temperature, vibrations, oil splashing, and impacts, for example.

It comprises a **TWD LEDCK1** controller for integration in fixed-installation machines (in external pump management or waste water treatment applications, for example) or for on-board mobile equipment, such as in specialist vehicles (garbage trucks, fire trucks, etc.).

The Twido Extreme controller is powered with 12 V  $\overline{\text{DC}}$  or 24 V  $\overline{\text{DC}}$  supplied by a buffer battery, the vehicle battery or a UPS device. It has a wide operating range extending from 9...16 V or 18...32 V.

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

The Twido Extreme controller has:

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

The Twido Extreme controller has three communication ports:

- One Modbus serial port
- One CANopen port
- One CAN J1939 port

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



TwidoSuite programming software

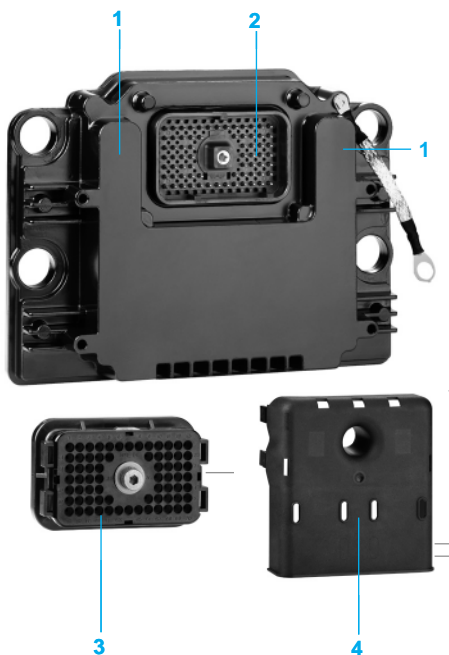
### Description

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

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

**To be ordered separately:**

- **TWD FCNK70**: One connector kit for assembly comprising one 70-way female connector **3**, 80 pins, 80 plugs and one cover **4**  
or
- **TWD FCWK70L015**: One 70-way female connector **3** equipped with a 1.5 m cable (and flying leads at the other end) and one cover **4**



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

(1) Values applicable to the base TWD LEDCK1, the xing kit TWD XMTK4 and the connector to be assembled TWD FCNK70. For the preformed connector TWD FCWK70L015: operating and storage temperatures: - 40...+75°C and no immunity to splashing of chemical products.

(2) Devices must be installed and wired in accordance with the instructions in the setup manual for the Twido Extreme controller.

(3) The controller is mounted using the xing kit TWD XMTK4.

1

|   |                        |  |   |   |  |
|---|------------------------|--|---|---|--|
| <b>Type of controller base</b>                        |                        | TWD LEDCK1   |   |   |  |
| <b>Characteristics of the Extreme base</b>            |                        |  |   |   |  |
| <b>Input/output voltage</b>                           |                        | 12 V $\overline{\text{DC}}$                                    | 24 V $\overline{\text{DC}}$                                       |   |  |
| <b>Number</b>   | Inputs                 | 22, see page 1/25 for details                                  |   |   |  |
|   | Outputs                | 19, see page 1/25 for details                                  | 11, see page 1/25 for details                                     |   |  |
| <b>PLC scan</b>                                       |                        | Normal (cyclic) or periodic (constant) from 2...150 ms         |   |   |  |
| <b>Application memory capacity</b>                    |                        | 3,000 instructions   |   |   |  |
| <b>I/O connection</b><br>On a single 70-way connector |                        |  |   |   |  |
| <b>Scan time</b>                                      | Execution time         | <b>ms</b>  | 10 for 1,000 logical or numerical instructions                    |   |  |
|   | System overhead        | <b>ms</b>  | 0.7   |   |  |
| <b>Data memory</b>                                    | Internal bits          | 256  |   |   |  |
|   | Internal words         | 3,000 (single, double, floating point and trigonometric words) |   |   |  |
|   | Timers                 | 128  |   |   |  |
|   | Counters               | 128  |   |   |  |
| <b>Backup battery</b>                                 |                        | Backup by external battery with key switch mechanism           |   |   |  |
| <b>Power supply</b>                                   | Nominal voltage        | <b>V <math>\overline{\text{DC}}</math></b>                     | 12   24   |   |  |
|   | Limit values           | <b>V <math>\overline{\text{DC}}</math></b>                     | 9...16   18...32  |   |  |
|   | Maximum inrush current | <b>A</b>   | 50 for 20 ms max.   |   |  |
| <b>Maximum power consumption</b>                      |                        | <b>VA</b>  | 96 (100% of outputs at state 1 and at full load)                  |   |  |
| <b>Communication</b>                                  |                        |  |   |   |  |
| <b>Function</b>                                       |                        | <b>Serial link</b>   | <b>CANopen</b>  | <b>CAN J1939</b>  |  |
| <b>Type of port</b>                                   |                        | RS 485   | CAN   | CAN   |  |
| <b>Maximum data rate</b>                              |                        | <b>Kbps</b>  | 38.4  | 500   | 250  |
| <b>Slave devices</b>                                  |                        | Number   | –   | 16 max.   | –  |
| <b>Object variables</b>                               |                        | Number   | –   | 16 PDO variables in read mode<br>16 PDO variables in write mode<br>(PDO: Process Data Object) | 32 PGN variables in read/write mode<br>(PGN: Parameter Group Number) |
| <b>Connection of programming terminal</b>             |                        | Half-duplex terminal port                                      | –   | –   |  |
| <b>Communication protocols</b>                        |                        | Modbus RTU<br>Master/Slave<br>ASCII character model            | Master<br>Conformity class M10                                    | J1939   |  |
| <b>Integrated functions</b>                           |                        |  |   |   |  |
| <b>Counting</b>                                       | Number of channels     |  | 1, see details on pages 1/25 and 4/5                              |   |  |
|   | Frequency              | <b>kHz</b>   | 10  |   |  |
|   | Capacity               |  | 16 bits or 32 bits  |   |  |
| <b>Position control</b>                               | Number of channels     |  | 3 outputs configurable as either PWM or PLS                       |   |  |
|   | Frequency              | <b>kHz</b>   | 1 for 2 outputs<br>5 for 1 output                                 |   |  |
|   | Functions              |  | PWM, pulse width modulation output<br>PLS, pulse generator output |   |  |
| <b>Process control (PID)</b>                          |                        |  | Yes   |   |  |
| <b>Event processing</b>                               |                        |  | Yes   |   |  |

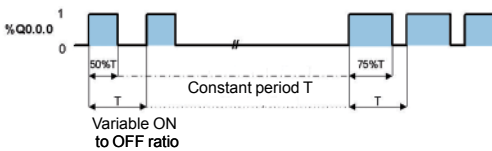
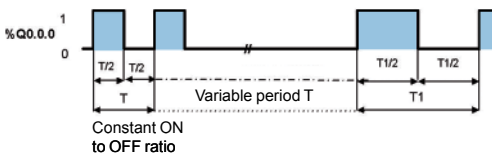
| Type of controller base                                   |                                |  | TWD LEDCK1  |                  |   |   |       |  |
|---|--------------------------------|--|---|------------------|---|---|-------|--|
| <b>Characteristics of discrete, analog and PWM inputs</b> |     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

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

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



Example of control lever with 1 or 2 electronic shafts



## PWM function: Pulse Width Modulation

### PWM inputs

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

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

### PWM/PLS outputs

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

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

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

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

### PLS function

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

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

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

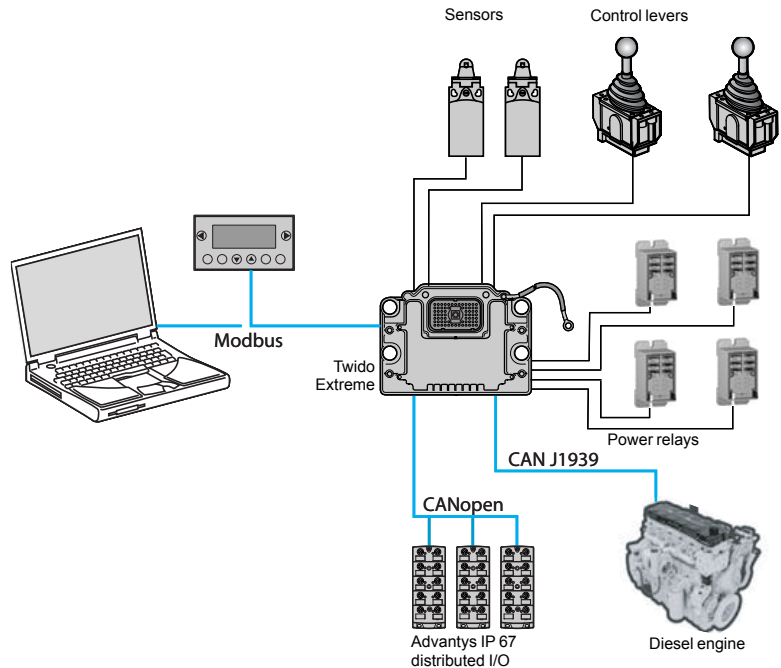
### PWM function

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

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

### Communication

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



### CAN J1939 communication protocol

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

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

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

*IWCx, y, z, QWCx, y, z*, where:

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

The CAN J1939 architecture of a Twido Extreme system consists of:

- 32 CAN J1939 objects, maximum addresses: 0 to 255.

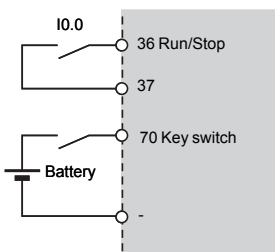
### Key switch function

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

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

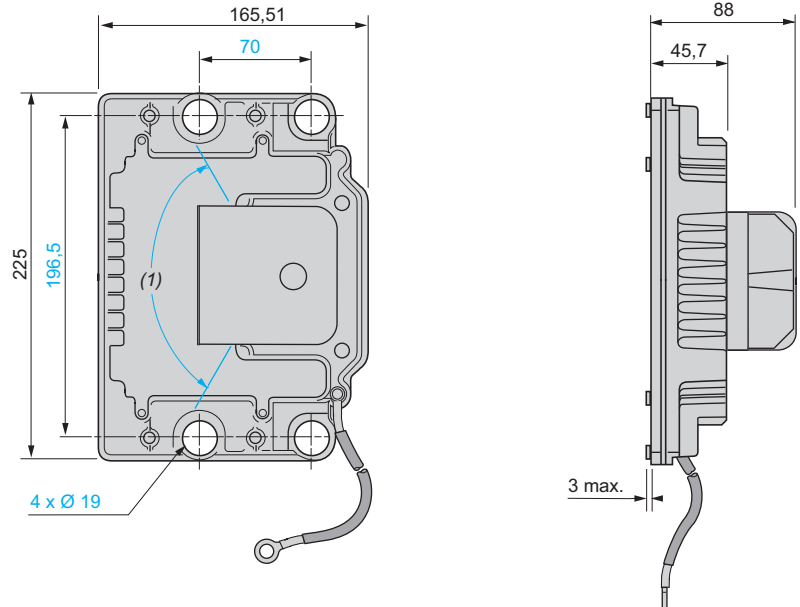
When exiting standby mode and starting the application (RUN), the application will resume its cycle at the state it was in at the time of stopping (before setting to standby).

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



### Dimensions

TWD LEDCK1 (dimensions in mm)



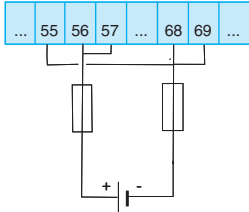
(1) Area of the conductors output



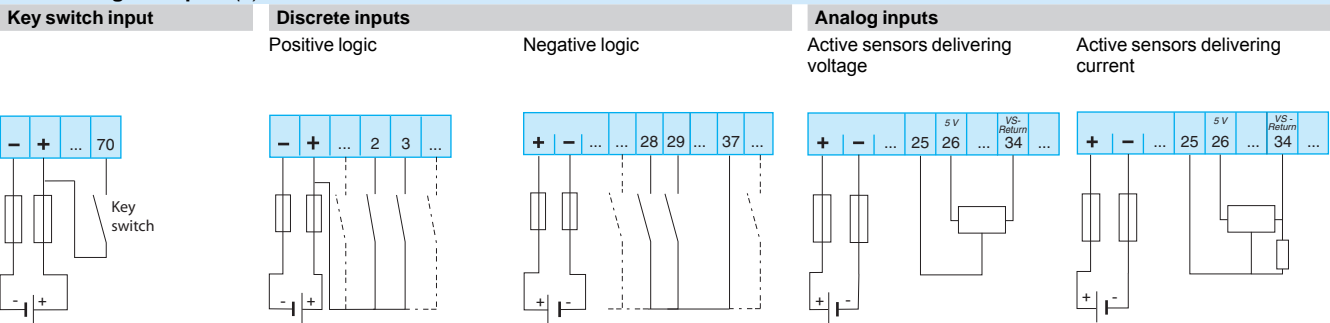
### Connections

#### Connecting the 12 or 24 V AC power supply

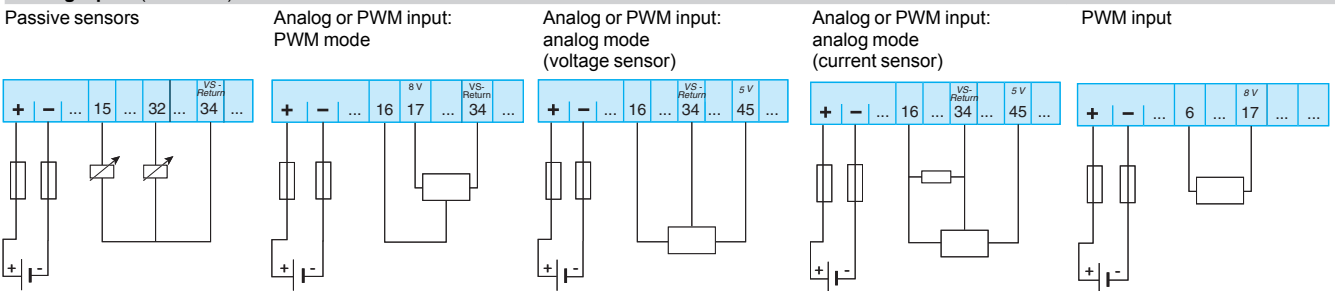
#### TWD LEDCK1



### Connecting the inputs (1)

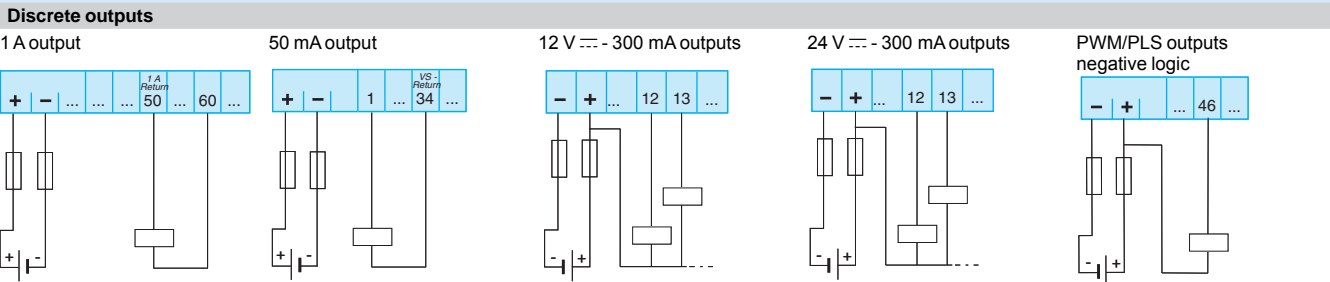


### Analog inputs (continued)



R = 250 Ω, 5 V/20 mA

### Connecting the outputs (1)



(1) These diagrams illustrate an example of how to connect each input/output.  
 (2) Number of outputs depending on the voltage, see page 1/25.

1



TWD LEDCK1

## References

## Twido Extreme base

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

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

| Designation                                     | Use  | Reference      | Weight kg |
|---|--|----------------|-----------|
| Fixing kit                                      | 4 spacers, 8 washers, 8 shock mounts                           | TWD XMTK4      | 0.150     |
| IP 67 70-way connectors<br>No. 2, see page 1/31 | For mounting (1) with 80 pins, 80 plugs, 1 cover               | TWD FCNK70     | 0.200     |
|   | Preformed with a 1.5 m cable and flying leads at the other end | TWD FCWK70L015 | 2.920     |

## Separate parts for Twido Extreme controller

| Designation   | Use   | Reference                   | Weight kg             |                |           |
|---|---|-----------------------------|-----------------------|----------------|-----------|
| Crimping pliers                                     | Crimping wires onto the 70-way connector pins | TWD XMTCT                   | –                     |                |           |
| Designation   | Control voltage                               | Number and type of contacts | Order in multiples of | Unit reference | Weight kg |
| IP 40 power relay<br>(thermal current Ith 30 A) (2) | 12 V $\overline{\text{---}}$                  | 2 "N/O"                     | 10                    | RPF 2AJD       | 0.086     |
|   |   | 2 "C/O"                     | 10                    | RPF 2BJD       | 0.086     |
|   | 24 V $\overline{\text{---}}$                  | 2 "N/O"                     | 10                    | RPF 2ABD       | 0.086     |
|   |   | 2 "C/O"                     | 10                    | RPF 2BBD       | 0.086     |



RPF 2●●D



XGS Z33 ETH

## Components for connection to the Ethernet TCP/IP network

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



TCS ESU 051 F0



499 NES 251 00

## Components for connection to the CANopen network

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

(1) Requires the use of crimping pliers TWD XMTCT.

(2) Ith = 30 A for mounting with a space of 13 mm between two relays, Ith = 25 A for side-by-side mounting. Operating temperature range around the product: -40...85°C.



FTX CN32●●



TWD NADK70P



TSX CUSB 485



VW3 A8 114



VW3 A8 115

**References (continued)**

**Components for connecting to the PC programming terminal**

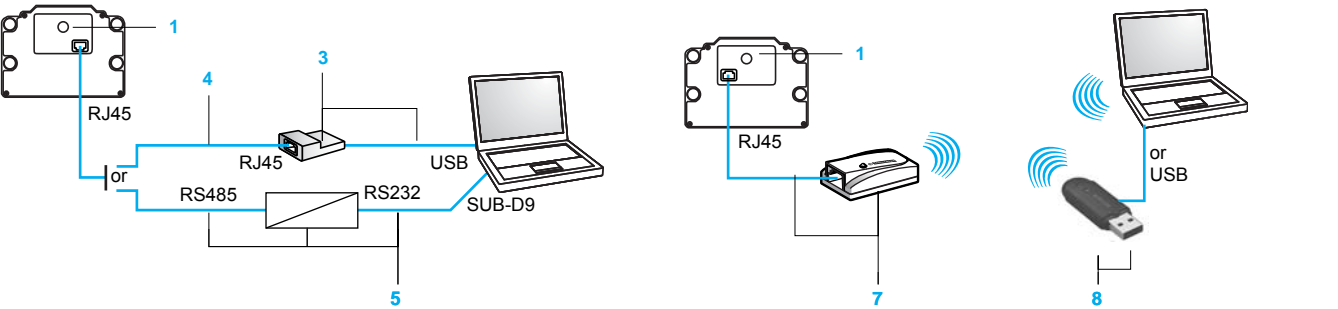
| Designation                                 | Description   | No. | Reference          | Weight kg |
|---|---|-----|--------------------|-----------|
| <b>70-way connector with RJ45 connector</b> | The RJ45 (RS 485) connector integrated in the 70-way connector can be used to connect the Twido Extreme controller to a programming PC via the RJ45 connector | 1   | <b>TWD NADK70P</b> | 0.200     |

12 V or 24 V  $\overline{\text{---}}$  power supply on 2 screw terminals

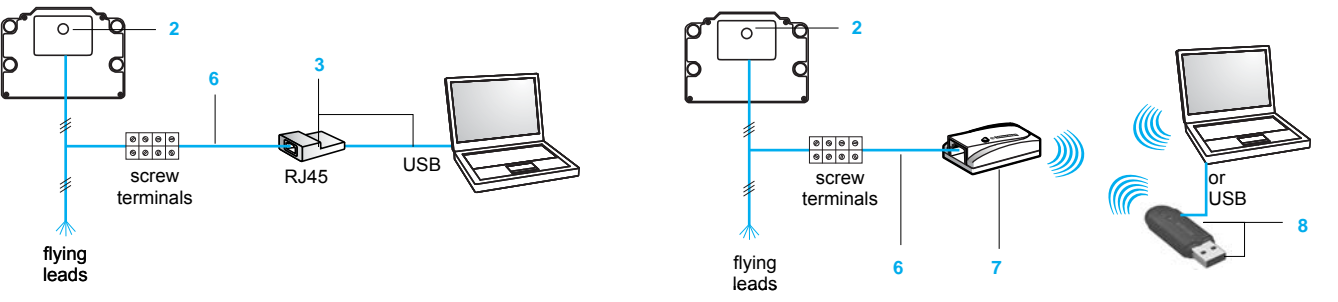
| Designation   | From   | To   | Length | Reference | Weight kg             |       |
|---|--|--|--------|-----------|-----------------------|-------|
| <b>USB/RS485 converter</b>                              | PC USB port                                  | RS485 cable 4<br>VW3 A8 306 R●●                | 0.4 m  | 3         | <b>TSX CUSB 485</b>   | 0.144 |
| <b>RS 485 cables</b><br>RJ45-RJ45 connectors            | USB/RS485 converter 3<br>TSX CUSB 485        | RJ45 connector 1<br>TWD NADK70P                | 0.3 m  | 4         | <b>VW3 A8 306 R03</b> | 0.025 |
|   |  |  | 1 m    | 4         | <b>VW3 A8 306 R10</b> | 0.060 |
|   |  |  | 3 m    | 4         | <b>VW3 A8 306 R30</b> | 0.130 |
| <b>RS 485 cable</b><br>RJ45 connector-flying leads      | USB/RS485 converter 3<br>TSX CUSB 485        | 70-way preformed connector 2<br>TWD FCWK70L015 | 3 m    | 6         | <b>VW3 A8 306 D30</b> | 0.150 |
| <b>Connection kit for PC serial port (1)</b>            | PC RS 232 serial port, 9-way SUB-D connector | RJ45 connector 1<br>TWD NADK70P                | 3 m    | 5         | <b>VW3 A8 106</b>     | 0.350 |
| <b>Bluetooth gateway for PC (2)</b>                     | RJ45 connector 1<br>TWD NADK70P              | –  | 0.1 m  | 7         | <b>VW3 A8 114</b>     | 0.155 |
| <b>Bluetooth USB adaptor for PC (3)</b><br>(range 10 m) | PC USB port                                  | –  | –      | 8         | <b>VW3 A8 115</b>     | 0.290 |

- (1) The connection kit **VW3 A8 106** consists of:
- One 3 m cable with two RJ45 connectors
  - One RS 232/RS 485 converter with 3 m cable equipped with one 9-way female SUB-D connector and one RJ45 connector
  - Three adaptors dedicated to ATV11/38/58/58F/68 drives
- (2) The Bluetooth gateway **VW3 A8 114** consists of:
- One Bluetooth adaptor (range 10 m, class 2) with an RJ45 connector
  - One 0.1 m cable with two RJ45 connectors
  - One cable and one adaptor dedicated to TwidoSuite and ATV11/38/58/58F/68 drives
- (3) USB-Bluetooth adaptor **VW3 A8 115** for use on the PC USB port if it does not have Bluetooth technology.

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



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



**Note:** No. 2 = IP 67 70-way connector TWD FCN70 or TWD FCWK70L015, see page 1/30.



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## 2.1 Discrete I/O modules

*Discrete input/output modules selection guide* ..... page 2/2

### ■ Discrete I/O modules

- Presentation, description ..... page 2/6
- Characteristics ..... page 2/7
- References ..... page 2/8
- Dimensions ..... page 2/10
- Connections ..... page 2/10

## 2.2 Analog I/O modules

*Analog I/O modules selection guide* ..... page 2/14

### ■ Analog I/O modules

- Presentation, description ..... page 2/16
- Characteristics ..... page 2/17
- References ..... page 2/20
- Dimensions ..... page 2/20
- Connections ..... page 2/21

## 2.3 Advantys IP 67 I/O splitter boxes and interfaces

*Telefast ABE 9 /FTB/FTM splitter boxes and IP 67 Interface selection guide* ..... 2/24

**Applications**

Discrete input expansion modules for compact and modular base controllers



**Type**

8 --- 24 V inputs

8 ~ 120 V inputs

16 --- 24 V inputs

**Connection**

By removable screw terminal block

**Inputs**

Voltage range

---

Input current

---

Input logic

---

Commons

---

Response time

- Energisation
- De-energisation

--- 20.4...28.8 V

---

7 mA per point

---

Sink (1)

---

1 common point

---

8 ms

---

8 ms

~ 85...132 V

---

7.5 mA per point

---

–

---

2 common points

---

25 ms

---

30 ms

--- 20.4...28.8 V

---

5 mA per point

---

Sink/source (1)

---

8 ms

---

8 ms

**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 DAI 8DT

TWD DDI 16DT

**Pages**

2/8

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

**Discrete input expansion modules for compact and modular base controllers**



16 --- 24 V inputs

32 --- 24 V inputs

By HE10 connector  
Allows use of the Advantys Telefast ABE 7 pre-wired system

--- 20.4...28.8 V

5 mA per point

Sink/source (1)

2 common points

4 common points

8 ms

8 ms

Between channels: common point  
Between bus and channels: by photocoupler

**TWD DDI 16DK**

**TWD DDI 32DK**

**Discrete mixed I/O expansion modules for compact and modular base controllers**



4 --- 24 V inputs/4 relay outputs

16 --- 24 V inputs/8 relay outputs

By removable screw terminal block

Non-removable spring terminal block

--- 20.4...28.8 V

7 mA per point

Sink/source (1)

1 common point

8 ms

8 ms

1 N/O contact

~ 240 V, --- 30V

1 common point

2 common points

2 A (lth)

7 A (lth)

Between input channels: common point, between output channels: common point  
Between bus and channels: by photocoupler

**TWD DMM 8DRT**

**TWD DMM 24DRF**

2  
2.1

**Applications**

8/16 output expansion modules with removable screw terminal block for compact and modular base controllers



**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
- Voltage range
- Logic (1)
- Commons
- Output current
  - Per output
  - Per group of channels

| Transistor       |        | Relay with 1 N/O contact |         |
|------------------|--------|--------------------------|---------|
| --- 20.4..28.8 V |        | ~ 240V, --- 30 V         |         |
| Sink             | Source | -                        |         |
| 1 common point   |        | 2 common points          |         |
| 0.3 A nominal    |        | 2 A max                  |         |
| 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

**Pages**

2/8

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



16/32 output expansion modules with HE 10 connectors for compact and modular base controllers



16 --- 24 V transistor outputs

16 --- 24 V transistor outputs

32 --- 24 V transistor outputs

32 --- 24 V transistor outputs

By HE10 connector

By HE10 connector  
Allows use of the Advantys  
Telefast ABE 7 pre-wired system

By HE10 connector

By HE10 connector  
Allows use of the Advantys  
Telefast ABE 7 pre-wired system

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

2/8

### 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:

- One ~ 120 V discrete input module, 8 channels, equipped with a removable screw terminal block.
- Four = 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 connector, depending on the model. These modules can be either “sink or source”.
- Eight 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 connector, depending on the model.
- Two mixed discrete input and output modules, comprising one 4-channel input/4-channel relay output module with removable screw terminal block and one 16-channel input/8-channel relay output module with non-removable spring terminal block.

The narrow width of these I/O modules (17.5 mm, 23.5 mm, 29.7 mm or 39.1 mm) makes it possible to build Twido configurations of up to 264 I/O with a minimal overall size of L 364.9 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 TWIDO base controller or to Advantys OTB distributed I/O 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 1/8).
- For 40 I/O compact base controllers **TWD LC●● 40DRF**: 7 modules max. (see characteristics page 1/8).
- For 20 I/O modular base controllers **TWD LMDA 20D●K**: 4 modules max. (see characteristics page 1/16).
- For 20 I/O modular base controllers **TWD LMDA 20DRT/40D●K**: 7 modules max. (see characteristics page 1/16).
- For Advantys interface modules **OTB 1●0 DM9LP**: 7 modules max.

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

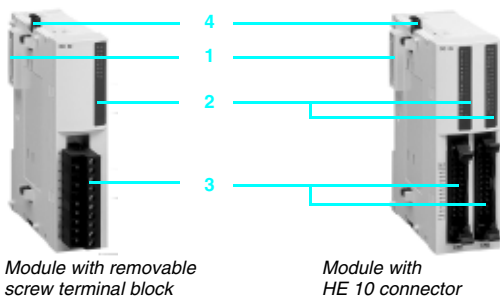
### Description

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 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 ensures continuity of the electrical link with the next I/O module.



### Characteristics of --- input channels

| Type                                | TWD                           | DAI 8DT                        | DDI 8DT       | DDI 16DT | DDI 16DK        | DDI 32DK | DMM 8DRT                       | DMM 24DRF             |        |
|-------------------------------------|-------------------------------|--------------------------------|---------------|----------|-----------------|----------|--------------------------------|-----------------------|--------|
| Number of input channels            |                               | 8                              |               | 16       |                 | 32       | 4                              | 16                    |        |
| Nominal input voltage               | V                             | ~ 120 V --- 24 sink/source     |               |          |                 |          |                                |                       |        |
| Connection                          |                               | Removable screw terminal block |               |          | HE 10 connector |          | Removable screw terminal block | Spring terminal block |        |
| Commons                             |                               | 2                              | 1             |          |                 | 2        | 1                              |                       |        |
| Input voltage range                 | V                             | ~ 85...132 V --- 20.4...28.8   |               |          |                 |          |                                |                       |        |
| Nominal 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                           | Between channels              | None                           |               |          |                 |          |                                |                       |        |
|                                     | Between channels & int. logic | V rms                          | 500 for 1 min |          |                 |          |                                |                       |        |
| Internal consumption for all inputs | At state 1 --- 5 V            | mA                             | 55            | 25       | 40              | 35       | 65                             | 25 (1)                | 65 (1) |
|                                     | --- 24 V                      | mA                             | 0             |          |                 |          |                                |                       |        |
|                                     | At state 0 --- 5 V            | mA                             | 25            | 5        |                 |          | 10                             | 5 (1)                 | 10 (1) |

### Characteristics of transistor output modules

| 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 term. blk |               |          | HE 10 connector |          |          |       |
| Commons   |                               | 1                         |               | 2        |                 | 4        |          |       |
| Nominal output values   | Voltage                       | V                         | 24            |          |                 |          |          |       |
|   | Current                       | A                         | 0.3           | 0.7      | 0.1             | 0.5      | 0.1      | 0.5   |
| Output voltage range  | Voltage                       | V                         | 20.4...28.8   |          |                 |          |          |       |
|   | Current per channel           | A                         | 0.36          | 0.7      | 0.12            | 0.5      | 0.12     | 0.5   |
|   | Current per common            | A                         | 2.9           | 4        | 2               |          |          |       |
| Response time   | At state 1                    | μs                        | 300           |          |                 |          |          |       |
|   | At state 0                    | μs                        | 300           | 450      | 300             | 450      | 300      | 450   |
| Residual voltage  | At state 1                    | V                         | ≤ 1           | ≤ 0.2    | ≤ 1             | ≤ 0.2    | ≤ 1      | ≤ 0.2 |
| Inductive load  |                               | H                         | –             | ≤ 2      | –               | ≤ 2      | –        | ≤ 2   |
| Internal protection of the outputs against overload and short-circuit |                               |                           | No            | Yes      | No              | Yes      | No       | Yes   |
| Maximum power of filament lamp  | W                             | 8                         | 16            | 8        | 16              | 8        | 16       |       |
| Isolation   | Between channels              | None                      |               |          |                 |          |          |       |
|   | Between channels & int. logic | V rms                     | 500 for 1 min |          |                 |          |          |       |
| Consumption for all the outputs                                       | At state 1 --- 5 V            | mA                        | 10            |          |                 | 20       |          |       |
|   | --- 24 V                      | mA                        | 20            |          |                 | 70       |          |       |
|   | At state 0 --- 5 V            | mA                        | 5             |          |                 | 10       |          |       |

### Characteristics of relay output channels

| 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        |
| Connection                      |   | Removable screw terminal block   |                 |                                   | Spring terminal block |
| Output currents                 | Current per channel   | A 2 (5 max. surge current)   |                 |                                   |                       |
|                                 | Current per common  | A 7  | 8               | 7                                 |                       |
| Commons                         |   | 1  | 2               | 1                                 | 2                     |
| Minimum switching load          |   | mA 0.1 per --- 0.1 V (reference value)   |                 |                                   |                       |
| Contact resistance              | When new  | mΩ 40 max  |                 |                                   |                       |
| Loads on relay outputs          | Resistive (e.g.: heating element)                           | A 2 at ~ 240 V or 2 at --- 30 V (with 1800 operations/hour max.):<br>- minimum electrical life: 1 x 10 <sup>6</sup> operations<br>- minimum mechanical life: 20 x 10 <sup>6</sup> operations |                 |                                   |                       |
|                                 | Inductive with protection (3) (e.g.: relay, solenoid valve) |  |                 |                                   |                       |
|                                 | Inductive without protection device                         |  |                 |                                   |                       |
|                                 | Capacitive (e.g.: TeSys U starters, Festo solenoid valves)  | Use of relay outputs not guaranteed (reduction of life). For this type of application, <b>it is advisable to use the transistor outputs</b> of expansion modules TWD DDO ●●●●                |                 |                                   |                       |
| Response time                   |   | ms ≤ 7   |                 |                                   |                       |
| Isolation voltage               | Between channels & int. logic                               | V rms 1500 for 1 mn  |                 |                                   |                       |
| 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.

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



TWD DDI 8DT



TWD DDI 32DK



TWD DDO 8T/DRA 8RT



TWD DDO 16DK



TWD DDO 32DK



TWD DRA 16RT



TWD DDM 8DRT



TWD DDM 24DRF

### References

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

| Base controller type | Compact |            |            |            | Modular    |            |            |            |
|----------------------|---------|------------|------------|------------|------------|------------|------------|------------|
|                      | TWD     | LC●A 10DRF | LC●A 16DRF | LC●A 24DRF | LC●● 40DRF | LMDA 20D●K | LMDA 20DRT | LMDA 40D●K |
| Number of modules    | 0       | 0          | 4          | 7          | 4          | 7          | 7          |            |

### Discrete input modules

| Input voltage      | No. of channels | No. of common points | Connection                                | Reference        | Weight<br>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 connector                           | TWD DDI 16DK (1) | 0.065        |
|                    | 32              | 2                    | HE 10 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 points | Connection                                | Reference        | Weight<br>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 connector                           | TWD DDO 16UK     | 0.070        |
|                                | 16, source       | 1                    | HE 10 connector                           | TWD DDO 16TK (1) | 0.070        |
|                                | 32, sink         | 2                    | HE 10 connector                           | TWD DDO 32UK     | 0.105        |
|                                | 32, source       | 2                    | HE 10 connector                           | TWD DDO 32TK (1) | 0.105        |
| Relay 2 A (lth) ~ 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 points                   | Connection                                | Reference     | Weight<br>kg |
|------------|--------------------------|------------------------------------|--|---|---------------|--------------|
| 8          | 4 I, = 24 V sink/source  | 4 O, relay (N/O contact) 2 A (lth) | Inputs: 1 common<br>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 (lth) | Inputs: 1 common<br>Outputs: 2 commons | Non-removable spring terminal block       | TWD DMM 24DRF | 0.140        |

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

### References

#### Separate components

| Description   | Application   | Reference     | Weight kg |
|---|---|---------------|-----------|
| Fixing kit  | For plate or panel mounting of the discrete modules.<br>Sold in lots of 5                         | TWD XMT 5     | –         |
| <b>Advantys Telefast ABE 7 pre-wired system for Twido</b> | Connection sub-bases<br>I/O connection sub-bases<br>Pre-wired solutions<br>Cables and accessories | See page 5/12 | –         |

#### HE 10 connectors

| Description   | Number of ways | Reference    | Weight kg |
|---|----------------|--------------|-----------|
| <b>HE 10 female connectors</b><br>(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 |
|---|-----------------------------------|---------------------------------|--------------|-------------|-----------|
| <b>Pre-formed cables</b><br>1 pre-formed cable:<br>one end fitted with HE 10 connector, one end with free wires | Modular base controllers          | AWG 22<br>0.035 mm <sup>2</sup> | 3 m          | TWD FCW 30M | 0.405     |
|   | TWD LMDA<br>20DTK/40DTK           | AWG 22<br>0.035 mm <sup>2</sup> | 5 m          | TWD FCW 50M | 0.670     |
|   | I/O extensions<br>TWD DDI         | AWG 22<br>0.035 mm <sup>2</sup> | 3 m          | TWD FCW 30K | 0.405     |
|   | 16DK/32DK<br>TWD DDO<br>16●K/32●K | AWG 22<br>0.035 mm <sup>2</sup> | 5 m          | TWD FCW 50K | 0.670     |

#### Connecting cables (1)

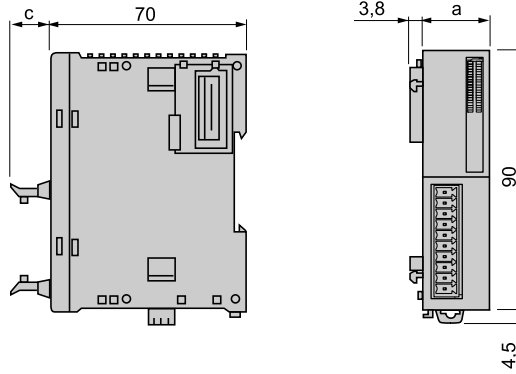
| Description  | For use with Twido       | Gauge C.s.a.                    | Cable length | Reference     | Weight kg |
|--|--------------------------|---------------------------------|--------------|---------------|-----------|
| <b>Discrete I/O pre-formed cables,</b><br>1 pre-formed cable:<br>one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

(1) Cables strictly for applications other than use of Advantys Telefast ABE 7 sub-bases with Twido controllers. For use of Advantys Telefast ABE 7 sub-bases with Twido controllers, see pages 5/4 to 5/17.

### 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<br>26-way A | HE 10<br>20-way B | HE 10<br>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<br>20-way A | HE 10<br>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<br>20-way A | HE 10<br>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                 |

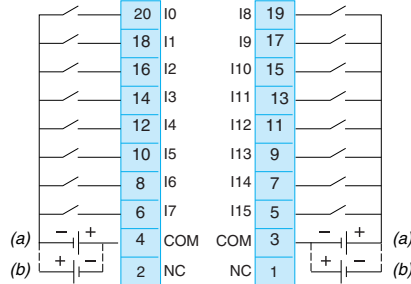
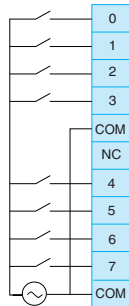
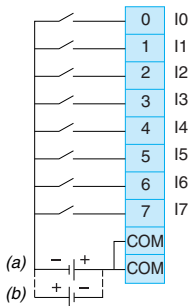
### Connections

#### Input modules

**TWD DDI 8DT (≐ 24 V)**

**TWD DAI 8DT (≈ 120 V)**

**TWD DDI 16DK (≐ 24 V)**

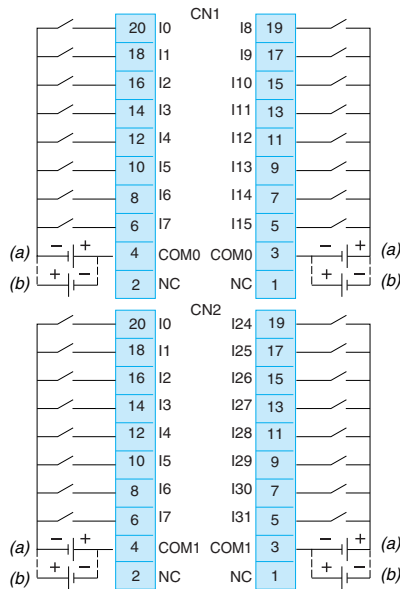
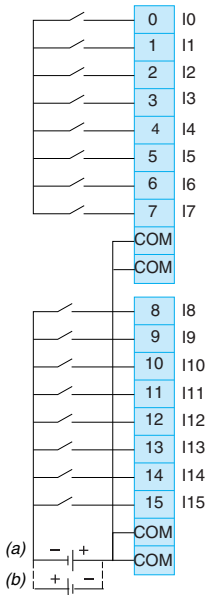


□ The COM terminals are linked internally

□ The COM terminals are linked internally

**TWD DDI 16DT (≐ 24 V)**

**TWD DDI 32DK (≐ 24 V)**



□ The COM terminals are linked internally

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

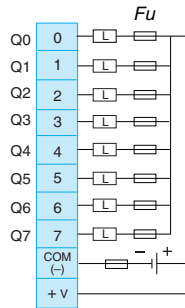
(a) Source input (negative logic).  
(b) Sink input (positive logic).

2

2.1

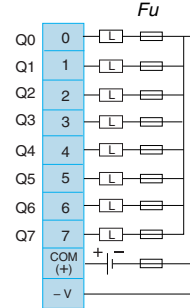
### Transistor output modules

#### TWD DDO 8UT



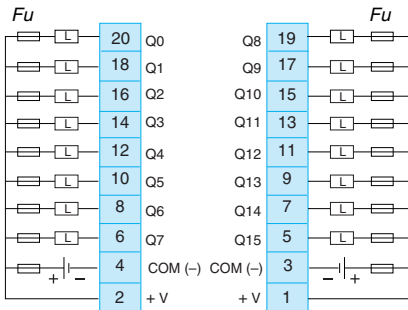
Fu: 0.3 A quick-blow fuse

#### TWD DDO 8TT



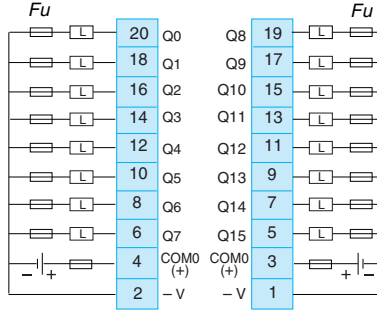
Fu: 0.3 A quick-blow fuse

#### TWD DDO 16UK



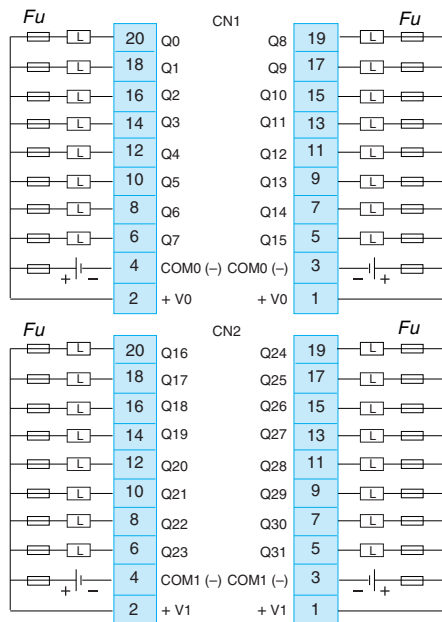
Fu: 0.1 A quick-blow fuse

#### TWD DDO 16TK



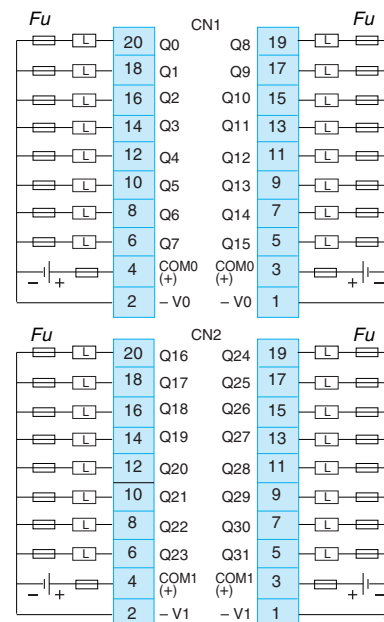
Fu: 0.1 A quick-blow fuse

#### TWD DDO 32UK



Fu: 0.1 A quick-blow fuse

#### TWD DDO 32TK



Fu: 0.1 A quick-blow fuse

**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

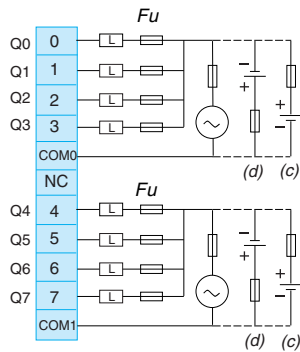
**Terminals:**

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

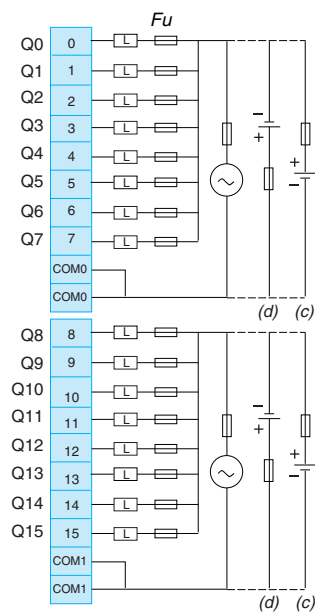


### Relay output modules

#### TWD DRA 8RT



#### TWD DRA 16RT

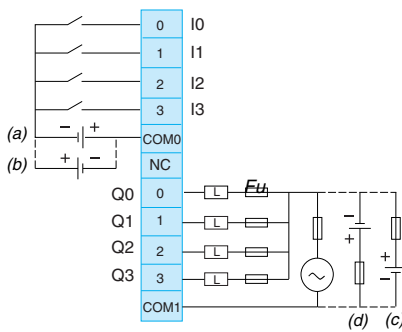


- Terminals:
- COM0 are linked internally
  - COM1 are linked internally
  - COM0 and COM1 are independent

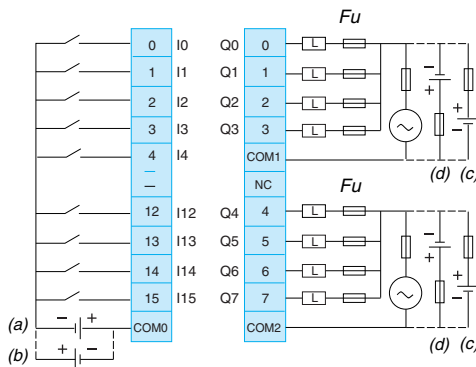
(c) Sink output (negative logic)  
(d) Source output (positive logic)

### Mixed input/output modules

#### TWD DMM 8DRT



#### TWD DMM 24DRF



- The COM (+) terminals are linked internally

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

(a) Source input (negative logic)  
(b) Sink input (positive logic)  
(c) Sink output (negative logic)  
(d) Source output (positive logic)

2

2.2

**Applications**

**Analogue input modules**



|                                 |                                    |   |  |                                 |  |   |  |
|---------------------------------|------------------------------------|---|--|---------------------------------|--|---|--|
| <b>Type</b>                     |                                    | 2 inputs  |  | 4 inputs                        |  | 8 inputs  |  |
| <b>Type</b>                     |                                    | Voltage/current   |  | Temperature                     |  | Voltage/current<br>Temperature  |  |
| <b>Connection</b>               |                                    | Removable screw terminal block  |  |                                 |  |   |  |
| <b>Inputs</b>                   | Range                              | 0...10 V (non differential)<br>4...20 mA (differential)   |  | Thermocouple type<br>K, J and T |  | 0...10 V (non differential)<br>0...20 mA (differential)<br>Pt 100/1000<br>NI 100/1000 |  |
|                                 | Resolution                         | 12 bits (4096 points)   |  | 12 bits (4096 points)           |  | 12 bits (4096 points)   |  |
|                                 | Acquisition period                 | 32 ms + 1 controller cycle time   |  | 200 ms per channel              |  | 160 ms per channel  |  |
| <b>Outputs</b>                  | Range                              |   |  |                                 |  |   |  |
|                                 | Resolution                         |   |  |                                 |  |   |  |
|                                 | Transfer time                      |   |  |                                 |  |   |  |
| <b>External supply</b>          |                                    | External $\bar{\bar{}}$ 24 V power supply to sensors/preactuators (voltage range 20.4...28.8 V) |  |                                 |  |   |  |
| <b>Isolation</b>                | Between channels                   | Non isolated  |  |                                 |  |   |  |
|                                 | Between channels and sensor supply | Non isolated  |  | Isolated                        |  | Non isolated  |  |
|                                 | Between channels and I/O bus       | Isolated  |  |                                 |  |   |  |
| <b>Analogue I/O module type</b> |                                    | TWD AMI 2HT   |  | TWD AMI 2LT                     |  | TWD AMI 4LT   |  |
| <b>Pages</b>                    |                                    | 2/19  |  |                                 |  |   |  |

**Analogue input modules (continued)**

**Analogue output modules**

**Analogue mixed I/O modules**



|          |                 |           |                   |  |                    |
|----------|-----------------|-----------|-------------------|--|--------------------|
| 8 inputs | 1 output        | 2 outputs | 2 inputs/1 output |  | 4 inputs/2 outputs |
| PTC/NTC  | Voltage/current | Voltage   | Voltage/current   | Thermocouple/<br>temperature probe<br>inputs<br>Voltage/current output | Voltage/current    |

Removable screw terminal block

|                       |                                    |                                     |  |   |                                    |
|-----------------------|------------------------------------|-------------------------------------|--|---|------------------------------------|
| -                     |                                    |                                     | 0...10 V<br>(non differential)<br>4...20 mA (differential) | Thermocouple<br>type K, J and T<br>Pt 100 3-wire<br>temperature probe | 0...10 V<br>4...20 mA              |
| 10 bits (1024 points) |                                    |                                     | 12 bits or 11 bits + sign (4096 points)                    |   | 12 bits (4096 points)              |
| 160 ms                |                                    |                                     | 32 ms + 1 controller<br>cycle time                         | 100 ms + 1 controller<br>cycle time                                   | 64 ms + 1 controller<br>cycle time |
|                       | 0...10 V<br>4...20 mA              | ± 10 V                              | 0...10 V<br>4...20 mA                                      |   |                                    |
|                       | 12 bits (4096 points)              | 11 bits (2048 points)<br>+ sign     | 12 bits (4096 points)                                      |   |                                    |
|                       | 20 ms + 1 controller<br>cycle time | 0.3 ms + 1 controller<br>cycle time | 20 ms + 1 controller cycle time                            |   |                                    |

External  $\overline{\text{---}}$  24 V power supply to sensors/preactuators (voltage range 20.4...28.8 V)

Non isolated

Non isolated

Isolated

|             |             |             |             |             |             |
|-------------|-------------|-------------|-------------|-------------|-------------|
| TWD ARI 8HT | TWD AMO 1HT | TWD AVO 2HT | TWD AMM 3HT | TWD ALM 3LT | TWD AMM 6HT |
|-------------|-------------|-------------|-------------|-------------|-------------|

### 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 following 8 analogue I/O modules are available:

- One module with 2 inputs: 0...10 V, 4...20 mA.
- One module with 2 inputs from thermocouples type K, J and T.
- 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...20mA and 1 output: 0...10 V, 4...20mA.
- One mixed module with 2 thermocouple or temperature probe inputs and one 0...10 V, 4...20 mA output.
- One mixed module with 4 inputs: 0...10 V, 4...20mA and 2 outputs: 0...10 V, 4...20mA.

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 1/8).
- For 40 I/O compact base controllers **TWD LC●● 40DRF**: 7 modules max. (see characteristics page 1/8).
- For 20 I/O modular base controllers **TWD LMDA 20D●K**: 4 modules max. (see characteristics page 1/16).
- For 40 I/O modular base controllers **TWD LMDA 20DRT/40D●K**: 7 modules max. (see characteristics page 1/16).
- For Advantys interface modules **OTB 1● DM9LP**: 7 modules max. or 24 input channels and 24 output channels max.

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

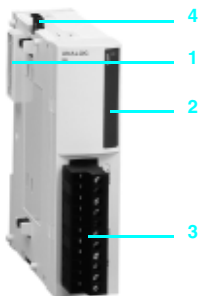
### Description

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 One (or 2, depending on model) removable screw terminal block(s) 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.



### Characteristics of 2 and 4-channel analogue input modules

| Module type                     |  | TWD AMI 2HT   |              | TWD AMI 2LT  |  | TWD AMI 4LT                                  |           |  |
|---------------------------------|--|---|--------------|--|--|--|-----------|--|
| Number of channels              |  | 2 high-level inputs                                     |              | 2 low-level inputs   |  | 4 inputs                                     |           |  |
| Range                           |  | Voltage   | Current      | Thermocouple   |  | Voltage                                      | Current   | Temperature probe                            |
|                                 |  | 0...10 V  | 4...20 mA    | Type J: - 200...760 °C<br>Type K: - 270...1370 °C<br>Type T: - 270...400 °C<br>No isolation between the input channels |  | 0...10 V                                     | 4...20 mA | PT100, PT1000, Ni100, Ni1000 - 100...600 °C  |
| Type                            |  | Non differential  | Differential | Differential   |  | Non differential                             |           | Differential                                 |
| Resolution                      |  | 12 bits   |              | 12 bits  |  | 12 bits                                      |           |  |
| LSB value                       |  | 2.5 mV  | 4.8 µA       | Type J: 0.3 °C<br>Type K: 0.325 °C<br>Type T :0.1 °C   |  | 2.5 mV                                       | 4.8 µA    | 0.15 ° K                                     |
| Connection                      |  | Removable screw terminal block                          |              |  |  |  |           |  |
| Permissible continuous overload |  | --- 13 V  | 40 mA        | ± --- 7.5 V supply   |  | 40 mA  | 13 V      | –  |
| Input impedance                 |  | 1 MΩ min  | 10 Ω         | 1 MΩ min   |  | 1 MΩ   | 470 Ω     | > 10 kΩ                                      |
| Maximum sampling duration       |  | ms  |              | 16   |  | 200 per channel                              |           | 160  |
| Sampling repetition time        |  | ms  |              | 16   |  | 0.5  |           | 4  |
| Acquisition period              |  | ms  |              | 16 ms per channel + 1 controller cycle time  |  | 200 ms per channel + 1 controller cycle time |           | 160 ms per channel + 1 controller cycle time |
| Measuring precision             |  | Max. error at 25° C                                     | % PE         | ± 0.2  |  | 0.2 ± 5 °C (1)                               |           | 0.5  |
|                                 |  | Temperature coefficient                                 | % PE/°C      | ± 0.006  |  | ± 0.006                                      |           | ± 0.005                                      |
|                                 |  | Repeat accuracy after stabilisation time                | % PE         | ± 0.5  |  | ± 0.5  |           | 2 low significance bits                      |
|                                 |  | Non linearity   | % PE         | ± 0.2  |  | ± 0.2  |           | ± 0.02                                       |
|                                 |  | Total error   | % PE         | ± 1  |  | ± 1  |           | ± 0.5  |
| Common mode rejection 50/60 Hz  |  | - 50 dB   |              | - 120 dB (- 60 dB in differential mode)  |  | - 90 dB                                      |           |  |
| Cross talk                      |  |   |              | 2 low significance bits max.   |  | 1 low significance bit max.                  |           |  |
| Cabling                         |  | Shielded twisted pair recommended                       |              |  |  |  |           |  |
| Dielectric strength             |  | Between the inputs and the supply circuit               | V rms        | ~ 500  |  | ~ 2500                                       |           |  |
| Protection                      |  | Photocoupler between the input and the internal circuit |              |  |  |  |           |  |
| External supply                 |  | Rated voltage: --- 24, voltage range: --- 20.4...28.8   |              |  |  |  |           |  |
| Consumption                     |  | Internal supply --- 5 V                                 | mA           | 50   |  | 100 (inrush, 140)                            |           | 50   |
|                                 |  | External supply --- 24 V                                | mA           | 60   |  | 21 (inrush, 30)                              |           | 60   |

### Characteristics of 8-channel analogue input modules

| Module type                     |  | TWD ARI 8HT   |         | TWD AMI 8HT             |          |
|---------------------------------|--|---|---------|-------------------------|----------|
| Number of channels              |  | 8 inputs  |         | 8 inputs                |          |
| Range                           |  | Temperature   |         | Current                 | Voltage  |
|                                 |  | NTC, PTC, 100 Ω < R < 10 kΩ                             |         | 0...20 mA               | 0...10 V |
| Type                            |  | Differential  |         | Non differential        |          |
| Resolution                      |  | 10 bits   |         |                         |          |
| LSB value                       |  | –   |         | 19.5 µA                 | 9.7 mV   |
| Connection                      |  | Removable screw terminal block                          |         |                         |          |
| Permissible continuous overload |  | –   |         | 40 mA                   | 13 V     |
| Input impedance                 |  | >1 MΩ   |         | 470 Ω                   | >10 kΩ   |
| Maximum sampling duration       |  | ms  |         |                         |          |
| Sampling repetition time        |  | ms  |         |                         |          |
| Acquisition period              |  | ms  |         |                         |          |
| Measuring precision             |  | Max. error at 25° C                                     | % PE/°C | 1                       |          |
|                                 |  | Temperature coefficient                                 | % PE    | ± 0.005                 |          |
|                                 |  | Repeat accuracy after stabilisation time                | % PE    | 2 low significance bits |          |
|                                 |  | Non linearity   | % PE    | ± 0.002                 |          |
|                                 |  | Total error   | % PE    | ± 1                     |          |
| Common mode rejection 50/60 Hz  |  | - 90 dB   |         | --- 15 V supply         | - 90 dB  |
| Cross talk                      |  | 1 low significance bit max.                             |         |                         |          |
| Dielectric strength             |  | Between the inputs and the supply circuit               | V rms   | 2500 V                  |          |
| Protection                      |  | Photocoupler between the input and the internal circuit |         |                         |          |
| External supply                 |  | Rated voltage: --- 24, voltage range: --- 20.4...28.8   |         |                         |          |
| Consumption                     |  | Internal supply --- 5 V                                 | mA      | 50                      |          |
|                                 |  | External supply --- 24 V                                | mA      | 50                      |          |

(1) ± 5 °C: precision of cold junction compensation.

### Characteristics of 3 and 6-channel analogue input/output modules

| Analogue inputs                   |  | TWD AMM 3HT   |                      | TWD AMM 6HT                  |                      | TWD ALM 3LT  |  |
|-----------------------------------|--|---|----------------------|------------------------------|----------------------|--|--|
| Module type                       |  | 2 high-level inputs                                       |                      | 4 high-level inputs          |                      | 2 low-level inputs   |  |
| Number of channels                |  |   |                      |                              |                      |  |  |
| Range                             |  | Voltage<br>0...10 V                                       | Current<br>4...20 mA | Voltage<br>0...10 V          | Current<br>4...20 mA | Thermocouple<br>Type:<br>- J: - 200...760 °C<br>- K: - 270...1370 °C<br>- T: - 270...400 °C<br>No isolation between the input channels | Temperature probe<br>Pt probe,<br>3-wire type:<br>- 100...500° C |
| Type                              |  | Non differential  | Differential         | Non differential             | Differential         | Differential   |  |
| Resolution                        |  | 12 bits   |                      |                              |                      |  |  |
| LSB value                         |  | 2.5 mV  | 4.8 µA               | 2.5 mV                       | 4.8 µA               | Type J: 0.3 °C<br>Type K: 0.325° C<br>Type T: 0.1° C   | 0.15° K  |
| Connection                        |  | Removable screw terminal block                            |                      |                              |                      |  |  |
| Permissible continuous overload   |  | --- 13 V  | 40 mA                | --- 13 V                     | 40 mA                | -  |  |
| Input impedance                   |  | 1 MΩ min  | 10 Ω min             | 10 kΩ min.                   | 250Ω max             | 250 Ω max  | 5 Ω max  |
| Maximum sampling duration         |  | ms 16   |                      | 16                           |                      | 50   |  |
| Sampling repetition time          |  | ms 16   |                      | -                            |                      | 50   |  |
| Acquisition period                |  | ms 16 + 1 controller cycle time                           |                      | 16 + 1 controller cycle time |                      | 500 + 1 controller cycle time  |  |
| Measuring precision               | Max. error at 25° C                      | % PE ± 0.2  |                      | ± 0.5                        |                      | 0.2 ± 4° C max (1) ± 0.2   |  |
|                                   | Temperature coefficient                  | % PE/°C ± 0.006   |                      | ± 0.06                       |                      | ± 0.006  |  |
|                                   | Repeat accuracy after stabilisation time | % PE ± 0.5  |                      | ± 0.5                        |                      | ± 0.5  |  |
|                                   | Non linearity                            | % PE ± 0.2  |                      | ± 0.4                        |                      | ± 0.2  |  |
|                                   | Total error                              | % PE ± 1  |                      | ± 1                          |                      | ± 1  |  |
| Common mode rejection             |  | - 50 dB   |                      |                              |                      |  |  |
| Cross talk                        |  | 2 low significance bits max.                              |                      |                              |                      |  |  |
| Cabling                           |  | Shielded twisted pair recommended                         |                      |                              |                      | -  |  |
| Protection                        |  | Photocoupler between the inputs and the internal circuit  |                      |                              |                      |  |  |
| Analogue outputs                  |  | TWD AMM 3HT   |                      | TWD AMM 6HT                  |                      | TWD ALM 3LT  |  |
| Module type                       |  | 1 output  |                      | 2 outputs                    |                      | 1 output   |  |
| Number of channels                |  |   |                      |                              |                      |  |  |
| Range                             |  | Voltage<br>0...10 V                                       | Current<br>4...20 mA | Voltage<br>0...10 V          | Current<br>4...20 mA | Voltage<br>0...10 V  | Current<br>4...20 mA   |
| Resolution                        |  | 12 bits   |                      |                              |                      |  |  |
| LSB value                         |  | 2.5 mV  | 4.8 µA               | 2.5 mV                       | 4.8 µA               | 2.5 mV   | 4.8 µA   |
| Load                              |  | Resistive   |                      |                              |                      |  |  |
| Type                              |  |   |                      |                              |                      |  |  |
| Impedance                         |  | Ω 2000 min  | 300 max              | 2000 min                     | 300 max              | 2000 min   | 300 max  |
| Stabilisation time                |  | ms 20   |                      |                              |                      |  |  |
| Total output system transfer time |  | ms 20 + 1 controller cycle time                           |                      |                              |                      |  |  |
| External supply                   |  | V Nominal voltage: --- 24. Voltage range: --- 20.4...28.8 |                      |                              |                      |  |  |
| Measuring precision               | Max. error at 25° C                      | % PE ± 0.2  |                      | ± 0.1                        |                      | ± 0.2  |  |
|                                   | Temperature coefficient                  | % PE/°C ± 0.015   |                      | ± 0.5                        |                      | ± 0.015  |  |
|                                   | Repeat accuracy after stabilisation time | % PE ± 0.5  |                      |                              |                      |  |  |
|                                   | Output error                             | % PE ± 1  |                      |                              |                      |  |  |
|                                   | Non linearity                            | % PE ± 0.2  |                      | ± 0.5                        |                      | ± 0.2  |  |
|                                   | Output ripple                            | 1 low significance bit max.                               |                      |                              |                      |  |  |
|                                   | Total error                              | % PE ± 1  |                      | ± 2                          |                      | ± 1  |  |
| Cabling                           |  | Shielded twisted pair recommended                         |                      |                              |                      |  |  |
| Protection                        |  | Photocoupler between the outputs and the internal circuit |                      |                              |                      |  |  |
| Dielectric strength               |  | Between the I/O and the supply circuit                    | V rms ~ 500          | ~ 800                        | ~ 500                |  |  |
| External supply to the module     |  | Nominal voltage   | V --- 24             |                              |                      |  |  |
| Voltage limits                    |  | --- 20.4...28.8   |                      |                              |                      |  |  |
| Module consumption                | Internal supply --- 5 V                  | mA 50   |                      | 60                           |                      | 50   |  |
|                                   | External supply --- 24 V                 | mA 60   |                      | 80                           |                      | 60   |  |

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

| Characteristics of 1 and 2-channel analogue outputs |  |   |           |                                    |
|---|--|---|-----------|------------------------------------|
| Module type   |  | TWD AMO 1HT   |           | TWD AVO 2HT                        |
| <b>Number of channels</b>                           |  | 1 output  |           | 2 outputs                          |
|   |  | Voltage   | Current   | Voltage                            |
| <b>Range</b>  |  | 0...10 V  | 4...20 mA | ± 10 V                             |
| <b>Resolution</b>                                   |  | 12 bits   |           | 11 bits + sign                     |
| <b>LSB value</b>                                    |  | 2.5 mV  | 4 µA      | ± 4.8 mV                           |
| <b>Load</b>   |  | Resistive   |           |                                    |
| Type  |  |   |           |                                    |
| Impedance   | Ω  | 2000 min  | 300 max   | 3000 min                           |
| <b>Stabilisation time</b>                           |  | ms  |           | 20                                 |
| <b>Total output system transfer time</b>            |  | ms  |           | 20 + 1 controller cycle time       |
| <b>Measuring precision</b>                          |  |   |           | 2 + 1 controller cycle time        |
|   | Max. 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       |                                    |
| <b>Cabling</b>                                      |  | Shielded twisted pair recommended                         |           |                                    |
| <b>Protection</b>                                   |  | Photocoupler between the outputs and the internal circuit |           |                                    |
| <b>Dielectric strength</b>                          |  | Between the outputs and the supply circuit                | V rms     | ~ 500                              |
|   |  |   |           | ~ 2500                             |
| <b>External supply</b>                              |  | Nominal voltage   | V         | --- 24                             |
|   |  | Voltage limits  | V         | --- 20.4...28.8 (including ripple) |
| <b>Module consumption</b>                           |  | Internal supply --- 5 V                                   | mA        | 50                                 |
|   |  | External supply --- 24 V                                  | mA        | 40                                 |
|   |  |   |           | 60                                 |
|   |  |   |           | 60                                 |

2

2.2



TWD AMI 2HT



TWD AMI 2LT



TWD ALM 3LT



TWD AMM 6HT

### References

These analogue I/O expansion modules are mounted on symmetrical  $\pm$  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:

| Base controller type | Compact    |            |            |            | Modular    |            |            |
|----------------------|------------|------------|------------|------------|------------|------------|------------|
|                      | LC●A 10DRF | LC●A 16DRF | LC●A 24DRF | LC●● 40DRF | LMDA 20D●K | LMDA 20DRT | LMDA 40D●K |
| Number of modules    | 0          | 0          | 4          | 7          | 4          | 7          | 7          |

### Analogue input modules

| Channel type | Input range                          | Output range | Resolution | Reference   | Weight kg |
|--------------|--------------------------------------|--------------|------------|-------------|-----------|
| 2 inputs     | 0...10 V<br>4...20 mA                | –            | 12 bits    | TWD AMI 2HT | 0.085     |
|              | Thermocouple K, J, T                 | –            | 12 bits    | TWD AMI 2LT | 0.085     |
| 4 inputs     | 0...10 V<br>0...20 mA<br>Temperature | –            | 12 bits    | TWD AMI 4LT | 0.085     |
| 8 inputs     | 0...10 V<br>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<br>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

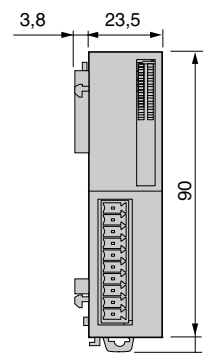
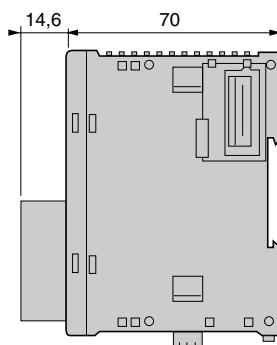
|                        |   |                       |         |             |       |
|------------------------|---|-----------------------|---------|-------------|-------|
| 2 inputs and 1 output  | 0...10 V<br>4...20 mA   | 0...10 V<br>4...20 mA | 12 bits | TWD AMM 3HT | 0.085 |
|                        | Thermocouple K, J, T<br>Temperature probe<br>3-wire Pt 100<br>No isolation between the input channels | 0...10 V<br>4...20 mA | 12 bits | TWD ALM 3LT | 0.085 |
| 4 inputs and 2 outputs | 0...10 V<br>4...20 mA   | 0...10 V<br>4...20 mA | 12 bits | TWD AMM 6HT | 0.085 |

### Separate components

| Description | Description   | Reference | Weight kg |
|-------------|---|-----------|-----------|
| Fixing kit  | For plate or panel mounting of the analogue modules.<br>Sold in lots of 5 | TWD XMT 5 | –         |

### Dimensions

#### Analogue I/O modules

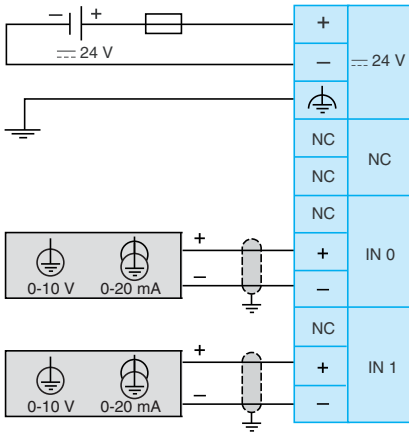




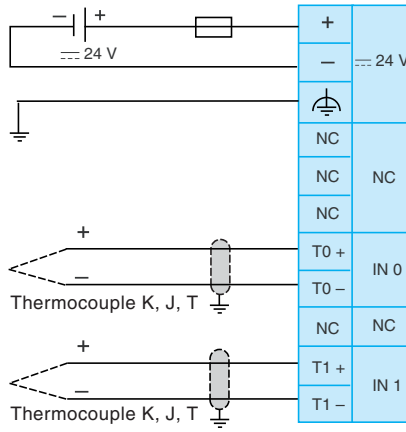
### Connections

#### Analogue input modules

##### TWD AMI 2HT



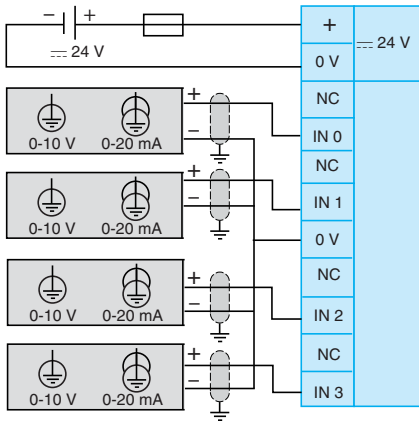
##### TWD AMI 2LT



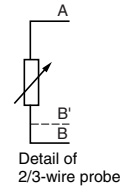
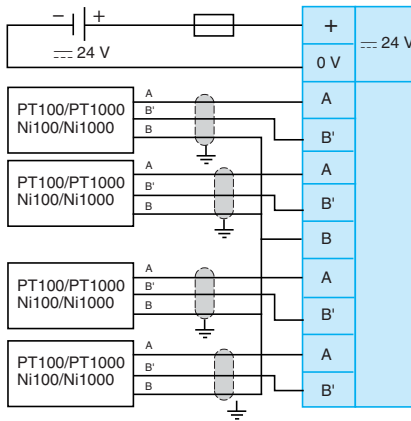
- Fit a fuse of appropriate size for the sensor type.
- Do not connect any wires to a channel that is not being used.

##### TWD AMI 4LT

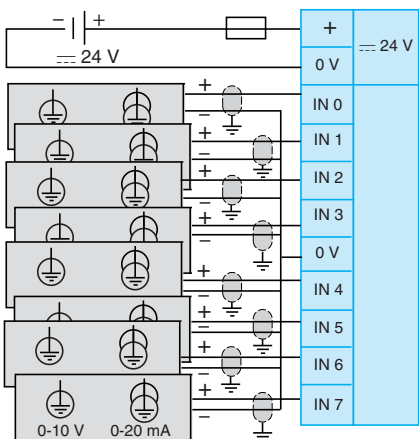
#### Voltage/current configuration



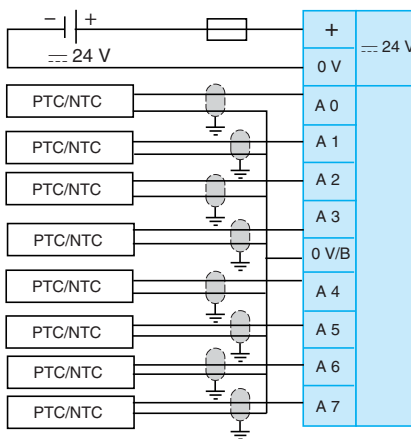
#### PT100/PT1000 temperature probe, Ni100/Ni1000 configuration



##### TWD AMI 8HT



##### TWD ARI 8HT

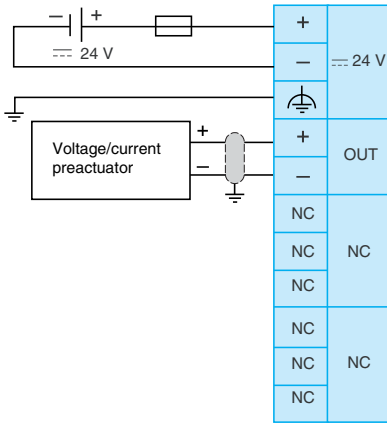


- Fit a fuse of appropriate size for the sensor type.
- Do not connect any wires to unused channels.

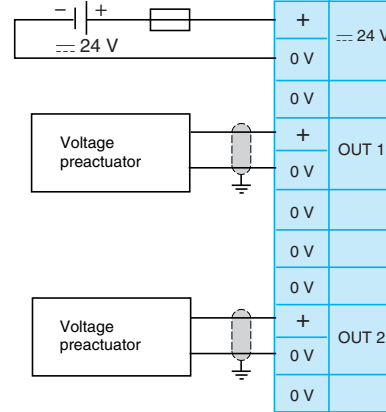
### Connections (continued)

#### Analogue output modules

##### TWD AMO 1HT



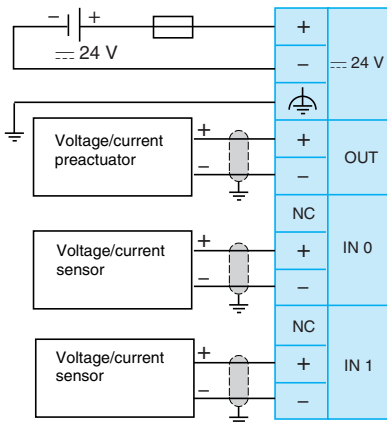
##### TWD AVO 2HT



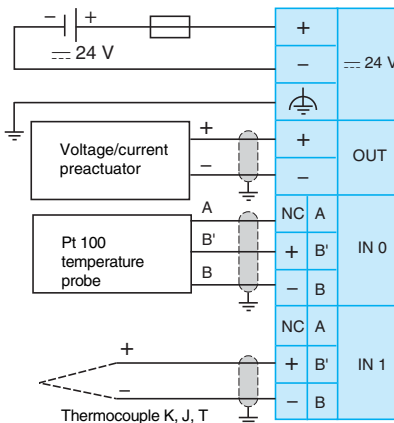
- Fit a fuse of appropriate size for the sensor type.
- Do not connect any wires to the unused channel.

#### Mixed input/output modules

##### 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 terminals B' and B (channels IN0 and/or IN1).
- Do not connect any wires to unused channels.

2

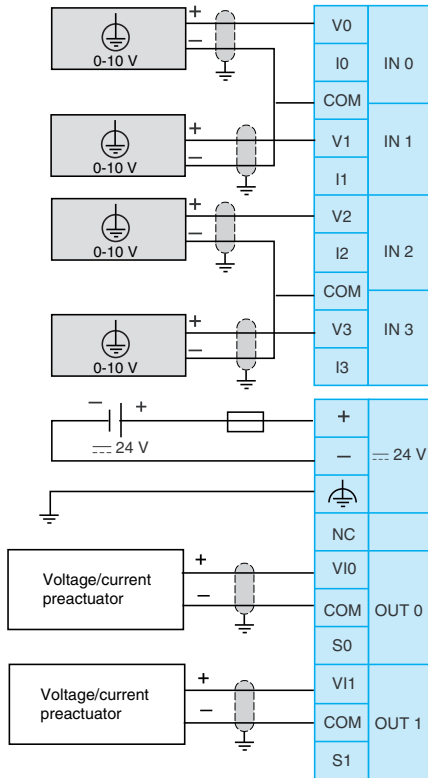
2.2

**Connections** (continued)

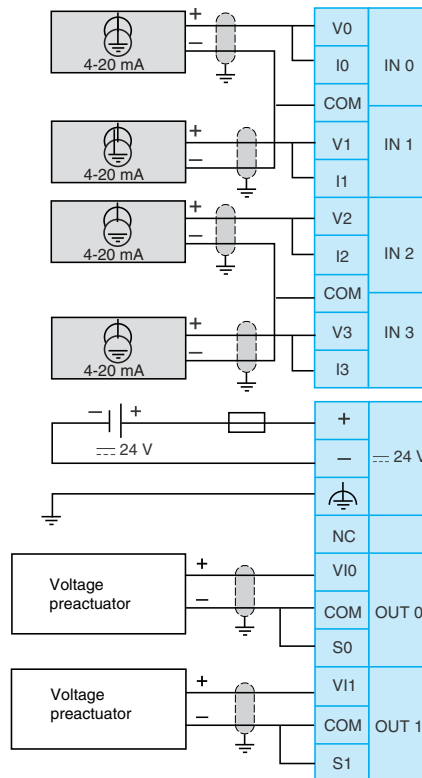
**Mixed input/output modules** (continued)

**TWD AMM 6HT**

**Voltage configuration**



**Current configuration**



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

# Connection interfaces

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

**Splitter box and interface type**

*In combination with IP 67 Twido controller, Extreme base (see page 1/22)*

**Passive splitter boxes**

**Advantys Telefast ABE9 splitter boxes**

2



2.3

**Fieldbus type**

–

**Inputs/Outputs**

Discrete

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

Analogue

–

**Functions**

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

**Type of connectors**

Sensors/actuators

Female M12 connectors, 5-ways

Automation

Female M23 connectors

Multicore cable

Length 5 m

Length 10 m

**Housing type**

Plastic

**Module type**

ABE 9C12●●C23

ABE 9C12●●L05

ABE 9C12●●L10

**Pages**

Please, consult our catalogue on the website, [www.telemecanique.com](http://www.telemecanique.com)

**Monobloc I/O splitter boxes and interfaces** **Modular I/O splitter boxes**

**Advantys FTB splitter boxes**

**Advantys IP 67 interfaces**

**Advantys FTM splitter boxes**



CANopen  
DeviceNet, INTERBUS,  
Profibus-DP

CANopen  
DeviceNet,  
Profibus-DP

AS-Interface

CANopen  
DeviceNet, Profibus-DP

16 I, 8 I/8 O, 12 I/4 O,  
16 configurable I/O, 8 I + 8 configurable I/O

4 I, 3 O, 4O,  
2 I/2 O, 4 I/4 O, 4 I/3 O

8 I, 16 I,  
8 configurable I/O, 16 configurable I/O

-

-

4 I/4 O

Connection of 1 to 16 sensors/actuors  
LED indicators

Connection of 1 to 8 sensors/actuors  
LED indicators

Connection of 1 to 256 sensors/actuors per bus  
module

Female M12 connectors, 5-ways

Female M12 connectors, 5-ways

Female M8 or M12 connectors, depending on  
model

Male and female M12 connectors  
Terminal block with INTERBUS

Direct connection on  
AS-Interface flat cable

Male M12 connectors

Male and female M12 connectors

Plastic

Metal

Plastic

Plastic

FTB 1●●●●P●

FTB 1●●●●S0

ASI 67FPP●●●

ASI 67FMP●●●

FTM 1●●10/FTM 1D●●●/FTM 1A●04

Please, consult our catalogue on the website,  
[www.telemecanique.com](http://www.telemecanique.com)

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Installations with industrial communications"

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*Communication selection guide* ..... 3/2

### 3.1 - Ethernet TCP/IP network - Transparent Ready

- Compact base with integrated port ..... page 3/4
- TwidoPort interface module ..... page 3/5
- ConneXium cabling system ..... page 3/6

### 3.2 - CANopen machines and installations bus

- Presentation ..... page 3/8
- Description ..... page 3/9
- Characteristics ..... page 3/9
- References ..... page 3/9
- Cabling system ..... page 3/10

### 3.2 - AS-Interface cabling system

- Presentation, description ..... page 3/12
- Diagnostic ..... page 3/13
- Characteristics ..... page 3/13
- References ..... page 3/13
- Cabling system ..... page 3/14

### 3.3 - Modbus, characters mode serial links, I/O remote link

- Presentation, description ..... page 3/16
- References ..... page 3/16
- Modbus and caractères mode links
  - Presentation ..... page 3/17
  - Characteristics ..... page 3/17
  - Cabling system ..... page 3/18
- Programming protocol, terminal link
  - Cabling system ..... page 3/20
  - Characteristics ..... page 3/20
  - References ..... page 3/20
- I/O Remote link protocol
  - Presentation ..... page 3/21
  - Characteristics ..... page 3/21
  - References ..... page 3/21
- Dimensions ..... page 3/22
- Connexions ..... page 3/23

# Twido programmable controller

## Communication, integrated ports and modules

3

|                     |   |   |
|---------------------|---|---|
| <b>Applications</b> | <b>40 I/O compact base controllers with integrated Ethernet TCP/IP port</b> | <b>TwidoPort Ethernet TCP/IP module</b> |
|---------------------|---|---|



Transparent Ready



Transparent Ready

|  |                                       |   |  |
|--|---------------------------------------|---|--|
| <b>Type</b>                                      |                                       | <b>Ethernet TCP/IP</b>  |  |
| <b>Structure</b>                                 | Physical interface                    | 10BASE-T/100BASE-TX   |  |
|  | Type of connector                     | RJ45  |  |
|  | Access method                         | CSMA-CD   |  |
|  | Binary rate                           | 10/100 Mbit/s   |  |
| <b>Medium</b>                                    |                                       | Double twisted pair copper cable, category CAT 5E<br>Fibre optic via ConneXium cabling system |  |
| <b>Configuration</b>                             | Maximum number of devices             | -   |  |
|  | Maximum length                        | 100 m (copper cable), 4000 m (multimode fibre optic), 32 500 m (single-mode fibre optic)      |  |
|  | Number of same type links per station | 1 (integrated port)   | 1 TwidoPort interface module   |
|  | Other integrated port                 | Serial link   | -  |
| <b>Basic services</b>                            |                                       | Modbus TCP/IP messaging (read/write of data words)  |  |
| <b>Conformity class</b>                          |                                       | Transparent Ready class A10   |  |
| <b>Transparent Ready communication services</b>  | FDR service                           | IP address assigned by FDR server   |  |
| <b>Compatibility with Twido base controllers</b> |                                       | -   | 10/16/24/40 I/O compact base controllers<br>20/40 I/O modular base controllers |
| <b>Base controller or module type</b>            |                                       | <b>TWD LCDE 40DRF</b><br>supply $\text{---} 24 \text{ V}$                                     | <b>TWD LCAE 40DRF</b><br>supply $\sim 100 \dots 240 \text{ V}$                 |
| <b>Page</b>                                      |                                       | 3/4   |  |
|  |                                       | 3/5   |  |



**CANopen bus master module for machines and installations**

**AS-Interface master module for sensors/actuators (Actuator Sensor Interface)**

**Integrated and optional asynchronous serial link**



| CANopen  | AS-Interface   | Modbus and Character Mode  |   |
|--|--|--|---|
| ISO 11898 (9-way SUB-D connector)<br>9-way SUB-D   | Removable screw terminal block   | RS 485 not isolated<br>8-way Mini-DIN  | R 232/485 not isolated<br>8-way Mini-DIN or screw terminal block (RS 485)   |
| Master CSMA/CA (multiple access)   | Master AS-Interface M3 (standard and extended addressing)                | Master/Slave for Modbus link, Half duplex (RS 485) / Full duplex (RS 232) in character mode                        |   |
| 125, 250 or 500 Kbit/s   |  | 1.2...38.4 Kbit/s  |   |
| Shielded double twisted pair copper cable  | Flat cable 2 x 1.5 mm <sup>2</sup>                                       | Shielded double twisted pair copper cable  |   |
| 16   | 62 discrete devices, 7 analogue devices                                  | 32 per segment   |   |
| 30 m...120 m depending on binary rate  | 100 m without repeater, 300 m with repeaters                             | 10 m (not isolated), 1000 m with insulation box  |   |
| 1  | 2  | 1  | 1 optional  |
| -  | -  | -  |   |
| - 16 input process data objects (receive PDO)<br>- 16 output process data objects (transmit PDO) | Read AS-Interface sensor state<br>Read/write AS-Interface actuator state | Read/write bits and words, diagnostics for Modbus link<br>Transmit and receive character strings in character mode |   |
| Class M10  | Profile M3 (except profile S-7.4 not supported)                          | -  |   |
| -  | -  | -  |   |
| 24/40 I/O compact base controller<br>20/40 I/O modular base controller                           | 24/40 I/O compact base controller<br>20/40 I/O modular base controller   | 10/16/24/40 I/O compact base controllers<br>20/40 I/O modular base controllers                                     | 16/24/40 I/O compact base controllers<br>20/40 I/O modular base controllers |
| <b>TWD NCO1M</b>   | <b>TWD NOI 10M3</b>  | <b>Terminal port integrated in the base controllers</b>  | <b>TWD NAC ●●●D/T</b><br><b>TWD NOZ ●●●D/T (1)</b>                          |
| 3/9  | 3/13   | 3/16   |   |

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

# Twido programmable controller

## Ethernet TCP/IP network

Twido compact base controllers with integrated Ethernet port



Twido compact base controller with display

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

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

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

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

### Description

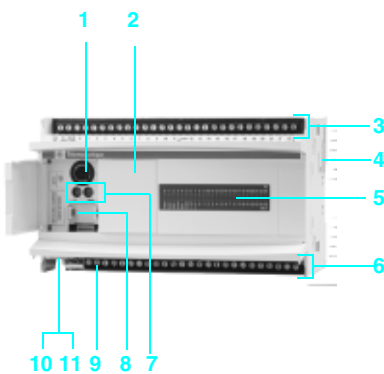
Twido compact base controllers with integrated Ethernet port

**TWD LCAE/LCDE 40DRF** comprise:

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

**With access through the bottom of the controller:**

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



### Characteristics

| Base controller type      |  | TWD LCAE 40DRF  | TWD LCDE 40DRF |
|---------------------------|--|---|----------------|
| TransparentReady Services | Class  | A10   |                |
|                           | Web services   | No Web server   |                |
|                           | Basic Ethernet TCP/IP communication services   | Modbus messaging (read/write of data words)<br>Client BOOTP for assignment of IP address by the FDR server (1)                                |                |
| Structure                 | Physical interface   | 10BASE-T/100BASE-TX, standard RJ45 type connector   |                |
|                           | Binary rate  | 10/100 Mbit/s with automatic recognition  |                |
|                           | Medium   | Twisted pair  |                |
| Compact base controller   | Supply voltage   | Nominal<br>~ 100...240 V, 50/60 Hz  | = 24 V         |
|                           |  | Limits<br>~ 85...264 V, 47...63 Hz  | 19.2...30 V    |
|                           | = 24 V sensor supply   | 250 mA  | -              |
|                           | Inputs   | 24 ~ 24 V inputs, 11 and 7 mA, type 1 (positive or negative logic)  |                |
|                           | Outputs  | 14 relay outputs, ~ 230 V or = 30 V, 2 A<br>2 transistor outputs, = 24 V, 1 A (positive logic)  |                |
|                           | Expansion modules  | 7 modules max.: Discrete I/O (see page 2/9), analogue I/O (see page 2/20), CANopen bus (see page 3/9) and AS-Interface system (see page 3/13) |                |
|                           | Other characteristics  | See pages 1/8 et 1/10   |                |
| LED indicator             | Controller status (PWR, RUN, ERR and STAT), I/O status (IN●/OUT●)<br>Ethernet status (LAN ST), 10 or 100 Mbit/s rate (L ACT) |   |                |

### References



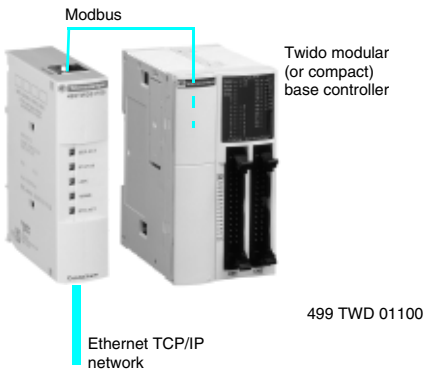
TWD LCDE 40DRF

| Description  | No. of discrete I/O                                 | Supply voltage | Reference             | Weight kg |
|--|---|----------------|-----------------------|-----------|
| Compact base controllers with integrated Ethernet port | 24 ~ 24 V inputs                                    | ~ 100...240 V  | <b>TWD LCAE 40DRF</b> | 0.525     |
|  | 14 relay outputs<br>2 solid state outputs<br>= 24 V | = 24 V         | <b>TWD LCDE 40DRF</b> | 0.525     |

Transparent Ready  
Class A10

**Separate components:** serial interface adapter, memory cartridge, digital display, see page 1/11.

(1) Auto MDI/MDX function not supported.



TwidoPort module **499 TWD 01100** is an Ethernet interface that is easy to use and dedicated to Twido compact or modular programmable controllers, version 3.0. It allows incorporation of the Twido controller into an Ethernet network as a passive device (slave). The TwidoPort module is ready for use.

When connected to the integrated RS 485 serial port of any compact or modular base controller, the TwidoPort module acts as a gateway between the Ethernet TCP/IP network and the Twido controller's Modbus serial link.

The connection cable between the base controller and the TwidoPort module is supplied with the module.

The main characteristics of the TwidoPort module are as follows:

- Connects to the RS 485 port of the Twido controller; no external auxiliary supply is necessary.
- Ethernet configuration:
  - takes the Ethernet configuration from the Twido application configuration (normal mode),
  - supports manual configuration using Telnet.
- Provides Ethernet statistics via a Telnet session.

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

### Description

The TwidoPort **499 TWD 01100** interface module comprises:


- 1 Five pilot lights indicating the status of the interface and of the TwidoPort module links.
- 2 An RJ45 type connector for connection of the power supply and of the link to the Twido controller's integrated RS 485 port. This connection is made using connection cable **TWD XCA RJP03P** supplied with the TwidoPort interface module.
- 3 An RJ45 connector (accessed through the bottom of the module) for connection to the Ethernet TCP/IP network.
- 4 An earthing screw (accessed through the bottom of the module).

The TwidoPort interface module can be mounted as standard on a symmetrical  $\sqcup$  rail. Fixing kit **TWD XMT5** (sold in lots of 5) allows plate or panel mounting (2 x  $\varnothing$  4.3 holes).

### Characteristics

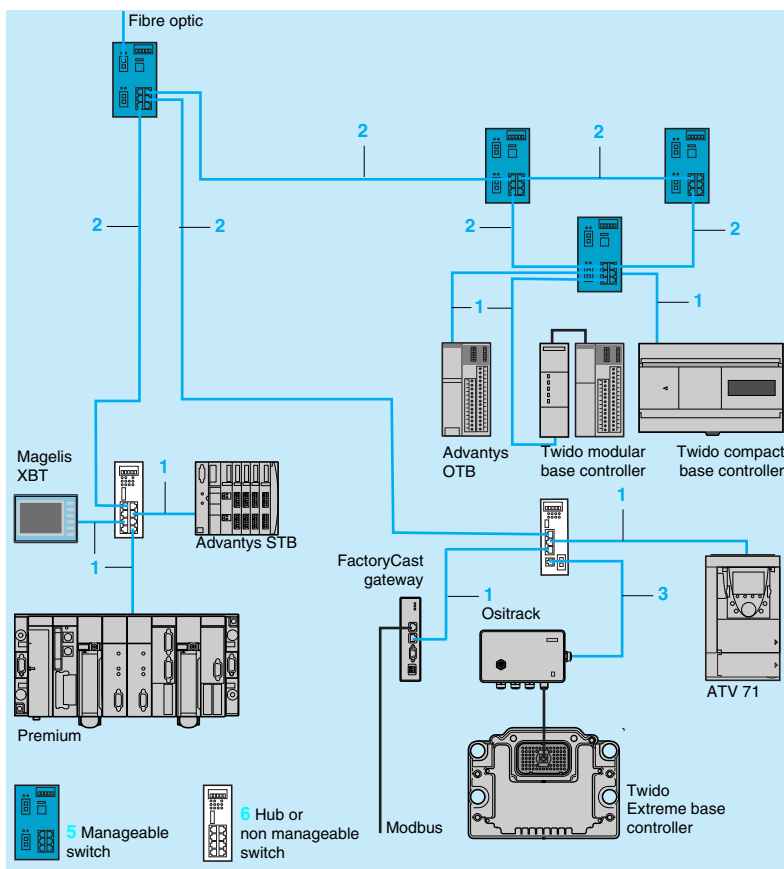
| TwidoPort module           |  | 499 TWD 01100   |
|----------------------------|--|---|
| Transparent Ready Services | Class  | A10   |
|                            | Web services                                 | No Web server   |
|                            | Basic Ethernet TCP/IP communication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

### Reference

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

499 TWD 01100

#### Ethernet TCP/IP network architecture



#### References (1)

##### Shielded copper connection cables

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

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

These cables conform to:

- standard EIA/TIA 568, category CAT 5E,
- standard IEC 11801/EN 50173, class D.

Their flame resistance conforms to:

- NFC 32070# classification C2
- standards IEC 322/1,
- Low Smoke Zero Halogen (LSZH).

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

These cables conform to:

- standards UL and CSA 22.1.

Their flame resistance conforms to NFPA 70.

#### “Do It Yourself” cable and connectors

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

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

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



490 NT● 000 ●●



499 NES 251 00



TCS ESM 043F2C●●0



499 NMS/NSS 251 02



TCS ESM 083F2C●●0



TCS ESU 051 F0

## References (continued)

## Shielded twisted pair cables to standard EIA/TIA568

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

## Shielded twisted pair cables, UL and CSA 22.1 approved

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

## Shielded twisted pair cable for IP 67 switch

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

## ConneXium hub

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

## ConneXium switches

| Description  | Number of ports |                | Item | Manag-eable      | Reference        | Weight kg |
|--|-----------------|----------------|------|------------------|------------------|-----------|
|  | Copper cable    | Fibre optic    |      |                  |                  |           |
| Optimised twisted pair switch<br>0BASE-T/100BASE-TX copper ports,<br>RJ45 shielded connectors  | 5               | –              | 6    | No               | 499 NES 251 00   | 0.190     |
| Twisted pair switches<br>10BASE-T/100BASE-TX copper ports,<br>RJ45 shielded connectors   | 8               | –              | 6    | No               | 499 NES 181 00   | 0.230     |
|  | 8               | –              | 5    | Yes              | TCS ESM 083F23F0 | 0.410     |
| Twisted pair and fibre optic switches<br>10BASE-T/100BASE-TX copper ports,<br>RJ45 shielded connectors.<br>100BASE-FX optical ports, SC connectors | 3               | 1, multimode   | 5    | Yes              | TCS ESM 043F1CU0 | 0.400     |
|  | 2               | 2, multimode   | 5    | Yes              | TCS ESM 043F2CU0 | 0.400     |
|  | 3               | 1, single-mode | 5    | Yes              | TCS ESM 043F1CS0 | 0.400     |
|  | 2               | 2, single-mode | 5    | Yes              | TCS ESM 043F2CS0 | 0.400     |
|  | 4               | 1, multimode   | 6    | No               | 499 NMS 251 01   | 0.330     |
|  | 3               | 2, multimode   | 6    | No               | 499 NMS 251 02   | 0.335     |
|  | 4               | 1, single-mode | 6    | No               | 499 NSS 251 01   | 0.330     |
|  | 3               | 2, single-mode | 6    | No               | 499 NSS 251 02   | 0.335     |
|  | 7               | 1, multimode   | 5    | Yes              | TCS ESM 083F1CU0 | 0.410     |
|  | 6               | 2, multimode   | 5    | Yes              | TCS ESM 083F2CU0 | 0.410     |
| 7  | 1, single-mode  | 5              | Yes  | TCS ESM 083F1CS0 | 0.410            |           |
| 6  | 2, single-mode  | 5              | Yes  | TCS ESM 083F2CS0 | 0.410            |           |
| 6  | 1, multimode    | 5              | Yes  | TCS ESM 083F2CX0 | 0.410            |           |
| 6  | 1, single-mode  | 5              | Yes  | TCS ESM 083F2CX0 | 0.410            |           |
| IP 67 twisted pair switch (1)<br>10BASE-T/100BASE-TX copper ports,<br>shielded M12 connectors (type D)   | 5               | –              | –    | No               | TCS ESU 051 F0   | 0.210     |

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

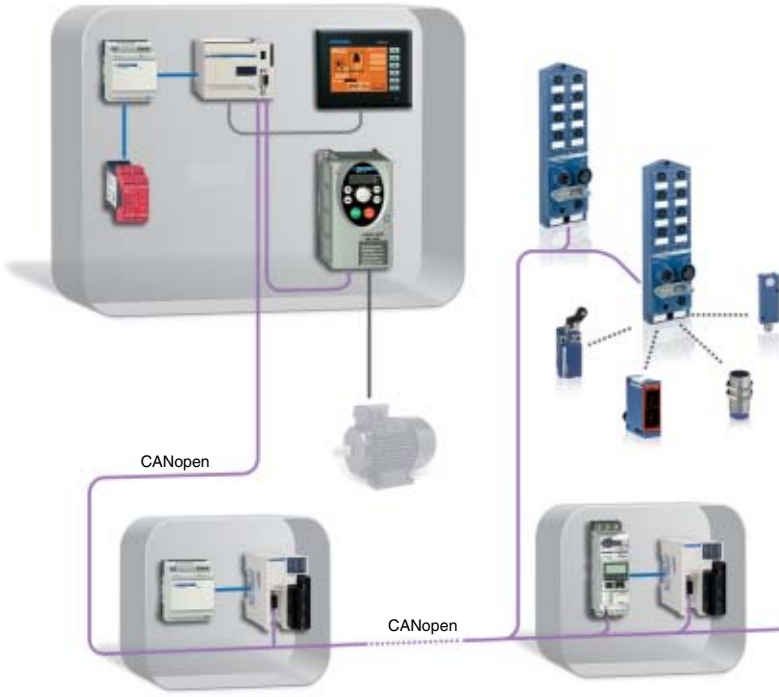
# Twido programmable controller

## CANopen bus

### CANopen bus master module

3

3.2



#### Presentation

Master module **TWD NCO1M** for the CANopen bus allows Twido programmable controllers version  $\geq 3.0$ , compact base controllers **TWD LC●A 24/40DRF** and modular base controllers **TWD LMDA ●0D●●**, to act as CANopen master.

The bus consists of a master station, the Twido controller and slave stations. The master is in charge of configuration, exchanges and diagnostics on the slaves.

The CANopen bus is a communication type bus and allows management of various slaves such as:

- Discrete slaves,
- Analogue slaves,
- Variable speed controllers,
- Motor starters,
- ....

The Twido CANopen master controls up to 16 slaves, each with an input PDO (*Process Data Object*) and an output PDO.

If a slave has more than one PDO, the maximum number of slaves is reduced by an equivalent number.

#### CANopen conformity class

Schneider Electric has defined the conformity classes for CANopen master and slave devices. Conformity classes are used to identify the services and levels of service supported by each CANopen device or product. These services are described in section 4 of our "Machines & Installations with industrial communications" catalogue. The table below shows product combination possibilities according to their conformity class.

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

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

#### Examples of combinations with the Twido controller

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

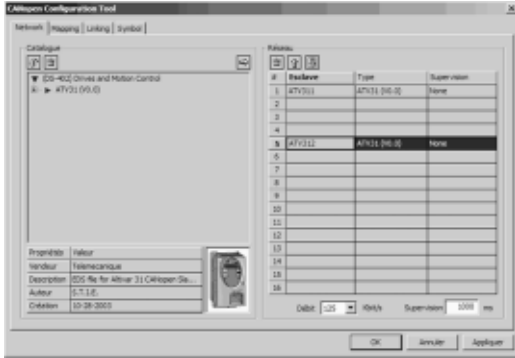
- Combination possible
- Use restriction
- Not supported by conformity class M10



# Twido programmable controller

## CANopen bus

### CANopen bus master module



#### Configuration

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

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

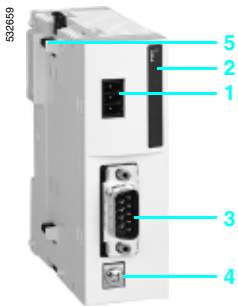
For certain slaves, such as ATV 31/61/71 variable speed controllers and Lexium 05 servo variable speed controller, one or more profiles are supplied, allowing the slave to be configured according to a mode predefined by Schneider Electric. The use of profiles provides the user with an operating mode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

#### Description

CANopen bus master module **TWD NCO1M** comprises:

- 1 An earthed, plug-in, 3-way,  $\bar{\text{---}}$  24 V supply connector.
- 2 A PWR LED, indicating module power ON or OFF.
- 3 A 9-way SUB-D connector for connection to the CANopen bus.
- 4 An earth screw.
- 5 A connector for connection to the Twido controller or to another I/O expansion module.

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



#### Characteristics

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

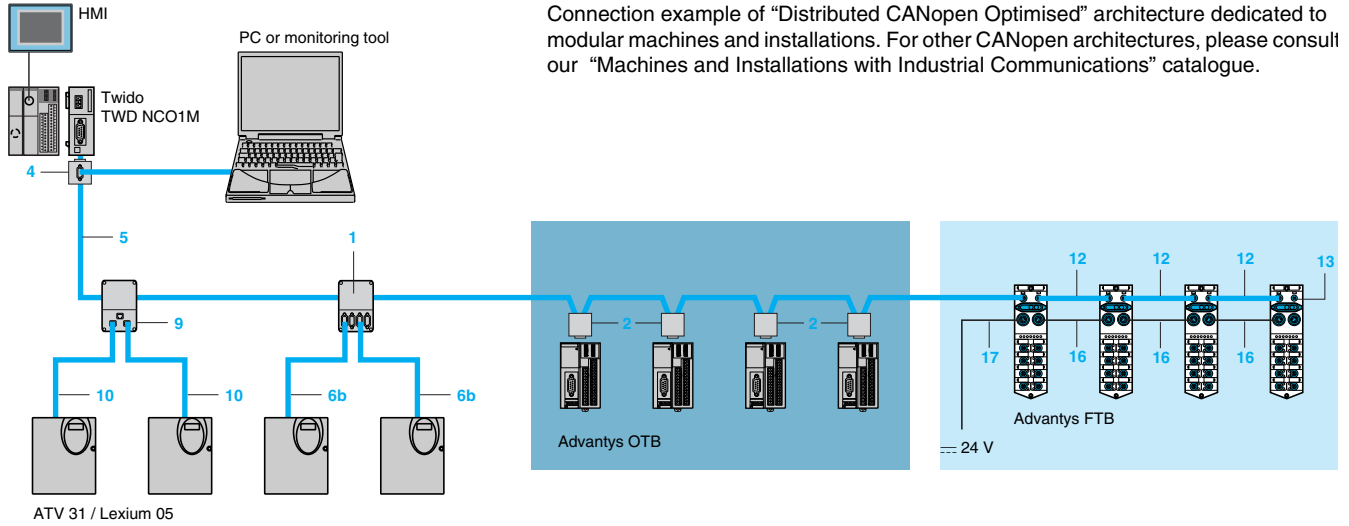
#### Reference



TWD NCO1M

| Description  | No. of modules per base controller                           | External supply         | Reference        | Weight kg |
|--|--|-------------------------|------------------|-----------|
| <b>CANopen bus master module for Twido base controller :</b><br>- Compact<br>TWD LC●● 24/40DRF<br>- Modular<br>TWD LMDA 20/40D●● | 1  | $\bar{\text{---}}$ 24 V | <b>TWD NCO1M</b> | -         |
| Conformity class M10   |  |                         |                  |           |
| Description  | Application  | Reference               | Weight kg        |           |
| <b>Fixing kit</b>  | For plate or panel mounting of the module. Sold in lots of 5 | <b>TWD XMT5</b>         | -                |           |

### CANopen architecture



3

3.2

### References



#### Standard junction boxes and connectors

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

#### Standard IP 20 pre-formed cables

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

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



## References (continued)

## Standard IP 20 pre-formed cables (continued)

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

## Standard IP 67 pre-formed cables

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

## IP 20 connection accessories

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

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

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

(1) Cable equipped with line end adapter.

(2) For variable speed controllers ATV 71H●●●M3, ATV 71HD11M3X, HD15M3X, ATV 71H075N4... HD18N4, this connector can be replaced by connector TSX CAN KCDF 180T.

(3) Standard environment: without any particular environmental restrictions, operating temperature between + 5 °C and + 60 °C, and for fixed installation.



VW3 CAN A71



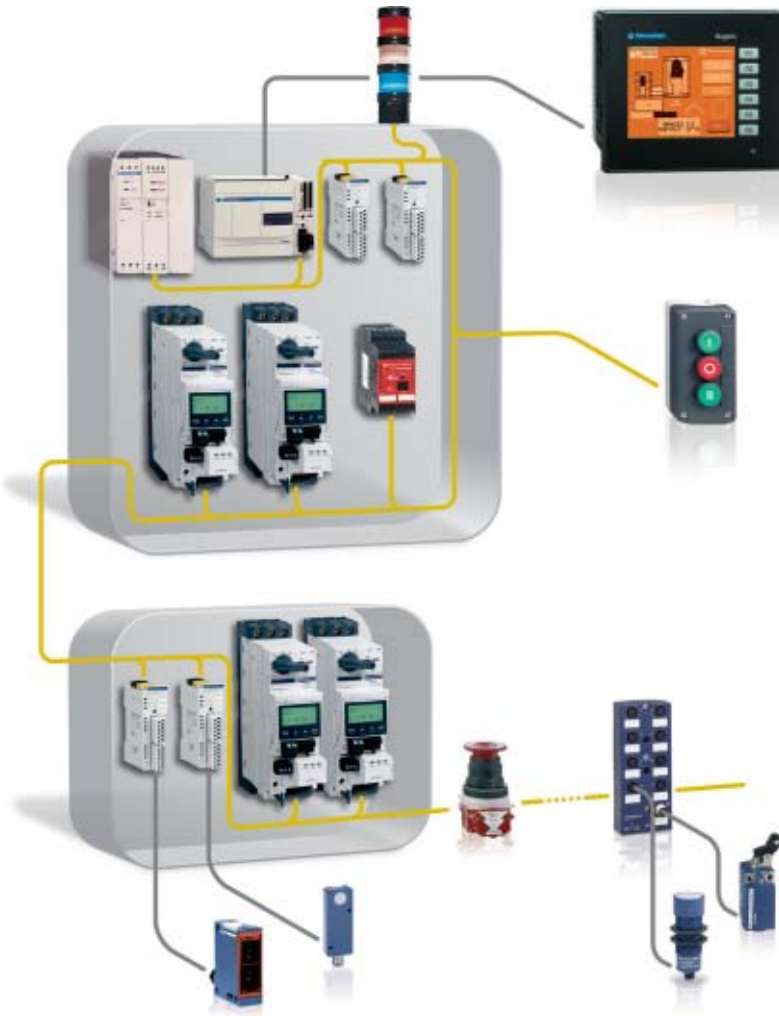
AM0 2CA 001V000



FTX DP21●●

3

3.3



#### Presentation

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

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

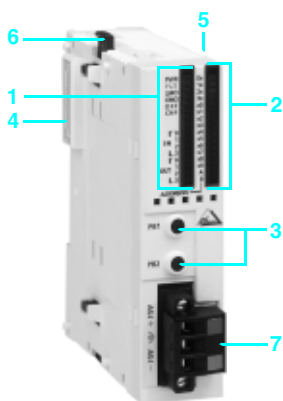
The **TWD NOI 10M3** master module manages the following with the AS-Interface M3 profile:

- 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.


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



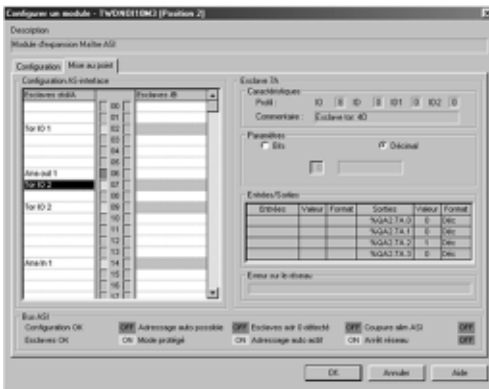
#### Description

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

- 1 A display block comprising:
  - 6 pilot lights indicating the module operating modes:
    - green PWR pilot light: module powered up,
    - red FLT pilot light: error in the configuration loaded,
    - green LMO pilot light: module in local mode,
    - green CMO pilot light: module in connected mode,
    - red CNF pilot light: not used,
    - red OFF pilot light: module in protected, unconnected mode.
  - 6 green pilot lights, 3 for inputs, 3 for outputs.
- 2 A block for displaying the status of the addresses.
- 3 Two pushbuttons PB1 and PB2 for controlling the status of the slaves by selecting their address and changing the mode.
- 4 An extension connector for electrical connection to the previous module.
- 5 A connector (on the RH side) for I/O expansion modules **TWD D●●** and **TWD A●●** (4 or 7 depending on version).
- 6 A latching mechanism for attachment to the previous module.
- 7 A power supply removable screw terminal block.

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

## Diagnostics



The 30 pilot lights on the front panel of the module are used in conjunction with the two pushbuttons for diagnostics by the Twido controller.

The display block on the front panel of master module **TWD NOI 10M3** allows simplified local diagnostics to be performed by displaying the slaves present on the AS-Interface.

### Software set-up

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

The services offered are based on the principle of simplicity:

- Management of profile tables, parameters and data by the master, in a way that is transparent to the user.

- Topological addressing of I/O: each AS-Interface slave defined has a topological address assigned to it, in a way that is transparent to the user.

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

## Characteristics

| Module type                          |             | TWD NOI 10M3  |             |
|--------------------------------------|-------------|---|-------------|
| AS-Interface profile                 |             | AS-Interface M3, V 2.11 (profile S-7.4 not supported) |             |
| Type of addressing                   |             | Standard and extended                                 |             |
| Product certifications               |             | AS-Interface n° 47801                                 |             |
| Degree of protection                 |             | IP 20   |             |
| Temperature                          | Operation   | °C  | 0...+ 55    |
|                                      | Storage     | °C  | - 25...+ 70 |
| AS-Interface external power supply   |             | --- V   | 29.5...31.6 |
| Internal current                     | At --- 5 V  | mA  | 80          |
|                                      | At --- 24 V | mA  | 0           |
| AS-Interface consumption at --- 24 V |             | mW  | 540         |

### Data exchange characteristics

|                                   |  |    |   |
|-----------------------------------|--|----|---|
| AS-Interface cycle time           | With 1 to 19 slaves                                | ms | 3   |
|                                   | With 20 to 62 slaves                               | ms | 0.156 x (1 + N) where N = number of active slaves |
|                                   | With 31 standard slaves or slaves in banks A and B | ms | 5   |
|                                   | With 62 slaves in banks A and B                    | ms | 10  |
| Max. number of modules            | Analogue modules (1)                               |    | 7   |
|                                   | Discrete modules (1)                               |    | 62  |
| Max. number of I/O                | Standard slaves                                    |    | 248 = 124 inputs + 124 outputs                    |
|                                   | Slaves in banks A and B                            |    | 434 = 248 inputs + 186 outputs                    |
| Max. length of AS-Interface cable | Without repeater or line extension                 | m  | 100   |
|                                   | With line extension TCS ARR01M                     | m  | 200   |
|                                   | With 2 repeaters ASI RPT01                         | m  | 300   |

## References



TWD NOI 10M3

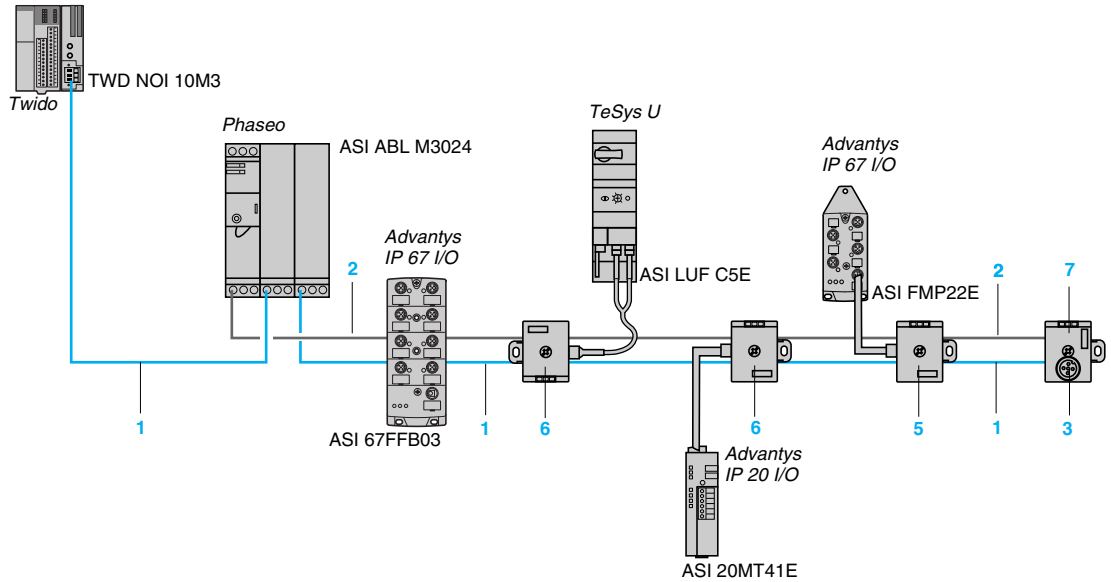
| Description  | No. modules per base controller | AS-Interface profile | Number of I/O (1)                                   | Reference    | Weight kg |
|--|---------------------------------|----------------------|---|--------------|-----------|
| <b>AS-Interface master module for Twido base controller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

| Description       | Application   | Reference | Weight kg |
|-------------------|---|-----------|-----------|
| <b>Fixing kit</b> | For plate or panel mounting of the module.<br>Sold in lots of 5 | TWD XMT5  | —         |

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

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

### AS-Interface infrastructure

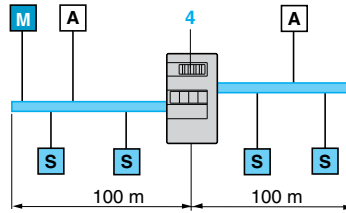


### Installation

#### AS-Interface cable lengths

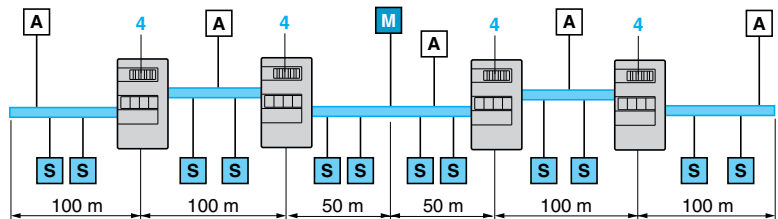
We recommend use of the flat yellow cable. The maximum length of an AS-Interface segment is 100 m, which can be extended to:

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



- 300 m with 2 repeaters.

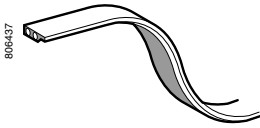
- 500 m by placing the master in the centre of the network:



M = Master Module

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

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



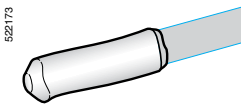
XZ CB1●●●●



TCS ARR01M



ASI RPT01



ASI 67FACC2



TCS ATN011F●



TCS ATV011F●



TCS ATN011F



TCS ATN02V

### Flat cables and line accessories

The special profile of these 2-core flat cables eliminates the risk of polarity reversal when connecting. Connections to the cables are made by IDCs (Insulation Displacement Connectors), see connection accessories.

The material used for the cable sheath causes the holes made by the IDCs to reseal themselves as soon as the connectors are removed, so maintaining the IP 67 degree of protection of AS-Interface cabling accessories.

The ambient temperatures which AS-Interface flat cable can withstand are as follows, according to the type:

- Standard cable: 25...+ 85 °C for operation, - 40...+ 85 °C for storage.
- TPE cable (oil and vapour resistant): - 30...+ 105 °C for operation with cable flexing, - 40...+ 105 °C for non-flexing operation or storage.

| Description  | Sheath colour                           | Item | Length | Type of cable | Reference   | Weight kg   |       |
|--|---|------|--------|---------------|-------------|-------------|-------|
| <b>Flat cables</b><br>2 x 1.5 mm <sup>2</sup><br>Ue ≤ 48 V | Yellow<br>(for AS-Interface)            | 1    | 20 m   | Standard      | XZ CB10201  | 1.400       |       |
|  |   |      |        | TPE           | XZ CB10201H | 1.400       |       |
|  |   |      |        | 50 m          | Standard    | XZ CB10501  | 3.500 |
|  |   |      |        |               | TPE         | XZ CB10501H | 3.500 |
|  |   |      |        | 100 m         | Standard    | XZ CB11001  | 7.000 |
|  |   |      |        |               | TPE         | XZ CB11001H | 7.000 |
|  | Black<br>(for separate --- 24 V supply) | 2    | 20 m   | Standard      | XZ CB10202  | 1.400       |       |
|  |   |      |        | TPE           | XZ CB10202H | 1.400       |       |
|  |   |      |        | 50 m          | Standard    | XZ CB10502  | 3.500 |
|  |   |      |        |               | TPE         | XZ CB10502H | 3.500 |
|  |   |      |        | 100 m         | Standard    | XZ CB11002  | 7.000 |
|  |   |      |        |               | TPE         | XZ CB11002H | 7.000 |

| Description                      | Application   | Item | Length | Sold in lots of | Unit reference | Weight kg |
|----------------------------------|---|------|--------|-----------------|----------------|-----------|
| <b>Line extension</b>            | Allows the length of a segment to be extended from 100 to 200 m             | 3    | –      | –               | TCS ARR01M ▲   | 0.047     |
| <b>Repeater</b>                  | Enables an AS-Interface line to be extended by 100 m                        | 4    | –      | –               | ASI RPT01      | 0.190     |
| <b>Heat shrinkable cable end</b> | To preserve IP 67 degree of protection at the end of the AS-Interface cable | –    | –      | 10              | ASI 67FACC2    | 0.002     |

### Accessories for connection to AS-Interface flat cables

Degree of protection: IP 67, connection to flat cables by means of IDC's. Ue ≤ 40 V, Ie ≤ 2 A.

Ambient temperature: - 25 °C...+ 70 °C for operation, - 40...+ 85 °C for storage.

#### Tap-offs for connection of AS-Interface components

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

#### T connectors

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

▲ Available 4th quarter 2007

# Twido programmable controller

## Asynchronous serial links

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

3

### Presentation

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

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

- **Programming**, for link with a PC (equipped with TwidoSuite programming software or TwidoAdjust adjustment software) or with a pocket PC. This link may be of the common, modem or wireless type using Bluetooth technology.
- **Modbus**, in order to meet the needs of master/slave architectures with Schneider Electric or third party devices.
- **ASCII** in character mode for links with serial devices (printer, modem, ...)
- **"Remote link" decentralised I/O** for Twido base controllers used as I/O extension or local "reflex" controller.

### Description

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

- 1 An RS 485 serial port, with mini-DIN connector, for connection to the programming terminal.
- 2 A slot for a 2<sup>nd</sup> serial port link (RS 485/RS 232) by inserting one of the three TWD NAC 485●/232D adapters.

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

- 1 An RS 485 serial port, with mini-DIN connector, for connection to the programming terminal.
- 2 A 2<sup>nd</sup> serial link port (RS 485/RS 232) via adapters TWD NAC 485●/232. Depending on the user's needs, this adapter (accessible via the removable cover 3) is either:
  - 4, included in the module with interface adapter TWD NOZ 485●/232D
  - 5, to be fitted into digital display module TWD XCP ODM.

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

### Twido controller serial ports

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

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

#

### References

#### Serial link modules and adapters

All serial links for Twido controllers, whether integrated or optional, are non isolated. It is therefore recommended that isolating devices be used for bus lengths > 10 m, see page 3/17.

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



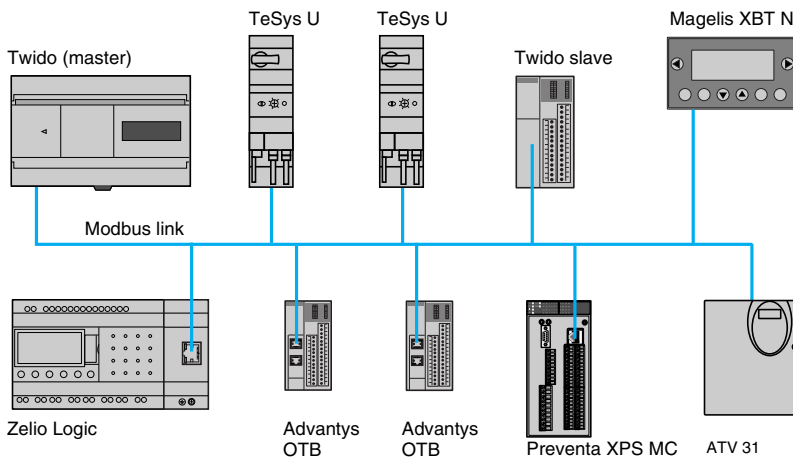


# Twido programmable controller

## Asynchronous serial links

### Modbus and character mode protocols

#### Modbus serial link



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

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

- Question/reply, questions from the master are addressed to a specific slave. The master waits for the reply to be returned by the slave polled.
- Distribution, the master distributes a message to all the slave stations on the bus. These stations execute the instruction without sending a reply.

#### Modbus and character mode characteristics

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

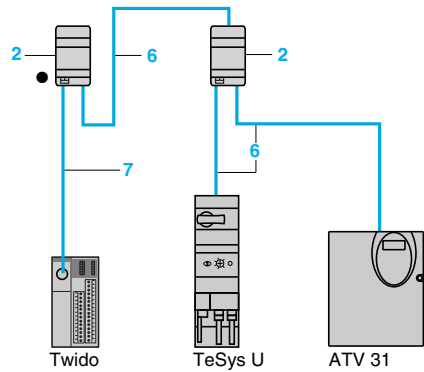
#### Modbus functions

| Modbus functions available on Twido controller serial link | Code | Modbus slave (server)   | Modbus master (client)  |
|--|------|---|-------------------------|
|  | 01   | Read n internal bits %M   | Read output bits        |
|  | 02   | Read n internal bits %M   | Read input bits         |
|  | 03   | Read n internal words %MW   | Read words              |
|  | 04   | Read n internal words %MW   | Read input words        |
|  | 05   | Write 1 internal bit %M   | Write 1 bit or n bits   |
|  | 06   | Write 1 internal word %MW   | Write 1 word or n words |
|  | 15   | Read n internal bits %M   | Write n output bits     |
|  | 16   | Write n internal words %MW  | Write n output words    |
|  | 23   | Read or write n internal words %MW, only with 40 I/O compact base controller<br><b>TWD LC●● 40DRF</b> | –                       |
|  | 43   | Read device identification  | –                       |

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

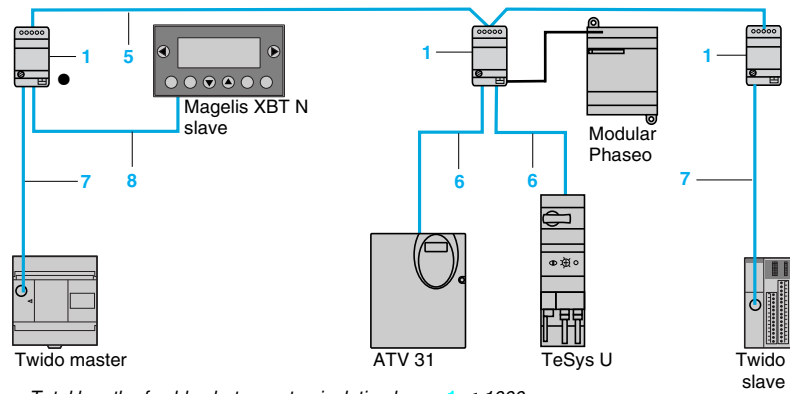
### Modbus cabling system

#### Non isolated link



- Cable length between Twido and ATV 31:  $\leq 30$  m
- Length of cable 6:  $\leq 10$  m
- Line polarisation active

#### Isolated link



- Total length of cables between tap isolation boxes 1:  $\leq 1000$  m
- Length of tap link cables 6, 7 or 8:  $\leq 10$  m
- Line polarisation active

3

### References

#### Tap-off and adapter components for RS 485 serial link

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

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



TWD XCA ISO



TWD XCA T3RJ



LU9 GC3



TSX SCA 50



XGS Z24

3.4



# Twido programmable controller

## Modbus and character mode serial link

### Cabling system

## References (continued)

## Connection cables for RS 485 serial link

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

## Connection cables for RS 232 serial link

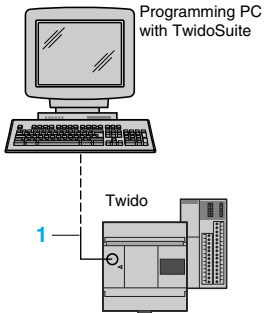
| Description   | Application   | Item | Length | Reference              | Weight kg |
|---|---|------|--------|------------------------|-----------|
| <b>Cable for DTE terminal</b><br>(printer)          | Serial link for terminal device (DTE) (1)<br>1 x RJ45 connector and<br>1 x 9-way SUB-D female connector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

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

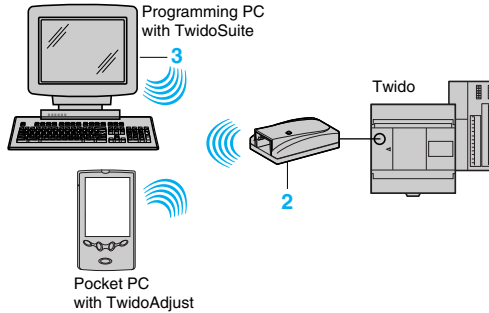
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#### Terminal link cabling system (integrated port)

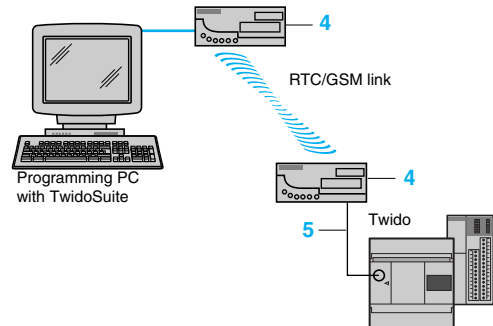
##### Direct link



##### Wireless link



##### Link by modem




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#### Terminal link characteristics (integrated port)

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

#### References

##### Connection components for terminal link

| Description  | Application   | Item           | Cable length | Unit reference      | Weight kg |
|--|---|----------------|--------------|---------------------|-----------|
| <b>USB/RS485 converter</b>   | Allows connection of the Twido controller's integrated port to the USB port on the programming PC. To be used with mini-DIN/RJ45 cable.   | 1              | 0.4 m        | <b>TSX CUSB 485</b> | 0.144     |
| <b>RS 485 cable</b>  | Fitted with a mini-DIN connector and an RJ45 connector. To be used with the USB/RS485 converter   | 1              | 2.5 m        | <b>TSX CRJMD 25</b> | 0.150     |
| <b>RS 232 cable for DTE terminal</b><br>(PC serial port, printer, ...) | Fitted with a mini-DIN connector and a 9-way SUB-D female connector   | 1 (1)<br>5 (2) | 2.5 m        | <b>TSX PCX 1031</b> | 0.170     |
| <b>Adapter Modbus/Bluetooth®</b>                                       | - 1 Bluetooth® adapter (range 10 m, class 2) with RJ45 connector<br>- 1 x 0.1 m length cable for TwidoSuite, with 1 RJ45 connector and 1 mini-DIN connector<br>- adapter and cable for ATV variable speed controllers | 2              | -            | <b>VW3 A8 114</b>   | 0.155     |
| <b>USB Bluetooth adapter for PC</b>                                    | Range 10 m<br>For use on the PC serial port if the PC does not have Bluetooth technology  | 3              | -            | <b>VW3 A8115</b>    | 0.290     |
| <b>Analogue PSTN Modem</b>   | Type WESTERMO TD-33 / V.90<br>Supplied with telephone cable<br>Supply voltage --- 12...36 V   | 4              | 3 m          | <b>SR1 MOD01</b>    | 0.231     |
| <b>GSM Modem</b>   | Type WAVECOM WMOD2B<br>Dual band 900/1800 MHz,<br>Supplied with power cable and lugs for plate mounting<br>Supply voltage --- 24 V  | 4              | 1.5 m        | <b>SR1 MOD2</b>     | 0.127     |
|  | GSM modem accessory comprising:   | -              |              | <b>SR1 KIT02</b>    | 0.180     |
|  | - a modem cable,  |                | 0.5 m        |                     |           |
|  | - an antenna with cable   |                | 3 m          |                     |           |
|  | - device for mounting on  rail   |                |              |                     |           |
| <b>RS 232 cable for DCE terminal</b><br>(modem, ...)                   | Fitted with a mini-DIN connector and a 9-way SUB-D male connector. Supplied with a <b>TSX CTC 09</b> adapter (9-way SUB-D female/25-way SUB-D male 25)  | 5              | 3 m          | <b>TSX PCX 1130</b> | 0.140     |

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

(2) Cable **TSX PCX 1031** may be used as connection cable 5 between the Twido controller and the modem, after having crossed the Rx and TX conductors.

3

3.4



TSX CUSB 485

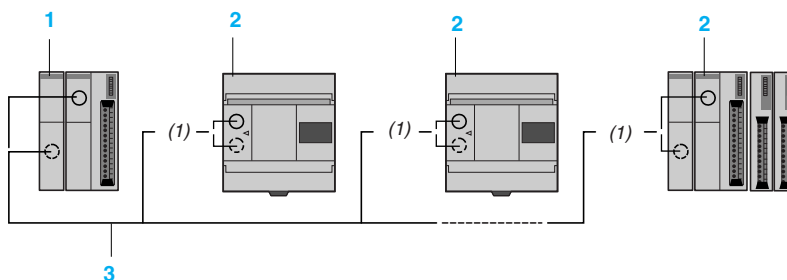


TSX PCX 1031



VW3 A8114

### "Remote Link" decentralised I/O



Each compact or modular base controller can be extended by means of any other Twido base controller used either as an I/O extension, or as a local "reflex" controller:

- When used as an I/O extension, these 10, 16, 20, 24 or 40 discrete I/O base controllers cannot take any expansion modules (discrete I/O, analogue I/O or communication). The "master" base controller acquires the inputs and updates the outputs of the Twido base controllers used as remote I/O extensions
- When used as a local "reflex" controller, these base controllers each have their own application program. They can take any of the expansion modules (discrete I/O, analogue I/O or communication). Eight internal words (4 input words %INW0.0...%INW0.3 and 4 output words %QNW0.0...%QNW0.3) are reserved in each "reflex" base controller for automatic exchange of information with the "master" controller.

- 1 Compact or modular base controller acting as "master".
- 2 Twido compact or modular base controllers used as I/O extension or as local "reflex" controller.
- 3 RS 485, 3-wire cable from the integrated serial port or from the 2<sup>nd</sup> optional serial port.

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

### "Remote link" characteristics

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

### References



TSX SCA 50

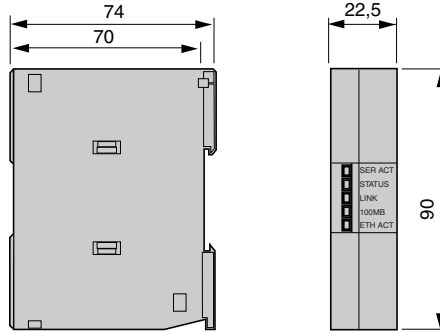
#### Tap-off and connection components

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

## Dimensions

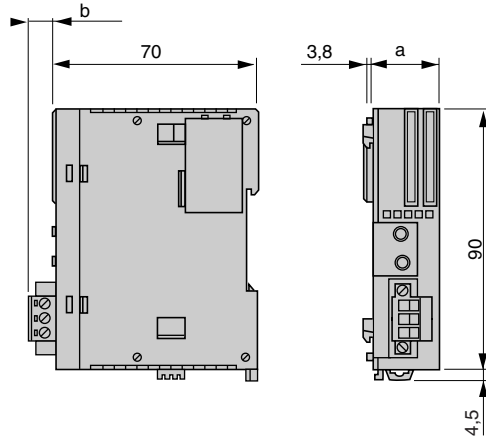
### TwidoPort Ethernet module

499 TWD 01100



### CANopen bus/AS-Interface expansion modules

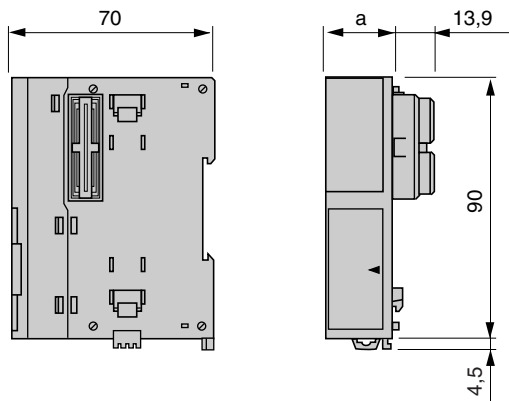
TWD NCO1M/NOI 10M3 (mounted on RH side of compact and modular base controllers)



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

### Expansion modules with serial adapter and digital display

TWD NOZ ●●●● and TWD XCP ODM (can only be mounted on LH side of base controllers)



|              | a     |
|--------------|-------|
| TWD NOZ ●●●● | 22.50 |
| TWD XCP ODM  | 38    |

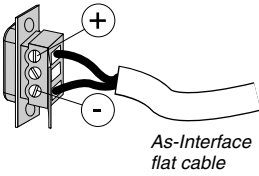
3

3.4

## Connections

### AS-Interface

#### Screw terminal block

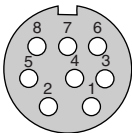


#### TWD NOI 10M3

- + Brown wire
- Blue wire

### Integrated serial link

#### RS 485, mini-DIN connector

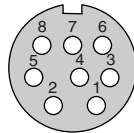


TWD LC●A 10/16/24DRF  
TWD LC●● 40DRF  
TWD LMDA ●0D●●

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

### Optional link

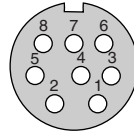
#### RS 485, mini-DIN connector



TWD NAC 485D  
TWD NOZ 485D

|              |
|--------------|
| D1 (A +)     |
| D0 (B -)     |
| N/C          |
| N/C          |
| N/C          |
| N/C          |
| 0 V          |
| 5 V (180 mA) |

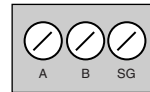
#### RS 232D, mini-DIN connector



TWD NAC 232D  
TWD NOZ 232D

|              |
|--------------|
| RTS          |
| DTR          |
| TXD          |
| RXD          |
| DSR          |
| 0 V          |
| 0 V          |
| 5 V (180 mA) |

#### RS 485T, screw terminal block



TWD NAC 485T  
TWD NOZ 485T

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

NC: not connected  
NPC: do not connect

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



# 4 - Operating and maintenance software

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## 4 - Software

- TwidoSuite programming software
  - Presentation ..... page 4/2
  - Functions ..... page 4/3
  - References ..... page 4/7
- TwidoAdjust maintenace software
  - Presentation, fonctions ..... page 4/8
  - References ..... page 4/9





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### Presentation

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

TwidoSuite is easy-to-use and takes little or no time to learn how to use. Its primary aim is to reduce project development time significantly by simplifying all necessary interventions.

TwidoSuite is the first software tool:

- Organized according to the project development cycle. Navigation through the software is so easy that it becomes second nature.
- Offering an interface that is resolutely modern, pleasant and intuitive, so that getting started is:
  - More user-friendly
  - Faster - the simplified interface helps you find the information you need in a matter of seconds
  - More efficient, thanks to the numerous tools and tips on offer

TwidoSuite software runs with the following minimum configurations:

- Microsoft Windows® 2000, Microsoft Windows® XP, (service Pack 2 recommended)
- 466 MHz Pentium type processor, hard disk with 100 Mb space available and 128 Mb of RAM
- Minimum screen resolution of 800 x 600 pixels

### Connecting a PC to the controller

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

#### Link via connection cables

The PC is connected to the Twido bases via:

- A USB port using the USB/RS 485 converter **TSX CUSB 485** and the 2.5 m Mini-DIN/RJ45 cable **TSX CRJMD25**
- A RS 232 serial port via the 2.5 m 9-way Mini-DIN/SUB-D multifunction cable **TSX PCX 1031**

#### Link via modem

Modems are a very practical solution avoiding the need for on-site attendance for certain maintenance operations.

The modem connected to the Twido controller must be declared in the hardware configuration. It will be initialized by the controller automatically (Hayes initialization string).

At the PC end, the TwidoSuite software will associate a special modem connection that will be memorized in the project (including the telephone number to use).

#### Ethernet network link

Thanks to its embedded Ethernet port, the Twido compact bases controller **TWD LCAE 40DRF** and **TWD LCDE 40DRF** can be connected to a PC using the Ethernet network and the Modbus TCP/IP protocol.

The TwidoPort Plug&Play interface module **499 TWD 01100** is extremely easy to use, and can be used to incorporate all Twido controllers (firmware version ≥ 3.0) into an Ethernet TCP/IP network.

#### Bluetooth wireless link

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

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



# Twido programmable controller

## TwidoSuite programming software

### Navigation, management, description

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#### Instinctive, visual navigation

Navigation within TwidoSuite is intuitive and highly visual.

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

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

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

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

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

#### Project management

The "Project management" function is used to:

- Create a new project with the option to enter data by means of a form and attach a photo
- Open a project from the PC (hard disk, CD-Rom, USB key, etc.)
- Review a project from a Twido controller.

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

#### Description of the architecture

This function is used to:

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

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

A highly visual "Catalog" can be used to select the appropriate product including:

- The product reference
- The product description
- A photo of the product

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

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

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# Twido programmable controller

## TwidoSuite programming software

### Configuration, programming, debugging

#### Configuration

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

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

#### Programming

Programming is an essential step, and one which has been carefully designed to be as efficient as possible. The program can now therefore be organized into "Sections", which simplify reading and navigating through the program.

These sections can be programmed in LIST or LADDER language.

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

#### Debugging

Often performed in difficult conditions, debugging is now much improved.

The connection task is guided step-by-step, so that all the actions performed by TwidoSuite (choice of connection, test of the connected controller, selection of the transfer performed) can be followed.

The program is then animated, allowing modifications to be made without stopping the controller (RUN).

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

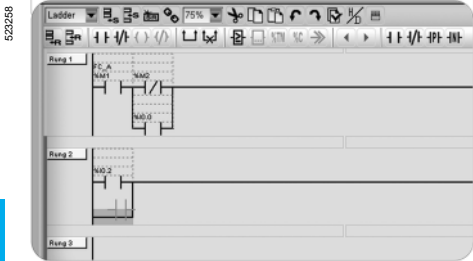
A mini floating display panel can be used to control actions on the controller.

#### Documentation

Because a printed dossier of the created project is still a crucial element, it is possible to configure some project elements for printing, define the page layout to suit the user's requirements, and then launch printing.

A preview function avoids wasted print jobs.

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



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#### Macros for Modbus serial link and CANopen bus

In order to make programming easier, a system of macros simplifies writing of the program and improves understanding of the code. This system is presented according to different families of equipment - generic equipment, variable speed drives (ATV 31, ATV 61, ATV 71 and Lexium 05).

For each family, a list of macros is suggested to facilitate exchanges between the Twido programmable controller and the device connected to the Modbus serial link or the CANopen bus. These macros are in the form of configurable families to describe the network characteristics of the device involved (Modbus network or CANopen bus, slave address, etc.). The instances thus configured can be run within the program.

For each macro, symbols for objects used can be generated automatically in order to provide further assistance in terms of readability of the application. For each macro inserted in the program, TwidoSuite software automatically generates code in Instruction List language, encapsulated in a subroutine. The macro's code call line is compiled by the TwidoSuite software by calling a subroutine.

After calling up a macro, the code generated in Instruction List language can be displayed. No modifications to the content of subroutines generated in this way are allowed.

#### Counter function

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

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

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

#### Very fast counter - VFC (20 kHz)

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

- Up/Down counter
- Up/Down counter with detection of running direction
- Single up counter
- Single down counter
- Frequency meter

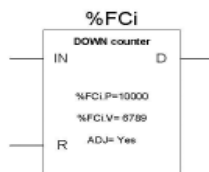
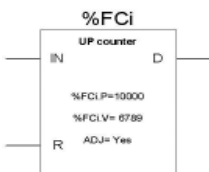
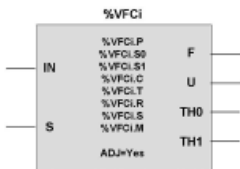
The pulses to be counted may come from an incremental encoder or from two proximity sensors (up/down counting) connected to inputs I0 and I1 of Twido base controllers.

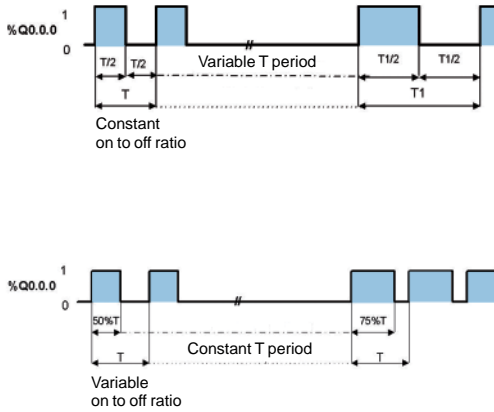
#### Fast counter - FC (5 or 10 kHz)

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

- Incrementing the value 0 to the preset value %FCi.P in up counter mode
- Decrementing the preset value %FCi.P to 0 in down counter mode

(1) Requires TwidoSuite software version ≥1.20.





### Position control

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

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

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

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

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

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

### PWM function (7 kHz) (1)

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

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

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

### Event processing

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

### PID

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

### Online modification

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

(1) 1 or 5 kHz maximum with the Twido Extreme controller (see page 1/25).



TSX PCX 1031



TSX CUSB 485



VW3 A8 115



499 TWD 01100

### References

TwidoSuite bilingual software packages are for use on PCs (1) with Windows 2000 or Windows XP operating systems.

The software product includes:

- A CD-ROM containing the TwidoSuite bilingual software (English and French) (2) and the hardware and software setup documentation
- Hard copy of the quick start guide

### TwidoSuite software

| Description                              | Programming languages      | Composition | Reference    | Weight kg |
|--|----------------------------|-------------|--------------|-----------|
| TwidoSuite version V2.0 Multilingual (2) | Ladder<br>Instruction List | 1 DVD-ROM   | TWD BTF U10M | –         |

### Discover TwidoPack

| Description       | Composition  | Reference     | Weight kg |
|-------------------|--|---------------|-----------|
| TwidoPack Compact | Compact base 10 I/O TWD LCAA 10DRF<br>Real-time clock cartridge TWD XPD RTC<br>Input simulator TWD X8M6<br>USB/RS485 converter TSX CUSB 485 with cardset (0.4 m) TSX CRJMD25<br>TwidoSuite software on DVD-Rom<br>TWD BTF 010M | TWD XPD PAK6M | –         |

### Components for connecting a PC to the controller

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

### Bluetooth wireless link

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

### Ethernet network interface

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

(1) Minimum configurations, see page 4/2.

(2) For connection of Twido Extreme, see page 1/29.

(3) To connect the Twido controller to the USB port of a PC, you need to add two other product references: cable TSX CRJMD25 and USB/RS 485 converter TSX CUSB 485.

⚠ Available 4th quarter of 2007

Before this date please order the english/french version CD-Rom reference TWD BTF U10EF. The other languages German, Spanish, Italian are only available by download from our site [www.telemecanique.com](http://www.telemecanique.com)

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Example of TwidoAdjust software screen

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## Presentation

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

The Pocket PC with TwidoAdjust software package can be connected to a Twido programmable controller:

- either using **TSX PCX 1031** and **TSX PCX 1130** connection cables (ensuring crossing of the Rx and Tx wires),
- or using Bluetooth wireless technology. For optimum performance, use a Pocket PC with integrated Bluetooth technology.

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

TwidoAdjust software is used to manage a project and allows:

- the transfer of applications,
- animation and back-up of object tables,
- back-up of object category values.

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

## Functions

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

### Connection

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

### Application

The application function includes the following functions:

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

### System

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

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

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

### References

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

- a CD-ROM containing TwidoAdjust multi-language software and multi-language documentation for hardware and software set-up,
- depending on the model, Bluetooth gateway **VW3 A8114**.

### TwidoAdjust software

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

### Separate components

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



VW3 A8114



TSX PCX 1031

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

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

(2) Connection schemes, see page 3/20.

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

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





# 5 - Connection interfaces, regulated switch mode power supplies and Human/Machine interfaces

## 5.1 - Advantys Telefast ABE 7 pre-wired I/O system

*Advantys Telefast ABE 7 selection guide* ..... page 5/2

- Presentation ..... page 5/4
- Description ..... page 5/5
- Associations ..... page 5/6
- Characteristics ..... page 5/8
- References ..... page 5/12
- Dimensions ..... page 5/13
- Schemes ..... page 5/14

## 5.2 - Regulated switch mode power supplies

*Phaseo Modular, Optimum and AS-Interface ranges selection guide* ..... page 5/18

- Phaseo Modular range power supplies
  - Presentation, description ..... page 5/20
  - Characteristics ..... page 5/21
  - Selection of protection ..... page 5/24
  - References ..... page 5/25
  - Dimensions, schemes ..... page 5/25
- Phaseo Optimum range power supplies
  - Presentation, description ..... page 5/26
  - Characteristics ..... page 5/27
  - Selection of protection ..... page 5/30
  - References ..... page 5/31
  - Dimensions, schemes ..... page 5/31
- Phaseo AS-Interface range power supplies
  - Presentation, description ..... page 5/32
  - Characteristics ..... page 5/33
  - Selection of protection ..... page 5/34
  - References ..... page 5/35
  - Dimensions, schemes ..... page 5/35

## 5.3 - Human/machines Interfaces

*Magelis compact display units and terminals selection guide* ..... page 5/36

# Connection interfaces

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

Applications

Connection sub-bases for discrete inputs and outputs



Compatibility

Twido modular base controllers equipped with HE 10 connectors **TWD LMDA 20DTK/40DTK**

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  
Output

5...7 mA  
0.3 A

5...7 mA  
2 A (solid state)  
3 A (electromechanical)

Modularity

20 (12 inputs/8 outputs)

Type of I/O

- 12 inputs  
(1 common/12 channels)  
- 8 outputs  
(1 common/8 channels)

- 12 inputs  
(1 common/12 channels)  
- 8 outputs with  
fuse protection  
(1 common/8 channels)  
  
LED indication

- 12 inputs (1 common/12 channels)  
- 2 solid state outputs  
(1 common/2 channels)  
- 6 relay outputs (electromechanical)  
1 N/O (1 common/6 channels)

Number of terminals per channel

2, 3 (with optional snap-on terminal block)

Connection to Twido programmable controller

HE 10 connector, 26-way

Type of terminal

Fixed screw terminal block

Interface type

**ABE 7B20MPN20**

**ABE 7B20MPN22**

**ABE 7B20MRM20**

Pages

5/12

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**Connection sub-bases for discrete inputs**

**Connection sub-bases for discrete outputs**



Twido I/O expansion modules with HE 10 connectors **TWD DDI 16DK/32DK** and **TWD DDO 16TK/32TK**

– 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

|                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|
| <b>ABE 7E16EPN20</b> | <b>ABE 7E16SPN20</b> | <b>ABE 7E16SPN22</b> | <b>ABE 7E16SRM20</b> |
|----------------------|----------------------|----------------------|----------------------|

|      |      |      |      |
|------|------|------|------|
| 5/12 | 5/12 | 5/12 | 5/12 |
|------|------|------|------|

# Connection interfaces

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

### Presentation

Relay and connection functions, with or without polarity distribution, significantly reduce wiring time and eliminate the risk of error.

The Advantys Telefast ABE 7 pre-wired system allows fast, reliable and economical remote connection of I/O modules (— 24 V discrete) to operative parts, partly eliminating the single-wire connection and intermediate terminal blocks.

The Telefast ABE 7 system can only be connected to Twido modules equipped with HE 10 type connectors. It consists of connecting cables and interface sub-bases.

The Telefast ABE 7 range is suitable for all types of connection found in control system devices:

- I/O located in the PLC cabinet,
- I/O located directly on the machine or in auxiliary enclosures.

All the I/O connection sub-bases comprise output terminals on 2 rows :

- 1<sup>st</sup> row: connection of the signal,
- 2<sup>nd</sup> row: connection of its common
- 24 V for the inputs,
- 0 V for the outputs.

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

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

### Sub-bases for Twido modular base controllers

- **ABE 7B20MPN20**: sub-base with 12 inputs + 8 passive outputs.
- **ABE 7B20MPN22**: sub-base with 12 inputs + 8 passive outputs.
  - individual fuse protection for each output (0.315 A),
  - LED indication,
  - blade disconnecter for the 0 V common.
- **ABE 7B20MRM20**: sub-base with 12 inputs + 8 outputs with soldered relays
  - 2 A solid state relay (1 x 4 A common/2 channels) on 2 outputs,
  - electromechanical relays (1N/O — 24 V/~ 250 V, 3 A) on 6 outputs for adaptation of the current or voltage signal (1 x 10 A common/6 channels).

### Sub-bases for Twido I/O expansion modules

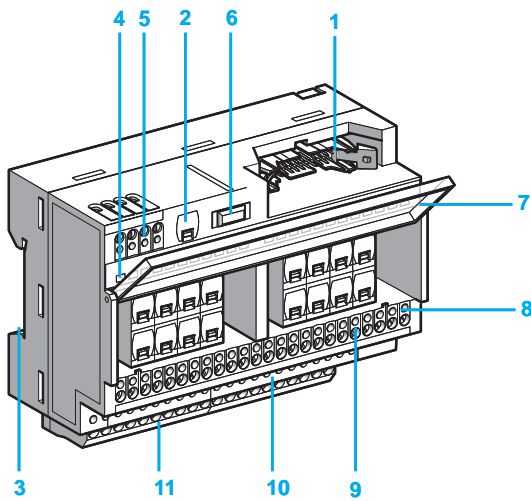
- **ABE 7E16EPN20**: sub-base with 16 passive inputs.
- **ABE 7E16SPN20**: sub-base with 16 passive outputs.
- **ABE 7E16SPN22**: sub-base with 16 passive outputs.
  - individual fuse protection for each output (0.315 A),
  - LED indication
  - blade disconnecter for breaking the 0 V common.
- **ABE 7E16SRM20**: sub-base with 16 soldered relay outputs
  - electromechanical relays (1N/O — 24 V/~ 250 V, 3 A) on 16 outputs for adapting the current or voltage signal (1 x 5 A common/4 channels)

### Optional terminal blocks

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

# Connection interfaces

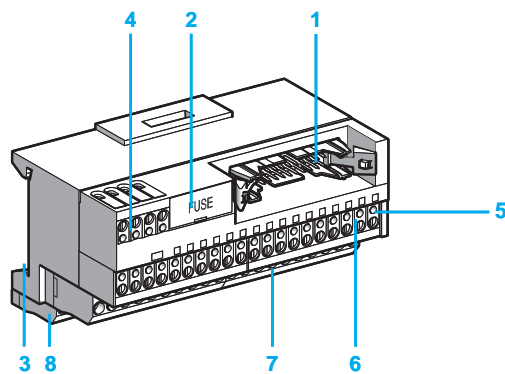
Advantys Telefast ABE 7 pre-wired  
Connection sub-bases for Twido controller



## Description

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

- 1 HE 10 connector (20-way for ABE 7E16●●●●●, 26-way for ABE 7B20●●●●●).
- 2 Fuse for the  $\text{---}$  24 V supply circuit.
- 3 Rail mounting.
- 4 LED for channel indication (only on ABE 7B20MPN22 and ABE 7E16SPN22).
- 5  $\text{---}$  24 V power supply terminal block.
- 6 Blade disconnect on  $\text{---}$  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  $\text{---}$   $\varnothing$  2.3 mm plug.
- 9 Upper terminal block for connection of signals.
- 10 Lower terminal block for connection of commons.
- 11 Optional snap-on terminal block with 20 screw terminals.



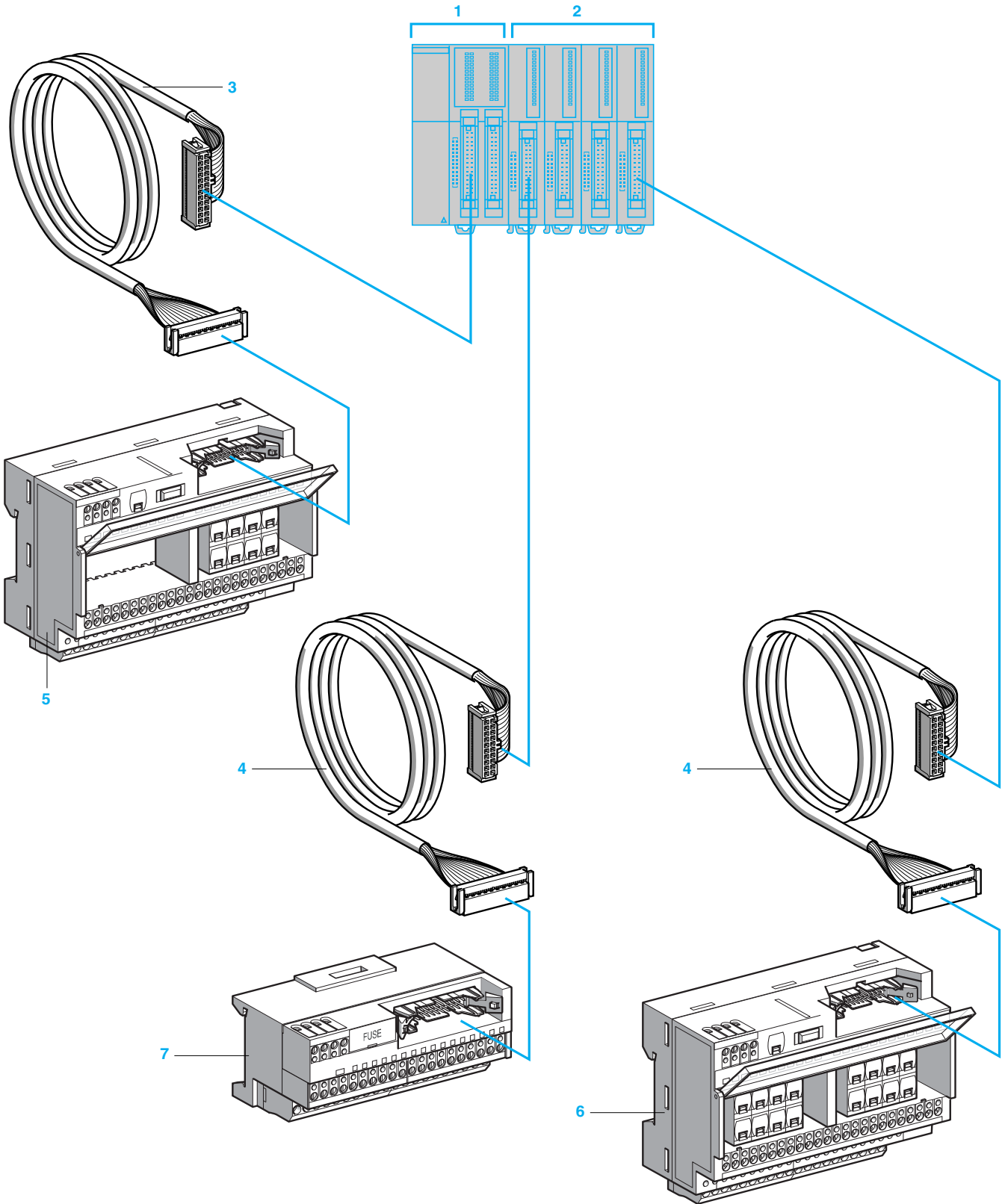
## Connection sub-bases ABE 7E16EPN20 and ABE 7E16SPN20

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

# Connection interfaces

Advantys Telefast ABE 7 pre-wired system

Pre-wired solution for Twido controller



5

5.1

#### 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<sup>2</sup>).
- 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<sup>2</sup>).
- 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 expansion modules                           |  |
|---|---|--|--|
|   | Inputs/outputs (source)   | Inputs   | Outputs (source)   |
| <b>Incorporated in Twido programmable controllers</b> | <b>TWD LMDA 20DTK</b> (12 I/8 O)<br><b>TWD LMDA 40DTK</b> (24 I/16 O) | <b>TWD DDI 16DK</b> (16 I)<br><b>TWD DDI 32DK</b> (32 I) | <b>TWD DDO 16TK</b> (16 O)<br><b>TWD DDO 32TK</b> (32 O) |
| <b>Terminal block types</b>                           | HE 10 connector, 26-way   | HE 10 connector, 20-way                                  |  |
| <b>Connection to Twido programmable controller</b>    | <b>ABF T26B●●0</b> (HE 10, 26-way)                                    | <b>ABF T20E●●0</b> (HE 10, 20-way)                       |  |

#### Passive connection sub-bases

|             |                      |  |  |  |  |
|-------------|----------------------|--|--|--|--|
| 20 channels | <b>ABE 7B20MPN2●</b> |  |  |  |  |
| 16 channels | <b>ABE 7E16EPN20</b> |  |  |  |  |
|             | <b>ABE 7E16SPN2●</b> |  |  |  |  |

#### Output adapter bases

|             |                      |  |  |  |  |
|-------------|----------------------|--|--|--|--|
| 20 channels | <b>ABE 7B20MRM20</b> |  |  |  |  |
| 16 channels | <b>ABE 7E16SRM20</b> |  |  |  |  |

## Environment characteristics

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

## Supply characteristics (controller side)

|  |                           |     |                   |
|--|---------------------------|-----|-------------------|
| <b>Supply voltage</b>  | Conforming to IEC 61131-2 | ~ V | 19...30 (Un = 24) |
| <b>Maximum supply current per sub-base</b>   |                           | ~ A | 2                 |
| <b>Voltage drop on supply fuse</b>   |                           | ~ V | 0.3               |
| <b>Supply overload and short-circuit protection</b><br>by quick-blow fuse (included) |                           | A   | 2                 |

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

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

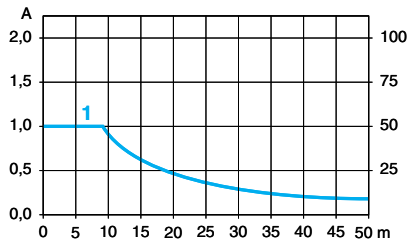


| Output circuit characteristics (preactuator side)                 |                         |                    |   |          |                               |   |             |       |
|---|-------------------------|--------------------|---|----------|-------------------------------|---|-------------|-------|
| 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)<br>(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                 | –<br>(315 for ABE 7 B20MPN22)                     | –        | –<br>(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  | –<br>(1.5 for ABE 7 B20MPN22) | –        | –<br>(1.5 for ABE 7 E16SPN22)             | –        |   |
| Rated impulse withstand voltage (1.2/50)                         | Solid state output |                                 | kV  |                               |          |   | 2.5      | – |
|  | Relay output       |                                 | kV  |                               |          |   | 6        |   |
| Switching frequency  | Solid state output |                                 | Hz  |                               |          |   | 300      | – |
|  | Relay output       |                                 | Hz  |                               |          |   | 20       |   |
| Mechanical durability  |                    | In millions of operating cycles |   |                               |          |   | 20       |   |

## Curves for determining cable type and length according to the current



1 Cables ABF T2●●●●● c.s.a. 0.08 mm<sup>2</sup> (AWG 28)

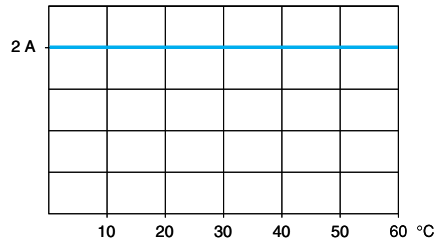
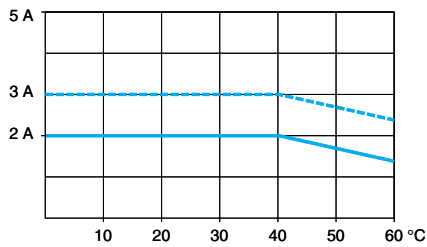
## Temperature derating curves

ABE E11SRM20, ABE 7E16SRM20

6 electromechanical relay outputs

ABE 7B20MR20

2 solid state outputs



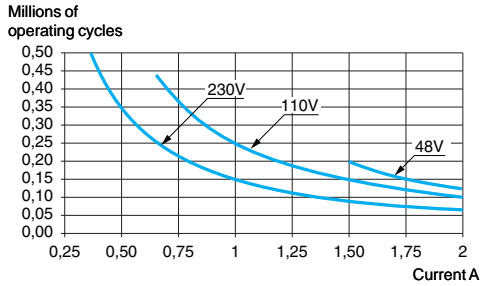
— 100 % of channels used  
- - - 50 % of channels used

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

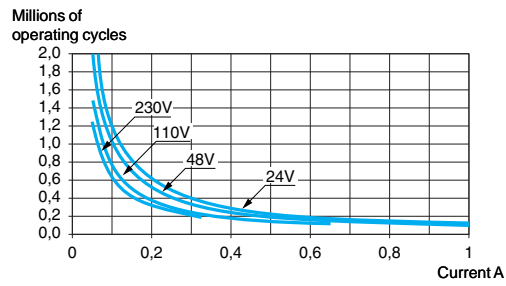
##### ABE 7B20MRM20 and ABE 7E16SRM20

##### d.c. loads

DC 12 curves (1)

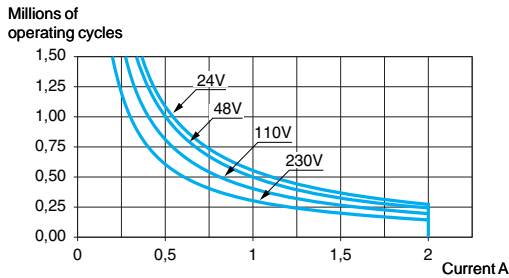


DC 13 curves (2)

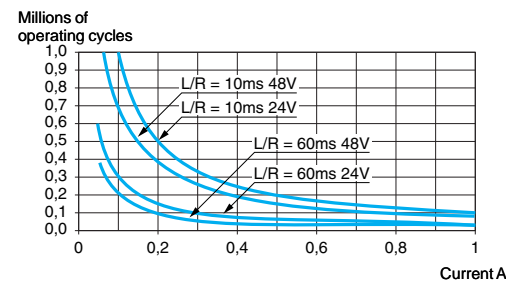


##### a.c. loads

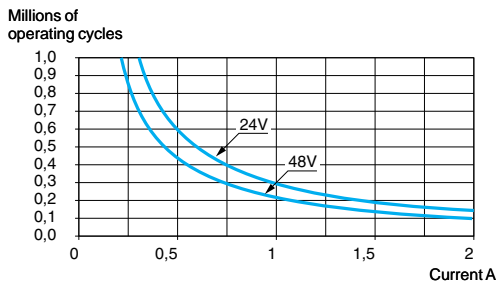
AC 12 curves (3)



AC 14 curves (4)



AC 15 curves (5)



(1) DC 12: control of resistive loads and of solid state loads isolated by optocoupler,  $L/R \leq 1$  ms.

(2) DC 13: control of electromagnets,  $L/R \leq 2 \times (U_e \times I_e)$  in ms,  $U_e$ : Rated operational voltage,  $I_e$ : rated operational current (with a protective diode on the load, DC12 curves must be used with a coefficient of 0.9 applied to the number in millions of operating cycles)

(3) AC 12: control of resistive loads and of solid state loads isolated by optocoupler,  $\cos \phi \leq 0.9$ .

(4) AC 14: control of small electromagnetic loads  $\leq 72$  VA, make:  $\cos \phi = 0.3$ , break:  $\cos \phi = 0.3$ .

(5) AC 15: control of electromagnetic loads  $> 72$  VA, make:  $\cos \phi = 0.7$ , break:  $\cos \phi = 0.4$ .

# Connection interfaces

## Advantys Telefast ABE 7 pre-wired system

### Connection sub-bases for Twido controller



ABE 7B20MPN20



ABE 7E16EPN20



ABE 7E16SRM20

### References

#### For Twido modular base controllers

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

#### For Twido extension modules

| Number of inputs  | Type of input                | Compatibility              | LED per channel | Fuse | Reference     | Weight<br>kg |
|-------------------|------------------------------|----------------------------|-----------------|------|---------------|--------------|
| 16                | Sink<br>--- 24 V             | TWD<br>DDI16DK/<br>DDI32DK | No              | No   | ABE 7E16EPN20 | 0.430        |
| Number of outputs | Type of output               | Compatibility              | LED per channel | Fuse | Reference     | Weight<br>kg |
| 16                | Source<br>--- 24 V           | TWD<br>DDO16TK/<br>DDO32TK | No              | No   | ABE 7E16SPN20 | 0.450        |
|                   |                              |                            | Yes             | Yes  | ABE 7E16SPN22 | 0.450        |
|                   | Relay<br>--- 24/~ 250 V, 3 A | TWD<br>DDO16TK/<br>DDO32TK | No              | No   | ABE 7E16SRM20 | 0.430        |

#### Connection cables for Twido modular base controllers

| Type of signal           | Compatibility                  | Type of connection                                 |                     | Gauge/<br>C.s.a. | Length<br>(1) | Reference   | Weight<br>kg |       |
|--------------------------|--------------------------------|--|---------------------|------------------|---------------|-------------|--------------|-------|
|                          |                                | Twido side   | Telefast ABE 7 side |                  |               |             |              |       |
| Discrete inputs/ outputs | TWD<br>LMDA20DTK/<br>LMDA40DTK | HE 10<br>26-way                                    | HE 10<br>26-way     | 28/<br>0.08      | 0.5           | ABF T26B050 | 0.080        |       |
|                          |                                |  |                     |                  | 1.0           | ABF T26B100 | 0.110        |       |
|                          |                                |  |                     |                  | 2.0           | ABF T26B200 | 0.180        |       |
|                          |                                | TWD<br>DDI16DK/<br>DDI32DK/<br>DDO16TK/<br>DDO32TK | HE 10<br>20-way     | HE 10<br>20-way  | 28/<br>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<br>kg |
|---------------------------------------|-----------------------------|-----------------|-----------------|----------------|--------------|
| Optional snap-on terminal blocks      | 20                          | –               | 5               | ABE 7BV20      | 0.060        |
|                                       | 12 + 8                      | –               | 5               | ABE 7BV20TB    | 0.060        |
| Quick-blow fuses<br>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.

## References (continued)


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

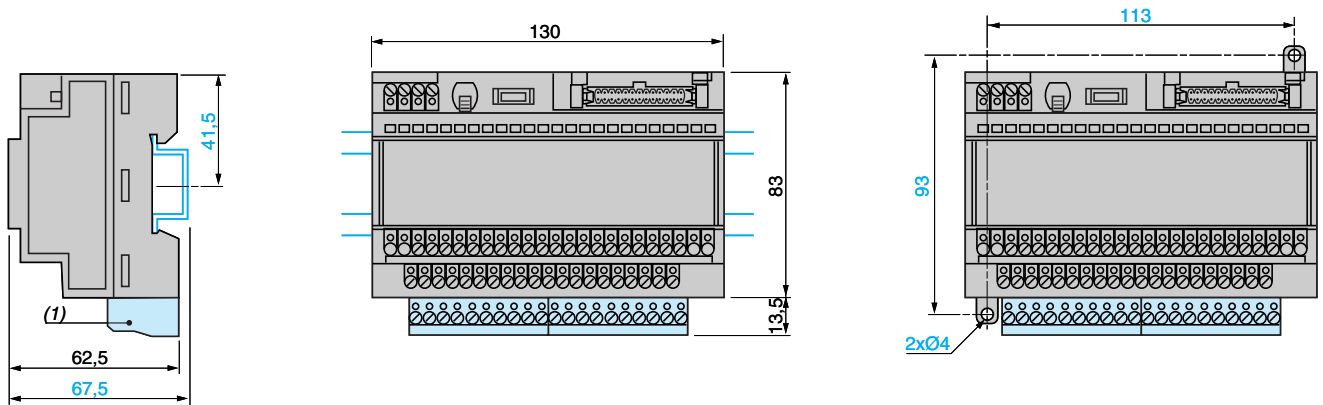
| Description                         | Compatibility                                      | Type of connection |              | Gauge/<br>C.s.a. | Length<br>m | Reference          | Weight<br>kg |
|-------------------------------------|--|--------------------|--------------|------------------|-------------|--------------------|--------------|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

## Dimensions

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


Mounting on 35 mm  rail

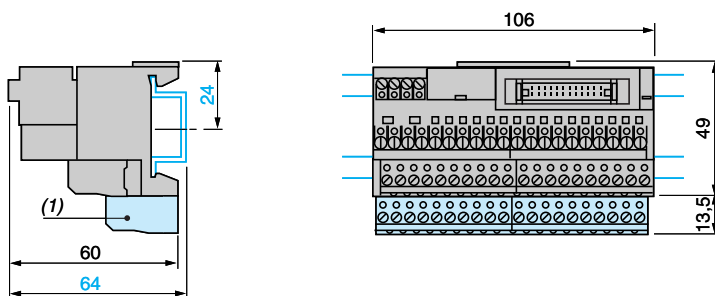
Screw fixing (retractable lugs)



(1) ABE 7BV20, ABE 7BV20TB.

ABE 7E16EPN20, ABE 7E16SPN20

Mounting on 35 mm  rail



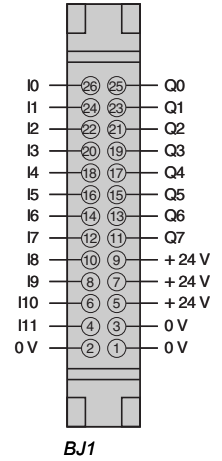
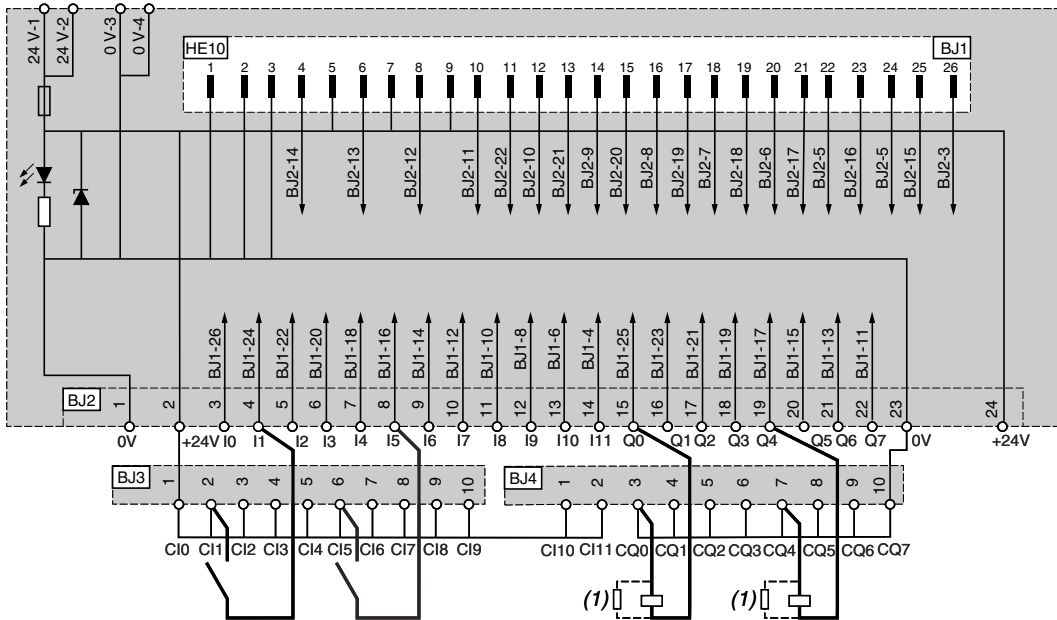
(1) ABE 7BV20, ABE 7BV20TB.

# Connection interfaces

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

## ABE 7B20MPN20

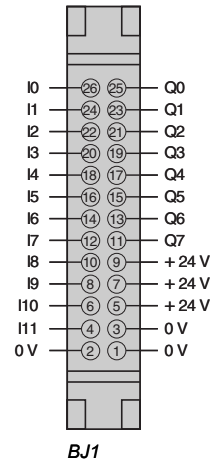
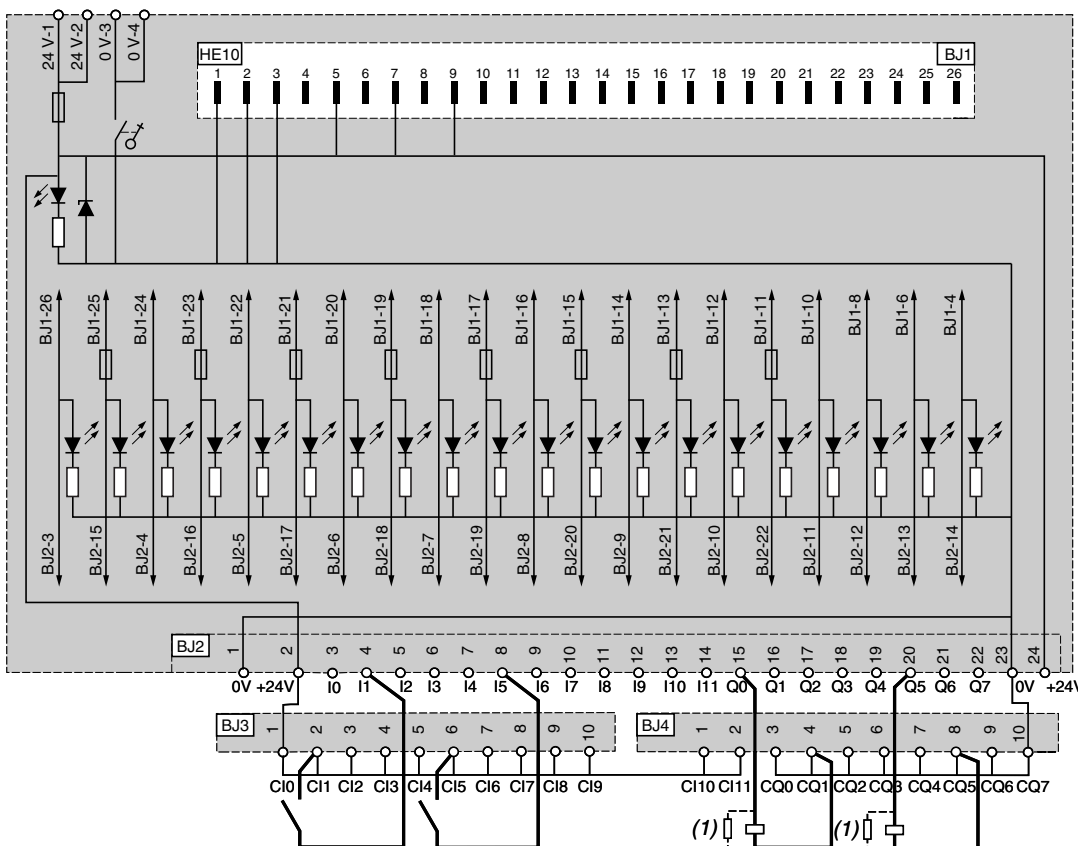
HE10, 26-way



BJ1

## ABE 7B20MPN22

HE10, 26-way

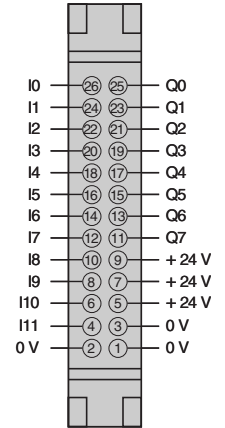
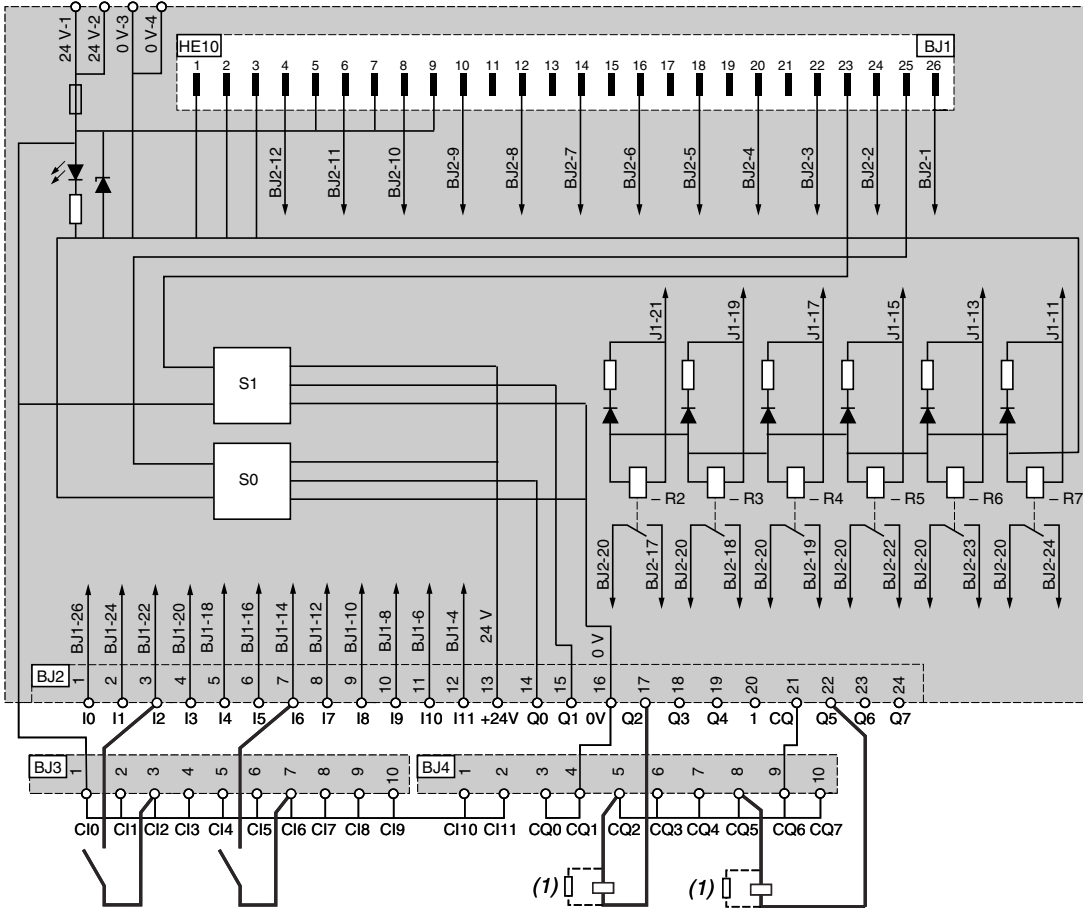


BJ1

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

### ABE 7B20MRM20

HE10, 26-way

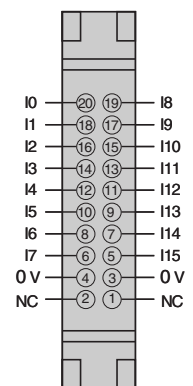
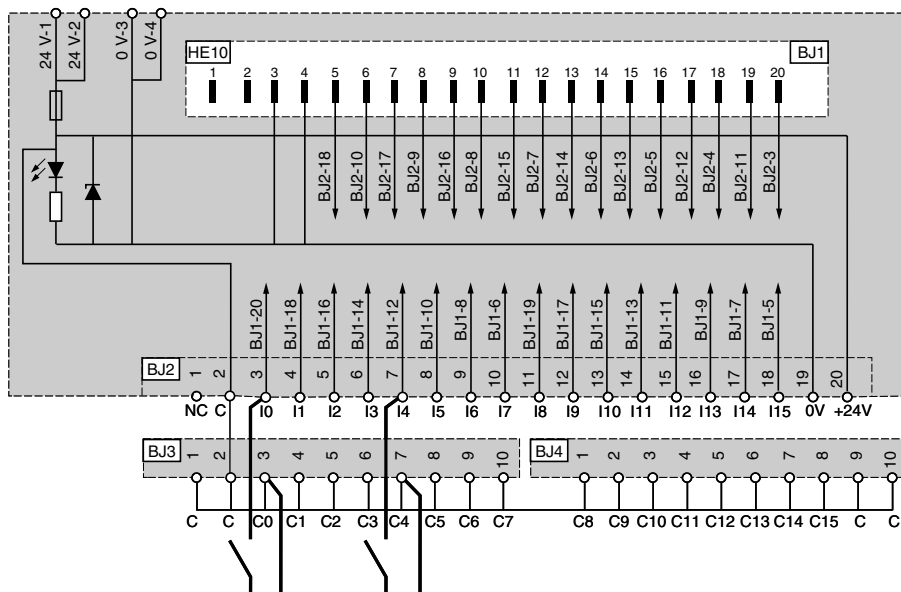


BJ1

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

### ABE 7E16EPN20

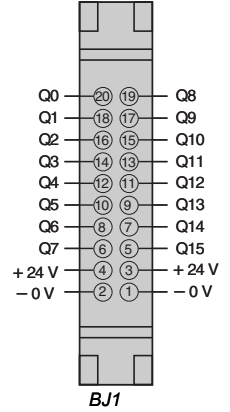
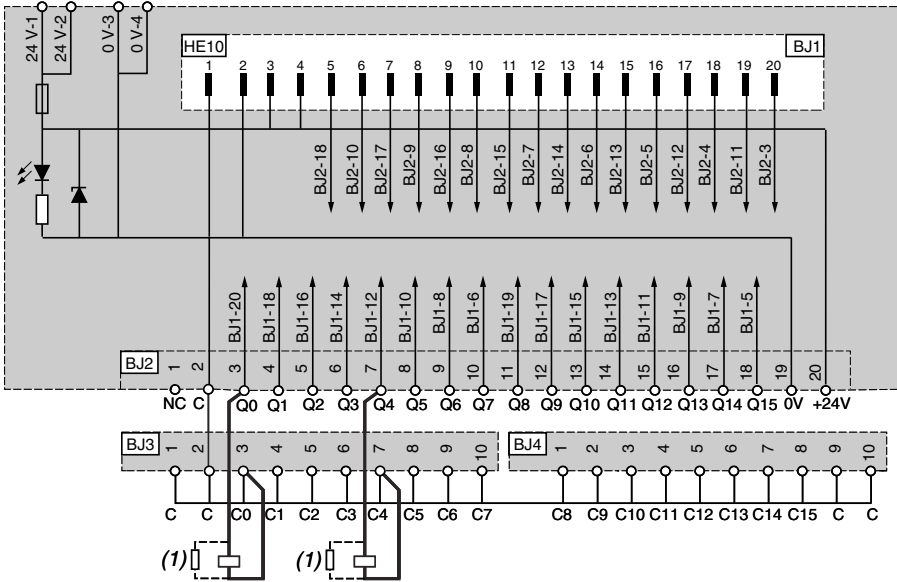
HE10, 20-way



BJ1

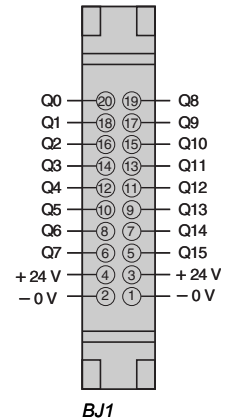
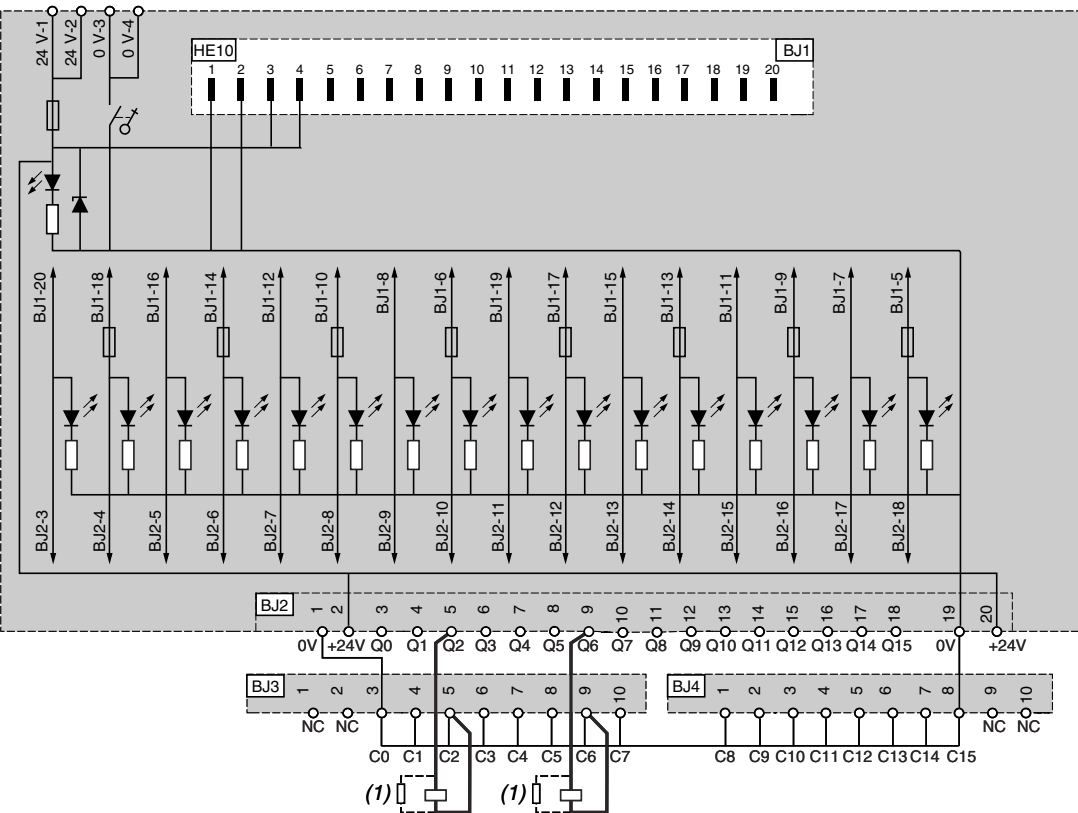
**ABE 7E16SPN20**

HE10, 20-way



**ABE 7E16SPN22**

HE10, 20-way



5

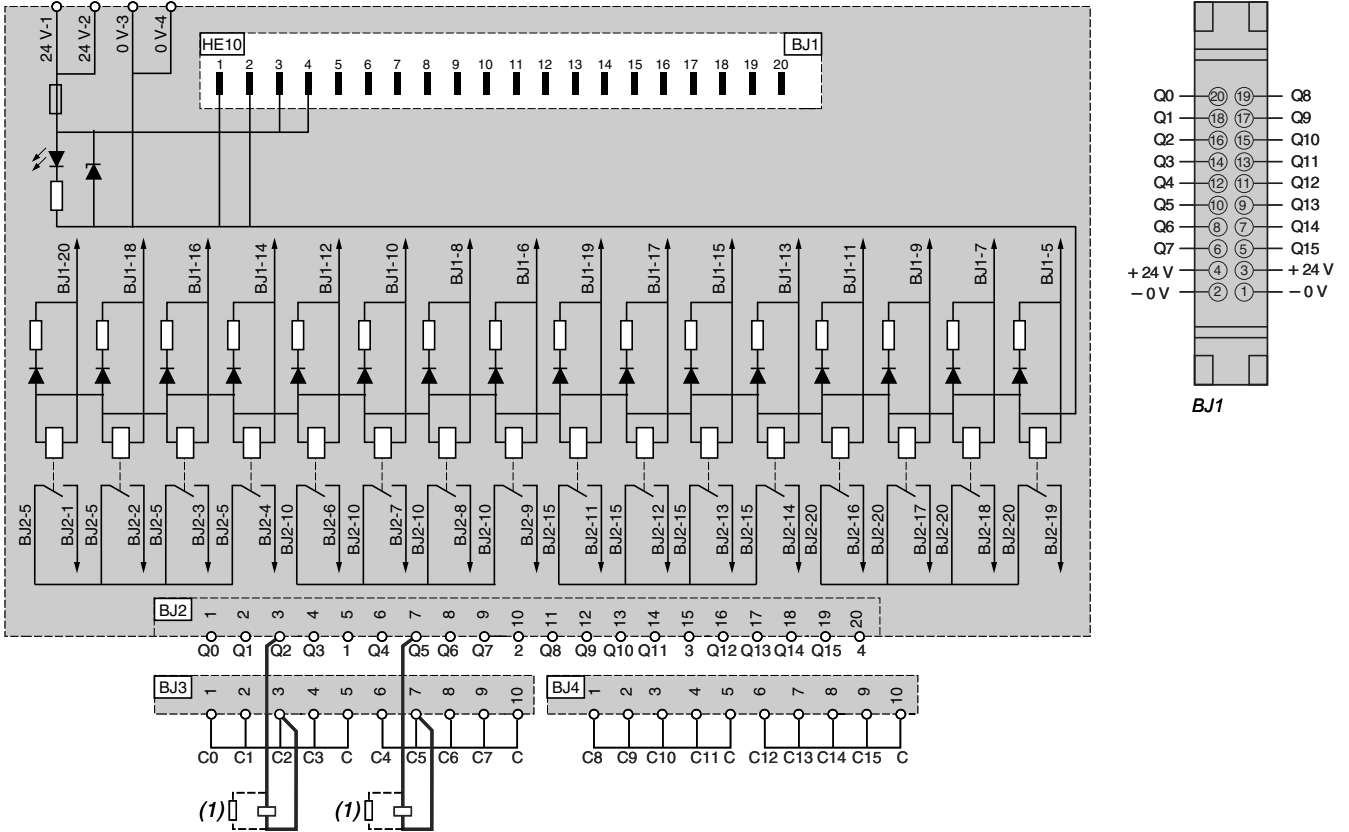
5.1

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



ABE 7E16SRM20

HE10, 20-way



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

Power supplies

Regulated switch mode

Phaseo Modular range and Optimum range industrial power supplies



Input voltage

100...240 V ~  
120...250 V ☐ (see pages 14080/3 and 14080/4)

**Connection to world-wide line supplies**  
United States  
- 120 V (in phase-to-neutral)  
- 240 V (in phase-to-phase)

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

Europe  
- 230 V (in phase-to-neutral)  
- 400 V (in phase-to-phase)

Single-phase (N-L1) connection

United States  
- 277 V (in phase-to-neutral)  
- 480 V (in phase-to-phase)

-

IEC 61000-3-2 conformity

Yes for ABL 7RP, not for ABL 8REM and not applicable for ABL 8MEM and ABL 7RM

Protection against undervoltage

Yes

Protection against overloads and short-circuits

Yes, voltage detection. Automatic restart on elimination on the fault

Diagnostic relay

-

Compatibility with function modules

-

Power reserve (Boost)

1,25 to 1,4 I<sub>n</sub> during 1 minute, depending on model (with ABL 8MEM) | No

Output voltage

| 5 V ☐                          | 12 V ☐                         | 24 V ☐                         | 48 V ☐                       |
|--------------------------------|--------------------------------|--------------------------------|------------------------------|
|                                |                                | <b>ABL 8MEM24003 (Modular)</b> |                              |
|                                |                                | <b>ABL 8MEM24006 (Modular)</b> |                              |
|                                |                                | <b>ABL 8MEM24012 (Modular)</b> |                              |
|                                | <b>ABL 8MEM12020 (Modular)</b> |                                |                              |
|                                |                                | <b>ABL 7RM24025 (Modular)</b>  | <b>ABL 7RP4803 (Optimum)</b> |
|                                |                                | <b>ABL 8REM24030 (Optimum)</b> |                              |
| <b>ABL 8MEM05040 (Modular)</b> |                                |                                |                              |
|                                | <b>ABL 7RP1205 (Optimum)</b>   | <b>ABL 8REM24050 (Optimum)</b> |                              |
|                                |                                |                                |                              |
|                                |                                |                                |                              |
|                                |                                |                                |                              |
|                                |                                |                                |                              |
|                                |                                |                                |                              |
|                                |                                |                                |                              |
|                                |                                |                                |                              |

Output current 0.3 A

0.6 A

1.2 A

2 A

2.5 A

3 A

4 A

4.8 A

5 A

6 A

10 A

20 A

40 A

Pages

5/25 | 5/25 (Modular) and 5/31 (Optimum) | 5/31

5

5.2

|   |  |
|---|--|
| <b>Regulated switch mode</b>                            | <b>Regulated switch mode</b>                                     |
| <b>Phaseo Universal range industrial power supplies</b> | <b>Phaseo range AS-Interface for AS-Interface cabling system</b> |



|  |                               |                         |  |                  |
|--|-------------------------------|-------------------------|--|------------------|
| 100...120 V ~ and<br>200...500 V ~ (1)   | 380...500 V ~                 | 24 V ---                | 100...240 V  |                  |
| Single-phase (N-L1) or 2-phase (L1-L2) connection  | –                             | –                       | Single-phase (N-L1) connection                       |                  |
|  | 3-phase (L1-L2-L3) connection | –                       | Single-phase (N-L1) connection                       |                  |
|  | 3-phase (L1-L2-L3) connection | –                       | –  |                  |
| Yes  | –                             | –                       | No   | Yes              |
| Yes  | –                             | –                       | –  | Yes              |
| Yes, current limitation or undervoltage detection  | –                             | Yes, current limitation | Yes  |                  |
| Yes, depending on model  | –                             | –                       | –  |                  |
| Yes with buffer module, battery and battery control modules, redundancy module and discriminating downstream protection module | –                             | –                       | –  |                  |
| 1,5 In during 4 secondes   | –                             | No                      | No   |                  |
| 24 V ---   | 5 V ---                       | 7...12 V ---            | 30 V ---   | 24 V ---         |
|  |                               |                         |  |                  |
|  |                               |                         |  |                  |
|  |                               |                         |  |                  |
|  |                               | ABL 8DCC12020 (2)       |  |                  |
|  |                               |                         | ASI ABLB3002<br>ASI ABLD3002 (3)<br>ASI ABLM3024 (4) |                  |
| ABL 8RPS24030  |                               |                         |  | ASI ABLM3024 (4) |
|  |                               |                         |  |                  |
|  |                               |                         |  |                  |
| ABL 8RPS24050  |                               |                         | ASI ABLB3004<br>ASI ABLD3004 (3)                     |                  |
|  |                               | ABL 8DCC05060 (2)       |  |                  |
| ABL 8RPS24100  |                               |                         |  |                  |
| ABL 8RPM24200  | ABL 8WPS24200                 |                         |  |                  |
|  | ABL 8WPS24400                 |                         |  |                  |
| Please, consult our catalogue "Phaseo, Power supplies & transformers"  |                               |                         | 5/35   |                  |

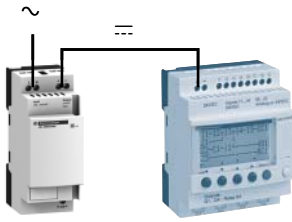
(1) Except **ABL 8RPM24200**. ~ 100...120 V and ~ 200...240 V.  
(2) ---/--- converter module, requires to be associated with the Phaseo Universal range power supply.  
(3) With earth fault detection.  
(4) One output 30 V --- and one output 24 V --- ± 5 %.

# Power supplies and transformers

## Power supplies for DC control circuits

### Regulated switch mode power supplies

#### Phaseo Modular range



ABL 8MEM..... Zelio Logic

#### Switch mode power supplies: Modular range

The **ABL 8MEM/7RM** power supply offer is designed to provide the DC voltage necessary for the control circuits of automation system equipment consuming 7 to 60 W in 5, 12 and 24 V  $\dots$ . Comprising six products, this range meets the needs encountered in industrial, commercial, and residential applications. These modular electronic switch mode power supplies provide a quality of output current that is suitable for the loads supplied and compatible with the **Zelio Logic** range. Clear guidelines are given on selecting the upstream protection devices which are often used with them, and thus a comprehensive solution is provided that can be used in total safety.

The Modular range of Phaseo power supplies can be connected in phase-to-neutral (N-L1) or in phase-to-phase (1) (L1-L2). They deliver a voltage that is precise to 3%, whatever the load and whatever the type of line supply, within a range of 85 to 264 V  $\sim$ . Conforming to IEC standards and UL, CSA and TUV certified, they are suitable for universal use. The inclusion of overload and short-circuit protection makes downstream protection unnecessary if discrimination is not required.

Due to their low power, the Modular range of Phaseo power supplies consume very little harmonic current and thus are not subject to the requirements of standard 61000-3-2 concerning harmonic pollution.

All the Modular range of Phaseo power supplies have protection devices to ensure optimum performance of the automation system with an automatic reset mode on elimination of the fault.

All products are equipped with an output voltage adjustment potentiometer in order to be able to compensate for any line voltage drops in installations with long cable runs.

These power supplies also have a cable run inside the unit so that the outputs can be connected at the top or bottom of the product as required.

These power supplies are designed for direct mounting on 35 mm  $\sqcorner$  rails, or on a mounting plate using their retractable fixing lugs.

There are six references available in the Phaseo Modular range:

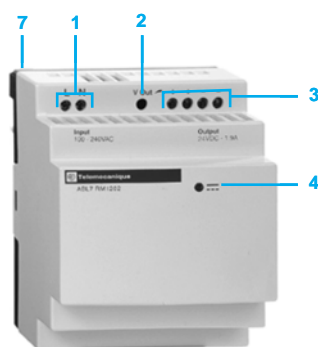
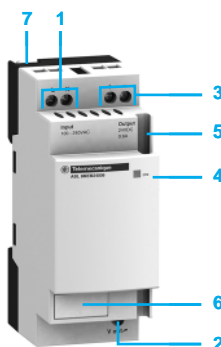
|                       |      |        |              |
|-----------------------|------|--------|--------------|
| ■ <b>ABL8MEM24003</b> | 7 W  | 300 mA | 24 V $\dots$ |
| ■ <b>ABL8MEM24006</b> | 15 W | 600 mA | 24 V $\dots$ |
| ■ <b>ABL8MEM24012</b> | 30 W | 1.2 A  | 24 V $\dots$ |
| ■ <b>ABL7RM24025</b>  | 60 W | 2.5 A  | 24 V $\dots$ |
| ■ <b>ABL8MEM05040</b> | 20 W | 4 A    | 5 V $\dots$  |
| ■ <b>ABL8MEM12020</b> | 25 W | 2 A    | 12 V $\dots$ |

(1) 240 V  $\sim$  nominal.

#### Description

ABL 8MEM.....

ABL7RM24025



- 1 2.5 mm<sup>2</sup> screw terminal for connection of the AC input voltage
- 2 Output voltage adjustment potentiometer
- 3 2.5 mm<sup>2</sup> screw terminal for connection of the output voltage
- 4 LED indicating presence of the DC output voltage
- 5 Duct for throughwiring of the output voltage conductors at the bottom (except for model ABL 7RM24025)
- 6 Clip-on marker label (except for model ABL 7RM24025)
- 7 Retractable fixing lugs for panel mounting

| Technical characteristics                          |                                  |  |  |  |  |                                |
|--|----------------------------------|--|--|--|--|--------------------------------|
| Power supply type                                  |                                  | ABL 8MEM24003  | ABL 8MEM24006  | ABL 8MEM24012                                | ABL 7RM24025                             |                                |
| Certifications                                     |                                  | cULus 508, cCSAus (CSA22.2 n950-1), TUV 60950-1, CE, C-Tick          |  |  | cULus CSA, TUV 60950-1, CE               |                                |
| Conformity to standards                            | Safety                           | IEC/EN 60950-1, SELV   |  |  |  |                                |
|  | EMC                              | IEC/EN 61000-6-2, IEC/EN 61000-6-3, IEC/EN 61204-3, EN 55022 Class B |  |  |  |                                |
| <b>Input circuit</b>                               |                                  |  |  |  |  |                                |
| LED indication                                     |                                  | No   |  |  |  |                                |
| Input values                                       | Nominal voltage                  | V  | 100...240 ~  |  |  |                                |
|  | Limit voltage                    | V  | 85...264 ~<br>120...250 --- (1)  |  | 85...264 ~                               |                                |
|  | Current consumption              | A  | 0.25 (100 V ~)<br>0.18 (240 V ~)   | 0.4 (100 V ~)<br>0.25 (240 V ~)              | 0.65 (100 V ~)<br>0.4 (240 V ~)          | 1.2 (120 V ~)<br>0.7 (240 V ~) |
|  | Permissible frequencies          | Hz   | 47...63  |  |  |                                |
|  | Maximum inrush current           | A  | 20   |  |  | 90 for 1 ms                    |
|  | Power factor                     |  | > 0.5  |  |  |                                |
|  | Efficiency at nominal load       |  | > 78%  | > 80%  | > 82%                                    | > 84%                          |
|  | Dissipated power at nominal load | W  | 2  | 3.8  | 6.6                                      | 11.4                           |
|  | <b>Output circuit</b>            |  |  |  |  |                                |
| LED indication                                     |                                  | Green LED  |  |  |  |                                |
| Nominal output values                              | Voltage ( $U_{out}$ )            | V  | 24 ---   |  |  |                                |
|  | Current                          | A  | 0.3  | 0.6  | 1.2                                      | 2.5                            |
|  | Power                            | W  | 7  | 15   | 30                                       | 60                             |
| Precision  | Output voltage                   | V  | Adjustable from 22.8 to 28.8   |  |  |                                |
|  | Line and load regulation         |  | ± 3%   |  |  |                                |
|  | Residual ripple - noise          | mV   | 250  |  |  | 200                            |
| Holding time for I max.                            | $U_{in} = 100 V \sim$            | ms   | ≥ 10   |  |  |                                |
|  | $U_{in} = 230 V \sim$            | ms   | ≥ 150  |  |  |                                |
| Protection   | Against short-circuits           |  | Permanent  |  |  |                                |
|  | Against undervoltages            | V  | -  |  |  | < 19                           |
|  | Thermal                          |  | Yes  |  | -  |                                |
| <b>Operating and environmental characteristics</b> |                                  |  |  |  |  |                                |
| Connections  | Input                            | mm <sup>2</sup>  | 2 x 0.14...2.5 screw terminals (26...14 AWG)                                     |  |  |                                |
|  | Output                           | mm <sup>2</sup>  | 2 x 0.14...2.5 screw terminals (26...14 AWG)                                     | 4 x 0.14...2.5 screw terminals (26...14 AWG) |  |                                |
| Mounting   |                                  |  | On $\perp$ rail, 35 x 7.5 mm and 35 x 15 mm or on panel (2 x $\varnothing$ 4 mm) |  |  |                                |
| Operating position                                 |                                  | On vertical plane  | Vertical   |  |  |                                |
| Connections  | Series                           |  | Possible, see page 5/23  |  |  |                                |
|  | Parallel                         |  | Possible, see page 5/23  |  |  |                                |
| Environment  | Operating temperature            | °C   | - 25...+ 70 (derating from 55°C, see page 5/23)                                  |  | - 25...+ 55                              |                                |
|  | Storage temperature              | °C   | - 40...+ 70  |  |  |                                |
|  | Relative humidity                |  | 90% during operation<br>95% in storage   |  |  |                                |
|  | Degree of protection             |  | IP 20 conforming to IEC 60529  |  |  |                                |
| Vibration acc. to EN 61131-2                       |                                  |  | 3...11.9 Hz amplitude 3.5 mm and 11.9 - 150 Hz acceleration 2 g                  |  |  |                                |
| Protection class according to VDE 0106 1           |                                  |  | Class II   |  |  |                                |
| Dielectric strength 50 Hz for 1 min                | Input/output                     | V rms  | 3000 ~   |  |  |                                |
|  | Input fuse incorporated          |  | Yes (not interchangeable)  |  |  |                                |
| Emissions according to EN 61000-6-3                |                                  |  | EN 50081-1 (generic)   |  |  |                                |
|  | Radiation                        |  | EN 55022 Class B   |  |  |                                |
|  | Conducted on the power line      |  | EN 55022 Class B   |  |  |                                |
|  | Harmonic currents                |  | IEC/EN 61000-3-2   |  |  |                                |
| Immunity according to EN 61000-6-2                 |                                  |  | IEC 61000-6-2 (generic)  |  |  |                                |
|  | Electrostatic discharge          |  | IEC/EN 61000-4-2 (6 kV contact/8 kV air)   |  | IEC/EN 61000-4-2 (4 kV contact/8 kV air) |                                |
|  | Radiated electromagnetic fields  |  | IEC/EN 61000-4-3 level 3 (10 V/m)  |  |  |                                |
|  | Induced electromagnetic fields   |  | IEC/EN 61000-4-6 level 3 (10 V/m)  |  |  |                                |
|  | Rapid transients                 |  | IEC/EN 61000-4-4 (4 kV)  |  |  |                                |
|  | Surges                           |  | IEC/EN 61000-4-5 (1 kV)  |  |  |                                |
|  | Primary outages                  |  | IEC/EN 61000-4-11 (voltage dips and interruptions)                               |  |  |                                |

(1) The certifications cULus 508, cCSAus, TUV 60950-1 are not valid for DC input voltages.

#### Technical characteristics

| Power supply type                                  |   | ABL 8MEM05040  | ABL 8MEM12020   |                            |  |
|--|---|--|---|----------------------------|--|
| <b>Certifications</b>                              |   | cULus 508, cCSAus (CSA22.2 n950-1), TUV EN 60950-1, CE, C-Tick       |   |                            |  |
| <b>Conformity to standards</b>                     | Safety  | IEC/EN 60950-1, SELV   |   |                            |  |
|  | EMC   | IEC/EN 61000-6-2, IEC/EN 61000-6-3, IEC/EN 61204-3, EN 55022 Class B |   |                            |  |
| <b>Input circuit</b>                               |   |  |   |                            |  |
| <b>LED indication</b>                              |   | No   |   |                            |  |
| <b>Input values</b>                                | Nominal voltage                               | V  | 100...240 ~   |                            |  |
|  | Limit voltage                                 | V  | 85...264 V ~  |                            |  |
|  |   |  | 120...250 V ≡ (1)   |                            |  |
|  | Current consumption                           | A  | 0.55 (100 V ~)  | 0.6 (100 V ~)              |  |
|  |   |  | 0.35 (240 V ~)  | 0.35 (240 V ~)             |  |
|  | Permissible frequencies                       | Hz   | 47...63   |                            |  |
|  | Maximum inrush current                        | A  | 20  |                            |  |
|  | Power factor                                  |  | > 0.5   |                            |  |
|  | Efficiency at nominal load                    |  | > 75%   | > 80%                      |  |
|  | Dissipated power at nominal load              | W  | 6.7   | 6.2                        |  |
|  |   |  |   |                            |  |
| <b>Output circuit</b>                              |   |  |   |                            |  |
| <b>LED indication</b>                              |   | Green LED  |   |                            |  |
| <b>Nominal output values</b>                       | Voltage (U <sub>out</sub> )                   | V  | 5 ≡   | 12...15 ≡                  |  |
|  | Current                                       | A  | 4   | 2.1                        |  |
|  | Power   | W  | 20  | 25                         |  |
| <b>Precision</b>                                   | Output voltage                                | V  | Adjustable from 4.75 to 6.25  | Adjustable from 11.4 to 15 |  |
|  | Line and load regulation                      |  | ± 3%  |                            |  |
|  | Residual ripple - noise                       | mV   | 250   |                            |  |
| <b>Holding time for I<sub>max</sub></b>            | U <sub>in</sub> min                           | ms   | ≥ 10  |                            |  |
| <b>Protection</b>                                  | Against short-circuits                        |  | Permanent   |                            |  |
|  | Against undervoltages                         |  | -   |                            |  |
|  | Thermal                                       |  | -   |                            |  |
| <b>Operating and environmental characteristics</b> |   |  |   |                            |  |
| <b>Connections</b>                                 | Input   | mm <sup>2</sup>  | 2 x 0.14...2.5 screw terminals (26...14 AWG)                                |                            |  |
|  | Output  | mm <sup>2</sup>  | 4 x 0.14...2.5 screw terminals (26...14 AWG)                                |                            |  |
| <b>Mounting</b>                                    |   |  | On 1 <sub>U</sub> rail, 35 x 7.5 mm and 35 x 15 mm or on panel (2 x Ø 4 mm) |                            |  |
| <b>Operating position</b>                          | On vertical plane                             |  | Vertical  |                            |  |
| <b>Connections</b>                                 | Series  |  | Possible, see page 5/23   |                            |  |
|  | Parallel                                      |  | Possible, see page 5/23   |                            |  |
| <b>Environment</b>                                 | Operating temperature                         | °C   | - 25...+ 70 (derating from 55°C, see page 5/23)                             |                            |  |
|  | Storage temperature                           | °C   | - 40...+ 70   |                            |  |
|  | Maximum relative humidity                     |  | 90% during operation  |                            |  |
|  |   |  | 95% in storage  |                            |  |
| Degree of protection                               |   | IP 20 conforming to IEC 60529  |   |                            |  |
| Vibration  |   | 3...11.9 Hz amplitude 3.5 mm and 11.9 -150 Hz acceleration 2 g       |   |                            |  |
| <b>Protection class</b> according to VDE 0106 1    |   |  | Class II  |                            |  |
| <b>Dielectric strength</b><br>50 Hz for 1 min      | Input/output                                  | V rms  | 3000 ~  |                            |  |
| <b>Input fuse incorporated</b>                     |   |  | Yes (not interchangeable)   |                            |  |
|  | <b>Emissions</b><br>according to EN 61000-6-3 |  | EN 50081-1 (generic)  |                            |  |
|  |   | Radiation  |   | EN 55022 Class B           |  |
|  |   | Conducted on the power line  |   | EN 55022 Class B           |  |
| <b>Immunity</b><br>according to EN 61000-6-2       | Harmonic currents                             |  | IEC/EN 61000-3-2  |                            |  |
|  |   |  | IEC 61000-6-2 (generic)   |                            |  |
|  | Electrostatic discharge                       |  | IEC/EN 61000-4-2 (6 kV contact/8 kV air)                                    |                            |  |
|  | Radiated electromagnetic fields               |  | IEC/EN 61000-4-3 level 3 (10 V/m)   |                            |  |
|  | Induced electromagnetic fields                |  | IEC/EN 61000-4-6 level 3 (10 V/m)   |                            |  |
|  | Rapid transients                              |  | IEC/EN 61000-4-4 (4 kV)   |                            |  |
|  | Surges  |  | IEC/EN 61000-4-5 (1 kV)   |                            |  |
| Primary outages                                    |   | IEC/EN 61000-4-11 (voltage dips and interruptions)                   |   |                            |  |

(1) The certifications cULus 508, cCSAus, TUV 60950-1 are not valid for DC input voltages.

### Output characteristics

#### Behavior in the event of short-circuits and overloads

Phaseo power supplies are equipped with an electronic protection device.

In the event of an overload or short-circuit, the integrated protection interrupts the current supply before the output voltage drops below 19 V.

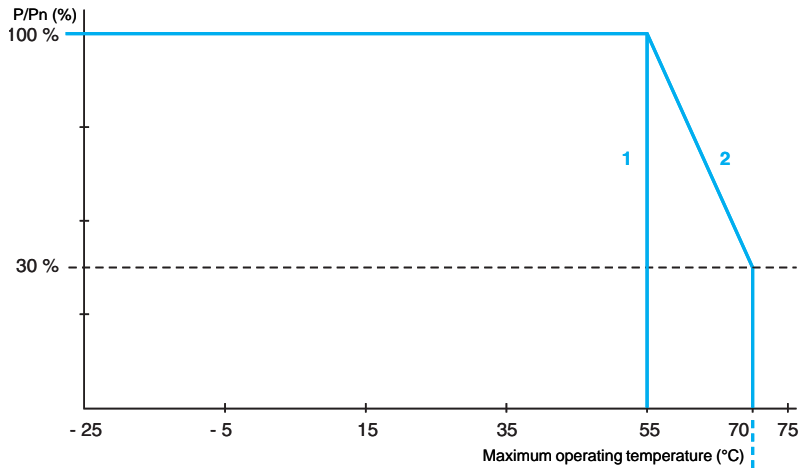
The output voltage reverts to its nominal value on elimination of the fault, which avoids having to take any action.

#### Derating

The ambient temperature is a determining factor that limits the power an electronic power supply can deliver continuously. If the temperature around the electronic components is too high, their life will be significantly reduced.

The nominal ambient temperature for the Modular range of Phaseo power supplies is 55°C. Above this temperature, derating is necessary up to a maximum temperature of 70°C (except for the ABL 7RM24025 model).

The graph below shows the power as a percentage of the nominal power that the power supply can deliver continuously, depending on the ambient temperature.



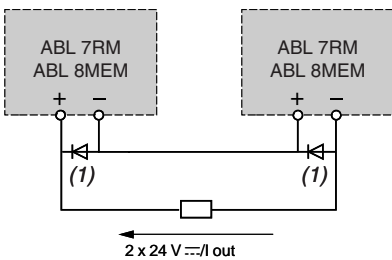
- 1 With an ABL 7RM24025
- 2 With an ABL 8MEM series

#### Temporary overloads

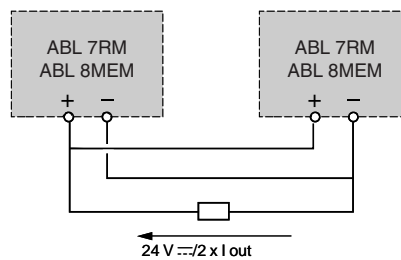
The ABL 8MEM series Modular range of power supplies have an energy reserve that can be used to supply the application with 125% to 140% of the nominal output current for a maximum of 1 minute, depending on the model.

### Series or parallel connection

#### Series connection



#### Parallel connection



(1) Two Schottky diodes  $I_{min}$  = power supply  $I_n$  and  $V_{min}$  = 50 V

| Family       | Series          | Parallel        |
|--------------|-----------------|-----------------|
| ABL 7RM/8MEM | 2 products max. | 2 products max. |

**Note:** Series or parallel connection is only recommended for products with identical references.

## Selection of protection for the power supply primary

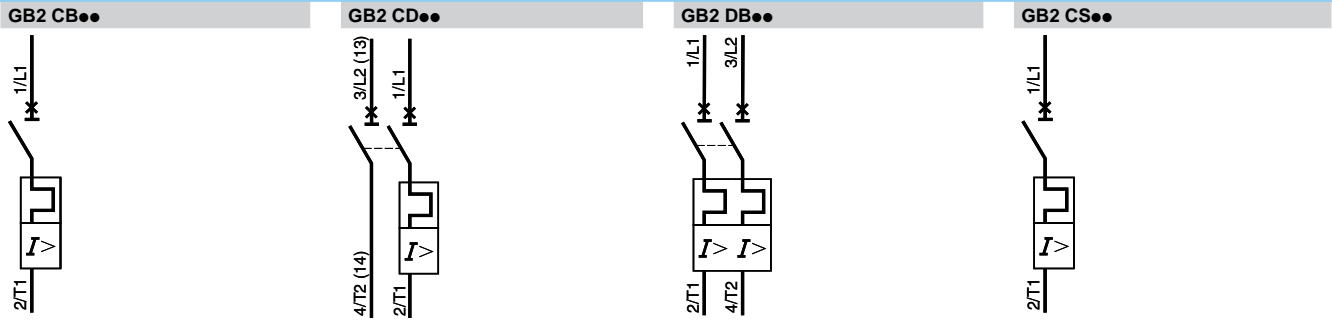
| Type of line supply | 100 to 240 V ~ single-phase      |                             |         |
|---------------------|----------------------------------|-----------------------------|---------|
| Type of protection  | Thermal-magnetic circuit-breaker |                             | gG fuse |
|                     | GB2 (IEC) (1)                    | C60N (IEC)<br>C60N (UL/CSA) |         |
| ABL 8MEM05040       | GB2 ●●07 (2)                     | 24581<br>24517              | 2 A     |
| ABL 8MEM12020       |                                  |                             |         |
| ABL 8MEM24003       |                                  |                             |         |
| ABL 8MEM24006       |                                  |                             |         |
| ABL 8MEM24012       |                                  |                             |         |
| ABL 7RM24025        | GB2 ●●08 (2)                     | 24582<br>24518              | 3 A     |

(1) UL pending

(2) Complete the reference by replacing ●● as required:

- **CB** for single-pole circuit-breaker with magnetic trip threshold 12 to 16 In
- **CD** for single-pole + neutral circuit-breaker with magnetic trip threshold 12 to 16 In
- **DB** for 2-pole circuit-breaker with magnetic trip threshold 12 to 16 In
- **CS** for single-pole circuit-breaker with magnetic trip threshold 5 to 7 In

## Circuit-breaker schemes



5

5.2



## Regulated switch mode power supplies: Phaseo Modular range



ABL 8MEM05040/12020/24012



ABL 8MEM24003/24006



ABL 7RM24025

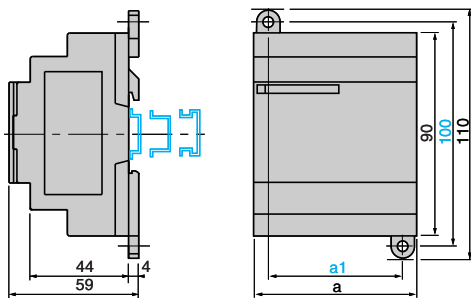
| Input voltage  | Secondary                    |               |                 | Reset          | Conforming to standard EN 61000-3-2 (1) | Reference            | Weight kg |
|--|------------------------------|---------------|-----------------|----------------|---|----------------------|-----------|
|  | Output voltage               | Nominal power | Nominal current |                |   |                      |           |
| <b>Single-phase (N-L1) or 2-phase (L1-L2) connection</b> |                              |               |                 |                |   |                      |           |
| 100...240 V<br>-15%, +10%<br>50/60 Hz                    | 5 V $\overline{\text{---}}$  | 20 W          | 4 A             | Automatic      | Not applicable                          | <b>ABL 8MEM05040</b> | 0.195     |
|  | 12 V $\overline{\text{---}}$ | 25 W          | 2 A             | Automatic      | Not applicable                          | <b>ABL 8MEM12020</b> | 0.195     |
| 24 V $\overline{\text{---}}$                             | 7 W                          | 0.3 A         | Automatic       | Not applicable | <b>ABL 8MEM24003</b>                    | 0.100                |           |
|  | 15 W                         | 0.6 A         | Automatic       | Not applicable | <b>ABL 8MEM24006</b>                    | 0.100                |           |
|  | 30 W                         | 1.2 A         | Automatic       | Not applicable | <b>ABL 8MEM24012</b>                    | 0.195                |           |
|  | 60 W                         | 2.5           | Automatic       | Not applicable | <b>ABL 7RM24025</b>                     | 0.255                |           |

| Designation           | Use   | Sold in packs of | Unit reference | Weight kg |
|-----------------------|---|------------------|----------------|-----------|
| Clip-on marker labels | Replacement parts for ABL 8MEM power supplies | <b>100</b>       | <b>LAD 90</b>  | 0.030     |

(1) Due to their power < 75 W, the ABL 8MEM/7RM Modular range of power supplies is not subject to the requirements of standard EN 61000-3-2.

## Dimensions

ABL 8MEM●●●●/ABL 7RM24025 power supply

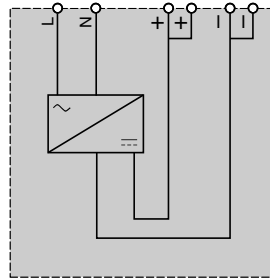
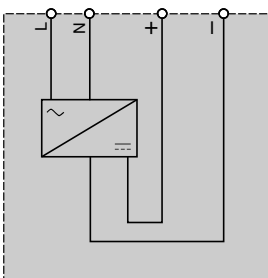


|               | a  | a1 |
|---------------|----|----|
| ABL 8MEM05040 | 54 | 42 |
| ABL 8MEM12020 | 54 | 42 |
| ABL 8MEM24003 | 36 | 24 |
| ABL 8MEM24006 | 36 | 24 |
| ABL 8MEM24012 | 54 | 42 |
| ABL 7RM24025  | 72 | 60 |

## Internal schemes

ABL 8MEM2400●

ABL 8MEM05040/8MEM12020/8MEM24012/7RM24025

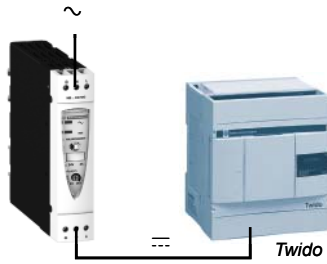


# Power supplies and transformers

Power supplies for DC control circuits

Regulated switch mode power supplies

Phaseo Optimum range



ABL 8REM24030

Twido

## Switch mode power supplies: Optimum range

The **ABL 8REM/7RP** power supply offer is designed to provide the DC voltage necessary for the control circuits of automation system equipment consuming 60 to 144 W in 12, 24 and 48 V  $\bar{\bar{}}$ . Comprising four products, this range meets the needs encountered in industrial, commercial, and residential applications. With phase-to-neutral (N-L1) or phase-to-phase (1) (L1-L2) connection, these slim electronic switch mode power supplies provide a quality of output current that is suitable for the loads supplied and compatible with both the **Twido** range and the smallest **Modicon M340** configurations, making them ideal partners. Their simplified characteristics in comparison with the Universal offer also make them the low-cost solution for applications less affected by problems with the line supply, such as harmonic pollution and outages. Clear guidelines are given on selecting the upstream protection devices which are often used with them, and thus a comprehensive solution is provided that can be used in total safety.

The Optimum range of Phaseo power supplies delivers a voltage that is precise to 3%, whatever the load and whatever the type of line supply, within a range of 85 to 264 V  $\sim$ . Conforming to IEC standards and UL, CSA and TUV certified, they are suitable for universal use. The inclusion of overload and short-circuit protection makes downstream protection unnecessary if discrimination is not required.

**ABL 8REM** power supplies do not have an anti-harmonic filter and do not satisfy the requirements of standard 61000-3-2 concerning harmonic pollution. **ABL 7RP** power supplies, however, are equipped with a PFC (*Power Factor Correction*) filter, thus ensuring compliance with standard 61000-3-2.

All the Optimum range of Phaseo power supplies have protection devices to ensure optimum performance of the automation system with an automatic reset mode on elimination of the fault.

In the event of an overload or short-circuit, the integrated protection interrupts the current supply before the output voltage drops below 19 V  $\bar{\bar{}}$ . The protection device resets itself automatically on elimination of the fault, which avoids having to take any action or change a fuse.

All products are equipped with an output voltage adjustment potentiometer in order to be able to compensate for any line voltage drops in installations with long cable runs.

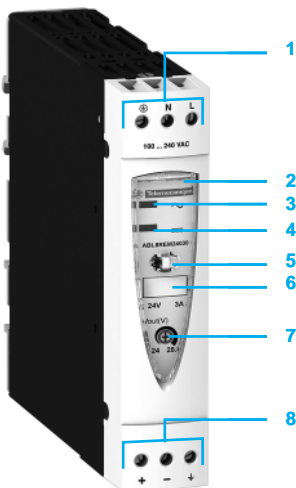
These power supplies are designed for direct mounting on 35 and 75 mm  $\bar{\bar{}}$  rails.

There are four references available in the Optimum range of Phaseo power supplies:

|                        |       |     |                     |
|------------------------|-------|-----|---------------------|
| ■ <b>ABL 8REM24030</b> | 72 W  | 3 A | 24 V $\bar{\bar{}}$ |
| ■ <b>ABL 8REM24050</b> | 120 W | 5 A | 24 V $\bar{\bar{}}$ |
| ■ <b>ABL 7RP1205</b>   | 60 W  | 5 A | 12 V $\bar{\bar{}}$ |
| ■ <b>ABL 7RP4803</b>   | 144 W | 3 A | 48 V $\bar{\bar{}}$ |

## Description

- 1 2.5 mm<sup>2</sup> enclosed screw terminals for connection of the input voltage (single-phase N-L1, phase-to-phase L1-L2 (1))
- 2 Protective glass flap
- 3 Input voltage status LED (orange).
- 4 Output DC voltage status LED (green).
- 5 Locking catch for the glass flap (sealable)
- 6 Clip-on marker label.
- 7 Output voltage adjustment potentiometer
- 8 2.5 mm<sup>2</sup> enclosed screw terminal block for connection of the DC output voltage



(1) 240 V  $\sim$  nominal

| Technical characteristics                          |                                 | ABL 7RP1205  | ABL 7RP4803 | ABL 8REM24030   | ABL 8REM24050 |
|--|---------------------------------|--|-------------|---|---------------|
| <b>Type of power supply</b>                        |                                 | cULus 508, cCSAus (CSA22.2 n950-1), TUV 60950-1, CE, C-Tick                                |             |   |               |
| <b>Certifications</b>                              |                                 | IEC/EN 60950, IEC/EN 61496-1-2, SELV   |             |   |               |
| <b>Conformity to standards</b>                     |                                 | IEC/EN 60950, SELV   |             |   |               |
| <b>Input circuit</b>                               |                                 | EN 50081-1, IEC 61000-6-2 (EN 50082-2)   |             |   |               |
| <b>LED indication</b>                              |                                 | Orange LED   |             |   |               |
| <b>Input values</b>                                |                                 |  |             |   |               |
| Nominal voltage                                    | V                               | 100...240 ~ compatible with 110...220 --- (1)  |             | 100...240 ~ compatible with 110...220 --- (1)             |               |
| Limit voltage                                      | V                               | 85...264 ~ compatible with 100...250 --- (1)   |             | 85...264 ~ single-phase compatible with 100...250 --- (1) |               |
| Current consumption                                | A                               | $U_{in} = 240 V \sim$<br>0.4   | 0.6         | 0.83  | 1.2           |
|  | A                               | $U_{in} = 100 V \sim$<br>0.8   | 1           | 1.46  | 1.9           |
| Permissible frequencies                            | Hz                              | 47...63  |             |   |               |
| Maximum inrush current                             | A                               | 30   |             |   |               |
| Power factor                                       |                                 | 0.98 approx.   |             | 0.65 approx.  |               |
| Efficiency at nominal load                         |                                 | > 85%  |             |   |               |
| Dissipated power at nominal load                   | W                               | 10.6   | 25.4        | 12.7  | 21.2          |
| <b>Output circuit</b>                              |                                 |  |             |   |               |
| <b>LED indication</b>                              |                                 | Green LED  |             |   |               |
| <b>Nominal output values</b>                       |                                 |  |             |   |               |
| Voltage ( $U_{out}$ )                              | V                               | 12 ---   | 48 ---      | 24 ---  |               |
| Current  | A                               | 5  | 3           | 3   | 5             |
| Power  | W                               | 60   | 144         | 72  | 120           |
| <b>Precision</b>                                   |                                 |  |             |   |               |
| Output voltage                                     | V                               | Adjustable from 100...120% voltage ( $U_{out}$ )   |             |   |               |
| Line and load regulation                           |                                 | ± 3%   |             |   |               |
| Residual ripple - noise                            | mV                              | < 200 (peak-peak)  |             |   |               |
| <b>Holding time for I max</b>                      |                                 |  |             |   |               |
| $U_{in} = 240 V \sim$                              | ms                              | ≥ 20   |             | ≥ 10  |               |
| $U_{in} = 100 V \sim$                              | ms                              | ≥ 20   |             | ≥ 10  |               |
| <b>Protection</b>                                  |                                 |  |             |   |               |
| Against short-circuits                             |                                 | Permanent/automatic or manual restart  |             | Permanent/automatic restart                               |               |
| Against overloads                                  |                                 | 1.1 In   |             |   |               |
| Against overvoltages                               |                                 | Tripping if $U_{out} > 1.5 U_n$  |             |   |               |
| Against undervoltages                              |                                 | Tripping if $U_{out} < 0.8 U_n$  |             |   |               |
| <b>Operating and environmental characteristics</b> |                                 |  |             |   |               |
| <b>Connections</b>                                 |                                 |  |             |   |               |
| Input  | mm <sup>2</sup>                 | 2 x 0.14...2.5 screw terminals (26...14 AWG) + ground                                      |             |   |               |
| Output   | mm <sup>2</sup>                 | 2 x 0.14...2.5 screw terminals (26...14 AWG) + ground, multiple output, depending on model |             |   |               |
| <b>Mounting</b>                                    | On L rail                       | , 35 x 7.5 mm, 35 x 15 mm and 75 x 7.5 mm  |             |   |               |
| <b>Operating position</b>                          | On vertical plane               | Vertical   |             |   |               |
| <b>Connections</b>                                 |                                 |  |             |   |               |
| Series   |                                 | Possible, see page 5/29  |             |   |               |
| Parallel   |                                 | Possible, see page 5/29  |             |   |               |
| <b>Degree of protection</b>                        |                                 | IP 20 conforming to IEC 60529  |             |   |               |
| <b>Environment</b>                                 |                                 |  |             |   |               |
| Operating temperature                              | °C                              | 0... +60 (derating from 50°C, see page 5/28)   |             |   |               |
| Storage temperature                                | °C                              | - 25...+ 70  |             |   |               |
| Maximum relative humidity                          |                                 | 95% without condensation or dripping water   |             |   |               |
| Vibration acc. to EN 61131-2                       |                                 | 3...11.9 Hz amplitude 3.5 mm and 11.9 -150 Hz acceleration 2 g                             |             |   |               |
| <b>Protection class according to VDE 0106 1</b>    |                                 | Class I  |             |   |               |
| <b>Dielectric strength</b>                         |                                 |  |             |   |               |
| Input/output                                       | V rms                           | 3000   |             |   |               |
| 50 and 60 Hz for 1 min                             | V rms                           | 3000   |             |   |               |
| Input/ground                                       | V rms                           | 3000   |             |   |               |
| Output/ground (and output/output)                  | V rms                           | 500  |             |   |               |
| <b>Input fuse incorporated</b>                     |                                 | Yes (not interchangeable)  |             |   |               |
| <b>Emissions</b>                                   |                                 |  |             |   |               |
| according to EN 61000-6-3                          | Conducted/radiated              | EN 50081-1 (generic)   |             |   |               |
|  |                                 | EN 55011/EN 55022 cl. B  |             |   |               |
| <b>Immunity</b>                                    |                                 |  |             |   |               |
| according to EN 61000-6-2                          |                                 | IEC 61000-6-2 (generic)  |             |   |               |
|  | Electrostatic discharge         | IEC/EN 61000-4-2 (6 kV contact/8 kV air)   |             |   |               |
|  | Radiated electromagnetic fields | IEC/EN 61000-4-3 level 3 (10 V/m)  |             |   |               |
|  | Induced electromagnetic fields  | IEC/EN 61000-4-6 level 3 (10 V/m)  |             |   |               |
|  | Rapid transients                | EN 61000-4-4 level 3 (2 kV)  |             |   |               |
|  | Surges                          | IEC/EN 61000-4-5 (2 kV)  |             |   |               |
|  | Primary outages                 | IEC/EN 61000-4-11 (voltage dips and interruptions)   |             |   |               |

(1) The certifications cULus 508, cCSAus (CSA22.2 n950-1) and TUV 60950-1 are not valid for DC input voltages.

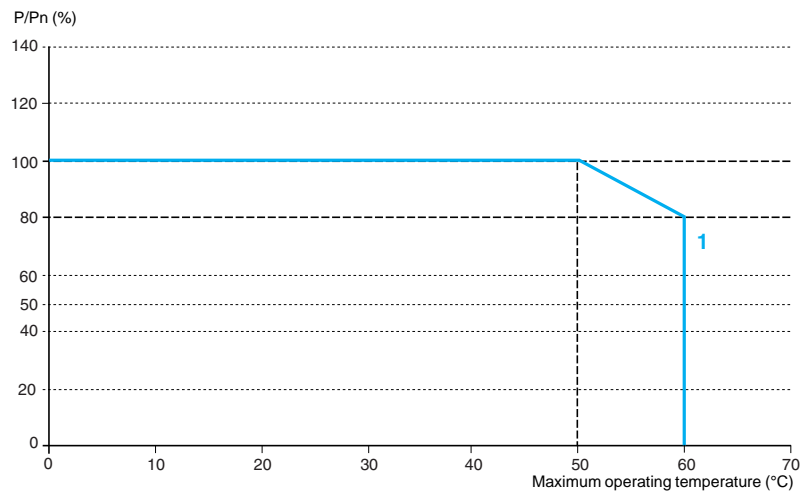
### Output characteristics

#### Derating

The ambient temperature is a determining factor that limits the power an electronic power supply can deliver continuously. If the temperature around the electronic components is too high, their life will be significantly reduced.

The nominal ambient temperature for the Optimum range of Phaseo power supplies is 50 °C. Above this temperature, derating is necessary up to a maximum temperature of 60 °C.

The graph below shows the power as a percentage of the nominal power that the power supply can deliver continuously, depending on the ambient temperature.



1 ABL 8REM, ABL 7RP mounted vertically

Derating should be considered in extreme operating conditions:

- Intensive operation (output current permanently close to the nominal current, combined with a high ambient temperature)
- Output voltage set above 24 V  $\overline{\text{---}}$  (to compensate for line voltage drops, for example)
- Parallel connection to increase the total power

#### General rules to be complied with

|  |   |
|--|---|
| <b>Intensive operation</b>                             | See derating on above graph.<br>Example for ABL 8REM:<br>- Without derating, from 0°C to 50°C<br>- Derating of nominal current by 2%, per additional °C, up to 60°C   |
| <b>Rise in output voltage</b>                          | The nominal power is fixed.<br>Increasing the output voltage means that the current delivered must be reduced.  |
| <b>Parallel connection to increase the total power</b> | The total power is equal to the sum of the power supplies used, but the maximum ambient temperature for operation is 50°C.<br>To improve heat dissipation, the power supplies must not be in contact with each other. |

In all cases, there must be adequate convection around the products to assist cooling. There must be sufficient clearance around the Optimum range of Phaseo power supplies:

- 50 mm above and below
- 15 mm on the sides

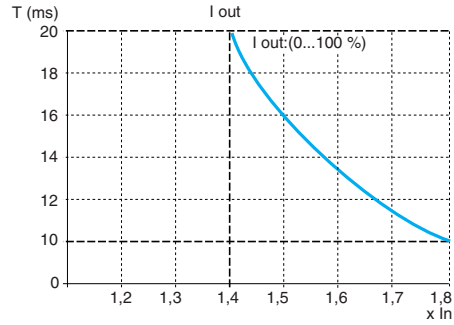
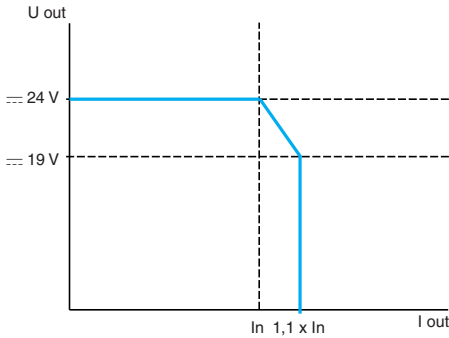
Output characteristics (continued)

Load limit

ABL 8REM240●●/ABL 7RP●●●●

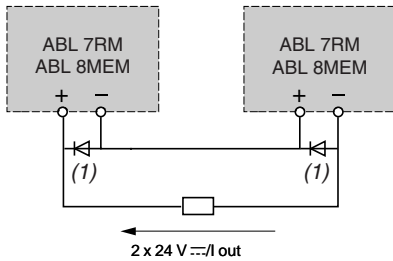
Temporary overloads

ABL 8REM/ABL 7RP

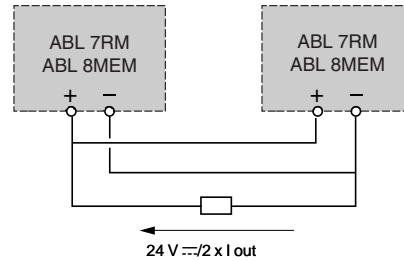


Series or parallel connection

Series connection



Parallel connection



| Family       | Series          | Parallel        |
|--------------|-----------------|-----------------|
| ABL 8REM/7RP | 2 products max. | 2 products max. |

(1) Two Schottky diodes  $I_{min}$  = power supply  $I_n$  and  $V_{min}$  = 50 V

**Note:** Series or parallel connection is only recommended for products with identical references.

## Selection of protection for the power supply primary

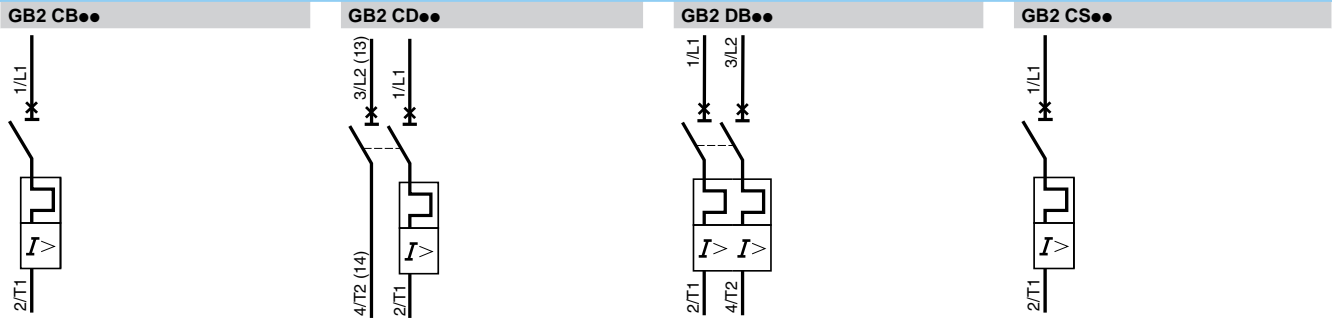
| Type of line supply | 100 V ~                          |                         |         | 240 V ~                          |                         |         |
|---------------------|----------------------------------|-------------------------|---------|----------------------------------|-------------------------|---------|
| Type of protection  | Thermal-magnetic circuit-breaker |                         | gG fuse | Thermal-magnetic circuit-breaker |                         | gG fuse |
|                     | GB2 (IEC) (1)                    | C60N (IEC)<br>C60N (UL) |         | GB2 (IEC) (1)                    | C60N (IEC)<br>C60N (UL) |         |
| ABL 7RP1205         | GB2 ●●06 (2)                     | 24580<br>24516          | 2 A     | GB2 ●●06 (2)                     | 24580<br>24516          | 1 A     |
| ABL 8REM24030       | GB2 ●●07 (2)                     | 24581<br>24517          | 2 A     | GB2 ●●06 (2)                     | 24580<br>24516          | 1 A     |
| ABL 8REM24050       | GB2 ●●07 (2)                     | 24581<br>24517          | 2 A     | GB2 ●●06 (2)                     | 24580<br>24516          | 1 A     |
| ABL 7RP4803         | GB2 ●●07 (2)                     | 24581<br>24517          | 2 A     | GB2 ●●06 (2)                     | 24580<br>24516          | 1 A     |

(1) UL pending

(2) Complete the reference by replacing ●● with:

- CB for single-pole circuit-breaker with magnetic trip threshold 12 to 16 In
- CD for single-pole + neutral circuit-breaker with magnetic trip threshold 12 to 16 In
- DB for 2-pole circuit-breaker with magnetic trip threshold 12 to 16 In
- CS for single-pole circuit-breaker with magnetic trip threshold 5 to 7 In

## Schemes for GB2 ●●0● thermal-magnetic circuit-breakers



5

5.2

## Regulated switch mode power supplies: Phaseo Optimum range



ABL 7RP1205/4803



ABL 8REM24030



ABL 8REM24050

| Input voltage   | Secondary      |               |                     | Reset               | Conforming to standard EN 61000-3-2 | Reference     | Weight kg |
|---|----------------|---------------|---------------------|---------------------|-------------------------------------|---------------|-----------|
|   | Output voltage | Nominal power | Nominal current     |                     |                                     |               |           |
| <b>Single-phase (N-L1) or phase-to-phase (L1-L2) connection</b> |                |               |                     |                     |                                     |               |           |
| 100...240 V ~<br>- 15%, + 10%<br>50/60 Hz                       | 12 V $\equiv$  | 60 W          | 5 A                 | Automatic or manual | Yes                                 | ABL 7RP1205   | 1.000     |
|   | 24 V $\equiv$  | 72 W          | 3 A                 | Automatic           | No                                  | ABL 8REM24030 | 0.520     |
|   |                | 120 W         | 5 A                 | Automatic           | No                                  | ABL 8REM24050 | 1.000     |
| 48 V $\equiv$   | 144 W          | 2.5 A         | Automatic or manual | Yes                 | ABL 7RP4803                         | 1.000         |           |

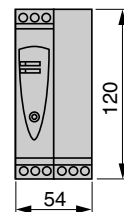
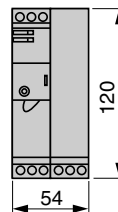
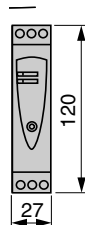
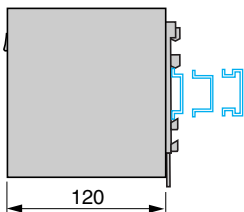
## Dimensions

ABL 7RP●●●●  
Common side view  
Mounted on 35 and 75 mm rails

ABL 8REM24030

ABL 7RP1205/4803

ABL 8REM24050

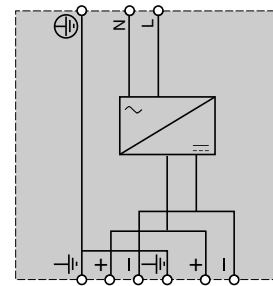
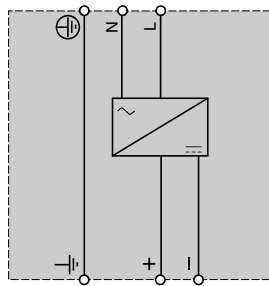
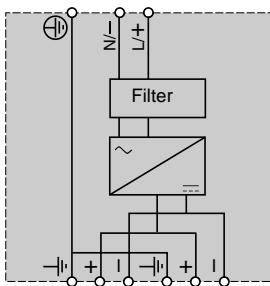


## Internal schemes

ABL 7RP1205/48030

ABL 8REM24030

ABL 8REM24050



# Power supplies and transformers

## Power supplies for control circuits for

### AS-Interface cabling system

#### Regulated switch mode power supplies

#### Phaseo AS-Interface range

### Power supplies for AS-Interface cabling system

Consistent with the standard Phaseo line, the range of **ASI ABL** power supplies is designed to deliver a  $\sim$  voltage, as required by AS-Interface cabling systems. Three versions are available to meet all needs encountered in industrial applications, in enclosures, cells or floor-standing enclosures. These single-phase, electronic, switch mode power supplies guarantee the quality of the output current, in accordance with the electrical characteristics and conforming to standard EN 50295.



ASI ABLB3002

#### ASI ABLB300●

Operating on a 100 to 240 V  $\sim$  supply, this power supply delivers a voltage of 30 V  $\sim$ . Available in 2.4 and 4.8 A ratings, the outgoing terminal block allows the cable to be connected separately to the AS-Interface interface modules and to the AS-Interface master. Input and output LEDs allow fast and continuous diagnostics.



ASI ABLD3004

#### ASI ABLD300●

Operating on a 100 to 240 V  $\sim$  supply, this power supply delivers a voltage of 30 V  $\sim$ . Available in 2.4 and 4.8 A ratings, it allows diagnosis and management of earth faults on AS-Interface interface modules. In the event of an earth fault, the Phaseo power supply stops dialogue on the AS-Interface cabling system and puts the installation in a fallback condition. Restarting is only possible after deliberate acknowledgement of the fault. Two inputs/outputs enable dialogue with a processing unit. The outgoing terminal block is used to connect the AS-Interface cable separately to the interface modules and master modules. Input, output and earth fault LED's allow fast and continuous diagnostics.

#### Warning:

■ The earth (GND) (1) connection must be made. In the event of disconnection, the built-in detector becomes inoperative. To obtain earth connection diagnostics, it is recommended that an **ASI ABLB300●** power supply be used together with insulation relay **RMO PAS 101**.



ASI ABLM3024

#### ASI ABLM3024

Operating on a 100 to 240 V  $\sim$  supply, this product provides two separate power supplies, which are totally independent in the way they operate. Two output voltages - 30 V/2.4 A (AS-Interface line supply) and 24 V/3 A - are available, so making it possible to supply the control equipment without an additional power supply. Input and output LEDs allow fast and continuous diagnostics.

(1) Compulsory connection.

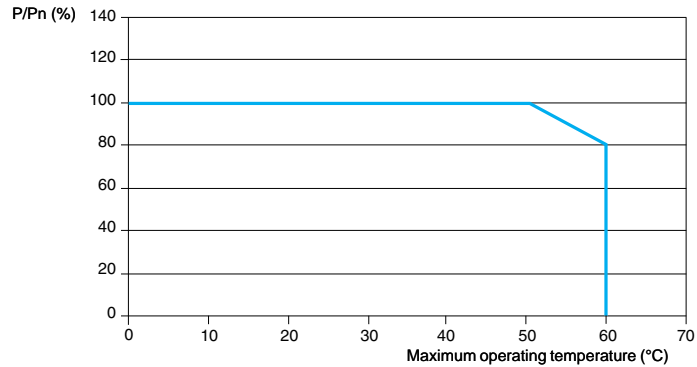


| Technical characteristics                     |                                  |                       |   |                            |                     |                     |                                     |   |               |
|---|----------------------------------|-----------------------|---|----------------------------|---------------------|---------------------|-------------------------------------|---|---------------|
| <b>Type of power supply</b>                   |                                  |                       | <b>ASI ABLB3002</b>   | <b>ASI ABLB3004</b>        | <b>ASI ABLD3002</b> | <b>ASI ABLD3004</b> | <b>ASI ABLM3024</b>                 |   |               |
| <b>Functions</b>                              |                                  |                       | Supply to the AS-Interface line (30 V $\overline{\text{---}}$ ) |                            |                     |                     | 30 V $\overline{\text{---}}$ supply | 24 V $\overline{\text{---}}$ supply                         |               |
| <b>Product certifications</b>                 |                                  |                       | UL 508, CSA 22-2 n° 950, TÜV 60950-1                            |                            |                     |                     |                                     |   |               |
| <b>Conforming to standards</b>                | Safety                           |                       | EN 60950-1  |                            |                     |                     |                                     |   |               |
|   | EMC                              |                       | EN 50081-1, IEC 61000-6-2, EN 55022 class B                     |                            |                     |                     |                                     |   |               |
|   | Low frequency harmonic currents  |                       | No  |                            |                     |                     |                                     |   |               |
| <b>Input circuit</b>                          |                                  |                       |   |                            |                     |                     |                                     |   |               |
| <b>LED indication</b>                         |                                  |                       | Orange LED  |                            |                     |                     |                                     |   |               |
| <b>Input voltage</b>                          | Rated values                     | <b>V</b>              | $\sim 100 \dots 240$  |                            |                     |                     |                                     |   |               |
|   | Permissible values               | <b>V</b>              | $\sim 85 \dots 264$   |                            |                     |                     |                                     |   |               |
|   | Current consumption              | <b>A</b>              | 0.5   | 1                          | 0.5                 | 1                   |                                     |   |               |
|   | Permissible frequencies          | <b>Hz</b>             | 47...63   |                            |                     |                     |                                     |   |               |
|   | Current at switch-on             | <b>A</b>              | < 30  |                            |                     |                     |                                     |   |               |
|   | Power factor                     |                       | 0.65  |                            |                     |                     |                                     |   |               |
|   | Efficiency at nominal load       | <b>%</b>              | > 83  |                            |                     |                     | > 83                                | > 80  |               |
|   | Dissipated power at nominal load | <b>W</b>              | 14.7  | 29.5                       | 14.7                | 29.5                | 14.7                                | 36  |               |
|   | <b>Output circuit</b>            |                       |   |                            |                     |                     |                                     |   |               |
| <b>LED indication</b>                         |                                  |                       | Green LED   |                            |                     |                     |                                     |   |               |
| <b>Nominal output values</b>                  | Voltage ( $U_{out}$ )            | <b>V</b>              | 30 (AS-Interface)   |                            |                     |                     | $\overline{\text{---}}$ 30          | $\overline{\text{---}}$ 24                                  |               |
|   | Current                          | <b>A</b>              | 2.4   | 4.8                        | 2.4                 | 4.8                 | 2.4                                 | 3   |               |
|   | Power                            | <b>W</b>              | 72  | 144                        | 72                  | 144                 | 72                                  | 72  |               |
| <b>Precision</b>                              | Adjustable output voltage        | <b>V</b>              | -   |                            |                     |                     | -                                   | 100 to 120 %  |               |
|   | Line and load regulation         |                       | 3 %   |                            |                     |                     |                                     |   |               |
|   | Residual ripple - noise          | <b>mV</b>             | 300 - 50  |                            |                     |                     |                                     |   |               |
| <b>Holding time for <math>I_{max}</math></b>  | $U_{in, min}$                    | <b>ms</b>             | $\geq 10$   |                            |                     |                     |                                     |   |               |
|   | <b>Protection</b>                |                       | Against short-circuit   |                            |                     |                     |                                     | Permanent. Automatic restart after elimination of the fault |               |
|   |                                  | Against overload      |   | 1.1 $I_n$                  |                     |                     |                                     |   |               |
|   |                                  | Against overvoltage   |   | Tripping if $U > 1.2 U_n$  |                     |                     |                                     | $U > 1.2 U_n$   | $U > 1.5 U_n$ |
|   |                                  | Against undervoltage  |   | Tripping if $U < 0.95 U_n$ |                     |                     |                                     | $U < 0.95 U_n$  | $U < 0.8 U_n$ |
| <b>Operating characteristics</b>              |                                  |                       |   |                            |                     |                     |                                     |   |               |
| <b>Connections</b>                            | Input                            | <b>mm<sup>2</sup></b> | 2 x 2.5 screw terminals + earth                                 |                            |                     |                     |                                     |   |               |
|   | Output                           | <b>mm<sup>2</sup></b> | 2 x 2.5 screw terminals + earth, multiple output                |                            |                     |                     |                                     |   |               |
| <b>Environment</b>                            | Operating temperature            | <b>°C</b>             | 0 to + 60 (derating from 50, see page 5/34)                     |                            |                     |                     |                                     |   |               |
|   | Storage temperature              | <b>°C</b>             | - 25 to + 70  |                            |                     |                     |                                     |   |               |
|   | Maximum relative humidity        |                       | 95 % (without condensation or dripping water)                   |                            |                     |                     |                                     |   |               |
|   | Degree of protection             |                       | IP 20 (conforming to IEC 529)                                   |                            |                     |                     |                                     |   |               |
|   | Vibrations                       |                       | EN 61131-2  |                            |                     |                     |                                     |   |               |
| <b>Operating position</b>                     |                                  |                       | Vertical  |                            |                     |                     |                                     |   |               |
| <b>MTBF</b>                                   |                                  | <b>h</b>              | > 100000 (conforming to Bell core, at 40 °C)                    |                            |                     |                     |                                     |   |               |
| <b>Dielectric strength 50 Hz during 1 min</b> | Input/output                     | <b>V rms</b>          | 3000  |                            |                     |                     |                                     |   |               |
|   | Input/earth                      | <b>V rms</b>          | 3000  |                            |                     |                     |                                     |   |               |
|   | Output/earth (and output/output) | <b>V rms</b>          | 500   |                            |                     |                     |                                     |   |               |
| <b>Input fuse incorporated</b>                |                                  |                       | Yes (not interchangeable)                                       |                            |                     |                     |                                     |   |               |
| <b>Emission according to EN 61000-6-3</b>     | Conducted/radiated               |                       | Class B (conforming to EN 55022)                                |                            |                     |                     |                                     |   |               |
| <b>Immunity according to EN 61000-6-2</b>     | Electrostatic discharge          |                       | EN 61000-4-2 (4 kV contact/8 kV air)                            |                            |                     |                     |                                     |   |               |
|   | Radiated electromagnetic field   |                       | EN 61000-4-3 level 3 (10 V/m)                                   |                            |                     |                     |                                     |   |               |
|   | Induced electromagnetic field    |                       | EN 61000-4-6 (10 V/m)   |                            |                     |                     |                                     |   |               |
|   | Rapid transients                 |                       | EN 61000-4-4 level 3 (2 kV),                                    |                            |                     |                     |                                     |   |               |
|   | Primary outages                  |                       | EN 61000-4-11 (voltage dips and interruptions)                  |                            |                     |                     |                                     |   |               |

### Output characteristics

#### Derating

The ambient temperature is a determining factor which limits the power that an electronic power supply can deliver continuously. If the temperature around the electronic components is too high, their life will be significantly reduced. The graph below shows the power (in relation to the nominal power) which the power supply can deliver continuously, according to the ambient temperature.



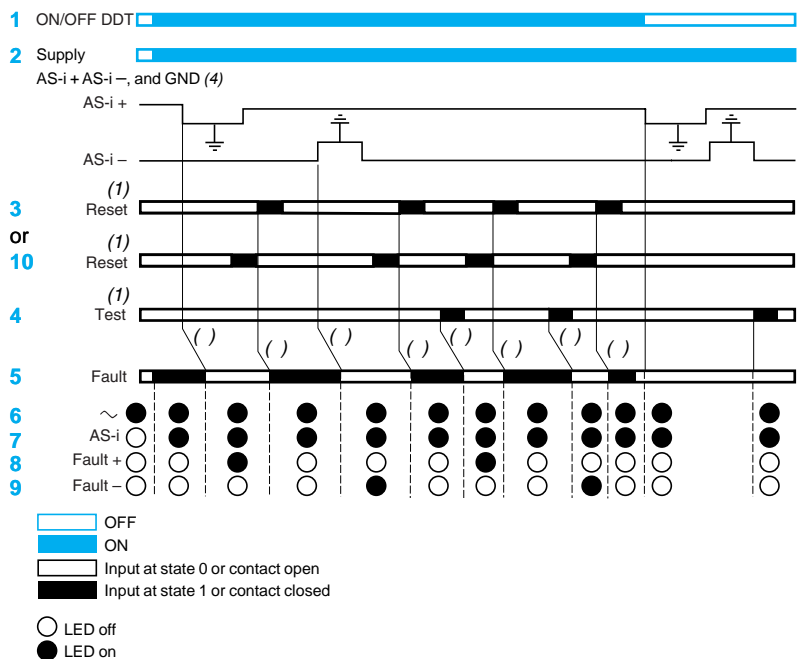
### Selection

#### Upstream protection of power supplies for AS-Interface cabling system

| Type of mains supply | ~ 115 V single-phase |                                  | ~ 230 V single-phase |                                  |                 |
|----------------------|----------------------|----------------------------------|----------------------|----------------------------------|-----------------|
|                      | Type of protection   | Thermal-magnetic circuit-breaker | Gg fuse              | Thermal-magnetic circuit-breaker | Gg fuse         |
| Single-pole          |                      | GB2 CB●●                         |                      |                                  |                 |
| 2-pole               |                      | GB2 DB●●                         | C60N                 | GB2 DB●●                         | C60N            |
| AS1 ABLB3002         |                      | GB2 ●B07                         | MG24517 (1) 2 A      | GB2 DB06                         | MG24516 (1) 2 A |
| AS1 ABLB3004         |                      | GB2 ●B08                         | MG24518 (1) 4 A      | GB2 DB07                         | MG17453 (1) 2 A |
| AS1 ABLD3002         |                      | GB2 ●B07                         | MG24517 (1) 2 A      | GB2 DB06                         | MG24516 (1) 2 A |
| AS1 ABLD3004         |                      | GB2 ●B08                         | MG24518 (1) 4 A      | GB2 DB07                         | MG17453 (1) 2 A |
| AS1 ABLM3024         |                      | GB2 ●B07                         | MG24517 (1) 2 A      | GB2 DB06                         | MG17453 (1) 2 A |

(1) UL certified circuit-breaker.

### Function diagram

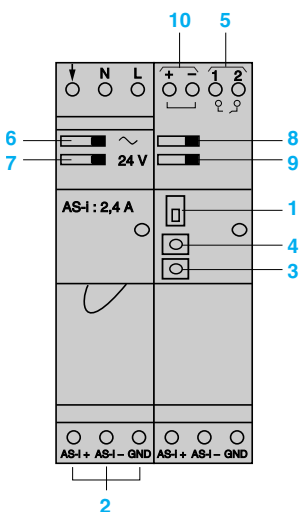


(1) 30 ms min.

(2) 15 ms.

(3) 20 ms.

(4) Warning: the earth fault detector will only operate if the earth (GND) terminal is connected.



# Power supplies and transformers

Power supplies for control circuits for  
AS-Interface cabling system

Regulated switch mode power supplies

Phaseo AS-Interface range

## Phaseo AS-Interface range regulated switch mode power supplies



ASI ABL3002

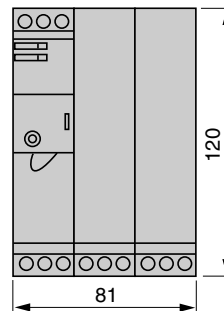
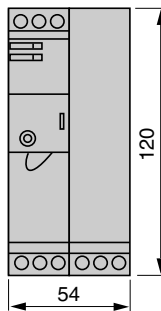
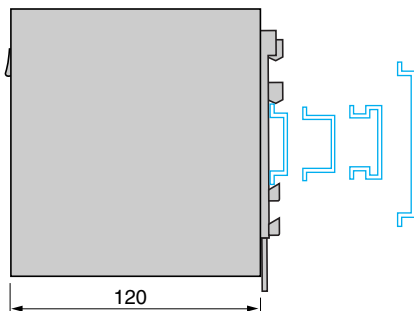
| Input voltage                                 | Secondary      |               |                 | Auto-protect reset | Earth fault detection | Reference    | Weight kg |
|---|----------------|---------------|-----------------|--------------------|-----------------------|--------------|-----------|
|   | Output voltage | Nominal power | Nominal current |                    |                       |              |           |
| <b>Single phase (N-L1) or 2-phase (L1-L2)</b> |                |               |                 |                    |                       |              |           |
| ~ 100...240 V<br>- 15 %, + 10 %<br>50/60 Hz   | = 30 V         | 72 W          | 2,4 A           | Auto               | No                    | ASI ABL3002  | 0.800     |
|   |                | 144 W         | 4,8 A           | Auto               | No                    | ASI ABL3004  | 1.300     |
|   | = 30 V         | 72 W          | 2,4 A           | Auto               | Yes                   | ASI ABLD3002 | 0.800     |
|   |                | 144 W         | 4,8 A           | Auto               | Yes                   | ASI ABLD3004 | 1.300     |
| = 24 V  | = 24 V         | 72 W          | 2,4 A           | Auto               | No                    | ASI ABLM3024 | 1.300     |
|   |                | 72 W          | 3 A             |                    |                       |              |           |

## Dimensions

Common side view  
Mounting on 35 et 75 mm rail

ASI ABL3002  
ASI ABLD3002

ASI ABL3004 / ABLD3004  
ASI ABLM3024

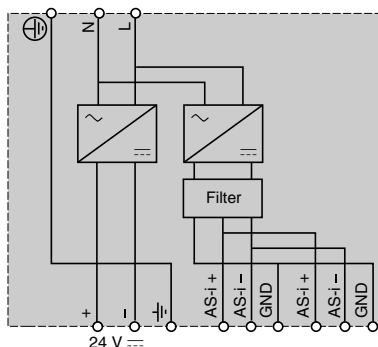
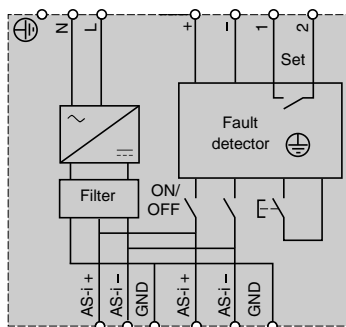
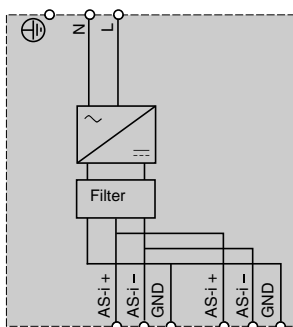



## Schemes

ASI ABL300●

ASI ABLD300●



ASI ABLM3024



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

5

5.3

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



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## 6 - Technical information

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# Technical information

## Automation products certifications






In some countries, certification of certain electrical components is enforced by law. A standard conformity certificate is then issued by the official organization. Each certified product must carry approval symbols when enforced. Use on board merchant navy vessels generally requires prior approval (= certification) of an electrical device by certain marine classification authorities.

| Key           | Certification body                                    | Country        |
|---------------|---|----------------|
| <b>CSA</b>    | Canadian Standards Association                        | Canada         |
| <b>C-Tick</b> | Australian Communication Authority                    | Australia      |
| <b>GOST</b>   | Gost Standard Scientific Research Institute           | C.I.S., Russia |
| <b>UL</b>     | Underwriters Laboratories                             | USA            |
| Key           | Classification authority                              | Country        |
| <b>IACS</b>   | International Association of Classification Societies | International  |
| <b>ABS</b>    | American Bureau of Shipping                           | USA            |
| <b>BV</b>     | Bureau Veritas  | France         |
| <b>DNV</b>    | Det Norske Veritas                                    | Norway         |
| <b>GL</b>     | Germanischer Lloyd                                    | Germany        |
| <b>LR</b>     | Lloyd's Register                                      | United Kingdom |
| <b>RINA</b>   | Registro Italiano Navale                              | Italy          |
| <b>RMRS</b>   | Russian Maritime Register of Shipping                 | C.I.S.         |

The table below shows the situation as at 01.09.2007 for certifications obtained or pending from organizations for base PLCs. An overview of certificates for Telemecanique products is available on our Internet website:

[www.telemecanique.com](http://www.telemecanique.com)

### Product certifications

|                                | Approvals   |   |  |   |   |   |
|--------------------------------|---|---|--|---|---|---|
|                                |  |  |  |  | Hazardous locations<br>Class I, Div 2 (1) |  |
|                                | UL<br>USA   | CSA<br>Canada   | ACA<br>Australia   | GOST<br>CIS, Russia   | USA, Canada                               | ATEX<br>Europe  |
| <b>Advantys OTB</b>            |   |   |  |   |   |   |
| <b>Advantys STB</b>            |   |   |  |   | FM  |   |
| <b>Advantys Telefast ABE 7</b> |   |   |  |   |   |   |
| <b>ConneXium</b>               |   |   |  |   | (2)                                       |   |
| <b>Magelis iPC</b>             | (3)   |   |  |   | UL  |   |
| <b>Magelis XBT GT</b>          |   |   |  |   |   | Cat 3 G-D   |
| <b>Magelis XBT F/FC/HM/PM</b>  |   |   |  |   |   |   |
| <b>Magelis XBT N/R</b>         |   |   |  |   | CSA/UL                                    | Cat 3 G-D   |
| <b>Modicon M340</b>            |   |   |  | en cours  | CSA                                       |   |
| <b>Modicon Momentum</b>        |   |   |  |   |   |   |
| <b>Modicon Premium</b>         |   |   |  | (2)   | CSA                                       |   |
| <b>Modicon Quantum</b>         |   |   |  | (2)   | FM (2)                                    |   |
| <b>Modicon TSX Micro</b>       |   |   |  |   |   |   |
| <b>Phaseo</b>                  | (3) (4)   |   |  |   |   |   |
| <b>Twido</b>                   | (5)   | (5)   |  |   | CSA/UL (5)                                |   |

(1) Hazardous locations: UL 1604, CSA 22.2 no. 213 or FM 3611, certified products are acceptable for use in hazardous locations of Class I, division 2, groups A, B, C and D or unclassified only.

(2) Depending on product, consult our website: [www.telemecanique.com](http://www.telemecanique.com)

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

(5) Except Universal power supplies and Function modules: UL certification pending.

(5) Except TWD NCO1M CANopen module, only CE.

#### Local certifications

|                     |           |   |
|---------------------|-----------|---|
| <b>BG</b>           | Germany   | <b>TSX DPZ 10D2A</b> safety module (TSX Micro).<br><b>TSX PAY 262/282</b> safety modules (Premium).   |
| <b>SIMTARS</b>      | Australia | Modicon TSX Micro automation platform<br>Modicon Premium automation platform (PL7)  |
| <b>AS-Interface</b> | Europe    | <b>TWD NOI 10M3</b> master module (Twido).<br><b>TSX SAZ 10</b> master module (TSX Micro).<br><b>TSX SAY 1000</b> master modules (Premium). |










# Technical information

## Automation products certifications

### Community regulations

#### Marine classification

|                         | Marine classification authorities   |   |   |  |   |   |   |
|-------------------------|---|---|---|--|---|---|---|
|                         |  |  |  |  |  |  |  |
|                         | ABS   | BV  | DNV   | GL   | LR  | RINA  | RMRS  |
|                         | USA   | France  | Norway  | Germany  | UK  | Italy   | C.I.S.  |
| Advantys OTB            |   |   |   |  |   |   |   |
| Advantys STB            | (1)   |   |   |  |   |   |   |
| Advantys Telefast ABE 7 |   |   |   |  |   |   |   |
| ConneXium               |   |   |   | (2)  |   |   |   |
| Magelis iPC             |   |   |   |  |   |   |   |
| Magelis XBT GT          |   |   |   |  |   |   |   |
| Magelis XBT F/FC/HM/PM  |   |   |   |  |   |   |   |
| Magelis XBT N/R         |   |   |   |  |   |   |   |
| Modicon M340            |   |   |   |  |   |   |   |
| Modicon Momentum        |   |   |   |  |   |   |   |
| Modicon Premium (3)     | (2)   | (2)   | (2)   | (2)  | (2)   | (2)   | (2)   |
| Modicon Quantum         |   |   |   | (2)  |   | (2)   |   |
| Modicon TSX Micro       |   |   |   |  |   |   |   |
| Phaseo                  |   |   |   |  |   |   |   |
| Twido                   |   |   | (4)   | (4)  | (4)   |   |   |

(1) Also meets US Navy requirements, ABS-NRV part 4.

(2) Depending on product, consult our website: [www.telemecanique.com](http://www.telemecanique.com).

(3) Modicon Premium, also KRS (Korean register of Shipping) certified.

(4) Except compact bases TWD LC●● 40DRF, Extreme base TWD LEDCK1, I/O module TWD DAI 8DT, analogue I/O modules TWD AMI 2LT/4LT/8HT, TWD ARI 8HT, TWD AVO 2HT, TWD AMM 6HT, communication modules 499 TWD 01100, TWD NCO1M, TWD NOI 10M3 and taps TWD XCA ISO/T3RJ.

#### CE marking

- The CE marking on a product means that the manufacturer certifies that his product conforms to the relevant European Directives; it is necessary in order that a product which is subject to a Directive(s) can be marketed and freely moved within the European Union.
- The CE marking is intended solely for the national authorities responsible for market regulation.

For electrical equipment, conformity of the product to standards indicates that it is suitable for use. Only the guarantee of a recognized manufacturer provides an assurance of high quality.

One or more Directives, as appropriate, may apply to our products, in particular:

- The Low Voltage Directive 72/23/EEC amended by Directive 93/68/EEC: The CE marking under the terms of this Directive is compulsory as of January 1, 1997.
- The Electromagnetic Compatibility Directive 89/336/EEC, amended by Directives 92/31/EEC and 93/68/EEC: The CE marking on the products covered by this Directive has been compulsory since January 1, 1996.
- Directive CE ATEX 94/9/EC.

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

Twido controller (compact and modular bases) meet the requirements of "TC" treatment (Treatment for all Climates).

For installations in industrial production workshops or environments corresponding to «TH» treatment (treatment for hot and humid environments), Modicon M340 PLCs must be embedded in envelopes with a minimum IP 54 protection, in compliance with IEC/EN 60664 and NF C 20 040.

Twido controller themselves offer **protection to IP 20 level** and **protection against pins** (enclosed equipment) (1). They can therefore be installed without an envelope in reserved-access areas which do not exceed **pollution level 2** (control room with no dust-producing machine or activity). The pollution level 2 does not take account of more severe environmental conditions: air pollution by dust, smoke, corrosive or radioactive particles, vapours or salts, attack by fungi, insects, ...

(1) Extreme base, see page 1/23.

|                 |      |              |      |                |          |               |         |                 |         |
|-----------------|------|--------------|------|----------------|----------|---------------|---------|-----------------|---------|
| <b>4</b>        |      | ASI ABLD3004 | 5/35 | TCS            |          | TSX PLP 01    | 1/11    | TWD NAC 232D    | 1/19,   |
| 490 NTC 000 05  | 3/7  | ASI ABLM3024 | 5/35 | ESM043F1CS0    | 3/7      | TSX PLP 101   | 1/11    |                 | 3/16    |
| 490 NTC 000 05U | 3/7  | ASI RPT01    | 3/15 | TCS            |          | TSX SCA 50    | 3/18    |                 | et 1/11 |
| 490 NTC 000 15  | 3/7  |              |      | ESM 043F1CU0   | 3/7      |               | et 3/21 | TWD NAC 485D    | 1/11,   |
| 490 NTC 000 15U | 3/7  | <b>F</b>     |      | TCS            |          | TWD ALM 3LT   | 2/20    |                 | 1/19    |
| 490 NTC 000 40  | 3/7  | FTX CN 12F5  | 3/10 | ESM 043F2CS0   | 3/7      | TWD AMI 2HT   | 2/20    |                 | et 3/16 |
| 490 NTC 000 40U | 3/7  | FTX CN 12M5  | 3/10 | TCS            |          | TWD AMI 2LT   | 2/20    | TWD NAC 485T    | 1/11,   |
| 490 NTC 000 80  | 3/7  | FTX CN 3203  | 3/11 | ESM 043F2CU0   | 3/7      | TWD AMI 4LT   | 2/20    |                 | 1/19    |
| 490 NTC 000 80U | 3/7  | FTX CN 3206  | 3/11 | TCS            |          | TWD AMI 8HT   | 2/20    |                 | et 3/16 |
| 490 NTW 000 02  | 3/7  | FTX CN 3210  | 3/11 | ESM 083F1CS0   | 3/7      | TWD AMM 3HT   | 2/20    | TWD NCO1M       | 3/9     |
| 490 NTW 000 02U | 3/7  | FTX CN 3220  | 3/11 | TCS            |          | TWD AMM 6HT   | 2/20    | TWD NOI 10M3    | 3/13    |
| 490 NTW 000 05  | 3/7  | FTX CN 3230  | 3/11 | ESM 083F1CU0   | 3/7      | TWD AMO 1HT   | 2/20    | TWD NOZ 232D    | et 1/19 |
| 490 NTW 000 05U | 3/7  | FTX CN 3250  | 3/11 | TCS            |          | TWD ARI 8HT   | 2/20    |                 | 3/16    |
| 490 NTW 000 12  | 3/7  | FTX CNCT1    | 3/11 | ESM 083F23F0   | 3/7      | TWD AVO 2HT   | 2/20    | TWD NOZ 485D    | 1/19    |
| 490 NTW 000 12U | 3/7  | FTX CNTL12   | 3/11 | TCS            |          | TWD BTF U10M  | 4/7     |                 | et 3/16 |
| 490 NTW 000 40  | 3/7  | FTX DP2115   | 3/11 | ESM 083F2CS0   | 3/7      | TWD DAI 8DT   | 2/8     | TWD NOZ 485T    | 1/19    |
| 490 NTW 000 40U | 3/7  | FTX DP2130   | 3/11 | TCS            |          | TWD DDI 16DK  | 2/8     |                 | et 3/16 |
| 490 NTW 000 80  | 3/7  | FTX DP2150   | 3/11 | ESM 083F2CU0   | 3/7      | TWD DDI 16DT  | 2/8     |                 |         |
| 490 NTW 000 80U | 3/7  | FTX DP2206   | 3/11 | ESM 083F2CX0   | 3/7      | TWD DDI 32DK  | 2/8     | TWD             |         |
| 499 NEH 104 10  | 3/7  | FTX DP2210   | 3/11 | TCS ESU 051F0  | 1/30     | TWD DDI 8DT   | 2/8     | SMD 1002 V30M   | 4/9     |
| 499 NES 181 00  | 3/7  | FTX DP2220   | 3/11 |                |          | TWD DDO 16TK  | 2/8     | TWD             |         |
| 499 NES 251 00  | 3/7  | FTX DP2250   | 3/11 | TCS            | and 3/7  | TWD DDO 16UK  | 2/8     | SMD 1004 V30M   | 4/9     |
| 499 NMS 251 01  | 3/7  | FTX CN 3203  | 1/30 | MCN 3M4F3C2    | 3/19     | TWD DDO 32TK  | 2/8     | TWD XCA 2A10M   | 1/19    |
| 499 NMS 251 02  | 3/7  | FTX CN 3206  | 1/30 | TCS            |          | TWD DDO 32UK  | 2/8     | TWD XCA FD010   | 3/19    |
| 499 NSS 251 01  | 3/7  | FTX CN 3210  | 1/30 | MCN 3M4M3S2    | 3/19     | TWD DDO 8TT   | 2/8     |                 | et 3/21 |
| 499 NSS 251 02  | 3/7  | FTX CN 3220  | 1/30 | TCS MCN1F10    | 1/30     | TWD DDO 8UT   | 2/8     | TWD XCA FJ010   | 3/19    |
| 499 TWD 01100   | 3/5  | FTX CN 3230  | 1/30 | TCS MCN1F2     | 1/30     | TWD DMM 24DRF | 2/8     | TWD XCA ISO     | 3/18    |
| 499 NES 251 00  | 1/30 | FTX CN 3250  | 1/30 | TCS MCN1F5     | 1/30     | TWD DMM 8DRT  | 2/8     | TWD XCA RJ003   | 3/19    |
| 499 TWD 01100   | 4/7  |              |      | TLA CD CBA 005 | 3/11     | TWD DRA 16RT  | 2/8     | TWD XCA RJ010   | 3/19    |
|                 |      |              |      | TLA CD CBA 015 | 3/11     | TWD DRA 8RT   | 2/8     | TWD XCA T3RJ    | 3/18    |
|                 |      |              |      | TLA CD CBA 030 | 3/11     | TWD FBT2T10   | 5/13    | TWD XCA T3RJ    | 3/18    |
|                 |      |              |      | TLA CD CBA 050 | 3/11     | TWD FCN 5K20  | 2/9     | TWD XCP MFK32   | 1/11    |
|                 |      |              |      | TSX CAN CA100  | 3/10     | TWD FCN 5K26  | 2/9     |                 | et 1/19 |
|                 |      |              |      | TSX CAN CA300  | 3/10     | TWD FCN2K20   | 5/13    | TWD XCP MFK64   | 1/11    |
|                 |      |              |      | TSX CAN CA50   | 3/10     | TWD FCN2K26   | 5/13    |                 | et 1/19 |
|                 |      |              |      | TSX            |          | TWD FCW 30K   | 2/9     | TWD XCP ODC     | 1/11    |
|                 |      |              |      | CAN CADD03     | 3/10     | TWD FCW 30M   | 2/9     | TWD XCP ODM     | 1/19    |
|                 |      |              |      | TSX CAN CADD1  | 3/10     | TWD FCW 50K   | 2/9     |                 | et 3/16 |
|                 |      |              |      | TSX CAN CADD3  | 3/10     | TWD FCW 50M   | 2/9     | TWD XCP RTC     | 1/11    |
|                 |      |              |      | TSX CAN CADD5  | 3/10     | TWD FCW30K    | 5/13    | TWD XDP PAK6M   | 4/7     |
|                 |      |              |      | TSX CAN CB100  | 3/10     | TWD FCW30M    | 5/13    | TWD XMT 5       | 1/19,   |
|                 |      |              |      | TSX CAN CB300  | 3/10     | TWD FCW50K    | 5/13    |                 | 2/9,    |
|                 |      |              |      | TSX CAN CB50   | 3/10     | TWD FCW50M    | 5/13    |                 | 2/20,   |
|                 |      |              |      | TSX            |          | TWD FTB 2T13  | 1/19    |                 | 3/9,    |
|                 |      |              |      | CAN CBDD03     | 3/10     | TWD FTB 2T16  | 1/19    |                 | et 3/13 |
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|                 |      |              |      | TSX CAN CBDD3  | 3/10     |               |         | TWD XSM 6       | 1/11    |
|                 |      |              |      | TSX CAN CBDD5  | 3/10     | LCAA 10DRF    | 1/11    | TWD XSM 9       | 1/11    |
|                 |      |              |      | TSX CAN CD100  | 3/10     | TWD           |         | TWD FCNK70      | 1/30    |
|                 |      |              |      | TSX CAN CD300  | 3/10     | LCAA 16DRF    | 1/11    | TWD             |         |
|                 |      |              |      | TSX CAN CD50   | 3/10     | TWD           |         | FCWK70L015      | 1/30    |
|                 |      |              |      | TSX            |          | LCAA 24DRF    | 1/11    | TWD LEDCK1      | 1/30    |
|                 |      |              |      | CAN KCDF 180T  | 3/10     | TWD           |         | TWD NADK70P     | 1/31    |
|                 |      |              |      | TSX            |          | LCAA 40DRF    | 1/11    | TWD XMTCT       | 1/30    |
|                 |      |              |      | CAN KCDF 90T   | 3/10     | TWD           |         | TWD XMTK4       | 1/30    |
|                 |      |              |      | TSX            |          | LCAE 40DRF    | et 3/4  |                 |         |
|                 |      |              |      | CAN KCDF 90TP  | 3/10     | TWD           |         | <b>V</b>        |         |
|                 |      |              |      | TSX CAN TDM4   | 3/10     | LCDA 10DRF    | 1/11    | VW3 A8 114      | 3/20    |
|                 |      |              |      | TSX CRJMD 25   | 3/20     | TWD           |         |                 | et 4/9  |
|                 |      |              |      |                | and 4/7  | LCDA 16DRF    | 1/11    | VW3 A8 306 D30  | 3/19    |
|                 |      |              |      | TSX CSA 100    | 3/19     | TWD           |         | VW3 A8 306 R03  | 3/19    |
|                 |      |              |      |                | and 3/21 | LCDA 24DRF    | 1/11    | VW3 A8 306 R10  | 3/19    |
|                 |      |              |      | TSX CSA 200    | 3/19     | TWD           |         | VW3 A8 306 R30  | 3/19    |
|                 |      |              |      |                | and 3/21 | LCDA 40DRF    | 1/11    | TWD             |         |
|                 |      |              |      | TSX CSA 500    | 3/19     | LCDE 40DRF    | 1/11    | VW3 A8 306 R30  | 3/19    |
|                 |      |              |      |                | et 3/21  | TWD           |         | VW3 A8 306 RC   | 3/19    |
|                 |      |              |      | TSX CUSB 485   | 1/31,    | LCDE 40DRF    | 1/11    | VW3 A8 306 TF03 | 3/18    |
|                 |      |              |      |                | 3/20     | TWD           |         | VW3 A8 306 TF10 | 3/18    |
|                 |      |              |      |                | et 4/7   | LCDE 40DRF    | 3/4     | W3 A8115        | 3/20    |
|                 |      |              |      | TSX CX 100     | 3/19     | TWD           |         | VW3 CAN A71     | 3/11    |
|                 |      |              |      |                | et 3/21  | LMDA 20DRT    | 1/19    | VW3             | 3/11    |
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|                 |      |              |      |                | 4/7      | TWD           |         | VW3 CAN CARR1   | 3/11    |
|                 |      |              |      |                | et 4/9   | LMDA 20DUK    | 1/19    | CAN KCDF 180T   |         |
|                 |      |              |      | TSX PCX 1130   | 3/20     | TWD           |         | VW3 CAN TAP2    | 3/10    |
|                 |      |              |      |                | et 4/9   | LMDA 40DTK    | 1/19    | VW3 M38 05 R010 | 3/11    |
|                 |      |              |      |                |          | TWD           |         |                 |         |
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| XZ CB11002H | 3/15 |

# The efficiency of Telemecanique branded *solutions*

Used in combination, Telemecanique products provide quality solutions, meeting all your **Automation & Control** applications requirements.



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