IP 20 distributed inputs/outputs

Advantys OTB

Catalogue
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Telemecanique

Contents

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Distributed I/O system for network or fieldbus

Advantys OTB

Applications		**Data exchange between a control source (PLC, variable speed drives, PC, etc.) and the inputs and outputs**
Type of bus or network		Ethernet TCP/IP network

Nature of bus or network		Mixed local industrial network
Structure	Physical interface	10/100 BASE-T
	Access method	CSMA-CD
	Transfer rate	10/100 Mbits/s
Medium		Shielded dual twisted pair via Ethernet ConneXium cabling system
Configuration	Number of devices	256 max. per network segment. Unlimited using switches.
	Maximum length (distance)	500 m according to standard 802.3 1000 m with ConneXium cabling system
Digital inputs/outputs	Number of I/O	20 I/O
	Number of inputs	12 ⎓ 24 V sink/source (PNP or NPN) inputs
	Number of outputs	6 relay outputs and 2 ⎓ 24 V transistor, source (PNP) outputs
Type of connection		Removable screw terminal blocks
Input/output expansion	Number of expansion modules	7 digital or analogue input/output modules, or connection accessories
	Maximum I/O configuration	With interface module: 132 with screw terminal I/O expansion module, 244 with type HE10 connector I/O expansion module; up to 48 analogue channels
Supply voltage		⎓ 24 V supply
Integrated I/O functions	Counting, 5 kHz	2 channels, 32 bits (0…4,294,967,296 points) - dedicated digital inputs - up/down counting with preset value
	Counting, 20 kHz	2 channels, 32 bits (0…4,294,967,296 points) - dedicated digital inputs/outputs - up/down counting, up counting, down counting, frequency meter
	Pulse generator, 7 kHz	2 PWM function channels (output with pulse width modulation) and PLS function (pulse generator output)
Type		**OTB 1E0 DM9LP**
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Data exchange between a control source (PLC, variable speed drives, PC, etc.) and the inputs and outputs	
CANopen bus	Modbus Series network
	
CAN fieldbus	Local RS 485 network
ISO 11898	RS 485
CSMA-MA, multimaster	Master-slave
10…1000 Kbits/s depending on distance	1.2…38.4 kbauds
Shielded dual twisted pair	Dual twisted pair
127 slaves	32 slaves per segment
From 30 m (1 Mbits/s) to 1000 m (> 50 Kbits)	Up to 1000 m
20 I/O	
12 ⎓ 24 V sink/source (PNP or NPN) inputs	
6 relay outputs and 2 ⎓ 24 V transistor, source (PNP) outputs	
Removable screw terminal blocks	
7 digital or analogue input/output modules, or connection accessories	
With interface module: 132 with screw terminal I/O expansion module, 244 with type HE10 connector I/O expansion module; up to 48 analogue channels	
⎓ 24 V supply	
2 channels, 32 bits (0…4,294,967,296 points) - dedicated digital inputs - up/down counting with preset value	
2 channels, 32 bits (0…4,294,967,296 points) - dedicated digital inputs/outputs - up/down counting, up counting, down counting, frequency meter	
2 PWM function channels (output with pulse width modulation) and PLS function (pulse generator output)	
OTB 1C0 DM9LP	**OTB 1S0 DM9LP**
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IP 20 distributed inputs/outputs
Distributed I/O system for network or fieldbus
Advantys OTB

Presentation

There is an increasing tendency for machine manufacturers to design their automation systems using modular architectures. The use of inputs/outputs (I/Os) is becoming more and more common. The Advantys OTB offer is an ideal solution for “optimised” type distributed input/output requirements. This offer has been designed to provide the right technical-economical balance and to meet the needs of machine manufacturers and users seeking the best compromise between size, ease of cabling, setting-up and costs. Open and modular, the Advantys OTB solution enables the creation of industrial I/O islands managed by a master controller (PLC, PC or variable speed drive) via a fieldbus or communication network.

With its expandable block type architecture, the Advantys OTB solution adapts to all configurations of automation system islands. The Advantys OTB offer is particularly economical for small and medium size islands. In addition, the optimised sizes of this offer are ideally suited to the size of enclosures for distributed I/Os, that are located as near to the machine as possible. This solution reduces cabling time and costs and at the same time takes into account the modular architecture of the machine.

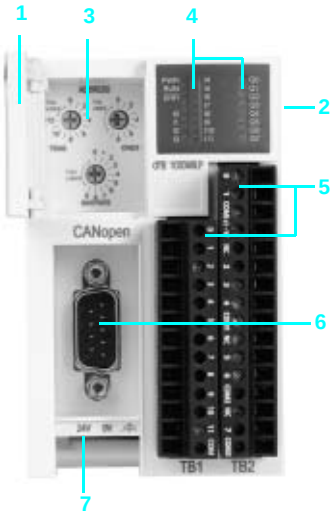
Furthermore, the Advantys OTB offer proposes fewer references relating to spare parts and accessories that are required for creating an island.

The Advantys OTB offer has also been designed to be as simple as possible. This offer includes 3 communication bases (interface modules) for the various types of network or fieldbus: CANopen, Ethernet TCP/IP or Modbus RS 485 Serial Line. Inputs and outputs are directly integrated in the interface modules. Each base incorporates 20 I/O:
- 12 ⎓ 24 V inputs,
- 6 relay outputs,
- 2 ⎓ 24 V solid-state outputs.

All the bases use a ⎓ 24 V supply. Of monobloc design, each Advantys OTB interface module can be fitted with expansion modules.

With its range of I/O expansions, the Advantys OTB offer provides a modularity that allows all requirements to be met, commencing with a base that can be fitted with up to 7 digital or analogue I/O modules. The expansion modules, like the interface modules, simply clip-on to 35 mm symmetrical rail and enable configurations of up to 132 digital I/O and up to 48 analogue I/O channels, or a mixture of both types (within the limit of 7 expansion modules), to be obtained.

Sensors and actuators are connected to the interface modules and I/O expansion modules using removable screw terminal blocks. All Advantys OTB modules provide an IP 20 degree of protection. To simplify sensor and actuator connections, as well as linking commons, the Advantys OTB offer also includes a commoning module. This module, as with all the other modules of the Advantys OTB range, allows the through connection of the internal bus or network (passively in this case) and enables connection of the commons in two isolated groups for each commoning module.



Description

The Advantys OTB 1●0 DM9LP *(1)* interface modules comprise:

1 An access door to the speed and network address coding wheels.
2 A connector for expansion modules (right-hand side).
3 Three coding wheels (island address and bus or network communication speed adjustment).
4 Indicator lights (communication status and I/O states).
5 Screw terminal connectors for connection of inputs/outputs.
6 Connectors for connection of bus or communication network.
7 Terminals for connection of ⎓ 24 V supply.

Mounting: the interface modules mount on 35 mm symmetrical rail.

(1) Only the communication part is dedicated to each fieldbus or network and can differ, the general description remains the same.

IP 20 distributed inputs/outputs
Distributed I/O system for network or fieldbus
Advantys OTB

Environmental characteristics

Product certifications			cULus
Temperature	Operation	**°C**	0…+ 55
	Storage	**°C**	- 25…+70
Relative humidity			30…95%, without condensation
Degree of protection			IP 20
Altitude	Operation	**m**	0…2000
	Storage	**m**	0…3000
Vibration resistance		**Hz**	10…57, amplitude 0.075 mm, acceleration 57…150 Hz
		m/s²	9.8 (1 gn)
Shock resistance		**m/s²**	147 (15 gn), for 11 ms
Resistance to electrostatic discharge	Conforming to IEC 61000-4-2	**kV**	4 on contact, 8 in air
Resistance to radiated fields	Conforming to IEC 61000-4-3	**V/m**	10
Immunity to fast transient currents	Conforming to IEC 61000-4-4	**kV**	0.5 for the I/Os, 1 for the ⎓ 24 V supply
Mounting			On 35 mm symmetrical rail

Interface module characteristics

Interface module type			**OTB 1E0 DM9LP**	**OTB 1C0 DM9LP**	**OTB 1S0 DM9LP**
Type of bus/network			Ethernet TCP/IP Modbus	CANopen	Modbus RS 485 Serial line
Transmission	Transfer rate		10 or 100 Mbits/s	10 Kbits/s…1 Mbits/s	1.2…38.4 kbauds
	Medium		Dual twisted pair, ConneXium	Shielded dual twisted pair	Dual twisted pair
Structure	Type		10/100 BASE-T	EN 50325 ISO 11898	Modbus.org
	Method		CSMA-CD	CSMA-MA, multimaster with priority	Master-slave
Configuration	Maximum number of devices		256 max. per segment, unlimited using switches	127	32 per segment
	Maximum length of bus/network	**m**	500 (1000 with ConneXium)	30 (1 Mbits/s) 5000 (10 Mbits/s)	1000
Type of port (bus/network connector)			RJ 45	SUB-D (DB9)	2 x RJ 45
Power supply	Nominal	**⎓ V**	24, non isolated		
	Voltage limits	**⎓ V**	20.4…26.4 including ripple		
	Maximum input current	**mA**	700 (at 26.4 V)		
	Maximum inrush current	**A**	50		
	Consumption	**W**	19 (interface module with 7 I/O expansion modules)		
Number of ⎓ 24 V inputs			12		
Number and type of outputs			6 relay 2 solid-state, source (PNP)		
Input/output connections			Removable screw terminal block		
Input/output expansion	Maximum number of modules		7		
	Maximum number of I/O		132 with screw/spring terminals, 244 with modules incorporating type HE10 connector		
Integrated functions					
Counting	Number of channels		4		
	Frequency	**kHz**	5 x 2 channels, 20 x 2 channels		
	Capacity		32 bits x 2 channels		
Movement	Number of channels		2		
	Frequency	**kHz**	7		
	Functions		PWM (output with pulse width modulation), PLS (pulse generator output)		

IP 20 distributed inputs/outputs

Distributed I/O system for network or fieldbus
Advantys OTB

Input characteristics

Number of input channels			12
Nominal input voltage		⎓ **V**	24, sink or source (positive or negative logic, PNP or NPN)
Common			1
Input voltage limits		⎓ **V**	20.4…26.4
Nominal input current		**mA**	5 for I0 and I1, I6 and I7; 7 for the others
Input impedance		**k**Ω	5.7 for I0 and I1, I6 and I7; 4.7 for the others
Filtering time	At state 1	µ**s**	35 for I0 and I1, I6 and I7; 40 for the others
	At state 0	µ**s**	45 for I0 and I1, I6 and I7; 150 for the others
Isolation			No isolation between channels, isolation with internal logic using photocouplers

Transistor output characteristics (solid-state)

Number of output channels			2
Output logic			Source (positive logic, PNP)
Common			1
Nominal output values	Voltage	⎓ **V**	24
	Current	**A**	0.3
Output value limits	Voltage	⎓ **V**	20.4…28.8
	Current per channel	**A**	0.36
	Current per common	**A**	1
Response time	At state 1	µ**s**	5 for Q0 and Q1; 300 for other outputs
	At state 0	µ**s**	5 for Q0 and Q1; 300 for other outputs
Voltage drop (voltage at state 1)		⎓ **V**	1 max.
Maximum inrush current		**A**	1
Leakage current		**mA**	0.1
Overvoltage protection		⎓ **V**	39
Maximum power (filament lamp)		**W**	8
Isolation			No isolation between channels, isolation with internal logic using photocouplers

Relay output characteristics

Number of output channels				6
Commons	Common 1			3 contacts (relay) NO
	Common 2			2 contacts (relay) NO
	Common 3			1 contact (relay) NO
Nominal output values *(1)* (resistive or inductive load)	Voltage		⎓ **V**	30
			∿ **V**	240
	Current per channel		**A**	2
	Current per common		**A**	8
Minimum switchable load			**mA/**⎓ **V**	0.1 (reference value)
Contact resistance (unused condition)			**m**Ω	30 max.
Insulation voltage (rms)			∿ **V**	1500 for 1 minute
Consumption for all the outputs	At state 1	⎓ 5 V	**mA**	30
		⎓ 24 V	**mA**	40
	At state 0	⎓ 5 V	**mA**	5

Commoning block characteristics

Commoning block type			**OTB 9ZZ 61JP**	**OTB 9YZ 61JP**
Application			Passive, inter-module	Last expansion module
Commons			2 groups of 10 terminals	
Nominal output values *(1)* (resistive or inductive load)	Voltage	⎓ **V**	19…30	
		∿ **V**	215…240	
	Current per channel	**A**	2	
	Current per group of commons	**A**	8	

(1) With 1800 operations max./hour:
- electrical life: 100,000 operations min.,
- mechanical life: 20 x 10^6 operations min.

IP 20 distributed inputs/outputs

Distributed I/O system for network or fieldbus
Advantys OTB

522010

OTB 1C0 DM9LP

522008

OTB 1E0 DM9LP

522012

OTB 1S0 DM9LP

Interface modules with integrated digital I/O

Supply voltage	Number and type of inputs	Number and type of solid-state outputs	Number and type of relay outputs	Number of commons I/SO/RO *(1)*	Connection by	Fieldbus or network	Reference	Weight kg
⎓ **24 V**	12 I ⎓ 24 V IEC type 1	2 O ⎓ 24 V 0.3 A	6 O ⎓ 30 V/ ∿ 240 V 2 A	1/1/3	Removable screw terminal block	CANopen	**OTB 1C0 DM9LP**	0.195
						Ethernet TCP/IP/Modbus	**OTB 1E0 DM9LP**	0.185
						Modbus RS 485 Serial line	**OTB 1S0 DM9LP**	0.190

Separate components

Description	Usage	Number of commons	wires	Reference	Weight kg
Commoning modules	For grouping input or output commons, 8 A maximum; inter-module	2 isolated groups	2 x 10	**OTB 9ZZ 61JP**	0.100
	For grouping input or output commons, 8 A maximum; last expansion module	2 isolated groups	2 x 10	**OTB 9YZ 61JP** ▲	0.085
Documentation	Hardware and software user guides	–	–	**FTX ES00**	0.050

Accessories

Description	Usage	Type of connector	Length m	Unit reference	Weight kg
End of line adaptors (sold in lots of 2)	For end of RS 485 line, R = 120 Ω, C = 1 nF	RJ 45	–	**VW3 A8 306 RC**	0.200
"T" tap-offs, Modbus		1 x RJ 45 male and 2 x RJ 45 female	0.3	**VW3 A8 306 TF03**	–
			1.0	**VW3 A8 306 TF10**	–
Connection cables for Modbus bus Serial line	RJ 45 connection (with screw or spring connector)	1 x RJ 45 one end, free wires other end	3.0	**VW3 A8 306 D30**	0.150
	Point-to-point connection	2 x RJ 45	0.3	**VW3 A8 306 R03**	0.050
			1.0	**VW3 A8 306 R10**	0.050
			3.0	**VW3 A8 306 R30**	0.150
Shielded dual twisted pair cables	RS 485	Without connector	100	**TSX CSA 100**	–
			200	**TSX CSA 200**	–
			500	**TSX CSA 500**	–

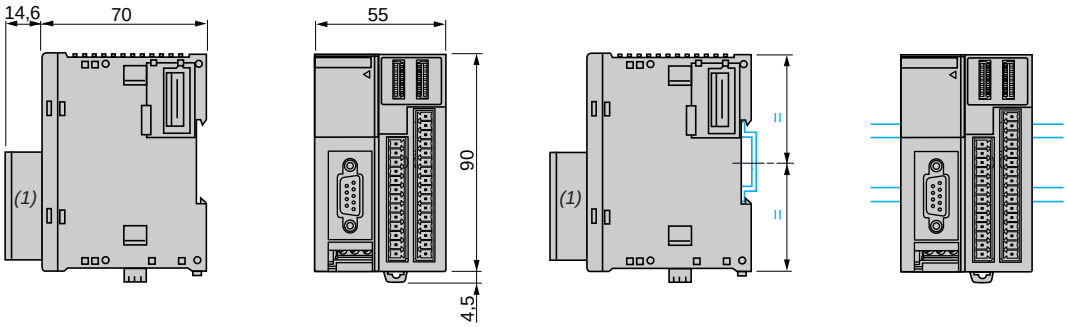
(1) Input, Solid-state Output, Relay Output.

▲ Availability planned for 1st quarter 2005.

Dimensions

OTB 1●0 DM9LP

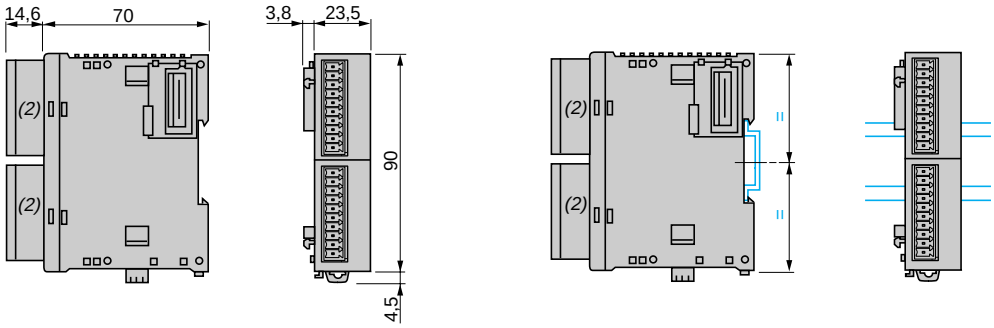
Mounting on symmetrical 35 mm ⊓ rail



(1) With removable screw terminal block type connector.

OTB 9●Z 61JP

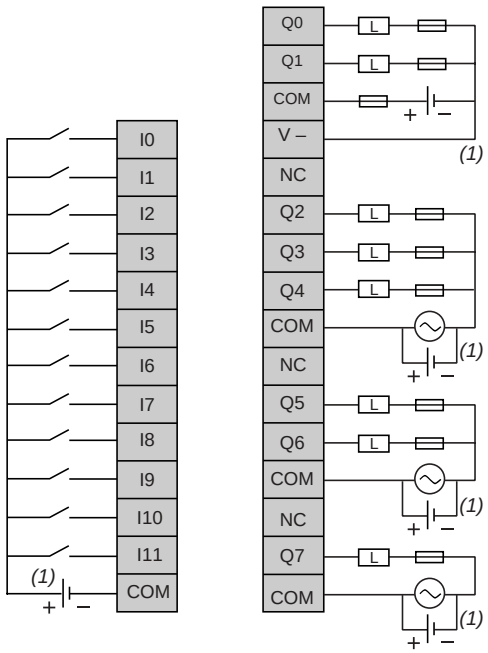
Mounting on symmetrical 35 mm ⊓ rail



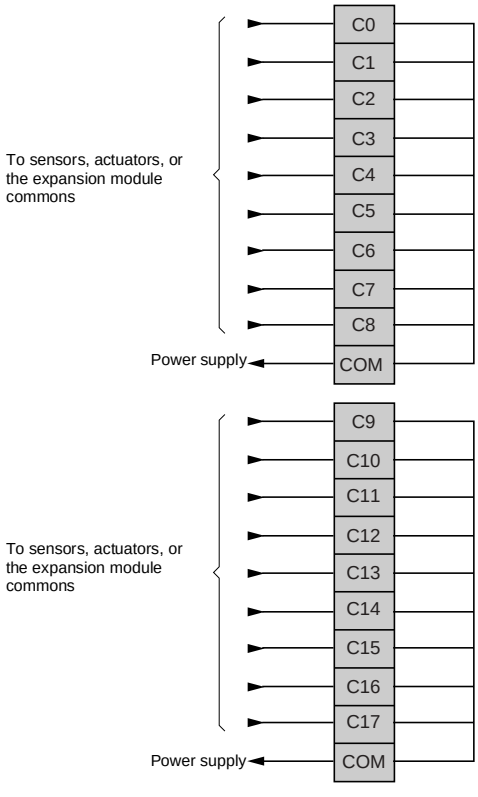
(2) With removable screw terminal block type connectors.

Schemes

OTB 1●0 DM9LP

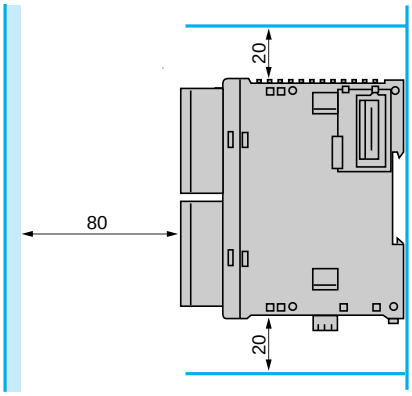


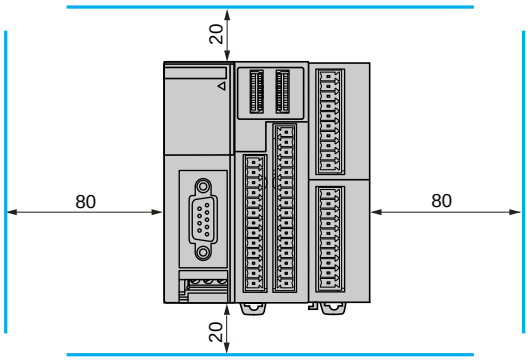
OTB 9●Z 61JP



(1) Supply connection for sink inputs, source outputs (positive logic).

Installation rules





Important:
- Must not be horizontally or flat mounted
- Avoid placing the module over a source of heat (transformer, power supply, power contactor, etc.)

IP 20 distributed inputs/outputs
Discrete I/O extension modules

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

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

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

IP 20 distributed inputs/outputs
Discrete I/O extension modules

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

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

16/32 output modules with HE 10 type connectors

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

IP 20 distributed inputs/outputs
Discrete I/O extension modules

Presentation

The range of Twido I/O modules includes input modules, output modules and mixed input/output modules. With the 15 I/O modules offered, in addition to the I/O integrated in 24 I/O compact base controllers and modular base controllers, configurations can be adapted to best suit application requirements, so optimising costs. The following discrete I/O modules are available :

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

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

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

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

The narrow width of these I/O modules (17.5 mm, 23.5 mm, 29.7 mm or 39.1 mm) makes it possible to build Twido configurations of up to 264 I/O with a minimal overall size of L 255.4 mm x H 90 mm x D 81.3 mm.

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

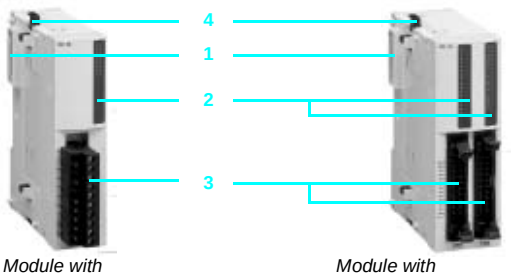
Twido discrete I/O modules comprise :

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 type connector (1 or 2) for modules whose reference ends in **K**,
- □ non-removable spring terminal block for module TWD DMM 24DRF.

4 Latching mechanism for attachment to the previous module.

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

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



Module with removable screw terminal block

Module with HE 10 type connector

IP 20 distributed inputs/outputs
Discrete I/O extension modules

General characteristics

Temperature		**°C**	Operation : 0…+ 55. Storage : - 25…+ 70.
Relative humidity			30 to 95 %, without condensation
Degree of protection			IP 20
Altitude		**m**	Operation : 0…2000. Storage : 0…3000.
Vibration resistance	Mounted on ⊓ rail	**Hz**	10…57, amplitude 0.075 mm, acceleration 57…150 Hz
		m/s²	9.8 (1 gn)
	Plate or panel mounted (using fixing kit TWD XMT5)	**Hz**	2…25, amplitude 1.6 mm, acceleration 25…100 Hz
		m/s²	39.2 (4 gn)
Shock resistance		**m/s²**	147 (15 gn) for 11 ms

Characteristics of ⎓ input channels

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

Characteristics of transistor output modules

Module type	**TWD**		**DDO 8UT**	**DDO 8TT**	**DDO 16UK**	**DDO 16TK**	**DDO 32UK**	**DDO 32TK**
Number of output channels			8		16		32	
Output logic *(2)*			Sink	Source	Sink	Source	Sink	Source
Connection			Removable screw terminal block		HE 10 type connector			
Commons			1				2	
Nominal output values	Voltage	**V**	24					
	Current	**A**	0.3		0.1			
Output voltage range	Voltage	**V**	20.4…28.8					
	Current per channel	**A**	0.36		0.12			
	Current per common	**A**	3		1			
Response time	At state 1	**µs**	300					
	At state 0	**µs**	300					
Residual voltage (voltage at state 1)		**V**	1 max					
Maximum inrush current		**A**	1					
Leakage current		**mA**	0.1					
Overvoltage protection		**V**	39					
Maximum power of filament lamp		**W**	8					
Isolation			No isolation between channels, isolation with internal logic by photocouplers					
Consumption for all the outputs	At state 1 ⎓ 5 V	**mA**	10		10		20	
	⎓ 24 V	**mA**	20		40		70	
	At state 0 ⎓ 5 V	**mA**	5		5		10	

Characteristics of relay output channels

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

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

IP 20 distributed inputs/outputs
Discrete I/O extension modules


TWD DDI 8DT


TWD DDI 32DK


TWD DDO 8●T/DRA 8RT


TWD DDO 16●K


TWD DDO 32●K


TWD DRA 16RT


TWD DDM 8DRT


TWD DDM 24DRF

References

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

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

Discrete input modules

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

Discrete output modules

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

Discrete mixed input/output modules

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

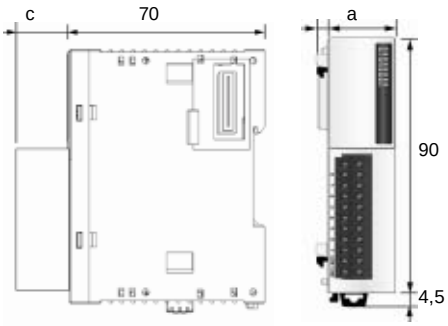
Separate component

Application	Description	Reference	Weight kg
Telefast pre-wired system for Twido	Connection sub-bases I/O connection sub-bases Pre-wired solutions Cables and accessories	See page 39	–

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

Dimensions

Discrete I/O modules

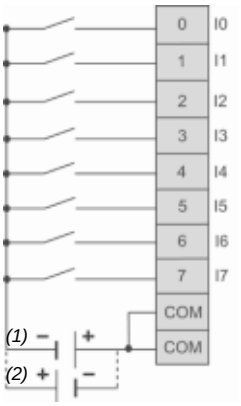


TWD	a	c
DDI 8DT/DAI 8DT	23,5	14,6
DDI 16DT	23,5	14,6
DDI 16DK	17,6	11,3
DDI 32DK	29,7	11,3
DDO 8UT/8TT	23,5	16,6
DDO 16UK/16TK	17,6	11,3
DDO 32UK/32TK	29,7	11,3
DRA 8RT/16RT	23,5	14,6
DMM 8DRT	23,5	14,6
DMM 24DRF	39,1	1,0

Connections

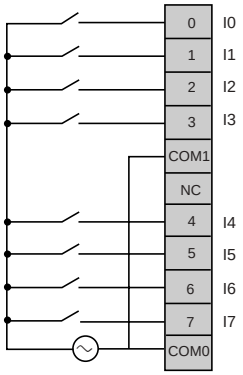
Input modules

TWD DDI 8DT (⎓ 24 V)

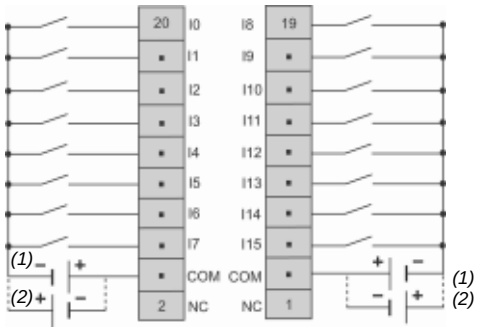


□ The COM terminals are linked internally

TWD DAI 8DT (∿ 120 V)

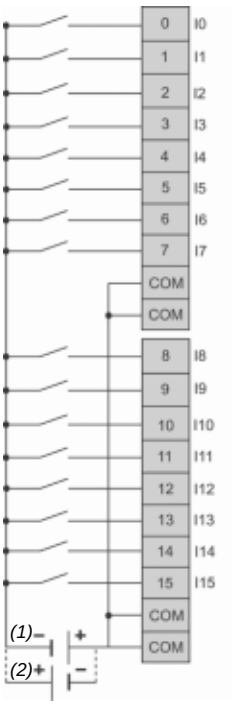


TWD DDI 16DK (⎓ 24 V)



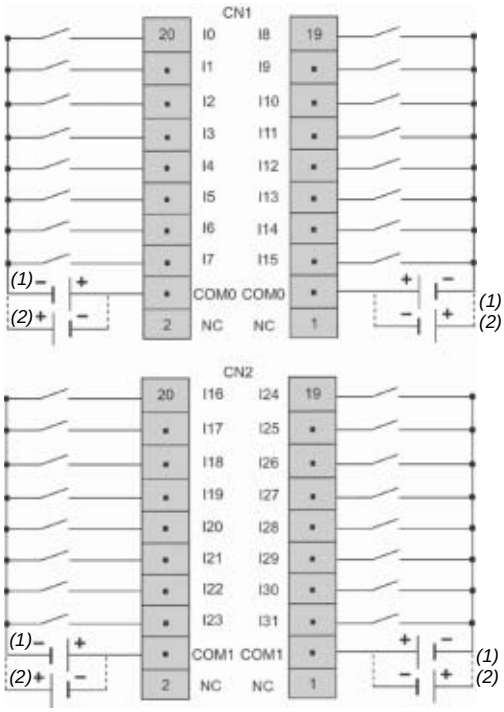
□ The COM terminals are linked internally

TWD DDI 16DT (⎓ 24 V)



□ The COM terminals are linked internally

TWD DDI 32DK (⎓ 24 V)



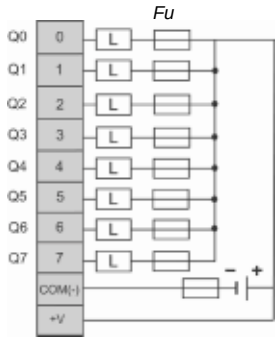
□ The COM0 terminals are linked internally.
□ The COM1 terminals are linked internally.

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

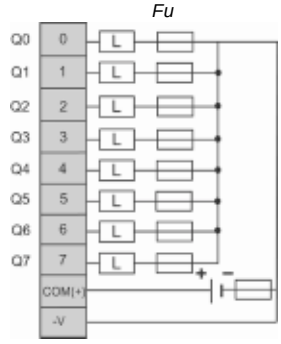
IP 20 distributed inputs/outputs
Discrete I/O extension modules

Transistor output modules

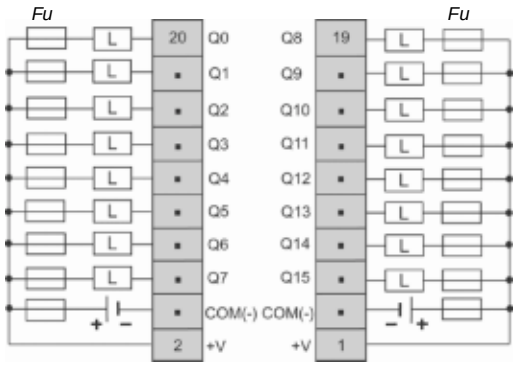
TWD DDO 8UT



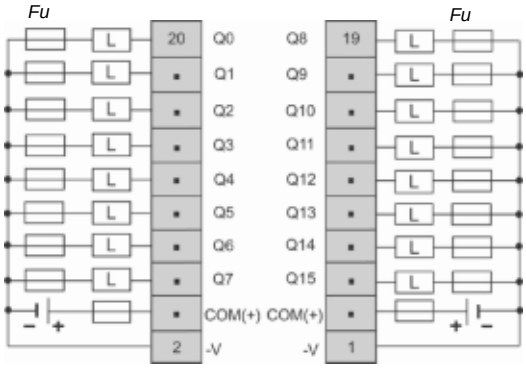
TWD DDO 8TT



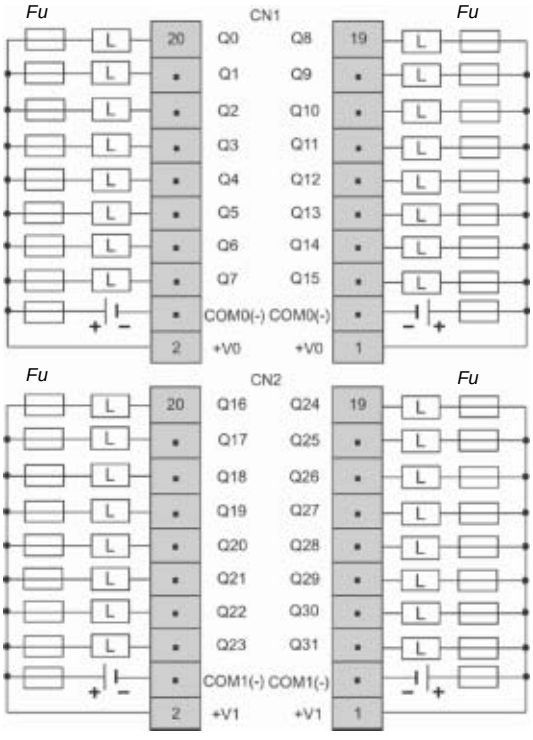
TWD DDO 16UK



TWD DDO 16TK

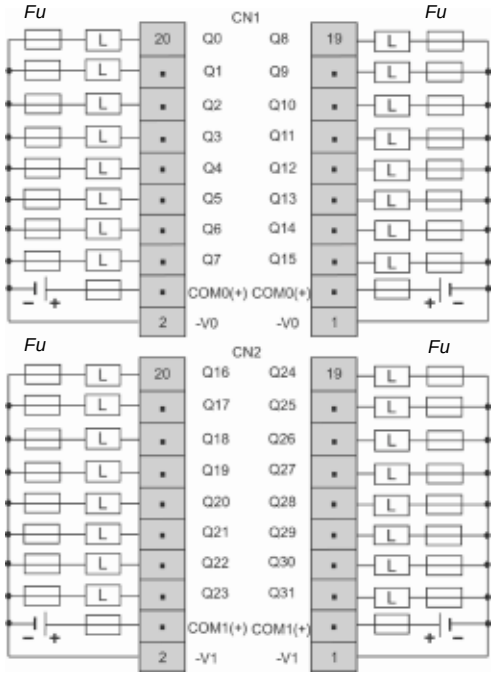


TWD DDO 32UK



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.

TWD DDO 32TK

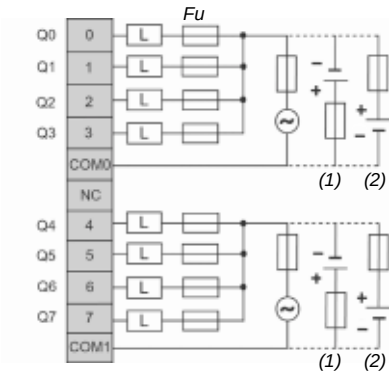


Terminals :
- COM (+) are linked internally.
- COM0 (+) are linked internally.
- COM1 (+) are linked internally.
- - V are linked internally.
- - V0 are linked internally.
- - V1 are linked internally.

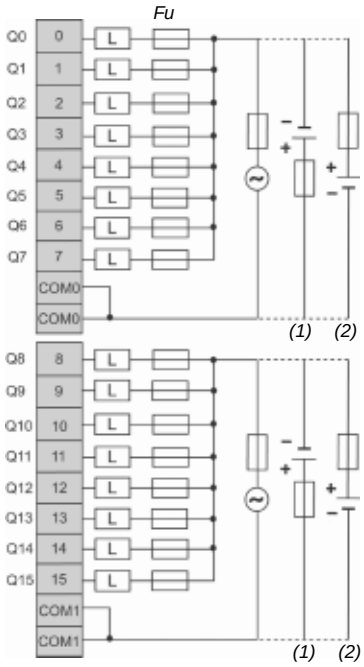
IP 20 distributed inputs/outputs
Discrete I/O extension modules

Relay output modules

TWD DRA 8RT



TWD DRA 16RT

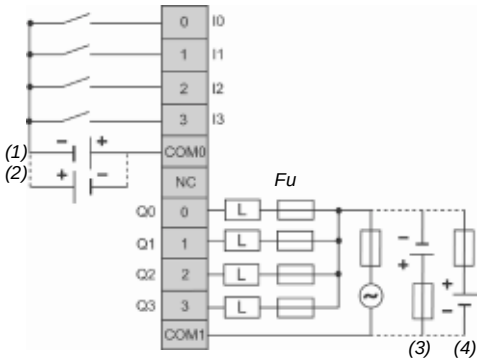


Terminals :
- COM0 are linked internally.
- COM1 are linked internally.
- COM0 and COM1 are independent

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

Mixed input/output modules

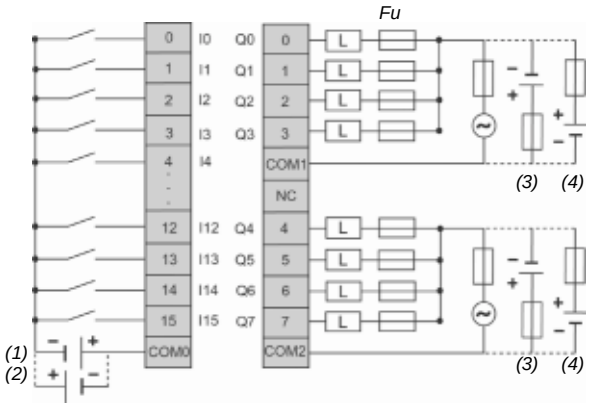
TWD DMM 8DRT



- The COM (+) terminals are linked internally

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

TWD DMM 24DRT



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

IP 20 distributed inputs/outputs
Analogue I/O extension modules

Applications		Analogue input modules			
					
Number of I/O		2 inputs	4 inputs	8 inputs	8 inputs
Type		Voltage/current	Voltage/current Temperature	Voltage/current	PTC/NTC
Connection		Removable screw terminal block			
Inputs	Range	0...10 V (non differential) 4...20 mA (differential)	0...10 V (non differential) 0...20 mA (differential) Pt 100/1000 NI 100/1000	0...10 V (non differential) 0...20 mA (differential)	–
	Resolution	10 bits (1024 points)	12 bits (4096 points)	10 bits (1024 points)	
	Acquisition period	32 ms + 1 controller cycle time	160 ms		
Outputs	Range				
	Resolution				
	Transfer time				
External supply		⎓ 24 V external power supply to sensors/preactuators (voltage range 20.4…28.8 V)			
Isolation		Isolation between channels and earth: by photocoupler			
Analogue I/O module type		**TWD AMI 2HT**	**TWD AMI 4LT** ▲	**TWD AMI 8HT** ▲	**TWD ARI 8HT** ▲
Pages		25			

▲ Available 4th quarter 2004.

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

Twido programmable controller
Analogue I/O extension modules

Presentation

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

Analogue output modules are used to control the preactuators in devices such as variable speed drives, valves and applications that require process control. The output current or voltage is proportional to the numerical value defined by the user program. When the Twido controller stops, the outputs can be configured with fallback (reset to the lowest scale value or hold the last value received). This function, when set to 'hold', is useful when debugging the application or when a fault occurs, in order not to disturb the process being controlled.

The 8 following analogue I/O modules are available:

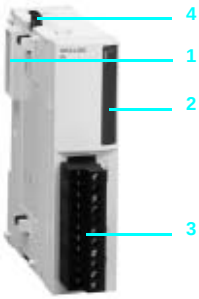
- One module with 2 inputs: 0…10 V, 4…20mA.
- One module with 4 inputs: 0…10 V, 0…20mA, Pt 100/1000, NI100/1000 range 50...150 °C.
- One module with 8 inputs: 0…10 V, 0…20mA.
- One module with 8 inputs: PTC/NTC.
- One module with 1 output: 0…10 V, 4…20mA.
- One module with 2 outputs: ± 10 V.
- One mixed 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…20mA output.

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

Like discrete I/O modules, analogue I/O modules are connected to the base controller by stacking them on a ⎍ rail, starting from the right-hand side panel of the base controller, according to the following rules:
- For 24 I/O compact base controller TWD LC●A 24DRF: 4 modules max.
- For 20 I/O modular base controllers TWD LMDA 20D●K: 4 modules max.
- For 40 I/O modular base controllers TWD LMDA 20DRT/40D●K: 7 modules 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 A removable screw terminal block for connection of the ⎓ 24 V external power supply, the sensors and the preactuators.
4 A latching mechanism for attachment to the previous module.

These modules are mounted on a symmetrical ⎍ rail. Fixing kit TWD XMT 5 (supplied in lots of 5) allows plate or panel mounting.

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

Twido programmable controller
Analogue I/O extension modules

General characteristics

Temperature		**°C**	Operation: 0…+ 55. Storage: - 25…+ 70.
Relative humidity			30 to 95 %, without condensation
Degree of protection			IP 20
Altitude		**m**	Operation: 0…2000. Storage: 0…3000.
Vibration resistance	Mounted on rail	**Hz**	10…57, amplitude 0.075 mm, acceleration 57…150 Hz
		m/s²	9.8 (1 gn)
	Plate or panel mounted (using fixing kit TWD XMT5)	**Hz**	2…25, amplitude 1.6 mm, acceleration 25…100 Hz
		m/s²	39.2 (4 gn)
Shock resistance		**m/s²**	147 (15 gn) for 11 ms

Analogue input characteristics

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

Analogue input characteristics (continued)

Module type			TWD AMI4LT			TWD ARI8HT	TWD AMI8HT	
Number of channels			4 inputs			8 inputs	8 inputs	
Range			Temperature	Current	Voltage	Temperature	Current	Voltage
			PT100, PT1000, Ni100, Ni1000	0…20 mA	0…10 V	NTC, PTC, 100 Ω<R<10 kΩ	0…20 mA	0…10 V
Type			Differential	Non differential		Differential	Non differential	
Resolution			12 bits			10 bits		
LSB value			–	9 mV	20 µA	–	2.5 mA	4 µA
Connection			Removable screw terminal block					
Permissible continuous overload			–	13 V	40 mA	–	40 mA	13 V
External supply		**V**	Rated voltage: ⎓ 24. Voltage range: ⎓ 20.4…28.8					
Input impedance			>1 MΩ	470 Ω	1 MΩ	>1 MΩ	470 Ω	1 MΩ
Maximum sampling duration		**ms**	160					
Sampling repetition time		**ms**	4			8		
Acquisition period		**ms**	640 + 1 controller cycle time			1280 + 1 controller cycle time		
Measuring precision	Maximum error at 25° C	**% PE**	0.5			1		
Consumption	Internal supply ⎓ 5 V	**mA**	50			50		
	External supply ⎓ 24 V	**mA**	60			50		
Applicable load			–					
Dielectric strength			2500 V between the inputs and the internal circuit					

Analogue output characteristics

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

Twido programmable controller
Analogue I/O extension modules

References

TWD AMI 2HT

TWD ALM 3LT

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

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

Analogue input modules

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

Analogue output modules

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

Analogue I/O modules

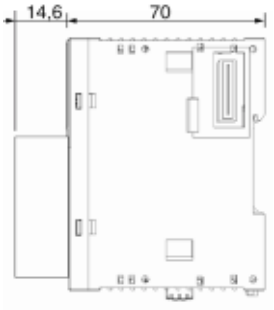
2 inputs and 1 output	0…10 V 4…20 mA	0…10 V 4…20 mA	12 bits	**TWD AMM 3HT**	0.085
	Thermocouple K, J, T Temperature probe Pt 100	0…10 V 4…20 mA	12 bits	**TWD ALM 3LT**	0.085

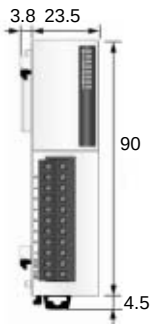
Separate component

Application	Description	Reference	Weight kg
Telefast® pre-wired system for Twido	Connection sub-bases I/O connection sub-bases Pre-wired solutions Cables and accessories	See page 39	–

Dimensions

Analogue I/O modules



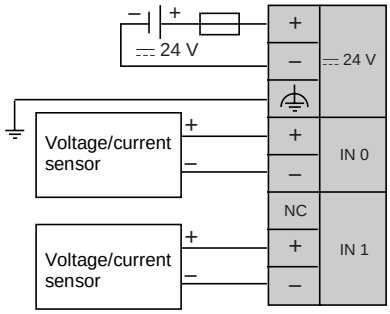


▲ Available 4th quarter 2004

Twido programmable controller
Analogue I/O extension modules

Analogue input modules

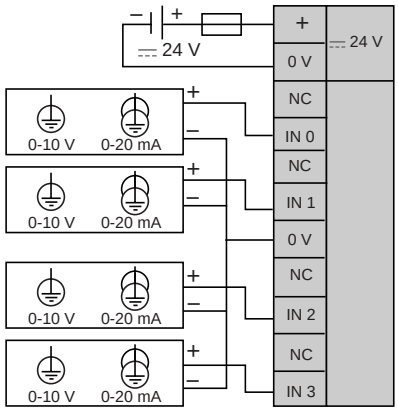
TWD AMI 2HT



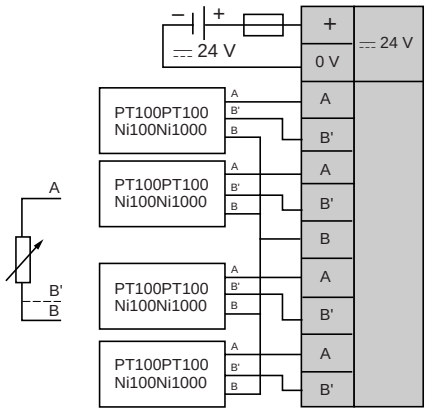
- Fit a fuse of appropriate size for the sensor type.
- Do not connect any wires to the unused channel.

TWD AMI 4LT

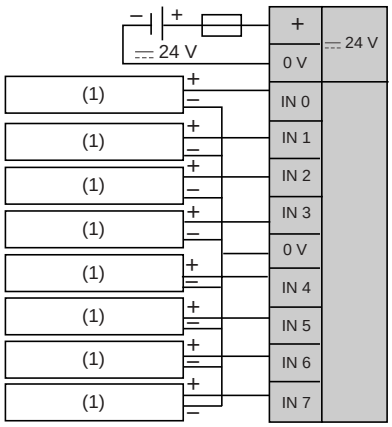
Voltage/Current configuration



PT100/PT1000 temperature probe, Ni100/Ni1000 configuration



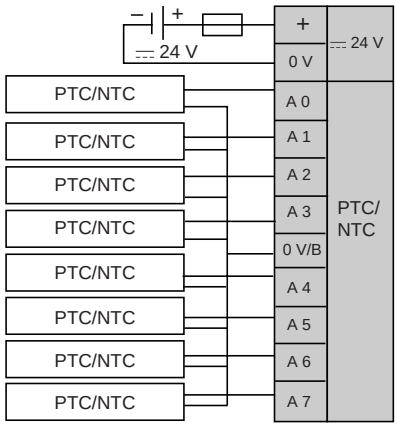
TWD AMI 8HT



(1) Analogue current/voltage output peripheral.

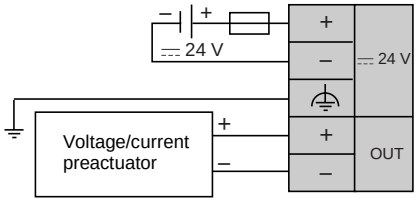
- Fit a fuse of appropriate size for the sensor type.
- Do not connect any wires to the unused channel.

TWD ARI 8HT

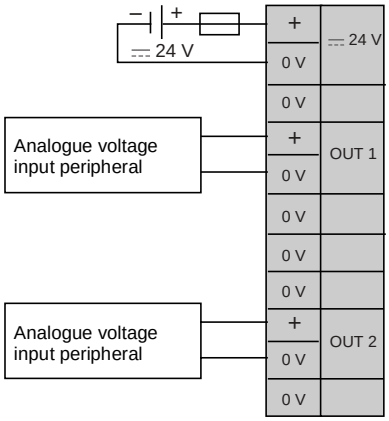


Analogue output modules

TWD AMO 1HT



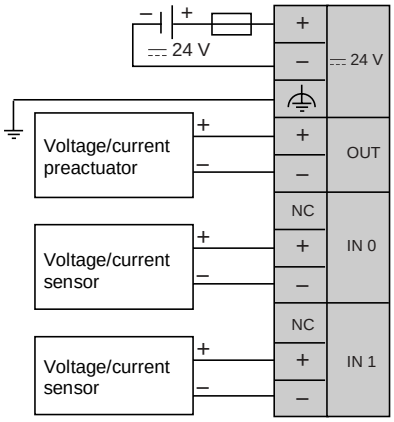
TWD AVO 2HT



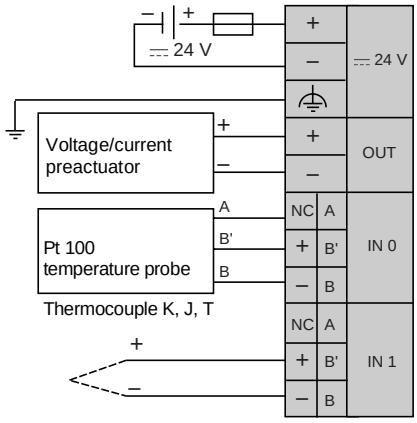
- Fit a fuse of appropriate size for the sensor type.
- Do not connect any wires to the unused channel.

Mixed input/output module

TWD AMM 3HT



TWD ALM 3LT



- Fit a fuse of appropriate size for the sensor and preactuator types.
- For a Pt 100 3-wire temperature probe (RTD), connect the three wires to terminals A, B' and B (channels IN0 and IN1).
- For a Pt 100 2-wire temperature probe (RTD), connect the two wires to terminals A and B' and make a bridge between B' and B (channels IN0 and IN1).
- For a thermocouple, connect the two wires to the + and - terminals (channels IN0 and/or IN1).
- Do not connect any wires to unused channels.

IP 20 distributed inputs/outputs

Advantys, Telefast® pre-wired system for extension modules

Connection sub-bases

Applications	**Connection sub-bases for discrete inputs and outputs**		
			
Compatibility	Twido modular base controllers equipped with HE 10 connectors		
Relay amplification	–		Electromechanical and solid state, fixed
Control voltage	⎓ 24 V		
Output voltage	⎓ 24 V		⎓ 24 V (solid state) ⎓ 5…30 V, ∿ 250 V (electromechanical)
Current per channel			
Input	5…7 mA		5…7 mA
Output	0.3 A		2 A (solid state) 3 A (electromechanical)
Modularity	20 (12 inputs/8 outputs)		
Type of I/O	□ 12 inputs (1 common/ 12 channels) □ 8 outputs (1 common/ 8 channels)	□ 12 inputs (1 common/ 12 channels) □ 8 outputs with fuse protection (1 common/ 8 channels) LED indication	□ 12 inputs (1 common/12 channels) □ 2 solid state outputs (1 common/2 channels) □ 6 relay outputs (electromechanical) 1 N/O (1 common/6 channels)
Number of terminals per channel	2 3 (with optional snap-on terminal block)		
Connection to Twido programmable controller	HE 10 connector, 26-way		
Type of terminal	Fixed screw terminal block		
Interface type	**ABE 7B20MPN20**	**ABE 7B20MPN22**	**ABE 7B20MRM20**
Pages	38	38	38

Connection sub-bases for discrete inputs	Connection sub-bases for discrete outputs		
			
Twido I/O modules equipped with HE 10 connectors			
–			Electromechanical, fixed
⎓ 24 V			
⎓ 24 V			⎓ 5…30 V, ∿ 250 V (electromechanical)
5 mA	–		–
–	0.1 A		3 A
16 inputs	16 outputs		
□ 16 inputs (1 common/16 channels)	□ 16 outputs (1 common/16 channels)	□ 16 outputs with fuse protection LED indication	□ 16 relay outputs (electromechanical) 1 N/O (1 common/4 channels)
2 3 (with optional snap-on terminal block)			
HE 10 connector, 20-way			
Fixed screw terminal block			
ABE 7E16EPN20	**ABE 7E16SPN20**	**ABE 7E16SPN22**	**ABE 7E16SRM20**
38	38	38	38

IP 20 distributed inputs/outputs

Advantys, Telefast® pre-wired system for extension modules

I/O connection sub-bases

Presentation

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

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

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

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

Sub-bases for Twido modular base controllers

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

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

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

Sub-bases for Twido extension modules

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

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

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

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

Optional terminal blocks

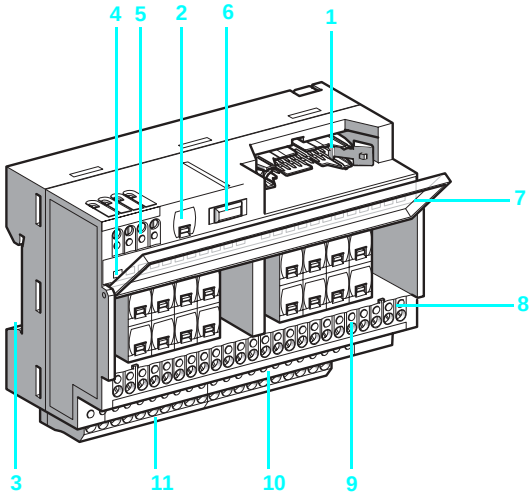
- **ABE 7BV20TB**
  - 12 shunted screw terminals for the input common,
  - 8 shunted screw terminals for the output common.

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

IP 20 distributed inputs/outputs

Advantys, Telefast® pre-wired system for extension modules

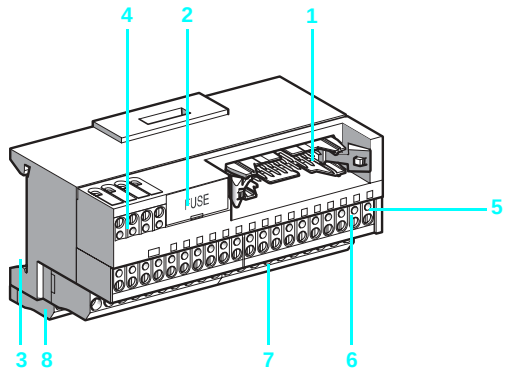
I/O connection sub-bases



Description

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

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



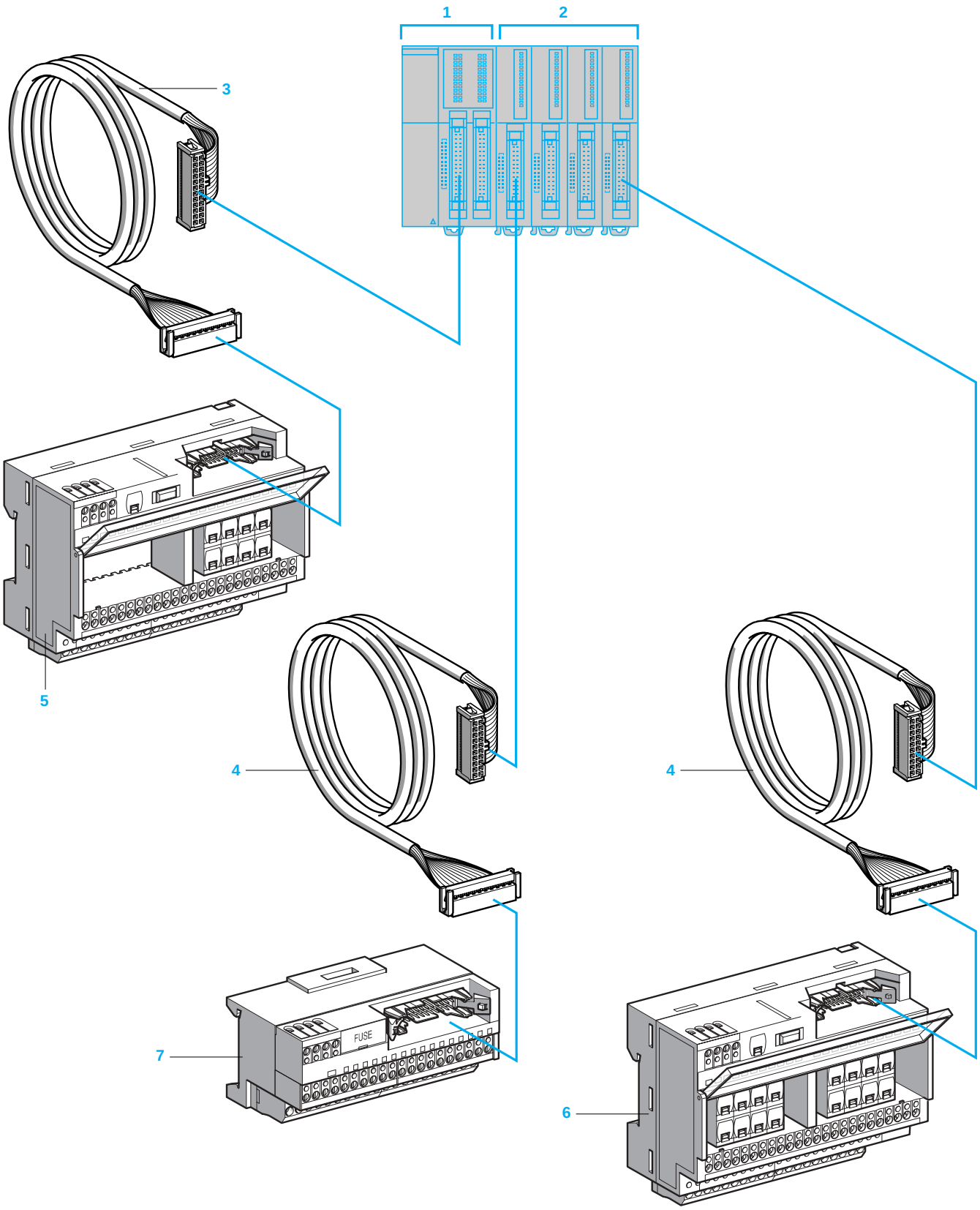
Connection sub-bases ABE 7E16EPN20 and ABE 7E16SPN20

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

IP 20 distributed inputs/outputs

Advantys, Telefast® pre-wired system for extension modules

Pre-wired solutions



IP 20 distributed inputs/outputs

Advantys, Telefast® pre-wired system for extension modules

Pre-wired solutions

Presentation (continued)

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

Compatibility with modular base controllers and I/O modules

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

IP 20 distributed inputs/outputs

Advantys, Telefast® pre-wired system for extension modules

Connection sub-bases

Environment characteristics

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

Supply characteristics (controller side)

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

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

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

Presentation : page 32 | Compatibility : page 33 | References, dimensions : pages 38 and 39 | Curves : pages 36 and 37 | Schemes : pages 40 to 43

IP 20 distributed inputs/outputs

Advantys, Telefast® pre-wired system for extension modules

Connection sub-bases

Output circuit characteristics (preactuator side)

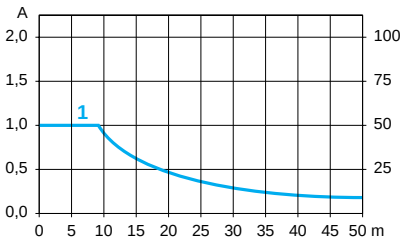
Sub-base type				Passive connection sub-bases for discrete signals			Connection sub-bases with soldered relays	
		ABE 7		B20MPN2●	E16EPN20	E16SPN2●	B20MRM20	E16SRM20
Number of channels		Passive output		8	–	16	–	–
		Solid state output		–	–	–	2	–
		Relay output		–	–	–	6	16
Contact arrangement				–			1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

Other characteristics (at ambient temperature of 20 °C)

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

IP 20 distributed inputs/outputs
Advantys, Telefast® pre-wired system for extension modules
Connection sub-bases

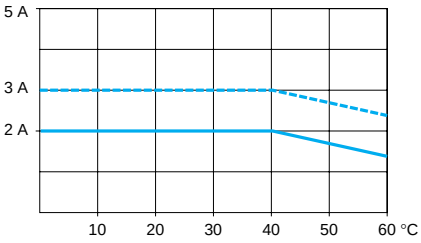
Curves for determining cable type and length according to the current



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

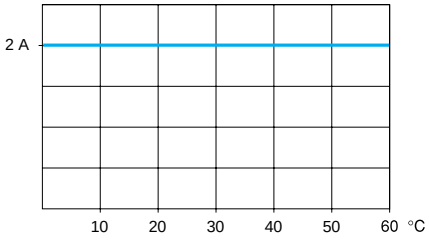
Temperature derating curves

ABE E11SRM20, ABE 7E16SRM20
6 electromechanical relay outputs



100 % of channels used
50 % of channels used

ABE 7B20MR20
2 solid state outputs

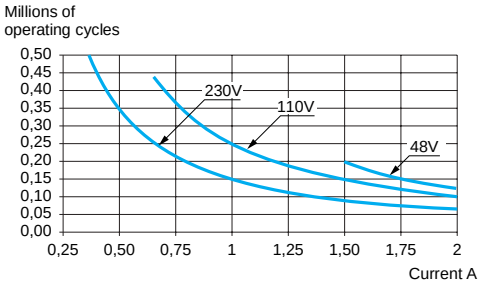


Electrical durability (in millions of operating cycles, conforming to IEC 60947-5-1)

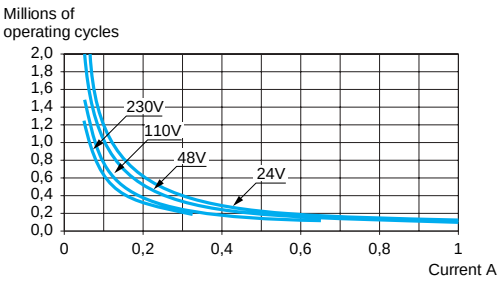
ABE 7B20MRM20 and ABE 7E16SRM20

d.c. loads

DC 12 curves *(1)*

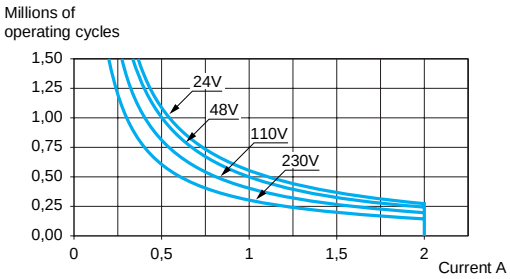


DC 13 curves *(2)*

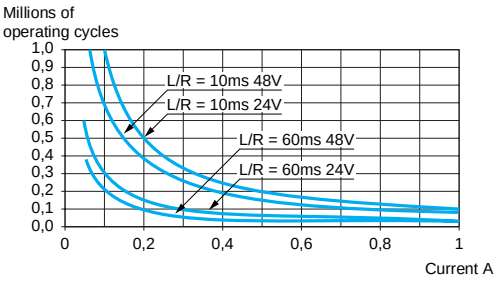


a.c. loads

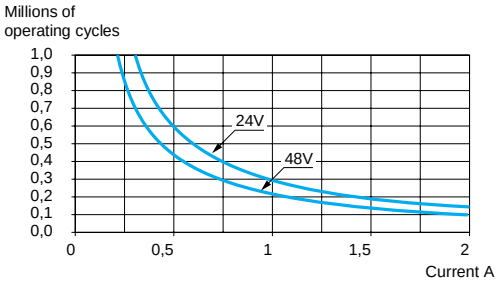
AC 12 curves *(3)*



AC 14 curves *(4)*



AC 15 curves *(5)*



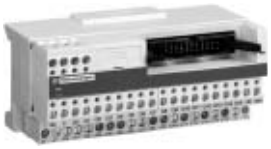
(1) DC 12: control of resistive loads and of solid state loads isolated by optocoupler, L/R ≤ 1 ms.
(2) DC 13: control of electromagnets, L/R ≤ 2 x (Ue x Ie) in ms, Ue: Rated operational voltage, Ie: rated operational current (with a protective diode on the load, DC12 curves must be used with a coefficient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

IP 20 distributed inputs/outputs

Advantys, Telefast® pre-wired system for extension modules

Connection sub-bases

ABE 7B20MPN20



ABE 7E16EPN20

ABE 7E16SRM20

For Twido modular base controllers

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

For Twido extension modules

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

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

Connection cables for Twido modular base controllers

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

Accessories

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

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

Presentation, description : pages 30 and 31
Presentation, compatibility : pages 32 to 33
Characteristics : pages 34 and 35
Dimensions : page 39
Schemes : pages 40 and 43

IP 20 distributed inputs/outputs

Advantys, Telefast® pre-wired system for extension modules

Cables for connection sub-bases and accessories

References (continued)

Separate components

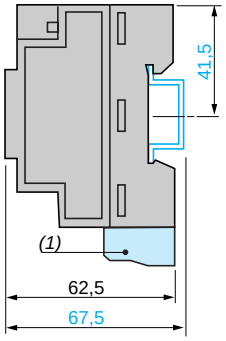
Description	Type	Compatibility	Reference	Weight kg
Connectors (sold in lots of 5)	HE 10 female 26-way	TWD LMDA20DTK/ LMDA40DTK	**TWD FCN2K26**	–
	HE 10 female 20-way	TWD DDI16DK/ DDI32DK/ DDO16TK/ DDO32TK	**TWD FCN2K20**	–
Screw terminal blocks (sold in lots of 2)	10-way	TWD DDI●DT/DAI8DT/ DDO8●T/DRA●RT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

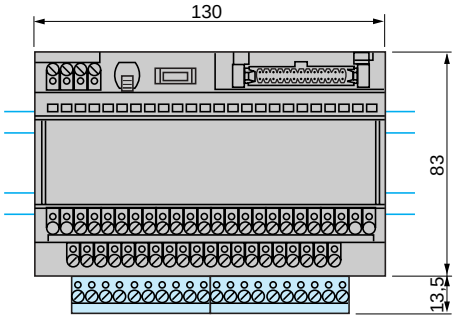
Description	Compatibility	Type of connection		Gauge/ C.s.a.	Length	Reference	Weight
		Twido side	Other end	AWG/mm²	m		kg
Cables for discrete I/O	TWD LMDA20DTK/ LMDA40DTK	HE 10 26-way	Bare wires	22/ 0.035	3.0	**TWD FCW30M**	0.405
					5.0	**TWD FCW50M**	0.670
	TWD DDI16DK/ DDI32DK/ DDO16TK/ DDO32TK	HE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

Dimensions

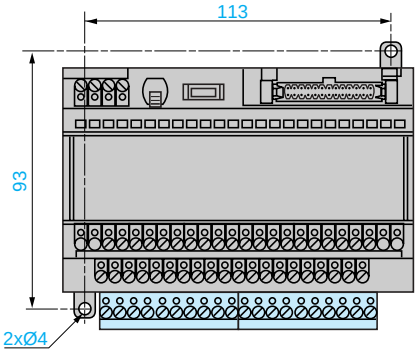
ABE 7B20MPN20, ABE 7B20MPN22, ABE 7B20MRM20, ABE 7E16SPN22, ABE 7E16SRM20

Mounting on 35 mm ⊓ rail





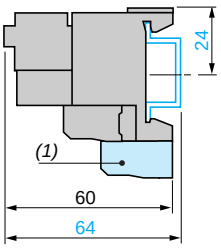
Screw fixing (retractable lugs)

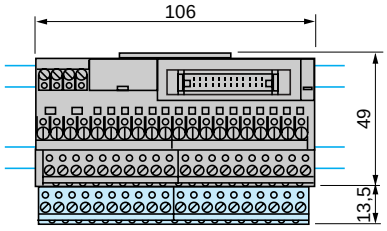


(1) ABE 7BV20, ABE 7BV20TB.

ABE 7E16EPN20, ABE 7E16SPN20

Mounting on 35 mm ⊓ rail





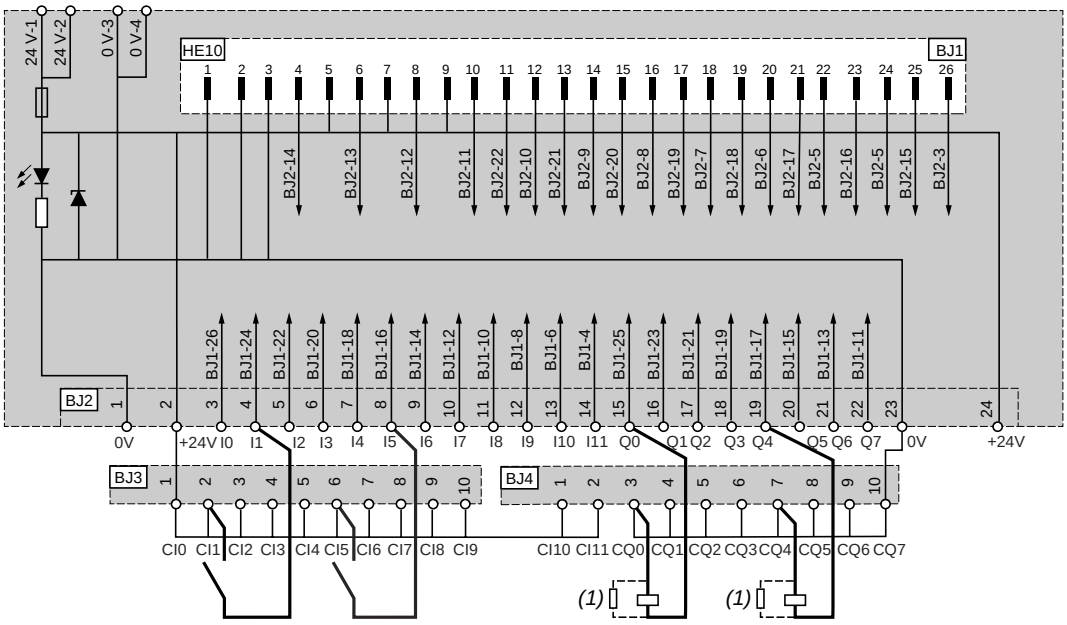
(1) ABE 7BV20, ABE 7BV20TB.

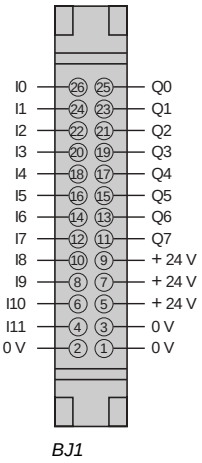
IP 20 distributed inputs/outputs

Advantys, Telefast® pre-wired system for extension modules

ABE 7B20MPN20

HE10, 26-way

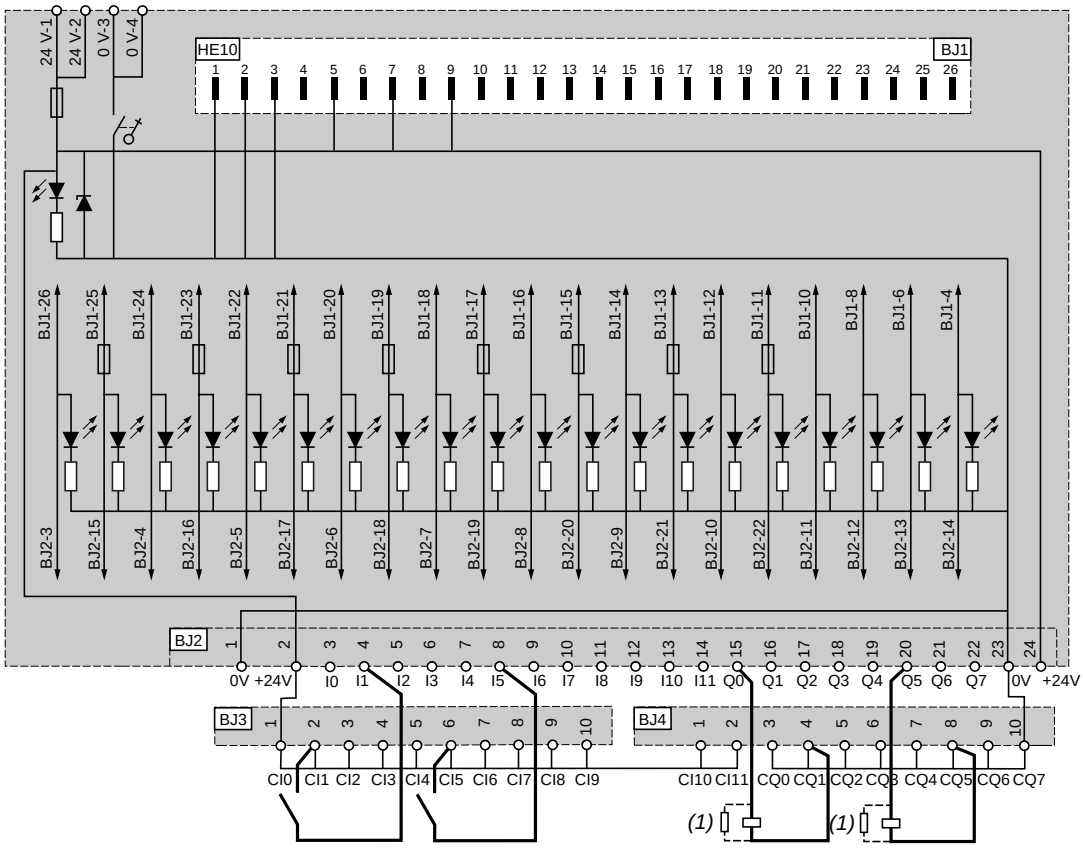


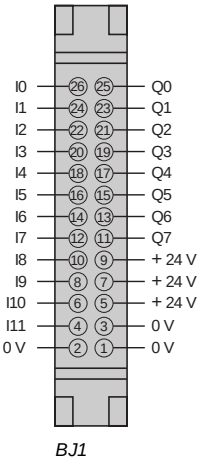


BJ1

ABE 7B20MPN22

HE10, 26-way





BJ1

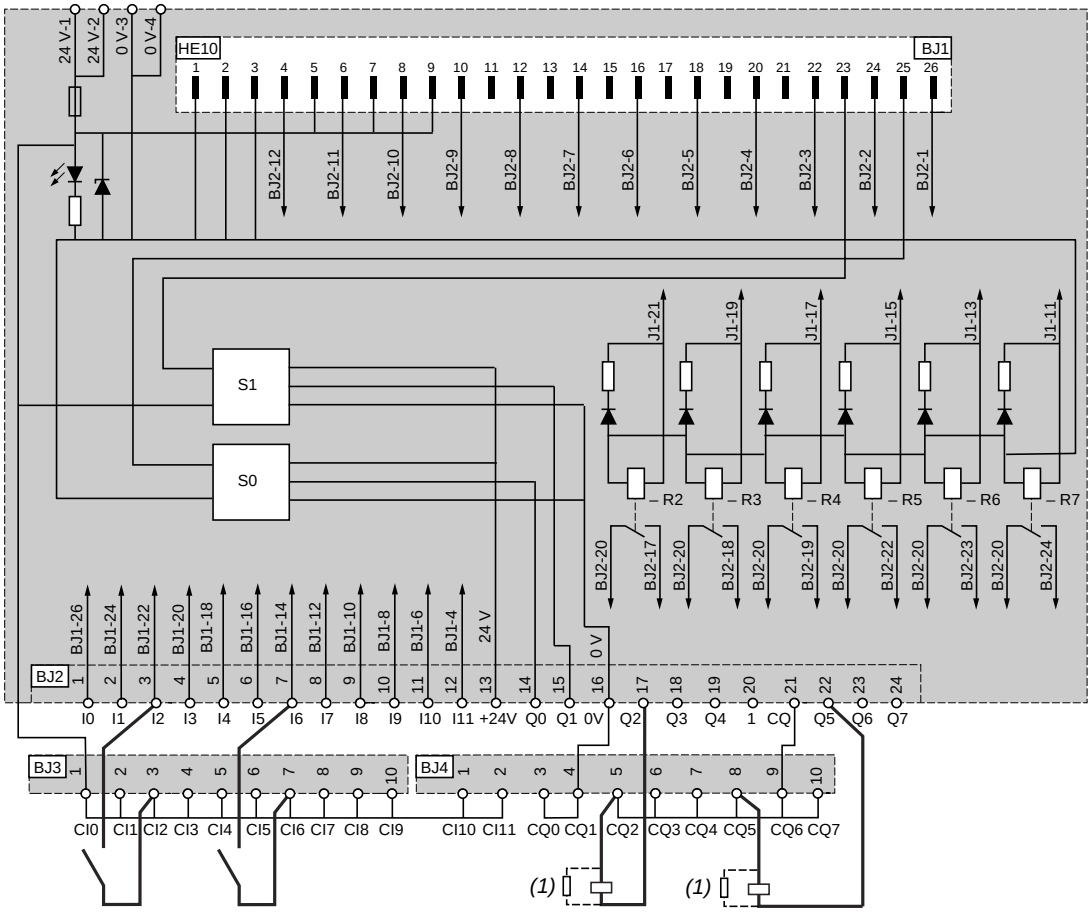
(1) Example of output connections.
When connecting an inductive load, include a diode or a varistor.

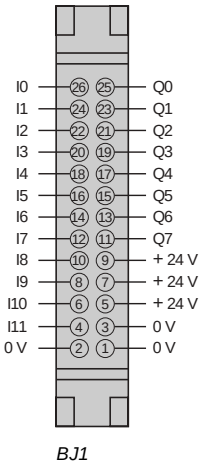
IP 20 distributed inputs/outputs

Advantys, Telefast® pre-wired system for extension modules

ABE 7B20MRM20

HE10, 26-way



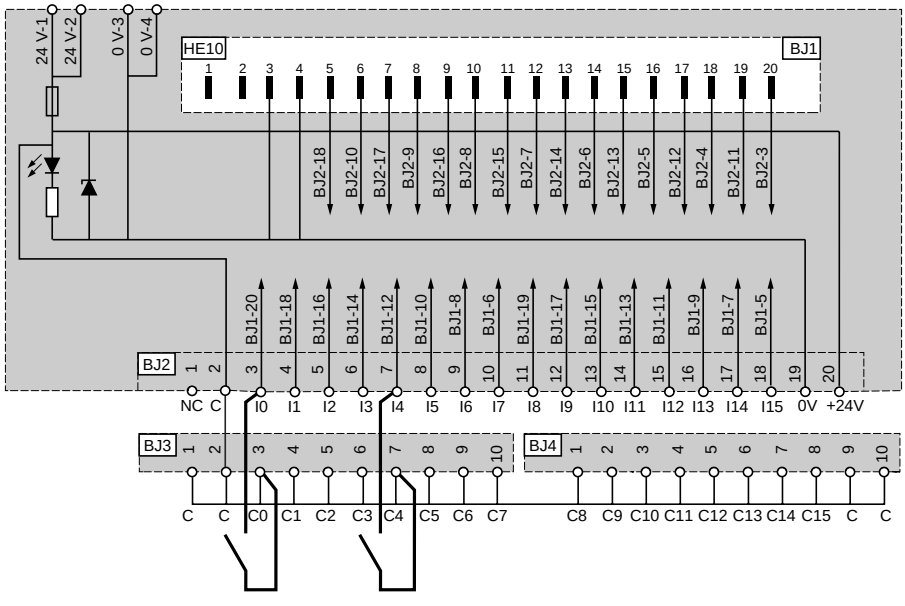


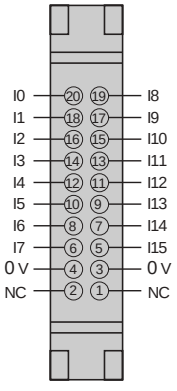
BJ1

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

ABE 7E16EPN20

HE10, 20-way





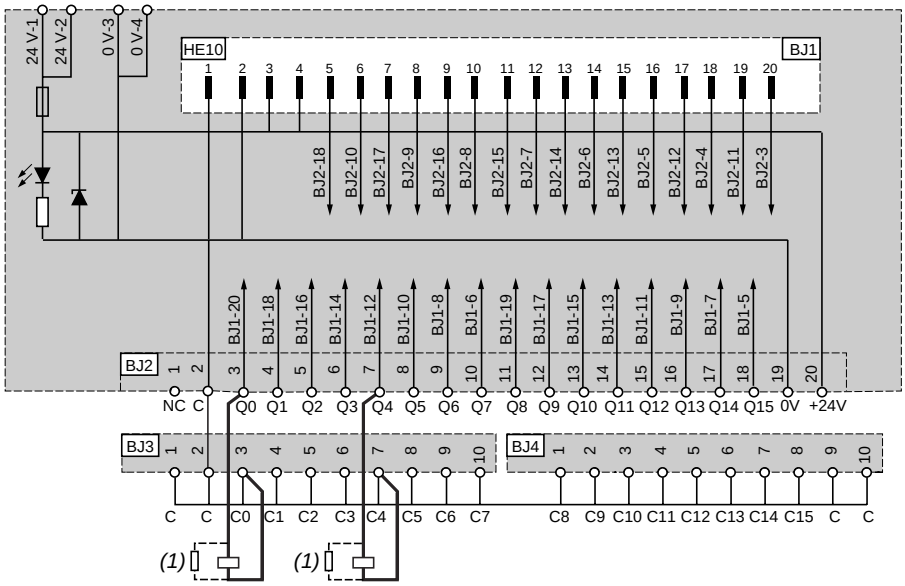
BJ1

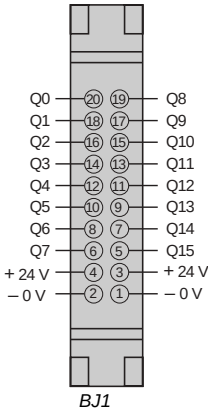
IP 20 distributed inputs/outputs

Advantys, Telefast® pre-wired system for extension modules

ABE 7E16SPN20

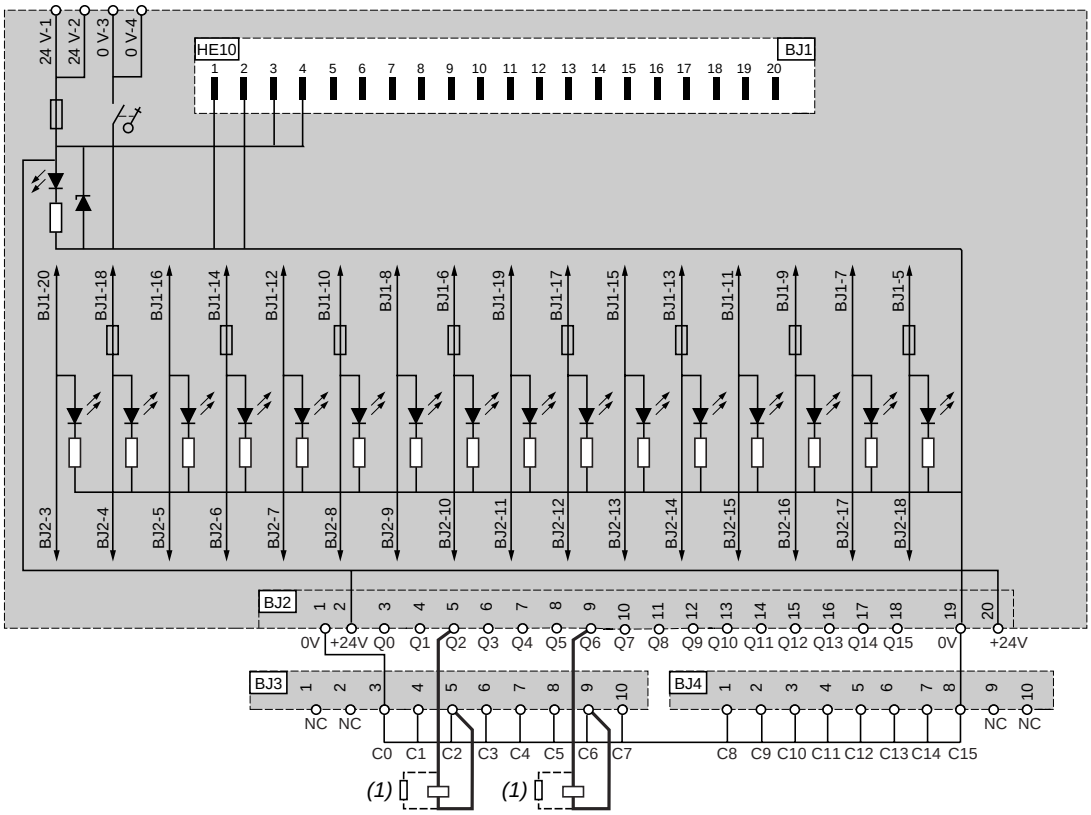
HE10, 20-way

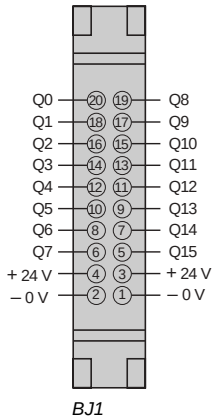




ABE 7E16SPN22

HE10, 20-way



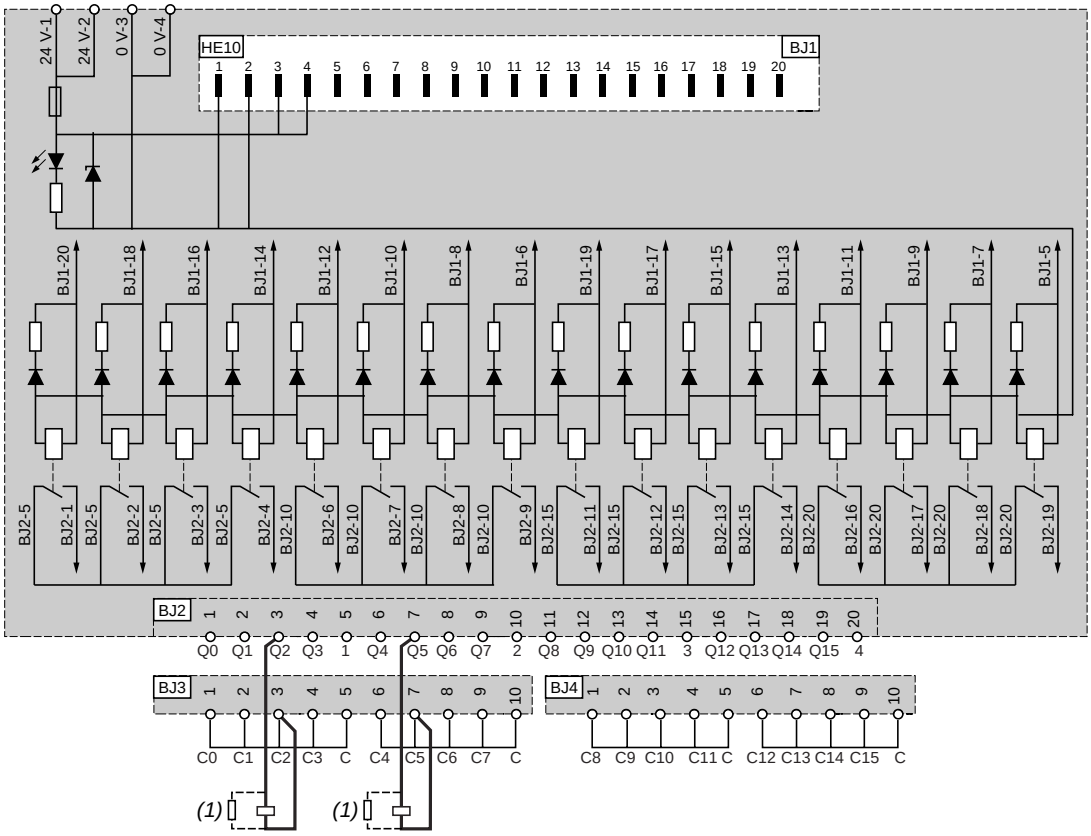


(1) Example of output connections.
When connecting an inductive load, include a diode or a varistor.

IP 20 distributed inputs/outputs

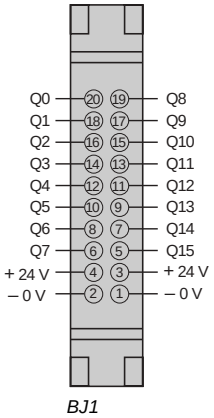
Advantys, Telefast® pre-wired system for extension modules

ABE 7E16SRM20



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

HE10, 20-way



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