Automation and Control

IP 67 I/O Splitter Boxes

Catalog
January

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a brand of Schneider Electric

Telemecanique

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IP 67 I/O Splitter Boxes and Modules

Splitter box and module type	Passive splitter boxes	Monobloc I/O splitter boxes and modules	
	Telefast® ABE9 splitter boxes	Advantys™ FTB splitter boxes	
	 108737	 108733	 521940
Fieldbus type	–	CANopen™ DeviceNet™ Profibus™-DP InterBus™	
Number of inputs/outputs	8 I/O, 16 I/O	16 I, 8 I + 8 O, 12 I + 4 O, 16 I/O, 8 I + 8 I/O	
Type of signal	Digital		
Functions	Connection of 1 to 16 sensors/actuators		
Type of input/output connectors	M12 (M8 connection available with T-connection accessory)		
Housing type	Plastic	Plastic	Metal
Module type	**ABE 9**	**FTB 1**	
Pages	9	28	

Modular I/O splitter boxes					
Advantys, FTM splitter boxes					
					
CANopen™ DeviceNet™ Profibus™-DP					
8 I, 16 I, 8 I/O and 16 I/O, digital 4 I or 4 O, analog					
Digital and analog					
Connection of 1 to 256 sensor/actuators per bus module					
M8 and M12					
Plastic only					
FTM 1					
48					

IP 67 passive splitter boxes
Telefast® Distribution System,
ABE9 splitter boxes

Presentation

ABE9 passive splitter boxes for M12 connectors make it possible to eliminate long and difficult cabling operations. Due to their modularity and their dimensions, they are the ideal solution for a wide variety of customer applications.
Connection to the processing unit can either be made by connector or by multicore cable of different lengths.
IP 67 protection allows these products to be used within processes or machines in harsh environments (splashing water, oil, dust, etc.).
The splitter boxes, available in 4 or 8 channel versions, allow connection of up to 16 signals maximum, depending on the version (2 per channel).

The characteristics of splitter boxes ABE 9C12 are as follows:
- Connection of sensors and actuators using M12, 5-pin connectors.
- Modularity: 4 or 8 channels.
- Mounting system and connection to the processing unit conforming to market standards:
  - mounting holes,
  - M23, 19-pin connector, enabling the use of pre-formed cables in order to reduce installation time and the risk of error,
  - multicore cable, 5 or 10 meters (16.4 or 32.8 ft.) long. The splitter box comprises a connection cover fitted with plug-in terminals, which provides considerable flexibility for:
    - the replacement of damaged parts,
    - modification of cable length.

Base units ABE 9C12●●L●● enable the use of 2 separate commons. This function is accessible beneath the terminal cover using 2 removable links. If both links are removed, the 2 supplies become independent.

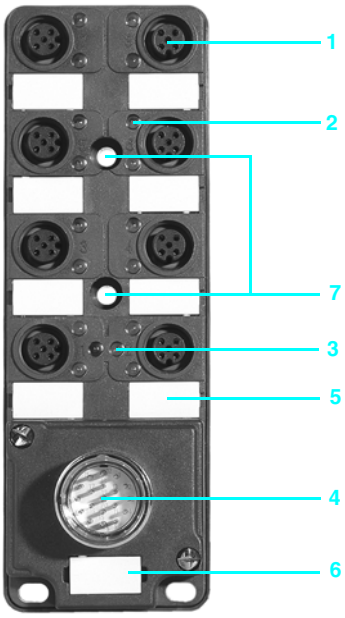
The use of a Y-connector allows 2 signals to be connected to the same M12 channel on the splitter box.
Example: splitter box ABE 9C1281 (8 channels) enables the connection of 16 signals to the processing unit.

The Y-connector is available in 2 versions:
- M12-M12 for connection of two M12 connectors to a single M12 channel on the splitter box,
- M8-M12 for connection of two M8 connectors to a single M12 channel on the splitter box.

Complete reference		Splitter box only		Connector with cable
ABE 9C1240L05	=	ABE 9C1240M	+	ABE 9XCA1405
ABE 9C1240L10	=	ABE 9C1240M	+	ABE 9XCA1410
ABE 9C1241L05	=	ABE 9C1241M	+	ABE 9XCA1405
ABE 9C1241L10	=	ABE 9C1241M	+	ABE 9XCA1410
ABE 9C1280L05	=	ABE 9C1280M	+	ABE 9XCA1805
ABE 9C1280L10	=	ABE 9C1280M	+	ABE 9XCA1810
ABE 9C1281L05	=	ABE 9C1281M	+	ABE 9XCA1805
ABE 9C1281L10	=	ABE 9C1281M	+	ABE 9XCA1810

Connector only
ABE 9CM12C

IP 67 passive splitter boxes
Telefast® Distribution System, ABE9 splitter boxes



Description

Passive splitter boxes ABE 9C12●●C23 have the following on the front face:

1 Four or eight M12 female connectors (depending on model) for connection of sensors and actuators (2 channels per connector).

2 Eight or sixteen channel status indicator lights (depending on model).

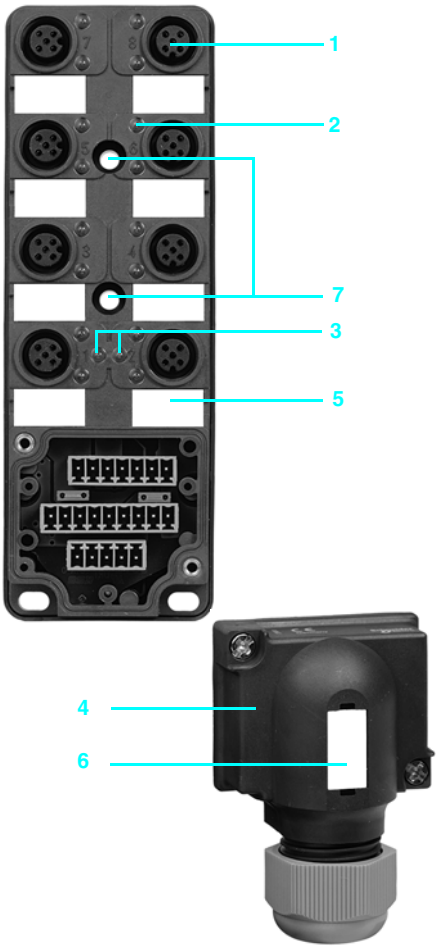
3 One “Power on” indicator light on the splitter box (depending on model).

4 One M23, 19-pin male connector.

5 Four or eight channel marker labels.

6 One splitter box marker label.

7 Splitter box mounting holes.



Passive splitter boxes ABE 9C12●●L●● have the following on the front face:

1 Four or eight M12 female connectors (depending on model) for connection of sensors and actuators (2 channels per connector).

2 Eight or sixteen channel status indicator lights (depending on model).

3 Two “Power on” indicator lights on the splitter box (depending on model).

4 One removable connection cover fitted with plug-in terminals.

5 Four or eight channel marker labels.

6 One splitter box marker label.

7 Splitter box mounting holes.

IP 67 passive splitter boxes

Telefast® Distribution System,
ABE9 splitter boxes

Splitter box type			ABE 9C12●0C23	ABE 9C12●1C23	ABE 9C12●0L●●, ABE 9C12●0M	ABE 9C12●1L●●, ABE 9C12●1M
Environmental characteristics						
Product certifications			cULus			
Temperature	Operation	**°C (°F)**	- 20 to + 80 (- 4 to + 176)			
	Storage	**°C (°F)**	- 40 to + 85 (- 40 to + 185)			
Degree of protection	Conforming to IEC 529		IP 67			
Vibration resistance	Conforming to IEC 68-2-6, test Fc	**Hz**	10 ≤ f ≤ 57 (constant amplitude = 1.5 mm) 57 ≤ f ≤ 150 (constant acceleration = 0.20 gn)			
Shock resistance	Conforming to IEC/EN 68-2-2		30 gn, for 11 ms			
Insulation group	VDE 0110		Category 3			
Mounting			All positions			
Mechanical mounting			M4 screw mounting			
Channel characteristics						
Number of channels			4 or 8 (depending on model)			
Type of connection per channel			M12, 5-pin female connectors			
Nominal voltage		**⎓ V**	24			
Current per channel		**A**	4 maximum			
Contact resistance		**mΩ**	5			
Power supply status indication			–	Green LED	–	Green LED
Channel status indication			–	Yellow LED	–	Yellow LED
Connection characteristics						
Type of connection			M23, 19-pin male connector		Multicore cable	
Total current in commons	1 mm² (18 AWG) supply wire	**A**	16			
	0.75 mm² (19 AWG) supply wire	**A**	12			
Separation of commons			Without		Without or with (by removing links BR1 and BR2, see connections on 11)	

Substitution table

Previous range	New range
Splitter boxes with connection by M23 connector	
XZ LC1241C3	**ABE 9C1241C23**
XZ LC1240C3	**ABE 9C1240C23**
XZ LC1281C3	**ABE 9C1281C23**
XZ LC1280C3	**ABE 9C1280C23**
Splitter boxes with connection by cable	
XZ LC1241L5	**ABE 9C1241L05**
XZ LC1240L5	**ABE 9C1240L05**
XZ LC1241L10	**ABE 9C1241L10**
XZ LC1240L10	**ABE 9C1240L10**
XZ LC1281L5	**ABE 9C1281L05**
XZ LC1280L5	**ABE 9C1280L05**
XZ LC1281L10	**ABE 9C1281L10**
XZ LC1280L10	**ABE 9C1280L10**
Accessories	
XZ LG102	**FTX CM12B**
XZ LC1220C1	**FTX CY1212**

IP 67 passive splitter boxes

Telefast® Distribution System, ABE9 splitter boxes

ABE 9C124●C23

ABE 9C128●C23

ABE 9C124●L●●

ABE 9C128●L●●

ABE 9C128●M

ABE 9XCA1●●●

FTXCY1208

References

Splitter boxes with connection by M23 connector

Number of channels	Connection by	LED indicator	Reference	Weight kg
4	4 x M12 female connectors	With	**ABE 9C1241C23**	0.080
		Without	**ABE 9C1240C23**	0.080
8	8 x M12 female connectors	With	**ABE 9C1281C23**	0.140
		Without	**ABE 9C1280C23**	0.140

Splitter boxes with connection by cable

Number of channels	Connection by	Length m (ft.)	LED indicator	Reference	Weight kg
4	4 x M12 female connectors	5 (16.4)	With	**ABE 9C1241L05**	0.680
			Without	**ABE 9C1240L05**	0.680
		10 (32.8)	With	**ABE 9C1241L10**	1.700
			Without	**ABE 9C1240L10**	1.700
8	8 x M12 female connectors	5 (16.4)	With	**ABE 9C1281L05**	1.610
			Without	**ABE 9C1280L05**	1.610
		10 (32.8)	With	**ABE 9C1281L10**	3.060
			Without	**ABE 9C1280L10**	3.060

Splitter boxes only, M12

Number of channels	For use with connector terminal	with cable	LED indicator	Reference	Weight kg
4	ABE 9CM12C	ABE 9XCA14●●	With	**ABE 9C1241M**	0.060
			Without	**ABE 9C1240M**	0.060
8	ABE 9CM12C	ABE 9XCA18●●	With	**ABE 9C1281M**	0.100
			Without	**ABE 9C1280M**	0.100

Separate components

Type	No. of chan-nels	For use with splitter box	Length m (ft.)	Reference	Weight kg
Terminal block connector *(1)*	–	ABE 9C124●M ABE 9C128●M	–	**ABE 9CM12C**	0.040
Connectors with cable	4	ABE 9C124●M	5 (16.4)	**ABE 9XCA1405**	1.060
			10 (32.8)	**ABE 9XCA1410**	2.080
	8	ABE 9C128●M	5 (16.4)	**ABE 9XCA1805**	1.510
			10 (32.8)	**ABE 9XCA1810**	2.240

Accessories

Description	Composition	Reference	Weight kg
Sealing plugs	For M8 connector (lot of 10)	**FTX CM08B**	0.100
	For M12 connector (lot of 10)	**FTX CM12B**	0.100
Y-connectors	Connection of 2 x M8 connectors to M12 connector on splitter box	**FTX CY1208**	0.020
	Connection of 2 x M12 connectors to M12 connector on splitter box	**FTX CY1212**	0.030
Marker labels	Lot of 12	**ABE 9XLA10**	–

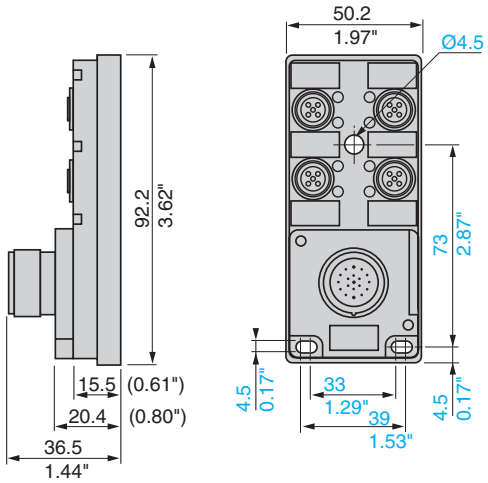
(1) To be wired by user.

IP 67 passive splitter boxes

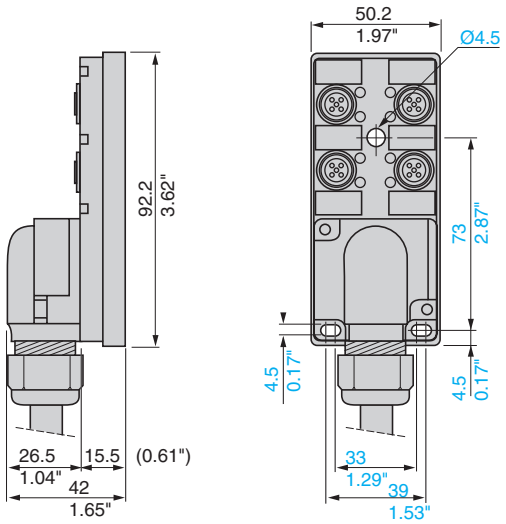
Telefast® Distribution System,
ABE9 splitter boxes

Dimensions

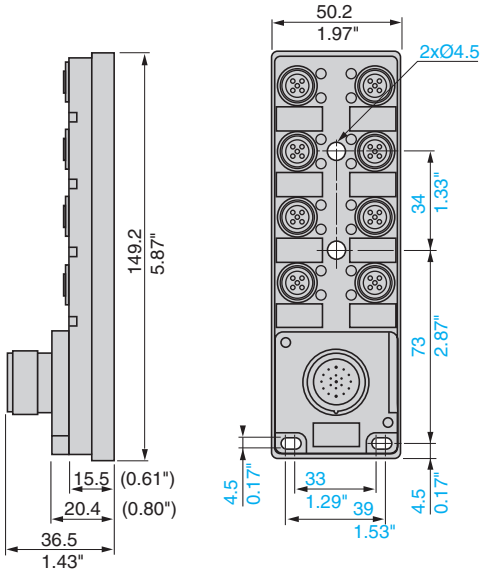
ABE 9C124●C23



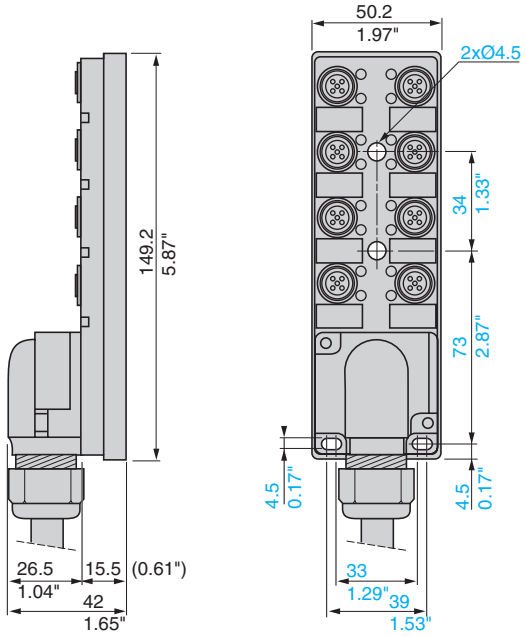
ABE 9C124●L●●



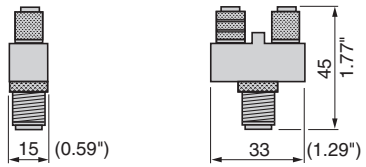
ABE 9C128●C23



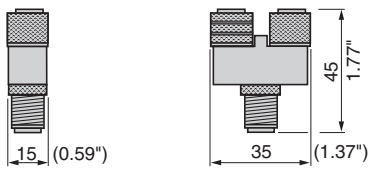
ABE 9C128●L●●



FTX CY1208

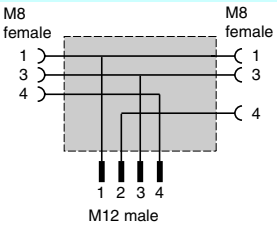


FTX CY1212

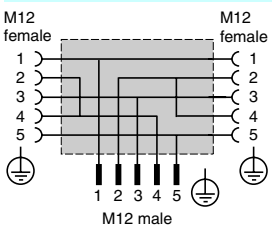


Y-connector connection

FTX CY1208



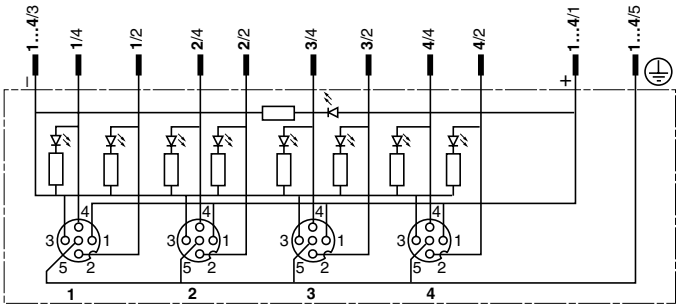
FTX CY1212



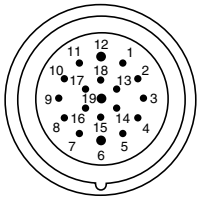
IP 67 passive splitter boxes

Telefast® Distribution System, ABE9 splitter boxes

ABE 9C124●C23

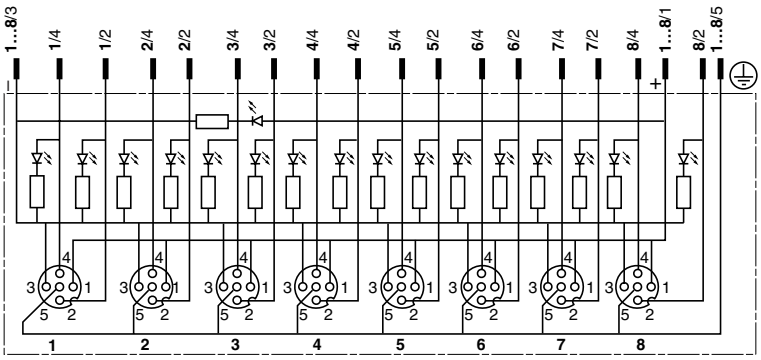


Item	Contact
1/4	15
1/2	7
2/4	5
2/2	4
3/4	16
3/2	8
4/4	3
4/2	14
1 and **3**/1	19
2 and **4**/1	19
1 and **3**/3	6
2 and **4**/3	6
1 to 4/5	12

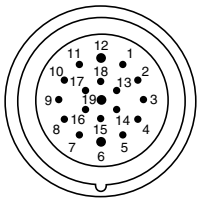


M23 connector

ABE 9C128●C23

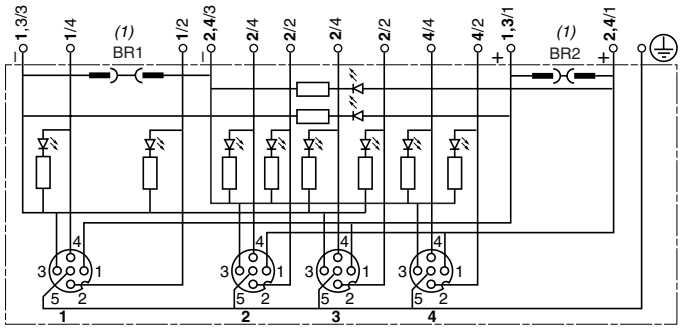


Item	Contact
1/4	15
1/2	7
2/4	5
2/2	4
3/4	16
3/2	8
4/4	3
4/2	14
5/4	17
5/2	9
6/4	2
6/2	13
7/4	11
7/2	10
8/4	1
8/2	18
1, **3**, **5** & **7**/1	19
2, **4**, **6** & **8**/1	19
1, **3**, **5** & **7**/3	6
2, **4**, **6** & **8**/3	6
1 to 8/5	12

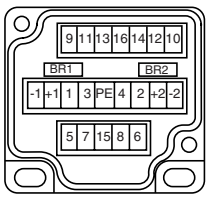


M23 connector

ABE 9C124●L●●

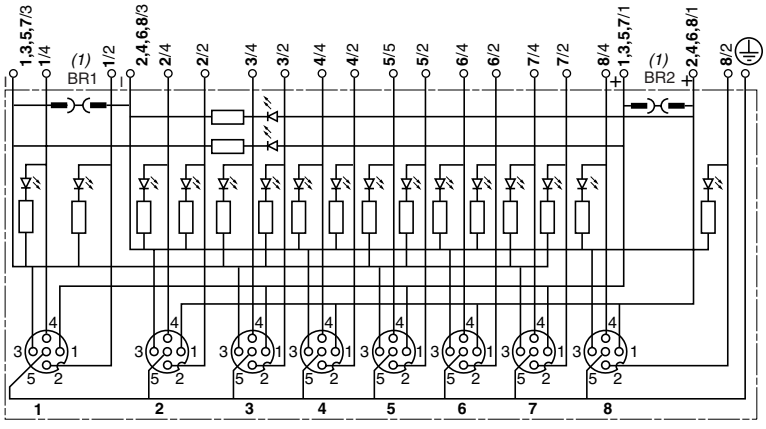


Item	Terml.	Wire
1/4	1	White
1/2	9	Grey/pink
2/4	2	Green
2/2	10	Red/blue
3/4	3	Yellow
3/2	11	White/green
4/4	4	Grey
4/2	12	Brown/green
1 and **3**/1	+ 1	Brown 1
2 and **4**/1	+ 2	Brown 2
1 and **3**/3	– 1	Blue 1
2 and **4**/3	– 2	Blue 2
1 to 4/5	PE	Green/yellow

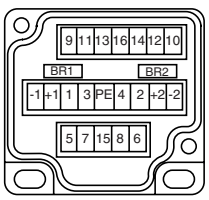


(1) BR1 and BR2: removable link.

ABE 9C128●L●●



Item	Terml.	Wire
1/4	1	White
1/2	9	Grey/pink
2/4	2	Green
2/2	10	Red/blue
3/4	3	Yellow
3/2	11	White/green
4/4	4	Grey
4/2	12	Brown/green
5/4	5	Pink
5/2	13	White/yellow
6/4	6	Red
6/2	14	Yellow/brown
7/4	7	Black
7/2	15	White/grey
8/4	8	Violet
8/2	16	Grey/brown
1, **3**, **5** & **7**/1	+ 1	Brown 1
2, **4**, **6** & **8**/1	+ 2	Brown 2
1, **3**, **5** & **7**/3	– 1	Blue 1
2, **4**, **6** & **8**/3	– 2	Blue 2
1 to 8/5	PE	Green/yellow



(1) BR1 and BR2: removable link.

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IP 67 monobloc I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTB splitter boxes

Applications **Industrial fieldbus type**		CANopen	
			
Degree of protection		IP 67	
Modularity (number of channels)	8 I + 8 O (8 O + 8 diagnostic inputs)	●	–
	12 I + 4 O (4 I + 4 O + 8 diagnostic inputs)	●	–
	16 I (8 I + 8 diagnostic inputs)	●	●
	16 I/O (8 I/O+ 8 diagnostic I/O)	●	●
	8 I + 8 I/O (8 I + 8 diagnostic I/O)	–	●
Inputs	**Voltage**	⎓ 24 V	
	Conformity to IEC 1131-2	Type 2	
Outputs	**Voltage**	⎓ 24 V	
	Type	Transistor	
	Current/output	1.6 A	
	Current/splitter box	8 A	
Connection		M12 connectors (5-pin)	
Housing type		Plastic	Metal
Diagnostics	**Per splitter box**	Bus and I/O undervoltage I/O short-circuit I/O supply	
	Per channel	I/O short-circuit Wire breakage fault Faulty sensors/actuators	
Module type		**FTB 1CN●●●P0**	**FTB 1CN●●●M0**
Page		28	28

DeviceNet

IP 67	
●	–
●	–
●	●
●	●
–	●
⎓ 24 V	
Type 2	
⎓ 24 V	
Transistor	
1.6 A	
8 A	
M12 connectors (5-pin)	
Plastic	Metal
Bus and I/O undervoltage I/O short-circuit I/O supply	
I/O short-circuit Wire breakage fault Faulty sensors/actuators	
FTB 1DN●●●P0	**FTB 1DN●●●M0**
28	

PROFIBUS

IP 67	
●	–
●	–
●	●
●	●
–	●
⎓ 24 V	
Type 2	
⎓ 24 V	
Transistor	
1.6 A	
8 A	
M12 connectors (5-pin)	
Plastic	Metal
Bus and I/O undervoltage I/O short-circuit I/O supply	
I/O short-circuit Wire breakage fault Faulty sensors/actuators	
FTB 1DP●●●P0	**FTB 1DP●●●M0**
28	

INTERBUS

IP 67
●
●
●
●
–
⎓ 24 V
Type 2
⎓ 24 V
Transistor
1.6 A
10 A
M12 connectors (5-pin)
Plastic only
Bus and I/O undervoltage I/O short-circuit I/O supply
I/O short-circuit Wire breakage fault Faulty sensors/actuators
FTB 1IB
28

IP 67 monobloc I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTB splitter boxes

Presentation

To meet the needs of machine manufacturers and users, automation system architectures are becoming decentralized, while offering performances comparable to those obtained with a centralized structure.
Advantys FTB IP 67 monobloc I/O splitter boxes enable sensors and actuators to be connected in distributed automation systems using pre-assembled cables, thus reducing wiring time and costs, whilst at the same time increasing the operational availability of the installation.

These IP 67 protected splitter boxes can also be used within processes or machines in harsh environments (splashing water, oil, dust, etc.). For difficult environments (welding shops etc.), a range of Advantys FTB splitter boxes with a metal housing is available.

Advantys FTB splitter boxes allow distributed connection of sensors and actuators on machines via a fieldbus. They communicate on different buses such as: CANopen, DeviceNet, Profibus-DP and InterBus.
Sensors and actuators are connected by means of standard M12 connectors.

Configuration and parametering of the Advantys FTB splitter boxes is carried out using configuration files (e.g.: .eds files for CANopen):
- either directly within the software workshop of the PLC used,
- or by using a SyCon type configurator (refer to our Modicon® Premium™ PLC automation platform catalog).

Advantys FTB splitter boxes are available with different input (⎓ 24 V IEC type 2) and output (transistor ⎓ 24 V/1.6 A) configurations:
- Mixed 8 input and 8 output splitter boxes, allowing connection of either 8 sensors and 8 actuators or 8 actuators with integrated diagnostics function.
- Mixed 12 input and 4 output splitter boxes, allowing connection of either 12 sensors and 4 actuators or 4 sensors and 4 actuators with integrated diagnostics function.
- 16 input splitter boxes allowing connection of either 16 sensors or 8 sensors with integrated diagnostics function.
- Mixed 16 input or output splitter boxes, configurable per channel, allowing all possible combinations: 16 inputs, 15 inputs/1 output, 14 inputs/2 outputs, to ., 16 outputs.

Functions

Selection of signal type per channel

- Each M12, 5-pin connector on Advantys FTB splitter boxes allows the connection of 2 signals. Depending on the type of splitter box, these can be:
  - 1 sensor input signal,
  - 1 diagnostic input signal,
  - 1 actuator output signal.

Signal type, depending on splitter box selected:

	FTB	1●●16E	1●●08E08S	1●●12E04S	1●●16C	1D●08E08C
M12	Contact 4	Input	Output	0 to 3: Input 4 to 7: Output	Input Output	Input Output
	Contact 2	Input Diagnostic	Input Diagnostic	Input Diagnostic	Input Output Diagnostic	Input Diagnostic

Note: *either a normally open (N/O) or a normally closed (N/C) contact can be chosen for each input signal.*

IP 67 monobloc I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTB splitter boxes

Diagnostics

Each Advantys FTB splitter box has one LED per channel to indicate the status of the channel and to enable fast and precise location of a fault. Fault monitoring diagnostics are indicated on the splitter box by LEDs and are fed back to the control system (PLC) via the bus.
There are 2 levels of diagnostics:
- diagnostics per channel,
- diagnostics per splitter box.

Diagnostics per channel

- **Sensor short-circuit**

A short-circuit or overload on contact 1 of the M12 female connector blows the self-resetting fuse. Each M12 connector is individually protected. A red LED indicates the fault on the corresponding M12 connector. This fault is signalled to the Master. Supply to the sensors is automatically restored after elimination of the fault.

- **Actuator short-circuit**

A short-circuit or overload of an output causes disconnection of this output. The fault is signalled to the Master. A red LED indicates the fault on the corresponding M12 connector. The output does not restart automatically. After having eliminated the cause of the fault, the channel must be reset by the PLC. This operation erases the short-circuit memory.

- **Actuator warning**

When the output is at state 0, the contact corresponding to the M12 female connector is checked for presence of 24 V voltage. If + 24 V is present, it means there is a “short-circuit”. A red LED indicates the fault on the corresponding M12 connector. The fault is signalled to the Master.

Diagnostics per splitter box

- **Sensor/actuator supply status.**
- **“Undervoltage” fault on the I/O supply.**
- **Sensor short-circuit.**
- **Actuator short-circuit.**

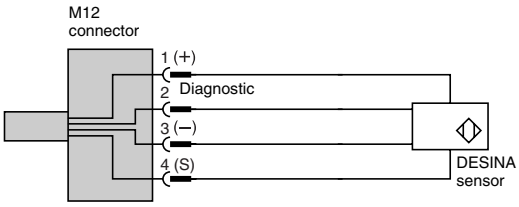
Use of the sensor/actuator diagnostics function

Advantys FTB splitter boxes allow the use of sensors and actuators incorporating an integrated diagnostics function (DESINA type ■). Configuring contact 2 of each M12 connector as a diagnostic input enables detection of external faults associated with the sensors or actuators.
This information enables the following faults to be detected:
- damage to the detection surface,
- faulty electronics,
- no load.

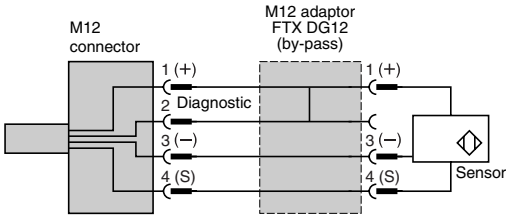
Selection of either the sensor input or diagnostic input function on contact 2 is made channel by channel, by entering parameters, when configuring the splitter box.
Fault indication by a red LED is possible for each channel configured as a diagnostic input (LEDs 10 to 17).

Example of connection of a sensor with integrated diagnostics function:
Using the M12 diagnostics adaptor accessory **FTX DG12**, it is possible to monitor breaks in wiring to sensors or actuators which do not have an integrated diagnostics function.

Example of connection of a sensor with integrated diagnostics function



Example of connection of a standard sensor with the diagnostics adaptor



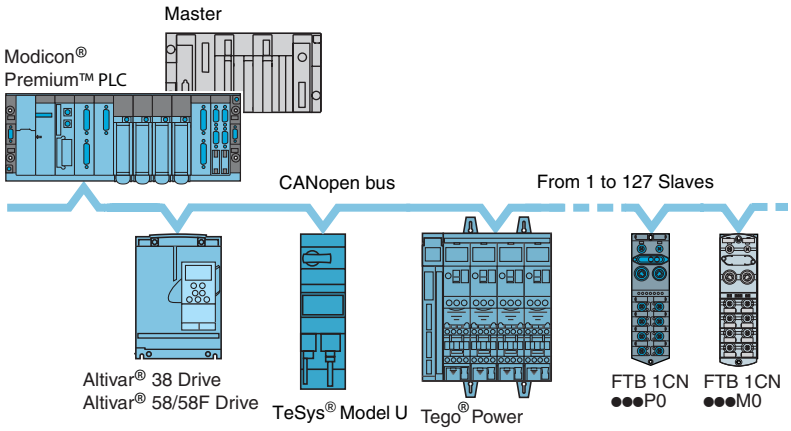
■ DESINA - Standard relating to the connector technology of sensors, and actuators, established by the German Machine Tool Builder's Association.

IP 67 monobloc I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTB splitter boxes
CANopen™ and DeviceNet™ bus extensions

Advantys FTB splitter boxes are of the monobloc type.
Each splitter box comprises one part for connection of sensors and actuators by means of M12 connectors, and one part for connection of splitter boxes on CANopen and DeviceNet fieldbuses.
These splitter boxes enable inputs/outputs to be located remotely, as close as possible to the equipment being controlled.

CANopen bus presentation



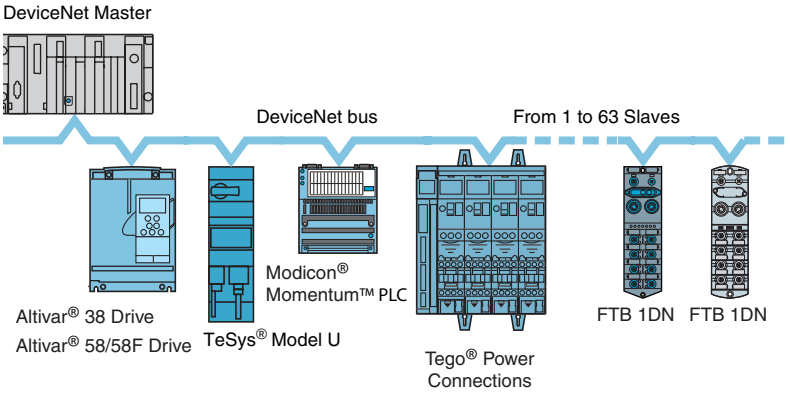
The CAN system, initially developed for real-time exchange of information in the automobile industry, is now being used more and more throughout industry. There are several fieldbuses based on CAN base layers and components.
The CANopen bus conforms to international standard ISO 11898, promoted by the “CAN in Automation” association (a grouping of manufacturers and users), and guarantees a high degree of openness and inter-operability due to its communication profiles and its standardized equipment.
The CANopen bus is now recognized, in Europe, as the reference standard for building industrial systems based on the CAN concept.
The CANopen bus is a Multimaster bus, based on the Master/Slave principle.
The physical link consists of a shielded twisted pair, to which up to a maximum of 127 Slaves can be connected by simple tap-off. The binary rate varies, depending on the length of the bus, from 1 Mbits/s for 40m (131.2 ft.) to 50 kbits/s for 1000m (3281 ft.).
Each end of the bus must be fitted with a line terminator.

The CANopen bus is a set of profiles on CAN systems, possessing the following characteristics:
- Open bus system.
- Data exchanges in real-time without overloading the protocol.
- Modular design allowing modification of size.
- Interconnection and interchangeability of devices.
- Standardized configuration of networks.
- Access to all device parameters.
- Synchronization and circulation of data from cyclic and/or event-controlled processes (short system response time).
- Exchanges possible with numerous international manufacturers.

IP 67 monobloc I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTB splitter boxes
CANopen™ and DeviceNet™ bus extensions

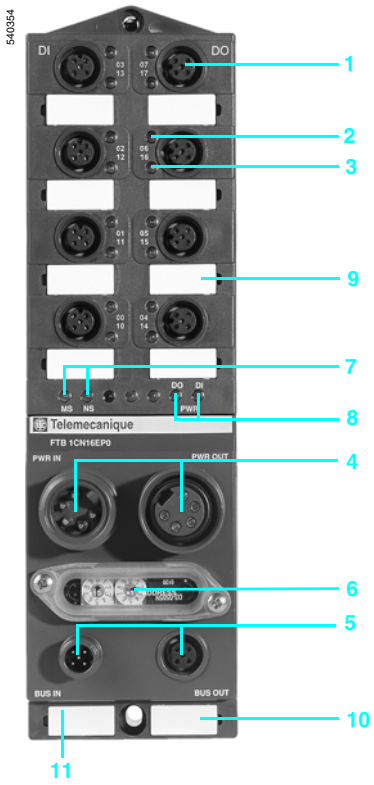
DeviceNet bus presentation



The DeviceNet system is a sensor/actuator bus system of the open Low-End type, used in various industrial applications and, in particular, the automobile industry. It is based on CAN technology (OSI layers 1 and 2).
The DeviceNet bus is based on the Master/Slave principle.
The physical link consists of 2 shielded twisted pairs (2 wires for data, 2 wires for auxiliary supply to sensors), to which up to a maximum of 63 slaves can be connected. The binary rate varies, depending on the length of the bus, from 500 kbits/s for 100m (328.1 ft.) to 125 kbits/s for 500m (1640 ft.).
Each end of the bus must be fitted with a line terminator.

IP 67 monobloc I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTB splitter boxes
CANopen™ and DeviceNet™ bus extensions



Description

CANopen and DeviceNet monobloc I/O splitter boxes FTB 1CN and FTB 1DN have the following on the front face:

1 Eight M12 female connectors for connection of sensors and actuators (2 channels per connector).

2 Eight channel status indicator lights (00 to 07).

3 Eight channel status indicator lights (10 to 17) or channel diagnostic indicator lights (00 to 07) depending on the splitter box configuration.

4 Two 7/8 connectors for connecting the ⎓ 24 V sensor and actuator power supplies: male for PWR IN, female for PWR OUT.

5 One M12 male connector (bus IN) and one M12 female connector (bus OUT) for connection of the CANopen and DeviceNet buses.

6 Access to coding and speed selection wheels.

7 Two bus diagnostic LEDs.

8 Two ⎓ 24 V sensor and actuator supply status LEDs.

9 Eight channel marker labels.

10 Two splitter box marker labels.

11 Splitter box functional ground connection (beneath the label).

Configuration

CANopen bus configuration

An .eds file is assigned to each product, which contains all the important information relating to the product. An icon (.dib for CANopen) is also available for installation in the system configurator.
Please refer to the configuration software documentation for the import of .eds files.
Following the CANopen system initialization phase, all the Slaves signal their presence on the bus by means of a “Boot-Up” message. A setting-up configurator (e.g.: SyCon) can then start to read and register the CANopen bus and, on the basis of the data obtained, assign a corresponding .eds file to each Slave. Based on the .eds file data, the Master creates a peripheral image of all the Slaves detected by the PLC. The user can assign I/O bytes to logic addresses within the PLC.

■ Addressing

The addresses are configurable from 1 to 99 by means of 2 coding wheels (x 10 and x 1). A 3rd coding wheel enables the data transmission speed to be selected (position 0 = automatic speed recognition from 125 kbits/s to 1 Mbits/s).

DeviceNet bus configuration

An .eds file is assigned to each product, which contains all the important information relating to the product. An icon (.ico for DeviceNet) is also available for installation in the system configurator.
When the network is scanned, the identification data is compared with that of the Slaves present on the network and assigned accordingly. After the scanning phase, the scanner will have identified all the Slaves and saved information relating to data length and operating mode.
The DeviceNet bus Master establishes a peripheral image of all the devices detected on the DeviceNet bus and incorporates them according to their physical location in a Scan list. The user can then assign the Scan list, according to the peripheral image of the bus devices, to logic addresses in the PLC.

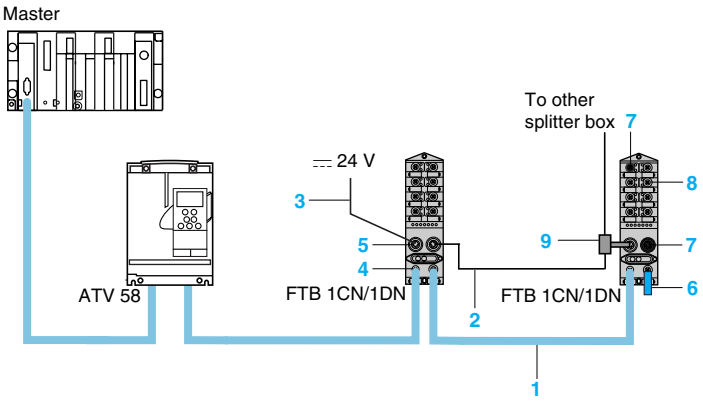
■ Addressing

The addresses are configurable from 1 to 63 by means of 2 coding wheels (x 10 and x 1). A 3rd coding wheel enables the data transmission speed to be selected (3 speeds can be selected: 125, 250 and 500 kbits/s).

IP 67 monobloc I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTB splitter boxes
CANopen™ and DeviceNet™ bus extensions

Cabling system



Cabling accessories

CANopen and DeviceNet bus connection cables

Cables FTX CN32●● enable connection of splitter boxes FTB 1CN and FTB 1DN to CANopen and DeviceNet fieldbuses.

1 **FTX CN32●●**: cables fitted with 2 elbowed M12, 5-pin connectors, one at each end, for chaining the bus between two splitter boxes.

Sensor and actuator ⎓ 24 V power supply connection cables

Cables FTX DP2●●● enable connection of ⎓ 24 V power supplies to splitter boxes FTB 1CN and FTB 1DN. Two types of cable are available, in various lengths:

2 **FTX DP22●●**: cables fitted with two 7/8, 5-pin connectors, one at each end, for chaining ⎓ 24 V power supplies between two splitter boxes.

3 **FTX DP21●●**: cables fitted with a 7/8, 5-pin connector at one end, with the other end free for connection of ⎓ 24 V power supplies.

Connectors

4 **FTX CN12●5**: M12, 5-pin, male and female connectors for bus cables.

5 **FTX C78●●**: 7/8, 5-pin, male and female connectors for ⎓ 24 V power supply cables.

Other components

6 **FTX CNTL12**: bus line terminator fitted with an M12 connector.

7 **FTX C●●●B**: sealing plugs for 7/8, M12 and M8 connectors.

8 **FTX CY12●●**: Y-connector for M12 and M8 connectors.

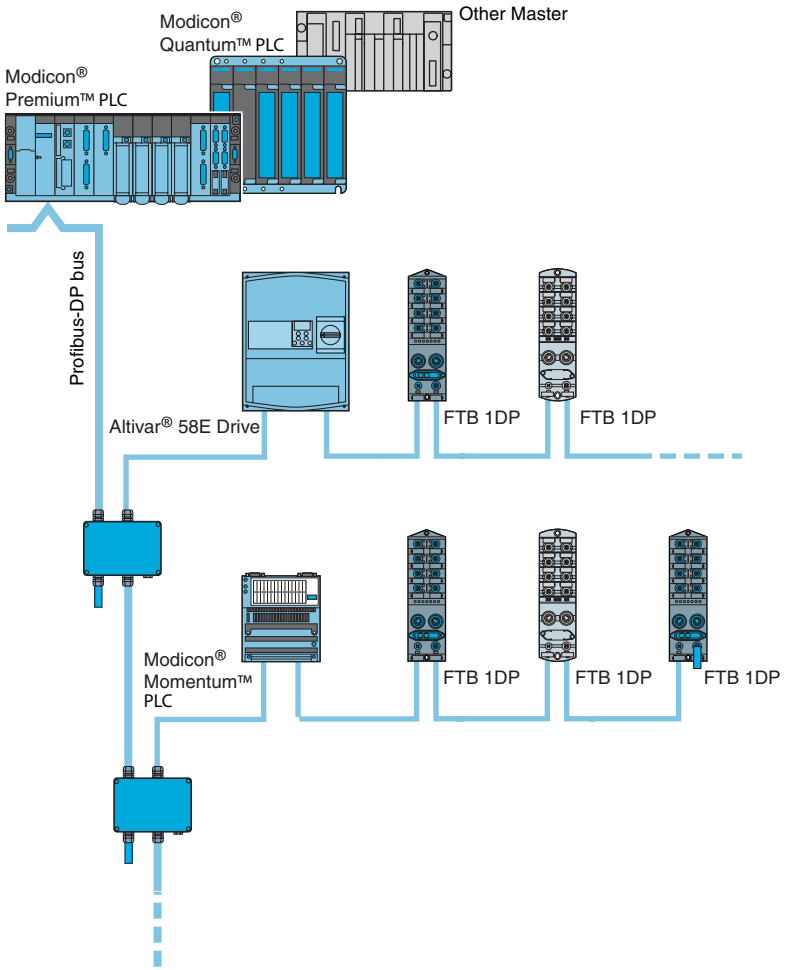
9 **FTX CNCT1**: T-connector fitted with two 7/8, 5-pin connectors for power supply cable.

IP 67 monobloc I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTB splitter boxes
Profibus™-DP bus

Advantys FTB splitter boxes are of the monobloc type.
Each splitter box comprises one part for connection of sensors and actuators by means of M12 connectors, and one part for connection of splitter boxes on Profibus-DP fieldbus.
This splitter box enables inputs/outputs to be located remotely, as close as possible to the equipment being controlled.

Profibus-DP presentation



The Profibus-DP (Process Fieldbus Decentralized Peripheral) is an open type fieldbus system for industrial applications. The Profibus standard is described in standard EN 50170.
The physical link is a simple, type A, shielded twisted pair.
Data exchange between the Master (processing unit) and the Slaves (decentralized devices) is performed in a cyclic manner.
A maximum of 32 Slaves can be connected to a bus segment. To increase the number of Slaves, repeaters must be installed in order to create new bus segments.
The repeaters also provide galvanic isolation of the bus segments.
The total number of slaves must not exceed 126.
The bus must be fitted with a line terminator at each end of each segment created.

IP 67 monobloc I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTB splitter boxes
Profibus™-DP bus

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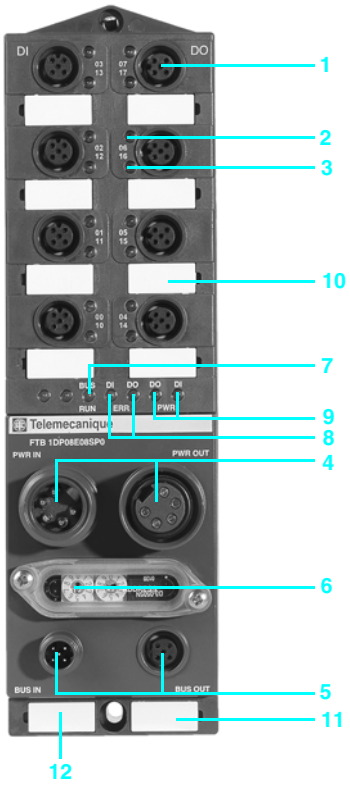

Description

Profibus-DP monobloc I/O splitter boxes FTB 1DP have the following on the front face:

1 Eight M12 female connectors for connection of sensors and actuators (2 channels per connector).

2 Eight channel status indicator lights (00 to 07).

3 Eight channel status indicator lights (10 to 17) or channel diagnostic indicator lights (00 to 07) depending on the splitter box configuration.

4 Two 7/8 connectors for connecting the ⎓ 24 V sensor and actuator power supplies: male for PWR IN, female for PWR OUT.

5 One M12 male connector (bus IN) and one M12 female connector (bus OUT) for connection of the Profibus-DP bus.

6 Access to the address coding wheels.

7 One bus diagnostics LED.

8 Two sensor/actuator diagnostic LEDs.

9 Two ⎓ 24 V sensor and actuator supply status LEDs.

10 Eight channel marker labels.

11 Two splitter box marker labels.

12 Splitter box functional ground connection (beneath the label).

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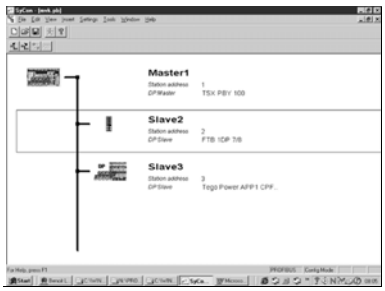

Step 1: Product selection

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Step 2: Access to the configuration menu

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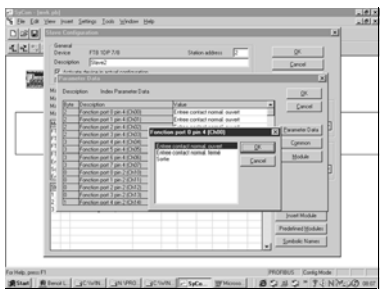

Step 3: Configuration

Configuration

The Profibus-DP identification number is a preset, non-modifiable element exclusive to each Slave.
An .gsd file is assigned to each product, which contains all the important information relating to the product. An icon (.dib for Profibus-DP) is also available for installation in the system configurator (please refer to the configuration software documentation for the import of .gsd files).
During configuration of the equipment, the Master receives precise criteria relating to the overall structure of the fieldbus via the system configurator. All necessary information relating to the type and operational behavior of the various Slaves, as well as data concerning the identification number, is included in the .gsd file.

Example with SyCon configurator (refer to our Modicon® Premium™ PLC automation platform catalog):

■ Select the products for the application from the product catalog library in the SyCon software (step 1),

■ Product configuration (step 2):
- □ double-click on the product icon to access the product configuration menu,
- □ select the required product reference from the suggested list,
- □ select the associated functions that you wish to use with the product.

■ Channel by channel, configure the type of signal that will be connected to it (step 3):
- □ input (N/O or N/C contact),
- □ diagnostic input (only applicable to channels 10 to 17),
- □ output.

Addressing

For the Slaves, the assignment of addresses generally starts at address 3 (0-2 reserved for the Master). The addresses are configurable from 1 to 99 by means of 2 coding wheels (x 10 and x 1).

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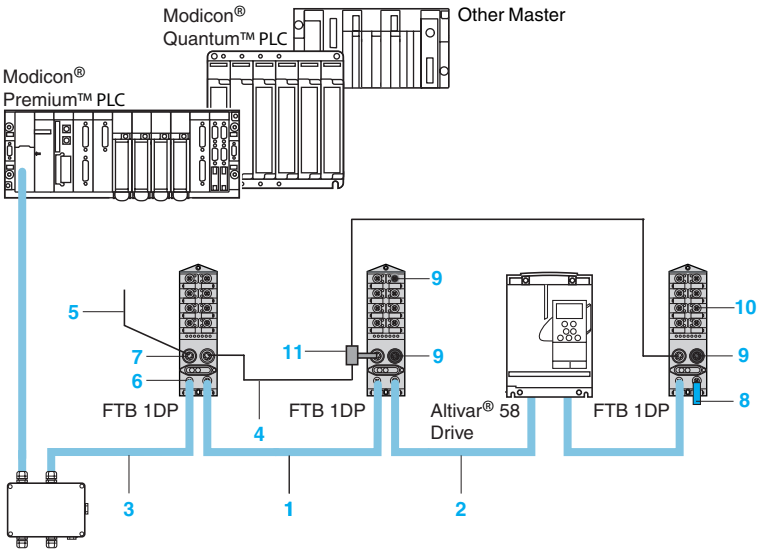
Characteristics: pages 26, 27
References: pages 28 - 30
Dimensions: pages 31 - 33

IP 67 monobloc I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTB splitter boxes
Profibus™-DP bus

Cabling system



Cabling accessories

Profibus-DP bus connection cables

Cables FTX DP●2●● enable connection of splitter boxes FTB 1DP to Profibus-DP fieldbus.

1 **FTX DP12●●**: cables fitted with 2 straight M12, 5-pin connectors, one at each end, for chaining the bus between two splitter boxes.
2 **FTX DP32●●**: cables fitted with 2 elbowed M12, 5-pin connectors, one at each end, for chaining the bus between two splitter boxes.
3 **TSX PBSCA●00**: cables with flying leads at both ends.

Sensor and actuator ⎓ 24 V power supply connection cables

Cables FTX DP2●●● enable connection of ⎓ 24 V power supplies to splitter boxes FTB 1DP. Two types of cable are available, in various lengths:

4 **FTX DP22●●**: cables fitted with two 7/8, 5-pin connectors, one at each end, for chaining ⎓ 24 V power supplies between two splitter boxes.
5 **FTX DP21●●**: cables fitted with a 7/8, 5-pin connector at one end, with the other end free for connection of ⎓ 24 V power supplies.

Connectors

6 **FTX DP12●5**: M12, 5-pin, male and female connectors for bus cables.
7 **FTX C78●●**: 7/8, 5-pin, male and female connectors for ⎓ 24 V power supply cables.

Other components

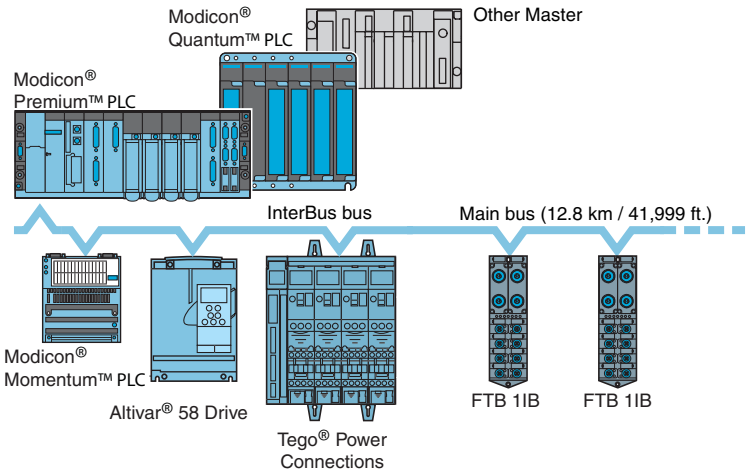
8 **FTX DPTL12:** bus line terminator fitted with an M12 connector.
9 **FTX C●●●B:** sealing plugs for 7/8, M12 and M8 connectors.
10 **FTX CY12●●:** Y-connector for M12 and M8 connectors.
11 **FTX CNCT1:** T-connector fitted with two 7/8, 5-pin connectors for power supply cable.

IP 67 monobloc I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTB splitter boxes
InterBus™ bus extenson

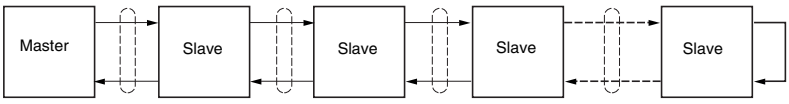
Advantys FTB splitter boxes are of the monobloc type.
Each splitter box comprises one part for connection of sensors and actuators by means of M12 connectors, and one part for connection of splitter boxes on InterBus fieldbus.
This splitter box enables inputs/outputs to be located remotely, as close as possible to the equipment being controlled.

InterBus bus presentation



InterBus is a serial link type fieldbus for sensors and actuators which satisfies the requirements of industrial environments.
Conforming to the standard specification, an InterBus can operate with up to 256 Slaves:
- 12.8 km (41,999 ft.) with copper conductors,
- beyond 80 km (262,500 ft.) using fiber optic cables.

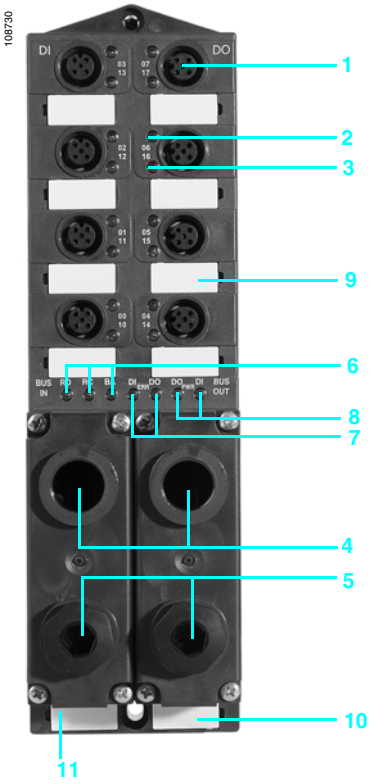
The distance between 2 different components of the bus must not exceed 400 m (1312 ft.) when using copper conductors.
The InterBus system is designed in the form of a loop and has the structure of a shift register distributed on the bus. Each Slave, with its registers, constitutes a component in this shift register loop.



The cyclic exchange of information between the Master and the Slaves is carried out independently by the Master.
The physical link consists of 3 pairs of twisted wires with common shielding.
In addition to the main bus (long distance bus), a local bus can be set up.
- Characteristics of InterBus local bus,
  - the ⎓ 24 V power supply also passes along the system cable (3 additional wires, 0.75 mm² / #19 AWG) to supply the electronics and the Slave peripherals,
  - the maximum current is limited to 4.5 A, in accordance with the specification,
  - the maximum distance is 50 m (164 ft.).

IP 67 monobloc I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTB splitter boxes
InterBus™ bus extention



Description

InterBus monobloc I/O splitter boxes FTB 1IB have the following on the front face:

1 Eight M12 female connectors for connection of sensors and actuators (2 channels per connector).

2 Eight channel status indicator lights (00 to 07).

3 Eight channel status indicator lights (10 to 17) or channel diagnostic indicator lights (00 to 07) depending on the splitter box configuration.

4 Two terminal blocks for connection of ⎓ 24 V sensor and actuator power supplies (IN and OUT) (connectors included with product).

5 Four terminal blocks for connection of the InterBus bus (connectors included with product).

6 Three bus diagnostic LEDs.

7 Two sensor/actuator diagnostic LEDs.

8 Two ⎓ 24 V sensor and actuator supply status LEDs.

9 Eight channel marker labels.

10 Two splitter box marker labels.

11 Splitter box functional ground connection (beneath the label).

Configuration

Each Slave has its own identification code, so that it can be clearly identified by the InterBus Master. This code is configured by the manufacturer and cannot be subsequently modified. The characteristics of this code are defined in the InterBus specification.
Start-up of the system is immediately followed by an identification cycle. During this system initialization phase, the identification data of all the Slaves is read by the Master according to their position in the bus. This data will, in particular, be used to prepare the peripheral image at the Master.
The following cycles are simple data cycles, whose only purpose is the exchange of process data between the Master and the Slaves.

Addressing

The InterBus system allows either physical addressing or logic addressing.

■ Physical addressing
The assignment of the Master's peripheral image to the process image within the PLC corresponds to the layout of the splitter boxes in the fieldbus.

■ Logic addressing
During configuration, it is possible to carry out manual logic addressing using configuration software (for example: CMDtools), independently of the Master used. During this operation, logic addressing of the peripheral image or of parts of this image is carried out to the process image within the PLC.

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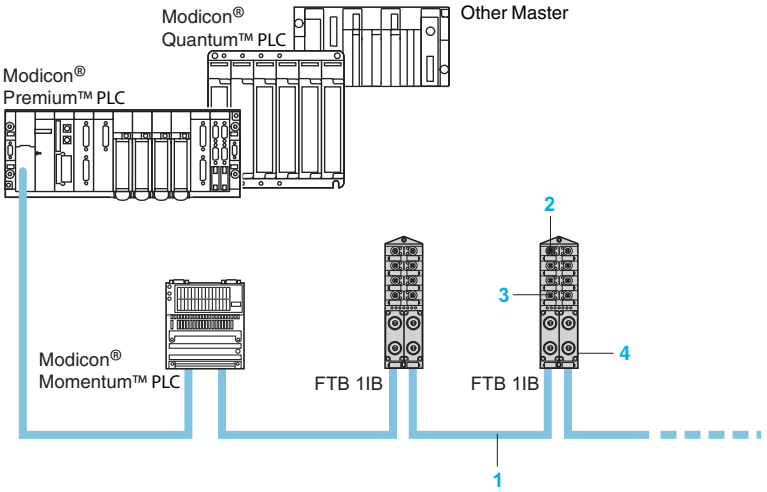
IP 67 monobloc I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTB splitter boxes
InterBus™ bus extension

Cabling system



Cabling accessories

Connection cables for the bus and for sensor and actuator ⎓ 24 V power supplies

Cables FTX IB12●● enable connection of splitter boxes FTB 1IB to InterBus fieldbus.

1 **FTX IB12●●**: cables fitted with 2 sets of connectors at each end for chaining the bus and power supplies between two splitter boxes.

Other components

2 **FTX CM●●B**: sealing plugs for M12 and M8 connectors.

3 **FTX CY12●●**: Y-connector for M12 and M8 connectors.

4 **FTX CPE10**: cable gland.

IP 67 monobloc I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTB splitter boxes

Environmental characteristics

Product certifications			cULus	
Temperature	Operation	**°C (°F)**	0 to + 55 (+ 32... 131)	
	Storage	**°C (°F)**	- 25 to + 70 (-13...+ 158)	
Degree of protection	Conforming to IEC 60529		IP 67	
Altitude		**m (ft.)**	0 to 2000 (0 to 6562)	
Vibration resistance	Conforming to IEC 68-2-6, test Fc	**Hz**	For plastic housing	5 ≤ f ≤ 57.55 (constant amplitude = 1.5 mm) 57.55 ≤ f ≤ 500 (constant acceleration = 10 gn)
			For metal housing	5 ≤ f ≤ 70 (constant amplitude = 1.5 mm) 70 ≤ f ≤ 500 (constant acceleration = 15 gn)
Shock resistance	Conforming to IEC 68-2-27, test Ea		For plastic housing	30 gn, for 11 ms
			For metal housing	50 gn, for 11 ms
Resistance to electrostatic discharge	Conforming to IEC 61000-4-2	**kV**	Contact: ± 4 Air: ± 8	
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**	Power supply: ± 2 Signal: ± 2	
Surge withstand	Conforming to IEC 61000-4-5	**V**	Power supply: (symmetrical) ± 500, (asymmetrical) ± 1000 Signals: (symmetrical) ± 500, (asymmetrical) ± 1000 Ground/PE: ± 500	
Immunity to conducted disturbance	Conforming to IEC 61000-4-6	**Vrms**	10	
Resistance to magnetic fields, 50 Hz	Conforming to IEC 61000-4-8	**A/m**	30	
Mounting			All positions	
Mechanical mounting			Mounting by two M4 screws for plastic housing (tightening torque 1.5 Nm / 13.3 lbf-in) Mounting by two M6 screws for metal housing (tightening torque 9 Nm / 79.7 lbf-in)	

Fieldbus characteristics

Bus type		**CANopen**	**DeviceNet**	**Profibus-DP**	**InterBus**
Structure	Type	EN 50325 ISO 11898	EN 50325 ISO 11898 CAN, layer 7 DeviceNet	DIN 19245 EN 50170	DIN 19258 EN 50254
	Access method	Multimaster, priority information	Master-Slave	Master-Slave, Multi-Master	Master-Slave
Transmission	Binary rate	1 Mbits/s	500 kbits/s	12 Mbits/s	500 kbits/s
	Medium	2 twisted, shielded wires	4 twisted, shielded wires	2 twisted, type A, shielded wires (RS 485)	3 twisted pairs with common shielding Fiber optic
Configuration	Maximum number of devices	127	63	32 without repeater 126 with repeaters	256
	Maximum length of bus	**At 1 Mbits/s**: - Max. tap-off length: 0.3 m (0.98 ft.) - Max. cumulative tap-off length: 1.5 m (4.9 ft.) **At 500 kbits/s**: - Max. tap-off length: 6 m (19.7 ft.) - Max. cumulative tap-off length: 30 m (32.8 ft.)	**Main line**: - 500 m (1640 ft.) without repeater, - 3 km (9843 ft.)with repeater **Tap-off**: 6 m (19.7 ft.) max.	Without repeater: **At 12 Mbits/s**: - 100 m (328.1 ft.)max. **At 1.5 Mbits/s:** - 200 m (656.2 ft.)max. **At 500 kbits/s:** - 400 m (1312 ft.)max. **At < 93.75 kbits/s:** - 1.2 km (3937 ft.)max.	**Main bus link** (long distance bus): 12.8 km (41,999 ft.) **Local bus link**: 50 m (164 ft.)

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IP 67 monobloc I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTB splitter boxes

Input/output characteristics

Splitter box type FTB			1●●16E●●	1●●08E08SP●	1●●12E04SP●	1●●16C●●	1●●08E08CM0
Bus type			All types of bus				CANopen bus, DeviceNet bus and Profibus-DP bus
Number of inputs/outputs			**16 I** (8 I + 8 diagnostic inputs)	**16 I/O** (8 O + 8 diagnostic inputs)	**16 I/O** (4 I + 4 O + 8 diagnostic inputs)	**16 I/O** (8 I/O + 8 diagnostic I/O)	**8 I + 8 I/O** (8 I + 8 diagnostic I/O)
Internal consumption of splitter box		**mA**	120				
Operating voltage		⎓ **V**	24				
Splitter box max. supply current		**A**	9 (10 for InterBus)				
Bus and I/O undervoltage detection		**V**	< 18				
Built-in short-circuit protection		**mA**	< 100, automatic tripping				
		mA	> 100, reset				

Input characteristics

Number of inputs			**16 I**	**8 I**	**12 I**	**0...16 I**	**8 I + 0...8 I**
Conformity to IEC 1131-2			Type 2				
Compatibility with 2-wire/ 3-wire proximity sensors			Yes				
Input values	Nominal voltage	⎓ **V**	24				
	Maximum current	**mA**	200				
	Sensor power supply	**V**	18 to 30				
Logic			Positive				
Input filtering		**ms**	1				
Protection against reversed polarity			Yes				

Output characteristics

Number of outputs			–	**8 O**	**4 O**	**0...16 O**	**0...8 O**
Output type			–	Transistor			
Nominal output values	Voltage	**V**	–	⎓ 24			
	Current	**A**	–	1.6			
Overvoltage protection			–	Yes (suppressor diode)			
Maximum switching cycles		**Hz**	–	20			
Maximum lamp load		**W**	–	10			
Output connection/cable lengths		**mm²** **AWG**	–	0.34 mm^2 / 5 m (#22 AWG / 16.4 ft.) max.			

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IP 67 monobloc I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTB splitter boxes

FTB 1CN●●●P0

FTB 1CN●●●M0

FTB 1DN●●●P0

FTB 1DN●●●M0

FTB 1DP●●●P0

FTB 1DP●●●M0

FTB 1IB

Number of I/O	Number, type of inputs *(1)*	Number, type of outputs *(2)*	Connection by	Housing type	Reference	Weight kg
Monobloc splitter boxes for CANopen bus						
16	8	8, transistor	8 x M12 female connectors	Plastic	**FTB 1CN08E08SP0**	0.430
	12	4, transistor	8 x M12 female connectors	Plastic	**FTB 1CN12E04SP0**	0.450
	16	–	8 x M12 female connectors	Plastic	**FTB 1CN16EP0**	0.440
				Metal	**FTB 1CN16EM0**	0.820
16 configur-able	0...16	0...16, transistor	8 x M12 female connectors	Plastic	**FTB 1CN16CP0**	0.450
				Metal	**FTB 1CN16CM0**	0.820
16 of which 8 configur-able	8 + 0...8	0...8, transistor	8 x M12 female connectors	Metal	**FTB 1CN08E08CM0**	0.820
Monobloc splitter boxes for DeviceNet bus						
16	8	8, transistor	8 x M12 female connectors	Plastic	**FTB 1DN08E08SP0**	0.450
	12	4, transistor	8 x M12 female connectors	Plastic	**FTB 1DN12E04SP0**	0.450
	16	–	8 x M12 female connectors	Plastic	**FTB 1DN16EP0**	0.430
				Metal	**FTB 1DN16EM0**	0.820
16 configur-able	0...16	0...16, transistor	8 x M12 female connectors	Plastic	**FTB 1DN16CP0**	0.450
				Metal	**FTB 1DN16CM0**	0.820
16 of which 8 configur-able	8 + 0...8	0...8, transistor	8 x M12 female connectors	Metal	**FTB 1DN08E08CM0**	0.820
Monobloc splitter boxes for Profibus-DP bus						
16	8	8	8 x M12 female connectors	Plastic	**FTB 1DP08E08SP0**	0.430
	12	4	8 x M12 female connectors	Plastic	**FTB 1DP12E04SP0**	0.430
	16	–	8 x M12 female connectors	Plastic	**FTB 1DP16EP0**	0.430
				Metal	**FTB 1DP16EM0**	0.820
16 configur-able	0...16	0...16	8 x M12 female connectors	Plastic	**FTB 1DP16CP0**	0.430
				Metal	**FTB 1DP16CM0**	0.820
16 of which 8 configur-able	8 + 0...8	0...8	8 x M12 female connectors	Metal	**FTB 1DP08E08CM0**	0.820
Monobloc splitter boxes for InterBus bus						
16	8	8	8 x M12 female connectors	Plastic	**FTB 1IB08E08SP1**	0.430
	12	4	8 x M12 female connectors	Plastic	**FTB 1IB12E04SP1**	0.440
	16	–	8 x M12 female connectors	Plastic	**FTB 1IB16EP1**	0.430
16 configur-able	0...16	0...16	8 x M12 female connectors	Plastic	**FTB 1IB16CP1**	0.430

(1) ⎓ 24 V IEC type 2.
(2) ⎓ 24 V/1.6 A.

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IP 67 monobloc I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTB splitter boxes

FTX DP2115

Connection accessories

Description	Composition	Length m (ft.)	Reference	Weight kg
For CANopen/DeviceNet buses				
Bus connection cables	Fitted with 2 elbowed M12, 5-pin connectors, A encoded, one at each end	0.3 (0.98)	**FTX CN3203**	0.040
		0.6 (1.97)	**FTX CN3206**	0.070
		1 (3.28)	**FTX CN3210**	0.100
		2 (6.56)	**FTX CN3220**	0.160
		3 (9.8)	**FTX CN3230**	0.220
		5 (16.4)	**FTX CN3250**	0.430
⎓ 24 V power supply connection cables	Fitted with two 7/8, 5-pin connectors, one at each end	0.6 (1.97)	**FTX DP2206**	0.150
		1 (3.28)	**FTX DP2210**	0.190
		2 (6.56)	**FTX DP2220**	0.310
		5 (16.4)	**FTX DP2250**	0.750
	Fitted with one 7/8, 5-pin connector, other end has flying leads	1.5 (4.92)	**FTX DP2115**	0.240
		3 (9.8)	**FTX DP2130**	0.430
		5 (16.4)	**FTX DP2150**	0.700
Connectors	M12 male, 5-pin, A encoded	–	**FTX CN12M5**	0.050
	M12 female, 5-pin, A encoded	–	**FTX CN12F5**	0.050
Line terminator (for end of bus)	Fitted with one M12 connector	–	**FTX CNTL12**	0.010
T-connector for power supply	Fitted with two 7/8, 5-pin connectors	–	**FTX CNCT1**	0.100
For Profibus-DP bus				
Bus connection cables	Fitted with 2 straight M12, 5-pin connectors, one at each end	0.3 (0.98)	**FTX DP1203**	0.040
		0.6 (1.97)	**FTX DP1206**	0.070
		1 (3.28)	**FTX DP1210**	0.100
		2 (6.56)	**FTX DP1220**	0.160
		3 (9.8)	**FTX DP1230**	0.220
		5 (16.4)	**FTX DP1250**	0.430
	Fitted with 2 elbowed M12, 5-pin connectors, one at each end	0.3 (0.98)	**FTX DP3203**	0.040
		0.6 (1.97)	**FTX DP3206**	0.070
		1 (3.28)	**FTX DP3210**	0.100
		2 (6.56)	**FTX DP3220**	0.160
		3 (9.8)	**FTX DP3230**	0.220
		5 (16.4)	**FTX DP3250**	0.430
⎓ 24 V power supply connection cables	Fitted with two 7/8, 5-pin connectors, one at each end	0.6 (1.97)	**FTX DP2206**	0.150
		1 (3.28)	**FTX DP2210**	0.190
		2 (6.56)	**FTX DP2220**	0.310
		5 (16.4)	**FTX DP2250**	0.750
	Fitted with one 7/8, 5-pin connector, other end has flying leads	1.5 (4.92)	**FTX DP2115**	0.240
		3 (9.8)	**FTX DP2130**	0.430
		5 (16.4)	**FTX DP2150**	0.700
Connectors	M12 male, 5-pin, B encoded	–	**FTX DP12M5**	0.050
	M12 female, 5-pin, B encoded	–	**FTX DP12F5**	0.050
Line terminator (for end of bus)	Fitted with one M12 connector	–	**FTX DPTL12**	0.010
T-connector for power supply	Fitted with two 7/8, 5-pin connectors	–	**FTX CNCT1**	0.100
Cables	Flying leads at both ends	100 (328.1)	**TSX PBSCA100**	–
		400 (1213)	**TSX PBSCA400**	–
For InterBus bus				
Cables with connectors for bus and power supply	Fitted with 2 sets of connectors	0.6 (1.97)	**FTX IB1206**	0.250
		1 (3.28)	**FTX IB1210**	0.400
		2 (6.56)	**FTX IB1220**	0.650
		5 (16.4)	**FTX IB1250**	–
Cable gland	M16 x 1.5 (set of 2)	–	**FTX CPE10**	0.020

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IP 67 monobloc I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTB splitter boxes

108768

FTX CY1208

Separate components

Description	Composition	Reference	Weight kg
For all bus types			
Connectors	7/8 male, 5-pin	**FTX C78M5**	0.050
	7/8 female, 5-pin	**FTX C78F5**	0.050
Sealing plugs	For M8 connector (lot of 10)	**FTX CM08B**	0.100
	For M12 connector (lot of 10)	**FTX CM12B**	0.100
	For 7/8 connector	**FTX C78B**	0.020
Y-connectors	Connection of 2 x M8 connectors to M12 connector on splitter box	**FTX CY1208**	0.020
	Connection of 2 x M12 connectors to M12 connector on splitter box	**FTX CY1212**	0.030
Diagnostics adaptor	Fitted with two M12 connectors	**FTX DG12**	0.020
Marker labels	For plastic splitter boxes (lot of 10)	**FTX BLA10**	0.010
	For metal splitter boxes (lot of 10)	**FTX MLA10**	0.010

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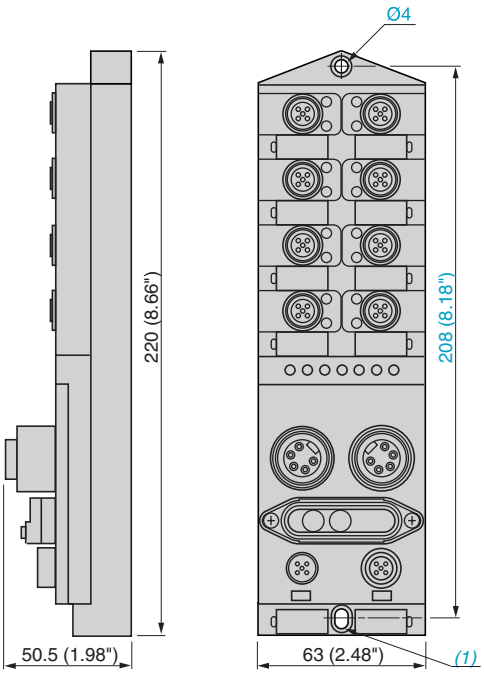
IP 67 monobloc I/O splitter boxes for fieldbuses

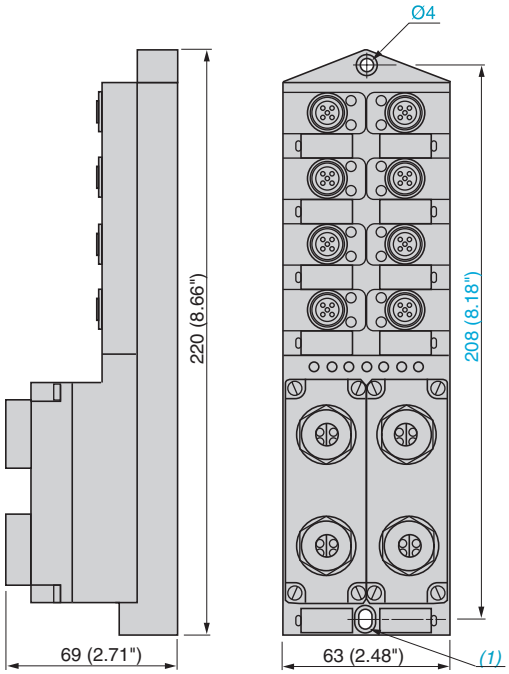
Advantys™ Distributed I/O, FTB splitter boxes

FTB 1CN●●●P0, FTB 1DN●●●P0, FTB 1DP●●●P0



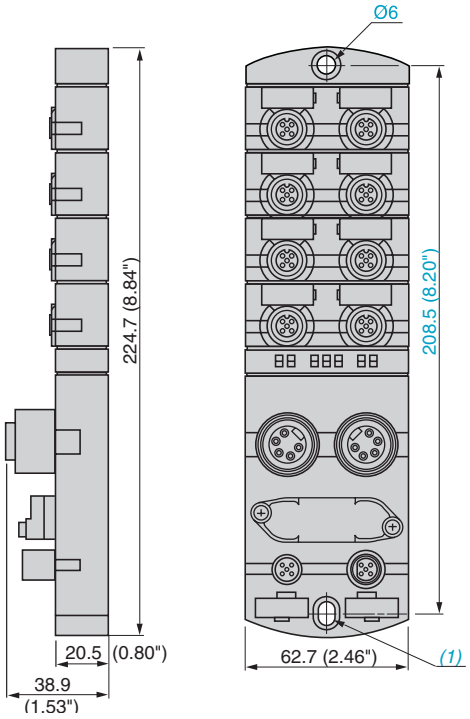
(1) Ø 4 elongated hole

FTB 1IB●●●P1



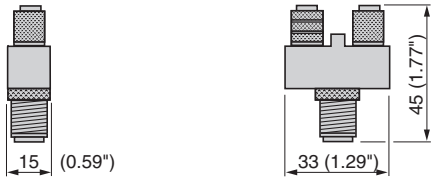
(1) Ø 4 elongated hole

FTB 1CN●●●●●●M0, FTB 1DN●●●●●●M0, FTB 1DP●●●●●●M0

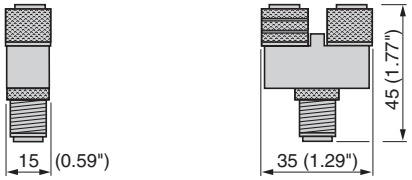


(1) Ø 6 elongated hole

FTX CY1208



FTX CY1212



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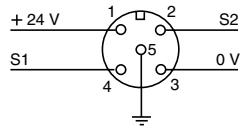
IP 67 monobloc I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTB splitter boxes

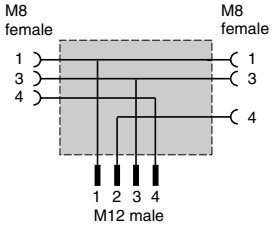
Sensor/actuator connection



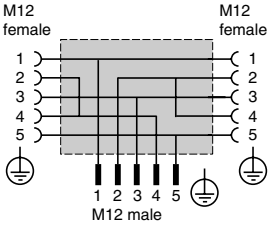
M12 female connector

Y-connector connection

FTX CY1208



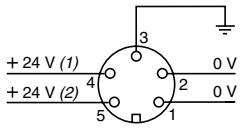
FTX CY1212



CANopen and DeviceNet buses

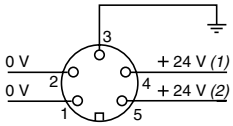
Supply to splitter box

Supply input



7/8 male connector

Supply output

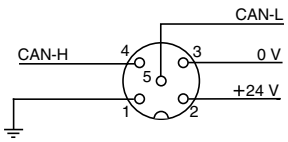


7/8 female connector

(1) Supply to splitter box and sensors.
(2) Supply to actuators.

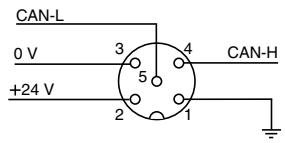
Bus input/Bus output

Bus input



M12 male connector

Bus output

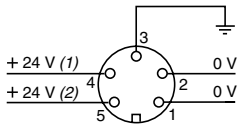


M12 female connector

Profibus-DP bus

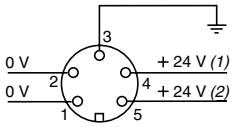
Supply to splitter box

Supply input



7/8 male connector

Supply output

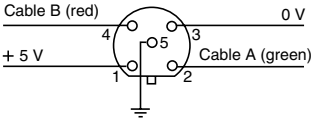


7/8 female connector

(1) Supply to splitter box and sensors.
(2) Supply to actuators.

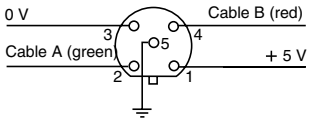
Bus input/Bus output

Bus input



M12 male connector

Bus output



M12 female connector

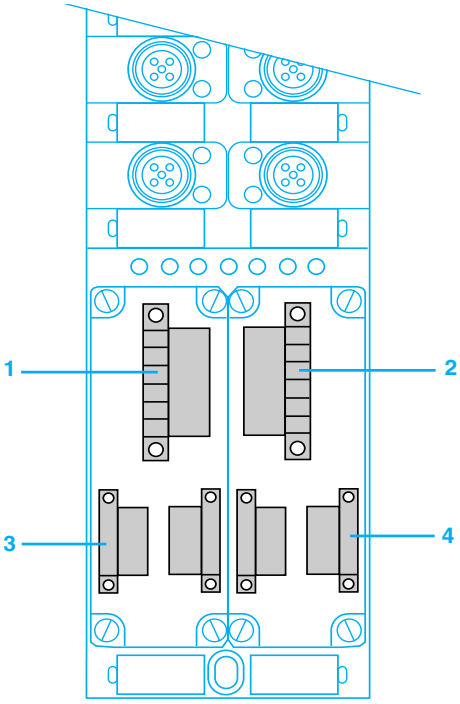
Note: *connectors linked to shielding.*

IP 67 monobloc I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTB splitter boxes

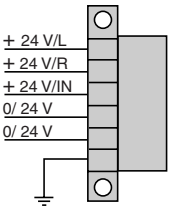
InterBus bus

Connections to splitter box

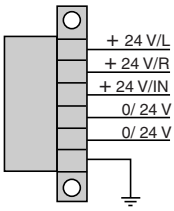


Supply to splitter box

1 Supply input

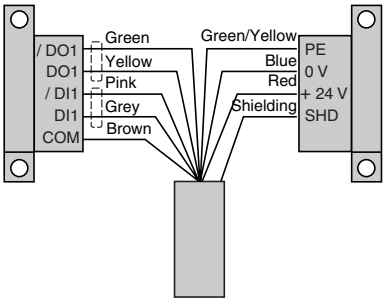


2 Supply output

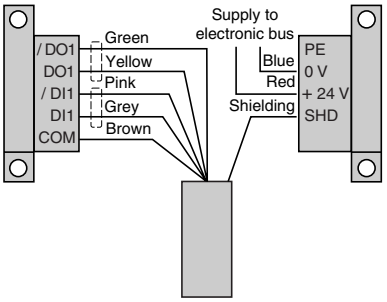


Bus input/Bus output

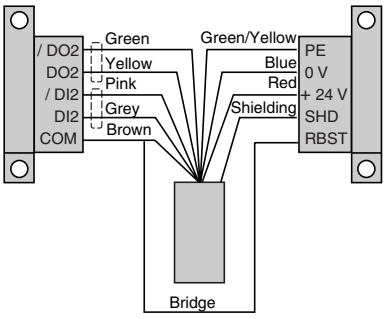
3 Local bus, bus input



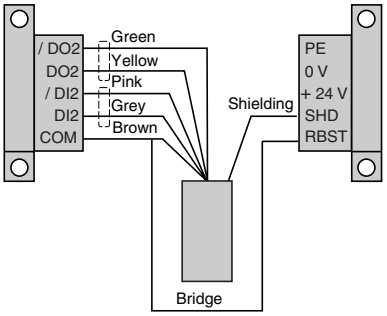
3 Main bus, bus input



4 Local bus, bus output



4 Main bus, bus output



IP 67 modulor I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTM splitter boxes

Bus modules FTM Industrial fieldbus type	CANopen	DeviceNet	PROFIBUS
			
Degree of protection	IP 67		
Bus connector type	M12, A encoded	M12, A encoded	M12, B encoded
Maximum number of digital I/O per bus module	256		
Maximum number of splitter boxes per bus module	16		
Maximum number of splitter boxes per segment	4		
Bus module type	FTM 1CN10	FTM 1DN10	FTM 1DP10
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Splitter boxes FTM (not governed by the type of fieldbus)		Digital inputs/outputs				Analog inputs/outputs			
		 108741		 109017		 108745			
Degree of protection		IP 67							
Bus connection		Internal bus + 24 V power supply by M12, 6-pin connectors							
Splitter box type		Compact		Expandable		Compact			
Connector type		M8	M12	M8	M12	M12			
Modularity Number of channels		8 I 8 I/O	8 I 8 I/O 16 I 16 I/O	8 I 8 I/O	8 I 8 I/O 16 I 16 I/O	4 I		4 O	
Digital inputs	**Voltage**	⎓ 24 V				–			
	Conformity to IEC 11331-2	Type 2				–			
Digital outputs	**Voltage**	⎓ 24 V				–			
	Type	Transistor				–			
	Current/output	0.5 A				–			
	Maximum supply by internal bus	4 A				–			
Analog inputs/outputs	**Nature**	–				Current	Voltage	Current	Voltage
	Measuring range	–				0 to 20 mA 4 to 20 mA	⎓ ± 10 V, ⎓ 0 to 10 V	0 to 20 mA 4 to 20 mA	⎓ ± 10 V, ⎓ 0 to 10 V
	Resolution	–				16 bits	15 bits + sign	12 bits	11 bits + sign
	Conversion time	–				≤ 2 ms/channel			
Diagnostics	**Per channel**	I/O short-circuit Wire breakage fault Faulty sensors/actuators				I/O short-circuit Wire breakage fault Faulty sensors/actuators			
Splitter box type		**FTM 1D●08 C08**	**FTM 1D●●● C12**	**FTM 1D●08 C08E**	**FTM 1D●●● C12E**	**FTM 1AE04 C12C**	**FTM 1AE04 C12T**	**FTM 1AS04 C12C**	**FTM 1AS04 C12T**
Pages		48				48			

IP 67 modular I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTM splitter boxes

Presentation

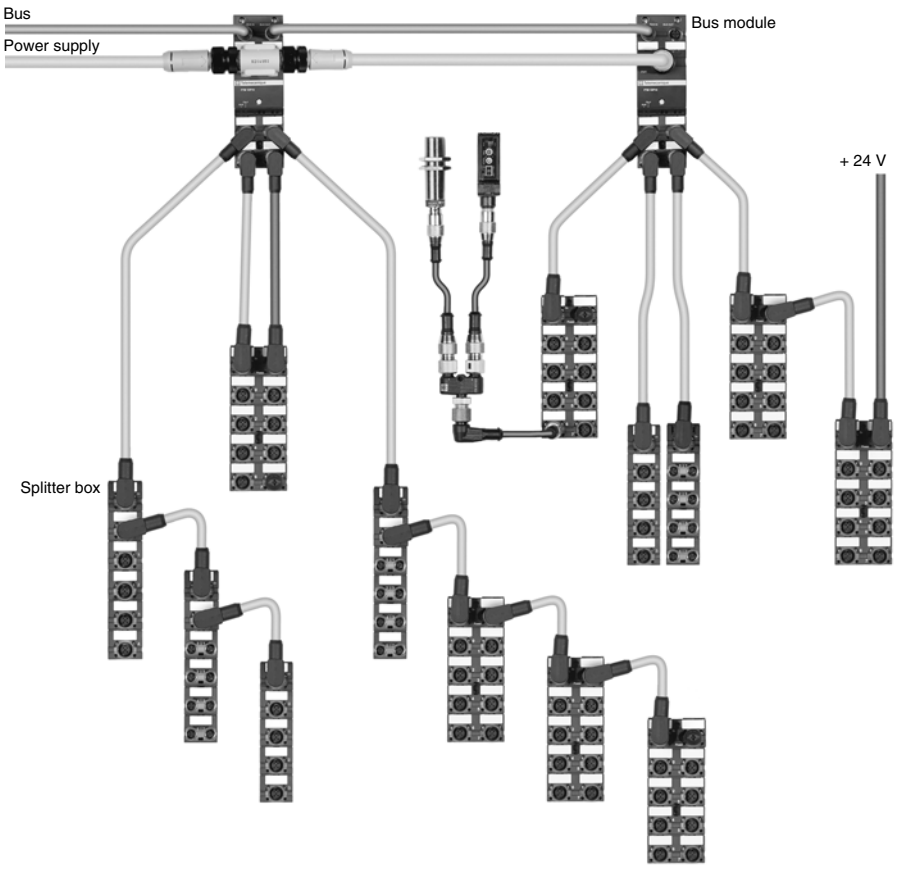
To meet the needs of machine manufacturers and users, automation system architectures are becoming decentralized, while offering performances comparable to those obtained with a centralized structure.
Advantys FTM IP 67 modular I/O splitter boxes enable sensors and actuators to be connected in distributed automation systems using pre-assembled cables, thus reducing wiring time and costs, whilst at the same time increasing the operational availability of the installation.

These IP 67 protected splitter boxes can also be used within processes or machines in harsh environments (splashing water, oil, dust, etc.).

Advantys FTM splitter boxes allow distributed connection of sensors and actuators on machines via a fieldbus. They communicate on different buses such as: CANopen, DeviceNet and Profibus-DP.
Sensors and actuators are connected by means of standard M12 and M8 connectors.
This modularity makes installation of the splitter boxes within the machine even easier.
The configurable I/O splitter boxes also enable the mixing of inputs and outputs and, as a result, reduce the number of product variants. This provides savings in space as well as increasing the flexibility of the installation.

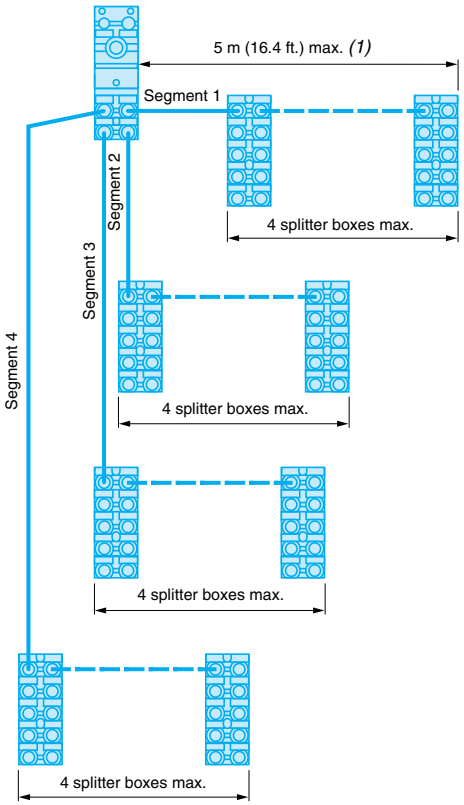
Principle

The Advantys FTM modular offer enables, from a single communication interface (fieldbus module), the connection of a changeable number of I/O splitter boxes. These splitter boxes are connected to the bus module by a hybrid cable comprising both the internal bus and the power supply (internal, sensors and actuators). **The I/O splitter boxes are not governed by the type of fieldbus**, thus reducing the number of splitter box references. Addressing of Advantys FTM splitter boxes is automatic. On completion of mounting, the system is ready to operate.



IP 67 modular I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTM splitter boxes



(1) Maximum distance of 5 m (16.4 ft.) between the bus module and the last splitter box on the same segment.

Presentation *(continued)*

The topology of the system is a star/line architecture.
Each bus module is fitted with four M12 connectors for the connection of Advantys FTM splitter boxes (star architecture). On each “run”, called a segment, it is possible to connect up to 4 splitter boxes on the chaining principle (line architecture). The maximum length of a segment, between the bus module and the last splitter box, must not exceed 5 m (16.4 ft.).

For one bus module, the maximum number of splitter boxes is:
- 4 per segment, i.e. 64 I/O.
- 16 for the group of 4 possible segments of the bus module, i.e. 256 digital I/O.

Several Advantys FTM splitter box variants are available:

Compact splitter boxes
These splitter boxes do not allow continuity of the internal bus to other splitter boxes on the same bus module segment. They are used in the following cases:
- a single splitter box on a segment (no chaining),
- the last splitter box on a segment.

Expandable splitter boxes
These splitter boxes allow continuity of the internal bus to other splitter boxes (chaining). If an expandable splitter box is used as the last splitter box of an internal bus segment, it is then necessary to install a line terminator on the output bus connector.

Digital I/O splitter boxes
These splitter boxes are available in compact and expandable versions, only for the connection of sensors (input splitter boxes) or for the connection of sensors and/or actuators (input/output splitter boxes):
- ⎓ 24 V inputs, IEC type 2.
- ⎓ 24 V 0.5 A transistor outputs.

- The different input splitter box variants are as follows:
  - 8 x M8 connectors for connection of up to 8 sensors,
  - 4 x M12 connectors for connection of up to 8 sensors (4 for sensors with integrated DESINA ■ diagnostics function),
  - 8 x M12 connectors for connection of up to 16 sensors (8 for sensors with integrated DESINA diagnostics function).

- The different input/output splitter box variants are as follows:

Each channel can be configured as an input, an output or as a diagnostic input.
  - 8 x M8 connectors for connection of up to 8 sensors or actuators,
  - 4 x M12 connectors for connection of up to 8 sensors or actuators (4 for sensors with integrated DESINA diagnostics function),
  - 8 x M12 connectors for connection of up to 16 sensors or actuators (8 for sensors or actuators with integrated DESINA diagnostics function).

Analog I/O splitter boxes
These splitter boxes are only available in the compact version for the connection of analog sensors or actuators using M12 connectors:
- 4 analog input splitter boxes (voltage or current).
- 4 analog output splitter boxes (voltage or current).

■ DESINA - Standard relating to the connector technology of sensors, and actuators, established by the German Machine Tool Builder’s Association.

IP 67 modular I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTM splitter boxes

Functions

Selection of signal type per channel

■ Each M12, 5-pin connector on Advantys FTM splitter boxes allows the connection of 2 signals. Depending on the type of splitter box, these can be:
□ 1 sensor input signal,
□ 1 diagnostic input signal,
□ 1 actuator output signal.

Signal type, depending on digital splitter box selected:

		FTM 1DD	FTM 1DE
M12 and M8	Contact 4	Input Output	Input
M12	Contact 2	Input Output Diagnostic	Input Diagnostic

Note: *either a normally open (N/O) or a normally closed (N/C) contact can be chosen for each input signal.*

Diagnostics

Each Advantys FTM splitter box has one LED per channel to indicate the status of the channel and to enable fast and precise location of a fault. Fault monitoring diagnostics are indicated on the splitter box by LEDs and are fed back to the control system (PLC) via the bus.

There are 2 levels of diagnostics:
■ diagnostics per channel,
■ diagnostics per splitter box.

Diagnostics per channel

■ **Sensor short-circuit**
A short-circuit or overload on contact 1 of the M12 or M8 female connector blows the self-resetting fuse. Each M12 or M8 connector is individually protected. A red LED indicates the fault on the corresponding M12 or M8 connector. This fault is signalled to the Master. Supply to the sensors is automatically restored after elimination of the fault.

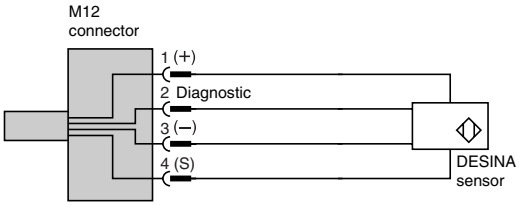
■ **Actuator short-circuit**
A short-circuit or overload of an output causes a reset of this output. The fault is signalled to the Master. A red LED indicates the fault on the corresponding M12 or M8 connector. The output does not restart automatically. After having eliminated the cause of the fault, the channel must be reset by the PLC. This operation erases the short-circuit memory.

■ **Actuator warning**
When the output is at state 0, the contact corresponding to the M12 or M8 female connector is checked for presence of 24 V voltage. If + 24 V is present, it means there is a “short-circuit”. A red LED indicates the fault on the corresponding M12 or M8 connector. The fault is signalled to the Master.

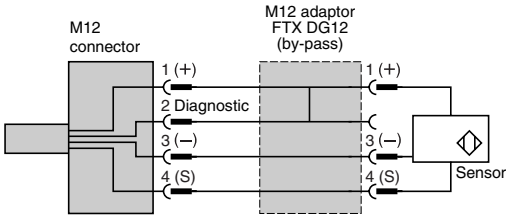
IP 67 modular I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTM splitter boxes

Example of connection of a sensor with integrated diagnostics function



Example of connection of a standard sensor with the diagnostics adaptor



Functions *(continued)*

Diagnostics per splitter box

- **Sensor/actuator supply status.**
- **"Undervoltage" fault on the I/O supply.**
- **Sensor short-circuit**.
- **Actuator short-circuit**.

Use of contact 2 diagnostics function (M12 connector)

Advantys FTM splitter boxes allow the use of sensors and actuators incorporating an integrated diagnostics function (DESINA type). Configuring contact 2 of each M12 connector as a diagnostic input enables detection of external faults associated with the sensors or actuators.
This information enables the following faults to be detected:

- damage to the detection surface,
- faulty electronics,
- no load.

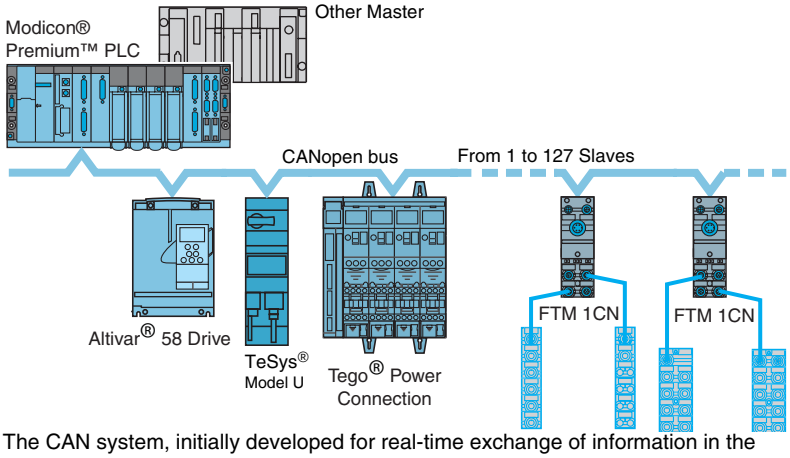
Selection of either the sensor input or diagnostic input function on contact 2 is made channel by channel, by entering parameters, when configuring the splitter box.
Fault indication by a red LED is possible for each channel configured as a diagnostic input.

Example of connection of a sensor with integrated diagnostics function:
Using the M12 diagnostics adaptor accessory **FTX DG12**, it is possible to monitor breaks in wiring to sensors or actuators which do not have an integrated diagnostics function (only applicable to splitter boxes fitted with M12 connectors).

IP 67 modular I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTM splitter boxes

CANopen bus presentation



The CAN system, initially developed for real-time exchange of information in the automobile industry, is now being used more and more throughout industry. There are several fieldbuses based on CAN base layers and components.
The CANopen bus conforms to international standard ISO 11898, promoted by the “CAN in Automation” association (a grouping of manufacturers and users), and guarantees a high degree of openness and inter-operability due to its communication profiles and its standardized equipment.
The CANopen bus is now recognized, in Europe, as the reference standard for building industrial systems based on the CAN concept.
The CANopen bus is a Multimaster bus, based on the Master/Slave principle.
The physical link consists of a shielded twisted pair, to which up to a maximum of 127 Slaves can be connected by simple tap-off. The binary rate varies, depending on the length of the bus, from 1 Mbits/s for 40 m (131.2 ft.) to 50 kbits/s for 1000 m 3281 ft.).
Each end of the bus must be fitted with a line terminator.

The CANopen bus is a set of profiles on CAN systems, possessing the following characteristics:
- Open bus system.
- Data exchanges in real-time without overloading the protocol.
- Modular design allowing modification of size.
- Interconnection and interchangeability of devices.
- Standardized configuration of networks.
- Access to all device parameters.
- Synchronization and circulation of data from cyclic and/or event-controlled processes (short system response time).
- Exchanges possible with numerous international manufacturers.

CANopen bus configuration

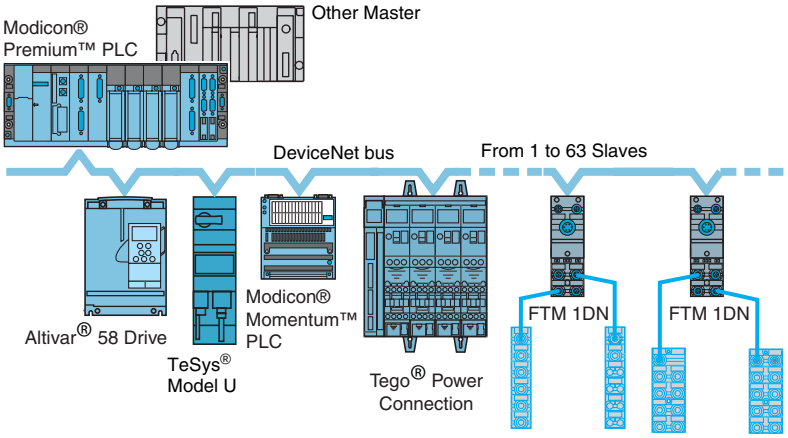
An .eds file is assigned to each product, which contains all the important information relating to the product. An icon (.dib) is also available for installation in the system configurator.
Please refer to the configuration software documentation for the import of .eds files.
Following the CANopen system initialization phase, all the Slaves signal their presence on the bus by means of a “Boot-Up” message. A setting-up configurator (e.g.: SyCon. Refer to our Modicon® Premium™ PLC automation platform catalog) can then start to read and register the CANopen bus and, on the basis of the data obtained, assign a corresponding .eds file to each Slave. Based on the .eds file data, the Master creates a peripheral image of all the Slaves detected by the PLC. The user can assign I/O bytes to logic addresses within the PLC.
- Addressing

The addresses are configurable from 1 to 99 by means of 2 coding wheels (x 10 and x 1). A 3rd coding wheel enables the data transmission speed to be selected (position 0 = automatic speed recognition).

IP 67 modular I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTM splitter boxes

DeviceNet bus presentation



The DeviceNet system is a sensor/actuator bus system of the open Low-End type, used in various industrial applications and, in particular, the automobile industry. It is based on CAN technology (OSI layers 1 and 2).
The DeviceNet bus is based on the Master/Slave principle.
The physical link consists of 2 shielded twisted pairs (2 wires for data, 2 wires for auxiliary supply to sensors), to which up to a maximum of 63 slaves can be connected. The binary rate varies, depending on the length of the bus, from 125 kbits/s for 500 m (1640 ft.) to 500 kbits/s for 100 m (328.1 ft.).
Each end of the bus must be fitted with a line terminator.

DeviceNet bus configuration

An .eds file is assigned to each product, which contains all the important information relating to the product. An icon (.ico) is also available for installation in the system configurator.
When the network is scanned, the identification data is compared with that of the Slaves present on the network and assigned accordingly. After the scanning phase, the scanner will have identified all the Slaves and saved information relating to data length and operating mode.
The DeviceNet bus Master establishes a peripheral image of all the devices detected on the DeviceNet bus and incorporates them according to their physical location in a Scan list. The user can then assign the Scan list, according to the peripheral image of the bus devices, to logic addresses in the PLC.

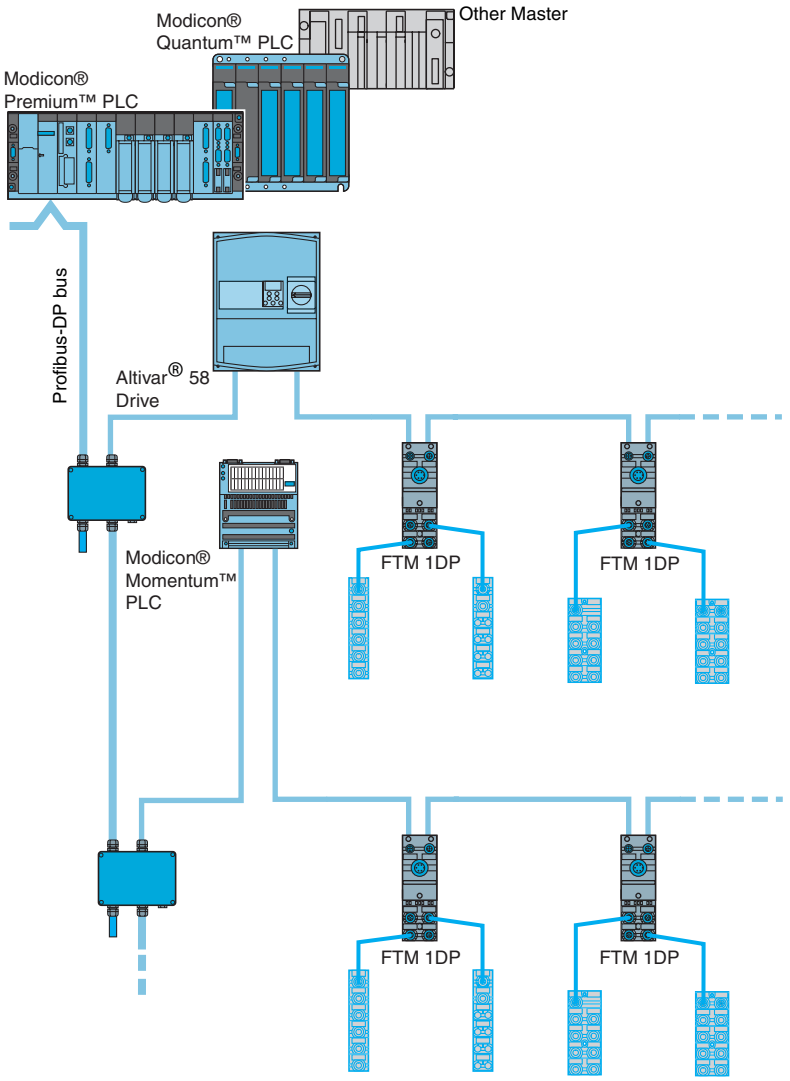
■ Addressing

The addresses are configurable from 1 to 63 by means of 2 coding wheels (x 10 and x 1). A 3rd coding wheel enables the data transmission speed to be selected (3 speeds can be selected: 125, 250 and 500 kbits/s).

IP 67 modular I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTM splitter boxes

Profibus-DP presentation

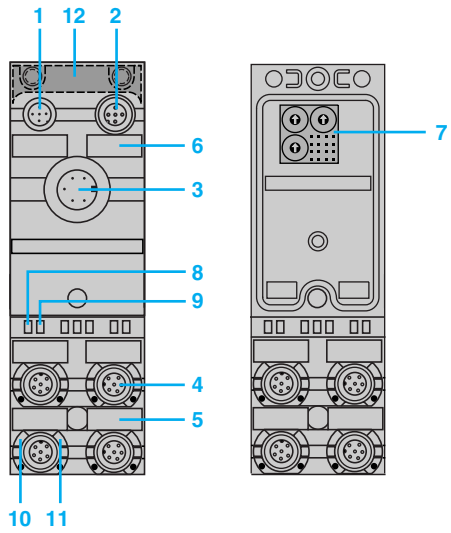


The Profibus-DP (Process Fieldbus Decentralized Peripheral) is an open type fieldbus system for industrial applications. The Profibus standard is described in standard EN 50170.
The physical link is a simple, type A, shielded twisted pair.
Data exchange between the Master (processing unit) and the Slaves (decentralized devices) is performed in a cyclic manner.
A maximum of 32 Slaves can be connected to a bus segment. To increase the maximum number of Slaves possible, repeaters must be installed in order to create new bus segments.
The repeaters also provide galvanic isolation of the bus segments.
The total number of slaves must not exceed 126.
The bus must be fitted with a line terminator at each end of each segment created.

Description: page 43 | Connections: pages 44, 45 | Characteristics: pages 46, 47 | References: pages 48, 49 | Dimensions, schemes: pages 50, 51

IP 67 modular I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTM splitter boxes



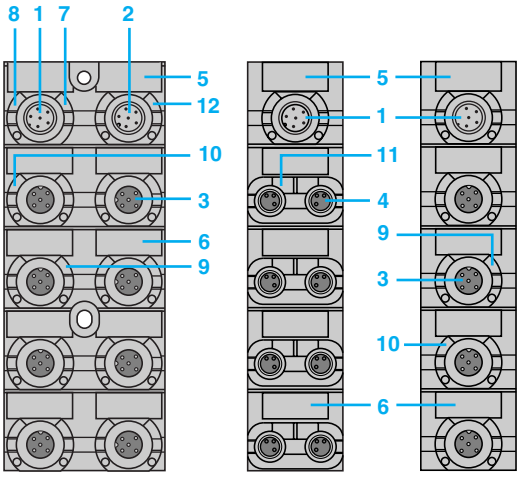
Bus module FTM with cover

Bus module FTM without cover

Description

Modular bus modules FTM have the following on the front face:

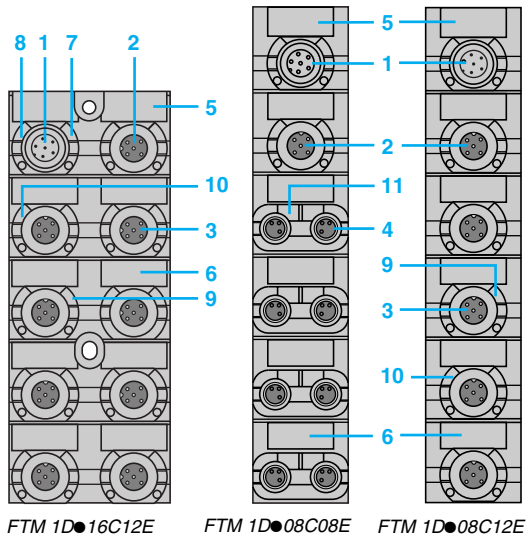
1 One M12 male connector (bus IN) for connection of the bus.
2 One M12 female connector (bus OUT) for connection of the bus.
3 One 7/8 male connector for connection of the ⎓ 24 V power supplies.
4 Four M12 female connectors for connection of the splitter box inputs/outputs via the internal bus.
5 Four channel marker labels.
6 Two bus module marker labels.
7 Speed selection (CANopen and DeviceNet buses) and bus address switches.
8 One bus power supply status LED.
9 One bus diagnostics LED.
10 One sensor power supply diagnostics LED.
11 One sensor power supply diagnostics and communication status LED.
12 Bus module functional ground connection.



FTM 1D●16C12 *FTM 1D●08C08* *FTM 1D●08C12 FTM 1A●04C12●*

Compact splitter boxes FTM 1D●08C●●, FTM 1D●16C12 and FTM 1A●04C12● have the following on the front face:

1 One M12 male connector for connection to the bus module or the previous module.
2 One M12 male connector for connection of an auxiliary ⎓ 24 V actuator power supply (only applicable to FTM 1DD16C12).
3 Four or eight M12 female connectors (depending on model) for connection of sensors and actuators.
4 Eight M8 female connectors for connection of sensors and actuators.
5 One or two splitter box marker labels (depending on model).
6 Four or eight channel marker labels.
7 One actuator power supply diagnostics LED.
8 One sensor power supply diagnostics and communication status LED.
9 Four or eight channel status indicator lights (00 to 07).
10 Four or eight channel status indicator lights (10 to 17) or channel diagnostic indicator lights (00 to 07) depending on the splitter box configuration.
11 Eight channel “power on” indicator lights (00 to 07).
12 One auxiliary supply “power on” indicator light.



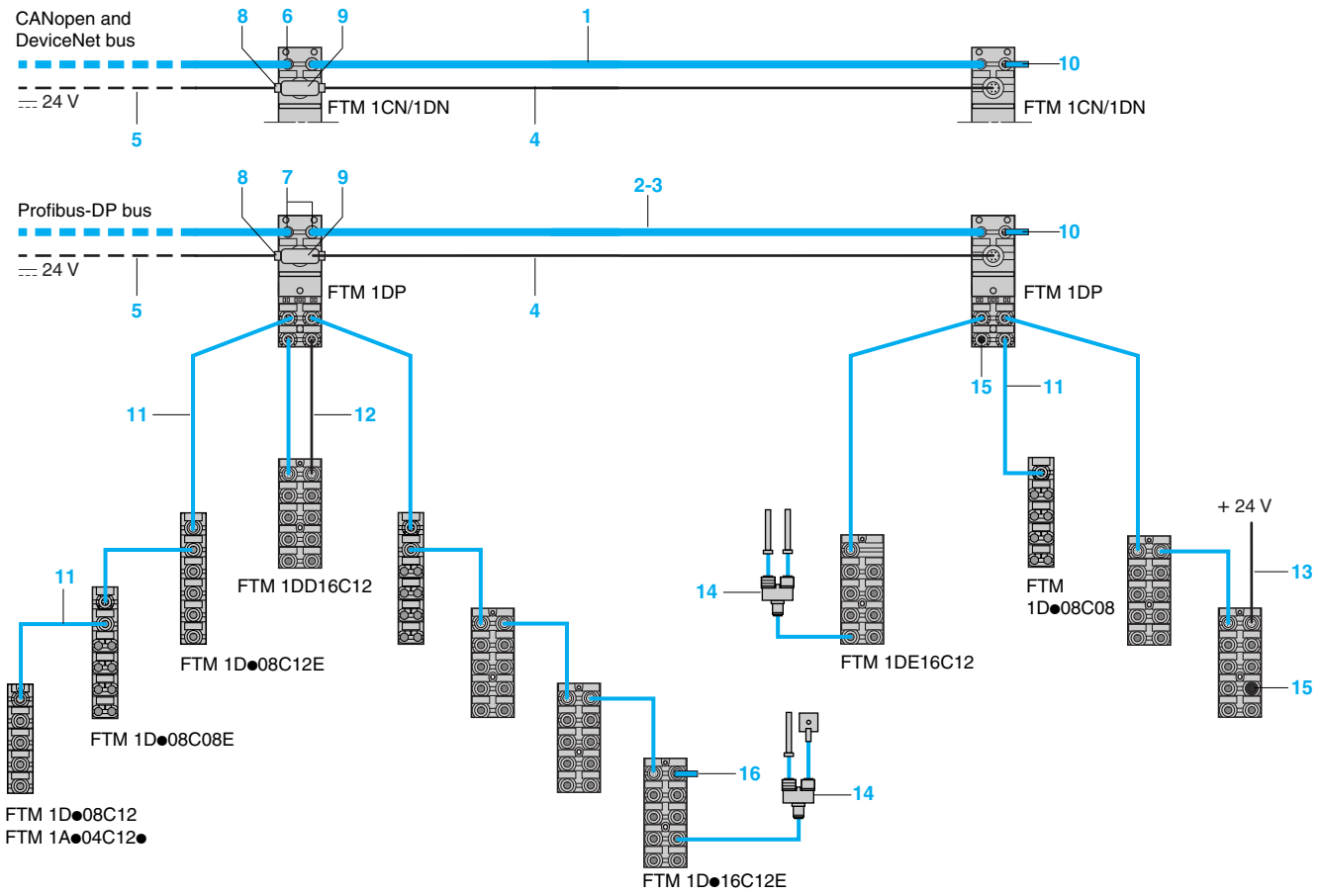
FTM 1D●16C12E *FTM 1D●08C08E* *FTM 1D●08C12E*

Expandable splitter boxes FTM 1D●08C●●E and FTM 1 D●16C12E have the following on the front face:

1 One M12 male connector for connection to the bus module or the previous module.
2 One M12 female connector for chaining the internal bus to the next module.
3 Four or eight M12 female connectors (depending on model) for connection of sensors and actuators.
4 Eight M8 female connectors for connection of sensors and actuators.
5 One or two splitter box marker labels (depending on model).
6 Four or eight channel marker labels.
7 One actuator power supply diagnostics LED.
8 One sensor power supply diagnostics LED.
9 Four or eight channel status indicator lights (00 to 07).
10 Four or eight channel status indicator lights (10 to 17) or channel diagnostic indicator lights (00 to 07) depending on the splitter box configuration.
11 Eight channel “power on” indicator lights (00 to 07).

IP 67 modular I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTM splitter boxes



Note: *the I/O splitter boxes are not governed by the type of fieldbus.*

IP 67 modular I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTM splitter boxes

Cabling accessories for bus modules

Bus module to bus connection cables

Various cables enable connection of the bus module to the fieldbus.
They are available in different lengths:

CANopen and DeviceNet buses:

1 **FTX CN32●●**: cables fitted with 2 elbowed M12, 5-pin connectors, one at each end, for connecting the bus between two bus modules.

Bus Profibus-DP:

2 **FTX DP32●●**: cables fitted with 2 elbowed M12, 5-pin connectors, one at each end, for connecting the bus between two bus modules.

3 **FTX DP12●●**: cables fitted with 2 straight M12, 5-pin connectors, one at each end, for connecting the bus between two bus modules.

Bus module ⎓ 24 V power supply connection cables

Cables FTX DP2●●● enable connection of the main ⎓ 24 V power supply to bus modules FTM 1.
Two types of cable are available, in various lengths:

4 **FTX DP22●●**: cables fitted with two 7/8, 5-pin connectors, one at each end, for chaining ⎓ 24 V power supplies between two bus modules.

5 **FTX DP21●●**: cables fitted with a 7/8, 5-pin connector at one end, with the other end free for connection of ⎓ 24 V power supplies.

Connectors

6 **FTX CN12●5**: M12, 5-pin, male and female connectors for CANopen and DeviceNet bus cables (A encoded).

7 **FTX DP12●5**: M12, 5-pin, male and female connectors for Profibus-DP bus cables (B encoded).

8 **FTX C78●5**: 7/8, 5-pin, male and female connectors for ⎓ 24 V power supply cables.

Other components

9 **FTX CNCT1**: T-connector fitted with two 7/8, 5-pin connectors, for power supply cable.

10 **FTX ●●TL12**: CANopen, DeviceNet and Profibus-DP bus line terminators, fitted with an M12 connector.

Internal cabling accessories

Internal bus connection cables

Cables FTX CB32●● enable connection of the internal bus between the bus module and the splitter boxes.
This cable is available in different lengths:

11 **FTX CB32●●**: cables fitted with 2 elbowed M12, 6-pin connectors, one at each end, for connection of internal bus between the bus module and the splitter box or for chaining between two splitter boxes.

Auxiliary ⎓ 24 V power supply connection cables

Cables FTX CA3●●● enable connection of an auxiliary ⎓ 24 V power supply between the bus module and the splitter boxes or directly from a ⎓ 24 V power supply.
Two types of cable are available, in various lengths:

12 **FTX CA32●●**: cables fitted with 2 elbowed M12, 6-pin connectors, one at each end, for connection of ⎓ 24 V power supplies between the bus module and the splitter box.

13 **FTX CA31●●**: cables fitted with 1 elbowed M12, 6-pin connector at one end, with the other end free for connection of ⎓ 24 V power supply.

Other components

14 **FTX CY12●●**: Y-connector for M12 and M8 connectors.

15 **FTX CM●●B**: sealing plugs for M12 and M8 connectors (bus modules and splitter boxes).

16 **FTX CBTL12**: internal bus line terminator fitted with an M12 connector.

IP 67 modular I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTM splitter boxes

Environmental characteristics

Product certifications			cULus
Temperature	Operation	**°C (°F)**	0 to + 55 (+ 32... + 131)
	Storage	**°C (°F)**	- 25 to + 70 (-13... + 158)
Degree of protection			IP 67
Altitude		**m (ft.)**	0 to 2000 (0...6562)
Vibration resistance	Conforming to IEC 68 part 2-6		15 gn
Shock resistance	Conforming to IEC 68-2-27, test Ea		50 gn, for 11 ms
Resistance to electrostatic discharge	Conforming to IEC 61000-4-2	**kV**	Contact: ± 4 Air: ± 8
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**	Power supply: ± 2 Signal: ± 2
Surge withstand	Conforming to IEC 61000-4-5	**V**	Power supply: (symmetrical and asymmetrical) ± 500 Signals: (symmetrical and asymmetrical) ± 1000 Ground/PE: ± 500
Immunity to conducted disturbance	Conforming to IEC 61000-4-6	**V/m**	10
Resistance to magnetic fields, 50 Hz	Conforming to IEC 61000-4-8	**A/m**	30
Mounting			All positions
Mechanical mounting			Mounting by two M4 screws (tightening torque 1.5 Nm / 13.3 lbf-in)

Bus module characteristics

Bus module type		**FTM 1CN10**	**FTM 1DN10**	**FTM 1DP10**
Bus type		CANopen	DeviceNet	Profibus-DP
Operating voltage	⎓ **V**	24		
Maximum supply current	**A**	9		
Binary rate		125, 250 and 500 kbits/s		12 Mbits/s
Internal consumption of bus module	**mA**	70		80

Fieldbus characteristics

Bus type			**CANopen**	**DeviceNet**	**Profibus-DP**
Structure	Type		EN 50325 ISO 11898	EN 50325 ISO 11898 CAN, layer 7 DeviceNet	DIN 19245 EN 50170
	Access method		Multimaster, priority information	Master-Slave	Master-Slave, Multi-Master
Transmission	Binary rate		1 Mbits/s	500 kbits/s	12 Mbits/s
	Medium		2 twisted, shielded wires	4 twisted, shielded wires	2 twisted, type A, shielded wires (RS 485)
Configuration	Maximum number of devices		127	63	32 without repeater 126 with repeaters
	Maximum length of bus		**At 1 Mbits/s**: - Max. tap-off length: 0.3 m (0.98 ft.) - Max. cumulative tap-off length: 1.5 m (4.9 ft.) **At 500 kbits/s**: - Max. tap-off length: 6 m (19.7 ft.) - Max. cumulative tap-off length: 30 m (98.42 ft.)	**Main line**: - 500 m (1640 ft.) without repeater, - 3 km (9843 ft.) with repeater **Tap-off**: 6 m (19.7 ft.) max.	Without repeater: **At 12 Mbits/s**: - 100 m (328.1 ft.) max. **At 1.5 Mbits/s:** - 200 m (656.2 ft.) max. **At 500 kbits/s:** - 400 m (1312 ft.) max. **At < 93.75 kbits/s:** - 1.2 km (3937 ft.) max.

Presentation, functions: pages 36 - 41 | Description: page 43 | Connections: pages 44, 45 | References: pages 48, 49 | Dimensions, schemes: pages 50, 51

IP 67 modular I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTM splitter boxes

Digital input/output splitter box characteristics

Splitter box type			Inputs		Inputs/outputs	
	Compact		FTM 1DE08C●●	FTM 1DE16C12	FTM 1DD08C●●	FTM 1DD16C12
	Expandable		FTM 1DE08C●●E	FTM 1DE16C12E	FTM 1DD08C●●E	FTM 1DD16C12E
Number of inputs/outputs			8 I	16 I	8 I/O	16 I/O
Internal consumption of splitter box		**mA**	30 (M8) 50 (M12)	50	30 (M8) 50 (M12)	50
Operating voltage		**⎓ V**	24			
Splitter box max. supply current		**A**	4			
Auxiliary supply max. current		**A**	–			4 (only **FTM 1DD16C12**)
Bus and I/O undervoltage detection		**V**	< 18			

Input characteristics

Number of inputs			8 I	16 I	0...8 I	0...16 I
Conformity to IEC 1131-2			Type 2			
Compatibility with 2-wire/3-wire proximity sensors			Yes			
Input values	Nominal voltage	**⎓ V**	24			
	Maximum current	**mA**	200			
	Sensor power supply	**V**	18...30			
Logic			Positive			
Input filtering		**ms**	1			
Channel status indication			By LED (yellow), one LED per input			
Protection against reversed polarity			Yes			

Output characteristics

Number of outputs			–		0...8 O	0...16 O
Output type			–		Transistor	
Nominal output values	Voltage	**⎓ V**	–		24	
	Current	**A**	–		0.5	
Response time		**ms**	–		< 0.5	
Max. switching cycle		**Hz**	–		Resistive: 50 Inductive: 5	
Max. lamp load		**W**	–		10	
Channel status indication			–		By LED (yellow), one LED per output	
Output connection/cable lengths			–		0.34 mm² / 5 m (#22 AWG / 16.4 ft.) max 0.75 mm² / 10 m (#19 AWG / 32.8 ft.) max	

Analog input/output splitter box characteristics

Splitter box type			Inputs		Outputs	
	Compact		FTM 1AE04C12C	FTM 1AE04C12T	FTM 1AS04C12C	FTM 1AS04C12T
Number of inputs/outputs			4 I	4 I	4 O	4 O
Internal consumption of splitter box		**mA**	50			
Operating voltage		**⎓ V**	24			
Maximum supply current	Splitter box	**A**	4			
	Per channel	**A**	≤ 0.2		≤ 1.6	
Bus and I/O undervoltage detection		**V**	< 18			

Input and output characteristics

Type			Differential 300 Ω	Differential 1 MΩ	≤ 500 Ω	≥ 500 Ω
Current	Measuring range		0 to 20 mA, 4 to 20 mA	⎓ ± 10 V, ⎓ 0 to 10 V	0 to 20 mA, 4 to 20 mA	⎓ ± 10 V, ⎓ 0 to 10 V
	Resolution	**Bits**	16	15 + Sign	12	11 + Sign
	Conversion time	**ms**	≤ 2/channel		≤ 1/channel	
Input filtering		**ms**	1		–	
Channel status indication			By LED			
Output connection/cable lengths		**m (ft.)**	30 (98.4) max.			

Digital and analog splitter boxes diagnostic characteristics

Internal bus and I/O undervoltage detection	**V**	< 18
Internal bus communication		By LED
Channel and splitter box short-circuit		By LED
Cable breakage		By LED

IP 67 modular I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTM splitter boxes

108739

FTM 1CN

108745

FTM 1D●08C08

109017

FTM 1D●08C08E

108768

FTM 1D●08C12
FTM 1A●04C12●

109018

FTM 1D●08C12E

108741

FTM 1DD16C12

Bus modules for modular splitter boxes

Bus type	Maximum number of splitter boxes	Connection to bus by	Reference	Weight kg
CANopen	16	M12 connectors	**FTM 1CN10**	0.420
DeviceNet	16	M12 connectors	**FTM 1DN10**	0.420
Profibus-DP	16	M12 connectors	**FTM 1DP10**	0.420

Modular digital I/O splitter boxes for all bus types

Number of I/O	Number, type of inputs	Number, type of outputs	Connection by	Type	Reference	Weight kg
8	8, ⎓ 24 V IEC type 2	–	8 x M8 female connectors	Compact	**FTM 1DE08C08**	0.120
				Expandable	**FTM 1DE08C08E**	0.120
			4 x M12 female connectors	Compact	**FTM 1DE08C12**	0.120
				Expandable	**FTM 1DE08C12E**	0.120
	0...8, ⎓ 24 V IEC type 2	0...8, transistor ⎓ 24 V/ 0.5 A	8 x M8 female connectors	Compact	**FTM 1DD08C08**	0.120
				Expandable	**FTM 1DD08C08E**	0.120
			4 x M12 female connectors	Compact	**FTM 1DD08C12**	0.120
				Expandable	**FTM 1DD08C12E**	0.120
16	16, ⎓ 24 V IEC type 2	–	8 x M12 female connectors	Compact	**FTM 1DE16C12**	0.220
				Expandable	**FTM 1DE16C12E**	0.220
	0...16, ⎓ 24 V IEC type 2	0...16, transistor ⎓ 24 V/ 0.5 A	8 x M12 female connectors	Compact	**FTM 1DD16C12**	0.220
				Expandable	**FTM 1DD16C12E**	0.220

Modular analog I/O splitter boxes for all bus types

4	4, 0...20 mA 4...20 mA	–	4 x M12 female connectors	Compact	**FTM 1AE04C12C**	0.130
	4, ⎓ ± 10 V ⎓ 0...10 V	–	4 x M12 female connectors	Compact	**FTM 1AE04C12T**	0.130
	–	4, 0...20 mA 4...20 mA	4 x M12 female connectors	Compact	**FTM 1AS04C12C**	0.130
		4, ⎓ ± 10 V ⎓ 0...10 V	4 x M12 female connectors	Compact	**FTM 1AS04C12T**	0.130

Connection accessories

Description	Composition	Length m (ft.)	Reference	Weight kg
For CANopen/DeviceNet buses				
Bus connection cables	Fitted with 2 elbowed M12, 5-pin connectors, A encoded, one at each end	0.3 (0.98)	**FTX CN3203**	0.040
		0.6 (1.97)	**FTX CN3206**	0.070
		1 (3.28)	**FTX CN3210**	0.100
		2 (6.56)	**FTX CN3220**	0.160
		3 (9.8)	**FTX CN3230**	0.220
		5 (16.4)	**FTX CN3250**	0.430
Connectors M12	5-pin, male, A encoded	–	**FTX CN12M5**	0.050
	5-pin, female, A encoded	–	**FTX CN12F5**	0.050
Line terminator (for end of bus)	Fitted with one M12 connector	–	**FTX CNTL12**	0.010
For Profibus-DP bus				
Bus connection cables	Fitted with 2 straight M12, 5-pin connectors, one at each end	0.3 (0.98)	**FTX DP1203**	0.040
		0.6 (1.97)	**FTX DP1206**	0.070
		1 (3.28)	**FTX DP1210**	0.100
		2 (6.56)	**FTX DP1220**	0.160
		3 (9.8)	**FTX DP1230**	0.220
		5 (16.4)	**FTX DP1250**	0.430
	Fitted with 2 elbowed M12, 5-pin connectors, one at each end	0.3 (0.98)	**FTX DP3203**	0.040
		0.6 (1.97)	**FTX DP3206**	0.070
		1 (3.28)	**FTX DP3210**	0.100
		2 (6.56)	**FTX DP3220**	0.160
		3 (9.8)	**FTX DP3230**	0.220
		5 (16.4)	**FTX DP3250**	0.430

Presentation, functions: pages 36 - 41 | Description: page 43 | Connections: pages 44, 45 | Characteristics: pages 46, 47 | Dimensions, schemes: pages 50, 51

IP 67 modular I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTM splitter boxes

Connection accessories (continued)

Description	Composition	Length m (ft.)	Reference	Weight kg
For Profibus-DP bus (continued)				
Connectors	M12 male, 5-pin, B encoded	–	**FTX DP12M5**	0.050
	M12 female, 5-pin, B encoded	–	**FTX DP12F5**	0.050
Line terminator (for end of bus)	Fitted with one M12 connector	–	**FTX DPTL12**	0.010
For all bus types				
⎓ 24 V bus module power supply connection cables	Fitted with two 7/8, 5-pin connectors, one at each end	0.6 (1.97)	**FTX DP2206**	0.150
		1 (3.28)	**FTX DP2210**	0.190
		2 (6.56)	**FTX DP2220**	0.310
		5 (16.4)	**FTX DP2250**	0.750
	Fitted with one 7/8, 5-pin connector, other end free	1.5 (4.92)	**FTX DP2115**	0.240
		3 (9.8)	**FTX DP2130**	0.430
		5 (16.4)	**FTX DP2150**	0.700
T-connector for power supply cable	Fitted with two 7/8, 5-pin connectors	–	**FTX CNCT1**	0.100
For internal bus				
Internal bus connection cables for bus module splitter box linking	Fitted with 2 elbowed M12, 6-pin connectors, one at each end	0.3 (0.98)	**FTX CB3203**	0.060
		0.6 (1.97)	**FTX CB3206**	0.090
		1 (3.28)	**FTX CB3210**	0.120
		2 (6.56)	**FTX CB3220**	0.215
		3 (9.8)	**FTX CB3230**	0.310
		5 (16.4)	**FTX CB3250**	0.500
Auxiliary ⎓ 24 V power supply connection cables for bus module splitter box linking	Fitted with 2 elbowed M12, 6-pin connectors, one at each end	0.3 (0.98)	**FTX CA3203**	0.035
		0.6 (1.97)	**FTX CA3206**	0.045
		1 (3.28)	**FTX CA3210**	0.060
		2 (6.56)	**FTX CA3220**	0.090
		3 (9.8)	**FTX CA3230**	0.120
		5 (16.4)	**FTX CA3250**	0.180
Auxiliary ⎓ 24 V power supply connection cables	Fitted with 1 elbowed M12, 6-pin connector, other end free	0.3 (0.98)	**FTX CA3103**	0.030
		0.6 (1.97)	**FTX CA3106**	0.035
		1 (3.28)	**FTX CA3110**	0.040
		2 (6.56)	**FTX CA3120**	0.070
		3 (9.8)	**FTX CA3130**	0.100
		5 (16.4)	**FTX CA3150**	0.160
Line terminator for end of internal bus	Fitted with one M12 connector	–	**FTX CBTL12**	0.030

Separate components

Description	Composition	Reference	Weight kg
Connectors	7/8 male, 5-pin	**FTX C78M5**	0.050
	7/8 female, 5-pin	**FTX C78F5**	0.050
Sealing plugs	For M8 connector (lot of 10)	**FTX CM08B**	0.100
	For M12 connector (lot of 10)	**FTX CM12B**	0.100
Y-connectors	Connection of 2 x M8 connectors to M12 connector on splitter box	**FTX CY1208**	0.020
	Connection of 2 x M12 connectors to M12 connector on splitter box	**FTX CY1212**	0.030
Diagnostics adaptor	Fitted with two M12 connectors	**FTX DG12**	0.020
Marker labels	Lot of 10	**FTX MLA10**	0.010
CD-ROM	Configuration files, technical manuals and operating instructions	**FTX ES00**	0.050

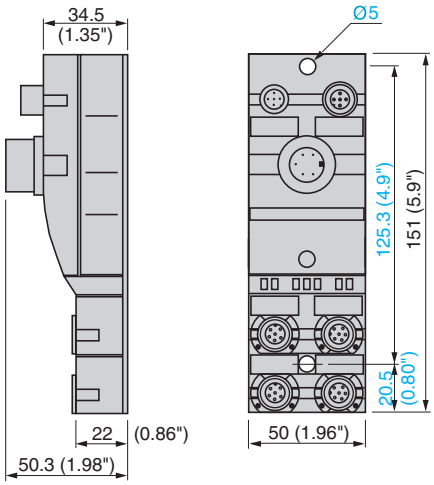
FTX CY1208

IP 67 modular I/O splitter boxes for fieldbuses

Advantys™ Distributed I/O, FTM splitter boxes

Bus modules

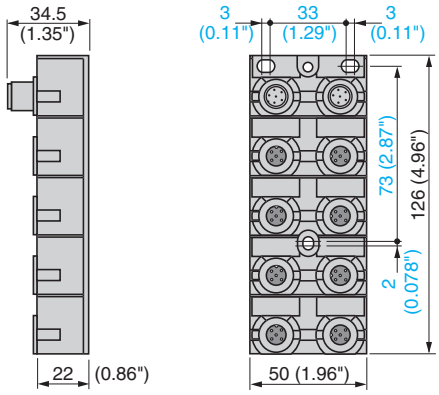
FTM 1●●10



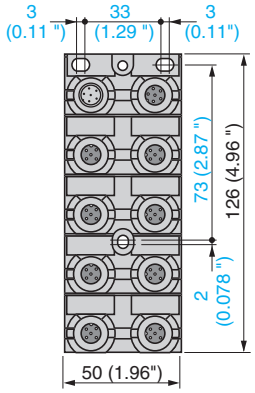
Splitter boxes

Common side view

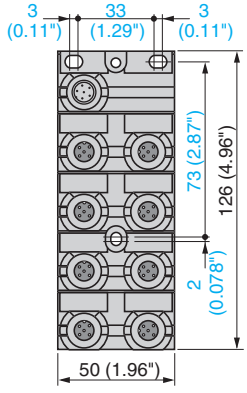
FTM 1DD16C12



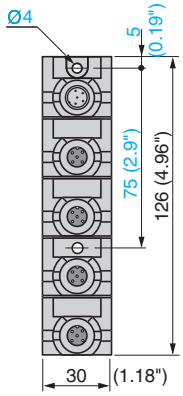
FTM 1DD16C12E
FTM 1DE16C12E



FTM 1DE16C12



FTM 1D●08C12
FTM 1A●04C12●



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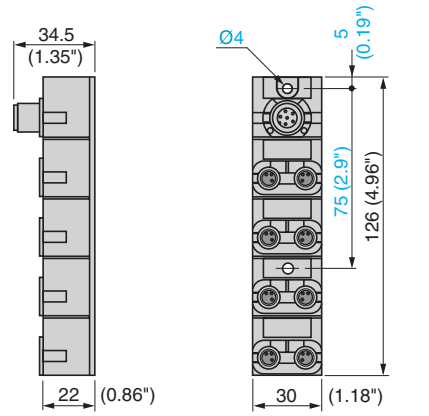

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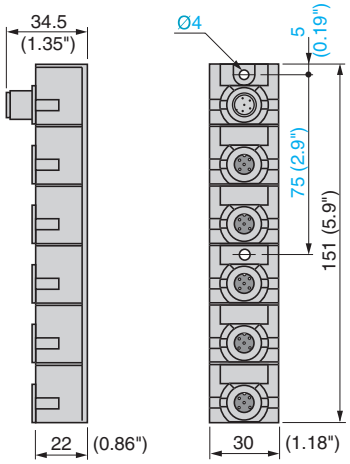

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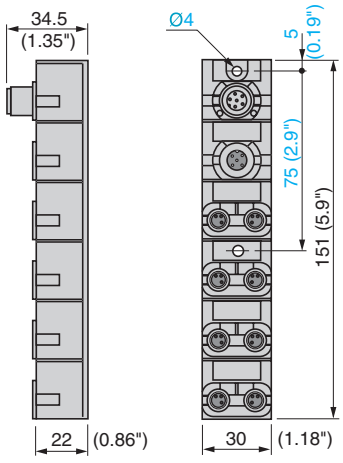
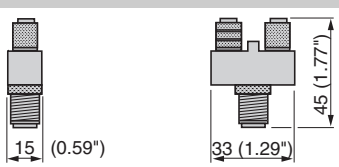


Y-connectors

FTX CY1208



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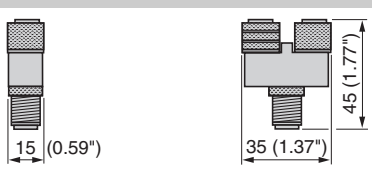
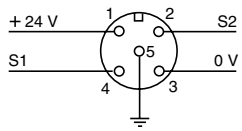


IP 67 modular I/O splitter boxes for fieldbuses

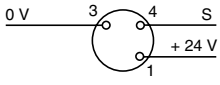
Advantys™ Distributed I/O, FTM splitter boxes

Splitter box connection

Input/output connection for digital splitter boxes



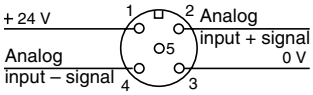
M12 female connector



M8 female connector

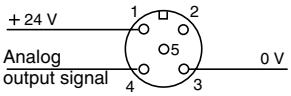
Input/output connection for analog splitter boxes

Analog input



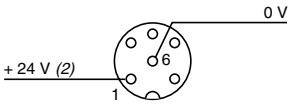
M12 female connector

Analog output



M12 female connector

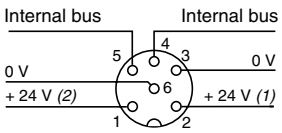
Auxiliary power supply



M12 male connector

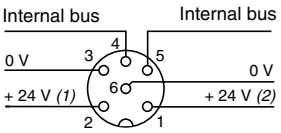
Bus input/Internal bus output of splitter boxes

Internal bus input



M12 male connector

Internal bus output



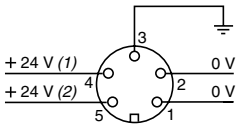
M12 female connector

(1) Supply to splitter box and sensors.
(2) Supply to actuators.

Bus module connection on CANopen and DeviceNet bus

Supply to bus module

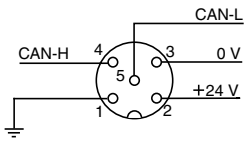
Supply input



7/8 male connector

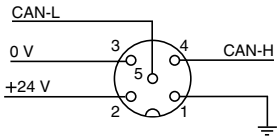
Bus input/Bus outputs of bus module

Bus input



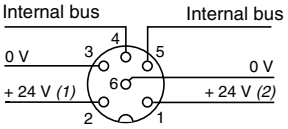
M12 male connector

Bus output



M12 female connector

Internal bus output



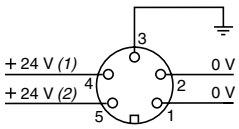
M12 female connector

(1) Supply to splitter box and sensors.
(2) Supply to actuators.

Bus module connection on Profibus-DP bus

Supply to bus module

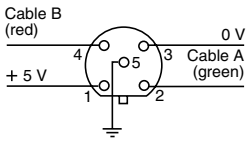
Supply input



7/8 male connector

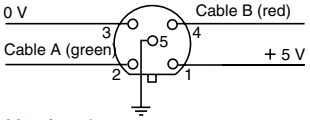
Bus input/Bus outputs of bus module

Bus input



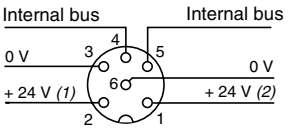
M12 male connector

Bus output



M12 female connector

Internal bus output



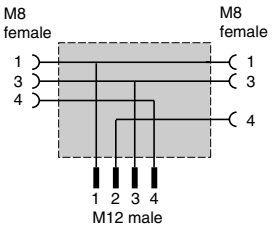
M12 female connector

(1) Supply to splitter box and sensors.
(2) Supply to actuators.

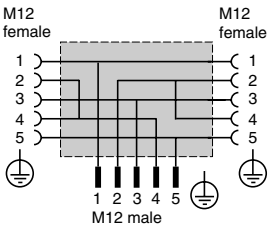
Note: *connectors linked to shielding.*

Y-connector connection

FTX CY1208



FTX CY1212



Power supplies
Power supplies for d.c. control circuits

Functions	Supplies for d.c. control circuits				
Type of product	**Single-phase, modular switch mode power supplies**		**Single-phase, regulated switch mode power supplies**		
					
Applications	Industrial, commercial or residential applications. Modular format allowing integration into panels.		Simple, low power equipment.	Industrial applications, low and medium power. Machine equipment applications.	Industrial or commercial applications on sites sensitive to mains interference. Protection against accidental restarting.
Nominal power	22 W	30 W	7 W to 30 W	48 to 240 W	60 to 240 W
Input voltage	∼ 100 to 240 V single-phase		∼ 100 to 240 V single-phase ⎓ 110 to 220 V compatible *(1)*	∼ 100 to 240 V single-phase	∼ 100 to 240 V single-phase, ⎓ 110 to 220 V compatible *(1)*
Output voltage	⎓ 12 V adjustable	⎓ 24 V adjustable	⎓ 24 V adjustable	⎓ 24 V adjustable	⎓ 12, 24 V or 48 V adjustable
Technology	Primary switch mode electronic power supplies.				
Secondary protection	Integrated, against overloads and short-circuits, with automatic reset.				Integrated, against overloads and short-circuits, with manual and automatic reset.
Signalling	Output indicator lamp.			Output and input indicator lamp.	
Other characteristics	–		Connection by lug-clamps possible	–	Anti-harmonic distortion filter
Mounting	Direct on ⎓ rail		Direct, on ⎓ rail and on panel	Direct on ⎓ rail	
Disturbance (conforming to EN55011/22) Conducted and radiated	cl.B		cl.A (7/15 W) cl.B (30 W)	cl.B	
Conforming to standards	EN 50081-1, IEC 61000-6-2 (EN 50082-2), IEC 60950, EN 61131-2/A11		EN 50081-2, IEC 61000-6-2, IEC/EN 60950	EN 50081-1, IEC 61000-6-2, (EN 50082-2), IEC/EN 60950	EN 50081-1, IEC 61000-6-2, (EN 50082-2), IEC/EN 60950, EN 61000-3-2
Approvals	cULus, CSA, TÜV		cULus, TÜV	UL, CSA, TÜV, CTick	
Device type	**ABL 7RM**		**ABL 7CEM**	**ABL 7RE**	**ABL 7RP**
Pages	57		58		

(1) Compatible input voltage, not indicated on the product.

2-phase regulated switch mode power supplies	3-phase regulated switch mode power supplies			
				
Industrial applications.	Industrial applications. In-line continuous process equipment, machine tools, injection presses, etc.			
120 and 240 W	240 and 480 W	120 W	240 to 960 W	
∼ 2 x 380 to 415 V 2-phase	∼ 3 x 380 to 415 V 3-phase	∼ 3 x 400 to 520 V 3-phase		
⎓ 24 V adjustable				
Primary switch mode electronic power supplies.				
Integrated, against overloads and short-circuits, with manual and automatic reset.				
Output indicator lamp.				
–	–	Anti-harmonic distortion filter		
Direct on ⎓ rail	Direct on ⎓ rail (except ABL 7UPS 24200 and ABL 7UPS24400)			
cl.B	cl.B			
EN 50081-1, EN 50082-2, EN 60950	EN 50081-1, EN 50082-2, IEC/EN 60950	EN 50081-1, EN 50082-2, IEC/EN 60950, EN 61000-3-2		
–	–	cULus, c UL us, CSA		
ABL 7REQ	**ABL 7UEQ**	**ABL 7UES**	**ABL 7UPS**	
59	59			

Power supplies
Power supplies for d.c. control circuits
Phaseo® modular regulated power supplies

Modular switch mode power supplies ABL 7RM

The ABL 7RM range of power supplies is designed to provide the d.c. voltage necessary for the control circuits of automation system equipment. Comprising 3 products, this range meets the needs encountered in industrial, commercial and residential applications. These single-phase, modular, electronic switch mode power supplies provide a quality of output current which is suitable for the loads supplied and compatible with the Zelio® Logic range, making them ideal partners. 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.

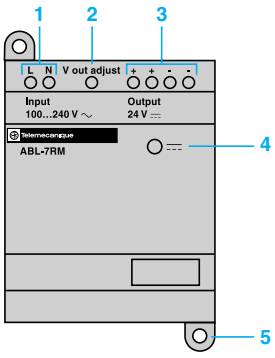
These switch mode power supplies are totally electronic and regulated. The use of electronics makes it possible to significantly improve the performance of these power supplies, which offer:
- very compact size,
- integrated overload, short-circuit, overvoltage and undervoltage protection,
- a very wide range of permissible input voltages, without any adjustment,
- a high degree of output voltage stability,
- good performance,
- considerably reduced weight,
- a modular format allowing integration into panels.

Phaseo power supplies deliver a voltage which is precise to 3%, whatever the load and whatever the type of mains supply, within a range of 85 to 264 V for single-phase. Conforming to IEC standards and UL and CSA certified, they are suitable for universal use. The inclusion of overload and short-circuit protection makes downstream protection unnecessary if discrimination is not required.
All the products are fitted 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 ⊔ rails, or on a mounting plate using the retractable mounting lugs.

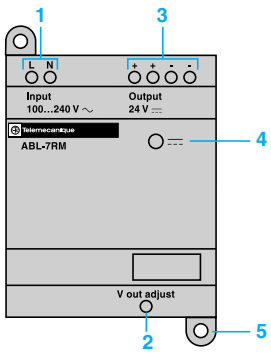
These power supplies are single-phase and three references are available:
- ABL 7RM2401 (24 V ⎓/1.3 A),
- ABL 7RM24025 (24 V ⎓/2.5 A),
- ABL 7RM1202 (12 V ⎓/1.9 A).

Description

ABL 7RM2401
ABL 7RM1202



ABL 7RM24025



1 2.5 mm² (#14 AWG) screw terminals for connection of the incoming a.c. supply voltage.
2 Output voltage adjustment potentiometer.
3 2.5 mm² (#14 AWG) screw terminals for connection of the output voltage.
4 LED indicating presence of the d.c. output voltage.
5 Retractable mounting lugs.

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Power supplies
Power supplies for d.c. control circuits
Phaseo® modular regulated power supplies

Technical characteristics					
Power supply type			**ABL 7RM1202**	**ABL 7RM2401**	**ABL 7RM24025**
Certifications			UL - CSA - TÜV		
Conforming to standards	Safety		IEC/EN 60950-1 - IEC/EN 61131-2/A11		IEC/EN 60950-1
	EMC		IEC/EN 61000-6-2 (IEC/EN 61000-6-1), IEC/EN 61000-6-3		
Input circuit					
LED indication			No		
Input voltage	Nominal values	**V**	∿ 100 to 240		
	Permissible values	**V**	∿ 85 to 264		
	Permissible frequencies	**Hz**	47 to 63		
	Efficiency at nominal load		> 80%		> 84%
	Current consumption	**A**	0.5 (100 V)/0.3 (240 V)	0.6 (100 V)/0.4 (240 V)	1.2 (120 V)/0.7 (240 V)
	Current at switch-on	**A**	< 20		< 90 for 1 ms
	Power factor		0.6		
Output circuit					
LED indication			Green LED		
Nominal output voltage		**V**	⎓ 12	⎓ 24	
Nominal output current		**A**	1.9	1.3	2.5
Precision	Output voltage		Adjustable from 100 to 120%		
	Line and load regulation		± 4 %	± 3 %	
	Residual ripple - interference	**mV**	200	250	200
Micro-breaks	Holding time for I max and Ue min	**ms**	> 10		
Protection	Against short-circuits		Permanent/Thermal protection		
	Against overcurrent, cold state		< 1.7 In	< 1.6 In	< 1.4 In
	Against overvoltage	**V**	< 10.5	< 19	
Operating characteristics					
Connections	Input	**mm² AWG**	1 x 2.5 (#14 AWG) or 2 x 1.5 (#16 AWG) screw terminals		
	Output	**mm² AWG**	1 x 2.5 (#14 AWG) or 2 x 1.5 (#16 AWG) screw terminals		
Environment	Storage temperature	**°C (°F)**	- 25 to + 70 (-13 to + 158)		- 40 to + 70 (-40 to + 158)
	Operating temperature	**°C (°F)**	- 20 to + 55 (-4 to + 131)		
	Maximum relative humidity		95 %		
	Degree of protection		IP 20		
	Vibration		IEC/EN 61131-2, IEC/EN 60068-2-6 test Fc		
Operating position			Vertical		
Connections	Series		No		
	Parallel		Yes (same references)		
Dielectric strength	Input/output		3000 Vac/50 Hz/1 min		
Protection class conforming to VDE 0106 1			Class II without PE		
Input fuse incorporated			Yes (not interchangeable)		
Emissions	Conducted/radiated		IEC/EN 61000-6-3, EN 55011, EN 55022 Cl:B		
Immunity	Electrostatic discharge		IEC/EN 61000-6-2 (generic standard), IEC/EN 61000-4-2 (4 kV contact/8 kV air)		
	Electromagnetic		IEC/EN 61000-4-3 level 3 (10 V/m)		
	Conducted interference		IEC/EN 61000-4-4 level 3 (2 kV), IEC/EN 61000-4-6 (10 V)		
	Mains interference		IEC/EN 61000-4-11		

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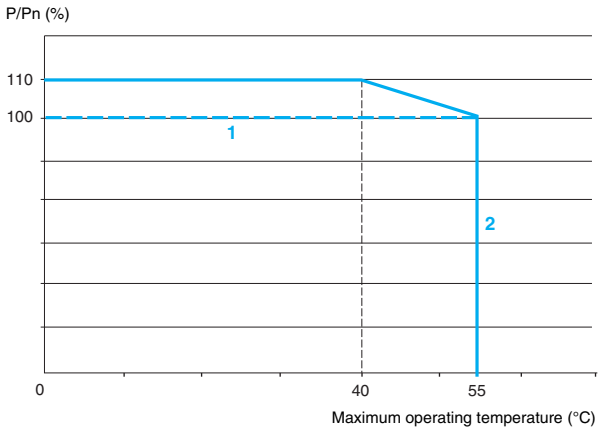
Power supplies
Power supplies for d.c. control circuits
Phaseo® modular regulated power supplies

Output characteristics

Exceeding the nominal power (only applicable to ABL 7RM1202 and ABL 7RM2401)

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. Conversely, a power supply can deliver more than its nominal power if the ambient temperature remains well below the nominal operating temperature.

The maximum ambient temperature for Phaseo power supplies is 55 °C (131°F). Below this temperature, uprating is possible up to 110% of the nominal power. The graph below shows the power (in relation to the nominal power) that the power supply can deliver continuously, according to the ambient temperature. Power supply ABL 7RM24025 cannot exceed the nominal power of 60 W.



1 ABL 7RM24025
2 ABL 7RM1202 and ABL 7RM2401

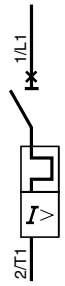
Selection

Upstream protection of power supplies

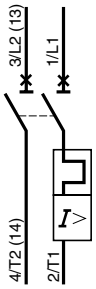
Type of mains supply	~ 100 V single-phase			~ 240 V single-phase		
Type of protection	Thermal-magnetic circuit-breaker		Fuse gG	Thermal-magnetic circuit-breaker		Fuse, gG
	GB2 (UL/IEC)	C60N (IEC) C60N (UL)		GB2 (UL/IEC)	C60N (IEC) C60N (UL)	
ABL 7RM1202	GB2 ●●06	24580 24516	1 A	GB2 ●●05	24494 24516	1 A
ABL 7RM2401	GB2 ●●06	24580 24516	1 A	GB2 ●●06	24580 24516	1 A
ABL 7RM24025	GB2 ●●08	24582 24518	3 A	GB2 ●●08	24582 24518	3 A

Schemes

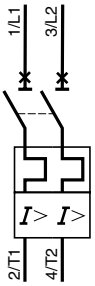
GB2 CB●●



GB2 CD●●



GB2 DB●●



GB2 CS●●

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Power supplies

Power supplies for d.c. control circuits
Phaseo® modular regulated power supplies

Modular regulated switch mode power supplies ABL 7RM *(1)*

ABL 7RM

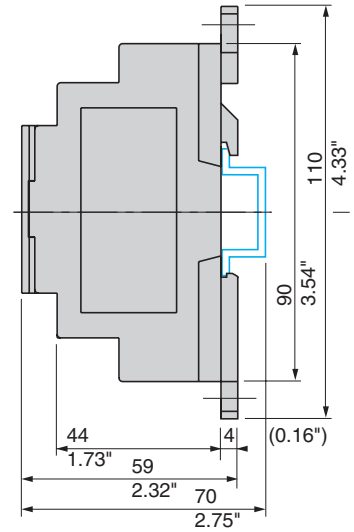
Mains input voltage 47 to 63 Hz	Output voltage	Nominal power	Nominal current	Auto-protect reset	Reference	Weight
V	⎓ V	W	A			kg
100 to 240 Single-phase wide range	12	22	1.9	Auto	**ABL 7RM1202**	0.180
	24	30	1.3	Auto	**ABL 7RM2401**	0.182
		60	2.5	Auto	**ABL 7RM24025**	0.255

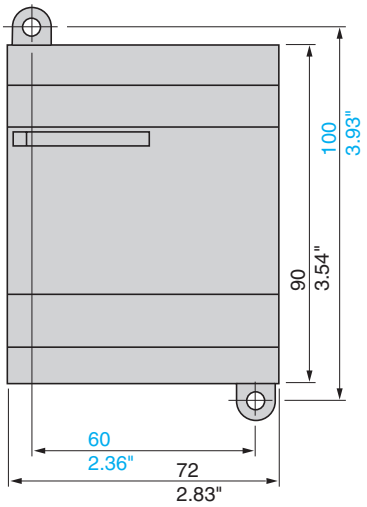
(1) For additional products, please refer to our "Interfaces, I/O splitter boxes and power supplies" catalog.

Dimensions

Power supply ABL 7RM●●●●

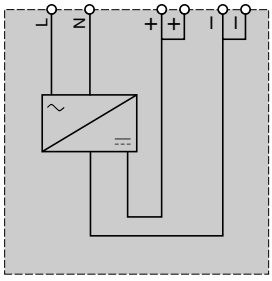
Dual Dimensions mm / inches





Scheme

ABL 7RM●●●●



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Characteristics: pages 55, 55

Power supplies
Power supplies for d.c. control circuits
Phaseo® regulated switch mode power supplies

ABL 7 power supplies

The ABL 7 range of power supplies is designed to provide the d.c. voltage necessary for the control circuits of automation system equipment. Split into three families, this range meets all the needs encountered in industrial, commercial and residential applications. Single-phase or 3-phase, of the electronic switch mode type, they provide a quality of output which is suitable for the loads supplied and compatible with the mains supply available in the equipment. Clear guidelines are given for selecting protection devices which are often used with them and thus a comprehensive solution is provided, which can be used in total safety.

Phaseo switch mode power supplies

These switch mode power supplies are totally electronic and regulated. The use of electronics makes it possible to significantly improve the performance of these power supplies, which offer:
- very compact size,
- integrated overload, short-circuit, overvoltage and undervoltage protection,
- a very wide range of permissible input voltages, without any adjustment,
- a high degree of output voltage stability,
- good performance,
- LED indicators on the front panel.

Phaseo power supplies are available in single-phase and 3-phase versions. They deliver a voltage which is precise to 3%, whatever the load and whatever the type of mains supply, within a range of 85 to 264 V for single-phase, or 360 to 550 V for 3-phase. Conforming to IEC standards and UL and CSA 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 7 RE and ABL 7 RP supplies are also equipped with an output undervoltage control which causes the product to trip if the output voltage drops below 19 V, in order to ensure that the voltage delivered is always usable by the actuators being supplied. All the products are fitted with an output voltage adjustment potentiometer in order to be able to compensate for any line voltage drops in installations with long cable runs. Most of our power supplies are designed for direct mounting on 35 and 75 mm ⊔ rails.

These power supplies are available in single-phase and 3-phase versions and are split into three families:

Compact single-phase supply ABL 7CEM:
- power less than or equal to 30 W (1.2 A),
- compact size,
- for all low power equipment,
- suitable for use in automation system environments based on the Nano™ PLC and Twido® PLC platforms, or in any automation system configuration requiring a ⎓ 24 V supply.

108700-13-M

ABL 7CEM

Universal single-phase supplies ABL 7RE and ABL 7RP:

- **ABL 7RE**
  - power between 48 W (2 A) and 240 W (10 A),
  - compact size,
  - for all machine equipment,
  - suitable for use in automation system environments based on the Micro™ PLC and Modicon® Premium™ PLC platforms, or in any automation system configuration requiring a ⎓ 24 V supply.
- **ABL 7RP**
  - power between 60 W and 240 W (10 A),
  - output voltage available: ⎓ 12, 24 and 48 V depending on version,
  - input filter (PFC) for commercial and residential environments (conforming to standard EN 61000-3-2),
  - two operating modes possible for handling of overload and short-circuit faults:
    - "AUTO" mode which provides automatic restarting of the power supply on elimination of the fault,
    - "MANU" mode which requires manual resetting of the power supply to restart. Resetting is achieved by switching off the mains power.

43367-15-M

ABL 7RP

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Power supplies
Power supplies for d.c. control circuits
Phaseo® regulated switch mode power supplies

108387-25-M

ABL 7UPS

530894

ABL 7REQ

Phaseo switch mode power supplies (continued)

3-phase and single-phase process supplies ABL 7U and ABL 7REQ:

■ **ABL 7UEQ**

□ power between 120 W (10 A) and 480 W (20 A),
□ compact size,
□ voltages between 3 x 380 V and 3 x 415 V,
□ for use in industrial applications, for all in-line or continuous process equipment, machine tools and injection presses, etc.
□ suitable for use in automation system environments based on the Modicon® Premium™ PLC and Modicon® Quantum™ PLC platforms, or in any automation system configuration requiring a ⎓ 24 V supply.

■ **ABL 7UPS and ABL 7UES**

□ power between 120 W (5 A) and 960 W (40 A).

Identical to the **ABL 7UEQ** range, this power supply differs in that it features an extended input voltage range from 3 x 400 to 3 x 520 V and includes a filter (PFC) which means that it can be connected directly to public mains supplies, in compliance with standard EN 61000-3-2. This product, for world-wide use, is UL and CSA certified.

■ **ABL 7REQ**

□ power between 120 W (5 A) and 240 W (10 A),
□ compact size,
□ can be connected to **2-phase** input voltages between 380 V and 415 V, to replace older power supplies connected by only two wires. Economical, more competitive, yet with a smaller input voltage range it can, in certain cases, be used in place of the 3-phase versions.

Using ⎓ 24 V

■ Using ⎓ 24 V enables so-called protection installations (PELV) to be built. Using PELV is a measure designed to protect people from direct and indirect contact. Measures relating to these installations are defined in publication NF C 12-201 and in standard IEC 364-4-41.
■ The application of these measures to the electrical equipment in machines is defined in standard NF EN 60204-1 and requires:
□ that the voltage used is below 60 V d.c. in dry environments and below 30 V in damp environments,
□ the connection of one side of the PELV circuit, or one point of the source, to the equipotential protection circuit associated with higher voltages,
□ the use of switchgear and control gear on which measures have been taken to ensure "safety separation" between power circuits and control circuits.
■ A safety separation is necessary between power circuits and control circuits in PELV circuits. Its aim is to prevent the appearance of dangerous voltages in ⎓ 24 V safety circuits.
■ The reference standards involved are:
□ IEC 61558-2-6 and EN 61558-2-6 (safety transformers),
□ IEC 664 (coordination of isolation).

Telemecanique® power supplies meet these requirements.
■ Moreover, to ensure that these products will operate correctly in relation to the demands of their reinforced isolation, it is recommended that they be mounted and wired as indicated below:
□ they should be placed on an grounded mounting plate or rail,
□ they should be connected using flexible cables, with a maximum of two wires per connection, and tightened to the nominal torque,
□ conductors of the correct insulation class must be used.
■ If the d.c. circuit is not connected to an equipotential protection conductor, an ground leakage detector will indicate any accidental ground faults (please consult your Regional Sales Office).

Operating voltage

■ The permissible tolerances for the operating voltage are listed in publications IEC 1131-2 and DIN 19240.
■ For nominal voltage Un = ⎓ 24 V, the extreme operating values are from - 15 % to + 20 % of Un, whatever the supply fluctuations in the range -10 % to + 6 % (defined by standard IEC 38) and load variations in the range 0-100 % of In.
All Telemecanique® ⎓ 24 V power supplies are designed to provide a voltage within this range.
■ It may be necessary to use a voltage measurement relay to detect when the normal voltage limits are being surpassed and to deal with the consequences of this (please consult your Regional Sales Office).

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Power supplies
Power supplies for d.c. control circuits
Phaseo® regulated switch mode power supplies

2

Selection of power supplies

The characteristics to be taken into account when selecting a power supply are:
- the required output voltage and current,
- the mains voltage available in the installation.

An initial selection can be made using the table opposite.
This may however result in several products being selected as suitable.
Other selection criteria must therefore be taken into account.

■ The quality of the mains power supply

The Phaseo range is the solution because it guarantees precision to 3% of the output voltage, whatever the load current and the input voltage. In addition, the wide input voltage range of Phaseo power supplies allows them to be connected to all mains supplies within the nominal range, without any adjustment.
The Phaseo RP family can also be connected to ⎓ 110 and 220 V emergency supplies.

■ Harmonic pollution (power factor)

The current drawn by a power supply is not sinusoidal. This leads to the existence of harmonic currents which pollute the mains supply. European standard EN 61000-3-2 limits the harmonic currents produced by power supplies. This standard covers all devices between 75 W and 1000 W, drawing up to 16 A per phase, and connected directly to the public mains power supply. Devices connected downstream of a private, low voltage general transformer are therefore excluded.
Regulated switch mode supplies always produce harmonic currents; a filter circuit (Power Factor Correction or PFC) must therefore be added to comply with standard EN 61000-3-2.
Phaseo ABL 7RP, ABL 7UES and ABL 7UPS power supplies conform to standard EN 61000-3-2 and can therefore be connected directly to public mains power supplies.

■ Electromagnetic compatibility

Levels of conducted and radiated emissions are defined in standards EN 55011 and EN 55022.
The majority of products in the Phaseo range have class B certification and can be used without any restrictions due to their low emissions.
ABL 7CEM24003 and ABL 7CEM24006 power supplies have class A certification. It is recommended that they should not be used in the following equipment: trains, aircraft, nuclear applications and in any environment where malfunctioning could cause serious injuries or lead to death. These products are designed for use in industrial equipment and are not suitable for use in residential environments.

■ Behavior in the event of short-circuits

Phaseo power supplies are equipped with an electronic protection device. This protection device resets itself automatically on elimination of the fault (around 1 second for ABL 7 RE/RP, around 3 seconds for ABL 7 UE/UP/REQ) which avoids having to take any action or change a fuse. In addition, the Phaseo ABL 7RP/U/REQ ranges allow the user to select the reset mode in the event of a fault:
- in the "AUTO" position, resetting is automatic,
- in the "MANU" position, resetting occurs after elimination of the fault and after switching the mains power off and back on.

This feature allows Phaseo ABL 7RP/U/REQ power supplies to be used in installations where the risks associated with untimely restarting are significant.

■ Behavior in the event of phase failure

In the event of failure of one phase, all Phaseo 3-phase power supplies switch to relaxation mode for as long as the input voltage is below 450 V.
For operation on higher voltages (e.g. 480 V), use of an upstream GV2 type residual current protection device is recommended.

■ Selection of reset mode

□ on the ABL 7RP family of products:
By microswitch on the front panel of the product.
□ on the ABL 7U/REQ family of products:
By jumper on the front panel. **Warning: selection of the function is only possible after the mains power supply has been switched off for at least 5 minutes**. The jumper is moved using a pair of insulated, flat-nose pliers.

Power supplies

Power supplies for d.c. control circuits

Phaseo® regulated switch mode power supplies

Selection according to application characteristics

Type of mains supply		Single-phase				2-phase	3-phase	
Rated mains supply voltage		~ 100 to 240 V 50/60 Hz ⎓ 110 to 220 V *(1)* Wide range			100 to 240 V 50/60 Hz Wide range	2 x 380 to 415 V 50/60 Hz	3 x 380 to 415 V 50/60 Hz	3 x 400 to 520 V 50/60 Hz Wide range
Permissible variation		85 to 264 V, 47 to 63 Hz ⎓ 100...250 V *(1)*, ⎓ 105...370 V *(2)*			85 to 264 V 47 to 63 Hz	340 to 460 V 47 to 63 Hz	340 to 460 V 47 to 63 Hz	360 to 550 V 47 to 63 Hz
Output voltage		12 V	48 V	24 V	24 V	24 V	24 V	24 V
Output current	0.3 A			**ABL 7CEM24003**				
	0.6 A			**ABL 7CEM24006**				
	1.2 A			**ABL 7CEM24012**				
	2 A				**ABL 7RE2402**			
	2.5 A		**ABL 7RP4803**					
	3 A			**ABL 7RP2403**	**ABL 7RE2403**			
	5 A	**ABL 7RP1205**		**ABL 7RP2405**	**ABL 7RE2405**	**ABL 7REQ24050**		**ABL 7UES24050**
	10 A			**ABL 7RP2410**	**ABL 7RE2410**	**ABL 7REQ24100**	**ABL 7UEQ24100**	
	20 A						**ABL 7UEQ24200**	
	40 A							
Conforming to EN 61000-3-2		Yes (not applicable for **ABL 7CEM**)			No	No	No	No
Integrated automatic protection		Yes Automatic or manual restart on **ABL 7RP** Automatic restart only on **ABL 7CEM**			Yes Automatic restart	Yes Automatic or manual restart		

*(1) Values for **ABL 7RP** power supplies, not indicated on the product.*

*(2) Values for **ABL 7CEM** power supplies, not indicated on the product.*

Power supplies
Power supplies for d.c. control circuits
Phaseo® regulated switch mode power supplies

Technical characteristics

Type of power supply			ABL 7CEM	ABL 7RE	ABL 7RP
Product certifications			cULus, TÜV	UL, CSA, TÜV, CTick	
Conforming to standards			UL 508	UL 508, CSA 22.2 n° 950	
	Safety		IEC/EN 60950, FELV		IEC/EN 60950, IEC/EN 61496-1-2, FELV
	EMC		EN 50081-2, EN 50082-2	EN 50081-1, IEC 61000-6-2 (EN 50082-2)	
	Low frequency harmonic currents		–	–	EN 61000-3-2
Input circuit					
LED indication			–	Orange LED	Orange LED
Input voltages	Rated values	**V**	∿ 100 to 240, ⎓ 110 to 220 compatible *(1)*	∿ 100 to 240	∿ 100 to 240, ⎓ 110 to 220 compatible *(1)*
	Permissible values	**V**	∿ 85 to 264, ⎓ 105 to 370 compatible *(1)*	∿ 85 to 264 single-phase	∿ 85 to 264, ⎓ 100 to 250 compatible *(1)*
	Permissible frequencies	**Hz**	47 to 63		
	Efficiency at nominal load		> 70 %	> 85 %	
	Current consumption Ue = 240 V	**A**	0.1 (7 W)/0.2 (15 W)/0.45 (30 W)	0.6 (48 W)/0.83 (72 W) 1.2 (120 W)/2.5 (240 W)	0.4 (60 and 72 W)/0.6 (120 W) 1.3 (240 W)
	Ue = 100 V	**A**	0.17 (7 W)/0.3 (15 W)/0.68 (30 W)	1.2 (48 W)/1.46 (72 W) 1.9 (120 W)/3.6 (240 W)	0.8 (60 and 72 W)/1 (120 W)/ 2.8 (240 W)
	Current at switch-on	**A**	< 50	< 30	
	Power factor		0.45 approx.	0.65 approx.	0.98 approx.
Output circuit					
LED indication			Green LED	Green LED	Green LED
Nominal output voltage (U out)		**V**	⎓ 24		12, 24 and 48
Nominal output current		**A**	0.3/0.6/1.2	2/3/5/10	2.5/5/10
Precision	Output voltage		Adjustable from 90 to 110 %	Adjustable from 100 to 120 %	
	Line and load regulation		2 % max	± 3 %	
	Residual ripple - interference	**mV**	< 200 (peak-peak)		
Micro-breaks	Holding time at I max and Ve min	**ms**	> 20	> 10	> 20
Temporary overloads	Permissible inrush current (U out >19V)		See curves 65		
Protection	Short-circuit		Permanent/automatic restart	Permanent/automatic restart	Permanent/automatic restart or restart after switching off mains power
	Overload		1.05 In	1.1 In	
	Overvoltage		U > 1.2	Tripping if U > 1.5 Un	
	Undervoltage		–	Tripping if U < 0.8 Un	
Operating and environmental characteristics					
Connections	Input	**mm^2 AWG**	2 x 2.5 + ground (#14 AWG)		
	Output	**mm^2 AWG**	2 x 2.5 (#14 AWG)	2 x 2.5 + ground (#14 AWG), multiple output, depending on model	
Ambient conditions	Storage temperature	**°C (°F)**	- 25 to + 70 (- 13 to + 158)		
	Operating temperature	**°C (°F)**	- 10 to + 60 (+ 14 to + 140) derating as from 50° C (+ 122), mounted vertically	0 to + 60 (+ 32 to + 140) derating as from 50° C (+ 122), mounted vertically	
	Max. relative humidity		20 to 90 %	95 % without condensation or dripping water	
	Degree of protection		IP 20 conforming to IEC 529		
	Vibrations		Conforming to IEC 61131-2		
Operating position			Vertical and horizontal (see derating curve, 64)	Vertical	
MTBF at 40°			> 100 000 h		
Connections	Series		Possible (see page 65)		
	Parallel		No	Possible (max. temperature 50° C)	
Dielectric strength	Input/output		3000 V/50 and 60 Hz 1 min	3000 V/50 and 60 Hz 1 min	
	Input/ground		2000 V/50 and 60 Hz 1 min	3000 V/50 and 60 Hz 1 min	
	Output/ground (and output/output)		500 V/50 and 60 Hz 1 min	500 V/50 and 60 Hz 1 min	
Input fuse incorporated			Yes (not interchangeable)		
Disturbance			EN 50081-2 (generic)	EN 50081-1	
	Conducted		EN 55011/EN 55022 class A (7 and 15 W) EN 55011/ EN 55022 class B (30 W)	EN 55011/EN 55022 class B	
	Radiated		EN 55011/EN 55022 class B		
Immunity			IEC 61000-6-2 (generic)		
	Electrostatic discharge		EN 61000-4-2 (4 kV contact/8 kV air)		
	Electromagnetic		EN 61000-4-3 level 3 (10 V/m)		
	Conducted interference		EN 61000-4-4 level 3 (2 kV), EN 61000-4-5, EN 61000-4-6 level 3, EN 61000-4-8 level 4		
	Mains interference		EN 1000-4-11 (voltage drops and cuts)		

(1) Compatible input voltage, not indicated on the product.

Power supplies

Power supplies for d.c. control circuits

Phaseo® regulated switch mode power supplies

Technical characteristics

Type of power supply			ABL 7REQ24●	ABL 7UEQ24●	ABL 7UES24●	ABL 7UPS24●
Product certifications			–			cULus, cURus and CSA
Conforming to standards						
	Safety		IEC/EN 60950, FELV			
	EMC		EN 50081-1, EN 50082-2			
	Low frequency harmonic currents		–			EN 61000-3-2
Input circuit						
LED indication			–			
Input voltages						
	Rated values	**V**	∿ 2 x 380 to 415	∿ 3 x 380 to 415	∿ 3 x 400 to 520	
	Permissible values	**V**	∿ 2 x 340 to 460	∿ 3 x 340 to 460	∿ 3 x 360 to 550	
	Permissible frequencies	**Hz**	50 to 60			
	Efficiency at nominal load		> 85 %	> 90 %		
	Current consumption					
	Ue = 400 V	**A**	0.65 (120 W)/1.2 (240 W)	0.75 (240 W)/1.5 (480 W)	0.7 (240 W)/1.2 (480 W)/1.7 (960 W)	
	Current at switch-on	**A**	< 35			
	Power factor		0.6	0.55	0.7	0.7/0.9 (960 W)
2-phase operating mode		**V**	–	Relaxation if input voltage < ∿ 450		
Output circuit						
LED indication			Green LED			
Nominal output voltage (U out)		**V**	⎓ 24			
Nominal output current		**A**	5/10	10/20	5	10/20/40
Precision						
	Output voltage		Adjustable from 100 to 116%			
	Line and load regulation		1 % max			
	Residual ripple - interference	**mV**	< 200 (peak-peak)			
Micro-breaks						
	Holding time for I max and Ve min	**ms**	15	10		Between 8 and 13
Temporary overloads						
	Permissible inrush current (U out >19V)		See curves, page 65			
Protection						
	Short-circuit		Permanent/automatic or normal restart			
	Overload		1.20 In < 50 ms			
	Overvoltage	**V**	28.5 typical			
	Undervoltage	**V**	19 typical			
Operating and environmental characteristics						
Connections	Input	**mm²** **AWG**	2 x 1.5 to 2.5 mm² + ground (#16 to # 14)			
	Output	**mm²** **AWG**	4 x 1.5 to 2.5 mm² (#16 to #14 AWG)	4 x 4 to 6 mm² (#10 AWG)	4 x 1.5 to 2.5 mm² (#16 to #14 AWG)	4 x 1.5 to 2.5 mm² (#16 to #14 AWG) 240 W 4 x 4 to 6 mm² (#10 AWG) 480 W 4 x 4 to 10 mm² (#8 AWG) 960 W
Ambient conditions	Storage temperature	**°C (°F)**	- 25 to + 70 (- 13 to + 158)			
	Operating temperature	**°C (°F)**	0 to + 60 (+ 32 to +140)			
	Maximum relative humidity		30 to 90 %			
	Degree of protection		IP 20			
	Vibrations		Conforming to IEC 61131-2			
Operating position			Vertical			
MTBF			> 100 000 h			
Connections	Series		Possible see page 65			
	Parallel		Possible see page 65			
Dielectric strength	Input/output		3750 V/50 and 60 Hz 1 min			
	Input/ground		3500 V/50 and 60 Hz 1 min			
	Output/ground (and output/output)		500 V/50 and 60 Hz 1 min			
Input fuse incorporated			No			
Disturbance	Conducted/radiated		EN 55011/EN 55022 - class B			
Immunity	Electrostatic discharge		EN 61000-4-2 (4 kV contact/8 kV air)			
	Electromagnetic		EN 61000-4-3 level 3 (10 V/m)			
	Conducted interference		EN 61000-4-4 level 3 (2 kV) , EN 61000-4-5, EN 61000-4-6 level3, EN 61000-4-8 level 4 (for ABL 7RE/RP)			
	Mains interference		EN 61000-4-11 (voltage drops and cuts)			

Presentation : pages 58, 59 | References : page 67 | Dimensions : page 68 | Schemes : page 69

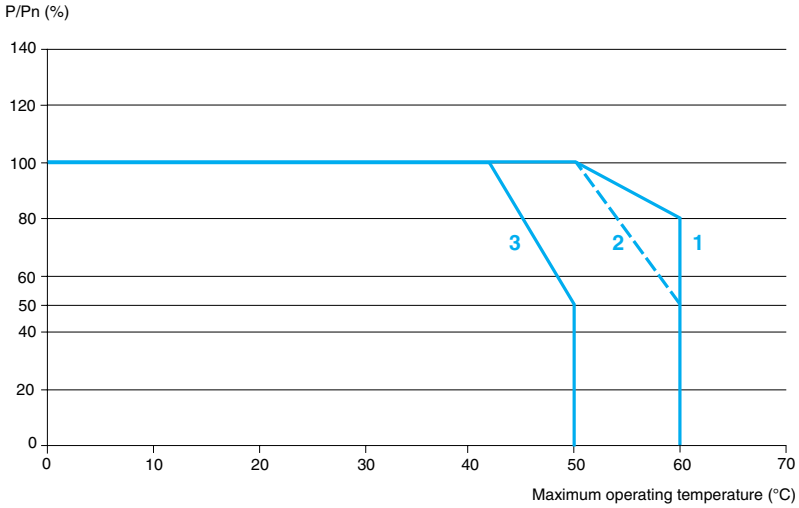
Power supplies
Power supplies for d.c. control circuits
Phaseo® regulated switch mode power supplies

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. Conversely, a power supply can deliver more than its nominal power if the ambient temperature remains largely below the rated operating temperature.

The rated ambient temperature for Phaseo power supplies is 50 °C (+ 122 °F). Above this, derating is necessary up to a maximum temperature of 60 °C (+ 140 °F).

The graph below shows the power (in relation to the nominal power) which the power supply can deliver continuously, according to the ambient temperature.



1 ABL 7RE, ABL 7RP, ABL 7U mounted vertically
2 ABL 7CEM mounted vertically
3 ABL 7CEM mounted horizontally

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 (to compensate for line voltage drops, for example),
- parallel connection to increase the total power.

General rules to be complied with

Intensive operation	See derating on above graph. Example for ABL 7RE: - without derating, from 0 °C to 50 °C (+ 32 to + 122 °F), - derating of nominal current by 2 %, per additional °C, up to 60 °C (+ 140 °F).
Rise in output voltage	The nominal power is fixed. Increasing the output voltage means that the current delivered must be reduced
Parallel connection to increase the power (except ABL 7CEM)	The total power is equal to the sum of the power supplies used, but the maximum ambient temperature for operation is 50 °C (+ 122 °F). To improve heat dissipation, the power supplies must not be in contact with each other

In all cases, there must be adequate convection round the products to ensure easier cooling. There must be a clear space of 50 mm (1.97") above and below Phaseo power supplies and of 15 mm (0.59") at the sides.

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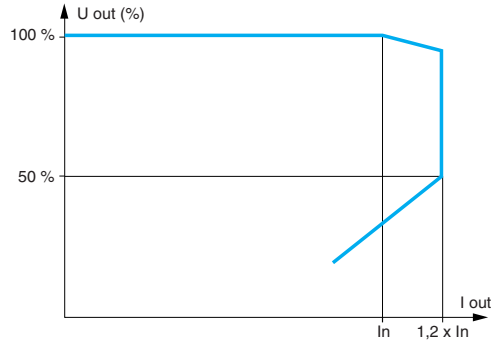
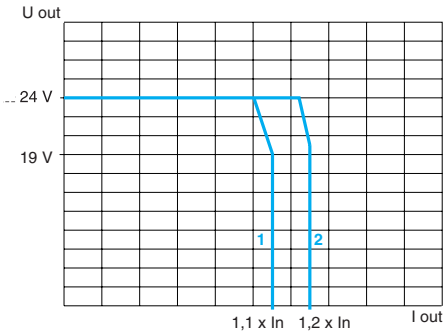
Power supplies
Power supplies for d.c. control circuits
Phaseo® regulated switch mode power supplies

Load limit

ABL 7CEM24●●●



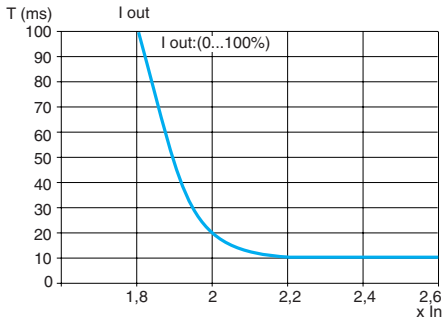
ABL 7RE24●●/ABL 7RP●●●●
ABL 7U●●24●●/ABL 7REQ●●●●



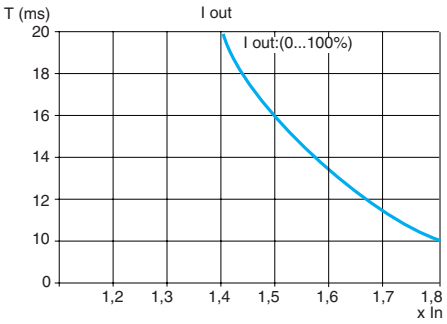
1 ABL 7RE24●●/ABL 7RP●●●●
2 ABL 7U●●24●●/ABL 7REQ●●●●

Temporary overloads

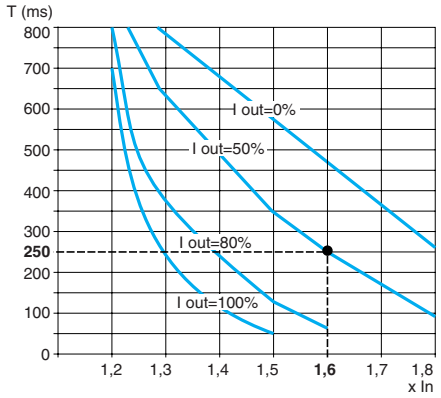
ABL 7CEM



ABL 7RE/ABL 7RP



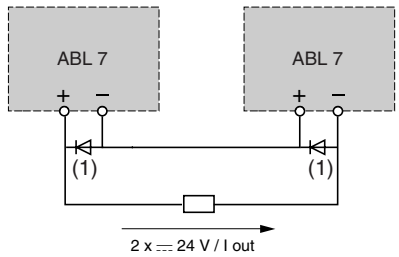
ABL 7U



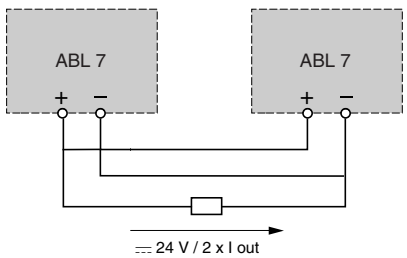
Example: For an ABL 7UPS24●●● power supply with 50 % loading. (I out = 50 %), this power supply can absorb a current peak of 1.6 x In for 250 ms with an output voltage ⩾ 19 V.

Series or parallel connection

Series connection



Parallel connection



Family	Series	Parallel
ABL 7CEM	2 products max *(1)*	No
ABL 7RE/RP	2 products max	2 products max
ABL 7U/REQ	2 products max	2 products max

(1) 2 Shottky diodes 2 A/100 V on ABL 7CEM only.

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Power supplies

Power supplies for d.c. control circuits
Phaseo® regulated switch mode power supplies
Upstream protection

ABL 7CEM, ABL 7RE and ABL 7RP power supplies: protection of the power supply line

Type of mains supply	∿ 100 V single-phase			∿ 240 V single-phase		
Type of protection	Thermal-magnetic circuit-breaker		gG fuse	Thermal-magnetic circuit-breaker		gG fuse
	GB2 (UL/IEC)	C60N (IEC) C60N (UL)		GB2 (UL/IEC)	C60N (IEC) C60N (UL)	
ABL 7CEM24003	GB2 ●●05	24494 24516	1 A	GB2 ●●05	24494 24516	1 A
ABL 7CEM24006	GB2 ●●05	24494 24516	1 A	GB2 ●●05	24494 24516	1 A
ABL 7CEM24012	GB2 ●●06	24580 24516	1 A	GB2 ●●06	24580 24516	1 A
ABL 7RE2402	GB2 ●●07	24581 24517	2A	GB2 ●●06	24580 24516	1 A
ABL 7RE2403	GB2 ●●07	24581 24517	2 A	GB2 ●●06	24580 24516	2 A
ABL 7RE2405	GB2 ●●08	24582 24518	4 A	GB2 ●●07	24581 24517	2 A
ABL 7RE2410	GB2 ●●12	24584 24520	6 A	GB2 ●●08	24582 24518	3 A
ABL 7RP1205	GB2 ●●06	24580 24516	2 A	GB2 ●●06	24580 24516	1 A
ABL 7RP2403	GB2 ●●07	24581 24517	2 A	GB2 ●●06	24580 24516	1 A
ABL 7RP2405	GB2 ●●07	24581 24517	2 A	GB2 ●●06	24580 24516	1 A
ABL 7RP2410	GB2 ●●09	24583 24519	4 A	GB2 ●●07	24581 24517	2 A
ABL 7RP4803	GB2 ●●07	24581 24517	2 A	GB2 ●●06	24580 24516	1 A

ABL 7REQ power supplies: protection of the power supply line

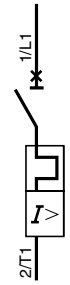
Type of mains supply	∿ 400 V 2-phase		
Type of protection	Thermal-magnetic circuit-breaker		gG fuse
	2-pole: GB2 DB●(UL/ IEC)	C60N (IEC) C60N (UL)	
ABL 7REQ24050	GB2 DB16	24586 24522	10 A
ABL 7REQ24100	GB2 DB16	24586 24522	10 A

ABL 7UEQ, ABL 7UES and ABL 7UPS power supplies: protection of the power supply line

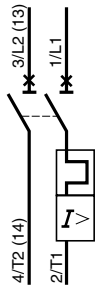
Type of mains supply	∿ 400 to 480 V 3-pole		
Type of protection	Thermal-magnetic circuit-breaker		gG fuse
	3-pole: GV2 ME●●	C60N (IEC) C60N (UL)	
ABL 7UEQ24100	GV2 ME08	24598 24535	4 A
ABL 7UEQ24200	GV2 ME08	24601 24538	10 A
ABL 7UES24050	GV2 ME08	24596 24533	2 A
ABL 7UPS24100	GV2 ME08	24596 24533	2 A
ABL 7UPS24200	GV2 ME08	24597 24534	3 A
ABL 7UPS24400	GV2 ME08	24598 24535	4 A

Schemes

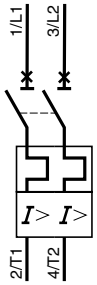
GB2 CB●●



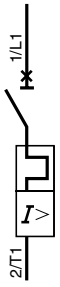
GB2 CD●●



GB2 DB●●



GB2 CS●●



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Power supplies

Power supplies for d.c. control circuits

Phaseo® regulated switch mode power supplies

ABL 7CEM

ABL 7CEM single-phase regulated switch mode power supplies

Mains input voltage 47...63 Hz	Output voltage	Nominal power	Nominal current	Auto-protect reset	Conforming to standard EN 61000-3-2	Reference	Weight
V	⎓ V	W	A				kg
∿ **100 to 240** single-phase wide range ⎓ **110 to 220** *(1)*	24	7	0.3	auto	–	**ABL 7CEM24003**	0.150
		15	0.6	auto	–	**ABL 7CEM24006**	0.180
		30	1.2	auto	–	**ABL 7CEM24012**	0.220

ABL 7RE2405
ABL 7RP2405
ABL 7RP4803

ABL 7RE single-phase regulated switch mode power supplies

Mains input voltage 47...63 Hz	Output voltage	Nominal power	Nominal current	Auto-protect reset	Conforming to standard EN 61000-3-2	Reference	Weight
V	⎓ V	W	A				kg
∿ **100 to 240** single-phase wide range	24	48	2	auto	–	**ABL 7RE2402**	0.520
		72	3	auto	no	**ABL 7RE2403**	0.520
		120	5	auto	no	**ABL 7RE2405**	1.000
		240	10	auto	no	**ABL 7RE2410**	2.200

ABL 7P●●●●

ABL 7RP single-phase regulated switch mode power supplies

Mains input voltage 47...63 Hz	Output voltage	Nominal power	Nominal current	Auto-protect reset	Conforming to standard EN 61000-3-2	Reference	Weight
V	⎓ V	W	A				kg
∿ **100...240** single-phase wide range ⎓ **110...220** *(1)*	12	60	5	auto/man	yes	**ABL 7RP1205**	1.000
	24	72	3	auto/man	yes	**ABL 7RP2403**	0.520
		120	5	auto/man	yes	**ABL 7RP2405**	1.000
		240	10	auto/man	yes	**ABL 7RP2410**	2.200
	48	144	2.5	auto/man	yes	**ABL 7RP4803**	1.000
∿ **100 to 240** single-phase wide range	24	480	20	auto/man	yes	**ABL 7RPM24200**	2.300

ABL-7REQ

ABL 7REQ 2-phase regulated switch mode power supplies

Mains input voltage 47...63 Hz	Output voltage	Nominal power	Nominal current	Auto-protect reset	Conforming to standard EN 61000-3-2	Reference	Weight
V	⎓ V	W	A				kg
∿ **380 to 415**	24	120	5	auto/man	no	**ABL 7REQ24050**	0.850
		240	10	auto/man	no	**ABL 7REQ24100**	1.200

ABL 7UPS

ABL 7U 3-phase regulated switch mode power supplies

Mains input voltage 47...63 Hz	Output voltage	Nominal power	Nominal current	Auto-protect reset	Conforming to standard EN 61000-3-2	Reference	Weight
V	⎓ V	W	A				kg
∿ **3x380 to 415**	24	240	10	auto/man	no	**ABL 7UEQ24100**	1.200
		480	20	auto/man	no	**ABL 7UEQ24200**	2.100
∿ **3x400 to 520**	24	120	5	auto/man	yes	**ABL 7UES24050**	1.300
		240	10	auto/man	yes	**ABL 7UPS24100**	1.300
		480	20	auto/man	yes	**ABL 7UPS24200**	2.300
		960	40	auto/man	yes	**ABL 7UPS24400**	4.500

(1) Compatible input voltage.

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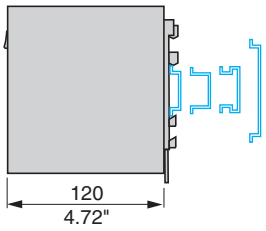
Power supplies

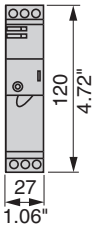
Power supplies for d.c. control circuits

Phaseo® regulated switch mode power supplies

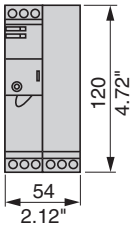
ABL 7RE24●●/ABL 7RP●●●●
Common side view
Mounting on 35 and 75 mm rails



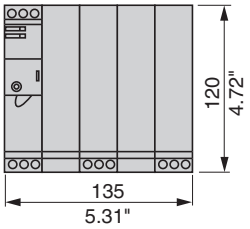
ABL 7RE2402/2403
ABL 7RP2403



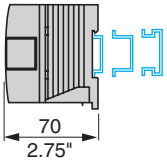
ABL 7RE2405
ABL 7RP1205/2405/4803



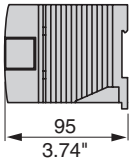
ABL 7RE2410
ABL 7RP2410



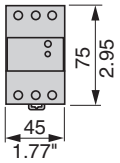
ABL 7CEM24●●●
ABL 7CEM24003



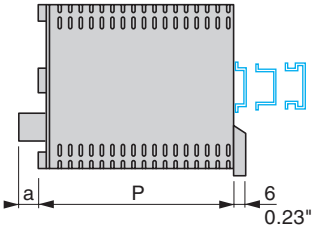
ABL 7CEM24006/
ABL 7CEM24012

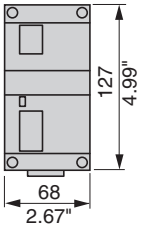


Common front view

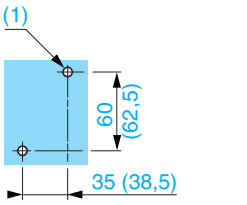


ABL 7REQ24●●●/ABL 7UEQ24100/ABL 7UES24050/
ABL 7UPS24100





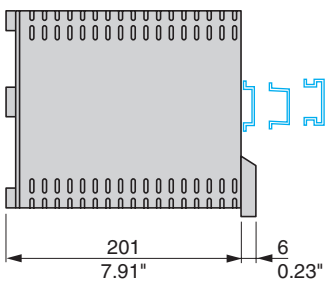
Panel mounting

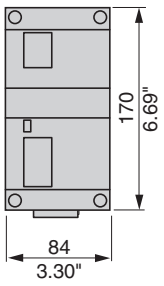


(1) 2 x M4 or 2 x Ø4.5

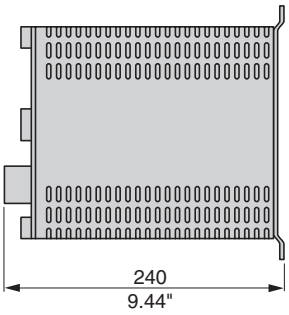
ABL	P mm (inches)	a mm (inches)
7REQ24050	130 (5.11")	–
7REQ24100	154 (6.06")	–
7UEQ24100	154 (6.06")	–
7UES24050	171 (6.73")	15 (0.59"
7UPS24100	171 (6.73")	15 (0.59")

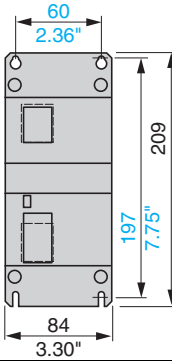
ABL 7UEQ24200





ABL 7UPS24200





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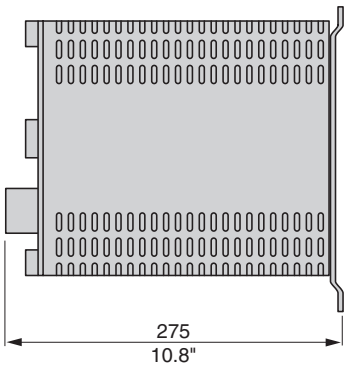
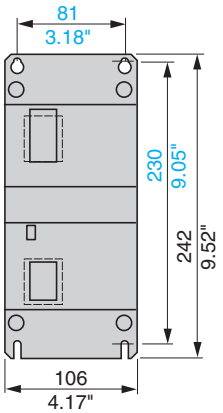




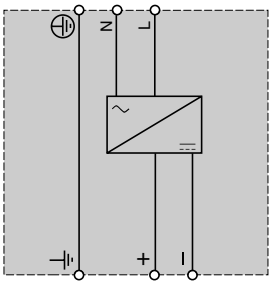
Dual Dimensions mm / inches

Presentation : pages page 58, page 59
Characteristics : pages page 62 - page 65
References : page page 67
Schemes : page page 69

Power supplies

Power supplies for d.c. control circuits
Phaseo® regulated switch mode power supplies

ABL 7RE2402/2403



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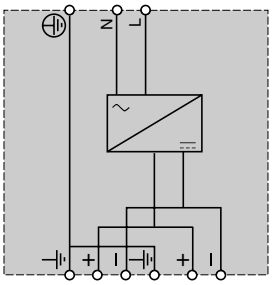

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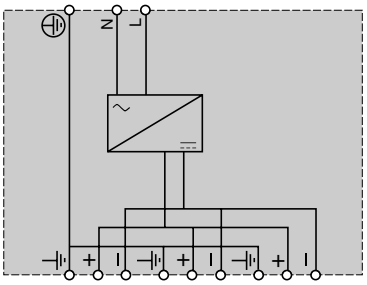

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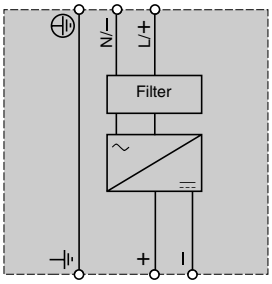

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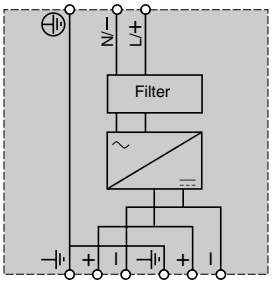

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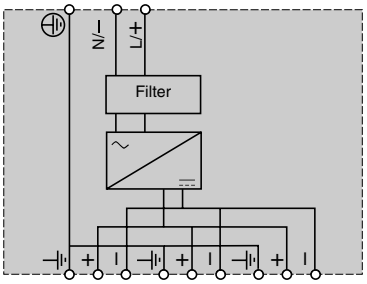

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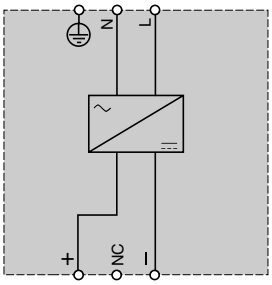

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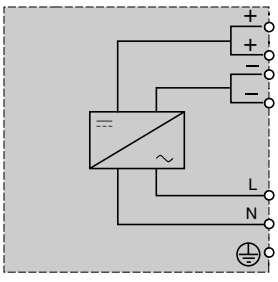
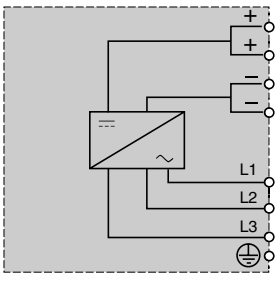
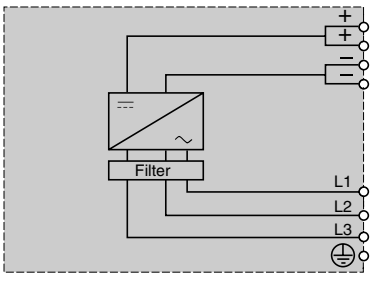


ABL 7UE●●●●●



ABL 7UPS●●●●● and 7UES



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