SENECA

Z-PC Line

ZC-16DI-8DO

EN

CANopen I/O Module:
16 Digital Inputs
8 Digital Outputs

Installation Manual

Contents:

- General Specifications
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General Specifications

- Sixteen 16 V_{DC} self-powered digital inputs with shared negative pole.
- Eight inputs settable as 32-bit counters with 10 kHz maximum frequency.
- Eight Mosfet Digital Outputs with shared negative pole, 5 - 30 V_{DC} collectively supplied .
- Digital outputs available both by terminals and IDC10 connector to facilitate the connection to external relays.
- Can Interface with CANopen protocol: up to 1 Mbps speed.
- CANopen Baud rate and Node ID configurability by DIP-switches or software.
- RS232 Serial Communication with MODBUS-RTU protocol.
- Facilitated power supply and CANopen bus wiring by means of the bus housed in the DIN rail.
- 1500 V_{AC} Isolation among input/output, power supply and CAN interface circuits.
- Counters increment individually configurable on the rising or falling edges of the corresponding digital input.
- Overflow indication available for each counter.
- Preset value configurable for each counter.
- Reset and preset commands individually executable on each counter.
- Overtemperature and short-circuit to ground of digital outputs continuous monitoring and consequent fault condition signalling.
- Outputs value in case of no communication or fault condition: programmable value or last set value.
- Leds Signallings: Power Supply, Digital Inputs/Outputs State, CAN Communication, MODBUS-RTU Communication, Outputs fault.

Technical Specifications

INPUTS	
Polarity (EN 61131-2 type 2)	Sink (pnp)
Channels	16
Counters (if enabled)	8 (32 bit)
U_L (state OFF)	0 - 7 V_{DC}
U_H (state ON)	11 - 30 V_{DC}
Absorbed Current (for each input)	3 mA
V_{MAX}	30 V_{DC}
Minimum pulse width	250 µs
ON/OFF Delay	Typical: 1.2 ms Max: 3 ms
Counters frequency	Max 10 kHz

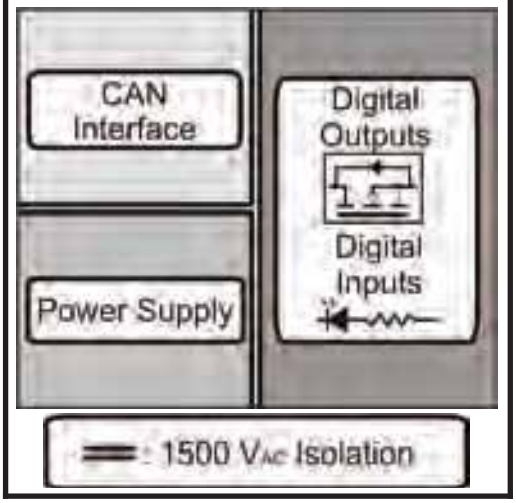
OUTPUTS	
Channels	8
Outputs Type	Mosfet (Open Source)
Power Supply Voltage	5 - 30 V_{DC}
Maximum current (for each output)	0.5 A (connection from terminals)
	25 mA (connection from IDC10 connector)
RDS on	0.75 Ω
ON/OFF Delay	Max 1 ms

POWER SUPPLY	
Voltage	10 - 40 VDC or 19 - 28 VAC
Consumption	Typical: 1.5 W, Max: 2.5 W
ENVIRONMENTAL CONDITIONS	
Temperature	-10 - + 65°C
Humidity	30 - 90% at 40°C non condensing
Altitude	up 2000 m slm
Storage Temperature	-20 - +85°C
Protection	IP20
CONNECTIONS	
Removable Terminals	4-way screw terminals (3.5 mm pitch): inputs/outputs.
Rear IDC10 Connector	CAN Interface and power supply (for DIN rail).
IDC10 Connector on the rear	Digital Outputs (alternatively to terminals).
Stereophonic frontal jack	3.5 mm: RS232 (COM).
DIMENSIONS / BOX	
Dimensions	L: 100 mm, H: 112 mm, W: 35 mm
Box	PBT, black

ISOLATIONS / STANDARDS

Isolation Diagram

3-Point 1500 VAC Isolation



Standards

The module complies with the following standards:

EN61000-6-4/2002-10 (electromagnetic emission, industrial environment).

EN61000-6-2/2006-10 (electromagnetic immunity, industrial environment).

EN61010-1/2001 (safety).
All circuits must be isolated from the other circuits under dangerous voltage with double isolation. The power supply transformer must comply with EN60742: “Isolated transformers and safety transformers”.

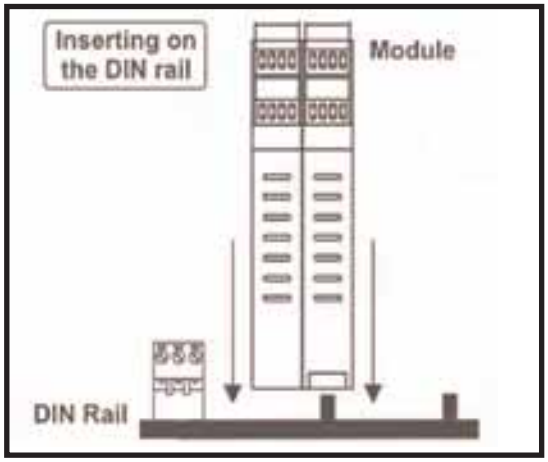
Installation Rules

The module is designed to be installed in vertical position on a DIN 46277 rail. In order to ensure optimum performance and the longest working life, the module(s) must be supplied adequate ventilation and no raceways or other objects that obstruct the ventilation slots. Never install modules above sources of heat; we recommend installation in the lower part of the control panel.

Inserting on the DIN rail

As it is illustrated in the figure:

1) Insert the rear IDC10 connector on a DIN rail free slot



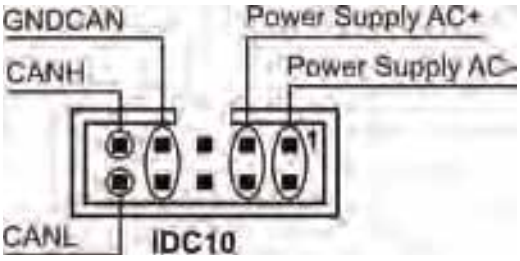
(the inserting is univocal since the connectors are polarized).
2) Tighten the two locks placed at the sides of the rear IDC10 connector to fix the module.

Electrical Connections

POWER SUPPLY AND CAN INTERFACE

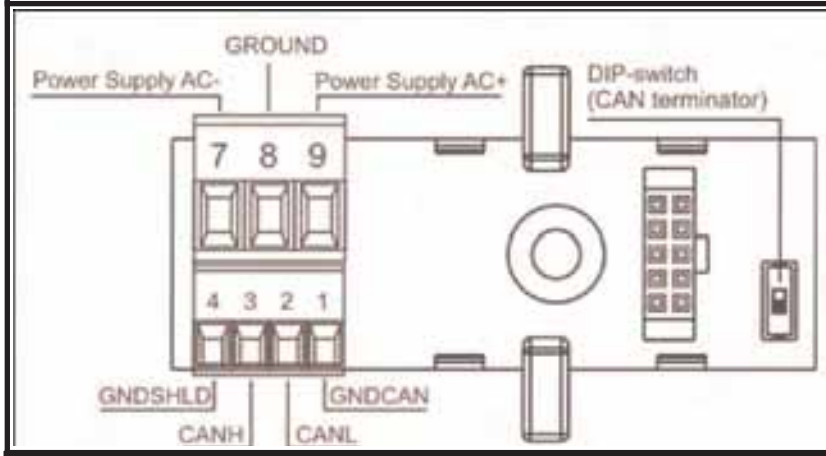
Power Supply and CAN interface are available by using the bus for the Seneca DIN rail, by the rear IDC10 connector or by Z-PC-DINAL-B accessory (see *Accessories).*

Rear Connector (IDC10)



In the figure the meaning of the IDC10 connector pins is showed, in the case the user decides to provide the signals directly through it.

Z-PC-DINAL-B Accessory Use



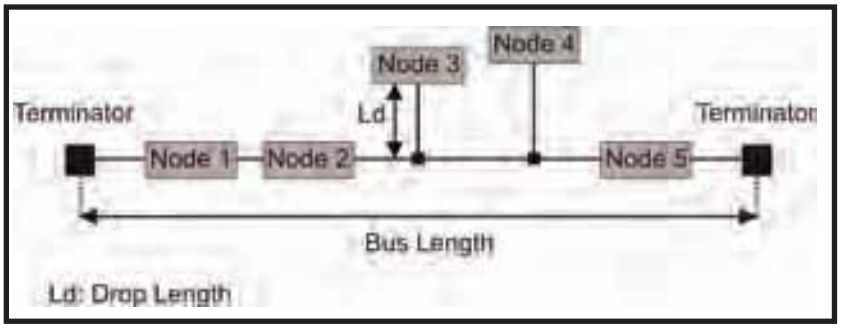
In case of Z-PC-DINAL-B accessory use, the signals may be provided by terminal blocks. The figure shows the meaning of the terminals and the position of the DIP-switch (present on each DIN rail supports listed on *Accessories*) for CAN network termination.
GNDSHLD: Shield to protect the connection cables (always

CAN bus Connection Rules

1) Install the modules on the DIN rail (max 120).
2) Connect the remote modules using cables of proper length. On the table the following data about the cables length are provided:
-*Bus Length*: CAN network maximum length as a function of the Baud rate. It is the lenght of the cables which connect the two bus terminators modules (see *Scheme 1*).
-*Drop Length*: maximum length of a drop line (see *Scheme 1*) as a function of the Baud Rate.

Baud rate	Bus Length	Drop Length
20 kbps	2500 m	150 m
50 kbps	1000 m	60 m
125 kbps	500 m	5 m
250 kbps	250 m	5 m
500 kbps	100 m	5 m
800 kbps	50 m	3 m
1000 kbps	25 m	0.3 m

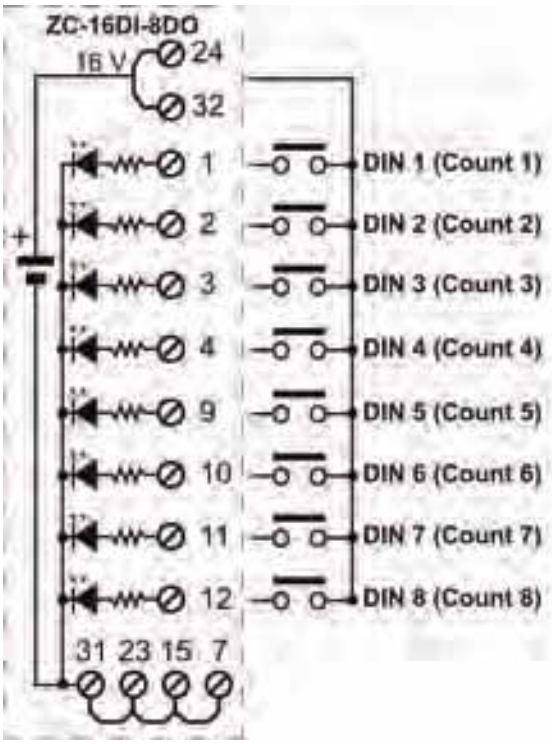
Scheme 1



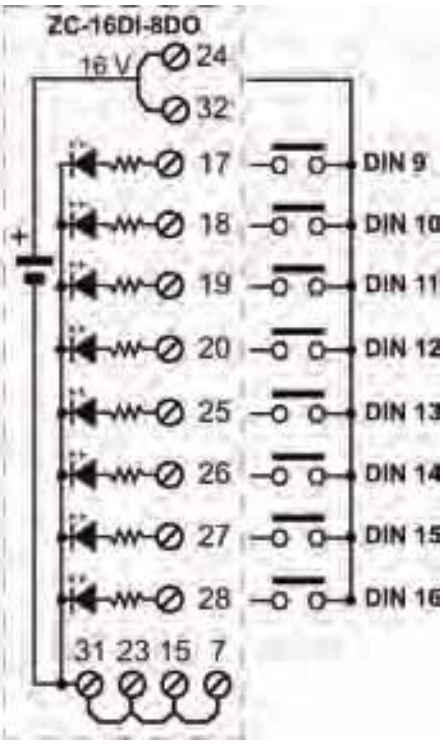
For the best performances, the use of special shielded cables is recommended (***BELDEN 9841*** cable for example).
3) Terminate the two ends of the CANbus network by setting to ON the DIP-switch present on the DIN rail connection supports (see *Accessories*) where the two ends are inserted.

DIGITAL INPUTS

Digital inputs settable as High Speed Digital Counters (Max Frequency: 10 kHz)



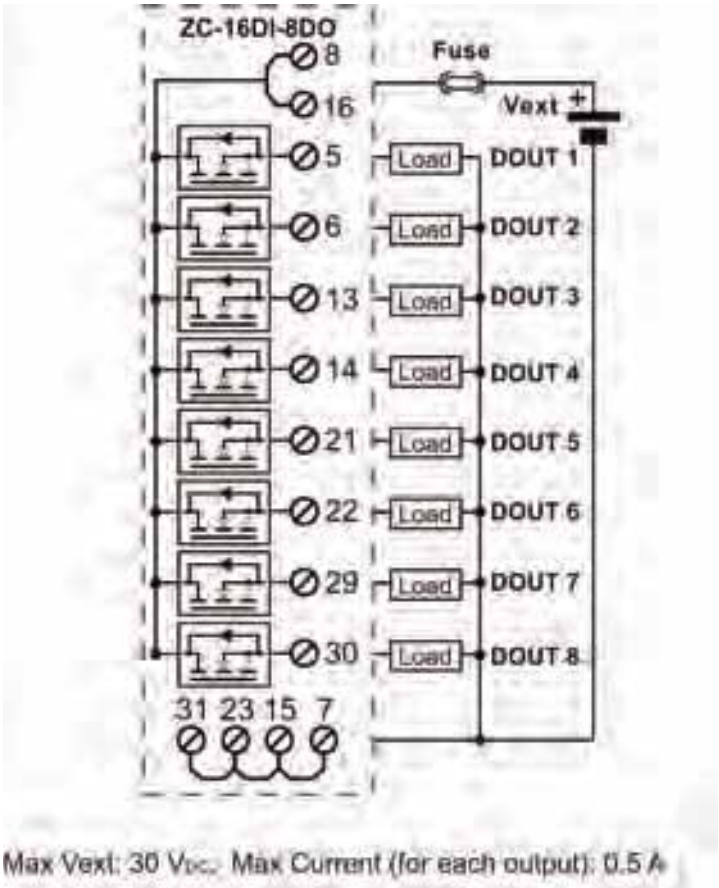
Generic Digital Inputs



DIGITAL OUTPUTS

Digital Outputs from Terminals

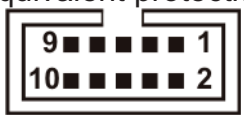
The total current entering on power supply terminal must be limited to **4 A** with quick-break fuse or equivalent protection.



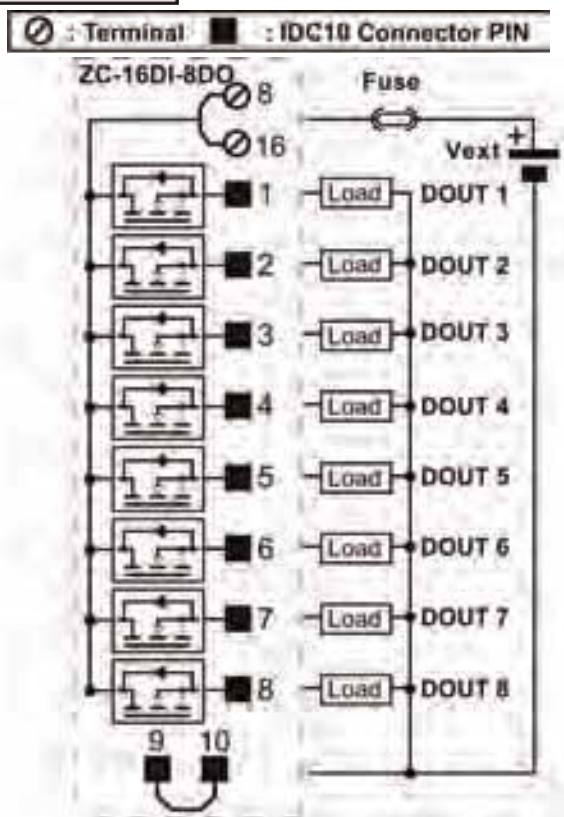
Max Vext: 30 Vdc. Max Current (for each output): 0.5 A

Digital Outputs from IDC10 connector

Connection suggested to supply 24 V relays. The total current entering on power supply terminal must be limited to **0.2 A** with quick-break fuse or equivalent protection.

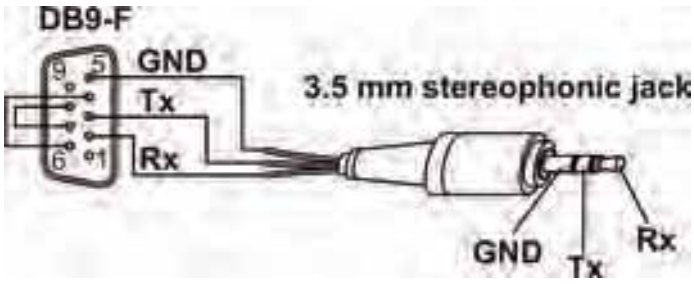


IDC10 Connector on the module rear side.



Max Vext: 30 Vdc. Max Current (for each output): 25 mA

RS232 SERIAL PORT



The connection cable DB9 with a 3.5 mm stereophonic jack, can be assembled as indicated in the following figure, or can be bought as an accessory (see *Accessories*).

DIP-switches Settings

The DIP-switches position defines the module CAN communication parameters: Address and Baud Rate. In the following figure the Baud Rate and Address values are listed as a function of the DIP-switches position:

BAUD RATE		ADDRESS	
1 2 3	Baud rate from memory	4 5 6 7 8 9 10	0000000 Address from memory
	20 kbps		0000001 Address: 001
	50 kbps		0000010 Address: 002
	125 kbps		0000011 Address: 003
	250 kbps		0000100 Address: 004
	500 kbps		0000101 Address: 005
	800 kbps	.....	..... Address as from binary representation
	1 Mbps		1111111 Address: 127

ON

We underline that on all the DIN rail supports listed on *Accessories* a DIP-switch is present and if it is set to ON position the CAN network termination is inserted.

Programming

PROGRAMMING THROUGH CAN INTERFACE

The module may be programmed/configured through the CAN interface; refer to the *User Manual* for details about the communication.

Factory CAN Parameters

With all the DIP-switches in OFF position (values from memory), the module is originally programmed as follows:
Baud Rate: 20 kbps, Address: 1

PROGRAMMING THROUGH RS232

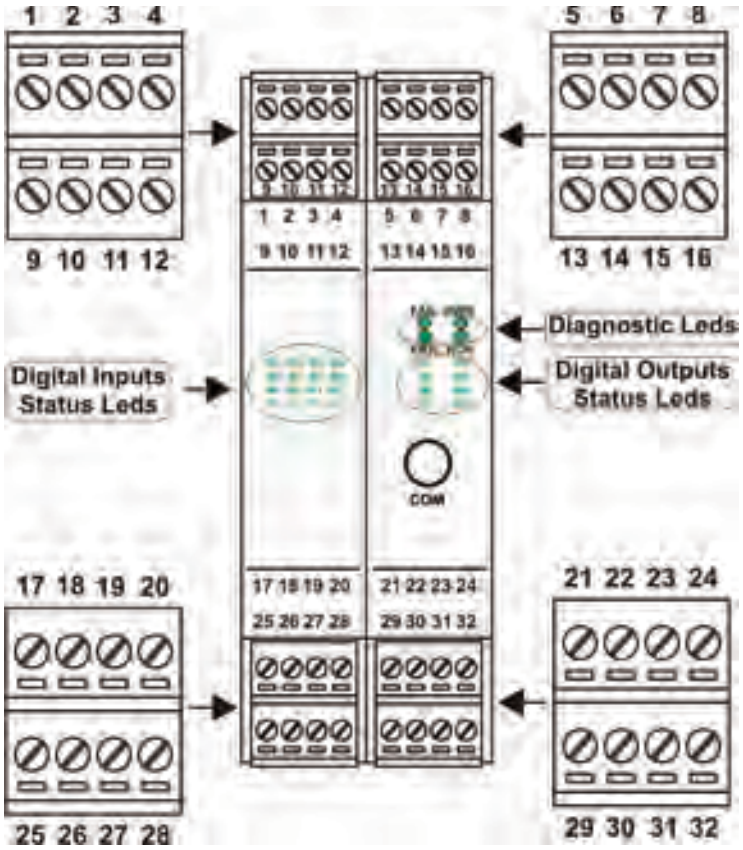
The module may be programmed/configured through the RS232 interface by using MODBUS-RTU protocol; refer to the *User Manual* for details about the communication. The connection parameters are the following:
Address: 1, **Baud Rate: 2400 Baud, Parity: none, Stop bit: 1.**

Significant Components Position

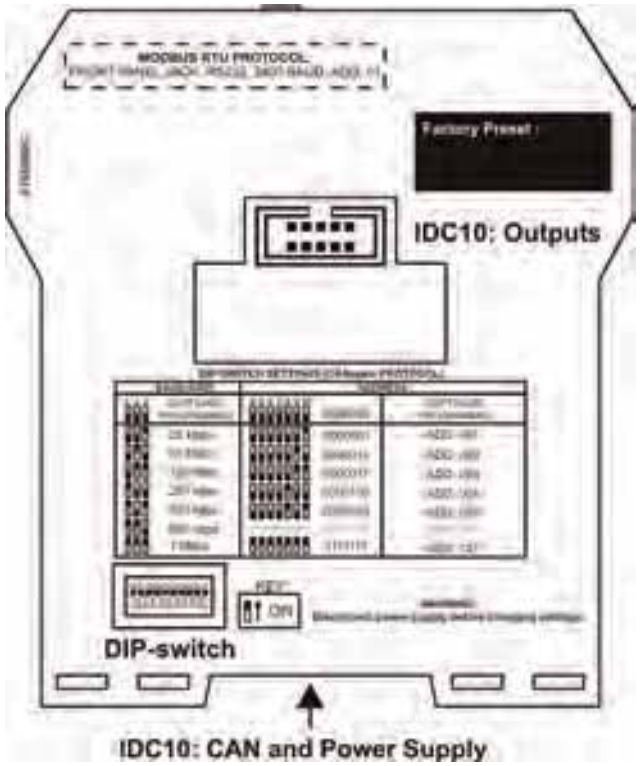
TERMINALS/LEDS/CONNECTORS/DIP-SWITCHES

The terminals numbering, the leds position on the frontal panel, the IDC10 connectors and the DIP-switch on the rear side are illustrated below.

Frontal Panel



Rear Side



Leds Signallings

LEDS *ERR* AND *RUN:* CANOPEN COMMUNICATION STATE

The meaning of leds ***ERR*** and ***RUN*** is described below; refer to the *User Manual* for details about the possible state and the flashing modes of the two leds.

Led ERR (Red) Meaning

N°	LED ERR (Red)	STATE	DESCRIPTION
1	Off	No error	The Device is in working condition.
2	Single flash	Warning limit reached	At least one of the error counters of the CAN controller has reached or exceeded the warning level (too many error frames).
3	Double flash	Error Control Event	A guard event (NMT-Slave or NMT-master) .
4	Triple flash	Sync Error	The SYNC message has not been received within the configured communication cycle period time out.
5	On	Bus off	The CAN controller is bus off.

Led RUN (Green) Meaning

N°	LED RUN (Green)	STATE	DESCRIPTION
1	Single flash	Stopped	The Device is in STOPPED state.
2	Blinking	Pre-Operational	The Device is in the PRE-OPERATIONAL state.
3	On	Operational	The Device is in the OPERATIONAL state.

LEDS FAIL AND PWR: GENERAL SYSTEM DIAGNOSTICS

LED PWR (Green)	Meaning
On	Power Supply Presence.

LED FAIL (Yellow)	Meaning
On / Blinking	-Data reception on the RS232 port (COM). -At least an output is in fault condition.

DIGITAL INPUT / OUTPUT STATE LEDS

LEDS 1O..8O (Green)	Meaning
On	The correspondent digital output (1O..8O) is ON.

LEDS 01..16 (Green)	Meaning
On	-**01..08**: If counters are enabled: the correspondent counter is ON. Otherwise it signals the state of the correspondent generic digital input. -**09..16**: The correspondent generic digital input is ON.

Accessories

SUPPORTS FOR MOUNTING ON DIN RAIL GUIDE/ SERIAL CABLE

Code	Description
Z-PC-DINAL-A	Bus Support: Terminal blocks + 2 slots to connect Z-PC line modules.
Z-PC-DINAL-B	Bus Support: Terminal blocks + 1 slot to connect Z-PC line modules.
Z-PC-DIN2-A	Bus Support: 2 slots to connect Z-PC line modules.
Z-PC-DIN2-B	Bus Support: 1 slot to connect Z-PC line modules.
Z-PC-DIN8-A	Bus Support: 8 slots to connect Z-PC line modules.
Z-PC-DIN8-B	Bus Support: 4 slots to connect Z-PC line modules.
PM001600	Serial Cable: from 3,5 mm stereo Jack to DB9F.

Disposal of Electrical & Electronic Equipment (Applicable throughout the European Union and other European countries with separate collection programs). This symbol, found on your product or on its packaging, indicates that this product should not be treated as household waste when you wish to dispose of it. Instead, it should be handed over to an applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences to the environment and human health, which could otherwise be caused by inappropriate disposal of this product. The recycling of materials will help to conserve natural resources. For more detailed information about the recycling of this product, please contact your local city office, waste disposal service or the retail store where you purchased this product.