

# Z-PC LINE

## Digital I/O modules

# ZC-24DO

24 CH Digital Output module / CANopen-ModBUS RTU



**NEW**  
CANopen & ModBUS  
all-in-one



CANopen



Modbus

Power Supply	10..40 Vdc, 19..28 Vac
Max Consumption	2,5 W
Isolation	1,5 kVac (3 way)
Channels	24
Output type	Mosfet, max 500 mA per channel
Vext	5..30 Vdc
RPDO	< 1,25 ms
Supported Protocols	CAN bus standard (2.0A), CANopen (CiA 401 v.2.01), ModBUS RTU
Dip-Switches	Baud rate and ID Node configuration
Operating temperature	-10..+65°C
Dimension (W*H*D)	35 x 100 x 112 mm



➔ For additional information please refer to [www.seneca.it](http://www.seneca.it)

# ZC-24DO

24 CH Digital Output module / CANopen-ModBUS RTU



## ORDER CODES

<b>Model</b>	<b>ZC-24DO</b>	24 CH Digital Output module / CANopen-ModBUS 10..40 Vdc / 19..28
<b>Accessories</b>	<b>Z-PC-DINAL1-35</b> <b>Z-PC-DIN1-35</b> <b>Z-PC-DIN4-35</b> <b>PM001601</b>	Terminal block for power / bus + 1 slot 35 mm 1 slot block 35 mm 4 slot block 35 mm Programming serial cable Jack / DB9F
<b>Configuration</b>		EDS File (Electronic Data Sheet) free on <a href="http://www.seneca.it">www.seneca.it</a>

## TECHNICAL FEATURES

### GENERAL DATA

<b>Power Supply</b>	10..40 Vdc; 19..28 Vac
<b>Max consumption</b>	1 W
<b>Isolation</b>	1,5 kVac (3way)
<b>Input Protection</b>	Against ESD up to 4 kV
<b>Rejection</b>	Settable 50 or 60 Hz
<b>Status indicator (LED)</b>	Power Supply, communication, fault
<b>Dimension (WxHxD)</b>	35 x 100 x 112 mm
<b>Enclosure, weight, color</b>	PBT, 140 g, black
<b>Operating temperature</b>	-10..+65°C
<b>Connection</b>	Screw-fit removable for wires up to 3.5 mm IDC10 Back connector for DIN rail frontal Jack RS232 (ModBUS) (COM) connection
<b>Protection degree</b>	IP20
<b>Configuration</b>	DIP switches (baud rate, ID Node) EDS IEC 61131
<b>Supported Protocols</b>	CAN bus standard (2.0A) CANopen (profile CiA 401 v.2.01) ModBUS RTU
<b>Max CANopen Speed</b>	1 Mbps
<b>Norms &amp; Approvals</b>	CE, EN 61000-6-4, EN 64000-6-2, EN 61010-1 CAN 2.0A CiA 401 v.2.01 IEC EN 61131-2

### OUTPUT DATA

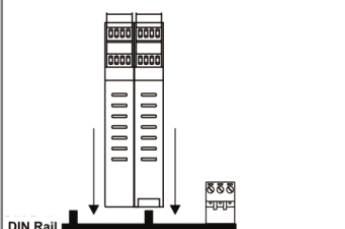
<b>Channels</b>	24
<b>Output type</b>	Mosfet (open source) with shared negative pole
<b>Power Supply</b>	5..30 Vdc
<b>Imax</b>	0.5 A (connection from terminals) 25 mA (connection from connectors)
<b>On/Off delay from RPDO</b>	< 1,25 ms

### CANOPEN FEATURES

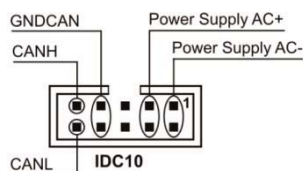
<b>NMT</b>	Slave
<b>Error control</b>	Node guarding
<b>Node ID</b>	Software, DIP-switch
<b>Nr PDO</b>	RX 5
<b>PDO Modes</b>	Event Triggered, Sync (cyclic), Sync (acyclic)
<b>PDO linking</b>	Yes
<b>PDO mapping</b>	Variable
<b>Nr SDO Server</b>	1
<b>Emergency Messages</b>	Yes
<b>Application layer</b>	CiA 301 v. 4.02
<b>Profile</b>	CiA 401 v. 2.01

## ELECTRICAL CONNECTIONS

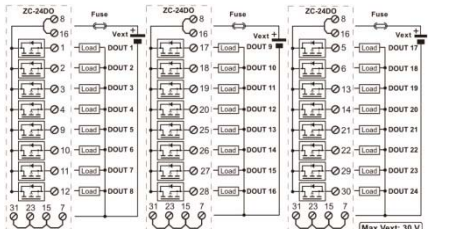
### Module insertion on DIN guide 46277



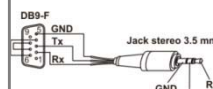
### IDC10 back connectors



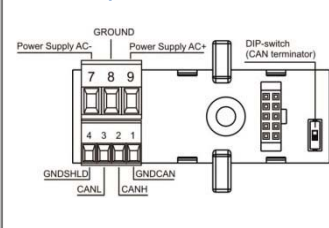
### Digital Outputs via terminals



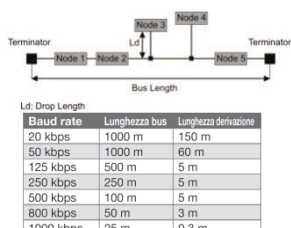
### RS232 - DB9F / Jack stereo Serial connection



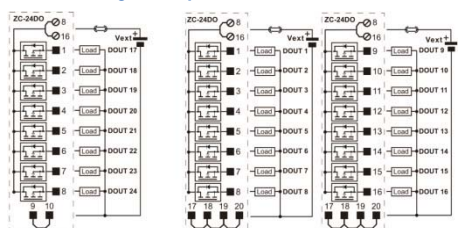
### Backplane bus Z-PC DIN



### CANbus Connection Norms



### Digital Outputs via connectors



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## Z-PC Line



# ZC-24DO

## CANopen/MODBUS I/O Module

### 24 Digital Outputs

## Installation Manual

### Contents:

- General Specifications
- Technical Specifications
- Installation Rules
- Electrical connections
- DIP-switches settings
- Programming
- Significant Components Position
- Leds Signallings
- Factory Settings



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For manuals, EDS files and configuration software, see [www.seneca.it](http://www.seneca.it)

This document is property of SENECA s.r.l. Duplication and reproduction are forbidden, if not authorized. Contents of the present documentation refers to products and technologies described in it. All technical data contained in the document may be modified without prior notice. Content of this documentation is subject to periodical revision.

Humidity	30 - 90 % at 40 °C non condensing
Altitude	Up to 2000 m a.s.l.
Storage Temperature	-20 / +85 °C
Protection	IP20
<b>CONNECTIONS</b>	
Removable Terminals	4-way screw terminals (3.5 mm pitch); outputs.
Rear IDC10 Connector	CAN/MODBUS Interface and power supply (for DIN rail)
IDC10 / IDC20 Connectors	Outputs (on the rear, alternatively to terminals).
Stereophonic Frontal Jack	3.5 mm; RS232 (COM)
<b>DIMENSIONS / BOX</b>	
Dimensions	L: 100 mm, H: 112 mm, W: 35 mm
Box	PBT, black

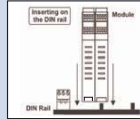
<b>ISOLATIONS / STANDARDS</b>	
<b>Isolation Diagram</b>	<b>Standards</b>
3-Points 1500 V <sub>AC</sub> isolation	<p>The module complies with the following standards:</p> <p>EN61000-6-4/2002-10 (electromagnetic emission, industrial environment).</p> <p>EN61000-6-2/2006-10 (electromagnetic immunity, industrial environment).</p> <p>EN61010-1/2001 (safety).</p> <p>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".</p>

### 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

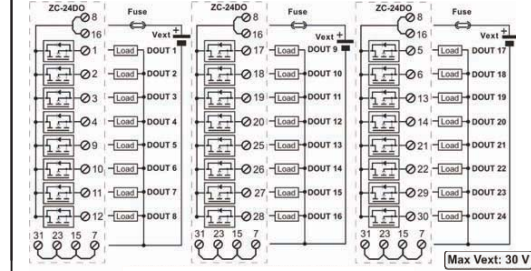
- As it is illustrated in the next figure:
- 1) Insert the rear IDC10 connector on a DIN rail free slot (the inserting is univocal since the connectors are polarized).
  - 2) Tighten the four locks placed at the sides of the rear IDC10 connector to fix the module.



## DIGITAL OUTPUTS

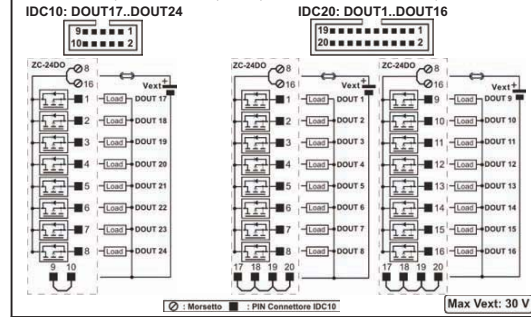
### Digital Outputs Connections from terminals

The total current entering on power supply terminal must be limited to 12 A with quick-break fuse or equivalent protection.



### Digital Outputs Connections from connectors (module rear side)

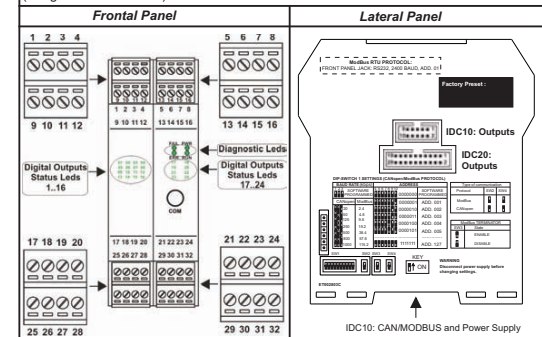
Connection suggested to supply 24 V relays. The total current entering on power supply terminal must be limited to 0.6 A with quick-break fuse or equivalent protection. Max. current for each output: 25 mA.



## Significant Components Position

### Terminals/Leds/IDC10 Connector/ DIP-switch

The terminals numbering, the leds position on the frontal panel, the rear IDC10 connector (fixing on the DIN rail) and the DIP-switch on the rear side are illustrated below.



### LEDs Signallings

#### LED ERR E RUN: CANOPEN / MODBUS 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)	STATE	LED (Red) ERR (CANOPEN) Meaning
OFF	No error	The Device is in working condition.
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).
Double flash	Error Event	A guard event (NMT-Slave or NMT-master).
Triple flash	Sync Error	The SYNC message has not been received within the communication cycle period time out.
ON	Bus off	The CAN controller is bus off.

LED ERR (Red)	LED (Red) Rx (MODBUS) Meaning
ON	The device is receiving.

## General Specifications

- 24 Mosfet Digital Outputs with shared negative pole, 5 - 30 V<sub>DC</sub> collectively supplied.
- Digital outputs available both by terminals and IDC10/ IDC20 connectors to facilitate the connection to external relays.
- Can Interface with CANopen protocol up to 1 Mbps speed or MODBUS RS485 Interface up to 115 Kbit/s speed.
- CANopen/MODBUS Baud rate and Node ID configurability by DIP-switches or software.
- RS232 Serial Communication with MODBUS-RTU protocol.
- Facilitated power supply and CANopen/MODBUS bus wiring by means of the bus housed in the DIN rail.
- 1500 VAC Isolation among output, power supply and CANopen/MODBUS interface circuits.
- 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 Outputs State, CANopen/MODBUS Communication, MODBUS-RTU Communication.

## Specifiche Tecniche

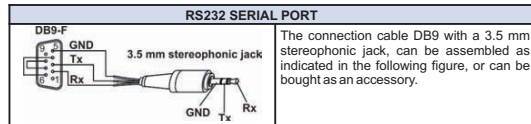
OUTPUTS	
Numbers of Channels	24
Outputs Type	MOSFET (Open Source)
Power Supply Voltage	5 - 30 V <sub>DC</sub>
Maximum current (for each output)	0,5 A (connection from terminals) 25 mA (connection from connectors)
RDS on	0,75 Ω
ON/OFF delay	Max 1 ms
POWER SUPPLY	
Voltage	10 - 40 V <sub>DC</sub> 19 - 28 V <sub>AC</sub>
Consumption	Typical: 1.5 W, Max: 2.5 W
ENVIRONMENTAL CONDITIONS	
Temperature	-10 / +65 °C

## Electrical Connections

POWER SUPPLY AND CAN/MODBUS INTERFACE																									
Power Supply and CAN/MODBUS interface are available by using the bus for the Seneca DIN rail, by the rear IDC10 connector or by Z-PC-DINAL-1-35 accessory.																									
<b>Rear Connector (IDC10)</b>																									
	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.																								
<b>Z-PC-DINAL-1-35 Accessory Use</b>																									
	In case of Z-PC-DINAL-1-35 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.																								
<b>CAN bus Connection Rules</b>																									
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 length 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.																									
<table border="1"> <thead> <tr> <th>Baud rate</th> <th>Bus Length</th> <th>Drop Length</th> </tr> </thead> <tbody> <tr> <td>20 kbps</td> <td>2500 m</td> <td>150 m</td> </tr> <tr> <td>50 kbps</td> <td>1000 m</td> <td>60 m</td> </tr> <tr> <td>125 kbps</td> <td>500 m</td> <td>5 m</td> </tr> <tr> <td>250 kbps</td> <td>250 m</td> <td>5 m</td> </tr> <tr> <td>500 kbps</td> <td>100 m</td> <td>5 m</td> </tr> <tr> <td>800 kbps</td> <td>50 m</td> <td>3 m</td> </tr> <tr> <td>1000 kbps</td> <td>25 m</td> <td>0,3 m</td> </tr> </tbody> </table>	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	
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																							

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.



### DIP-switches Settings

The DIP-switches position defines the module CAN/MODBUS 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 (kbps)	ADDRESS	Type of communication
5 SOFTWARE PROGRAMMED	0000000	Protocol
2.5 SOFTWARE PROGRAMMED	0000001	SW2 SW4
50	0000010	ModBus
125	0000011	CANopen
250	0000100	ModBus TERMINATOR
500	0000101	SW3 State
800	.....	ENABLE
1000	1111111	DISABLE
	ADD. 127	KEY

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

## Programming

PROGRAMMING THROUGH CAN/MODBUS INTERFACE	
The module may be programmed/configured through the CAN/MODBUS interface; refer to the User Manual for details about the communication.	
Factory Parameters	
With all the DIP-switches in OFF position (values from memory), the module is originally programmed as follows: <b>MODBUS, Baud Rate: 38400, Bit: 8, Parity: None, Stop bit: 1, Address: 1</b> <b>To switching ON SW2 and SW4 : CANOPEN, Baud Rate: 20 kbps, Address: 127.</b>	
PROGRAMMING THROUGH RS232 (FRONTAL JACK)	
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: <b>Address: 1, Baud Rate: 2400 Baud, Parity: none, Stop bit: 1.</b>	

LED RUN (Green)	STATE	LED (Green) RUN (CANOPEN) Meaning
Single flash	Stop	The Device is in STOPPED state.
Blinking	Pre-operational	The Device is in the PRE-OPERATIONAL state.
ON	Operational	The Device is in the OPERATIONAL state.

LED RUN (Green)	LED (Green) Tx (MODBUS) Meaning
On	The device is transmitting.

### LEDS FAIL AND PWR: GENERAL SYSTEM DIAGNOSTICS

LED PWR (Green)	Meaning	LED FAIL (Yellow)	Meaning
ON	Power Supply Presence	ON / Blinking	- Data reception on the RS232 port (COM). - Fault: at least an output is in fault condition.

### LEDS 01..24: DIGITAL OUTPUTS STATE

LED 01..24 (Green)	Meaning
ON	The corresponding output (01..24) is ON.

### FACTORY SETTINGS





- All DIP-switch OFF:**
- MODBUS Protocol / - Communication parameters: 38400 8,N,1 Addr. 1
  - In case of fail, outputs go low.
  - Modbus communication monitoring, not active.

- All dip switch OFF except SW2 (ON) and SW4 (ON):
- CANopen Protocol / - Communication parameters: 20K Addr. 127
  - In case of fail, outputs go low.

Variations of standard parameters are possible by using configuration softwares Z-NET and EASY-Z-PC ([www.seneca.it](http://www.seneca.it)).

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 	<h3>ZC-24DO</h3> <p>CANopen/Modbus I/O Module 24 Digital Output</p>	
<h2>User Manual</h2>		
		<p>Contents:</p> <ul style="list-style-type: none"> <li>CANopen Features</li> <li>CANopen PDOs</li> <li>CANopen PDO Transmission Type</li> <li>CANopen Emergency Message</li> <li>CANopen Functional Diagrams</li> <li>CANopen Object Dictionary</li> <li>Modbus Features</li> <li>Modbus Register</li> <li>Modbus Command</li> </ul>

### CANopen PDOs TRANSMISSION TYPE SUPPORTED

OBJECT VALUE 0x180x sub 2	TRANSMISSION TYPE
0	Synchronous - acyclic
From 1 to 240	Synchronous - cyclic
255	Asynchronous

### CANopen PDOs MAPPING

OBJECTS FOR DEFAULT MAPPING				
PDO NR	COB-ID	MAPPED OBJECTS	INDEX	SUBINDEX
RPDO1	0x200 + NodeId	Digital Output [1..8]	0x6200	1
		Digital Output [9..16]	0x6200	2
		Digital Output [17..24]	0x6200	3

### CANopen FEATURES

TECHNICAL DATA	
BAUD RATE	20, 50, 125, 250, 500, 800, 1000 Kbits/s
TYPICAL ON/OFF DELAY	1 ms (with filter disabled)
CANopen TECHNICAL DATA	
NMT	SLAVE
ERROR CONTROL	NODE GUARDING
NODE ID	HW SWITCH OR SOFTWARE
NUMBER OF PDO	1 RX
PDO MODES	Event Triggered, Sync (cyclic), Sync (acyclic)
PDO MAPPING	VARIABLE
PDO LINKING	SUPPORTED
NUMBER OF SDO	1 SERVER
ERROR MESSAGE	YES
SUPPORTED APPLICATION	CiA 301 v4.02
LAYER	CiA 401 v2.01

### CANopen EMERGENCY MESSAGE

The Emergency message is composed by:

- 2 bytes of EEC (Emergency error code)
- 1 bytes of ER (Error Register)
- 4 bytes MEF (Manufacturer Error Filled Objects) (0x1200)

EMERGENCY MESSAGE						
BYTE0	BYTE1	BYTE2	BYTE3	BYTE4	BYTE5	BYTE6
EER		ER	MEF			



EEC	
CODE	DESCRIPTION
0x0000	No Error
0x1000	Generic error
0x4201	CPU Temperature over T_HIGH_HIGH
0x4202	CPU Temperature over T_HIGH
0x4203	CPU Temperature under T_LOW
0x8110	Communication Can Overrun
0x8120	Error Passive
0x8130	Life Guard Error
0x8140	Recovered From Bus Off
0xFF20	CPU Error
0xFF30	
0xFF50	

If Hardware switches are in “from memory” mode baud rate is selectable by **Object 0x2002\_**

BAUDRATE ( OBJECT 0X2002 )	
OBJECT VALUE	DESCRIPTION
1	20 Kbit/s
2	50 Kbit/s
3	125 Kbit/s
4	250 Kbit/s
5	500 Kbit/s
6	800 Kbit/s
7	1 Mbit/s

ER							
BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
Generic	0	0	Temperature	Communication	0	0	Manufacture

**Object 0x2030** can be used for monitoring the CPU temperature

CPU TEMPERATURE ( OBJECT 0X2030 )	
SUBINDEX	DESCRIPTION
1	Actual Temperature [°C/10]
2	Temperature for HOT STOP ERROR [°C/10] 95.0°
3	Temperature for HOT ERROR [°C/10] 90.0°
4	Temperature for COLD ERROR [°C/10] -25.0°

Where if the bit is 0 means no error

### CANopen MANUFACTURER SPECIFIC PROFILE

If Hardware switches are in “from memory” mode the node address is selectable by **Object 0x2001**.

NODE ADDRESS (OBJECT 0X2001:)	
OBJECT VALUE	DESCRIPTION
0...127	Node Address

The HOT STOP Temperature sends in pre-operational the station.

The HOT ERROR and the COLD ERROR Temperature sends the Emergency Object.

The Object is Read Only

**Object 0X2520** can be used for monitoring outputs status:

“1” = ERROR  
“0” = OK

OUTPUTS STATUS (OBJECT 0X2520)	
COMMAND CODE	DESCRIPTION
0x5C0n	OUTPUTS [1..8] STATUS
0x5D0n	OUTPUTS [9..16] STATUS
0x5E0n	OUTPUTS [17..24] STATUS






### DIP-SWITCH CONFIGURATION





BAUD RATE (kbps)			ADDRESS										
1	2	3	4	5	6	7	8	9	10				
SOFTWARE PROGRAMMED			SOFTWARE PROGRAMMED										
CANopen			ModBus										
20	50	125	250	500	800	1000	2.4	4.8	9.6	19.2	38.4	57.6	115.2
			00000000										
			00000001										
			00000010										
			00000011										
			00001000										
			00001001										
			.....										
			11111111										
			ADD. 001										
			ADD. 002										
			ADD. 003										
			ADD. 004										
			ADD. 005										
			.....										
			ADD. 127										

Type of communication		
Protocol	SW2	SW4
ModBus	<input type="checkbox"/>	<input type="checkbox"/>
CANopen	<input type="checkbox"/>	<input type="checkbox"/>



OUTPUT LED DESCRIPTION		
LED	STATE	DESCRIPTION
 1...8	ON	Output [1..8] is high
	OFF	Output [1..8] is low
 9...16	ON	Output [9..16] is high
	OFF	Output [9..16] is low
 17...24	ON	Output [17..24] is high
	OFF	Output [17..24] is low

### CANopen LED DESCRIPTION

SERVICE (DIAGNOSTIC) LED DESCRIPTION		
LED	STATE	DESCRIPTION
 RUN	BLINKING	Pre-operational mode
	SINGLE FLASH	Stop mode
	ON	Operational mode
 ERROR	SINGLE FLASH	At least one error counter has reached or exceeded the warning level
	DOUBLE FLASH	GUARD Event
	TRIPLE FLASH	The SYNC hasn't received within the configured communication cycle timeout period
	ON	The CAN controller is bus OFF
	OFF	NO Error
 FAIL	ON BLINKING	Data receiving from RS232
 POWER	ON	Power Supply



**CANopen DIGITAL OUTPUT MANAGEMENT**

**Object 0x6200** is used as 8 bit output

8 BIT OUTPUT (OBJECT 0X6200)	
SUBINDEX	DESCRIPTION
1	OUTPUT [1..8] VALUE
2	OUTPUT [9..16] VALUE
3	OUTPUT [17..24] VALUE

**Object 0x6206** is used in FAULT case:

If the output n corresponding bit is "0", this output keeps the last value;

If the output n corresponding bit is "1", this output is loaded with object 0x6207

OUTPUT ERROR MODE (OBJECT 0X6206)	
SUBINDEX	DESCRIPTION
1	OUTPUT [1..8] ERROR MODE
2	OUTPUT [9..16] ERROR MODE
3	OUTPUT [17..24] ERROR MODE

**Object 0x6207** is used to store outputs values to load, in fault case (only if in output error mode the corresponding bit value is "1").

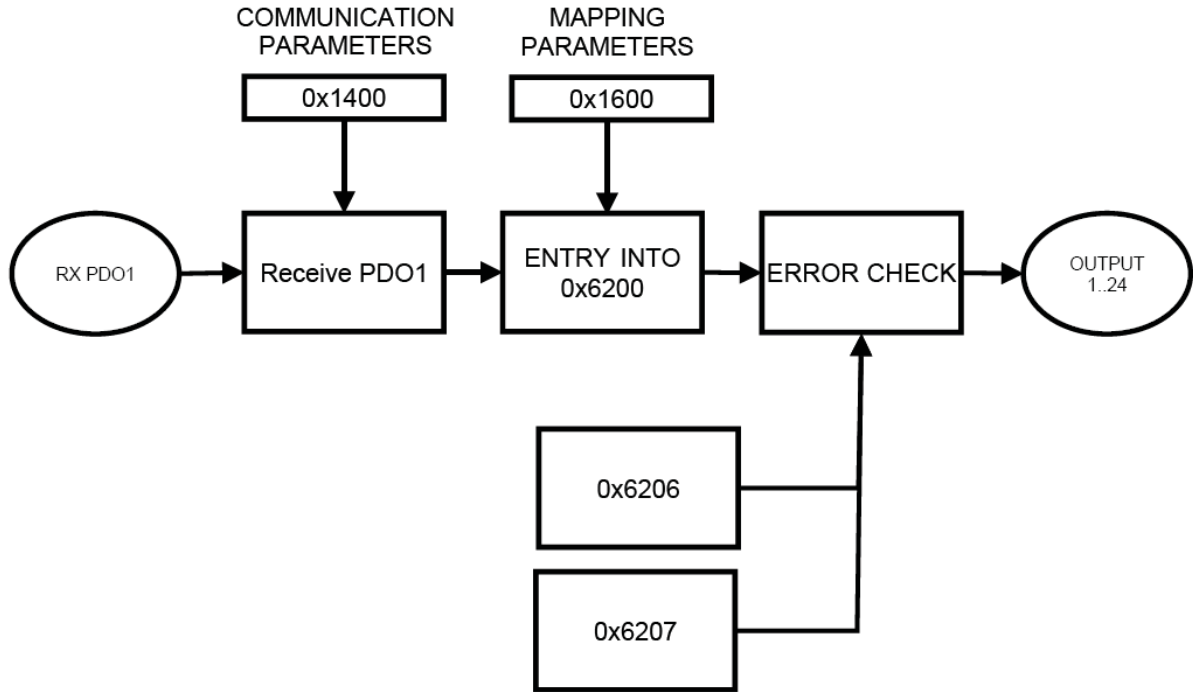
OUTPUT ERROR VALUE (OBJECT 0X6008)	
SUBINDEX	DESCRIPTION
1	Interrupt mask on falling edsge input [1..8]
2	Interrupt mask on falling edsge input [9..16]
3	Interrupt mask on falling edsge input [17..24]

**Object 0x6220** is used for outputs corresponding bits

OUTPUT SINGLE BIT (OBJECT 0X6220)	
SUBINDEX	DESCRIPTION
1	Output 1 value
2	Output 2 value
3	Output 3 value
4	Output 4 value
5	Output 5 value
6	Output 6 value
7	Output 7 value
8	Output 8 value
9	Output 9 value
10	Output 10 value
11	Output 11 value
12	Output 12 value
13	Output 13 value
14	Output 14 value
15	Output 15 value
16	Output 16 value
17	Output 17 value
18	Output 18 value
19	Output 19 value
20	Output.20 value
21	Output 21 value
22	Output 22 value
23	Output 23 value
24	Output 24 value



**CANopen FUNCTIONAL DIAGRAM**  
**DIGITAL OUTPUT**







**CANopen OBJECT DICTIONARY**

**Communication Profile Area**

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1000	0	Device Type	Device Type (Profile 401 = 0x191)	UNSIGNED 32	RO	0x00030191
0x1001	0	Error register	Error register (DS 401)	UNSIGNED 8	RO	0
0x1002	0	Manufacturer Status Register	Status Register	UNSIGNED 32	RO	0
0x1005	0	SYNC COB-ID	The device consumes the SYNC message	UNSIGNED 32	RW	0x80
0x1006	0	Communication Window Length	Sync interval [us]	UNSIGNED 32	RW	0
0x1007	0	Synchronous Window Length	Time window [us] for the PDO transmission after the SYNC	UNSIGNED 32	RW	0
0x1008	0	Manufacturer Device Name	Device name	VISIBLE STRING	RO	"ZC-24DO"
0x1009	0	Manufacturer Hardware version	Hardware version	VISIBLE STRING	RO	"SC000000"
0x100A	0	Manufacturer Software version	Software version	VISIBLE STRING	RO	"SW001170"
0x100C	0	Guard Time	Guard Time [ms]	UNSIGNED 16	RW	0
0x100D	0	Life Time Factor	Max delay between two guarding telegrams = Guard_Time*Life_Time_Factor	UNSIGNED 8	RW	0
0x1010	0	Store Parameters	Max Subindex Number		RO	4
	1	Save All Parameters	Store not volatile parameters (Write in ASCII "save" for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	2	Save Communication Parameters	Store not volatile parameters (Write in ASCII "save" for store process MSB 0x65766173 LSB)	UNSIGNED 32	RW	1
	3	Save Application Parameters	Store not volatile parameters	UNSIGNED 32	RW	1
	4	Save Manufactures Parameters	Store not volatile parameters	UNSIGNED 32	RW	1
0x1011	0	Restore Default	Max Subindex Number	UNSIGNED 8	RO	4
	1	Restore All Parameters	Restore not volatile parameters (Write in ASCII "load" for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	2	Restore Communication Parameters	Restore not volatile parameters (Write in ASCII "load" for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	3	Restore Application Parameters	Restore not volatile parameters (Write in ASCII "load" for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0
	4	Restore Manufactures parameters	Restore not volatile parameters (Write in ASCII "load" for load process MSB 0x64616F6C LSB)	UNSIGNED 32	RW	0



INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x1014	0	COB-ID Emergency Object	COB-ID for Emergency Object	UNSIGNED 32	RO	NODEID + 0x80
0x1018	0	Identity Object	Max Subindex Number	UNSIGNED 8	RO	4
	1	Vendor ID	Seneca srl	UNSIGNED 32	RO	0x00000249
	2	Product Code	ZC-24DO Machine ID Code	UNSIGNED 32	RO	0x00000021
	3	Revision Number	Revision	UNSIGNED 32	RO	0
	4	Serial Number	Serial Number Code	UNSIGNED 32	RO	0
0x1200	0	Server SDO Parameters	Max Subindex Number	UNSIGNED 8	RO	2
	1	Receive SDO COB-ID	COB-ID of Receive SDO	UNSIGNED 32	RO	NODEID + 0x600
	2	Transmit SDO COB-ID	COB-ID of Transmit SDO	UNSIGNED 32	RO	NODEID+0x580
0x1400	0	Receive PDO1 Communication Parameters	Max Subindex Number	UNSIGNED 8	RO	3
	1	COB-ID	COB-ID of RxPDO1	UNSIGNED 32	RW	NODEID + 0x40000180
	2	Transmission Type	Transmission Type for TxPDO1 0x00 = Synchronous - acyclic 0x01 to 0xF0 = Synchronous- cyclic 0xFF = Asynchronous	UNSIGNED 8	RW	0xFF
	3	Inhibit Time	Not used in Rx PDO	UNSIGNED 16	RW	0x0000
0x1600	0	Receive PDO1 Mapping	Max Subindex Number	UNSIGNED 8	RO	4
	1	Object NR1	First Object (default Output 1..8)	UNSIGNED 32	RW	0x62000108 Object = 0x6000 Subindex = 1 Length = 8 bit
	2	Object NR2	Second Object (default Output 9..16)	UNSIGNED 32	RW	0x62000208 Object = 0x6000 Subindex = 2 Length = 8 bit
	3	Object NR3	Third Object (default Output 17..24)	UNSIGNED 32	RW	0x62000308 Object = 0x6000 Subindex = 3 Length = 8 bit



**Manufacturer Profile Area**

INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x2001	0	Module Address	Station Address (only if dip switch 4,5,6,7,8,9,10 are OFF)	UNSIGNED 8	RW	127
0x2002	0	Buad Rate	Station Baud Rate (only if dip switch 1,2,3 are OFF) 1 = 20Kbps 2 = 50Kbps 3 = 125Kbps 4 = 250Kbps 5 = 500Kbps 6 = 800Kbps 7 = 1Mbps	UNSIGNED 8	RW	7
0x2030	0	Device Temperature	Max Subindex Number	UNSIGNED 8	RO	4
	1	Internal Temperature	Station internal Temperature [°C/10]	INTEGER 16	RO	0
	2	Hi Hi Temperature	Critical Hot Temperature (All operations Stop ) [°C/10]	INTEGER 16	RO	950
	3	Hi Temperature	Warning for Too Hot Temperature [°C/10]	INTEGER 16	RO	900
	4	Low Temperature	Critical Low Temperature (All operations Stop ) [°C/10]	INTEGER 16	RO	-250
0x2051	0	CPU Command	Command to execute Supported commands are: 0x5C0n Force preset for counter mask nn 0x5D0n Force reset for counter mask nn 0x5E0n Force overflow for counter mask nn	UNSIGNED 16	RW	0
0x2052	0	Aux Command	Reserved	UNSIGNED 16	RW	0
0x2520	0	Output Status	Max Subindex Number	UNSIGNED 8	RO	3
	1	Output [1..8] Status	1 = Output status ERROR 0 = Output status OK	UNSIGNED 8	RW	0
	2	Output [9..16] Status	1 = Output status ERROR 0 = Output status OK	UNSIGNED 8	RW	0
	3	Output [17..24] Status	1 = Output status ERROR 0 = Output status OK	UNSIGNED 8	RW	0
0x2521	0	Output Fail type	Max Subindex Number	UNSIGNED 8	RO	3
	1	Fail type Output [1..8]	Reserved	UNSIGNED 32	RW	0
	2	Fail type Output [9..16]	Reserved	UNSIGNED 32	RW	0
	3	Fail type Output [17..24]	Reserved	UNSIGNED 32	RW	0



INDEX	SUB INDEX	NAME	DESCRIPTION	TYPE	ACCESS	DEFAULT
0x6200	0	8 bit Output	Max Subindex Number	UNSIGNED 8	RO	1
	1	Output 1..8 Value	Output 1..8 values	UNSIGNED 32	RW	0
	2	Output 9..16 Value	Output 9..16 values	UNSIGNED 32	RW	0
	3	Output 17..24 Value	Output 17..24 values	UNSIGNED 32	RW	0
0x6206	0	Error Mode Output	Max Subindex Number	UNSIGNED 8	RO	1
	1	Output [1..8] Error Mode	"1" = Load 0x6207 value "0" = Keep last	UNSIGNED 32	RW	0xFF
	2	Output [9..16] Error Mode	"1" = Load 0x6207 value "0" = Keep last	UNSIGNED 32	RW	0xFF
	3	Output [17..24] Error Mode	"1" = Load 0x6207 value "0" = Keep last	UNSIGNED 32	RW	0xFF
0x6207	0	Error Value Output	Max Subindex Number	UNSIGNED 8	RO	1
	1	Output [1..8] Error Value	Value to load in fail case	UNSIGNED 32	RW	0x00
	2	Output [9..16] Error Value	Value to load in fail case	UNSIGNED 32	RW	0x00
	3	Output [17..24] Error Value	Value to load in fail case	UNSIGNED 32	RW	0x00
0x6220	0	Single bit Output	Max Subindex Number	UNSIGNED 8	RO	8
	1	Output 1 value	Output value	BOOLEAN	RW	0
	2	Output 2 value	Output value	BOOLEAN	RW	0
	3	Output 3 value	Output value	BOOLEAN	RW	0
	4	Output 4 value	Output value	BOOLEAN	RO	0
	5	Output 5 value	Output value	BOOLEAN	RW	0
	6	Output 6 value	Output value	BOOLEAN	RW	0
	7	Output 7 value	Output value	BOOLEAN	RW	0
	8	Output 8 value	Output value	BOOLEAN	RO	0
	9	Output 9 value	Output value	BOOLEAN	RW	0
	10	Output 10 value	Output value	BOOLEAN	RW	0
	11	Output 11 value	Output value	BOOLEAN	RW	0
	12	Output 12 value	Output value	BOOLEAN	RO	0
	13	Output 13 value	Output value	BOOLEAN	RW	0
	14	Output 14 value	Output value	BOOLEAN	RW	0
	15	Output 15 value	Output value	BOOLEAN	RW	0
	16	Output 16 value	Output value	BOOLEAN	RO	0
	17	Output 17 value	Output value	BOOLEAN	RW	0
	18	Output 18 value	Output value	BOOLEAN	RW	0
	19	Output 19 value	Output value	BOOLEAN	RW	0
	20	Output 20 value	Output value	BOOLEAN	RO	0
	21	Output 21 value	Output value	BOOLEAN	RW	0



<i>INDEX</i>	<i>SUB INDEX</i>	<i>NAME</i>	<i>DESCRIPTION</i>	<i>TYPE</i>	<i>ACCESS</i>	<i>DEFAULT</i>
0x6220	22	Output 22 value	Output value	BOOLEAN	RO	0
	23	Output 23 value	Output value	BOOLEAN	RO	0
	24	Output 24 value	Output value	BOOLEAN	RO	0



## MODBUS FEATURES

TECHNICAL DATA	
BAUD RATE	2.4, 4.8, 9.6, 19.2, 38.57.6, 115.2 Kbits/s

## DIP-SWITCH CONFIGURATION

BAUD RATE (kbps)		ADDRESS	
1 2 3	SOFTWARE PROGRAMMED	4 5 6 7 8 9 10	SOFTWARE PROGRAMMED
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	000 0000
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00000 01
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00000 10
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00000 11
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00001 00
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00001 01
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	.....
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11111 11
			ADD. 001
			ADD. 002
			ADD. 003
			ADD. 004
			ADD. 005
			.....
			ADD. 127

Type of communication		
Protocol	SW2	SW4
ModBus	<input type="checkbox"/>	<input type="checkbox"/>
CANopen	<input type="checkbox"/>	<input type="checkbox"/>

ModBus TERMINATOR	
SW3	State
<input type="checkbox"/>	ENABLE
<input type="checkbox"/>	DISABLE

## MODBUS LED DESCRIPTION

SERVICE LED DESCRIPTION			
LED	STATE	DESCRIPTION	
	RUN/TX	ON	Data Transmission
	ERR/RX	ON	Data Receiving
	FAIL	ON BLINKING	Data receiving from RS232
	POWER	ON	Power Supply

OUTPUT LED DESCRIPTION			
LED	STATE	DESCRIPTION	
	1...8	ON	Output [1..8] is high
		OFF	Output [1..8] is low
	9...16	ON	Output [9..16] is high
		OFF	Output [9..16] is low
	17...24	ON	Output [17..24] is high
		OFF	Output [17..24] is low



**MODBUS REGISTERS**

*Holding Registers*

ADDRESS	REGISTER	DESCRIPTION	TYPE	ACCESS	DEFAULT
40001	MACH-ID/EXT_FW_REV	machine id = 0x20 ext revision 1	FLASH	R	0x2001
40002	FW_CODE	Seneca FW Code	FLASH	R	1182
40003	OUTPUT 1..8	Output 1...8	RAM	R	0
40004	OUTPUT 9..16	Output 9...16	RAM	R	0
40005	OUTPUT 17..24	Output 17...24	RAM	R	0
40006	OUTPUT 1..8 STATUS	Status	RAM	R/W	0
40007	OUTPUT 9..16 STATUS	Status	RAM	R/W	0
40008	OUTPUT 17..24 STATUS	Status	RAM	R/W	0
40009	ERROR MODE 1..8	Output 1..8 Error Mode	FLASH	R/W	0xFF
40010	ERROR MODE 9..16	Output 9..16 Error Mode	FLASH	R/W	0xFF
40011	ERROR MODE 17..24	Output 17..24 Error Mode	FLASH	R/W	0xFF
40012	ERROR VALUE 1..8	Output 1..8 Error Values	FLASH	R/W	0
40013	ERROR VALUE 9..16	Output 9..16 Error Values	FLASH	R/W	0
40014	ERROR VALUE 17..24	Output 17..24 Error Values	FLASH	R/W	0
40015	ADDR CAN	CANOpen Address 127	FLASH	R/W	127
40016	BAUD CAN	CANOpen Baudrate 20 kbps	FLASH	R/W	1
40018	ADDR/PARITY MODBUS	Modbus Address 1, no parity	FLASH	R/W	0x0100
40019	BAUD/DELAY MODBUS	Modbus Baudrate 38400, no delay	FLASH	R/W	0x0500
40020	MODBUS FAIL COMM MODE	Modbus communication monitoring result	FLASH	R/W	0
40021	MODBUS FAIL TIMEOUT	Timeout for Modbus communication monitoring [1/10 s]	FLASH	R/W	100
40201	COMMAND	Enter register for COMMAND	RAM	R/W	0
40202	COMMAND_AUX	Service register for COMMAND	RAM	R	0
40301	OUTPUTS [1..16]		RAM	R	0
40302	OUTPUTS- [17..24]		RAM	R	0

**Modbus FAIL Communication**

During Modbus Communication, a traffic monitoring is improved; so, if for a fixed time ( MODBUS FAIL TIMEOUT) there is no data transmission/reception and MODBUS FAIL COMM MODE = 1, the device is in FAIL condition and Error values are loaded.

**Command Modbus**

COMMAND	
COD	DESCRIPTION
0xBAB0	Save in FLASH
0xBCD0	Load default
0x6BAC	DIP-SW Read
0xC1A0	Reset Module



*Coil Registers*

<i>ADDRESS</i>	<i>REGISTER</i>	<i>DESCRIPTION</i>	<i>TYPE</i>	<i>ACCESS</i>	<i>DEFAULT</i>
10001	OUTPUT1	Output1	RAM	R/W	0
10002	OUTPUT2	Output2	RAM	R/W	0
10003	OUTPUT3	Output3	RAM	R/W	0
10004	OUTPUT4	Output4	RAM	R/W	0
10005	OUTPUT5	Output5	RAM	R/W	0
10006	OUTPUT6	Output6	RAM	R/W	0
10007	OUTPUT7	Output7	RAM	R/W	0
10008	OUTPUT8	Output8	RAM	R/W	0
10009	OUTPUT9	Output9	RAM	R/W	0
10010	OUTPUT10	Output10	RAM	R/W	0
10011	OUTPUT11	Output11	RAM	R/W	0
10012	OUTPUT12	Output12	RAM	R/W	0
10013	OUTPUT13	Output13	RAM	R/W	0
10014	OUTPUT14	Output14	RAM	R/W	0
10015	OUTPUT15	Output15	RAM	R/W	0
10016	OUTPUT16	Output16	RAM	R/W	0
10017	OUTPUT17	Output17	RAM	R/W	0
10018	OUTPUT18	Output18	RAM	R/W	0
10019	OUTPUT19	Output19	RAM	R/W	0
10020	OUTPUT20	Output20	RAM	R/W	0
10021	OUTPUT21	Output21	RAM	R/W	0
10022	OUTPUT22	Output22	RAM	R/W	0
10023	OUTPUT23	Output23	RAM	R/W	0
10024	OUTPUT24	Output24	RAM	R/W	0