USER MANUAL

Z-10-D-OUT

SENECA s.r.l.

Via Austria, 26 – 35127 – PADOVA – ITALY

Tel. +39.049.8705355 – 8705359 Fax. +39.049.8706287

Web site: www.seneca.it

Technical assistance: supporto@seneca.it (IT), support@seneca.it (Other)

Commercial reference: commerciale@seneca.it (IT), sales@seneca.it (Other)

MI002551

Seneca Z-PC Line module: **Z-10-D-OUT**

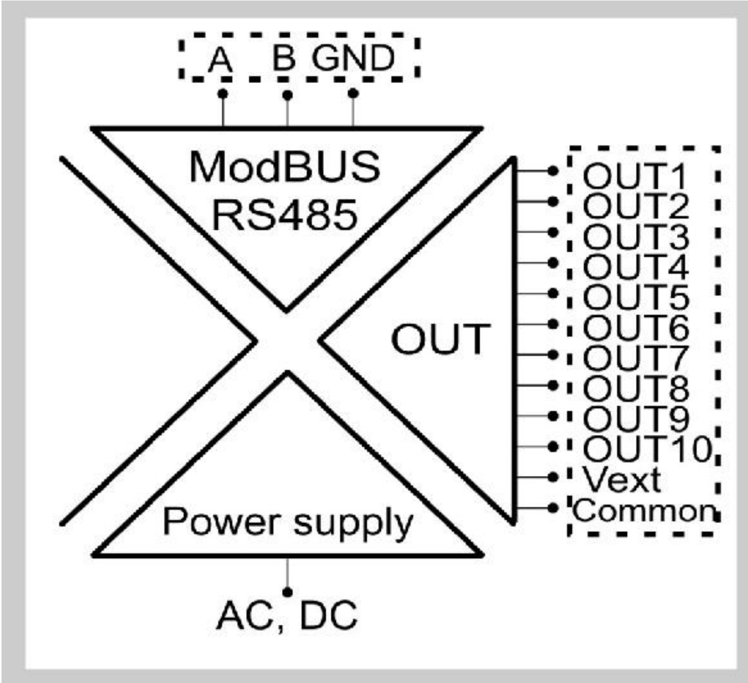
The module Z-10-D-OUT controls 10 digital outputs (OUT1-OUT10), each of them (by MOSFET) actives/deactivates a output load (LOAD1-LOAD10).

General characteristics

- It is possible to manage the output state if the interval time of RS485-bus communication failure is greater than a configurable time (up to 2000sec)
- Management of the output state if the interval time of a load short-circuited is greater than a configurable time (up to 8sec)
- It is possible to measure and control the outputs supply Vext
- Configuration of the module (node) address and baud-rate by Dip-Switches
- It is possible to add/remove the module to/from RS485-bus without disconnecting the communication or power supply

Features

OUTPUT	
Number	10 (type: MOSFET with negative common)
Max current through each load	0.5 A (if resistive load); 0.5 A (if inductive load). The supplied currents sum through all loads (these currents are inwards with reference to the screw terminal 1): <5 A (see «Output connections»). For each MOSFET: max0.5 A
Max state-switching frequency for each load	2Hz
MOSFET protection	The MOSFETs are protected against: load short-circuited, over-temperature
MOSFET supply	With reference to the screw terminal 12 (common), power the MOSFETs by screw terminal 1 (Vext): min 6 V, max 30 V
MOSFET max energy	40 mJ with inductive load
MOSFET response time	5/2 ms
R_{DSON}	0.75 Ω
Switching delay	1 ms (max)
CONNECTIONS	
RS485 interface	IDC10 connector for DIN 46277 rail (back-side panel)
1500 Vac ISOLATIONS	
	Between: power supply, ModBUS RS485, digital outputs

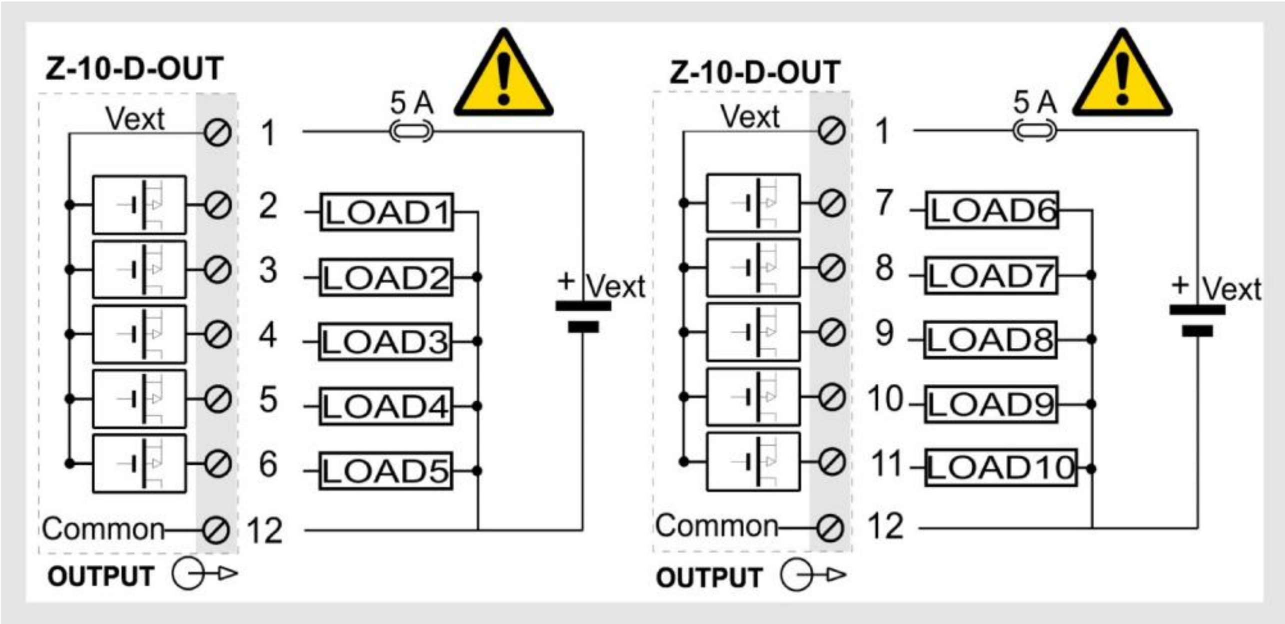


POWER SUPPLY	
Supply voltage	10 – 40 Vdc or 19 – 28 Vac (50Hz - 60Hz)
Power consumption	Min: 0.5 W; Max: 2.5 W

The power supply transformer necessary to supply the module must comply with EN60742 (Isolated transformers and safety transformers requirements). To protect the power supply, it is recommended to install a fuse.

Output connections

Power on the module with < 40 Vdc or < 28 Vac voltage supply. These upper limits must not be exceeded to avoid serious damage to the module.



It's forbidden that the current through the screw terminal 1 (Vext) is greater than 5A.

Dip-switches table

In the following tables: box without circle means Dip-Switch=0 (OFF state); box with circle means Dip-Switch=1 (ON state).

BAUD-RATE (Dip-Switches: DIP-SWITCH STATUS)						
1	2	Meaning				
		Baud-rate=9600 Baud				
	●	Baud-rate=19200 Baud				
●		Baud-rate=38400 Baud				
●	●	Baud-rate=57600 Baud				
ADDRESS (Dip-Switches: DIP-SWITCH STATUS)						
3	4	5	6	7	8	Meaning
						Address and Baud-Rate are acquired from memory(EEPROM)
					●	Address=1
				●		Address=2
				●	●	Address=3
			●			Address=4
X	X	X	X	X	X	……………………
●	●	●	●	●	●	Address=63
RS485 TERMINATOR (Dip-Switches: DIP-SWITCH STATUS)						
9	10	Meaning				
		RS485 terminator disabled				
	●	RS485 terminator enabled				

RS485 registers table

Name	Range	Interpretation of register	R/W	Default	Address
MachineID	/	MSB, LSB	R		40001
	Id_Code (Module ID)			0x0D	Bit [15:8]
	Ext_Rev (Module version)				Bit [7:0]
FWREV	/	Word	R		40023
	Firmware Code				
Errors	0-1	Bit	R		40002
	These bits aren't used			/	Bit [15:7]
	Output supply voltage Vext (applied to screw terminal 1, with reference to screw terminal 12) (if bit40012.1=1): 0=the outputs are correctly supplied (Vext>VextTh); 1=the outputs aren't correctly supplied (Vext<VextTh)			/	Bit 6
	These bits aren't used			/	Bit [5:4]
	Outputs OUT1-OUT10 error: 0=no one output has an error; 1=at least one output has an error			/	Bit 3
	These bits aren't used			/	Bit [2:1]
	Loads short-circuited error: 0=no one load short-circuited; 1=at least one load short-circuited (see reg.40007)			/	Bit 0
Diagnostics Enabling	0-1	Bit	R/W		40015
	These bits aren't used			/	Bit [15:10]
	Output OUT10 diagnostics: 0=deactivated; 1=activated (if bit40015.9=1, bit40004.9 is enabled)			1	Bit 9
	Output OUT9 diagnostics: 0=deactivated; 1=activated (if bit40015.8=1, bit40004.8 is enabled)			1	Bit 8
	Output OUT8 diagnostics: 0=deactivated; 1=activated (if bit40015.7=1, bit40004.7 is enabled)			1	Bit 7
	Output OUT7 diagnostics: 0=deactivated; 1=activated (if bit40015.6=1, bit40004.6 is enabled)			1	Bit 6
	Output OUT6 diagnostics: 0=deactivated; 1=activated (if bit40015.5=1, bit40004.5 is enabled)			1	Bit 5
	Output OUT5 diagnostics: 0=deactivated; 1=activated (if bit40015.4=1, bit40004.4 is enabled)			1	Bit 4
	Output OUT4 diagnostics: 0=deactivated; 1=activated (if bit40015.3=1, bit40004.3 is enabled)			1	Bit 3
	Output OUT3 diagnostics: 0=deactivated; 1=activated (if bit40015.2=1, bit40004.2 is enabled)			1	Bit 2
	Output OUT2 diagnostics: 0=deactivated; 1=activated (if bit40015.1=1, bit40004.1 is enabled)			1	Bit 1
	Output OUT1 diagnostics: 0=deactivated; 1=activated (if bit40015.0=1, bit40004.0 is enabled)			1	Bit 0
Diagnostics	0-1	Bit	R/W		40004
	These bits aren't used			/	Bit [15:10]
	Output OUT10 error (if bit 40015.9=1): 0=there isn't; 1=there is. To reset, overwrite "0" from master			/	Bit 9
	Output OUT9 error (if bit 40015.8=1): 0=there isn't; 1=there is. To reset, overwrite "0" from master			/	Bit 8
	Output OUT8 error (if bit 40015.7=1): 0=there isn't; 1=there is. To reset, overwrite "0" from master			/	Bit 7
	Output OUT7 error (if bit 40015.6=1): 0=there isn't; 1=there is. To reset, overwrite "0" from master			/	Bit 6
	Output OUT6 error (if bit 40015.5=1): 0=there isn't;			/	Bit 5

	1=there is. To reset, overwrite "0" from master		
	Output OUT5 error (if bit 40015.4=1): 0=there isn't; 1=there is. To reset, overwrite "0" from master	/	Bit 4
	Output OUT4 error (if bit 40015.3=1): 0=there isn't; 1=there is. To reset, overwrite "0" from master	/	Bit 3
	Output OUT3 error (if bit 40015.2=1): 0=there isn't; 1=there is. To reset, overwrite "0" from master	/	Bit 2
	Output OUT2 error (if bit 40015.1=1): 0=there isn't; 1=there is. To reset, overwrite "0" from master	/	Bit 1
	Output OUT1 error (if bit 40015.0=1): 0=there isn't; 1=there is. To reset, overwrite "0" from master	/	Bit 0

If at least one bit 40004.X (X=0;9) is equal to «1», the bit 40002.3 switches to «1». To reset the bit 40002.3 (bit40002.3=0), overwrite «0» to all the bits 40004.X.

Shorted Outputs	0-1	Bit	R		40007
	These bits aren't used			/	Bit [15:10]
	LOAD10 short-circuited error: 0=there isn't; 1=there is (if bit40007.9=1 then bit 40002.0=1)			/	Bit 9
	LOAD9 short-circuited error: 0=there isn't; 1=there is (if bit40007.8=1 then bit 40002.0=1)			/	Bit 8
	LOAD8 short-circuited error: 0=there isn't; 1=there is (if bit40007.7=1 then bit 40002.0=1)			/	Bit 7
	LOAD7 short-circuited error: 0=there isn't; 1=there is (if bit40007.6=1 then bit 40002.0=1)			/	Bit 6
	LOAD6 short-circuited error: 0=there isn't; 1=there is (if bit40007.5=1 then bit 40002.0=1)			/	Bit 5
	LOAD5 short-circuited error: 0=there isn't; 1=there is (if bit40007.4=1 then bit 40002.0=1)			/	Bit 4
	LOAD4 short-circuited error: 0=there isn't; 1=there is (if bit40007.3=1 then bit 40002.0=1)			/	Bit 3
	LOAD3 short-circuited error: 0=there isn't; 1=there is (if bit40007.2=1 then bit 40002.0=1)			/	Bit 2
	LOAD2 short-circuited error: 0=there isn't; 1=there is (if bit40007.1=1 then bit 40002.0=1)			/	Bit 1
	LOAD1 short-circuited error: 0=there isn't; 1=there is (if bit40007.0=1 then bit 40002.0=1)			/	Bit 0
Address Parity		MSB, LSB	R/W		40010
	Address for RS485 (address of module/node if parameters are configurated by memory modality): from 0x01=1 to 0xFF=255			1	Bit [15:8]
	Parity for RS485: 0=there isn't; 1=even parity; 2=odd parity			0	Bit [7:0]
Baudrate Delay	Delay: from 0x00=0 to 0xFF=255	MSB, LSB	R/W		40011
	Baudrate for RS485 (baud-rate of module/node if parameters are configurated by memory modality): 0=4800; 1=9600; 2=19200; 3=38400; 4=57600; 5=115200; 6=1200; 7=2400			38400	Bit [15:8]
	Delay for RS485 (delay of communication response: pauses between the end of Rx message and the start of Tx message)			0	Bit [7:0]
Command	0xC1A0; 0xBDAC	Word	R/W		40024
	Module reset, if reg.40024=0xC1A0; the module writes the Dip-Switch state in reg.40025, if reg.40024=0xBDAC				

Command aux	/	Word	R		40025
	These bits aren't used			/	Bit [15:8]
	Dip-Switch [1:2] state. They correspond to the module address (if reg.40024=0xBDAC)			/	Bit [7:6]
	Dip-Switch [3:8] state. They correspond to the module baud-rate (if reg.40024=0xBDAC)			/	Bit [5:0]
Vext measure	/	Bit	R		40009
	Output supply voltage (Vext) measure (screw terminals 1-12) [V/10]. If Vext < VextTh (see bit40016.[7:0]) and if bit40012.1=1, then the LED FAIL is on			/	
Outputs	0-1	Bit	R/W		40003
	These bits aren't used			/	Bit [15:10]
	Output OUT10 state: 0=LOAD10 is deactivated (there is no current through LOAD10); 1=LOAD10 is activated (there is current through LOAD10)			/	Bit 9
	Output OUT9 state: 0=LOAD9 is deactivated (there is no current through LOAD9); 1=LOAD9 is activated (there is current through LOAD9)			/	Bit 8
	Output OUT8 state: 0=LOAD8 is deactivated (there is no current through LOAD8); 1=LOAD8 is activated (there is current through LOAD8)			/	Bit 7
	Output OUT7 state: 0=LOAD7 is deactivated (there is no current through LOAD7); 1=LOAD7 is activated (there is current through LOAD7)			/	Bit 6
	Output OUT6 state: 0=LOAD6 is deactivated (there is no current through LOAD6); 1=LOAD6 is activated (there is current through LOAD6)			/	Bit 5
	Output OUT5 state: 0=LOAD5 is deactivated (there is no current through LOAD5); 1=LOAD5 is activated (there is current through LOAD5)			/	Bit 4
	Output OUT4 state: 0=LOAD4 is deactivated (there is no current through LOAD4); 1=LOAD4 is activated (there is current through LOAD4)			/	Bit 3
	Output OUT3 state: 0=LOAD3 is deactivated (there is no current through LOAD3); 1=LOAD3 is activated (there is current through LOAD3)			/	Bit 2
	Output OUT2 state: 0=LOAD2 is deactivated (there is no current through LOAD2); 1=LOAD2 is activated (there is current through LOAD2)			/	Bit 1
	Output OUT1 state: 0=LOAD1 is deactivated (there is no current through LOAD1); 1=LOAD1 is activated (there is current through LOAD1)			/	Bit 0

If one of the bits40003.X (or one "Input Status" register) is equal to «1», it's possible to detect if the corresponding load is short-circuited after TimeoutShort/30[sec]. In this case: bit40002.0=1, bit40002.3=1, bit40004.X=1, bit 40007.X=1 (X=[0;9]) and the LED FAIL is on (see reg.40012). If one of the bits40003.X (or one "Input Status" register) is equal to «0», it isn't possible to detect if the corresponding load is short-circuited, though bit 40003.X switches from «0» to «1». In this case, reset the bit 40004.X.

Fault Outputs	0-1	Bit	R/W		40005
	These bits aren't used			/	Bit [15:10]
	Fault value for output OUT10 state: 0=LOAD10 is deactivated (there is no current through LOAD10); 1=LOAD10 is activated (there is current through LOAD10)			0	Bit 9
	Fault value for output OUT9 state: 0=LOAD9 is deactivated (there is no current through LOAD9); 1=LOAD9 is activated (there is current through LOAD9)			0	Bit 8
	Fault value for output OUT8 state: 0=LOAD8 is deactivated (there is no current through LOAD8); 1=LOAD8 is activated (there is current through LOAD8)			0	Bit 7
	Fault value for output OUT7 state: 0=LOAD7 is deactivated (there is no current through LOAD7); 1=LOAD7 is activated (there is current through LOAD7)			0	Bit 6
	Fault value for output OUT6 state: 0=LOAD6 is deactivated (there is no current through LOAD6); 1=LOAD6 is activated (there is current through LOAD6)			0	Bit 5
	Fault value for output OUT5 state: 0=LOAD5 is deactivated (there is no current through LOAD5); 1=LOAD5 is activated (there is current through LOAD5)			0	Bit 4
	Fault value for output OUT4 state: 0=LOAD4 is deactivated (there is no current through LOAD4); 1=LOAD4 is activated (there is current through LOAD4)			0	Bit 3
	Fault value for output OUT3 state: 0=LOAD3 is deactivated (there is no current through LOAD3); 1=LOAD3 is activated (there is current through LOAD3)			0	Bit 2
	Fault value for output OUT2 state: 0=LOAD2 is deactivated (there is no current through LOAD2); 1=LOAD2 is activated (there is current through LOAD2)			0	Bit 1
	Fault value for output OUT1 state: 0=LOAD1 is deactivated (there is no current through LOAD1); 1=LOAD1 is activated (there is current through LOAD1)			0	Bit 0

Fault state. If the interval time of RS485-bus communication failure is greater than Timeout/30 [sec], the outputs OUT1-OUT10 and LED1-10 have the bit40005.X configuration. If the module is connected to the RS485-bus for the first time, the outputs OUT1-OUT10 and LED1-10 have the bit40005.X configuration and the bits40005.X are overwritten to the bits40003.X, with X=0;9.

Timeout	0=timeout deactivated; between: 1 (=1/30[sec]); 60000 (=2000[sec])	Word	R/W		40013
	Timeout [sec/30] (if reg.40013 is different to 0: it is interval time of RS485-bus communication failure, after which the bit 40005.X is overwritten in the bit 40003.X, with X=0;9)			150 (=5[sec])	
Reset Timer Timeout		Word	R/W		40012
	These bits aren't used			/	Bit [15:10]
	LED FAIL state to signal if there is a error (see reg.40002): 0b00=constant light; 0b01=slow blinking light; 0b10=quick blinking light; 0b11=double blinking light			0b00	Bit [9:8]
	These bits aren't used			/	Bit [7:2]
	Voltage Vext detection through LED FAIL. If bit 40012.1=0: LED FAIL is Vext-value indipendent. If bit40012.1=1: LED FAIL «off» means that Vext>VextTh; LED FAIL «on» means that Vext<VextTh (see			0	Bit 1

	bit40016.[7:0])				
	Timer reset type. The module has a timer: if the interval time of RS485-bus communication failure is greater than Timeout/30[sec], the module overwrites the content of FaultOutputs (bits 40015.[0:9]) to Outputs (bits 40003.[0:9]). It's possible to reset this timer (the timer returns to «Timeout/30[sec]» automatically) when one of the following event occurs: 1) event=writing of an output within Timeout/30[sec] (if bit 40012.0=1); 2) event=sending of any command through RS485-bus within Timeout/30[sec] (if bit 40012.0=0)			0	Bit 0
TimeoutShort LowPower	TimeoutShort: from 1(=1/30[sec]) to 240(=8[sec])	MSB, LSB	R/W		40016
	Short-circuited timeout [sec/30] (interval time of short-circuited load, after which the corresponding bit in reg.40007 switches to «1»)			30 (=1[sec])	Bit [15:8]
	Output supply threshold voltage (VextTh) for screw terminals 1-12 [V/10] (see bit40012.1)			60 (=6[V])	Bit [7:0]

The «Input Status» registers used are shown in the following table:

State OUT1	0-1	Word	R		10001
	Output OUT1 state: 0=LOAD1 is deactivated (there is no current through LOAD1); 1=LOAD1 is activated (there is current through LOAD1)			/	
State OUT2	0-1	Word	R		10002
	Output OUT2 state: 0=LOAD2 is deactivated (there is no current through LOAD2); 1=LOAD2 is activated (there is current through LOAD2)			/	
State OUT3	0-1	Word	R		10003
	Output OUT3 state: 0=LOAD3 is deactivated (there is no current through LOAD3); 1=LOAD3 is activated (there is current through LOAD3)			/	
State OUT4	0-1	Word	R		10004
	Output OUT4 state: 0=LOAD4 is deactivated (there is no current through LOAD4); 1=LOAD4 is activated (there is current through LOAD4)			/	
State OUT5	0-1	Word	R		10005
	Output OUT5 state: 0=LOAD5 is deactivated (there is no current through LOAD5); 1=LOAD5 is activated (there is current through LOAD5)			/	
State OUT6	0-1	Word	R		10006
	Output OUT6 state: 0=LOAD6 is deactivated (there is no current through LOAD6); 1=LOAD6 is activated (there is current through LOAD6)			/	
State OUT7	0-1	Word	R		10007
	Output OUT7 state: 0=LOAD7 is deactivated (there is no current through LOAD7); 1=LOAD7 is activated (there is current through LOAD7)			/	
State OUT8	0-1	Word	R		10008
	Output OUT8 state: 0=LOAD8 is deactivated (there is no current through LOAD8); 1=LOAD8 is activated (there is current through LOAD8)			/	
State OUT9	0-1	Word	R		10009
	Output OUT9 state: 0=LOAD9 is deactivated (there is no current through LOAD9); 1=LOAD9 is activated (there is current through LOAD9)			/	

State OUT10	0-1	Word	R		10010
	Output OUT10 state: 0=LOAD10 is deactivated (there is no current through LOAD10); 1=LOAD10 is activated (there is current through LOAD10)			/	

LEDs for signalling

In the front-side panel there are 14 LEDs and their state refers to important operating conditions of the module.

LED	LED status	Meaning
PWR	Constant light	The power is on
FAIL	Blinking light	The module has at least one of the errors/overflows described in RS485 Registers table
	Constant light	Module failure
RX	Constant light	Verify if the bus connection is corrected
	Blinking light	The module received a data packet
TX	Blinking light	The module sent a data packet
	Constant light	Verify if the bus connection is corrected
1-10	Constant light	OUT1-10 state equal to «1»
	No light	OUT1-10 state equal to «0» (if the power is on and the outputs are supplied)

Easy-SETUP

To configure the Seneca Z-PC Line modules, it is possible to use Easy-SETUP software,

Free-downloadable from the www.seneca.it; the configuration can be performed by RS232 or RS485 bus communication.