USER MANUAL

Z-3A0

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Seneca Z-PC Line module: **Z-3AO**

The Z-3AO module supplies 3 single-ended analog signals (voltage or current type).

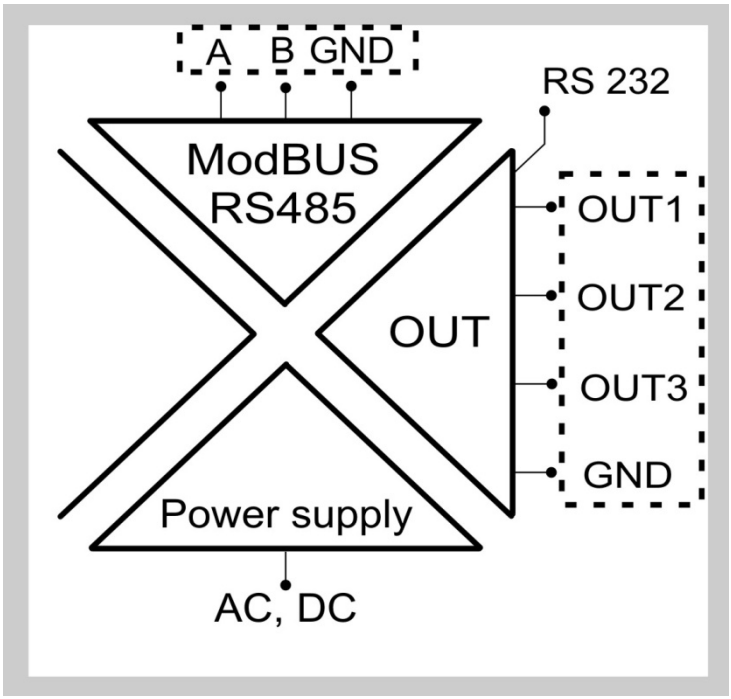
General characteristics

- It is possible to choose if each output is voltage or current type
- It is possible to change the electrical start/end scale between ± 10 V, 0-20 mA
- It's possible to manage the electrical values (for each output) if the interval time of RS485-bus communication failure is greater than a configurable time (see Timeout register)
- Output protection against the overvoltage surge transients and short-circuits
- Configuration of the module (node) address, baud-rate and output-type (voltage or current) by Dip-Switches
- It is possible to add/remove the module to/from RS485-bus without disconnecting the communication or power supply
- It is possible to switch automatically RS485 to RS232 or vice versa

Features

OUTPUT	
Number	3
Resolution	12 bit. If output is voltage-type, resolution=5mV; if output is current-type, resolution=5µA
Response time	< 50 ms (step response, 10%-90%)
Accuracy	Initial: 0.1% of Electrical End Scale (E.E.S.)
	Linearity: 0.05% of E.E.S.
	Calibration: 0.2% of E.E.S.
	Thermal stability: 0.01%/°C
	EMI: < 1%
Protection	Protection against the overvoltage surge transients by transient suppressor (400W/ms); protection against the output short-circuits by internal series PTC
Voltage-type OUT	Bipolar with E.S.S./E.E.S.(Electrical Start/End Scale) configurable between: ± 10Vdc. Output impedance: > 600 Ω
Current-type OUT	Unipolar with E.S.S./E.E.S.(Electrical Start/End Scale) configurable between: 0-20mA. Output impedance: < 600 Ω
Internal supply Vaux	The #4 and #7 screw terminals: power 13V to max180mA
CONNECTIONS	
RS485 interface	IDC10 connector for DIN 46277 rail (back-side panel) or (alternative) the screw terminals: 4(GND), 5(B), 6(A)
RS232 interface	Jack stereo 3.5mm connector:plugs into COMport(front-side panel)
1500 Vac ISOLATIONS	
	Between: power supply, ModBUS RS485, analog output

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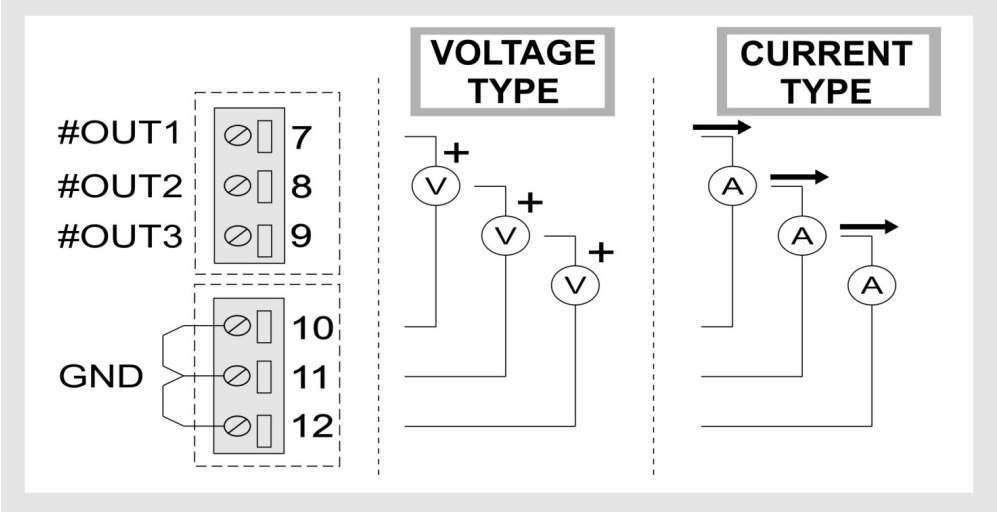


POWER SUPPLY	
Supply voltage	10 – 40 Vdc or 19 – 28 Vac (50Hz - 60Hz)
Power consumption	Min: 0.5W; Max: 3.2W

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

The 3 analog outputs (voltage or current type) are avaliable at the screw terminals 7, 8, 9 and their refer to the equipotential screw terminals 10, 11, 12 (GND) (connected internally).



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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-Switch: TERM)	
1	Meaning
	RS485 terminator disabled
●	RS485 terminator enabled

OUTPUT TYPE (Dip-Switches: ANALOG OUTPUT)											
1	2	3	Meaning	1	2	3	Meaning	1	2	3	Meaning
			OUT1=voltage				OUT2=voltage				OUT3=voltage
●			OUT1=current		●		OUT2=current			●	OUT3=current

RS485 Register table

Name	Range	Interpretation of register	R/W	Default	Address
MachineID	/	MSB, LSB	R		40001
	Id_Code (Module ID)			0x0F (=15 decimal)	Bit [15:8]
	Ext_Rev (Module version)				Bit [7:0]
FWREV	/	Word	R		40011
	Firmware Code				
Errors	/	Bit	R		40008
	These bits aren't used			/	Bit [15:5]
	Memory loss of data (in EEPROM): 0=there isn't;1=there is			/	Bit 4

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	This bit isn't used			/	Bit 3
	Fault error (there is if the interval time of RS485-bus communication failure is greater than Timeout/10 [sec]): 0=there isn't; 1=there is			/	Bit 2
	These bits aren't used			/	Bit [1:0]
Eprflag	/	Bit	R/W		40004
	These bits aren't used			/	Bit[15:13]
	0=old modality for Z-3AO module; 1=new modality for Z-3AO module				Bit 12
	These bits aren't used				Bit [11:8]
	Module behavior if there is a fault error: 0=no operation; 1=the module overwrites the content of the register: 40069 in 40005, 40070 in 40006, 40071 in 40007). See register 40003			0	Bit 7
	These bits aren't used			/	Bit [6:5]
	Parity for RS485: 0=even parity; 1=odd parity			0	Bit 4
	Parity for RS485: 0=deactivated; 1=activated			0	Bit 3
	Delay for RS485 (delay of communication response: pauses between the end of Rx message and the start of Tx message): 0=there isn't; 1=there is			0	Bit 2
	These bits aren't used			/	Bit [1:0]
Baudrate Address	Address: from 0x01=1 to 0xFF=255	MSB, LSB	R/W		40002
	Baud-rate 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]
	Address for RS485 (address of module if parameters are configurated by memory modality)			1	Bit [7:0]
Command	0xBAB0, 0xCAC0, 0xC1A0	Word	R/W		40009
	Save configuration in memory (EEPROM), if reg.40009=0xBAB0 The module writes the Dip-Switches-state in reg.40010, if reg.40009=0xCAC0 Module reset, if reg.40009=0xC1A0			0	
Command aux		Bit	R		40010
	These bits aren't used			/	Bit [15:11]
	Dip-Switch "Analog Output 3" state. It corresponds to the selected output3-type. Bit40010.10=0 corresponds to the current-type output, bit40010.10=1 corresponds to the voltage-type output (if reg.40009=0xCAC0)			/	Bit 10
	Dip-Switch "Analog Output 2" state. It corresponds to the selected output2-type. Bit40010.9=0 corresponds to the current-type output, bit40010.9=1 corresponds to the voltage-type output (if reg.40009=0xCAC0)			/	Bit 9
	Dip-Switch "Analog Output 1" state. It corresponds to the selected output1-type. Bit40010.8=0 corresponds to the current-type output, bit40010.8=1 corresponds to the voltage-type output (if reg.40009=0xCAC0)			/	Bit 8
	Dip-Switches "DipSwitchStatus [1:2]" state. They correspond to the module baud-rate (if reg.40009=0xCAC0)			/	Bit [7:6]
	Dip-Switches "DipSwitchStatus [3:8]" state. They correspond to the module address (if reg.40009=0xCAC0)			/	Bit [5:0]
Timeout	Value in s/10 Between: 0(=0sec) to 250 (=25 sec)	Word	R/W		40003
	Timeout [sec/10] (if bit40004.7=1: it is interval time of RS485-bus communication failure, after which the			200 (=20sec)	

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	bit40008.2 switches to 1 and the module overwrites the content of the register: 40069 in 40005, 40070 in 40006, 40071 in 40007)				
OUTPUT 1					
OUT1	Between:-10000; 10000 (if voltage), 0;10000 (if current)	Word	R/W		40005
	Normalized value of output1. The corresponding electric value is the voltage or current-type value available at the screw terminals 7-GND (see figure 1 and 2)			OUT1 Fault	
OUT1-mV 0	Between: -11000[mV]; +11000[mV]	Word	R/W		40012
	Electrical value of output 1 [mV] corresponding to the normalized value OUT1=0 (if output 1 is voltage-type) (see figure 1 and 2)			0 [mV]	
OUT1-mV 10000	Between: -11000[mV]; +11000[mV]	Word	R/W		40013
	Electrical value of output 1 [mV] corresponding to the normalized value OUT1=10000 (if output 1 is voltage-type). This value coincides with the Electrical End Scale (E.E.S.) of the output1 (see figure 1 and 2)			10000 [mV]	
OUT1-µA 0	Between: 0[µA]; +22000[µA]	Word	R/W		40018
	Electrical value 1 [µA] corresponding to the normalized value OUT1=0 (if output 1 is current-type) (see figure 1 and 2)			4000 [µA]	
OUT1-µA 10000	Between: 0[µA]; +22000[µA]	Word	R/W		40019
	Electrical value 1 [µA] corresponding to the normalized value OUT1=10000 (if output 1 is current-type). This value coincides with the Electrical End Scale (E.E.S.) of the output1 (see figure 1 and 2)			20000 [µA]	
OUT1 Fault	Between:-10000; 10000 (if voltage), 0;10000 (if current)	Word	R/W		40069
	Normalized fault value of output 1. The corresponding electric value is the voltage or current-type value available at the screw terminals 7-GND (see figure 1 and 2). This register is overwritten in the reg.40005: if the module is connected to the RS485 bus communication (to initialize it) or if: bit 40008.2=1 and bit40004.7=1			0	
OUTPUT 2					
OUT2	Between:-10000; 10000 (if voltage), 0;10000 (if current)	Word	R/W		40006
	Normalized value of output2. The corresponding electric value is the voltage or current-type value available at the screw terminals 8-GND (see figure 1 and 2)			OUT1 Fault	
OUT2-mV 0	Between: -11000[mV]; +11000[mV]	Word	R/W		40014
	Electrical value of the output 2 [mV] corresponding to the normalized value OUT2=0 (if output 2 is voltage-type) (see figure 1 and 2)			0[mV]	
OUT2-mV 10000	Between: -11000[mV]; +11000[mV]	Word	R/W		40015
	Electrical value of output 2 [mV] corresponding to the normalized value OUT2=10000 (if output 2 is voltage-type). This value coincides with the Electrical End Scale (E.E.S.) of the output1 (see figure 1 and 2)			10000 [mV]	
OUT2-µA 0	Between: 0[µA]; +22000[µA]	Word	R/W		40020
	Electrical value 2 [µA] corresponding to the normalized value OUT2=0 (if output 2 is current-type) (see figure 1			4000 [µA]	

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	and 2)				
OUT2-µA 10000	Between: 0[µA]; +22000[µA]	Word	R/W		40021
	Electrical value 2 [µA] corresponding to the normalized value OUT2=10000 (if output 2 is current-type). This value coincides with the Electrical End Scale (E.E.S.) of the output2 (see figure 1 and 2)			20000 [µA]	
OUT2 Fault	Between: -10000; 10000 (if voltage), 0;10000 (if current)	Word	R/W		40070
	Normalized fault value of output 2. The corresponding electric value is the voltage or current-type value available at the screw terminals 8-GND (see figure 1 and 2). This register is overwritten in the reg.40006: if the module is connected to the RS485 bus communication (to initialize it) or if: bit 40008.2=1 and bit40004.7=1			0	
OUTPUT3					
OUT3	Between:-10000; 10000 (if voltage), 0;10000 (if current)	Word	R/W		40007
	Normalized value of output3. The corresponding electric value is the voltage or current-type value available at the screw terminals 9-GND (see figure 1 and 2)			OUT3 Fault	
OUT3-mV 0	Between: -11000[mV]; +11000[mV]	Word	R/W		40016
	Electrical value of the output 3 [mV] corresponding to the normalized value OUT3=0 (if output 3 is voltage-type) (see figure 1 and 2)			0[mV]	
OUT3-mV 10000	Between: -11000[mV]; +11000[mV]	Word	R/W		40017
	Electrical value of output 3 [mV] corresponding to the normalized value OUT1=10000 (if output 3 is voltage-type). This value coincides with the Electrical End Scale (E.E.S.) of the output3 (see figure 1 and 2)			10000 [mV]	
OUT3-µA 0	Between: 0[µA]; +22000[µA]	Word	R/W		40022
	Electrical value 3 [µA] corresponding to the normalized value OUT3=0 (if output 3 is current-type) (see figure 1 and 2)			4000 [µA]	
OUT3-µA 10000	Between: 0[µA]; +22000[µA]	Word	R/W		40023
	Electrical value 3 [µA] corresponding to the normalized value OUT3=10000 (if output 3 is current-type). This value coincides with the Electrical End Scale (E.E.S.) of the output3 (see figure 1 and 2)			20000 [µA]	
OUT3 Fault	Between:-10000; 10000 (if voltage), 0;10000 (if current)	Word	R/W		40071
	Normalized fault value of output 3. The corresponding electric value is the voltage or current-type value available at the screw terminals 9-GND (see figure 1 and 2). This register is overwritten in the reg.40007: if the module is connected to the RS485 bus communication (to initialize it) or if: bit 40008.2=1 and bit40004.7=1			0	

With reference to the output1 (and, in the same way, to the output2 and output3), the electrical value "OUT1-mV 0" ("OUT1-µA 0") is NOT the Electrical Start Scale (E.S.S.), if output is voltage (current)-type. The Electrical Start Scale is the electrical value corresponding to the normalized value=-10000 (unchangeable).

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In the following lines is described the register configuration of the output1 to obtain the desired electrical value; the register configuration of the output 2 and 3 is similar.

To configure the analog output 1 in voltage (current)-type, execute the following operations:

1) configure the register “OUT1-mV 0” (“OUT1-µA 0”) corresponding to the normalized value=0 and “OUT1-mV 10000” (“OUT1-µA 10000”) corresponding to the normalized value=10000 (figure 1);
2) configure the register OUT1: it is the normalized value corresponding to the desired electrical value available at the screw terminals (mV or µA) (figure 1);

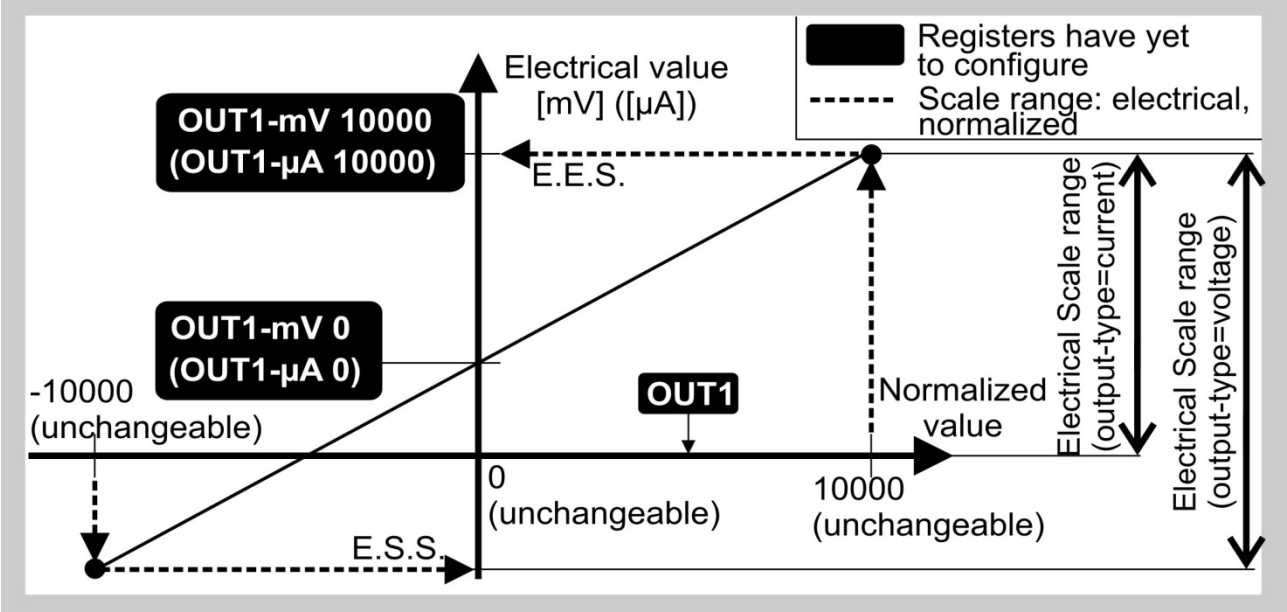


Fig.1 – Description of output configuration (step 1 and step 2)

The content of the register “OUT1-mV 10000” (“OUT1-µA 10000”) coincides with the Electrical End Scale (E.E.S.); the Electrical Start Scale (E.S.S.) is the electrical value corresponding to the normalized value=-10000, and it isn’t a register.

3) it’s possible to read the electrical value through the screw terminals (7-GND for output 1) corresponding to the normalized value=OUT1. If the output is current-type and if OUT1=[-10000;0], E.S.S.=0µA.

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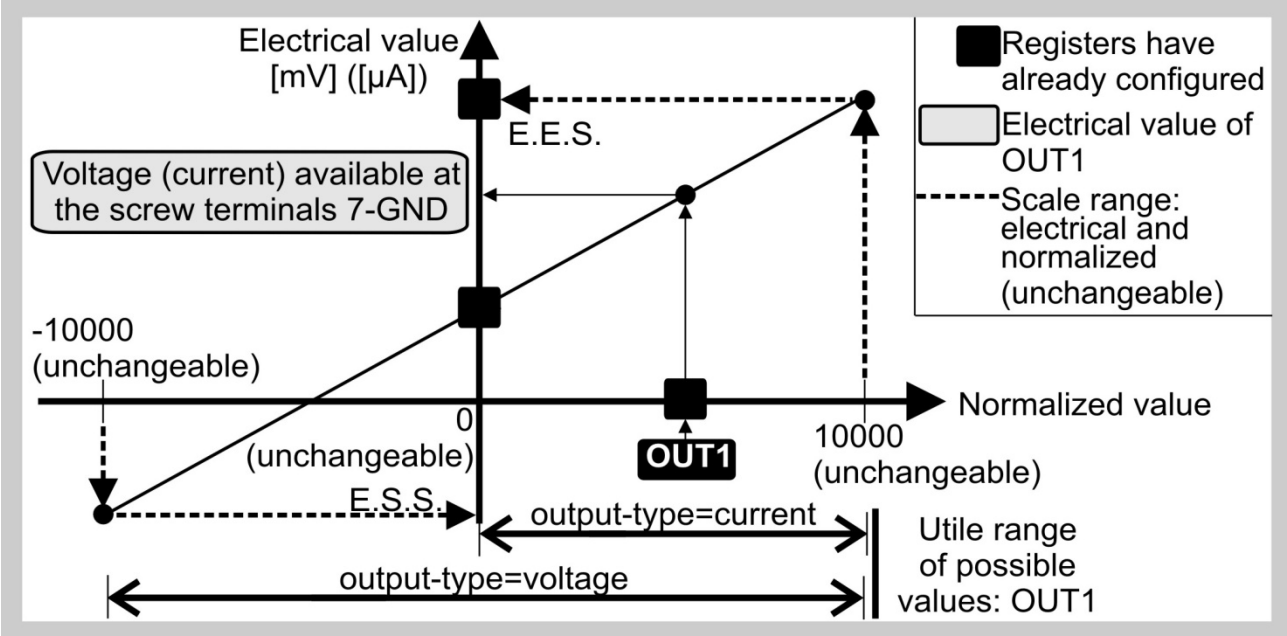


Fig.2 - Description of output configuration (step 3)

LEDs for signalling

In the front-side panel there are 4 LEDs and their state refers to important operating conditions of the module.

LED	LED status	Meaning
PWR	Constant light	The module power is on
ERR	Blinking light	The module has at least one of the errors described in RS485 Registers table
	Constant light	Module failure or there is a fault error (bit40008.2=1)
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

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.

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