USER MANUAL

Z-8AI

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Seneca Z-PC Line module: **Z-8AI**

The Z-8AI module acquires up to 8 single-ended input signals (voltage or current type) and it converts them to a digital format (normalized measure).

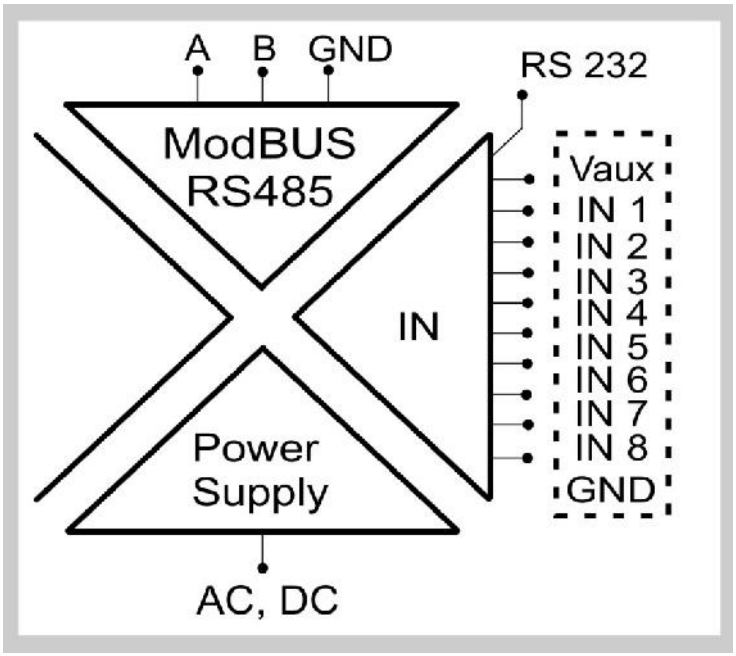
General characteristics

- It is possible to choose if each input is voltage or current type
- It is possible to enable/disable each input
- It is possible to change: the electrical start/end scale between ± 10 V, ± 20 mA, the normalized start/end scale between ± 32000
- 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
- It is possible to switch automatically RS485 to RS232 or vice versa

Features

INPUT	
Number	8
Resolution	16 bits (15+1 sign). If Electrical End-Scale (E.E.S.)<2.5V, resolution=80µV; se 2.5V<E.E.S.<10V, resolution=300µV
Sampling time	Configurable between: 10, 20, 40 or 120 ms
Accuracy	Initial: 0.1% of E.E.S.. If E.E.S.<2.5V, accuracy=2.5mV; if 2.5V<E.E.S.<10V, accuracy=10mV
	Linearity: 0.03% of E.E.S. (see initial accuracy)
	Zero: 0.05% of E.E.S. (see initial accuracy)
	Thermal stability: < 100 ppm/°K
	EMI: < 1%
Protection	± 30Vdc and 25mA
Voltage-type IN	Bipolar with E.S.S./E.E.S.(Electrical Start/End Scale) configurable between: ± 10Vdc. Input impedance: > 100 kΩ
Current-type IN	Bipolar with E.S.S./E.E.S. configurable between: ±20mA.Internal shunt:50Ω. To enable these shunts, use the «Analog inputs» Dip-Switches
Internal supply Vaux	The #4 and #7 screw terminals: power 13V to max180mA (figure10)
CONNECTIONS	
RS485 interface	IDC10 connector
RS232 interface	Jack stereo 3.5mm connector: plugs into COM port
1500 Vac ISOLATIONS	
	Between: power supply, ModBUS RS485, analog inputs

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POWER SUPPLY	
Supply voltage	10 – 40 Vdc or 19 – 28 Vac (50Hz - 60Hz)
Power consumption	Min: 0.5W; Max: 3.5W (to power 8 current loop)

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.

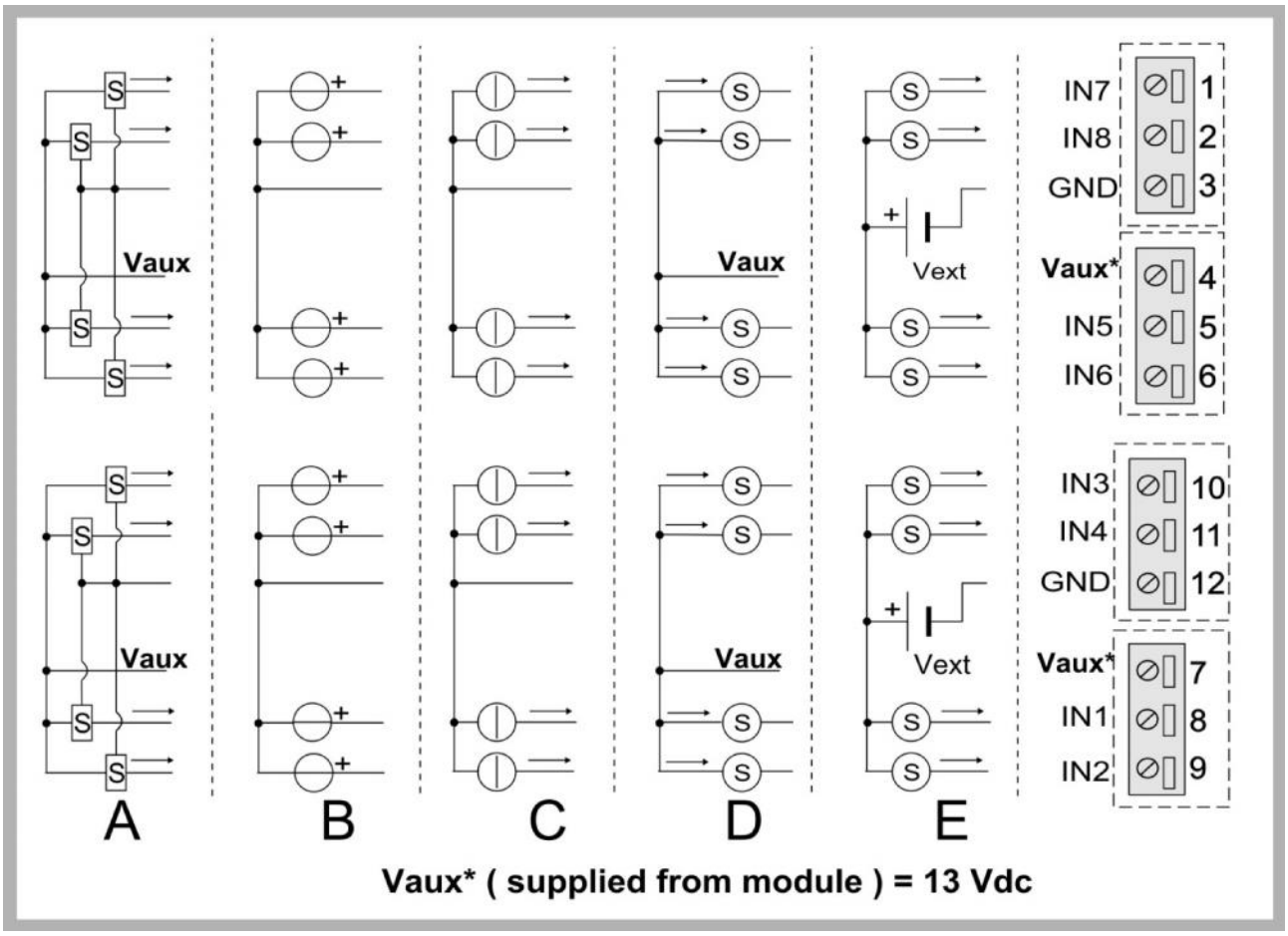
Input connections

It is possible to connect to the Z-8AI module two types of sensors:

- **passive sensors**, indicated with “S” label (these sensors have to be supplied: by a module external voltage Vext or by the module internal voltage Vaux);
- **active sensors**, indicated with “voltage generator” or “current generator” label (these sensors have already been supplied).

In the following figure are shown five possible sensor connections.

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	Acquired signal	Up to	Connection modality	Sensors power supply
A	Voltage or current type	8 passive sensors	3-wire	Vaux (*)
B	Voltage type	8 sensors as voltage generator	2-wire	/
C	Current type	8 sensors as current generator	2-wire	/
D	Current-active type	8 passive sensors	2-wire	Vaux (*)
E	Current-passive type	8 passive sensors	2-wire	Vext (connect "-" to GND)

(*) **A and D connections are possible only if the absorbed currents sum from all sensors: <180mA.**

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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-Switches: DIP-SWITCH STATUS)		
9	10	Meaning
		RS485 terminator disabled
	●	RS485 terminator enabled

INPUT TYPE (Dip-Switches: ANALOG INPUTS)								
1	2	3	4	5	6	7	8	Meaning
								IN 1=voltage
●								IN 1=current
								IN 2=voltage
	●							IN 2=current
								IN 3=voltage
		●						IN 3=current
								IN 4=voltage
			●					IN 4=current

INPUT TYPE (Dip-Switches: ANALOG INPUTS)								
1	2	3	4	5	6	7	8	Meaning
								IN 5=voltage
				●				IN 5=current
								IN 6=voltage
					●			IN 6=current
								IN 7=voltage
						●		IN 7=current
								IN 8=voltage
							●	IN 8=current

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RS485 Register table

Name	Range	Interpretation of register	R/W	Default	Address
MachineID	/	MSB, LSB	R		40001
	Id_Code (Module ID)			0x0E	Bit [15:8]
	Ext_Rev (Module version)				Bit [7:0]
FWREV	/	Word	R		40062
	Firmware Code				
Status	/	Bit	R/W		40002
	Generic error: 0=there isn't; 1=there is			/	Bit 15
	Configuration error: 0=there isn't; 1=there is			/	Bit 14
	Memory error (EEPROM): 0=there isn't; 1=there is			/	Bit 13
	Save configuration in memory (EEPROM): 0=deactivated; 1=activated			/	Bit 12
	These bits aren't used			/	Bit [11:9]
	Reset of module: 0=deactivated; 1=activated			/	Bit 8
	These bits aren't used			/	Bit [7:0]
Errors	/	Bit	R		40063
	These bits aren't used			/	Bit[15:10]
	Setting error (in memory): 0=there isn't; 1=there is			/	Bit 9
	Calibration error (in memory): 0=there isn't;1=there is			/	Bit 8
	These bits aren't used			/	Bit [7:1]
	ADC error: 0=there isn't; 1=there is			/	Bit 0
Address Parity	/	MSB, LSB	R/W		40012
	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	/	MSB, LSB	R/W		40013
	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]
	Delay for RS485 (delay of communication response: it represents the number of the pauses(*) between the end of Rx message and the start of Tx message): from 0x00=0 to 0xFF=255 (*)1 pause=6 characters			0	Bit [7:0]
INPUT 1					
IN1	Between: IN 1-NSS, IN 1-NES	Word	R		40003
	Normalized measure of input 1			/	
IN 1-ESS	±10000 [mV] (if voltage), ±20000 [µA] (if current)	Word	R/W		40014
	Electrical Start Scale (E.S.S.) of input 1 [mV or µA]			0 [mV]	

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IN 1-EES	±10000 [mV] (if voltage), ±20000 [µA] (if current)	Word	R/W		40015
	Electrical End Scale (E.E.S.) of input 1 [mV or µA]			10000 [mV]	
IN 1-NSS	±32000	Word	R/W		40016
	Normalized Start Scale (N.S.S.) of input 1			0	
IN 1-NES	±32000	Word	R/W		40017
	Normalized End Scale (N.E.S.) of input 1			10000	
IN 1-FLAGS	/	Bit	R/W		40019
	These bits aren't used			/	Bit [15:8]
	Input enabling: 0=deactivated; 1=activated			1	Bit 7
	These bits aren't used			/	Bit [6:4]
	Sampling time: 0b00=10 ms; 0b01=30 ms; 0b10=40 ms; 0b11=120 ms			10 [ms]	Bit [3:2]
	This bit isn't used			/	Bit 1
	Acquired-input type: 0=voltage; 1=current			0	Bit 0
INPUT 2					
IN 2	Between: IN 2-NSS, IN 2-NES	Word	R		40004
	Normalized measure of input 2			/	
IN 2-ESS	±10000 [mV] (if voltage), ±20000 [µA] (if current)	Word	R/W		40020
	Electrical Start Scale (E.S.S.) of input 2 [mV or µA]			0 [mV]	
IN 2-EES	±10000 [mV] (if voltage), ±20000 [µA] (if current)	Word	R/W		40021
	Electrical End Scale (E.E.S.) of input 2 [mV or µA]			10000 [mV]	
IN 2-NSS	±32000	Word	R/W		40022
	Normalized Start Scale (N.S.S.) of input 2			0	
IN 2-NES	±32000	Word	R/W		40023
	Normalized End Scale (N.E.S.) of input 2			10000	
IN 2-FLAGS	/	Bit	R/W		40025
	See IN 1-FLAGS register (40019)			/	
INPUT 3					
IN 3	Between: IN 3-NSS, IN 3-NES	Word	R		40005
	Normalized measure of input 3			/	
IN 3-ESS	±10000 [mV] (if voltage), ±20000 [µA] (if current)	Word	R/W		40026
	Electrical Start Scale (E.S.S.) of input 3 [mV or µA]			0 [mV]	
IN 3-EES	±10000 [mV] (if voltage), ±20000 [µA] (if current)	Word	R/W		40027
	Electrical End Scale (E.E.S.) of input 3 [mV or µA]			10000 [mV]	
IN 3-NSS	±32000	Word	R/W		40028
	Normalized Start Scale (N.S.S.) of input 3			0	
IN 3-NES	±32000	Word	R/W		40029
	Normalized End Scale (N.E.S.) of input 3			10000	
IN 3-FLAGS	/	Bit	R/W		40031
	See IN 1-FLAGS register (40019)			/	
INPUT 4					
IN 4	Between: IN 4-NSS, IN 4-NES	Word	R		40006
	Normalized measure of input 4			/	
IN 4-ESS	±10000 [mV] (if voltage), ±20000 [µA] (if current)	Word	R/W		40032

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	Electrical Start Scale (E.S.S.) of input 4 [mV or µA]			0 [mV]	
IN 4-EES	±10000 [mV] (if voltage), ±20000 [µA] (if current)	Word	R/W		40033
	Electrical End Scale (E.E.S.) of input 4 [mV or µA]			10000 [mV]	
IN 4-NSS	±32000	Word	R/W		40034
	Normalized Start Scale (N.S.S.) of input 4			0	
IN 4-NES	±32000	Word	R/W		40035
	Normalized End Scale (N.E.S.) of input 4			10000	
IN 4-FLAGS	/	Bit	R/W		40037
	See IN 1-FLAGS register (40019)			/	
INPUT 5					
IN 5	Between: IN 5-NSS, IN 5-NES	Word	R		40007
	Normalized measure of input 5			/	
IN 5-ESS	±10000 [mV] (if voltage), ±20000 [µA] (if current)	Word	R/W		40038
	Electrical Start Scale (E.S.S.) of input 5 [mV or µA]			0 [mV]	
IN 5-EES	±10000 [mV] (if voltage), ±20000 [µA] (if current)	Word	R/W		40039
	Electrical End Scale (E.E.S.) of input 5 [mV or µA]			10000 [mV]	
IN 5-NSS	±32000	Word	R/W		40040
	Normalized Start Scale (N.S.S.) of input 5			0	
IN 5-NES	±32000	Word	R/W		40041
	Normalized End Scale (N.E.S.) of input 5			10000	
IN 5-FLAGS	/	Bit	R/W		40043
	See IN 1-FLAGS register (40019)			/	
INPUT 6					
IN 6	Between: IN 6-NSS, IN 6-NES	Word	R		40008
	Normalized measure of input 6			/	
IN 6-ESS	±10000 [mV] (if voltage), ±20000 [µA] (if current)	Word	R/W		40044
	Electrical Start Scale (E.S.S.) of input 6 [mV or µA]			0 [mV]	
IN 6-EES	±10000 [mV] (if voltage), ±20000 [µA] (if current)	Word	R/W		40045
	Electrical End Scale (E.E.S.) of input 6 [mV or µA]			10000 [mV]	
IN 6-NSS	±32000	Word	R/W		40046
	Normalized Start Scale (N.S.S.) of input 6			0	
IN 6-NES	±32000	Word	R/W		40047
	Normalized End Scale (N.E.S.) of input 6			10000	
IN 6-FLAGS	/	Bit	R/W		40049
	See IN 1-FLAGS register (40019)			/	
INPUT 7					
IN 7	Between: IN 7-NSS, IN 7-NES	Word	R		40009
	Normalized measure of input 7			/	
IN 7-ESS	±10000 [mV] (if voltage), ±20000 [µA] (if current)	Word	R/W		40050
	Electrical Start Scale (E.S.S.) of input 7 [mV or µA]			0 [mV]	
IN 7-EES	±10000 [mV] (if voltage), ±20000 [µA] (if current)	Word	R/W		40051
	Electrical End Scale (E.E.S.) of input 7 [mV or µA]			10000 [mV]	

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IN 7-NSS	±32000	Word	R/W		40052
	Normalized Start Scale (N.S.S.) of input 7			0	
IN 7-NES	±32000	Word	R/W		40053
	Normalized End Scale (N.E.S.) of input 7			10000	
IN 7-FLAGS	/	Bit	R/W		40055
	See IN 1-FLAGS register (40019)			/	
INPUT 8					
IN 8	Between: IN 8-NSS, IN 8-NES	Word	R		40010
	Normalized measure of input 8			/	
IN 8-ESS	±10000 [mV] (if voltage), ±20000 [µA] (if current)	Word	R/W		40056
	Electrical Start Scale (E.S.S.) of input 8 [mV or µA]			0 [mV]	
IN 8-EES	±10000 [mV] (if voltage), ±20000 [µA] (if current)	Word	R/W		40057
	Electrical End Scale (E.E.S.) of input 8 [mV or µA]			10000 [mV]	
IN 8-NSS	±32000	Word	R/W		40058
	Normalized Start Scale (N.S.S.) of input 8			0	
IN 8-NES	±32000	Word	R/W		40059
	Normalized End Scale (N.E.S.) of input 8			10000	
IN 8-FLAGS	/	Bit	R/W		40061
	See IN 1-FLAGS register (40019)			/	

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 power is on
ERR	Blinking light	The module has at least one of the errors described in RS485 Registers table
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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