EN

S311G-L / S311G-L-O / S311G-H / S311G-H-O

Advanced Analog Indicator-Generator with 4 Digit Display

1. GENERAL SPECIFICATIONS

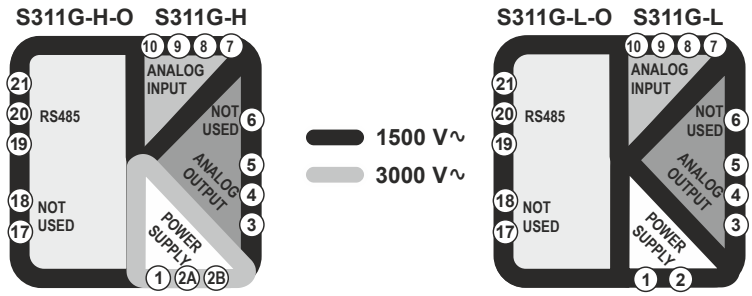
- Analog Input: voltage, current or potentiometer.
- Analog output: voltage or active / passive current.
- Easy navigation of the configuration menu through three buttons on the front panel.
- 4 Digit display with adjustable contrast.
- Anti-bump filter adjustable from 0 to 255 seconds (if t = 0 then the filter is disabled).
- Noise rejection filter at 50 and 60 Hz.
- Two LEDs indicating the automatic and manual mode on front panel.
- Manual or automatic mode is stored in a non-volatile memory.
- **Manual mode:**
  You can set and display a value by means of the three buttons on front panel.
  The value is stored in a non-volatile memory.
- **Automatic mode:**
  Visualisation of the value scaled for the display.
  Generation of the value displayed scaled for the isolated analog output
- **For optional version (-O):**
  RS485 serial communication with ModBUS RTU protocol , maximum 32 nodes.

2. TECHNICAL SPECIFICATIONS

Power Supply:	Code S311G-L: 10-40 V⎓, 19-28 V∿ 50-60 Hz, max 1.5 W. Code S311G-H: 85-265 V∿ 50-60 Hz, max 1.5 W.
Voltage Input:	0 – 10 V, input impedance: 100 kΩ resolution: 10000 points.
Current Input:	0 – 20 mA, input impedance ~20 Ω resolution: 10000 points.
Potentiometer Input:	Excitation Current: 1,1 mA. Potentiometer value from 1 kΩ to 100 kΩ, to always use with a parallel resistor of 330 Ω.
Analog Output:	Generated Current: 0 – 20 mA, max load resistance: 500 Ω. Voltage: 0 – 10 V, min load resistance: 1 kΩ. Configurable Start and Full scale values. Resolution: 2 μA / 1 mV.

Errors referred to max measuring range:	Calibration Error	Thermal Coefficient	Linearity Error	Others
Voltage or Current Input:	0,1%	0,01%/°K	0,05%	EMI (1):<1%
Potentiometer Input :	0,1%	0,01%/°K	0,1%	EMI (1):<1%
Voltage or Current Output:	0,1%	0,01%/°K	0,05%	EMI (1):<1%

(1) EMI: electromagnetic interferences.

Sampling Frequency:	Fixed: 2 Hz.
Response Time:	700 ms.
Environmental Conditions:	Temperature: -10 – 60°C Humidity: 30% – 90% non condensing.
Isolation :	
Connections :	Removable screw terminals, pitch 3,5 mm / 5,08 mm.
Protection Degree :	Ip65 (on the frontal panel with the provided seal)
Dimensions (L x W x H)	98,5 x 90,5 x 44,5 mm (front panel 96,5 x 48,5 mm)
Standards: CE	EN61000-6-4 (electromagnetic emission, industrial environment). EN61000-6-2 (electromagnetic immunity, industrial environment). EN61010-1 (safety).

3. DESCRIPTION OF OPERATION

The input measurement has been scaled and sent to the display.
The displayed value has been scaled further and sent to the analog output.
The value is also available through Modbus RTU protocol by RS485 port (only in the optional version -O).

3.1 Parameter setting

You can set all the instrument parameters with the configuration menu or through the RS485 interface (only in the optional version -O).

3.2 Operating modes

You choose between two operating modes:
1) **Manual:** you set the value from the front buttons and the instrument generates the output.
2) **Automatic:** the instrument displays the scaled measure and generates scaled output.

3.3 Menu access password

You can protect the access in the configuration menu from the panel with admin password ≠ 5477.

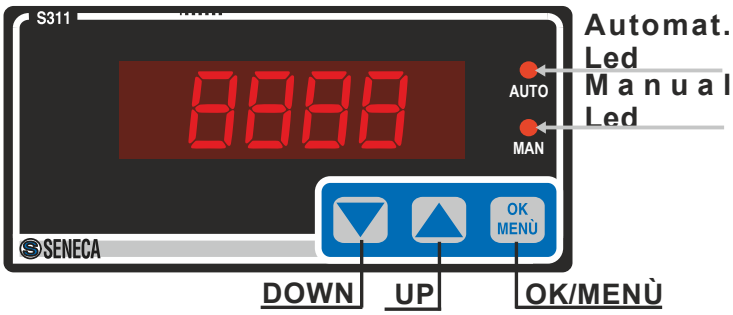
In manual mode you can protect Automatic / Manual mode selection and value change with user password ≠ 5477and ≠ 5472.

3.4 Anti-bump filter

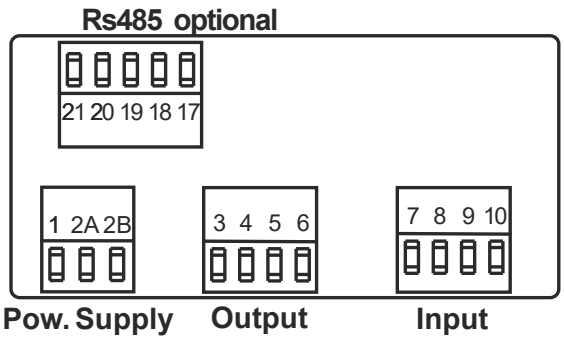
This filter prevent sharp output changes because it spreads the change in a ramp as long as the time set. In Manual mode, the filter is always engaged.
In trasition from automatic to manual mode the filter remains active for a time equal to that configured in the anti-bump time parameter.

4. POSITION OF BUTTONS AND SCREW TERMINALS

FRONT PANEL: BUTTONS AND LEDS



REAR SIDE: TERMINALS



Terminals 17 to 21 are only available with optional card (-O).

5. BUTTON ACTION SUMMARY

The following table gives a summary of the actions that you can perform using the panel buttons. The buttons must be enabled with one of the two passwords: sysadmin=5477;user=5472

In order to access the configuration menu and to change the operation modes **the panel buttons must be pressed for a few seconds**	
▼ + OK MENÙ Configuration menu access.	OK MENÙ Operating modes selection between: Manual or Automatic
▲ In manual mode it allows you to increase the value displayed. Holding down the button the speed increases.	▼ In manual mode it allows you to decrease the value displayed.. Holding down the button the speed increases.

6. ERROR SIGNALLINGS

Errors are also directly notified on the display.
The next table shows the possible error notifications and their meanings:

nnnn: Input value scaled > 2.5% of Hi-d value or
Input value scaled > maximum viewable.

UUUU: Input value scaled < 2.5% of Lo-d value or
Input value scaled < minimum viewable.

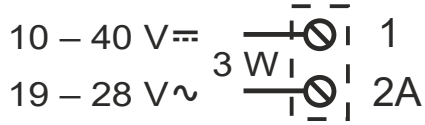
EErr: On startup indicates a calibration memory error (EEprom ERRor).

When this error happens the operation of the instrument is blocked and the ModBus communication is only available if the optional card is present (-O).

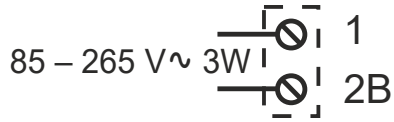
7. ELECTRICAL CONNECTIONS

POWER SUPPLY: to avoid serious damage to the device, pay attention to the instrument code before connecting the power supply.

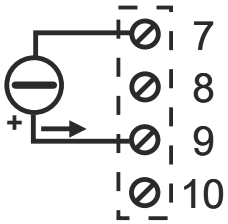
Code S311G-L and S311G-L-O



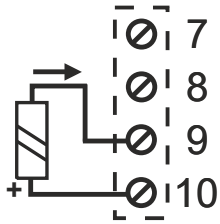
Code S311G-H and S311G-H-O



CURRENT INPUT (mA)

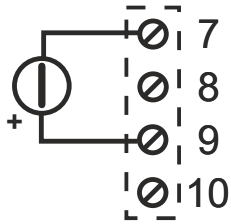


The loop is powered by the sensor

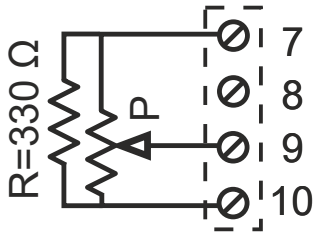


The loop is powered by the module (17 V Loop)

VOLTAGE INPUT (V)



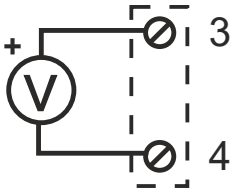
POTENTIOMETER INPUT



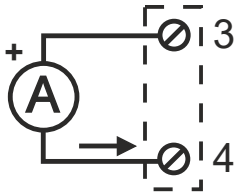
Resistance R=330 Ω (not provided), P=1 kΩ – 100 kΩ

ANALOG OUTPUT

Voltage

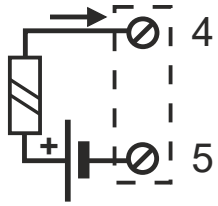


Generated Current



Active Output (powered) to connect to passive inputs.

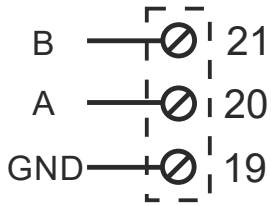
Ext. Power Supply Current



Passive Output (unpowered) to connect to active inputs

OPTIONAL CARD CONNECTIONS

RS485



8. SUBMENUS OF EACH PARAMETER

Menu configurable parameters: C.O.n.F.

Parameter Symbol	Parameter Name	Description and setting range	Value
PASS	Admin Password	Allows you access to the configuration menu in order to configure the device, allows you to select the operating mode and allows to set the input value.	5477 (default)
	User Password	Allows you to use the control panel buttons for selecting manual or automatic mode and allows to set the input value in manual mode.	5472
	No Password	Only allows you to access the setup menu in order to change the password. It does not allow you to change the operating mode and or to set the input value in manual mode using the control panel keys.	All values except 5472 and 5477

Menu configurable parameters: : I.n.P.t.

Parameter Symbol	Parameter Name	Description and setting range	Default Value
tYPE	Input Type	1 = Voltage 2 = Current 3 = Potentiometer	2 Current
LO-E	Electrical Start Scale Value	Voltage (V) Current (mA) Potentiometer (%) It defines the input signal value associated to the minimum displayable value (LO-d). **Allowed configurable values:** Values included between the lower and the upper limits specified for the selected input type. Minimum value = 0, Maximum value = 99,99.	4,00 (mA)
HI -E	Electrical Full Scale Value	Voltage (V) Current (mA) Potentiometer (%) It defines the input signal value associated to the maximum displayable value (HI -d). **Allowed configurable values:** Values included between the lower and the upper limits specified for the selected input type. Minimum value = 0, Maximum value =: 99,99.	20,00 (mA)

Menu configurable parameters: S.C.A.L.

Parameter Symbol	Parameter Name	Description and setting range	Default Value
LO-d	Display Start Scale Value	Integer values included between these limits: Minimum limit = -1999 Maximum limit = 9999	0
HI -d	Display Full Scale Value	Integer values included between these limits: Minimum limit = -1999 Maximum limit = 9999	1000
dP	Decimal point position	0 = no decimal point (ex: 1234), 1 = first digit (ex 123.4), 2 = second digit (ex 12.34), 3 = third digit (ex 1.234)	0 = no decimal point
FILt	Stabilizer filter level	Allowed values: from 0 to 20 (0 = no filter)	0 = no filter

Menu configurable parameters: O.U.t.

Parameter Symbol	Parameter Name	Description and setting range	Default Value
LO-t	Display value associated to the minimum output value	Minimum and maximum displayable value. Decimal point through dP set. Allowed values included between: Minimum limit -1999 Maximum limit 9999	0
HI -t	Display value associated to the maximum output value		1000
tYPE	Regenerated output type	1 = 0 – 10 V 2 = 4 – 20 mA 3 = 0 – 20 mA	2 4 – 20 mA
bUnP	Time that the analog output needs to increase from 0% to 100%.	The anti-bump filter makes the output variation gradually change with time. Allowed values from 1 to 255 sec (0 = anti-bump filter disabled)	15 sec
LO-L	Analog output minimum limit	Upper and lower limits of the generated output in V or mA, depending on the type of output selected in parameter: tYPE.	4.00 mA
HI -L	Analog output maximum limit		20.00 mA

Menu configurable parameters: b.U.S. .

Parameter Symbol	Parameter Name	Description and setting range	Default Value
Addr	MODBUS address	Slave address of Modbus device. Integer values between 1 and 255	1
PAr	Parity control type	Parity check in RS485 serial communication: 0 = None 1 = Even 2 = Odd.	0 = None
dEL	Response delay time	Response delay time. It represents the number of six characters delays between the end of the Rx message and the beginning of the Tx. Allowed values included between 0 and 255. 0 = No delay ,1 = 1 six characters delay, etc.	0 = No delay
bAUd	Communication speed	RS485 Serial communication speed in Baud: 0 = 4800 1 = 9600 2 = 19200 3 = 38400 4 = 57600 5 = 115200 6 = 1200 7 = 2400 8 = 14400	3 = 38400

Menu configurable parameters: S.y.S. .

Parameter Symbol	Parameter Name	Description and setting range	Default Value
COnt	Display contrast	Display contrast adjustment. Values from 1 (minimum contrast) to 20 (maximum contrast).	10
dFLt	Default settings	1 = Overwrite all the values configured with the default values.	

Menu configuration exit:
By clicking **OK/MENU** button all the parameters are stored in the flash memory and after a few moments the device is reset. E.H.I .t.

9. MULTIPLE CHOICE PARAMETER VALUES

The multiple choice parameter descriptions are listed below.

9.1 CONF. CONFIGURATION ACCESS

PASS: Allows the selection of the password.
5477 is the administrator password and 5472 is the user password; the remaining values prevent access to the instrument.

9.2 INPT. ELECTRICAL INPUT TYPES

TYPE.: Allows to select the input type among the following:
1 = Voltage 2 = Current = Default 3 = Potentiometer.

9.3 SCAL. SETTING DISPLAYED VALUE

FILT.: Allows the stabilizer filter level selection of the measure displayed.
Allowed values: 0 = disabled filter = Default 1 – 20 = filtering level.

9.4 OUT. .OUTPUT GENERATED TYPE

TYPE.: Selects the output type among the following:
1 = Output 0 – 10V 2 = Output 4 – 20 mA = Default 3 = Output 0 – 20 mA.

9.5 bUS. . RS485 SETTINGS

Addr.: Allows the slave address selection of the Modbus board.
Allowed values: 1 – 255= available addresses 1 = address Default.

PAr. .: Allows the parity control selection of the serial communication.
Allowed values: 0 = None (no parity check) = Default 1 = Even 2 = Odd.

dEL. .: Allows the response delay time selection.
Allowed values: 1 – 255= number of six characters delays 0 = no delay = Default.

bAUd.: Allows the Baud-rate selection.
Allowed values:
0 = 4800 baud 2 = 19200 baud 4= 57600 baud 6 = 1200 baud 8 = 14400 baud
1 = 9600 baud 3 = 38400 baud = Default 5 = 115200 baud 7 = 2400 baud.

9.6 SYS. . SYSTEM SETTINGS

Cont.: Allows the display contrast adjustment.
Allowed values: 1 – 20 with 1 = minimum contrast 10 = Default 20 = maximum contrast.

9.7 dFLt. RESTORE TO FACTORY DEFAULT SETTINGS

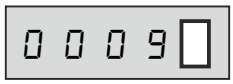
1 = All parameters return to the factory settings.

10. SETTING EXAMPLES

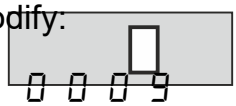
10.1 EXAMPLE OF PARAMETERS MODIFICATION

We are going to illustrate an example of HI.-d. parameter modification.
In this example, the digit to modify - which in the instrument itself flashes - is highlighted.
After selecting the parameter to modify, which for example can have value 000:

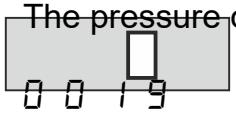
The pressure of ▼ generates this result:



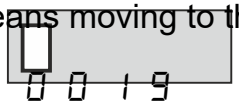
The pressure of ▼ has brought the blinking digit to the maximum value.
Now the pressure of **OK/MENU** buttons allows the shift of position of the digit to modify:



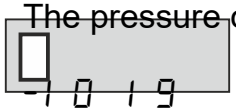
The pressure of ▲ generates this result:



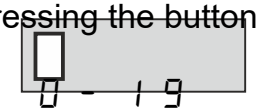
The digit has been increased of a unit.
To set a negative value, it is necessary to move to the most significant digit. This means moving to the left by repeatedly pressing **OK/MENU**:



The pressure of ▼ generates this result:



The last digit is brought to the most negative value: -1
pressing the button again ▼ generates this result:



Now the minus sign is obtained replacing the first non-useful zero of the set value.
By pressing the **OK/MENU** button the set value is confirmed.
A further pressure of the **OK/MENU** button, causes the return to the name of the parameter just modified HI.-d.

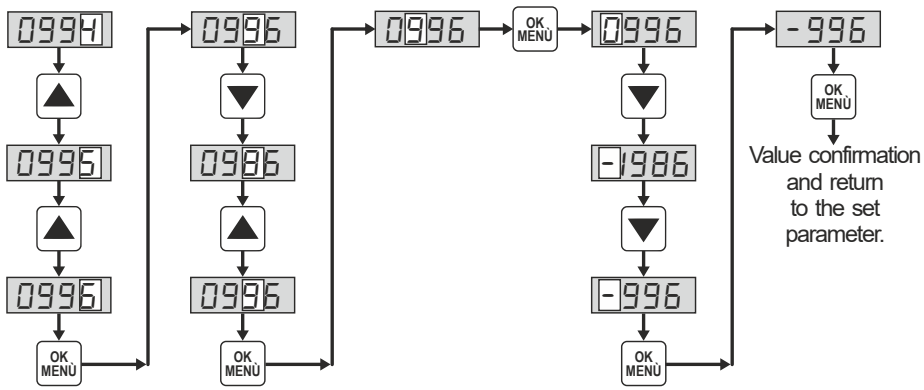
ACCESS TO THE PROGRAMMING MENU

▼ + OK MENÙ

Press the two buttons at the same time for a few seconds.

PARAMETERS MODIFICATION

You can modify the parameter value digit by digit.The digit you want modify, which on the display **flashes**, in this diagram is highlighted:



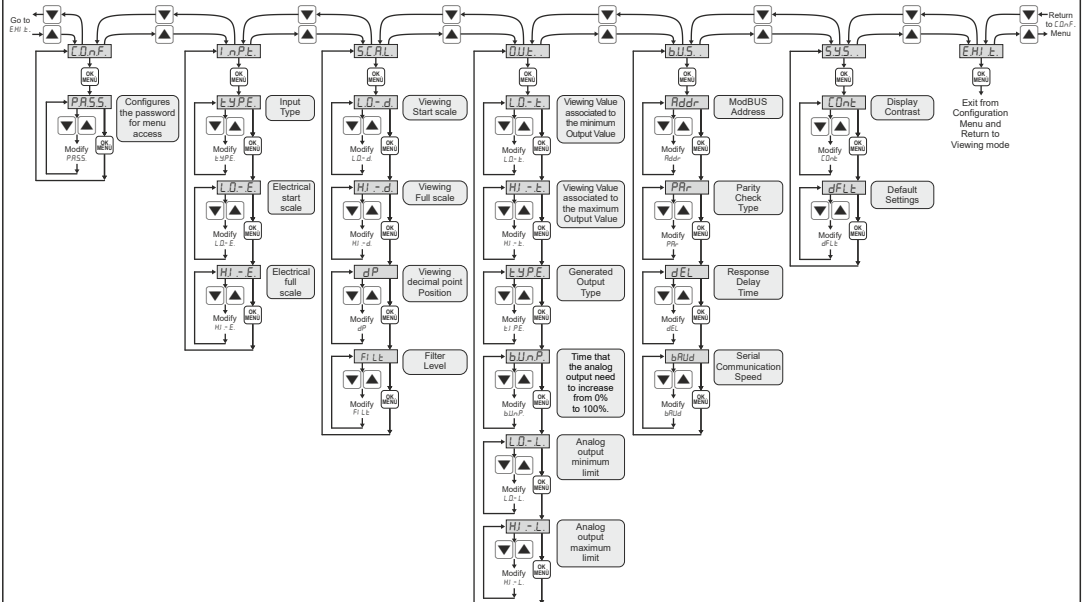
▲ : Increments the digit value of a unit. ▼: Decreases the digit value of a unit

OK MENÙ : Confirms the value and go to the next digit.
: If last digit: confirms the value of the digit and a further pressure takes back to the parameter

Notes on values setting

If the value can be negative then: the last digit allows to also insert the **–** or **-1** value.
If the value is out of the parameter range then: the value is teken back within the range.

CONFIGURATION MENU SCHEME



11. MODBUS REGISTERS (Optional Card)

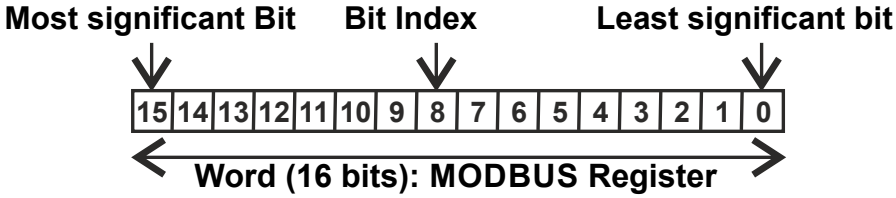
The S311G-L-O and S311G-H-O indicators offer 16 bits (words) ModBUS registers, accessible through a RS485 serial communication port.

11.1 Available MODBUS commands

Code	Function	Description
03	Read Holding Registers	Word registers reading, up to 16 registers at a time.
06	Write Single Register	Word register writing.
16	Write Multiple Registers	Word registers writing, up to 16 registers at a time.

11.2 Holding Registers

16-bit Holding Registers have the following structure:



In the next table the notation Bit [x:y], means all bits from x to y. Example: Bit [2:1] indicates bit 2 and bit 1, and illustrates the meaning of the various combinations of the two-bit values.

Offset	Addr.	Register	Bit	Description	R/W
0	40001	MACHINE ID	15 : 8	**Module ID = (113)**	R
			7 : 0	**Firmware revision**	R
1	40002	FW_CODE	15 : 0	**Instrument firmware code**	R
2	40003	TYP_INP	15 : 8	**Input type:** 1 = Voltage, 2 = Current =Default 3 = Potentiometer.	R/W
			7 : 0	**Anti-bump time:** Values from 1 to 255 sec (0 = anti-bump disabled). Default = 15.	R/W
3	40004	HI_E	15 : 0	**Input electrical Full Scale in:** **Volt/100** or **mA/100** or **Percentage %/100** This value must be included between the minimum and maximum limit for each input type. This parameter defines the value of the input signal associated to the maximum viewing value: HI_D. Min : 0, Max: 9999. Default: 2000.	R/W
4	40005	LO_E	15 : 0	**Input electrical Start Scale in:** **Volt/100** or **mA/100** or **Percentage %/100**. This value must be included between the minimum and maximum limit for each input type. This parameter defines the value of the input signal associated to the maximum viewing value: LO_D. Min : 0, Max: 9999. Default: 400.	R/W

Offset	Addr.	Register	Bit	Description	R/W
5	40006	DP_IST	15 : 8	**Display decimal point position (dP):** 0 = no decimal point (es 1234) = Default 1 = first digit (es 123.4), 2 = second digit (es 12.34) and 3 = third digit (es 1.234).	R/W
			7 : 0	Not used.	
6	40007	FILT	15 : 8	**Filter level configuration:** Allowed values: 0 – 20. 0 = no filter = Default.	R/W
			7 : 0	Not used.	
8	40009	TYP_OUT	15 : 8	Not used.	R/W
			7 : 0	**Generated output configuration:** 1 = voltage output 0 – 10 V 2 = current output 4 – 20 mA = Default 3 = current output 0 – 20 mA	
9	40010	CONTRAST	15 : 8	Not used.	R/W
			7 : 0	**Display contrast configuration:** Allowed values from 1 (minimum contrast) to 20 (maximum contrast). Default = 10.	
11	40012	HI_L	15 : 0	**Analog output maximum limit in:** **V** or **mA** related to the type of output. Maximum possible value of the analog output.	R/W
13	40014	LO_L	15 : 0	**Analog output minimum limit in:** **V** or **mA** related to the type of output. Minimum possible value of the analog output.	R/W
14	40015	PASSWORD	15 : 0	**Enable and disable the configuration menu access.**	R/W
21	40022	HI_T	15 : 0	**Input value displayable corresponding to the maximum generated output value.** Set the value referred to the display scale but without the decimal point. Example: If the value reported to the display scale is: 10.0 set 100. Minimum Value: -1999. Maximum value: 9999. Default = 1000.	R/W

All the parameters are stored in a non-volatile memory.

Offset	Addr.	Register	Bit	Description	R/W
23	40024	LO_T	15 : 0	**Input display value corresponding to the minimum generated output value.** Set the value referred to the display scale but without the decimal point. Example: If the value referred to the display scale is: 10.0 set 100. Minimum Value: -1999. Maximum value: 9999. Default = 0.	R/W
25	40026	HI_D	15 : 0	**Electrical full scale displayable value.** **dP_IST** (40006) sets the decimal point position on the integer value. The minimum and maximum values depend on the number of digit (see **HI_T** (40021). Default = 1000.	R/W
27	40028	LO_D	15 : 0	**Electrical start scale displayable value.** **dP_IST** (40006) sets the decimal point position on the integer value. The minimum and maximum values are the same as **HI_T** (40021). Default = 0.	R/W
30	40031	ADDR	15 : 8	**Module address.** Allowed values from **0x01** to **0xFF**. Decimal values from **1** to **255**. Default = 1.	R/W
			7 : 0	**Parity check:** 00000000: no parity check (NONE) = Default 00000001: parity even (EVEN) 00000010: parity odd (ODD)	
31	40032	BAUDR	15 : 8	**Baudrate** 00000000 (0x00) = 4800 00000001 (0x01) = 9600 00000010 (0x02) = 19200 00000011 (0x03) = 38400 = Default 00000101 (0x05) = 115200 00000110 (0x06) = 1200 00000111 (0x07) = 2400 00001000 (0x08) = 14400	R/W
			7 : 0	**Response delay time.** It represents the number of six characters delays between the end of the Rx message and the beginning of the Tx message. Allowed values: from 0 to 255. Default = 0 = no delay.	

All the parameters values are stored in a non-volatile memory.

Offset	Addr.	Register	Bit	Description	R/W
63	40064	COMMAND	15 : 0	**Remote device commands.** After execution all commands reset the register to zero. 49568 Device reset 40960 Change to Automatic mode 45056 Change to Manual mode 99152 Stores the state in non-volatile memory	R/W

Offset	Addr.	Register	Bit	Description	R/W
70	40071	DISPL	15 : 0	**Displayed value.** Only writable if manual mode is selected. The parameter is stored in a non-volatile memory	R/W

12. ORDER CODES

	Code	Description
Model	S311G	Advanced Analog Indicator-Generator.
Power Supply	-H	85 – 265 V∿
	-L	10 – 40 V⎓ / 19 – 28 V∿
Options	-O	Optional card: RS485 ModBus Port. Isolation: 1500 V∿ among each port.

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 authorised 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 thè retail store where you purchased this product.

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SENECA s.r.l.
Via Austria, 26 - 35127 - PADOVA - ITALY
Tel. +39.049.8705355 - 8705359 - Fax +39.049.8706287
e-mail: info@seneca.it - www.seneca.it