EN S311A-XX-L / S311A-XX-H Line
Advanced Analog Indicators-Integrators
4, 6, 8, 11 Digits Display

1. GENERAL SPECIFICATIONS
- Universal input: voltage, current, thermocouples,, thermoresistors (2, 3 or 4 wires measurements), potentiometer.
- View of the instantaneous and/or integrated input value.
- Programmable retransmission of the measured instantaneous value by the isolated analog output (voltage or active/passive current).
- Retransmission of the integrated value by the isolated digital output (Open Collector).
- Integrator value is saved on non-volatile memory.
- Filter programmable at 20 levels to stabilise reading.
- Temperature measurement diplayable in Celsius or Fahrenheit degrees.
- Cold junction compensation in case of thermocouple input.
- Integrator Reset by digital input, buttons pressure or Modbus register.
- 4, 6, 8 or 11 (4+7) Digits display.
- In case of optional card use, two alarms are activable on the instantaneous input value (maximum, minimum, automatically resettable or not).
- Alarms status visible through two leds on the frontal panel.
- RS485 serial communication with MODBUS RTU protocol (by optional board), maximum 32 nodes.
- Two relay outputs (available on the optional card) for alarms signalling.
- Easy navigation on the programming Menu by three buttons on the frontal panel.
- Quick configuration of the alarm thresholds by the Quick Alarms Menu.
- Disturbance Rejection at 50 and 60 Hz.
- Display contrast settable.

2. TECHNICAL SPECIFICATIONS

Power Supply:	Code S311A-XX-L: 10-40 Vdc, 19-28 Vca 50-60 Hz, max 3 W. Code S311A-XX-H: 85-265 Vac 50-60 Hz, max 3 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.
Thermoresistor Input (RTD) PT100	2, 3 or 4 wires measurement, excitation current: 1,1 mA, resolution: 0,1 °C. Temperature Range : -150 °C..650 °C. Resistance Range: 20..350 Ω.
Thermocouple Input:	Type: J, K, R, S, T, B, E, N; resolution: 10 μV . Refer to the **TABLE: TC RANGE** for the measurement range.
Potentiometer Input:	Excitation Current: 1,1 mA. Potentiometer value from 1 kΩ to 100 kΩ, to use always with a parallel resistor equal to 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.
Digital Output :	Type: Open Collector, Imax: 50 mA, Vmax: 30 V.

Relay output (1) :	Capacity: 8 A / 250 Vac.			
Digital Input (1) :	Optoisolated, Vmin: 10 V, Vmax: 30 V.			
Sampling Frequency:	Fixed: 2 Hz.			
Response Time:	700 ms.			
Environmental Conditions:	Temperature: -10..60°C, Humidity min: 30%, max 90% at 40°C non-condensing.			
Errors referred to max measuring range:	Calibration Error	Thermal Coefficient	Linearity error	Others
Voltage/Current Input:	0,1%	0,01%/°K	0,05%	EMI (2):<1%
Input for thermocouples: J,K,E,T,N:	0,1%	0,01%/°K	0,5 °C	EMI (2): <1%
Input for Thermocouples: R,S:	0,1%	0,01%/°K	1 °C	EMI (2): <1%
Input for Thermocouples: B :	0,1%	0,01%/°K	2 °C	EMI (2): <1%
Cold junction compens.:	± 1,5 °C			
Potentiometer :	0,1%	0,01%/°K	0,1%	EMI (2): <1%
Thermoresistor Input :	0,1%	0,01%/°K	0,2%	EMI (2): <1%
Voltage/Current Output :	0,1%	0,01%/°K	0,05%	EMI (2): <1%
Isolation :	1500 V among each pair of ports (included the optional card ports).			
Connections :	-Removable screw terminals, pitch 3,5 mm / 5,08 mm. -Three buttons for menu navagation.			
Protection Degree :	IP65 (on the frontal panel with the provided seal)			
Dimensions (L x W x H)	98,2 x 88,5 x 48 mm			
Standards CE	EN61000-6-4/2002-10 (electromagnetic emission, industrial environment). EN61000-6-2/2006-10 (electromagnetic immunity, industrial environment). EN61010-1/2001 (safety). 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".			

Table: TC Range

TC TYPE	Admitted Range	TC TYPE	Admitted Range
J	-210..1200 °C	S	-50..1768 °C
K	-200..1372 °C	R	-50..1768 °C
E	-200..1000 °C	B	250..1820 (3) °C
N	-200..1300 °C	T	-200..400 °C

(1) Available only on the optional card.
(2) EMI: electromagnetic interferences.
(3) Up to 250 °C, the output is considered equivalent to a null temperature.

3. FUNCTIONING DESCRIPTION
The measured or integrated input value is translated into an analog or digital output signal.
The instantaneous measurement of the input or as an alternative the integral of is displayed; on the 11 (4+7) digits model, both the values are simultaneously displayed (4 digits: instantaneous value, 7 digits: integral value). The values are also available via Modbus RTU protocol upon query by RS485 bus (by the optional card).

3.1 Setting Modalities
All the parameters of the instrument may be set by the programming Menu or RS485 (by the optional card). The alarms thresholds may be quickly set by the *Quick Alarm Menu*. Besides the Z-NET3 software has been developed for the programming and the configuration of the module (consult the web site www.seneca.it).

3.2 Retransmission Modalities
The instrument allows the following retransmission modalities:
Analog Output: The measured input value is translated into an analog output signal (voltage or current).
Digital Output: The digital output follows the integrator up to 4.7 Hz maximum frequency: at each increment of the integrator, an impulse with duration >= ~100 ms is generated. At the overcoming of the maximum frequency above indicated, pulses are lost until an always low output is obtained. The output is normally at high logic level.

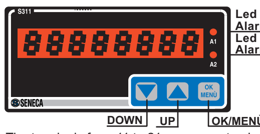
3.3 Alarms on the Analog input (with optional card)
Two alarms may be activated on the instantaneous value of the input. Each alarm may be set on the following way:
1) Alarm on the minimum thershold. 2) Alarm on the maximum thershold.
3) Retained Alarm on the minimum threshold (the reset is not automatic).
4) Retained Alarm on the maximum threshold (the reset is not automatic).
For each alarm, it is possible to set Threshold and Hysteresys. If the alarm is set as high, the alarm will turn OFF when the input value is Threshold-Hysteresys; instead if the alarm is set as low, the alarm condition will end when if the input value is Threshold+Hysteresys. The alarms status is displayed by two leds on the frontal panel and by the relays (in case of optional card use). The relays toggle at the alarm condition and return to the initial status at the end of the alarm condition or at the reset (if retained). The retained alarms are reset by pressing the buttons **UP** + **OK/MENÙ** for some seconds (on normal view functioning).

3.4 Integrator
As an alternative to the input instantaneous value, it is possible to display the integrator value (saved on non-volatile memory). This value is only available for voltage or current inputs. On the 11 digits (4+7) indicators both the values are simultaneously available. The integral is not calculated on the following cases:
- UUUU Error (see ***10. Error Signallings*** on page 13).
- Input value < LO-E + 200 mV (voltage input) or Input value < LO-E + 0,2 mA (current input). Where LO-E is the start value of the electrical scale. Example: Input: 4..20 mA, Minimum input integrable value: 4,2 mA.
The reset may be performed on the three following ways: by digital input (if enabled), by the pressure of the three buttons simultaneously for some seconds or via Modbus.

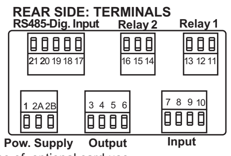
3.5 Instantaneous value or integrated value display
Three **Functioning Types** may be set (except for the 11 digits indicators which display both the instantaneous value and the integral value) which define the view modalities:
1) Type 0: both instantaneous and integrated value view. By pressing the **UP** button for some seconds the instantaneous view is selected, instead by pressing **DOWN** for some seconds the integrated value is displayed. At the passage to the instantaneous value the writing IST appears for some seconds, while passing to the integrated value, the writing tOt appears.
2) Type 1: only instantaneous value view.
3) Type 2: only integral value view.

3.6 Password for access to the menu
It is possible to enable the protection of the Programming Menu by password.
The Quick Alarm Menu is instead password free.

4. BUTTONS AND TERMINALS POSITION
FRONTAL PANEL: BUTTONS AND LEDS

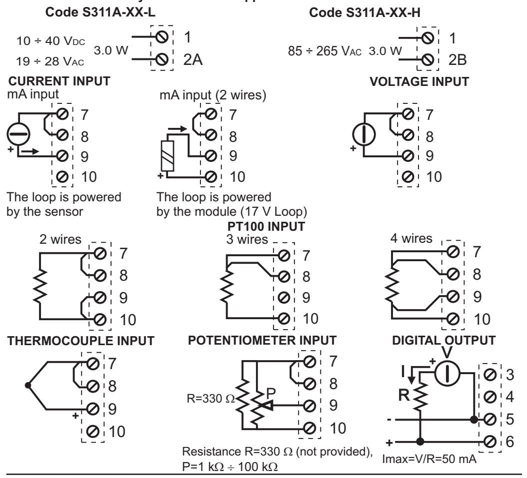


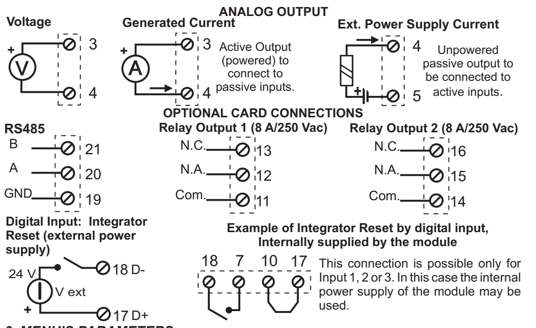
REAR SIDE: TERMINALS



The terminals from 11 to 21 are present only in case of optional card use.

5. ELECTRICAL CONNECTIONS
POWER SUPPLY: Verify the code on the applied label.





6. MENU'S PARAMETERS

Parameters settable from Menu : C.O.n.F.

Parameter Symbol	Parameter Name	Description and setting range	Default Value
FUnC	Indicator Functioning Type	0 = function of instantaneous value and integrator view. 1 = only function of instantaneous value view. 2 = only function of integrator view.	0 : Instant. and Integ.
IrES	Enables the reset of the integral by buttons and digital input	0 = enables the reset of the integral from panel and digital input. 1 = disables the reset of the integral from panel and digital input.	0 : Enabled
PASS	Enables the Password for the access to menu	Setting a value diffferent from **5477**, the password (always 5477) will be required at the start of the menu.	5477: Password disabled

Parameters settable from Menu : I.n.P.t.

Parameter Symbol	Parameter Name	Description and setting range	Default Value
tYPE	Input Type	1 = Voltage 6 = TC R 11 = TC N 2 = Current 7 = TC S 12 = PT100 (2 wires) 3 = Potentiometer 8 = TC T 13 = PT100 (3 wires) 4 = TC J 9 = TC B 14 = PT100 (4 wires) 5 = TC K 10 = TC E	2 : Current

LO-E	Electrical Start Scale Value	Only for input type 1, 2 and 3. Start scale in V (voltage input) or mA (current input) o % (potentiometer). It defines also the value of the input signal associated to the minimum value of view (LO-d). **Settable Values** Values included between the minimum and maximum limits specified for the secleted input type. Minimum Value: 0, Maximum Value: 99,99.	4,00 (mA)
HI-E	Electrical Full Scale value	Only for input type 1, 2 and 3. Full scale in V (voltage input) or mA (current input) o % (potentiometer). It defines also the value of the input signal associated to the maximum value of view (HI-d). **Settable Values** Values included between the minimum and maximum limits specified for the secleted input type. Minimum Value: 0, Maximum Value: 99,99.	20,00 (mA)

Parameters settable from Menu : S.C.A.L.

Parameter Symbol	Parameter Name	Description and setting range	Default Value
LO-d	Start scale of instantaneous view	Only for inputs 1, 2 and 3. Integer values between the following limits: Display Digits Number / Min. Limit / Max. Limit: 4: -1999 / 9999 6: -199999 / 999999 8: -19999999 / 99999999 11 (4+7): -1999 / 9999	0
HI-d	Full scale of instantaneous view		1000
dP	Decimal Point position on the instantaneous view	**Inputs 1, 2 and 3** 0 = no decimal point (ex 12345678), 1 = first digit (es 1234567.8) ... ... N display digit-1 11 digits (4+7) indicators: max number of decimal digits equal to 3. **Temperature Measurement** 0 = resolution: °C (°F). 1 = resolution: °C/10 (°F/10).	0 = No decimal point
FAHr	Temperature measurement in °C or °F	0 = Celsius degrees. 1 = Fahrenheit degrees.	0 = °C
FILt	Filter Level	0 = no filter 1 ... 20	0 = No filter

Parameters settable from Menues : A.L.1. e A.L.2.

Alarm 1 parameters: accessible from A.L.1 menu and identified by the final index 1.
Alarm 2 parameters: accessible from A.L.2 menu and identified by the final index 2.

Parameter Symbol	Parameter Name	Description and setting range	Default Value
SEt1	Alarm 1 Threshold	Value referred to the displayed value (decimal point set by dP). Temperature input: value expressed as set by FAHr (°C or °F). Settable value on the following ranges: Display Digits Number / Min. Limit / Max. Limit: 4: -1999 / 9999 6: -199999 / 999999 8: -19999999 / 99999999 11 (4+7): -1999 / 9999	500
SEt2	Alarm 2 Threshold		1000
HYS1	Alarm 1 Hysteresys		10
HYS2	Alarm 2 Hysteresys		10
tYP1	Alarm 1 Type	0 = Alarm disabled 1 = Alarm on the minimum threshold 2 = Alarm on the maximum threshold 3 = Retained alarm on the minimum threshold (the reset is not automatic) 4 = Retained alarm on the maximum threshold (the reset is not automatic)	0: Al 1 disabled
tYP2	Alarm 2 Type		0: Al 2 disabled
rLY1	Relay 1: N.O./N.C.	Relay Functioning: 0 = relay normally opened (N.O.) 1 = relay normally closed (N.C.).	0: N.O.
rLY2	Relay 2: N.O./N.C.		0: N.O.

Parameters settable from Menu : O.U.t..

Parameter Symbol	Parameter Name	Description and setting range	Default Value
LO-t	Instantaneous display value associated to the minimum value of the output.	Limits for the scaling of the retransmitted output. Decimal point set by dP. Settable values on the following limits: Display Digits Number / Min. Limit / Max. Limit: 4: -1999 / 9999 6: -199999 / 999999 8: -19999999 / 99999999 11 (4+7): -1999 / 9999	0
HI-t	Instantaneous display value associated to the maximum value of the output.		1000
tYPE	Retransmitted output type	1 = 0..10 V 2 = 4..20 mA 3 = 0..20 mA 4 = integrator digital output.	2: 4..20 mA

Parameters settable from Menu : b.U.S..

Parameter Symbol	Parameter Name	Description and setting range	Default Value
Addr	MODBUS Address	Settable Values: from 1 to 255.	1
PAr	Parity control	0 = None 1 = Even 2 = Odd.	0: None
dEL	Delay of the response	Number of pauses of 6 characters each to be entered between the end of the Rx message and the start of the Tx. Settable value: 0..255.	0: No Delay
bAUd	Serial communication speed	Serial communication speed in baud: 0 = 4800 3 = 38400 6 = 1200 1 = 9600 4 = 57600 7 = 2400 2 = 19200 5 = 115200 8 = 14400	3: 38400

Parameters settable from Menu : S.Y.S..

Parameter Symbol	Parameter Name	Description and setting range	Default Value
COnt	Display Contrast	Values : 1 (minimum contrast) to 20 (maximum).	10
bUrn	Behaviour in case of Burn out (with PT100 or TC)	0 = Full scale value indication 1 = Start scale value indication If the value is set to full scale, also the retransmitted output goes to the 100% (0% if the value is set to the start scale) and the maximum (minimum) alarms are activated.	0: Full scale Indicat.
dFLt	Default Settings	1 = Overwrite the set values with the default values.	

Parameters settable from Menu : I.n.t..

Parameter Symbol	Parameter Name	Description and setting range	Default Value
VALI	Constant to assign to obtain the desidered integration	The value to set is: VALI =(IMP/h)*9999/(HI-d without decimal point). Where IMP/h represents the number of impulses per hour. The default value is 9999: if HI-d without decimal point is 1000 the integral value in one hour is 1000 (see examples on page 12). Minimum Limit : 0. Maximum Limit : 4 digits: 9999, 6 digits 999999, 8 digits: 99999999, 11 (4+7) digits: 9999999.	9999
dP1	Decimal point position on the integrator view	0 = decimal point absent (ex. 123456) 1 = first digit (ex 12345.6) .... N display digits-1. 11 digits (4+7) indicators: max number of decimal digits equal to 6.	0: Decimal point absent

E.H.I.t. By confirming with **OK/MENÙ** all the parametes are saved in flash memory and after some instants the module is reset.

9. SUMMARY OF BUTTONS ACTIONS (in view mode)
On the following table we give a summary of the actions which may be performed during the view phase (not programming phase). To effectively execute the actions, it is necessary to press the buttons for some seconds.

DOWN + OK/MENÙ: Access to programming Menu	OK/MENÙ: Access to Quick Alarms Menu
UP: If FUnC=0 has been set, the indicator switches to the instantaneous view (except 11 digits model).	DOWN: If FUnC=0 has been set, the indicator switches to the integrator view (except 11 digits model).
UP + OK/MENÙ: Retained Alarms reset.	UP + DOWN + OK/MENÙ: Integrator Reset (if this functionality it has been enabled by setting IrES=0).

10. ERROR SIGNALLINGS
The errors are directly viewed through display.
We are going to list all the possible signallings with the correspondent meaning:
nnnn: Instantaneous value to display > HI-d value of the 2.5% or if the instantaneous value > maximum displayable.
UUUU: Instantaneous value to display < LO-d value of the 2.5% or instantaneous value to display < minimum displayable.
bUrn: Burn-out of the temperature sensor.
SErr: communication error with the cold junction thermometer.
EErr: at the start may signal an error on the calibration memory. The functioning of the module is blocked while the Modbus communication is available (if optional card).

11. ORDER CODES

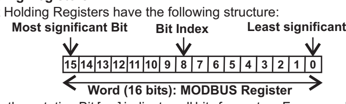
Code				Description
Model	S311A			Indicator - integrator with universal analog input.
Display		-4		4 digits
		-6		6 digits
		-8		8 digits
		-11		4+7 digits
Power Supply		-H		85..265 VAC
		-L		10..40 VDC / 19..28 VAC
Options			-O	Optional card: RS485 ModBus Port, 2 relay alarms and digital input. Isolation: 1500 VAC among each port
			/T	Calibration and configuration Service

12. MODBUS REGISTERS (Optional Card)
The S311A-XX-L and S311A-XX-H lines indicators have MODBUS 16 bits (words) registers, accessible by RS485 serial communication (available in case of optional card).

12.1 Supported MODBUS Commands

Code	Function	Description
03	Read Holding Registers	Reading of word registers up to 16 at a time.
06	Write Single Register	Writing of a word register.
16	Write Multiple Registers	Writing of word registers up to 16 at a time.

12.2 Holding Registers
The 16-bit Holding Registers have the following structure:



In the table the notation Bit [x:y] indicates all bits from x to y. For example Bit [2:1] indicates bit 2 and bit 1, and serves to illustrate the meaning of the various united combinations of the values of the two bits. Default values are indicated with the * symbol.

REGISTER	Description	ADDR.	R/W
MACHINE ID	**Bit [15:8]: contain the module's ID: 25.** **Bit [7:0]: contain the firmware's revision.**	40001	R
FW_CODE	**Register containing the internal code of the firmware.**	40002	R
TYP_INP_CEL_FAHR	**Register for the setting of the input type and of the temperature measure unit.**	40003	R/W
Bit [15:8]	Set the input type: 1 : Voltage, 2* : Current 3 : Potentiometer, 4 : Thermocouple J 5 : Thermocouple K, 6 : Thermocouple R 7 : Thermocouple S, 8 : Thermocouple T 9 : Thermocouple B, 10 : Thermocouple E 11: Thermocouple N, 12 : PT100 (2 wires) 13 : PT100 (3 wires), 14 : PT100 (4 wires)		
Bit [7:1]	Not used		
Bit 0	*Temperature in Celsius or Fahrenheit degrees*: 0* : Celsius 1 : Fahrenheit		
HI_E	**Electrical Full Scale of the input in V/100, mA/100 or %/100**	40004	R/W
Bit [15:0]	Full scale in Volt/100, mA/100 or %/100 respectively for input types 1, 2 and 3. This value must be included between the minimum and maximum specified for each input. Besides this parameter defines the value of the input signal associated to the maximum instantaneous value of view: HI_D. Min : 0, Max: 9999. Default: 2000.		
LO_E	**Electrical Start Scale of the input in V/100, mA/100 or %/100**	40005	R/W
Bit [15:0]	Start scale in Volt/100, mA/100 or %/100 respectively for input types 1, 2 and 3. This value must be included between the minimum and maximum specified for each input. Besides this parameter defines the value of the input signal associated to the minimum instantaneous value of view: LO_D. Min : 0, Max: 9999. Default: 400.		

DP_IST/DP_INT	**Decimal point position for instantaneous and integrated value.**	40006	R/W
Bit [15:8]	Decimal point position on the instantaneous view (**dp_IST**): 0* = decimal point absent (ex. 12345678) , 1 = first digit (ex 1234567.8), 2 = second digit, ..., N display digits-1. For temperature measurements: 0: °C (°F) resolution, 1: °C/10 (°F/10) resolution. 11 (4+7) digits indicator: maximum number of decimal digits equal to 3.		
Bit [7:0]	Decimal point position on the integrator view (**dp_INT**): 0* = decimal point absent (ex. 12345678) , 1 = first digit (ex 1234567.8), 2 = second digit, ..., N display digits-1. 11 (4+7) digits indicator: maximum number of decimal digits equal to 6.		
FILT/TYP_AL1	**Register for the setting of the filter and alarm 1 type**	40007	R/W
Bit [15:8]	Set the filter level. Admitted values: 0* = no filter, 1 ..20.		
Bit [7:0]	Set the Alarm 1 functioning: 0* = Alarm disabled 1 = Alarm on the minimum threshold 2 = Alarm on the maximum threshold 3 = Retained alarm on the minimum threshold (reset is not automatic) 4 = Retained alarm on the maximum threshold (reset is not automatic)		
RLY1_AL1/TYP_AL2	**Sets the normal status of relay 1 and alarm 2 type.**	40008	R/W
Bit [15:9]	Not used		
Bit 8	Sets the relay 1 functioning (only with the optional card): 0* = normally opened 1 = normally closed		
Bit [7:0]	Set the Alarm 2 functioning: 0* = Alarm disabled 1 = Alarm on the minimum threshold 2 = Alarm on the maximum threshold 3 = Retained alarm on the minimum threshold (reset is not automatic) 4 = Retained alarm on the maximum threshold (reset is not automatic)		

RLY2_AL2/TYP_OUT	**Sets the normal status of relay 2 (only with optional card) and the retransmitted output type.**	40009	R/W
Bit [15:9]	Not used		
Bit 8	Sets the relay 2 functioning (only with the optional card): 0* = normally opened 1 = normally closed		
Bit [7:0]	Set the retransmitted output type: 1 = 0..10 V output 2* = 4..20 mA output 3 = 0..20 mA output 4 = impulsive integrator digital output		
BURN/CONTRAST	**Sets the behaviour in case of Burn Out (PT100 or TC) and the display contrast.**	40010	R/W
Bit [15:9]	Not used.		
Bit 8	*Behaviour in case of PT100 or Thermocouple Burn out*: 0* = Full scale indication 1 = Start scale indication.		
Bit [7:0]	Set the display contrast: values from 1 (minimum constrast) to 20 (maximum contrast). Default: 10.		
SET1_LONG_MSW	**Alarm 1 Threshold (most significant word).**	40011	R/W
Bit [15:0]	Alarm 1 threshold: value referred to the view scale but without decimal point. For example if the value referred to the view scale is 20,0 sets 200. See **HI_T_LONG**, **40021** for parameter limits. Default: 500.		
SET1_LONG_LSW	**Alarm 1 Threshold (least significant word).**	40012	R/W
HYS1_LONG_MSW	**Alarm 1 Hysteresis (most significant word).**	40013	R/W
Bit [15:0]	Alarm 1 hysteresis: value referred to the view scale but without decimal point. For example if the value referred to the view scale is 10,00 sets 1000. See **HI_T_LONG**, **40021** for parameter limits. Default: 10.		
HYS1_LONG_LSW	**Alarm 1 Hysteresis (least significant word).**	40014	R/W
PASSWORD	**Enables / disables the password for the access to the programming menu.**	40015	R/W
Bit [15:0]	By setting a value different from **5477**, at the start of the programming menu the password (always 5477) will be required. Default: 5477.		

SET2_LONG_MSW	**Alarm 2 Threshold (most significant word).**	40016	R/W
Bit [15:0]	Alarm 2 threshold: value referred to the view scale but without decimal point. For example if the value referred to the view scale is 20,0 sets 200. See **HI_T_LONG**, **40021** for parameter limits. Default: 1000.		
SET2_LONG_LSW	**Alarm 2 Threshold (least significant word).**	40017	R/W
HYS2_LONG_MSW	**Alarm 2 Hysteresis (most significant word).**	40018	R/W
Bit [15:0]	Alarm 2 hysteresis: value referred to the view scale but without decimal point. For example if the value referred to the view scale is 10,00 sets 1000. See **HI_T_LONG**, **40021** for parameter limits. Default: 10.		
HYS2_LONG_LSW	**Alarm 2 Hysteresis (least significant word).**	40019	R/W
HI_T_LONG_MSW	**Displayed instantaneous value correspondent to the maximum value of the analog output (most significant word).**	40021	R/W
Bit [15:0]	Displayed instantaneous input value corresponding to retransmitted output maximum value. Set the value referred to the view scale but without decimal point. Example: if the value referred to the view scale is 10,0, set 100. Default: 1000. Minimum Value (dipending on the digits number): 4 Digits: -1999 6 Digits: -199999 8 Digits: -19999999 11 (4+7) Digits: -1999 Maximum value (depending on the digits number): 4 Digits: 9999 6 Digits: 999999 8 Digits: 99999999 11 (4+7) Digits: 9999		
HI_T_LONG_LSW	**Displayed instantaneous value correspondent to the maximum value of the analog output (least significant word).**	40022	R/W
LO_T_LONG_MSW	**Displayed instantaneous value correspondent to the minimum value of the analog output (most significant word).**	40023	R/W
Bit [15:0]	Displayed instantaneous input value corresponding to retransmitted output minimum value. Set the value referred to the view scale but without decimal point. Example: if the value referred to the view scale is 10,0, set 100. Default: 0. For parameter limits see **HI_T_LONG, 40021**.		

LO_T_LONG_LSW	**Displayed instantaneous value correspondent to the minimum value of the analog output (least significant word).**	40024	R/W
HI_D_LONG_MSW	**Full Scale value of instantenous view (Most significant word)**	40025	R/W
Bit [15:0]	Set the full scale value of the view scale (integer, most significant word). Only for input 1, 2 and 3. The decimal point on the set integer value is given by **dP_IST** (40006). Default: 1000. Minimum and maximum values depending on the digits number (see **HI_T_LONG**, 40021).		
HI_D_LONG_LSW	**Full Scale Value of instantenous view (Least significant word)**	40026	R/W
LO_D_LONG_MSW	**Start Scale value of instantenous view (Most significant word).**	40027	R/W
Bit [15:0]	Set the start scale value of the view scale (integer, most significant word). Only for input 1, 2 and 3. The decimal point on the set integer value is given by **dP_IST** (40006). Default: 0. Limits value depend on the digits number (see **HI_T_LONG**, 40021).		
LO_D_LONG_LSW	**Start Scale value of instantenous view (Least significant word).**	40028	R/W
VALINT_LONG_MSW	**Constant for integration (Most significant word).**	40029	R/W
Bit [15:0]	The value to set to obtain the desidered integration is: VALI =(IMP/h)*9999/(HI-d without decimal point). Where IMP/h represents the number of impulses per hour. The default value is 9999: if HI-d without decimal point is 1000 the integral value in one hour is 1000 (see Examples on page 12). Minimum Limit : 0. Maximum Limit : 4 digits: 9999, 6 digits 999999, 8 digits: 99999999, 11 (4+7) digits: 9999999.		
VALINT_LONG_LSW	**Constant for integration (Least significant word).**	40030	R/W
ADDR	**Register for the setting of the Modbus address and parity control.**	40031	R/W
Bit [15:8]	Set the module's address. Permissible values from **0x01** to **OxFF** (decimal values in the range of 1-255). Default: 1.		
Bit [7:0]	Set the control parity type: 00000000 *: No parity (NONE) 00000001 : Even parity (EVEN) 00000010 : Odd parity (ODD)		

BAUDR	**Register for the setting of the Baudrate and the response delay time in characters.**	40032	R/W
Bit [15:8]	Serial communication speed in Baud: 00000000 (0x00): 4800 00000100 (0x04): 57600 00000001 (0x01): 9600 00000101 (0x05): 115200 00000010 (0x02): 19200 00000110 (0x06): 1200 00000011*(0x03): 38400 00000111 (0x07): 2400 00001000 (0x08): 14400		
Bit [7:0]	Response delay time. It represents the number of pauses of 6 characters each to be entered between the end of the Rx message and the start of the Tx message. Default value: 0.		
RESET_ZERO INT	**Module's Reset and Integrator's Reset.**	40064	R/W
Bit [15:0]	-By writing 0xC1A0, the module is reset. -By writing 0xC1C2, the integrator reset by panel is blocked. -By writing 0xC1C3, the integrator reset by panel is enabled.		
STATUS	**Errors and alarms Signalling.**	40065	R
Bit [15:9]	Not used.		
Bit 8	**1**: *Alarm 2 active.*		
Bit 7	**1**: *Alarm 1 active.*		
Bit 6	**1**: if the value to view is < LO-d of the ***2,5 %*** or temperature sensor under range.		
Bit 5	**1**: If the value to view is > HI-d of the **2,5 %** or the temperature sensor is over range.		
Bit 4	**1**: *Temperature Sensor Burn-out*		
Bit 3	**1**: *Failure on integrator saving*		
Bit 2	**1**: *Failure on the cold junction thermometer initialitation.*		
Bit 1	**1** *: Fault on cold junction thermometer.*		
Bit 0	**1**: *Calibration Eeprom damaged* Contact Seneca srl to solve the problem.		
POTEN_FLOAT_MSW	**Measurement value for potentiometer input (Floating point, most significant word).**	40066	R
POTEN_FLOAT_LSW	**Measurement value for potentiometer input (Floating point, least significant word).**	40067	R
DISPL_LONG_MSW	**Displayed value (Long Format, Most significant word).**	40070	R
DISPL_LONG_LSW	**Displayed value (Long Format, Least significant word).**	40071	R
mV_CJ_FLOAT_MSW	**Cold junction voltage in mV (Floating point format, most significant word).**	40079	R
mV_CJ_FLOAT_LSW	**Cold junction voltage in mV (Floating point format, least significant word).**	40080	R
mV_TC_FL_MSW	**Compensated Thermocouple Voltage in mV (Floating point Format, Most significant word).**	40081	R
mV_TC_FL_LSW	**Compensated Thermocouple Voltage in mV (Floating point Format, Least significant word).**	40082	R

TEMP_TC_FL_MSW	**Temperature in °C read from the thermocouple (Floating point, most significant word).**	40083	R
TEMP_TC_FL_LSW	**Temperature in °C read from the thermocouple (Floating point, least significant word).**	40084	R
TEMP_CJ_SHORT	**Cold junction temperature in 1/256 of °C.**	40085	R
Rx_FLOAT_MSW	**Resistance in Ohm if PT100 (Floating point format, most significant Word).**	40086	R
Rx_FLOAT_LSW	**Resistance in Ohm if PT100 (Floating point format, least significant Word).**	40087	R
TEMP_RTD_FL_MSW	**Temperature read from PT100 in °C (Floating point format , most significant word).**	40088	R
TEMP_RTD_FL_LSW	**Temperature read from PT100 in °C (Floating point format , least significant word).**	40089	R
Rx_short	**Measured resistance if PT100 (in Ω/100)**	40090	R
INT_LONG_MSW	**Integral Value (Long Format, Most significant word).**	40091	R
INT_LONG_LSW	**Integral Value (Long Format, Least significant word).**	40092	R
mVOLT_FL_MSW	**Measurement in mV in case of voltage input (Floating point format, most significant word).**	40093	R
mVOLT_FL_LSW	**Measurement in mV in case of voltage input (Floating point format, least significant word).**	40094	R
μAMPER_FL_MSW	**Measurement in μA in case of current input (Floating point format, most significant word).**	40095	R
μAMPER_FL_LSW	**Measurement in μA in case of current input (Floating point format, least significant word).**	40096	R

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 applicable 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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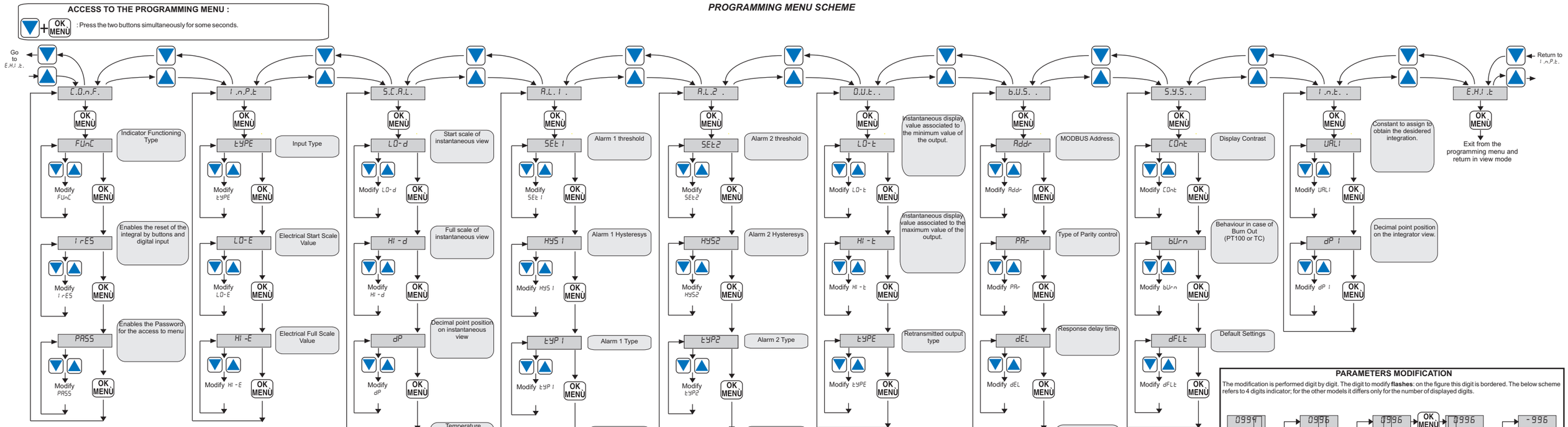
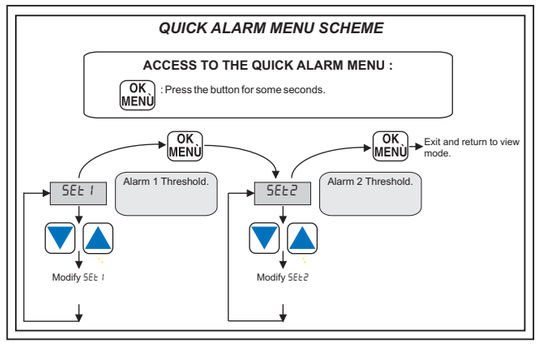
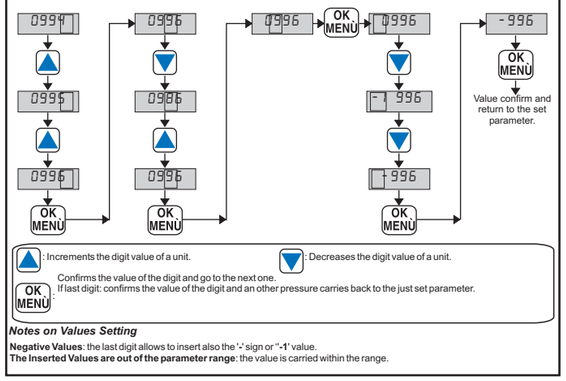
PROGRAMMING MENU SCHEME





PARAMETERS MODIFICATION

The modification is performed digit by digit. The digit to modify **flashes**: on the figure this digit is bordered. The below scheme refers to 4 digits indicator; for the other models it differs only for the number of displayed digits.



Notes on Values Setting

Negative Values: the last digit allows to insert also the '-' sign or "**-1**' value.
The Inserted Values are out of the parameter range: the value is carried within the range.

7. SETTABLE VALUES FOR MULTIPLE CHOICE PARAMETERS

The various options for the multiple choice parameters are listed below. Default values are indicated with the * symbol.

7.1 C.O.n.F. **(FUNCTIONING CONFIGURATION)**
FUnC
Selects the functioning type :
0* = function of instantaneous value and integrator value view.
1 = only function of instantaneous value view.
2 = only function of integrator view.
irES
Enables the reset of the integral by panel and digital input:
0 * = enabled.
1 = disabled.

7.2 I.n.P.t. **(ELECTRICAL INPUT)**
tYPE
Selects the input type among the following:

1 = Voltage			
2* = Current	5 = TC K	9 = TC B	13 = PT100 (3 wires)
3 = Potentiometer	6 = TC R	10 = TC E	14 = PT100 (4 wires)
4 = TC J	7 = TC S	11 = TC N	
	8 = TC T	12 = PT100 (2 wires)	

7.3 S.C.A.L. **(SETTING DISPLAYED VALUE)**
FAHr
Selects if the temperature will be displayed in:
0* = Celsius degrees
1 = Fahrenheit degrees.
FILt
Sets the level filter. Admitted Value:
0* = no filter
1 ... 20.

7.4 A.L.1. . /A.L.2. . **(ALARM 1 AND ALARM 2 SETTING)**
tYPE 1/tYPE2
Sets the alarm type :
0* = Inactive Alarm
1 = Alarm on the minimum threshold
2 = Alarm on the maximum threshold
3 = Retained alarm on the minimum threshold (reset is not automatic)
4 = Retained alarm on the maximum threshold (reset is not automatic).

rLY1/rLY2
Sets the functioning of the correspondent relay (if optional card):
0* = relay normally opened
1 = relay normally closed.

7.5 O.U.t. . **(RETRANSMITTED OUTPUT SETTING)**
tYPE
Sets the type of the retransmitted output:
1 = 0..10 V output 2* = 4..20 mA output
3 = 0..20 mA output 4 = integrator digital output.

7.6 b.U.S. . **(RS485 SETTINGS)**
Addr
Selects the slave Modbus address. Values from da 1 to 255. Default: 1.
PAr
Selects the parity control of the serial communication:
0* = None 1 = Even 2 = Odd.
dEL
Sets the response delay time. Values: 0 .. 255. 0* = no delay, 1 = 1 pause, etc.
bAUd
Sets the Baudrate :

0 = 1200	3 = 38400	6 = 1200
1 = 2400	4 = 57600	7 = 2400
2 = 4800	5 = 115200	8 = 14400

7.7 S.Y.S. . (SYSTEM)
COnt
Sets the display contrast:
Values from 1 (minimum contrast) to 20 (maximum contrast). Default: 10.
bUrn
Behaviour in case of Burn Out in PT100 or Thermocouple.
0* = Full scale indication
1 = Start scale indication.

7.8 d.F.L.t. (DEFAULT SETTING)
1 = Sets the default values for all the parameters.

8. SETTING EXAMPLES

8.1 Modification parameters examples
We are going to illustrate an example of HI-d parameter modification for a 6 digits model. In this example the digit to modify, that in the real case flashes, is bordered:

Once the parameter to modify has been selected, the set value is for example:

The pressure of the **DOWN** button entails:

DOWN has brought the digit to the maximum value.
Now the pressure of **OK/MENÙ** buttons entails the position shift of the digit to modify:

The pressure of the **UP** button entails:

that is the digit has been increased of a unit.
To set a negative value, place on the most significant digit by subsequent pressures of **OK/MENÙ** button :

By pressing the **DOWN** button:

The last digit is brought to the most negative value: -1.
By pressing the **DOWN** button :

Now the minus sign is obtained replacing the first non-useful zero of the set value.
By pressing the **OK/MENÙ** button the set value is confirmed:

A further pressure of the **OK/MENÙ** button, entails the return to the voice correspondent to the just modified parameter:

8.2 Integrator Setting examples
8.2.1 Example 1
To configure the integrator, access to I.n.t. . submenu and set opportunely the URLI parameter, fundamental for the correct integration.
Let's suppose that we want to obtain in one hour an integral value equal to 5000 (Imp/h) and that the mean value displayed in one hour is equal to 6,000 (correspondent to HI-d parameter value), then the value to set is:
5000*9999/6000=8332.5
Where 6000 is the value of HI-d without decimal point.
So we set:
URLI **= 08333**

8.2.2 Example 2: Integrator Setting for flow-rate meter
In this example we want to set the integrator for:
Display the thousands of accumulated liters.
Let's suppose that the mean instantaneous value (correspondent to HI-d parameter value) displayed in one hour is: **5 liters/seconds**.

Calculation of the integral value in one hour
If 5,000 liters/sec pass, **in 1 hour the instrument accumulates**:
Imp/h = 5 liters/sec * 3600 sec = 18000 liters = **18 thousands of liters.**

Valuation of the mean value displayed in one hour (HI-d **value without decimal point)**
If 5,000 liters/sec meanly pass, then the mean value displayed in 1 hour without decimal point is:
5000 (HI-d parameter value without decimal point)

Calculation of URLI
By inserting the calculated values on the generic formula on page 8:
URLI **= 18*9999/5000=360**