10. Set the operating mode

10.1 Select a configuration

10.1.1 Configuration description

***Note**: in the default Master configuration, the setpoint coincides with the maximum fan speed (menu **4: SETUP** > parameter **C4** = **hi**), and the controller automatically selects the sensor with the stronger signal (menu **4: SETUP** > parameter **C1** = **hi**).*

Configuration	Signal/Transducer	Type of control	Description
rs6-20, rs7-20, rs8-20	0–20 mA	**Slave**	They receive a voltage or current signal in input and replicate it proportionally to the analog **OUT** output and Modbus **COM1**. Regulation, alarms, and value display will always be in volt (rS-010) or milliampere (rS-20).
rs6-10, rs7-10, rs8-10	0–10 V dc		
rPr420	transducers with 4-20 mA output and mA reading	**Master**	It reads transducer values with current output. Regulation, alarms, and value display will always be in milliampere.
rPr015, rPr025, rPr030, rPr045,	transducers with 4-20 mA output and bar reading	**Master**	They read transducer values with current output with different scales and convert them into pressure values. Control and value display will always be in pressure (bar). While the minimum and maximum limit alarm on the inputs are in mA, regardless. ***Note**: if the signal is less than 4 mA, 0 bar will always appear on the display.*
rPu030	transducers with V dc output and bar reading	**Master**	It reads transducer values with voltage output and converts them into pressure values. Regulation and value display will always be in pressure (bar).
rUu-05, rUu-010	transducers with V dc output and V dc reading	**Master**	They read transducer values with voltage output. Regulation, alarms, and value display will always be in volt.
rtE-01, rtE-02	probe NTC 10 kΩ @ 25 °C/77 °F	**Master**	They read NTC sensor values and convert them to temperature values. Regulation, alarms, and value display will always be in temperature (° C). ***NOTICE**: use the rtE-02 configuration if the MEI-4 input expansion module is installed.*

10.1.2 Technical specifications of the configurations

Following are the specifications of each configuration:

***Note**: from version 8.0 of the DSV firmware, the temperature and pressure values can be viewed with Imperial units of measure (°F e psi). Therefore, where the text indicates the unit of measure available in °C, it is also available in °F, and where bar is indicated, psi is also available. For the conversion values, use the following formulas: °F = 32+ (°C x 9/5), psi = bar x 14.5.*

Configuration	Mode	IN1/IN2 input	No. default inputs	Signal/ Transducer/	Display	Setpoint	Proportional band
rs6-20, rs7-20, rs8-20	Slave	0–20 mA Ri= 100 Ω	1	0–20 mA	0–23.5 mA	-	-
rs6-10, rs7-10, rs8-10	Slave	0–10 V dc Ri= 10 kΩ	1	0–10 V dc	0–10 V dc	-	-
rPr420	Master	4–20 mA Ri= 100 Ω	2	4–20 mA	4–20 mA	14 mA	2.6 mA
rPr015	Master	4–20 mA Ri= 100 Ω	2	0–15 bar > 4–20 mA	0–15 bar	10.6 bar	2.4 bar
rPr025	Master	4–20 mA Ri= 100 Ω	2	0–25 bar > 4–20 mA	0–25 bar	17.0 bar	3.5 bar

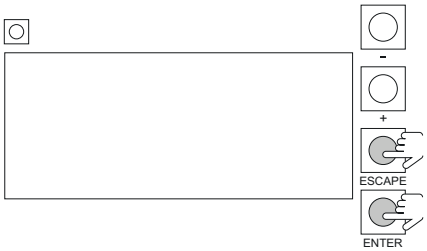
Configuration	Mode	IN1/IN2 input	No. default inputs	Signal/ Transducer/	Display	Setpoint	Proportional band
rPr030	Master	4–20 mA Ri= 100 Ω	2	0–30 bar > 4–20 mA	0–30 bar	17.0 bar	3.5 bar
rPr045	Master	4–20 mA Ri= 100 Ω	2	0–45 bar > 4–20 mA	0–45 bar	25.0 bar	5.2 bar
rUu05	Master	0–5 V dc Ri= 10 kΩ	2	0.5–4.5 V dc	0–5 V dc	2.9 V dc	0.8 V dc
rPu030	Master	0–5 V dc Ri= 10 kΩ	2	0–30 bar > 0–5 V dc	0–35 bar	17.0 bar	3.5 bar
rUu010	Master	0–10 V dc Ri= 10 kΩ	2	0–10 V dc	0–10 V dc	6 V dc	1.6 V dc
rtE-01 (default)	Master	NTC 10 kΩ @ 25°C	2	NTC 10 kΩ @ 25°C	from -30 to + 99 °C	45 °C	7.5 °C
rtE-02	Master	NTC 10 kΩ @ 25°C	2	NTC 10 kΩ @ 25°C	from 9.6 to 99 °C	45 °C	7.5 °C

10.1.3 Select a configuration

***NOTICE**: this deletes any previous change and restores all selected configuration default values.*

***Note**: follow this procedure also if there is a fault in displaying the parameters on the display: all selected configuration default values will be restored.*

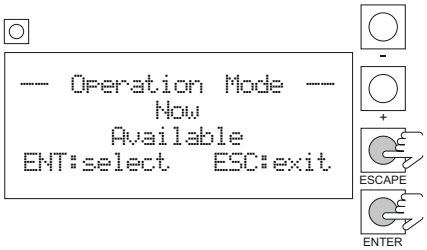
To change/restore a configuration:



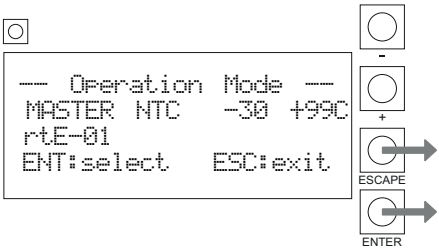
1. Simultaneously press and hold down the **ESCAPE** and **ENTER** keys.



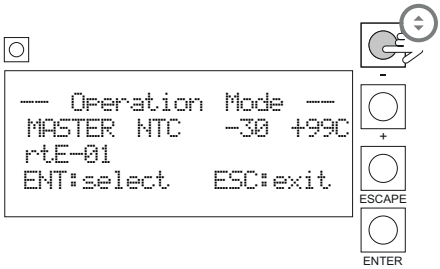
2. Press and hold down both keys, briefly press the **RESET** button (or turn the controller off and on).



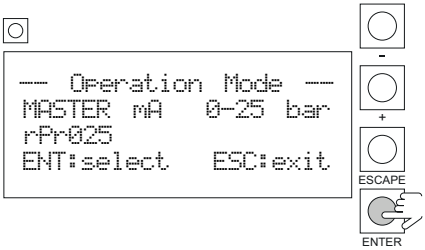
3. Holding down the two keys, wait for the "Operation mode now available" message.



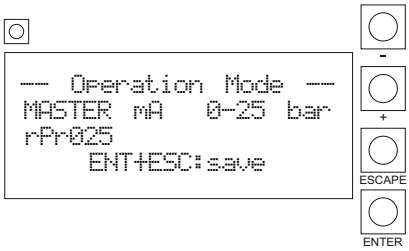
4. Simultaneously release the **ESCAPE** and **ENTER** keys: the last set configuration appears.



5. Press **-**(or **+**) to scroll through the settings.



6. Press the **ENTER** key for the selected configuration.



7. Continue as follows:
   - To confirm, press the **ENTER** and **ESCAPE** keys: the "Saving new values. Please wait" message appears that confirms that it is being saved. Then, the controller restarts and displays the home page.
   - To cancel and modify the selected configuration press the **ESCAPE** key once.
   - To return to the home page, press the **ESCAPE** key twice.

10.2 Editing parameters

10.2.1 Basic parameters

SW1-1 = *Off*

Parameter/ page	Description	Unit of measure	Minimum	Maximum	Default	Transducer/ sensor/signal	Configuration	Settings system
SP1/SP2	Setpoint, set 1/ set 2	°C	-15.0	+90.0	45.0	NTC 10k@ 25 °C	rtE-01	
		°C	+20.0	+90.0	45.0	NTC 10k@ 25 °C	rtE-02	
		mA	4.0	20.0	14.0	4–20 mA	rPr420	
		bar	0	15.0	10.6	0–15 bar > 4–20 mA	rPr015	
		bar	0	25.0	17.0	0–25 bar > 4–20 mA	rPr025	
		bar	0	30.0	17.0	0–30 bar > 4–20 mA	rPr030	
		bar	0	45.0	25.0	0–45 bar > 4–20 mA	rPr045	
		V dc	0	5.0	2.9	0.5–4.5 V dc	rUu-05	
		bar	0	30.0	17.0	0–30 bar > 0–5 V dc	rPu030	
		V dc	0	10.0	6.0	0–10 V dc	rUu010	

Parameter/ page	Description	Unit of measure	Minimum	Maximum	Default	Transducer/ sensor/signal	Configuration	Settings system
LNight	Maximum step for night limit	-	0	8	8	All	All	
LSpray	Set step with spray on	-	0	8	8	All	All	

10.2.2 Expert level parameters for set 1 and 2

SW1-1 = *On*

***Note**: parameters **SP1**, **SP2**, **Pb1**, and **Pb2** are only visible with the controller in Master mode.*

***Note**: in Master configurations, the dedicated setpoint for the external unit is the algebraic sum of the setpoint in use (**SP1** or **SP2**) and the setpoint for the external unit in use (**USP1** or **USP2**).*

***Note**: in Slave configurations, the dedicated setpoint for the external units is simply the setpoint for the external unit in use (**USP** or **USP2**).*

Parameter/ page	Description	Unit of measure	Minimum	Maximum	Default	Transducer/ sensor/signal	Configuration	Settings system
SP1/SP2	Setpoint, set 1/ set 2	°C	-15.0	+90.0	45.0	NTC 10k@ 25 °C	rtE-01	
		°C	+20.0	+90.0	45.0	NTC 10k@ 25 °C	rtE-02	
		mA	4.0	20.0	14.0	4–20 mA	rPr420	
		bar	0	15.0	10.6	0–15 bar > 4–20 mA	rPr015	
		bar	0	25.0	17.0	0–25 bar > 4–20 mA	rPr025	
		bar	0	30.0	17.0	0–30 bar > 4–20 mA	rPr030	
		bar	0	45.0	25.0	0–45 bar > 4–20 mA	rPr045	
		V dc	0	5.0	2.9	0.5–4.5 V dc	rUu-05	
		bar	0	30.0	17.0	0–30 bar > 0–5 V dc	rPu030	
		V dc	0	10.0	6.0	0–10 V dc	rUu010	
LNight	Maximum step for night limit	-	0	8	8	All	All	
LSpray	Set step with spray on	-	0	8	8	All	All	
Hi 1/ Hi 2	Maximum step limit, set 1 / set 2	-	0	8	8	All	All	
Lo 1/ Lo 2	Minimum step limit, set 1 / set 2	-	0	8	0	All	All	

Parameter/ page	Description	Unit of measure	Minimum	Maximum	Default	Transducer/ sensor/signal	Configuration	Settings system
di 1 / di 2 (*)	Differential (step amplitude), set 1 / set 2	°C	0.3	10	4.0	NTC 10k@ 25 °C	rtE-01	
		°C	0.3	10	4.0	NTC 10k@ 25 °C	rtE-02	
		mA	0.2	2.1	1.2	4–20 mA	rPr420	
		bar	0,1	1.6	1.2	0–15 bar > 4–20 mA	rPr015	
		bar	0.1	2.6	1.7	0–25 bar > 4–20 mA	rPr025	
		bar	0.2	3.1	1.7	0–30 bar > 4–20 mA	rPr030	
		bar	0.2	4.7	3.6	0–45 bar > 4–20 mA	rPr045	
		V dc	0.1	0.5	0.4	0.5–4.5 V dc	rUu-05	
		bar	0.2	3.1	1.7	0–30 bar > 0–5 V dc	rPu030	
		V dc	0.2	1.0	0.8	0–10 V dc	rUu010	
Sc1 / Sc2 (*)	Variance between steps, set 1 / set 2	°C	0.3	10	0.7	NTC 10k@ 25 °C	rtE-01	
		°C	0.3	10	0.7	NTC 10k@ 25 °C	rtE-02	
		mA	0.1	2.1	0.2	4–20 mA	rPr420	
		bar	0.1	1.6	0.2	0–15 bar > 4–20 mA	rPr015	
		bar	0.1	2.6	0.3	0–25 bar > 4–20 mA	rPr025	
		bar	0.1	3.1	0.3	0–30 bar > 4–20 mA	rPr030	
		bar	0.1	4.6	0.5	0–45 bar > 4–20 mA	rPr045	
		V dc	0.1	0.5	0.1	0.5–4.5 V dc	rUu-05	
		bar	0.1	3.1	0.3	0–30 bar > 0–5 V dc	rPu030	
		V dc	0.2	1.0	0.2	0–10 V dc	rUu010	

Parameter/ page	Description	Unit of measure	Minimum	Maximum	Default	Transducer/ sensor/signal	Configuration	Settings system
do 7_1 / do 7_2 (*)	Step 7 differential (step amplitude), set 1 / set 2	°C	0.3	10	4.0	NTC 10k@ 25 °C	rtE-01	
		°C	0.3	10	4.0	NTC 10k@ 25 °C	rtE-02	
		mA	0.2	2.2	1.3	4–20 mA	rPr420	
		bar	0.1	1.6	1.2	0–15 bar > 4–20 mA	rPr015	
		bar	0.2	2.6	1.7	0–25 bar > 4–20 mA	rPr025	
		bar	0.2	3.1	1.7	0–30 bar > 4–20 mA	rPr030	
		bar	0.2	4.7	3.6	0–45 bar > 4–20 mA	rPr045	
		V dc	0.0	0.5	0.4	0.5–4.5 V dc	rUu-05	
		bar	0.2	3.1	1.7	0–30 bar > 0–5 V dc	rPu030	
		V dc	0.2	1.0	0.8	0–10 V dc	rUu010	
So 7_1 / So 7_2 (*)	Step 7 variance, set 1 / set 2	°C	0.3	10	0.7	NTC 10k@ 25 °C	rtE-01	
		°C	0.3	10	0.7	NTC 10k@ 25 °C	rtE-01	
		mA	0.1	2.1	0.2	4–20 mA	rPr420	
		bar	0.1	1.6	0.2	0–15 bar > 4–20 mA	rPr015	
		bar	0.2	2.6	0.3	0–25 bar > 4–20 mA	rPr025	
		bar	0.1	3.1	0.3	0–30 bar > 4–20 mA	rPr030	
		bar	0.1	4.6	0.5	0–45 bar > 4–20 mA	rPr045	
		V dc	0.1	0.5	0.1	0.5–4.5 V dc	rUu-05	
		bar	0.1	3.1	0.3	0–30 bar > 0–5 V dc	rPu030	
		V dc	0.2	1.0	0.2	0–10 V dc	rUu010	

Parameter/ page	Description	Unit of measure	Minimum	Maximum	Default	Transducer/ sensor/signal	Configuration	Settings system
do 8_1 / do 8_2 (*)	Step 8 differential (step amplitude), set 1 / set 2	°C	0.3	10	4.0	NTC 10k@ 25 °C	rtE-01	
		°C	0.3	10	4.0	NTC 10k@ 25 °C	rtE-02	
		mA	0.2	2.2	1.3	4–20 mA	rPr420	
		bar	0.1	1.6	1.2	0–15 bar > 4–20 mA	rPr015	
		bar	0.2	2.6	1.7	0–25 bar > 4–20 mA	rPr025	
		bar	0.2	3.1	1.7	0–30 bar > 4–20 mA	rPr030	
		bar	0.2	4.7	3.6	0–45 bar > 4–20 mA	rPr045	
		V dc	0.0	0.5	0.4	0.5–4.5 V dc	rUu-05	
		bar	0.2	3.1	1.7	0–30 bar > 0–5 V dc	rPu030	
		V dc	0.2	1.0	0.8	0–10 V dc	rUu010	
So 8_1 / So 8_2 (*)	Step 8 variance, set 1 / set 2	°C	0.3	10	0.7	NTC 10k@ 25 °C	rtE-01	
		°C	0.3	10	0.7	NTC 10k@ 25 °C	rtE-02	
		mA	0.1	2.1	0.2	4–20 mA	rPr420	
		bar	0.1	1.6	0.2	0–15 bar > 4–20 mA	rPr015	
		bar	0.2	2.6	0.3	0–25 bar > 4–20 mA	rPr025	
		bar	0.1	3.1	0.3	0–30 bar > 4–20 mA	rPr030	
		bar	0.1	4.6	0.5	0–45 bar > 4–20 mA	rPr045	
		V dc	0.1	0.5	0.1	0.5–4.5 V dc	rUu-05	
		bar	0.1	3.1	0.3	0–30 bar > 0–5 V dc	rPu030	
		V dc	0.2	1.0	0.2	0–10 V dc	rUu010	
dE 1/ dE 2	Delay between two successive step changes, set 1 / set 2	s	0.1	60	2.0	All	All	
Ss 1 / Ss 2	Step activation split time, set 1 / set 2	s	0.4	5.0	0.5	All	All	

Parameter/ page	Description	Unit of measure	Minimum	Maximum	Default	Transducer/ sensor/signal	Configuration	Settings system
USP 1/ USP 2	Setpoint (RH %) for voltage output to external unit (spray unit) **OUT** , set 1 / set 2	mA	0	20.0	15.0	-	rS6-20	
							rS7-20	
							rS8-20	
		V dc	0	10	7.5	-	rS6-10	
							rS7-10	
							rS8-10	
		°C	-55.0	+55.0	-1.6	NTC 10k@ 25 °C	rtE-01	
		°C	-55.0	+55.0	-1.6	NTC 10k@ 25 °C	rtE-02	
		mA	-8.0	+8.0	-0.6	4–20 mA	rPr420	
		bar	-7.5	+7.5	-0.6	0–15 bar > 4–20 mA	rPr015	
		bar	-12.5	+12.5	-0.7	0–25 bar > 4–20 mA	rPr025	
		bar	-15	+15	-0.7	0–30 bar > 4–20 mA	rPr030	
		bar	-22.5	+22.5	-1.0	0–45 bar > 4–20 mA	rPr045	
		V dc	-2.5	+2.5	-0.2	0.5–4.5 V dc	rUu-05	
		bar	-15	+15	-1.0	0–30 bar > 0–5 V dc	rPu030	
		V dc	-5.0	+5.0	-0.5	0–10 V dc	rUu010	
UPb 1/ UPb 2	Proportional band (RH %) for voltage output to external unit (spray unit) **OUT**, set 1/ set 2	mA	0.5	20	4.2	-	rS6-20	
							rS7-20	
							rS8-20	
		V	0.2	10	2.1	-	rS6-10	
							rS7-10	
							rS8-10	
		°C	2.0	55.0	2.4	NTC 10k@ 25 °C	rtE-01	
		°C	2.0	55.0	2.4	NTC 10k@ 25 °C	rtE-02	
		mA	0.5	15.0	1.0	4–20 mA	rPr420	
		bar	0.5	15.0	0.8	0–15 bar > 4–20 mA	rPr015	
		bar	1.0	25.0	1.2	0–25 bar > 4–20 mA	rPr025	
		bar	1.0	30.0	1.2	0–30 bar > 4–20 mA	rPr030	
		bar	1.0	45.0	1.8	0–45 bar > 4–20 mA	rPr045	
		V dc	0.1	5.0	0.4	0.5–4.5 V dc	rUu-05	
		bar	1.0	30.0	1.5	0–30 bar > 0–5 V dc	rPu030	
		V dc	0.2	10.0	0.8	0–10 V dc	rUu010	

***Note** (*): In Slave mode, the step parameters are fixed and cannot be changed. The number of steps used (6, 7, or 8) depends on the slave configuration chosen, "Select a configuration" on page 60.*

10.2.3 Configuration parameters

SW1-1 = *On*

Note*: the values of these parameters are defined automatically by the set predefined configuration (see "Select a configuration" on page 60). They can be singularly edited according to need.*

Parameter/ page	Description	Possible values	Default	Configuration	Settings system
C0	Operating modes and number of inputs used	**GP1**: Slave controller that uses one input **GP2**: Slave controller that uses two inputs	GP2	rS-010, rS-020	
		r1: Master proportional controller that uses one input (IN1) **r2**: Master proportional controller that uses two inputs (IN1 and IN2)	r2	rtE-01, rtE-02, rPr420, rPr015, rPr025 rPr030, rPr045, rUu-05, rPu030, rUu010	
C1	Input to use. The other input is still visible from the display or from Modbus port (input selection)	■ **oFF**: always uses input **IN1** With **C0** = **GP1, r1** ■ **hi**: always uses the input with the higher value ■ **Lo**: always uses the input with the lower value	hi	All	
C2	**IN1** and **IN2** type input	Automatic settings	-	-	
C3	Display value conversion	Automatic settings	-	-	
C4	Setpoint position	**oFF**: Slave controller	oFF	rS 010 , rS 020	
		hi: Master controller, setpoint at **Pb** high end. **Lo**: Master controller, setpoint at low end of **Pb**.	hi	rtE-01, rtE-02, rPr420, rPr015, rPr025 rPr030, rPr045, rUu-05, rPu030, rUu010	
C5	Step switching mode	**no jump**: execution in sequence of all steps **jump**: jumps directly to the optimum step for control	no jump	All	

Parameter/ page	Description	Possible values	Default	Configuration	Settings system
C6	Input **IN3** functions	**Nothing**: not connected / reading value / switching parameter set **SP from IN3**: set setpoint by external signal 0–10 V. **Floating SP**: adjust setpoint as a function of the external temperature. **Slave Safety**: control in Slave mode (Slave safety)	Nothing	rtE-01, rtE-02, rPr420, rPr015, rPr025 rPr030, rPr045, rUu-05, rPu030, rUu010	
C7	Relay **RL1** management	**RL1=off-> error**: RL1=off: relay Off when the controller is in fail status. **RL1=off-> error + S2**: RL1=off: relay Off when the controller is in fail status and contract S2 is closed. **RL1=off-> error + S2 + OFF**: RL1=off: relay Off when the controller is in fail status, contract S2 is closed, and the speed command is zero.	RL1=off-> error	All	
C8	**OUT_1** analog output settings	**SLAVE 0-10 V**: command to Slave unit with 0–10 V dc, copies the fan controller command **SPRAY 1-10 V**: command to Water-Spray unit 1–10 V dc with specific setpoint and proportional band. **USP-DIR 0-10 V**: command to motorized actuator with 0–10 V dc input with specific setpoint and proportional band. **USP-REV 10-0 V**: reverse control to motorized actuator with input 10–0 V dc with specific setpoint and proportional band **SLAVE 10-0 V**: reverse command to Slave unit with 10–0 V dc input, copies the controller command.	SLAVE 0-10 V	All	
C9	**OUT_2** analog output settings		SPRAY 1-10 V	All	

***Note**: parameters **C2** and **C3** are set automatically as a function of the predefined configuration chosen and cannot be modified.*

10.2.4 C0, C1 and C4 parameter combinations for each configuration

Configuration	C0	C1	C4
rS-010, rS-020	**GP2 (default)**	**Hi**	**oFF**
		Lo	**oFF**
	GP1	**oFF**	**oFF**
rtE-01, rtE-02, rPr420, rPr015, rPr025 rPr030, rPr045, rUu-05, rPu030, rUu010	**r2 (default)**	**Hi**	**Hi**
			Lo
		Lo	**Hi**
			Lo
	r1	**oFF**	**Hi**
			Lo

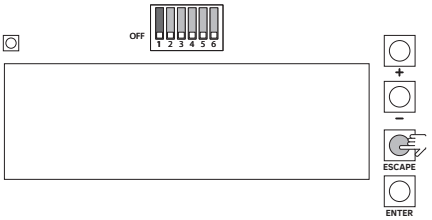
10.2.5 Parameters for Modbus communication with PC-BMS

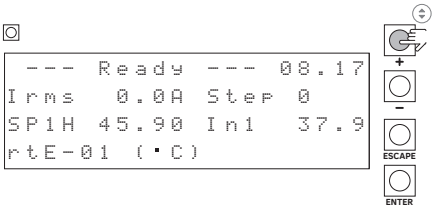
"Modbus" page

***Note**: the parameters for Modbus communication can always be edited.*

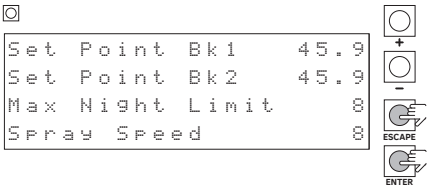
Parameter/ page	Description	Unit of measure	Minimum	Maximum	Default	Settings system
MBaddr	Controller Modbus address	-	1	247	247	
MBrate	Communication speed ■ **4800** ■ **9600** ■ **19200** (default) ■ **38400**	baud	4800	38400	19200	
MBtype	Communication mode ■ **8b+1s NO p.**: 8 bit, no parity, 1 stop bit ■ **8E1+1s EVEN p.**: 8-bit, even parity, 1 stop bit (default) ■ **8b+1s ODD p.**: 8 bit, odd parity, 1 stop bit	-	-	-	8b+1s EVEN p.	

10.2.6 Edit a basic, Modbus and internal clock parameter



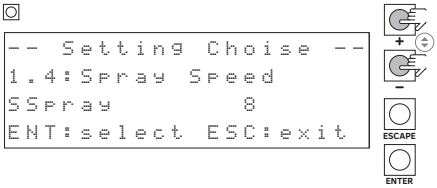


1. Leave switch 1 of DIP switch **SW1 OFF** and press the **ESCAPE** key.
2. Press **+** (or **-**) to scroll through the parameters and go to the next page.

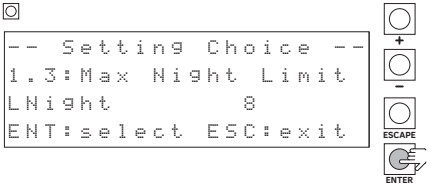


3. On the page of basic parameters, press the **ESCAPE** and **ENTER** keys at the same time: the page for editing the first parameter is displayed.

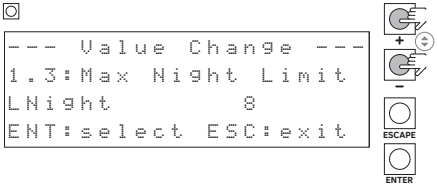
   ***Note**: if the "Function reserved to Expert mode" message is displayed, the parameters on the page can not be edited using this procedure.*



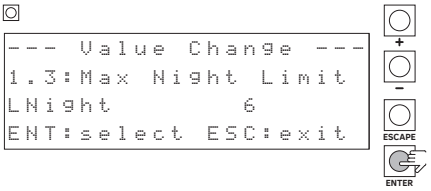
4. Press **+** (or **-**) to scroll through the parameters on the page.



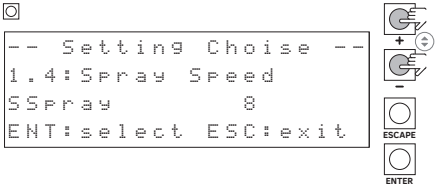
5. Press the **ENTER** key at the parameter of interest.



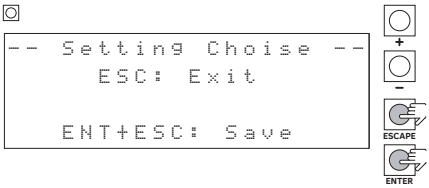
6. Press **+** (or **-**) to edit the selected parameter value.



7. Continue as follows:
   - To save the value, press the **ENTER** key: the value is saved in the volatile memory.
   - To cancel the change, press the **ESCAPE** key: it returns to step 3.

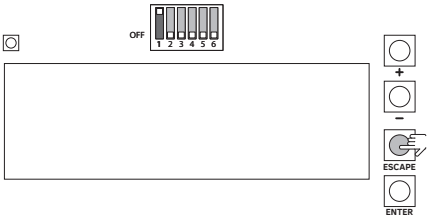


8. Continue as follows:
   - To edit the other parameters in the same submenu, repeat the procedure in step 4.
   - Otherwise, press the **ESCAPE** key.

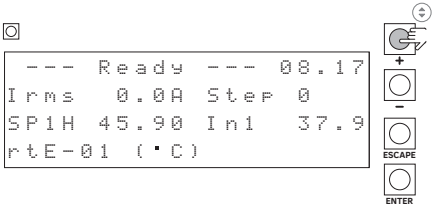


9. Continue as follows:
   - To save the changes made, press the **ENTER** and **ESCAPE** keys: the "Saving new values Pleas wait" message appears that confirms the saving is in progress. Then, the home page is displayed.
   - To cancel the changes, press the **ESCAPE** key: the "Restoring old values Change values discarded" message is displayed, informing the operator that the previous values have been restored and then the home page is displayed.

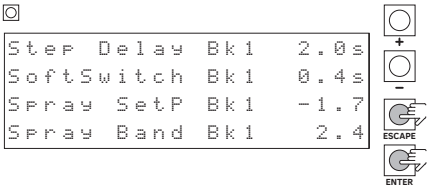
10.2.7 Edit any parameter



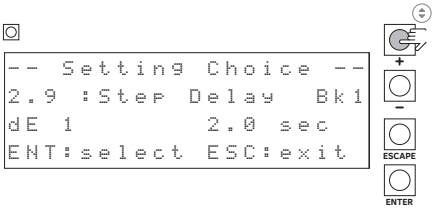
1. Leave switch 1 of DIP switch **SW1 OFF** and press the **ESCAPE** key.



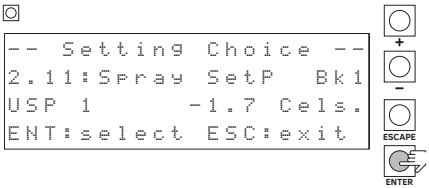
2. Press **+** (or **-**) to scroll through the parameters and go to the next page.



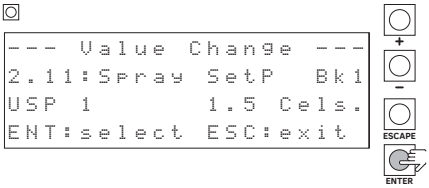
3. On the page of the parameter of interest, press the **ESCAPE** and **ENTER** keys at the same time: the page for editing the first parameter is displayed.



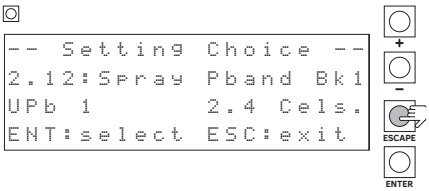
4. Press **+** (or **-**) to scroll through the parameters on the page.



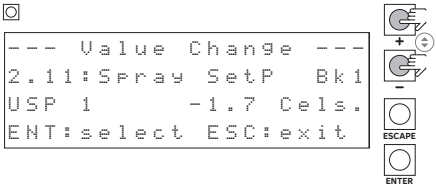
5. Press the **ENTER** key at the parameter of interest.



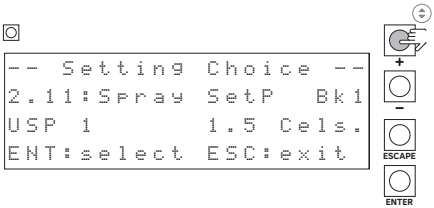
7. Continue as follows:
   - To save the value, press the **ENTER** key: the value is saved in the volatile memory.
   - To cancel the change, press the **ESCAPE** key: it returns to step 3.



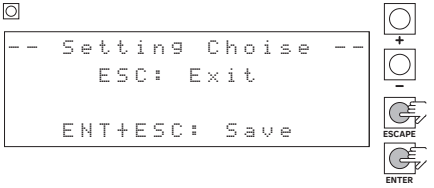
9. Press the **ESCAPE** key to exit.



6. Press **+** (or **-**) to edit the selected parameter value.



8. To edit other parameters on the same page, repeat the procedure in step 4.



10. Continue as follows:
    - To save the changes made, press the **ENTER** and **ESCAPE** keys: the "Saving new values Pleas wait" message appears that confirms the saving is in progress. Then, the home page is displayed.
    - To cancel the changes, press the **ESCAPE** key: the "Restoring old values Change values discarded" message is displayed, informing the operator that the previous values have been restored and then the home page is displayed.