NUOVA FIMA

Industrial instrumentation for Pressure and Temperature

ENG

User guide

MULTIFUNCTION DIGITAL PRESSURE INSTRUMENT SDM

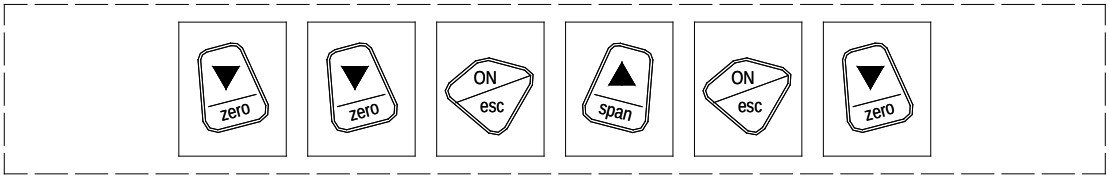
MI-SDM-ENG-600mA_1 11/2011

NUOVA FIMA
Via C. Battisti, 59/61 – 28045 INVORIO (No) – Italy
Tel. +39 0322 253200 – Fax +39 0322 253232
www.nuovafima.com – e-mail: info@nuovafima.com

PASSWORD

ENTRANCE PASSWORD

ACCESS PASSWORD TO THE INSTRUMENT MENU'- SEE MENÙ 62 PAGE 52

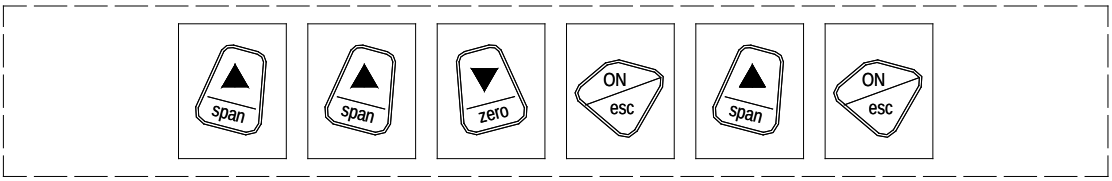


Attention

Password established by the constructor and available for the user

CALIBRATION PASSWORD

ACCESS PASSWORD TO THE CALIBRATION MENU'- SEE MENÙ 2 PAGE 23



Attention

Password established by the constructor and not removable

Index

1. Introduction

1.1 Important information

Please carefully read this information before the installation and use of the instrument. Keep it in a safe and accessible place for every user.

The safety level of the instrument depends on the chosing the correct application, the proper installation of the instrument and by following the maintenance procedures established by the manufacturer.
Technicians in charge of the instrument selection, installation and maintenance should be able to understand if the instruments condition could affect its function and thereby, lead to any premature damage or breaking.
It is essential that these procedures are included in the plants regulations and should be carried out by a qualified staff.
Any improper use could damage the instrument, causing breakage and possible hazards to the staff and to the plant.
In order correctly choose the right instrument it is highly recommended to reference the most recent catalogue sheets available on-line at **www.nuovafima.com**

CE

In accordance with directive	Standards of reference: EN 61326
EMC 2004/108/CE – PED 97/23/CE	IEC 60770 – IEC 61298-2

1.2 Safety information

- The manufacturer disclaims all responsibility in case of damages caused by the improper use of the product and by the non-respect of the instructions reported in this manual.
- Follow carefully the specific safety rules in case of measuring oxygen pressure, acetylene, inflammable or toxic gas or liquids.
- Disconnect the instruments only after depressurization of the system.
- The process fluids residuals in the disassembled instruments could affect people, the environment and the system. It is highly recommended to take proper precautions.

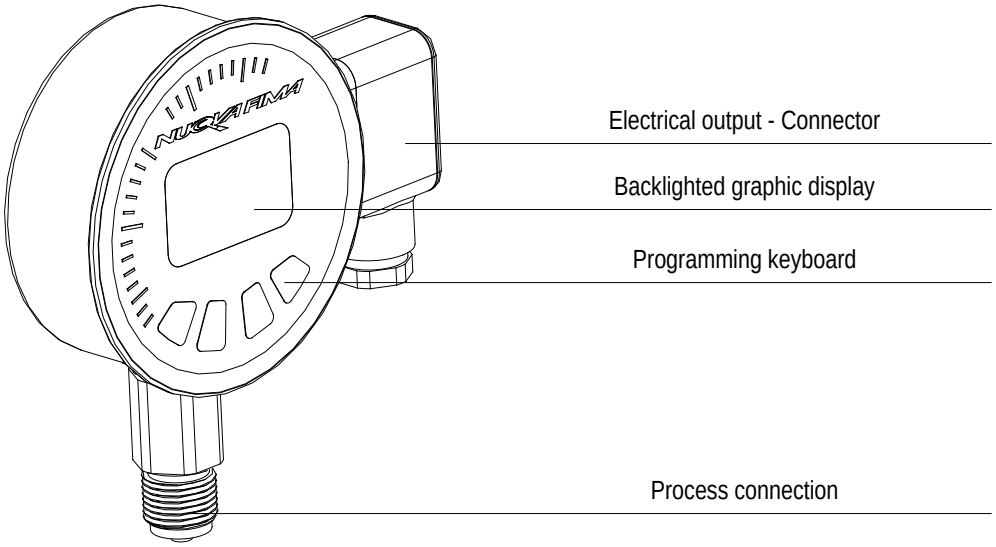
- Before installation be sure that the right instrument has been selected following the working conditions and in particular the range, the working temperature and the compatibility between the material used and the process fluid.
- This manual does not concern the instruments conforming to standard 94/9/CE (ATEX).
- The product warranty is no longer valid in case of non-authorized modifications and of wrong use of the product.
- The user is totally responsible for the instrument installation and maintenance.
- Handle and carefully stock the instrument used for toxic or inflammable liquids measurement

2. Product description

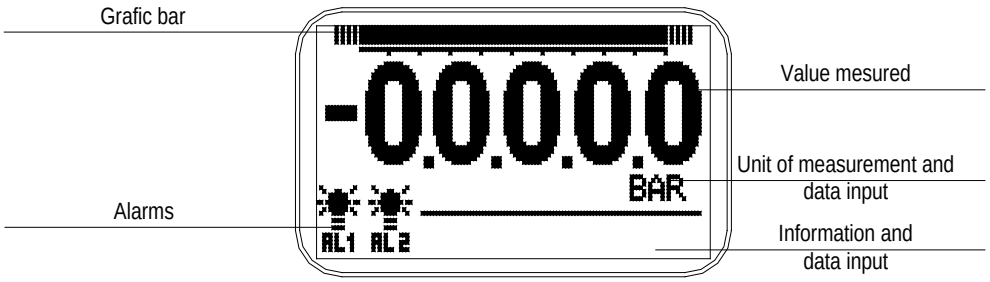
2.1 Main instrument feature

The digital multifunction instrument SDM can be used to measure and to control pressure. Thanks to a wide choice of scale ranges and processes connection it can be used in the following industrial sectors: food industry, canning industry pharmaceutical, petrochemical, conventional plants.

The instruments components are:



2.2 Display



Graphic bar

The graphic bar shows the zero point and the calibration full scale for the instrument. The segment extension of the graphic bar displayer shows the zero and the full scale range crossing of the instrument.

Value measured

Viewing of pressure value measured with resolution from 1 to 5 digits

Unit of measurement and setting menu

Viewing of unit of instrument calibration measurement and dialogue window of setting menus
The following are available

- unit of pressure - BAR,mBAR,AT,KPA,MPA,PSI,KG/CM2,MH2O,CMH2O,MMH2O,MMHG,INHG
- unit of measurement not for pressure - MM,M,FEET,INCH,L,KG,T,M3,GAL,LB,%

Information and data input

Viewing of information and data entry dialogue window:

- minimum and maximum
- ambient temperature, minimum temperature and maximum temperature
- analogue output signal

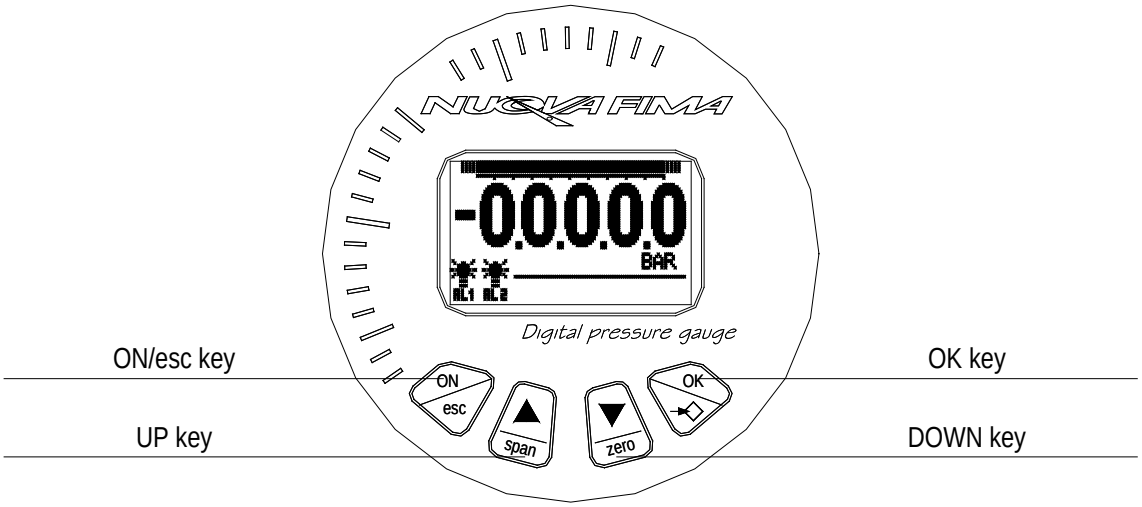
Alarms

Viewing of status of alarm thresholds AL1 and AL2

Setting available:

- Hysteresis
- Window

2.3 Programming keypad



ON/esc key

- Exits the menu or submenu
- Enters the settings menu when pressed a the same time as OK

OK key

- Confirms the data entered and alters the instrument settings
- Enters settings menu pressed at the same time as esc

UP and DOWN keys

- Keys to move in order to select the desire function
- increase (SU) and decreases (GIU') the value entered

3. Technical data

3.1 Ranges

Nominal range	Minimal extension scale	Set zero	Offset	Overpressure	Breakage
-0,1…0,4 bar	20%	-0,1…0 bar	±20%	0,8 bar	1,2 bar
-0,4…1,6 bar	20%	-0,4…0 bar	±10%	3,2 bar	4,8 bar
-1…6 bar	20%	-1…0 bar	±8%	12 bar	18 bar
-1…16 bar	20%	-1…0 bar	±4%	32 bar	48 bar
-1…40 bar	20%	-1…0 bar	±2%	80 bar	120 bar
-1…100 bar	20%	-1…0 bar	±2%	200 bar	300 bar
-1…250 bar	20%	-1…0 bar	±2%	375 bar	500 bar
-1…400 bar	20%	-1…0 bar	±2%	600 bar	800 bar
-1…1000 bar	50%	-1…0 bar	±2%	1100 bar	1200 bar
-1…1600 bar	50%	-1…0 bar	±2%	1700 bar	1800 bar

3.2 Features

Electrical feature

Analogue signal on output	*4…20mA, with separate power source (3 wires)*
Electrical connection	*Coupling cable box in accordance with VDE regulations, with pigtail outlet or screened cables ø7…13mm. Protection against inverstion of polarity and short-circuit*
Alarm thresholds	*n°2, PNP o NPN, programmable*
Input	*Power supply 11…30 VDC*

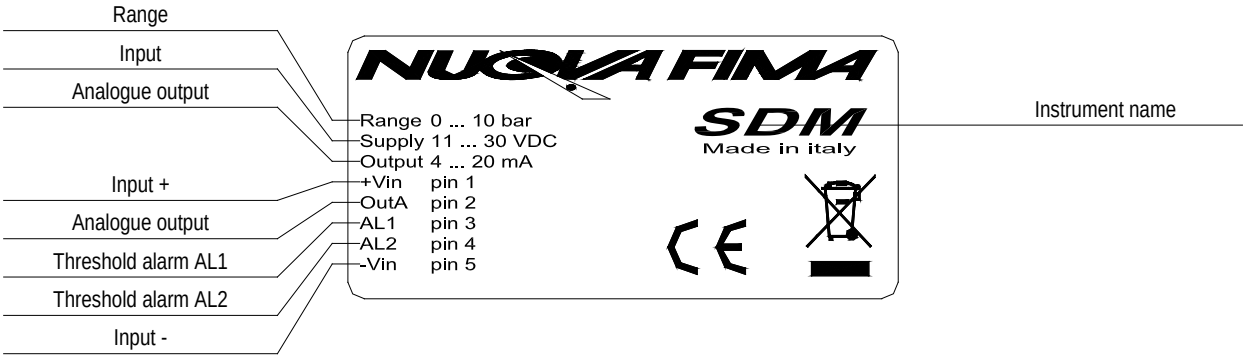
Mechanical features

Process connection	*Threaded process connection 1/2” Gas o 1/2” NPT In stainless steel AISI 316 L*
Sensor	*Piezoresistive for range ≤400 bar with o-ring in NBR (optional: FPM-EPDM-CR) thin film in stainless steel for range >400 bar*
Case	*Stainless steel, aired for pressure ≤100bar*
Ring	*Stainless steel*
Keyboard	*Polyester*
Protection degree	*IP 65 according IEC 529/ EN 60529-1*

Temperature of use

Ambient temperature	*-4…+158°F (-20…70°C)*
Process fluid temperature	*-4…+176°F (-20…80°C)*
Compensated temperature range	*+32…+176°F (0…80°C)*

3.3 Label



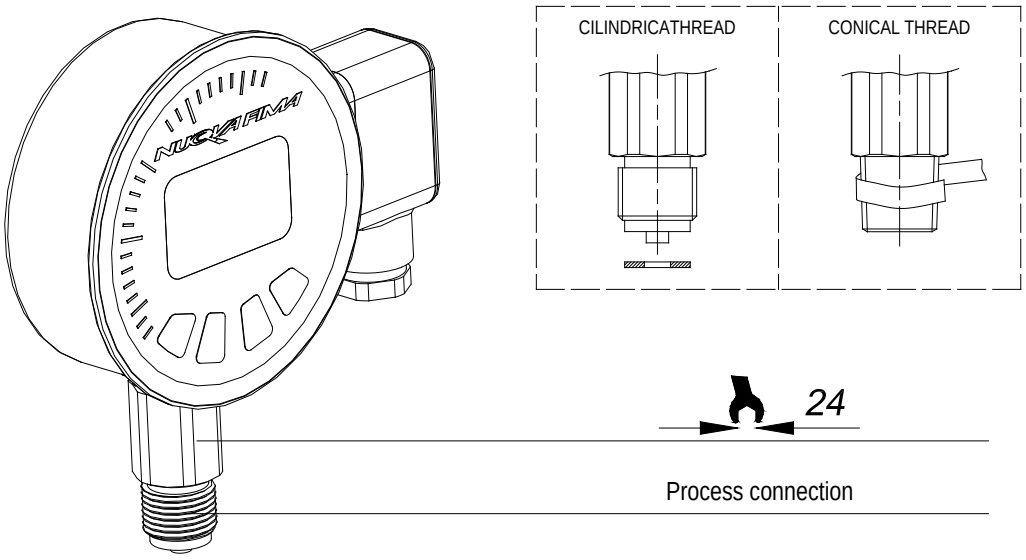
4. Installation

4.1 Process connection

Tighten the threaded portion of the instrument, applying a torque (max 30Nm) using a suitable spanner on the hexagonal part of the process connector, without applying force to the case with your hands.

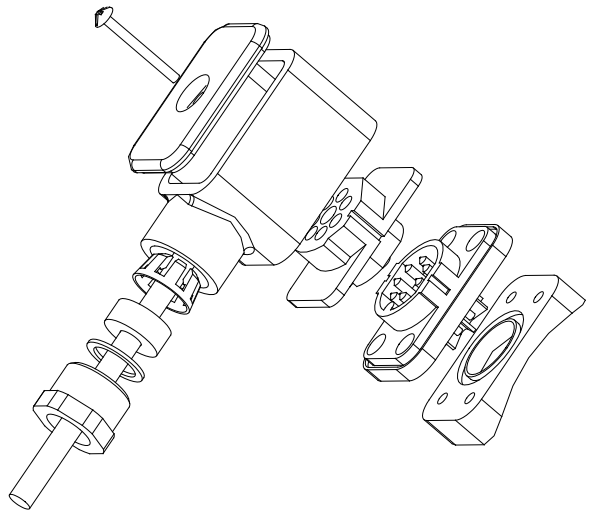
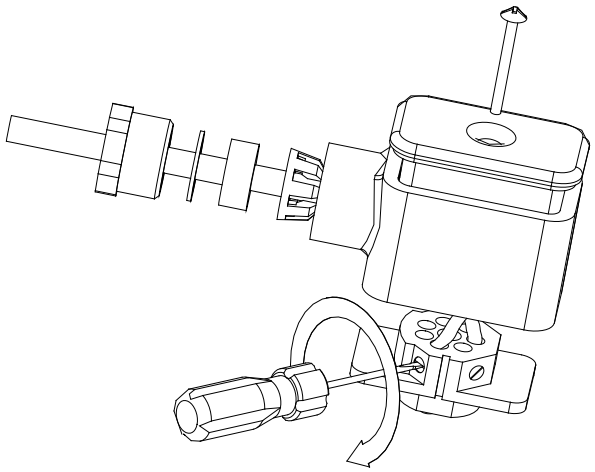
For attachments to the process with cylindrical threads (GAS – metric), a head gasket made from material compatible with measurement fluid or gas, must be used. If the attachment thread is conical.

If the attachment thread is conical, the seal should, instead, be created by simply tightening the grip.
To improve thread hold a PTFE strip of the male thread.



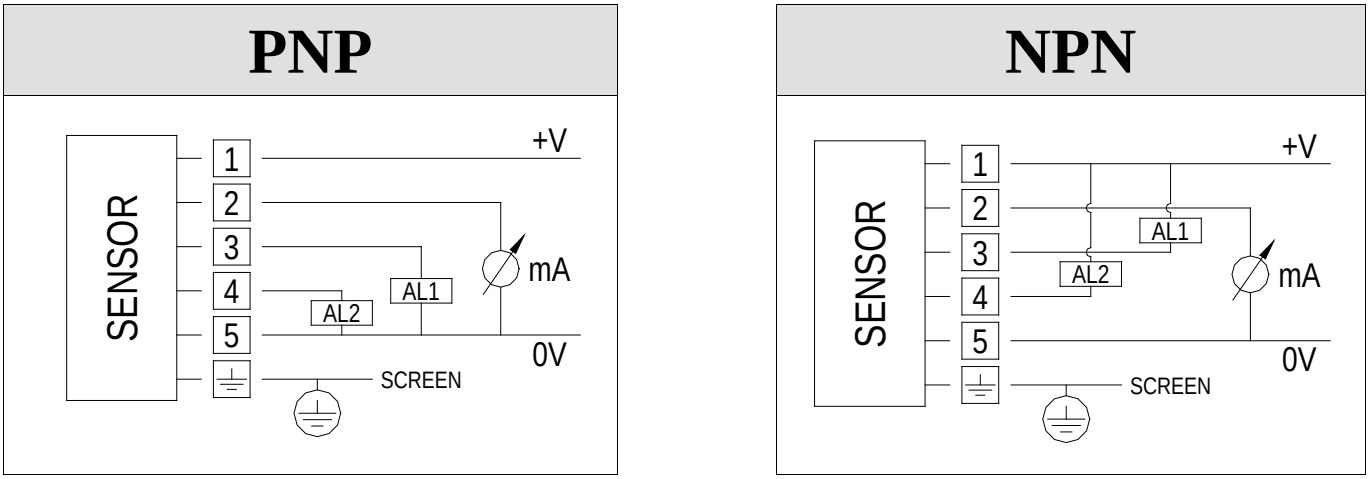
If the instrument is equipped with a fluid separator, the grip by which to tighten the attachment, must be carried out on the latter and not on the instrument itself, as this may affect calibration.

4.2 Electric connection

	1 – Dismount the connector as in the figure
	2 – Connect cable (see figure) remount the connector and fix it on the instrument

The IP degree according to the normative EN 60529-1:1992 is guaranteed only if the female connector, together with the connection cable, is mounted on the instrument and its components are mounted correctly

4.3 Connection electrical diagram



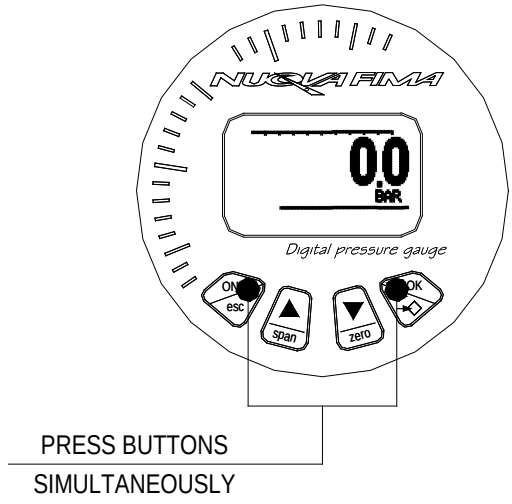
Input	*11…30 VDC*
Analogue input	*4…20mA*
Analogue output charge	$R_L \leq (V_{in}-11)/0,02$
Alarm thresholds	*PNP-NPN*
Thresholds Energy capacity	*2 x 600mA**
Absorbed energy	*< 100mA + thresholds energy*

*single function PNP o NPN function available only

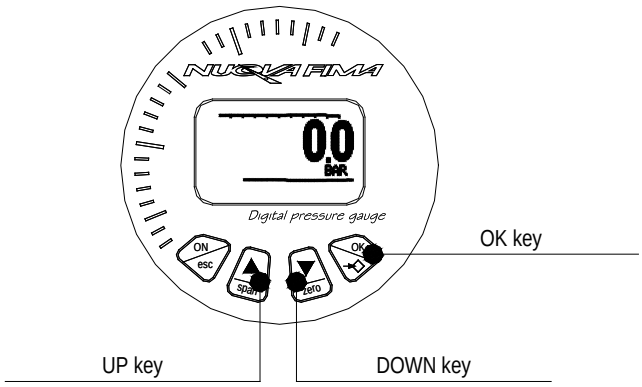
Use shielded cable

5. Calibration and start-up

5.0.1 Main menu entry



To enter the main menu press simultaneously ON/esc and OK as shown in the picture

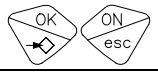


Use UP and DOWN keys to select the desired menu page, as shown in the figure, and press OK

5.0.2 Menu screen for pressure gauge set up

Instrument menu entry through password if activated, after digit confirm it through "PASSWORD OK" at page 3 – for activation see page 60

Press buttons simultaneously ON/esc and OK



Instrument menu entry through password if activated, after digit confirm it through **"PASSWORD OK" at page 3 – for activation see page 52**

Use UP and DOWN keys to select the desired sub-menu

1	DISPLAY SET	11 DIGIT RES	Page 15
		12 LCD INTEGR	Page 16
		13 SECOND MEAS	Page 17
		14 TEMPERATURE	Page 18
		15 INIT MEASURE	Page 19
		16 BACKLIGHT	Page 20
		17 CLEAR ERROR	Page 21

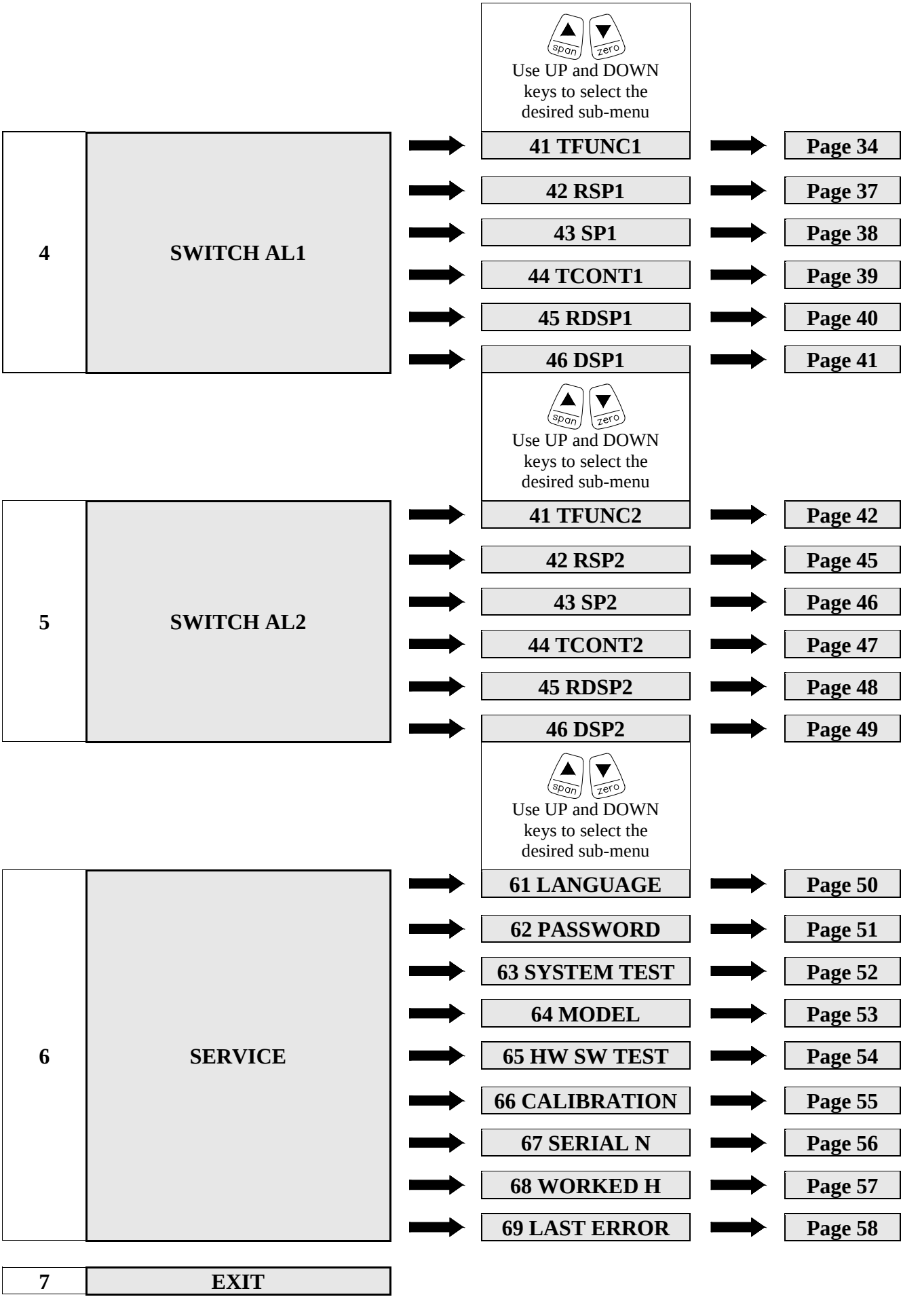
Calibration menu entry
Entry calibration password
SEE PAGE 3

Use UP and DOWN keys to select the desired sub-menu

2	USER CALIB	21 CAL PRESS	Page 22
		22 CAL NO PRESS	Page 24
		23 REINIT ALL	Page 26

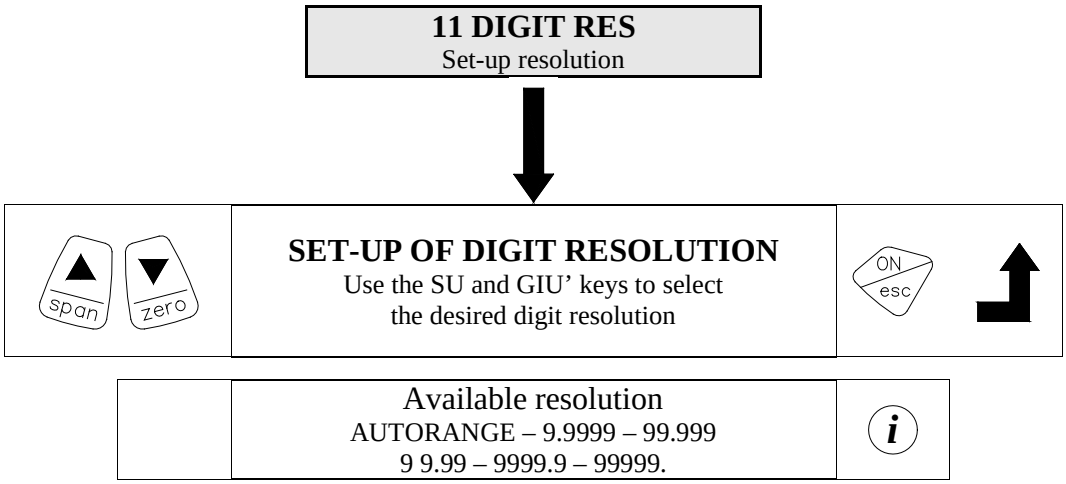
Use UP and DOWN keys to select the desired sub-menu

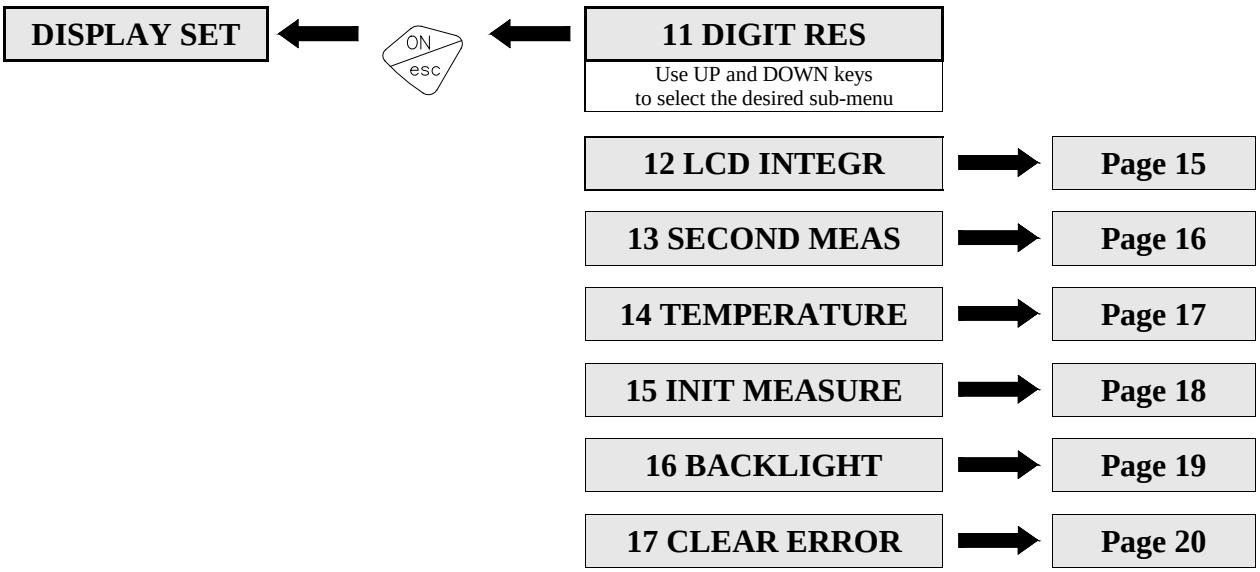
3	ANALOG OUT MA	31 OUT TYPE	Page 30
		32 LIMIT LOW	Page 31
		33 LIMIT HIGH	Page 32
		34 OUT INTEGR	Page 33


span
zero
Use UP and DOWN keys to select the desired sub-menu
4
SWITCH AL1
41 TFUNC1
Page 34
42 RSP1
Page 37
43 SP1
Page 38
44 TCONT1
Page 39
45 RDSP1
Page 40
46 DSP1
Page 41
span
zero
Use UP and DOWN keys to select the desired sub-menu
5
SWITCH AL2
41 TFUNC2
Page 42
42 RSP2
Page 45
43 SP2
Page 46
44 TCONT2
Page 47
45 RDSP2
Page 48
46 DSP2
Page 49
span
zero
Use UP and DOWN keys to select the desired sub-menu
6
SERVICE
61 LANGUAGE
Page 50
62 PASSWORD
Page 51
63 SYSTEM TEST
Page 52
64 MODEL
Page 53
65 HW SW TEST
Page 54
66 CALIBRATION
Page 55
67 SERIAL N
Page 56
68 WORKED H
Page 57
69 LAST ERROR
Page 58
7
EXIT

5.1 DISPLAY SET

5.1.1 DIGIT RESOLUTION – Set-up of digit resolution





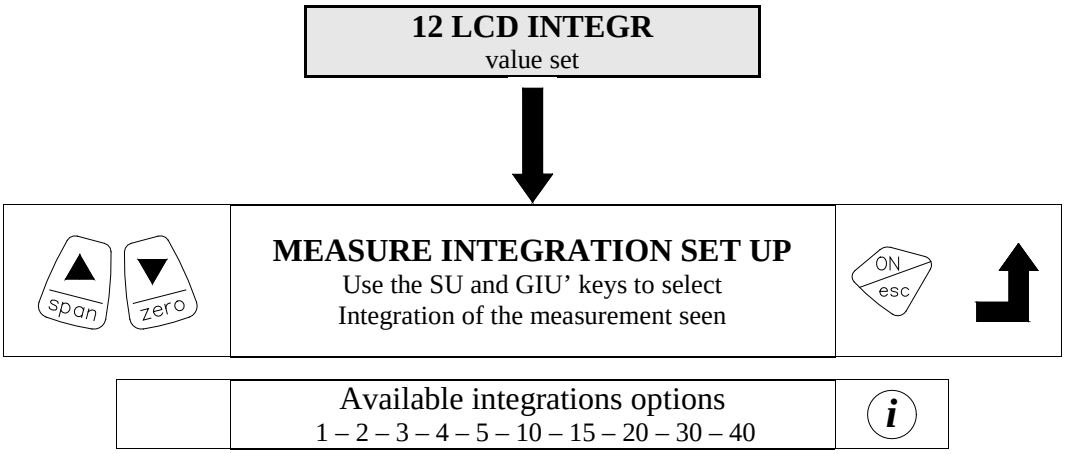
i Digit resolution

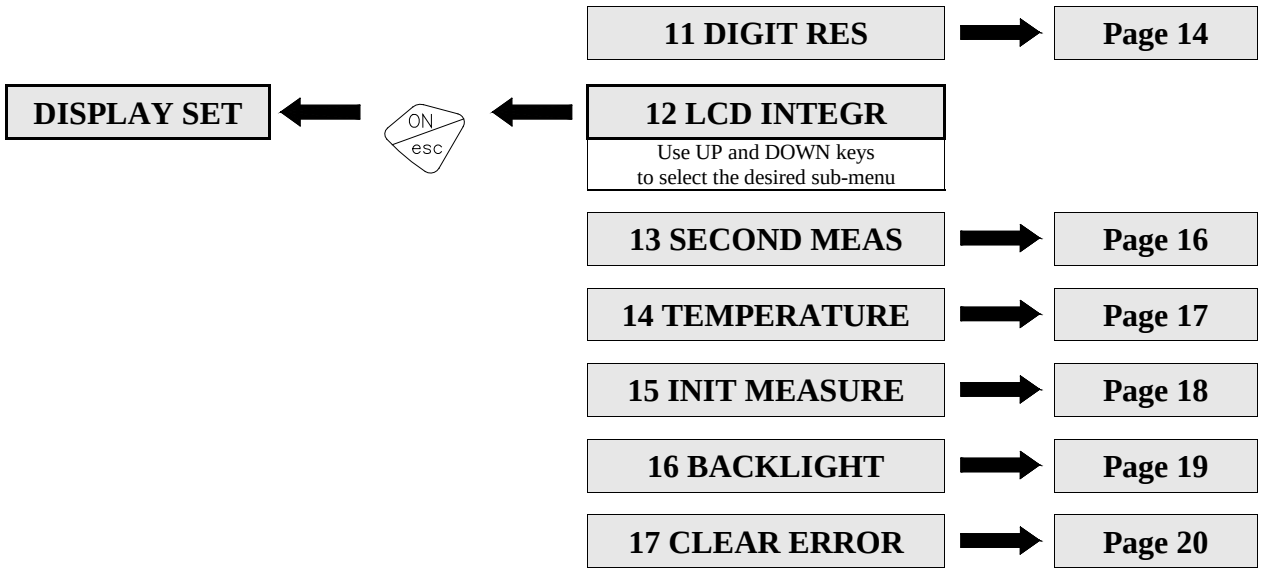
Available setup options

AUTORANGE	Automatically sets the decimal digit after the point
9.9999	Four digits after point
99.999	Three digits after point
999.99	Two digits after point
9999.9	One digit after point
99999.	No digit after point

5.1 DISPLAY SET

5.1.2 LCD INTEGR – Measure integration set up



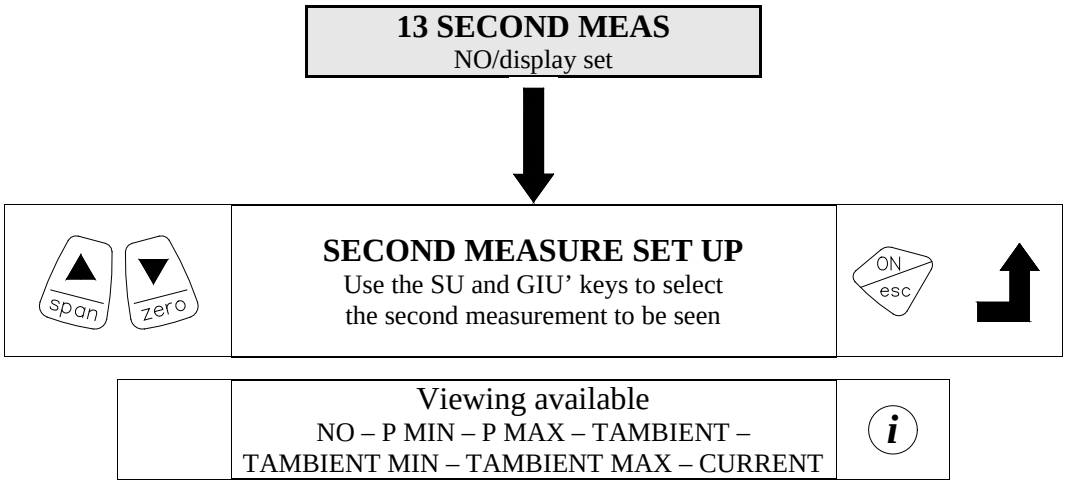


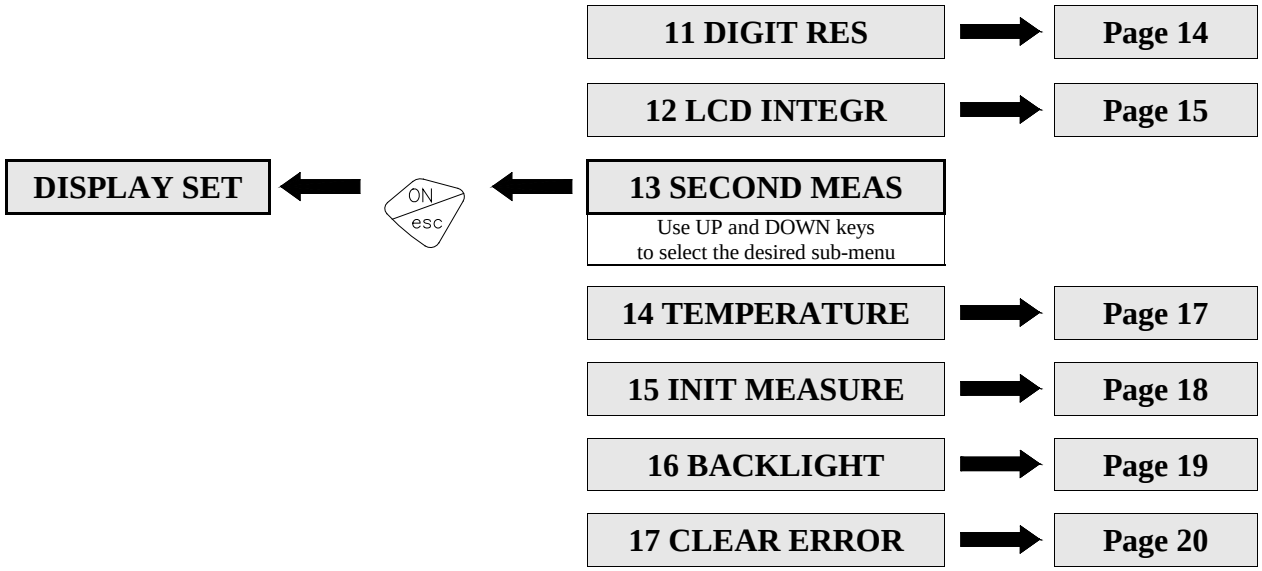
i Display integration

By selecting one of the values available, the update time of the measurement seen is increate or decreased

5.1 DISPLAY SET

5.1.3 SECOND MEAS – Second measure display set up





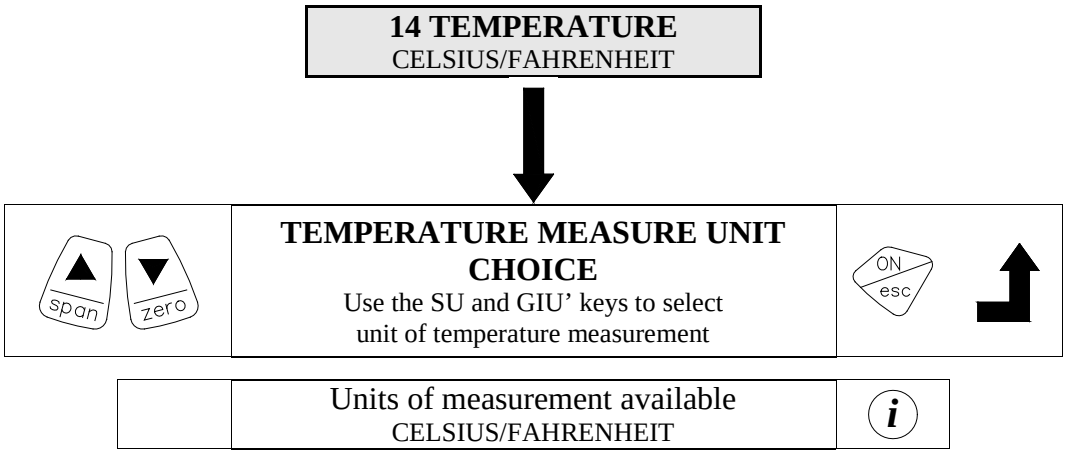
i Viewing of second measurement

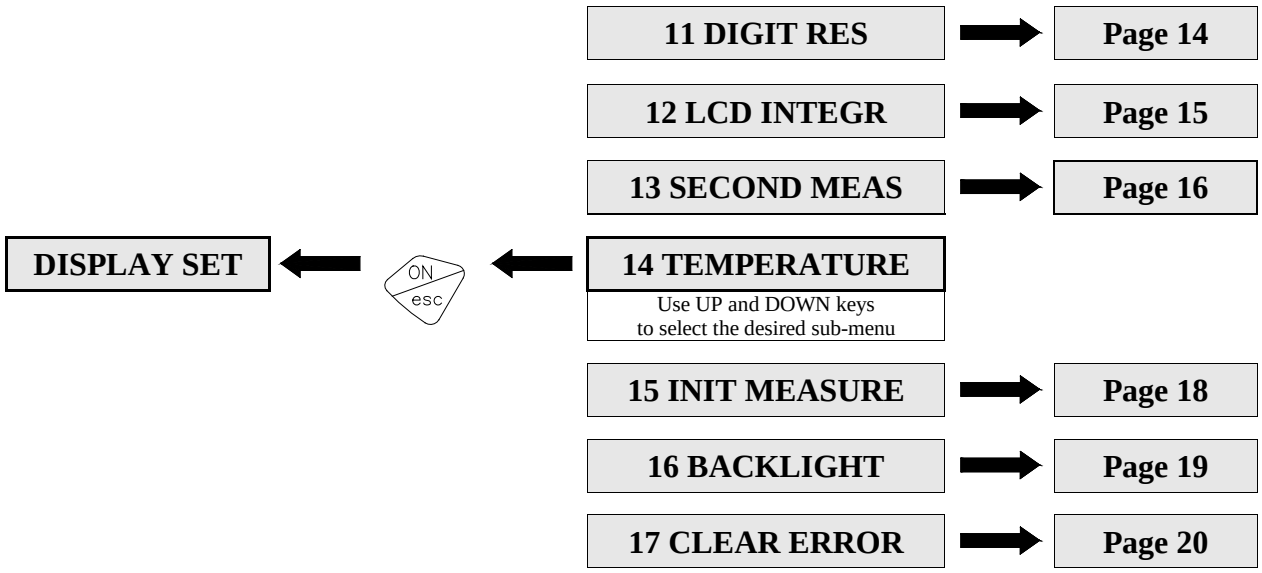
Viewing available

NO	No measure displayed
P MIN	Measure minimum pressure
P MAX	Measure maximum pressure
T AMBIENT MAX	Minimum ambient temperature measured
T AMBINET MAX	Maximum ambient temperature measured
CURRENT	Electrical Energy measure

5.1 DISPLAY SET

5.1.4 TEMPERATURE – Temperature measure unit choice





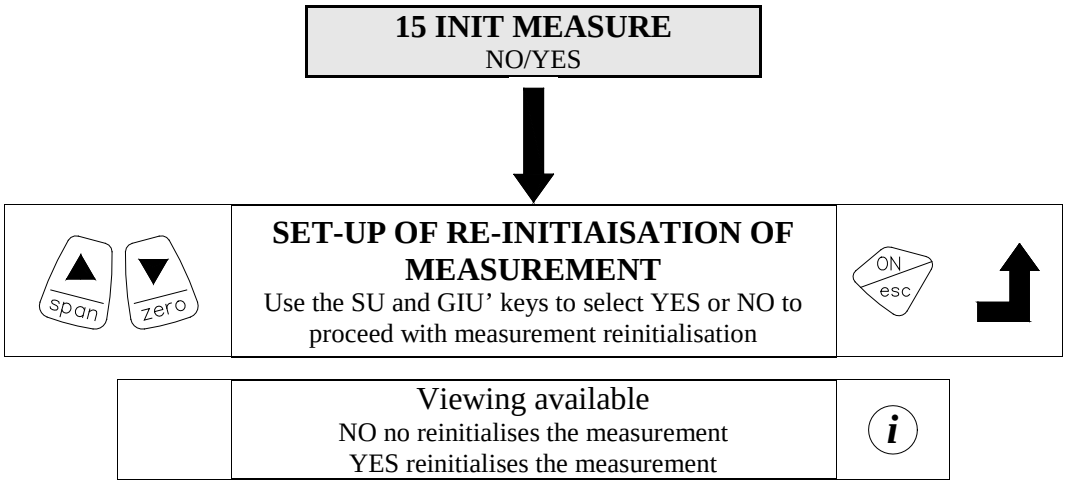
i Temperature measure unit choice

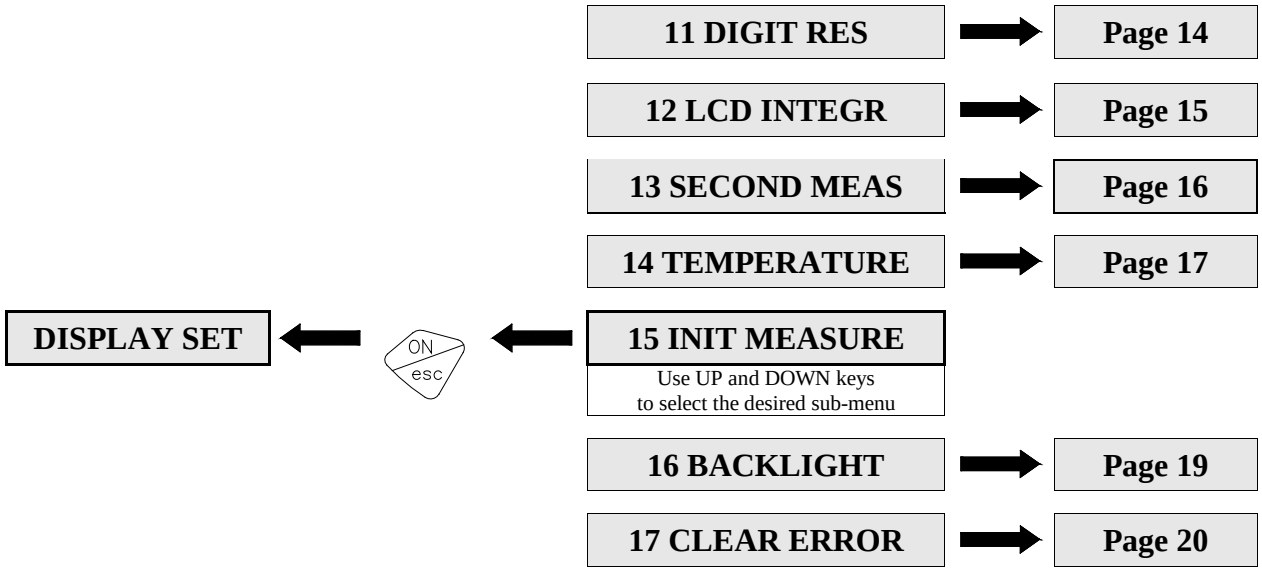
Unit of measurement available Celsius – Fahrenheit

Celsius (T°F-32)x5/9 **Fahrenheit 9/5xT°C+32**

5.1 DISPLAY SET

5.1.5 INIT MEASURE – Set-up of re-initialisation of measurement



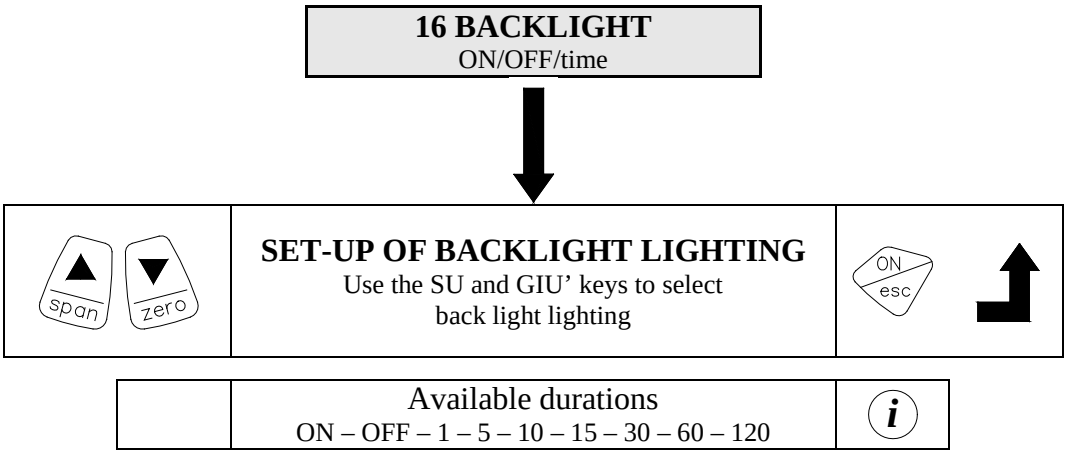


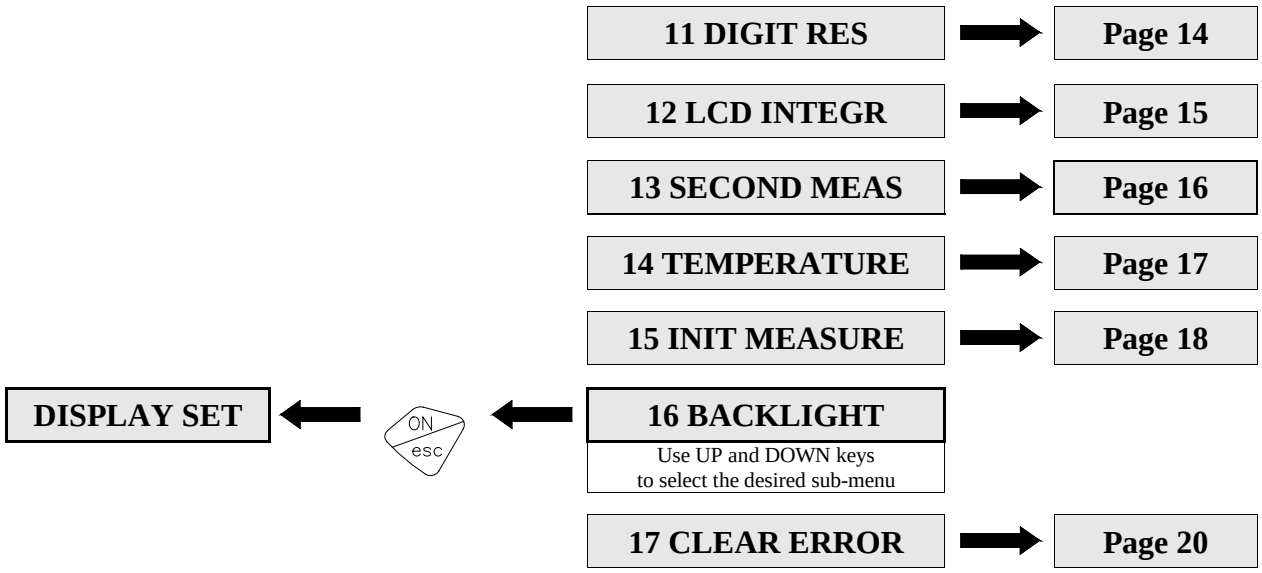
i Measurement reinitialisation shown

Starting up the INIT MEASURE function the instrument starts the reading of the measure previously detected
PM – Pm – TAM – TAm

5.1 DISPLAY SET

5.1.6 BACKLIGHT – Set-up of BACKLIGHT lighting



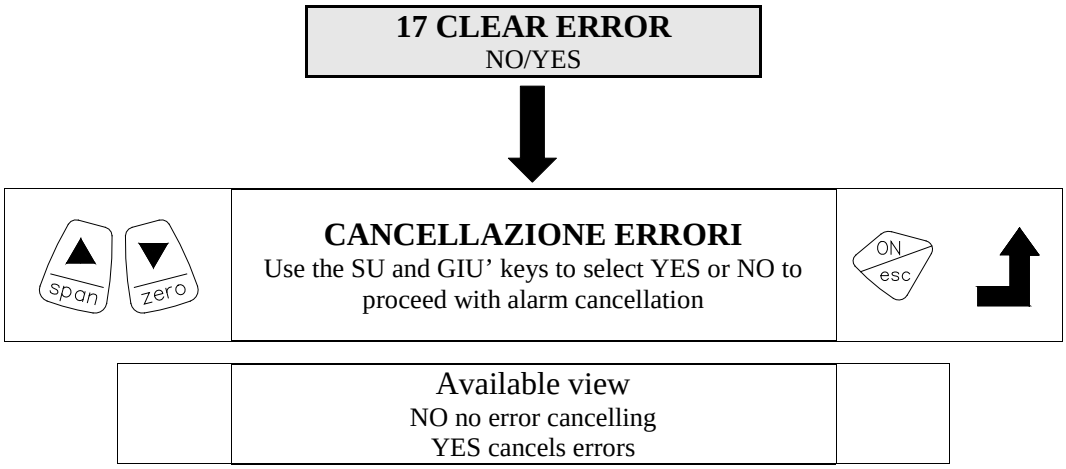


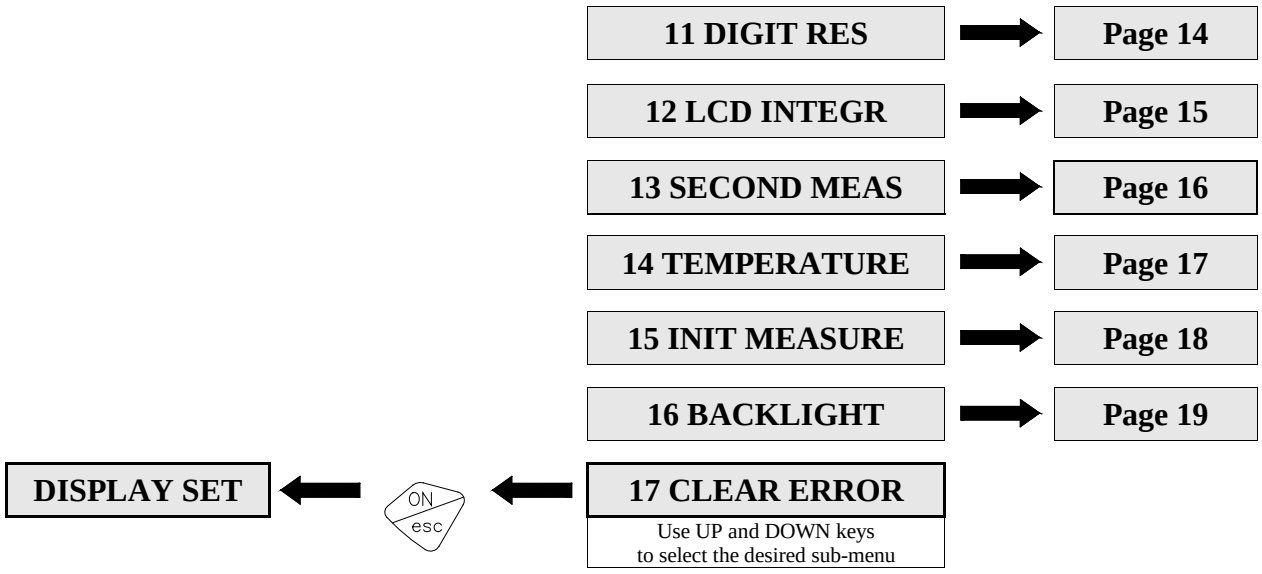
i Backlight lighting

By selecting from the various time available, the back light lighting time is defined
Times available: ON – OFF – 1 – 5 – 10 – 15 – 30 – 60 – 120

5.1 DISPLAY SET

5.1.7 CLEAR ERROR – Error cancellation





i Error cancellation

This function cancels from the display all error signals visualized

5.2 USER CALIB

5.2.1 CAL PRESS – Pressure calibration

USER CALIB menu entry
Entry calibration **PASSWORD** – **SEE PAGE 3**
after digit confirm it through

21 CAL PRESS

CONFIRMATION REQUEST OF CALIBRATION DURIG PRESSURE
Use the SU and GIU' keys to select YES or NO to proceed pressurized zeroing

NO exit menu
YES proceeds with pressurized calibration

YES **NO**

SET UNITS
Use the SU and GIU' keys to select
The desired unit of measurement

Unit of measurement available
BAR,mBAR,AT,KPA,MPA,PSI,
KG/CM2,MH2O,CMH2O,MMH2O,
MMHG,INHGMM,M,FEET,INCH,
L,KG,T,M3,GAL,LB,%

SET P OFFSET
Use the SU and GIU' keys to select YES or NO to proceed with the confirmation of the minimum scale value

NO exit menu
YES proceeds by confirmation of the offset value

CONTINUES ON PAGE 24

MINIMUM SCALE RANGE VALUE SET UP

Use the UP and DOWN keys, select NO or APPLY to proceed with the confirmation of the minimum scale value

NO exit menu
APPLY proceeds by confirmation of the offset value

MAXIMUM SCALE RANGE VALUE SET UP

Use the UP and DOWN keys, select NO or APPLY to proceed with the confirmation of the maximum scale value

NO exit menu
APPLY proceeds by confirmation of the offset value

Unit of pressure measurement	Attention	**Unit of measurement not for pressure**

FULL SCALE RANGE VALUE OF REFERENCE SET UP

Use the UP and DOWN arrows to increase or decrease the value or OK (advance one place) or ESC (back one place). Press OK on an empty place to memorize the data entered

2 USER CALIB ← **21 CAL PRESS**

Use UP and DOWN keys to select the desired sub-menu

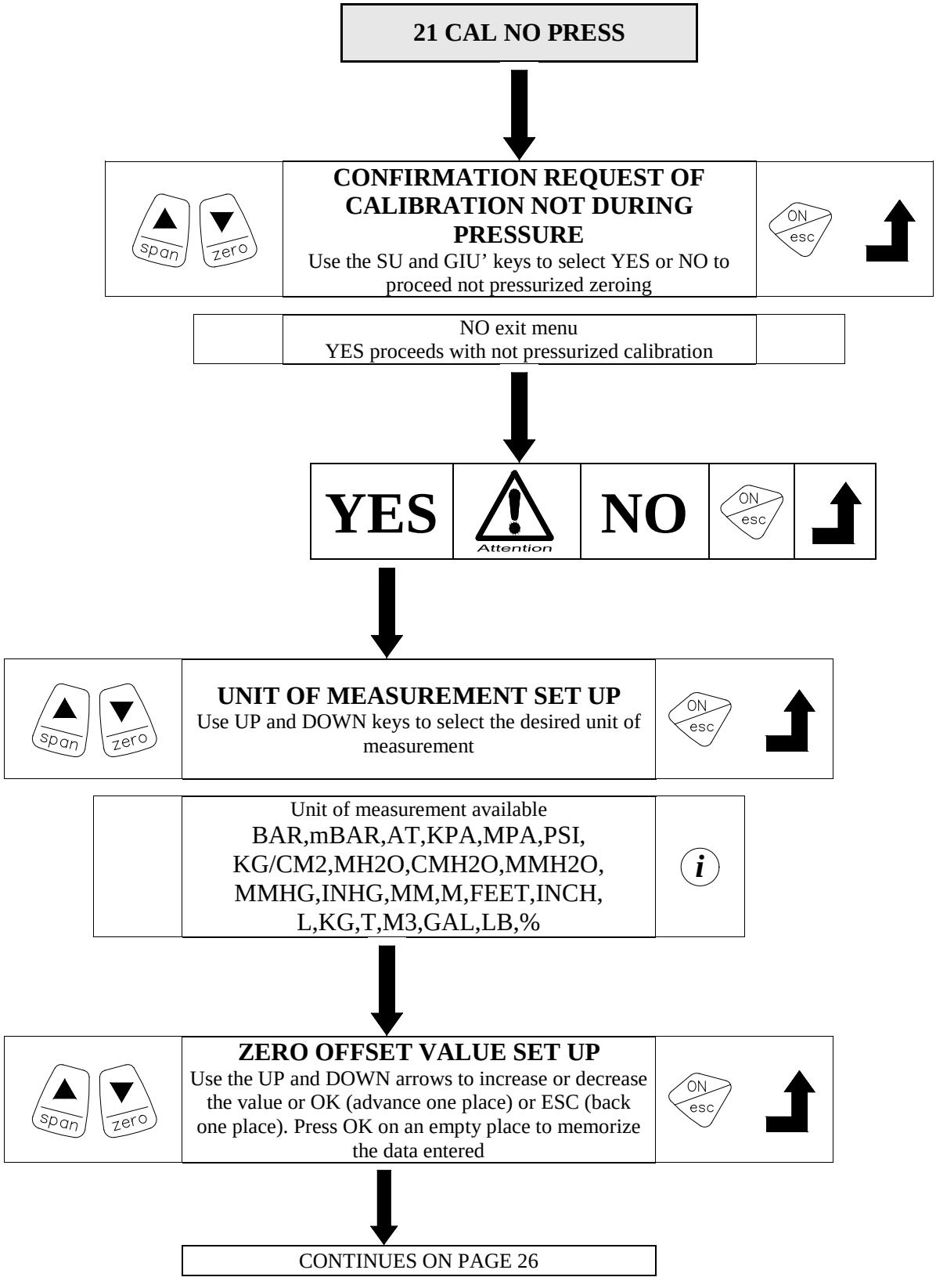
22 CAL NO PRESS → **Page 24**

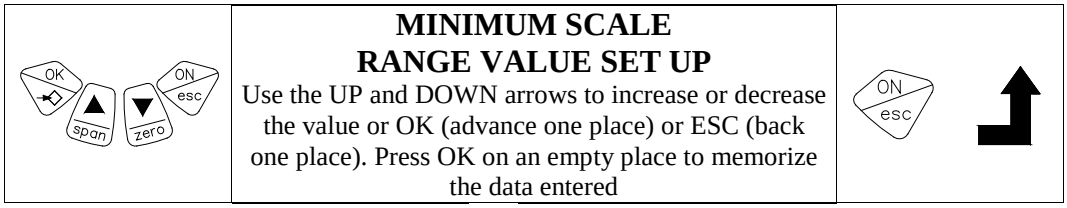
23 REINIT ALL → **Page 26**

5.2 USER CALIB

5.2.2 CAL NO PRESS – Calibration without pressure

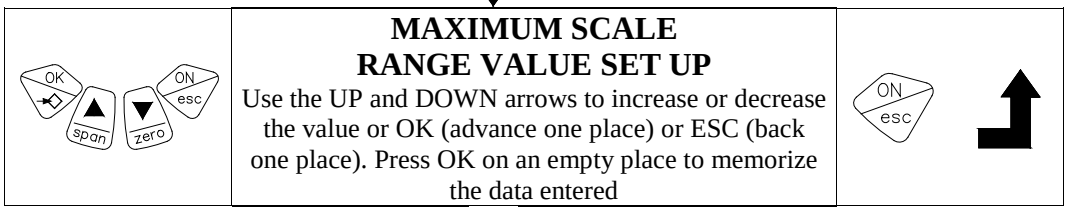
USER CALIB menu entry
Entry calibration **PASSWORD** – **SEE PAGE 3**
after digit confirm it through





MINIMUM SCALE RANGE VALUE SET UP

Use the UP and DOWN arrows to increase or decrease the value or OK (advance one place) or ESC (back one place). Press OK on an empty place to memorize the data entered



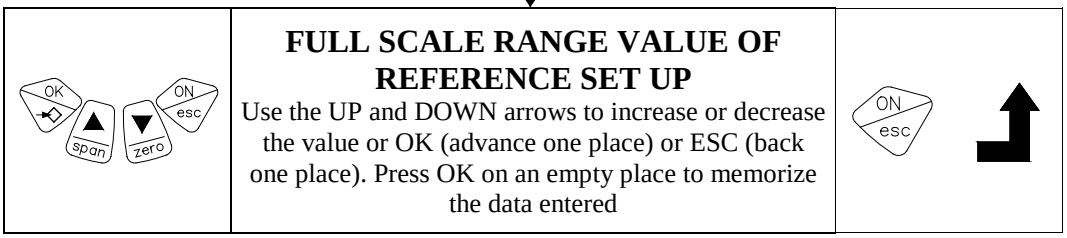
MAXIMUM SCALE RANGE VALUE SET UP

Use the UP and DOWN arrows to increase or decrease the value or OK (advance one place) or ESC (back one place). Press OK on an empty place to memorize the data entered

Unit of pressure measurement

Attention

Unit of measurement not for pressure



FULL SCALE RANGE VALUE OF REFERENCE SET UP

Use the UP and DOWN arrows to increase or decrease the value or OK (advance one place) or ESC (back one place). Press OK on an empty place to memorize the data entered

21 CAL PRESS → **Page 22**

2 USER CALIB ← ON esc ← **22 CAL NO PRESS**

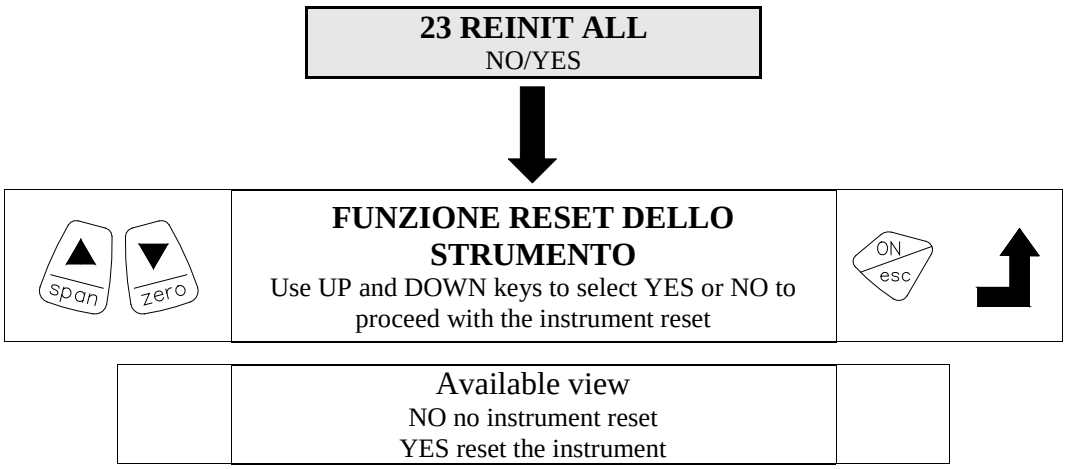
Use UP and DOWN keys to select the desired sub-menu

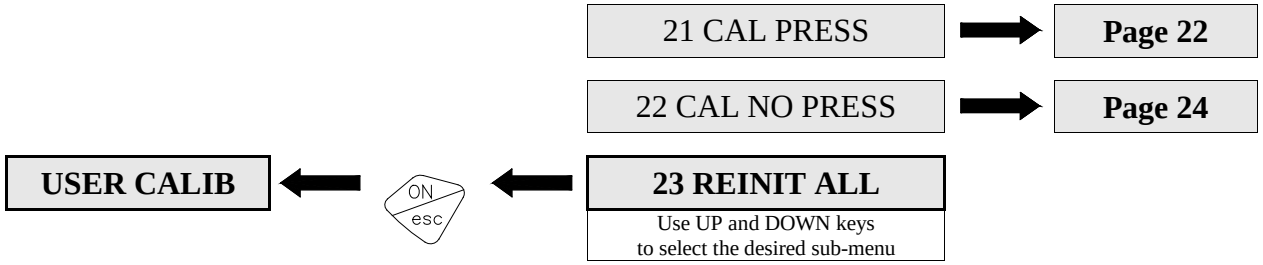
23 REINIT ALL → **Page 26**

5.2 USER CALIB

5.2.3 REINIT ALL – Instrument reset function

USER CALIB menu entry
Entry calibration **PASSWORD** – **SEE PAGE 3**
after digit confirm it through





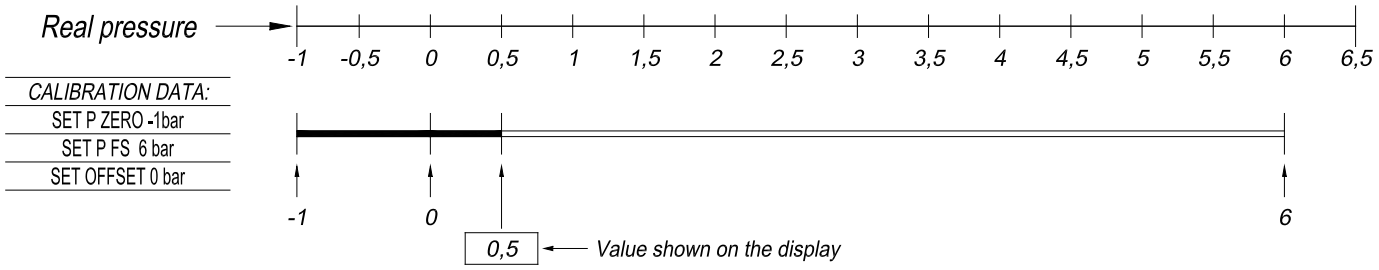
i Information

Zero offset value set up

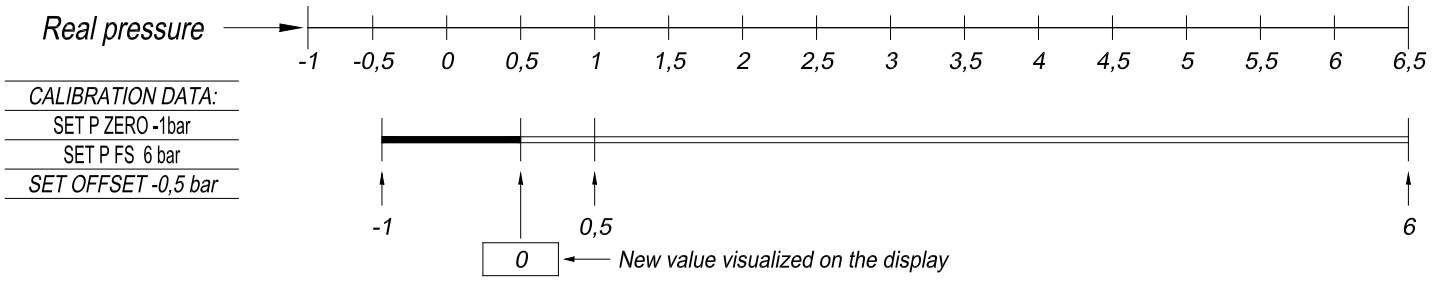
Use the function SET P OFFSET to zero the instrument within the limits set out in the table on page 7

Example 1: range –1…6 bar (POSITIVE OFFSET)

Initial situation

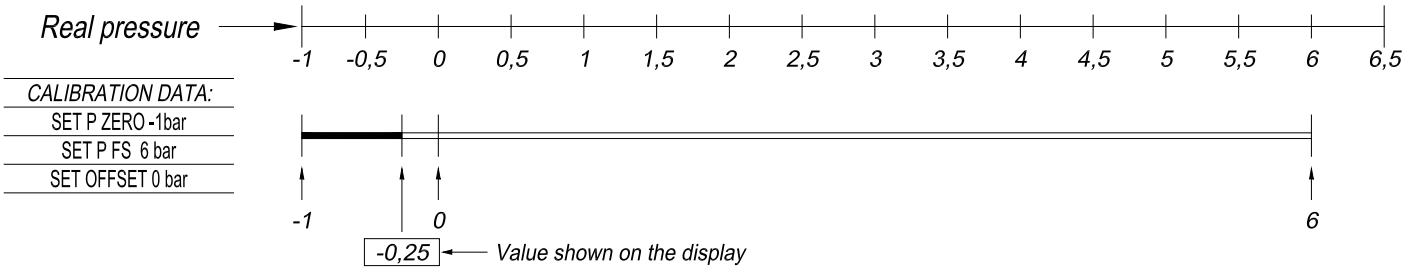


For error correction key in –0,5 bar in the window dialogue SET P OFFSET

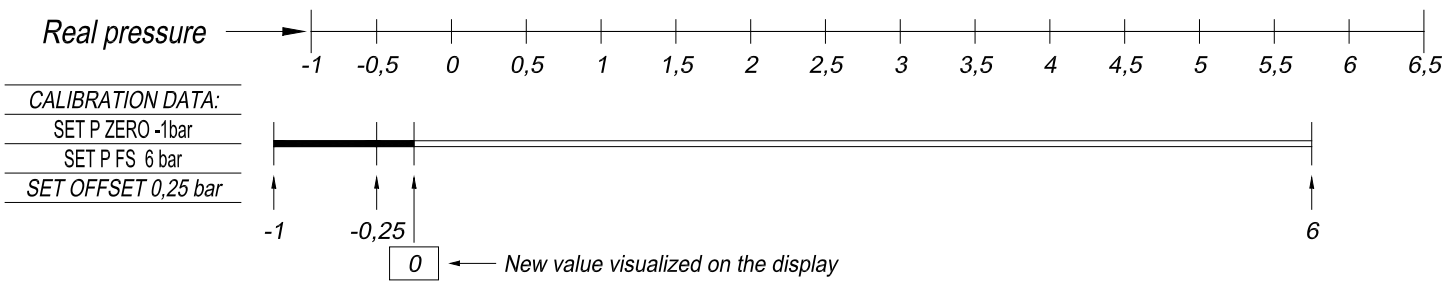


Example 2: range –1…6 bar (NEGATIVE OFFSET)

Initial situation

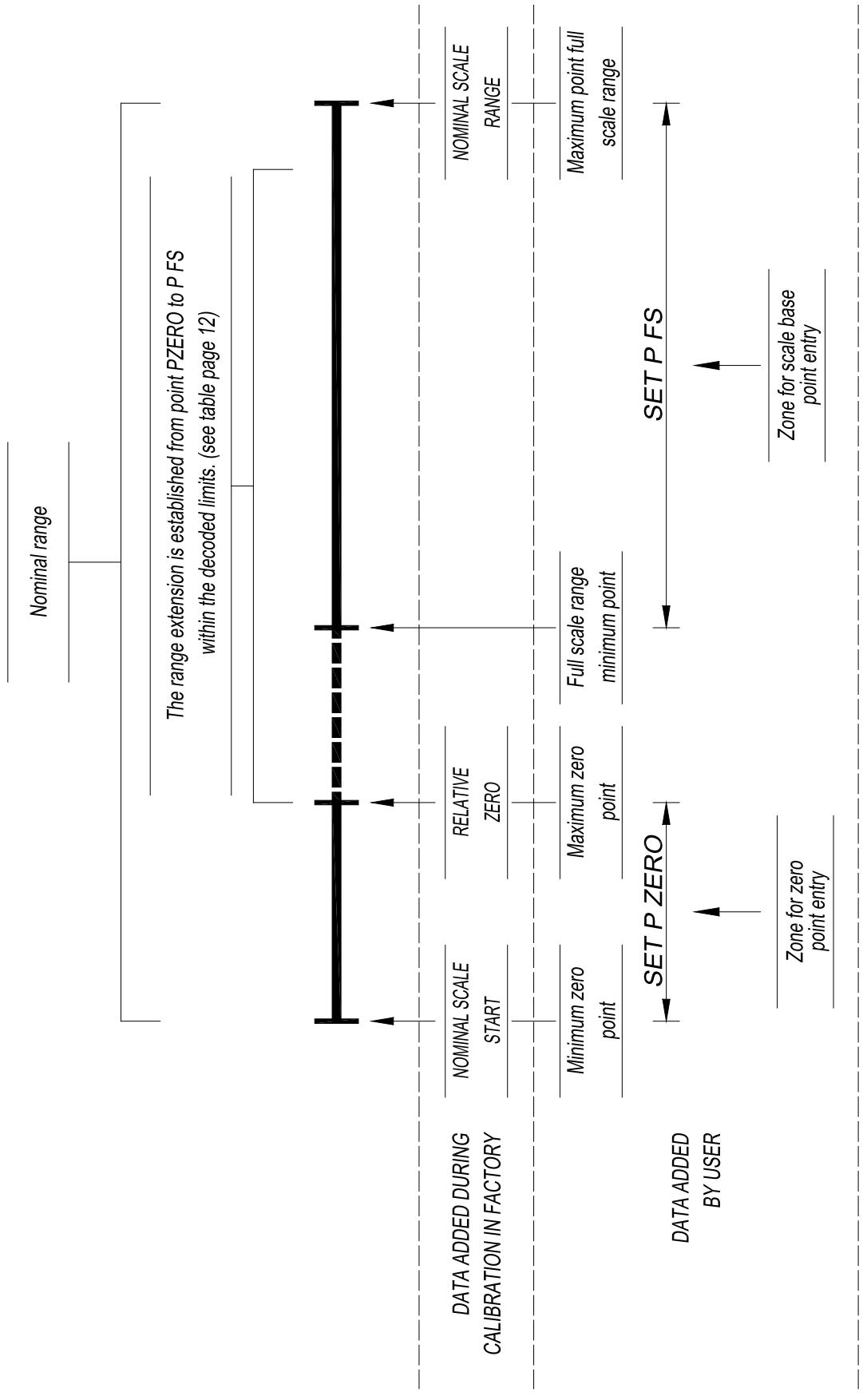


For error correction key in –0,25 bar in the window dialogue SET P OFFSET



Information

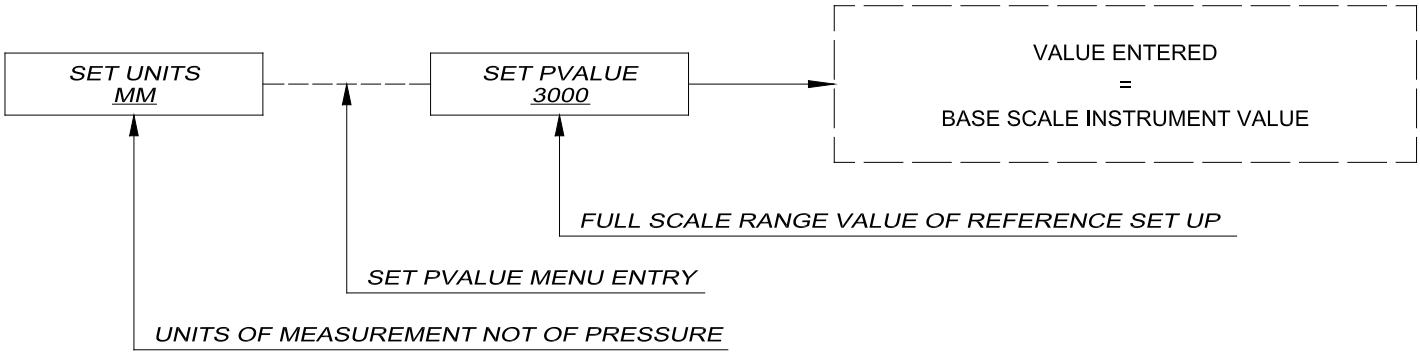
Minimum and full scale range value set up



Information

Full range value of reference set up

Entering a measure different from pressure the instrument requires a value to be used as full range reference



Unit ok measurement set up

The available measure units can be divided into two groups:

Unit of pressure
BAR, mBAR, AT, KPA, MPA, PSI, KG/CM2, MH2O, CMH2O, MMH2O, MMHG, INHG,

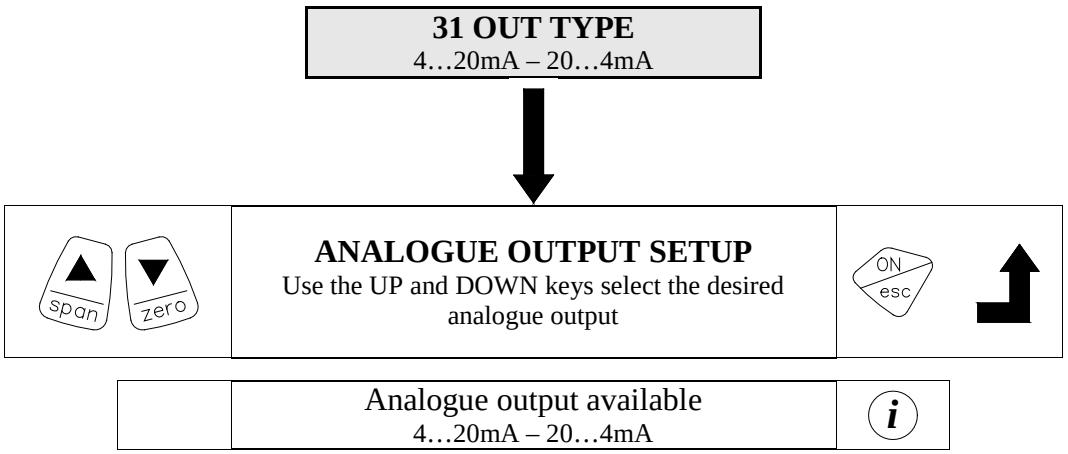
Unit of measurement not for pressure
MM, M, FEET, INCH, L, KG, T, M3, GAL, LB, %

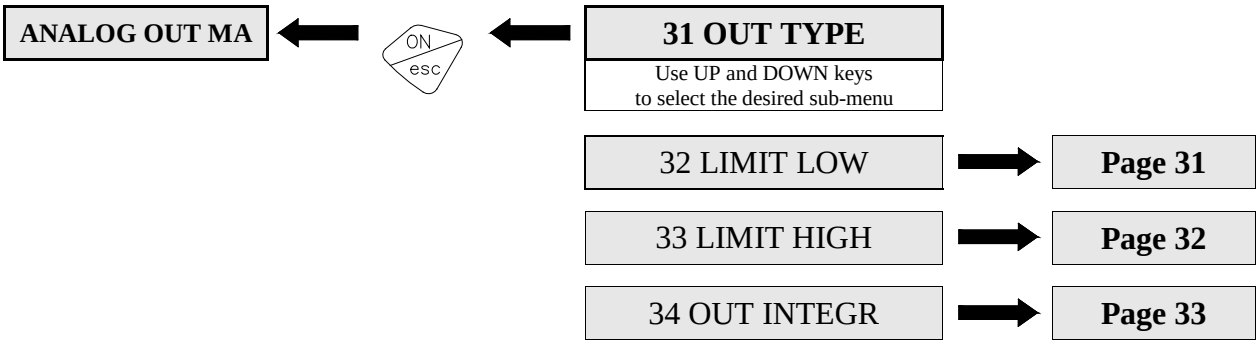
When using the units of measure not related to pressure, a value of base scale reference will be required, except for those given in %

Changing the unit of measurement zeroes the alarm thresholds limits, setting them to default values

5.3 ANALOG OUT MA

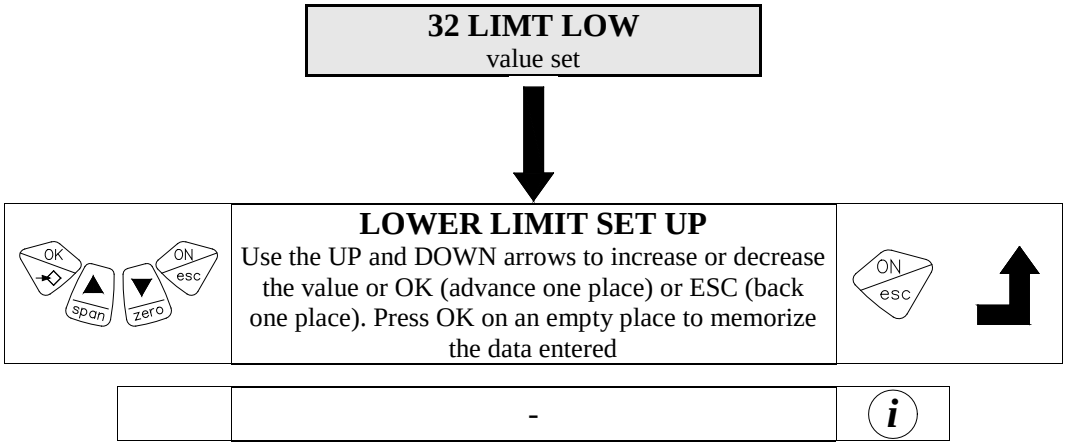
5.3.1 OUT TYPE – Analogue otuput set up

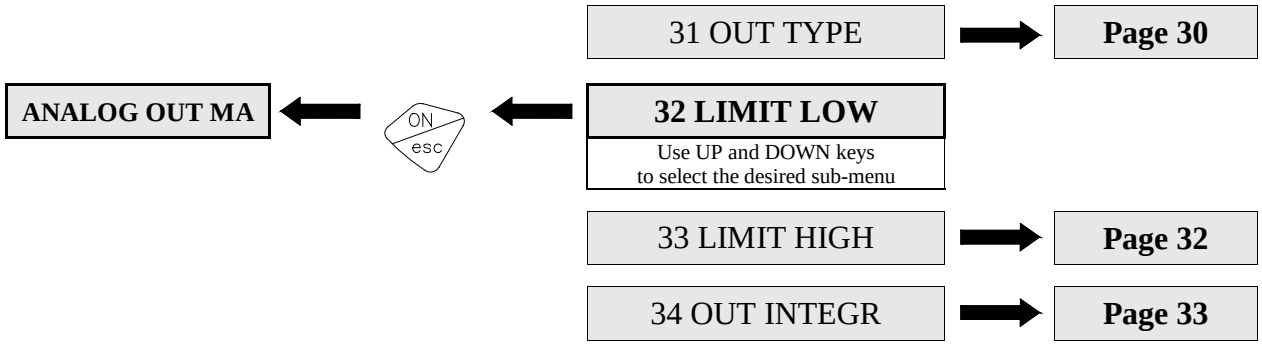




5.3 ANALOG OUT MA

5.3.2 LIMIT LOW – Lower limit set up



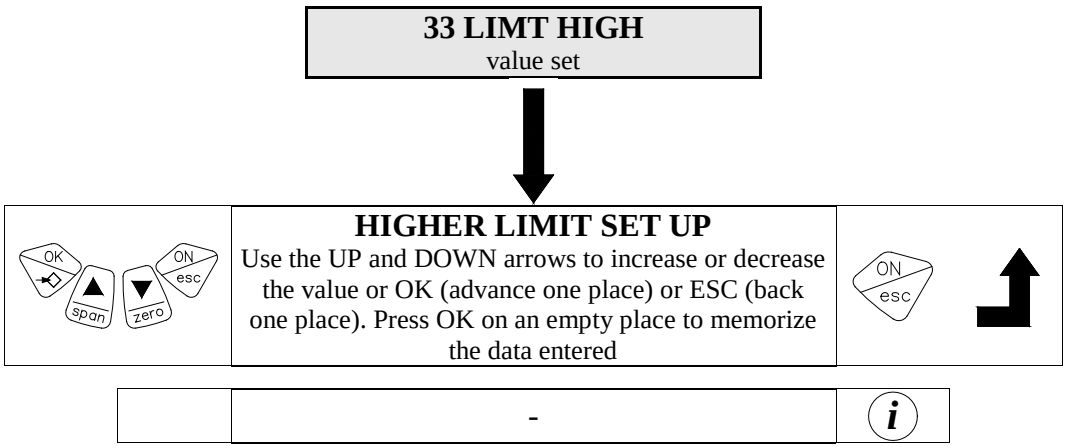


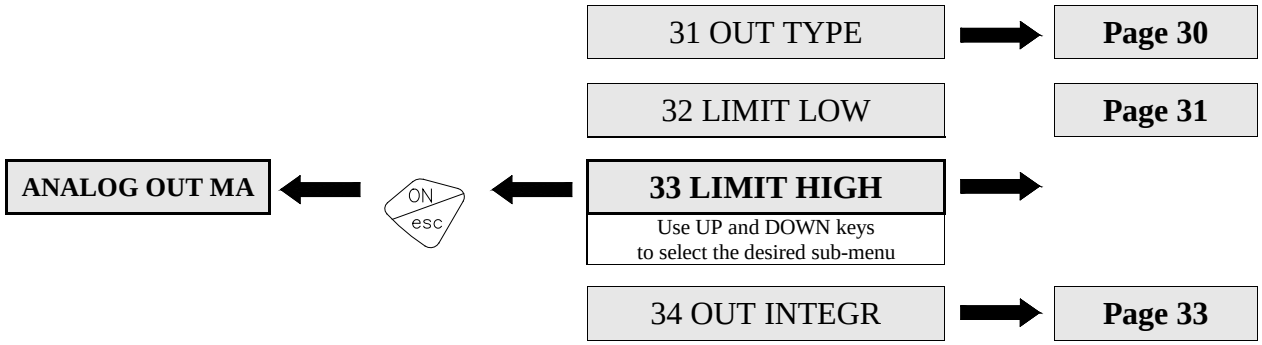
i Limit low set up

This is an alarm function and allows to set the lower value of the analogical output OUT LIMIT LOW

5.3 ANALOG OUT MA

5.3.3 LIMIT HIGH – Higher limit set up



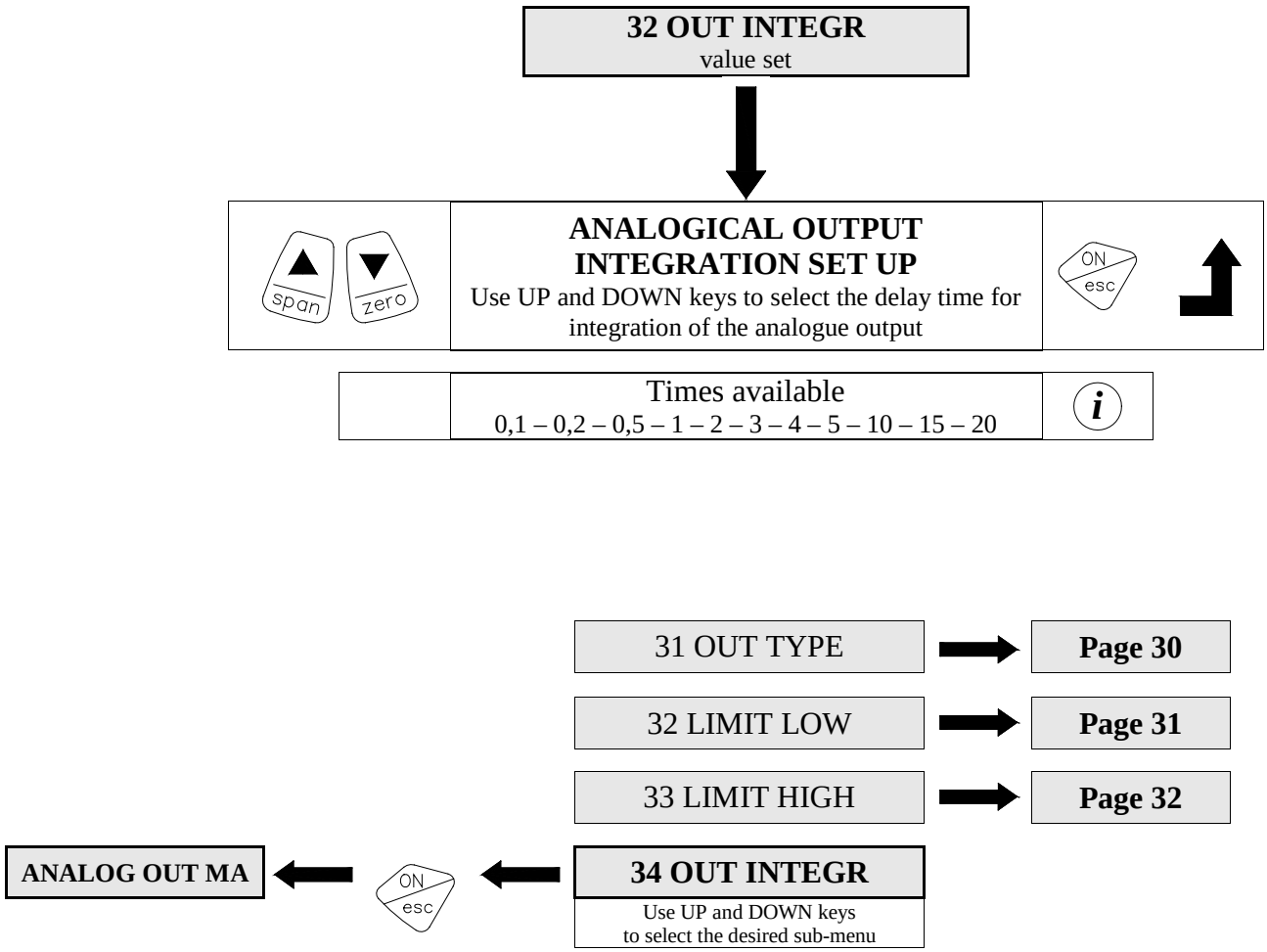


i Limit high set up

This is an alarm function and allows to set the lower value of the analogical output OUT LIMIT HIGH

5.3 ANALOG OUT MA

5.3.4 OUT INTEGR – Analogical output integration set up

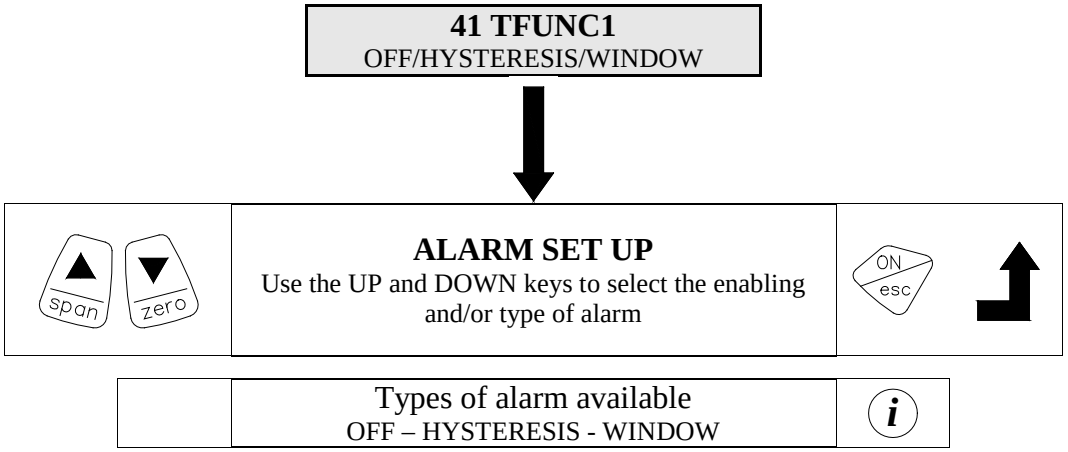


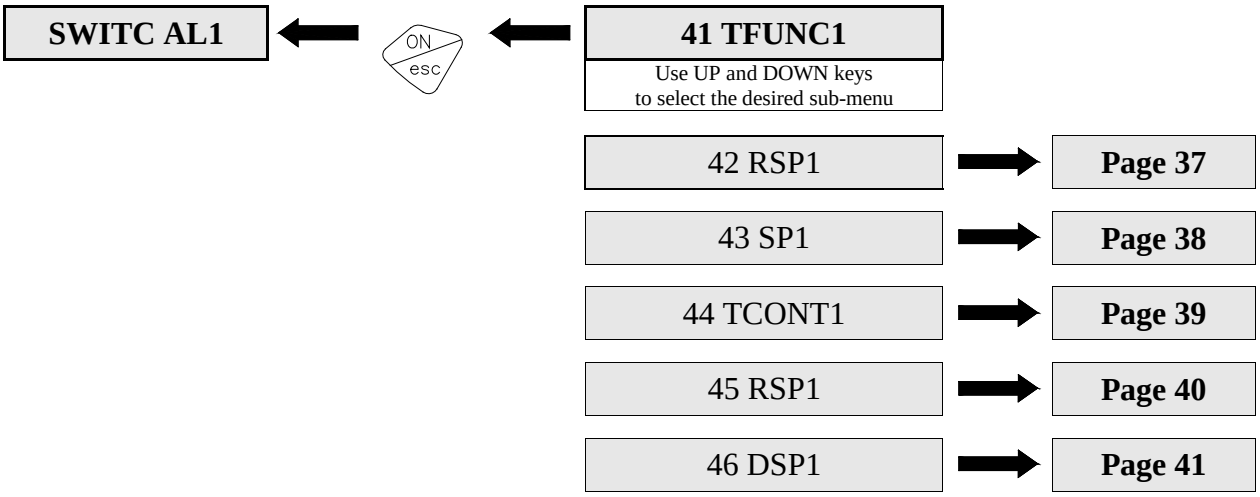
i Set-up of integration time analogue output

By selecting of the values available, the integration time of the signal output is increate or decreased.
Time available: 0,1 – 0,2 – 0,5 – 1 – 2 – 3 – 4 – 5 – 10 – 15 – 20s

5.4 SWITCH AL1

5.4.1 TFINC1 – Alarm set up





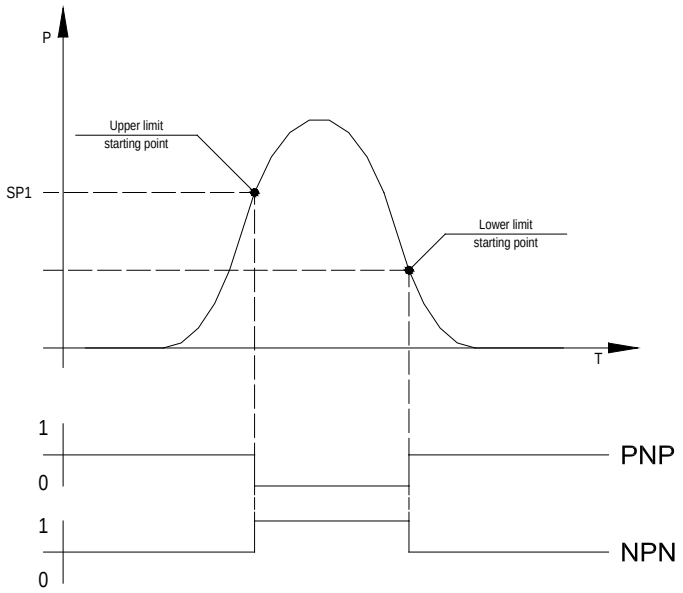
Information

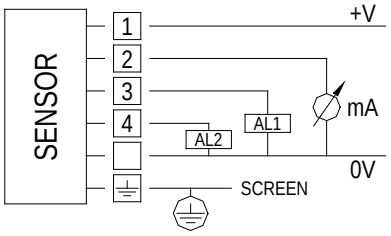
Set up of alarm function

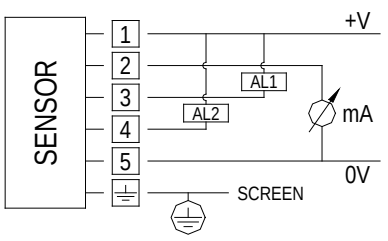
HYSTERESIS

HYSTERESIS main features

The HYSTERESIS function allows to set up the switch hysteresis between point SP1 and RSP1
When the increasing pressure reaches the SP1 point the contact switches on
When the decreasing pressure reaches the RSP1 the contact switches or and returns to its original condition.







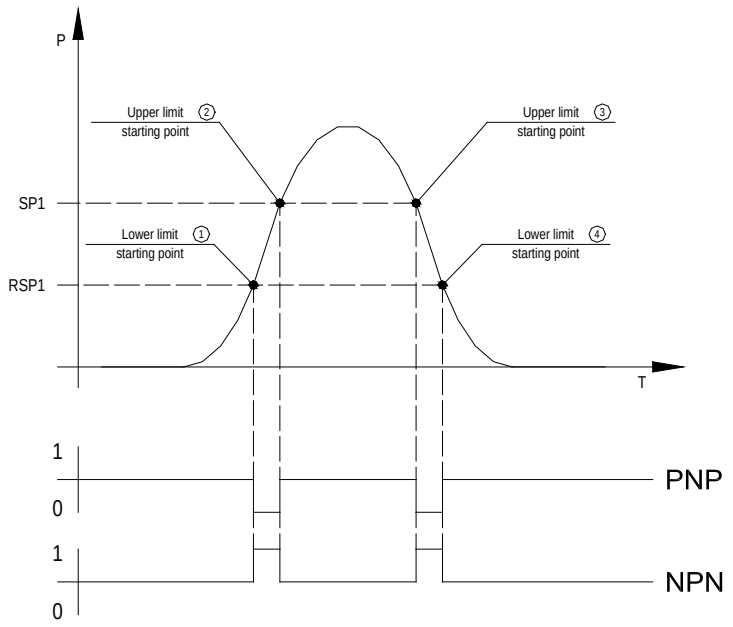
Information

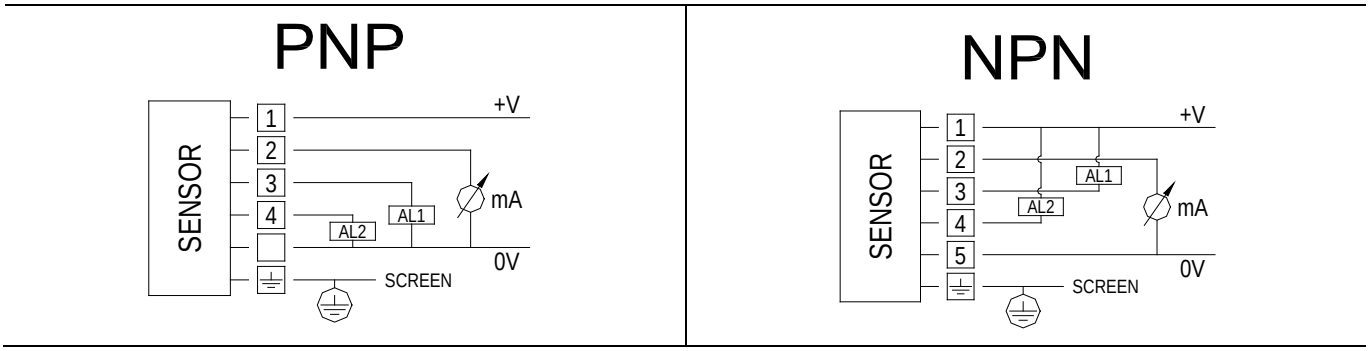
Set-up of alarm function

WINDOW

WINDOW main features

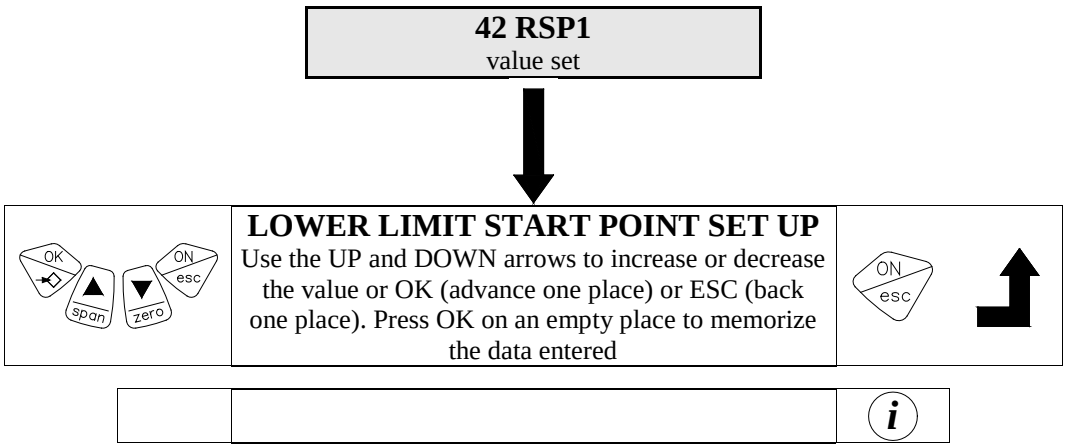
The window function brings to the contact switch during crossing of points SP1 and RPS1 when the pressure increases or decreases

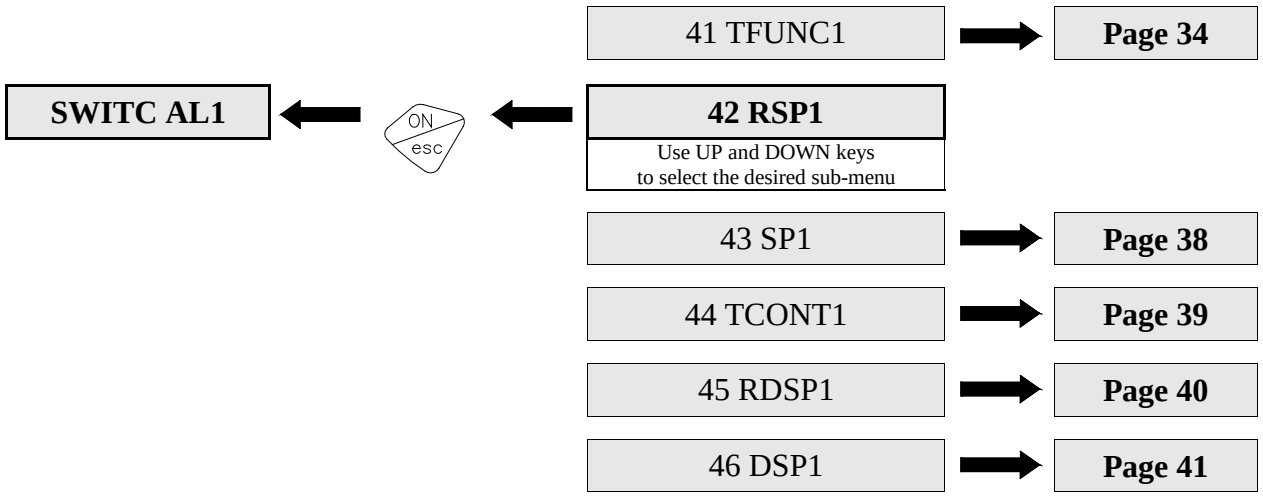




5.4 SWITCH AL1

5.4.2 RSP1 – Lower limit start point set up



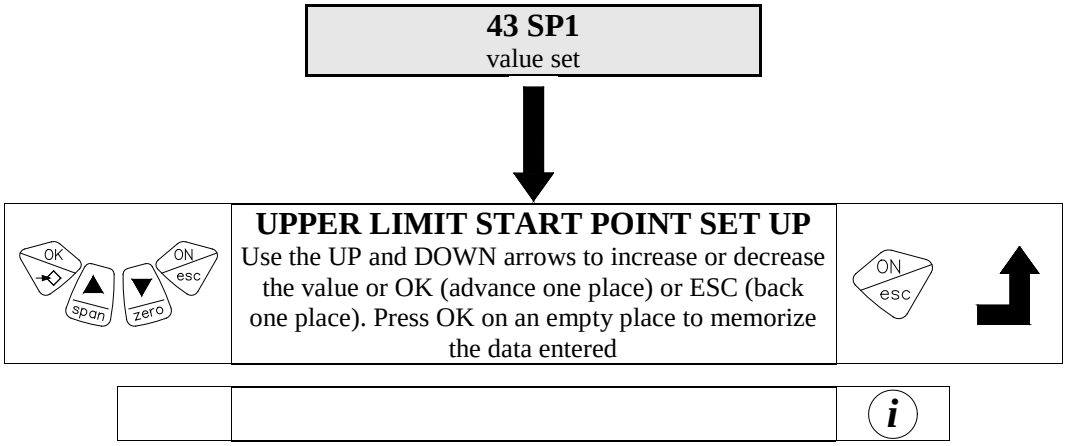


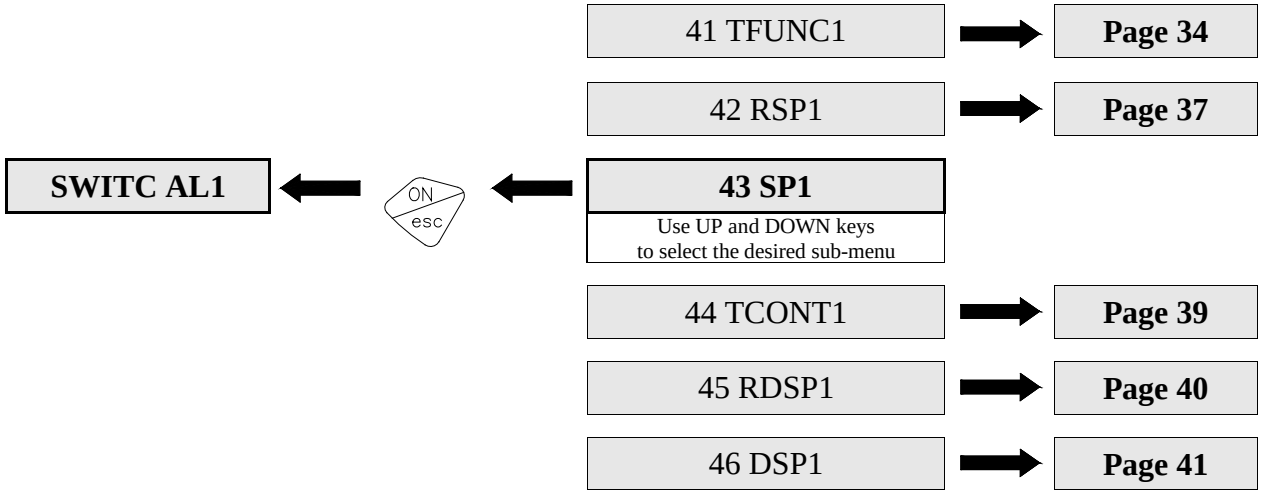
i Lower limit start point set up

Value always less than upper limit intervention point (SP1)

5.4 SWITCH AL1

5.4.3 SP1 – Upper limit start point set up



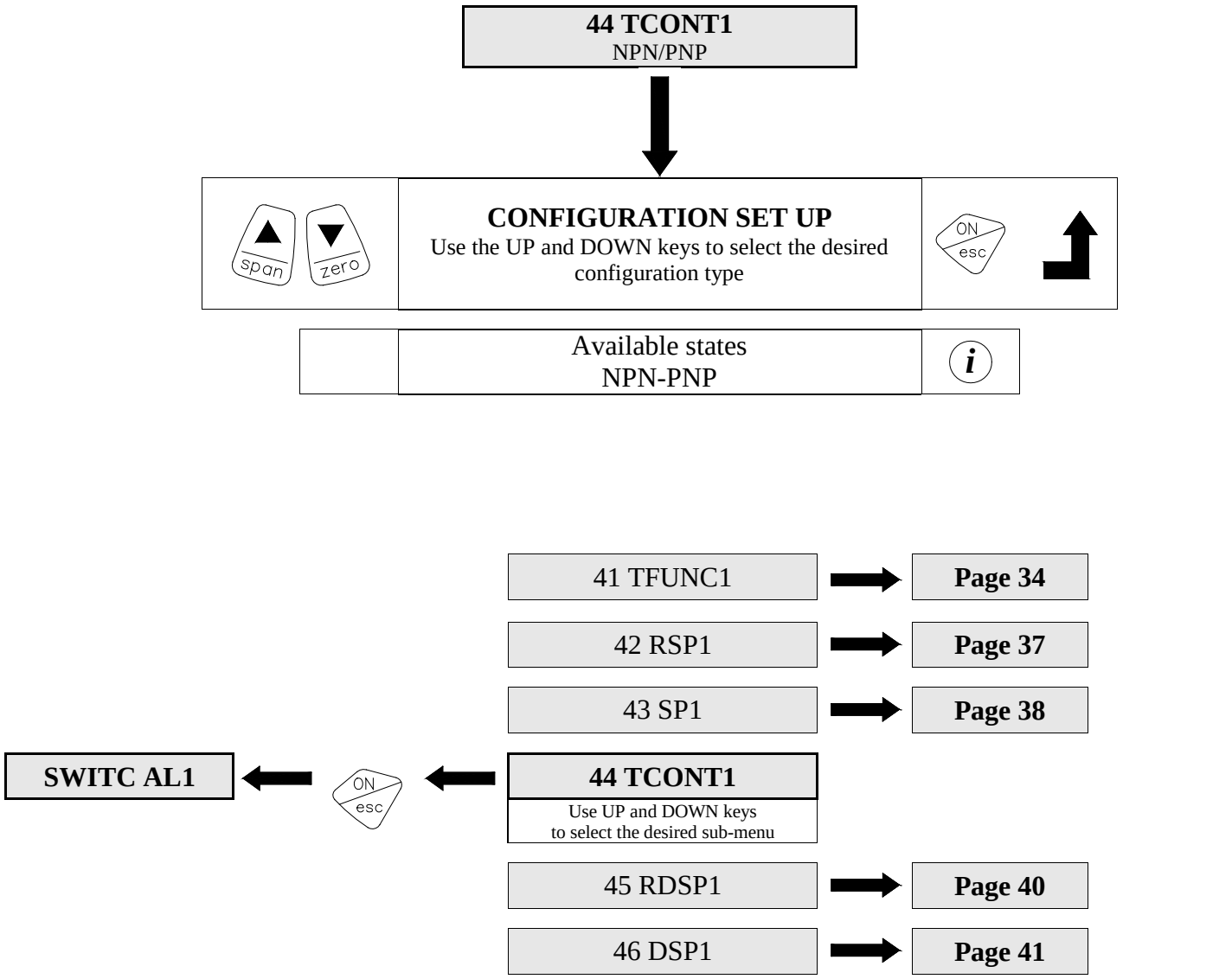


i Upper limit start point set up

Value always greater than lower limit intervention point (RSP1)

5.4 SWITCH AL1

5.4.4 TCONT1 – Configuration set-up

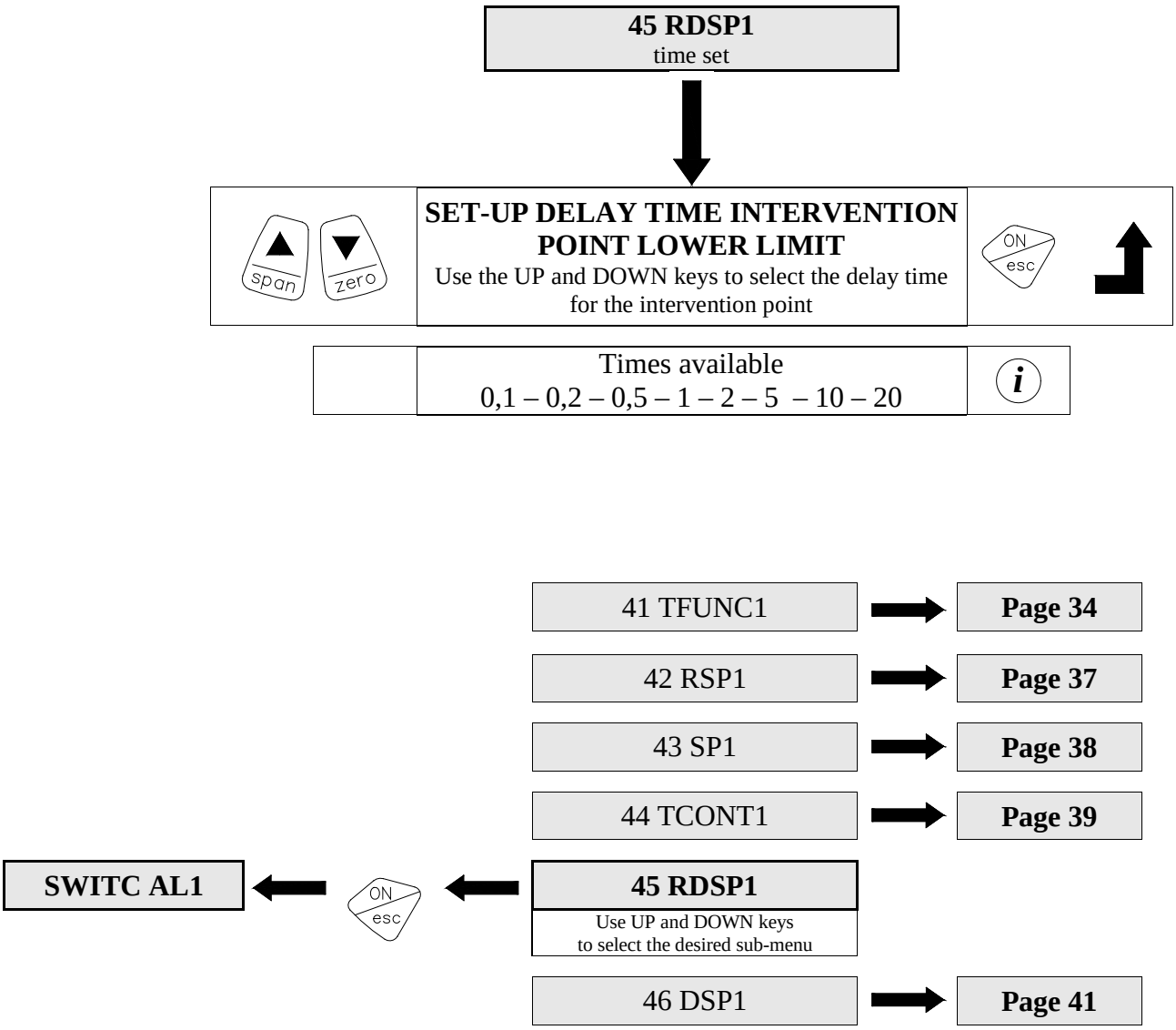


i Configuration set up

See page 36 - 37

5.4 SWITCH AL1

5.4.5 RDSP1 – Setup delay time intervention point lower limit

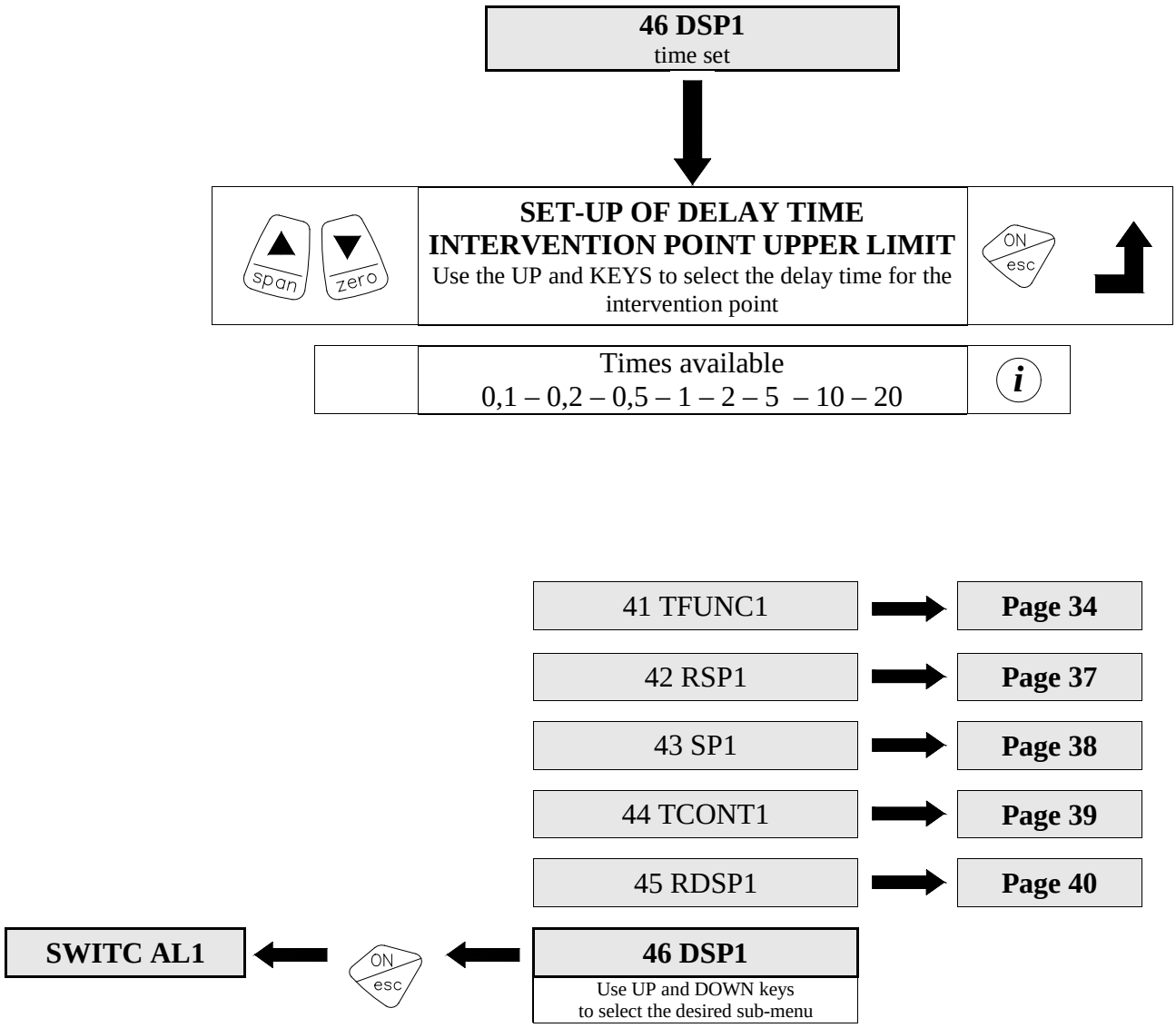


i Set-up of delay time intervention point lower limit

Defines the time necessary for contact switch. This occurs where the pressure, having passed the switch point, is maintained for a time in excess of that set

5.4 SWITCH AL1

5.4.6 RDSP1 – Set up delay time intervention point upper limit

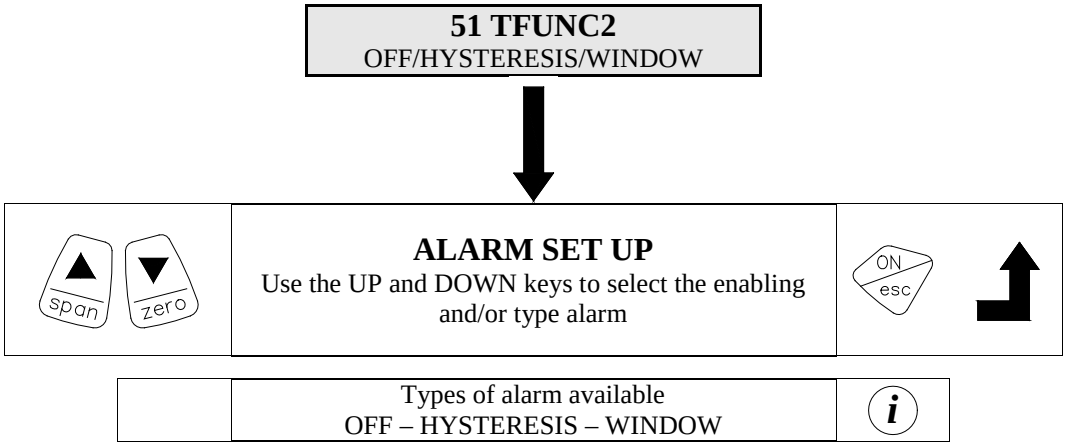


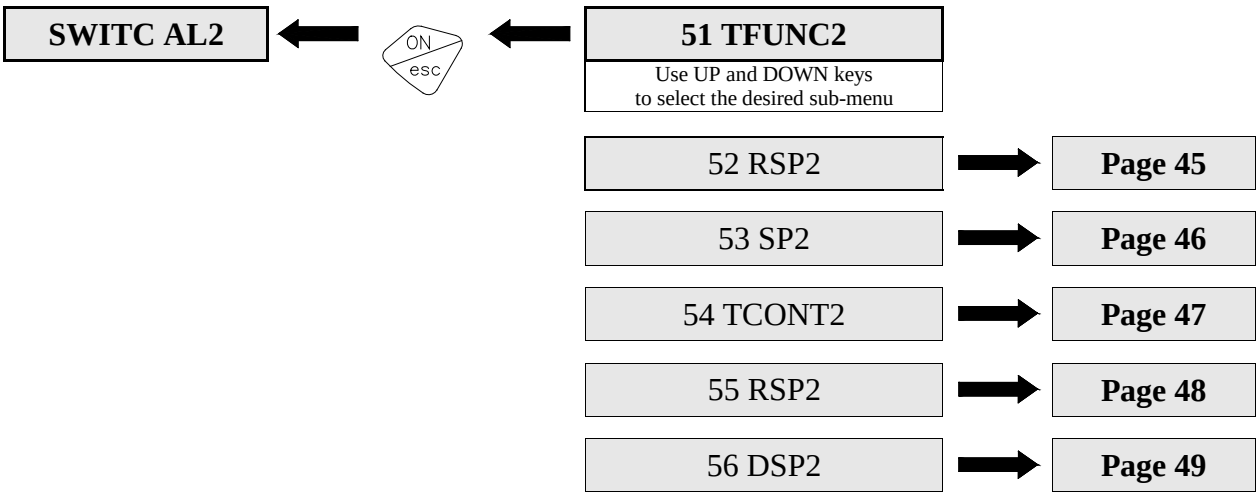
i Set up of delay time intervention point upper limit

Defines the time necessary for contact switch. This occurs where the pressure, having passed the switch point, is maintained for a time in excess of that set

5.5 SWITCH AL2

5.5.1 TFINC2 – Alarm set up





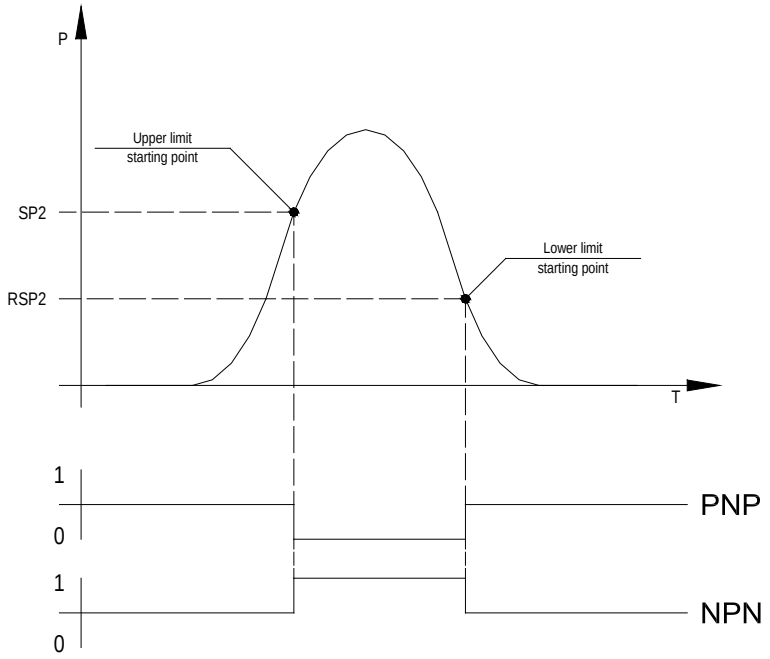
Information

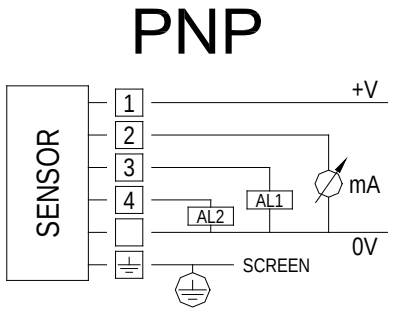
Set up of alarm function

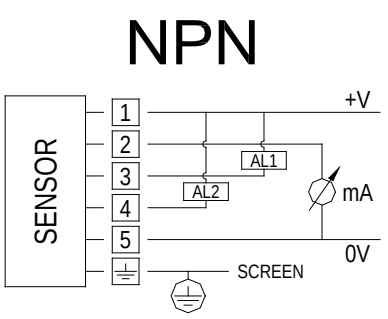
HYSTERESIS

HYSTERESIS main features

The HYSTERESIS function allows to set up the switch hysteresis between point SP2 and RSP2
When the increasing pressure reaches the SP2 point the contact switches on
When the decreasing pressure reaches the RSP2 the contact switches or and returns to its original condition.







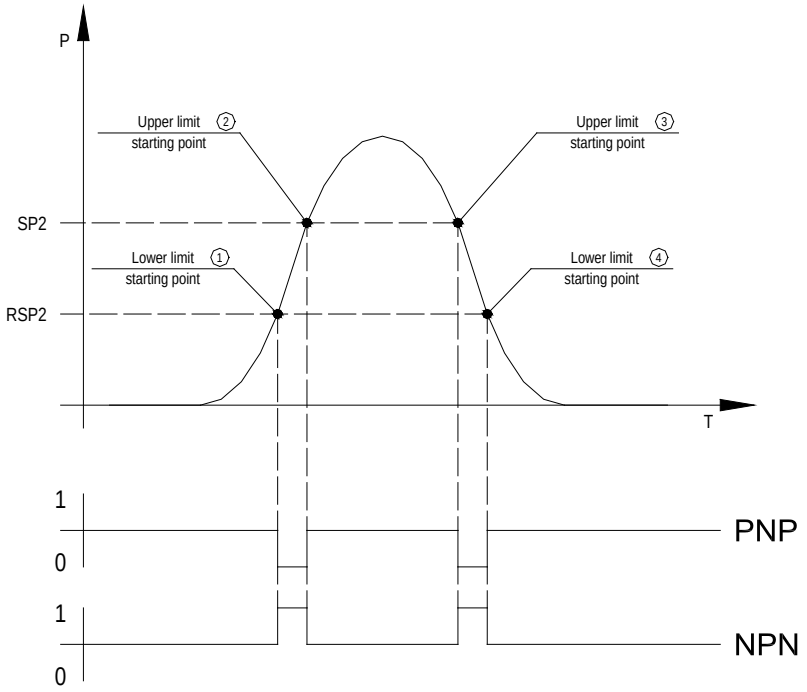
Information

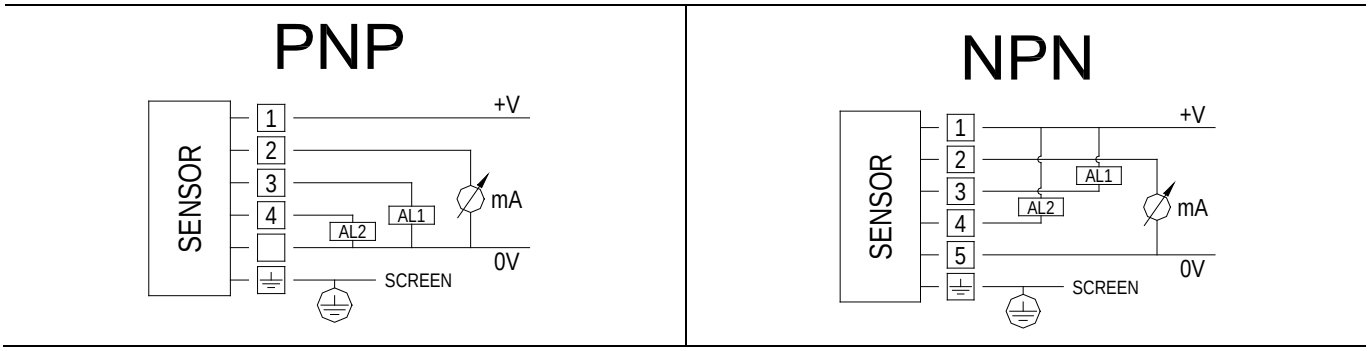
Set-up of alarm function

WINDOW

WINDOW main features

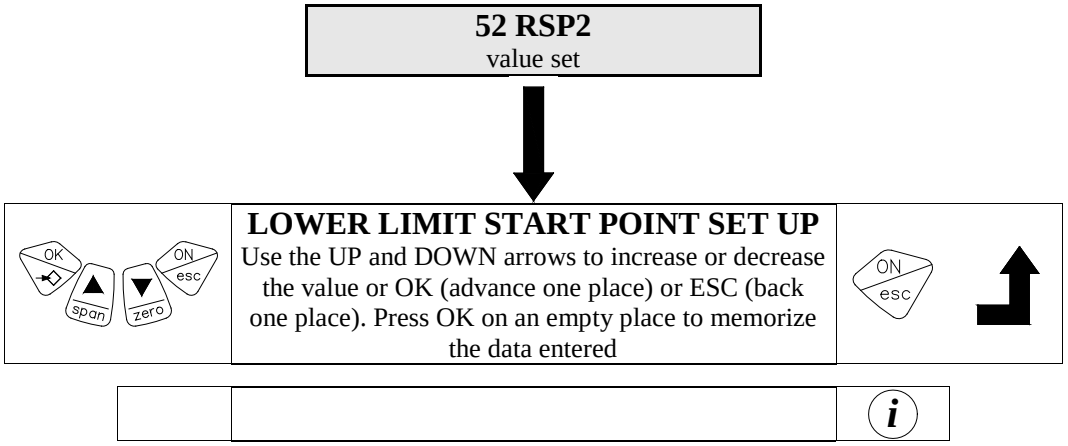
The window function brings to the contact switch during crossing of points SP2 and RPS2 when the pressure increases or decreases

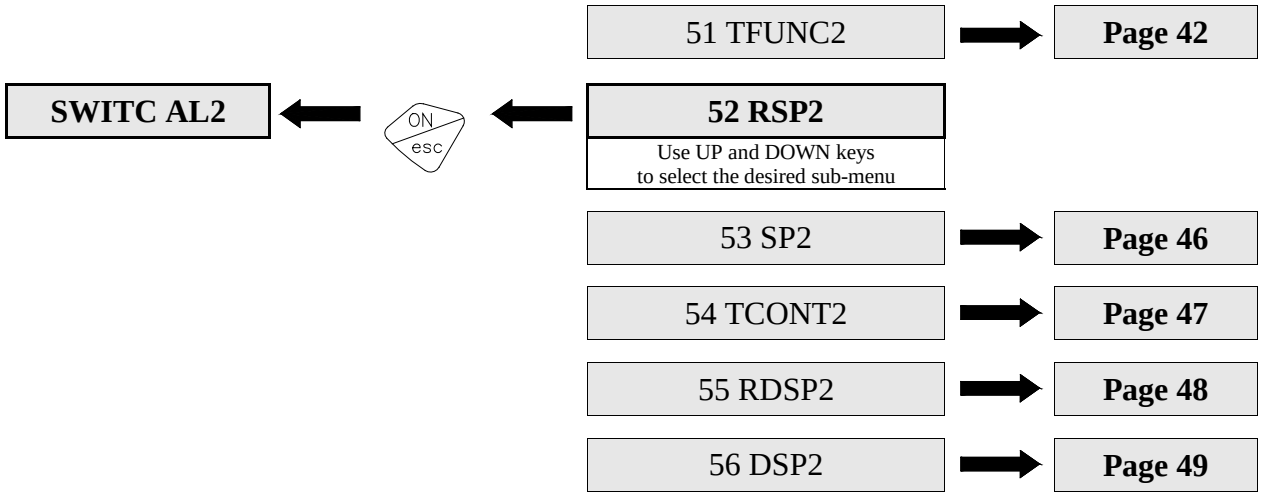




5.5 SWITCH AL2

5.5.2 RSP2 – Lower limit start point set up



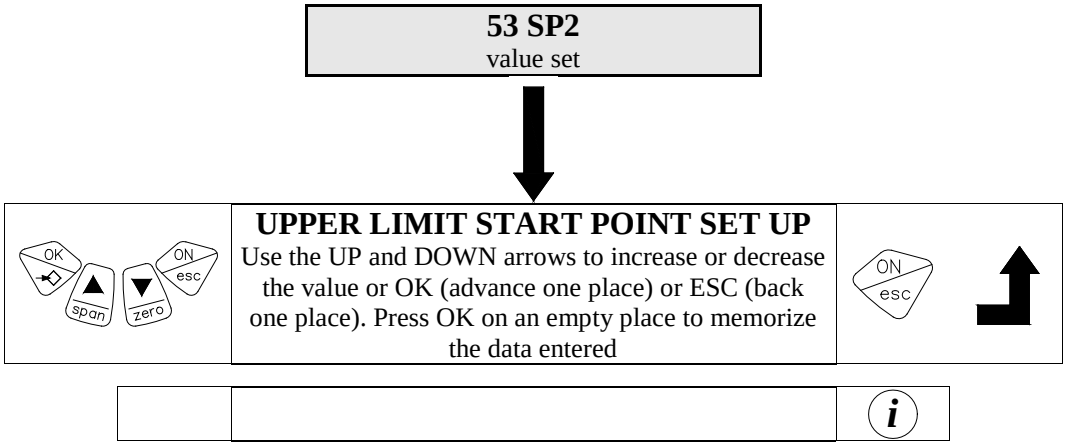


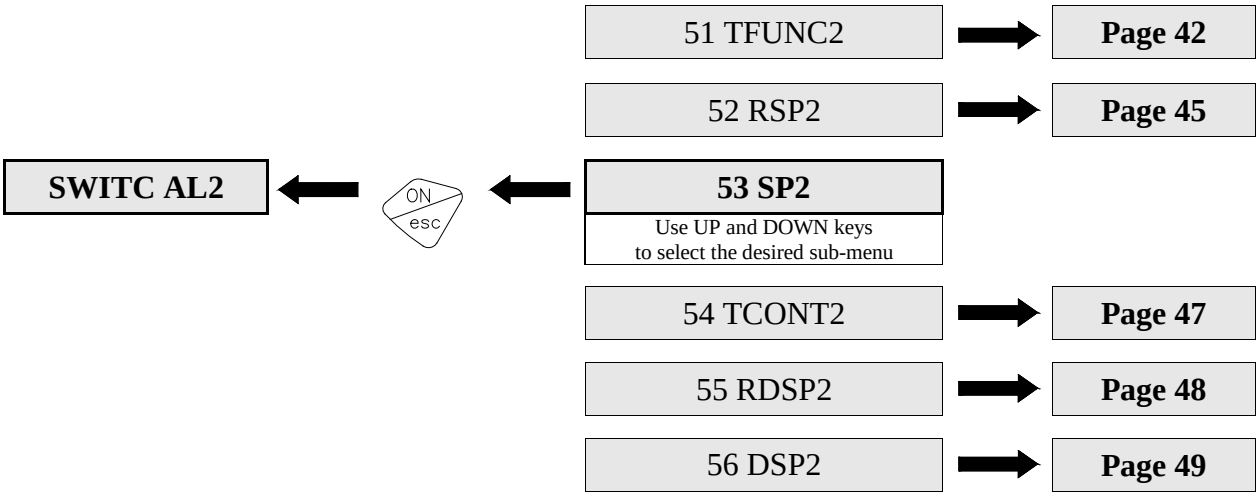
i Lower limit start point set up

Value always less than upper limit intervention point (SP2)

5.5 SWITCH AL2

5.5.3 SP2 – Upper limit start point set up



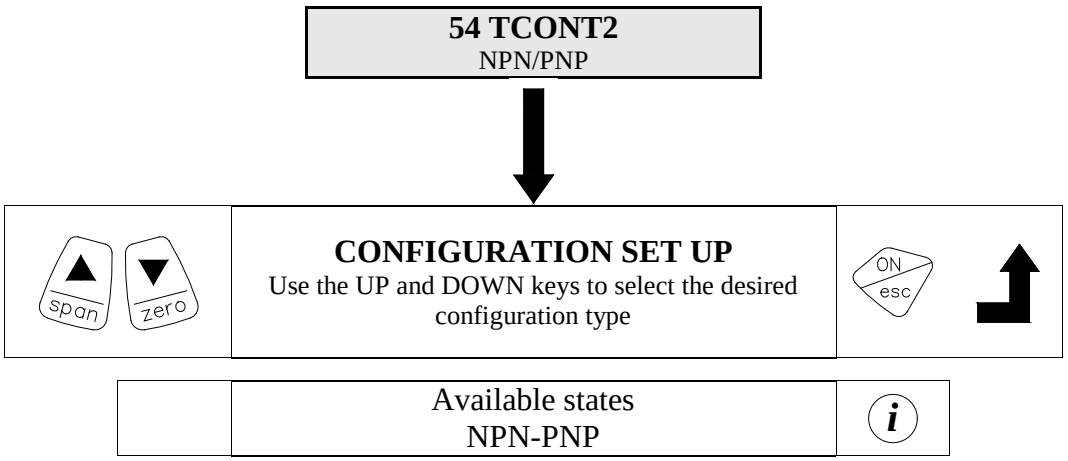


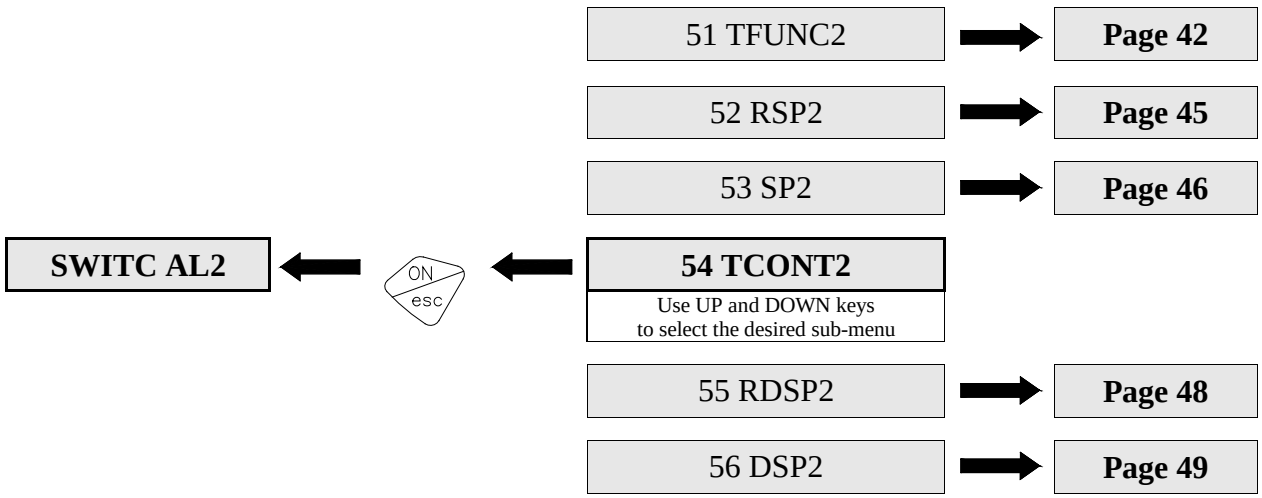
i Upper limit start point set up

Value always greater than lower limit intervention (RSP2)

5.5 SWITCH AL2

5.5.4 TCONT2 – Configuration set up



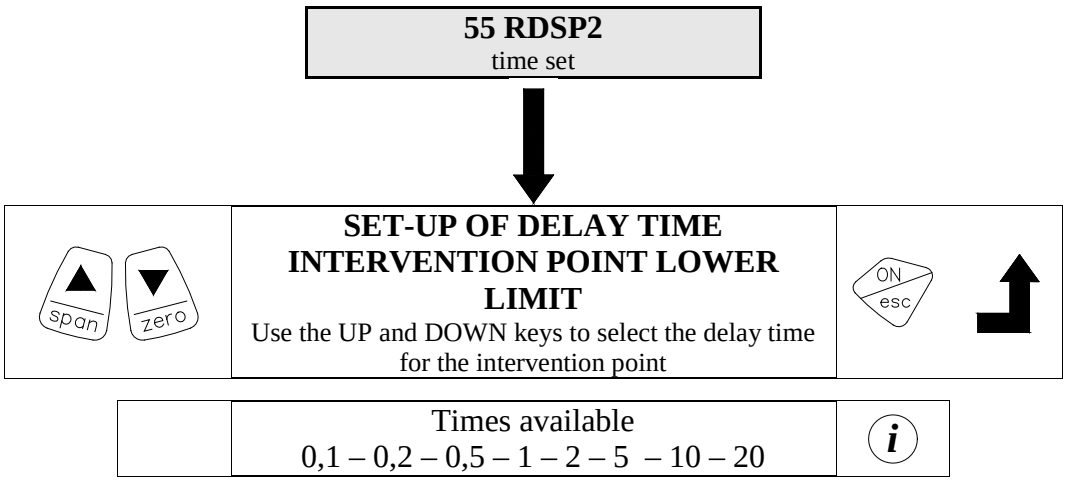


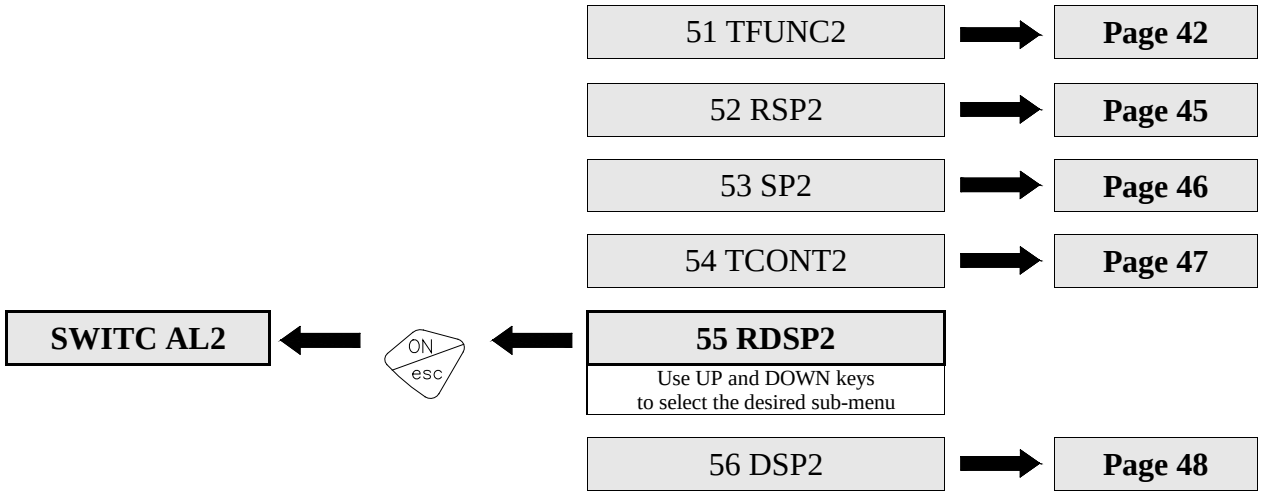
i Configuration set-up

See page 44 - 45

5.5 SWITCH AL2

5.5.5 RDSP2 – Set-up of delay time intervention point lower limit



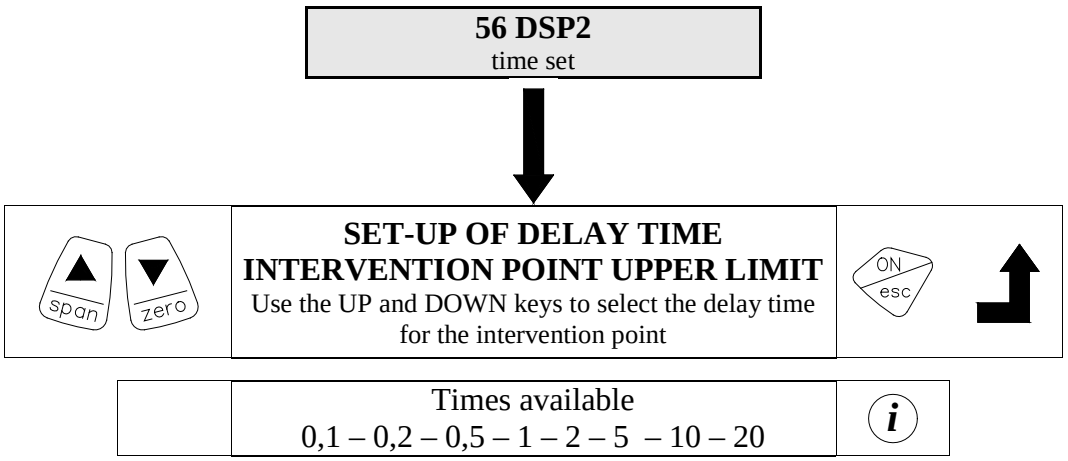


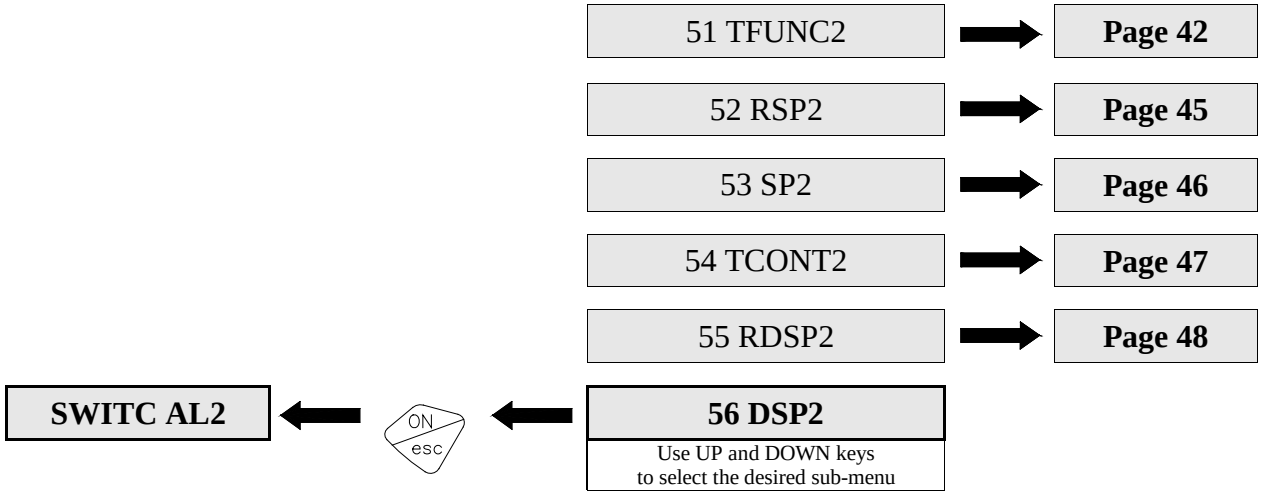
i Set up of delay time intervention point lower limit

Defines the time necessary for contact switch. This occurs where the pressure, having passed the switch point, is maintained for a time in excess of that set

5.5 SWITCH AL2

5.5.6 DSP2 – Set up of delay time intervention point upper limit



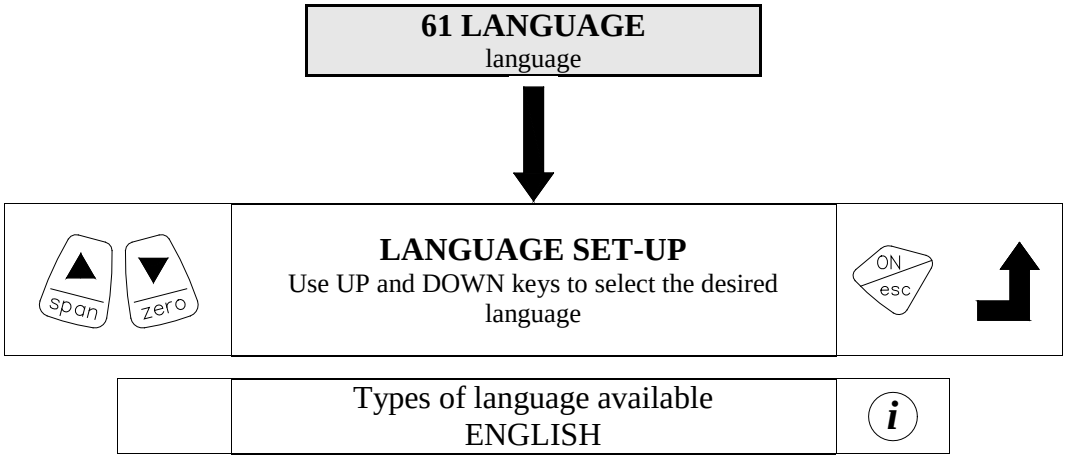


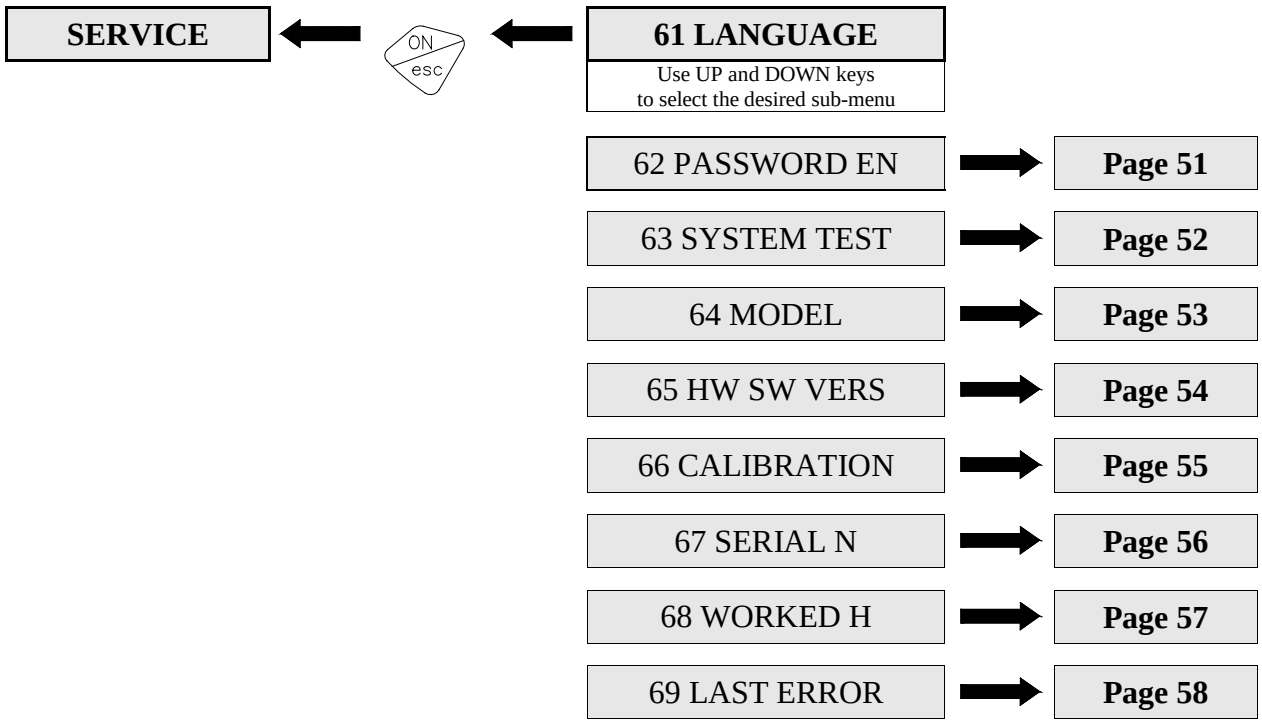
i Set up of delay time intervention point upper limit

Defines the time necessary for contact switch. This occurs where the pressure, having passed the switch point, is maintained for a time in excess of that set

5.6 SERVICE

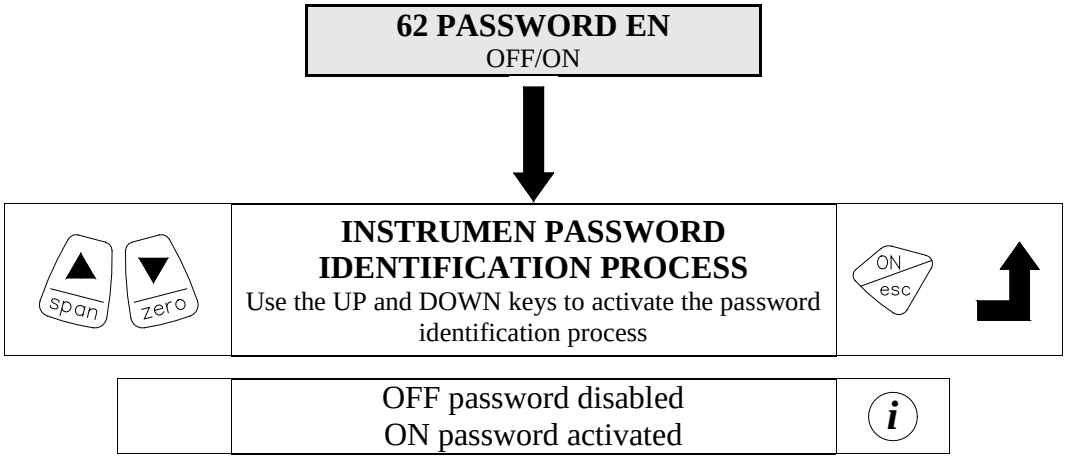
5.6.1 LANGUAGE – Language set up

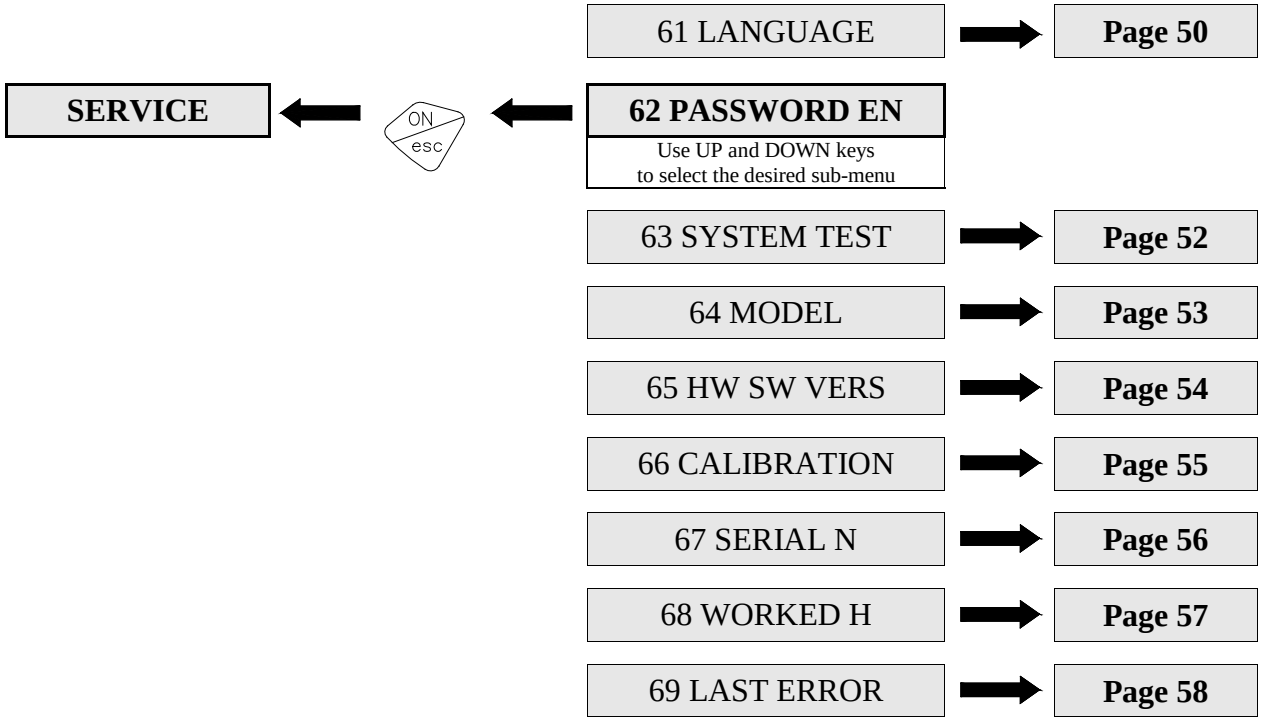




5.6 SERVICE

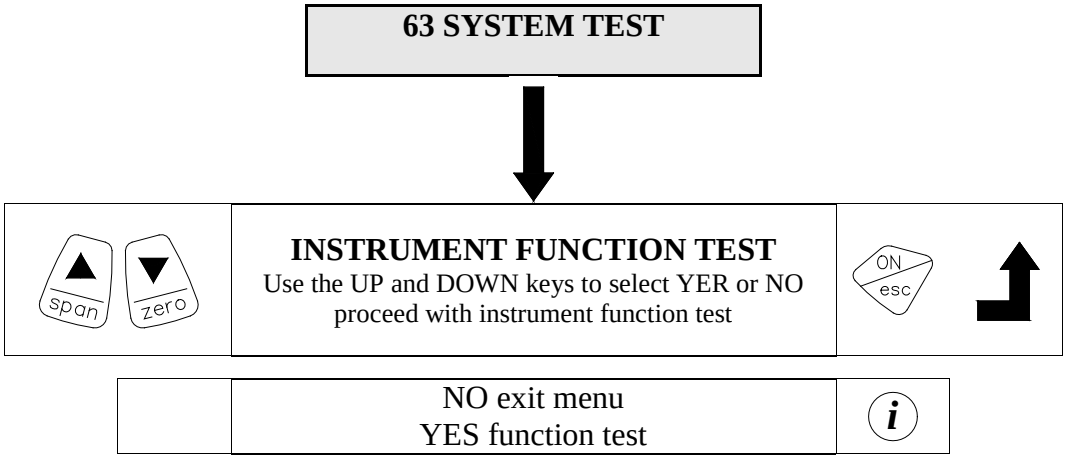
5.6.2 PASSWORD EN – Instrument password identification process

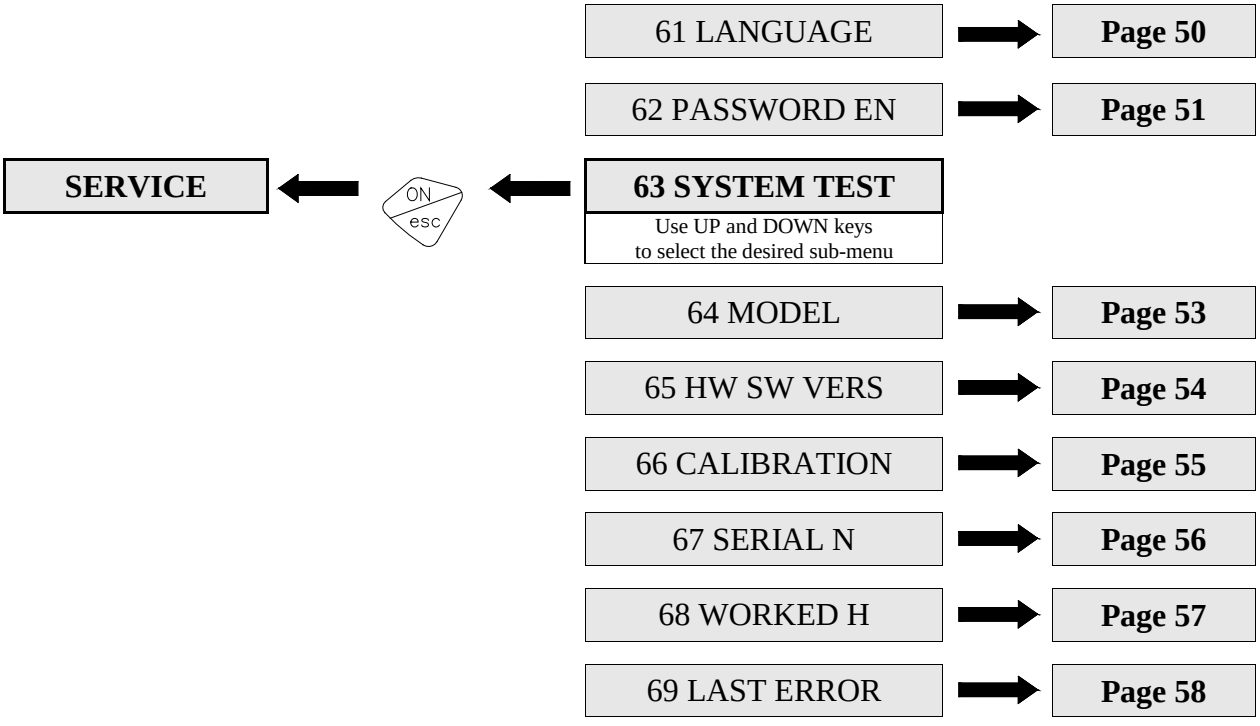




5.6 SERVICE

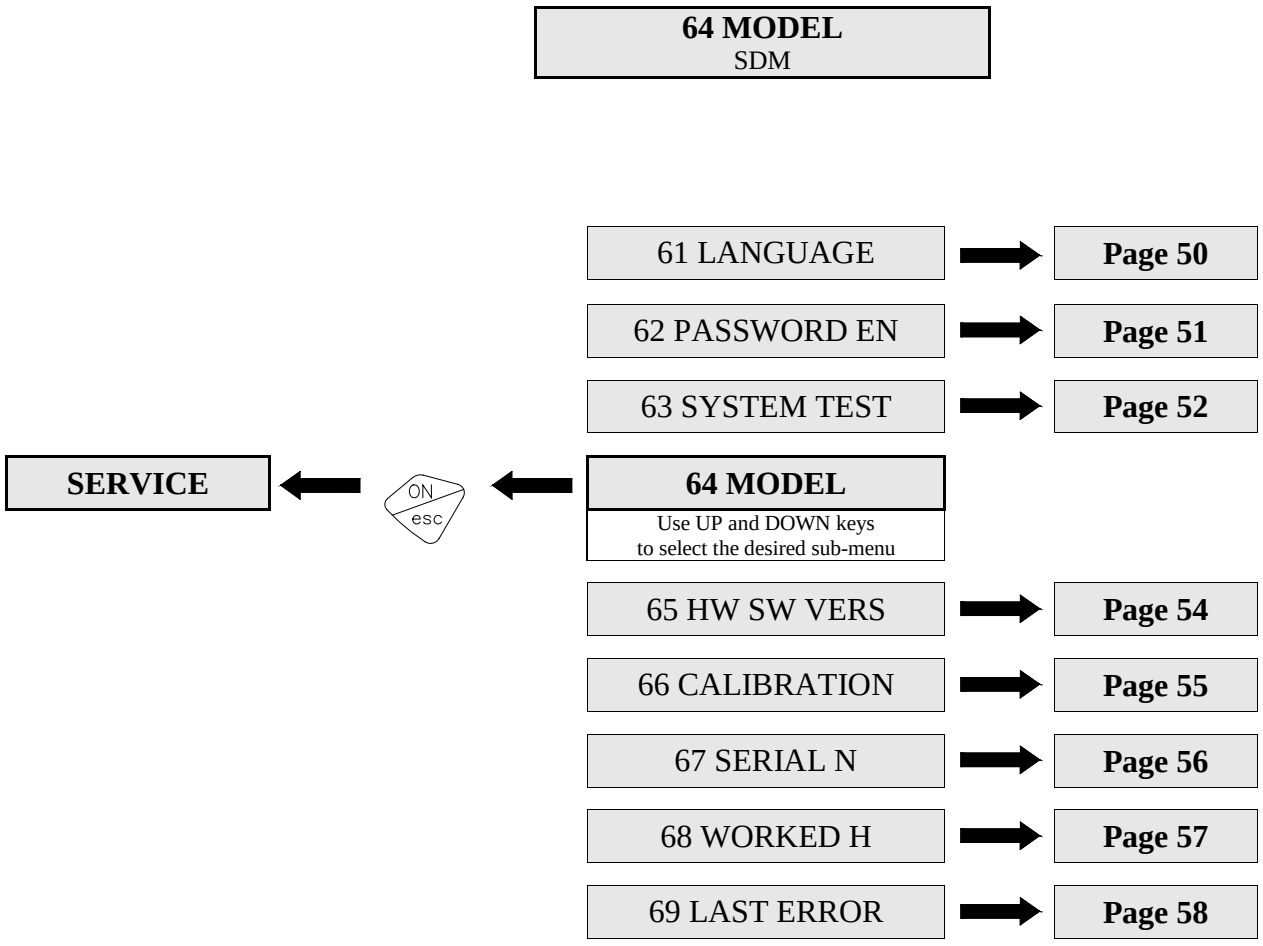
5.6.3 SYSTEM TEST – Instrument function test





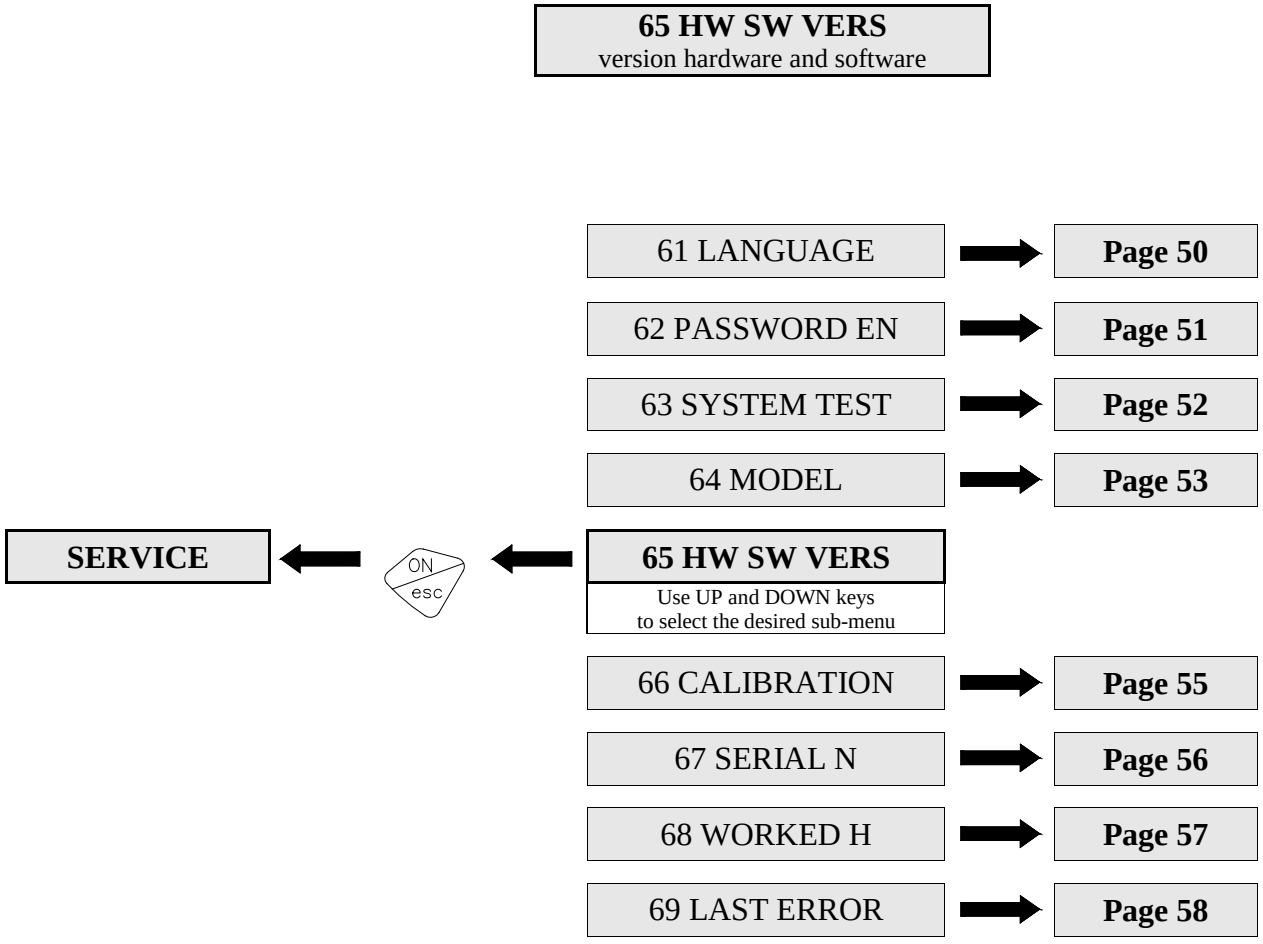
5.6 SERVICE

5.6.4 MODEL – Viewing model instrument



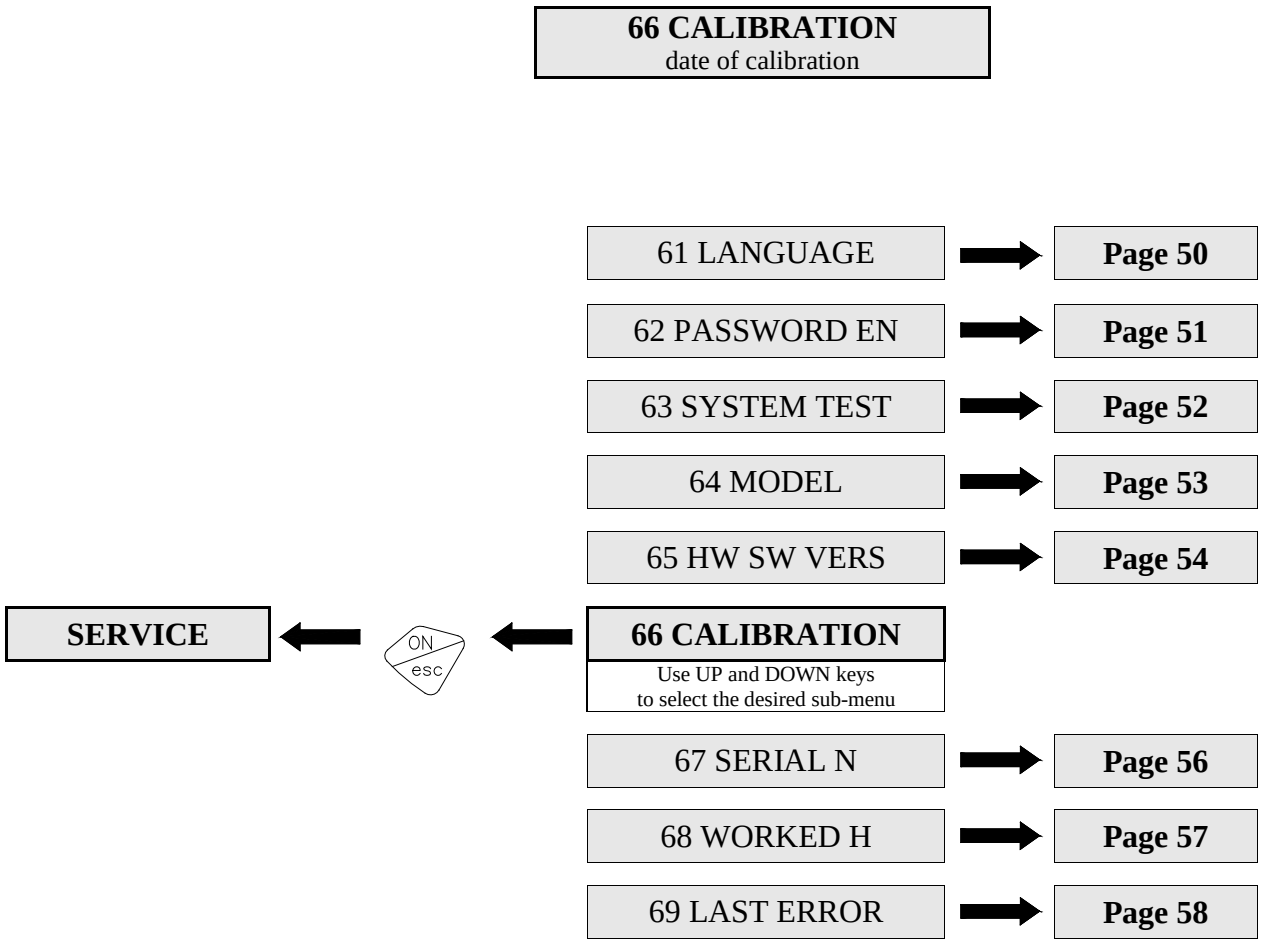
5.6 SERVICE

5.6.5 HW SW VERS – Viewing version hardware and software



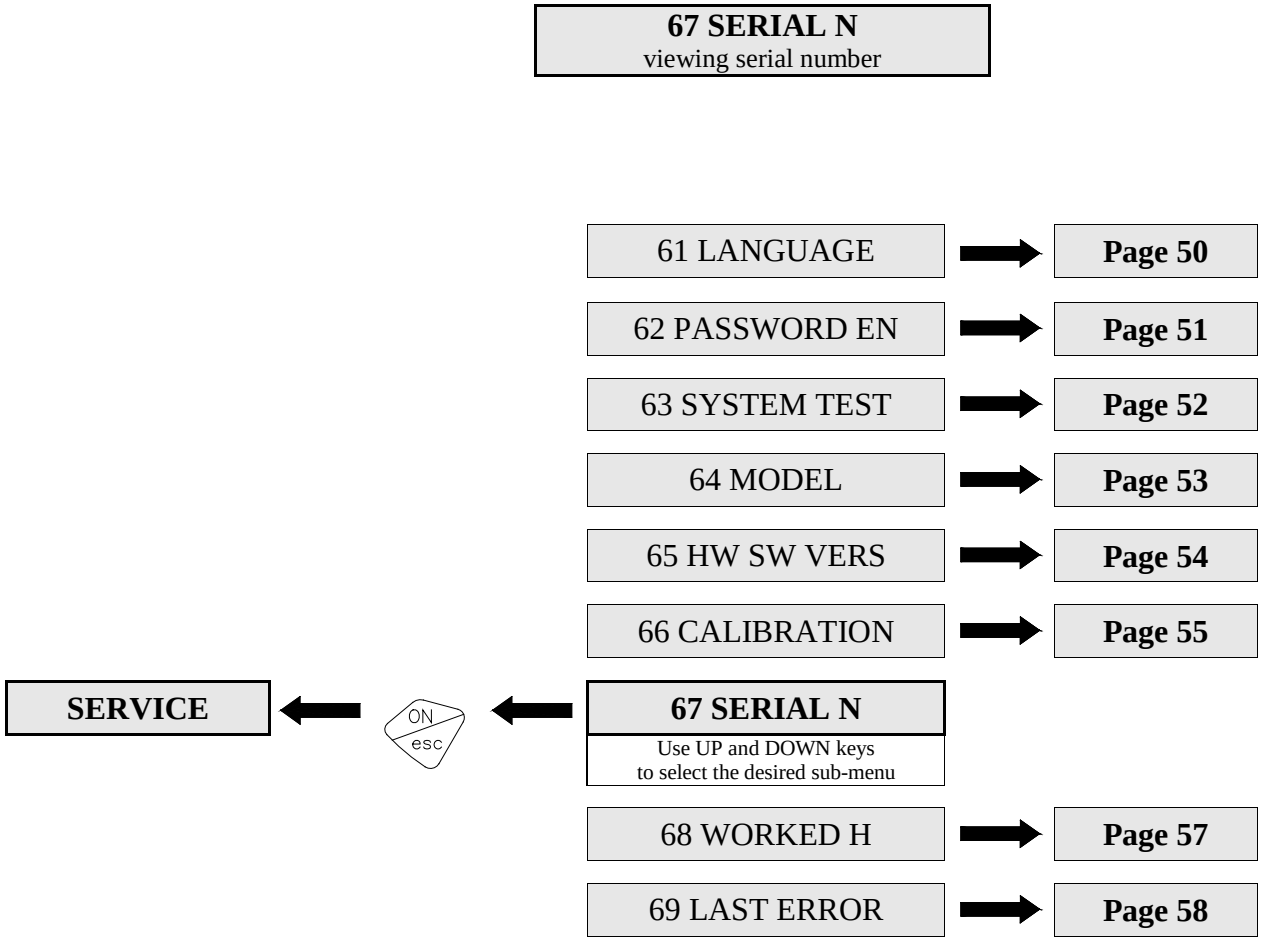
5.6 SERVICE

5.6.6 CALIBRATION – Viewing date of calibration



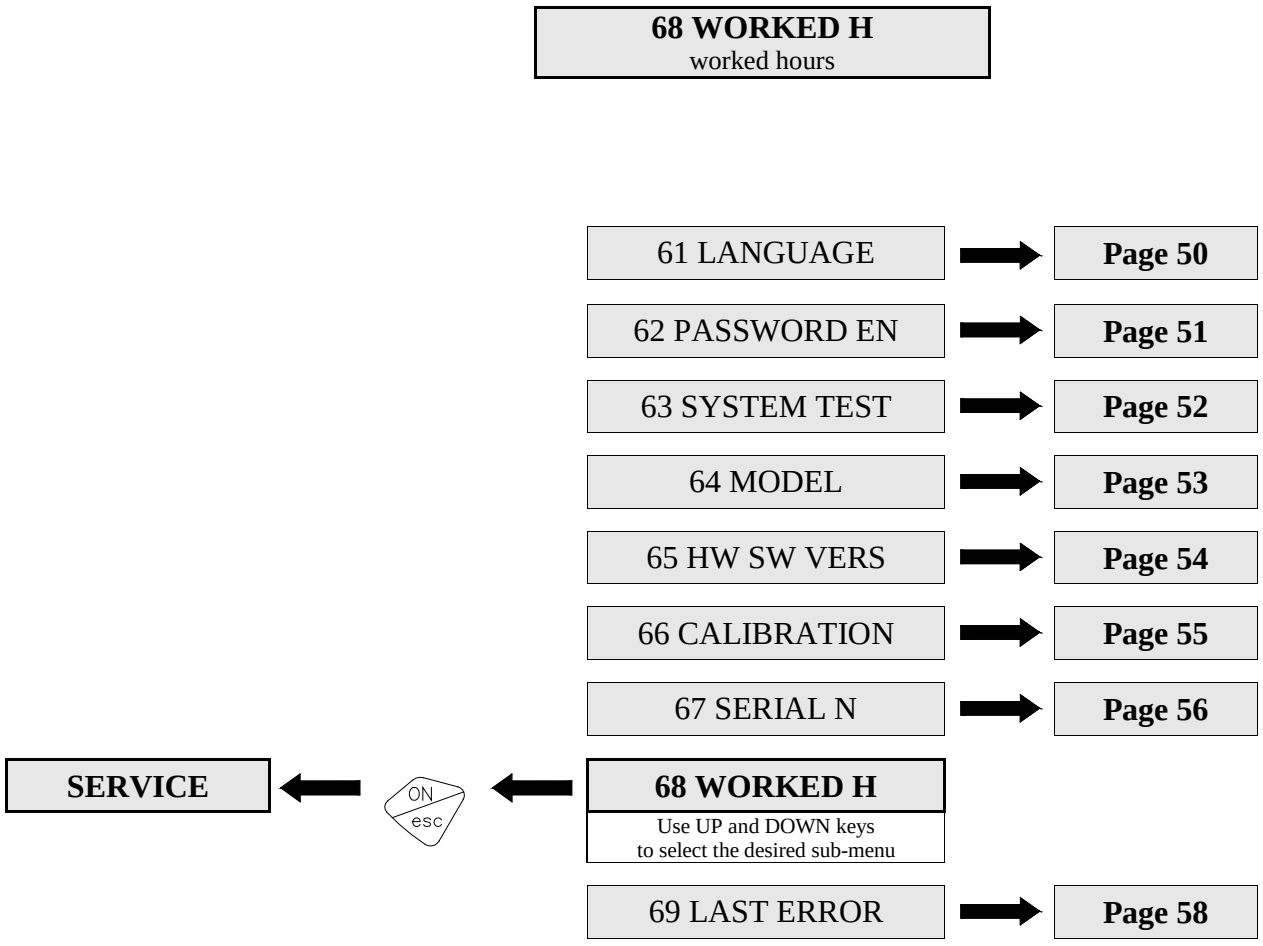
5.6 SERVICE

5.6.7 SERIAL N – Viewing serial number



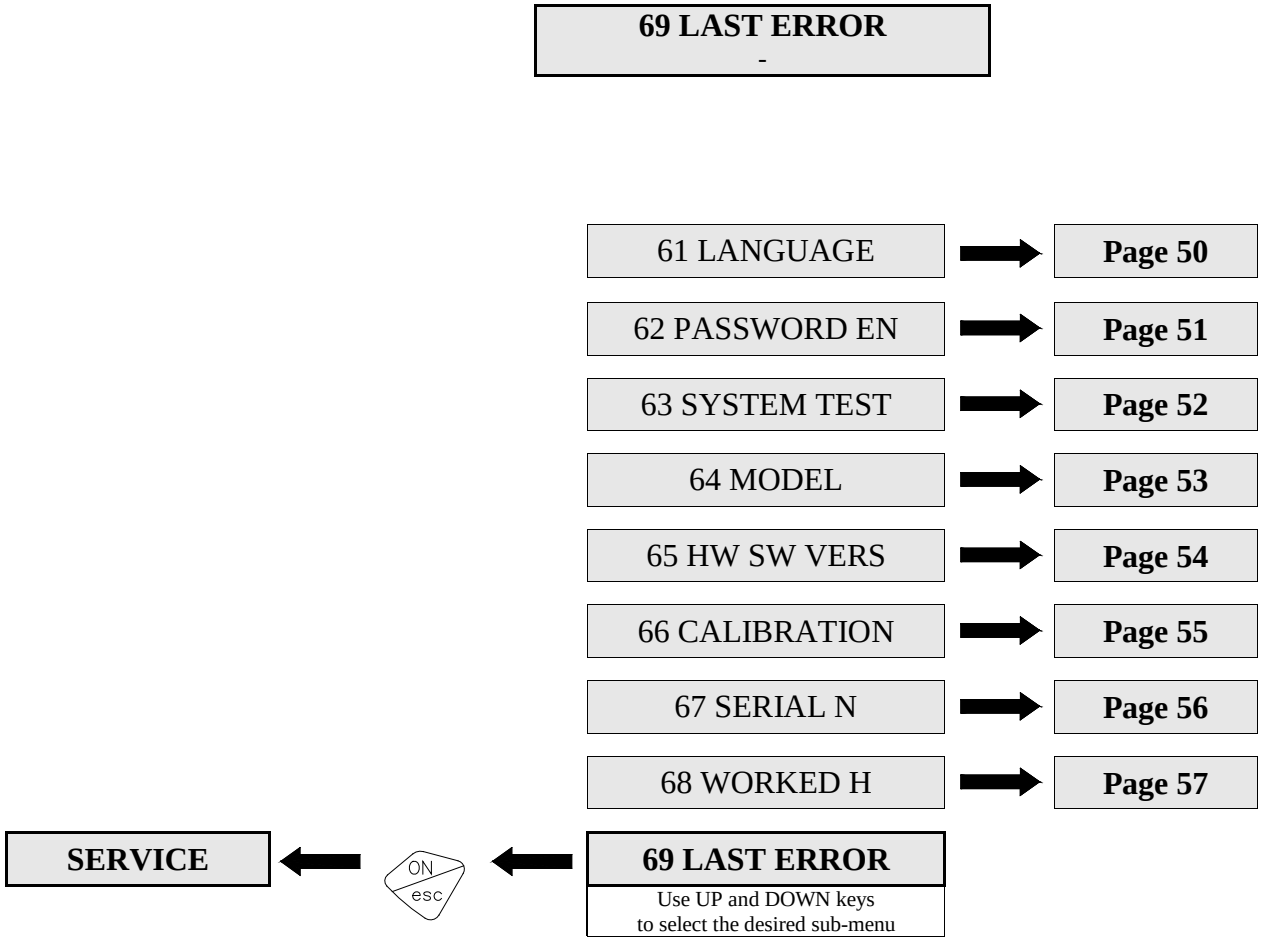
5.6 SERVICE

5.6.8 WORKED H – Viewing worked hours



5.6 SERVICE

5.6.9 LAST ERROR – Viewing last error



The following error cannot be cancelled

6. Alarm signals

6.1 Alarm signal description

Displayed errors	Description
MAX HI PRESS	Signalling of exceeding upper breakage limit
OVER HI PRESS	Signalling of exceeding upper overpressure limit
OUT HI PRESS	Signalling of exceeding upper calibration limit
OUT LOW PRESS	Signalling of exceeding lower calibration limit
OVER LOW PRESS	Signalling of exceeding lower overpressure limit
MAX LOW PRESS	Signalling of exceeding lower breakage limit

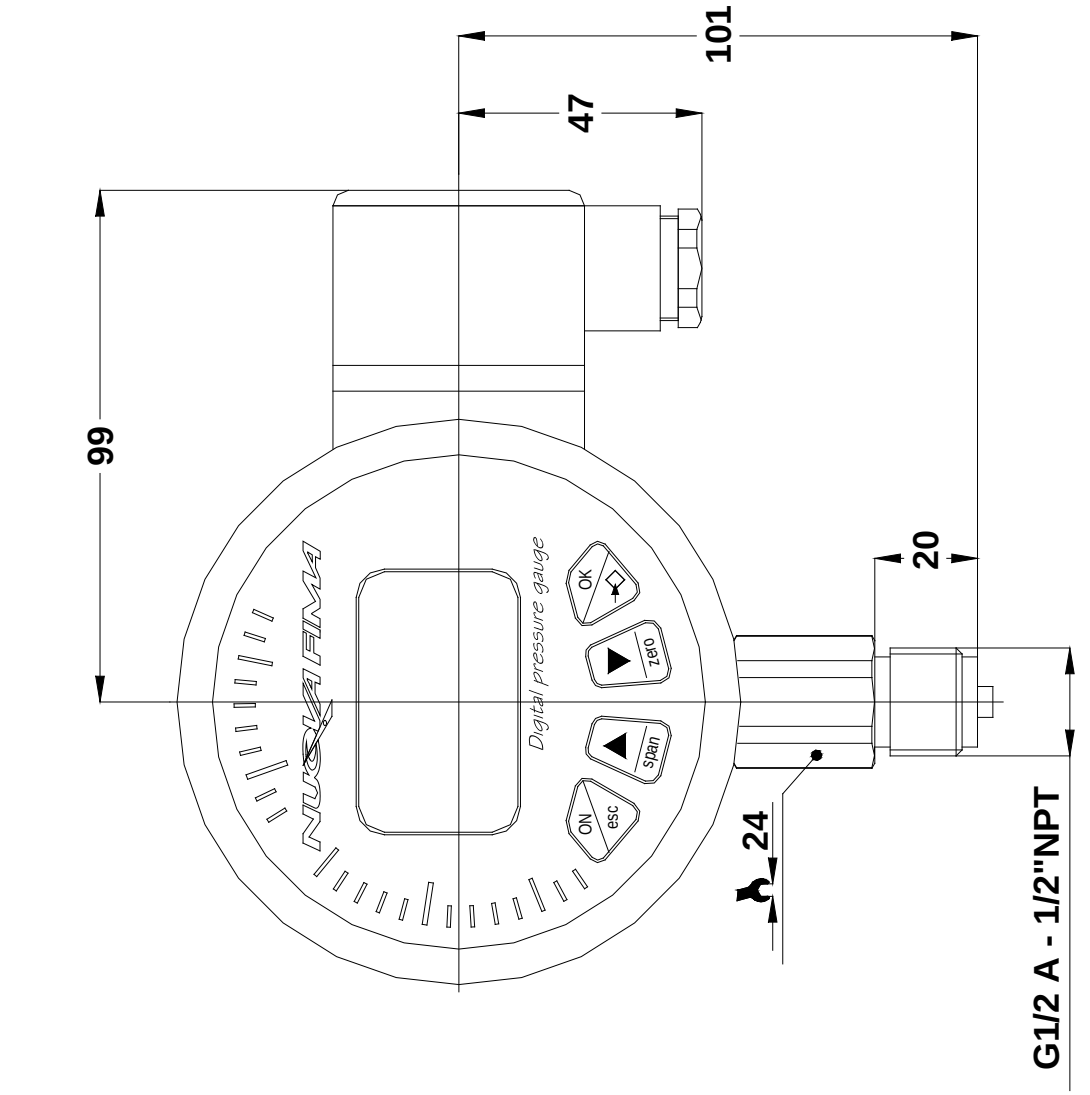
Displayed errors	Description
OUT HI LIMIT	Signalling of exceeding upper limit analogue output
OUT LOW PRESS	Signalling of exceeding lower limit analogue output

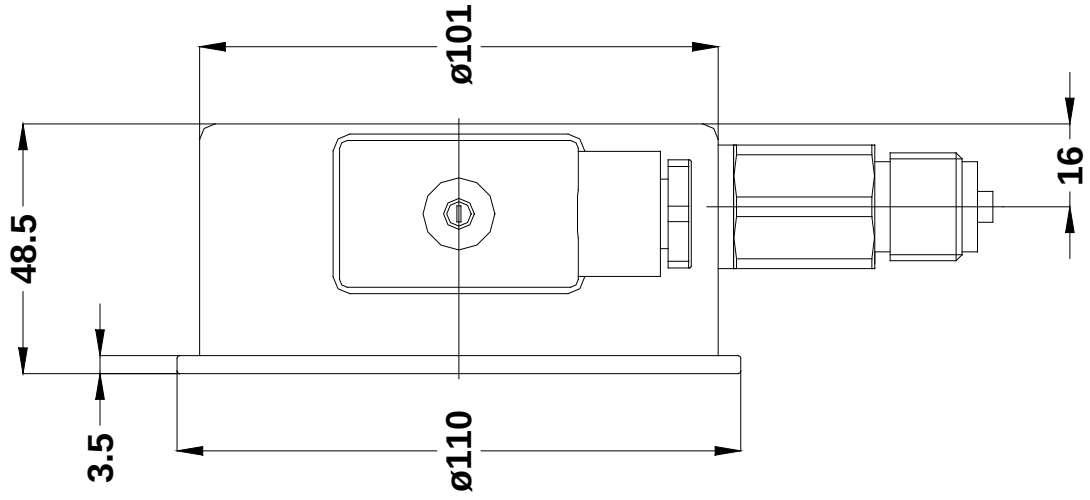
Displayed errors	Description
ERR PM	Read signal not updated for power cut
ERR Pm	Read signal not updated for power cut
ERR TAM	Read signal not updated for power cut
ERR TAm	Read signal not updated for power cut

The visualized errors clearance can be carried out through the menu 17 at the point CLEAR ERROR (see page 22)

7. Appendix

7.1 Dimension





7.2 Table showing equivalence of units of measurement

	bar	mbar	at	kPa	MPa	psi	kg/cm^2	mH2O	cmH2O	mmH2O	mmHg	inHg
bar		1000	0,987	100	0,1	14,5	1,02	10,19	1019,7	10197	750,06	29,53
mbar	$1x10^{-3}$		$9,87x10^{-4}$	0,1	$1x10^{-4}$	0,0145	$1,02x10^{-3}$	0,0102	1,02	10,20	0,750	0,0295
at	1,013	1013		101,33	0,1013	14,7	1,033	10,33	1033,3	103330	760	29,92
kPa	0,01	10	$9,87x10^{-3}$		$1x10^{-3}$	0,145	0,0102	0,1019	10,19	101,9	7,50	0,295
MPa	10	10000	9,87	1000		145	10,20	101,9	10197	101974	7500	295
psi	0,069	68,94	0,068	6,894	$6,89x10^{-3}$		0,0703	0,703	70,31	703,1	51,71	2,036
kg/cm^2	0,098	981	0,96	98,1	0,098	14,22		10	1000	10000	735,56	28,96
mH2O	0,098	98,06	0,097	9,81	$9,81x10^{-3}$	1,42	0,1		100	1000	73,554	2,89
cmH2O	$9,8x10^{-4}$	0,98	$9,7x10^{-4}$	0,0981	$9,8x10^{-5}$	0,0142	$1x10^{-3}$	0,01		10	0,735	0,0289
mmH2O	$9,8x10^{-5}$	0,098	$9,7x10^{-5}$	$9,81x10^{-3}$	$9,8x10^{-6}$	$1,42x10^{-3}$	$1x10^{-4}$	$1x10^{-3}$	0,1		0,0735	$2,89x10^{-3}$
mmHg	$1,33x10^{-3}$	1,333	$1,31x10^{-3}$	0,13	$1,33x10^{-4}$	0,0193	$1,3x10^{-3}$	0,013	1,359	13,59		0,039
inHg	0,034	33,86	0,033	3,386	$3,38x10^{-3}$	0,491	0,0345	0,345	34,53	345,32	25,4	

NOTES

NUOVA FIMA
Via C. Battisti, 59/61 – 28045 INVORIO (No) – Italy
Tel. +39 0322 253200 – Fax +39 0322 253232
www.nuovafima.com – e-mail: info@nuovafima.com