DIGITAL PANEL METERS
PROGRAMMABLE ±10000 POINTS

DGN 75S

User handbook
Valid for instruments with version 02.xx

KLAY-INSTRUMENTS B.V.
Nijverheidsweg 5
Postbus 13
Tel. 0521-591550
Fax 0521-592046
7991 CZ DWINGELOO
7990 AA DWINGELOO
Nederland
E-mail: info@klay.nl

■ Summary

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1. INTRODUCTION

The DGN75S is a high accuracy programmable digital panel meter, with 2 independent current inputs, capable of performing a calculation between these 2 inputs, for display and management by 1 of its outputs.

• The standard **DGN75S** has:

2 current inputs
Bidirectionnal ±20mA.

- Accuracy 0.05 % of the full scale at +25 °C
  Thermic drift < 150 ppm/°C
- Measurable scale overstepping from -5% to +5%
- Programmable scale factor
- Enlarging effect - square root extraction
- Mathematical calculation between the 2 channels. With programable operations and constants.
- Supply for 2 or 3 wire sensor 26 V_{DC} (±15%) 50 mA
protected from short-circuits.

AVAILABLE OPTIONS: *(specify on order)*

Insulated analog output: A
Programmable on channel 1, channel 2 or on the calculation
Active or passive current output, or voltage.
Programmable scale ratio with enlarging effect.

Relay output: R or R4
2 or 4 relays: alarm programmable on channel 1, channel 2 or on the calculation, in mode setpoint or window.
Recording of alarms.
Time delay and hysteresis adjustable on each setpoint.
Alarm messages

Insulated digital output: N
RS 485 2 wire, protocole MODBUS-JBUS.

Logic input 2 insulated logic inputs with programmable functions:
display hold,
moving of the decimal point,
tare function,
zero reset of the min. and max.

Bargraph: (16 leds display): B
Allows a quick evaluation of the variations of channel 1 or channel 2, or the calculation
Programmable scale factor

General features

• Sampling time: 100 ms
• Input impedance: drop 0.9 V max. for channel 1
  5 ohms for channel 2
• Common mode rejection rate: 130 dB
  Serial mode rejection rate 70 dB 50/60 Hz
• Zero drift compensation and self-calibration
• Insulation: Input / Power supply: 2.5 kV eff. 50Hz-1min
  Input / Output: 2.5 kV eff. 50Hz-1min

• **Power supply:** *(specify on order)*

2 Versions: High voltage or Low voltage
High voltage: 90...270 V_{AC} and 88 ...350 V_{DC} 50/60/400 Hz
Low voltage: 20...53 V_{AC} and 20...75 V_{DC} 50/60/400 Hz

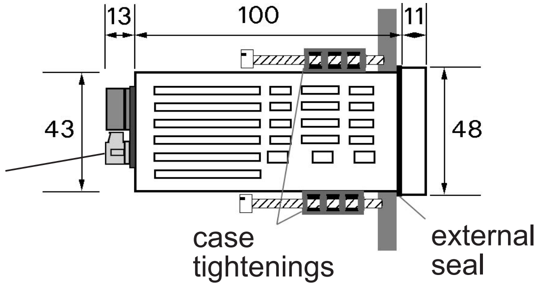
• **Power draw**: 5 W max. 8 VA max.

• **Conform** with standards EN 50081-2 on rejections and EN 50082-2; immunity (in industrial environment)
EN 61000-4-2 level 3, EN 61000-4-3 level 3,
EN 61000-4-4 level 4, EN 61000-4-6 level 3.
CE marking according to the directive CEM 89-336

2. SPACE REQUIREMENTS

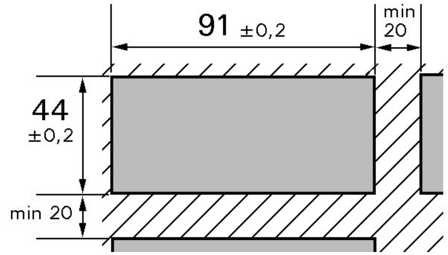
Dimensions of the case: (with terminals)

96 x 48 x 124 mm



Panel mounting

cut out 44 x 91 mm



Protection:
Front face: IP 65
Case: IP20
Terminals: IP 20

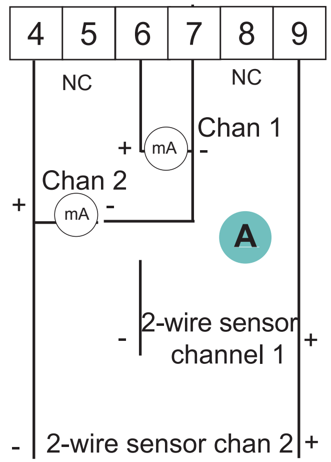
Housing:
Self-extinguishing case of black UL 94 V0 ABS.

Plug-off connectors on rear face for screwed connectings (2.5mm², flexible or rigid)

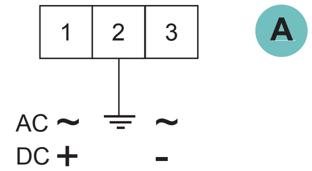
Display: ±10 000 points (14 mm)
Electroluminescent red (green optional)
4 alarm leds
+ 3 leds for indication of the displayed channel

-10 000/+100 000 points (14 mm) (optional)
-2 000 / +10 000 points (20 mm) (consult)

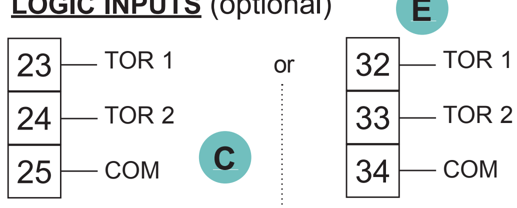
3. CONNECTINGS
INPUTS



SUPPLY

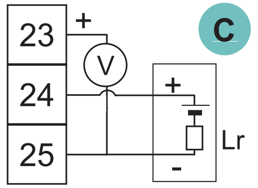


LOGIC INPUTS (optional)



OUTPUTS (optional)

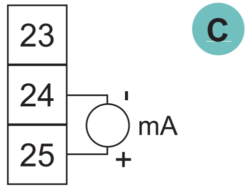
VOLTAGE
PASSIVE CURRENT



0-4/20mA passive
external source 30 V max.

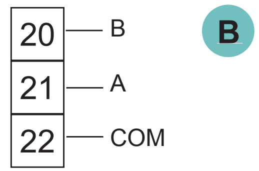
or

ACTIVE CURRENT



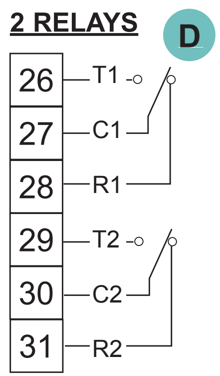
0-4/20mA active

DIGITAL

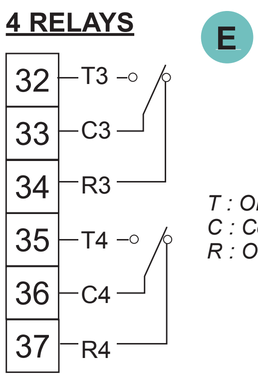


Data link RS 485

2 RELAYS



4 RELAYS

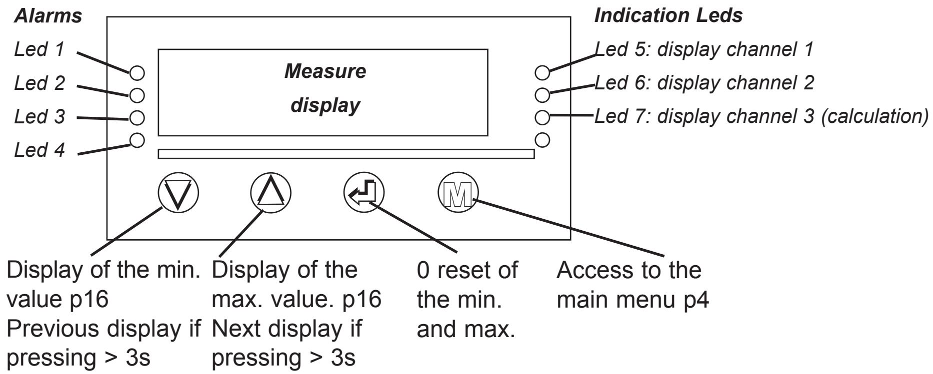


T : ON
C : Common
R : OFF

4. PROGRAMMING

4.1 Communication with the instrument

Several functions can be accessed from the front face:



Further functions can be accessed by pressing several keys simultaneously:

- ▲ + ▼ Setting of the display down scale (see p18)
- ↵ + M Setting of the display full scale (see p18)
- ▼ + M Visualisation of the direct measure (see p19)
- ▲ + M Visualisation and setting of the alarm setpoints (see p19)
- ▼ + ↵ Setting of the tare (see p19)

Reading convention:

- ——— Move through the main menu
- ·········➤ Revert to previous menu
- ☐ Blinking display: awaiting validation or setting
- ▽ Alternating information display

Entering of a parameter:

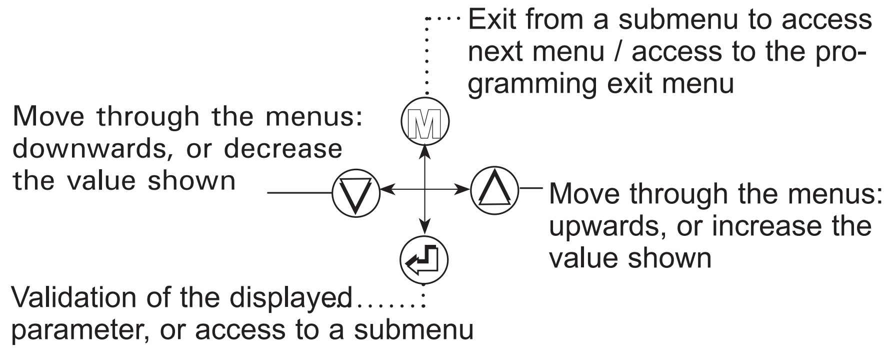
6888	First start by increasing or decreasing The 1st digit and the sign: from -9 to +9.
6588	The 2nd from 0 to 9
6528	The 3rd from 0 to 9
6520	The 4th from 0 to 9

Between each entering, validate the cipher with key ↵

4.2. Orientation through the programming

The dialogue is ensured by 4 keys located on the front face.

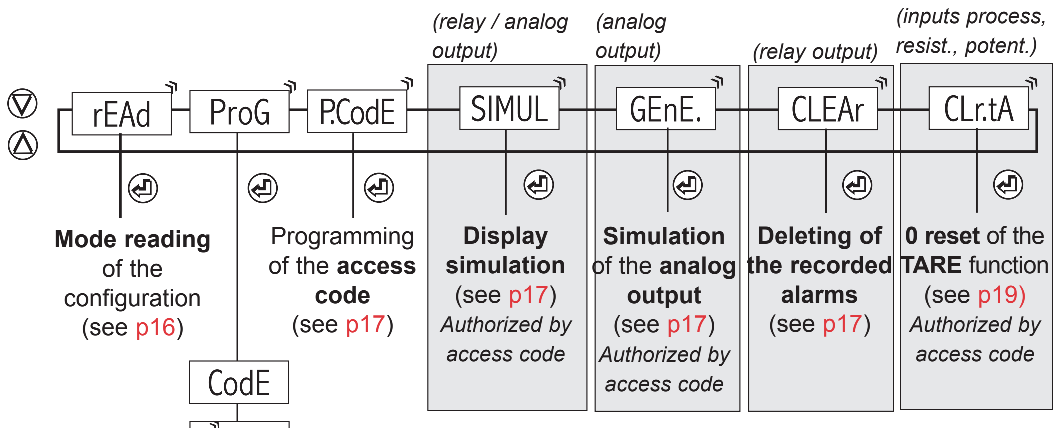
▼ ▲ ↵ M



Note: In mode programming, the instrument will automatically revert to measure with the previous configuration if no key is pressed during 1min.

4.3. Main menu

▼ ▲ **scroll menus** ↵ **vertical move**



Entering of the access code.
The access to the programming menu is protected by a 4 cipher code.
The code is 0000 on factory exit (to change the code, see page 17).

4.4. Programming menu

- InPut — Access to the programming of the inputs p5
- dISPL. — Access to the programming of the display parameters p6
- cALc. — Access to the programming of the calculation parameters p6
- OUt.MA or OUt.U — Access to the program.of the analog output p7 *(option analog output)*
- JbuS — Access to the communication parameters p7 *(option digital output)*
- tor — Access to the programming of the logic inputs p8 *(option logic inputs)*
- rELAY — Access to the programming of the relays (2 or 4 relays) p8 *(option relay output)*
- SECU — Access to the programming of the analog output and the relays in case of self-diagnosis error and/or sensor rupture p9 *(option analog output or relays)*
- Pr.diS — Access to the programming of the display: Birghtness and display function (bargraph if option) p10
- SAvE — Access to the programming exit menu p10

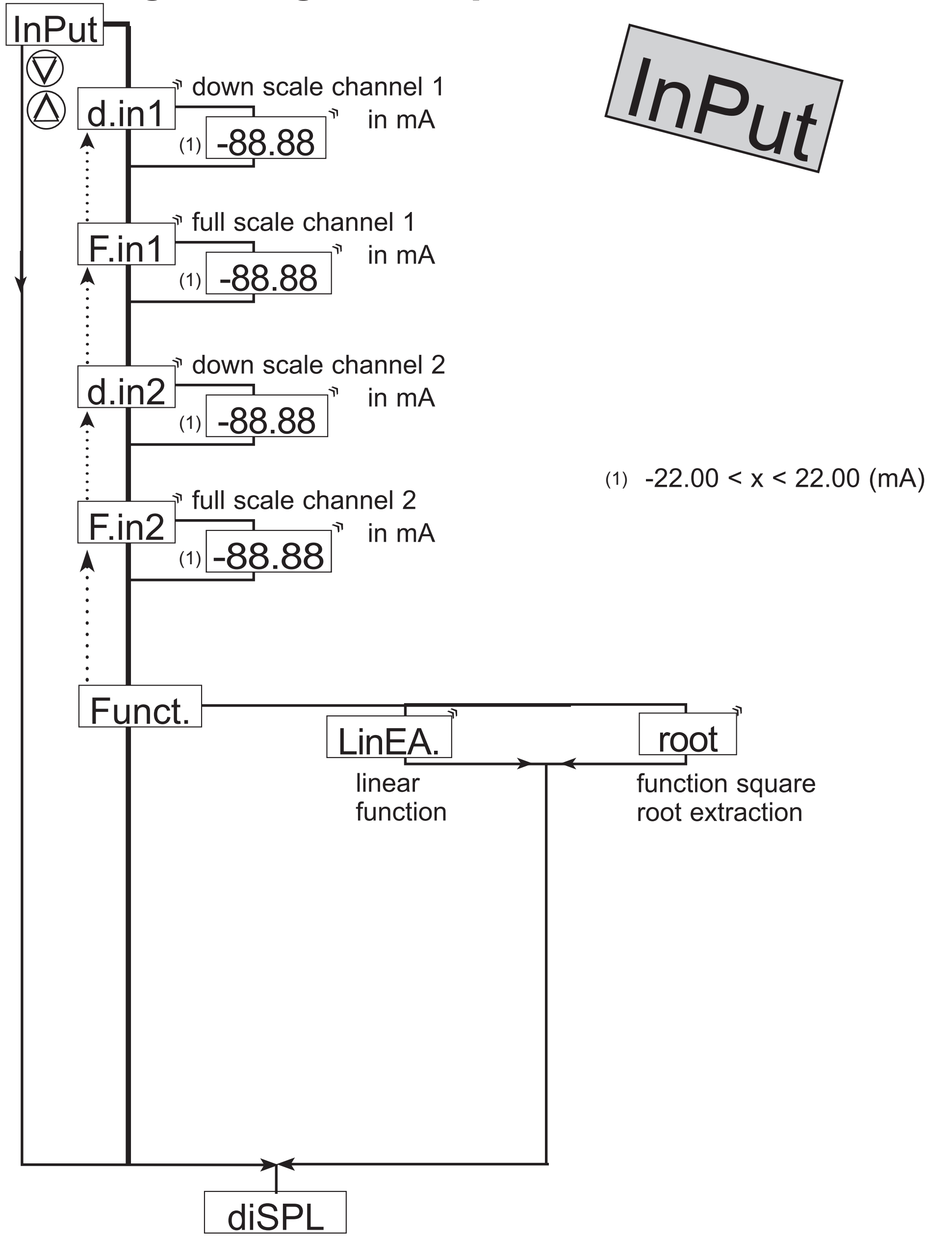
Note:
- Press Ⓜ to go to menu SAvE
- In mode programming, the instrument will automatically revert to measure with the previous configuration if no key is pressed during 1min.

Note:
Press Ⓜ to go on to next menu

▽ △ Move through the menus / choice

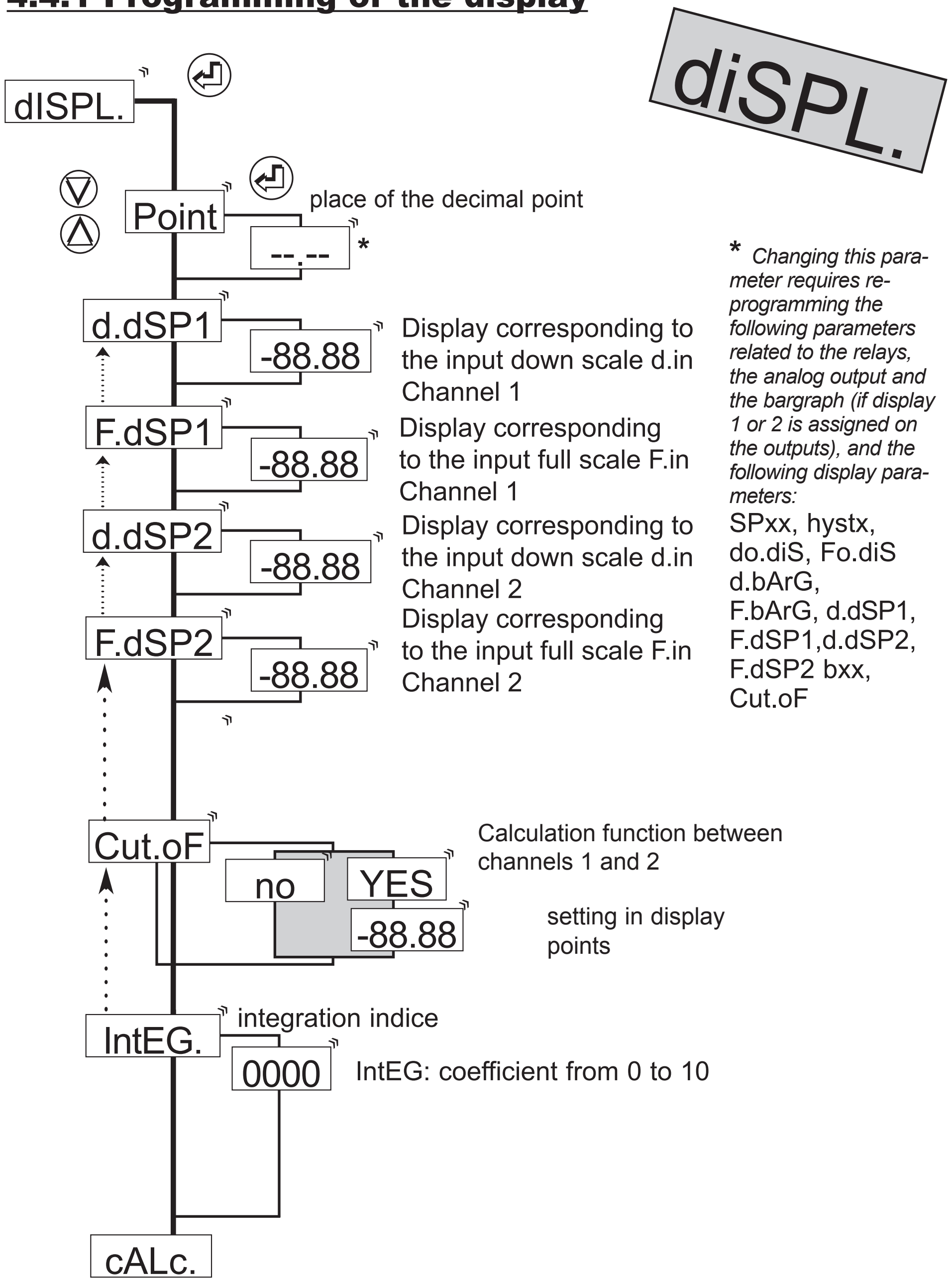
Ⓜ Menu exit / access	△ Upwards move / Increase
▽ Downwards move / decrease	↵ Validation / vertical move

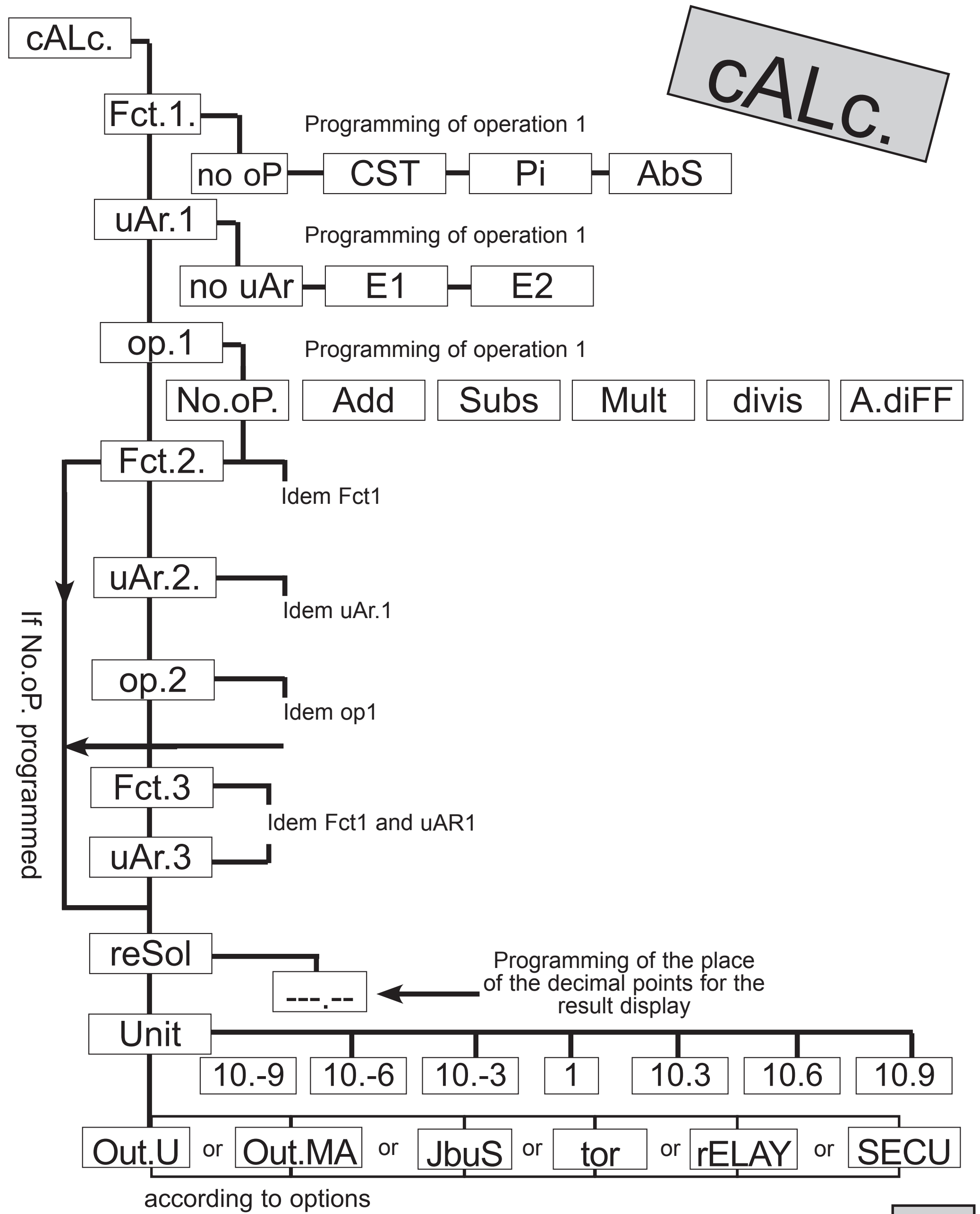
4.4.1 Programming of the input



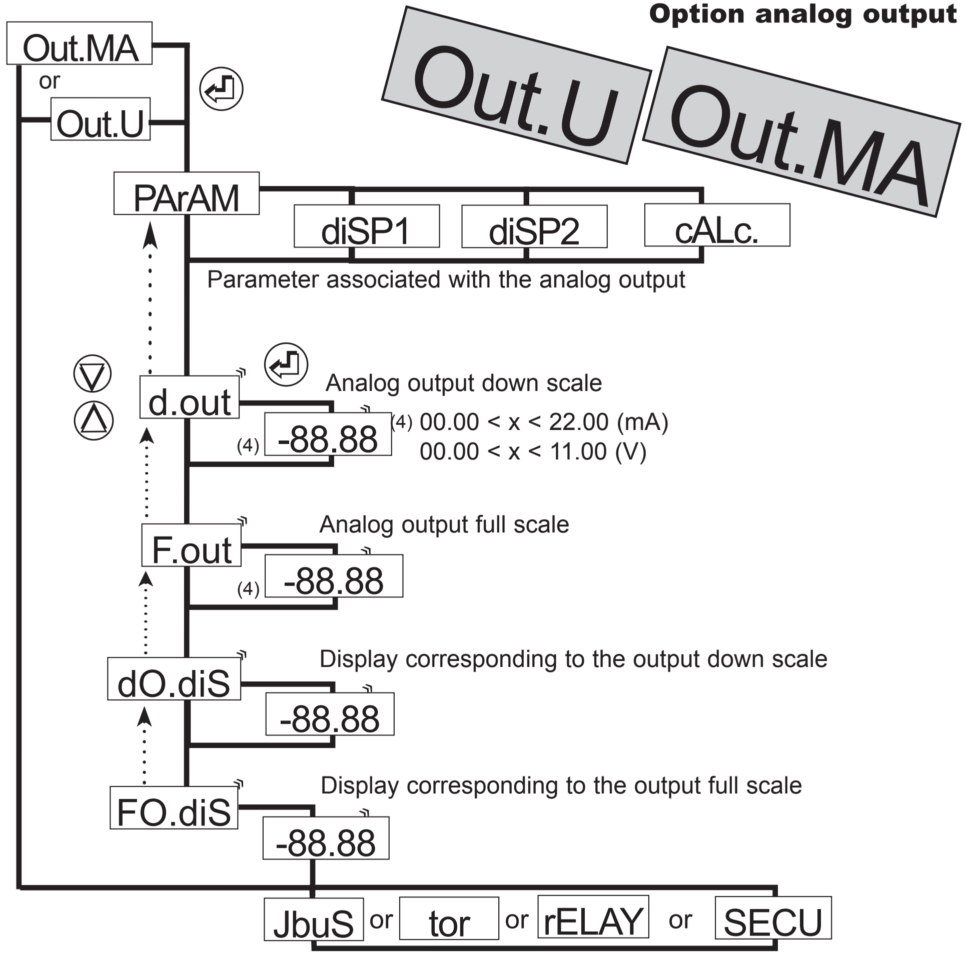
Note:
Press Ⓜ to go to menu diSPL.

4.4.1 Programming of the display





Option analog output



See also the features p11

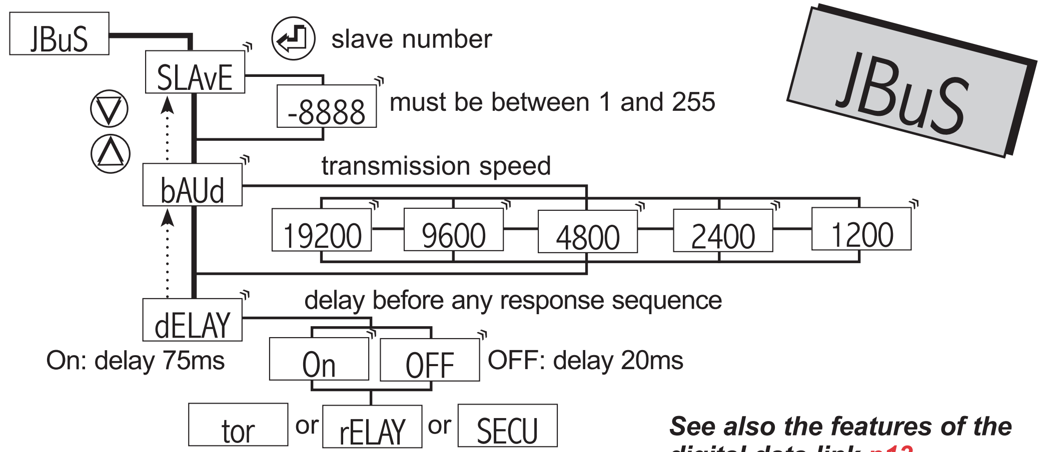
Note:
Press (M) to go on to next menu

Move through the menus / choice

Menu exit / access	Upwards move / increase
Downwards move / decrease	Validation / vertical move

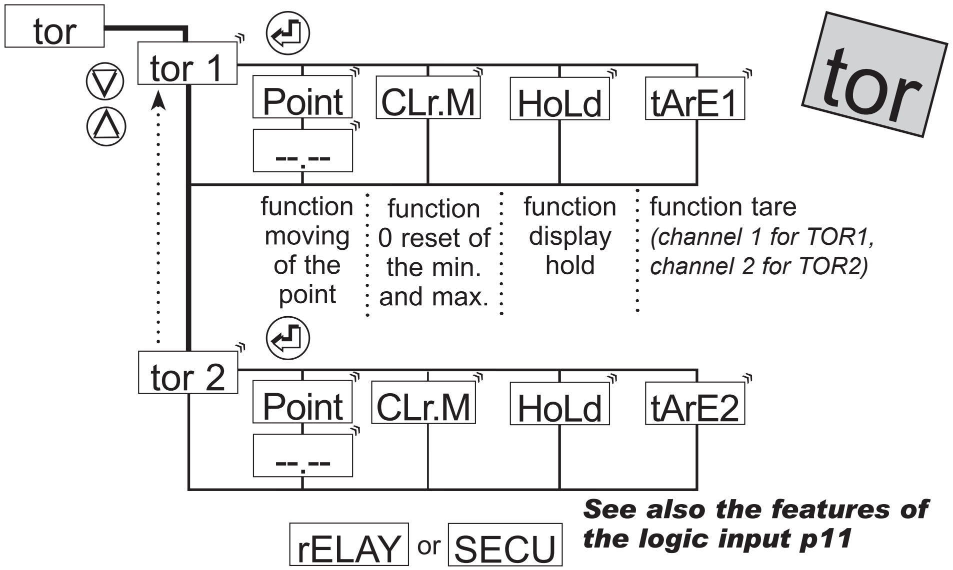
Communication parameters

Option digital output



See also the features of the digital data link p13

Option logic inputs



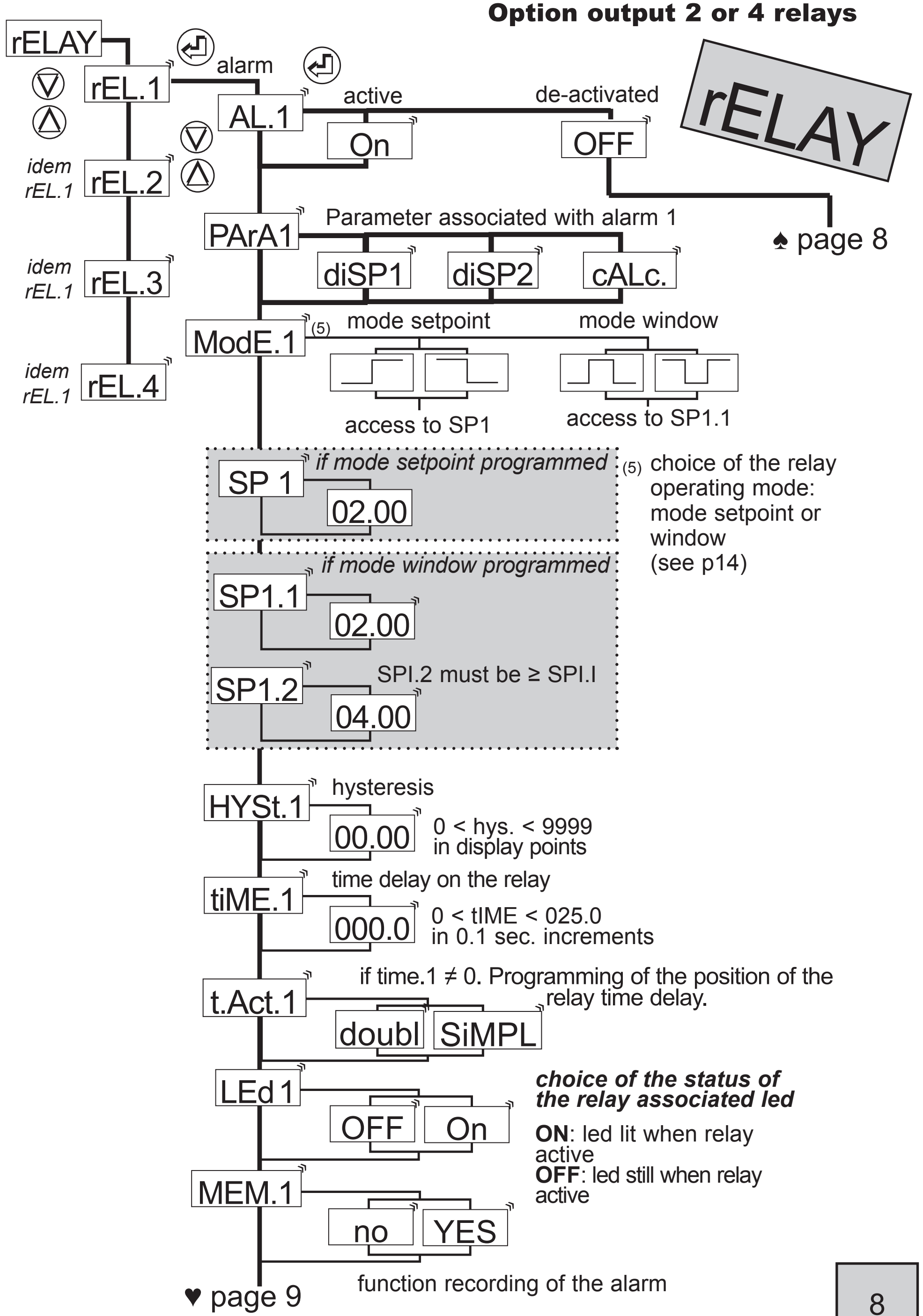
See also the features of the logic input p11

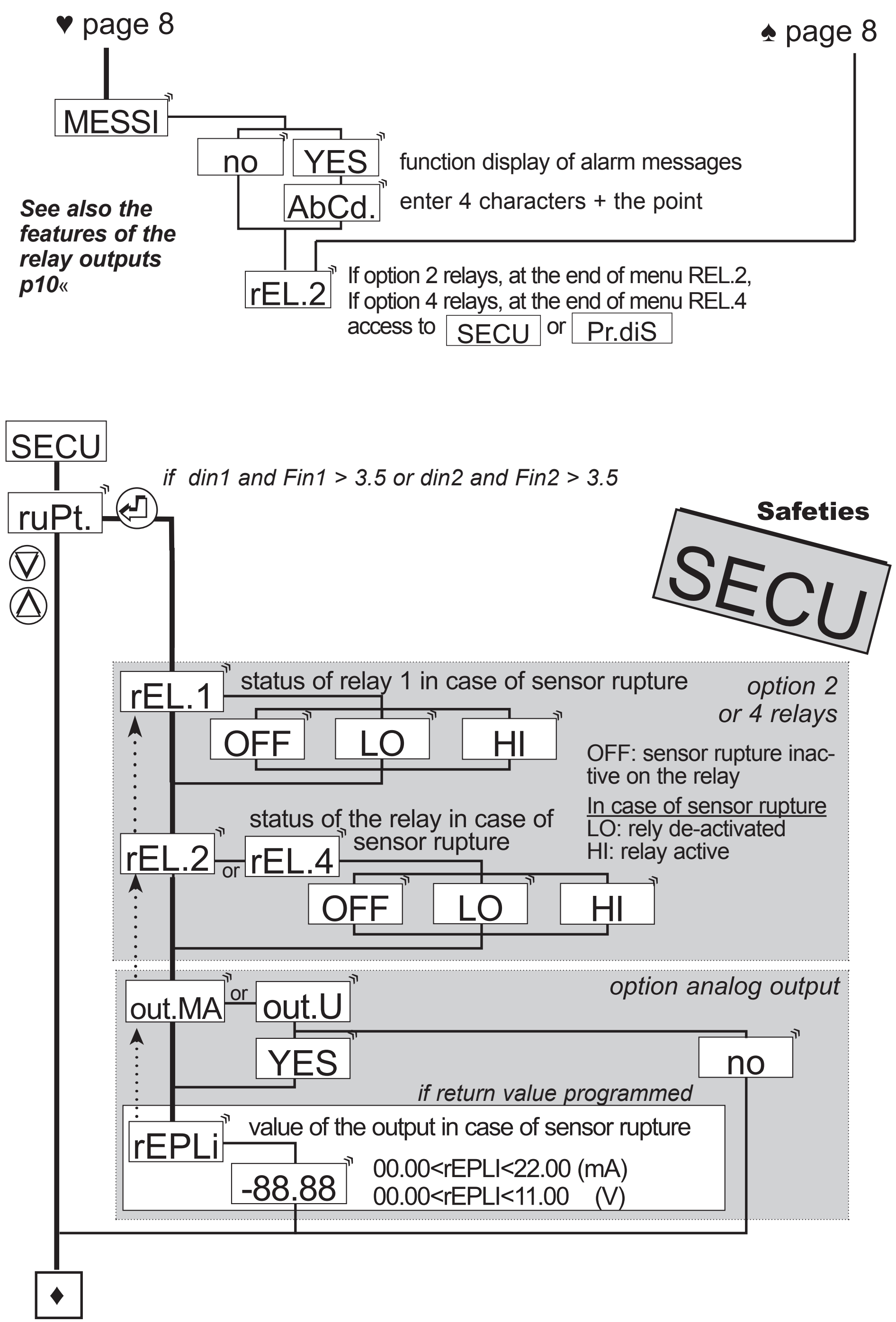
Note :
Press (M) to go on to next menu

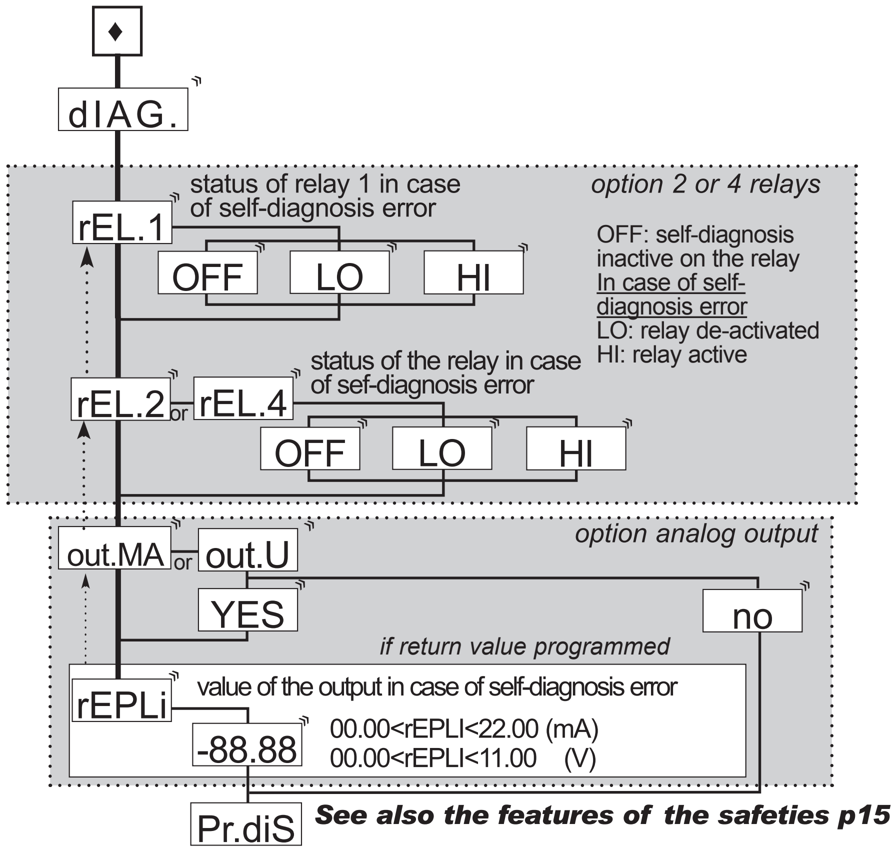
Move through the menus / choice

Menu exit / access	Upwards move / increase
Downwards move / decrease	Validation / vertical move

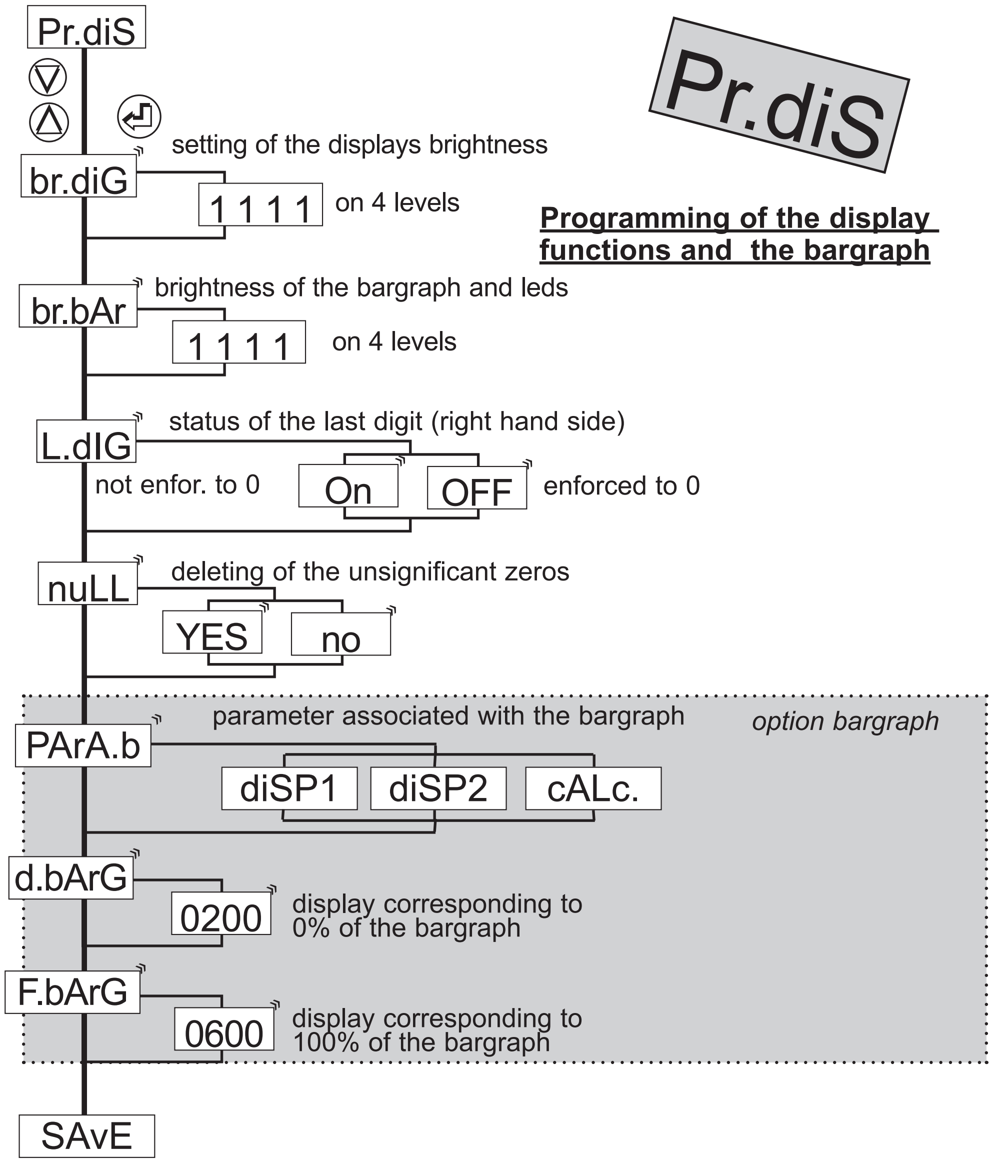
Option output 2 or 4 relays




♥ page 8
♠ page 8
MESSI
no
YES
function display of alarm messages
AbCd.
enter 4 characters + the point
See also the features of the relay outputs p10«
rEL.2
If option 2 relays, at the end of menu REL.2,
If option 4 relays, at the end of menu REL.4
access to SECU or Pr.diS
SECU
ruPt.
if din1 and Fin1 > 3.5 or din2 and Fin2 > 3.5
Safeties
SECU
rEL.1
status of relay 1 in case of sensor rupture
option 2 or 4 relays
OFF
LO
HI
OFF: sensor rupture inactive on the relay
In case of sensor rupture
LO: rely de-activated
HI: relay active
rEL.2 or rEL.4
status of the relay in case of sensor rupture
OFF
LO
HI
out.MA or out.U
option analog output
YES
no
if return value programmed
rEPLi
value of the output in case of sensor rupture
-88.88
00.00<rEPLI<22.00 (mA)
00.00<rEPLI<11.00 (V)
♦

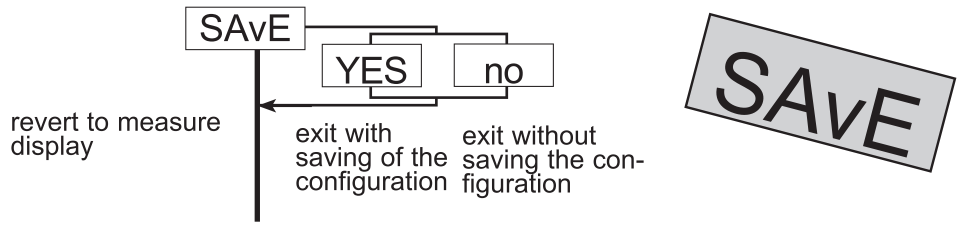

♦
dIAG.
rEL.1
status of relay 1 in case of self-diagnosis error
option 2 or 4 relays
OFF
LO
HI
OFF: self-diagnosis inactive on the relay
In case of self-diagnosis error
LO: relay de-activated
HI: relay active
rEL.2 or rEL.4
status of the relay in case of sef-diagnosis error
OFF
LO
HI
out.MA or out.U
option analog output
YES
no
if return value programmed
rEPLi
value of the output in case of self-diagnosis error
-88.88
00.00<rEPLI<22.00 (mA)
00.00<rEPLI<11.00 (V)
Pr.diS
See also the features of the safeties p15

Programming of the display functions and the bargraph



See also the display features p11

Exit from the programming with or without saving



Note : An exit from mode programming with saving of the configuration (SAVE, YES) will automatically reset to zero the la tare, the min. and the max., as well as the alarm recordings.

In case of modification of the place of the decimal point, the instrument will propose after SAVE YES all the parameters related to the decimal which have not been modified.

4.5. Input features and programming limits

- Linear

Measurable limits of the input: -22mA to 22mA

Caliber	Display resolution	Input level resolution	Accuracy
from -20mA to +20mA	± 1 digit	14 bits	0.05% of the MR

- Unlinear

Square root extraction (effective on the 2 inputs) root

Note: The function square root tends to amplify the background noise of the input signal when getting near to zero.

To avoid the ripples caused by this noise, simply programme a cut-off value (in display points).

– If display full scale > display down scale and if the display is ≤ to the cut off value, then it is maintained at down scale.

– If display full scale < display down scale and if the display is ≥ to the cut off value, then it is maintained at down scale.

Logic inputs (optional)

Board of 2 logic inputs: input signal 24 Vdc

Possible functions:

HoLd Display hold in case of activation of the logic function. The display and the analog output remain fixed in case of variation of the input signal. The relays will carry on reacting to the input signal.

CLr.M Zero reset of the min. and the max. Activating the logic function provoques a zero reset of the min. and max.

tArE1 tArE2 Activation of the function tare on channel 1 for logic input 1 and on channel 2 for logic input 2. The meter switches to mode tare, the tare being the value of the display present at the moment of the activation.

Point Function moving of the decimal point.

_.___ In case of activation of the logic function, the decimal point will place itself as it has been programmed.

4.6. Output features and programming limits

4.6.1 Display features

diSPL.

Point Place of the decimal point for the display of the inputs

d.dSP1 d.dSP2 Display corresponding to the input down scale of channel 1 or channel 2

F.dSP1 F.dSP2 Display corresponding to the input full sale of channel 1 or channel 2

CutoF Programming of the cut off (effective on channel 1 and channel 2) expressed in display points

If display full scale > display down scale and if the display is <= to the cut off value, then it will be held at down scale.

If display full scale < display down scale and if the display is >= to the cut off value, then it will be maintained at down scale.

Response time: intEG

Integration indice of the digital filtering (effective on the 2 channels) programmable from 0 to 10. For use in case of unsteady input signal.

Pr.diS

Setting of the digits brightness br.diG

1111 Lowest brightness

4444 Strongest brightness

Setting of the brightness of the bargraph and the leds br.bAr

1111 Lowest brightness

4444 Strongest brightness

The brightness level is visualised directly on leds 5 to 8 and on the bargraph

Caution: during the setting, the 4 leds and the bargraph no longer represent the mesure, including in mode reading.

Inhibition of the last digit (bottom weight): L.diG

In mode programming, the menu L.diG allows suppressing the display of the last digit, the latter being enforced to 0 if OFF is validated.

Deleting of the unsignificant zeros: nuLL

nuLL = YES Suppresses the display of the unsignificant zeros on the left hand side.

Eg.: value to be displayed: 0015

nuLL = no display = 0015

nuLL = YES display = 15

Eg.: value to be displayed: 00.15

nuLL = no display = 00.15

nuLL = YES display = 0.15

Display factor of the bargraph (option bargraph only):

Parameter associated with the bargraph: PArA.b

- diSP1 Channel 1
- diSP2 Channel 2
- cALc. Calculation between channels 1 and 2

d.bArG Display corresponding to an extinguished bargraph (0%)
F.bArG Display corresponding to a fully lit bargraph (100%)
In case of overstepping, the bargraph starts to blink. A sensor rupture will be shown on the bargraph by the lighting of one led out of two.

4.6.2 Calculation function

cALc.

The equation performed by the DGN75S is of the type [(Fct1.uAr1) op1 (Fct2.uAr2)] op2 (Fct3 uAr3)

uAr.x: corresponds to the assigned input variable:

- no.uAr : none
- E1 : input 1
- E2 : input 2

Fct x: corresponds to the type of function applied to the variable, or not.

- no.op: no operation
- CSt : constant adjustable from ± 0.001 to ± 9999
- Pi : π constant with a value of 3,1416
- Abs: Absolute value of the variable (can apply only if E1 or E2 is selected.)

Opx : Corresponds to the type of operation applied between the two elements of the calculation.

- no.op: No operation (in this case equation ended)
- Add: summ
- SubS : substraction
- Mult: multiplication
- diviS : division
- A.diFF : absolute value of the difference

rESOL : place of the decimal point on the result

Unit : choice of the result unit

10.-9 nano	10.3 kilo
10.-6 micro	10.6 mega
10.-3 milli	10.9 giga
1 unit	

Example of programming:

1) You want the average of the 2 inputs:

$$\frac{E1+E2}{2}$$

In the formula [(Fct1 var1) op1(Fct2 var 12)] opt2 (Fct3 var3) programme:

Fct1 = Fct2 = no.op
var1 = E1 var2=E2
opt1 = add.
opt2 = divis
Fct3 = Const with a value of 2
var3 = no var

2) You want the ratio of the difference of the inputs in absolute value on input 1, displayed in % from 0.0 to 100.0

Say $100.\frac{|E1-E2|}{E1}$

Programme:

Fct1=Fct2=Cst with a value of 100
Uar1 = E1 Uar2=E2
Opt1=A.DIFF
Opt2=divis
Fct3=no op.
Uar3=E1

reSol ---.- and unit: 1

Analog output $\boxed{\text{Out.MA}}$ **or** $\boxed{\text{Out.U}}$

active or passive current output 0/4-20mA (Vmax=30Vdc), or voltage output 0-10V

- Accuracy 0.1% in relation to the display (at +25°C)
- Residual ripple <= 0.2%
- Admissible load 0Ω < Lr < 500Ω (current) Lr>= 2kΩ (voltage)
- Programmable scale ratio with enlarging effect
- Response time : 40ms in relation to the display

PArAM	Parameter associated with the analog output
diSP1	channel 1
diSP2	channel 2
cALc.	calculation of the 2 channels
d.out	Down scale of the analog output (eg. : 04.00 → 4mA)
F.out	Full scale of the analog output (eg. : 20.00 → 20mA)
d0.diS	Display value corresponding to the output down scale
F0.diS	Display value corresponding to the output full scale

In measure mode, the analog output can not overstepp 10% of the greatest of the 2 values: d.out and F.out

4.6.4 Digital output

- Data link RS485 (2 wire)
- Protocoles MODBUS-JBUS format of data: integer and double integer
- exclusive transmission format: 1 start bit
  8 parityless bits
  1 stop bit

SLavE	Slave number between 1 and 255
bAud	Transmission speed between 1200 and 19200 bauds
dELAY	Delay before any response sequence

*Table of **modbus addresses**, fused functions, see the annexe* *p25.*

4.6.5 Relay outputs

2 relay outputs $\boxed{\text{rEL1}}$ $\boxed{\text{rEL2}}$ or 4 relay outputs $\boxed{\text{rEL1}}$ $\boxed{\text{rEL2}}$ $\boxed{\text{rEL3}}$ $\boxed{\text{rEL4}}$

- Hysteresis independently programmable in the display unit
- Time delay independently programmable from 0 to 25 s in 0.1s. increments
- NO-NC contact 8 A - 250 V on resistive load

Activation or de-activation of alarm x

On	The status of the relay depends on the performed programming.
Off	The relay x remains still

PArA.x Parameter associated with alarm x

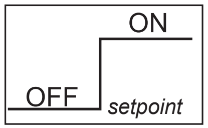
diSP1 channel 1

diSP2 channel 2

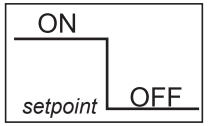
cALc. calculation of the 2 channels

Choice of the operating mode: ModE.x

Mode setpoint

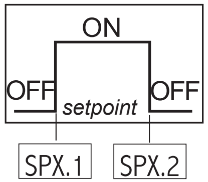


or

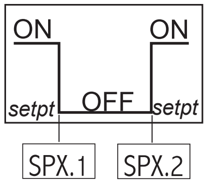


Legend:
ON coil supplied
OFF coil not supplied

Mode window



or



Choice of the led associated with the relay: LEd.x

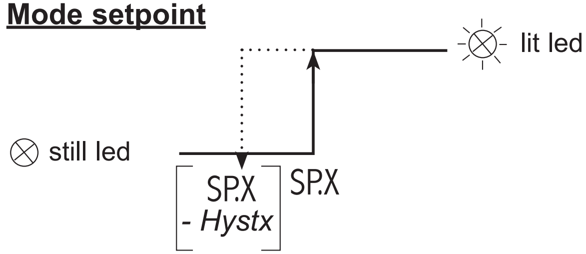
The led indicates the alarm status.

On Led lit when relay active (coil supplied)

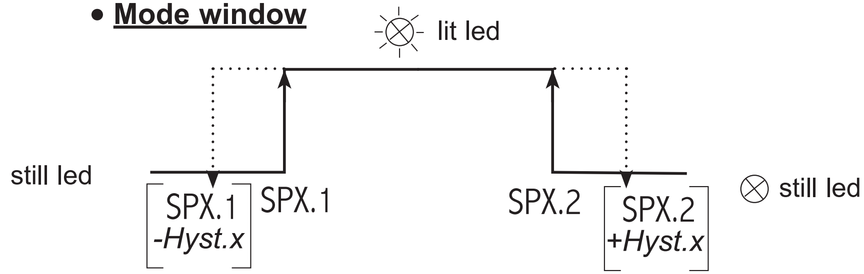
OFF Led still when relay active (coild supplied)

HYSt.x Setting of the hysteresis in display points. The hysteresis is active on switching from lit led to still led, that it to say on switching out of alarm, as the led represents the alarm status.

• **Mode setpoint**



• **Mode window**



• **Time delay on the alarm** tiME.x

The relay time delay is adjustable from 000.0 to 025.0s. in 0.1s increments. It is active both on switching and switching back.

• **Positionning of the time delay** t.Act.x

SIMPL Time delay on switching on alarm

doubL Time delay on switching on alarm and out of alarm.

• **Alarm recording** MEM.x

Allows recording the alarm after a setpoint has been passed. When the measure reverts below the alarm setpoint, the relay remains on and the led blinks to warn the user that the setpoint has been passed (the reset the recording of alarms to zero see menu CLEAR p17)

Note: An exit from mode programming with saving of the configuration will reset the alarm recordings to zero.

Display of alarm messages: MESS.x

A programmed alarm message can be made to appear alternating with the measure. The message will appear only during the alarm, while the associated led is lit.

Setting of the setpoints:

There are 2 ways to adjust setpoints.

- either in mode programming entering the correct safety access code
- or by pressing simultaneously on (M) and (△) if the access to a quick entering has been authorised on the programming of the code (see p17)

4.6.6 Safeties

Self-diagnosis:

The meter permanently watches any drifts which may occur on its components. The self-diagnosis serves to warn the user in case of abnormal increase of these drift before they may provoque false measures.

The self-diagnosis error information can be reported:

- on the display: an error message appears alternating with the measure. An error code is registered and can be read in the menu ABOUT (see p24)

Coding:

1 : Programming error
2 : Gain error
4 : Offset error
8 : Input calibration error
16 : Output calibration error
64 : Upper or lower electrical overstepping of the input.
128 : Dividing by 0.

If the instrument detects for example and offset error (4) and a gain error (2) the **value of the error code will be 6** (4+2).

- on the relays

OFF No influence on the relay in case of self-diagnosis error

LO Relay de-activated (coil not supplied) in case of self-diagnosis error

HI Relay active (coil supplied) in case of self-diagnosis error

Note: the led is either still or lit according to its programming in the menu rELAY

- on the analog output

If a return value has been entered, the value can be comprised beween 0 and 22mA (current output), 0 and 11V (voltage output)

Sensor rupture

The sensor rupture can be detected if the down and full scale (channel 1 or channel 2) > 3.5mA

The sensor rupture information can be reported:

- on the relays

OFF No influence on the relay in case of sensor rupture

LO Relay de-activated (coil not supplied) in case of sensor rupture detection

HI Relay active (coil supplied) in case of sensor rupture detection

- on the analog output

If a return value has been entered, the value can be comprised between 0 and 22mA (current output), 0 and 11V (voltage output)

- on the display

Message OPEn whichever the selected display.

Note: the sensor rupture detection has a priority over the self-diagnosis.

4.7 Reading of the configuration

rEAd

Validation / vertical move

- InPut — Reading of the input parameters
- diSPL — Reading of the measure display parameters
- cALc. — Reading of the parameters of the calculation function
- out.MA / out.U — Reading of the analog output parameters (option analog output)
- JbuS — Reading of the communication parameters (option digital output)
- tor — Reading of the parameters of the logic inputs (option logic inputs)
- rELAY — Reading of the alarm parameters (option 2 or 4 relays)
- SECU — Reading of the safety parameters for sensor rupture or self-diagnosis of the outputs
- Pr.diS — Reading of the programming parameters of the display functions
- About — Reading of the instrument internal parameters

In each reading sub-menu, use keys △ and ▽ to move, and key ↵ to visualise parameters

If no key is pressed during 20 s., the instrument will automatically revert to measure display.

Submenu

Validation / vertical move

- About
- d420 — type of the instrument
- n0 — number of the instrument
- A0123
- ProG — programme version
- 02.00
- 0PtI0. — XXXXX (1 2 3 4 5.) code of the installed options
- Ar4--.
- Err. — error code in case of self-diagnosis error
- 0000
- CH.SUM — check sum of the flash memory
- FC4E

X1 : - : no analog output
X1 : A : analog output

X2X3 : - - : no relay output
X2X3 : r - : output 2 relays
X2X3 : r 4 : output 4 relays

X4 : - : no digital output
X4 : n : digital output

X5 : - : no logic input
X5 : t : 2 logic inputs

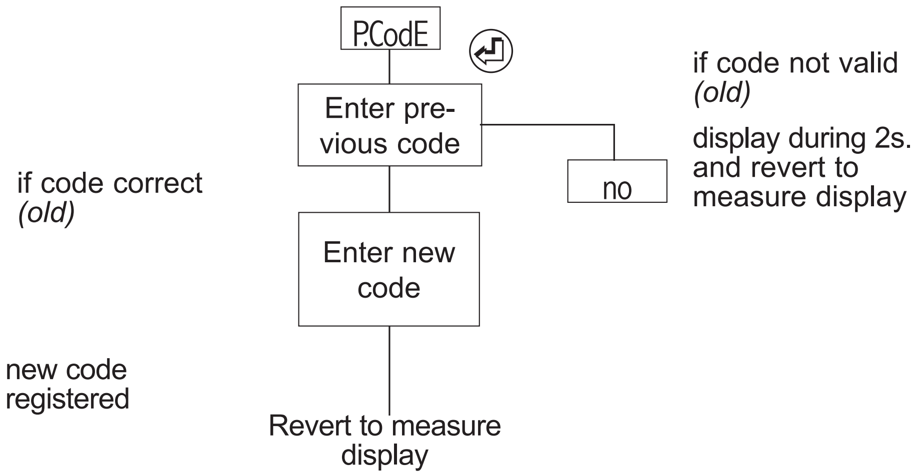
(.) : decimal point still: no bargraph
(.) : decimal point lit: bargraph

4.8 Access code

An access code adjustable from 0000 to 9999 serves to protect the meter and its setpoints from unauthorized programming, and to lock the access to some functions.

0 0 0 0	Factory code
x x x x	
0 to 5	Access to the display shifting
6 to 9	No access
0 to 5	Access to the display and output simulations
6 to 9	No access
0 to 5	Access to the function “tare”
6 to 9	No access
0 to 5	Access to the quick entering of alarm setpoints
6 to 9	No access

4.9 Programming of a new access code

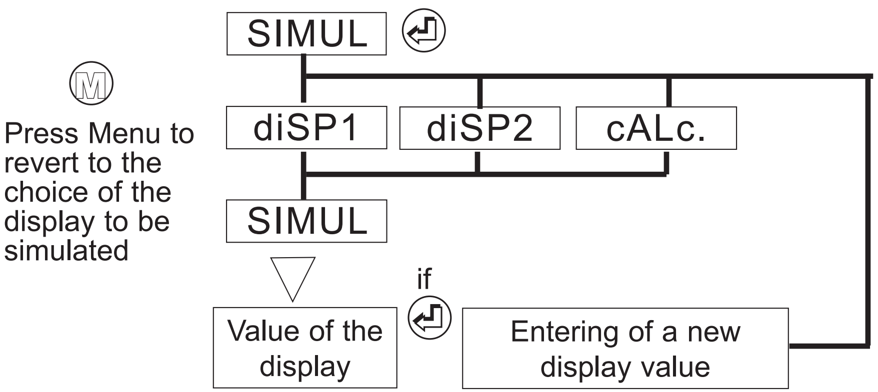


Reminder: If no key is pressed during 1 min, the instrument will revert to measure display.

4.10 Functions which can be accessed in the main menu

4.10.1 Display simulation *(accessible according to the programmed access code and if option relays or analog output)*

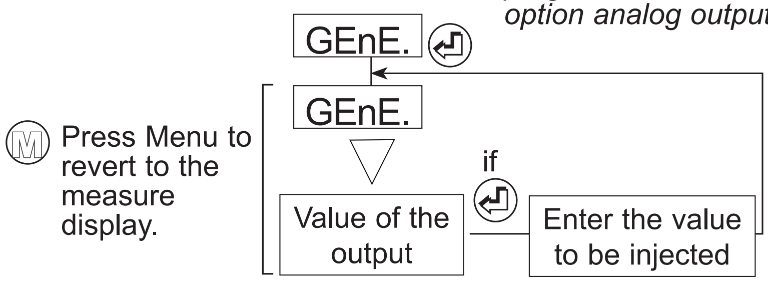
The display can be simulated with the meter in order to validate the configuration of the analog output and the relay outputs in the installation.



Note: The instrument no longer measures during the simulation. The analog output, the relay outputs and the calculation will react according to the entered display. If alarm messages have been programmed, they may appear during the simulation.

4.10.2 Simulation of the analog output *(generator mode)*

(accessible according to the programmed access code and if option analog output)

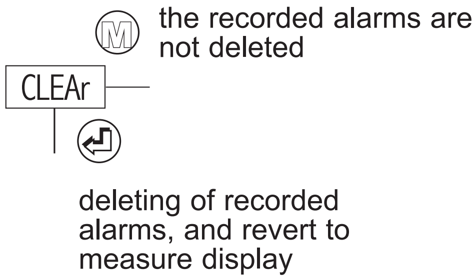


Note: The instrument will carry on measuring during the simuation. Only the analog output no longer reacts to the measure.

4.10.3 Menu CLEAR: deleting of the recorded alarms

If the function recording of alarms has been programmed:
The relay status is recorded after a setpoint has been passed.

If the setpoint is passed back the other way, the relay status does not change and the corresponding led starts to blink.
To come back to the normal state (led not blinking and relay in the correct status), use menu CLEAr.



Note: If no key is pressed during 20s, the instrument will revert to measure display.
Note: an exit from mode programming with saving of the configuration will reset the recorded alarms to zero.

4.10.4 Menu CLR.TA: suppressing of the programmed tare *(accessible according to the programmed access code)*

CLr.tA

the recorded tare is not deleted

suppressing of the recorded tare, and revert to measure display

Reminder: if no key is pressed during 20s, the instrument will revert to measure display.

5 . FUNCTIONS WHICH CAN BE ACCESSED DIRECTLY FROM THE FRONT FACE

5.1 Functions which require pressing only 1 key

a) Display of the min. value

Measure display

InF.

Alternating information display

02.00 Minimum value of the channel present on display

b) Display of the max. value

Measure display

SUP.

Alternating information display

08.00 Maximum value of the channel present on display

c) Switching to the display of the previous channel

Measure display

Press (>3s) on

d) Switching to the display of the next channel

Measure display

Press (>3s) on

Reminder:
Led 5 → display of channel 1
Led 6 → display of channel 2
Led 7 → display of the calculation between channel 1 and channel 2
The display present on the meter is recorded in case of power supply cut.

e) Deleting of the min. and max. values

Measure display

CLr.M

deleting of the recorded min. and max. (of the 3 channels), and revert to measure display

The instrument reverts to measure display.

Reminder: if no key is pressed during 20s, the instrument will revert to measure display.
Note: an exit from mode programming with saving of the configuration will reset the recorded min. and max. to zero.

5.2 Functions which require pressing several keys

5.2.1 Shifting of the chan. present on the display: chan.1 or chan.2 *(accessible according to the programmed access code)*

Shifting of the display down scale (AdJ.Lo)

Shifting of the display full scale (AdJ.Hi)

After selecting on the display the channel which is to be shifted and after injecting a signal corresponding to the down (or full) display scale, press simultaneously on keys and (or on keys and) The message ADJ.LO (ADJ.HI) appears alternating with the value, to indicate that you are in the menu adjustment)

By pressing on and you can increase or decrease the down (or full) display scake.
If you keep pressing during 3s on key or , you can access to a quick increasing or decreasing of the display value.

Press key to validate this shifting. Once the shiftings are validated, the input thus shifed will keep this shifting even after a setting off tension.

Press on (or do not press any key during 20s) to revert to measure display without modification.
The instrument will then readjust its scale factor and its display factor of the specified channel, to obtain the required result on the display.

5.2.2 Visualisation and setting of the alarm setpoints (option 2 or 4 relays)

Setting of the setpoints: there are 2 ways to adjust setpoints:
- either in mode programming entering the correct safety acces code
- or by pressing simultaneously on and

The meter will then show the message SP.x or SP.xx alternating with the value of the corresponding setpoint.
The values of the various setpoints can be accessed by or
These setpoints can then be modified (if access code < 6000 (see p14)) by pressing

When the setpoint is adjusted press to revert to the setpoints reading menu.
Once all setpoints are adjusted, simply press and the meter will revert to mode measure, taking the new values of the setpoints into account.

5.2.3 Visualisation of the direct measure

Press and to visualise the signal directly in mA without processing : scale factor, square root.

5.2.4 Setting of the tare (accessible according to the programmed access code)

Pressing and will enforce the display of the input signal of the selected channel to the display down scale d.diSP .

Note : The tare is not memorised in case of power supply cut. To suppress the tare, validate menu CLr.tA in the main menu. An exit from mode programming with saving of the configuration will reset the tare to zero.

6. ERROR MESSAGES

2000	Measure of one of the two channels in overstepping
OPEn	Sensor rupture on one of the two channels
Err.I	Value set out of range
----	Upper or lower electrical overstepping of one of the two channels
OL	Displayable value overload
Er.xxx	Self-diagnosis error

7. GENERAL WARRANTY TERMS

WARRANTY applying and duration
This appliance is garanteed for a duration of 1 year against any design or manufacturing defects, under normal operating conditions.

Processing conditions * : Processing not under warranty will be submited to the acceptance of a repair estimate. The customer will return the products at his charge, and they will be restored to him after processing. Without a written agreement on the repair estimate within 30 days, products will not be held.

** Complete warranty terms and details available on request.*

8. LEXIQUE

Messages shown by the meter in mode programming and/or reading.

General access

rEAd	Access to the reading of the parameters
ProG	Access to the programming of the input and output parameters
CodE	Code for access to the programming of the input and output parameters
P.CodE	Programming of a new access code
SiMUL	Access to the display simulation
GEnE	Access to the simulation of the analog output
CLEAr	Deleting of the recorded alarms
CLr.tA	Suppressing of the tare

Inputs

InPut	Access to the submenu programming of the input
d.in1	Input down scale channel 1
F.in1	Input full scale
d.in2	Input down scale channel 2
F.in2	Input full scale
Funct.	Choice of the processing function
LinEA.	Linear
root	Extraction of the square root

Logic inputs

tor	Access to the submenu programming of the logic inputs
tor1	Programming of logic input 1
tor2	Programming of logic input 2
Point	Function moving of the decimal point
--.--	Place of the decimal point
CLr.M	Function deleting of the min. and max.
HoLd	Function display hold
tArE	Function tare

Display

diSPL.	Access to the submenu programming of the display
Point	Choice of the place of the decimal point
--.--	Place of the decimal point
d.dSP1	Display down scale channel 1
F.dSP1	Display full scale channel 1
d.dSP2	Display down scale channel 2
F.dSP2	Display full scale channel 2
Cut.of	Cut off programmable or not
InteG.	Integration indice

Calculation function

uAr.x	Assigned input variable
no.uAr	None
E1	Input 1
E2	Input 2
Fct x	Type of function applied to the function or not
no.op.	No operation
CSt	Constant adjustable from ± 0,001 to ± 9999
Pi	π constant value 3.1416
Abs	Absolute value of the variable (can apply only if E1 or E2 is selected.)
Opx	Corresponds to the type of operation applied between the two elements of the calculation
Add	Addition
Subs	Substraction
MuLt	Multiplication
diviS	Division
A.diFF	Absolute value of the difference
rESOL	Place of the decimal point on the result
Unit	Choice of the result unit
A.diFF	Absolute value of the difference of the 2 channels

Display parameters

Pr.diS	Submenu programming of the display features
br.diG	Setting of the digits brightness (4 levels)
1111	Lowest brightness
4444	Strongest brightness
br.bAr	Setting of the brightness of the bargraph and the leds
1111	Lowest brightness
4444	Strongest brightness
L.diG	Last digit (bottom weight)
On	In service
OFF	Enforced to zero
nuLL	Deleting of the unsignificant zeros
YES	Yes
no	No
PArA.b	Parameter associated with the bargraph
diSP1	Chan.1
diSP2	Chan.2
cALc.	Calculation
d.bArG	Display corresponding to 0% of the bargraph
F.bArG	Display corresponding to 100% of the bargraph

Analog output

Out.U	Access to the submenu programming of the voltage output
Out.MA	Access to the submenu programming of the current output
PArAM	Parameter associated with the analog output
diSP1	Chan.1
diSP2	Chan.2
cALc.	Calculation
d.out	Down scale of the analog output
F.out	Full scale of the analog output
d0.diS	Access to the display corresponding to the output down scale
F0.diS	Access to the display corresponding to the output full scale

Digital output

JbuS	Access to the submenu programming of the RS output
SLAvE	Slave number
bAud	Transmission speed
19200	19200 bauds
9600	9600 bauds

4800 — 4800 bauds

2400 — 2400 bauds

1200 — 1200 bauds

dELAY — Delay before any response

On — Delay 75ms   OFF — Delay 20ms

Relay outputs (x 1 to 4)

rELAY — Access to the submenu programming of the relay outputs

rEL.x — Access to the programming of relay x

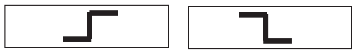
AL.x — Activation of relay output x

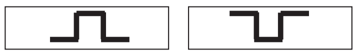
On — Activation   OFF — De-activation

PArA.x — Parameter associated with relay x

diSP1 — Chan.1   diSP2 — Chan.2   cALc. — Calculation

ModE.x — Operating mode of relay x

 Mode setpoint

 Mode window

SP.x — Value of the setpoint in mode setpoint

SPx.1 — Value of the 1st setpoint in mode window

SPx.2 — Value of the 2nd setpoint in mode window

HYSt.x — Value of the hysteresis in display points

tiME.x — Time delay on relay x

t.Act.x — Position of the time delay on relay x

SiMPL — Time delay on switching on alarm

doubL — Time delay on switching on alarm and out of alarm

LEd.x — Programming of the relay associated led

On — Led lit when relay active (coil supplied)

OFF — Led still when relay active (coil supplied)

MEM.x — Recording of alarm x

YES — Recording   no — No recording

MESS.x — Alarm message x

YES — Message   no — No message

Safeties

SECU — Access to the submenu programming of the safeties

rUPt — Programming of the sensor rupture safety

rEL.x — Status of relay x in case of sensor rupture

OFF — No sensor rupture associated with the relay

LO — Relay de-activated in case of sensor rupture (coil not supplied)

HI	Relay active in case of sensor rupture (coil supplied)
out.U out.MA	Return value (or not) on the output in case of self-diagnosis error
YES	Return value required
no	No return value
rEPLi	Return value

Saving of the configuration

SAvE	Saving of the configuration
YES	Saving
no	No saving

Reading of the instrument internal features

About	Access to the submenu reading of the internal features
dGn75S	Type of the instrument
n A0006	Identification number
ProG	Programme version
01.00	Programme version number
OPtiO.	Option code
Ar---.	Value of the option code
Err.	Self-diagnosis error
0000	Type of error
CH.SuM	Display of the check sum
FC4E	Value of the check sum

Other functions

InF.	Display of the minimum value
SuP.	Display of the maximum value
CLr.M	Deleting of the min. and max.

Error messages

Err.1	Value set out of range
OPEn	Sensor rupture
2000	Blinking display : measure in overstepping
OL	Displayable value overload
----	Upper or lower electrical input overstepping
Er.xxx	Self-diagnosis error

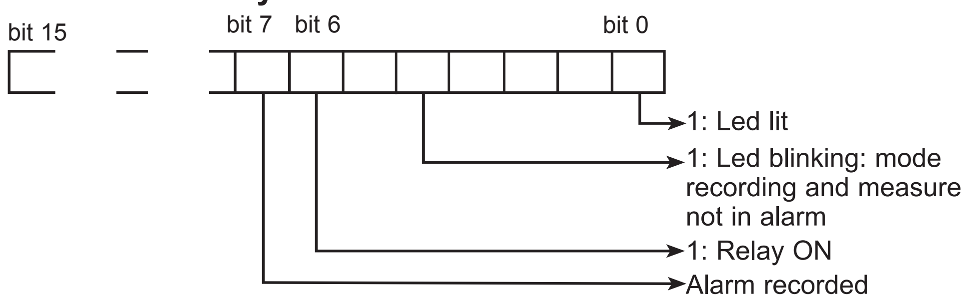
9. ANNEXE: MODBUS

9.1 Table of the MODBUS addresses

Address		Format	Number of words
200	Value of the analog output in µA (mA output) in mV (10V output)	double integer	2
202	Minimum value of channel 1	double integer	2
204	Minimum value of channel 2	double integer	2
206	Min. value of the calculation	double integer	2
208	Maximum value of channel 1	double integer	2
210	Maximum value of channel 2	double integer	2
212	Max. value of the calculation	double integer	2
214	Measure of channel 1	double integer	2
216	Measure of channel 2	double integer	2
218	calculation	double integer	2
220	Direct mesure of channel 1	double integer	2
222	Direct measure of channel 2	double integer	2
310	Status of relay 1	integer	1
311	Status of relay 2	integer	1
312	Status of relay 3	integer	1
313	Status of relay 4	integer	1

Direct measure:
Value without scale factor, in µA

Status of the relays:



Displayed measure:
The displayed measure value is taken up without the decimal point.
To read the decimal point value, read the word at address 215.

Address 125:

bit 15		bit 2	bit 1	bit 0

Place of the decimal point from 1 to 4 (version 10000 points)
Place of the decimal point from 0 to 4 (version 100000 points)
0: display with 4 decimals
1: display with 3 decimals
2: display with 2 decimals
3: display with 1 decimal
4: display with 0 decimals

9.2 Description of the born MODBUS functions

Reading of N words: function n°3
Request sequence

Slave number	Function 3 or 4	1st word address		Number of words		CRC16
		MSB	LSB	MSB	LSB	
1 byte	1 byte	2 bytes		2 bytes		2 bytes

Response sequence

Slave number	Function 3 or 4	Number of read bytes	1st word value		2nd word value		CRC16
			MSB	LSB	MSB	LSB	
1 byte	1 byte	1 byte	2 bytes		2 bytes		2 bytes

Writing of N words: function n°16

Request sequence

Slave number	Function 16	1st word address	Nbr of words to be enfor.	Nbr of bytes to be enfor.	Value of the words to be enfor.	CRC16
1 byte	1 byte	2 bytes	2 bytes	1 byte	N bytes	2 bytes

Response sequence

Slave number	Function 16	1st word address	Number of words to be enforced	CRC16
1 byte	1 byte	1 byte	2 bytes	2 bytes

Writing of 1 word: function n°6:

Request sequence

Slave number	Function 6	Address of the word	Value of the word to be enforced	CRC16
1 byte	1 byte	2 bytes	2 bytes	2 bytes

Response sequence

Slave number	Function 6	Address of the word	Value of the word to be enforced	CRC16
1 byte	1 byte	2 bytes	2 bytes	2 bytes

Exception sequence

Slave number	Function requested with MSB=1	Error code	CRC16
1 byte	1 byte	1 byte	2 bytes

Values of the error codes:
1: function code unknown
2: address incorrect
3: data incorrect
9: writing impossible

9.3 Reading in double integer format

Eg.: reading of the displayed measure

Reading of the displayed measure:

254	03	0	206	0	2	CRC16
Slave number	Reading of n words	Address		Number of words		

Response with a positive measure:

254	3	4	19	136	0	0	CRC16
			byte 1	byte 2	byte 3	byte 4	2 bytes

Value of the measure:

byte 3	byte 4	byte 1	byte 2
00000000	00000000	00010011	10001000
0	0	19	136

Sign: 0 positive 1 negative

Measure = byte 3 x 256^3 + byte 4 x 256^2 + byte 1 x 256 + byte 2
Measure = 0 x 256^3 + 0 x 256^2 + 19 x 256 + 136 = 5000
Reading of address 120 (decimal point) = 2 displayed measure = 50.00

Response with a negative measure

254	3	4	236	120	255	255	CRC16
			byte 1	byte 2	byte 3	byte 4	2 bytes

Value of the measure:

byte 3	byte 4	byte 1	byte 2
11111111	11111111	11101100	01111000
255	255	236	120

Sign: 1 negative: invertion of the bits, and adding of 1

Invertion:

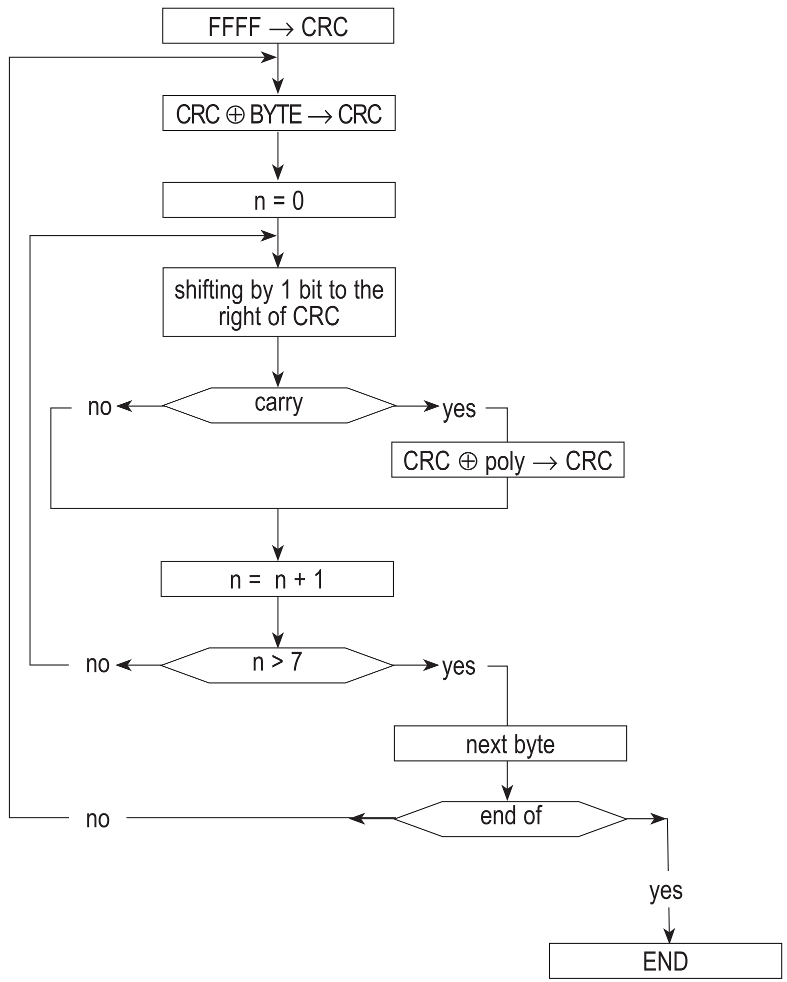
byte 3	byte 4	byte 1	byte 2
00000000	00000000	00010011	10000111

Plus 1:

byte 3	byte 4	byte 1	byte 2
00000000	00000000	00010011	10001000

Measure = - (byte 3 x 256^3 + byte 4 x 256^2 + byte 1 x 256 + byte 2)
Measure = - (0 x 256^3 + 0 x 256^2 + 19 x 256 + 136) = -5000
Reading of address 120 (decimal point) = 2
displayed measure = -50.00

9.4 CRC16 calculation algorythm



Note 1: ⊕ = exclusive or.

Note 2: POLY = A001 (hex).

Note 3:
The CRC 16 calculation applies to all bytes in the pattern (except CRC 16).

Note 4:
Caution! In the CRC 16, the 1st sent byte is the LSB.

Example: Pattern 1-3-0-75-0-2 CRC16 = 180-29 (values are decimal).