PROGRAMMABLE CONVERTER

µC 305
µC 805 - µC 405

User handbook valid for
µC 305 version 03.7x and
µC 805 and µC 405 version 04.3x

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■ **Summary**

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1. EXTERNAL VIEW

The series µC 305 / 805 / 405, offers a broad range of fully programmable measurement interfaces.

• Input features:

Direct voltage or current input
Bidirectionnal ±100mV, ±1V, ±10V, ±300V, ±20mA.

- Accuracy: 0.05% of 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
- Special linearisation in 20 points
- supply for 2 or 3-wire sensor 26 VDC (±15%) -25 mA
protected from short-circuits

Thermocouple input:
(J, K, N, S, B, W5, T, R, E, W, W3, L)

- Accuracy: 0.1% of full scale at +25°C,
  or 25µV typical (50µV max.)
- Thermic drift < 150ppm/°C
  C.J.C. efficiency: < 0.03°C/°C ± 0.5°C from -5°C to +55°C

Sensor input: Pt 100 Ω, Ni 100 Ω
- Line resistance influence in 3-wire measurement included in the grade for 0<Rl<25Ω
- Measurement of Δ Pt100 2 wires from -200°C to +270°C (0<Rl<10Ω) (R max. 400Ω)
- Max. measure current: 250 µA
- Accuracy: 0.1% of full scale at +25°C
- Thermic drift < 150ppm/°C.

Resistive sensor: calibers 0-400 Ω and 0-2 kΩ (0-8 kΩ optional)
- Accuracy: 0.1% for calibers 0-400 Ω and 0-8 kΩ and 0.5% for caliber 0-2 kΩ (of full scale at +25°C)
- Thermic drift < 150ppm/°C

Potentiometers: from 100 Ω to 10 kΩ
- Accuracy: 0.1% of full scale at +25°C
- Thermic drift < 150ppm/°C

• Output features:

µC 305, µC 805

Insulated analog output:
Programmable scale ratio with enlarging effect.

For a µC 305, only 1 of the 2 analog outputs can be activated (outputs are not independent).
For a µC 805, the analog output type (mA or V) must be specified on the order.

µC 805, µC 405

Relay output:
4 relays: mode setpoint or window.
Recording of alarms.
Time delay and hysteresis adjustable on each setpoint.
Alarm messages

Type **µC 305 C - 2**

Universal inputs
Outputs:
µC 305: 1 analog
µC 805: 1 analog, 4 relays
µC 405: 4 relays

Power supply:
3 Low Voltage
2 High Voltage

Version:
C case
K rack (consult)

Input features

Types of **INPUTS**	Measure range adjustable from:	Intrinsinc error	Console resolution	Input impedance
mA	-22 to +22mA with √♣	< ±0.05% of MR	10 µA	5 Ω
mV♠	-110 to +110mV with √♣		10 µV	≥ 1MΩ
V	-11 to +11V with √♣	Input resolution: 14 bits	1 mV	
	-330 to +330V with √♣		10mV	
Thermocouples ♠ Standard IEC 581 J K B R S T E N L W♠ W3 WRE5	°C / °F -160/1200 / -256/2192 -270/1370 / -454/2498 200/1820 / 392/3308 -50/1770 / -58/3218 -50/1770 / -58/3218 -270/410 / -454/770 -120/1000 / -184/1832 0/1300 / -32/2372 -150/910 / -238/1670 1000/2300 / 1832/4172 0/2480 / 32/4496 0/2300 / 32/4172	< ±0.1% ♦*** of MR	0.1°C / 0.1°F	≥ 1 MΩ
Sensor Pt100Ω ♠* 3 wire, Stand. IEC 751 (DIN 43760)	°C / °F -200 / -328 / 850 / / 1562	< ±0.1% of MR	0.1°C / 0.1°F	Current 250µA
Sensor Ni 100 3 wires *♠	-60/260 / -76/500			
Differential measurements from 2 sensors Pt100Ω 2 wires Stand. IEC 751 ♠**	°C / °F -200 / -328 / 270 / / 518			
Resistive sensor	Calibers 0-440 Ω and 0-2,2 kΩ ♣ (0-8,8 kΩ optional)	< ±0.1% of MR (0.5% for 0-2KΩ)	-	
Potentiometer	from 100Ω to 10 kΩ ♣			
2-wire sensor supply	26 VDC ±10% with protection from short-circuits.			
Special linearisation *program. up to 20 points*	On input: mV, V, mA. Resistive sensor and potentiometer			

* Line resistance <25Ω

** Line resistance <10Ω and R. max. of 400Ω

*** or 25 µV typical (50µV Max.)

♦ CJC efficiency: ±0.03°C/°C ±0.5°C from -5°C to +55°C

MR = Measure range

√: square root extraction

♠ A 12 µA pulsed current allows line or sensore rupture detection

♣ Cut off: the console display and the µC output are held at down scale for an input signal < the cut-off value, programmable from 0% to 100% of the full input scale.

Tehrmic drift <150ppm /°C

Output features

µC 305	µC 805	µC 405	Types of **OUTPUTS**		Features
●	●		Analog insulated	Current active / pass.	Direct or inverted 0-20mA Load impedance ≤ Lr 600Ω
				Voltage	Direct or inverted 0-10V Load impedance ≥ Lr 2000Ω
	●	●	4 relays with active contact (NO)		2 setpoints per relay configurable on the whole MR. Hysteresis programmable from 0 to 100%. Time delay programmable from 0 to 25 sec. (8A/250 VAC on resistive load)

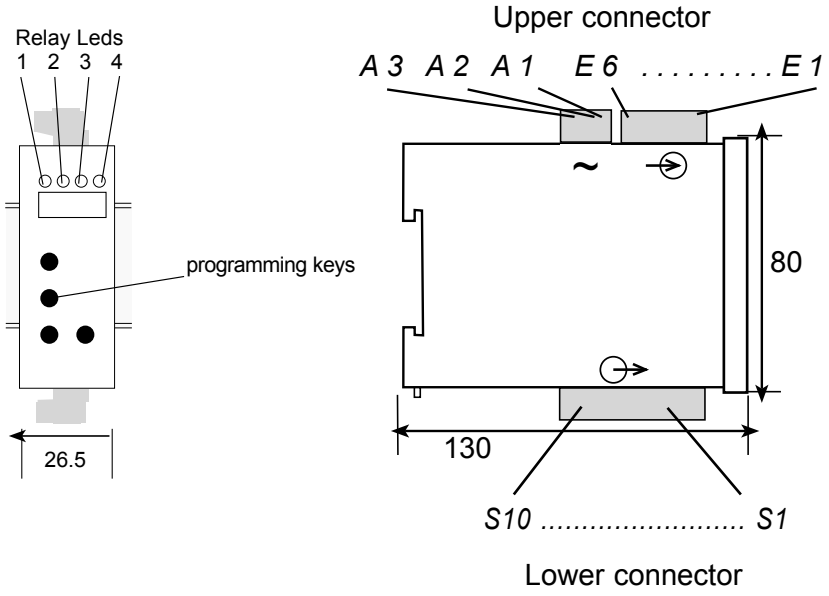
General features

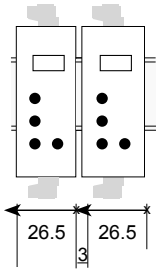
Galvanic partition: 2kV-50Hz-1min. between Supply, Input, Analog Output and Relay Outputs

	Type of **SUPPLY**	Max. operating range	Power draw	Dielectric withstanding
3	Low Voltage	20 to 40 VAC and 20 to 64 VDC	3 W max. 5 VA max.	2KV-50Hz-1min.
2	High Voltage	90 to 270 VAC and 88 to 350 VDC		

- Sampling time: 100 ms
- Common mode rejection rate: 130 dB
  Serial mode rejection rate: 70 dB 50/60 Hz
- Zero drift compensation and self-calibration
- **Complies** with standards EN 50081-2 on rejections and EN 50082-2 on 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 Directive EMC 89-336.

2. SPACE REQUIREMENTS





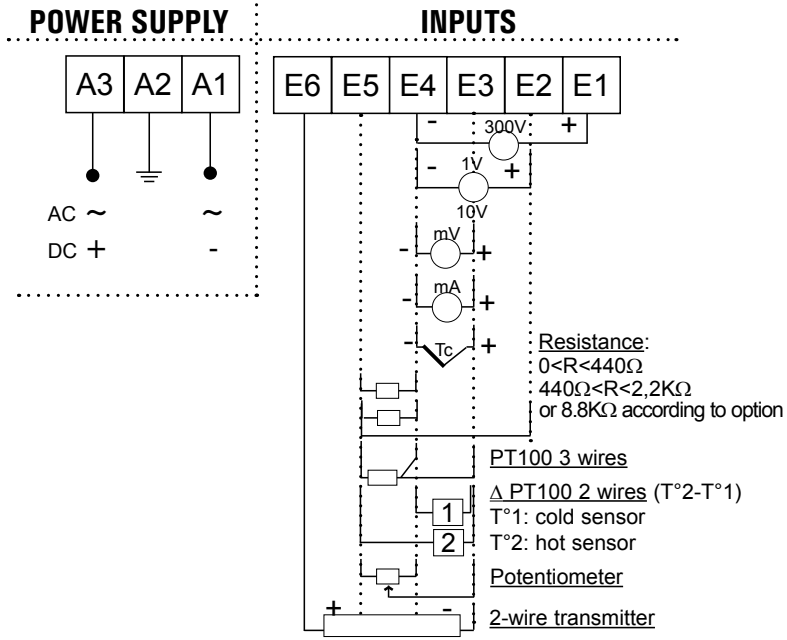
Mount the instruments vertically (on horizontal DIN rail) and provide a 3 mm spacement.

Dimensions: 26.5 x 80 x130 mm
Case: self-extinguishing In black UL 94VO ABS
Mounting in electrical switchbox: latching on symmetrical DIN rail
Rack version: consult with us
Plug-off connectors for screwed connections
(2.5mm², flexible or rigid)
Protection: Case / terminals: IP 20

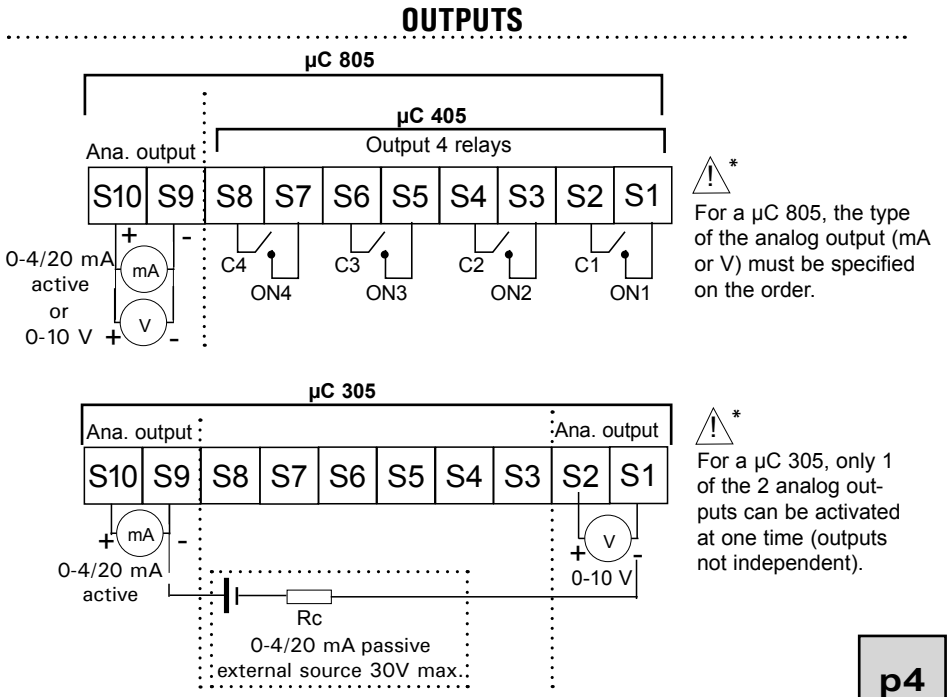
Operating temperature: -10 to 50°C
Storage temperature: -20 to 70°C

3. WIRING

Upper connector

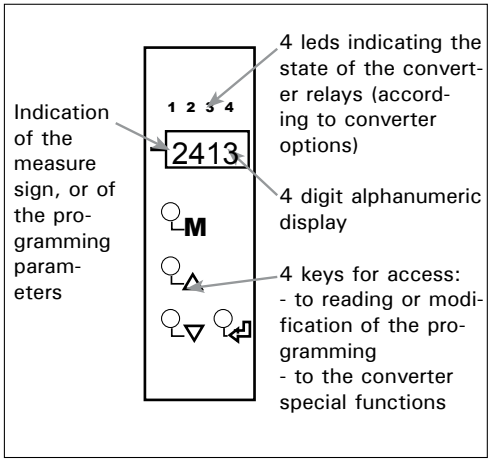


Lower connectors



4. PROGRAMMING

4.1 Communication with the instrument



Several funtions can be accessed during measurement:

(M) Access to main menu p5

(△) Max. value display p18

(▽) min. value display p18

(↵) min. and Max. zero reset p18

Further functions can be accessed by pressing several keys simultaneously:

(△) + (▽) Adjusting of display down scale ; (see p18)

(↵) + (M) Adjusting of display full scale ; (see p18)

(▽) + (M) Direct measure visualisation; (see p19)

(△) + (M) Visualisation and setting of alarm setpoints; (see p19)

Reading convention:

Move through main menu

Return to previous menu

Blinking display: awaiting validation or setting

Alternate information display

Entering of a parameter:

6888 First start by increasing or decreasing The 1st digit and the sign: from -9 to +9. (△) and (▽)

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 by pressing (↵)

4.2 Orientation through programming

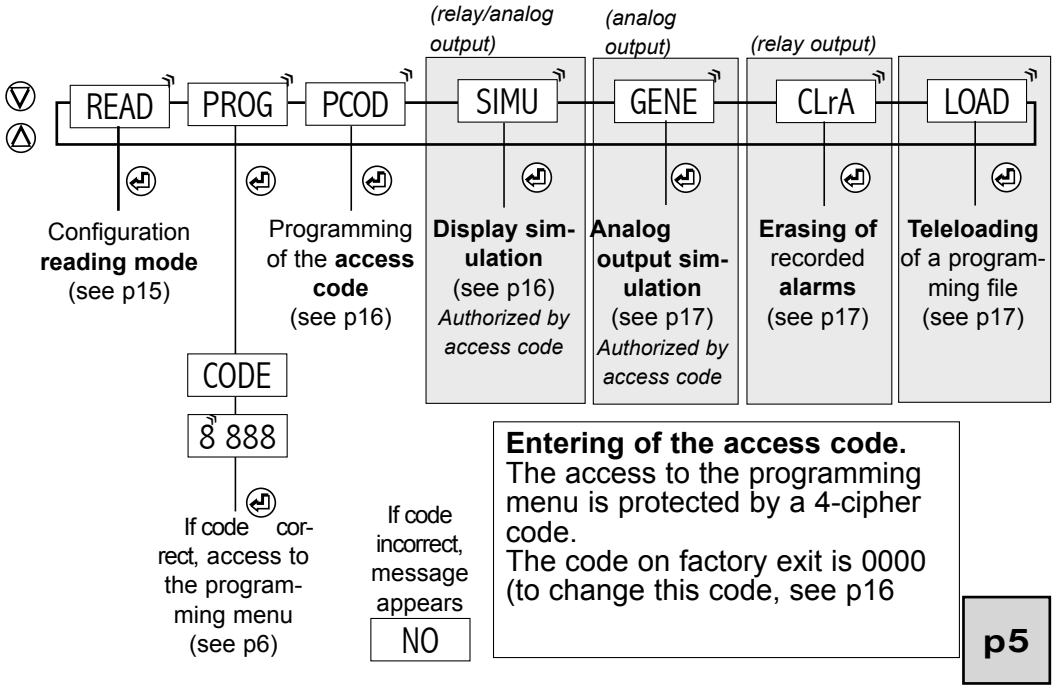
Dialogue is ensured by 4 keys located on the front face.

(M)	(△)	(▽)	(↵)
Exit from a sub-menu to access next menu / access to the programming exit menu	Move through menus : to the top, or increase the value shown	Move through menus : to the bottom, or decrease the value shown	Validation of the parameter shown, or access to a sub-menu

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

4.3 Main menu

(▽) (△) **scroling menus** — (↵) **vertical move**



4.4 Programming menu *(according to options)*

INP	Access to input programming	p6
DISP	Access to programming of the operating mode (mode indicator or mode transmitter)	p8
ANA	Access to programming of the analog output *(option analog output)*	p8
REL	Acces to programming of the relays *(option relay outputs)*	p9
SECU	Acces to programming of the outputs, of the relays in case of self-diagnosis and/or sensor rupture, and access to disconnection of the sensor rupture *(option analog or relay output)*	p9
PrDI	Access to display programming	p10
NAME	Access to the µC file name	p10
SAVE	Access to the programming exit menu, with or without saving the configuration	p10

Note:
⇒ In mode programming, the instrument will automatically resume measuring with the previous configuration if no key is pressed during 1min.

Note:
Press (M) to access next menu

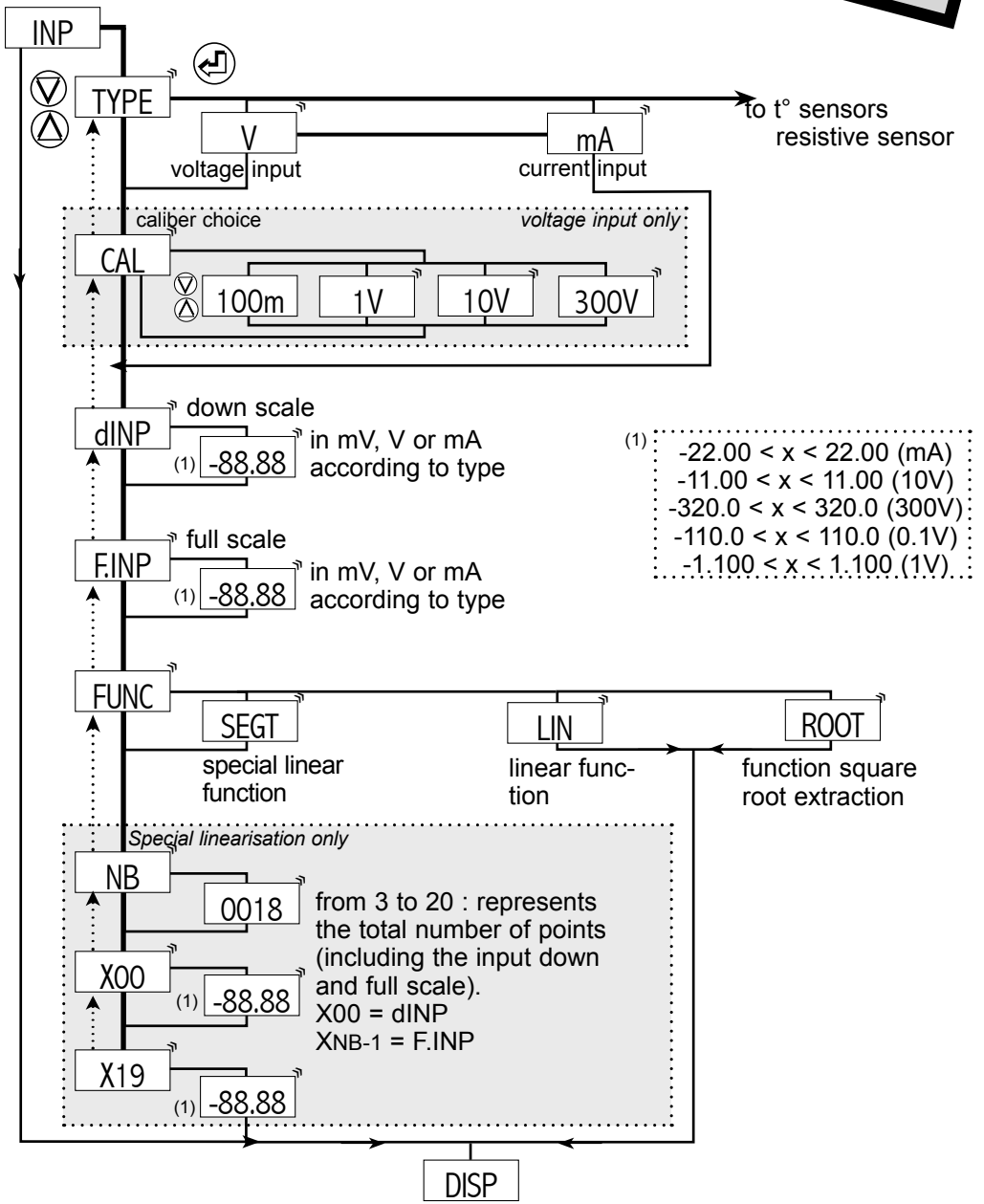
Move through menus / choice

(M) Menu exit / access	(△) Upwards move / increase
(▽) Downwards move / decrease	(↵) Validation / Vertical move

4.4.1 Input programming

INP

a. Process signals



Note:
Press (M) to access menu

DISP

b. Temperature signals

INP

process signals

TEMP — temperature inputs

CAPT

RTD | ni 100 | ΔRTD | TC

To

°C | °F #

 # Changing this parameter requires re-programming following parameters concerning the relays and the analog output : SPxx, HYSx, dodI, F.OdI

If other than thermocouple

TC--

If thermocouple

TC-K | TC-J | TC-L | TCW5 | TCW3 | TC-W

TC-N | TC-B | TC-E | TC-T | TC-R | TC-S

CJC

CJC * compensation

external: CJ-E

CJ-1 internal

(2) -10°.0C < CJC < 60°.0C
14°.0F < CJC< 140°F

external CJC only

CJ-T

(2) -888.8

If no shifting

ADJ

YES | NO

Available only in the case where an input shifting has been entered (see p18)

DISP

* cold junction compensation, except thermocouple B which is only in CJ-E

c. Resistive sensors

INP

temperature signals
process signals

RES | POT

CAL — if resistance

400Ω | 2KΩ | or 8KΩ — according to option

dINP

-8888 (3)

F.INP

-8888 (3)

FUNC

SEGT | LIN

NB

0018 — 3 to 20: adjusting of the total number of points (including down and full input scale)

X00

-8888 (3) — setting of abscises

X19

8888 (3) X00 = dINP
XNB-1 = F.INP

special linearisation

DISP

(3)
000.0<x<440.0 for cal. 400Ω
0000<x<2200 if option 2kΩ
0000<x<8800 if option 8kΩ
cal. 2KΩ or 8KΩ accor. to option
000.0 < x < 100.0% (pot)
If caliber 400Ω measure is taken between terminals E4 and E5
If caliber 2KΩ (or 8KΩ) measure is taken between terminals E2, E4 and E5 (see wiring)

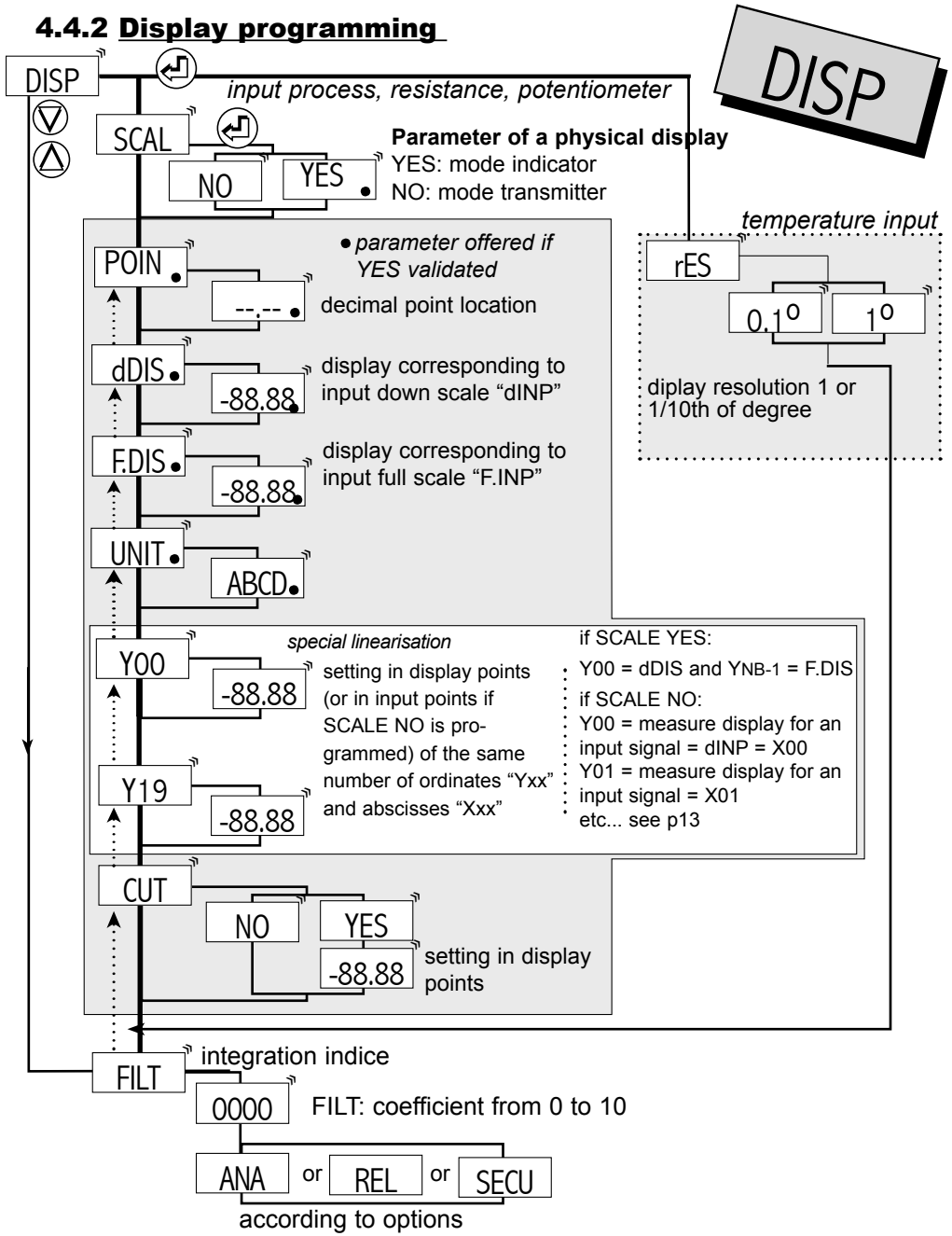
See also input features p11

Note:
Press (M) to access next menu

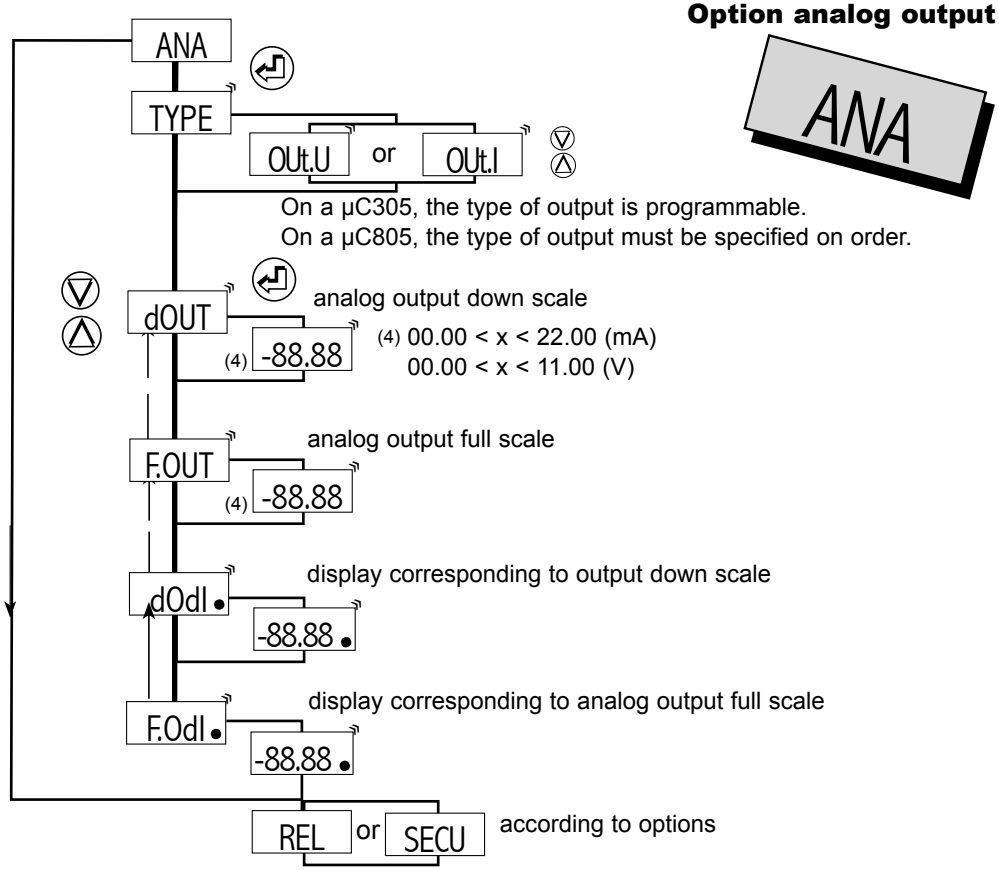
Move through menus / choice

(M) Menu exit / access
Upwards move / increase
Downwards move / decrease
Validation / Vertical move

4.4.2 Display programming



Option analog output



See also output features p12

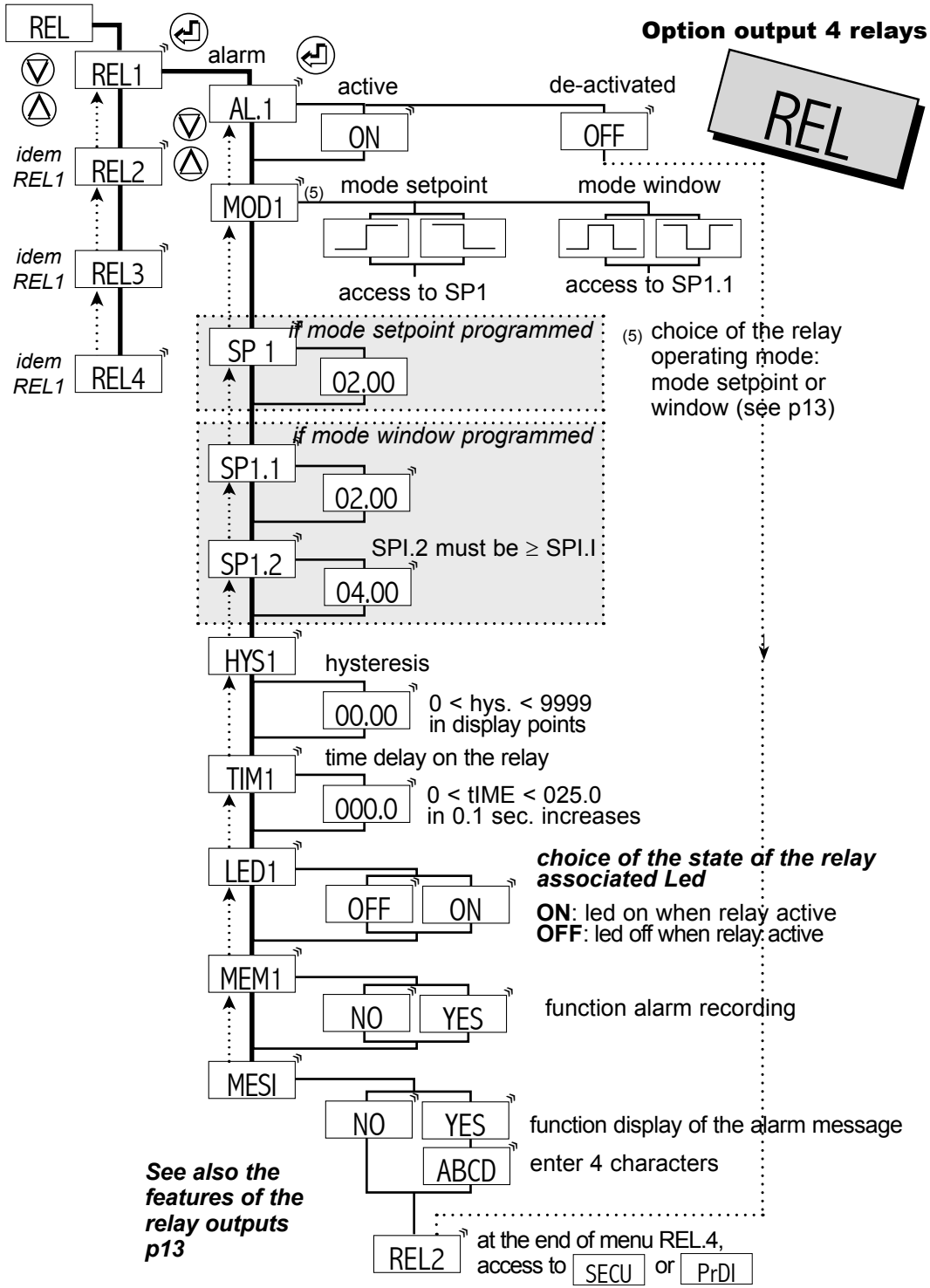
***Example**: **In mode indicator** or for a temperature input:*
dOUT *= 4 mA* F.OUT *= 20.00 mA* dOdI *= 10.0°* F.OdI *= 100.0°*
the analog output value will then be 4 mA when the displayed measurement is 10.0° , and 20 mA for a displayed measurement of 100.0°.

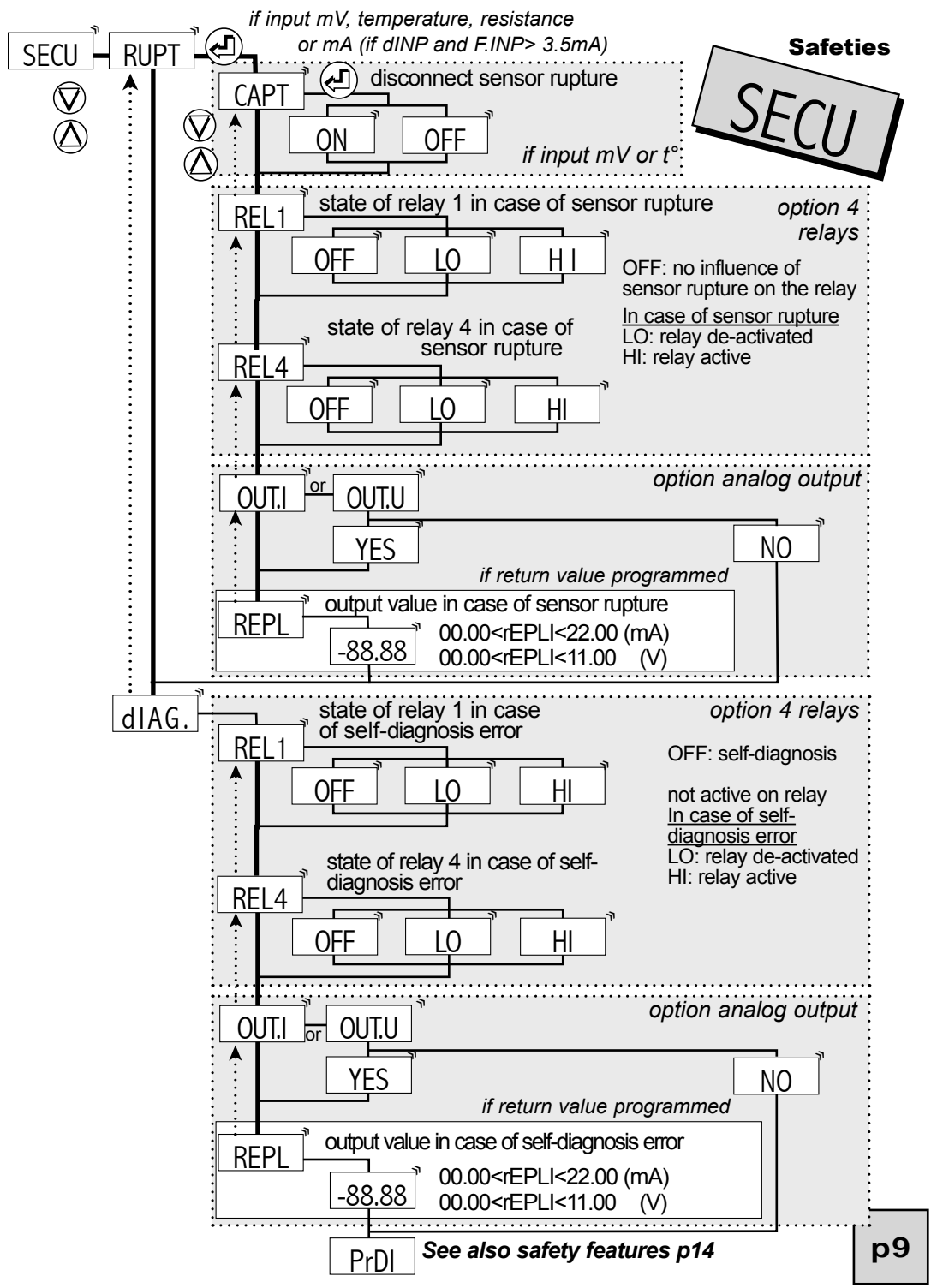
***In mode transmitter**. Only d.OUT and F.OUTparameters are available*
For a mA input with dINP = 0.00 and FINP = 20.00 mA if dOUT=4 mA and F.OUT = 20 mA. The analog current output value will be 4.00 mA for an input signal of 0.00 mA.

dOUT
F.OUT

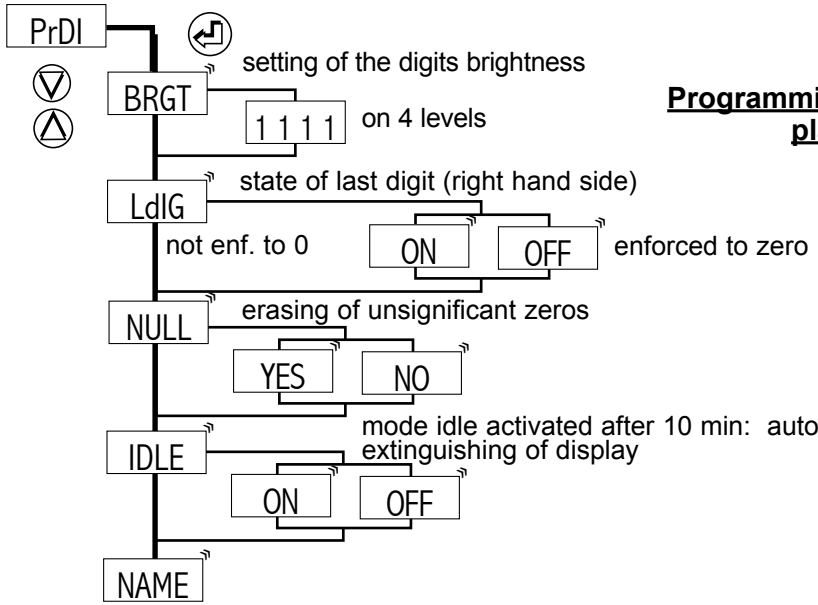
• *valid if SCALE YES validated: mode indicator / temperature input*

Menu exit / access	Upwards move / Increase
Downward move / decrease	Validation / Vertical move


REL
REL1
alarm
AL.1
active
de-activated
ON
OFF
idem REL1
REL2
MOD1
(5)
mode setpoint
mode window
access to SP1
access to SP1.1
idem REL1
REL3
idem REL1
REL4
if mode setpoint programmed
SP 1
02.00
(5) choice of the relay operating mode: mode setpoint or window (see p13)
if mode window programmed
SP1.1
02.00
SP1.2
SPI.2 must be ≥ SPI.I
04.00
HYS1
hysteresis
00.00
0 < hys. < 9999 in display points
TIM1
time delay on the relay
000.0
0 < tIME < 025.0 in 0.1 sec. increases
LED1
choice of the state of the relay associated Led
OFF
ON
ON: led on when relay active
OFF: led off when relay active
MEM1
NO
YES
function alarm recording
MESI
NO
YES
function display of the alarm message
ABCD
enter 4 characters
See also the features of the relay outputs p13
REL2
at the end of menu REL.4, access to SECU or PrDI
Option output 4 relays
REL


SECU
RUPT
if input mV, temperature, resistance or mA (if dINP and F.INP> 3.5mA)
CAPT
disconnect sensor rupture
ON
OFF
if input mV or t°
REL1
state of relay 1 in case of sensor rupture
OFF
LO
HI
option 4 relays
OFF: no influence of sensor rupture on the relay
In case of sensor rupture
LO: relay de-activated
HI: relay active
REL4
state of relay 4 in case of sensor rupture
OFF
LO
HI
option analog output
OUT.I
or
OUT.U
YES
NO
if return value programmed
REPL
output value in case of sensor rupture
-88.88
00.00<rEPLI<22.00 (mA)
00.00<rEPLI<11.00 (V)
dIAG.
state of relay 1 in case of self-diagnosis error
REL1
OFF
LO
HI
option 4 relays
OFF: self-diagnosis not active on relay
In case of self-diagnosis error
LO: relay de-activated
HI: relay active
state of relay 4 in case of self-diagnosis error
REL4
OFF
LO
HI
option analog output
OUT.I
or
OUT.U
YES
NO
if return value programmed
REPL
output value in case of self-diagnosis error
-88.88
00.00<rEPLI<22.00 (mA)
00.00<rEPLI<11.00 (V)
PrDI
See also safety features p14
Safeties
SECU

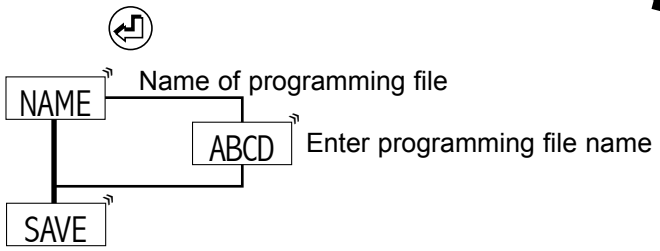
PrDI



Programming of the display brightness

See also display features p16

NAME



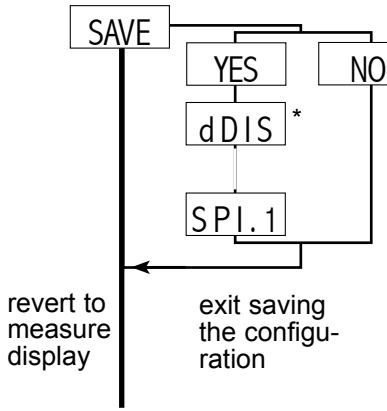
Note :

Press (M) to access next menu

(▽) (△) Move through menus / Choice

(M) Menu exit / access	(△) Upwards move / Increasing
(▽) Downwards move / decreasing	(↵) Validation / Vertical move

Programming exit with or without saving



SAVE

* If during a change of decimal point location (parameter POIN) or of operating mode (parameter SCALE) the user has not modified or re-validated parameters dDIS , F.DIS ,CUT, Yxx dODIS, F.OdI (if option analog output) and SPxx and HYSx (if option relays) then the converter will propose again after SAVE YES the parameters which have not yet been validated.

Note: Exit from mode programming saving the configuration (SAVE, YES)will automatically reset the min. and max. as well as alarm recordings to zero.
After SAVE, YES the µconsole shows WAIT during the converter re-initialisation phase.

4.5 Measure display

4.5.1 Mode transmitter / indicator

According to choice SCALE YES / NO , you will decide to have a physical scale for the converter, or not.

SCALE YES lets parameters POIN (decimal point location) dDIS and F.DIS (down and full display scale corresponding to the down and full input scale, selected in dINP and F.INP) and UNIT (unit of diplayed physical magnitude) appear.
With the configuration SCALE YES it may be considered that the converter operates as a meter which can display a measured physical magnitude locally.

Example 1: For a 4/20 mA signal coming from a level sensor on a tank, following programming is shown in menu INP: TYPE = mA, FUNC = LIN, dINP = 4.00 , F.INP = 20.00,
in menu DISP : SCALE YES, POIN **=** _ _ _ . _
dDIS = 000.0, F.DIS =300.0, UNIT = LTS (liters) CUT = NO for:

4 mA from the sensor, display = 000.0
12 mA from the sensor, display = 150.0
20 mA from the sensor, display = 300.0

In the case of MODE INDICATOR (with a physical scale programmed by SCALE, YES), the parameters down and full display scale, set-points, hysteresis, dOdI and F.IdI for the analog output, cut-off and ordinates (if input linearised in segments) are to be considered in the programmed physical scale magnitude.

For example *1*, a setpoint on relay 1 (SPI.I) with a value of 30.0 corresponds to a setpoint of 30.0 I. If the display oversteps 30.0I (if the input oversteps 5.60 mA) the state of relay 1will change.

Note: If you want to avoid overloading the programming with an unnecessary physical display, programme SCALE NO (mode transmitter). in this case, parameters POIN, DDIS, FDIS , UNIT. and dOdI and FOdI (if option analog output) do not need to be entered.

In the case of MODE TRANSMITTER (SCALE NO) the parameters setpoints, hysteresis, cut-off and ordinates (if input linearised by segments) are to be considered in the physical magnitude of the programmed input type (V, mA, Ω etc...).

In *example 1*, for the state of relay 1 to switch if the level oversteps 30.0I, you must enter a setpoint value of 1 SP1.1 = 5.60 for 5.60mA.

In mode transmitter , the resolution of parameters is commanded by the selected input type: 2 decimals for a mA input, 1 decimal for caliber 300V, etc... on the console display.

4.5.2 Decimal point location / resolution

Parameter POIN is to be considered as a move of the decimal point, and not as a resolution. Parameter POIN is common to all parameters related to the display in the case of a programmed physical scale (down and full display scale, setpoints, hysteresis etc...).

In the case of a programming without a physical display scale, parameter POIN is not available and the decimal point location is set according to the chosen input type (see

To take up *example 1*, display = 300.0L for a 4-20mA input at 20mA, with a setpoint at 30.00L**.**

If you want measure to be displayed without decimals, i.e. for a 20mA input display = 300, change POIN from ---.- to ----. and divide by 10 all parameters related to the display.

In this example, after modifying parameter POIN from ---.- to ----. you must modify F.DIS from 3000. to 0300. and SP1.1 from 0300. to 0030. to obtain the required operating.

Note: For safety reasons, in case the user forgets after changing the decimal point location, (parameter POIN) or the operating mode (parameter SCALE) the transmitter will propose again after SAVE YES the list of parameters which have not been validated (see previous page).

For the temperature input, when the resolution is changed from RES=1°C° to RES = 0,1°C or the contrary, the user will not need to modify again all the parameters related to the display.

Note following odness on the µconsole, because it has only 4 digits :

If you are in RES =1°C°, with a setpoint SP1.1 = 1000 and if you modify RES = 0.1°C, the 0.1°C (which can not be shown on 4 digits) does not appear for this setpoint, which still appears as SP1.1 = 1000.

If you want to modify this setpoint to 900°C for instance, first enter 0900 and validate, and the converter will propose the value again with the possible resolution of 0.1°C°programmed, i.e. 900.0.

4.6 Input features

4.6.1 Current input mA or voltage V

Square root extraction ROOT

The function square root a tends to amplify the input signal background noise as it gets near to zero.

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

If the display is below this value, it is maintained at down scale (if input full scale > input down scale) or at full scale (if input full scale < input down scale)

Special linearisation: SEGT

For specific applications such as volume measurement, the converter can memorise an unlinear curve, programmable in X and in Y.

The curve resulting from your equation can be replaced by a sequence of linear segments, with a maximum of 20 points
(19 segments).

Note that X00 = dINP and for the last point abscisse
XNB-1 = F.INP

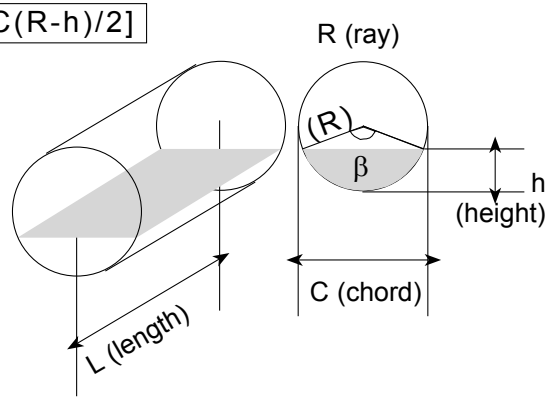
Note1: The values of abscisses (x) have to go increasing.
value of X00 < value of X01...

Note2: In special linearisation and in mode transmitter (SCALE NO), the displayed measure is the measure linearised by the programming of points. The undeformed input measure can always be accessed by function direct measure (see p20).

Example:
For a layed cylindric tank, 1 meter high (h) and 1 meter long (l); a linear sensor 0-20 mA measures the height of the liquid surface line:

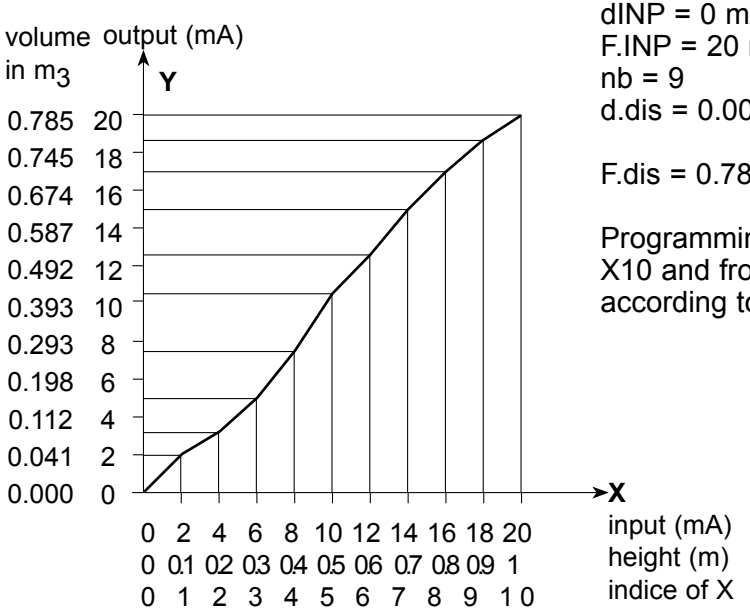
0 meter -> 0 mA (empty tank) 1 meter -> 20 mA (full tank)
with cos $\beta/2 = (R-h)/R$ and $\sin \beta/2 = C/2R$
Volume empty tank = 0.000
Volume full tank =0.785

Volume = $L [\pi R^2 \beta/360 - C(R-h)/2]$



Say a curve of 10 equally long segments:
Measure range / Nr of segments = 20mA/10 = 2mA = segment length. For 10 segments Nr = 11 (number of linearisation points).

Input mA		Height m	Degree	Chord m	Volume m^3		Outputs in mA
X00	0	0.0	0.00	0.00	Y00	0.000	00.00
X01	2	0.1	73.74	0.60	Y01	0.041	01.04
X02	4	0.2	106.26	0.80	Y02	0.112	02.85
X03	6	0.3	132.84	0.92	Y03	0.198	05.04
X04	8	0.4	156.93	0.98	Y04	0.293	07.47
X05	10	0.5	180.00	1.00	Y05	0.393	10.00
X06	12	0.6	203.07	0.98	Y06	0.492	12.54
X07	14	0.7	227.16	0.92	Y07	0.587	14.96
X08	16	0.8	253.74	0.70	Y08	0.674	17.17
X09	18	0.9	286.76	0.60	Y09	0.745	18.98
X10	20	1.0	360.00	0.00	Y10	0.785	20.00



Programming:
dINP = 0 mA = X00
F.INP = 20 mA = X10
nb = 9
d.dis = 0.000 m^3 =Y00

F.dis = 0.785 m^3 =Y10

Programming from X00 to X10 and from Y00 to Y10 according to table.

4.7 Output features and programming limits

4.7.1 Analog output ANA

Current output 0/4-20mA active or passive (Vmax.=30VDC) or voltage output 0-10V (specify on order)

- Accuracy 0.1 % in relation to display (at +25°C)
- Residual drift ≤ 0.2%
- Admissible load 0Ω ≤ Rc ≤ 500Ω (current)
  Rc ≥ 2 kΩ (voltage)
- Programmable scale ratio with enlarging effect
- Response time: 40 ms in relation to display

dOUT	Analog output down scale (eg. 04.00 (4mA))
F.OUT	Analog output full scale (eg. 20.00 (20mA))
dOdI	Display value corresponding to output down scale
F.OdI	Display value corresponding to output full scale

In mode measurement, the analog output can not exceed 10% of the greatest of the 2 values: dOUT and F.OUT

4.7.2 Relay outputs:

4 relay outputs REL1 REL2 REL3 REL4

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

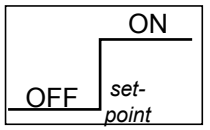
Activation or de-activation of alarm x AL.X

ON The state of relay x depends on the performed programming

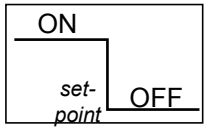
OFF Relay x remains still.

Choice of the operating mode: MODx

- **Mode setpoint**



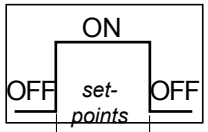
or



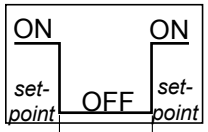
Legend:
ON coil supplied
OFF coil not supplied

SPX SPX

- **Mode window**



or



SPX.1 SPX.2 SPX.1 SPX.2

If mode indicator (SCALE YES) is selected, the setting of setpoints is in display points.

If mode transmitter (SCALE NO) is selected, the setting of setpoints is in input scale points.

Choice of the relay associated Led LEdx

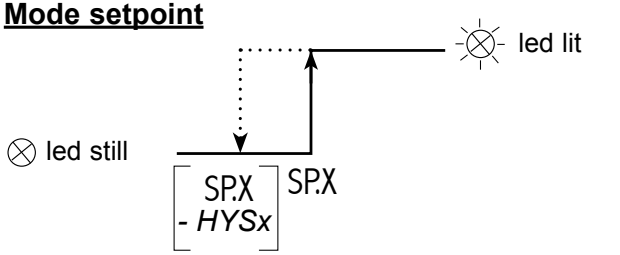
The Led indicates the alarm state.

ON Led lit when relay active (coil supplied)

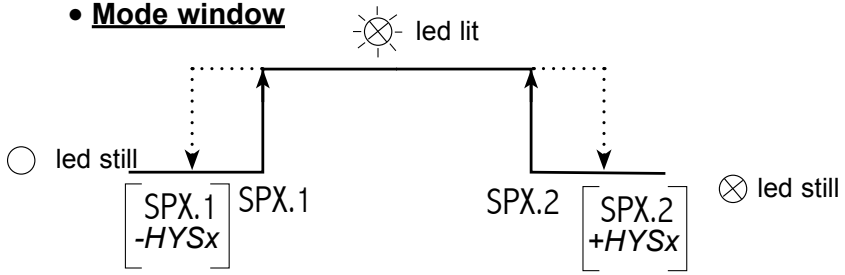
OFF Led still when relay active (coil supplied)

HYSx Hysteresis adjusting in display points if mode indicator (SCALE YES). The hysteresis is active on passing from Led lit to Led still ; i.e. on switching out of alarm, as the Led represents the alarm state.

- **Mode setpoint**



- **Mode window**



- **Alarm time delay** TIMx

The relay switching time delay is adjustable form 000.0 to 025.0s. in 0,1s. increases. It is active both on switching and switching back

- **Alarm recording** MEM.x

Keeps a memory of alarms after a setpoint has been passed. As measure reverts below the alarm setpoint, the relay remains ON. The corresponding Led blinks to warn the user that a setpoint has been passed (to reset alarm recordings to zero see menu CLrA p17)

Note: Exit from mode programming with configuration saving will automatically reset recorded alarms to zero.

- **Display of alarm messages** MESx

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

- **Setting of setpoints:** There are 2 ways to adjust setpoints

- either in mode programming entering the correct access code
- or by simultaneous pressing on (M) + (△) if the access to quick entering has been authorized on programming of the code (see p16)

4.7.3 Safeties:

• **Self-diagnosis:** DIAG

The converter permanently watches any drifts that may surge on its components. The self-diagnosis serves to warn the user in case of abnormal increase of these drifts, before they provoque false measures.

The self-diagnosis error information can be reported:

· *On the display*: An error message appears alternating with measure.

Coding:
1 : Programming error
2 : Gain error
4 : Offset error
8 : Input calibration error
16 : Output calibration error
64 : Input upper or lower electrical overstepping

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

· *On the relays:*

OFF	No influence of a self-diagnosis error on the relay
LO	Relay de-activated (coil not supplied) in case of self-diagnosis error
HI	Relay activated (coil supplied) in case of self-diagnosis error

· *On the analog output*

If a return value has been programmed
Value included between : 0 and 22 mA (current output)
or 0 and 11 V (voltage output)

· *On the converter*: Led ON blinks fast

• **Sensor rupture** RUPT

The sensor rupture can be detected on inputs mV, Cc, Pt100, Ni100, ΔPT100, resistance, and current if down and full scale > 3.5 mA.

The sensor rupture information can be reported:

· *On the relay*

OFF	No influence of sensor rupture on the relay
LO	Relay de-activated (coil not supplied) in case of sensor rupture
HI	Relay active (coil supplied) in case of sensor rupture

Note: the Led is either still or lit according to its programming in menu REL.

· *On the analog output*

If a return value has been programmed
Value included between : 0 and 22 mA (current output)
or 0 and 11 V (voltage output)

· *On the display*: Message OPEN

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

· *On the converter*: Led ON blinks slowly

• **Sensor rupture disconnection** *(If input mV or temperature)*

The sensor rupture can be disconnected to avoid disturbing some calibrators that may be sensitive to the rupture detection current.

In menu SECU :

CAPT	Validation (or not) of the sensor rupture
ON	Sensor rupture active
OFF	Sensor rupture inactive

4.7.4 Display features:

POIN	Decimal point location for inputs other than temperature inputs
RES	Display resolution for temperature inputs **0.1°** or **1°**
dDIS	Display corresponding to down input scale (except temperature input)
F.DIS	Display corresponding to full input scale (except temperature input)
CUT	Only for inputs process, resistance, potentiometer , expressed in display points if mode indicator (SCALE YES).

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

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

• **Response time**:

FILT Digital filtering integration indice:
Programmable from 0 to 10; for use in case of unsteady input signal.

FILT	0	1	2	3	4	5
Typical response time at 90%	120 ms	400 ms	600 ms	1 s	1.4 s	2 s

6	7	8	9	10
3 s	5 s	7.5 s	10 s	15 s

To obtain the maximum response time, add 240 ms.

Note: For the analog output response time, add 40ms to the values shown in the table
For the relays: add the time delay programmed on the alarms.

• **Adjusting of the digits brightness** BRGT

1111 Lowest brightness 4444 Strongest brightness

• **Last digit inhibition** *(low weight)* LdIG

In mode programming, menu LdIG enables display suppression of the last digit, the latter being enforced to 0 if OFF is validated.

• **Erasing of unsignificant zeros** NULL

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

Eg.: Display value 0015

NULL = NO Display 0015
= YES Display 15

Eg.: Display value 00.15

NULL = NO Display 00.15
= YES Display 0.15

• **Display self-extinguishing** IDLE

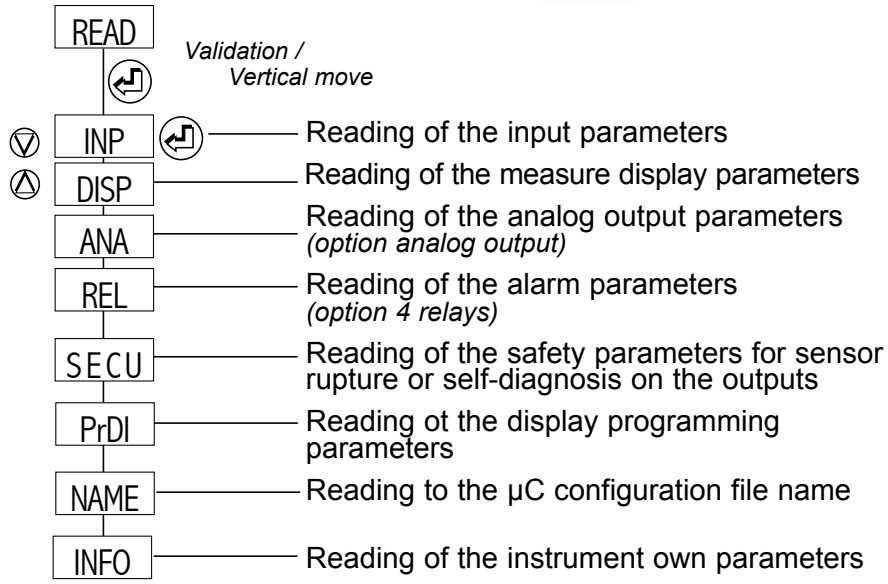
OFF Display permanently lit
ON After 10 min, display shows ....

In mode idle (display shows ....), following messages can appear briefly every 5 seconds to indicate to the user that the transmitter is not in a standard measurement phase.

Displayable messages:

SIMU , GENE , ERxx , OPEN or ----

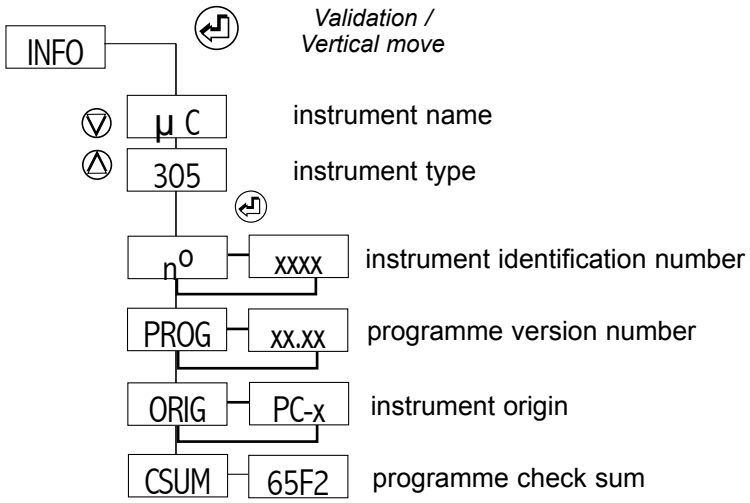
4.8 Configuration reading READ



In each reading sub-menu, keys ▽ and △ are used to move, and key ↵ is used to visualise parameters.

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

Sub-menu

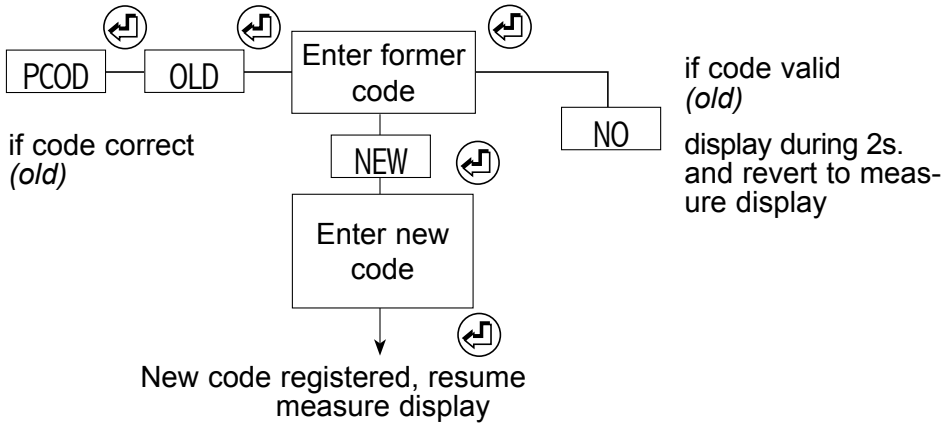


4.9 Access code

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

0 0 0 0	Factory code
x x x x	
0 to 5	Access to display shifting
6 to 9	No access
0 to 5	Access to display and output simulations
6 to 9	No access
0 to 5	Access to teleloading files
6 to 9	No access
0 to 5	Access to fast entering of alarm setpoints
6 to 9	No access

4.10 Programming of a new access code



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

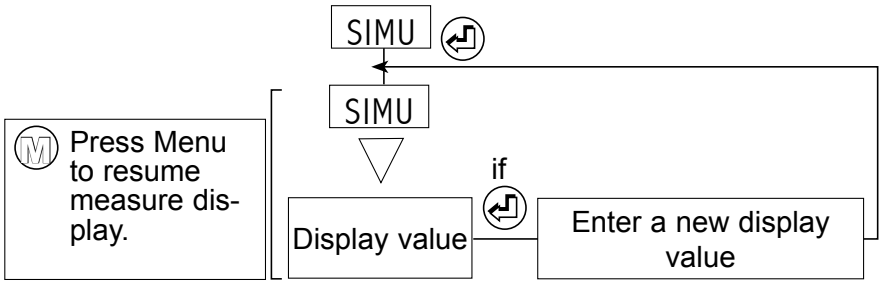
On factory exit, the access code is 0000.

4.11 Functions accessible in the main menu

4.11.1 Display simulation

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

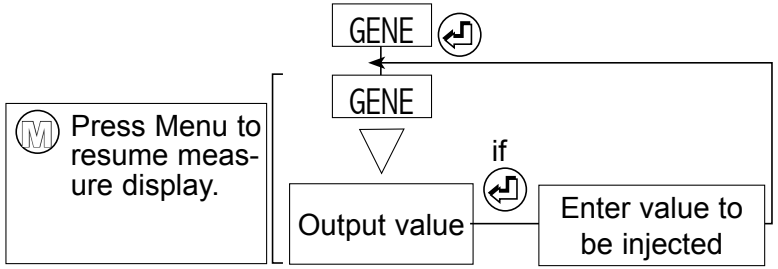
The display can be simulated with the converter in order to validate the analog output and relay outputs configuration in the installation.



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

4.11.2 Analog output simulation *(mode generator)*

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

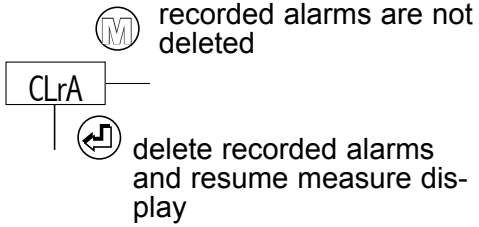


Note: During simulation, the instrument keeps measuring, only the analog output no longer reacts to measure.

4.11.3 Menu CLrA : Erasing of recorded alarms

If the function recording of alarms has been programmed:
After the setpoint has been passed, the relay state is recorded.

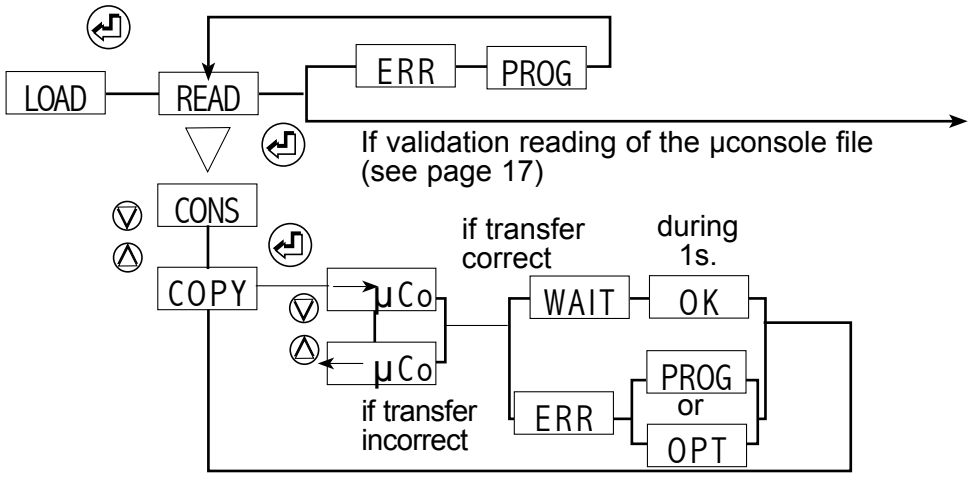
If the setpoint is passed back, the relay state does not change and the corresponding Led starts to blink.
To come back to the normal state (Led not blinking and relay in the correct state), use menu CLrA.



Reminder: If no key is pressed during 20 s., the instrument will automatically resume measure display.

Note: Exit from mode programming with configuration saving will automatically delete recorded alarms.

4.11.4 Menu LOAD : Teleloading of a programming file



µCo save the µC programme in the µconsole memory.

µCo teleload the programming file from the µconsole to the µC.

ERR PROG Programming file not correct: belongs to another instrument type

ERR OPT File does not have the same options as the instrument currently in service

Eg. : a µC305 file can not be copied to a µC805. For the teleloading in the direction µCo to be possible, the receiving converter must have the same input and output options as the converter from which the programming file has been copied.

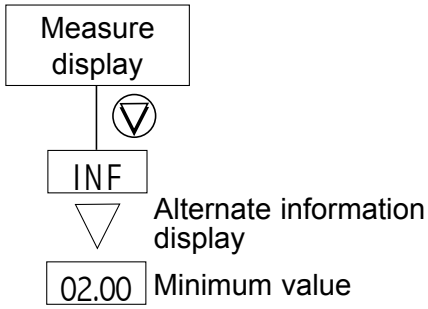
The reading of the file stored in the µconsole is possible if you validate choice READ CONS . In this case the programming file reading organigramme is the same as for the instrument programming. (see p6)

Reminder: If no key is pressed during 20 s., or if you press M the instrument will resume measure display.

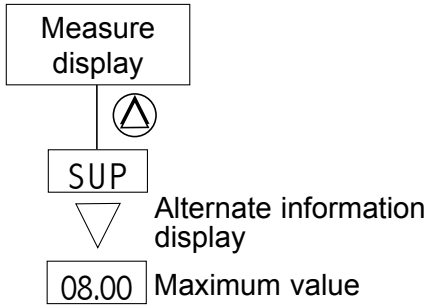
5. FUNCTIONS ACCESSIBLE DURING DISPLAY

5.1 Functions that require pressing only 1 key:

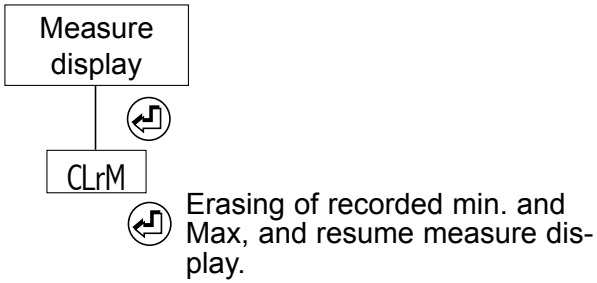
a / min. value display.



b/ max. value display



c / Deleting of minimum and maximum values



(M) The instrument will resume measure display.

Reminder: If no key is pressed during 20 s., the instrument will automatically resume measure display.

Note: Exit from mode programming with configuration saving will automatically reset min. and max. values to zero.

5.2 Functions which require pressing several keys:

(accessible according to programmed access code)

5.2.1 Display shifting

(△) (▽) Display down scale shifting [ADJ ↓]

(↵) (M) Display full scale shifting [ADJ ↑]

After injecting an input signal corresponding to the down (or full) display scale, press simultaneously on keys (△) and (▽) (or (↵) and (M)).
The message [ADJ ↓] [ADJ ↑]) will appear alternating with the value, to indicate you are in menu adjustment.

The down and full display scale can be increased or decreased by pressing (△) and (▽) .
If you keep pressing (△) or (▽) during 3 seconds you can access a fast increasing or decreasing of the value shown.

Press (↵) to validate the shifting. Message [OK] appears during the shifting acknowledgement (1s.), and the instrument resumes measure. Once all shiftings are validated, the shifted input will keep this shifting even after setting OFF tension.
Press (M) (or no pressing during 20 s.) to resume measure displays without modifications.

- **Case of a process, resistance or potentiometer input**

The instrument will then re-adjust its scale factor and display factor in order to obtain the required result on the display.

- **Case of a temperature input**

On a temperature input; if one of the 2 settings is performed, this will correspond to an offset, that is to say all points will be shifted by the same quantity.

On the contrary, if the 2 settings are performed, slope and offset will be corrected to obtain the required result.

example:

Say a PT100 input for 0°C. Display = -000.3
For 500°C you will obtain a display = 0500.2. To correct this display, shift the display down scale by 3 points to obtain 000.0, and the display full scale by -2 points to obtain 0500.0.

note: Only for **temperature inputs**:
From menu READ, performed scale shiftings can be seen in sub-menu INP:

offset shifting
= shifting by 1 point with

OFFS
000.3
ADJ ↓
or
ADJ ↑

slope and offset shifting
= shifting by 2 points with

ADJ ↓
or
ADJ ↑

dDIS
-000.3 display down scale
ADJ ↓
000.3 display down scale shifting
F.DIS
500.2 display full scale
ADJ ↑
-000.2 display full scale shifting

Suppression of the input shifting:
(Case of a temperature input only)
Menu ADJ in the mode programming of a temperature input allows cancelling the entered shifting, or not.

NO: the instrument will revert to factory settings
Yes: the instrument will take the programmed adjustments into account (offset and / or slope)

5.2.2 Direct measure visualising

Press ▽ and Ⓜ to visualise the signal directly without processing: scale factor, square root, linearisation

– in mV, V or mA for process inputs
– in mV for the thermocouple input
– in Ω for the Pt100, Ni100 input
– in Ω for the resistance input
– in percents for the potentiometer input
– hot sensor temperature for the ΔPt100 input

5.2.3 Visualisation and setting of alarm setpoints

Option 4 relays

Setting of setpoints: There are 2 ways to adjust setpoints.
- either in mode programming entering the correct safety access code (see p16)
- or by simultaneous pressing on △ and Ⓜ

The converter will then show message SP.x or SPx.x alternating with the value of the corresponding setpoint.

The values of the various setpoints can be accessed with ▽ and △

These setpoints can then be modified (if access code < 6000 (see p16)) pressing ↵

Once the setpoint is adjusted press key ↵ to come back to the setpoints reading menu.

Once all setpoints are adjusted, just press, Ⓜ and the converter will revert to mode measurement, taking the new values into account.
If no key is pressed during 60 s. the converter will automatically resume measure display without modification of the setpoint values.

6. ERROR MESSAGES

2000	Measure in overstepping	----	Input upper or lower over-stepping
OPEN	Sensor rupture	OL	Displayable value overstepping.
ERR1	Value set out of range To enter the value again press key ↵ (see p14)	ERxx	Self-diagnosis error (see p14)

6.1 Led ON blinking:

Fast blinking: self-diagnosis active (display shows ERxx)

Slow blinking:
Sensor rupture detected (display shows OPEN)

Input upper or lower electrical overstepping (display shows ----)

The converter is blocked in mode SIMU or GENE

7. GENERAL WARRANTY TERMS

WARRANTY applying and duration
We garantees this instrument, for a duration of 1 year from any design or manufacturing defects, under normal operating conditions.

Intervening conditions * : Processing of goods not under warranty will be subject to the acceptance of a repair estimate. The customer will return the products at his expense, who will re-send the goods after processing. Without a written agreement on the repair estimate whithin 30 days, products will not be held.

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

8. LEXIQUE

Messages shown by the converter in mode programming and/or in mode reading

General access

- LOAD — Access to teleloading of a programming file
- READ — Access to reading of the parameters
- PROG — Access to programming of the input and output parameters
- CODE — Code for access to the programming of input and output parameters
- PCOD — Programming of a new access code
- SIMU — Access to display simulation
- GENE — Access to the analog output simulation
- CLrA — Deleting of recorded alarms

Inputs

- INP — Access to the input programming sub-menu
  - TYPE — Type of input
    - V — Voltage input
    - mA — Current input
    - TEMP — Temperature input
    - POT — Potentiometer input
    - RES — Resistance input

Potentiometer input and resistance input — POT — RES

- dINP — Input down scale
- F.INP — Input full scale
- FUNC — Choice of the processing function
  - LIN — Linear
  - SEGT — Special linearisation
    - NB — Number of linearisation points
    - Xxx — Abscisse of a special linearisation point

Voltage and current input — V — mA

- CAL — Choice of the voltage caliber
  - 10V — Input 0 to 10 V (or -10/10V)
  - 300V — Input 0 to 300 V (or -300/300V)
  - 100m — Input 0 to 100 mV (or -100/100mV)
  - 1V — Input 0 to 1 V (or -1/+1V)
- dINP — Down input scale
- F.INP — Full input scale
- FUNC — Choice of the processing function
  - LIN — Linear
  - ROOT — Square root extraction
  - SEGT — Special linearisation
    - NB — Number of linearisation points
    - Xxx — Abscisse of a special linearisation point

Temperature input — TEMP

- CAPT — Type of temperature sensor
  - RTD — Pt100 input
  - TC — Thermocouple input
    - TC-- — Thermocouple type
      - TC-K — Thermocouple K (see table page 3)

CJC Type of cold junction compensation
CJ-I Internal cold junction compensation
CJ-E External cold junction compensation
CJ-T Value of external cold junction compensation
ΔRTD Delta PT100 input
ni 100 NI100 input
T°0 Type of degrees
°C Degree Celcius
°F Degree Fahrenheit

ADJ Input shifting
OFFS Offset shifting
dDIS Slope and offset shifting, display down scale
ADJ ↓ Display down scale adjusting
FDIS Slope and offset shifting, display full scale
ADJ ↑ Display full scale adjusting

Display parameters

PrDI Display features programming sub-menu
BRGT Adjusting of digits brightness (4 levels)
1 1 1 1 Lowest brightness
4444 Strongest brightness
LdIG Last digit (least significant)
ON Last digit in service
OFF Last digit enforced to 0
NULL Erasing of unsignificant zeros
YES Yes
NO No

Display

SCAL Choice to use either a display scale, or mode transmitter (display of measured magnitude)
DISP Access to the display programming sub-menu
POIN Choice of the decimal point location
--.-- Decimal point location
dDIS Display down scale
FDIS Display full scale
Yxx Ordinate of a special linearisation point
CUT Cut-off programmable or not
RES Display resolution for temperature inputs
0.1°0 Resolution 1/10th of degree
1°0 Resolution 1 degre
FILT Integration indice
UNIT Choice of 4 characters to define the display unit

Analog output

OUt.U Access to the voltage output programming sub-menu
OUt.I Access to the voltage output programming sub-menu
dOUT Analog output down scale
F.OUT Analog output full scale
dOdI Access to the display corresponding to the output down scale
F.OdI Access to the display corresponding to the output full scale

Relay outputs: x: 1 to 4

REL Access to the relay outputs programming sub-menu
REL.x Access to the programming of relay x
AL.x Activation of relay output 1
ON Activation
OFF De-activation
MODx Operating mode of relay x
__1-- --1__ Mode setpoint
_1--1_ -1__1- Mode window
SPx Value of setpoint in mode setpoint
SPx.1 Value of 1st setpoint in mode window
SPx.2 Value of 2nd setpoint in mode window
HYSx Hysteresis value, in display points
TIM.x Time delay on relay X

LEDx 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

MESx Alarm message

YES Message NO No message

Safeties

SECU Access to the safeties programming sub-menu

RUPT Programming of the sensor rupture safety

CAPT Validation (or not) of the sensor rupture

OFF Sensor rupt. inactive ON Sensor rupt. active

REL.X State 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.I (or) Return value (or not) on the output in case of sensor rupture

YES Return value requested NO No return value

REPL Return value

DIAG. Programming of the self-diagnosis safety

REL.X State of relay X in case of self-diagnosis error

OFF No self-diagnosis associated with the relay

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

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

OUT.U / OUT.I (or) Return value (or not) on the output in case of self-diagnosis error

YES Return value requested NO No return value

REPL Return value

Configuration saving

SAVE Configuration saving

YES Saving NO No saving

WAIT Awaiting transfer

Reading of the instrument internal features

INFO Access to the internal features reading sub-menu

µC Instrument name

305 Instrument type: µC305, µC805, µC405

n0 xxxx Instrument identification number

PROG xxx Instrument programme version number

ORIG PC-X Instrument origin

CSUM 65F2 Programme check-sum

Changing of the access code

PCOD Access to the access code modification sub-menu

OLD Enter former access code

NEW Enter new access code

NO Entered code not valid

Teleloading of a programming file

LOAD	Access to the teleloading of programming files sub-menu
READ	Alternating with CONS: reading of the programming file stored in the µconsole
COPY	Programming transfer
→µCo	Indicates writing of the µC programming in progress to the µconsole (saving of a file)
←µCo	Indicates teleloading of the µconsole programming file in progress to the µC (restoring of a file)
ERR PROG	Programming file incorrect
ERR OPT	File does not have the same options as the instrument currently in service

Further functions

INF	Minimum value display
SUP	Maximum value display
CLrM	Delete min. and max.
CLrA	Delete recorded alarms.

Error messages

ERR1	Value set out of span
OPEN	Sensor rupture
2000	Blinking measure: measure in overstepping
OL	Displayable value overstepping
----	Input upper or lower electrical overstepping
ERxx	Self-diagnosis error
ERR tYPE CONS	The µconsole type is not compatible with the converter type