PULSE COUNTER
mod. D98 / X98

OPERATOR' S MANUAL

RELEASE 01.06

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Ipm0135.1

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1.0 OVERVIEW

The MPCT300 P6 model has 5 main programmable functions: RPM meter, frequency meter, hourly production meter, timer, and uni-directional pulse counter.
Each one of these five functions is independent and they can't be used at the same time.
Main characteristics are:

- count memory at the switching off (you can exclude this function from the menu).
- six digits for counting.
- NPN or PNP inputs (open collector or passive pull-up) or not amplified proximity (configured by jumpers or terminal connections)
- up to three exchange relay alarm outputs (5A switch) (option)
- programmable multiplying and dividing factor from 1 to 65535 (pulse counter, frequency meter, RPM meter and hourly production meter)
- programmable pre-set (pulse counter and timer only)
- up/down count (pulse counter and timer only)
- visualisation of the partial or total counting (counter only)
- timer (hold and reset) or chronometer (start, stop, reset) functioning
- working-break functioning (timer)

1.1 TECHNICAL FEATURES

Table 1

Inputs	uni-directional npn/pnp encoder 3 wire npn/pnp amplified proximity 2 wire not amplified proximity mechanical switch IBT (option)
Transducer Supply	16 Vdc / 50 mA not reg. 5V / 50 mA (on request)
Digits numbers	999999
Frequency max. (RPM)	10 KHz
Frequency min. (RPM)	0.001 Hz
Min. width pulse	100 μs
Notches number	1 to 9999
Divider	1 to 65535
Multiplier	1 to 65535
RPn meter max error	0,01 %
Timer max error	0.01 %
Alarm output	exchange relay 250 Vac / 5 A
Supply	12 ÷ 30 Vdc

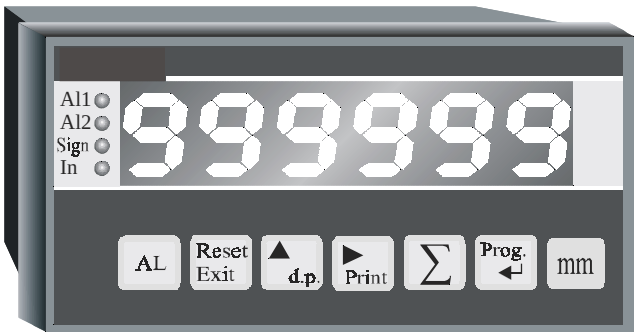
	25Vac 115Vac 230Vac
Dimensions	48 x 96 x 75 mm
Piercing template	44.5 mm (height) x 92.5 mm (width)

1.2 DISPLAY MESSAGES

Table 2

r.01.00	Software version
-OFL-	overflow
-UFL-	underflow
ErP 1	error in programming parameter: dEnO = 0
ErP 2	error in programming parameter: n.riF = 0
ErP 7	error in programming parameter: the Preset item is not compatible with the alarms set point

1.3 WIRING DIAGRAMS



DESCRIPTION OF THE FRONT COMMANDS

Led AL1: alarm 1 status indication
Led AL2: alarm 2 status indication
Led Sign: no managed
Led In: total counting indication

Key Prog. : access at the programming functions

Key Σ : it visualises the total counting (it can be disabled by the menu). Stop counting if timer.

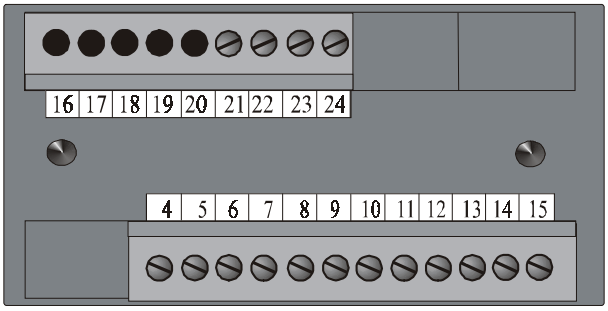
Key Print : readout print. Used for set up.

Key d.p. **:** it sets up decimal point (it can be disabled by the menu). Used for set up. Start counting if timer.

Key Reset Exit : Clear count (can be disabled by the menu) / fast exit in menu

Key AL : it visualises alarm set point (it can be disabled by the menu)

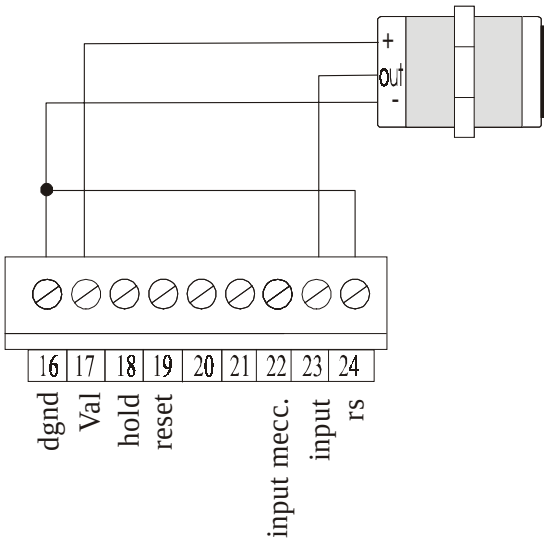
BASIC TERMINAL BOARD DESCRIPTION



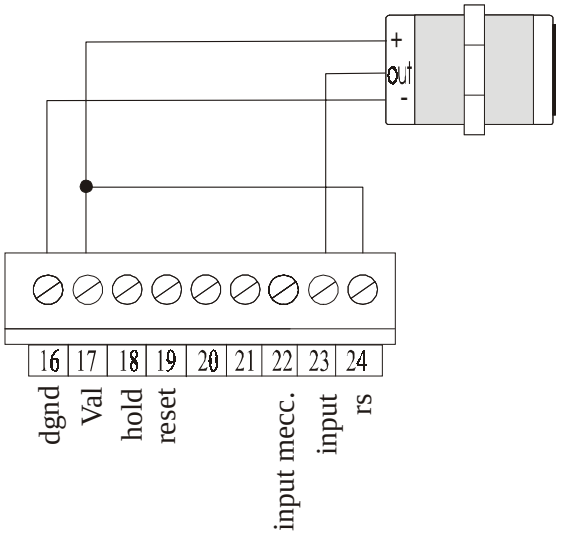
Terminals 4-5-6	- exchange relay output (AL2: 4 = Com, 5 = NC, 6 = NO)
Terminals 7-8-9	- exchange relay output (AL1: 7 = Com, 8 = NC, 9 = NO)
Terminals 13 and 15	- instrument power supply (verify the instrument's label to understand the power supply value to give)
Terminal 16	- ground
Terminal 17	- transducer power supply (16Vdc). On request 5V.
Terminal 18	- "hold" or "stop" for timer. In counter and/or timer functioning it can be configurated to select Up-Down counting.
Terminal 19	- external reset. In counter and/or timer functioning it can be configurated to select Up-Down counting.
Terminal 20	- "start" for timer in chronometer function
Terminal 22	- link for mechanical contact input
Terminal 23	- counting input
Terminal 24	- pull-up resistor for counting input

1.4 WIRING SCHEMATICS FOR COUNTER, REVOLUTION COUNTER AND HOURLY PRODUCTION

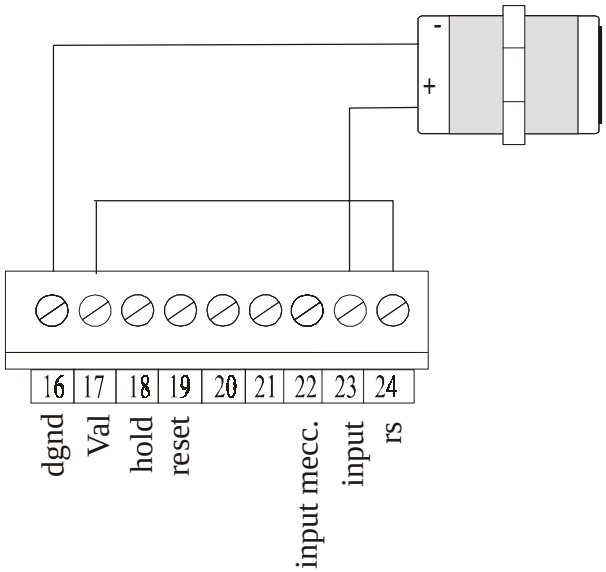
NPN Prox connection



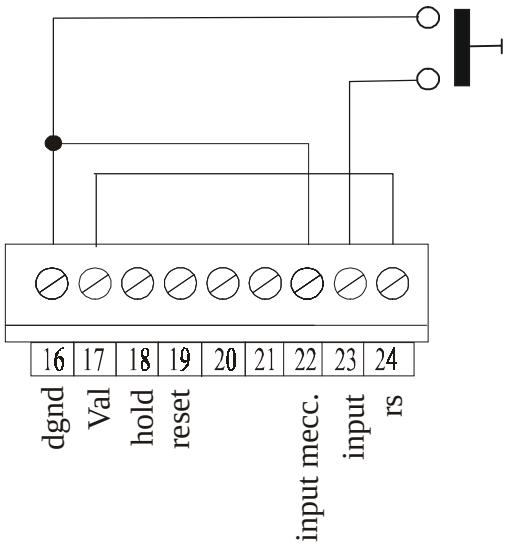
PNP Prox connection



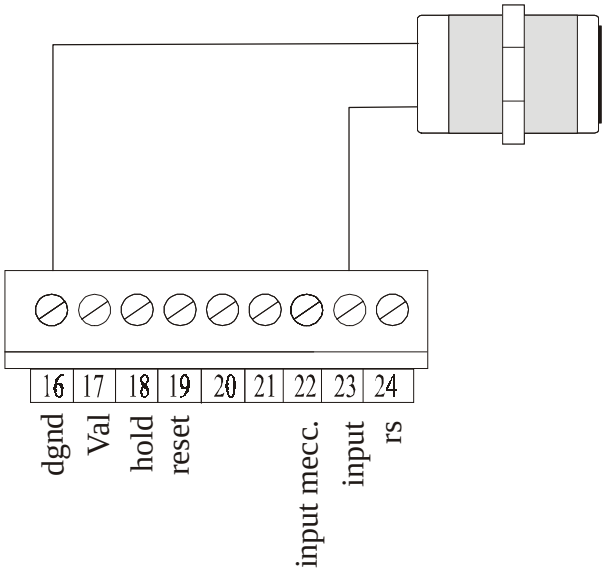
Not amplified MAF 35 sensor connection (maf 35)



MECHANICAL contact connection



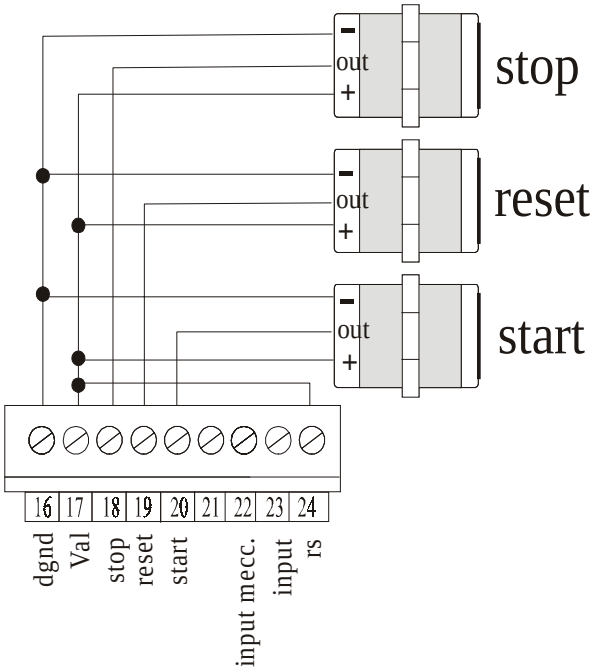
Magnetic pick-up (IBT option) connection



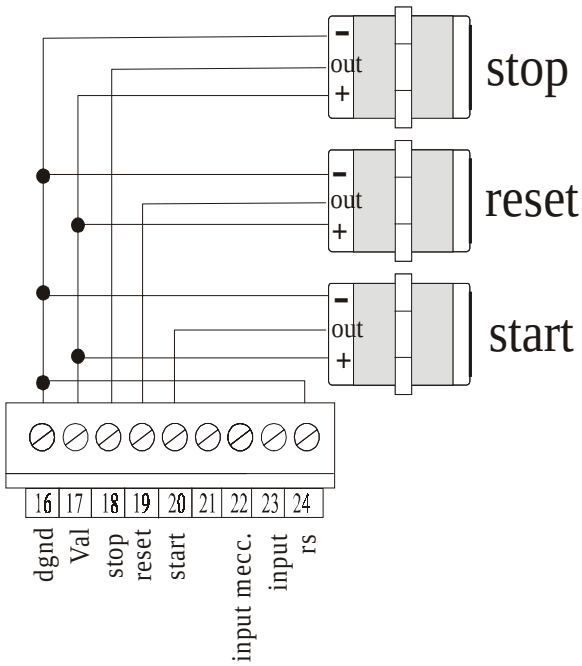
For frequency generator connection use 23 and 16 terminals (gnd)

1.5 WIRING SCHEMATICS FOR TIMER

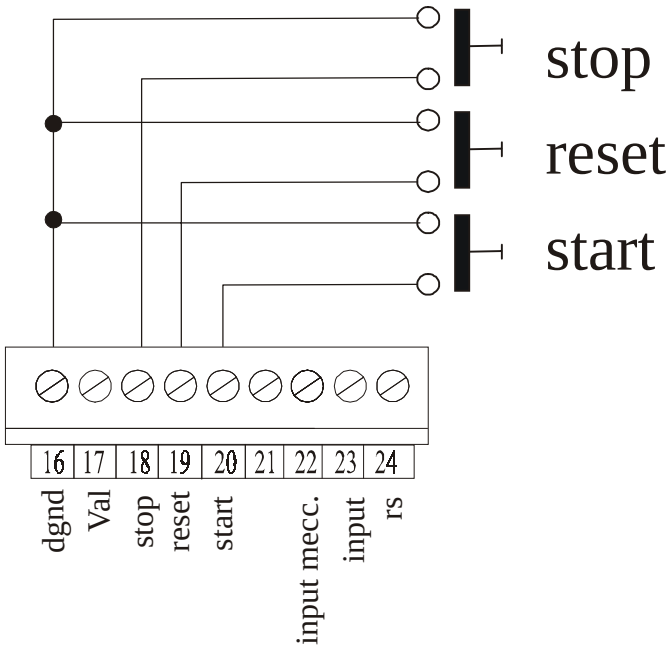
NPN Prox connection



PNP Prox connection



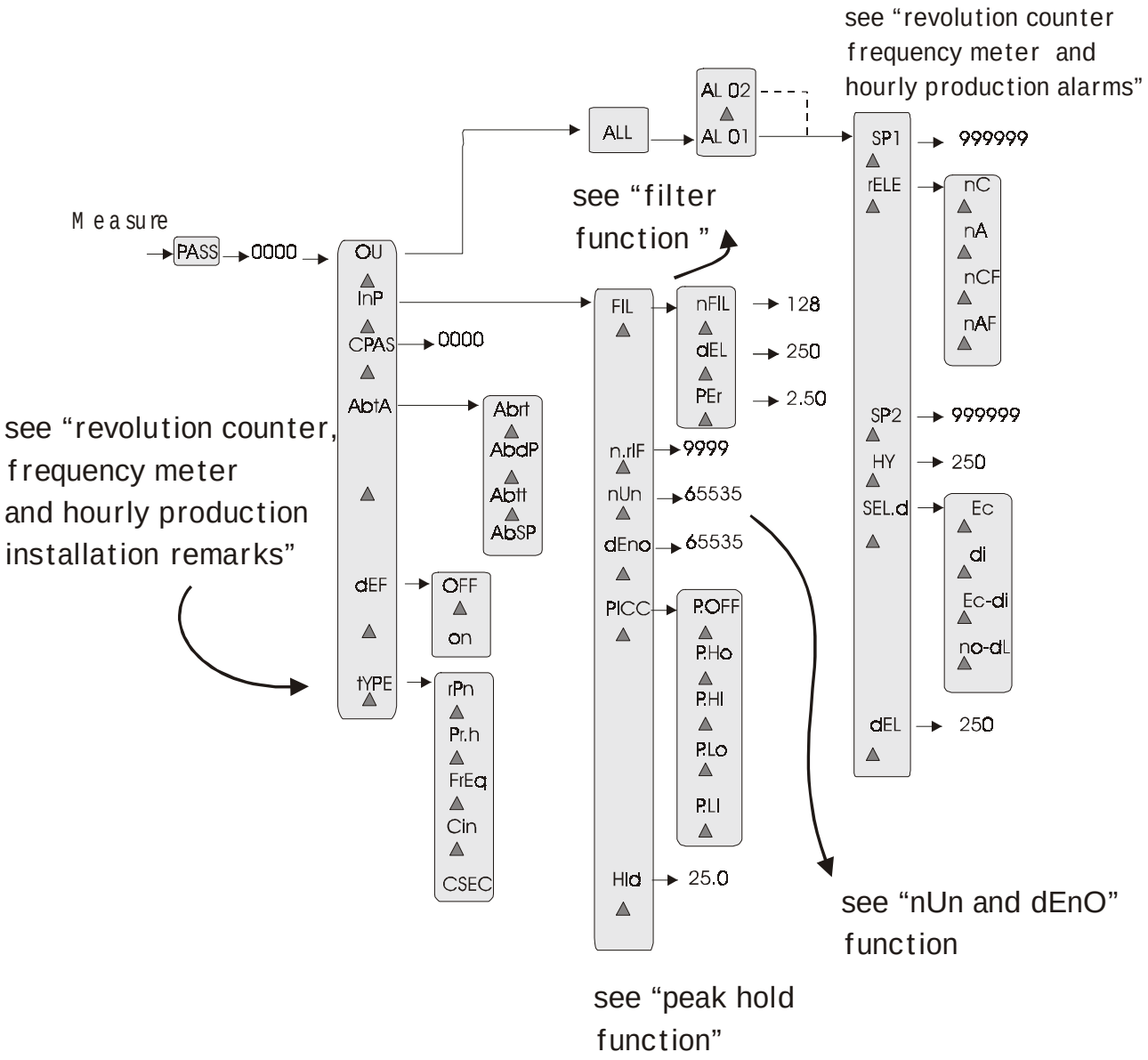
Switch connection



1.6 PROGRAMMING TIPS

- Press Prog. key to get into the programming menu.
- Press Prog. key to search the item to program.
- If the set up needs a number to write, use the ▲ d.p. key to increase the digit which blinks and ▶ Print key to move the blinking digit and confirm with Prog.
- If the set up needs the selection of an item, use ▲ d.p. key and confirm with Prog.
- To exit the menu, press Reset Exit : the modified parameters will be stored.

1.7 RPM, FREQ. OR PR.H INSTRUMENT MENU FLOW

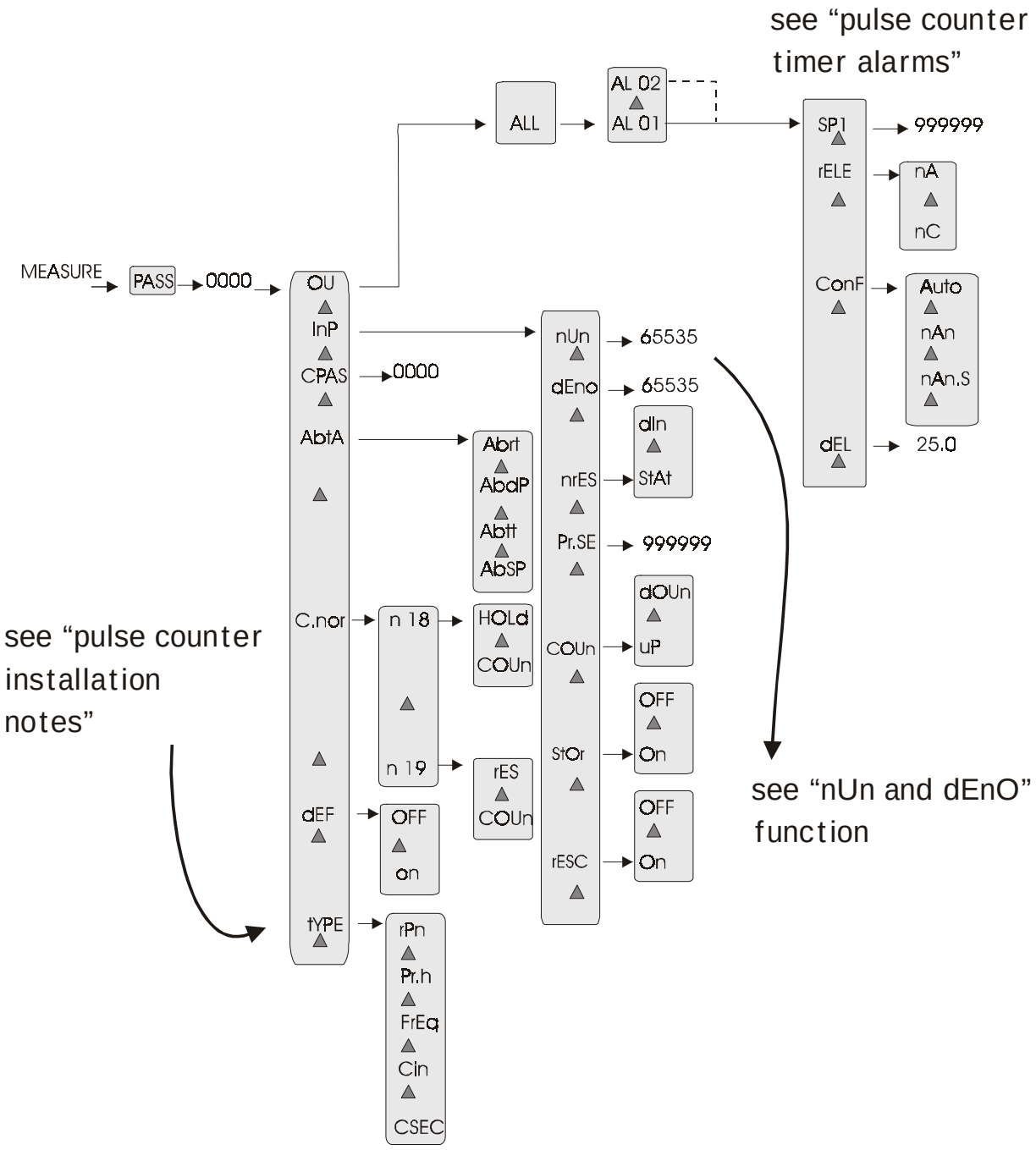


Notes:

The → symbol means: Prog. ↵

The ▲ symbol means: ▲ d.p.

1.8 COUNTER INSTRUMENT MENU FLOW

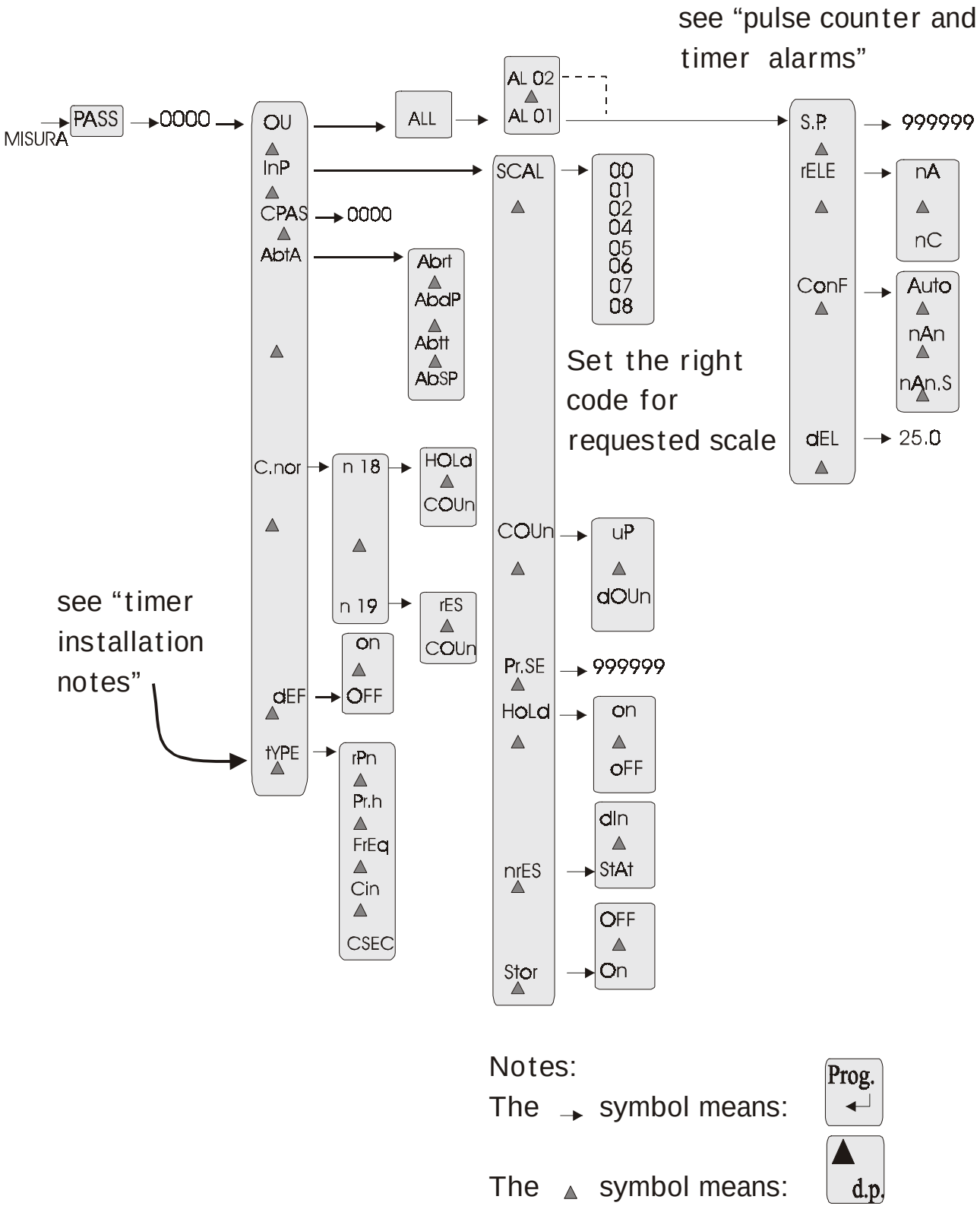


Notes:

The → symbol means: Prog. ↵

The ▲ symbol means: ▲ d.p.

1.9 TIMER INSTRUMENT MENU FLOW



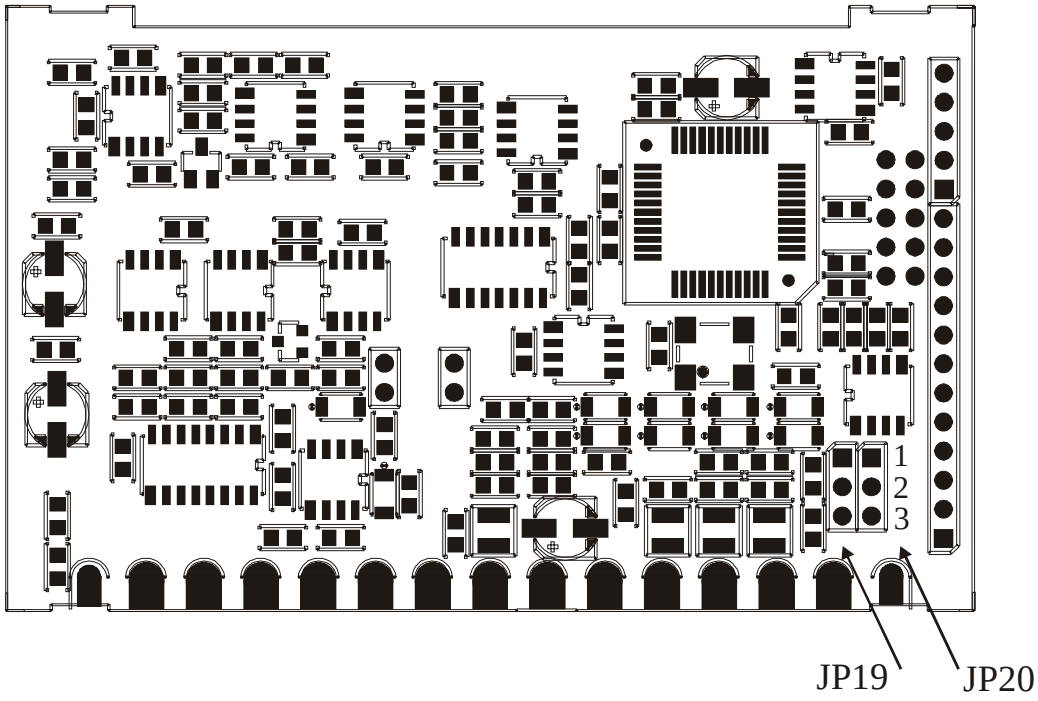
Notes:

The → symbol means: Prog. ↵

The ▲ symbol means: ▲ d.p.

1.10 PRINTED CIRCUIT BOARD (PCB) CONFIGURATION

Open the instrument to configure the “Hold”, “Reset” and “Start” (NPN or PNP) inputs. To open the instrument use a screw-driver to lever on the long part of the keyboard and on the side hooks and extract the instrument from the front.
The “Hold/Stop”, “Reset” and “Start” inputs are in NPN configuration.
To set up the “Reset”, “Hold/Stop” and “Start” inputs as PNP version, move the JP19 and JP20 jumpers in 1-2 position.



2.0 REVOLUTION COUNTER, FREQUENCY METER AND HOURLY PRODUCTION INSTALLATION REMARKS

2.1 INSTALLATION PROCEDURE

1) Make connections as indicated at pages: 7, 8, 9 and 10
HOLD terminal connections:
when it works, it stops the visualization and the acquisition of new input signals.
To modify the “hold” input for a PNP input look paragraph “PCB configuration”.
2) Switch the unit on.
3) Program the functions based on the indications in the following table:

Table 3

n°seq.	Press Key	Appears on the display	Remarks
1	Prog. ↵	PASS	Touch the "prog." key to get into the programming menu
2	Prog. ↵	0 000	In this phase the instrument asks for the "password" number to protect the data programmation. (see "Password function")
3		Ou	
4	▲	InP	
5	▲	CPAS	
6	▲	AbtA	
7	▲	dEF	
8	▲	tYPE	TYPE INSTRUMENT
9	prog. ↵	rPn	rPn = rpm meter Pr.h = hourly production meter FrEq = frequency meter CSEC = timer CIn = counter Select by "▲ "key "rPn" to program revolution counter, or "FrEq" to program frequency meter or "Pr.h" to program hourly production. (Confirm by "prog. ↵")
10		tYPE	
11	AL Exit		

4) Program the functions of the following table to set notches number (n.rIF), multiplaying or division Factors (uUn or dEnO) and the decimal point with front key.
5) Set up, if requested, the peak function; for this function in detail see "peak-hold function" paragraph.
6) Set up, if necessary, a digital filter (menu item "nFIL", dEL and PEr). For these functions in detail see "filter function" paragraph.
7) For default parameters see "default parameters" paragraph
8) Set alarms (if requested)
9) Set, if desired, the programming menu access code (password function)
10) The unit is now ready to be used.

Table 4

n°seq.	Press Key	Appears on the display	Remarks
1	Prog. ↵	PASS	Touch the "prog." key to get into the programming menu
2	Prog. ↵	0 000	In this phase the instrument asks for the "password" number to protect the data programmation (see "Password function")
3		Ou	
4	▲	InP	
5	prog. ↵	FIL	DIGITAL FILTER PROGRAMMING (look paragraph)
6	▲	n.rIF	NOTCHES NUMBER
7	prog. ↵	00001	set number of notches requested (1÷9999) **(press "prog. ↵" to confirm)
8		n.rIF	
9	▲	nUn	MULTIPLAYING FACTOR
10	prog. ↵	0.0000	Set multiplying factor value (1÷65535). This number will be the numerator of the correction constant (see "nUn and dEno function") ** (press "prog. ↵" to confirm)
11		nUn	
12	▲	dEno	DIVISION FACTOR
13	prog. ↵	00001	Set division factor value (1÷65535). This number will be the denominator of the correction constant (see "nUn and dEno function") **(press "prog. ↵" to confirm)
14		dEno	
15	▲	PICC	PEAK SET-UP
16	prog. ↵	P.OFF	P.OFF = Peak excluded P.h.O = Maximum peak with time P.h.I = Maximum infinite peak P.L.O. = Minimum peak with time P.L.I = Minimum infinite peak Touch "▲" key until there appears the req. item (confirm to "prog. ↵")
17		PICC	
18	▲	.HLd	TIME OF READING RETENTION

n°seq.	Press Key	Appears on the display	Remarks
19	prog. ↵	25.0	write retention time (0 ÷ 25.0 sec) if PhO or PLO is req. ** (confirm to "prog. ↵")
20		.HLd	
21	Reset Exit	measure	To exit from programming menu

** see para. "SET-UPS" to change the set value.

2.2 "nUn" and "dEno" FUNCTION

There are two menu items that allow to modify the displayed value by a constant factor. The "nUn" item allows to program a multiply factor in the range 1 ÷ 65535, and the "dEno" item allows to program a divide factor in the range 1 ÷ 65535.
The constant factor will be:

$$\text{readout on the display} = \frac{nUn}{dEno} * X$$

Where:
X = "rPn measured" if the instrument is set up in revolution counter
X = "Pr.h measured" if the instrument is set up in hourly production
X = "pulses read at the input" if the instrument is set up in pulse counter

For a reading without correction factor is sufficient to set up nUn = dEno, instead to add corrective costant is necessary to set up "nUn" and "dEno" to get the desired value.
The visualization in RPN and Pr.h are linked by the following relations:

$$RPM\ (rPn) = \frac{60 * Hz}{n.riF} * \frac{nUn}{dEno}$$

$$Pr.h = \frac{3600*Hz}{n.riF} * \frac{nUn}{dEno}$$

(Hz = frequency at the instrument input)

2.3 EXPLICATIVE EXAMPLES

- *Make following settings on "rev. counter" instrument.*

The parameter to be measured is the speed, in mt/sec., of toothed belt by reading the rotating speed of the driving shaft. Four notches can be identified on the shaft and the belt advances by 0.55 mt for one revolution of the shaft.

To get the requested visualisation, you have to multiply the reading revolution/minute (RPM) by 0.55. To visualize the revolution/minute reading you must set up in the menu item “n.riF” = 4 (notches for revolution). To correct the visualisation by a 0.55 factor, you have to set up “nUn” = 55 and “dEno” = 100. Infact we know this relation:

$$\text{reading} = \text{RPM} * \frac{\text{nUn}}{\text{dEno}} = \text{RPM} * \frac{55}{100} = \text{RPM} * 0.55$$

The unit can be programmed whit:
selection “rPn”
n. rIF = 4
nUn = 55
dEno = 100

- *Make following setting on “hourly production” instrument.*

The parameter to be measured is the hourly production of a toothed belt moving bottles. Each toothed represent a row of ten bottles.

To get the requested visualisation, you have to multiply 10 with the hourly production meter reading (Pr.h). To visualize the hourly production meter reading you must set up in the menu item “n.riF” = 1 (notches for revolution). To correct the visualisation by a 10 increasing factor, you have to set up “nUn” = 10 and “dEno” = 1. Infact we know this relation:

$$\text{reading} = \text{Pr.h} * \frac{\text{nUn}}{\text{dEno}} = \text{Pr.h} * \frac{10}{1} = \text{Pr.h} * 10$$

The unit can be programmed with:
selection “Pr.h”
n. rIF = 1
nUn = 10
dEno = 1

2.4 DEFAULT PARAMETERS (dEF)

Some wrong values in menu programming function can cause the “ERR” item to appear. To reset to factory default parameters you can use the “dEF” function, which sets up all the programmation parameters at the factory value, eliminating all the error situation (look the following table).
BE CAREFUL: all previous programmed values will be lost.

Table 5

n° seq.	touch key	Appears on the display	NOTES
1	prog. ↵	PASS	Press “prog.” key to get into the programming menu
2	prog. ↵	0 000	Digit the personal password ** (confirm with “prog. ↵”)
3		Ou	
4	▲	InP	
5	▲	C.PAS	
6	▲	AbtA	
7	▲	dEF	DEFAULT PARAMETERS
8	prog. ↵	OFF	Touch the "▲" key until the written “ON” appears ** (confirm with “prog. ↵”) The instrument exits from the programming menu and it follows the default parameters.
9		measure	

2.5 FRONT KEYS ENABLING

The keys used on the front of the instrument for the direct sets up (reset, decimal point, alarm and total counting) can be disabled from the programming menu. Follow the next table.

Table 6

N seq.	Tasto da Premere	Scritta sul Display	NOTE
1	prog. ↵	PASS	Touch the “prog. ↵” key to get into the programming menu
2	prog. ↵	0 0000	Digit the personal Password. Press “prog. ↵” to confirm. (see “Password function”)
3		OU	
4	▲	InP	
5	▲	C.PAS	
6	▲	AbtA	KEYS ENABLING
7	prog. ↵	Abtr	"Reset” KEY ENABLING
8	prog. ↵	On	On = enabled, OFF= disabled Press “▲” key till when the desired function appears on the display **(press “prog. ↵” to confirm)
9		Abtr	
10	▲	AbdP	"d.p.” KEY ENABLING (decimal point)
11	prog. ↵	On	On = enabled, OFF= disabled Press “▲” key till when the desired function

N seq.	Tasto da Premere	Scritta sul Display	NOTE
			appears on the display **(press "prog. ↵" to confirm)
12		AbdP	
13	▲	Abtt	"Σ" KEY ENABLING
14	prog. ↵	On	On = enabled, OFF= disabled Press "▲" key till when the desired function appears on the display **(press "prog. ↵" to confirm)
15		Abtt	
16	▲	AbSP	"AL" KEY ENABLING (alarms)
17	prog. ↵	On	On = enabled, OFF= disabled Press "▲" key till when the desired function appears on the display **(press "prog. ↵" to confirm)
18		AbSP	
19	Reset Exit	Readout	To get out from the menu

** see "SET-UP" paragraph to change the set value.

3.0 PEAK-HOLD (PICC) FUNCTION

By using the "PICC" function it is possible to memorize the highest (P.h.) or the lowest (P.L.) readings leaving them continuously on the display (P.h.I. - P.L.I.) or just for a pre-set time limit from 0 ÷ 19.9 sec using the "hld" function (P.h.O. - P.L.O.) . This function, if unwanted, can be excluded from the programming or by short-circuiting hold terminals with the "GND".

If the instrument is requested with serial output and the hold terminal is configured for the readout transmission, the reset peak function can't be done (see "Serial output" paragraph).

The following two examples describe the main operating methods of the "PICC" function, while for the complete programming please refer to TAB 3.

- EXAMPLE 1

  Programme with the function "PICC" the "P.h.0." item.

  and in the "HLd" function the time "10.0" sec.

  The instrument thus programmed, will follow the entry signal only in the variations that increase the reading value, while, for decreasing readings, the instrument maintains the fixed display for 10 seconds, after which the correct value will appear. Of course during this 10 second period the instrument detects an increase in the reading value, the display becomes updated and the time zeroed. (See fig 1).

The “PICC” function can be excluded by short-circuiting the terminals 16 and 18.

- EXAMPLE 2

Programme with the function "PICC" the "P.h.I." item.

The instrument behaves exactly in the same way as the one described before with the variation that the time is not programmable but fixed up to an infinite value. Also in this case the cancellation of the peak memorisation and the exclusion of that function can be undertaken by short-circuiting terminals 16 and 18.

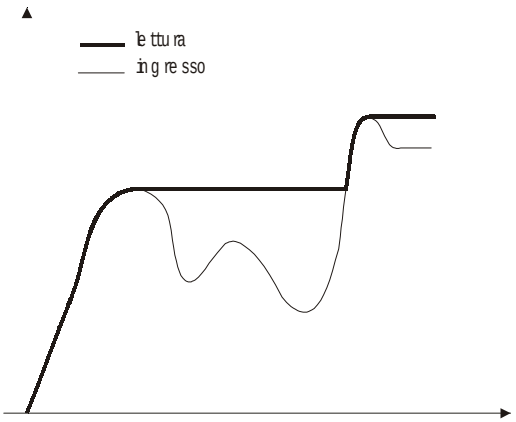


Fig. 1

4.0 “FILTER” FUNCTION

The MPCT300 P6 instruments provide the following filtering mode:

1. **n.FIL** : number of averages of the converted value (it acts within the window called “dEL”)
2. **dEL** : window within which the averages are taken (the number of averages taken is as programmed at item “n.FIL”). At the displayed number, a window (dEL) is calculated, all numbers courted within this window are averaged, whereas those exceeding the window immediately update the display.
3. **PEr** : time in seconds by which the last averaged value is shown.

When the converted value exceeds the set window value programmed in the dEL item, the dwell time (Per) gets started. If after the dwell time (Per) the converted value falls again within the set windows value, the old value is not considered for the average, otherwise the display is immediately updated.

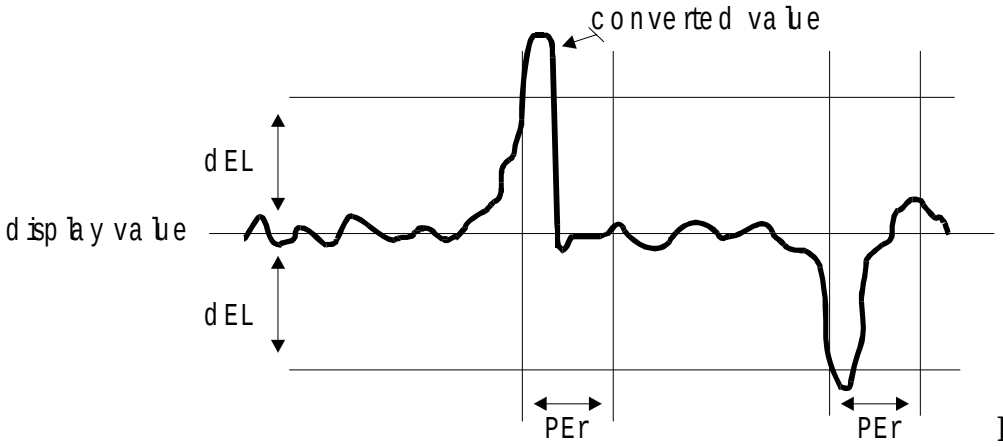


Fig. 2

To program these items follow the instructions in the following table.

Table 7

n° seq.	touch key	Appears on the display	NOTES
1	prog. ↵	PASS	Touch the "prog. ↵" key to get into the programming menu
2	prog. ↵	0 000	Digit personal password code (look "Password function")
3	prog. ↵	Ou	
4	▲	InP	
5	prog. ↵	FIL	FILTER PROGRAMMING
6	prog. ↵	n.FIL	NUMBER OF AVERAGES
7	prog. ↵	128	Press key " ▲ " until the display shows the number of averages required (0 = no filter). **(confirm with "prog. ↵")
8		n.FIL	
9	▲	dEL	FILTERING WINDOW
10	prog. ↵	250	Set the number of digits within the filter is activated. **(confirm with "prog. ↵")
11		dEL	
12	▲	PEr	Dwell time
13	prog. ↵	2.50	write dwell time (0.01÷2.50 sec) ** (confirm with "prog. ↵")
14		PEr	
15	Reset Exit	measure	Procedure to exit programming mode

** see "SET UP" paragraph to change the set value.

5.0 REVOLUTION COUNTER, FREQUENCY METER AND HOURLY PRODUCTION ALARMS

The MPCT300 P6 instrument can be requested with 2 exchange relay. If the instrument has to work as revolution counter, frequency meter or hourly production, each alarm has the following programmation:

1) Hysteresis from 1 to 250 digits
2) Delay time from 0 to 250 seconds, with the following configurations:
   - activation delay
   - de-activation delay
   - activation and de-activation delay
3) Activation at max or min level
4) Window activation; max or min level can be set

Programming of the above functions is described here below in more detail.

a) **SP1 :** Setting of alarm threshold in the range 0÷999999
In the case of windowed threshold "SP1" selects the first commutation (see fig.3)

b) **SP2**: Setting of the second commutation point of the window threshold (see fig.4).

c) **HY:** Setting of hysteresis value, centred on the set-point (previously programmed) in the range 0 ÷ +/- 250 digits.
HYSTERESIS: number of digits between triggering and de-triggering the alarm threshold.

It can operate in two ways:
- Simple triggering threshold see fig.3
- Window triggering threshold see fig.4

d) **dEL :** Setting of the threshold commutation delay time. It can be set in the range 0 to 25.0 seconds. Alarms 1 and 2 indicate triggering of the delay time by the appropriate led blinking.

e) **SEL.d**: (type of delay) setting the type of delay programmed at item "dEL".
- EC: the time set up comes in before the output activation
- dI: the time set up comes in before the output de-activation
- EC.dI: both EC and dI
- nO dL: time is disabled

f) **RELE :**Selecting the threshold operating mode, which can be normal or window type**.**
For normal operation mode (SP1), the following items should be programmed within the "rele" function.
- nA: normally open
- nC: normally closed

For window mode operation, the two commutation points should be programmed (SP1 and SP2) and within the “delay” function one the following two should selected:

- nAF: normally open (closed within the selected window)
- nCF: normally closed (open within the selected window).

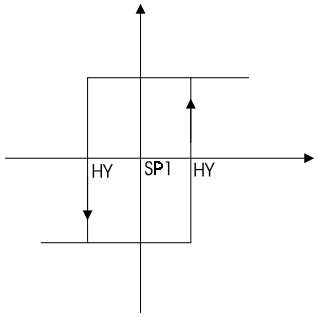


Fig. 3

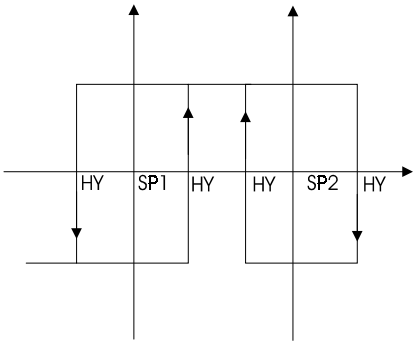


Fig. 4

5.1 ALARM SETTING

Alarm values can be set in two different ways: by front panel keys or by standard menu. In the first case it is possible to get into at the Set 1 and 2 of the alarms 1 and 2 set up very quickly, in the second case it is possible to reach the alarm sets (for normal or windowed functioning) and all the parameters of the instrument. The first step is to get into the complete menu and to configure the alarms as requested.
Each alarm can be programmed as a minimum level alarm, maximum level alarm or windowed alarm (normally open or normally closed).
See the following table to program the alarms.

- Minimum or maximum alarm. Select “nA” item from “rELE” menu for a maximum alarm, or “nC” for a minimum alarm. In this case the threshold level is SP1.
- Windowed alarm. Select “nAF” from relay menu for a maximum windowed alarm, or “nCF” for a minimum windowed alarm. In this case the first threshold level is SP1, the second is SP2.

Table 8

n° seq.	**Touch key**	**Appears on the display**	**REMARKS**
1	prog. ↵	PASS	Touch the “prog. ↵” key to get into the programming menu
2	prog. ↵	0 000	Digit the password code **(press “prog. ↵” to confirm)
3		Ou	
4	prog. ↵	ALL	ALARM 1 PARAMETERS

n° seq.	Touch key	Appears on the display	REMARKS
5	prog. ↵	AL 01	ALARM 1 SET UP
6	prog. ↵	SP.1	Setting the minimum or maximum set-point value or the first triggering value for windowed alarm
7	prog.	0 00000	Set up the SP1 value **(Confirm by “prog. ↵”)
8		S.P.1	
9	▲	rELE	AL1 CONTACT CONFIGURATION
10	prog. ↵	n.A.	n.A. = threshold normally open n.C. = threshold normally closed n.A.F.= normally open window threshold n.C.F. = normally closed window threshold Select the desired item by key " ▲ " and confirm with “prog. ↵”
11		rELE	
12	▲	SP.2	SETTING the second triggering. Second threshold set up to use only if windowed alarm is requested
13	prog.	0 00000	Set up the SP2 value **(Confirm by “prog.”)
14		SP.2	
15	▲	HY	HYSTERESIS SET-UP ALARM 1
16	prog. ↵	00 250	Set up a number between 0 and 250 digit. ** (press “prog. ↵” to confirm)
17		HY	
18	▲	SEL.d	TIME CONFIGURATION AL1
19	prog. ↵	Ec	Ec = delay activation dI = delay deactivation Ec-dI = delay activation + de-activation nO dL = no delay Select the desired item by key " ▲ " and confirm with “prog. ↵”
20		SEL.d	
21	▲	dEL	TIME SET-UP AL1
22	prog. ↵	00 250	Set up a number between 0 and 250 sec. ** (press “prog. ↵” to confirm)
23	▶	AL01	
24	▲	AL02	ALARM 2 PARAMETERS (as alarm 1)

n° seq.	Touch key	Appears on the display	REMARKS
25	Reset Exit	measure	Procedure to exit programming mode

** see para “SETTING” to change the set value.

6.0 PULSE COUNTER INSTALLATION NOTES

6.1 INSTALLATION PROCEDURE

1 Make connections as indicated at pages: 7, 8, 9 and 10.
Two terminal connections are possible, with the following meanings:
RESET - When short circuited to ground (DGND), the instrument is reset. (The reset can be selected at the menu on static or dinamic mode). By “reset” key it is possible to choose UP-DOWN counting (see “UP-DOWN function”).
HOLD - When short circuited to ground (DGND), display value is memorized. By “hold” key it is possible to choose UP-DOWN counting (see “UP-DOWN function”).
To modify the “reset” and “hold” inputs in PNP version, see PCB configuration paragraph.

2 Switch the unit on.

3 Program the functions based on the indications in the following table:

Table 9

n°seq.	Press Key	Appears on the display	Remarks
1	Prog. ↵	PASS	Touch the “Prog. ↵” key to get into the programming menu
2	Prog. ↵	0 000	In this phase the instrument asks for the “password” number to protect the data programmation. (see “Password function”)
3		Ou	
4	▲	InP	
5	▲	CPAS	
6	▲	AbtA	
7	▲	dEF	
8	▲	tYPE	TYPE INSTRUMENT
9	prog. ↵	CIn	rPn = rpm meter Pr.h = hourly production meter FrEq = frequency meter CSEC = timer

n°seq.	Press Key	Appears on the display	Remarks
			CIn = counter Select by " ▲ "key "CIn" to program pulse counter and confirm by "prog. ↵"
10		tYPE	
11	AL Exit		

4 Program the functions of the following table to set multiplaying or division factors (uUn or dEnO), to define terminal reset functioning, type of counting (Up or Down), the decimal point with front key, the preset and the count memory at the switching off.

5 Define the reset key on the front panel by "rES" item and the reset terminal function by the "nrES" item. The "reset" key on the front panel zeroes the display. If you don't want this function, you can exclude it by the menu. The reset contact in the terminal board can work in a static mode (till when the contact is linked the instrument is zeroed) or in a dinamic way (immediate zeroing).

6 Use the "Stor" item not to store the counting at the swithching off.

7 For default parameters see "default parameters" paragraph

8 Set alarms (if requested)

9 Set, if desired, the programming menu access code (password function)

10 The unit is now ready to be used.

Table 10

n° seq.	Touch key	Appears on the display	REMARKS
1	prog. ↵	PASS	Touch the "prog. ↵" key to get into the programming menu
2	prog. ↵	0 0000	Digit the password code ** (press "prog. ↵" to confirm)
3		Ou	
4	▲	InP	
5	▲	nUn	MULTIPLYING FACTOR
6	prog. ↵	10000	Digit a number in the 1 to 65535 range. This is the numerator of the correction constant. ** (Press "prog. ↵" to confirm)
7		nUn	
8	▲	dEnO	DIVISION FACTOR

n° seq.	Touch key	Appears on the display	REMARKS
9	prog. ↵	00001	Digit a number in the 1 to 65535 range. This is the denominator of the correction constant. ** (Press “prog. ↵” to confirm)
10		dEnO	
11	▲	nrES	RESET TERMINAL BOARD CONFIGURATION
12	prog. ↵	StAt	StAt = the instrument keeps staying at zero till when the terminal is short-circuited. dIn = the instrument immediately goes to zero when the terminal is short-circuited Press key "▲ " until the required function appears on the display and confirm with “prog. ↵”
13		nrES	
14	▲	Pr.SE	PRE-SET PROGRAMMING
15	prog. ↵	000000	Input the desired pre-set value, in the 0 to 999999 range. ** (Press prog. ↵ to confirm)
16		Pr.SE	
17	▲	CoUn	COUNT DEFINITION
18	prog. ↵	uP	Press key "▲ " until the required function is displayed: up = upcount, doun = downcount. ** (Press “prog. ↵” to confirm)
19		CoUn	
20	▲	StOr	COUNTING STORE AT THE SWITCHING OFF
21	prog. ↵	On	Press key "▲ " until the required function is displayed: on = store counting oFF = don’t store counting ** (Press “prog. ↵” to confirm)
22		StOr	
23	▲	rESC	TOTAL COUNTING ZEROING
24	prog. ↵	OFF	Press key "▲ " until the required function is displayed: on = total counting is reset oFF = total counting is not reset ** (Press “prog. ↵” to confirm)
25		rESC	
26	Reset	measure	Procedure to exit the programming mode

n° seq.	Touch key	Appears on the display	REMARKS
	Exit		

** see para. “SET UPS” to change the set value.

6.2 UP-DOWN FUNCTION

The Up/Down counting function (valid on pulse counter and timer functions), can be selected by the menu “COUn” item or by “hold” and “reset” terminal board if they are abled to select the counting direction (if you use the terminal board, you can’t use the “COUn” menu item). To use the terminal board program the instrument as table below shows.
When there is not link between the terminal board and the GND, the counting is UP.
If the terminal board is configurated as NPN, it has to be a low level (GND) to make start the Down counting. If it is configurated as PNP, the terminal board has to be at an high level (+16V:Val) -see PCB configuration- .

Table 11

n°seq.	Press Key	Appears on the display	Remarks
1	Prog. ↵	PASS	Touch the “Prog. ↵” key to get into the programming menu
2	Prog. ↵	0 000	In this phase the instrument asks for the “password” number to protect the data programmation. (see “Password function”)
3		Ou	
4	▲	InP	
5	▲	CPAS	
6	▲	AbtA	
7	▲	C.nor	TERMINAL CONFIGURATION
8	prog. ↵	n 18	TERMINAL 18 CONFIGURATION
9	prog. ↵	HoLd	HoLd = terminal 18 with hold/stop function COUn = terminal 18 with Up/Down function Select by " ▲ " key and confirm with “prog. ↵”
10		n 18	
11	▲	n 19	TERMINAL 19 CONFIGURATION
12	prog. ↵	rES	rES = terminal 19 with reset function COUn = terminal 19 with Up/Down function Select by " ▲ " key and confirm with “prog. ↵”
13		n 19	
14	AL	measure	Procedure to exit the programming mode

n°seq.	Press Key	Appears on the display	Remarks
	Exit		

7.0 PULSE COUNTER AND TIMER ALARMS

Alarm values can be set in two different ways: by front panel keys or by standard menu. In the first case it is possible to immediately get in at the 1 and 2 alarms set up, the second one (MENU) drives you through all parameters of the instrument.
The first step to do is to get in the complete menu and to set up the alarms as requested.

7.1 "UP" COUNT MODE ALARMS

The MPCT300 P6 instruments can be requested with 2 exchange alarm relay. Each alarm can be programmed in the following ways:
MANUAL MODE (nAn): when the counting reaches the programmed numeric value in the "SP" item, it changes the relay and the counting keeps going till when it is not made a "reset" which zeroes the visualisation and the alarm output.
MANUAL MODE WITH STOP COUNTING (nAn S.): when the counting reaches the programmed numeric value in the "SP" item, it changes the relay and the counting is stopped till when it is not made a "reset" which zeroes the visualisation and the alarm output.
AUTOMATIC MODE (AUto): when the counting reaches the programmed numeric value in the "SP" item, it changes the relay for a determinate time, set in the "dEL" item, and the counting is zeroed with the eventual alarms which were working.
To program the alarms you must follow the next table.

7.2 "DOWN" COUNT MODE ALARMS

In the down count mode, the alarms act as follows:
MANUAL MODE (nAn): after a reset, the count starts from the value set at the menu item "PrESE". When the counting reaches the programmed numeric value in the "SP" item, it changes the relay and the counting keeps going till when it reaches the zero. Reaching zero, the count stops until a reset is performed, to start again the count from the "PrESE" value.
MANUAL MODE WITH STOP COUNTING (nAnS.): after a reset, the count starts from the value set at the menu item "PrESE". When the counting reaches the programmed numeric value in the "SP" item, it changes the relay and the counting is stopped till when it is not made a "reset" which zeroes the visualisation at the selected value in the "PrESE" item.

AUTOMATIC MODE (AUto): when the counting reaches the programmed numeric value in the “SP” item, it changes the relay for a determinate time, set in the “dEL” item, it resets the visualisation at the “PrESE” value and starts the cycle again.
To program the alarms you must follow the indication on the following table.

Table 12

n° seq.	Touch key	appears on the display	REMARKS
1	prog. ↵	PASS	Touch the “prog. ↵” key to get into the programming menu
2	prog. ↵	0 0000	Input the personal password code ** (Press “prog. ↵” to confirm)
3	prog. ↵	Ou	
4	prog. ↵	ALL	ALARM PARAMETER
5	prog. ↵	AL01	ALARM 1 PARAMETERS
6	prog. ↵	S.P	Alarm 1 threshold setting
7	prog. ↵	0 00000	Set the required threshold value. ** (Press “prog. ↵” to confirm)
8		S.P.	
9	▲	rELE	OUTPUT RELAY CONFIGURATION
10	prog. ↵	nA	Touch the "▲" key until the desired configuration is displayed: nA = relay normally open; nC = relay normally closed. **(Press “prog. ↵” to confirm)
11		rELE	
12	▲	COnF	ALARM CYCLE CONFIGURATION
13	prog. ↵	AUto	Auto = automatic cycle nAn = manual cycle nAn S. = manual cycle with stop counting Select by "▲" key and confirm with “prog. ↵”
14		COnF	
15	▲	dEL	Automatic cycle TIME SETTING
16	prog. ↵	00 25.0	Digit a value from 0 to 25.0 seconds. ** (Press “prog. ↵” to confirm)
17		dEL	
18	▶	AL01	
19	▲	AL02	ALARM 2 PARAMETERS
20	prog. ↵	S.P	for the alarms two and three also, follow

n° seq.	Touch key	appears on the display	REMARKS
			the indication for alarm 1.
21	Reset Exit	"measure"	Procedure to exit the programming mode

** see para. "SET UPS" to change the set value.

8.0 TIMER INSTALLATION NOTES

8.1 INSTALLATION PROCEDURE:

1 Make connections as indicated at pages: 7, 8, 9 and 10
Terminal connections:
to use PNP sensors it's necessary to modify an internal configuration of the instrument (as described in the "PCB configuration" paragraph).
The 3 inputs are used in the "chronometer" mode (start, stop and reset), and in "timer" mode is sufficient to use the input connected at the "hold" terminal and to program the "hold" item at "on". By "hold" and "reset" terminal board it is possible to choose the Up-Down counting (see "Up-Down function").

2 Switch the unit on.

3 Program the functions based on the indications in the following table:

Table 13

n°seq.	Press Key	Appears on the display	Remarks
1	Prog. ↵	PASS	Touch the "prog." key to get into the programming menu
2	Prog. ↵	0 000	In this phase the instrument asks for the "password" number to protect the data programmation. (see "Password function")
3		Ou	
4	▲	InP	
5	▲	CPAS	
6	▲	AbtA	
7	▲	dEF	
8	▲	tYPE	TYPE INSTRUMENT
9	prog. ↵	CSEC	rPn = rpm meter Pr.h = hourly production meter FrEq = frequency meter CSEC = timer CIn = counter

n°seq.	Press Key	Appears on the display	Remarks
			Select by " ▲ "key "CSEC" to program timer and confirm by "prog. ↵"
10		tYPE	
11	AL Exit		

4. Program the functions of the following table to set the measuring scale (hours, minutes, seconds), type of functioning (timer or chronometer), the reset terminal board functioning, the counting type (Up or Down), the preset and count memory at the switching off.
5. Set up the type of functioning by the "hold" item. With the "on" selection, the instrument works as timer (comands hold and reset from the terminal board), with "oFF" selection, the instrument works as chronometer (comands start, stop and reset from the terminal board).
6. Define the reset key on the front panel by the "rES" item and the reset function from the terminal board by the "nrES" item. The "reset" key on the front panel works for the zeroing function of the diplay. If you don't want this function, you can exclude it through the programmation of the keyboard. The "reset" contact in the terminal board can work in a static way (till when the contact is pressed, the instrument is at 0), or in a dinamyc way (immediate zeroing).
7. For default parameters see "default parameters" paragraph
8. Set alarms (if requested)
9. Set, if desired, the programming menu access code (password function)
10. The unit is now ready to be used.

Table 14

n° seq.	Touch key	Appears on the display	NOTES
1	prog. ↵	PASS	Touch the "prog. ↵" key to get into the programming menu
2	prog. ↵	0 000	Input the personal password code ** (Press "prog. ↵" to confirm)
3		Ou	
4	▲	InP	
5	prog. ↵	SCAL	SELECTION MEASURING SCALE
6	prog. ↵	000000	Set up the relative number for the desired scale: To use scale 9999.99 sec write the number "0" To use scale 99999.9 sec write the number "1" To use scale 999999 sec write the number "2" To use scale 999999 min write the number "6"

n° seq.	Touch key	Appears on the display	NOTES
			To use scale 999999 h write the number “8” To use scale 9999 min 59 sec write the number “3” To use scale 9999 h 59 min write the number “7” To use scale 99 h 59 min 59 sec write the number “4” To use scale 23 h 59 min 59 sec write the number “5” ** (Press “prog. ↵” to confirm)
7		SCAL	
8	▲	CoUn	TYPE OF COUNTING SELECTION
9	prog. ↵	uP	Press key "▲" till when on the display appears the desired counting and confirm with “prog.” (“uP” for increasing counting and “doun” for decreasing counting)
10		CoUn	
11	▲	Pr.SE	PRESET FOR DOWN COUNTING
12	prog. ↵	100000	Write the number of the requested preset ** (Press “prog. ↵” to confirm)
13		Pr.SE	
14	▲	HOLd	CHRONOMETER/TIMER SELECTION
15	prog. ↵	on	Selection the type of functioning: timer or chronometer. Press key "▲" till when on the display appears the desired functioning and confirm with “prog. ↵”: “on” = timer functioning (hold and reset from the terminal board) “oFF” = chronometer functioning (start, stop and reset from the terminal board)
16		HOLd	
17	▲	nrES	RESET TERMINAL BOARD CONFIGURATION
18	prog. ↵	StAt	StAt = the instrument keeps staying at zero till when the terminal is short-circuited. dIn = the instrument immediately goes to zero when the terminal is short-circuited Press key "▲ " until the required function appears on the display and confirm with “prog. ↵”
19		nrES	
20	▲	StOr	COUNTING MEMORIZING AT THE SWITCHING OFF
21	prog. ↵	On	Press key "▲" till when on the display appears th

n° seq.	Touch key	Appears on the display	NOTES
			desired function: on = counting stored oFF = counting not stored ** (Press “prog. ↵” to confirm)
22		StOr	
23	Reset Exit	measure	Procedure to exit the programming mode

** see para. “SET UPS” to change the set value.

9.0 PASSWORD FUNCTION

Programmed data can be protected from unauthorised changes using the password function.
The instrument is supplied with the password code set = 0; any number in the range 0 to 9999 can be used as access key to changing set data.
See following table for setting a customer password.
The password code is requested when accessing the programming menu.
The instruments, after receiving the password number, can behave in two different ways.

1) **correct Password number:** The user can gain access to programming menu and modify any function or number that is flashing.
2) **false Password number:** The user can only see the programmed numbers but cannot modify them.

WARNING. The code programmed at the item “c.PASS” by the user, shall be entered in the field “n.PASS” every time access is required to the programming menu to change the set data.
Should the user forget the programmed password code, our Customer Service should be called to unlock the instrument.

Table 15

n° seq.	Touch key	Appears 0n the display	NOTES
1	prog. ↵	PASS	Touch the “prog. ↵” key to get into the programming menu
2	prog. ↵	0 000	
3	prog. ↵	Ou	
4	▲	InP	
5	▲	c.PAS	PERSONAL PASSWORD

n° seq.	Touch key	Appears 0n the display	NOTES
6	prog. ↵	0 000	Input a Password number between 0 and 9999. ** (confirm to "prog. ↵")
7		c.PAS	
8	Reset Exit	measure	procedure to exit the programming mode

** see para. "SET UPS" to change the set value.

10.0 SET UPS

Instructions for changing and storing programming numbers. In this paragraph the instructions to set up "SP1" item are shown but the procedure is the same for all items.

Table 16

n° seq.	Touch key	Appears on the display	REMARKS
1		SP1	example of changing set point value
2	prog. ↵	0 00000	the display shows the first digit blinking
3	▶	0 0 0000	key " ▶ "moves the blinking digit forward right
4	▲	0 1 0000	key " ▲ " increases the blinking digit
5	prog. ↵	SP1	The value is stored and the display moves back to the selected item.

11.0 NOTES

The instrument does not have a power on switch and an internal fuse, but it immediately switch on when the correct voltage is applied (see the operating voltage on the instrument label). Keep the power line separate from the signal lines.
For security reasons, it is necessary to provide externally a two phases switch and a protective fuse near the instrument with easy access for the user.
Avoid the presence of others power elements, humidity, acid, heat sources, etc..

Mect srl is not responsible for damages to humans or goods for an improper use of the instrument or not conforming to the characteristics of its instrument.
In mect srl there has an help desk office.