USER'S MANUAL
series MPCT20 M1

mect

☎ 011/9664616

ME3007_10
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INDEX

☑ 1.0 OVERVIEW

The MPCT20 M1 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.
The instruments have two relay alarms.
Main characteristics are:

- count memory for almost ten years (yuo can exclude this function fron the menu)
- five digits for counting and five digits for Set-Point.
- NPN or PNP inputs (open collector or passive pull-up) or not amplified proximity (configured by jumpers or terminal connections)
- two contact relay alarm outputs (5A switch) or only one exchange relay (SR1F option)
- programmable multiply factor from 1 to 65535
- programmable divide factor from 1 to 65535
- 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..
Digits max inputs	99999
Frequency max. (RPM)	2 KHz
Frequency min. (RPM)	0.001 Hz
Min. width pulse	500 μs
Notches number	1 to 9999
Divider	1 to 65535
Multiplier	1 to 65535
RPM meter max error	0,01 %
Timer max error	0.01 %
Alarm output	2 contact relay 5A/250 Vac exchange relay 5 A/250 Vac (SR1F option)
Supply	12÷30 Vdc

	25 Vac/50 ÷ 60 Hz
	115 Vac/50 ÷ 60 Hz
	230 Vac/50 ÷ 60 Hz
Dimensions	48 x 48 x 96 mm
Piercing template	45 mm (height) x 45 mm (width)

1.2 DISPLAY MESSAGES

Table 2

n000.0 r.01.00	S W release
-OFL-	overflow
-UFL-	underflow
Err	error in programming parameter

1.3 WIRING DIAGRAMS
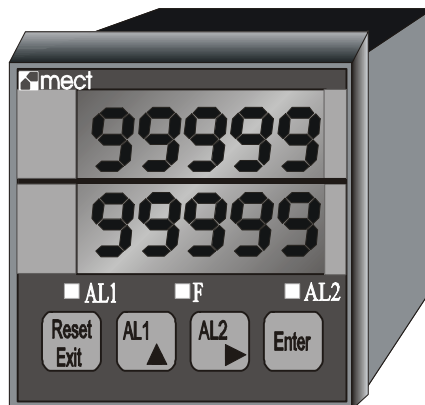
DESCRIPTION OF THE FRONT COMMANDS

Upper Display: count display

Lower Display: set-point or total count display

Led AL1: alarm 1 status indication

Led AL2: alarm 2 status indication

Key [Enter] : access to the programming functions

Key [AL1 ▲] : Alarm 1 key (can be disabled) / program key

Key [AL2 ▶] : Alarm 2 key (can be disabled) / program key

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

BASIC TERMINAL BOARD DESCRIPTION
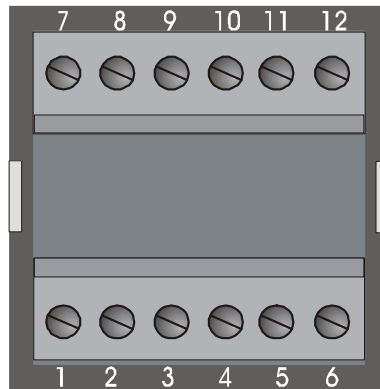
Terminal 1	- pull-up resistor for terminal 2
Terminal 2	- counting input or "start" for timer in chronometer function
Terminal 3	- external reset / Up-Down counting selection
Terminal 4	- "hold" or "stop" for timer / Up- Down counting selection
Terminal 5	- ground
Terminal 6	- transducer power supply (16Vdc)
Terminals 7, 8	- instrument power supply (if power supply "Vcc": 7 = Vcc; 8 = gnd)
Terminals 9, 10	- contact relay output (AL1)
Terminals 9, 10, 11	- exchange relay output (if option: SR1F 9 = Com, 10 = N.O., 11 = N.C.)
Terminals 11-12	- contact relay output (AL2)

If STN2 options, see "static outputs connection"

1.4 WIRING SCHEMATICS FOR COUNTER, FREQUENCY METER REVOLUTION COUNTER AND HOURLY PRODUCTION

Prox npn connection
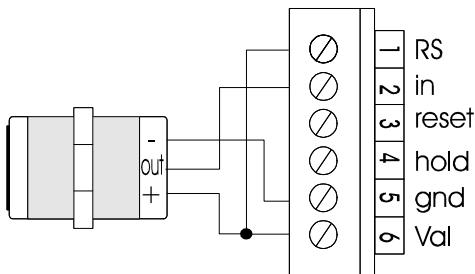
Prox pnp connection
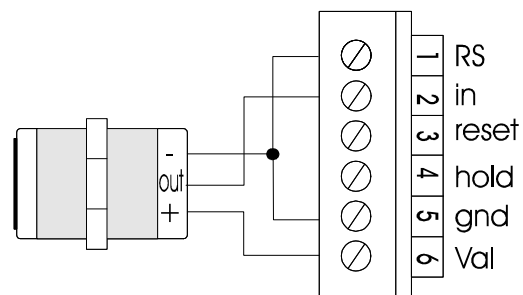
Not amplified MAF 35 sensor
connection (maf 35)

MECHANICAL contact connection (
It's necessary to make an internal link.
See "Printed circuit board
configuration")
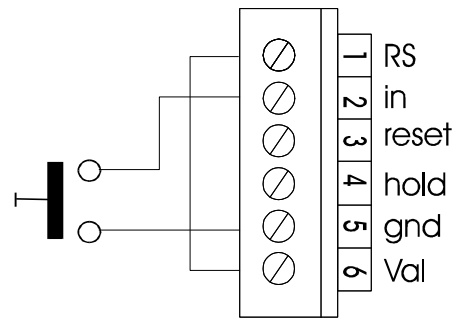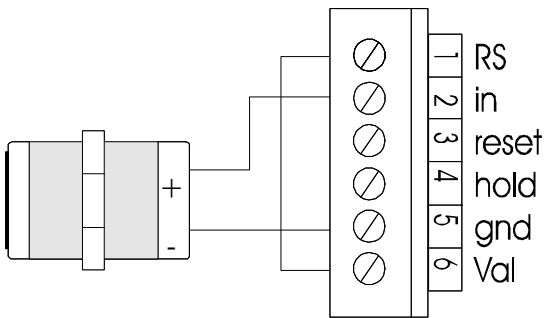
Magnetic pick-up (IBT option) connection
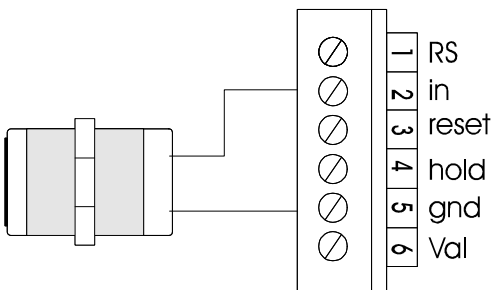
For frequency generator
connection use 2 (+) and 5 (-)
terminals

1.5 WIRING SCHEMATICS FOR TIMER

Prox npn connection

Prox pnp connection

for input reset
and stop PNP
see "Print circuit
board configuration"
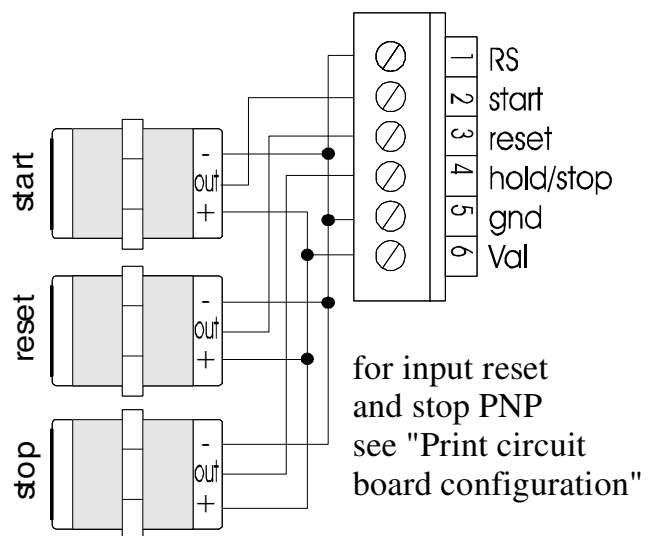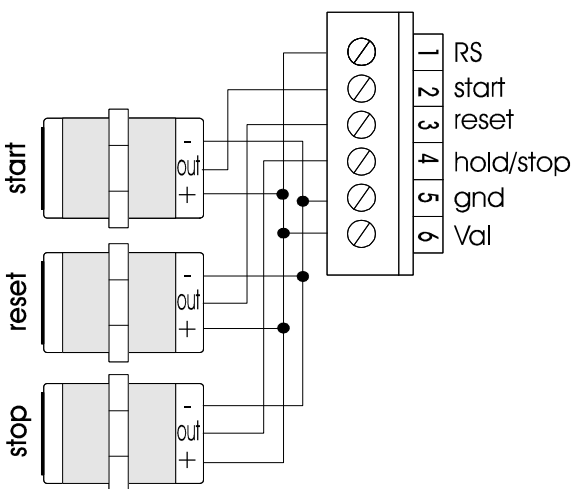
Switch connection

Static outputs connection

9 = out AL 1
12 = out AL 2

10, 11=Gnd
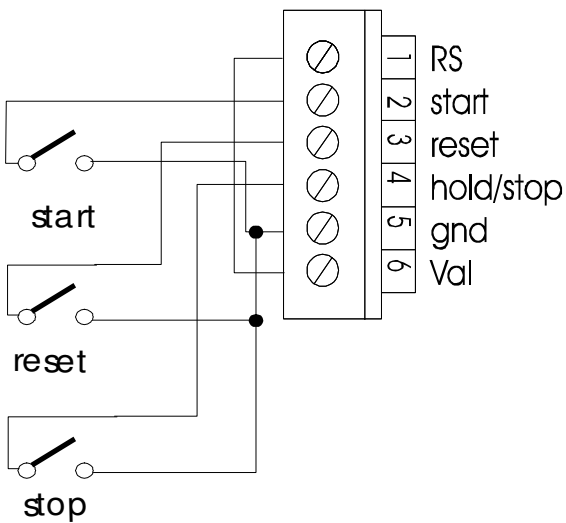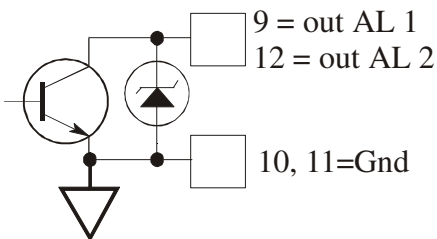
1.6 PROGRAMMING TIPS

- Search for the item to change, shown in the upper display using key Enter .
  The value to change is shown on the lower display.

- If you want to change a number, use the AL1 ▲ key to increment the blinking
  digit, and the AL2 ▶ key to shift the blinking digit, and if you want to select an
  item, use the AL1 ▲ key. In either case use the Enter key to confirm the input
  and go to the menù.

- To exit the menù, press Reset Exit : the modified parameters will be stored

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

see "revolution counter, frequency meter and hourly production alarms"

AL 02
△
AL 01 → SP1 → 99999

see "filter function "

FIL → nFIL → 128
△   △
       dEL → 250
       △
       PEr → 2.50
       △

rELE → nC
△   △
      nA
      △
      nCF
      △
      nAF
      △

n.rIF → 9999
△

P.dEC → 9.9.9.9.9
△

nUn → 65535
△

dEno → 65535
△

SP2 → 99999
△
HY → 250
△
SEL.d → Ec
△   △
      di
      △
      Ec-di
      △
      no-dL
      △

Measure → PASS → 0000 → OU
                        △
                        InP
                        △
                        CPAS → 0000
                        △

see "revolution counter, frequency meter and hourly production installation remarks"

PICC → P.OFF
△   P.Ho
      △
      P.HI
      △
      P.Lo
      △
      P.LI
      △

dEF → on
△   △
     OFF

dEL → 25.0
△
AbtS → on
△   △
      OFF

tYPE → rPn
△   △
      Pr.h
      △
      FrEq
      △
      Cin
      △
      CSEC

Hld → 25.0
△

see "peak hold function"

see "nUn and dEnO" function

Notes:

The → symbol means: Enter

The △ symbol means: AL1 ▲

1.8 COUNTER INSTRUMENT MENU FLOW

see "pulse counter and time alarms"

AL 02

AL 01

SP → 99999

rELE → nA / nC

AbtS → on / OFF

SP → 99999

rELE → nA / nC

AbtS → on / OFF

ConF → Auto / nAn / nAn.S

dEL → 25.0

P.dEC → 9.9.9.9.9

nUn → 65535

dEno → 65535

rES → on / OFF

nrES → dIn / StAt

Pr.SE → 99999

Coun → doun / uP

Stor → OFF / On

d InF → tot / SEt

rESC → OFF / On

see "nUn and dEnO" function

no item if n3 or n4 = coun

Total counting zero setting if "d.InF=tot"

Measure → PASS → 0000 → OU

OU
InP
CPAS → 0000
Cnor → n4 / n3
Cnor → HoLd / Coun / rESt
Cnor → rES / Coun / rESt

dEF → on / OFF

tYPE → rPn / Pr.h / FrEq / Cin / CSEC

see "pulse counter installation notes"

Notes:

The → symbol means: **Enter**

The ▵ symbol means: **AL1 ▲**

1.9 TIMER INSTRUMENT MENU FLOW

see "pulse counter and timer alarms"

Set the right code for requested scale

no item if n3 or n4 = coun

see "timer installation notes"

Measure → PASS → 0000 →

OU
InP
CPAS → 0000
Cnor
dEF → on / OFF
tYPE → rPn / Pr.h / FrEq / Cin / CSEC

n4 / n3

HoLd / Coun
rES / Coun

SCAL → 00 01 02 04 05 06 07 08

AL 01
AL 02

Coun → uP / doun
Pr.SE → 99999
hold → on / oFF
rES → on / oFF
nrES → dIn / StAt
Stor → OFF / On

S.P. → 99999
rELE → nA / nC
AbtS → on / OFF

S.P. → 99999
rELE → nA / nC
Abts → on / OFF
ConF → Auto / nAn / nAn.S
dEL → 25.0

Notes:

The → symbol means: [Enter]

The ▲ symbol means: [AL1 ▲]

1.10 PRINTED CIRCUIT BOARD (PCB) CONFIGURATION

Open the instrument to configure the main input (standard or mechanical contact) and the "Hold" and "Reset" (NPN and PNP) inputs. To open the instrument use a screw-driver to take off the back of the body of the instrument and extract the instrument from the back.

To set up the input circuit as mechanical contact link by the jumper the JP1 configuration.

To set up the "Reset" and "Hold" inputs as PNP version, move the JP4 and JP5 jumpers in 1-2 position.
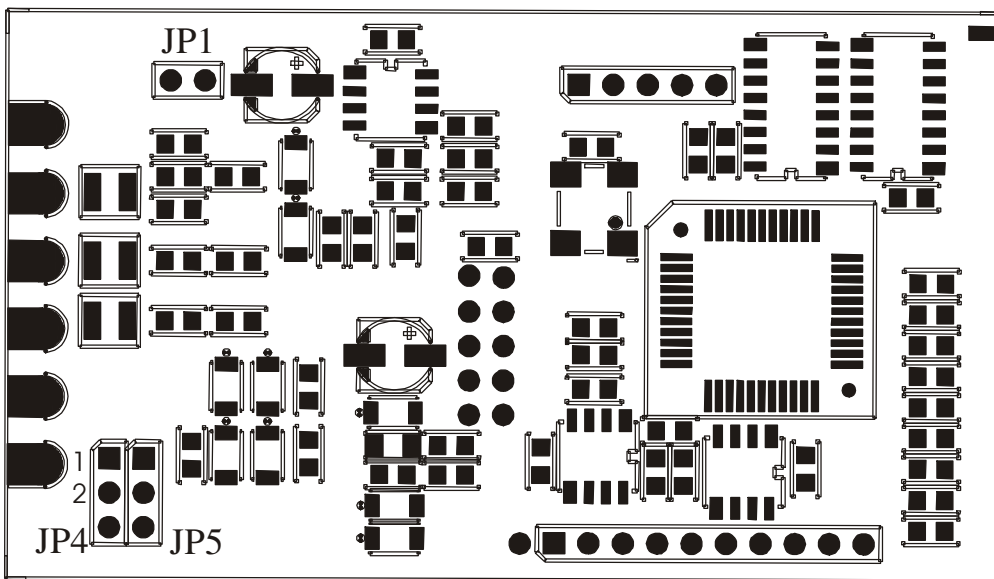
2.0 REVOLUTION COUNTER, FREQUENCY METER AND HOURLY PRODUCTION INSTALLATION REMARKS

2.1 INSTALLATION PROCEDURE

1) Make connections as indicated at pages: 7, 8 and 9
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	Upper display	Lower display	Remarks
1	enter			Touch the "enter" key
2	enter	PASS	0 000	In this phase the instrument asks for the o

n° seq.	Press Key	Upper display	Lower display	Remarks
				"password" number to protect the data programmation (see "Password functon")
3		SEL	Ou	
4	AL1 ▲	SEL	InP	
5	AL1 ▲	SEL	CPAS	
6	AL1 ▲	SEL	dEF	
7	AL1 ▲	SEL	tYPE	TYPE INSTRUMENT
8	enter	tYPE	rPn	rPn = rpm meter Pr.h = hourly production meter FrEq = frequency meter CSEC = timer CIn = counter Select by "AL1 ▲ "key "rPn" to program revolution counter, or "FrEq" to program frequency meter or "Pr.h" to program hour production. (Confirm by "enter")
9		SEL	tYPE	
10	Reset Exit	"misura"	SP 1	

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.
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
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	Upper display	Lower display	Remarks
1	Enter			Touch the "enter" key
2	Enter	PASS	0 000	In this phase the instrument asks for the of "password" number to protect the data programmation (see "Password functon")
3		SEL	Ou	
4	AL1 ▲	SEL	InP	

n°seq.	Press Key	Upper display	Lower display	Remarks
5	enter	InP	FIL	DIGITAL FILTER PROGRAMMING (look paragraph)
6	AL1 ▲	InP	n.rIF	NOTCHES NUMBER
7	enter	n.rIF	00001	set number of notches requested (1÷9999) **(press "enter" to confirm)
8		InP	n.rIF	
9	AL1 ▲	InP	P.dEC	DECIMAL POINT
10	enter	P.dEC	0.0000	Press key " ▶ " until the decimal point is displayed at the desired position. **(press "enter" to confirm)
11		InP	P.dEC	
12	AL1 ▲	InP	nUn	MULTIPLY FACTOR
13	enter	nUn	10000	Set multiplying factor value (see "nUn and dEno function") ** (press "enter" to confirm)
14		InP	nUn	
15	AL1 ▲	InP	dEno	DIVISION FACTOR
16	enter	dEno	10000	Set division factor value; (see "nUn and dEno function"); **(press "enter" to confirm)
17		InP	dEno	
18	AL1 ▲	InP	PICC	PEAK SET-UP
19	enter	PICC	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 "AL1 ▲" key until there appears the req. item (confirm to "enter")
20		InP	PICC	
21	AL1 ▲	InP	.HLd	TIME OF READING RETENTION
22	enter	.HLd	25.0	write retention time (0 ÷ 25.0 sec) if PhO or PLO is req. ** (confirm to "enter")
23		InP	.HLd	
24	Reset Exit	"measure"	SP 1	

** 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 $1 \div 65535$, and the "dEno" item allows to program a divide factor in the range $1 \div 65535$.
The constant factor will be:

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

Where:
X = "RPM 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 factors is sufficient to set up nUn = dEno, instead to add corrective costants 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 connections:

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

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

(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:

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

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:

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

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	upper display	lower display	NOTES
1	enter			Touch the "enter" key
2	enter	PASS	0 000	Digit the personal password ** (confirm with "enter")
3		SEL	Ou	
4	AL1▲	SEL	InP	
5	AL1▲	SEL	C.PAS	
6	AL1▲	SEL	dEF	DEFAULT PARAMETERS
7	enter	dEF	On	Touch the " AL1▲ " key until the written "ON" appears ** (confirm with "enter") The instrument exits from the programming menu and it executes an automatic power on.

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 $0 \div 19.9$ 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.

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 5 and 4.

- 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 5 and 4.

Fig. 1
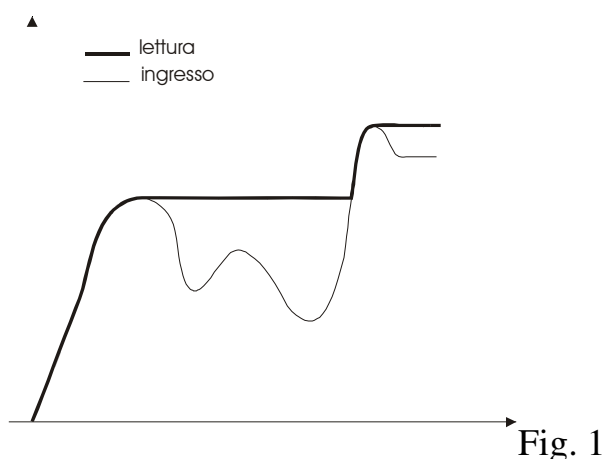
4.0 "FILTER" FUNCTION

The MPCT20 M1 serie 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.
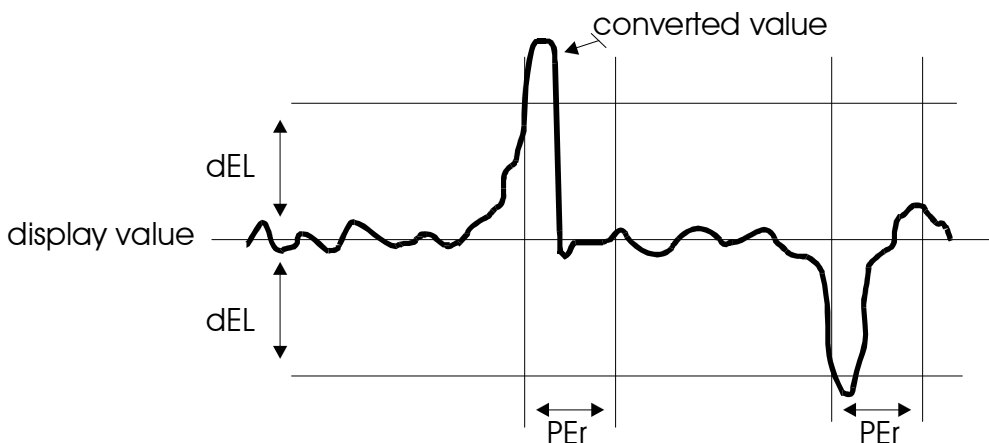
Fig. 2

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

Table 6

n° seq.	touch key	upper display	lower display	NOTES
1	enter			Touch the "enter" key
2	enter	PASS	0 000	Digit personal password code (look "Password function")
3	enter	SEL	Ou	
4	AL1 ▲	SEL	InP	
5	enter	InP	FIL	FILTER PROGRAMMING
6	enter	FIL	n.FIL	NUMBER OF AVERAGES
7	enter	n.FIL	128	Press key "AL1 ▲ " until the display shows the number of averages required (o= no filter).

n° seq.	touch key	upper display	lower display	NOTES
				**(press "enter" to confirm)
8		FIL	n.FIL	
9	AL1 ▲	FIL	dEL	FILTERING WINDOW
10	enter	dEL	250	Set the number of digits within the filter is activated. **(press "enter" to confirm)
11		FIL	dEL	
12	AL1 ▲	FIL	PEr	Dwell time
13	enter	PEr	2.50	write retention time (0.01÷2.50 sec) **(press "enter" to confirm)
14		FIL	PEr	
15	Reset Exit	Measure	SET 1	Procedure to exit programming mode

** see "SETTING" paragraph to change the set value.

5.0 REVOLUTION COUNTER, FREQUENCY METER AND HOURLY PRODUCTION ALARMS

The MPCT20 M1 serie instruments have two relay or static alarms and they can have an exchange relay (if requested SR1F option) and the following voices can be programmed:

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÷99999
In the case of window type 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 250 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 switched off

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).
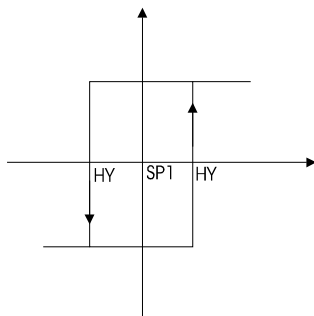
Fig. 3
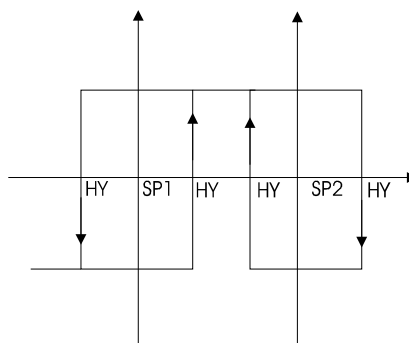
Fig. 4

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 set up immediately two set point values, the second one (MENU) drives you through all parameters of the instrument. The first case you set the instrument, use "MENU" item to set all the parameters of the instrument.

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 7

n° seq.	Touch key	Upper display	Lower display	REMARKS
1	enter			Touch the "enter" key
2	enter	PASS	0 000	Digit the password code .**(press "enter" to confirm)
3		SEL	Ou	
4	enter	nALL	AL 01	ALARM PARAMETERS 1
5	enter	AL 01	S.P.1	Setting the minimum or maximum set-point value or the first triggering value for windowed alarm
6	enter	S.P.1	0 0000	Set up the SP1 value.**(press "enter" to confirm)
7		AL 01	S.P.1	
8	AL1 ▲	AL 01	rELE	AL1 CONTACT CONFIGURATION
9	enter	rELE	n.A.	n.A. = normally open output n.C. = normally closed output n.A.F.= normally open window threshold n.C.F. = normally closed window threshold Select the desired item by key " AL1 ▲ " and confirm with "enter"
10		AL 01	rELE	
11	AL1 ▲	AL 01	S.P.2	SETTING the second triggering. Second threshold set up to use only if windowed alarm is requested
12	enter	S.P.2	0 0000	Set up the SP2 value **(press "enter" to confirm)
13		AL 01	S.P.2	
14	AL1 ▲	AL 01	HY	HYSTERESIS SET-UP ALARM 1
15	enter	HY	00 250	Set up a number between 0 and 250 digit. ** (press "enter" to confirm)
16		AL 01	HY	
17	AL1 ▲	AL 01	SEL.d	TIME CONFIGURATION AL1
18	enter	SEL.d	Ec	Ec = delay activation dI = delay deactivation Ec-dI = delay activation + de-activation nO dL = no delays

n° seq.	Touch key	Upper display	Lower display	REMARKS
				Select the desidered item by key " AL1 ▲ " and confirm with "enter"
19		AL 01	SEL.d	
20	AL1 ▲	AL 01	dEL	TIME SET-UP AL1
21	enter	dEL	00 250	Set up a number between 0 and 250 digit. ** (press "enter" to confirm)
22		AL 01	dEL	
23	AL1 ▲	AL 01	AbtS	ABILITATION SET 1 KEY
24	enter	AbtS	on	Select by " AL1 ▲ " key the "on" or "oFF" item. **(press "enter" to confirm)
25		AL 01	AbtS	
26	AL2 ▸	nALL	AL01	
27	AL1 ▲	nALL	AL02	ALARM 2 PARAMETERS
28	enter	AL02	S.P.1	To set up alarm 2 parameters use the same procedure already used for the alarm 1.
29	Reset Exit	"measure"	SP 1	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 and 9.
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") or total counting zeroing.
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") or total counting zeroing.
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 8

n° seq.	Press Key	Upper display	Lower display	Remarks
1	enter			Touch the "enter" key
2	enter	PASS	0 000	In this phase the instrument asks for the of "password" number to protect the data programmation. (see "Password functon")
3		SEL	Ou	
4	AL1 ▲	SEL	InP	
5	AL1 ▲	SEL	CPAS	
6	AL1 ▲	SEL	C.nor	
7	AL1 ▲	SEL	dEF	
8	AL1 ▲	SEL	tYPE	TYPE INSTRUMENT
9	enter	tYPE	CIn	rPn = rpm meter Pr.h = hourly production meter FrEq = frequency meter CSEC = timer CIn = counter Select by " ▲ "key "CIn" and confirm by "enter"
10		SEL	tYPE	
11	Reset Exit	"misura"	SP 1	

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, 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   To show the total count on second display program the menù item dInF= tot. Total count can be reset by means of the menu item rESC, or by means of the rear contact 3 or 4 if programmed as : n3 = rESt or n4 = rESt.

8   For default parameters see "default parameters" paragraph

9   Set alarms

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

11 The unit is now ready to be used.

Table 9

n° seq.	Touch key	Upper display	Lower display	REMARKS
1	enter			Touch the "enter" key
2	enter	PASS	0 0000	Digit the password code ** (press "enter" to confirm)
3		SEL	Ou	
4	AL1 ▲	SEL	InP	
5	enter	InP	P.dEC	DECIMAL POINT
6	enter	P.dEC	0.0000	Press key " AL1 ▲ " until the decimal point is in the required position ** (Press "enter" to confirm)
7		InP	P.dEC	
8	AL1 ▲	InP	nUn	MULTIPLYING FACTOR
9	enter	nUn	10000	Digit a number in the 1 to 65535 range. This is the numerator of the correction constant. ** (Press "enter" to confirm)
10		InP	nUn	
11	AL1 ▲	InP	dEno	DIVISION FACTOR
12	enter	dEno	10000	Digit a number in the 1 to 65535 range. This is the denominator of the correction constant. ** (Press "enter" to confirm)
13		InP	dEno	
14	AL1 ▲	InP	rES	RESET KEY ACTIVATION
15	enter	rES	on	Press key " AL1 ▲ " until the required function is displayed: on = front panel reset activated off = front panel reset de-activated ** (Press enter to confirm)
16		InP	rES	
17	AL1 ▲	InP	nrES	RESET TERMINAL BOARD CONFIGURATION
18	enter	nrES	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 " AL1 ▲ " until the required function appears on the display and confirm with "enter"
19		InP	nrES	

n° seq.	Touch key	Upper display	Lower display	REMARKS
20	AL1 ▲	InP	Pr.SE	PRE-SET PROGRAMMING
21	enter	Pr.SE	00000	Input the desired pre-set value, in the 0 to 99999 range. ** (Press enter to confirm)
22		InP	Pr.SE	
23	AL1 ▲	InP	CoUn	COUNT DEFINITION
24	enter	Coun	uP	Press key " ▲ " until the required function is displayed: up = upcount, doun = downcount. ** (Press "enter" to confirm)
25		InP	CoUn	
26	AL1 ▲	InP	StOr	COUNTING STORE AT THE SWITCHING OFF
27	enter	StOr	On	Press key " AL1 ▲ " until the required function is displayed: on = store counting oFF = don't store counting ** (Press "enter" to confirm)
28		InP	StOr	
29	AL1 ▲	InP	dInF	TOTAL COUNTING FUNCTION
30	enter	dInF	SEt	Press key " AL1 ▲ " until the required function is displayed: SEt = lower display shows the set point tot = lower display shows the total counting ** (Press enter to confirm)
31		InP	dInF	
32	AL1 ▲	InP	rESC	TOTAL COUNTING ZEROING
33	enter	rESC	OFF	Press key " AL1 ▲ " until the required function is displayed: on = total counting is reset oFF = total counting is not reset ** (Press "enter" to confirm) Attention: the menu item is not present if one of the rear contact (n3 or n4) is programmed as "coun" (n3 = coun; n4 = coun)
34		InP	rESC	
35	Reset Exit	"Measure"	SET 1 or Tot.	Procedure to exit the programming mode

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

6.2 UP-DOWN FUNCTION and TERMINAL CONFIGURATION

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 configured as NPN, it has to be a low level (GND) to make start the Down counting. If it is configured as PNP, the terminal board has to be at an high level (+16V: Val) -see PCB configuration-.

Table 10

n°seq.	Press Key	Upper display	Lower display	Remarks
1	enter			Touch the "enter" key to get into the programming menu
1	enter	PASS	0 000	In this phase the instrument asks for the "password" number to protect the data programmation. (see "Password function")
2	AL1 ▲	SEL	Ou	
3	AL1 ▲	SEL	InP	
4	AL1 ▲	SEL	CPAS	
5	AL1 ▲	SEL	C.nor	TERMINAL CONFIGURATION
7	enter	nor	n 4	TERMINAL 4 CONFIGURATION
8	enter	n 4	HoLd	HoLd = terminal 4 with hold/stop function COUn = terminal 4 with Up/Down function rESt = if the instrument is programmed as pulse counter the terminal 4 resets total count. Select by " AL1 ▲ " key and confirm with "enter"
9		nor	n 4	
10	AL1 ▲	nor	n 3	TERMINAL 3 CONFIGURATION
11	enter	n 3	rES	rES = terminal 3 with reset function COUn = terminal 3 with Up/Down function rESt = if the instrument is programmed as pulse counter the terminal 3 resets total count. Select by " AL1 ▲ " key and confirm with "enter"
12		nor	n 3	

n°seq.	Press Key	Upper display	Lower display	Remarks
13	Reset Exit	measure	SP1	Procedure to exit the programming mode

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 set up two set point values, the second one (MENU) drives you through all parameters of the instrument. The first case you set the instrument, use "MENU" item to set all the 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 MPCT20 M1 instruments have 2 contact relay alarms and it can also have one exchange relay alarm (SR1F option).

ALARM 1 can be programmed in the following ways:

MANUAL MODE (nAn): reaching the count value set in SP of AL2, the instrument activates the alarm 2 relay, reaching the count value set in SP of AL1, the instrument activates the alarm 1 relay.

The count continues until a "reset" is performed, which sets to zero the display and the alarms 1 and 2 outputs.

MANUAL MODE WITH COUNT HOLD-UP (nAn S.): reaching the count value set in SP of AL2, the instrument activates the alarm 2 relay, reaching the count value set in SP of AL1, the instrument activates the alarm 1 relay and stops the count. When a "reset" is performed, this sets to zero the display and the alarms 1 and 2 outputs.

AUTOMATIC MODE (AUto): reaching the count value set in SP of AL2, the instrument activates the alarm 2 relay, reaching the count value set in SP of AL1, the instrument activates the alarm 1 relay for a time as set at item "dEL", sets to zero the display and the alarms 1 an 2 outputs and starts the cycle again. See the following Table for programming the alarms.

For instruments with single alarm, the menu part for AL1 applies (option SR1F).

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". Reaching the count value set in SP of AL1, the instrument activates the alarm 1 relay, reaching the count value set in SP of AL2, the instrument activates the alarm 2 relay.

Reaching zero, the count stops until a reset is performed, to start again the count from the "PrESE" value.

MANUAL MODE WITH COUNT HOLD-UP (nAnS.): after a reset, the count starts from the value set at the menu item "PrESE". Reaching the count value set in SP of AL2, the instrument activates the alarm 2 relay, reaching the count value set in SP of AL1, the instrument activates the alarm 1 relay and stops the count.

When a reset is performed, the display is reset to the value selected in "PrESE".

AUTOMATIC MODE (AUto): reaching the count value set in SP of AL2, the instrument activates the alarm 2 relay, reaching the count value set in SP of AL1, the instrument activates the alarm 1 relay for a time as set at item "dEL", sets the display to the "PrESE" value, sets to zero the alarm 2 output and starts the cycle again.

To program the alarms you must follow the indication on the following table. If the instrument is requested with only one alarm, you must program the part of the menu about AL1 (option SR1F).

Table 11

n° seq.	Touch key	Upper display	Lower display	REMARKS
1	enter			Touch the "enter" key
2	enter	PASS	0 0000	Input the personal password code ** (Press "enter" to confirm)
3		SEL	Ou	
4	enter	Ou	AL01	ALARM 1 PARAMETERS
5	enter	AL01	S.P	Alarm 1 threshold setting
6	enter	S.P.	0 0000	Set the required threshold value. ** (Press "enter" to confirm)
7		AL01	S.P.	
8	AL1 ▲	AL01	rELE	OUTPUT RELAY CONFIGURATION
9	enter	rELE	nA	Touch the " AL1 ▲ " key until the desired configuration is displayed: nA = relay normally open; nC = relay normally closed. **(Press "enter" to confirm)
10		AL01	rELE	
11	AL1 ▲	AL01	AbtS	SET1 KEY ENABLE
12	enter	AbtS	on	Select by " AL1 ▲ " key "on" or "oFF" item and confirm with "enter"
13		AL01	AbtS	
14	AL1 ▲	AL01	ConF	ALARM CYCLE CONFIGURATION
15	enter	ConF	AUto	Press key " AL1 ▲ " until the required mode is displayed: AUto = automatic cycle, nAn = manual cycle,

n° seq.	Touch key	Upper display	Lower display	REMARKS
				nAn.S = manual cycle with count hold-up. ** (Press "enter" to confirm.)
16		AL01	ConF	
17	AL1 ▲	AL01	dEL	Automatic cycle TIME SETTING
18	enter	dEL	00 25.0	Digit a value from 0 to 25.0 seconds. ** (Press "enter" to confirm)
19		AL01	dEL	
20	AL2 ▶	nALL	AL01	
21	AL1 ▲	nALL	AL02	ALARM 2 PARAMETERS
22	enter	AL02	S.P	Alarm 2 threshold setting
23	enter	S.P.	0 0000	Set the required threshold value. ** (Press "enter" to confirm)
24		AL02	S.P.	
25	AL1 ▲	AL02	rELE	OUTPUT RELAY CONFIGURATION
26	enter	RELE	nA	Touch the " AL1 ▲ " key until the desired configuration is displayed: nA = relay normally open; nC = relay normally closed. **(Press "enter" to confirm)
27		AL02	rELE	
28	AL1 ▲	AL02	AbtS	SET1 KEY ENABLE
29	enter	AbtS	on	Select by " AL1 ▲ " key "on" or "oFF" item and confirm with "enter"
30		AL02	AbtS	
31	Reset Exit	"measure"	SET 1	Procedure to exit the programming mode

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

Instal **8.0 TIMER INSTALLATION NOTES**

11.1 INSTALLATION PROCEDURE:

1   Make connections as indicated at pages: 7, 8 and 9
     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 12

n° seq.	Press Key	Upper display	Lower display	Remarks
1	enter			Touch the "enter" key
2	enter	PASS	0 000	In this phase the instrument asks for the of "password" number to protect the data programmation (see "Password functon")
3		SEL	Ou	
4	AL1 ▲	SEL	InP	
5	AL1 ▲	SEL	CPAS	
6	AL1 ▲	SEL	C.nor	
7	AL1 ▲	SEL	dEF	
8	AL1 ▲	SEL	tYPE	TYPE INSTRUMENT
9	enter	tYPE	CSEC	rPn = rpm meter Pr.h = hourly production meter FrEq = frequency meter CSEC = timer CIn = counter Select by "AL1 ▲" key "CSEC" and confirm by "enter"
10		SEL	tYPE	
11	Reset Exit	"misura"	SP 1	

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. Set alarms
8. Set, if desired, the programming menu access code (password function)
9. The unit is now ready to be used.

Table 13

n° seq.	Touch key	Upper display	Lower dipsplay	NOTES
1	enter			Touch the "enter" key
2	enter	PASS	0 000	Input the personal password code ** (Press "enter" to confirm)
3		SEL	Ou	
4	AL1 ▲	SEL	InP	
5	enter	InP	SCAL	SELECTION MEASURING SCALE
6	enter	SCAL	00000	Set up the relative number for the desired scale: To use scale 999.99 sec write the number "0" To use scale 9999.9 sec write the number "1" To use scale 99999 sec write the number "2" To use scale 99999 min write the number "6" To use scale 99999 h write the number "8" To use scale 999 min 59 sec write the number "3" To use scale 999 h 59 min write the number "7" To use scale 9 h 59 min 59 sec write the number "4" To use scale 23 h 59 min write the number "5" ** (Press "enter" to confirm)
7		InP	SCAL	
8	AL1 ▲	InP	CoUn	TYPE OF COUNTING SELECTION
9	enter	CoUn	uP	Press key " AL1 ▲ " till when on the display appears the desired counting and confirm with "enter" ("uP" for increasing counting and "doun" for decreasing counting)
10		InP	CoUn	
11	AL1 ▲	InP	Pr.SE	PRESET FOR DOWN COUNTING
12	enter	Pr.SE	10000	Write the number of the requested preset ** (Press "enter" to confirm)
13		InP	Pr.SE	
14	AL1 ▲	InP	HOLd	CHRONOMETER/TIMER SELECTION
15	enter	HOLd	on	Selection the type of functioning: timer or chronometer. Press key " AL1 ▲ " till when on the display appears the desired functioning and confirm

n° seq.	Touch key	Upper display	Lower dipsplay	NOTES
				with "enter": "on" = timer functioning (hold and reset from the terminal board) "oFF" = chronometer functioning (start, stop and reset from the terminal board)
16		InP	HOLd	
17	AL1 ▲	InP	rES	KEY RESET ON THE FRONT PANEL ENABLE
18	enter	rES	on	Enable "reset" key from the front panel (the key reset is "reset"). Press key " AL1 ▲ " till when on the display appears the desired functioning and confirm with "enter" ("on" for "reset" enabled key or "oFF" for disabled key)
19		InP	rES	
20	AL1 ▲	InP	nrES	RESET TERMINAL BOARD CONFIGURATION
21	enter	rES	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 " AL1 ▲ " until the required function appears on the display and confirm with "enter"
22		InP	nrES	
23	AL1 ▲	InP	StOr	COUNTING STORE AT THE SWITCHING OFF
24	enter	StOr	On	Press key " AL1 ▲ " till when on the display appears th desired function: on = counting stored oFF = counting not stored ** (Press "enter" to confirm)
25		InP	StOr	
26	Reset Exit	measure	SET 1	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 14

n° seq.	Touch key	Upper display	Lower display	NOTES
1	enter	PASS	0 000	Touch the "enter" key
2		SEL	Ou	
3	AL1 ▲	SEL	InP	
4	AL1 ▲	SEL	c.PAS	PERSONAL PASSWORD
5	enter	c.PAS	0 000	Input a Password number between 0 and 9999. **(press "enter" to confirm)
6		SEL	c.PAS	
7	Reset Exit	measure	SET 1	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 15

n° seq.	Touch key	Upper display	Lower display	REMARKS
1		AL01	SP1	example of changing set point value
2	enter	SP1	0 0000	the display shows the first digit blinking
3	AL2 ▸	SP1	0 0 000	key "AL2 ▸ "moves the blinking digit
4	AL1 ▲	SP1	0 1 000	key "AL1 ▲ " increases the blinking digit
5	enter	AL01	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..
The instruments must be powered by safety isolating transformer or by selv type power supply.

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.