USER'S MANUAL
Series MPCIB396 P6
(Bidirectional counter)

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1.0 OVERVIEW

The MPCIB396 P6 model is an instrument which counts, places or measures by a bi-directional encoder.
Main characteristics are:

- count memory at the switching off (you can exclude this function from the menu).
- six digits for counting + sign
- NPN or PNP encoder inputs open collector, passive pull-up or push-pull, 3 wire amplified proximity or 2 wire not amplified (configured by jumpers and menu)
- three exchange relay alarms (if requested)
- programmable multiplying and dividing factor from 1 to 65535
- programmable pre-set (offset)
- possibility to read on 1, 2 or 4 edges of frequency input
- serial outputs (if requested)
- analogue outputs (if requested)
- one count input and one Up/Down control input
- two indipented count inputs A and B with A+B or A-B function
- possibility to able the marker pulse by "hold" terminal

1.1 TECHNICAL FEATURES

Table 1

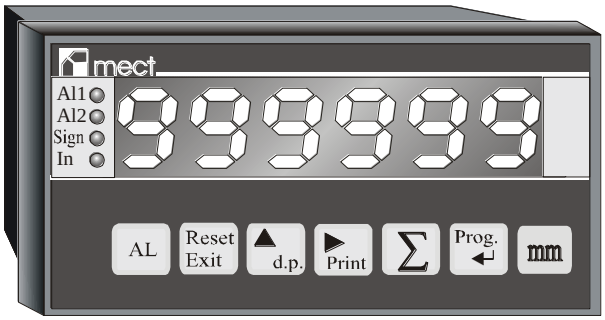
Inputs	Bi-directional npn/pnp encoder 3 wire npn/pnp amplified proximity 2 wire not amplified proximity
Transducer Supply	14 Vdc / 100 mA not reg. 5Vdc / 50 mA (on request)
Max input frequency	40 KHz
Divider	1 to 65535
Multiplier	1 to 65535
Alarm output	exchange relay 250 Vac / 5A
Supply	90 ÷ 260 Vac / Vdc; 5W 20 ÷ 30 Vac / Vdc; 5W
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
ErP 4	item IS = FS
ErP 6	item dEnon = 0
ErP 7	If windows alarm SP2 < SP1
ErP 8	If windows alarm HY > (SP1-SP2)
ErP 9	item dEnon = 0

1.3 WIRING DIAGRAMS



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

Reset Exit : Clears count (can be disabled in the menu) / fast exit in menu

d.p. : it sets up decimal point (it can be disabled in the menu). Used for set up.

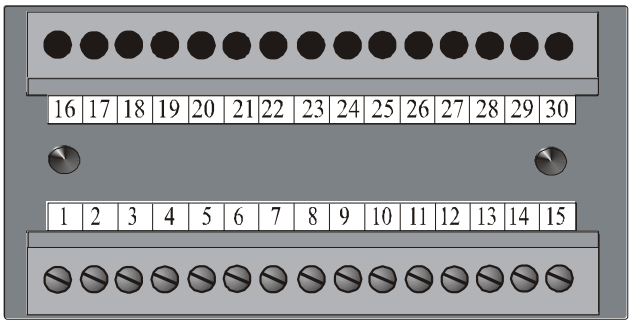
Print : readout print. Used for set up.

Σ : Total counting function (it can be disabled in the menu).

Prog. : access at the programming functions and confirm of the selected function

KEYBOARD DESCRIPTION

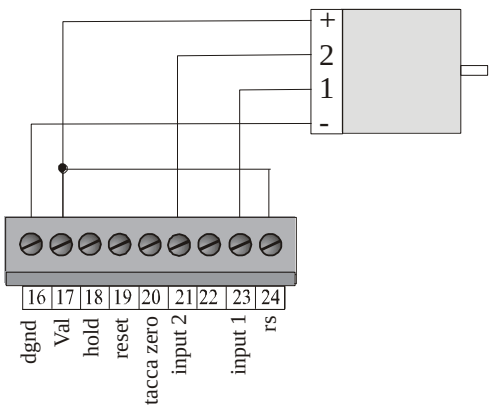
Led AL1: alarm 1 status indication
Led AL2: alarm 2 status indication
Led Sign: minus sign for negative numbers
Led In: total count on display when on



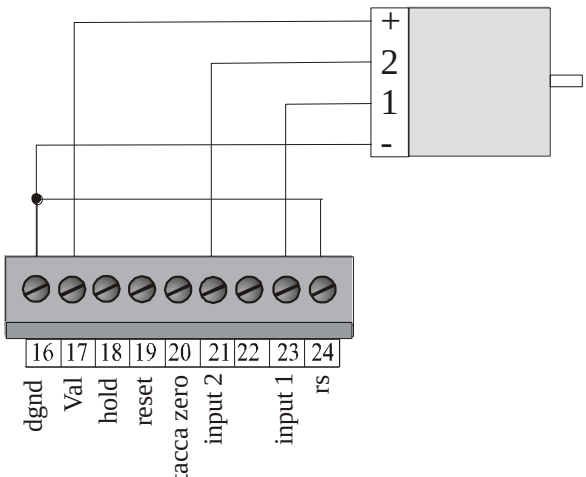
Terminals 1-2-3	- exchange relay output (AL3: 1 = Com, 2 = NC, 3 = NO)
Terminals 4-5-6	- exchange relay output (AL2: 4 = Com, 5 = NC, 6 = NO)
Terminals 7-8-9	- exchange relay output (AL1: 7 = Com, 8 = NC, 9 = NO)
Terminals 13 and 15	- possible power supplies: 24 (20-30Vac/Vdc – no polarity), 220 (90-260Vac). Check the label of the instrument to find out the power supply voltage to be supplied.
Terminal 16	- encoder ground
Terminal 17	- encoder power supply
Terminal 18	- stop counting / marker pulse abilitation / print (if serial output requested) / reset total counting
Terminal 19	- reset counting / print (if serial output requested) / reset total counting
Terminal 20	- encoder marker pulse
Terminal 21	- encoder input 2 (direction input counting if monodirectional pulse counter)
Terminal 23	- encoder input 1 (input counting if monodirectional input counting)
Terminal 24	- npn/pnp encoder configuration resistor
Terminal 25, 26, 27	- serial outputs

1.4 WIRING SCHEMATICS

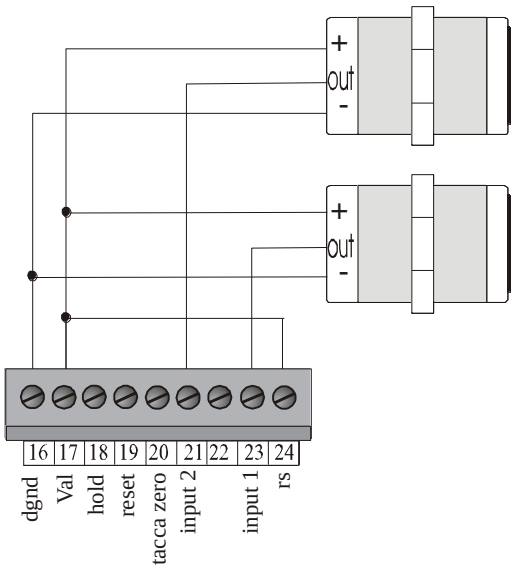
NPN encoder connection



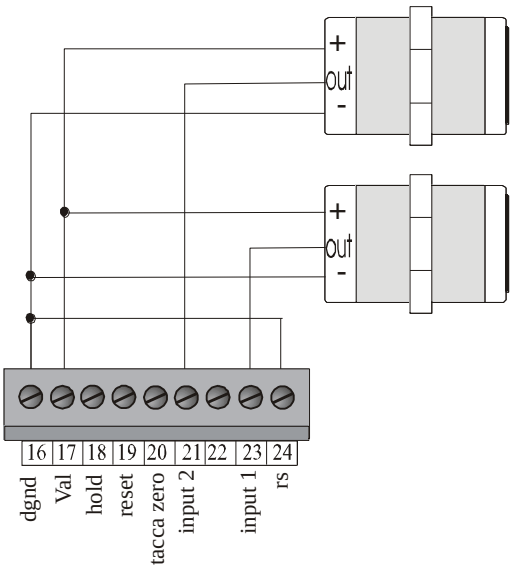
PNP encoder connection



NPN connection



PNP connection

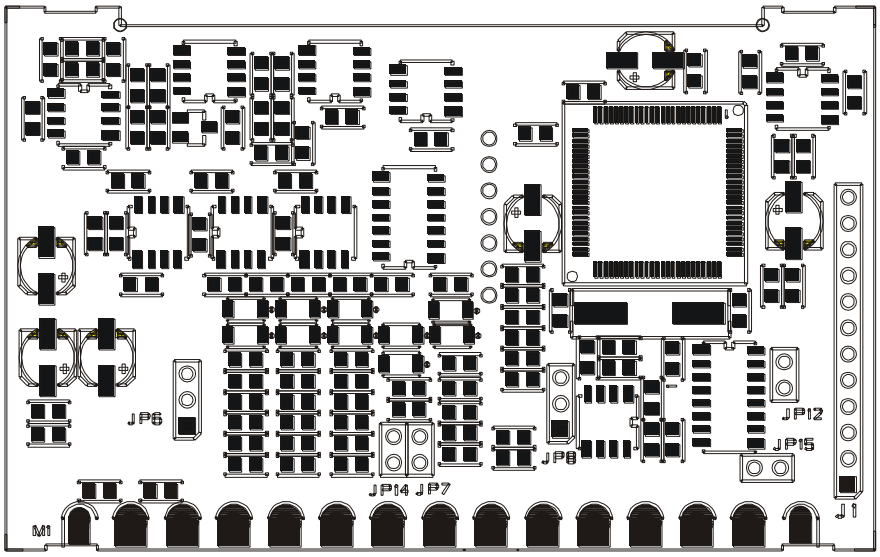


1.5 NPN or PNP INPUTS CONFIGURATION

The “hold” and “reset” inputs can be used with “npn” or “pnp” polarity.

- “npn” input: short-circuit JP7 and program the menu item “nInP”=nPn
- “pnp” input: short-circuit JP14 and program the menu item “nInP”=PnP

The instruments are delivered with NPN inputs.



1.6 PROGRAMMING TIPS

- Press 

key to get into the programming menu.
- Press 

key to search the item to program and the 

as indicated in diagram menu
- If the set up needs a number to write, use the 

key to increase the digit which blinks and 

key to move the blinking digit and confirm with 

key
- If the set up needs the selection of an item, use 

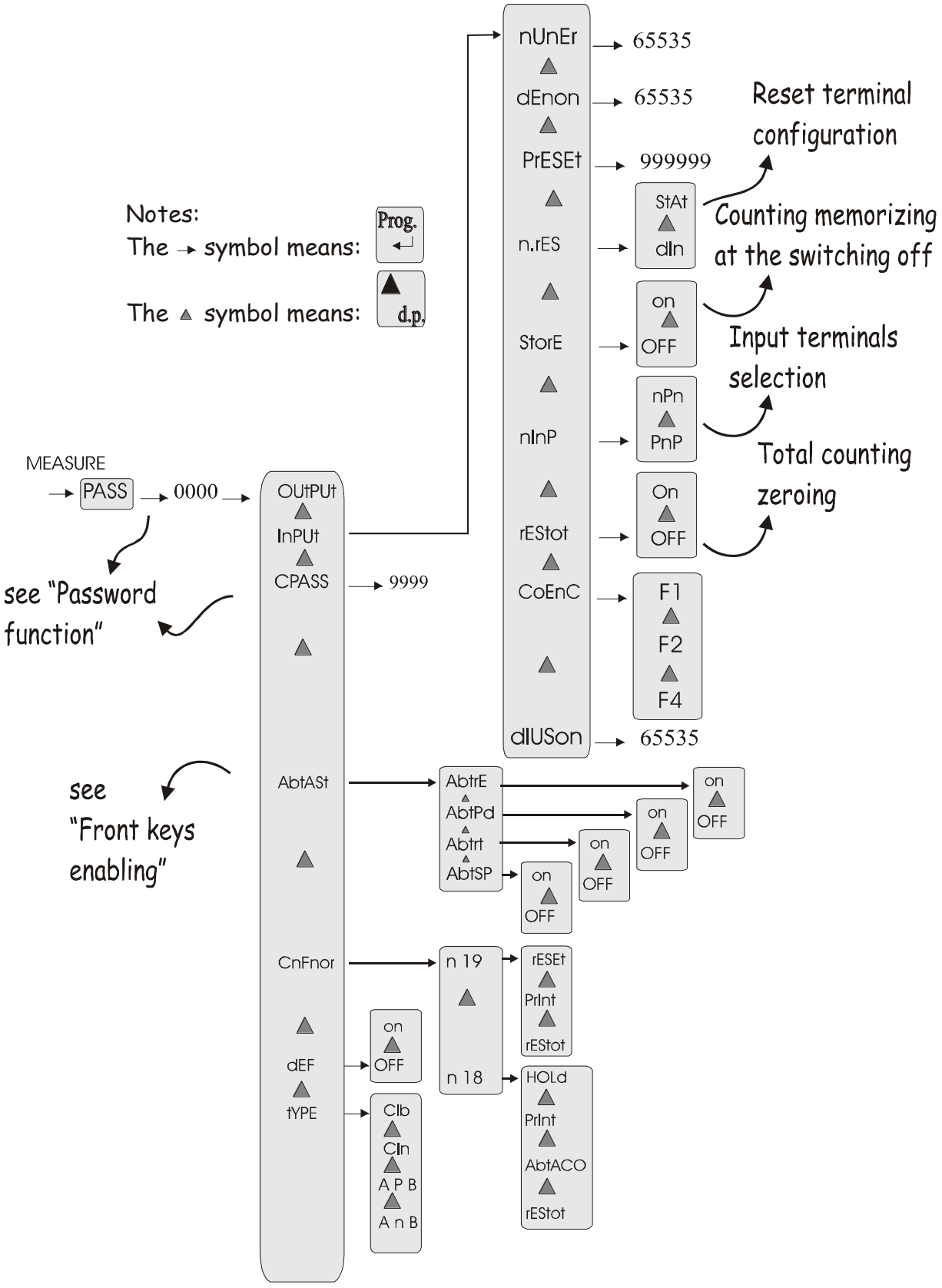
key and confirm with 

key
- Press 

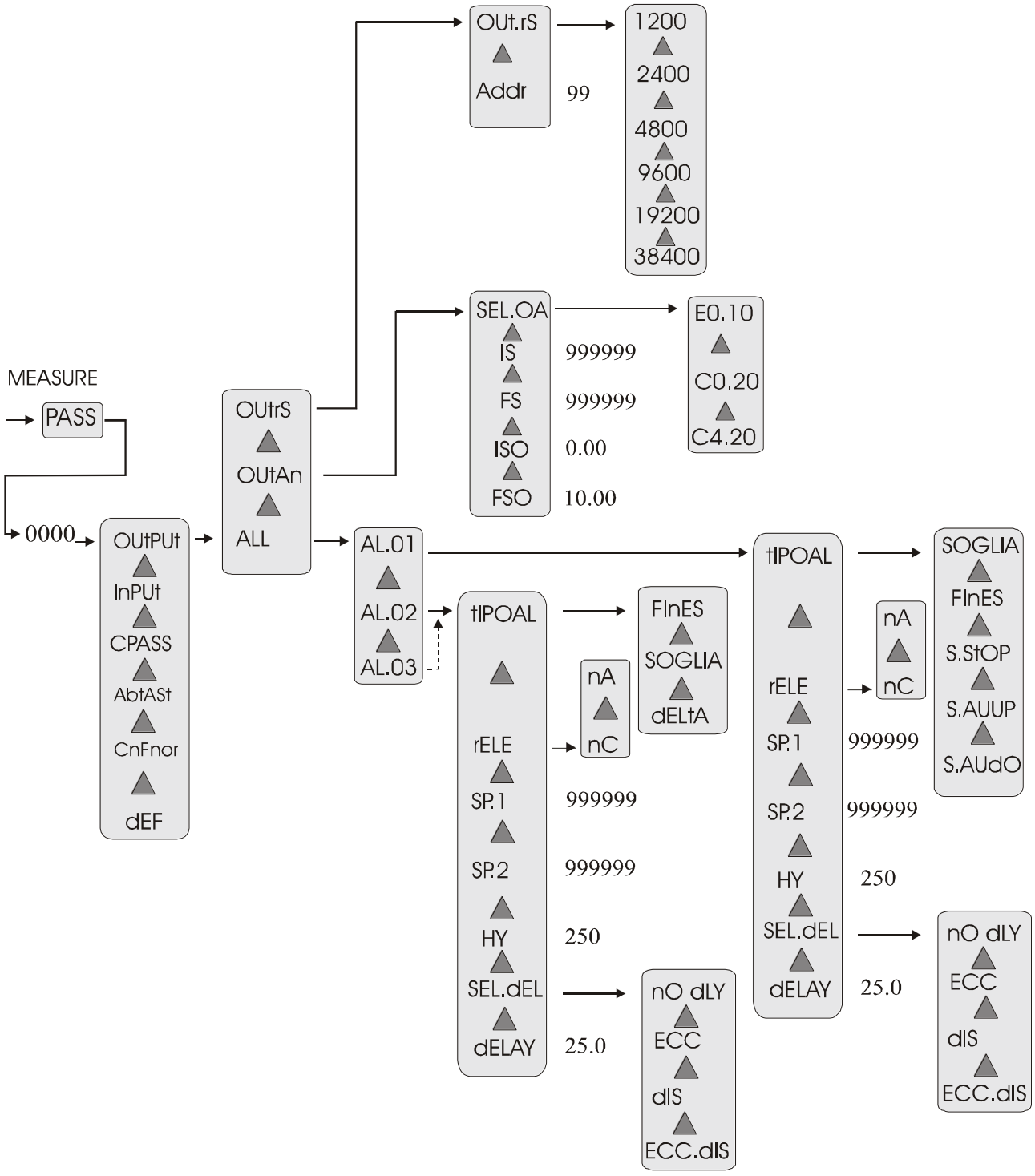
key to go to the upper level.
- To exit the menu, press 

: the modified parameters will be stored.

1.7 BASE INSTRUMENT MENU DIAGRAM



1.8 OPTIONS MENU DIAGRAM



Notes:

The → symbol means: Prog. ↵

The ▲ symbol means: ▲ d.p.

2.0 INSTALLATION REMARKS

2.1 INSTALLATION PROCEDURE

Make connections as indicated at pages:
page 6, 7 and 8 – base instrument wiring diagram and input signal wiring

1. Switch the unit on.

   With the d.p. key it is possible to modify the decimal point position.

   To set up the decimal point, press the indicated key and use Print key to move the decimal point. When the point is placed in the right position, confirm with Prog. key.

2. Get into the menu with Prog. key. Program the functions of the following table to select the requested type of functioning.

Table 3

n° seq.	Key to press	Appears on the display	NOTES
1	prog. ↵	PASS	Touch the "prog. ↵" key to get into the programming menu
2	prog. ↵	0 000	Digit the personal Password. Press "prog. ↵" to confirm. (see "Password function")
3		OUtPUt	
4	▲	InPUt	
5	▲	CPASS	
6	▲	AbtASt	
7	▲	CnFnor	
8	▲	dEF	
9	▲	tYPE	TYPE INSTRUMENT
10	prog. ↵	CIb	CIb = bidirectional input CIn = monodirectional input A P B = input 1 + input 2 A n B = input 1 – input 2 Select by "▲ "key and confirm by "prog. ↵"
11		tYPE	

n° seq.	Key to press	Appears on the display	NOTES
12	Reset Exit	"measure"	To get out from the menu

3. If requested monodirectional input see paragraph "monodirectional pulse counter functioning"
4. If requested Add/Subtract counting modes see paragraph "A+B and A-B functioning"
5. If requested marker pulse see paragraph "marker pulse functioning"
6. Set up the correcting factor using "nUnEr" and "dEnon" items (see paragraph).
7. Set a preset number (if desired) using "PrESEt" function.
8. Set alarms (if requested see paragraph)
9. Set serial outputs (if requested see paragraph)
10. Set analogue outputs (if requested see paragraph)
11. Set, if desired, the programming menu access code (password function)
12. For default parameters see "default parameters" paragraph
13. The unit is now ready to be used.

Table 4

n seq.	Key to press	Appears on the display	NOTES
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		OUtPUt	
4	▲	InPUt	
5	prog. ↵	nUnEr	MULTIPLAYING FACTOR
6	prog. ↵	10000	Set multiplying factor value (1÷65535). This number will be the numerator of the correction constant ** (press "prog. ↵" to confirm)
7		nUnEr	
8	▲	dEnOn	DIVISION FACTOR
9	prog. ↵	10000	Set division factor value (1÷65535). This number will be the denominator of the correction constant **(press "prog. ↵" to confirm)
10		dEnOn	
11	▲	PrESEt	PRESET SET UP

n seq.	Key to press	Appears on the display	NOTES
12	prog. ↵	000000.	Set up the desired preset between –999999 and + 999999 **(press "prog. ↵" to confirm)
13		PrESEt	
14	▲	nrES	RESET TERMINAL CONFIGURATION
15	prog. ↵	StAt	StAt = the instrument remains at zero till when the terminal is short-circuited dIn = the instrument instantaneously zeroes itself when the terminal is short-circuited Press "▲" key till when the desired function appears on the display **(press "prog. ↵" to confirm)
16		nrES	
17	▲	StorE	TOTAL COUNTING AND PARTIAL COUNTING STORED AT THE SWITCHING OFF
18		On	On =it memorizes the counting OFF = it doesn't memorize the counting Press "▲" key till when the desired function appears on the display **(press "prog. ↵" to confirm)
19		StorE	
20	▲	nInP	INPUT TERMINALS SELECTION
21	prog. ↵	nPn	nPn ="reset" and "hold" inputs have NPN polarity PnP = "reset" and "hold" inputs have PNP polarity Press "▲" key till when the desired function appears on the display **(press "prog. ↵" to confirm)
22		nInP	
23	▲	rEStot	TOTAL COUNTING ZEROING
24	prog. ↵	OFF	On = it zeroes the total counting OFF = it doesn't zero the total counting Press "▲" key till when the desired function appears on the display **(press "prog. ↵" to confirm)
25		rEStot	
26	▲	CoEnC	ENCODER COUNTING
27	prog. ↵	F 1	Press "▲" key till when the desired function

n seq.	Key to press	Appears on the display	NOTES
			appears on the display (see “COEN function” paragraph) **(press “prog. ↵” to confirm)
28		CoEnC	
29	▲	dIUSon	DIVISION FACTOR TOTAL COUNTING
30	prog. ↵	10000	Set division factor value (1÷65535). This number will be the denominator of the correction constant **(press “prog. ↵” to confirm)
31		dIUSon	
32	Reset Exit	“measure”	

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

2.2 "nUnEr" and “dEnon” FUNCTION (multiplying factor)

It is possible to programme a correction factor, which multiplies or divides the number pulses received at the input, visualizing them as you desire. The two menu items that you have to programme mean:

$$\text{display readout} = \frac{\text{nUnEr}}{\text{dEnon}} * \text{CoEnC} * \text{Input pulses}$$

For a reading without correction factor is sufficient to set up nUnEr = dEnon, instead to add corrective constant is necessary to set up “nUnEr” and “dEnon” to get the desired value.
As described in “CoEnC function” paragraph, it is possible to obtain multiplying factors using the reading of the encoder’s edges (see paragraph).
Now is shown an applicative example; for the set up instruction see Table 3.

- 119 pulses/revolution encoder and it is requested a visualisation of 100 digits/revolution

$$K = \frac{\text{display readout}}{\text{input pulses}}$$

Programme “100” at the “nUnEr” item and 119 at the “dEnon” item (CoEnC = F1).

2.3 FRONT KEYS ENABLING

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

Table 5

N seq.	Key to press	Appears on the display	NOTES
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		OUtPUt	
4	▲	InPUt	
5	▲	C.PASS	
6	▲	AbtASt	KEYS ENABLING
7	prog. ↵	AbtrE	"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		AbtrE	
10	▲	AbtPd	"d.p." KEY ENABLING (decimal point)
11	prog. ↵	On	On = enabled, OFF= disabled Press "▲" key till when the desired function appears on the display **(press "prog. ↵" to confirm)
12		AbtPd	
13	▲	Abtrt	"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		Abtrt	
16	▲	AbtPr	"Print" KEY ENABLING
17	prog. ↵	On	On = enabled, OFF= disabled Press "▲" key till when the desired function appears on the display **(press "prog. ↵" to confirm)
18		AbtPr	
19	▲	AbtSP	"AL" KEY ENABLING (alarms)

N seq.	Key to press	Appears on the display	NOTES
20	prog. ↵	On	On = enabled, OFF= disabled Press "▲" key till when the desired function appears on the display **(press "prog. ↵" to confirm)
21		AbtSP	
22	Reset Exit	Readout	To get out from the menu

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

2.4 TERMINALS 18 AND 19 CONFIGURATION

See the following table to set up the terminals 18 and 19. It is possible to set up one or both terminals to send the readout of the instrument on serial line (if provided).

Tabella 6

N seq.	Key to press	Appears on the display	NOTES
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		OUtPUt	
4	▲	InPUt	
5	▲	C.PASS	
6	▲	AbtASt	
7	▲	CnFnor	TERMINALS CONFIGURATION
8	prog. ↵	n 19	TERMINAL 19 CONFIGURATION
9	prog. ↵	rESEt	Terminal 19: rESEt: reset counting Print: print (if serial output requested) rEStOt: azzeramento contatore totale Press "▲" key till when the desired function appears on the display. Press "prog. ↵" to confirm
10		n 19	
11	▲	n 18	TERMINAL 18 CONFIGURATION
12	prog. ↵	hoLd	Terminal 18: hoLd: stop counting Print: print (if serial output requested) AbtACO: marker pulse abilitation rEStOt: reset total counting

N seq.	Key to press	Appears on the display	NOTES
			Press "▲" key till when the desired function appears on the display. Press "prog. ↵" to confirm
13	Reset Exit	Readout	To get out from the menu

2.5 "CoEnC" FUNCTION (encoder counting)

The "CoEnC" function gives you the possibility to get readings with major resolutions using as much as possible the encoder resources.
Infact the bi-directional encoder produces two waves dephased of 90°. The reading of an edge every four allows to visualize the encoder revolution pulses: this function is obtained with the set up of "CoEnC" = F1 (fig.C). By the "CoEn" set up it is possible to read two or four edges, getting double or quadruple readings about the encoder revolution pulses. To double the reading you have to set up "CoEnC" = F2 (fig. B), while to quadruple you have to set up "CoEnC" = F4 (fig. A). See Table 4 to set up this function.

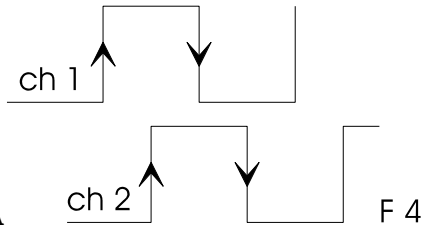


Figure A

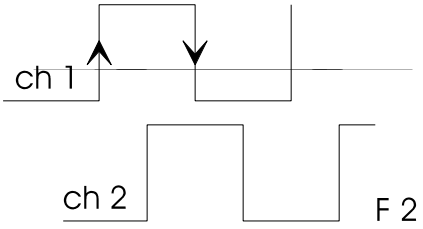


Figure B

Figure C

2.6 " PrESEt" FUNCTION (preset)

The "PrESEt" function on the MPCIB396 P6 instrument allows to set up a preset, i.e. a number which appears every time that the instrument is zeroed.
The "PrESEt" function works with any number between –999999 and +999999 (to set up the negative sign see "SET UP" paragraph). To set the visualization at the "PrESEt" value, it is sufficient to press the reset front key (if enabled), or the terminal reset. To modify this function see Table 4.

2.7 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 7

n° seq.	touch key	Appears on the display	NOTES
1	prog. ↵	PASS	Press "prog. ↵" key to get into the programming menu
2	prog. ↵	0 0000	Digit the personal password ** (confirm with "prog. ↵")
3		OUtPUt	
4	▲	InPUt	
5	▲	C.PASS	
6	▲	AbtASt	
7	▲	CnFnor	Terminal configuration if serial output are requested
8	▲	dEF	DEFAULT PARAMETERS
9	prog. ↵	On	Touch the "▲" key until the written "ON" appears ** (confirm with "prog. ↵") The instrument exits from the programming menu and it follows the default parameters.

2.8 TOTAL COUNTING FUNCTION

By the Σ key it is possible to visualize the total counting on the display. The total counting is the sum of all the partial counting memorized after a reset. The total count can be shown on display divided by the value programmed in the "dIUSOn" menu item. The "In" led switching on means that the display is visualizing the total counting. To zero this counting it is necessary to put "on" at the "rEStot" menu item

or shorting to ground the terminal 18 or 19 if programmed to this function (see paragraph “TERMINALS 18 AND 19 CONFIGURATION”). The key  can be disabled setting “OFF” at the “Abtrt” menu item (see “Front key enabling” paragraph).

2.9 MONODIRECTIONAL PULSE COUNTER FUNCTIONING

Selecting from the programming menu the “tYPE” = “CIn” item, the instrument works as monodirectional pulse counter. The counting input is terminal 23, while the second input terminal 21 can be used to select the counting direction (shortcircuited input at V+ -terminal 17- = Up counting; shortcircuited input at GND -terminal 16- = Down counting).

2.10 A + B AND A – B FUNCTIONING

Selecting from the programming menu the “tYPE” = “A P B”, the instrument works as monodirectional pulse counter with double input in add counting mode. The two used inputs are: input 1 at terminal 23 and input 2 at terminal 21.
Selecting from the programming menu the “tYPE” = “A n B”, the instrument works as monodirectional pulse counter with double input in subtract counting mode. The two used inputs are: input 1 at terminal 23 for up counting and input 2 at terminal 21 for down counting.

2.11 MARKER PULSE FUNCTIONING

The fifth encoder wire, called “marker pulse”, is abled to zero the visualization just when the “hold” terminal is programmed as “marker pulse abilitation”.
When terminal 18 is active, the instrument is abled to zero the visualization when it receives a pulse on terminal 20 (marker pulse). In this case the reset value is not consedered in the total counting function.

 *3.0 ALARMS (option)*

The MPCIB396 P6 instrument can be requested with 3 exchange relay.
Alarm 1 can be set up in the following ways:

1. windowed programming two set point (FinES)
2. threshold with programmed set point (SOGLIA)
3. threshold with programmed set point and stop counting (S.Stop)
4. Automatic cycle (up count) with reset of the display when count reaches the setpoint and switch of the output for a programmable time. (S.AuuP)
5. Automatic cycle (down count): the display is set to the setpoint value when the count reaches zero and switch of the output for a programmable time (S.AudO).

Alarms 2 and 3 can be set up in the following ways:

1. windowed programming two set point (FinES)

2. threshold with programmed set point (SOGLIA)
3. offset respect setpoint 1 (dELtA)

For both alarms it is possible to configure:

1. starting relay condition (normally open or normally closed)
2. eventual hysteresys
3. eventual delay times (activation, deactivation or activation + deactivation)

WINDOWED THRESHOLD (FinES). The output changes when the counting crosses a window defined by two set point: SP1 and SP2 (SP2>SP1).
The output, inside of the window, can be normally activated or deactivated.
Besides for SP1 and SP2 it is possible to programme delay time or hysteresys (see figure D). After reset the display shows the preset value.

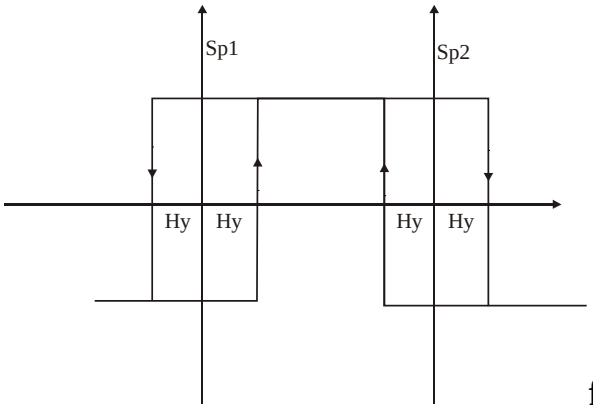


figure D

THRESHOLD (SOGLIA). The output changes when the counting crosses the SP1 set point.
The output can be normally activated or deactivated.
Besides for SP1 it is possible to set up delay time or hysteresys (see figure E). After reset the display shows the preset value.

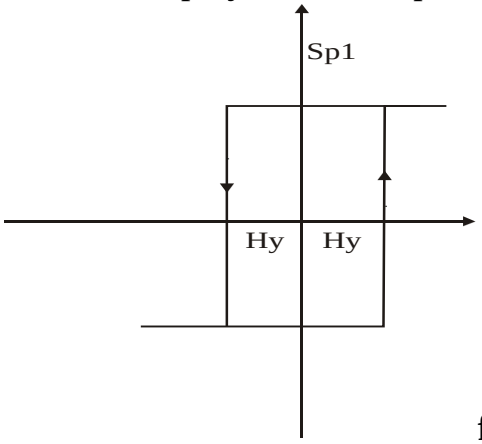


figure E

THRESHOLD WITH STOP COUNTING (S.StoP). When the counting reaches the value written in the SP1 changes the output and stops itself. It is not possible to programme delay time and hysteresys. After reset the display shows the preset value.

AUTOMATIC CYCLE THRESHOLD for up count (S.AuuP). The counting when reaches the value SP1 changes the output for the time programmed in the “dELAY" menu item, loads the preset value on the display and restarts the cycle.

AUTOMATIC CYCLE THRESHOLD for down count (S.AudO). The counting when reaches zero change the output for the time programmed in the "dELAY" menu item, loads the SP1 value on the display and restarts the cycle. The preset value can be used to increase or decrease the start value of the cycle (setpoint 1). After a reset the display shows the setpoint value (SP1) of the alarm 1.

Example 1:
SP1 = 1000
PrESEt = +100
Counting decrease till 0, switch the relay for a programmed time, shows 1100 on the display and restarts until reaches 0 again.

Example 2:
SP1 = 1000
PrESEt = -100
Counting decrease till 0, switch the relay for a programmed time, shows 900 on the display and restarts until reaches 0 again.

OFFSET THRESHOLD. This function is available only for alarms 2 and 3. The offset value is respect setpoint 1.

Example :
Alarm 1 Threshold (Sp1) = 1000
Alarm 2 dELtA (Sp1) = -20 (980)
Alarm 3 dELtA (Sp1) = 20 (1020)
In this case, if setpoint 1 changes, the values of alarms 2 and 3 follow setpoint 1.

3.1 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 quickly into the alarms set up, in the second case it is possible to reach the alarm sets and all the parameters of the instrument.

- The first step is to get into the complete menu and to configure the alarms as requested. See the following table.

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		OUtPUt	
4	prog. ↵	ALL	
5	prog. ↵	AL01	ALARM 1 PARAMETERS
6	prog. ↵	tIPOAL	ALARM SELECTION
7	prog. ↵	FInES	FinES = windowed alarm S.StOP = alarm with stop counting S.AUUP = automatic cycle alarm (count up) S.AUdO = automatic cycle alarm (count down) SOGLIA = threshold alarm Select the desired item by " ▲ " key and confirm with “prog. ↵”
8		tIPOAL	
9	▲	rELE	AL1 CONTACT CONFIGURATION
10	prog. ↵	nA	n.A. = relay normally open n.C. = relay normally closed Select the desired item by " ▲ " key and confirm with “prog. ↵”
11		rELE	
12	▲	SP 1	First trigger set point SET UP
13	prog. ↵	0 00000	Set up the SP1 value. **(Confirm by “prog. ↵”)
14		SP 1	
15	▲	SP 2	Second trigger set point SET UP. Program only if the functioning of the windowed alarm is requested.
16	prog. ↵	0 00000	Set up the SP2 value. **(Confirm by “prog. ↵”)
17		SP 2	
18	▲	HY	HYSTERESIS ALARM 1 SET-UP
19	prog. ↵	00 250	Set up a number between 0 and 250 digit. ** (press “prog. ↵” to confirm)
20		HY	
21	▲	SEL.d	TIME CONFIGURATION AL1
22	prog. ↵	ECC	ECC = activation delay dIS = deactivation delay

n° seq.	Touch key	Appears on the display	REMARKS
			ECC-dIS = activation + deactivation delay nO dLY = no delay Select the desired item by " ▲ " key and confirm with "prog. ↵"
23		SEL.d	
24	▲	dELAY	AL1 TIME SET-UP
25	prog. ↵	00 25.0	Set up a number between 0 and 25.0 sec. ** (press "prog. ↵" to confirm)
26		dELAY	
27	▶	AL01	
25	▲	AL02	ALARM 2 PARAMETERS
26	prog. ↵	tIPOAL	KIND OF ALARMS SELECTION
27	prog. ↵	FInES	FinES = windowed alarm SOGLIA = threshold alarm dELtA = delta rispetto allarme1 Select the desired item by " ▲ " key and confirm with "prog. ↵"
28		tIPOAL	
29	▲	rELE	ALARM 2 FUNCTIONING CONFIGURATION
30	prog. ↵	NA	n.A. = relay normally open n.C. = relay normally closed Select the desired item by " ▲ " key and confirm with "prog. ↵"
31		rELE	
32	▲	SP 1	First trigger set point SET UP
33	prog. ↵	0 00000	Set up the SP1 value. **(Confirm by "prog. ↵")
34		SP 1	
35	▲	SP 2	Second trigger set point SET UP. Program only if the functioning of the windowed alarm is requested.
36	prog. ↵	0 00000	Set up the SP2 value. **(Confirm by "prog. ↵")
37		SP 2	
38	▲	HY	ALARM 2 HYSTERESIS SET-UP
39	prog. ↵	00 250	Set up a number between 0 and 250 digit. ** (press "prog. ↵" to confirm)
40		HY	
41	▲	SEL.d	AL2 TIME CONFIGURATION
42	prog. ↵	ECC	ECC = activation delay dIS = deactivation delay

n° seq.	Touch key	Appears on the display	REMARKS
			ECC-dIS = activation + de-activation delay nO dLY = no delay Select the desired item by " ▲ " key and confirm with "prog. ↵"
43		SEL.d	
44	▲	dELAY	AL2 TIME SET-UP
45	prog. ↵	00 25.0	Set up a number between 0 and 25.0 sec. ** (press "prog. ↵" to confirm)
46		dELAY	
47	▶	AL02	
48	▲	AL03	ALARM 3 PARAMETERS
49	prog. ↵	tIPOAL	Also for alarm 3 set up, follow the indication shown for alarm 2 set up.
50	Reset Exit	"measure"	Procedure to get out of the menu

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

After to have configured the alarms, it is possible to get in the change of set point by the front key "AL". See the next table.

Table 9

N.SEQ.	Press key	appears on display	NOTES
1	AL	AL 01	Press "AL" key to get into the set up alarms set point
2	prog. ↵	SP 1	First set point alarm 1
3	prog. ↵	0 00000	Write the alarm 1 relative number ** (confirm with "prog. ↵")
4		SP 1	
5	▲	SP 2	Second set point alarm 1, to use if the windowed alarms are requested
6	▶	AL 01	
7	▲	AL 02	Alarm 2 parameters. With the same procedure used for alarm 1, programme the set points for alarm 2.
8	▲	AL 03	Alarm 3 parameters. With the same procedure used for alarm 1, programme the set points for alarm 3.

N.SEQ.	Press key	appears on display	NOTES
9	Reset Exit	measure	Procedure to get out from the alarms menu.

4.0 ANALOGUE OUTPUTS (option)

The MPCIB396 P6 instrument can be ordered with a voltmeter or ammeter standard analogue output (“OAP” option).

The analogue output can work as revolution counter, hourly production and pulse counter.

The flexibility of use and complete programmability make this output an important interface with analogue computer inputs, recorders or repeaters with analogue input . In particular you can choose, by programming the requested output (0÷10V, 0÷20mA, 4÷20mA), the calibration values linked to the required observations. The instrument can supply a maximum voltage of 10V and a current of 20mA, there being no limit to the intermediate values.

To configure the analogue output the user will have to set up the two reading values (IS and FS) and the corresponding output values (ISO and FSO). It is necessary to take account of the fact that for reading values smaller or greater than those programmed the analogue output will not rise above the values set by the programming parameters ISO and FSO output values.

For greater clarity please check with the paragraph “Notes on the analogue output set-up”.

The analogue outputs follow instantaneously the display reading, consequently the are locked when hold is entered on the terminal board and they take account of the numbers zeroed in the terminal board by the function “Display reset”.

4.1 TECHNICAL CHARACTERISTICS

Table 10

Analogue Output	0÷10 V - 0÷ 20 mA - 4÷20 mA
Max. impedance for current output	400 Ω
Min. impedance for voltage output	1 KΩ
Max. voltage supplied	10 V
Max. current supplied	20 mA
Resolution	12 bit

4.2 INSTALLATION OF ANALOGUE OUTPUT

To use correctly the analogue output it is necessary to follow carefully these instructions:

1- Follow the connections in FIG B for the voltmeter output or the connections on FIG A for the ammeter output.

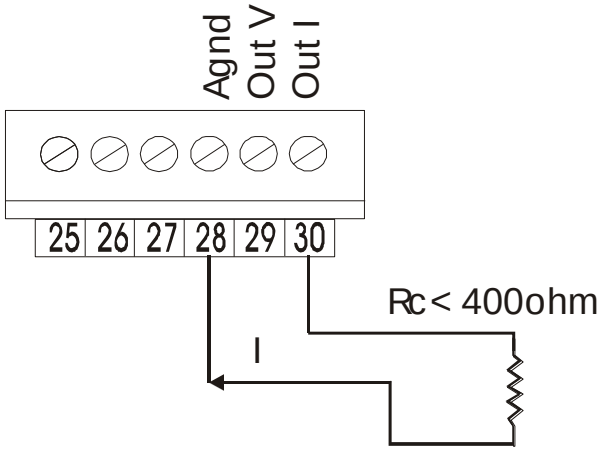


Fig A

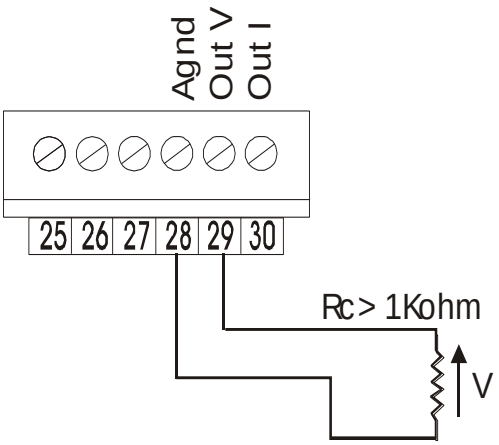


Fig B

Ammeter output

Voltmeter output

2- Follow the programming procedure on following table and then check with the examples that follow.

For programming it is necessary to take account of:

ISO (beginning of output scale) is the value of the analogue output coinciding with the observed digit at the beginning of the initial reading scale (IS). Digit at the input "IS" the display reading value which you want to coincide with initial value of the analogue output (ISO). The programming parameter "ISO" is programmed depending on the type of output chosen. Consequently we can obtain:

- ISO = 00.000 V if voltage output
- ISO = 00.000 mA if ammeter output (for output 4÷20 mA no programming is necessary).

FSO (end of the output scale) is the value of the analogue output which coincides with the programmed number at the item FS. Digit at the "FS" item the display reading value which you want to make to coincide with the final value of the analogue output (FSO).

The menu item "FSO" must be programmed on the basis of the type of output chosen. Therefore we obtain.:

- FSO = 10.000 V if voltage output
- FSO = 19.999 mA if ammeter output (for an output at 4 ÷20 mA no programming is necessary).

Table 11

n seq.	Press key	appears on display	NOTE
1	prog. ↵	PASS	Press the "prog. ↵" key to get into the programming menu
2	prog. ↵	0 0000	Input the personal Password number if already programmed see "password Function" ** (confirm with "prog. ↵")
3		OUtPUt	
4	prog. ↵	ALL	
5	▲	OUt.An	
6	prog. ↵	SEL.OA	ANALOGUE OUTPUT SELECTION
7	prog. ↵	E0.10	E0.10 = voltage output 0÷10 V C0.20 = current output 0÷20 mA C4.20 = current output 4÷20 mA Select the requested item with "▲ " key and confirm with "prog. ↵" key
8		SEL.OA	
9	▲	IS	BEGINNING OF READING SCALE
10	prog. ↵	0 00000	write the reading value which coincides with ISO ** (confirm with "prog. ↵")
11		IS	
12	▲	FS	END OF READING SCALE
13	prog. ↵	1 00000	write the reading value which coincides with FSO ** (confirm with "prog. ↵")
14		FS	
15	▲	ISO	BEGINNING OF ANALOGUE OUTPUT SCALE
16	prog. ↵	000.00	write the output value which coincides with the reading programmed in "IS". ** (confirm with "prog. ↵")
17		ISO	
18	▲	FSO	END OF ANALOGUE OUTPUT SCALE
19	prog. ↵	010.00	write the output value which coincides with the programmed reading at "FS". ** (confirm with "prog↵.")
20		FSO	
21	Exit Reset	Read out	Procedure for exiting programming area

** to modify the number set-up see the procedure illustrated in the paragraph “SET-UPS”.

4.3 NOTES ON THE SET UP OF ANALOGUE OUTPUTS

- Program instrument with the following calibration:

READING: 100 AMMETER OUTPUT: 5 mA ;
READING: 10000 AMMETER OUTPUT: +15 mA;

The instrument parameters should be programmed as follows.

PARAMETERS "OUt AN":
SEL. OA = C0.20
IS = 100
FS = 10000
ISO = 5.00 *
FSO = 15.00 *

* with display below “100” the analogue output is fixed to 5 mA; with display above “10000” the analogue output is fixed to 15 mA.

- Program instrument with the following calibration:

READING: 100 AMMETER OUTPUT: 4 mA ;
READING: 10000 AMMETER OUTPUT: 20 mA ;

The instrument parameters should be programmed as follows.

PARAMETERS “OUt AN.”
SEL.OA = C 4.20
IS = 100
FS = 10000
ISO = not necessary to program
FSO = not necessary to program

* with display below “100” the analogue output is fixed to 4 mA; with display above “10000” the analogue output is fixed to 20mA.

- Program instrument with the following calibration:

READING: 100 VOLTMETER OUTPUT: 2 V
READING: 1000 VOLTMETER OUTPUT: 6 V

The instrument parameters should be programmed as follows.

PARAMETERS "OUt AN.":
SEL.OA = E0.10
IS = 100
FS = 10000
ISO = 2.00 *
FSO = 6.00 *

- with display below “100” the analogue output is fixed to 2V; with display above “10000” the analogue output is fixed to 6V.

5.0 SERIAL OUTPUT (option)

"MPCIB396 P6" series models can communicate with an host computer along an opto-isolated RS232, RS422, RS485 half duplex serial line.

Unidirectional serial output

"MPCIB396 P6" series instrument with unidirectional optoisolated RS232 output send out the readout value when the Print key is pressed or shorting the terminal 18 or 19 if programmed to this function (see paragraph "TERMINALS 18 AND 19 CONFIGURATION"). Serial output features are listed in the table below, and the wiring diagram is shown in fig F. The output format is as follows:

30	31	34	37	32	31	OD	OA
H.T.	T.T.	T.	H.	tens	unity	LF	CR

Bi-directional serial output

It is possible to program or read the most of the keyboard function of one or more instruments linked with each other (31 max) by this line transmission. All messages are sent and received by means of an ASCII protocol.

Table 12

SERIAL CHARACTERISTICS	
baud rate	From 1200 to 38400 (programmable)
start bit	1 bit
Length	8 bit
Stop	1 bit
Parity	no

To use the instruments "MPCIB396 P6" models with RS485 or RS422 serial output, you must follow figure "G", for RS232 serial output follow figure "F" program the instrument with the address code and the BAUD RATE and realize a supervisor software using the mnemonic codes described in the following pages.

The address code, which must be assigned at the instrument, is the name by which the host computer calls the instrument that must receive or send information by the serial line. To program the address code and the baud rate (functions programmable only by keyboard) follow the next table.

Table 13

n seq.	**Key to press**	**Appears on the display**	**NOTES**
1	prog. ↵	PASS	Press the "prog. ↵" key to get into the

n seq.	Key to press	Appears on the display	NOTES
			programming menu
2	prog. ↵	0 0000	Input the personal password number ** (confirm with “prog. ↵”)
3		OUtPUt	
4	prog. ↵	ALL	
5	▲	Out.An	
6	▲	Out.rS	
7	prog. ↵	bAUd	BAUD RATE
8	prog. ↵	9600	1200 = 1200 baud rate 2400 = 2400 baud rate 4800 = 4800 baud rate 9600 = 9600 baud rate 19200 = 19200 baud rate 38400 = 38400 baud rate Press the key " ▲ " key until appears the requested baud-rate. ** (confirm with “prog. ↵”)
9		bAUd	
10	▲	Addr	INSTRUMENT ADDRESS
11	prog. ↵	001	Input the instrument address with a number between 001 and 099. **(confirm with “prog. ↵”)
12		Addr	
13	Exit Reset	“measure”	Procedure to exit to programming environment

** to modify the number set-up see the procedure illustrated in the paragraph “SET-UPS”.

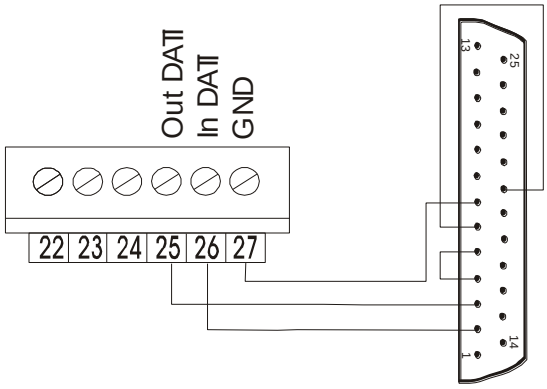


Figure F.(RS232)

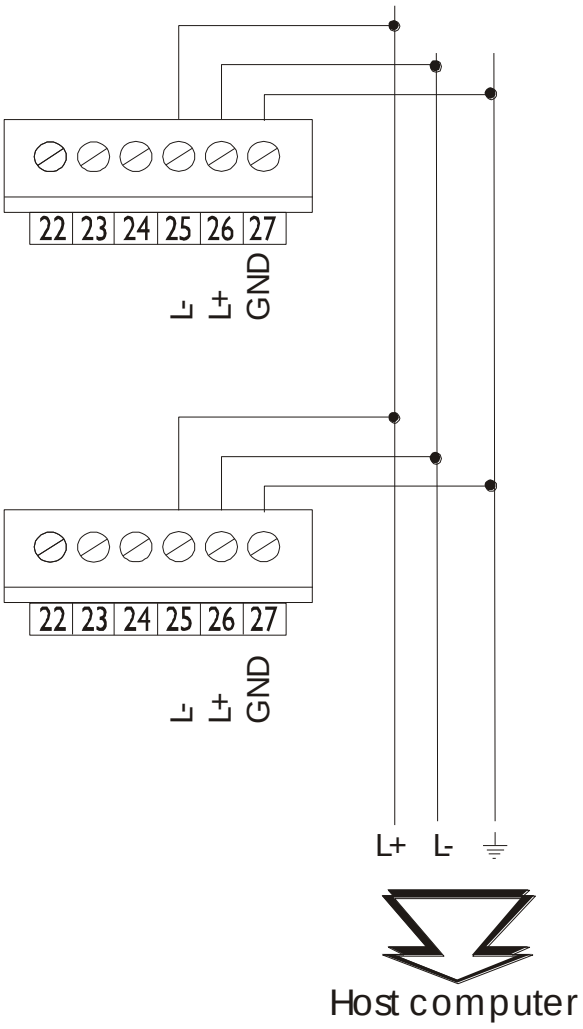


Figure G (RS485)

5.1 DATA READING FROM HOST TO INSTRUMENT MPCIB396 P6

Transmission string set-up.

EOT GID GID UID UID C1 C2 ENQ

EOT = EOT from host indicates start of transmission string
GID = Instrument address: ASCII in decimal code to transmit twice consecutively
UID = Instrument address: in units ASCII to transmit twice consecutively
C1 C2 = mnemonic ASCII code for command to follow (see paragraph “command codes”).

EXAMPLE: data transmission string from host to MPCIB396 P6 with address "01" for data request "PRESET" (PR).

EOT	0	0	1	1	P	R	ENQ	
04	30	30	31	31	50	52	05	cod. ASCII

The instrument, as soon as receives the first string code transmitted by the host, leaves 400 ms. during which it waits for the completion of the transmission operation. When the 400 ms. operation finishes, or when the data reception is complete, the instrument, depending on the information received, can behave in the following ways :

1. If the data string received presents errors which do not allow address identification then the instrument cannot reply and rejects the information received.
2. The string has a correct address code but it detects other errors: in this case the instrument transmits the ASCII code: NACK (not understood) and rejects the information received.
3. The received data string is totally correct, in this case the instrument transmits the data requested in ASCII format. (see paragraph “DATA TRANSMISSION FROM MPCIB396 P6 TO HOST”)
4. When the complete message is not received before "timeout" (400 ms), the instrument rejects the information received and is ready to receive a new message.

5.2 DATA TRANSMISSION FROM MPCIB396 P6 TO HOST

Transmission String configuration

STX C1 C2 D1 . . . . D8 ETX BCC

STX = text beginning
C1 C2 = mnemonic code ASCII relative to command to follow. (see paragraph “command codes”).

D1 ÷D8 = digits observed, including negative nos. , also ">", decimal points (if required) and blank or zero for digit not used (the transmitted digits must always be eight)
ATTENTION: the data must always be right justified and in any case the significant numbers cannot be more than five. In the case of positive numbers the sign "+" must not be transmitted.

EXAMPLE: the number -5.6 can be written in two ways

1)	blank	blank	blank	blank	-	5	.	6
	20	20	20	20	2D	35	2E	36
2)	-	0	0	0	0	5	.	6
	2D	30	30	30	30	35	2E	36

EXT = End of text
BCC = Checksum, obtained using EXCLUSIVE OR, of the string transmitted excluding the code "STX" comprising "ETX" in the indicated order.

$$BCC = C1 + C2 + D1 + D2 + D3 + D4 + D5 + D6 + D7 + D8 + ETX$$

EXAMPLE: data string from MPCIB396 P6 to host in response to preceding example.

STX	P	R	blank	blank	blank	blank	0	1	0	0	ETX	BCC	
02	50	52	20	20	20	20	30	31	30	30	03	00	cod. ascii

The MPCIB396 P6 after having transmitted the string with the data requested from the host-computer awaits the reply confirming the result of the transmission.

1. The host-computer replies in ASCII: NACK (retransmit the message). The MPCIB396 P6 retransmits the data string.
2. The host-computer does not reply. In this case the instrument awaits the next EOT on the network to set up the next communication.
3. The host-computer replies in ASCII: ACK (understood). The instrument awaits new commands.

5.3 DATA WRITING FROM HOST TO MPCIB396 P6

Set up of transmission string

EOT GID GID UID UID STX C1 C2 D1 . . . D8 ETX BCC

EOT = EOT from host indicates start of transmission string
GID = Instrument address: ASCII code in decimal twice to transmit consecutively
UID = Instrument address: ASCII in units to transmit twice consecutively

C1 C2 = mnemonic ASCII code for command to follow . (see paragraph “command codes”).
D1 ÷ D8 = Digits seen. The same rules are valid as those described in the paragraph " data transmission from MPCIB396 P6 to host"
BCC = Checksum, obtained using EXCLUSIVE OR, of the transmitted string excluding code "STX" comprising "ETX" in the order indicated

$$BCC = C1 + C2 + D1 + D2 + D3 + D4 + D5 + D6 + D7 + D8 + ETX$$

EXAMPLE: string for writing data from host to MPCIB396 P6 with "01" address.

EOT	0	0	1	1	STX	P	R	blank	blank	blank	blank	0	1	0	0	ETX	BCC
04	30	30	31	31	02	50	52	20	20	20	20	30	31	30	30	03	00

The instrument starting from the first code received of the data string transmitted by the host, leaves 400 ms during which it waits for the transmission operation to be completed. When the 400 ms operation finishes, or when the data reception is complete, the instrument , depending on the information received, can behave in four different ways :

1. If the data string received presents errors which do not allow address identification, then the instrument cannot reply and rejects the information received.
2. The string has a correct address code but detects other errors: in this case the instrument transmits the ASCII code: NACK (not understood) and rejects the information received.
3. The received data string is totally complete, in which case the instrument stores the information and transmits the code ASCII=ACK (understood)
4. When the complete message is not received before "time-out" (400 ms), the instrument rejects the information received and is ready to receive a new message.

5.4 COMMAND CODES

The codes of the variables used for the MPCIB396 P6 instrument programming, are listed in the following Table. Not all the parameters allow the writing from host, in this case the instrument replies "NACK" (read only parameters).

Table 14

COMMAND CODES	COMANDS DESCRIPTION	POSSIBLE OPERATION	DATA CODES
SC	Selection instrument (Cib, Cin, A+B, A-B)	Read/write	Hexadecimal 0 = CIb 1 = CIn 2= A+B 3 = A-B

PR	PrESEt	Read/write	ASCII 0 ÷ + -999999
PT	P.dEC (decimal point)	Read/write	Hexadecimal 0 = no point 1 = 99999.9 2 = 9999.99 3 = 999.999 4 = 99.9999 5 = 9.99999
NU	NUnEr (multiplying factor)	Read/write	ASCII 1 ÷ 65535
DN	dEnon (division factor)	Read/write	ASCII 1 ÷ 65535
RS	Display reset	Only write	Hexadecimal 1 = zeroing
RT	Totalizator reset	Only write	Hexadecimal 1 = zeroing
LT	Total counting	Read/write	ASCII
RO	Read out (display)	Only read	ASCII + -999999
AR	Generic status word	Read/write	Hexadecimal (see paragraph)
A1-A2-A3	SP1 (AL1-AL2-AL3)	Read/write	ASCII + -999999
B1-B2-B3	SP2 (AL1-AL2-AL3)	Read/write	ASCII + -999999
H1-H2-H3	HY (AL1-AL2-AL3)	Read/write	ASCII 0 ÷ 250
D1-D2-D3	Delay (AL1-AL2-AL3)	Read/write	ASCII 0 ÷ 25.0
W1-W2-W3	Alarm status word	Read/write	Hexadecimal (see paragraph)

* The code is composed by the letter followed by the number of the alarm to program

5.5 TRANSMISSION OF HEXADECIMAL VALUES

Some values must be transmitted in a 4 digit hexadecimal format. In that case the protocol string must be preceded by the ASCII character ">".
EXAMPLE: the string for reading or writing the decimal point in the position 1999.9 will be:
Blank Blank Blank > 0001
EXAMPLE TO READ DECIMAL POINT POSITION
HOST:

EOT	0	0	1	1	P	T	ENQ	
04	30	30	31	31	50	54	05	

INSTRUMENT MPCIB396 P6

STX	P	T	blank	blank	blank	>	0	0	0	4	ETX	BCC

02 50 54 20 20 20 3E 30 30 30 34 03 1D

EXAMPLE TO WRITE DECIMAL POINT POSITION

HOST:

EOT 0 0 1 1 STX P T blank blank blank > 0 0 0 2 ETX BCC

04 30 30 31 31 02 50 54 20 20 20 3E 30 30 30 32 03 1B

INSTRUMENT MPCIB396 P6

ACK

06

ATTENTION:

In the readout transmission (code "RO") appears also the word that indicates if the instrument is in hold state. In the paragraphs above it has been said that, in normal conditions, the data are transmitted from "D1" to "D8" and particularly"D1" and "D2" are considered "blank". With the instrument in hold state, "D1" gets the H value while "D2" keeps staying "blank".

5.6 ALARM SETTING (W status word)

MPCIB396 P6 series instruments can have 3 alarms.

The relevant codes to program are:

A reading/writing of SP1

B reading/writing of SP2

H reading/writing of hysteresis

D reading/writing of delay time

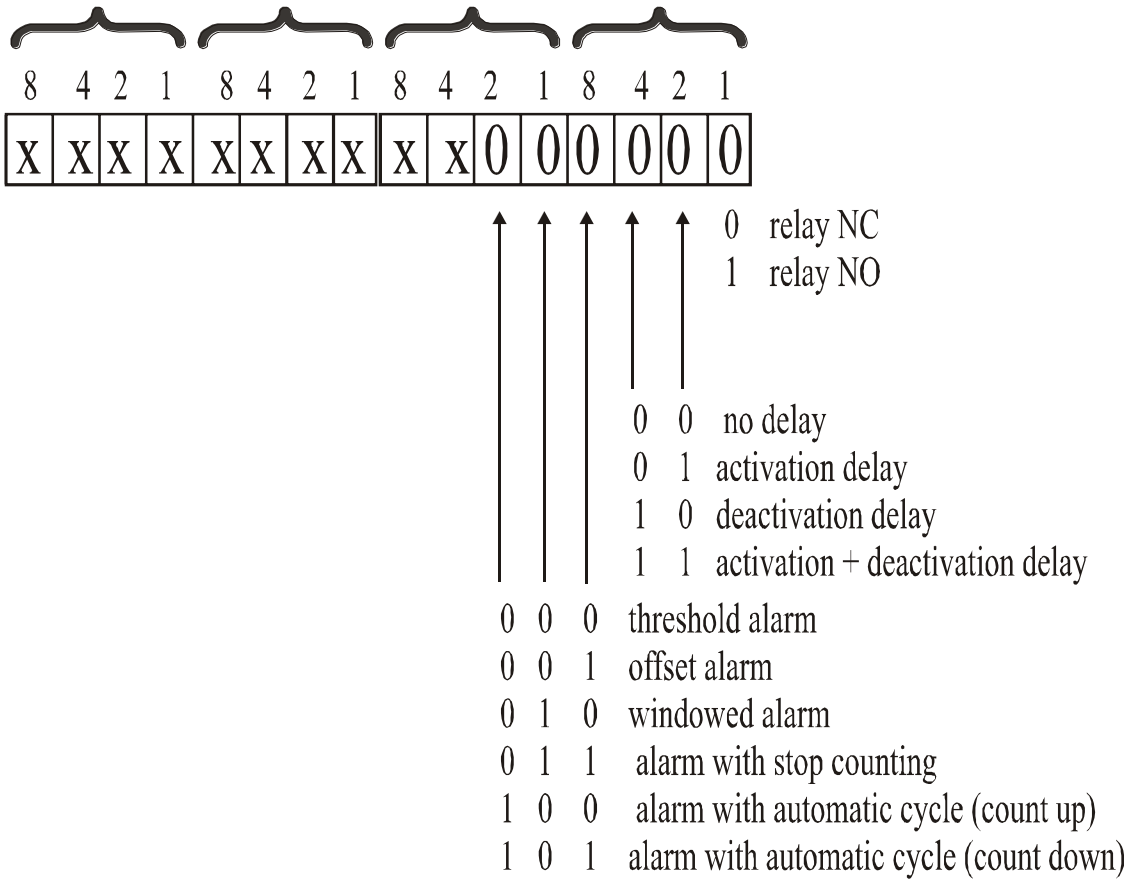
W reading/writing of the status word of the alarm

The code is followed by a number indicating the alarm number.

For instance, "H2" means hysteresis for alarm 2 while "A1" indicates the set-point 1 of the alarm 1.

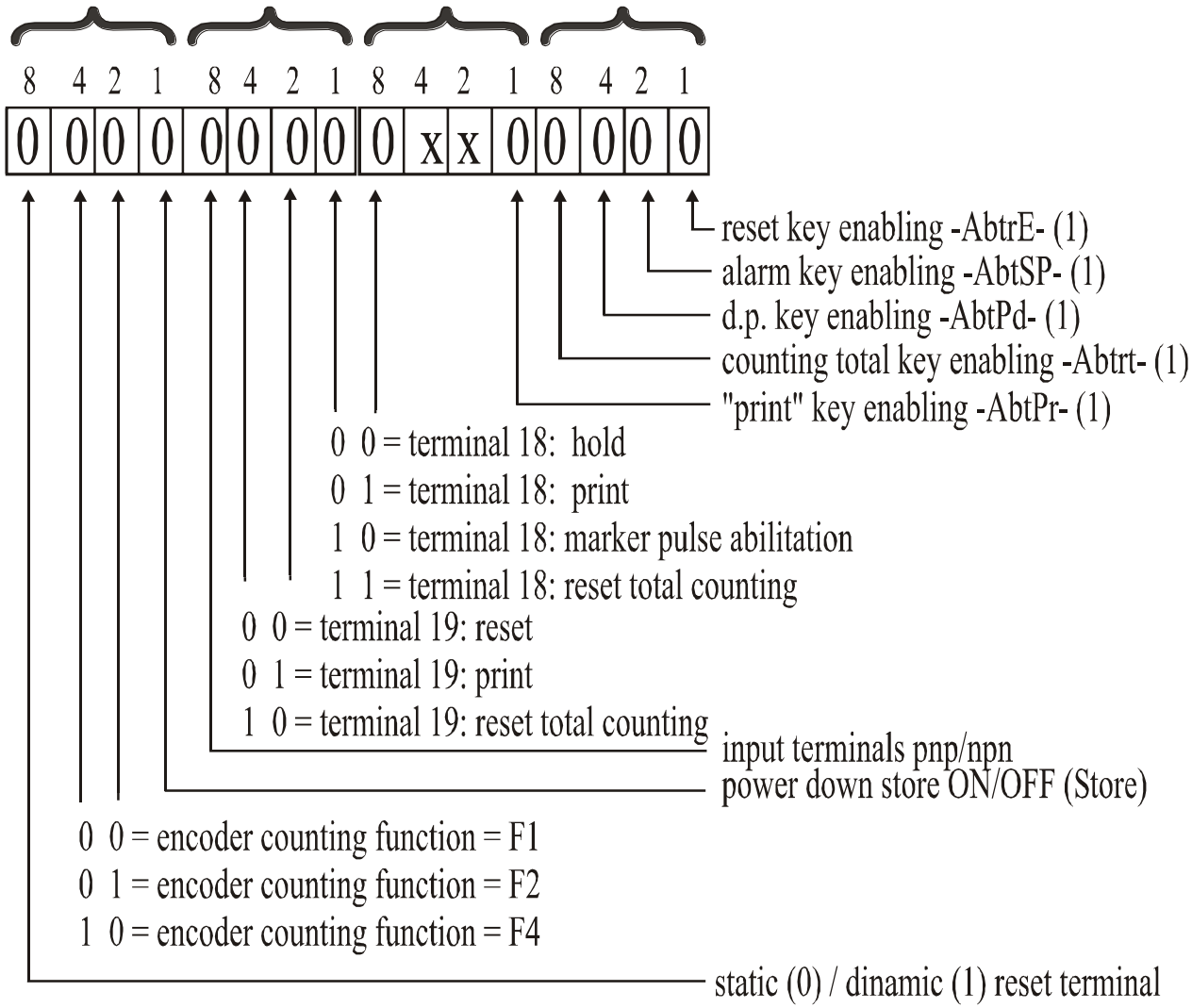
The status word W gives the information on the relay status (normal or windowed alarm) and about the kind of delay (excitation or de-excitation**).**

The alarms status word accepts hexadecimal numbers from 0 to F as shown in the table below.



5.7 AR STATUS WORD

The “AR” status word allows to configure the front keys enabling by serial line, the terminals configuration, the kind of encoder counting. You can see the status word description in the following picture.



5.8 BASIC PROGRAM

The following basic program shows the reading of the set-point of an instrument by an host computer. Set up baud rate = 9600 and address = 01 for the functioning of the program.

```
on error goto 20
cls
open “com1: 9600, n, 8, 1” for random as #1
print #1, chr$(4) + “0” + “0” + “1” + “1” + “R” + “O” + chr$(5)
print “waiting for answer …”
cls
a$ = input$(13, #1)
b$ = mid $(a$, 5, 7)
print
print “read : “;b$
end
20 print “no answer”
resume
```

6.0 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 on the display	REMARKS
1	prog. ↵	PASS	Touch the "prog. ↵" key to get into the programming menu
2	prog. ↵	0 00000	** (confirm with"prog. ↵")
3		OUtPUt	
4	▲	InPUt	
5	▲	C.PASS	PERSONAL PASSWORD
6	prog. ↵	0 00000	Input a Password number between 0 and 9999. ** (confirm to "prog. ↵")
7		C.PASS	procedure to exit the programming mode
8	Reset Exit	"measure"	

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

7.0 SET UP

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		SP. 1	example of threshold changing
2	prog. ↵	0 00000	the display shows the first digit blinking
3	▲	1 00000	key “▲” increases the blinking digit. The first digit on the left is used to set up the numbers from 1 to 9 and the negative sign at the items which can be set up in the negative field . The negative sign is indicated at the front led “Sign” switching on
4	▶	0 0 000	key “▶”moves the blinking digit forward right
5	prog. ↵	SP. 1	The value is stored and the display moves back to the selected item.

8.0 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.