








USER'S MANUAL
MPA381M6 series
MPV371 M6 series






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1.0 IN GENERAL

The MPA model (current input) and the MPV model (voltage input) are instruments with a 16 bit analogue to digital converter; they are made in 48x96 standard body.

The MPA and MPV models have interesting features as:

- 4 ½ digit display (± 19999 digits);
- set-up of any reading value with any input value in the requested range;
- maximum or minimum peak-hold;
- programmable digital filter;
- display reset function.

The MPA and MPV instruments can be requested with the following options:

- mono-directional or bi-directional (RS232 or RS485) standard or opto-isolated serial output
- up to 4 relay alarms or up to 8 static alarm triggers with standard or opto-isolated static output for normal or window operation completely programmable for value, hysteresis and delay
- current (0÷20mA or 4÷20mA) and voltage (0÷10V) standard or opto-isolated analogue output
- regulated voltage output for transducer supply (if requested from 5 to 24V).
- reading with 10 steps

1.1 TECHNICAL CHARACTERISTICS

Table 1

Inputs	4÷20 mA input impedance 20 Ω 0÷20 mA input impedance 20 Ω 0÷2 mA input impedance 100 Ω 0÷200 mA input impedance 1 Ω 0÷2 mA input impedance 0.1 Ω 0÷5 A input impedance 0.01 Ω voltage input: input impedance 1MΩ
Outputs	exchange relay 250 Vac / 5 A static NPN / PNP 30Vdc / 50 mA
Power supply	90÷260 Vac/Vdc 6VA; 12÷30 Vac/Vdc 6VA;
Dimensions	48 x 96 x 120 mm
Piercing template	44.5 mm (height) x 92.5 mm (width)
conv/sec	30 (without filter)

1.2 DISPLAY SIGNALS









Table 2

r.001.0	instrument software release
-OFL-	over-range signal
-UFL-	under-range signal
ErP1	FSL=ISL (same values of the reading)
ErP2	FSI=ISI (same values of the input)
ErP3	FSO=ISO (same values of the output)
ErP4	FS=IS (same values of the anal. output)
ErP5	FS<IS (wrong parameters for anal. Out.)
ErP6	ISI > FSI (wrong parameters of the input)
Err 1	serial output transmission buffer full (switch off and on the instrument to reset the error)
Err 3	serial output receiver buffer full (switch off and on the instrument to reset the error)
Err 4	fatal error: call assistance

1.3 WIRING DESCRIPTION



KEYBOARD DESCRIPTION

-  : alarm set-up
-  : allows readout zeroing, or, when in menu program, fast exit.
-  : increments blinking digit in menu or decimal point set-up
-  : shifts blinking digit in menu or prints readout
-  : readout zero set-up
-  : readout full scale set-up or enter in menu (enter)
-  +  : enter to the menu

LEDS DESCRIPTION

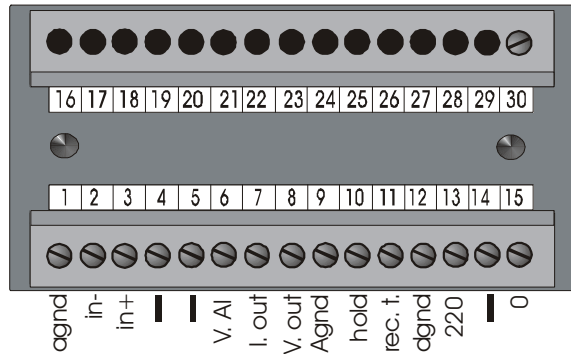
AL1: alarm 1

AL2: alarm 2

IN1: readout zeroing on

IN2: hold on

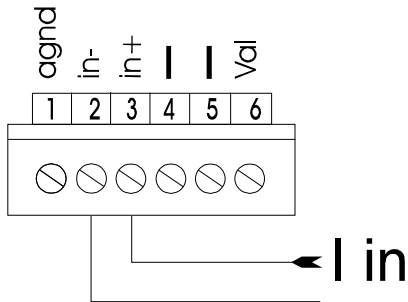
TERMINAL BOARD DESCRIPTION



- Terminal 1 - analogue reference
- Terminals 2 and 3 - signal input
- Terminal 6 - power supply for transducer (V5÷V24 option)
- Terminals 7,8 and 9 - analogue outputs (if requested)
- Terminal 10 - Hold : short-circuiting terminals 10/12 stores observed value
- Terminal 11 - Display reset.
Terminals 11/12 open: the reading are the same as the programming values.
Terminals 11/12 closed: at the moment the terminals are short-circuited the display becomes zeroed (display reset)
- Terminals 13,15 -instrument power supply

1.4 CONNECTION DIAGRAMS MPA-MPV/M6 SERIES

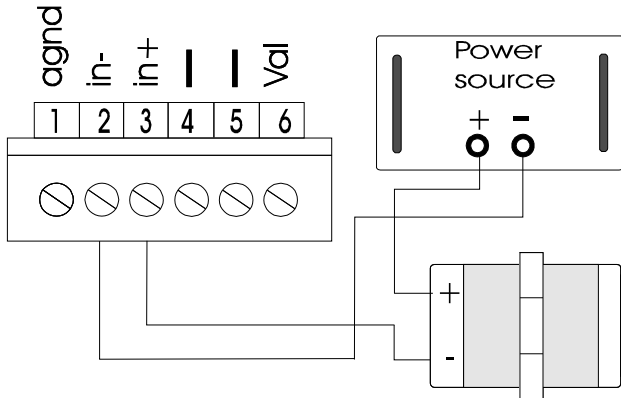
1) Current input connection



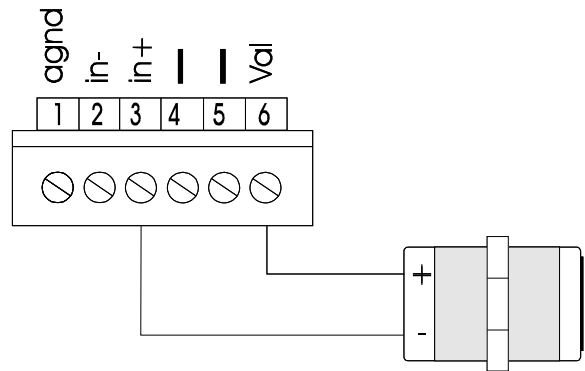
For instruments with ammeter transformer input, connect the ammeter transformer output to terminals 2 and 3.

For instruments with voltage input, connect the signal to terminals 2 (-) and 3 (+)

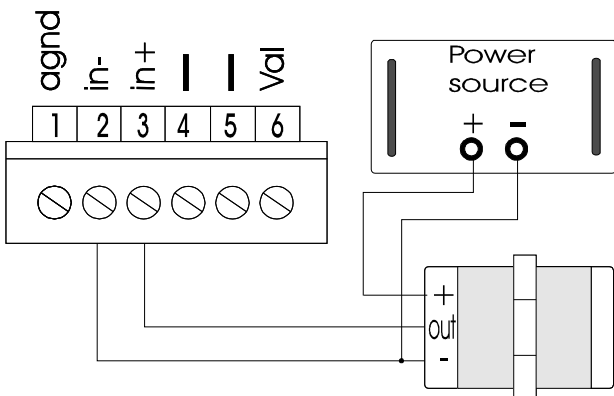
2) 2 wire transducer with external power source



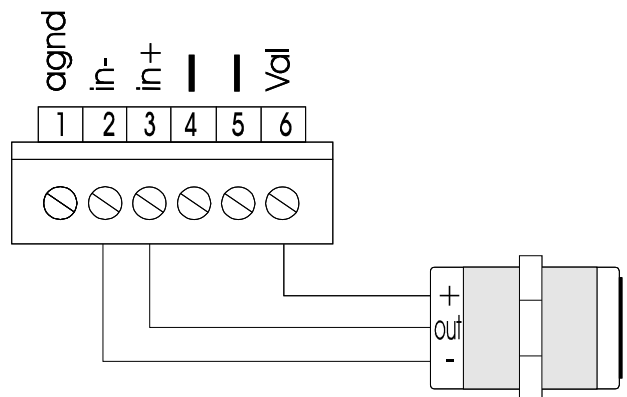
3) 2 wire connection for transducer



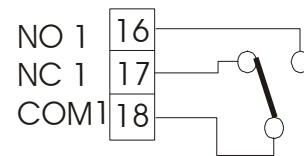
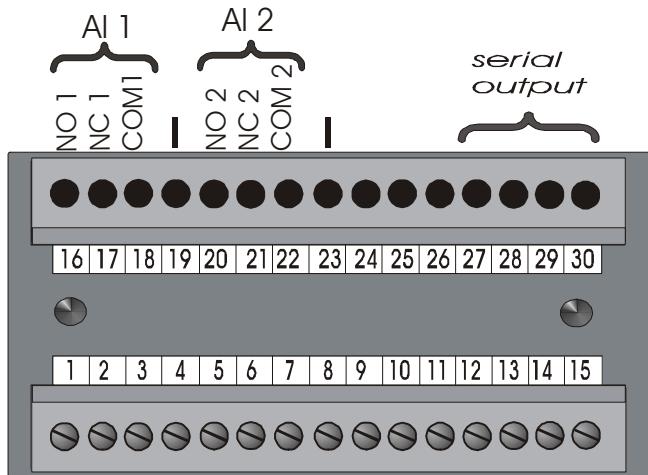
4) Connection 3 wire transducer with external power source



5) Connection for 3 wire transducer

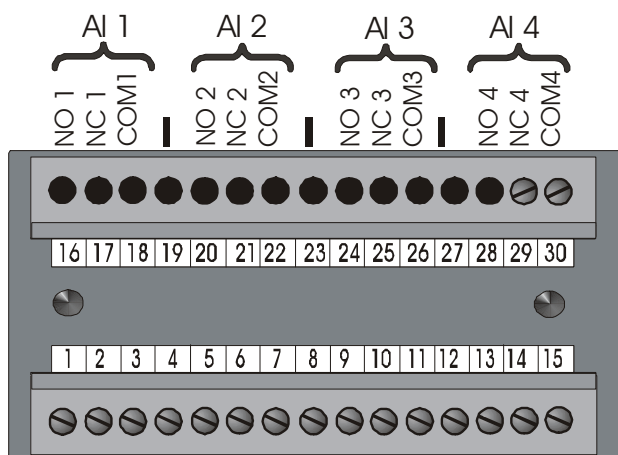


1.5 CONNECTION DIAGRAM 2 RELAY + SERIAL OUTPUT

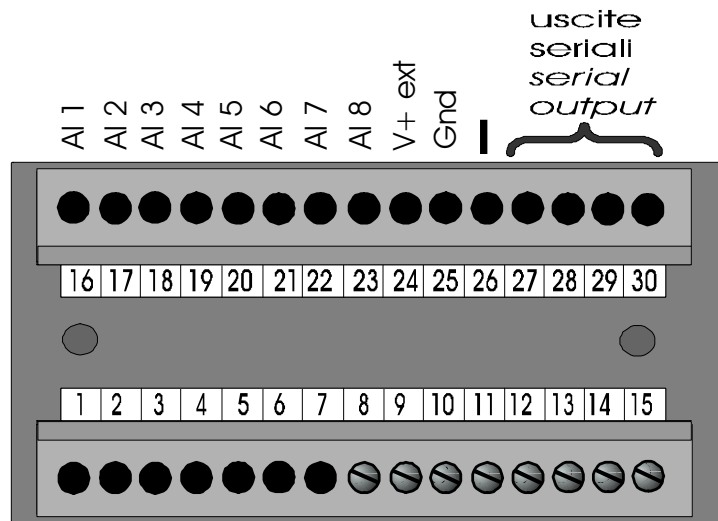


EXCHANGE RELAY:
250 Vac/5A max.

1.6 CONNECTION DIAGRAM - 4 RELAY

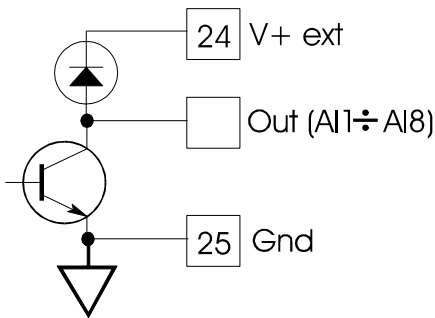


1.7 CONNECTIONS FOR 8 STANDARD OR OPTO-ISOLATED STATIC ALARMS

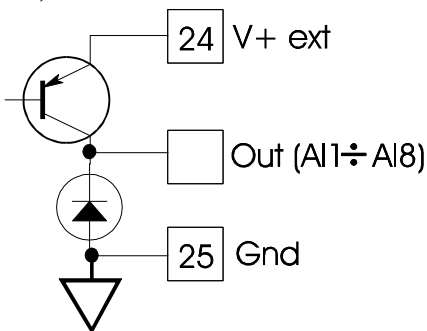


Static output can be requested as follows (with order code):












- 1) STN/STNO: Standard or opto-isolated static NPN output open collector



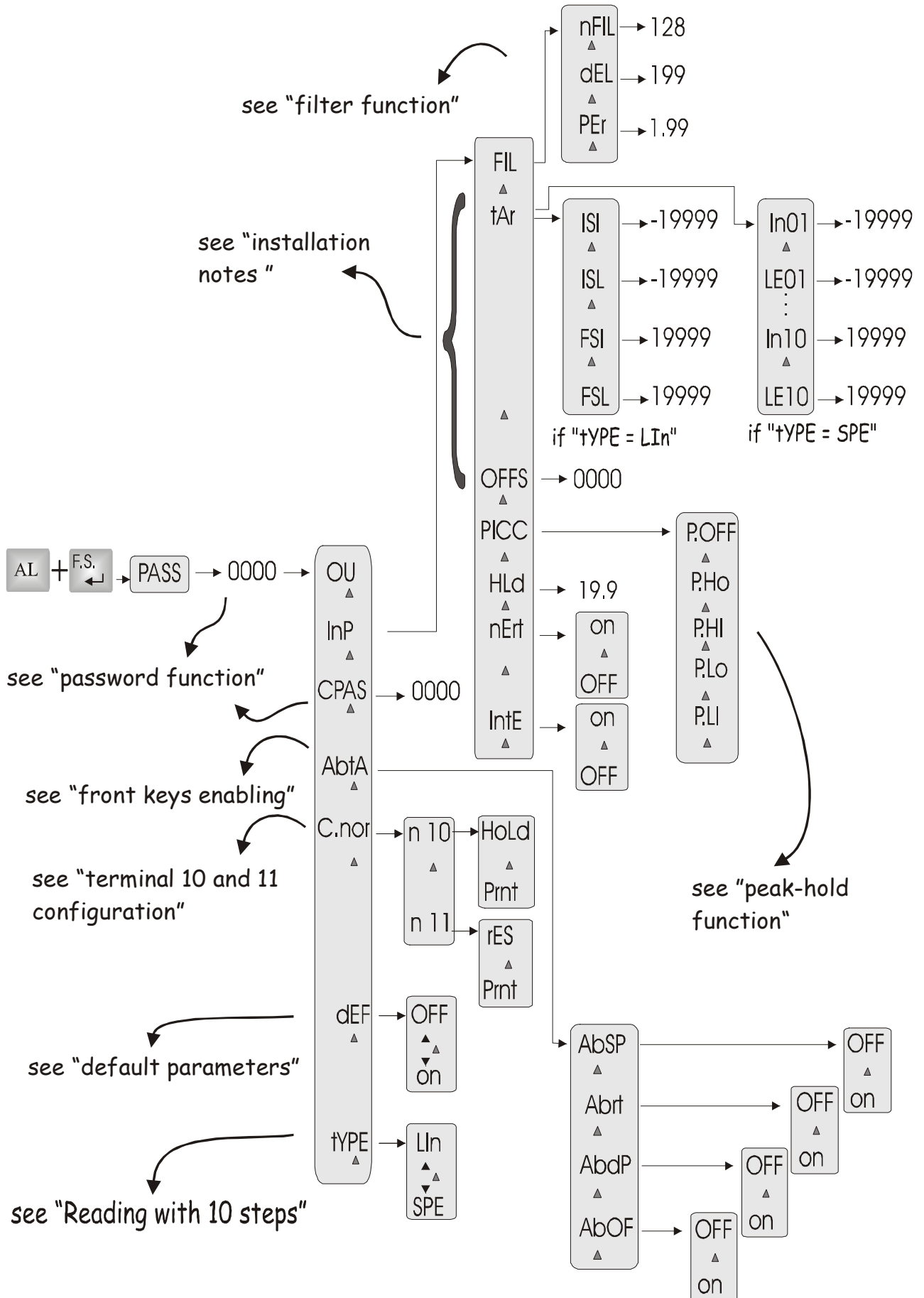
- 2) STP/STPO: Standard or opto-isolated static PNP output open collector



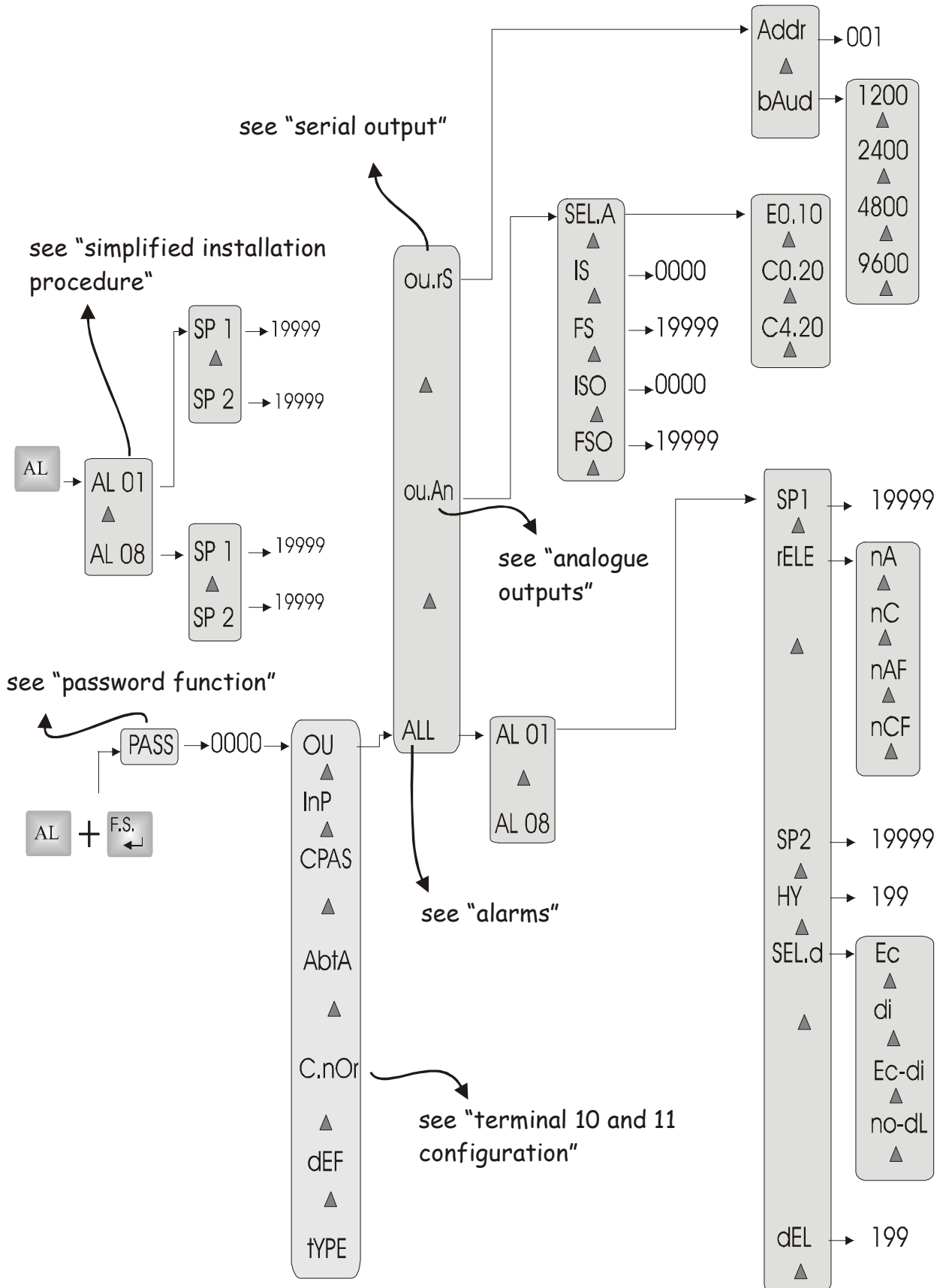
1.8 PROGRAMMING TIPS

- Press  +  keys to enter menu.
- To reach a menu item, use the  and the  key as shown in the menu flow for base instrument and base + option instrument.
- To change a digit, use the  key to increment the blinking digit and the  key to shift the blinking digit and confirm by  key.
- To select an item use the  key and confirm by the  key.
- To go to an upper level, use the  key.
- To exit menu, use the  key: the modified parameters are stored.

1.9 BASE INSTRUMENT MENU FLOW



1.10 OPTIONS INSTRUMENT MENU FLOW







2.0 INSTALLATION NOTES

2.1 SIMPLIFIED INSTALLATION PROCEDURE

- 1- Connect the instrument as follows:
 - pag 6 – base instrument wiring diagram
 - pag 7 – input signal wiring diagram
 - pag 8 – alarm wiring diagram (if requested).
- 2- Power up the instrument
- 3- Front panel keys allow the following set up:

- With  key it is possible to set up the readout at the beginning of the input scale

- With  key it is possible to set up the readout at the end of the input scale

To set up the zero and full scale values use the relevant keys, then use the



key to increment the blinking digit and the




key to shift the


blinking digit. When the value is correct confirm by the



key .

- With the  key is possible to change the decimal point position.

To set up the decimal point position, press the relevant key (it appears

“000000”) and use the  key to shift the decimal point in the desired

position. When the decimal point is correct, confirm by the



key.

- With the  key it is possible to set up the alarm values

To set up the alarm values use the following table. For further information about the alarm functions, see “Alarm” paragraph.

Table 3

Seq n°	Press key	appears on display	NOTES
1	AL	AL 1	Press the “AL” key to reach the alarm Set-Point ite
2	FS ↵	SP 1	First set-point of the alarm 1
3	FS ↵	0 0000	Input the value of alarm 1 ** (confirm with “FS ↵”)
4		SP 1	
5	▲	SP 2	Second set-point of alarm1, if request window alarms

Seq n°	Press key	appears on display	NOTES
6	▶	AL 1	
7	▲	AL 2	Alarm 2
8	FS ↵	SP 1	First set-point of the alarm 2
9	FS ↵	0 0000	Input the value of alarm 2 ** (confirm with “FS ↵”)
10		SP 1	
11	▲	SP 2	Second set-point of alarm 2, if request window alarms
12	Exit Reset	Read out	

** to modify the value see the procedure illustrated in the paragraph “SET-UPS” .

- To lock the front keys or to use other configuration, see the “Front key enabling” paragraph
- The instrument is ready to be used
- To use the instrument with the “display reset” function, see "display clear function" paragraph
- Other functions can be programmed following the paragraph "Complete installation procedure "

2.2 COMPLETE INSTALLATION PROCEDURE

Follow this procedure to completely set up the instrument.

1. Look at the following table to change the input and peak hold values
2. To set the alarm set-point parameters see “ALARMS” paragraph (for window alarms, delay and hysteresis)
3. For analogue output set up see “ANALOGUE OUTPUTS” paragraph
4. For serial output set up see “SERIAL OUTPUTS” paragraph
5. Insert, if desired, the access code to the programming menu (see Password function)
6. The instrument is ready to be used
7. To use the instrument with the “display reset” function see "display clear function" paragraph.
8. for reading with 10 steps see paragraph “reading with 10 steps linearization”

Table 4

seq. n°	Press key	appears on display	NOTE
1	FS ↵ + AL	PASS	Press the “FS ↵” + “AL” keys
2	FS ↵	0 0000	Input the personal Password ** (confirm with “FS ↵”)

seq. n°	Press key	appears on display	NOTE
3		Ou	
4	▲	InP	
5	FS ↵	FIL	FILTER PROGRAMMING
6	▲	tAr	
7	▲	ISI	BEGINNING OF INPUT SCALE
8	FS ↵	0 4000	normally 4 mA for 4÷20mA scale normally 0 for other scales **(confirm with "FS ↵")
9		ISI	
10	▲	ISL	BEGINNING OF READING SCALE ("ZERO" key)
11	FS ↵	00000	Write the value you want to visualize with ISI. The same value is available with the "ZERO" front key **(confirm with "FS ↵")
12		ISL	
13	▲	FSI	END OF INPUT SCALE
14	FS ↵	19.999	Write the requested input end of scale: 19.999 for 20 mA. **(confirm with "FS ↵")
15		FSI	
16	▲	FSL	END OF READING SCALE ("FS ↵" key)
17	FS ↵	19999	write the value to be seen with FSI. The same value is available with the "FS ↵" front key **(confirm with "FS ↵")
18		FSL	
19	▶	tAr	
20	▲	OFFS	OFFSET SUBTRACTED FROM READ OUT
21	FS ↵	00.000	Normally = 0 . **(confirm to "FS ↵")
22		OFFS	
23	▲	PICC	PEAK SET-UP
24	FS ↵	P.OFF	Select the requested Peak function P.OFF = Peak excluded P.h.O. = Maximum peak with programmable reset time P.h.I. = Maximum infinite peak P.L.O. = Minimum peak with programmable reset time P.L.I. = Minimum infinite peak Press ▲ key until you will see the req. item (confirm with " FS ↵")

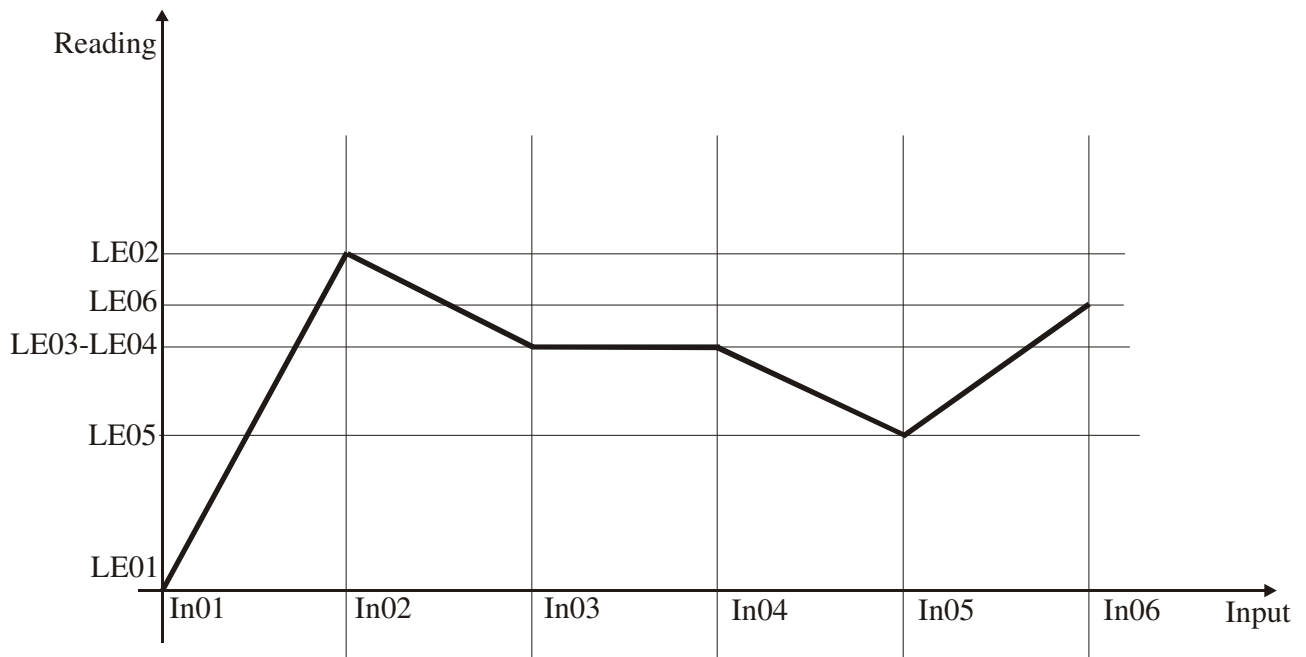
seq. n°	Press key	appears on display	NOTE
25		PICC	
26	▲	.HLd	TIME OF PEAK RETENTION
27	FS ↵	19.9	write retention time (0 ÷ 19.9 s) if PhO or PLO selected ** (confirm with "FS ↵")
28		.HLd	
29	▲	nErt	MEMORIZING DISPLAY CLEAR FUNCTION
30	FS ↵	On	On = memorize the display clear function at the switching off OFF = the instrument loses the display clear function value at the switching off Press "▲" key until you will see the req. item ** (confirm with "FS ↵")
31		nErt	
32	▲	IntE	Power on test display exclusion
33	FS ↵	On	On = when you switch on the instrument, it visualizes a test display and the software release OFF = at the switching on the instrument visualizes the measure Press "▲" key until you will see the req. item (confirm with "FS ↵")
34		IntE	
35	Exit Reset	Read out	Procedure to exit from programming area.

****** to modify the value set-up see the procedure illustrated in the paragraph "SET-UPS".

2.3 READING WITH 10 STEPS LINEARIZATION

The instrument can be programmed to visualize the reading up to 10 steps. In the picture below a graphic is shown as an example to demonstrate a visualization of 5 steps with the following set ups:

$$\begin{aligned}
 0\text{mA(In01)} &\equiv 0(\text{LE01}) \\
 4\text{mA(In02)} &\equiv 15000(\text{LE02}) \\
 8\text{mA(In03)} &\equiv 11000(\text{LE03}) \\
 12\text{mA(In04)} &\equiv 11000(\text{LE04}) \\
 16\text{mA(In05)} &\equiv 7000(\text{LE05}) \\
 20\text{mA(In06)} &\equiv 13000(\text{LE06})
 \end{aligned}$$



To realize a programming with steps is necessary to set the “tYPE = SPE” menu item, as shown in the following table. If you have to set a new step program in the instrument, it is better to zeroing the memory (see the paragraph “Default parameters”).

Table 5

n seq.	Press key	appears on display	NOTE
1	FS ↓ + AL	PASS	Press the “FS ↓” + “AL” keys
2	FS ↓	0 0000	Input the personal Password ** (confirm with “FS ↓”)
3		Ou	
4	▲	InP	
5	▲	C.PAS	
6	▲	AbtA	
7	▲	dEF	DEFAULT PARAMETERS
8	▲	tYPE	
9	FS ↓	LIn	Press the key "▲" until when the written “SPE” will appear on the display (confirm with “FS ↓”) LIn : linear reading to set with the ISI, ISL, FSI and FSL items. SPE : reading with steps.
10		tYPE	
11	Exit		Procedure to exit from programming area.

n seq.	Press key	appears on display	NOTE
	Reset		

After to have set “tyPE” = “SPE” item, program the desired set ups of steps which you want to make using the indication of the following table (the step menu item that you won’t use must not be programmed).

Table 6

N° seq.	Press key	appears on display	NOTE
1	FS ↵ + AL	PASS	Press the “FS ↵” + “AL” keys
2	FS ↵	0 0000	Input the personal Password ** (confirm with “FS ↵”)
3		Ou	
4	▲	InP	
5	FS ↵	FIL	FILTER PROGRAMMING
6	▲	tAr	INSTRUMENT SET UP
7	FS ↵	In01	FIRST INPUT POINT
8	FS ↵	04.000	Digit the number which is referred to first point of the step (use the unit measuring of the instrument) ** (confirm with “FS ↵”)
9		In01	
10	▲	LE01	FIRST READING POINT
11	FS ↵	00000	Write the value which you want to visualize in relation with the In01 point. ** (confirm with “FS ↵”)
12		LE01	
13	▲	In02	SECOND INPUT POINT
14	FS ↵	19.999	Digit the number which is referred to second point of the step (use the unit measuring of the instrument) ** (confirm with “FS ↵”)
15		In02	
16	▲	LE02	SECOND READING POINT
17	FS ↵	19999	write the value which you want to visualize in relation with the In02 point. ** (confirm with “FS ↵”)
18		LE02	continue until the end of the steps

2.4 "DISPLAY" CLEAR FUNCTION

“Display clear” means a control that, when functioning, shuts down the display. This shut down is not taken into consideration when the instrument is switched on

again or exiting from the programming menu. The function “Display clear” works short-circuiting terminals 11 and 12 or pressing the “Exit\Reset” front key, if it is enabled by the menu. When you start using this function, a zeroing of the visualization is executed and the “In1” led on the front get switched on.

The “Display clear” function is used when you have to make many visualization zeroing. The zeroing by this function can be memorized at the switching off of the instrument if the “nErt” menu item is enabled, (see Table 4).

To delete the executed zeroing with the “Display clear” function is necessary to press at the same time the two central keys which indicates the arrows. If the application doesn’t need many zeroing, it is possible to use the “OFFS” menu item to memorize in the permanent memory the data to zero.

If the instrument is requested with serial outputs, the “display clear” terminal can be configured as transmission of the read-out, (see “Serial output” paragraph).

Practical example.

The instrument is linked with a transducer and it visualizes “100.0” PSI. Linking terminals 11 and 12 we zero the visualization, so the indication will be negative for the values under “100.0” and positive for the values over “100.0” PSI.

2.5 DEFAULT PARAMETERS (dEF)

Some wrong values in menu programming function can cause the “ERR” display to appear. To reset to factory default parameters you can use the DEF function (see table 5). BE CAREFUL: all previous programmed values will be lost.

Table 7

seq. n.	Press key	appears on display	NOTES
1	FS ↓ + AL	PASS	Press the “FS ↓” + “AL” keys
2	FS ↓	0 0000	Input the personal number password ** (confirm with “FS ↓”)
3		Ou	
4	▲	InP	
5	▲	C.PAS	
6	▲	AbtA	
7	▲	dEF	DEFAULT PARAMETERS
8	FS ↓	On	Press the " ▲ " key until appears the “On” item ** (confirm with “FS ↓”) The instrument exits from the menu.

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

2.6 FRONT KEYS ENABLING

The front keys can be disabled in the programming menu. To realize these disable functions follow the table 6.

Table 8

seq. n	Press key	Appears on display	NOTES
1	FS ↓ + AL	PASS	Press FS ↓ + "AL" keys
2	FS ↓	0 0000	Input the personal number password ** (confirm with "FS ↓")
3		Ou	
4	▲	InP	
5	▲	C.PAS	
6	▲	AbtA	ENABLING KEYS
7	FS ↓	AbSP	ENABLING KEY "AL" (for set point)
8	FS ↓	On	On = enabled, OFF= disabled Change the configuration with "▲" key and confirm with "FS ↓" key
9		AbSP	
10	▲	Abrt	ENABLING KEY "Reset" (display clear)
11	FS ↓	On	On = enabled, OFF= disabled Change the configuration with "▲" key and confirm with "FS ↓" key
		Abrt	
12	▲	AbdP	ENABLING KEY "dp" (decimal point)
13	FS ↓	On	On = enabled, OFF= disabled Change the configuration with "▲" key and confirm with "FS ↓" key
		AbdP	
14	▲	AbOF	ENABLING KEYS "ZERO" and "FS"
15	FS ↓	On	On = enabled, OFF= disabled Change the configuration with "▲" key and confirm with "FS ↓" key
16		AbOF	
17	Exit Reset	Read out	To exit from programming area



3.0 PEAK-HOLD (PICC) FUNCTION

By using the “PICC” function it is possible to store the highest reading (P.h.) or the lowest (P.L.) leaving them continuously on the display (P.h.I. - P.L.I.) or for just a programmable time limit from 0 ÷ 19.9 Sec. using the “HLd” function (P.h.O. - P.L.O.). Peak Hold function is displayed from the blinking flash led on the front panel of the instrument.

If the instrument is requested with the serial output and the hold terminal is configured as transmission of the read out, the “Peak-hold” function cannot be used (see “Serial output” paragraph).

The following two examples describe the main operating methodology of the “PICC” function, while for the complete programming please refer to Table 4.

- **EXAMPLE 1**

Program in the function "PICC" the "P.h.0." item and in the "HLd" function the time "10.0" s.

The instrument thus programmed will follow the input signal only on the variations that increase the reading value, while, for decreasing readings, the instrument maintains the fixed display for 10 seconds, thereafter the correct value will appear. Obviously, if during the 10 second period the instrument shows an increase in the reading value, the display becomes updated and the time is reset. (See fig A).

- **EXAMPLE 2**

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

The instrument behaves in the same way as the previous one with the difference that the time is not programmable but fixed up to an infinite value.

Also in this case the zeroing of the peak memory can be done by short-circuiting terminals 11 and 12. In the same way can be done the exclusion of this function.

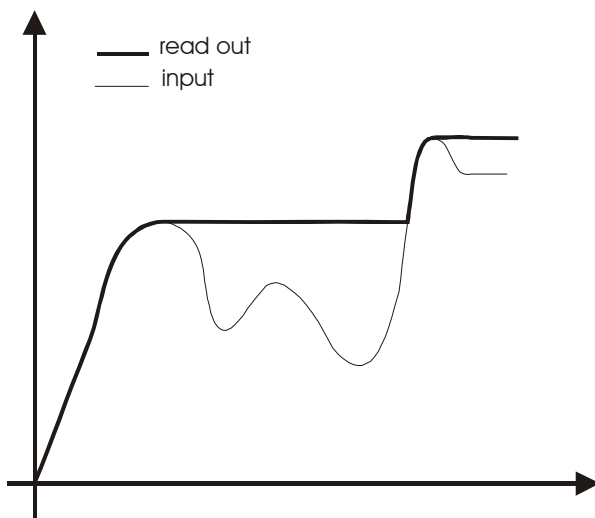


Fig A



4.0 “FILTER” FUNCTION

The MPA-MPV/M6 series instruments provide the following filtering mode:

1. **n.FIL** : number of averages of the converted value (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 delta (dEL) is computed, all numbers converted within this window are averaged out, whereas those exceeding the window immediately update the display after the PER time .
3. **PEr** : time in seconds by which the last averaged value is shown.

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

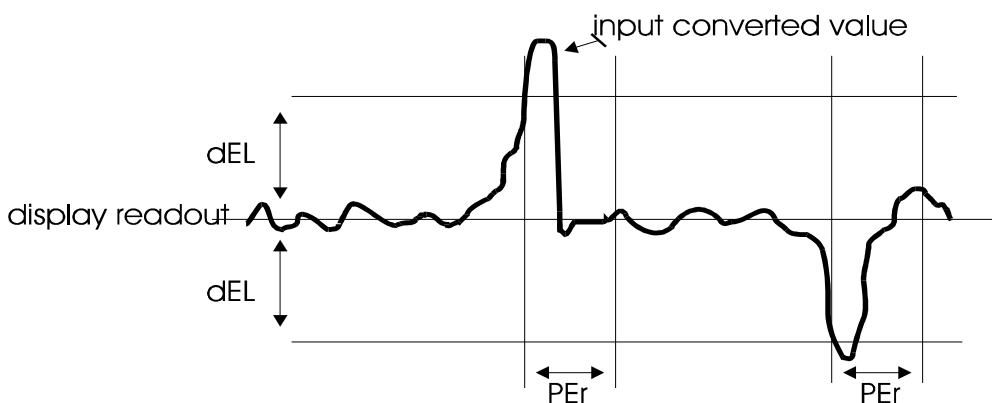


Fig. B

To program those items see the following table.

Table 9

n seq.	Press key	appears on display	NOTE
1	FS ↓ + AL	PASS	Press the “FS ↓” + “AL” keys
2	FS ↓	0 0000	Input the personal Password number if already programmed: see “password Function” ** (confirm with “FS ↓”)
3		Ou	
4	▲	InP	
5	FS ↓	FIL	FILTER PROGRAMMING
6	FS ↓	n.FIL	NUMBER OF AVERAGES
7	FS ↓	128	Press key “▲ “ until the display shows the number

n seq.	Press key	appears on display	NOTE
			of averages required (0= no filter) Press “FS ↵” to confirm.
8		n.FIL	
9	▲	DEL	DELTA FILTER
10	FS ↵	65000	Set the number of digits within the filter is activated. **(Press “FS ↵” to confirm)
11		DEL	
12	▲	Per	TIME OF READING RETENTION
13	FS ↵	1.99	write retention time (0.01÷1.99 s) ** (confirm with “FS ↵”)
14		Per	
15	Exit Reset	Read out	To exit from programming area

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



5.0 ANALOGUE OUTPUTS (option)

The MPA-MPV/M6 instrument can be ordered with a voltmeter and ammeter standard or opto-isolated analogue output point (“OAM” or “OAT” options).

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”.

5.1 TECHNICAL CHARACTERISTICS

Table 10

Analogue Output	0÷10 V - 0÷ 20 mA - 4÷20 mA
Max. impedance for current output	600 Ω
Min. impedance for voltage output	1 K Ω
Max. voltage supplied	10 V
Max. current supplied	20 mA
Resolution	16 bit

5.2 INSTALLATION OF ANALOGUE OUTPUT

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

1- Follow the connections in FIG D for the voltmeter output or the connections on FIG C for the ammeter output.

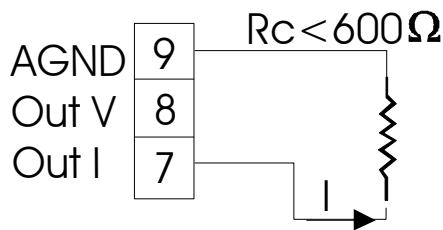


Fig C

Ammeter output

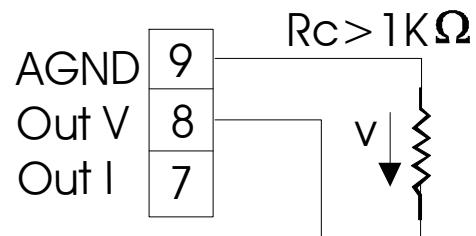


Fig D

Voltmeter output

2- Follow the programming procedure on Table 9 and then check with the examples that follow.

For programming it is necessary to take account of:

ISO (start 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 = 20.000 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	FS ↓ + AL	PASS	Press the “FS ↓” + “AL” keys
2	FS ↓	0 0000	Input the personal Password number if already programmed see “password Function” ** (confirm with “FS ↓”)
3		Ou	
4	FS ↓	ALL	
5	▲	Ou.An	PROGRAMMING ANALOGUE OUTPUTS
6	FS ↓	SEL.A	Selection output type
7	FS ↓	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 “FS ↓” key
8		SEL.A	
9	▲	IS	START OF READING SCALE
10	FS ↓	0 0000	write the reading value which coincides with ISO ** (confirm with “FS ↓”)
11		IS	
12	▲	FS	END OF READING SCALE
13	FS ↓	1 0000	write the reading value which coincides with FSO ** (confirm with “FS ↓”)
14		FS	
15	▲	ISO	START OF ANALOGUE OUTPUT SCALE
16	FS ↓	00.000	write the output value which coincides with the reading programmed in “IS”. This item has not to be programmed if SEL.A = C4.20. ** (confirm with “FS ↓”)
17		ISO	
18	▲	FSO	END OF ANALOGUE OUTPUT SCALE
19	FS ↓	10.000	write the output value which coincides with the programmed reading at “FS”. This item has not to

n seq.	Press key	appears on display	NOTE
			be programmed if SEL.A = C4.20. ** (confirm with "FS ↵")
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".

5.3 NOTES ON THE SET UP OF ANALOGUE OUTPUTS

- Programme instrument with the following calibration:

AMMETER OUTPUT: 5 mA with reading -500

AMMETER OUTPUT: +15 mA with reading 500

The instrument parameters should be programmed as follows.

PARAMETERS "OU AN":

SEL. A = C0.20

IS = -500

FS = 500

ISO = 5.000 *

FSO = 15.000 *

* with display below "-500" the analogue output is fixed to 5 mA; with display above "500" the analogue output is fixed to 15 mA.

- Programme instrument with the following calibration:

AMMETER OUTPUT: 4 mA with reading -500

AMMETER OUTPUT: 20 mA with reading 500

The instrument parameters should be programmed as follows.

PARAMETERS "OU AN."

SEL.A = C 4.20

IS = -500

FS = 500

* with display below "-500" the analogue output is fixed to 4 mA; with display above "500" the analogue output is fixed to 20mA.

- Programme instrument with the following calibration:

VOLTMETER OUTPUT: 2 V with reading -500

VOLTMETER OUTPUT: 6 V with reading 500

the instrument parameters should be programmed as follows.

PARAMETERS "OU AN.":

SEL.A = E0.10

IS = -500

FS = 500

ISO = 2.000 *

FSO = 6.000 *

* with display below “-500” the analogue output is fixed to 2V; with display above “500” the analogue output is fixed to 6V.



6.0 ALARMS (option)

The MPA - MPV /M6 can be supplied with up to 8, standard or opto-isolated, static NPN or PNP outputs or up to 4 relay alarms and each one can be programmed as follows:

- 1) Hysteresis from 1 to 200 digits.
- 2) Delay time from 0 to 200 s configurable in:
 - activation delay
 - de-activation delay
 - activation and de-activation delay
- 3) minimum or maximum function
- 4) Window signal configurable as min. or max.

Now, it follows a more detailed description of the programming of these functions.

- a) **SP1** : set up of point of alarm input up to +/- 19999 (see FIG. E). In the case of “Window” trigger “SP1” determines the first switching (see FIG. F).
- b) **SP2**: set up of the second switching point of “window” trigger .(see FIG. F).
- c) **HY**: Set up of the hysteresis centred on the set point, previously inserted, in the field from 0 ÷ +/- 200 digits.

HYSTERESIS: number of digits that sit between the insertion and de-insertion of the alarm trigger. There are two functioning methods:

- trigger for simple alarm output (see FIG. E)
- trigger for “window” alarm output (see FIG. F)

- d) **dEL**: Delay set up before the switching on the trigger. This time can be between 0 ÷200 s

The alarms 1 and 2 signal the delay action by means of the flashing led.

- e) **SEL.d**: (Delay Type) programming the delay type in the “delay” function.

- EC: the time set up comes in before activating the exit
- dI: the time set up comes in before de-activating the exit
- EC.dI: both EC and DI
- NO dL: time is switched off

- f) **RELE** : By means of the programming function “rele” it is possible to choose the trigger functioning which can be normal or “window”.

For normal functioning (SP1), inside the “rele” functioning it is necessary to programme:

- nA: on Max. (normally open)
- nC: on Min. (normally closed)

For “window” functioning two commutation points (SP1 and SP2) are needed and one must choose inside the “rele” function one of these two items:

- nAF: normally open (closed inside the programmed window)
- nCF: normally closed (open inside the programmed window)

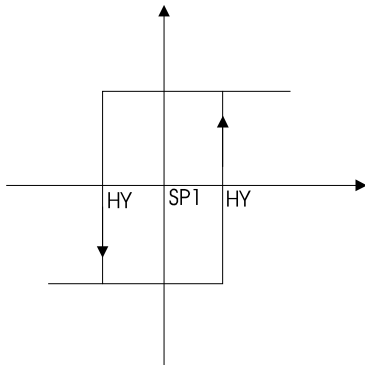


Fig E

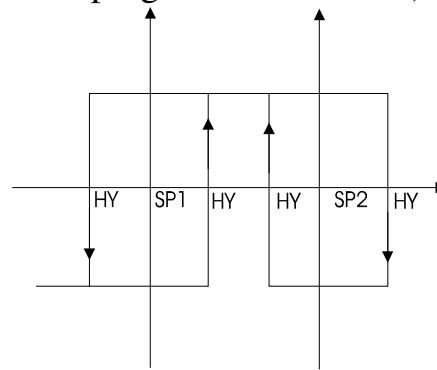


Fig F

6.1 ALARMS SET UP

Alarm values can be set in two different ways: by means of the front key “AL” or by means of standard menu (MENU). First way shows immediately set point values, the second one (MENU) drives you through all parameters of the instrument. The first time you set the instrument, use “MENU” item to set all the parameters of the instrument.

The instrument can be requested with up to 8 static alarms or up to 4 relay alarms. Each alarm can be programmed as minimum, maximum or window function. To set these functions it is necessary to follow next indications and table 10.

- Minimum or Maximum alarm. Select at item “RELE” the item “nA” for maximum or “nC” for minimum function. In this case point of switching is set at “SP1”
- Window alarm. Select at item “RELE” the item “nAF” for maximum or “nCF” for minimum window function. In this case the first point of switching is set at “SP1”, while the second at “SP2”.

Table 12

n seq.	Press key	appears on display	NOTE
1	FS ↓ + AL	PASS	Press the “FS ↓” + “AL” keys
2	FS ↓	0 0000	Input the personal Password no. *(confirm with “FS ↓”)
3		Ou	
4	FS ↓	ALL	
5	FS ↓	AL1	ALARM PARAMETERS 1
6	FS ↓	S.P.1	SET UP 1^ Minimum or maximum or first switching point for window alarm
7	FS ↓	0 0000	Set SP1. *(confirm with “FS ↓”).

n seq.	Press key	appears on display	NOTE
8		S.P.1	
9	▲	rELE	SET UP CONTACT AL.1
10	FS ↵	n.A.	Select type of output n.A. = maximum alarm n.C. = minimum alarm n.A.F.= trigger norm. open window n.C.F.= trigger norm. closed window Choose the requested item with “▲” key and confirm with “FS ↵”
11		rELE	
12	▲	S.P.2	SET UP 2^ ONLY FOR “WINDOW” FUNCTION
13	FS ↵	0 0000	** (confirm with “FS ↵”)
14		S.P.2	
15	▲	HY	HYSTERESIS SET UP AL1
16	FS ↵	00 199	(0÷200 digit) ** (confirm with “FS ↵”)
17		HY	
18	▲	SEL.d	TYPE OF DELAY SET-UP AL1
19	FS ↵	Ec	Select type of functioning Ec = activation delay dI = deactivation delay Ec-dI = activation + deactivation delay nO dL = excluded delay Choose the requested item with “▲” key and confirm with “FS ↵”
20		SEL.d	
21	▲	dEL	DELAY SET UP AL 1
22	FS ↵	00 199	Set a number between 0÷199 s ** (confirm with “FS ↵”)
23		dEL	
24	▶	AL1	
25	▲	AL2	ALARM 2 PARAMETERS
26	FS ↵	S.P.1	For alarm 2 and subsequent ones follow the same procedure as alarm 1
27	Exit Reset	Read out	Procedure for exiting programming area

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

After the alarm parameters has been programmed, it is possible to change rapidly the set point values by means of simplified menu (see SIMPLIFIED INSTALLATION PROCEDURE paragraph).



7.0 SERIAL OUTPUT (option)

"MPA-MPV/M6" series models with 48 x 96 housing can communicate with an host computer along a standard or optoisolate RS232, RS422, RS485 serial line.

Unidirectional serial output

"MPA-MPV/M6" series instrument with unidirectional standard or optoisolated RS232 output (1 or 11 code) send out the readout value when the " ▶/Print" key is pressed. Serial output features are listed in the table below, and the wiring diagram is shown in fig 8. The output format is as follows:

30	31	34	37	32	OD	OA
----	----	----	----	----	----	----

ten thousands thousands hundreds tens unity LF CR

7.1 TERMINALS 10 AND 11 CONFIGURATION

Terminals 10 and 11 are normally used for the “hold” and the “display clear” functions, but it is possible to show one of the two terminals (or both) for the transmission of the read out by the menu item “CnOr” if the instrument has a serial output. See the following table:

Table 13

seq. n.	Press key	appears on display	NOTES
1	FS ↵ + AL	PASS	Press the “FS ↵” + “AL” keys
2	FS ↵	0 0000	Input the personal password number ** (confirm with “FS ↵”)
3		Ou	
4	▲	InP	
5	▲	C.PAS.	
6	▲	AbtA	ENABLING KEYS
7	▲	CnOr	TERMINAL CONFIGURATION
8	FS ↵	n 10	TERMINAL 10 CONFIGURATION
9	FS ↵	HOLd	HOLd = the terminal works as hold Prnt = the terminal is enabled for the transmission of the read out Select with the “▲” key the requested item and confirm with “FS ↵”
10		n 10	
11	▲	n 11	TERMINAL 11 CONFIGURATION
12	FS ↵	rES	rES = the terminal works as display clear Prnt = the terminal is enabled for the transmission of the read out Select with the “▲” key the requested item and confirm with “FS ↵”
13		n 11	
14	Exit Reset	Read out	Procedure to exit to programming environment

Bi-directional serial output

It is possible to programme 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 14

SERIAL CHARACTERISTICS	
baud rate	9600 4800 2400 1200 (programmable)
start bit	1 bit
Length	8 bit
Stop	1 bit
Parity	no

To use the instruments “MPA-MPV M6” models with RS485 or RS422 serial output, you must follow figure “G”, for RS232 serial output follow figure “H”. Programme the instrument with the address code 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 programme the address code and the baud rate (functions programmable only by keyboard) follow the next table.

Table 15

seq. n.	Press key	appears on display	NOTES
1	FS ↓ + AL	PASS	Press the “FS ↓” + “AL” keys
2	FS ↓	0 0000	Input the personal password number ** (confirm with “FS ↓”)
3		Ou	
4	FS ↓	ALL	
5	▲	Ou An.	
6	▲	Ou rS	
7	FS ↓	bAUd	BAUD RATE
8	FS ↓	9600	Press the " ▲ " key until appears the baud-rate ** (confirm with “FS ↓”)
9		bAUd	
10	▲	Addr	INSTRUMENT ADDRESS
11	FS ↓	001	Input the instrument address with a number between 001 and 099. ** (confirm with “FS ↓”)
12		Addr	
13	Exit Reset	Read out	Procedure to exit to programming environment

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

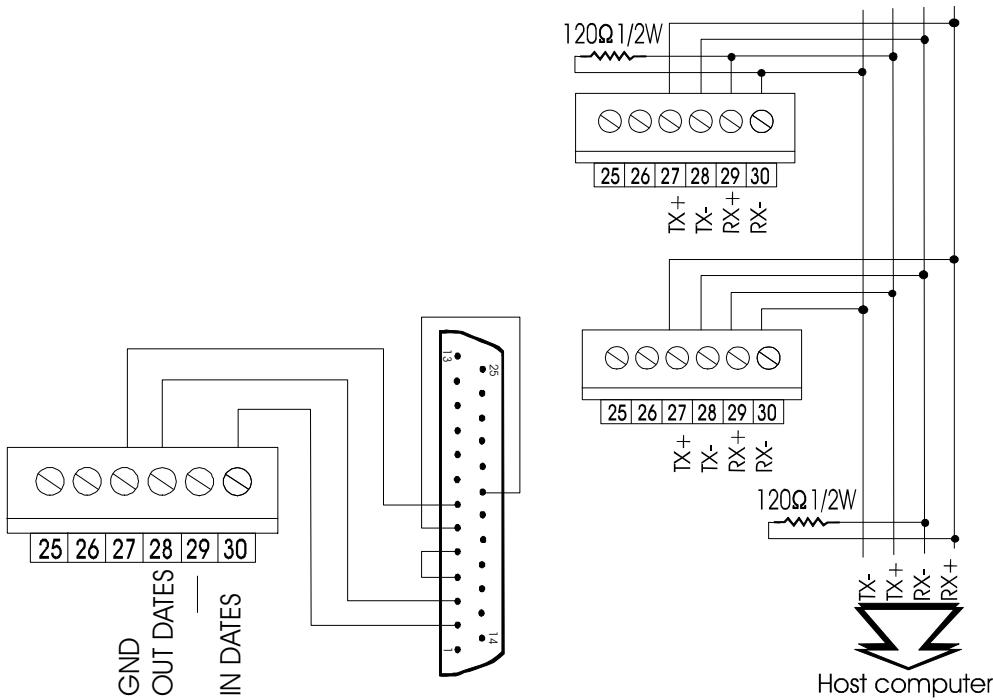


Figure H.(RS232)

Figure G (RS485)

7.2 DATA READING FROM HOST TO INSTRUMENT MPA-MPV M6

Transmission string set-up.

EOT GID GID UID UID C1 C2 ENQ

EOT = EOT from host indicates start of transmission string

GID = decimal instrument address to transmit twice consecutively in ASCII code.

UID = units instrument address to transmit twice consecutively in ASCII code.

C1 C2 = mnemonic ASCII code for command to follow (see paragraph “command codes”).

EXAMPLE: data transmission string from host to MPA-MPV/M6 with address "01" for data request "Reading scale end" (FL).

EOT 0 0 1 1 F L ENQ
 04 30 30 31 31 46 4C 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 MPA-MPV/M6 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.

7.3 DATA TRANSMISSION FROM MPA-MPV M6 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 sign, 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 MPA-MPV/M6 to host in response to preceding example.

STX F L blank blank blank blank 0 1 0 0 ETX BCC
 02 46 4C 20 20 20 20 30 31 30 30 03 08 cod. ascii

The MPA-MPV/M6 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 MPA-MPV/M6 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.

7.4 DATA WRITING FROM HOST TO MPA-MPV M6

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 = decimal instrument address to transmit twice consecutively in ASCII code.

UID = units instrument address to transmit twice consecutively in ASCII code.

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 MPA-MPV/M6 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 MPA MPV/M6 with "01" address.

EOT 0 0 1 1 STX F L blank blank blank blank 0 1 0 0 ETX

BCC

04 30 30 31 31 02 46 4C 20 20 20 20 30 31 30 30 03 08

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 this 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.

7.5 COMMAND CODES

The codes of the variables used for the MPA-MPV/M6 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 16

COMMAND CODES	COMMAND DESCRIPTION	POSSIBLE OPERATION	DATE CODE
II	ISI	read/write	ASCII \pm 19999
IL	ISL	read/write	ASCII \pm 19999
FI	FSI	read/write	ASCII \pm 19999
FL	FSL	read/write	ASCII \pm 19999
OF	OFFS (vis.)	read/write	ASCII \pm 19999
PT	P.dEC (decimal point)	read/write	hexadecimal 0 = no point 1 = 1999.9 2 = 199.99 3 = 19.999 4 = 1.9999
PM	PICC (peak hold)	read/write	hexadecimal 0 = P.OFF 1 = P.ho 2 = P.hi 3 = P.Lo 4 = P.Li
TI	.HLd	read/write	ASCII 0÷19.9
NM	nFIL (filtering number)	read/write	hexadecimal 0 = no filter 1 = 2 2 = 4 3 = 8 4 = 16 5 = 32 6 = 64 7 = 128
SA	dEL (width filter)	read/write	ASCII 0÷199

COMMAND CODES	COMMAND DESCRIPTION	POSSIBLE OPERATION	DATE CODE
PE	Per (filter permanence)	read/write	ASCII 0÷1.99
AT	SEL.A (analogue output selection)	read/write	hexadecimal 0 = E0.10 1 = C0.20 2 = C4.20
IU	IS (out an)	read/write	ASCII ± 19999
FU	FS (out an)	read/write	ASCII ± 19999
IO	ISO (out an)	read/write	ASCII ± 19999
FO	FSO (out an)	read/write	ASCII ± 19999
RP	Peak reset	read/write	ASCII ± 19999
RT	Display clear	write only	
RO	read out (display)	read only	
AR	Generic status word	read/write	See “Generic status word” paragraph
A1..A8*	SP1 (AL1÷AL8)	read/write	ASCII ± 19999
B1..B8*	SP2 (AL1÷AL8)	read/write	ASCII ± 19999
H1..H8*	HY (AL1÷AL8)	read/write	ASCII ± 199
D1..D8*	delay(AL1÷AL8)	read/write	ASCII ± 199
W1..W8*	status word alarms	read/write	hexadecimal 0÷F(T.15)
I0..I9*	In01÷In10	lettura / scrittura	ASCII ± 19999
L0..L9*	LE01÷LE10	lettura / scrittura	ASCII ± 19999

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

7.6 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 FOR READING DECIMAL POINT POSITION

HOST:

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

INSTRUMENT MPA-MPV/M6

```
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 FOR WRITING DECIMAL POINT POSITIONHOST:

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 MPA-MPV M6

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”.

7.7 ALARM SETTING

MPA-MPV M6 series instruments can have up to 8 alarms with window, delay time and hysteresis. The relevant codes 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 between 1 and 8 indicating the alarm number.

For instance, “H3” means hysteresis for alarm 3 and so on.

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.

Table 17

CODE W1÷W8	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
T.DEL	no- dL	no- dL	no- dL	no- dL	E C	E C	EC	EC	di	di	di	di	EC- di	EC- di	EC- di	EC- di
RELAY	NC	NA	NC F	NA F	N C	N A	N CF	N AF	N C	N A	NC F	N AF	NC	NA	NC F	NA F

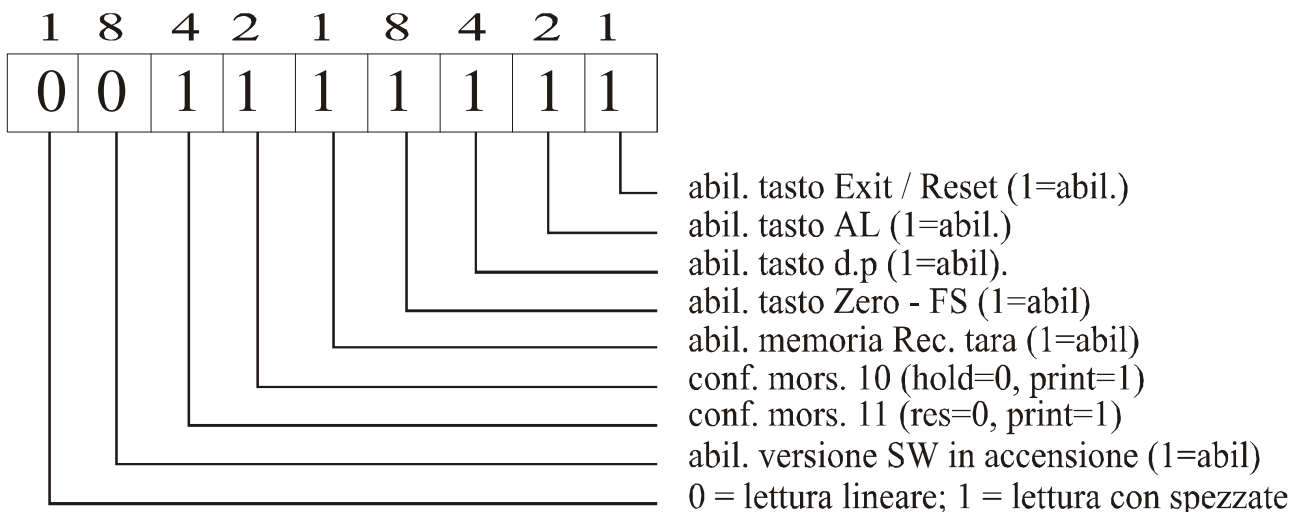
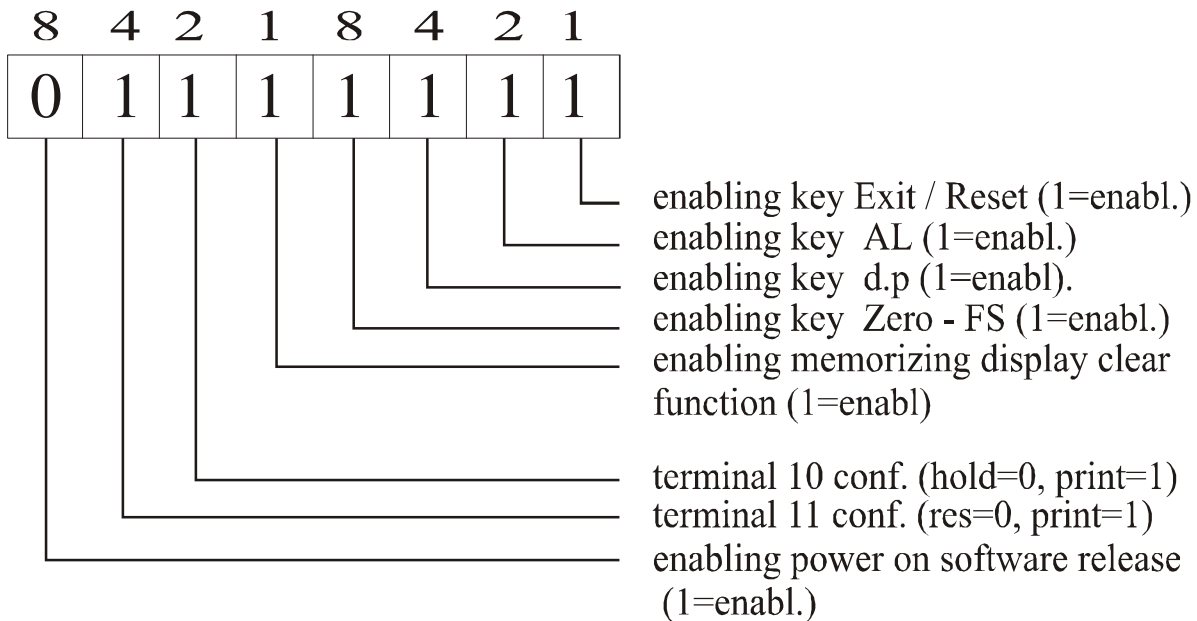
7.8 PEAK-HOLD RESET

MPA-MPV M6 have a peak-hold capability. The peak value can be reset by means of writing the serial code “RP” followed by 0 value.

The peak status of the instrument can be read by means of reading the serial code "RP": a 0 value means that the readout is in program, and a 1 value means that the display is in peak-hold.

7.9 GENERIC STATUS WORD

The status word "AR" allows to enable the front keys by serial, to show terminals 10 and 11 and to enable the display clear memorising. To make the hexadecimal data to transmit, follow the next scheme.



7.10 BASIC PROGRAM

The following basic program shows the reading of the set-point of an instrument by an host computer

```
on error goto 20
```

```
cls
```

```
open "com1: 9600, n, 8, 1" for random as #1
```

```
print #1, chr$(4) + "0" + "0" + "1" + "1" + "S" + "P" + chr$(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

```



8.0 PASSWORD FUNCTION

The user can keep the information programmed from possible misuse by using the password function.

The instrument is supplied with password number = 0, but any number between 0 and 9999 can be set up as an access key to modify the operating data (for the operating of personal password numbers see TABLE 15).

The Password is asked for each time the user gains access to the programming menu. The instrument, after receiving the password number can behave in two different ways:

- 1) **n. correct Pass.** The user can gain access to the programming menu and modify any function or number.
- 2) **n. false Pass.** The user can only see the numbers programmed but cannot modify them.

ATTENTION. The number that can be programmed at the "c.PASS", code, must be written at "n.PASS" item each time you gain access to the programming menu for the insertion of new variables.

If the user does not remember the exact "secret" number, it is necessary to call the service centre.

Table 18

N seq.	Press key	written on display	NOTE
1	FS ↵	PASS	Press the "FS ↵" key ** (confirm with "FS ↵")
2	FS ↵	0 0000	
3		Ou	
4	▲	InP	NUMBER OF PERSONAL PASSWORD
5	▲	c. PAS	
6	FS ↵	0 000	Digit the number of password between 0 and 9999 ** (confirm with "FS ↵")
7		c. PAS	Procedure to exit to programming environment
8	Exit Reset	Read out	

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



9.0 SET UPS

Instructions for changing and storing programming number

Table 19

n seq.	Key to Press	written on display	NOTE
1		SP1	modification of trigger value
2	FS ↵	0 0000	the display begins with the first blinking number
3	▶	0 0 000	the key “▶” moves the blinking number
4	▲	0 1 000	the key “▲” increases the blinking number
5	FS ↵	SP1	the number is memorised and the display returns to the chosen item



10.0 NOTES

The instrument does not have a power on switch and a fuse, but it immediately switches on when the correct voltage is applied (see the operating voltage on the instrument label). Keep the power line separate from the signals lines.

For security reasons, it is necessary to provide externally a two phases switch and a protective fuse near the instrument with easy access for the user.

Avoid the presence of others power elements, humidity, acid, heat sources, etc..

Mect srl is not responsible for damages to humans or goods for an improper use of the instrument or not conforming to the characteristics of its instrument.

In mect srl there is an help desk office.