USER'S MANUAL
MPPV010 P6 series

☎ 011/9664616

ME2080_08
10/09

INDEX

1.0 IN GENERAL

The MPPV010 model (strain gauge input) is an instrument with a 16 bit analogue to digital converter; it is made in 48x96 standard body.
The MPPV model can be requested specifying the sensibility range:

1 mV/V (0.7 ÷1.05 mV/V)
1.5 mV/V (1.0 ÷ 1.6 mV/V)
2 mV/V (1.5 ÷ 2.1 mV/V)
3 mV/V (2.0 ÷ 3.1 mV/V)
10 mV/V (9.0 ÷ 10.1 mV/V)

The MPPV010 model have interesting features as:

- 4 ½ digit display (± 30000 digits);
- calibrating with sample weight or 5°wire.
- 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.
- Batching function
- Total weight

The MPPV010 instruments can be requested with the following options:

- mono-directional or bi-directional (RS232 or RS485) serial output
- two alarms with exchange relay output (3 if 220V power supply)
- current (0÷20mA or 4÷20mA) and voltage (0÷10V) analogue output

1.1 TECHNICAL CHARACTERISTICS

Table 1

Input	strain gauge
Strain gauge power supply	5V / 30mA
Outputs	exchange relay 250 Vac / 5 A
Power supply	90÷260Vac/Vdc - 24Vac - 12÷30 Vdc ;
Dimensions	48 x 96 x 75 mm
Piercing template	44.5 mm (height) x 92.5 mm (width)
conv/sec	200 (without filter)

1.2 DISPLAY SIGNALS

Table 2

r.001.0	instrument software release
-OFL-	over-range signal
-UFL-	under-range signal
ErP3	FSO=ISO (same values for analogue output parameters)
ErP4	FS=IS (same values for analogue output parameters)
ErP5	FS<IS (wrong parameters for analogue output parameters)
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

AL : alarm set-up (it can be disabled in the menu)

Exit Reset : allows readout zeroing (it can be disabled in the menu), or, when in menu program, fast exit.

d.p. : increments blinking digit in menu or decimal point set-up (it can be disabled in the menu)

Print : shifts blinking digit in menu or prints readout

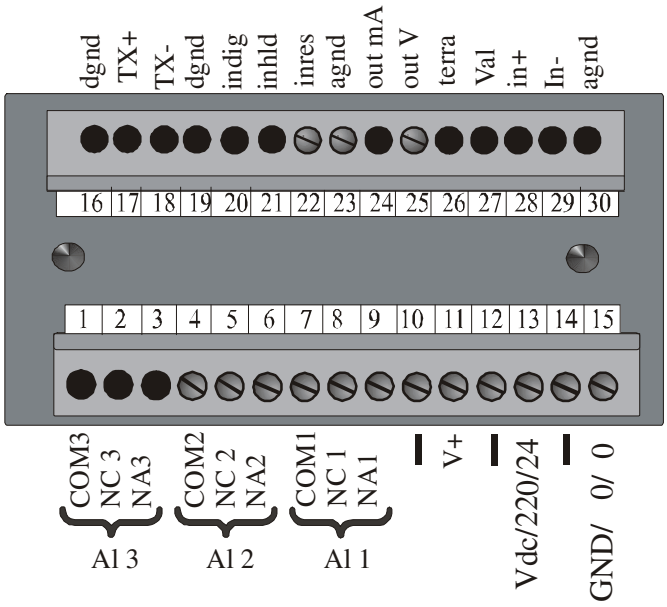
Σ : SUM (it can be disabled in the menu)

Prog. ↵ : enter in menu (enter)

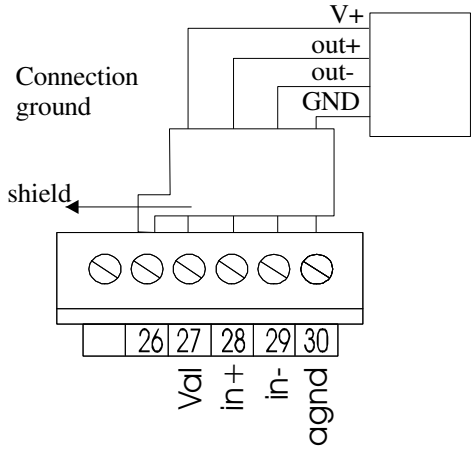
LEDS DESCRIPTION

AL1: alarm 1; **AL2**: alarm 2; **Sign:** readout zeroing on; **IN:** hold on

1.4 TERMINAL BOARD DESCRIPTION



Terminals 1-3 : alarm output 3 (only 220V power supply)
Terminals 4-6 : alarm output 2
Terminals 7-9 : alarm output 1 (batching function)
Terminals 13-15 : instrument power supply (Vcc, Vpt, 24Vac, 90÷260Vac)
With DC power supply, terminal 13 is positive and terminal 15 is negative.
Terminals 16-18: serial output (see paragraph)
Terminals 19-20: batching start / stop.
Terminals 19-21: hold
Terminals 19-22: Recovery tara
Terminals 23-25: analog output (see paragraph)
Terminals 26-30: strain gauge input



1.5 PROGRAMMING TIPS

- Press 

key to enter menu.
- To reach a menu item, use the 

and the 

keys 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 

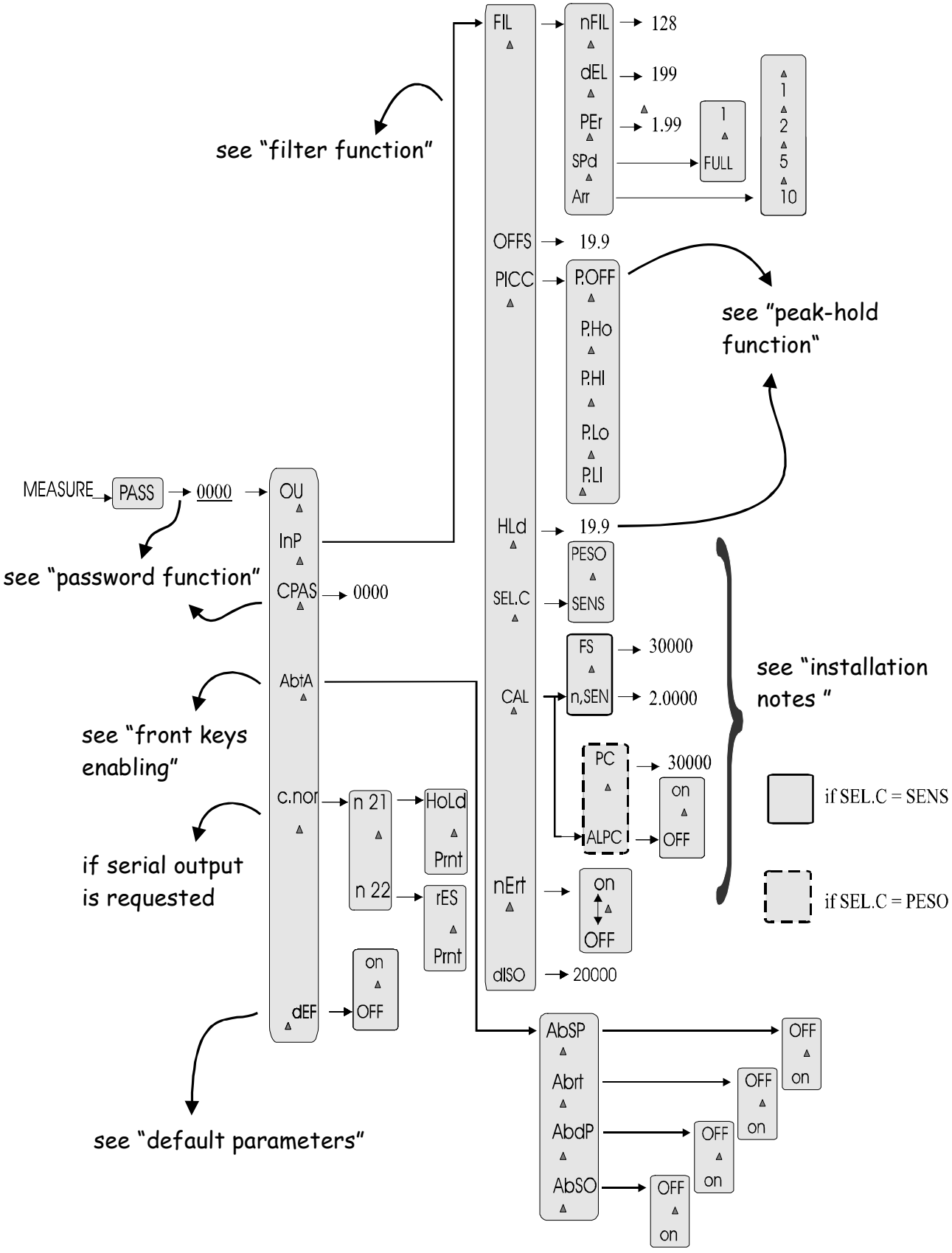
key and confirm by the 

key.
- To go to an upper level, use the 

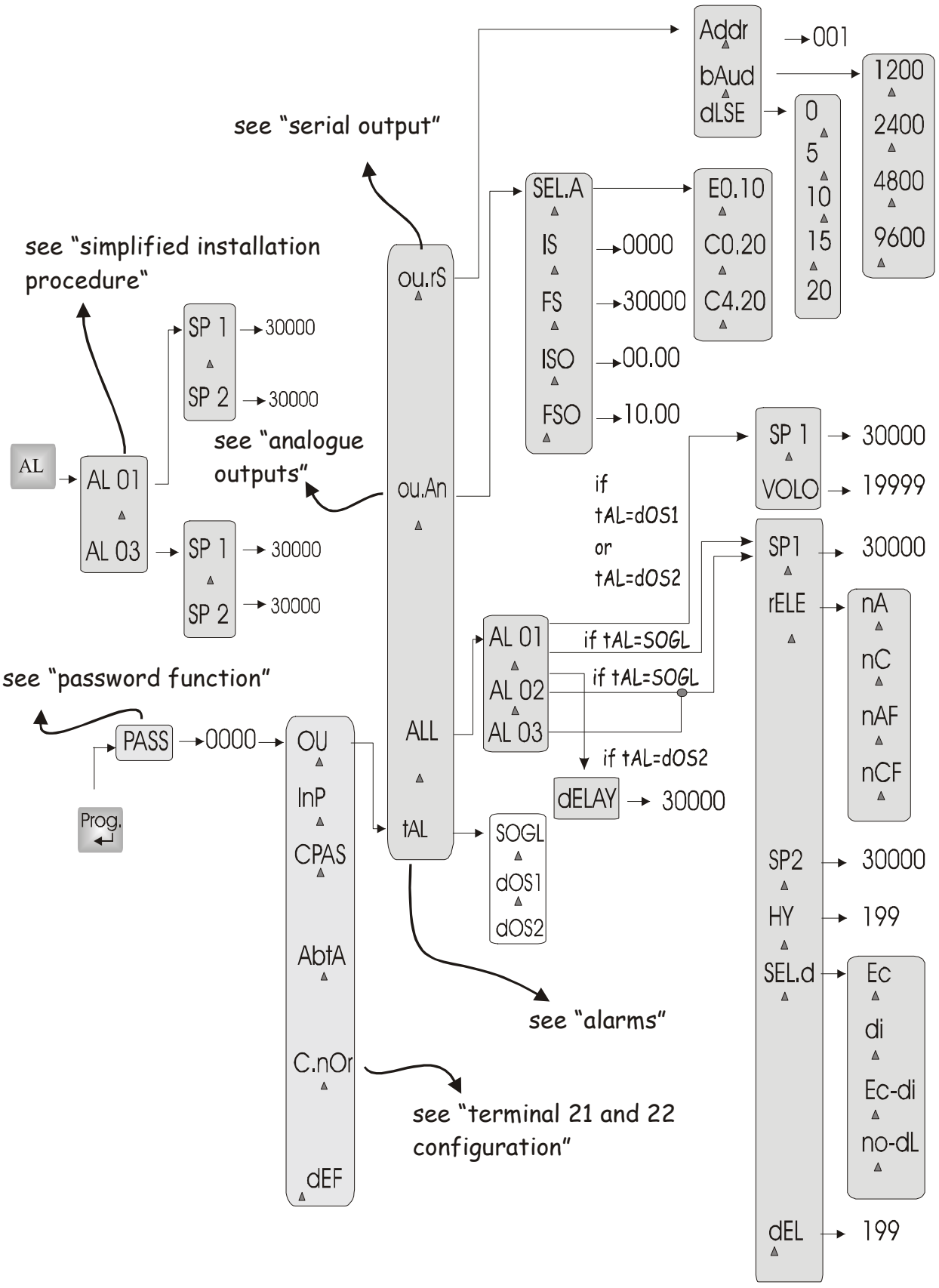
key.
- To exit menu, use the 

key: the modified parameters are stored.

1.6 BASE INSTRUMENT MENU FLOW



1.7 OPTIONS INSTRUMENT MENU FLOW



2.0 INSTALLATION NOTES

2.1 SIMPLIFIED INSTALLATION PROCEDURE

1- Connect the instrument as follows:
pag 7 – base instrument wiring diagram
2- Use sensibility or sample weight calibrating in according with the following paragraphs.

2.2 CALIBRATING THE INSTRUMENT WITH CELL SENSIBILITY

To follow this procedure you must know the cell sensibility (see it in the calibrating certificate).
Suppose to have a load cell with a sensibility of 1.9856 mV/V with a full scale of 150 Kg.
To calibrate the instrument do the following:

1. Power on
2. Setup the decimal point position to 000.00 by 

key
3. Set SEL.C = SEnS
4. Put n.Sen equal to 1.9856 (sensibility)
5. Put F.S. (full scale) value equal to 15000 (readout)
6. Exit the menu procedure with the cell unloaded and read the display value
7. Write the number in OFFS menu item and exit the menu procedure
8. The instrumenti is now calibrated
9. Program the digital filter (see filter function paragraph if requested)
10. If peak-hold is requested, see peak-hold function paragraph
11. If analogue output is requested, see analogue output function paragraph
12. If alarm is requested, see alarm function paragraph
13. To reset to factory default parameters, see default parameters paragraph
14. If you need a password, see password paragraph
15. If you need a display reset function, see display reset function paragraph

With the 

key it is possible to set up the alarm values
See paragraph “Alarms”.

- **To lock the front keys or to use other configuration, see the “ Front key enabling” paragraph**
- **To set other parameters, use the following table.**

Table 3

seq. n°	Press key	appears on display	NOTE
1	Prog. ↵	PASS	Press the Prog. ↵ key
2	Prog. ↵	0 0000	Input the personal Password

seq. n°	Press key	appears on display	NOTE
			** (confirm with Prog. ↵)
3		Ou	
4	▲	InP	
5	Prog. ↵	FIL	FILTER PROGRAMMING (see paragraph)
6	▲	OFFS	OFFSET SUBTRACTED FROM READ OUT
7	Prog. ↵	00.000	Write tare value **(confirm to Prog. ↵)
8		OFFS	
9	▲	PICC	PEAK SET-UP
10	Prog. ↵	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 Prog. ↵)
11		PICC	
12	▲	.HLd	TIME OF PEAK RETENTION
13	Prog. ↵	19.9	write retention time (0 ÷ 19.9 s) if PhO or PLO selected **(confirm with Prog. ↵)
14		.HLd	
15	▲	SEL.C	CALIBRATING SELECTION
16	Prog. ↵	SEnS	Press ▲ key until "SEnS" item appears. (confirm with Prog. ↵)
17		SEL.C	
18	▲	CAL	INSTRUMENT CALIBRATION
19	Prog. ↵	n.SEn	CELL SENSIBILY
20	Prog. ↵	2.0000	Write the sensibility written in the calibrating certificate **(confirm with Prog. ↵)
21		n.SEn	
22	▲	F.S.	FULL SCALE CELL
23	Prog. ↵	19999	Write the full scale of the cell **(confirm with Prog. ↵)
24		F.S.	
25	▶	CAL	
26	▲	nErt	MEMORIZING DISPLAY CLEAR FUNCTION
27	Prog. ↵	On	On = memorize the display clear function at the switching off OFF = the instrument looses the display clear function

seq. n°	Press key	appears on display	NOTE
			value at the switching off Press "▲" key until you will see the req. item **(confirm with Prog. ↵)
28		nErt	
29	▲	dISO	WEIGHT SUM SCALING FACTOR
30	Prog. ↵	10000	Write the scaling factor (32000 max) **(confirm with Prog. ↵)
31		dISO	
32	Exit Reset	Measure	Procedure to exit from programming area.

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

2.3 CALIBRATING THE INSTRUMENT WITH SAMPLE WEIGHT OR 5° WIRE

If you don't know the sensitivity of the cell, you can calibrate the instrument with a sample weight or the cell's 5° wire. We suppose to have a cell with about 2mV/V sensitivity and use a 1.5678Kg (or 5° wire) weight to calibrate the instrument.
To calibrate the instrument do the following:

1. Power on
2. Setup the decimal point position to 0.0000 by 

key
3. Set SEL.C = PESO
4. Exit the program menu and perform a reset display function with no load on the cell.
5. Enter the program menu with the sample weight on the cell (or with the inserted 5° wire) and program the P.C. menu item with number "1.5678"
6. In the menu item "ALPC" select "on" and confirm with "Prog ↵". Exit from program menu with the 

key and verify the correct display (weight + tare)
7. Unload the cell (or disconnect the 5° wire) and read the display value
8. Write the number in OFFSt menu item and exit from the menu procedure
9. The instrumenti is now calibrated
10. Program, if requested, the digital filter (see filter function paragraph)
11. If peak-hold is requested, see peak-hold function paragraph
12. If analogue output is requested, see analogue output function paragraph
13. If alarms are requested, see alarm function paragraph
14. To reset to factory default parameters, see default parameters
15. If you need a password, see password paragraph
16. If you need a display reset function, see disply reset function paragraph

With the AL key it is possible to set up the alarm values
See paragraph "Alarms".

- **To set other parameters, use the following table.**

Table 4

seq. n°	Press key	appears on display	NOTE
1	Prog. ↵	PASS	Press the "Prog. ↵" key
2	FS ↵	0 0000	Input the personal Password **(confirm with "Prog. ↵")
3		Ou	
4	▲	InP	
5	Prog. ↵	FIL	FILTER PROGRAMMING (see paragraph)
6	▲	OFFS	OFFSET SUBTRACTED FROM READOUT
7	Prog. ↵	00.000	Write tare value. **(confirm with "Prog. ↵")
8		OFFS	
9	▲	PICC	PEAK SET UP
10	▲	.HLd	TIME OF PEAK RETENTION
11	▲	SEL.C	CALIBRATING SELECTION
12	Prog. ↵	PESO	Press "▲" key until "PESO" item appears. (confirm with "Prog. ↵")
13		SEL.C	
14	▲	CAL	INSTRUMENT CALIBRATION
15	Prog. ↵	P.C.	SAMPLE WEIGHT OR 5° WIRE
16	Prog. ↵	15678	Write the number for sample weight or 5° wire. (confirm with "Prog. ↵")
17		P.C.	
18	▲	ALPC	CONFIRM CALIBRATION
19	Prog. ↵	on	Touch "▲" key until "on" item appears. (confirm with "Prog. ↵")
20		ALPC	
21	▶	CAL	
22	▲	nErt	MEMORIZING DISPLAY CLEAR FUNCTION
23	Prog. ↵	On	On = memorize the display clear function at the switching off OFF = the instrument looses the display clear function value at the switching off Press "▲" key until you will see the req. item **(confirm with "Prog. ↵")
24		nErt	

seq. n°	Press key	appears on display	NOTE
25	▲	dISO	WEIGHT SUM SCALING FACTOR
26	Prog. ↵	10000	Input scaling factor (32000 max) **(confirm with "Prog. ↵")
27		dISO	
28	Exit Reset	Measure	Procedure to exit from programming area.

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

2.4 "DISPLAY" CLEAR FUNCTION

"Display clear" means a control that, when functioning, shuts down the display. The function "Display clear" works short-circuiting terminals 19 and 22 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 3 or 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" Kg. Linking terminals 19 and 22 we zero the visualization, so the indication will be negative for the values under "100.0" and positive for the values over "100.0" Kg.

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 the next table). BE CAREFUL: all previous programmed values will be lost.

Table 5

seq. n.	Press key	appears on display	NOTES
1	Prog. ↵	PASS	Press the "Prog. ↵" key
2	Prog. ↵	0 0000	Input the personal number password ** (confirm with "Prog. ↵")
3		Ou	
4	▲	InP	

seq. n.	Press key	appears on display	NOTES
5	▲	C.PAS	
6	▲	AbtA	
7	▲	CnOr	If serial output
8	▲	dEF	DEFAULT PARAMETERS
9	Prog. ↵	On	Press the "▲" key until appears the "On" item ** (confirm with "Prog. ↵") The instrument exits from the menu and executes an automatic power on..

** to modify the value 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 following table .

Table 6

seq.n	Press key	Appears on display	NOTES
1	Prog. ↵	PASS	Press "Prog. ↵" key
2	Prog. ↵	0 0000	Input the personal number password ** (confirm with "Prog. ↵")
3		Ou	
4	▲	InP	
5	▲	C.PAS	
6	▲	AbtA	ENABLING KEYS
7	Prog. ↵	AbSP	ENABLING KEY "AL" (for set point)
8	Prog. ↵	On	On = enabled, OFF= disabled Change the configuration with "▲" key and confirm with "Prog. ↵" key
9		AbSP	
10	▲	Abrt	ENABLING KEY "Reset" (display clear)
11	Prog. ↵	On	On = enabled, oFF= disabled Change the configuration with "▲" key and confirm with "Prog. ↵" key
		Abrt	
12	▲	AbdP	ENABLING KEY "dp" (decimal point)
13	Prog. ↵	On	On = enabled, OFF= disabled Change the configuration with "▲" key and confirm with "Prog. ↵" key
		AbdP	

seq.n	Press key	Appears on display	NOTES
14	▲	AbSO	ENABLING KEY "Σ"
15	Prog. ↵	On	On = enabled, OFF= disabled Change the configuration with "▲" key and confirm with "Prog. ↵" key
16		AbSO	
17	Exit Reset	Read out	To exit from programming area

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

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 19 and 21. In the same way can be done the exclusion of this function.

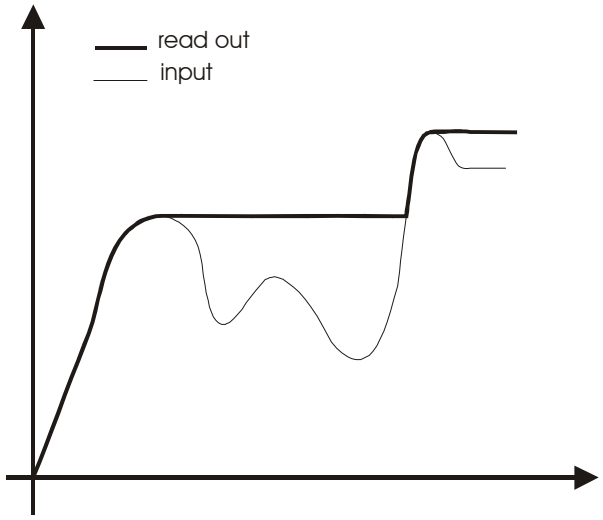


Fig A

4.0 "FILTER" FUNCTION

The MPPV010 P6 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.

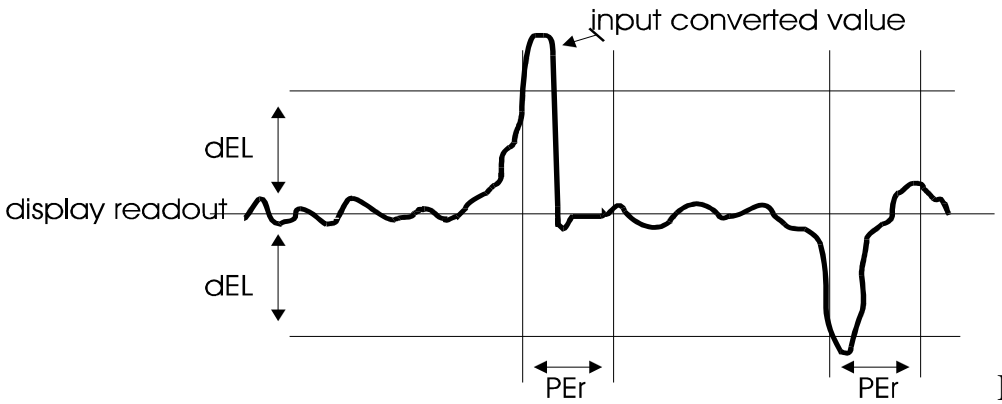


Fig. B

The filtered value can be modified by means of the following items before being displayed.
SPd : display readout for second. The internal processor converts the input 40 times for second. By means of SPd item it is possibile to choose the readout speed. Possibile SPd value is:
1: 1 readout for second
2: 2 readout for second
4: 4 readout for second
8: 8 readout for second
16: 16 readout for second
FULL: full speed
Arr : display rounding function.
The readout can be rounded as follows:
1: no rounding function
2: modulo 2 rounding function
5: modulo 5 rounding function
10: modulo 10 rounding function
To program those items see the following table.

Table 7

n seq.	Press key	appears on display	NOTE
Prog. ↵	Prog. ↵	PASS	Press the "Prog. ↵" key
Prog. ↵	Prog. ↵	0 0000	Input the personal Password number if already programmed: see "password Function" ** (confirm with "Prog. ↵")
3		Ou	
4	▲	InP	
5	Prog. ↵	FIL	FILTER PROGRAMMING
6	Prog. ↵	n.FIL	NUMBER OF AVERAGES
7	Prog. ↵	128	Press key "▲ " until the display shows the number of averages required (0= no filter). (confirm with "Prog. ↵")
8		n.FIL	
9	▲	dEL	DELTA FILTER
10	Prog. ↵	199	Set the number of digits within the filter is activated. ** (confirm with "Prog. ↵")
11		dEL	
12	▲	PEr	TIME OF READING RETENTION
13	Prog. ↵	1.99	write retention time (0.01÷1.99 s) ** (confirm with Prog. ↵)

n seq.	Press key	appears on display	NOTE
14		PEr	
15	▲	SPd	DISPLAY READOUT FOR SECOND
16	Prog. ↵	1	Press key "▲ " until the display shows the number of readout required (1, 2, 4, 8, 16) or Full (max speed). **(confirm with "Prog. ↵")
17		SPd	
18	▲	Arr	DISPLAY ROUNDING FUNCTION
19	Prog. ↵	5	Press key "▲ " until the display shows the number of rouding function required (x1, x2, x5, x10). (confirm with "Prog. ↵")
20		Arr	
21	Exit Reset	Measure	To exit from programming area

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

5.0 ANALOGUE OUTPUTS (option)

The MPPV010 P6 instrument can be ordered with a voltmeter and ammeter analogue output point ("OAP" 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 8

Analogue Output	0÷10 V - 0÷ 20 mA - 4÷20 mA

Max. impedance for current output	600 Ω
Min. impedance for voltage output	1 KΩ
Max. voltage supplied	10 V
Max. current supplied	20 mA
Resolution	12 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.

Voltmeter output

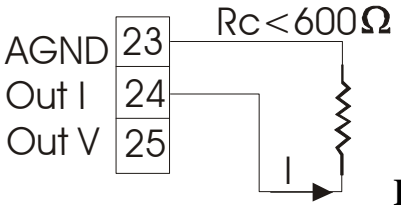


Fig C

Ammeter output

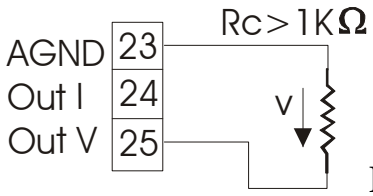


Fig D

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 (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 = 00.00 V if voltage output
- ISO = 00.00 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 = 10.00 V if voltage output
- FSO = 20.00 mA if ammeter output (for an output at 4 ÷20 mA no programming is necessary).

Table 9

n seq.	Press key	appears on display	NOTE
1	Prog. ↵	PASS	Press the "Prog. ↵" key
2	Prog. ↵	0 0000	Input the personal Password number if already programmed see "password Function" ** (confirm with "Prog. ↵")
3		Ou	
4	Prog. ↵	ALL	
5	▲	Ou.An	PROGRAMMING ANALOGUE OUTPUTS
6	Prog. ↵	SEL.A	Selection output type
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.A	
9	▲	IS	START OF READING SCALE
10	Prog. ↵	0 0000	write the reading value which coincides with ISO ** (confirm with "Prog. ↵")
11		IS	
12	▲	FS	END OF READING SCALE
13	Prog. ↵	1 0000	write the reading value which coincides with FSO ** (confirm with "Prog. ↵")
14		FS	
15	▲	ISO	START OF ANALOGUE OUTPUT SCALE
16	Prog. ↵	00.00	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 "Prog. ↵")
17		ISO	
18	▲	FSO	END OF ANALOGUE OUTPUT SCALE
19	Prog. ↵	10.00	write the output value which coincides with the programmed reading at "FS". This item has not to be programmed if SEL.A = C4.20. ** (confirm with "Prog. ↵")
20		FSO	
21	Exit Reset	Measure	Procedure to exit from programming area

** to modify the value 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 instrument can be requested with up to 3 relay alarms. The first alarm output function can be choosen between weight and threshold. This selection is made by means of the "tAL1" menu item.

Alarm values can be set in two different ways: by means of the 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.

6.1 Alarm threshold

The alarms 1, 2 and 3 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 +/- 30000 (see FIG. E). In the case of "Window" trigger "SP1" determines the first switching point (see FIG. F).
b) **SP2:** set up of the second switching point of "window" trigger .(see FIG. F).
c) **HY:** Set up of the hysterisis centred on the set point, previously inserted, in the range 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 for the switching on the trigger. This time can be between 0 ÷200 s

The alarms 2 and 3 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 output
   - dI: the time set up comes in before de-activating the output
   - 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)

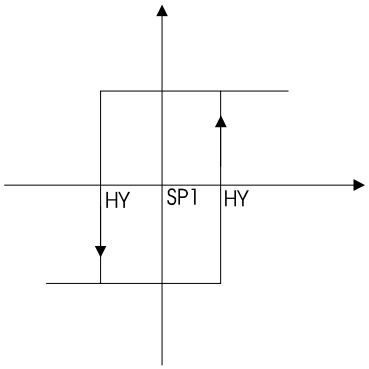


Fig E

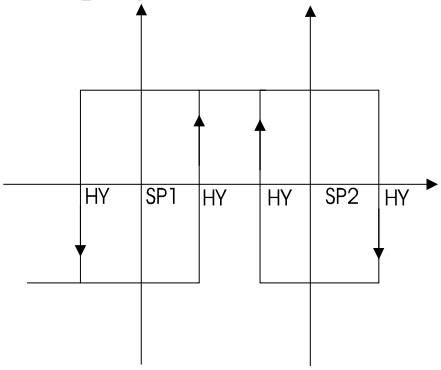


Fig F

Table 10

n seq.	Press key	appears on display	NOTE
1	Prog. ↵	PASS	Press the "Prog. ↵" key
2	Prog. ↵	0 0000	Input the personal Password no. **(confirm with "Prog. ↵")
3		Ou	
4	Prog. ↵	tAL1	TYPE ALARM
5	Prog. ↵	SOGL	SOGL = Alarm threshold DOS1 = batching function alarm 1 DOS2 = batching function alarm 1 and 2 Choose the requested item with "▲" key and confirm with "Prog. ↵"
6		tAL1	
7	▲	ALL	
8	Prog. ↵	AL.01	ALARM 1 PARAMETERS
9	Prog. ↵	S.P.1	Setpoint alarm 1
10	Prog. ↵	0 0000	Set SP1. ** (confirm with "Prog. ↵").
11		S.P.1	
12	▲	rELE	SET UP CONTACT AL.1
13	Prog. ↵	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

n seq.	Press key	appears on display	NOTE
			confirm with "Prog. ↵"
14		rELE	
15	▲	S.P.2	SET UP 2° SET POINT ONLY FOR "WINDOW" FUNCTION
16	Prog. ↵	0 0000	**(confirm with "Prog. ↵")
17		S.P.2	
18	▲	HY	HYSTERESIS SET UP AL1
19	Prog. ↵	00 199	(O÷200 digit) **(confirm with "Prog. ↵")
20		HY	
21	▲	SEL.d	TYPE OF DELAY SET-UP AL1
22	Prog. ↵	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 "Prog. ↵"
23		SEL.d	
24	▲	dEL	DELAY SET UP AL 1
25	Prog. ↵	00 199	Set a number between 0÷199 s **(confirm with Prog. ↵)
26		dEL	
27	▶	AL.01	
28	▲	AL.02	ALARM 2
29	▲	AL.03	ALARM 3
30	Exit Reset	Measure	Procedure to exit from programming area

** to modify the value 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 key AL **.**

Table 11

Seq n°	Press key	appears on display	NOTES
1	AL	AL 1	Press the "AL" key to reach the alarm Set-Point items
2	Prog. ↵	SP 1	First set-point of the alarm 1
3	Prog. ↵	0 0000	Input the value of alarm 1 ** (confirm with Prog. ↵)

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

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

6.2 Alarm 1 e 2 (batching)

The alarm 1 has the "batching" function if the item menu is "tAL=dOS1", alarm1 and 2 has the "batching" function if the item "tAL=dOS2".
Alarm 1 has 2 set-ups: setpoint and flight (VOLO).
Alarm 2 has 1 set-ups: delay.

How it works (tAL=dOS1)
Perform a reset display function. Close start contact on rear panel. The instrument activates the alarm 1 output: this output is reset when the weight is equal to "setpoint – flight" or if START is closed again START contact toggles between start/stop cycle.
How it works (tAL=dOS2)
Perform a reset display function. Close start contact on rear panel. The instrument activates the alarm 1 and alarm 2 output: the alarm 1 output is reset when the weight is equal to "setpoint – flight" and the alarm 2 is reset after the delay time programmed in the menu or if START is closed again START contact toggles between start/stop cycle..

6.3 Sum function

The sum function is linked to alarm 1 (batching function). The current weight is added to the SUM when the alarm 1 is reset (max value for sum =64000). The Σ key shows the current value of the sum. The sum value is reset if you press the Σ key for 10 seconds. The sum value can be divided by the dISO value to scale it as desired.

Table 12

n seq.	Press key	appears on display	NOTE
1	Prog. ↵	PASS	Press the "Prog. ↵" key
2	Prog. ↵	0 0000	Input the personal Password no. **(confirm with "Prog. ↵")
3		Ou	
4	Prog. ↵	tAL1	TYPE ALARM
5	Prog. ↵	dOSE	SOGL = Allarme a soglia DOS1 = batching function alarm 1 DOS2 = batching function alarm 1 and 2 Choose the requested item with "▲" key and confirm with "Prog. ↵"
6		tAL1	
4	▲	ALL	
5	Prog. ↵	AL1	ALARM PARAMETERS 1 (Batching)
6	Prog. ↵	S.P.1	SET point for batching function
7	Prog. ↵	0 0000	Set SP1. ** (confirm with "Prog. ↵").
8		S.P.1	
9	▲	VOLO	SET "VOLO" (FLIGHT)
10	Prog. ↵	1000	Set "VOLO" value to subtract from setpoint value ** (confirm with "Prog. ↵").
11		VOLO	
12	Exit Reset	Read out	

. 7.0 SERIAL OUTPUT (option)

"MPPV010 P6" 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

"MPPV010 P6" series instrument with unidirectional RS232 output 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 G. The output format is as follows:

30	31	34	37	32	OD	OA

ten thousands thousands hundreds tens unity LF CR

7.1 TERMINALS 21 AND 22 CONFIGURATION

Terminals 21 and 22 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	Prog. ↵	PASS	Press the Prog. ↵ key
2	Prog. ↵	0 0000	Input the personal password number ** (confirm with Prog. ↵)
3		Ou	
4	▲	InP	
5	▲	C.PAS.	
6	▲	AbtA	ENABLING KEYS
7	▲	CnOr	TERMINAL CONFIGURATION
8	Prog. ↵	n 21	TERMINAL 21 CONFIGURATION
9	Prog. ↵	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 Prog. ↵
10		n 21	
11	▲	n 22	TERMINAL 22 CONFIGURATION
12	Prog. ↵	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 Prog. ↵
13		n 22	
14	Exit Reset	Read out	Procedure to exit from programming environment

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

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 “MPPV010 P6” models with RS485 or RS422 serial output, you must follow figure “H”, for RS232 serial output follow figure “G”. Program 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. The answer delay is the minimum time that the instrument waits before the answer. To programme the address code, the baud rate and the answer delay (functions programmable only by keyboard) follow the next table.

Table 15

seq. n.	Press key	appears on display	NOTES
1	Prog. ↵	PASS	Press the “Prog. ↵“ key
2	Prog. ↵	0 0000	Input the personal password number ** (confirm with “Prog. ↵“)
3		Ou	
4	Prog. ↵	tAL1	
5	▲	ALL	
6	▲	Ou An.	
7	▲	Ou rS	
8	Prog. ↵	bAUd	BAUD RATE
9	Prog. ↵	9600	Press the "▲" key until appears the requested baud-rate. ** (confirm with “Prog. ↵“)
10		bAUd	
11	▲	Addr	INSTRUMENT ADDRESS
12	Prog. ↵	001	Input the instrument address with a number between 001 and 099. **(confirm with “Prog. ↵“)
13		Addr	
14	▲	dLSE	ANSWER DELAY
15	Prog. ↵	005	Press the "▲" key until appears the requested “answer delay” (0, 5, 10, 15 and 20mSec). ** (confirm with “Prog. ↵ “)

16		dLSE	
17	Exit Reset	Measure	Procedure to exit from programming environment

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

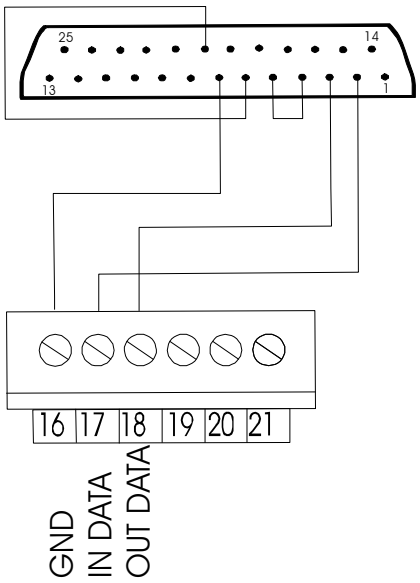


Figure G.(RS232)

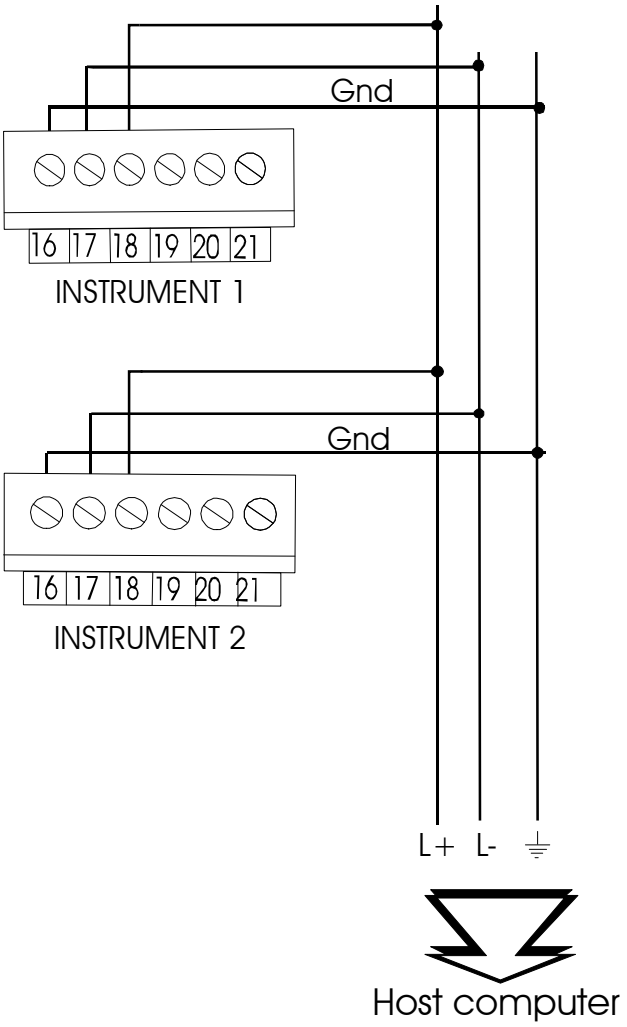


Figure H (RS485)

7.2 DATA READING FROM HOST TO INSTRUMENT MPPV010 P6

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 execute (see paragraph "command codes").

EXAMPLE: data transmission string from host to MPPV010 P6 with address "01" for data request "Reading offset" (OF).

EOT	0	0	1	1	O	F	ENQ	
04	30	30	31	31	4F	46	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 trasmission from MPPV010 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.

7.3 DATA TRANSMISSION FROM MPPV010 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 execute. (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 MPPV010 P6 to host in response to preceding example.

STX	O	F	blank	blank	blank	blank	0	1	0	0	ETX	BCC	
02	4F	46	20	20	20	20	30	31	30	30	03	0B	cod. ascii

The MPPV010 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 (not understood). The MPPV010 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.

7.4 DATA WRITING FROM HOST TO MPPV010 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 = 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 execute . (see paragraph “command codes”).
D1 ÷ D8 = Digits seen. The same rules are valid as those described in the paragraph " data transmission from MPPV010 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 MPPV010 P6 with "01" address.

EOT	0	0	1	1	STX	O	F	blank	blank	blank	blank	0	1	0	0	ETX	BCC
04	30	30	31	31	02	4F	46	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 MPPV010 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 16

COMMAND CODES	COMMAND DESCRIPTION	POSSIBLE OPERATION	DATE CODE
FS	F.S. (strain gauge)	read/write	ASCII 0÷30000
PC	P.C. (sample weight)	read/write	ASCII 0÷30000
NS	n.SEn (sensibility)	read/write	ASCII 0÷6.4000
OF	OFFS (vis.)	read/write	ASCII ± 19999
SC	SCAL	read	hexadecimal 0 = 1mV/V 1 = 1.5 mV/V 2 = 2 mV/V 3 = 3 mV/V 4 = 10 mV/V
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 = POFF 1 = P.ho

COMMAND CODES	COMMAND DESCRIPTION	POSSIBLE OPERATION	DATE CODE
			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
PE	Per (filter permanence)	read/write	ASCII 0÷1.99
VD	SPd (display readout for second)	read/write	hexadecima 0 = FULL 1 = 1 2 = 2 3 = 4 4 = 8 5 = 16
AO	Arr (display routing function)	read/write	hexadecimal 0 = x1 1 = x2 2 = x5 3 = x10
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	write	ASCII ± 19999
RT	Display clear	write only	
AR	Generic status word	read/write	See “Generic status

COMMAND CODES	COMMAND DESCRIPTION	POSSIBLE OPERATION	DATE CODE
			word" paragraph
RO	read out (display)	read only	
VO	VOLO	read/write	ASCII 19999
DS	dISO (scaling factor)	read/write	ASCII 32000
SO	Σ (sum)	read only	ASCII 64000
A1..A3*	SP1 (AL1÷AL3)	read/write	ASCII ± 19999
B1..B3*	SP2 (AL1÷AL3)	read/write	ASCII ± 19999
H1..H3*	HY (AL1÷AL3)	read/write	ASCII ± 199
D1..D3*	delay(AL1÷AL3)	read/write	ASCII ± 199
W1..W3*	status word alarms	read/write	hexadecimal see table

* 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 MPPV010 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 FOR WRITING 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 MPPV010 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 paragraph 7.3 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

MPPV010 P6 series instruments can have up to 2 alarms with window function, 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 2 and 3 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

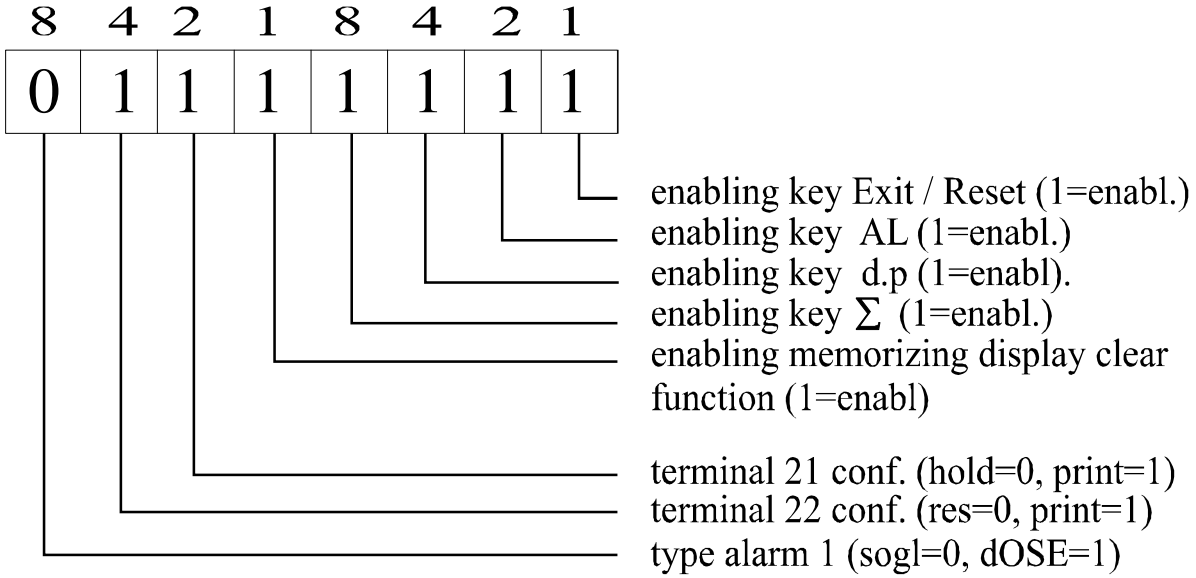
CODE W2÷W3	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
T.DEL	no-dL	no-dL	no-dL	no-dL	EC	EC	EC	EC	di	di	di	di	EC-di	EC-di	EC-di	EC-di
RELAY	NC	NA	NCF	NAF	NC	NA	NCF	NAF	NC	NA	NCF	NAF	NC	NA	NCF	NAF

7.8 PEAK-HOLD RESET

MPPV010 P6 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 21 and 22 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 read out of an instrument by an host computer. Set before baud rate = 9600 and address = 01

```
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
```

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 the following TABLE).

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	Prog. ↵	PASS	Press the "Prog. ↵" key
2	Prog. ↵	0 0000	** (confirm with "Prog. ↵")
3		Ou	
4	▲	InP	
5	▲	c. PAS	NUMBER OF PERSONAL PASSWORD
6	Prog. ↵	0 000	Digit the number of password between 0 and 9999 ** (confirm with "Prog. ↵")
7		c. PAS	
8	Exit Reset	Measure	Procedure to exit from programming environment

** to modify the value 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	Prog. ↵	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	Prog. ↵	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 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 is an help desk office.