USER'S MANUAL
Series MPM P6

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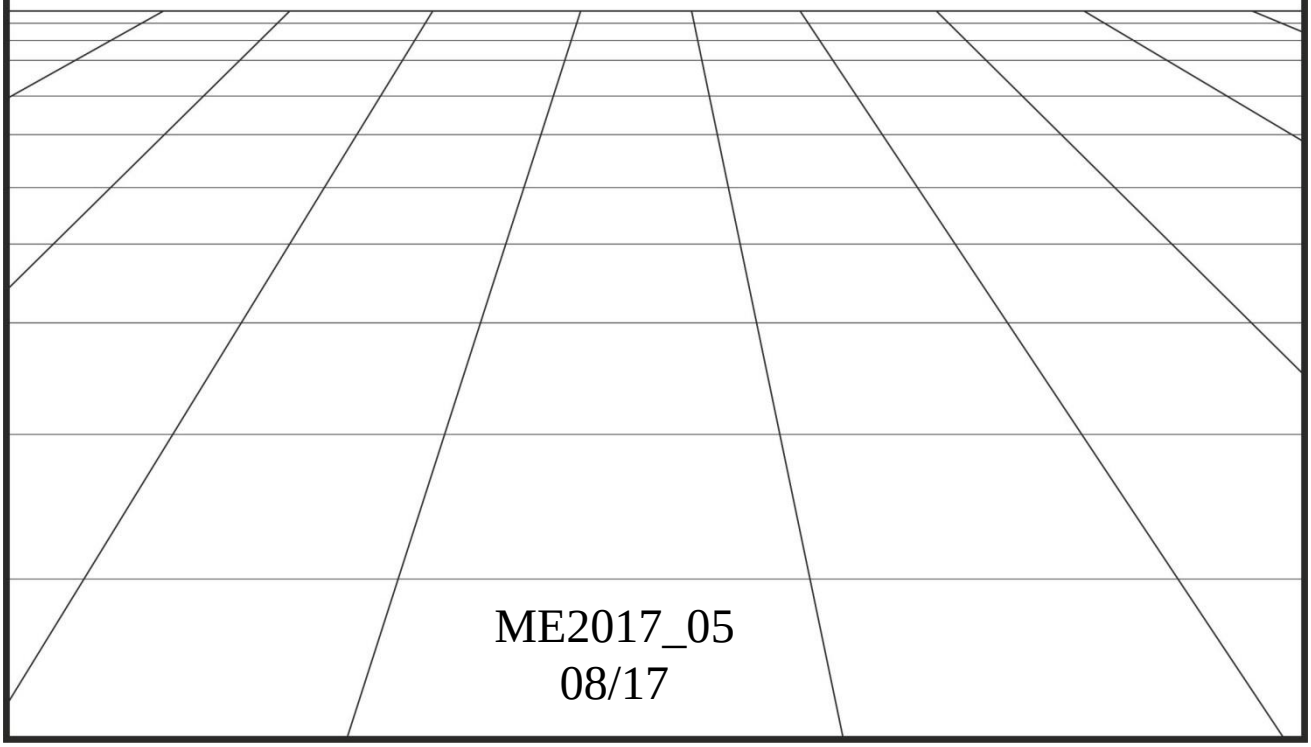

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1.0 GENERAL POINTS

The MPM series instrument in the P6 housing (depth 75mm) has 2 analogue inputs and can show one input or the sum, differance, product or ratio of the two. The instrument can be ordered for 2 current (0÷20mA or 4÷20mA) or voltage (0÷10V) inputs.
The main characteristics are as follows:

- two alarms with exchange relay output (3 if 220V power supply) that can be assigned to display, channel 1, channel 2, sum, difference, product or ratio.
- 16V not regulated for 2 or 3 wire transducer power supply
- alarm programming and calibration by 6 key on instrument front panel for easy of use
- 9999 point display
- the 'hold' function (memory of value displayed) and 'tara recovery' (automatic zeroing) operate directly from the terminal board for voltage and currente inputs only. Not available if serial outputs are requested.
- possibility of programming delay time and hysteresis alarms using hidden menu which is password protected.
- possibility of fixed zero setup
- programmable analogue output in voltage (0-10V) or current output (0-20mA or 4-20mA)
- RS485 or RS232 serial outputs.

1.1 TECHNICAL CHARACTERISTICS

Table 1

Input	4÷20 mA input imp.: 20 Ω voltage input imp.: 1MΩ
Transducer supply	16Vdc, 20mA (40mA for display instruments only)
Alarm output	exchange relay 5 A / 250 Vac static NPN / PNP 50 mA / 30 Vcc
Analogue output	0÷10V, 0÷20mA or 4÷20mA: 12 bit di risolution
Power Supply	90÷260 Vac, 25 Vac 50 ÷ 60 Hz 12 ÷ 30Vdc
Dimension	48 x 96 x 75
Mounting Plate	44.5 mm (height) x 92.5 mm (length)

1.1.1 DISPLAY SIGNALS

LO: reading less than -2000
HI: reading above 9999
Err: outside input scale or input circuit malfunctioning
Err 9: menu parameters wrongly set up

1.2 CONNECTION DESCRIPTIONS

KEYBOARD DESCRIPTION

SET1 : alarm setup 1

SET2 : alarm setup 2. Into the menu it fulfils the exit function.

d.p. : increments blinking digit in menu or decimal point set-up

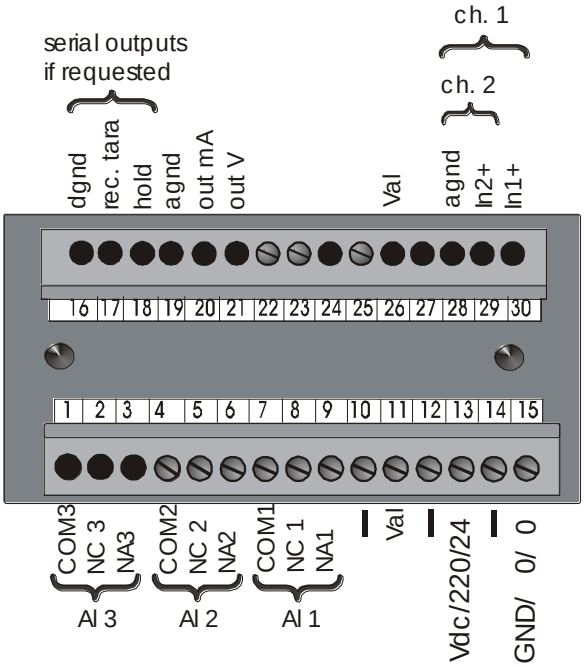
▶ : shifts blinking digit in menu. If “dISP = CAn1 / CAn2” toggles between CAn1 and CAn2

Zero : setup of reading scale start point

F.S. : set up of reading scale end point

SET1 + F.S. : menu access point

TERMINAL BOARD DESCRIPTION



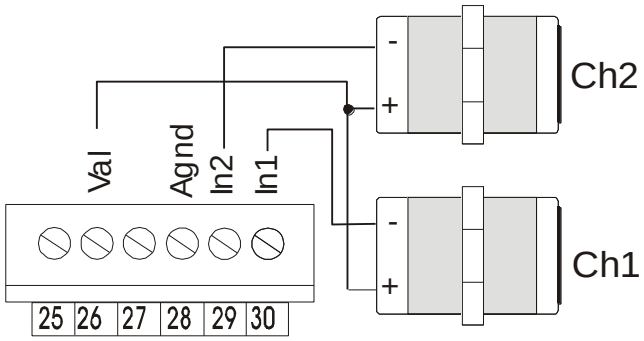
Terminals 1, 2, 3 - alarm output 3
Terminals 4,5,6 - alarm output 2
Terminals 7,8,9 - alarm output 1
Terminal 11, 26 - transducer power supply (16V)
Terminals 13 and 15 - instrument power supply (Vcc, Vpt, 24Vac, 90÷260Vac). DC power supply, terminal 13 is positive and terminal 15 is negative.
Terminals 28, 30 - input channel 1
Terminals 28, 29 - input channel 2
Terminals 19, 20, 21 - analogue output (if requested)
Terminal 18 - Hold: shortcircuiting terminals 16 and 18 will memorize the reading
Terminal 17 - Recovery tara:

1) Terminals 16-17 open: the reading is the same as the programmed values
2) Terminals 16-17 closed: at the moment the terminals become shortcircuited the display is zeroed (rec.tara)

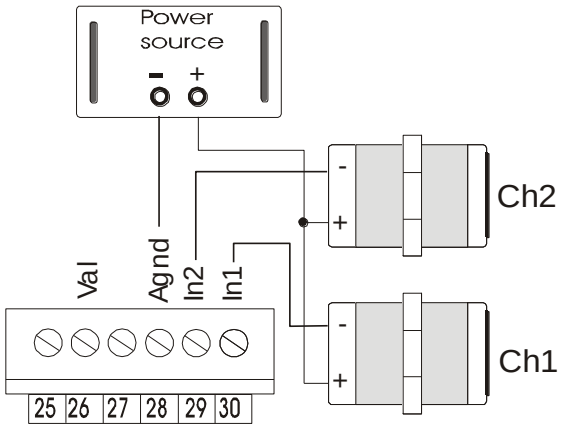
If requested serial output (the “hold” and “Rec. tara” functions is not available):
Terminal 16: see paragraph “serial outputs”
Terminal 17: see paragraph “serial outputs”
Terminal 18: see paragraph “serial outputs”

1.2.1 WIRING DIAGRAM FOR CURRENT INPUT

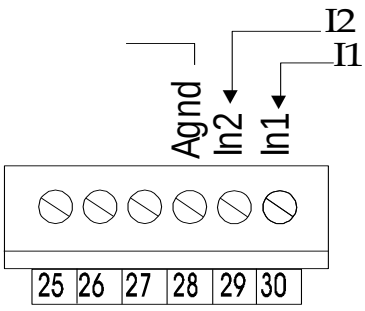
1) Connection for 2 wire transducer



2)Connection for 2 wire transducer with external power supply

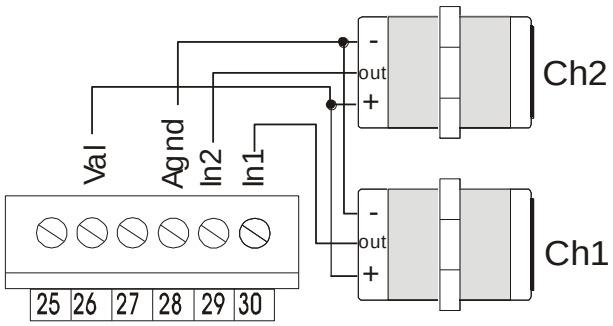


3) Connection for current input

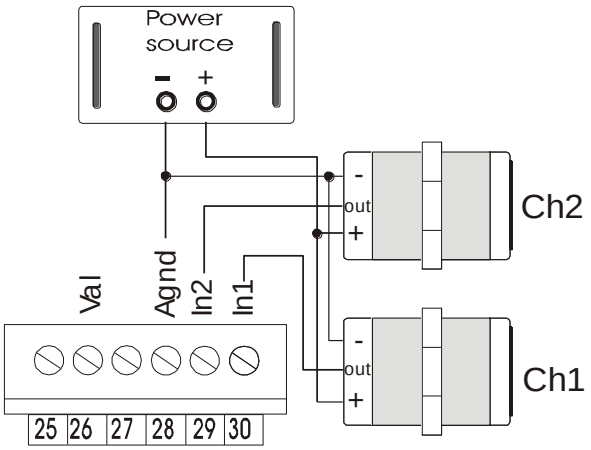


1.2.2 WIRING DIAGRAM FOR VOLTAGE INPUT

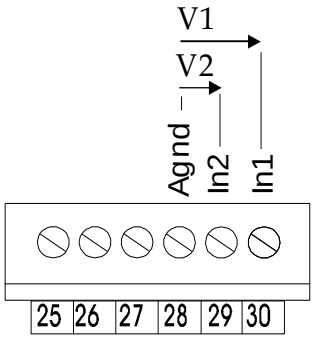
1) Connection for 3 wire transducer



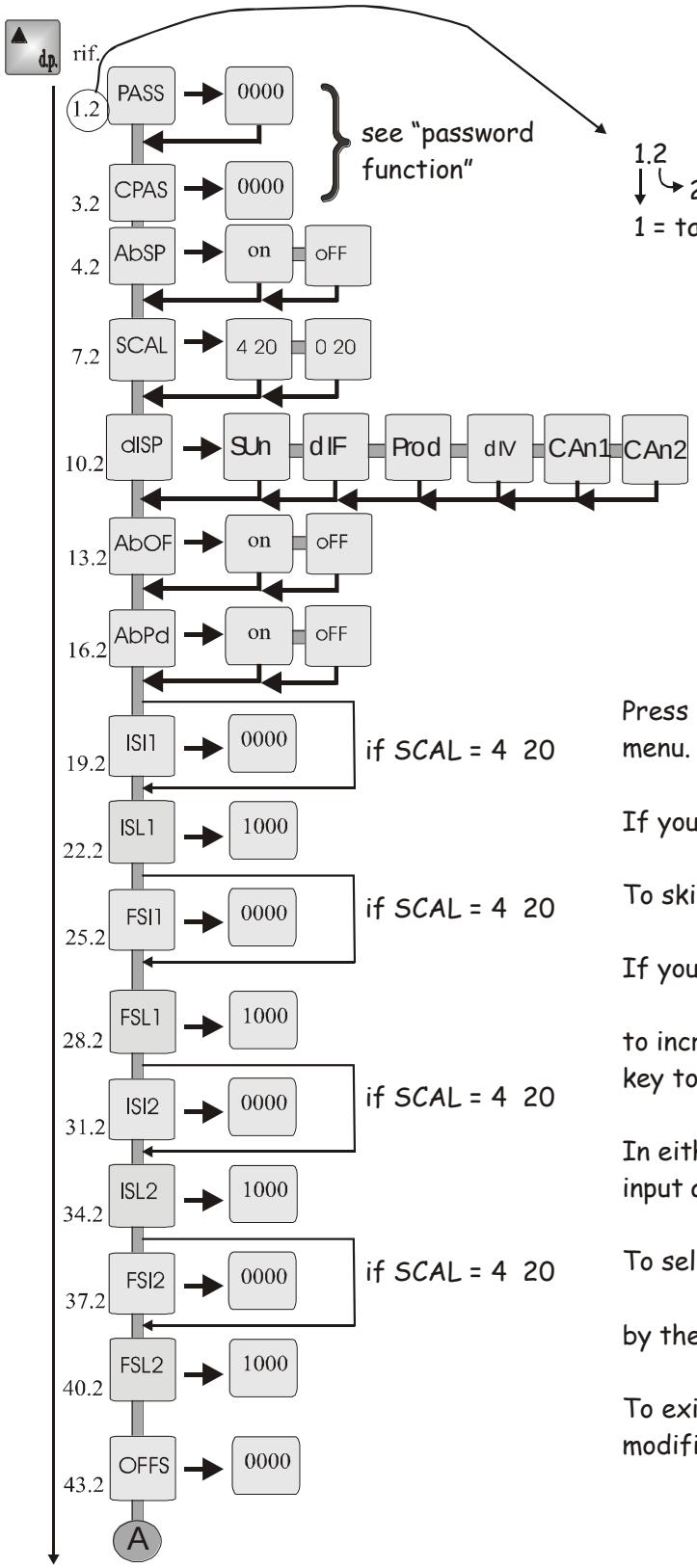
2) Connection for 3 wire transducer with external power supply



3) Connection for voltage input



1.3 PROGRAMMING TIPS



Press SET 1 + F.S. keys and reach the program menu.

If you want to reach an item, use the d.p. key.

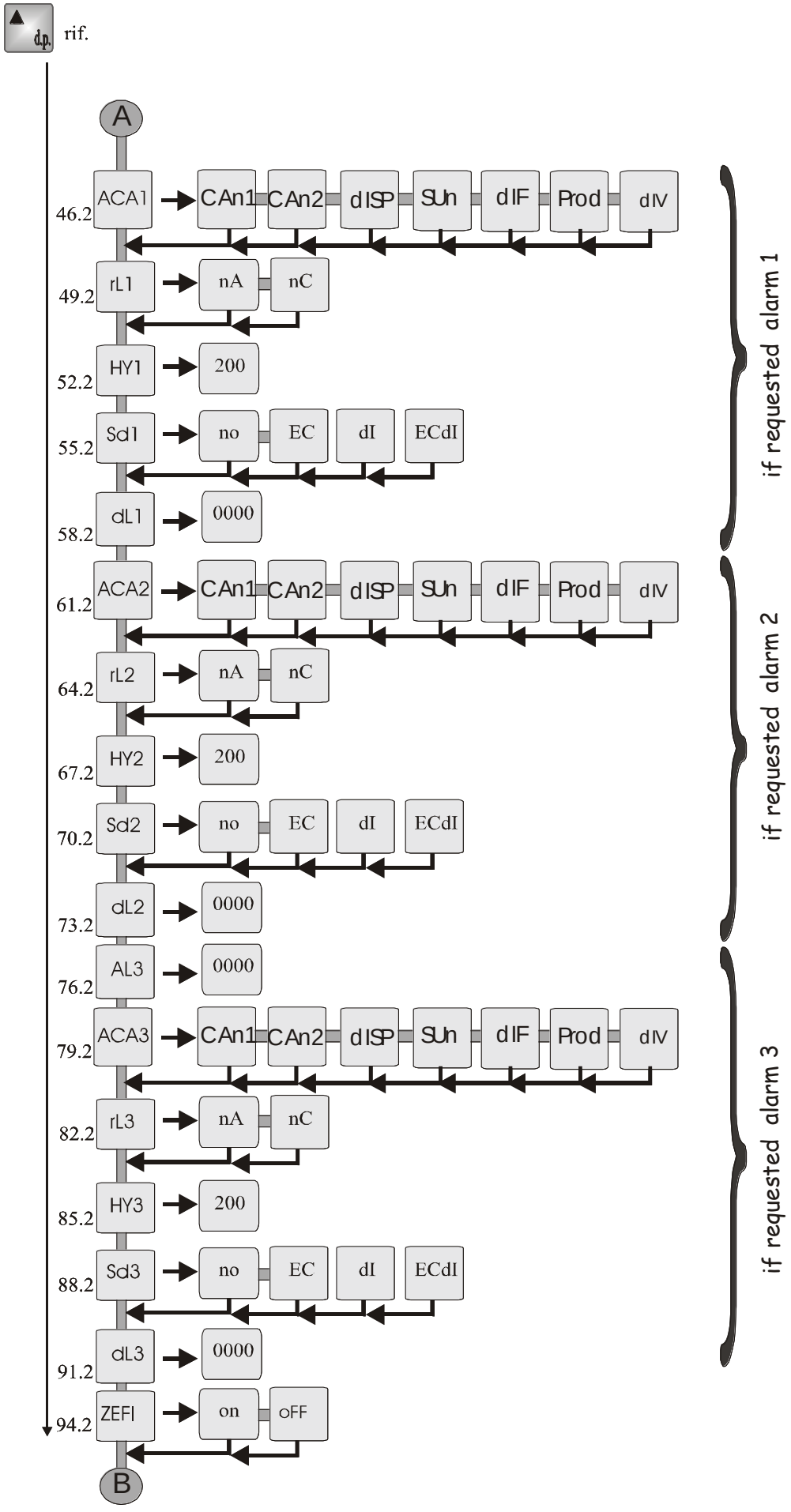
To skip into the item press F.S. key.

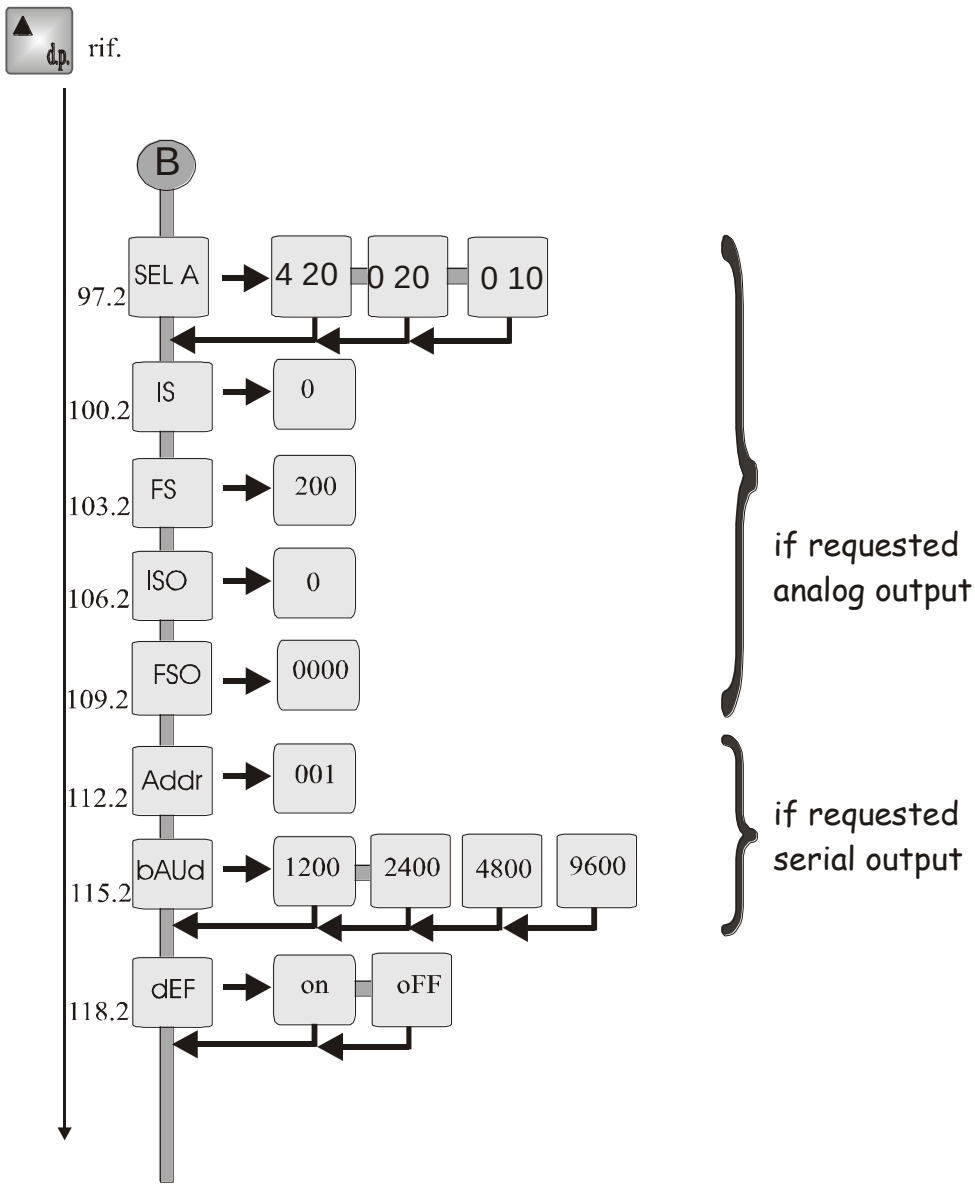
If you want to change a number, use the d.p. key to increment the blinking digit, and the ▶ key to shift the blinking digit.

In either case use the F.S. key to confirm the input and go to the menu.

To select an item use the d.p. key and confirm by the F.S. key

To exit from the menu, press SET 2 key: the modified parameters will be stored.


dp.
rif.
A
46.2
ACA1
CAn1
CAn2
dISP
SUn
dIF
Prod
dIV
49.2
rL1
nA
nC
52.2
HY1
200
55.2
Sd1
no
EC
dI
ECdI
58.2
dL1
0000
61.2
ACA2
CAn1
CAn2
dISP
SUn
dIF
Prod
dIV
64.2
rL2
nA
nC
67.2
HY2
200
70.2
Sd2
no
EC
dI
ECdI
73.2
dL2
0000
76.2
AL3
0000
79.2
ACA3
CAn1
CAn2
dISP
SUn
dIF
Prod
dIV
82.2
rL3
nA
nC
85.2
HY3
200
88.2
Sd3
no
EC
dI
ECdI
91.2
dL3
0000
94.2
ZEFI
on
oFF
B
if requested alarm 1
if requested alarm 2
if requested alarm 3



Instal

2.0 INSTALLATION NOTES

2.1 INSTALLATION PROCEDURE

1- Execute the connections as indicated at 6, 7, 8 pages
2- Switch on the instrument
3- Get into the programming menu to set the type of visualization required (by the "SCAL" menu item) and the set up of the two inputs (ISI1, ISL1, FSI1, FSL1 e ISI2, ISL2, FSI2, FSL2).
4- The "zero" key is enabled just for the visualization of the single input (can1 and can2). Using the "zero" key it is possible to set the reading value which must be the same of the minimum input (0 for the 0-10V and 0-20mA scales, 4 for the 4-20mA scale to change this value see paragraph "Instrument configuration".

5- The "F.S." key is enabled just for the visualization of the single inputs (cAn1 and cAn2). Using this key it is possible to set the reading value which must be the same of the input "fondo scala" (10V for the 0-10V scale, 20mA for the 0-20mA and 4-20mA scales to change this value see paragraph "Instrument configuration").

6- Use the d.p. key to set up the decimal point as required.

7- Use the SET1 key to set up alarm value 1

8- Use the SET2 key to set up alarm value 2

9- The instrument is now ready for use.

10- For automatic zeroing check the recovery Tara function.

11- To install other input parameters or alarms see the instrument setup paragraph.

12- To set up the visualization see the "mathematic functions" paragraph.

13- To set up the analogue output (if required) see the "analogue output" paragraph.

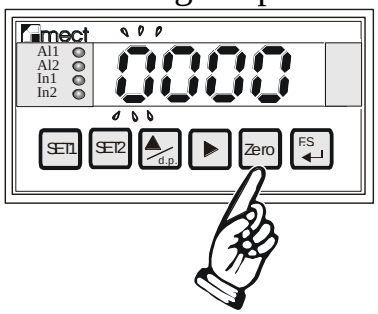
14- To set up the serial output (if required) see the "serial output" paragraph.

2.2 HOW TO OPERATE

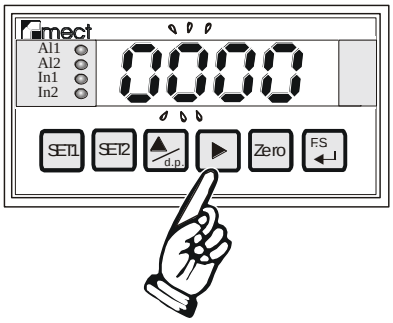
Please use the specific keys on the front in order to calibrate the instrument. With the ZERO key set up the reading value that is in line with the beginning of the input scale, then with the F.S. key set up the reading value which coincides with the base input scale, with the Set1 and Set2 keys set up the alarm values and finally with the dp key you should set up the decimal point.

WARNING : This type of programming can be realized by using the SET1, SET2, d.p., ZERO, and FS keys if the keys are enabled. (the "zero" and "FS" keys are enabled for only ch1 and ch2 visualization)

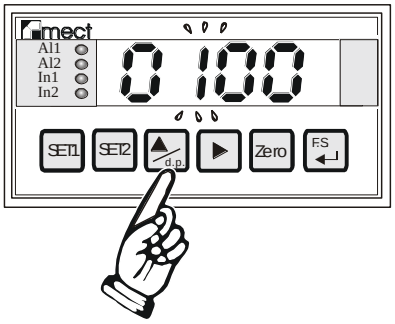
There now follow examples of zero calibration which are also true for end scale and alarms using the personalized keys F.S., SET1 and SET2.



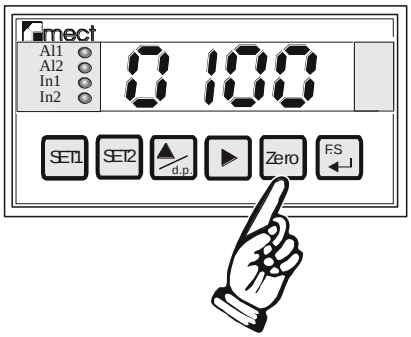
1st OPERATION
Touch the zero key. The display will visualize the value which it keeps in memory with the first left hand digit flashing.



2nd OPERATION
Touch the " ▶ " key to move the flashing digit to the right.

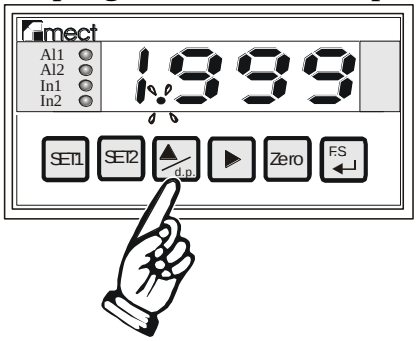


3rd OPERATION
Touch the " ▲ " key to increase the flashing number.



4th OPERATION
Confirm the programmed number by touching the 'zero' key.

To program the decimal point observe the following indications.



Touch the " ▲ " key with the instrument in measuring mode. A decimal point will light up. In order to move this point touch the indicated key until the desired point is reached.

2.3 RECOVERY TARA FUNCTION

Function enabled only for 0-10V and 4-20mA inputs.
For "Recovery Tara" we mean a function that when in use zeroes the instrument readings. The Recovery Tara function with terminals 16 and 17 open is not in use and in these circumstances the instrument reading is linked to the programming parameters ISL, FSL and OFFS. At the moment when the terminals 16 and 17 are short circuited zero is displayed and the reading zeroed.

Let us assume that the instrument, linked to a transducer, indicates a 100kg number. Shutting down the connection between terminals 16 and 17 will zero the instrument reading , thus rendering the indications negative for weight values that are less than 100 Kg and positive for values that are greater than 100 Kg.

N.B. The recovery tara function is used when it is necessary to zero the instrument reading continuously as the data contained in the instrument memory will not be retained after instrument switch off. To retain in the permanent memory the zeroed data you should use the menu item OFFS (see table 2).

2.4 MACHINE OPERATION WITH FIXED ZERO

The instrument can be programmed to visualize the range -1990 ÷ 9990 with the units number blocked at zero. To set up this function it is necessary to programme 'on' using the hidden menu item ZEFI (see table 2).

2.5 INSTRUMENT SET UP

By using a hidden menu which is accessed by pushing together the two keys SET1 and F.S., it is possible to programme certain items of secondary importance which are protected by a password code and which can be useful for certain display values or for alarm functions. These setups are explained in the following table.

IMPORTANT

Per la programmazione dei parametri di lettura, esistono quattro voci per ogni ingresso. I parametri dell'ingresso 1 sono: ISI1, ISL1, FSI1, FSL1. Mentre i parametri dell'ingresso 2 sono: ISI2, ISL2, FSI2, FSL2. These menu items allow the setup of the co-ordinates which process the instrument readings. The first co-ordinate is formed by ISI and ISL. ISI is the initial value of the input scale which coincides with that written in the instrument label (0 mA, 4 mA, 0 V, Etc..) while ISL is the corresponding instrument display value. The second coordinate is formed of FSI and FSL. FSI is the bottom scale input value which coincides with that written on the instrument label (20 mA, 100 mV, 10 V, etc..), while FSL is the corresponding instrument display value. After calibrating the instrument it is possible to correct any unbalances in the transducer by using the menu item “OFFS”.

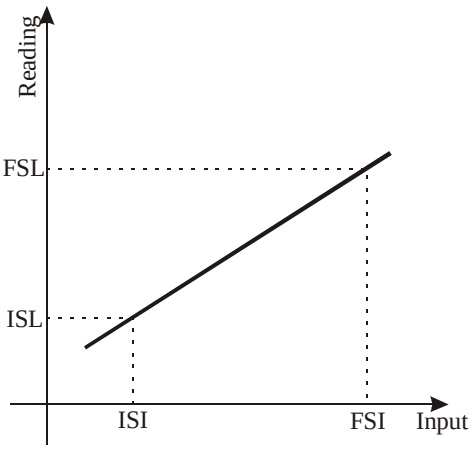


Table 2

n seq.	Touch key	Written on display	NOTE
1	FS ↵ + SET1	PASS	Touch FS ↵ + SET1 keys for some seconds.
2	FS ↵	0 000	Digit the personal password ** (confirm with " FS ↵")
3	▲	CPAS	CHANGE PASSWORD (if required see paragraph)
4	▲	AbSP	SET POINT IN USE
5	FS ↵	on	on = Set1 and Set2 keys in use off = Set1 and Set2 keys out of use. To change use " ▲ " key and confirm with " FS ↵"
6		AbSP	
7		SCAL	SELECTION INPUT CURRENT (only for MPM 15-22 instrument)
8	FS ↵	4 20	4 20 = 4-20mA input, 0 20 = 0-20mA input. To change use " ▲ " key and confirm with " FS ↵"
9		SCAL	
10	▲	dISP	SELECTION READ OUT
11	FS ↵	SUM	**SUM** = ch1 + ch2, **DIF** = ch1 - ch2, **PrOd** = ch1 * ch2, **dIV** = ch1 ÷ ch2, **CAn1** = read out input 1 **CAn2** = read out input 2 To change use " ▲ " key and confirm with " FS ↵"
12		dISP	
13	▲	AbOF	ZERO SETUP AND END SCALE (only if dISP=CAN1 or CAN2)
14	FS ↵	on	on = zero and FS keys in use; OFF = zero and FS keys out of use. To change use " ▲ " key and confirm with " FS ↵"
15		AbOF	
16	▲	AbPd	DECIMAL POINT SETUP
17	FS ↵	on	on = d.p. key in use OFF = d.p. key out of use. To change use " ▲ " key and confirm with " FS ↵"
18		AbPd	
19	▲	ISI1	START INPUT 1 SCALE
20	FS ↵	0000	Insert the input value with which should represent the initial scale reading "ISL1". ** confirm with " FS ↵"

n seq.	Touch key	Written on display	NOTE
21		ISI1	
22	▲	ISL1	START READING SCALE (input 1)
23	FS ↵	0000	Insert the reading value which coincides with the input value."ISI1". ** confirm with " FS ↵"
24		ISL1	
25	▲	FSI1	END INPUT 1 SCALE
26	FS ↵	1999	Insert the input value with which should represent the END scale reading "FSL1". ** confirm with " FS ↵"
27		FSI1	
28	▲	FSL1	FULL SCALE READING (input 1)
29	FS ↵	1000	Insert the reading value which coincides with the input value “FSI1” ** confirm with " FS ↵"
30		FSL1	
31	▲	ISI2	START INPUT 2 SCALE
32	FS ↵	0000	Insert the input value with which should represent the initial scale reading "ISL2". ** confirm with " FS ↵"
33		ISI2	
34	▲	ISL2	START READING SCALE (input 2)
35	FS ↵	0000	Insert the reading value which coincides with the input value. "ISI2". ** confirm with " FS ↵"
36		ISL2	
37	▲	FSI2	END INPUT 2 SCALE
38	FS ↵	1999	Insert the input value with which should represent the END scale reading "FSL2". ** confirm with " FS ↵"
39		FSI2	
40	▲	FSL2	FULL SCALE READING (input 2)
41	FS ↵	1000	Insert the reading value which coincides with the input value “FSI2” ** confirm with " FS ↵"
42		FSL2	
43	▲	OFFS	ZEROING
44	FS ↵	0000	Use this item to effect a zeroing that will be retained in memory. The number written can vary between -999 and 2000. ** confirm with " FS ↵"
45		OFFS	
46		ACA1	ALARM 1 LINK

n seq.	Touch key	Written on display	NOTE
47		CAn1	Select which item is linked to alarm1: **CAn1** = input 1 **CAn2** = input 2. **SUM** = input1 + input2, **DIF** = input1 - input2, **PrOd** = input1 * input2, **dIV** = input1 ÷ input2, **dISP** = diplay. To change this use the "▲" key and confirm with " FS ↵"
48		ACA1	
49	▲	rL1	SET UP OF EXCHANGE RELAY 1
50	FS ↵	nA	nA = normal open relay; nC = normal closed relay To change this use the "▲" key and confirm with " FS ↵"
51		rL1	
52	▲	HY1	HYSTERESIS ALARM1
53	FS ↵	200	Set up hysteresis requested with a number between 0 and 200 digits. ** confirm with " FS ↵"
54		HY1	
55	▲	Sd1	DELAY SELECTION RELAY1

56	FS ↵	no	no = no delay time;
			EC = switch on delay;
			di = switch off delay;
			ECdi = switch on + off delay
			To change use the "▲" key and confirm with " FS ↵"

57		Sd1	
58	▲	dL1	DELAY TIME ALARM 1
59	FS ↵	20.0	Set up required delay with number which varies between 0 and 20.0 seconds.
60		dL1	
61		ACA2	ALARM 2 LINK

n seq.	Touch key	Written on display	NOTE
62		CAn1	Select which item is linked to alarm2: **CAn1** = input 1 **CAn2** = input 2. **SUM** = input1 + input2, **DIF** = input1 - input2, **PrOd** = input1 * input2, **dIV** = input1 ÷ input2, **dISP** = diplay. To change this use the "▲" key and confirm with " FS ↵"
63		ACA2	
64	▲	rL2	EXCHANGE RELAY 2 SET UP
65	FS ↵	nA	nA = normal open relay; nC = normal closed relay . To change use the "▲" key and confirm with " FS ↵"
66		rL2	
67	▲	HY2	HYSTERESIS ALARM 2
68	FS ↵	200	Set up required hysteresis with a number between 0 and 200 digits. ** confirm with " FS ↵"
69		HY2	
70	▲	Sd2	SELECTION DELAY TYPE RELAY 2

71	FS ↵	no	no = no delay time;
			EC = switch on delay;
			di = switch off delay;
			ECdi = switch on + off delay.
			To change use the "▲" key and confirm with " FS ↵"

72		Sd2	
73	▲	dL2	DELAY TIME ALARM 2
74	FS ↵	20.0	Set up required delay with number which varies between 0 and 20.0 seconds.
75		dL2	
76	▲	AL3	SET POINT ALARM 3
77	FS ↵	1000	Set up the alarm 3 value ** confirm with " FS ↵"
78		AL3	
79		ACA3	ALARM 3 LINK

n seq.	Touch key	Written on display	NOTE
80		CAn1	Select which item is linked to alarm3: **CAn1** = input 1 **CAn2** = input 2. **SUM** = input1 + input2, **DIF** = input1 - input2, **PrOd** = input1 * input2, **dIV** = input1 ÷ input2, **dISP** = diplay. To change this use the "▲" key and confirm with " FS ↵"
81		ACA3	
82		rL3	
83	FS ↵	nA	nA = normal open relay; nC = normal closed relay . To change use the "▲" key and confirm with " FS ↵"
84		rL3	
85	▲	HY3	HYSTERESIS ALARM 3
86	FS ↵	200	Set up required hysteresis with a number between 0 and 200 digits. ** confirm with " FS ↵"
87		HY3	
88	▲	Sd3	SELECTION DELAY TYPE RELAY 3

89	FS ↵	no	no = no delay time;
			EC = switch on delay;
			di = switch off delay;
			ECdi = switch on + off delay.
			To change use the "▲" key and confirm with " FS ↵"

90		Sd3	
91	▲	dL3	DELAY TIME ALARM 2
92	FS ↵	20.0	Set up required delay with number which varies between 0 and 20.0 seconds.
93		dL3	
94	▲	ZEFI	FIXED ZERO SELECTION
95	FS ↵	on	OFF=standard display ON=fixed zero display . To change use the "▲" key and confirm with " FS ↵"
96		ZEFI	
97	▲	SEL.A	ANALOGUE OUTPUT SCALE

n seq.	Touch key	Written on display	NOTE
98	FS ↵	4 20	4 20= analogue ouput 4÷20mA; 0 20= analogue output 0÷20mA; 0 10= analogue output 0÷10. To change use the "▲" key and confirm with " FS ↵"
99		SEL.A	
100	▲	IS	BEGINNING SCALE READING (ANALOGUE OUTPUT)
101	FS ↵	0000	Write down the reading value where the analogue scale output begins (ISO) ** confirm with " FS ↵"
102		IS	
103	▲	FS	END SCALE READING (ANALOGUE OUTPUT)
104	FS ↵	1000	Write down output value which coincides with FSO value. ** confirm with " FS ↵"
105		FS	
106	▲	ISO	BEGINNING SCALE READING (ANALOGUE OUTPUT)
107	FS ↵	00.00	Write down output value which coincides with IS value. ** confirm with " FS ↵"
108		ISO	
109	▲	FSO	END SCALE READING (ANALOGUE OUTPUT)
110	FS ↵	10.00	Write down output value which coincides with FS value ** confirm with " FS ↵"
111		FSO	
112	▲	Addr	INSTRUMENT ADDRESS
113	FS ↵	0001	Input the instrument address with a number between 001 and 099. **(confirm with “FS ↵”)
114		Addr	
115	▲	bAUd	BAUD RATE
116	FS ↵	9600	Press the "▲" key until appears the desired baud-rate ** (confirm with “FS ↵”)
117		bAUd	
118	▲	dEF	DEFAULT PARAMETERS (see paragraph)
119	FS ↵	on	on= default parameter setup; OFF=no def.param. set up. To change use "▲" key and confirm with " FS ↵"
120		dEF	
121	▲	“measure”	

** To modify the preset number follow the procedure shown under the 'SETUP' paragraph.

2.6 DEFAULT PARAMETERS (dEF)

The instrument will signal erroneous setups with the Err9 display. In order to retrieve the situation as quickly as possible it is advisable to put the dEF function into use, which resets all the functions to factory default standards by eliminating all error situations.

WARNING: Setting up this function eliminates all the current instrument programming.

2.7 MATHEMATIC FUNCTIONS

It is possible to visualize the following functions by the "SCAL" menu item:
Input 1 (cAn1), input 2 (cAn2), the total count (SUn), the difference (diF), the division (dIV) and multiplication (Prod).
The result of the mathematic operations, counted by the instrument, are defined by the set up of every single input by the parameters ISI, ISL, FSI, FSL.
Example: sum of two pression transductor with input 4-20mA and full scale 10 BAR and 6 BAR. Set the intrument as is shown in the following scheme:

SCAL = 4 20
dISP = SUM

ISI1 = 4.00	ISI2 = 4.00
ISI1 = 0	ISI2 = 0
FSI1 = 19.99	FSI2 = 19.99
FSL1 = 1000	FSL2 = 600

Punto dec. = 00.00

The instrument with both 20mA inputs (full scale of trasducers) will show 16.00 BAR.
The functioning descripted above is valid for the sum and the difference. It is not possible to set the decimal point for the devision and the multiplication (the division is automatically set in the 000.0 position).
Another important detail in the visualization of the division is the segnalation of "Err" with input at zero and full scale.

3.0 ANALOGUE OUTPUT (OPTION)

The MPM P6 instrument can be ordered with a voltmeter and ammeter analogue output point ("OAP" options).
The flexibility of use and the comprehensive keyboard programming make this output an important interface between analogue computer input, recorders or repeaters with analogue input.
In particular the programming functions enable one to choose differing output (0÷10V, 0÷20mA, 4÷20mA) and the appropriate reading calibration. The maximum voltage that the instrument can use is 10V positive and is automatically limited in the programming phase. In addition the maximum current output generated is at most 20mA while in both cases their are no limits for furnishing intermediate values.

In order to set up the analogue output the user must install the two reading values (IS and FS) and the corresponding output values (ISO and FSO). It is necessary that for larger or smaller reading values to those programmed the analogue output values cannot exceed the values setup under the ISO and FSO programme values (output values).

For further clarification we would ask you to follow the examples shown in the paragraph 'Analogue output setup' . The analogue output instantly follows the display visualisation and is therefore blocked the moment in which the terminal board hold comes in and it takes account of the numbers zeroed using the 'Recovery Tara' function .

3.1 TECHNICAL CHARACTERISTICS

Table 3

Analogue output	0÷10V - 0÷ 20mA - 4÷20mA
Maximum current output imp.	400 Ω
Minimum voltage output	1KΩ
Maximum voltage supplied	10 V
Maximum current supplied	20mA
Resolution	12 bit

3.2 INSTALLATION OF ANALOGUE OUTPUT

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

1- Set up the connections as shown in Figure 1 for the ammeter output otherwise the connections

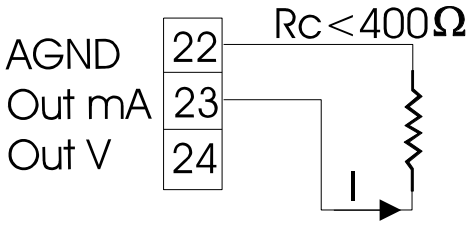


Figure A

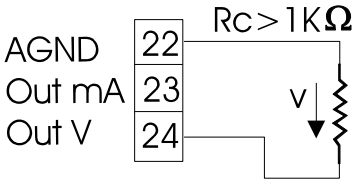


Figure B

shown in Figure 2 for the voltmeter output.

2- Program the menu items related to the analogue output (see table 2) and follow, eventually, the examples explained in the paragraph 'Notes on analogue output setup'. To undertake this programming it is necessary to take account of the following:

ISO (beginning of output scale) is the value of the analogue output which coincides with the number programmed under the menu item 'IS'. Make sure to load under

the 'IS' heading the display value which coincides with the initial value of the analogue output (ISO). The ISO programming item should be programmed on the basis of the output selected. As a consequence we can obtain:

- ISO = 00.00 V for voltmeter output
- ISO = 00.00 mA for the ammeter output (for 4-20mA output this item need not be programmed)

FSO (end scale output) is the value of analogue output which coincides with the number displayed under the menu item FS. Digit under the FS item the display value which should correspond with the final value of the analogue output (FSO). The menu item FSO should be programmed on the basis of the type of output required.

As a consequence we are able to obtain:

- FSO = 10.00 V if voltmeter output
- FSO = 19.99 mA if ammeter output (for 4-20mA output the voice is not programmable).

3.3 NOTES ON ANALOGUE OUTPUT SET UPS

- Programme the instrument to function with the following calibrations:

DISPLAY -500 AMMETER OUTPUT 5mA
DISPLAY 500 AMMETER OUTPUT +15mA
The instrument parameters must be set out as follows.
SEL.A = 0 20
IS = -500
FS = 500
ISO = 5.00*
FSO =15.00*

* with the instrument readings below -500, the analogue output remains fixed at 5mA, while with the reading above 500 the analogue output remains fixed at 15 mA.

- Programme the instrument to function with the following calibrations:

DISPLAY -500 AMMETER OUTPUT 4mA
DISPLAY 500 AMMETER OUTPUT 20mA
The instrument parameters must be set out as follows.
SEL.A = 4 20
IS = -500
FS = 500
ISO = not programmable*
FSO = not programmable*

- Programme the instrument to function with the following calibrations:

DISPLAY -1000 VOLTMETER OUTPUT 2V

DISPLAY +1000 VOLTMETER OUTPUT 6V
The instrument parameters must be set out as follows.
SEL.A = 0 10
IS = -500
FS = 500
ISO = 2.00*
FSO = 6.00*
* with the instrument readings below -500, the analogue output remains fixed at 2V, while with the reading above 500 the analogue output remains fixed at 6V.

4.0 SERIAL OUTPUT (OPTION)

MPM P6 models can communicate with an host computer along a RS232, RS422 and RS485 serial.

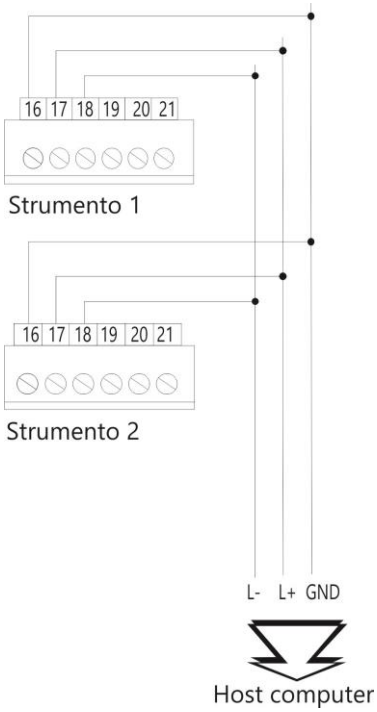
Bi-directional serial output

By the serial output it is possible to read out and write all parameters of the instrument. It is possible to connect up to 31 instruments (with RS485). All messages are sent and received by the serial output by an ASCII protocol.

Table 4

SERIAL CHARACTERISTICS	
baud rate	9600 4800 2400 1200 (programmable by the keyboard)
start bit	1 bit
Length	8 bit
Stop	1 bit
Parity	No

The wiring diagram for the MPM P6 model with RS422 or RS485 is shown in fig D. The wiring diagram for the MPM P6 model with RS232 is shown in fig C. To program the address and the baud rate see the table 2.



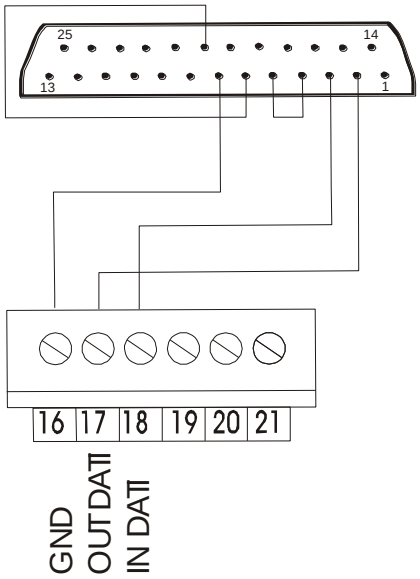


Figure D **Figure C**

4.1 DATA READING FROM HOST TO INSTRUMENT MPM P6

Transmission string set-up.

EOT GID GID UID UID C1 C2 ENQ

EOT = EOT from host indicates the start of transmission string
GID = ASCII code for the tenths of the instrument address to transmit twice consecutively
UID = ASCII code for the units of the instrument address to transmit twice consecutively
C1 C2 = mnemonic ASCII code for command to execute. (see paragraph "COMMAND CODES")

EXAMPLE: data transmission string from host to MPM P6 with address "01" for request of "Reading scale end" (FL)

EOT	0	0	1	1	F	L	ENQ	
04	30	30	31	31	46	4C	05	cod. ASCII

The instrument, from the moment in which it receives the first string code transmitted by the host, leaves 400 mSec. during which it waits for the end of the transmission operation. When the 400 mSec. operation finishes, or when the data reception is completed, the instrument, depending on the information received, can behave in the following four 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 completed, in this case the instrument transmits the data requested in ASCII format (see paragraph "DATA TRANSMISSION FROM MPM P6 TO HOST").
4) When the complete message is not received before "timeout" (400 mSec), the instrument rejects the information received and it is ready to receive a new message.

4.2 DATA TRANSMISSION FROM MPM P6 TO HOST

Transmission string configuration

STX C1 C2 D1 . . . . D6 ETX BCC

STX = start of text

C1 C2 = mnemonic code ASCII relative to command to execute (see paragraph "COMMAND CODES")

D1 ÷D6 = Numbers displayed, including negative sign, ">", decimal points (if it is present) and blank or zero for not significant digits (the transmitted digits must always be 6)

ATTENTION: the data must always be "supported" on the right 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	-	5	.	6
	20	20	2D	35	2E	36
2)	-	0	0	5	.	6
	2D	30	30	35	2E	36

ETX = End of text

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

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

EXAMPLE: data string from MPM P6 to host in response to example above.

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

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

1) The host-computer replies in ASCII: NACK (not understood). The MPM transmits again the data string.
2) The host-computer does not reply. In this case the instrument waits the next EOT on the network to set up the next communication.
3) The host-computer replies in ASCII: ACK (understood). The instrument waits new commands.

4.3 DATA WRITING FROM HOST TO MPM P6

Set up of transmission string

EOT GID GID UID UID STX C1 C2 D1 . . . D6 ETX BCC

EOT = EOT from host indicates the start of transmission string
GID = ASCII code for the tenths of the instrument address to transmit twice consecutively
UID = ASCII code for the units of the instrument address to transmit twice consecutively
C1 C2 = mnemonic ASCII code for command to execute (see paragraph "COMMAND CODES")
D1 ÷ D6 = Digits displayed. The same rules are valid as those described in the paragraph " data transmission from MPT to host"
BCC = Checksum, obtained using EXCLUSIVE OR, of the transmitted string excluding the code "STX" comprising "ETX" in the order indicated

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

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

EOT	0	0	1	1	STX	F	L	blank	blank	0	1	0	0	ETX	BCC
04	30	30	31	31	02	46	4C	20	20	30	31	30	30	03	08

The instrument, from the moment in which it receives the first code of the data string transmitted by the host, makes to start 400 mSec during which it waits for the transmission operation to be completed. When the 400 mSec. operation finishes, or when the data reception is completed, the instrument, depending on the information received, can be have 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 completed, in which case the instrument writes the information memorized and transmits the code ASCII=ACK (understood)
4) When the complete message is not received before "timeout" (400 mSec.), the instrument rejects the information received and is ready to receive a new message.

4.4 COMMAND CODES

The codes of the variables used for the MPM P6 instrument programming, are listed into the following table. Not all the parameters allow the writing from host, in this case the instrument does not work and replies "NACK".

Table 5

COMMAND CODES	COMMAND DESCRIPTION	ALLOWED SET-UP	TYPE OF CODE
DI	DISP (input selection)	read/write	hexadecimal 0 = Sun 1 = diF 2 = Prod 3 = div 4 = Chan 1 5 = Chan 2
C1	ACA1 (alarm 1)	read/write	hexadecimal 0: ACA1 = DISPL 1: ACA1 = SUn 2: ACA1 = DIF 3: ACA1 = Prod 4: ACA1 = dIv 5: ACA1 = CAn1 6: ACA1 = CAn2
C2	ACA2 (alarm 2)	read/write	hexadecimal 0: ACA2 = DISPL 1: ACA2 = SUn 2: ACA2 = DIF 3: ACA2 = Prod 4: ACA2 = dIv 5: ACA2 = CAn1 6: ACA2 = CAn2

COMMAND CODES	COMMAND DESCRIPTION	ALLOWED SET-UP	TYPE OF CODE
C3	ACA3 (alarm 3)	read/write	hexadecimal 0: ACA3 = DISPL 1: ACA3 = SUn 2: ACA3 = DIF 3: ACA3 = Prod 4: ACA3 = dIv 5: ACA3 = CAn1 6: ACA3 = CAn2
II	ISI (channel 1)	read/write	ASCII ±9999
IL	ISL (channel 1)	read/write	ASCII ±9999
FI	FSI (channel 1)	read/write	ASCII ±9999
FL	FSL (channel 1)	read/write	ASCII ±9999
I1	ISI (channel 2)	read/write	ASCII ±9999
I2	ISL (channel 2)	read/write	ASCII ±9999
F1	FSI (channel 2)	read/write	ASCII ±9999
F2	FSL (channel 2)	read/write	ASCII ±9999
SC	SCAL (selection input current)	read/write	hexadecimal 1 = 0÷20mA 2 = 4÷20mA
OF	OFFS (visualiz.)	read/write	ASCII ±9999
PT	P.dEC (decimal point)	read/write	hexadecimal 0 = no point 1 = 199.9 2 = 19.99 3 = 1.999
AT	SEL.A (analogue output scale)	read/write	hexadecimal 0 = E0.10 1 = C0.20 2 = C4.20
IU	IS (out an.)	read/write	ASCII ±9999
FU	FS (out an.)	read/write	ASCII ±9999
IO	ISO (out an.)	read/write	ASCII 19.99
FO	FSO (out an.)	read/write	ASCII 19.99
RT	Recovery tara	only write	hexadecimal 0 = clear rec. tara 1 = set rec. tara
RO	read out (display)	only read	
SW	Status word	read/write	See paragraph “Generic status word”
A1..A3*	SP1 (AL1÷AL3)	read/write	ASCII ± 9999

COMMAND CODES	COMMAND DESCRIPTION	ALLOWED SET-UP	TYPE OF CODE
H1..H3*	HY (AL1÷AL3)	read/write	ASCII 0÷199
D1..D3*	delay(AL1÷AL3)	read/write	ASCII 0÷19.9
W1..W3*	alarm status word	read/write	hexadecimal 0÷F

4.5 TRASMISSION OF HEXADECIMAL VALUES

Some values must be transmitted in a 4 digit hexadecimal format. In this case the protocol string must be preceded by the ASCII character ">".
EXAMPLE: for decimal point = 199.9 the data will be: blank >0001

EXAMPLE OF READING DECIMAL POINT

HOST:

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

MPM P6 INSTRUMENT:

STX	P	T	blank	>	0	0	0	1	ETX	BCC
02	50	54	20	3E	30	30	30	31	03	18

EXAMPLE OF WRITING DECIMAL POINT

HOST:

EOT	0	0	1	1	STX	P	T	blank	>	0	0	0	1	ETX	BCC
04	30	30	31	31	02	50	54	20	3E	30	30	30	31	03	18

MPM P6 instrument:

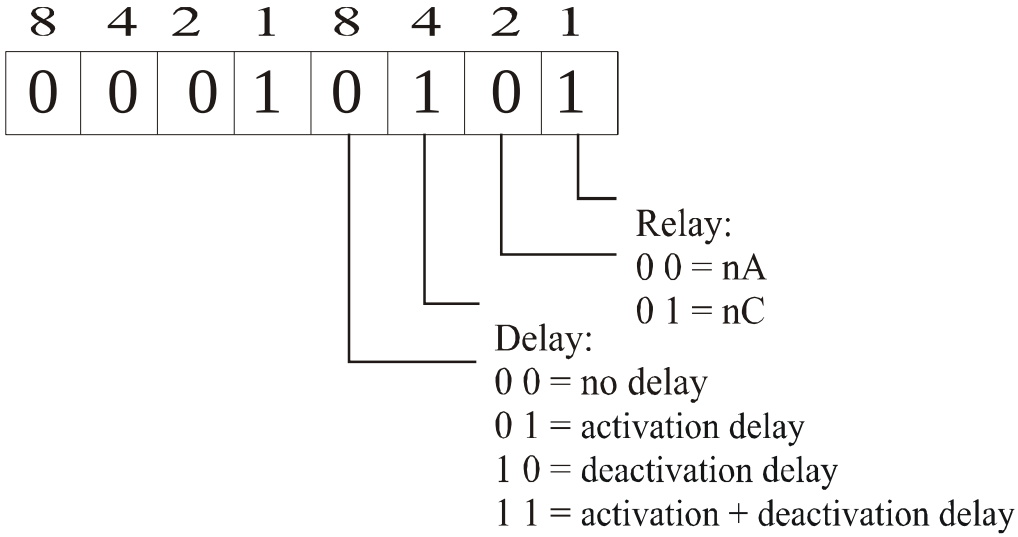
ACK
06

4.6 ALARM SETTING

MPM P6 series instruments can have up to 3 alarms with delay time and hysteresis. The relevant codes are:

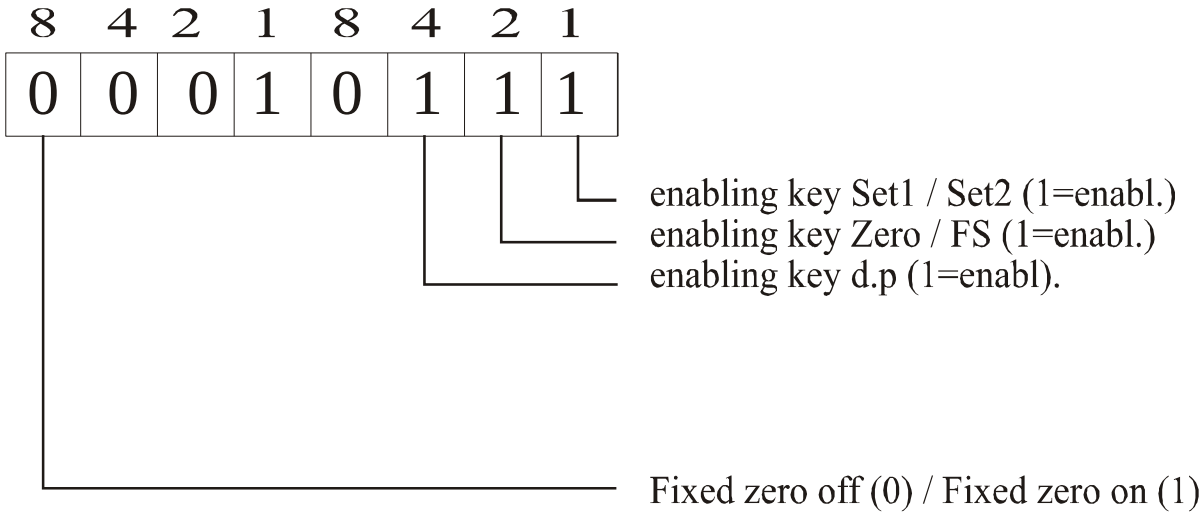
A reading/writing of SP1
H reading/writing of hysteresis
D reading/writing of delay time
W reading/writing of the status word of the alarm

The code is followed by a number between 1 and 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 (normaly open or close) 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.



4.7 GENERIC STATUS WORD (SW)

The status word "SW" allows to enable the front keys by serial, to enable the fixed zero and selection temperature read out (°C or °F). To make the hexadecimal data to transmit, follow the next scheme.



4.8 AN EXAMPLE IN BASIC LANGUAGE

Here you can see an example of a program in Basic to read the readout of the instrument with a serial line. Program the instrument with address = 01, baud rate = 9600.

```
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$(11, #1)
b$ = mid $(a$, 4, 7)
```

```
print
print “readout: “;b$
end
20 print “nothing received”
resume
```

5.0 PASSWORD FUNCTION

The user should save the programmed information from misuse by using the password function.
The instrument comes supplied with a password code =0, but any number between 0 and 9999 can be set up as an access code in order to modify the instrument functioning (for programming personal password number check with the following table).
The use of the password code is requested each time the user wishes to gain access to the programming functions. The instrument, after having obtained the password number then behaves in two different ways.
1) **correct N.Pass** The user can use the programming menu in order to modify a function or number.
2) **incorrect Pass** The user can gain access to the programming menu only in order to check the numbers and functions already programmed, but never to modify them.

WARNING. The number programmed under the c.PAS menu item by the user must be reinserted under the PASS heading each time that the programming menu is used for insertion of the variables. If the user does not remember the exact secret code, then it is necessary to call our service centre.

Table 4

n seq.	Touch Key	Written on display	NOTE
1	FS ↵ + SET1	PASS	Touch FS ↵ + SET1
1	FS ↵	PASS	Touch 'enter' key
2	FS ↵	0 000	** (confirm with ' FS ↵')
3	▲	C.PAS	PERSONAL PASSWORD NUMBER
4	FS ↵	0 000	Enter Password Number between 0 and 9999 . ** (confirm with ' FS ↵')
5		C.PAS	
6	▲	“measure”	Touch 'up' key until you exit the menu

** To modify the preset number follow the procedure shown under the 'SETUP' paragraph.

6.0 SET UP

The following paragraph shows the steps necessary for programming the various menu items. The example that follows is related to programming under the 'CPAS' menu item, but the procedure is valid for all the menu items that need a numerical setup.

Table 5

n seq.	Touch Key	Written on display	NOTE
1		CPAS	Example of password change
2	FS ↵	0 000	The display appears as a flashing number)
3	▸	0 0 00	Pressure on the ▸ key moves the flashing number right
4	▲	0 1 00	Pressure on the ▲ key increases the flashing number
5	FS ↵	CPAS	The number is memorized and the display returns to selected menu item

7.0 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..
The power supply or transformer used to supply our instruments must be of “safe” type with “double isolation” type.

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.