USER'S MANUAL
Series MP1200 P6

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ME2065_10
07/17

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1.0 GENERAL POINTS

The instrument of the MP1200 series in the P6 type container (75mm depth) can be programmed with the following inputs: 4÷20mA, 0÷20mA, 0÷10V, thermocoupling J (Fe/Co) 0÷600°C, thermocoupling K (Cr/Al) 0÷1200°C, thermocoupling S (Pt/Pt-10%Rh) 0÷1710°C or thermoresistence (PT100r: –40,0÷410,0°C, PT100e: –40÷800°C). The main characteristics are as follows:

- two alarms with exchange relay output (3 if 220V power supply)
- 18V not regulated for 2 or 3 wires 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
- temperature in °C or °F
- programmable analogue output in voltage (0-10V) or current output (0-20mA or 4-20mA)
- RS485 or RS232 serial outputs
- 20 step to linearize analogue inputs
- programmable digital filter

1.1 TECHNICAL CHARACTERISTICS

Table 1

Input impedance	4÷20 mA input imp.: 20 Ω 0÷10V voltage input imp.: 1MΩ
Transducer supply	18Vdc, 20mA
Cold junction compensation:	automatic
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 of resolution
Power Supply	90÷260 Vac/Vdc, 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

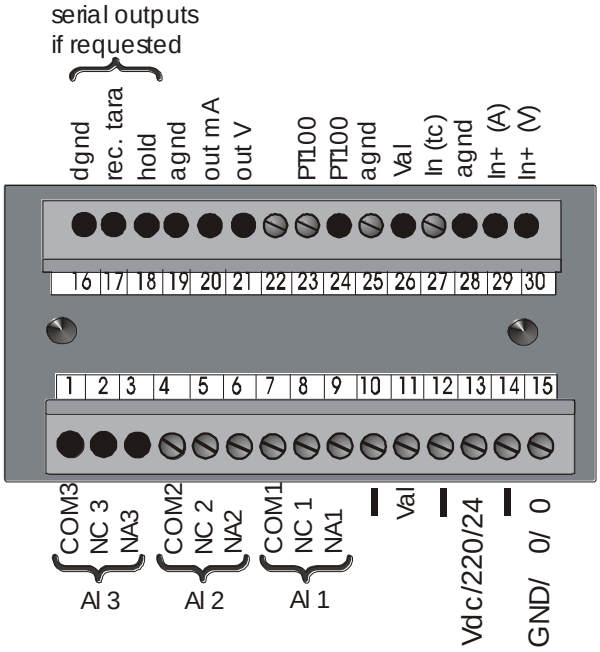
▶ : shifts blinking digit in menu

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



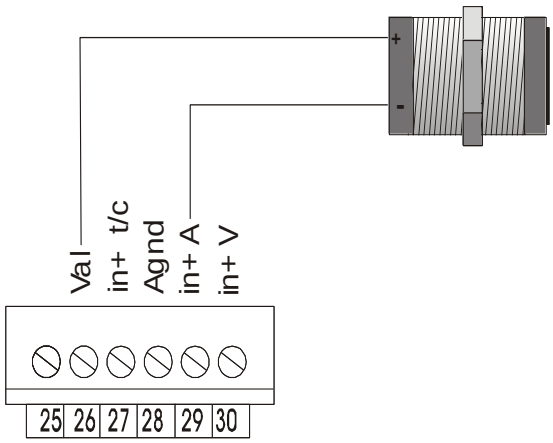
Terminals 1, 2, 3	- alarm output 3
Terminals 4,5,6	- alarm output 2
Terminals 7,8,9	- alarm output 1
Terminal 11	- transducer power supply (18V)
Terminals 13 and 15	- instrument power supply (Vcc, Vpt, 24Vac, 90÷260Vac) With DC power supply, terminal 13 is positive and terminal 15 is negative.
Terminals 27, 28	- thermocoupling input
Terminals 28, 29	- current input 0/4÷20mA
Terminals 28, 30	- voltage input 0÷10V
Terminals 23, 24 e 25	- thermoresistance input PT100
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)

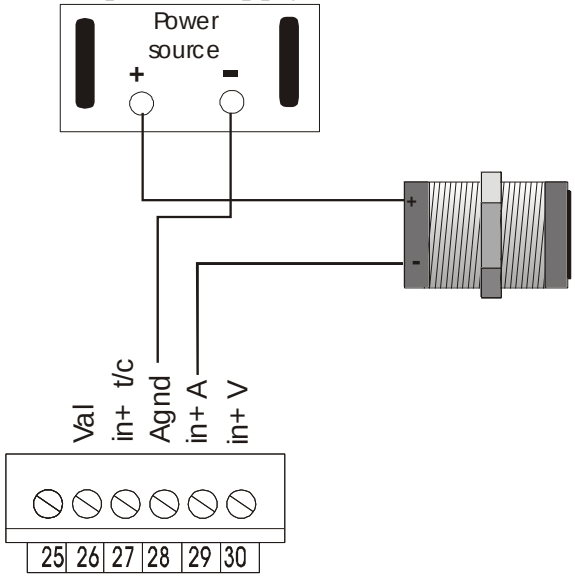
If requested serial output (the “hold” and “Rec. tara” functions is not available):
Terminal 16: see paragraph “serial outputs”
Terminal 17: see paragraph “serial outputs”
Terminal 18: see paragraph “serial outputs”

1.2.1 WIRING DIAGRAM FOR CURRENT INPUT

1) Connection for 2 wire transducer

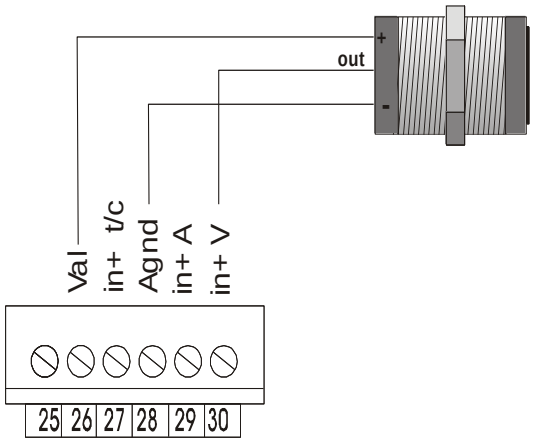


2)Connection for 2 wire transducer with external power supply

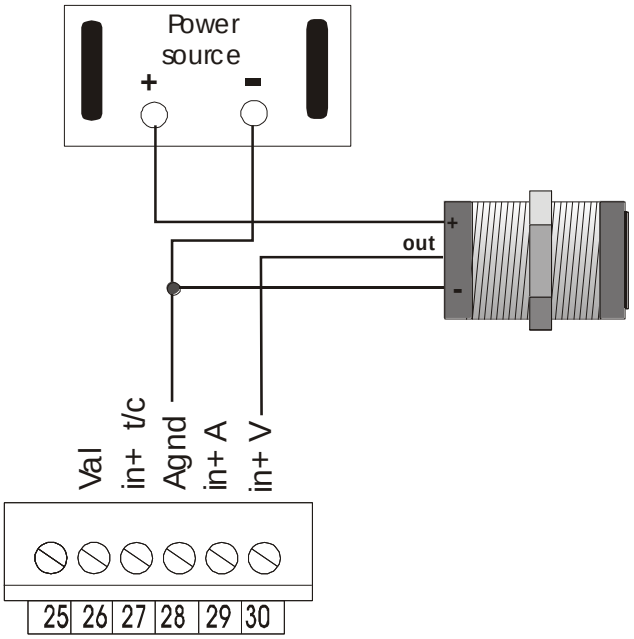


1.2.2 WIRING DIAGRAM FOR VOLTAGE INPUT

1) Connection for 3 wire transducer

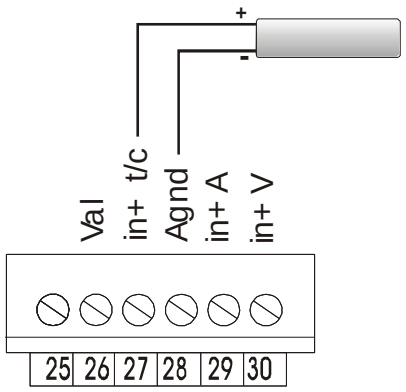


2) Connection for 3 wire transducer with external power supply



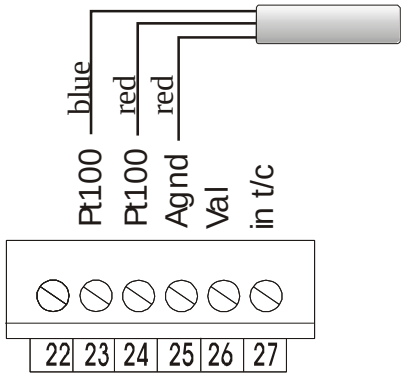
1.2.3 WIRING DIAGRAM FOR THERMOCOUPLING OR THERMORESISTANCE

Connection thermocoupling input

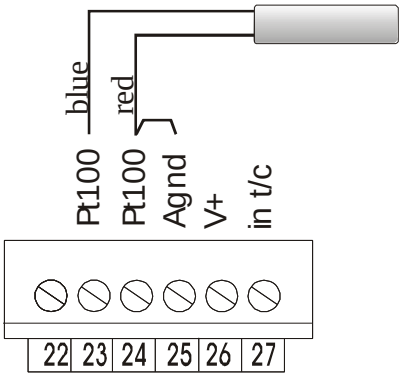


Thermocouplings must be isolated. For thermocoupling connection use only compensated wire for the type of thermocouple in use.
If shielded cable is used, connect the shield to ground at one end only.

Thermoresistance 3 wires

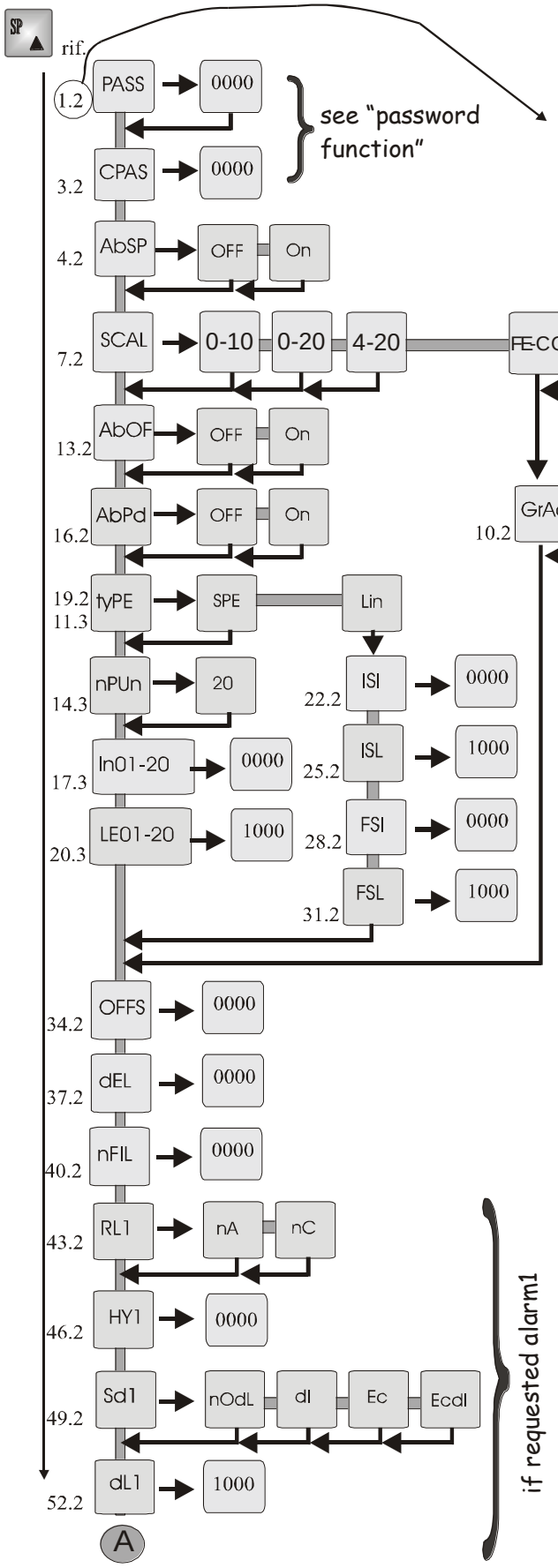


Thermoresistance 2 wires



For thermoresistance connection pay attention to the line resistance: if too high there may be some errors in readout. Use the same kind of wire for the three connections. If shielded cable is used, connect the shield to ground at one end only.

1.3 PROGRAMMING TIPS



Press SET1 + F.S. keys and reach the program menu.

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

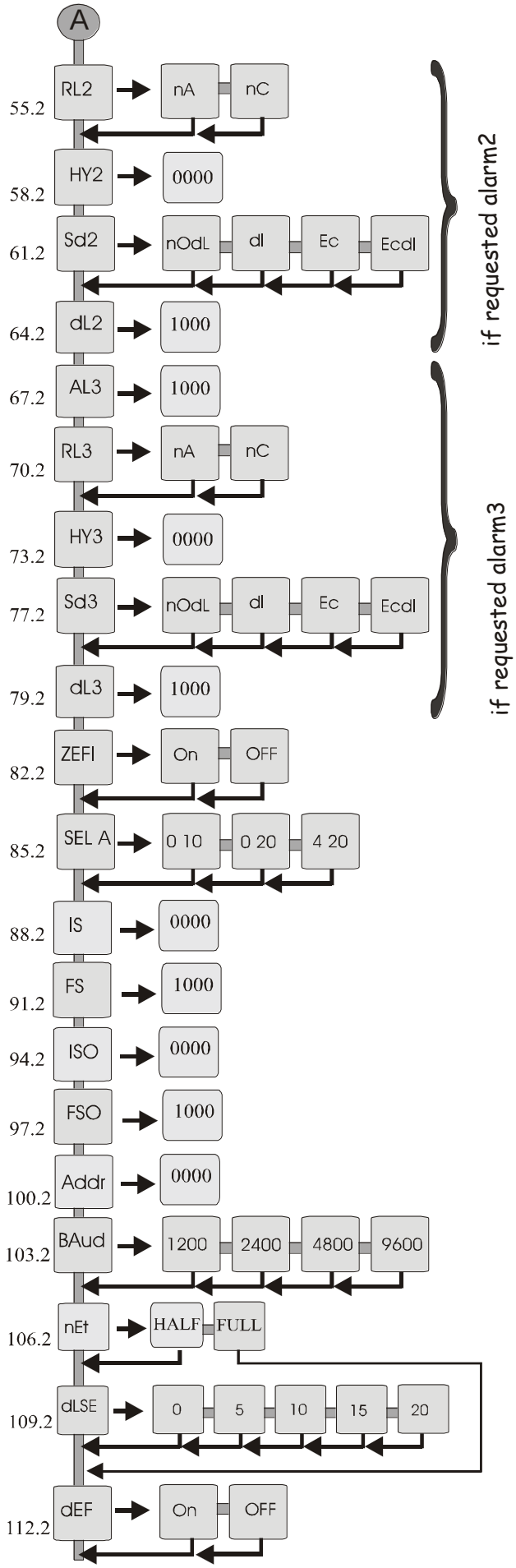
To skip into the item press F.S. key.

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 SET2 key: the modified parameters will be stored.


A
55.2
RL2
nA
nC
58.2
HY2
0000
61.2
Sd2
nOdL
dI
Ec
EcdI
64.2
dL2
1000
if requested alarm2
67.2
AL3
1000
70.2
RL3
nA
nC
73.2
HY3
0000
77.2
Sd3
nOdL
dI
Ec
EcdI
79.2
dL3
1000
if requested alarm3
82.2
ZEFI
On
OFF
85.2
SEL A
0 10
0 20
4 20
88.2
IS
0000
91.2
FS
1000
94.2
ISO
0000
97.2
FSO
1000
100.2
Addr
0000
103.2
BAud
1200
2400
4800
9600
106.2
nEt
HALF
FULL
109.2
dLSE
0
5
10
15
20
112.2
dEF
On
OFF

2.0 INSTALLATION NOTES

2.1 INSTALLATION PROCEDURE

1- Execute the connections as indicated at 5, 6,7 pages
2- Switch on the instrument
3- Enter in the menu and set the requested scale (see table 2). For voltage or current inputs it is necessary to follow the indications written in 4, 5 and 6 steps.
4- Set the reading value that must coincide with the minimum input value (0 for 0÷10V and 0÷20mA scales, 4 for 4÷20mA scale). For this setup use Zero key following the paragraph "How to operate".
5- Set the reading value that must coincide with the full scale input value (10V for 0÷10V scale, 20mA for 4÷20mA and 0÷20mA scales). For this set up use F.S. key following the paragraph "How to operate".
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 (if requested)
8- Use the SET2 key to set up alarm value 2 (if requested)
9- To set the alarm value 3 (only with 230V power supply) see Table 2.
10- The instrument is now ready for use.
11- For automatic zeroing check the recovery Tara function.
12- To install other input parameters or alarms see the instrument setup 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.

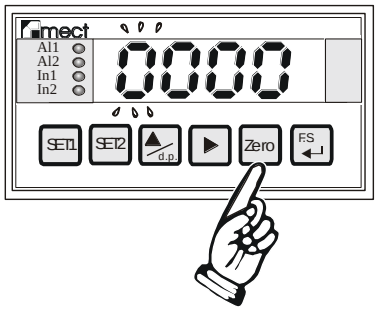
To configure the instrument with **0÷10V** input scale, it is necessary to set up in the menu "SCAL" item as 0-10. In this way, by "zero" key we can set up the reading value coincident with 0V at the input and by "F.S." key we can set up the reading

value coinsident with 10V at the input. By “d.p." key we can set up the decimal point.

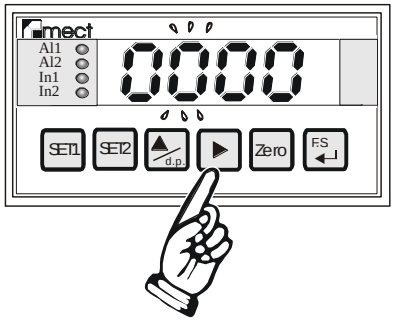
To configure the instrument with **4÷20mA** input scale, it is necessary to set up in the menu “SCAL” item as 4-20. In this way, by "zero" key we can set up the reading value coincident with 4mA at the input and by “F.S." key we can set up the reading value coinsident with 20mA at the input. By “d.p." key we can set up the decimal point.

To configure the instrument with **0÷20mA** input scale, it is necessary to set up in the menu “SCAL” item as 0-20. In this way, by "zero" key we can set up the reading value coincident with 0mA at the input and by “F.S." key we can set up the reading value coinsident with 20mA at the input. By “d.p." key we can set up the decimal point.

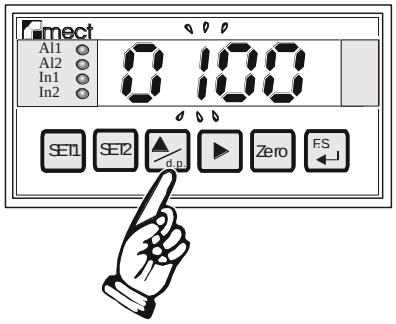
There now follow examples of zero calibration which are also true for end scale and alarms using the personalized keys F.S., SET1 and SET2.



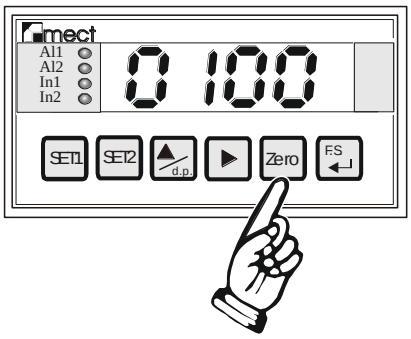
1st OPERATION
Touch the zero key. The display will visualize the value which it keeps in memory with the first left hand digit flashing.



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

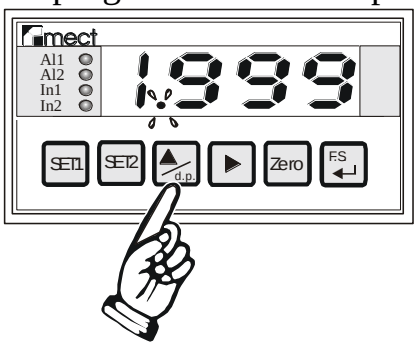


3rd OPERATION
Touch the “ ▲ ” key to increase the flashing number.



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. This operation is indicated when the led 'In1' lights up on the instrument front.
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 program '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

For the programming of the instrument display parameters there are four codes:
ISI, ISL, FSI, and FSL. 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”.

Figure A

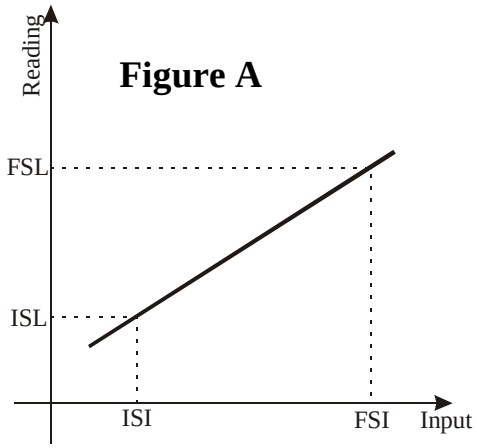


Table 2

N seq.	Touch key	Display value	NOTES
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

N seq.	Touch key	Display value	NOTES
8	FS ↵	0 10	0 10 = input 0÷10V 0 20 = input 0÷20mA 4 20 = input 4÷20mA FeCo = input thermocoupling Fe/CO, CrAL = input thermocoupling Cr/AL, PtPr = input thermocoupling Pt/Pt-Rh10%, PtE = input Pt100 -40÷800°C, Ptr = input Pt100 -40,0÷410,0°C. to change use " ▲ " key and confirm with " FS ↵"
9		SCAL	
10	▲	GrAd	SELECTION °C or °F (for temperature input)
11	FS ↵	°C	to change use " ▲ " key and confirm with " FS ↵"
12		GrAd	
13	▲	AbOF	ZERO SETUP AND END SCALE
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	▲	tyPE	SELECTION TYPE OF DISPLAY (for analogue inputs)
20	FS ↵	LIn	LIn = linear display with 4 setup parameters SPE = 20 step display (see paragraph) To change use ▲ key and confirm with “FS ↵”
21		tyPE	
22	▲	ISI	START INPUT SCALE (for analogue inputs tyPE = LIn)
23	FS ↵	0000	Insert the input value with which should represent the initial scale reading. ** confirm with " FS ↵"
24		ISI	
25	▲	ISL	START READING SCALE (for analogue inputs tyPE = LIn)
26	FS ↵	0000	Insert the reading value which coincides with the input value. confirm with " FS ↵"
27		ISL	

N seq.	Touch key	Display value	NOTES
28	▲	FSI	END INPUT SCALE (for analogue inputs tyPE = LIn)
29	FS ↵	1999	Insert the input value with which should represent the END scale reading. ** confirm with " FS ↵"
30		FSI	
31	▲	FSL	FULL SCALE READING (for analogue inputs tyPE = LIn)
32	FS ↵	1000	Insert the reading value which coincides with the input value. confirm with " FS ↵"
33		FSL	
34	▲	OFFS	ZEROING
35	FS ↵	0000	Use this item to effect a zeroing that will be retained in memory. The number written can vary between -200 and 200 ** confirm with " FS ↵"
36		OFFS	
37	▲	dEL	DELTA FILTER
38	FS ↵	0000	Use this item to setup a window around the measure within which the filter works. Outside the window the filter reset itself
39		dEL	
40	▲	nFIL	FILTER
41	FS ↵	0000	Use this item to setup the filter weight (0= no filter, 99= maximum filter) (confirm with " FS ↵")
42		nFIL	
43	▲	rL1	EXCHANGE RELAY 1 SET UP
44	FS ↵	nA	nA = normal open relay; nC = normal closed relay To change this use the " ▲ " key and confirm with " FS ↵"
45		rL1	
46	▲	HY1	HYSTERESIS ALARM 1
47	FS ↵	200	Set up required hysteresis (see Fig. B) with a number between 0 and 200 digits. ** confirm with " FS ↵"
48		HY1	
49	▲	Sd1	DELAY SELECTION RELAY 1

50	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 ↵"

51		Sd1	

N seq.	Touch key	Display value	NOTES
52	▲	dL1	DELAY TIME ALARM 1
53	FS ↵	20.0	Set up required delay with number which varies between 0 and 20.0 seconds.
54		dL1	
55	▲	rL2	EXCHANGE RELAY 2 SET UP
56	FS ↵	nA	nA = normal open relay; nC = normal closed relay . To change use the " ▲ " key and confirm with " FS ↵"
57		rL2	
58	▲	HY2	HYSTERESIS ALARM 2
59	FS ↵	200	Set up required hysteresis (see Fig. B) with a number between 0 and 200 digits. ** confirm with " FS ↵"
60		HY2	
61	▲	Sd2	SELECTION DELAY TYPE RELAY 2

62	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 ↵"

63		Sd2	
64	▲	dL2	DELAY TIME ALARM 2
65	FS ↵	20.0	Set up required delay with number which varies between 0 and 20.0 seconds.
66		dL2	
67	▲	AL3	SET POINT ALLARME 3
68	FS ↵	1000	Set up the alarm 3 value ** confirm with " FS ↵"
69		AL3	
70	▲	rL3	EXCHANGE RELAY 3 SET UP
71	FS ↵	nA	nA = normal open relay; nC = normal closed relay . To change use the " ▲ " key and confirm with " FS ↵"
72		rL3	
73	▲	HY3	HYSTERESIS ALARM 3
74	FS ↵	200	Set up required hysteresis (see Fig. B) with a number between 0 and 200 digits. ** confirm with " FS ↵"
75		HY3	
76	▲	Sd3	SELECTION DELAY TYPE RELAY 3

N seq.	Touch key	Display value	NOTES

77	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 ↵"

78		Sd3	
79	▲	dL3	DELAY TIME ALARM 3
80	FS ↵	20.0	Set up required delay with number which varies between 0 and 20.0 seconds.
81		dL3	
82	▲	ZEFI	FIXED ZERO SELECTION
83	FS ↵	on	OFF=standard display ON=fixed zero display . To change use the " ▲ " key and confirm with " FS ↵"
84		ZEFI	
85	▲	SEL.A	ANALOGUE OUTPUT SCALE
86	FS ↵	4 20	4 20= analogue output 4÷20mA; 0 20= analogue output 0÷20mA; 0 10= analogue output 0÷10. To change use the " ▲ " key and confirm with " FS ↵"
87		SEL.A	
88	▲	IS	BEGINNING SCALE READING (ANALOGUE OUTPUT)
89	FS ↵	0000	Write down the reading value where the analogue scale output begins (ISO) ** confirm with " FS ↵"
90		IS	
91	▲	FS	END SCALE READING (ANALOGUE OUTPUT)
92	FS ↵	1000	Write down output value which coincides with analog end scale value (FSO). ** confirm with " FS ↵"
93		FS	
94	▲	ISO	BEGINNING SCALE READING (ANALOGUE OUTPUT)
95	FS ↵	00.00	Write down output value which coincides with IS value. ** confirm with " FS ↵"
96		ISO	
97	▲	FSO	END SCALE READING (ANALOGUE OUTPUT)
98	FS ↵	10.00	Write down output value which coincides with FS value ** confirm with " FS ↵"
99		FSO	

N seq.	Touch key	Display value	NOTES
100	▲	dEF	DEFAULT PARAMETERS (see paragraph)
101	FS ↵	on	on= default parameter setup; OFF=no def.param. set up. To change use " ▲ " key and confirm with " FS ↵"
102		dEF	
103	▲	"measure"	

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

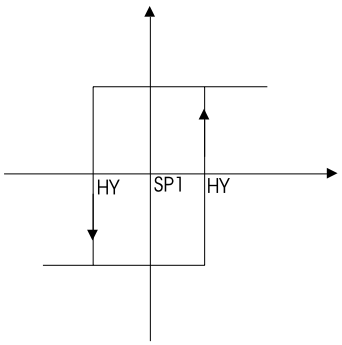


Figure B

2.6 DEFAULT PARAMETERS (dEF)

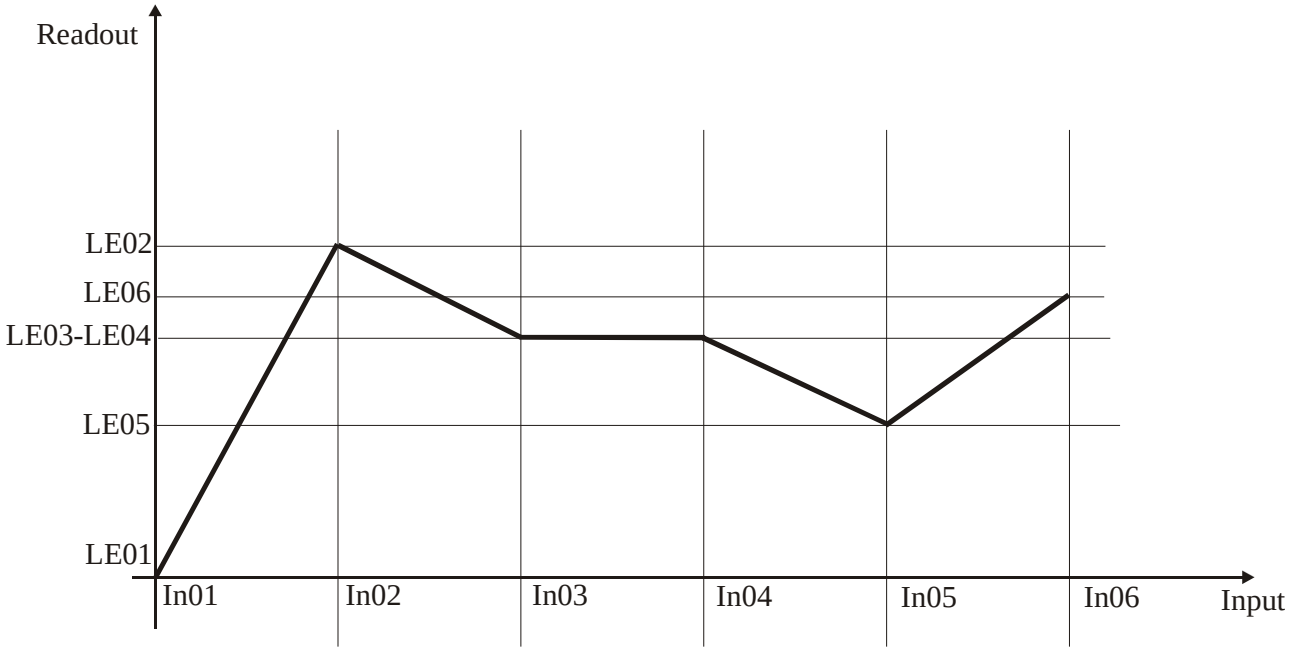
The instrument will signal erroneous setups with the "Err9" display. In order to retrieve the situation as quickly as possible it is advisable to put the dEF function into use, which resets all the functions to factory default standards by eliminating all error situations.

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

2.7 20 STEP READOUT

The instrument can be programmed to show the readout in up to 20 linear steps with 0÷10V, 0÷20mA e 4÷20mA input. In the figure is shown, as example, a graph that shows a display with 6 steps with the following setup:

POINTS	INPUT	READOUT
Point 1	0mA(In01)	0(LE01)
Point 2	4mA(In02)	15000(LE02)
Point 3	8mA(In03)	11000(LE03)
Point 4	12mA(In04)	11000(LE04)
Point 5	16mA(In05)	7000(LE05)
Poimt 6	20mA(In06)	13000(LE06)



To obtain a STEP readout it is necessary to choose the “tYPE = SPE” item in the menu, program the desired number of points in the “nPUn” item in the menu (in this case 6) and program the input and readout values as desired.

IMPORTANT NOTICE

Input values (In01….In20) must be ascending in their values hence X value must be greater than X-: for example In03 is greater than In02 and so forth. The following table explains how to program the instrument. After setting the item “tyPE”= ”SPE” program the coordinates for the desired step lines following the instructions provided in the table below.

Table 3

N seq.	Key to press	Display value	NOTES
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	▲	SCAL	SELECTION INPUT
6	FS ↵	0 10	0 10 = input 0÷10V 0 20 = input 0÷20mA 4 20 = input 4÷20mA To change use " ▲ " key and confirm with " FS ↵"
7		SCAL	
8	▲	AbOF	ZERO SETUP AND END SCALE

N seq.	Key to press	Display value	NOTES
9	▲	AbPd	DECIMAL POINT SETUP
10	▲	tyPE	DISPLAY SELECTION (for analogue inputs)
11	FS ↵	SPE	LIn = linear display with 4 setup parameters SPE = 20 step display To change use " ▲ " key and confirm with " FS ↵"
12		tyPE	
13	▲	nPUn	NUMBER OF POINTS
14	FS ↵	20	Setup the desired number of points (at least 2). confirm with " FS ↵"
15		nPUn	
16	▲	In01	FIRST INPUT POINT
17	FS ↵	04.000	Write the first point for input ** confirm with " FS ↵"
18		In01	
19	▲	LE01	FIRST DISPLAY POINT
20	FS ↵	00000	Write the desired display value with the input In01. ** confirm with " FS ↵"
21		LE01	
22	▲	In02	Complete the others point in the same way.

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

3.0 “FILTER” FUNCTION

The MP1200 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.

4.0 ANALOGUE OUTPUT (OPTION)

The MP1200 P6 instrument can be ordered with a voltmeter and ammeter analogue output (“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.

4.1 TECHNICAL CHARACTERISTICS

Table 4

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

4.2 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 C for the ammeter output otherwise the connections shown in Figure D for the voltmeter output.

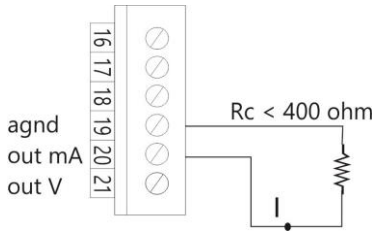


Figure C

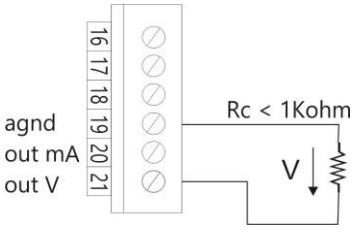


Figure D

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).

4.3 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*
*with the instrument readings below -500, the analogue output remains fixed at 4mA, while with the reading above 500 the analogue output remains fixed at 20mA.

- 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.

5.0 SERIAL OUTPUT (OPTION)

MP1200 P6 models can communicate with an host computer along a RS232, RS422 and RS485 serial. Program the menu items: BAUD-RATE to setup transfer speed, the address and the answer delay to avoid line conflicts (only for RS485 half duplex). To setup the instrument see the table:

Table 5

N seq.	Touch key	Display value	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)
	▲		Press "▲"fino to achieve the following entry
4	▲	Addr	INSTRUMENT ADDRESS
5	FS ↵	0001	Input the instrument address with a number between 001 and 099. **(confirm with "FS ↵")
6		Addr	
7	▲	bAUd	BAUD RATE
8	FS ↵	9600	Press the "▲" key until appears the desired baud-rate (1200, 2400, 4800, 9600)** (confirm with "FS ↵")
9		bAUd	

N seq.	Touch key	Display value	NOTE
10	▲	dLSE	SERIAL ANSWER DELAY SELECTION (SE HALF DUPLEX)
11	FS ↵	5	Press "▲" key until the desired delay time appears (0, 5, 10, 15, 20). Confirm with "FS ↵".
12		dLSE	
13	▲	"measure"	

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 6

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 MP1200 P6 model with RS232 is shown in fig. E while for model with RS422 or RS485 is shown in fig. F.

Programming instruments with the address code, the BAUD RATE and implement a program of interviews using the mnemonics described in the following pages.

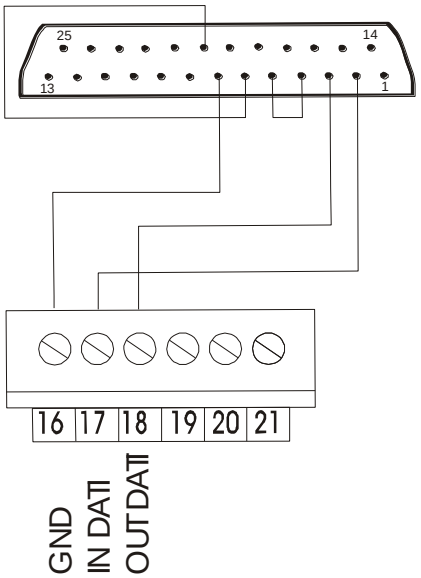


Figure E

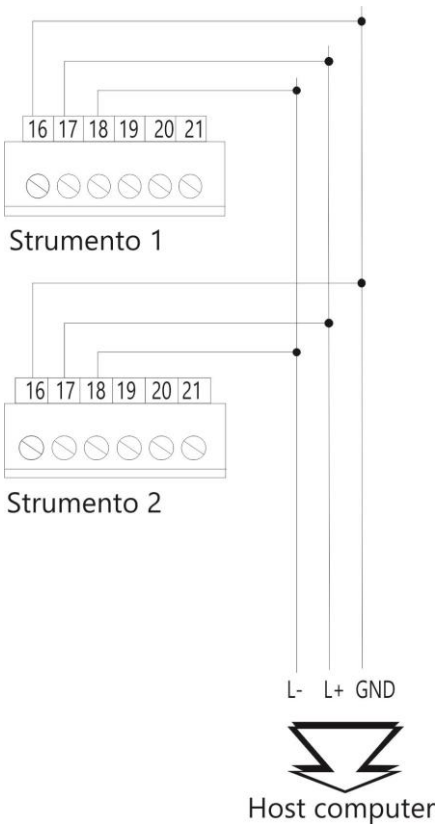


Figure F

5.1 DATA READING FROM HOST TO INSTRUMENT MP1200 P6

Transmission string set-up.

EOT GID GID UID UID C1 C2 ENQ

EOT = EOT from host indicates the 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 MP1200 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 MP1200 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.

5.2 DATA TRANSMISSION FROM MP1200 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 MP1200 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 MP1200 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 MP1200 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.

5.3 DATA WRITING FROM HOST TO MP1200 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 = 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 ÷ D6 = Digits displayed. The same rules are valid as those described in the paragraph " data transmission from MP1200 P6 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 MP1200 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 this 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.

5.4 COMMAND CODES

The codes of the variables used for the MP1200 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 7

COMMAND CODES	**COMMAND DESCRIPTION**	**ALLOWED SET-UP**	**TYPE OF CODE**
SC	SCAL (input selection)	read/write	hexadecimal 0 = Fe-Co 1 = Cr-Al 2 = PtPr 3 = PtE 4 = Ptr 5 = 0-10V 6 = 0-20mA 7 = 4-20mA
II	ISI	read/write	ASCII -1999÷9999
IL	ISL	read/write	ASCII -1999÷9999
FI	FSI	read/write	ASCII -1999÷9999
FL	FSL	read/write	ASCII -1999÷9999
OF	OFFS	read/write	ASCII -1999÷9999
PT	P.dEC (decimal point)	read/write	hexadecimal 0 = no point 1 = 199.9 2 = 19.99 3 = 1.999

COMMAND CODES	COMMAND DESCRIPTION	ALLOWED SET-UP	TYPE OF CODE
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 -1999÷9999
FU	FS (out an.)	read/write	ASCII -1999÷9999
IO	ISO (out an.)	read/write	ASCII 19.99
FO	FSO (out an.)	read/write	ASCII 19.99
DS	DLSE	read/write	ASCII 0÷255
RT	Recovery tara	only write	hexadecimal 0 = clear rec. tara 1 = set rec. tara
RO	read out (display)	only read	
SA	dEL (filter)	read/write	ASCII 9999
NM	NM (filter)	read/write	ASCII 99
SW	Status word	read/write	See paragraph “Generic status word”
A1..A3*	SP1 (AL1÷AL3)	read/write	ASCII -1999÷9999
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
I0	In01	read/write	ASCII -1999÷9999
I1	In02	read/write	ASCII -1999÷9999
I2	In03	read/write	ASCII -1999÷9999
I3	In04	read/write	ASCII -1999÷9999
I4	In05	read/write	ASCII -1999÷9999
I5	In06	read/write	ASCII -1999÷9999
I6	In07	read/write	ASCII -1999÷9999
I7	In08	read/write	ASCII -1999÷9999
I8	In09	read/write	ASCII -1999÷9999
I9	In010	read/write	ASCII -1999÷9999
IA	In011	read/write	ASCII -1999÷9999
IB	In012	read/write	ASCII -1999÷9999
IC	In013	read/write	ASCII -1999÷9999
ID	In014	read/write	ASCII -1999÷9999
IE	In015	read/write	ASCII -1999÷9999
IF	In016	read/write	ASCII -1999÷9999
IG	In017	read/write	ASCII -1999÷9999

COMMAND CODES	COMMAND DESCRIPTION	ALLOWED SET-UP	TYPE OF CODE
IH	In018	read/write	ASCII -1999÷9999
IJ	In019	read/write	ASCII -1999÷9999
IK	In020	read/write	ASCII -1999÷9999
L0	LE01	read/write	ASCII -1999÷9999
L1	LE02	read/write	ASCII -1999÷9999
L2	LE03	read/write	ASCII -1999÷9999
L3	LE04	read/write	ASCII -1999÷9999
L4	LE05	read/write	ASCII -1999÷9999
L5	LE06	read/write	ASCII -1999÷9999
L6	LE07	read/write	ASCII -1999÷9999
L7	LE08	read/write	ASCII -1999÷9999
L8	LE09	read/write	ASCII -1999÷9999
L9	LE010	read/write	ASCII -1999÷9999
LA	LE011	read/write	ASCII -1999÷9999
LB	LE012	read/write	ASCII -1999÷9999
LC	LE013	read/write	ASCII -1999÷9999
LD	LE014	read/write	ASCII -1999÷9999
LE	LE015	read/write	ASCII -1999÷9999
LF	LE016	read/write	ASCII -1999÷9999
LG	LE017	read/write	ASCII -1999÷9999
LH	LE018	read/write	ASCII -1999÷9999
LJ	LE019	read/write	ASCII -1999÷9999
LK	LE020	read/write	ASCII -1999÷9999

5.5 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

MP1200 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

MP1200 P6 instrument:

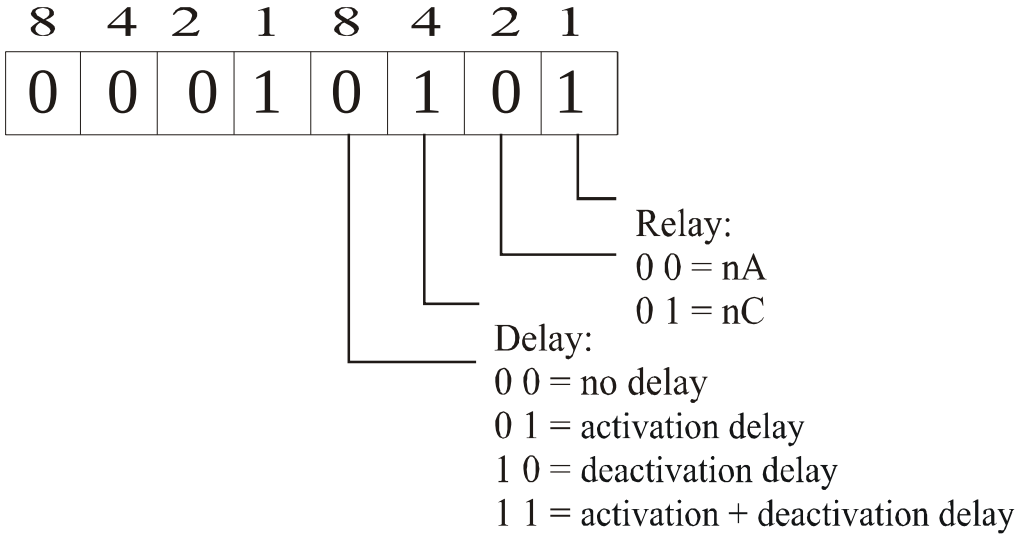
ACK
06

5.6 ALARM SETTING

MP1200 P6 series instruments can have up to 3 alarms with delay time and hysteresis. The relevant codes are:

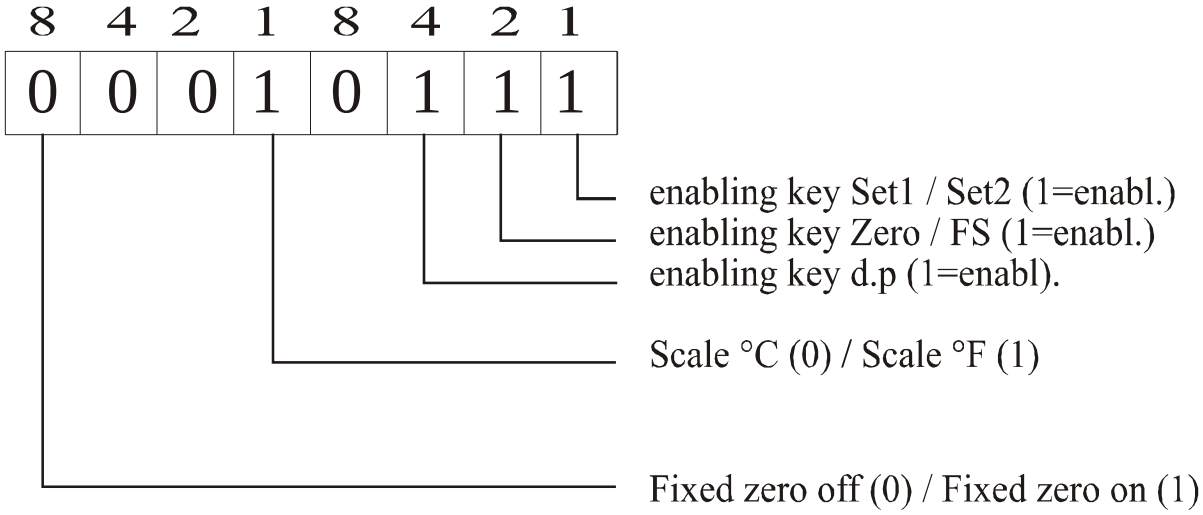
A reading/writing of SP1
H reading/writing of hysteresis
D reading/writing of delay time
W reading/writing of the status word of the alarm

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.



5.7 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.



5.8 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$(4) + “0” + “0” + “1” + “1” + “R” + “O” + chr$(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
```

6.0 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 8

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.

7.0 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 9

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

8.0 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 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.