

CALIBRATION PROCEDURE
F3910000-004 MicroCal 10

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1 CALIBRATION EQUIPMENT REQUIRED

The calibration procedure of MicroCal 10 calibrator require the availability of the following equipment :

- a) 0 ÷ 100 mV Dc voltage generator, $\pm 2 \mu\text{V}$ accuracy (Fluke cat. 5700A - prot.n. STD.0.0008)
- b) 1 V Dc voltage generator, $\pm 20 \mu\text{V}$ accuracy (Fluke cat. 5700A - prot.n. STD.0.0008)
- c) 10 V dc voltage generator $\pm 200 \mu\text{V}$ accuracy (Fluke cat. 5700A - prot.n. STD.0.0008)
- d) 20mA Dc current generator, $\pm 0,02\%$ fs. (Fluke cat. 5700A - prot.n. STD.0.0008)
- e) 100mV. f.s. Dc voltmeter, 1 μV resolution, $\pm 2 \mu\text{V}$ accuracy (Datron cat. 1281 - STD.0.0010 or STD.0.0011)
- f) ohmmeter (3/4 wires) with a 0,01 Ω resolution at 400 Ω fs and a $\pm 0,02\%$ fs. (Datron cat. 1281 - prot.n. STD.0.0010 or STD.0.0011)
- g) ice-point reference system ($0^\circ\text{C} \pm 0,05^\circ\text{C}$) (Kaye cat. K150-6C - prot.n. STD.0. 0006)
- h) zero Ω jig for Ω range prot.n. STD.0.0031
- i) zero Ω jig for mV range prot.n. STD.0.0030
- l) 400 Ω precision resistor, $\pm 0,01\%$ - 0,3 ppm- 1/4W prot n. STD.0.0024
- m) premium grade thermocouple type T wire cat. EE440002 prot.n. STD.0.0033;
- n) 2 low f.e.m. insulated cables with two wires (1mt) cat. EE930001+EE930002 prot.n. STD.0.0029
- o) instructions manual: MM850138
- p) PC prot.n. ID#3
- q) TTL to RS232 isolated converter cat. BB530004 prot.n. STD2.0.0007

2 GENERAL NOTES

- a) Before proceeding with the calibration, the battery pack of the instrument has to be fully charged. During calibration the instrument under calibration should be battery operated.
- b) With new instrumens, before entering the calibration procedure, make the following operations:
 - b1) Assign the serial number and record the data in the data bank
 - b2) Memory load the default parameters (EEPROM) according to the personalization of the instrument using the equipment "p" and "q".
- c) During calibration remember that the instructions of this procedure related to key operation have the following meaning:

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<A> + Press the <A> key and while keeping the pressure on the key, press then the key.

<A> , Press in sequence first the <A> key and then the key.

- d) <ENTER> + <0> is the store key in during the calibration procedure.

ATTENTION ! On each calibration procedure step wait value stabilization before press the store key .

- e) After each memory load operation the calibrator will answer with one of the following messages :

" * CAL " indicates that the calibration step is successful;

" ?CAL " indicates a failure and that the calibration step must be repeated;
a new failure will require inside check of the instrument.

The calibration procedure could be different for each software release installed in your machine. Identify the release number and follow the pertinent procedure.

One of the following software releases should be installed on your instrument unless your instrument is a special version:

ver 2.001

3 "IN" AND "OHM" CALIBRATION

3.1 Required equipment

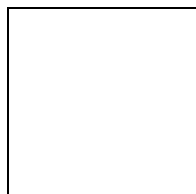
With reference to par. 1 the following equipment is required: a ; b ; c ; d ; f ; g ; h ; i ; l ; m ; n ;

3.2 New calibration

This procedure allows memory storage of new calibration data.

3.2.1 Switch the instrument off;

3.2.2 to enter the calibration procedure press simultaneously + <'> keys and keeping the pressure on keys, press the <ON> key to obtain the following indication:



3.2.3 Please remember the following keys function:

<SELECT> to advance one step in the calibration procedure

<ENTER> + <SELECT> to return to the previous calibration step.

<ENTER> + <0> to store the step (see general notes 2c).

<0> press once shows the step, the range of calibration you are in and the acceptable bits value;

press again shows, in bits, a previous calibration value

After every step the instrument will answer you in one of the following ways :

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* CAL 606 N=0

when the calibration step is acknowledged ;

? CAL 606 N=0

when the calibration step is rejected;

The non acceptance can be caused by the reference standard instrument, a wrong connection or faulty components inside of the instrument.

3.2.4 the following table shows the sequence of the calibration steps with these indications:

- 1st col. : the calibration step identification number (" N = " on the display) ;
- 2nd col.: the correspondent point and range of calibration you are in to ;
- 3rd col. : the terminals used in that step;
- 4th col. : the signal or the connection for the relative terminals;
- 5th col. : the required equipment for each step and cross-reference footnotes;
- 6th col. : the acceptable range of bits on the display for each step acknowledgment;

N	Function	A	B	C	Input	Equipment	Min - MAX
0	zero - 22mV	x	x		Link	i	28500 - 29500
1	zero - 54mV	x	x		Link	i	550 - 670
2	zero-100mV	x	x		Link	i	550 - 670
3	zero - 1 V	x	x		Link	i	580 - 640
4	zero - 10V	x	x		Link	i	580 - 640
5	f.s. - 22 mV	x	x		22mV	a ; n	63200 - 64800
6	f.s. - 54 mV	x	x		54mV	a ; n	60000 - 64000
7	f.s. - 100 mV	x	x		100mV	a ; n	60000 - 64000
8	f.s. - 1 V	x	x		1V	b ; n	60000 - 64000
9	f.s. - 10 V	x	x		10 V	c ; n	60000 - 64000
A	f.s. - 20 mA	x	x		20mA	d ; n	41800 - 49200
B	Rj cal.	x	x		Tc T @ 0°C	g ; m	+40 - -40
C	0 Ω In	x	x	x	Link	h	580 - 640
D	400Ω In	x	x	x	400Ω	l	60000 - 64000
E	100Ω Out	(-)	(+)		-	f ; n ; (1) ; (2);	12000 - 14000
F	400Ω Out	(-)	(+)		-	f ; n ; (3);	60000 - 64000

(1) - see Fig.2

(2) - the reference ohmmeter should read $100\Omega \pm 0,01\Omega$;

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- if required press the + <?> keys to obtain the above reading in the correct bit numerical range.
- (3) - as note (2) with a $400\Omega \pm 0,01\Omega$ reading on the ohmmeter;

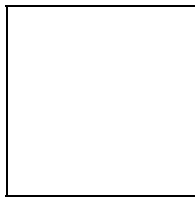


Fig.2

3.2.5 Switch the instrument off.

4 OFFSET OUT TERMO OHM CALIBRATION

4.1 Required equipment

With reference to par. 1 the following equipment is required: e ; n ;

4.2 Procedure

During this part of calibration the back shell of the instrument is unscrewed from the front shell for the P1 and P2 adjustment.

Anyway the two shells must be kepted as close as possible to mantain the shield effect.

4.2.1 Connect the voltmeter to the "A" and "C" MicroCal terminals;

4.2.2 Set the 100mV scale on the Dc voltmeter;

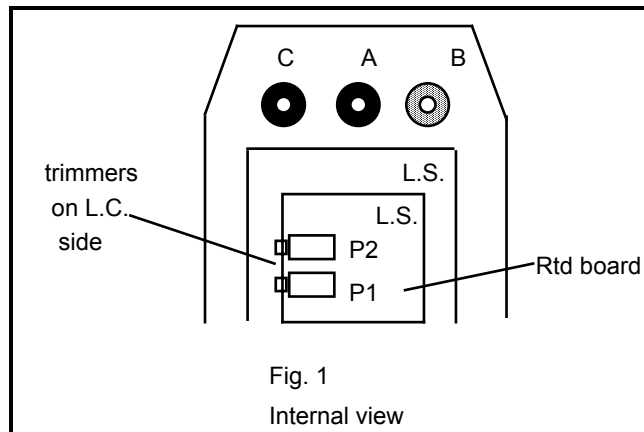
4.2.3 switch the Microcal on;

4.2.4 put the MicroCal in the OUT mode and generate 19.00 Ω , (see Instruction Manual);

4.2.5 adjust the P1 trimmer on the Rtd board (L.C.side) for a 0,000 mV reading ($\pm 2 \mu V$) on the Dc voltmeter (see Fig.1);

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- 4.2.6 generate 400.00Ω with the MicroCal;
- 4.2.7 adjust the P2 trimmer on the Rtd board (L.C.side) for a 0,000 mV reading ($\pm 15 \mu V$) on the Dc voltmeter;
- 4.2.8 repeat the check from the 4.2.1 step and readjust the trimmers if required;
- 4.2.9 switch off the MicroCal;
- 4.2.10 put a drop of fixative on P1 & P2 trimmers;
- 4.2.11 close the instrument case with its' back panel and four screws;
- 4.2.12 switch the Microcal on and recheck from 4.2.1 step.

5 **RTD CALIBRATION POINT REVIEW**

This procedure allows a calibration review for the following point only:
OUT Rtd.

- 5.1 switch the instrument -Off-;
- 5.2 to enter the calibration procedure press simultaneously **+ <'>** keys and keeping the pressure on keys, press the **<ON>** key to obtain the following indication:

PCAL 606 N=0

- 5.3 select the pertinent procedure step pressing **<ENTER> + <SELECT>** keys and connect the required signal to the input terminals (see 3.2.4 table and procedure); points e) and f).
- 5.4 after the acknowledgment , switch the instrument -Off -