OC502-t_GBM_21311

HANDHELD CALIBRATOR-MULTIMETER OC502-t

Owner's Manual

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Unpacking Instructions

Remove the Packing List and verify that you have received all equipment, including the following:
Orbit Controls Model OC 502-t Handheld Calibrator.
Operator's Manual OC 502-t.
If you have any questions about the shipment, please call the Orbit Controls Customer Service Department.

NOTE

When you receive the shipment, inspect the container and equipment for signs of damage. Note any evidence of rough handling in transit. Immediately report any damage to the Orbit Controls customer service, Phone +4144 730 2753 or Fax +4144 730 2783 and to the shipping agent.
The carrier will not honour damage claims unless all shipping material is saved for inspection. After examining and removing contents, save packing material and carton in event the reshipment is necessary.

The shipment contains:
Calibrator-Multimeter Model OC502-t
Battery charger 12V DC, 600mA
Measure leads 4mm with banana and crocodile, 300 mm length
Owner's manual with Calibration Certificate

CE

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CALIBRATOR - MULTIMETER OC 502-t

- √ **Current Calibrator 0/4 - 22mA, Source-Sink**
- √ **Voltage Calibrator 0-14V**
- √ **mV-Outputs 28mV and 560mV**
- √ **DIN Thermocouples J, K, N, R, S, T, B, E**
- √ **Multimeter ± 2V to ± 200V DC and ± 100mA**
- √ **Calibrates and Measures simultaneously**
- √ **Firm steps and continuous ramps**
- √ **Direct value entry via the keyboard**
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Orbit Controls Model OC 502-t is a Calibrator-Multimeter which generates currents 0/4-22mA in Source or Sink mode and Voltages 0 to 14V. External voltages ± 2V, ± 20V and ± 200VDC (firm ranges or Autoranging) and currents up to ±100mA can be measured while the calibrator generates the selected output signal. Due to this simultaneous operation a response from e.g. external transmitters under test can be measured with the calibrated signal from OC502-t. Both, the generated calibration signal and the measured external signal are displayed.
For calibration of mV devices such as strain gauges chains, Millivolt outputs 0-28mV or 0-560mV with high resolution are available.
Din Thermocouples J, K, N, R, S, T, B, E can be simulated in positive temperature range. The sensor type will be selected and the required temperature entered with the keyboard. The display shows the temperature, the mV output is at the output terminals. The junction is compensated for the ambient temperature with internal sensor. The compensation can be switched-off.

OC502-t can be software recalibrated via the keyboard whenever required. The instrument is supplied from internal rechargeable battery which permits 9 hour uninterrupted operation.
Back ground light can be switched on.

1 FUNCTIONS

OC502-t can be set for following functions by using the keyboard and the digital display:

- ❑ Tara of the analogue outputs, the filter selection, background light.
- ❑ Direct value entry via the keyboard. The current can be set between 0 and 22mA, the voltage between 0 and 14V.
- ❑ Raising or sinking Ramps 0-14V or 0-22mA, with selectable steps.
- ❑ Range selection 0-28mV or 0-560mV with resolution 0.001mV and 0.01mV.
- ❑ Simulation of DIN - J, K, N, R, S, T, B, E Thermocouples with or without compensation.
- ❑ Signal output of all Signal types in firm steps such as 0-2-4-6-8-10-12-14V.

Calibrator	Current Source	0 ... 22 mA
	Current Sink	0 ... 22 mA
	Voltage Source	0 ... 14 V
	mV Source	0 … 28.000 mV and 0 … 560.00 mV
	DIN Thermometers	J, K, N, R, S, T, B, E

The calibrator functions are settable with three sliding switches:

ON-OFF	Power ON and OFF
SRC-I, SNK-I	Current Source 0-22mA, Current Sink 0-22mA
OUT-V, OUT-I	Voltage Output 0-14V, Current Output 0-22mA

ATTENTION!
In the **Current Sink Mode** the switches **SNK-I** and **OUT-I** have to be selected. Do not switch to **OUT-V**!
The Current and the Voltage Outputs might be destroyed!

Multimeter	Voltage Ranges	Firm ranges	± 2V, ± 20V, ± 200VDC
		Autoranging	0 ... ± 200VDC
	Current Range	Firm range	0 ... ± 100mADC

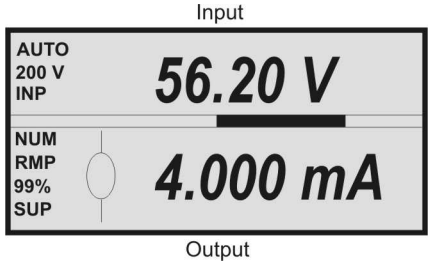
The Multimeter Functions can be set with the keys *100mA, AUTO, 2V, 20V, 200V*.

2 OUTPUTS and INPUTS

CALIBRATOR:	Voltage and Current Output:	**+ OUT -**
MULTIMETER:	Voltage Input:	**GND, IN-V**
	Current Input:	**GND, IN-I**

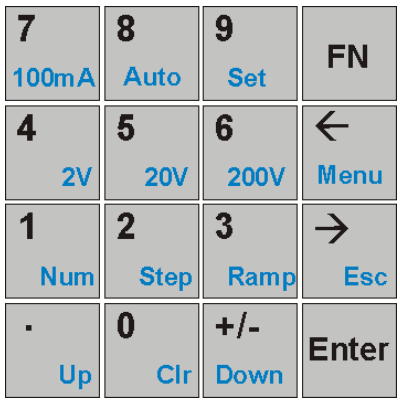
3 LCD DISPLAY

The LCD Display is divided into 2 sections. The upper part shows the multimeter functions, the lower part shows the generated calibrator signals. A Bargraph in the middle displays the measured values as an analogue function. The left side of the display shows various statements:



AUTO-FIX	Automatic Range selection or Firm Ranges
200V	Firm Ranges 2V, 20V, 200V, 100mA
INP	The display shows the input signal. With **FN** the following functions can be set:
	HLD Display HOLD
	MAX Maximum Value Hold
	MIN Minimum Value Hold
	RST Reset the max. and the min. values to zero
NUM	Direct value selection with the keyboard
RMP	Automatic Ramp
SUP	Charger plugged, Battery is charged
99%	Battery voltage shown in % of full capacity. Charge the battery when less than **0%** is displayed. Charge only with the enclosed original charger.

4 KEYBOARD



5 SPECIFICATIONS

CALIBRATOR **Outputs** ***+ OUT -***

Current Source
Range 0 ... 22mA, max. Load 750 Ohm
Accuracy ± (0.05% from Value + 0.1% from Range)
Option: 0 … 110mA, see page 16: OC502-V2-100.

Current Sink
Range 0 ... 22mA @ max. 24VDC
Accuracy ± (0.05% from Value + 0.1% from Range)

Voltage Source
Range 0 ... 14 V, 0 … 560mV, 0 … 28mV
Accuracy ± (0.05% from Value + 0.1% from Range)
Load: 0 - 25V, maximum 1mA
0 - 560mV, 0 - 28mV: maximum load 1kOhm

Thermocouples
According to ITS 90:
Type B, E, J, K, N, R, S, T
Range: -270 ºC up to 1820 ºC
Accuracy: ± 0.3 – 2.5 ºC
Load: maximum load 1kOhm
Could Junction compensation with SMT160 can be menu calibrated.

Working Ranges and specified Accuracies for Thermocouples

R	Range [°C]	-50 - 0	0 - 400	400 - 1760
	Accuracy [°C]	1.6	1.6	1.6
S	Range [°C]	-50 - 0	0 - 500	500 - 1760
	Accuracy [°C]	2.4	1.9	1.5
B	Range [°C]	50 - 800	800 - 100	1000 - 1820
	Accuracy [°C]	2.5	1.5	1.3
J	Range [°C]	-140 - 0	0 - 700	700 - 1200
	Accuracy [°C]	1.1	0.6	0.6
T	Range [°C]	-270 - -100	-100 - 0	0 - 400
	Accuracy [°C]	1.7	0.7	0.3
E	Range [°C]	-120 - 0	0 - 370	370 - 1000
	Accuracy [°C]	1.1	0.3	0.7
K	Range [°C]	-230 - -100	-100 - 0	0 - 1370
	Accuracy [°C]	1.8	0.8	0.9
N	Range [°C]	-270 - -100	-100 - 0	0 - 1300
	Accuracy [°C]	2.1	1.4	1.2

The accuracies shown are maximum values. Typical accuracies are lower.

Resolution	0…22.000mA, 0…14.000V, 0…560.00mV, 0…28.000mV, 0.1ºC
Tempco	± 25ppm/K
Ramps	Raising or sinking Ramps with programmable Steps ± 0.1mA, ± 0.05V, ± 2mV, ± 0.1mV, ± 5 ºC or ± 0.5mA, ± 0.25V, ± 10mV, ± 0.5mV, ± 20 ºC
Temperature	Working: -10 ºC ... +35 ºC, Store: 0 ... 45 ºC
Terminals	4mm gold plated terminals

ATTENTION!
In the **Current Sink Mode** the switches **SNK-I** and **OUT-I** have to be selected. Do not switch to **OUT-V**!
The Current and the Voltage Outputs might be destroyed!

MULTIMETER **Inputs** ***GND, IN-V, IN-I***

Voltage:	Ranges	± 2V (1.83 MΩ), ± 20V (363 kΩ), ± 200V (333 kΩ)
IN-V:	Autoranging	± 200V DC
	Accuracy	± 0.1% from range ± 1 Digit
Current:	Range	± 100mA DC (10 Ω)
IN-I:	Accuracy	± 0.1% from range ± 1 Digit
Tara:	Tara can be activated with the keyboard.	
Filter:	Averaging filter with filtering constants 0 to 9.	
Tempco:	± 25ppm/K	
Terminals	4mm gold plated terminals	

The specifications are valid after a warm-up time of 10 min. and an ambient temperature of 23 ºC±2 ºC.

The calibrator output and the multimeter inputs have common GND.

MICROCONTROLLER
The Multimeter or the Calibrator functions can be selected with sliding switches. The settings and the parameters are stored in internal memory. The instrument can be software calibrated via the keyboard.

Keyboard:	The keys have to be pressed at least for 0.5 sec in order to permit the controller to accept the command.
Rate:	1 sample per 1 sec.
Memory:	EEPROM.

SUPPLY

Battery:	Two 3.7V-2000mAh rechargeable Li-ion Batteries permit an uninterrupted operation of 9 hours with 20mA set at the calibrator output.
Charger:	Mains voltage 100-240V, 48-60Hz / 12V-600mA DC. The battery requires 4.0 hours to be fully charged. The green LED stops flashing.

6 CALIBRATOR - FUNCTION SELECTION

The calibrator functions are selectable with three sliding switches. The keyboard permits setting of Ramps, Steps or direct Value entry.
The Multimeter is active all the time and can be simultaneously used with the calibrator. The function is described in § 7.

The display is divided into two parts. The upper part shows the multimeter values, the lower part is assigned to the calibrator outputs 0-20mA or 0-10V. The middle part is a Bargraph showing the values as analogue information.

6.1 Setting of the output current 0 - 22mA in Steps or Ramps

Sliding switch to be set to SRC-I and OUT-I.
The key *Clr* set the output current to 4mA.
The key *Up* increases the output current in 0.20 mA steps.
The key *Down* decreases the output current in 0.20 mA steps.
The key *Ramp* activates the automatic ramp. To stop the ramp, press the key again.
The key *Step* generates the current steps of 4, 8, 12, 16, 20, 22mA

6.2 Direct setting of the output current between 0 and 22mA

Sliding switch to be set to SRC-I and OUT-I.
The key *Num* activates the numeric selection.
Enter the required value with the keyboard and press *Enter*.
To erase the last entry, use the keys ← and → .

6.3 Setting of the voltage output 0 - 14 V in Steps or Ramps

Sliding switch to be set to OUT-V.
The key *Clr* sets the output voltage to 0 V.
The key *Up* increases the output voltage in 0.10 V steps.
The key *Down* decreases the output voltage in 0.10 V steps.
The key *Ramp* activates the automatic voltage ramp.
The key *Step* generates voltage increments 0, 2, 4, 6, 8, 10, 12, 14V.

6.4 Setting of mV Outputs 0–560mV and 0–28mV in Steps or Ramps

Same like 0–14V voltage output. Menu selection: Select 2 or Select 3.

6.5 Thermocouple output in Steps or Ramps

Put the Sliding Switch into Position OUT-V.
Press MENU until the display shows VOLTAGE OUTPUT U.
Select 4 with MENU.
THERMOCOUPLE OUTPUT. Select the required Type.
Select **Cold Junct. Comp.** Select 1 (ON) for internal on-board compensation. Press MENU.
Select **Unit Selection.** Select 1 for degree Centigrade (ºC). Press ESC.
Key *Clr* sets the output signal to 0.0 ºC.
Key *Up* increases the Output mV in 10 ºC steps.
Key *Down* decays the Output mV in 10 ºC steps.
Key *Ramp* activates the automatic Ramp generation.
Key *Step* generates Output mV in Steps 0, 200, 400, 600, 800, 1000, 1200, 1400 ºC

RAMPS
The key *Ramp* activates the Ramp Generator. The display increments or decrement in steps selected in the Menu and shows the symbol *RMP*. With the key Ramp the Ramp can be stopped. When pressed again, the Ramp will continue from the value when it had been stopped. By keeping pressed the key *Ramp* for several seconds, the Ramp will start from beginning.

6.6 Direct setting of the output voltage value between 0 and 14 V, 0-560mV, 0-28mV and T/C

Sliding switch set to OUT-V.
The key *Num* activates the numeric selection.
Enter the required value with the keyboard and press *Enter*.
To erase the entry, use the keys ← and → .

6.7 Selection of the display function

The key **MENU** selects following operation modes – see page 14:

TARA SELECT — Tara of the Multimeter input signal to Zero

FILTER DEGREE — Selection of averaging filter from 0 to 9.

RAMP SELECT — Activates Ramps:

1	Raising Ramp with 0.5mA, 0.25V, 10mV, 0.5mV and 20 ºC steps
2	Raising Ramp with 0.1mA, 0.05V, 2mV, 0.1mV and 5 ºC steps
3	Sinking Ramp with -0.1mA, -0.05V, -2mV, -0.1mV and -5 ºC steps
4	Sinking Ramp with -0.5mA, -0.25V, -10mV, -0.5mV and -20 ºC steps

GRAPHICS — Graphics of last 128 measuring points in the Multimeter function of the voltage range up to 200V DC or currents up to 100mA DC.

BACKLIGHT — Back ground light: OFF or ON. With ON selection the display remains illuminated for 20 seconds after pressing any key of the keypad.

VOLTAGE OUTPUT U — Output Signal selection

1	Output 0…14V
2	Output 0…560mV
3	Output 0…28mV
4	Thermocouples Simulation

THERMOCOUPLE OUTPUT (Select 4 is activated)

1	Type B	2	Type E
3	Type J	4	Type K
5	Type N	6	Type R
7	Type S	8	Type T

Cold Junct. Comp. — Cold Junction Compensation can be activated or switched-off.

Unit Selection — ºC or ºF
EEprom Archive — Erase or Store the settings in internal EEPROM.

The key **Esc** terminates the programming mode and the display switches into the Measuring mode.

7 MULTIMETER - FUNCTION SELECTION

The multimeter is active all the time and can be simultaneously used with the calibrator.

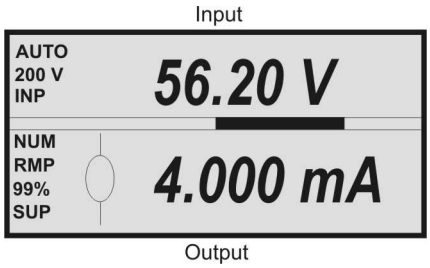
> ***The calibrator output and the multimeter inputs have common GND.***

The upper part of the display shows the values and parameters of the Multimeter:

AUTO	Autoranging ± 2 ... ± 200VDC, settable with the key **Auto**.
FIX	Firm voltage ranges ± 2V, ± 20V, ± 200V DC, settable with **Auto**.
	Firm current range ± 100mA DC, settable with **100mA**.

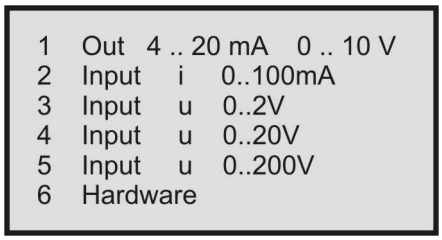
With the key **FN** following mode of operation can be set:

INP	The display shows the input signal
HLD	HOLD the display
MAX	The display shows the maximum value
MIN	The display shows the minimum value
RST	The maximum and the minimum stored values are erased



8 SOFTWARE CALIBRATION

The voltage and the current ranges of the multimeter and the output signals of the calibrator can be precisely calibrated by using the keyboard. The calibration menu can be opened with the key *Set*.



A full calibration of all 5 ranges or selected ranges only can be approached. A five digit multimeter 10VDC and 20mADC will be used as well as a Voltage/Current calibrator 100mA, 2V, 20V and 200VDC.

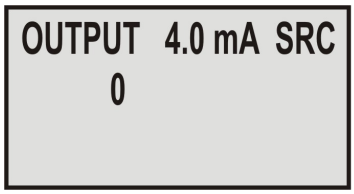
1: Calibrator Outputs
2-5: Multimeter Inputs
6: Hardware Configuration

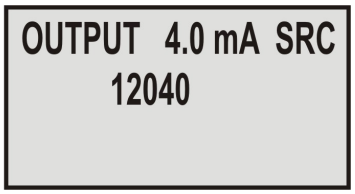
To close the calibration menu press the key **Esc**.

8.1 CALIBRATION of CALIBRATOR OUTPUTS

8.1.1 Current Output 4-20mA

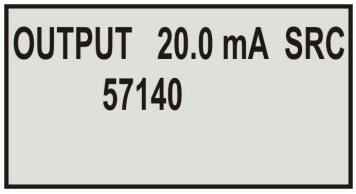
Outputs ***+ OUT -*** *with connected mA-Meter.*
Sliding switch ***OUT-I.***
Press ***1***. The display shows:





With the keys ***Up*** or ***Down*** appears the calibration constant 0. To change it, enter 11 with ***Up*** or ***Down***. The whole constant can be set with the keyboard. The 4.000 mA output current is set. Fine corrections can be made with ***Up*** or ***Down***. Press ***Enter*** to save the point. The display confirms with *EEPROM*.

Press ***Menu*** to next calibration range. The Display shows:

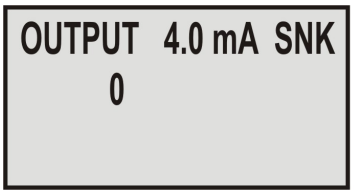


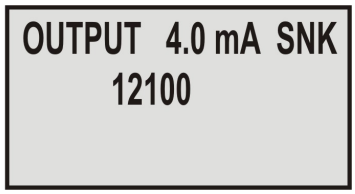
With the keys ***Up*** or ***Down*** set the output current to 20.000 mA.
Press ***Enter*** to store.

With ***Esc*** returns the display to calibration menu.

8.1.2 Current Sink 0/4-20mA

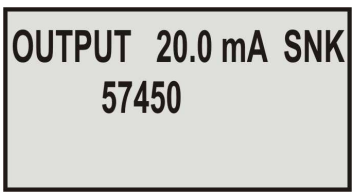
Sliding Switches OUT-I and SNK-I
Output Terminal **+ OUT** connect with the Plus Terminal of external voltage source (max. 24V). Output Terminal ***- OUT*** connect with the Minus Terminal of external voltage source with an mA-Meter connected in serial. Press the key ***1***. The display shows:





With the keys ***Up*** or ***Down*** appears the calibration constant 0. To change it, enter 11 with ***Up*** or ***Down***. The whole constant can be set with the keyboard. The 4.000 mA output current is set. Fine corrections can be made with ***Up*** or ***Down***. Press ***Enter*** to save the point. The display confirms with *EEPROM*.

Press ***Menu*** to next calibration range. The Display shows:
With the keys ***Up*** or ***Down*** set the output current to 20.000 mA.
Press ***Enter*** to store.
With ***Esc*** returns the display to calibration menu.

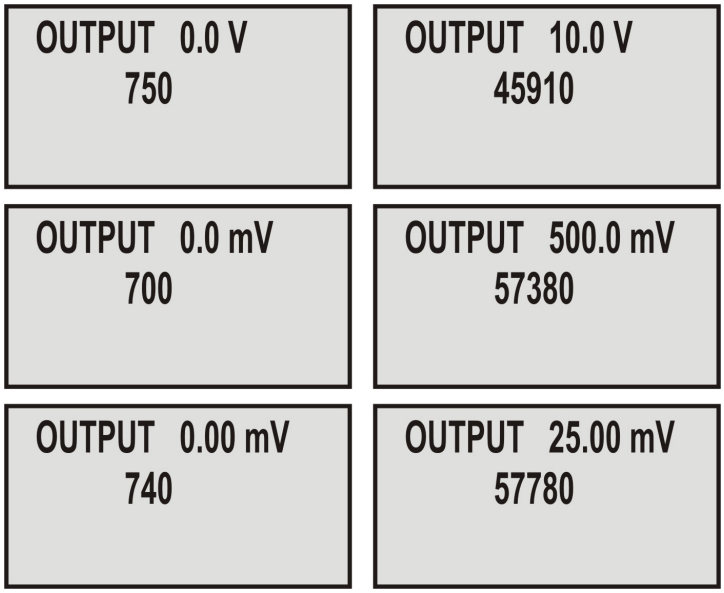


8.1.3 Voltage Ranges 0-14V, 0-560mV, 0-28mV

Output Terminals ***+ OUT –*** *with external V-Meter connected.*
Sliding Switch in Position ***OUT-V****.*
Set the output voltage 2V with ***Up*** or ***Down*** and store with ***Enter***.
Select 10V Range with ***Menu***, set the calibration Constant with ***Up*** or ***Down*** and store with ***Enter***.

Continue with ***Menu*** for calibration of Ranges 560mV and 28mV.

With the key ***Esc*** changes the display into the calibration Menu.



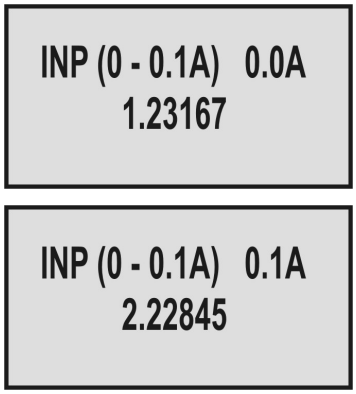
8.2 CALIBRATION of MULTIMETER INPUTS

8.2.1 Current Input 0-100mA

Connect external Current Calibrator to Input Terminals ***GND*** *and* ***IN-I****.*

Press **2***.* The display shows:
Short the inputs. Press ***Enter*** to store the zero input.

Press ***Menu***. The display changes to:
Apply 100mA from external calibrator.
Press ***Enter*** to store the 100mA full range input.

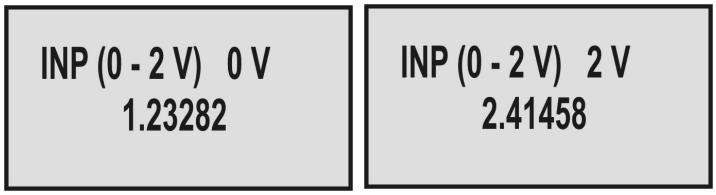


8.2.2 Voltage Input 2VDC

Connect 2VDC from external Voltage Calibrator to Input Terminals ***GND*** *and* ***IN-V****.*

Press **3***.* The display shows:
Short the inputs. Press ***Enter*** to store the zero input.

Press ***Menu***. The display changes to:
Apply 2VDC from external calibrator.
Press ***Enter*** to store the 2V full range input.

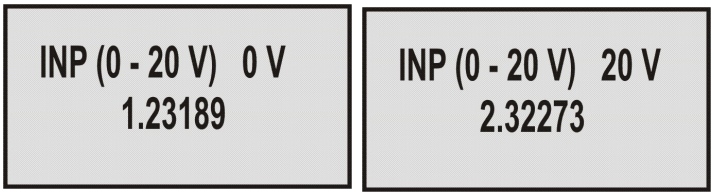


8.2.3 Voltage Input 20VDC

Inputs GND and IN-V supplied from external voltage calibrator 20VDC.

Press **4***.* The display shows:
Short the inputs. Press ***Enter*** to store the zero input.

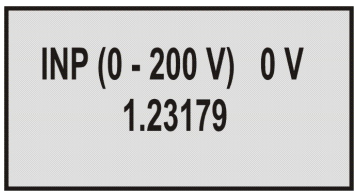
Press ***Menu***. The display changes to:
Apply 20VDC from external calibrator.
Press ***Enter*** to store the 20V full range input.



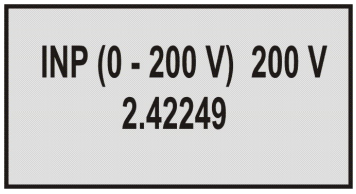
8.2.4 Voltage input 200VDC

Inputs GND and IN-V supplied from external voltage calibrator 200VDC.

Press **5.** The display shows:
Short the inputs. Press ***Enter*** to store the zero input.



Press ***Menu***. The display changes to:
Apply 200VDC from external calibrator.
Press ***Enter*** to store the 200V full range input.



Press ***Esc*** to exit the calibration mode. The instrument is calibrated.

NOTE

Do not approach the calibration when the battery sign **0%** at the display is illuminated. The instrument has to be charged first.

9 LOGO

After the power has been switched on, the display shows a manufacturer Logo. Upon request this Logo can be customized. Contact the manufacturer for more information.

10 HARDWARE

This menu step contains the settings of the output configuration 12 bit or 16 bit signal resolution, 20mA or 100mA output current and the possible correction of the cold junction compensation. The Option 100mA has to be ordered from the manufacturer.

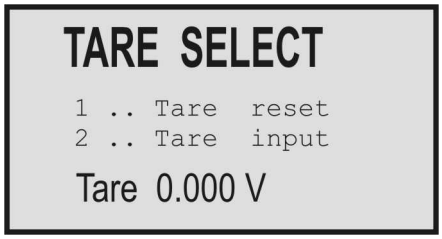
Corrections can be set with UP or DOWN, confirmed with ENTER. With ESC returns the display to the measuring mode.

The factory setting is 16 bit. When 12 bit resolution is selected, the display and the output signal resolution is limited to two decimal points.

ATTENTION
When the calibration has not been done correctly due to invalid calibration values, ***Calibration Error*** appears at the display. The display changes automatically to the calibration Overview. The wrongly calibrated point is marked with ***err.***

11 TARE

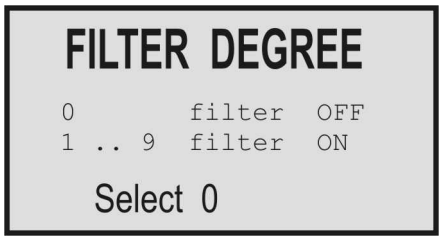
The Tare is active in the Multimeter function and can be used for DC-V and DC-I measurements to set the display to zero. Attention has to be paid when the Tare is set. The entire measuring range has to be considered in order not to overrange the meter.
The Tare is activated with the key Menu. The display shows:



*Key **1*** deactivates Tare.
*Key **2*** activates the Tare and the Tare value is shown at the lowest display section. The Tare Selection will be closed with the key **Esc**.

12 FILTER

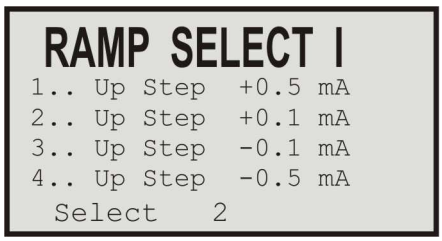
An averaging Filter is active in the multimeter function. The filter value (number of measurements) can be set from 0 to 9. By selecting 0 the filter is deactivated. The filter function is activated after the key **Menu** is pressed twice. The display shows:
Key 0 switches the filter off.
Keys 1-9 select the filter value. The filter selection is closed with **Esc**.

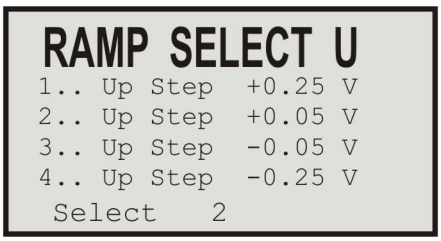


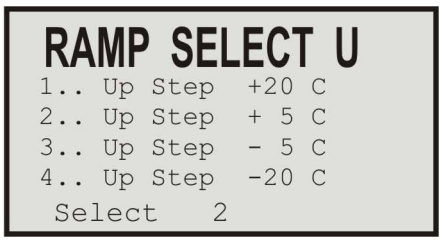
13 RAMPS

The Ramp function can be opened with **Menu**. The display shows RAMP SELECT:

1 Increasing ramp with steps of 0.5mA, 0.25V, 10mV, 0.5mV and 20 ºC
2 Increasing ramp with steps of 0.1mA, 0.05V, 2mV, 0.1mV and 5 ºC
3 Decaying ramp with steps of -0.1mA, -0.05V, -2mV, -0.1V and -5 ºC
4 Decaying ramp with steps of -0.5mA, -0.25V, -10mV, -0.5mV and -20 ºC



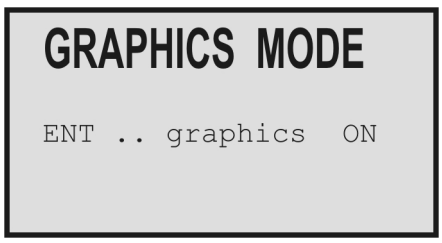


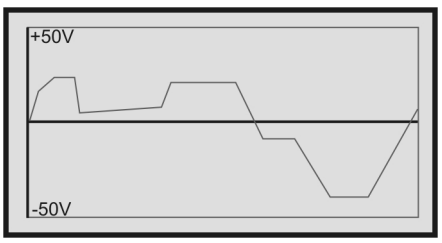


Current or Voltage Ramp are automatically generated with the selection of switches OUT-I or OUT-V.

14 GRAPHICS

During the measurement of DC Voltage or DC Current the last 128 measured points are automatically memorized and can be shown at the display. The Graphic Mode will be opened with **Menu** and confirmed with **Enter**.





15 HANDHELD CALIBRATOR – MULTIMETER OC502-V2-100

- √ **Current Calibrator 0/4 - 110mA, Source**
- √ **Voltage Calibrator 0-11V**
- √ **Multimeter ± 2V to ± 200V DC and ± 100mA**
- √ **Calibrates and Measures simultaneously**
- √ **Firm steps and continuous ramps**
- √ **Direct value entry via the keyboard**
- √ **Rechargeable Battery**
- √ **Software calibration**

Orbit Controls Model OC 502-V2-100 is a Calibrator-Multimeter for generation of 0/4 - 110mA in Source and Sink mode and Voltages between 0 to 11V. External voltages ± 2V, ± 20V and ± 200VDC (firm ranges or Autoranging) and currents up to ±100mA can be measured while the calibrator generates the selected output signal. Due to this simultaneous operation a response from e.g. an external transmitter under test can be measured which is signal supplied from OC502-V2-100. Both, the generated calibration signal and the measured external signal are shown at the LCD digital display

OC502-V2-100 can be software calibrated via the keyboard whenever required.

The instrument is supplied from internal battery and permits an uninterrupted operation of 3-4 hours with the output current between 0 and 20mA. For higher output currents up to 100mA the calibrator has to be connected to the charger. When the display shows BAT of the battery capacity, the calibrator has to be connected to the charger.

SPECIFICATIONS

CALIBRATOR OC502-V2-100		**Outputs + *OUT* -**
Current Source	Range	0 ... 110mA
	Accuracy	± 0.1% from range
Voltage Source	Range	0 ... 11 V
	Accuracy	± 0.1% from range
Tempco:	± 25ppm/K	
Temperature:	Working:	+20 ºC ... +25 ºC
	Storing:	0 ... 45 ºC

The remaining parameters, menu steps and settings are identical with the standard model OC502-t without generation of mV-Signals and simulation of thermocouples.

CALIBRATION CERTIFICATE

EUT: Model OC 502-t Calibrator-Multimeter Serial Number: ……

Instruments used for calibration
Multifunction Calibrator OCM 130 SN: 150341
5 ½ digits Multimeter HP 34401A SN: 3145A11814
Ambient temperature 23°C ± 2°C.

CALIBRATOR
Max. Inaccuracy: Voltage and Current source mode: ± (0.05% from Value + 0.1% from Range)
Current sink mode: ± (0.05% from Value + 0.1% from Range)
DIN-Thermocouples: ± 0.3 – 2.5 ºC

CURRENT SOURCE		CURRENT SINK	
Display	**Output mA**	**Display**	**Output mA**
0.000 mA		0.000 mA	
8.000 mA		8.000 mA	
20.000 mA		20.000 mA	

VOLTAGE OUTPUT		VOLTAGE OUTPUT		VOLTAGE OUTPUT	
Display	**Output V**	**Display**	**Output mV**	**Display**	**Output mV**
0.000 V		0.00 mV		0.000 mV	
2.000 V		100.00 mV		5.000 mV	
10.000 V		500.00 mV		25.000 mV	

THERMOCOUPLES	B	E	J	K	N	R	S	T/300ºC
mV @ 0 ºC								
mV @ 1000 ºC								

MULTIMETER
Max. Inaccuracy: ± 0.1% from Value ± 1 digit

VOLTAGE INPUT						CURRENT INPUT	
2V DC		20V DC		200V DC		100 mA DC	
Input	**Display V**	**Input**	**Display V**	**Input**	**Display V**	**Input**	**Display mA**
0.0000 V		0.000 V		0.000 V		0.000 mA	
1.0000 V		10.000 V		100.000 V		50.000 mA	
2.0000 V		20.000 V		200.000 V		100.000 mA	

Technician .....

QC: .....

Date: ……..

ORBIT CONTROLS AG
Zürcherstrasse 137
CH-8952 Schlieren/ZH
Tel: +41 44 730 2753
Fax: +41 44 730 2783
info@orbitcontrols.ch

Dear Customer,

Thank you for ordering the hand held Calibrator-Multimeter OC 502-t.

The instrument has been carefully checked in all operation modes and finally precisely calibrated. The calibration sheet is enclosed.

WARRANTY

The instrument has 24 month warranty for all parts and labour involved with the repair. The warranty does not apply to damaged, overloaded or modified instruments or instruments with broken seal at the rear cover.

PLEASE NOTE

The instrument is supplied from internal rechargeable Li-ion battery. Please make sure that the battery is correctly charged from the enclosed battery charger as soon as the **0%** sign at the display is illuminated. The time for the full charge is 4.0 hours.

We will be pleased to answer all your questions not only to this instrument but also to all our calibrators and measuring equipment. Please call our customer service or write to us

info@orbitcontrols.ch

Thank you.

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