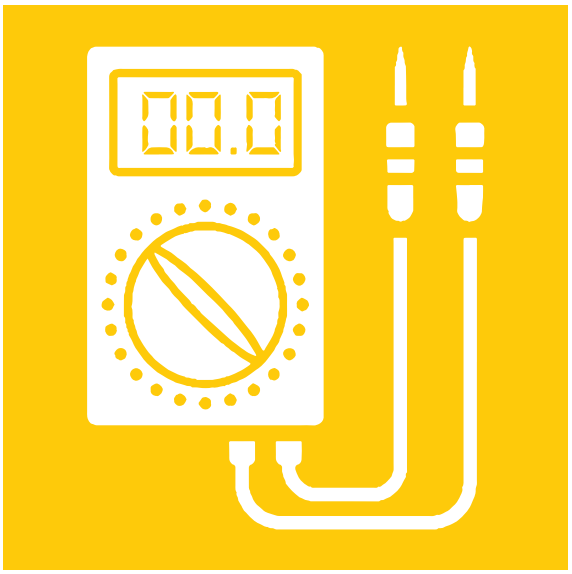
MULTIFUNCTION CALIBRATORS



4

4.9

MULTIFUNCTION CALIBRATORS

Multifunction calibrators are devices used for calibration, simulation, verification and adjustment operations in installations and instrumentation. The calibrators deal with different quantities that must be attributed to normalised measurement signals: mA, mV, V, Ohm, Hz (frequency and pulses),°C or °F. These instruments also have functions of generation, smoothing, linearisation or gradation of signals. Their main use lies in the verification of company instruments in order to control the quality of the measurement. Industrial calibration can be accompanied by particular adaptations and compensations. According to the various requirements, there are multifunction calibrators that allow the generation, simulation and simultaneous reading of multiple values or for single quantities (pressure, temperature, flow rate, sound, vibrations, voltage, current, resistance, pulses, frequency).

	TEST-4	MSC
		
Power supply	2 x AA NiMh batteries 2650 mAh	1 Lithium Polymer battery (LiPo) 3400 mAh
Autonomy	Autonomy 8 hours (minimum max load), 20 hours (average)	Autonomy 8 hours (minimum max load), 20 hours (average)
Accuracy	0.1% for each type of input/output	0.03% of base, 0.04% for current
Measuring instrument	Current, Voltage (V)	Current, Voltage (V, mV), Thermocouple, Thermoresistances, Load cell, Pulse, Frequency
Generator	Current, Voltage (V)	Current, Voltage (V, mV), Thermocouple, Thermoresistances, Load cell, Pulse, Frequency
Signal generation in Ramp mode	Current, Voltage (V)	Current, Voltage, TC, RTD, Load cell single/loop, max 9 segments, ramp min 1 second
Datalogger	-	Datalogger (up to 100,000 stored values, data export in csv format, real-time data display on mobile devices and PC)
Integration LabVIEW	-	Yes
Interface	High brightness OLED, 128 x 64 points	external PC / Smartphone / Tablet
Communication	-	Bluetooth Low Energy 4.1
Settings	Multiturn encoder key	Windows / Android / iOS App
Applications	Diagnostics, signal simulation and PLC calibration, sensors, recorders, valves and industrial devices	Diagnostics, signal simulation and PLC calibration, sensors, recorders, valves and industrial devices Maintenance and testing of process meters and industrial equipment Control and calibration of process instrumentation in the field, industry (laboratories, workshops and production), quality control

Test-4

GENERATOR, PORTABLE METER WITH RAMP FUNCTION FOR ANALOG SIGNALS

Test-4 is a valid support for calibration sessions, laboratory tests and for the simulation of analog measurements controlled by industrial devices (PLC, regulators, data acquisition systems, etc.). With a total accuracy of less than 0.1%, a resolution of 1 µA / 1 mV, Test-4 guarantees optimal calibration results. It allows the simulation of both voltage and current ramps (active or passive). Test-4 can be powered from a 220 Vac network through a dedicated power supply or with 2 NiMh batteries that ensure an average life of 20 hours.

TECHNICAL SPECIFICATIONS

GENERAL DATA	
Power supply	2 x AA batteries of 2650 mAh type Autonomy: 8 hours (minimum load max), 20 hours (average) From 220 Vac network through dedicated power supply/battery charger
Protection degree	IP 20
Operating temperature	0..50°C (recommended)
Humidity	30..90 % non-condensing
Dimension	140 x 75 x 33 mm
Weight	250 g
Isolation	Battery powered instrument, intrinsically isolated
Rejection	50-60 Hz
Freq. Sampling	10 Hz
Input / output signals	Voltage measurement/generation: 0..11 V Current measurement/generation: 0..21 mA Protection ± 30 V
Accuracy	0.1% for each type of input/output
Resolution	0.002 mA 0.001 V
OPERATING DATA	
Operation keys	The ESC key for functions ESC / ON/OFF device and restoring from screen saver after 7 minutes of inactivity The knob: to increase / decrease current value / voltage (exerting rotation); "weight" variation with value*10N, N=0, 1, 2, 3 (exerting pressure)
Languages available	Italian, English, German, French, Spanish
Contrast	15 levels
Screensaver	Vertical scroll display content after 7 minutes of non-use. Reset when the ESC / ON/OFF button is pressed
Function menu	General setup (selection of type of operation, type of signal, language, display contrast, encoder sensitivity) Generation (selection of voltage / current / passive current) Measurement (voltage / current selection) Generation of currents and voltages in ramp mode
Error warnings	Surge Voltage reading above 11 V Under voltage Reading voltage below -0.2 V Over current Current reading greater than 21 mA Under current Current reading lower than -0.1 mA Flashing value Generating voltage / current failed

CONNECTIONS	
Input / Output	Tips diameter 2 mm
Power supply	Battery charger socket, battery compartment on the back, under the protective rubber cover
USB Micro	For future implementations

EQUIPMENT

Tips

Power unit

Transport bag

2 NiMh batteries type AA 2650 mAh

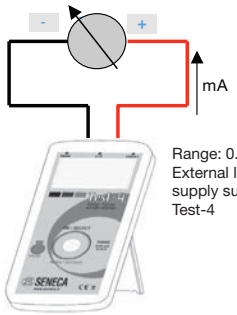
ORDER CODE

Code	Description
TEST-4	Signal generator, portable V-mA meter with ramp simulation
TEST-4-PK	Accuracy Kit (set of accuracy tips and crocodile clips) for Test-4
TEST-4-R	Accuracy tip set for Test-4
TEST-4-T	ISO 9001 calibration certificate for Test-4

CONNECTION DIAGRAMS

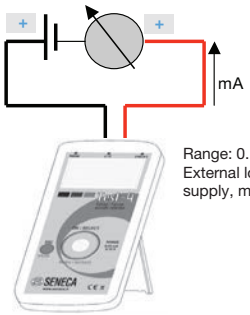
SIGNAL GENERATION

ACTIVE CURRENT



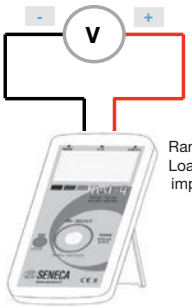
Range: 0..21 mA, External loop power supply supplied by Test-4

PASSIVE CURRENT



Range: 0..21 mA, External loop supply, max 24 Vdc

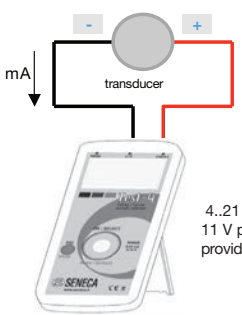
VOLTAGE



Range: 0..11 V Load impedence 1kΩ

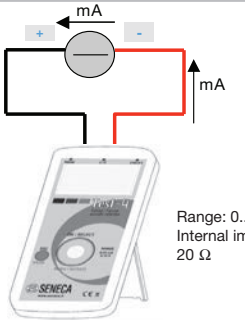
SIGNAL MEASUREMENT

ACTIVE CURRENT



4..21 mA loop 11 V power supply provided by Test-4

PASSIVE CURRENT



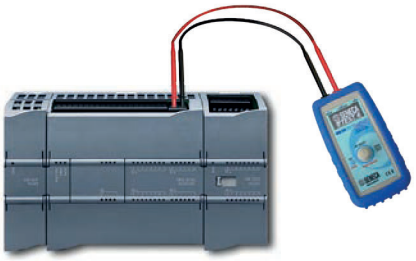
Range: 0..21 mA Internal impedence 20 Ω

VOLTAGE

Range: 0..11 V Internal impedence 100 kΩ

APPLICATION EXAMPLE

SIMULATION OF SIGNALS FROM THE FIELD



PROCESS CALIBRATION FOR SENSORS, ACTUATORS, POSITIONERS, PLC, REGULATORS, ETC.

The technical data and the diagrams in this document are indicative and not binding.

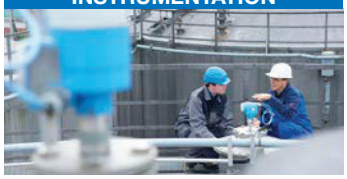
MULTIFUNCTION UNIVERSAL CALIBRATOR

MSC (Multifunction Smart Calibrator) is a flexible and universal tool for maintenance, calibration, testing, diagnostics and inspection. With a accuracy class better than 0.05% for each type of input/output, MSC offers measurement and generation/simulation of signals: analog, digital, from temperature sensors and from load cells. The display of the data and the setting of the parameters takes place via
MSC application in Windows PC version with USB cable and in multilingual mobile version available for iOS and Android devices via Bluetooth 4.1 connection. MSC includes programmable functions of automatic ramp generation, datalogging with data export in .csv format, the possible use as an automatic testing system through LabVIEW libraries and the management of multiple calibrators via PC.
Equipped with a rechargeable lithium polymer battery, MSC is able to power external devices and sensors and can be used without power supply with an autonomy of up to 20 hours.
The instrument, with a storage capacity of up to 100,000 measurements, is suitable for professional and industrial use for PLC programmers, maintenance technicians, technical assistance companies, measurement laboratories, control and calibration of sensors and process instrumentation in the field, industry (laboratories, workshops and production), quality control.

AREAS OF USE

ON MACHINE ELECTRICAL PANELS

PROCESS SENSORS AND INSTRUMENTATION



LABORATORIES

PRODUCTION / QUALITY CONTROL

STATIONS AND TEST BENCHES / TEST ROOMS

Bluetooth Low Energy

USER INSTRUCTIONS

PC DESKTOP / NOTEBOOK

- Complete calibrator management
- Multiple configurations
- Data log creation and export
- Firmware update
- Typical use for laboratories

SMARTPHONE AND TABLET

- Complete calibrator management
- Data log creation
- Tests, calibrations, tests on the machine or instruments in the field

LABVIEW LIBRARIES

- Integration with LabVIEW systems
- Use in automatic testing systems

FUNCTIONS

SIGNAL MEASURING DEVICE

GENERATOR / SIMULATOR

FUNCTION RAMPS
Single / Loop, max 9 segments

DATALOGGER
100,000 stored values csv data format

SIGNALS MANAGED

ANALOG SIGNALS
Current (mA)
Voltage (V, mV)

SIGNALS IN FREQUENCY / PULSES
Max 1,000 Hz

TEMPERATURE SENSORS
TC J,K,T,E,N,R,S,B,L - RTD 2,3,4 Wires

LOAD CELLS
Ohm - mV/V

10 REASONS TO CONNECT YOUR DEVICE TO THE MSC SMART CALIBRATOR

1 MULTIFUNCTION CALIBRATOR

- Signal Measuring Device
- Signal Generator / Simulator
- Single or loop ramp function
- Datalogger (up to 100,000 stored values, data export in csv format, real-time data display on mobile devices and PC)

2 UNIVERSAL SIGNAL MANAGEMENT

- Analog: V, mV, mA
- Thermocouples type J,K,T,E,N,R,S,B (IEC EN 60584-1)
- RTD (Pt100, Pt500, Pt1000, Ni100, Ni120, Cu50,
- Cu100 - IEC EN 60751-1)
- Load cells
- Pulse / frequency signals (0.1÷1.000 Hz)

3 WIRED AND WIRELESS MULTI-DEVICE USE

- Calibrator management via MSC PC software and USB connection also for multiple configurations
- Calibrator management via MSC mobile APP for iOS and Android with Bluetooth 4.1 connection
- Integration with LabVIEW systems

4 HIGH ACCURACY CLASS

- Better than 0.05% for each type of input / output

5 FLEXIBLE POWER SUPPLY

- Power supply from 230 Vac mains or from battery (up to 20 h of autonomy)
- Power supply for external devices and sensors @24 V

6 REMOTE CALIBRATION AND HARDWARE-INDEPENDENT

- Diagnostics, signal simulation and PLC calibration, sensors, recorders, valves and industrial devices of any make and type
- Connection to the calibrator via Bluetooth Low Energy 4.1 or Micro USB

7 COST REDUCTION OF MAINTENANCE AND TESTING

- Unique and universal instrument for the maintenance and testing of process meters and industrial equipment
- Multiple and PLC optimised configurations
- Reading, writing and immediate transmission of measurements, parameters and reports

8 FOR ALL INDUSTRIAL AND PROFESSIONAL USERS

- PLC programmers, industrial maintainers, technical assistance companies, measurement, control and calibration laboratories, industry (laboratories, workshops and production), quality control

9 DATA ALWAYS AVAILABLE ON PC...

- Application Multilingual Windows PC software for complete management of measurement and testing sessions
- Local trend display, graphs, data, events
- Real-time data sharing, creation and export of data logs
- Security, backup, controlled and secure access, automatic updates
- Multiple configurations

10 OR ON MOBILE DEVICE (SMARTPHONE, TABLET...)

- Multi-language app for iOS and Android mobile devices available on the App Store or Google Play
- Local trend display, graphs, data, events
- Real-time data sharing and creation of data logs
- Security, backup, controlled and secure access, automatic updates

MULTIFUNCTION CALIBRATORS

TECHNICAL DATA

GENERAL DATA

Mains power supply	From 230 Vac mains via standard USB battery charger
Battery power supply	1 Lithium Polymer (LiPo) 3400 mAh batteries; autonomy 8 hours (minimum @ max load), 20 hours (max)
Protection degree	IP20
Operating temperature	-20..50°C (not charging), 0-45°C while charging
Storage temperature	0..35°C
Humidity	30..90 % non-condensing
Isolation	Battery powered instrument, intrinsically isolated No isolation from the USB port
Surge protection	230 Vac max without permanent damage
Rejection	50/60 Hz
Freq. Sampling	10 Hz
Operating Procedure	Meter, Generator, Ramps Datalogger
Dimension	88 x 147 x 25 mm
Weight	330 g
Equipment	Connection cables (4), mains battery charger
Factory calibration certificate	Supplied
Approval	EC

MEASURING ACCURACY

Accuracy	0.03% of base, 0.04% for current
Resolution	1 µA; 1 mV; 5 µV; 0,1°C; 0,1uV/V

GENERATION ACCURACY

Accuracy	0.03% of base, 0.04% for current
Resolution	1 µA; 1 mV; 5µV; 0,1°C; 0,02 Ohm; 0,1 uV/V;

INTERFACES AND SIGNALS

Buttons	On / Off / Pairing
LED	Power on indication LED Communication indication LED Error indication LED PAIRING BT indication LED Data logger on indication LED (future) Battery status indication LED
Buzzer	Buzzer for overload signalling and impossibility of simulating the request value.
Standard sockets	No.4 4mm sockets
Thermocouple connection	Mini plug (7.9mmm) for thermocouple measurement and simulation
Power supply	USB Micro
USB Micro	For fw update or modbus communication (virtual com)
Wireless communication	Bluetooth Low Energy 4.1 towards Smart phone and Tablet Andriod or Ios

MEASURING FUNCTIONS

Current	0..24 mA active and passive; protection ± 28 V
Voltage (V)	0.0÷27 V
Voltage (mV)	-10mV÷+90mV
Thermocouple	Type K ,T, E, N, R, S, B, L
Thermo resistors (2,3,4 wires)	Pt100, Pt500, Pt1000, Cu50, Cu100, Ni100, Ni120
Load cell	350 Ohm; -0.2÷+2.4mV/V
Pulse	Max count 1000 Hz
Frequency	0.1..1000 Hz

GENERATION FUNCTIONS

Current	0.1..24 mA active and passive; protection ± 28 V
Voltage (V)	0.1÷26 V
Voltage (mV)	-10mV÷+90mV
Thermocouple	Type J,K ,T, E, N, R,S, B, L
Thermo resistors (2 wires)	Pt100, Pt500, Pt1000, Cu50, Cu100, Ni100, Ni120
Load cell	350 Ohm; -0.2..+2.4mV/V
Pulse	Min 0.5 ms (1..24V) number of pulses that can be set
Frequency	0.1..1000 Hz

DATALOGGER

Advanced	Yes
Sampling time	>500 ms

RAMP FUNCTION

Sign	Current/Voltage/TC/RTD/Load Cell
Functions	Single or with Loop
Type	Maximum 9 segments, ramp resolution 100ms, minimum ramp 1 second

MANAGEMENT APP

Languages available	APP in language
O.S / Store	IoS 10.3 or higher (App Store) / Android 4.0.3 or higher (Play Store)
Functions menu	General setup (selection of the type of operation, type of signal, language Measurement (voltage / current / passive current / thermo couples / thermo resistors / load cell / pulses selection; average-min-max value, counter reset, measurement pause; value sharing; scale change) Generation (voltage / current / passive current / thermo couples / thermo resistors / load cell / pulses selection; on-off; scale change)
Error signalling	Out of scale of measurement Generation overload signalling Low battery Internal malfunction

KEY

1. Socket for thermocouple measurement/ generation
2. Measuring/generation socket -EX
3. Measuring/generation socket -SN
4. Measuring/generation socket +SN
5. Measuring/generation socket +EX
6. On and off button
7. Bluetooth RESET button
8. Powering PWR LED
9. Successful connection Bind LED
10. Battery status indicator LED
11. Bluetooth/USB communication LED
12. Data recording LED
13. Error signalling LED
14. Micro USB connector for power/ communication
15. RESET button
16. Battery charge indicator LED

EQUIPMENT

1) Transportable case
2) MSC Calibrator (battery included)
3) Electrical socket
4) USB data and charging cable
5) User manual
6) Factory calibration certificate
7) Test cables
8) K thermocouple

MEASURING RANGE

GRANDEZZA	U.M.	GENERAZIONE	MISURA
Voltage (hi range)	[dc V]	0..26 V	0..26 V
Voltage (low range)	[dc mV]	-10..+90 mV	-10..+90 mV
Active current	[dc mA]	0,1..+24 mA	0..+24 mA
Passive current	[dc mA]	0,1..+24 mA (3..29 V)	0..+24 mA
Pt100	[°C]	-200..+859°C	-200..+850°C
Pt500	[°C]	-200..+859°C	-200..+850°C
PT1000	[°C]	-200..+859°C	-200..+850°C
Cu50 / Cu100	[°C]	-180..+200°C	-180..+200°C
Ni100 / Ni120	[°C]	-80..+260°C	-60..+250°C
Thermocouple J	[°C]	-210..+1200°C	-210..+1200°C
Thermocouple K	[°C]	-270..+1372°C	-200..+1372°C
Thermocouple T	[°C]	-270..+400°C	-200..+400°C
Thermocouple E	[°C]	-270..+1000°C	-200..+1000°C
Thermocouple N	[°C]	-270..+1300°C	-200..+1300°C
Thermocouple R	[°C]	-50..+1768°C	-50..+1768°C
Thermocouple S	[°C]	-50..+1768°C	-50..+1768°C
Thermocouple B	[°C]	0..+1820°C	250..+1820°C
Thermocouple L	[°C]	-200..+800°C	-200..+800°C
Load Cell 350 Ohm	[mV/V]	-0,2..+2,4 mV/V	-0,2..+2,4 mV/V
Pulse / Frequency	[Hz]	0,1..1000 Hz (1..24 V)	0,1..1000 Hz (3..24 Vdc)

ORDER CODES

Code	Description
MSC	Multifunction Smart Calibrator - Signal Generator / Meter, app-based bluetooth calibrator
MSC TOOL	Free Windows application for fw update and data extraction in .csv format
ISO-USB	PC-USB isolator (accessory)
ALIM-MSC	1A / 5V power supply unit (spare)

The technical data and the diagrams in this document are indicative and not binding.