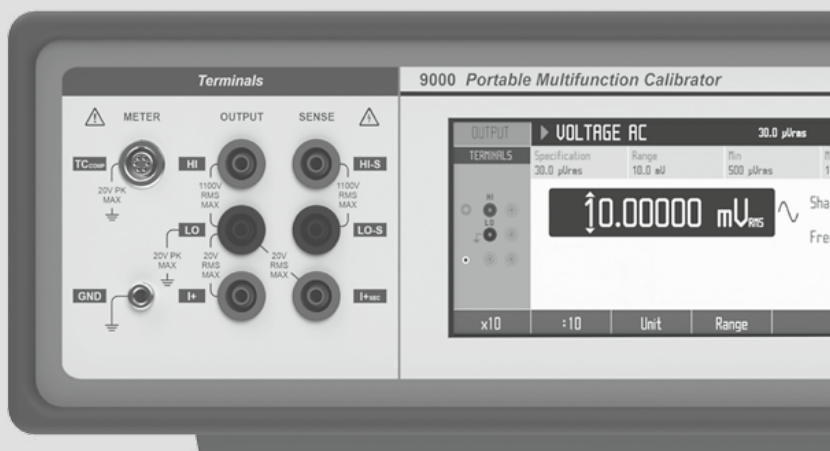


# ELECTRICAL CALIBRATION

product overview



# DECADES OF COMMITMENT

History of Meatest started back in early 80s when all three founders started to work together on calibrators and standards in metrology department of company Tesla. Collapse of the Soviet Union brought favourable conditions for doing business in Czech Republic once again and marked the foundation of Meatest in 1991.

With just 200 sqm of rented space, no staff and early-days ambitions the founders set about developing their own calibrators, standards and solutions for automatic calibration and eventually selling them to local customers throughout the nation.





It was obvious that local market wasn't big enough for Meatest right from the beginning so we started to look for global customers in mid 90s. First success came in 1998 when agreement on delivering calibrators to Taiwanese distributor for south west Asia has been made, followed by Swiss distributor for western Europe in 2000.

2000 was a milestone for Meatest as it had to take a huge step towards its own factory in order to keep up with foreign market demand and new trends in electronics. Newly acquired space of 650 sqm was enough even for introduction of two new types of products – programmable resistance decades and magnetic flow meters.

Another factory floor has been built in 2006, then a brand new 600 sqm development center in 2009 and staff numbers reached 40 in 2019.

And now it's time for you to try our time-proven technology and join our story

We strive to offer our customers great return on investment by keeping operating costs as low as possible and offering flexible solutions. Being a rather small company in metrology market we can work closely with customer feedback to create both hardware and software solutions that match everyone's exact applications even if it means creating a custom solution altogether.

<b>MULTIFUNCTION CALIBRATORS</b>	<ul style="list-style-type: none"><li>- Bench-top Multifunction Calibrators</li><li>- Portable Multifunction Calibrators</li><li>- Multifunction Process Calibrators</li></ul>
<b>PROGRAMMABLE DECADES</b>	<ul style="list-style-type: none"><li>- Resistance Decades</li><li>- Capacitance Decades</li><li>- RTD Simulators</li><li>- High Voltage Resistance Decades</li></ul>
<b>SPECIAL LABORATORY INSTRUMENTS</b>	<ul style="list-style-type: none"><li>- Power and Energy Calibrators</li><li>- High Current, Impedance Calibrators</li><li>- Resistance and Capacitance Standards</li></ul>
<b>CALIBRATION SOFTWARE</b>	<ul style="list-style-type: none"><li>- Automated calibration</li><li>- Camera readout</li><li>- Calibration database</li></ul>

**Samsung, NPL, CMI, TÜV SÜD, NASA,  
Telefonica, Philips, Jumo, Egston,  
INOR, Weidmüller, Bourns Inc.,  
Celesta, Iskra, Bosch, Osram, Siemens,  
Honeywell, ABB, E.ON, Skoda,  
Mercedes-Benz, ...**

**How can we help you?**

# MULTIFUNCTION CALIBRATORS

Multifunction calibrators are all-in-one standards for calibration of multimeters, panel meters and other electric measuring devices. All Meatest calibrators support remote control over multiple interfaces and additional options further extend calibrator capabilities to calibrate oscilloscopes, insulation testers, clamp meters, transducers and more.

<b>BENCH-TOP</b>	<p><b>9010+</b> 10 ppm accuracy, calibrates most types of electrical meters including up to 6½ digit DMMs, 1GHz o-scopes, power analyzers, insulation testers, clamp meters and more.</p> <p><b>9010</b> 30 ppm version of 9010+.</p>
<b>PORTABLE</b>	<p><b>9000</b> 60 ppm accuracy, compact size and weight, great for onsite handheld calibration up to 4½ digit.</p>
<b>PROCESS</b>	<p><b>M160</b> Light and highly accurate, designed to simulate all kinds of process sensors in tough industrial conditions.</p>

Model	Voltage	Current	Power	Frequency	Impedance	TC	RTD	Accuracy
9010+	1050 V	30 A	31.5 kW	1100 MHz	1.1 GΩ, 120 mF	✓	✓	10 ppm
9010	1050 V	20.5 A	5.74 kW	400 MHz	1.1 GΩ, 120 mF	✓	✓	35 ppm
9000	1050 V	2/20.5 A	—	2 MHz	—	✓	—	60 ppm
9000 RC	1050 V	2/20.5 A	—	2 MHz	600 MΩ, 120 mF	✓	✓	60 ppm
M160	100 V	50 mA	—	15 kHz	300 kΩ	✓	✓	15 ppm
M160i	100 V	50 mA	—	15 kHz	—	✓	—	15 ppm

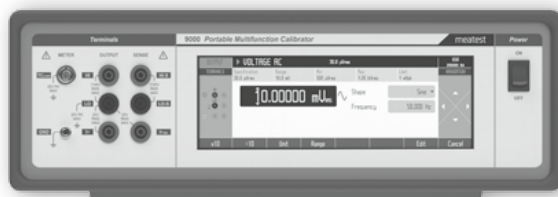
## 9010 9010+



Advancing from previous M14x multifunction calibrator series, 9010+ can now calibrate 1.1 GHz oscilloscopes, 1.5 kV insulation testers and power analyzers. Frequency ranges of main AC functions as well as RC standards have been upgraded too. On the other hand, we kept all the popular functions like transducer and sensor monitor calibration (strain gauge, pressure, torsion, force, etc.) using built-in multimeter, uncertainty indication on main display or comprehensive remote control.

Large display and simple interface give its user a great comfort. Further combined with Caliber© and WinQBase© software, the 9010 series becomes a fully automated workstation.

## 9000



Size of a notebook case, weights just 11 kg / 25 lbs and still capable of calibrating all handheld DMMs up to 4½ digit. The 9000 calibrator outputs up to 1050 V and 20.5 A DC and AC as well as resistance, capacitance, TC, RTD and frequency.

Combined with CamOCR optical display readout module, the 9000 is ideal solution for onsite meter calibrations. In this scenario, Meatest's automation SW Caliber drives the 9000, reads DUT measurements through camera and guides the operator to select appropriate functions and wiring.

# PROGRAMMABLE DECADE BOXES

Reference impedance standards were once huge sets of boxes that needed to be switched between manually. But as we moved into 21st century (at least Meatest did), things have changed. Welcome to the world of automated testing, one-click switching, no residual impedance and simple recalibration, where no accuracy or stability has been lost. All decades can be built into 19" rack and come with RS-232 interface as standard.

**REAL RESISTANCE**

**M6x2** Excellent accuracy, stability, resolution, 6 ms reaction time and wide range. 4W connection.

**M6x1** Designed for RTD simulation. Shorter ranges, otherwise same parameters and technology as M6x2.

**REAL-CAPACITANCE**

**M525** Low loss coefficient, open correction, resolution from 1 pF.

**HIGH VOLTAGE**

**M194** Calibrates insulation testers up to 6 kV and 100 GΩ, test voltage verification through signal meter.

**M109R** Cost saving version of M194. Fully floating terminals, battery powered.



Model	Range	Resolution	Max. Voltage	Interfaces (RS232 std.)	Accuracy
M632	1 $\Omega$ – 1.2 M $\Omega$	10 $\mu\Omega$	200 V <sub>PK</sub>	USB, GPIB, LAN	0.002 %
M642	0.1 $\Omega$ – 20 M $\Omega$	1 $\mu\Omega$	200 V <sub>PK</sub>	USB, GPIB, LAN	0.02 %
M631	16 $\Omega$ – 400 k $\Omega$	0.001 $^{\circ}\text{C}$	200 V <sub>PK</sub>	USB, GPIB, LAN	0.01 $^{\circ}\text{C}$
M641	10 $\Omega$ – 300 k $\Omega$	0.01 $^{\circ}\text{C}$	200 V <sub>PK</sub>	USB, GPIB, LAN	0.1 $^{\circ}\text{C}$
M525	0.1 nF – 100 $\mu\text{F}$	1 pF	50 V <sub>PK</sub>	USB, GPIB, LAN	0.25 %
M194	10 k $\Omega$ – 100 G $\Omega$	10 $\Omega$	6000 V <sub>PK</sub>	USB, GPIB, LAN	0.1 %
M109R	1 M $\Omega$ – 12 G $\Omega$	1 M $\Omega$	5000 V <sub>PK</sub>	—	0.1 %

## THE M632



Precision Resistance Decade M632 is truly a masterpiece, providing excellent 20 ppm accuracy and less than 1 ppm/ $^{\circ}\text{C}$  temperature coefficient in area of resistance calibration.

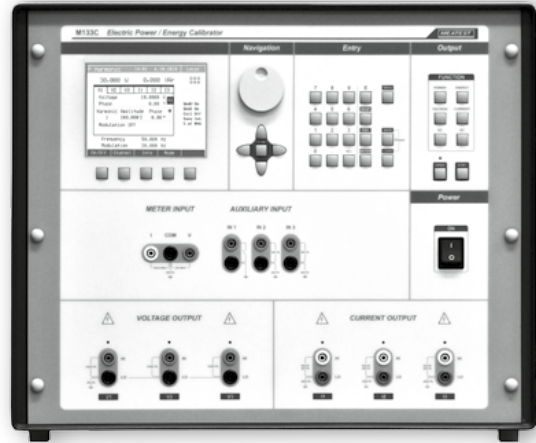
Precise resistance decade can't go without best foil resistors like those from Vishay Precision Group. Even relays available in time of M632 development were not good enough so they had to be customized by Meder to meet our high requirements.

# SPECIAL LABORATORY INSTRUMENTS

Sometimes your requirements just don't fit into ordinary ranges and capabilities of multi-purpose instruments. For these cases, Meatest has few a solutions:

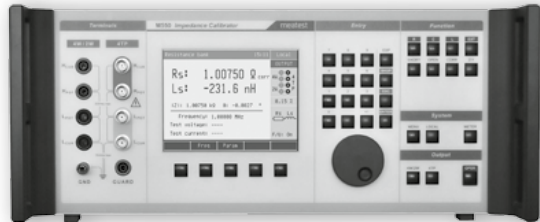
<b>POWER &amp; ENERGY CALIBRATORS</b>	<b>M133C</b> 0.037 % accuracy in 3-phase AC/DC power with harmonic and interharmonic distortion, amplitude modulation, Dip/Swell and flicker. Voltage-from-Current function, built-in multimeter, single-phase 90A output, RS232, ethernet, GPIB.
<b>HIGH CURRENT CALIBRATOR</b>	<b>M151</b> 175 ppm AC/DC current source and amplifier with range from 8 mA to 120 A. Built-in multimeter, simple recalibration, RS232, GPIB.
<b>IMPEDANCE CALIBRATOR</b>	<b>M550</b> The only fully automated calibration solution for LCR meters on the market! Includes 25 LCR standards (0.1 $\Omega$ to 100 M $\Omega$ , 10 pF to 100 $\mu$ F and 10 $\mu$ H to 10 H), built-in test signal meter, RS232 and GPIB interface.
<b>IMPEDANCE STANDARDS</b>	<b>MTE</b> Fix LF standards with low temperature coefficient and time constant. Decadic resistance and capacitance values.

## THE M133C



Outstanding accuracy and resolution are quite common for Meatest instruments but the best thing about M133C is its flexibility. All three phases are completely independent and AC signal can be set up in many different ways including phase shift, frequency, harmonic and interharmonic distortion, amplitude modulation by yet another independent signal and dip/swell.

## THE M550



Impedance calibrator M550 has been made using the proven top-quality-parts recipe with low calculated phase shift resulting in very good accuracy, thermal independence and lasting stability.

With M550, you no longer need countless numbers of fix standards and a lot of time to calibrate your LCR meters with frequency up to 1 MHz. Just connect your LCR meter to the M550 and press start.

# CALIBRATION SOFTWARE

## AUTOMATION WITH CALIBER

Create and run automated calibration procedures in just a few clicks. Caliber is easy to use, flexible and reads meter screens through Optical Camera Readout.



## LABORATORY MANAGEMENT WITH WINQBASE

Manage laboratory workload, keep track of customer assets and print calibration certificates in line with ISO17025.

# Caliber

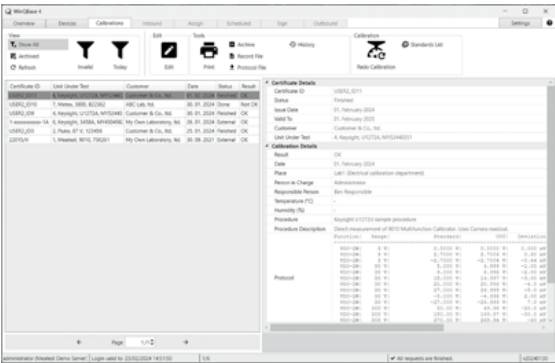
Caliber controls calibration instruments through RS232, GPIB, or VISA interfaces. For instruments with no interfaces, Caliber offers step-by-step guidance to manual calibration operators. Its innovative CamOCR module uses camera to scan digital segment displays, translate the images into numerical data, significantly reduce human error and increase calibration speed.



Caliber’s modular procedures can be converted to use new standards or even created from scratch in just a few clicks. Results with ISO17025 uncertainties can be turned into calibration certificate in Meatest WinQBase or processed by 3rd party software.

# WinQBase

Laboratory management is easier with the right tools. WinQBase is a laboratory database that keeps track of your instruments, calibrations, customers and other resources to help improve productivity and maintain ISO17025 compliance.



Future development will focus on workflow optimizations, resource allocation, order management, billing and more.

### **CERTIFIED BUSINESS**

Our quality management system is certified to ISO 9001:2015 under UKAS certification rules. All new instruments are tested and calibrated with possibility of ISO 17025 certified calibration.

### **MADE TO LAST**

Development and instrument design in Meatest is focused on long-lasting durability. High quality components and precise manufacturing processes are key factors in cutting life-cycle costs.

### **INNOVATION FOCUS**

Continuous development is taken very seriously in Meatest. That's why developers account for more than a quarter of all Meatest workforce.

### **FLEXIBLE SOLUTIONS**

Nothing on market to match your requirements? Or just missing critical feature in our instruments? Let us know and together we'll surely come up with solution.

## **INSTRUMENTS FOR PEOPLE**

Even though Meatest instruments are complex and powerful, user interface is always clear and easy. Come to one of our events and try it yourself.

## **WHEREVER YOU ARE**

Our representatives are at your service all over the world. Would you like to consult your solution with us? Get a quote? Training? Service? Calibration? Let us know.

## **AFFORDABLE CALIBRATION SOFTWARE**

To make your work a bit easier, Meatest has developed a calibration software designed to work in synergy with calibration instruments not only from Meatest. Let your PC do all the hard work for you!



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