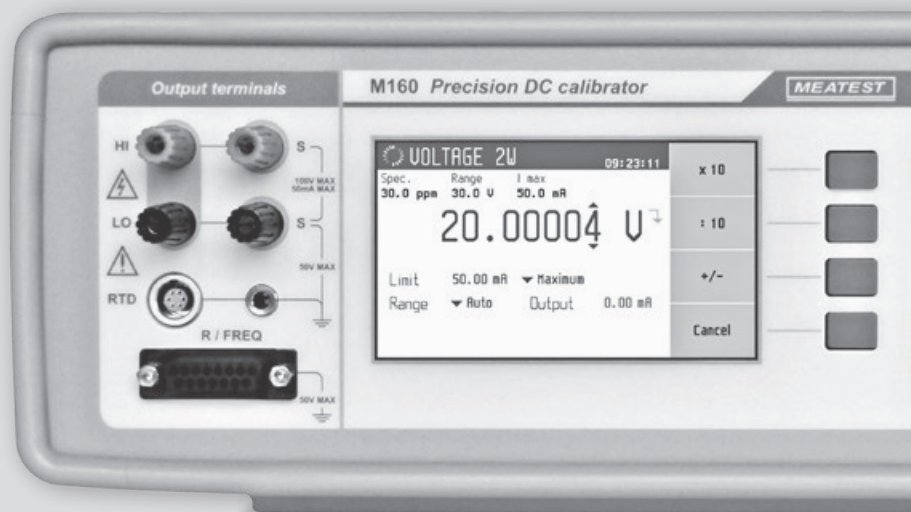


# ELECTRICAL CALIBRATION

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 lent 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 seemed obvious that local market was is not big enough for Meatest right from the start 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.

From that time on, Meatest keeps exporting more and more, reaching some 95% in foreign exposition. Another factory floor has been built in 2006, then a brand new 600 sqm development center in 2009 and even staff numbers reached 40 in 2019.

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

# OUR SOLUTIONS

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 cost-saving, all-in-one standards for calibration of electric meters including DMMs, transducers and regulators. All Meatest multifunction calibrators support computer assisted automated calibration. Full versions support additional functions like RTD simulation, resistance or power.

<b>BENCH-TOP</b>	<p><b>M142</b> 10 ppm accuracy, widest ranges and workload coverage, built-in multimeter.</p> <p><b>9010</b> 30 ppm accuracy, options for scope, clamp meter and insulation tester calibration.</p>
<b>PORTABLE</b>	<p><b>M143</b> 60 ppm accuracy, compact size and weight, wide ranges, great value for money.</p>
<b>PROCESS</b>	<p><b>M160</b> High accuracy industrial DC signals, designed for tough industrial conditions.</p>

Model	Voltage	Current	Power	Frequency	Impedance	TC	RTD	Accuracy
M142	1000 V	30 A	2.4 kW	20 MHz	1 G $\Omega$ , 100 $\mu$ F	✓	✓	10 ppm
M142i	1000 V	30 A	–	–	–	✓	–	10 ppm
9010	1050 V	20 A	5.6 kW	400 MHz	1 G $\Omega$ , 120 mF	✓	✓	30 ppm
M143	1000 V	20 A	–	2 MHz	100 M $\Omega$	✓	opt.	60 ppm
M143i	1000 V	2 A	–	2 MHz	100 M $\Omega$	✓	opt.	60 ppm
M160	100 V	50 mA	–	15 kHz	300 k $\Omega$	✓	✓	20 ppm
M160i	100 V	50 mA	–	15 kHz	–	✓	–	20 ppm

## THE 9010



Advancing from previous M14x multifunction calibrator series, 9010 can now calibrate even 400 MHz 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 becomes a fully automated workstation.

## THE M143



Size of a notebook case, weight of just 9kg and still a lot to offer. M143 is a cost saving solution for calibration of meters of electric quantities with basic accuracy 60 ppm which is enough for calibration of 3½ and 4½ digit multimeters. This portable calibrator can output up to 1000 V, 20 A or 100 MΩ, further offering TC and RTD temperature sensor simulation.

Model M143 works with Caliber© and WinQbase© software as well.

# 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.

<b>REAL RESISTANCE</b>	<p><b>M6X2</b> Excellent accuracy, stability, resolution, 6 ms reaction time and wide range. 4W connection.</p> <p><b>M6X1</b> Designed for RTD simulation. Shorter ranges, otherwise same parameters and technology as M6x2</p>
<b>REAL-CAPACITANCE</b>	<p><b>M525</b> Low loss coefficient, open correction resolution from 1 pF</p>
<b>HIGH VOLTAGE</b>	<p><b>M194</b> 100 G<math>\Omega</math>, 6 kV peak voltage and signal meter.</p> <p><b>M109R</b> Cost saving, battery powered, floating mode</p>



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

<p><b>POWER &amp; ENERGY CALIBRATORS</b></p>	<p><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.</p>
<p><b>HIGH CURRENT CALIBRATOR</b></p>	<p><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.</p>
<p><b>IMPEDANCE CALIBRATOR</b></p>	<p><b>M550</b> 100 ppm RLC programmable standard. High stability, accuracy, built-in multimeter, RS232, GPIB. Decimal values from 0.1 <math>\Omega</math> to 100 M<math>\Omega</math>, 10 pF to 100 <math>\mu</math>F and 10 <math>\mu</math>H to 10 H.</p>
<p><b>IMPEDANCE STANDARDS</b></p>	<p><b>MTE</b> Fix LF standards with low temperature coefficient and time constant. Decadic resistance and capacitance values.</p>

## 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



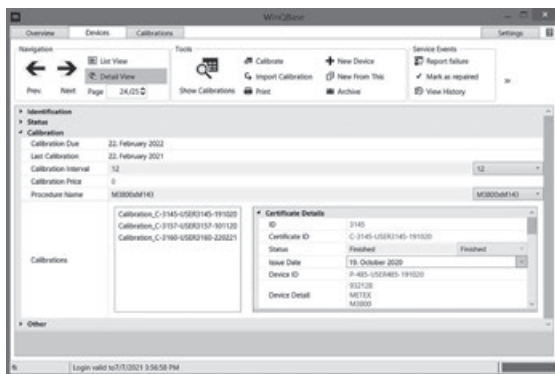
Impedance calibrator M550 has been made using the proven top-quality-parts recipe with low calculated phase shift resulting in very good accuracy, thermal independence and lasting stability.

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

# CALIBRATION SOFTWARE

To make your work a bit easier, Meatest has developed its own calibration software designed to work in synergy with all calibration instruments, reducing calibration times, calculating uncertainties and keeping your data organized.

## LABORATORY MANAGEMENT IN WINQBASE



## LABORATORY RESOURCES

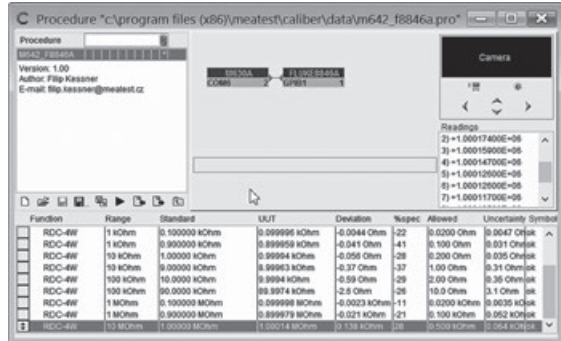
- Inventory & locations
- Personnel
- Workload schedule

## CUSTOMER DATA

- Calibrated inventory
- Orders & billing
- Contact details

WinQbase is designed to keep track of your calibrator arsenal, customers, work in progress and of course the calibrations themselves. Calibrations done by Caliber software are then linked to these records as well as instrument serial number, inventory data, owner identification, calibration dates, methods, etc.

# CALIBRATIONS IN CALIBER



## PROCEDURE AUTOMATION

- Procedure setup
- Uncertainty calculation
- Full test automation
- Protocol output

Caliber software is designed for automated calibration and reporting. It does the same thing as you would with Excel spreadsheet and manual calibration but much faster, cheaper, doing no errors and not bothering you even a minute. Caliber controls calibration instruments using RS232, GPIB or VISA interface where possible. Instruments with no such interfaces can be operated and read manually with Caliber providing detailed step-by-step guidance.

## CAMOCR CAMERA MODULE



CamOcr camera module extends possibilities of MEATEST automatic calibration software Caliber by scanning readouts directly from 7 segment digital displays. CamOCR can do any number of repeated measurements, decreasing type "A" uncertainty.

## **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? Share with us and together we'll surely come up with solution.

## **INSTRUMENTS FOR PEOPLE**

Even though our 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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