Data Sheet: MP10.535.R1.EN

www.aep.it

MP10*Plus*

Professional indicator
High Accuracy

Measures of:

• Force • Weight • Pressure

• Torque • Displacement

The digital indicator **MP10*Plus*** is a programmable instrument for the treatment of signals from full bridge strain gauge transducers, that allows the measurement of FORCES, MASS, PRESSURE, TORQUE AND DISPLACEMENTS.

It has been designed to be used in the most modern systems of static and dynamic measurement of high precision, such as metrology laboratories, materials testing machines, test benches or test etc. ...
It is ideal to be used as first-line standard, if **periodically certified by ACCREDIA laboratories or equivalent centers**.

MP10*Plus* has an **accuracy** of **0.0010%** or **0.0020%,** 24-bit internal resolution and combines a resolution (with signal ± 2 mV/V) of **± 2.000.000 divisions** in the **K2** version (± 200.000 divisions in the standard version).

It can be connected to load cells, dynamometers, pressure, torque or displacement transducers, unamplified from 200Ω to 1000 Ω connect 4 or 6 wires.

Transducers are powered with a square wave voltage (0-5V) whose frequency is equal to the number of conversions per second set.
The power supply of the strain gauge bridge transducer is protected from short circuits, so malfunctions will be prevented even in case of connection failures.

Up to 10 dynamometers can be associated to a single input channel, they can be fully characterized both in tension and compression through 4 different modes of calibration:

- **Full Scale**: with the characterization through the range and sensitivity for both positive (+2mV/V) and negative (-2mV/V) measurements.
- **Polynomial**: for the compensation of non-linearity through the identification of up to 5 known points in both the positive (+2mV/V) and negative (-2mV/V) fields.
- **Equation**: to compensate the non-linearity through an equation of 3° degree which is normally issued by accreditation centers. It is possible to set an equation in the positive range and another in the negative range.
- **Known Weight** in which the transducer is characterized on the field setting a known reference load which will characterize the measurement scale.

The digital indicator is available in four versions:

- **MP10Plus B K2:** **MP10 K2 Basic Version** equipped with 2 channels (+/-2.000.000 div.)
- **MP10Plus F K2:** **MP10 K2 Full Version** with 10 channels and infrared remote control (+/-2.000.000 div.)
- **MP10Plus B:** **MP10 Basic Version** equipped with 2 channels (+/-200.000 div.)
- **MP10Plus F:** **MP10 Full Version** with 10 channels and infrared remote control (+/-200.000 div.)

MP10*Plus* main features are:

- Large size and high resolution **Graphic display** with adjustable contrast.
- Resolution: ± **2.000.000** divisions **(K2 Version)** or ± **200.000** divisions (**Standard Version**).
- Acquisition frequency from 2.5Hz to 4800Hz.
- Type of transducers that can be managed: Force, Weight, Pressure, Torque and Displacement.
- Selection of numerous units of measurement for each type of transducer.
- **Internal Data logger** based on a non-volatile memory that can store up to 130,000 measurement points at a maximum speed of 4800 points for second.
- **External Data Logger** that uses a common **USB Flash Memory** to easily transfer data to a PC.
- **Infrared remote control** (optional) for remote functionality (ex. manual recordings, ZERO function, HOLD function, etc.).
- **ZERO**, HOLD and **PEAK** functions.
- **Clock-Calendar** function with date and time.
- 24 column **Printer** (option) connected to the serial port through which you can print out the measurement points with the indication of the company information.
- **Auto-calibration** function, programmable by the user, to minimize errors in temperature of the amplification chain and the A / D converter (reference for a guaranteed change of 1ppm / ° C).
- **Internal reference Channel** for the verification and control of the consistency of the measurements.
- **USB communication port** that allows real time data transfer to a PC at the maximum possible speed (4800Hz).
- **RS232 Serial communication port**.

MP10*Plus* can be bundled with **WinMP10** PC software that allows an immediate interfacing through the **USB** port with the instrument and allows you to view graphs, download data log, export data to Microsoft Excel and control all the configuration parameters.
The program also allows you to download the data log either using the internal memory or using a Flash Memory and to display the respective curves of acquisition.

Typical applications are:

Calibration of Reference machines force, pressure, and torque.
Calibration of material testing machines.
Calibration of test benches and testing equipment.
Calibration of transducers, pressure transmitters and pressure switches.
Calibration of load cells, force transducers and torque transducers.
Calibration of torque wrenches and snap or direct reading screwdrivers.
Audit of laboratories for testing the measurement uncertainties.
Audit to perform metrological confirmation.
Audit for interlaboratory comparisons.
Quality control in production lines.
Quality control Testing and Calibration Laboratories.
Tests on materials such as springs, friction detection, breakout forces.
Testing of protective equipment and safety.

Purchase Codes:

MP10BK2	**2** Channels • Resolution **2.000.000** div. • Accuracy **0,0010%**
MP10FK2	**10** Channels • Resolution **2.000.000** div. • Accuracy **0,0010%** • Remote control.
MP10B	**2** Channels • Resolution **200.000** div. • Accuracy **0,0020%**
MP10F	**10** Channels • Resolution **200.000** div. • Accuracy **0,0020%** • Remote control.

AVAILABLE VERSIONS:

µKAL KAL CLF C8S CLB TCETM

System for the measurement of **FORCE (**compression and tensile) combined with force transducers with ranges from 10N to 5000kN.

CLT CLS C2S F1

System for the measurement of **WEIGHT** in compression and tension matched to the load cells with ranges from 1kg to 500t.

TP16 TP1

System for the measurement of **PRESSURE** and **VACUUM** (Empty) combined with pressure transducers.
Normalized ranges from 5 bar to 2000bar (29000psi) for use in gas and liquid.

TRX TRS µTOR RT2

System for the measurement of **TORQUE** clockwise and counterclockwise combined with torque transducers static or dynamic.
Normalized ranges from 0.5 Nm to 5000 Nm, ability to record high-speed continuous **PEAKS** up up to 4.8kHz.

LDT

System for the measurement of **DISPLACEMENT** transducers coupled with transducers with normalized ranges from 5 to 100 mm.

Of course, you can use different transducers to be able to work with all the different mechanical quantities FORCE, PRESSURE, TORQUE and DISPLACEMENT

MAIN FEATURES*:*

Type	Channels	Resolutions	ACCURACY	Remote control
MP10*Plus* B K2	2	**2.000.000** div.	0,0010%	No
MP10*Plus* F K2	10	**2.000.000** div.	0,0010%	Yes
MP10*Plus* B	2	**200.000** div.	0,0020%	No
MP10*Plus* F	10	**200.000** div.	0,0020%	Yes

Possibility to connect alternately strain gauge transducers to measure
FORCE • WEIGHT • PRESSURE • TORQUE • DISPLACEMENT.

PROGRAMMABLE MEASUREMENT UNIT:
FORCE and WEIGHT: kg - t - N - daN - kN - MN – lb - klb – mV/V – div.
PRESSURE: bar-mbar-psi-MPa-kPa-Pa-mH2O-inH2O-kg/cm2-mmHg-cmHg-inHg-atm-mV/V – div.
TORQUE: Nm – Nmm – kgm – kNm - in.lbf - ft.lbf – gcm – kgmm- mV/V – div.
DISPLACEMENT: m- cm – dm - mm - µm – inch – foot - mV/V – div.

MP10*Plus* has got 1 strain gauge INPUT Channel calibrated at ±2mV/V
Power Supply: 5Vac programmable for **4** wires or **6** wires connection.
Internal resolution **24 bit**,
Resolution ±**2.000.000** or **±200.000** divisions at 2mV/V.
Full bridge strain gauge from 200Ω to 1000Ω.

DISPLAY High resolution graphic LCD (240x64 dots) backlit display with adjustable contrast to adapt to any external light condition.

MULTI-JOG that makes it easier to program the parameters inside the **Menu.**
Rotary Encoder to change parameters values.
4 keys positioned at 90° + one central key (Enter).

DIGITAL CALIBRATION (Password Protected) independent for each channel with selectable calibration FULL SCALE, FOR POINTS, by EQUATION (1st, 2nd and 3rd degree) or via KNOWN WEIGHT.
Using the calibration by EQUATION and FOR POINTS, a transducer LINEARIZATION cab be achieved by increasing the metrological characteristics of the system (MP10 + transducer).
Each channel is associated with two different calibrations, one in the positive range and one for negative range (Example: Tension and Compression)

Back-up channel function allows you to perform a backup of all calibration of the channels. **Restore Channels** function allows you to restore previously saved calibration of the channels with the function of Back-up

DATA LOGGER allows you to store up to 130,000 measurement points and keep them in the internal memory even when the power is turned off.
The logging can be done in **AUTO** mode or **MANUAL** mode.
In **AUTO** mode, the instrument records the measurements at regular time intervals and can be set for a specific period of time (up to 100 days). The time intervals can be set from maximum speed conversion (4.8 kHz) up to a single recording every 24 hours.
The **MANUAL** mode allows the operator to decide when to record the measurements on the memory. The store command can be given either via button on the front panel or via REMOTE CONTROL.

All data can then be displayed on the screen, downloaded through the powerful software WinMP10 or exported to external flash memory (USB Flash Drive) for charting, data processing Microsoft Excel, report printing etc. ...

Programmable RESOLUTION.

DIGITAL FILTER and programmable acquisition frequency from **2,5 to 4800 (4,8kHz)**.
The high speed allows to analyze dynamic measurements such as the measurement of the impact force generated by a free-falling mass, or the measurement of a series of pulses generated by screwdrivers.

ZERO function allows to clear the measure or to view the natural zero (offset) of the transducer connected.
HOLD function allows to freeze for a short time the measures in order to analyze them.
PEAK function (both positive and negative) to see in the same time both the actual measure that the max and min values

Programmable **REMOTE CONTROL** allows to perform some functions remotely: **ZERO**, **HOLD**, **PRINT** and **RECORD** of a Data logger point manually (both in the internal that on an external Flash memory).
The **MP10*Plus* B** version does not include the remote control (to be purchased separately).

Flash MEMORY connector (on the front panel) allows you to copy in a very fast way data logger cycle on a PC.

It is possible to create file in .bin format (for max speed and size) or as .CSV file format for a direct export of data on spreadsheet like Microsoft Excel

Internal **Clock-Calendar with Date and Time**

USB port for PC communication.
RS232C serial port for PC o PLC communication.
USB and RS232 communication are independent so it is possible to connect at the same time a PC or a PLC (or an external 24 column printer).

External 24 column **Printer**.
It is possible to print a report header (as 3 rows of free text) and to print the measurements by pressing the PRINT Key on the front panel or by using the REMOTE CONTROL (option)
You can print both on paper and on adhesive labels.

PROTECTION CLASS (EN 60529) IP40, powder coated ALUMINIUM container, WEIGHT ~ 0.7kg

REFERENCE TEMPERATURE 23°C, NOMINAL WORKING TEMPERATURE from 0 to +50°C
Temperature drift (10°C): on ZERO ≤ ± 0.01%, on full scale ≤ ± 0.01%

COMPONENT SUPPLIED

MP10*Plus* B (both **K2** and **standard versions)** equipped with 2 channels.

Power supply cord

CD with
Manual and USB Driver

MP10*Plus* F (both **K2** and **standard versions)** equipped with 10 channels and remote control.

Power supply cord

CD with
Manual and Driver USB

Infrared
remote control

OPTIONAL COMPONENTS (purchased separately)

USB cable

RS232 serial cable

Infrared REMOTE Control

24 column printers

Connector for Transducer

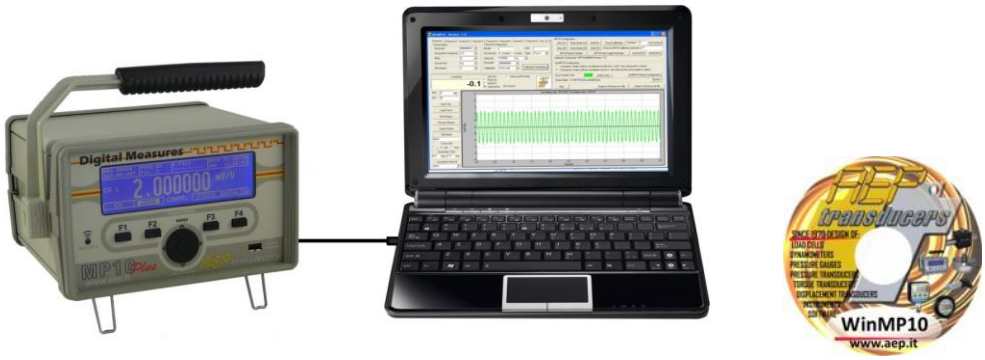
Calibration Report

ACCREDIA certificates

Carrying case

Flying male 7 pin MIL	in mV/V	System (MP10 + Transducers)

APPLICATION SOFTWARE (purchased separately)



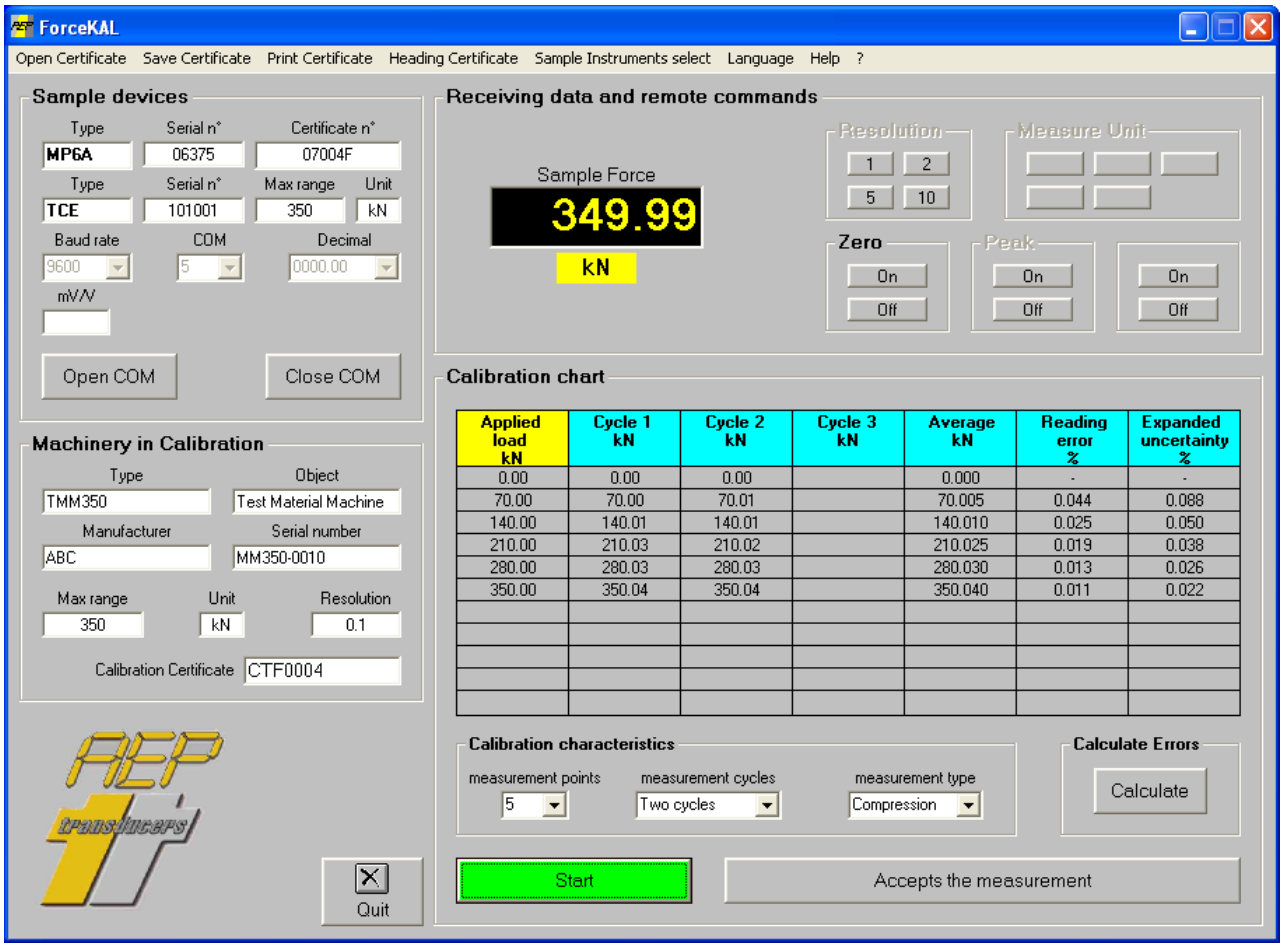
To complete the system of measurement **AEP transducers** has developed several software applications that interface directly to the instrument **MP10*Plus*** and support the user in the various functions of calibration, testing, analysis, data storage, transfer of measures to Microsoft Excel etc.

For dedicated calibration applications 3 different software are available: **ForceKal, PressKal, TorqueKal**

For more information download the manuals of the software on the site:
www.aeptransducers.com
www.aep.it

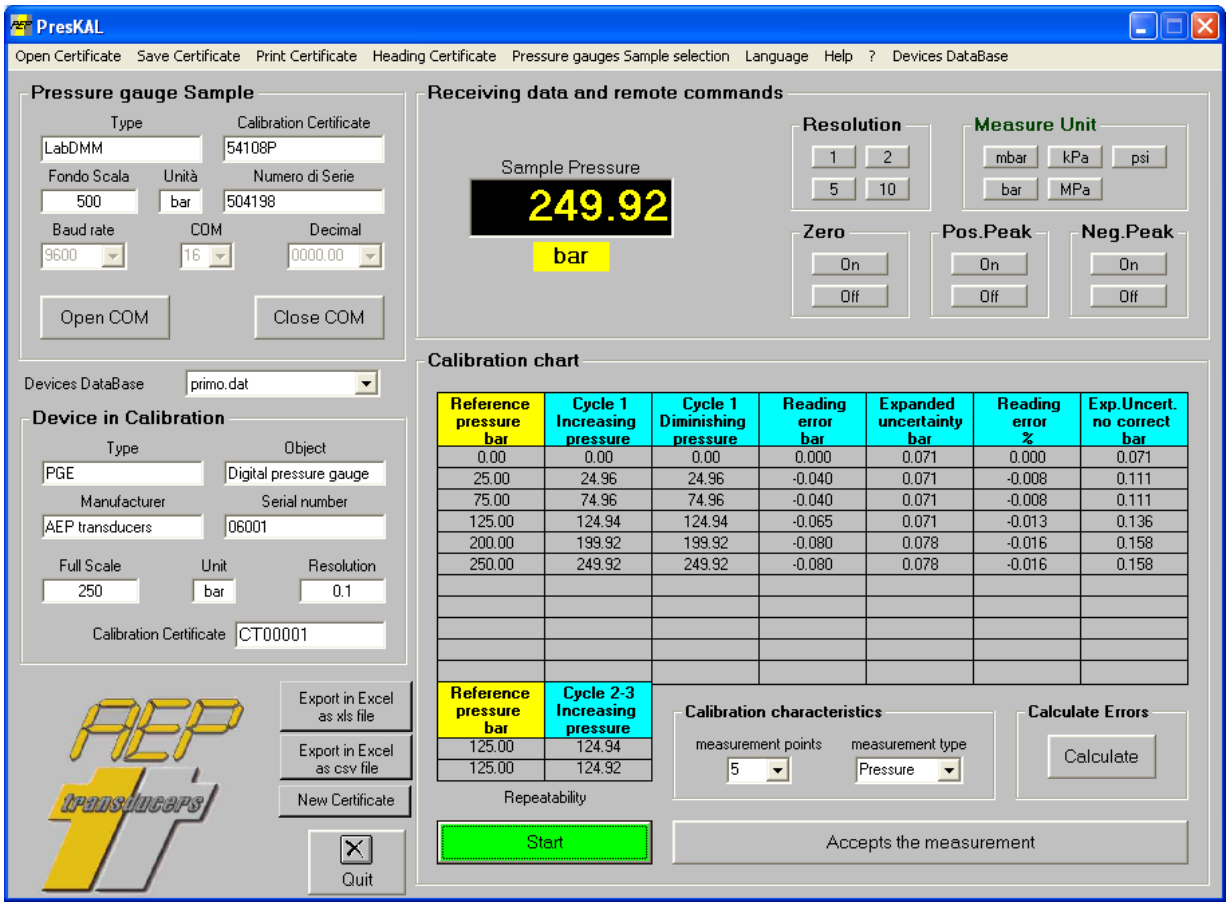
ForceKAL

Dedicated to the calibration of testing machines AND test benches where force is generated.



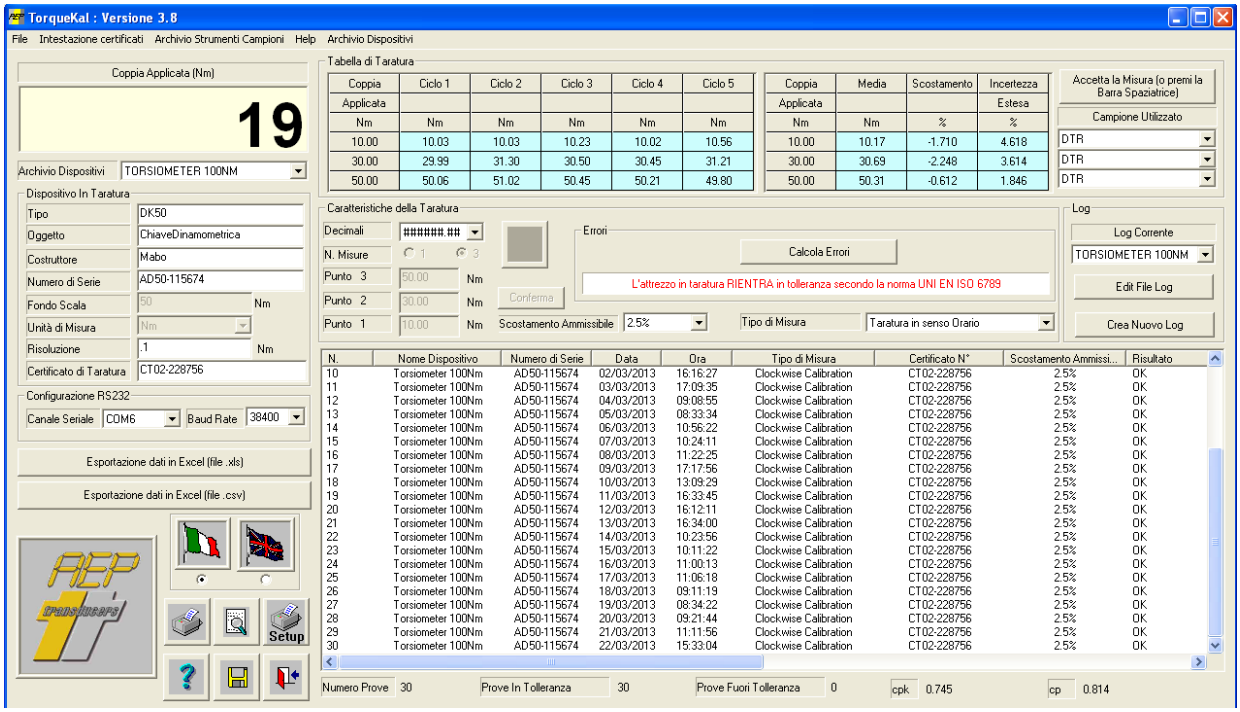
PressKAL

Dedicated to the calibration of pressure gauges such as manometers, pressure transducers, pressure transmitters, pressure switches



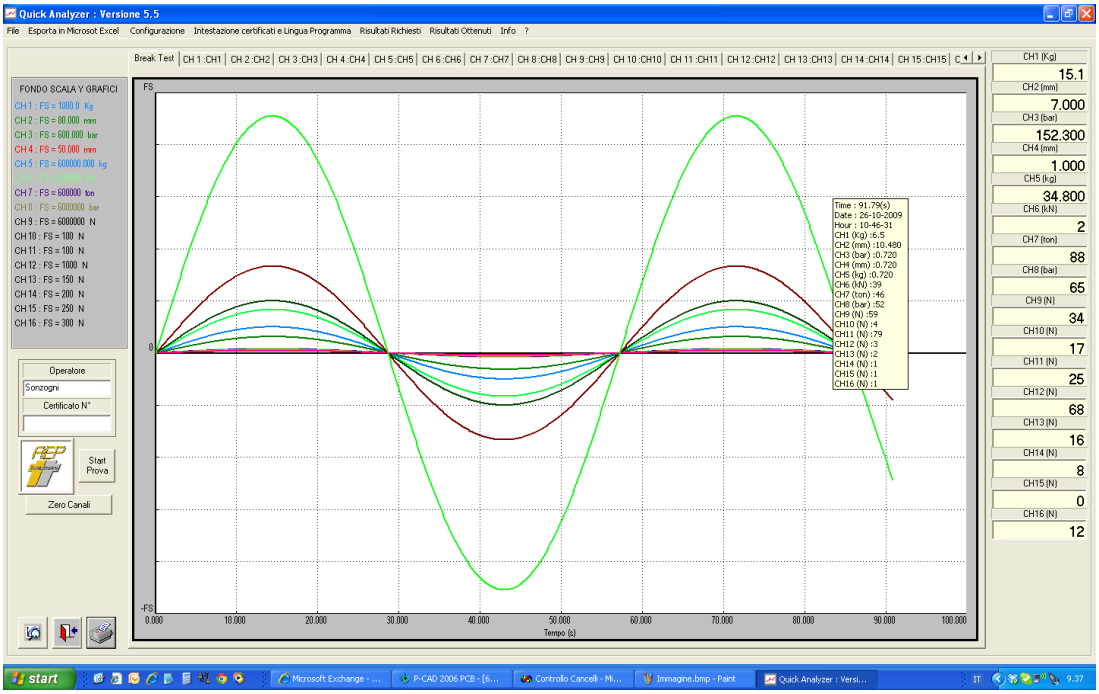
ToqueKAL

Dedicated to the calibration of torque wrenches and direct reading or snap torque screwdrivers.



Quick Analyzer

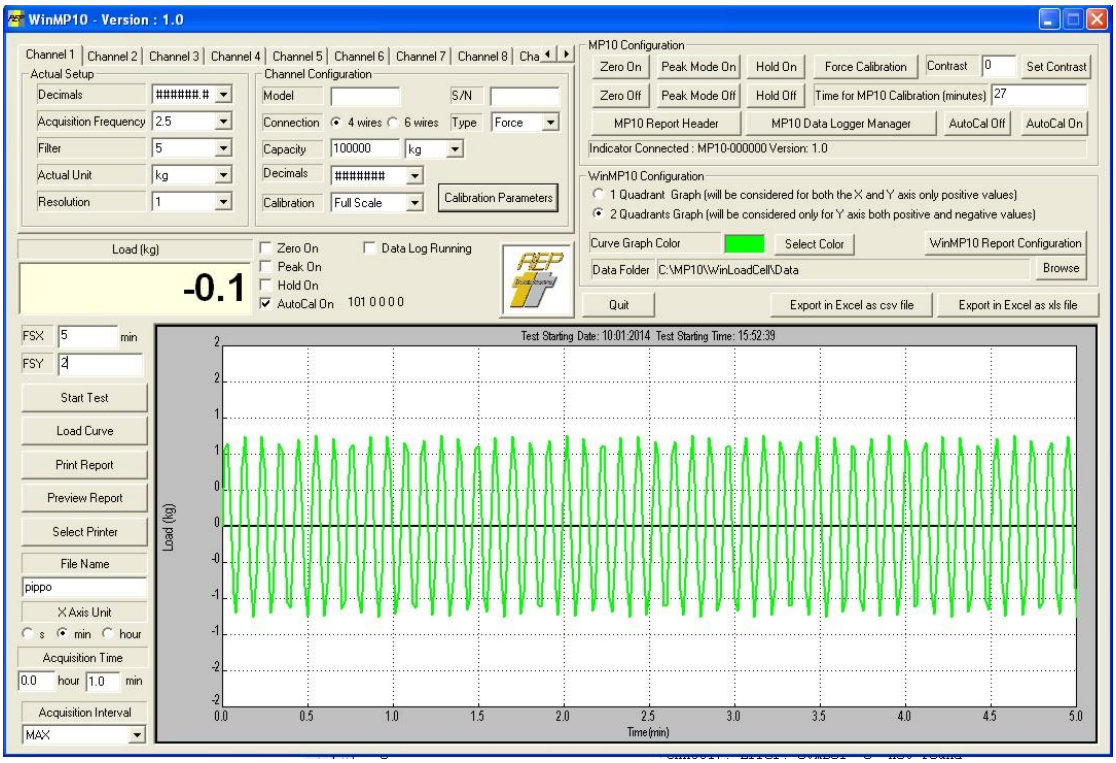
Dedicated to recording and graphical analysis of up to 16 different AEP transducers instruments to measure: force, weight, pressure, torque and displacement.



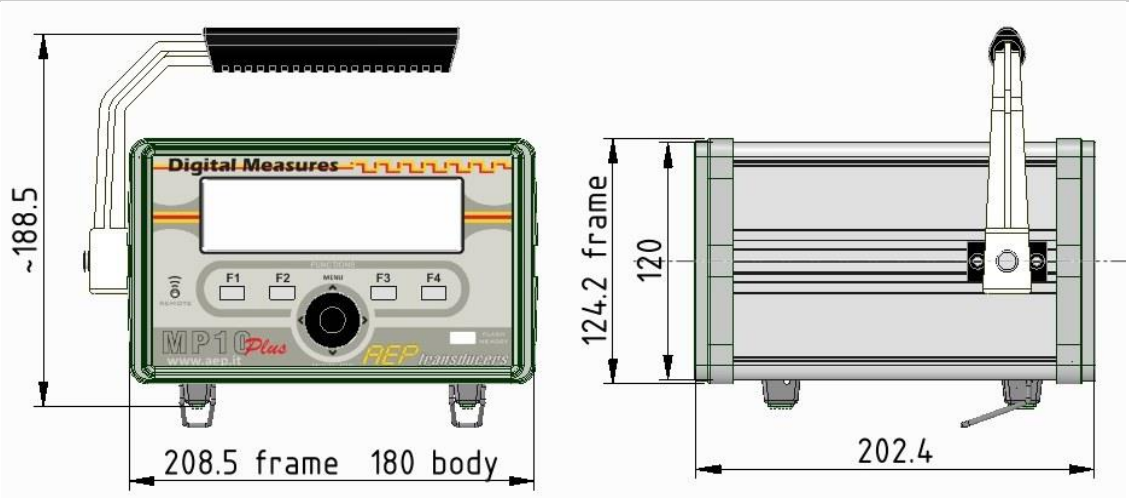
WinMP10

A dedicated program that allows an immediate interfacing through the USB port with the **MP10***Plus* and allows you to view graphs, export data to Microsoft Excel directly from the PC and set all configuration parameters.

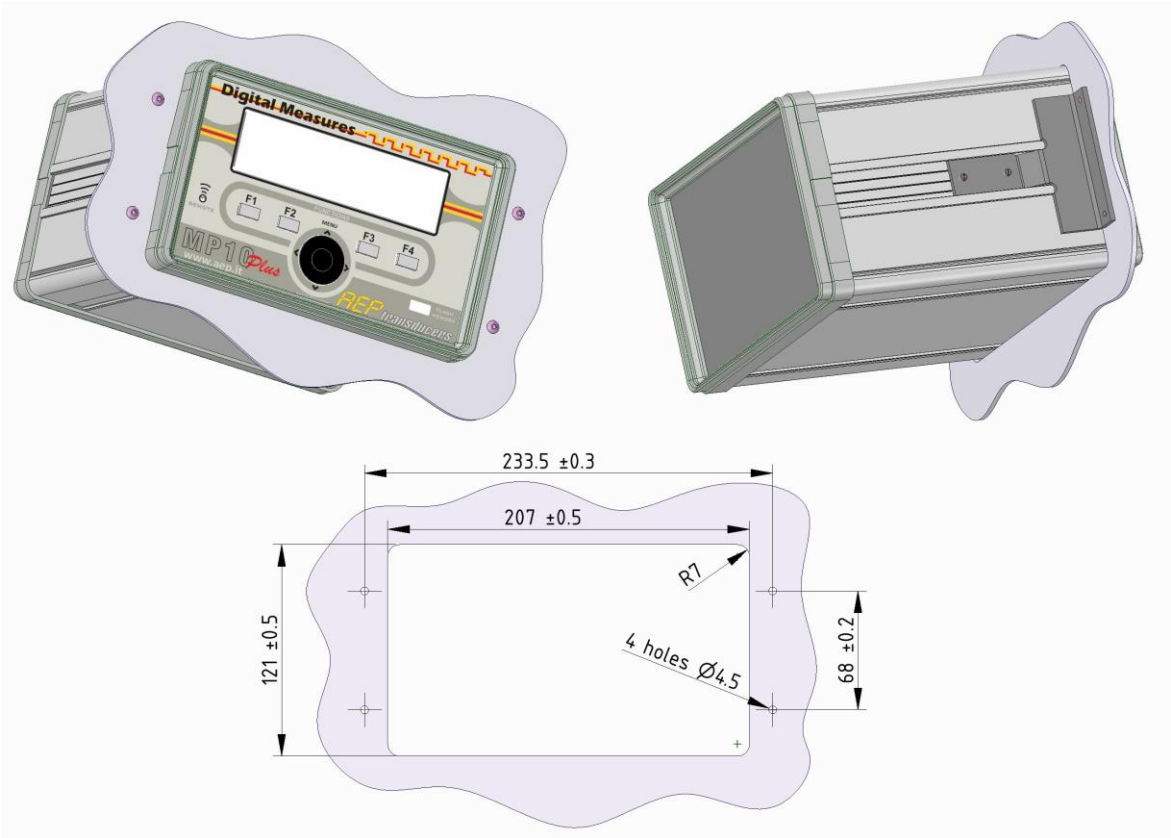
The program also allows you to download a Data log using the internal memory or the USB Flash Memory and display the respective curves of acquisition.



Dimensions (mm)



BUILT-IN APPLICATION



Note: for panel mounting two brackets are needed