

**Measures of:**

- **Force** • **Weight** • **Pressure**
- **Torque** • **Displacement**

RISOLUZIONE versione K2
 ± 2.000000 div
 RESOLUTION K2 version

RISOLUZIONE STANDARD
 ± 200000 div
 RESOLUTION STANDARD

ACCURATEZZA
 $\leq \pm 0.0010\%$
 ACCURACY

ACCURATEZZA
 $\leq \pm 0.0020\%$
 ACCURACY

15
 Stabilità a lungo termine
 Long term high stability

Alta Affidabilità
 High Reliability

CE RoHS

USB 2.0

Smart

Data Logger

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 $\pm 2.000.000$ 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 1000Ω 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

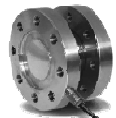
System for the measurement of **WEIGHT** in compression and tension matched to the load cells with ranges from 1kg to 500t.



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 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 - μ m - inch - foot - mV/V - div.



MP10^{Plus} has got 1 strain gauge INPUT Channel calibrated at ± 2 mV/V

Power Supply: 5Vac programmable for 4 wires or 6 wires connection.

Internal resolution **24 bit**,

Resolution $\pm 2.000.000$ or ± 200.000 divisions at 2mV/V.

Full bridge strain gauge from 200 Ω to 1000 Ω .

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 can 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 remote control is standard in the **K2** version only.



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

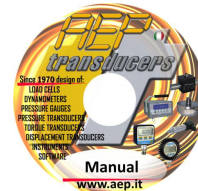
Temperature drift (10°C): on ZERO $\leq \pm 0.01\%$, on full scale $\leq \pm 0.01\%$

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
Flying male 7 pin MIL



Calibration Report
in mV/V

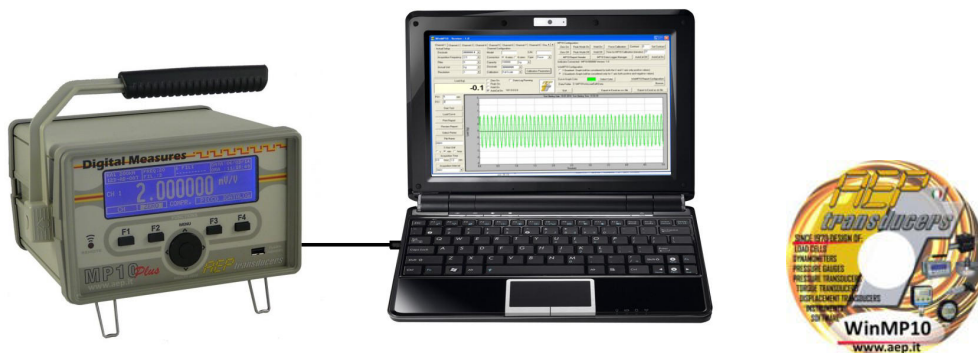


ACCREDIA certificates
System (MP10 + Transducers)



Carrying case

APPLICATION SOFTWARE (purchased separately)



To complete the system of measurement **AEP transducers** has developed several software applications that interface directly to the instrument **MP10Plus** 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.

ForceKAL

Open Certificate Save Certificate Print Certificate Heading Certificate Sample Instruments select Language Help ?

Sample devices

Type	Serial n°	Certificate n°	
MP6A	06375	07004F	
Type	Serial n°	Max range	Unit
TCE	101001	350	kN
Baud rate	COM	Decimal	
9600	5	0000.00	
mV/V			

Open COM Close COM

Receiving data and remote commands

Sample Force

349.99

kN

Resolution: 1 2 5 10 Measure Unit: Zero: On Off Peak: On Off

Machinery in Calibration

Type	Object	
TMM350	Test Material Machine	
Manufacturer	Serial number	
ABC	MM350-0010	
Max range	Unit	Resolution
350	kN	0.1

Calibration Certificate CTF0004

Calibration chart

Applied load kN	Cycle 1 kN	Cycle 2 kN	Cycle 3 kN	Average kN	Reading error %	Expanded uncertainty %
0.00	0.00	0.00		0.000	-	-
70.00	70.00	70.01		70.005	0.044	0.088
140.00	140.01	140.01		140.010	0.025	0.050
210.00	210.03	210.02		210.025	0.019	0.038
280.00	280.03	280.03		280.030	0.013	0.026
350.00	350.04	350.04		350.040	0.011	0.022

Calibration characteristics

measurement points: 5 measurement cycles: Two cycles measurement type: Compression

Calculate Errors Calculate

Start Accepts the measurement

Quit

PressKAL

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

PresKAL

Open Certificate Save Certificate Print Certificate Heading Certificate Pressure gauges Sample selection Language Help ? Devices DataBase

Pressure gauge Sample

Type: LabDMM Calibration Certificate: 54108P

Fondo Scala: 500 Unità: bar Numero di Serie: 504198

Baud rate: 9600 COM: 16 Decimal: 0000.00

Open COM Close COM

Receiving data and remote commands

Sample Pressure: **249.92 bar**

Resolution: 1 2 5 10

Measure Unit: mbar kPa psi bar MPa

Zero: On Off Pos.Peak: On Off Neg.Peak: On Off

Calibration chart

Reference pressure bar	Cycle 1 Increasing pressure	Cycle 1 Diminishing pressure	Reading error bar	Expanded uncertainty bar	Reading error %	Exp.Uncert. no correct bar
0.00	0.00	0.00	0.000	0.071	0.000	0.071
25.00	24.96	24.96	-0.040	0.071	-0.008	0.111
75.00	74.96	74.96	-0.040	0.071	-0.008	0.111
125.00	124.94	124.94	-0.065	0.071	-0.013	0.136
200.00	199.92	199.92	-0.080	0.078	-0.016	0.158
250.00	249.92	249.92	-0.080	0.078	-0.016	0.158

Devices DataBase: primo.dat

Device in Calibration

Type: PGE Object: Digital pressure gauge

Manufacturer: AEP transducers Serial number: 06001

Full Scale: 250 Unit: bar Resolution: 0.1

Calibration Certificate: CT00001

Export in Excel as xls file Export in Excel as csv file New Certificate Quit

Calibration characteristics

measurement points: 5 measurement type: Pressure

Calculate Errors: Calculate

Repeatability: Start

Accepts the measurement

ToqueKAL

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

TorqueKal : Versione 3.8

File Intestazione certificati Archivio Strumenti Campioni Help Archivio Dispositivi

Coppia Applicata (Nm): **19**

Archivio Dispositivi: TORSIOMETER 100NM

Dispositivo In Taratura: DK50

Objetto: ChiaveDinamometrica

Costruttore: Mabo

Numero di Serie: AD50-115674

Fondo Scala: 50 Nm

Unità di Misura: Nm

Risoluzione: .1 Nm

Certificato di Taratura: CT02-228756

Configurazione RS232: Canale Seriale: COM6 Baud Rate: 38400

Esportazione dati in Excel (file .xls)

Esportazione dati in Excel (file .csv)

Tabella di Taratura

Coppia	Ciclo 1	Ciclo 2	Ciclo 3	Ciclo 4	Ciclo 5
Applicata					
Nm	Nm	Nm	Nm	Nm	Nm
10.00	10.03	10.03	10.23	10.02	10.56
30.00	29.99	31.30	30.50	30.45	31.21
50.00	50.06	51.02	50.45	50.21	49.80

Caratteristiche della Taratura

Decimale: #####

N. Misure: 1 3

Punto 3: 50.00 Nm

Punto 2: 30.00 Nm

Punto 1: 10.00 Nm

Scostamento Ammissibile: 2.5%

Tipi di Misura: Taratura in senso Orio

Calcola Errori

L'attrezzo in taratura RIENTRA in tolleranza secondo la norma UNI EN ISO 6789

Log

Log Corrente: TORSIOMETER 100NM

Edit File Log

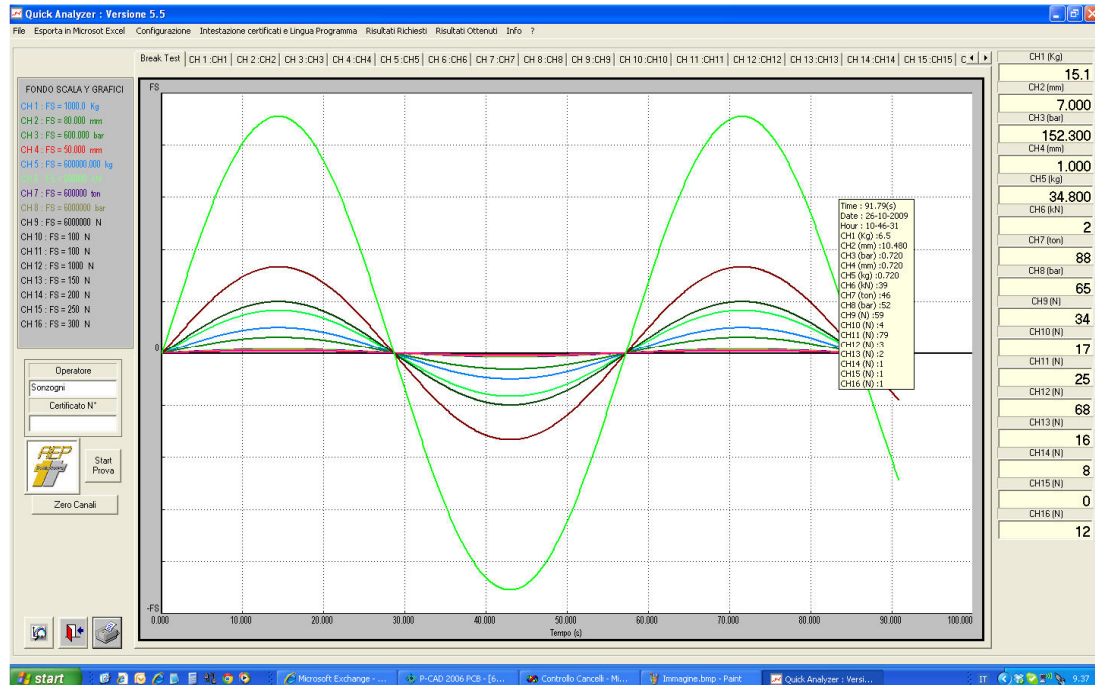
Crea Nuovo Log

N.	Nome Dispositivo	Numero di Serie	Data	Ora	Tipi di Misura	Certificato N°	Scostamento Ammissibile	Risultato
10	Torsionmeter 100Nm	AD50-115674	02/03/2013	16:16:27	Clockwise Calibration	CT02-228756	2.5%	OK
11	Torsionmeter 100Nm	AD50-115674	03/03/2013	17:09:35	Clockwise Calibration	CT02-228756	2.5%	OK
12	Torsionmeter 100Nm	AD50-115674	04/03/2013	09:08:55	Clockwise Calibration	CT02-228756	2.5%	OK
13	Torsionmeter 100Nm	AD50-115674	05/03/2013	08:33:34	Clockwise Calibration	CT02-228756	2.5%	OK
14	Torsionmeter 100Nm	AD50-115674	06/03/2013	10:56:22	Clockwise Calibration	CT02-228756	2.5%	OK
15	Torsionmeter 100Nm	AD50-115674	07/03/2013	10:24:11	Clockwise Calibration	CT02-228756	2.5%	OK
16	Torsionmeter 100Nm	AD50-115674	08/03/2013	11:22:25	Clockwise Calibration	CT02-228756	2.5%	OK
17	Torsionmeter 100Nm	AD50-115674	09/03/2013	17:17:56	Clockwise Calibration	CT02-228756	2.5%	OK
18	Torsionmeter 100Nm	AD50-115674	10/03/2013	13:09:29	Clockwise Calibration	CT02-228756	2.5%	OK
19	Torsionmeter 100Nm	AD50-115674	11/03/2013	16:33:45	Clockwise Calibration	CT02-228756	2.5%	OK
20	Torsionmeter 100Nm	AD50-115674	12/03/2013	16:12:11	Clockwise Calibration	CT02-228756	2.5%	OK
21	Torsionmeter 100Nm	AD50-115674	13/03/2013	16:34:00	Clockwise Calibration	CT02-228756	2.5%	OK
22	Torsionmeter 100Nm	AD50-115674	14/03/2013	10:23:56	Clockwise Calibration	CT02-228756	2.5%	OK
23	Torsionmeter 100Nm	AD50-115674	15/03/2013	10:11:22	Clockwise Calibration	CT02-228756	2.5%	OK
24	Torsionmeter 100Nm	AD50-115674	16/03/2013	11:00:13	Clockwise Calibration	CT02-228756	2.5%	OK
25	Torsionmeter 100Nm	AD50-115674	17/03/2013	11:06:18	Clockwise Calibration	CT02-228756	2.5%	OK
26	Torsionmeter 100Nm	AD50-115674	18/03/2013	09:11:19	Clockwise Calibration	CT02-228756	2.5%	OK
27	Torsionmeter 100Nm	AD50-115674	19/03/2013	08:34:22	Clockwise Calibration	CT02-228756	2.5%	OK
28	Torsionmeter 100Nm	AD50-115674	20/03/2013	09:21:44	Clockwise Calibration	CT02-228756	2.5%	OK
29	Torsionmeter 100Nm	AD50-115674	21/03/2013	11:11:56	Clockwise Calibration	CT02-228756	2.5%	OK
30	Torsionmeter 100Nm	AD50-115674	22/03/2013	15:33:04	Clockwise Calibration	CT02-228756	2.5%	OK

Numero Prove: 30 Prove In Tolleranza: 30 Prove Fuori Tolleranza: 0 cpk: 0.745 cp: 0.814

Quick Analyzer

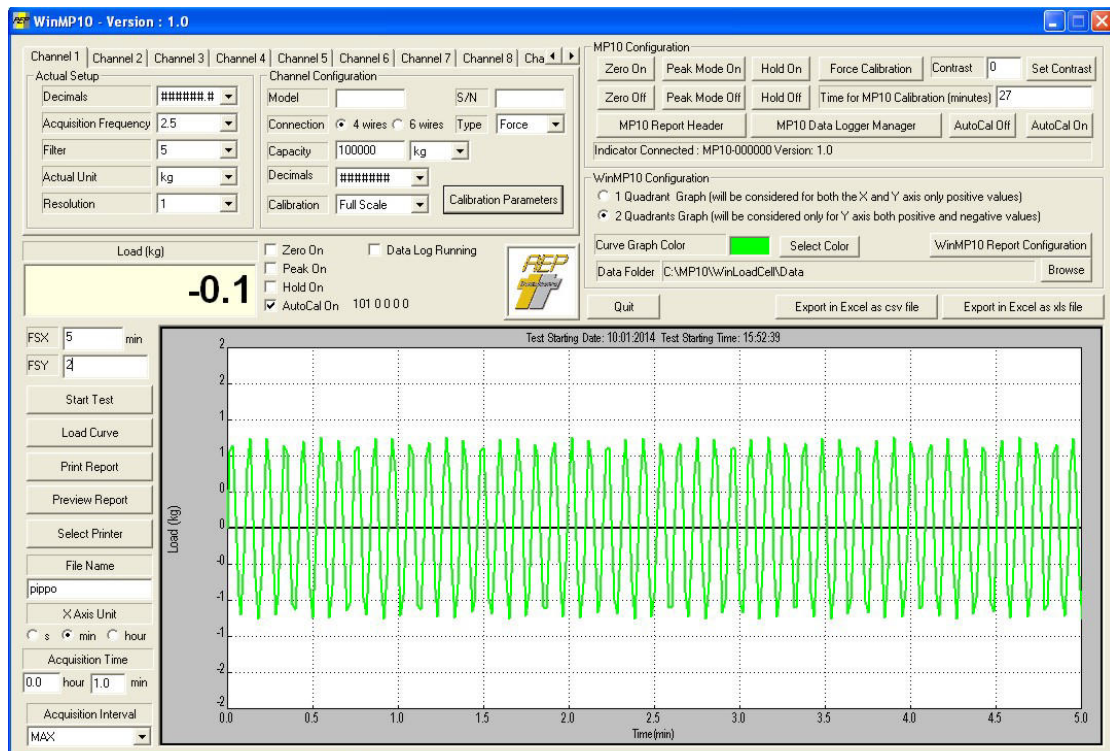
Dedicated to recording and graphical analysis of up to 16 different AEP transducers instruments to measure: force, weight, pressure, torque and displacement.



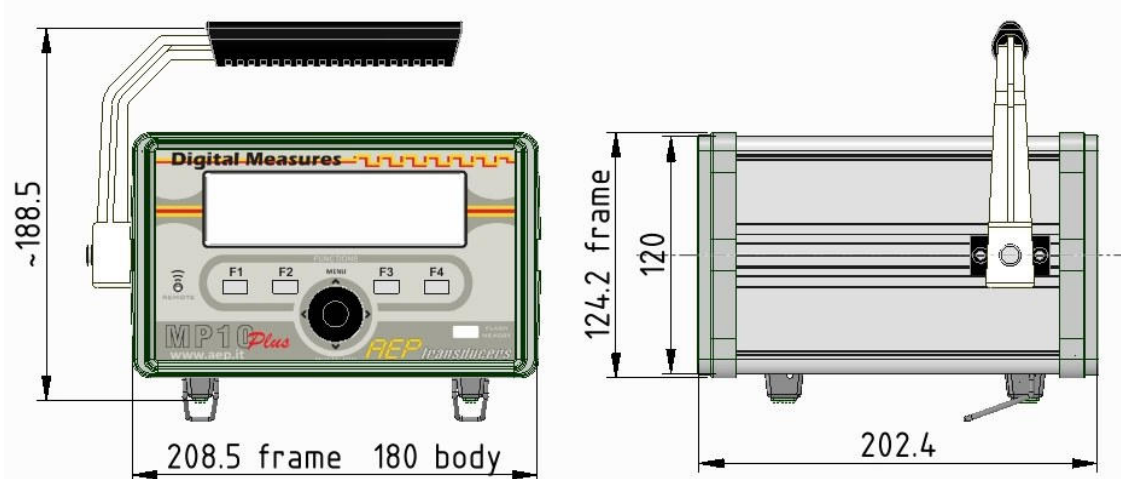
WinMP10

A dedicated program that allows an immediate interfacing through the USB port with the **MP10Plus** and allows you to view graphs, export data to Microsoft Excel directly from the PC and set all configuration parameters.

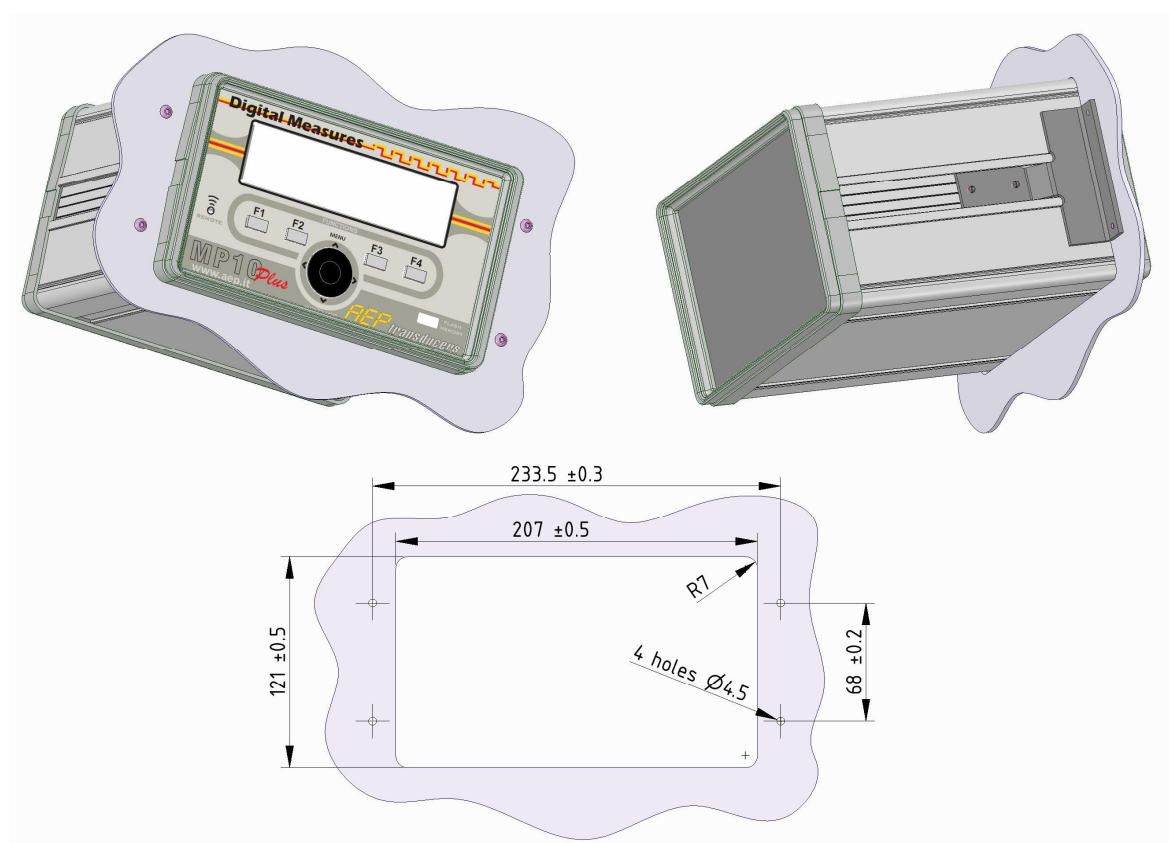
The program also allows you to download a Data log using the internal memory or the USB Flash Memory and display the respective curves of acquisition.



Dimensions (mm)



BUILT-IN APPLICATION



Note: for panel mounting two brackets are needed



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