Data sheet: MP6P.540.R0.ENG

www.aep.it

MP6Plus

LABORATORY PROFESSIONAL INDICATOR with 1, 2, 3 or 4 channels

Measurement of WEIGHT, FORCE, PRESSURE, TORQUE, DISPLACEMENT and TEMPERATURE

"THE EVOLUTION OF THE SPECIES" : after more than 20 years of service in the various versions the new **MP6*Plus*** is born.

MP6*Plus* is a Professional Digital Laboratory Indicator with **1, 2, 3, or 4 inputs**, suitable for receiving signals from strain gauge sensors, transmitters with voltage or current output and PT100. Particularly suitable for both static and dynamic applications, for calibration and verification in metrology laboratories or industrial environments where it is necessary to make measurements of weight, force, pressure, torque, displacement and temperature in a synchronized manner.

To **FIT EVERY APPLICATION** the instrument can be configured and customized: the function keys F1, F2, F3 and F4 can be programmed for the function of interest such as: PEAK, HOLD, RELEASE, TX DATA DATALOG, DISCHARGE, ZOOM.

MP6*Plus* allows you to enable and disable each channel and using the **ZOOM** function it s possible to display only the channel of interest in full screen.

The instrument works with a resolution of ±100.000 divisions and an accuracy better than 0.005% due to an internal 24-bit Sigma-Delta AD converter and a measurement control that is carried out for switching at a frequency equal to that of sampling: this system provides a better suppression of interference due to offset drift and to the connecting cables.

The sampling frequency (common to all channels) can be set from 2.5 samples per second up to 4800 samples per second therefore the instrument meets the needs of applications that require a considerable speed of response.

Each input channels can be supplied in 4 different configurations:

- Version with **input for strain gauge transducers** with standard resolution of ±100.000 div. suitable for working with load cells or force transducers with output ±2mV/V or ±3mV/V and 4 wires or 6 wires connection.
- Version with **voltage input** with standard resolution of ±100.000 div. suitable for working with pressure, torque transmitters, etc ... with output ±10V or ±5V.
- Version with **current input** with a standard resolution of ±160.000 div. suitable for working with pressure, torque transmitters, etc ... with output 4-20mA or 0-20mA and 2- and 3-wires.
- Version with **temperature input** for PT100 eligible to work in the range from -50 °C to + 250 °C with 0.1 °C resolution and accuracy ± 1 °C.

The instrument is equipped with a rear **USB** port to connect directly to a PC or Tablet.

As **OPTIONS** the instrument can be equipped with:

- **Additional input channels CH2, CH3 and CH4** with a synchronization system that allows to acquire at the same instant the measurement of all channels.

- One, two, three or four **Analog Outputs** programmable as voltage (± 10V, 0/5V, 0/10V, ±5V) or current (4-20mA, 0-20mA, 0-24mA) that can be associated to different channels or to the TOTAL (sum of two or more channels). The refresh rate of the analog signals is equal to the frequency of acquisition of the respective channels in input.
- A serial **RS232** line to directly connect the device to a PC, PLC or a serial **PRINTER**.
- 4 programmable **DIGITAL INPUTS** 24Vdc.
- A serial **RS485** line with protocol MODBUS RTU normally used to connect multiple instruments in a same network to a PLC.
- **WIRELESS** transmission designed to transmit measurements to other devices by radio at a distance up to 100m.
- A powerful **DATALOGGER** with non-volatile memory, which allows to store data at the maximum acquisition speed, synchronize recordings with an internal clock-calendar and eventually export data to a file using an USB stick in .csv file format that can be transferred directly to Microsoft Excel.

Other features and functions of importance are:
- Graphical, large and high resolution LCD display with backlit.
- Automatic **UNIT CONVERSIONS** in many specific units for each type of transducers.
- Function **MULTIMETER** which displays the signal of the sensor directly in mV/V, V or mA.
- User selectable language : **ITALIAN or ENGLISH**.
- Function **ZERO** and **AUTOZERO** to reset automatically the measure if the measurement is below a set threshold.
- Function of **HOLD**, **PEAK**, programmable **FILTER**.
- Function of **DISCHARGE** in order to measure the amount of product discharged for example from a tank.
- Function **TOTAL** to perform the sum of the channels.
- Function **KEY LOCK** to protect the instrument settings by unauthorized persons.
- Function **CLOCK-CALENDAR** (Option) with date and time.
- 24 columns **PRINTER** (option) connected to the serial port through which it is possible to print the measuring points with the date and time and the data of the company that carried out the survey.

For each input channel, you can calibrate the signal coming from the sensor both in the **POSITIVE RANGE** and in the **NEGATIVE RANGE** (Example in tension and compression) through 3 different modes:
- Calibration with **Full Scale**: characterization through the programming of the transducer full scale and sensitivity in both the positive and negative range.
- Calibration for **POINTS**: linearity correction by programming 5 known points in both the positive and negative range.
- **Known Weight**: practice characterization (in the field) by imposing a known weight, pressure, torque to the sensor and calibrating the transducer output to this reference value.

To increase security the instrument has the ability to perform a **BACKUP** of all calibrations data so that you can recall them in case of accidental tampering.

MP6*Plus* may be accompanied by various applications and analysis software to perform calibrations for : PRESSURE FORCE and TORQUE measurements.

Typical applications:
Calibration of reference machines: force, pressure and torque.
Calibration of materials testing machines.
Calibration of test benches and testing machine.
Calibration of transducers, pressure transmitters and pressure switches.
Calibration of load cells, force transducers and dynamometers.
Calibration of wrenches: snap or direct reading, screwdrivers.
Audits between laboratories for the verification of measurement uncertainties.
Audit to perform metrological confirmations.
Audit for interlaboratory comparisons.
Quality control in production lines.
Quality Control in Calibration and Testing Laboratories.
Tests on materials such as springs, friction detection, breakout forces.
Tests on protective devices and safety.
Monitoring over time of mechanical quantities.

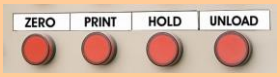
STANDARD CONFIGURATION

INPUT	**CH1** ±2mV/V, ±3mV/V ±5V, ±10V 0-20mA, 4-20mA

FUNCTION	**POWER SUPPLY** **220 Vac**	 **USB 2.0**	PEAK TOTAL DISCHARGE DIGITAL FILTER ZERO and AUTOZERO DIGITAL CALIBRATIONS UNIT CONVERSION

ADDITIONAL OPTIONS

INPUT	**CH2 - CH3 - CH4 OPTIONS** ±2mV/V, ±3mV/V ±5V, ±10V 0-20mA, 4-20mA PT100 (temperature) ONLY CHANNELS CH2 and CH4

OPTION	**RS232C** **RS485 MODBUS**  **PRINTER** 	**From 1 to 4** **ANALOG OUPUTS** Associated with channels CH1, CH2, CH3, CH4 or TOTAL The refresh rate of the analog signals is equal to the frequency of acquisition of the respective channels in input. 	**4 Programmabile Digital Inputs**  **Used for:** • Remote Function key • PLC Commands	 **DATA TRANSMISSION** 

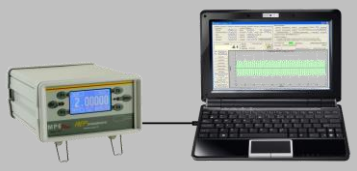
OPTION	 + Internal CLOCK CALENDAR	 Front panel USB port to download data logger using a USB sticks and to bring data directly to a PC. File type : csv or txt	Power Supply 115 Vac 24Vdc	 HANDLE

TECHNICAL DATA

STARDARD NUMBER OF CHANNELS	**1** (CH1)
ACCURACY	≤± 0,005%
LINEARITY ERROR	≤± 0,005%
INTERNAL DIVISIONS	24bit
CH1 INPUT : STRAIN GAUGE TRANSDUCERS	**± 2mV/V, ±3mV/V** (max ±3.5mV/V)
RESOLUTION	± 100.000div
TRANSDUCERS POWER SUPPLY	5Vdc switching (±3%)
TYPE OF CONNECTION	4 or 6 wires
TRANSDUCER RESISTANCE	from 100Ω to 2000Ω
CH1 INPUT : VOLTAGE AMPLIFIED TRANSDUCERS	**± 10V** and **± 5V**
RESOLUTION	± 100.000div
TRANSDUCERS POWER SUPPLY	20Vdc (±1Vdc)
CH1 INPUT : CURRENT AMPLIFIED TRANSDUCERS	**0-20mA** | **4-20mA**
RESOLUTION	+200.000div | +160.000div
TRANSDUCERS POWER SUPPLY	20Vdc (±1Vdc)
Unit Conversions for **WEIGHT** and **FORCE**	kg, t, N, daN, kN, MN, lb, klb
Unit Conversions for **PRESSURE**	bar, mbar, psi, MPa, kPa, Pa, mH_2O inH_2O kg/cm^2, mmHg, cmHg, inHg, atm
Unit Conversions for **TORQUE**	N·m, N·mm, kN·m, kg·m, g·cm, kg·mm, ft·lbf, in·lbf
Unit Conversions for **DISPLACEMENT**	mm, m, foot, inch, cm, dm, µm
MULTIMETER FUNCTION	Direct Display in mV/V, Volt o mA
BACKLIT GRAPHIC DISPLAY	128 x 64 dots
CHARACTER SIZE	~ 13 mm
TRANSDUCER CALIBRATION	Both in the POSITIVE and NEGATIVE range
TYPE OF DIGITAL CALIBRATION	Full Scale, Point Interpolation, Known Weight
FIELD LINEARITATION	On 1 … 5 measurement point
BACKUP AND RESTORE FUNCTION	Save and restore all configuration data
FUNCTION OF ZERO	100% (on all the measurement range)
FUNCTION OF AUTOZERO	With TIME and THRESHOLD programming
FUNCTION OF PEAK	POSITIVE and NEGATIVE
FUNCTION OF DISCHARGE	YES
FUNCTION OF KEY BLOCK	Enabled through a Password
FUNCTION OF TOTAL (on all enabled channels)	YES
PROGRAMMABLE RESOLUTION	1 … 100
DIGITAL FILTER	0 … 5
PROGRAMMABLE CONVERSION RATE	from 2.5 to 4800 samples for second
INSTRUMENT LANGUAGE	ITALIAN and ENGLISH
Function Keys programmable in configuration	F1 – F2 – F3 – F4
Rear USB output, Connector type B	Max Cable Length 3.5m
NOMINAL WORKING TEMPERATURE	0... +50°C
MAX WORKING TEMPERATURE	0... +50°C
STORAGE TEMPERATURE	-20... +70°C
TEMPERATURE EFFECTS on the measurements a)	
on zero (10°C variation)	≤±0,005%
b) on full scale (10°C variation)	≤±0,005%
POWER SUPPLY	230 Vac +/-10%
FREQUENCY	50/60 Hz
EXTERNAL PROTECTION FUSE	250mA / 250 V
MAX. POWER REQUIRED	10VA
CASE MATERIAL	ALUMINIUM painted container
PROTECTION CLASS (EN 60529)	IP40
DEGREE OF ENVIRONMENTAL CONT.	1
WEIGHT	~ 0,8 kg

OPTIONS

INPUT CH2-CH3-CH4: STRAIN GAUGE TRANSDUCERS	**± 2mV/V, ± 3mV/V** (max ±3.5mV/V)
RESOLUTION	± 100.000div
TRANSDUCERS POWER SUPPLY	5Vdc switching (±3%)
TYPE OF CONNECTION	4 or 6 wires
TRANSDUCER RESISTANCE	from 100Ω to 2000Ω
INPUT CH2 – CH3 - CH4: VOLTAGE AMPLIFIED TRANSDUCERS	**± 10V** e **± 5V**
RESOLUTION	± 100.000 div
TRANSDUCERS POWER SUPPLY	20Vdc
INPUT CH2 – CH3 - CH4: CURRENT AMPLIFIED TRANSDUCERS	**0-20mA** | **4-20mA**
RESOLUTION	+200.000 div | +160.000 div
TRANSDUCERS POWER SUPPLY	20Vdc
INPUT CH2 – CH4 TEMPERATURE	**PT100** 2 wires (range -50 +250°C)
ACCURACY	±1°C
RESOLUTION	±0.1°C°
UNITS	C°, °F
RS232 SERIAL OUTPUT	MAX cable Lenght 13m
RS485 MODBUS RTU (max 32 in multipoint)	MAX cable Lenght 1000m
PRINTER	24 columns (RS232)



USB Port for PC communication.
RS232C serial port for PC or PLC communication.
RS485 serial port for PC or PLC communication
The USB, RS232 and RS485 are indipendent so it is possible to connect at the same time a PC , a PLC and a 24 columns serial printer.

Serial communication with a 24 columns **PRINTER** .
On the report is it possible to print up to 3 header lines with the company data. A mesurement point will be printed by pressing the key PRINT or using a remote digital command.
You can print on both paper and adhesive labels.

Analog Outputs	1, 2, 3 or 4 independent outputs
Current Output	0-20mA, 4-20mA, 0-24mA
Voltage Output (max 20mA – RL min: 1kΩ)	0-5V, 0-10V, ±10V, ±5V
DIGITAL INPUTS with programmable function	4
WIRELESS transmission – only version with up to 2 channels	433MHz
Max distance in free space	100m

DATA LOGGER allows you to store the measurements and to keep them in internal memory even if you turn off the instrument.
The logging can be done in **AUTO** mode or **MANUAL** mode.
The **AUTO** mode records the measurements at regular intervals for a programmable time. The time interval between two measurements points can be varied from the maximum speed conversone (4,8kHz) up to recording every 24 hours.
The **MANUAL** mode allows the operator to decide when to record the measurements on memory. The command can be given either via a button on the front panel or via a digital input.
All data can be subsequently displayed on the display, downloaded through the powerful software **MPSupervisor** or exported to external Flash Memory (USB stick) for charting, data processing on Microsoft Excel, press reports etc ...

DATA LOGGER	
Max Storing Points	1 channel enabled : max. 130.000
	2 channels enabled: max. 65.000
	3 channels enabled: max. 32.000
	4 channels enabled: max. 43.000
	4 channels enabled +TOTAL: max. 26.000
MAX PROGRAMMABLE TIME	100 days
CLOCK - CALENDAR	Year, Month, Day, Hour, Minute,Seconds

Front Panel USB connector (type A) that allows you to save or export the recorded measurements directly on a USB stick, for faster portability of the measures on PC.
It is possible to export the file in TXT or CSV for a direct import of the measures on programs such as Microsoft Excel.

POWER SUPPLY	115 Vac or 24Vdc

COMPONENTS SUPPLIED

Power Cord

DB9 Male Connector
for transducer

CD with
Manual and USB Driver

COMPONENTS IN OPTION (purchased separately)

USB cable

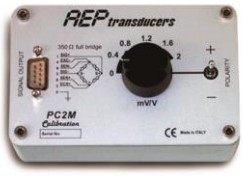
RS232 Serial Cable

Pair of mounting
brackets for panel

Desktop Printer 24
columns

DB9 Male
Connector
For each
transducers

Calibration Report
ACCREDIA Certificate
(MP6Plus +Transducer)



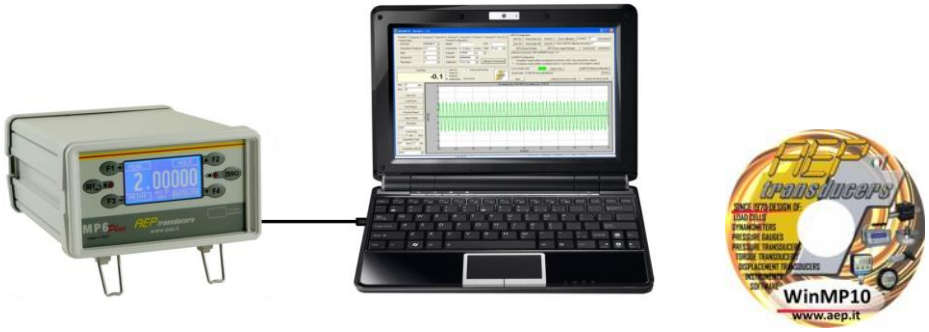
Calibrator for mV/V
signals

Case for transport

ELECTRICAL CONNECTION

❶ Power Supply
❷ Fuse
❸ Main Switch
❹ USB Port
❺ RS232 - RS485 - Digital Input – Analog Outputs.
❻ CH1 standard input
❼ CH2 Input (Option)
❽ CH3 Input (Option)
❾ CH4 Input (Option)

APPLICAZIONI SOFTWARE (purchased separately)



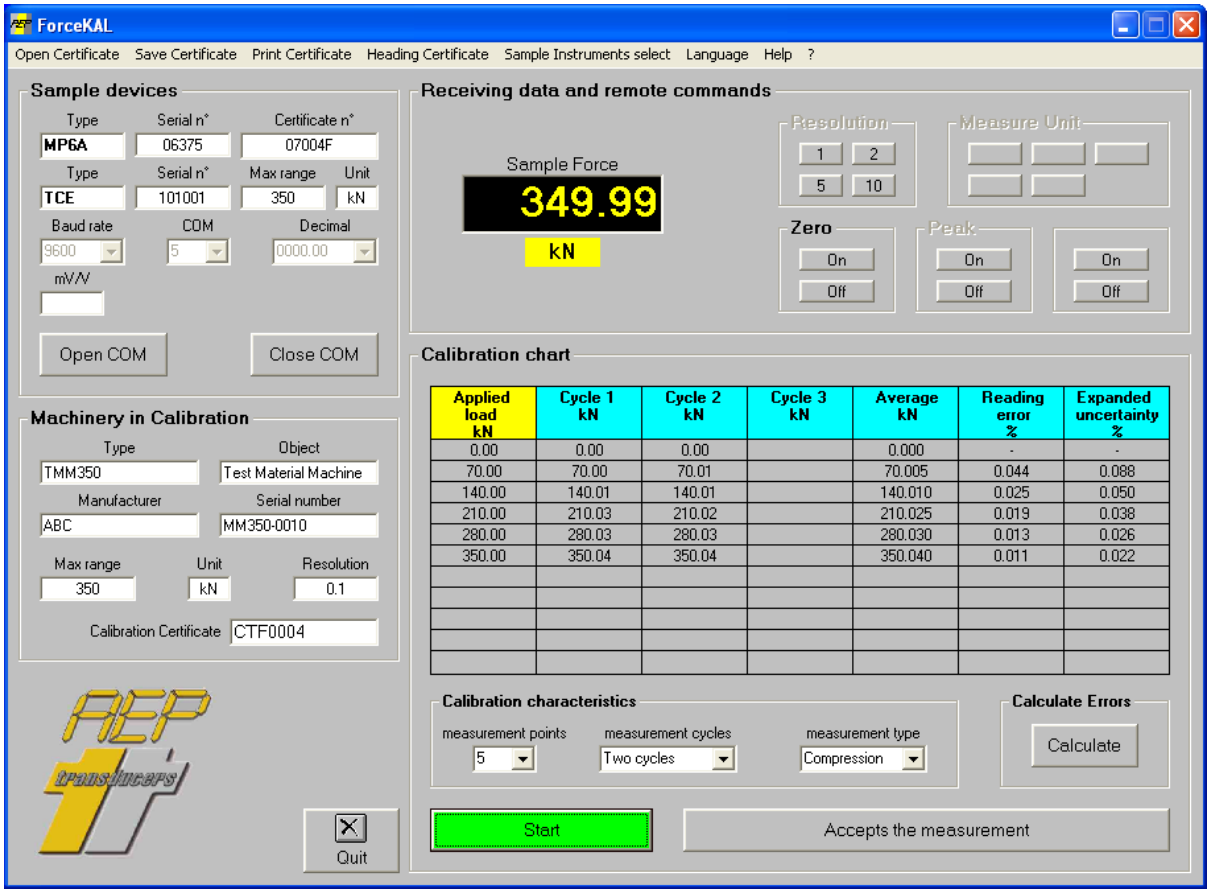
To complete the system of measurement **AEP transducers** has developed several software applications that interface directly to the instrument **MP6*Plus*** and support the user in the various functions of calibration, testing, analysis, data storage, transfer of measures on Microsoft Excel etc. ...

MPSupervisor is a software dedicated to **MP6*Plus*** . Through this software you can download the data logger and operate directly on **MP6*Plus*** to change parameters and create graphics test.
Quick Analzyer is a general purpose acquisition software where **MP6*Plus*** can be associated to other **AEP instruments** .
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

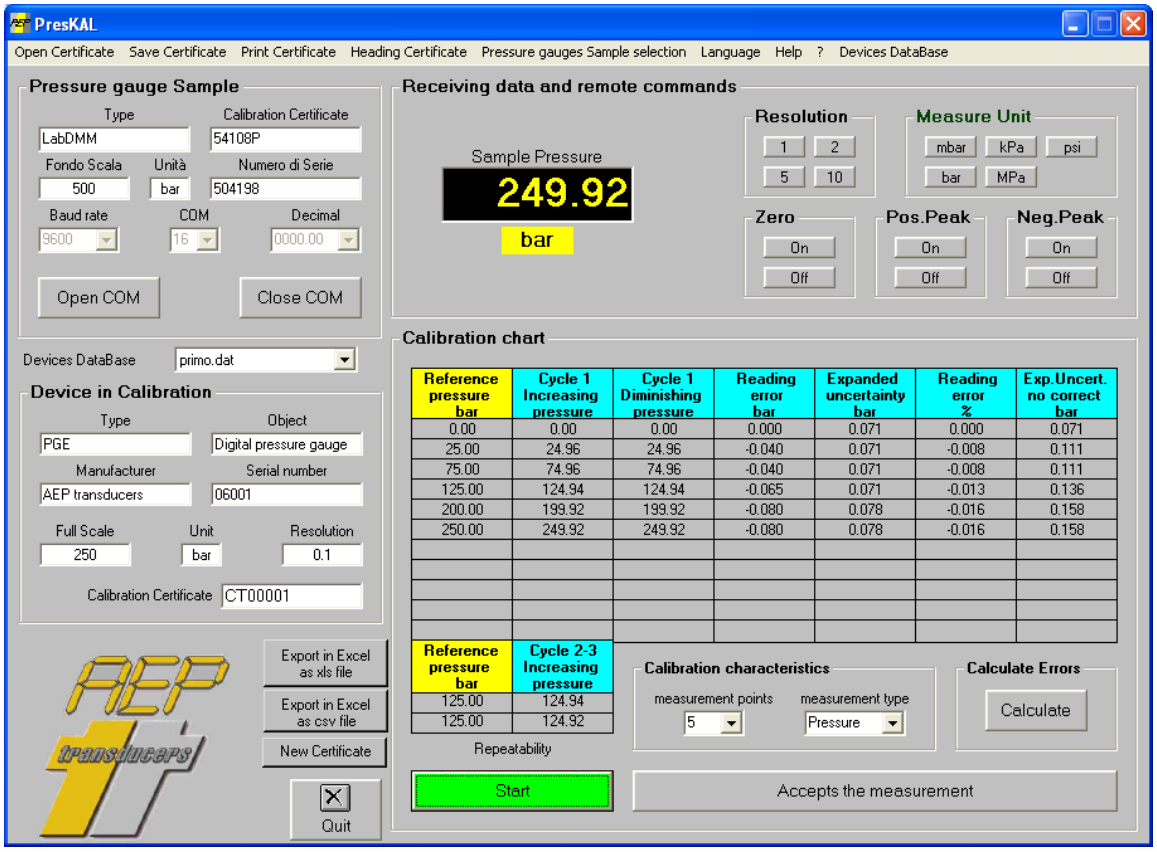
Dedicated to the calibration of testing machines, test benches where force is generated.



PressKAL

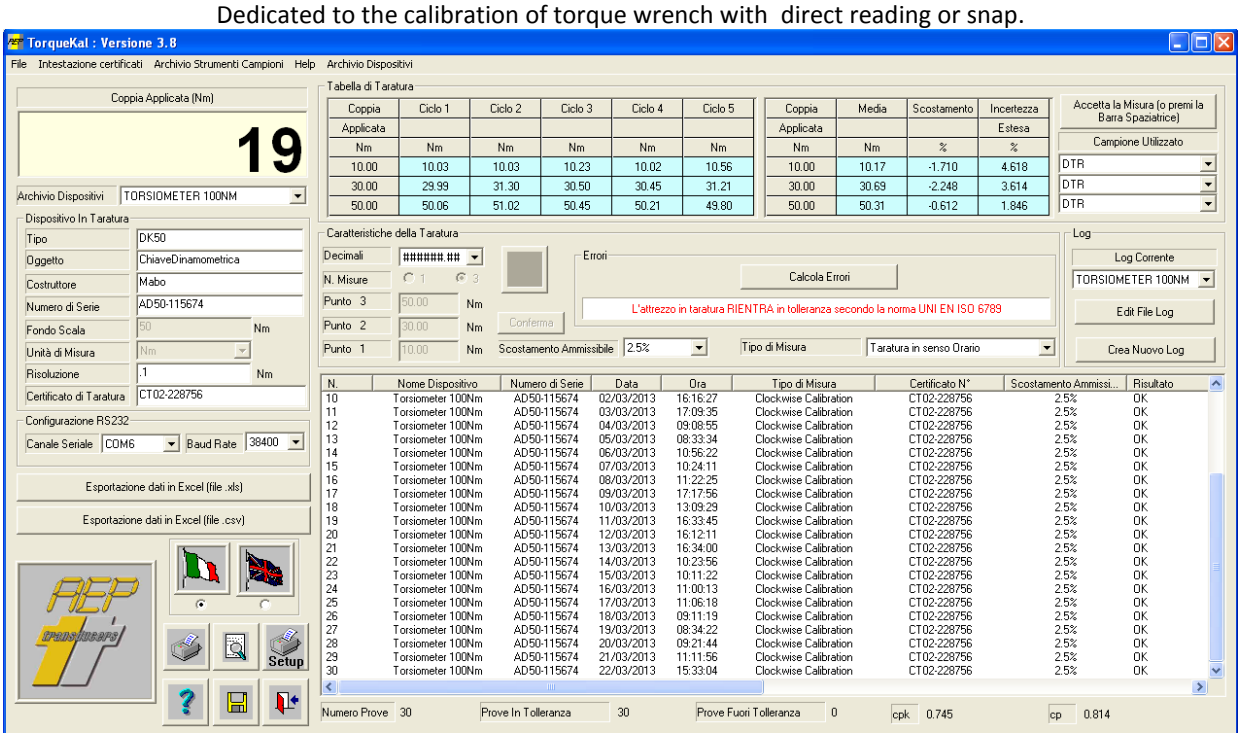
Dedicated to the calibration of pressure gauges such as

- manometers
- pressure transducers
- pressure transmitters
- pressure switches



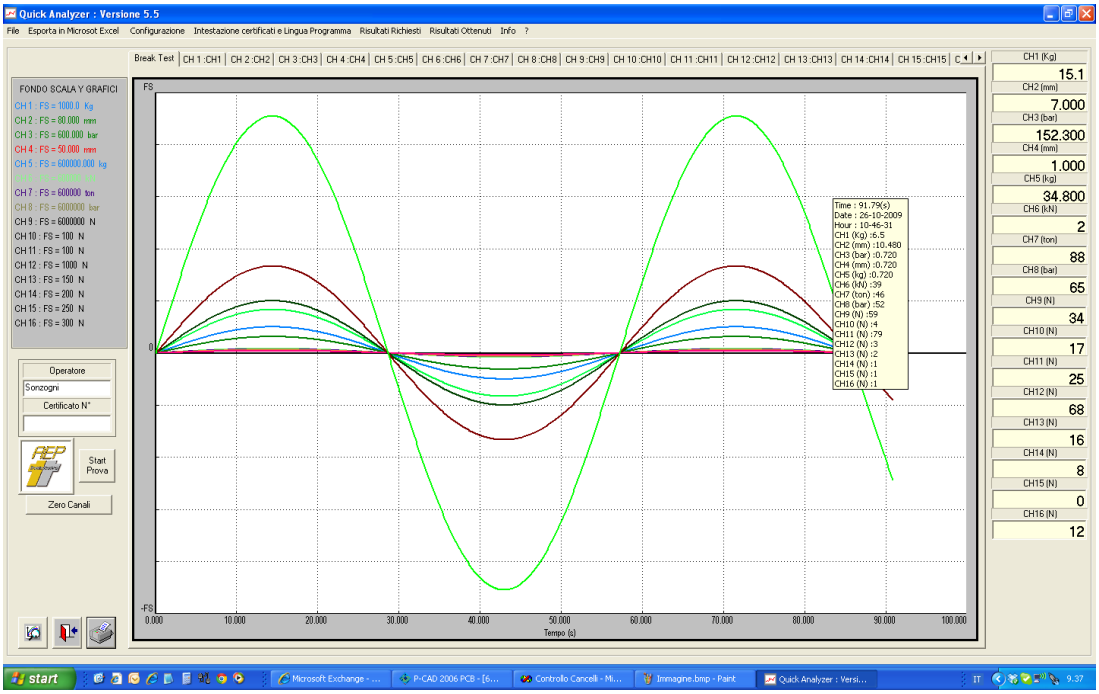
TORQUEKAL

Dedicated to the calibration of torque wrench with direct reading or snap.



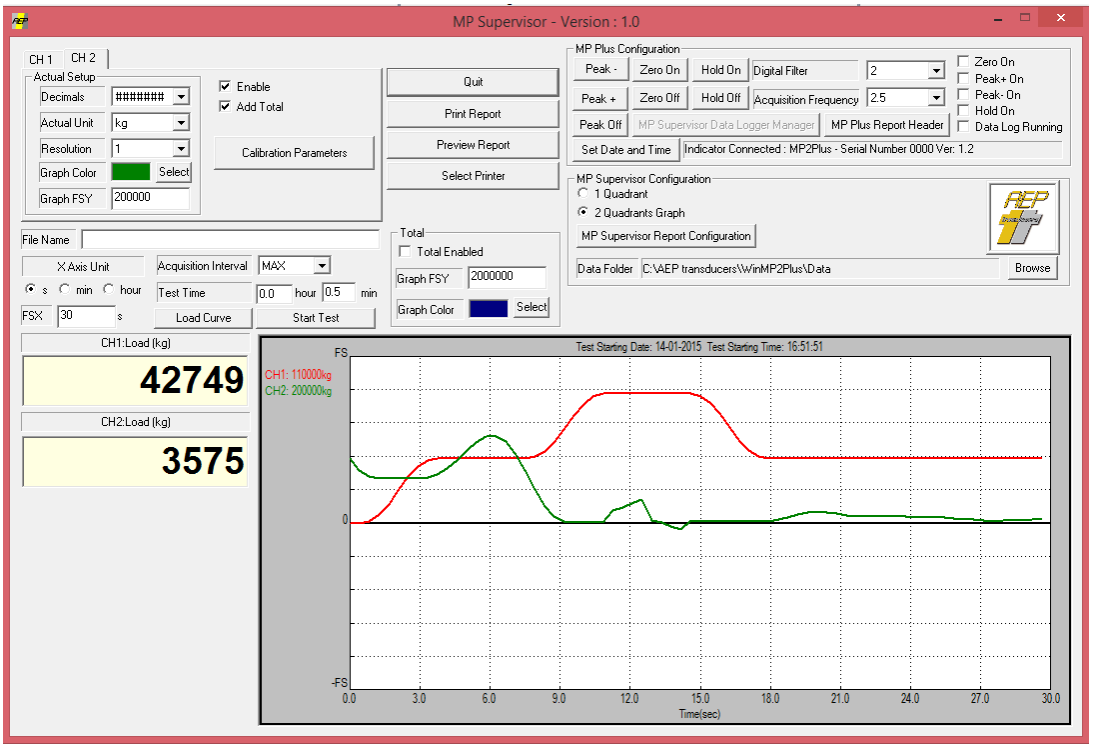
QUICK ANALYZER

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

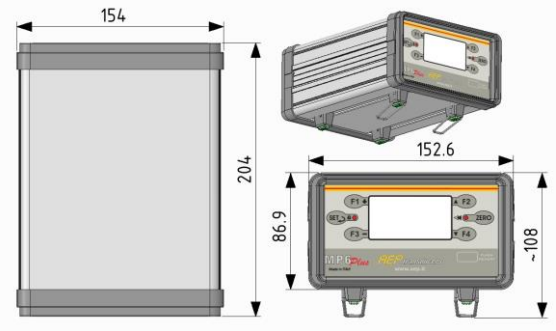


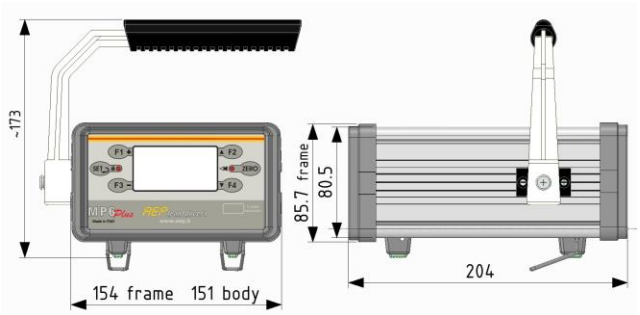
MP Supervisor

A dedicated program that allows an immediate interfacing through the USB port with the MP6Plus 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 Logger carried out using the internal memory or the USB Flash Memory and display the respective curves of acquisition.

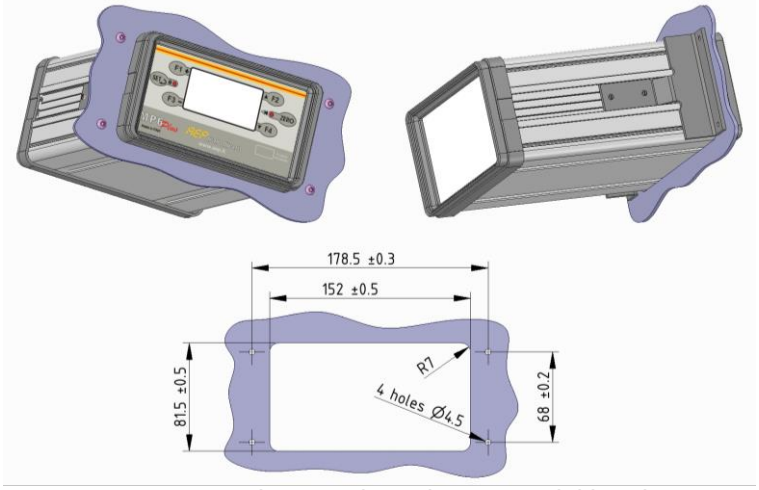


Dimensions (mm) STANDARD VERSION





MOUNTING PANEL APPLICATION



Note: For mounting panel requires 2 special brackets.

PURCHASE CODES

	Inputs	Power	Analog Output	Serial Output	Functions	Accessories	Digital Inputs
MP6P	X	XXX	XX	X	X	X	X
	2 2 inputs	**230** 230 Vac	**A1** 1 output	**S** RS232, RS458 Modbus, Printer	**D** Data logger Clock-Calendar	**M** Handle	**N** 4 Digital Inputs
	3 3 inputs	**115** 115Vac	**A2** 2 outputs	**W** Wireless Transmission	**F** Datalogger Clock-Calendar USB Flash Memory		
	4 4 inputs	**24** 24Vdc	**A3** 3 outputs				
			A4 4 outputs				

Example: MP6P230 (MP6Plus power supply230Vac base version)
Example: MP6P224A2SM (MP6Plus 2 channels- power supply 24Vdc + 2 Analog output + Serial output + handle)
Examples: MP6P3115SF (MP6Plus 3 channels power supply 115Vac + Serial output + USB Flash Memory)

ALWAYS SPECIFY in the puchase order how to configure the input channels:
Example: CH1 = 4-20mA CH2 = 2mV/V CH3 = 10V CH4 = PT100