Data sheet: MP6P.540.R0.ENG

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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 MP6Plue is born.

MP6*Ptus* 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 <u>synchronized</u> 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*Plua* 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 \pm 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 ± 2 mV/V or ± 3 mV/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*Plue* 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.

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STANDARD CONFIGURATION

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STARDARD NUMBER OF CHANNELS	1 (CH1)			
ACCURACY	≤± 0,005%			
	≤± 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 ±5\			
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 ₂ O inH ₂ O 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 CHARACTER SIZE	128 x 64 dots			
	~ 13 mm			
TRANSDUCER CALIBRATION	Both in the POSITIVE and NEGATIVE range			
TYPE OF DIGITAL CALIBRATION	Full Scale, Point Interpolation, Known Weigh			
FIELD LINEARITATION	On 1 5 measurement point			
BACKUP AND RESTORE FUNCTION	Save and restore all configuration da			
FUNCTION OF ZERO	100% (on all the measurement range)			
FUNCTION OF AUTOZERO	With TIME and THRESHOLD programmir			
	POSITIVE and NEGATIV			
FUNCTION OF DISCHARGE FUNCTION OF KEY BLOCK	YES			
FUNCTION OF TOTAL (on all enabled channels)	Enabled through a Passwor			
PROGRAMMABLE RESOLUTION	YES 1 100			
DIGITAL FILTER				
PROGRAMMABLE CONVERSION RATE	0 5			
INSTRUMENT LANGUAGE	from 2.5 to 4800 samples for second ITALIAN and ENGLISH			
Function Keys programmable in configuration	F1 - F2 - F3 - F4			
	Max Cable Length 3.5m			
Rear USB output, Connector type B				
	0+50°C			
MAX WORKING TEMPERATURE	0 +50°C -20 +70°C			
	-20 +70 C			
TEMPERATURE EFFECTS on the measurements a)	~+0.00E0/			
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 GAUG	E 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	100 Ω to 2000 Ω		
INPUT CH2 – CH3 - CH4: VOLTAGE AMPLIFIED TRANSDUCERS			$\pm 10V e \pm 5V$		
RESOLUTION		± 100.000 div			
TRANSDUCERS POWER SUPPLY		20Vdd			
INPUT CH2 – CH3 - CH4: CURRENT AMPLIFIED TRANSDUCERS		0-20mA	4-20mA		
RESOLUTION		+200.000 div	+160.000 div		
TRANSDUCERS POWER SUPPLY		20Vd			
INPUT CH2 – CH4 TEMPERATURE		PT100 2 wires (range -50 +250°C)			
ACCURACY			±1°C		
RESOLUTION			±0.1°C°		
UNITS			C°, °F		
RS232 SERIAL OUTPUT			ble Lenght 13m		
RS485 MODBUS RTU (max 32 in mu	ltipoint)		e Lenght 1000m		
PRINTER		24 c	olumns (RS232)		
	USB Port for PC communi	cation			
	RS232C serial port for PC				
	RS485 serial port for PC of				
		5 are indipendent so it is possible to	connect at the		
		d a 24 columns serial printer.	connect at the		
	Serial communication with				
		le to print up to 3 header lines wit			
		t will be printed by pressing the key P	PRINT or using a		
U U V	remote digital command.				
	You can print on both pap	er and adhesive labels.			
Analog Outputs		1, 2, 3 or 4 indep	endent outputs		
		, ,			
Current Output			-20mA, 0-24mA		
Current Output Voltage Output (max 20mA – RL mir		0-20mA, 4			
Current Output Voltage Output (max 20mA – RL mir DIGITAL INPUTS with programmable	e function	0-20mA, 4	-20mA, 0-24mA		
Current Output Voltage Output (max 20mA – RL mir DIGITAL INPUTS with programmable WIRELESS transmission – only versi	e function	0-20mA, 4	-20mA, 0-24mA		
Current Output Voltage Output (max 20mA – RL mir DIGITAL INPUTS with programmable WIRELESS transmission – only versi Max distance in free space	e function on with up to 2 channels	0-20mA, 4 0-5V, 0-	-20mA, 0-24mA -10V, ±10V, ±5V 4 433MHz 100m		
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COMPONENTS SUPPLIED





Power Cord



DB9 Male Connector for transducer



CD with Manual and USB Driver

COMPONENTS IN OPTION (purchased separately)



USB cable



DB9 Male Connector For each transducers





Calibration Report ACCREDIA Certificate (MP6Plus +Transducer)



Pair of mounting brackets for panel



Calibrator for mV/V signals



Desktop Printer 24 columns



Case for transport

ELECTRICAL CONNECTION



- Power Supply
- 2 Fuse
- Main Switch
- **4** USB Port
- **S** RS232 RS485 Digital Input Analog Outputs.
- **6** CH1 standard input
- CH2 Input (Option)
- 8 CH3 Input (Option)
- **9** 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**²/₄ 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_{Plue} 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

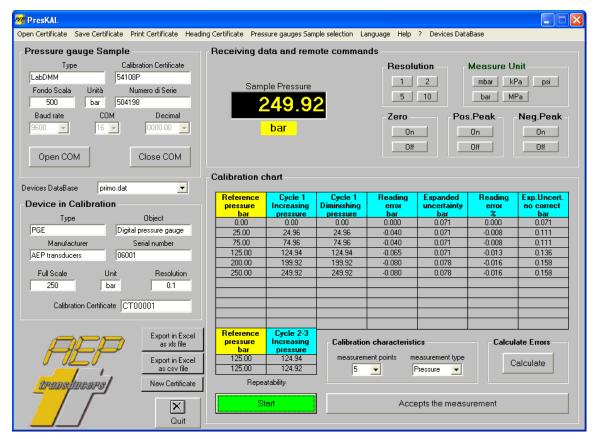
ForceKAL Open Certificate Save Certificate Print Certificate Heading Certificate Sample Instruments select Language Help ? Sample devices Receiving data and remote commands Serial n* Certificate n° Туре MP6A 06375 07004F 1 2 Sample Force Max range Serial n* Unit Туре 5 10 TCE 101001 350 kN COM Decimal Baud rate Zero 0000.00 kΝ --On On On mV/V Off Off Off Open COM Close COM **Calibration chart** Applied load Cycle kN Cycle 2 kN Cycle kN Average kN Reading Expanded uncertainty Machinery in Calibration <u>kN</u> 0.00 Object 0.00 0.000 Туре 0.00 TMM350 70.005 0.044 0.088 Test Material Machine 70.00 70.00 140.00 140.01 140.01 140.010 0.025 0.050 Serial number Manufacturer 210.00 210.025 0.019 0.038 ABC MM350-0010 280.00 280.03 280.03 280.030 0.013 0.026 350.00 350.04 350.04 350.040 0.011 0.022 Max range Unit Resolution kN 350 0.1 Calibration Certificate CTF0004 Calibration characteristics Calculate Errors measurement points measurement cycles measurement type Calculate Compression 💌 5 🔻 Two cycles Ŧ $|\mathbf{X}|$ Star Accepts the measurement Quit

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



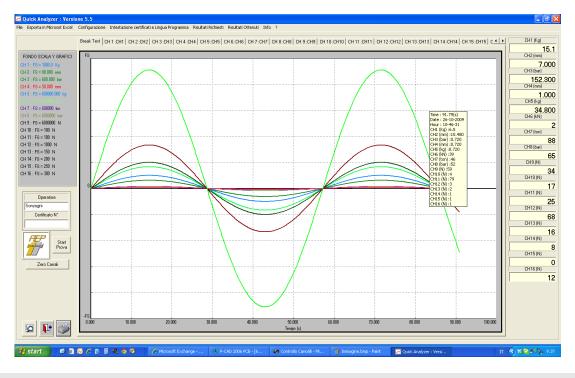
TORQUEKAL

TorqueKal : Versione 3.8 certificati Archiv Archivio Dispositiv Tabella di Taratura Coppia Applicata (Nm) Coppia Ciclo 1 Ciclo 2 Ciclo 3 Ciclo 4 Ciclo 5 Coppia Media Scostamento Incertezza Accetta la Misura (o premi la Barra Spaziatrice) Applicata Nm Applicata Nm Estesa 9 Campione Utilizzato Nm Nm Nm Nm Nm Nm DTR 10.00 10.03 10.03 10.23 10.02 10.56 10.00 10.17 4 618 • DTR 30.00 29.99 31.30 30.50 30.45 31.21 30.00 30.69 -2.248 3.614 Archivio Dispositivi TORSIOMETER 100NM • 50.00 50.06 51.02 50.45 50.21 49.80 50.00 50.31 -0.612 1.846 DTB Dispositivo In Taratura Caratteristiche della Taratura Log DK50 Tipo Decimali Errori Log Corrente ChiaveDinamometrica Oggetto N. Misure Calcola Errori TORSIOMETER 100NM Mab Costruttore AD50-115674 Punto 3 Nm Numero di Serie L'attrezzo in taratura RIENTRA in tolleranza secondo la norma UNI EN ISO 6789 Edit File Log Punto 2 Nm Nm Fondo Scala Punto 1 Scostamento Ammissibile 2.5% • Tipo di Misura Taratura in senso Orario • Nm Crea Nuovo Log Unità di Misura Numero di Senie AD50116574 A Tipo di Misura Clockwise Calibration Risoluzione Nm Nome Dispositivo Torsiometer 100Nm Torsiometer 100Nm Torsiometer 100Nm Torsiometer 100Nm Torsiometer 100Nm Torsiometer 100Nm Certificato N° CT02-228756 CT02-228756 CT02-228756 CT02-228756 CT02-228756 CT02-228756 CT02-228756 Ora 16:16:27 17:09:35 N. ssi... Risultato Data 02/03/2013 S nento Am 2.5% Certificato di Taratura CT02-228756 2.5% 2.5% 02/03/2013 03/03/2013 05/03/2013 06/03/2013 06/03/2013 08/03/2013 09/03/2013 09/03/2013 11/03/2013 13/03/2013 13/03/2013 15/03/2013 15/03/2013 17/03/2013 11 12 13 14 15 16 17 18 20 21 22 23 24 25 26 27 28 29 30 Configurazione BS232 09:08:55 08:33:34 10:56:22 10:24:11 11:22:25 17:17:56 13:09:29 16:34:00 10:23:56 10:11:22 11:00:13 11:06:14 09:11:19 08:34:22 09:21:149 $\begin{array}{c} 2.5\%\\ 2.5\%$ ▼ Baud Rate 38400 ▼ Canale Seriale COM6 CT02-228756 CT02-228756 CT02-228756 CT02-228756 CT02-228756 CT02-228756 Torsiometer 100Nm Esportazione dati in Excel (file .xls) Torsiometer 100Nm Torsiometer 100Nm Torsiometer 100Nm Torsiometer 100Nm Torsiometer 100Nm Esportazione dati in Excel (file .csv) Clockwise Calibration Clockwise Calibration Clockwise Calibration CT02-228756 CT02-228756 Torsiometer 100Nm Torsiometer 100Nm Torsiometer 100Nm Torsiometer 100Nm Torsiometer 100Nm Clockwise Calibration Clockwise Calibration Clockwise Calibration Clockwise Calibration CT02-228756 CT02-228756 CT02-228756 CT02-228756 CT02-228756 AD50-115674 AD50-115674 AD50-115674 AD50-115674 AD50-115674 19/03/2013 20/03/2013 Torsiometer 100Nm Clockwise Calibration CT02-228756 CT02-228756 Torsiometer 100Nm Torsiometer 100Nm Torsiometer 100Nm Q Clockwise Calibration ý CT02-228756 CT02-228756 21/03/2013 22/03/2013 11:11:56 15:33:04 Clockwise Calibration Clockwise Calibration 2.5% 2.5% < > H 1. Numero Prove 30 Prove In Tolleranza 30 Prove Fuori Tolleranza 0 cpk 0.745 cp 0.814

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

QUICK ANALYZER

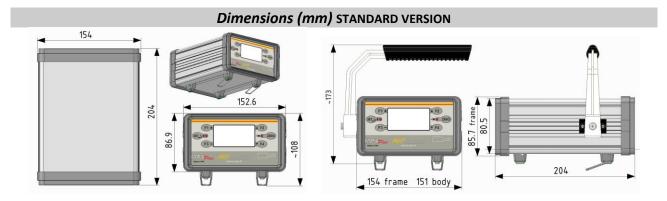
Dedicated to recording and graphical analysis of up to 16 different AEP transducers instruments to measure: force, weight, pressure, torque and displacement.



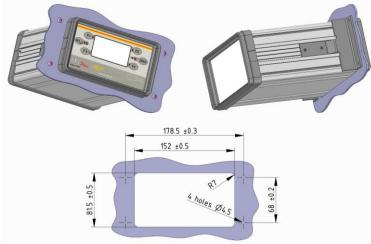
MP Supervisor

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.

AP	MP Supervisor - Ver	rsion : 1.0	- 🗆 🗙
CH 1 CH 2 Actual Setup Image: Constraint of the setup of the setu	Quit Print Report Preview Report Select Printer Total Total Total Enabled	Peak + Zero Off Hold Off Acquisition Frequency 2.5	ak+On ak-On
CH1:Load (kg) 42749 CH2:Load (kg) 3575	3.0 6.0 9.0	Test Starting Date: 14-01-2015 Test Starting Time: 16-51-51	30.0



MOUNTING PANEL APPLICATION



Note: For mounting panel requires 2 special brackets.

PURCHASE CODES

	Inputs	Power	Analog Output	Serial Output	Functions	Accessories	Digital Inputs
MP6P	Х	XXX	XX	Х	Х	Х	X
	2	230	A1	S	D	Μ	Ν
	2 inputs	230 Vac	1 output	RS232, RS458 Modbus, Printer	Data logger Clock-Calendar	Handle	4 Digital Inputs
	3	115	A2	W	F		
	3 inputs	115Vac	2 outputs	Wireless	Datalogger		
	4 4 inputs	24 24Vdc	A3	Transmission	Clock-Calendar USB Flash		
l	4 inputs	24000	3 outputs		Memory		
			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





www.systemtech.se

Tel: 013-35 70 30 sales@systemtech.se Linnégatan 14 • 582 25 LINKÖPING