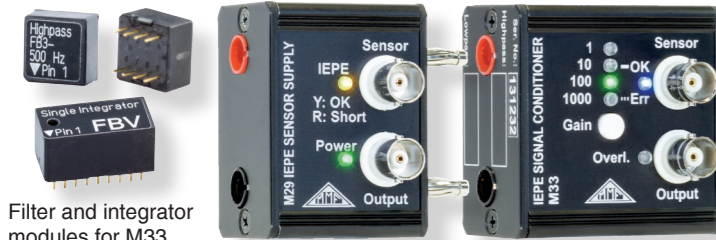


## M29 / M33 IEPE Supply / Amplifier

The low-cost instrument M29 is a constant current source with decoupling network for IEPE transducers. Its output provides the unaltered AC sensor signal.

The M33 is intended for applications where amplification and filtering are needed.

Both units can be DIN rail mounted (option). Power supply is connected by a DC jack. The modules can be interconnected with screw-in banana plugs which simplifies the installation. Their wide supply voltage range and compact design make the M29 and M33 suitable for laboratory, industrial and mobile applications.



Filter and integrator modules for M33

Technical Data	M29	M33
Gain	1	1/10/100 /1000
Input / output	BNC / BNC	
Accuracy	<1 %	
IEPE sensor supply	3.5 to 4.5 mA / 24 V compliance	
Low pass filter	-	FB2 plug-in filters
High pass filters	-	FB3 plug-in filters
Integrator	-	FBV/FBD, plug-in
LEDs	sensor; power	sensor; gain; overload
Power supply	5 to 28 V DC; DC jack or banana plugs	
Dimensions (WxHxD)	40x55x45 mm <sup>3</sup>	54x55x45 mm <sup>3</sup>

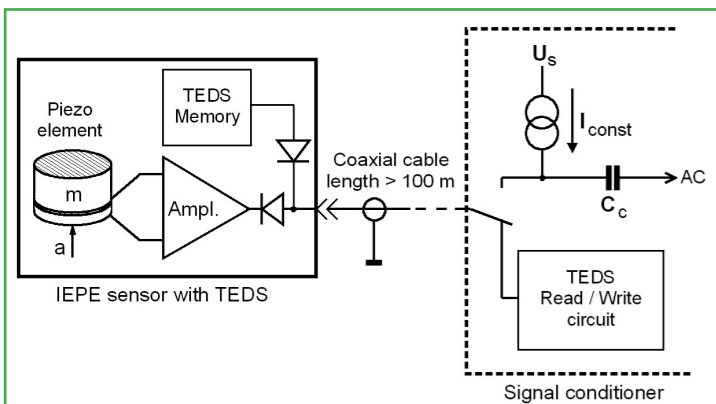
## TEDS

TEDS means "Transducer Electronic Data Sheet". This is a digital memory inside a sensor. It contains important data like model and serial number, sensitivity and measuring unit, calibration date and customer-editable data like a name of the measuring point.

From the hardware perspective TEDS accelerometers work like regular IEPE transducers. The only difference is that the memory is read by a so-called One-Wire protocol with negative polarity via the measuring cable.

TEDS specification is laid down in IEEE 1451.4. There are several templates describing the data stored in TEDS. The most common template for accelerometers is no. 25.

TEDS can be particularly useful in signal conditioners to avoid cabling and setup errors.



IEPE and TEDS principle

## IEPE100 Remote Charge Converter

The IEPE100 is an in-line charge amplifier. It is used to connect charge type piezoelectric sensors to IEPE inputs. By this means long and inexpensive cables can be used. The IEPE100 is supplied from the IEPE constant current via its output. A special feature is the selectable gain by internal DIP switches.



Technical Data	IEPE100
Gain	0.1 / 1 / 10 mV/pC
Input / output	BNC female / BNC male
Accuracy	<2 %
IEPE power supply	4 to 20 mA / >20 V compliance
Output impedance	<100 Ohms
Output bias voltage	11 to 16 V
Full-scale output	±5 V
Output noise	<50 μV
Dimensions (LxØ)	44 mm x 24 mm

## IEPE

IEPE stands for "Integrated Electronics Piezo Electric". It has been established as the industrial standard for piezoelectric transducers. Other brand names for the same principle are ICP®, Isotron®, Deltatron®, Piezotron®, CCLD etc. The integrated sensor circuit transforms the charge signal of the piezo-ceramics, with its very high impedance and high EMI sensitivity, into a robust voltage signal with low impedance which can be more easily transmitted. At this signal ordinary low cost coaxial cable with a length of more than one hundred meters can be used.

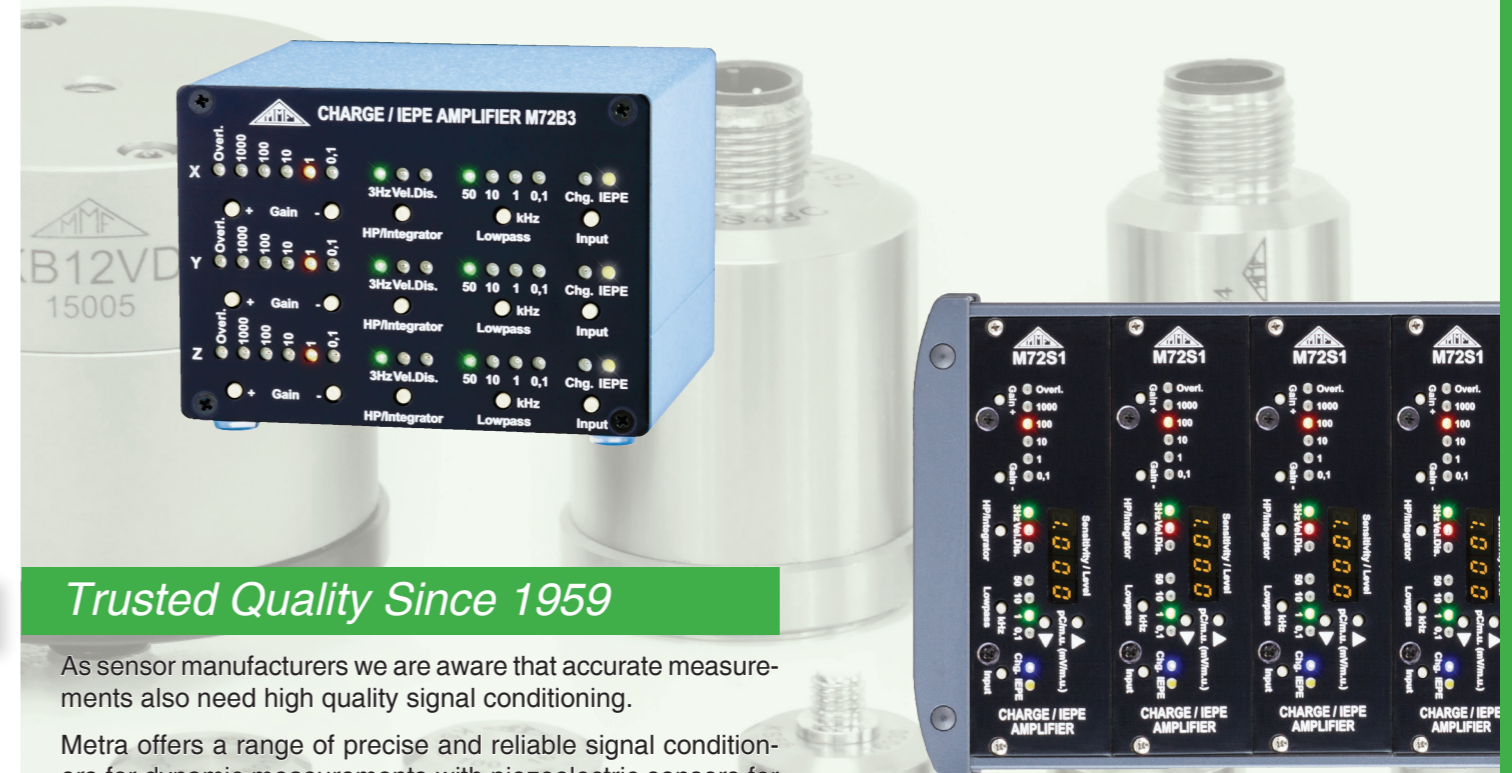
A peculiarity of IEPE is that power supply and measuring signal use the same line. So, an IEPE transducer needs, like a transducer with charge output, only one single-ended cable. To separate the low impedance sensor signal from the power supply, the integrated circuit is supplied with constant current. This constant current must be fed into the measuring line and simultaneously separated from the subsequent amplifier stages.

Please visit our web site [www.MMF.de](http://www.MMF.de) for further information material like data sheets, instruction manuals and trial software.

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# Accuracy from the Outset

M72 Series  
 M208 Series  
 M29  
 M33  
 IEPE100



## Trusted Quality Since 1959

As sensor manufacturers we are aware that accurate measurements also need high quality signal conditioning.

Metra offers a range of precise and reliable signal conditioners for dynamic measurements with piezoelectric sensors for acceleration, force, pressure and sound.

There are two kinds of piezoelectric sensors

- Charge mode sensors
- IEPE sensors

Signal conditioners are needed to adapt a sensor signal to the input of an instrument or a data acquisition system. Their functions include:

- Adaptation of the sensor signal
- Sensor power supply
- Amplification
- Overload detection
- High- and low-pass filtering (for example anti-aliasing filter)
- Integration of the sensor signal, for instance, to measure velocity or displacement with an accelerometer
- Transducer Electronic Data Sheet (TEDS) support

Metra's signal conditioners are supplied with a traceable calibration certificate. DKD calibration can be offered on demand.



Manfred Weber  
**Metra Meß- und Frequenztechnik in Radebeul e.K.**

Signal Conditioners for Piezoelectric Sensors

## M72 Series Charge and IEPE Conditioners

The M72 series amplifies, filters and integrates the signals from sensors with charge, IEPE and AC voltage output. They provide scalable solutions from 1 to 8 channels in bench top or rack mounting cases.

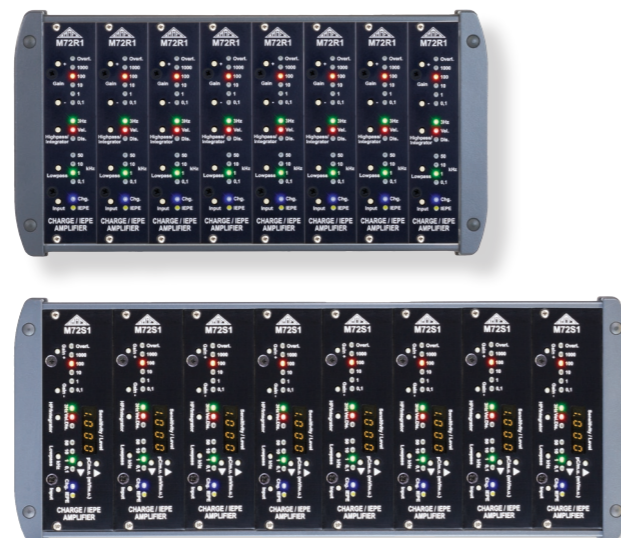
The instruments are available with or without transducer sensitivity adjustment including TEDS support. The 19" rack cases M72R8 and M72S8 have a USB interface for controlling all functions from a PC. Software support is provided.



Technical Data	M72A1	M72A3	M72S1	M72B1	M72B3	M72R1
Channels	1	3	1	1	3	1
Charge / IEPE gains	0.1 / 1 / 10 / 100 / 1000 mV/pC; 0 / 20 / 40 / 60 dB					
Transducer sensitivity input	4 digits; 0.001 to 9999 mV or pC/mech. unit					
TEDS support	Template 25 for force and acceleration; 27 for microphones					
Low pass filters (-3 dB)	0.1 / 1 / 10 / 50 kHz; Butterworth; 4 poles; -75 dB/decade					
High pass filters (-3 dB)	0.1 (high pass off) / 3 Hz; Butterworth; 2 poles; -40 dB/decade					
Integrators	single (velocity); double (displacement); off (acceleration, pressure, force, etc.)					
Accuracy	±0.5 % at >10 % of full scale and center of frequency range					
Noise at output	<6 mV <sub>RMS</sub> ; 1 to 50,000 Hz, gain 1000 mV/pC or 60 dB					
Inputs / outputs	BNC sockets at rear of instruments					
IEPE sensor supply	3.5 to 4.5 mA constant current; 24 V compliance voltage; switchable					
Level indication	numeric LED display in percent; overload LED			overload LED		
USB interface	-	-	with M72S8 rack	-	-	with M72R8 rack
Power supply	7 to 30 V DC with mains plug adapter		from M72S8 rack	7 to 30 V DC with mains plug adapter		from M72R8 rack
Dimensions (WxHxD)	105x43x95 mm <sup>3</sup>	105x104x95 mm <sup>3</sup>	8WUx3HUx170	105x37x95 mm <sup>3</sup>	105x78x95 mm <sup>3</sup>	6WUx3HUx170

## M72 Rack Cases

The 19" rack cases M72S8 and M72R8 are designed for up to 8 modules M82S1 or M72R1. They deliver power supply to the modules from a DC jack at the rear side. There is also a USB socket for digital control of the signal conditioners. All functions can be set by text commands in virtual COM port mode. A control software tool is provided.



Technical Data	M72S8	M72R8
Slots	for 8 M72S1	for 8 M72R1
Power supply	8 to 28 V DC or mains adapter	
Digital control interface	USB at rear, virtual COM port mode	
Dimensions (WxHxD)	365x145x210 mm <sup>3</sup>	280x145x210 mm <sup>3</sup>

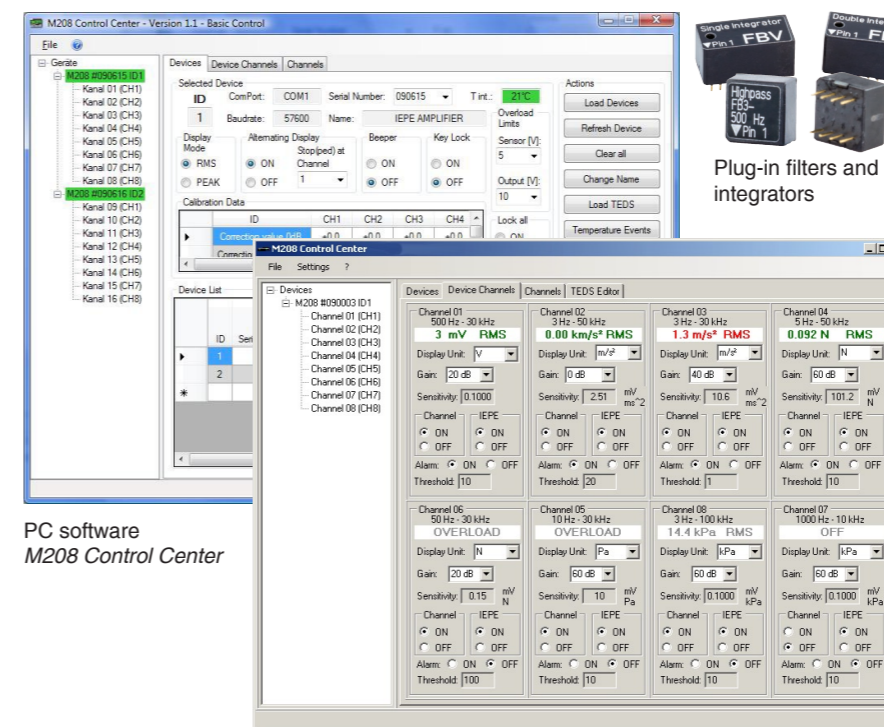
## M208A/B 8-Channel IEPE Conditioners

The signal conditioners M208A and M208B are suited for up to 8 IEPE sensors. The economic 19" units feature adjustable gain, filtering and integration. Model M208A also features some monitoring functions. Its LCD shows the RMS or peak values in multiplex mode.

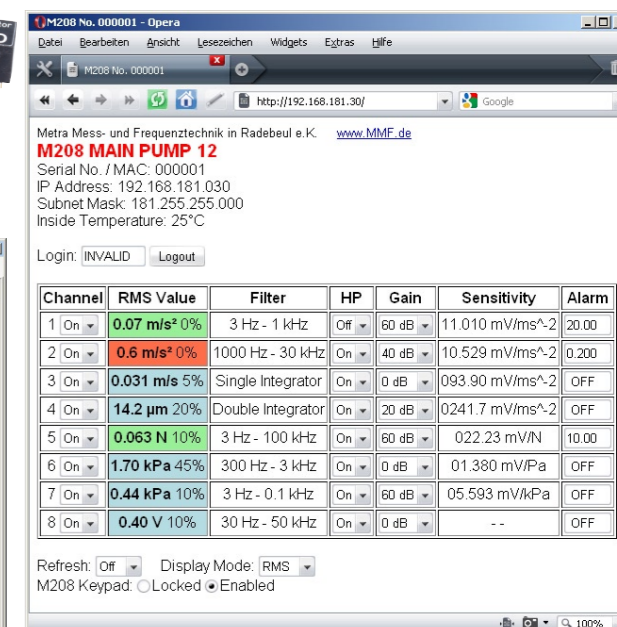
All settings of the M208A can be programmed and the RMS / peak values can be read via a serial interface. In addition there is a network interface. The M208A hosts a web page for setup and measurement which enables remote control. The M208A also features TEDS and a relay output.



Technical Data	M208A	M208B
Channels	8 IEPE	8 IEPE
Gain	0.1 to 1000; incremental	1 / 10 / 100 / 1000
Transducer sensitivity input	0.1000 to 12,000 mV/mech. unit	-
Low pass filters (-3 dB)	Plug-in modules FB2-0,1 / 1 / 3 / 5 / 10 / 30 / 50 / 100 kHz; Butterworth; 4 poles	
High pass filters (-3 dB)	Plug-in modules FB3-3 / 5 / 10 / 30 / 50 / 100 / 300 / 500 / 1000 Hz; Butterworth; 2 poles; can be switched off	
Integrators	Plug-in modules FBV (single integrator, 3 to 1000 Hz) and FBD (double integrator 5 to 200 Hz)	
Inputs / outputs	BNC/BNC at front; Sub-D socket at rear panel	BNC/BNC at front
IEPE sensor supply	3.5 to 4.5 mA constant current; 24 V compliance voltage; switchable	
Accuracy	±0.5 % at >5 % of full scale and center of frequency range	±1 % at >5 % of full scale and center of frequency range
TEDS support	Template 25 for force and acceleration; 27 for microphones	-
LEDs	2 x gain; IEPE; overload for each channel	
Display functions	Peak / RMS with mech. units, multiplex	-
Web server	HTML page for setup and RMS/peak monitoring	-
Interfaces	RS-232 (master/slave); Ethernet 10 Base-T	-
Relay output	1 relay; change-over; RMS/peak trip value selectable	-
Noise at output	<0.4 mV <sub>RMS</sub> (0 dB); <5 mV <sub>RMS</sub> (20 dB); <6 mV <sub>RMS</sub> (40 dB); <10 mV <sub>RMS</sub> (60 dB); 0.1 to 30,000 Hz	
Power supply	10 to 28 V DC or mains adapter, socket on rear	
Dimensions (WxHxD)	483 (19") x 44 (1 HU) x 124 mm <sup>3</sup>	



PC software M208 Control Center



Example of web page hosted by the M208A