



## Demonstration Meters



Electronic Multimeter  
1070



Mains Power Meter  
1091 USB

- To be used in demonstration racks or as table instruments
- Application in all fields of technology
- With big dual scales
- Protected against overload
- With built-in power supply

The Demonstration Meters can be used for measuring values when experimenting with hps Training Systems.

They have the same dimensions as the Demonstration Boards and can be suspended in hps bench racks or demonstration racks during experimenting.

All measuring ranges of the Demonstration Meters are protected against overload by internal circuits or fuses.

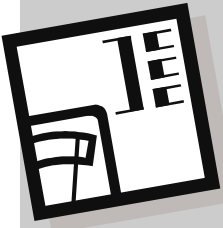
Large dual scales with figures up to 19 mm height make accurate reading possible even at far distances.

The front panel of the Demonstration Meters is made of 5 mm thick laminate, matt blue in colour with white printing representing the built-in function groups.

The rear of the Meters is protected with a grey plastic cover.

Connections are made via 4 mm safety sockets which are integrated in the front panel.

The following pages contain further technical data and illustrations of the Demonstration Meters.



## Demonstration Meters

### Demonstration Meters

#### Electronic Multimeter

Type 1070



Type 1070

##### Measuring ranges

- Voltage: (DC) 0.2 V / 2.0 V / 20 V / 200 V / 600 V  
(AC) 2.0 V / 20 V / 200 V / 600 V  
input impedance: 10 M $\Omega$   
input capacitance: < 100 pF  
frequency range: 40 ... 400 Hz
- Current: (DC / AC) 0.2 mA / 2 mA / 20 mA / 200 mA / 10 A  
frequency range: 40 ... 400 Hz  
shunt resistor: < 50 m $\Omega$
- Resistance: 200  $\Omega$  / 2 k $\Omega$  / 20 k $\Omega$  / 200 k $\Omega$  / 2 M $\Omega$  / 20 M $\Omega$
- Battery tester 1.5 V und 9 V
- Diode tester
- Continuity tester with audible signal

##### Other

- Current and voltage input via 4 mm safety jacks

##### Mains connection

- 100 ... 240 V AC; 50 ... 60 Hz; 15 VA

##### Dimensions / weight

- 266 x 297 x 90 mm (w x h x d) / 1.6 kg

#### RMS Multimeter

Type 1075



Type 1075

##### Measuring ranges

- Voltage (AC / DC): 0 ... 3 / 10 / 30 / 100 / 300 / 1000 V
- Current (AC / DC): 0 ... 0.1 / 0.3 / 1 / 3 / 10 A
- Resistance: 0 ... 100 / 300 / 1k / 3k / 10k / 30k / 100k / 300k / 1M / 3M / 10M

##### Other

- Input impedance: 10 M
- Frequency range: 10 Hz ... 10 kHz
- Crest factor: 10
- Error limit: 2.5 % (0 ... 5 kHz)  
5.0 % (5 kHz ... 10 kHz)

##### Mains connection

- 230 V AC / 115 V AC (110 V AC); 50 ... 60 Hz; 4 VA

##### Dimensions / weight

- 266 x 297 x 150 mm (w x h x d) / 2.8 kg



## Demonstration Meters

### Demonstration Meters

#### Electronic Power Meter

Type 1077



Type 1077

##### Measuring ranges

- Voltage (AC / DC): 0 ... 3 / 10 / 30 / 100 / 300 / 1000 V
- Current (AC / DC): 0 ... 0.1 / 0.3 / 1 / 3 / 10 A
- Active power: 0 ... 10 kW (crest factor 4)
- Reactive power: 0 ... 10 kVAr (capacitive and inductive)
- Apparent power: 0 ... 10 kVA

##### Mains connection

- 230 V AC / 115 V AC (110 V AC); 50 ... 60 Hz; 20 VA

##### Dimensions / weight

- 266 x 297 x 150 mm (w x h x d) / 3.3 kg

#### AC Multifunction Tester

Type 1079 USB



Type 1079 USB

##### Measuring ranges

- Voltage: 5 V ... 250 V (rms)
- Current: 0.1 A ... 10 A (rms)
- Frequency: 45 Hz ... 65 Hz

##### Meter

- Phase angle:  $-90^\circ$  ...  $0^\circ$  ...  $+90^\circ$   
inductive / capacitive display via LED
- $\cos \varphi$ : 0 ... 1 (leading), 1 ... 0 (lagging)  
Phase angle measurement between  $U_1 / I$  oder  $U_1 / U_2$

- USB Interface

##### Mains connection

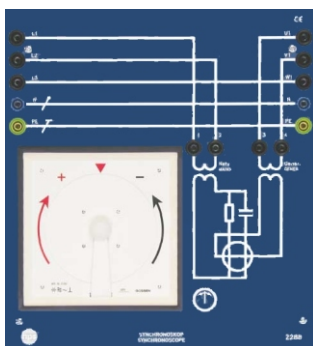
- 100 V ... 240 V AC; 50 ... 60 Hz; 10 VA

##### Dimensions / weight

- 266 x 297 x 150 mm (w x h x d) / 2.7 kg

#### Synchronoscope

Type 2288



Type 2288

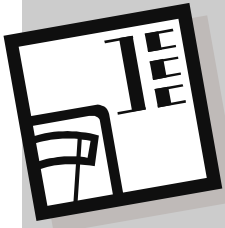
For synchronisation of a generator to the mains

##### Rated Voltage

- 230 V AC / 400 V AC; 50 ... 60 Hz

##### Dimensions / weight

- Casing: 266 x 297 x 135 mm (w x h x d)
- Meter: 144 x 144 mm (w x h)
- Weight: 2.3 kg

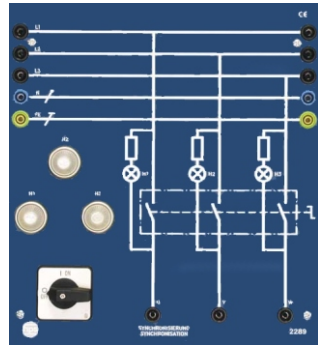


## Demonstration Meters

### Demonstration Meters

#### Synchronisation

Type 2289



Type 2289

For synchronisation of a generator to the mains

#### Voltage

- For three-phase connection:  
220 V ... 240 V AC / 380 V ... 415 V AC; 50 ... 60 Hz

#### Indication

- Through three lamps

#### Dimensions / weight

- 266 x 297 x 120 mm (w x h x d) / 1.25 kg

#### Speed indicator

Type 5511



Type 5511

#### Measuring range

- Speed: 0 ... 1500 min<sup>-1</sup> (for both directions of rotation)
- Voltage: 10 V DC (full-scale deflection)

#### Dimensions / weight

- Casing: 266 x 297 x 90 mm (w x h x d)
- Meter: 144 x 144 mm (w x h)
- Weight: 1.55 kg

#### Speed indicator

Type 5511.1



Type 5511.1

#### Measuring range

- Speed: 0 ... 3000 min<sup>-1</sup> (for both directions of rotation)
- Voltage: 10 V DC (full-scale deflection)

#### Dimensions / weight

- Casing: 266 x 297 x 90 mm (w x h x d)
- Meter: 144 x 144 mm (w x h)
- Weight: 1.55 kg



## Demonstration Meters

### Mains Power Meter

### Type 1091 USB



Type 1091 USB

#### Measuring range

- Voltage: 0 ... 250 V (rms)
- Current: 0 ... 10 A
- Power factor:  $\cos \varphi$  0 ... 1 ( U / I )  
inductive / capacitive display via LED
- Active power: 0 ... 2500 W
- Apparent power: 0 ... 2500 VA
- Reactive power: 0 ... 2500 Var
- Frequency: 45 ... 65 Hz
- Interface: USB

#### Mains connection

- 100 ... 240 V AC; 50 ... 60 Hz; app. 15 VA

#### Dimensions / weight

- 266 x 297 x 95 mm (w x h x d) / 0.9 kg

## Demonstration Meters

### Further Demonstration Meters (without illustration)

#### Dual Voltmeter

Typ 2257

- With two moving iron instruments
- 2 x 500 V AC / DC
- Dimensions of casing: 266 x 297 x 90 mm (w x h x d)
- Dimensions of meter: 144 x 144 mm (w x h)

#### Dual Frequency Meter

Typ 2280.1

- Frequency: 46 ... 54 Hz
- Voltage: 230 V AC / 400 V AC
- Dimensions of casing: 266 x 297 x 90 mm (w x h x d)
- Dimensions of meter: 144 x 144 mm (w x h)

#### Phase-Sequence Indicator

Typ 2283

- 220 V ... 240 V AC / 380 V ... 415 V AC; 50 ... 60 Hz
- With lamp indication
- Dimensions: 96 x 297 x 90 mm (w x h x d)

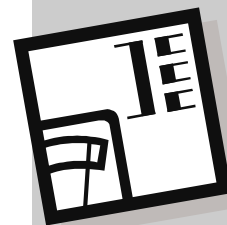
#### Power Factor Meter

Typ 2284.1

- For symmetrical three-phase load
- 230 V AC / 400 V AC; 1 A; 50 ... 60 Hz
- Scale: 0,3 inductive; 0,7 capacitive
- Dimensions of casing: 266 x 297 x 90 mm (w x h x d)
- Dimensions of meter: 144 x 144 mm (w x h)

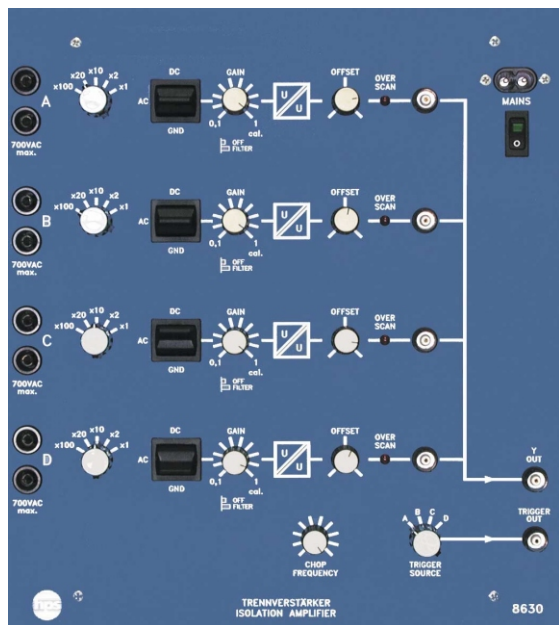
Subject to technical modification.





Type 8630

## Isolation Amplifier



Front view of the Isolation Amplifier

Type 8630

- 4 potential-free differential inputs
- Every input switchable to GND/DC/AC
- Switchable LF filter
- All measuring outputs through fully insulated BNC jacks
- Overload indicator for all channels
- Can be used directly as a benchtop unit or in a demonstration rack

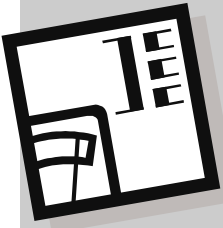
The Isolation Amplifier is used for safe, potential-free measuring of different voltages in connection with an oscilloscope.

Up to 4 signals, even with different reference points, can be displayed on one oscilloscope channel.

The Isolation Amplifier can be used universally from the fundamentals of electrical engineering right up to power electronics.

The inputs and outputs are electrically isolated by an isolation amplifier component with a linearity error of a mere 0.008% and a coupling capacity of 2 pF.

To conduct the experiments, the Isolation Amplifier is placed on a table or suspended in an hps rack for demonstration purposes.



## Type 8630

### Mechanical Data

The front panel of the Isolation Amplifier is made of 5 mm thick laminate, matt blue in colour with white engraving representing the built-in function groups.

The rear of the Board is protected with a grey plastic cover. Its shape allows the Board to be placed at an ergonomically favourable angle for example on a table.

### Accessories Recommended

- 2 Connecting Leads (Type 9102.14-1), Screened, 50 , 1 m long, with insulated connectors (BNC/BNC)

## Isolation Amplifier

### Technical Data

#### Mains connection

- Voltage: 230 V AC (standard version);  
50 ... 60 Hz; 20 VA

If you require the special 110 V version, please state so when ordering as the unit can only be converted in the factory.

#### Inputs

- Differential inputs: 4 (potential-free and electrically isolated)  
Wiring takes place through 4 mm safety jacks.
- Input voltage: max. 1000 V DC / 700 V AC
- Selector switch: AC/DC/GND
- Measuring ranges: x 100; x 20; x 10; x 2; x 1
- Input attenuator: enables – additionally to the input divider – a continuous attenuation by factor 10 (x 0.1... x 1).  
An LF filter for suppression of high-frequency interferences is connected when pulling the rotary switch.  
Limit frequency of the LF filter: 500 Hz
- Input resistance: 1 M
- Input capacitance: 30 pF
- Limit frequency: 50 kHz (-3 dB)

#### Outputs

- Electrically isolated from the inputs
- Channels (A ... D) through 4 fully insulated BNC jacks
- Channels (A ... D) through one fully insulated BNC jack (multiplex mode)
- Variable chopper frequency for low interference signal transmission;  
frequency range: approx. 2 kHz ... 50 kHz
- Trigger signal through insulated BNC jack, switchable to channel A ... D
- Overload indicator: for every channel, LED indicator
- Output voltage: < -8 V, > +8 V
- Zero adjustor: +/- 8 V

#### Dimensions

- 266 x 297 x 90 mm (w x h x d)

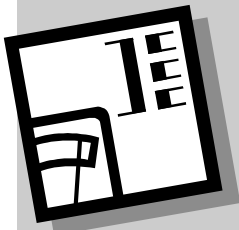
#### Weight

- 2.4 kg

Subject to technical modifications.







## Type 1091

# Universal Power Meter

## Accessories Recommended

- Visualisation software: Type 1091.2-EVGB  
Hardware requirements:  
IBM-compatible PC with CPU: 80386/40 MHz and higher,  
working memory: 8 MB RAM, 5 MB free hard disk  
space,  
operating system: Windows 3.x / 95 / 98, monitor and  
graphic card (VGA), mouse, free serial interface
- Additional requirements: connecting lead RS 232 between  
PC and Universal Power Meter, e. g. hps Type 9102.50  
(9-pin, length 2 m)

## Technical Data

### Measuring ranges

- Voltage/Current: 0 ... 500 V/0 ... 20 A
- Power factor (cos  $\phi$ ): 0 ... 1
- Active power: 0 ... 10 kW (single-phase)  
0 ... 30 kW (three-phase)
- Apparent power: 0 ... 10 kVA (single-phase)  
0 ... 30 kVA (three-phase)
- Reactive power: 0 ... 10 kvar (single-phase)  
0 ... 30 kvar (three-phase)
- Active energy: 0 ... 999999 kWh
- Apparent energy: 0 ... 999999 kVAh
- Reactive energy: 0 ... 999999 kvarh
- Active resistance: 0 ... 999999
- Apparent resistance: 0 ... 999999
- Reactive resistance: 0 ... 999999
- Measuring time: 0 ... 999999 h

### Measuring errors

- Voltage and current measuring: +/-1.0%, +/-1 digit
- Power measuring: +/-1.0%, +/-5 digits

### Serial interface (RS 232)

- Electrically isolated, bi-directional,  
baud rate: 1200, 2400, 4800 or 9600 baud,  
1 start bit, 8 data bits, 1 stop bit, no parity

### Mains connection

- 220 ... 240 V, 50 ... 60 Hz, approx. 4 VA

### Mechanical Data

The front panel of the Universal Power Meter is made of 5 mm thick laminate, matt blue in colour with white engraving representing the built-in function groups.

The rear of the Board is protected with a grey plastic cover. Its shape allows the Board to be placed at an ergonomically favourable angle for example on a table.

To conduct the experiments, the Universal Power Meter can be placed on a table or suspended in an hps bench rack for demonstration purposes.

### Dimensions / weight

- 133 x 297 x 95 mm (w x h x d) / weight: approx. 0.9 kg

Subject to technical modification.