

# Prüf- und Messtechnik



Spitzentechnologie, die überzeugt



**Operation manual**

**Energy Meter**

# 1. Safety precautions

This product complies with the requirements of the following European Community Directives: 2004/108/EG (Electromagnetic Compatibility) and 2006/95/EG (Low Voltage) as amended by 2004/22/EG (CE-Marking).

To ensure safe operation of the equipment and eliminate the danger of serious injury due to short-circuits (arcing), the following safety precautions must be observed.

Damages resulting from failure to observe these safety precautions are exempt from any legal claims whatever.

- Do not use this instrument for high-energy industrial installation measurement.
- Prior connection of the equipment to the mains, check that the available mains voltage corresponds to the voltage setting of the equipment.
- Connect this instrument only to main outlet with protection earth contact (PE).
- Do not operate the meter before the cabinet has been closed and screwed safely as terminal can carry voltage.
- To avoid electric shock, do not operate this product in wet or damp conditions. Conduct measuring works only in dry clothing and rubber shoes, i. e. on isolating mats.
- Comply with the warning labels and other info on the equipment.
- Do not subject the equipment to direct sunlight or extreme temperatures, humidity or dampness.
- Do not subject the equipment to shocks or strong vibrations.
- Do not operate the equipment near strong magnetic fields (motors, transformers etc.).

- \* Allow the equipment to stabilize at room temperature before taking up measurement (important for exact measurements).
- \* Use caution when working with voltages above 35V DC or 25V AC. These Voltages pose shock hazard.
- \* Fetch out the battery when the meter will not be used for long period.
- \* Periodically wipe the cabinet with a damp cloth and mild detergent. Do not use abrasives or solvents.
- \* The meter is suitable for indoor use only
- \* Unplug before cleaning
- \* The power meter shall be used only in area with installation category II (CAT II) according to IEC664, in which the transient voltages do not exceed 300V. The mains supply for residential areas generally belongs to this category.
- \* Do not store the meter in a place of explosive, inflammable substances.
- \* Do not modify the equipment in any way
- \* Opening the equipment and service – and repair work must only be performed by qualified service personnel
- \* **Measuring instruments don't belong to children hands.**

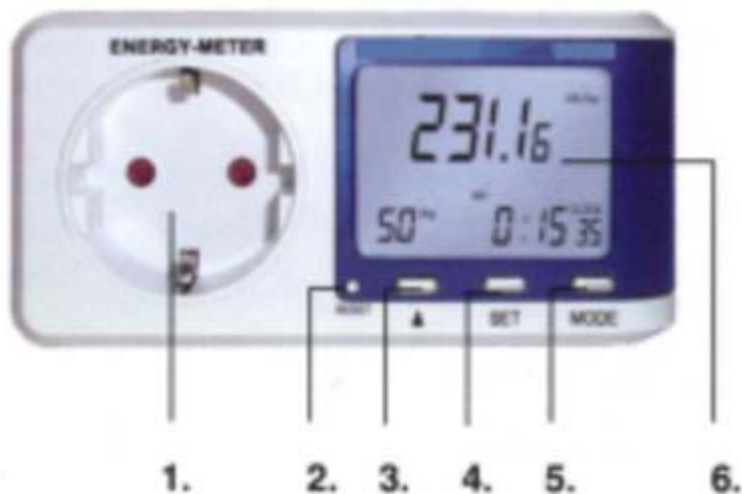
## 2. General

New designed, high-precision Energy Meter for detecting the energy consumption of electrical appliances and to calculate the total cost of the electricity consumption of a device by entering the current price. Through the integrated power factor calculation all modern electronic consumers such as switching power supplies, TVs, fluorescent lights, LED systems and of course, resistive loads such as electric heaters and hobs are precisely measured. In addition, due to the high resolution and the low response, even very small or standby loads are measured from approximately 1W.

### 3. Features

- Measure the energy costs (€), energy consumption (kWh), Voltage (V) Frequency (Hz), load current (A), power factor
- Display of the maximum consumption ( $W_{max}$ ) with trigger time
- Display of time, day and consumption time
- Power factor measurement from about 1W
- Adjustable day and night tariff
- Integrated overload indicator and child lock
- Reset button to reset all device functions
- CO2 emission calculation in CO2/kg
- Built-in rechargeable battery for memory conservation
- High resolution of 0.005 A
- High basic accuracy  $\pm 0.5\%$
- GS-certified, Intertek Deutschland GmbH
- Safety: GS, EN61010-1, CAT II 300V

#### 4. Front panel description



1. Earthed socket with child protection
2. Reset button to reset all device settings
3. ▲-button for setting the various values
4. SET button to select the cost or time setting
5. MODE button to switch the measurement functions
6. LCD multi-range display

## 5. Date and time

This energy cost meter has a built-in system clock, which is required to switch the day and night tariff. Furthermore, the device stores the maximum consumption value with time for better evaluation of the consumption behavior.

- Connect the unit to a wall outlet. The unit automatically turns on and the voltage measurement is displayed.
- Press the SET button and starts the day flashing.
- Press the ▲ key to the current day is displayed.
- After further pressing the SET button flashes the hours of time.
- Press the ▲ key until the correct hour is displayed.
- After further pressing the SET button, minutes flash on the display of time.
- Press the ▲ key to the current minute is displayed.
- After further pressing the SET button, the time has been saved.

Press the ▲ button within measurement range menus to switch between the 24h and the 12h display.

## b. Set prices

In this energy cost meter can be set two different price rates, which can be used to calculate costs in split day and night tariff. This setting is valid for the whole week or only selected weekdays. The value received is neutral and therefore can be used worldwide.

### 6.1. Price 1 set:

- Press the MODE button for about 5 seconds in the voltage measurement, current measurement and power measurement menu to activate the tariff preferences.
- Press the SET button to make the adjustment of the cost of Price1.
- The first digit (ten units of money per kWh) starts flashing.
- Press the ▲ key to change this value (e.g.: 0 -at a rate of 00.25 € per kWh)
- Press the SET button to the second digit (a unit of money per kWh) input.
- Press the ▲ key to change this value (e.g.: 0 -at a rate of 00.25 € per kWh)
- Press the SET button to select the third digit (0.1 unit of money per kWh).
- Press the ▲ key to change this value (e.g.: 2 -at a rate of 00.25 € per kWh)



- Press the SET button to select the third digit (0.01 cash per unit kWh).
- Press the ▲ key to change this value (e.g.: 5 -at a rate of 00.25 € per kWh)
- Press the SET button to set the decimal point change.
- Press the ▲ key to change the decimal point (in € not necessary)
- Press the SET button for the appropriate day of the week for Price 1 change.
- Repeatedly press the ▲ button to cycle through the weekdays (normal value: Mo-Su) (Mo, Tu, We, Th, Fri, Sat, Sun, Mon-Fri, Mon-Sat, Sat-Su, Mo-Su)
- Press the SET button to set the daily hour of the start time for Price 1.
- Press the ▲ key to set the hour (e.g.: 6 - at begin of Price 1 at 6 AM)
- Press the SET button to the minute of the start time for Price 1 set.
- Press the ▲ key to set the minute (e.g.: 00 – at begin of Price 1 at 6 AM)
- Press the SET button to save the settings.

## 6.2. Price 2 set:

- Press the MODE button for about 5 seconds in the voltage measurement, current measurement and power measurement menu to activate the tariff preferences.

- Press the MODE button one time to switch from PRICE 1 to PRICE 2.
- Press the SET button to make the adjustment of the cost of Price2.
- The first digit (ten units of money per kWh) starts flashing.
- Press the ▲ key to change this value (e.g.: 0 -at a rate of 00.21 € per kWh)
- Press the SET button to the second digit (a unit of money per kWh) input.
- Press the ▲ key to change this value (e.g.: 0 -at a rate of 00.21 € per kWh)
- Press the SET button to select the third digit (0.1 unit of money per kWh).
- Press the ▲ key to change this value (e.g.: 2 -at a rate of 00.21 € per kWh)
- Press the SET button to select the third digit (0.01 cash per unit kWh).
- Press the ▲ key to change this value (e.g.: 1 -at a rate of 00.21 € per kWh)
- Press the SET button to set the decimal point change.
- Press the ▲ key to change the decimal point (in € not necessary)
- Press the SET button for the appropriate day of the week for Price 2 change.

- Repeatedly press the ▲ button to cycle through the weekdays (normal value: Mo-Su) (Mo, Tu, We, Th, Fri, Sat, Sun, Mon-Fri, Mon-Sat, Sat-Su, Mo-Su)
- Press the SET button to set the daily hour of the start time for Price 2.
- Press the ▲ key to set the hour (e.g.: 10 - at begin of Price 2 at 10 PM)
- Press the SET button to the minute of the start time for Price 2 set.
- Press the ▲ key to set the minute (e.g.: 00 – at begin of Price 2 at 10 PM)
- Press the SET button to save the settings.

## 7. Overload settings

With a preset overload an OVERLOAD symbol flashes on the display when the set value is exceeded. This value is normally set to 16A.

- Press the MODE button for about 5 seconds in the voltage measurement, current measurement and power measurement menu to activate the overload settings.
- Press the MODE button twice to switch from PRICE1 and PRICE2 to the OVERLOAD settings.
- Press the SET button. The first digit (tens of amperes) starts to flash.
- Press the ▲ key to change this value.
- Press the SET button again to select the second digit (one amp).
- Press the ▲ key to change this value.
- Press the SET button again to select the third digit (0.1 amps).
- Press the ▲ key to change this value.
- Press the SET button again to select the fourth digit (0.01 amps).
- Press the ▲ key to change this value.
- Confirm with the SET key

## 8. LCD display and menu control

After connecting the device to a power outlet, the device switches on automatically and displays the VOLTAGE menu.

Here you can check the measured line voltage, line frequency, weekday and the current time.



Press the MODE button to switch to the CURRENT range.  
Here you can check the load current in amps, power factor, weekday  
and the current time.



Press the MODE button to switch to the WATT range.

Here you can check the current power of the load in watts, the power factor, weekday and the current time.

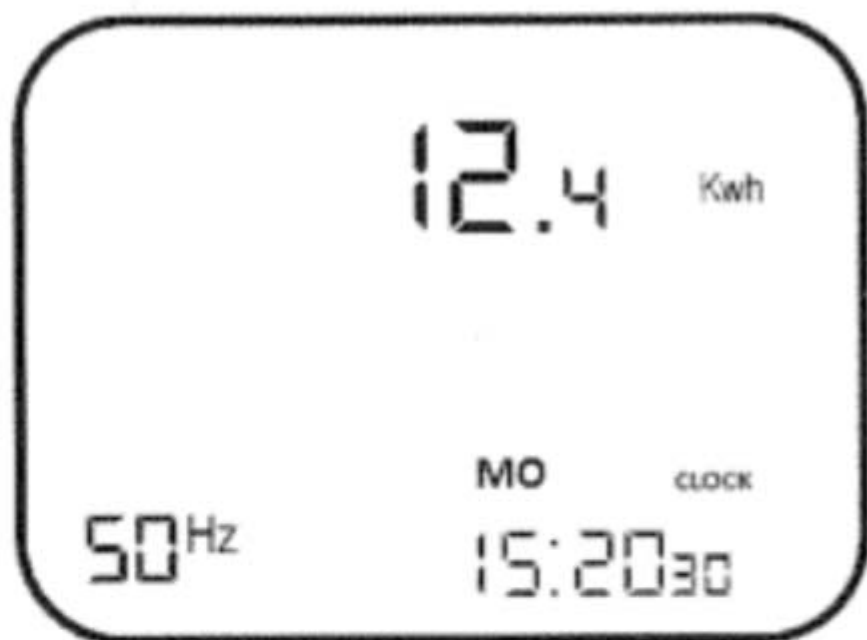


Press the MODE button to switch to the WATT MAX range.  
Here you can check the measured maximum power of the load in watts, the power factor and the trigger time of the maximum power measurement.





Press the MODE key to switch to the kWh (kilowatt hours) range.  
Here you can check the previously measured power of the consumer  
in kWh, power factor, weekday and the current time.



Press the MODE key to switch to the CO<sub>2</sub>/kg range.

Here you can check an orientation value for the generated CO<sub>2</sub> emission values of the previously measured power of the consumer, the power factor, weekday and the current time. The CO<sub>2</sub>/kg Value refers to a 100% supply by coal-fired power and is calculated by the theoretical CO<sub>2</sub> emissions of 0.792 kg / kWh. If your energy supplier offers a different energy mix, you can subtract this percentage value.

Example:

12.5kgCO<sub>2</sub> at 100% coal power =

6.25kgCO<sub>2</sub> at 50% coal power & 50% wind power



Press the MODE key again to switch to the Total Price area. To calculate a Total costs, you must have set at least the tariff 1 first. The total costs as sum of the both tariffs are indicated. Depending upon your settings, you can read this value as the €- value. In addition, the "Total on Time" for both tariffs will be displayed.

To reset these values press the MODE button for about 2 seconds.



12.9

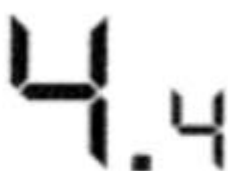
TOTAL PRICE

TOTAL  
ON TIME

1 21 08

Press the MODE key again to switch to the total price Tariff 1 area. To calculate a total value, you must have set a tariff 1 first. The total cost of the tariff 1 appears in this indication. Depending upon your settings, you can read this value as the €- value. In addition, the "Total on Time" for tariff 1 will be displayed during the tariff.

To reset these values press the MODE button for about 2 seconds.



4.4

TOTAL PRICE 1

TOTAL  
ON TIME

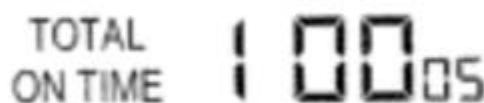
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Press the MODE key again to switch to the total price Tariff 2 area. To calculate a total value, you must have set a tariff 1 first. The total cost of the tariff 2 appears in this indication. Depending upon your settings, you can read this value as the €- value. In addition, the "Total on Time" for tariff 2 will be displayed during the tariff.

To reset these values press the MODE button for about 2 seconds.



8.5  
TOTAL PRICE 2



TOTAL  
ON TIME 1 00 05

## 9. Integrated storage battery:

- The integrated storage battery serves to backup the measured values in case of power failure or when the unit is unplugged from the outlet
- When the unit is connected to the electrical grid, the storage battery reloads itself automatically
- The storage battery is integral and hasn't to be replaced or disposed separately

## 10. Technical Specification

Nominal input voltage	240V AC 50Hz
Voltage measurement	200 - 276 V AC, 45 - 65Hz
Maximum load	16A, 3680W
Lower current range	0.005A
Power consumption	<0.5W
Current display	0.005A ... 16.000A
Watt Range	0.0 ... 3680.0 W
Power factor calculation	0.10 ... 1.00
Consumption display	0.0 ... 9999.9 kWh
Accuracy	+ / - 0.5%
Internal Battery	Ni-Mh 3.6V
Dimensions (WxHxD)	120 x 60 x 75 mm
Weight	160g