

## Display & Programming.

Mode	LED	Function	Parameter	▼	▲	Display	Default
kW[%]/kW	Green	Measurement in kW		kW-range	kWh	kW	
kW[%]/kW	Red	Measurement in %		kW-range	kWh	kW[%]	
Locked	Red/Green	Operating lock	On / Off	Decrease	Increase	On / Off	On
Parameter	Red	Parameter access	P00-P11	Decrease	Increase	Parameter no.	
Range I/U	Red	Current range	0.5 - 1000A			Current [A]	5
Range I/U	Green	Voltage range	100 - 575 Vac			Voltage [V]	400*

\*Depends on order

The HPL503 is programmed by the use of only three keys located on the front panel, see paragraph about programming on page 2. All directly accessible parameters as well as their adjustable range are listed in the table above. Parameters are stored in EEPROM. If no key is activated for approx. 30 seconds, the display defaults to kW [%]. Note that the function of the keys is repeated if held down continuously. Access to the parameter list is found under the field „Parameter“. The display shows P00, which using the arrow-up key must be changed to the desired number (see table to the right). Upon pressing the „Mode“ key the value of the selected parameter is shown. It may now be changed using the arrow keys. To store the new value press the „Mode“ key and the unit returns to the parameter list. Pressing the „Reset“ key instead of the „Mode“ key discards the new value and keeps the old value and the unit returns to showing kW.

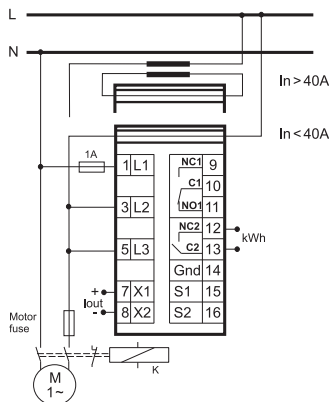
Nr.	Parameter	Indstilling
P01	Spændingsområde	100-575V (*)
P02	Ekstern strømtrafo (N/5)	Off, 50 - 1000A <sup>1)</sup>
P03	kW-måleområde	0.1 - 999 (3,4)
P04	Type af Iout	0-20mA, 4-20mA
P05	Ioutmodus	n.inv., inv.
P06	Pmin (Iout = 0(4)mA)	0 - 50%
P07	Pmax (Iout = 20mA)	50 - 100%
P08	Pulserate for kWh-pulser	0,1, 1,0, 10
P09	Dæmpningsfilter	Off, On
P10	Nulstil kWh sum	rtn, rSt-000
P11	Fabriksindstillinger	Par, rSt-DEF

Understregede værdier er fabriksindstillinger

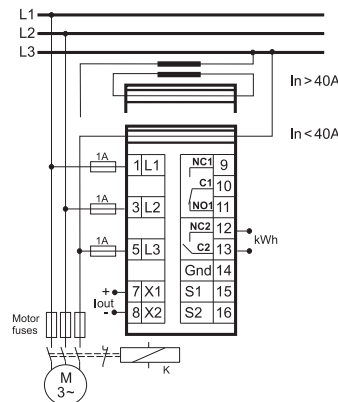
<sup>1)</sup>Fabriksindstilling for spændingsområde afhænger af bestilling

2) Ved ekstern strømtrafo sættes internt strømområde til 5A

**Note: Current must be measured in the L3 phase (Terminal 5).  
Direction is not important**



Single phase - connect phase to both L2 & L3  
Connection to a single phased load



Connection to a three phased load

# Unipower

HPL503  
Version 1.0

Technical information

English edition

## Technical Specifications

### Mechanical spec.

#### Housing

Makrolon 8020 (30% GV), UL94V-1 (house).  
Makrolon 2800, UL94V-2 (connector + front).

#### Mounting

Snap-on construction for 35mm DIN-rail or wall mounting.  
Max. cablelength: 20m

#### Protection class

IP40 (house).  
IP20 (connector).

#### Operating Temperature range:

-15 - +50 °C surrounding air.

#### Weight: Approx. 250g.

#### Dimensions: D 110 x W 56 x H 75 mm.

Terminal tight. torque: 7lbs/in, 0.79Nm

Use 60/75 copper (CU) wire only

### Electrical spec.

#### Supply / measuring voltage

1x100 - 1x400Vac, ±10%.

3x100 - 3x575Vac, ±10%.

#### Current range

Internal: 0.5 - 40A

External: With N/5A converter (50-1000A)

#### Accuracy: Class 2.

#### Consumption: 2 VA

#### Frequency range: 45 - 65 Hz

#### Relay spec.: 24 VDC/30mA.

#### Analogue output

0(4)-20mA, max load 400Ω

galvanically isolated from the measuring system.

#### kWh output: 0.1, 1.0 or 10kWh per pulse on relay output 2

Pulse width: 330ms

#### CE-mark to:

EN61326-1, EN61010-1

#### UL certified:

UL508, File E194022



## Generally

Unipower HPL503 is a special edition in the HPL500 family - a kW meter with analogue output and pulse output for kWh. Unipower HPL503 is equipped with a specially developed power supply for use from 100V - 575V - both single phased and three phased. Mains voltages in the whole world is hereby covered with one unit. HPL503 also measures currents up to 40A without the use of an external current converter. Readout in both kW and kW%. Easy setup makes it quick and easy to configure the unit.

The device has no monitoring functions. Here we refer to e.g. HPL500..

## Generally

The measurement is based on a fast four quadrant multiplication of current and voltage making the HPL503 capable of measuring the exact power consumption also on frequency inverters. Measurement:  $P = \sqrt{3} \times U \times I \times \cos\phi$ .

## Programming:

The HPL503 is programmed by the use of only three keys placed on the front panel. The „Mode“-key is used to select one of the programmable parameters. When a parameter is selected, the value may be changed using the two arrow keys. To store the new value, press the „Mode“-key, and the value is stored in EEPROM. If the „Reset“-key is pressed the old value is kept and the unit returns to showing kW%.

Please note: The unit is equipped with a key lock which must be unlocked before a parameter can be changed. This is done by selecting „Locked“ and then changing the display value from „On“ to „Off“ with the arrow keys.

## Voltage range:

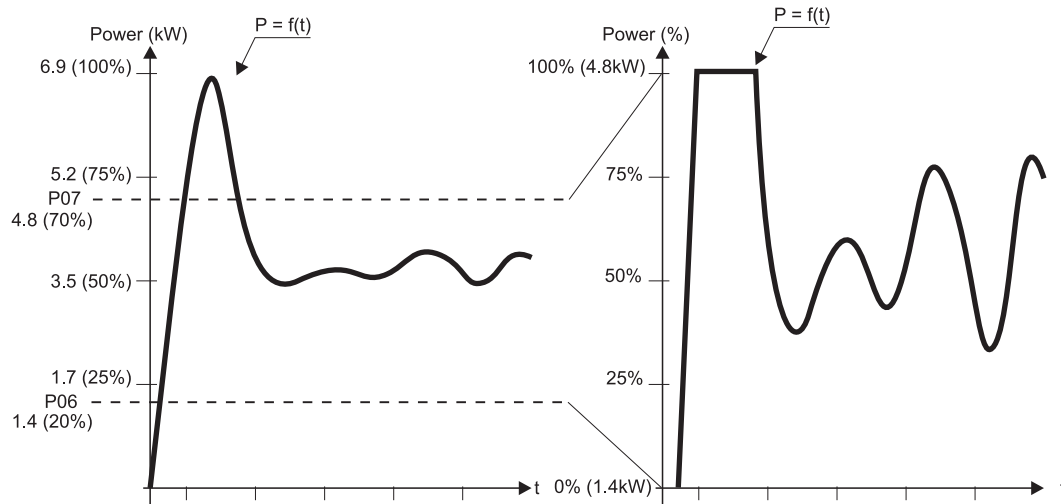
The HPL503 is equipped with a newly developed power supply unit making the unit applicable for voltages from 100V to 575V - single phased as well as three phased. Simply set up the connected voltage via parameter P01.

## Measuring range:

The device contains a current transformer for max. 40A. If a larger area is needed, an external current transformer must be used, which is set via parameter P02

Setting up the measuring range in the HPL503 differs from the rest of the HPL500 family. In the HPL503, the measuring range is set directly in kW. The procedure depends on whether an external current transformer (CT) is required.

Both methods have in common that the HPL503 must first be „unlocked“ as described above.



## Setting the measuring range without external CT:

### 1. Set measuring voltage

Select voltage under parameter P01. Pay attention to the difference between single-phased and three-phased measurement.

### 2. Set the desired kW measurement range

Parameter P03 is set to the kW value, where it is desired that the HPL503 should output 20mA.

## Setting the measuring range with an external CT:

### 1. Set measuring voltage

Select voltage under parameter P01. Pay attention to the difference between single-phased and three-phased measurement.

### 2. Set the external power transformer

Select the connected current transformer under parameter P02. Please note that only N/5A current transformers are available.

### 3. Set the desired kW measurement range

Parameter P03 is set to kW value, where it is desired that the HPL503 should output 20mA.

After setting the kW measuring range, the HPL503 itself calculates the internal current range and scaling.

The HPL503 is now basically set up and functions as a kW meter with both analog output and pulse output for kWh. The analogue output gives 0(4)-20mA corresponding to the desired kW range and the pulse output gives pulses proportional to summarized kWh (See parameter P08).

The HPL503 contains special settings for the analogue output and the kWh output, which are described in the following.

## Functions

## Analogue output:

The HPL503 features a current output configurable as either 0-20mA or 4-20mA (P04). If the output is in a control loop it can be inverted (P05).

## Zoom:

If it is necessary to scale the analogue output manually - and not just use the device's automatic calculation, the scaling can be set via parameters P06 and P07 in % of the measuring range. This function is particularly useful if the area is also narrowed from below (see figure at the bottom of page 2). However, the narrowed area cannot be reduced to less than 50%. I.e the difference between P06 and P07 must be at least 50%. In the figure, for the sake of the example, a voltage range of 400V (P01) and a kW measuring range of 4.8kW (P03) have been selected. In addition, the bottom is scaled up to 20% (P07). The scaling only affects the analogue output - and not the % readout nor the kWh calculation.

## kWh:

### Pulse output:

Relay output 2 gives pulses proportional to summed kWh. The pulse rate can be set to 0.1, 1.0 or 10 kWh per pulse via parameter P08.

kWh is also stored in the EEPROM and can be read out by activating the „up“ arrow key during „kW“ reading.

### Reset kWh:

If it is desired to reset the internally summarized kWh, parameter P10 is selected. The display now shows „rtn“ and can be returned from without resetting by pressing the „Mode“ key. If reset is desired, an arrow key must be pressed and the display changes reading to flashing „rSt“ and „,000“. If „Mode“ is now pressed, the internally summarized kWh are reset - also in the EEPROM. **Note: This action can NOT be reversed!**

The HPL503 counts kWh up to 999.9kWh, where the value remains until reset (see above). This has no effect on the pulse output, which continues to provide pulses with the desired resolution (P08).

## Filter:

When dealing with fluctuating power signals a built-in damping filter (P09) may be used to advantage. It has a time constant of approx. 250ms.

## Relay 2:

Relay 2 is a close / break switch which always is related to kWh pulses. The relay closes on a pulse. The polarity cannot be changed.

To limit the current for the pulses, 820Ω has been inserted in series, so that at 24Vdc it is limited to 30mA.

The pulse width is approx. 330 ms

## Readout:

The HPL503 - like all other units in the HPL500 family - reads out both kW and percentage of the power range. The set power range can be read out during both „kW“ and „kW [%]“ readout by activating the „down“ arrow key (see table on page 4).

The summarized kWh can be read out by activating the „up“ arrow key under both „kW“ and „kW [%]“ readout (see table on page 4).

## Factory settings:

The unit may always return to the factory settings (P11) if a „fresh start“ parameters set up is desirable. The display now shows „rtn“ and it is possible to return without using the factory settings by pressing the „Mode“ key. If the factory settings are desired, an arrow key must be pressed and the display changes reading to flashing „rSt“ and „,000“. If „Mode“ is now pressed, all parameters are reset to factory settings - also in EEPROM.

**Note: This also resets the summarized kWh.**

**Note: This action can NOT be reversed!**