Display & Programming overview.

Mode	Function	Parameter	▼	▲	Display	Default
kW [%]	KW [%] display		Min. Peak	Max. Peak	kW [%]	
kW	kW display		Min. Peak	Max. Peak	kW	
Display	Display readout	kW%, kW	Toggle	Toggle	"dSP"	kW[%]
Locked	Program. Protection	On/OFF	Toggle	Toggle	"On", "OFF"	"On"
Int. C.T.	Internal Current Range	1, 3, 5, 8 Amp.	Decrease	Increase	1, 3, 5, 8	5
Ext. C.T.	External CT	OFF,10/1-1000/5	Decrease	Increase	CT	"OFF"
Parameters	Parameters	1 - 5	Decrease	Increase	0 - 5	

The HPL103A is programmed by the use of only three keys located at the front panel. See paragraph about programming on page 2. The parameters and their programming ranges are listed in the function table above. The function of the keys is repeated if continuously activated. Parameters are stored in EEPROM. When no key has been activaed for about 10 seconds the display returns to the programmed display position (kW% or kW). This also stores eventual altered parameters as if the „Mode"-key was pressed.

In addition to the table above the „Reset"-key may be used to view both the nominal voltage setting as well as the current nominal max. power (P1Max). This is done by activating the „Reset"-key in the kW%- and the kW-position respectively. These values are only meant as information for the user.

Note: Before altering a parameter (Direct or through the parameter list - see below) the programming protection must be unlocked. This is done by selecting „Locked" and change the „On" to „OFF" using one of the arrow keys. When the display reads „OFF" all parameters may be changed.

Parameters.

Parameter	Function	Value	▼	▲	Display	Default
P01	Zoom min	0 - 60%	Decrease	Increase	0 - 60	0
P02	Zoom max	40 - 100%	Decrease	Increase	40 - 100	100
P03	Iout	0-20, 4-20	Toggle	Toggle	"0.20", "4.20"	4-20
P04	Iout mode	inv, n.inv	Toggle	Toggle	"in", "n.in"	n.inv
P05	kWh pr. pulse	0.1, 1, 10	Decrease	Increase	0.1, 1, 10	1

All parameters are accessed through the „Parameters" entry on the frontplate. With the „Mode"-key select „Parameters" and the display will read „P00". Now the arrow keys are used to select the desired parameter number which is entered by pressing „Mode". The present value of the parameter is shown in the display and may be altered using the arrow keys. To store the new value press „Mode" and the display will read „P0x" again. A new parameter may be selected or pressing „Reset" returns the display to showing kW or kW% again.

Note:
The zoom values can not be set so the difference between them is smaller than 40%. This way the resolution of the analogue output will remain better than 0.2%.

Unipower   HPL103A
Version 4.0

Technical Information   English Edition
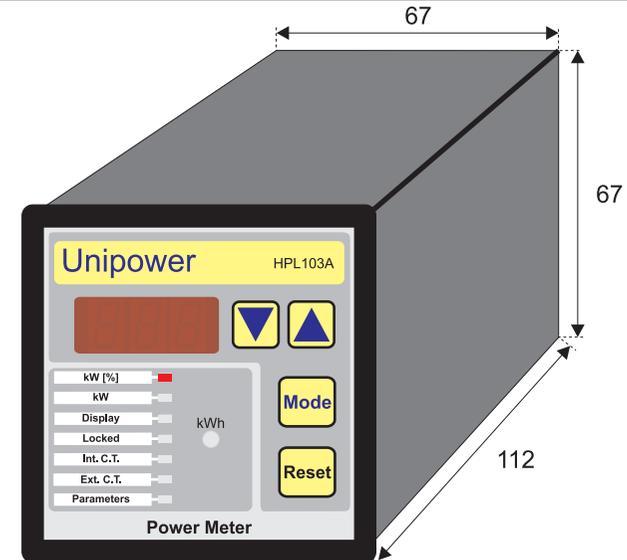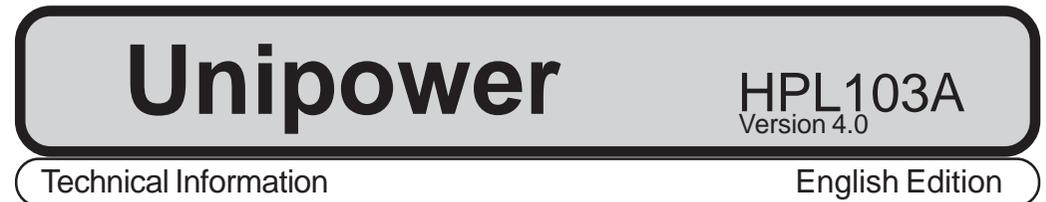
Technical Specifications

Electrical
Power Supply
See technical info on the unit.
Also available:
3 x 200 VAC -> 3 x 660 VAC
Current Range
Internal: max, 8 Amp.
External: N/1 or N/5 converter.
Cos(φ) Range: 0-1
Frequency Range: 45-65 Hz.
Consumption:
Power supplied from measuring circuit, 2VA
Relay spec.: 250 VAC/5 Amp.

Mechanical
Housing: Noryl
Mounting: Panel mounting.
Protection Class: IP54
Operating Temperature Range: -15 - +50 °C.
Weight: Approximately 400g.
Dimensions: D 112 x W 72 x H 72 mm.
Cut out: 67 x 67 mm

CE mark to:
EN61326-1, EN61010-1

THE CONCEPT

The unipower HPL103A is a member of a family of „Intelligent Power-Control Units". The unit measures symmetrical 3-phased power in kW from the formula:

$$P = \sqrt{3} \times U \times I \times Cos\varphi$$

The unit is a dedicated measurement transducer for PLC-interface etc. It displays power in kW or kW% of the measurement range, which is set up via 4 internal current ranges (up to 8A) or via an internal table of external CTs (N/1 or N/5). The unit has user defined 0-20mA or 4-20mA which may be inverted for use in a control loop. Also a kWh output is available with 0.1 kWh, 1kWh or 10kWh pr pulse. Using the built-in zoom function the analogue output may be scaled and thereby „tuned" to part of the measurement range.

Generally

HPL103A measures - like the rest of the Uni-power-family - true power (U x I x cosφ) and may therefore also be used for measuring on non sine shaped loads, such as frequency inverters.

Programming:

HPL103A is programmed by the use of only three keys located on the front panel. The „Mode"-key is used for selecting one of the six programmable parameters: When a parameter is selected its value may be altered using the two arrow keys.

Measurement range:

Setting up the measurement range (P1max) for the HPL103A is done in two steps: Selecting external CT or internal CT and possibly setting up the zoom function. From these selections the unit calculates P1max = Ö3 x Unom x Inom, where Unom is the unit's nominal measurement voltage (See technical info on the unit) and Inom is the unit's nominal measurement current. Inom depends on the user settings for external and internal CT.
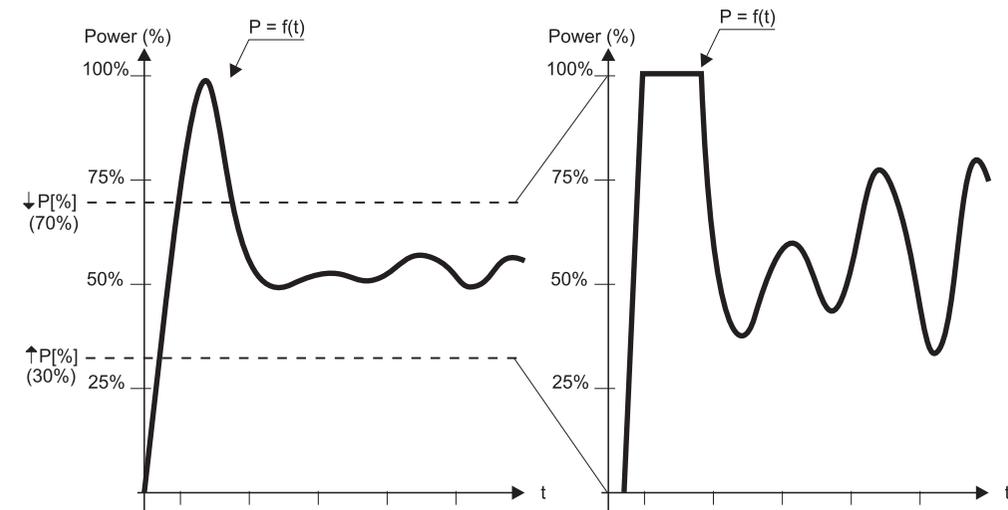
External CT:

HPL103A may be connected to N/1 or N/5 CTs. With the item Ext. CT the connected CT is selected in the internal table (10 - 1000A). First part of the list is N/1 CTs followed by N/5 CTs. If no external CT is used, „OFF" is selected (Default). Changing external or internal CT settings results in resetting of zoom settings to default (0%, 100%).

Internal CT:

Int. CT setting (internal current range) is only available if no external CT is chosen. I.e. if no external CT is connected to HPL103A, the current range is selected by setting Int. CT to 1, 3, 5 or 8A.

Zoom-function:

HPL103A contains a zoom function, which makes it possible to scale the analogue output (Iout) See the figure below. The scaling is done with the parameters (P01 & P02) in percent of the chosen measurement range (P1max). The settings for the two zoom parameters are illustrated in the table on page 4 - the narrowed range cannot be less than 40%, i.e. the difference between the upper and lower zoom limit is at least 40%.

The figure on page 2 shows an example of the use of the zoom function; The left curve shows a power curve in the whole measurement range (P1max). This range is then reduced by changing the upper zoom limit to 70% and the lower zoom limit to 30%. Maximum zoom is hereby utilized, namely 40%. Read out of the unit is illustrated on the right curve, from which it is evident that the power changes produce a larger change. The unit now shows 0%, when the power is less than the lower zoom limit and 100% when the power exceeds the upper zoom limit.

Peak detectors:

Leave the motor running at normal load and read the peak values by activating the arrow keys in kW[%]-mode or kW-mode. In kW[%]-mode the peak values represent the „zoomed" measurement and are displayed in %, whereas in kW-mode the peak values are true kW readings.

The peak detectors may be reset seperately (Max- and Min-Peak) by pressing the relevant arrow key and at the same time activate the Reset key. Hereby the peak detector is set to the actual measured value.

Analogue output:

HPL103A has an analogue current output. The user may set the unit to 0-20mA or 4-20mA and invert the output making it usable inside a control loop.

The analogue output is always proportional to the units read out in kW% and thereby the scaled values if the zoom function is used.

Read out:

When „Display" is selected the standard read out is set; kW or kW%. The unit now shows this value until the display setting is changed. The user may display the other value using the „Mode"-key. After approx. 10 seconds the unit will return to showing the read out selected under „Display". This setting does not influence the zoom settings.

kWh output:

Pin 9-10 on the unit is a relay output for kWh (see figure below). With parameter P05 the output is set for 0.1 kWh, 1kWh or 10kWh pr pulse. The duration of each pulse is 200ms. The relay is on when a pulse is given.
An LED on the front will flash 10 times for each pulse for user information.

Typical installation
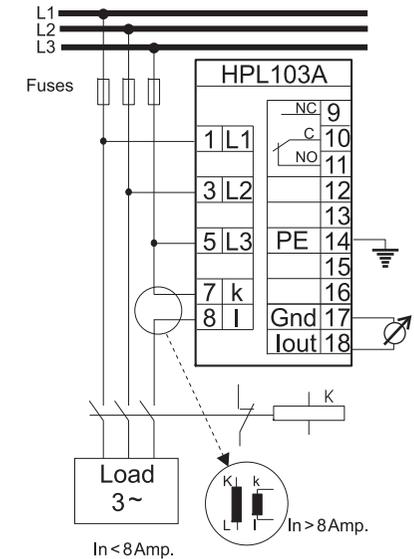
Note!!! An external current converter must always be mounted in the L3-phase for correct measurement. The converter polarity is not important.