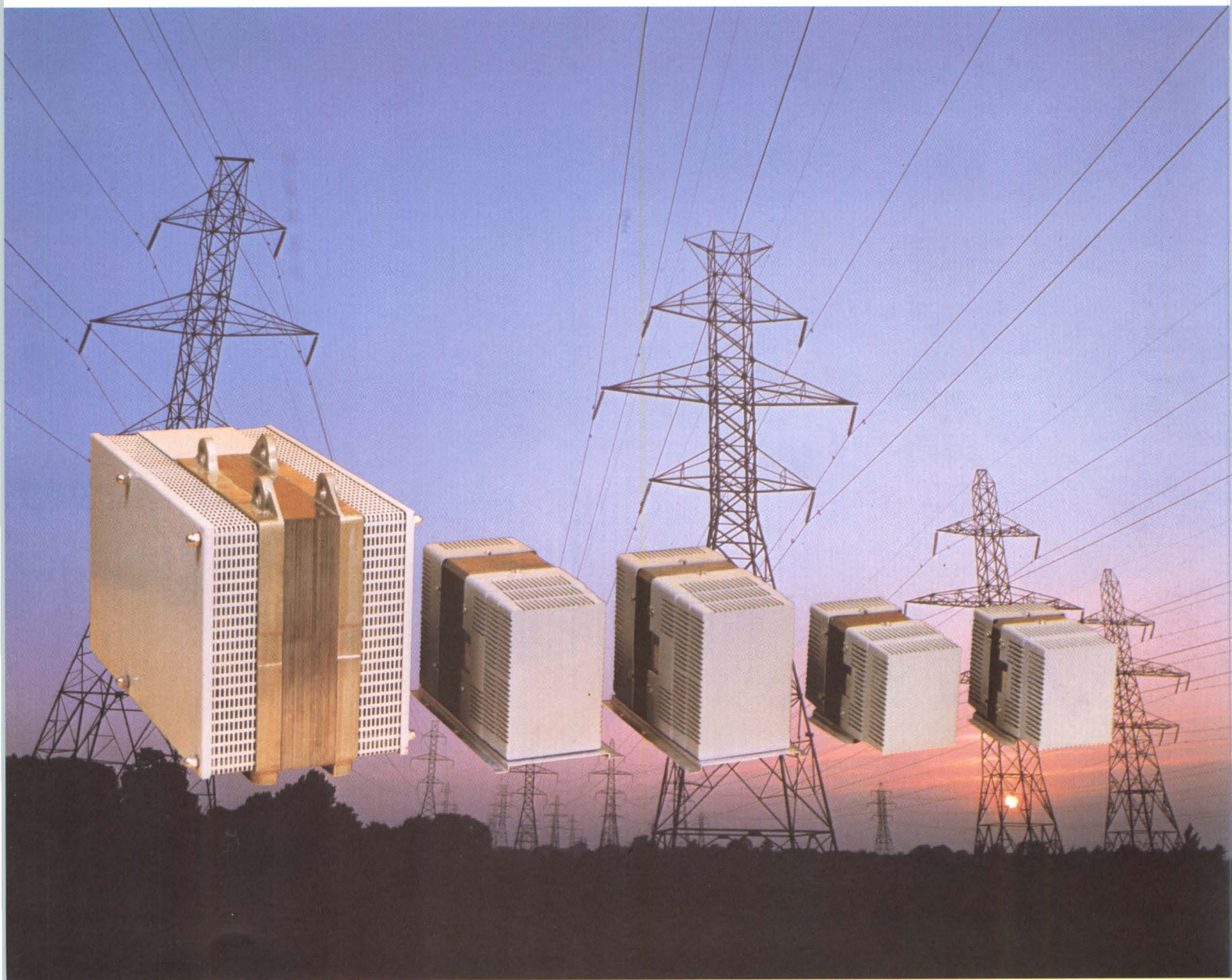


AGAINST  
LINE DISTURBANCES CHOOSE  
**LINE CONDITIONERS**  
ACCORDING TO  
IEC AND VDE SAFETY NORMS



Test & Measuring  
Instruments

**PHILIPS**



## For protecting your equipment against mains transients and avoiding intermittent errors...

In all modern electronic equipment, especially where minute digital logic signals are used, mains borne transients often cause serious problems. These unwanted signals not only throw digital circuits into confusion by falsifying results, but high-voltage transients can also ruin input circuits. In particular, data memories can be inadvertently erased and valuable software programs lost.

With the ever-increasing demands on mains supply networks, and the wide variety of electrical and electronic equipment in use today, a transient-free supply becomes more of a hope than a reality. In practice, energy spikes from heavy electrical appliances, such as motors, welding machines, etc. will inevitably appear in the mains supply network, and will just as inevitably introduce their quota of faults into sensitive electronics equipment.

Fortunately, however, as problems worsen, solutions improve. Modern line conditions are available that will cut transients down to size. For example, if you need a sinusoidal output over a wide range of mains and load variations, with excellent protection against transients, then look no further than the Philips range of line conditioners. In addition, and this is unique, transient-killing properties can be further improved by a simple connection change, with only a slight reduction in output stability.

The units shown below offer a choice of ratings from 200 to 5000 VA and each one can be used either as a filter or as a stabilizer, by a simple wiring variation on the unit.

## SPECIFICATIONS

### FOR 220 V OUTPUT

#### Power rating

200 VA	PE 1411/00
400 VA	PE 1412/00
850 VA	PE 1413/00
1500 VA	PE 1414/00
3000 VA	PE 1415/00
5000 VA	PE 1416/00

#### INPUT DATA

##### Input voltage

220 V nominal	240 V nominal
(198 V - 242 V)	(216 - 264 V)

depending on how the unit is connected.

##### Mains frequency

50 Hz  $\pm$  1% (1)

(1) 50/60 Hz versions available on request.

## OUTPUT DATA

### Stability

#### AS A STABILISER

● Against mains voltage variations only  
At mains voltage variations of 198 V to 242 V and a constant load with  $\cos \Phi = 1$  220 V  $\pm$  or  $\pm$  1% for all models.

● For combined mains voltage variations and load variations.  
At mains voltage variations of 198 V to 242 V together with resistive load variations from no load to full load or vice versa :

PE 1411	$\pm$ 3,0% or $\pm$ 0,8%
PE 1412	$\pm$ 2,8% or $\pm$ 1,6%
PE 1413	$\pm$ 2,3% or $\pm$ 1,2%
PE 1414	$\pm$ 2,0% or $\pm$ 1,0%
PE 1415	$\pm$ 2,3% or $\pm$ 1,5%
PE 1416	$\pm$ 1,5% or $\pm$ 0,5%

#### AS A FILTER

● Against mains voltage variations only.

At mains voltage variations of 198 V to 242 V (or 216 to 264 V if the unit is connected for a nominal voltage of 240 V) and a constant load with  $\cos \Phi = 1$  220 V  $\pm$  or  $\pm$  2% for all models.

● For combined mains voltage and load variations.

At mains voltage variations of 198 to 242 V (or 216 to 264 V if applicable), together with resistive load variations from no load to full load, or from full load to no load, the output voltage is kept within the following limits :

PE 1411	$\pm$ 6,0% or $\pm$ 2,0%
PE 1412	$\pm$ 4,9% or $\pm$ 2,5%
PE 1413	$\pm$ 4,5% or $\pm$ 2,1%
PE 1414	$\pm$ 4,2% or $\pm$ 1,8%
PE 1415	$\pm$ 4,5% or $\pm$ 2,1%
PE 1416	$\pm$ 4,0% or $\pm$ 1,0%

(stability figures apply for a constant mains frequency).

### Distortion

Less than 4% of its rms value (valid only if the distortion of the input voltage is less than 5% of its rms value and if its frequency is 50 Hz).

### Energy reserve

$\geq$  10 ms

### Response time

Less than 30 ms.

### Suppression of transients

$\geq$  75 dB (see Fig. 1)

### Overload protection

If a short circuit occurs in the load, the output voltage will collapse and the current will be limited to approx. 200% of the maximum rated value.

### Parallel operation

The stabilizer provides galvanic separation between input and output. Parallel use of two stabilizers is permitted, even 3 phase configuration is possible.

### Efficiency

At full load better than :

For PE 1411	76%
For PE 1412	81%
For PE 1413	88%
For PE 1414	89%
For PE 1415	89%
For PE 1416	90%

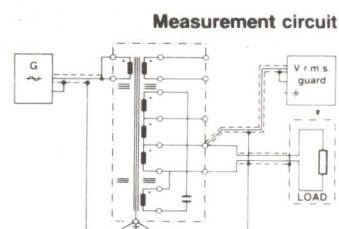
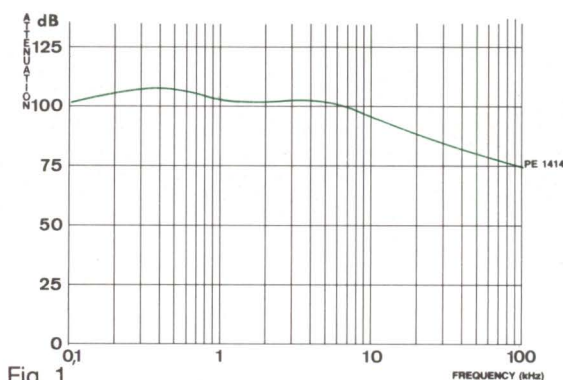
## FOR 240 V INPUT/OUTPUT

In order to comply with the requirements of countries with 240 V / 50 Hz mains, Philips has developed a new range of cost-effective line conditioners valid for 240 V input and 240 V output line voltages.

Apart from the input and the output voltages, all the other specifications mentioned on page 2 and 3 are valid for these line conditioners.

In order to avoid confusion, the table 1 page 4 gives a survey of the available models in both ranges.

### Interference suppression of the line conditioners





- Ask for line conditioners with:**— optimum combination of line stability and transient suppression,  
 — more than 100 dB transient suppression for short pulse widths,  
 — output stability of  $\pm 1\%$  even for very low input voltages,  
 — sinewave output with distortion lower than 4% even for square wave inputs,  
 — short-circuit proof output due to automatic overload protection,  
 — mean time between failure in excess of 100.000 operating hours.

#### Noise level :

Type n°	Level dBA
PE 1411/00/01	$\leq 32$
PE 1412/00/01	$\leq 34$
PE 1413/00/01	$\leq 44$
PE 1414/00/01	$\leq 48$
PE 1415/00/01	$\leq 48$
PE 1416/00/01	$\leq 60$

#### Ambient temperature

Rated range of operation :

— 10° C to... + 45° C.

#### SAFETY REQUIREMENTS

Philips line conditioners comply with the following safety standards :

IEC 65 safety requirements for mains-operated electronic and related apparatus for household and similar general use.

IEC 348 safety requirements for electronic measuring apparatus.

IEC 435 safety requirements for data processing equipment.

VDE 0550 insulation test for transformers.

#### ENVIRONMENTAL CONDITIONS

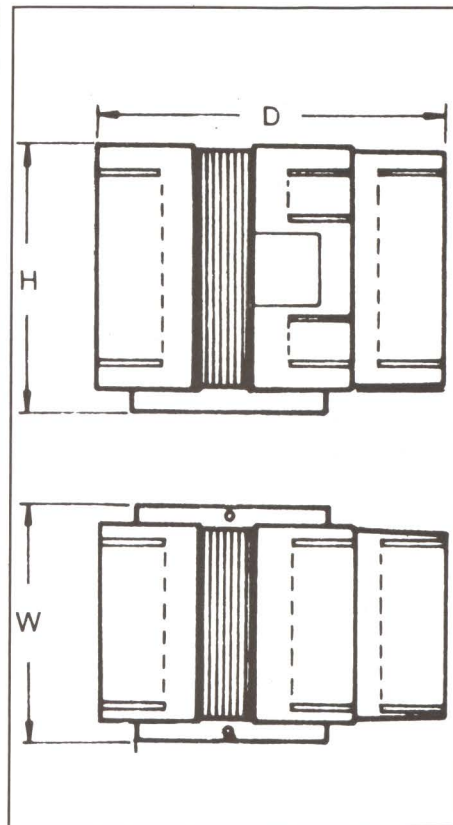
The line conditioners have been subjected to exhaustive environmental tests according to : IEC 68-2.

#### M.T.B.F.

100.000 operating hours at 40° C.

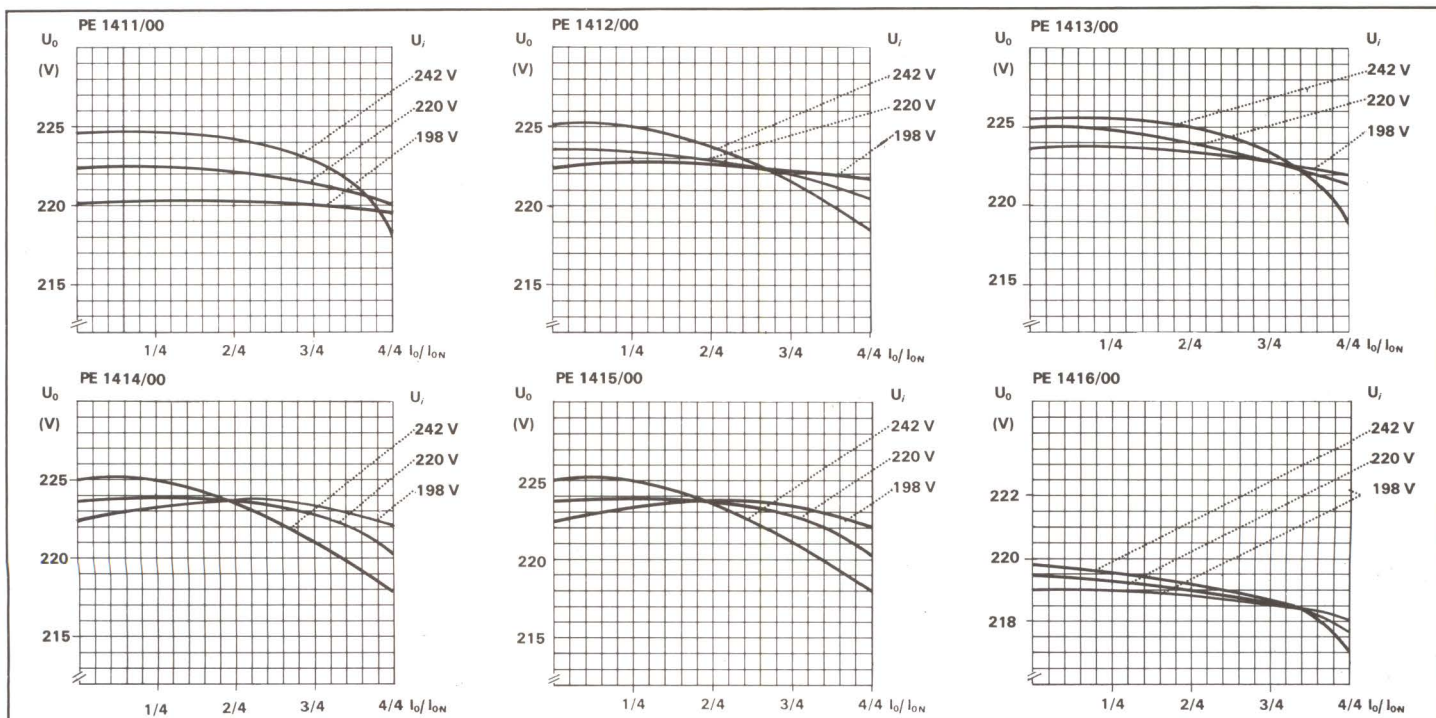
#### DIMENSIONS (mm)

Type n°	H	D	W	Weight kg
PE 1411	183	226	158	7.5
PE 1412	183	252	158	11.
PE 1413	256	317	206	21.
PE 1414	256	362	206	33.
PE 1415	293	690	206	65.
PE 1416	437	672	360	110.



#### OUTPUT CHARACTERISTIC WITH COMPENSATION

##### RESISTIVE LOAD





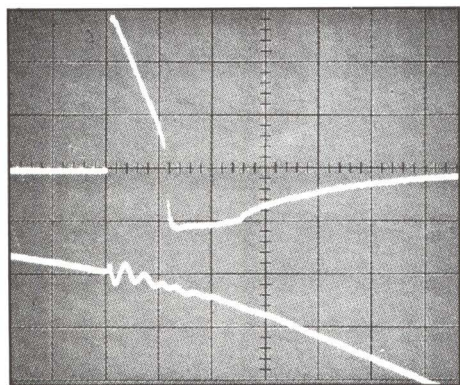
PE 1411/00/01  
PE 1412/00/01  
PE 1413/00/01  
PE 1414/00/01  
PE 1415/00/01  
PE 1416/00/01

## APPLICATION FIELDS

For most equipment that is sensitive to voltage variations and spikes, such as medical equipment, computers, analytical instruments, test equipment, computer peripherals, industrial robots, bank terminals, control equipment, security devices, ... effective line conditioners are a must.

As seen in fig. 2, high power applications can be solved thanks to parallel connections.

However, for more sophisticated applications where 0.1% stability is required, independently of frequency, with good transient suppression, electronic-magnetic stabilizers are the obvious choice. The solution lies in the PE 1610 series, with an available output power from 1.000 VA to 10.000 VA. Finally, for cases requiring real no-break power supplies, uninterruptible systems fitted with batteries can be provided on request.



Oscilloscope illustrates a 3 kV fast rise time transient on top trace (1 kV/div and 80 us/div). Bottom trace with 5 V/div sensitivity illustrates the transient-killing ability of Philips line conditioners.

PE 1415/00/01

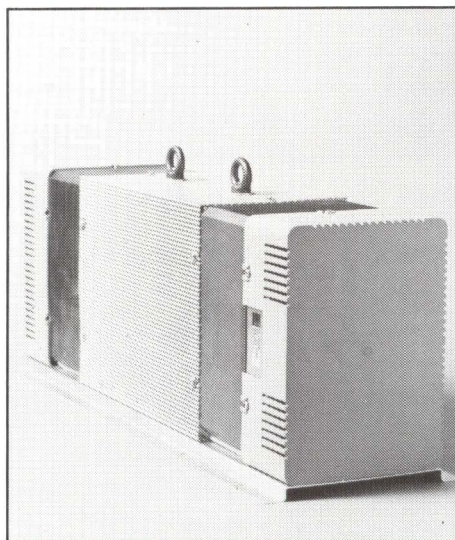


TABLE 1

Power rating	Input voltage	
	220V/50Hz	240V/50Hz
	model number	
200 VA	PE 1411/00	PE 1411/01
400 VA	PE 1412/00	PE 1412/01
850 VA	PE 1413/00	PE 1413/01
1500 VA	PE 1414/00	PE 1414/01
3000 VA	PE 1415/00	PE 1415/01
5000 VA	PE 1416/00	

Parallel connections (examples)

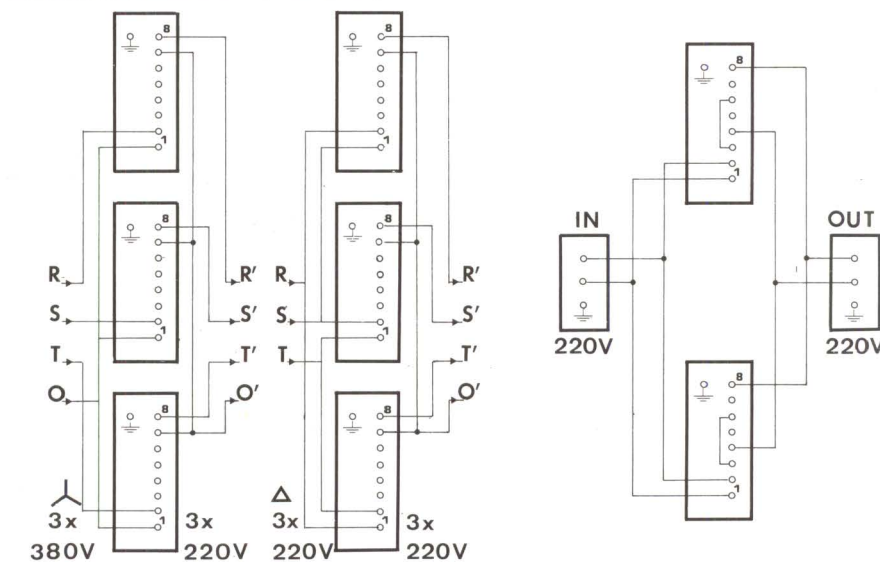


Fig. 2

For custom designed line conditioners with other input/output voltages (or frequency), contact a Philips specialist.