

## Precision-Power-Calibration-System Primary standard PPCS



The new ZERA single phase precision power calibration system PPCS is developed for the traceable calibration of measuring instruments for active-, reactive and apparent power and has a great importance for national metrology institutes.

The new ZERA precision power calibration system PPCS generates sinusoidal voltage and current with adjustable phase shifts of  $0^\circ$  to  $\pm 180^\circ$  in the technical frequency range up to 60 Hz.

The stable displaying and highly precise measurement of active-, reactive and apparent power is possible for free selectable power factors with a standard measuring uncertainty of  $< 10 \times 10^{-6}$  by frequencies from 40 Hz to 60 Hz.

### Capability characteristics

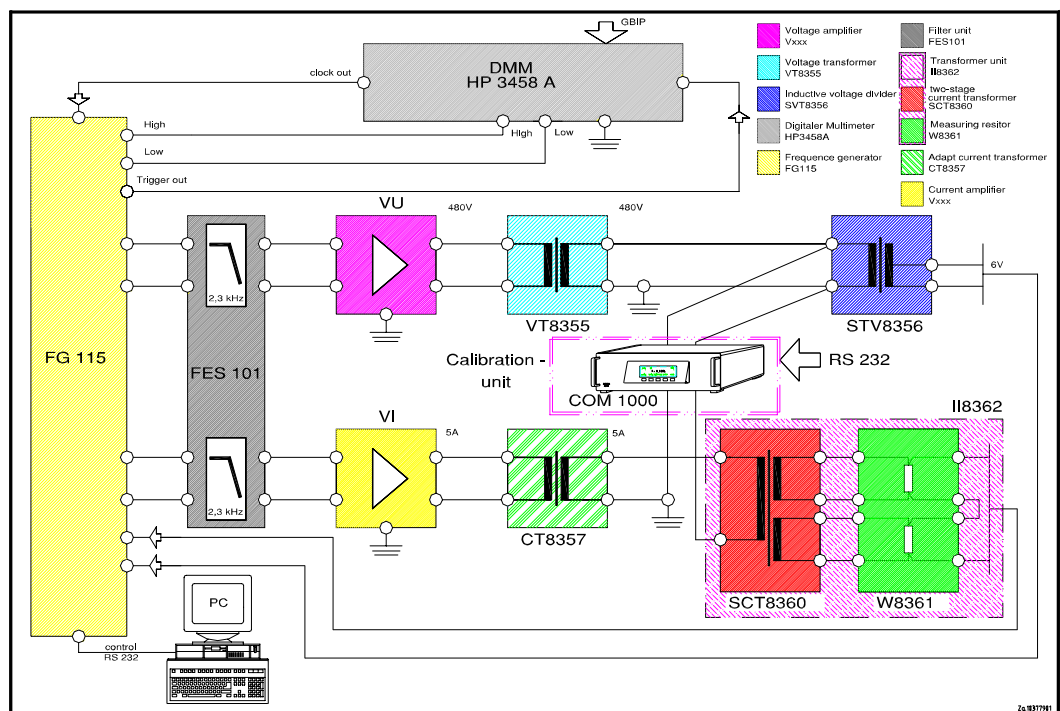
- Highly precise current-, voltage-, and power calibration
- Simple traceability to national standards
- High measuring stability by using of many years approved ZERA components
- High repetition accuracy of the measured values
- Smallest measurement deviations of  $< 10 \times 10^{-6}$  (related to the nominal value of the apparent power)

### Required calibration periods:

- Transformers every 5 years
- Resistances every year
- Multimeters every 90 days

The inherent error of each device - determined by a re-calibration - can be considered as error compensation by the application software.

### Measurement principle



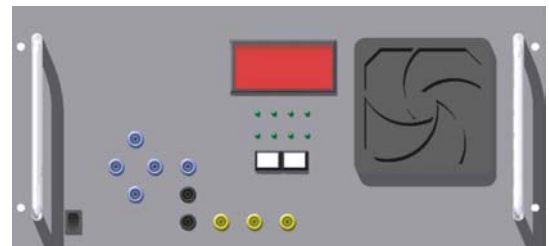
### Technical Data

Output voltage:	60 V – 480 V
Output current:	0,1 A – 10 A (optional 100 A)
Frequency:	50 Hz, 60 Hz
Power factor:	0 - 1 - 0 - (-1)
Power deviation:	$< 10 \times 10^{-6}$
Design:	19" rack cabinet
Mains supply:	single phase, 230 V $\pm$ 10 %, 50 ... 60 Hz (typical fuse protection)

### The particular components of the PPCS

#### Voltage amplifier

Linear ZERA-Voltage amplifier for generation of the output voltages of 60 V - 480 V in the frequency range of 40 Hz - 60 Hz. With integrated voltage transformer VT 8355 for galvanic separation



#### Inductive voltage divider

The voltage divider STV 8356 generates the measuring value (6 V) from the following primary ranges : 480 V / 240 V / 120 V / 60 V.



#### Digital multimeter

8<sup>1</sup>/<sub>2</sub> digit Digital-Multimeter HP 3458 A to acquire the measured values.



#### Filter unit FES 101

Antialaying-Filter FES 101



### Frequency generator FG 115

Programmable dual voltage amplifier



### 2-Step Current transformer II 8362

Current transformer II 8362 with implemented measuring resistor  
Prim: 10 A / 5 A / 2,5 A / 1 A / 0,5 A / 0,25 A / 0,1 A sec.: 0,1 A (1 V)  
 $R=10\Omega$   $R=10$



### Current amplifier

Linear ZERA current amplifier for generation of the output currents of 0,1 A - 10 A in the frequency range of 40 Hz - 60 Hz (optional 100 A).

With integrated adapt current transformer CT 8357 for galvanic separation



### Control PC for the PPCS

Windows based software to control the frequency generator (RS232), digital multimeter (IEEE488) and test devices (IEEE488 or RS232). Different configurations can be selected.

