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**MARSENERGO**  
INSTRUMENTS FOR POWER INDUSTRY

*Making energy visible*

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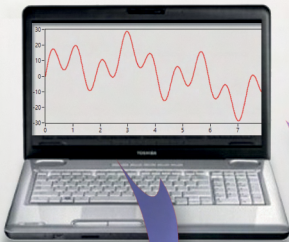
**REFERENCE COMPARATOR FOR CALIBRATION/VERIFICATION  
OF ELECTRONIC LOW POWER INSTRUMENT TRANSFORMERS  
OF VOLTAGE AND CURRENT (LPIT)**

# MarsComp K-1000

Accuracy class 0.02

*Electronic transformers (LPIT)  
to be tested*

*Control Terminal with  
E-TransformerTest software*



*Test report*



**MarsComp K-1000-P  
Portable**



**MarsComp K-1000-S  
Stationary**

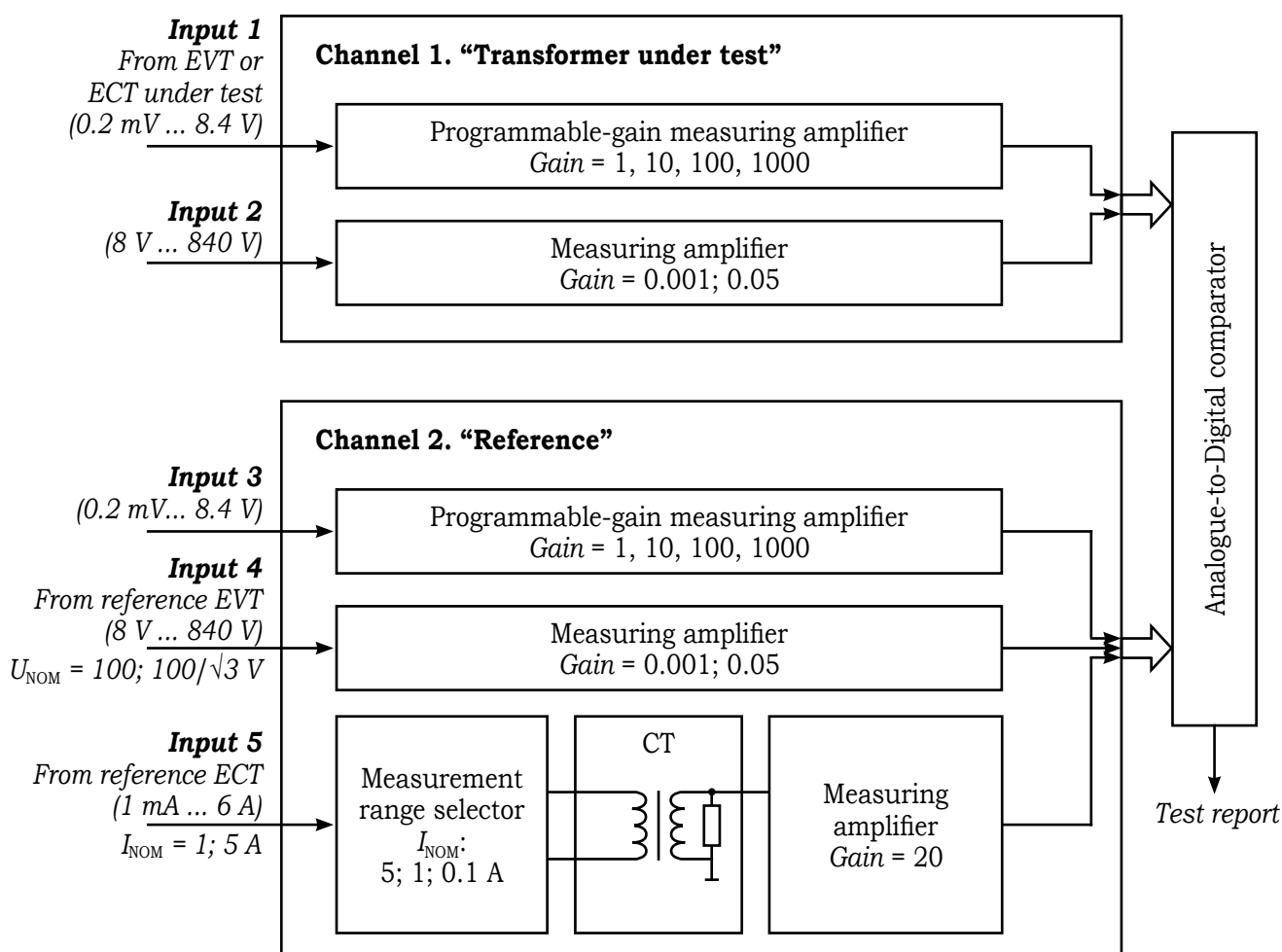
## Features

- One and the same instrument performs 2 functions: calibration/verification of both voltage and current transformers.
- As reference transformers, together with MarsComp you can use conventional instrument transformers: CTs (1A, 5A) and VTs (100 V,  $100/\sqrt{3}$  V).

## Sphere of application

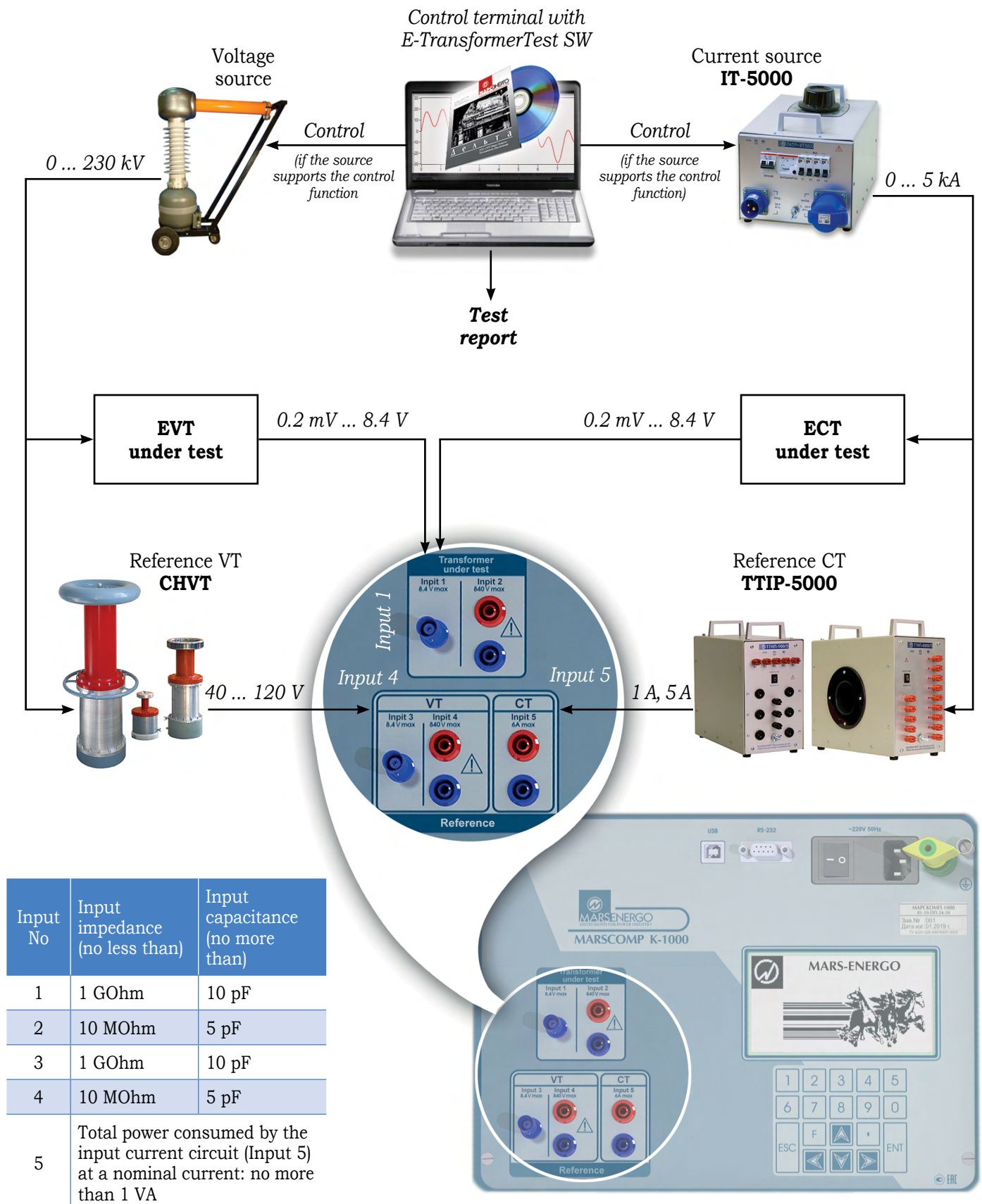
1. Verification (accuracy check or determining ratio and angle errors) and calibration of:
  - *Low-power instrument voltage transformers* (electronic voltage transformers, EVT) with analogue AC voltage output within the ratings from 20 mV to 8 V according to IEC 60044-7
  - *Low-power instrument current transformers* (electronic current transformers, ECT) with analogue AC voltage output within the ratings from 20 mV to 8 V according to IEC 60044-8
  - *Conventional instrument voltage transformers (VT)*
  - *Voltage dividers, scaling voltage converters*
2. For instrument voltage transformers, investigation of their amplitude/phase to frequency curves as a response to application of voltage harmonics from 0.3th to 50th (15 to 2500 Hz) within the range from 0.08 to 840V.

## Block diagram



### Test scheme for an electronic voltage LPIT

### Test scheme for an electronic current LPIT



Input No	Input impedance (no less than)	Input capacitance (no more than)
1	1 GOhm	10 pF
2	10 MOhm	5 pF
3	1 GOhm	10 pF
4	10 MOhm	5 pF
5	Total power consumed by the input current circuit (Input 5) at a nominal current: no more than 1 VA	

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### Basic accuracy specifications

Measured values	Measurement ranges	Limits of permissible intrinsic measurement error
RMS of AC voltage on inputs 1 and 2, V	0,2 mV ... 840 V	Relative, % $\pm 0.015 + \Delta$
AC frequency, Hz	15 ... 2500 Hz	Relative, % $\pm 0.02$
RMS of AC voltage for even and odd voltage harmonics of order h, h from 0.3 to 50 (from 15 Hz to 2.5 kHz), V	0,2 mV ... 840 V	Relative, % $\pm 0.015 + \Delta$
Phase shift between the voltages of frequency f from the 2 channels	0 to 60 min	Absolute, min $\pm [1 + 0.02 \cdot h]$
	1 to 90°	Absolute, min $\pm 10$
Phase shift between voltage harmonics of order h from the 2 channels	0 to 60°	Absolute, min $\pm 10$
RMS of AC current	1 mA ... 6 A	Relative, % $\pm 0.015 + \Delta$

### Accuracy characteristics as applied to testing of electronic voltage transformers (EVT)

Error (absolute)	Limits of permissible error
Voltage ratio error, %	$\pm 0.015$
Angle error, min	$\pm 1.0$
Composite error, %	$\pm 0.03$

### Accuracy characteristics as applied to testing of electronic current transformers (ECT)

Error (absolute)	Limits of permissible error
Current ratio error, %	$\pm 0.015$
Angle error, min	$\pm 1.0$
Composite error, %	$\pm 0.03$

### General specifications

Parameter	Value
Mains power supply	220 $\pm$ 22 V, 47 ... 63 Hz
AC power consumption	50 VA, or less
Overall dimensions (length $\times$ width $\times$ height)	max
- Stationary	485 $\times$ 450 $\times$ 140 mm
- Portable	335 $\times$ 289 $\times$ 155 mm
Weight	max
- Stationary / Portable	10 / 11 kg
Operating temperature range	+5 to +40 °C

### Accuracy characteristics as applied to testing of conventional analogue VTs

Error (absolute)	Limits of permissible error
Voltage ratio error, %	$\pm 0.002$
Angle error, min	$\pm 0.1$