

## PRS 400.3

Three-phase Portable Reference Standard Class 0.02



The PRS 400.3 is a high accuracy reference standard for the comprehensive investigation of all components of a modern metering installation. Characteristic features are its wide measuring range, the high accuracy and the small dependence of disturbing.

### Advantages of the PRS 400.3

- Simultaneous testing of up to three meters or registers of a multi-functional meter
- Current- and voltage ranges:  
1 mA ... 120 A / 5 V ... 520 V / 45 Hz ... 70 Hz
- Six current inputs allow simultaneous measurements of both primary and secondary currents in CT connected metering systems
- Using several clip-on CT's at the range of 100 A up to 3000 A or hot sticks for measurement on high voltage potential
- Internal memory for measurement results and customer data
- Integrated RS 232 C interface for data transfer and programme control via external PC

- The Portable Control Module PCS 400.3 can be removed and the reference standard is controlled in this case via blue-tooth

### Functions

- Active, reactive and apparent power measurement in three-wire or four-wire circuits with integrated error measurement and pulse output for energy
- Vector diagram, harmonics spectrum, wave form and rotary field display for analysis of the mains conditions
- Burden measurement and ratio test of current and voltage transformers
- Measuring of current, voltage and power transducers

### Options

- Software CAMCAL for Windows or CALSOFT
- Error compensated clip-on CT's up to 100 A
- Clip-on CT's up to 1000 A
- Flexible current transformers LEMflex up to 3000 A
- Scanning head SH 2003 with clamp on device SCD 2003

## Technical Data PRS 400.3 + PCS 400.3

|   |  |
|---|--|
| Mains supply voltage:                         | 88 ... 280 V, 45...66 Hz   |
| Power consumption:                            | max. 20 VA   |
| Housing:                                      | Metal, rubber protection   |
| Dimensions:                                   | W 520 x H 195 x D 275 mm   |
| Weight:                                       | approx. 11.5 kg  |
| Influence of supply on the measuring results: | ≤ 0.005% at 10% variation  |
| Ambient temperature:                          | -10 °C ... +50 °C (Operating range)<br>+10 °C ... +40 °C (Specified range) |
| Temp. Coefficient:                            | ≤ 0.0025 % / °C +10°C ... +40°C<br>≤ 0.0050 % / °C -10°C ... +50°C         |
| Frequency range of the measured quantities:   | 45 ... 70 Hz   |
| Influence of external fields:                 | ≤ 0.07 % / 0.5 mT  |
| Time base:                                    | 1 (0.2 ... 9999) s   |

### Current measurement (I)

#### Direct

|                    |  |
|--------------------|--|
| Current range:     | 1 mA ... 12 A  |
| Internal range:    | 1 mA ... 4 mA $\alpha = 30000$<br>4 mA ... 12 mA $\alpha = 10000$<br>12 mA ... 40 mA $\alpha = 3000$<br>40 mA ... 120 mA $\alpha = 1000$<br>120 mA ... 400 mA $\alpha = 300$<br>400 mA ... 1.2 A $\alpha = 100$<br>1.2 A ... 4.0 A $\alpha = 30$<br>4.0 A ... 12.0 A $\alpha = 10$ |
| Display range:     | 1.0000 mA ... 12.0000 A  |
| Measurement error: | $E \leq \pm 0.02\%$ 4 mA ... 12 A<br>of the measured value<br>$E \leq \pm 0.02\%$ 1 mA ... 4 mA<br>of the measurement range final value  |
| Current range:     | 10 mA ... 120 A  |
| Internal range:    | 10 mA ... 40 mA $\alpha = 3000$<br>40 mA ... 120 mA $\alpha = 1000$<br>120 mA ... 400 mA $\alpha = 300$<br>400 mA ... 1.2 A $\alpha = 100$<br>1.2 A ... 4 A $\alpha = 30$<br>4 A ... 12 A $\alpha = 10$<br>12 A ... 40 A $\alpha = 3$<br>40 A ... 120 A $\alpha = 1$               |
| Display range:     | 10.000 mA ... 120.000 A  |
| Measurement error: | $E \leq \pm 0.02\%$ 40 mA ... 120 A<br>of the measured value<br>$E \leq \pm 0.02\%$ 10 mA ... 40 mA<br>of the measurement range final value  |

#### Electronically compensated Clip-on CT's

|                    |   |
|--------------------|---|
| Current range:     | 50 mA ... 100 A   |
| Range:             | 50 mA ... 800 mA $\alpha = 125$<br>800 mA ... 4 A $\alpha = 25$<br>4 A ... 20 A $\alpha = 5$<br>20 A ... 100 A $\alpha = 1$ |
| Display range:     | 10.00 mA ... 100.00 A   |
| Measurement error: | $E \leq \pm 0.2\%$ 0.5 A ... 100 A<br>$E \leq \pm 1.0\%$ 50 mA ... 499 mA   |

#### Clip-on CT's up to 1000 A

|                    |  |
|--------------------|--|
| Measurement error: | $E \leq \pm 0.5\%$ 2 A ... 1000 A<br>of the measured value + error of the clip-on CT's |
|--------------------|--|

#### Current transformers LEMflex 30 / 300 / 3000 A

|                    |   |
|--------------------|---|
| Measurement error: | $E \leq \pm 0.5\%$ 10 ... 100 % of range<br>of the measured value + error of the clip-on CT's |
|--------------------|---|

### Voltage measurement (U)

|                    |   |
|--------------------|---|
| Voltage range:     | 5 V ... 520 V   |
| Internal ranges:   | 5 V ... 65 V $\beta = 8$<br>65 V ... 130 V $\beta = 4$<br>130 V ... 260 V $\beta = 2$<br>260 V ... 520 V $\beta = 1$                    |
| Display range:     | 5.0000 ... 520.000 V  |
| Measurement error: | $E \leq \pm 0.02\%$ 30 V ... 520 V<br>of the measured value<br>$E \leq \pm 0.02\%$ 5 V ... 30 V<br>of the measurement range final value |

### Burden measurement

|                    |   |
|--------------------|---|
| Voltage range:     | 0 V ... 5 V   |
| Display range:     | 0.000 mV ... 5.000 V  |
| Measurement error: | $E \leq \pm 0.5\%$ 0.4 V ... 5 V<br>of the measured value<br>$E \leq \pm 1.0\%$ 0 V ... 0.4 V<br>of the measurement range final value |

### DC measurement

|                    | DC Current         | DC Voltage           |
|--------------------|--------------------|----------------------|
| Measurement range: | 0 ... ± 20 mA      | 0 ... ± 10 V         |
| Measurement error: | $E \leq \pm 1.0\%$ | $E \leq \pm 1.0\%$   |
| Display range      | 0.00 ... 20.00 mA  | 0.000 V ... 10.000 V |

### Power measurement (P, Q, S)

Power measurement per phase on range 30 ... 520 V. The accuracy of the power is related to apparent power

#### Measurement error direct (1 mA ... 12 A):

|   |   |
|---|---|
| Active, reactive, apparent power P, Q, S: | $E \leq \pm 0.02\%$ 4 mA ... 12 A<br>of the measured value<br>$E \leq \pm 0.02\%$ 1 mA ... 4 mA<br>of the measurement range final value |
|---|---|

#### Measurement error direct (10 mA ... 120 A):

|   |   |
|---|---|
| Active, reactive, apparent power P, Q, S: | $E \leq \pm 0.02\%$ 40 mA ... 120 A<br>of the measured value<br>$E \leq \pm 0.02\%$ 10 mA ... 40 mA<br>of the measurement range final value |
|---|---|

#### Measurement error with electronically compensated clip-on CT's (50 mA ... 100 A):

|   |   |
|---|---|
| Active, reactive, apparent power P, Q, S: | $E \leq \pm 0.2\%$ 500 mA ... 100 A<br>of the measured value<br>$E \leq \pm 0.5\%$ 50 mA ... 500 mA<br>of the measurement range final value |
|---|---|

#### Measurement error with clip-on CT's up to 1000 A:

|                 |  |
|-----------------|--|
| Active power P: | $E \leq \pm 0.2\%$ 50 A ... 1000 A<br>of the measured value<br>$E \leq \pm 0.5\%$ 2 A ... 50 A<br>of the measurement range final value |
|-----------------|--|

#### Measurement error with current transformers

##### LEMflex 30 / 300 / 3000 A:

|                 |  |
|-----------------|--|
| Active power P: | $E \leq \pm 2.0\%$ 10 ... 100 % of range<br>of the measured value<br>$E \leq \pm 3.0\%$ 3.33 ... 10 % of range<br>of the measurement range final value<br>6-digit for each measuring point |
|-----------------|--|

Display range:

### Energy measurement (W)

Connections and errors as under power measurement

### Power factor (PF)

$$PF = \frac{P}{S}$$

Measurement error direct:  
 $E \leq \pm 0.0002$

Measurement error with electronically compensated clip-on CT's:  
 $E \leq \pm 0.0002$

- 1.00000 ... + 1.00000

Display range:

### Phase angle display

Resolution: 0.01°

Accuracy:  $E \leq \pm 0.05^\circ$

### Frequency inputs 1-3

|                      |                         |
|----------------------|-------------------------|
| Input level:         | 4 ... 12 V (24V)        |
| Input frequency:     | max. 200 kHz            |
| Auxiliary voltage:   | 11 ... 13 V (I ≤ 60 mA) |
| Min. impulse length: | ≥ 1 μs                  |

### Frequency outputs 1-3 (fo)

Output level: 5 V TTL short-circuit-proof

Range 0.01 ... 100 A  $\Sigma C_P = 1'125 \text{ Imp./Wh}$

$$f_o = \frac{\Sigma P \cdot \Sigma C_P \cdot a \cdot b}{3600}$$

Output frequency:  $\alpha, \beta$  The factors of the highest current and voltage range reached are to be substituted here.

max. 58'500 Hz

Output frequency:

### Safety Requirements

- Isolation protection EN 61010-1
- CE-certified
- Degree of Protection: IP-40
- Storage Temp.: -20°C ... +55°C
- Relative humidity: ≤ 85% at Ta ≤ 21°C
- Relative humidity: ≤ 95% at Ta ≤ 25°C at 30 days/year: