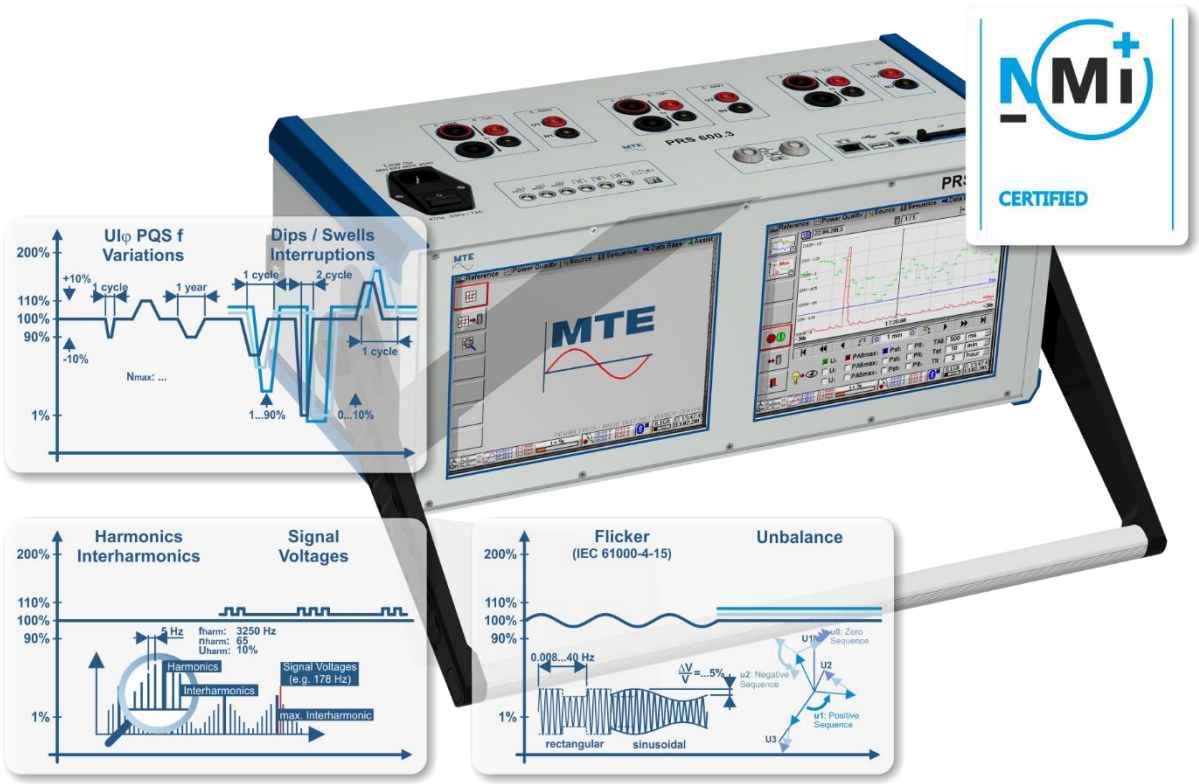
MTE Energy Systems & Services

PRS 600.3

Three-phase Portable Reference Standard and Power Quality Analyzer



The PRS 600.3 is a combination of a three-phase Portable Reference Standard of class 0.02% and an IEC 61000-4-30 Class A compatible Power Quality Analyzer with 3 voltage and 3 current channels. The device is equipped with two 8.4" colors TFT displays based on touch screen operation. The Reference Standard is used to test single and three phase meters, instrument transformers and installations on site.
The Power Quality Analyzer is used as reference for PQ test systems, to resolve disputes at contractual applications, for statistical surveys, including EN 50160 reporting, and for online troubleshooting of different kind of power quality problems.
The unit can be used with various types of clamp-on CTs and current and voltage sensors. Therefore, it is possible to easily and accurately test both CT/PT and direct connected meters.

Advantages

- Two instruments in one compact case
- Two large 8.4" (640 x 480 pixels) color TFT VGA displays with graphical user interface
- Data transfer and communication via 2 x USB (Type A and B) or 1 x ETHERNET
- Data storage on removable Compact Flash memory card
- Independent sets of UCT clamp-on CTs allow service, calibration or later purchase of clamp-on CTs without factory return of the device.

Measurement Inputs

- 3 voltage inputs U1, U2, U3
- 3 direct current inputs I1, I2, I3
- 2 universal UCT clamp-on CT current inputs for I1, I2, I3

WORKING STANDARD - Functions

- Meter testing of pulse outputs (LED/disc mark/S0) and registers of active, reactive, apparent 1- or 3-phase, 3- or 4-wire energy meters with 3 pulse inputs and 3 pulse outputs
- Measurement of electrical parameters (UI φ, PQS, f, PF) including vector diagram, harmonic analysis and wave form display.
- Instrument transformer testing (CT/PT burden, CT/PT ratio)

POWER QUALITY ANALYZER – Functions

in accordance with IEC 61000-4-30 Class A, IEC 62586-2, **certified by ISO/IEC 17025 accredited laboratory NMi Certin B. V.**

- Dips / Swells / Interruptions
- Harmonics / Interharmonics / Signal voltages
- Unbalance
- Under- and Overdeviation
- Rapid Voltage Changes RVC
- Flicker
- Transient capture ≥ 100µs (26.7 kHz)

Options

- Software CALegration
- GPS Time Synchronization (integrated, order with instrument)
- Set of 3 UCT120.3 clamp-on CT 120A (active error compensated)
- Set of 3 UCT 1000.3 clamp-on CT 1000A
- Set of 3 UCT LEM.3 flexible current probes FLEX 3000 (30/300/3000A)
- UCT AMP-LiteWire 3-phase adapter set for AmpLiteWire
- Primary current sensor AmpLiteWire 2000 A
- UCT VOLT-LiteWire 3-phase adapter set for VoltLiteWire
- Primary voltage sensor VoltLiteWire 40 kV

Technical Data PRS 600.3

General

Auxiliary supply:	88VAC$_{min}$ … 264 VAC$_{max}$
Power consumption:	max. 85 VA
Housing:	Hard Plastic
Dimensions:	W 510 x H 182.5 x D 227.5 mm
Weight:	approx. 10 kg
Operation temperature:	-10 °C ... +50 °C
Storage temperature:	-20 °C ... +60 °C
Relative humidity:	≤ 85% at Ta ≤ 21°C
	≤ 95% at Ta ≤ 25°C, 30 days / year spread
Safety	CE certified
Isolation protection:	IEC 61010-1:2010
Measurement Category:	300V CAT IV, 600V CAT III
Degree of protection:	IP-40

Measurement Range

Measuring Quantity	Range	Input / Sensor
Voltage (phase - neutral)	5 V … 520 V	U1, U2, U3
	10 mV … 5 V	U1 (Burden)
Current	1 mA … 12 A	12 A (I1, I2, I3)
	10 mA … 120 A	120 A (I1, I2, I3)
	10 mA … 120 A	UCT 120.3
	100 mA …1000 A	UCT 1000.3
	3 A …3000 A	FLEX 3000
Primary current	30 A …2000 A	AmpLiteWire 2000A
Primary voltage	500 V … 40 kV	VoltLiteWire 40kV

PORTABLE REFERNCE STANDARD

Measurement Accuracy

Voltage / Current		≤ ± E [%] [1 2 4 6]
Measuring Quantity	Range	**Cl. 0.02**
Voltage (U1, U2, U3, N)	30 V … 520 V	0.01
	5 V … 30 V	0.02
Current direct up to 12 A	60 mA … 12 A	0.01
	6 mA … 60 mA	0.02
	1 mA … 6 mA	0.02
Current direct up to 120 A	600 mA … 120 A	0.01
	60 mA … 600 mA	0.02
	10 mA … 60 mA	0.02
Current CT 120A UCT 120.3	100 mA … 120 A	0.2
	10 mA … 100 mA	0.2
Curr. CT 1000A UCT 1000.3	10 A …1000 A	0.2
	1 A … 10 A	1.0
Current FLEX 3000 UCT LEM.3	300 A …3000 A 30 A … 300 A 3 A … 30 A	0.1 + E_M
Burden Voltage (U1)	100 mV … 5 V	0.1
	10 mV … 100 mV	0.1
Current AmpLiteWire 2000A	300 A …2000 A	0.1 + E_M
	30 A … 300 A	0.1 + E_M
Voltage VoltLiteWire 40kV	10 kV … 40 kV	0.1 + E_M
Drift / year		≤ ± E [%] [1 2 5 6]
Measuring Quantity	Range	
Voltage (U-N)	30 V ... 520 V	0.004
Current direct up to 12 A	60 mA ... 12 A	0.004
Current direct up to 120 A	600 mA ... 120 A	0.004

Power / Energy Voltage: 30 V… 520 V (U - N)		≤ ± E [%] [1 2 3 6]
Measuring quantity / Input I	Range	**Cl. 0.02**
Active (P), Apparent (S) and Reactive (Q) Power / Energy		
Direct 12 A (I1, I2, I3)	60 mA … 12 A	0.015
	6 mA … 60 mA	0.02
	1 mA … 6 mA	0.02
Direct 120 A (I1, I2, I3)	600 mA … 120 A	0.015
	60 mA … 600 mA	0.02
	1 mA … 60 mA	0.02
Current CT 120A UCT 120.3	100 mA … 120 A	0.2
	10 mA … 100 mA	1.0
Curr. CT 1000A UCT 1000.3	10 A …1000 A	0.2
	1 A … 10 A	1.0
Drift / year		≤ ± E [%] [1 2 3 5 6]
Measuring Quantity	Range	
Power / Energy (PQS)	I direct	0.008

		≤ ± TC [%/°C] [3]
Temperature coefficient (TC):	Range	**Cl. 0.02**
	-10° C ... +15°C	0.0015
	+35° C ... +50°C	0.0015

Frequency / Phase Angle / Power Factor		≤ ± E
Measuring Quantity	Range	**Cl. 0.02**
Frequency (f)	40 Hz … 70 Hz	0.01 Hz
Phase Angle (φ)	0.00 °… 359.99°	0.01°
Power Factor (PF)	-1.000… +1.000	0.0002

CT/PT Ratio	≤ ± E [%][1 2]
Ratio error E: Sum of errors of inputs used for primary (IP, UP) and secondary (IS, US) measurements.	$E_P + E_S$

CT/PT Burden	≤ ± E[%] [1 2]
Operating burden Sn: Sum of errors of inputs used for voltage (U) and current (I) measurement.	$E_U + E_I$

Notes

[1] x.x :Related to the measuring value (at power / energy PF ≥ 0.5)
x.x :Related to the measuring range final value (full scale, FS),
E(M) = FS/M * x.x (e.g. 0.1 at FS =10 mA, E(2mA) = 10/2 * 0.1 = 0.5 %)

[2] Fundamental frequency in the range 45 … 66 Hz

[3] S: x.x, P,Q: x.x / PF (PF < 0.5, related to apparent power),
3- and 4-wire networks

[4] E_M: Accuracy specified by manufacturer of clamp-on CT or sensor

[5] Typical values, determined on the basis of monthly calibrations and calculated by least square method

[6] Valid in temperature range: +15°C ... +35°C

3 Pulse Inputs / outputs

Input level:	4 … 12 VDC (24 VDC)
Input frequency:	max. 200 kHz
Supply:	12 VDC (I < 60 mA)
Output level:	5V
Pulse length:	≥ 10µs
Meter constant: Active, Reactive, Apparent	C = C_0 / (In * Un) C_0=56'160'000 [imp/Wh(varh,VAh)] The meter constant depends on the highest selected internal ranges In, Un. Example: Un = 520V, In = 120 A) C = 900 [imp/Wh(varh,VAh)]
Output frequency: (e.g. Output 1)	CPZ_1 = C / 3'600 [imp/Ws(vars, VAs)] f_0 = CPZ_1 * PΣ(QΣ, SΣ) f_{max} = CPZ_1 * **3** * Un * In = 0.25 imp/Ws * **3** * 520V * 120A = 46'800 [imp/s] Factor **3** for 3-phase system

POWER QUALITY ANALYZER

Voltage	
Inputs	3
Accuracy class	■ 0.1%
Dips / Swells / Interruptions	■ $U_{RMS\,½}$
Harmonics	■ 2 … 64
Interharmonics	■ 1-2 … 63-64
Signal Voltages	■ fs < 3 kHz
Flicker P_{st}, P_{lt}	■ up to 40 Hz
Unbalance	■
Under- and Overdeviation	■
Rapid Voltage Changes RVC	■
Transients	● 0.8 kV/≥ 100 µs (26.7 kHz)
EN 50160	●
Current	
Inputs	3
Accuracy class	■ 0.1%
Inrush	■
Harmonics	■ 2 … 64
Interharmonics	■ 1-2 … 63-64
Unbalance	■
Transients	● ≥ 100 µs (26.7 kHz)
Power	
Active (P) / Reactive (Q) / Apparent (S)	●
Harmonics P, Q, S	●
Energy	●
Communication	
USB	●
ETHERNET	●
Other functions	
Removable Compact Flash card memory	●
GPS time synchronization (integrated)	○

Notes

■ Function according IEC 61000-4-30 Class A and IEC 62586-2, certified by ISO/IEC 17025 accredited laboratory NMi Certin B.V.

○ Option

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