

## PTS 3.3 *genX*

Three-phase, fully automatic test system with class 0.05 reference standard and integrated three-phase current and voltage source



The PTS 3.3 genX portable test system consists of an integrated three-phase current and voltage source unit and a three-phase electronic reference standard of accuracy class 0.05. Characteristic features of the PTS 3.3 genX are its wide measuring range, high accuracy and high tolerance to unwanted external influences.

The PTS 3.3 genX allows the monitoring of meter installations as well as analysis of the local mains conditions.

### Advantages

- Easy verification of meters under precise load conditions, using the built-in, compact, current and voltage source
- Automatic operation with predefined load points without the need for an external PC
- Large 9" (800 x 480 pixels) TFT touch screen colour display with graphical user interface
- Data transfer and communication via USB (Type B), ETHERNET or WLAN
- Built in web server for remote display of graphical user interface and remote control of the unit
- Data storage on removable SD memory card
- Two USB (type A) connectors for connection of peripherals like mouse, keyboard

### Functions

- Independent generation of single- or three-phase loading conditions for verification of meters
- Active, reactive and apparent energy measurement for three phase, 3 or 4-wire, systems with integrated error calculator with 2 pulse inputs (1 configurable as output)
- Vector diagram, harmonics spectrum, wave form and rotary field display for analysis of the mains conditions
- Burden measurement of Current Transformer (CT) and Potential Transformer (PT)
- Ratio testing of Current Transformers (CT)

### Options

- Software CALegration
- UCT 120.3 set of 3 clamp-on CT's 120 A
- UCT 1000.3 set of 3 clamp-on CT's 1000 A
- UCT LEM.3 set of 3 flexible current probes FLEX 3000 (30/300/3000A)
- UCT AMP-LiteWire 3-phase adapter set for AmpLiteWire + primary high voltage current sensor AmpLiteWire 2000 A
- UCT VOLT-LiteWire 3-phase adapter set for VoltLiteWire + primary voltage sensor VoltLiteWire 40 kV

# Technical Data PTS 3.3 genX

## General

Auxiliary power supply:	88 VACmin ... 264 VACmax / 47 ... 63 Hz Protection: Switch off supply at > 276 VAC
Power consumption:	max. 500 VA
Housing:	Hard Plastic
Dimensions:	W 470 x D 320 x H 253 mm
Weight:	approx. 23 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

Isolation protection:	IEC 61010-1:2010
Measurement Category:	300V CAT III, 600V CAT II
Degree of protection:	IP-40

## Power Source - Ranges

<b>Voltage Range</b>	30 V ... 480 V	
<b>Output power</b>	30 VA (per phase)	
	<b>Internal Ranges</b>	<b>S<sub>max</sub> / I<sub>max</sub></b>
	30 V ... 60 V	30 VA / 0.5 A
	60 V ... 120 V	30 VA / 0.25 A
	120 V ... 240 V	30 VA / 0.125 A
	240 V ... 480 V	30 VA / 0.0625 A
<b>Current Range</b>	1 mA ... 120 A	
<b>Output power</b>	60 VA (per phase)	
	<b>Internal Ranges</b>	<b>S<sub>max</sub> / U<sub>max</sub></b>
	1 mA ... 12 mA	60 mVA / 5 V
	12 mA ... 120 mA	600 mVA / 5 V
	120 mA ... 1.2 A	6 VA / 5 V
	1.2 A ... 12 A	60 VA / 5 V
	12 A ... 80 A	60 VA / 0.75 V
	80 A ... 120 A	60 VA / 0.5 V

## Power Source - Accuracy

<b>Resolution U, I</b>	0.01 % of end of internal range		
<b>Accuracy U, I</b>	≤ 0.1 % of end of internal range		
<b>Distortion Factor U, I</b>	≤ 0.25 % on linear load		
<b>Stability U, I</b>	≤ 0.03 % (30 min.) ≤ 0.1 % (1 h)		
<b>Load Regulation U, I</b>	≤ 0.01 % (from 0 % ... 100 % load)		
<b>Power Factor of Load</b>	0.5 cap - 1 - 0.1 ind		
<b>Bandwidth U, I</b>	30 Hz ... 3 kHz (-3 dB)		
<b>Efficiency U, I</b>	> 85 %		
	<b>Range</b>	<b>Accuracy</b>	<b>Resolution</b>
<b>Phase Angle</b>	-180° ..+180°	± 0.1°	0.01°
<b>Frequency</b>	40 Hz-70 Hz	± 0.01 Hz	0.01 Hz
<b>Mode Sync (to input voltage)</b>	40 Hz-70 Hz		

## Reference Standard - Measurement Ranges

<b>Measuring Quantity</b>	<b>Range</b>	<b>Input / Sensor</b>
<b>Voltage (phase - neutral)</b>	5 V ... 500 V	U1, U2, U3
	10 mV ... 5 V	U1, U2, U3 (Burden)
<b>Current</b>	1 mA ... 12 A	12 A (I1, I2, I3)
	1 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

## Reference Standard - Measurement Accuracy

<b>Voltage / Current</b>		≤ ± E [%] <sup>1 2 4</sup>
<b>Measuring Quantity</b>	<b>Range</b>	<b>Class 0.05</b>
<b>Voltage (U1, U2, U3, N)</b>	30 V ... 500 V	0.05
	5 V ... 30 V	0.1
<b>Current direct 12 A / 120 A</b>	10 mA ... 120 A	0.05
	1 mA ... 10 mA	0.1
<b>Current CT 120A UCT 120.3</b>	100 mA ... 120 A	0.2
	10 mA ... 100 mA	1.0
<b>Current CT 1000A UCT 1000.3</b>	10 A ... 1000 A	0.2
	1 A ... 10 A	1.0
<b>Current FLEX 3000 UCT LEM.3</b>	300 A ... 3000 A	0.1 + E <sub>M</sub>
	30 A ... 300 A	
	3 A ... 30 A	
<b>Burden Voltage (U1)</b>	500 mV ... 5 V	0.5
	10 mV ... 500 mV	0.5

<b>Power / Energy</b>	Voltage: 30 V ... 500 V (U - N)	≤ ± E [%] <sup>1 2 3</sup>
<b>Measuring quantity / Input I</b>	<b>Range</b>	<b>Class 0.05</b>
<b>Active (P), Apparent (S) and Reactive (Q) Power / Energy</b>		
<b>Direct 12 A / 120 A (I1, I2, I3)</b>	10 mA ... 120 A	0.05
	1 mA ... 10 mA	0.1
<b>Current CT 120A UCT 120.3</b>	100 mA ... 120 A	0.2
	10 mA ... 100 mA	1.0
<b>Current CT 1000A UCT 1000.3</b>	10 A ... 1000 A	0.2
	1 A ... 10 A	1.0

Influence of external magnetic fields (45 Hz ... 66 Hz): ≤ 0.07 % / 0.5 mT<sup>3</sup>

<b>Temperature coefficient (TC):</b>	<b>Range</b>	≤ ± TC [%/°C] <sup>3</sup>
	0° C ... +40°C	0.005
	-10° C ... +50°C	0.008

<b>Frequency / Phase Angle / Power Factor</b>		≤ ± E
<b>Measuring Quantity</b>	<b>Range</b>	<b>Class 0.05</b>
<b>Frequency (f)</b>	40 Hz ... 70 Hz	0.01 Hz
<b>Phase Angle (φ)</b>	0.00 ° ... 359.99°	0.1°
<b>Power Factor (PF)</b>	-1.000 ... +1.000	0.002

<b>CT/PT Ratio</b>	≤ ± E [%] <sup>1 2</sup>
<b>Ratio error E:</b> Sum of errors of inputs used for primary (IP, UP) and secondary (IS, US) measurements.	E <sub>P</sub> + E <sub>S</sub>

<b>CT/PT Burden</b>	≤ ± E [%] <sup>1 2</sup>
<b>Operating burden S<sub>n</sub>:</b> Sum of errors of inputs used for voltage (U) and current (I) measurement.	E <sub>U</sub> + E <sub>I</sub>

## Notes

- x.x : Related to the measuring value  
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E(M) = FS/M \* x.x (e.g. 0.1 at FS = 120 mA, E(20mA) = 120/20 \* 0.1 = 0.5 %)
- Fundamental frequency in the range 45 ... 66 Hz
- S: x.x, P, Q: x.x / PF (related to apparent power), 3- and 4-wire networks
- E<sub>M</sub>: Accuracy specified by manufacturer of clamp-on CT or sensor
- Typical values, determined on the basis of monthly calibrations and calculated by least square method

## Pulse Input / output

<b>Input level:</b>	4 ... 12 VDC (24 VDC)			
<b>Input frequency:</b>	max. 200 kHz			
<b>Supply:</b>	12 VDC (I < 60 mA)			
<b>Output level:</b>	5V			
<b>Pulse length:</b>	≥ 8μs			
<b>Meter constant:</b> Active, Reactive, Apparent	C = C <sub>0</sub> / (ln * Un) C <sub>0</sub> = 60'000'000 [imp/Wh(varh, VAh)] The meter constant depends on the highest selected internal ranges In, Un. The actual constant CPZ <sub>1</sub> with unit [imp/Ws (vars, VAs)] is indicated on the display at frequency output.			
	<b>Internal current ranges In [A]</b>			
<b>Direct 12/120 A (I1, I2, I3)</b>	0.004	0.012	0.04	0.12
	0.4	1.2	4	12
	40	80	120	
<b>Current CT 120A UCT 120.3</b>	0.12	1.2	12	120
<b>Current CT 1000A UCT 1000.3</b>	1	10	100	1000
<b>FLEX 3000 UCT LEM.3</b>	30	300	3000	
	<b>Internal voltage ranges Un [V]</b>			
<b>Burden U1, U2, U3</b>	0.5	5		
<b>Direct U1, U2, U3</b>	60	120	240	480
	Example: Un = 240 V, In = 12 A C = 20'833 [imp/Wh(varh, VAh)]			
<b>Output frequency:</b>	CPZ <sub>1</sub> = C / 3'600 [imp/Ws(vars, VAs)] f <sub>0</sub> = CPZ <sub>1</sub> * PΣ(QΣ, SΣ) f <sub>max</sub> = CPZ <sub>1</sub> * 3 * Un * In = 5.78704 imp/Ws * 3 * 240V * 12A = 50'000 [imp/s] Factor 3 for 3-phase system			