The PTS 2.3 C portable test system consists of an integrated three-phase current source unit and a three-phase electronic reference standard of accuracy class 0.1. Characteristic features of the PTS 2.3 C are its wide measuring range, high accuracy and high tolerance to unwanted external influences.

The PTS 2.3 C 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 source
- Automatic operation with predefined load points without the need for an external PC
- Exchangeable Compact Flash (CF) memory card for measurement results and customer data
- Display of vector diagram and phase sequence for analysis of the supply conditions
- User-friendly system for data input and operation of combined source and reference meter
- The system may be used either as a stand-alone reference standard meter, or together with the integrated power source

**Functions**
- Independent generation of single or three-phase current loading conditions for verification of meters using the incoming supply voltage
- Active, reactive and apparent energy measurement for three phase, 3 or 4-wire, systems with integrated error calculator and pulse 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)

**Application**
- On site meter measurements
- Verification of energy registration
- Verification of the circuit load conditions

**Options**
- Software CALegration
- Error compensated clip-on CT’s up to 100 A
- Clip-on CT’s up to 1000 A
- Flexible current transformers FLEX 3000 up to 3000 A
Technical Data PTS 2.3 C

General

Auxiliary voltage: 88 VACmin ... 264 VACmax 47 ... 63 Hz
Power consumption: 320 VAmax
Dimensions: W 430 x D 218 x H 250 mm
Weight: approx. 13.5 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 61010-1:2002
Measurement Category: 300 V CAT III, 600 V CAT II
Degree of protection: IP-20

Current Source

Range (per phase): 1 mA ... 120 A
Output power (per phase): 60 VA
Internal ranges (Smax / Umax):
10 A ... 120 A (60 VA / 0.5 V)
1 A ... 10 A (25 VA / 2.5 V)
1 mA ... 1 A (10 VA / 10 V)

Distortion factor: ≤ 0.8 %
Resolution: min. 1 mA
Accuracy: 0.5 % (45 Hz … 100 Hz)
Stability: 0.03 % (30 min) / 0.1 % (1 h)
Bandwidth: 30 ... 1'000 Hz (3 dB)
Phase angle:
-180.0 ° ... +180.0 °
Resolution:
0.1 ° (45 ... 100 Hz) / 1 ° (>100 Hz)

Reference Standard - Measurement Range

Measuring Quantity | Range | Input / Sensor
--- | --- | ---
Voltage (phase - neutral) | 5 V ... 500 V | L1, L2, L3, N
20 mV ... 5 V | L1, N (CT Burden)
Current | 1 mA ... 12 A | 1A/10A (I1, I2, I3)
10 mA ... 120 A | 100A (I1, I2, I3)
10 mA ... 100 A | Clamp-on CT 100A
100 mA ... 1000 A | Clamp-on CT 1000A
3 A ... 3000 A | FLEX 3000

Reference Standard - Measurement Accuracy

Measuring Quantity | Range | ≤ ± E [%] 1 2 1 2
--- | --- | ---
Voltage | 5 V ... 500 V | L1, L2, L3, N
Current | 30 V ... 500 V | L1, L2, L3, N
5 V ... 30 V | 0.1
Current direct 1A/10A, 100A | 120 mA ... 120 A | 0.1
1 mA ... 120 mA | 0.2
Current clamp-on CT 100A | 100 mA ... 1000 A | 0.2
Current clamp-on CT 1000A | 20 A ... 1000 A | 0.2
Current FLEX 3000 | 300 A ... 3000 A | 0.5 + EM
30 A ... 300 A | 0.5
3 A ... 30 A | 0.5

Burden Voltage(L1,N) | 500 mV ... 5 V | 0.5
20 mV ... 500 mV | 0.5

Power / Energy | Voltage: 30 V ... 500 V (L-N) | ≤ ± E [%] 1 2 1 2
--- | --- | ---
Measuring Quantity | Input / Range | Class 0.1
Active (P), Apparent (S) Power / Energy | Direct 1A/10A or 120A | 0.1
120 mA ... 120 A | 0.1
1 mA ... 120 mA | 0.2
Clamp-on CT100A | 100 mA ... 100 A | 0.2
Clamp-on CT1000A | 20 A ... 1000 A | 0.2

Reactive (Q) Power / Energy | Direct 1A/10A or 120A | 0.2
120 mA ... 120 A | 0.2
1 mA ... 120 mA | 0.2
Clamp-on CT 100A | 100 mA ... 100 A | 0.4
Clamp-on CT1000A | 20 A ... 1000 A | 0.4
Drift / year at Power / Energy (PQS) (I direct) | 0.03

Notes

1. x.x: Related to the measuring value
x.x: Related to the measuring range final value (full scale, FS),
\[ E(M) = F/S/M \times x.x \ (e.g. 0.1, FS = 120 mA: E(20mA) = 120/20*0.1 = 0.6 \% ) \]
2. Fundamental frequency in the range 45 ... 66 Hz
3. x: x, P, Q: x.x / PF (related to apparent power), 3- and 4-wire networks
4. EU: Accuracy specified by manufacturer of clamp-on CT or sensor
5. E[%]: Accuracy of ratio E;
6. CF: Accuracy of ratio E: [imp/Wh(varh,VAh)]

Influence of external magnetic fields (45 Hz … 66 Hz):
≤ 0.07 % / 0.5 mT 3

Temperature coefficient (TC):
Range | Class 0.1
--- | ---
0°C ... +40°C | 0.005
-10°C ... +50°C | 0.008

CT Burden | ≤ ± E [%] 1 2 5
--- | ---
I (I1, I2, I3) | U (L1, N)
120 mA ... 120 A | 500 mV ... 5 V | 0.6
120 mA ... 120 A | 20 mV ... 500 mV | 0.1 ± 0.5

PT Burden | ≤ ± E [%] 1 2 5
--- | ---
I (I1, I2, I3) | U (L1, L2, L3, N)
120 mA ... 120 A | 30 V ... 500 V | 0.2
1 mA ... 120 A | 30 V ... 500 V | 0.1 ± 0.1

CT Ratio | ≤ ± E [%] / Δϕ [%] 1 2 6
--- | ---
IP - Input / Range | IS (I1, I2, I3)
Clamp-on CT 100A | 100 mA ... 100 A
120 mA ... 120 A | 0.3 / 0.3
100 mA ... 100 A | 1 mA ... 120 mA | 0.2 / 0.1 ±
Clamp-on CT 1000A | 20 A ... 1000 A
120 mA ... 120 A | 0.3 / 0.3
20 A ... 1000 A | 1 mA ... 120 mA | 0.2 / 0.1 ±
FLEX 3000 | 300 A ... 3000 A
120 mA ... 120 A | 0.6 ± EU / ±
30 A ... 300 A | 1 mA ... 120 mA | 0.5 ± EU / ±
3 A ... 30 A | 1 mA ... 120 mA | 0.5 ± EU / ±

Frequency / Phase Angle / Power Factor | ≤ ± E [%] 
--- | ---
Measuring Quantity | Range
Frequency (f) | 40 Hz ... 70 Hz | 0.01 Hz
Phase Angle (ϕ) | 0.00 ° ... 359.99 ° | 0.1 °
Power Factor (PF) | -1.000 ... +1.000 | 0.002

Pulse Input

Suitable for scanning head type SH 2003
Input level: 4 ... 12 VDC (24 VDC)
Input frequency: max 200 kHz
Input supply: 12 VDC (I < 60 mA)

Pulse Output

Output level: 5V
Pulse length: ≥ 10μs
Meter constant
Active, Reactive, Apparent
\[ (\text{impWh(varh,VAh)}) \]
The meter constant depends on the highest selected internal ranges of In, Un.

Internal current ranges In [A]
Direct I1, I2, I3 | 0.12 | 1.2
120 | 120
Clamp-on CT 100A | 0.10 | 1.0
10 | 120
Clamp-on CT 1000A | 1.0 | 10
100 | 1000

Internal voltage ranges Un [V]
Direct L1, L2, L3, N | 250 | 500