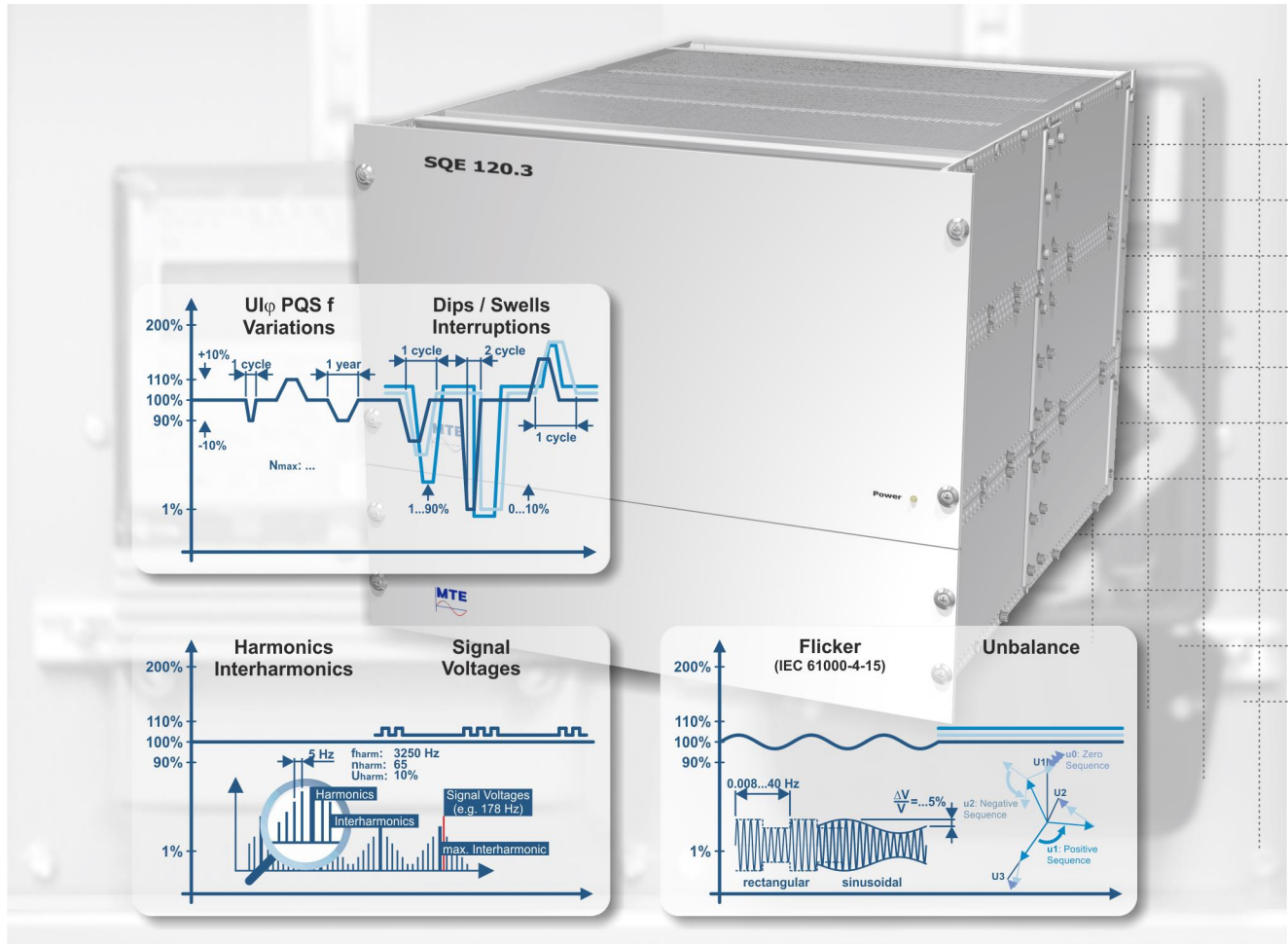


## SQE 120.3

### Three-phase power source with power quality signal generation

The SQE 120.3 is a further development of the SPE 120.3 with increased short term stability and integrated power quality test functions. The computer controlled power source can simulate any 2-, 3- or 4-wire system (IEC or ANSI) with symmetrical or asymmetrical conditions, combined with different types of power quality test signals.



The SQE 120.3 is especially appropriate for test laboratories to perform compliance, acceptance or type test of electricity meters and different types of power, energy and power quality measurement devices, following the existing (IEC 61000-4-30, EN 50160) and the new (IEC 62586-1,2) power quality standards.

#### 3-Phase Power Source for Meter Test Systems

- Voltage U: 3 x 0 V ... 480 V (L-N) / 600 VA ( $\leq 0.05\%$ )
- Current I: 3 x 0 A ... 120 A / 600 VA ( $\leq 0.05\%$ )
- Phase angle  $\varphi$ : 3 x 0.00 ... 359.99° ( $\leq 0.1^\circ$ )
- Frequency f (fundamental): 40 ... 400 Hz ( $\leq 0.01$  Hz) (40 ... 70 Hz synchronized to supply voltage)
- Stability (fulfills Chinese standard JJG 597-2005):
  - 1 h: U, I:  $\leq 0.005\%$  (time base: 150s)
  - P:  $\leq 0.01\%$  (time base: 150s)
  - 2 min: P:  $\leq 0.015\%$  (time base: 1 - 1.5s)

#### Communication

The SQE 120.3 is controlled with a PC with the test system software CALegration via one of the interfaces:

- Ethernet (RJ45)
- USB 2.0 (Type B)

#### Generation of Power Quality Test Signals

- Phase synchronisation / control / regulation
  - Voltage variations
  - Dips/Swells/Interruptions
  - Flicker (IEC 61000-4-15)
- Interharmonics superposition
- Power Quality Signal Stream
- PQ Command Set
- GPS time synchronisation (Option)

#### Synchronisation Pulse Outputs / Inputs

Events (dips, swells, interruptions) may be precisely time stamped (start time, end time) for synchronisation.

- 3 Outputs (5 V / BNC):
  - Trigger Output (dip / swell)
  - Sample Ref Output (scanning / sampling)
  - Phase Ref Output (zero crossing)
- 3 Inputs (5 ... 24 V / BNC):
  - Trigger Inputs (dip / swell)
  - Delay: 0 ... 60s  $\pm$  30  $\mu$ s

## Technical Data SQE 120.3

### GENERAL

Supply voltage	3 x 88 / 152 VACmin ... 264 / 457 VACmax, 47 ... 63 Hz
Power consumption:	< 4.3 kW (PFC Power Factor Correction)
Power efficiency	> 85 % at full load
Housing:	19"-plug-in unit, 9HU
Dimensions:	W 485 x H 400 x D 600 mm
Weight:	approx. 70 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

<b>Safety</b>	CE certified
Isolation protection:	IEC 61010-1:2001
Measurement Category:	300 V CAT III, 600 V CAT II
Degree of protection:	IP-20

### POWER SOURCE

#### Voltage

Range (phase - neutral):	0 V ... 480 V										
Output power (per phase):	600 VA										
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0 V ... 75 V	600 (117 V / 12.4 A)										
Resolution:	0.01 % <sup>1</sup>										
Accuracy	≤ 0.05 % (typical < 0.02 %) <sup>1</sup>										
Distortion factor:	≤ 0.5 % (typical < 0.3 %) <sup>2</sup>										
Load regulation:	≤ 0.01 % (from 0 % – 100 % load)										
Power factor of the load:	0.5 cap. – 1 – 0.2 ind.										

#### Current

Range (phase - neutral):	0 A ... 120 A														
Output power (per phase):	600 VA														
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Accuracy	≤ 0.05 % (typical < 0.02 %) <sup>1</sup>														
Distortion factor:	≤ 0.5 % (typical < 0.3 %) <sup>2</sup>														
Load regulation:	≤ 0.01 % (from 0 % – 100 % load)														
Power factor of the load:	1 – 0.1 ind.														

#### Phase angle

Range:	0.00 ° - 359.99 °
Resolution:	0.01 °
Accuracy:	≤ 0.1 ° (typical < 0.05 °)

#### Frequency

Fundamental	Mode NUM: 45 Hz ... 65 Hz (Option: 15 Hz ... 400 Hz) Mode LINE: 40 Hz ... 70 Hz synchronized to supply voltage
Resolution:	0.01 Hz
Accuracy:	≤ 0.01 Hz
Stability:	0.001 Hz

#### Stability

Duration 1 h:	U,I: ≤ 0.005 % (time base: 150s) P: ≤ 0.01% (time base: 150s)
Duration 2 min:	P: ≤ 0.015 % (time base: 1 - 1.5s) fulfills Chinese standard JJJ 597-2005

## POWER QUALITY SIGNALS

### Power Frequency

Range	Accuracy	Time base / Interval
42.5 Hz ... 69 Hz	0.01 Hz	10 s

### Magnitude of Voltage, Current

Range	Accuracy	Time base / Interval
U: 5 V ... 480 V <sup>4</sup> 10 % ... 200 % U <sub>din</sub> <sup>3</sup>	U: 0.1 % of U <sub>din</sub> <sup>3</sup> within 10 .. 15 % U <sub>din</sub>	10 cyc (50 Hz) / 200 ms 12 cyc (60 Hz) / 200 ms
I: 0 A ... 120 A <sup>4</sup>	I: 0.1 % <sup>1</sup>	

### Harmonics / Interharmonics of Voltage, Current

Range	Accuracy	Time base / Interval
<b>Harmonics U, I</b> <sup>4</sup>		
1 Harmonic <sup>6</sup>	U Harmonics: ≥ 1 % Un: ± 5 % < 1 % Un: ± 0.05 % <sup>1</sup>	10 cyc (50 Hz) / 200 ms 12 cyc (60 Hz) / 200 ms
Hn	Range	
2 ... 8	max. 100 %	
9 ... 30	max. 40 %	
31 ... 64	max. 10 %	
2 ... 8 Harmonics <sup>6</sup> Sum of all: max. 40 %	< 1 % In: ± 0.05 % <sup>1</sup>	
<b>Interharmonics U, I</b> <sup>4</sup>		
1 Interharmonic <sup>6</sup>	U Interharmonics: ≥ 3 % Un: ± 5 % < 3 % Un: ± 0.15 % <sup>1</sup>	10 cyc (50 Hz) / 200 ms 12 cyc (60 Hz) / 200 ms
f [Hz]	Range	
40 - 400	max 100 %	
- 1'500	max. 40 %	
- 3'000	max. 10 %	
2 .. 4 Interharmonics <sup>6</sup> Sum of all: max. 40 %	< 3 % In: ± 0.15 % <sup>1</sup>	

### Flicker

Range	Accuracy	Time base / Interval
0 Pst ... 10 Pst <sup>4</sup> Rectangular, sinusoidal: 0 .. 5 % ΔU/U, 0 .. 40 Hz	5 % on test points acc. IEC 61000-4-15	10 min

### Unbalance of Voltage

Range	Accuracy	Time base / Interval
0 ... 5 % u0 0 ... 5 % u2 applies only on 3-phase systems	0.15 % absolute within: 1 ... 5 % u0 1 ... 5 % u2	10 cyc (50 Hz) / 200 ms 12 cyc (60 Hz) / 200 ms

### Mains Signalling Voltage (Ripple Control Signal)

Range	Accuracy	Time base / Interval
Signalling Voltage <sup>4</sup>	Amplitude	10 cyc (50 Hz) / 200 ms
f [Hz]	Amplitude	12 cyc (60 Hz) / 200 ms
40 - 400	max 100 %	
- 1'500	max. 40 %	
- 3'000	max. 10 %	
	3 .. 15 % of U <sub>din</sub> <sup>3</sup> : ± 5 % 1 .. 3 % of U <sub>din</sub> : ± 0.15 % U <sub>din</sub>	

### Dips and Swells of Voltage / Inrush Current

Range	Accuracy	Time base / Interval
Amplitude Urms(1/2): 0.5 V ... 480 V <sup>4</sup> (1 % U <sub>din</sub> )	Amplitude Urms(1/2): 0.2 % of U <sub>din</sub> <sup>3</sup>	Urms(1/2), Irms(1/2) (sliding)
Amplitude Irms(1/2): max. 100 % of In <sup>4</sup>	Amplitude Irms(1/2): 0.5 %	
Duration U, I: 1 cyc – 10 min <sup>4,5</sup>	Duration U, I: 1 cyc	

### Interruptions of Voltage

Range	Accuracy	Time base / Interval
Amplitude Urms(1/2): 0 V ... 24 V <sup>4</sup> (<1 % ... <10 % U <sub>din</sub> <sup>3</sup> )		Urms(1/2) (sliding)
Duration: 1 cyc – 10 min <sup>4,5</sup>	Duration: 1 cyc	

#### Notes

- <sup>1</sup> related to the internal range (Un, In) final value (Full Scale, FS)
- <sup>2</sup> at linear load, sinusoidal signals
- <sup>3</sup> declared input voltage U<sub>din</sub>: 57.7, 63.5, 220, 230, 240 V (L-N)
- <sup>4</sup> individual per phase
- <sup>5</sup> variable start point of event in relation to zero crossing of fundamental: ±180° (Resolution: 1°)
- <sup>6</sup> for single frequency harmonics, interharmonics under steady-state conditions