EN 50160 Report

Company

Name	
Company	
Address	
Phone	
Email	

Client

Name	
Company	
Address	
Phone	
Email	

Measurement

Objective	
Site description	
Start time	22/08/2016 10:30:00.000
Stop time	29/08/2016 10:29:59.999
Duration	6 days 23 h 59 m 59 s 999 ms
Interval	10 minutes
Connection	Three phase four wire
Nominal voltage	230.00 V
Nominal frequency	50.00 Hz
System type	Systems with synchronous connection
Include flagged data	Included
Effective measurement period	100.00 %
EN 50160 Limits	LV
Operating conditions	Normal

Instrument

Instrument name	Power Master
Instrument model	MI 2892

Manufacturer	Metrel d.d.
Serial Number	14050468
Firmware version	1.0.2570
Operater name	shmulik
Current clamps	A1227 (30.00 A/V), Clamp measuring range (30.00 A), Instrument measuring range (100 % of Clamp measuring range), Current transformer ratio: 5.00 A : 5.00 A
Additional equipment	

EN50160 Compliance summary

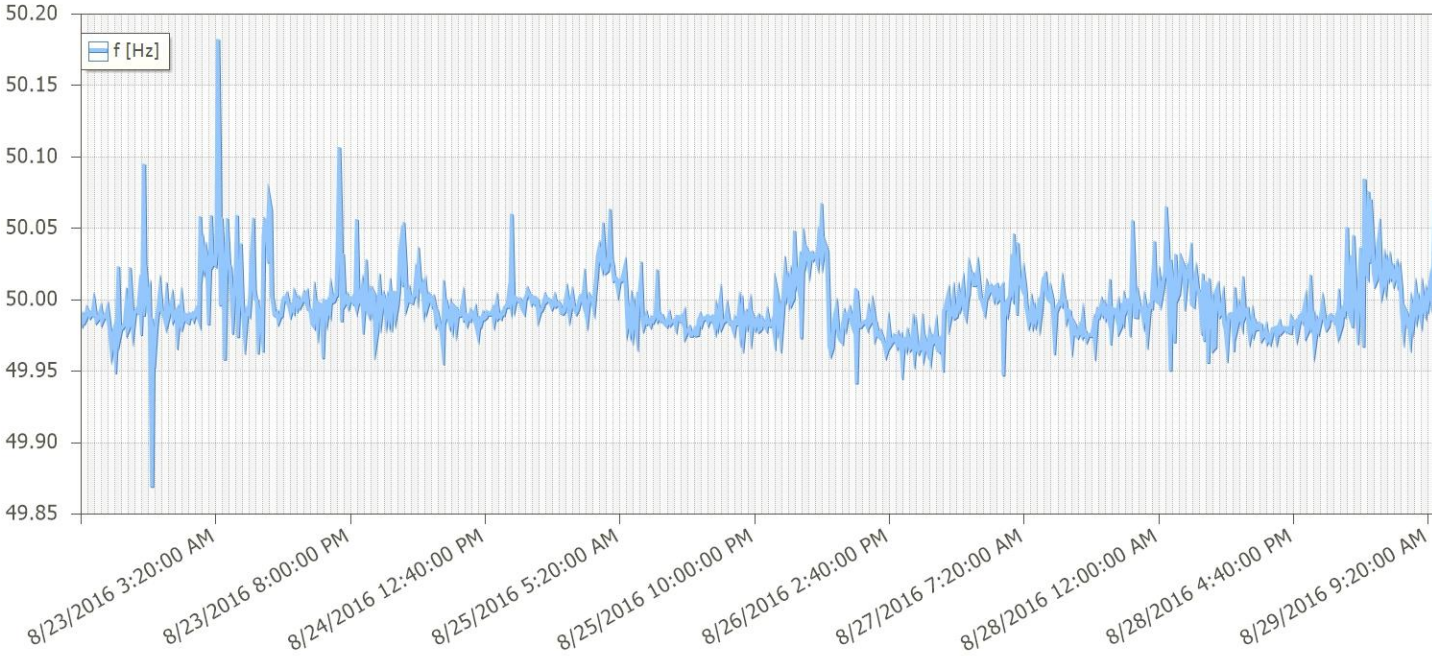
Power frequency	Passed
Supply Voltage Variations	Passed
Flicker Severity	Passed
Voltage Unbalance	Passed
Harmonic Voltages	Failed
Interharmonic Voltages	Measured
Signalling	Failed
Dips	1
Interruptions	1
Swells	0

EN 50160 Report

Power frequency

Nominal frequency	50.00 Hz
Measured quantity	Mean value of the fundamental frequency measured over 10 seconds (f_{10s})
Criteria	Systems with synchronous connection
EN 50160 standard	Section 4.2.1

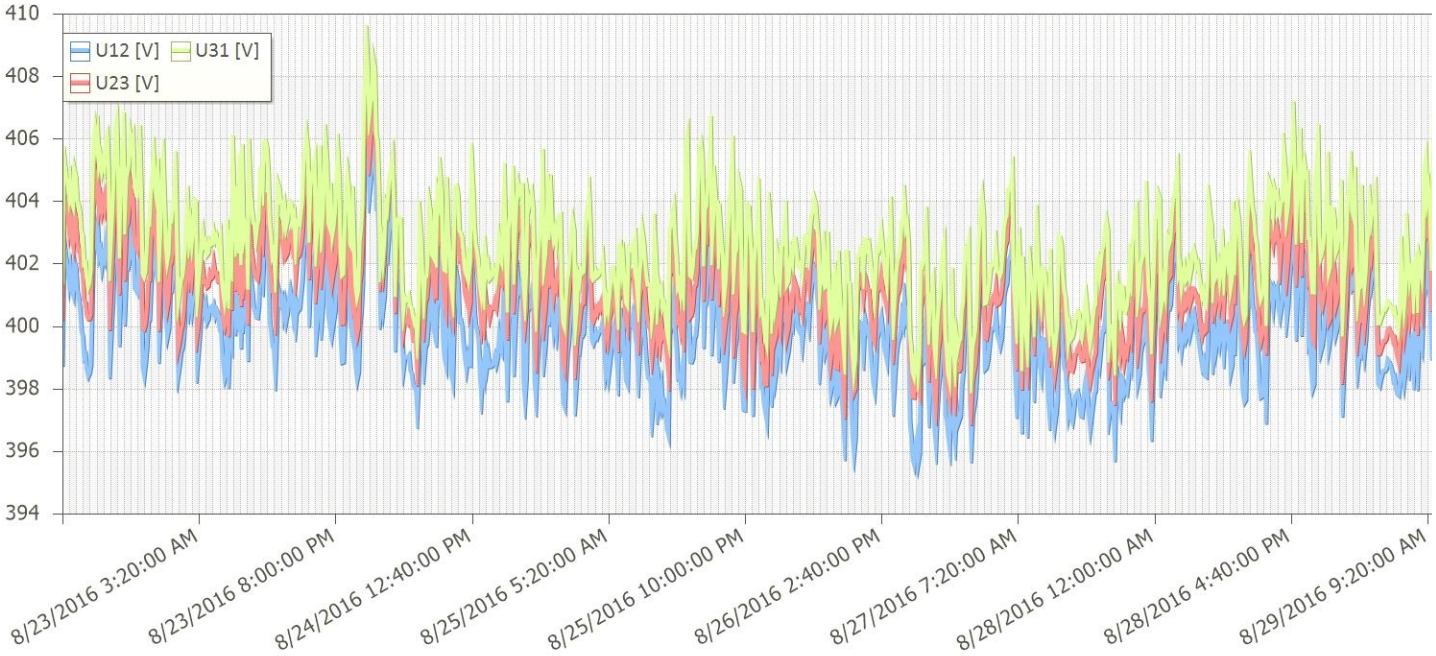
Requirements		Measured	Status
49.50 – 50.50 Hz	99.50 % of interval (week)	49.91 – 50.09 Hz	Passed
47.00 – 52.00 Hz	100.00 % of interval (week)	49.38 – 50.21 Hz	Passed



Supply Voltage Variations

Nominal voltage	230.00 V
Measured quantity	10 minutes mean RMS value Urms
Criteria	Systems with synchronous connection
EN 50160 standard	Section 4.2.1

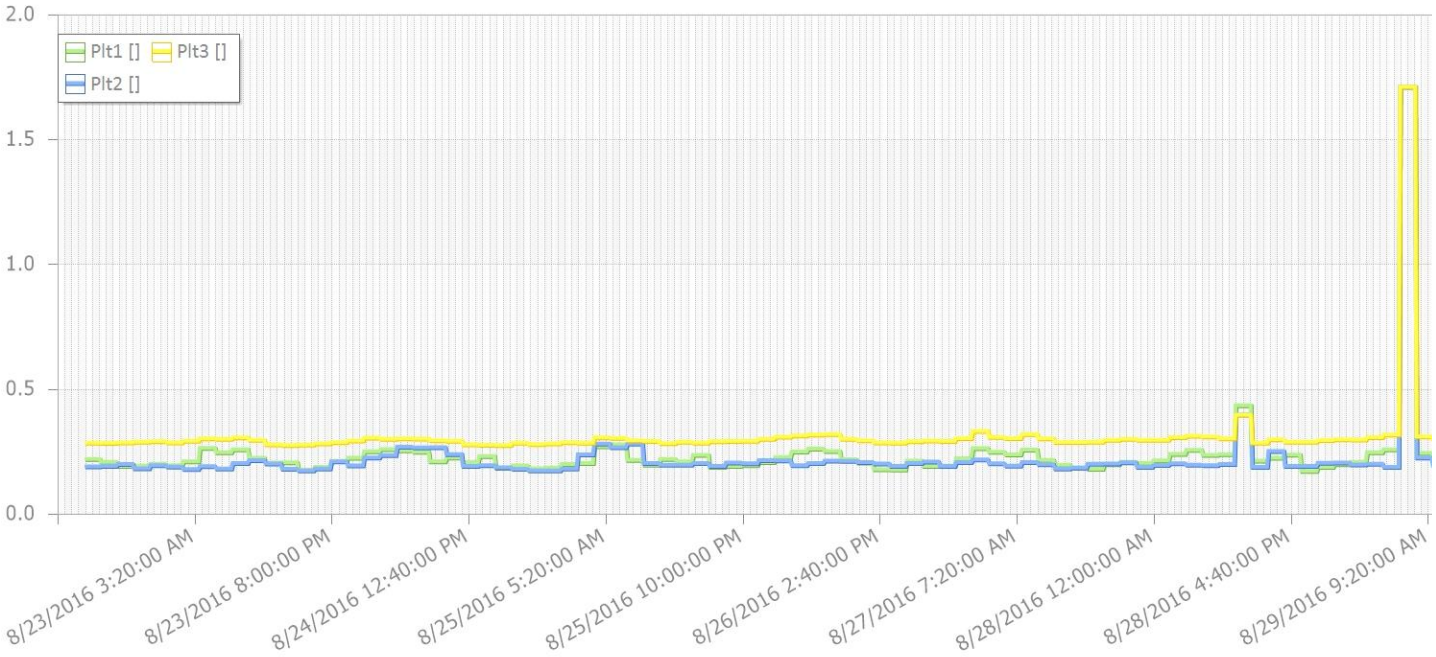
Requirements		Measured	Status
207.00 – 253.00 V	99.00 % of interval (week)	227.84 – 235.49 V	Passed
195.50 – 253.00 V	100.00 % of interval (week)	227.84 – 236.96 V	Passed



Flicker Severity

Measured quantity	Long term flicker severity (P_{lt})
EN 50160 standard	Section 4.2.3.2
Operating conditions	Normal

Requirements		Measured	Status
Plt < 1	95.00 % of interval (week)	0.17 – 0.32	Passed

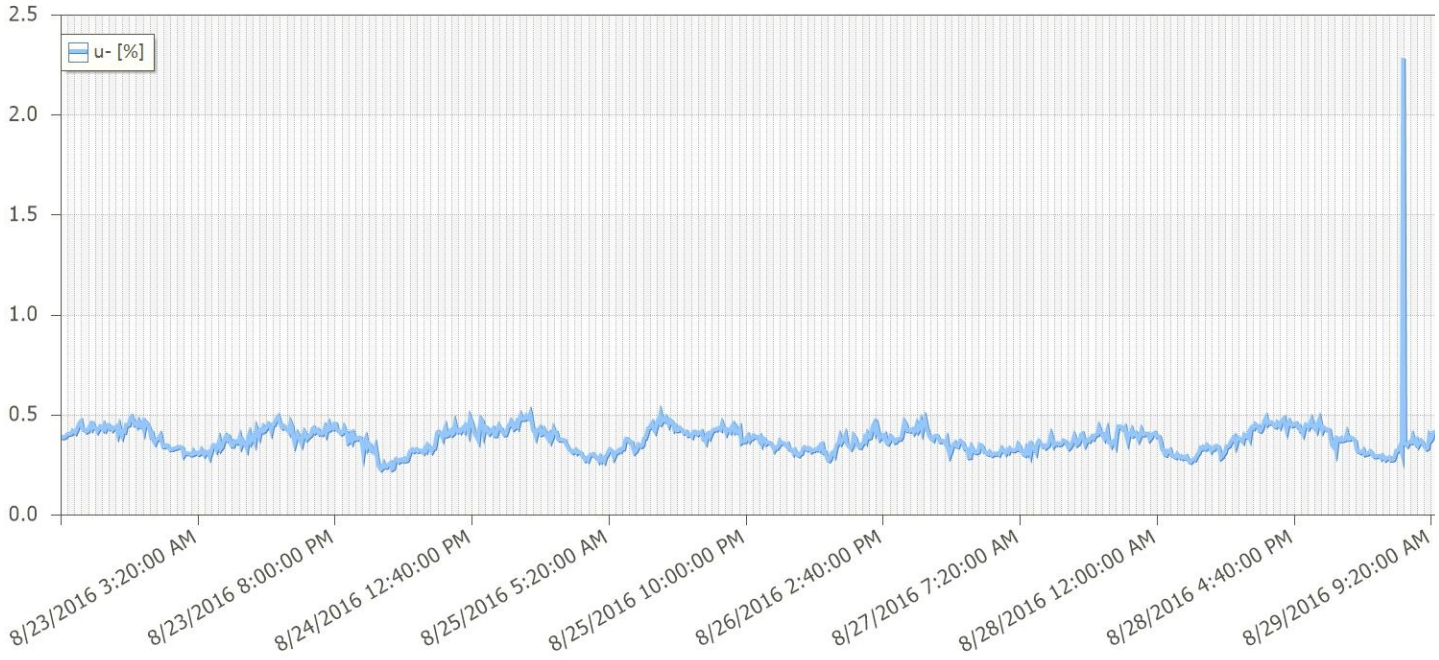


Voltage Unbalance

Measured quantity	10 minutes mean RMS values of the negative sequence ratio u-
EN 50160 standard	Section 4.2.4

Operating conditions	Normal

Requirements		Measured	Status
u- < 2.00 %	95.00 % of interval (week)	0.22 – 0.46 %	Passed



Harmonics voltage

Measured quantity	10 minutes mean RMS values of the harmonic and total harmonic distortion
EN 50160 standard	Section 4.2.5
Operating conditions	Normal

		L1		L2		L3	
Harmonic	Requirement	Measured	Status	Measured	Status	Measured	Status
THD	< 8.00 %	2.64 %	Passed	2.82 %	Passed	2.97 %	Passed
2	< 2.00 %	0.04 %	Passed	0.04 %	Passed	0.04 %	Passed
3	< 5.00 %	0.90 %	Passed	1.02 %	Passed	1.04 %	Passed
4	< 1.00 %	0.04 %	Passed	0.03 %	Passed	0.03 %	Passed
5	< 6.00 %	1.55 %	Passed	1.24 %	Passed	1.25 %	Passed
6	< 0.50 %	0.04 %	Passed	0.03 %	Passed	0.03 %	Passed
7	< 5.00 %	0.82 %	Passed	0.77 %	Passed	0.67 %	Passed
8	< 0.50 %	0.04 %	Passed	0.03 %	Passed	0.03 %	Passed
9	< 1.50 %	0.87 %	Passed	1.01 %	Passed	0.88 %	Passed
10	< 0.50 %	0.03 %	Passed	0.03 %	Passed	0.03 %	Passed
11	< 3.50 %	0.62 %	Passed	0.65 %	Passed	0.54 %	Passed

12	< 0.50 %	0.03 %	Passed	0.03 %	Passed	0.03 %	Passed
13	< 3.00 %	0.98 %	Passed	0.97 %	Passed	1.13 %	Passed
14	< 0.50 %	0.03 %	Passed	0.04 %	Passed	0.03 %	Passed
15	< 0.50 %	0.67 %	Failed	0.59 %	Failed	0.71 %	Failed
16	< 0.50 %	0.03 %	Passed	0.03 %	Passed	0.02 %	Passed
17	< 2.00 %	1.14 %	Passed	0.94 %	Passed	0.91 %	Passed
18	< 0.50 %	0.03 %	Passed	0.03 %	Passed	0.03 %	Passed
19	< 1.50 %	0.90 %	Passed	1.00 %	Passed	1.40 %	Passed
20	< 0.50 %	0.04 %	Passed	0.04 %	Passed	0.03 %	Passed
21	< 0.50 %	0.19 %	Passed	0.16 %	Passed	0.21 %	Passed
22	< 0.50 %	0.02 %	Passed	0.02 %	Passed	0.02 %	Passed
23	< 1.50 %	0.51 %	Passed	0.57 %	Passed	0.38 %	Passed
24	< 0.50 %	0.03 %	Passed	0.03 %	Passed	0.02 %	Passed
25	< 1.50 %	0.35 %	Passed	0.33 %	Passed	0.33 %	Passed

Interharmonics voltage

Measured quantity	10 minutes mean RMS values of each interharmonic and total harmonic distortion
EN 50160 standard	Section 4.2.6 - Informative
Operating conditions	Normal

		L1	L2	L3
Interharmonic	**Requirement**	**Measured**	**Measured**	**Measured**
0	---	0.94 %	1.01 %	1.01 %
1	---	0.98 %	0.98 %	0.98 %
2	---	0.38 %	0.35 %	0.35 %
3	---	0.26 %	0.24 %	0.24 %
4	---	0.21 %	0.23 %	0.23 %
5	---	0.21 %	0.23 %	0.23 %
6	---	0.14 %	0.14 %	0.14 %
7	---	0.13 %	0.13 %	0.13 %
8	---	0.11 %	0.12 %	0.12 %
9	---	0.11 %	0.11 %	0.11 %
10	---	0.12 %	0.12 %	0.12 %
11	---	0.12 %	0.12 %	0.12 %
12	---	0.12 %	0.12 %	0.12 %

13	---	0.12 %	0.12 %	0.12 %
14	---	0.10 %	0.11 %	0.11 %
15	---	0.11 %	0.11 %	0.11 %
16	---	0.13 %	0.13 %	0.13 %
17	---	0.14 %	0.15 %	0.15 %
18	---	0.13 %	0.14 %	0.14 %
19	---	0.16 %	0.17 %	0.17 %
20	---	0.13 %	0.13 %	0.13 %
21	---	0.11 %	0.11 %	0.11 %
22	---	0.12 %	0.12 %	0.12 %
23	---	0.14 %	0.15 %	0.15 %
24	---	0.18 %	0.16 %	0.16 %
25	---	0.14 %	0.14 %	0.14 %
26	---	0.16 %	0.15 %	0.15 %
		L1	**L2**	**L3**
Interharmonic	**Requirement**	**Measured**	**Measured**	**Measured**
27	---	0.13 %	0.13 %	0.13 %
28	---	0.13 %	0.13 %	0.13 %
29	---	0.14 %	0.14 %	0.14 %
30	---	0.14 %	0.14 %	0.14 %
31	---	0.18 %	0.19 %	0.19 %
32	---	0.17 %	0.18 %	0.18 %
33	---	0.14 %	0.14 %	0.14 %
34	---	0.11 %	0.12 %	0.12 %
35	---	0.11 %	0.10 %	0.10 %
36	---	0.09 %	0.10 %	0.10 %
37	---	0.12 %	0.12 %	0.12 %
38	---	0.10 %	0.10 %	0.10 %
39	---	0.10 %	0.10 %	0.10 %
40	---	0.09 %	0.09 %	0.09 %
41	---	0.11 %	0.10 %	0.10 %
42	---	0.10 %	0.10 %	0.10 %
43	---	0.11 %	0.11 %	0.11 %
44	---	0.12 %	0.13 %	0.13 %

45	---	0.10 %	0.11 %	0.11 %
46	---	0.09 %	0.09 %	0.09 %
47	---	0.12 %	0.10 %	0.10 %
48	---	0.10 %	0.10 %	0.10 %
49	---	0.11 %	0.14 %	0.14 %
50	---	0.09 %	0.09 %	0.09 %

Signalling

Measured quantity	3 second mean value of signal voltages at 316.00 and 70.00 Hz
EN 50160 standard	Section 4.2.7
Operating conditions	Normal

Voltage signal at 316.00 Hz (% of time less than 20.70 V)							
		L1		L2		L3	
Start time	Stop time	Measured	Status	Measured	Status	Measured	Status
22/08/2016 10:30:00	22/08/2016 23:50:00	100.00 %	Passed	100.00 %	Passed	100.00 %	Passed
23/08/2016 00:00:00	23/08/2016 23:50:00	100.00 %	Passed	100.00 %	Passed	100.00 %	Passed
24/08/2016 00:00:00	24/08/2016 23:50:00	100.00 %	Passed	100.00 %	Passed	100.00 %	Passed
25/08/2016 00:00:00	25/08/2016 23:50:00	100.00 %	Passed	100.00 %	Passed	100.00 %	Passed
26/08/2016 00:00:00	26/08/2016 23:50:00	100.00 %	Passed	100.00 %	Passed	100.00 %	Passed
27/08/2016 00:00:00	27/08/2016 23:50:00	100.00 %	Passed	100.00 %	Passed	100.00 %	Passed
28/08/2016 00:00:00	28/08/2016 23:50:00	100.00 %	Passed	100.00 %	Passed	100.00 %	Passed
29/08/2016 00:00:00	29/08/2016 10:30:00	100.00 %	Passed	100.00 %	Passed	100.00 %	Passed

Voltage signal at 70.00 Hz (% of time less than 0.00 V)							
		L1		L2		L3	
Start time	Stop time	Measured	Status	Measured	Status	Measured	Status
22/08/2016 10:30:00	22/08/2016 23:50:00	100.00 %	Passed	100.00 %	Passed	100.00 %	Passed
23/08/2016 00:00:00	23/08/2016 23:50:00	100.00 %	Passed	100.00 %	Passed	100.00 %	Passed
24/08/2016 00:00:00	24/08/2016 23:50:00	100.00 %	Passed	100.00 %	Passed	100.00 %	Passed
25/08/2016 00:00:00	25/08/2016 23:50:00	100.00 %	Passed	100.00 %	Passed	100.00 %	Passed
26/08/2016 00:00:00	26/08/2016 23:50:00	100.00 %	Passed	100.00 %	Passed	100.00 %	Passed
27/08/2016 00:00:00	27/08/2016 23:50:00	100.00 %	Passed	100.00 %	Passed	100.00 %	Passed
28/08/2016 00:00:00	28/08/2016 23:50:00	100.00 %	Passed	100.00 %	Passed	100.00 %	Passed
29/08/2016 00:00:00	29/08/2016 10:30:00	100.00 %	Passed	100.00 %	Passed	100.00 %	Passed

Interruptions

Nominal voltage	230.00 V
Measured quantity	Number of interrupts within predefined duration ranges
Measurement method	Voltage interruption begins when the Urms voltages of all channels fall below the voltage interruption threshold and ends when the Urms voltage on any one channel is equal to, or greater than, the voltage interruption threshold plus the hysteresis.
Interrupt threshold	5.00 % of nominal voltage
Hysteresis voltage	2.00 % of nominal voltage
Operating conditions	Normal
EN 50160 standard	Section 4.3.2.4

Residual voltage (% of nominal)	Duration (s)	
	t ≤ 2.00 s	t > 2.00 s
U < 5.00	1	0

Dips

Nominal voltage	230.00 V
Measured quantity	Number of dips within predefined voltage and duration ranges
Measurement method	One cycle RMS updated each half cycle Urms(1/2). Dip begins when the voltage of one or more channels is below the dip threshold and ends when the voltage on all measured channels is equal to or above the dip threshold plus the hysteresis voltage.
Hysteresis voltage	2.00 % of nominal voltage
Operating conditions	Normal
EN 50160 standard	Section 4.3.2.4

Residual voltage (% of nominal)	Duration (ms)				
	10 ≤ t ≤ 200	200 < t ≤ 500	500 < t ≤ 1 000	1 000 < t ≤ 5 000	5 000 < t ≤ 60 000
90 > U ≥ 80	0	0	0	0	0
80 > U ≥ 70	0	0	0	0	0
70 > U ≥ 40	0	0	0	0	0
40 > U ≥ 5	0	0	0	0	0
U < 5	0	0	1	0	0

Swells

Nominal voltage	230.00 V
Measured quantity	Number of swells within predefined voltage and duration ranges

Measurement method	One cycle RMS updated each half cycle Urms(1/2) Swell begins when the voltage of one or more channels is above the swell threshold and ends when the voltage on all measured channels is equal to or below the swell threshold minus the hysteresis voltage.
Operating conditions	Normal
EN 50160 standard	Section 4.3.2.5

Swell voltage (% of nominal)	Duration (ms)		
	$10 \leq t \leq 500$	$500 < t \leq 5\,000$	$5\,000 < t \leq 60\,000$
$U \geq 120$	0	0	0
$120 > U > 110$	0	0	0