

Certificate

BELGIUM C10/11 100%

The results of tests performed according to reference standard BELGIUM C10/11 100% are summarized in this certificate. Power-One Italy S.p.a. declares that the units set for BELGIUM C10/11 100% operations are characterized by the following features:

- The internal specification and parameters are set to be compliant with BELGIUM C10/11 100% engineering requirements.
- All units have identical internal parameters setting.
- These parameters cannot be changed without the usage of password protected tool.

SSEG DETAILS (Small-Scale Embedded Generator)

SSEG Type Reference:	PHOTO-VOLTAIC GRID TIED INVERTER
SSEG Model Reference:	TRIO-27.6-TL-OUTD-400 TRIO-27.6-TL-OUTD-S2-400 TRIO-27.6-TL-OUTD-S2F-400 TRIO-27.6-TL-OUTD-S2X-400 TRIO-20.0-TL-OUTD-400 TRIO-20.0-TL-OUTD-S2-400 TRIO-20.0-TL-OUTD-S2F-400 TRIO-20.0-TL-OUTD-S2X-400
Maximum export capability (SSEG rating less parasitic load)	27600W (TRIO-27.6-TL-OUTD-400 and derived models) 20000W (TRIO-20.0-TL-OUTD-400 and derived models)
Nominal Output AC Power	27600W (TRIO-27.6-TL-OUTD-400 and derived models) 20000W (TRIO-20.0-TL-OUTD-400 and derived models)

MANUFACTURER and TEST HOUSE DETAILS

Name:	Power-one Italy S.p.A. - R.& D. Department
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TEST RESULTS SUMMARY

Power Quality:

- Harmonic Current Emission as per EN-61000-3-12
- Voltage Fluctuation and Flickers as per EN-61000-3-11
- DC Injection as per VDE 0126
- Power Factor as per VDE 0126

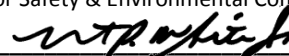
Protection:

- Under/Over Frequency Tests
- Under/Over Voltage Tests
- Reconnection Times
- Loss of Mains Test

Power-One Italy S.p.a.
Terranuova Bracciolini,

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Robert White
(Director Safety & Environmental Compliance)



BELGIUM C10/11 100% TEST RESULTS DETAILS – TYPE VERIFICATION TEST SHEET

POWER QUALITY

TRIO-27.6-TL-OUTD-400		Value of Short Circuit Power SSC = 0.9108 MVA @ RSCE = 33							
Harmonic Current Emission as per EN-61000-3-12									
Harmonic		3rd [A%]	5rd [A%]	7rd [A%]	9rd [A%]	11rd [A%]	13rd [A%]	THD [A%]	PWHD [A%]
Limit		21.6	10.7	7.2	3.8	3.1	2	13	22
Result	Test value L1	0.458	0.365	0.037	0.045	1.148	0.805	1.655	2.922
	Test value L2	0.270	0.348	0.046	0.090	1.077	0.854	1.597	2.846
	Test value L3	0.225	0.365	0.033	0.097	1.083	0.864	1.613	2.932

TRIO-20.0-TL-OUTD-400		Value of Short Circuit Power SSC = 0.66 MVA @ RSCE = 33							
Harmonic Current Emission as per EN-61000-3-12									
Harmonic		3rd [A%]	5rd [A%]	7rd [A%]	9rd [A%]	11rd [A%]	13rd [A%]	THD [A%]	PWHD [A%]
Limit		21.6	10.7	7.2	3.8	3.1	2	13	22
Result	Test value L1	0.952	0.042	0.039	0.096	1.371	0.917	2.036	2.802
	Test value L2	0.608	0.066	0.043	0.162	1.216	1.006	1.820	2.786
	Test value L3	0.418	0.026	0.044	0.211	1.288	1.021	1.844	2.705

TRIO-27.6-TL-OUTD-400					
Voltage Fluctuation and Flickers as per EN-61000-3-11					
Voltage Disturbance	Pst	Plt	D(t) > 3%	dc (%)	dmax (%)
Limit	1	0.65	1	3.3	6
Test Value	0.112	0.056	0.001	0.001	5.629

TRIO-20.0-TL-OUTD-400					
Voltage Fluctuation and Flickers as per EN-61000-3-11					
Voltage Disturbance	Pst	Plt	D(t) > 3%	dc (%)	dmax (%)
Limit	1	0.65	0.5	3.3	6
Test Value	0.205	0.168	0.001	0.029	0.661

TRIO-27.6-TL-OUTD-400							
VDE 0126 Limit 0.5% of 45A	DC injection [A]				Power Factor		
	225mA, tested at three power levels				0.95 lag - 0.95 lead at three voltage levels		
Test Level		10%	50%	100%	187.7 Vac	230 Vac	259.2 Vac
Test Value	L1	0.004	0.003	0.006	0.998	0.997	0.996
	L2	-0.002	0.001	-0.011			
	L3	-0.003	-0.004	0.002			

TRIO-20.0-TL-OUTD-400							
VDE 0126 Limit 0.5% of 33A	DC injection [A]				Power Factor		
	165mA, tested at three power levels				0.95 lag - 0.95 lead at three voltage levels		
Test Level		10%	50%	100%	187.7 Vac	230 Vac	259.2 Vac
Test Value	L1	0.006	0.007	0.008	0.997	0.996	0.995
	L2	0.001	-0.001	-0.002			
	L3	-0.006	-0.007	-0.004			

PROTECTION

TRIO-27.6-TL-OUTD-400 and TRIO-20.0-TL-OUTD-400

UNDER FREQUENCY TEST						
Fnom=50Hz	BELGIUM C10/11 100% Limit	Settings		Results		
Under Frequency <	Frequency [Hz]	Time [s]	Frequency [Hz]	Time [s]	Frequency [Hz]	Time [s]
	47.50	0.20	47.50	0.12	47.49	0.12

OVER FREQUENCY TEST						
Fnom=50Hz	BELGIUM C10/11 100% Limit	Settings		Results		
Over Frequency >	Frequency [Hz]	Time [s]	Frequency [Hz]	Time [s]	Frequency [Hz]	Time [s]
	51.50	0.20	51.50	0.12	51.52	0.13

UNDER VOLTAGE TEST						
Vφ-n nom =230V	BELGIUM C10/11 100% Limit	Settings		Results		
Under Voltage <	Voltage [V]	Time [s]	Voltage [V]	Time [s]	Voltage [V]	Time [s]
L1-N	184.0	0.20	184.0	0.16	184.7	0.19
L2-N					184.1	0.19
L3-N					183.8	0.18
L1-L2-L3	318.7	0.20	318.7	0.16	320.6	0.18

OVER VOLTAGE TEST						
Vφ-n nom =230V	BELGIUM C10/11 100% Limit	Settings		Results		
Over Voltage > (10min AVG)	Voltage [V]	Time [s]	Voltage [V]	Time [s]	Voltage [V]	Time [s]
Lx-N	253.0	<600	253.0	<600	254.5	<580
Over Voltage >>	Voltage [V]	Time [s]	Voltage [V]	Time [s]	Voltage [V]	Time [s]
L1-N	264.5	0.20	264.5	0.16	264.5	0.18
L2-N					265.3	0.18
L3-N					264.9	0.18
L1-L2-L3	458.1	0.20	458.1	0.16	458.2	0.18

RECONNECTION TIMES			
	Under/Over voltage	Under/Over Frequency	Loss of Main
Minimum Value Limit [s]	60	60	60
Actual setting [s]	60	60	60
Recorded value [s]	77	79	77

LOSS OF MAIN TESTS			
Method used	Rate Of Change Of Frequency and Active Power Variation		
Output power Level	10%Prated	55%Prated	100%Prated
BELGIUM C10/11 100% Limit [s]	5.0	5.0	5.0
Trip setting [s]	4.0	4.0	4.0
Trip value [s]	4.2	4.3	4.3

SSEG Short Circuit Current Contribution Test

RMS Value over 1 Period (Cycle)	58.00	[Aac]
Peak Current	507.0	[A]

SELF MONITORING – SOLID STATE SWITCHING

Not applicable because electro-mechanical relays are used

Voltage reading accuracy = +/- 1%
Frequency reading accuracy = +/- 0.05Hz