

Unit Certificate

Order number: 44 799 12 401807-002

Manufacturer **Power-One Italy S.p.A**
Via San Giorgio, 642
52028 Terranuova Bracciolini
Arezzo, Italy

Type of unit Photovoltaic central inverter

Description of unit **ULTRA-1050.0-TL**

Technical data

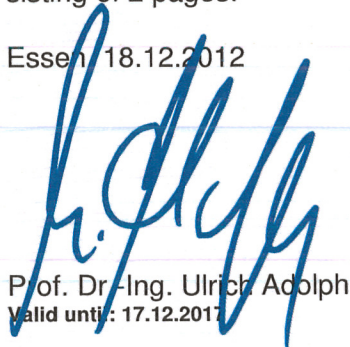
| | |
|-------------------------|-----------------------|
| Nominal apparent power: | $S_{AC,n} = 1170$ kVA |
| Nominal active power: | $P_{AC,n} = 1050$ kW |
| Nominal voltage: | $U_{AC,n} = 690$ V |
| Nominal current: | $I_{AC,n} = 876$ A |
| Nominal frequency: | $f_n = 50$ Hz |

Conformity assessment **BDEW guideline (June 2008)** **Technical Guideline Generating Plants Connected to the Medium-Voltage Network**

| | | |
|----------------------|-----------------------|--|
| Additional standards | FGW TR 3 (Rev. 22) | Determination of electrical characteristics of power generating units and systems connected to MV, HV and EHV grids |
| | FGW TR 4 (Rev. 5) | Demands on Modelling and Validating Simulation Models of the Electrical Characteristics of Power Generating Units and Systems |
| | FGW TR 8 (Rev. 5) | Certification of the Electrical Characteristics of Power Generating Units and Farms in the Medium-, High and Highest-voltage Grids |

The generating unit complies with the requirements of the BDEW Guideline „Generating units connected to the medium-voltage network“, issued June 2008. This certificate contains an annex, consisting of 2 pages.

Essen / 18.12.2012



Prof. Dr.-Ing. Ulrich Adolph
Valid until: 17.12.2017



Dr. Ralf Kotte



DAkkS
Deutsche
Akkreditierungsstelle
D-ZE-12007-01-03

Certification body of
TÜV NORD CERT GmbH

Annex 1 of Unit Certificate

Order number 44 799 12 401807-002

General description

See Unit Certificate

Technical Data

| General | | | |
|---|----------------------|--------------|----------------|
| Unit description | ULTRA-1050.0-TL | | |
| AC output | | | |
| Number of phases | three-phase | | |
| Nominal voltage | 690 V | | |
| Nominal frequency | 50 Hz | | |
| Nominal apparent power | 1170 kVA | | |
| Nominal active power | 1050 kW | | |
| Nominal current | 876 A | | |
| Short-circuit current (Manufacturer declaration) | 975 A | | |
| DC input | | | |
| Min. MPP voltage | 450 V | | |
| Max. MPP voltage | 950 V | | |
| Max. PV input voltage | 1100 V | | |
| Max. PV input current | 2160 A | | |
| Max. peak power | 1638 kW | | |
| Converter power section | | | |
| Manufacturer | Power-One | | |
| Nominal apparent power | 3 x 390 kVA | | |
| Trafo type (no, HF/LF-Trans.) | No transformer | | |
| Switching frequency | 9 kHz | | |
| Type of power control (MPP) | Multisampling MPPT | | |
| Software Version | DSP DC/DC | DSP inverter | Microprocessor |
| | AF10 | BF92 | CF2D |
| HW Revision | See technical report | | |



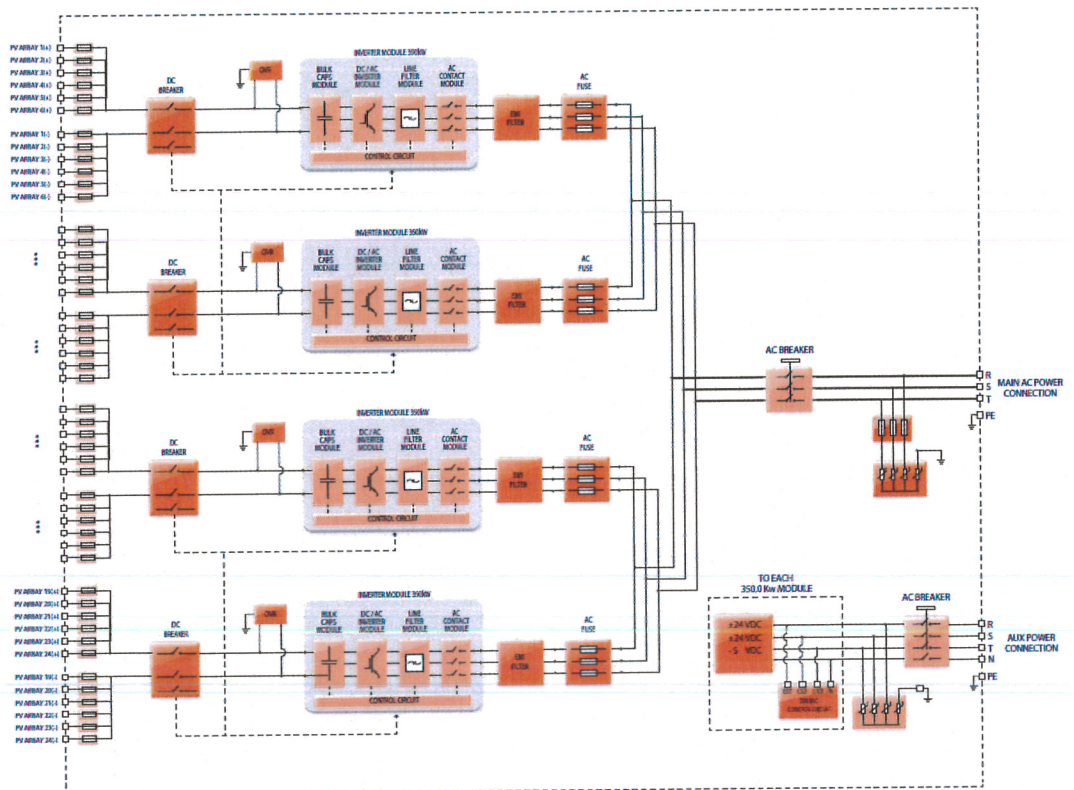
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Block diagram of power generation unit



Validated simulation model

The simulation model for symmetrical and unsymmetrical faults was validated using DigSilent Powerfactory 14.1.3. Restrictions documented in the relevant validation report have to be considered.

| File name | Size | Checksum (MD5) |
|-----------------|-------|----------------------------------|
| ULTRA-350-TL.dz | 12 kB | 5fa7d53dd016289e138538c6848f92e9 |

Remarks

The manufacturer has proven certification of its quality management system according to ISO 9001.

The use of other firmware and software version numbers is allowed if the differences are proved and confirmed by TÜV NORD CERT GmbH beforehand. Validity of a new software version is attested by written confirmation and becomes part of the certificate.

Additional technical data, according to FGW TR 8 annex A, are given in technical report number 12 799 401807, version 1 or higher, and in validation report no. 12 799 401807, version 1 or higher.

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