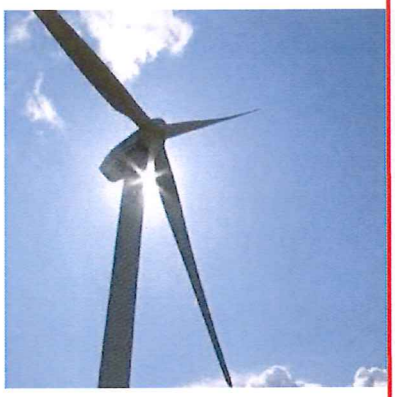


Prototypenbestätigung

Die ABE Zertifizierung GmbH bescheinigt hiermit der

Power-One Italy S.p.A.

Via San Giorgio, 642

52028 Terranuova Bracciolini, Italy,

dass die Erzeugungseinheit vom Typ

PVS-175-TL [...*]

**(Detaillierte technische Daten und Ausführungsvarianten siehe Kapitel 5 und 6)*

die Voraussetzungen für einen Prototypen gemäß

- **VDE-AR-N 4110:2018-11**
- **VDE-AR-N 4120:2018-11**
- **FGW TR8 Rev. 9**

(Einschränkungen siehe Kapitel 7)

erfüllt. Die genannte Einheit ist nach Prüfung der eingereichten Dokumente grundsätzlich in der Lage die Anforderungen an die elektrischen Eigenschaften der genannten Richtlinien zu erfüllen.

Gemäß eingereichtem Inbetriebsetzungprotokoll erfolgte die Inbetriebsetzung des ersten Prototyps am 26.11.2019.

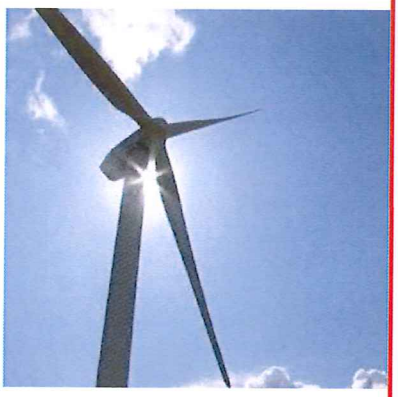
Gültigkeit ab: 26.11.2019 Gültigkeit bis: 25.11.2021

Dieses Dokument ist die englische Übersetzung der deutschen Originalversion der Prototypenbestätigung ABE-P-902-2019 (0). Die deutsche Version ist verbindlich.

Dokumentennummer:	ABE-P-902-2019
Revision:	0
Anzahl Seiten:	13 + Anhang A

Barsbüttel / 20.02.2020

Dipl.-Ing. Sebastian Gerbig
Leiter der Zertifizierungsstelle



Prototype confirmation

ABE Zertifizierung GmbH hereby certifies

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

that the unit of the type

PVS-175-TL [...*]

**(Detailed technical data and product variants see chapter 5 and 6)*

meets the conditions of a prototype according to

- **VDE-AR-N 4110:2018-11**
- **VDE-AR-N 4120:2018-11**
- **FGW TR8 Rev. 9**

(Restrictions see chapter 7)

After checking the documents submitted, the mentioned unit is principally able to fulfil the requirements of the electrical properties of the guidelines mentioned.

In accordance with the submitted commissioning protocol, the commissioning of the first prototype took place on 26.11.2019.

Valid from: 26.11.2019 Valid until: 25.11.2021

This document is the English translation of the original German version of the prototype confirmation ABE-P-902-2019 (0). The German version is binding.

Document number:	ABE-P-902-2019
Revision:	0
Number of pages:	13 + Annex A

Barsbüttel / 20.02.2020

Dipl.-Ing. Sebastian Gerbig
Head of Certification Body

I. Document information

Document no.	ABE-P-902-2019 (0)
Author	ABE Zertifizierung GmbH Großer Kamp 5 D-22885 Barsbüttel
Pages of document	13 + Annex A
Status	Approved

II. List of changes

Revision	Creation date	Change	Creation
0	19.02.2020	Initial edition	Gerbig

1 Introduction

Prototype confirmation is deemed evidence of the first generation unit of a type that shows essential technical further developments or innovations, and all further generation units of that type that are taken into operation within two years after initial taking into operation of the first generation unit of that type. Based on the further development or innovation, this generation unit does not have any unit certificate in accordance with VDE-AR-N 4110:2018-11 and VDE-AR-N 4120:2018-11 yet.

This prototype confirmation contains the evaluation of technical data in accordance with chapter 12 of VDE-AR-N 4110:2018-11 and VDE-AR-N 4120:2018-11 based on a manufacturer's declaration. The prototype confirmation confirms that the generation unit is generally able to meet the requirements to electrical properties in accordance with the specifications of VDE-AR-N 4110:2018-11 and VDE-AR-N 4120:2018-11.

2 Validity of prototype confirmation

Valid from:	**26.11.2019**
Valid until:	**25.11.2021**

In accordance with chapter 12 of the VDE-AR-N 4110:2018-11 and VDE-AR-N 4120:2018-11, a prototype confirmation instead of the unit certificate is sufficient within two year of taking into operation of the first prototype unit in Germany. A prototype within the meaning of the VDE directive shall be the first generation unit of a type that shows essential technical further developments or innovations and all further generation units of that type that are commissioned within two years after initial commissioning of the first generation unit of that type.

The certification body was informed of the commissioning date of the first prototype via the official commissioning protocol. The above validity results from this accordingly.

3 Evaluation bases

The following subchapters form the evaluation basis for this prototype confirmation.

3.1 Laws, standards and directives

VDE-AR-N 4110:2018-11 - Technische Regeln für den Anschluss von Kundenanlagen an das Mittelspannungsnetz und deren Betrieb (TAR Mittelspannung)
VDE-AR-N 4120:2018-11 - Technische Regeln für den Anschluss von Kundenanlagen an das Hochspannungsnetz und deren Betrieb (TAR Hochspannung)
Technische Richtlinie für Erzeugungseinheiten und –anlagen Teil 8 Revision 9 der Fördergesellschaft Windenergie und andere Dezentrale Energien (FGW e.V.)

3.2 Manufacturer-specific documents

The following manufacturer-specific documents were used for the plausibility check of this prototype confirmation.

Manufacturer's declaration of the unit manufacturer: "PVS-175-TL Principle of operation Revision 03", as of: 19.11.2019
Data sheet of the unit manufacturer: "PVS-175-TL_9AKK107046A3492_EN_Rev_C", as of: 06.12.2018

4 Prerequisites for the prototype confirmation

Power-One Italy S.p.A. has developed a new unit-type with the generation unit PVS-175-TL under consideration of the requirements to the electrical properties in accordance with the VDE-AR-N 4110:2018-11 and VDE-AR-N 4120:2018-11. In accordance with the manufacturer's declaration, the software version of the unit has been adjusted as compared to the already-certified BDEW-compliant version, in order to be able to meet the requirements of VDE-AR-N 4110:2018-11 and VDE-AR-N 4120:2018-11. Adjustment of the software version changes the electrical properties of the PVS-175-TL, which is an essential technical further development within the meaning of VDE-AR-N 4110:2018-11 and VDE-AR-N 4120:2018-11.

The manufacturer has documented the technical data already available for the generation unit in accordance with chapter 12 of VDE-AR-N 4110:2018-11 and VDE-AR-N 4120:2018-11 in a manufacturer's declaration. In its manufacturer's declaration, Power-One Italy S.p.A. also declared that the generation unit PVS-175-TL has been constructed so that the requirements of VDE-AR-N 4110:2018-11 and VDE-AR-N 4120:2018-11 can be met.

5 Electrical data

The following table contains the electrical data of the generation unit PVS-175-TL according to the manufacturer's information.

General matters and initial values		
1	**Manufacturer**	Power-One Italy S.p.A.
2	**Type designation**	PVS-175-TL
3	**Infeed (single-phase/three-phase)**	three-phase
4	**Nominal apparent power (S_N)**	185 kVA
5	**Nominal active power (P_N at cos φ=1)**	185 kW
6	**AC nominal voltage (U_{L-N})**	800 V
7	**AC nominal frequency**	50 Hz
DC input values		
1	**Min. MPP voltage**	850 V
2	**Max. MPP voltage**	1350 V
3	**Max. DC input voltage**	1500 V
4	**Max. DC input current**	264 A (22 A x 12)
Inverter power unit		
1	**Manufacturer**	Power-One Italy S.p.A.
2	**Type designation**	PVS-175-TL
3	**Nominal apparent power**	185 kVA
4	**Generation type**	Transformerless
5	**Frequency**	8.33 kHz
6	**Type of power control**	Vector Control
7	**Software version**	A05A-B074-C04C
Other electrical components		
1	**Type of grid coupling**	Contactor Relay
2	**Manufacturer**	ABB
3	**Type designation**	AF146 (1SFL467072R3210)
4	**Grid protection integrated**	Yes
5	**Harmonic filter**	Yes

6 Schematic overview circuit diagram of the generation unit

The schematic overview circuit diagram, including all essential components of the generation unit PVS-175-TL described in this prototype confirmation is shown below.

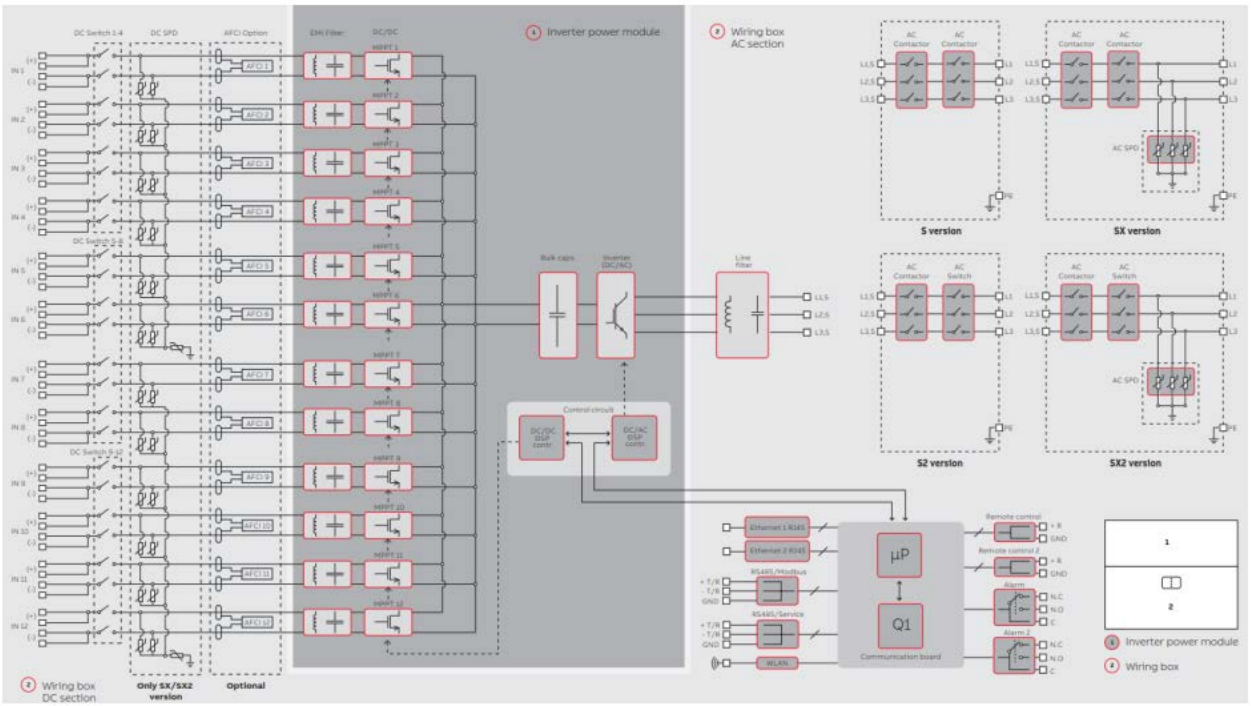


Figure 1: Schematic overview circuit diagram of the generation unit

The PVS-175-TL is made up of two parts: the "power module" and the "wiring box". The different design versions of the two units are presented in the following figure.

Product variants:
Solar Grid Tied Inverter,
type **PVS-175-TLX-WIRINGBOX-Opz.1 Opz.2 Opz.3 Opz.4 Opz.5 Opz.6 Opz.7**
where (refer to the **Power Module Table**, **Wiring Box Table** and **Option Table** for details):

- X may be 1 or 2
- WIRINGBOX may be WB-S or WB-S2 or WB-SX or WB-SX2
- Opz.1 is I
- Opz.2 is F
- Opz.3 is A
- Opz.4 may be y or N
- Opz.5 may be y or N
- Opz.6 may be S or M
- Opz.7 may be Y or N

Power Module Table

POWER MODULE		
Opz. X	**Model Designation**	**Characteristics**
1	**PVS-175-TL-POWER-MODULE-1**	Power Module with Precharge (Opz.7 = Y)
2	**PVS-175-TL-POWER-MODULE-2**	Power Module without Precharge (Opz.7 = N)

Wiring Box Table

WIRINGBOX		
Opz. WIRINGBOX	**Model Designation**	**Characteristics**
WB-S	WB-S-PVS-175-TL	- Varistor Surge protection - DC disconnector switch
WB-S2	WB-S2-PVS-175-TL	- Varistor Surge protection - DC disconnector switch - AC disconnector switch
WB-SX	WB-SX-PVS-175-TL	- SPD type 2 Surge protection DC and AC side - DC disconnector switch
WB-SX2	WB-SX2-PVS-175-TL	- SPD type 2 Surge protection DC and AC side - DC disconnector switch - AC disconnector switch

Figure 2: Design versions of the PVS-175-TL – Power module table & wiring box table

Option Table

Opz.	Item Description	Available options	
1	MPPT Number	I= Independent MPPT (12)	
2	DC- Grounding	F= Floating	
3	DC Plate Configuration	A= 24 Input – Quick Plug	
4	Anti PID board	Y= yes	N= No
5	Arc Fault	Y= yes	N= No
6	AC Plate configuration	S= Single Core Cables	M= Multi Core Cable
7	Precharge	Y= yes	N= No

The above mentioned Inverter consists of the following components:
Power Module,
type **PVS-175-TL-POWER-MODULE-1** or
type **PVS-175-TL-POWER-MODULE-2**
Refer to the Power Module Table for details.

Wiring Box,
type **WB-S-PVS-175-TL** or
type **WB-S2-PVS-175-TL** or
type **WB-SX-PVS-175-TL** or
type **WB-SX2-PVS-175-TL**
Refer to the Wiring Box Table for details.

Test performed on:
Inverter, type (model designation) **PVS-175-TL1- WB-S-IFANNMN**
For the scope of this standard, it is equivalent to the other models.

Figure 3: Design versions of the PVS-175-TL – Option table

7 Summary

Due to the plausibility check in Annex A, ABE Zertifizierung GmbH comes to the result that the generation unit PVS-175-TL of Power-One Italy S.p.A., generally is able to meet the requirements of the directives named in chapter 3.1. The restrictions named in this chapter must be observed for this. The full review of the requirements must take place in the scope of the unit certification.

Type PVS-175-TL also is an essential technical further development/innovation. Therefore, the generation unit meets the prerequisites of a prototype in accordance with chapter 12 of the VDE-AR-N-4110 and VDE-AR-N 4120:2018-11.

Function/property	Evaluation	Limitation
Electrical data	Successful	-
Schematic overview picture	Successful	-
Operating range: • Limits in quasi-stationary operation • Reactive power adjustment range • FRT threshold curve	Successful	-
Protection functions with setting ranges: • Disconnection protection • Inherent protection	Successful	**Limitation 1:** The required setting range of the U>> level until 1.30 U_{NS} cannot be implemented. The maximum setting can be made at 577 V (1.25 U_{NS}). **Limitation 2**: Any required setup, such as a test terminal strip or a test socket in order to permit inspection of the protection device without disconnecting any wires must be implemented separately on a superordinate, certified protection device or retrofitted on the unit.
Active power control: • Power-frequency-behaviour • Active power gradient	Successful	-

Function/property	Evaluation	Limitation
Reactive power control	Successful	-
Dynamic reactive current infeed: • General function	Successful	-