

Medium-Voltage Transformer

Important requirements for medium-voltage transformers for

SUNNY BOY, SUNNY MINI CENTRAL and SUNNY TRIPOWER



Content

This document describes the requirements of medium-voltage transformers which are connected to the following SMA inverters:

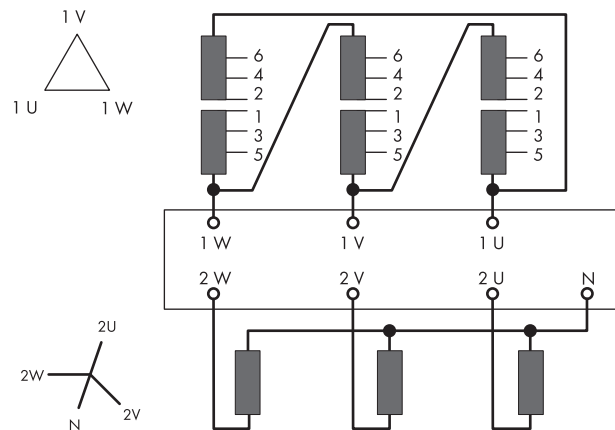
- Sunny Boy 3000-US / 3800-US / 4000-US / 5000-US / 6000-US / 7000-US / 8000-US / 6000TL-US / 7000TL-US / 8000TL-US / 9000TL-US / 10000TL-US / 11000TL-US
- Sunny Mini Central 4600A / 5000A / 6000A / 7000HV / 6000TL / 7000TL / 8000TL / 9000TL / 10000TL / 11000TL / 9000TLRP / 10000TLRP / 11000TLRP
- Sunny Tripower 5000TL / 6000TL / 7000TL / 8000TL / 9000TL / 10000TL / 12000TL / 15000TL / 17000TL / 15000TLEE / 20000TLEE / 15000TLHE / 20000TLHE

SMA Solar Technology AG only provides a warranty for transformers that have been purchased from SMA Solar Technology AG.

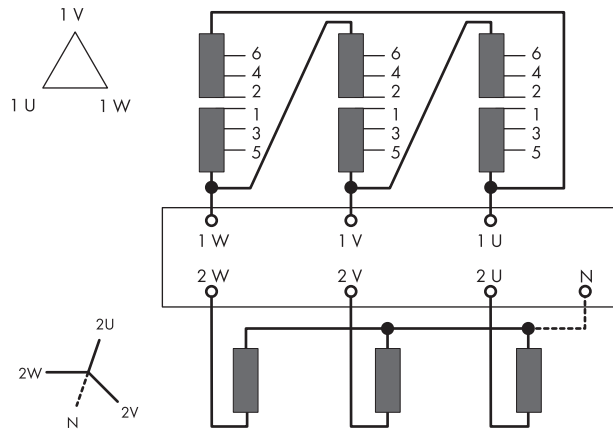
1 General Technical Properties

The transformers used must comply with the following technical specifications:

- The transformer for the inverters can be designed as a distribution transformer.
- The voltage level on the high-voltage side of the transformer must be selected according to the grid-connection point.
- SMA Solar Technology AG recommends the use of a transformer with a tap changer on the high-voltage side that enables an adjustment to the voltage level of the electricity grid.
- Several inverters can be connected to one low-voltage winding on the transformer.
- For inverters without transformers (Sunny Mini Central TL, Sunny Boy TL-US, Sunny Tripower), SMA Solar Technology AG recommends transformers with a delta connection on the medium-voltage side and a star connection on the low-voltage side, e.g. Dyn1, Dyn5, Dyn11 with a neutral point that leads outward (see figure below).



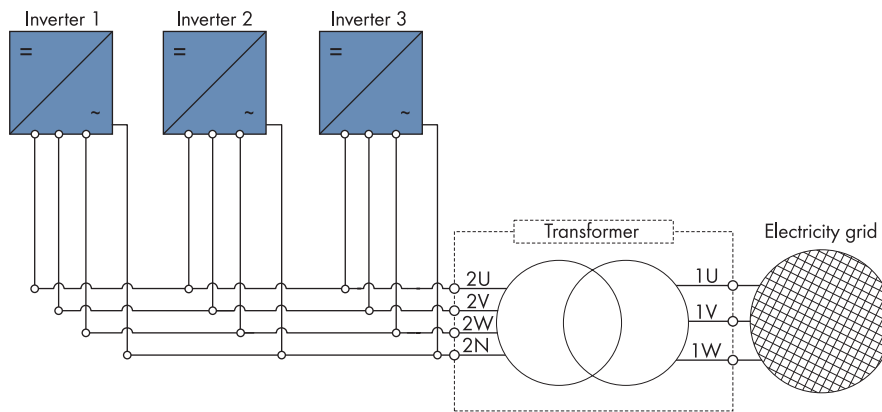
- For inverters with transformers (Sunny Mini Central A, Sunny Mini Central HV, Sunny Boy US), SMA Solar Technology AG recommends transformers with a delta connection on the medium-voltage side and a star connection on the low-voltage side. A neutral point that leads outward is not required, e.g. Dy(n)1, Dy(n)5, Dy(n)11 (see figure below).



- Transformers with vector groups YNyn0, YNyn6, YNy(n)0 and YNy(n)6 can also be connected.
- For thermal rating, the load curve of the transformer and the ambient conditions at the respective installation site must be taken into account.
- The maximum nominal AC current of all connected inverters must be taken into account (see the installation manual of the respective inverter).
- Potential error sources (e.g. short-circuit, earth fault or power failure) must be taken into account when selecting a transformer.
- The country-specific power frequency must be taken into account.
- The applicable country-specific standards must be taken into account.

2 Technical Properties of the Sunny Tripower

- The voltage on the low-voltage side must be $3 \times 230 \text{ V} / 400 \text{ V}$. A neutral point is required and must lead outward as a neutral conductor.

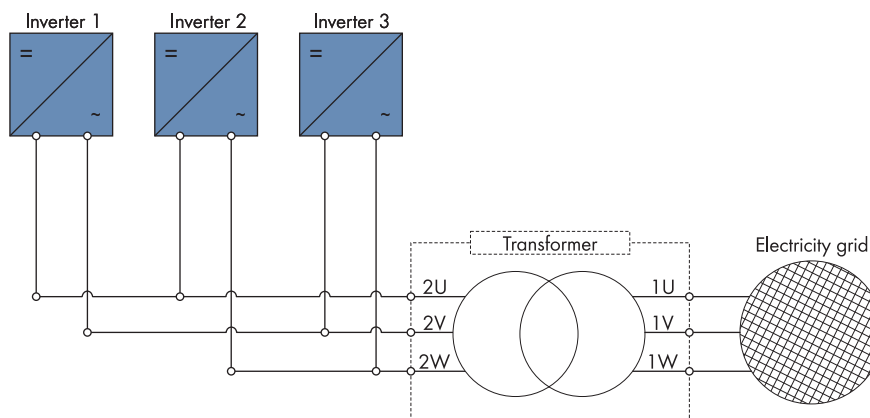


3 Technical Properties of the Sunny Boy and Sunny Mini Central

- Each of the following single-phase inverters can be operated between two line conductors on a three-phase electricity grid:

Inverter	Line-to-line voltage on the low-voltage side
Sunny Boy -US	183 V ... 229 V at a rated voltage of 208 V 211 V ... 264 V at a rated voltage of 240 V
Sunny Mini Central A Sunny Mini Central HV	160 V ... 265 V at a rated voltage of 230 V

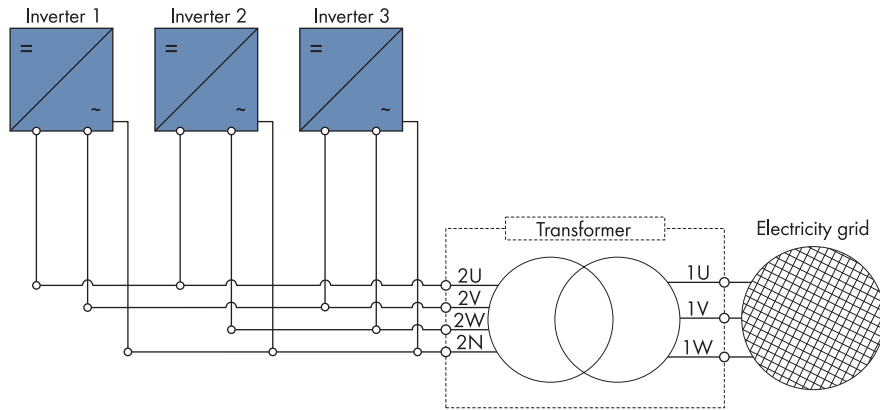
A neutral point on the low-voltage side is not required for a two-phase connection.



- On a three-phase electricity grid, each of the following single-phase inverters can be operated between two line conductors if the neutral conductor is connected:

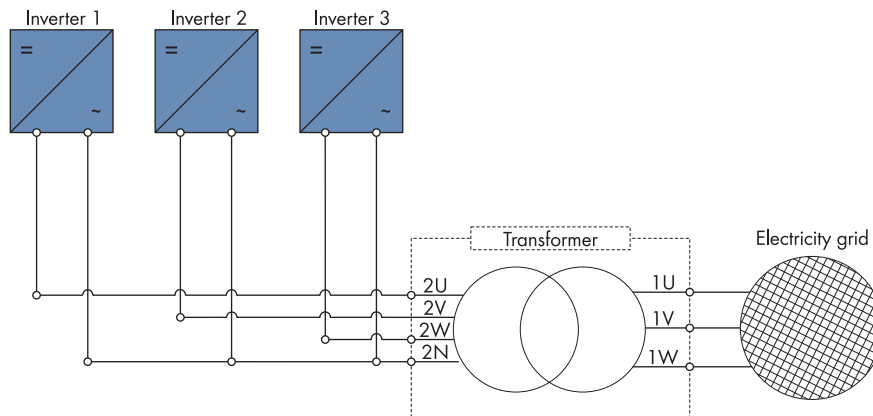
Inverter	Line-to-line voltage on the low-voltage side
Sunny Boy TL-US	183 V ... 229 V at a rated voltage of 208 V 211 V ... 264 V at a rated voltage of 240 V

A neutral conductor is required and must be connected to the inverter.



- On a three-phase electricity grid, each of the following inverters can be operated between one line conductor and the neutral conductor:

Inverter	Phase voltage on the low-voltage side
Sunny Boy -US	244 V ... 305 V at a rated voltage of 277 V
Sunny Mini Central A Sunny Mini Central HV	160 V ... 265 V at a rated voltage of 230 V
Sunny Mini Central TL	180 V ... 265 V at a rated voltage of 230 V



- The unbalanced load capacity of the transformer must be taken into account for operating the Sunny Boy and Sunny Mini Central single-phase inverters.