Wels, 10th of December 2018

INFORMATION REGARDING THE IMPLEMENTATION OF THE EUROPEAN NETWORK CODES (RFG)

In the following, Fronius International provides information on the requirements resulting from Regulation (EU) 2016/631 on the establishment of a grid code with grid connection provisions for electricity generators (hereinafter referred to as RfG [Requirement for Generators]).

It can be assumed that as of 27th of April 2019 most EU member states will require compliance with these requirements (in various forms), although many member states are still working on the definition of the national details.
These national implementations will mostly be based on the European Standards EN 50549-1 (Requirements for generating plants to be connected in parallel with distribution networks – Part 1: Connection to a LV distribution network – Generating plants up to and including Type A) and EN 50549-2 (Requirements for generating plants to be connected in parallel with distribution networks – Part 2: Connection to a MV distribution network), or on the connection requirements of Germany (VDE-AR-N 4105 and VDE-AR-N 4110).
Since some of this work is still ongoing, it is very difficult to make final statements about the impact of these new rules.

However, Fronius is working intensively on implementing the new requirements and hereby confirms that the inverter series Fronius Primo, Fronius Symo (incl. Symo Hybrid) and Fronius Eco will provide all the necessary functions. These will be implemented by means of software updates, and the necessary certificates and manufacturer declarations will be available in time.

Due to requirements concerning the withstand capability against fast frequency changes, the Fronius Galvo series will no longer comply with the RfG, which is why the Fronius Galvo cannot be installed in new installation after the 27th of April 2019 in all EU countries.

An overview of the compatibility with the four standards mentioned above is given in the table below. Detailed information on the effects in individual countries is described further below.

Table 1 Compatibility of Fronius Inverters

Inverter series	VDE-AR-N 4105 (Systems <135 kW)	VDE-AR-N 4110 (Systems ≥135 kW)	EN 50549-1 (Systems connected to low voltage grid)	EN 50549-2 (Systems connected to medium voltage grid)
Fronius Primo 3.0-1 – 8.2-1	✓	×	✓	×
Fronius Symo 3.0-3-S – 4.5-3-S	✓	×	✓	×
Fronius Symo 3.0-3-M – 8.2-3-M	✓	×	✓	×
Fronius Symo Hybrid 3.0-3-S – 5.0-3-S	✓	×	✓	×
Fronius Symo 10.0-3-M – 20.0-3-M	✓	✓	✓	✓
Fronius Eco 25.0-3 – 27.0-3	✓	✓	✓	✓
Fronius Galvo 1.5-1 – 3.1-1	×	×	×	×

In summary, the Fronius Snapinverter generation (with the exception of the Fronius Galvo) can continue to be used in low-voltage and medium-voltage networks in the future (according to Table 1). Compliance with the new connection conditions can also be easily guaranteed for devices already delivered via software updates (e.g. via Solar.web).

Detailed overview concerning the situation in selected European countries

Germany
In Germany, the requirements of the RfG were taken into account when revising or redesigning the grid connection conditions. For generation units intended for connection to the low-voltage grid, the VDE-AR-N 4105 " Generators connected to the low-voltage distribution network – Technical requirements for the connection to and parallel operation with low-voltage distribution networks" and the VDE-AR-N 4100 " Technical rules for the connection and operation of customer installations to the low voltage network (TAR Low-Voltage)" apply.

Generation units that form a generation system with a maximum active power P_{Amax} < 135 kW, must - irrespective of the voltage level to which the generation system is connected - be designed in accordance with VDE-AR-N 4105 as of 27th of April 2019. Since work is still in progress on the test standard for VDE-AR-N 4105, the DIN VDE V 0124-100, a manufacturer's declaration will be necessary on the 27th of April 2019 to demonstrate compliance with the requirements of VDE-AR-N 4105. Until 12 months after the entry into force of DIN VDE V 0124-100, but by 1st of April 2020 at the latest, manufacturer's declarations are sufficient instead of certificates. Afterwards, a certificate will be required.

For generation units which are intended for the connection to the medium-voltage grid, compliance with VDE-AR-N 4110 " Technical requirements for the connection and operation of customer installations to the medium voltage network (TAR medium voltage)" is required in Germany by 27th of April 2019. For generators and storages the requirements of TAR medium-voltage only fully apply for a maximum active power P_{Amax} ≥ 135 kW.

Currently, the connection conditions stipulate that a unit certificate confirming compliance with the requirements of VDE-AR-N 4110 is required as of 27th of April 2019. Documents relevant for certification and modelling (TR 4 "Requirements for modelling and validation of simulation models of the electrical properties of generation units and systems" and TR 8 "Certification of the electrical properties of generation units and systems on the low, medium, high and extra-high voltage grid") are still being revised by FGW, and the publication of these documents is not planned until 2019.

When VDE-AR-N 4110 comes into force, the following changes must be taken into account for generation systems with P_{Amax} ≥ 135 kW:

- Since VDE-AR-N 4110 requires control of the reactive power on the basis of measured values on the medium voltage side, compliance with the requirements is only possible in combination with a “Power Park Controller”. This must also be certified.
  Fronius works together with manufacturers of “Power Park Controllers” to ensure a complete solution.

- VDE-AR-N 4110 requires the following fort he disconnection protectio of generating units:
  „The protection of generating units requires a network independent auxiliary power supply, which maintains the protective functions for at least 5s.“
  - Fronius Symo 10.0-3-M – 20.0-3-M:
    - As the internal disconnection protection of the Fronius Symo 10.0-3-M – 20.0-3-M doesn´t fulfill that requirement, generating plants of P_{Amax} ≥ 135 kW containing the Fronius Symo 10.0-3-M – 20.0-3-M are only feasible when installing an external disconnection protection with included auxiliary power supply.
  - Fronius Eco 25.0-3-S – 27.0-3-S:
    - The internal disconnection protection of the Fronius Eco does already fulfills that requirement. Therefore an external disconnection protection is not required.

In order to meet the new German connection requirements, Fronius International assumes that only software adaptations and no hardware adaptations are required for the devices in Table 1.
Fronius International will make the necessary adjustments in time before 27th of April 2019

VDE-AR-N-4105:
It is assumed that the test guideline for the requirements of AR-N-4105 will be ready in time so that Fronius can provide the necessary documents.

VDE-AR-N-4110:
Fronius is expecting to perform all adjustments in time, in order to comply with the new requirements. Fronius is also going to be capable of starting the certification process in time. Unfortunately the date of completion of the certification conditions is changing constantly.

UK
Great Britain has taken the requirements of the RfG into account when creating the following two documents, which have to be fulfilled from 27th of April 2019 on:

- Engineering Recommendation G98 (Requirements for the connection of Fully Type Tested Micro-generators (up to and including 16 A per phase) in parallel with public Low Voltage Distribution Networks on or after the 27th of April 2019).

- Engineering Recommendation G99 (Requirements for the connection of generation equipment in parallel with public distribution networks on or after the 27th of April 2019)

To comply with the above mentioned Engineering Recommendations, only firmware adaptations have to be done for the devices mentioned in table 1. For both standards manufacturers declarations and Test Reports will be required. Fronius International will provide them in time.

Italy
In Italy, the connection conditions for low voltage (CEI 0-21) and medium voltage (CEI 0-16) are currently being revised. The documents are still in draft status. It is assumed that the final versions of the two standards will be published at the end of January 2019. From 27th of April 2019, manufacturer declarations will be required, with 2020 certificates must be provided.

Austria
The TOR D4 is still worked on. The requirements will be fulfilled in the context of implementation of the German connection conditions.

Belgium
C10/C11 will be published in January 2019. The requirements will be fulfilled in the context of implementation of the German connection conditions.

Spain
Work is still in progress on PO 12.2. Further information is not yet available.

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