Documentation guide

DANISH ENERGY ASSOCIATION

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Documentation guide to get your plant on the positive list (Category A1/A2)

In the Technical Regulations from Energinet.dk there is a requirement to fill out appendix B1.1 to get your plant on the positive list. Besides appendix B1.1, which you have to send to positivlister@danskenergi.dk, you also need to send the technical documents that support your answers given in appendix B1.1.

But what kind of technical documents are we talking about? Below we give some examples of documents:

- CE declaration of conformity ***(required)***
- Installation and operation manual
- Test Certificate
- Test report (e.g. according VDE 4105 or EN50438)
- Other relevant documents that support your answers in B1.1.

NB! – Some requirements in the technical regulations from Energinet.dk are not covered by VDE 4105 or EN 50438. These requirements are listed below:

- DC-current injection is not covered by the VDE 4105 nor the EN 61000 series. It is, however, covered by EN 50438.

- Control functions for:
  - Constant reactive power
  - Ramp rate constraint function
  - Absolute power constraint function

- Different relay settings in the Danish technical regulation from Energinet.dk
  - Here you have to show us that you can change the settings as required in the technical regulation.

- Connection and Synchronization:
  - In the Danish technical regulation from Energinet.dk, the required observation time before connecting and starting to produce power is 3 minutes.
    In VDE 4105 and EN 50438, the observation time is 1 minute. You need to show us that the observation time can be configured to 3 minutes, as per Danish requirements.

This means that we need some extra documentation for these requirements besides the VDE 4105 or EN 50438 documents.

In the following pages, we give an example on how to fill out appendix B1.1. The example is based on a copy from the Energinet.dk document “Technical regulation 3.2.1 for plants up to and including 11 kW” with the reference number 15/01353-92, from 30.06.2016, rev. 2.

B1.1. Appendix 1 for plant category A1 not listed on the positive list

The documentation form must be filled in with data for the *plant* valid at the time of commissioning and sent to the *electricity supply undertaking.*

B1.1.1. Identification

Plant	Description of the *plant*: *Solar inverter P12* *Documents:* *CE declaration of conformity* *Installation and operation manual* *VDE 4105 test report*
GSRN number	*N/A*
Plant owner name and address	*Supplier details*
Plant owner tel. no.	*Supplier details*
Plant owner e-mail	*Supplier details*
Type/model	*Sunwind P12*
Voltage (nominal)	*400 V*
Rated power (data sheet)	*10 kW*

B1.1.2. Power quality

For each power quality parameter, indicate how the result was achieved.

B1.1.2.1. Voltage changes

Are the voltage changes for the entire *plant* below the limit values? Where to find documentation that this requirement has been met? *See CE declaration of conformity or VDE 4105 test report (page 5)*	Yes ☒ No ☐

B1.1.2.2. DC content

Does the DC content at normal operation exceed 0.5% of the nominal current? Where to find documentation that this requirement has been met? *See installation and operation manual for sunwind (Page 4)*	Yes ☐ No ☒

B1.1.2.3. Asymmetry

Does the asymmetry at normal operation and during faults exceed 16 A? Where to find documentation that this requirement has been met? *It's a 3-phase inverter.* *See page 2 in installation and operation manual*	Yes ☐ No ☒
If the *plant* is made up of single-phase *electricity-generating units*, have you taken measures to ensure that the above limit is not exceeded? Where to find documentation that this requirement has been met? *It's a 3-phase inverter.* *See page 2 in installation and operation manual*	Yes ☐ No ☐

B1.1.2.4. Flicker

Is the *flicker* contribution for the entire *plant* below the limit value? Where to find documentation that this requirement has been met? *See CE declaration of conformity or VDE 4105 test report (page 7)*	Yes ☒ No ☐

B1.1.2.5. Harmonic distortions

Are all *harmonic distortions* for the entire *plant* below the limit values? Where to find documentation that this requirement has been met? *See CE declaration of conformity or VDE 4105 test report (page 11)*	Yes ☒ No ☐

B1.1.3. Connection and synchronisation

Can the *plant* be started and generate power continuously within the *normal production* range, limited only by the protective settings? Where to find documentation that this requirement has been met? *See page 5 in installation and operation manual*	Yes ☒ No ☐
Do connection and synchronisation occur three minutes, at the earliest, after voltage and frequency have come within the *normal production* range? Where to find documentation that this requirement has been met? *See page 5 in installation and operation manual*	Yes ☒ No ☐

B1.1.4. Active power control at overfrequency

Is the *plant* equipped with a *frequency response* function?	Yes ☒ No ☐
Is the function activated?	Yes ☒ No ☐
Where to find documentation that these requirements have been met? *See page 10 in installation and operation manual*	

B1.1.5. Absolute power constraint function

Is the *plant* equipped with an a*bsolute power constraint* function*?*	Yes ☒ No ☐
Is the function activated?	Yes ☐ No ☒
Where to find documentation that these requirements have been met? *See page 15 in installation and operation manual*	

B1.1.6. Ramp rate constraint function

Is the *plant* equipped with a *ramp rate constraint* function?	Yes ☒ No ☐
Is the function activated?	Yes ☐ No ☒
Where to find documentation that these requirements have been met? *See page 20 in installation and operation manual*	

B1.1.7. Reactive power control

Reactive power can be controlled by means of	*Q control* ☒ *Power Factor control* ☒ Automatic *Power Factor control* ☒

B1.1.7.1. Q control

Is the control function activated with a set point of _*N/A*_ VAr? (Value may not differ from 0 VAr unless agreed with the *electricity supply undertaking*). Where to find documentation that this requirement has been met? *See page 26 in installation and operation manual*	Yes ☐ No ☒

B1.1.7.2. Power Factor control

Is the control function deactivated? Where to find documentation that this requirement has been met? *See page 30 in installation and operation manual*	Yes ☒ No ☐

B1.1.7.3. Automatic Power Factor control

Is the control function deactivated? Where to find documentation that this requirement has been met? *See page 33 in installation and operation manual*	Yes ☒ No ☐

B1.1.8. Protection against electricity system faults

B1.1.8.1. Relay settings

In the table below, indicate the values at the time of commissioning.

Protective function	Symbol	Setting		Trip time	
Overvoltage (step 2)	$U_{>>}$	*Default setting*	V	*Default time*	ms
Overvoltage (step 1)	$U_{>}$	*Default setting*	V	*Default time*	s
Undervoltage (step 1)	$U_{<}$	*Default setting*	V	*Default time*	s
Undervoltage (step 2)	$U_{<<}$	*Default setting*	V	*Default time*	ms
Overfrequency	$f_{>}$	*Default setting*	Hz	*Default time*	ms
Underfrequency	$f_{<}$	*Default setting*	Hz	*Default time*	ms
Change of frequency	*df/dt*	*Default setting*	Hz/s	*Default time*	ms

B1.1.8.2. Central protection

Has a central protection unit been installed?	Yes ☐ No ☒
Where is it located?	*PCI* ☐ *POC* ☐
Where to find documentation that these requirements have been met? *See page 9 in installation and operation manual*	
Has consumption been connected after the protection unit? Where to find documentation that this requirement has been met? *Specific for the site of the PV-inverter or wind turbine*	Yes ☐ No ☒

B1.1.9. Signature

Date of commissioning	*Application date*
Company	*Supplier name…*
Person responsible for commissioning	*Supplier…*
Signature	*Supplier…*