Appendix 1 – Documentation

Technical regulation 3.2.2
for PV power plants with a power output
above 11 kW

|  |  |  |  |  |  |  |
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Appendix 1 Documentation

Appendix 1 specifies the documentation requirements for the four *PV power plant categories*, cf. section 1.2.5.

The documentation, as specified in section 8, must be sent electronically to the *electricity supply undertaking*.

The technical documentation must contain configuration parameters and configuration data applicable to the *PV power plant* at the time of commissioning.

All subsections in the appendix must be filled in for the *plant* in question.

If information changes after the time of commissioning, updated documentation must be submitted as required in section 2.2.

Templates for Appendix 1 for the various *plant categories* are available on the website [www.energinet.dk.](http://www.energinet.dk)

* 1. Appendix 1 for plant category A2 not listed on the positive list

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

* + 1. Identification

|  |  |
| --- | --- |
| *Plant* | Description of the *plant*: |
| GSRN number |  |
| *Plant owner* name and address |  |
| *Plant owner* tel. no. |  |
| *Plant owner* e-mail |  |
| Type/model  |  |
| *Voltage (nominal)*  |  |
| *Rated power* (data sheet) |  |

* + 1. Power quality

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

* + - 1. Voltage changes

|  |  |
| --- | --- |
| Are the voltage changes for the entire *plant* below the limit value?Where to find documentation that this requirement has been met?  | Yes [ ] No [ ]  |

* + - 1. DC content

|  |  |
| --- | --- |
| Does the DC content at normal operation exceed 0.5% of nominal current? Where to find documentation that this requirement has been met?  | Yes [ ] No [ ]  |

* + - 1. Asymmetry

|  |  |
| --- | --- |
| Does the asymmetry at normal operation and during faults exceed 16 A?Where to find the documentation that this requirement has been met?  | Yes [ ] No [ ]  |
| In case of a *PV power plant* made up of single-phased *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?  | Yes [ ] No [ ]  |

* + - 1. Flicker

|  |  |
| --- | --- |
| Is the *flicker* contribution for the entire *plant* below the limit value?Where to find documentation that this requirement has been met?  | Yes [ ] No [ ]  |

* + - 1. Harmonic distortions

|  |  |
| --- | --- |
| Are all *harmonic distortions* for the entire *plant* below the limit values?Where to find documentation that this requirement has been met?  | Yes [ ] No [ ]  |

* + 1. Connection and synchronisation

|  |  |
| --- | --- |
| Can the *PV power 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?  | 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?  | Yes [ ] No [ ]  |

* + 1. Active power control at overfrequency

|  |  |
| --- | --- |
| Is the *PV power plant* equipped with a *frequency response function*?Is the function activated?Where to find documentation that these requirements have been met?  | Yes [ ] No [ ] Yes [ ]  No [ ]  |

* + 1. Absolute power constraint function

|  |  |
| --- | --- |
| Is the *PV power plant* equipped with an a*bsolute power constraint function?*Is the function activated?Where to find documentation that these requirements have been met? | Yes [ ]  No [ ] Yes [ ]  No [ ]  |

* + 1. Ramp rate constraint function

|  |  |
| --- | --- |
| Is the *PV power plant* equipped with a *ramp rate constraint* function?Is the function activated?Where to find documentation that these requirements have been met? | Yes [ ]  No [ ] Yes [ ]  No [ ]  |

* + 1. Reactive power control

|  |  |
| --- | --- |
| Reactive power can be controlled by means of  | *Q control* [ ] *Power factor control* [ ] Automatic *power factor control* [ ]  |

* + 1. Q control

|  |  |
| --- | --- |
| Is the control function activated with a set point of \_\_\_\_\_ 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?  | Yes [ ] No [ ]  |

* + 1. Power factor control

|  |  |
| --- | --- |
| Is the control function deactivated?Where to find documentation that this requirement has been met?  | Yes [ ] No [ ]  |

* + 1. Automatic power factor control

|  |  |
| --- | --- |
| Is the control function deactivated?Where to find documentation that this requirement has been met?  | Yes [ ] No [ ]  |

* + 1. Protection against electricity system faults
			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>> |  | V |  | ms |
| Overvoltage (step 1) | U> |  | V |  | s |
| Undervoltage (step 1) | U< |  | V |  | s |
| Undervoltage (step 2) | U<< |  | V |  | ms |
| Overfrequency | *f>* |  | Hz |  | ms |
| Underfrequency | *f<* |  | Hz |  | ms |
| Change of frequency | *df/dt* |  | Hz/s |  | ms |

* + - 1. Central protection

|  |  |
| --- | --- |
| Has a central protection unit been installed?Where is it located?Where to find documentation that these requirements have been met? | Yes [ ]  No [ ] *PCI* [ ]  *POC* [ ]  |
| Has consumption been connected after the protection unit?Where to find documentation that this requirement has been met? | Yes [ ]  No [ ]  |

* + 1. Signature

|  |  |
| --- | --- |
| Date of commissioning |  |
| Company |  |
| Person responsible for commissioning |  |
| Signature |  |

* 1. Appendix 1 for plant category A2 listed on the positive list

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

* + 1. Identification

|  |  |
| --- | --- |
| *Plant* | Description of the *plant*: |
| GSRN number |  |
| *Plant owner* name and address |  |
| *Plant owner* tel. no. |  |
| *Plant owner* e-mail |  |
| Type/model  |  |
| *Voltage (nominal)*  |  |
| *Rated power* (data sheet) |  |

* + 1. Active power control at overfrequency

|  |  |
| --- | --- |
| Is the *PV power plant* equipped with a *frequency response* function?Is the function activated? | Yes [ ] No [ ] Yes [ ]  No [ ]  |

* + 1. Absolute power constraint function

|  |  |
| --- | --- |
| Is the *PV power plant* equipped with an *absolute power constraint* function?Is the function activated? | Yes [ ]  No [ ] Yes [ ]  No [ ]  |

* + 1. Reactive power control

|  |  |
| --- | --- |
| Reactive power can be controlled by means of | *Q control* [ ] *Power factor control* [ ] Automatic *power factor control* [ ]  |

* + 1. Q control

|  |  |
| --- | --- |
| Is the control function activated with a set point of \_\_\_\_\_ VAr?(Value may not differ from 0 VAr unless agreed with the *electricity supply undertaking*). | Yes [ ] No [ ]  |

* + 1. Power factor control

|  |  |
| --- | --- |
| Is the control function deactivated? | Yes [ ] No [ ]  |

* + 1. Automatic power factor control

|  |  |
| --- | --- |
| Is the control function deactivated? | Yes [ ] No [ ]  |

* + 1. Protection against electricity system faults
			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>> |  | V |  | ms |
| Overvoltage (step 1) | U> |  | V |  | s |
| Undervoltage (step 1) | U< |  | V |  | s |
| Undervoltage (step2) | U<< |  | V |  | ms |
| Overfrequency | *f>* |  | Hz |  | ms |
| Underfrequency | *f<* |  | Hz |  | ms |
| Change of frequency | *df/dt* |  | Hz/s |  | ms |

* + - 1. Central protection

|  |  |
| --- | --- |
| Has a central protection unit been installed?Where is it located? | Yes [ ]  Nej [ ] *PCI* [ ]  *POC* [ ]  |
| Has consumption been connected after the protection unit? | Yes [ ]  No [ ]  |

* + 1. Signature

|  |  |
| --- | --- |
| Date of commissioning |  |
| Company |  |
| Person responsible for commissioning |  |
| Signature |  |

* 1. Appendix 1 for plant category B

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

* + 1. Identification

|  |  |
| --- | --- |
| *Plant* | Description of the *plant*: |
| GSRN number |  |
| *Plant* *owner* name and address |  |
| *Plant* *owner* tel. no. |  |
| *Plant owner* e-mail |  |
| Type/model  |  |
| *Voltage (nominal)*  |  |
| *Rated power* (data sheet) |  |

* + 1. Voltage dip tolerances

|  |  |
| --- | --- |
| Will the *PV power plant* remain connected to the *public electricity supply grid* during voltage dips as specified in section 3.3.1? | Yes [ ] No [ ]  |
| Has a simulation been enclosed, documenting that the Low Voltage Fault Ride Through (LVFRT) requirements have been met? If No, how is compliance then documented?  | Yes [ ] No [ ]  |

* + 1. Voltage quality

Please state how results were achieved for each power quality parameter.

|  |  |
| --- | --- |
| Have the values been calculated?  | Yes [ ] No [ ]  |
| Have the values been measured?  | Yes [ ] No [ ]  |
| Is a report enclosed, documenting that the calculations or measurements meet emission requirements? If No, how are the calculations or measurements documented?  | Yes [ ] No [ ]  |

* + - 1. DC content

|  |  |
| --- | --- |
| Does the DC content at normal operation exceed 0.5% of the nominal current? | Yes [ ] No [ ]  |

* + - 1. Asymmetry

|  |  |
| --- | --- |
| Does the asymmetry at normal operation and during faults exceed 16 A? | Yes [ ] No [ ]  |
| In case of a *PV power plant* made up of single-phase *electricity-generating units*, have you taken measures to ensure that the above limit is not exceeded? | Yes [ ] No [ ]  |

* + - 1. Flicker

|  |  |
| --- | --- |
| Is the *flicker* contribution for the entire *PV power plant* below the limit value? | Yes [ ] No [ ]  |

* + - 1. Harmonic distortions

|  |  |
| --- | --- |
| Are all *harmonic distortions* for the entire *PV power plant* below the limit values? | Yes [ ] No [ ]  |

* + - 1. Interharmonic distortions

|  |  |
| --- | --- |
| Are all interharmonic distortions for the entire *PV power plant* below the limit values? | Yes [ ] No [ ]  |

* + - 1. Distortions from 2-9 kHz

|  |  |
| --- | --- |
| Is the emission of distortions with frequencies in the 2-9 kHz range lower than 0.2% of the *rated current In*? | Yes [ ] No [ ]  |

* + 1. Connection and synchronisation

|  |  |
| --- | --- |
| Can the *PV power plant* be started and generate power continuously within the *normal production* range. limited only by the protective settings? | Yes [ ] No [ ]  |
| Do connection and synchronisation occur three minutes, at the earliest, after the voltage and frequency have come within the *normal production* range? | Yes [ ] No [ ]  |

* + 1. Active power control at overfrequency

|  |  |
| --- | --- |
| Is the *PV power plant* equipped with a *frequency response* function? | Yes [ ] No [ ]  |

* + 1. Absolute power constraint function

|  |  |
| --- | --- |
| Is the *PV power plant* equipped with an *absolute power constraint* function?Is the function activated? | Yes [ ]  No [ ] Yes [ ]  No [ ]  |

* + 1. Ramp rate constraint function

|  |  |
| --- | --- |
| Is the *PV power plant* equipped with a *ramp rate constraint* function?Is the function activated? | Yes [ ]  No [ ] Yes [ ]  No [ ]  |

* + 1. Reactive power control

|  |  |
| --- | --- |
| Reactive power can be controlled by means of | *Q control* [ ] *Power factor control* [ ] *Automatic power factor control* [ ]  |

* + 1. Q control

|  |  |
| --- | --- |
| Is the control function activated with a set point of \_\_\_\_\_ VAr?(Value may not differ from 0 VAr unless agreed with the *electricity supply undertaking*).  | Yes [ ] No [ ]  |

* + 1. Power factor control

|  |  |
| --- | --- |
| Is the control function deactivated? | Yes [ ] No [ ]  |

* + 1. Automatic power factor control

|  |  |
| --- | --- |
| Is the control function deactivated? | Yes [ ] No [ ]  |

* + 1. Protection against electricity system faults
			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>> |  | V |  | ms |
| Overvoltage (step 1) | U> |  | V |  | s |
| Undervoltage (step 1) | U< |  | V |  | s |
| Overfrequency | *f>* |  | Hz |  | ms |
| Underfrequency | *f<* |  | Hz |  | ms |
| Change of frequency | *df/dt* |  | Hz/s |  | ms |

* + - 1. Central protection

|  |  |
| --- | --- |
| Has a central protection unit been installed?Where is it located? | Yes [ ]  No [ ] *PCI* [ ]  *POC* [ ]  |
| Has consumption been connected after the protection unit? | Yes [ ]  No [ ]  |

* + 1. Single-line representation

|  |  |
| --- | --- |
| Is a single-line representation for the *plant* enclosed with the documentation?If No, when will the final single-line representation be provided? | Yes [ ] No [ ]  |

* + 1. Signature

|  |  |
| --- | --- |
| Date of commissioning |  |
| Company |  |
| Person responsible for commissioning |  |
| Signature |  |

* 1. Appendix 1 to plant category C

The documentation form must be filled in with preliminary data for the *PV power plant* and sent to the *electricity supply undertaking* no later than three months **before** the date of commissioning.

No later than three months **after** the date of commissioning, the documentation form must be filled in with specific data for the entire *PV power plant* and sent to the *electricity supply undertaking*.

The required documentation comprises the following:

* + 1. Identification

|  |  |
| --- | --- |
| *Plant* | Description of the *plant*: |
| GSRN number |  |
| *Plant* *owner* name and address |  |
| *Plant owner* tel. no. |  |
| *Plant owner* e-mail |  |
| Type/model  |  |
| *Voltage (nominal)*  |  |
| *Rated power* (data sheet) |  |

* + 1. Voltage dip tolerances

|  |  |
| --- | --- |
| Will the *plant* remain connected to the *public electricity supply grid* during voltage dips as specified in section 3.3.1? | Yes [ ] No [ ]  |
| Has a simulation been enclosed, documenting that the Low Voltage Fault Ride Through (LVFRT) requirements have been met? If No, how is compliance then documented?  | Yes [ ] No [ ]  |

* + 1. Voltage quality

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

|  |  |
| --- | --- |
| Have the values been calculated?  | Yes [ ] No [ ]  |
| Have the values been measured?  | Yes [ ] No [ ]  |
| Is a report enclosed, documenting that the calculations or measurements meet the emission requirements? If No, how are the calculations or measurements documented?  | Yes [ ] No [ ]  |

* + - 1. DC content

|  |  |
| --- | --- |
| Does the DC content at normal operation exceed 0.5% of the nominal current? | Yes [ ] No [ ]  |

* + - 1. Asymmetry

|  |  |
| --- | --- |
| Does the asymmetry at normal operation and during faults exceed 16 A? | Yes [ ] No [ ]  |
| In case of a *PV power plant* made up of single-phase *electricity-generating units*, have you taken measures to ensure that the above limit is not exceeded? | Yes [ ] No [ ]  |

* + - 1. Flicker

|  |  |
| --- | --- |
| Is the *flicker* contribution for the entire *PV power plant* below the limit value? | Yes [ ] No [ ]  |

* + - 1. Harmonic distortions

|  |  |
| --- | --- |
| Are all *harmonic distortions* for the entire *PV power plant* below the limit values? | Yes [ ] No [ ]  |

* + - 1. Interharmonic distortions

|  |  |
| --- | --- |
| Are all interharmonic distortions for the entire *PV power plant* below the limit values? | Yes [ ] No [ ]  |

* + - 1. Distortions from 2-9 kHz

|  |  |
| --- | --- |
| Emission of distortions with frequencies in the 2-9 kHz range is determined by the *electricity supply undertaking*. Is the requirement met? | Yes [ ] No [ ]  |

* + 1. Connection and synchronisation

|  |  |
| --- | --- |
| Can the *plant* be started and generate power continuously within the *normal production* range, limited only by the protective settings? | Yes [ ] No [ ]  |
| Do connection and synchronisation occur three minutes, at the earliest, after voltage and frequency have come within the *normal production* range? | Yes [ ] No [ ]  |

* + 1. Active power control at overfrequency

|  |  |
| --- | --- |
| Is the *PV power plant* equipped with a *frequency response* function? | Yes [ ] No [ ]  |

* + 1. Frequency control

|  |  |
| --- | --- |
| Is the *PV power plant* equipped with a *frequency control* function as specified in section 5.2.2? | Yes [ ]  No [ ]  |

* + 1. Absolute power constraint function

|  |  |
| --- | --- |
| Is the PV power *plant* equipped with an *absolute power constraint* function?Is the function activated? | Yes [ ]  No [ ] Yes [ ]  No [ ]  |

* + 1. Delta power constraint function

|  |  |
| --- | --- |
| Is the *PV power plant* equipped with a *delta power constraint* function?Is the function activated? | Yes [ ]  No [ ] Yes [ ]  No [ ]  |

* + 1. Ramp rate constraint function

|  |  |
| --- | --- |
| Is the *PV power plant* equipped with a *ramp rate constraint* function?Is the function activated? | Yes [ ]  No [ ] Yes [ ]  No [ ]  |

* + 1. System protection

|  |  |
| --- | --- |
| Is the *PV power plant* equipped with a system protection function?Is the function activated? | Yes [ ]  No [ ] Yes [ ]  No [ ]  |

* + 1. Reactive power control

|  |  |
| --- | --- |
| Reactive power can be controlled by means of | *Q control* [ ] *Power factor control* [ ] *Voltage control* [ ]  |

* + 1. Q control

|  |  |
| --- | --- |
| Is the control function activated with a set point of \_\_\_\_\_ VAr?(Value may not differ from 0 VAr unless agreed with the *electricity supply undertaking*). | Yes [ ] No [ ]  |

* + 1. Power factor control

|  |  |
| --- | --- |
| Is the control function deactivated? | Yes [ ] No [ ]  |

* + 1. Voltage control

|  |  |
| --- | --- |
| Is the *plant* equipped with a *voltage control* function as specified in section 5.3.3? | Yes [ ]  No [ ]  |

* + 1. Protection against electricity system faults
			1. Relay settings

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

|  |  |  |  |
| --- | --- | --- | --- |
| **Protective function** | **Symbol** | **Setting** | **Trip time** |
| Overvoltage (step 3) | U>>> |  | V |  | Ms |
| Overvoltage (step 2) | U>> |  | V |  | Ms |
| Overvoltage (step 1) | U> |  | V |  | S |
| Undervoltage (step 1) | U< |  | V |  | S |
| Overfrequency | *f>* |  | Hz |  | Ms |
| Underfrequency | *f<* |  | Hz |  | Ms |
| Change of frequency | *df/dt* |  | Hz/s |  | Ms |

* + - 1. Central protection

|  |  |
| --- | --- |
| Has a central protection unit been installed?If Yes, where is it located? | Yes [ ]  No [ ] *PCI* [ ]  *POC* [ ]  |
| Has consumption been connected after the protection unit? | Yes [ ]  No [ ]  |

* + 1. Single-line representation

|  |  |
| --- | --- |
| Is a single-line representation for the *PV power plant* enclosed with the documentation?If No, when will the final single-line representation be provided? | Yes [ ] No [ ]  |

* + 1. PQ diagram

|  |  |
| --- | --- |
| Has the final PQ diagram been submitted to the *electricity supply undertaking*?If No, when will the final PQ diagram be provided? | Yes [ ]  No [ ]  |

* + 1. Signal list

|  |  |
| --- | --- |
| Has the final signal list been submitted to the *electricity supply undertaking*?If No, when will the final signal list be provided? | Yes [ ]  No [ ]  |

* + 1. Simulation model

|  |  |
| --- | --- |
| Has the electrical simulation model for the *PV power plant* been submitted to the *electricity supply undertaking*? If No, when will the final simulation model be provided? | Yes [ ]  No [ ]  |

* + 1. Verification report

|  |  |
| --- | --- |
| Has the verification report been submitted to the *electricity supply undertaking*?If No, when will the verification report be provided? | Yes [ ]  No [ ]  |

* + 1. Signature

|  |  |
| --- | --- |
| Date of commissioning |  |
| Company |  |
| Person responsible for commissioning |  |
| Signature |  |

* 1. Appendix 1 for plant category D

The documentation form must be filled in with preliminary data for the *PV power plant* and sent to the *electricity supply undertaking* no later than three months **before** the date of commissioning.

No later than three months **after** the date of commissioning, the documentation form must be filled in with specific data for the entire *PV power plant* and sent to the *electricity supply undertaking*.

The required documentation comprises the following:

* + 1. Identification

|  |  |
| --- | --- |
| *Plant* | Description of the *plant*: |
| GSRN number |  |
| *Plant* *owner* name and address |  |
| *Plant owner* tel. no. |  |
| *Plant owner* e-mail |  |
| Type/model  |  |
| *Voltage (nominal)*  |  |
| *Rated power* (data sheet) |  |

* + 1. Voltage dip tolerances

|  |  |
| --- | --- |
| Will thePV power *plant* remain connected to the *public electricity supply grid* during voltage dips as specified in section 3.3.1? | Yes [ ] No [ ]  |
| Has a simulation been enclosed, documenting that the Low Voltage Fault Ride Through (LVFRT) requirements have been met? If No, how is compliance then documented?  | Yes [ ] No [ ]  |

* + 1. Voltage quality

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

|  |  |
| --- | --- |
| Have the values been calculated?  | Yes [ ] No [ ]  |
| Have the values been measured?  | Yes [ ] No [ ]  |
| Is a report enclosed, documenting that the calculations or measurements meet the emission requirements? If No, how are the calculations or measurements documented?  | Yes [ ] No [ ]  |

* + - 1. DC content

|  |  |
| --- | --- |
| Does the DC content at normal operation exceed 0.5% of the nominal current? | Yes [ ] No [ ]  |

* + - 1. Asymmetry

|  |  |
| --- | --- |
| Does the asymmetry at normal operation and during faults exceed 16 A? | Yes [ ] No [ ]  |
| In case of a *PV power plant* made up of single-phase *electricity-generating units*, have you ensured that the above limit is not exceeded? | Yes [ ] No [ ]  |

* + - 1. Flicker

|  |  |
| --- | --- |
| Is the *flicker* contribution for the entire *PV power plant* below the limit value? | Yes [ ] No [ ]  |

* + - 1. Harmonic distortions

|  |  |
| --- | --- |
| Are all *harmonic* *distortions* for the entire *PV power plant* below the limit values? | Yes [ ] No [ ]  |

* + - 1. Interharmonic distortions

|  |  |
| --- | --- |
| Are all interharmonic distortions for the entire *PV power plant* below the limit values? | Yes [ ] No [ ]  |

* + - 1. Distortions from 2-9 kHz

|  |  |
| --- | --- |
| Emission of distortions with frequencies in the 2-9 kHz range is determined by the *electricity supply undertaking*. Is the requirement met? | Yes [ ] No [ ]  |

* + 1. Connection and synchronisation

|  |  |
| --- | --- |
| Can the *PV power plant* be started and generate power continuously within the *normal production* range, limited only by the protective settings? | Yes [ ] No [ ]  |
| Do connection and synchronisation occur three minutes, at the earliest, after voltage and frequency have come within the *normal production* range? | Yes [ ] No [ ]  |

* + 1. Active power control at overfrequency

|  |  |
| --- | --- |
| Is the *PV power plant* equipped with a *frequency response* function? | Yes [ ] No [ ]  |

* + 1. Frequency control

|  |  |
| --- | --- |
| Is the *PV power plant* equipped with a *frequency control* function as specified in section 5.2.2? | Yes [ ]  No [ ]  |

* + 1. Absolute power constraint function

|  |  |
| --- | --- |
| Is the *PV power plant* equipped with an *absolute power constraint* function?Is the function activated? | Yes [ ]  No [ ] Yes [ ]  No [ ]  |

* + 1. Delta power constraint function

|  |  |
| --- | --- |
| Is the *PV power plant* equipped with a *delta power constraint* function?Is the function activated? | Yes [ ]  No [ ] Yes [ ]  No [ ]  |

* + 1. Ramp rate constraint function

|  |  |
| --- | --- |
| Is the *PV power plant* equipped with a *ramp rate constraint* function?Is the function activated? | Yes [ ]  No [ ] Yes [ ]  No [ ]  |

* + 1. System protection

|  |  |
| --- | --- |
| Is the *PV power plant* equipped with a system protection function?Is the function activated? | Yes [ ]  No [ ] Yes [ ]  No [ ]  |

* + 1. Reactive power control

|  |  |
| --- | --- |
| Reactive power can be controlled by means of | *Q control* [ ] *Power factor control* [ ] *Voltage control* [ ]  |

* + 1. Q control

|  |  |
| --- | --- |
| Is the control function activated with a set point of \_\_\_\_\_ VAr?(Value may not differ from 0 VAr unless agreed with the *electricity supply undertaking*). | Yes [ ] No [ ]  |

* + 1. Power factor control

|  |  |
| --- | --- |
| Is the control function deactivated? | Yes [ ] No [ ]  |

* + 1. Voltage control

|  |  |
| --- | --- |
| Is the *PV power plant* equipped with a *voltage control* function as specified in section 5.3.3? | Yes [ ]  No [ ]  |

* + 1. Protection against electricity system faults
			1. Relay settings

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

|  |  |  |  |
| --- | --- | --- | --- |
| **Protective function** | **Symbol** | **Setting** | **Trip time** |
| Overvoltage (step 3) | U>>> |  | V |  | Ms |
| Overvoltage (step 2) | U>> |  | V |  | Ms |
| Overvoltage (step 1) | U> |  | V |  | S |
| Undervoltage (step 1) | U< |  | V |  | S |
| Overfrequency | *f>* |  | Hz |  | Ms |
| Underfrequency | *f<* |  | Hz |  | Ms |
| Change of frequency | *df/dt* |  | Hz/s |  | Ms |

* + - 1. Central protection

|  |  |
| --- | --- |
| Has a central protection unit been installed?Where is it located? | Yes [ ]  No [ ] *PCI* [ ]  *POC* [ ]  |
| Has consumption been connected after the protection unit? | Yes [ ]  No [ ]  |

* + 1. Single-line representation

|  |  |
| --- | --- |
| Is a single-line representation for the *plant* enclosed with the documentation?If No, when will the final single-line representation be provided? | Yes [ ] No [ ]  |

* + 1. PQ diagram

|  |  |
| --- | --- |
| Has the final PQ diagram been submitted to the *electricity supply undertaking*?If No, when will the final PQ diagram be provided? | Yes [ ]  No [ ]  |

* + 1. Signal list

|  |  |
| --- | --- |
| Has the final signal list been submitted to the *electricity supply undertaking*?If No, when will the final signal list be provided? | Yes [ ]  No [ ]  |

* + 1. Simulation model

|  |  |
| --- | --- |
| Has the electrical simulation model for the *PV power plant* been submitted to the *electricity supply undertaking*? If No, when will the final simulation model be provided? | Yes [ ]  No [ ]  |

* + 1. Verification report

|  |  |
| --- | --- |
| Has the verification report been submitted to the *electricity supply undertaking*?If No, when will the verification report be provided? | Yes [ ]  No [ ]  |

* + 1. Signature

|  |  |
| --- | --- |
| Date of commissioning |  |
| Company |  |
| Person responsible for commissioning |  |
| Signature |  |