

ENQUIRY RESULTS

<p>prEN 50549-2 Title: Requirements for generating plants to be connected in parallel with distribution networks - Part 2: Connection to a MV distribution network</p>	<p>Submission: 2017-05-26 Deadline: 2017-08-18 Subsector: U95 Project: 63321 TC(s): CLC/TC 8X Directive(s): RfG (2016/631) Mandated: M/490 Supersedes: CLC/TS 50549-2:2015</p>
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Results	Countries (* = with comments, ** = no answer received, *** = answer received, but file is not valid --> vote not accepted)
ACCEPTANCE:	AT*, BE*, BG, CZ, DE*, FR*, HR, HU, IT*, LT, LV*, MT, NL*, NO*, RO*, RS, SE, SI*
REJECTION:	DK*, EE*, ES*, FI*, GB*, PL*
Abstention:	CH, CY, GR, IE, IS, LU, MK, PT, SK, TR

Total members/weighted votes
 18(219)
 6(101)

Evaluation	All countries		EEA countries	
	1) Simple majority of members for acceptance (Yes/No)	18/6	YES	17/6
2) Proportion of positive weighted votes ≥ 71	68.44%	NO	67.73	NO
Conditions fulfilled		NO		NO

Proposed implementation dates
 doa: dor + 6 months
 dop: dor + 12 months
 dow: dor + 36 months

Ca. 657 Comments

Comments marked yellow in first column have been discussed in the meeting. All other proposed observation have been checked by members independently, the original proposal has been agreed.

Proposals marked red: Observation results in no implementation task,

Proposals marked in orange: Observation results in implementation based on another comment,

Proposals marked in green: Observation results in change of text, planned change has been implemented in draft for FORMAL VOTE.

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
AT 01				ge	The Austrian Electrotechnical Committee is in favour of the submitted prEN on principle , but submits the following comments asking for consideration for improvement:		Noted	
BE01				G	The BE NC fully supports the development of this document. Such an EN will be a very efficient tool in the further progress of the energy transition providing a set of European reference requirements to be considered in view of the compliance assessment of dispersed generating units. The BE NC also wants to emphasize the urgency of this work. As the European NC RfG will apply from three years after its publication (i.e. 27 APR 2019), it becomes urgent to have a standard that will facilitate the issuing of Equipment Certificates by an authorised certifier. In view of a further improvement of the draft, the BE NC provides following comments. * The comments indicated with a *, have an equivalent comment on 50549-1		Noted	
BE02			Title	Te/Ed	Depending on national choice of the threshold between Type B and Type C, Type C generating units could also be connected in parallel to MV networks. From the text of the draft, it can be understood that the draft only overs generating units up to and including Type B (and not Type C)	Change title to "Requirements for generating plants to be connected in parallel with distribution networks - Part 1-1: Connection to a MV distribution network - Generating plants up to and including Type B "	accepted Requirements for generating plants to be connected in parallel with distribution networks - Part 2: Connection to a MV distribution network - Generating plants up to and including Type B " proposal to be the new title, all other comments on title are dealt with by this solution	

MB/ NC	Line numb er	Clause/ Subclau se	Paragr aph/ Figure/ Table	Type of com ment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK1				te	<p>The DK NC cast a negative vote on the prEN 50549-2 for the following reasons:</p> <p>One of the reasons is the needed technical improvements on the draft which also is reflected in the DK technical comments.</p> <p>Also alignment in draft EN of RSO/DSO/TSO and who specifies requirements according to RFG?</p> <p>The draft has caused a lot of discussions in DK and the NC has not reached consensus. The lack of consensus in DK is also caused by different opinions on whether the document shall be by and TS or and EN. Furthermore, the timeframe for the project has been discussed heavily, this in relation to the national implementation of the RFG. Should the EN/TS be published before or after the deadline for national implementation of the RFG?</p> <p>The DK NC agrees on the overall purpose and fully supports the efforts in trying to harmonize European grid codes as much as possible.</p> <p>Same comment/vote is given to the prEN50549-1</p>	Please consider and reflect on this comment	<p>Noted</p> <p>detailed comments will be considered</p> <p>see also TC8X and BT decision regarding this work item</p>	
EE-02				Ge	The definition of the requirements as made within this document may interfere with the national implementation of the connection network codes, with a potential result of not coherency between this document and national implemented requirements.	It is recommended to postpone the approval of this document until analysing the final European network codes implementation, or at least make a review after it.	Partly accepted A review is planned	
ES-01				Ge	The definition of the requirements as made within this document may interfere with the national implementation of the connection network codes, with a potential result of not coherency between this document and national implemented requirements.	It is recommended to postpone the approval of this document until analysing the final European network codes implementation, or at least make a review after it.	Partly accepted A review is planned	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
ES-02				Ge	The document usually makes reference to “generating plants” and “generating units”, and the Regulation 2016/631 establishes the requirements to “power generating modules”.	The whole text shall be revised in order to achieve consistency with the terms.	partly accepted The WG considered this option but since 2016/631 terms are not in consistence with other CENELEC standards the WG chose to keep consistency within the CENELEC standards Add Note after line 121: Definitions are used for consistency with IEV and CENELEC definitions taking into account that definitions in RfG deviate	
FI 1				ge	The Finnish National Committee casts a negative vote with technical comments. There are technical issues which need to be clarified before proceeding to publication.		Noted	
FR 01				Ge	The FR NC supports this project and will express a positive vote at next stage, provided that the following comments are accepted		Noted	
IT01				ge	In order to avoid ambiguity, it should be clarified throughout the whole document when the requirements apply to generating plants, module or units (or combination of them), since they shall be subject to conformity assessment and tests		Noted Please be more specific since the WG considers this already implemented. The word chosen in the text generating plant , unit and module are chosen with great care	
NL-02				ge	The definition of the requirements as made within this document may interfere with the national implementation of the connection network codes, with a potential result of not coherency between this document and national implemented requirements.	It is recommended to postpone the approval of this document until analysing the final European network codes implementation, or at least make a review after it.	Partly accepted A review is planned	
PL-01				ge	The Polish mirror committee <i>disapproves the presented draft standard</i> based on comments provided below.		Noted	

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PL-02				ge	<p>Technical requirements for power generating modules, intended to operate in parallel with MV distribution networks, set in Draft Standard 50549-2 shall be developed in reference to Regulation (EU) 2016/631 and shall be strictly compliant with this Regulation. Such approach will facilitate avoiding interpretational ambiguities of these Standards and will actually enable using these norms in practise.</p> <p>Reasoning:</p> <p>Compliance between norms and Regulation (EU) 2016/631 is a sine qua non condition for using these standards in practise. In the event of any discrepancies between these documents, the latter (Regulation and decisions adopted on its basis) is binding, so eventually, using of the standard will be very limited.</p>		<p>Noted</p> <p>The WG is aware of this and takes great care to keep the standard congruent with EU 2016/631</p>	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Priority
PL-03				ge	<p>Standard 50549-2 covers the requirements for generators of both A and B type intended to operate parallel with MV distribution networks. As the requirements for B type generators are broader than for A type, requirements shall be described separately. Our proposal is to develop separate chapters for requirements provided for A and B types intended to operate in parallel with MV distribution networks:</p> <p>a) Standard's main body</p> <p>i. Requirements for A type generators</p> <p>ii. Requirements for B type generators</p> <p>Reasoning:</p> <p>Without proper distinction between Type A and Type B generators the interpretational problem may occur concerning doubt, which requirements are provided for which type of generating facility. Some of the requirements provided for B type generators can be treated as provided also for A type generators unjustifiably or on the contrary, requirements provided for A Type generators by Regulation (EU) 2016/631 can be treated as exhaustive for grid connection of B-type generators. Developing separate chapters, as proposed above, will clarify requirements' scope for generating plants intended to operate in parallel with MV distribution networks.</p>		<p>Rejected</p> <p>In contrast to EU2016/631 this document does not cover only cross border issues respectively transport system issues, but also issues that are only relevant locally for which the differentiation between type A and B is not relevant</p> <p>This is namely:</p> <p>4.3 switch gear</p> <p>4.7.1 and 4.7.2 Reactive power requirements</p> <p>4.8 EMC</p> <p>4.9 Interface protection requirements</p> <p>4.10 connection conditions as this is also a local issue in LV grids</p> <p>4.11 reduction of output power as far as distribution grid management is concerned</p> <p>4.12 communication exchange as far as distribution grid management is concerned</p>	
RO-01					<p>According to IEC 60050 ref. 601-03-01, the adjective "power" is related to the term "power station" (also known as "electrical generating station") which is identical to "power plant" used throughout different American publications referring to small power generating installations.</p>	<p>Replace the title by:</p> <p><i>Requirements for power plants to be connected in parallel with distribution networks – Part 2: Connection to a MV distribution network</i></p>	<p>Rejected,</p> <p>Generating plant seems to be understandable</p>	

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
RO-02				ge	<p>In order to clarify certain technical requirements related to different types of “power station units” (identical to “power generating units”) classified by the type of primary energy source and technology used to generate the electrical energy, in the latest European / international standards (e.g. EN 60909-0:2016 identical to the international standard IEC 60909-0:2016), by this way, the following terms have been established: photovoltaic power station unit; wind power station unit with asynchronous generator; wind power station unit with doubly fed asynchronous generator; wind power station unit with full size converter, etc..</p> <p>However, other similar terms are to be defined into current developments of future European standards (in this case, EN 50549 standard series) for certification purposes mainly.</p>	<p>All technical requirements shall be clearly specified taking into account each type of power plant (power generating module / unit) in order to facilitate the implementation at European and national level, and to ensure permanent correlation between technical standards and regulations.</p> <p>Moreover, all technical requirements and related terms shall be established in close relation with those already defined throughout new European/international standards (recently adopted as national standards) by the technical committees involved in development of smart grid architecture in order to assure the interoperability between relevant systems / equipment (units, components).</p> <p>Having in view the above-mentioned aspects, the drafts of future EN 50549 standard series need to be carefully rewritten.</p>	Noted	
PL-04	0001	Title		gd	<p>Requirements for generating plants to be connected in parallel</p> <p>with distribution networks - Part 2: Connection to a MV distribution network</p>	<p>Modify title:</p> <p>Requirements for power generating modules to be connected in parallel with distribution networks - Part 2: Connection to a MV distribution network</p>	<p>Rejected</p> <p>The standard is intended to define requirements for generating plants, not modules as defined in RfG. The generating plant corelates to a generating facility in RfG. See also ES02</p>	
DK3	0049	Foreword		ge	<p>“This European Standard is also intended to serve as a technical reference for the definition of national requirements ...”</p> <p>Network codes, which are established by means of EU Regulations, shall prevail over European standards. Consequently standards cannot be considered as technical reference for national implementation of network codes. NC RfG Article 7(3)(f) defined, that European shall be taken into consideration, which is different from serving as technical reference. Wording shall be aligned with NC RfG.</p>	<p>“This European Standard shall be taken into consideration for the definition of national requirements ...”</p>	<p>Rejected</p> <p>It is not necessary to copy parts of a regulation in a standard.</p> <p>The meaning is the same, by serving as reference, the document is considered by a party implementing RfG</p>	

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EE-03	0049	Foreword		Ge	<p>“This European Standard is also intended to serve as a technical reference for the definition of national requirements ...”</p> <p>Network codes, which are established by means of EU Regulations, shall prevail over European standards. Consequently standards cannot be considered as technical reference for national implementation of network codes. NC RfG Article 7(3)(f) defined, that European shall be taken into consideration, which is different from serving as technical reference. Wording shall be aligned with NC RfG.</p>	<p>“This European Standard shall be taken into consideration for the definition of national requirements ...”</p>	See DK3	
NL-03	0049	Foreword		ge	<p>“This European Standard is also intended to serve as a technical reference for the definition of national requirements ...”</p> <p>Network codes, which are established by means of EU Regulations, shall prevail over European standards. Consequently standards cannot be considered as technical reference for national implementation of network codes. NC RfG Article 7(3)(f) defined, that European shall be taken into consideration, which is different from serving as technical reference. Wording shall be aligned with NC RfG.</p>	<p>“This European Standard shall be taken into consideration for the definition of national requirements ...”</p>	See DK3	
FR 02	0055-56			Ge	<p>There is no explicit mandate from the European Commission</p>	<p>Remove statement in line 55-56</p>	<p>accepted</p> <p>replace by. This document has been prepared as a deliverable to the EC mandate M/490</p>	
FR 03	0057	1		Ge	<p>This standard is related to the RfG network code, not to all network codes</p>	<p>Write: “This European Standard relates to both the RfG European Network Code and current technical market needs”</p>	accepted	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
FR 04	0060	1		Ge	This standard is related to the RfG network code, not to all network codes	Write: "This European Standard is also intended to serve as a technical reference for the definition of national requirements where the RfG European Network Code requirements allow flexible implementation"	accepted	
RO-03	0065-67	1	Scope	te	In general, the technical requirements for the protection functions and operational capabilities of power generating units (especially those based on synchronous machines) shall be taken into account when they are intended to operate in parallel with MV distribution networks.	Replace the text by: This European Standard specifies the technical requirements for the protection functions and the operational capabilities for power plants (power generating units) intended to operate in parallel with MV distribution networks	Rejected The intention of this document is to define requirements that a generating plant shall deliver at the point of connection. Whether these requirements are implemented in a generating unit or in additional equipment rests with the generating plant design	
EE-04	0066-67	1			This European Standard specifies the technical requirements for the protection functions and the operational capabilities for generating plants, intended to operate in parallel with MV distribution networks	This European Standard specifies the technical requirements for the protection functions and the operational capabilities for generating plants unit generation, intended to operate in parallel with MV distribution networks. Synchronous generating or generating module. To be clarify if batteries has them place in this standard The notion of generating plants shall be replaced by unit generation	Rejected The intention of this document is to define requirements that a generating plant shall deliver at the point of connection. Whether these requirements are implemented in a generating unit or in additional equipment rests with the generating plant design.	

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NL-04	0066-67	1			This European Standard specifies the technical requirements for the protection functions and the operational capabilities for generating plants, intended to operate in parallel with MV distribution networks	<p>This European Standard specifies the technical requirements for the protection functions and the operational capabilities for generating plants unit generation, intended to operate in parallel with MV distribution networks.</p> <p>Synchronous generating or generating module. To be clarify if batteries has them place in this standard</p> <p>The notion of generating plants shall be replaced by unit generation</p>	<p>Rejected</p> <p>The intention of this document is to define requirements that a generating plant shall deliver at the point of connection. Whether these requirements are implemented in a generating unit or in additional equipment rests with the generating plant design.</p>	
PL-05	0066-67	1		gd	This European Standard specifies the technical requirements for the protection functions and the operational capabilities for generating plants, intended to operate in parallel with MV distribution networks	This European Standard specifies the technical requirements for the protection functions and the operational capabilities for power generation module, intended to operate in parallel with MV distribution networks.	<p>Rejected</p> <p>The intention of this document is to define requirements that a generating plant shall deliver at the point of connection. Whether these requirements are implemented in a generating unit or in additional equipment rests with the generating plant design.</p>	
NO 1	0066-67 and 92-93			ed	In order to introduce the scope as early and compact as possible, it would be better to move the lines 92-93 before line 66	Move the lines 92-93 before line 66	<p>Accepted</p> <p>See DE-012</p>	

MB/ NC	Line numb er	Clause/ Subclau se	Paragr aph/ Figure/ Table	Type of com ment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK4	0069	1		ge	<p>“For practical reasons, this European Standard refers to the relevant distribution system operator where settings have to be defined and/or provided, even when these settings are to be defined and/or provided by another actor e.g. TSO, Member state, regulatory authorities, according to national and European legal framework.”</p> <p>This clause creates ambiguity and uncertainty, because it can be understood, that the DSO defines settings by default.</p> <p>It also defines, that settings, which are not defined according to national and European legal framework, are specified by the DSO, which in practice may not be the case.</p>	<p>Define explicitly in every single case (like for NC RfG), which entity / entities are in charge of defining settings.</p> <p>Alternatively leave out reference of requirement specifier.</p>	<p>Partly accepted</p> <p><u>change for RfG topics where it is not DSO</u></p> <p><u>replace “DSO” by “responsible party”</u></p> <p><u>rephrase line 78:</u></p> <p><u>For practical reasons this EN refers to the responsible party where requirements have to be defined by an actor other than the DSO e.g. TSO, Member state, regulatory authorities according to the legal framework. Typically the DSO will inform the producer about these requirements</u></p> <p><u>add definition of “responsible party” in 3.1</u></p>	
EE-05	0069	1		Ge	<p>“For practical reasons, this European Standard refers to the relevant distribution system operator where settings have to be defined and/or provided, even when these settings are to be defined and/or provided by another actor e.g. TSO, Member state, regulatory authorities, according to national and European legal framework.”</p> <p>This clause creates ambiguity and uncertainty, because it can be understood, that the DSO defines settings by default.</p> <p>It also defines, that settings, which are not defined according to national and European legal framework, are specified by the DSO, which in practice may not be the case.</p>	<p>Define explicitly in every single case (like for NC RfG), which entity / entities are in charge of defining settings.</p>	<p>See DK4</p>	

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ES-03	0069	1		Ge	<p>“For practical reasons, this European Standard refers to the relevant distribution system operator where settings have to be defined and/or provided, even when these settings are to be defined and/or provided by another actor e.g. TSO, Member state, regulatory authorities, according to national and European legal framework.”</p> <p>If this sentence is not removed, then the rest of the Technical Standard shall define DSO and TSO responsibility, attending to Regulation 2016/63”.</p> <p>The mode of redaction of the document, due to the application of this clause, leads to misunderstanding as it can be understood that the DSO defines the settings by default, and not according to Regulation 2017/631</p>	Define explicitly in every single case which entity / entities are in charge of defining settings.	See DK4	
NL-05	0069	1		ge	<p>“For practical reasons, this European Standard refers to the relevant distribution system operator where settings have to be defined and/or provided, even when these settings are to be defined and/or provided by another actor e.g. TSO, Member state, regulatory authorities, according to national and European legal framework.”</p> <p>This clause creates ambiguity and uncertainty, because it can be understood, that the DSO defines settings by default.</p> <p>It also defines, that settings, which are not defined according to national and European legal framework, are specified by the DSO, which in practice may not be the case.</p>	Define explicitly in every single case (like for NC RfG), which entity / entities are in charge of defining settings.	See DK4	

MB/ NC	Line numb er	Clause/ Subclau se	Paragr aph/ Figure/ Table	Type of com ment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
PL-06	0069	1		ge	<p>“For practical reasons, this European Standard refers to the relevant distribution system operator where settings have to be defined and/or provided, even when these settings are to be defined and/or provided by another actor e.g. TSO, Member state, regulatory authorities, according to national and European legal framework.”</p> <p>This clause creates ambiguity and uncertainty, because it can be understood, that the DSO defines settings by default.</p> <p>It also defines, that settings, which are not defined according to national and European legal framework, are specified by the DSO, which in practice may not be the case.</p> <p>Where Art. 7 (9) will be established by the Member State, the DSO will be Inadequate.</p>	Define explicitly in every single case which entity / entities are in charge of defining settings and consider relevant system operator will be the most appropriate	See DK-04	
NO 2	0070			te/ed	The term “settings” is used several places in the document, but it is not clear what is covered by the term	Consider to include a definition of the term in chapter 3 or include an explanatory note the first time the term appears	Accepted see DK4	

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DE-004	0077	1		general	battery storage generation units add to list	<p>...in line 87 and 89</p> <p>Delete "primary"</p>	<p>Accepted</p> <p>add after bullet list a note: Electrical energy storage systems in meeting the conditions above are considered.</p> <p>also align in -1</p> <p>add in clauses: EESS in charging mode <u>should</u> provide the same behaviour Thomas implementation note: EES and EESS definition of IEC 62933 added (FDIS state expected publication date 06-2018) Implemented only in 4.1 general for whole clause 4 The provisions of Clause 4 apply during normal operation of the generating unit and do not apply in case of maintenance or units out of operation. <u>The provisions apply to EESS in generation mode. In charging mode EESS should provide the same behaviour.</u></p>	1 2 3
RO-04	0077 ÷79	1	Scope	te	<p><i>The requirements of this European Standard apply to all generating plants, generating modules, electrical machinery and electronic equipment, irrespective of the kind of primary energy source and irrespective of the presence of loads in the producer's network that meet all of the following conditions</i></p> <p>Depending on type of generation technologies, there are different variants of power plants that may consist of different equipment (modules/units and components).</p>	<p>Replace the existing text by:</p> <p>The requirements of this European Standard apply to all types of power plants, that consist of power generating modules / units using different generation technologies depending on type of primary energy sources (having an influence on the selection of electrical and electronic equipment, irrespective of the electrical loads connected to producer's network), and that shall meet the following conditions:</p>	See FR 05	

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DK5	0077-79	1		ed	The requirements of this European Standard apply to all generating plants, generating modules, electrical machinery and electronic equipment, irrespective of the kind of primary energy source and irrespective of the presence	The requirements of this European Standard apply to all power generating plants, generating modules, electrical machinery and electronic equipment, depending on which entity is referred in the text, irrespective of the kind of primary energy source and irrespective of the presence	See FR 05	
FR 05	0077-79	1		Te	The requirement may be misleading	Write : "the requirements of this European Standard apply, irrespective of the kind of primary energy source and irrespective of the presence of loads in the producer's network, to generating plants and/or generating modules and/or electrical machinery and/or electronic equipment that meet all of the following conditions"	accepted	
BE03*	0080-0085	1	Scope	Ed	2 nd and 4 th bullet have quite the same meaning	Drop 2 nd bullet and rephrase 4 th bullet as follows intended to operate in parallel with a MV distribution network	accepted delete 4 bullet, change 2 bullet to: connected to and operated in parallel with an AC MV distribution network	
DE-005	0081	1		editorial	As this standard refers to generators intended to operate in parallel with the MV distribution network, it is not relevant if the generator is connected to the MV network at the time being. It is relevant if it is intended to be connected to the network (see also lines 67 and 85)	Intended to be connected to a MV distribution network or connected to a MV distribution network	Accepted See BE03	
EE-07	0082				generating modules capacity of Type B or smaller	It is preferable that the standards will be elaborated on each type A and separate for B. The requirements are different and the products are different. If the standard covers both A & B requirements for a rated power depending of the country and his A-B limit, some performances must be deactivated.	Rejected During the work on 50549 it became apparent that the differences are minor, since most requirements are necessary for type A also for reasons of local network control that do not fall into the scope of RFG. The few differences, mainly LVRT are handled in the relevant chapters	

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FR 06	0082	1		Te	"or smaller" is not precise	Write : "type B or type A according to commission regulation ..."	Rejected, also plants below Type A fall in the scope of this standard	
NL-07	0082				generating modules capacity of Type B or smaller	It is preferable that the standards will be elaborated on each type A and separate for B. The requirements are different and the products are different. If the standard covers both A & B requirements for a rated power depending of the country and his A-B limit, some performances must be deactivated.	See EE-07	
DE-006	0082 – 84	1		Ge	<p>"generating modules capacity of Type B or smaller according to COMMISSION REGULATION (EU) 2016/631 while considering national implementation for the decision regarding power limits between A and B types and B and C types"</p> <p>This clause excludes MV-connected generators of Type C from applicability of this standard.</p>	<ul style="list-style-type: none"> - "generating modules capacity of Type C or B or smaller according to COMMISSION REGULATION (EU) 2016/631 while considering national implementation for the decision regarding power limits between A and B types and B and C types" 	<p>Rejected</p> <p>The standard is currently written only in view of Type A and B. Additional requirements apply for Type C that are not yet covered. This might be subject to a -3 in the series or a revision of the -2. The German NC is invited to prepare a new work item proposal for Type C</p>	
EE-06	0082 – 84	1		Ge	<p>"generating modules capacity of Type B or smaller according to COMMISSION REGULATION (EU) 2016/631 while considering national implementation for the decision regarding power limits between A and B types and B and C types".</p> <p>This clause excludes MV-connected generators of Type C from applicability of this standard. The scope of the document is not clear, and it shall include Type C generation connect to the MV network.</p>	"generating modules capacity of Type C or B or smaller according to COMMISSION REGULATION (EU) 2016/631 while considering national implementation for the decision regarding power limits between A and B types and B and C types"	See DE-006	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
NL-06	0082 – 84	1		ge	<p>“generating modules capacity of Type B or smaller according to COMMISSION REGULATION (EU) 2016/631while considering national implementation for the decision regarding power limits between A and B types and B and C types”.</p> <p>This clause excludes MV-connected generators of Type C from applicability of this standard. The scope of the document is not clear, and it shall include Type C generation connect to the MV network.</p>	<p>“generating modules capacity of Type C or B or smaller according to COMMISSION REGULATION (EU) 2016/631while considering national implementation for the decision regarding power limits between A and B types and B and C types”</p>	See DE-006	
PL-07	0082 – 84	1		ge	<p>“generating modules capacity of Type B or smaller according to COMMISSION REGULATION (EU) 2016/631while considering national implementation for the decision regarding power limits between A and B types and B and C types”.</p> <p>This clause excludes MV-connected generators of Type C from applicability of this standard. The scope of the document is not clear, and it shall include Type C generation connect to the MV network.</p>	<p>“Power generating modules capacity of Type A and Type B according to COMMISSION REGULATION (EU) 2016/631while considering national implementation for the decision regarding power limits between A and B types and B and C types”</p>	See DE-006	
RO-05	0082 ÷84	1	Scope	te	<p>“generating modules capacity of Type B or smaller...”</p> <p>Since the diversity of products leads to different requirements to met, consequently, the requirements related to each power generating module of type A shall be separately specified from the requirements related to power generating modules of type B.</p>	<p>If the standard covers both A & B related requirements for a rated power depending of the country and corresponding A-B classification, some performances shall be deactivated.</p>	See FR-06	
DE-007	0082-84	1		Technical	<p>Why is this European Standard limited to Type B or smaller? Also Type C could be connected to MV distribution network</p>	<p>Include Type C generating modules in this Standard</p>	See DE-006	
DK6	0082-84	1		te	<p>Why is this European Standard limited to Type B or smaller? Also Type C could be connected to MV distribution network</p>	<p>Include Type C generating modules in this Standard</p>	See DE-006	
NO 3	0084			te	<p>Type A, B and C should be explained/indicated – i.e. to include regulation 2016/631 limits as a note or similar</p>	<p>Add explanation</p>	<p>rejected reference to RfG is given, re-explain the RfG would not help</p>	
FI 2	0086-87	1		ge	<p>Sentence is not clear.</p>	<p>Reword it or provide explaining note e.g. what are the different requirements for module types.</p>	<p>Accepted “plant” was missing in the original text. Is added</p>	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
GB-01	0089	1	Scope	Ed	The word "plant" is missing	modify to "...a generating plant with a maximum...."	Accepted	
DE-008	0089-91	1		Ge / ed	<p>Threshold between A and B should be 150 kVA as default value.</p> <p>Most requirements of 50549 still are needed for generating plants smaller than 100/150kVA.</p> <p>We only may reduce to ask for an interface protection at the POC. (compare draft VDE-AR-N 4110, lines 73-76)</p>	<p>Unless specified otherwise by the DSO, an interface protection for the POC is not needed for generating plants with a maximum apparent power up to 150 kVA. A different threshold may be defined by the DSO.</p>	<p>Accepted</p> <p>Thomas 5.12.: comment not clear. We require also interface protection in -1 Maybe the "discussed" mark was set in error. NOT IMPLEMENTED</p>	
RO-06	0089-91	1	Scope	te	<p><i>Unless specified otherwise by the DSO, a generating with a maximum apparent power up to 100 kVA can, as alternative to the requirements of this European Standard, comply with EN 50549-1. A different threshold may be defined by the DSO.</i></p> <p>We agree the level of 100 kVA but with condition to exist remote information exchange over this threshold (it is nothing specified concerning this aspect in standard 50549-1). It can be interpretate</p>	<p>Has to be completed 89-91 lines with remote information exchanged aspects (to be mentioned)</p>	Comment unclear	
DE-009	0089-91	1		ed	The requirements of this European Standard apply to all generating plants, generating modules, electrical machinery and electronic equipment, irrespective of the kind of primary energy source and irrespective of the presence	The requirements of this European Standard apply to all power generating plants, generating modules, electrical machinery and electronic equipment, depending on which entity is referred in the text , irrespective of the kind of primary energy source and irrespective of the presence	Partly accepted see DE-012	
EE-08	0089-91	1		ed	The requirements of this European Standard apply to all generating plants, generating modules, electrical machinery and electronic equipment, irrespective of the kind of primary energy source and irrespective of the presence	The requirements of this European Standard apply to all power generating plants, generating modules, electrical machinery and electronic equipment, depending on which entity is referred in the text, irrespective of the kind of primary energy source and irrespective of the presence	Partly accepted see DE-012	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
NL-08	0089-91	1		ed	The requirements of this European Standard apply to all generating plants, generating modules, electrical machinery and electronic equipment, irrespective of the kind of primary energy source and irrespective of the presence	The requirements of this European Standard apply to all power generating plants, generating modules, electrical machinery and electronic equipment, depending on which entity is referred in the text, irrespective of the kind of primary energy source and irrespective of the presence	Partly accepted see DE-012	
DE-010	0092	1		Ge	Add sentence, to make clear the requirements are asking for the behaviour of the generating unit and allowing individual manufacture solutions.	This European Standard defines connection requirements for generating plants to be connected in parallel with distribution networks. To fulfil the requirements individual approaches are allowed, as long as the technical implementation is in line with the requirement of the EN-50549-2 or the RSO.	Partly accepted see DE-012	
DE-011	0092	Scope		ge	This EN defines requirements for generating plants to be connected in parallel with distribution networks. Connection requirements are not defined. Due to different grid operation forms connection requirements have to be defined on national or DSO level.	This European Standard defines connection requirements for generating plants to be connected in parallel with distribution networks.	Partly accepted see DE-012	
DE-012	0092			ge	Connection requirements for generation plants are defined here. There are different grid operations forms. For that reason connection requirements should be defined on national or DSO level.	Skip the following part from the standard: This European Standard defines connection requirements for generating plants to be connected in parallel with distribution networks.	Accepted	
FR 07	0092-93	1		Te	Statement is not precise enough	Write : "This European Standard defines the technical requirements for grid connection of power generating facilities to MV distribution networks"	Partly accepted see DE-012	

MB/ NC	Line numb er	Clause/ Subclau se	Paragr aph/ Figure/ Table	Type of com ment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
RO-07	0093 To be insert ed either below row 93 or below row 104	1	Scope	te	We have to decide if the standard covers relevant requirements related to prosumer's electrical installations to be connected to LV distribution network (according to new drafts of European/international standards, for example, future HD 60364-8-2 „Low-voltage electrical installations - Part 8-2: Smart Low-Voltage Electrical Installations” identical to IEC 60364-8-2 prepared by IEC/TC 64).	If applicable, an appropriate explanation should be added, at the end of row 93, regarding prosumer's electrical installation: This standard specifies the requirements related to grid connection of prosumer's electrical installation. Or “Excluded from the scope are:” - prosumer's electrical installation;...,	Rejected Already covered in line 79	
DE-013	0094			ge	National regulations and network operator requirements should be given preference to this standard. Deviations from the 50549 are needed <ul style="list-style-type: none"> • for high density of decentralized power supply and • special situations like islands. Following issues might be needed in case of high density of decentralized generation: <ul style="list-style-type: none"> • - FRT (LVRT & HVRT) also needed for type A generators • - Dynamic behavior on active and reactive power during faults to support the grid stability • - Reaction on the “low inertia”-topic / support inertia to sustain a stable system • - Behavior of generators as voltage source instead of current fed inverter to sustain a stable system • - Control of inverters on basis of instant values to increase the dynamic of the generating plants to sustain a stable system - Stronger requirements regarding symmetric infeed to sustain a stable system and to optimize the degree of capacity utilisation 	Following sentence has to be changed: ...and these <u>shall</u> be complied with. Add following part: This European Standard recognizes the existence of special requirements in case of high density of decentralized power supply by national regulation or DSO requirements.	accepted in principle This European Standard recognizes the existence of specific technical requirements (e.g. grid codes) of the DSO or another responsible party within a member state and these must be complied with.	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
NO 4	0098			te/ed	The meaning of "power system impact assessment" is not clear	Add explanation	Accepted Any proposals??	
NO 5	0099			te/ed	The meaning of "connection assessment" is not clear	Add explanation	Accepted Any proposals??	
DE-003	0102	Scope		Ge	Application of national requirements is an external obligation	Change should to must	Accepted	
FR 08	0108	2		te	It is missing two standards mentionned in the text : TS 50662 lines 634-635 and EN 50560 lines 271, 278 and 287	Add TS 50662 and EN 50560 as normative references	rejected, 50662 is not published jet, 50560 is not used.	
FI 3	0116-117	2		te	EN 61000-4-30 definitions of measurement methods are not meant nor suitable for control applications such as frequency control. There the EN 61000-4-30 methods are way too slow and unreliable. It seems that a normative reference on the requirements on the measurement performance and reliability is very much needed and completely missing here. Lack of the specification of frequency measurement severely reduces the usefulness of the EN50549.	Consider using IEC 60255-181 Functional Requirements for Frequency Protection as a reference on how to measure frequency. CD2 is available and CDV is planned to be published in October 2017.	Accepted in principle, since we expect publication before publication of 60255-181 we will not be able to refer to this standard	

MB/ NC	Line numb er	Clause/ Subclau se	Paragr aph/ Figure/ Table	Type of com ment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-014	0120	3		Gene ral	No definition for UVRT (LVRT) and OVRT (HVRT)	<p>Add definition for UVRT (LVRT) and OVRT (HVRT) and align within the test what to use.</p> <p>Recent standard developments in the wind area use UVRT / OVRT.</p>	<p>Accepted Also align -1 from 61400-21-1</p> <p>under voltage ride through UVRT</p> <p>ability of a generating unit or generating plant to stay connected during voltage dips</p> <p>Note 1 to entry: In some documents the expression low voltage ride through (LVRT) is used for the same concept.</p> <p>over voltage ride through OVRT</p> <p>ability of a generating unit or generating plant to stay connected during voltage swells</p> <p>Note 1 to entry: In some documents the expression high voltage ride through (HVRT) is used for the same concept.</p>	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK7	0120	3		ge	No definition for UVRT (LVRT) and OVRT (HVRT)	Add definition for UVRT (LVRT) and OVRT (HVRT) and align within the test what to use. Recent standard developments in the wind area use UVRT / OVRT.	Accepted, see DE-014	
FR 09	0120	3		Te	Definitions of type A and type B modules are missing. They are needed for a self-supporting document.	Add a definition of type A and type B modules	accepted reference is made to RfG Gunnar implementation Note reference will be made to RfG in a note to the definition of generating module	
RO-08	0120	3.1	Terms and definitions	ge	Stakeholders should clarify and agree on the technical requirements for grid connection agreements including any relevant specifications for the equipment testing and certification processes. Therefore, there is a need for a standardised language provided by suitable terminology defined throughout the European and international standards, and EU regulations as well.		Noted	
RO-09	0125	3.1.1	Terms and definitions	te	AC networks shall be clearly stipulated in order to not confuse with DC networks.	Replace “ <i>electrical network</i> ” by “AC <i>electrical network, including...</i> ” Additionally, the following note should be inserted: Note 1 to entry: A distribution network does not include the producer’s network.	Accepted	
DK8	0125-127	3.1.1		te	electrical network, including closed distribution networks, for the distribution of electrical power from and to third parties connected to it, to and from a transmission or another distribution network, for which a DSO is responsible	AC electrical network, including closed distribution networks, for the distribution of electrical power from and to third parties connected to it, to and from a transmission or another distribution network, for which a DSO is responsible; this network does not include producer’s network.	Partly accepted see RO-09	
FR 10	0139	3.1.3		Te	The “public” is too restrictive	Write : “the final customer”	Accepted: to final customers ..	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
EE-09	0139-142	3.1.1		ed	electrical network, including closed distribution networks, for the distribution of electrical power from and to third parties connected to it, to and from a transmission or another distribution network, for which a DSO is responsible	AC electrical network, including closed distribution networks, for the distribution of electrical power from and to third parties connected to it, to and from a transmission or another distribution network, for which a DSO is responsible; this network does not include producer's network.	Partly accepted see RO-09	
NL-09	0139-142	3.1.1		ed	electrical network, including closed distribution networks, for the distribution of electrical power from and to third parties connected to it, to and from a transmission or another distribution network, for which a DSO is responsible	AC electrical network, including closed distribution networks, for the distribution of electrical power from and to third parties connected to it, to and from a transmission or another distribution network, for which a DSO is responsible; this network does not include producer's network.	Partly accepted see RO-09	
BE04*	0142	3.1.3	Note 1 to entry	Ed	Unclear wording	Rephrase as follows: Note 1 to entry: As this document is applicable to distribution grids, DSO is used for relevant system operator according Article 2 (13) of COMMISSION REGULATION 2016/631.	Accepted	
RO-10	0142 ÷ 143	3.1.3		ge	Because the main subject is <i>generating plants to be connected in parallel with distribution networks</i> it is important to use the term relevant distribution operator (i.e. relevant DSO) within present standard	3.1.3 will be split: 3.1.3.1 Distribution system operator.... 3.1.3.2 Relevant distribution system operator means the distribution system operator to whose system a* is or will be connected. *It will be clarified if we will use the terms : power park modules/power generating modules or generating module/generating plant (or power plant)/generating unit.	Partly accepted See BE04	
PL-08	0143	3.1.3	Note	ed	Grammatical correction.	Replace the phrase "according Article" with the phrase "according to Article".	Accepted	
RO-11	0144	3.1.3			<i>Note 2 to entry: In some countries, the distribution network operator (DNO) fulfils the role of the DSO.</i> It is closed distribution network operator? Or transmission system operator?	To be clearly specified who is the network operator.	Proposal unclear	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
BE05	0152	3.1.5		Te	The term low voltage distribution network is used in the scope.	Add definition of low voltage (LV) distribution network just like in prEN50549-1	Accepted	
AT 02	0156	3.1		ge	The term “LV distribution network”, also used in this document, should be defined in item 3.1.	Insert after item 3.1.4 the following item “3.1.5 low voltage (LV) distribution network <i>electric distribution network with a voltage whose nominal r.m.s. value is $U_n \leq 1 \text{ kV}$”</i>	Accepted	
PL-09	0163	3.1.7		ed	Grammatical correction.	Replace the phrase “has or is planning” with the phrase “has planned or is planning”.	Accepted Thomas implementation note: natural or legal person who <u>already has connected</u> or is planning to connect an electricity generating plant to a distribution network	
DK9	0163-164	3.1.7		te	natural or legal person who already has or is planning to connect an electricity generating plant to a distribution network	natural or legal person who already has or is planning to connect an electricity power generating plant to a distribution network	Rejected, Generating plant is defined in 3.2.2, not power generating plant	
RO-12	0168 To be inserted below row 168	3.1.8	Terms and definitions	te	The relevant system operator (DSO) has the right to require additional information from power plants’ owners, having in view their roles either as producer or prosumer.	If applicable, a note may be added: Note 1 to entry: When the internal distribution network is identical to an electrical network of a customer having his own power generating plant (where power generating module is connected to it behind a common point of connection - POC), this network may be also referred as internal network of prosumer.	Accepted, Gunnar implementation note: with modifications according to already existing terms	
DK10	0169-168	3.1.8		te	electrical installations downstream from the point of connection owned/operated by the producer for internal distribution of electricity	AC electrical installations downstream from the point of connection owned/operated by the producer for internal distribution of electricity	Accepted Also align -1	
EE-10	0178-179	3.1.7		ed	natural or legal person who already has or is planning to connect an electricity generating plant to a distribution network	natural or legal person who already has or is planning to connect an electricity power generating plant to a distribution network	Rejected, Generating plant is defined in 3.2.2, not power generating plant	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
NL-10	0178-179	3.1.7		ed	natural or legal person who already has or is planning to connect an electricity generating plant to a distribution network	natural or legal person who already has or is planning to connect an electricity power generating plant to a distribution network	Rejected, Generating plant is defined in 3.2.2, not power generating plant	
PL-10	0178-179	3.1.7		ed	natural or legal person who already has or is planning to connect an electricity generating plant to a distribution network	natural or legal person who already has or is planning to connect an electricity power generating module to a distribution network	Rejected, Generating plant is defined in 3.2.2, not power generating plant	
EE-11	0182	3.1.8		ed	electrical installations downstream from the point of connection owned/operated by the producer for internal distribution of electricity	AC electrical installations downstream from the point of connection owned/operated by the producer for internal distribution of electricity	See DK10	
NL-11	0182	3.1.8		ed	electrical installations downstream from the point of connection owned/operated by the producer for internal distribution of electricity	AC electrical installations downstream from the point of connection owned/operated by the producer for internal distribution of electricity	See DK10	
RO-13	0185	3.2	Terms and definitions	ge	For the purpose of this standard, we have to define the relevant terms as “power plant”, “ <i>power generating unit</i> ”, “ <i>power generating module</i> ”, etc.) to ensure the conformity with requirements of related standards and EU regulations and certification processes. As possible, the terms established according to R631/2016, if they have the same meaning, should be used.	Replace by: Power plant, power generating module and power generating unit	accepted in principle add Note in 3.2.1 and 3.2.2 and 3.2.3 “In some documents this can mean a power-generating modul/plant/unit” See RO-11 in -1	
RO-14	0187-190	3.2.1		te	The term “power generating module” is recommended to be used instead of “ <i>generating module</i> ”.	Replace the text by : Power generating module one or more power generating units connected to a common point of connection, and that include the components needed to feed the electrical energy into distribution network Note 1 to entry: Power generating units shall be grouped by the type of generation technology, which is based on synchronous machines or induction machines or other equipment.	accepted in principle add Note in 3.2.1 and 3.2.2 and 3.2.3 “In some documents this can mean a power-generating modul/plant/unit” See RO-13	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK11	0188-190	3.2.1		te	generating module either a generating unit of synchronous generating technology or the sum of all generating units of non-synchronous generating technology connected to a common point of connection including all elements needed to feed electric power to the distribution grid	Power generating module either a generating unit of synchronous machine generating technology or the sum ensemble of all generating units of non-synchronous other generating technology connected to a common point of connection including all elements needed to feed electric power to the distribution grid	Rejected Improvement not apparent	
BE06*	0191	3.2.1		Ed		Modul => <u>Module</u>	Accepted	
BE07*	0191	3.2.1		Ed	Please align SGT in figure with definition 3.2.6 SGT: synchronous generating technology 3.2.6: synchronously coupled generating technology	Align and do check in rest of text if necessary	Accepted Implementation note: Changed from synchronously coupled -> synchronous in 4 text passages	
RO-15	0194 ÷195	3.2.2		te	generating plant <i>sum of generating modules connected at one point of connection, including auxiliaries and all connection equipment</i> It is necessary to define this concept instead of power plant? R631/2016 doesn't specify specific conditions for generating plant but it specifies requirements for power park modules that represent a power plant. However, it has to be aligned according to concept of power park modules from R631/2016.	Our proposal is to replace by Power plant <i>Ensemble of power generating modules....</i>	rejected See RO-13	
DK12	0195-196	3.2.2		te	generating plant sum of generating modules connected at one point of connection, including auxiliaries and all connection equipment	Power generating plant Sum of generating modules connected at one point of connection (POC), including auxiliaries and all connection equipment	Partly accepted See RO-13	

MB/ NC	Line numb er	Clause/ Subclau se	Paragr aph/ Figure/ Table	Type of com ment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
RO-16	0198 below row 198				If applicable, some definitions related to prosumer and prosumer's electrical installations are given.	<p>"Prosumer = Entity or party who can be a producer and a consumer of electrical energy</p> <p>Prosumer's Electrical Installation: PEI Electrical installation able to operate with or connected to:</p> <ul style="list-style-type: none"> - Local power supplies, and/or - Local storage units, and/or - Public distribution network; <p>and that monitors and controls the energy from the connected sources delivering to it</p> <ul style="list-style-type: none"> - Current-using equipment, and/or - Local storage units, and/or - Public distribution network <p>[Source: IEC 60364-8-2]"</p> <p>Or other proposals :</p> <p>Prosumer = owner of an electrical installation intended to be used as power plant and consumer, by case, which shall meet at least two of the following requirements: power generating modules/units, loads and/or electrical energy storage units.</p> <p>Note 1 to entry: Where stipulated, the prosumer entity shall fulfil technical requirements at its POC (required by relevant DSO) without the obligation that those requirements to be fulfilled by each component/equipment downstream from POC. These requirements should be covered by the prosumer entity using a suitable automation system.</p> <p>Note 2 to entry: Where stipulated, the prosumer entity should fulfil compliance to the technical requirements at its POC without the obligation that the technical requirements to be fulfilled by each component downstream from POC. This requirement may be covered by an appropriate automation system.</p>	<p>rejected</p> <p>See scope line 77: "irrespective of the presence of loads in the producer's network"</p> <p>therefore loads might be present, but resulting issues are not handled here</p>	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
EE-12	0207-211	3.2.1		ed	generating module either a generating unit of synchronous generating technology or the sum of all generating units of non-synchronous generating technology connected to a common point of connection including all elements needed to feed electric power to the distribution grid	Power generating module either a generating unit of synchronous machine generating technology or the sum ensemble of all generating units of non-synchronous other generating technology connected to a common point of connection including all elements needed to feed electric power to the distribution grid	Rejected Improvement not apparent see RO-13	
NL-12	0207-211	3.2.1		ed	generating module either a generating unit of synchronous generating technology or the sum of all generating units of non-synchronous generating technology connected to a common point of connection including all elements needed to feed electric power to the distribution grid	Power generating module either a generating unit of synchronous machine generating technology or the sum ensemble of all generating units of non-synchronous other generating technology connected to a common point of connection including all elements needed to feed electric power to the distribution grid	Rejected Improvement not apparent see RO-13	
PL-11	0207-211	3.2.1		ed	generating module either a generating unit of synchronous generating technology or the sum of all generating units of non-synchronous generating technology connected to a common point of connection including all elements needed to feed electric power to the distribution grid	Power generating module either a generating unit of synchronous machine generating technology or the sum ensemble of all generating units of non-synchronous other generating technology connected to a common point of connection including all elements needed to feed electric power to the distribution grid	Rejected Improvement not apparent see RO-13	
DK13	0215	3.2.5		te	Note 1 to entry: Examples are: induction machines and converter based technologies.	Note 1 to entry: Examples are: induction machines (non-synchronously connected in 2016/631) and converter based technologies (connected through power electronics in 2016/631).	Rejected Improvement not apparent	
EE-13	0215-217	3.2.2 (3.2.2.a)		ed	generating plant sum of generating modules connected at one point of connection, including auxiliaries and all connection equipment	Electrical energy generating plant sum Ensemble of generating modules connected at one point of connection (POC), including auxiliaries and all connection equipment	Rejected Improvement not apparent	
NL-13	0215-217	3.2.2 (3.2.2.a)		ed	generating plant sum of generating modules connected at one point of connection, including auxiliaries and all connection equipment	Electrical energy generating plant sum Ensemble of generating modules connected at one point of connection (POC), including auxiliaries and all connection equipment	Rejected Improvement not apparent	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
RO-19	0217				Cogeneration - combined heat and power (CHP)	It is not clearly specified in the text of standard. To be clarified it throughout the standard.	Comment unclear	
DK14	0218-219	3.2.6		te	Cogeneration - combined heat and power (CHP) combined generation of electricity and heat by an energy conversion system and the concurrent use of the electric and thermal energy from the conversion system	Is it used or relevant in this document?	noted yes in line 1241	
RO-17	0221	3.2.6		te	synchronously coupled generating technology	Just a proposal to replace by: technology using power generating modules/units directly coupled technology where the power generating modules/ units are based on synchronous machines that allow to be directly coupled at a common point of connection to distribution network	Rejected Improvement not apparent See BE07	
EE-14	0223				Cogeneration - combined heat and power (CHP) combined generation of electricity and heat by an energy conversion system and the concurrent use of the electric and thermal energy from the conversion system	It is used or relevant in this document?	Noted Used twice in the text	
NL-14	0223				Cogeneration - combined heat and power (CHP) combined generation of electricity and heat by an energy conversion system and the concurrent use of the electric and thermal energy from the conversion system	It is used or relevant in this document?	Noted Used twice in the text	
PL-12	0223			ed	Cogeneration - combined heat and power (CHP) combined generation of electricity and heat by an energy conversion system and the concurrent use of the electric and thermal energy from the conversion system	Change the definition from Congestion to CHP CHP- combined generation of electricity and heat by an energy conversion system and the concurrent use of the electric and thermal energy from the conversion system Or change in content from CHP to Cogeneration	Noted Used twice in the text	
RO-18	0224 +226	3.2.7		te	non-synchronous generating technology Note 1 to entry should be removed having in view that the term "non- synchronous" is not suitable for this case (grid connection technologies are based on power electronics).	Just a proposal to replace by: technology using power generating modules/units connected by power electronics technology where the power generating modules/ units are based on induction machines or other equipment that need to be connected by power electronics at a common point of connection to distribution network	Rejected Improvement not apparent	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
BE08*	0225	3.3.2		Te	<p>The definition of “maximum active power – Pmax” is not clear and not aligned with definition of Smax.</p> <p>Is Pmax meant to be a characteristic of the plant or a power agreed upon with the DSO? From the text of the draft it seems to be a characteristic.</p> <p>Is there a reason that Pmax is defined for the plant and Smax for a unit or set of units? From the text of the draft it seems to be used for a unit or set of units.</p> <p>For information: in NC RfG, this definition is on the module.</p>	<p>Even though the definition in the draft is a copy/paste from the NC RfG, couldn't it be aligned with the definition of “maximum apparent power – Smax”?</p> <p>Proposal</p> <p>maximum active power - Pmax maximum continuous AC active power output that the generating unit or the sum of all the generating units in a generating plant or module is designed to achieve under normal operating conditions</p> <p>Note 1 to entry: This maximum power is defined by a measurement with 10 min averaging.</p> <p>Note 2 to entry: the demand power associated solely with facilitating the operation of the generating unit(s) has to be subtracted from the gross maximum active power to obtain the maximum active power.</p>	accepted in principle maximum continuous active power which a generating unit or the sum of all the generating units in a generating plant can produce, minus any loads associated solely with facilitating the operation of that generating plant and not fed into the network as specified in the connection agreement or as agreed between the DSO and the generating plant operator	
BE09*	0226	3.3.2		Ed	<p>Use of the defined terms.</p> <p>Do not use “power generating unit/module/plant” but just “generating unit/module/plant” as defined.</p> <p>The information that it is about electrical power is already covered in the definition of the generating unit.</p>	If BE proposal on rephrasing of the definition would not be accepted , delete “power”	see BE08	
DK15	0244	3.3.5		te	actual AC active power output at a certain instant.	actual AC active power output calculated at a certain instant according to IEC61000-4-30 paragraph 4.4 from basic values on 10/12 cycles time intervals. at a certain instant	Rejected There is no argument given why a standardised calculation is necessary, why is a faster or more exact longer measurement not allowed	
FI 4	0244	3.3.5		te	Without definition of time resolution the meaning of “instant” is ambiguous.	Consider improving the definition.	Rejected see DK15	
PL-13	0247	3.3.6		ed	<p>primary energy source</p> <p>247 non-electric energy source supplying an electric generating unit</p>	<p>primary energy source</p> <p>247 non-electric energy source supplying an power generating module</p>	Rejected, according to figure 1 the used term “unit” is part of the module.	
EE-15	0253	3.2.6		ed	synchronously generating technology	synchronously coupled machine generating technology	Rejected Improvement not apparent	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
NL-15	0253	3.2.6		ed	synchronously generating technology	synchronously coupled machine generating technology	Rejected Improvement not apparent	
FI 5	0257	3.4.1		ge	Concept of nominal voltage have been defined in IEC see. <u>IEC ref 826-11-01</u>	Add source: [SOURCE: 826-11-01]	rejected, definition is in line with EN 50160	
EE-16	0258-260	3.2.7		ed	non-synchronous generating technology technology where a generating unit is connected non-synchronously to a distribution grid	non-synchronous-machine generating technology technology where a generating unit is connected non-synchronously to a distribution grid which is not based on a synchronous machine	Rejected Improvement not apparent	
NL-16	0258-260	3.2.7		ed	non-synchronous generating technology technology where a generating unit is connected non-synchronously to a distribution grid	non-synchronous-machine generating technology technology where a generating unit is connected non-synchronously to a distribution grid which is not based on a synchronous machine	Rejected Improvement not apparent	
DE-015	212	3.2.5		ed	Note 1 to entry: Examples are: induction machines and converter based technologies.	Note 1 to entry: Examples are: induction machines (non-synchronously connected in 2016/631) and converter based technologies (connected through power electronics in 2016/631).	Accepted Implement also in -1	
EE-17	0261-263	3.2.7		ed	Note 1 to entry: Examples are: induction machines and converter based technologies.	Note 1 to entry: Examples are: induction machines (non-synchronously connected in 2016/631) and converter based technologies (connected through power electronics in 2016/631).	See DE-015	
NL-17	0261-263	3.2.7		ed	Note 1 to entry: Examples are: induction machines and converter based technologies.	Note 1 to entry: Examples are: induction machines (non-synchronously connected in 2016/631) and converter based technologies (connected through power electronics in 2016/631).	See DE-015	
FR 11	0279	3.4.5		te	(French version) Term "assez" in the sentence "... deux niveaux consécutifs qui se maintiennent d'une façon assez stable pendant des durées déterminées ...» brings confusion	In the French version, remove term "assez" or specify a value	Noted FR NC can improve translation	
DE-016	0280	3.3.3		ed	3.3.3	3.3.3a	Comment unclear	
EE-18	0280	3.3.3		ed	3.3.3	3.3.3a	Comment unclear	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
NL-18	0280	3.3.3		ed	3.3.3	3.3.3a	Comment unclear	
DE-017	0285-289	3.3.3b		te		nominal current current by which a supply network is designated or identified and to which certain operating characteristics are referred [SOURCE: IEV 415-04-03, modified]	Rejected, Not used	
EE-19	0285-289	3.3.3b		te		nominal current current by which a supply network is designated or identified and to which certain operating characteristics are referred [SOURCE: IEV 415-04-03, modified]	Rejected, Not used	
NL-19	0285-289	3.3.3b		te		nominal current current by which a supply network is designated or identified and to which certain operating characteristics are referred [SOURCE: IEV 415-04-03, modified]	Rejected, Not used	
EE-20	0297-298	3.3.5		ed	actual AC active power output at a certain instant.	actual AC active power output calculated at a certain instant according to IEC61000-4-30 paragraph 4.4 from basic values on 10/12 cycles time intervals. at a certain instant	Rejected Noted for testing document, for the implementation, no technical solution shall be specified	
NL-20	0297-298	3.3.5		ed	actual AC active power output at a certain instant.	actual AC active power output calculated at a certain instant according to IEC61000-4-30 paragraph 4.4 from basic values on 10/12 cycles time intervals. at a certain instant	See EE-20	
PL-14	0307	3.5.3		ed	As in part 1 of the standard.	Align the formula to left.	Accepted	
PL-15	0312	3.5.4.1		ed	To improve readability.	Insert an empty line above line 312.	Accepted	
DE-018	0315	3.4.1		ed	3.4.1	3.4.1a	Rejected, new terms get a new number	
EE-21	0315	3.4.1		ed	3.4.1	3.4.1a	Rejected, new terms get a new number	
NL-21	0315	3.4.1		ed	3.4.1	3.4.1a	Rejected, new terms get a new number	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
EE-22	0319-322	3.4.1b		te		3.4.1b rated voltage - Un maximum continuous AC output voltage which a generating unit or generating plant is designed to achieve under normal operating conditions	rejected term is not used	
NL-22	0319-322	3.4.1b		te		3.4.1b rated voltage - Un maximum continuous AC output voltage which a generating unit or generating plant is designed to achieve under normal operating conditions	See EE-22	
NO 6	0403		Figure 2	te	Indicate in the figure that there can be more than one generating unit and include possible battery location	Add/indicate generation units and battery to the figure	Rejected, figure is an example to indicate location of switches	
DK16	0403-404	3.6.8	Figure 2	ed	Example of an electricity generating plant connected to a distribution network (schematic view of switches)	Example of an electricity power generating plant connected to a distribution network (schematic view of switches)	Rejected Improvement not apparent	
NO 7	0406-408	3.6.8.1		te	The access to the main switch by the DSO (to avoid installation of an extra switch outside the producer's premises) has been heavily discussed in Norway. So it would be beneficial to hint that the main switch can be accessed by the producer and/or the DSO depending on the circumstances	"...disconnection of the whole plant from the distribution network by the producer and/or the DSO"	Rejected, Not part of the definition, please see chapter 4.3	
BE11*	0413	3.6.8.2		Ed	Use of the defined terms. To identify the unit, plant, module etc use the word ' generating ' instead of 'generation'	Replace ' generation unit ' by ' generating unit '	Accepted	
PL-16	0428	3.6.10.1		ed	To improve readability.	Insert an empty line above line 428.	Accepted	
DE-019	0440-442	3.6.10.3		te	The intentional delay contradicts the RfG requirement in Article 13(2)(e) of providing active power reduction "as fast as possible"	Delete paragraph	Rejected The term is used for interface protection and for frequency response. As long it is used, the term should be defined	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
SI-1	0481	3.7.2	Second line in first paragraph	te	Droop can be for active or reactive power. Define this droop as Active power droop	Replace "droop" with "active power droop".	Rejected WGs are always in the conflict to either use terms defined in IEV even if they are not elegant, or risk creating different terms for the same thing. We choose the first option.	
AT 03	0482	3.7.2		te	There is missing a definition for Δf	Complete chapter 3 with a definition for Δf .	Rejected ΔP is not defined as well, we assume that "change of frequency" provides sufficient clarity	
SI-2	0482 to 484	3.7.2	Whole paragraph	te	Define this droop as Active power droop	Replace "power" with "active power".	Rejected WGs are always in the conflict to either use terms defined in IEV even if they are not elegant, or risk creating different terms for the same thing. We choose the first option.	
DE-020	0483	3.7.2		Technical	P_{ref} is not defined	Include P_{ref} in chapter 3.3	Accepted Thomas Implementation Note: The term P_{ref} is explained in 4.6.1 and the explanation is too complicated for a term definition.	
DK17	0483	3.7.2		te	P_{ref} is not defined	Include P_{ref} in chapter 3.3	accepted Thomas Implementation Note: The term P_{ref} is explained in 4.6.1 and the explanation is too complicated for a term definition. Term definition in 3.3 is omitted	
EE-23	0484	3.6.8	Figure 2	ed	Example of an electricity generating plant connected to a distribution network (schematic view of switches)	Example of an electricity power generating plant connected to a distribution network (schematic view of switches)	rejected See also RO-14	
NL-23	0484	3.6.8	Figure 2	ed	Example of an electricity generating plant connected to a distribution network (schematic view of switches)	Example of an electricity power generating plant connected to a distribution network (schematic view of switches)	rejected See also RO-14	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
PL-17	0484	3.6.8	Figure 2	ed	Example of an electricity generating plant connected to a distribution network (schematic view of switches)	Example of an electricity power generating plant connected to a distribution network (schematic view of switches)	rejected See also RO-14	
DK18	0511	4		ed	Requirements on generating plants	Requirements on power generating plants	rejected see RO-11	3
DK19	0513	4.1		ed	This clause defines the requirements on generating plants	This clause defines the requirements for power generating plants	rejected see RO-11	3
RO-20	0513 ÷ 517	4.1+ Annex B	Table B1		<p><i>This clause defines the requirements for generating plants to be operated in parallel with the distribution network. Where settings or a range of configurability is provided, and respecting the legal framework the configurations and settings may be provided by the DSO. Where no settings are provided by the DSO, the specified default settings shall be used; if no default settings are provided, it is the responsibility of the producer to choose the settings or to deactivate the function.</i></p> <p>Romanian practice is to not put in function the PGM, if settings specified in technical norm (resulted by R631/2016), are not verified and checked by the DSO.</p> <p>If no default settings are provided this could be a DSO oversight/negligence and not a right of producer to choose the setting. It is necessary to exist a DSO checking of R631/2016 conditions fulfilment, implemented in technical norms (it is mentioned procedure for conformity checking - PGM type A and B)</p>	<p>The specified default settings (Value Default) shall be verified: Intentional Delay = 0s, Cos φ setpoint = 1, which cannot be reached generally.</p> <p>It is necessary to impose certain conditions: before putting into function of PGM/power plant etc., DSO shall verify the default settings mentioned in Annex B.</p> <p><i>The following sentence shall be reformulated : Where no settings are provided by the DSO has no capacity to supply certain values , the specified default settings shall be used; if no default settings are provided, it will be used the default settings from ANNEX B it is the responsibility of the producer to choose the settings or to deactivate the function.</i></p>	Accepted in principle Change to Where no settings are provided by the DSO, the specified default settings shall be used; if no default settings are provided, the producer shall propose settings and inform the DSO.	2

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
BE12*	0514	4.1		Ed	Unclear phrasing	Replace sentence from "Where settings ..." with following: Where settings or ranges of configurability are to be provided, these may be provided by the DSO, respecting the legal framework.	Accepted align with DK4 align in -1	3
DE-021	0515-517	4.1		Te	"Where no settings are provided by the DSO, the specified default settings shall be used; if no default settings are provided, it is the responsibility of the producer to choose the settings or to deactivate the function." State clearly that where not settings are provided by the DSO, the chosen settings have to be compliant with the capabilities of the generation defined in Regulation 2016/631, or at national level.	Modify sentence: "Where no settings are provided by the DSO, the specified default settings shall be used; if no default settings are provided, it is the responsibility of the producer to choose the settings or to deactivate the function." Where no settings are provided by the DSO, the settings have to be selected in compliance with the technical capabilities defined in Regulation 2016/631 or by the DSO and TSO at national level."	Partly accepted see RO-20	3
EE-24	0515-517	4.1		Te	"Where no settings are provided by the DSO, the specified default settings shall be used; if no default settings are provided, it is the responsibility of the producer to choose the settings or to deactivate the function." State clearly that where not settings are provided by the DSO, the chosen settings have to be compliant with the capabilities of the generation defined in Regulation 2016/631, or at national level.	Modify sentence: "Where no settings are provided by the DSO, the specified default settings shall be used; if no default settings are provided, it is the responsibility of the producer to choose the settings or to deactivate the function." Where no settings are provided by the DSO, the settings have to be selected in compliance with the technical capabilities defined in Regulation 2016/631 or by the DSO and TSO at national level."	Partly accepted see RO-20	3
ES-04	0515-517	4.1			"Where no settings are provided by the DSO, the specified default settings shall be used; if no default settings are provided, it is the responsibility of the producer to choose the settings or to deactivate the function." State clearly that where not settings are provided by the DSO, the chosen settings have to be compliant with the capabilities of the generation defined in Regulation 2016/631, or at national level.	Modify sentence: "Where no settings are provided by the DSO, the specified default settings shall be used; if no default settings are provided, it is the responsibility of the producer to choose the settings or to deactivate the function. Where no settings are provided by the DSO, the settings have to be selected in compliance with the technical capabilities defined in Regulation 2016/631 or by the DSO and TSO at national level."	Partly accepted see RO-20	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
NL-24	0515-517	4.1		te	<p>“Where no settings are provided by the DSO, the specified default settings shall be used; if no default settings are provided, it is the responsibility of the producer to choose the settings or to deactivate the function.”</p> <p>State clearly that where not settings are provided by the DSO, the chosen settings have to be compliant with the capabilities of the generation defined in Regulation 2016/631, or at national level.</p>	<p>Modify sentence:</p> <p>““Where no settings are provided by the DSO, the specified default settings shall be used; if no default settings are provided, it is the responsibility of the producer to choose the settings or to deactivate the function.</p> <p>Where no settings are provided by the DSO, the settings have to be selected in compliance with the technical capabilities defined in Regulation 2016/631 or by the DSO and TSO at national level.”</p>	Partly accepted see RO-20	3
AT 04	0525-534	4.1	Paragraph 3	te	Immunity to disturbances is missing	<p>Recommendation for the prioritisation of the different generator requirements:</p> <ol style="list-style-type: none"> 1. <i>Generating unit protection including for the prime mover if technically justified and agreed between the producer and the DSO;</i> 2. <i>Interface protection (see 4.9) and protection against faults within the generating plant;</i> 3. Immunity to disturbances (see 4.5) 4. <i>Remote control command on active power limitation if applicable;</i> 5. <i>Local response to overfrequency (see 4.6.1) and underfrequency (4.6.2).</i> 6. <i>Remote control commands (P and/or Q set points or control modes) if applicable;</i> 7. <i>Local reactive power (see 4.7.2) and/or active power (see 4.7.3) controls</i> 	<p>See DE-022</p> <p>Rejected</p> <p>The hierarchy of immunity is considered in the text of the clause.</p>	0

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-022	0525 - 534	4.1		General / technical	Descending order is inappropriate. Especially voltage support during faults and voltage steps is most important, following the protections of the unit/plant itself.	Descending order should be: 1. generating unit protection including the prime mover if technically justified and agreed between the producer and the DSO; 2. interface protection (see 4.9) and protections against faults within the generating plant; 3. Voltage support during faults and voltage steps (see 4.7.3.2) 4. remote control command on active power limitation for distribution grid security; 5. local response to overfrequency (see 4.6.1) 6. local response to underfrequency if applicable (see 4.6.2); 7. reactive power controls (see 4.7.2) 8. remote control command on active power limitation for market or economic reasons;	Accepted Merge 4 and 5 to: the lower value of: remote control command on active power limitation for distribution grid security; and local response to overfrequency (see 4.6.1) Change 8 to. other control commands on active power set point for (e.g. market, economic reasons, self-consumption optimization); Also align clause 4.11 introducing two sources of information 1) Grid management 2) Market or economic control Add Note in 4.11: Besides the requirements of this clause there might be other systems in place to control active power for reasons of market participation or local optimisation.	1
PL-18	0525 – 534	4.1		technical	If different requirements on the generating plant interfere with each other following hierarchy in 526 descending order shall be applied. The hierarchy do not consider all states make happened in network. Hierarchy will impose strict requirements, which could be dangerous for system stability.	Remove sentence or change sentence: If different requirements on the power generating module interfere shall be applied:.	Comment unclear	3
DK20	0525-526	4.1		technical	If different requirements on the generating plant interfere with each other following hierarchy in descending order shall be applied	If different requirements on the power generating plant interfere with each other following hierarchy in descending order shall be applied	rejected see RO-15	3

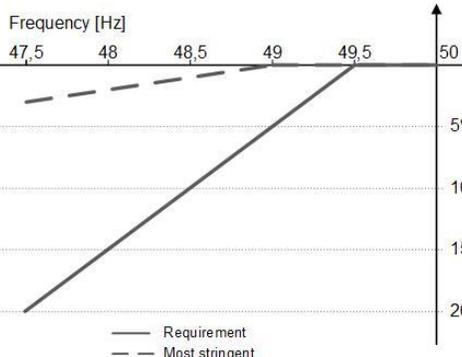
MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-023	0531 – 532	4.1		Te	<p>“4. remote control command on active power limitation if applicable; 5. local response to underfrequency if applicable (see 4.6.2);”</p> <p>According to NC RfG frequency control is of higher priority than local active power management. Swap sequence of criteria.</p>	<p>“4. local response to underfrequency if applicable (see 4.6.2); 5. remote control command on active power limitation if applicable;”</p>	<p>Partly accepted</p> <p>See DE-022</p> <p>Local over load management of the DSO needs to have higher priority than power increase in case of under frequency, since protection tripping would be the result. Besides LFSM-U is out of scope of RfG for Type A and B</p>	0
DK21	0531 – 532	4.1		te	<p>“4. remote control command on active power limitation if applicable; 5. local response to underfrequency if applicable (see 4.6.2);”</p>	<p>Delete 5. local response to underfrequency if applicable (see 4.6.2);”</p>	<p>Rejected</p> <p>As we have clause 4.6.2 we need to include it in the hierarchy</p>	1
EE-25	0533 – 534	4.1		Te	<p>“4. remote control command on active power limitation if applicable; 5. local response to underfrequency if applicable (see 4.6.2);”</p> <p>According to NC RfG frequency control is of higher priority than local active power management. Swap sequence of criteria.</p>	<p>“4. local response to underfrequency if applicable (see 4.6.2); To be define “if applicable”</p> <p>5. remote control command on active power limitation if applicable;” To be define “if applicable”</p>	<p>Partly accepted</p> <p>See DE-023</p>	0
NL-25	0533 – 534	4.1		te	<p>“4. remote control command on active power limitation if applicable; 5. local response to underfrequency if applicable (see 4.6.2);”</p> <p>According to NC RfG frequency control is of higher priority than local active power management. Swap sequence of criteria.</p>	<p>“4. local response to underfrequency if applicable (see 4.6.2); To be define “if applicable”</p> <p>5. remote control command on active power limitation if applicable;” To be define “if applicable”</p>	<p>Partly accepted</p> <p>See DE-023</p>	0

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-024	0535 - 536	4.1		General / technical	<p>Please state clear that the generating plants have to be designed to be able to support the grid stability(voltage, frequency) with all required functions as described in this TS and may not trip prior to this by design.</p> <p>The actual wording may be interpreted that possibly only the actual settings and not the whole settable range have to fulfil this requirement.</p>	<p>“The system shall be designed that under foreseeable conditions the self-protection does not trip prior to interface protection. This includes i.a. the complete defined settable area of the protection devices, the defined fault ride through criteria, the specifications of EN 50160, reactive power requirements, the individual situation at the poc and the influence of the grid-connection. National specifications apply.”</p>	<p>partly accepted</p> <p>This includes i.a. the complete defined settable area of the protection devices, the defined fault ride through criteria, the specifications of EN 50160, reactive power requirements, the individual situation at the poc and the influence of the grid-connection. National specifications apply.</p> <p>As the settable range of interface protection is beyond the FRT capability we may only reference the FRT requirements</p> <p>Thomas 5.12.2017: see GB 26 of -1</p>	2
DK22	0537-538	4.1		technical	Besides the requirements of Clause 4, additional requirements shall apply for connecting a generating plant to the distribution network, e.g. assessment of the point of connection	Besides the requirements of Clause 4, additional requirements shall may apply for connecting a power generating plant to the distribution network, e.g. assessment of the point of connection	<p>rejected</p> <p>comment not clear, what does “shall may” mean</p> <p>see also DE-013</p>	3
DE-025	0539	4.1		general	all power generator units shall have a type test which show that the behaviour are conform with the requirements of this standard	Add the following sentence: All power generating units shall be type-tested to proof the general conformity according to the requirement in this standard.	<p>Rejected,</p> <p>This is a requirement document; verification is not in the scope. This will be covered in -10</p>	1

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK23	0541	4.2		te	The generating plant shall be in compliance with the requirements of the DSO	The power generating plant shall be in compliance with the requirements	accepted in principle the comment shows a misunderstanding, only the connection scheme shall be according to DSO requirement. rephrase to <u>The connection scheme of the generating plant shall be in compliance...</u>	3
DK24	0544	4.2		ed	disconnection of the generating plant from the distribution network by tripping the interface switch according to 4.9.	disconnection of the power generating plant from the distribution network by tripping the interface switch according to 4.9.	partly accepted see RO-15	3
BE13*	0555	4.2		Ed	Unclear reference to "following sections"	Drop "to each of the following sections"	accepted	3
AT 05	0561	4.3.1		ed	Call the short circuit contribution of the generating plant !	<i>"For this purpose, the short circuit current at the installation point shall be assessed, taking into account, inter alia, the short circuit contribution of the generating plant."</i>	accepted	3
DE-026	0568 – 569	4.3.2		Te	"The short-time withstand current of the switching devices shall be coordinated with maximum short circuit power at the point of connection." Short circuit power at the connection point may vary in time. Therefore the relevant entity for coordination is the short circuit capacity rating of the equipment of the network operator at the connection point.	Please rephrase to make clear that not the short circuit power at a given moment, but the rated short circuit power of the grid is relevant.	accepted The short-time withstand current of the switching devices shall be coordinated with maximum rated short circuit power at the point of connection."	3
EE-26	0572 – 573	4.3.2		Te	"The short-time withstand current of the switching devices shall be coordinated with maximum short circuit power at the point of connection." Short circuit power at the connection point may vary in time. Therefore the relevant entity for coordination is the short circuit capacity rating of the equipment of the network operator at the connection point.	"The short-time withstand current of the switching devices shall be coordinated with the short circuit capacity of the network operator's equipment at the point of connection."	accepted in principle see DE-026	3

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
NL-26	0572 – 573	4.3.2		te	<p>“The short-time withstand current of the switching devices shall be coordinated with maximum short circuit power at the point of connection.”</p> <p>Short circuit power at the connection point may vary in time. Therefore the relevant entity for coordination is the short circuit capacity rating of the equipment of the network operator at the connection point.</p>	<p>“The short-time withstand current of the switching devices shall be coordinated with the short circuit capacity of the network operator’s equipment at the point of connection.”</p>	accepted in principle see DE-026	3
FR 12	0577-578	4.3.2		Te	<p>The proposed standard focuses on power system stabilisation functions that should support a generating plant and its protection interface. It should not go into the details of the generating plant internal design.</p> <p>Line 541 states that “the generating plant shall be in compliance with the requirements of the DSO”.</p>	Write “As a consequence, at least two switches in series might be present between any generating unit and the POC”	Rejected The standard focuses on the behaviour of power plants in the grid. Disconnection is an important characteristic of a plant	1fr
GB-02	0583	4.4.2	Table 1	Te	<p>In the current GB Grid Code we require a frequency operating range of 47 – 52Hz. Under the current GB Code and RfG the frequency ranges and time periods applicable are the same as the most stringent requirements and hence plant meeting the standards need to be aware that they will have to meet the more onerous requirements</p>	Unclear why the standard selects the time durations presented which are less onerous than RfG permits. Change to most onerous values permitted by RfG.	partly accepted Values were chosen to fit to central Europe and GB, as far as are known at the moment. EN50549 should be updated if other values are used by TSOs	3
NO 8	0585-586			te	<p>What about frequency excursions outside 47-52 Hz? The Norwegian TSO sees it as favourable that DG e.g. small hydro remains in operation for e.g. 10-20 seconds in the frequency range 52-55 Hz. Is such a requirement in line with chapter 4.4.4 and table 1?</p>	Add note or make clearer requirements or degree of freedom outside the range 47-52 Hz	accepted in principle add after Line 591: ...unless DSO, TSO and producer agree on wider frequency ranges and longer durations	2
DE-027	0589 – 591	4.4.2	Table 1	Te	<p>The interpretation of NC RfG Table 2 as minimum and most stringent requirements is wrong. In particular the introduction of a most stringent requirement could imply that longer time periods for operation are not admissible, which is not the case. NC RfG Article 13 (a)(1)(ii) allows for wider ranges and/or longer minimum times of operation. These times are not limited by the boundaries of Table 1.</p>	Remove the distinction between minimum and most stringent requirements and replicate the NC RfG Table 2 2 instead of the current Table 1 (line 594).	accepted in principle “time period for operation stringent requirement” align line 590-591, see also NO 11	2

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
FI 6	0589-590	4.4.2		ed	There may be some risk of misunderstanding and confusion. Frequency related requirements are required by the TSO and the role of DSO typically is to forward these requirements. Only for island operation the DSO may need to set own frequency control related requirements.	Consider making the text more clear in this respect.	noted, please see line 71 see DK4	3
EE-27	0590	4.4.2		Te	Frequency range from 47 Hz to 52 Hz is wider than at NC RfG.	Keep the frequency range according NC RfG (from 47,5 Hz to 51,5 Hz)	rejected comment not correct, statement is only correct for central Europe, but this is an European standard	3
NL-27	0590	4.4.2		te	Frequency range from 47 Hz to 52 Hz is wider than at NC RfG.	Keep the frequency range according NC RfG (from 47,5 Hz to 51,5 Hz)	rejected comment not correct, statement is only correct for central Europe, but this is an European standard	3
PL-19	0590	4.4.2		te	In the frequency range from 47 Hz to 52 Hz the generating plant should be capable of operating until the interface protection trips. The range from 47Hz to 52Hz is favourable to requirements for power generating module.		noted no proposal	3
BE14*	0592	4.4.2		Ed	Uniformity in used terms	"even more stringent time periods"	Accepted	3

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Priority
BE15*	0595	4.4.3		Te	<p>Bring requirement in line with NC RfG and response to Question 3 of the TC8X/Sec/0154/ INF.</p> <ul style="list-style-type: none"> The power reduction limit should be expressed in p.u. of P_{max} and not P_M. The graph and the text should make clear that between 50Hz and 49,5Hz no power reduction is allowed => Thicker line <p>To our understanding, Art 13.5 (b) of NC RfG is applicable when making the choice within the range offered by the NC RfG. As the CENELEC requirement is equal to the less stringent possibility offered by the NC RfG, this Art 13.5 (b) has no application in the EN.</p>	 <p>Change text and figure as follows: The admissible active power reduction due to underfrequency is limited by the full line in Figure 5 and is characterized by a maximum allowed reduction rate of 10 % of P_{max} per 1 Hz for frequencies below 49,5 Hz.</p> <p>It is possible that a more stringent power reduction characteristic is required by the DSO. Nevertheless this requirement is expected to be limited to an admissible active power reduction represented by the dotted line in Figure 5 which is characterised by a reduction rate of 2 % of the maximum power P_{max} per 1 Hz for frequencies below 49 Hz.</p> <p>If any ambient conditions have influence on the power reduction behaviour of the system, the manufacturer shall specify at which ambient conditions the requirements can be fulfilled.</p>	<p>Accepted in principle:</p> <p>Change figure to make full line visible over the axes</p> <p>The admissible active power reduction due to underfrequency is limited by the full line in Figure 5 and is characterized by a maximum allowed reduction rate of 10 % of P_{max} per 1 Hz for frequencies below 49,5 Hz.</p> <p>It is possible that a more stringent power reduction characteristic is required by the <u>relevant party</u>. Nevertheless this requirement is expected to be limited to an admissible active power reduction represented by the dotted line in Figure 5 which is characterised by a reduction rate of 2 % of the maximum power P_{max} per 1 Hz for frequencies below 49 Hz.</p> <p>If any technologies intrinsic design or ambient conditions have influence on the power reduction behaviour of the system, the manufacturer shall specify at which ambient conditions the requirements can be fulfilled and eventual limitations. The information can be provided in the format of a graph showing the intrinsic behaviour of the generating unit for example at different ambient condition. The power reduction and the ambient conditions shall comply with the specification given by the responsible party. If the generating unit does not meet the power reduction at the specified ambient conditions, the producer and the responsible party shall agree on acceptable ambient conditions.</p>	2
DK25	0595	4.4.3		ge	<p>A more stringent reduction characteristic could be required by the DSO but it is up to TSO what it will be set. It is expected that the power reduction will be required by manufacturer to be close to lower limit but for operational point of view is better to set close to highest limit.</p>	<p>The maximum admissible power reduction characteristic shall be specified by the TSO.</p>	<p>accepted in principle See DK4 Change DSO to “responsible party”</p>	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
EE-28	0597-598	4.4.2			The generating plant shall be capable of operating continuously when the frequency at the point of connection stays within the range of 49 Hz to 51 Hz.		no proposal	3
NL-28	0597-598	4.4.2			The generating plant shall be capable of operating continuously when the frequency at the point of connection stays within the range of 49 Hz to 51 Hz.		no proposal	3
GB-03	0598	4.4.3	Output Power with Falling Frequency	Te	Again the GB values proposed for this requirement are more onerous than the minimum requirement (ie a maximum Active Power drop of 5% from 49.5Hz to 47Hz). This is more onerous than the requirement but less onerous than the most stringent requirement. Under RfG this requirement would apply to all Type A plant and above (800MW plus).	Change to most onerous values permitted by RfG or the most onerous selected by all parties if this is less onerous possible.	rejected we don't see a reason to use the most onerous value. As we do not have a clear view of the future requirements in member states we keep the current default	1
EE-29	0599-600	4.4.2			In the frequency range from 47 Hz to 52 Hz the generating plant should be capable of operating until the interface protection trips.	In the frequency range from 47 Hz to 51,5 Hz the generating plant should be capable of 599 operating until the interface protection trips.	rejected no reason for change given	3
NL-29	0599-600	4.4.2			In the frequency range from 47 Hz to 52 Hz the generating plant should be capable of operating until the interface protection trips.	In the frequency range from 47 Hz to 51,5 Hz the generating plant should be capable of 599 operating until the interface protection trips.	rejected no reason for change given	3
FI 7	0600	4.4.3		ed	There may be some risk of misunderstanding and confusion. Frequency related requirements are required by the TSO and the role of DSO typically is to forward these requirements. Only for island operation the DSO may need to set own frequency control related requirements.	Consider making the text more clear in this respect.	accepted please see line 69 see also DK4	3
EE-30	0600-601	4.4.2	Table 1	Te	The interpretation of NC RfG Table 2 as minimum and most stringent requirements is wrong. In particular the introduction of a most stringent requirement could imply that longer time periods for operation are not admissible, which is not the case.	Remove the distinction between minimum and most stringent requirements and replicate the NC RfG Table 2.	see DE-027	3
NL-30	0600-601	4.4.2	Table 1	te	The interpretation of NC RfG Table 2 as minimum and most stringent requirements is wrong. In particular the introduction of a most stringent requirement could imply that longer time periods for operation are not admissible, which is not the case.	Remove the distinction between minimum and most stringent requirements and replicate the NC RfG Table 2.	see DE-027	3
EE-31	0601	4		ed	Requirements on generating plants	Requirements on power generating plants	Align with decision of RO-15	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
NL-31	0601	4		ed	Requirements on generating plants	Requirements on power generating plants	rejected see RO-15	3
EE-32	0603	4.1		ed	This clause defines the requirements for power generating plants	This clause defines the requirements for power generating plants	rejected see RO-15	3
NL-32	0603	4.1		ed	This clause defines the requirements for power generating plants	This clause defines the requirements for power generating plants	rejected see RO-15	3
PL-20	0603	4.1		ed	This clause defines the requirements for power generating plants	This clause defines the requirements for power generating facility	rejected see RO-15	3
DE-028	0604 – 605	4.4.3		Te	“If any ambient conditions has influence on the power reduction behaviour of the system, the manufacturer shall specify at which ambient conditions the requirements can be fulfilled.” According to NC RfG ambient conditions are part of the specification by the TSO and are not to be defined at the manufacturer’s discretion. Furthermore the consideration of technical capabilities is missing.	“The TSO shall specify at which ambient conditions the requirements shall be fulfilled taking into account technical capabilities of generation technologies.”	accepted in principle see BE15	2
DK26	0604 – 605	4.4.3		te	“If any ambient conditions has influence on the power reduction behaviour of the system, the manufacturer shall specify at which ambient conditions the requirements can be fulfilled.” According to NC RfG ambient conditions are part of the specification by the TSO and are not to be defined at the manufacturer’s discretion. Furthermore the consideration of technical capabilities is missing.	“The TSO shall specify at which ambient conditions the requirements shall be fulfilled taking into account technical capabilities of generation technologies.”	accepted in principle see BE15	2
EE-33	0604 – 605	4.4.3		Te	“If any ambient conditions has influence on the power reduction behaviour of the system, the manufacturer shall specify at which ambient conditions the requirements can be fulfilled.” According to NC RfG ambient conditions are part of the specification by the TSO and are not to be defined at the manufacturer’s discretion. Furthermore the consideration of technical capabilities is missing.	“The TSO shall specify at which ambient conditions the requirements shall be fulfilled taking into account technical capabilities of generation technologies.”	accepted in principle see BE15	2
NL-33	0604 – 605	4.4.3		te	“If any ambient conditions has influence on the power reduction behaviour of the system, the manufacturer shall specify at which ambient conditions the requirements can be fulfilled.” According to NC RfG ambient conditions are part of the specification by the TSO and are not to be defined at the manufacturer’s discretion. Furthermore the consideration of technical capabilities is missing.	“The TSO shall specify at which ambient conditions the requirements shall be fulfilled taking into account technical capabilities of generation technologies.”	accepted in principle see BE15	2

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
EE-34	0609	4.4.3		Ge	A more stringent reduction characteristic could be required by the DSO but it is up to TSO what it will be set. It is expected that the power reduction will be required by manufacturer to be close to lower limit but for operational point of view is better to set close to highest limit.	The maximum admissible power reduction characteristic shall be specify by the TSO.	accepted in principle see BE15	2
NL-34	0609	4.4.3		ge	A more stringent reduction characteristic could be required by the DSO but it is up to TSO what it will be set. It is expected that the power reduction will be required by manufacturer to be close to lower limit but for operational point of view is better to set close to highest limit.	The maximum admissible power reduction characteristic shall be specify by the TSO.	accepted in principle see BE15	2
DE-029	0611	4.4.4		Ed		Insert “≤” before “95 %”	Accepted Should use the wording of AT 06, so it aligns with the wording in -1 (LV).	3
FR 13	0611	4.4.4		Te	“In case of voltages 95% Uc” is not correct	Replace by “In case of voltages < 95% Uc”	see DE-029	3
AT 06	0611 - 612	4.4.4	Paragraph 1	te	Wording !	Add the following: <i>“In case of voltages below 95 % U_n, it is allowed to reduce the apparent power to maintain the current limits of the generating plant.”</i>	see DE-029	3
EE-35	0611-612	4.4.4		Te	“In case of voltages 95 % Uc, it is allowed to reduce the apparent power to maintain the current limits of the generating plant. The reduction shall be as small as technically feasible.” Power reduction is not allowed on a general basis as it may be very dangerous for system stability if it is done by reducing active power component	Add the note as in 4.7.2.2. “Whether there is a priority given to P or Q or the active factor when reducing the apparent power is not defined in this European Standard. Risks and benefits of different priority approaches are under consideration”	rejected voltage in LV and MV systems is a local phenomenon and therefore not generally applied If necessary, this should be discussed in an early stage of the next revision of this document	2
ES-05	0611-612	4.4.4		Te	“In case of voltages 95 % Uc, it is allowed to reduce the apparent power to maintain the current limits of the generating plant. The reduction shall be as small as technically feasible.” Power reduction is not allowed on a general basis as it may be very dangerous for system stability if it is done by reducing active power component.	Add the note as in 4.7.2.2. “Whether there is a priority given to P or Q or the active factor when reducing the apparent power is not defined in this European Standard. Risks and benefits of different priority approaches are under consideration”.	rejected voltage in LV and MV systems is a local phenomenon and therefore not generally applied If necessary, this should be discussed in an early stage of the next revision of this document	2

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
FR 14	0611-612	4.4.4		te	<p>"In case of voltages 95 % U_c, it is allowed to reduce the apparent power to maintain the current limits of the generating plant. The reduction shall be as small as technically feasible."</p> <p>Possibility of power reduction in the operational voltage range is to be decided by the DSO (cf RfG §13. 1 (ii))</p>	<p>Replace with "In case of voltages < 95% U_c, unless otherwise specified by the DSO, it is allowed to reduce the apparent power to maintain the current limits of the generating plant. The reduction shall be as small as technically feasible."</p>	<p>rejected</p> <p>voltage in LV and MV systems is a local phenomenon and therefore not generally applied</p> <p>If necessary, this should be discussed in an early stage of the next revision of this document</p> <p>Comment not correct, according the RfG 13.1. (a) ii the RSO might <u>agree</u> with the producer on wider voltage and frequency ranges, the RSO does not decide these independently</p> <p>WG03 intends to use default values that are most market relevant</p>	2
NL-35	0611-612	4.4.4		te	<p>"In case of voltages 95 % U_c, it is allowed to reduce the apparent power to maintain the current limits of the generating plant. The reduction shall be as small as technically feasible."</p> <p>Power reduction is not allowed on a general basis as it may be very dangerous for system stability if it is done by reducing active power component</p>	<p>Add the note as in 4.7.2.2.</p> <p>"Whether there is a priority given to P or Q or the active factor when reducing the apparent power is not defined in this European Standard. Risks and benefits of different priority approaches are under consideration"</p>	<p>see EE-05 and FR 14</p>	2
PL-21	0611-612	4.4.4		te	<p>"In case of voltages 95 % U_c, it is allowed to reduce the apparent power to maintain the current limits of the generating plant. The reduction shall be as small as technically feasible."</p> <p>Power reduction is not allowed on a general basis as it may be very dangerous for system stability if it is done by reducing active power component.</p>	<p>Remove sentence</p>	<p>see EE-05 and FR 14</p>	2

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
EE-36	0612	4.4.4		Te	"The reduction shall be as small as technically feasible." Apparent power reduction at low voltage is detrimental to system stability.	Remove sentence.	see EE-05 and FR 14	2
NL-36	0612	4.4.4		te	"The reduction shall be as small as technically feasible." Apparent power reduction at low voltage is detrimental to system stability.	Remove sentence.	see EE-05 and FR 14	2
BE16*	0615	4.4.4	Note	Ed/Te	Unclear phrasing. What is the meaning of "the specified reduction"	Consider whether it should be "the specified lower limit of the voltage range" Or drop the note	accepted in principle: Change note to: The specified accepted reduction of output power is an absolute minimum requirement. Further power system aspects might require maintained output power in the entire continuous operation voltage range.	3
FR 15	0615	4.4.4		Te	The Note is not clear : what is the "specified reduction" as above no reduction is specified ? What is the "requirement" ?	Please clarify and write explicitly what this note means	see BE16	3
EE-37	0615-616	4.1		ed	If different requirements on the generating plant interfere with each other following hierarchy in descending order shall be applied	If different requirements on the power generating plant interfere with each other following hierarchy in descending order shall be applied	partly accepted see see RO-15	3
NL-37	0615-616	4.1		ed	If different requirements on the generating plant interfere with each other following hierarchy in descending order shall be applied	If different requirements on the power generating plant interfere with each other following hierarchy in descending order shall be applied	partly accepted see see RO-15	3
PL-22	0615-616	4.1		ed	If different requirements on the generating plant interfere with each other following hierarchy in descending order shall be applied. The hierarchy do not consider all states make happened in network. Hierarchy will impose strict requirements, which could be dangerous for system stability.	Remove sentence or change sentence: If different requirements on the power generating module interfere shall be applied:.	see DE-022	3
FR 16	0621-622	4.4.4		Te	What does the sentence "the operability of the power plant in this condition shall be taken into account by the manufacturers" mean ?	Please clarify and write explicitly what this sentence means	acceptedaccepted in principle Add after line 622: 4.5.3 specifies additional requirements at voltages below 90%Un	2
EE-38	0627-628	4.1		ed	Besides the requirements of Clause 4, additional requirements shall apply for connecting a generating plant to the distribution network, e.g. assessment of the point of connection	Besides the requirements of Clause 4, additional requirements shall may apply for connecting a power generating plant to the distribution network, e.g. assessment of the point of connection	see DK22	3

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
NL-38	0627-628	4.1		ed	Besides the requirements of Clause 4, additional requirements shall apply for connecting a generating plant to the distribution network, e.g. assessment of the point of connection	Besides the requirements of Clause 4, additional requirements shall may apply for connecting a power generating plant to the distribution network, e.g. assessment of the point of connection	see DK22	3
PL-23	0627-628	4.1		ed	Besides the requirements of Clause 4, additional requirements shall apply for connecting a generating plant to the distribution network, e.g. assessment of the point of connection	Besides the requirements of Clause 4, additional requirements shall may apply for connecting a power generating facility to the distribution network, e.g. assessment of the point of connection	see DK22	3
BE17*	0630	4.5.2		Te	Please put most relevant RoCoF immunity level. For Continental Europe this tends to be 2 Hz/s.	Change 1Hz/s to 2Hz/s or other value resulting from the coordinated national implementation processes of the NC RfG. Add Note: As long as RoCoF is also used as a mean to detect loss of mains situations, the interface protection relay may give an order to disconnect before the limit of this immunity range is reached.	Partly accepted, See proposal to BE17 in annex	1
FR 17	0630	4.5.2		te	Combustion engine can cope with a maximum ROCOF rate of 1%.	Add a ROCOF table with maximum rate depending on technologies	See BE-17 Miguel: The sentence provide an option to define by the DSO and this shall maintain.	3
AT 07	0631 - 635	4.5.2 Annex C	Table C.1 ?	te	This item states that if no ROCOF withstand capability is defined by the DSO, the generation unit shall be able to operate with rates of change up to 1 Hz/s. In lines 634 & 635, for the time until CLV 50662 is available, a requirement of 2.5 Hz/s is stated. In Table B.1 in Annex B also 2.5 Hz are quoted. It is not clear which one is the correct value for this prEN. European countries are considering a minimum requirement of 2 Hz/s with a 500ms window. For the 1 Hz/s value there would be missing a definition for a measurement window.	Please check the value being discussed during meetings for the IGD for Frequency parameters from ENTSO-E and align clarifyingly. Please consider, that for 1 Hz/s, the definition of a measurement window would need to be defined. (See also AT 40)	Partly accepted Adapt RoCoF in table C.1 accordingly Delete lines 634 & 635 See BE-17 Miguel: The sentence provide an option to define by the DSO and this shall maintain.	2
DE-030	0631-633	4.5.2		Technical	Mixture of requirements – plant level and unit level – which needs to be aligned	Requirements should be on generating plant level	See BE-17 No mixture, The requirement is a plant level but the compliance could be showed at generating unit level.	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-031	0631-633	4.5.2		Editorial	"..., the generating plant shall be able to operate with a specified ROCOF, provided by the DSO."	Language should be adopted – it could be interpreted that a plant should operate with a specific ROCOF which is not correct. A plant should stay connected and operate up to a ROCOF of ...Hz/s	See BE-17 Accepted.	3
DK27	0631-633	4.5.2		te	Mixture of requirements – plant level and unit level – which needs to be aligned	Requirements should be on generating plant level	See BE-17 No mixture, The requirement is a plant level but the compliance could be showed at generating unit level.	3
DK28	0631-633	4.5.2		ed	"..., the generating plant shall be able to operate with a specified ROCOF, provided by the DSO."	Language should be adopted – it could be interpreted that a plant should operate with a specific ROCOF which is not correct. A plant should stay connected and operate up to a ROCOF of ...Hz/s	See BE-17 Accepted.	3
EE-39	0541	4.2		ed	The generating plant shall be in compliance with the requirements of the DSO	The power generating plant shall be in compliance with the requirements of the DSO	Rejected Improvement not apparent See RO-11 Partly implemented see RO-13	3
NL-39	0541	4.2		ed	The generating plant shall be in compliance with the requirements of the DSO	The power generating plant shall be in compliance with the requirements of the DSO	See EE-39	3
PL-24	0541	4.2		ed	The generating plant shall be in compliance with the requirements of the DSO	The power generating module shall be in compliance with the requirements of the DSO	See EE-39	3
DE-032	0632-635	4.5.2		Technical	First paragraph states that a generating unit shall be able to operate with a ROCOF up to 1 Hz/s Second paragraph suddenly refers to 2,5 Hz/s which is somehow a much more stringent requirement.	Not sure what TS 50662 refers to but the requirement should be aligned and should be 1 Hz/s.	See AT-07	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK29	0632-635	4.5.2		te	First paragraph states that a generating unit shall be able to operate with a ROCOF up to 1 Hz/s Second paragraph suddenly refers to 2,5 Hz/s which is somehow a much more stringent requirement.	Not sure what TS 50662 refers to but the requirement should be aligned and should be 1 Hz/s.	See AT-07	3
DE-033	0633	4.5.2		Ed	RoCoF of 1 Hz/s. This must be a error. The default RoCoF to be withstood is 2,5 Hz/s according to Annex C.	2,5 Hz/s	See BE-17 and AT-07 The value shall be fixed by the DSO in case of no specification the value should be 1 Hz/s but in case of national requirements the value shall be the national value.	3
DK30	0633	4.5.2		te	RoCoF of 1 Hz/s. This must be a error. The default RoCoF to be withstood is 2,5 Hz/s according to Annex C.	Substitute 1 Hz/s per 2,5 Hz/s	See BE-17 and AT-07 Same as DE-033	3
EE-40	0633	4.5.2		Ed	RoCoF of 1 Hz/s. This must be a error. The default RoCoF to be withstood is 2,5 Hz/s according to Annex C.	Substitute 1 Hz/s per 2,5 Hz/s	See BE-17 and AT-07 Same as DE-033	3
ES-06	0633	4.5.2		Ed	"1 Hz/s" This shall be an error, as Annex C stated 2,5 Hz/s	Substitute 1 Hz/s per 2,5 Hz/s.	See BE-17 and AT-07 Same as DE-033	3
FR 18	0633	4.5.2		Te	The 1 Hz/s limit will be insufficient for small systems like islands	Similarly to lines 592 and 593, add a foot note : "For small isolated distribution networks (typically on islands) higher ROCOF immunity values may be required"	Accepted	1
NL-40	0633	4.5.2		ed	RoCoF of 1 Hz/s. This must be a error. The default RoCoF to be withstood is 2,5 Hz/s according to Annex C.	Substitute 1 Hz/s per 2,5 Hz/s	See BE-17 and AT-07 Same as DE-033	3
PL-25	0633	4.5.2		ed	RoCoF of 1 Hz/s. This must be a error. The default RoCoF to be withstood is 2,5 Hz/s according to Annex C.	Substitute 1 Hz/s per 2,5 Hz/s	See BE-17 and AT-07 Same as DE-033	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
FI 9	0633-634	4.5.2		ed	There seems to be some error or misprint here. Should there be the same frequency rate of change value in both sentences in lines 633 and 634? If not the language needs to be corrected. If the first is 1Hz/s and the second one 2,5 Hz/s the logic seems to be missing. Any ROCOF requirement that does not specify the measurement window is ambiguous.	Please check the values.	See AT-07 Same as DE-033	3
FR 19	0633-634	4.5.2		Te	Consistency between 1 Hz/s and 2,5 Hz/s values ?	Replace 1 Hz/s and 2,5 Hz/s by 2 Hz/s value foreseen by ENTSOE in the document "Frequency Stability Evaluation Criteria for the Synchronous Zone of Continental Europe" of March 2016	See BE-17 Same as DE-033	3
BE18*	0634	4.5.2		Ed	Wrong phrasing	Drop "2,5 Hz/s"	See BE-17	3
FI 8	0634	4.5.2		ge	Text refer to document CLC/TS 50662 which does not exist. CLC/TS 50662 is not listed under CLC/TC 8X work program. Possible wrong document reference?	Please check the document reference.	See AT-07	3
GB-05	0634	4.5.2	2	Te	It is not clear how the 2.5Hz/s mentioned here is related to the requirement of 1Hz/s withstand.	Add some context to how this value is related to the withstand value.	See BE-17 and AT-07	3
DE-034	0634-635	4.5.2		Te	<p>"Until CLC TS 50662 is available, the 2,5Hz/s ROCOF should be defined by a 5 cycle measurement window. Once CLC TS 50662 is available the definition according CLC TS 50662 should be used"</p> <p>There is a deep discussion at European and national levels still ongoing about the parameters to be required for the ROCOF, about the state of the art capability as well as ongoing studies to determine system needs. It is recommended to wait until the input of the Implementation of Regulation 2016/631 before stating these values for the ROFOC and measurement window.</p>	Remove values, or wait until European harmonization of this requirement	See AT-07	3

MB/ NC	Line numb er	Clause/ Subclau se	Paragr aph/ Figure/ Table	Type of com ment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
EE-41	0634- 635	4.5.2		Te	<p>“Until CLC TS 50662 is available, the 2,5Hz/s ROCOF should be defined by a 5 cycle measurement window. Once CLC TS 50662 is available the definition according CLC TS 50662 should be used”</p> <p>There is a deep discussion at European and national levels still ongoing about the parameters to be required for the ROCOF, about the state of the art capability as well as ongoing studies to determine system needs. It is recommended to wait until the input of the Implementation of Regulation 2016/631 before stating these values for the ROFOC and measurement window.</p>	Remove values, or wait until European harmonization of this requirement	See AT-07	3
ES-07	0634- 635	4.5.2		Te	<p>“Until CLC TS 50662 is available, the 2,5Hz/s ROCOF should be defined by a 5 cycle measurement window. Once CLC TS 50662 is available the definition according CLC TS 50662 should be used”.</p> <p>There is a deep discussion at European and national levels still ongoing about the parameters to be required for the ROCOF, about the state of the art capability as well as ongoing studies to determine system needs. It is recommended to wait until the input of the Implementation of Regulation 2016/631 before stating these values for the ROFOC and measurement window.</p>	Remove values, or wait until European harmonization of this requirement.	See AT-07	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
NL-41	0634-635	4.5.2		te	<p>“Until CLC TS 50662 is available, the 2,5Hz/s ROCOF should be defined by a 5 cycle measurement window. Once CLC TS 50662 is available the definition according CLC TS 50662 should be used”</p> <p>There is a deep discussion at European and national levels still ongoing about the parameters to be required for the ROCOF, about the state of the art capability as well as ongoing studies to determine system needs. It is recommended to wait until the input of the Implementation of Regulation 2016/631 before stating these values for the ROFOC and measurement window.</p>	Remove values, or wait until European harmonization of this requirement	See AT-07	3
PL-26	0634-635	4.5.2		te	<p>“Until CLC TS 50662 is available, the 2,5Hz/s ROCOF should be defined by a 5 cycle measurement window. Once CLC TS 50662 is available the definition according CLC TS 50662 should be used”</p> <p>There is a deep discussion at European and national levels still ongoing about the parameters to be required for the ROCOF, about the state of the art capability as well as ongoing studies to determine system needs. It is recommended to wait until the input of the Implementation of Regulation 2016/631 before stating these values for the ROFOC and measurement window.</p>	Remove values, or wait until European harmonization of this requirement	See AT-07	3
DK31	0544	4.2		ed	Inter alia, the generating plant shall ensure the following	Inter alia, the power generating plant shall ensure the following	Rejected Improvement not apparent See RO-11	3
EE-42	0544	4.2		ed	Inter alia, the generating plant shall ensure the following	Inter alia, the power generating plant shall ensure the following	Rejected Improvement not apparent See RO-11	3
NL-42	0544	4.2		ed	Inter alia, the generating plant shall ensure the following	Inter alia, the power generating plant shall ensure the following	Rejected Improvement not apparent See RO-11	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
PL-27	0544	4.2		ed	Inter alia, the generating plant shall ensure the following	Inter alia, the power generating module shall ensure the following	Rejected Improvement not apparent See RO-11	3
DE-035	0636	4.5.3		general	The term “low voltage ride through (LVRT)” is misleading. “Low voltage” is defined as a nominal voltage of 1 kV or less (compare definition in Section 3.1.5 of prEN50549-1). Please use the term “under voltage ride through (UVRT).	Please use the term “under voltage ride through (UVRT)” (within the whole document).	See DE-014 Correct whole document LVRT → UVRT HVRT → OVRT	0
DE-036	0636-701	4.5.3-4.5.4		Technical	In this chapter requirements for generating unit, module and plant are defined	Requirements should be on generating plant level	Rejected Already the case see line 640	1
DK32	0636-701	4.5.3-4.5.4		te	In this chapter requirements for generating unit, module and plant are defined	Requirements should be on generating plant level	See DE-036	0
AT 08	0637	4.5.3.1	Paragraph	te	Add a note for the use of relays that have the option to input a LVRT curve to better define the protection and compliance.	Add the following note: <i>“The protection relay shall be capable to input corner points of fault ride through profiles.”</i>	Rejected, but note added to clarify: NOTE 3 The FRT curves in Figures 6, 7 and 8 describe the minimum requirements for continued connection of the generating plant to the grid. They are not designed for parameterizing the interface protection.	1
GB-04	0642	4.5.3.2	(Fault Ride Through)	Te	As per 50549-1 comments as follows: Section 4.5.3.1 (LVRT) – Recovery we generally require 90% of the prefault active power to be restored within 0.5 seconds of fault clearance.	Make it clear that Type A has to comply if the member state requires it – ie it is an option for national or local implementation dependent on system characteristics	Rejected This is defined by legal framework , as this is not clear at the time of writing , we do not make a statement on this	1

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-037	0642 – 646	4.5.3.1		ge	<p>LVRT and voltage support during faults and voltage steps only for Type B generators and above is not sufficient. The need of a full LVRT and voltage support during faults and voltage steps also for type A was shown by TU Munich and is mandatory.</p> <p>This part is also in contradiction to the German national implementation of RfG, which is not acceptable as every national implementation must be possible within the borders of 50549.</p> <p>CHP below 50kW must be according EN50465 thus making UVRT impossible</p>	<ol style="list-style-type: none"> 1. Open Scope for possible national deviations, e.g. in case of high density of DER. 2. Following proposals for adaption of requirements: <p>Lines 649 following: In general, generating plants shall contribute to overall power system stability by providing immunity towards dynamic voltage changes unless safety standards require a disconnection.</p> <p>Lines 653 following: Generating modules classified as Type A excluding CHP below 50kW or B modules according to COMMISSION REGULATION 2016/631 shall comply with the requirements of 4.5.3.2 and 4.5.3.3. If confirmed by the DSO, Generating modules classified as Type A and smaller according to COMMISSION REGULATION 2016/631 may not need to comply with these requirements.</p> <p>Add chapter 4.7.3.2 of 50549-2 to 50549-1.</p>	<p>Partly accepted</p> <p>Keep should but add Note stating, that from a technical view WG03 considers including Type A generating plants into LVRT based on the chosen banding thresholds for necessary. Exemption is only acceptable for CHP and generating units based on rotating machinery below 50kW as EN50465 for gas appliance requests disconnection in case of undervoltage.</p> <p>Regarding clause 4.7.4 See also DK37 national level.</p>	1
FR 20	0611	4.4.4		Te	<p>A margin should be kept between the maximum/minimum voltage in normal operation allowed by EN50160 (110% & 90% over 10 minutes) and transient overvoltages/undervoltages that can occur on the MV network during short periods of time.</p> <p>A clear link should be made between this paragraph 4.4.4 and</p> <p>paragraph 4.5.4 on High Voltage Ride Through, and margins should be kept above 110% and below 90%</p>	<p>Please clarify the link between 4.4.4 and 4.5.4 and keep margins above 110% (115% for example) and below 90% (85% for example)</p>	<p>partly accepted</p> <p>Comment indicates a misunderstanding. The link is considered to be clear as the ranges of 4.4.4 fit to the end value of figure 6 and 7.</p> <p>Add sentence: Beyond these values the under and over voltage ride through immunity as specified in clause 4.5.3 and 4.5.4 apply.</p>	1

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK33	0644-645	4.5.3.1		te	LVRT requirements shall be mandatory for Type A where technically feasible.	Replace 'should' with 'shall' and add 'where technically feasible' after 'requirements' Add Note with technologies that cannot comply with the requirements.	Accepted Rejected. Not all the local requirement will request compliance for these products.	2
EE-43	0552-0553	4.2		ed	disconnection of the generating plant from the distribution network by tripping the interface switch according to 4.9.	disconnection of the power generating plant from the distribution network by tripping the interface switch according to 4.9.	Rejected Improvement not apparent See RO-11	3
NL-43	0552-0553	4.2		ed	disconnection of the generating plant from the distribution network by tripping the interface switch according to 4.9.	disconnection of the power generating plant from the distribution network by tripping the interface switch according to 4.9.	Rejected Improvement not apparent See RO-11	3
NO 9	0644-645			Ed/te	Generating modules classified as Type A 655 and smaller according to COMMISSION REGULATION 2016/631 should comply with these requirements.- which requirements are referred to?	Make the reference more clear	See DK-33	
PL-28	0552-0553	4.2		ed	disconnection of the generating plant from the distribution network by tripping the interface switch according to 4.9.	disconnection of the power generating plant from the distribution network by tripping the interface switch according to 4.9.	Rejected Improvement not apparent See RO-11	3
DK34	0649 – 651	4.5.3.1	Note 2	te	“These requirements are independent of the interface protection settings. Disconnection settings of the interface protection relay always overrule technical capabilities. So, whether the generating plant will stay connected or not will also depend upon those settings.” Protection settings shall not impair LVRT capability and can therefore not always overrule technical capabilities, but only if required by safety standards.	Change sentence to: “These requirements are independent of the interface protection settings. Disconnection settings of the interface protection relay can overrule technical capabilities, if safety standards require so. So, whether the generating plant will stay connected or not will also depend upon those settings.” Also consider: Lom detection needs to be specified/described on a functional basis.	Partly accepted, Keep note as is, but add in line 1116, that interface protection shall be according DSO and “responsible party” requirements	1
EE-44	0649 – 651	4.5.3.1		Te	“These requirements are independent of the interface protection settings. Disconnection settings of the interface protection relay always overrule technical capabilities. So, whether the generating plant will stay connected or not will also depend upon those settings.” Protection settings shall not impair LVRT capability and can therefore not always overrule technical capabilities, but only if required by safety standards.	“These requirements are independent of the interface protection settings. Disconnection settings of the interface protection relay can overrule technical capabilities, if safety standards require so. So, whether the generating plant will stay connected or not will also depend upon those settings.”	See DK-34	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
NL-44	0649 – 651	4.5.3.1		te	<p>“These requirements are independent of the interface protection settings. Disconnection settings of the interface protection relay always overrule technical capabilities. So, whether the generating plant will stay connected or not will also depend upon those settings.”</p> <p>Protection settings shall not impair LVRT capability and can therefore not always overrule technical capabilities, but only if required by safety standards.</p>	<p>“These requirements are independent of the interface protection settings. Disconnection settings of the interface protection relay can overrule technical capabilities, if safety standards require so. So, whether the generating plant will stay connected or not will also depend upon those settings.”</p>	See DK-34	3
BE21*	0653			Te	<p>The process of national implementation of NC RfG brings new information.</p> <p>In BE, the LVRT requirement will probably be less stringent than the standard curve in this draft document and more in line with interface protection settings.</p>	<p>Please reconsider FRT requirement. This proposal still has to be subjected to a BE public consultation and a validation by the NRA in 2018.</p>	<p>Rejected, day or in discussion => 0,05% => 0,1% => 0,15% typical value exists in rope</p> <p>But: rename “requirement” to “default requirement”</p>	1
DE-038	0653	4.5.3.2		Technical	<p>Why is it necessary to prove that a generating unit connected to the MV grid can withstand a voltage drop down to 5% retained voltage. The requirement of the rfg is to operate stable during a disturbance in the transmission system</p>	<p>Change the figure to 15% retained instead of 5% retained voltage.</p>	Rejected see BE21	1
GB-06	0653	4.5.3.2	Figure 6	Te	<p>The time parameter requirement of 0.2s should be 0.14s with a voltage drop of 0.15pu to align with RfG. The most stringent line in the existing figure is acceptable.</p>	<p>Modify the figure values to 0.14s and 0.15pu Voltage</p>	Rejected see BE21	1
DE-039	0656	4.5.3.2		Editorial	<p>“.... remains above the voltage-time diagram of Figure 6.”</p>	<p>Change to “....remains above the voltage-time curve of Figure 6.”</p>	accepted	2
DK35	0656	4.5.3.2		ed	<p>“.... remains above the voltage-time diagram of Figure 6.”</p>	<p>Change to “....remains above the voltage-time curve of Figure 6.”</p>	See DE-039	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
FR 21	0656	4.5.3.2		Te	<p>In the RfG, the connection point is the “interface at which the power generating module /demand facility/distribution system/... is connected to a ... distribution system ... as identified in the connection agreement”.</p> <p>In EN50549, the connection point is the point of connection of the generating plant to the network.</p> <p>We should make clear that the point of connection at which the voltage is measured is the point of connection of the generating plant even if the LVRT requirement is for the power module.</p>	write “... the voltage at the point of connection of the generating plant ...	Accepted Rejected (2
AT 09	0657	4.5.3.2	Paragraph 1	te	If a neutral is present the smallest phase to neutral voltage should be observed.	Change as follows: <i>“The smallest phase to phase voltage or the smallest phase to neutral voltage (if present) shall be evaluated.”</i>	accepted	2
BE19*	0661	4.5.3.2		Ed	Mismatch	...the generating units and all elements that might cause their disconnection	accepted	2

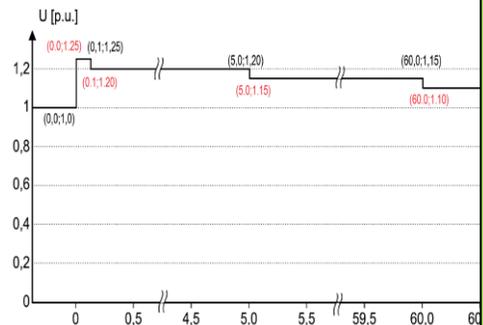
MB/ NC	Line numb er	Clause/ Subclau se	Paragr aph/ Figure/ Table	Type of com ment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
FR 22	0663- 665	4.5.3.2		Te	<p>What counts is the LVRT capability of the module with a voltage measured at the connection point of the generating plant.</p> <p>If the LVRT requirement is verified with a voltage measured at the terminals of the generating unit, it will also be verified for that same unit with voltage measured at the point of connection of the generating plant as voltage increases from the connection point of the generating plant to the terminal of the generating unit.</p> <p>So verifying LVRT with a voltage measured at the terminal of the generating unit is useful for equipment type test or to give a hint on the capability of the generating plant to verify the LVRT at its point of connection but not necessarily a proof if for instance auxiliaries or other modules in the generating plant do not have the LVRT capability.</p>	<p>Write just before the text in lines 663-665 : “The verification of LVRT capability with voltage measured at the connection point of the generating unit is useful for equipment type tests and contributes to the proof of LVRT capability with voltage measured at the connection point of the generating plant”.</p>	<p>Rejected</p> <p>The requirement is on the plant or module respectively, however for validation reason a unit is considered capable to fulfil this requirement if it fulfills the same curve at the clamps of the unit. This is an option for validation, but other ways of validation are not excluded</p>	1
AT 10	0666 - 667	4.5.3.2	Paragr aph 5	te	<p>This paragraph defines the following: <i>“After the voltage returns to continuous operating voltage range, 90 % of the pre fault power shall be resumed as fast as possible, but at the latest within 5 s if no other value is defined by the DSO.”</i></p> <p>The continuous operating voltage range is defined by 90 % - 110 % Un in chapter 4.4.4. According to figure 6, a LVRT can last up to 180 seconds, and after entering the continuous operating voltage range the generation unit has to deliver 90 % of pre fault power, which results in a time span of 185 seconds between the pre fault and the moment where 90 % of pre fault power has to be provided. During this time period it can happen that the generating unit is not able to deliver 90 % of the pre fault power, because of a decrease in the primary energy supply (wind, irradiation). This should be considered !</p>	<p>Complete after line 667 as follows: <i>“After the voltage returns to continuous operating voltage range, 90 % of the pre fault power shall be resumed as fast as possible, but at the latest within 5 s if no other value is defined by the DSO. If, due to a decrease in the primary energy supply, 90 % of the pre fault power cannot be resumed within 5 s, 90 % of the maximum available power shall be resumed as fast as possible, but at the latest within 5 s if no other value is defined by the DSO.”</i></p>	<p>Accepted</p> <p>Proposal as in -1 to AT09:</p> <p><i>After the voltage returns to the continuous operating voltage range, 90 % of the pre fault power or available power whichever is the smallest shall be resumed as fast as possible, but at the latest within 5 s if no other value is defined by the DSO</i></p>	1

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
GB-07	0668	4.5.3.3	Figure 7	Te	The requirement line should have a time value of $t_{clear} = 0.14s$	Change requirement line to have $t_{clear} = 0.14s$	See GB-06	0
BE22*	0669			Te	<p>The process of national implementation of NC RfG brings new information.</p> <p>In BE, the LVRT requirement will probably be more stringent than the standard curve in this draft document.</p>	<p>Please reconsider FRT requirement. This proposal still has to be subjected to a BE public consultation and a validation by the NRA in 2018.</p>	<p>Partly accepted Keep most stringent, fault requirement: 100% for 150ms 100% from 150ms to 700ms 100% from 1,5s to 180s</p> <p>Change to "default requirement"</p>	1
DE-040	0670	4.5.4	Figure 8	Te	<p>The OVRT requirement is more stringent, then in the previous TS50549 without any technical discussion. Putting it in line with the German VDE-AR-N 4110 requirement might look like a good approach on the one hand. But looking at the broad range of MV networks we have in Europe it will not be necessary for all of them. The local DSO needs to have a higher influence on this requirement and not be generalized by CENELEC. It shall be taken into account that higher requirements lead to higher costs. As overvoltages in MV grids are local events and the impact of several MW tripping due to higher voltage to the overall system stability is neglectable. This requirement shall be rather based on good cost-benefit analysis and reduced as much as possible to cover some of the probable cases of overvoltages in the MV grids. Also this overvoltage effect is being reduced because of the use of voltage control as required in 899.</p>	<p>Use the TS50549 requirement and the Draft EN50549 requirement as the most stringent (similar to the LVRT curves).</p>	<p>Rejected The old TS requirement seems to be to weak to be used as a default, Text is kept</p>	1
AT 11	0671	4.5.3.3	Paragraph 1	ed	Typo	<p>Remove the comma between "shall" and "be" to "Generating modules shall be capable of ..."</p>	Accepted	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
PL-29	0671	4.5.3.3		ed	The coma is unnecessary.	Delete the coma from the phrase "shall, be capable".	See AT-11	3
DE-041	0672	4.5.3.3		Editorial	"... remains above the voltage-time diagram of Figure 7."	Change to "...remains above the voltage-time curve of Figure 7."	Accepted	2
DK36	0672	4.5.3.3		ed	"... remains above the voltage-time diagram of Figure 7."	Change to "...remains above the voltage-time curve of Figure 7."	See DE-041	3
FR 23	0672	4.5.3.3		Te	<p>In the RfG, the connection point is the "interface at which the power generating module /demand facility/distribution system/... is connected to a ... distribution system ... as identified in the connection agreement".</p> <p>In EN50549, the connection point is the point of connection of the generating plant to the network.</p> <p>We should make clear that the point of connection at which the voltage is measured is the point of connection of the generating plant even if the LVRT requirement is for the power module.</p>	write "... the voltage at the point of connection of the power plant ...	<p>Accepted</p> <p>See FR 21:</p> <p>Write "... the voltage at the point of connection of the generating plant ..."</p>	2
AT 12	0673	4.5.3.3	Paragraph 1	te	If a neutral is present the smallest phase to neutral voltage should be observed.	<p>Change as follows:</p> <p><i>"The smallest phase to phase voltage or the smallest phase to neutral voltage (if present) shall be evaluated."</i></p>	Accepted	2

MB/ NC	Line numb er	Clause/ Subclau se	Paragr aph/ Figure/ Table	Type of com ment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
FR 24	0679- 681	4.5.3.3		Te	<p>What counts is the LVRT capability of the module with a voltage measured at the connection point of the generating plant.</p> <p>If the LVRT requirement is verified with a voltage measured at the terminals of the generating unit, it will also be verified for that same unit with voltage measured at the point of connection of the generating plant as voltage increases from the connection point of the generating plant to the terminal of the generating unit.</p> <p>So verifying LVRT with a voltage measured at the terminal of the generating unit is useful for equipment type test or to give a hint on the capability of the generating plant to verify the LVRT at its point of connection but not necessarily a proof if for instance auxiliaries or other modules in the generating plant do not have the LVRT capability.</p>	<p>Write just before the text in lines 679-681 : “The verification of LVRT capability with voltage measured at the connection point of the generating unit is useful for equipment type tests and contributes to the proof of LVRT capability with voltage measured at the connection point of the generating plant”.</p>	<p>See FR-22</p>	0
AT 13	0682 - 683	4.5.3.3	Paragr aph 5	te	<p>This paragraph defines the following: <i>“After the voltage returns to continuous operating voltage range, 90 % of the pre fault power shall be resumed as fast as possible, but at the latest within 5 s if no other value is defined by the DSO.”</i></p> <p>The continuous operating voltage range is defined by 90 % - 110 % Un in chapter 4.4.4. According to figure 6, a LVRT can last up to 180 seconds, and after entering the continuous operating voltage range the generation unit has to deliver 90 % of pre fault power, which results in a time period of 185 seconds between the pre fault and the moment where 90 % of pre fault power has to be provided. During this time period it can happen that the generating unit is not able to deliver 90 % of the pre fault power, because of a decrease in the primary energy supply (wind, irradiation). This should be considered !</p>	<p>Complete after line 683 as follows: <i>“After the voltage returns to continuous operating voltage range, 90 % of the pre fault power shall be resumed as fast as possible, but at the latest within 5 s if no other value is defined by the DSO. If, due to a decrease in the primary energy supply, 90 % of the pre fault power cannot be resumed within 5 s, 90 % of the maximum available power shall be resumed as fast as possible, but at the latest within 5 s if no other value is defined by the DSO.”</i></p>	<p>Accepted in principle: See AT 10</p> <p>Conclusion with DE-042 and DK37 Partly accepted 90 % of pre fault power shall be resumed in: 1s for non-sync 3s for sync Keep: unless the DSO requires an other value</p> <p>Align for OVRT,UVRT and -1</p>	1

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-042	0682 – 683	4.5.3.3		Te	“After the voltage returns to continuous operating voltage range, 90 % of pre fault power shall be resumed as fast as possible, but at the latest within 5 s if no other value is defined by the DSO.”	After the voltage returns to continuous operating voltage range, the pre fault power shall be resumed as fast as possible, but at the latest within 1 s if no other value is defined by the DSO.	Discuss with AT-13	1
DK37	0682 – 683	4.5.3.3		te	“After the voltage returns to continuous operating voltage range, 90 % of pre fault power shall be resumed as fast as possible, but at the latest within 5 s if no other value is defined by the DSO.”	After the voltage returns to continuous operating voltage range, the pre fault power shall be resumed as fast as possible, but at the latest within 5 sec.	See AT-13 and DE-042	3
EE-45	0682 – 683	4.5.3.3		Te	“After the voltage returns to continuous operating voltage range, 90 % of pre fault power shall be resumed as fast as possible, but at the latest within 5 s if no other value is defined by the DSO.”	After the voltage returns to continuous operating voltage range, the pre fault power shall be resumed as fast as possible, but at the latest within 1 s if no other value is defined by the DSO.	See AT-13 and DE-042	3
NL-45	0682 – 683	4.5.3.3		te	“After the voltage returns to continuous operating voltage range, 90 % of pre fault power shall be resumed as fast as possible, but at the latest within 5 s if no other value is defined by the DSO.”	After the voltage returns to continuous operating voltage range, the pre fault power shall be resumed as fast as possible, but at the latest within 1 s if no other value is defined by the DSO.	See AT-13 and DE-042	3
PL-30	0682 – 683	4.5.3.3		te	“After the voltage returns to continuous operating voltage range, 90 % of pre fault power shall be resumed as fast as possible, but at the latest within 5 s if no other value is defined by the DSO.”	After the voltage returns to continuous operating voltage range, the pre fault power shall be resumed as fast as possible. Specific conditions including time and the value of pre fault power are defined by the DSO.	See AT-13 and DE-042	3
DE-043	0683	4.5.3.3		te	Latest within 5 s is slow. Simulations in the project “DEA-Stabil” showed that a quicker power recovery is better for voltage stability as also recommended in B. Weise, “Impact of K-factor and active current reduction during fault-ride-through of generating units connected via voltage-sourced converters on power system stability,” IET Renew. Power Gener., vol. 9, no. 1, pp. 25–36, 2015.	Latest within 1 s if no other value is defined by the DSO.	Discuss with AT-13 and DE-042	2
DE-044	0684	4.5.4		general	The term “high voltage ride through (HVRT)” is misleading. “High voltage” is usually defined as a nominal voltage above medium voltage (i.e. above 36 kV, compare Section 3.1.5 of prEN50549-2). Please use the term “over voltage ride through (OVRT).”	Please use the term “over voltage ride through (OVRT)” (within the whole document).	See DE-014	0
DE-045	0685	4.5.4		te	Definition of term “terminals” in this case not clear. Terminals of generating unit or plant?	Definition must be made clear	See DE-046	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-046	0685-686	4.5.4		Technical	Adapt the sentence to the LVRT part (655-657)	Generating modules shall be capable of staying connected to the distribution network if the voltage at the point of connection goes beyond the upper limit of the continuous operating voltage range:	Accepted	1
DK38	0685-686	4.5.4		te	Adapt the sentence to the LVRT part (655-657)	Generating modules shall be capable of staying connected to the distribution network if the voltage at the point of connection goes beyond the upper limit of the continuous operating voltage range:	See DE-046	3
AT 14	0690	4.5.4	Paragraph 2	te	If a neutral is present the highest phase to neutral voltage should be observed.	Change as follows: <i>"The highest phase to phase voltage or the smallest phase to neutral voltage (if present) shall be evaluated."</i>	accepted	1
PL-31	0690	4.5.4		ed	See line e.g. 613.	Replace the phrase "phase-phase" with the phrase "phase to phase".	accepted	2
AT 15	0691	4.5.4	Figure 8	te	Figure 8 needs some improvement.	Complete figure by adding missing coordinates at corner points (see below in red).  Change “,” to “.” in co-ordinates, e.g. (0,0;1,0) → (0.0;1.0)	accepted	2

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
AT 16	0698 - 701	4.5.4	Note 2	te	Note 2 states the following: “A voltage jump of + 10 % of Un from any stable point of operation is considered, to result in high voltage situations for many seconds.” This does not prove true. The continuous operating voltage range (4.4.4) is defined by 85 % - 110 % Un. If the voltage jumps from 86 % Un to 96 % Un, this does not result in a high voltage situation !	Delete the crossed-out sentence: <i>“Note 2: This is a minimum requirement. Further power system stability aspects might be relevant. The technical discussion is still ongoing. A voltage jump of +10 % of Un from any stable point of operation is considered, to result in high voltage situations for many seconds. In later editions of this document, more stringent immunity might be required.”</i>	Proposal Accepted in principle: change note to: <i>Note 2: This is a minimum requirement. Further power system stability aspects might be relevant. The technical discussion is still ongoing. A voltage jump of +10 % of Un from any stable point of operation is considered. <u>In case of steady state voltages near the maximum voltage before the event, this will result in high voltage situations for many seconds. In later editions of this document, more stringent immunity might be required</u></i>	1
AT 17	0703	4.6.1	Paragraph	ge	Align with COMMISSION REGULATION 2016/631 and change name of requirement	Change name to Limited Frequency Sensitive Mode Over (LFSM-O)	Partly accepted Add note that this function is referred to as LFSM and frequency control in other documents	1
DE-047	0703	4.6.1		Te	An explicit behaviour of storage-units in charging mode is missing and should be added	Add paragraph at the end of the chapter: Storage units that are in charging mode in the instance the frequency passes the threshold f1 shall not reduce the charging power below Pm until frequency returns below f1. Storage units should increase the charging power according to the configured droop. In case the maximum charging capacity is reached or to prevent any other risk of injury or damage of equipment, a reduction of charging power is permitted	Accepted See also NC draft emergency and restoration	1

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
GB-09	0704	4.6.1	(Limited Frequency Sensitive Mode – Over Frequency)	Te	Use of a deactivation threshold will lead to step changes in output when frequency recovers with clear risk of unstablising frequency. Offering of a f_{stop} option does not add anything and generates the potential for instability in frequency control. With correct droop control acting above f_1 such control is unnecessary. This option should only be available in combination with automatic connection/reconnection option for Type A in RfG Article 13.2(b).	Remove the deactivation threshold option f_{stop} option or make it only available in combination with the automatic connection/reconnection option for Type A in RfG Article 13.2(b). The +/-10% power tolerance is too wide. This requirement is a minimum and therefore no negative tolerance should be acceptable. Remove Power tolerance altogether. The value of frequency measure resolution appears reasonable	Rejected, Keep hysteresis approach in the document, add in information document an explanation that it was on discussion, but WG could not agree to remove it as it might be used in some countries and is not clearly forbidden by RfG	1
AT 18	0704 – 707	4.6.1	Paragraph 1	te	As mentioned above, the available primary energy can vary. If the droop is referenced to P_m at the instant when the frequency reaches the programmable frequency threshold f_1 and the available primary power changes during a high frequency period, it may not be possible to meet the requirements defined in this chapter.	Insert the following sentence after paragraph 1: <i>“If the available primary power decreases during a high frequency period below the power defined by the droop function, the defined droop shall be fulfilled as accurate as possible.”</i>	accepted in principle If the available primary power decreases during a high frequency period below the power defined by the droop function, <u>lower power values are permitted.</u>	2
DE-048	0706 – 707	4.6.1		Te	“The droop reference P_{ref} is P_m , the actual AC output power at the instant when the frequency reaches the threshold f_1 .” For synchronous power generating modules P_{ref} shall be P_{max} .	To distinguish between synchronous and non-synchronous power generating modules when defining P_{ref} .	see DK39	0
DK39	0706 – 707	4.6.1		te	“The droop reference P_{ref} is P_m , the actual AC output power at the instant when the frequency reaches the threshold f_1 .” For synchronous power generating modules P_{ref} shall be P_{max} .	To distinguish between synchronous and non-synchronous power generating modules when defining P_{ref} .	Accepted in principle Add definition of P_{ref} in chapter 3; In 4.6.1: $P_{ref}=P_{max}$ for sync and storage, $P_{ref}=P_m$ for non-sync generation Unless specified differently Thomas Implementation Note: The term P_{ref} is explained in 4.6.1 and the explanation is too complicated for a term definition. Term definition in 3.3 is omitted	
EE-46	0706 – 707	4.6.1		Te	“The droop reference P_{ref} is P_m , the actual AC output power at the instant when the frequency reaches the threshold f_1 .” For synchronous power generating modules P_{ref} shall be P_{max} .	To distinguish between synchronous and non-synchronous power generating modules when defining P_{ref} .	See DK39	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
NL-46	0706 – 707	4.6.1		te	“The droop reference P _{ref} is PM, the actual AC output power at the instant when the frequency reaches the threshold f1.” For synchronous power generating modules P _{ref} shall be P _{max} .	To distinguish between synchronous and non-synchronous power generating modules when defining P _{ref} .	See DK39	3
DE-049	0708	4.6.1		te	In order to avoid misinterpretations there should be additional graphical examples to the alternatives mentioned under NOTE 1 (alike Figures 9 and 10)	Add graphs explaining NOTE 1 referring to P _{max} alike Figure 9/10	accepted in principle, as the figure would not look that much different a formula for P calculation should be added Add Formula for P=P _M +ΔP with $\Delta P = g \times P_{ref} \times (f1 - f)$ Implementation Note thomas: Formula above is for gradient. formula for droop inserted P=P _M +ΔP with $\Delta P = \frac{100}{s} \times \frac{(f1-f)}{fn} \times P_{ref}$ with f the actual frequency	2
DE-050	0712-713				Generating plants, except for micro-generating plants shall be capable of staying connected if the voltage at the terminals goes beyond the upper limit of the continuous operating voltage range:	micro-generating plants must be defined or deleted.	accepted delete for -2 Couldn't find the relevant text	3
EE-47	0712-713				Generating plants, except for micro-generating plants shall be capable of staying connected if the voltage at the terminals goes beyond the upper limit of the continuous operating voltage range:	micro-generating plants must be defined or deleted.	see DE-050	3
NL-47	0712-713				Generating plants, except for micro-generating plants shall be capable of staying connected if the voltage at the terminals goes beyond the upper limit of the continuous operating voltage range:	micro-generating plants must be defined or deleted.	see DE-050	

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
AT 19	0715	4.6.1			A step response time requirement of maximum 30 s would be many times faster than e.g. the requirement for secondary control (5 mins) and would not be performable by standard hydraulic engines.	Delete the words <i>“and with a step response time of maximum 30 s”.</i> (already regulated in NC RfG)	accepted in principle Increase of times is allowed based on national level. keep current text with as fast as technically feasible. Add in line 715 “unless another value is defined by the relevant party. Add Note: Technical feasibility is considered *for PV and Battery inverters below 1s for a delta P of 100%Pmax *For Wind turbines 2s for deltaP<50%Pmax also include the option of staged disconnection as in -1 for -2 also align same comment in -2	1
DE-051	0715 – 716 723 – 729 746 – 747 786 – 787 795 - 801	4.6.1		Te	“An intentional delay shall be programmable to adjust the dead time to a value between the intrinsic dead time and 2 s.” An intentional delay is detrimental for system stability. In particular in situations with low system inertia, immediate reaction is required.	Remove sentence.	rejected Keep intentional delay in the document, add Note with an explanation that it was on discussion, but WG could not agree to remove it as it might be used in some countries and is not clearly forbidden by RfG And that simulations show, that 500ms is a sufficient delay to allow island detection to operate. ENEL slides in joint working group TC8X_WG03 / IT / 14042014 / INF	1

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
EE-49	0715 – 716 723 – 729 795 - 801	4.6.1 – 4.6.2		Te	<p>“An intentional delay shall be programmable to adjust the dead time to a value between the intrinsic dead time and 2 s.”</p> <p>An intentional delay is detrimental for system stability. In particular in situations with low system inertia, immediate reaction is required.</p>	Remove sentence.	see DE-051	0
NL-49	0715 – 716 723 – 729 795 - 801	4.6.1 – 4.6.2		te	<p>“An intentional delay shall be programmable to adjust the dead time to a value between the intrinsic dead time and 2 s.”</p> <p>An intentional delay is detrimental for system stability. In particular in situations with low system inertia, immediate reaction is required.</p>	Remove sentence.	see DE-051	0
PL-32	0715 – 716 723 – 729 795 - 801	4.6.1 – 4.6.2		te	<p>“An intentional delay shall be programmable to adjust the dead time to a value between the intrinsic dead time and 2 s.”</p> <p>An intentional delay is detrimental for system stability. In particular in situations with low system inertia, immediate reaction is required.</p>	Remove sentence.	see DE-051	0
DE-052	0715-716	4.6.1		te	An intentional delay is contradictory to the RfG requirement in Article 13(2)(e) of being “as fast as possible”.	Delete sentence in lines 715-716	see DE-051	0
EE-48	0715-716	4.6.1		Te	<p>“An intentional delay shall be programmable to adjust the dead time to a value between the intrinsic dead time and 2 s.”</p> <p>The possibility to have an intentional delay is not covered by Regulation 2016/631, and any intentional delay is detrimental for system stability, therefore it shall not be included here to avoid misunderstanding</p>	Remove sentence and any reference to this value	see DE-051	0
ES-08	0715-716	4.6.1		Te	<p>“An intentional delay shall be programmable to adjust the dead time to a value between the intrinsic dead time and 2 s.”</p> <p>The possibility to have an intentional delay is not covered by Regulation 2016/631, and any intentional delay is detrimental for system stability, therefore it shall not be included here to avoid misunderstanding.</p>	Remove sentence and any reference to this value.	see DE-051	0

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
FR 25	0715-716	4.6.1		Te	This requirement is needed for safety reasons and should be maintained. The intentional delay allows DSOs to limit the risk of unintentional islanding (which are extremely dangerous situations for safety of operation)	none	see DE-051	0
NL-48	0715-716	4.6.1		te	<p>“An intentional delay shall be programmable to adjust the dead time to a value between the intrinsic dead time and 2 s.”</p> <p>The possibility to have an intentional delay is not covered by Regulation 2016/631, and any intentional delay is detrimental for system stability, therefore it shall not be included here to avoid misunderstanding</p>	Remove sentence and any reference to this value	see DE-051	0
PL-33	0715-716	4.6.1		te	<p>“An intentional delay shall be programmable to adjust the dead time to a value between the intrinsic dead time and 2 s.”</p> <p>The possibility to have an intentional delay is not covered by Regulation 2016/631, and any intentional delay is detrimental for system stability, therefore it shall not be included here to avoid misunderstanding</p>	Remove sentence and any reference to this value	see DE-051	0
AT 20	0717	4.6.1	Figure 9	ed	Typo in the inscription in figure 9	<p>Correct as follows:</p> <p><i>“Rated limited power increase after deactivation of response response”</i></p>	accepted	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
SI-3	0717 to 742	4.6	Whole paragraph 4.6	te	<p>Characteristics on proposed Figure A enables different operating islands (in the TSO and/or DSO network) to be reconnected. With the current characteristics depicted on Figures 9 and 10 that is not possible.</p> <p>Dead band depicted on Figures 9 and 10 can lead to:</p> <ul style="list-style-type: none"> Frequency mismatch of two islanding systems thus prohibiting their resynchronisation. With reference power manipulation, frequency closer to 50Hz can't be achieved (almost by default, frequency error will be at the frequency f_1). <p>(See Figure A enhanced below the table)</p>	<p>Replace Figures 9 and 10 with proposed figure A.</p> <p>Figure A</p>	rejected as not jet used and not foreseen in RfG. Benefits are not clear.	1
PL-34	0718	4.6.1	Figure 9	ed	The titles of figures start with capital letter (see previous figure titles).	Change the word "active" onto word "Active".	accepted	3
BE23*	0721	4.6.1		Te	Nominal power is not defined nor used elsewhere in the draft	Use Pmax instead	Rejected, definition of nominal value is added	1
DE-053	0722-723	4.6.1		te	An intentional delay is contradictory to the RfG requirement in Article 13(2)(e) of being "as fast as possible".	Delete Note 3	see DE-051	0
DE-054	0725-728	4.6.1		te	An intentional delay is contradictory to the RfG requirement in Article 13(2)(e) of being "as fast as possible".	Delete Note 4	see DE-051	0
DE-055	0729-730	4.6.1		te	An intentional delay is contradictory to the RfG requirement in Article 13(2)(e) of being "as fast as possible".	Delete Note 5	see DE-051	0
PL-35	0733	4.6.1		ed	One dot is unnecessary.	Delete one dot at the end of the sentence.	accepted	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-056	0736	4.6.1	Figure 10	Ge	<p>If this function is needed and already in use by some DSO's it will be continued by them if needed. For the future EN50549 this non-standard parametrization should first be checked if it is needed for this document. Is there a technical advantage, that make it necessary to have both functions in the document? How is the legal situation? Would this function maybe limit the market to only one manufacturer, because of the patent situation?</p> <p>Frequency control deactivation mode (hysteresis) is not required in RfG and only linear response shall apply. ENTSO-e has already provided answer to this question to CENELEC with reference number EU2016/631. Document is available online on the ENTSO-e web page</p> <p>https://www.entsoe.eu/Documents/Network%20codes%20documents/Implementation/stakeholder_committees/GSC/2017_06_07/2.3.170529%20ENTSO-E%20-%20Response%20to%20CENELEC%20regarding%20RfG.pdf?Web=1</p>	Remove the hysteresis HFR. The aim of the EN is to give one general guideline for a general set of requirements in line with the RfG. The frequency is a synchronous area wide value. Therefore a variety of requirements (like for the voltage related topics) is not wanted.	See DK40	0
DE-057	0736 – 739	4.6.1		Ge	<p>“If required by the DSO an additional deactivation threshold frequency fstop shall be programmable in the range of at least 50Hz to f1. If fstop is configured to a frequency below f1 there shall be no response according to the droop in case of a frequency decrease see Figure 10. The output power is kept constant until the frequency falls below fstop.”</p> <p>This behaviour contradicts to the NC RfG LFSM-O requirement. According to NC RfG, only the behavior described by Figure 9 is admissible.</p>	Remove sentence.	See DK40	0

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK40	0736 – 739	4.6.1		ge	<p>“If required by the DSO an additional deactivation threshold frequency fstop shall be programmable in the range of at least 50Hz to f1. If fstop is configured to a frequency below f1 there shall be no response according to the droop in case of a frequency decrease see Figure 10. The output power is kept constant until the frequency falls below fstop.”</p> <p>This behaviour contradicts to the NC RfG LFSM-O requirement. According to NC RfG, only the behaviour described by Figure 9 is admissible.</p>	<p>“If required by the TSO an additional deactivation threshold frequency fstop shall be programmable in the range of at least 50Hz to f1. If fstop is configured to a frequency below f1 there shall be no response according to the droop in case of a frequency decrease see Figure 10. The output power is kept constant until the frequency falls below fstop.”</p> <p>This behaviour contradicts to the NC RfG LFSM-O requirement. According to NC RfG, only the behaviour described by Figure 9 is admissible.</p>	See GB-09	0
EE-50	0736 – 739	4.6.1		Ge	<p>“If required by the DSO an additional deactivation threshold frequency fstop shall be programmable in the range of at least 50Hz to f1. If fstop is configured to a frequency below f1 there shall be no response according to the droop in case of a frequency decrease see Figure 10. The output power is kept constant until the frequency falls below fstop.”</p> <p>This behaviour contradicts to the NC RfG LFSM-O requirement. According to NC RfG, only the behaviour described by Figure 9 is admissible.</p>	Remove sentence.	See DK40	0
NL-50	0736 – 739	4.6.1		ge	<p>“If required by the DSO an additional deactivation threshold frequency fstop shall be programmable in the range of at least 50Hz to f1. If fstop is configured to a frequency below f1 there shall be no response according to the droop in case of a frequency decrease see Figure 10. The output power is kept constant until the frequency falls below fstop.”</p> <p>This behaviour contradicts to the NC RfG LFSM-O requirement. According to NC RfG, only the behaviour described by Figure 9 is admissible.</p>	Remove sentence.	See DK40	0

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
PL-36	0736 – 739	4.6.1		ge	<p>“If required by the DSO an additional deactivation threshold frequency f_{stop} shall be programmable in the range of at least 50Hz to f_1. If f_{stop} is configured to a frequency below f_1 there shall be no response according to the droop in case of a frequency decrease see Figure 10. The output power is kept constant until the frequency falls below f_{stop}.”</p> <p>This sentence in European Standard give huge benefits for requirements for power generating modules. New capability allows blocked/deactivated LFMS-U mode.</p>		See DK40	0
AT 21	0740	4.6.1	Figure 10	ed	Typo in the inscription in figure 10	<p>Correct as follows:</p> <p><i>“Rated limited power increase after deactivation of response response”</i></p>	Accepted	3
DK41	0740	4.6.1	Figure 10	te	The function is not compliant with the RfG.	Consider if it should be removed or kept for future amendment of RfG.	see DK40	1
PL-37	0741	4.6.1	Figure 10	ed	The titles of figures start with capital letter (see previous figure titles).	Change the word “active” onto word “Active”.	AcceptedAccepted	3
DE-058	0746	4.6.1		te	The intentional delay contradicts the RfG requirement in Article 13(2)(e) of providing active power reduction “as fast as possible”	Delete “and the intentional delay” from sentence in line 746	see DE-051	
DE-059	0751	4.6.1	Table 2	te	The intentional delay contradicts the RfG requirement in Article 13(2)(e) of providing active power reduction “as fast as possible”	Delete last column from Table 2	see DE-051	
GB-08	0751	4.6.1	Table 2	Te	The default settings are arguably not sufficiently onerous.	Change f_1 to 50.5Hz, droop to 2%, delay to 1s for the default settings.	<p>rejected</p> <p>default values are only a default to match the most likely setting in the field. Each unit needs to be capable of the full configuration range</p>	3
PL-38	0751	4.6.1	Table 2	ed	Conformity with adopted convention (see the above row of the table).	In the middle column, 3 rd row insert a space into the phrase “50,0 Hz”	AcceptedAccepted	3
SI-4	0751	4.6.1	Table 2	te	Active power response is deactivated only when frequency is within and stays within the limits (f_{STOP}) for a given period of time (T_{STOP}). Default T_{STOP} setting is between 15 min and 2 h.	<p>Add T_{STOP} to Deactivation threshold f_{STOP}.</p> <p>Replace “droop” with “active power droop”.</p>	<p>partly accepted</p> <p>depending on decision on DK40</p> <p>If f_{stop} remains in the standard add T_{stop} to table</p>	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK42	0755	4.6.1		te	The alternative option for generating modules of Type A should be described after this line, like it is in prEN 50549-1 (lines 770-783).	Add same text as in prEN 50549-1 (lines 770-783).	accepted, as Type A might be relevant in medium voltage implementation note: change text format "standard" not only "-1"	3
AT 22	0756	4.6.2	Paragraph	ge	Align with COMMISSION REGULATION 2016/631 and change name of requirement	Change name to Limited Frequency Sensitive Mode Under (LFSM-U)	See AT17	0
DK43	0756	4.6.2		te	Power response to underfrequency	Power response to underfrequency for battery storage units (devices) - It is an abuse comparing to 2016/631 to ask this for anything except storage, as A and B do not ask for such compliance in EU regulation 2016/631	unclear proposal no implementation	3
DE-060	0756ff	4.6.2	Fig. 11	te	It is not explicitly clear that figure 11 shows an EXAMPLE. This could lead to the assumption that the given characteristic head curve has to be followed with the given values of Pmax at y-Axis.	Add term "example" to description of figure 11.	accepted	3
DK44	0757	4.6.2		te	<p>"Battery storage generating units in generating plants shall be capable of activating active power response to underfrequency. Other generating units/plants should be capable of activating active power response to underfrequency. If active power to underfrequency is provided by a generating plant/unit, the function shall comply with the requirements below."</p> <p>EU Regulation 2016/631 requires the capability of providing LFSM-U to all generating modules from Type C (included), independently of having storage systems or not.</p> <p>Underfrequency response is only applied to type C and D generators, which is not included in this standard</p>	Delete subclause 4.6.2	rejected Battery storage is not in the scope of RfG, in this regard we only need to consider the technical sensible. WG experts consider the contribution of battery storage in case of under frequency as helpful and in future necessary. Since this function comes with very limited costs, even manufacturers do not reject this requirement	1

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
EE-51	0757	4.6.2		Te	<p>"Battery storage generating units in generating plants shall be capable of activating active power response to underfrequency. Other generating units/plants should be capable of activating active power response to underfrequency. If active power to underfrequency is provided by a generating plant/unit, the function shall comply with the requirements below."</p> <p>EU Regulation 2016/631 requires the capability of providing LFSM-U to all generating modules from Type C (included), independently of having storage systems or not.</p>	<p>Substitute by</p> <p>"Power generating modules shall be capable of activating active power response to underfrequency, when required by the Regulation 2016/631. If active power to underfrequency is provided by a generating plant/unit, the function shall comply with the requirements below."</p>	see DK44	0
GB-10	0757	4.6.2		Te	<p>Draft Emergency Response code (Article 15) envisages that storage will switch to generation on falling frequency</p>	<p>Consider how to take into account the likely legal requirements from the NC ER.</p>	<p>Accepted in principle:</p> <p>Add Note: This clause provides additional detail to the draft network code on electricity emergency and restoration Article 15 3 (a). If during the comitology process of the code there are changes made to Article 15, this EN will be revised if necessary.</p>	2

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
NL-51	0757	4.6.2		te	<p>"Battery storage generating units in generating plants shall be capable of activating active power response to underfrequency. Other generating units/plants should be capable of activating active power response to underfrequency. If active power to underfrequency is provided by a generating plant/unit, the function shall comply with the requirements below."</p> <p>EU Regulation 2016/631 requires the capability of providing LFSM-U to all generating modules from Type C (included), independently of having storage systems or not.</p>	<p>Substitute by</p> <p>"Power generating modules shall be capable of activating active power response to underfrequency, when required by the Regulation 2016/631. If active power to underfrequency is provided by a generating plant/unit, the function shall comply with the requirements below."</p>	see DK44	0
RO-21	0757 ÷758	4.6.2		te	<p>Power response to underfrequency for battery storage units - <i>Battery storage generating units in generating plants shall be capable of activating active power response to underfrequency.</i></p> <p>In the European Regulation 2016/631, art (3), (d) is stipulated that storage devices except for pump-storage power-generating modules in accordance with Article 6(2), are excepted from its provisions.</p>	To include a note referring to the <i>European regulation</i> where this technical condition is required.	see DK44	0
DE-061	0758	4.6.2		te	Term "should" is not well defined in the standard. It is not clear if it is mandatory or not. A clear definition is needed in order to state compliance with the standard.	Obligation of requirement must be defined	rejected please see CENELEC Directive regarding modal verbs	3
DE-062	0758 – 759	4.6.2		Ge	<p>"Other generating units/plants should be capable of activating active power response to underfrequency."</p> <p>LFSM-U capability is mandatory according to NC RfG.</p>	<p>Discuss in WG03: Consider option to make requirement mandatory for all generating units</p> <p>"Other generating units/plants shall be capable of activating active power response to underfrequency."</p>	<p>Rejected,</p> <p>See also DK44. The current approach seems to be a good compromise</p>	1

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
AT 23	0761 – 767	4.6.2		te	Power response to underfrequency is mandatory for battery storage systems. As mentioned in Note 2, the state of charge of the battery should also be part of the conditions in line 761 – 767, if the battery storage generating unit changes to generating mode.	<p>Insert the following bullet points after line 767:</p> <ul style="list-style-type: none"> • <i>For battery storage generating units in generating mode: state of charge (SOC) > 0</i> • <i>Battery storage generating unit is not in maintenance mode</i> 	<p>partly accepted</p> <p>in our understanding the available power in case of a battery includes the SOC</p> <p>Add Note after 792:</p> <p>in case of battery storage units, the available power includes the state of charge of the battery</p> <p>regarding maintenance:</p> <p>This is a general issue; all requirements are only relevant in case of generation.</p> <p>Include statement in 4.1:</p> <p>modify line 527: The provisions of Clause 4 apply during normal operation of the generating unit and do not apply in case of maintenance or units out of operation. The applicability is independent of the duration the generating unit operates in parallel with the distribution network. ...</p>	2
BE25*	0763			Ed	Type mismatch	<p>The generating unit is operating ...below its</p> <p>Equivalent in lines 0764, 0767</p>	accepted	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
BE26*	0763-0795			Ed/Te	The conditions do not reflect correctly the case of a storage system working in charging mode	Change into: <ul style="list-style-type: none"> the voltages at the point of connection of the generating plant are within the continuous operating range if generating, the generating unit is operating at active power below its maximum active power Pmax; if generating, the generating unit is operating at active power below the available active power PA; if generating, the generating unit is operating with currents lower than its current limit. 	accepted we have to be aware, that this also has another meaning stating, that if a generating unit e.g. CHP is in standby it does not need to increase power. Is this wanted? If not, I propose rejection, as line 770 771 makes this topic clear	2
DE-063	0765 – 766	4.6.2		Te	“the voltages at the point of connection of the generating plant are within the continuous operating voltage range;” Voltages in the limited operating voltage range shall not prevent the LFSM-U provision, because it is also typically limited in time	Remove sentence.	rejected primary goal must be to avoid protection tripping and loss of all generation. Therefore active power increase is only possible if no over voltage is caused	3
EE-52	0765 – 766	4.6.2		Te	“the voltages at the point of connection of the generating plant are within the continuous operating voltage range;” Voltages in the limited operating voltage range shall not prevent the LFSM-U provision, because it is also typically limited in time	Remove sentence.	rejected primary goal must be to avoid protection tripping and loss of all generation. Therefore active power increase is only possible if no over voltage is caused	3
NL-52	0765 – 766	4.6.2		te	“the voltages at the point of connection of the generating plant are within the continuous operating voltage range;” Voltages in the limited operating voltage range shall not prevent the LFSM-U provision, because it is also typically limited in time	Remove sentence.	rejected primary goal must be to avoid protection tripping and loss of all generation. Therefore active power increase is only possible if no over voltage is caused	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
PL-39	0767 – 767	4.6.2		te	<p>Active power response to underfrequency shall be provided when all 761 of the following conditions are</p> <p>762 met:</p> <p>763 • the generating units are operating at active power below its maximum active power Pmax;</p> <p>764 • the generating units are operating at active power below the available active power PA;</p> <p>765 • the voltages at the point of connection of the generating plant are within the continuous operating</p> <p>766 voltage range; and</p> <p>767 • the generating units are operating with currents lower than its current limit. The conditions do not consider all states make happened in network. The conditions will impose strict requirements, which could be dangerous for system stability.</p>	Remove sentences	comment reasoning and proposal not clear	3
DK45	0772-812	4.6.2		te	In case of battery storage generating units active power frequency response to underfrequency shall be provided in charging and generating mode	Delete supclause 4.6.2. The compartment of batteries must be subject of another standard.	rejected, this standard considered batteries as generating units with internal loads included	2
EE-54	0772-812	4.6.2			In case of battery storage generating units active power frequency response to underfrequency shall be provided in charging and generating mode	Remove all sentences and figures.. The compartment of batteries must be subject of another standard.	rejected, this standard considered batteries as generating units with internal loads included	2
NL-54	0772-812	4.6.2			In case of battery storage generating units active power frequency response to underfrequency shall be provided in charging and generating mode	Remove all sentences and figures.. The compartment of batteries must be subject of another standard.	rejected, this standard considered batteries as generating units with internal loads included	2
PL-40	0772-812	4.6.2		te	In case of battery storage generating units active power frequency response to underfrequency shall be provided in charging and generating mode	Remove all sentences and figures.. The compartment of batteries must be subject of another standard.	rejected, this standard considered batteries as generating units with internal loads included	2

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
BE24	0773	4.6.1		Te	a staged disconnection of units (see 50549-1 lines 770 and following) as alternative to the droop implementation is also applicable to Type A units in MV grids	Copy relevant lines from 50549-1	accepted	3
FR 26	0778	4.6.2		Te	How do we define the "Pmax "of a generating plant with both generating units and battery storage generating units?	Please clarify	<p>discuss</p> <p>add note emphasising that this clause in a requirement on unit level. As Battery storage is often embedded in generating plants, this requirement is intended to be fulfilled independently of other generating units.</p> <p>Add Formula to calculate Pset: $P = P_M + \Delta P$ with</p> $\Delta P = g \times P_{ref} \times (f1 - f)$ <p>Implementation Note: Aligned with DE-049</p>	1
BE28*	0784			Te		Add following paragraph before, If this control, leads to a power setpoint which is higher than the active power setpoint provided remotely by the DSO in view of a reduction of active power (see chapter 4.11.2), the power shall be kept constant.	<p>accepted in principle</p> <p>this topic is covered in 4.1 hierarchy of functions. As this was not noted by the reader issuing this comment,</p> <p>Proposal:</p> <p>Add Note: In case of increase of active power generation, the hierarchy of requirements in clause 4.1 apply</p>	1
FR 27	0784	4.6.2		Te	<p>The NC RfG requirement mentions a "response with an initial delay that is as short as possible".</p> <p>There are different interpretations of the NC requirement and of its objectives.</p>	<p>Add at the end of the paragraph:</p> <p>The intentional delay shall be deactivated by default and implemented only at the request of the network operator.</p>	<p>accepted</p> <p>implementation note Thomas</p> <p>Then needed for 4.6.1 as well</p> <p>Not implemented, as this is clearly stated in the general structure of the text and repeated in the Notes</p>	3

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
AT 24	0784-786	4.6.2			A step response time requirement of maximum 30 s would be many times faster than e.g. the requirement for secondary control (5 mins) and would not be performable by standard hydraulic engines.	Delete the words <i>“and with a step response time of maximum 30 s”.</i> (already regulated in NC RfG)	Accepted in principle, same solution as in AT19	1
ES-09	0786	4.6.2		Te	“An intentional delay shall be programmable to adjust the dead time to a value between the intrinsic dead time and 2 s.” The possibility to have an intentional delay is not covered by Regulation 2016/631, and any intentional delay is detrimental for system stability, therefore it shall not be included here to avoid misunderstanding	Remove sentence and any reference to this value	see DE-051	3
DE-064	0786-787	4.6.2		te	The intentional delay contradicts the RfG requirement in Article 13(2)(e) of providing active power reduction “as fast as possible”	Delete sentence in lines 786-787	see DE-051	3
DE-065	0795-796	4.6.2			The intentional delay contradicts the RfG requirement in Article 13(2)(e) of providing active power reduction “as fast as possible”	Delete Note 5	see DE-051	3
DE-066	0797-800	4.6.2			The intentional delay contradicts the RfG requirement in Article 13(2)(e) of providing active power reduction “as fast as possible”	Delete Note 6	see DE-051	3
DE-067	0801-802	4.6.2			The intentional delay contradicts the RfG requirement in Article 13(2)(e) of providing active power reduction “as fast as possible”	Delete Note 7	see DE-051	3
EE-53	0802	4.6.2			Battery storage generating units in generating plants shall be capable of activating active power response to underfrequency.	Remove batteries. If we want to impose the underfrequency response the phrase can be generating units themselves or with additional capacities as batteries shall be capable of activating active power response to underfrequency.in the POC	rejected due to various interpretation regarding requirements in RfG imposed for one type, WG03 recommends LFSM-U for generating units and requires from battery storage, as here RfG does not apply	3
NL-53	0802	4.6.2			Battery storage generating units in generating plants shall be capable of activating active power response to underfrequency.	Remove batteries. If we want to impose the underfrequency response the phrase can be generating units themselves or with additional capacities as batteries shall be capable of activating active power response to underfrequency.in the POC	see EE-53	3

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
PL-41	0802	4.6.2		te	Battery storage generating units in generating plants shall be capable of activating active power response to underfrequency.	Remove batteries. If we want to impose the underfrequency response the phrase can be generating modules themselves or with additional capacities as batteries shall be capable of activating active power response to underfrequency.in the POC	see EE-53	3
DE-068	0808-809	4.6.2		te	The intentional delay contradicts the RfG requirement in Article 13(2)(e) of providing active power reduction "as fast as possible"	Delete "and the intentional delay" from sentence	see DE-051	3
DE-069	0828	4.7.2.2.	Figure 12	editorial	shading of "further requirement in some countries" is difficult to recognize in the figure 12	use a better darker colour for "further requirement in some countries" in the diagram	Rejected, The shift of shading is intended so that no requirement might be seen in it.	3
DE-070	0832 – 835	4.7.2.2		Te	"Generating plants connected to MV shall be able to operate with active factors as defined by the DSO from $\cos \varphi = 0,90$ underexcited to $\cos \varphi = 0,90$ overexcited either at the terminals of the/each generating unit or at POC. Generating plants connected to MV with S_{max} above a power threshold to be defined by the DSO the required active factor shall be delivered at POC" The reactive power capability shall apply at the connection point in any case.	"Generating modules connected to MV shall be able to operate with active factors as defined by the DSO from $\cos \varphi = 0,90$ underexcited to $\cos \varphi = 0,90$ overexcited either at the terminals of the/each generating unit or at POC. Generating plants connected to MV with S_{max} above a power threshold to be defined by the DSO the required active factor shall be delivered at POC	Rejected: See ES-10 If the DSO wants all MV systems to do the control referred to the point of connection they just have to state that this threshold is zero. This threshold has no impact on any other thresholds.	1
EE-55	0832 – 835	4.7.2.2		Te	"Generating plants connected to MV shall be able to operate with active factors as defined by the DSO from $\cos \varphi = 0,90$ underexcited to $\cos \varphi = 0,90$ overexcited either at the terminals of the/each generating unit or at POC. Generating plants connected to MV with S_{max} above a power threshold to be defined by the DSO the required active factor shall be delivered at POC" The reactive power capability shall apply at the connection point in any case.	"Generating modules connected to MV shall be able to operate with active factors as defined by the DSO from $\cos \varphi = 0,90$ underexcited to $\cos \varphi = 0,90$ overexcited either at the terminals of the/each generating unit or at POC. Generating plants connected to MV with S_{max} above a power threshold to be defined by the DSO the required active factor shall be delivered at POC	See ES-10	0

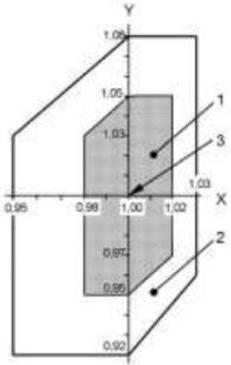
MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
NL-55	0832 – 835	4.7.2.2		te	<p>“Generating plants connected to MV shall be able to operate with active factors as defined by the DSO from $\cos \varphi = 0,90$ underexcited to $\cos \varphi = 0,90$ overexcited either at the terminals of the/each generating unit or at POC. Generating plants connected to MV with S_{max} above a power threshold to be defined by the DSO the required active factor shall be delivered at POC”</p> <p>The reactive power capability shall apply at the connection point in any case.</p>	<p>“Generating modules connected to MV shall be able to operate with active factors as defined by the DSO from $\cos \varphi = 0,90$ underexcited to $\cos \varphi = 0,90$ overexcited either at the terminals of the/each generating unit or at POC. Generating plants connected to MV with S_{max} above a power threshold to be defined by the DSO the required active factor shall be delivered at POC”</p>	See ES-10	0
PL-42	0832 – 835	4.7.2.2		te	<p>“Generating plants connected to MV shall be able to operate with active factors as defined by the DSO from $\cos \varphi = 0,90$ underexcited to $\cos \varphi = 0,90$ overexcited either at the terminals of the/each generating unit or at POC. Generating plants connected to MV with S_{max} above a power threshold to be defined by the DSO the required active factor shall be delivered at POC”</p> <p>Different generating module shall be able to operate with active factors as defined by the DSO from different range of $\cos \varphi$. Mentioned values for $\cos \varphi$ have positive influence to requirements for PPMs. On the other hand mentioned range of $\cos \varphi$ shall restricted capacities of PGMs.</p>		See ES-10	0
ES-10	0832-835	4.7.2.2		Te	<p>“Generating plants connected to MV shall be able to operate with active factors as defined by the DSO from $\cos \varphi = 0,90$ underexcited to $\cos \varphi = 0,90$ overexcited either at the terminals of the/each generating unit or at POC. Generating plants connected to MV with S_{max} above a power threshold to be defined by the DSO the required active factor shall be delivered at POC”.</p> <p>As required by Regulation 2016/631, reactive power capability shall be always defined in the POC.</p>	<p>Correct: “Generating plants connected to MV shall be able to operate with active factors as defined by the DSO from $\cos \varphi = 0,90$ underexcited to $\cos \varphi = 0,90$ overexcited either at the terminals of the/each generating unit or at POC. Generating plants connected to MV with S_{max} above a power threshold to be defined by the DSO the required active factor shall be delivered at POC”.</p>	<p>Rejected:</p> <p>If the DSO/responsible party wants all MV systems to do the control referred to the point of connection they just have to state that this threshold is zero. This threshold has no impact on any other thresholds.</p> <p>According to RfG e.g. for type A there is no requirement. So for reactive power required because of local needs (not RfG issue) it can be decided by however if at POC or unit.</p> <p>change as decided in DK04 in line 835 “DSO and responsible party”</p>	1

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
FR 28	0833	4.7.2.2		te	Cos ϕ 0.9 under excited combined with under voltage (0.85 U_n referring to EN50560) should lead to a huge oversizing of synchronous alternator. Rated power could be X2.	Cos ϕ range from 0.95 (under excited) to cos ϕ 1	Rejected. This is addressed in lines 863-864 and Figure 13.	1
DK46	0834	4.7.2.2		te	“Generating plants connected to MV with S_{max} above a power threshold to be defined by the DSO the required active factor shall be delivered at POC” If it is not removed, the structure of the sentence is not clear	If it is not removed, this shall be rewritten: “The active factor of generating plants connected to MV with S_{max} above a power threshold to be defined by the DSO, shall be delivered at POC”	Accepted. Change sentence as proposed. (See also subsequent comments.)	2
EE-56	0834	4.7.2.2		Ed	“Generating plants connected to MV with S_{max} above a power threshold to be defined by the DSO the required active factor shall be delivered at POC” If it is not removed, the structure of the sentence is not clear	If it is not removed, this shall be rewritten: “The active factor of generating plants connected to MV with S_{max} above a power threshold to be defined by the DSO, shall be delivered at POC”	See DK46 above.	0
ES-11	0834	4.7.2.2		Ed	“Generating plants connected to MV with S_{max} above a power threshold to be defined by the DSO the required active factor shall be delivered at POC”. If it is not removed, the structure of the sentence is not clear.	If it is not removed, this shall be rewritten: “The active factor of generating plants connected to MV with S_{max} above a power threshold to be defined by the DSO, shall be delivered at POC”.	See DK46 above.	0
NL-56	0834	4.7.2.2		ed	“Generating plants connected to MV with S_{max} above a power threshold to be defined by the DSO the required active factor shall be delivered at POC” If it is not removed, the structure of the sentence is not clear	If it is not removed, this shall be rewritten: “The active factor of generating plants connected to MV with S_{max} above a power threshold to be defined by the DSO, shall be delivered at POC”	See DK46 above.	0
PL-43	0834	4.7.2.2		ed	“Generating plants connected to MV with S_{max} above a power threshold to be defined by the DSO the required active factor shall be delivered at POC” If it is not removed, the structure of the sentence is not clear	If it is not removed, this shall be rewritten: “The active factor of power generating facility connected to MV with S_{max} above a power threshold to be defined by the DSO, shall be delivered at POC”	See DK46 above. Notice use of the term “generating facility”. Term not existing in this standard. Usage of “generating plant” instead.	2

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-071	0836	4.7.2.2	Note 1	Ge	This Note should be part of the testing document.	Remove Note	Rejected. Why? Has nothing to do with testing.	2
DE-072	0842 – 845	4.7.2.2		Te	<p>“The generating unit manufacturer has a certain freedom in the sizing of the output side of the generating unit considering the advantages and drawbacks in the practical use of the generating unit when evaluating the need to reduce active output power (e.g. due to voltage variation or reactive power exchange) in order to respond to the requirements of this European Standard.”</p> <p>Active power output reduction is a critical issue for system stability. It hence cannot be left at the manufacturer’s discretion to decide on this, but the network operator shall define, whether it is admissible.</p>	Remove note.	Partly accepted, We assume the comment is due to a misunderstanding. add the following at the end of the Note: “This is referred to / indicated by the <i>Design freedom area</i> in Figure 12.”	2
DK47	0842 – 845	4.7.2.2		te	<p>“The generating unit manufacturer has a certain freedom in the sizing of the output side of the generating unit considering the advantages and drawbacks in the practical use of the generating unit when evaluating the need to reduce active output power (e.g. due to voltage variation or reactive power exchange) in order to respond to the requirements of this European Standard.”</p> <p>Active power output reduction is a critical issue for system stability. It hence cannot be left at the manufacturer’s discretion to decide on this, but the network operator shall define, whether it is admissible.</p>	Remove note.	See DE-072 above.	0
EE-57	0842 – 845	4.7.2.2		Te	<p>“The generating unit manufacturer has a certain freedom in the sizing of the output side of the generating unit considering the advantages and drawbacks in the practical use of the generating unit when evaluating the need to reduce active output power (e.g. due to voltage variation or reactive power exchange) in order to respond to the requirements of this European Standard.”</p> <p>Active power output reduction is a critical issue for system stability. It hence cannot be left at the manufacturer’s discretion to decide on this, but the network operator shall define, whether it is admissible.</p>	Remove notes.	See DE-072 above.	0

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
NL-57	0842 – 845	4.7.2.2		te	“The generating unit manufacturer has a certain freedom in the sizing of the output side of the generating unit considering the advantages and drawbacks in the practical use of the generating unit when evaluating the need to reduce active output power (e.g. due to voltage variation or reactive power exchange) in order to respond to the requirements of this European Standard.” Active power output reduction is a critical issue for system stability. It hence cannot be left at the manufacturer’s discretion to decide on this, but the network operator shall define, whether it is admissible.	Remove notes.	See DE-072 above.	0
PL-44	0842 – 845	4.7.2.2		te	“The generating unit manufacturer has a certain freedom in the sizing of the output side of the generating unit considering the advantages and drawbacks in the practical use of the generating unit when evaluating the need to reduce active output power (e.g. due to voltage variation or reactive power exchange) in order to respond to the requirements of this European Standard.” Active power output reduction is a critical issue for system stability. It hence cannot be left at the manufacturer’s discretion to decide on this, but the network operator shall define, whether it is admissible.	Remove notes.	See DE-072 above.	0
FR	846 – 848	4.7.2.2		te	What does this sentence mean?	Please clarify	Rejected. Seems to be clear.	2
FR	852	4.7.2.2		te	“VA operation” is not clear	Please clarify	Noted. “continuous VA operation” means a state of operation in which a defined level of apparent power (VA, kVA) is provided disregarding the availability of the primary energy.	3
DE-073	0857	4.7.2.2		Editorial	S _{min} and S _{max} should be subscripted	S _{min} and S _{max}	Accepted. Edit text accordingly.	3
DK48	0857	4.7.2.2		ed	S _{min} and S _{max} should be subscripted	S _{min} and S _{max}	See DE-073.	0

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
AT 25	0857 – 862	4.7.2.2	Paragraph 9	te	<p>The document defines that when operating above the apparent power threshold S_{min} equal to 10 % of the maximum apparent power S_{max} or the minimum regulating level of the generating plant, whichever is the higher value, the reactive power capability shall be provided with an accuracy of $\pm 2\% S_{max}$.</p> <p>This is unreasonably exact. When providing reactive power, the correct behaviour (under-excited/ overexcited) is more important than high accuracy.</p>	Change the requirement from $\pm 2\% S_{max}$ to $\pm 4\% S_{max}$ $\pm 5\% S_{max}$.	Rejected. Is a requirement in several member states.	1
AT 26	0868	4.7.2.2	Figure 13	ed	Typos in the labels of the x-axes	<p>Correct the labels of the x-axes in Figure 13 as follows:</p> <p><i>“Absorption of reactive energy”</i></p> <p><i>“Provision of reactive energy”</i></p>	Accepted. Modify diagram.	3
DE-074	0868	4.7.2.2	Figure	Technical	<p>Figure 13 specifies the U(Q) requirements. Why the voltage range is defined down to 85 U/Un?</p> <p>Chapter 4.4.4 specified a voltage range of $\pm 10\%$.... but mentions also EN 50160.</p> <p>Furthermore at 85 U/Un a generating plant might already operate in the FRT area.</p>	Adopt and align with 4.4.4 and 4.5.2	Accepted. Replace with 50549-2 figure.	1
DK49	0868	4.7.2.2	Figure 13	te	<p>Figure 13 specifies the U(Q) requirements. Why the voltage range is defined down to 85 U/Un?</p> <p>Chapter 4.4.4 specified a voltage range of $\pm 10\%$.... but mentions also EN 50160.</p> <p>Furthermore at 85 U/Un a generating plant might already operate in the FRT area.</p>	Adopt and align with 4.4.4 and 4.5.2	See DE-074 above.	0

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK50	0868	4.7.2.2	Figure 13	te	The way reactive power requirements are specified should be more harmonised.	Consider to change the figure to the format used in Germany and Spain 	Rejected Figure is from IEC 60034 regarding voltage and frequency. not applicable here	1
NO 10	0868		Figure 13	ed	Part of the figure text is not in English	Translate	Accepted. Modify diagram.	3
DE-077	0869	4.7.2.2	Figure 13	Ge	Wrong figure. The figure was taken from the 50549-1 document and does require a static voltage range down to 0.85 p.u.	Replace with 50549-2 figure.	See DE-074 above.	0
DK51	0872	4.7.2.2		te	<p>“NOTE 7 Whether there is a priority given to P or Q or the active factor when reducing the apparent power is not defined in this European Standard. Risks and benefits of different priority approaches are under consideration.”</p> <p>We support that there is a risk on reducing apparent power by reducing the active component.</p>	Remove note	Partly accepted Proposal: It shall be: ...when <u>reaching the maximum</u> apparent power is not...	2
EE-58	0872	4.7.2.2		Te	<p>“NOTE 7 Whether there is a priority given to P or Q or the active factor when reducing the apparent power is not defined in this European Standard. Risks and benefits of different priority approaches are under consideration.”</p> <p>We support that there is a risk on reducing apparent power by reducing the active component.</p>		See DK51 above.	0

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
ES-12	0872	4.7.2.2		Te	<p>“NOTE 7 Whether there is a priority given to P or Q or the active factor when reducing the apparent power is not defined in this European Standard. Risks and benefits of different priority approaches are under consideration.”</p> <p>We support that there is a risk on reducing apparent power by reducing the active component.</p>		See DK51 above.	0
NL-58	0872	4.7.2.2		te	<p>“NOTE 7 Whether there is a priority given to P or Q or the active factor when reducing the apparent power is not defined in this European Standard. Risks and benefits of different priority approaches are under consideration.”</p> <p>We support that there is a risk on reducing apparent power by reducing the active component.</p>		See DK51 above.	0
PL-45	0872	4.7.2.2		te	<p>“NOTE 7 Whether there is a priority given to P or Q or the active factor when reducing the apparent power is not defined in this European Standard. Risks and benefits of different priority approaches are under consideration.”</p> <p>We support that there is a risk on reducing apparent power by reducing the active component.</p>		See DK51 above.	0
DE-078	0877 – 878	4.7.2.3.1		Te	<p>“The control shall refer to the terminals of the generating units or to the point of connection depending on the size of the generating plant and the power threshold defined by the DSO according clause 4.7.2.2.”</p>	<p>“The control shall refer to the terminals of the generating units or to the point of connection depending on the size of the generating plant and the power threshold defined by the DSO according clause 4.7.2.2.”</p>	<p>Rejected:</p> <p>If the DSO wants all MV systems to do the control referred to the point of connection they just have to state that this threshold is zero. This threshold has no impact on any other thresholds.</p> <p>(The proposed sentence is incorrect anyway. The second half would have to be deleted as well.)</p> <p>Also see ES-10</p>	2

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
EE-59	0877 – 878	4.7.2.3.1		Te	“The control shall refer to the terminals of the generating units or to the point of connection depending on the size of the generating plant and the power threshold defined by the DSO according clause 4.7.2.2.”	“The control shall refer to the terminals of the generating units or to the point of connection depending on the size of the generating plant and the power threshold defined by the DSO according clause 4.7.2.2.”	Identical DE-078	0
NL-59	0877 – 878	4.7.2.3.1		te	“The control shall refer to the terminals of the generating units or to the point of connection depending on the size of the generating plant and the power threshold defined by the DSO according clause 4.7.2.2.”	“The control shall refer to the terminals of the generating units or to the point of connection depending on the size of the generating plant and the power threshold defined by the DSO according clause 4.7.2.2.”	Identical DE-078	0
PL-46	0877 – 878	4.7.2.3.1		te	“The control shall refer to the terminals of the generating units or to the point of connection depending on the size of the generating plant and the power threshold defined by the DSO according clause 4.7.2.2.”	“The control shall refer to the terminals of the generating units or to the point of connection depending on the size of the generating module and the power threshold defined by the DSO according clause 4.7.2.2.”	Rejected Plant is as good as module and more in line with CLC language	2
BE20*	0879	4.7.2.3.1		Ed	Use of the defined terms. To identify the unit, plant, module etc use the word ‘ generating ’ instead of ‘generation’ Do not use “ power generating unit/module/plant” but just “generating unit/module/plant” as defined. The information that it is about electrical power is already covered in the definition of the generating unit.	Replace ‘ power generation plant/unit’ by ‘ generating plant/unit’	Accepted	3
EE-60	0884 0784	4.6.2		ed	Power response to underfrequency	Power response to underfrequency for battery storage units (devices) - It is an abuse comparing to 2016/631 to ask this for anything except storage, as A and B do not ask for such compliance in EU regulation 2016/631	Wrong chapter → Transfer this comment to other chapter!?	
NL-60	0884 0784	4.6.2		ed	Power response to underfrequency	Power response to underfrequency for battery storage units (devices) - It is an abuse comparing to 2016/631 to ask this for anything except storage, as A and B do not ask for such compliance in EU regulation 2016/631	Wrong chapter → Transfer this comment to other chapter!?	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
SI-5	0884, 885	4.7.2.3.1	Fourth paragraph	te	<p>Reactive power control and voltage regulation. In Slovenia reactive power control scheme $Q = f(P, U)$ is mandatory by the national law for all generating plants/units. Every generating plant/unit must be able to control its reactive power as a function of its momentary active power and supply voltage magnitude at its terminals at the same time.</p> <p>Reactive power requirements are given explicitly with mathematical expressions as well as graphically. Allowed reactive power range is given graphically as well as with mathematical expressions.</p>	<p>After line 884 and before line 885 insert a bullet with this text:</p> <ul style="list-style-type: none"> “Reactive power as a function of active power and voltage at the same time $Q(P, U)$” <p>or a bullet with this text (whichever fits better into the bulleted list):</p> <ul style="list-style-type: none"> “$Q(P, U)$” 	<p>Accepted in principle.</p> <p>The voltage related control mode ($Q(U)$) includes the possibility to add P lock-in/out limits. In this sense it is a $Q(P, U)$-function.</p> <p>If the request is meant in a different way, it would have to be specified with more detail.</p>	1
FR	885	4.7.2.3.1		te	Tan ϕ may also be used	Write “cos ϕ or tan ϕ setpoint mode”	<p>Rejected.</p> <p>Tanphi can be recalculated into cosphi. So there is no difference in the function. To not confuse anyone it is proposed to formulate cosphi requirements and not tanphi requirements.</p>	2
DK52	0887-888			te	A controlled voltage support by reactive power is not required from this technology.	Remove sentence. If the technology is capable for voltage control is not the case to write as not required. It is ok if nothing is written on voltage control.	<p>RejectedRejected.</p> <p>Not understood.</p> <p>What is “this technology”?</p> <p>What does this mean “If the technology is capable for voltage control is not the case to write as not required.”?</p> <p>It is just a recommendation (note) for manufacturers to implement all listed modes.</p>	2
EE-61	0887-888				A controlled voltage support by reactive power is not required from this technology.	Remove sentence. If the technology is capable for voltage control is not the case to write as not required. It is ok if nothing is written on voltage control.	See DK52	0
NL-61	0887-888				A controlled voltage support by reactive power is not required from this technology.	Remove sentence. If the technology is capable for voltage control is not the case to write as not required. It is ok if nothing is written on voltage control.	See DK52	0
PL-47	0887-888			te	A controlled voltage support by reactive power is not required from this technology.	Remove sentence. If the technology is capable for voltage control is not the case to write as not required. It is ok if nothing is written on voltage control.	See DK52	0
FR	895	4.7.2.3.2		te	cos ϕ or tan ϕ	Replace “cos ϕ ” by “cos ϕ or tan ϕ ”	See FR L 885	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
EE-65	0899	4.7.2.3.3			Voltage related control modes	Why is necessary if we have declared before that the voltage control is not necessary for class A and B?	Rejected It is required in several states for A and B	2
NL-65	0899	4.7.2.3.3			Voltage related control modes	Why is necessary if we have declared before that the voltage control is not necessary for class A and B?	See EE-65	0
GB-11	0912	4.7.2.3.3	4.7.2.3 (Control Modes)	Te	In terms of speed of response, we would generally be looking at response times in the order of 1 second (ie 90% of the change in reactive power should be achieved in 1 second following the change in voltage). A response time of more than this is likely to cause issues (ie loss of reactive / voltage support) under disturbed conditions	Consider specifying such that 90% of the response is delivered in $\leq 1s$.	<p>Reject + clarification</p> <p>1) Add to note: A response time (t_r) that defines 90% shall be achieved is equal to $t_r = \tau/2,3$. E.g. $t_r = 10\text{sec}$ is equal to a $\tau = 4,35\text{sec}$</p> <p>2) For reactive power controlled depending on voltage studies have shown that a response time below 3sec can cause instabilities in distribution systems with several independently controlled generators. With $\tau \geq 3\text{sec}$ there is no risk any more.</p> <p>3) in systems with park controller time delays will be in the range of 1 sec. requiring settling times in the same scale will cause instabilities</p> <p>Thomas 14.12. Implementation Note: As DE-079 defined the dynamic tolerance as $\pm 5\%$, a responstime definition reaching 95% seems more suited. This results in $T_r = 3T_{\tau}$</p>	1

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
FR 99	918 – 919	4.7.2.3.3		te	What does that mean? Which power is locked? (apparent? active?)	Please clarify	Accepted Two active power levels shall be configurable both at least in the range of 0 % to 100 % of PD. The lock-in value turns the Q(U) mode on, the lock-out value turns Q(U) off. If lock-in is larger than lock-out a hysteresis is given. Add picture Annex 2	2
DE-079	0920	4.7.2.3.3		te	The time constant accuracy of 5 % of its set value leads to an unnecessarily stringent requirement for the minimum time constant of 3 s (→150 ms accuracy). It is not clear how this is evaluated under consideration of dead times.	The accuracy of the configurable time constant shall be 5 % of its set value or 300 ms, whichever is the higher value.	Accepted in principle: There shall be an allowed band within the requirement is fulfilled, so that well configured PI control will perfectly fit. Define the allowed dead band in the requirements, instead of the reference to the steady state 2% of 4.7.2.2. See Annex 1	1
PL-48	0924	4.7.2.3.4		ed	Capital letter “C” is unnecessary.	In the title of the subclause replace the word “Control” with the word “control”.	accepted	3
DK53	0936	4.7.3.1		te	It shall be possible for the DSO to require that such functionality is disabled. The setting shall be protected from unpermitted interference.	Add sentence: ‘The enabling and disabling of the function shall be field adjustable and means have to be provided to protect the setting from unpermitted interference (e.g. password or seal) if required by the DSO.’	Accepted See DE-080	0

MB/ NC	Line numb er	Clause/ Subclau se	Paragr aph/ Figure/ Table	Type of com ment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-080	0937 – 940	4.7.3.1		Te	<p>“In order to avoid disconnection due to overvoltage protection (see 4.9.3.3 and 4.9.3.4), generating plants/units are allowed to reduce active power output as a function of this rising voltage. The final implemented logic can be chosen by the manufacturer. Nevertheless, this logic shall not cause steps or oscillations in the output power.”</p> <p>Active power output reduction is a critical issue for system stability. It hence cannot be left at the manufacturer’s discretion to decide on this, but the network operator shall define, whether it is admissible.</p>	Remove sentence.	<p>Accepted in principle</p> <p>Add: The power reduction caused by such a function may not be faster than an equivalent of $\tau=3\text{sec}$. ($\approx 33\%/ \text{sec}$ at a 100% change)</p> <p>Add: The enabling and disabling of the function shall be field adjustable and means have to be provided to protect the setting from unpermitted interference (e.g. password or seal) if required by the DSO.</p> <p>Further WG03 response: What is the danger for system stability?? Smooth power reduction based on local voltage can be stabilizing much more than tripping or HVRT with switching to zero current. Or in case it is a slow control it has no influence on short term stability. It can only cause local instabilities if there is a combination of a very fast control together with a very steep P/V curve. (e.g. 100%/V and 1sec)</p>	1

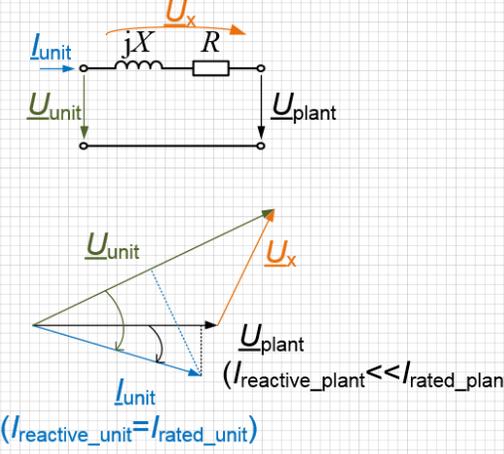
MB/ NC	Line numb er	Clause/ Subclau se	Paragr aph/ Figure/ Table	Type of com ment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
FR 29	0937- 939	4.7.3.1		te	<p>“In order to avoid disconnection due to overvoltage protection (see 4.9.3.3 and 4.9.3.4), generating plants/units are allowed to reduce active power output as a function of this rising voltage. The final implemented logic can be chosen by the manufacturer. Nevertheless, this logic shall not cause steps or oscillations in the output power.”</p> <p>Active power reduction may be very dangerous for system security, and therefore it shall not be left open to the manufacturer criteria. If this is needed, it shall be defined on an exceptional basis by the network operator</p>	Remove sentence “The final implemented logic can be chosen by the manufacturer. “ and add : “generating plants/units are allowed to reduce active power output as a function of this rising voltage, as defined by the DSO in coordination with the TSO ”	See DE-0-80	0
DK54	0937- 940	4.7.3.1		te	<p>“In order to avoid disconnection due to overvoltage protection (see 4.9.3.3 and 4.9.3.4), generating plants/units are allowed to reduce active power output as a function of this rising voltage. The final implemented logic can be chosen by the manufacturer. Nevertheless, this logic shall not cause steps or oscillations in the output power.”</p> <p>Active power reduction may be very dangerous for system security, and therefore it shall not be left open to the manufacturer criteria. If this is needed, it shall be defined on an exceptional basis by the network operator (here, the coordination between DSO and TSO is needed)</p>	Remove sentence or correct: “In order to avoid disconnection due to overvoltage protection (see 4.9.3.3 and 4.9.3.4), generating plants/units may be allowed to reduce active power output as a function of this rising voltage, as defined by the DSO in coordination with the TSO. The final implemented logic can be chosen by the manufacturer. Nevertheless, this logic shall not cause steps or oscillations in the output power.””	See DE-0-80	0

MB/ NC	Line numb er	Clause/ Subclau se	Paragr aph/ Figure/ Table	Type of com ment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
EE-62	0937- 940	4.7.3.1		Te	<p>“In order to avoid disconnection due to overvoltage protection (see 4.9.3.3 and 4.9.3.4), generating plants/units are allowed to reduce active power output as a function of this rising voltage. The final implemented logic can be chosen by the manufacturer. Nevertheless, this logic shall not cause steps or oscillations in the output power.”</p> <p>Active power reduction may be very dangerous for system security, and therefore it shall not be left open to the manufacturer criteria. If this is needed, it shall be defined on an exceptional basis by the network operator (here, the coordination between DSO and TSO is needed)</p>	<p>Remove sentence or correct: “In order to avoid disconnection due to overvoltage protection (see 4.9.3.3 and 4.9.3.4), generating plants/units may be allowed to reduce active power output as a function of this rising voltage, as defined by the DSO in coordination with the TSO. The final implemented logic can be chosen by the manufacturer. Nevertheless, this logic shall not cause steps or oscillations in the output power.””</p>	See DE-0-80	0
ES-13	0937- 940	4.7.3.1		Te	<p>“In order to avoid disconnection due to overvoltage protection (see 4.9.3.3 and 4.9.3.4), generating plants/units are allowed to reduce active power output as a function of this rising voltage. The final implemented logic can be chosen by the manufacturer. Nevertheless, this logic shall not cause steps or oscillations in the output power.”</p> <p>Active power reduction may be very dangerous for system security, and therefore it shall not be left open to the manufacturer criteria. If this is needed, it shall be defined on an exceptional basis by the network operator (here, the coordination between DSO and TSO is needed).</p>	<p>Remove sentence or correct: “In order to avoid disconnection due to overvoltage protection (see 4.9.3.3 and 4.9.3.4), generating plants/units may be allowed to reduce active power output as a function of this rising voltage, as defined by the DSO in coordination with the TSO. The final implemented logic can be chosen by the manufacturer. Nevertheless, this logic shall not cause steps or oscillations in the output power.””</p>	See DE-0-80	0

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
NL-62	0937-940	4.7.3.1		te	<p>“In order to avoid disconnection due to overvoltage protection (see 4.9.3.3 and 4.9.3.4), generating plants/units are allowed to reduce active power output as a function of this rising voltage. The final implemented logic can be chosen by the manufacturer. Nevertheless, this logic shall not cause steps or oscillations in the output power.”</p> <p>Active power reduction may be very dangerous for system security, and therefore it shall not be left open to the manufacturer criteria. If this is needed, it shall be defined on an exceptional basis by the network operator (here, the coordination between DSO and TSO is needed)</p>	Remove sentence or correct: “In order to avoid disconnection due to overvoltage protection (see 4.9.3.3 and 4.9.3.4), generating plants/units may be allowed to reduce active power output as a function of this rising voltage, as defined by the DSO in coordination with the TSO. The final implemented logic can be chosen by the manufacturer. Nevertheless, this logic shall not cause steps or oscillations in the output power.””	See DE-0-80	0
PL-49	0937-940	4.7.3.1		te	<p>“In order to avoid disconnection due to overvoltage protection (see 4.9.3.3 and 4.9.3.4), generating plants/units are allowed to reduce active power output as a function of this rising voltage. The final implemented logic can be chosen by the manufacturer. Nevertheless, this logic shall not cause steps or oscillations in the output power.”</p> <p>Active power reduction may be very dangerous for system security, and therefore it shall not be left open to the manufacturer criteria. If this is needed, it shall be defined on an exceptional basis by the network operator (here, the coordination between DSO and TSO is needed)</p>	Remove sentence or correct: “In order to avoid disconnection due to overvoltage protection (see 4.9.3.3 and 4.9.3.4),power generating facility/module may be allowed to reduce active power output as a function of this rising voltage, as defined by the DSO in coordination with the TSO. The final implemented logic can be chosen by the manufacturer. Nevertheless, this logic shall not cause steps or oscillations in the output power.””	Rejected Plant/unit is as good as facility/module in this context and more in line with CLC language	2
DK55	0938 - 938	4.7.3		te	<p>Voltage related active power reduction.</p> <p>It is not useful to use in standards sentence as: “The final implemented logic can be chosen by the manufacturer”</p>	Remove sentence.	See DE-0-80	0

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
EE-66	0938 - 938	4.7.3			Voltage related active power reduction. It is not useful to use in standards sentence as: "The final implemented logic can be chosen by the manufacturer"	Remove sentence.	See DE-0-80	0
NL-66	0938 - 938	4.7.3			Voltage related active power reduction. It is not useful to use in standards sentence as: "The final implemented logic can be chosen by the manufacturer"	Remove sentence.	See DE-0-80	0
PL-50	0938 - 938	4.7.3		te	Voltage related active power reduction. It is not useful to use in standards sentence as: "The final implemented logic can be chosen by the manufacturer"	Remove sentence.	See DE-0-80	0
DE-081	0938 - 939	4.7.3			Voltage related active power reduction. It is not useful to use in standards sentence as: "The final implemented logic can be chosen by the manufacturer"	Remove sentence.	See DE-0-80	0
AT 27	0941	4.7.3.1	Paragraph 1	ed	It is not clear what is meant by the sentence "Short circuit current requirements on generating plants". Should this be a heading? It is obviously incomplete.	Delete text in line 941: "Short circuit current requirements on generating plants"	see DE-082	0
DE-082	0941	4.7.3.1		Ed	"Short circuit requirements on generating plants" This sentence is not coherent.	Set as heading 3	Accepted	3
DK56	0941	4.7.3.1		ed	This should be a numbered heading.	Make it a numbered heading.	see DE-082	0
DK57	0941	4.7.3.1		te	"Short circuit requirements on generating plants" This sentence is not coherent.	Remove sentence	see DE-082	3
EE-63	0941	4.7.3.1		Ed	"Short circuit requirements on generating plants" This sentence is not coherent.	Remove sentence	see DE-082	3
ES-14	0941	4.7.3.1		Ed	"Short circuit requirements on generating plants". This sentence is not coherent.	Remove sentence.	see DE-082	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
GB-12	0941	4.7.3.1	Voltage related active power reduction	Ed	"Short circuit requirements on generating plants" looks like a typo but probable needs to be incorporated into the title of 4.7.3.2	Remove line 941.	see DE-082	3
NL-63	0941	4.7.3.1		ed	"Short circuit requirements on generating plants" This sentence is not coherent.	Remove sentence	see DE-082	3
PL-51	0941	4.7.3.1		ed	"Short circuit requirements on generating plants" This sentence is not coherent.	Remove sentence	see DE-082	3
GB-13	0943	4.7.3.2	Reactive Current Injection	te	These requirements are quite different to the current GB RfG proposals for fast fault current injection. .	Leave the option open for national specification of fast fault current injection defined on a different basis	Rejected, As this is a proposal for national implementation, other implementations are possible	1
FR 32	0944		4.7.3.2.1	Te	According to RfG, the requirement for fast reactive current injection may be required by the relevant system operator for type B modules, not for type A.	Modify the text line 944 : ... generating plants of category B shall have the capability to provide additional reactive current up to the current limitation of the generating plant and generating plants of category A should have the capability to provide additional reactive current up to the current limitation of the generating plant.	accepted, use same approach as for immunity, B=shall; A=should	2

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Priority
DE-083	0944	4.7.3.2.1		te	<p>It is not technically feasible to set this requirement for the generating plant and implying the PCC as reference point.</p> <p>Since an unnecessary reduction of active current is not wanted, it is not practicable to demand reactive current up to the rated current of the plant. This would require all units to go far beyond their rated currents or to reduce the active current to 0, because the transformers lead to phase angle changes (and therefore the reactive current value).</p> 	<p>All requirements should be set for the units, because measurement and control at PCC is not possible with the given step response and settling times.</p> <p>Replace “generating plant” with “generating unit” in this chapter.</p>	partly accepted, see DE-093	3
DE-084	0946	4.7.3.2.1		te	<p>Maximum reactive current limit should be 90 % of the rated current of the unit to make more room for active power support during faults.</p>	<p>Change: “At least 90 % of the rated current of the generating plant shall be injected according to Figure 15”</p>	<p>rejected</p> <p>Please provide additional information, also VDE-AR-N 4110 requires 100%, so what is the intention of this reduction. If active power is needed, either active power priority or a smaller k-faktor might be used</p>	2

MB/ NC	Line numb er	Clause/ Subclau se	Paragr aph/ Figure/ Table	Type of com ment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-085	0946	4.7.3.2.1		te	It is not clear from Figure 15 and the stated requirements that the both positive and negative sequence current affect the individual phase currents of the generation unit at the same time. It is necessary that both current contributions are recognized, when considering the current limitation of the generation unit.	Add: “...shall be injected according to Figure 15, while considering that both positive and negative sequence reactive current affect the individual phase currents simultaneously. The highest phase current is relevant for the limitation.”	accepted in principle include detail in line 1012 The additional reactive current shall be provided up to the current limitation of the generating plant. Considering both, positive and negative sequence results in different phase currents. The highest phase current is relevant for the limitation. To provide maximum reactive current it is acceptable to reduce the active current component to maximize reactive current within the apparent current limits of the generation unit. However, the reduction of active current shall be as small as possible. Thomas 7.12. Implementation note. The part of current limitation is shifted further back, as the contend of the comment can only be understood once the concept of pos- and neg sequenc is explained.	3

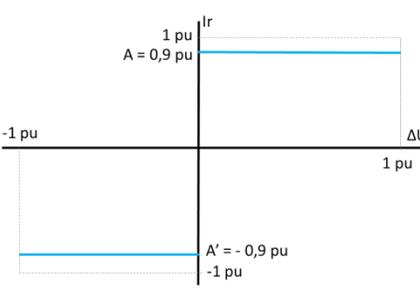
MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Priority 1 2 3
DE-086	0957-971	4.7.3.2.1		technical	<p>What is the definition of a “sudden change in voltage”? Without a clear definition, it is not clear how to detect it.</p> <p>Is a “sudden change in voltage” the same as a “sudden voltage jump”?</p> <p>What exactly is the “actual value of the voltage” for positive and negative sequence (probably the pos./neg. sequence RMS value of the last 20ms)? Note, the actual value of the positive sequence (or neg. seq.) voltage cannot be an instantaneous voltage value. Which threshold for the “sudden change in voltage” shall apply to activate the dynamic reactive current provision, is it 0..15%?</p>	<p>Please add a precisely definition of “sudden change in voltage” and of “actual value of voltage (positive and negative sequence).</p>	<p>partly accepted</p> <p>“sudden change in voltage” is defined in line 966</p> <p>rephrase line 966ff</p> <p>A sudden voltage jump is defined by the absolute difference between the actual value of the positive and negative sequence voltage and the 50 period average of the positive and negative sequence voltage relative to U_c.</p> <p>Also change because of patent application EP 2 614 573 B1:</p> <p>U1-1min: the 1 min average of the pre-fault voltage of the positive sequence or the RMS value.</p> <p>Note: in normal operation the positive sequence voltage is almost identical to the RMS value</p> <p>U2-1min: the 1 min average of the pre-fault voltage of the negative sequence or zero. Note: In normal operation the negative sequence voltage is ~ 0</p>	3
PL-52	0959	4.7.3.2.1		ed	See line e.g. 613.	Replace the phrase “phase-phase” with the phrase “phase to phase”.	Accepted	3

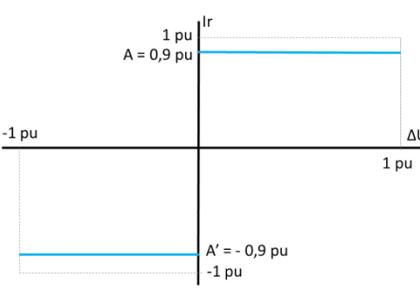
MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
EE-64	0960	4.7.2.3.2			The settling time shall be less than one minute.	The setpoint is remote? It is applied only for class B. It must be clear! Similar for reactive power	partly accepted see DE-093 and FR 32 Thomas 7.12.: Implementation Note: misplaced comment See EE-65	3
NL-64	0960	4.7.2.3.2			The settling time shall be less than one minute.	The setpoint is remote? It is applied only for class B. It must be clear! Similar for reactive power	partly accepted see DE-093 and FR 32 Thomas 7.12.: Implementation Note: misplaced comment See EE-65	3
DE-087	0987	4.7.3.2		Technical	It is not clear if k_1 and k_2 could defer.	Please describe precisely	rejected it seems sufficiently clear, see also Appendix C	3
DK58	0987	4.7.3.2		technical	It is not clear if k_1 and k_2 could defer.	Please describe precisely	rejected it seems sufficiently clear, see also Appendix C	3
DE-088	0988	4.7.3.2.1		edited	phase angle	phase angle	accepted	3
DE-089	0996	4.7.3.2		Technical	Gradients with $k=2$ and $k=5$ are shown in the figure. I expect it should be $k=2$ and $k=6$ according to the configurable range	Change the figure to $k=6$	accepted	3
DK59	0996	4.7.3.2		technical	Gradients with $k=2$ and $k=5$ are shown in the figure. I expect it should be $k=2$ and $k=6$ according to the configurable range	Change the figure to $k=6$	accepted	3
DE-090	0998	4.7.3.2.1	Figure 16	technical	The factor for the lower limit of the tolerance range should be " $k=2$ " instead of " $k=k_{set}$ " for the negative sequence, as argued in NOTE 2 in line 992: The current cannot be changed by DFIG and should be considered as sufficient.	Replace " $k=k_{set}$ " with " $k=2$ " in Figure 16, first quadrant.	rejected it is the intention to allow a tolerance for -10%, +20% from any set point, therefore the tolerance gradient has the same gradient as the set-gradient. The only exception is the +Tolerance in case of overvoltage	2
AT 28	0998	4.7.3.2.1	Figure 16	technical	The upper tolerance limit in quadrant 2 is set with $k = 6$. This means that if the actual set value for k is 6, which can happen because the configurable range for k_1 and k_2 is 2-6, there is no tolerance range.	Change the upper limit of tolerance range in quadrant 2 to $k = k_{set}$.	rejected comment is not correct, $k=6$ is the gradient of the tolerance line, however the tolerance line is still 20% shifted above the set value. A tolerance of 20% is present also for $k=6$	3

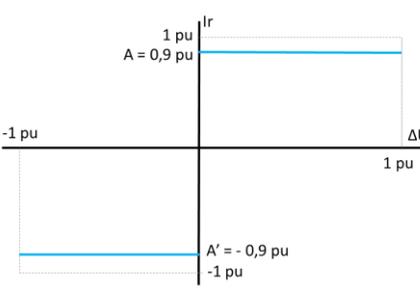
MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-091	1002	4.7.3.2.1		te	Calculation of positive and negative sequence components (e.g. according to IEC 61400-21) takes additional time. This should be considered by the requirements for step response and settling times.	Add: "The time frame for the calculation of symmetrical components (20 ms) shall be subtracted before the step response and settling time criteria are evaluated."	accepted in principle, as this is a testing and evaluation topic and the approach is generally applied in present test-standards, text will not be changed	2
DE-092	1003	4.7.3.2		Technical	Clearing time is not defined	Change the term or include it in chapter 3.7	accepted, should be settling time	3
DK60	1003	4.7.3.2		te	Clearing time is not defined	Change the term or include it in chapter 3.7	accepted, should be settling time See DE-093	3

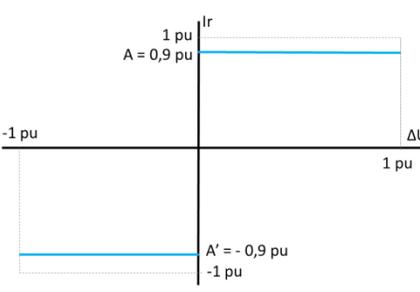
MB/ NC	Line numb er	Clause/ Subclau se	Paragr aph/ Figure/ Table	Type of com ment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-093	1003- 1004	4.7.3.2		Tech nical	"The step response and clearing time at fault inception apply at the terminals of the generation unit." This implies that at fault clearance the step response and clearing time apply at the generating plant terminals.	Delete the sentence and include at the beginning of the chapter a general sentence that the requirements in this chapter could be fulfilled at unit level.	<p>partly accepted as the fast fault current injection might be provided by the generating units or additional equipment in the plant, the requirement is stated on plant level, however due to the fast response required the evaluation.</p> <p>Explanation of accuracy requirement shall be improved delete line 1003 and 1004 Add paragraph after 1023 This short circuit current requirement may either be implemented in the generating units or in additional equipment in the generating plant. Due to the high dynamic of the requirement the accuracy of injected current and the response and settling time is evaluated at the clamps of the generating unit or if applicable at the clamps of the additional equipment providing the short circuit current.</p> <p>The tolerance is defined as in Figure 16. The lower tolerance in quadrant 1 and 3 is -10%, the higher tolerance in quadrant 3 is +20%, the higher tolerance in quadrant 1 has a starting value of +20% but is increasing with k=12 independent of the set k-factor</p> <p>Thomas Implementation Note: also added accuracy allowance: "Furthermore in quadrant 1 it is accepted to limit the apparent power to Pmax."</p>	2

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK61	1003-1004	4.7.3.2		te	"The step response and clearing time at fault inception apply at the terminals of the generation unit." This implies that at fault clearance the step response and clearing time apply at the generating plant terminals.	Delete the sentence and include at the beginning of the chapter a general sentence that the requirements in this chapter could be fulfilled at unit level.	see DE-093	3
BE32	1004			Ed	Uniformity in terms used	Use " generating unit" instead of "generation unit"	accepted	3

MB/ NC	Line numb er	Clause/ Subclau se	Paragr aph/ Figure/ Table	Type of com ment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK62	1012- 1018	4.7.3.2.1		te	<p>“During the provision of additional reactive current it is acceptable to reduce the active current component to maximize reactive current within the apparent current limits of the generation unit. However, the reduction of active current shall be as small as possible.</p> <p>Furthermore the generating plant shall be able to give priority to active current injection. In this case the unit shall deliver maximum available active current, limited only by the current limitation of the generating unit. If the resulting active current remains below the current limitation of the generating unit, additional reactive current according to Figure 15 shall be provided”</p> <p>During the implementation of CNC in Spain, voltage support during faults was discussed in depth and according to the transmission system operator simulations, it is essential to implement a reactive current injection limitation in order to allow an active current component. If this is not foreseen, a general lack of active power from the PPMs may be seen by the system during the fault, which would be very dangerous.</p>	<p>Add the text after line 1011:</p> <p>“The control shall include a limitation for the total reactive current in order to allow an active current component injection. This limitation shall be made by setting A and A' values as defined in figure X:</p>  <p>AND Modify the text:</p> <p>“During the provision of additional reactive current it is acceptable to reduce the active current component to maximize reactive current within the apparent current limits of the generation unit and also taking into account the limitation of the reactive power, if any. However, the reduction of active current shall be as small as possible. Furthermore, by setting A and A' values on Figure X, the generating plant shall be able to give priority to active current injection. In this case the unit shall deliver maximum available active current, limited only by the current limitation of the generating unit. If the resulting active current remains below the current limitation of the generating unit, additional reactive current according to Figure 15 shall be provided”</p>	<p>Generally accepted</p> <p>Add sentence before 1015 as further option (activated/deactivated according to DSO, responsible party) to limit maximum reactive current (absolute, not additional) to a value defined by the relevant party in the range of 0% to 100% I rated.</p> <p>Add Note: leave some active power especially if a high k factor is needed for voltage stability reasons with high density of DER</p>	1

MB/ NC	Line numb er	Clause/ Subclau se	Paragr aph/ Figure/ Table	Type of com ment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
EE-67	1012- 1018	4.7.3.2.1		Te	<p>“During the provision of additional reactive current it is acceptable to reduce the active current component to maximize reactive current within the apparent current limits of the generation unit. However, the reduction of active current shall be as small as possible.</p> <p>Furthermore the generating plant shall be able to give priority to active current injection. In this case the unit shall deliver maximum available active current, limited only by the current limitation of the generating unit. If the resulting active current remains below the current limitation of the generating unit, additional reactive current according to Figure 15 shall be provided”</p> <p>During the implementation of CNC in Spain, voltage support during faults was discussed in depth and according to the transmission system operator simulations, it is essential to implement a reactive current injection limitation in order to allow an active current component. If this is not foreseen, a general lack of active power from the PPMs may be seen by the system during the fault, which would be very dangerous.</p>	<p>Add the text after line 1011:</p> <p>“The control shall include a limitation for the total reactive current in order to allow an active current component injection. This limitation shall be made by setting A and A' values as defined in figure X:</p>  <p>AND Modify the text:</p> <p>“During the provision of additional reactive current it is acceptable to reduce the active current component to maximize reactive current within the apparent current limits of the generation unit and also taking into account the limitation of the reactive power, if any. However, the reduction of active current shall be as small as possible. Furthermore, by setting A and A' values on Figure X, the generating plant shall be able to give priority to active current injection. In this case the unit shall deliver maximum available active current, limited only by the current limitation of the generating unit. If the resulting active current remains below the current limitation of the generating unit, additional reactive current according to Figure 15 shall be provided”</p>	see DK62	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Priority
ES-15	1012-1018	4.7.3.2.1		Te	<p>“During the provision of additional reactive current it is acceptable to reduce the active current component to maximize reactive current within the apparent current limits of the generation unit. However, the reduction of active current shall be as small as possible.</p> <p>Furthermore the generating plant shall be able to give priority to active current injection. In this case the unit shall deliver maximum available active current, limited only by the current limitation of the generating unit. If the resulting active current remains below the current limitation of the generating unit, additional reactive current according to Figure 15 shall be provided”.</p> <p>During the implementation of CNC in Spain, voltage support during faults was discussed in depth and according to the transmission system operator simulations, it is essential to implement a reactive current injection limitation in order to allow an active current component. If this is not foreseen, a general lack of active power from the PPMs may be seen by the system during the fault, which would be very dangerous.</p>	<p>Add the text after line 1011:</p> <p>“The control shall include a limitation for the total reactive current in order to allow an active current component injection. This limitation shall be made by setting A and A' values as defined in figure X:</p>  <p>AND Modify the text:</p> <p>“During the provision of additional reactive current it is acceptable to reduce the active current component to maximize reactive current within the apparent current limits of the generation unit and also taking into account the limitation of the reactive power, if any. However, the reduction of active current shall be as small as possible.</p> <p>Furthermore, by setting A and A' values on Figure X, the generating plant shall be able to give priority to active current injection. In this case the unit shall deliver maximum available active current, limited only by the current limitation of the generating unit. If the resulting active current remains below the current limitation of the generating unit, additional reactive current according to Figure 15 shall be provided”.</p>	Discuss	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Priority
NL-67	1012-1018	4.7.3.2.1		te	<p>“During the provision of additional reactive current it is acceptable to reduce the active current component to maximize reactive current within the apparent current limits of the generation unit. However, the reduction of active current shall be as small as possible.</p> <p>Furthermore the generating plant shall be able to give priority to active current injection. In this case the unit shall deliver maximum available active current, limited only by the current limitation of the generating unit. If the resulting active current remains below the current limitation of the generating unit, additional reactive current according to Figure 15 shall be provided”</p> <p>During the implementation of CNC in Spain, voltage support during faults was discussed in depth and according to the transmission system operator simulations, it is essential to implement a reactive current injection limitation in order to allow an active current component. If this is not foreseen, a general lack of active power from the PPMs may be seen by the system during the fault, which would be very dangerous.</p>	<p>Add the text after line 1011:</p> <p>“The control shall include a limitation for the total reactive current in order to allow an active current component injection. This limitation shall be made by setting A and A' values as defined in figure X:</p>  <p>AND Modify the text:</p> <p>“During the provision of additional reactive current it is acceptable to reduce the active current component to maximize reactive current within the apparent current limits of the generation unit and also taking into account the limitation of the reactive power, if any. However, the reduction of active current shall be as small as possible. Furthermore, by setting A and A' values on Figure X, the generating plant shall be able to give priority to active current injection. In this case the unit shall deliver maximum available active current, limited only by the current limitation of the generating unit. If the resulting active current remains below the current limitation of the generating unit, additional reactive current according to Figure 15 shall be provided”</p>	Discuss	3
BE33	1013			Ed	Uniformity in terms used	Use “ generating unit” instead of “generation unit”	accepted	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-094	1015-1018	4.7.3.2		Technical	Maximum available active current is not clear enough. What happens in case of curtailment?	Change to: "In this case the unit shall deliver maximum prefault active current, limited only by the current...."	rejected it is not clear how fast fault current injection of several 100ms might affect network congestions management	2
DK63	1015-1018	4.7.3.2		te	Maximum available active current is not clear enough. What happens in case of curtailment?	Change to: "In this case the unit shall deliver maximum prefault active current, limited only by the current...."	rejected it is not clear how fast fault current injection of several 100ms might affect network congestions management	2
DE-095	1019-1021	4.7.3.2		Technical	K=0 is not demanded in line 980 and 987	Delete this part	accepted in principle convert to note Note: In case k=0 is configurable it is pointed out, that for k = 0 the active and reactive currents present before the activation of the dynamic reactive current provision are maintained as far as technical feasible; k = 0 does therefore not represent a zero current mode as intended in 4.7.3.1.2.	3
DK64	1019-1021	4.7.3.2		te	K=0 is not demanded in line 980 and 987	Delete this part	see DE-095	3
DE-096	1021	4.7.3.2		Editorial	Chapter 4.7.3.1.2 does not exist	Change to 4.7.3.2.2	see DE-097	3
DE-097	1021	4.7.3.2.1		ed	Link to 4.7.3.1.2 is wrong	Link to 4.7.3.2.2 would be right	accepted	3
DK65	1021	4.7.3.2		ed	Chapter 4.7.3.1.2 does not exist	Change to 4.7.3.2.2	see DE-097	3

MB/ NC	Line numb er	Clause/ Subclau se	Paragr aph/ Figure/ Table	Type of com ment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-098	1028	4.7.3.2.2		Te	An explicit threshold to exit the zero current mode is missing. Based on this description zero current mode might be exited at re-entry into the configured static voltage range, or at re-entry into the continuous operating voltage range clause 4.4.4 as required in the immunity clause 4.5.3	Please specify requested behaviour exactly or make freedom of implementation clear	<p>Accepted in principle</p> <p>Define only activation, recovery above the threshold as fast as possible according to clause 4.5</p> <p>change configuration range to 20%-90%, default 50%</p> <p>Result of Discussion in Germany:</p> <ol style="list-style-type: none"> 1) same threshold for activation and deactivation is used 2) <u>in MV</u> a combination of ZCM <u>and</u> Voltage support is needed. Above the ZCM threshold the unit shall provide fast fault current injection, below the threshold ZCM shall be activated. Same behaviour at return ov voltage. <p>Proposal:</p> <p>Include three additional options in 4.7.4 that are not needed in a default implementation but shall be available if the responsible party request it:</p> <ol style="list-style-type: none"> 1) active power priority 2) limitation of reactive current 3) ZCM: reduce current to zero if voltage falls below configured value <p>Add Note to where these options might be useful or needed</p> <p>Thomas 7.12. Implementation Note: to allow referencing I put the options into a separate subclause</p>	1

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-099	1028	4.7.4		Te	The motivation of this function “zero current mode for converter connected generating plants” is not clear while however the activation of this function without the supervision of the TSO may lead to a transient lack of active power, and to an oscillatory behavior that may be very dangerous.	Remove section 4.7.4 or at least specify that this requirement has to be coordinated with the TSO.	partly accepted refer to relevant party instead of DSO, see also DK4	3
DK66	1028	4.7.4		te	The motivation of this function “zero current mode for converter connected generating plants” is not clear while however the activation of this function without the supervision of the TSO may lead to a transient lack of active power, and to an oscillatory behavior that may be very dangerous.	Remove section 4.7.4 or at least specify that this requirement has to be coordinated with the TSO.	see DE-099	3
EE-68	1028	4.7.4		Te	The motivation of this function “zero current mode for converter connected generating plants” is not clear while however the activation of this function without the supervision of the TSO may lead to a transient lack of active power, and to an oscillatory behavior that may be very dangerous.	Remove section 4.7.4 or at least specify that this requirement has to be coordinated with the TSO.	see DE-099	3
ES-16	1028	4.7.4		Te	The motivation of this function “zero current mode for converter connected generating plants” is not clear while however the activation of this function without the supervision of the TSO may lead to a transient lack of active power, and to an oscillatory behavior that may be very dangerous.	Remove section 4.7.4 or at least specify that this requirement has to be coordinated with the TSO/DSO.	see DE-099	3
NL-68	1028	4.7.4		te	The motivation of this function “zero current mode for converter connected generating plants” is not clear while however the activation of this function without the supervision of the TSO may lead to a transient lack of active power, and to an oscillatory behavior that may be very dangerous.	Remove section 4.7.4 or at least specify that this requirement has to be coordinated with the TSO.	see DE-099	3
DE-100	1029	4.7.3.2.2		Editorial	Chapter 4.7.3.1.1 does not exist	Change to 4.7.3.2.1	see DE-097	3
DK67	1029	4.7.3.2.2		ed	Chapter 4.7.3.1.1 does not exist	Change to 4.7.3.2.1	see DE-097	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-101	1031	4.7.3.2.2		te	As acknowledged in NOTE 2 in 4.7.3.2.1, generating units based on a doubly fed induction machine provide a negative sequence current that cannot be changed. (also see VDE-AR-N 4110)	Add: Generating units based on a doubly fed induction machine can only reduce the positive sequence current below 10 % of the rated current. Negative sequence current shall be tolerated during unbalanced faults. In case this current reduction is not sufficient, the DSO should choose suitable interface protection settings.	Accepted Accepted Thomas. 7.12. Implementaion note: also included in "optional modes" according to DE-098	3
DE-102	1033	4.7.3.2.2		Technical	Zero current mode is not useful in OVRT situations	Delete the second part of the sentence: "The static voltage range shall be adjustable from 80 % to 100 % of U_c for the undervoltage boundary."	Accepted See also DE-098 Thomas. 7.12. Implementaion note: only implemented for -2, as comment does not exist for -1	1
DK68	1033	4.7.3.2.2		te	Zero current mode is not useful in OVRT situations	Delete the second part of the sentence: "The static voltage range shall be adjustable from 80 % to 100 % of U_c for the undervoltage boundary."	see DE-102	3
AT 29	1034 - 1035	4.7.3.2.2	Paragraph 2	te	If a neutral is present the phase to neutral voltage should be observed.	Change as follows: <i>"Each phase to phase voltage or the smallest phase to neutral voltage (if present) shall be evaluated."</i>	accepted align with chapter 4.5	1
GB-14	1036	4.7.3.2.2	Zero current mode for converter connected generating technology	Te	As per 50549-1 comments – item 16 above We need to be careful here. Under the RfG Implementation work Fast Fault Current injection is a very important element which is required to i) inject sufficient fault current during the fault period to retain system voltage, ii) ensure that the voltage profile is as high as possible so that plant does not trip (ie fall below the fault ride through - voltage against time curve and iii) ensure sufficient fault current to drive power system protection. Clearly it is vital that on fault clearance fault current is limited to prevent over voltage transients but this issue needs careful consideration.	By default the function shall be disabled. This shall be ensured at manufacture, unless it is known that the DSO requires it to be set to function.	Noted WG03 agrees with this request and sees it implemented in the current text	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-103	1041	4.7.3.2.2		Editorial	Chapter 4.7.3.1.1 does not exist	Change to 4.7.3.2.1	Accepted	3
DK69	1041	4.7.3.2.2		ed	Chapter 4.7.3.1.1 does not exist	Change to 4.7.3.2.1	see DE-103	3
DE-104	1050	4.7.3.3.		technical	The experience of the FRT test synchronous generator units has shown that the of AVR controller is important for the FRT behaviour and the reactive current reaction of synchronous generator units in special of unsymmetrical fault	Add the following sentence: "Only AVR are permitted, in which the setting values can be defined in a defined manner. In addition, only AVR are allowed, which take into account all three phases. The AVR may change the excitation current during a line fault (additional excitation current) in order to reduce the rotor angle and thus improve the stability of the generating unit. During an unsymmetrical fault and after a fault, the voltage boost by the reactive current supply in the healthy outer conductor (s) must not exceed 5% U_{rated} against the pre-fault voltage. At the latest after 5 s the additional excitation current must have lead back to the normal operation value.	Accepted in principle, Replace: No further requirements for this technology apply. With: The generator excitation control system shall apply reproducible parameterization of set points. It shall be equipped with a three-phase voltage measurement for a reliable detection of asymmetrical faults in the network. In case of a network fault, the excitation control system shall vary the excitation current to contribute in sustaining the voltage and consequently improve the stability of the generating unit.	1

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
GB-64 on -1	1090	4.9.1	Interface protection on General	Te	The RfG does not define interface protection so should this whole section be included?	Remove all requirements that are above and beyond the RfG as they are 'gold plating'	Rejected. Interface protections are absolutely necessary for connection of generators to distribution networks. So this standard has to deal with the subject and define ranges of possible capabilities Settings of interface protections that may have a transborder impact on the power system (e.g. frequency and ROCOF thresholds) are to be decided by, or in agreement with, the relevant TSO	3
AT 31	1093 – 1095	4.9.1	Paragraph 1	ed	Typo	Correct to: “- prevent the power production of the generating plant to causing an overvoltage situation in the distribution network it is connected to to.”	Accepted	3

MB/ NC	Line numb er	Clause/ Subclau se	Paragr aph/ Figure/ Table	Type of com ment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
GB-65 on -1	1109- 1112	4.9.1	Interfac e protecti on Genera l	Te	Yes it is one of the purposes of the interface protection to prevent damage due to auto re-closers which could risk injury or death	Remove this false statement altogether, or clarify that in some countries it is indeed one of the purposes	Partially accepted. Replace lines 1052 to 1055 with : “• prevent damages to the generating unit due to incidents (e.g. short circuits) on the distribution network.” and add the following new paragraph underneath (without bullet point) “Interface protections may contribute to preventing damage to the generating units due to out-of-phase reclosing of automatic reclosing which may happen after some hundreds of ms. However, in some countries some technologies of, generating units are explicitly required to have an appropriate immunity level against the consequences of out-of-phase reclosing.” Correct: asynchronous (automatic) reconnection to out of phase re-closing change in 1039 .This is contributing to prevent damage....	2

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Priority
DE-109	1115-1116	4.9.1		Te	<p>“Therefore, the interface protection system shall comply with the requirements of this European Standard and the configured settings shall comply with the requirements of the DSO.”</p> <p>There is a huge benefit for the system security if the generating modules have wider technical capabilities than the ones defined in the requirements. For this reason, when there is not a technical limitation and where there is not a default setting defined by the DSO or TSO, the settings of the protection functions shall not be understood as the limit of the ranges of the requirements (for example, the undervoltage protection shall not be set taking into account the values of 4.5.3, unless there is a technical limitation for the generating module). Therefore, this should be clearly stated.</p>	<p>Modify sentence: “Therefore, The interface protection system shall comply with the requirements of this European Standard and the configured settings shall comply with the requirements of the DSO. In any case, the technical requirements defined shall be understood as the values for the interface protection system, i.e. where there is a wider technical capability of the generation module, it shall not be withheld by the settings of the protections.”</p>	<p>Partially accepted. Modify sentence as following :</p> <p>“Therefore, The interface protection system shall comply with the requirements of this European Standard and the configured settings shall comply with the requirements of the DSO. In any case, the settings defined shall be understood as the values for the interface protection system, i.e. where there is a wider technical capability of the generation module, it shall not be withheld by the settings of the protections.”</p> <p>Thomas 08.12.Implementation note: make clear, that compliance with the standard is also possible if not all described functions are implemented, but if all functions required form the DSO are available.</p> <p><u>Which functions are implemented in a product shall be stated in the product documentation.</u></p> <p>The interface protection system shall comply with the requirements of this European Standard, <u>the available functions</u> and configured settings shall comply with the requirements of the DSO and the responsible party</p>	2

MB/ NC	Line numb er	Clause/ Subclau se	Paragr aph/ Figure/ Table	Type of com ment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK71	1115- 1116	4.9.1		te	<p>“Therefore, the interface protection system shall comply with the requirements of this European Standard and the configured settings shall comply with the requirements of the DSO.”</p> <p>There is a huge benefit for the system security if the generating modules have wider technical capabilities than the ones defined in the requirements. For this reason, when there is not a technical limitation and where there is not a default setting defined by the DSO or TSO, the settings of the protection functions shall not be understood as the limit of the ranges of the requirements (for example, the undervoltage protection shall not be set taking into account the values of 4.5.3, unless there is a technical limitation for the generating module). Therefore, this should be clearly stated.</p>	<p>Modify sentence: “Therefore, the interface protection system shall comply with the requirements of this European Standard and the configured settings shall comply with the requirements of the DSO. In any case, the technical requirements defined shall be understood as the values for the interface protection system, i.e. where there is a wider technical capability of the generation module, it shall not be withheld by the settings of the protections.”</p>	See DE-109	0
EE-69	1115- 1116	4.9.1		Te	<p>“Therefore, the interface protection system shall comply with the requirements of this European Standard and the configured settings shall comply with the requirements of the DSO.”</p> <p>There is a huge benefit for the system security if the generating modules have wider technical capabilities than the ones defined in the requirements. For this reason, when there is not a technical limitation and where there is not a default setting defined by the DSO or TSO, the settings of the protection functions shall not be understood as the limit of the ranges of the requirements (for example, the undervoltage protection shall not be set taking into account the values of 4.5.3, unless there is a technical limitation for the generating module). Therefore, this should be clearly stated.</p>	<p>Modify sentence: “Therefore, the interface protection system shall comply with the requirements of this European Standard and the configured settings shall comply with the requirements of the DSO. In any case, the technical requirements defined shall be understood as the values for the interface protection system, i.e. where there is a wider technical capability of the generation module, it shall not be withheld by the settings of the protections.”</p>	See DE-109	0

MB/ NC	Line numb er	Clause/ Subclau se	Paragr aph/ Figure/ Table	Type of com ment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
ES-17	1115- 1116	4.9.1		Te	<p>“Therefore, the interface protection system shall comply with the requirements of this European Standard and the configured settings shall comply with the requirements of the DSO.”</p> <p>There is a huge benefit for the system security if the generating modules have wider technical capabilities than the ones defined in the requirements. For this reason, when there is not a technical limitation and where there is not a default setting defined by the DSO or TSO, the settings of the protection functions shall not be understood as the limit of the ranges of the requirements (for example, the undervoltage protection shall not be set taking into account the values of 4.5.3, unless there is a technical limitation for the generating module). Therefore, this should be clearly stated.</p>	<p>Modify sentence: “Therefore, The interface protection system shall comply with the requirements of this European Standard and the configured settings shall comply with the requirements of the DSO. In any case, the technical requirements defined shall be understood as the values for the interface protection system, i.e. where there is a wider technical capability of the generation module, it shall not be withheld by the settings of the protections.”</p>	See DE-109	0
NL-69	1115- 1116	4.9.1		te	<p>“Therefore, the interface protection system shall comply with the requirements of this European Standard and the configured settings shall comply with the requirements of the DSO.”</p> <p>There is a huge benefit for the system security if the generating modules have wider technical capabilities than the ones defined in the requirements. For this reason, when there is not a technical limitation and where there is not a default setting defined by the DSO or TSO, the settings of the protection functions shall not be understood as the limit of the ranges of the requirements (for example, the undervoltage protection shall not be set taking into account the values of 4.5.3, unless there is a technical limitation for the generating module). Therefore, this should be clearly stated.</p>	<p>Modify sentence: “Therefore, The interface protection system shall comply with the requirements of this European Standard and the configured settings shall comply with the requirements of the DSO. In any case, the technical requirements defined shall be understood as the values for the interface protection system, i.e. where there is a wider technical capability of the generation module, it shall not be withheld by the settings of the protections.”</p>	See DE-109	0

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
PL-54	1115-1116	4.9.1		te	<p>“Therefore, the interface protection system shall comply with the requirements of this European Standard and the configured settings shall comply with the requirements of the DSO.”</p> <p>There is a huge benefit for the system security if the generating modules have wider technical capabilities than the ones defined in the requirements. For this reason, when there is not a technical limitation and where there is not a default setting defined by the DSO or TSO, the settings of the protection functions shall not be understood as the limit of the ranges of the requirements (for example, the undervoltage protection shall not be set taking into account the values of 4.5.3, unless there is a technical limitation for the generating module). Therefore, this should be clearly stated.</p>	<p>Modify sentence:</p> <p>“Therefore, The interface protection system shall comply with the requirements of this European Standard and the configured settings shall comply with the requirements of the DSO. In any case, the technical requirements defined shall be understood as the values for the interface protection system, i.e. where there is a wider technical capability of the generation module, it shall not be withheld by the settings of the protections.”</p>	See DE-109	0
GB-15	1117	4.9.1		Te	<p>There is no justification for limiting the incorporation of protection to only micro generation. This will stifle innovation and cost reduction.</p> <p>Note that the UK already allow Generating Units of up to 50kW to have incorporated protection functions for connection to the GB network. This limitation would add considerable costs to Power generation facilities for no valid reason.</p>	Remove the prohibition. Or make it available on a national basis.	<p>Rejected</p> <p>This standard deals with MV connected power plants with power of typically more than 100 kW</p> <p>The possibility to test interface protections is needed</p>	1
GB-16	1136	4.9.2		Ed	“Mounted” is the wrong word	Use “connected”	Accepted	3
PL-55	1166	4.9.3.1	Note 2	ed	See line eg. 613.	Replace the phrase “phase-phase” with the phrase “phase to phase”.	Accepted	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
GB-68 on -1	1174-1176	4.9.3.1		te	<p>The document specifies minimum required accuracy with no requirement at to how often this is updated. This should be significantly faster than the shortest suggested operating time. This is currently possible to be set to 0.1s or 100ms. I would suggest therefore that voltage and frequency values should be updated at least every 50ms conveniently this can be expressed as every 2 cycles.</p> <p>However there are issues around measuring frequency in such a short time so a longer measurement period ought to be allowed for, with measurement periods overlapping to give the required update rate.</p>	<p>Replace line 1174</p> <p>Voltage and Frequency measurements should be updated every 2 cycles or faster, to the protection function with the following accuracies.</p> <p>Add a line after 1176</p> <p>In order to simplify frequency measurements they may be taken over more than 2 cycles. However the maximum number of cycles used for a measurement should not exceed 10 and sufficient overlapping measurements should be taken to ensure that an updated value is provided at least every second cycle.</p>	<p>Rejected</p> <p>The internal process of the protection is not the purpose of this standard.</p>	1
GB-69 on -1	1181-1184	4.9.3.1		te	<p>The proposed disengaging value of 2% to 5% from the operating value is not acceptable for frequency measurements. If a relay picks up at say 51.52 Hz and the disengaging value is 2% less then it will remain engaged if the frequency remains above 50.49Hz. In this condition a short term over frequency as is experienced at fault clearance or prior to the operation of other over frequency response actions, could result in the protection operating after a time delay inappropriately. If the total generation with this facility were sufficiently large it could result in an under frequency event.</p> <p>Suggest that the pick up, drop off ratio for frequency protection is only 0.2Hz or 0.4%. (this is significantly larger than the minimum required accuracy)</p> <p>2% is an appropriate number for voltage.</p> <p>In defining a standard it will be better to give a range and suggest a default setting as is done elsewhere in the document</p> <p>I would suggest 0.2% to 2% for Frequency and 1% to 10% for voltage with default settings of 0.4% and 2%</p>	<p>Change second sentence to read.</p> <p>The range for frequency shall be at least 0.2% to 2% with a default of 0.4% if not specified by the DSO. Maximum step size to be 0.1%</p> <p>The range for voltage shall be at least 1% to 10% with a default of 2% if not specified by the DSO. Maximum step size to be 0.5%</p>	<p>Accepted in principle</p> <p>The interface protection relay shall not conduct continuous starting and disengaging operations. of the interface protection relay. Therefore a reasonable reset ratio shall be implemented which shall not be zero but be below 2% of nominal value for voltage and below 0,2Hz for frequency.</p>	1
PL-56	1182	4.9.3.1		ed	The space is unnecessary.	Delete the space from behind of the abbreviation "DSO".	Accepted	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
AT 32	1185	4.9.3.2	Paragraph	te	Add the possibility to have LVRT supervision type relays	Note: The protection relay shall be capable to input corner points of fault ride through profiles.	Rejected There is no need for such complicated interface protection systems	1
FR 34 on -1	1185	4.9.3.2		Te	The protection should be insensitive to voltage transients	Add a line : "The protection should be insensitive to voltage transients with duration equal or less than 60 ms"	Accepted in principle Add requirement for maximum reset time after line 1176. The maximum reset time shall be 50ms Delete insensitivity in line 1232 and 1251 Thomas 8.12. Implementation note: line number do not fit used as in -1	1
AT 33	1202	4.9.3.3		ed	Typo	Correct from " Thr8eshold " to " Threshold "	Accepted	3
DE-110	1202	4.9.3.3		ed		Threshold	Accepted	3
GB-17	1202	4.9.3.3	Overvoltage Protection	ed	Typo – the word "Threshold" contains a superfluous "8"	Remove the 8.	Accepted	3
PL-57	1202	4.9.3.3		ed	The digit is unnecessary.	Delete digit "8" from the word "Thr8eshold".	Accepted	3
FR 35 on -1	1196	4.9.3.3		Te	The protection should be insensitive to voltage transients	Add a line : "The protection should be insensitive to voltage transients with duration equal or less than 60 ms"	See FR34 on -1	1
DE-111	1218	4.9.3.5		Te	If the DSO/TSO do not specify anything, and the manufacturer choses a non-justified value (making use of clause in line 515: "Where no settings are provided by the DSO, the specified default settings shall be used; if no default settings are provided, it is the responsibility of the producer to choose the settings or to deactivate the function"), it may lead to non-desirable massive disconnection of generation when there is still technical capability.	Add sentence: "If nothing is specified by the DSO or TSO or no setting is provided, and if there is not a technical limitation for the power generating module to withstand the underfrequency, this protection function shall be disabled."	Partly accepted see RO-20	1

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK72	1218	4.9.3.5		te	If the DSO/TSO do not specify anything, and the manufacturer choses a non-justified value (making use of clause in line 515: "Where no settings are provided by the DSO, the specified default settings shall be used; if no default settings are provided, it is the responsibility of the producer to choose the settings or to deactivate the function"), it may lead to non-desirable massive disconnection of generation when there is still technical capability.	Add sentence: "If nothing is specified by the DSO or TSO or no setting is provided, and if there is not a technical limitation for the power generating module to withstand the underfrequency, this protection function shall be disabled."	See DE-111	0
EE-70	1218	4.9.3.5		Te	If the DSO/TSO do not specify anything, and the manufacturer choses a non-justified value (making use of clause in line 515: "Where no settings are provided by the DSO, the specified default settings shall be used; if no default settings are provided, it is the responsibility of the producer to choose the settings or to deactivate the function"), it may lead to non-desirable massive disconnection of generation when there is still technical capability.	Add sentence: "If nothing is specified by the DSO or TSO or no setting is provided, and if there is not a technical limitation for the power generating module to withstand the underfrequency, this protection function shall be disabled."	See DE-111	0
ES-18	1218	4.9.3.5		Te	If the DSO/TSO do not specify anything, and the manufacturer choses a non-justified value (making use of clause in line 515: "Where no settings are provided by the DSO, the specified default settings shall be used; if no default settings are provided, it is the responsibility of the producer to choose the settings or to deactivate the function"), it may lead to non-desirable massive disconnection of generation when there is still technical capability.	Add sentence: "If nothing is specified by the DSO or TSO or no setting is provided, and if there is not a technical limitation for the power generating module to withstand the underfrequency, this protection function shall be disabled."	See DE-111	0

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
NL-70	1218	4.9.3.5		te	If the DSO/TSO do not specify anything, and the manufacturer chooses a non-justified value (making use of clause in line 515: "Where no settings are provided by the DSO, the specified default settings shall be used; if no default settings are provided, it is the responsibility of the producer to choose the settings or to deactivate the function"), it may lead to non-desirable massive disconnection of generation when there is still technical capability.	Add sentence: "If nothing is specified by the DSO or TSO or no setting is provided, and if there is not a technical limitation for the power generating module to withstand the underfrequency, this protection function shall be disabled."	See DE-111	0
PL-58	1218	4.9.3.5		te	If the DSO/TSO do not specify anything, and the manufacturer chooses a non-justified value (making use of clause in line 515: "Where no settings are provided by the DSO, the specified default settings shall be used; if no default settings are provided, it is the responsibility of the producer to choose the settings or to deactivate the function"), it may lead to non-desirable massive disconnection of generation when there is still technical capability.	Add sentence: "If nothing is specified by the DSO or TSO or no setting is provided, and if there is not a technical limitation for the power generating module to withstand the underfrequency, this protection function shall be disabled."	See DE-111	0
GB-70 on -1	1227-1228 Bazertyuiop ^\$3	4.9.3.5	Under frequency protection	Te	The strongly trend is to move away from narrow frequency thresholds which destabilise grids so should this be included?.	Remove it or make it clear that it is undesirable	Rejected Narrow frequency is indeed dangerous for the power system unless it is triggered locally, e.g. upon detection of a fault	3
AT 34	1229-1231	4.9.3.5	Paragraph 4	te	Either the first or the second requirement defined in lines 1229-1231 should activate and deactivate a stage !	Change as follows: <i>"In order to use narrow frequency thresholds for islanding detection (see 4.9.4.3) it may be required to have the ability to activate and deactivate a stage by:</i> - <i>an external signal</i> or - <i>passing the protection threshold on the zero, the negative and/or the positive sequence component of the fundamental voltage."</i>	Accepted	3

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
GB-71 on -1	1230-1231	4.9.3.5	Under frequency protection	Te	This is too vague to be meaningful	Either make it unambiguous or remove it. Do not include any definition that requires the fundamental of the voltage to be evaluated as that requirement has been removed from the RfG implementation	Rejected The wording is actually unambiguous. A local fault detection (positive, negative, zero sequence) may trigger the activation of the narrow frequency range	2
FR 36 on -1	1231	4.9.3.5		Te	The activation of the narrow frequency range may also be activated by the crossing of a ROCOF threshold	Add a bullet point : • passing the protection threshold on the ROCOF	Rejected, Considered for further investigation	2
FR 37 on -1	1232	4.9.3.5		Te	40 ms may be insufficient	Replace 40 ms with 60 ms	See FR 34 on -1	2
GB-72 on -1	1232	4.9.3.5	Under frequency protection	Te	How is this immunity tested?.	Either define the immunity unambiguously or remove it as it to avoid arguments about what it really means	Rejected This question is the subject of EN50549-10 (even if the question is in itself valid))	2
DE-112	1237	4.9.3.6		Te	If the DSO/TSO do not specify anything, and the manufacturer choses a non-justified value (making use of clause in line 515: "Where no settings are provided by the DSO, the specified default settings shall be used; if no default settings are provided, it is the responsibility of the producer to choose the settings or to deactivate the function"), it may lead to non-desirable massive disconnection of generation when there is still technical capability.	Add sentence: "If nothing is specified by the DSO or TSO or no setting is provided, and if there is not a technical limitation for the power generating module to withstand the overfrequency, this protection function shall be disabled."	Partly accepted, See RO 20	1

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK73	1237	4.9.3.6		te	If the DSO/TSO do not specify anything, and the manufacturer choses a non-justified value (making use of clause in line 515: "Where no settings are provided by the DSO, the specified default settings shall be used; if no default settings are provided, it is the responsibility of the producer to choose the settings or to deactivate the function"), it may lead to non-desirable massive disconnection of generation when there is still technical capability.	Add sentence: "If nothing is specified by the DSO or TSO or no setting is provided, and if there is not a technical limitation for the power generating module to withstand the overfrequency, this protection function shall be disabled."	See DE-112	0
EE-71	1237	4.9.3.6		Te	If the DSO/TSO do not specify anything, and the manufacturer choses a non-justified value (making use of clause in line 515: "Where no settings are provided by the DSO, the specified default settings shall be used; if no default settings are provided, it is the responsibility of the producer to choose the settings or to deactivate the function"), it may lead to non-desirable massive disconnection of generation when there is still technical capability.	Add sentence: "If nothing is specified by the DSO or TSO or no setting is provided, and if there is not a technical limitation for the power generating module to withstand the overfrequency, this protection function shall be disabled."	See DE-112	0
ES-19	1237	4.9.3.6		Te	If the DSO/TSO do not specify anything, and the manufacturer choses a non-justified value (making use of clause in line 515: "Where no settings are provided by the DSO, the specified default settings shall be used; if no default settings are provided, it is the responsibility of the producer to choose the settings or to deactivate the function"), it may lead to non-desirable massive disconnection of generation when there is still technical capability.	Add sentence: "If nothing is specified by the DSO or TSO or no setting is provided, and if there is not a technical limitation for the power generating module to withstand the overfrequency, this protection function shall be disabled."	See DE-112	0

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
NL-71	1237	4.9.3.6		te	If the DSO/TSO do not specify anything, and the manufacturer choses a non-justified value (making use of clause in line 515: "Where no settings are provided by the DSO, the specified default settings shall be used; if no default settings are provided, it is the responsibility of the producer to choose the settings or to deactivate the function"), it may lead to non-desirable massive disconnection of generation when there is still technical capability.	Add sentence: "If nothing is specified by the DSO or TSO or no setting is provided, and if there is not a technical limitation for the power generating module to withstand the overfrequency, this protection function shall be disabled."	See DE-112	0
PL-59	1237	4.9.3.6		te	If the DSO/TSO do not specify anything, and the manufacturer choses a non-justified value (making use of clause in line 515: "Where no settings are provided by the DSO, the specified default settings shall be used; if no default settings are provided, it is the responsibility of the producer to choose the settings or to deactivate the function"), it may lead to non-desirable massive disconnection of generation when there is still technical capability.	Add sentence: "If nothing is specified by the DSO or TSO or no setting is provided, and if there is not a technical limitation for the power generating module to withstand the overfrequency, this protection function shall be disabled."	See DE-112	0
<i>GB-73 on -1</i>	1246	4.9.3.6	Over frequency protection	Te	The trend is away from narrow frequency thresholds which destabilise grids so should this be included?.	Remove it or make it clear that it is undesirable	Rejected Narrow frequency is indeed dangerous for the power system unless it is triggered locally, e.g. upon detection of a fault See <i>GB-70 on -1</i>	3
<i>GB-74 on -1</i>	1246	4.9.3.6	Over frequency protection	Te	This is too vague to be meaningful	Either make it unambiguous or remove it. Do not include any definition that requires the fundamental of the voltage to be evaluated as that requirement has been removed from the RfG implementation	Rejected See <i>GB-71 on -1</i>	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
AT 35	1248-1250	4.9.3.6	Paragraph 4	te	Either the first or the second requirement defined in lines 1248-1250 should activate and deactivate a stage !	Change as follows: <i>"In order to use narrow frequency thresholds for islanding detection (see 4.9.4.3) it may be required to have the ability to activate and deactivate a stage by:</i> <ul style="list-style-type: none"> - <i>an external signal</i> or - <i>passing the protection threshold on the zero, the negative and/or the positive sequence component of the fundamental voltage."</i> 	Accepted	3
FR 38 on -1	1250	4.9.3.6		Te	The activation of the narrow frequency range may also be activated by the crossing of a ROCOF threshold	Add a bullet point : <ul style="list-style-type: none"> • passing the protection threshold on the ROCOF 	Rejected Noted For further consideration	2
FR 39 on -1	1251	4.9.3.6		Te	40 ms may be insufficient	Replace 40 ms with 60 ms	See FR 34 on -1	2
GB-75 on -1	1251	4.9.3.6	Over frequency protection	Te	How is this immunity tested?.	Either define the immunity unambiguously or remove it as it to avoid arguments about what it really means	Rejected This question is the subject of EN50549-10 (even if the question is in itself valid))	2
AT 36	1254 - 1261	4.9.3.7		te	The mention of the "positive sequence undervoltage protection" provides no additional benefit for this document, because it is rarely used.	Delete item 4.9.3.7.	Rejected This feature is necessary	3
AT 37	1262 - 1269	4.9.3.8		te	The mention of the "negative sequence overvoltage protection" provides no additional benefit for this document, because it is rarely used.	Delete item 4.9.3.8.	Rejected This feature is necessary	3
DE-113	1266	4.9.3.8		Technical	The threshold for negative sequence overvoltage protection doesn't make sense	In normal condition the negative sequence is 0. Please adjust the threshold	Accepted Write : "threshold (1-100)% U _n adjustment by steps of 1% U _n "	3
DK74	1266	4.9.3.8		te	A threshold range of 20-100 % U _n doesn't make sense for negative sequence overvoltage protection. In normal grid condition the negative sequence voltage is around 0 % U _n .	"Threshold (0-80) % U _n adjustment by steps of 1 % U _n "	See DE-113	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
AT T38	1270 - 1276	4.9.3.9		te	The mention of the “zero sequence overvoltage protection” provides no additional benefit for this document, because it is rarely used.	Delete item 4.9.3.9.	Rejected This feature is necessary	3
FR 40 on -1	1276	4.9.3.10		Te	ROCOF protection may be used	Add a paragraph 4.9.3.10 “ROCOF protection” “The ROCOF might be configured to operate the interface protection and/or to change the narrow frequency band according to 4.9.4.3. - Threshold in the range [0-1 Hz/s] - Frequency at which the ROCOF is measured [47-52 Hz] - Operate time : [0-1s]	Rejected For the time being we do not have a clear view. To be considered for future work	1
PL-60	1280	4.9.4.1		ge	The maximum allowable island detection time is not determined in the records on <i>rules of operation of anti-islanding protections</i> .	<i>We propose to add the following sentence after the first sentence in § 4.9.4.1:</i> Detection of islanding situation and disconnection of generating units by means of the interface switch shall be completed within 5 seconds.	Rejected, As we do not specify a method it is difficult to specify a time. As EN62116 is referenced, for PV inverters, there is a time specified there	2
GB-76 on -1	1287	4.9.4.1	Means to detect island situation General	Te	VS is missed from the list then mentioned in the next paragraph.	Correct the list or the paragraph to be consistent	Accepted Add between lines 1286 and 1287 : • vector shift	3
DE-114	1287	4.9.4.1		Technical	Vector jump is not named in the list above	Please add vector jump to the list or delete it here	See GB-76 on -1	3
DK75	1287	4.9.4.1		te	Vector jump is not named in the list above	Please delete vector jump here	See GB-76 on -1	3
FR 41 on-1	1296	4.9.4.3		Te	Take into account new 4.9.3.10 paragraph	Write “...correlating its activation with one of the protection functions in 4.9.3.7, 4.9.3.8, 4.9.3.9 or 4.9.3.10”	Accepted Thomas 8.12. as FR 38 on-1 was rejected, this change is not needed, not conducted	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK76	1299-1300	4.9.4.3		ed	NOTE An additional gateway to ensure communication with the DSO communication system might be required. This has to be introduced after a certain number is already installed – very expensive requirement.	Please reconsider the requirement and align it with EU regulation 2016/631.	Rejected Where is the contradiction with EU regulation 2016/631 ? (for category B modules art 14 5. (d) (i) : power generating facilities shall be capable of exchanging information with the relevant system operator or the relevant TSO in real time or periodically with time sampling, as specified by the relevant system operator or the relevant TSO")	3
EE-74	1299-1300	4.9.4.3		ed	NOTE An additional gateway to ensure communication with the DSO communication system might be required. This has to be introduced after a certain number is already installed – very expensive requirement.	Please reconsider the requirement and align it with EU regulation 2016/631.	See DK-76	0
NL-74	1299-1300	4.9.4.3		ed	NOTE An additional gateway to ensure communication with the DSO communication system might be required. This has to be introduced after a certain number is already installed – very expensive requirement.	Please reconsider the requirement and align it with EU regulation 2016/631.	See DK-76	0
PL-61	1299-1300	4.9.4.3		ed	NOTE An additional gateway to ensure communication with the DSO communication system might be required. This has to be introduced after a certain number is already installed – very expensive requirement.	Please reconsider the requirement and align it with EU regulation 2016/631.	See DK-76	0
DE-103 on -1	1303	4.9.5		ed	"and/or" is bad style and ambiguous.	Modify: These inputs can for example be used to allow transfer trip or the switching to the narrow frequency band.	Accepted	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
EE-73	1318-1339	4.10.2, 4.10.3			Automatic reconnection after tripping. It is not in line with table 2	Please align with table 2.	Reject Table 2 is "Active power response to over frequency. This is not related to tripping. Reconnection is almost independent of this. Especially the default settings do fit together as the reconnection frequency 50,10Hz is below the default P(f) threshold of 50,2Hz	2
NL-73	1318-1339	4.10.2, 4.10.3			Automatic reconnection after tripping. It is not in line with table 2	Please align with table 2.	See EE-73	0
NO 13	1321			te	As frequency excursions above 50,1 Hz are not infrequent in the Nordic system, reconnection should be allowed up to 50,2 Hz , but generation should only be allowed below 50,1 Hz	Frequency range: $47,50 \text{ Hz} \leq f \leq 50,20 \text{ Hz}$	Accept in principle: In that case it is proposed to set the NO default to 50.2 National Annex Additional behaviour between 50,1 and 50,2 gets unnecessary complicated.	
DE-115	1323	4.10.2		Te	"Minimum observation time: 60 s." Disconnection by tripping may have been caused by a larger system disturbance. An observation time of 60s is considered to be too short to assume that the system has returned to a safe and stable state to allow automatic reconnection of a larger number of power generating modules. A longer observation time is needed.	"Minimum observation time: 10 min. "	Reject GB wants 20sec DE wants 10min DE wants 3 min So 60sec seems a reasonable default	1
DE-116	1323	4.10.2		Te	"Minimum observation time: 60 s." Disconnection by tripping may have been caused by a larger system disturbance. An observation time of 60s is considered to be too short to assume that the system has returned to a safe and stable state to allow automatic reconnection of a larger number of power generating modules. A longer observation time is needed.	"Minimum observation time: 10 min. "	See DE-115	0

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK77	1323	4.10.2		te	"Minimum observation time: 60 s." Disconnection by tripping may have been caused by a larger system disturbance. An observation time of 60s is considered to be too short to assume that the system has returned to a safe and stable state to allow automatic reconnection of a larger number of power generating modules. A longer observation time is needed.	"Minimum observation time: 3 min. "	See DE-115	0
EE-72	1323	4.10.2		Te	"Minimum observation time: 60 s." Disconnection by tripping may have been caused by a larger system disturbance. An observation time of 60s is considered to be too short to assume that the system has returned to a safe and stable state to allow automatic reconnection of a larger number of power generating modules. A longer observation time is needed.	"Minimum observation time: 10 min. "	See DE-115	0
NL-72	1323	4.10.2		te	"Minimum observation time: 60 s." Disconnection by tripping may have been caused by a larger system disturbance. An observation time of 60s is considered to be too short to assume that the system has returned to a safe and stable state to allow automatic reconnection of a larger number of power generating modules. A longer observation time is needed.	"Minimum observation time: 10 min. "	See DE-115	0
DK78	1328	4.10.2		te	It should be specified that the randomized value shall be uniformly distributed.	Specify that the randomized value shall be uniformly distributed.	accept	3
DE-117	1332	4.10.3		Te	"Frequency range: 47,50 Hz ≤ f ≤ 50,10 Hz" Starting a power generating module shall be admissible up to the maximum frequency of normal operation.	"Frequency range: 47,50 Hz ≤ f ≤ 50,20 Hz "	Accept With different settings for "after tripping" and "startup" the following sentence should be added: In case Automatic reconnection after tripping and Starting to generate power are not distinct, the tighter range and the start-up gradient shall be used. Thomas Implementation note: integrated in 4.10.1	1

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK81	1332	4.10.3		te	"Frequency range: 47,50 Hz ≤ f ≤ 50,10 Hz" Starting a power generating module shall be admissible up to the maximum frequency of normal operation.	Please reconsider the requirement and align it with EU regulation 2016/631.	Noted Implementation note. Text of CD was in line with ENTSO-E workshop presentation https://www.entsoe.eu/Documents/Events/2017/171004_WS_Frequency_Stability_Parameters.pdf	1
EE-75	1332	4.10.3		Te	"Frequency range: 47,50 Hz ≤ f ≤ 50,10 Hz" Starting a power generating module shall be admissible up to the maximum frequency of normal operation.	"Frequency range: 47,50 Hz ≤ f ≤ 50,20 Hz "	See DE-117	0
NL-75	1332	4.10.3		te	"Frequency range: 47,50 Hz ≤ f ≤ 50,10 Hz" Starting a power generating module shall be admissible up to the maximum frequency of normal operation.	"Frequency range: 47,50 Hz ≤ f ≤ 50,20 Hz "	See DE-117	0
PL-62	1332	4.10.3		te	"Frequency range: 47,50 Hz ≤ f ≤ 50,10 Hz" Starting a power generating module shall be admissible up to the maximum frequency of normal operation.	"Frequency range: 47,50 Hz ≤ f ≤ 50,20 Hz "	See DE-117	0
DK79	1333	4.10.3		te	Voltage ranges in 4.10.2 and 4.10.3 should be the same.	Harmonize voltage ranges of 4.10.2 and 4.10.3.	Accepted see GB-18	2
GB-18	1333	4.10.3	1	Te	The minimum voltage range is stated at 85% which is not aligned with the rest of the document which states 90%	Change the value to 90%	Accepted?	1
DK80	1335	4.10.3		te	The reconnection requirements should be harmonized with those of 4.10.2.	Remove first sentence and replace it with the text in lines 1324-1328.	rejected: there is no need for a ramp if the generators start due to normal operation. Make clear by default, there is no ramp rate limitation	1
DE-118	1341	4.10.4		Editorial	n in plant is missing	"Synchronizing a generating plant/unit..."	Accepted	3
DK82	1341	4.10.4		ed	n in plant is missing	"Synchronizing a generating plant/unit..."	See DE-118	0
GB-19	1341	4.10.4	1	Ed	Typo: plat	plant	See DE-118	0

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
BE30*	1353	4.11.2		Ed	Use of the defined terms. To identify the unit, plant, module etc use the word ' generating ' instead of 'generation' Do not use "power generating unit/module/plant" but just "generating unit/module/plant" as defined. The information that it is about electrical power is already covered in the definition of the generating unit.	Replace ' power generation plant/unit' by ' generating plant/unit'	Accept	0
DE-119	1354	4.11.2		Technical	"Nominal power" is not defined	Use "design active power" instead	Accepted in principle, add IEV 151-16-09 nominal value to definitions IEV number on 3.3.3 is not correct rated current is 314 Implementation note: IEV reference of rated current deleted. IEV has no suitable rated current definition for us.	3
DK83	1354	4.11.2		te	"Nominal power" is not defined	Use "design active power" instead	See DE-119	0
DE-120	1355 – 1356	4.11.2		Te	"Generating plants are permitted to disconnect from the network at a set value below 15 % of nominal power." The LVRT capability shall not be impaired.	"Generating plants are permitted to disconnect from the network at a set value below 15 % of nominal power notwithstanding the capabilities according to 4.5.3.2 and 4.5.3.3. "	Accept in principle (See RO-41 in "-1")	0
EE-76	1355 – 1356	4.11.2		Te	"Generating plants are permitted to disconnect from the network at a set value below 15 % of nominal power." The LVRT capability shall not be impaired.	"Generating plants are permitted to disconnect from the network at a set value below 15 % of nominal power notwithstanding the capabilities according to 4.5.3.2 and 4.5.3.3. "	Accept in principle (See RO-41 in "-1")	0
NL-76	1355 – 1356	4.11.2		te	"Generating plants are permitted to disconnect from the network at a set value below 15 % of nominal power." The LVRT capability shall not be impaired.	"Generating plants are permitted to disconnect from the network at a set value below 15 % of nominal power notwithstanding the capabilities according to 4.5.3.2 and 4.5.3.3. "	Accept in principle (See RO-41 in "-1")	0
PL-63	1355 – 1356	4.11.2		te	"Generating plants are permitted to disconnect from the network at a set value below 15 % of nominal power." The LVRT capability shall not be impaired.	"Generating modules are permitted to disconnect from the network at a set value below 15 % of nominal power not withstanding the capabilities according to 4.5.3.2 and 4.5.3.3."	Accept in principle (See RO-41 in "-1")	0

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
FR 30	1356	4.11.2		te	Setpoint of active power under 15% of rated power is not possible for combustion engine (because damage should occurs with glazing of cylinders).	Setpoint should be 30% as a minimum	Accept in principle (See RO-41 in "-1")	0
DK85	1357 – 1358	4.11.2		ge	“When the requested power reduction with the required accuracy and within the requested settling time is technically not feasible for a generating technology, the generating unit/plant shall disconnect.” Being not able to reduce active power output is not compatible with NC RfG. In such cases the power generating module operator shall apply for derogation from this requirement. Based on this application it will be decided, if instead a disconnection is admissible. Allowing for disconnection without a derogation is not in line with NC RfG.	Remove sentence.	Accepted in principle. (See DE-107 in "-1")	0
EE-77	1357 – 1358	4.11.2		Ge	“When the requested power reduction with the required accuracy and within the requested settling time is technically not feasible for a generating technology, the generating unit/plant shall disconnect.” Being not able to reduce active power output is not compatible with NC RfG. In such cases the power generating module operator shall apply for derogation from this requirement. Based on this application it will be decided, if instead a disconnection is admissible. Allowing for disconnection without a derogation is not in line with NC RfG.	Remove sentence.	Accepted in principle. (See DE-107 in "-1")	0
NL-77	1357 – 1358	4.11.2		ge	“When the requested power reduction with the required accuracy and within the requested settling time is technically not feasible for a generating technology, the generating unit/plant shall disconnect.” Being not able to reduce active power output is not compatible with NC RfG. In such cases the power generating module operator shall apply for derogation from this requirement. Based on this application it will be decided, if instead a disconnection is admissible. Allowing for disconnection without a derogation is not in line with NC RfG.	Remove sentence.	Accepted in principle. (See DE-107 in "-1")	0

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
PL-64	1357 – 1358	4.11.2		ge	<p>“When the requested power reduction with the required accuracy and within the requested settling time is technically not feasible for a generating technology, the generating unit/plant shall disconnect.”</p> <p>Being not able to reduce active power output is not compatible with NC RfG. In such cases the power generating module operator shall apply for derogation from this requirement. Based on this application it will be decided, if instead a disconnection is admissible. Allowing for disconnection without a derogation is not in line with NC RfG.</p>	Remove sentence.	Accepted in principle. (See DE-107 in “-1”)	0
DE-121	1357 – 1359	4.11.2		Ge	<p>“When the requested power reduction with the required accuracy and within the requested settling time is technically not feasible for a generating technology, the generating unit/plant shall disconnect.”</p> <p>Being not able to reduce active power output is not compatible with NC RfG. In such cases the power generating module operator shall apply for derogation from this requirement. Based on this application it will be decided, if instead a disconnection is admissible. Allowing for disconnection without a derogation is not in line with NC RfG.</p>	Remove sentence.	Accepted in principle. (See DE-107 in “-1”)	0
DE-122	1360 – 1363	4.12		Ge	<p>“Generating plants whose power is above a threshold to be determined by the DSO shall have the capacity to be monitored by the DSO or TSO control centre or control centres as well as receive operation parameter settings for the functions specified in this European Standard from the DSO or TSO control centre or control centres.” According to NC RfG Art. 14(5)(d) information exchange requirements shall apply uniformly to type B generating modules.</p>	<p>“Type B Generating plants whose power is above a threshold to be determined by the DSO shall have the capacity to be monitored by the DSO or TSO control centre or control centres as well as receive operation parameter settings for the functions specified in this European Standard from the DSO or TSO control centre or control centres.”</p>	Partly accepted, See also NL03 Replace DSO in line 1360 by “DSO in coordination with the responsible party”	2
DK86	1360 – 1363	4.12		ge	<p>“Generating plants whose power is above a threshold to be determined by the DSO shall have the capacity to be monitored by the DSO or TSO control centre or control centres as well as receive operation parameter settings for the functions specified in this European Standard from the DSO or TSO control centre or control centres.” According to NC RfG Art. 14(5)(d) information exchange requirements shall apply uniformly to type B generating modules.</p>	<p>“Generating plants whose power is above a threshold to be determined by the DSO shall have the capacity to be monitored by the DSO or TSO control centre or control centres as well as receive operation parameter settings for the functions specified in this European Standard from the DSO or TSO control centre or control centres.”</p>	See DE-122	0

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
EE-78	1360 – 1363	4.12		Ge	“Generating plants whose power is above a threshold to be determined by the DSO shall have the capacity to be monitored by the DSO or TSO control centre or control centres as well as receive operation parameter settings for the functions specified in this European Standard from the DSO or TSO control centre or control centres.” According to NC RfG Art. 14(5)(d) information exchange requirements shall apply uniformly to type B generating modules.	“Type B Generating plants whose power is above a threshold to be determined by the DSO shall have the capacity to be monitored by the DSO or TSO control centre or control centres as well as receive operation parameter settings for the functions specified in this European Standard from the DSO or TSO control centre or control centres.”	See DE-122	0
NL-78	1360 – 1363	4.12		ge	“Generating plants whose power is above a threshold to be determined by the DSO shall have the capacity to be monitored by the DSO or TSO control centre or control centres as well as receive operation parameter settings for the functions specified in this European Standard from the DSO or TSO control centre or control centres.” According to NC RfG Art. 14(5)(d) information exchange requirements shall apply uniformly to type B generating modules.	“Type B Generating plants whose power is above a threshold to be determined by the DSO shall have the capacity to be monitored by the DSO or TSO control centre or control centres as well as receive operation parameter settings for the functions specified in this European Standard from the DSO or TSO control centre or control centres.”	See DE-122	0
PL-65	1360 – 1363	4.12		ge	“Generating plants whose power is above a threshold to be determined by the DSO shall have the capacity to be monitored by the DSO or TSO control centre or control centres as well as receive operation parameter settings for the functions specified in this European Standard from the DSO or TSO control centre or control centres.” According to NC RfG Art. 14(5)(d) information exchange requirements shall apply uniformly to type B generating modules.	“Type B Generating modules whose power is above a threshold to be determined by the DSO shall have the capacity to be monitored by the DSO or TSO control centre or control centres as well as receive operation parameter settings for the functions specified in this European Standard from the DSO or TSO control centre or control centres.”	See DE-122	0
DK87	1364-1366	4.12		ge	<p>“The monitoring may be used by the DSO for the operation of its network or transmitted further to the TSO. Similarly orders transmitted by the DSO may have been previously given by the TSO to the DSO.”</p> <p>This sentence is note related to the technical capabilities of generators, but to operational agreements and information exchange structure agreed at national level. Therefore it is not under the scope of this European Standard.</p>	Remove sentence	Accept	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
EE-79	1364-1366	4.12		Ge	<p>“The monitoring may be used by the DSO for the operation of its network or transmitted further to the TSO. Similarly orders transmitted by the DSO may have been previously given by the TSO to the DSO.”</p> <p>This sentence is note related to the technical capabilities of generators, but to operational agreements and information exchange structure agreed at national level. Therefore it is not under the scope of this European Standard.</p>	Remove sentence	See DK87	0
ES-20	1364-1366	4.12		Ge	<p>“The monitoring may be used by the DSO for the operation of its network or transmitted further to the TSO. Similarly orders transmitted by the DSO may have been previously given by the TSO to the DSO.”</p> <p>This sentence is note related to the technical capabilities of generators, but to operational agreements and information exchange structure agreed at national level. Therefore it is not under the scope of this European Standard.</p>	Remove sentence.	See DK87	0
NL-79	1364-1366	4.12		ge	<p>“The monitoring may be used by the DSO for the operation of its network or transmitted further to the TSO. Similarly orders transmitted by the DSO may have been previously given by the TSO to the DSO.”</p> <p>This sentence is note related to the technical capabilities of generators, but to operational agreements and information exchange structure agreed at national level. Therefore it is not under the scope of this European Standard.</p>	Remove sentence	See DK87	0

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
PL-66	1364-1366	4.12		ge	<p>“The monitoring may be used by the DSO for the operation of its network or transmitted further to the TSO. Similarly orders transmitted by the DSO may have been previously given by the TSO to the DSO.”</p> <p>This sentence is note related to the technical capabilities of generators, but to operational agreements and information exchange structure agreed at national level. Therefore it is not under the scope of this European Standard.</p>	Remove sentence	See DK87	0
NO 14	1391	Annex A		ed	In the informative annex, many “shall” requirements are stated. In an annex, maybe “should” is more pertinent?	Replace shall with should.	<p>Accepted, Rename to “interconnection guidance” Add after line 1300:</p> <p>As this annex is informative, the requirements below are not part of this EN, but are requirements typically found in national grid connection rules.</p>	2
DK88	1404-1405	A.2		te	the connection of the generating plant shall not cause a voltage rise exceeding the voltage limits at any point within the network	the connection of the power generating plant shall not cause a voltage rise exceeding the voltage limits at any point within the network	<p>Rejected There is no advantage seen by adding the word “power” to the See decision on RO-13</p>	3
EE-80	1429-1430	A.1		ed	the connection of the generating plant shall not cause a voltage rise exceeding the voltage limits at any point within the network	the connection of the power generating plant shall not cause a voltage rise exceeding the voltage limits at any point within the network	See DK88	0
NL-80	1429-1430	A.1		ed	the connection of the generating plant shall not cause a voltage rise exceeding the voltage limits at any point within the network	the connection of the power generating plant shall not cause a voltage rise exceeding the voltage limits at any point within the network	See DK88	0

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
PL-67	1429-1430 1402-1403	A.1 A2.		ed	Annex A The European Standards should specify the technical requirements. Other aspects based on the local law. It is not necessary add the information in Annex A	Remove this annex.	Partly accepted, WG03 considers the contend helpful, but agrees that it has to be clear that this is not a requirement Rename to "interconnection guidance" Add after line 1300: As this annex is informative, the requirements below are not part of this EN, but are requirements typically found in national grid connection rules.	
DK89	1431	A.2		te	contribution of the generating plant to short circuit current	contribution of the power generating plant to short circuit current	See DK88	0
DK90	1442-1443	A.2		te	a list of measurement and control signals to be exchanged between the DSO and power generating unit.	a list of measurement and control signals to be exchanged between the DSO/TSO and generating plant.	accepted	3
EE-81	1460	A.2		ed	contribution of the generating plant to short circuit current	contribution of the power generating plant to short circuit current	See DK88	0
NL-81	1460	A.2		ed	contribution of the generating plant to short circuit current	contribution of the power generating plant to short circuit current	See DK88	0
EE-82	1472-1473	A.2		ed	a list of measurement and control signals to be exchanged between the DSO and power generating unit.	a list of measurement and control signals to be exchanged between the DSO and generating plant, if the DSO is entitled by the national regulatory agency to ask for such exchange.	See DK90	0
NL-82	1472-1473	A.2		ed	a list of measurement and control signals to be exchanged between the DSO and power generating unit.	a list of measurement and control signals to be exchanged between the DSO and generating plant, if the DSO is entitled by the national regulatory agency to ask for such exchange.	See DK90	0
PL-68	2000	Annex B	Table B.2, Line "T4-15"	ed	To improve readability.	In the 5 th column insert a space into the phrase "100 ms (as fast ...).	Accepted	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
AT 39	3000	Annex C	Table C.1	ed	In rows 1 and 2 the frequency parameters are wrongly written; it should not be 47-5 Hz and 48-5 Hz but 47,5 Hz and 48,5 Hz	Correct in In rows 1 and 2 47,0 – 47,5 Hz –Duration → 47,0 – 47,5 Hz –Duration 47,5 – 48,5 Hz –Duration → 47,5 – 48,5 Hz -Duration	Accepted, Gunnar implementation Note: and add spaces accordingly, use long dashes instead of short hyphens, lower indices, use of capital letters	3
AT 40	3000	Annex C,	Table C.1 4.5.2	te	In row 10, for ROCOF there is only a default value of 2.5Hz/s. The time window is missing. See AT 07	Include time window of 5 cycles.	Rejected The time window is not a configurable parameter	3
AT 41	3000	Annex C	Table C.1	te	In table row 21 (Threshold frequency for power response to underfrequency) a value range of 49,8 Hz to 46 Hz is quoted, but according to chapter 4.6.2, line 777, the value range shall be 49,8 – 49,5 Hz.	Change value range from 49,8 – 46 Hz to 49,8 – 49,5 Hz	Accepted in principle Keep 46 Hz here, but add in 4.6.2 When applying active power response to underfrequency, the frequency threshold f_1 should be set to a value from 49,8 Hz up to 49,5 Hz. Setting the frequency threshold f_1 to 46 Hz is considered as deactivating this function. Thomas Implementation Note: added as note as in 4.6.1	2
AT 42	3000	Annex C	Table C.1	te	In table row 49 (Overvoltage threshold stage 2) a value range of 1 – 1,2 is quoted, but according to chapter 4.9.3.3, line 1205, the value range shall be 1 – 1,3 Hz.	Change value range from 1 – 1,2 to 1 – 1,3	Accepted	3
DE-123	3000	Annex C	Table C.1	te	The intentional delay contradicts the RfG requirement in Article 13(2)(e) of providing active power reduction “as fast as possible”	Remove line referring to 4.6.1 A “intentional delay”	To be aligned with the decision taken on intentional delay in 4.6.1 and 4.6.2	1
DE-124	3000	Annex C	Table C.1	te	The intentional delay contradicts the RfG requirement in Article 13(2)(e) of providing active power reduction “as fast as possible”	Remove line referring to 4.6.2 n.a “Intentional delay”	See DE-123	0

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-125	3000	Annex C			Minutes of WG03 Meeting on 28 th June 2017 states that "A detailed list of WG03s understanding of cross border relevant topics in EN50549 is included in Annex C of EN50549-2" This is not the case and it is not stated here.		Noted RfG relevant topics stated in annex C column Ref. Proposed change: add after 1364 If n.a. is set, this parameter is: not applicable for 2016/631, but is introduce into EN50549-X for local DSO network management reasons and are not understood as cross border issues	3
FR 31	3000	Annex C + 4.4.2 to 4.12	Table C.1 + 4.4.2 to 4.12	te	All values given shall comply with the value ranges specified in the EU regulation which is not the case for the selectable ranges neither the default values given in the table.	Please correct the values in table as well as the various clauses affected.	Accepted in principle but unclear comment. The stated ranges and defaults are a repetition of the text in clause 4. It is the intention of WG03 to be in line with all possible implementations of RfG and additionally include further local, non-cross border needs. We expect the general parameter range to be in line with RfG. If a specific parameter is not correct, please point out, we will align accordingly	2
GB-20	3000	Annex C – Parameter Table		te	Unclear what value this table adds as default values are inevitably at odds with National selections. Would be of value if it included all known National selections but suggest it is best removed altogether.		Rejected This table is a tool to provide information on the national requirements in comparison with the default values of this standard. This can be of help in the conformity assessment process or when reviewing the default values of the standard.	2
PL-69	3000	Annex C	Table C.1	ed	Conformity with adopted convention	Insert a space between the numbers and units.	Accepted	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
PL-70	3000	Annex C	Table C.1 "Subclause 4.4.3"	ed	Orthographical correction.	Replace the word "underfrequence" with the word "underfrequency".	Accepted	3
PL-71	3000	Annex C	Table C.1 "Subclause 4.6.2"	ed	The dot is unnecessary.	Delete the dot from left enquiry.	Unclear comment Add dot to "n.a." where missing	3
DE-002	4000	Annex D		ge	See comment Westnetz to lines 94 – 95.	List of national requirements applicable for Generating plants -This Annex provides an overview of further national requirements applicable for generating plants. Generating plants are expected to be required to comply with these national requirements. At the time being national deviations may be given by national connection requirements, especially in countries with high density of DER. European consolidation will follow step by step in this annex.	rejected, with the changes according DE-001 it seems sufficiently clear that national requirements must be complied with. This is the case independent of the density of DER in this member state	3
DE-126	4000	Annex D		Technical	VDE-AR-N 4105 is only for low voltage	Delete it from the list	accepted	3
DK84	4000	Annex D		te	VDE-AR-N 4105 is only for low voltage	Delete it from the list	See DE-126	3

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK91	4000	Annex D	Table	te	<p>What is the aim of Annex D? All European countries have national requirements for grid connection of power generating units as of today. The national requirements have higher priority than a product standard as the present document is aiming to provide. What is the real value for the reader to know about the various requirements in each country? Typically the information is outdated before the standard will be published.</p> <p>The present table has absolute no value if not all countries are listed and it's discussable if any value at all.</p>	<p>Complete the Annex D table with references to documents from all European countries alternatively remove the Annex.</p> <p>The latest action is preferred.</p>	<p>partly accepted, WG03 requested from NCs to provide information about national documents, unfortunately not all NCs responded, including DK.</p> <p>check with ENTSO-E if information about active library might be inserted here as well Thomas to check with Ioannis if we can put a reference to the active library and how this could look like</p> <p>Add in second paragraph that some information might be outdated</p> <p>Add a paragraph that this list is incomplete, not all CENELEC Members provided information for this annex</p>	1
EE-83	4000	Annex D	Table	te	<p>What is the aim of Annex D? All European countries have national requirements for grid connection of power generating units as of today. The national requirements have higher priority than a product standard as the present document is aiming to provide. What is the real value for the reader to know about the various requirements in each country? Typically the information is outdated before the standard will be published.</p> <p>The present table has absolute no value if not all countries are listed and it's discussable if any value at all.</p>	<p>Complete the Annex D table with references to documents from all European countries with links to the websites of the NRA, TSO or DSO, alternatively remove the Annex.</p> <p>The latest action is preferred.</p>	see DK91	0
IT02	4000		Annex D	te	Please include in the table the following documents in force in Italy: CEI 0-16 and CEI 0-21		accepted	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3				
LVS	4000	Annex D		ge	We propose to include information attached in Proposed change section to the table "List of national requirements applicable for Generating plants"	<table border="1"> <tr> <td>Country</td> <td>Applicable Documents</td> </tr> <tr> <td>Latvia</td> <td>Sabiedrisko pakalpojumu regulēšanas komisijas padomes noteikumi "Sistēmas pieslēguma noteikumi elektroenerģijas ražotājiem" (Regulations for a system connection for electricity producers, issued by national Public utilities commission)</td> </tr> </table>	Country	Applicable Documents	Latvia	Sabiedrisko pakalpojumu regulēšanas komisijas padomes noteikumi "Sistēmas pieslēguma noteikumi elektroenerģijas ražotājiem" (Regulations for a system connection for electricity producers, issued by national Public utilities commission)	accepted	3
Country	Applicable Documents											
Latvia	Sabiedrisko pakalpojumu regulēšanas komisijas padomes noteikumi "Sistēmas pieslēguma noteikumi elektroenerģijas ražotājiem" (Regulations for a system connection for electricity producers, issued by national Public utilities commission)											
NL-83	4000	Annex D	Table	te	<p>What is the aim of Annex D? All European countries have national requirements for grid connection of power generating units as of today. The national requirements have higher priority than a product standard as the present document is aiming to provide. What is the real value for the reader to know about the various requirements in each country? Typically the information is outdated before the standard will be published.</p> <p>The present table has absolute no value if not all countries are listed and it's discussable if any value at all.</p>	<p>Complete the Annex D table with references to documents from all European countries with links to the websites of the NRA, TSO or DSO, alternatively remove the Annex.</p> <p>The latest action is preferred.</p>	see DK91	0				
NO 15	4000	Annex D – first sentence		te/ed	Are national requirements limited to those enforced by regulations given by the authorities or are national recommendations also to be included?	This annex provides an overview of further national requirements and recommendations....	Accepted Please provide information what should be included for NO	3				
PL-72	4000	Annex D	Table	te	<p>What is the aim of Annex D? All European countries have national requirements for grid connection of power generating units as of today. The national requirements have higher priority than a product standard as the present document is aiming to provide. What is the real value for the reader to know about the various requirements in each country? Typically the information is outdated before the standard will be published.</p> <p>The present table has absolute no value if not all countries are listed and it's discussable if any value at all.</p>	<p>Complete the Annex D table with references to documents from all European countries with links to the websites of the NRA, TSO or DSO, alternatively remove the Annex.</p> <p>The latest action is preferred.</p>	see DK91	3				

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
SI-6	4000	Annex D	Table	te	In Slovenia there is a dedicated regulation regarding connection and operation of generating plants/units in electric distribution networks (medium voltage and low voltage). <i>Slovenian national rules for connection and operation of generators in the distribution network</i> were officially announced in the <i>Uradni list RS (Official Gazzette of the Republic of Slovenia) No. 41/2011</i> and are published on the website of the SODO – Slovenian Electricity Distribution System Operator. https://www.sodo.si/kdo-smo/zakonodaja/sondo	<i>In the Country column add:</i> “Slovenia” <i>In the Applicable documents column add:</i> “SONDO and SONDSEE (Slovenian national rules for connection and operation of generators in the distribution network)”	accepted	1
					No comments on Annex E			
					ANNEX F not yet (20171026) discussed, proposals are in the EN50549 folder of the collaboration tool			
					No comments on Annex G and H			

Annex

Proposal for BE17*****

ROCOF immunity of a power generating plant means that the generating modules in this plant stay connected with the distribution network and are able to operate when the frequency on the distribution network changes with a specified ROCOF. The generating units and all elements in the generating plant that might cause their disconnection or impact their behavior shall have this same level of immunity.

The generating modules in a generating plant shall have ROCOF immunity for a ROCOF equal or exceeding the value specified by the responsible party. If no ROCOF immunity value is specified, the following ROCOF immunity shall apply, making distinction between generating technologies:

- Non-synchronous generating technology: at least 2 Hz/s
- Synchronously coupled generating technology: at least 1 Hz/s

The ROCOF immunity is defined with a sliding measurement window of 500 ms.

Note: For control action based on frequency measurement shorter measurement periods are expected to be necessary.

NOTE: For small isolated distribution networks (typically on islands) higher ROCOF immunity values may be required.

NOTE: ROCOF is used as a means to detect loss of mains situations in some countries. The ROCOF immunity requirement is independent of the interface protection settings. Disconnection settings of the interface protection relay always overrule technical capabilities. So, whether the generating plant will stay connected or not will also depend upon those settings.

*****end proposal BE17

Annex to DE-079:

The tolerance in time shall be $-0/+3\text{sec}$ or $-0/+2*\tau$, whatever is the larger. The tolerance of Q during dynamic operation shall be: $\pm 10\%$ of S_n .

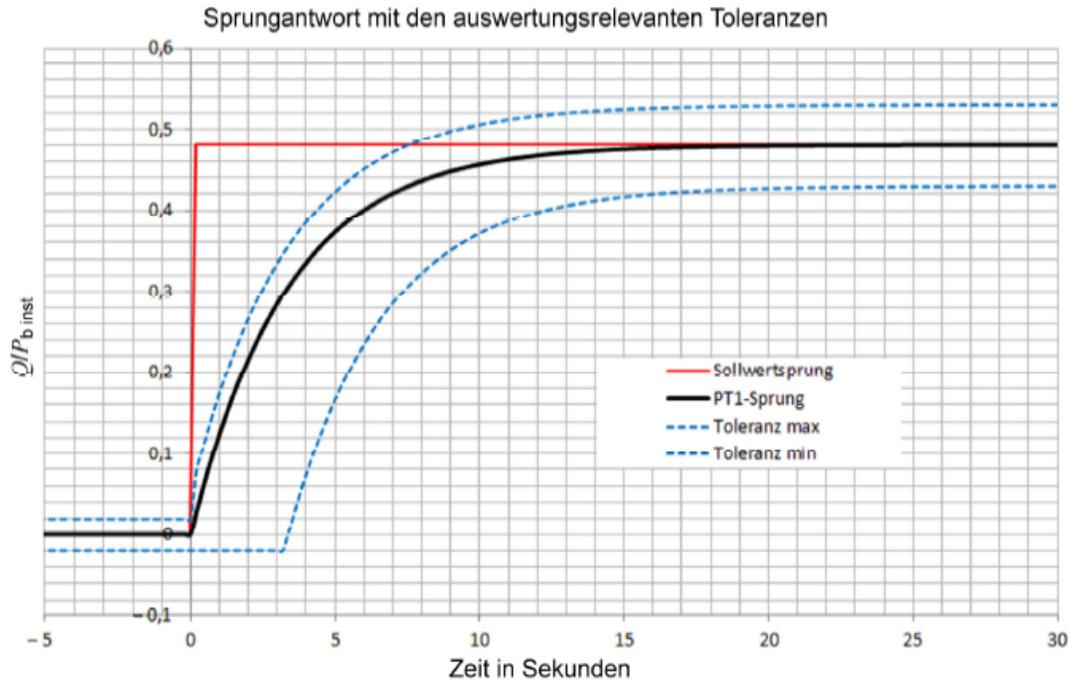


Bild C.3 – Veranschaulichung bei $3 \tau = 10 \text{ s}$

Annex to FR 99:

