

ENQUIRY RESULTS

prEN 50549-1 Title: Requirements for generating plants to be connected in parallel with distribution networks - Part 1-1: Connection to a LV distribution network – Generating plants up to and including Type A	Submission: 2017-05-26 Deadline: 2017-08-18 Subsector: U95 Project: 63319 TC(s): CLC/TC 8X Directive(s): RfG (2016/631) Mandated: M/490 Supersedes: EN 50438:2013 EN 50438:2013/IS1:2015 CLC/TS 50549-1:2015
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Results	Countries	Total members/weighted votes
	(* = with comments, ** = no answer received, *** = answer received, but file is not valid --> vote not accepted)	
ACCEPTANCE:	AT*, BE*, BG, CH*, CZ*, DE*, FR*, HR, HU, IE*, IT*, LT, LV*, MT, NL*, NO*, RO*, RS, SE, SI*	20(236)
REJECTION:	DK*, EE*, ES*, FI*, GB*, PL*	6(101)
Abstention:	CY, GR, IS, LU, MK, PT, SK, TR	

Evaluation		Proposed implementation dates	
1) Simple majority of members for acceptance (Yes/No)	All countries	doa: dor + 6 months	
	20/6 YES	dop: dor + 12 months	
2) Proportion of positive weighted votes ≥ 71	EEA countries	dow: dor + 36 months	
	70.03% NO		
Conditions fulfilled	NO		

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 numb er	Clause/ Subclau se	Paragr aph/ Figure/ Table	Type of com ment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
AT 01				ge	The Austrian Electrotechnical is in favour of the submitted prEN on principle , but submits the following comments asking for consideration for improvement:		Noted	
BE01				ge	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.		Noted	
BE02			Title	te/ed	Depending on national choice of the threshold between Type A and Type B, Type B generating units could also be connected in parallel to LV networks. From the text of the draft, it can be understood that the draft also covers these Type B generating units	Change title to "Requirements for generating plants to be connected in parallel with distribution networks - Part 1-1: Connection to a LV distribution network - Generating plants up to and including Type B " As it is very unlikely to find generating modules bigger than Type B in LV, the title could be shortened to: "Requirements for generating plants to be connected in parallel with distribution networks - Part 1-1: Connection to a LV distribution network" Nevertheless the BE NC prefers the first proposal because it brings clarity that Type B connected to LV is also included.	Accepted Requirements for generating plants to be connected in parallel with distribution networks - Part <u>1</u> : Connection to a LV 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	The DK NC cast a negative vote on the prEN 50549-1 for the following reasons: One of the reasons is the needed technical improvements on the draft which also is reflected in the DK technical comments. Also alignment in draft EN of RSO/DSO/TSO and who specifies requirements according to RFG? 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? The DK NC agrees on the overall purpose and fully supports the efforts in trying to harmonize European grid codes as much as possible. Same comment/vote is given to the prEN50549-2	Please consider and reflect on this comment	Noted detailed comments will be considered see also TC8X and BT decision regarding this work item	
DK2				ge	Is the new number prEN 50549-1 or prEN 50549-1-1	Align	Accepted, see BE02	
DK3				te	Title of document incorrectly limits the scope to generating plants of Type A only.	Remove 'Generating plants up to and including Type A' from the document title.	Partly accepted see BE02	
EE-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	

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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	
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 128: Terms and definitions are selected to archive consistency with IEV (cf. www.electropedia.org) and CENELEC terminology, taking into account that terms in COMMISSION REGULATION (EU) 2016/631 may deviate.	
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	
FR 02		title		Te	The EN 50549-1 is for plants up to type B	Correct the title : “generating plants up to and including type B”	See BE02	
FR 11		3.4.4		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 French version, remove term “assez” or specify a value	FR NC to decide on	
FR 12		3.5.4.1		ed	(French version) There should not be any mark on the A in the formula	In the French version, remove the mark on A in formula	FR NC to decide on	
GB-05		1	Scope	ge	We suggest that the Network Code Requirements for Generators (RfG) is a red herring in terms of gold plating.	We should agree technically what is generically required, ensure it conforms to the law. If this goes beyond the RfG, then so be it. The RfG is not the last word on technical requirements	Note Please introduce us into the meaning of red herring and gold plating	

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GB-06		1	Scope	ge	General comment – The document applies to all plant Type B and below. . For a European Standard to be of value across Europe it shall offer the most stringent requirements of all National selections, not a specific subset leaving some National selections more onerous than the standard.	Set defaults values generally at the onerous end of the range.	Rejected The setting range is defined to allow for the “onerous end” of the allowed range in RfG, the default is chosen to meet the biggest market share	
GB-07		1	Scope	te	Scope goes right down to 0W; type A stops at 800W.	No change. Please make sure that the 800W limit is NOT introduced by any future changes.	Accepted	
IT01				ge	Italy NC supports the approach to combine part 1-1 and part 1-2 in a single document		accepted	
IT02				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	
LVS-01		general		ge	Considering that the standard will replace the current standard EN 50438:2013, we propose to include in the standard prEN 50549-1 safety requirements for the operation of micro-generators from standard EN 50438:2013 clause 5 “Operation and safety of the micro-generator” and clause 6 “Commissioning”		rejected safety is out of the scope of this standard, even in 50438 safety has been excluded.	
NL-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	
NO 1		Title		te	The title suggest that the document only covers Type A generation, but the scope indicated that type B connected to LV is also covered.	Requirements for generating plants to be connected in parallel with distribution networks - Part 1-1: Connection to a LV distribution network - Generating plants up to and including Type A or include type B	Accepted See BE02	

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PL-01				ge	The Polish mirror committee <i>disapproves the presented draft standard</i> based on comments provided below.		Noted	
PL-02				ge	Technical requirements for generating plants, intended to operate in parallel with LV distribution networks, set in Draft Standard 50549-1 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. Reasoning: 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.		Noted The WG is aware of this and takes great care to keep the standard congruent with EU 2016/631	

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PL-03				Ge	Standard 50549-1 covers the requirements for generators of both A and B type intended to operate parallel with LV 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 LV distribution networks: a) Standard's main body i. Requirements for A type generators ii. Requirements for B type generators Reasoning: 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 LV distribution networks.		Rejected 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 This is namely: 4.3 switch gear 4.7.1 and 4.7.2 Reactive power requirements 4.8 EMC 4.9 Interface protection requirements 4.10 connection conditions as this is also a local issue in LV grids 4.11 reduction of output power as far as distribution grid management is concerned 4.12 communication exchange as far as distribution grid management is concerned	

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PL-04				Ge	Standard 50549-1 shall enable taking into account the parameters developed as “Requirements of general application”, especially non-exhaustive ones, which are currently being developed by relevant system operators. Consequently we highly recommend to postpone the works on these standards, especially in the scope of parameters to be created by relevant system operators. In our opinion these standards shall be developed after the approval of non-exhaustive requirements by relevant regulators. Reasoning: Network Codes impose on relevant system operators obligation to develop non-exhaustive requirements, specifying parameters that are also subject to draft Standards 50549-1 and 50549-2. Including these parameters in Standards will be possible only after establishing these parameters by relevant system operators (separate parameters by each relevant system operator). Only in this case we can ensure that relevant parameters will be included in Standards, so the parameters set in the Standards will be in line with requirements resulting from Regulation (EU) 2016/631. Otherwise Standards will be probably not in line with requirements resulting from Regulation 2016 (EU) 2016/631 and as such will not actually enable using these standards in practise.		Rejected EN50549-1 and -2 allow for a parameter range, so what ever parameter national implementations provide will be in the range of 50549-1 and -2. In case there will be need for adaption, TC8X will adapt its standards immediately thus allowing a faster track to a consistent requirement system see also TC8X and BT decision regarding this work item	
PL-05		Title		Ed	Requirements for generating plants to be connected in parallel with distribution networks - Part 1-1: Connection to a LV - Generating plants up to and including Type A. This title should be contain precise information about content of this European Standard. In this form, the European Standard suggests that it only concerns Type A modules.	Modify title: Requirements for power generating modules to be connected in parallel with distribution networks - Part 1-1: Connection to a LV distribution network	Rejected 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 BS02	

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RO 01			Title	ge	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. Therefore, the existing title “<i>Requirements for generating plants to be connected in parallel with distribution networks - Part 1-1: Connection to a LV distribution network - Generating plants up to and including Type A</i>” should be modified accordingly.	Replace the title by: <i>Requirements for power plants to be connected in parallel with distribution networks – Part 1: Connection to a LV distribution network</i> The additional information related to the types of power plants (power generating modules/units respectively) should be stipulated in the scope of standard.	Partly accepted See BE02	
RO 02				ge	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.. 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.	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. 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). Having in view the above-mentioned aspects, the drafts of future EN 50549 standard series need to be carefully rewritten.	noted	
GB-01	0001			ge	Consider combining the two parts into one EN	With a single standard where there is a difference between type A and type B generating units, just include the type A only requirements as a separate chapter, and the several type B requirements as a separate chapter.	rejected see also TC8X and BT decision regarding this work item, for further revision this should be considered	

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GB-02	0001			Te	Where applicable these comments also apply to prEN 50549-2	See above	Noted This is difficult to deal with, the WG03 can not assure that all comments are handled correctly for -2	
GB-03	0001	Title	Title page	Te	The title includes a reference for generating units up to and including type A. In some countries type B will be connected at LV and the main text of the document recognises this. Therefore the title should be changed if two separate documents are to be retained.	Modify the document title to "Requirements for generating plants to be connected in parallel with distribution networks - Part 1: Connection to a LV distribution network"	Accepted See BE02	
GB-04	0001	Title		Te	The title says "up to and including Type A" yet the body covers type B as well, the title should reflect the content. If it were not to cover type B then such a generator, if connected at LV as is entirely possible, would fall into a void between part 1 (Type A only) and part 2 (HV only).	Correct either the title or the body to be consistent.	accepted See BE02	
IE01	0001			ge	Main title refers to connected at LV and Type A. In Ireland, the A-B threshold is at 100kW but we connect generators at LV up to 600KVA so this title is not appropriate or consistent.	Change to "... Generating plants up to and including Type B"	Accepted See BE02	
FI 2	0045	1		ed	Recurrent misspelling of the word commission as "comission".	Replace "comission" by commission. Check all the appearances of the word in the document.	accepted	
FR 03	0056-57			Ge	There is no explicit mandate from the European Commission	Remove statement in line 56-57	accepted replace by. This document has been prepared as a deliverable to the EC mandate M/490	
NO 2	0058-65			ge	We support to combine the two documents		Accepted	
DE-002	0059	foreword		ed	"it" does not fit	Remove "it" after the date 2016-11-23	Accepted, Paragraph will be deleted for Draft for vote	

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FI 1	0063			ge	The Finnish National Committee casts a negative vote with technical comments. In general FI NC supports prEN 50549-1 project, and supports working group WG03 proposal to merge parts EN 50549-1-1 and EN 50549-1-2 into single document EN 50549-1. However, there are technical issues which need to be clarified before proceeding to publication.		Noted Thank you	
CH-01	0064	European foreword		ge	Switzerland agrees to combine the two documents -1-1 and -1-2 into one EN 50549-1.		Noted Thank you	
FR 04	0066	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	
GB-09	0074	1	Scope	Te	This draft EN is being interpreted as requiring that every clause be complied with in order to comply with a particular countries implementation of the RfG. As this draft contains numerous requirements that are beyond those in the RfG this incorrect interpretation must be corrected.	Add a paragraph to make it clear that it is for each national implementation of the RfG to specify which clauses of this draft are required.	Rejected The application of standards is voluntary.	
RO 03	0075-76	1	Scope	te	The technical requirements for the protection functions and operational capabilities of power generating units, mainly based on synchronous machines, shall be taken into account when those are intended to operate in parallel with LV distribution networks.	Just a proposal, replace the existing text by: This European Standard specifies the technical requirements for the protection functions and the operational capabilities for power generating units (modules) intended to operate in parallel with LV 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.	
NO 3	0075-76 and 99-100			ed	In order to introduce the scope as early and compact as possible, it would be better to move the lines 99-100 before line 75	Move the lines 99-100 before line 75	Accepted	

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DE-004	0077	1		gener al	battery storage generation units add to list	...in line 87 and 89 Delete "primary	Accepted add after bullet list a note: Electrical energy storage systems in meeting the conditions above are considered. add in clauses: EESS (electric energy storage systems) 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> <u>In clause 4.6.2 battery storage is replaced by EESS</u>	

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ES-03	0078	1		Ge	“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.” The text of the Technical Standard shall define DSO and TSO responsibility, attending to Regulation 2016/631. 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.	Define explicitly in every single case which entity / entities are in charge of defining settings.	partly accepted see NL-03	
GB-10	0078	1	Scope	Te	What “practical reasons” justify muddying the waters by saying that the DSO provides settings that are legally defined by the TSO per synchronous area?. This can only lead to arguments over who has the authority to define settings. The RfG is clear enough which parameters are to be defined by the TSO and there are groups all over the EU working these values out right now, so why is it beyond this prEN to abide by the distinction?.	Justify this or remove it	partly accepted see NL-03	

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NL-03	0078 - 83	1		ge	"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." If this sentence is not removed, then the rest of the Technical Standard shall define DSO and TSO responsibility, attending to Regulation 2016/63" 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	Define explicitly in every single case which entity / entities are in charge of defining settings. The balancing responsible TSO is the only entity that can be responsible for the frequency related parameters as these affects the system security and balancing.	Partly accepted <u>change for RfG topics where it is not DSO</u> <u>replace "DSO" by "responsible party"</u> <u>rephrase line 78:</u> <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> <u>add definition of "responsible party" in 3.1</u>	1

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DK5	0078 – 83	1		ge	“For practical reasons, this proposed document 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.” If this sentence is not removed, then the rest of the document shall define DSO and TSO responsibility, attending to Regulation 2016/63” 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. It is legally wrong to give the reader the impression that the DSO is right entity to set specific requirements in this document. It is in direct conflict with EU regulation 2016/631	Define explicitly in every single case (like for NC RfG), which entity / entities are in charge of defining settings. Alternatively leave out reference of requirement specifier.	partly accepted see NL-03	0

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EE-03	0078 – 83	1		Ge	“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.” If this sentence is not removed, then the rest of the Technical Standard shall define DSO and TSO responsibility, attending to Regulation 2016/63” 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	Define explicitly in every single case which entity / entities are in charge of defining settings. The balancing responsible TSO is the only entity that can be responsible for the frequency related parameters as these affects the system security and balancing.	partly accepted see NL-03	0
PL-06	0078 – 83	1		Ge	“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.” If this sentence is not removed, then the rest of the Technical Standard shall define DSO and TSO responsibility, attending to Regulation 2016/63” 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. Where Art. 7 (9) will be established by the Member State, the DSO will be Inadequated.	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.	partly accepted see NL-03	0

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DE-003	0079	1 Scope		ed	“and/or” is bad style and ambiguous cf. with the Boolean meaning of AND and OR A, B, A and B, A or B 0,0,0,0 0,1,0,1 1,0,0,1 1,1,1,1 In most cases the OR comprises the AND, except the XOR case (either or).	Use “or” instead.	Accepted	
NO 4	0079			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	partly accepted see NL-03	1
FR 05	0086-88	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	
RO 04	0087÷89	1		te	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.	In place of generating plants, generating modules, electrical machinery and electronic equipment to be used terms from R631/2016 or the final terms established according to present observations.	See FR 05	
FI 3	0089	1		te	The scope should include also generating plants that comprise individual d.c. producing generating units, which are connected to a public a.c. mains through a common d.c. bus and grid-tie converter.	Remove the qualifier “AC” from the sentence.	Accepted see BE03	
FI 4	0090	1		te	The scope should be clearly limited to connection of generation to public LV a.c. distribution networks.	Add the qualifier “AC” to the sentence.	Accepted see BE03	
BE03	0090-0092	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 <u>LV</u> distribution network	Accepted delete 4 bullet, change 2 bullet to: connected to and operated in parallel with an AC <u>LV</u> distribution network	

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CZ-01	0091	Scope		te	generating modules capacity of Type B or smaller;	Discrepancy with the name of the standard prEN 50549-1:2017	Accepted see BE02	
DE-005	0091	1		Ed	"generating modules capacity of Type B or smaller"	Make reference to the Regulation 2016/631 and the national thresholds for type A to B and type B to C, <u>as done in prEN 59549-2.</u>	Accepted	
DE-006	0091	1		ge	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 LV distribution network or connected to a LV distribution network	accepted see BE03	
EE-04	0091	1		Ed	"generating modules capacity of Type B or smaller"	Make reference to the Regulation 2016/631 and the national thresholds for type A to B and type B to C, as done in prEN 59549-2.	See DE-005	
ES-04	0091	1			"generating modules capacity of Type B or smaller".	Make reference to the Regulation 2016/631 and the national thresholds for type A to B and type B to C, as done in prEN 50549-2.	See DE-005	
FI 5	0091	1		te	There is a discrepancy in applicability of the standard between row 91 (<i>generating modules capacity of Type B or smaller</i>) and title (<i>Generating plants up to and including Type A</i>).	Please check the correct scope of the standard.	Partly accepted see BE02	
FR 06	0091	1		Te	"or smaller" is not precise	Write : "type B or type A or with an output power less than 800 W"	See DE-006	
IE02	0091	1 Scope		ge	This clause is fine for Ireland but inconsistent with the main title as above.	No change proposed	See BE02	
NL-04	0091	1		ed	"generating modules capacity of Type B or smaller"	Make reference to the Regulation 2016/631 and the national thresholds for type A to B and type B to C, as done in prEN 59549-2.	See De-005	
NO 5	0091			te	Type B (and Type A) should be defined or explained	Add definition or explanation	See De-005	
PL-07	0091	1		Ed	"generating modules capacity of Type B or smaller"	Power generating modules capacity of Type A and Type B"	See De-005	

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-007	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 Wrong reference refers to line 99 delete line 99 and 100	
FI 6	0093	1		ge	Sentence is not clear. <i>"If generating modules of different type are combined in one plant, different requirements apply for the different modules based on the type of each module. "</i>	Reword it or provide explaining note e.g. what are the different requirements for module types. To clarify the meaning of the meaning of the terms plant, module and unit, please add a note that refers to section 3.2 for explanation.	Accepted	
DE-008	0095	1		Ed	The location of the Note 3 should be moved below the paragraph following the Note 3 or it should even considered removing the Note 3 because the content of it became obvious by the content of the 5 th paragraph.	Remove Note 3 or move it below the paragraph, which follows the Note 3.	Rejected The note refers to the voltage level, the paragraph to the power	
DE-009	0095	1 Scope		ed	Line 95 refers to the bullet point list above, item "LV network".	Move note after line 90, directly after the item "connected to a LV distribution network".	Accepted	
FI 7	0095	1		te	Note should be added that a module can be an ensemble of several units that together produce a certain behaviour.	Add a new note: "Note 4: a module can be an ensemble of several units that together produce a certain behaviour."	Rejected see 3.2.1	
DE-010	0096 - 98	1		Te	The threshold of 100 kV is not anymore the preferred level. Instead off it 150 kVA is in some EU countries	Please replace "100 kVA" by "150 kVA"	accepted	
DE-011	0096 - 98	1		Ge	Threshold between A and B should be 150 kVA as default value. Most requirements of 50549 still are needed for generating plants smaller than 100/150kVA. We only may reduce to ask for an interface protection at the POC. (compare draft VDE-AR-N 4110, lines 73-76).	Unless specified otherwise by the DSO, an interface protection for the POC is not needed for generating plants connected to a medium voltage distribution network with a maximum apparent power up to 150 kVA. A different threshold may be defined by the DSO. Better: Delete whole sentence.	See DE-010	

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 05	0097 ÷99	1		te	Unless specified otherwise by the DSO, generating plants connected to a medium voltage distribution network with a maximum apparent power up to 100 kVA can comply with this European Standard as alternative to the requirements of prEN 50549-2. A different threshold may be defined by the DSO. 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)	Has to be completed 97÷99 lines with remote information exchanged aspects (to be mentioned)	accepted in principle no change in scope add chapter of information exchange to -1, (required only for Type B) without Annex B, but add reference informative to annex B in -2	
DE-012	0098	1		Ge	Add an information, which requirements of EN50549-2 are additionally to be fulfilled by type B generating plants (compare draft VDE-AR-N 4105, lines 95 – 105)	Unless specified otherwise by the DSO, generating plants of type B have to fulfil the following requirements of 50549-2 additionally: - reactive power (static and in case of faults and voltage steps) - disconnection in case of instability of the generating plant	rejected see also DE-010 No additional parts of -2 need to be complied with, since all aspects required are stated in the text. If you need further requirements of -2 use the -1/-2 threshold accordingly	
DE-013	0099	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-007	
DE-014	0099-100	1 Scope		ge	Line 99f is redundant to line 90 and 96. Are really “connection requirements” part of this standard, that means where and how to connect a generator, or are requirements for generators (black boxes ready to use as produced in the factory) part of this standard?	Remove line 99 + 100.	Partly accepted See DE-007	
FR 07	0099-100	1		Te	Statement is not precise enough	Write : “This European Standard defines the technical requirements for grid connection of power generating facilities to LV distribution networks”	Partly accepted See DE-007	

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 06	0100 To be insert ed below row 100 or below row 112	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 IEC 60364-8-2 which will be adopted at European level as future HD 60364-8-2: the prosumer is an entity or party who can be a producer and a consumer of electrical energy). In this case, an appropriate definition of prosumer's electrical installations is needed (see the definitions proposed in future clause 3.2.2.b).	If applicable, an appropriate explanation should be added regarding prosumer's electrical installation: This standard specifies the requirements related to grid connection of prosumer's electrical installations. Or "Excluded from the scope are:" - prosumer's electrical installations.	Rejected, Already explained in line 88	
DE-015	0101-102	1 Scope		te	Redundant and even conflicting message with line 82-83. It is clear that legal documents (laws and regulations) have priority to technical rules such as EN standards. But what is with company specific standards?	Remove line 101-102 and keep line 82-83 (maybe amended).	Partly accepted See DE-007	
DE-001	0102	Scope		Ge	Application of national requirements is an external obligation	Change should to must	accepted 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.	
FI 8	0103-111			te	To further clarify the scope, it should be mentioned that any of the requirements do not concern connection of generators to d.c. networks.	Add sentence: "the connection of a generating unit, module or plant into a DC network"	Accepted	
NO 6	0105			te/ed	The meaning of "power system impact assessment" is not clear	Add explanation	Accepted Any proposals??	
NO 7	0106			te/ed	The meaning of "connection assessment" is not clear	Add explanation	Accepted Any proposals??	

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
DK6	0111- 112			te	Uninterruptable power supply with duration of parallel operation limited to 100 ms. This exemption is not clear enough and will lead to discussion. Note 4 Parallel operation due to maintenance of uninterruptible power supply units is not considered.	The exemption need to be based on another parameter than parallel operation mode / and maintenance due to the fact that new uninterruptable power supply do have green environmental features (or SmartGrid) where they run parallel with the grid without doing maintains.	Rejected, If a UPS as described in the proposal is connected, it shall comply with the standard	
DE-016	0112	1 Scope		te	Note 4 should not have normative content (maintenance is not considered by the standard drafting body as part of the standard) , it should only explain the current situation, e.g. maintenance is not seen as normal operation and therefore not seen as part of this standard (state of the art)	Modify note 4: Parallel operation due to maintenance of uninterruptible power supply units is not seen as part of normal UPS operation and therefore not considered in this EN.	accepted	
FR 08	0115	2		te	It is missing two standards mentionned in the text : TS 50662 line 645 and EN 50560 lines 283 and 292	Add TS 50662 and EN 50560 as normative references	rejected, 50662 is not published yet, 50560 is not used.	
GB-11	0119	2	Normati ve referen ces	Te	Why single out under/over voltage to be delegated to another standard when all others are defined in this standard?.	Be consistent, all others are define din this draft so include under/over voltage	see Fi 9	
FI 9	0121- 122	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	
FR 09	0127	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 will be made to RfG in a note to the definition of generating module	

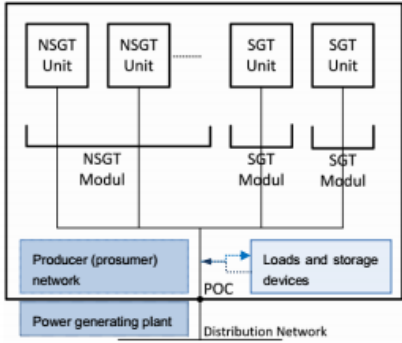
MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
GB-12	0127	3	Terms and Definitions	Te	There is no definition of “Active Power” despite it being referred to numerous times.	Define it	Accepted Also align -2 active power under periodic conditions, mean value, taken over one period T, of the instantaneous power p $P = \frac{1}{T} \int_0^T p \, dt$ Note 1 to entry: Under sinusoidal conditions, the active power is the real part of the complex power $\underline{S}$, thus $\underline{P} = \text{Re } \underline{S}$ Note 2 to entry: The coherent SI unit for active power is watt, W. 131-11-42	
RO 07	0127	3.1	Terms and definitions	ge	As general rule, a correlation between terms established by relevant European/international standards (as well as IEC 60050 series - International Electrotechnical Vocabularies prepared by IEC) and EU regulations shall be assured to facilitate the national implementation of their requirements addressed to the designers, relevant system operators (DSO, TSO), regulatory authorities, certification bodies, accredited testing and simulation laboratories (compliance testing and monitoring), equipment manufacturers, etc.	The whole document needs to be checked for consistent use of defined terms, taking into account permanent correlation between related standards, as well as the correlation between standards and technical regulations to facilitate the implementation at national level.	Noted This is and was always the intention of the WG please point out specific problems in case we overlooked any	
RO 08	0132	3.1.1	Terms and definitions	te	AC networks should be clearly stipulated in order to not confuse with DC networks.	Replace “ <i>electrical network</i> ” by the term “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 With the note: A distribution network does not include the customer installation.	

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-017	0137	3.1.2		ed	“geographically confined” refers to following three options: industrial, commercial or shared services site; it is not a 4 th (or the first) option of a list	Remove comma between confined and industrial, or redraft the sentence: within a industrial, commercial or shared services site, that is geographically confined, and does ...	Accepted	
DE-018	0138-140	3.1.2		te	prejudice sounds weird in the sense of preconception. Use simple English instead.	Modify sentence : ...does not supply households customers (without excluding the option of a small number of households served by the system, that have an employment or similar associations with the owner of the system)	Partly accepted add: [source: Directive 2009/72/EC, article 28, modified]	
DE-019	0141	3.1.2	Note 1	ed	Let the note start with the indefinite article “a” and use lower-case letters for closed distribution network. Use network user instead of user of the system. Integrated into which structure? What does operations of the closed distribution network mean?	Modify note: A closed distribution network will either be used to integrate the production processes of the network users for specific or technical reasons or distribute electricity primarily to the operator of the closed distribution network or his related undertakings.	Accepted	
FR 10	0146	3.1.3		Te	The “public” is too restrictive	Write : “the final customer”	Accepted Gunnar implementation note: , modify: ... to final customers ...	
BE04	0149	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	
DE-020	0149	3.1.3	Note 1	ed	For clarity, add a comma.	Modify the note: In this document applicable to distribution grids, DSO is used ...	Partly accepted See BE04	
PL-08	0150	3.1.3	Note	ed	Grammatical correction.	Replace the phrase “according Article” with the phrase “according to Article”.	Accepted	

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
RO 09	0150 ÷ 151	3.1.3		ge	Because the main subject is the generating plants to be connected in parallel with distribution networks it is important to use the term “relevant distribution operator (i.e. relevant DSO)” within this document.	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	
BE05	0158	3.1.5		te	The term medium voltage distribution network is used in the scope.	Add definition of medium voltage (MV) distribution network just like in prEN50549-2	Accepted	
AT 02	0161	3.1		te	The term “MV distribution network”, used in this document, should be defined in item 3.1.	Insert after 3.1.5 low voltage (LV) distribution network item “3.1.6 medium voltage (MV) distribution network <i>electric distribution network with a voltage whose nominal r.m.s. value is $1\text{ kV} < U_n \leq 36\text{ kV}$</i> <i>Note 1: Because of existing network structures, the upper boundary of MV can be different in some countries”</i>	Accepted, see BE05	
PL-09	0168	3.1.7		ed	Grammatical correction.	Replace the phrase “has or is planning” with the phrase “has planned or is planning”.	Accepted	
DE-021	0172	3.1.8		te	Owned/operated: Usually the operator is responsible for all the action. If the operator is not the same person as the owner, the owner transfers some rights to the operator. The operator has the more detailed duties, whereas the a separated owner only receives the revenues from the business operation.	Remove “operated” and use only “operated”	accepted remove” owned/” align in -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
RO 10	0173 To be insert ed below row 173	3.1.8		te	The relevant system operator (DSO) has the right to require additional information from power plants' owners.	If applicable, a note may be added having in view their roles of power plants' owners either as producer or prosumer :	rejected note would not be part of a definition, but of a requirement	
DE-022	0179	3.1.10		ed	The abbreviation follows in a second line.	point of connection POC reference point ...	Accepted	
DE-023	0188	3.1.12		ed	Improve wording, rearrange sentence	conditions in which the generating plant is connected during defined short periods to a distribution network to maintain the continuity of the supply and to facilitate testing	Accepted	
IE03	0190	3.2		ge	Apparent needless deviation from RfG terminology. Will lead to confusion with Equipment Manufacturers.	Align with RfG terminology	see ES-02 Add a Note: Terms and definitions are selected to achieve consistency with IEV (cf. www.electropedia.org) and CENELEC terminology, taking into account that terms in COMMISSION REGULATION (EU) 2016/631 may deviate.	
RO 11	0190	3.2; 3.2.1, 3.2.2, 3.2.3	Terms and definitio ns	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 the text 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"	

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 12	0192 ÷195	3.2.1		te	The term “power generating module” is recommended to be used instead of “generating module”	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 grid 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.	See RO 11	
BE06	0196	3.2.1		ed		Modul => Module	Accepted	
BE07	0196	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 synchronously coupled -> synchronous	
GB-13	0196	3.2.1	Figure 1	ge	Module Is missing the E within the diagram Figure 1	Spell module with an E	Accepted	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
RO 13	0196 ÷197		Figure 1	te	If the standard is also applicable to prosumer's electrical installations, the Figure 1 should be modified.	 Key: SGT – Generation technology based on synchronous machines (directly coupled at POC); NSGT – Generation technologies based on induction machines or other equipment (non-directly coupled at POC; connected by power electronics). Figure 1 — Power generating modules (units) connected at a common connection point (POC)	rejected	
RO 14	0199 ÷200	3.2.2		ge	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.	Just a proposal! Replace by: Power plant <i>Ensemble of power generating modules....</i>	Rejected Improvement not apparent see RO-11	

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
RO 15	0203 below row 203			te	If standard is applicable to prosumer's electrical installations (from domain of customer premises, according to smart grid architecture), please find possible definitions for prosumer. For this reason, new terms (3.2.2.b) related to "Prosumer" and "Prosumer's Electrical Installation" should be inserted.	According to IEC 60364-8-2: "Prosumer=Entity or party who can be a producer and a consumer of electrical energy Prosumer's Electrical Installation: PEI Electrical installation able to operate with or connected to: – Local power supplies, and/or – Local storage units, and/or – Public distribution network; and that monitors and controls the energy from the connected sources delivering to it – Current-using equipment, and/or – Local storage units, and/or – Public distribution network [Source: IEC 60364-8-2]" Or other definition: 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. 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. 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.	rejected See scope line 77: "irrespective of the presence of loads in the producer's network" therefore loads might be present, but resulting issues are not handled here	

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	0205	3.2.3		ge	generating unit	Replace by: Power generating unit	Rejected Improvement not apparent see RO-11	
DE-024	0209	3.2.3	Note 1	te	The idea is to present to items which belong together: gas turbine + steam turbine = one unit (CCGT), ICE + ORC = one unit	Modify Note 1: For example, a combined cycle gas turbine (CCGT) consisting of a gas turbine and a steam turbine or an installation of an internal combustion engine (ICE) followed by an organic rankine cycle (ORC) machine are considered both as a single generating unit.	Accepted	
DE-025	0214 - 219	3.2.4 + 3.2.5		te	Threshold for micro generating plant has to be 4,6 kVA, not 16A per phase. Plants with apparent power above 4,6kVA have to fulfil the standard requirements of this EN. (compare draft VDE-AR-N 4105, i.e. lines 847 – 848)	micro-generating plant generating plant up to 4,6 kVA apparent power 3.2.5 micro-generating unit generating unit up to 4,6 kVA apparent power	Rejected There is no conflict with the current VDE-AR-N 4105 and the published drafts. The thresholds are deviating and resulting in different requirements according to drafts of EN 50549-1 and VDE-AR-N 4105, but no conflict is present.	

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
FI 10	0220- 222	3.2.6		te	Definition of synchronous coupled generating technology should be expanded to include ensembles that together can perform like a synchronous generator, even though they are not traditional synchronous machines. These include converter coupled setups.	Change the text as follows: "synchronously coupled generating technology" technology where a generating unit is based on a directly coupled synchronous machine or on a combination of generating technologies and other devices that together perform like a synchronous machine Note 1 to entry: A combination of generating technologies and other devices can include non-synchronous generators, energy storages, controlled load devices and different converters based technologies. Note 2 to entry: Synchronous generating unit can be an ensemble of different generating units that are internally connected into a non-synchronously operating network or a DC network, and which is coupled to the distribution network through a single connection point with a converter"	Rejected WG03 welcomes this proposal however at the time being the behaviour of such a combination is not defined in a standard and therefore cannot be verified. It should be considered to start a standardisation project on this topic	
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	partly accepted see DK7	
DK7	0211	3.2.4		te	Technology where a generating unit is based on a synchronous machine which is directly coupled	To be in line with the definition headline "synchronously coupled generating technology" directly need to be to be defined or deleted.	accepted in principle align in -2 Gunnar implementation note: technology where a generating unit is based on a synchronous machine which is directly coupled to an electric power system align with non-synchronous generating technology	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
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 (converters are synchronously coupled; 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	partly accepted, see also DK7 align in -2 technology where a generating unit is connected non-synchronously to an electric power system	
CH-02	0226	3.2.7		ge	Converter based systems allow more options compared to systems with induction machines.	Include separate chapters or subchapters for the options offered by converter type generating units.	Noted Most of the requirements in the document distinguish requirements of induction machines and converters	
DE-026	0226	3.2.7	Note 1	te	If you want to show example, see for example: ftp://ftp.cenelec.eu/CENELEC/IR/CENECENELEC_IR3_EN.pdf clause 3.1.1 and 16.5.6	Use the EXAMPLE tag instead of the Note.	Accepted Gunnar implementation note: For whole clause 3	
FI 11	0226	3.2.7	Note 1	te	Converter based generating technologies should not be generically equated with non-synchronous generation technologies. The converter coupled units are often programmed to behave more like synchronous units.	Remove reference to converter based technologies from the note.	Rejected Rejected, for the time being most converter technologie behave as controlled current sources and therefore completely different then a virtual synchronous machine See also FI-10	
RO 19	0228			ge	Cogeneration - combined heat and power 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	If the standard is applicable to CGP, it should be clarified within scope and relevant clauses.	Noted Used twice in the text	

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
FI 12	0230- 231	Add 3.2.9	New clause	te	Add definition for converter coupled generating technology. Add required references to the unit type into other sections of the standard.	Add definition: "3.2.9 Converter coupled generating technology technology where generating unit is based on connection of a production device, energy storage or an ensemble of these to the distribution network through a grid-tie converter. Note 1 to the entry: Converter coupled generating technology can be programmed to emulate the behaviour of synchronously coupled or non-synchronously coupled generating technology. Note 2 to the entry: For example a PV power plant	Rejected, is integrated in non-synchronous generating technology	
DE-027	0232	3.3.1		ed	The symbol is written in a separate line above the term. See Internal Regulations #3, clause 16.6	P_D design active power maximum AC ...	Accepted	
BE08	0236	3.3.2		te	The definition of "maximum active power – Pmax" is not clear and not aligned with definition of Smax. 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. 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. For information: in NC RfG, this definition is on the module.	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"? Proposal 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 Note 1 to entry: This maximum power is defined by a measurement with 10 min averaging. 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.	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	

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
BE09	0236	3.3.2		ed	Use of the defined terms. 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.	If BE proposal on rephrasing of the definition would not be accepted , delete “power”	see BE08	
DE-028	0237	3.3.2		ed	The symbol is written in a separate line above the term. See Internal Regulations #3, clause 16.6	$P_{\max}$ maximum active power maximum ...	accepted	
DE-029	0238	3.3.2		ed	Minus is clearer than less here.	Modify: ... can produce, minus any demand ...	see BE08	
DE-030	0241	3.3.1		te	As the DSO is the operator, the power generating facility owner should be exchanged for the operator to allow operator to operator talks. Owner to owner talks could be pension fund and life insurance company.	Modify: ... between the DSO and the power generating facility owner	Comment unclear be more exact see BE08	
GB-14	0248	3.3.4	Maximum Apparent Power	Te	Why is VA defined with a 10 minute average?. This means that ‘active factor’ and ‘power factor’ are a function of both current data and a 10 minute average which can’t be the intention.	Remove the erroneous requirement for an average	partly accepted see DE-032	
DE-031	0249	3.3.4		ed	The symbol is written in a separate line above the term. See Internal Regulations #3, clause 16.6	$S_{\max}$ maximum apparent power	accepted	
DE-032	0252	3.3.4		te	The content of the note is not explanatory and informative but mandatory and contrains a requirement. Move note to the definition above or to a suitable clause later in the main text.	maximum AC apparent power output that the generating unit or the sum of all the generating units in a generating plant is designed to achieve under normal operating conditions and measured in a 10 min average	Accepted align active power align -2	
DE-033	0254	3.3.5		ed	The symbol is written in a separate line above the term. See Internal Regulations #3, clause 16.6	P_M momentary active power	Accepted	
FI 13	0255	3.3.5		te	Without definition of time resolution the meaning of “instant” is ambiguous.	Consider improving the definition.	See RO-20	

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
RO 20	0255	3.3.5		te	momentary active power - PM	Please replace the existing definition by: actual AC active power output calculated at a certain instant (according to IEC 61000-4-30 paragraph 4.4 from basic values on 10/12 cycles time intervals). Note 1 to entry: Other aggregating methodologies for calculating momentary active power can be accepted until IEC 60050 standard series will be revised (e.g. by including definitions of momentary instrumentation values in smart meters).	Rejected There is no argument given why a standardised calculation is necessary, why is a faster or more exact longer measurement not allowed Noted for testing document, for the implementation, no technical solution shall be specified	
GB-15	0261	3.3.7	Available Active Power	Te	"maximum AC active power available from the prime mover" is clearly wrong as the prime moved does not provide AC power.	Correct the definition	Accepted	
DE-034	0262	3.3.7		ed	The symbol is written in a separate line above the term. See Internal Regulations #3, clause 16.6	See above	Accepted	
FI 14	0268	3.4.1		ge	Concept of nominal voltage have been defined in IEV see. <u>IEV ref 826-11-01</u>	Add source: [SOURCE: 826-11-01]	rejected, definition is in line with EN 50160	
DE-035	0269	3.4.1		ed	The symbol is written in a separate line above the term. See Internal Regulations #3, clause 16.6	See above	Accepted	
GB-16	0269	3.4.1	Nominal Voltage	Te	Why does it not state 230V to avoid argument when this is the EU standard for LV?, 3.4.2 states 50Hz so stating 230V would be consistent.	State 230V	Rejected Also in EU there are LV grids with deviating nominal voltage	
DE-036	0272	3.4.2		ed	The symbol is written in a separate line above the term. See Internal Regulations #3, clause 16.6	See above	Accepted	
AT 03	0277	3.1		te	As is done in prEN 50549-2, the term "supply voltage" is also used in this standard, therefore the declared supply voltage should be also defined in item 3.1	Insert the following definition in item 3.1: "declared supply voltage – U_C <i>Supply voltage U_C agreed by the power system operator and the network user</i> <i>Note 1: Generally the declared supply voltage U_C is the nominal voltage U_N but it may be different according to agreement between the DSO and the network user."</i>	accepted in principle delete "voltage" in 3.1.12; delete "supply" in 4.9	

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
AT 04	0281	3.4.3		ed	The usual term is “declared supply voltage”	Change “declared voltage” to “declared supply voltage”	Partly accepted See BE10	
BE10	0281	3.4.3		Ed/Te	The term “declared voltage” is only applicable in MV grids and therefore not to be used in EN50549-1.	Rephrase Note as follows: Note 1 to entry: For the purpose of this standard, the reference voltage is the nominal voltage or the declared voltage of the distribution network <u>being 230V.</u>	Partly accepted, do not add “being 230V	
DK8	0285			te	Voltage change versus voltage variation. Is it really necessary to have both “voltage change” and “voltage variation” defined?	Consider and if possible remove one of the definitions.	Accepted Replace “Voltage variation” in line 848 and 881 “ with voltage change” Gunnar Implementation note: and remove voltage variations from the title of 4.7	
DE-037	0291	3.4.5		ed	And/or is bad style and ambiguous. See boolean meaning of AND and OR and XOR.	Use: in load or generation	See DK8, term voltage variation is removed	
IE 04	0294	3.5.1		ge	Would question the need for a new definition?		Rejected The definition is not new, IEV is used	
GB-17	0299	3.5.1	Active Factor	Te	Note 2 is incorrect as the active power is signed, or should be if the definition were not omitted, so the ratio of active power to apparent power is also signed, but the cosine function always returns a positive result by definition.	Extend the note to say that it is only true for +ve power.	Partly accepted Check note 2 in IEV: OK	
DE-038	0302	3.5.2		ed	The symbol is written in a separate line above the term. See Internal Regulations #3, clause 16.6	See above	Accepted	
GB-18	0306	3.5.2	Displac ement factor	Te	Note 2 is incorrect as explained for Active Factor above.	Correct the definition as above	Partly accepted Check note 2 in IEV: OK	
PL-10	0316	3.5.4.1		ed	To improve readability.	Insert an empty line above line 316.	Rejected	

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-19	0372	3.6.1	Protecti on System	Te	Why are circuit breakers not part of the protection system?, they may contain protection functions.	Explain why or remove the note	partly accepted align with -2 correct source 448-11-04 add 441-14-20 definition of circuit breaker to terms	
GB-20	0389	3.6.4	Interfac e Protecti on Relay	Te	This assumes that islanding protection is included but the need for this is under discussion in GB and probably elsewhere so it should be optional.	Note that islanding protection may or may not be required	rejected, this is started clearly in clause 4.9.3	
NO 8	0411		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	
RO 24	0412		Figure 2	ge	For the consistency of the terms established for the purpose of this document, the term " <i>power generating plant</i> " should be used instead of any other similar term "electricity generating plant".	Replace by: Requirements on power generating plants	Partly accepted, Align to the defined term generating plant Also implement in -2	
GB-21	0413	3.6.8	Switch	Te	It should be noted under this diagram that there is no requirement for three separate switches between the generating unit and POC, section 4.3.2 requires only two.	Add the note	Rejected The intention of the comment should be apparent, since the figure is in the Terms chapter	
NO 9	0415- 417			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 The question of accessibility to the DSO is covered in Chapter 4	
RO 21	0416 +417	3.6.8.1		te	main switch	Just a proposal to replace by: switch installed as close as possible to the point of connection, for protection against internal faults and disconnection of the whole power plant (or prosumer's electrical installation) from the distribution network	rejected, no advantage apparent	

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 22	0421 ÷422	3.6.8.2		te	interface switch	Just a proposal to replace by: switch (circuit breaker, switch or contactor) installed in the producer's network, for separating the part(s) of the producer's network containing at least one generation unit and local loads of prosumer which can be supplied in island mode from the distribution network	rejected, no advantage apparent	
BE11	0422	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	
RO 23	0428 ÷429	3.6.8.3		te	generating unit switch	Just a proposal to replace by: switch installed electrically close to the terminals of each generating unit of the generating plant, for protection and disconnection of that generating unit and, in case of prosumer, of local loads which can be supplied in island mode	rejected, no advantage apparent	
PL-11	0437	3.6.10.1		ed	To improve readability.	Insert an empty line above line 437.	Accepted	
DE-039	0439	3.6.10.1		te	The definition describing the term shall not begin with the term itself, as the definition shall be written in such a form that it can replace the term in its context. A equals A + D does not work if D is not empty. See Internal Regulations #3, 16.5.5	energizing quantity input value by which the protection function is activated when it is applied under specified conditions	Accepted	
EE-05	0449- 451	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	
NL-05	0449- 451	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	See EE-05	
PL-12	0449- 451	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	See EE-05	

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
IE 05	0472	3.6.10.7		ed	The term “input energisatng quantity “is long and inelegant – also should be defined.	Replace with “Measured Parameter”	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-040	0487	3.7.1		ed	Either use point of connection or POC as official abbreviation.	functional controller which ensures the completion of performance requirements at the POC of a generating plant, usually by utilizing external measurement signals from the POC to generate reference to a sub structure	accepted	
IE 06	0489	3.7.1		ed	Droop applies to more parameters than frequency	Change to “Frequency Droop”	See GB-22	
GB-22	0490	3.7.2	Droop	Te	Should be “Frequency Droop” as voltage droop is also a common requirement.	Be explicit that this is frequency 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.	
SI-1	0490	3.7.2	Second line in first paragraph	te	Droop can be for active or reactive power. Define this droop as Active power droop	<i>Replace “droop” with “active power droop”.</i>	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 05	0491	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	

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
SI-2	0491 to 493	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 IEC even if they are not elegant, or risk creating different terms for the same thing. We choose the first option.	
GB-23	0501	3.7.3.1 Dead Time		Te	This should be defined with a threshold. The measured quantity will never be perfectly stable so the dead time has to start when the quantity passes a threshold.	Define the threshold	Rejected, The definition does not use the measured quantity, but the corresponding change of control, this can be, this can be seen also in a measurement. A flux measured quantity would always have the problem that for some situations it is too high, for others too low depending on the dynamic of the response and the noise on the signal	
GB-24	0516	3.8 Single Fault Tolerance		Te	There is no definition of what sort of ‘fault’ has to be catered for, 4.12 elaborates a little but is still wide open to interpretation.	Define it unambiguously or remove the requirement	Rejected, Any kind of fault is meant. The alternative would be to reference to SIL 3 of EN61508. WG03 considers the used approach more easy to understand and implement for the user of the standard.	
RO 25	0520	4		te	In the frequency range from 47 Hz to 52 Hz the generating plant should be capable of operating until the interface protection trips.	Replace the text by: In the frequency range from 47 Hz to 51,5 Hz the generating plant should be capable of operating until the interface protection trips	Rejected Paragraph is only an introduction to the requirements stated in table 1. Range 47-52 is relevant in some European countries	3
DK9	0520 - 1290			te	In chapter 4, it's stated that DSO specify requirements and settings which are clearly outside the DSO responsibility according to EU regulation 2016/631.	Define explicitly in every single case (like for NC RfG), which entity / entities are in charge of defining settings. Alternatively leave out reference of requirement specifier.	Partly accepted See NL-03 for solution	3

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
BE12	0523	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 see also NL03	3
RO 26	0523 ÷ 527	4.1+ Annex B	Table B1		<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> 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. 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).	The specified default settings (Value Default) shall be verified: Intentional Delay = 0s, Cos φ setpoint = 1, which cannot be reached generally. 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. <i>The following sentence shall be reformulated : Where no settings are provided by the DSO, 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>	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
EE-06	0524-526	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 26	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
ES-05	0524- 526	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 26	3
NL-06	0524- 526	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 26	3
PL-13	0524- 526	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 26	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-25	0527	4.1 General		Te	"The provisions of Clause 4 are independent of the duration the generating unit operates in parallel with the distribution network" - This is contrary to the RfG which clearly states that parallel operation of the set for less than 5 minutes per month excludes it from the scope. Article 3-2 (b)	Remove this as it contradicts the RfG	rejected, Backup power is excluded form scope in line 110 and 111. If operation exceeds 100ms there are some DSO requirements present according to this standard, These are not necessarily covered in RfG.	1
GB-26	0536	4.1 General		Te	In what clause does the RfG give the DNO the final say on prime mover protections as this paragraph appears to say?.	Make it clear that the DSO has no rights to define the protections of the prime mover	accepted in principle Delete second half of 536 Add in 545 ... and all settings provided by the DSO or responsible party.	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
AT 06	0536 - 543	4.1	Paragr aph 3	te	Immunity to disturbances is missing	Recommendation for prioritisation and listing of the different generator requirements: 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>	Rejected The hierarchy of immunity is considered in the text of the clause. See also GB 26	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
DE-041	0536 - 543	4.1		Gene ral / techni cal	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 Added in meeting 1026: For cogeneration plants embedded in industrial sites, active power requirements shall be agreed between the responsible party and the producer. In such a case the priority list is adapted accordingly <i>Note for WG members, this addition is due to RfG Article 6 4.</i> 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

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK10	0539			te	Local response to overfrequency. The frequency settings and functionality is not a local phenomenon and are to be specified by the TSO. Under frequency response is only applicable for type C and D generators	delete reference	Rejected Comment not correct LFSM-O is required for Type A see also NL-03 Perhaps we should just write "response to overfrequency" in the priority list i.e. remove the word "local". Goes for underfrequency as well. Also applies to -2 (MV).	3
RO 27	0539	4.1			2. <i>interface protection (see 4.9) and protection against faults within the generating plant;</i> <i>According to R631/2016 (art.14, (5), (a)) only Type B-PGM has to fulfil (to be foreseen with protections). Or at LV in Romania there are not connected Type B-PGM, only Type A-PGM.</i>	<i>Paragraph (2) has to be modified:</i> <i>(2) interface protection (see 4.9) and</i> <i>protection against faults within the generating plant;</i>	Rejected Independent of RfG protection against internal faults is necessary for local reason See also directive 714/2009 8(7)	3
RO 28	0543	4.1			6. <i>remote control commands (P and/or Q set points or control modes) if applicable;</i> According to R631/2016 for Q it isn't a condition for type A which are usually connected in LV.	6 remote control commands (P and/or Q set points or control modes) if applicable	rejected Please note that this standard is taking into account RfG as well as needs of DSOs to manage their systems that are no cross border issues See also directive 714/2009 8(7)	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
RO 29	0544	4.1 4.7.3.			7. <i>local reactive power (see 4.7.2) and/or active power (P(U) see 4.7.3) controls.</i> And <i>4.7.3. Voltage related active power reduction</i> <i>In order to avoid disconnection due to overvoltage protection (see 4.9.2.3 and 4.9.2.4), 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.</i> Conditions for <i>local reactive power</i> or <i>voltage related active power reduction</i> there are not foreseen for type A PGM in R631/2016.	It has to be correlated the conditions in R631/2016 with requirements from this draft of standard.	rejected See also directive 714/2009 8(7)	3
DE-042	0544 - 545	4.1		General / technical	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. The actual wording may be interpreted that possibly only the actual settings and not the whole settable range have to fulfil this requirement.	“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.”	Rejected Present text references to the complete Document and is as such clear	2
DE-043	0548	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.	Rejected, This is a requirement document; verification is not in the scope. This will be covered in -10	1

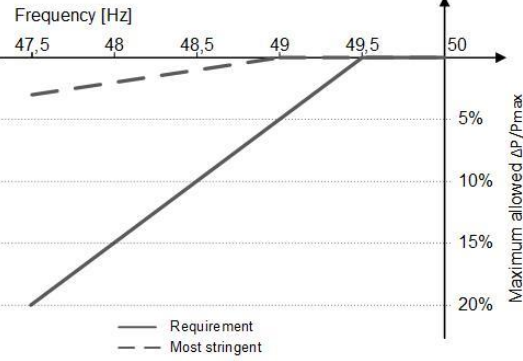
MB/ NC	Line numb er	Clause/ Subclau se	Paragr aph/ Figure/ Table	Type of com ment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
GB-27	0550	4.2	Connec tion scheme	Te	"The generating plant shall be in compliance with the requirements of the DSO." This appears to be a sweeping statement giving the DSO complete control of the specification, regardless of the contents of this standard.	Remove this statement or all the rest of the draft which it makes redundant	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
BE13	0564	4.2		Ed	Unclear reference to "following sections"	Drop "to each of the following sections"	accepted	3
AT 07	0570	4.3.1		ed	Call the short circuit contribution of the generating plant !	Modify to: <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 Also -2 (MV).	3
DE-044	0575 – 576	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
NO 10	0579			te	See comment NO 9 – it is here indicated that the interface switch should not have a requirement on DSO access, but what about the main switch?	Add information on DSO access to main switch	rejected access to main switch is not specific to generating plants and as such covered in installation or operation standards	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
FR 13	0586- 587	4.3.2		Te	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. Line 550 states that “the generating plant shall be in compliance with the requirements of the DSO”.	Write “As a consequence, at least two switches in series might be present between any generating unit and the POC”	Reject A protection and back up protection scheme is a requirement for distribution system operation	1
NO 11	0596- 597			te	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?	Add note or make clearer requirements or degree of freedom outside the range 47-52 Hz	accepted in principle add after Line 602: ...unless DSO, TSO and producer agree on wider frequency ranges and longer durations	2
DE-045	0600 – 602 and 609	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. 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.	Remove the distinction between minimum and most stringent requirements and replicate the NC RfG Table 2 instead of the current Table 1 (line 609). DKE AK261.0.2: delete “most” add “a” for all values in third column	accepted in principle “time period for operation stringent requirement” align line 601-602, see also NO 11	2
FI 15	0600- 601	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 78 See NL-03	3
BE14	0603	4.4.2		Ed	Uniformity in used terms	“even more stringent time periods”	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
DK11	0605			te	Linear generators. Linear generators are not defined.	Define linear generators.	Accepted: Define: linear Stirling engines: A linear Stirling generator is a Stirling engine whose prime mover performs a cyclic linear up and down movement through a magnetic field to generate AC electric power Change all reference to "linear Stirling engine"	3
FR 14	0605-608	4.4.2		te	Technologies qualified as emerging could not be respecting the NC RfG (commission regulation (EU) 2016/351). However, it is not necessary to precise that linear generators, coupled directly and synchronously to the grid, and powered by free piston Stirling engines do not respect this precise characteristic. The risk is to have to update this standard when this technology will no longer be considered as emerging. This paragraph is redundant with the commission regulation (EU) 2016/631	Delete from line 605 to line 608.	rejected, this standard should be usable without taking into consideration to many further documents. WG03 will update this standard whenever needed	3
GB-28	0605-608	4.4.2	and Table 1	te	It should be noted that free piston stirling engines are exempt only in respect of being treated as Emerging Technology but there is a limit to the size of the technology that can fit into this sector and therefore they may not necessary be exempt in the longer term future once the capacity limit has been fully allocated.	Reword NOTE at end of 4.4.2 to make it clearer that the emerging technology acceptance of frequency range limitation is bounded by a total allocation.	accepted Add Note: The status of emerging technology in R 631/2016 Title 6 depends on the cumulative maximum capacity of this technology. Once the threshold in cumulative maximum capacity is reached the status will be withdrawn	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
RO 30	0606 ÷ 609	4.4.2		te	In the R631/2016, Art. 66 Emerging technologies stipulates: <i>(1) With the exception of Article 30, the requirements of this Regulation shall not apply to power-generating modules classified as an emerging technology, in accordance with the procedures set out in this Title.</i> prEN 50549 stipulates (606-609) : <i>As long as generating modules with linear generators, coupled directly and synchronously to the grid, and powered by free piston Stirling engines are recognized as emerging technology according to COMMISSION REGULATION (EU) 2016/631 Title 6, they are permitted to disconnect below 49,5 Hz and above 50,5 Hz.</i> Moreover at 598-599 it is stipulated : <i>In the frequency range from 47 Hz to 52 Hz the generating plant should be capable of operating until the interface protection trips.</i> So, in the case for mCHP with emerging technology status it is not very clear if it is necessary to disconnect mCHP using frequency protections (over/under frequency) at interface switch or if it is necessary to put frequency protections at generating unit switch, taking into account the reduce interval of operating (49.5-50,5) and necessity to prevent damage both in the producer's installations and the distribution network. At the lines 1062-1066, it is specified for micro generating plants: <i>the interface protection system and the point of measurement might be integrated into the generating units. For generating plants with nominal current above 16A the interface protection system shall be realized as a dedicated device and not integrated into the generating units, unless the DSO has defined a higher threshold below which it is also allowed to integrate the interface protection system into the generating units.</i> So, it is understood that all micro generating plants has to contain interface protection, but for mCHP with emerging technology status it is specified nothing. The same problems for voltage protections in the case of mCHP using linear generator using free piston Stirling engines.	Has to be specified the interface protection (if it will be, content etc.), below 1062-1066 lines, for mCHP with emerging technology status due to the mentioned clause 66 in R631/2016.	accepted in principle Add explanation, that interface protection requirements are not affected by this sentence, but only the requirement to operate in the range as defined in Tabel 1. As a consequence in this case machine protection might trip prior to interface protection. If this is the case the reduction of the configuration range of the interface protection in clause 4.9 is acceptable. proposed text: This permit does not affect the requirements for interface protection according to clause 4.9. In this case over and under frequency machine protection might trip prior to interface protection. If an integrated interface protection device is used, the reduction of the configuration range of the interface protection in clause 4.9 is acceptable.	2
PL-14	0608	4.4.2		ed	To improve understanding.	Replace the phrase "50.5." with the phrase "50.5 Hz".	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-29	0609	4.4.2	Operati ng Freque ncy Range	Te	4.4.2 Operating Frequency Range The listing of frequency range requirements is pointless when these are defined per synchronous area. In fact the contents of table 1 contradict the RfG in some values e.g for Continental Europe 47.5-48.5Hz does not limit the most stringent requirements to 90 minutes as claimed in this table.	Remove all requirements that are set per synchronous area in the RfG	partly accepted see DE-045 WG03 intends to put default values, which fit to the majority of European markets. This may require maintenance of this document as the situation evolves	3

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
BE15	0610	4.4.3		Te	Bring requirement in line with NC RfG and response to Question 3 of the TC8X/Sec/0154/ INF. - 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 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.	 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. 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. 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.	Accepted in principle: Change figure to make full line visible over the axes The admissible active power reduction due to underfrequency is limited by the full line in Figure 5 which is characterized by a maximum allowed reduction rate of 10 % of P_{max} per 1 Hz for frequencies below 49,5 Hz. 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. 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.	2
	DK12	0610	4.4.3	te	Minimal requirement for active power delivery at underfrequency. This requirement is to be specified by the TSO.	Remove the DSO remarks and the requirement as the specification is specified by the national TSO.	accepted in principle, see NL-03	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-30	0610- 622	4.4.3	Output Power with Falling Freque ncy Figure 5	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). Unclear why the standard selects the values presented which are less onerous than RfG permits.	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 see also GB-06	1
FI 16	0615	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 78 and NL-03	3
CZ-02	0624	4.4.4		ge	When generating power the generating plant shall be capable of continuous operation when the...	The first three words are confusing	rejected the word have an intended meaning. If a generating plant is in stand by, disconnection is allowed.	3
FR 15	0625	4.4.4		Te	A margin should be kept between the maximum voltage in normal operation allowed by EN50160 (110% over 10 minutes) and transient overvoltages that can occur on the LV network during short periods of time. A clear link should be made between this paragraph 4.4.4 and paragraph 4.5.4 on High Voltage Ride Through, and margins should be kept above 110%	Please clarify the link between 4.4.4 and 4.5.4 and keep margins above 110% (115% for example)	partly accepted 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. 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.	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
FR 16	0625- 626	4.4.4		te	"In case of voltages below U_n, 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." Possibility of power reduction in the operational voltage range is to be decided by the DSO (cf RfG §13. 1 (ii))	Replace with "In case of voltages below U_n , 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."	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 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 WG03 intends to use default values that are most market relevant	2
EE-07	0626	4.4.4		Te	"In case of voltages below U_n, 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 see FR16	2
ES-06	0626	4.4.4		Te	"In case of voltages below U_n, 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 see FR16	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
NL-07	0626	4.4.4		Te	"In case of voltages below U_n, 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 see FR16	2
DE-046	0627	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.	rejected see FR16	2
BE16	0630	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 17	0630	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	accepted see BE16	3
DK13	0641			te	Rate of Change of Frequency Are not to be specified by the DSO. The general used ROCOF withstand capability is 2,5 Hz/s	Remove the sentence where the DSO specifies rate of change of frequency.	accepted see NL-03	3
FR 18	0641	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	0
IE 07	0641	4.5.2		ge	Sliding window of 100ms inconsistent with Irish Distribution Code requirements which prescribes 500ms		See BE17	1
IE 08	0641	4.5.2		ed	2.5 Hz/s not properly introduced. Sliding window should be the same for both – if 1 Hz/s and 2.5 Hz/s are to remain.		Accepted	3

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
FR 19	0641- 646	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	0
AT 08	0642 - 646	4.5.2 Annex B	Table B.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 line 645, 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 2Hz/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 30)	See BE 17	0
BE17	0644	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
DE-047	0644	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	Same as BE -17	0
DK14	0644	4.5.2		ed	"1 Hz/s" This shall be an error, as Annex B stated 2,5 Hz/s	Substitute 1 Hz/s per 2,5 Hz/s	Same as BE -17	0
EE-08	0644	4.5.2		Ed	"1 Hz/s" This shall be an error, as Annex B stated 2,5 Hz/s	Substitute 1 Hz/s per 2,5 Hz/s	Same as BE -17	0

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
ES-07	0644	4.5.2		Ed	"1 Hz/s" This shall be an error, as Annex B stated 2,5 Hz/s	Substitute 1 Hz/s per 2,5 Hz/s.	Same as BE -17	0
FR 20	0644	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"	Same as BE -17	0
NL-08	0644	4.5.2		ed	"1 Hz/s" This shall be an error, as Annex B stated 2,5 Hz/s	Substitute 1 Hz/s per 2,5 Hz/s	Same as BE -17	0
PL-15	0644	4.5.2		ed	"1 Hz/s" This shall be an error, as Annex B stated 2,5 Hz/s	Substitute 1 Hz/s per 2,5 Hz/s	Same as BE -17	0
FI 18	0644-645	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 644 and 645? 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.	Same as BE -17	0
BE18	0645	4.5.2		Ed	Wrong phrasing	Drop "2,5 Hz/s"	See BE17	0
GB-32	0645	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.	Rejected	3
GB-33	0645	4.5.2	Rate of change of frequency (RCOC OF) Immunity	Te	Line 645 states "the 2,5Hz/s ROCOF" Where does 2.5 come from after the previous paragraph states that it is to be defined by the DSO and defaults to 1.0?, this value is also thrown into Annex B.	Remove all requirements that are set per synchronous area in the RfG	Same as BE -17 and: there are other areas for the ROCOF so is better leave open to not be in front of national regulations.	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-048	0645- 646	4.5.2		Te	"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" 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.	Remove values, or wait until European harmonization of this requirement	Obsolete, see BE 17	3
EE-09	0645- 646	4.5.2		Te	"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" 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.	Remove values, or wait until European harmonization of this requirement	Same as DE-048	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-08	0645- 646	4.5.2		Te	“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” 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.	Remove values, or wait until European harmonization of this requirement	Same as DE-048	0
FI 17	0645- 646	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.	Same as DE-048	0
NL-09	0645- 646	4.5.2		te	“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” 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.	Remove values, or wait until European harmonization of this requirement	Same as DE-048	0

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
PL-16	0645- 646	4.5.2		te	“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” 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.	Remove values, or wait until European harmonization of this requirement Or add. “If not specified by the relevant TSO...	Same as DE-048	0
DE-049	0647	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).	Accepted For UVRT and OVRT in the whole document Correct whole document LVRT → UVRT HVRT → OVRT	2

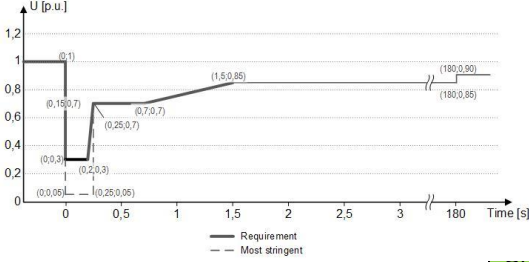
MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-050	0649 – 657	4.5.3.1		ge	LVRT and voltage support during faults and voltage steps only for Type B generators and above is not sufficient. The need of a full LVRT and voltage support during faults and voltage steps also for type A was shown by TU Munich and is mandatory. 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. CHP below 50kW must be according EN50465 thus making UVRT impossible	1. Open Scope for possible national deviations, e.g. in case of high density of DER. 2. Following proposals for adaption of requirements: 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. Lines 653 following: Generating modules classified as Type A excluding CHP and rotating machinery below 50kW or as Type 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. Add chapter 4.7.3.2 of 50549-2 to 50549-1.	Partly accepted 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. Regarding clause 4.7.4 See also DK37	1
GB-34	0653	4.5.3.1	3	Ge	Type B units are mentioned here and makes this section confusing as the title of the standard only includes Type A units	Modify the document title to “Requirements for generating plants to be connected in parallel with distribution networks - Part 1: Connection to a LV distribution network”	Accepted Align with decisions on title in earlier comments	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-35	0654	4.5.3.1	Genera l	Te	“Generating modules classified as Type A and smaller according to COMMISSION REGULATION 2016/631 <u>should</u> comply with these requirements. The actual behaviour of Type A modules shall be specified in the connection agreement.” The RfG does not require band A to meet LVRT requirements so why should they?.	Remove all requirements that are above and beyond the RfG as they are ‘gold plating’	rejected with a should it is only a recommendation, not a requirement	3
GB-31	0654 and 655	4.5.3.1	(LVRT)	te	Lack of clarity as to whether this applies to Type A or not “shall” for type B; “should” for type A “Generating Modules classified as Type A and Smaller according to Commission Regulation 2016/631 should comply with these requirements” .	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 WG03 cannot find a reason to request UVRT of Type A that is not a cross border issue, and therefore not covered by RfG. If UVRT in LV is necessary, please consider a corresponding banding threshold. See also DE-050	2
RO 31	0655 +657	4.5.3.1	Genera l	te	There are different requirements related to each type of power generating modules (type A and type B), and relevant requirements shall clearly specified in order to reduce the additional requirements that could be required by relevant system operators (DSO/TSO).		Rejected. It is clear what requirement is applicable to Type A or B.	3
DK15	0655- 656	4.5.3.1		te	LVRT requirements shall be mandatory where technically feasible.	Replace ‘should’ with ‘shall’ and add ‘where technically feasible’ after ‘requirements’ Add Note with technologies that cannot comply with the requirements.	Rejected. Not all the local requirement will request compliance for these products.	3
NO 12	0655- 656			Ed/te	Generating modules classified as Type A and smaller according to COMMISSION REGULATION 2016/631 should comply with these requirements.- which requirements are referred to?	Make the reference more clear	Rejected. We are in the chapter of LVRT.	3
GB-37	0660	4.5.3.1	Genera l	Te	Paragraph starting on line 660 leaves uncertainty as to how a protection relay should respond to LVRT as it contradicts statements in the paragraph starting on line 672.	Make the definition unambiguous	Rejected. The intention of note 2 is define than the settings for disconnection for the relay shall be in line with the LVRT requirement.	3

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
BE21	0663			Te	The process of national implementation of NC RfG brings new information. 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.	Please reconsider FRT requirement. This proposal still has to be subjected to a BE public consultation and a validation by the NRA in 2018.	Accepted in principle, name Requirement to fault requirement” change default curve minimum retained voltage to %	1
DK16	0664			te	1 Hz/s This is in conflict with line 645.	Change to 2,5 Hz/s	Same as DE-048	3
FR 21	0667	4.5.3.2		te	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”. In EN50549, the connection point is the point of connection of the generating plant to the network. 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.	write “... the voltage at the point of connection of the generating plant ...	rejected, POC is defined in 3.1.10, no need to repeat this	3
DE-051	0668	4.5.3.2		te	“The smallest phase to neutral voltage or if no neutral is present the smallest phase to phase voltage shall be evaluated.” This means if only one measured value is low and the others are still ok, the generating modules are allowed to disconnect.	Consider to develop a proper definition and differentiation of 1, 2, 3 phase faults.	Rejected: For the time being there seems to be no reason why a more complicated requirement is needed. This comment would cause significant cost during testing	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
DK17	0670			te	"The DSO may define a different FRT characteristic." This is not correct. The DSO cannot define generator characteristic which impacts robustness and due to this system stability. The requirement is quite optimistic as it applicability depends on the acceptance of each national regulator.	Rewrite text.	Rejected. The sentence talk about the FRT characteristics and not about the technology. Thomas: see also NL-03 will be changed to "relevant party" FINAL Partly accepted See NL03 introducing "responsible party"	3
BE19	0672	4.5.3.2		Ed	Mismatch	The generating units and all elements that might cause their disconnection	Accepted	3
FR 22	0675-677	4.5.3.2		te	What counts is the LVRT capability of the module with a voltage measured at the connection point of the generating plant. 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. 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.	Write just before the text in lines 675-677 : "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".	Rejected The requirement is on the plant or module respectively, however for validation reason a unit is considered capable to fulfil this requirement if it fulfils the same curve at the clamps of the unit. This is an option for validation, but other ways of validation are not excluded	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
AT 09	0678 - 679	4.5.3.2	Paragr aph 5	te	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> The continuous operating voltage range is defined by 85 % - 110 % Un in chapter 4.4.4. According to figure 6, a LVRT can last up to 3 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 8 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!	Insert the following after line 679: <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>	Accepted Thomas: Accepted in principle, the wording is too complicated. <i>After the voltage returns to continuous operating voltage range, 90 % of the pre fault power <u>or available power whichever is the smaller</u> shall be resumed as fast as possible, but at the latest within 5 s if no other value is defined by the DSO</i> FINAL: Accepted in principle <i>After the voltage returns to the continuous operating voltage range, 90 % of the pre fault power <u>or available power whichever is the smallest</u> shall be resumed as fast as possible, but at the latest within 5 s if no other value is defined by the DSO</i>	3
DE-052	0679	4.5.3.2		te	Latest within 5 s is slow. Simulations in the German research 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.	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 Align for OVRT,UVRT	3

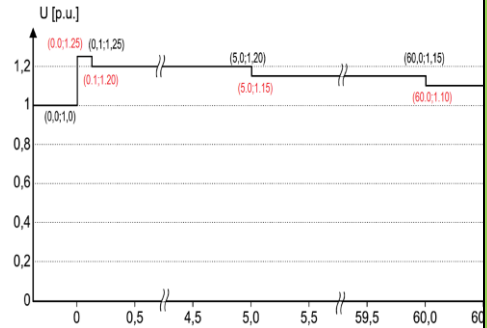
MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
GB-36	0679	4.4.3.2		Te	Resumption of pre fault power at 5 seconds is far too slow. This should be restored within 0.5 seconds to be of use in maintaining system stability. If there are reasons for a slower power restoration then the DNO can ask for a slower restoration.	Replace the second part of line 679 with: "but at the latest within 0.5 seconds or some longer period if defined by the DSO."	Same as DE-052	3
BE22	0680			Te	The process of national implementation of NC RfG brings new information. In BE, the LVRT requirement will probably be more stringent than the standard curve in this draft document.	 Please reconsider FRT requirement. This proposal still has to be subjected to a BE public consultation and a validation by the NRA in 2018.	Partly accepted Keep most stringent, fault requirement: % for 150ms % from 150ms to 700ms % from 1,5s to inf Change to "default requirement"	1
AT 10	0683	4.5.3.3		ed	Typo	Remove the comma between "shall" and "be" to <i>"Generating modules shall be capable of ..."</i>	Accepted	3
DE-053	0683	4.5.3.3		te	The "shall" conflicts with the "should" in line 655. Mini-CHP and micro-CHP are so far not system relevant, and due to the low penetration rate and sales figures, the FRT cost are significant for the end user price.	Add an exemption rule for synchronous generators up to e.g. 50 kVA.	Accepted in principle Add in 4.5.3.1 Exemption for CHP and generating units based on rotating machinery below 50kW as EN50465 for gas appliance requests disconnection in case of undervoltage.	1
PL-17	0683	4.5.3.3		ed	The coma is unnecessary.	Delete the coma from the phrase "shall, be capable".	Same as AT-10	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
FR 23	0684	4.5.3.3		te	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”. In EN50549, the connection point is the point of connection of the generating plant to the network. 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.	write “... the voltage at the point of connection of the power plant ...	see FR 21	1
DE-054	0685	4.5.3.3		te	“The smallest phase to neutral voltage or if no neutral is present the smallest phase to phase voltage shall be evaluated.” This means if only one measured value is low and the others are still ok, the generating modules are allowed to disconnect.	Consider to develop a proper definition and differentiation of 1, 2, 3 phase faults.	Same as DE-051	2
DK18	0687			te	“The DSO may define a different FRT characteristic.” This is not correct. The DSO cannot define generator characteristic which impacts robustness and due to this system stability. The requirement is quite optimistic as it applicability depends on the acceptance of each national regulator.	Rewrite text.	Same as DK-17	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
FR 24	0692- 694	4.5.3.3		te	What counts is the LVRT capability of the module with a voltage measured at the connection point of the generating plant. 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. 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.	Write just before the text in lines 692-694 : “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”.	Rejected The requirement is on the plant or module respectively, however for validation reason a unit is considered capable to fulfil this requirement if it fulfils the same curve at the clamps of the unit. This is an option for validation, but other ways of validation are not excluded	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
AT 11	0695 - 696	4.5.3.3	Paragr aph 5	te	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> In chapter 4.4.4, the continuous operating voltage range is defined by 85 % - 110 % Un. According to figure 6, a LVRT can last up to 3 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 8 seconds between the pre-fault and the moment where 90 % of pre fault power has to be provided. During this time span 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 !	Insert the following after line 696: <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>	Accepted Thomas: Accepted in principle, the wording is too complicated. <i>After the voltage returns to continuous operating voltage range, 90 % of the pre fault power <u>or available power whichever is the smaller</u> shall be resumed as fast as possible, but at the latest within 5 s if no other value is defined by the DSO</i> FINAL: Partly accepted Equivalent to AT09	3
DE-055	0695 – 696	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.	Same as DE-052	3
DE-056	0697	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).	Rejected. hIGH Voltage Ride through is the common name used in grid codes for this type of tests. Thomas: Accepted. 61400-21 is changing to UVRT and OVRT as this cannot be confused with LV, MV, HV FINAL: Equivalent to DE49	2

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
GB-38	0697	4.5.4	High voltage ride through (HVRT)	Te	HVRT is not defined in the RfG.	Remove all requirements that are above and beyond the RfG as they are 'gold plating'	rejected additional detail to RfG is legitimate, Additional requirements are legitimate according to 714/2009 7(8) for non-cross border issues, and issues not covered in RfG	1
DE-057	0698 – 702	4.5.4		Te	In Clause 4.5.3 for LVRT, it was made clear that the LVRT requirements are not required to comply with for Type A generators, since the NC RfG do not require this too. The term "should" is used and not "shall" as for Type B generators; see line 649 - 657. The same is valid for HVRT, we therefore suggest to implement prior to line 698 All controls, including the safety relevant ones, for burners and oil- or gas appliances are specified for 230 V +10 % / -15 %). An operation outside the specification is in general not permitted.	Please implement the following prior to line 698: "In general, generating plants should contribute to overall power system stability by providing immunity towards dynamic voltage changes unless safety standards require different tolerances. The following clauses describe the required immunity for generating plants taking into account the connection technology of the generating modules. Generating modules classified as Type A excluding CHP and rotating machinery below 50kW or as Type B modules according to COMMISSION REGULATION 2016/631 shall comply with the requirements of clause 4.5.4. The actual behaviour of Type A modules shall be specified in the connection agreement."	Accepted in principle, add exemption according DE-050 also in 4.5.4	2 1
CZ-03	0698-702 1125-1131	4.5.4 a 4.9.2.3		ge	In order to ensure the HVRT function with the required voltage level up to 125%, overvoltage protection is required to have a higher adjustment than 1.2 Un.		FINAL: Rejected Stage 2 Threshold is up to 1,3, Stage 1 delay time is up to 100s. This is in alignment with OVRT requirement	3
PL-18	0703	4.5.4		ed	See line eg. 628.	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
AT 12	0705	4.5.4	Figure 8	ed	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	3
DE-058	0710	4.6.1		Êd	Add formula for converting droop to gradient	Gradient $g [(P/P_n)/Hz] = 1/(s \cdot f_n)$	Accepted	3
AT 13	0713 - 715	4.5.4	Note 2	te	Note 2 states the following: “A voltage jump of + 10 % of U_n 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 % U_n. If the voltage jumps from 86 % U_n to 96 % U_n, 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 U_n 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>	Rejected if a stable situation is 109% and starting from this a voltage jump of +10% occurs, this will result in 119% for several seconds. so what is it that is not true?	2
DK19	0716	4.6		te	DSO is not the right entity to set requirements for frequency deviations.	Rewrite text.	accepted in principle see NL-03	3
AT 14	0717	4.6.1	Paragraph	ed	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

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-059	0717	4.6.1		Te	An explicit behavior 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 f_1 shall not reduce the charging power below P_m until frequency returns below f_1 . 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
GB-45	0717-783	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 note 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 15	0718 - 721	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_d , and the available primary power changes during a high frequency period, it may not be possible to fulfil 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 Add in line 720: The droop defines a maximum generation limit. Implementation note Thomas: included in change to GB39. P_{max} -limit instead of P_{set}	2

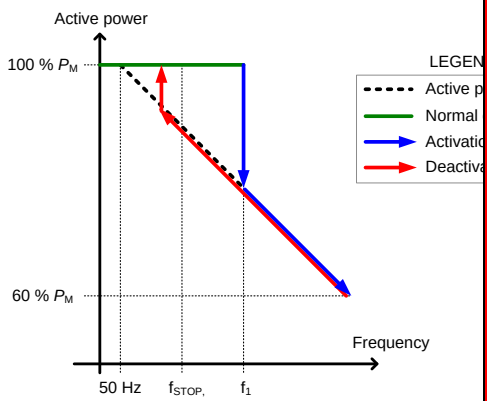
MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-060	0720 – 721	4.6.1		Te	“The droop reference Pref is PM, the actual AC output power at the instant when the frequency reaches the threshold f1.” For synchronous power generating modules P_{ref} shall be P_{max}.	To distinguish between synchronous and non-synchronous power generating modules when defining P_{ref} .	Accepted in principle In 4.6.1: $P_{ref}=P_{max}$ for sync and storage, $P_{ref}=P_m$ for non-sync generation Unless specified differently Implementation note Thomas: Droop 3.7.2 changed accordingly The term Pref is explained in 4.6.1 and the explanation is too complicated for a term definition. Term definition in 3.3 is omitted	
RO 32	0721 after row 721 and 729	4.6		te	Active response to frequency deviation If applicable, relevant prosumer requirements should be specified.	If applicable, please insert the following texts in suitable places: The power response to overfrequency shall be a capability corresponding to each power generating module or to power plant (producer or prosumer entity) at common POC, based on the choice of the producer or prosumer. In the case of a prosumer entity, the activation should be of maximum 5 seconds (or above sometimes), with the same step response time of maximum 30 s.	accepted in principle the requirement is only for the generating plant. The presence of loads is not regarded. It is not required to compensate for load variations (see scope) Add text to make this clear, Align with text for reactive power Thomas implementation note At POC loads, if present in the producer's network, might interfere with the response of the generating plant. The effect of loads is not considered for the evaluation of the accuracy, only the behaviour of the generating plant is relevant.	3
GB-39	0722	4.6.1	Power response to over frequency	Te	How can P_{max} be used as Pref ?, e.g. if the set were operating at 50% of P_{max} and the frequency threshold were reached the output would have to jump up to Pref before drooping which is certainly not desirable.	Remove note 1 or explain how it can work	accepted in principle is a misunderstanding. Add formula for $P=P_M+\Delta P$ with $\Delta P = g \times Pref \times (f1 - f)$	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-061	0727 - 730	4.6.1	New paragra ph after 730	Te	The step response time of maximum 30 s is without further specification such as the step itself of 30 %, 50 % or even 100 % for rotating CHP generator not possible. E.g. if the frequency change e.g. by considering the strongest troop would require an change of active power close to 0, this would require that the rotating generator has smoothly move close to 0 without falling into negative values, which would be equal to a power driven "Motor" which from the gas safety e.g. EN 50465 not permitted. We therefore suggest to expand the time to 60 s in combination with a step change of 50 %	Add a new paragraph after line 730 as follows: "CHP generator units based on rotating machines shall be capable of activating active power response to overfrequency as fast as technically feasible with an intrinsic dead time that shall be as short as possible with a maximum of 2 s and with a step response time of maximum xx s based on a step change of xx %. Or 8. Allow exceeding of step response time in case of technical restrictions of the technology	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

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-062	0727-730	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 sentence in lines 729-730	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
DE-063	0727-730	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 sentence in lines 729-730	see DE 062	0
EE-10	0727-730	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 sentence in lines 729-730	see DE 062	0
NL-10	0727-730	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 sentence in lines 729-730	see DE 062	0
PL-19	0727-730	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 sentence in lines 729-730	see DE 062	0
AT 16	0729	4.6.1		te	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 “and with a step response time of maximum 30 s”. (already regulated in NC RfG)	partly accepted see DE-061	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-11	0729	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." 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 reference to this setting	see DE 062	0
ES-09	0729	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." 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 reference to this setting	see DE 062	0
GB-40	0729	4.6.1	Power respon se to over frequen cy	Te	The adjustable dead time requirement is not in the RfG and is likely to be problematic, e.g. if the frequency rises rapidly past the threshold but no response is made for 2s then there will be a sudden step down in power to catch up with the curve.	Remove all requirements that are above and beyond the RfG as they are 'gold plating'	see DE 062	0
GB-41	0729	4.6.1	Power respon se to over frequen cy	Te	The step response time requirement is not in the RfG.	Remove all requirements that are above and beyond the RfG as they are 'gold plating'	rejected but see DE 061	0
NL-11	0729	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." 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 reference to this setting	see DE 062	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
PL-20	0729	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." 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 reference to this setting	see DE 062	0
DE-064	0729 – 730	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.	see DE 062	0
FR 25	0729- 730	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-062	1
AT 17	0731	4.6.1	Figure 9	ed	Typo in the inscription in figure 9	Correct as follows: <i>"Rated limited power increase after deactivation of response response"</i>	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	0731 to 756	4.6	Whole paragra ph 4.6	te	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. Dead band depicted on Figures 9 and 10 can lead to: - 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). (See Figure A enhanced below the table)	Replace Figures 9 and 10 with proposed figure A.  Figure A	rejected Proposal rejected as not jet used in Europe.	1
PL-21	0732	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	0735	4.6.1			Nominal power is not defined nor used elsewhere in the draft	Use Pmax instead	Rejected Nomial value is added	3
DE-065	0735	4.6.1		Te	The tolerance of 10 % of the nominal power looks in a first attempt quite reasonable. But considering generator specific effects on rotating CHP generators such as a single cylinder engine and the variation in the gas quality and considering that no time is specified on which a kind of an average is calculated the 10 % may be too tight. We suggest therefore to increase the value from 10 % to 20 % or to keep the 10 % but specifying an time on which the average is based on over 1 minute or even 10 minute, where the 10 minutes would correspond with the 10 minutes average time for U>.	Please add as shown in red colour “... 10 % based on an average of 10 minutes”	accepted in principle is a testing issue but since -10 is not available add The accuracy is evaluated with a 1min average value.	2
DE-066	0737- 738	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 062	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-067	0737- 738	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 062	0
EE-12	0737- 738	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 062	0
NL-12	0737- 738	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 062	0
PL-22	0737- 738	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 062	0
DE-068	0739- 742	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 062	0
DE-069	0739- 742	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 062	0
DK20	0739- 742	4.6.1		te	An intentional delay is contradictory to the RfG requirement in Article 13(2)(e) of being “as fast as possible”.	Can the statement in this note be proved? If not, Delete Note 4	accepted, can be proven studies exist by ERDF no change	3
EE-13	0739- 742	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 062	0
NL-13	0739- 742	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 062	0
PL-23	0739- 742	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 062	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-070	0743-744	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 062	0
DE-071	0743-744	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 062	0
EE-14	0743-744	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 062	0
NL-14	0743-744	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 062	0
PL-24	0743-744	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 062	0
DE-072	0745-747	4.6.1		Te	If a generating plant consists of several generating units it may be the case that the different generating units have a different “minimum regulating level” therefore we suggest including this aspect into the requirement as suggested. With tis suggestion the starting part of the paragraph is consistent with the second part of the paragraph.	Please include as follows: “Generating plants or generating unites of this plant reaching their minimum regulating level shall, in the event of further frequency increase, maintain this power level constant unless the DSO requires to disconnect the complete plant or if the plant consists of multiple units by disconnecting individual units.	accepted align in -2	1
DK21	0746			te	The DSO cannot require the generating unit to disconnect during frequency events. This is a TSO responsibility.	Remove the DSO remarks and the requirement as the specification is specified by the national TSO.	accepted see NL-03	3
DE-073	0750	4.6.1		te	It is unclear what the benefits are of the implementation of hysteresis. Control theory says a hysteresis prohibits that you can conclude on a system state by looking at measured values.	Delete lines 750 - 756	See GB-45	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
GB-42	0750	4.6.1	Power respon se to over frequen cy	Te	The deactivation threshold is not in the RfG.	Remove all requirements that are above and beyond the RfG as they are 'gold plating'	DE-073	0
DE-074	0750 – 753	4.6.1		Ge	“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.” This behaviour contradicts to the NC RfG LFSM-O requirement. According to NC RfG, only the behavior described by Figure 9 is admissible.	Remove sentence.	DE-073	0
AT 18	0754	4.6.1	Figure 10	ed	Typo in the inscription of figure 10	Change the following: <i>“Rated limited power increase after deactivation of response response”</i>	Accepted	3
DK22	0754	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.	DE-073	0
PL-25	0755	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”.	DE-073	0
DE-075	0757	4.6.1		ed	The statement is not well phrased. The Terms power and power gradient are mixed	...the active power increase of the generating plant shall not exceed the gradient defined in 4.10.2	accepted	3
GB-43	0759	4.6.1	Power respon se to over frequen cy	Te	The limit to the rate of increase in power is not in the RfG.	Remove all requirements that are above and beyond the RfG as they are 'gold plating'	rejected additional detail to RfG is legitimate, Additional requirements are legitimate according to 714/2009 7(8) for non-cross boarder issues	3
DE-076	0760	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 760	see DE-51	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-077	0760	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 760	see DE-51	0
DK23	0760			te	Settings for frequency thresholds are not to be set by the DSO. This is a TSO responsibility.	Remove the DSO remarks and the requirement as the specification is specified by the national TSO.	see DE-51	0
EE-15	0760	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 760	see DE-51	0
NL-15	0760	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 760	see DE-51	0
PL-26	0760	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 760	see DE-51	0
DK24	0762-764	4.6.1		te	Should this be a NOTE? The equivalent text in prEN 50549-2 (line 748-750) is a NOTE.	Align prEN 50549-1 and prEN 50549-2.	accepted	3
DE-078	0765	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 row from Table 2	see DE-51	0
DE-079	0765	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 row from Table 2	see DE-51	0
DK25	0765			te	Which synchronous area is the threshold f1 used as default setting?	It will most likely be necessary to have separate area values for the f1 threshold.	noted this is why 50549 allows a configuration range to adopt to value specified by the TSO	3

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
EE-16	0765	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 row from Table 2	see DE-51	0
GB-44	0765	4.6.1	Table 2	Te	The default settings are arguably not sufficiently onerous.	Change f1 to 50.5Hz, droop to 2%, delay to 1s for the default settings.	rejected 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	3
NL-16	0765	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 row from Table 2	see DE-51	0
PL-27	0765	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 row from Table 2	see DE-51	0
PL-28	0765	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 “50,0Hz”	accepted	3
SI-4	0765	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.	<i>Add T_{STOP} to Deactivation threshold f_{STOP}. Replace “droop” with “active power droop”.</i>	partly accepted depending on decision on DE 073 If fstop remains in the standard add Tstop to table Implementation note Explanation in the Text implemented as well	3
GB-46	0770 to 783	4.6.2		te	How does anyone know that the random feature has been properly implemented across a wide area?	Remove all this from the standard unless it is clear how it can be proved that the random is truly random across an installed population and that in aggregate it gives the desired effect.	rejected RfG 13 2. (b) provides this option. providing evidence to the randomisation will be a topic to a testing standard	3

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK26	0772			te	Randomized disconnection is not a DSO question. It is a question and decision the individual TSO will make.	Remove the DSO remarks and the requirement as the specification is specified by the national TSO.	accepted in principle see NL-03	3
BE24	0773	4.6.1			For most areas, limited time operation is only requested to frequencies lower than 52 Hz. In order to have a correct emulation of a droop, randomisation should take place in the frequency range from f1 to the upper limit of the frequency range for which an operation duration is required (default 51.5 Hz). The effect to have 52 Hz can hardly be considered as negligible.	Change 52 Hz into "51.5 Hz or another limit provided by the DNO considering the upper limit of the required operating frequency range."	accepted in principle comment indicates misunderstanding The interface protection is still active disconnecting all generating units at 51,5. The even distribution up to 52 emulates a higher droop with ca. 30% of generating units disconnecting at 51,5Hz. Add After line 773: Note The usage of a disconnection limit above 51,5Hz does not necessarily imply the requirement to operate at this frequency. Operating range is defined in caluse 4.4.4. If the randomized disconnection value is above the operating range and interface protection setting, the unit is disconnected according to chapter 4.9 at the value set by the interface protection	2
PL-29	0773	4.6.1		ed	See the line eg. 719.	Replace the symbol "f1" with the symbol "f ₁ ".	accepted	3
DK27	0774-776	4.6.1		te	The normal connection conditions in 4.10 are already randomized for units that cannot ramp, so why not just use the procedure in 4.10.2?	Reconnection according to 4.10.2.	rejected, 4.10 requires a delayed connection, in case of randomized dis-and reconnection, the reconnection shall be as fast as possible in case of falling frequency to emulate also for falling frequency the same behaviour as a droop	3

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK28	0777	4.6.1		ed	The intention of the requirement is not clear	Reformulate	accepted the randomization shall either be at unite level by changing the threshold over time, or on plant level by choosing different values for each unit within a plant, or on distribution system level if the DSO specifies a specific threshold for each plant or unit in its distribution system	2
AT 19	0784	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)"	Accepted in principle align with 4.6.1 AT 14	1
DK29	0785	4.6.2		te	"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." 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. Underfrequency response is only applied to type C and D generators, which is not included in this standard	Delete supclause 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
AT 20	0785 - 803	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 791 – 795, if the battery storage generating unit changes to generating mode.	Insert the following bullet points after line 767: • “For battery storage generating units in generating mode: state of charge (SOC) > 0 Battery storage generating unit is not in maintenance mode”	partly accepted in our understanding the available power in case of a battery includes the SOC Add Note after 792: in case of battery storage units, the available power includes the state of charge of the battery regarding maintenance: This is a general issue; all requirements are only relevant in case of generation. Include statement in 4.1: 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. ...	2
RO 33	0786 ÷ 788	4.6.2		te	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> In European Regulation 2016/631, art (3), (d) it is stipulated that storage devices except for pump-storage power-generating modules in accordance with Article 6(2), are excepted from its provisions.	To include a note referring to the <i>European regulation</i> where this technical condition is required.	see DK29	0
BE25	0791				Type mismatch	The generating unit is operating ...below its Equivalent in lines 0792, 0795	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
BE26	0791- 0795			Ed/Te	The conditions do not reflect correctly the case of a storage system working in charging mode	Change into: - 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 <i>Note for WG members: 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 798 799 makes this topic clear</i>	2
DE-080	0793 – 794	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
BE27	0796			Ed		Add blank specified conditions	accepted	3
PL-30	0796	4.6.2	Note 1	ed	Inserting of the space.	Replace the phrase “specifiedconditions” with the phrase “specified conditions”.	see BE27	0
GB-47	0800	4.6.2	Note 2	Ge	Draft Emergency Response code (Article 15) envisages that storage will switch to generation on falling frequency	Consider how to take into account the likely legal requirements from the NC ER.	noted draft emergency response code (article 15) will be considered https://ec.europa.eu/energy/sites/ener/files/documents/nc_er_ener_vs_13_ecbc_on_24_25_10-2016finalasvotedfor_publication.pdf	2

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
FR 26	0806	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	discuss 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. Add Formula to calculate Pset: $P = P_M + \Delta P$ with $\Delta P = g \times P_{ref} \times (f1 - f)$ Add for note in line 7xx: for 50Hz system $g \times s = 200$ Thomas Implementation note: $g \times s = 200$ replaced by proposal of DE 0-58	1
DE-081	0812 - 815	4.6.2	New paragraph after 815	Te	The step response time of maximum 30 s is without further specification such as the step itself of 30 %, 50 % or even 100 % for rotating CHP generator not possible. E.g. if the frequency change e.g. by considering the strongest troop would require an change of active power close to 0, this would require that the rotating generator has smoothly move close to 0 without falling into negative values, which would be equal to a power driven “Motor” which from the gas safety e.g. EN 50465 not permitted. We therefore suggest to expand the time to 60 s in combination with a step change of 50 %	Add a new paragraph after line 815 as follows: “CHP generator units based on rotating machines shall be capable of activating active power response to overfrequency as fast as technically feasible with an intrinsic dead time that shall be as short as possible with a maximum of 2 s and with a step response time of maximum xx s based on a step change of xx %. Or Allow exceeding of step response time in case of technical restrictions of the technology	accepted solution see DE-061	1
DE-082	0812-815	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 814-815	see DE-51	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-083	0812-815	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 814-815	see DE-51	0
EE-17	0812-815	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 814-815	see DE-51	0
NL-17	0812-815	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 814-815	see DE-51	0
PL-31	0812-815	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 814-815	see DE-51	0
GB-48	0813-814	4.6.2		te	Current wording says an intentional delay shall be programmable to adjust the dead time to a value between the intrinsic dead time and 2s. This ought to be made clear that this is for the initial dead time only.	Add “initial” so that the sentence starts “An intentional initial delay shall be programmable to adjust the dead time---“	accepted align in -2	3
AT 21	0814	4.6.2		te	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 see DE-061	1
DE-084	0814	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 reference to this setting	see DE-51	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-18	0814	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 reference to this setting	see DE-51	0
ES-10	0814	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 reference to this setting	see DE-51	0
NL-18	0814	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 reference to this setting	see DE-51	0
PL-32	0814	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 reference to this setting	see DE-51	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-085	0821	4.6.2		Te	The tolerance of 10 % of the nominal power looks in a first attempt quite reasonable. But considering generator specific effects on rotating CHP generators such as a single cylinder engine and the variation in the gas quality and considering that no time is specified on which a kind of an average is calculated the 10 % may be too tight. We suggest therefore to increase the value from 10 % to 20 % or to keep the 10 % but specifying an time on which the average is based on over 1 minute or even 10 minute, where the 10 minutes would correspond with the 10 minutes average time for U>.	Please add as shown in red colour "... 10 % based on an average of 10 minutes" or increase the value of 20 %.	accepted in principle is a testing issue but since -10 is not available add The accuracy is evaluated with a 1min average value.	2
DE-086	0823-824	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 Note 5	see DE-51	0
DE-087	0823-824	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-51	0
EE-19	0823-824	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 Note 5	see DE-51	0
NL-19	0823-824	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 Note 5	see DE-51	0
PL-33	0823-824	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 Note 5	see DE-51	0
DE-088	0825-828	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 Note 6	see DE-51	0
DE-089	0825-828	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-51	0
EE-20	0825-828	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 Note 6	see DE-51	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
NL-20	0825- 828	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 Note 6	see DE-51	0
PL-34	0825- 828	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 Note 6	see DE-51	0
DE-090	0829- 830	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 Note 7	see DE-51	0
DE-091	0829- 830	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-51	0
EE-21	0829- 830	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 Note 7	see DE-51	0
NL-21	0829- 830	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 Note 7	see DE-51	0
PL-35	0829- 830	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 Note 7	see DE-51	0
DK30	0836/ 837	4.6.2		te	The DSO does not control activation or deactivation nor the threshold or droop.	Remove the DSO remarks and the requirement as the specification is specified by the national TSO.	accepted in principle, see NL-03	3
DE-092	0836- 837	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-51	0
DE-093	0836- 837	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-51	0
EE-22	0836- 837	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-51	0

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
NL-22	0836-837	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-51	0
PL-36	0836-	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-51	0
BE28	0840					Add paragraph, 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.	accepted in principle this topic is covered in 4.1 hierarchy of functions. As this was not noted by the reader issuing this comment, Proposal: Add Note: In case of increase of active power generation, the hierarchy of requirements in clause 4.1 apply	1
IE 09	0841	4.7.1		te	It should be made clear whether these requirements apply at the Point of Connection or the Generator terminals. Suspect the latter.		Rejected. For each specific / single requirement the location of application is given separately, e.g. line 862, 865 or 916.	1
DE-094	0856	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 color 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

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
CH-03	0859 – 860	4.7.2.2	New paragra ph	Te	Since the NC RfG does not require reactive power contribution for type A generators, we suggest to allow generator units ≤ 150 kVA a reduced amount of reactive power requirement. Furthermore, CHP generators shall comply with the European Energy Efficiency Directive ErP where high efficiencies are defined to support the European target on CO ₂ reduction to reach the global climate targets. An expansion of the $\cos \varphi$ range to lower values than 0,95 – 0,95 would be significantly in contradiction to the ErP targets.	Please add the following prior to line 860: CHP generating units with a capacity ≤ 150 kVA shall be able to operate with active factors as defined by the DSO from $\cos \varphi = 0,95$ underexcited to $\cos \varphi = 0,95$ overexcited at the terminals of the/each generating unit.	accepted Proposal is in line with German implementation BE: ok	1
DK31	0860- 862	4.7.2.2		te	“Unless specified differently below for specific generating technologies, generating plants connected to LV 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 at the terminals of the/each generating unit.” The DSO may define the reactive power capability at the POC	Modify sentence: “Unless specified differently below for specific generating technologies, generating plants connected to LV 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 at the terminals of the/each generating unit or at the POC. ”	Rejected For practical reasons requirement is evaluated at terminals, the difference between terminals and POC is negligible	1
EE-23	0860- 862	4.7.2.2		Te	“Unless specified differently below for specific generating technologies, generating plants connected to 861 LV shall be able to operate with active factors as defined by the DSO from $\cos \varphi = 0,90$ underexcited to 862 $\cos \varphi = 0,90$ overexcited at the terminals of the/each generating unit.” The DSO may define the reactive power capability at the POC	Modify sentence: “Unless specified differently below for specific generating technologies, generating plants connected to 861 LV shall be able to operate with active factors as defined by the DSO from $\cos \varphi = 0,90$ underexcited to 862 $\cos \varphi = 0,90$ overexcited at the terminals of the/each generating unit or at the POC. ”	See DK31 above.	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-11	0860- 862	4.7.2.2		Te	“Unless specified differently below for specific generating technologies, generating plants connected to 861 LV shall be able to operate with active factors as defined by the DSO from $\cos \varphi = 0,90$ underexcited to 862 $\cos \varphi = 0,90$ overexcited at the terminals of the/each generating unit.” The DSO may define the reactive power capability at the POC.	Modify sentence: “Unless specified differently below for specific generating technologies, generating plants connected to 861 LV shall be able to operate with active factors as defined by the DSO from $\cos \varphi = 0,90$ underexcited to 862 $\cos \varphi = 0,90$ overexcited at the terminals of the/each generating unit or at the POC.”	See DK31 above.	0
NL-23	0860- 862	4.7.2.2		te	“Unless specified differently below for specific generating technologies, generating plants connected to 861 LV shall be able to operate with active factors as defined by the DSO from $\cos \varphi = 0,90$ underexcited to 862 $\cos \varphi = 0,90$ overexcited at the terminals of the/each generating unit.” The DSO may define the reactive power capability at the POC	Modify sentence: “Unless specified differently below for specific generating technologies, generating plants connected to 861 LV shall be able to operate with active factors as defined by the DSO from $\cos \varphi = 0,90$ underexcited to 862 $\cos \varphi = 0,90$ overexcited at the terminals of the/each generating unit or at the POC.”	See DK31 above.	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
PL-37	0860- 862	4.7.2.2		Te	"Unless specified differently below for specific generating technologies, generating plants connected to 861 LV shall be able to operate with active factors as defined by the DSO from $\cos \varphi = 0,90$ underexcited to 862 $\cos \varphi = 0,90$ overexcited at the terminals of the/each generating unit." 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.		see DK31. No proposal	1
GB-49	0861	4.7.2.2	Capabil ities	Te	Why does this section specify values that are in fact determined per synchronous area?.	Remove all requirements that are set per synchronous area in the RfG	Reject. This is a local requirement and independent of RfG or synchronous areas	1
FR 27	0861- 862	4.7.2.2		te	$\cos \varphi$ 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.	$\cos \varphi$ range from 0.95 (under excited) to $\cos \varphi$ 1	Partly accepted see CH-03	1
RO 34	0863 -867	4.7.2.2		te	Generating units with an induction generator coupled directly to the grid and used in generating plants above micro generating level, shall be able to operate with active factors as defined by the DSO from $\cos \varphi = 0,95$ underexcited to $\cos \varphi = 1$ at the terminals of the unit.	To clarify it ! DSO only ?	Noted Yes only DSO	1
SI-5	0863 to 876	4.7.2.2	All togethe r four paragra phs	te	Required reactive power characteristics for all low voltage generators (including micro generators) is fully defined in the <i>Slovenian national rules for connection and operation of generators in the distribution network</i> . A simplified controlled voltage support by reactive power is required also for this type of generators.	Delete lines from 863 to 876.	Rejected: according to scope additional national requirements might exist and must be complied with.	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
IE 10	0865	4.7.2.2		te	The terms under and over excited should only be used for synchronous machines. Their use in induction machines and invertors is technically incorrect.	To distinguish, would suggest a convention such as "Generating importing Vars" and "Generator exporting Vars".	Rejected. Using "underexcited" / "overexcited" is common in standards. → Or should we use leading-/lagging? Discuss: Over and underexcited is a must have, as all other definitions are more at risk of misinterpretations.	2
BE29	0867				Pnom is not defined in this draft standard	Replace Pnom by "P _D , the maximum active power at the active factor 0,95 _{underexcited} ."	Partly accepted. Replace "P _{nom} " by "P _D , i.e. for this type of generating technology the maximum active power at the minimum active factor defined by the DSO." Discuss! Implementation note Thomas: only change to PD, definition not repeated	2
RO 35	0870	4.7.2.2		te	<i>A controlled voltage support by reactive power is not required from this technology.</i> If the technology is capable for voltage control, is not the case to write as not required.	Remove the sentence.	Partly accepted, Rewrite sentence ..., and therefore a controlled...	1

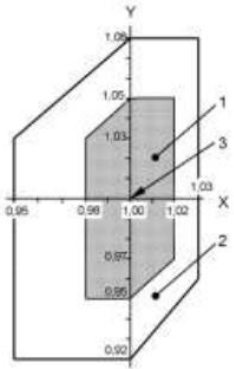
MB/ NC	Line numb er	Clause/ Subclau se	Paragr aph/ Figure/ Table	Type of com ment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK32	0876	4.7.2.2		te	"In case of different generating technologies with different requirements in one generating plant, each unit shall provide voltage support by reactive power as required for its specific technology. A compensation of one technology to reach the general plant requirement is not expected." The requirements of reactive power are defined in Regulation 2016/631 by power generating module not by generating plant. In this case, if there are different technologies in one module, it shall be possible to compensate the reactive power injection in order the generating module comply with the reactive power capability requirement at the terminals or at the POC.	Remove sentence, or if not, make it consistent with the application of requirements by power generating module as defined in Regulation 2016/631.	Rejected Text is a proposal of a RSO-specification for reactive power requirement according to article 17/20 2(b). If used, in a PPM there are different requirements of induction and inverter based generation units. This is stated here. If other requirements are specified according to 17/20 2(b) other solutions must be found	1
EE-24	0876	4.7.2.2		Te	"In case of different generating technologies with different requirements in one generating plant, each unit shall provide voltage support by reactive power as required for its specific technology. A compensation of one technology to reach the general plant requirement is not expected." The requirements of reactive power are defined in Regulation 2016/631 by power generating module not by generating plant. In this case, if there are different technologies in one module, it shall be possible to compensate the reactive power injection in order the generating module comply with the reactive power capability requirement at the terminals or at the POC.	Remove sentence, or if not, make it consistent with the application of requirements by power generating module as defined in Regulation 2016/631.	See DK32 above.	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-12	0876	4.7.2.2		Te	“In case of different generating technologies with different requirements in one generating plant, each unit shall provide voltage support by reactive power as required for its specific technology. A compensation of one technology to reach the general plant requirement is not expected.” The requirements of reactive power are defined in Regulation 2016/631 by power generating module not by generating plant. In this case, if there are different technologies in one module, it shall be possible to compensate the reactive power injection in order the generating module comply with the reactive power capability requirement at the terminals or at the POC.	Redraft sentence in order to make it consistent with the application of requirements by power generating module as defined in Regulation 2016/631.	See DK32 above.	0
NL-24	0876	4.7.2.2		te	“In case of different generating technologies with different requirements in one generating plant, each unit shall provide voltage support by reactive power as required for its specific technology. A compensation of one technology to reach the general plant requirement is not expected.” The requirements of reactive power are defined in Regulation 2016/631 by power generating module not by generating plant. In this case, if there are different technologies in one module, it shall be possible to compensate the reactive power injection in order the generating module comply with the reactive power capability requirement at the terminals or at the POC.	Remove sentence, or if not, make it consistent with the application of requirements by power generating module as defined in Regulation 2016/631.	See DK32 above.	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
PL-38	0876	4.7.2.2		Te	"In case of different generating technologies with different requirements in one generating plant, each unit shall provide voltage support by reactive power as required for its specific technology. A compensation of one technology to reach the general plant requirement is not expected." The requirements of reactive power are defined in Regulation 2016/631 by power generating module not by generating plant. In this case, if there are different technologies in one module, it shall be possible to compensate the reactive power injection in order the generating module comply with the reactive power capability requirement at the terminals or at the POC.	Remove sentence, or if not, make it consistent with the application of requirements by power generating module as defined in Regulation 2016/631.	See DK32 above.	0
DE-095	0879	4.7.2.2		Te	"NOTE 1 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 reduction has an important impact in the system stability and security and this cannot be left to manufacturers criteria.	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

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
DK33	0879	4.7.2.2		te	“NOTE 1 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 reduction has an important impact in the system stability and security and this cannot be left to manufacturers criteria.	Remove note	See DE-095 above.	0
EE-25	0879	4.7.2.2		Te	“NOTE 1 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 reduction has an important impact in the system stability and security and this cannot be left to manufacturers criteria.	Remove note	See DE-095 above.	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
NL-25	0879	4.7.2.2		te	“NOTE 1 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 reduction has an important impact in the system stability and security and this cannot be left to manufacturers criteria.	Remove note	See DE-095 above.	0
PL-39	0879	4.7.2.2		Te	“NOTE 1 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 reduction has an important impact in the system stability and security and this cannot be left to manufacturers criteria.	Remove note	See DE-095 above.	0
FR 28	0889	4.7.2.2		te	“VA operation” is not clear	clarify	“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. Maybe add some more details / explanations to the Note?	3

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
AT 22	0896	4.7.2.2	Paragraph 9	te	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 $\pm 2\% S_{max}$. This is unreasonably exact. When providing reactive power, the correct behaviour (under-excited/ overexcited) is more important than high accuracy.	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
GB-50	0896	4.7.2.2	Capabilities	Te	Why is such a high accuracy needed?, ($S \pm 2\%$ down to only 10% of maximum).	Fully justify the requirement or leave it to the manufacturer as this could distort the market	Compare AT22 above	0
NO 13	0907		Figure 13	ed	Part of the figure text is not in English	Translate	Accepted. Modify diagram.	3
AT 23	0907	4.7.2.2	Figure 13	ed	Typos in the labels of the x-axes	Correct the labels of the x-axes in Figure 13 as follows: "Absorption of reactive energy" "Provision of reactive energy"	Accepted. Modify diagram.	3
DK34	0907	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

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
BE20	0917	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
FR 29	0922	4.7.2.3.1		Te	Tan ϕ may also be used	Write "cos ϕ or tan ϕ setpoint mode"	Rejected. 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.	2
SI-6	0923, 924	4.7.2.3.1	Fourth paragraph	te	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. 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.	<i>After line 923 and before line 924 insert a bullet with this text:</i> "Reactive power as a function of active power and voltage at the same time $Q(P, U)$" <i>or a bullet with this text (whichever fits better into the bulleted list):</i> "$Q(P, U)$"	rejected 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. If the request is meant in a different way, it would have to be specified with more detail.	1
FR 30	0931-932	4.7.2.3.2		Te	cos ϕ or tan ϕ	Replace "cos ϕ " by "cos ϕ or tan ϕ "	See FR29	3
RO 36	0933	4.7.2.3.2		te	The settling time shall be less than one minute.	<i>The set point is remotely? It is applied only for class B. It shall be clearly specified to reactive power as well.</i>	Rejected This requirement is independent of whether it is set remotely or locally (locally it wont be set very often; remotely the one minute requirement applies) As this chapter does not require remote setting it is also independent of class AB..	2

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
RO 37	0934	4.7.2.3.3		te	Voltage related control modes	<i>Why is need it? if we have declared before that the voltage control is not necessary for class A and B?</i>	Rejected Requested in several states for local voltage control needs	3
GB-51	0936	4.7.2.3.3	Voltage related control modes	Te	Says that it is for the manufacturer to choose the method of voltage measurement, then in contradiction limits this choice to one of three methods.	Leave it to the manufacturer to define measurement techniques.	Rejected It is a should, not a shall. So it is left to the manufacturer.	3
GB-52	0936	4.7.2.3.3	Voltage related control modes	Te	Terms like “for the time being” and “at present” do not belong in an EN	Remove such emotive language which has no place in EN. The whole document if only for the time being and will inevitably change.	Partly accepted: change to: There is no preferred state of the art for evaluating the voltage. Therefore it is the responsibility of the generating plant designer to choose a method. One of the following methods should be used: Also applies for -2	2
GB-53	0936	4.7.2.3.3	Paragraph	ed	<i>“For the time being there is no preferred state of the art for evaluating the voltage”</i> The use of “State of the art” does not read correctly	<i>Consider changing to</i> <i>“For the time being there is no preferred option for evaluating the voltage”</i>	See GB-52	0
GB-54	0940	4.7.2.3.3	Voltage related control modes	Te	What is the “the average voltage of a three phase system” ?, maybe it was supposed to be “the average of the RMS values measured independently for each phase” ?.	Clarify the statement	Accepted the average voltage of a three phase system; <u>the average of the voltages measured independently for each phase to neutral or phase to phase;</u>	2
GB-55	0941	4.7.2.3.3	Voltage related control modes	Te	Confuses voltage and reactive power, it is supposed to be a method of evaluating voltage	Clarify the statement	Rejected No Idea how this can be even more clear. It is about Q(U). And says: phase independently the voltage of every phase to determine the reactive power for every phase.	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
GB-56	0945	4.7.2.3.3	Voltage related control modes	Te	Dictates a first order control response with a settable time constant, but this is incompatible with a PI controller as an integrator does not follow a first order response. This is not required by the RfG and should be for manufacturers to define.	Remove all requirements that are above and beyond the RfG as they are 'gold plating'	Accepted in principle with different proposed change Defining of the behaviour (at least roughly) is important for not having the situation that systems near each other operate completely different. This is a local issue, and therefore has nothing to do with RfG. There shall be an allowed band within the requirement is fulfilled, so that well configured PI control will perfectly fit. Change 955-956 to: See Annex 1 1) Add to note: A response time (tr) that defines 90% shall be achieved is equal to $tr = \tau * 2,3$. E.g. $tr = 10\text{sec}$ is equal to a $\tau = 4,35\text{sec}$ Thomas 14.12. Implementation Note: As DE-079 (on -2) and Annex 1 show the figure of a PT-1 and define the dynamic tolerance band, the second half of the note is omitted	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
GB-57	0947	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 $\leq 1s$.	Rejected, This function is addressing normal system operation and not disturbed state. Disturbed state is covered in clause on short circuit current contribution. 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. 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	1
GB-58	0949	4.7.2.3.3	Voltage related control modes	Te	What does note 2 mean, it's unclear and suggests a bad translation?.	Clarify its meaning	Accepted Note 2: The response to disturbances as in clause 4.5 and short circuit requirements as in 4.7.4 is not included in this clause.	2
FR 31	0953	4.7.2.3.3		Te	What does that mean? Which power is locked? (apparent? active ?)	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

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
GB-59	0953	4.7.2.3.3	Voltage related control modes	Te	What are “lock in and lock out power levels”?.	Define these terms	See FR31	0
GB-60	0955	4.7.2.3.3	Voltage related control modes	Te	“The accuracy of each Q set point shall be according to 4.7.2.2” but that section does not define the Q accuracy, only the S accuracy.	Provide a fully justified definition of accuracy or better still leave it to the manufacturer as this could distort the market	See GB-56	1
GB-61	0960	4.7.2.3.4	Power related Control mode	Te	This whole section is in broken English and needs rewording before meaningful comment can be made.	Correct the language so it can be commented on	Rejected. The chapter can be understood. So if there shall be corrections in the language it is ed and not te. The “proposed change” column would be the right place for proposals.	2
DK35	0970	4.7.3		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-096 093	3
RO 38	0970	4.7.3		te	Voltage related active power reduction	<i>It is not usual to use in standards a sentence as: “The final implemented logic can be chosen by the manufacturer”</i>	Noted. No proposal. Sentence is allowed.	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-096	0971- 974	4.7.3.1		Te	"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." 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)	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.'"	Accepted in principle Add: The power reduction caused by such a function may not be faster than an equivalent of tau=3sec. (=33%/sec at a 100% change) 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. 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)	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
DK36	0971- 974	4.7.3.1		te	"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." 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)	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.""	Identical DE-096	0
EE-26	0971- 974	4.7.3.1		Te	"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." 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)	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.""	Identical DE-096	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-13	0971- 974	4.7.3.1		Te	“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.” 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).	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.””	Identical DE-096	0
FR 32	0971- 974	4.7.3.1		te	“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.” 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	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-096	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
NL-26	0971- 974	4.7.3.1		te	"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." 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)	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.""	Identical DE-096	0
PL-40	0971- 974	4.7.3.1		Te	"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." 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)	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 relevant system operator 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.""	Identical DE-096	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
DK37	0975			ge	As Type B generation may fall under the scope of this document, and according Regulation 2016/631 they may include a fast fault current injection control. If the 50549-2 document include the "Voltage support during faults and voltage steps" definition, 50549-1 shall include it also.	Include the same Voltage support during faults and voltage steps definition in both documents.	Accepted in principle Include same heading structure in -1, but state that in LV no voltage support is requested as it conflicts with LV-Grid protection configuration. If requested by the responsible party for a Type B plant in LV, the requirements of -2 apply	1
EE-27	0975			Ge	As Type B generation may fall under the scope of this document, and according Regulation 2016/631 they may include a fast fault current injection control. If the 50549-2 document include the "Voltage support during faults and voltage steps" definition, 50549-1 shall include it also.	Include the same Voltage support during faults and voltage steps definition in both documents.	See DK37	0
GB-08	0975	1	Scope	ge	Missing fast fault current injection requirements from 50549-1 which should include them for instances where type B generating units are connected at LV	Include fast fault current injection requirements in part 1 for example where type B Generating Units are connected at LV	See DK37	0
NL-27	0975			ge	As Type B generation may fall under the scope of this document, and according Regulation 2016/631 they may include a fast fault current injection control. If the 50549-2 document include the "Voltage support during faults and voltage steps" definition, 50549-1 shall include it also.	Include the same Voltage support during faults and voltage steps definition in both documents.	See DK37	0
DE-097	0975	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

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-098	0975	4.7.4		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	Accepted in principle Define only activation, recovery above the threshold as fast as possible to clause 4.5 change configuration range to 20%-90%, default 50% for information: Currently only used in Germany, German Result of Discussion in Germany: 1) same threshold for activation and deactivation is used 2) in <u>MV</u> a combination of ZCM and 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.	1
DK38	0975	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 DE0-97	3

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
EE-28	0975	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 DE0-97	3
ES-14	0975	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 DE0-97	3
NL-28	0975	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 DE0-97	3
GB-62	0989	4.8	EMC and power quality	Te	Why does this EN mandate compliance with a Directive, particularly one which manufacturers are already obliged to comply with?.	Remove this pointless clause, it doesn't even make clear requirements. Alternatively make it an informative Annex because that's all it is.	Rejected The statement is correct, but it helps to understand the general concepts and we added reference for some specific EMC requirement in this EN	1
AT 24	0989 - 990	4.8	Paragraph 1	te	Directive 2014/30/EU is not the only one important to be mentioned here. On from June 12 th , 2017, generating units with radio communication are falling into the scope of the Radio Equipment Directive 2014/53/EU.	Complete as follows: “ <i>Similar to any other apparatus or fixed installation, generating units shall comply with the requirements on electromagnetic compatibility established in Directive 2014/30/EU or 2014/53/EU, whichever applies.</i> ”	Accepted	3
PL-41	1010	4.8	Note 2	ed	Inserting of the space (conformity with adopted convention).	Replace the “EN61000” standard number with the number “EN 61000”.	Accepted	3

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK39	1015			te	ROCOF is mentioned in part 4.8 which is regarding EMC and Power quality. ROCOF is not EMC or Power Quality.	Delete line 1015	Rejected. Is an example as LVRT, HVRT,...	3
DK40	1016			te	LVRT is mentioned in part 4.8 which is regarding EMC and Power quality. LVRT is not EMC or Power Quality.	Delete line 1016	Rejected. Is an example as LVRT, HVRT,...	3
DK41	1017			te	HVRT is mentioned in part 4.8 which is regarding EMC and Power quality. HVRT is not EMC or Power Quality.	Delete line 1017	Rejected. Is an example as LVRT, HVRT,...	3
GB-63	1018- 1020	4.8		Te	There is a requirement to not inject DC current in line 1018 and then a Note3 says that the DC injection clause is considered to be passed when the measured DC injection of a type tested unit is below the testing threshold. This leaves the standard open to all sorts of problems. A DSO could detect DC down to 1mA on a 50kW inverter and fail it. A manufacturer could use a technique which fails to measure 50mA on a 100W micro inverter put in 50kW in a street and inject 25A of DC into the DSOs transformer causing it to overheat, produce a distorted voltage output and become very noisy. The current UK method of setting a limit based on current rating is much more transparent and has been shown to be achievable at reasonable cost to the manufacturer and with minimum adverse affects on the DNOs network.	Set a limit for DC injection of 0.25% of the AC current rating.	Rejected Will be included in -10	1
NO 14	1026- 1027			te	As some countries have different requirements on voltage characteristics than EN 50160 the text should cover this.	Generating units are also expected to be compatible with voltage characteristics at the point of connection, as described in EN 50160 or in national regulations,....	Accepted	3
NO 15	1027- 1028			te	The statement "however no specific verification is required due to the nature of EN 50160" is not clear and might not be needed. Consider to delete or to explain meaning.	...however no specific verification is required due to the nature of EN 50160.	Accepted in principle ...however no compliance test is required due to the scope of EN 50160.	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
GB-64	1029	4.9.1	Interfac e protecti on Genera l	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 25	1036	4.9.1	Paragr aph 2	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 number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
GB-65	1052	4.9.1	Interface protection on General	Technical	Yes it is one of the purposes of the interface protection to prevent damage due to auto reclosers 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	Prio 1 2 3
DE-099	1058-1059	4.9.1		Te	"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." 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.	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."	Partially accepted. Modify sentence as following : "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." 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. <u>Which functions are implemented in a product shall be stated in the product documentation.</u> 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	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
DK42	1058- 1059	4.9.1		te	"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." 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.	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."	See DE-099	0
EE-29	1058- 1059	4.9.1		Te	"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." 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.	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."	See DE-099	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-15	1058- 1059	4.9.1		Te	"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." 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.	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."	See DE-099	0
NL-29	1058- 1059	4.9.1		te	"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." 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.	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."	See DE-099	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
PL-42	1058- 1059	4.9.1		Te	"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." 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.	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 relevant system operator. 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."	See DE-099	0
GB-66	1060	4.9.1		Te	There is no justification for limiting the incorporation of protection to only micro generation. This will stifle innovation and cost reduction. 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.	Remove the prohibition. Or make it available on a national basis.	Partly accepted Lines 1063 to 1064 provide the required flexibility Add Note UK allows integrated protection up to 50kW/unit	2
CH-04	1060 -1064	4.9.1		te	Converter based systems may include the interface protection system also in bigger generating plants. There is no reason to set a general limit to 16 A or 30 kVA. It shall be left open and solved according the local requirements. Change the sentence as proposed and delete the two notes.	For converter type generating plants, the interface protection system and the point of measurement might be integrated into the generating units. In specific cases, e.g. high voltage drop or requirements for additional test options, the interface protection system may be realized as a dedicated device and not be integrated into the generating units.	Rejected See GB-66	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
GB-67	1061	4.9.1	Interfac e protecti on Genera l	Te	Why does the interface protection have to be “realized as a dedicated device and not integrated into the generating units”	Fully justify this prohibition or leave it as a local decision	Rejected See GB-66	0
RO 39	1062 ÷ 1066	4.9/4.9.1		te	In 1062÷1066 lines it is stipulated: “<i>For micro generating plants, the interface protection system and the point of measurement might be integrated into the generating units. For generating plants with nominal current above 16A the interface protection system shall be realized as a dedicated device and not integrated into the generating units, unless the DSO has defined a higher threshold below which it is also allowed to integrate the interface protection system into the generating units.</i>” it is understood in the content of the draft of this standard , taking into account each DSO opinion (there are 8 in Romania), power generating modules are equipped or not with the interface protection. There are two types of PGM, one with interface protection, and one without interface protection. Furthermore, these PGM types will be manufactured without knowledge about delimitating power level.	A minimum level where the PGMs are equipped or not with interface protection shall be defined.	Rejected We cannot impose such a minimum level as there are different policies among DSOs	1
PL-43	1093	4.9.2.1	Note 2	ed	See line eg. 628.	Replace the phrase “phase-phase” with the phrase “phase to phase”.	Accepted	3
FR 33	1094- 1095	4.9.2.1		Te	Why is Note 3 added in this standard related to the connection to LV networks?	Remove Note 3	Accepted Remove note 3 in -1	1

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
GB-68	1101- 1103	4.9.2.1		te	The document specifies minimum required accuracy with no requirement as 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. 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.	Replace line 1101 Voltage and Frequency measurements should be updated every 2 cycles or faster, to the protection function with the following accuracies. Add a line after 1103 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.	Rejected The internal process of the protection is not the purpose of this standard.	1
GB-69	1108- 1111	4.9.2.1		te	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. 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) 2% is an appropriate number for voltage. In defining a standard it will be better to give a range and suggest a default setting as is done elsewhere in the document I would suggest 0.2% to 2% for Frequency and 1% to 10% for voltage with default settings of 0.4% and 2%	Change second sentence to read. 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% 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%	Accepted in principle 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.	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
DE-100	1111 – 1112	4.9.2.1	New last paragra ph		For micro-generating plants with an integrated interface protection it is important to limit the Overvoltage threshold stage 1 at 1,1 to avoid that the supplied internal safety controls are not driven outside there specification.	Please add the following after the last paragraph: “If in a micro-generating plant an integrated interface protection is used, the Overvoltage threshold stage 1 of 1,1 U _N shall not be adjustable.”	Rejected The proposed range [1-1,2] gives a usual range for distribution networks It is not the interface protection settings that have to adapt to internal control of inverters. The internal control of inverters should be compatible with the interface protection settings that are defined by the DSO or the relevant system operator.	2
AT 26	1112	4.9.2.2	Paragr aph	te	Incomplete listing of options.	Add the possibility to have LVRT supervision type relays . The change will depend on the decision made towards the inclusion of this type of relay.	Rejected There is no need for such complicated interface protection systems	1
FR 34	1112	4.9.2.2		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 1103. The maximum reset time shall be 50ms Delete insensitivity in line 1160 and 1179	1
FR 35	1124	4.9.2.3		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	1
DE-101	1146	4.9.2.5		Ge	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 26 (thomas Oct. 25: changed from RO 39 to RO 26 as RO 26 is the correct reference)	1

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DK43	1146	4.9.2.5		ge	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 101	0
EE-30	1146	4.9.2.5		Ge	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 101	0
ES-16	1146	4.9.2.5		Ge	If the DSO/TSO do not specify anything, and the manufacturer choses a non-justified value (making use of clause in line 524-526: "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 101	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
NL-30	1146	4.9.2.5		ge	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 101	0
PL-44	1146	4.9.2.5		Ge	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 101	0
GB-70	1155	4.9.2.5	Under frequ ency protecti on	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 27	1157	4.9.2.5	Paragr aph 2	te	Either the first or the second requirement defined in lines 1157 – 1159 should activate and deactivate a stage !	Change the following: <i>"In order to use narrow frequency thresholds for islanding detection (see 4.9.3.3) 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 in principle Delete second bullet, as only used in MV protection systems	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-71	1158	4.9.2.5	Under frequen cy protecti on	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	1159	4.9.2.5		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	1160	4.9.2.5		Te	40 ms may be insufficient	Replace 40 ms with 60 ms	See FR 34	2
GB-72	1160	4.9.2.5	Under frequen cy protecti on	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-102	1165	4.9.2.6		Ge	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 26	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
DK44	1165	4.9.2.6		ge	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-102	0
EE-31	1165	4.9.2.6		Ge	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-102	0
ES-17	1165	4.9.2.6		Ge	If the DSO/TSO do not specify anything, and the manufacturer choses a non-justified value (making use of clause in line 524-526: "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-102	0

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
NL-31	1165	4.9.2.6		ge	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 overfrequency, this protection function shall be disabled."	See DE-102	0
PL-45	1165	4.9.2.6		ge	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 overfrequency, this protection function shall be disabled."	See DE-102	0
GB-73	1174	4.9.2.6	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 GB-70	3
GB-74	1174	4.9.2.6	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 GB-71	3

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
AT 28	1176	4.9.2.6	Paragraph 2	te	Either the first or the second requirement defined in lines 1176 – 1178 should activate and deactivate a stage!	Change the following: <i>“In order to use narrow frequency thresholds for islanding detection (see 4.9.3.3) 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 Thomas 8.12. implementation note: Aligned with AT27, second bullet only in -2	3
FR 38	1178	4.9.2.6		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 Noted For further consideration	2
FR 39	1179	4.9.2.6		Te	40 ms may be insufficient	Replace 40 ms with 60 ms	See FR 34	2
GB-75	1179	4.9.2.6	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
FR 40	1181	4.9.2.7		Te	ROCOF protection may be used	Add a paragraph 4.9.2.7 “ROCOF protection” “The ROCOF might be configured to operate the interface protection and/or to change the narrow frequency band according to 4.9.3.3. - 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-46	1185	4.9.3.1		ge	The maximum allowable island detection time is not determined in the records on rules of operation of anti-islanding protections.	<i>We propose to add the following sentence after the first sentence in § 4.9.3.1:</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

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
GB-76	1192	4.9.3.1	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 1191 and 1192 : • vector shift	3
FR 41	1201	4.9.3.3		Te	Take into account new 4.9.2.7 paragraph	Write "...correlating its activation with another additional protection function (e.g. in 4.9.2.7)	Accepted Thomas 8.12. as FR 38 on-1 was rejected, this change is not needed, not conducted	3
DK76 on -2	1204-1205	4.9.3.3		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
DE-103	1208	4.9.4		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
RO 40	1223 ÷ 1234	4.10.2, 4.10.3			Automatic reconnection after tripping - It is not in conformity with the table 2.	It shall be modified accordingly.	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

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
GB-77	1224	4.10.2		te	The settings can be defined by the DSO then default settings are shown. If there is a range then the required range should be defined. Add lines to define range required.	Lower frequency 47.0 to 49.5Hz Upper frequency 50 to 52 Hz Lower voltage 50% to 100% Upper voltage 100% to 120% Minimum observation time 10s to 600s	Accepted: Range at least... Thomas implementation note: table with parameters added	2
GB-78	1226	4.10.2		te	The proposed range of frequencies which re start is allowed for is too tight for many networks which operate at higher than 50.1Hz for some periods. The nominal frequency range goes up to 50.5Hz and this frequency should be used to allow generation to take place, possibly at reduced output if the frequency is within the frequency management area. Suggest changing 50.1Hz to 50.5Hz for the default setting.	Change the upper frequency from 50.1Hz to 50.5Hz	Accept: Use entso e proposal for CE: As default 49.5-50,2	1
NO 16	1226			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.	2
DE-104	1228	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. ”	Partly accepted Default value to remain 60s, but make it clear that it is a default value Change minimum observation time To Observation time GB wants 20sec DE wants 10min So 60sec seems a reasonable default Thomas implementation note: see result to GB-77	1

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
GB-79	1228	4.10.2		te	Minimum Observation time of 60s. This is too long 20s is adequate and allows generation to re connect before the operation of tap changers has altered the network voltage.	Replace 60 s with 20 s	See DE-104	2
GB-81	1229- 1233	4.10.2		te	Default setting of a gradient of 10% per minute is far too slow. Taken with a 60 second min observation time means that generation would not be fully restored for 11 minutes. Suggest 10% / second allowing generation to be fully restored in 30 seconds restoring network voltages before tap change operations are required.	Change setting of gradient to be from 0.1% to 50% of active power per second as defined by DSO. Change default gradient to 10% P _n /second.	Accept 0,1% to 50%/s default is 0,17%/s which equals 10%/min Thomas Implementation note: Unit still in %/min resulting in 6% to 3000%/min	1
GB-80	1231	4.10.2	Automatic reconnection after tripping	Te	The default of 10% / minute looks like an error?.	Check and correct if it's a type	See GB-79	3
DK45	1233	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-105	1237	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.	1

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
GB-82	1239	4.10.3		te	Minimum Observation time set to 60 seconds. There is no need for this set to 20 seconds as per the automatic re connection.	Replace 60 s with 20 s	Partly accepted Default value to remain 60s, but make it clear that it is a default value Change minimum observation time To Observation time GB wants 20sec DE wants 10min So 60sec seems a reasonable default	1
DK46	1240	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 1229-1233.	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
WG03-01	1259	4.11.2		Te	The generating plant may not set the new (active) power output to the new value as fast as possible. This might lead to big jumps in power flow in the grid that cannot be controlled or adequately reacted on.	Limit the change rate of (active) power output to:(ref. VDE-AR-N 4105) - not faster than 0,66 % P _n per s; - Not slower than 0,33 % P _n je s - The changing shall be as even as possible. Input parameters by the DSO always have a higher priority than other set values (e.g. market driven).	Accept in principle → Also for -2 Introduce values as default, but not state a requirement and not state a configuration range As priority is stated in clause 4.1 we will not repeat it here Power plants based on combustion engines are permitted to be disconnected from the network if driven below the technical minimum output.	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
GB-83	1250	4.11.2	Reducti on of active power on a set point	Te	The lack of any communications interface definition will lead to arguments over whether a set meets this requirement if it has a proprietary communication protocol that the DSO isn't equipped to use	Either define the interface or make it clear that any interface is acceptable	Rejected, the interface will always be defined by the DSO locally	2
RO 41	1254 ÷ 1261	4.11.2		te	If standard is applicable to prosumer's electrical installations, relevant specifications related to reduction of active power on a set point should be added.	For power generating modules of type B or for prosumer's electrical installations with active power of power generation modules/units reaching the type B threshold, the power plant shall be capable of reducing its active power to a set point provided remotely by DSO. A power plant with power generating modules of type B (or in case of prosumer's electrical installations with cumulated active power of power generation modules/units reaching the type B threshold) shall be capable of carrying out the reduction of output power to the respective set point as fast as technically feasible with an accuracy of 5 % of nominal power and a settling time of maximum one minute. Power plants are permitted to be disconnected from the network at a set value below 15 % of nominal power. For prosumer's electrical installations, the output power reduction shall be applied to POC.	Rejected, as requirement is on plant level the effect of a local loads might be included regarding the power limit	1
BE30	1258	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	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-106	1260 – 1261	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.”	Rejected There is no immunity requirement once disconnected	2
FR 42	1261	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	Partly accepted, changed to minimum regulating level	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-107	1262 – 1263	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.	Partly accepted, sentence is partly removed Conclusion of all proposed changes to this clause: For generating modules of type B, a generating plant shall be capable of reducing its active power to a limit value provided remotely by the DSO. The limit value shall be adjustable in the complete operating range from the maximum active power to minimum regulating level. The adjustment of the limit value shall be possible with a maximum increment of 10% of nominal power A power generation unit/plant shall be capable of carrying out the power output reduction to the respective limit within an envelope of not faster than 0,66 % Pn/ s and not slower than 0,33 % Pn/s with an accuracy of 5 % of nominal power. Generating plants are permitted to disconnect from the network at a limit value below it minimum regulating level.	1

MB/NC	Line number	Clause/Subclause	Paragraph/Figure/Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
GB-84	1264	4.12	Requirements regarding single fault tolerance of interface protection system and interface switch	Te	What are "Faults of common cause" and what is "significant"	This is a hugely complex issue and can't realistically be defined unambiguously in this EN, so the requirement should be removed.	Partly accepted, Add definition of common cause failures IEC 192-03-18	1
BE31	1270	4.11.2		Ed	Use of the defined terms. 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.	Delete "power"	Rejected Misplaced comment, its content is covered in BE30	
FI 19	1287	4.12		te	Requirements should apply to all kind of inverter not just PV-inverter.	Consider to change wording to be technology neutral.	rejected unclear comment. If the comment intends to require two galvanic switches, for all technologies, that lines 1283-1286 need to be changed also. The intention of line 1287 ff is to limit the application of line 1283-1286 so it cannot be used for transformerless PV-inverters. For all other generating technologies one galvanic switch and one semiconductor switch is deemed sufficient.	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
FI 20	1290	4.12		te	Text in line 1290 makes no sense because PV inverter is part of the PV generator (PV generator = PV array + PV inverter). Basic concepts for PV system installation are given in HD 60364-7-712:2016. 712.3.4 PV generator PV array (712.3.3) including the inverter and the PV a.c. supply circuit 712.3.3 PV array assembly of electrically interconnected PV modules, PV strings, PV sub-arrays and PV array combiner boxes 712.3.9 PV inverter device which converts d.c. voltage and d.c. current of the PV array into a.c. voltage and a.c. current	Change: "be located between PV generator and PV inverter" to: → "be located between PV array and PV inverter"	accepted	3
FR 43	1290	4.13		Te	The RfG (art 14.4 and 14.5) requires for type B modules : - Capacity to contribute to system restoration - Capacity of system management and information exchange These requirements are missing	Copy paragraph 4.12 in EN 50549-2 and add annex with same content as annex B of EN 50549-2	Accepted. Create a paragraph 4.13 that copies the paragraph 4.12 of EN50549-2 and add an Annex H with the same content as Annex B of EN 50549-2 In the new paragraph 4.13 replace in the penultimate line "Annex B" by "Annex H" Thomas Implementation Note: the proposed change is in conflict with the decision on RO 05. RO05 is implemented. Annex B is void and reference is given to Annex B of -2	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
NO 17	1291	Annex A		ed	In the informative annex, many “shall” requirements are stated. In an annex, maybe “should” is more pertinent?	Replace shall with should.	Accepted, 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.	2
GB-85	1301	Annex A	(informative) Interco nnectio n require ments	Te	As this is informative it should not impose requirements, but it uses “shall” numerous times leaving its status unclear. It includes many sweeping and vague statements so its status needs clarifying. If it is truly informative wouldn't it be better in a discussion paper than this EN?.	If this Annex is indeed informative then remove all references to ‘shall’ or similar.	See NO 17	0
GB-86	1319- 1328	Annex A	A.2	te	This does not tie up with GB current practice where interface protection may take up to 90 seconds to operate in case of an over frequency between 50.5Hz and 52Hz and where auto reclose schemes operate in 10 or 20 seconds. In this case the repeated use of the word shall is not appropriate. It would be better to replace shall with should.	In the bullet point starting on line 1319 replace all instances of the word “shall” with the word “should”	See NO 17	0
GB-87	1360- 1365	Annex B – Paramet er Table	Table B.1	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.	Consider removing this annex	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

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
AT 29	1365	Annex B	Table B.1	ed	Typos In table rows 3 and 4: 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 3 and 4: 47,0 – 47,5 Hz –Duration to 47,0 – 47,5 Hz –Duration 47,5 – 48,5 Hz –Duration to 47,5 – 48,5 Hz -Duration	Accepted	3
AT 30	1365	Annex B,	Table B.1, 4.5.2	te	For ROCOF there is only a default value of 2.5 Hz/s. The time window is missing (see also AT 08).	Include time window of 5 cycles.	Rejected The time window is not a configurable parameter	3
AT 31	1365	Annex B	Table B.1	te	In row 22 (Power response to underfrequency, Threshold frequency f_1) a value range of 49,8 Hz to 46 Hz is quoted. But according to chapter 4.6.2, line 805, 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.	2
AT 32	1365	Annex B	Table B.1	te	In row 46 (Overvoltage threshold stage 2) a value range of 1 – 1,2 is quoted. But according to chapter 4.9.2.3, line 1133, the value range shall be 1 – 1,3 Hz.	Change value range from 1 – 1,2 to 1 – 1,3	Accepted	3
DE-108	1365	Annex B	Table B.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

MB/ NC	Line number	Clause/ Subclause	Paragraph/ Figure/ Table	Type of comment	Comments	Proposed change	Proposed Observations	Prio 1 2 3
DE-109	1365	Annex B + 4.3.2 to 4.11	Table B.1 + 4.3.2 to 4.11	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
DE-110	1365	Annex B	Table B.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”	See DE 108	0
DE-111	1365	Annex B	Table B.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 108	0
DK47	1365	Annex B + 4.3.2 to 4.11	Table B.1 + 4.3.2 to 4.11	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.	See DE 109	0
EE-32	1365	Annex B	Table B.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”	See DE 108	0
EE-33	1365	Annex B	Table B.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 111	0
EE-34	1365	Annex B + 4.3.2 to 4.11	Table B.1 + 4.3.2 to 4.11	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.	See DE 109	0
FR 44	1365	Annex B + 4.3.2 to 4.11	Table B.1 + 4.3.2 to 4.11	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.	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
GB-88	1365	Annex B	(inform ative) Parame ter	Te	Again an informative Annex making requirements	Make it clear that in the case of any discrepancy between this table and the body of the text the latter shall prevail.	Rejected. There are no requirements in this Annex. It provides default values. The text in the main body always prevails due to informative character of this Annex. This intrinsic characteristic of an informative annex should not be explained all times.	3
GB-89	1365	Table B.1		Te	4.5.2 There is no default RoCoF of 2.5Hz/s in the RfG	Remove all requirements that are above and beyond the RfG as they are 'gold plating'	To be aligned with the decision taken on rocof Immunity	2
GB-90	1365	Table B.1		Te	4.6.1 "Intentional Delay" and "Deactivation threshold" are not RfG requirements.	Remove all requirements that are above and beyond the RfG as they are 'gold plating'	To be aligned with the decision taken on intentional delay and deactivation threshold	1
GB-91	1365	Table B.1		Te	4.10.3 and 4.10.3 No details of reconnection requirements are given in the RfG.	Remove all requirements that are above and beyond the RfG as they are 'gold plating'	To be aligned with the decision taken on reconnection requirement	1
NL-32	1365	Annex B	Table B.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"	See DE 108	0
NL-33	1365	Annex B	Table B.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 111	0
NL-34	1365	Annex B + 4.3.2 to 4.11	Table B.1 + 4.3.2 to 4.11	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.	See DE 109	0
PL-47	1365	Annex B	Table B.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"	See DE 108	0
PL-48	1365	Annex B	Table B.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 111	0
PL-49	1365	Annex B + 4.3.2 to 4.11	Table B.1 + 4.3.2 to 4.11	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.	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
PL-50	1365	Annex B	Table B.1	ed	Conformity with adopted convention	Insert a space between the numbers and units.			Accepted	3
DE-112	1366 - 1371	Annex C		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
NO 18	1370			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	3
DE-113	1374	Annex C	Germa ny	Ed		Please add VDE-AR-N 4100			accepted	3
LVS-02	1374	Annex C		ge	We propose to include information attached in Proposed change section to the table “List of national requirements applicable for Generating plants”	Country	Applicable Documents		accepted thanks for the information	3
						Latvia	Sabiedrisku pakalpojumu regulēšanas komisijas padomes noteikumi “Sistēmas pieslēguma noteikumi elektroenerģijas ražotājiem” (Regulations for a system connection for electricity producers, issued by national Public utilities commission)			

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
SI-7	1374	Annex C	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 Gazette 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 thanks for the information	3
GB-92	1375	Annex D	(informative) Loss of Mains and overall power system security	Te	Again an informative Annex making requirements	If this Annex is indeed informative then remove all references to ‘shall’ or similar.	Accepted in principle Replace shall by “are expected to have”	
GB-93	1375	Annex D	(informative) Loss of Mains and overall power system security	Te	This is a discussion of the fact that adding frequency and voltage support for the network also increases the likelihood of unintentional islands being sustained. Wouldn't it be better in a discussion paper than this EN?.	Remove it to a more appropriate document	Rejected For a more extensive explanation, another type of document fits probably better. Nevertheless, there is a clear link with considerations to be made when setting some of the parameters of this prEN. Therefore this description providing general thoughts is considered valuable informative input.	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
GB-94	1408- 1409	Annex D		te	This makes reference to the immunity to asynchronous reclosing (see 4.8 and 4.9) Neither 4.8 or 4.9 have any reference to a generating module being able to withstand an out of phase reclosure. On line 1046 and then lines 1052 to 1055 it says. It is not the purpose of the interface protection system to Prevent damages to the generating unit due to incidents (eg short circuits) on the distribution network or reclosing operations (especially fast automatic ones, which may happen after some hundreds of ms) Therefore the generator should have an appropriate immunity level (see 4.8) Section 4.8 is headed EMC and power quality and does stray into other things but not immunity to an out of phase reclosure. This can lead you in circles but not result in actually finding any solid requirements.	Please decide if immunity to out of phase or asynchronous closing is required and insert it in the document at a relevant part. If not then remove lines 1408 and `1409	Partly accepted, see GB-65, immunity to out of phase reclosing might be needed in some countries	1
GB-95	1409	Annex D	(inform ative) Loss of Mains and overall power system security	Te	Clauses 4.8 and 4.9 do not define the immunity to asynchronous reclosing as this claims	Remove the reference	See GB 94	0
FR 45	1602- 1603	Annex G	Table F.1	Ed	Line "article 13.6" in the chart. Reference 4.11 is imprecise	Replace 4.11 by 4.11.1	accepted align -2 also rename table to match with annex	3
FR 46	1602- 1603	Annex G	Table F.1	Ed	Line "article 14.1" in the chart. Reference to 4.1.1 is wrong	Replace 4.1.1 by 4.11.1	accepted	3
FR 47	1602- 1603	Annex G	Table F.1	Te	Line "article 14.2" in the chart. References article 14.2 and 4.11 are imprecise	Replace "article 14.2" by "article 14.2 (a)" and 4.11 by 4.11.2	accepted align -2	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
FR 48	1602- 1603	Annex G	Table F.1	Te	A line “article 14.2 (b)” is missing	Add a line “article 14.2 (b)” with in the column “clause” : “4.13 Remote information exchange”	accepted align -2	3
FR 49	1602- 1603	Annex G	Table F.1	Te	Line “14.5 (a)” in the chart. 4.10, 4.11 and 4.13 should also be mentioned	Add 4.10, 4.11 and 4.13 to the list 4.6, 4.7, 4.9	accepted also add all clauses to 14.5.(b) align -2	3
CH-05	1627	Bibliogra phy		ed	Add a new entry as line 1628	Add a new line with the following content: IEC TS 62786 Distributed energy resources connection with the grid	accepted	
IT03	3000		Annex C	te	Please include in the table the following documents in force in Italy: CEI 0-16 and CEI 0-21.		accepted	3
DK4	All over the docu ment			ge	The document usually make 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	accepted	3
EE-02	All over the docu ment			Ge	The document usually make 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	accepted	3
NL-02	All over the docu ment			ge	The document usually make 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	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
PL-53	All over the docu ment			Ge	The document usually make reference to “generating plants” and “generating units”, and the Regulation 2016/631 establishes the requirements to power-generating module’ means either a synchronous power-generating module or a power park module; ‘power-generating facility’ means a facility that converts primary energy into electrical energy and which consists of one or more power-generating modules connected to a network at one or more connection points; ‘power-generating facility owner’ means a natural or legal entity owning a power-generating facility;	The whole text shall be revised in order to achieve consistency with the terms.	accepted	3

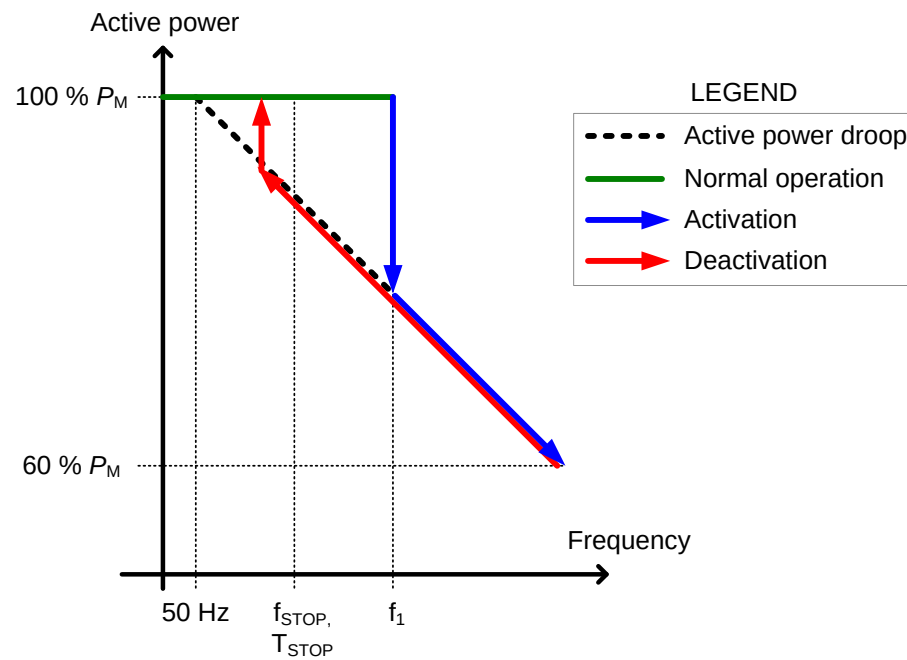


Figure A

Annex to GB-56:

The tolerance in time shall be -0/+3sec or -0/+2* τ , whatever is the larger. The tolerance of Q during dynamic operation shall be: +-10% of S_n .

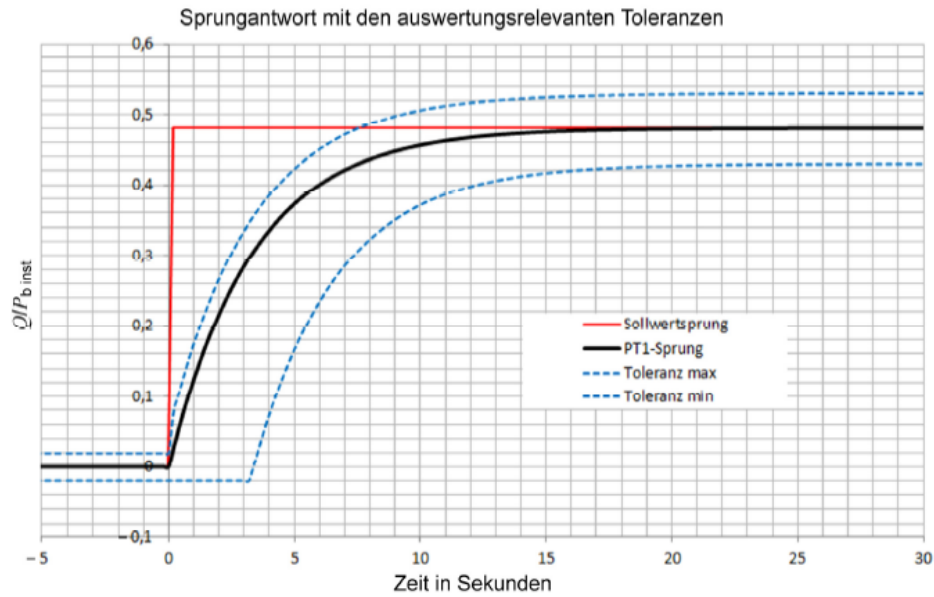
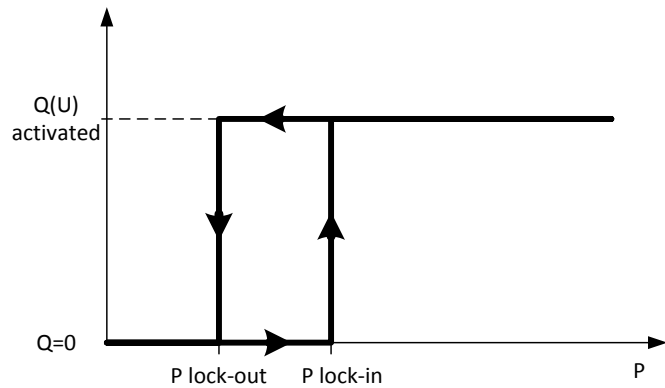


Bild C.3 – Veranschaulichung bei $3 \tau = 10 \text{ s}$

Annex 2 to FR 31:



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.