



Country Settings Switzerland 2020

Extract from Annex E Internal Regulation Connection of Generation Units to
Grid Level 7 (NA/EEA-NE7-CH)

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Gender-fair language.

In the interest of easier readability this document uses the masculine form for both genders. All roles and personal designations refer to both women and men. We thank you for your understanding.

Annex E: Country Settings Switzerland

E.1 Units Type A (VSE NA/EEA – CH 2020 Type A)

Valid for units Typ 2 (Non-synchron – Converter and Induction Machines)

Grid connection criteria				
Parameter	Symbol	Unit	Value	Parameter related comments
Minimum connection voltage	Uac min	V	196	85% of U_n
Maximum connection voltage	Uac max	V	253	110% of U_n
Minimum connection frequency	f min	Hz	47.5	
Maximum connection frequency	f max	Hz	50.1	Shall be consistent with Uac NP min
Check time U/f before reconnection	t	s	60	Minimum reconnection delay time after fault condition
Reconnection ramp during start-up	Soft Start	-	ON	Default value: connected
Ramping rate of change	Pac Ramping	%Pn/Min	10	

Table 1: Grid connection criteria Type A

Grid protection criteria					
Parameter	Symbol	Unit	Value	Time	Parameter related comments
Overvoltage	U >>	V	276	≤ 100 ms	120% of U_n ^{a)}
Overvoltage (sliding mean value over 10 minutes)	U >	V	253	≤ 100 ms	110% of U_n ^{b), c)}
Undervoltage	U <	V	184	≤ 1500 ms	80% of U_n ^{d)}
Undervoltage	U <<	V	104	≤ 300 ms	45% of U_n ^{d)}
Underfrequency	f <	Hz	47.50	≤ 100 ms	
Overfrequency	f >	Hz	51.50	≤ 100 ms	
Frequency-based power reduction	P (f)	-	ON	-	Default value: ON
Starting value for power reduction	f start	Hz	50.20	-	
Rate of change for power reduction	P (f) red	% Pmom/Hz	40	-	
Island detection	Anti Islanding	s	5.00	-	Fault clearing time within 5 s, Conformity acc. SNEN 62116:2014

Table 2: Grid protection criteria Type A

Grid Operation			
Parameter	Symbol	Value (≤ 250 kVA)	Parameter related comments
Reactive power control	$\cos \phi$	1.00	Default value 1.00 or according DSO request
FRT-Requirement	FRT	NON (inactive)	Dynamic voltage support <u>without</u> reactive power injection
k-Factor	k-Factor	-	Default value: 2 or according DSO request

Table 3: Grid Operation Type A

E.2 Units Type B (VSE NA/EEA – CH 2020 Type B)

Valid for Typ2 2 (Non-synchron – Converter and Induction Machines)

Grid connection criterias				
Parameter	Symbol	Unit	Value	Parameter related comments
Minimum connection voltage	Uac min	V	196	85% of U_n
Maximum connection voltage	Uac max	V	253	110% of U_n
Minimum connection frequency	f min	Hz	47.5	
Maximum connection frequency	f max	Hz	50.1	Shall be consistent with Uac NP min
Check time U/f before re-connection	t	s	600	Minimum reconnection delay time after fault condition
Ramp during start-up	Soft Start	-	ON	Standardwert: eingeschaltet
Ramping rate of change	Pac Steigerung	%Pn/Min	10	

Table 4: Grid connection criteria Type B

Grid protection criteria					
Parameter	Symbol	Unit	Value	Time	Parameter related comments
Overvoltage	U >>	V	276	≤ 100 ms	120% of U_n ^{a)}
Overvoltage (sliding mean value over 10 minutes)	U >	V	253	≤ 100 ms	110% of U_n ^{b), c)}
Undervoltage	U <	V	184	≤ 1500 ms	80% of U_n ^{d)}
Undervoltage	U <<	V	104	≤ 300 ms	45% of U_n ^{d)}
Underfrequency	f <	Hz	47.50	≤ 100 ms	
Overfrequency	f >	Hz	51.50	≤ 100 ms	
Frequency-based power reduction	P (f)	-	ON	-	Default value: connected
Starting value for power reduction	f start	Hz	50.20	-	
Rate of change for power reduction	P (f) red	% Pmom/Hz	40	-	
Island detection	Anti Islanding	s	5.00	-	Fault clearing time within 5 s, Conformity acc. SNEN 62116:2014

Table 5: Grid protection criteria Type B

Grid Operation			
Parameter	Symbol	Value (> 250 kVA)	Parameter related comments
Reactive power control	$\cos \phi$	1.00	Default value: 1.00 or according DSO request
FRT-Requirement	FRT	Yes (active)	Dynamic voltage support <u>with</u> reactive power injection
k-Factor	k-Factor	2	Default value: 2 or according DSO request

Table 6: Grid Operation Type B

Food notes and recommendations:

- a) The time request " ≤ 100 ms" for the protection relay setting is based on a maximum protection device reaction time including coupling breaker time of about 100 ms. Consequently the total disconnection time is 200 ms.
- b) It shall be ensured that on the connection point the voltage does not exceed $1.10 U_n$. If this requirement is fulfilled by the usage of an external unit connection protection device it is admitted that the $U>$ protection of the decentralised units could be set up to $1,15 U_n$ respectively. The unit provider shall consider the corresponding impact on the related customer installations. A combination of external unit protection device setting of ($U>$: $1.1 U_n$) and integrated unit protection with ($U>$: $1.1 U_n$ up to $1.15 U_n$) is recommended if the voltage drop within the internal house wiring is neglectable. This is typically required if longer connection lines are involved.
- c) If the $U>$ -function does not evaluate the 10 minutes sliding mean value than a related setting of $1.10 U_n$ with a 60 s delay is recommended, however outside the OVRT area. In this case the reset ratio (Hysteresis) of the related relays shall be considered in order to avoid a certain overfunctionality or faulty reconnection.
- d) If the adjacent medium voltage grid is equipped with an auto-reclosing functionality the following setting configuration is recommended: $U<<$ -Funktion: $0.45 U_n$, without delay (shortest possible settable delay) and $U <$ -funktion: $0,8 U_n$, 300 ms. The FRT requirement must not be fulfilled in this case. The exact request for protection settings will be given by the DSO.