Group: Generator settings

Subgroup: Overload Protection

Overload BOC

Setpoint group	Generator settings	**Related FW**	1.8.0
Range [units]	**Overload Wrn (page 227)** .. 200 [%]		
Default value	120 %	**Alternative config**	NO
Step	1 % of **Nominal Power (page 176)**		
Comm object	8280	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold level for generator overload (in % of Nominal power) protection. Protection is BOC (Breaker Open and gen-set Cooldown). ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

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Overload Wrn

Setpoint group	Generator settings	**Related FW**	1.8.0
Range [units]	0 .. **Overload BOC (page 227)** [%]		
Default value	120 %	**Alternative config**	NO
Step	1 % of **Nominal Power (page 176)**		
Comm object	9685	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold level for generator overload (in % of Nominal power) protection. This is only warning.			

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Overload Delay

Setpoint group	Generator settings	**Related FW**	1.8.0
Range [units]	0,0 .. 600,0 [s]		
Default value	5,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8281	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for **Overload BOC (page 227)Overload BOC (page 227)** and **Overload Wrn (page 227)** protection.			

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Subgroup: Current Protection

Short Circuit BOC

Setpoint group	Generator settings	**Related FW**	1.8.0
Range [units]	100 .. 500 [%]		
Default value	250 %	**Alternative config**	NO
Step	1 % of **Nominal Current (page 176)**		
Comm object	8282	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
BOC occurs when generator current reaches this preset threshold. ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

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Short Circuit BOC Delay

Setpoint group	Generator settings	**Related FW**	1.8.0
Range [units]	0,00 .. 10,00 [s]		
Default value	0,04 s	**Alternative config**	YES
Step	0,01 s		
Comm object	9991	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Always		
Description			
Delay for **Short Circuit BOC (page 228)** protection.			

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IDMT Overcurrent Delay

Setpoint group	Generator settings	**Related FW**	1.8.0
Range [units]	1,0 .. 600,0 [s]		
Default value	4,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8283	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			

IDMT curve shape selection. IDMT Overcurrent Delay is a reaction time of IDMT protection for 200% overcurrent I_{gen} =2***Nominal Current (page 176)**

IDMT is “very inverse” over current protection. Reaction time is not constant but depends on over current level according to the following formula:

$$\text{Reaction } \text{\textcircled{?}} \text{\textcircled{?}} \quad \text{time} = \frac{Overcurrent\ \ IDMT\text{\textcircled{?}}\text{\textcircled{?}}\ Delay^{*}\ Nominal\text{\textcircled{?}}\text{\textcircled{?}}\ \ \text{\textcircled{?}}\text{\textcircled{?}}\ \ Current}{I_{gen}\text{\textcircled{?}}\text{\textcircled{?}}\ Nominal\text{\textcircled{?}}\text{\textcircled{?}}\ \ Current}$$

Note: *Reaction time is limited to 3600 s = 60 minutes. IDMT protection is not active for Reaction time values longer than 60 minutes.*

I_{gen} is maximal value of all measured phases of generator current.

Table 9.1 EXAMPLE of Reaction time for different over current levels

	Overcurrent IDMT Delay	Overcurrent		
		≤ 100 %	101 %	110 %
Reaction time	0,2 s	No action	20 s	2 s
	2 s	No action	200 s	20 s
	20 s	No action	2000 s	200 s

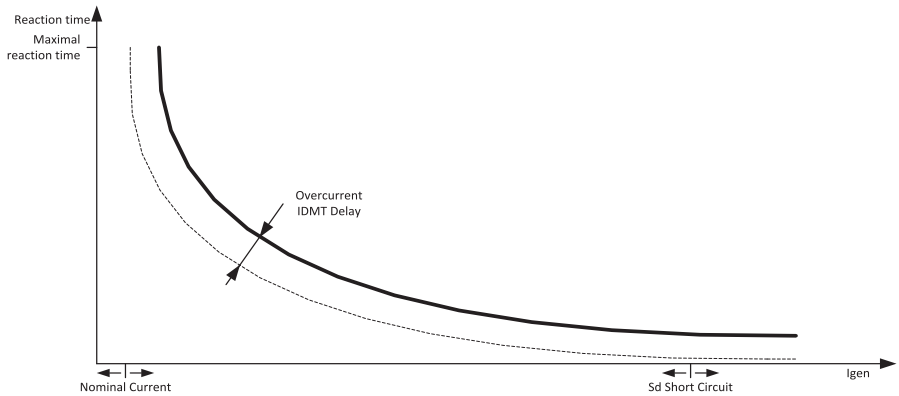

Image 9.19 IDMT Overcurrent Delay

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Current Unbalance BOC

Setpoint group	Generator settings	**Related FW**	1.8.0
Range [units]	1 .. 200 [%] of **Nominal Current (page 176)**		
Default value	50 %	**Alternative config**	NO
Step	1 % of **Nominal Current (page 176)**		
Comm object	8284	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 177)**		
Description			
Threshold for generator current asymmetry (unbalance). Protection is BOC (Breaker Open and genset Cooldown). ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

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Current Unbalance BOC Delay

Setpoint group	Generator settings	**Related FW**	1.8.0
Range [units]	0,0 .. 600,0 [s]		
Default value	5,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8285	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 177)**		
Description			
Delay for **Current Unbalance BOC (page 230)** protection.			

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Subgroup: Voltage Protection

Generator Overvoltage Sd

Setpoint group	Generator settings	**Related FW**	1.8.0
Range [units]	**Generator Overvoltage Wrn (page 231)** .. 200 [%]		
Default value	110 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-N (page 179)** or **Nominal Voltage Ph-Ph (page 179)**		
Comm object	8291	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator overvoltage protection. All three phases are checked. Maximum out of three is used. ***Note:*** *Phase to phase and phase to neutral voltages are used for this protection.*			

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Generator Overvoltage Wrn

Setpoint group	Generator settings	**Related FW**	1.8.0
Range [units]	**Generator Undervoltage Wrn (page 232)** .. **Generator Overvoltage Sd (page 230)** [%]		
Default value	110 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-N (page 179)** or **Nominal Voltage Ph-Ph (page 179)**		
Comm object	9686	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator overvoltage protection. All three phases are checked. Maximum out of three is used. ***Note:*** *Phase to phase and phase to neutral voltages are used for this protection.*			

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Generator Undervoltage BOC

Setpoint group	Generator settings	**Related FW**	1.8.0
Range [units]	0 .. **Generator Undervoltage Wrn (page 232)** [%]		
Default value	70 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-N (page 179)** or **Nominal Voltage Ph-Ph (page 179)**		
Comm object	8293	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator undervoltage protection. All three phases are checked. Minimum out of three is used. ***Note:*** *Phase to phase and phase to neutral voltages are used for this protection.* ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

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Generator Undervoltage Wrn

Setpoint group	Generator settings	**Related FW**	1.8.0
Range [units]	**Generator Undervoltage BOC (page 231)** .. **Generator Overvoltage Wrn (page 231)** [%]		
Default value	70 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-N (page 179)** or **Nominal Voltage Ph-Ph (page 179)**		
Comm object	9687	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator undervoltage protection. All three phases are checked. Minimum out of three is used. ***Note:*** *Phase to phase and phase to neutral voltages are used for this protection.*			

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Generator <> Voltage Delay

Setpoint group	Generator settings	**Related FW**	1.8.0
Range [units]	0,0 .. 600,0 [s]		
Default value	3,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	9103	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for **Generator Overvoltage Sd (page 230)**, **Generator Overvoltage Wrn (page 231)**, **Generator Undervoltage BOC (page 231)** and **Generator Undervoltage Wrn (page 232)** protection.			

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Voltage Unbalance BOC

Setpoint group	Generator settings	**Related FW**	1.8.0
Range [units]	1 .. 200 [%] of **Nominal Voltage Ph-Ph (page 179)**		
Default value	10 %	**Alternative config**	NO
Step	1 % of **Nominal Voltage Ph-Ph (page 179)**		
Comm object	8288	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 177)**		
Description			
Threshold for generator voltage unbalance alarm. ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

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Voltage Unbalance BOC Delay

Setpoint group	Generator settings	**Related FW**	1.8.0
Range [units]	0,0 .. 600,0 [s]		
Default value	3,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8289	**Related applications**	AMF, MRS
Config level	Advanced		
Setpoint visibility	Conditioned by the setpoint **Connection type (page 177)**		
Description			
Delay for **Voltage Unbalance BOC (page 232)** protection.			

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Subgroup: Frequency Protection

Generator Overfrequency BOC

Setpoint group	Generator settings	**Related FW**	1.8.0
Range [units]	**Generator Overfrequency Wrn (page 233)** .. 200,0 [%]		
Default value	110,0 %	**Alternative config**	NO
Step	0,1 % of **Nominal Frequency (page 180)**		
Comm object	8296	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator phase L1 overfrequency. ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

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Generator Overfrequency Wrn

Setpoint group	Generator settings	**Related FW**	1.8.0
Range [units]	**Generator Underfrequency Wrn (page 234)** .. **Generator Overfrequency BOC (page 233)** [%]		
Default value	110,0 %	**Alternative config**	NO
Step	0,1 % of **Nominal Frequency (page 180)**		
Comm object	9688	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator phase L1 overfrequency.			

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Generator Underfrequency BOC

Setpoint group	Generator settings	**Related FW**	1.8.0
Range [units]	0,0 .. **Generator Underfrequency Wrn (page 234)** [%]		
Default value	85,0 %	**Alternative config**	NO
Step	0,1 % of **Nominal Frequency (page 180)**		
Comm object	8298	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator phase L1 underfrequency. ***Note:*** *When there is no control of breakers, the type of protection is Sd not BOC.*			

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Generator Underfrequency Wrn

Setpoint group	Generator settings	**Related FW**	1.8.0
Range [units]	**Generator Underfrequency BOC (page 234)** .. **Generator Overfrequency Wrn (page 233)** [%]		
Default value	85,0 %	**Alternative config**	NO
Step	0,1 % of **Nominal Frequency (page 180)**		
Comm object	9689	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Threshold for generator phase L1 underfrequency.			

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Generator <> Frequency Delay

Setpoint group	Generator settings	**Related FW**	1.8.0
Range [units]	0,0 .. 600,0 [s]		
Default value	3,0 s	**Alternative config**	NO
Step	0,1 s		
Comm object	8297	**Related applications**	AMF, MRS
Config level	Standard		
Setpoint visibility	Always		
Description			
Delay for **Generator Overfrequency BOC (page 233)**, **Generator Overfrequency Wrn (page 233)**, **Generator Underfrequency Wrn (page 234)** and **Generator Underfrequency BOC (page 234)** protection.			

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