Exciters and Governors: Over Excitation Limiter OEL2C

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1 Description

This device is an implementation of the IEEE type OEL2C takeover or summation over excitation limiter model. This device is implemented as described in [1]. Implementation details can be viewed by inspecting the subcircuit of this device.

1.1 Pins

This device has 2 pins:

Pin name	Type	Description	Units
OEL Input	Input	Generator field current or generator field voltage or exciter field current	pu
VOEL	Output	Over Excitation Limiter signal	pu

1.2 Parameters

The default set of parameters can be found in [1].

1.2.1 Data tab

The parameters on the Data tab are:

1. **Time constant T_{C1OEL}**: OEL regulator denominator (lag) time constant 1
2. **Time constant T_{B1OEL}**: OEL regulator numerator (lead) time constant 1
3. **Time constant T_{C2OEL}**: OEL regulator denominator (lag) time constant 2
4. **Time constant T_{B2OEL}**: OEL regulator numerator (lead) time constant 2
5. **Gain K_{POEL}**: OEL PID regulator proportional gain
6. **Gain K_{IOEL}**: OEL PID regulator integral gain
7. **Gain K_{DOEL}**: OEL PID regulator differential gain
8. **Time constant T_{DOEL}**: OEL PID regulator differential time constant
9. **Maximum output $V_{OELmax3}$**: maximum OEL PID output limit

10. **Minimum output $V_{OELmin3}$**: minimum OEL PID output limit
11. **Maximum output $V_{OELmax2}$**: maximum OEL lead-lag 1 output limit
12. **Minimum output $V_{OELmin2}$**: minimum OEL lead-lag 1 output limit
13. **Maximum output $V_{OELmax1}$**: maximum OEL output limit
14. **Minimum output $V_{OELmin1}$**: minimum OEL output limit
15. **Reset-reference I_{reset}**: OEL reset-reference, if OEL is inactive
16. **Activation delay time T_{en}**: OEL activation delay time
17. **Reset delay time T_{off}**: OEL reset delay time
18. **Reset value I_{THoff}**: OEL reset threshold value
19. **Scaling factor K_{SCALE}**: OEL input signal scaling factor
20. **Time constant T_{Roel}**: OEL input signal filter time constant
21. **Scaling factor K_{ACT}**: OEL actual value scaling factor
22. **Reference I_{TFpu}**: OEL reference for inverse time calculations
23. **Maximum field current I_{inst}**: OEL instantaneous field current limit
24. **Minimum field current I_{lim}**: OEL thermal field current limit
25. **Time constant T_{Aoel}**: OEL reference filter time constant
26. **Exponent C_1**: OEL exponent for calculation of $I_{ERRinv1}$
27. **Gain K_1**: OEL gain for calculation of $I_{ERRinv1}$
28. **Exponent C_2**: OEL exponent for calculation of $I_{ERRinv2}$
29. **Gain K_2**: OEL gain for calculation of $I_{ERRinv2}$
30. **Maximum output V_{INVmax}**: OEL maximum inverse time output
31. **Minimum output V_{INVmin}**: OEL minimum inverse time output
32. **Delay time Fixed$_{RU}$**: OEL fixed delay time output
33. **Cooling-down Fixed$_{RD}$**: OEL fixed cooling-down time output
34. **Timer reference T_{FCL}**: OEL timer reference
35. **Timer maximum level T_{max}**: OEL timer maximum level
36. **Timer minimum level T_{min}**: OEL timer minimum level
37. **Gain K_{FB}**: OEL timer feedback gain
38. **Ramp-down rate K_{RD}**: OEL reference ramp-down rate
39. **Ramp-up rate K_{RU}**: OEL reference ramp-up rate
40. **Reference release threshold K_{ZRU}**: OEL thermal reference release threshold
41. OEL Ramp Rate Logic Switch option: see explanations below.

There are two possible selections for the OEL Ramp Rate Logic Switch option:

1. Fixed ramp rated.
2. Ramp rate function of the field current error

2 Initial conditions

The OEL is supposed to be inactive during the steady-state conditions.

3 References

[1] “IEEE Recommended Practice for Excitation System Models for Power System Models for Power System Stability Studies,” IEEE Standard 421.5-2016.