

Line Relays TIOCR1

Time Inverse Over-Current Relay

Relays are assigned to a specific end of a branch. This end is specified by the column **Device Location** which can be set to either *From* or *To*. It is specified on the branch dialog by checking the box **Device is at From End of Line (otherwise at To End)**. The end specified by the **Device Location** is referred to as the "Relay End", while the other is referred to as the "Other End". When this relay's conditions are met, the entire branch is opened.

Type	Active - OOSLEN ID=1 (From ▾)	☒ Active
Device ID	1	☒ Device is at From End of Line (otherwise at To End)

Type	Active - OOSLEN ID=1 (From ▾)	☒ Active
Device ID	1	☒ Device is at From End of Line (otherwise at To End)

Relay Operation

The TimeToClose varies according to the piecewise linear function of per unit current as shown to the right and as specified by the input values Threshold, m1..m5, and t1..t5. If m1 is greater than 1.0, then an additional point at the Threshold current of 1 hour (3,600 seconds) is added to the curve.

The time at which the relay will close is determined by integrating the following function. When the function equal 1.0 then the relay will close.

$$\theta = \int \left[\frac{1}{\text{TimeToClose}} \right] dt$$

Relay Resetting

When the current drops below the *Threshold* current, then the relay resets according to the parameter *TReset*. If *TReset* is zero, then the relay resets to $\theta = 0$ instantaneously. Otherwise there is a timed reset which occurs by integrating using the function

$$\theta = \int \left[1 - \left(\frac{I_{\text{Current}}}{\text{Threshold}} \right)^2 \right] \left[\frac{-1}{T_{\text{Reset}}} \right] dt$$

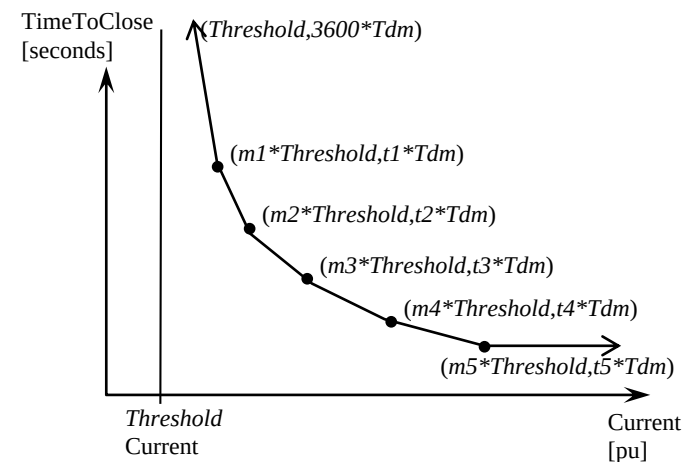
This function means that at zero current, it completely resets in *TReset* seconds.

Monitor Flag

If the monitor flag is 0, then the relay will create result events to indicate that lines would have tripped, but will not actually trip any lines. If monitor flag is not zero, then the relay will send a trip signal to the branch when to $\theta \geq 1$ and the branch will trip after the *Breaker Time* seconds have elapsed.

Transfer Trip

Trip signals for this relay may be sent to three different branches by pointing to branches for *Transfer Trip 1*, *Transfer Trip 2*, and *Transfer Trip 3*. In addition, a *Transfer Trip Load* record may also be pointed to with a corresponding parameter *Load Shed %* specifying what percentage of the load should be tripped.



Model Supported by PSSE