

Instantaneous Current Curves (Phase)

Explanation:

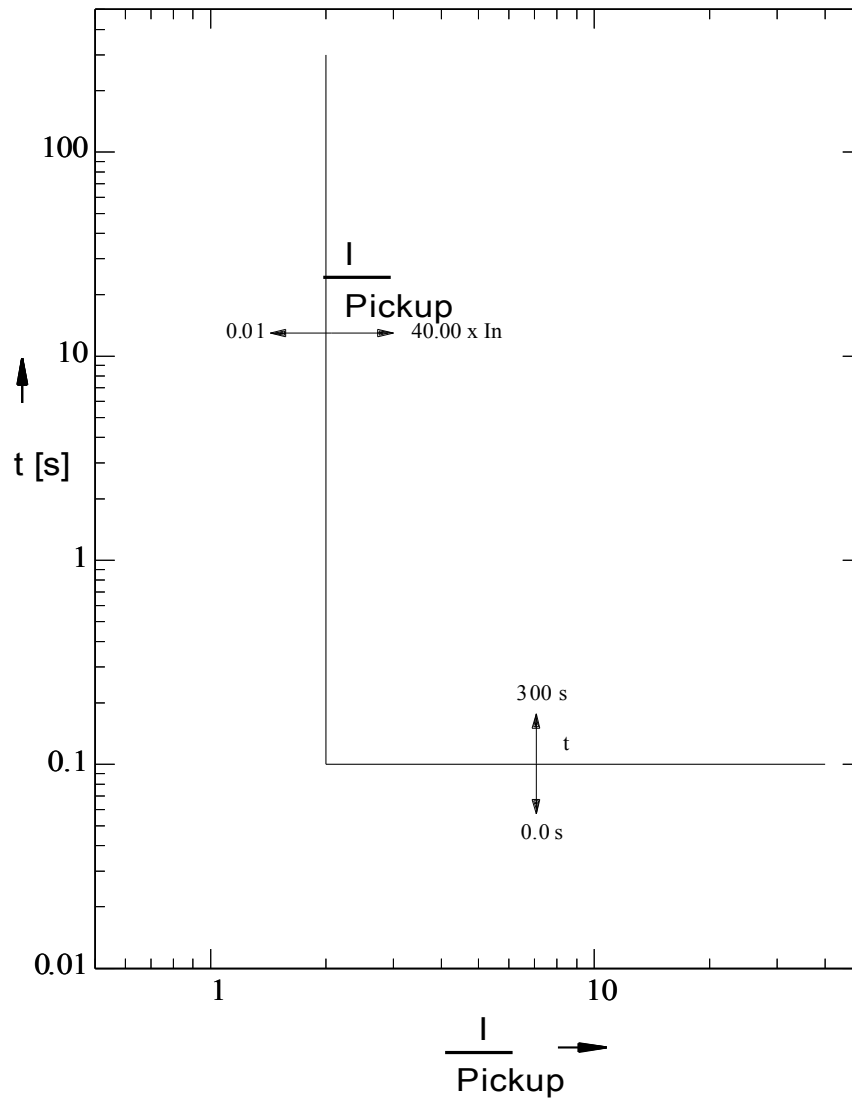
t = Tripping delay

I = Fault current

I_n = CT primary

Pickup = If the pickup value is exceeded, the module/element starts to time out to trip .

DEFT



Time Current Curves (PHASE)

The following characteristics are available:

- NINV (IEC/XInv);
- VINV (IEC/XInv);
- LINV (IEC/XInv);
- EINV (IEC/XInv);
- MINV (ANSI/XInv);
- VINV (ANSI/XInv);
- EINV (ANSI/XInv);
- Thermal Flat;
- Therm Flat IT;
- Therm Flat I2T; and
- Therm Flat I4T.

Explanation:

t = Tripping delay

t-multiplier = Time multiplier/tripping characteristic factor . The setting range depends on the selected tripping curve.

I = Fault current

Pickup = If the pickup value is exceeded, the module/element starts to time out to trip .

I_n = CT primary

Pickup Range = $[0.02 - 4.00] \times I_n$

IEC NINV



Notice!

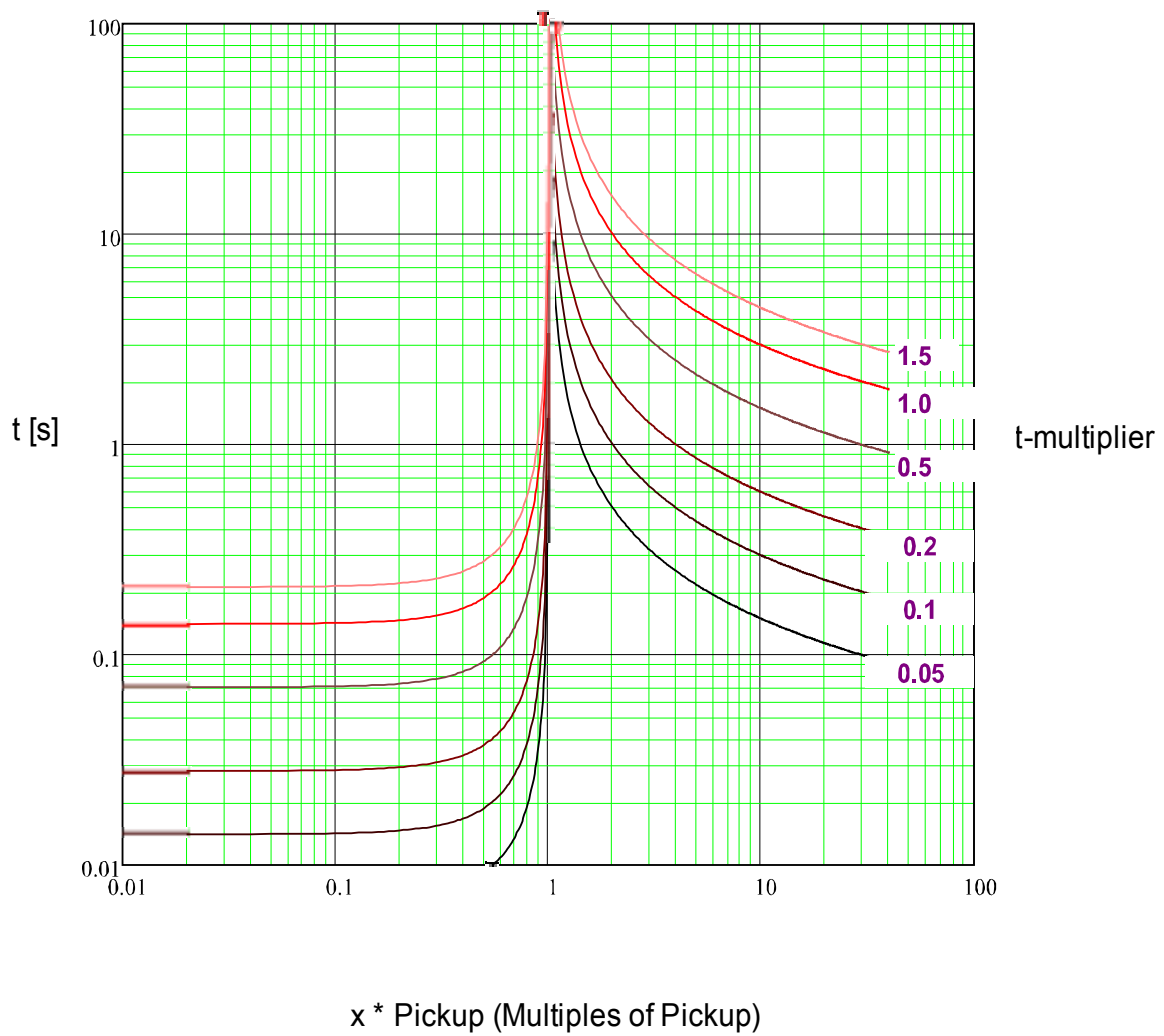
Various Reset Modes are available . Resetting via characteristic, delayed, and instantaneous .

Reset

$$t = \left| \frac{0.14}{\left(\frac{I}{I_{Pickup}}\right)^2 - 1} \right| * t\text{-multiplier [s]}$$

Trip

$$t = \frac{0.14}{\left(\frac{I}{I_{Pickup}}\right)^{0.02} - 1} * t\text{-multiplier [s]}$$



IEC VINV



Notice!

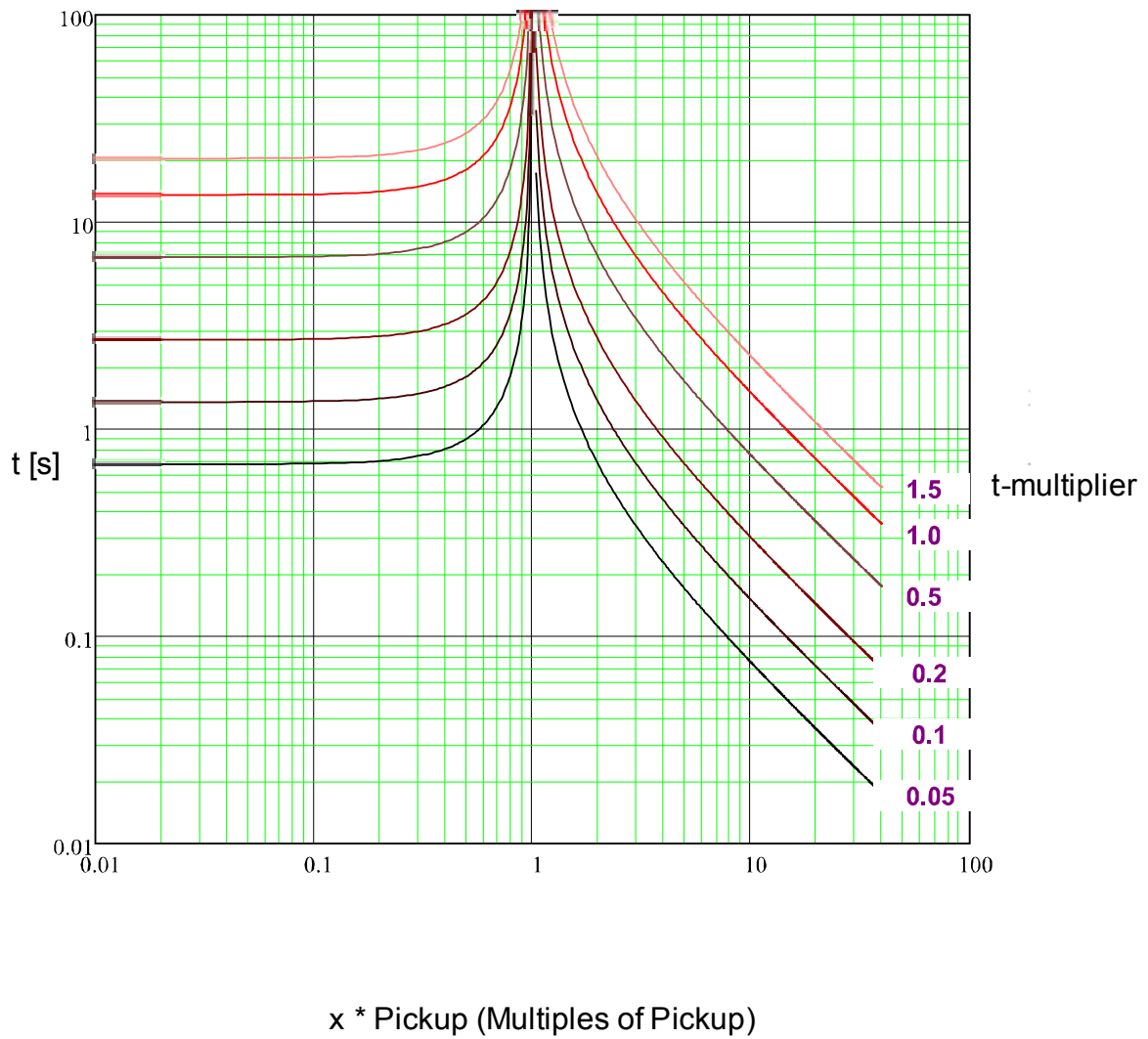
Various Reset Modes are available . Resetting via characteristic, delayed , and instantaneous .

Reset

Trip

$$t = \left| \frac{13.5}{\left(\frac{I}{I_{Pickup}}\right)^2 - 1} \right| * t\text{-multiplier [s]}$$

$$t = \frac{13.5}{\left(\frac{I}{I_{Pickup}}\right) - 1} * t\text{-multiplier [s]}$$



IEC LINV



Notice!

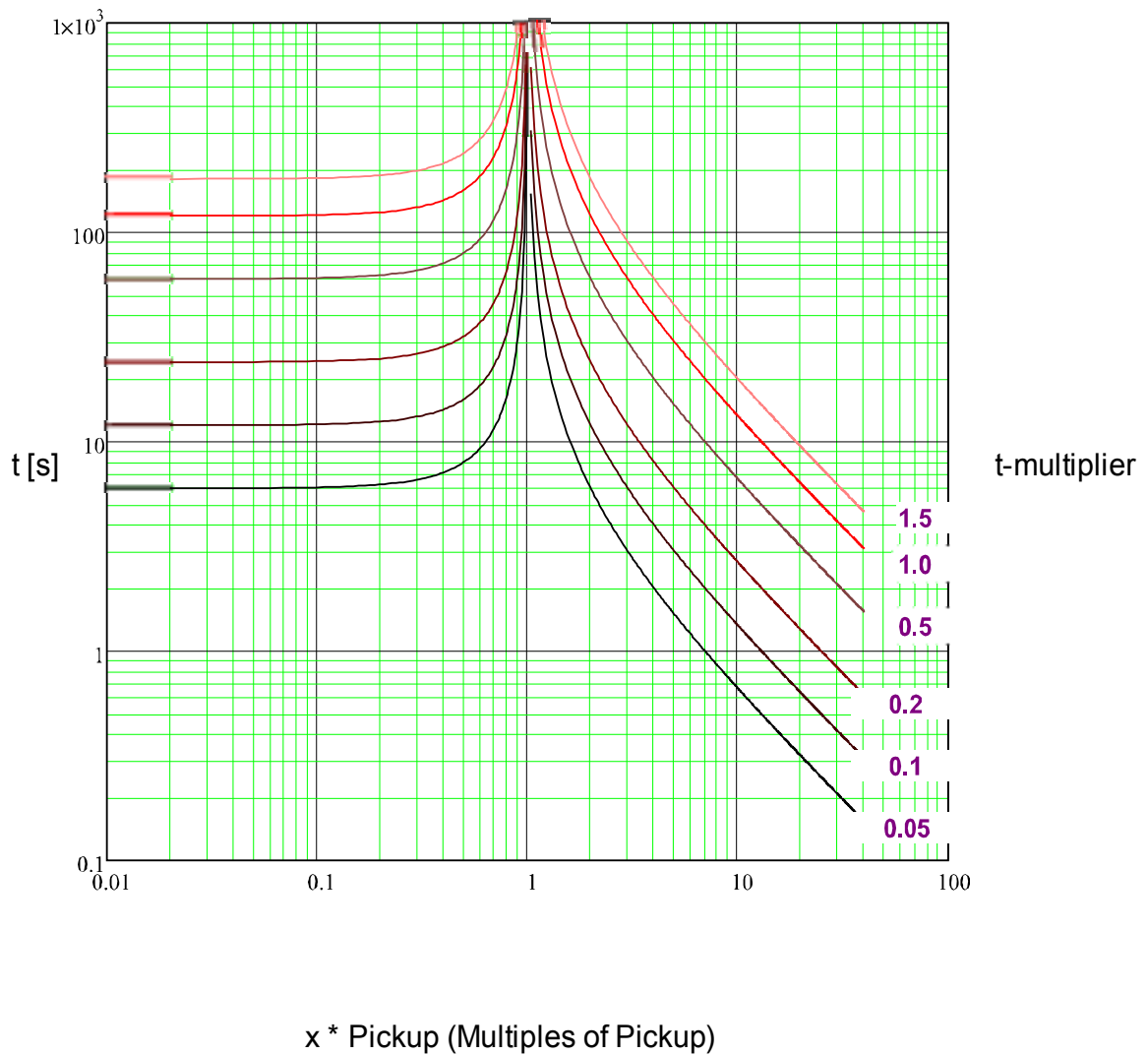
Various Reset Modes are available . Resetting via characteristic, delayed , and instantaneous .

Reset

Trip

$$t = \left| \frac{120}{\left(\frac{I}{\text{Pickup}}\right)^2 - 1} \right| * t\text{-multiplier [s]}$$

$$t = \frac{120}{\left(\frac{I}{\text{Pickup}}\right) - 1} * t\text{-multiplier [s]}$$



IEC EINV



Notice!

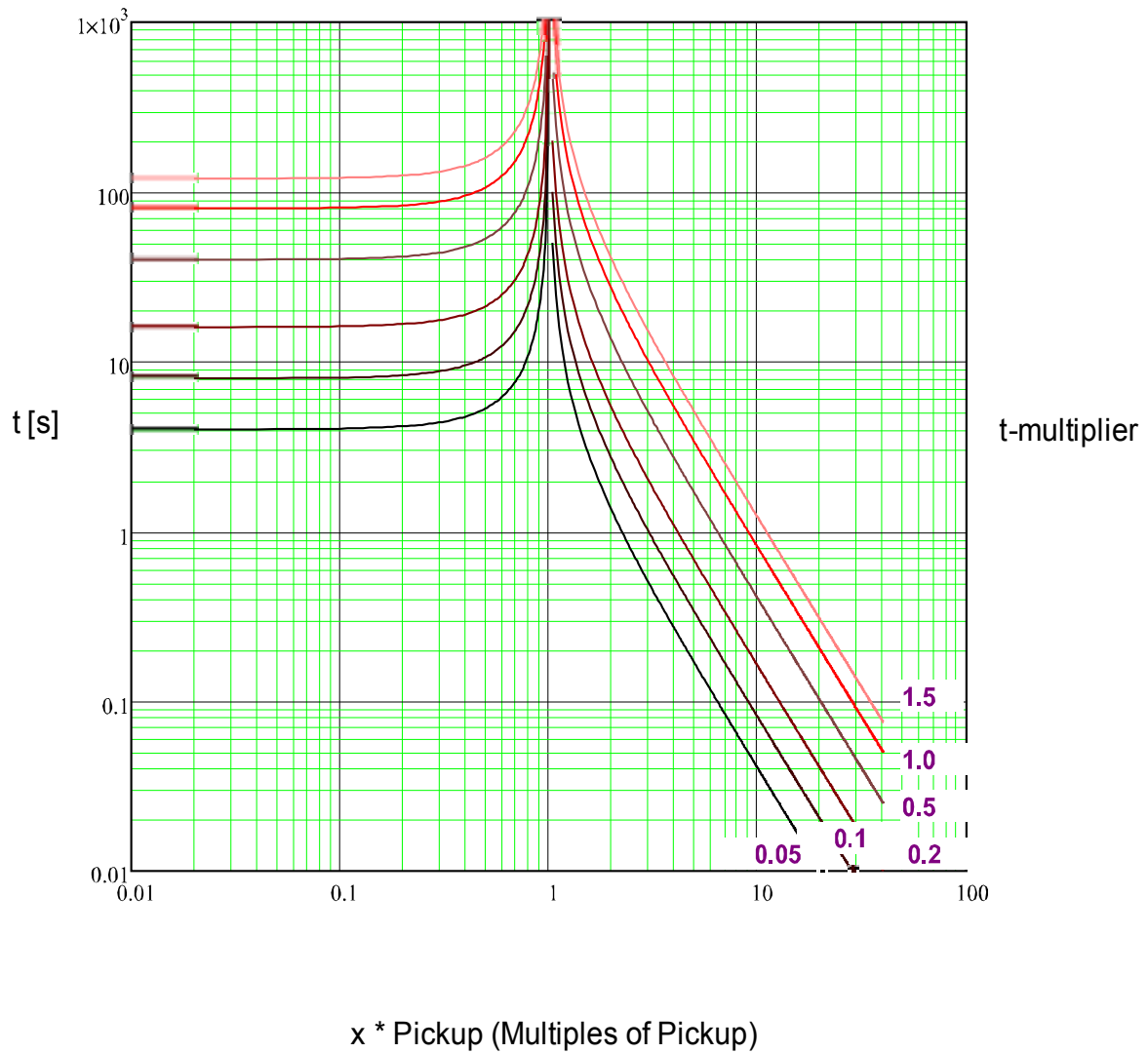
Various Reset Modes are available . Resetting via characteristic, delayed , and instantaneous .

Reset

$$t = \left| \frac{80}{\left(\frac{1}{\text{Pickup}}\right)^2 - 1} \right| * t\text{-multiplier [s]}$$

Trip

$$t = \frac{80}{\left(\frac{1}{\text{Pickup}}\right)^2 - 1} * t\text{-multiplier [s]}$$



ANSI MINV

Notice!

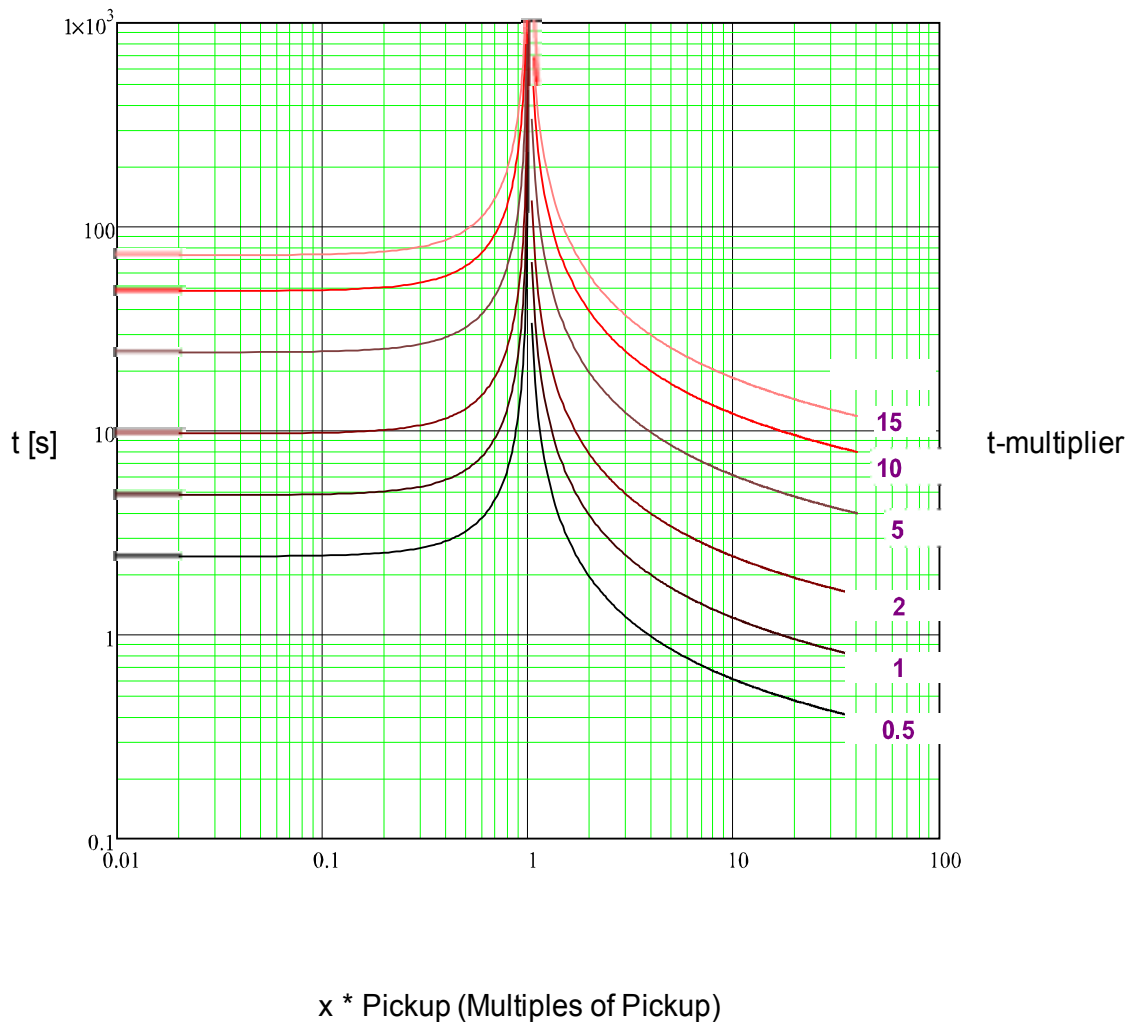
Various Reset Modes are available . Resetting via characteristic, delayed, and instantaneous .

Reset

$$t = \left| \frac{4.85}{\left(\frac{1}{\text{Pickup}}\right)^2 - 1} \right| * t\text{-multiplier [s]}$$

Trip

$$t = \left(\frac{0.0515}{\left(\frac{1}{\text{Pickup}}\right)^{0.02} - 1} + 0.1140 \right) * t\text{-multiplier [s]}$$



ANSI VINV



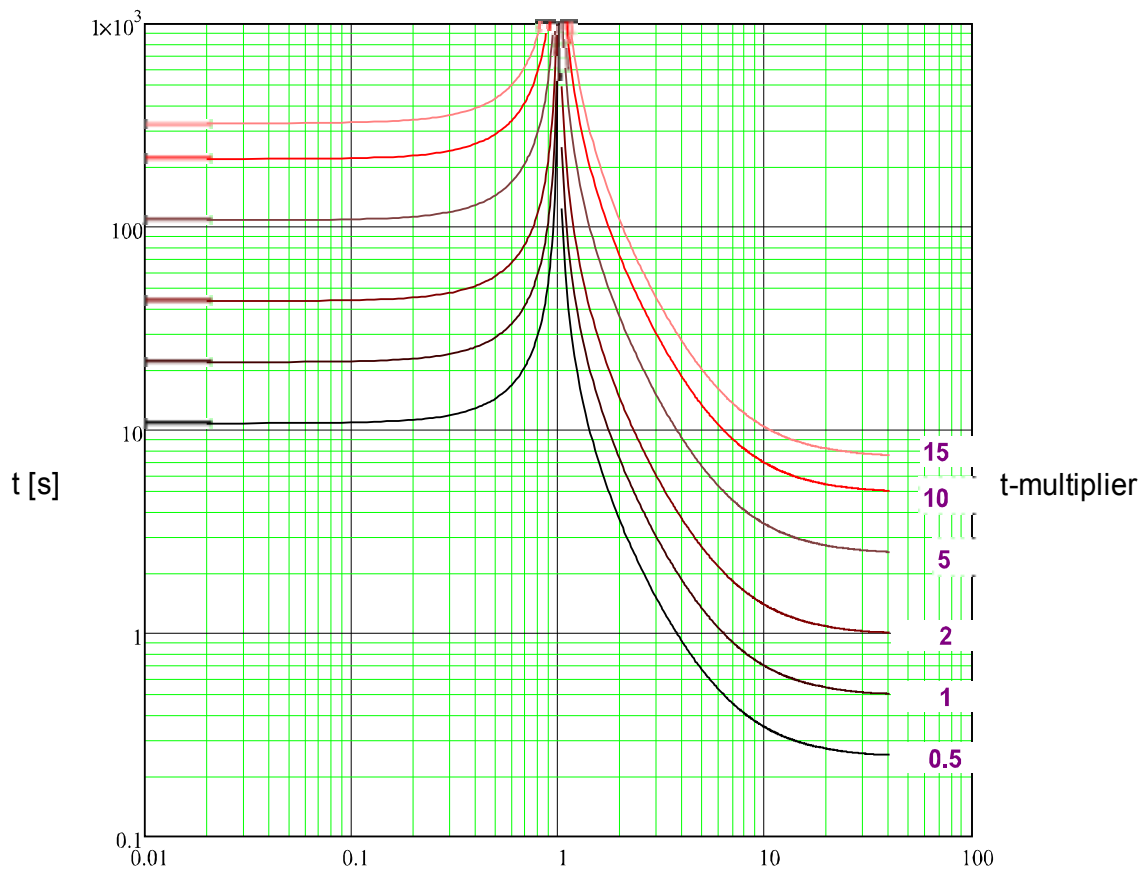
Notice!

Various Reset Modes are available . Resetting via characteristic, delayed , and instantaneous .

Reset

Trip

$$t = \left| \frac{21.6}{\left(\frac{1}{\text{Pickup}}\right)^2} \right| * t\text{-multiplier [s]} \quad t = \left(\frac{19.61}{\left(\frac{1}{\text{Pickup}}\right)^2} + 0.491 \right) * t\text{-multiplier [s]}$$



x * Pickup (Multiples of Pickup)

ANSI EINV



Notice!

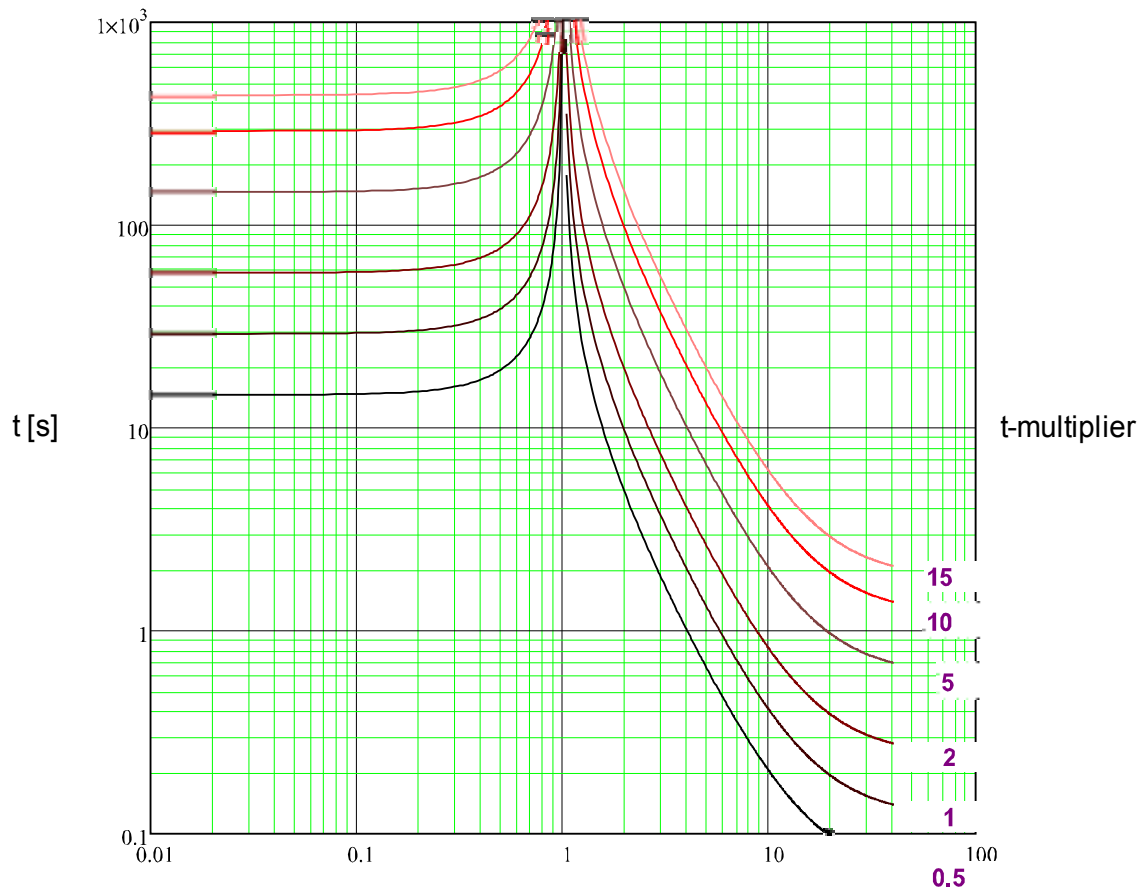
Various Reset Modes are available . Resetting via characteristic, delayed, and instantaneous .

Reset

Trip

$$t = \left| \frac{29.1}{\left(\frac{I}{\text{Pickup}}\right)^2 - 1} \right| * t\text{-multiplier [s]}$$

$$t = \left(\frac{28.2}{\left(\frac{I}{\text{Pickup}}\right)^2 - 1} + 0.1217 \right) * t\text{-multiplier [s]}$$



x * Pickup (Multiples of Pickup)

Therm Flat

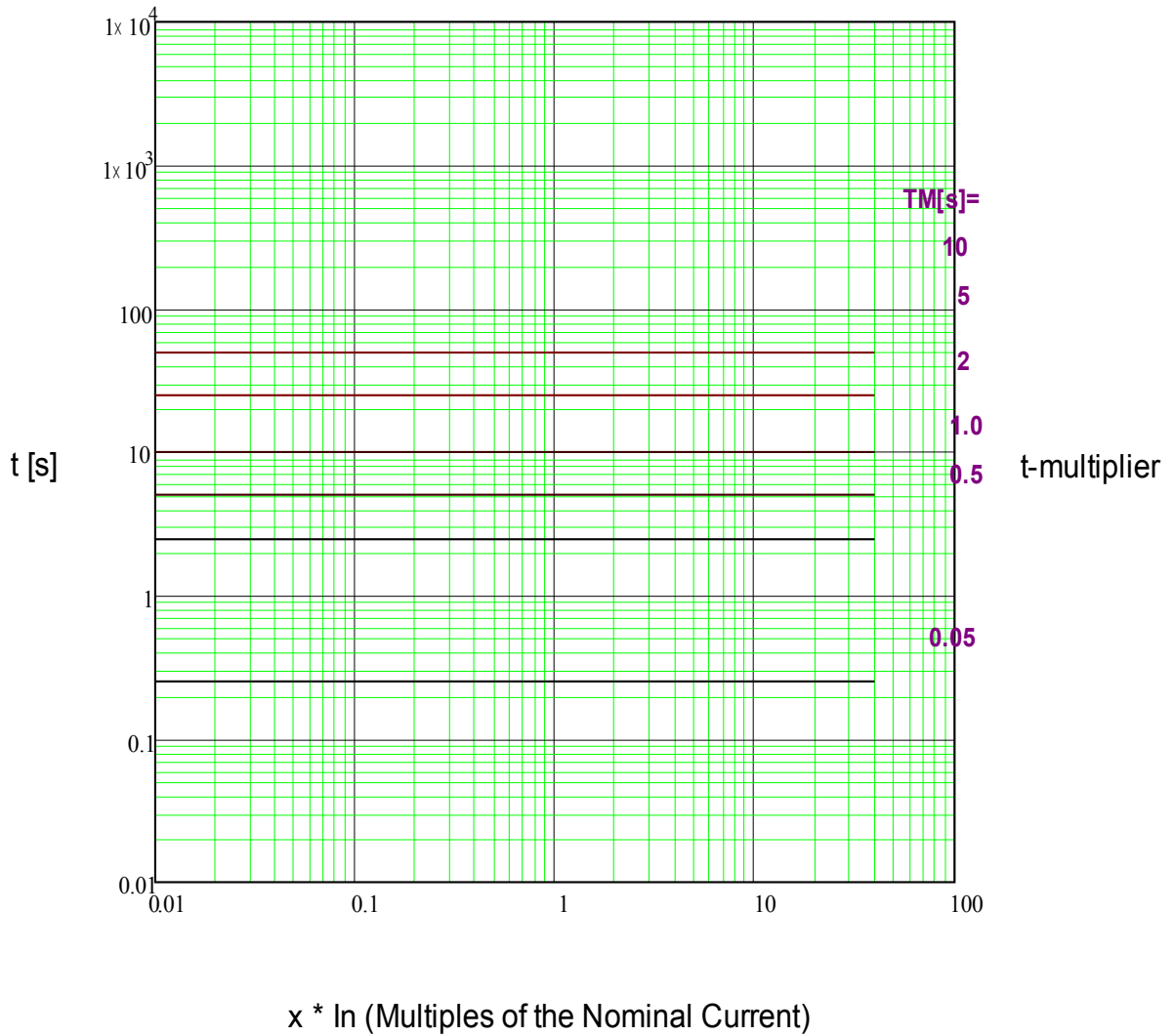


Notice!

Various Reset Modes are available . Resetting via characteristic, delayed , and instantaneous .

$$t = \left| \frac{5 \cdot 3^2}{\left(\frac{I}{I_n}\right)^0} \right| * t\text{-multiplier [s]} \quad \text{Reset} \qquad t = \frac{5 \cdot 1^2}{\left(\frac{I}{I_n}\right)^0} * t\text{-multiplier [s]} \quad \text{Trip}$$

$$t = 45 * t\text{-multiplier [s]}$$



IT



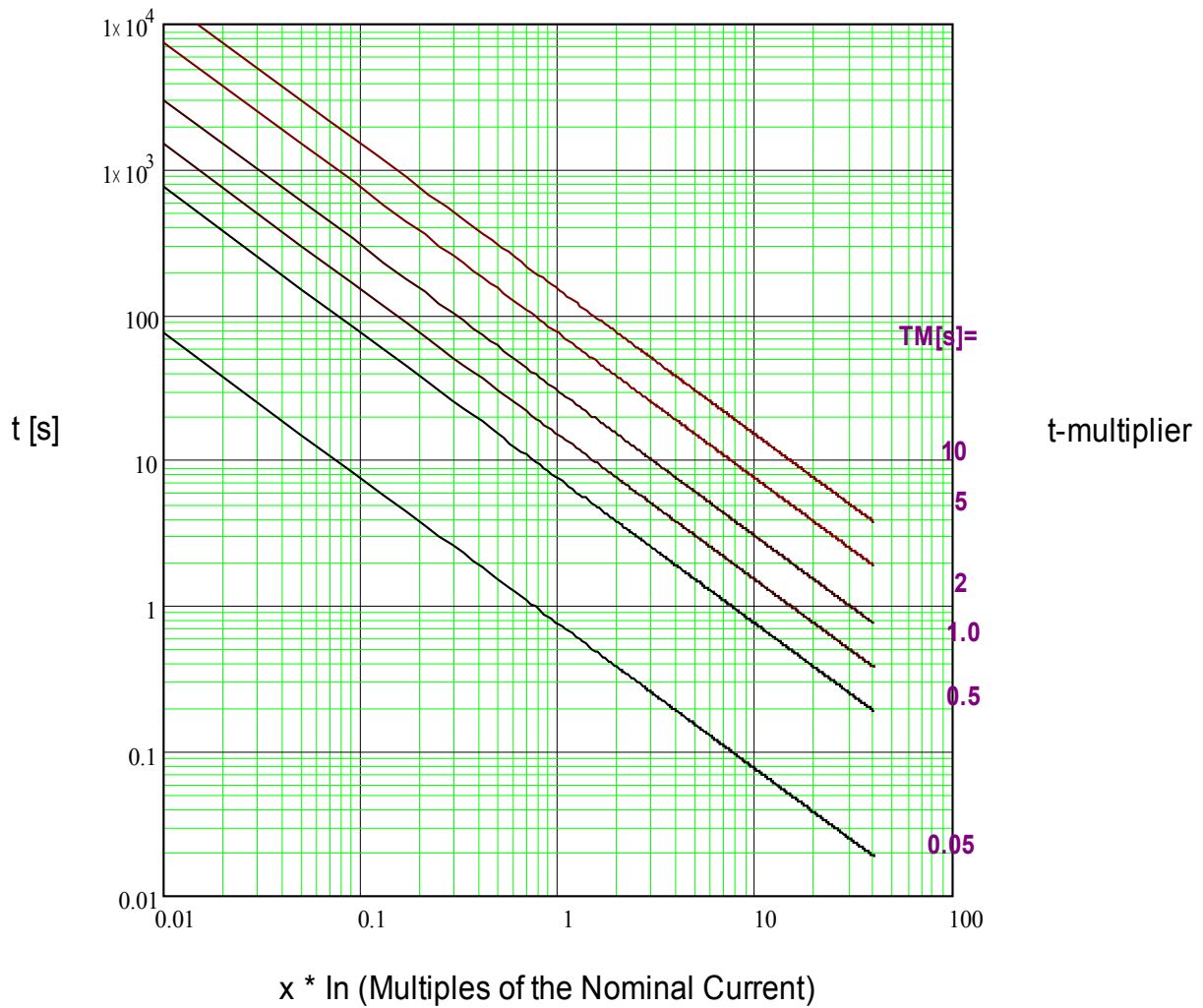
Notice!

Various Reset Modes are available . Resetting via characteristic, delayed , and instantaneous .

Reset

Trip

$$t = \left| \frac{5 \cdot 3^2}{\left(\frac{I}{I_n}\right)^0} \right| \cdot t\text{-multiplier [s]} \quad t = \frac{5 \cdot 3^1}{\left(\frac{I}{I_n}\right)^1} \cdot t\text{-multiplier [s]}$$



I²T



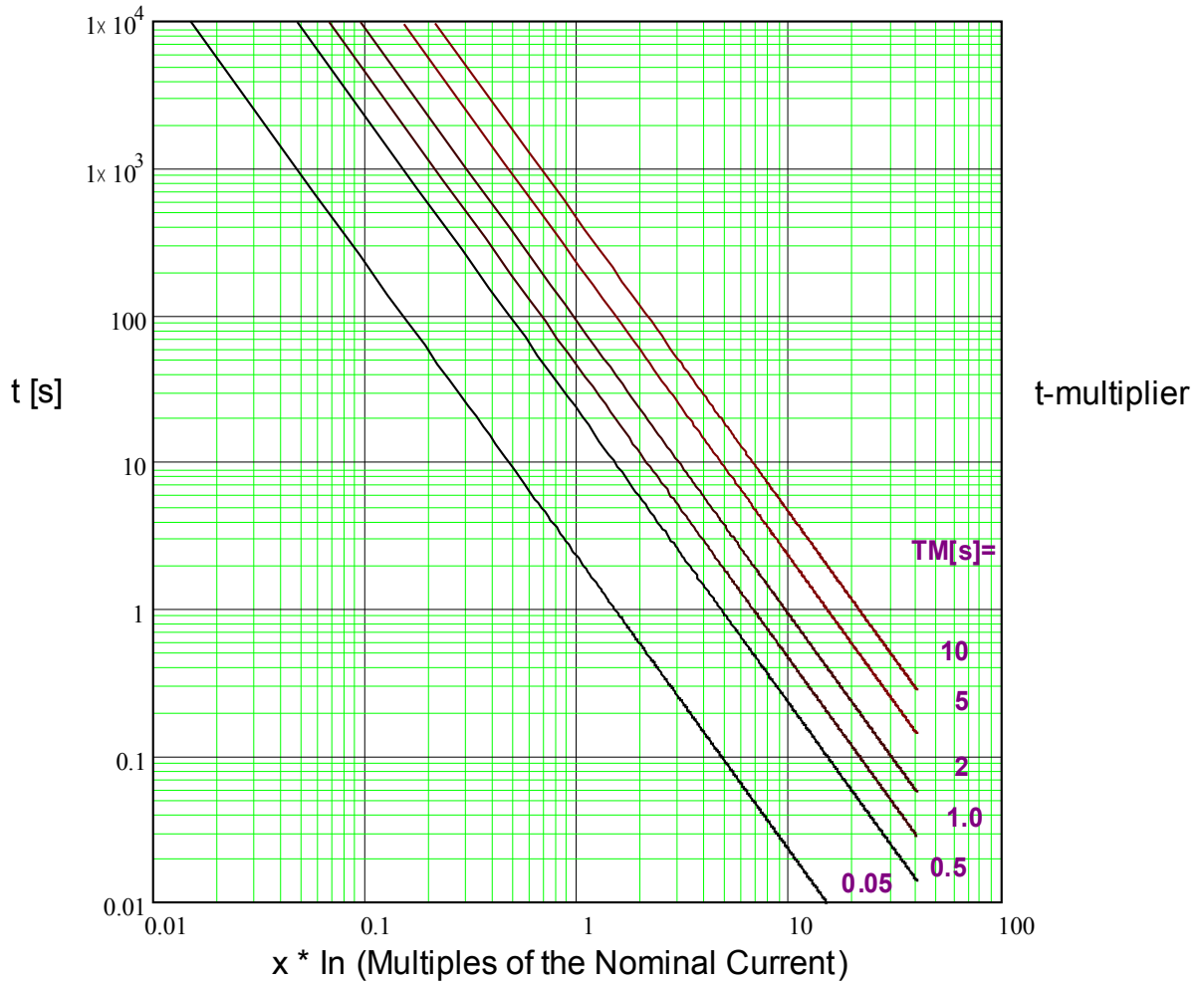
Notice!

Various Reset Modes are available . Resetting via characteristic, delayed , and instantaneous .

Reset

Trip

$$t = \left| \frac{5 \cdot 3^2}{\left(\frac{I}{I_n}\right)^0} \right| * t\text{-multiplier [s]} \quad t = \frac{5 \cdot 3^2}{\left(\frac{I}{I_n}\right)^2} * t\text{-multiplier [s]}$$



I4T



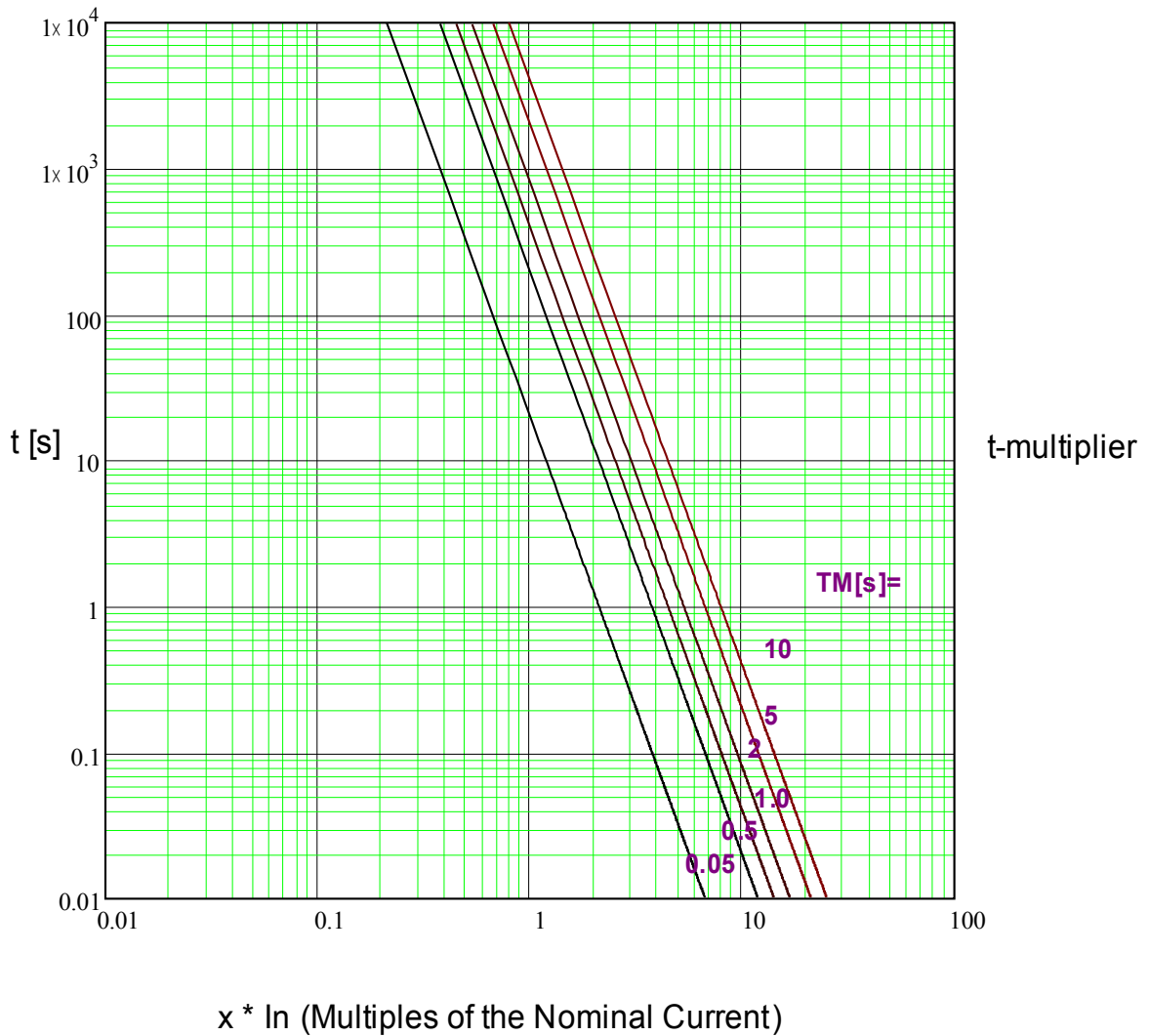
Notice!

Various Reset Modes are available . Resetting via characteristic, delayed, and instantaneous .

Reset

Trip

$$t = \left| \frac{5 \cdot 3^2}{\left(\frac{I}{I_n}\right)^0} \right| \cdot t\text{-multiplier [s]} \quad t = \frac{5 \cdot 3^4}{\left(\frac{I}{I_n}\right)^4} \cdot t\text{-multiplier [s]}$$



Instantaneous Current Curves (Ground Current Calculated)

The following characteristics is available:

- DEFT (definite time).

Explanation:

t = Tripping delay

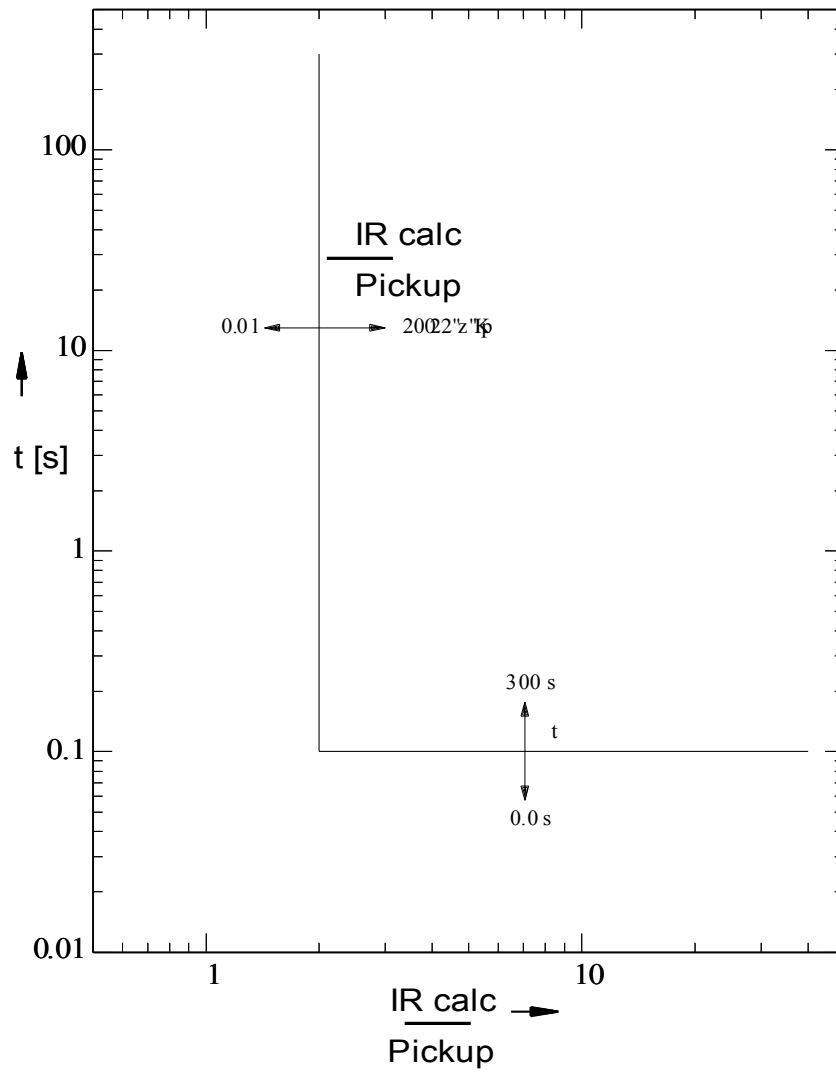
IG = Fault current

In = CT primary

Pickup = If the pickup value is exceeded, the module/element starts to time out to trip .

The ground current can be measured either directly via a zero sequence transformer or detected by a residual connection. The ground current can alternatively be calculated from the phase currents; but this is only possible if the current transformers are Wye-connected.

DEFT



Instantaneous Current Curves (Ground Current Measured)

The following characteristics is available:

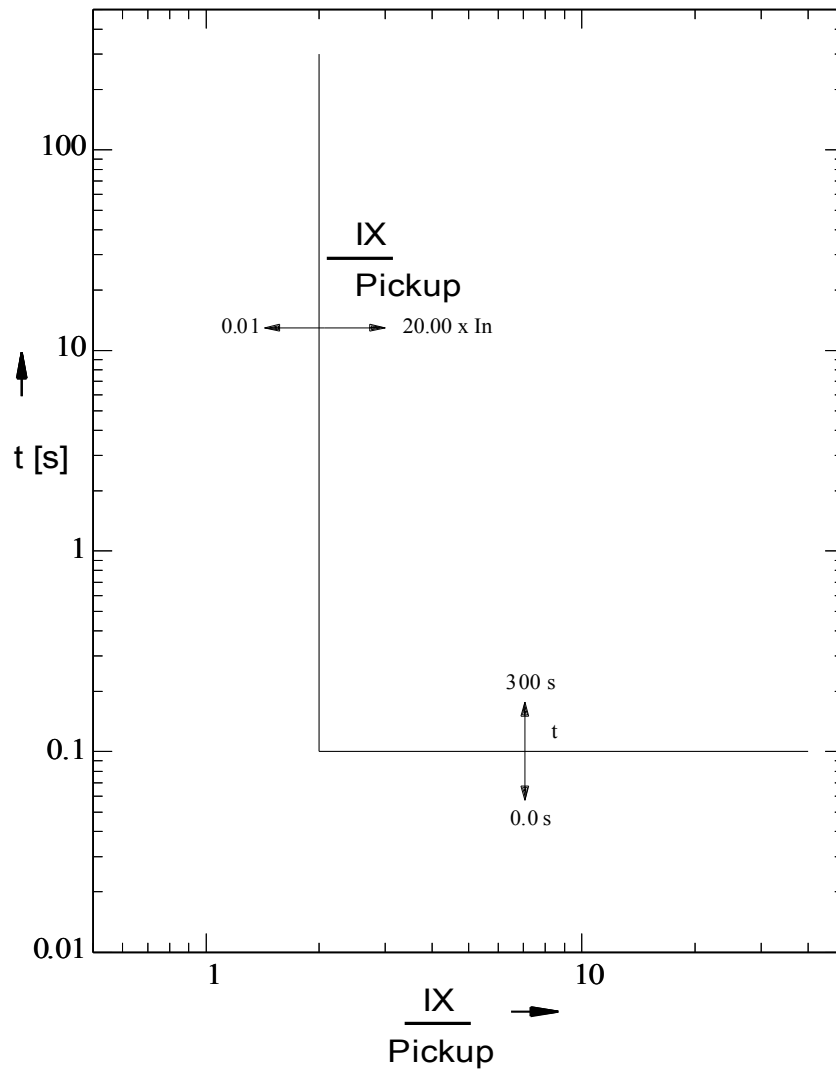
- DEFT (definite time).

Explanation:

I_n = CT primary

The ground current can be measured either directly via a zero sequence transformer or detected by a residual connection. The ground current can alternatively be calculated from the phase currents; but this is only possible if the current transformers are Wye-connected.

DEFT



Time Current Curves (Ground Current)

The following characteristics are available:

- NINV (IEC/XInv);
- VINV (IEC/XInv);
- LINV (IEC/XInv);
- EINV (IEC/XInv);
- MINV (ANSI/XInv);
- VINV (ANSI/XInv);
- EINV (ANSI/XInv);
- Thermal Flat;
- Therm Flat IT;
- Therm Flat I2T; and
- Therm Flat I4T.

Explanation:

t = Tripping delay

t -multiplier = Time multiplier/tripping characteristic factor. The setting range depends on the selected tripping curve.
 I_G = Fault current

Pickup = If the pickup value is exceeded, the module/element starts to time out to trip .

The ground current can be measured either directly via a zero sequence transformer or detected by a residual connection. The ground current can alternatively be calculated from the phase currents; but this is only possible if the current transformers are Wye-connected.

I_n = CT primary

Pickup Range = $[0.02 - 4.00] \times I_n$

Sensitive Ground Option Pickup Range = $[0.002 - 2.000] \times I_n$

IEC NINV



Notice!

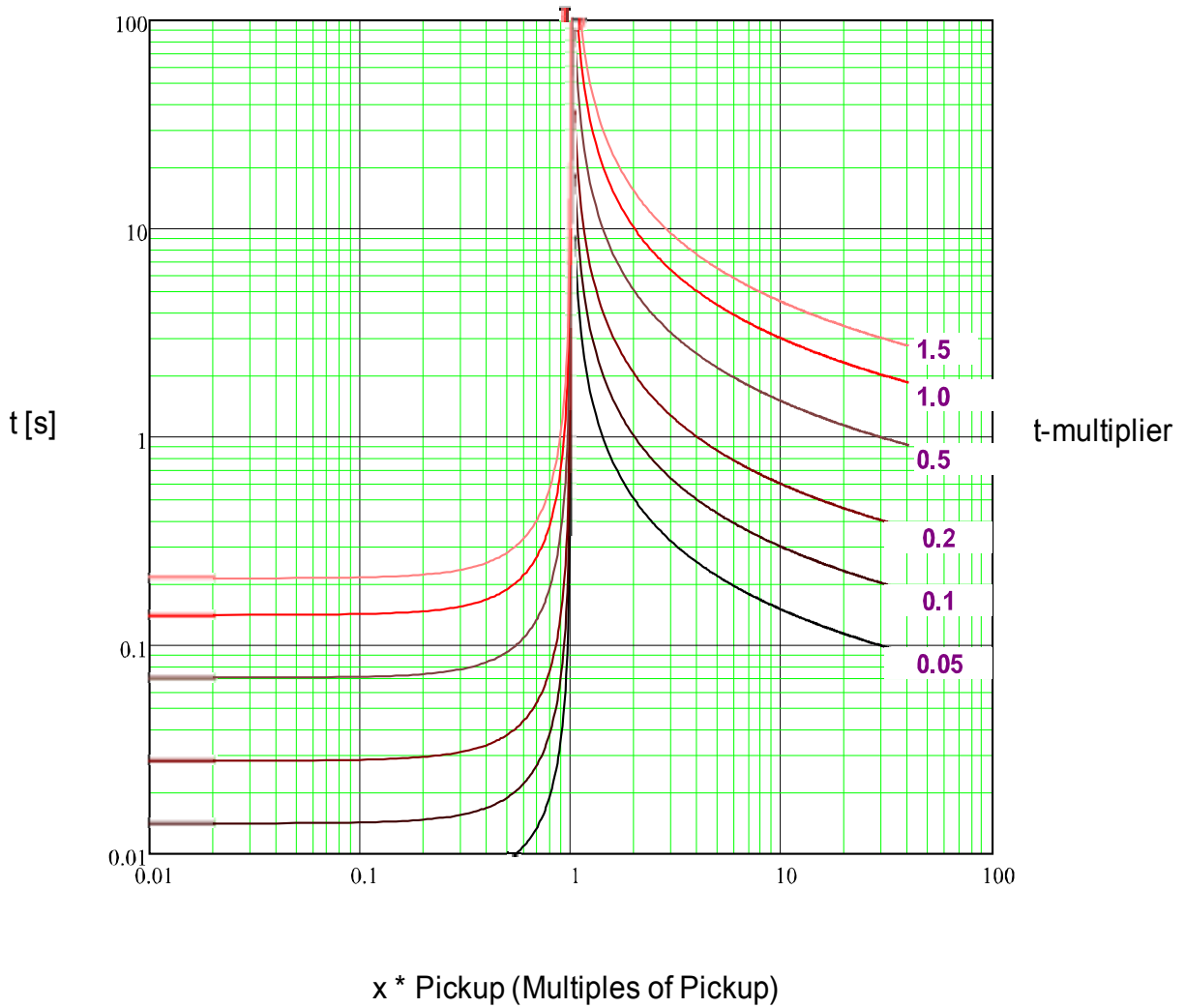
Various Reset Modes are available . Resetting via characteristic, delayed, and instantaneous .

Reset

Trip

$$t = \left| \frac{0.14}{\left(\frac{IG}{Pickup}\right)^2 - 1} \right| * t\text{-multiplier [s]}$$

$$t = \frac{0.14}{\left(\frac{IG}{Pickup}\right)^{0.02} - 1} * t\text{-multiplier [s]}$$



IEC VINV



Notice!

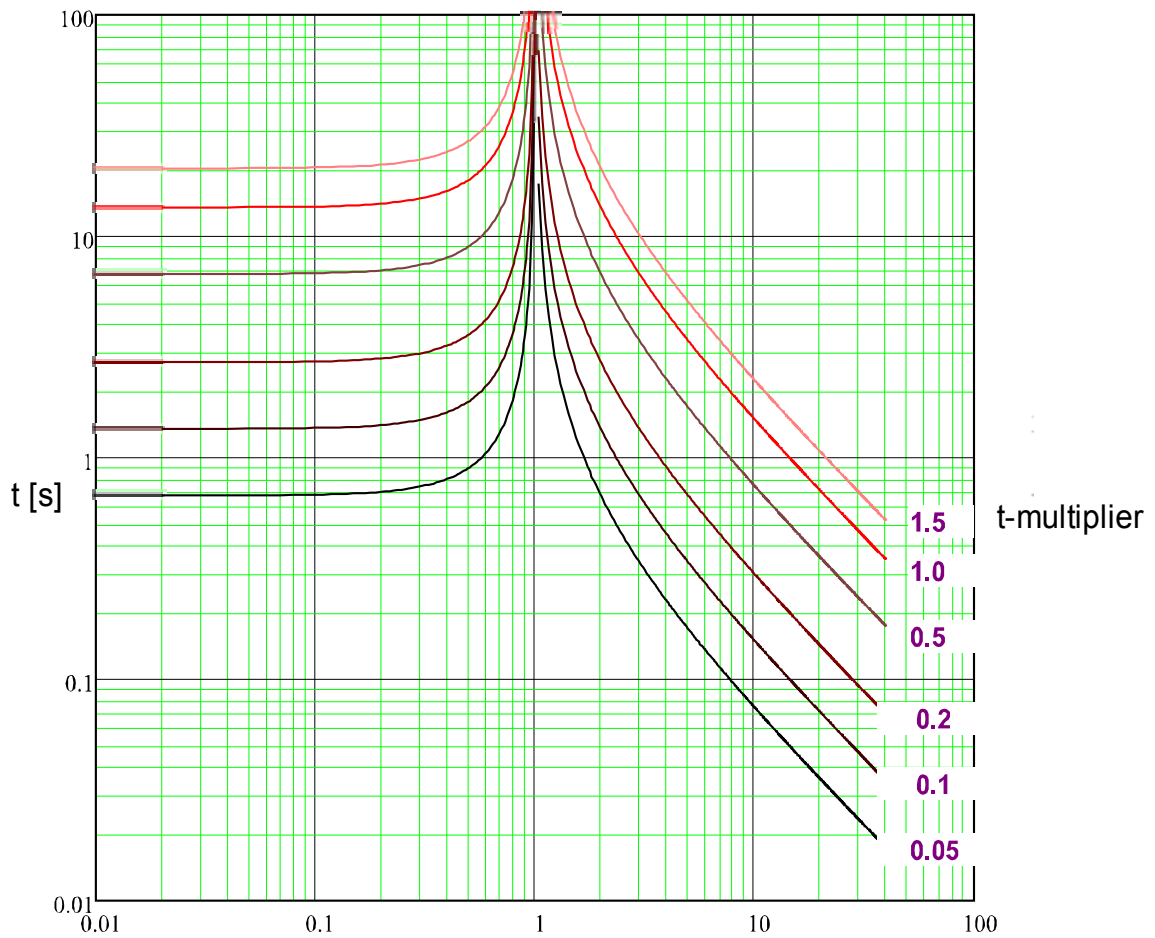
Various Reset Modes are available . Resetting via characteristic, delayed , and instantaneous .

Reset

Trip

$$t = \left| \frac{13.5}{\left(\frac{IG}{Pickup}\right)^2} \right| * t\text{-multiplier [s]}$$

$$t = \frac{13.5}{\left(\frac{IG}{Pickup}\right)^{-1}} * t\text{-multiplier [s]}$$



x * Pickup (Multiples of Pickup)

IEC LINV



Notice!

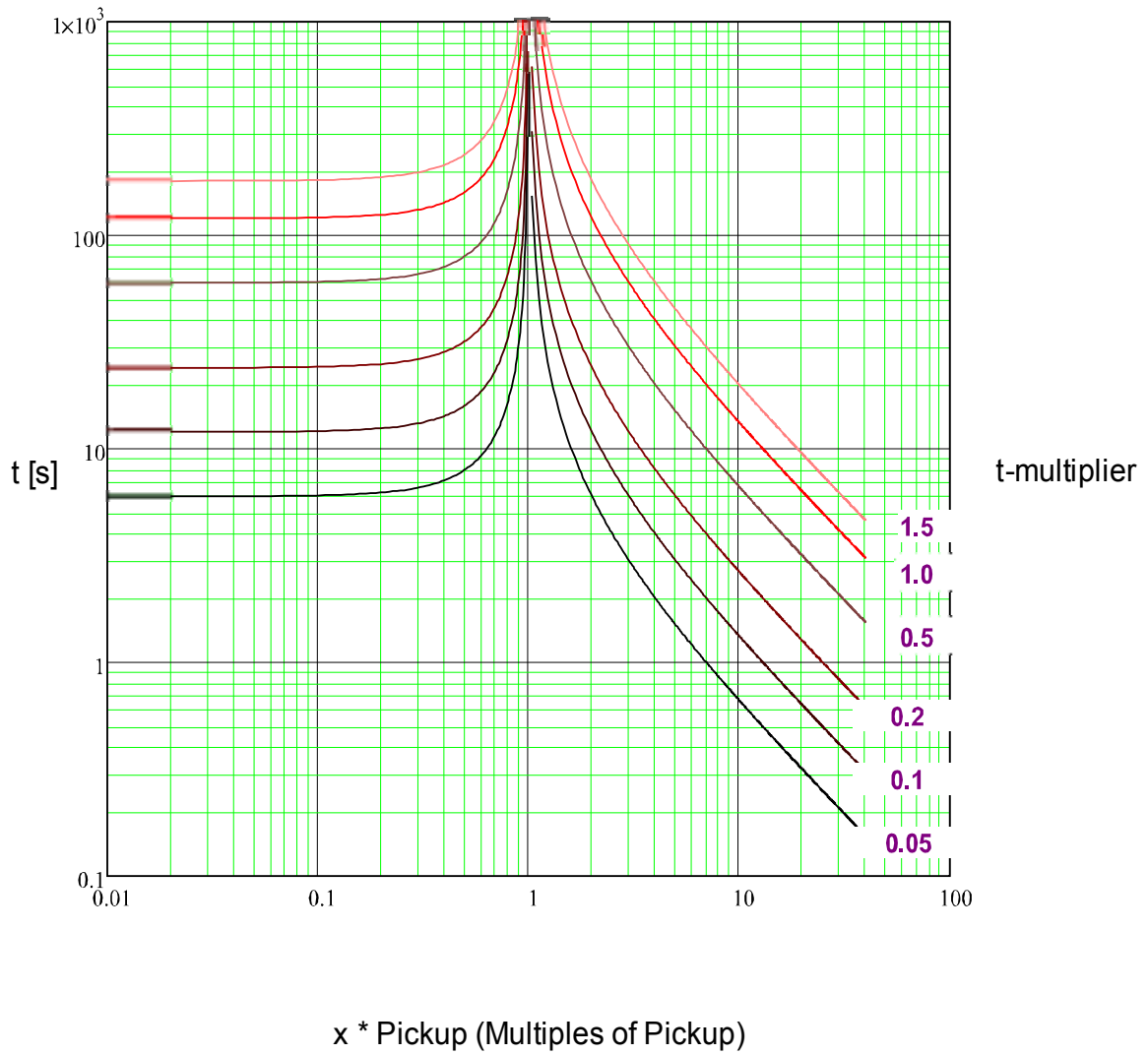
Various Reset Modes are available . Resetting via characteristic, delayed, and instantaneous .

Reset

$$t = \left| \frac{120}{\left(\frac{IG}{Pickup}\right)^2} \right| * t\text{-multiplier [s]}$$

Trip

$$t = \frac{120}{\left(\frac{IG}{Pickup}\right)^1} * t\text{-multiplier [s]}$$



IEC EINV



Notice!

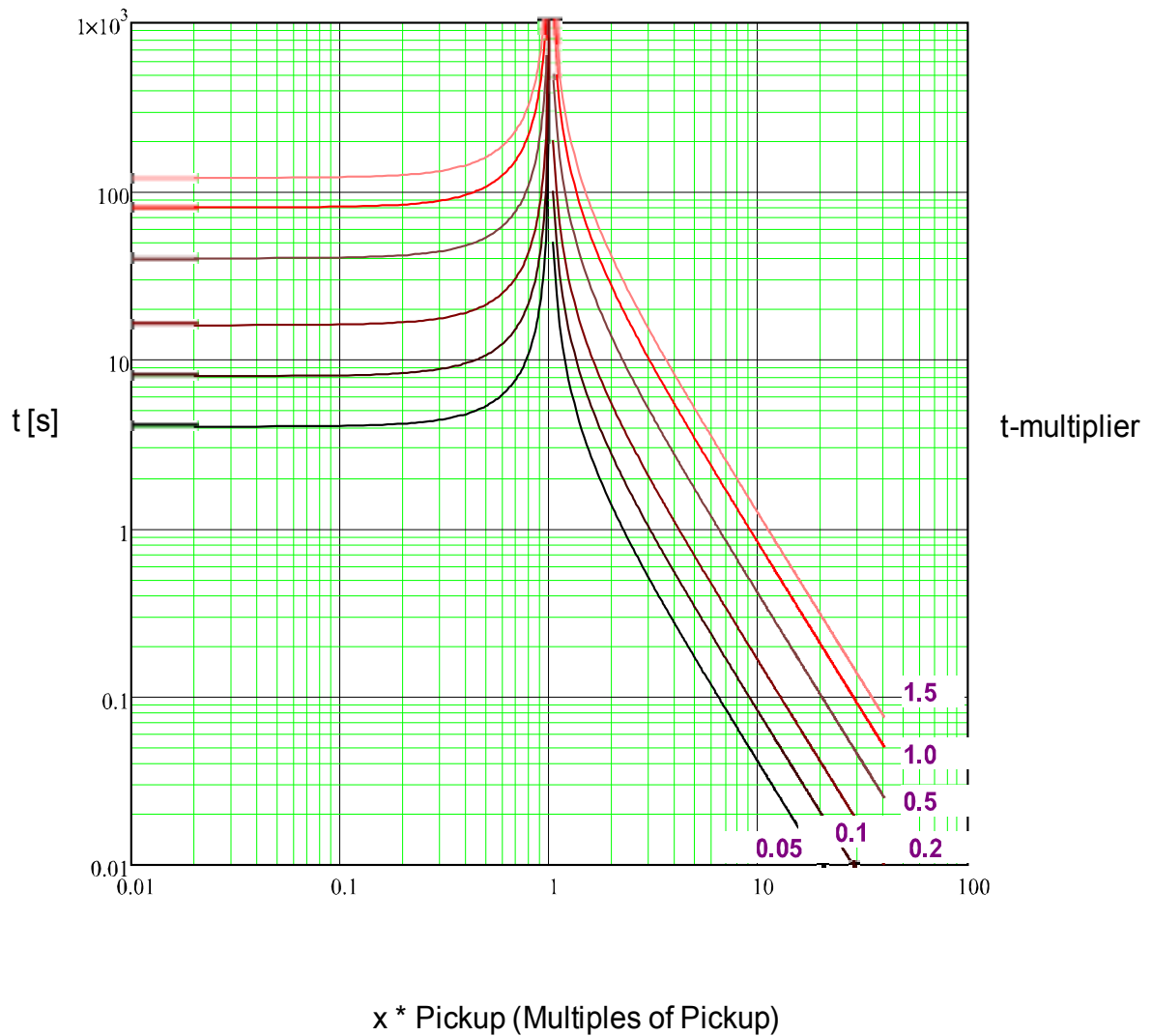
Various Reset Modes are available . Resetting via characteristic, delayed , and instantaneous .

Reset

Trip

$$t = \left| \frac{80}{\left(\frac{IG}{Pickup}\right)^2 - 1} \right| * t\text{-multiplier [s]}$$

$$t = \frac{80}{\left(\frac{IG}{Pickup}\right)^2 - 1} * t\text{-multiplier [s]}$$



ANSI MINV



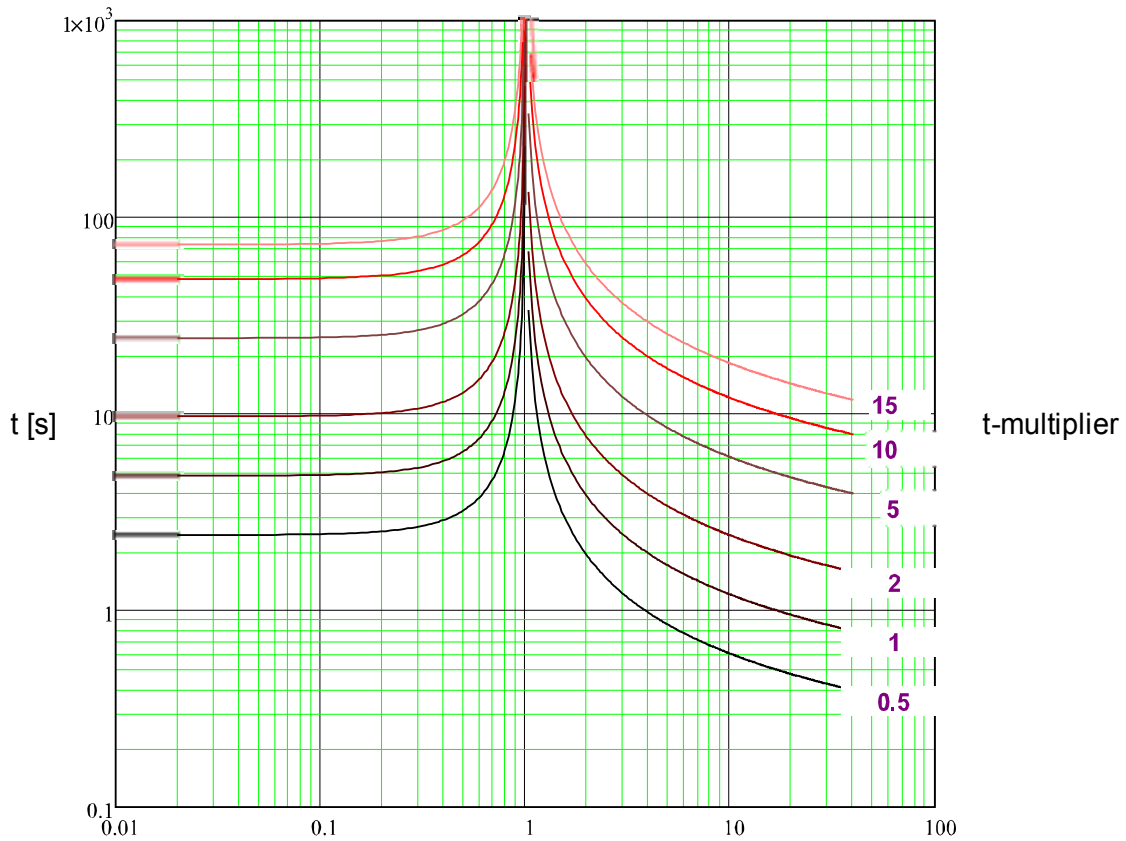
Notice!

Various Reset Modes are available . Resetting via characteristic, delayed , and instantaneous .

Reset

Trip

$$t = \left| \frac{4.85}{\left(\frac{IG}{Pickup}\right)^2 - 1} \right| * t\text{-multiplier [s]} \qquad t = \left(\frac{0.0515}{\left(\frac{IG}{Pickup}\right)^{0.02} - 1} + 0.1140 \right) * t\text{-multiplier [s]}$$



x * Pickup (Multiples of Pickup)

ANSI VINV



Notice!

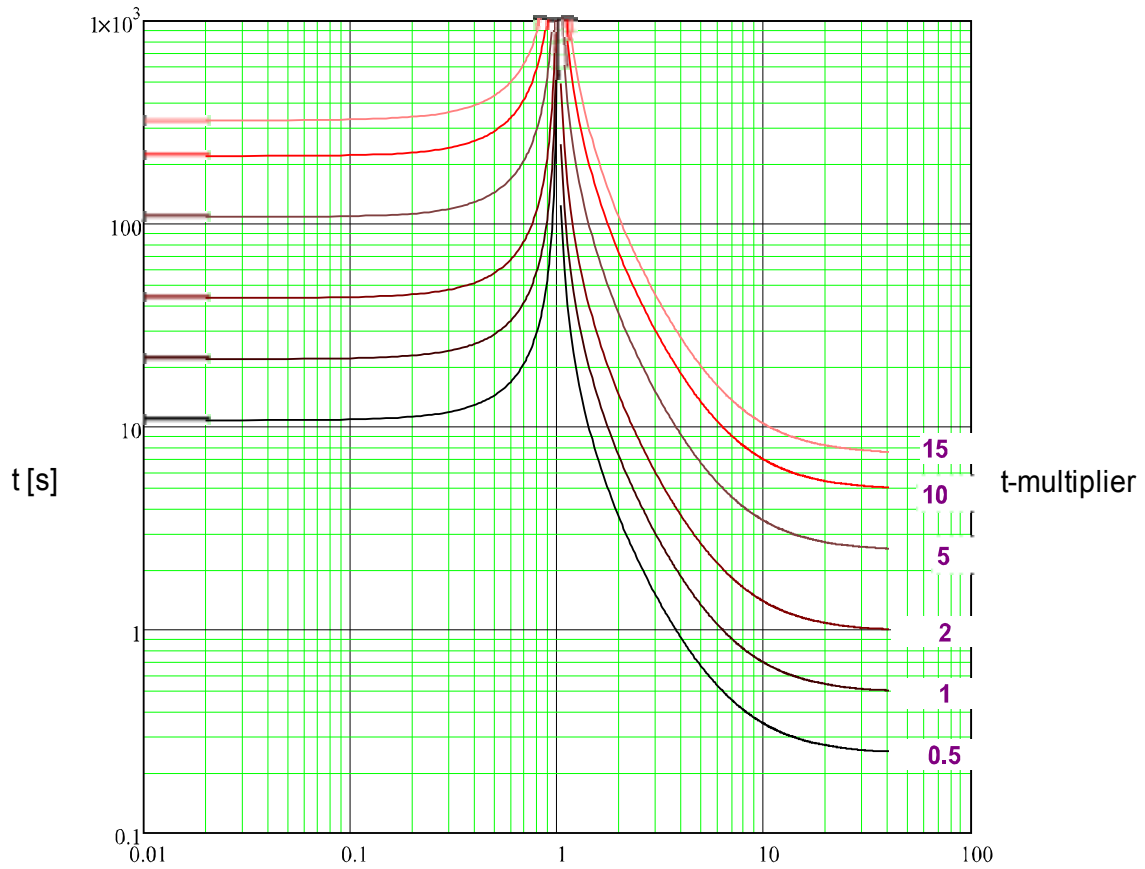
Various Reset Modes are available . Resetting via characteristic, delayed, and instantaneous .

Reset

$$t = \left| \frac{21.6}{\left(\frac{IG}{Pickup}\right)^2 - 1} \right| * t\text{-multiplier [s]}$$

Trip

$$t = \left(\frac{19.61}{\left(\frac{IG}{Pickup}\right)^2 - 1} + 0.491 \right) * t\text{-multiplier [s]}$$



x * Pickup (Multiples of Pickup)

ANSI EINV



Notice!

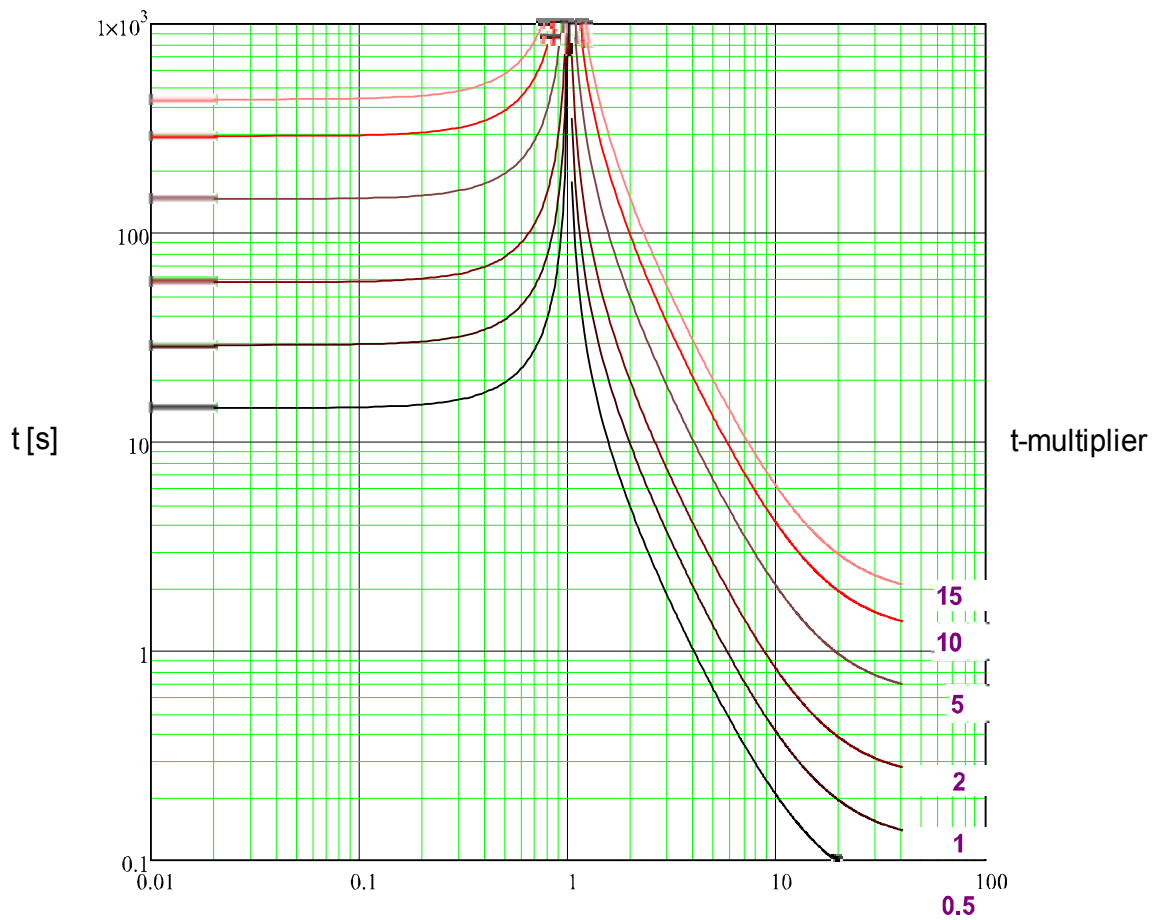
Various Reset Modes are available . Resetting via characteristic, delayed, and instantaneous .

Reset

Trip

$$t = \left| \frac{29.1}{\left(\frac{IG}{Pickup}\right)^2 - 1} \right| * t\text{-multiplier [s]}$$

$$t = \left(\frac{28.2}{\left(\frac{IG}{Pickup}\right)^2} + 0.1217 \right) * t\text{-multiplier [s]}$$



x * Pickup (Multiples of Pickup)

Therm Flat



Notice!

Various Reset Modes are available . Resetting via characteristic, delayed , and instantaneous .

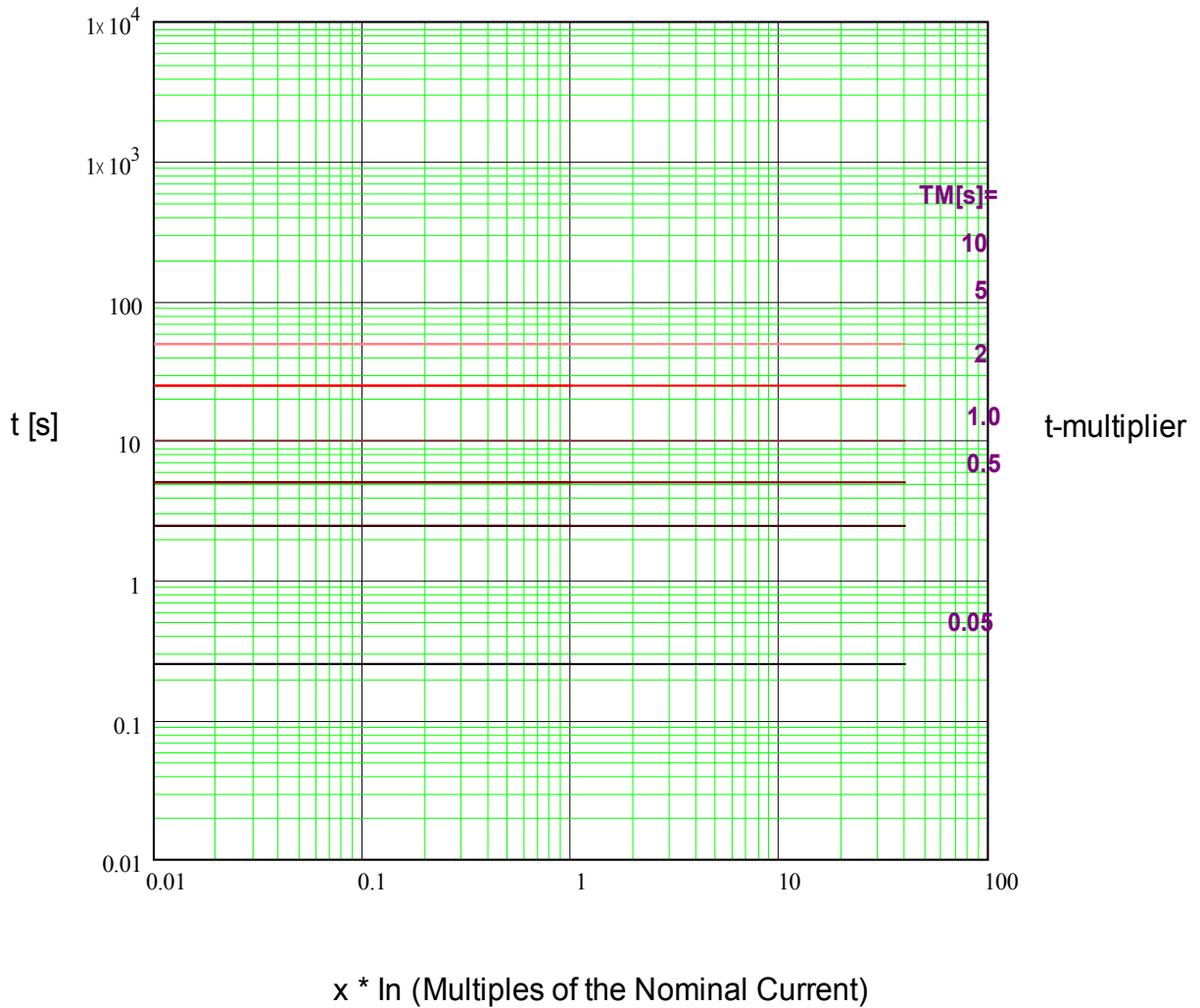
Reset

$$t = \left| \frac{5 \cdot 1^2}{\left(\frac{IG}{IG_{nom}}\right)^0} \right| \cdot t\text{-multiplier [s]}$$

Trip

$$t = \frac{5}{\left(\frac{IG}{IG_{nom}}\right)^0} \cdot t\text{-multiplier [s]}$$

$$t = 5 \cdot t\text{-multiplier [s]}$$



IT



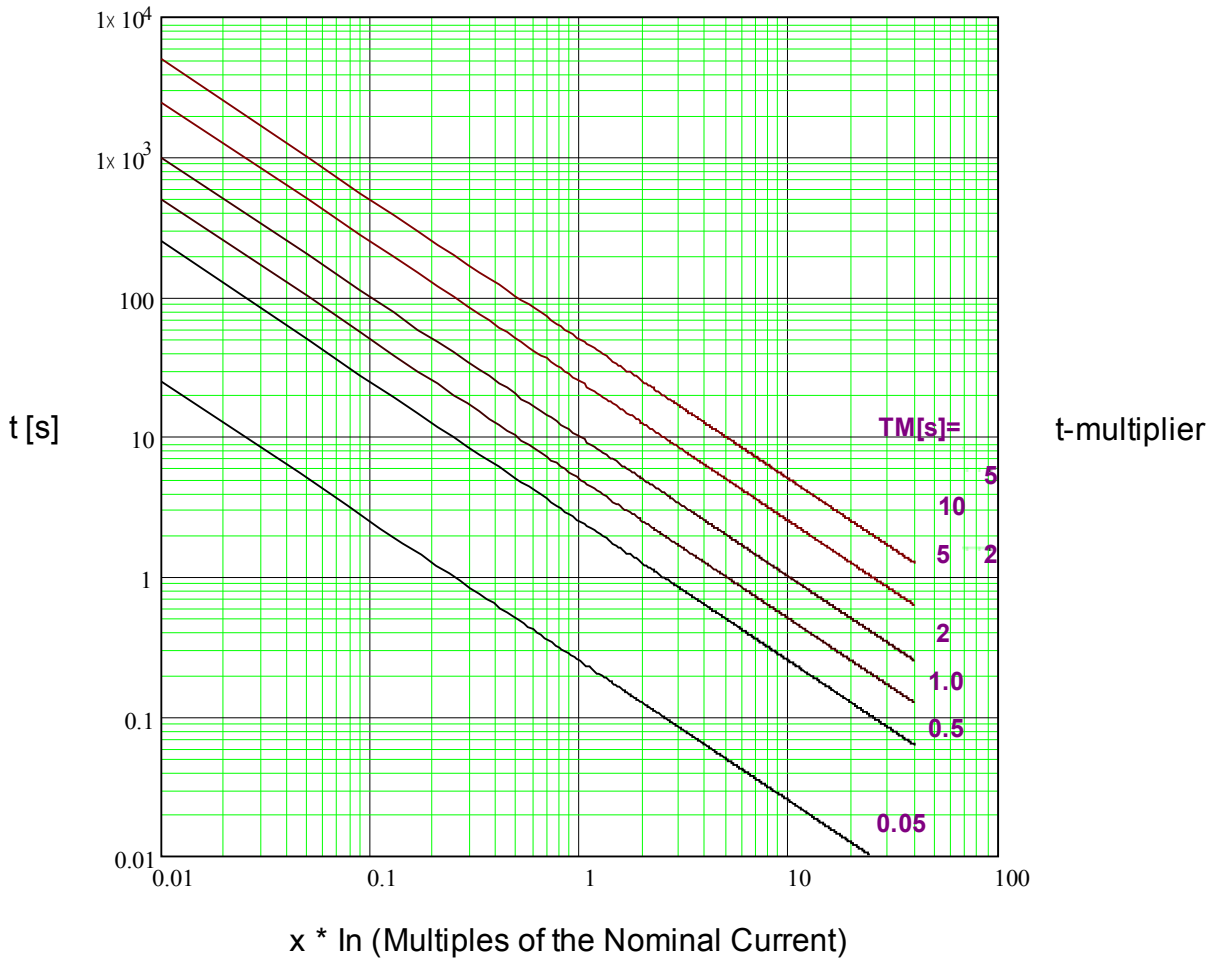
Notice!

Various Reset Modes are available . Resetting via characteristic, delayed, and instantaneous .

Reset

Trip

$$t = \left| \frac{5 \cdot 1^2}{\left(\frac{IG}{IGnom}\right)^0} \right| * t\text{-multiplier [s]} \quad t = \frac{5 \cdot 1^1}{\left(\frac{IG}{IGnom}\right)^1} * t\text{-multiplier [s]}$$



I²T



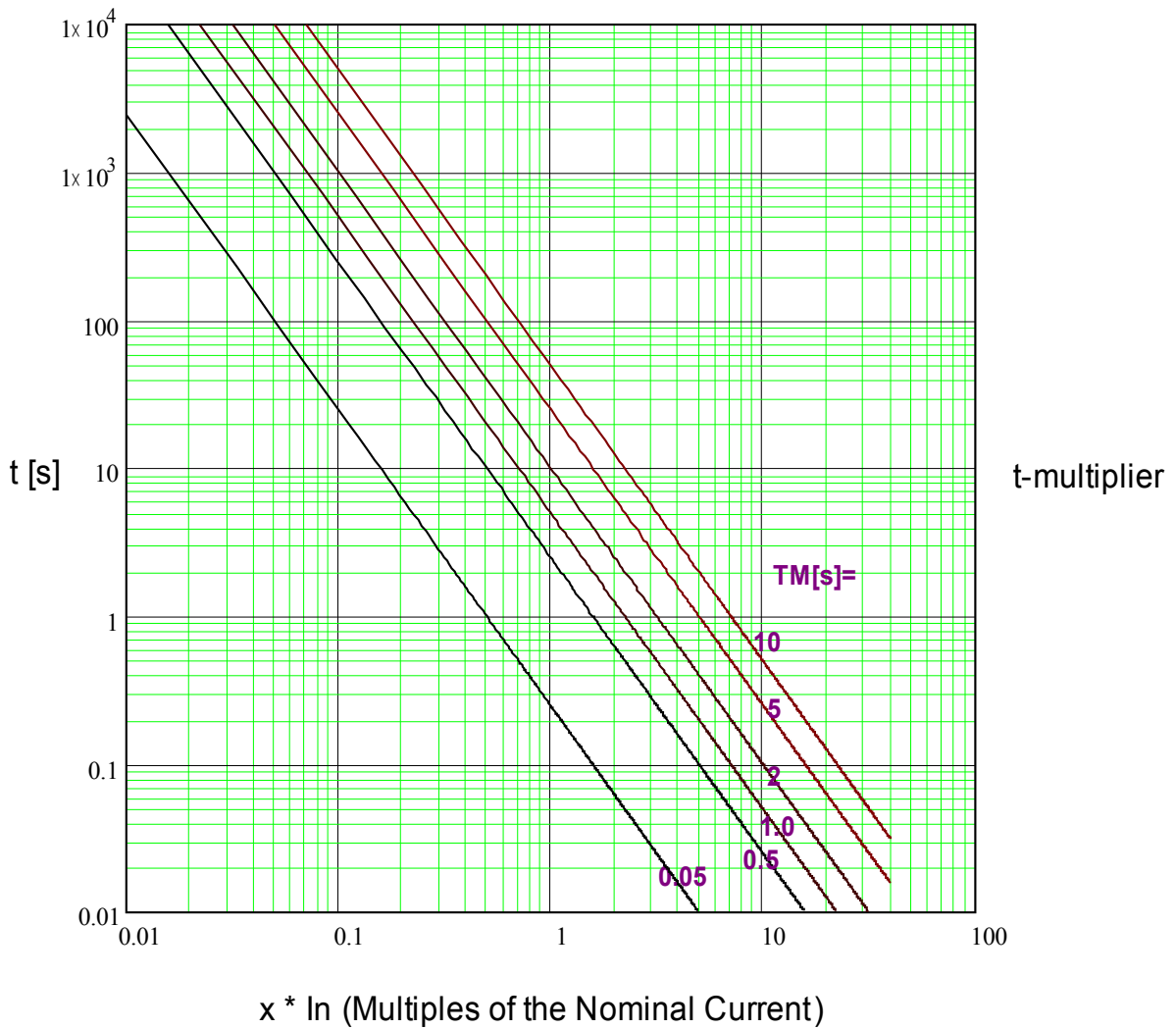
Notice!

Various Reset Modes are available . Resetting via characteristic, delayed, and instantaneous .

Reset

Trip

$$t = \left| \frac{5 \cdot 1^2}{\left(\frac{IG}{IGnom}\right)^0} \right| \cdot t\text{-multiplier [s]} \quad t = \frac{5 \cdot 1^2}{\left(\frac{IG}{IGnom}\right)^2} \cdot t\text{-multiplier [s]}$$



I4T



Notice!

Various Reset Modes are available . Resetting via characteristic, delayed, and instantaneous .

Reset

Trip

$$t = \left| \frac{5 \cdot 1^2}{\left(\frac{IG}{IGnom}\right)^0} \right| * t\text{-multiplier [s]}$$

$$t = \frac{5 \cdot 1^4}{\left(\frac{IG}{IGnom}\right)^4} * t\text{-multiplier [s]}$$

