

ACM3.2 – Calculating differential and restraint current

Abbreviations

I diff: Differential current

I res: Restraint current

Parameter set points

All parameters below are numbered here and can be seen in curve on next page.

Table 4.71 Stabilised differential current default parameters

	Parameter	Range	Default	
①	I diff. min.	5 to 100 % of I_{nom}	15 %	Differential current
②	Region 1: End	10 to 150 % of I_{nom}	75 %	Restraint current
③	Region 2: Slope	10 to 50 % of I_{nom}	20 %	Slope – see used in calculation below
④	Region 2: End ^I	100 to 1000 % of I_{nom}	200 %	Restraint current
⑥	Region 3: Slope	30 to 100 % of I_{nom}	75 %	Slope – see used in calculation below

Table 4.72 High set differential current default parameters

	Parameter	Range	Default
⑧	Set point	50 to 1200 % of I_{nom}	800 %

Calculations

Differential current at region 2 end

$$\textcircled{5} I_{\text{diff reg. 2 end}} = (\textcircled{4} \text{Region 2: End} - \textcircled{2} \text{Region 1: End}) * \textcircled{3} \text{Region 2: Slope} + \textcircled{1} I_{\text{diff. min.}}$$

$$\textcircled{5} I_{\text{diff reg. 2 end}} = (\textcircled{4} 200\% - \textcircled{2} 75\%) * \textcircled{3} 0,20 + \textcircled{1} 15\%$$

$$\textcircled{5} I_{\text{diff reg. 2 end}} = \mathbf{40\%}$$

The slope for region 3 continues till it reaches the fixed tripping curve, which default is 800% - see point ⑧ in table above and curve on next page. Therefore, instead of the differential current we can calculate the level of the restraint current (point ⑦ – see curve on next page), at which slope 3 reaches the fixed tripping curve.

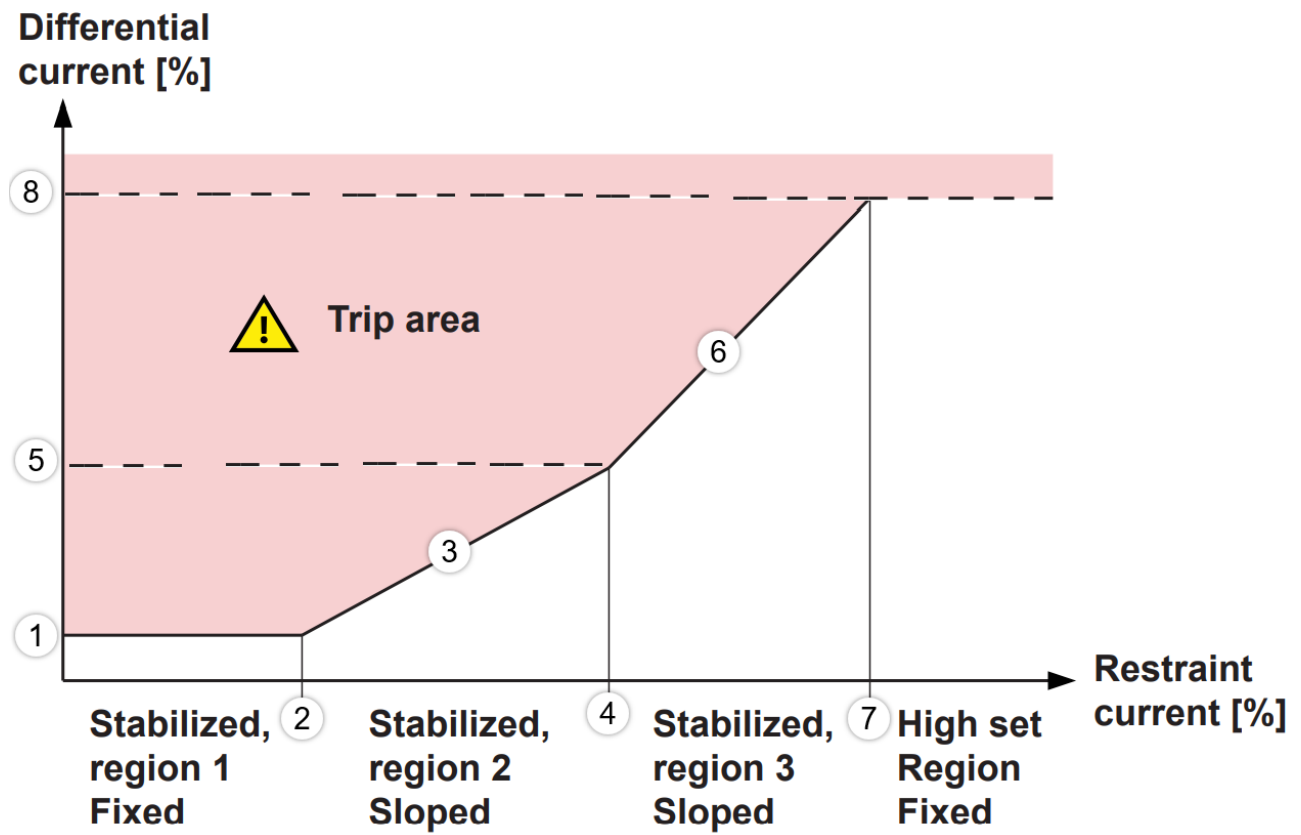
I res. at Region 3: End

$$\textcircled{7} I_{\text{res reg. 3 end}} = \frac{\textcircled{8} \text{Hig set diff.} - \textcircled{5} I_{\text{diff reg. 2 end}}}{\textcircled{6} \text{Region 3: Slope}}$$

$$\textcircled{7} I_{\text{res reg. 3 end}} = \frac{\textcircled{8} 800\% - \textcircled{5} 40\%}{\textcircled{6} 0,75}$$

$$\textcircled{7} I_{\text{res reg. 3 end}} = \mathbf{1013\%}$$

Tripping curve



Restraint measurement (I_{rest})

The ACM3.2 uses the value from the biggest RMS current on one side.

$$I_{restLx} = \text{Max}(I_{1Lx}, I_{2Lx})$$