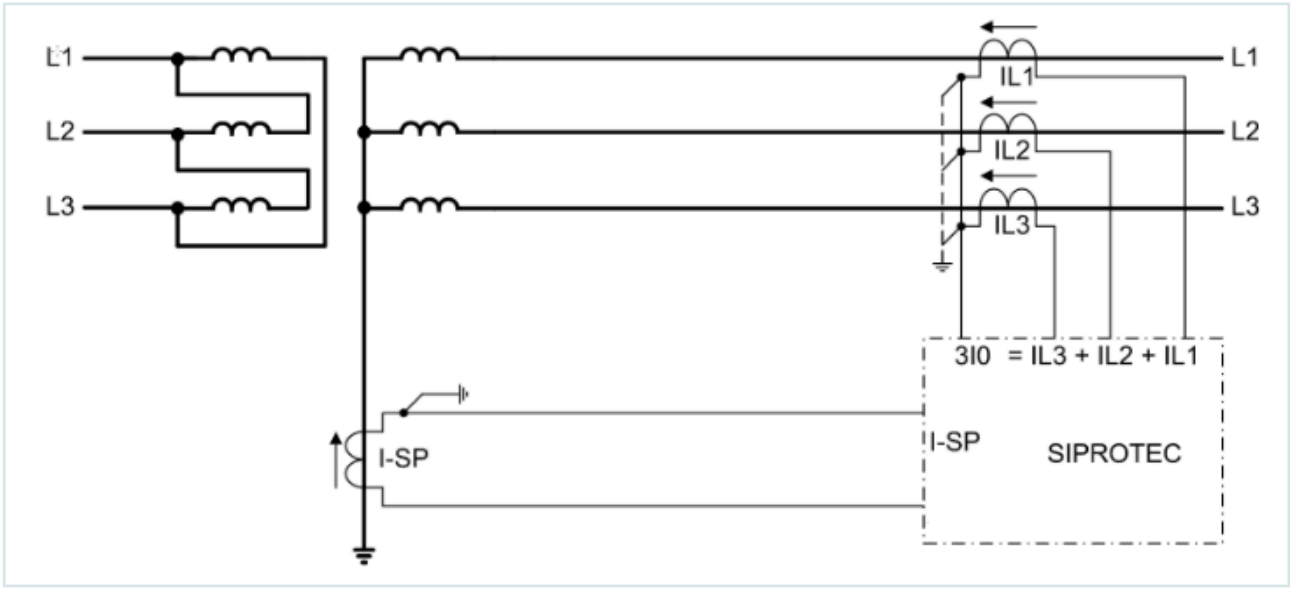
Sınırlı Toprak Arızası

Kategory	**tester**
Bölüm	**AMT Diferansiyel Modülü**
Dil	**Türkçe**
Oluşturuldu	**2026-11-04**



Şekil 1

$$I_{ref,N} = \frac{S_{ref}}{\sqrt{3}.V_{nom}}$$

$I_{ref,N}$ = Reference Current of the Ground Differential Protection Function

S_{ref} = Reference Power

V_{nom} = Nominal Voltage

$$K_{ph} = \frac{I_{nom,ph}}{I_{ref,N}}$$

$$K_y = \frac{I_{nom,y}}{I_{ref,N}}$$

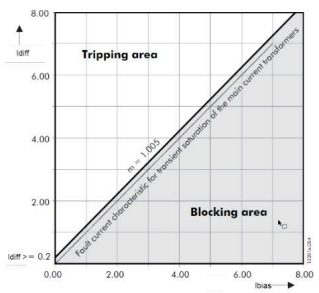
K_{ph} : Phase Matching Factor

K_y : Starpoint Matching Factor

$I_{nom,ph}$ = Primary Nominal Current of the Phase Current Transformer

$I_{nom,y}$ = Primary Nominal Current of Current Transformer in the Starpoint

Şekil 2



$$I_{diff} = |\vec{I}_{ph} + \vec{I}_y|$$

$$I_{bias} = |I_{ph}|$$

Şekil 3

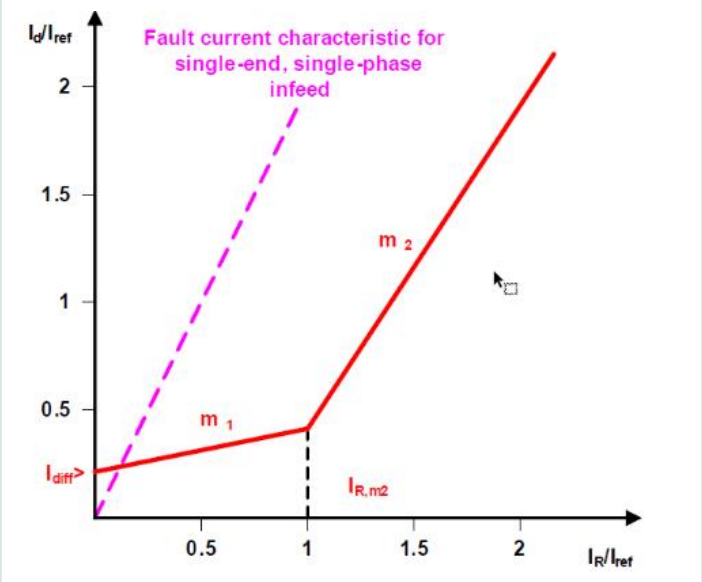
$$I_{diff} = | 3\vec{I}_0 + \vec{I}_y |$$

$$I_{bias} = \frac{| I_0 | + | I_y |}{2}$$

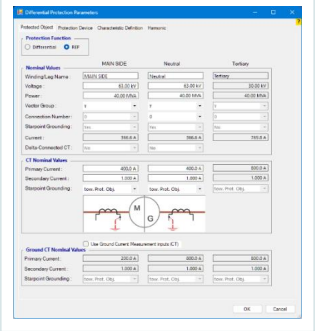
$$3\vec{I}_0 = I_A + I_B + I_C$$

$$I_y = \text{Neutral Point Current}$$

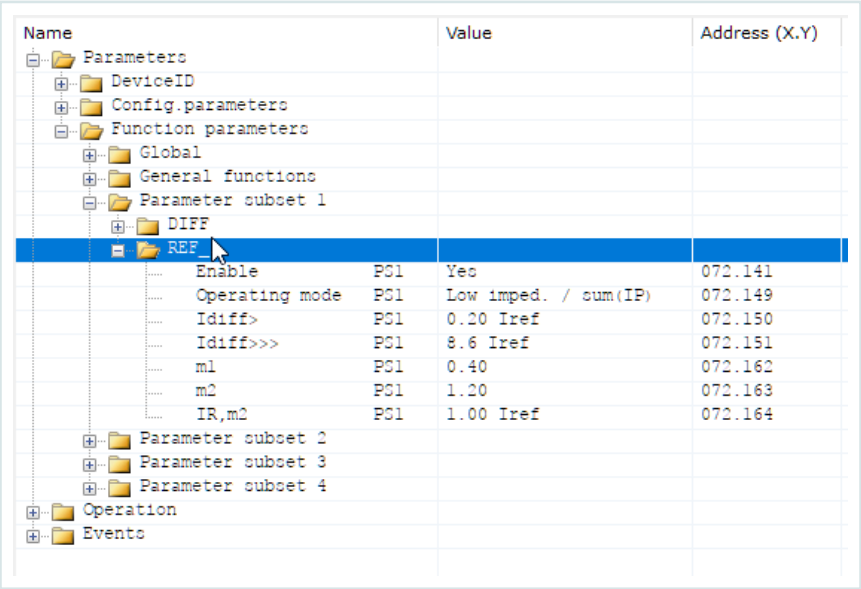
Şekil 4



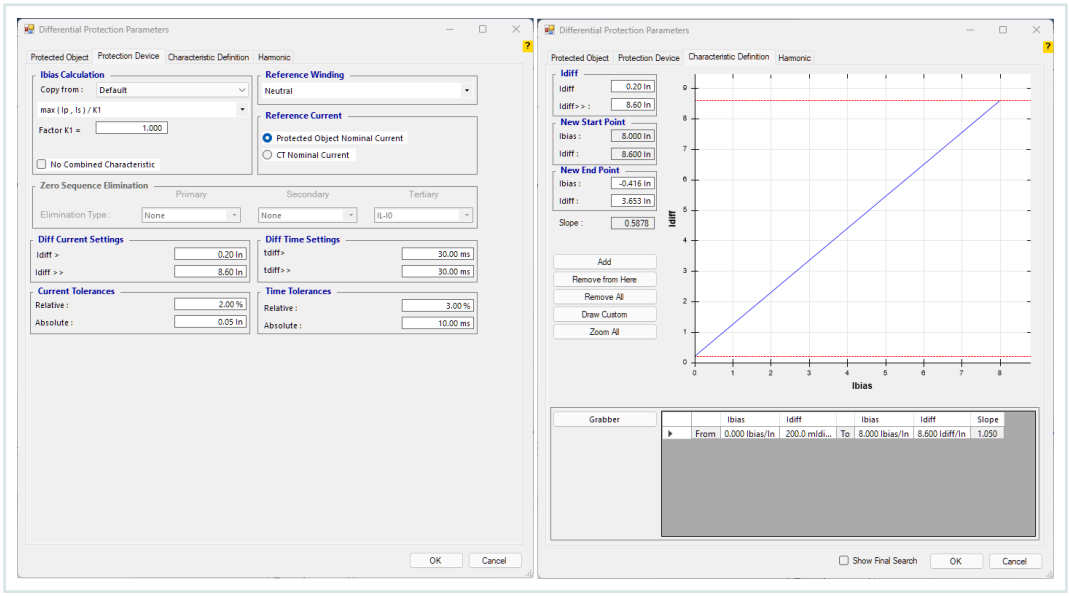
Şekil 5



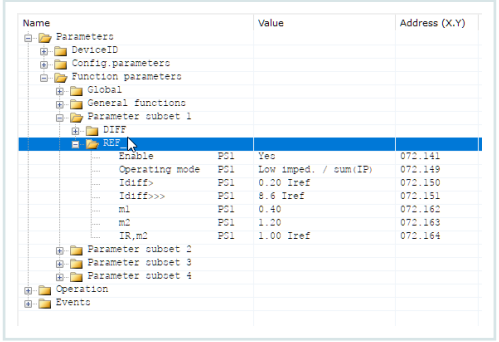
Şekil 6



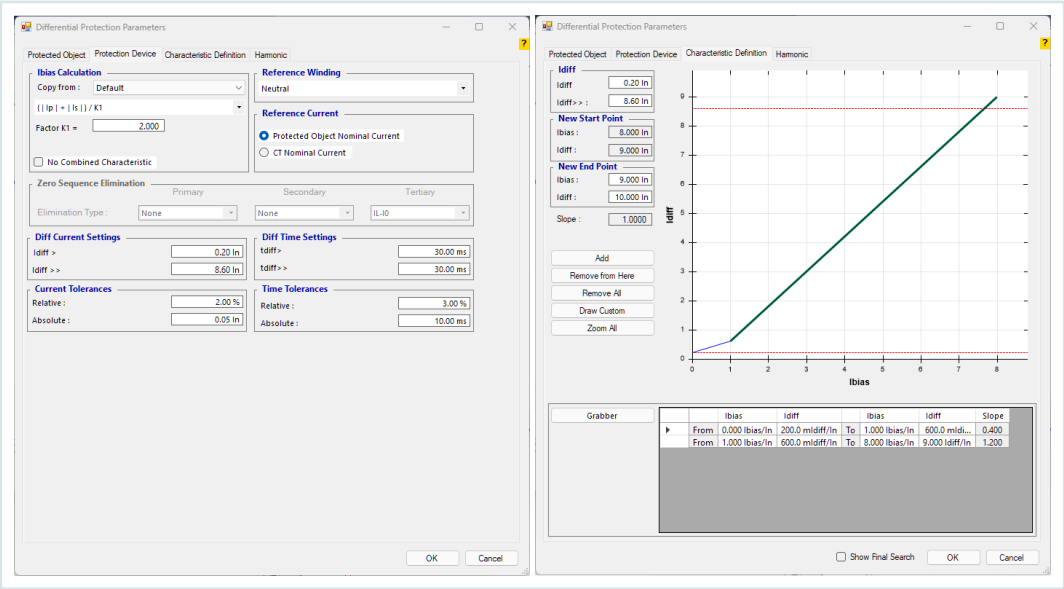
Şekil 7



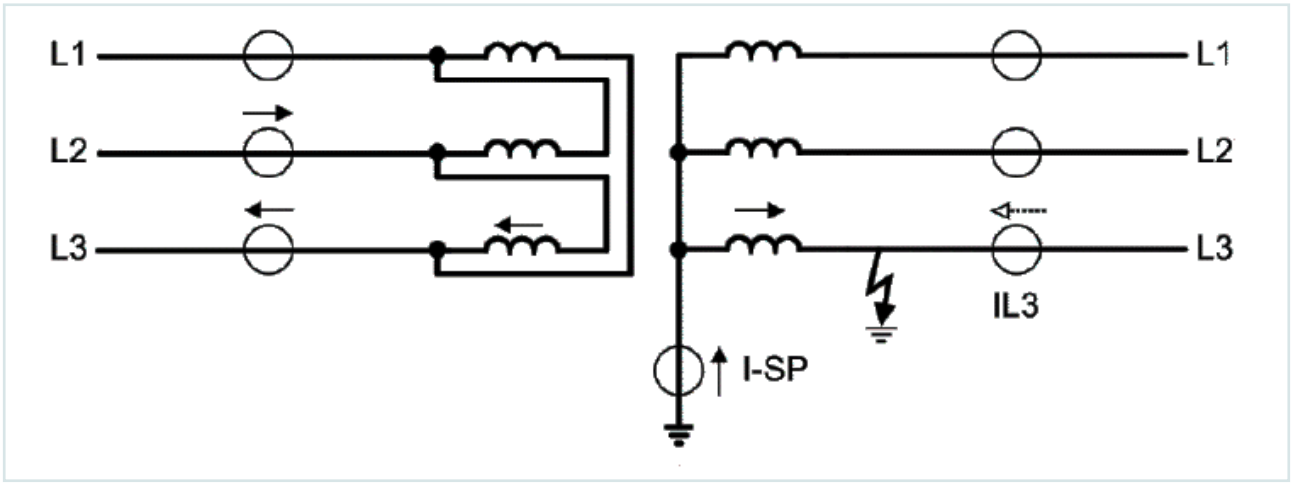
Şekil 8



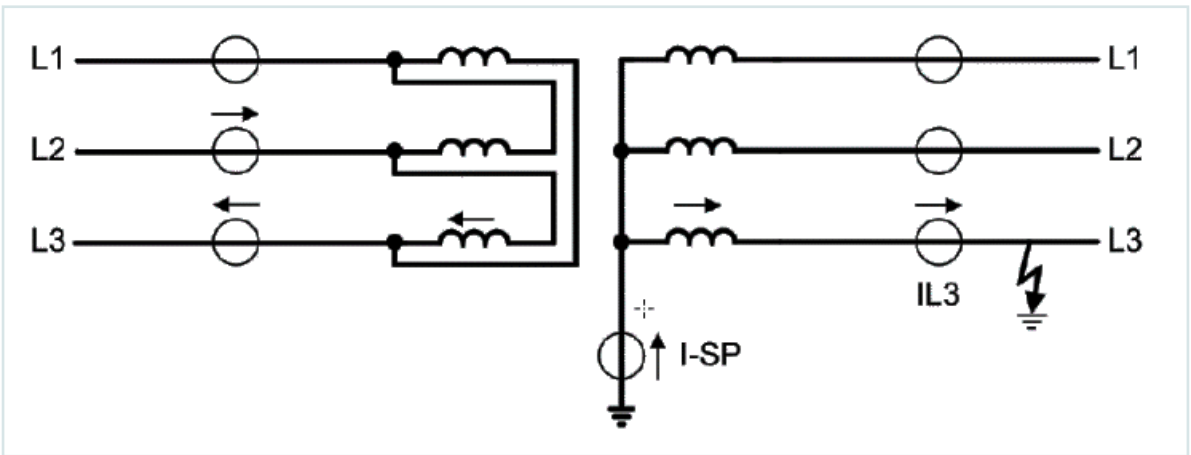
Şekil 9



Şekil 10



Şekil 11



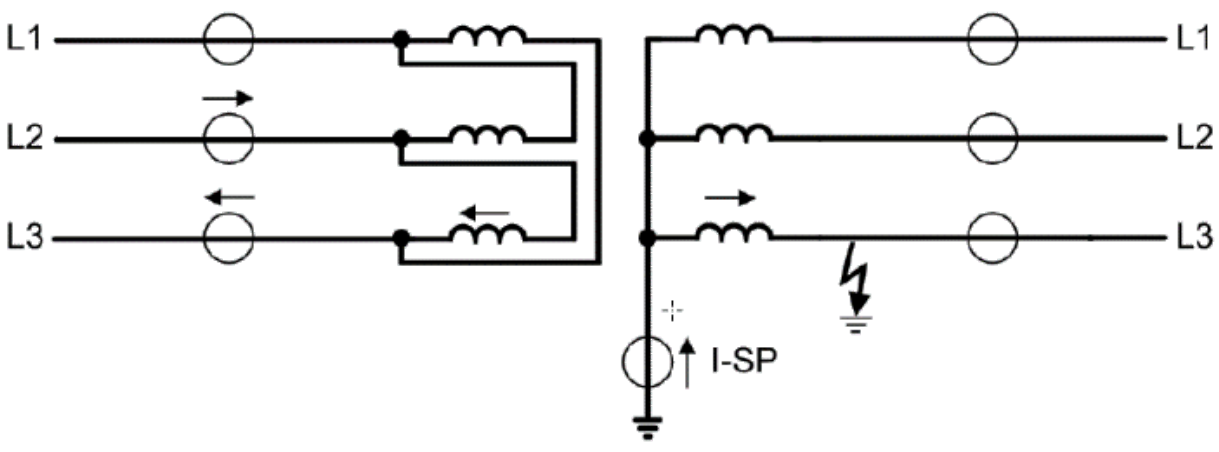
Şekil 12

$$I_{REF} = |I_{SP}|$$
$$I_{stab} = |I_{SP} - 3I_0| - |I_{SP} + 3I_0|$$

Şekil 13

$$3I_0 = -I_{SP}$$
$$I_{REF} = |I_{SP}|$$
$$I_{STAB} = |I_{SP} - 3I_0| - |I_{SP} + 3I_0| => |I_{SP} + I_{SP}| - |I_{SP} - I_{SP}| = 2I_{SP}$$

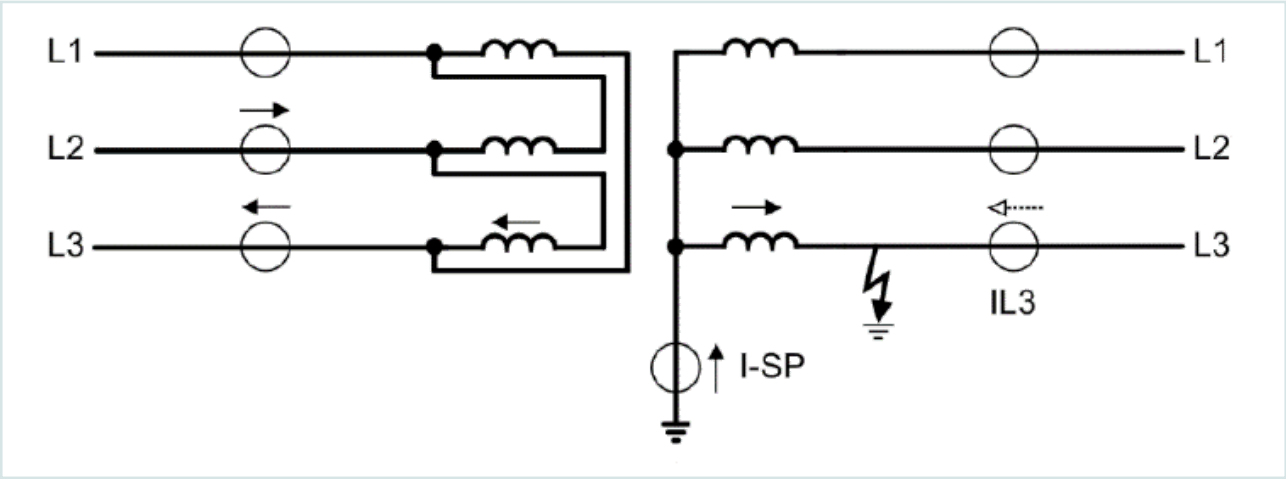
Şekil 14



Şekil 15

$$3I_0 = 0$$
$$I_{REF} = |I_{SP}|$$
$$I_{STAB} = |I_{SP} - 3I_0| - |I_{SP} + 3I_0| => |I_{SP} - 0| - |I_{SP} + 0| = I_{SP} - I_{SP} = 0$$

Şekil 16



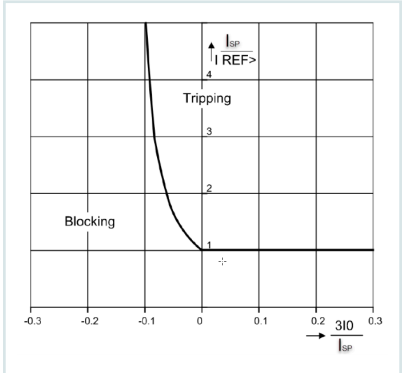
Şekil 17

$$3I_0 = I_{SP}$$
$$I_{REF} = |I_{SP}|$$
$$I_{STAB} = |I_{SP} - 3I_0| - |I_{SP} + 3I_0| \Rightarrow |I_{SP} - I_{SP}| - |I_{SP} + I_{SP}| = 0 - |2I_{SP}| = -2I_{SP}$$

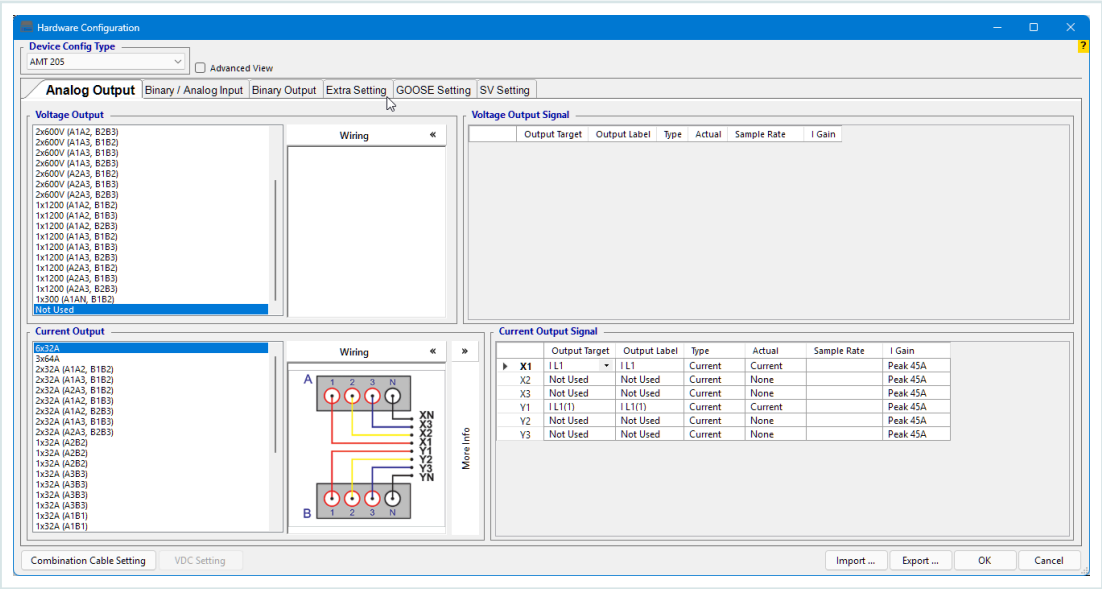
Şekil 18

$$|1-1\angle 90| - |1+1\angle 90| = 0$$

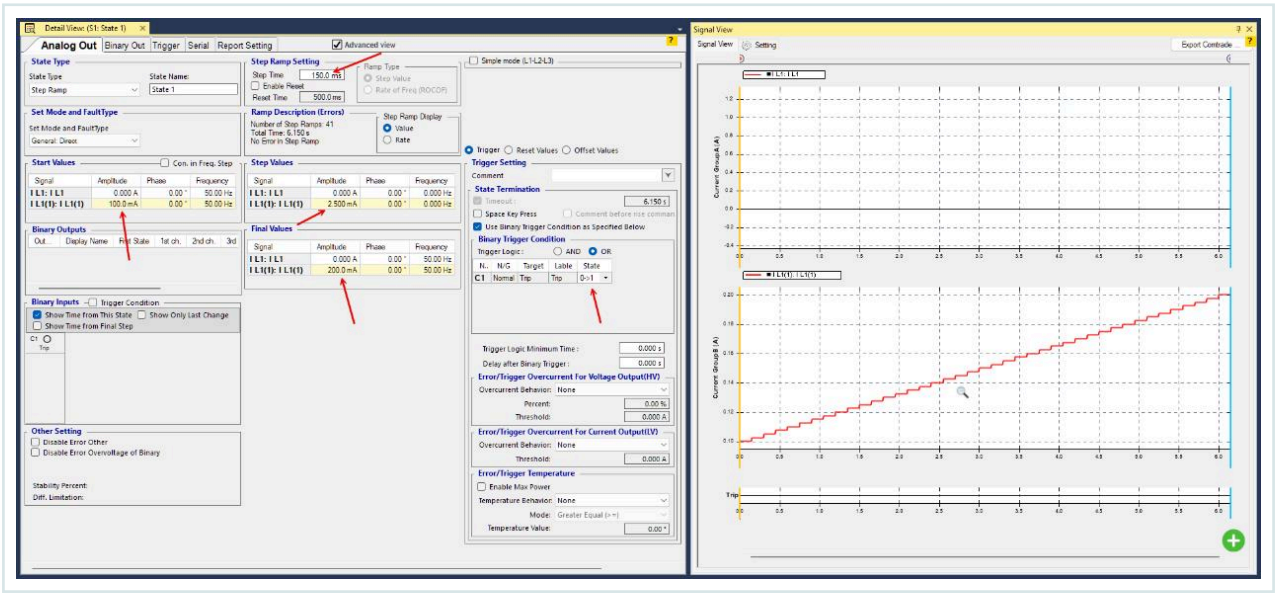
Şekil 19



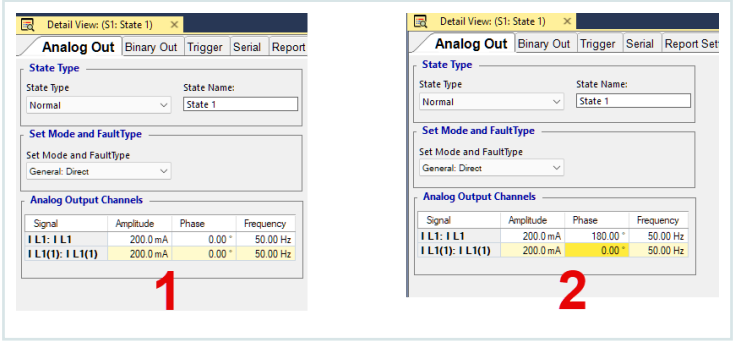
Şekil 20



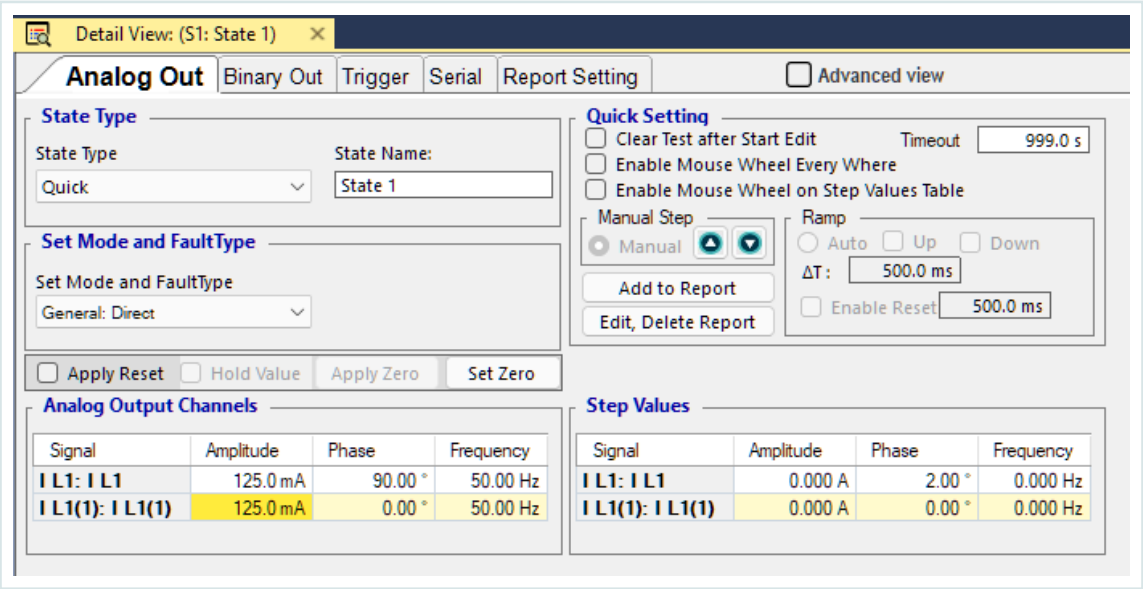
Şekil 21



Şekil 22



Şekil 23

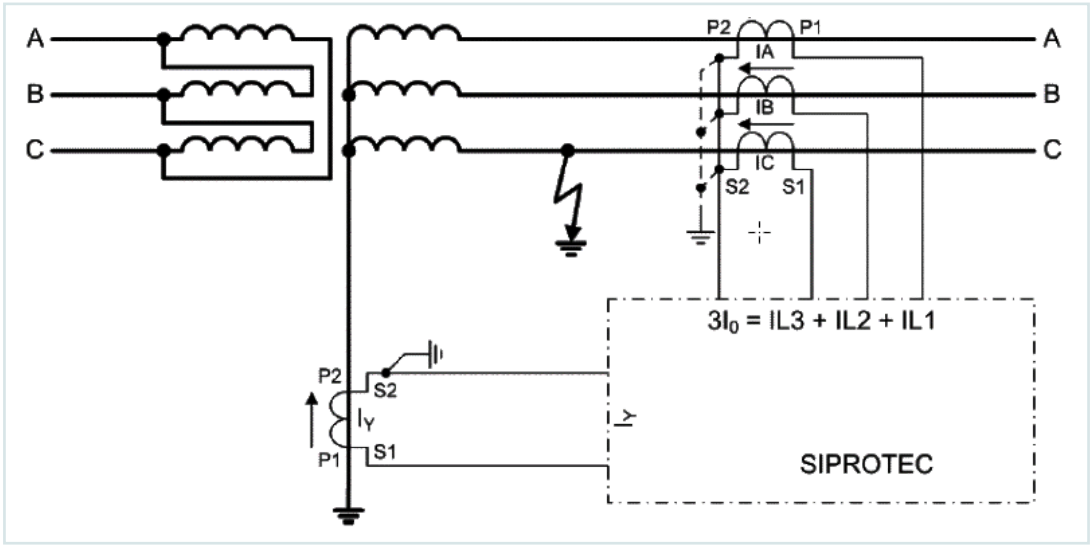


Şekil 24

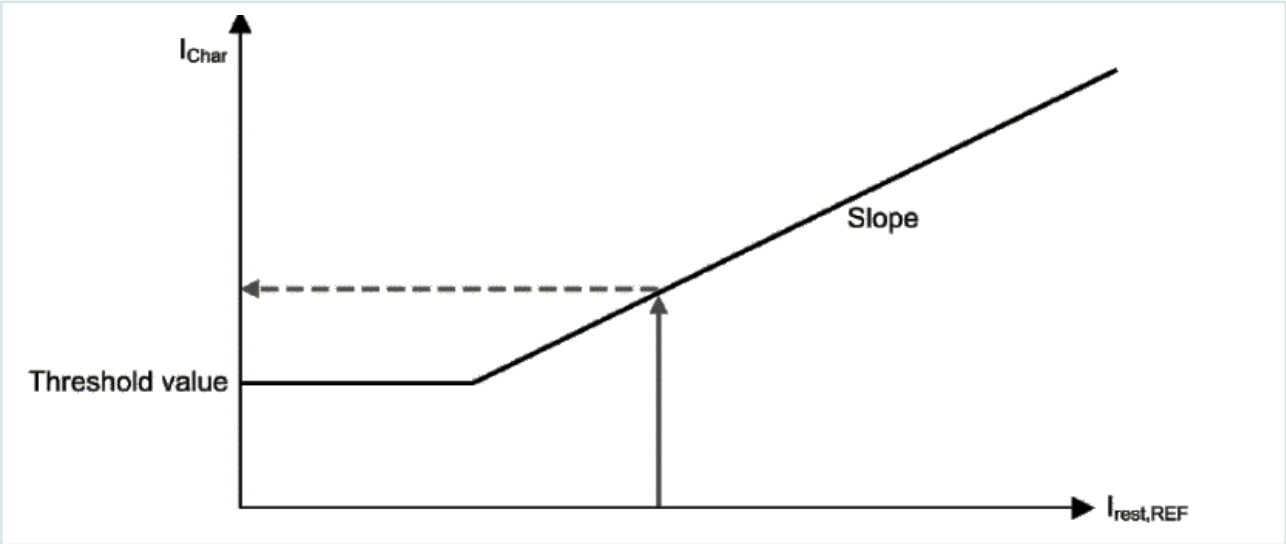
$$I_{diff} = |\vec{I}_Y + 3\vec{I}_0|$$

$$I_{bias} = |I_Y| + |I_A| + |I_B| + |I_C|$$

Şekil 25



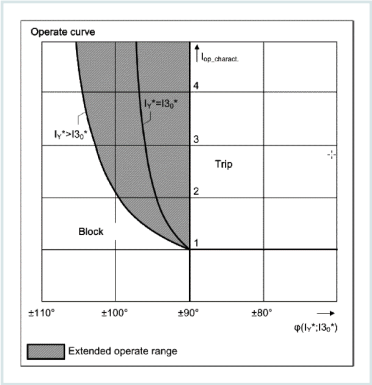
Şekil 26



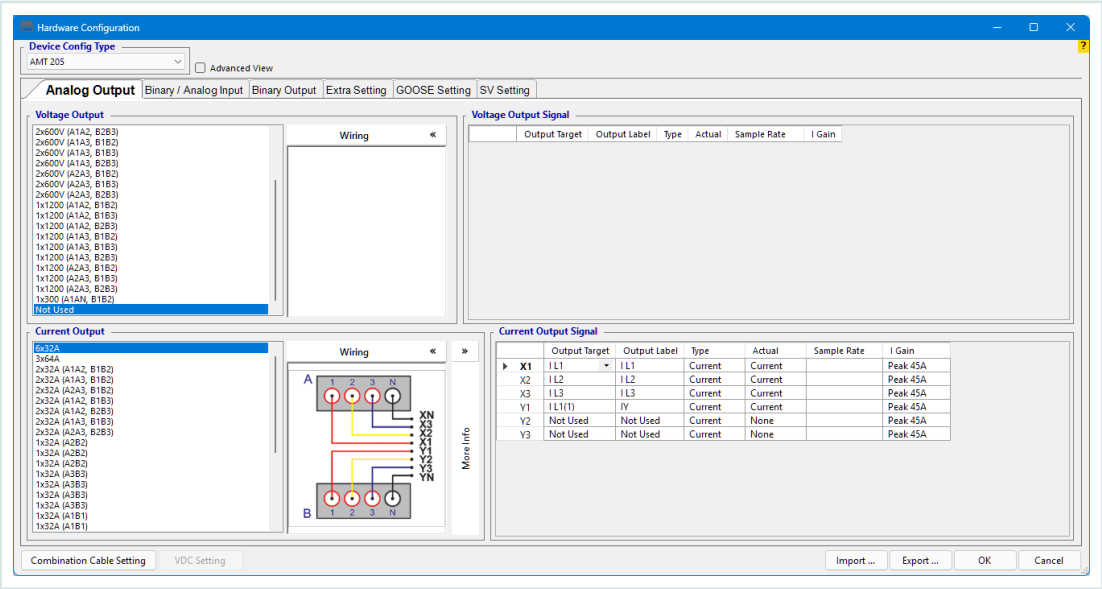
Şekil 27

$$I_{trip} = \frac{|I_Y|}{|I_{char}|}$$

Şekil 28



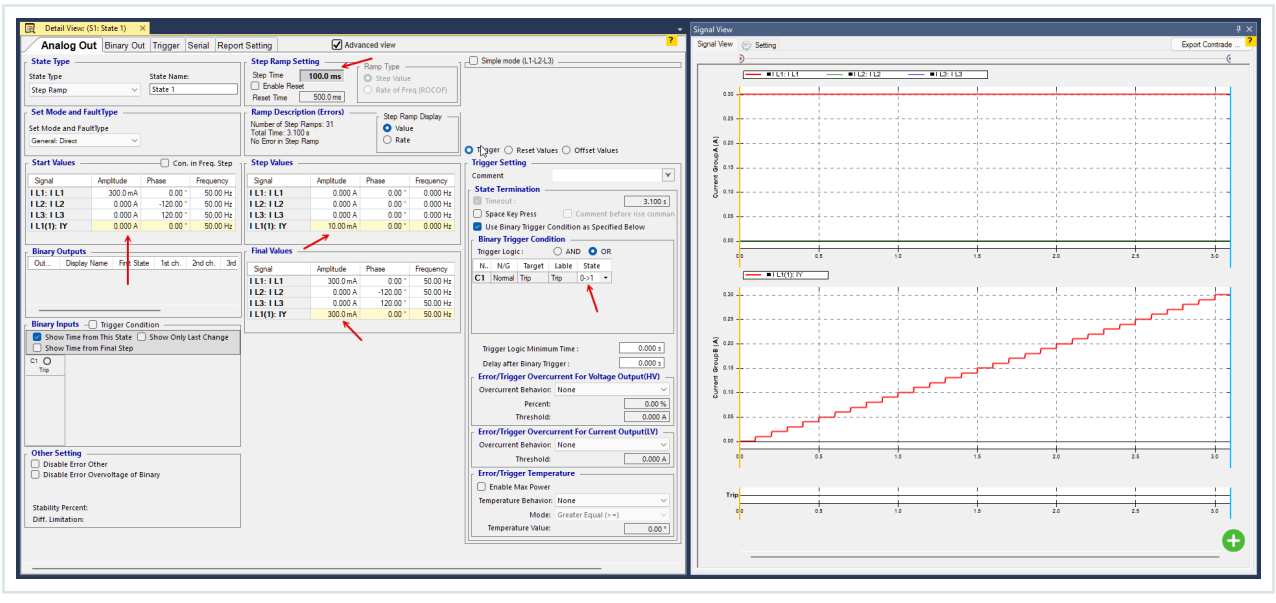
Şekil 29



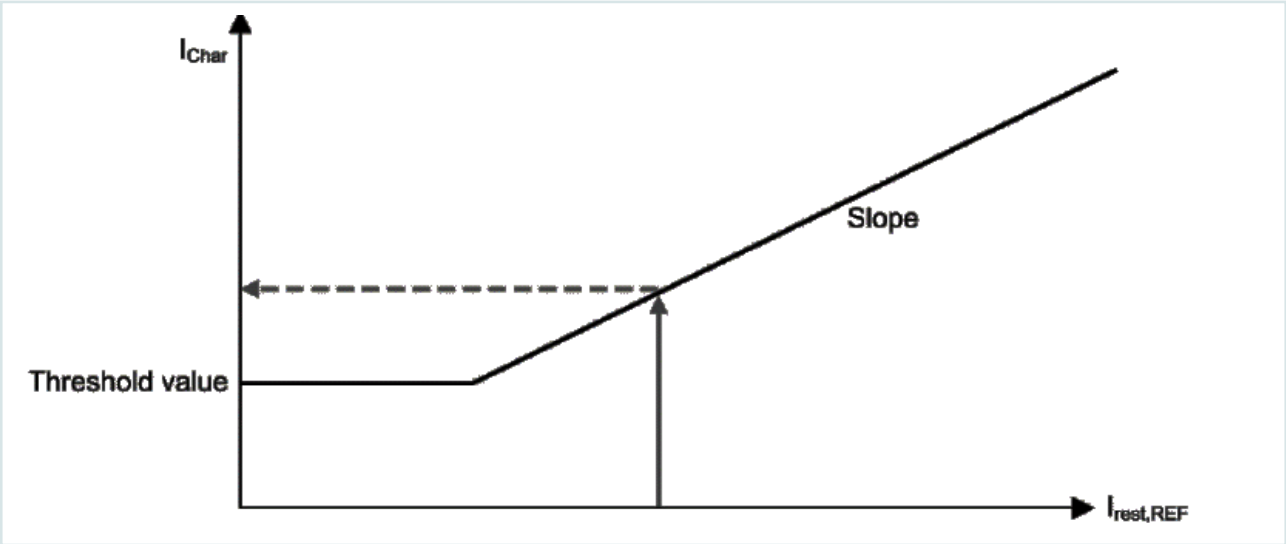
Şekil 30

$$I_{bias} = | I_Y | + | I_A |$$

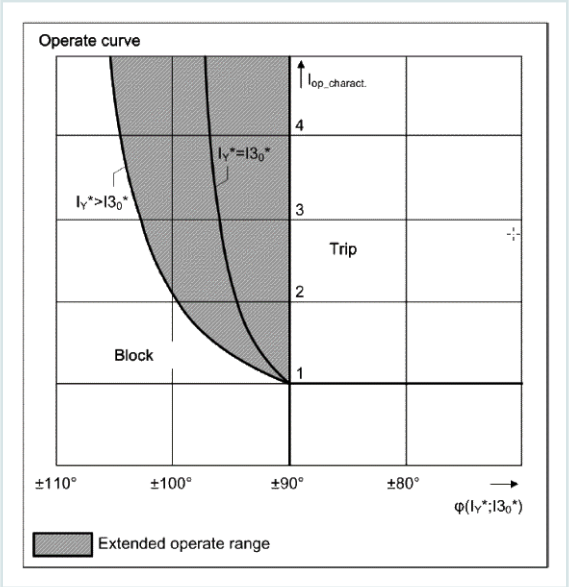
Şekil 31



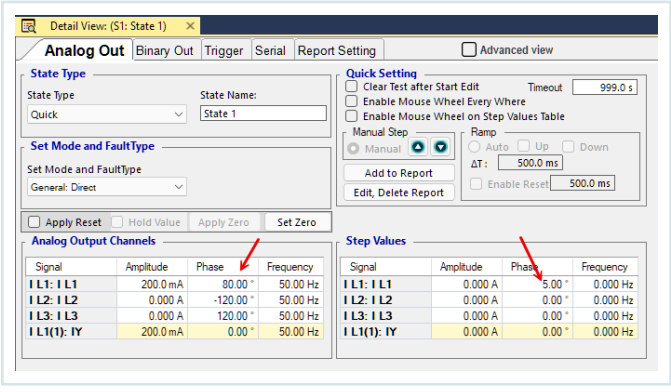
Şekil 32



Şekil 33



Şekil 34

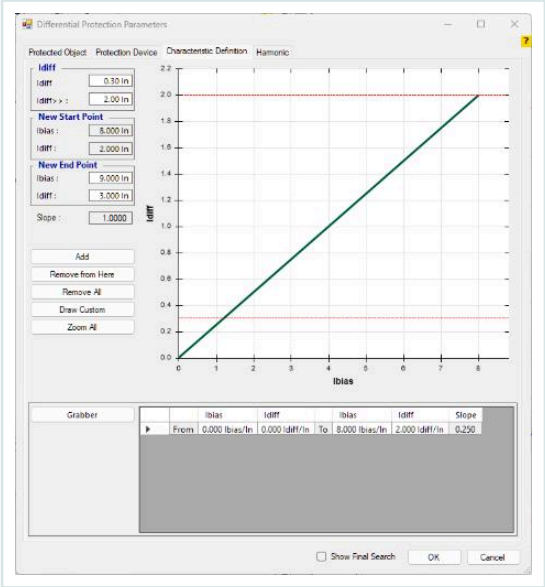


Şekil 35

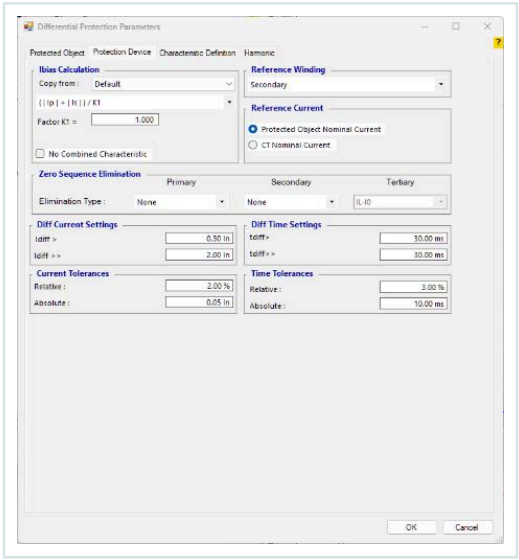
$$I_{char} = I_{diff} = \left| \vec{I}_Y + 3\vec{I}_0 \right|$$

$$I_{bias} = \left| I_Y \right| + \left| I_A \right| + \left| I_B \right| + \left| I_C \right|$$

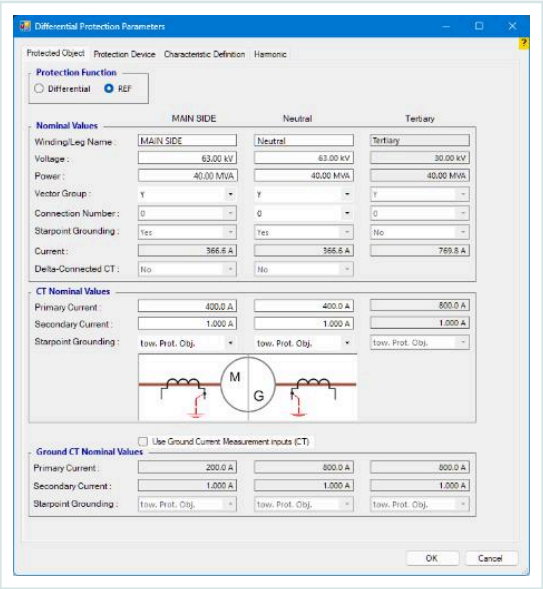
Şekil 36



Şekil 37



Şekil 38

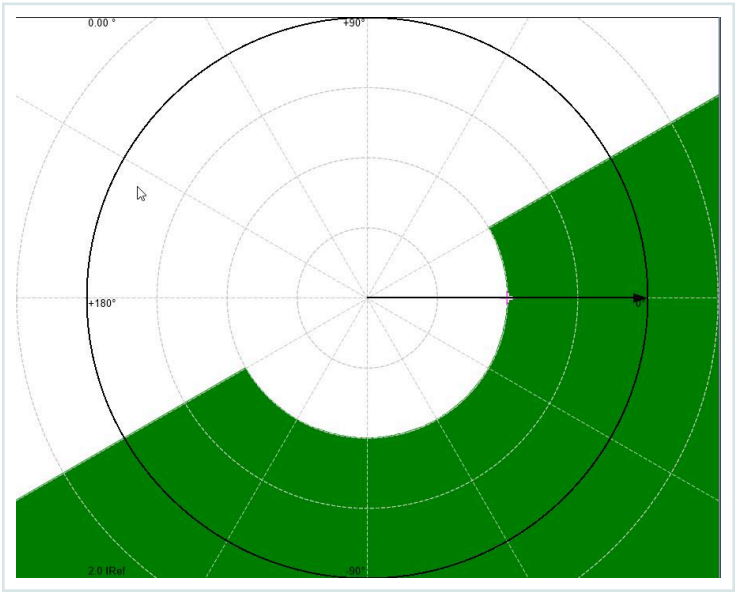


Şekil 39

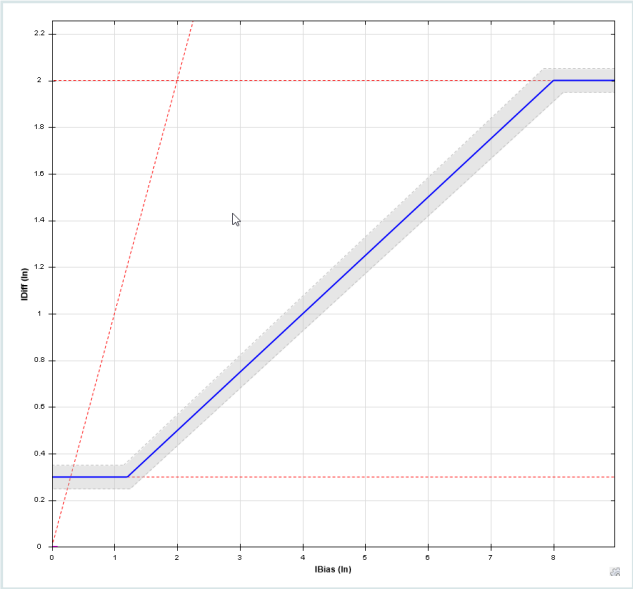
$$I_{diff} = | I_{N_SEC} - I_{ZS_SEC} |$$

$$I_{bias} = Max(| I_A |, | I_B |, | I_C |, | I_{N_SEC} |)$$

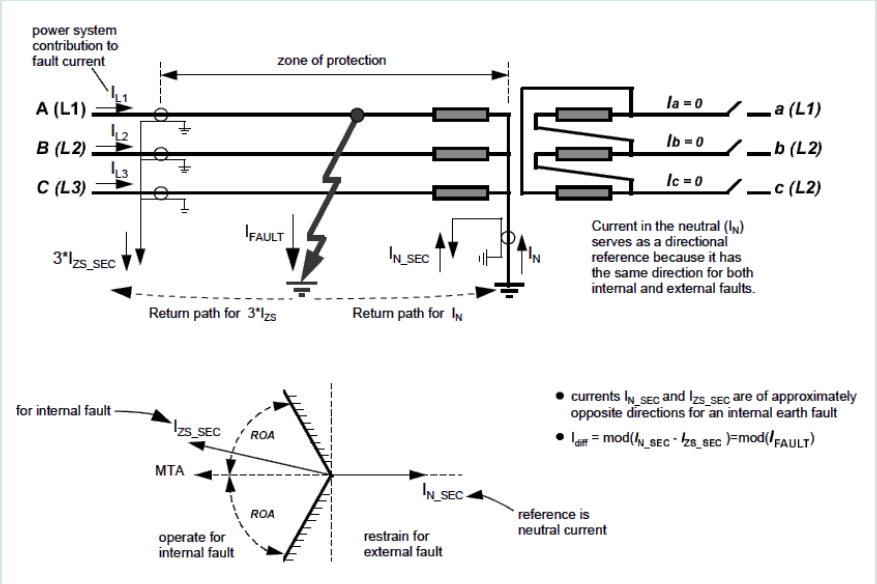
Şekil 40



Şekil 41



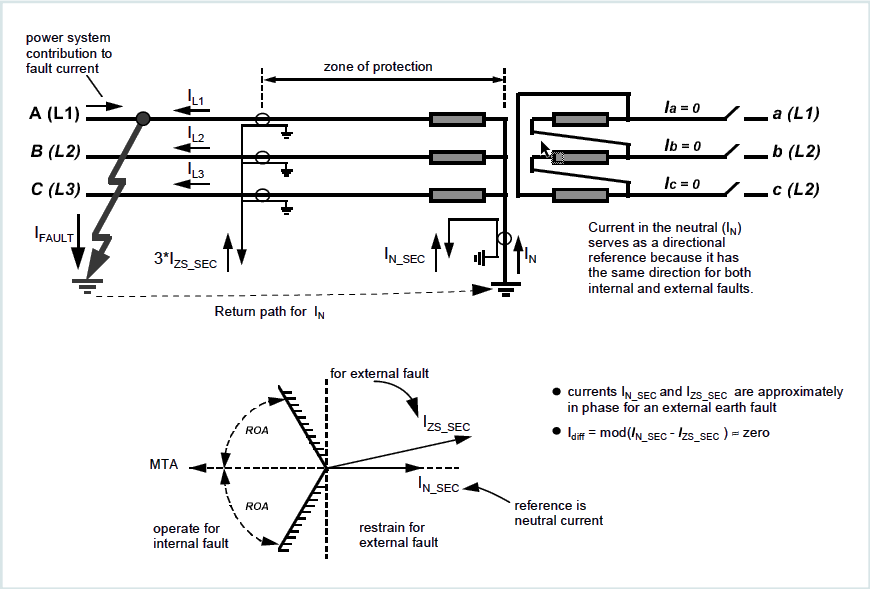
Şekil 42



Şekil 43

$$I_{diff} = |I_{N_SEC} - I_{ZS_SEC}| = |I_{FAULT}|$$

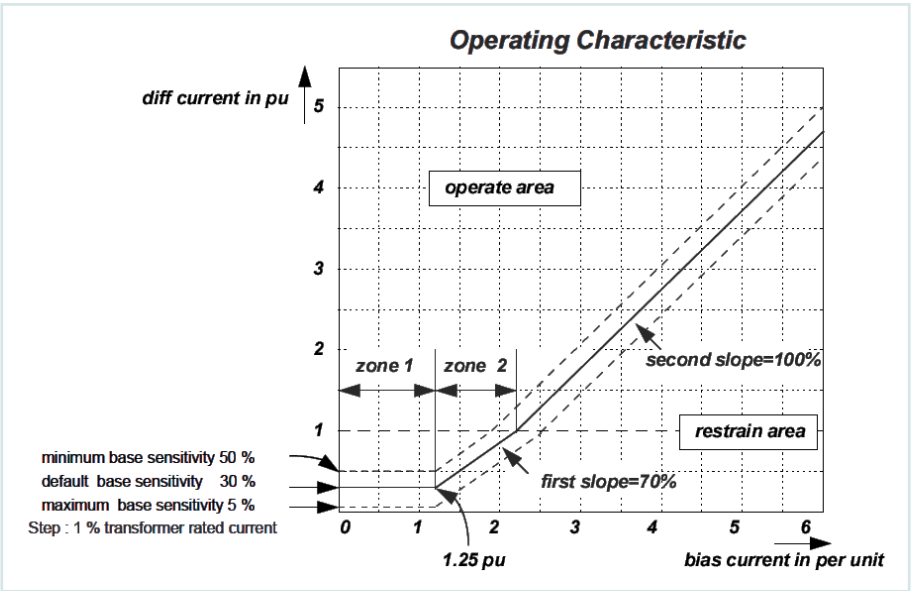
Şekil 44



Şekil 45

$$I_{diff} = |I_{N_SEC} - I_{ZS_SEC}| \approx 0$$

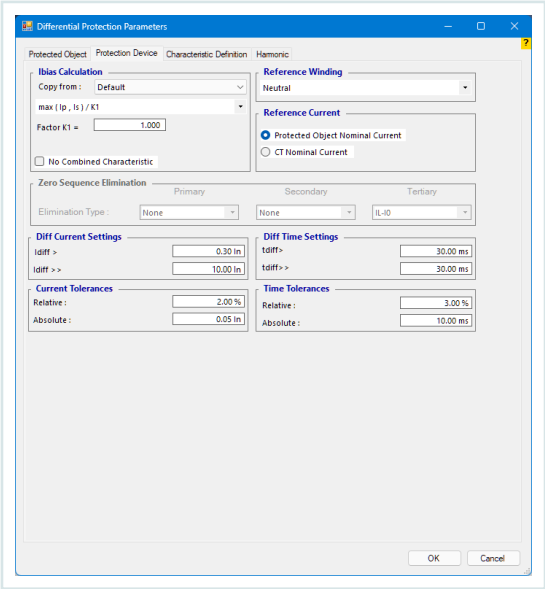
Şekil 46



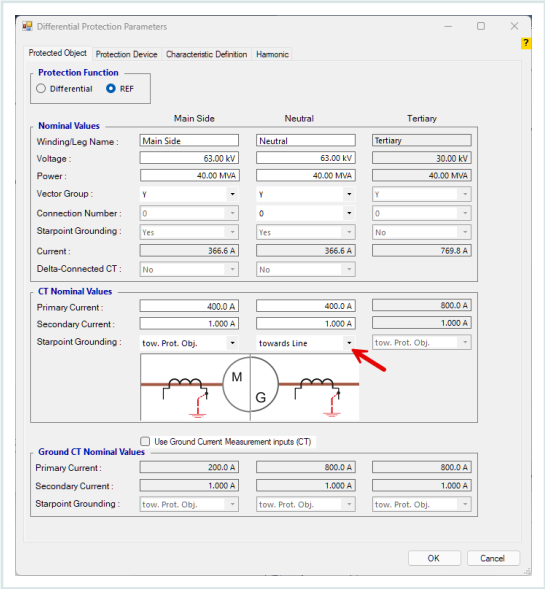
Şekil 47



Şekil 48



Şekil 49

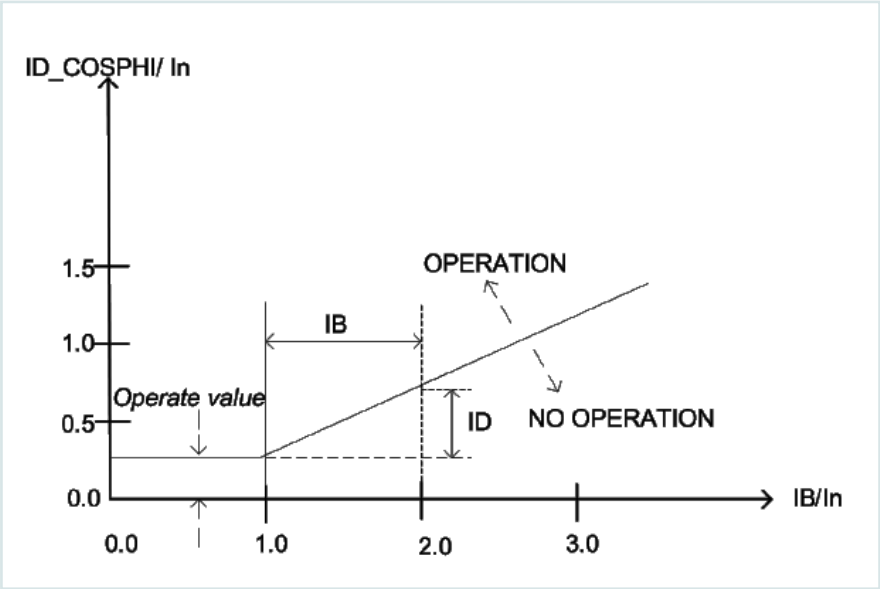


Şekil 50

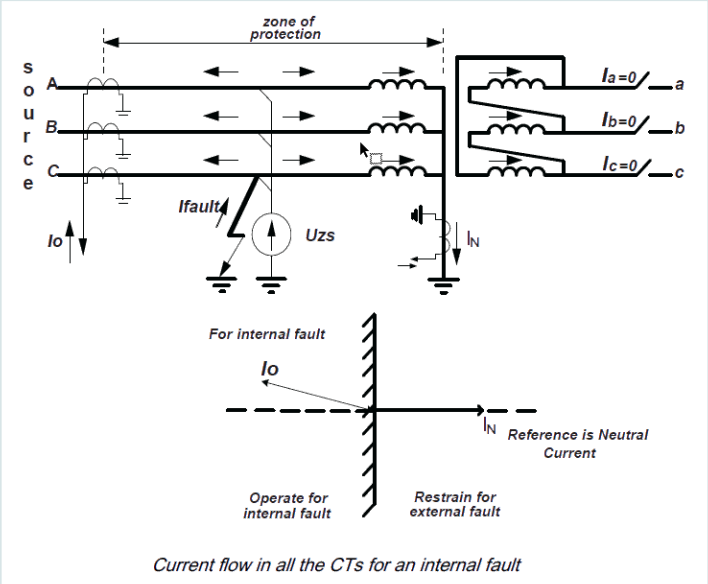
$$ID_COSPHI = \left(\left|\sum \vec{I} - \vec{I}_Y\right|\right) * COS\varphi$$

$$IB = \frac{I_A + I_B + I_C}{3}$$

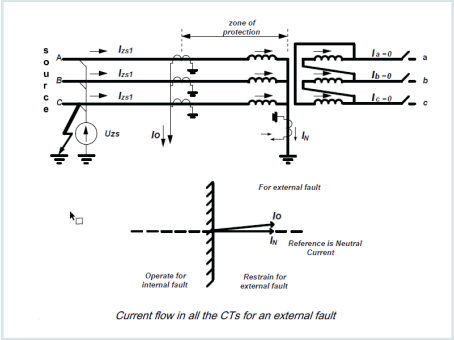
Şekil 51



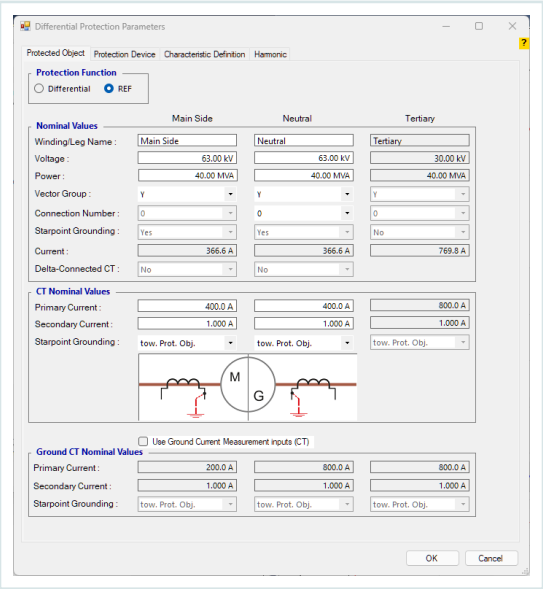
Şekil 52



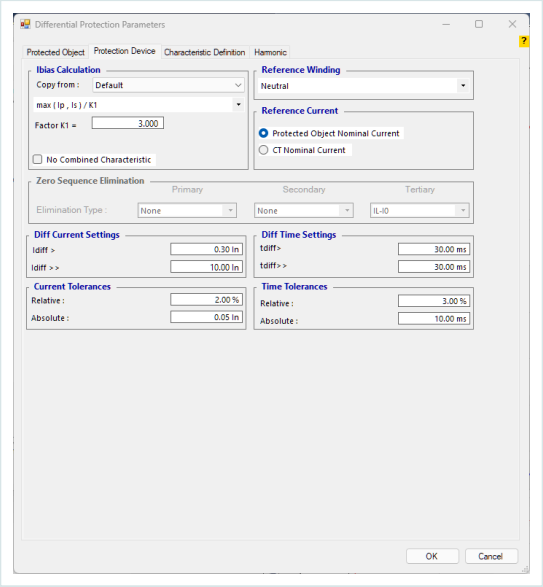
Şekil 53



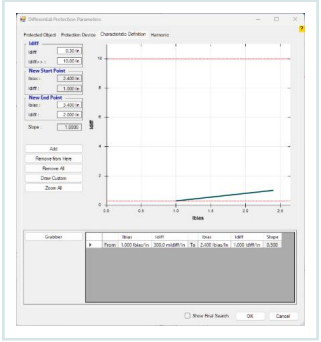
Şekil 54



Şekil 55



Şekil 56



Şekil 57