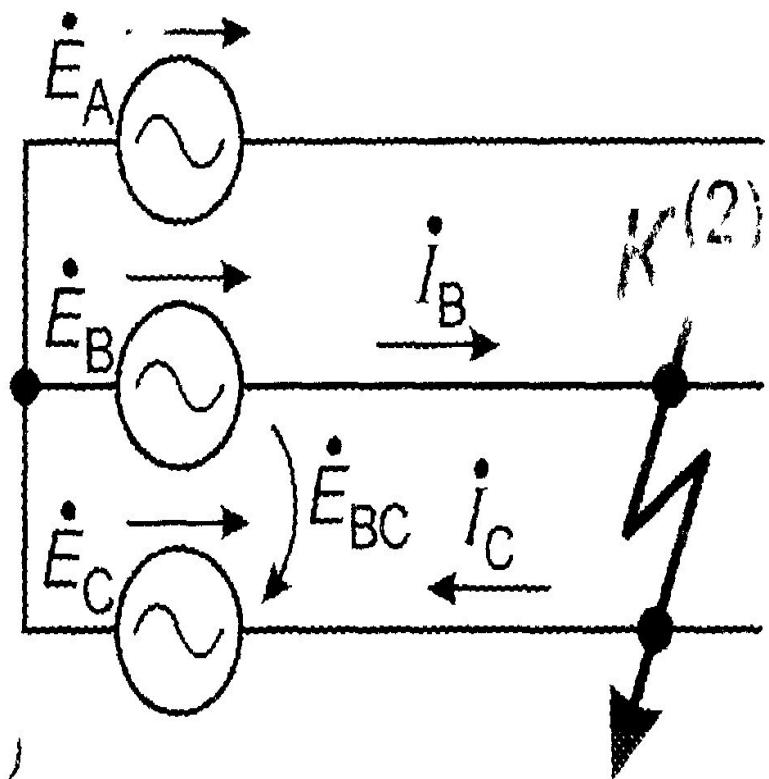
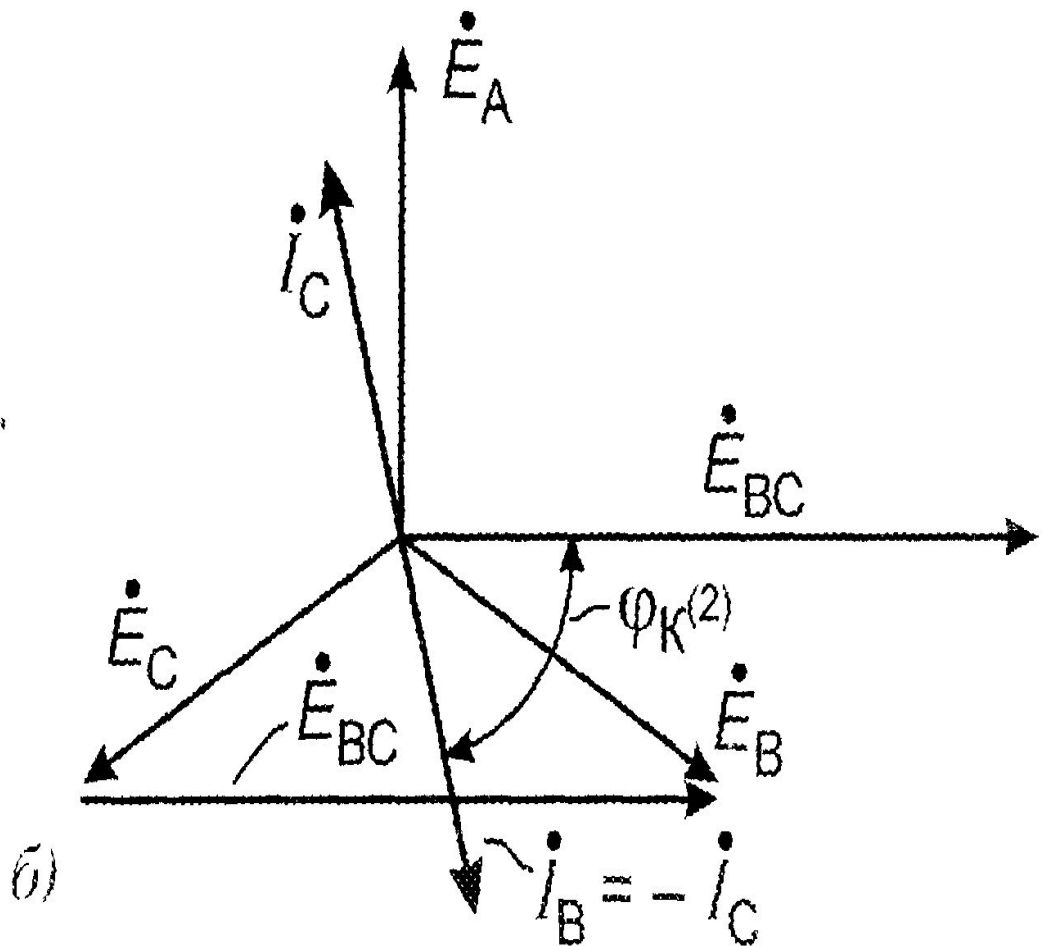


$$\varphi_K = \operatorname{arctg} \frac{x_{\Gamma} + x_{\text{Л}}}{r_{\text{Л}}}$$



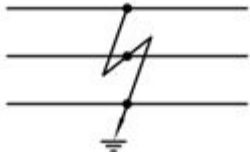
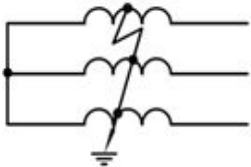
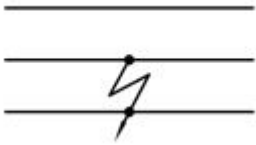

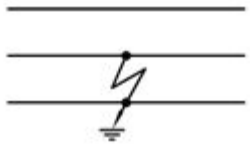
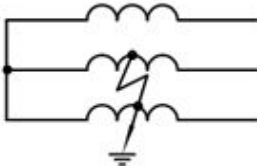
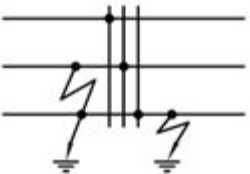

$$I_{K3}^{(3)} = |\dot{I}_A| = |\dot{I}_B| = |\dot{I}_C| = \frac{E_{\Phi}}{Z_K} = \frac{E_{\Phi}}{\sqrt{r_{\text{Л}}^2 + (x_{\Gamma} + x_{\text{Л}})^2}}$$



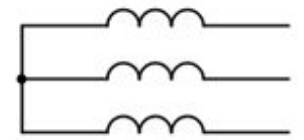
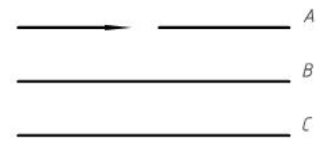
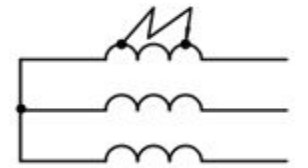
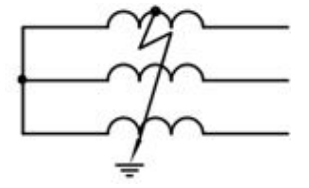
$$I_A \approx 0$$



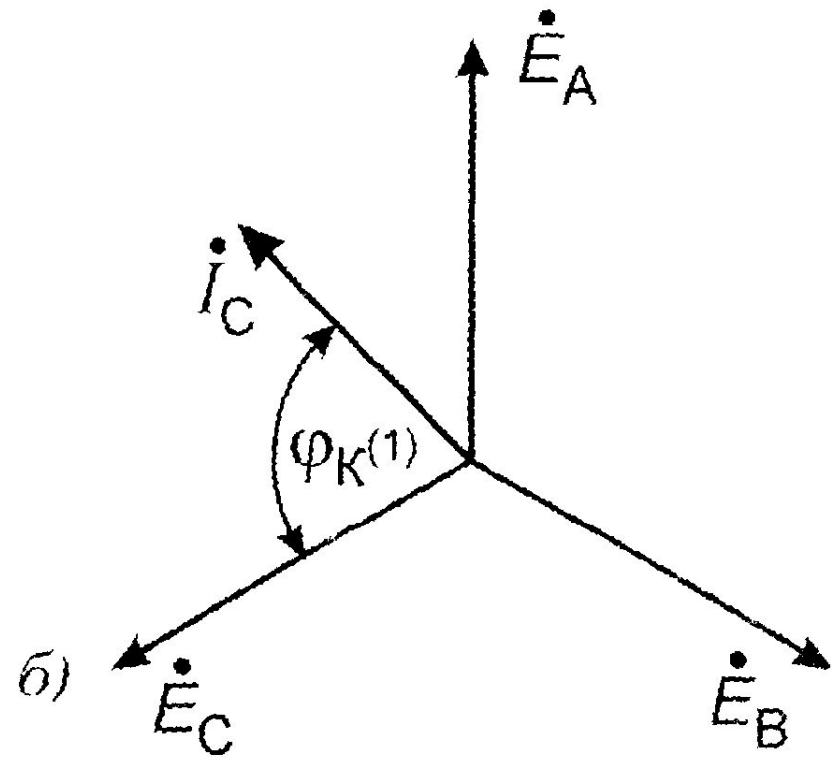
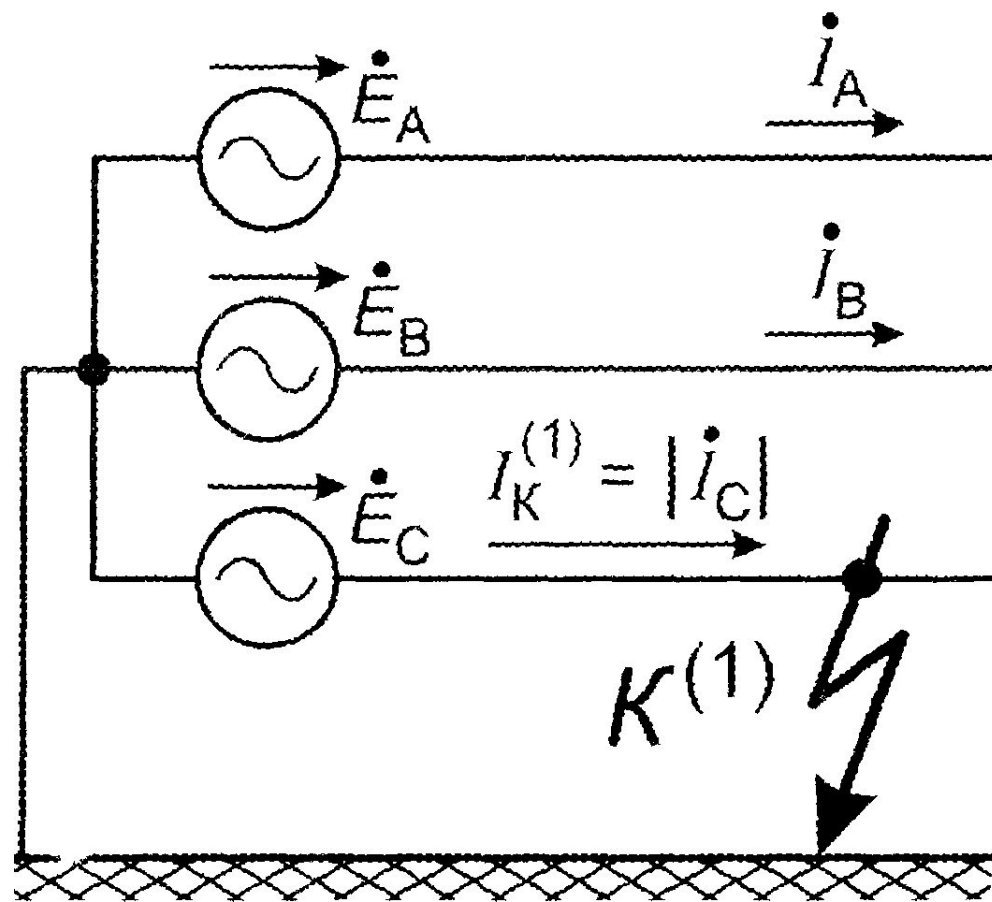
$$I_K^{(2)} = |\dot{I}_B| = |\dot{I}_C| = \frac{\sqrt{3} E_\Phi}{2 Z_K} = \frac{\sqrt{3}}{2} \frac{E_\Phi}{\sqrt{r_L^2 + (x_\Gamma + x_\Pi)^2}} = \frac{\sqrt{3}}{2} I_K^{(3)} \approx 0,866 \cdot I_K^{(3)}.$$

Повреждения	Разновидности и обозначения	Линии и шины, изображения	Машины и аппараты, изображения
Трёхфазные КЗ	КЗ между тремя фазами – $K^{(3)}$		
	Трёхфазное КЗ на землю – $K_3$ <i>(1,1,1)</i>		
Двухфазные КЗ	КЗ между двумя фазами $K^{(2)}$		
	Двухфазное КЗ на землю – $K$ <i>(1,1)</i>		
	Двойное КЗ на землю $K^{(1,1)}$ <sub>ДВ</sub>		

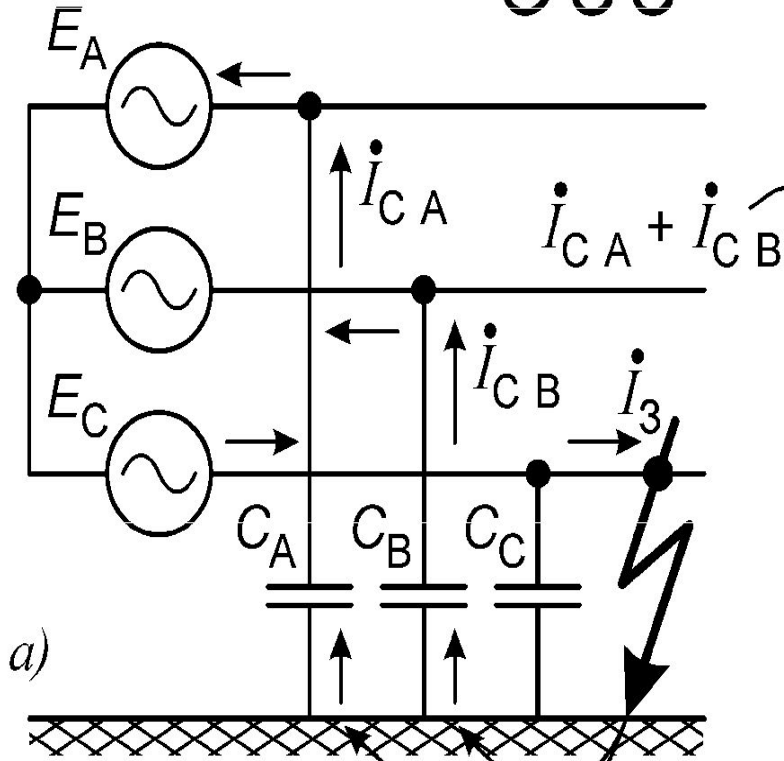
<p>Однофазные КЗ и однофазные замыкания на землю</p>	<p>Однофазное КЗ – <math>K^{(1)}</math> и однофазное замыкание на землю <math>K^{(1)}_3</math></p>
	<p>Однофазное витковое КЗ – <math>K^{(1)}_3</math></p>
<p>Разрыв фазы</p>	<p><math>L</math></p>



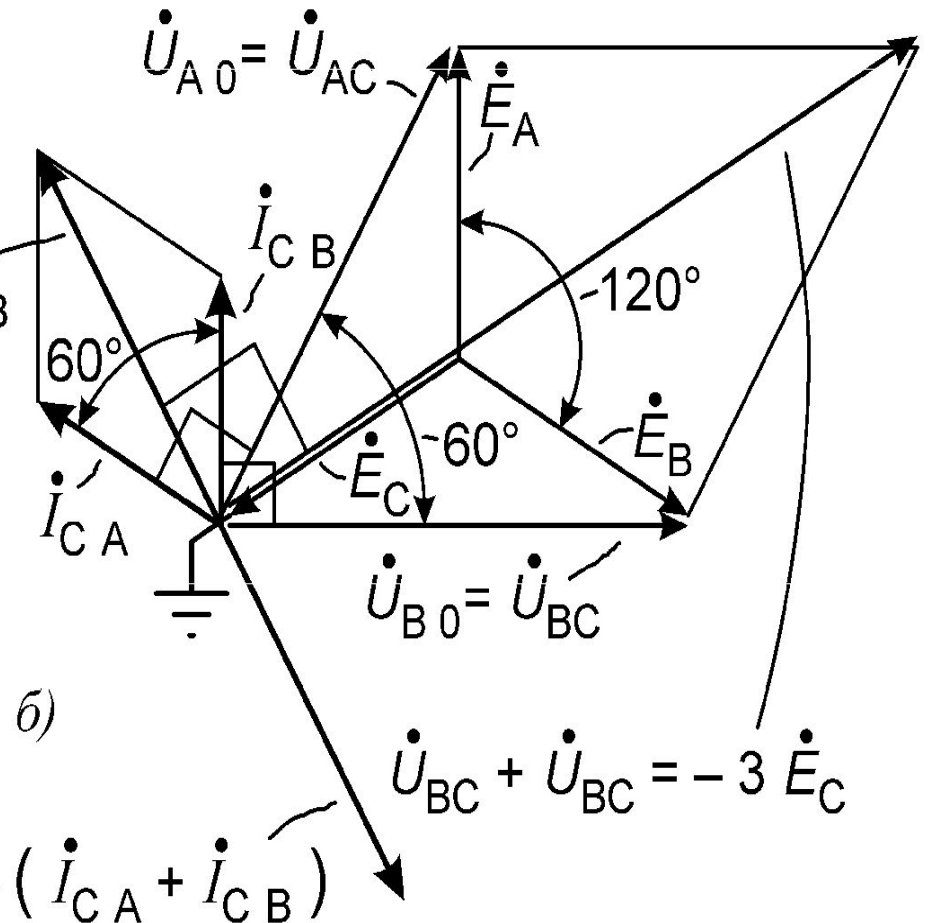
$$I_{K3}^{(1)} = |\dot{i}_C| = \frac{E_\Phi}{Z_K} = \frac{E_\Phi}{\sqrt{(r_\Pi + r_3)^2 + (x_\Gamma + x_\Pi + x_3)^2}}$$



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a)

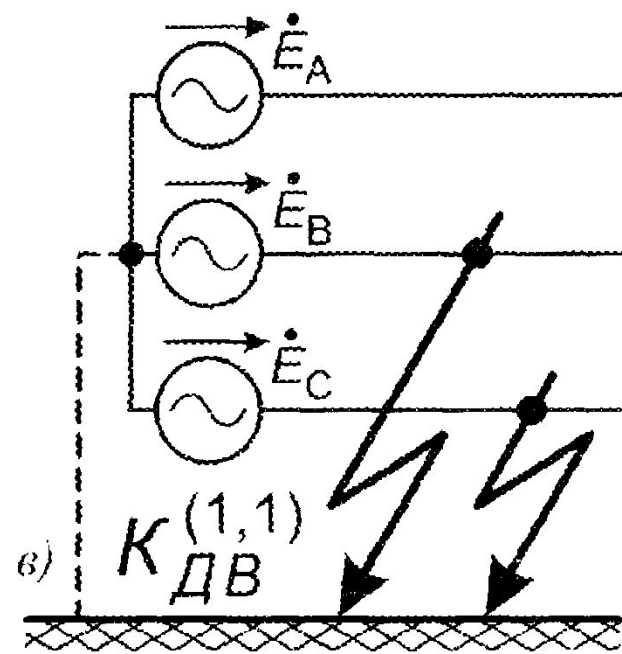
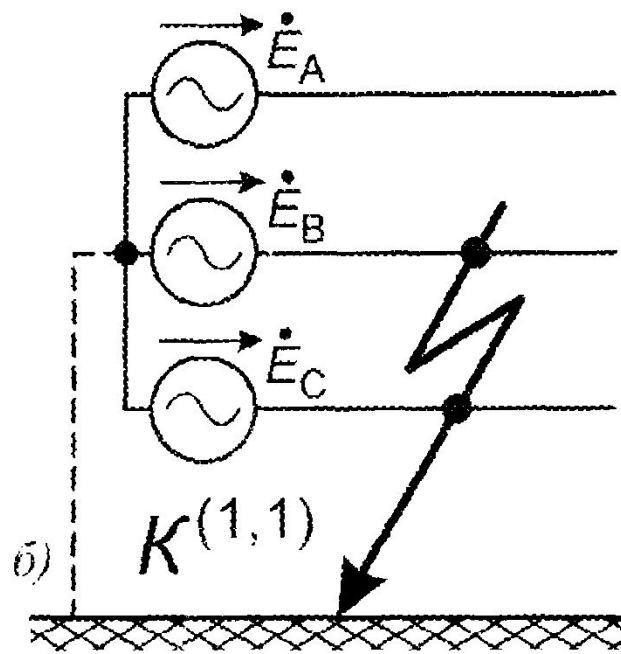
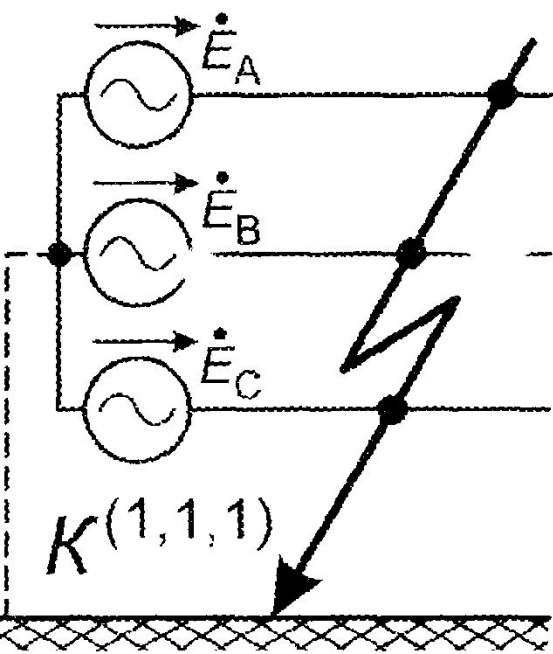


b)

$$\dot{I}_3 = -(\dot{I}_{CA} + \dot{I}_{CB}) = - \left( \frac{\dot{U}_{A0}}{1} + \frac{\dot{U}_{B0}}{1} \right) \left( \frac{1}{j\omega C_A} + \frac{1}{j\omega C_B} \right)$$

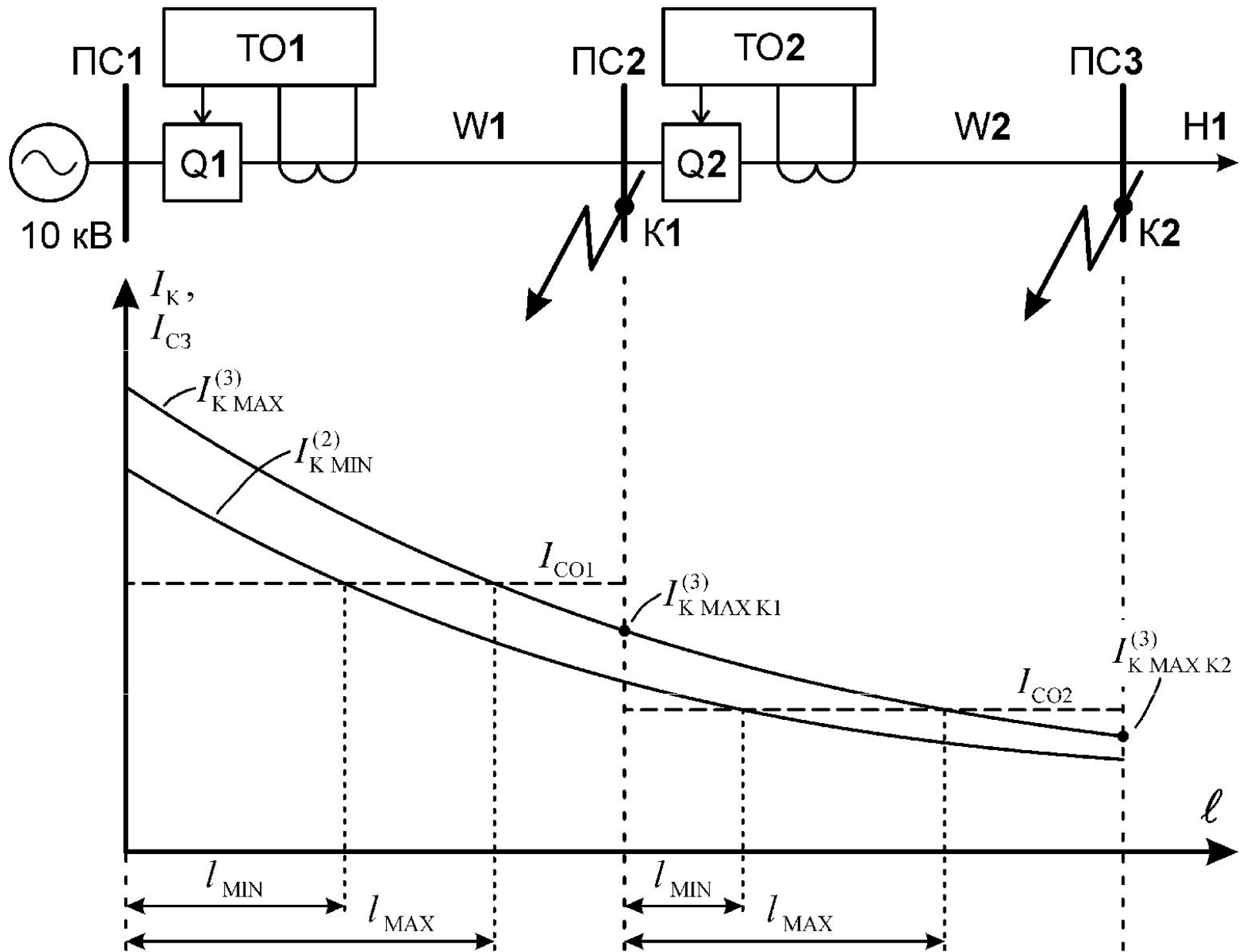
$$\dot{I}_3 = -j\omega C (\dot{U}_{AC} + \dot{U}_{BC}) = 3j\omega C \dot{E}_C$$

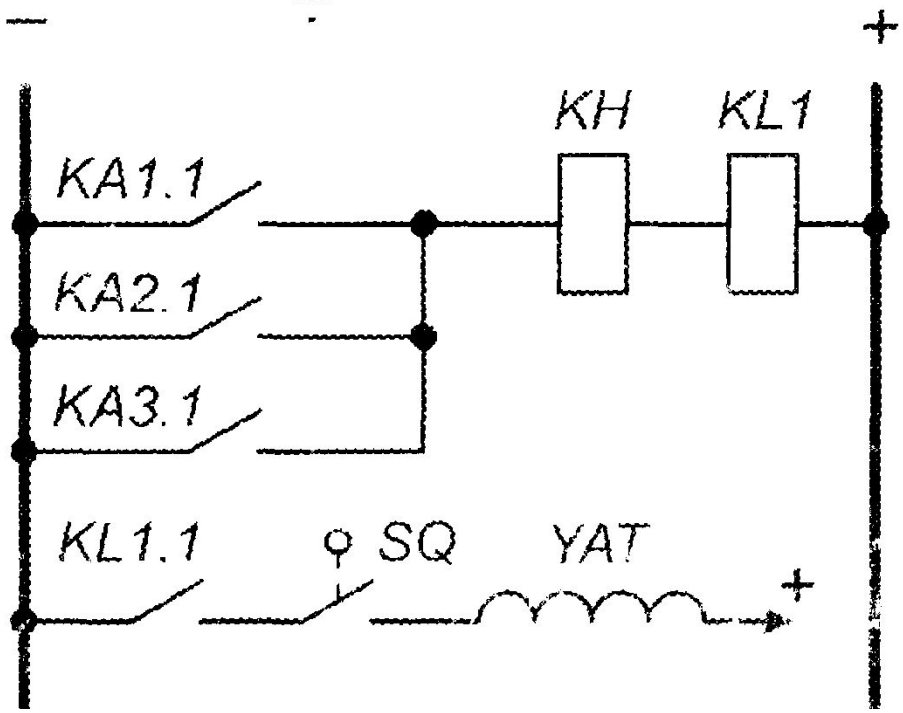
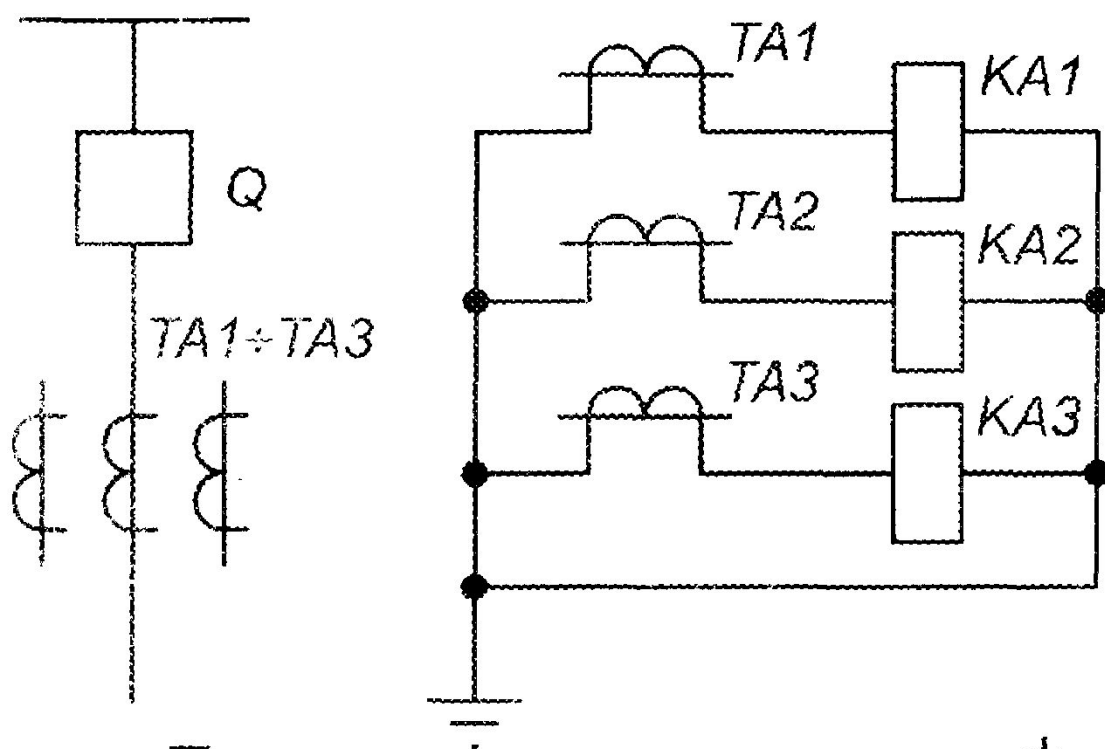
$$I_3 = 3U_\Phi \omega C = 6\pi U_\Phi f C$$

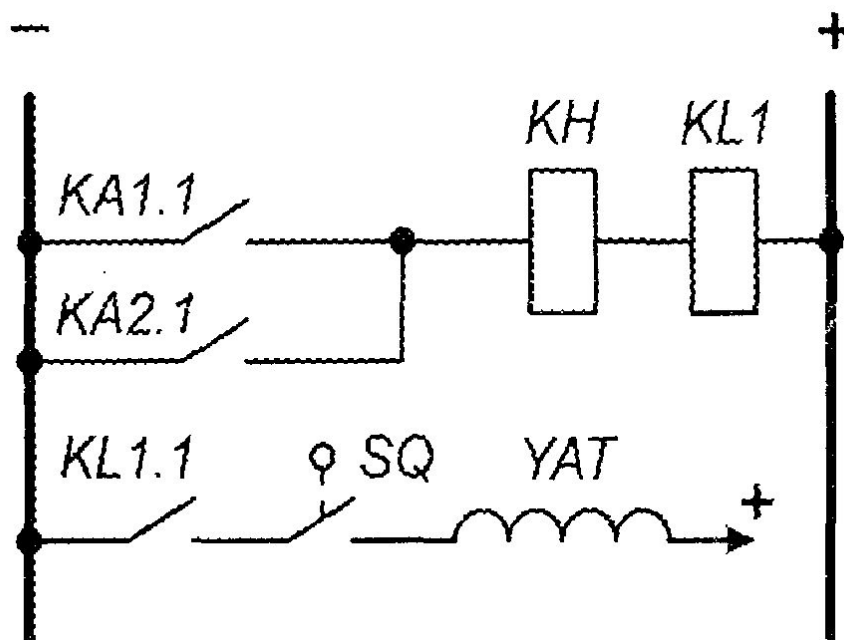
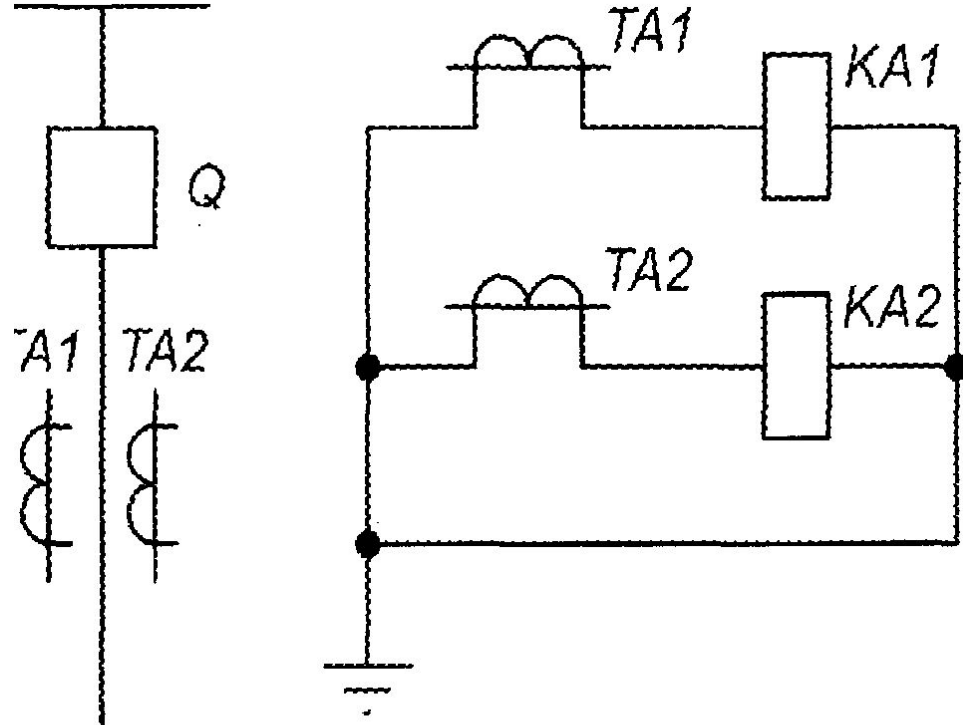


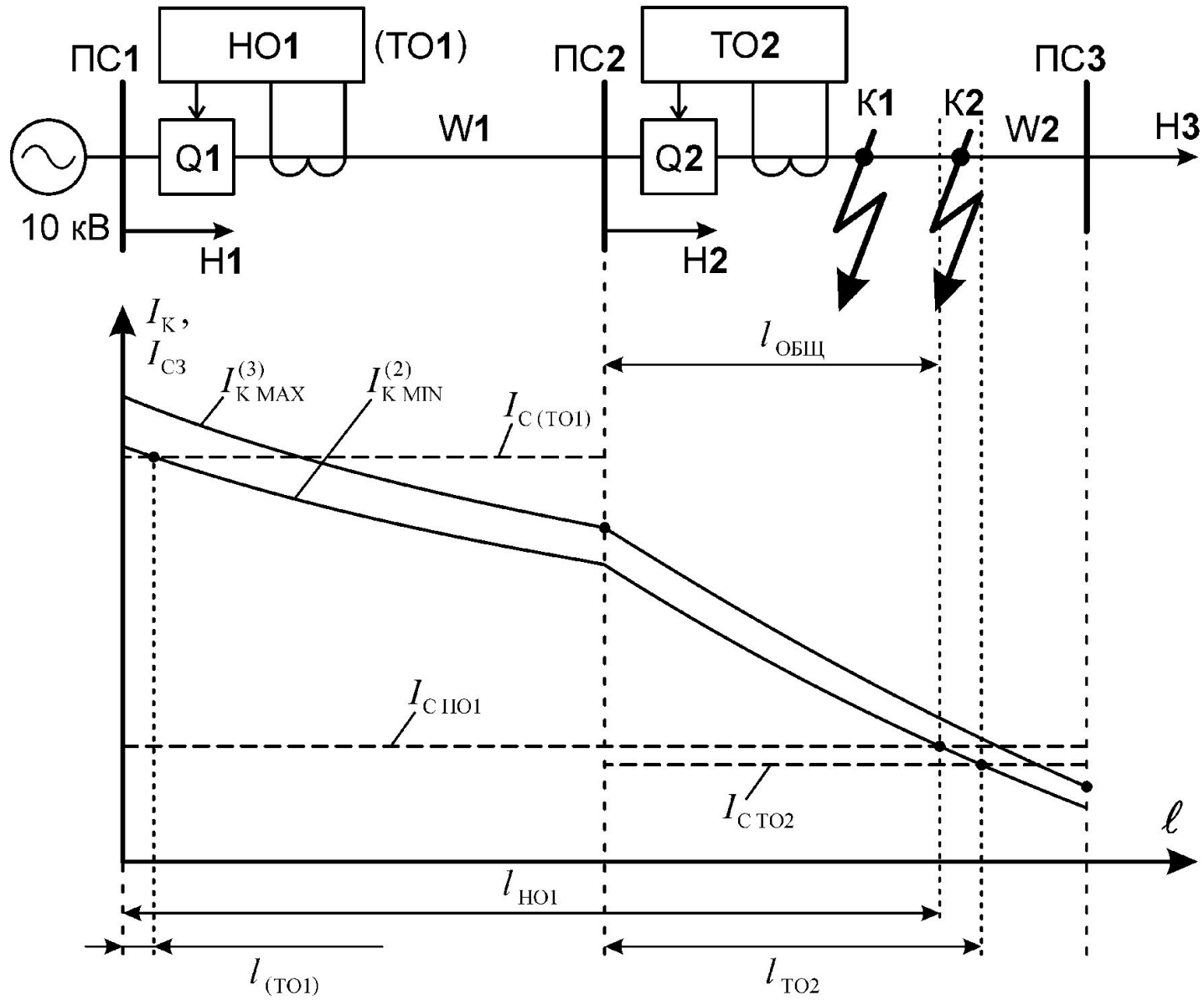
$$I_{CP} = \frac{k_{cx}}{k_{TA}} I_{C3}$$

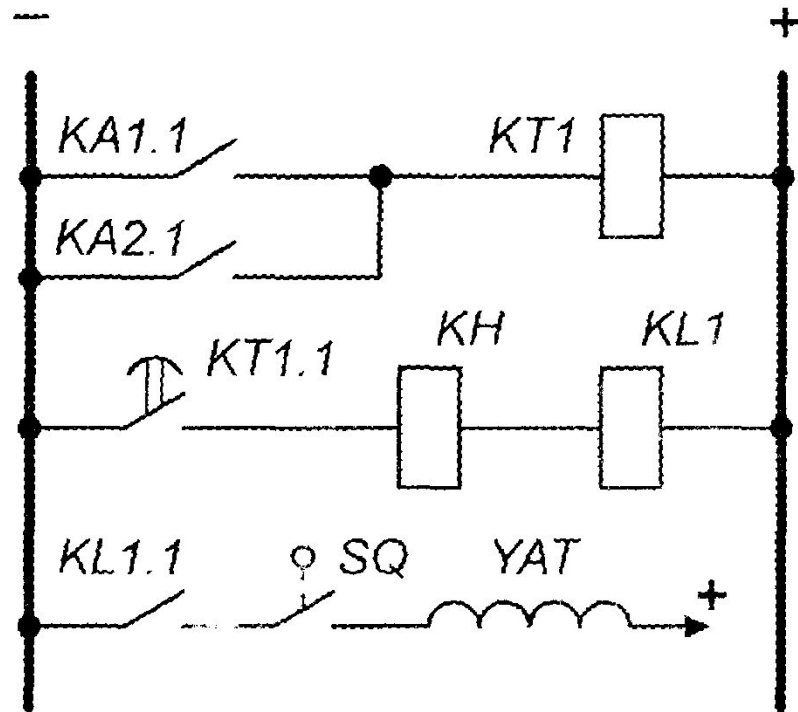
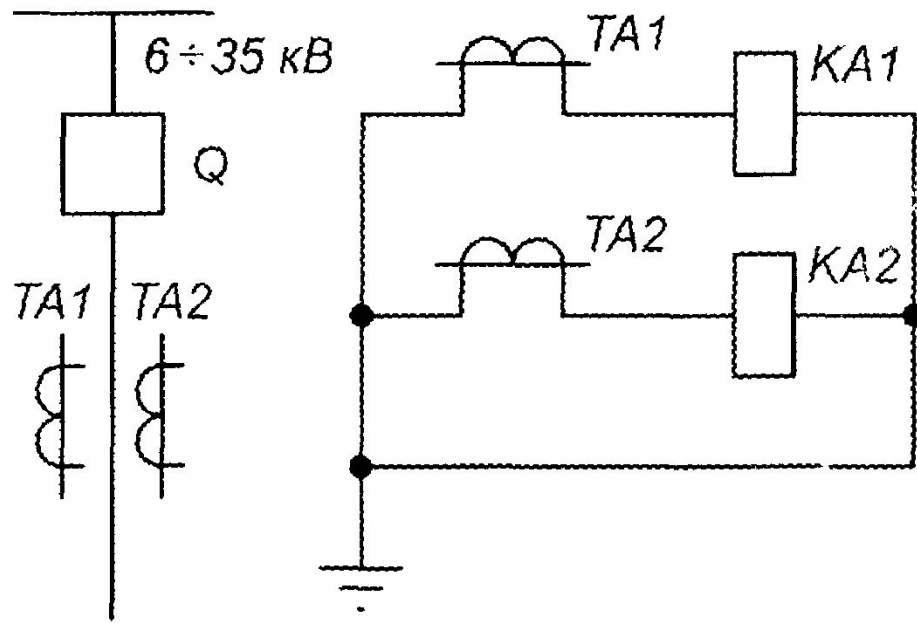


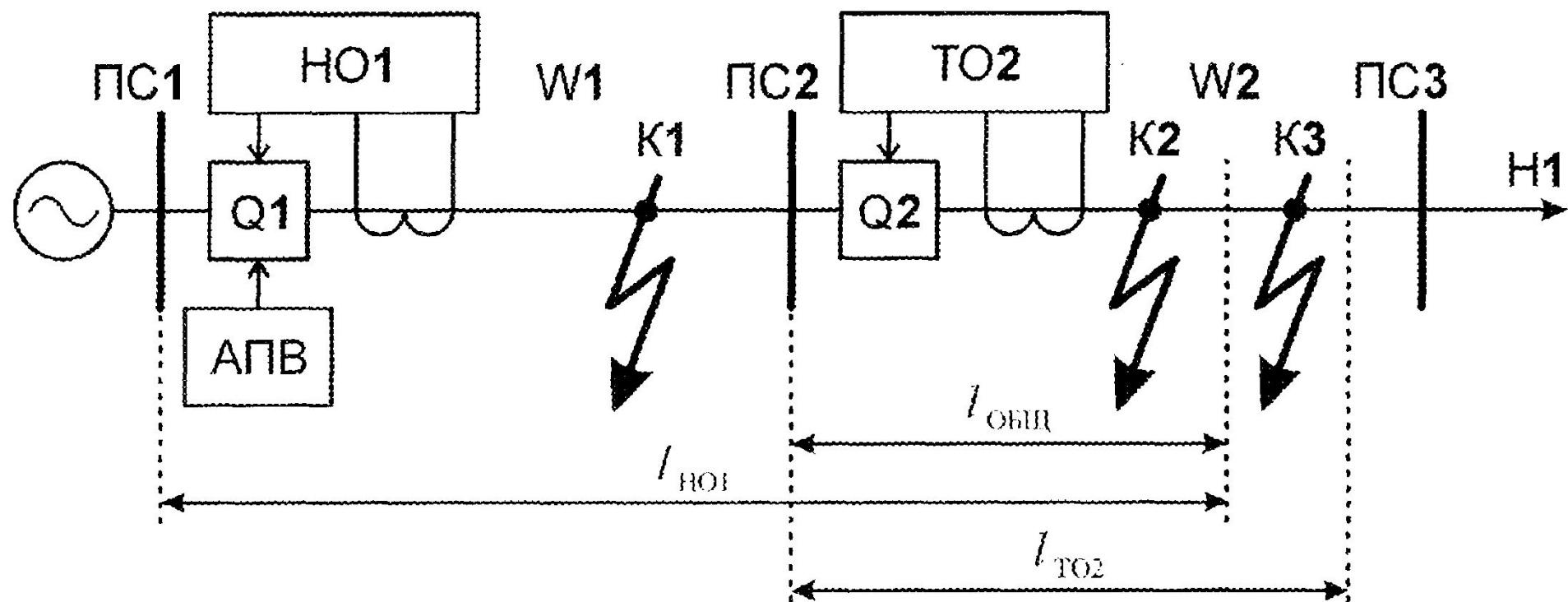












$$I_{cp HO1} \leq \frac{U_{cp MIN}}{\sqrt{3} k_3 (1 + k_O) Z_{cp MIN}}$$