

**PERHITUNGAN  
SETTING RELAI ARUS LEBIH**

❖ Relai R3-11

Manufacture	: Siemens
Tipe	: ISGS
Curve	: Inverse
Rasio CT	: 1200/5
$I_{sc \text{ Max } 21\text{-MC-401}}$	: 6.33 kA
$I_{sc \text{ Min } 21\text{-MC-401}}$	: 5.6 kA
Waktu Operasi	: 0.2 detik

➤ Full Load Amper (FLA)

$$FLA = \frac{kVA}{\sqrt{3} \times kV} = \frac{500}{\sqrt{3} \times 0.4} = 721.68 \text{ A}$$

➤ Pick Up

$$\frac{1.05}{CT} \times FLA \leq I_p \leq \frac{1.3}{CT} \times FLA$$

$$1.05 \times 721.68 \leq I_p \leq 1.3 \times 721.68$$

$$\frac{727.76}{1200} \leq I_p \leq \frac{938.18}{1200}$$

$$0.63 \leq I_p \leq 0.78$$

➤ Time Dial

Waktu Operasi : 0.2 detik

Arus Aktual ( $I_{set}$ ) :  $0.63 \times 1200 = 756$

$$T = \frac{td \times \beta \times \left[ \left( \frac{I}{I_s} \right)^\alpha - 1 \right]}{k}$$

$$T = \frac{td \times \beta \times \left[ \left( \frac{I_{sc \text{ max}}}{tap \times CT} \right)^\alpha - 1 \right]}{k}$$

$$T = \frac{0.2 \times 10 \times \left[ \left( \frac{6330}{0.63 \times 1200} \right)^1 - 1 \right]}{13.5}$$

$$T = 1.09$$

❖ Relai R3-9

Manufacture	: Merlin Gerin
Tipe	: SPAM 1000
Curve	: Standard Inverse
Rasio CT	: 100/5
$I_{sc \text{ Max } 02\text{-MC-201}}$	: 9.86 kA
$I_{sc \text{ Min } 02\text{-MC-201}}$	: 7.83 kA
Waktu Operasi	: 0.4 detik

➤ Full Load Ampere (FLA)

$$FLA = \frac{kVA}{\sqrt{0.3} \times kv} = \frac{500}{\sqrt{3} \times 6.9} = 41.83$$

➤ Pick Up

$$\frac{1.05}{CT} \times FLA \leq Ip \leq \frac{1.3}{CT} \times FLA$$

$$1.05 \times 41.83 \leq Ip \leq 1.3 \times 41.83$$

$$43.92 \leq Ip \leq 54.73$$

$$\frac{43.92}{100} \leq Ip \leq \frac{54.73}{100}$$

$$0.43 \leq Ip \leq 0.54$$

➤ Time Dial

Waktu Operasi	: 0.4 detik
Arus Aktual ( $I_{set}$ )	: $100 \times 0.43 = 43$

$$T = \frac{td \times \beta \times \left[ \left( \frac{I}{I_s} \right)^\alpha - 1 \right]}{k}$$

$$T = \frac{td \times \beta \times \left[ \left( \frac{I_{sc \text{ max}}}{tap \times CT} \right)^\alpha - 1 \right]}{k}$$

$$T = \frac{0.4 \times 2.97 \times \left[ \left( \frac{9860}{100 \times 0.43} \right)^{0.02} - 1 \right]}{0.14}$$

$$T = 0.97$$

❖ Relai F3-1

Manufacture	: Merlin Gerin
Tipe	: SPAM 2000
Curve	: Standart Inverse
Rasio CT	: 1250/5
$I_{sc \text{ Max } 02\text{-MC-201}}$	: 9.86 kA
$I_{sc \text{ Min } 02\text{-MC-201}}$	: 7.83 kA
Waktu Operasi	: 0.6 detik

➤ Full Load Ampere (FLA)

$$FLA = \frac{kVA}{\sqrt{0.3} \times kv} = \frac{10.000}{\sqrt{3} \times 6.9} = 836.7$$

➤ Pick Up

$$\frac{1.05}{CT} \times FLA \leq I_p \leq \frac{1.3}{CT} \times FLA$$

$$1.05 \times 836.7 \leq I_p \leq 1.3 \times 836.7$$

$$878.53 \leq I_p \leq 11087.71$$

$$\frac{878.53}{1250} \leq I_p \frac{1087.71}{1250}$$

$$0.7 \leq I_p \leq 0.87$$

➤ Time Dial

Waktu Operasi	: 0.6 detik
Arus Aktual ( $I_{set}$ )	: $0.7 \times 1250 = 875$

$$T = \frac{td \times \beta \times \left[ \left( \frac{I}{I_s} \right)^\alpha - 1 \right]}{k}$$

$$T = \frac{td \times \beta \times \left[ \left( \frac{I_{sc \text{ max}}}{tap \times CT} \right)^\alpha - 1 \right]}{k}$$

$$T = \frac{0.6 \times 2.97 \times \left[ \left( \frac{9860}{0.7 \times 1250} \right)^{0.02} - 1 \right]}{0.14}$$

$$T = 0.63$$

❖ Relai F-3

Manufacture	: Merlin Gerin
Tipe	: SPAM 1000
Curve	: Standart Inverse
Rasio CT	: 700/5
$I_{sc \text{ Max 11-SG-101}}$	: 27.57 kA
$I_{sc \text{ Min 21-MC-401}}$	: 25.84 kA
Waktu Operasi	: 0.8 detik

➤ Full Load Ampere (FLA)

$$FLA = \frac{kVA}{\sqrt{0.3} \times kv} = \frac{10.000}{\sqrt{3} \times 11} = 524.9$$

➤ Pick Up

$$\frac{1.05}{CT} \times FLA \leq Ip \leq \frac{1.3}{CT} \times FLA$$

$$1.05 \times 524.9 \leq Ip \leq 1.3 \times 524.9$$

$$551.14 \leq Ip \leq 682.37$$

$$\frac{551.14}{700} \leq Ip \leq \frac{682.37}{700}$$

$$0.78 \leq Ip \leq 0.97$$

➤ Time Dial

Waktu Operasi	: 0.8 detik
Arus Aktual	: $0.78 \times 700 = 546$

$$T = \frac{td \times \beta \times \left[ \left( \frac{I}{I_s} \right)^\alpha - 1 \right]}{k}$$

$$T = \frac{td \times \beta \times \left[ \left( \frac{I_{sc \text{ max}}}{tap \times CT} \right)^\alpha - 1 \right]}{k}$$

$$T = \frac{0.8 \times 2.97 \times \left[ \left( \frac{27570}{0.78 \times 700} \right)^{0.02} - 1 \right]}{0.14}$$

$$T = 1.3$$

# LAMPIRAN