Universidad Nacional del Centro del Perú

Facultad de Ingeniería Eléctrica y Electrónica

MATERIAL DE ENSEÑANZA

094C Protección de Sistemas de Potencia

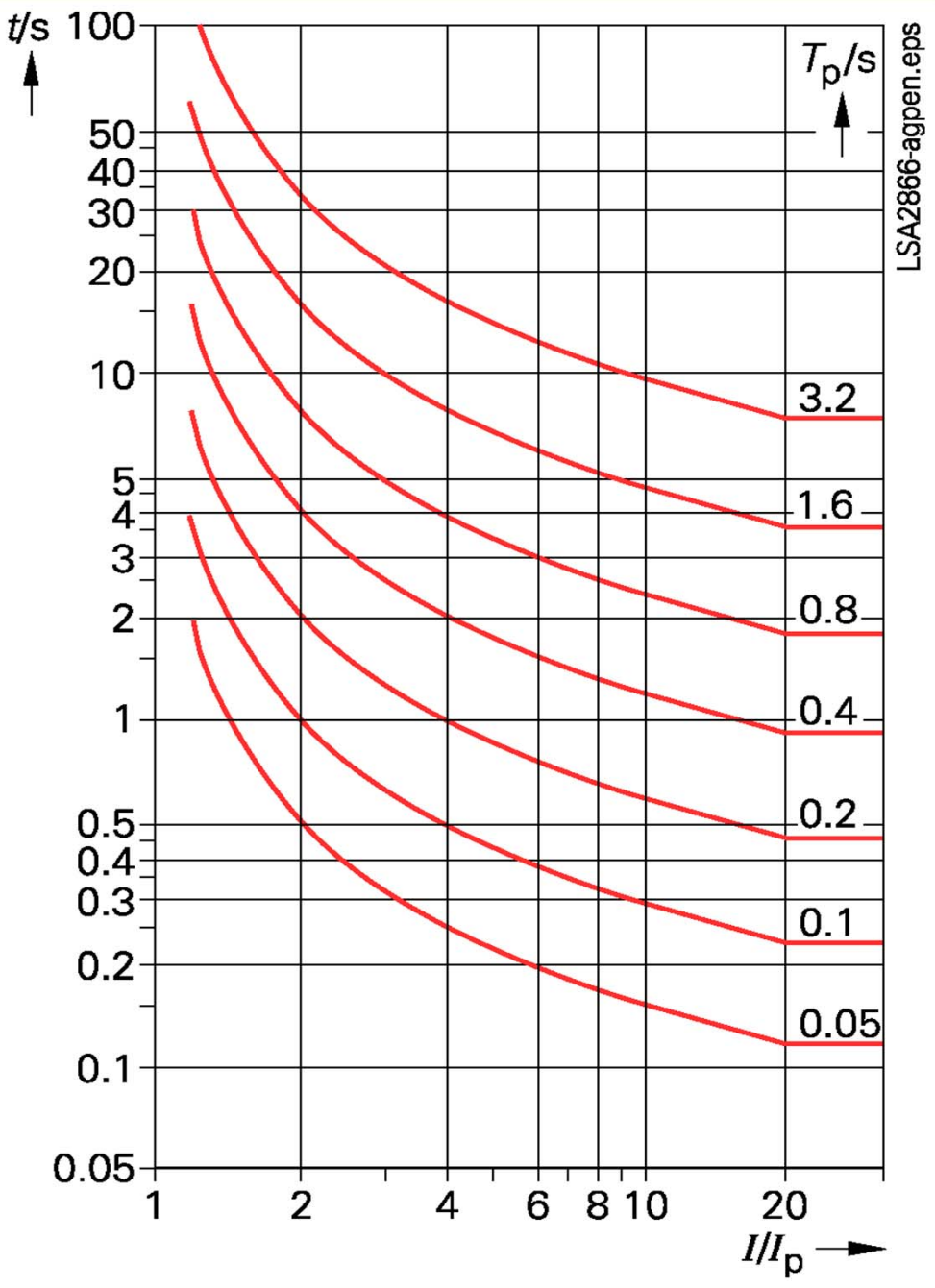
CURVAS CARACTERÍSTICAS

wastorayme@hotmail.com

Inverse-time Overcurrent Protection Characteristics according to IEC 60255.

Relays Characteristics

Fuente: SIPROTEC Numerical Protection Relays
Siemens Catalog 2002



CURVE

INVERSE

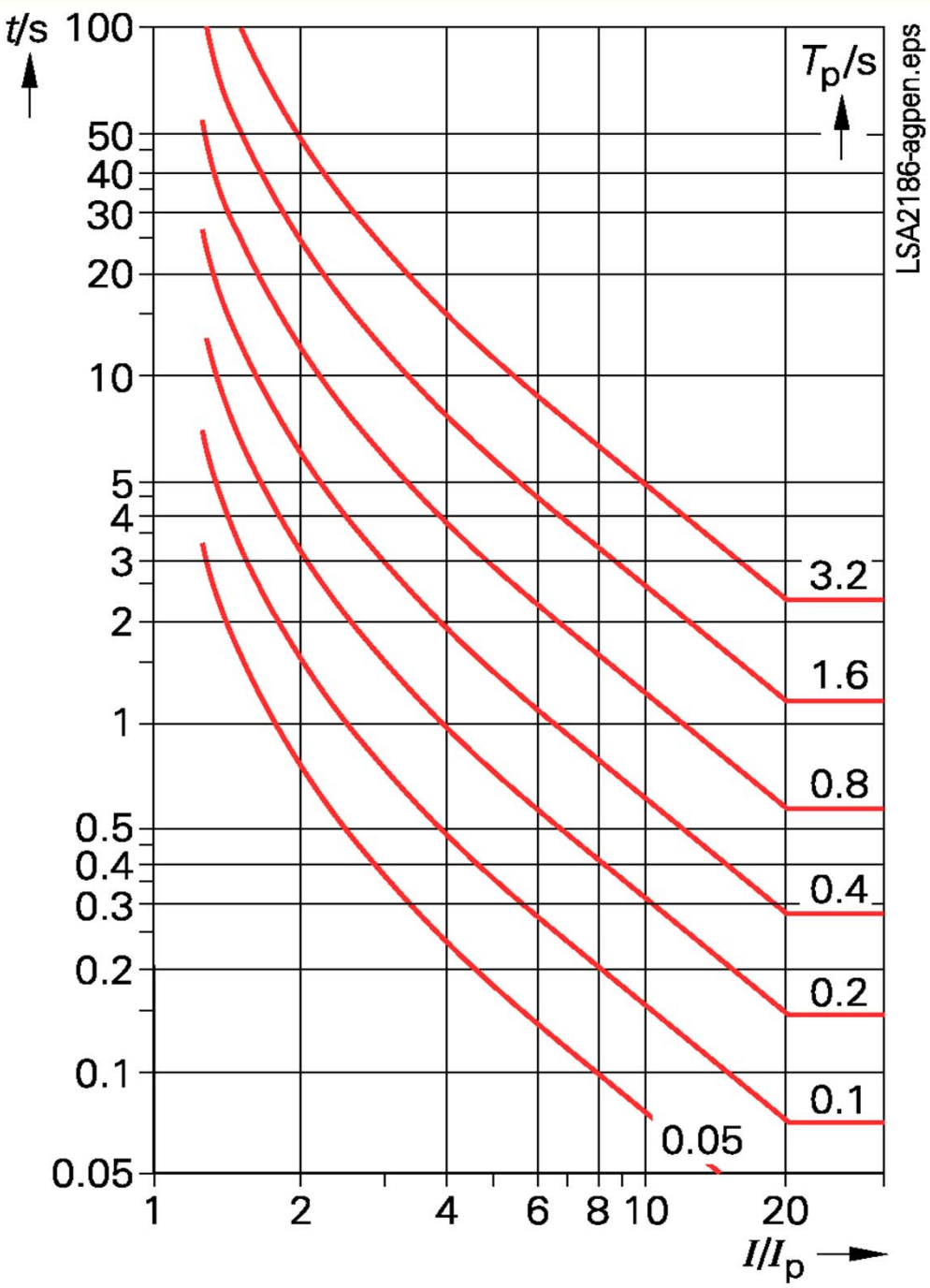
$$t = \frac{0.14}{\left(I/I_p\right)^{0.02} - 1} \cdot T_p$$

I = current

t = tripping time

I_p = pickup setting

T_p = time multiplier setting

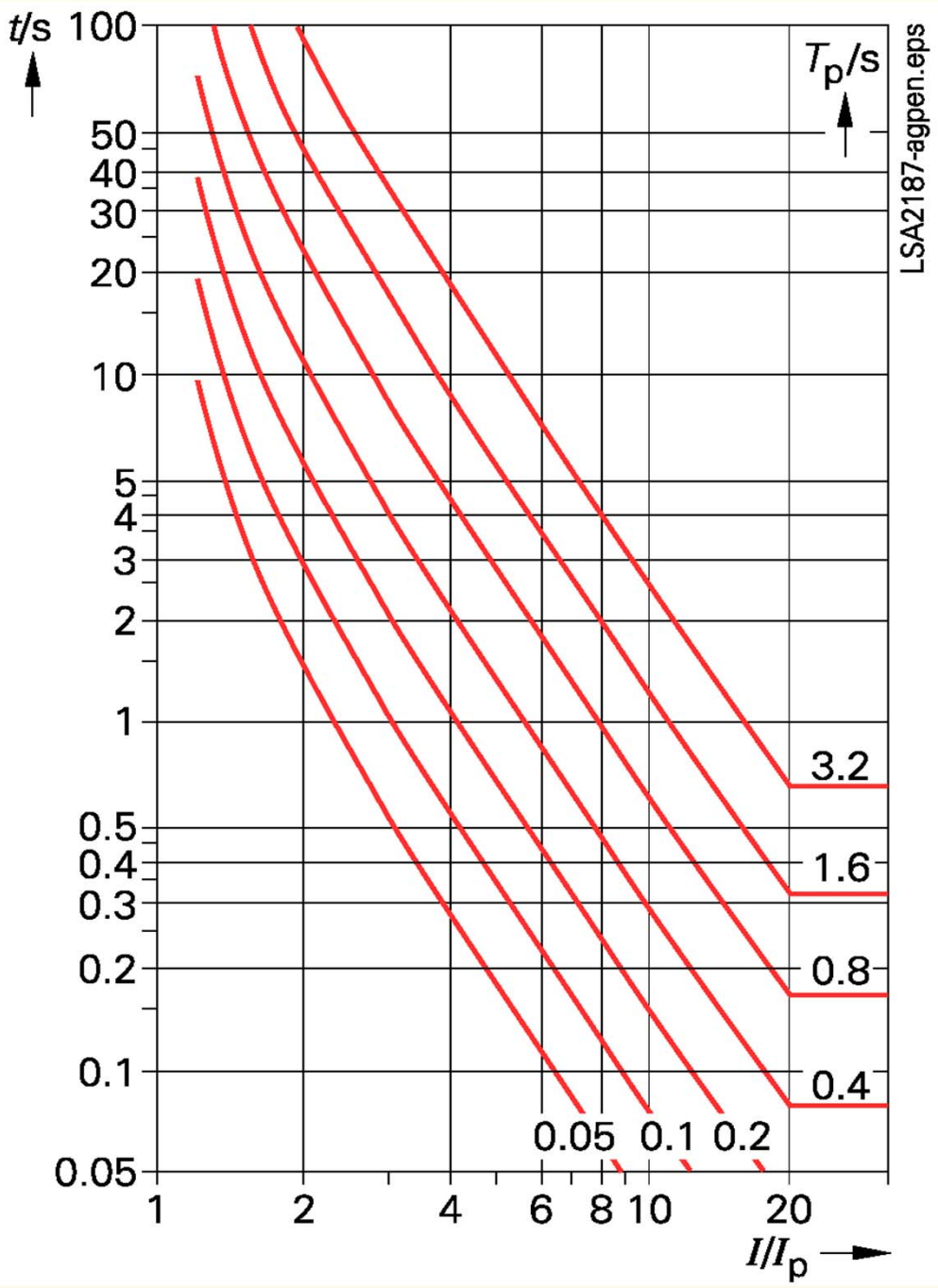


CURVE

VERY INVERSE

$$t = \frac{13.5}{(I/I_p) - 1} \cdot T_p$$

I	=	current
t	=	tripping time
I_p	=	pickup setting
T_p	=	time multiplier setting



CURVE

EXTREMELY INVERSE

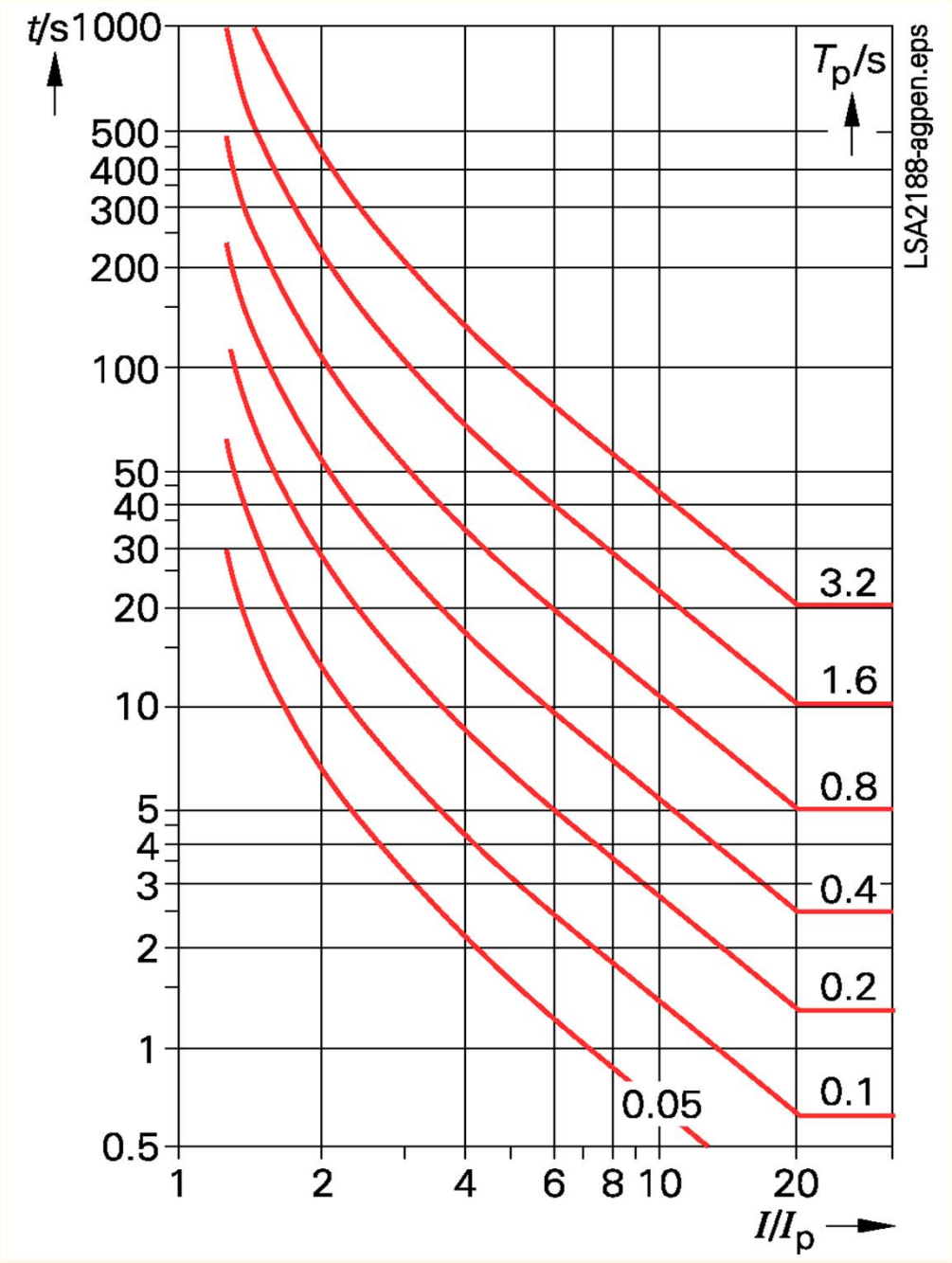
$$t = \frac{80}{\left(I/I_p\right)^2 - 1} \cdot T_p$$

I = current

t = tripping time

I_p = pickup setting

T_p = time multiplier setting



CURVE

LONG INVERSE

$$t = \frac{120}{(I/I_p) - 1} \cdot T_p$$

I = current

t = tripping time

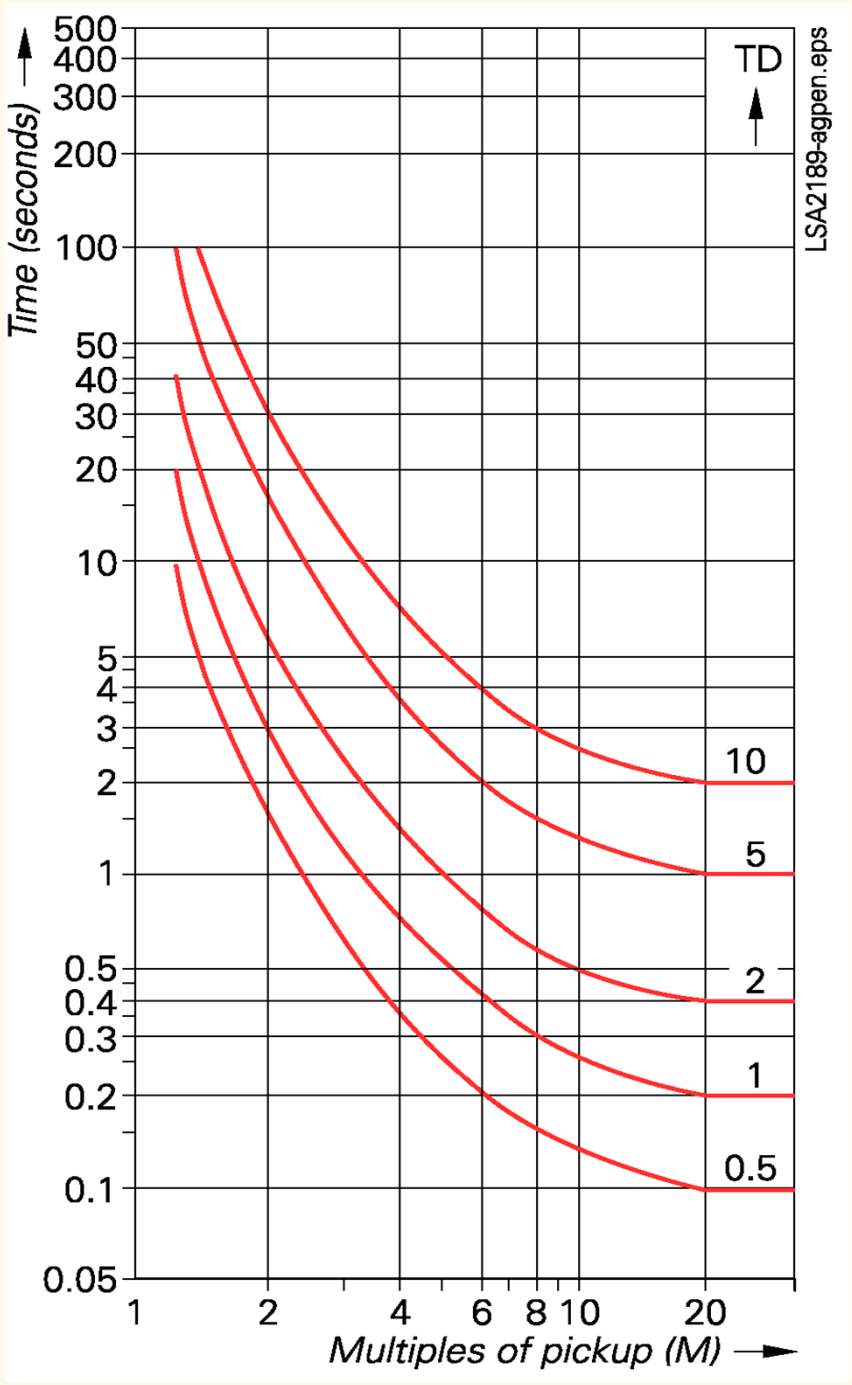
I_p = pickup setting

T_p = time multiplier setting

Inverse-time Overcurrent Protection Characteristics according to ANSI (IEEE).

Relays Characteristics

Fuente: SIPROTEC Numerical Protection Relays
Siemens Catalog 2002



CURVE

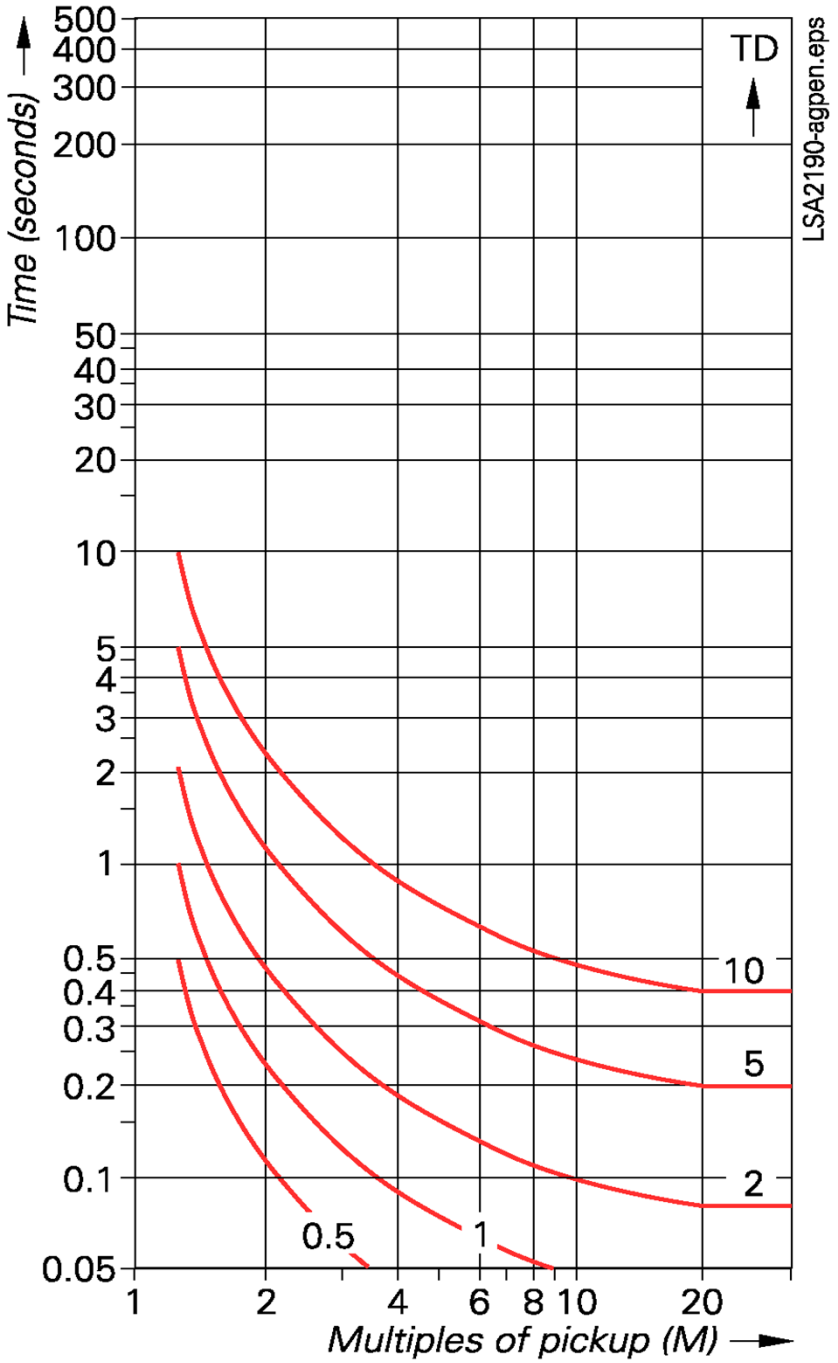
INVERSE

$$t = \left(\frac{8.9341}{M^{2.0938} - 1} + 0.17966 \right) \cdot TD$$

t = tripping time in seconds

M = current in multiples of pickup setting (I/Ip) range 0.1 to 4

TD = time dial

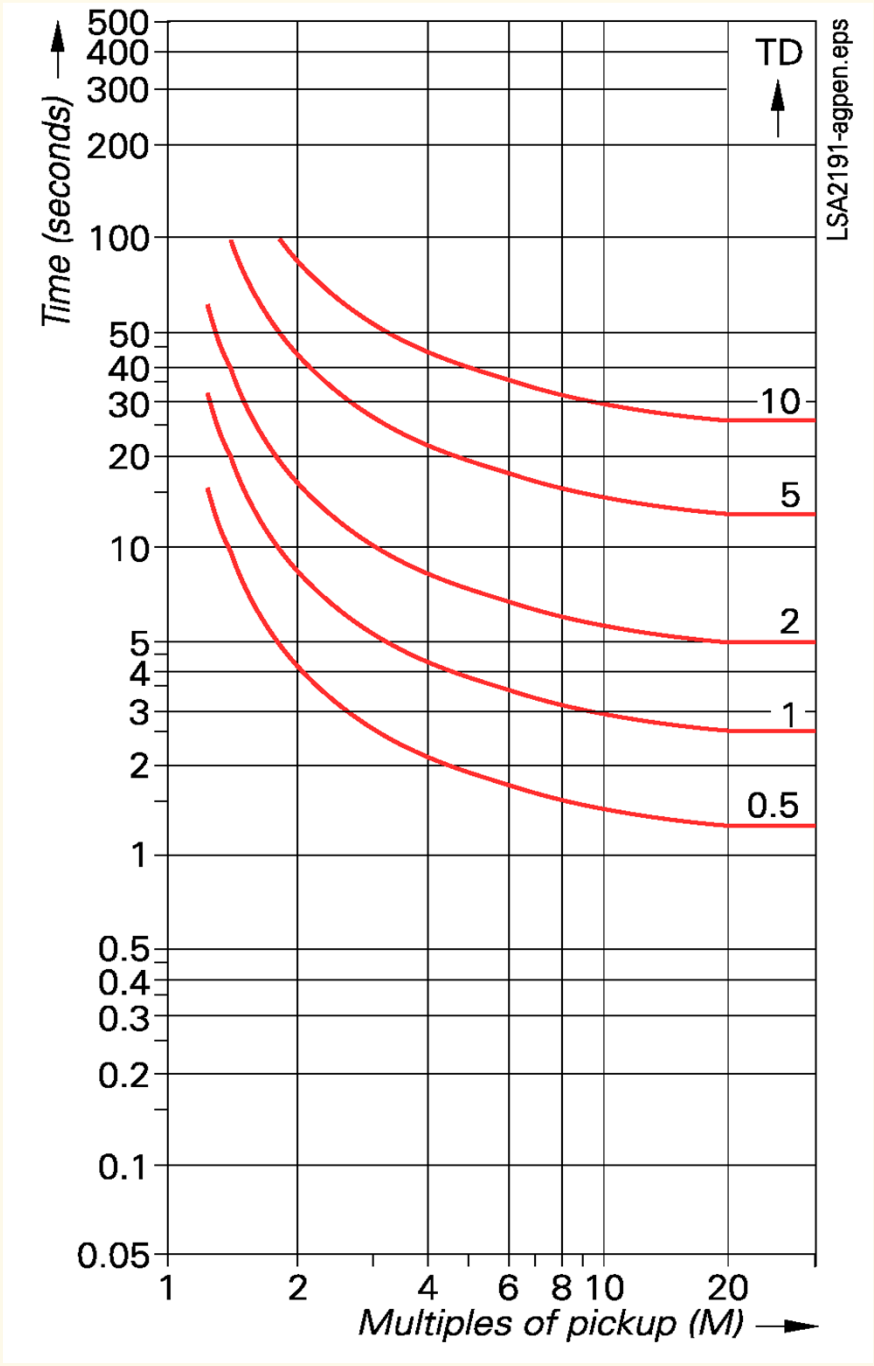


CURVE

SHORT INVERSE

$$t = \left(\frac{0.2663}{M^{1.2969} - 1} + 0.03393 \right) \cdot TD$$

t	=	tripping time in seconds
M	=	current in multiples of pickup setting (I/Ip) range 0.1 to 4
TD	=	time dial



CURVE

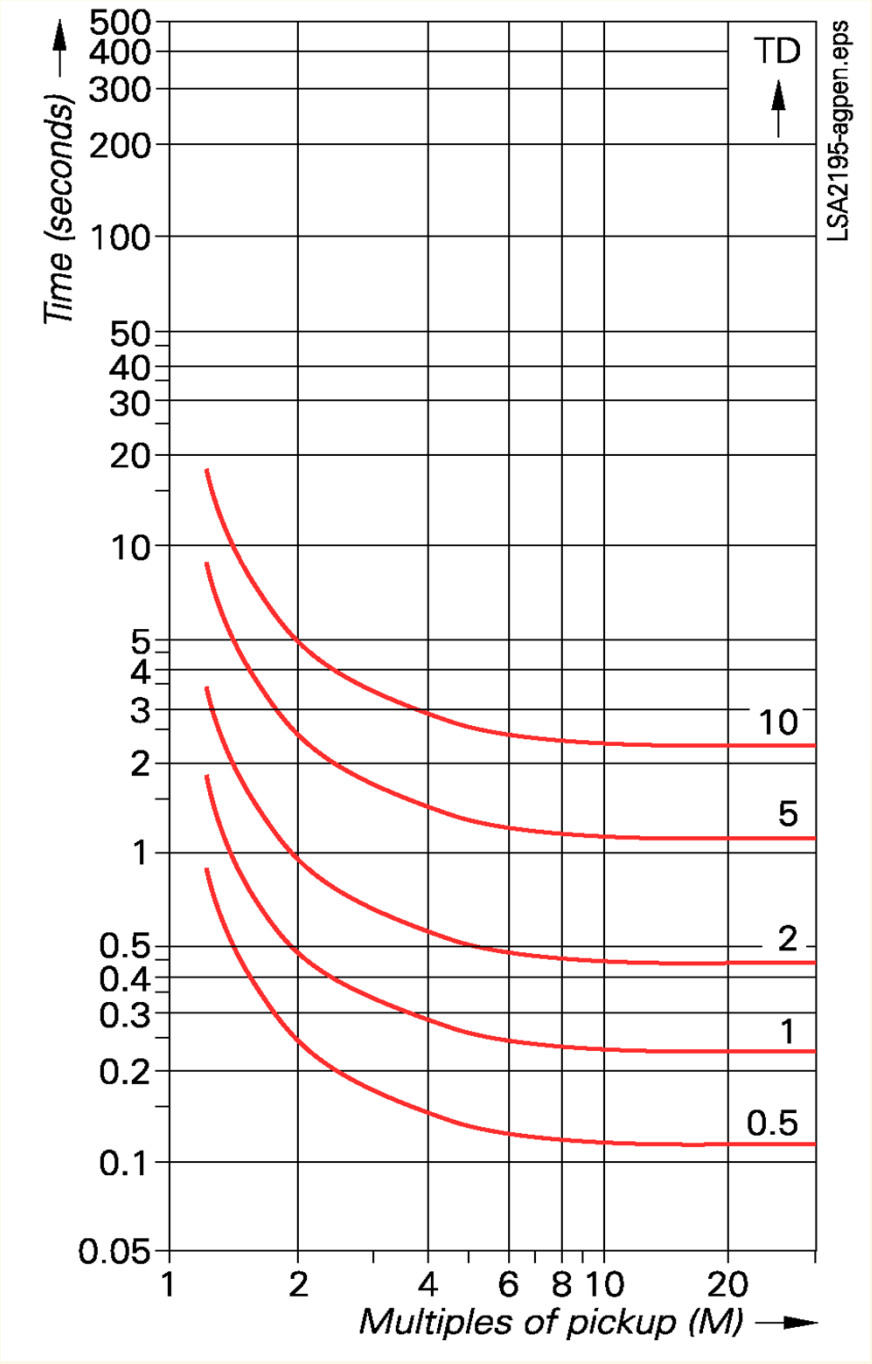
LONG INVERSE

$$t = \left(\frac{5.6143}{M - 1} + 2.18592 \right) \cdot TD$$

t = tripping time in seconds

M = current in multiples of pickup setting (I/Ip) range 0.1 to 4

TD = time dial



CURVE

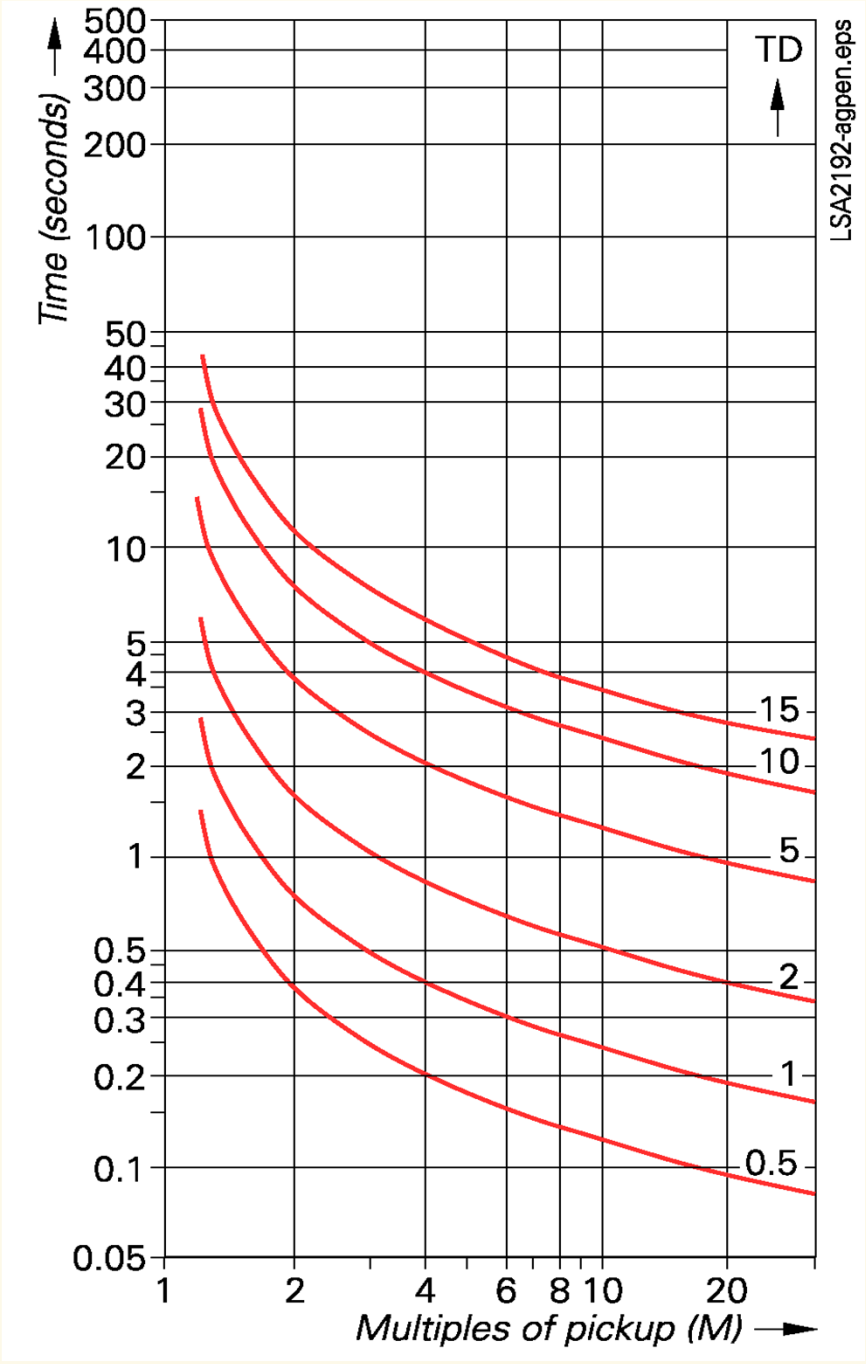
DEFINITE INVERSE

$$t = \left(\frac{0.4797}{M^{1.5625} - 1} + 0.21359 \right) \cdot TD$$

t = tripping time in seconds

M = current in multiples of pickup setting (I/Ip) range 0.1 to 4

TD = time dial



CURVE

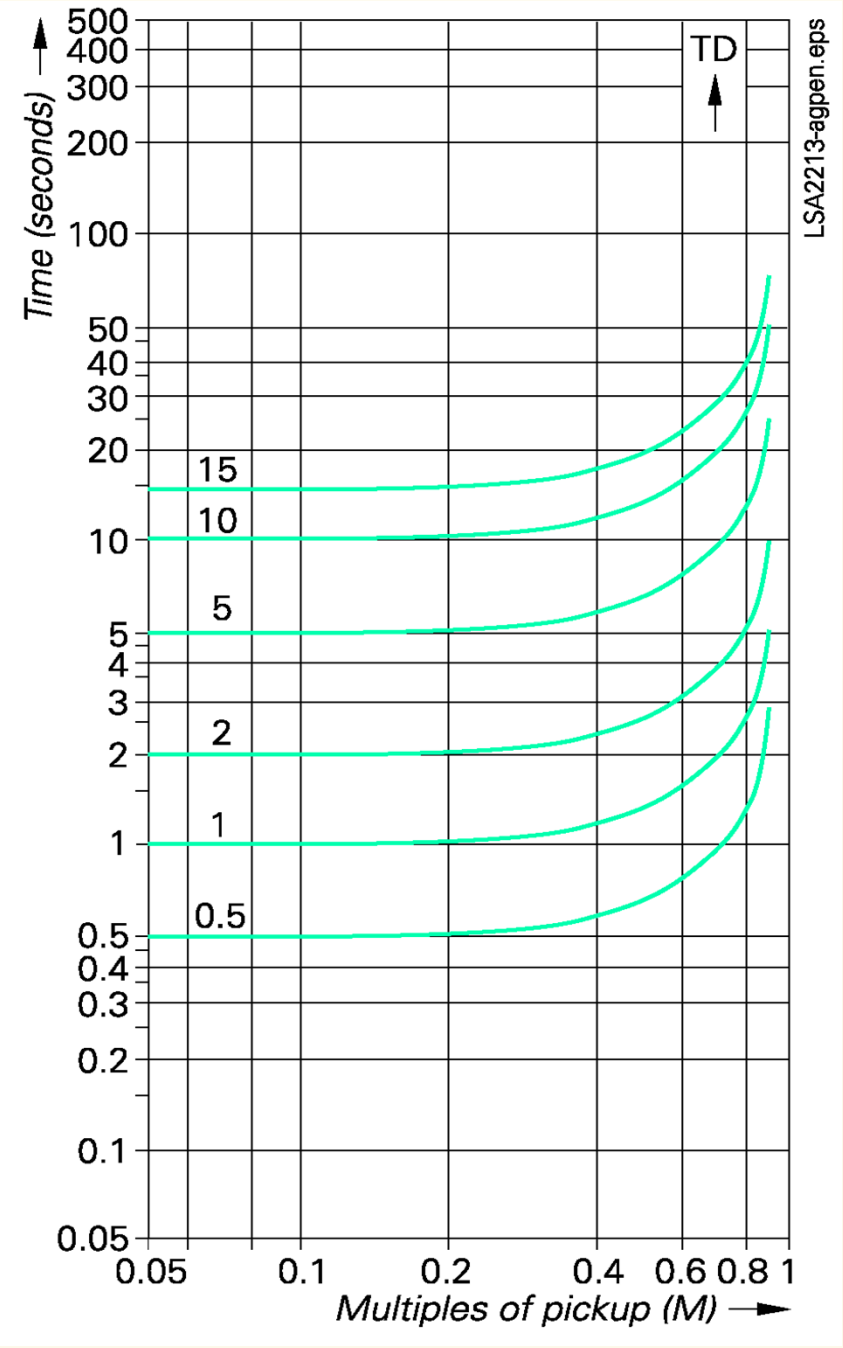
MODERATELY INVERSE

$$t = \left(\frac{0.0103}{M^{0.02} - 1} + 0.0228 \right) \cdot TD$$

t = tripping time in seconds

M = current in multiples of pickup setting (I/Ip) range 0.1 to 4

TD = time dial



CURVE

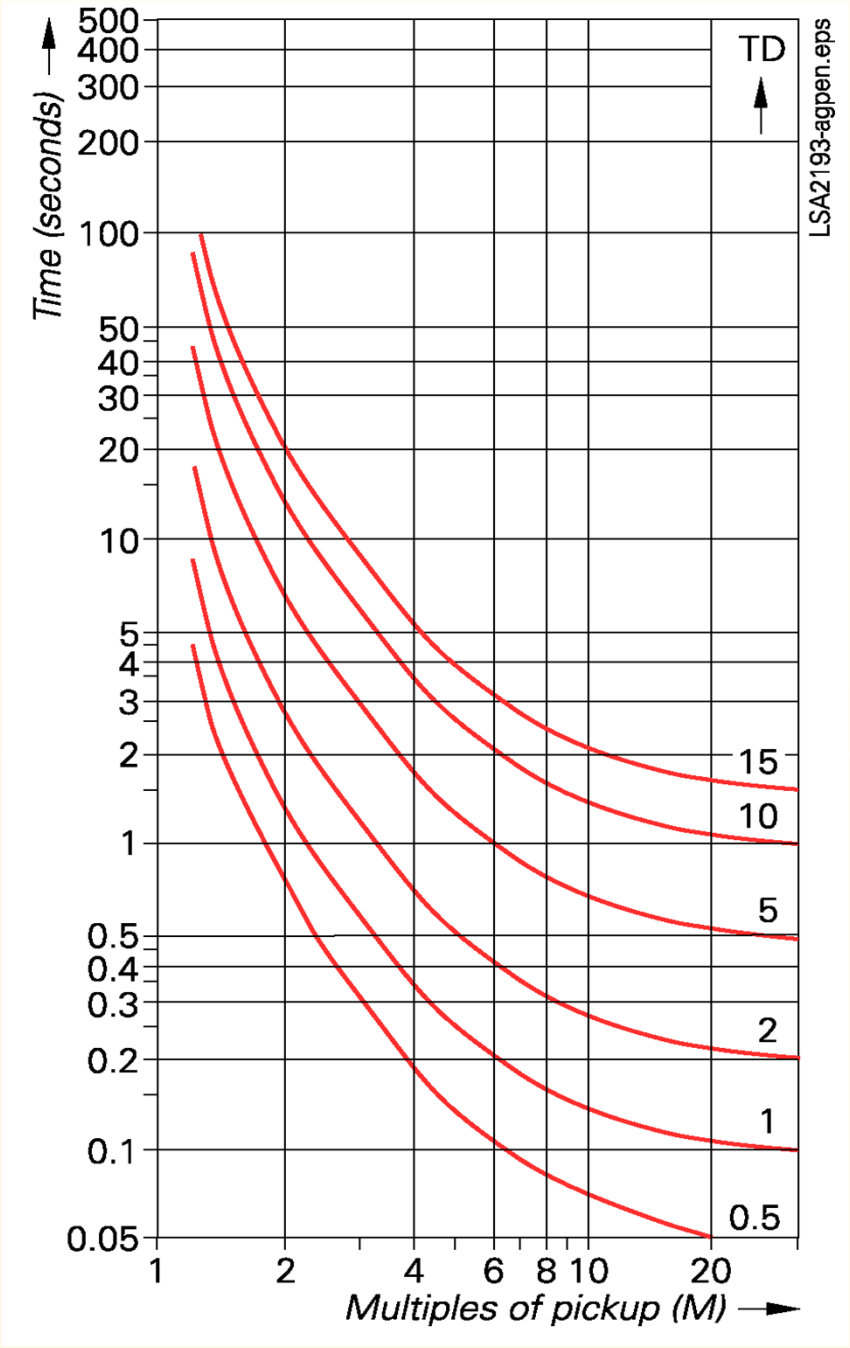
RESET MODERATELY INVERSE

$$t_{reset} = \frac{0.97 \cdot TD}{M^2 - 1}$$

t = tripping time in seconds

M = current in multiples of pickup setting (I/Ip) range 0.1 to 4

TD = time dial



CURVE

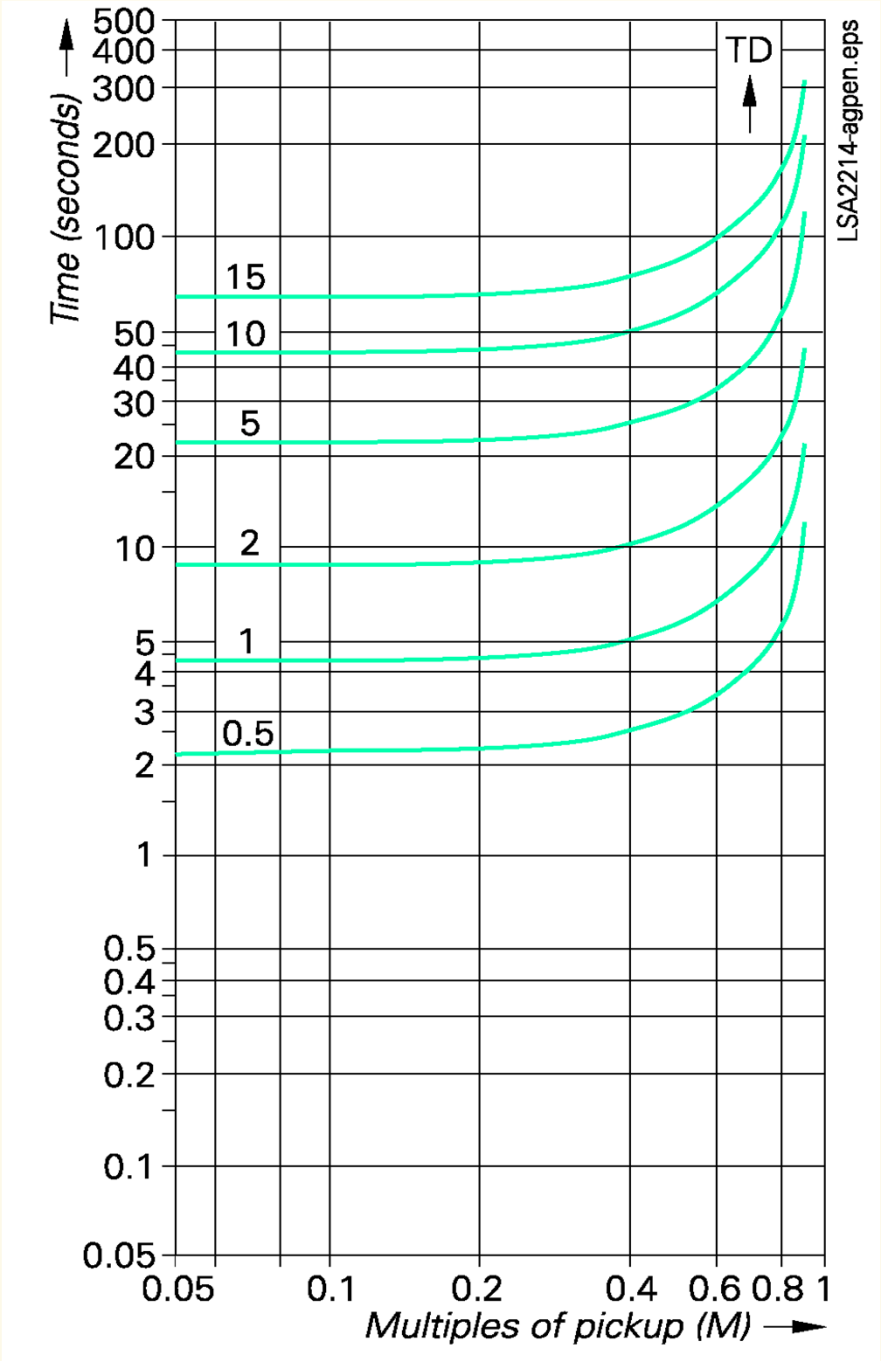
VERY INVERSE

$$t = \left(\frac{3.922}{M^2 - 1} + 0.0982 \right) \cdot TD$$

t = tripping time in seconds

M = current in multiples of pickup setting (I/Ip) range 0.1 to 4

TD = time dial



CURVE

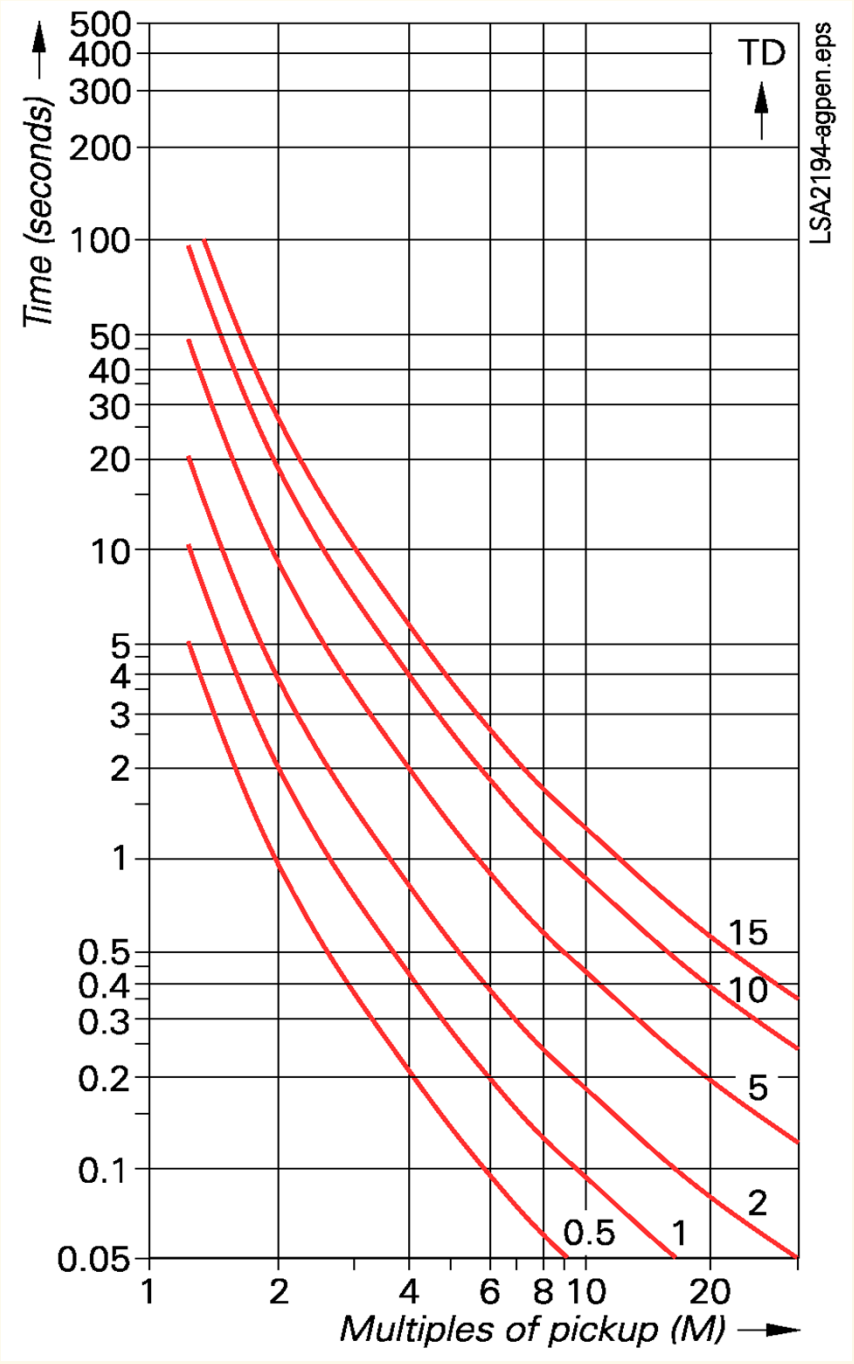
RESET VERY INVERSE

$$t_{reset} = \frac{4.32 \cdot TD}{M^2 - 1}$$

t = tripping time in seconds

M = current in multiples of pickup setting (I/Ip) range 0.1 to 4

TD = time dial



CURVE

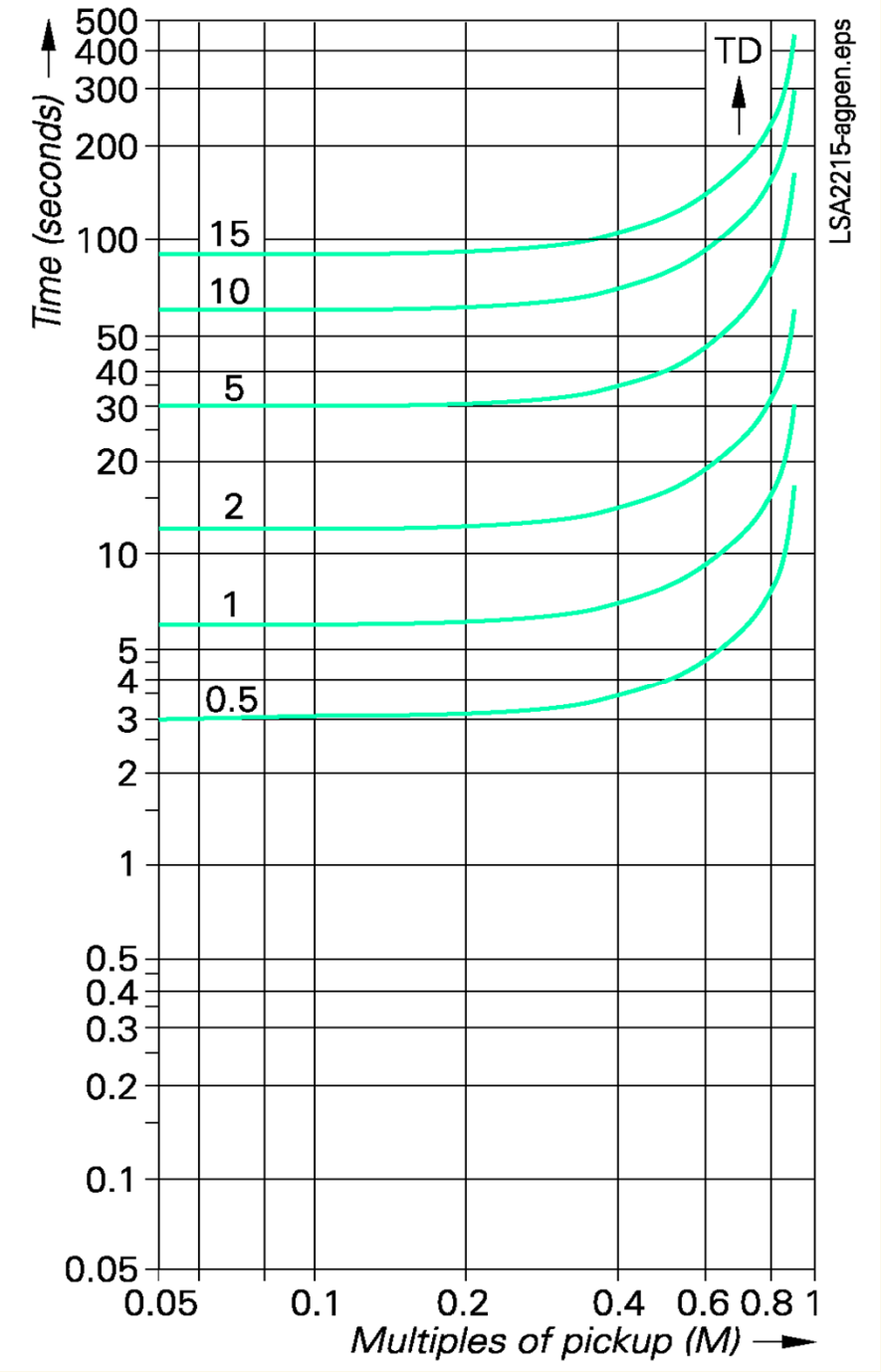
EXTREMELY INVERSE

$$t = \left(\frac{5.64}{M^2 - 1} + 0.0243 \right) \cdot TD$$

t = tripping time in seconds

M = current in multiples of pickup setting (I/Ip) range 0.1 to 4

TD = time dial



CURVE

RESET EXTREMELY INVERSE

$$t_{reset} = \frac{5.82 \cdot TD}{M^2 - 1}$$

t = tripping time in seconds

M = current in multiples of pickup setting (I/Ip) range 0.1 to 4

TD = time dial

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¡Muchas Gracias!

2014 Waldir Astorayme Taipe

wastorayme@hotmail.com