Reinforced discrimination

Additional characteristics
Contents

Compact NSX100 to 250

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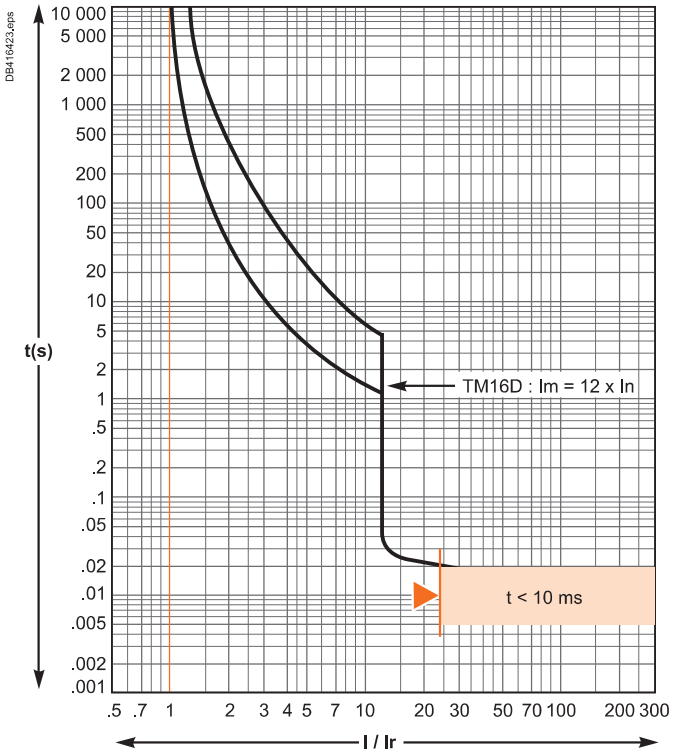
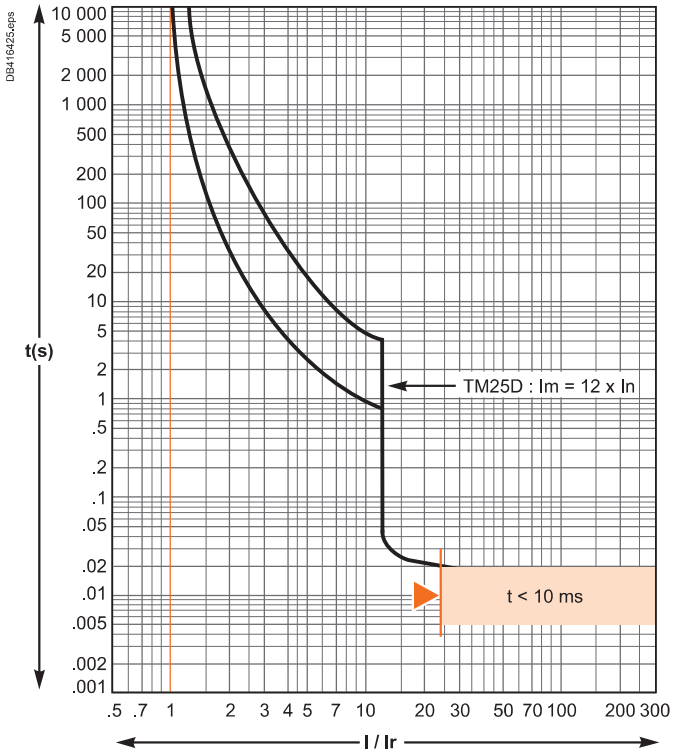
Protection of distribution systems

TM16D

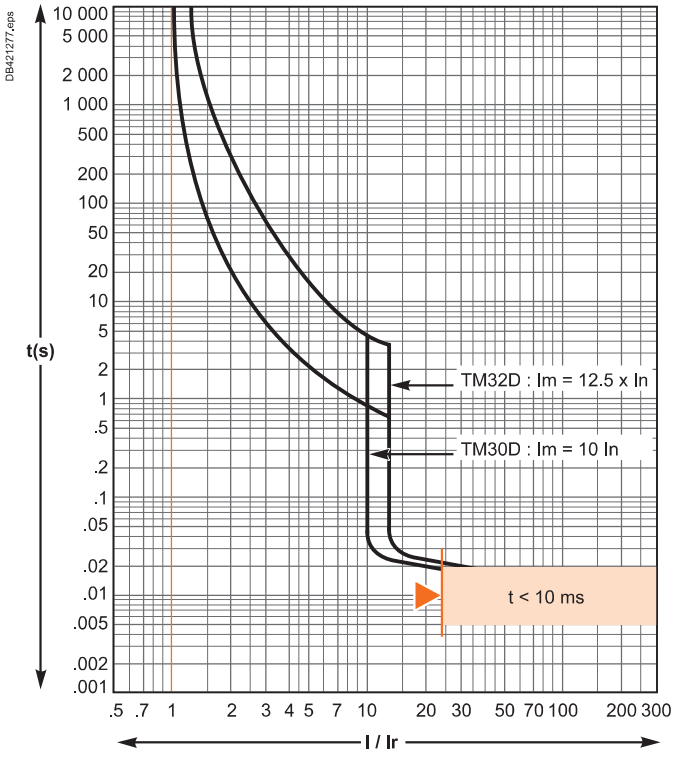


TM25D

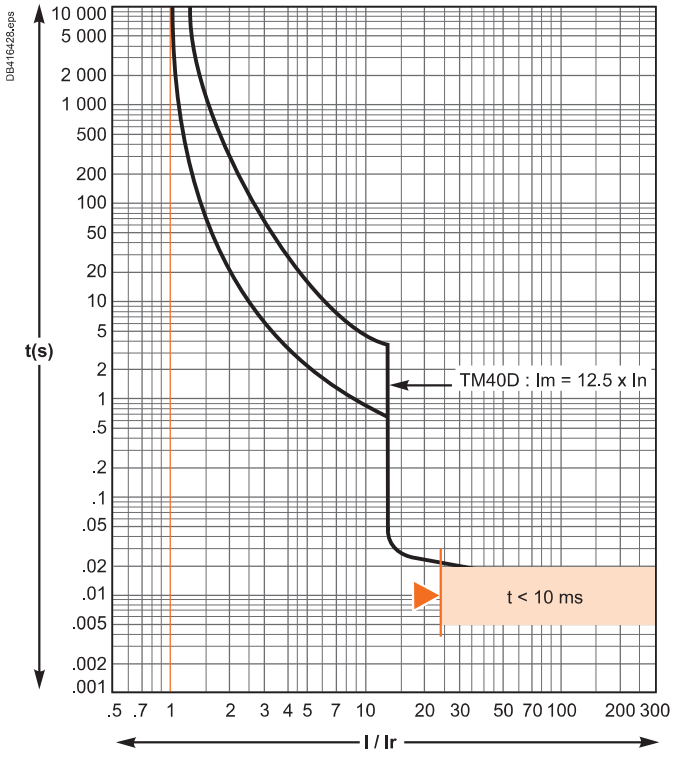


Reflex tripping.

TM30D/TM32D



TM40D



Reflex tripping.

Compact NSX100 to 250

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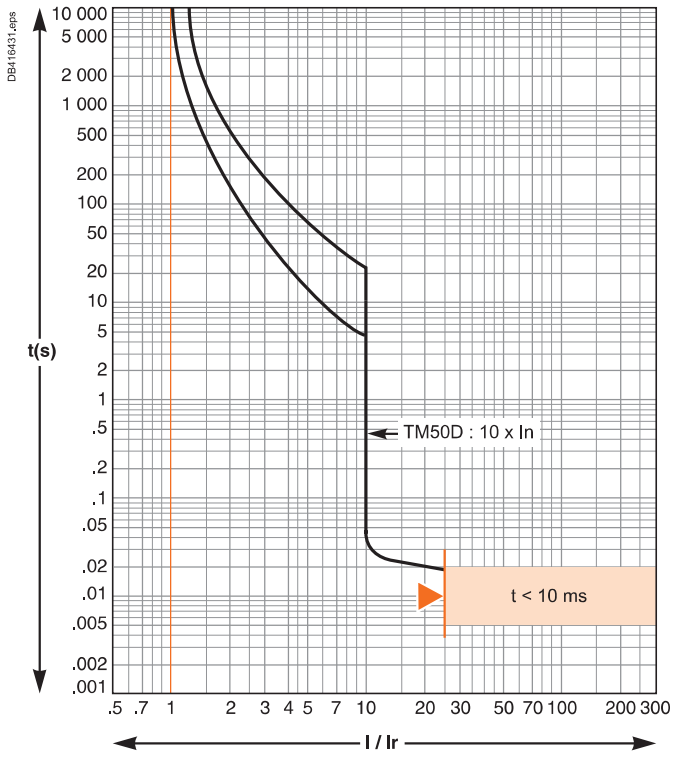
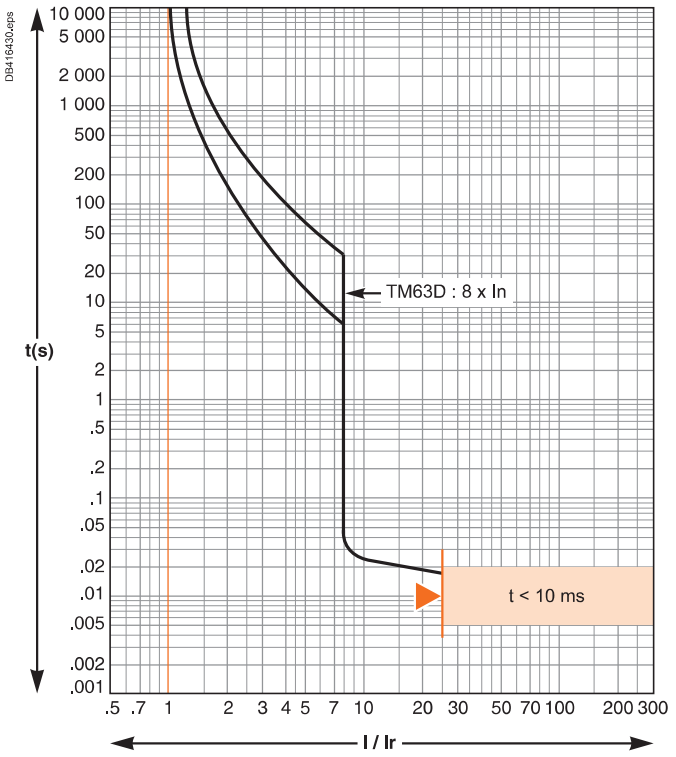
Protection of distribution systems

TM50D

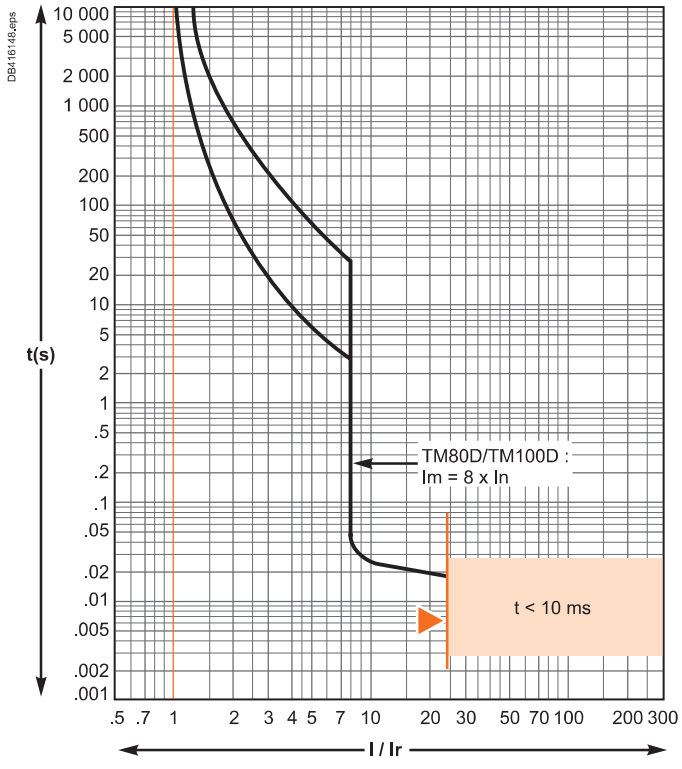


TM63D

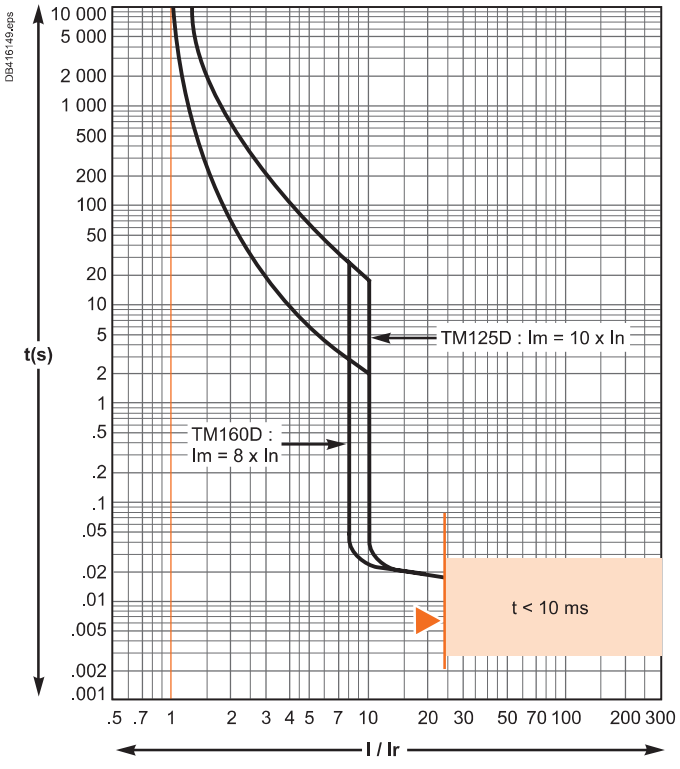


Reflex tripping.

TM80D / TM100D



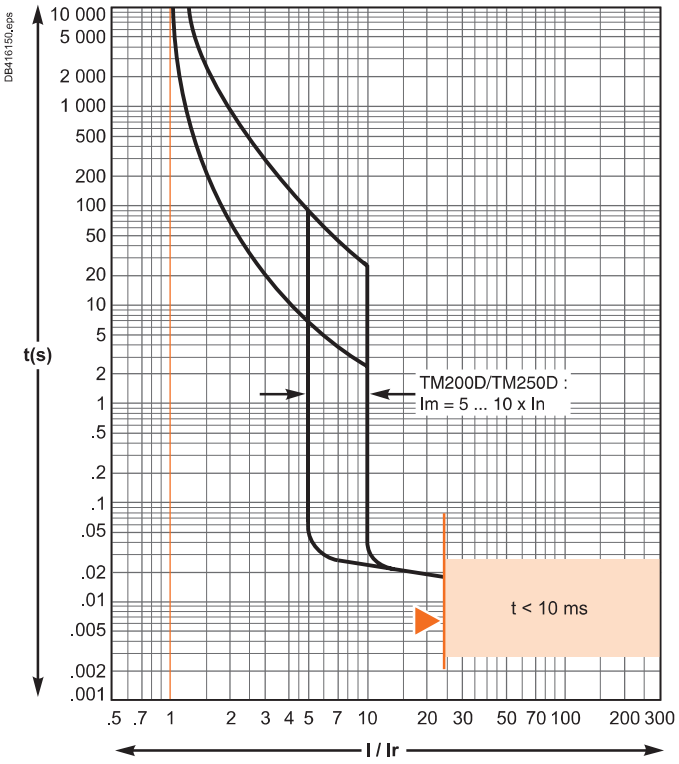
TM125D / TM160D



Reflex tripping.

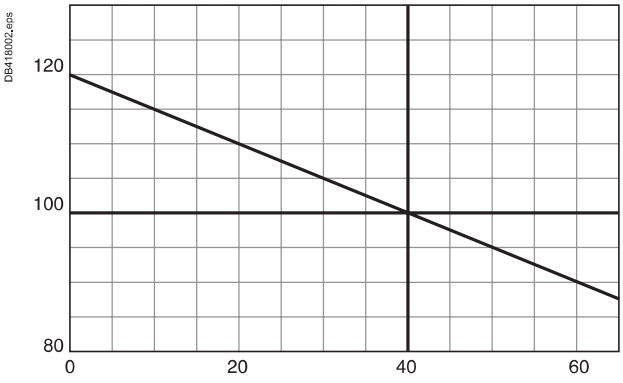
Compact NSX100 to 250
TMD magnetic trip units, tripping curves
Protection of distribution systems

TM200D / TM250D



Reflex tripping.

For all TDM curves :
Values are given for 40 °C ambiant, Ir = 1xIn, 3 poles loaded, cold start.
For Ir = k x In, read the time corresponding to 1/k times given current.
For 1 pole tripping, read the time corresponding to 0.85 times given current.
For hot start (0.9 x Ir), divide max. time by 2, min. time by 4.

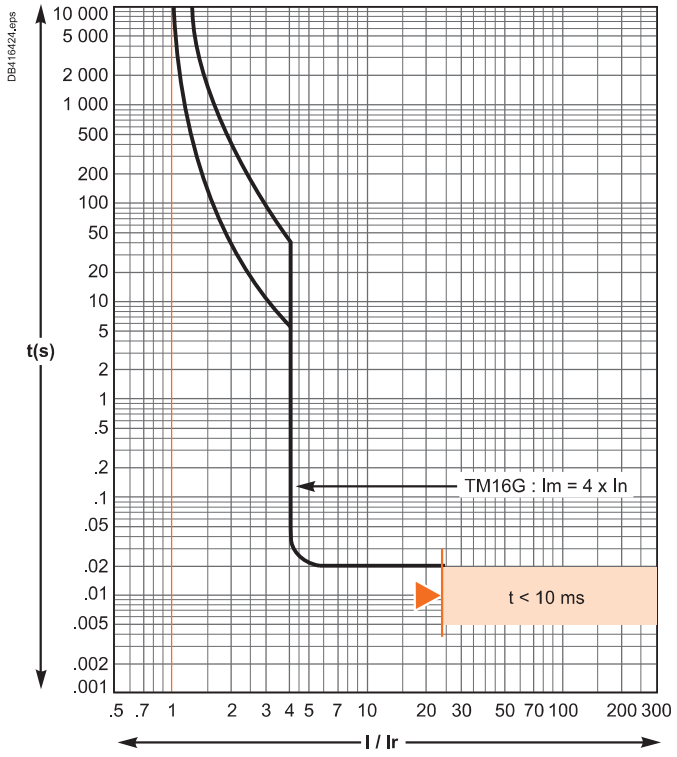


Compact NSX100 to 250

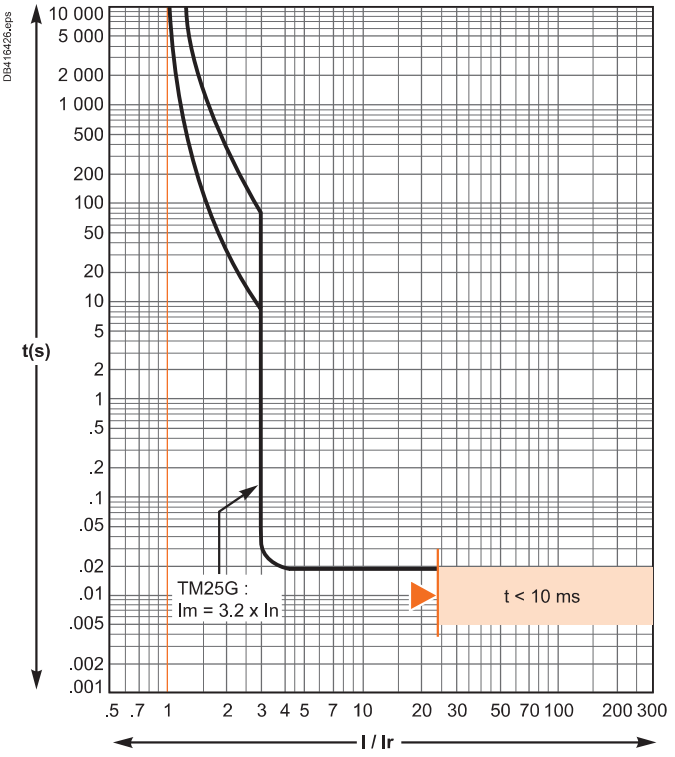
TMG magnetic trip units, tripping curves

Protection of distribution systems

TM16G

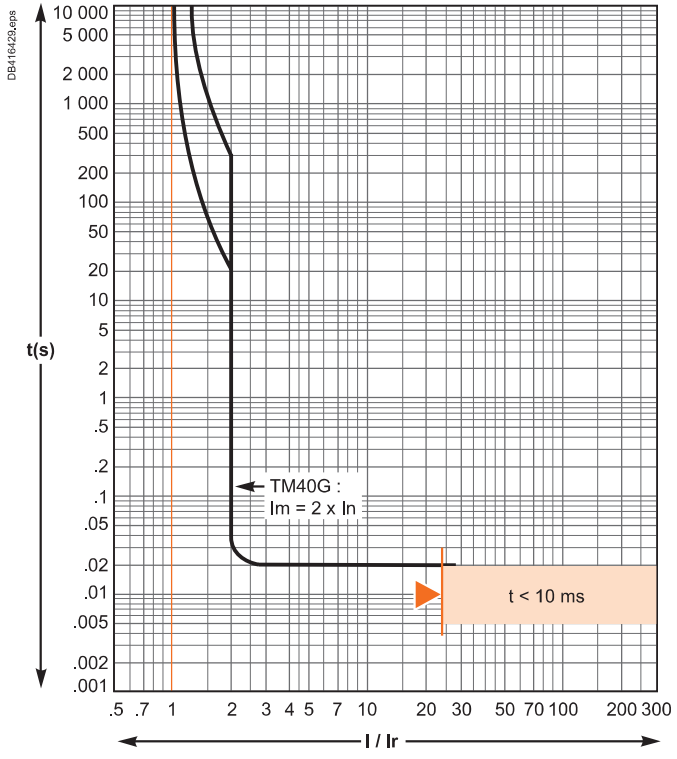


TM25G

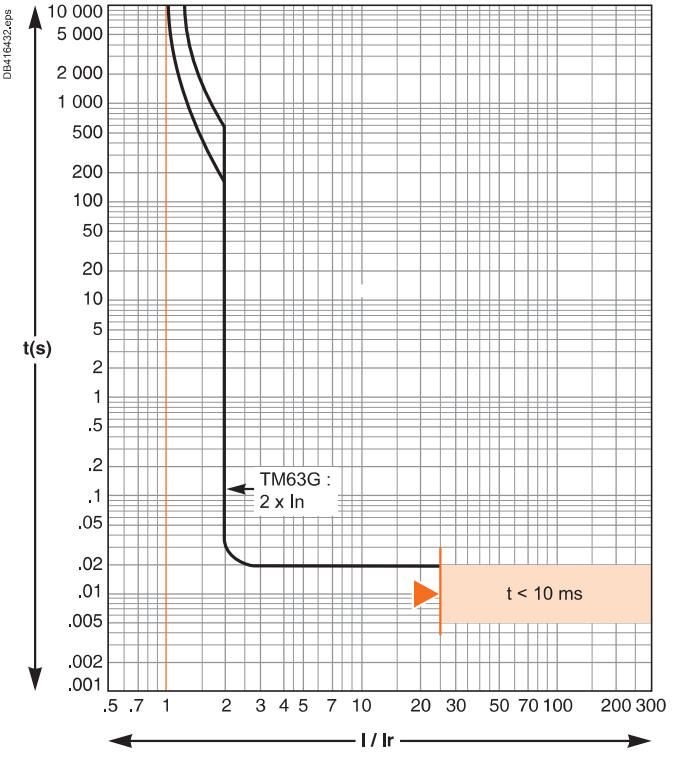


Reflex tripping.

TM40G



TM63G



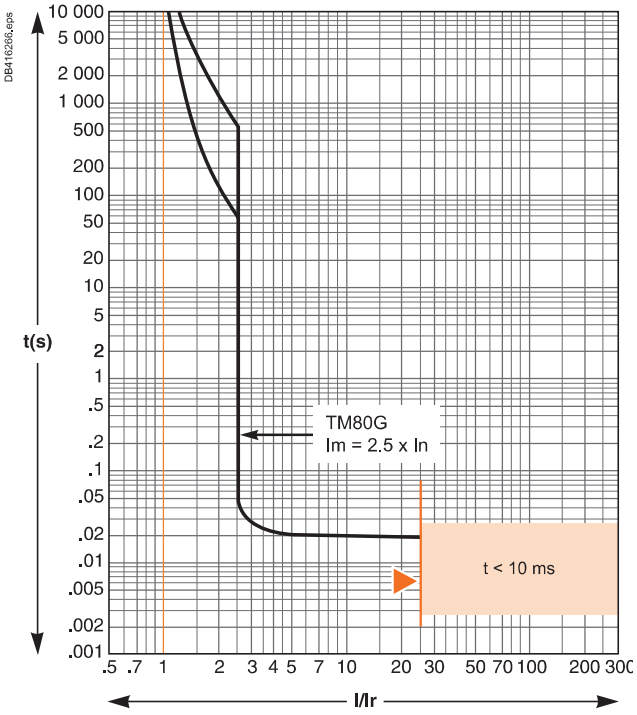
Reflex tripping.

Compact NSX100 to 250

TMG magnetic trip units, tripping curves

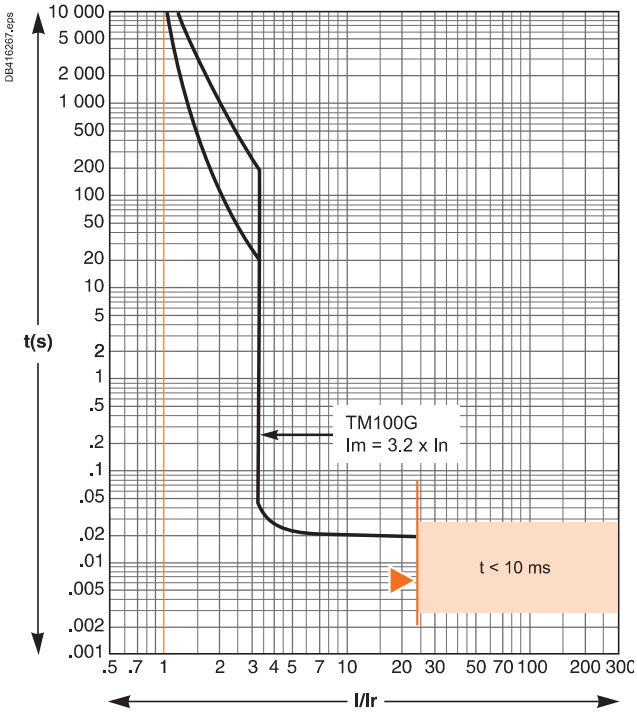
Protection of distribution systems

TM80G

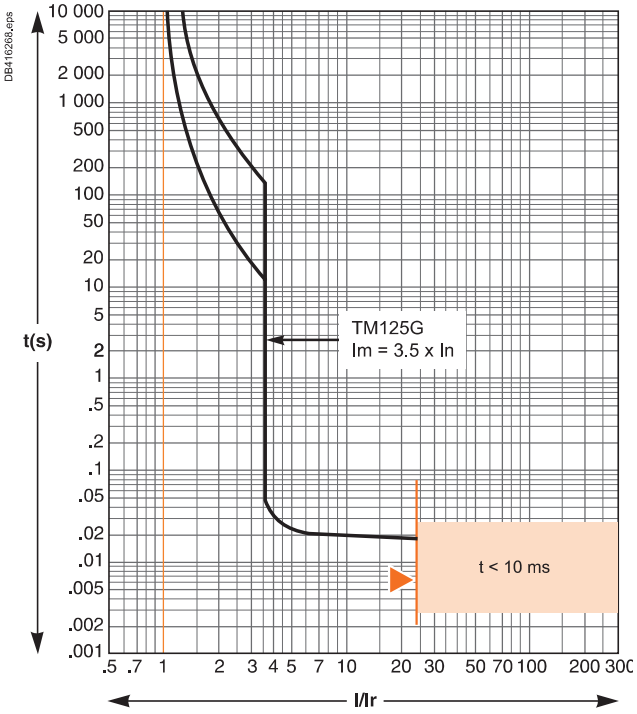


Reflex tripping.

TM100G

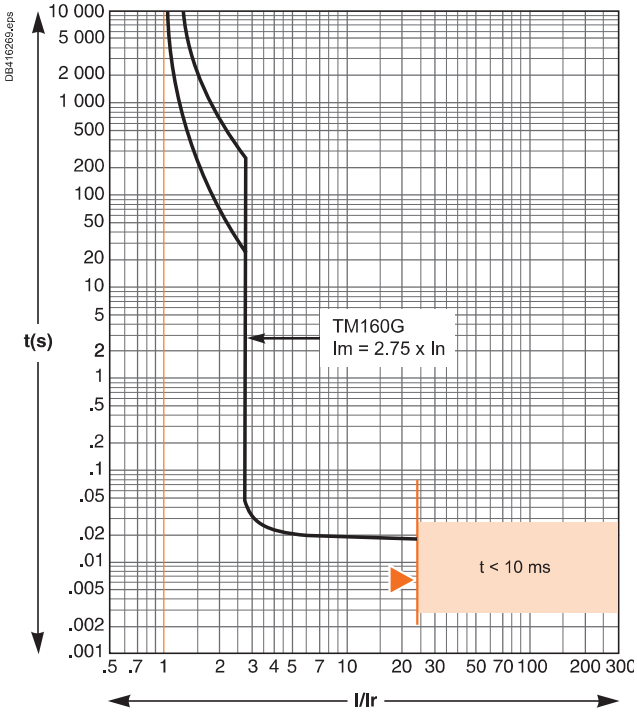


TM125G



Reflex tripping.

TM160G

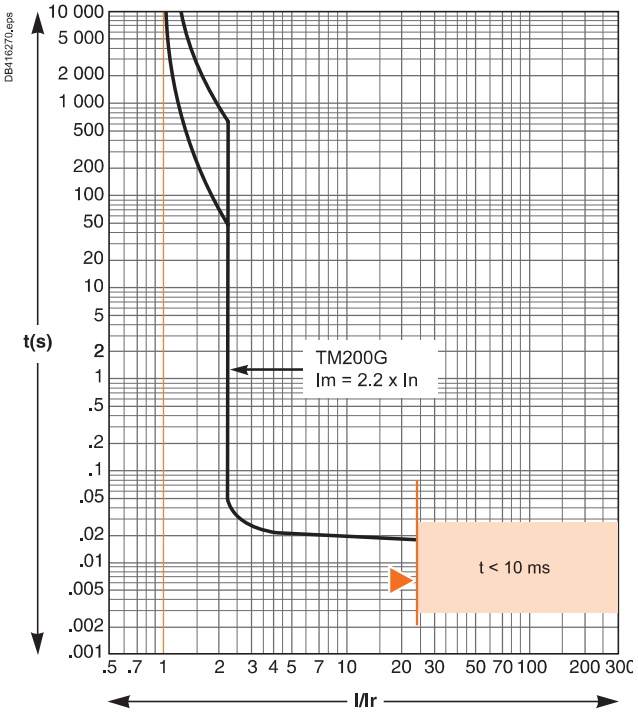


Compact NSX100 to 250

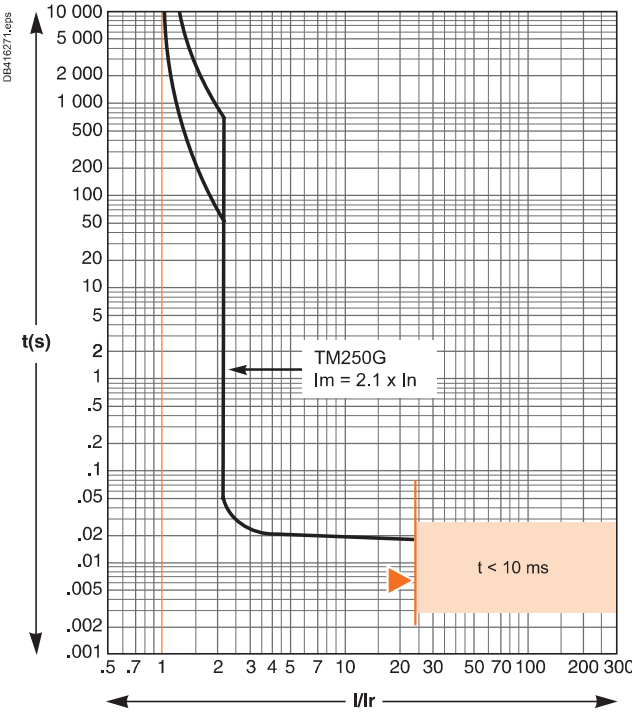
TMG magnetic trip units, tripping curves

Protection of distribution systems

TM200G



TM250G



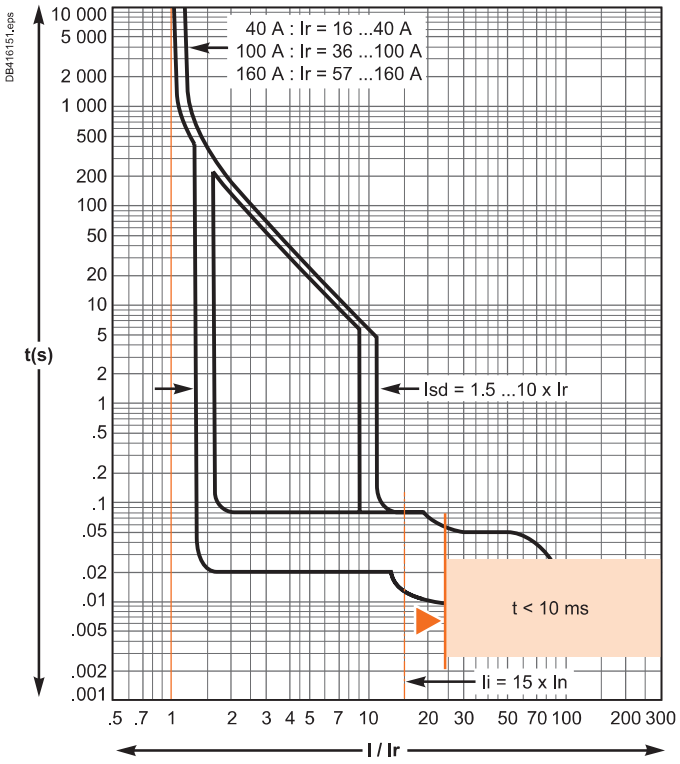
Reflex tripping.

Compact NSX100 to 250

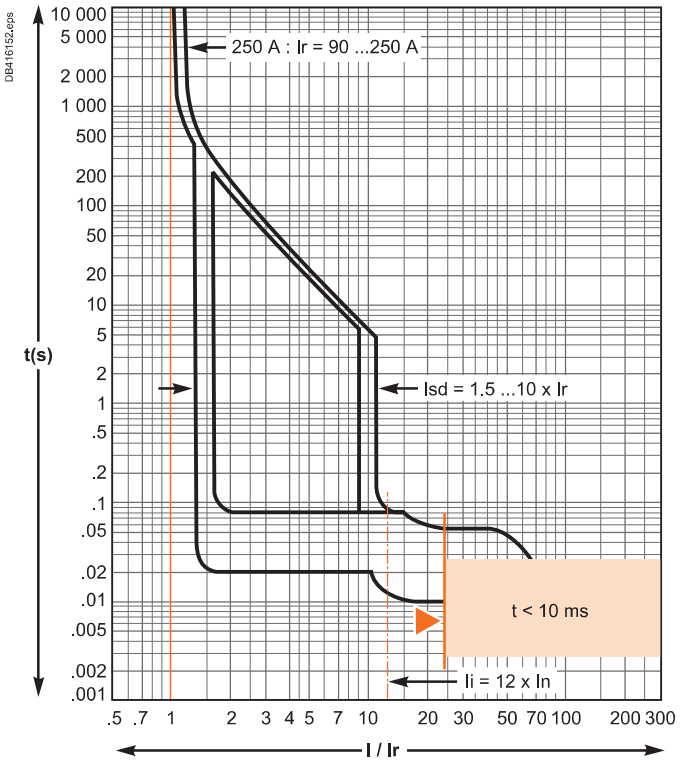
Micrologic 2.2 and 2.2 G electronic trip units, tripping curves

Protection of distribution systems

Micrologic 2.2 - 40... 160 A

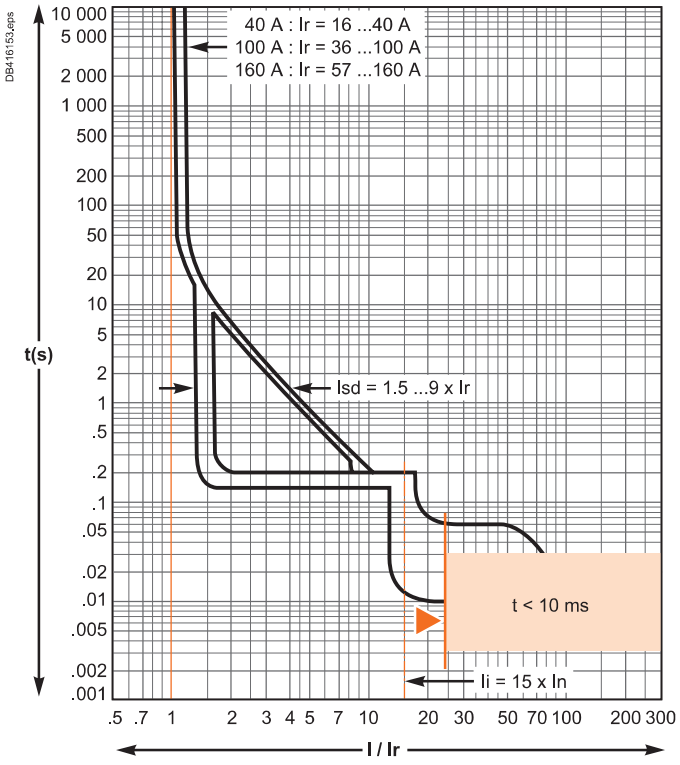


Micrologic 2.2 - 250 A

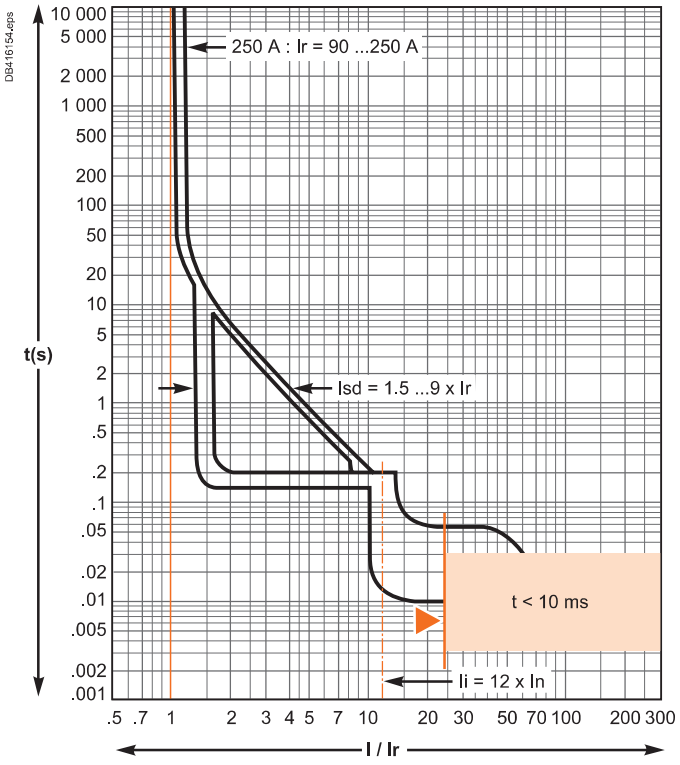


Reflex tripping.

Micrologic 2.2 G - 40... 160 A



Micrologic 2.2 G - 250 A



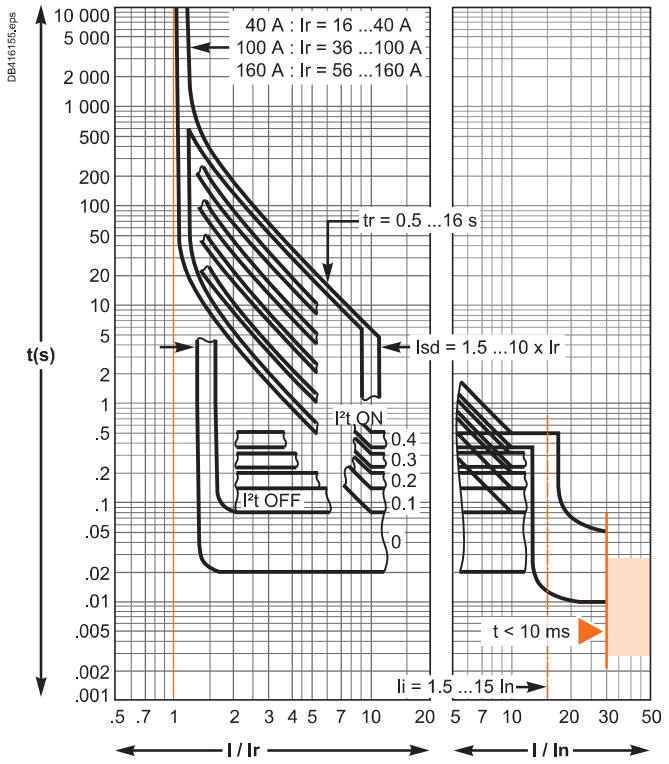
Reflex tripping.

Compact NSX100 to 250

Micrologic 5.2 and 6.2 A or E electronic trip units, tripping curves

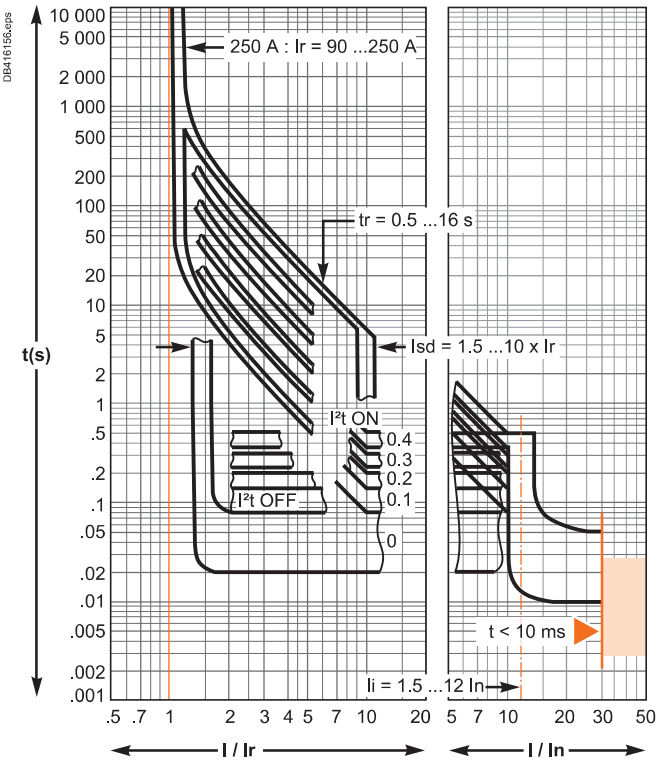
Protection of distribution systems

Micrologic 5.2 and 6.2 A or E - 40... 160 A

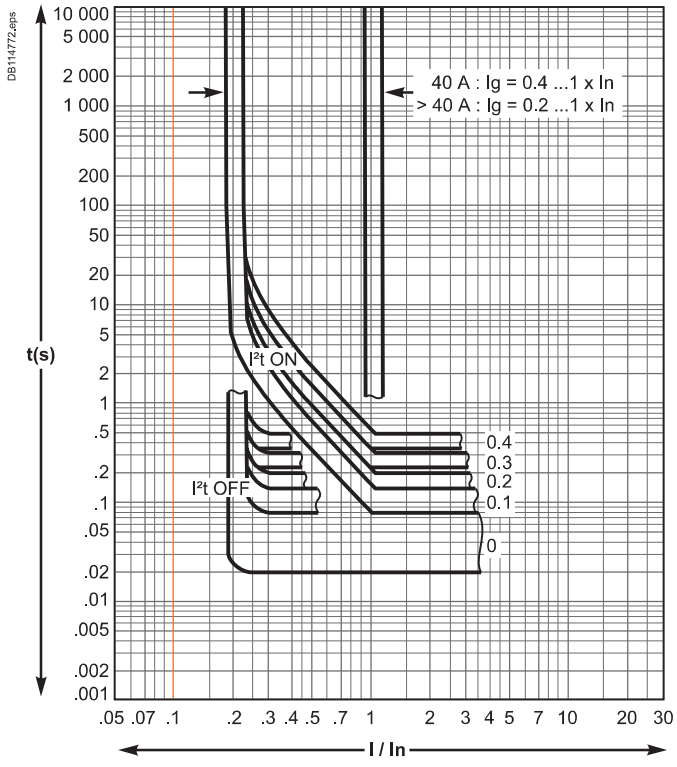


Reflex tripping.

Micrologic 5.2 and 6.2 A or E - 250 A



Micrologic 6.2 A or E (ground-fault protection)

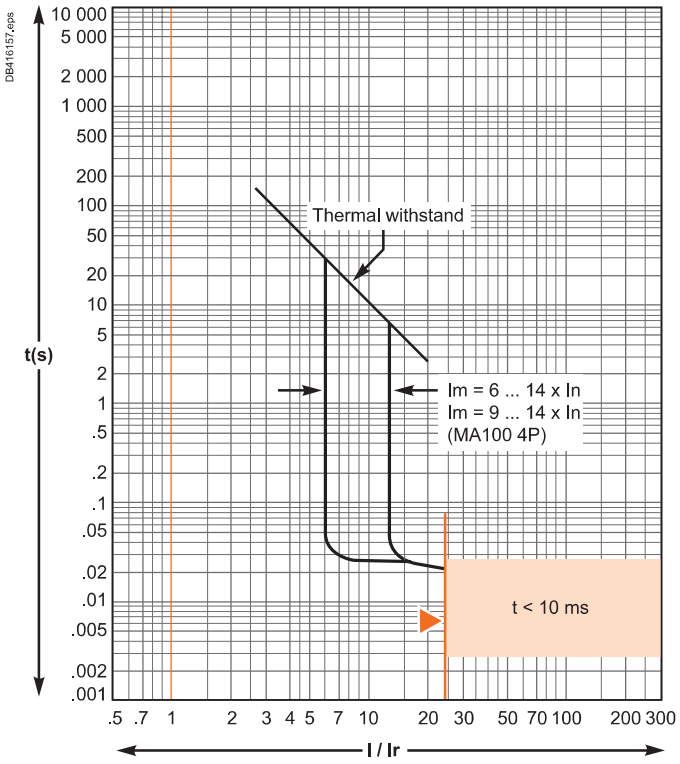


Compact NSX100 to 250

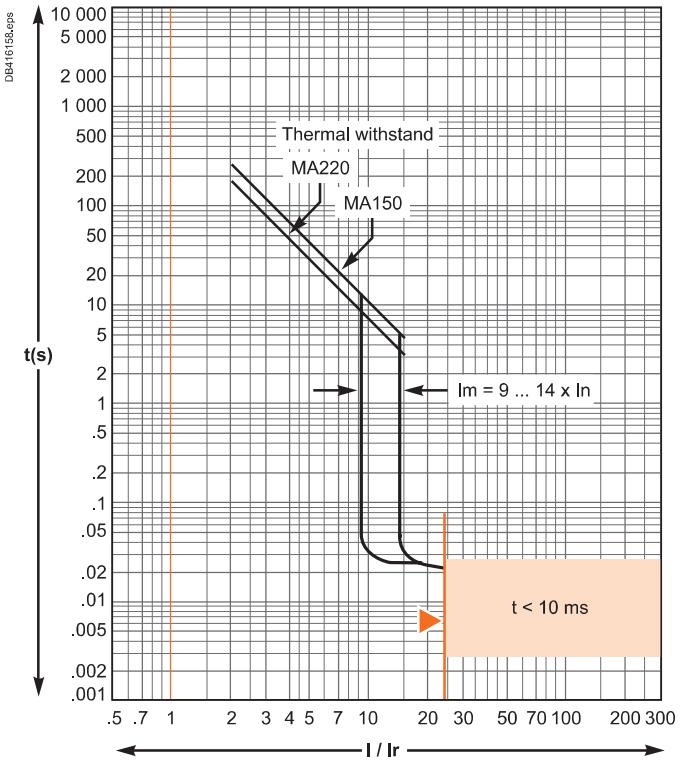
MA magnetic trip units, Micrologic 2.2 M electronic trip units, tripping curves

Motor protection

MA2.5... MA100

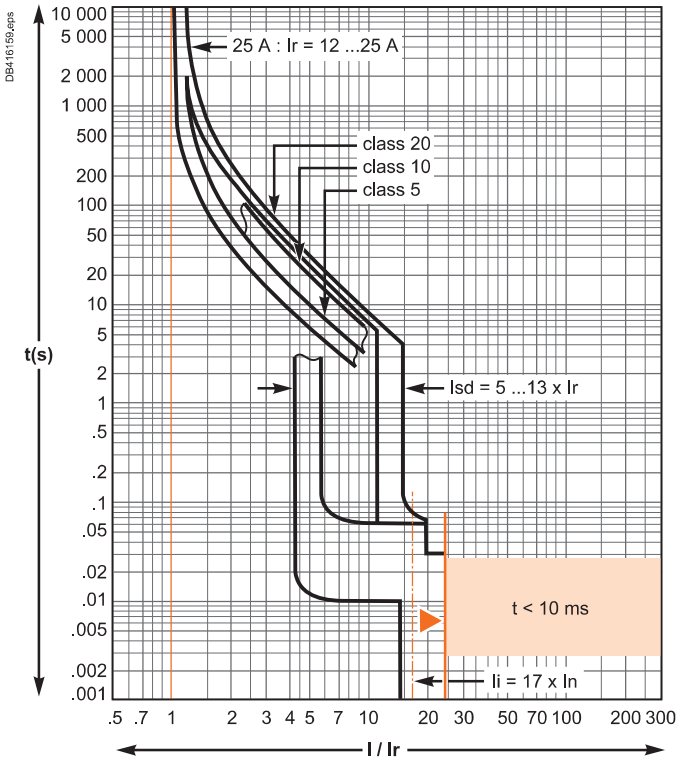


MA150 and MA220

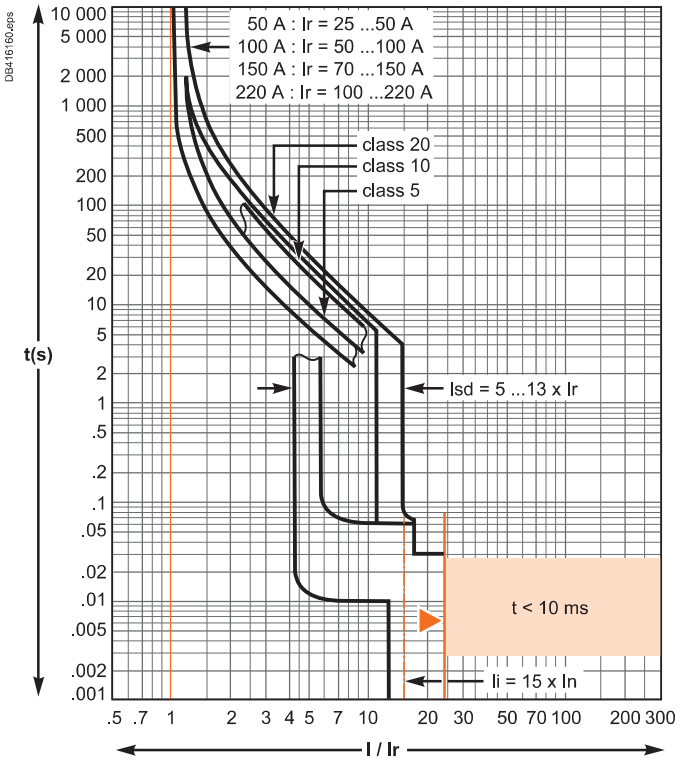


Reflex tripping.

Micrologic 2.2 M - 25 A



Micrologic 2.2 M - 50... 220 A



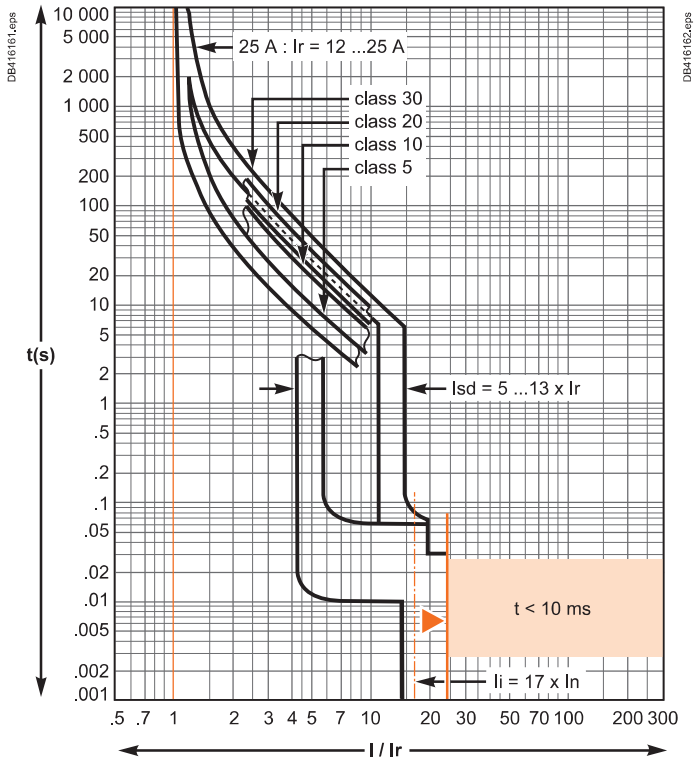
Reflex tripping.

Compact NSX100 to 250

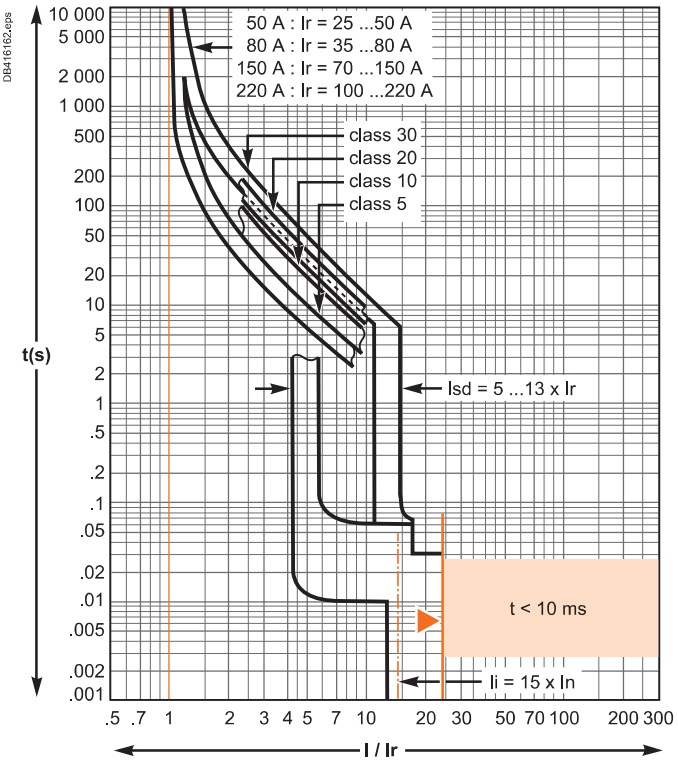
Micrologic 6.2 E-M electronic trip units, tripping curves

Motor protection

Micrologic 6.2 E-M - 25 A

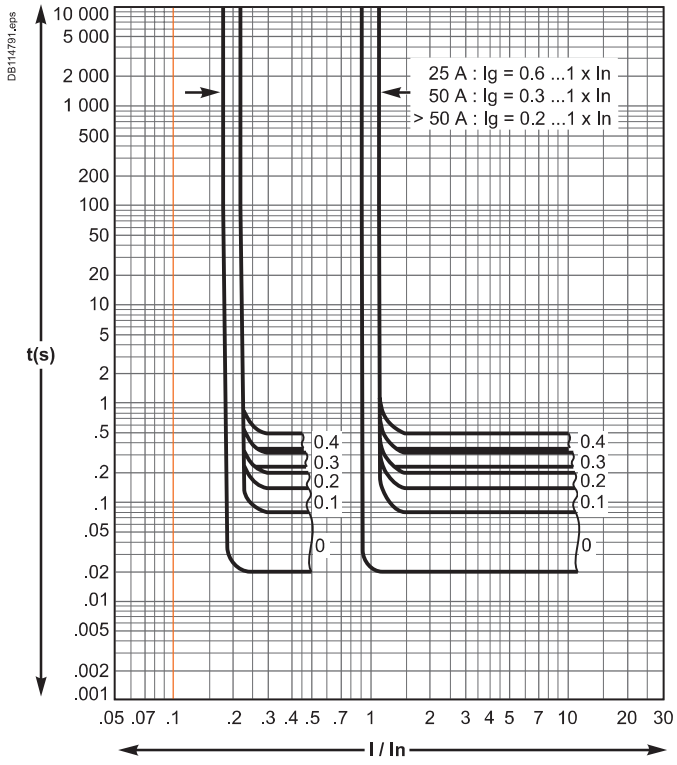


Micrologic 6.2 E-M - 50... 220 A



Reflex tripping.

Micrologic 6.2 E-M (ground-fault protection)

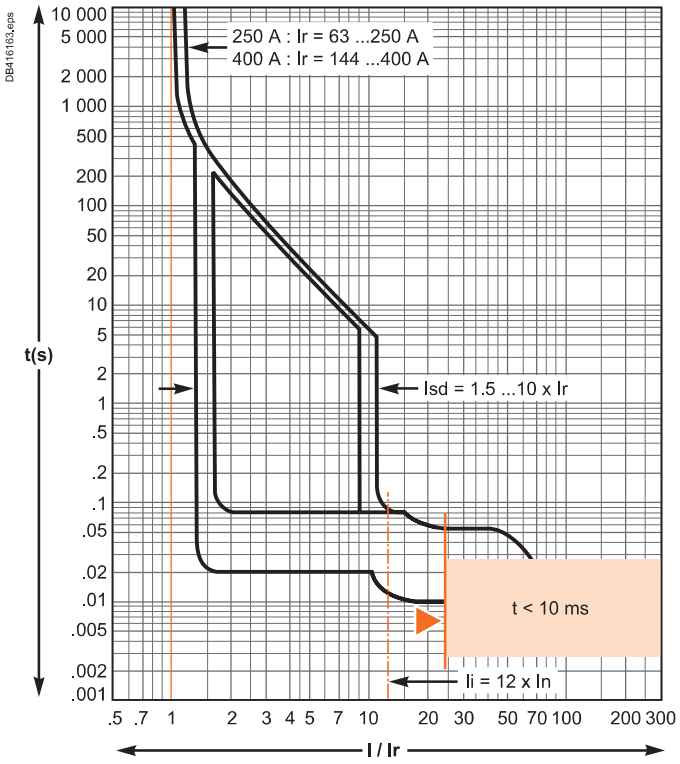


Compact NSX400 to 630

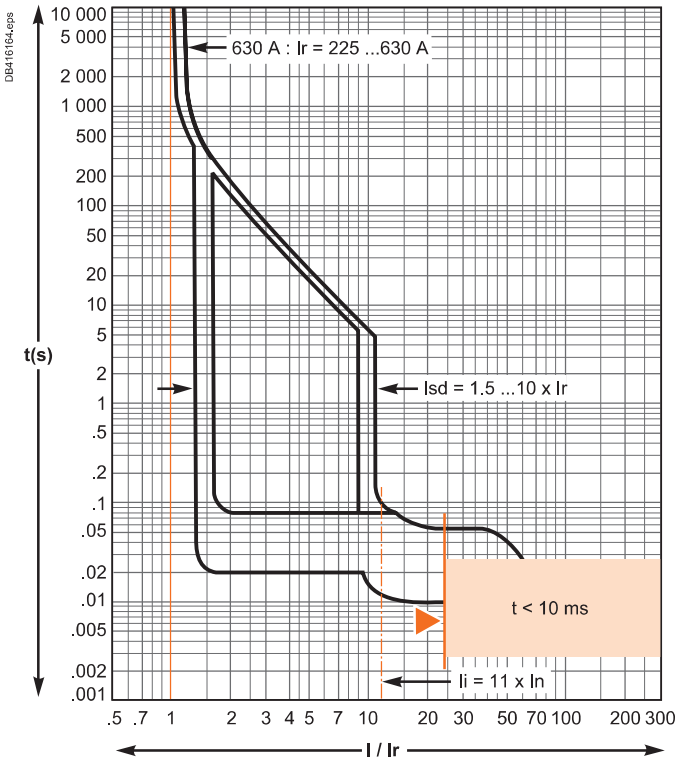
Micrologic 2.3, 5.3 and 6.3 A or E electronic trip units, tripping curves

Protection of distribution systems

Micrologic 2.3 - 250... 400 A

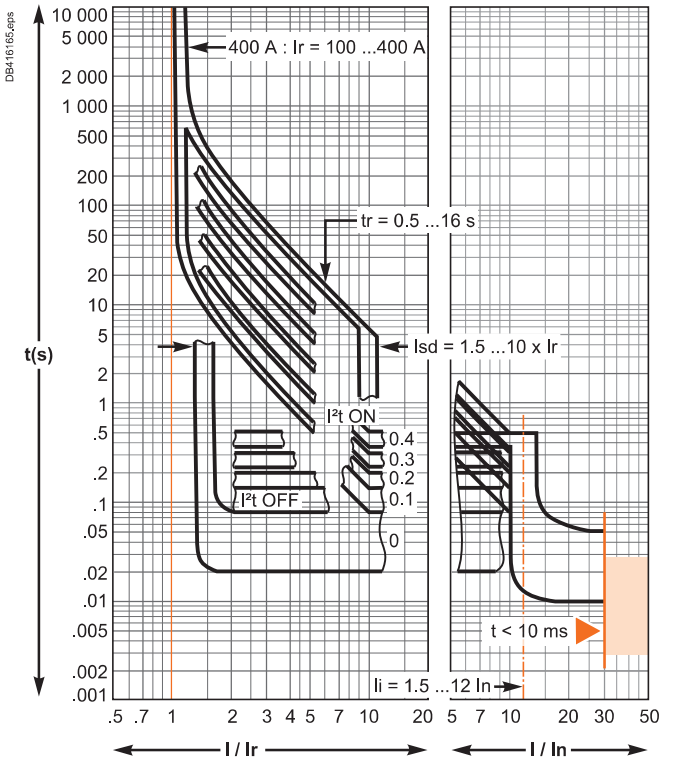


Micrologic 2.3 - 630 A

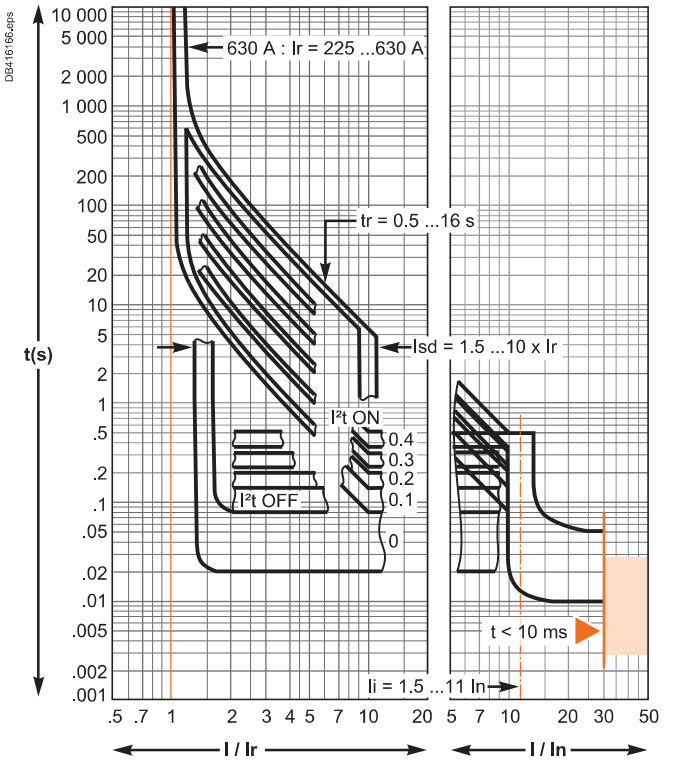


Reflex tripping.

Micrologic 5.3 and 6.3 A or E - 400 A



Micrologic 5.3 and 6.3 A or E - 630 A



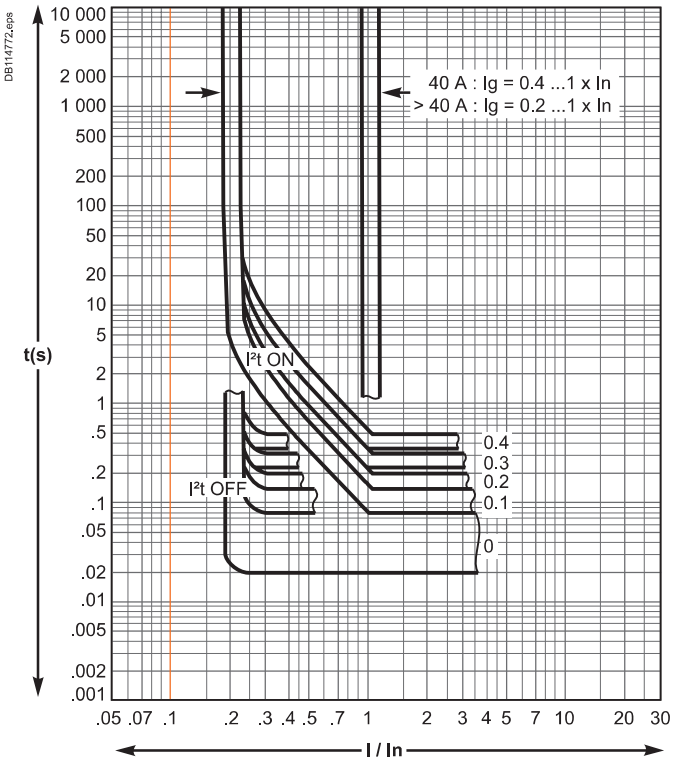
Reflex tripping.

Compact NSX400 to 630

Micrologic 6.3 A or E electronic trip units, tripping curves

Protection of distribution systems

Micrologic 6.3 A or E (ground-fault protection)

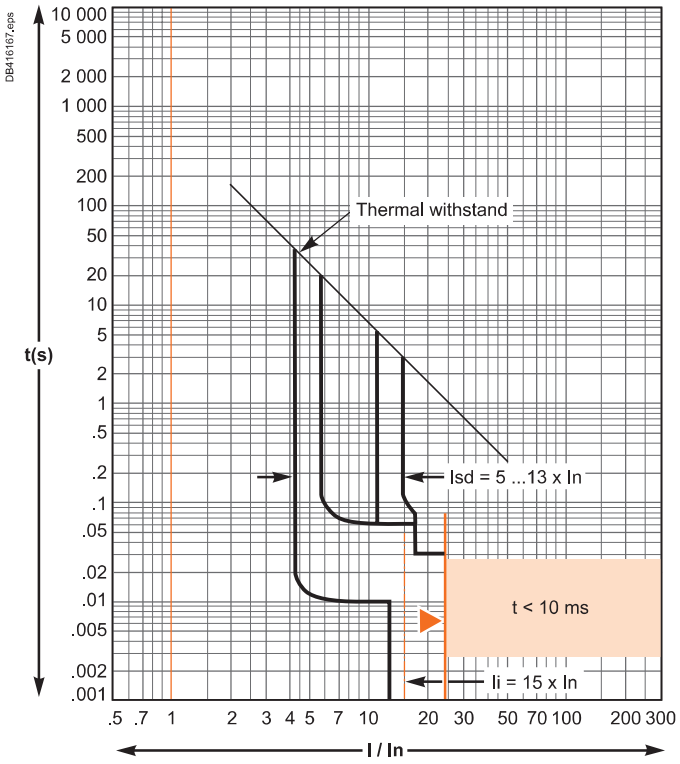


Compact NSX400 to 630

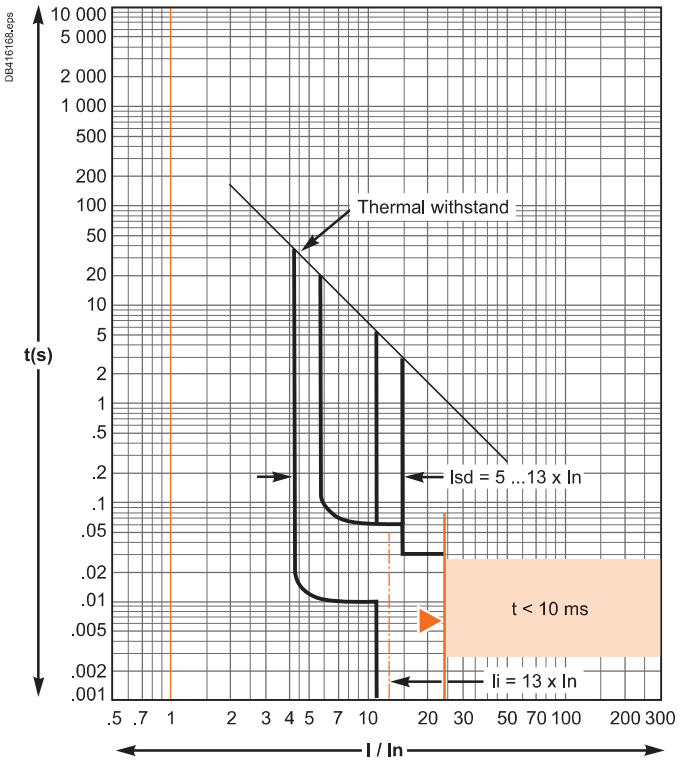
Micrologic 1.3 M and 2.3 M electronic trip units, tripping curves

Motor protection

Micrologic 1.3 M - 320 A

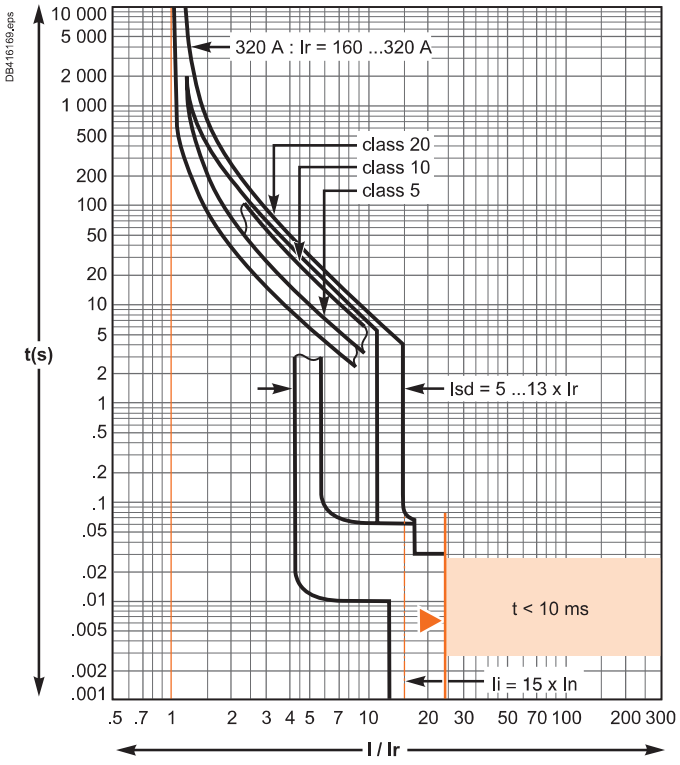


Micrologic 1.3 M - 500 A

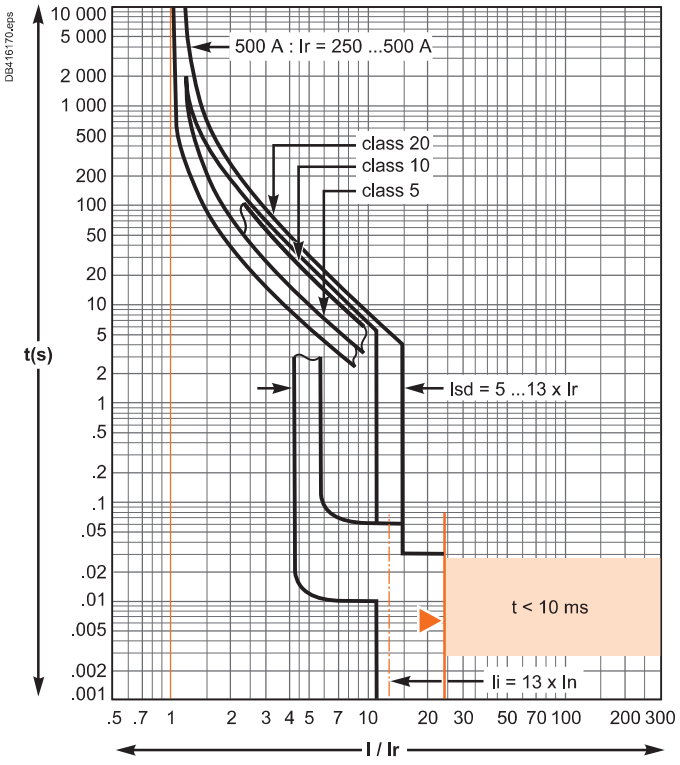


Reflex tripping.

Micrologic 2.3 M - 320 A



Micrologic 2.3 M - 500 A



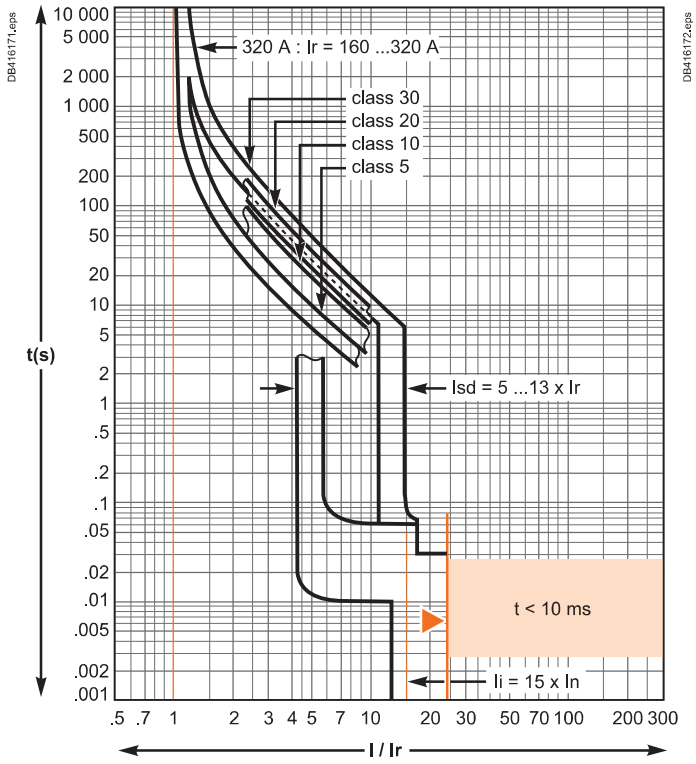
Reflex tripping.

Compact NSX400 to 630

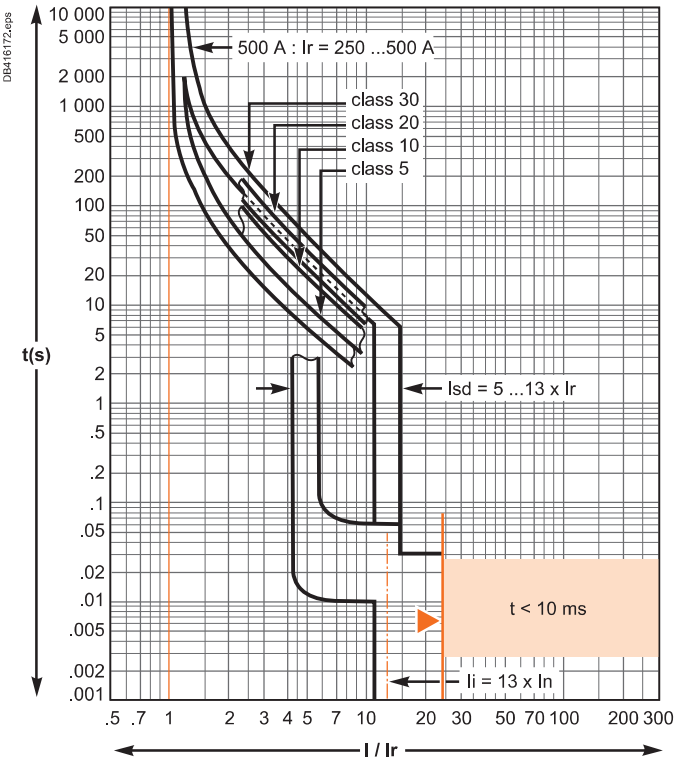
Micrologic 6.3 E-M electronic trip units, tripping curves

Motor protection

Micrologic 6.3 E-M - 320 A

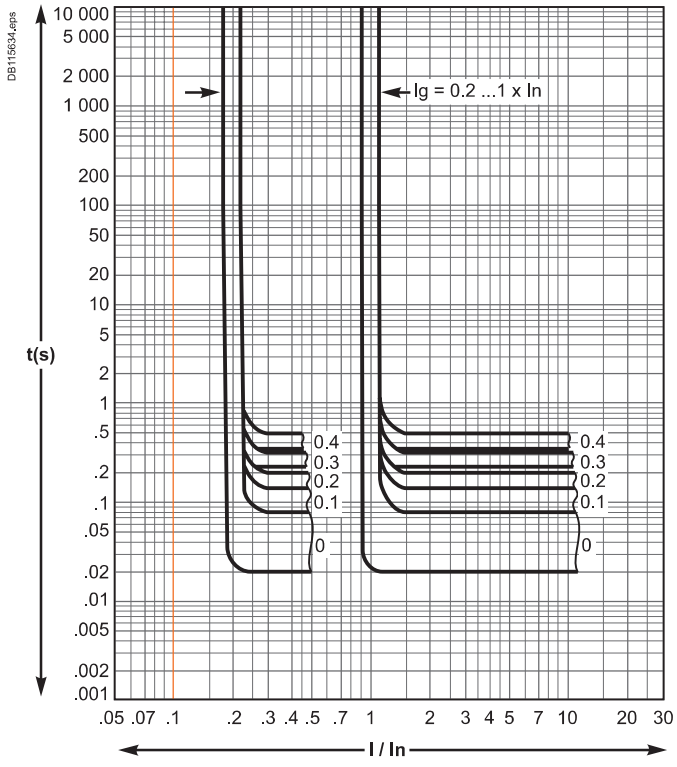


Micrologic 6.3 E-M - 500 A



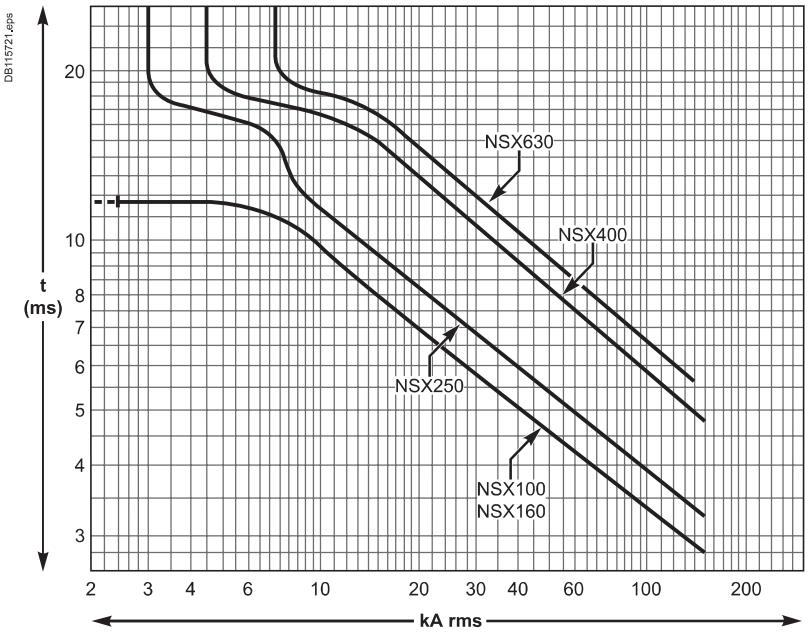
Reflex tripping.

Micrologic 6.3 E-M (ground fault protection)



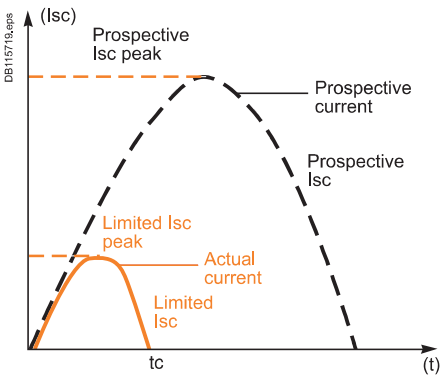
Tripping curves
Compact NSX100 to 630
Reflex tripping

Compact NSX100 to 630 devices incorporate the exclusive reflex-tripping system.
This system breaks very high fault currents.
The device is mechanically tripped via a "piston" actuated directly by the pressure produced in the breaking units by the short-circuit.
For high short-circuits, this system provides a faster break, thereby ensuring discrimination.
Reflex-tripping curves are exclusively a function of the circuit-breaker rating.



Current and energy limiting curves

The limiting capacity of a circuit breaker is its aptitude to let through a current, during a short-circuit, that is less than the prospective short-circuit current.



The exceptional limiting capacity of the Compact NSX range is due to the rotating double-break technique (very rapid natural repulsion of contacts and the appearance of two arc voltages in-series with a very steep wave front).

Ics = 100 % Icu

The exceptional limiting capacity of the Compact NSX range greatly reduces the forces created by fault currents in devices.
The result is a major increase in breaking performance.
In particular, the service breaking capacity Ics is equal to 100 % of Icu.
The Ics value, defined by IEC standard 60947-2, is guaranteed by tests comprising the following steps:

- ■ break three times consecutively a fault current equal to 100 % of Icu
- ■ check that the device continues to function normally, that is:
- □ it conducts the rated current without abnormal temperature rise
- □ protection functions perform within the limits specified by the standard
- □ suitability for isolation is not impaired.

Longer service life of electrical installations

Current-limiting circuit breakers greatly reduce the negative effects of short-circuits on installations.

Thermal effects
Less temperature rise in conductors, therefore longer service life for cables.

Mechanical effects
Reduced electrodynamic forces, therefore less risk of electrical contacts or busbars being deformed or broken.

Electromagnetic effects
Fewer disturbances for measuring devices located near electrical circuits.

Economy by means of cascading

Cascading is a technique directly derived from current limiting. Circuit breakers with breaking capacities less than the prospective short-circuit current may be installed downstream of a limiting circuit breaker. The breaking capacity is reinforced by the limiting capacity of the upstream device. It follows that substantial savings can be made on downstream equipment and enclosures.

Current and energy limiting curves

The limiting capacity of a circuit breaker is expressed by two curves which are a function of the prospective short-circuit current (the current which would flow if no protection devices were installed):

- ■ the actual peak current (limited current)
- ■ thermal stress (A^2s), i.e. the energy dissipated by the short-circuit in a conductor with a resistance of 1 Ω.

Example
What is the real value of a 150 kA rms prospective short-circuit (i.e. 330 kA peak) limited by an NSX250L upstream ?
The answer is 30 kA peak (curve page E-18).

Maximum permissible cable stresses

The table below indicates the maximum permissible thermal stresses for cables depending on their insulation, conductor (Cu or Al) and their cross-sectional area (CSA). CSA values are given in mm^2 and thermal stresses in A^2s.

CSA		1.5 mm²	2.5 mm²	4 mm²	6 mm²	10 mm²
PVC	Cu	$2.97x10^4$	$8.26x10^4$	$2.12x10^5$	$4.76x10^5$	$1.32x10^6$
	Al					$5.41x10^5$
PRC	Cu	$4.10x10^4$	$1.39x10^5$	$2.92x10^5$	$6.56x10^5$	$1.82x10^6$
	Al					$7.52x10^5$
CSA		**16 mm²**	**25 mm²**	**35 mm²**	**50 mm²**	
PVC	Cu	$3.4x10^6$	$8.26x10^6$	$1.62x10^7$	$3.31x10^7$	
	Al	$1.39x10^6$	$3.38x10^6$	$6.64x10^6$	$1.35x10^7$	
PRC	Cu	$4.69x10^6$	$1.39x10^7$	$2.23x10^7$	$4.56x10^7$	
	Al	$1.93x10^6$	$4.70x10^6$	$9.23x10^6$	$1.88x10^7$	

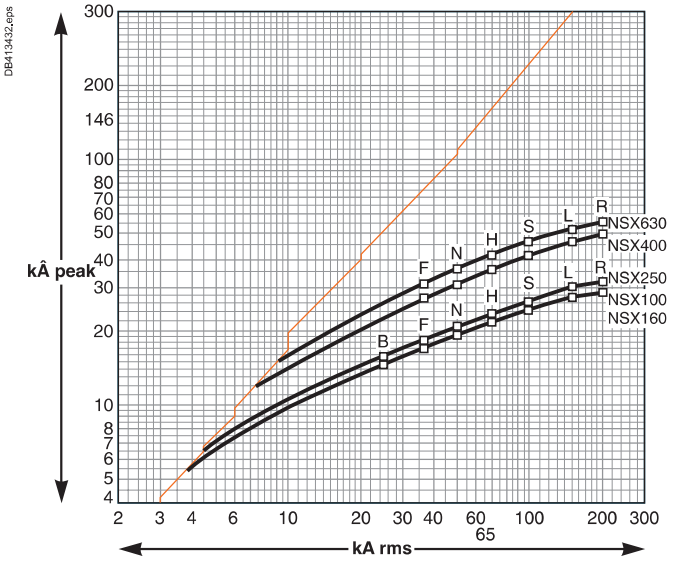
Example
Is a Cu/PVC cable with a CSA of 10 mm^2 adequately protected by an NSX160F?
The table above indicates that the permissible stress is $1.32x10^6$ A^2s.
All short-circuit currents at the point where an NSX160F (Icu = 35 kA) is installed are limited with a thermal stress less than $6x10^5$ A^2s (curve page E-18).
Cable protection is therefore ensured up to the limit of the breaking capacity of the circuit breaker.

Current and energy limiting curves

Current-limiting curves

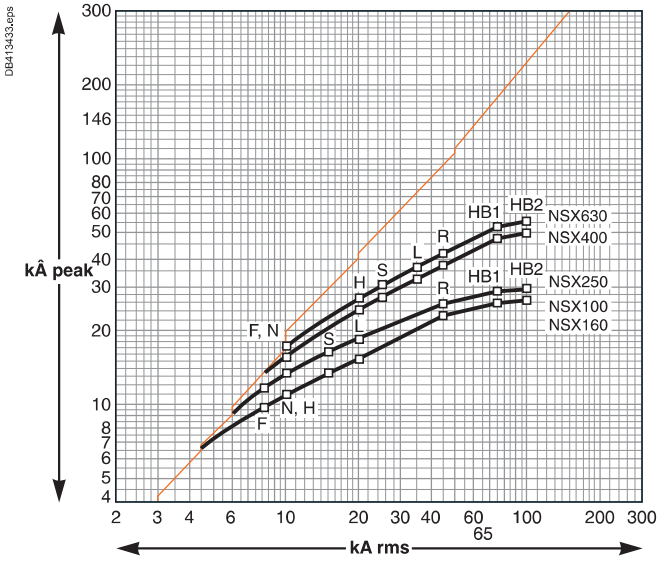
Voltage 400/440 V AC

Limited short-circuit current (kÂ peak)



Voltage 660/690 V AC

Limited short-circuit current (kÂ peak)

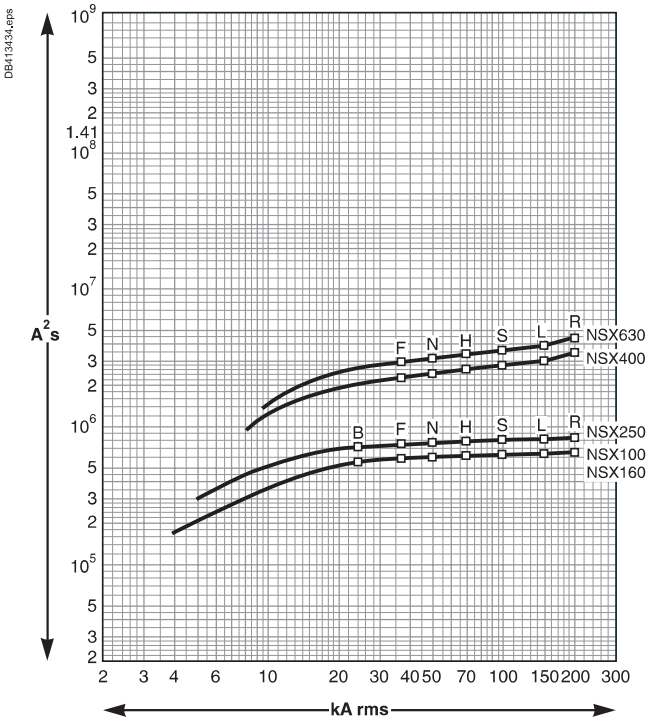


Current and energy limiting curves

Energy-limiting curves

Voltage 400/440 V AC

Limited energy



Voltage 660/690 V AC

Limited energy