Characteristics and performance
ComPact NSXm circuit breakers from 16 to 160 A up to 690 V

ComPact NSXm.

Common characteristics				
Rated voltages	Insulation voltage (V)	Ui		800
	Insulation voltage for ELCB [1] (V)	Ui		500
	Impulse withstand voltage (kV)	Uimp		8
	Operational voltage (V)	Ue	AC 50/60 Hz	690
	Operational voltage for ELCB [1] (V)	Ue	AC 50/60 Hz	440
Suitability for isolation		IEC/EN 60947-2		yes
Utilisation category				A
Pollution degree		IEC 60664-1		3

Common characteristics			
Control	Manual	With toggle	◉
		With direct or extended rotary handle	◉
		With side rotary handle	◉
Versions	Fixed		◉

Circuit breakers				NSXm up to 63 A					NSXm from 80 to 160 A and ELCB [1]				
Breaking capacity levels				E	B	F	N	H	E	B	F	N	H
Breaking capacity (kA rms)													
	Icu	AC 50/60 Hz	220...240 V	25	50	85	90	100	25	50	85	90	100
			380...415 V	16	25	36	50	70	16	25	36	50	70
			440 V	10	20	35	50	65	10	20	35	50	65
			500 V	8	10	15	25	30	-	-	-	-	-
			525 V	-	-	10	15	22	-	-	-	-	-
			660...690 V	-	-	-	10	10	-	-	-	-	-
Service breaking capacity (kA rms)													
	Ics	AC 50/60 Hz	220...240 V	25	50	85	90	100	25	50	85	90	100
			380...415 V	16	25	36	50	70	16	25	36	50	70
			440 V	10	20	30	50	65	10	20	30	50	65
			500 V	8	10	10	25	30	-	-	-	-	-
			525 V	-	-	10	15	22	-	-	-	-	-
			660...690 V	-	-	-	2.5	2.5	-	-	-	-	-
Durability (C-O cycles)		Mechanical		20000									
		Electrical	440 V In/2	20000									
			440 V In	10000									
			690 V In/2	10000									
			690 V In	5000									
Protection and measurements													
Overload / short-circuit protection	Thermal magnetic			◉					◉				
	Electronic with Earth Leakage Protection (ELCB)								◉				
Options	Device status/control			◉									
	For ELCB [1]: alarming and fault differenciation			◉									
Installation / connections													
Dimensions and weights													
Dimensions (mm) W x H x D			3P	81 x 137 x 80									
			4P	108 x 137 x 80									
			ELCB [1]	108 x 144 x 80									
Weight (kg)			3P	1.06									
			4P	1.42									
			ELCB [1]	1.63									
Connections													
Pitch (mm)			Standard	27									
			With spreaders	35									
EverLink lug Cu or Al [2] cables	Cross-section (mm²)		Rigid	95									
			Flexible	70									
Crimp lugs Cu or Al	Cross-section (mm²)		Rigid	120									
			Flexible	95									
Source changeover system													
Manual mechanical interlocking				◉					◉				

[1] ELCB: Earth Leakage Circuit Breaker (MicroLogic Vigi 4.1).
[2] Al up to 100 A.

www.se.com
Select your circuit breakers and switch-disconnectors
Characteristics and performance
ComPact NSXm circuit breakers from 16 to 160 A up to 690 V
A

Characteristics and performance
ComPact NSX circuit breakers from 100 to 250 A up to 690 V

PB105112.eps

ComPact NSX100/160/250.

PB110406_40.eps

ComPact NSX250 R.

PB110420.eps

ComPact NSX250 HB2.

[1] OSN: Over Sized Neutral protection for neutrals carrying high currents (e.g. 3rd harmonics).
[2] ZSI: Zone Selective Interlocking using pilot wires.
[3] Vigi add-on is not available for breaking capacity levels HB1/HB2.
[4] There is no 160 A frame, use 250 A frame with lower rating trip units for R, HB1, HB2.
[5] 2P circuit breaker in 3P case for B and F types, only with thermal-magnetic trip unit.
[6] Earth Leakage Circuit Breaker (MicroLogic Vigi 4.2 and 7.2 E).

www.se.com
Select your circuit breakers and switch-disconnectors
Characteristics and performance
ComPact NSX circuit breakers from 100 to 250 A up to 690 V

A

Common characteristics

Rated voltages	Insulation voltage (V)	Ui		800
	Insulation voltage for ELCB [6]	Ui		500
	Impulse withstand voltage (kV)	Uimp		8
	Operational voltage (V)	Ue	AC 50/60 Hz	690
	Operation voltage for ELCB [6]	Ue	AC 50/60 Hz	440
Suitability for isolation			IEC/EN 60947-2	yes
Utilisation category				A
Pollution degree			IEC 60664-1	3

Common characteristics

Control	Manual	With toggle ●
		With direct or extended rotary handle ●
	Electrical	With remote control ●
Versions	Fixed	●
	Withdrawable	Plug-in base ●
		Chassis ●

Circuit breakers

Breaking capacity levels				NSX100									NSX160 [4]						NSX250								
				B	F	N	H	S	L	R	HB1	HB2	B	F	N	H	S	L	B	F	N	H	S	L	R	HB1	HB2
Electrical characteristics as per IEC/EN 60947-2																											
Rated current (A)	**In**	40 °C		**100**						**100**			**160**						**250**						**250**		
Number of poles				2 [5], 3, 4						3, 4			2 [5], 3, 4						2 [5], 3, 4						3, 4		
Breaking capacity (kA rms)																											
	Icu	AC 50/60 Hz	220/240 V	40	85	90	100	120	150	200	-	-	40	85	90	100	120	150	40	85	90	100	120	150	200	-	-
			380/415 V	25	36	50	70	100	150	200	-	-	25	36	50	70	100	150	25	36	50	70	100	150	200	-	-
			440 V	20	35	50	65	90	130	200	-	-	20	35	50	65	90	130	20	35	50	65	90	130	200	-	-
			500 V	15	25	36	50	65	70	80	85	100	15	30	36	50	65	70	15	30	36	50	65	70	80	85	100
			525 V	-	22	35	35	40	50	65	80	100	-	22	35	35	40	50	-	22	35	35	40	50	65	80	100
			660/690 V	-	8	10	10	15	20	45	75	100	-	8	10	10	15	20	-	8	10	10	15	20	45	75	100
Service breaking capacity (kA rms)																											
	Ics	AC 50/60 Hz	220/240 V	40	85	90	100	120	150	200	-	-	40	85	90	100	120	150	40	85	90	100	120	150	200	-	-
			380/415 V	25	36	50	70	100	150	200	-	-	25	36	50	70	100	150	25	36	50	70	100	150	200	-	-
			440 V	20	35	50	65	90	130	200	-	-	20	35	50	65	90	130	20	35	50	65	90	130	200	-	-
			500 V	7	12	36	50	65	70	80	85	100	15	30	36	50	65	70	15	30	36	50	65	70	80	85	100
			525 V	-	11	35	35	40	50	65	80	100	-	22	35	35	40	50	-	22	35	35	40	50	65	80	100
			660/690 V	-	4	10	10	15	20	45	75	100	-	8	10	10	15	20	-	8	10	10	15	20	45	75	100
Durability (C-O cycles)		Mechanical		50000						20000			40000						20000						20000		
		Electrical	440 V In/2	50000						20000			40000						20000						20000		
			440 V In	30000						10000			20000						10000						10000		
			690 V In/2	20000						10000			15000						10000						10000		
			690 V In	10000						5000			7500						5000						5000		
Characteristics as per UL 508																											
Breaking capacity (kA rms)		AC 50/60 Hz	240 V	-	85	85	85	-	-	-	-	-	-	85	85	85	-	-	-	85	85	85	-	-	-	-	-
			480 V	-	25	50	65	-	-	-	-	-	-	35	50	65	-	-	-	35	50	65	-	-	-	-	-
			600 V	-	10	10	10	-	-	-	-	-	-	10	10	10	-	-	-	15	15	15	-	-	-	-	-
Protection and measurements																											
Short-circuit protection	Magnetic only			●									●						●								
Overload / short-circuit protection	Thermal magnetic			●									●						●								
	Electronic			●									●						●								
		with neutral protection (Off-0.5-1-OSN) [1]		●									●						●								
		with ground-fault protection		●									●						●								
		with zone selective interlocking (ZSI) [2]		●									●						●								
Display / I, U, f, P, E, THD measurements / interrupted-current measurement				●									●						●								
Options	Power Meter display on door			●									●						●								
	Operating assistance			●									●						●								
	Counters			●									●						●								
	Histories and alarms			●									●						●								
	Metering Com			●									●						●								
	Device status/control Com			●									●						●								
Earth-leakage protection	By Vigi add-on [3]			●									●						●								
	By Vigirex relay			●									●						●								
Installation / connections																											
Dimensions and weights																											
Dimensions (mm)	Fixed, front connections	2/3P		105 x 161 x 86						105 x 161 x 86			105 x 161 x 86						105 x 161 x 86						105 x 161 x 86		
W x H x D		4P		140 x 161 x 86						140 x 161 x 86			140 x 161 x 86						140 x 161 x 86						140 x 161 x 86		
Weight (kg)	Fixed, front connections	2/3P		2.05						2.4			2.2						2.4								
		4P		2.4						2.8			2.6						2.8								
Connections																											
Connection terminals	Pitch	With/without spreaders		35/45 mm						35/45 mm			35/45 mm						35/45 mm								
Large Cu or Al cables	Cross-section	mm²		300						300			300						300								
Source-changeover system																											
Manual mechanical interlocking				●									●						●								
Automatic source-changeover				●									●						●								

Characteristics and performance
ComPact NSX circuit breakers from 400 to 630 A up to 690 V

PB108166.eps

ComPact NSX400/630.

PB111001.eps

ComPact NSX630 R.

PB111013.eps

ComPact NSX630 HB2.

[1] OSN: Over Sized Neutral protection for neutrals carrying high currents (e.g. 3rd harmonics).
[2] ZSI: Zone Selective Interlocking using pilot wires.
[3] Vigi add-on is not available for breaking capacity levels HB1/HB2.
[4] Earth Leakage Circuit Breaker (MicroLogic Vigi 4.3 and 7.3 E)

Common characteristics

Rated voltages	Insulation voltage (V)	Ui		800
	Insulation voltage for ELCB [4]			500
	Impulse withstand voltage (kV)	Uimp		8
	Operational voltage (V)	Ue	AC 50/60 Hz	690
	Operation voltage for ELCB [4]	Ue	AC 50/60 Hz	440
Suitability for isolation			IEC/EN 60947-2	yes
Utilisation category				A
Pollution degree			IEC 60664-1	3

Common characteristics

Control	Manual	With toggle ●
		With direct or extended rotary handle ●
	Electrical	With remote control ●
Versions	Fixed	●
	Withdrawable	Plug-in base ●
		Chassis ●

Circuit breakers				NSX400								NSX630										
																	Ir = 225 - 500 A			Ir = 501 - 630 A		
Breaking capacity levels				F	N	H	S	L	R	HB1	HB2	F	N	H	S	L	R	HB1	HB2	R	HB1	HB2
Electrical characteristics as per IEC/EN 60947-2																						
Rated current (A)	**In**	40 °C		**400**					**400**			**630**					**630**					
Number of poles				3, 4					3, 4			3, 4					3, 4					
Breaking capacity (kA rms)																						
	Icu	AC 50/60 Hz	220/240 V	40	85	100	120	150	200	-	-	40	85	100	120	150	200	-	-	200	-	-
			380/415 V	36	50	70	100	150	200	-	-	36	50	70	100	150	200	-	-	200	-	-
			440 V	30	42	65	90	130	200	-	-	30	42	65	90	130	200	-	-	200	-	-
			500 V	25	30	50	65	70	80	85	100	25	30	50	65	70	80	85	100	80	85	100
			525 V	20	22	35	40	50	65	80	100	20	22	35	40	50	65	80	100	65	80	100
			660/690 V	10	10	20	25	35	45	75	100	10	10	20	25	35	45	75	100	45	75	100
Service breaking capacity (kA rms)																						
	Ics	AC 50/60 Hz	220/240 V	40	85	100	120	150	200	-	-	40	85	100	120	150	200	-	-	200	-	-
			380/415 V	36	50	70	100	150	200	-	-	36	50	70	100	150	200	-	-	200	-	-
			440 V	30	42	65	90	130	200	-	-	30	42	65	90	130	200	-	-	200	-	-
			500 V	25	30	50	65	70	80	85	100	25	30	50	65	70	80	85	100	80	85	100
			525 V	10	11	11	12	12	65	80	100	10	11	11	12	12	65	80	100	-	-	-
			660/690 V	10	10	10	12	12	45	75	100	10	10	10	12	12	45	75	100	-	-	-
Durability (C-O cycles)		Mechanical		15000					15000			15000					15000					
		Electrical	440 V In/2	12000					12000			8000					8000					
			In	6000					6000			4000					4000					
			690 V In/2	6000					6000			6000					6000					
			In	3000					3000			2000					2000					
Characteristics as per UL 508																						
Breaking capacity (kA rms)		AC 50/60 Hz	240 V	85	85	85	-	-	-	-	-	85	85	85	-	-	-	-	-	-	-	-
			480 V	35	50	65	-	-	-	-	-	35	50	65	-	-	-	-	-	-	-	-
			600 V	20	10	20	-	-	-	-	-	20	20	20	-	-	-	-	-	-	-	-
Protection and measurements																						
Short-circuit protection	Magnetic only			●								●										
Overload / short-circuit protection	Thermal magnetic			-								-										
	Electronic			●								●										
		with neutral protection (Off-0.5-1-OSN) [1]		●								●										
		with ground-fault protection		●								●										
		with zone selective interlocking (ZSI) [2]		●								●										
Display / I, U, f, P, E, THD measurements / interrupted-current measurement				●								●										
Options	Power Meter display on door			●								●										
	Operating assistance			●								●										
	Counters			●								●										
	Histories and alarms			●								●										
	Metering Com			●								●										
	Device status/control Com			●								●										
Earth-leakage protection	By Vigi add-on [3]			●								●										
	By Vigirex relay			●								●										
Installation / connections																						
Dimensions and weights																						
Dimensions (mm) W x H x D	Fixed, front connections		2/3P	140 x 255 x 110								140 x 255 x 110										
			4P	185 x 255 x 110								185 x 255 x 110										
Weight (kg)	Fixed, front connections		2/3P	6.05								6.2										
			4P	7.90								8.13										
Connections																						
Connection terminals	Pitch	With/without spreaders		45/52.5 mm 45/70 mm								45/52.5 mm 45/70 mm										
Large Cu or Al cables	Cross-section	mm²		4 x 240								4 x 240										
Source-changeover system																						
Manual mechanical interlocking				●								●										
Automatic source-changeover				●								●										

Characteristics and performance
ComPact NSX circuit breakers from 400 to 630 A up to 690 V

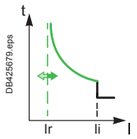
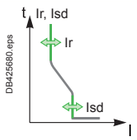
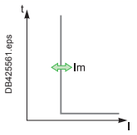
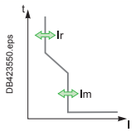
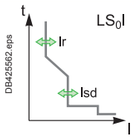
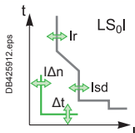
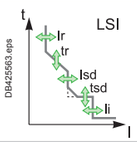
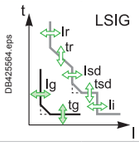
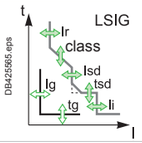
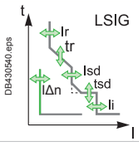
www.se.com
Select your protection
Overview of trip units

B

ComPact NSXm has a built-in trip unit.

ComPact NSX offers a range of trip units in interchangeable cases, whether they are magnetic, thermal-magnetic or electronic. Versions 5 and 6 of the electronic trip unit offer communication and metering. Using MicroLogic sensors and intelligence, ComPact NSX supplies all the information required to manage the electrical installation and optimise energy use.

B

	ComPact NSXm up to 160 A		ComPact NSX up to 250 A		ComPact NSX up to 630 A				
										
	TM-D distribution	**MicroLogic Vigi 4.1 Distribution and earth leakage protection**	**MA Distribution and motors**	**TM-D distribution TM-G generators**	**MicroLogic 2 and 1.3** 1.3 M Motors (I only) 2.2/2.3 A Distribution 2.2/2.3 AB Service connection (public distribution) 2.2 G Generators 2.2/2.3 M Motors	**MicroLogic Vigi 4** 4.2/4.3 Distribution and earth leakage protection 4.2/4.3 AB Service connection (public distribution) 4.2/4.3 AL	**MicroLogic 5 / 6 A** 5.2/5.3/6.2/6.3 A Distribution and generators 5.2/5.3 A-Z 16Hz 2/3 networks	**MicroLogic 5 / 6 E** 5.2/5.3/6.2/6.3 E Distribution and generators 6.2/6.3 E-M Motors	**MicroLogic Vigi 7 E** 7.2/7.3 E Distribution and earth leakage protection 7.2/7.3 E AL
										
Settings & indications	Pick-up set in amps using dials Non-adjustable time delay				Pick-up set in amps using dials Non-adjustable time delay					
Front indication	◉	◉	◉	◉	◉	◉	◉	◉	◉
Test connector		◉			◉	◉	◉	◉	◉
Self test	◉	◉	◉	◉	◉	◉	◉	◉	◉
Measurements									
Amps							◉	◉	◉
Power								◉	◉
Diagnostic & Maintenance									
Status indication	◉	◉	◉	◉	◉	◉	◉	◉	◉
Operating assistance							◉	◉	◉
Control									
Voltage release	◉	◉	◉	◉	◉	◉	◉	◉	◉
Motor mechanism			◉	◉	◉	◉	◉	◉	◉
Communication									
Modbus SL			◉	◉	◉	◉	◉	◉	◉
Ethernet			◉	◉	◉	◉	◉	◉	◉
Local display			◉	◉	◉	◉	◉	◉	◉
Input / Output control									
SDx		◉					◉	◉	◉
I/O module			◉	◉	◉	◉	◉	◉	◉
Earth Leakage									
Integrated protection		◉				◉			◉
Vigi Add-on module			◉	◉	◉		◉	◉	
External relay	◉		◉	◉	◉		◉	◉	

[1] Only for MicroLogic 6 electronic.
[2] Only for MicroLogic E.

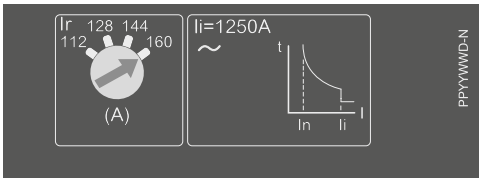
Protection of distribution systems
ComPact NSXm TM thermal-magnetic trip units

ComPact NSXm has a built-in thermal magnetic trip units.

PB114894_L35.eps

ComPact NSXm 160.

DB421211.eps



TM-D thermal-magnetic trip units

Circuit breakers equipped with thermal-magnetic trip units are used mainly in industrial and commercial electrical distribution applications for protection of cables on distribution systems supplied by transformers.

Protection

Thermal protection (Ir)

Thermal overload protection based on a bimetal strip providing an inverse time curve I^2t, corresponding to a temperature rise limit. Above this limit, the deformation of the strip trips the circuit breaker operating mechanism.
This protection operates according to:
- **Ir** that can be adjusted in amps from 0.7 to 1 times the rating of the circuit breaker (16 A to 160 A), corresponding to settings from 11 to 160 A for the range of products
- a non-adjustable time delay, defined to ensure protection of the cables.

Magnetic protection (Im)

Short-circuit protection with a fixed pick-up Im that initiates instantaneous tripping if exceeded with a non adjustable time delay to ensure selectivity and cascading.

Protection versions

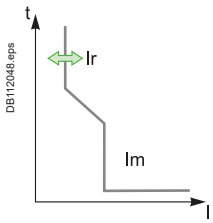
- 3-pole:
  - 3P 3D: 3-pole frame (3P) with detection on all 3 poles (3D).
- 4-pole:
  - 4P 3D: 4-pole frame (4P) with detection on 3 poles (3D).
  - 4P 4D: 4-pole frame (4P) with detection on all 4 poles (same threshold for phases and neutral).

Note: All the circuit breakers have a transparent lead-sealable cover that protects access to the adjustment dials.

Protection of distribution systems

ComPact NSXm TM thermal-magnetic trip units

Thermal-magnetic trip units TM16D to 160D



Ratings (A)	In at 40 °C [1]	16	25	32	40	50	63	80	100	125	160
Circuit breaker	ComPact NSXm	◉	◉	◉	◉	◉	◉	◉	◉	◉	◉
Thermal protection											
Pick-up (A) tripping between 1.05 and 1.20 Ir	Ir = In x ...	adjustable in amps from 0.7 to 1 x In									
Time delay (s)	tr	non-adjustable									
Magnetic protection											
Pick-up (A)	Im	fixed									
accuracy ±20 %	ComPact NSXm	500	600	600	600	600	800	1000	1250	1250	1250
Time delay	tm	fixed									
Neutral protection											
Unprotected neutral	4P 3D	no detection									
Fully protected neutral	4P 4D	1 x Ir									

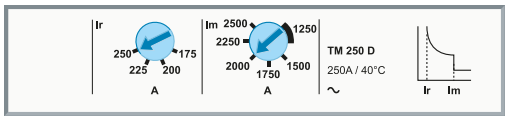
[1] If the circuit breakers are used in high-temperature environments, the setting must take into account the thermal limitations of the circuit breaker. See the temperature derating table.

B

Protection of distribution systems
ComPact NSX TM thermal-magnetic and MA magnetic trip units

TM thermal-magnetic and MA magnetic trip units can be used on ComPact NSX100/160/250 circuit breakers with performance levels B/F/H/N/S/L. TM trip units are available in 2 versions:
- TM-D, for the protection of distribution cables
- TM-G, with a low threshold, for the protection of generators or long cable lengths.

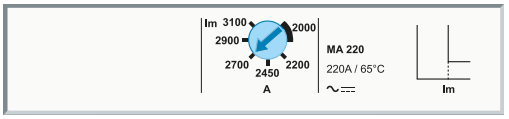
DB112046.eps



PB103193_20.eps

ComPact NSX250 F.

DB112110.eps



TM-D and TM-G thermal-magnetic trip units

Circuit breakers equipped with thermal-magnetic trip units are used mainly in industrial and commercial electrical distribution applications:
- TM-D, for protection of cables on distribution systems supplied by transformers
- TM-G, with a low pick-up for generators (lower short-circuit currents than with transformers) and distribution systems with long cable lengths (fault currents limited by the resistance of the cable).

Protection

Thermal protection (Ir)

Thermal overload protection based on a bimetal strip providing an inverse time curve I^2t, corresponding to a temperature rise limit. Above this limit, the deformation of the strip trips the circuit breaker operating mechanism.
This protection operates according to:
- Ir that can be adjusted in amps from 0.7 to 1 times the rating of the trip unit (16 A to 250 A), corresponding to settings from 11 to 250 A for the range of trip units
- a non-adjustable time delay, defined to ensure protection of the cables.

Magnetic protection (Im)

Short-circuit protection with a fixed or adjustable pick-up Im that initiates instantaneous tripping if exceeded.
- TM-D: fixed pick-up, Im, for 16 to 160 A ratings and adjustable from 5 to 10 x In for 200 and 250 A ratings
- fixed pick-up for 16 to 63 A ratings.

Protection against insulation faults
Two solutions are possible by adding:
- a Vigi add-on acting directly on the trip unit of the circuit breaker
- a Vigirex relay connected to an MN or MX voltage release.

Protection versions

- 3-pole:
  - 3P 3D: 3-pole frame (3P) with detection on all 3 poles (3D)
  - 3P 2D: 3-pole frame (3P) with detection on 2 poles (2D).
- 4-pole:
  - 4P 3D: 4-pole frame (4P) with detection on 3 poles (3D).
  - 4P 4D: 4-pole frame (4P) with detection on all 4 poles (same threshold for phases and neutral).

MA magnetic trip units

In distribution applications, circuit breakers equipped with MA magnetic-only trip units are used for:
- short-circuit protection of secondary windings of LV/LV transformers with overload protection on the primary side.
- as an alternative to a switch-disconnector at the head of a switchboard in order to provide short-circuit protection.

Their main use is however for motor protection applications, in conjunction with a thermal relay and a contactor or motor starter.

Protection

Magnetic protection (Im)

Short-circuit protection with an adjustable pick-up Im that initiates instantaneous tripping if exceeded.
- **Im = In x ...** set in amps on an adjustment dial covering the range 6 to 14 x In for 2.5 to 100 A ratings or 9 to 14 In for 150 to 220 A ratings.

Protection versions

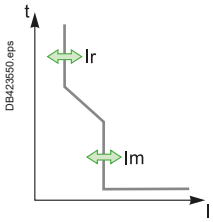
- 3-pole (3P 3D): 3-pole frame (3P) with detection on all 3 poles (3D).
- 4-pole (4P 3D): 4-pole frame (4P) with detection on 3 poles (3D).

Note: All the trip units have a transparent lead-sealable cover that protects access to the adjustment dials.

Protection of distribution systems

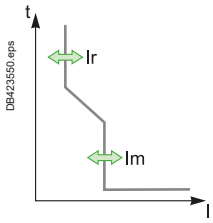
ComPact NSX TM thermal-magnetic and MA magnetic trip units

Thermal-magnetic trip units TM16D to 250D



Ratings (A)	In at 40 °C [1]	16	25	32	40	50	63	80	100	125	160	200	250
Circuit breaker	ComPact NSX100	◉	◉	◉	◉	◉	◉	◉	◉	-	-	-	-
	ComPact NSX160	-	-	◉	◉	◉	◉	◉	◉	◉	◉	-	-
	ComPact NSX250	-	-	-	-	-	◉	◉	◉	◉	◉	◉	◉
Thermal protection													
Pick-up (A) tripping between 1.05 and 1.20 Ir	**Ir** = In x ...	adjustable in amps from 0.7 to 1 x In											
Time delay (s)	**tr**	non-adjustable											
	tr at 1.5 x In	120 to 400											
	tr at 6 x Ir	15											
Magnetic protection													
Pick-up (A) accuracy ±20 %	**Im**	fixed										adjustable	
	ComPact NSX100	190	300	400	500	500	500	640	800				
	ComPact NSX160/250	190	300	400	500	500	500	640	800	1250	1250	5 to 10xIn	
Time delay	**tm**	fixed											
Neutral protection													
Unprotected neutral	4P 3D	no detection											
Fully protected neutral	4P 4D	1 x Ir											

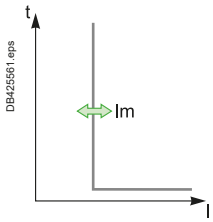
Thermal-magnetic trip units TM16G to 250G



Ratings (A)	In at 40 °C [1]	16	25	40	63	80	100	125	160	200	250
Circuit breaker	ComPact NSX100	◉	◉	◉	◉	◉	◉	-	-	-	-
	ComPact NSX160	-	◉	◉	◉	◉	◉	◉	◉	-	-
	ComPact NSX250	-	-	-	-	-	-	-	◉	◉	◉
Thermal protection											
Pick-up (A) tripping between 1.05 and 1.20 Ir	**Ir** = In x ...	adjustable in amps from 0.7 to 1 x In									
Time delay (s)	**tr**	non-adjustable									
	tr at 1.5 x In	120 to 400									
	tr at 6 x Ir	-									
Magnetic protection											
Pick-up (A) accuracy ±20 %	**Im**	fixed									
	ComPact NSX100	63	80	80	125	200	320	-	-	-	-
	ComPact NSX160	-	80	80	125	200	320	440	440	-	-
	ComPact NSX250	-	-	-	-	-	-	-	440	440	520
Time delay	**tm**	fixed									
Neutral protection											
Unprotected neutral	4P 3D	no									
Fully protected neutral	4P 4D	1 x Ir									

[1] For temperatures greater than 40 °C, the thermal protection characteristics are modified. See the temperature derating table.

Magnetic trip units MA 2.5 to 220



Ratings (A)	In at 65 °C [1]	2.5	6.3	12.5	25	50	100 [1]	150	220
Circuit breaker	ComPact NSX100	◉	◉	◉	◉	◉	◉	-	-
	ComPact NSX160	-	-	-	◉	◉	◉	◉	-
	ComPact NSX250	-	-	-	-	-	◉	◉	◉
Instantaneous magnetic protection									
Pick-up (A) accuracy ±20 %	**Im** = In x ...	Adjustable from 6 to 14 x In (settings 6, 7, 8, 9, 10, 11, 12, 13, 14)						Adjustable from 9 to 14 x In (settings 9, 10, 11, 12, 13, 14)	
Time delay (ms)	tm	fixed							

[1] MA100 3P adjustable from 6 to 14 x In.
MA100 4P adjustable from 9 to 14 x In.

Note: all the trip units have a transparent lead-sealable cover that protects access to the adjustment dials.

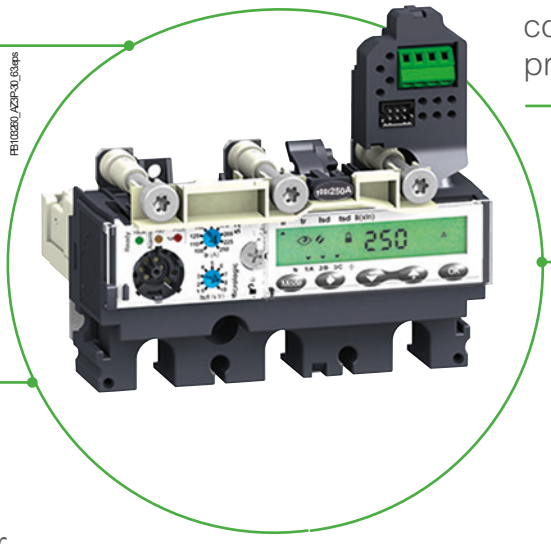
Protection of distribution systems
Overview of functions

Measurement

Energy management is the challenge of present and future generations. To meet this requirement MicroLogic E incorporates all the measuring functions of a power meter.

Diagnostics & Maintenance

Optimal continuity of services as well as extended life of equipment is one of customer main concerns. For that purpose MicroLogic A and E trip units contributes to corrective, preventive and predictive maintenance.



Protection

MicroLogic 5 (LSI), 6 (LSIG) and 7 (LSIR) offer a large long time delay setting range (0.4 to 1 xIn) and protection accuracy for a wide temperature range (-25 to +70 C).

Communication

- Protection Control Unit, provides local information for network operation and maintenance, as well as remote information for higher functions of control, monitoring, energy efficiency and assets management.
- To comply with those requirements MicroLogic trip unit and Enerlin'X communication system provides access to status, electrical values and devices control using Ethernet and Modbus SL communication protocols.

Protection of distribution systems
ComPact NSXm + NSX circuit breakers trip units

Understanding the names of MicroLogic electronic trip units

Example: MicroLogic 6.3 E-M	6	3	E	M
	Protection	Frame	Measurements	Applications
	1: I **2**: LS_0I **4**: LS_0IR **5**: LSI **6**: LSIG **I**: Instantaneous **L**: Long time **R**: Residual current **S_0**: Short time [2] (fixed delay) **S**: Short time **G**: Ground fault	**1**: NSXm 16 to 160  **2**: NSX 100/160/250  **3**: NSX 400/630 	**A**: Ammeter  **E**: Energy 	Distribution, otherwise **G**: Generator **AB**: Public distribution [1] **M**: Motors **Z**: 16 Hz 2/3 [1]

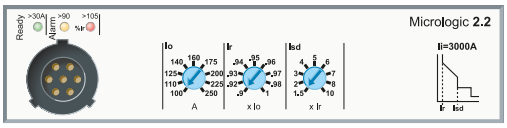
Examples				
MicroLogic 1.3	Instantaneous only	400 or 630 A	-	Distribution
MicroLogic 2.3	LS_0I	400 or 630 A	-	Distribution
MicroLogic Vigi 4.1	LS_0IR	16 to 160 A	-	Distribution
MicroLogic 5.2 A	LSI	100, 160 or 250 A	Ammeter	Distribution
MicroLogic 6.3 E-M	LSIG	400 or 630 A	Energy	Motor

[1] AB-Z: except NSXm and NSX R, HB1, HB2.
[2] LS_0I protection is standard on MicroLogic 2. To ensure selectivity, it offers short-time protection S_0 with a non-adjustable delay and instantaneous protection.

Protection of distribution systems
ComPact NSX MicroLogic 2 and 1.3 trip units

MicroLogic 2 trip units can be used on ComPact NSX100 to 630 circuit breakers with performance levels B/F/H/N/S/L/R/ HB1/HB2.
They provide:
■ standard protection of distribution cables
■ indication of:
□ overloads (via LEDs)
□ overload tripping (via the SDx relay module).

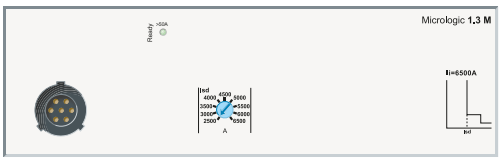
DB112050.eps



PB103377.eps

SDx remote indication relay module with its terminal block.

DB112106.eps



MicroLogic 2

Circuit breakers equipped with MicroLogic 2 trip units can be used to protect distribution systems supplied by transformers. For generators and long cables, MicroLogic 2 G trip units offer better suited low pick-up solutions (see page B-50).

Protection

Settings are made using the adjustment dials with fine adjustment possibilities.

Overloads: Long time protection (Ir)

Inverse time protection against overloads with an adjustable current pick-up Ir set using a dial and a non-adjustable time delay tr.

Short-circuits: Short-time protection with fixed time delay (Isd)

Protection with an adjustable pick-up Isd. Tripping takes place after a very short delay used to allow selectivity with the downstream device.

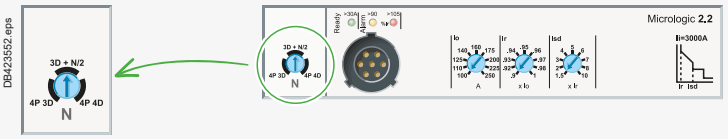
Short-circuits: Non-adjustable instantaneous protection

Instantaneous short-circuit protection with a fixed pick-up.

Neutral protection

■ On 3-pole circuit breakers, neutral protection is not possible.
■ On four-pole circuit breakers, neutral protection may be set using a three-position switch:
□ 4P 3D: neutral unprotected
□ 4P 3D + N/2: neutral protection at half the value of the phase pick-up, i.e. 0.5 x Ir
□ 4P 4D: neutral fully protected at Ir.

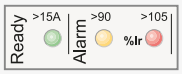
DB423552.eps



Indications

Front indications

■ Green “Ready” LED: flashes slowly when the circuit breaker is ready to trip in the event of a fault.
■ Orange overload pre-alarm LED: steady on when I > 90 % Ir.
■ Red overload LED: steady on when I > 105 % Ir.



Remote indications

An overload trip signal can be remoted by installing an SDx relay module inside the circuit breaker.
This module receives the signal from the MicroLogic electronic trip unit via an optical link and makes it available on the terminal block. The signal is cleared when the circuit breaker is reclosed. For description, see page C-28.

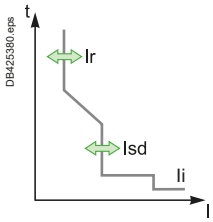
MicroLogic 1.3 M for magnetic protection only

MicroLogic 1.3 M trip units provide magnetic protection only, using electronic technology. They are dedicated to 400/630 A 3-poles (3P 3D) circuit breakers or 4-pole circuit breakers with detection on 3 poles (4P, 3D) and are used in certain applications to replace switch-disconnectors at the head of switchboards. They are especially used in 3-poles versions for motor protection, see page B-30.

Note: all the trip units have a transparent lead-sealable cover that protects access to the adjustment dials.

Protection of distribution systems
ComPact NSX MicroLogic 2 and 1.3 trip units

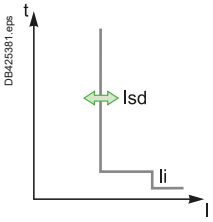
MicroLogic 2



Ratings (A)	In at 40 °C [1]		40	100	160	250	400	630
Circuit breaker	ComPact NSX100		◉	◉	-	-	-	-
	ComPact NSX160		◉	◉	◉	-	-	-
	ComPact NSX250		◉	◉	◉	◉	-	-
	ComPact NSX400		-	-	-	◉	◉	-
	ComPact NSX630		-	-	-	◉	◉	◉
L Long-time protection								
Pick-up (A) tripping between 1.05 and 1.20 Ir		Io	value depending on trip unit rating (In) and setting on dial					
	In = 40 A	Io =	18	18	20	23	25	28	32	36	40
	In = 100 A	Io =	40	45	50	55	63	70	80	90	100
	In = 160 A	Io =	63	70	80	90	100	110	125	150	160
	In = 250 A (NSX250)	Io =	100	110	125	140	160	175	200	225	250
	In = 250 A (NSX400)	Io =	70	100	125	140	160	175	200	225	250
	In = 400 A	Io =	160	180	200	230	250	280	320	360	400
	In = 630 A	Io =	250	280	320	350	400	450	500	570	630
	Ir = Io x ...		9 fine adjustment settings from 0.9 to 1 (0.9 - 0.92 - 0.93 - 0.94 - 0.95 - 0.96 - 0.97 - 0.98 - 1) for each value of Io					
Time delay (s) accuracy 0 to -20%	**tr**		non-adjustable					
		1.5 x Ir	400					
		6 x Ir	16					
		7.2 x Ir	11					
Thermal memory			20 minutes before and after tripping					
S_0 Short-time protection with fixed time delay								
Pick-up (A) accuracy ±10 %	**Isd** = Ir x ...		1.5	2	3	4	5	6	7	8	10
Time delay (ms)	**tsd**		non-adjustable					
	Non-tripping time		20					
	Maximum break time		80					
I Instantaneous protection								
Pick-up (A) accuracy ±15 %	Ii non-adjustable		600	1500	2400	3000	4800	6900			
	Non-tripping time		10 ms								
	Maximum break time		50 ms								

[1] If the trip units are used in high-temperature environments, the MicroLogic setting must take into account the thermal limitations of the circuit breaker. See the temperature derating table.

MicroLogic 1.3 M

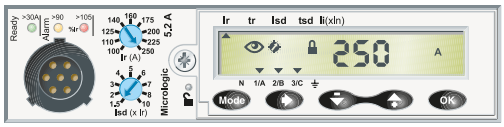


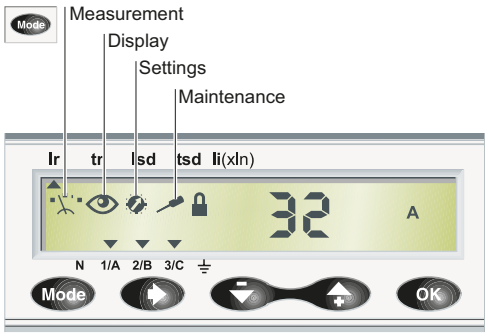
Ratings (A)	In at 65 °C [1]	320	500
Circuit breaker	ComPact NSX400	◉	-
	ComPact NSX630	◉	◉
S Short-time protection			
Pick-up (A) accuracy ±15 %	**Isd**	Adjustable directly in amps	
		9 settings: 1600, 1920, 2240, 2560, 2880, 3200, 3520, 3840, 4160 A	9 settings: 2500, 3000, 3500, 4000, 4500, 5000, 5500, 6000, 6500 A
Time delay (ms)	**tsd**	Non-adjustable	
	Non-tripping time	10	
	Maximum break time	60	
I Instantaneous protection			
Pick-up (A) accuracy ±15 %	**Ii** non-adjustable	4800	6500
	Non-tripping time	0	
	Maximum break time	30 ms	

[1] Motor standards require operation at 65 °C. Circuit-breaker ratings are derated to take this requirement into account.

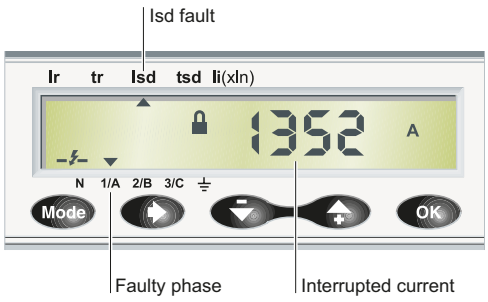
Protection of distribution systems
ComPact NSX MicroLogic 5 / 6 A or E trip units

MicroLogic 5 / 6 A (Ammeter) or E (Energy) trip units can be used on ComPact NSX100 to 630 circuit breakers with performance levels B/F/H/N/S/L/R/HB1/HB2. They all have a display unit.
They offer basic LSI protection (MicroLogic 5) or LSI and ground-fault protection G (MicroLogic 6).
They also offer measurement, alarm and communication functions.





Trip unit menus.



Display of interrupted current.

Note: all the trip units have a transparent lead-sealable cover that protects access to the adjustment dials.

Protection

Settings can be adjusted in two ways, using the dials and/or the keypad. The keypad can be used to make fine adjustments in 1 A steps below the maximum value defined by the setting on the dial. Access to setting modifications via the keypad is protected by a locking function displayed on the screen and controlled by a microswitch. The lock is activated automatically if the keypad is not used for 5 minutes. Access to the microswitch is protected by a transparent lead-sealable cover. With the cover closed, it is still possible to display the various settings and measurements using the keypad.

Overloads: Long time protection (Ir)

Inverse time protection against overloads with an adjustable current pick-up **Ir** set using a dial or the keypad for fine adjustments. The time delay **tr** is set using the keypad.

Short-circuits: Short-time protection (Isd)

Short-circuit protection with an adjustable pick-up **Isd** and adjustable time delay **tsd**, with the possibility of including a portion of an inverse time curve (I^2t On).

Short-circuits: Instantaneous protection (Ii)

Instantaneous protection with adjustable pick-up **Ii**.

Additional ground fault protection (Ig) on MicroLogic 6

Residual type ground-fault protection with an adjustable pick-up **Ig** (with Off position) and adjustable time delay **tg**. Possibility of including a portion of an inverse time curve (I^2t On).

Neutral protection

- On 4-pole circuit breakers, this protection can be set via the keypad:
  - Off: neutral unprotected
  - 0.5: neutral protection at half the value of the phase pick-up, i.e. 0.5 x Ir
  - 1.0: neutral fully protected at Ir
  - OSN: Oversized neutral protection at 1.6 times the value of the phase pick-up. Used when there is a high level of 3rd order harmonics (or orders that are multiples of 3) that accumulate in the neutral and create a high current. In this case, the device must be limited to Ir = 0.63 x In for the maximum neutral protection setting of 1.6 x Ir.
- With 3-pole circuit breakers, the neutral can be protected by installing an external neutral sensor with the output (T1, T2) connected to the trip unit.

Zone selective interlocking (ZSI)

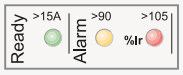
A ZSI terminal block may be used to interconnect a number of MicroLogic control units to provide zone selective interlocking for short-time (Isd) and ground-fault (Ig) protection, without a time delay. For ComPact NSX 100 to 250, the ZSI function is available only in relation to the upstream circuit breaker (ZSI out).

Display of type of fault

On a fault trip, the type of fault (Ir, Isd, Ii, Ig), the phase concerned and the interrupted current are displayed. An external power supply is required.

Indications

Front indications



- Green “Ready” LED: flashes slowly when the circuit breaker is ready to trip in the event of a fault.
- Orange overload pre-alarm LED: steady on when I > 90 % Ir.
- Red overload LED: steady on when I > 105 % Ir.

Remote indications

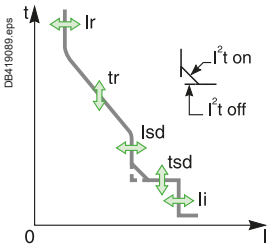
An SDx relay module installed inside the circuit breaker can be used to remotely access to the following information:

- overload trip
- overload prealarm (MicroLogic 5) or ground fault trip (MicroLogic 6).

This module receives the signal from the MicroLogic electronic trip unit via an optical link and makes it available on the terminal block. The signal is cleared when the circuit breaker is closed.
These outputs can be reprogrammed to be assigned to other types of tripping or alarm. The module is described in detail in the section dealing with accessories.

Protection of distribution systems
ComPact NSX MicroLogic 5 / 6 A or E trip units

Protection MicroLogic 5 / 6 A or E trip units



Ratings (A)	In at 40 °C [1]	40 [2]	100	160	250	400	630
Circuit breaker	ComPact NSX100	◉	◉	-	-	-	-
	ComPact NSX160	◉	◉	◉	-	-	-
	ComPact NSX250	◉	◉	◉	◉	-	-
	ComPact NSX400	-	-	-	-	◉	-
	ComPact NSX630	-	-	-	-	◉	◉

L Long-time protection

Pick-up (A) tripping between 1.05 and 1.20 Ir	**Ir** = ...	dial setting	value depending on trip unit rating (In) and setting on dial							
		In = 40 A Io =	18	18	20	23	25	28	32	36	40
		In = 100 A Io =	40	45	50	55	63	70	80	90	100
		In = 160 A Io =	63	70	80	90	100	110	125	150	160
		In = 250 A Io =	100	110	125	140	160	175	200	225	250
		In = 400 A Io =	160	180	200	230	250	280	320	360	400
		In = 630 A Io =	250	280	320	350	400	450	500	570	630
		keypad setting	Fine adjustment in 1 A steps below maximum value set on dial							
Time delay (s) accuracy 0 to -20 %	**tr** = ...	keypad setting	0.5	1	2	4	8	16		
		1.5 x Ir	15	25	50	100	200	400		
		6 x Ir	0.5	1	2	4	8	16		
		7.2 x Ir	0.35	0.7	1.4	2.8	5.5	11		
Thermal memory			20 minutes before and after tripping							

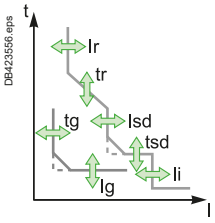
S Short-time protection with adjustable time delay

Pick-up (A) accuracy ±10 %	**Isd** = Ir x ...	dial setting for MicroLogic 5	1.5	2	3	4	5	6	7	8	10
			Fine adjustment in 0.5 x Ir steps using the keypad								
		keypad settings for MicroLogic 6	Adjustment in steps of 0.5 x Ir over the range 1.5 x Ir to 10 x Ir								
Time delay (s)	**tsd** = ...	keypad setting	I²Off	0	0.1	0.2	0.3	0.4			
			I²On	-	0.1	0.2	0.3	0.4			
		Non-tripping time (ms)		20	80	140	230	350			
		Maximum break time (ms)		80	140	200	320	500			

I Instantaneous protection

Pick-up (A) accuracy ±15 %	**Ii** = In x	keypad setting	Adjustment in steps of 0.5 x In over the range 1.5 x In to: 15 x In (40 to 160 A), 12 x In (250 to 400 A) or 11 x In (630 A)
		Non-tripping time	10 ms
		Maximum break time	50 ms

G Ground-fault protection - for MicroLogic 6 A or E



Pick-up (A) accuracy ±10 %	**Ig** = In x	dial setting									
		In = 40 A	0.4	0.4	0.5	0.6	0.7	0.8	0.9	1	Off
		In > 40 A	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1	Off
			Fine adjustment in 0.05 A steps using the keypad								
Time delay (s)	**tg** = ...	keypad setting	I²Off	0	0.1	0.2	0.3	0.4			
			I²On	-	0.1	0.2	0.3	0.4			
		Non-tripping time (ms)		20	80	140	230	350			
		Maximum break time (ms)		80	140	200	320	500			
Test	Ig function			built-in							

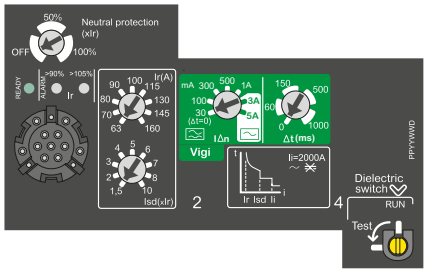
[1] If the trip units are used in high-temperature environments, the MicroLogic setting must take into account the thermal limitations of the circuit breaker. See the temperature derating table.
[2] For 40 A rating, the neutral N/2 adjustment is not possible.

B

Protection of distribution systems
ComPact NSXm MicroLogic Vigi 4.1 trip unit
with integrated earth leakage protection

ComPact NSXm circuit breakers up to 160 A can be ordered with Micologic Vigi 4.1 trip unit with performance levels E/B/F/N/H.
They provide:
■ standard protection of distribution cables
■ earth leakage protection
■ indication of:
□ overload alarming (via LEDs and via SDx module)
□ overload tripping (via the SDx module)
□ earth leakage alarming (via the SDx module)
□ earth leakage tripping (via front face screen and the SDx module).

DB430716.eps



PB119117.eps

ComPact NSXm MicroLogic Vgi 4.1.

MicroLogic Vigi 4.1

Circuit breakers equipped with MicroLogic Vigi 4.1 trip units can be used to protect distribution systems supplied by transformers.

Short-circuit and overload protection

Settings are made using the adjustment dials.

Overloads: Long time protection (Ir)

Inverse time protection against overloads with a wide range adjustable current pick-up Ir set using a dial and a non-adjustable time delay tr.

Short-circuits: Short-time protection with fixed time delay (Isd)

Protection with an adjustable pick-up Isd. Tripping takes place after a very short delay used to allow selectivity with the downstream device.

Short-circuits: Non-adjustable instantaneous protection

Instantaneous short-circuit protection with a fixed pick-up.

Neutral protection

■ On 3-pole circuit breakers, neutral protection is not possible.
■ On 4-pole circuit breakers, neutral protection may be set using a three-position switch:
□ OFF: neutral unprotected
□ 50 % [1]: neutral protection at half the value of the phase pick-up, i.e. 0.5 x Ir
□ 100 %: neutral fully protected at Ir.

Earth leakage protection

Protection with an adjustable leakage level (IΔn) with an adjustable delay (Δt).

Compliance with standards

■ IEC 60947-2, annex B.
■ IEC 60755, class A, immunity to DC components up to 6 mA.
■ Operation down to -25 °C as per VDE 664.

Power supply

It is self-powered internally and therefore does not require any external source. It's still working even when supplied by only two phases.

Sensitivity IΔn (A)

■ Type A: 30mA - 100mA - 300mA - 500mA - 1A.
■ Type AC: 30mA - 100mA - 300mA - 1A - 3A - 5A.

Intentional delay Δt (ms)

0 - 60 [2] - 150 [2] - 500 [2] - 1000 [2].

Operated voltage

200...440 V AC - 50/60 Hz.

Operating safety

The earth leakage protection is a user safety device. It must be tested at regular intervals (every 6 months) via test button.

[1] On 100A and 160A circuit breakers only.
[2] If the sensitivity is set to 30 mA, there is no time delay, whatever the time-delay setting.

Note: all the trip units have a transparent lead-sealable cover that protects access to the adjustment dials.

Protection of distribution systems
ComPact NSXm MicroLogic Vigi 4.1 trip unit
with integratedd earth leakage protection

Indications

Front indications

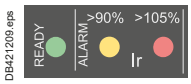
- Green “Ready” LED: flashes slowly when the circuit breaker is ready to trip in the event of an overload or short-circuit fault.
- Orange overload pre-alarm LED: steady on when I > 90 % Ir.
- Red overload LED: steady on when I > 105 % Ir.
- Screen that indicate an earth leakage fault trip - reset when product is powered.

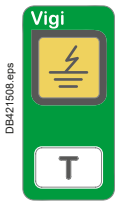
Alarming and fault differentiation

A side module SDx can be installed to provide alarming and fault differenciation:

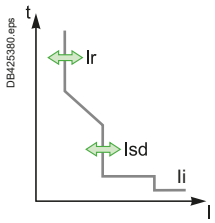
- overload alarm (I > 105 % Ir)
- overload trip indication
- earth leakage alarm (IΔn > 80 % threshold)
- earth leakage trip indication.

This module receives the signal from the MicroLogic electronic trip unit via an optical link and makes it available on the terminal block through NO/NC dry contacts.
The signal is cleared when the circuit breaker is restarted.
For description, see page C-11.

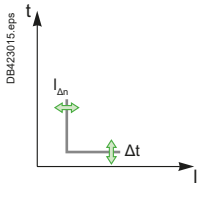




MicroLogic Vigi 4.1



Ratings (A)	In at 40 °C [1]		25	50	100	160					
Circuit breaker	ComPact NSXm		◉	◉	◉	◉					
L Long-time protection											
Pick-up (A)		Ir	value depending on trip unit rating (In) and setting on dial								
tripping between 1.05 and 1.20 Ir	In = 25 A	Ir =	10	11	12	14	16	18	20	22	25
	In = 50 A	Ir =	20	22	25	28	32	36	40	45	50
	In = 100 A	Ir =	40	45	50	56	63	70	80	90	100
	In = 160 A	Ir =	63	70	80	90	100	115	130	145	160
Time delay (s) accuracy 0 to -20%	**tr**		non-adjustable								
		1.5 x Ir	200								
		6 x Ir	8								
		7.2 x Ir	5								
Thermal memory			20 minutes before and after tripping								
S_0 Short-time protection with fixed time delay											
Pick-up (A) accuracy ±15 %	**Isd** = Ir x ...		1.5	2	3	4	5	6	7	8	10
Time delay (ms)	**tsd**		non-adjustable								
	Non-tripping time		20								
	Maximum break time		80								
I Instantaneous protection											
Pick-up (A) accuracy ±15 %	Ii non-adjustable		375	750	1500	2000					
	Non-tripping time		10 ms			5 ms					
	Maximum break time		50 ms								
R Earth leakage protection											
Sensitivity $I_{\Delta n}$ (A)	Adjustable	$I_{\Delta n}$ =	0.03	0.1	0.3	0.5	1	3	5		
	Type		A and AC					AC			
Time delay Δt (ms)	Adjustable	Δt =	0	60 [2]	150 [2]	500 [2]	1000 [2]				
	Maximum break time (ms)		< 40	< 140	< 300	< 800	< 1500				



[1] If the circuit breakers are used in high-temperature environments, the setting must take into account the thermal limitations of the circuit breaker.
[2] If the sensitivity is set to 30 mA, there is no time delay, whatever the time-delay setting.

Protection of distribution systems

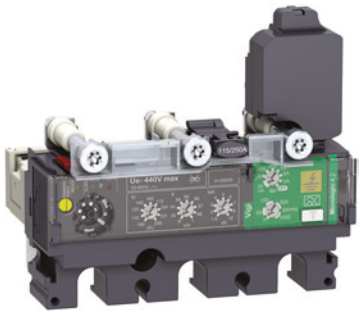
ComPact NSX MicroLogic Vigi 4 trip unit

with integrated earth leakage protection

The ComPact NSX range is now complemented with a new type of MicroLogic trip unit including both circuit protection and earth leakage protection. It means that the earth leakage protection, previously located within the Vigi Add-on, will be integrated within the existing size of the MicroLogic trip unit.
MicroLogic Vigi 4 is compliant with IEC 60947-2 annex B.

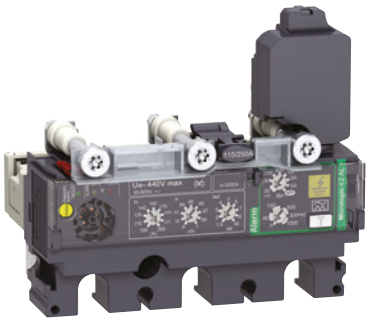
PB119127_L39.eps

LV433803.eps



MicroLogic Vigi 4 (LS_oIR).

LV433887.eps



MicroLogic Vigi 4 AL (LS_oI + Earth Leakage Alarm).

MicroLogic Vigi 4

There are two versions of MicroLogic Vigi 4:
- distribution protection including Earth Leakage Protection (LS_oIR)
- distribution protection including Earth Leakage Alarm (LS_oI + Earth Leakage Alarm).

Protections

Settings are made using the rotary dial with fine adjustment capabilities.

Short circuit and overload protections

Overload: long-time protection (Ir)

Inverse time protection against overload with an adjustable current pick-up Ir set using a dial and a non-adjustable time delay tr.

Short-circuit: short-time protection with fixed time delay (Isd)

That protection is set with an adjustable pick-up Isd. The tripping takes place after a very short time used to allow selectivity with downstream devices.

Short circuit: non-adjustable instantaneous protection (with a fix pick-up)

Neutral protection

- On a 3-pole device, neutral protection is not possible
- On a 4-pole device, neutral protection may be set using the dedicated coding wheel to meet the following configurations: 4P 3D, 4P 3D + N/2 or 4P 4D (same as for MicroLogic 2).

Earth leakage protections

Adjustable leakage threshold (IΔn) and adjustable time delay threshold (Dt) by using the two dials on the green area of the trip unit.

Power supply

The trip unit is self supplied, and so does not need any external source. It works even when fed by 2 phases only.

Sensitivity IΔn (A)

- Type A: 30mA - 100mA - 300mA - 500mA - 1A - 3A - 5A (for the ratings 40 to 250A)
- Type A: 300mA - 500mA - 1A - 3A - 5A - 10A (for the ratings 400 to 570A).

Caution: "OFF" setting of IΔn is possible. It cancels the earth leakage protection, in that case, the circuit breaker with MicroLogic Vigi 4 behaves as a standard circuit breaker. That "OFF" position is located on the highest side of the coding wheel.

Intentional delay IΔt (s)

Case IΔn = 30mA: Δt 0 sec (whatever the setting)
Case IΔn > 30mA: Δt 0 – 60ms – 150ms – 500ms – 1sec (by setting)

Operated voltage

200 to 440 VAC (only) – 50/60 Hz

Operating safety

The earth leakage protection is a user safety device. It must be regularly tested using the test button (T) that simulates a real current leakage within the toroid. When IΔn is set on the OFF position, press the T will cancel any test.
As for standard circuit breaker, the circuit breaker with MicroLogic Vigi 4 can be reset after any fault by operating an OFF/ON procedure.
Specific for the circuit breaker with MicroLogic Vigi 4 Alarm (AL), after testing as well as after a real leakage fault, it can be reset by pressing more than 3 seconds the test button (T), to avoid switching OFF the device.

Protection of distribution systems
ComPact NSX MicroLogic Vigi 4 trip unit
with integrated earth leakage protection

Indications

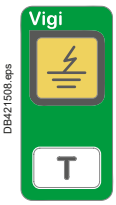
Front indications

- Green "Ready" LED: flashes slowly when the circuit breaker is ready to trip in case of a fault.
- Orange overload pre-alarm LED: steady ON when I > 90% Ir.
- Red overload LED: steady ON when I > 105% Ir.
- Yellow Screen: indicates an earth leakage fault (reset when operating OFF/ON for the "trip" or when pressing >3sec the T button for the Alarm).

Alarming and fault differentiation

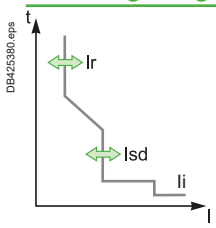
- An overload trip signal can be remotely available by installing an SDx relay module inside the circuit breaker on both "trip" and "alarm" versions.
- An earth leakage trip signal can be remotely available by installing an SDx module, only on the "trip" version.
- An earth leakage alarm signal (MicroLogic Vigi 4 AL) can be remotely available on the SDx, for the circuit breaker with MicroLogic Vigi 4 Alarm".

This module receives the signal from the MicroLogic trip unit via an optical link and makes it available on the terminal block. The signal is reset when the breaker is operated.

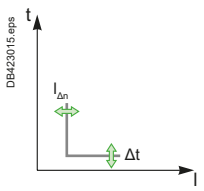


B

MicroLogic Vigi 4



Ratings (A)	In at 40 °C [1]		40	100	160	250	400	570			
Circuit breaker	ComPact NSX100		●	●							
	ComPact NSX160		●	●	●						
	ComPact NSX250		●	●	●	●					
	ComPact NSX400						●				
	ComPact NSX630						●	●			
L Long-time protection											
Pick-up (A)		Io	value depending on the rating (In) and the dial setting								
tripping between 1.05 and 1.20 Ir	In = 40 A	Io =	18	18	20	23	25	28	32	36	40
	In = 100 A	Io =	40	45	50	55	63	70	80	90	100
	In = 160 A	Io =	63	70	80	90	100	110	125	150	160
	In = 250 A	Io =	100	110	125	140	160	175	200	225	250
	In = 400 A	Io =	160	180	200	230	250	280	320	360	400
	In = 570 A	Io =	250	280	320	350	400	450	500	570	570
	Ir = Io x		9 fine adjustment settings from 0.9 to 1 (0.9 – 0.92 ... 0.98 - 1)								
Time delay (s) accuracy 0 to -20%	**tr**		non-adjustable								
	at	1.5 x Ir	tr = 400 s								
	at	6 x Ir	tr = 16 s								
	at	7.2 x Ir	tr = 11 s								
Thermal memory			20 minutes before and after tripping								
S_0 Short-time protection with fixed time delay											
Pick-up (A) accuracy ±10 %	**Isd** = Ir x ...		1.5	2	3	4	5	6	7	8	10
Time delay (ms)	**tsd**		non-adjustable								
	Non-tripping time		20								
	Maximum break time		80								
I Instantaneous protection											
Pick-up (A) accuracy ±15 %	Ii non-adjustable		600	1500	2400	3000	4800	6900			
	Non-tripping time		10 ms								
	Maximum break time		50 ms								



R Earth leakage protection / Earth leakage alarm											
Sensitivity (A)	Type A, adjustable (9 positions)										
	In = 40 A	IΔn =	0.03	0.03	0.1	0.3	0.5	1	3	5	OFF
	In = 100 A	IΔn =	0.03	0.03	0.1	0.3	0.5	1	3	5	OFF
	In = 160 A	IΔn =	0.03	0.03	0.1	0.3	0.5	1	3	5	OFF
	In = 250 A	IΔn =	0.03	0.03	0.1	0.3	0.5	1	3	5	OFF
	In = 400 A	IΔn =	0.3	0.3	0.5	1	3	5	10	10	OFF
	In = 570 A	IΔn =	0.3	0.3	0.5	1	3	5	10	10	OFF
Time delay Δt (ms)	Adjustable	Δt =	0	60 [2]	150 [2]	500 [2]	1000 [2]				
	Maximum break time (ms)		<40	<140	<300	<800	<1500	ms			

[1] For the use in high temperature environment, take into account the thermal limitation of the breaker.
[2] The time delay (Δt) is mandatory and forced to "Δt = 0" when the IΔn dial is set on 30mA (0.03). The time delay has no effect when the dial IΔn is set to the "OFF" position.

Protection of distribution systems

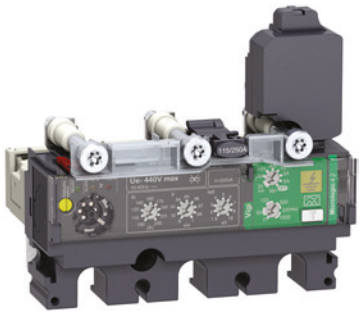
ComPact NSX MicroLogic Vigi 4 trip unit

with integrated earth leakage protection

The ComPact NSX range is now complemented with a new type of MicroLogic trip unit including both circuit protection and earth leakage protection. It means that the earth leakage protection, previously located within the Vigi Add-on, will be integrated within the existing size of the MicroLogic trip unit.
MicroLogic Vigi 4 is compliant with IEC 60947-2 annex B.

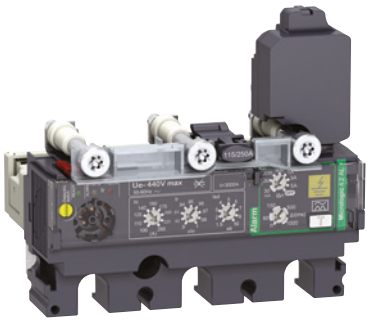
PB119127_L39.eps

LV433803.eps



MicroLogic Vigi 4 (LS_oIR).

LV433887.eps



MicroLogic Vigi 4 AL (LS_oI + Earth Leakage Alarm).

MicroLogic Vigi 4

There are two versions of MicroLogic Vigi 4:
- distribution protection including Earth Leakage Protection (LS_oIR)
- distribution protection including Earth Leakage Alarm (LS_oI + Earth Leakage Alarm).

Protections

Settings are made using the rotary dial with fine adjustment capabilities.

Short circuit and overload protections

Overload: long-time protection (Ir)

Inverse time protection against overload with an adjustable current pick-up Ir set using a dial and a non-adjustable time delay tr.

Short-circuit: short-time protection with fixed time delay (Isd)

That protection is set with an adjustable pick-up Isd. The tripping takes place after a very short time used to allow selectivity with downstream devices.

Short circuit: non-adjustable instantaneous protection (with a fix pick-up)

Neutral protection

- On a 3-pole device, neutral protection is not possible
- On a 4-pole device, neutral protection may be set using the dedicated coding wheel to meet the following configurations: 4P 3D, 4P 3D + N/2 or 4P 4D (same as for MicroLogic 2).

Earth leakage protections

Adjustable leakage threshold (IΔn) and adjustable time delay threshold (Dt) by using the two dials on the green area of the trip unit.

Power supply

The trip unit is self supplied, and so does not need any external source. It works even when fed by 2 phases only.

Sensitivity IΔn (A)

- Type A: 30mA - 100mA - 300mA - 500mA - 1A - 3A - 5A (for the ratings 40 to 250A)
- Type A: 300mA - 500mA - 1A - 3A - 5A - 10A (for the ratings 400 to 570A).

Caution: "OFF" setting of IΔn is possible. It cancels the earth leakage protection, in that case, the circuit breaker with MicroLogic Vigi 4 behaves as a standard circuit breaker. That "OFF" position is located on the highest side of the coding wheel.

Intentional delay IΔt (s)

Case IΔn = 30mA: Δt 0 sec (whatever the setting)
Case IΔn > 30mA: Δt 0 – 60ms – 150ms – 500ms – 1sec (by setting)

Operated voltage

200 to 440 VAC (only) – 50/60 Hz

Operating safety

The earth leakage protection is a user safety device. It must be regularly tested using the test button (T) that simulates a real current leakage within the toroid. When IΔn is set on the OFF position, press the T will cancel any test.
As for standard circuit breaker, the circuit breaker with MicroLogic Vigi 4 can be reset after any fault by operating an OFF/ON procedure.
Specific for the circuit breaker with MicroLogic Vigi 4 Alarm (AL), after testing as well as after a real leakage fault, it can be reset by pressing more than 3 seconds the test button (T), to avoid switching OFF the device.

Protection of distribution systems
ComPact NSX MicroLogic Vigi 4 trip unit
with integrated earth leakage protection

Indications

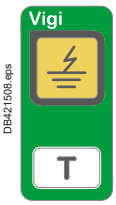
Front indications

- Green "Ready" LED: flashes slowly when the circuit breaker is ready to trip in case of a fault.
- Orange overload pre-alarm LED: steady ON when I > 90% Ir.
- Red overload LED: steady ON when I > 105% Ir.
- Yellow Screen: indicates an earth leakage fault (reset when operating OFF/ON for the "trip" or when pressing >3sec the T button for the Alarm).

Alarming and fault differentiation

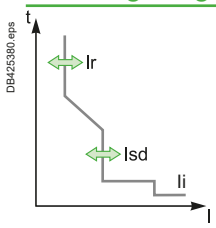
- An overload trip signal can be remotely available by installing an SDx relay module inside the circuit breaker on both "trip" and "alarm" versions.
- An earth leakage trip signal can be remotely available by installing an SDx module, only on the "trip" version.
- An earth leakage alarm signal (MicroLogic Vigi 4 AL) can be remotely available on the SDx, for the circuit breaker with MicroLogic Vigi 4 Alarm".

This module receives the signal from the MicroLogic trip unit via an optical link and makes it available on the terminal block. The signal is reset when the breaker is operated.

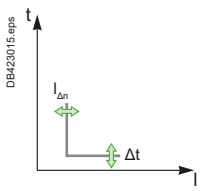


B

MicroLogic Vigi 4



Ratings (A)	In at 40 °C [1]		40	100	160	250	400	570			
Circuit breaker	ComPact NSX100		●	●							
	ComPact NSX160		●	●	●						
	ComPact NSX250		●	●	●	●					
	ComPact NSX400						●				
	ComPact NSX630						●	●			
L Long-time protection											
Pick-up (A)		Io	value depending on the rating (In) and the dial setting								
tripping between 1.05 and 1.20 Ir	In = 40 A	Io =	18	18	20	23	25	28	32	36	40
	In = 100 A	Io =	40	45	50	55	63	70	80	90	100
	In = 160 A	Io =	63	70	80	90	100	110	125	150	160
	In = 250 A	Io =	100	110	125	140	160	175	200	225	250
	In = 400 A	Io =	160	180	200	230	250	280	320	360	400
	In = 570 A	Io =	250	280	320	350	400	450	500	570	570
	Ir = Io x		9 fine adjustment settings from 0.9 to 1 (0.9 – 0.92 ... 0.98 - 1)								
Time delay (s) accuracy 0 to -20%	**tr**		non-adjustable								
	at	1.5 x Ir	tr = 400 s								
	at	6 x Ir	tr = 16 s								
	at	7.2 x Ir	tr = 11 s								
Thermal memory			20 minutes before and after tripping								
S_0 Short-time protection with fixed time delay											
Pick-up (A) accuracy ±10 %	**Isd** = Ir x ...		1.5	2	3	4	5	6	7	8	10
Time delay (ms)	**tsd**		non-adjustable								
	Non-tripping time		20								
	Maximum break time		80								
I Instantaneous protection											
Pick-up (A) accuracy ±15 %	Ii non-adjustable		600	1500	2400	3000	4800	6900			
	Non-tripping time		10 ms								
	Maximum break time		50 ms								



R Earth leakage protection / Earth leakage alarm											
Sensitivity (A)	Type A, adjustable (9 positions)										
	In = 40 A	IΔn =	0.03	0.03	0.1	0.3	0.5	1	3	5	OFF
	In = 100 A	IΔn =	0.03	0.03	0.1	0.3	0.5	1	3	5	OFF
	In = 160 A	IΔn =	0.03	0.03	0.1	0.3	0.5	1	3	5	OFF
	In = 250 A	IΔn =	0.03	0.03	0.1	0.3	0.5	1	3	5	OFF
	In = 400 A	IΔn =	0.3	0.3	0.5	1	3	5	10	10	OFF
	In = 570 A	IΔn =	0.3	0.3	0.5	1	3	5	10	10	OFF
Time delay Δt (ms)	Adjustable	Δt =	0	60 [2]	150 [2]	500 [2]	1000 [2]				
	Maximum break time (ms)		<40	<140	<300	<800	<1500	ms			

[1] For the use in high temperature environment, take into account the thermal limitation of the breaker.
[2] The time delay (Δt) is mandatory and forced to "Δt = 0" when the IΔn dial is set on 30mA (0.03). The time delay has no effect when the dial IΔn is set to the "OFF" position.

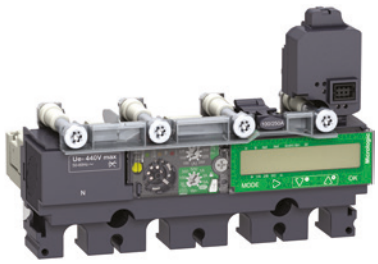
Protection of distribution systems

ComPact NSX MicroLogic Vigi 7 E trip unit with integrated earth leakage protection

The ComPact NSX range is now complemented with a new type of MicroLogic trip unit including circuit protection, metering and earth leakage protection. It means that the earth leakage protection, previously located within the Vigi Add-on, will be integrated within the existing size of the MicroLogic trip unit.
MicroLogic Vigi 7 E is compliant with IEC 60947-2 annex B.

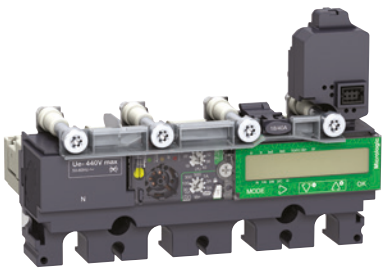
PB119128_L46.eps

LV433882.eps



MicroLogic Vigi 7 E (LSIR).

LV433898.eps



MicroLogic Vigi 7 E AL (LSI + Earth Leakage Alarm).

MicroLogic Vigi 7 E

There are two versions of MicroLogic Vigi 7 E:
- distribution protection including Earth Leakage Protection (LSIR)
- distribution protection including Earth Leakage Alarm (LSI + Earth Leakage Alarm).

Locking Protection - Parameter Settings

Settings are made using the rotary dial or/and the keypad. The protection parameter settings are locked when the transparent cover is closed and sealed to prevent access to the adjustment dials and the locking/unlocking microswitch. But you can display the various parameters using the keypad even when the cover is closed (and sealed).

Short circuit and overload protections

Overload: long time protection (Ir)

Inverse time protection against overload with an adjustable current pick-up Ir set using the dial or the keypad for fine adjustments. The adjustable time delay tr is set using the keypad only.

Short-circuit: short circuit protection (Isd)

That protection is with an adjustable pick-up Isd and an adjustable time delay tsd. It is possible to include a portion of an inverse time curve (I^2t On).

Short circuit: Instantaneous protection (Ii)

Instantaneous protection with an adjustable protection pick-up Ii.

Neutral protection

- On a 4-pole device, the neutral protection may be set using the dedicated coding wheel to meet the following configurations: 4P 3D, 4P 3D + N/2 or 4P 4D (same as for MicroLogic 5)
- OSN (oversized neutral protection) at 1.6 times the phase pick-up value; useful where there is an high level of 3rd order harmonics (or multiple of 3) that create an over-current within the neutral. In that case the device has to be limited to Ir = In x 0.63 (for each phase) to allow the neutral protection setting to 1.6 x Ir.

Earth leakage protections

Adjustable leakage threshold (IΔn) using the dial only (without any use of the keypad for fine-tuning) and an adjustable time delay threshold (Δt) using the keypad only.

Power supply

The MicroLogic trip unit is powered with its own current in order to guarantee the protection functions.
If there is no optional external 24 VDC power supply, the MicroLogic trip unit only works when the circuit breaker is closed. When the circuit breaker is open or the through current is low (15 to 50 A depending on the rating), the MicroLogic trip unit is no longer powered and its display switches off.
An external 24 VDC power supply for the MicroLogic trip unit is optional for:
- modifying the setting values when the circuit breaker is open
- displaying measurements when there is a low current through the circuit breaker (15 to 50 A depending on the rating) when the circuit breaker is closed
- continuing to display the reason for the trip and the breaking current when the circuit breaker is open.

Sensitivity IΔn (A)

- Type A: 30mA - 100mA - 300mA - 500mA - 1A – 3A - 5A (for the ratings 40 to 250A)
- Type A: 300mA - 500mA - 1A – 3A - 5A – 10A (for the ratings 400 to 570A)

Caution: "OFF" setting of IΔn is possible, it cancels the earth leakage protection, in that case, the circuit breaker with MicroLogic Vigi 4 behaves as a standard circuit breaker. "OFF" position is located on the highest side of the coding wheel.

Intentional delay IΔt (s)

- Case IΔn = 30mA: Δt 0 sec
- Case IΔn > 30mA: Δt 0 – 60ms – 150ms – 500ms – 1sec

Operated voltage

200 to 440 VAC (only) – 50/60 Hz

Operating safety

The earth leakage protection is a user safety device. It must be regularly tested using the test button (T) that simulates a real current leakage within the toroid. When IΔn is set on the OFF position, press the T will cancel any test. As for the standard circuit breaker, the circuit breaker with MicroLogic Vigi 7 E ("Trip" or "Alarm" version) can be reset after any fault by using the keypad.
The MicroLogic Vigi 7 E allows you to set-up a specific "(T) test without tripping" procedure using the keypad.

Display of the type of fault

On a trip, the root cause of the fault (phase and interrupted current) are displayed. An external power supply is needed to ensure this function.

Protection of distribution systems
ComPact NSX MicroLogic Vigi 7 E trip unit
with integrated earth leakage protection

Indications

Front indication

- Green “Ready” LED: flashes slowly when the circuit breaker is ready to trip in case of a fault.
- Orange overload pre-alarm LED: steady ON when I > 90% Ir.
- Red overload LED: steady ON when I > 105 % Ir.

Written on keypad: earth leakage fault indication (reset using the keypad) for both "Trip" & "Alarm".

Alarming and fault differentiation

An SDx relay module can be installed inside the earth leakage circuit breaker to remotely access to the following data:

- Overload pre-Alarm
- Overload trip
- Earth leakage pre-alarm (useful for the "trip" version of the circuit breaker with MicroLogic Vigi 7 E only)
- Earth leakage trip (exist for the "trip" version of thecircuit breaker with MicroLogic Vigi 7 E only)
- Earth leakage Alarm without "trip" (circuit breaker with MicroLogic Vigi 7 E AL version only).

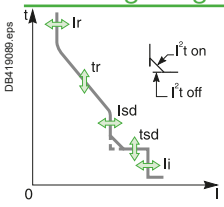
This module receives the signal from the MicroLogic electronic trip unit via an optical link and makes it available on the terminal block. The signal is reset when the breaker is operated.
These outputs can be reprogrammed to be assigned to other types of tripping or alarm. The module is deeper described in the section dealing with accessories.

Protection of distribution systems

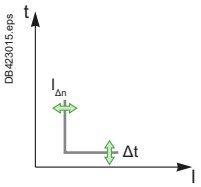
ComPact NSX MicroLogic Vigi 7 E trip unit

with integrated earth leakage protection

MicroLogic Vigi 7 E



Ratings (A)	In at 40 °C [1]		40 [2]	100	160	250	400	570
Circuit breaker	ComPact NSX100		◉	◉				
	ComPact NSX160		◉	◉	◉			
	ComPact NSX250		◉	◉	◉	◉		
	ComPact NSX400						◉	
	ComPact NSX630						◉	◉
L Long-time protection								
Pick-up (A)	Dial setting		value depending on the rating (In) and the dial setting					
	Ir							
tripping between 1.05 and 1.20 Ir	In = 40 A	Io =	18	18	20	23	25	28	32	36	40
	In = 100 A	Io =	40	45	50	55	63	70	80	90	100
	In = 160 A	Io =	63	70	80	90	100	110	125	150	160
	In = 250 A	Io =	100	110	125	140	160	175	200	225	250
	In = 400 A	Io =	160	180	200	230	250	280	320	360	400
	In = 570 A	Io =	250	280	320	350	400	450	500	570	570
	Keypad setting		fine adjustment in 1A step below the max value set on the dial								
Time delay (s) accuracy 0 to -20%	**tr**										
	Keypad setting		0.5		1	2	4	8	16		
	at	1.5 x Ir	15		25	50	100	200	400		
	at	6 x Ir	0.5		1	2	4	8	16		
	at	7.2 x Ir	0.35		0.7	1.4	2.8	5.5	11		
Thermal memory			20 minutes before and after tripping								
S Short-time protection with adjustable time delay											
Pick-up (A) accuracy ±10 %	**Isd** = Ir x ... keypad settings		Adjustment in steps of 0.5 x Ir over the range 1.5 x Ir to 10 x Ir								
Time delay (ms)	**tsd**		I²Of	0	0.1	0.2	0.3	0.4			
	Keypad		I²On	-	0.1	0.2	0.3	0.4			
	Non-tripping time (ms)			20	80	140	230	350			
	Maximum break time			80	140	200	320	500			
I Instantaneous protection											
Pick-up (A) accuracy ±15 %	**Ii** = In x		Adjustment in steps of 0.5 x In over the range 1.5 x In to:								
	Keypad settings		15 x In (40 to 160A), 12 x In (250 to 400A), or 12 x In (570A)								
	Non-tripping time		10 ms								
	Maximum break time		50 ms								
R Earth leakage protection / Earth leakage alarm											
Sensitivity (A)	Type A, adjustable (9 positions)										
	In = 40 A	IΔn =	0.03	0.03	0.1	0.3	0.5	1	3	5	OFF
	In = 100 A	IΔn =	0.03	0.03	0.1	0.3	0.5	1	3	5	OFF
	In = 160 A	IΔn =	0.03	0.03	0.1	0.3	0.5	1	3	5	OFF
	In = 250 A	IΔn =	0.03	0.03	0.1	0.3	0.5	1	3	5	OFF
	In = 400 A	IΔn =	0.3	0.3	0.5	1	3	5	10	10	OFF
	In = 570 A	IΔn =	0.3	0.3	0.5	1	3	5	10	10	OFF
Time delay Δt (ms)	Adjustable keypad	Δt =	0	60 [3]	150 [3]	500 [3]	1000 [3]				
	Maximum break time (ms)		<40	<140	<300	<800	<1500				



[1] For the use in high temperature environment, take into account the thermal limitation of the breaker.
[2] For the rating 40A, the N/2 adjustment is not possible
[3] The time delay (Δt) is mandatory and designed "Δt = 0" when the IΔn dial is set on 30mA (0.03). The time delay has no effect when the dial IΔn is set to the "OFF" position.

B

Characteristics and performance
ComPact NSX circuit breakers from 100 to 250 A up to 690 V


pb107518_15.eps

ComPact NSX single-pole.


PB107524_23.eps

ComPact NSX two-pole.

ComPact circuit breakers				NSX100						NSX160						NSX250
Number of poles				1			2			1			2			1
Control	manual	toggle		◉			◉			◉			◉			◉
		direct or extended rotary handle		-			-			-			-			-
	electric			-			-			-			-			-
Connections	fixed	front connection		◉			◉			◉			◉			◉
		rear connection		◉			◉			◉			◉			◉
	withdrawable	front connection		-			-			-			-			-
		rear connection		-			-			-			-			-
Electrical characteristics as per IEC/EN 60947-2																
Rated current (A)	**In**	40 °C		100			100			160			160			250
Rated insulation voltage (V)	**Ui**			750			750			750			750			750
Rated impulse withstand voltage kV)	**Uimp**			8			8			8			8			8
Rated operational voltage (V)	**Ue**	AC 50/60 Hz		277			690			277			690			277
		DC		250			500			250			500			-
Type of circuit breaker				F	N	M	F	M	S	F	N	M	F	M	S	N
Ultimate breaking capacity (kA rms)	**Icu**	AC 50/60 Hz	220/240 V	18	25	40	36	85	100	18	25	40	36	85	100	25
			380/415 V	-	-	-	18	25	70	-	-	-	18	25	70	-
			440 V	-	-	-	15	25	65	-	-	-	15	25	65	-
			500/525 V	-	-	-	10	18	35	-	-	-	10	18	35	-
			660/690 V	-	-	-	5	8	10	-	-	-	5	8	10	-
		DC	250 V (1P)	36	50	85	36	85	100	36	50	85	36	85	100	-
			500 V (2P)	-	-	-	36	85	100	-	-	-	36	85	100	-
Service breaking capacity (kA rms)	**Ics**	% Icu		100 %			100 %			100 %			100 %			100 %
Suitability for isolation				◉			◉			◉			◉			◉
Utilisation category				A			A			A			A			A
Durability (C-O cycles)	mechanical			20000			20000			20000			20000			10000
	electrical	277 V	In/2	20000			20000			20000			20000			10000
			In	10000			10000			10000			10000			5000

Protection and measurements																
Type of trip units				built-in thermal-magnetic						built-in thermal-magnetic						built-in thermal-magnetic
Ratings		**In**		16	20	25	30	40	50	63	80	100	125	160		160	200	250
Overload protection (thermal)	long time	**Ir**		fixed									fixed			fixed		
	threshold			16	20	25	30	40	50	63	80	100	125	160		160	200	250
Short-circuit protection (magnetic)	instantaneous	**Im**		fixed									fixed			fixed		
	pickup		value indicated for AC [1]	190	190	300	300	500	500	500	640	800	1000	1250		850	850	850
			real value for DC	260	260	400	400	700	700	700	800	1000	1200	1250		-	-	-
Add-on earth-leakage protection	Vigi add-on			-					-				-		-	-		
	combination with Vigirex relay			-					◉				-		◉	-		
Additional indication and control auxiliaries																
Indication contacts				-					◉				-		◉	-		
Voltages releases	MX shunt release			-					◉				-		◉	-		
	MN undervoltage release			-					◉				-		◉	-		
Installation																
Accessories	terminal extensions and spreaders			◉					◉				◉		◉	◉		
	terminal shields and interphase barriers			◉					◉				◉		◉	◉		
	escutcheons			◉					◉				◉		◉	◉		
Dimensions (mm)	W x H x D			35 x 161 x 86					70 x 161 x 86				35 x 161 x 86		70 x 161 x 86	35 x 161 x 86		
Weight (kg)				0.7					1.2				0.7		1.2	0.7		
Source changeover system																
Manual mechanical interlocking				◉					◉				◉		◉	◉		

[1] The thresholds for TMD and TMG 1-pole and 2-pole magnetic trip units up to 63 A are indicated for AC. The real DC thresholds are indicated on the following line.

Select your circuit breakers and switch-disconnectors
www.se.com
Characteristics and performance
ComPact NSX circuit breakers from 100 to 250 A up to 690 V
A

Characteristics and performance
ComPact NSXm switch-disconnectors from 50 to 160 A NA

Installation standards require upstream protection.
However ComPact NSXm 50 to 160 NA switch-disconnectors are self-protected by their high-set magnetic release.

ComPact NSXm switch-disconnectors.

Common characteristics				
Rated voltages	Insulation voltage (V)	Ui		800
	Impulse withstand voltage (kV)	Uimp		8
	Operational voltage (V)	Ue	AC 50/60 Hz	690
Suitability for isolation			IEC/EN 60947-3	yes
Utilisation category			AC 22 A/AC 23 A	
Pollution degree			IEC 60664-1	3

Common characteristics		
Control	Manual	With toggle ◉
		With direct or extended rotary handle ◉
		With side rotary handle ◉
Versions	Fixed	◉

Switch-disconnectors				NSXm50NA	NSXm100NA	NSXm160NA
Electrical characteristics as per IEC/EN 60947-3						
Conventional thermal current (A)	Ith 40 °C			**50**	**100**	**160**
Number of poles				3, 4	3, 4	3, 4
Operational current (A) depending on the utilisation category	Ie	AC 50/60 Hz		**AC22A / AC23A**	**AC22A / AC23A**	**AC22A / AC23A**
			220/240 V	50	100	160 / 100
			380/415 V	50	100	160 / 100
			440/480 V	50	100	160 / 100
			500/525 V	50	100	160 / 100
			660/690 V	50	100	160 / 100
Short-circuit making capacity (kA peak)	Icm	min. (switch-disconnector alone)		1.28	2.13	2.13
		max. (protection by upstream circuit breaker)		150	150	150
Rated short-time withstand current (A rms)	Icw	for	1 s	900	1500	1500
			3 s	900	1500	1500
			20 s	200	335	335
Durability (C-O cycles)	mechanical			20000	20000	20000
	electrical AC			**AC22A / AC23A**	**AC22A / AC23A**	**AC22A / AC23A**
		440 V	Ie/2	20000 / 20000	20000 / 20000	20000 / 20000
			Ie	10000 / 10000	10000 / 10000	10000 / 10000
		690 V	Ie/2	10000 / 6000	10000 / 6000	10000 / 6000
			Ie	5000 / 3000	5000 / 3000	5000 / 3000
Positive contact indication				◉	◉	◉
Pollution degree				3	3	3
Additional indication and control auxiliaries						
Indication contacts				◉	◉	◉
Voltage releases	MX shunt trip release			◉	◉	◉
	MN undervoltage release			◉	◉	◉
Installation / connections						
Dimensions and weights						
Dimensions (mm) W x H x D		3P		81 x 137 x 80		
		4P		108 x 137 x 80		
Weight (kg)		3P		1.06		
		4P		1.42		
Connections						
Pitch (mm)		Standard		27		
		With spreaders		35		
EverLink lug Cu or Al [1] cables	Cross-section (mm²)	Rigid		95		
		Flexible		70		
Crimp lugs Cu or Al	Cross-section (mm²)	Rigid		120		
		Flexible		95		
Source-changeover systems						
Manual mechanical interlocking				◉		

[1] Al up to 100 A.

www.se.com
Select your circuit breakers and switch-disconnectors
Characteristics and performance
ComPact NSXm switch-disconnectors from 50 to 160 A NA
A

Characteristics and performance
ComPact NSX switch-disconnectors from 100 to 630 A NA

Installation standards require upstream protection. However ComPact NSX100 to 630 NA switch-disconnectors are self-protected by their high-set magnetic release.


PB119115.eps

ComPact NSX100 to 250 NA.


PB119116.eps

ComPact NSX400 to 630 NA.

> Discover our specific switch-disconnectors offer:
ComPact INS/INV

LVPED213024EN

[1] 2P in 3P case.

Common characteristics

Rated voltages	Insulation voltage (V)	Ui		800
	Impulse withstand voltage (kV)	Uimp		8
	Operational voltage (V)	Ue	AC 50/60 Hz	690
Suitability for isolation			IEC/EN 60947-3	yes
Utilisation category		AC 22 A/AC 23 A - DC 22 A/DC 23 A		
Pollution degree			IEC 60664-1	3

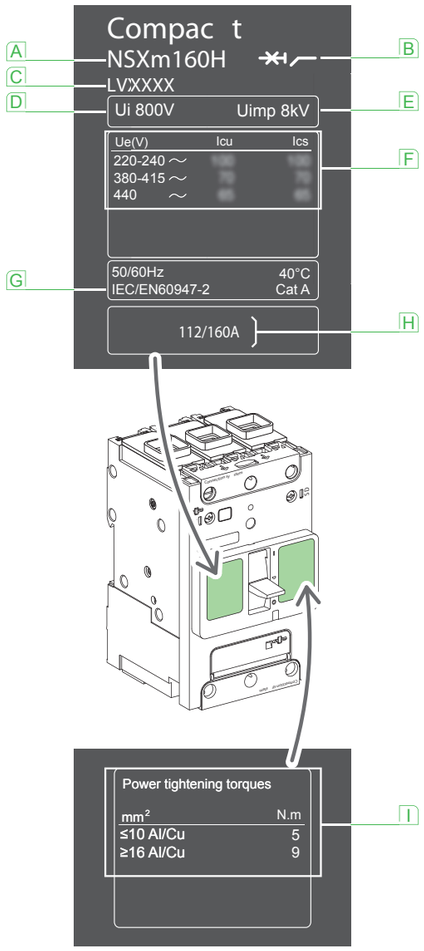
Common characteristics

Control	Manual	With toggle	◉
		With direct or extended rotary handle	◉
	Electrical	With remote control	◉
Versions	Fixed		◉
	Withdrawable	Plug-in base	◉
		Chassis	◉

Switch-disconnectors				NSX100NA	NSX160NA	NSX250NA	NSX400NA	NSX630NA
Electrical characteristics as per IEC/EN 60947-3								
Conventional thermal current (A)	Ith 60 °C			**100**	**160**	**250**	**400**	**630**
Number of poles				2 [1], 3, 4	2 [1], 3, 4	2 [1], 3, 4	3, 4	3, 4
Operational current (A) depending on the utilisation category	Ie	AC 50/60 Hz		**AC22A / AC23A**	**AC22A / AC23A**	**AC22A / AC23A**	**AC22A / AC23A**	**AC22A / AC23A**
			220/240 V	100	160	250	400	630
			380/415 V	100	160	250	400	630
			440/480 V	100	160	250	400	630
			500/525 V	100	160	250	400	630
			660/690 V	100	160	250	400	630
		DC		**DC22A / DC23A**	**DC22A / DC23A**	**DC22A / DC23A**	**-**	**-**
			250 V (1 pole)	100	160	250	-	-
			500 V (2 poles in series)	100	160	250	-	-
			750 V (3 poles in series)	100	160	250	-	-
Short-circuit making capacity (kA peak)	Icm	min. (switch-disconnector alone)		2.6	3.6	4.9	7.1	8.5
		max. (protection by upstream circuit breaker)		330	330	330	330	330
Rated short-time withstand current (A rms)	Icw	for	1 s	1800	2500	3500	5000	6000
			3 s	1800	2500	3500	5000	6000
			20 s	690	960	1350	1930	2320
Durability (C-O cycles)	mechanical			50000	40000	20000	15000	15000
	electrical	AC		**AC22A / AC23A**	**AC22A / AC23A**	**AC22A / AC23A**	**AC22A / AC23A**	**AC22A / AC23A**
			440 V In/2	35000	30000	15000	10000	6000
			In	20000	15000	7500	5000	3000
			690 V In/2	15000	10000	6000	5000	3000
			In	8000	5000	3000	2500	1500
		DC	250 V (1 pole) and 500 V (2 poles in series) In/2	10000	10000	10000	-	-
			In	5000	5000	5000	-	-
Positive contact indication				◉	◉	◉	◉	◉
Pollution degree				3	3	3	3	3
Protection								
Add-on earth-leakage protection	By Vigi add-on			◉			◉	
	By Vigirex relay			◉			◉	
Additional indication and control auxiliaries								
Indication contacts				◉			◉	
Voltages releases	MX shunt release			◉			◉	
	MN undervoltage release			◉			◉	
Voltage-presence indicator				◉			◉	
Current-transformer module				◉			◉	
Ammeter module				◉			◉	
Insulation monitoring module				◉			◉	
Remote communication by bus								
Device-status indication				◉			◉	
Device remote operation				◉			◉	
Operation counter				◉			◉	
Installation / connections								
Dimensions (mm)	fixed, front connections	2/3P		105 x 161 x 86			140 x 255 x 110	
W x H x D		4P		140 x 161 x 86			185 x 255 x 110	
Weight (kg)	fixed, front connections	3P		1.5 to 1.8			5.2	
		4P		2.0 to 2.2			6.8	
Source-changeover systems (see chapter on Source-changeover systems)								
Manual mechanical interlocking				◉			◉	
Automatic source-changeover				◉			◉	

www.se.com
Select your circuit breakers and switch-disconnectors
Characteristics and performance
ComPact NSX switch-disconnectors from 100 to 630 A NA

DB425628.eps



Standardised characteristics indicated on the rating plate:
- A Type of device: frame size and breaking capacity class
- B Circuit breaker/switch-disconnector symbol.
- C Commercial reference.
- D Ui: rated insulation voltage.
- E Uimp: rated impulse withstand voltage.
- F Ue: operational voltage.
- G Reference standard.
- H Circuit breaker rating.
- I Power connections tightening torques.

Note: when the circuit breaker is equipped with an extended rotary handle, the door must be opened to access the rating plate.

DB410174.eps

Green Premium™ Product

Compliance with standards

ComPact NSX and NSXm circuit breakers and switch-disconnectors comply with the following:
- b international standards:
  - v IEC 60947-1: general rules
  - v IEC 60947-2: circuit breakers
  - v IEC 60947-3: switch-disconnectors
  - v IEC 60947-4-1: contactors and motor starters [1]
  - v IEC 60947-5-1 and following: control circuit devices and switching elements; automatic control components
- b European standards (EN 60947-1, EN 60947-2, EN 60947-3 and EN 60947-5-1):
  - v China CCC
  - v EAC (Customs Union)
- b the specifications of the marine classification companies (Veritas, Lloyd's Register of Shipping, Det Norske Veritas, etc.), recommendations issued by the CNOMO organisation for the protection of machine tools.

Pollution degree

ComPact NSX and NSXm circuit breakers and switch-disconnectors are certified for operation in pollution degree 3 environments as defined by IEC standards 60947-1 and 60664-1 (industrial environments).

Climatic withstand

ComPact NSX and NSXm circuit breakers have successfully passed the tests defined by the following standards for extreme atmospheric conditions.
Dry cold and dry heat:
- b IEC 60068-2-1: dry cold at -55 °C
- b IEC 60068-2-2: dry heat at +85 °C.

Damp heat (tropicalization)
- b IEC 60068-2-30: damp heat (temperature + 55 °C and relative humidity of 95 %).
- b IEC 60068-2-52: severity 2 - Cycling salt mist.

Environment

ComPact NSX and NSXm respects the European environment directive EC/2002/95 concerning the restriction of hazardous substances (RoHS) and is Green Premium.
Product environment profiles (PEP) have been prepared, describing the environmental impact of every product throughout its life cycle, from production to the end of its service life.
All ComPact production sites have set up an environmental management system certified ISO 14001.
Each factory monitors the impact of its production processes. Every effort is made to prevent pollution and to reduce consumption of natural resources.

Ambient temperature

- b ComPact NSX and NSXm circuit breakers may be used between -25 °C and +70 °C. For temperatures higher than 40 °C, (For ComPact NSX: +65 °C for circuit breakers used to protect motor feeders) devices must be derated (pages E-8 to E-9 and E-14 to E-17).
- b Circuit breakers should be put into service under normal ambient, operating-temperature conditions. Exceptionally, the circuit breaker may be put into service when the ambient temperature is between -35 °C and -25 °C.
- b The permissible storage temperature range for ComPact NSX and NSXm circuit breakers in the original packing is -50 °C [2] [3] and +85 °C.

[1] For ComPact NSX
[2] For ComPact NSXm: - 40 °C for ComPact NSXm MicroLogic Vigi 4.1.
[3] For ComPact NSX: -40 °C for MicroLogic control units with an LCD screen and MicroLogic Vigi 4.

Electromagnetic compatibility

ComPact NSX and NSXm devices are protected against:
- b overvoltages caused by circuit switching (e.g. lighting circuits)
- b overvoltages caused by atmospheric disturbances
- b devices emitting radio waves such as mobile telephones, radios, walkie-talkies, radar, etc.
- b electrostatic discharges produced by users.

Immunity levels for ComPact NSXm comply with the standards below.
- b IEC/EN 60947-2: Low-voltage switchgear and controlgear, part 2: Circuit breakers:
  - v Annex F: Immunity tests for circuit breakers with electronic protection
  - v Annex B: Immunity tests for residual current protection
- b IEC/EN 61000-4-2: Electrostatic-discharge immunity tests
- b IEC/EN 61000-4-3: Radiated, radio-frequency, electromagnetic-field immunity tests
- b IEC/EN 61000-4-4: Electrical fast transient/burst immunity tests
- b IEC/EN 61000-4-5: Surge immunity tests
- b IEC/EN 61000-4-6: Immunity tests for conducted disturbances induced by radio-frequency fields
- b IEC/EN 61000-4-8: Power frequency magnetic field immunity test
- b IEC/EN 61000-4-11: Voltage dips, short interruptions and voltage variations immunity tests
- b CISPR 11: Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement.

Suitable for isolation with positive contact indication

All ComPact NSX and NSXm devices are suitable for isolation as defined in IEC standard 60947-2:
- b The isolation position corresponds to the O (OFF) position.
- b The operating handle cannot indicate the OFF position unless the contacts are effectively open.
- b Padlocks may not be installed unless the contacts are open.

Installation of a rotary handle or a motor mechanism does not alter the reliability of the position-indication system.
The isolation function is certified by tests guaranteeing:
- b the mechanical reliability of the position-indication system
- b the absence of leakage currents
- b overvoltage withstand capacity between upstream and downstream connections.

The tripped position does not insure isolation with positive contact indication.
Only the OFF position guarantees isolation.

Installation in class II switchboards

All ComPact NSX and NSXm devices are class II front face devices. They may be installed through the door of class II switchboards (as per IEC standards 61140 and 60664-1) without downgrading switchboard insulation. Installation requires no special operations, even when the circuit breaker is equipped with a rotary handle or a motor mechanism.

Degree of protection

The following indications are in accordance with standards IEC 60529 (IP degree of protection) and IEC 62262 (IK protection against external mechanical impacts).

Bare circuit breaker with terminal shields

- b With toggle: IP40, IK07.
- b With direct rotary handle: IP40 IK07.

Circuit breaker installed in a switchboard

ComPact NSXm
- b With toggle: IP40, IK07.
- b With direct rotary handle: IP40, IK07.
- b With extended rotary handle: IP54 or IP65 IK08
- b With side rotary handle: IP54 or IP65 IK08.

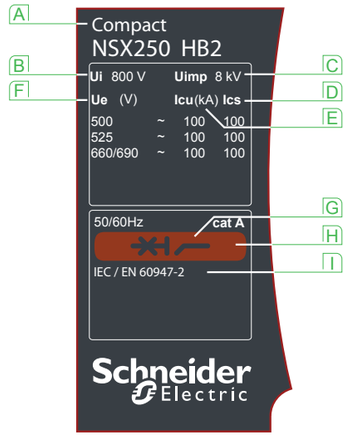
ComPact NSX
- b With toggle: IP40, IK07.
- b With direct rotary handle:
  - v standard / VDE: IP40, IK07
  - v MCC: IP43 IK07
  - v CNOMO: IP54 IK08
- b With extended rotary handle: IP55 IK08
- b With motor mechanism: IP40 IK07.

For more detail about IP, see page E-7.

Select your circuit breakers and switch-disconnectors
www.se.com
General characteristics of the ComPact range

A

DB413275.eps

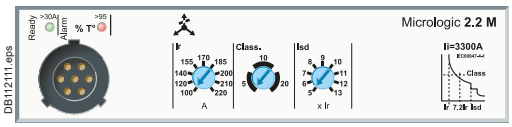


Standardised characteristics indicated on the rating plate:
- A Type of device: frame size and breaking capacity class
- B Ui: rated insulation voltage.
- C Uimp: rated impulse withstand voltage.
- D Ics: service breaking capacity.
- E Icu: ultimate breaking capacity for various values of the rated operational voltage Ue
- F Ue: operational voltage.
- G Circuit breaker/switch-disconnector symbol.
- H Colour label indicating the breaking capacity class.
- I Reference standard.

Note: when the circuit breaker is equipped with an extended rotary handle, the door must be opened to access the rating plate.

ComPact NSX motor protection
MicroLogic 2.2 / 2.3 M electronic trip units

MicroLogic 2.2 / 2.3 M trip units provide built-in thermal and magnetic protection. They are used in 2 devices motor-feeder solutions on ComPact NSX100 to 630 circuit breakers with performance levels B/F/H/N/S/L.
They provide protection for motors up to 315 kW at 400 V against:
- short-circuits
- overloads with selection of a trip class (5, 10 or 20)
- phase unbalance.



DB112111.eps

Circuit breakers with a MicroLogic 2.2 / 2.3 M trip unit include protection similar to an inverse-time thermal relay. They are combined with a contactor.

Protection

Settings are made using a dial.

Overloads (or thermal protection): Long-time protection and trip class (Ir)
Inverse-time thermal protection against overloads with adjustable pick-up Ir.
Settings are made in amperes. The tripping curve for the long-time protection, which indicates the time delay **tr** before tripping, is defined by the selected trip class.

Trip class (class)
The class is selected as a function of the normal motor starting time.
- Class 5: starting time less than 5 s.
- Class 10: starting time less than 10 s.
- Class 20: starting time less than 20 s.

For a given class, it is necessary to check that all motor-feeder components are sized to carry the 7.2 Ir starting current without excessive temperature rise during the time corresponding to the class.

Short-circuits: Short-time protection (Isd)
Protection with an adjustable pick-up **Isd**. There is a very short delay to let through motor starting currents.

Short-circuits: Non-adjustable instantaneous protection (Ii)
Instantaneous protection with non-adjustable pick-up **Ii**.

Phase unbalance or phase loss (Iunbal) ( )
This function opens the circuit breaker if a phase unbalance occurs:
- that is greater than the 30 % fixed pick-up **Iunbal**
- following the non-adjustable time delay **tunbal** equal to:
  - 0.7 s during starting
  - 4 s during normal operation.

Phase loss is an extreme case of phase unbalance and leads to tripping under the same conditions.

Indications

Front indications
- Green “Ready” LED: flashes slowly when the circuit breaker is ready to trip in the event of a fault.
- Red alarm LED for motor operation: goes ON when the thermal image of the rotor and stator is greater than 95 % of the permissible temperature rise.

Remote indications via SDTAM module
ComPact NSX devices with a MicroLogic 2 can be equipped with an SDTAM module dedicated to motor applications for:
- a contact to indicate circuit-breaker overload
- a contact to open the contactor. In the event of a phase unbalance or overload, this output is activated 400 ms before circuit-breaker tripping to open the contactor and avoid circuit breaker tripping.

This module takes the place of the MN/MX coils and an OF contact.

PB103376.eps

SDTAM remote indication relay module with its terminal block.

Note: all the trip units have a transparent lead-sealable cover that protects access to the adjustment dials.

ComPact NSX motor protection
MicroLogic 6 E-M electronic trip units

Display of type of fault

On a fault trip, the type of fault (Ir, Isd, Ii, Ig, Iunbal, Ijam), the phase concerned and the interrupted current are displayed.

Indications

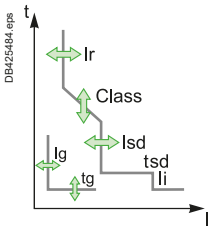
Front indications

- Green “Ready” LED: flashes slowly when the circuit breaker is ready to trip in the event of a fault.
- Red alarm LED for motor operation: goes ON when the thermal image of the rotor or stator is greater than 95% of the permissible temperature rise.

Remote indications via SDTAM or SDx module

See description on page C-31 for SDTAM and for SDx.

MicroLogic 6.2 / 6.3 E-M



Ratings (A)	In at 65 °C [1]	25	50	80	150	220	320	500
Circuit breaker	ComPact NSX100	◉	◉	◉	-	-	-	-
	ComPact NSX160	◉	◉	◉	◉	-	-	-
	ComPact NSX250	◉	◉	◉	◉	◉	-	-
	ComPact NSX400	-	-	-	-	-	◉	-
	ComPact NSX630	-	-	-	-	-	◉	◉

L Overloads: Long-time protection

Pick-up (A)	**Ir**	Dial setting		Value depending on trip-unit rating (In) and setting on dial							
Tripping between 1.05 and 1.20 Ir		In = 25 A	Ir =	12	14	16	18	20	22	23	24	25
		In = 50 A	Ir =	25	30	32	36	40	42	45	47	50
		In = 80 A	Ir =	35	42	47	52	57	60	65	72	80
		In = 150 A	Ir =	70	80	90	100	110	120	130	140	150
		In = 220 A	Ir =	100	120	140	155	170	185	200	210	220
		In = 320 A	Ir =	160	180	200	220	240	260	280	300	320
		In = 500 A	Ir =	250	280	320	350	380	400	440	470	500
		Keypad setting		Fine adjustments in 1 A steps below maximum value defined by dial setting								
Trip class as per IEC 60947-4-1				5	10	20	30					
Time delay (s)	**tr**		1.5 x Ir	120	240	480	720	for warm motor				
depending on selected trip class			6 x Ir	6.5	13.5	26	38	for cold motor				
			7.2 x Ir	5	10	20	30	for cold motor				
Thermal memory				20 minutes before and after tripping								
Cooling fan				Settings for self-cooled or fan-cooled motors								

S_n Short-circuits: Short-time protection with fixed time delay

Pick-up (A) accuracy ±15 %	**Isd** = Ir x ...		5	6	7	8	9	10	11	12	13
			Fine adjustment In 0.5 x Ir steps using the keypad								
Time delay	**tsd**		non-adjustable								
	Non-tripping time		10 ms								
	Maximum break time		60 ms								

I Short-circuits: Non-adjustable instantaneous protection

Pick-up (A) accuracy ±15 %	**Ii** non-adjustable	425	750	1200	2250	3300	4800	6500	
	Non-tripping time	0 ms							
	Maximum break time	30 ms							

G Ground faults

Pick-up (A) accuracy ±10 %	**Ig** = In x ...		Dial setting								
		In = 25 A	Ig =	0.6	0.6	0.6	0.6	0.7	0.8	0.9	1	Off
		In = 50 A	Ig =	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	Off
		In > 50 A	Ig =	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1	Off
				fine adjustments in 0.05 x In steps								
Time delay (ms)	**tg**			0	0.1	0.2	0.3	0.4				
	Non-tripping time			20	80	140	230	350				
	Maximum break time			80	140	200	320	500				

[1] Motor standards require operation at 65 °C. Circuit-breaker ratings are derated to take this requirement into account (see pages E-14 to E-17).
[2] The unbalance measurement takes into account the most unbalanced phase with respect to the average current.

Additional technical characteristics

Phase unbalance
An unbalance in three-phase systems occurs when the three voltages are not equal in amplitude and/or not displaced 120° with respect to each other. It is generally due to single-phase loads that are incorrectly distributed throughout the system and unbalance the voltages between the phases.
These unbalances create negative current components that cause braking torques and temperature rise in asynchronous machines, thus leading to premature ageing.

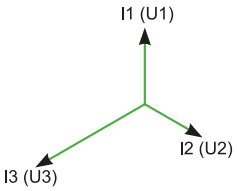
Phase loss
Phase loss is a special case of phase unbalance.
- During normal operation, it produces the effects mentioned above and tripping must occur after four seconds.
- During starting, the absence of a phase may cause motor reversing, i.e. it is the load that determines the direction of rotation. This requires virtually immediate tripping (0.7 seconds).

Starting time in compliance with the class (MicroLogic 2 M)
For normal motor starting, MicroLogic 2 M checks the conditions below with respect to the thermal-protection (long-time) pick-up Ir:
- current > 10 % x Ir (motor-off limit)
- overrun of 1.5 x Ir threshold, then return below this threshold before the end of a 10 s time delay.

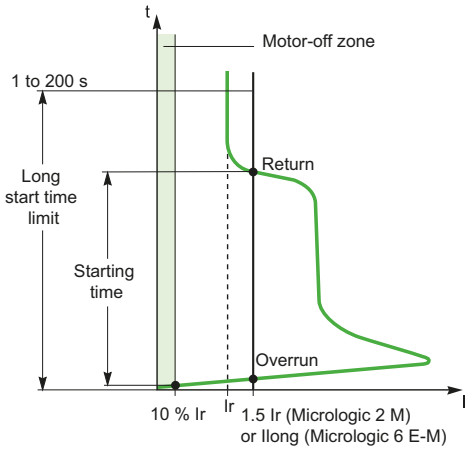
If either of these conditions is not met, the thermal protection trips the device after a maximum time equal to that of the selected class.
Pick-up Ir must have been set to the current indicated on the motor rating plate.

Long starts (MicroLogic 6 E-M)
When this function is not activated, the starting conditions are those indicated above.
When it is activated, this protection supplements thermal protection (class).
A long start causes tripping and is characterised by:
- current > 10 % x Ir (motor-off limit) with:
- either overrun of the long-time pick-up (1 to 8 x Ir) without return below the pick-up before the end of the long-time time delay (1 to 200 s)
- or no overrun of the long-time pick-up (1 to 8 x Ir) before the end of the long-time time delay (1 to 200 s).

Pick-up Ir must have been set to the current indicated on the motor rating plate.
This protection should be coordinated with the selected class.



Unbalance of phase currents and voltages.



Motor starting and long starts.

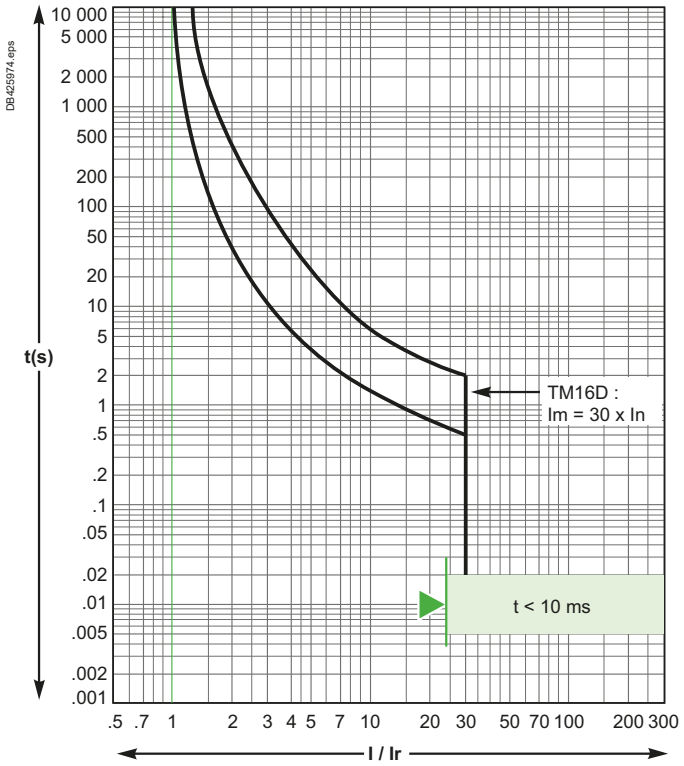
B

ComPact NSXm up to 160 A

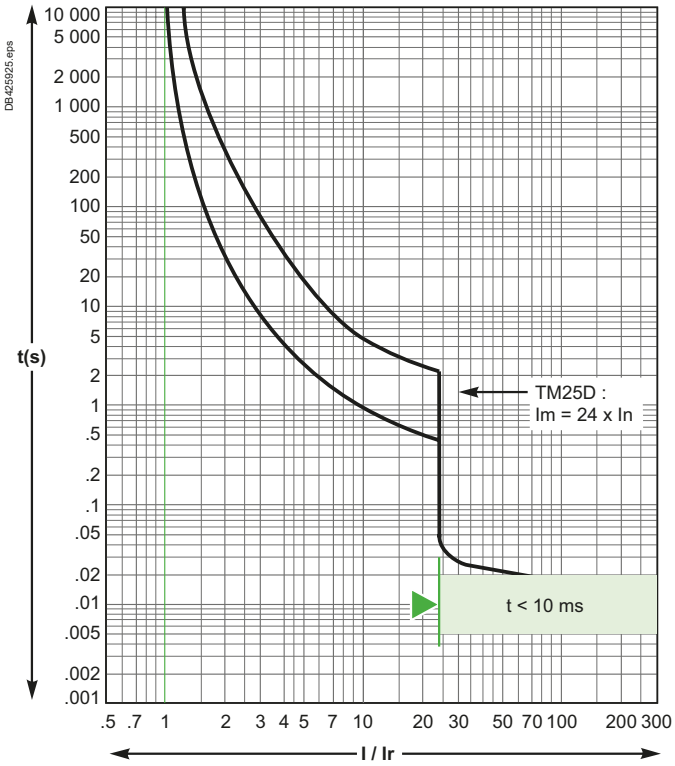
TMD magnetic trip units, tripping curves

Protection of distribution systems

TM16D

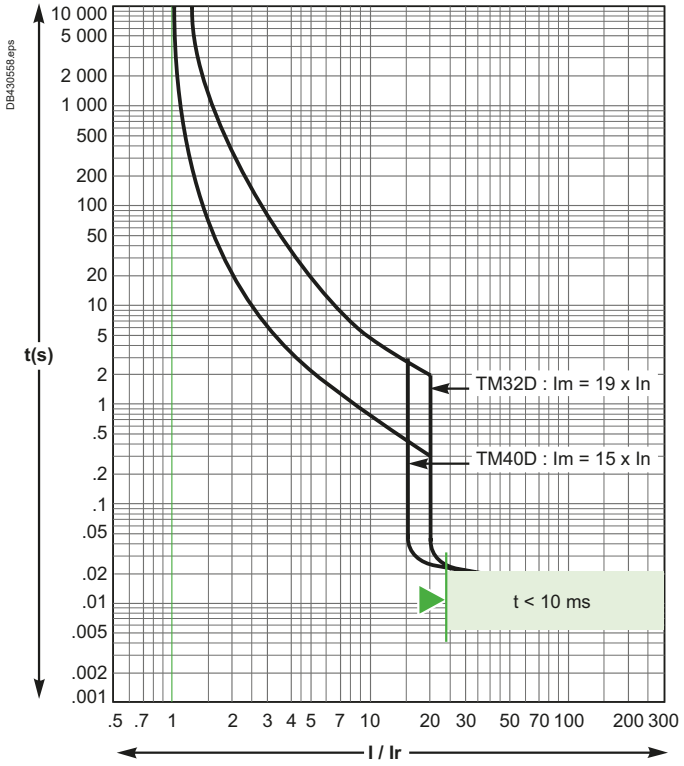


TM25D

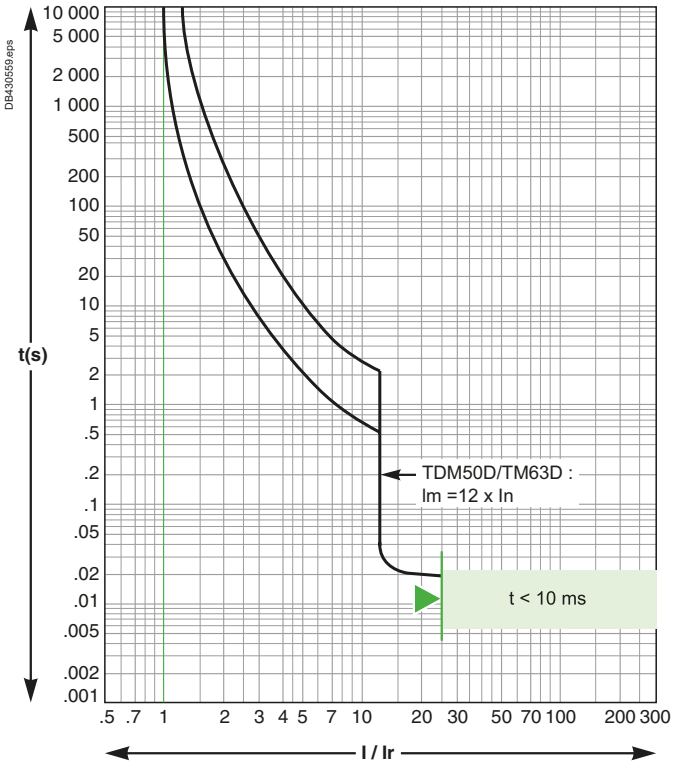


Reflex tripping.

TM32D / TM40D



TM50D / TM63D



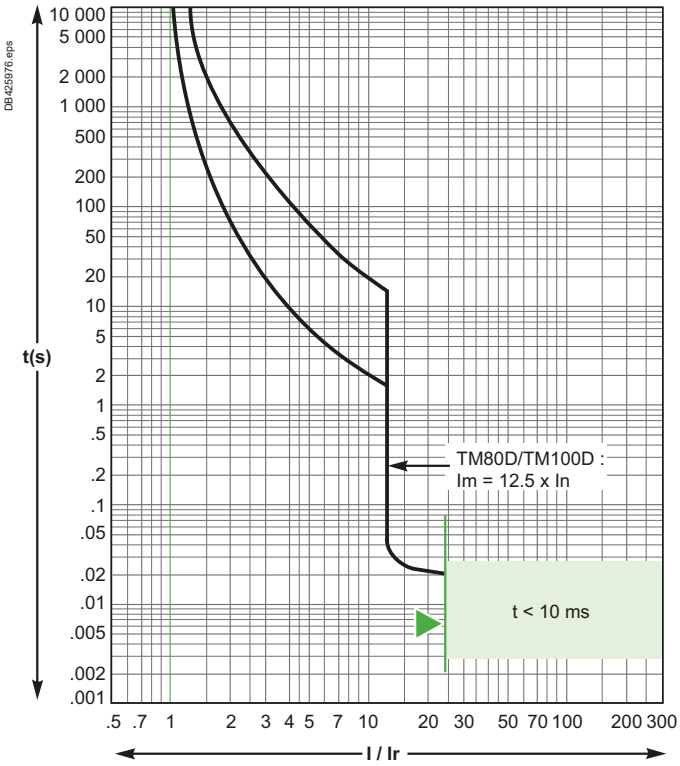
Reflex tripping.

H

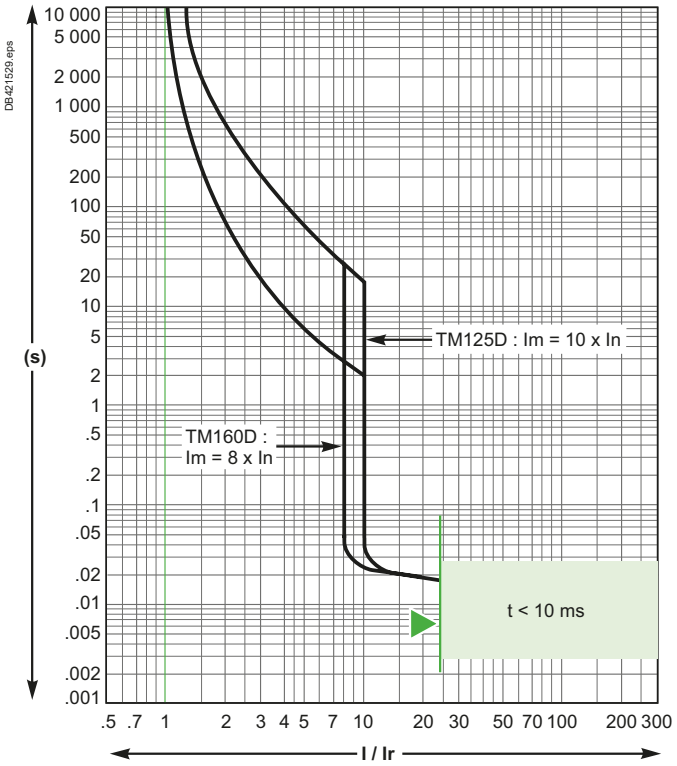
ComPact NSXm up to 160 A

TMD magnetic trip units, tripping curves
Protection of distribution systems

TM80D / TM100D



TM125D / TM160D



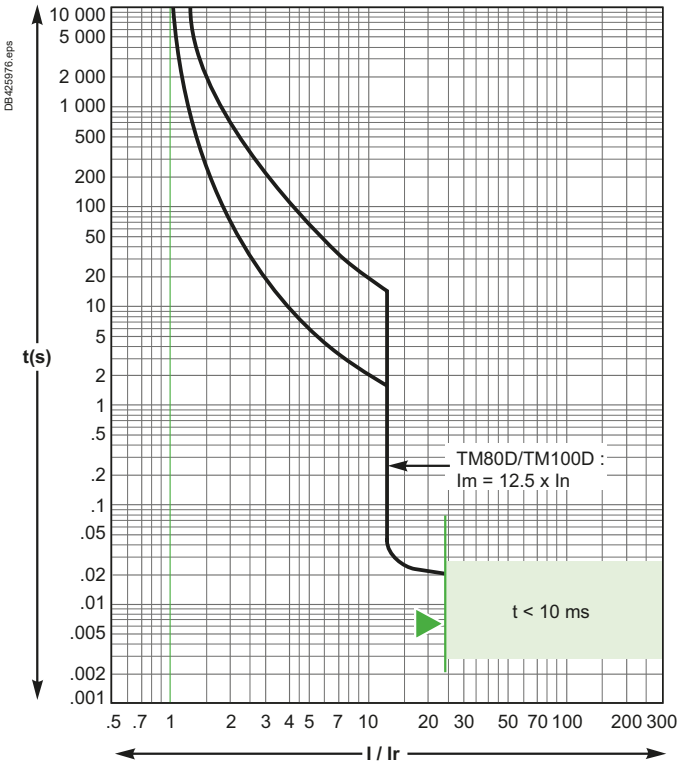
Reflex tripping.

For all TMD 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.

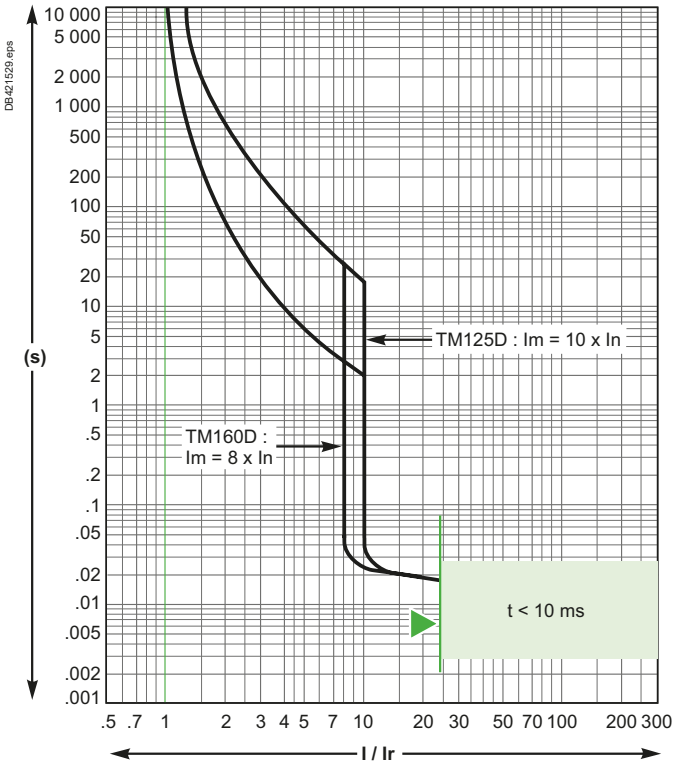
ComPact NSXm up to 160 A

TMD magnetic trip units, tripping curves
Protection of distribution systems

TM80D / TM100D



TM125D / TM160D



Reflex tripping.

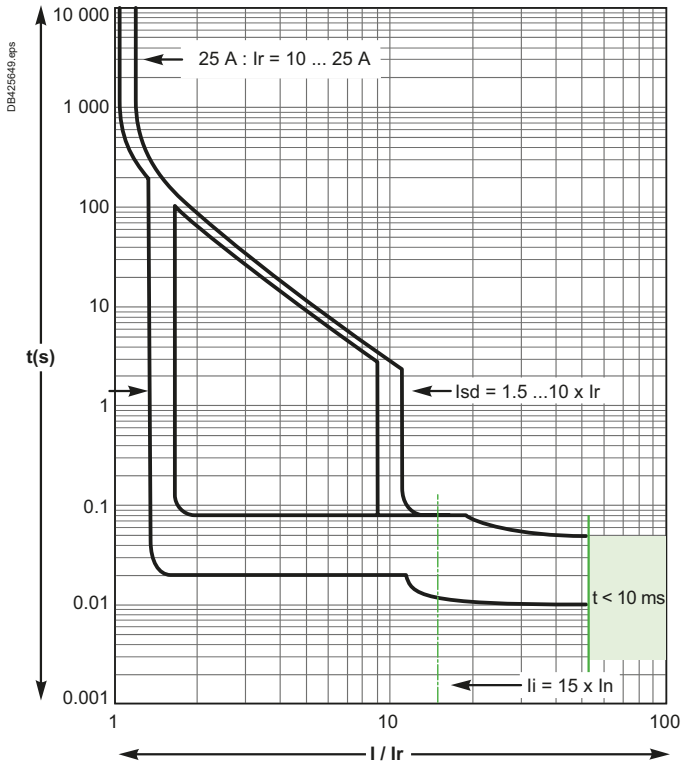
For all TMD curves :
Values are given for 40 °C ambiant, Ir = 1xIn, 3 poles loaded, cold start.
For Ir = k x In, read the time corresponding to 1/k times given current.
For 1 pole tripping, read the time corresponding to 0.85 times given current.
For hot start (0.9 x Ir), divide max. time by 2, min.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

ComPact NSXm up to 160 A

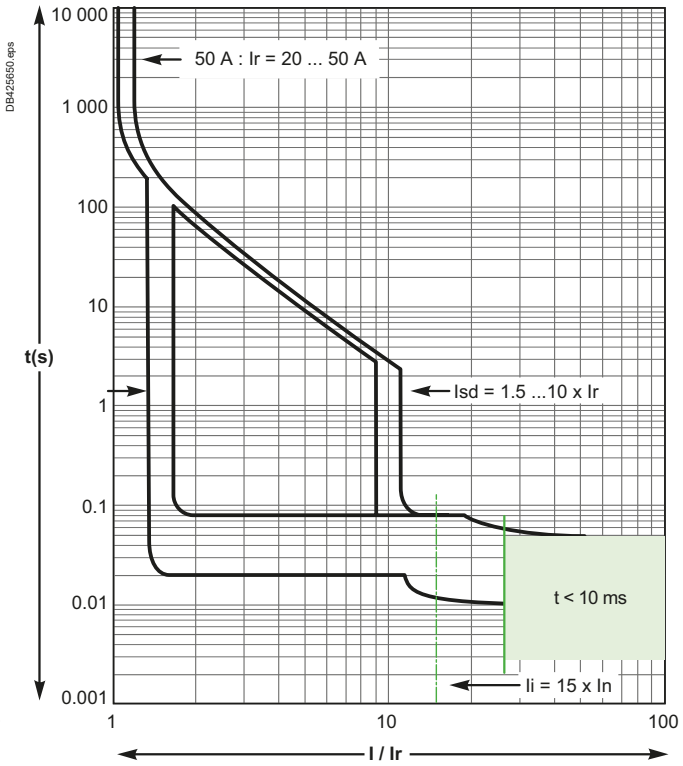
MicroLogic Vigi 4.1, tripping curves

Protection of distribution systems

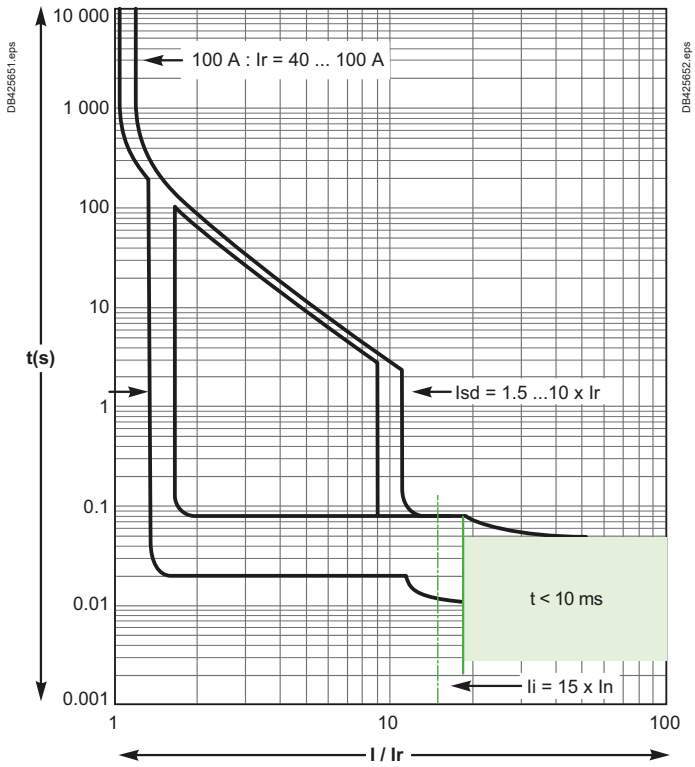
25 A



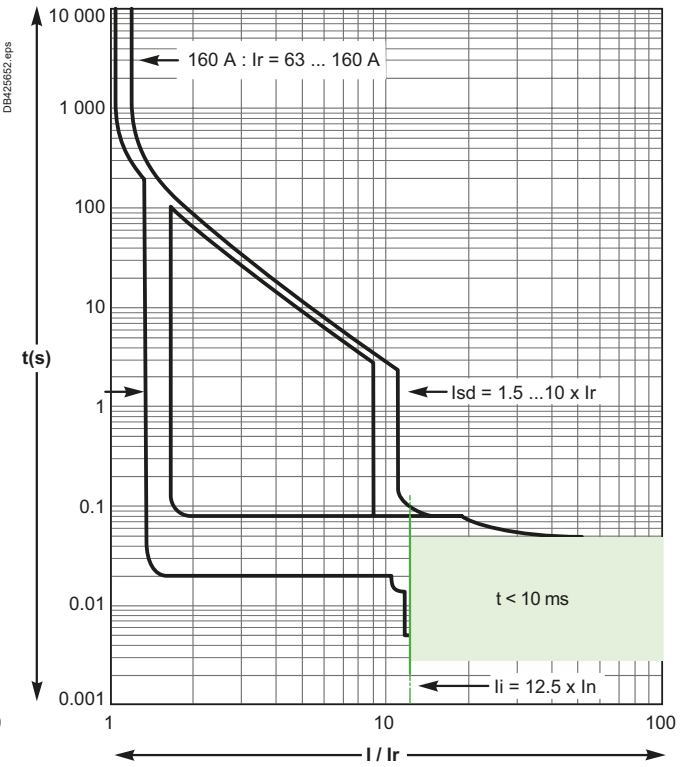
50 A



100 A



160 A



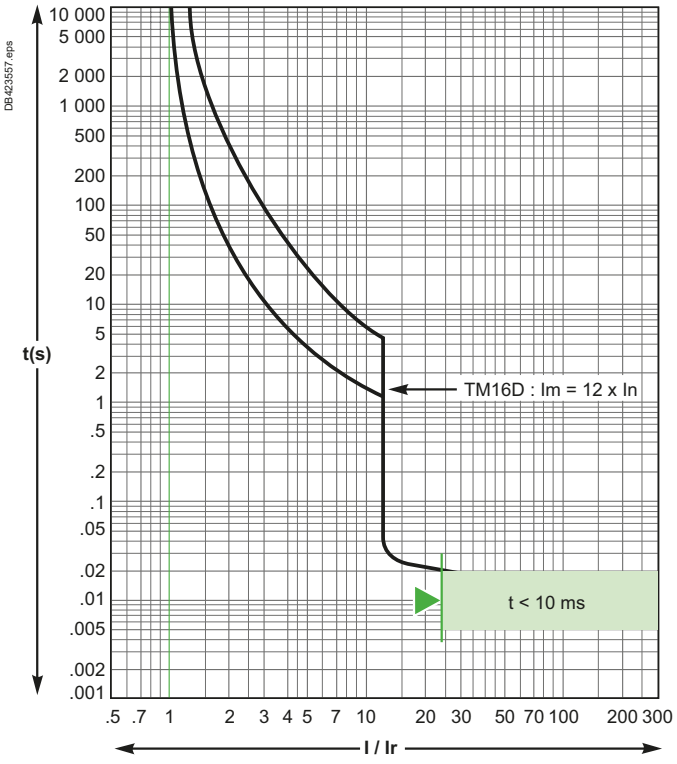
Reflex tripping.

ComPact NSX100 to 250

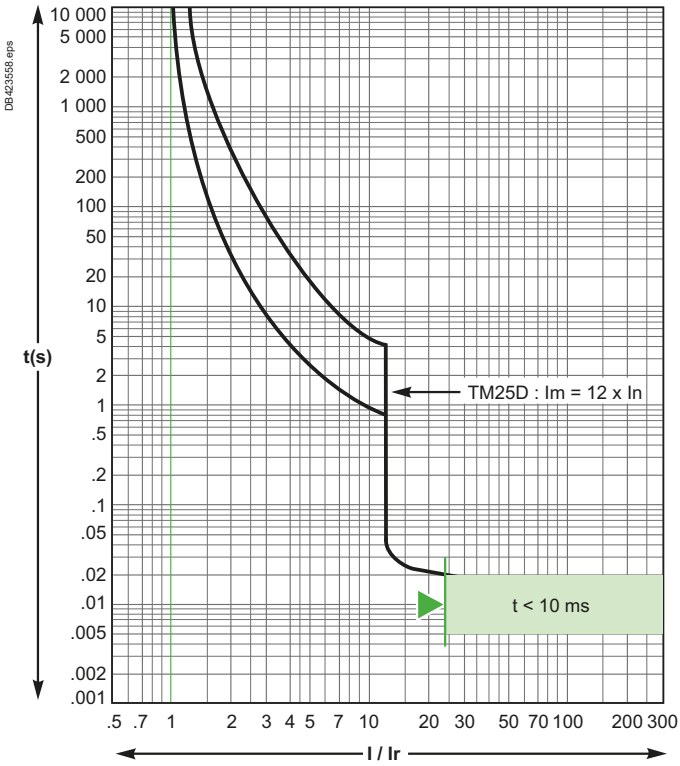
TMD magnetic trip units, tripping curves

Protection of distribution systems

TM16D

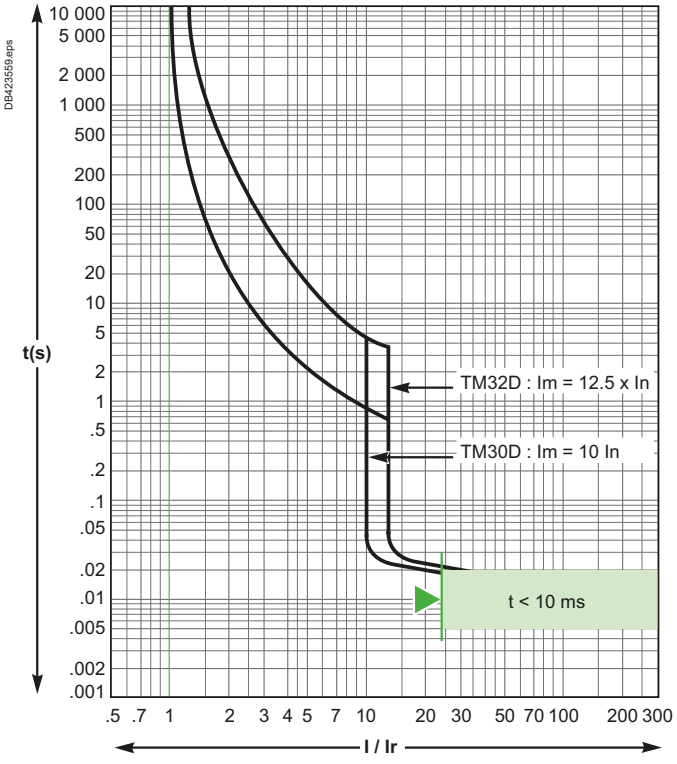


TM25D

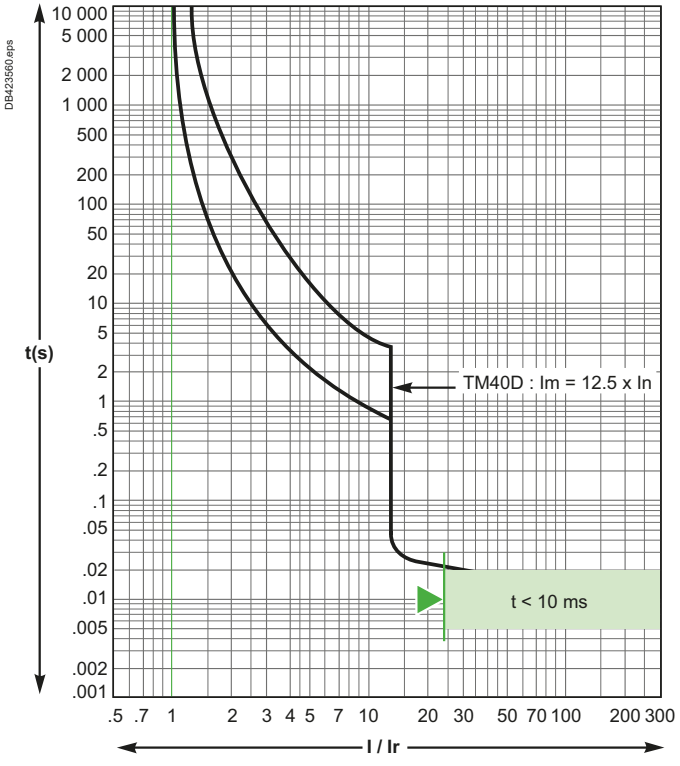


Reflex tripping.

TM30D / TM32D



TM40D



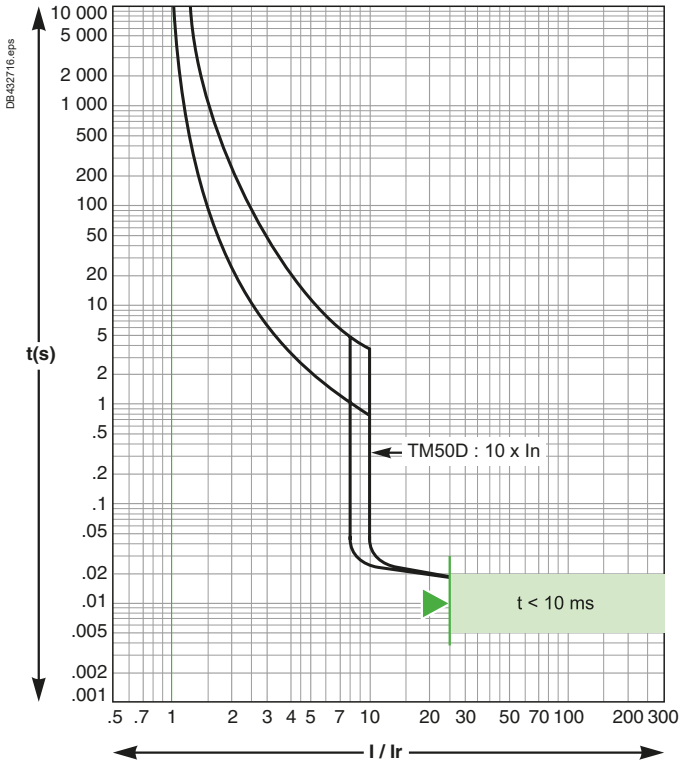
Reflex tripping.

H

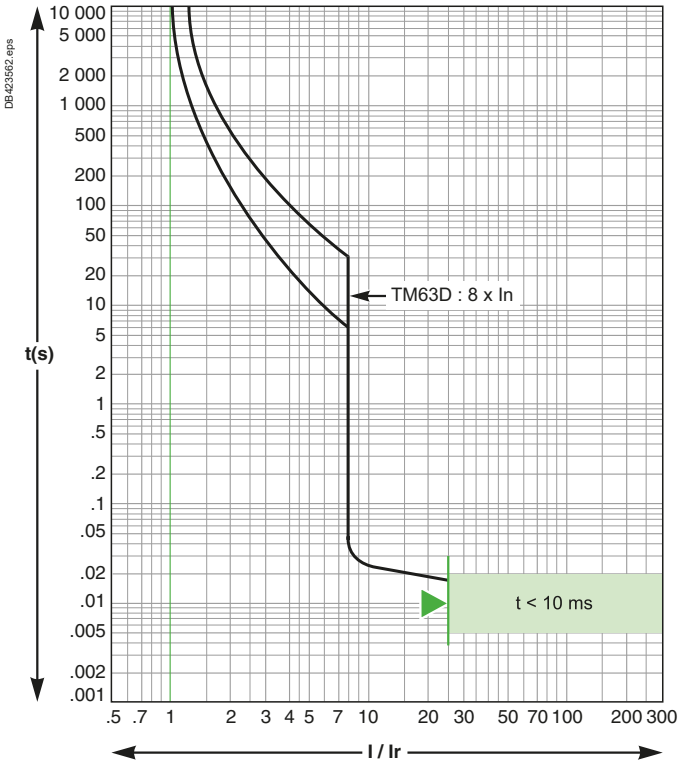
ComPact NSX100 to 250

TMD magnetic trip units, tripping curves
Protection of distribution systems

TM50D

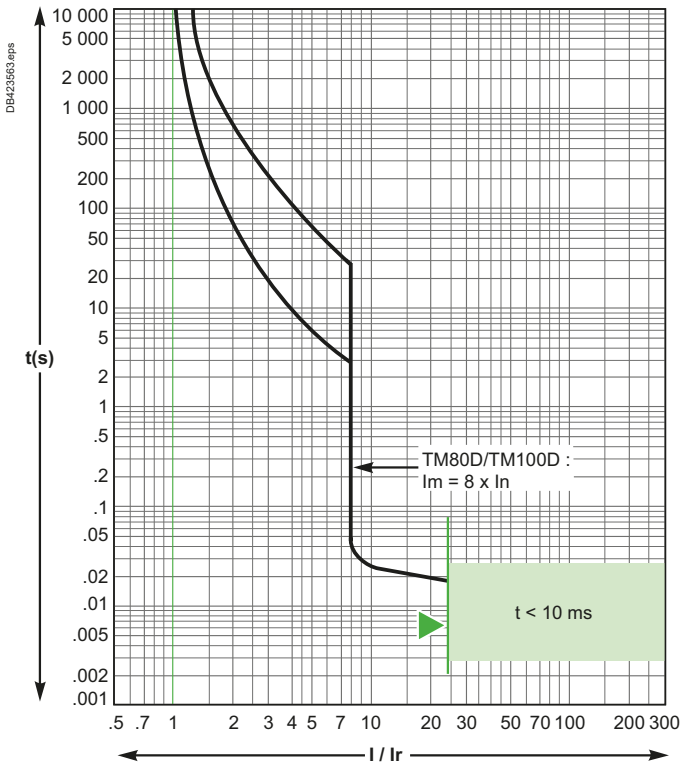


TM63D

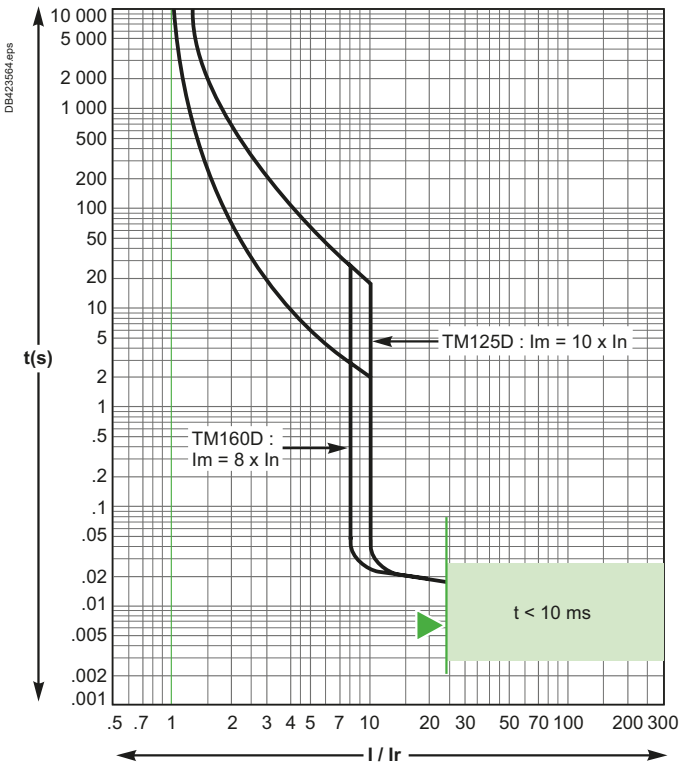


Reflex tripping.

TM80D / TM100D



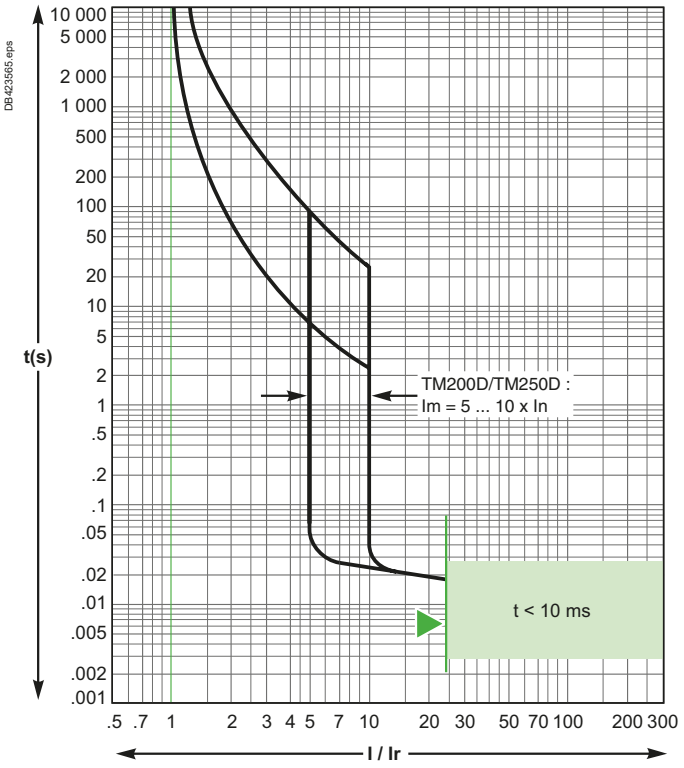
TM125D / TM160D



Reflex tripping.

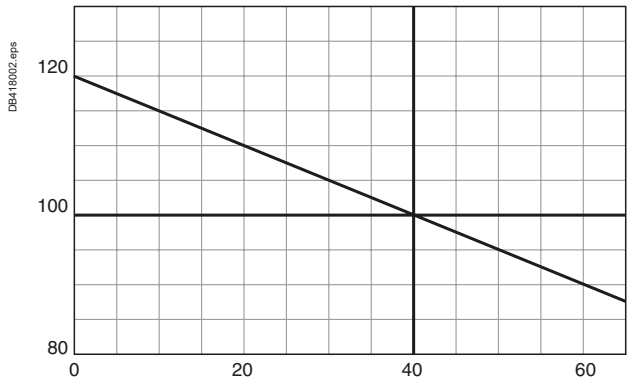
H

TM200D / TM250D



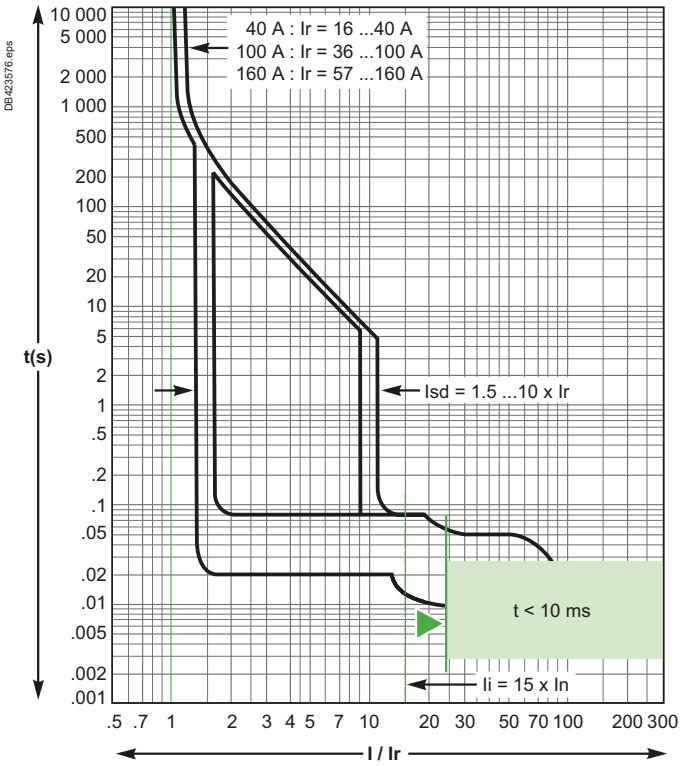
Reflex tripping.

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.

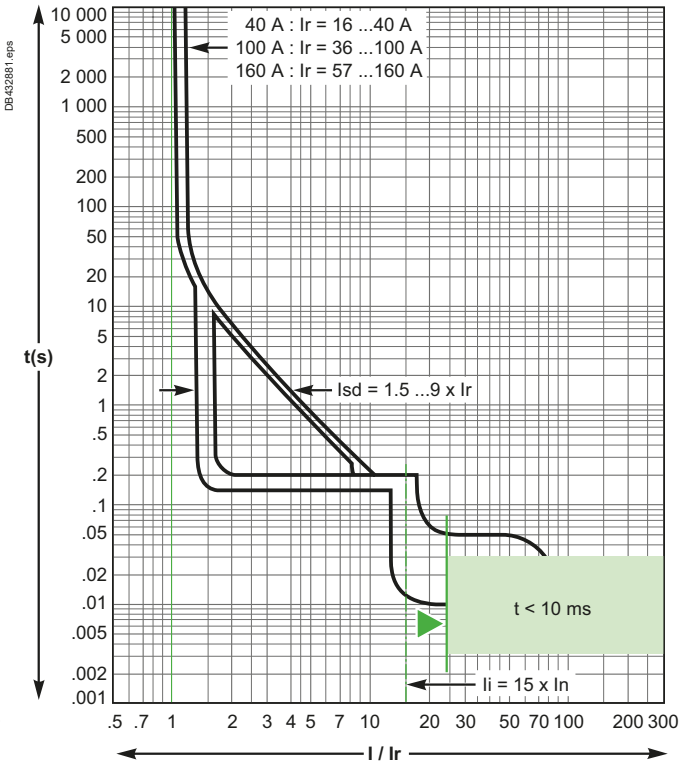


H

MicroLogic 2.2, 4.2 - 40... 160 A

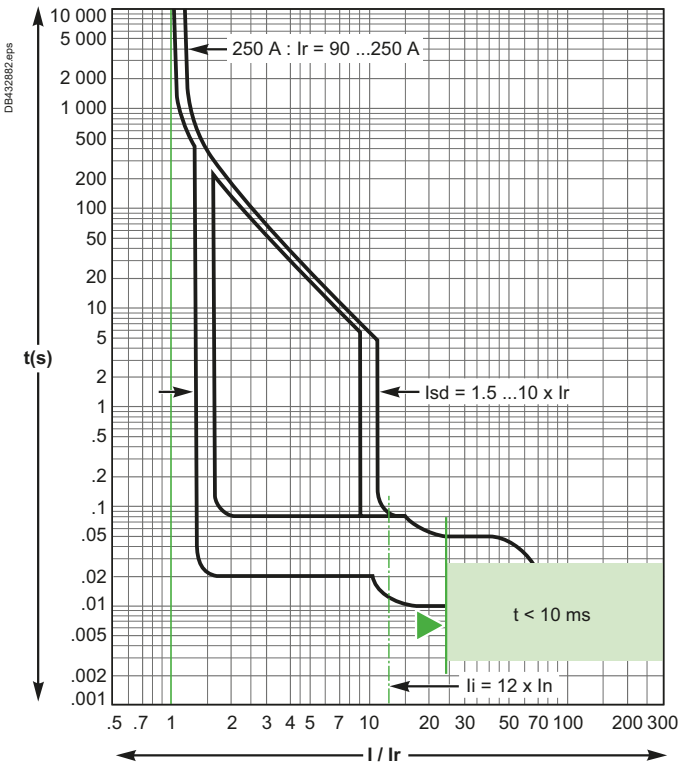


MicroLogic 2.2, 4.2 - 250 A

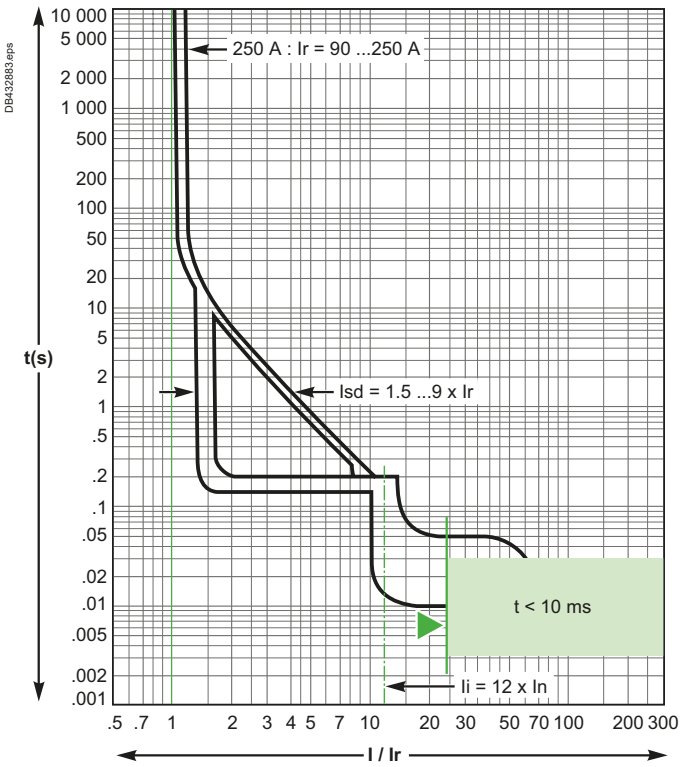


Reflex tripping.

MicroLogic 2.2 G - 40... 160 A



MicroLogic 2.2 G - 250 A



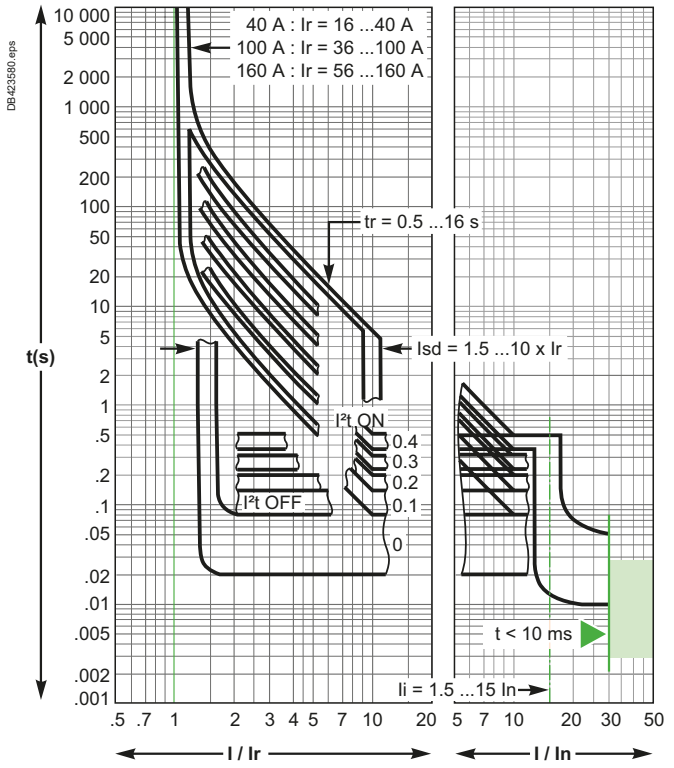
Reflex tripping.

H

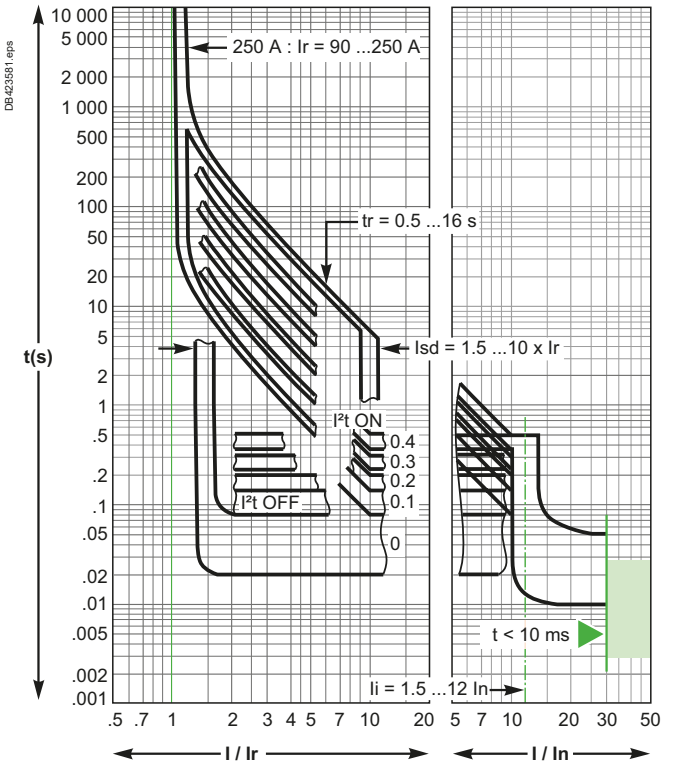
ComPact NSX100 to 250

MicroLogic 5.2 and 6.2 A or E and 7.2 E electronic trip units, tripping curves - Protection of distribution systems

MicroLogic 5.2 and 6.2 A or E and 7.2 E - 40... 160 A

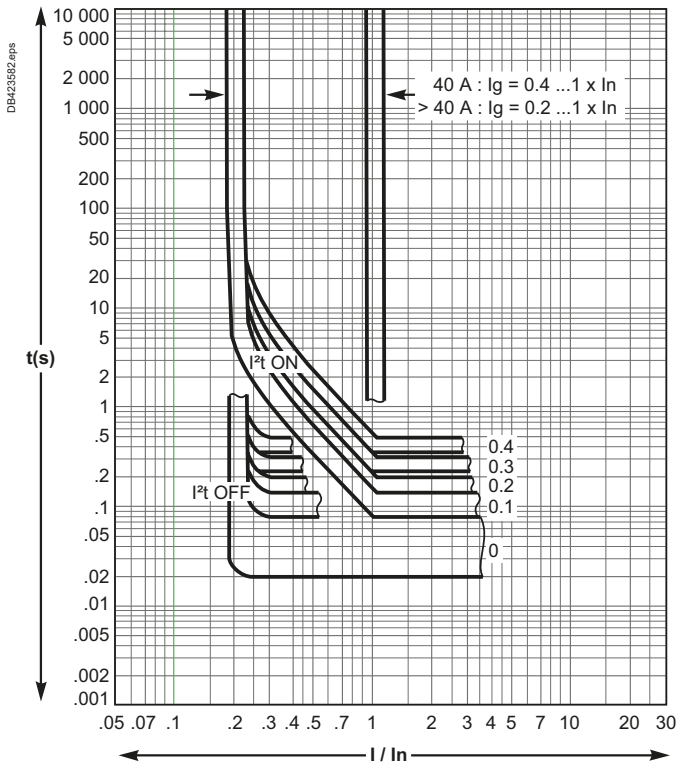


MicroLogic 5.2 and 6.2 A or E and 7.2 E - 250 A



Reflex tripping.

MicroLogic 6.2 A or E (ground-fault protection)

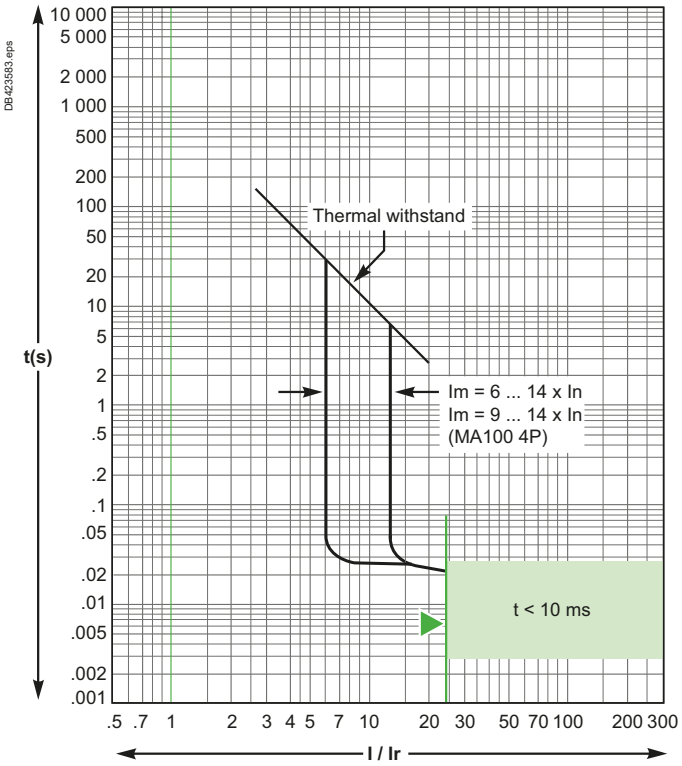


Reflex tripping.

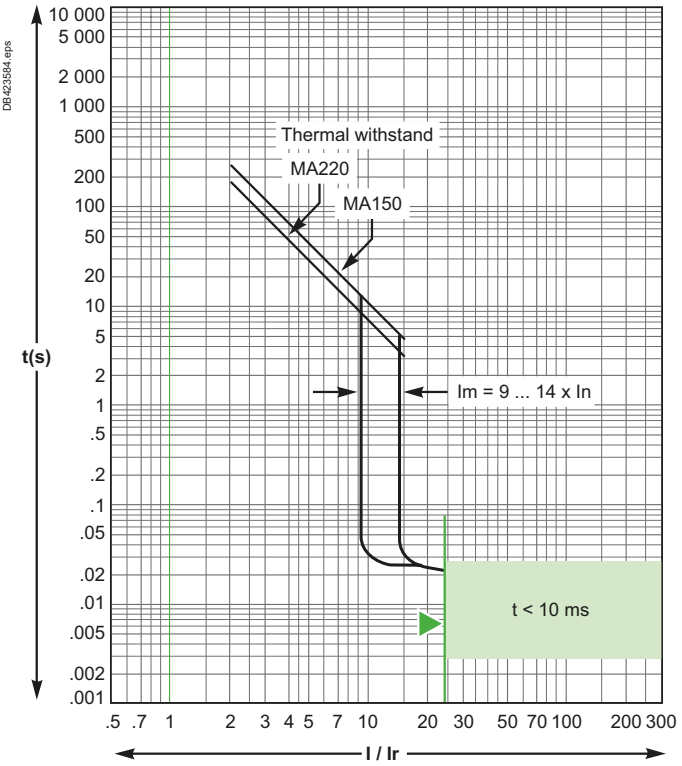
ComPact NSX100 to 250

MA magnetic trip units, MicroLogic 2.2 M electronic trip units, tripping curves - Motor protection

MA2.5... MA100

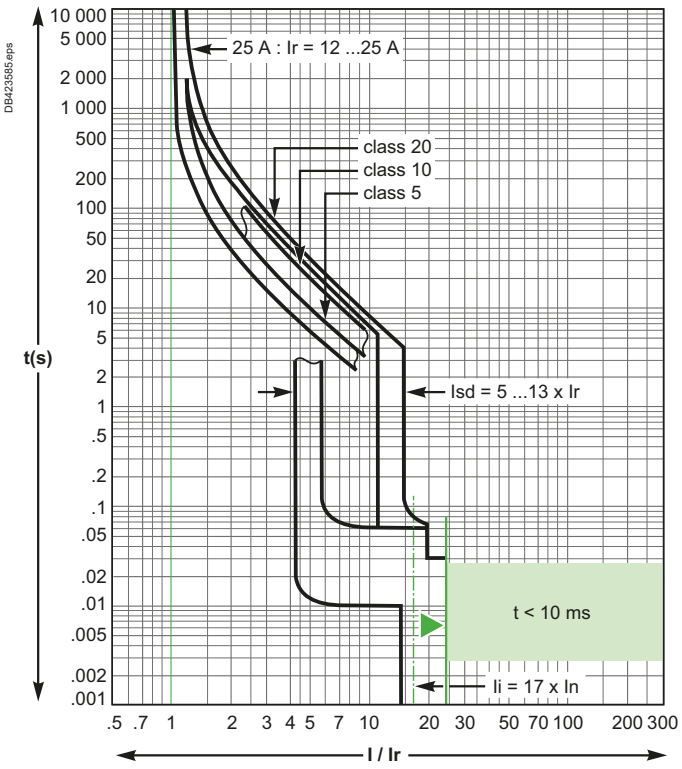


MA150 and MA220

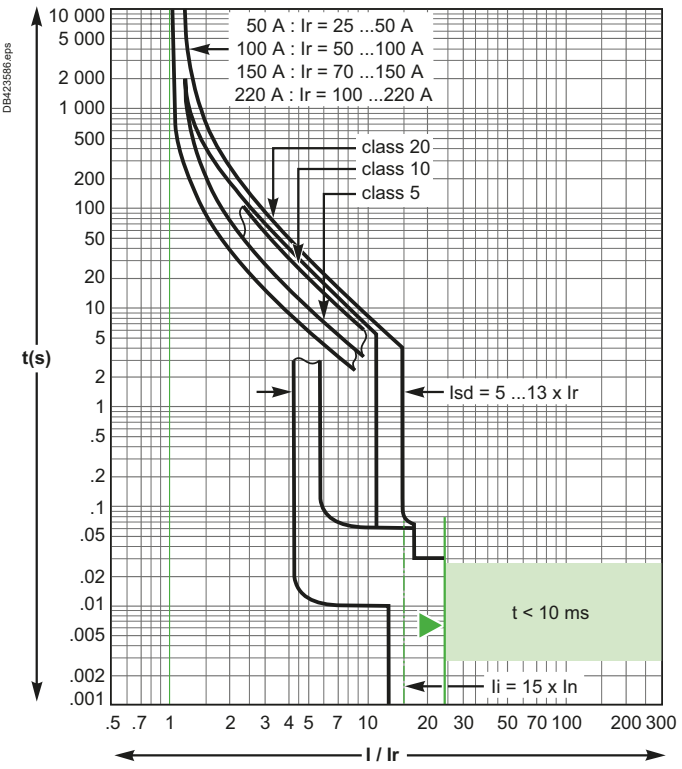


Reflex tripping.

MicroLogic 2.2 M - 25 A



MicroLogic 2.2 M - 50... 220 A



Reflex tripping.

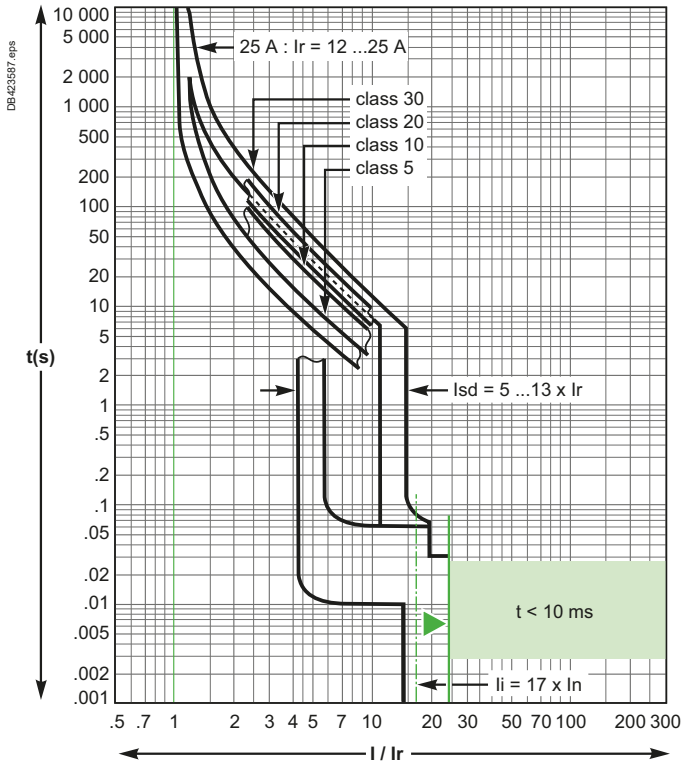
H

ComPact NSX100 to 250

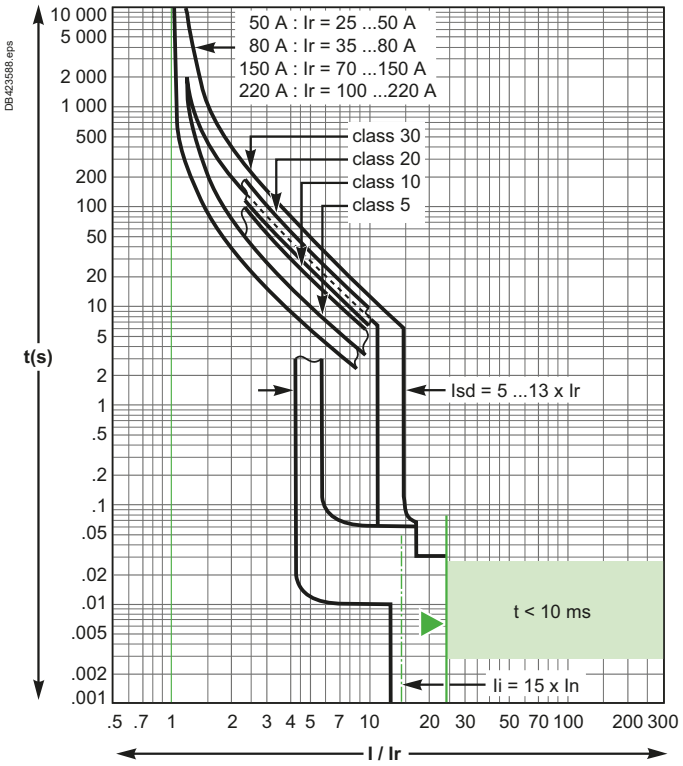
MicroLogic 6.2 E-M electronic trip units, tripping curves

Motor protection

MicroLogic 6.2 E-M - 25 A

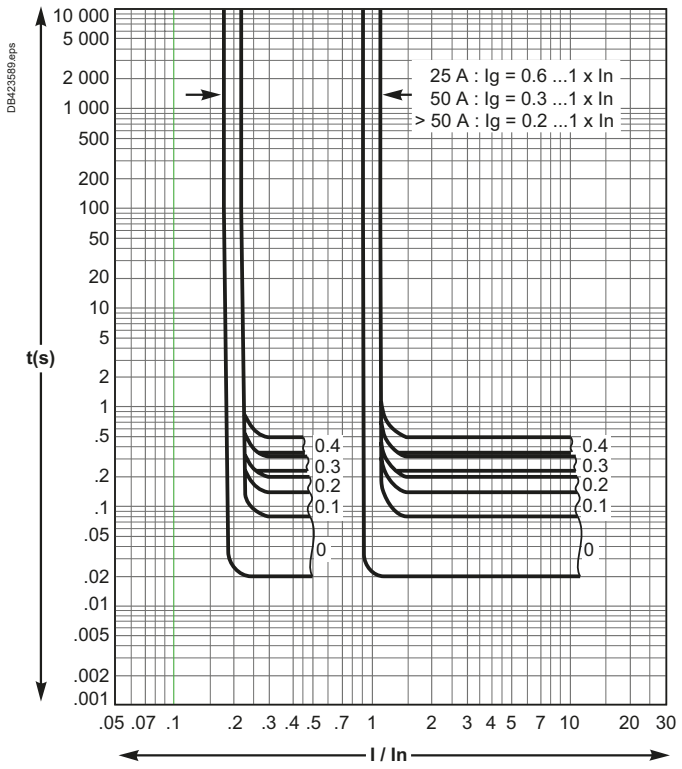


MicroLogic 6.2 E-M - 50... 220 A



Reflex tripping.

MicroLogic 6.2 E-M (ground-fault protection)

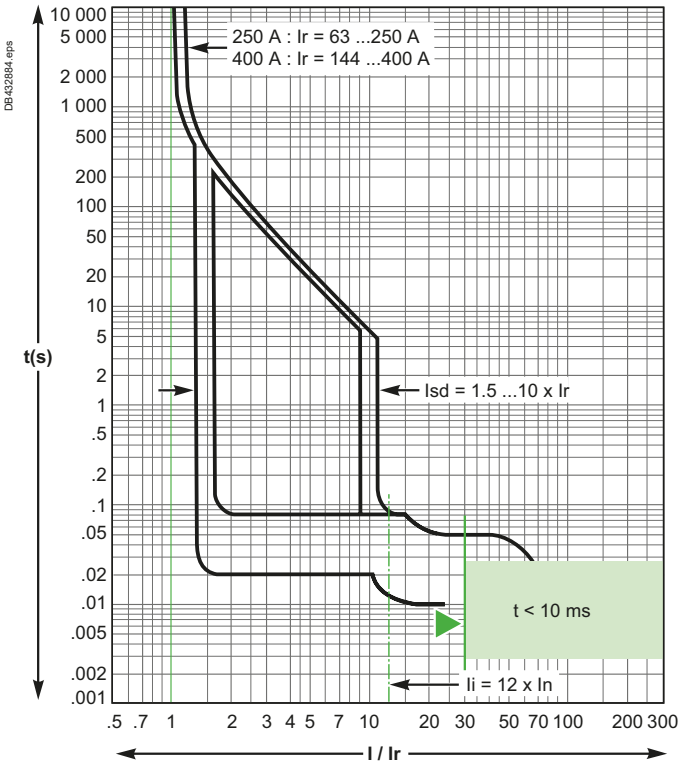


H

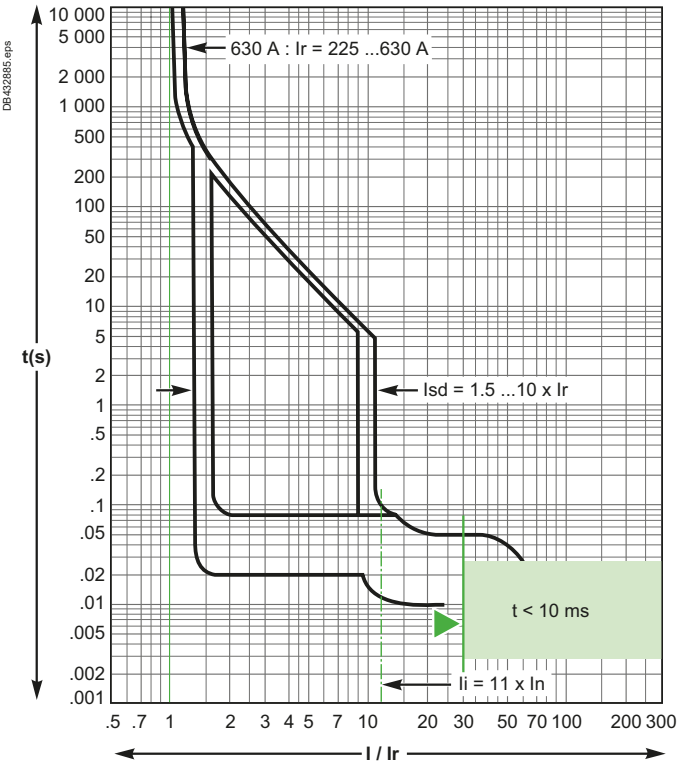
ComPact NSX400 to 630

MicroLogic 2.3, 4.3, 5.3 and 6.3 A or E and 7.3 E electronic trip units, tripping curves - Protection of distribution systems

MicroLogic 2.3, 4.3 - 250... 400 A

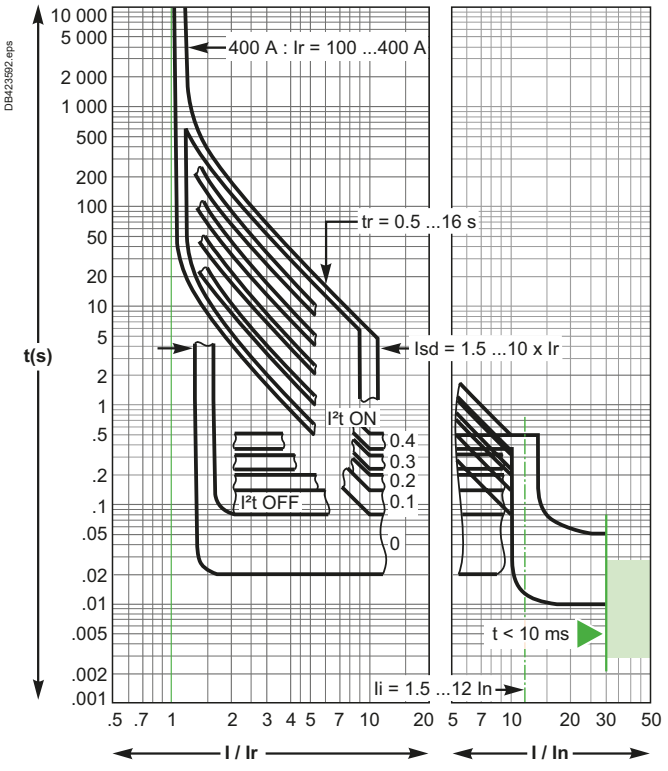


MicroLogic 2.3, 4.3 - 630 A

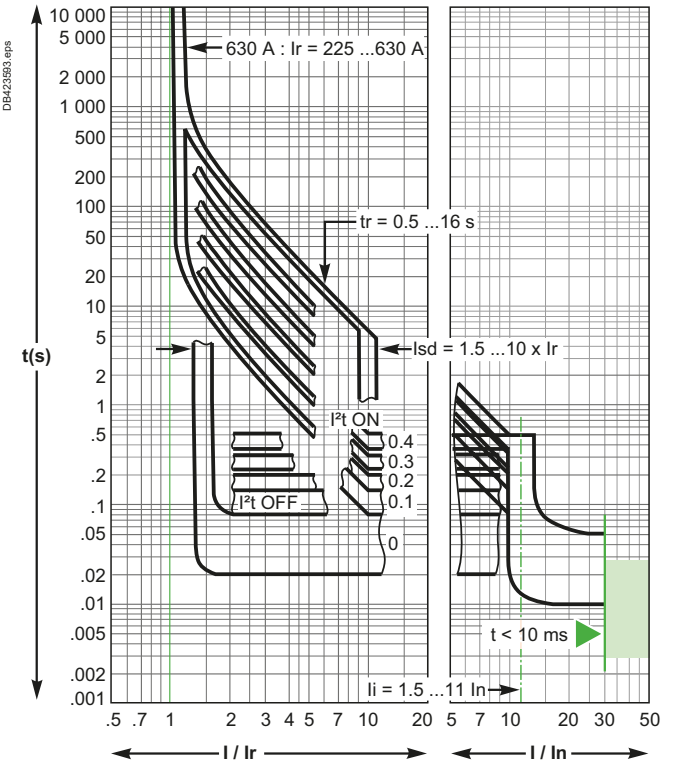


Reflex tripping.

MicroLogic 5.3 and 6.3 A or E and 7.3 E - 400 A



MicroLogic 5.3 and 6.3 A or E and 7.3E (up to 570 A) - 630 A



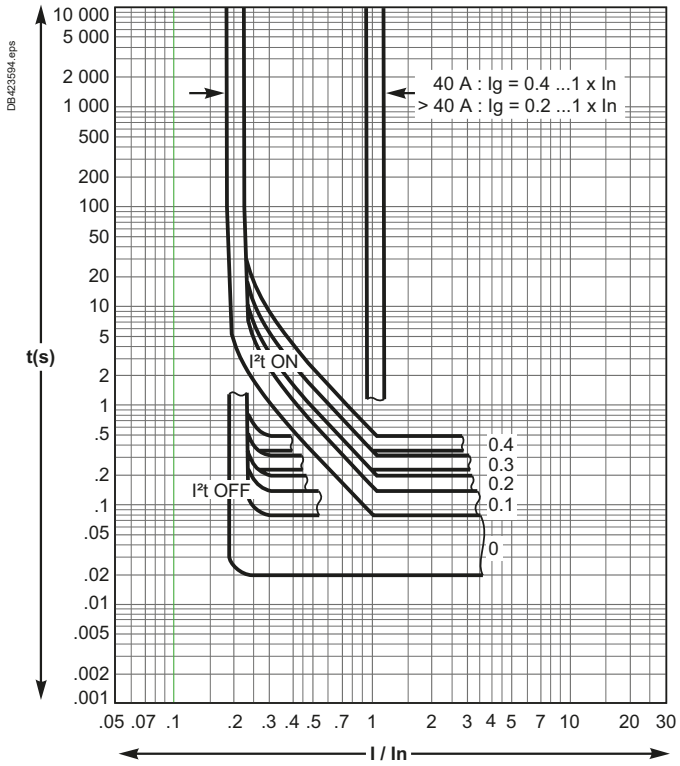
Reflex tripping.

H

ComPact NSX400 to 630

MicroLogic 6.3 A or E and 7.3 E electronic trip units, tripping curves - Protection of distribution systems

MicroLogic 6.3 A or E and 7.3 E (up to 570 A) (ground-fault protection)



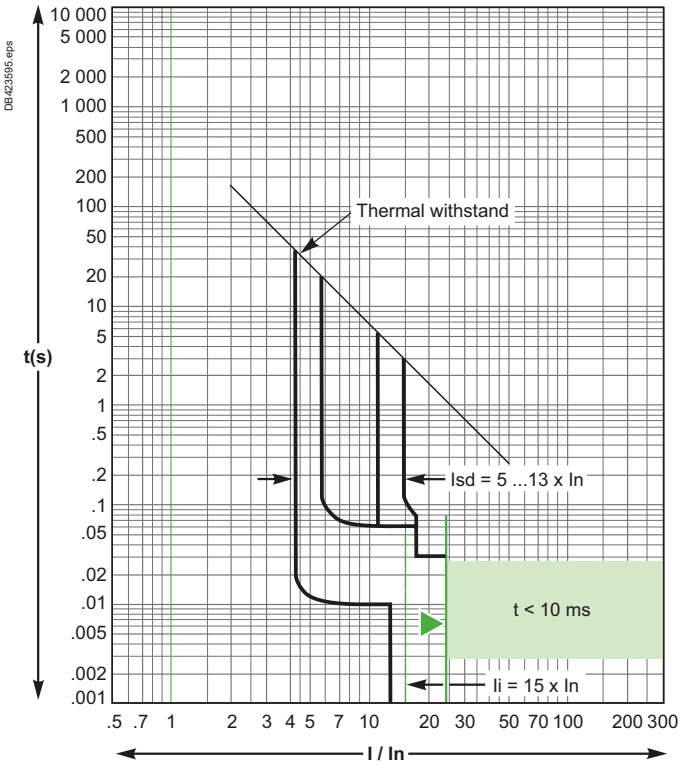
H

ComPact NSX400 to 630

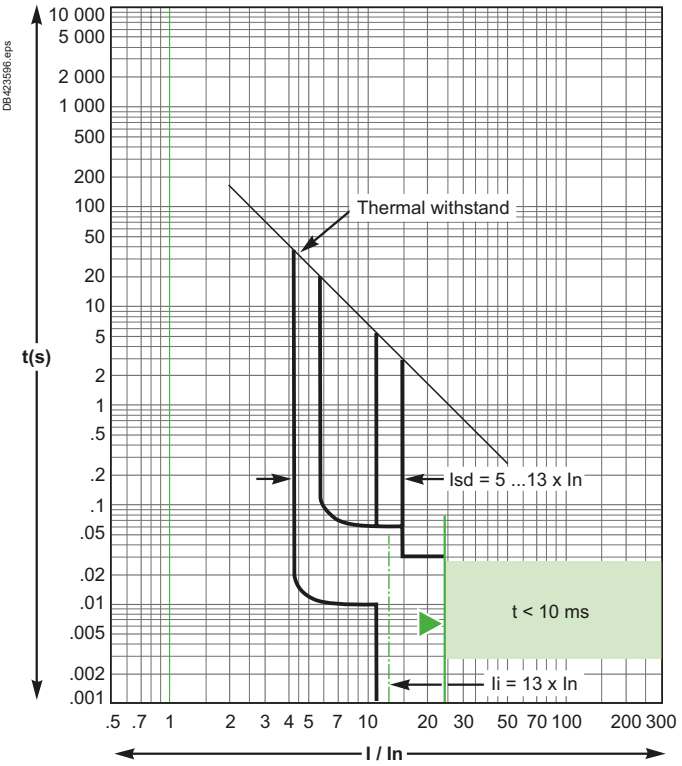
MicroLogic 1.3 M and 2.3 M electronic trip units, tripping curves

Motor protection

MicroLogic 1.3 M - 320 A

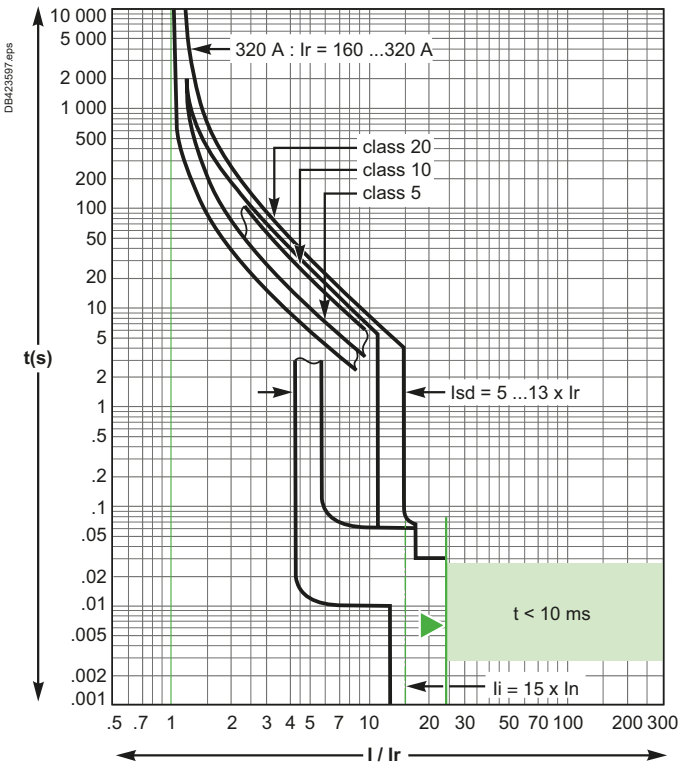


MicroLogic 1.3 M - 500 A

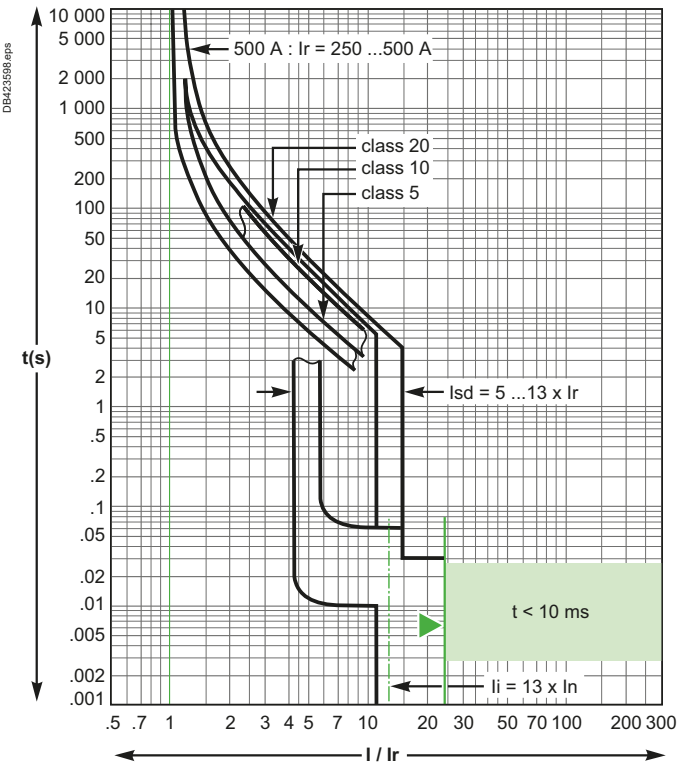


Reflex tripping.

MicroLogic 2.3 M - 320 A



MicroLogic 2.3 M - 500 A



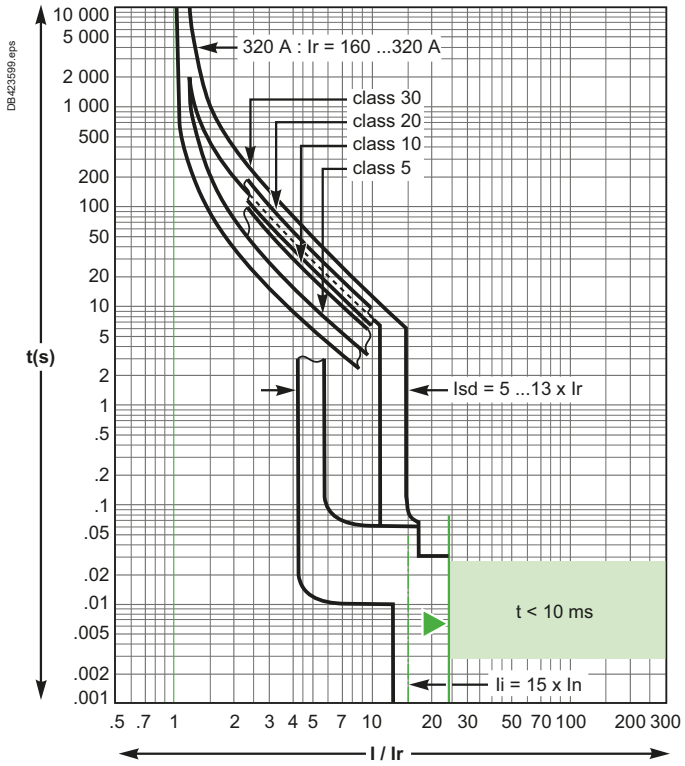
Reflex tripping.

ComPact NSX400 to 630

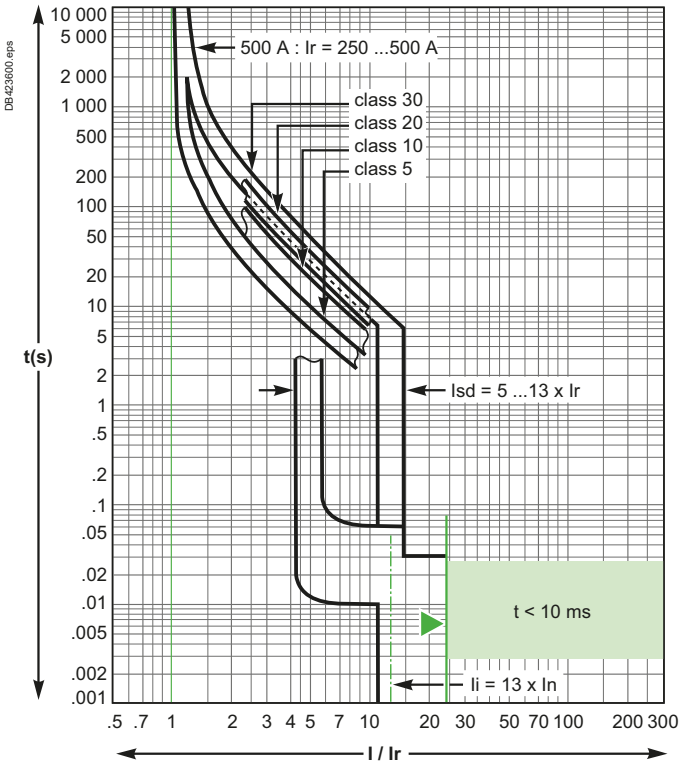
MicroLogic 6.3 E-M electronic trip units, tripping curves

Motor protection

MicroLogic 6.3 E-M - 320 A

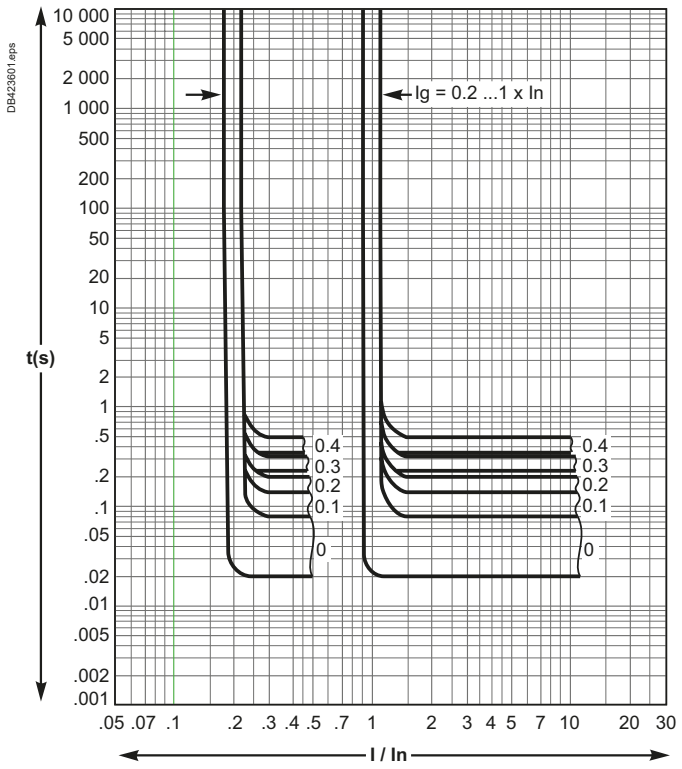


MicroLogic 6.3 E-M - 500 A



Reflex tripping.

MicroLogic 6.3 E-M (ground fault protection)

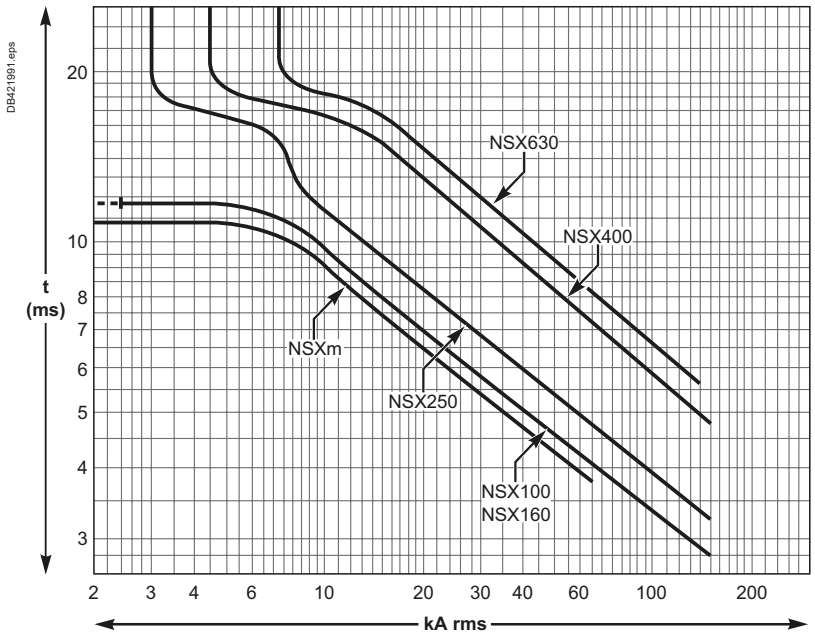


H

Tripping curves ComPact NSXm and NSX

Reflex tripping

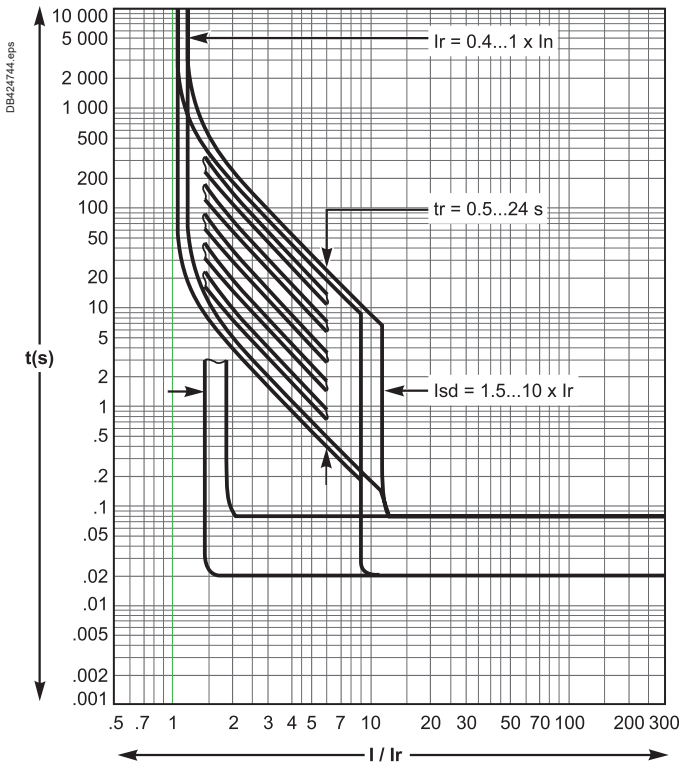
ComPact NSXm and NSX100 to 630 devices incorporate the exclusive reflex-tripping system.
This system breaks very high fault currents. The device is mechanically tripped via a "piston" actuated directly by the pressure produced in the breaking units by the short-circuit.
For high short-circuits, this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



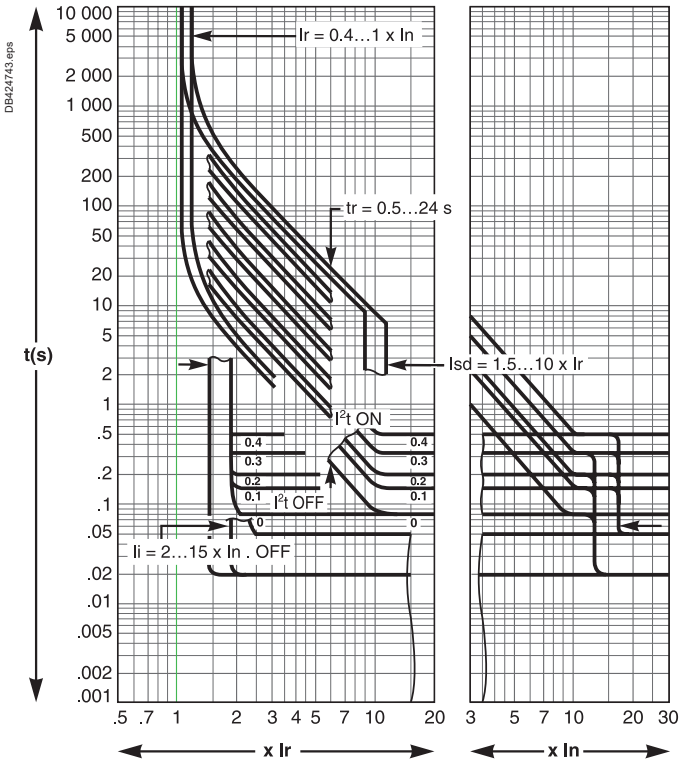
Tripping curves
ComPact NS630b to 3200

Micrologic electronic control units

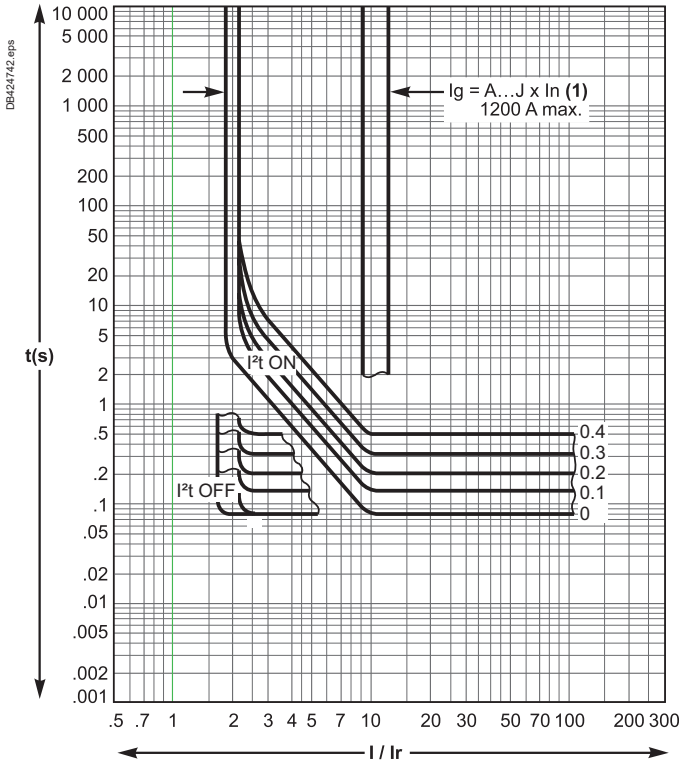
Micrologic 2.0



Micrologic 5.0, 6.0, 7.0



Earth-fault protection (Micrologic 6.0)

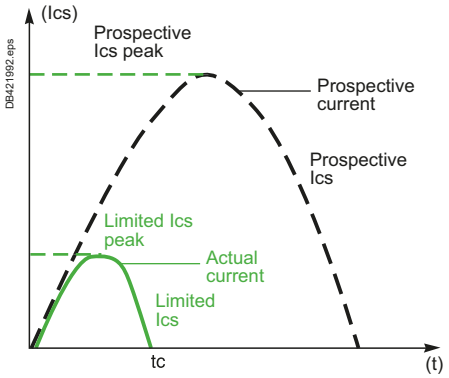


[1]

Ig = In x...	A	B	C	D	E	F	G	H	J
In < 400 A	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
400 A ≤ In ≤ 1200 A	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
In > 1200 A	500	640	720	800	880	960	1040	1120	1200

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 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 and NSXm ranges 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 70 kA rms prospective short-circuit (i.e. 100 kA peak) limited by an NSXm160H upstream ?
The answer is 20 kA peak.

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 mm² 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	$1.93x10^6$	$4.70x10^6$	$9.23x10^6$	$1.88x10^7$	

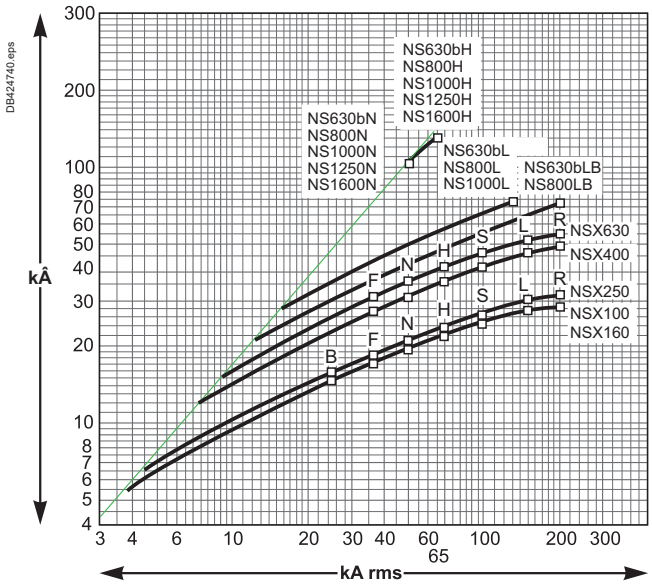
Example
Is a Cu/PVC cable with a CSA of 10 mm² adequately protected by an NSX160F?
The table above indicates that the permissible stress is $1.32x10^6$ A^2s.
All short-circuit currents at the point where an NSX160F (Icu = 35 kA) is installed are limited with a thermal stress less than $6x10^5$ A^2s.
Cable protection is therefore ensured up to the limit of the breaking capacity of the circuit breaker.

Current-limiting curves

Current-limiting curves

Voltage 400/440 V AC (1)

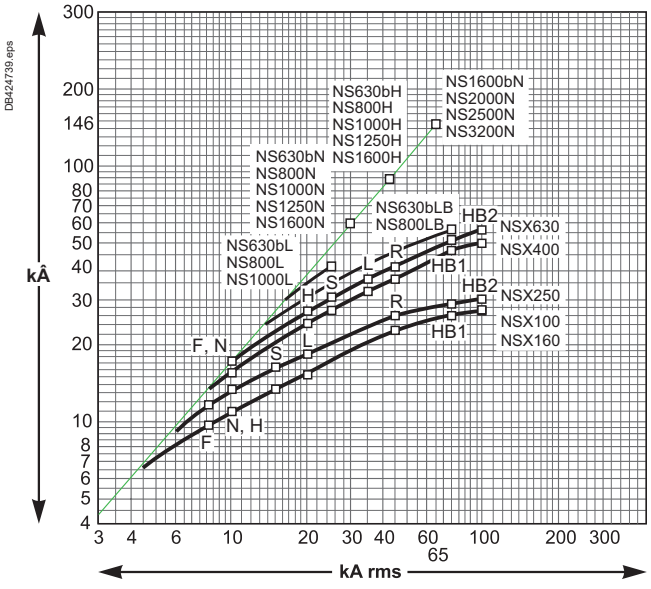
Limited short-circuit current (kÂ peak)



Rated short-circuit current (kA rms)

Voltage 660/690 V AC

Limited short-circuit current (kÂ peak)

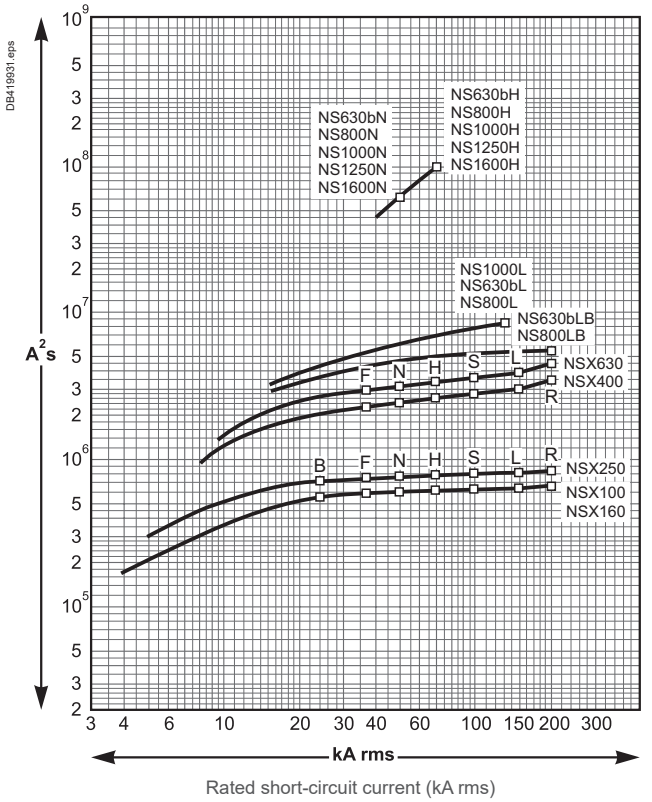


Rated short-circuit current (kA rms)

Thermal-stress curves

Voltage 400/440 V AC [1]

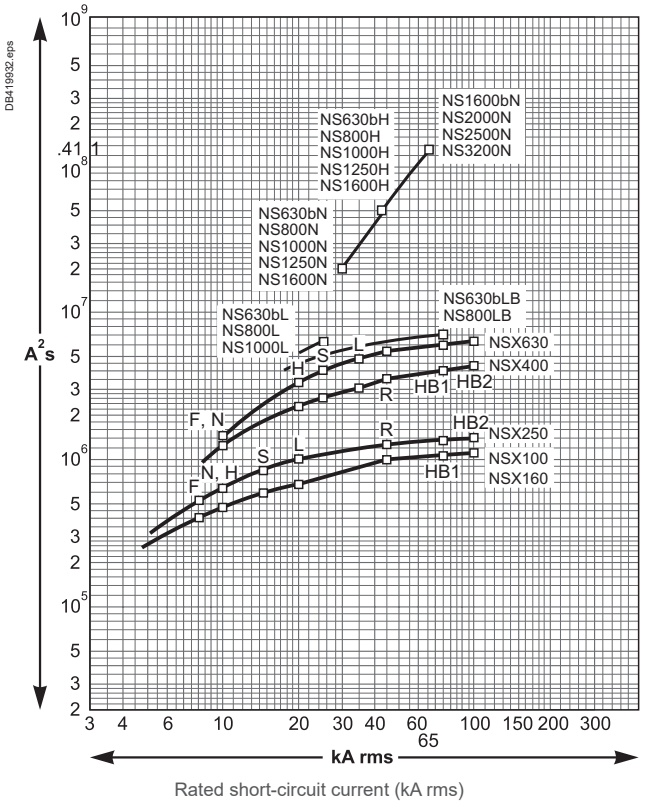
Limited energy



Rated short-circuit current (kA rms)

Voltage 660/690 V AC

Limited energy



Rated short-circuit current (kA rms)

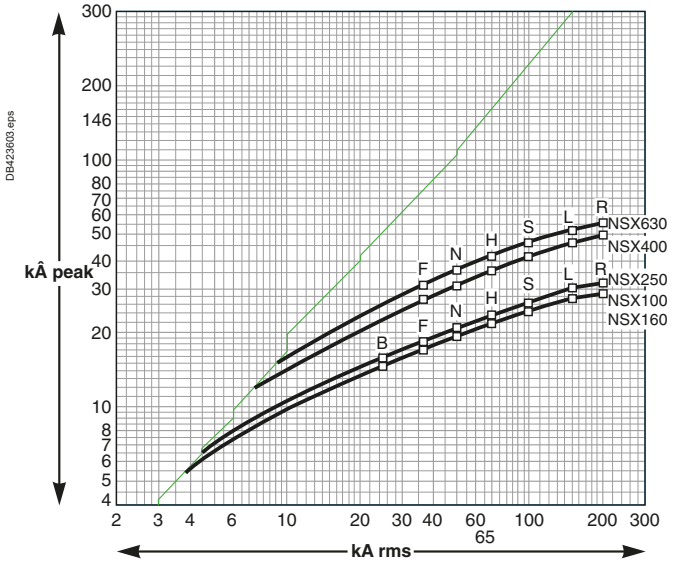
[1] Valid for 480 V Nema.

Current and energy limiting curves
ComPact NSX

Current-limiting curves

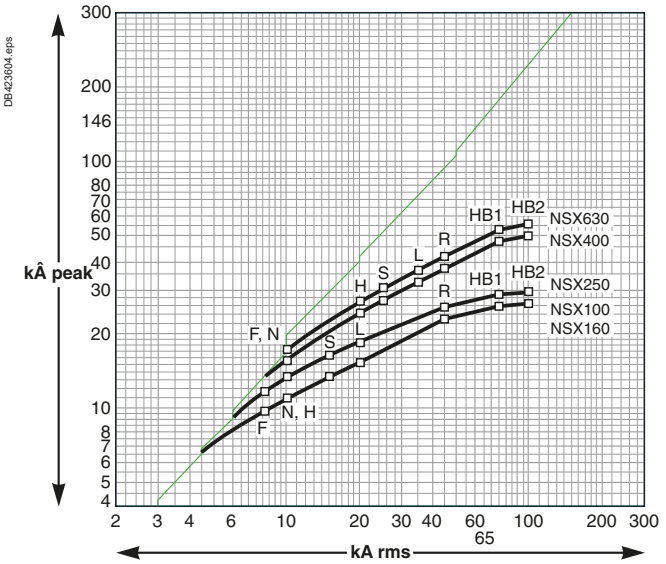
Voltage 400/440 V AC

Limited short-circuit current (kÂ peak)



Voltage 660/690 V AC

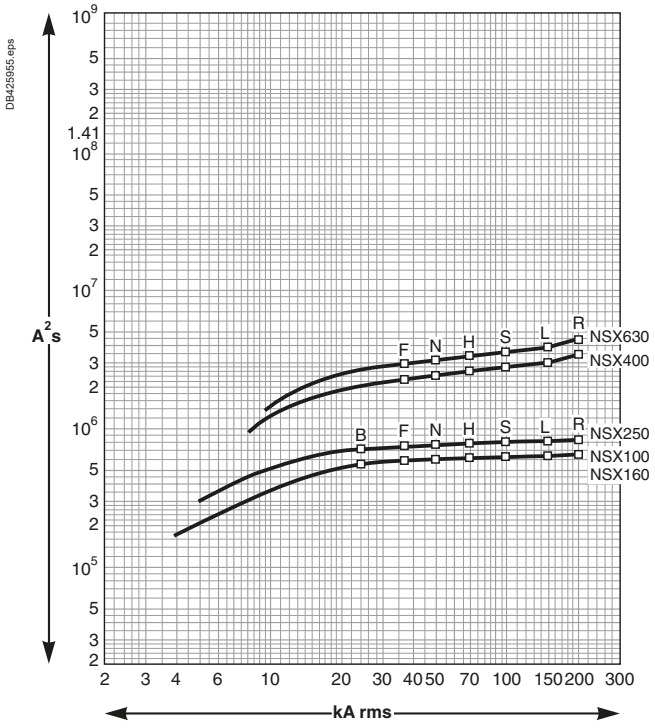
Limited short-circuit current (kÂ peak)



Energy-limiting curves

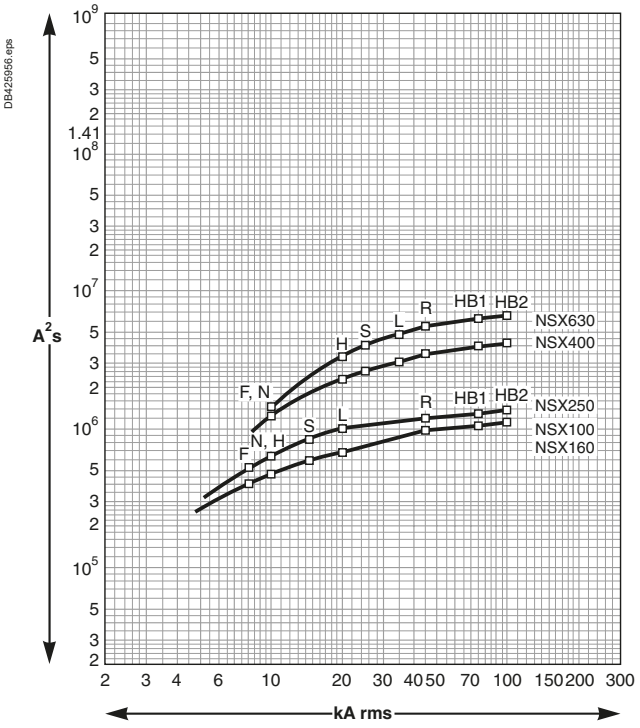
Voltage 400/440 V AC

Limited energy



Voltage 660/690 V AC

Limited energy



H