COMPACT NSF and NSJ

150 to 600 A circuit breakers

Class 615

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Merlin Gerin

SQUARE D
Schneider Electric

COMPACT® NSF and NSJ
150 to 600 A circuit breakers

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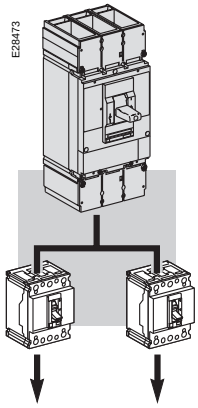
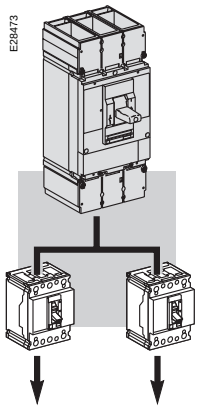
The COMPACT® circuit breaker line

Circuit breakers page 6



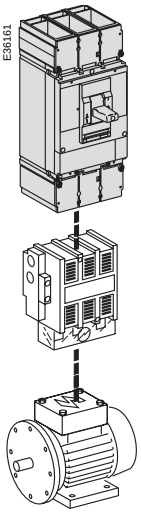
						
Rated current (A)		**15–100**	**15–250**	**150–600**	**400–1200**	**1250–2500**
COMPACT®		**NSE100**	**NSF150 NSF250**	**NSJ400 NSJ600**	**CK400– CK1200**	**CM1250– CM2500**
Interrupting rating at 480 V	N	18	35	35	50	–
	H	–	65	65	65	85
	L	–	–	100	150	–

Switches page 14



Rated current (A)	**70**	**150, 250**	**400, 600**	**800, 1200**	**1600–2500**
COMPACT®	**NSE100A**	**NSF150A**	**NSJ400A**	**CK800NA**	**CM1600HA**
		NSF250A	**NSJ600A**		**CM2000HA**
					CM2500HA

Motor circuit protectors page 16



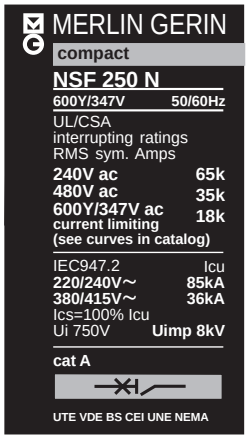
Rated current (A)	**3–75**	**100–250**	**400–600**	**800–1200**	
COMPACT®	**NSE75HC**	**NSF150HC**	**NSJ400HC**	**CK800N/H**	
		NSF250HC	**NSJ600HC**	**CK1000HL/L**	
				CK1200N/H	

NSE, CK and CM circuit breakers: see appropriate catalog.

General characteristics

Compliance with standards

E28472



Compliance with North American standards

COMPACT® NS circuit breakers are built in accordance with Underwriters Laboratories Inc. UL 489 Standard and Canadian Standards Association CSA C22.2 No.5.1 Standard. Circuit breakers, switches and their accessories, except where noted, are Listed under UL files E63335, E103740, E103955, and Certified under CSA files LR69561 and LR88980.

Compliance with international standards

COMPACT® NS circuit breakers and their accessories comply also with the following international standards:
- IEC 947-1: general rules;
- IEC 947-2: circuit breakers;
- IEC 947-3: switches, disconnectors, switch disconnectors, etc.

In that these standards are applied in most countries, COMPACT® circuit breakers and their accessories comply with European (EN 60947-1 and EN 60947-2) and the corresponding national standards:
- France NF;
- Germany VDE;
- U.K. BS;
- Australia AS;
- Italy CEI.

Compliance with the specifications of marine classification organizations

COMPACT® NS circuit breakers have been approved for marine application by the American Bureau of Shipping, Bureau Veritas, Lloyd's Register of Shipping, Registro Italiano Navale, Germanischer Lloyd's and Det Norske Veritas.
They comply with the following standards:
- UL 489 Supplement SA. Marine use on vessels over 65 feet in length;
- US Coast Guard specifications;
- IEC 92-504 and marine specifications: inclination, vibrations, insulation resistance;
- IEC 803 Electromagnetic Disturbance Immunity.

Tropicalization

COMPACT® NS circuit breakers comply with NF C 63-100 standard level 2 conditions (95% relative humidity at 45°C or 80% at 55°C, hot and humid climate conditions).
They also comply with the following standards:
- IEC 68-2-30 damp heat;
- IEC 68-2-2 dry heat;
- IEC 68-2-11 salt spray;
- IEC 68-2-1 low temperatures.

Pollution degree

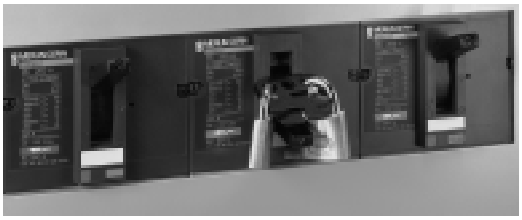
COMPACT® NS circuit breakers are certified for operation in pollution degree III environments as defined by IEC standard 947 (industrial environments).

Environmental protection

COMPACT® NS circuit breakers take into account concerns for environmental protection. Most components are recyclable and parts are marked as specified in applicable standards.

General characteristics

044334



Suitability for isolation (positive contact indication)

All COMPACT® NS circuit breakers and switches are suitable for isolation as defined in the IEC 947-2 Standard:

- **The isolation position corresponds to the O (OFF position);**
- **The operating handle cannot indicate the OFF position unless the contacts are open;**
- **Padlocks may not be installed unless the contacts are open.**

Installation of a rotary handle or a motor mechanism does not alter the functionality of the position indication system.
The isolation function is certified by tests guaranteeing:

- The mechanical reliability of the position indication system;
- The absence of leakage currents;
- Overvoltage withstand capacity between upstream and downstream connections.

E18569

Circuit breaker marking

E36863

Switch marking

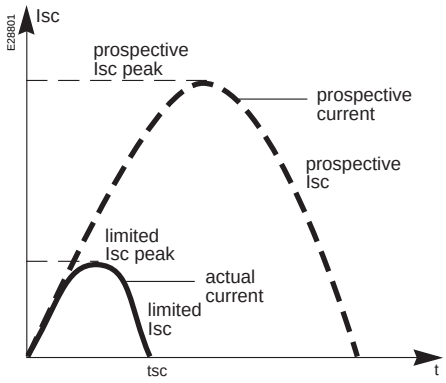
Installation in Class II switchboards

All COMPACT® NS circuit breakers, even when fitted with a rotary handle or a motor mechanism, can be installed through the door of Class II IEC switchboards (as per IEC 664 Standard). Refer to circuit breaker installation instructions prior to installing circuit breaker.
Installation requires no special insulation because COMPACT® NS circuit breakers provide Class II insulation between the front face and all internal circuits.

General characteristics

The limiting capacity of a circuit breaker is its ability to limit short-circuit currents.

Exceptional current limiting capacity



Circuit breaker current limiting capacity

The exceptional limiting capacity of the COMPACT® NS line is due to the double break technique (very rapid natural repulsion of contacts and the appearance of two arc voltages in series with a very steep wavefront).
The exceptional limiting capacity of the COMPACT® NS line 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 947-2, is guaranteed by tests comprising the following operations:

- Breaking a fault current equal to 100% of Icu three times consecutively;
- Checking that the device continues to function normally:
  - Conduction of 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

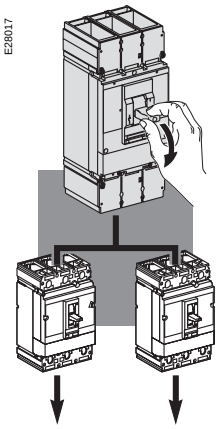
Current limiting circuit breakers greatly reduce the negative effects of short circuits on installations.

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 distorted or broken.

Electromagnetic effects
Less disturbance for measuring devices located near electrical circuits.

Circuit breakers



COMPACT® NSF250H circuit breaker

COMPACT® NSJ600L circuit breaker

Ratings and interrupting ratings

UL 489 Listed ratings

COMPACT® circuit breakers			
Number of poles			
Rated voltage (V)		AC 50/60 Hz	
Rated current (A)	**In**	40°C	
Interrupting ratings (kA rms)			240 V
			480 V
			600Y/347 V
			600 V

IEC 947-2 and EN 60947-2 ratings

COMPACT® circuit breakers			
Number of poles			
Rated insulation voltage (V)	**Ui**		
Rated impulse withstand voltage (kV)	**Uimp**		
Rated operational voltage (V)	**Ue**	AC 50/60 Hz	
		DC	
Rated current (A)	**In**	40°C	
Ultimate breaking capacity (kA rms)	**Icu**	AC 50/60 Hz	220/240 V
			380/415 V
			440 V
			500 V
			525 V
			660/690 V
		DC	250 V (1 pole)
			500 V (2 pole in series)
Service breaking capacity	**Ics**	(% Icu)	
Utilization category			

Circuit breakers are listed under UL file E63335 and Certified under CSA file LR 69561.

Circuit breakers

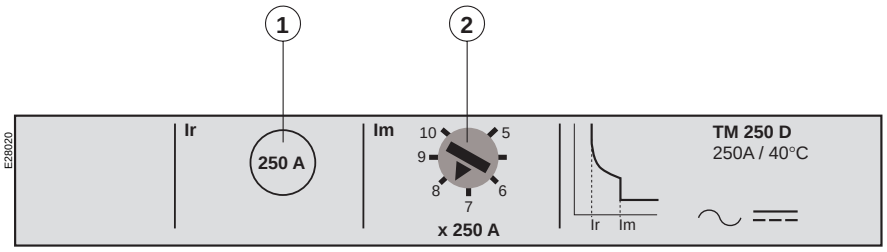
	NSF150		NSF250		NSJ400			NSJ600		
	3		3		3			3		
	600Y/347		600Y/347		600			600		
	150		250		400 (100% rated circuit breaker)			600		
	N	**H**	**N**	**H**	**N**	**H**	**L**	**N**	**H**	**L**
	65	100	65	100	65	100	150	65	100	150
	35	65	35	65	35	65	100	35	65	100
	18	25	18	25						
					18	25	25	18	25	25

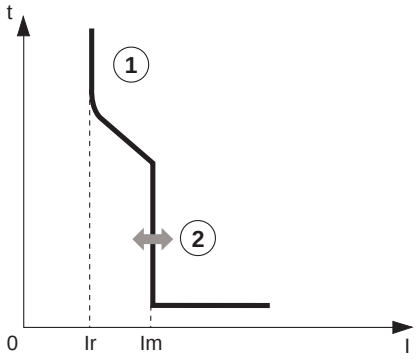
	NSF150		NSF250		NSJ400			NSJ600		
	3		3		3			3		
	750		750		750			750		
	8		8		8			8		
	690		690		690			690		
	500		500		500			500		
	150		250		400			600		
	N	**H**	**N**	**H**	**N**	**H**	**L**	**N**	**H**	**L**
	85	100	85	100	85	100	150	85	100	150
	36	70	36	70	45	70	150	45	70	150
	35	65	35	65	42	65	130	42	65	130
	30	50	30	50	30	50	70	30	50	70
	22	35	22	35	22	35	50	22	35	50
	8	10	8	10	10	20	35	10	20	35
	50	85	50	85		85			85	
	50	85	50	85		85			85	
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	A	A	A	A	A	A	A	A	A	A

Trip units

Trip units for COMPACT® NSF150 and NSF250 circuit breakers

COMPACT® NSF150 and NSF250 circuit breakers are equipped with thermal-magnetic (TM) trip units.





Protection

■ Against overload **(1)** with a fixed thermal protection.
■ Against short circuits **(2)** with fixed (on NSF150) or adjustable (on NSF250) magnetic protection.

Trip units for COMPACT® NSF150 to NSF250 circuit breakers		**TM15DP to TM250DP trip units**															
Rating (A)	**In**	40°C	15	20	30	40	50	60	70	80	90	100	125	150	175	200	225	250
		50°C	14.2	19	28.5	38	47.5	57	66.5	76	85	95	118	142	166	190	213	237
		60°C	13.5	18	27	36	45	54	63	72	81	90	112	135	158	180	203	225
		70°C	12.8	17	25.6	34.2	43	51	60	68	77	85	107	128	150	171	192	214
For circuit breaker	COMPACT® NSF150 N/H		■	■	■	■	■	■	■	■	■	■	■	■				
	COMPACT® NSF250 N/H														■	■	■	■
Overload protection																		
Thermal			non-adjustable															
Short-circuit protection																		
Magnetic			non-adjustable												adjustable			
	COMPACT® NSF150		400				500			1000			1250	1500				
	COMPACT® NSF250														5–10 In			

Trip units

Trip units for COMPACT® NSJ400 and NSJ600 circuit breakers

COMPACT® NSJ400 and NSJ600 circuit breakers are equipped with current sensors and electronic trip units.

Current sensors
Four different sizes are available and can be mounted with all trip units:
■ NSJ400: 150, 250 and 400 A;
■ NSJ600: 600 A;

Trip units STR23SP and STR53UP
■ Protection for loads, from 60 to 600 A.
❑ STR23SP and STR53UP for standard protection;
❑ STR53UP for generator supplied network protection and for long cable runs;
■ Trip units STR23SP and STR53UP can be mounted on all COMPACT® NSJ400 and NSJ600 circuit breaker types N, H and L;
■ Trip unit STR53UP offers a greater number of protection settings, optional indication and measurement functions and ground-fault protection;
■ Trip units do not have a predefined rating. The tripping threshold depends only on the circuit breaker rating and the long-time protection setting.
For example, trip unit STR23SP, with maximum settings, has a tripping threshold of:
❑ 150 A, if mounted on a COMPACT® NSJ400 circuit breaker with 150 A current sensors;
❑ 600 A, if mounted on a COMPACT® NSJ600 circuit breaker.

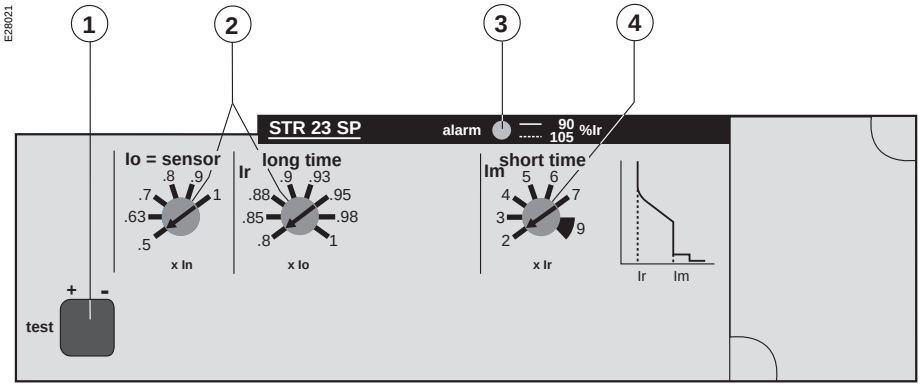
Trip units for COMPACT® NSJ400 and NSJ600 circuit breakers			**STR23SP**	**STR53UP**			
Overload protection (long time)							
Tripping threshold (A)	**Ir**	**20 to 70°C (*)**	adjustable (48 settings) 0.4–1 x In	adjustable (48 settings) 0.4–1 x In			
Tripping time (s)			fixed	adjustable			
(min–max)		at 1.5 x Ir	90–180	8–15	34–50	69–100	138–200
		at 6 x Ir	5–7.5	0.4–0.5	1.5–2	3–4	6–8
Short-circuit protection (short time)							
Tripping threshold (A)	**Im**		adjustable (8 settings) 2–9 x Ir	adjustable (8 settings) 1.5–7 x Ir			
	accuracy		± 15%	± 15%			
Time delay (ms)	max. overcurrent time before tripping		fixed ≤ 40	adjustable (4 settings + constant I^2t function) ≤ 15	≤ 60	≤ 140	≤ 230
	total breaking time		≤ 60	≤ 60	≤ 140	≤ 230	≤ 350
Short-circuit protection (instantaneous)							
Tripping Threshold (A)			fixed ≥ 9 x In	adjustable (8 settings) 1.5–7 x In			
Other functions							
Indication of type of fault				■ (standard)			
"Ground-fault" protection (T)				■			
Built-in ammeter (I)				■			
Zone-selective interlocking (ZSI)				■			
Communication (COM)				■			

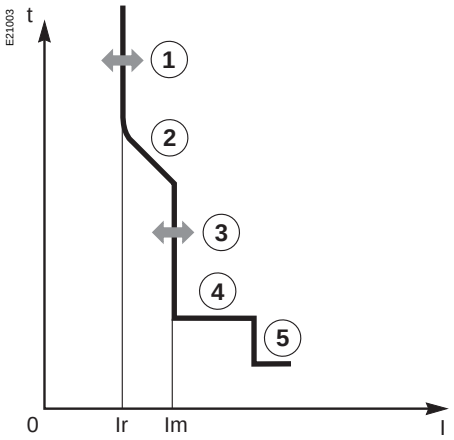
(*) If the STR23SP or STR53UP trip units are used at high operating temperature, the setting must take into account the thermal limits of the circuit breaker; the overload protection setting cannot exceed 0.95 at 60°C or 0.90 at 70°C for the COMPACT® NSJ400 circuit breaker, and 0.95 at 50°C, 0.90 at 60°C and 0.85 at 70°C for the COMPACT® NSJ600 circuit breaker.

Trip units

Trip units for COMPACT® NSJ400 and NSJ600 circuit breakers

Electronic trip unit STR23SP





Protection

■ LT (long-time) overload protection, adjustable threshold, based on the actual rms current:
❑ Adjustable threshold **(1)** using six Io base settings (0.5 to 1) and fine adjustment Ir with eight settings ranging from (0.8 to 1);
❑ Non-adjustable tripping time **(2)**;
■ ST (short-time) short-circuit protection:
❑ Adjustable threshold Im **(3)**;
❑ Fixed time delay **(4),** with or without constant I^2t function;
■ I (instantaneous) short-circuit protection, fixed threshold **(5)**.

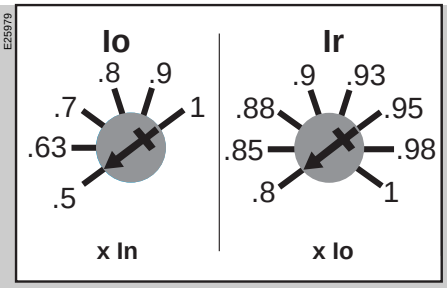
Other functions

Indications
Load indication (LED) in front **(6)**:
■ Goes on at: 90% of Ir threshold;
■ Flashes at: >105% or more of Ir threshold.

Test
■ Test connector in front **(7)** for connection to a mini test kit or calibration test kit (see page 13) to check circuit breaker operation after fitting the trip unit or other accessories;

Setting example

What is the overload protection threshold of a COMPACT® NSJ400 circuit breaker equipped with trip unit STR23SP where Io = 0.5 and Ir = 0.8 ?
Answer:
In x Io x Ir = 400 x 0.5 x 0.8 = 160 A
The same trip unit with the same settings, mounted on an NSJ600 circuit breaker will have the following tripping threshold:
In x Io x Ir = 600 x 0.5 x 0.8 = 240 A

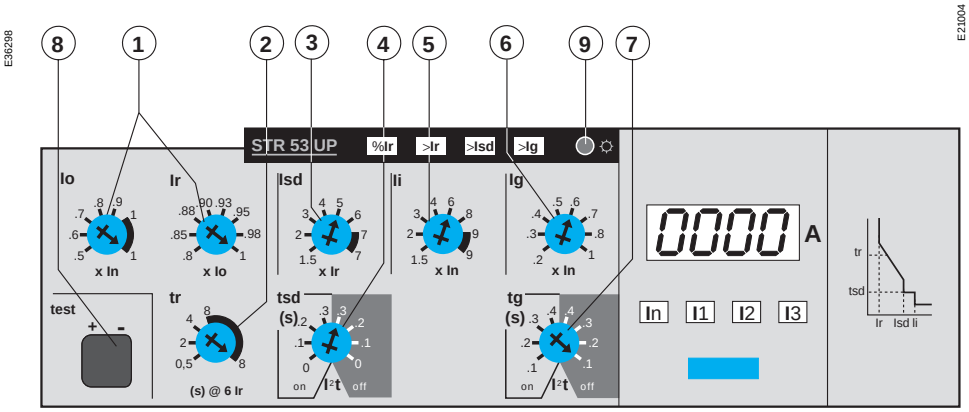


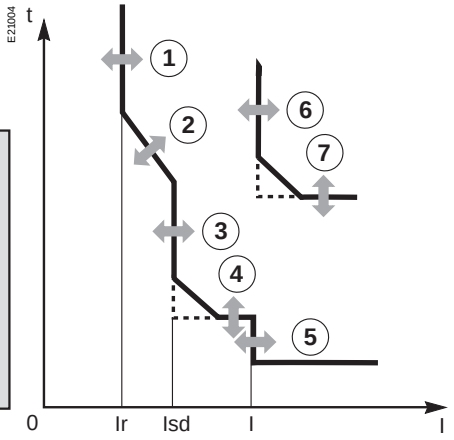
400 x 0.5 x 0.8 = 160 A

Trip units

Trip units for COMPACT® NSJ400 and NSJ600 circuit breakers

Electronic trip unit STR53UP





Protection

■ LT (long-time) overload protection, adjustable threshold, based on the actual rms current, as defined by IEC 947-2, appendix F:
❑ Adjustable threshold **(1)** using six Io base settings (0.5 to 1), and fine adjustment Ir with eight settings ranging from (0.8 to 1);
❑ Adjustable tripping time **(2)**;
■ ST (short-time) short-circuit protection:
❑ Adjustable threshold Isd **(3)**;
❑ Adjustable time delay **(4),** with or without constant I^2t function;
■ I (instantaneous) short-circuit protection, adjustable threshold **(5)**.

Other functions

Overload indications (%Ir)
■ LED goes on when the current exceeds 0.9 Ir;
■ LED flashes when the current exceeds the long-time threshold Ir.

Fault indications
LEDs indicate the type of fault that caused tripping:
■ Overload (LT protection) or abnormal component temperature **(>Ir)**;
■ Short-circuit (ST or instantaneous protection) **(>Isd)**;
■ Ground-fault (if earth-fault protection option is present) **(>Ig)**;
■ Microprocessor malfunction (both **(>Ir)** and **(>Isd)** LEDs go on, plus the **(>Ig)** LED if the ground-fault protection option is present).
LEDs are battery powered. Spare batteries are supplied in an adapter box. When a fault occurs, the LED indicating the type of fault goes off after about 10 minutes to conserve battery power. The information is, however,stored in memory and the LED can be re-illuminated by pressing the battery/LED test pushbutton **(9)**. The LED automatically goes off and the memory is cleared when the circuit breaker is reset.

Test
■ Test connector in front **(8)** for connection to a mini test kit or calibration test kit (see page 13) to check circuit breaker operation after fitting the trip unit or other accessories;
■ Test button **(9)** for (%Ir), (>Ir), (>Im) and (>Ig) LEDs and battery.

Self-monitoring
The circuit breaker trips for:
■ Microprocessor faults;
■ Abnormal temperatures.

Trip units

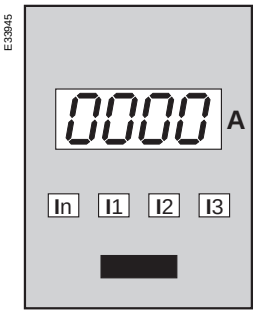
Options for electronic trip unit STR53UP

"Ground-fault" protection (T) (see (6) and (7), page 11)

Type		residual current			
Tripping threshold	Ih	adjustable (8 settings) 0.2 to 1 x In			
	accuracy	± 15%			
Tripping time (ms)	maximum overcurrent time before tripping	adjustable (4 settings + function "I²t=Cst") 60	140	230	350
	total breaking time	≤ 140	≤ 230	≤ 350	≤500

Ammeter (I)

A digital display continuously indicates the current of the phase with the greatest load. By pressing a scroll button, it is also possible to display successively the readings of I1, I2, I3 and I neutral.
LEDs indicate the phase for which the current is displayed.



Zone-selective interlocking (Z)

A number of circuit breakers are interconnected one after another by a pilot wire.
In the event of a short-time or earth fault:
■ If a given trip unit STR53UP detects the fault, it informs the upstream circuit breaker which applies the set time delay;
■ If the trip unit STR53UP does not detect the fault, the upstream circuit breaker trips after its shortest time delay.
In this way, the fault is cleared rapidly by the nearest circuit breaker. In addition, the thermal stresses on the circuits are minimized and time discrimination is maintained throughout the installation.

Opto-electronic outputs
The use of opto-transistors ensures total isolation between the internal circuits of the trip unit and the circuits wired by the user.

Communication (COM)

Transmission of data to DIGIPACT® distribution monitoring and control modules.
Transmitted data:
■ Settings;
■ Phase and neutral currents (rms values);
■ Highest current of the three phases;
■ Overload condition alarm;

Possible combinations

■ I;
■ T;
■ I + T;
■ I + COM;
■ I + T + COM;
■ ZSI;
■ ZSI + I;
■ ZSI + T;
■ ZSI + I + T;
■ ZSI + I + COM;
■ ZSI + I + T + COM.

Trip units

Electronic trip unit test kits

047035

Mini test kit

The two test kits presented below are compatible with COMPACT® and MASTERPACT® circuit breakers.
Tests performed by test kits are only functional tests designed to electrically test the operating integrity of the trip unit, the flux shifter and the mechanical operation of the circuit breaker. Tests are not designed to calibrate the circuit breaker.

Mini test kit

The mini test kit is a portable unit requiring no external power supply (five 9 V alkaline batteries, not supplied), used to check operation of the electronic trip unit and circuit breaker tripping. It connects to the test connector on the front of the trip unit.

Portable test kit

The calibration test kit is used to check the operation of the trip unit by measuring the actual trip time:
- At 1.5 x Ir (for long-time protection);
- At 15 x Ir (for short-time protection);
- At 0.8 x In (for ground-fault protection).

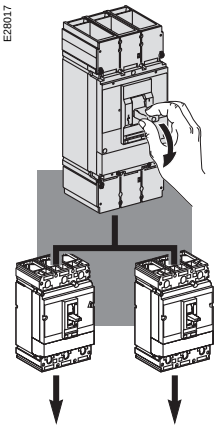
Required power supply: 110 or 240 Vac, 50/60 Hz (2-position selector).

052172

ME portable test kit

Switches

E28017



Ratings and interrupting ratings

UL 1087 Listed ratings

COMPACT® switches		
Number of poles		
Rated voltage (V)		AC 50/60 Hz
Rated current (A)		

IEC 947-3 ratings

COMPACT® switches		
Number of poles		
Rated insulation voltage (V)	**Ui**	
Rated impulse withstand voltage (kV)	**Uimp**	
Rated operational voltage (V)	**Ue**	AC 50/60 Hz
		DC
Rated operational current (V)	**Ie**	AC23A 690 V
		DC23A 250 V
		DC23A 500 V (2 poles in series)
Making capacity (kA peak)		
Short-time withstand current (kA rms)	**Icw**	Icw (kA rms)
		duration (s)

Short-circuit withstand current
Molded case switches are identical to molded case circuit breakers, except that they are not equipped with trip units and sensors.
These switches open instantaneously at a non-adjustable, factory preset, magnetic trip point calibrated to protect only the molded case switch itself. (magnetic settings: NSF150/250 A switches: 2000 A; NSJ 400/600 A switches: 6000 A).
When protected by any protective device, these switches are suitable for use on a circuit capable of delivering not more than:
- 240 V: 100 kA for NSF switches and 150 kA for NSJ switches;
- 480 V: 65 kA for NSF switches and 100 kA for NSJ switches;
- 600 V (600Y/347 for NSF switches): 25 kA.

Switches are Listed under UL file E103740 and Certified under CSA file LR 88980.

Molded case switches are automatic and open instantaneously at a factory preset magnetic trip point of:
- 2000 A for NSF150A and NSF250A switches;
- 6000 A for NSJ400A and NSJ600A switches.

Molded case switches are calibrated to protect only the molded case switch itself when subjected to high fault currents. The trip point is non-adjustable and provides no overload protection.

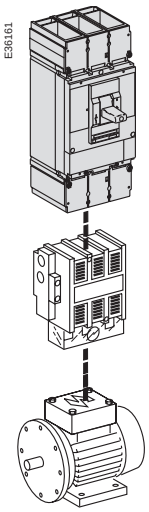
Molded case switches open when the handle is switched to the OFF position or in response to an auxiliary tripping device such as a shunt trip or an undervoltage release.

Switches

	NSF150A	NSF250A	NSJ400A	NSJ600A
	3	3	3	3
	600Y/347	600Y/347	600	600
	150	250	400	600

	NSF150A	NSF250A	NSJ400A	NSJ600A
	3	3	3	3
	750	750	750	750
	8	8	8	8
	690	690	690	690
	500	500	500	500
	160	250	400	630
	160	250	400	630
	160	250	400	630
	3.6	4.9	7.1	8.5
	2.5	3.5	5	8
	3	3	3	3

Motor circuit protectors



Ratings

UL 489 Recognized Component

COMPACT® circuit breakers			
Number of poles			
Rated voltage (V)		AC 50/60 Hz	
Rated current (A)	**In**	40°C	
Magnetic trip setting	**Im**		

IEC 947-2 and EN 60947-2 ratings

COMPACT® circuit breakers			
Number of poles			
Rated insulation voltage (V)	**Ui**		
Rated impulse withstand voltage (kV)	**Uimp**		
Rated operational voltage (V)	**Ue**	AC 50/60 Hz	
		DC	
Rated current (A)	**In**	40°C	
Ultimate breaking capacity (kA rms)	**Icu**	AC 50/60 Hz	220/240 V
			380/415 V
			440 V
			500 V
			525 V
			660/690 V
		DC	250 V (1 pole)
			500 V (2 poles in series)
Service breaking capacity	**Ics**	(% Icu)	
Utilization category			

Motor circuit protectors are Recognized under UL file E113389 and Certified under CSA file LR 69561.

Motor circuit protectors

	NSF150HC	NSF250HC		NSJ400HC	NSJ600HC
	3	3		3	3
	600Y/347	600Y/347		600	600
	150	200	250	400 (100% rated circuit breaker)	600
	900-1800	1000-2000	1250-2500	2000-4000	3000-6000

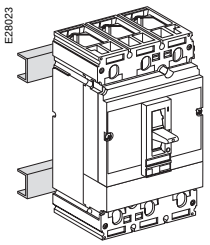
	NSF150HC	NSF250HC		NSJ400HC	NSJ600HC
	3	3		3	3
	750	750		750	750
	8	8		8	8
	690	690		690	690
	500	500		500	500
	150	200	250	400	600
	HC	**HC**		**HC**	**HC**
	100	100		100	100
	70	70		70	70
	65	65		65	65
	50	50		30	30
	35	35		35	35
	10	10		20	20
	85	85		85	85
	85	85		85	85
	100%	100%		100%	100%
	A	A		A	A

Installation and connections

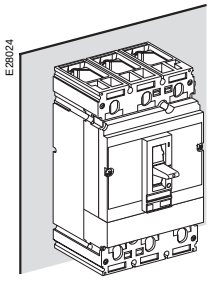
Refer to circuit breaker installation instructions before installing circuit breaker, accessories or wiring.

Fixed mounting

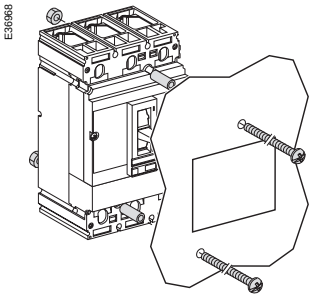
Mounting on rails



Mounting on backplate



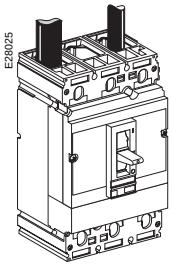
Flush mounting



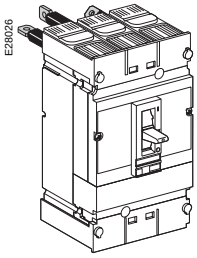
Connections

See pages 20 and 21 for details. COMPACT® NSF and NSJ circuit breakers are suitable for reverse feeding.

Front connection



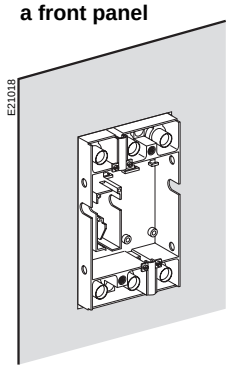
Rear connection



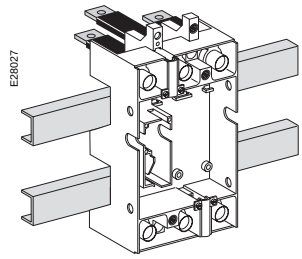
COMPACT® NSF250N circuit breaker on a plug-in mounting

Plug-in-mounting

Mounting through a front panel



Mounting on rails



The plug-in configuration makes it possible to:
- Extract and/or rapidly replace the circuit breaker without having to touch connections;
- Allow for addition of future circuits at a later date.

When the circuit breaker is in the connected position, the primary voltage is fed through the circuit breaker by means of multiple finger disconnects. Control voltage of internal accessories is provided through secondary disconnects.

Parts of a plug-in configuration
- COMPACT® circuit breaker (fixed mounted);
- Set of power and secondary disconnects that are added to the circuit breaker;
- Plug-in base for mounting through a front panel or on rails;
- Safety trip, to be installed on the circuit breaker, that causes automatic tripping if the circuit breaker is ON before engaging or withdrawing it. The safety trip does not prevent circuit breaker operation, even when the circuit breaker is disconnected;
- Mandatory short terminal shields.

The plug-in mounting is Listed under UL file E113555 and Certified under CSA file LR 69561.

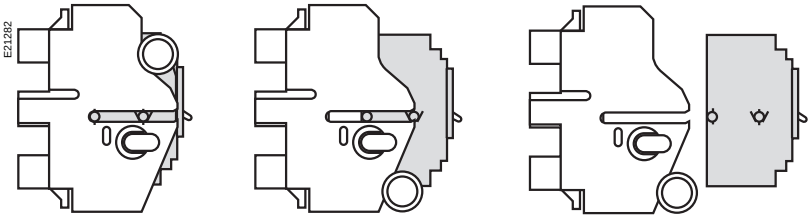
Installation and connections

86025

COMPACT® NSF250N circuit breaker on a drawout chassis

Drawout mounting

E21282



The chassis is made up of two side plates installed on the base and two other plates mounted on the circuit breaker.

Chassis functions

All functions of the plug-in base, plus:

■ Disconnected position: the power circuits are disconnected, the circuit breaker is simply "withdrawn" and may still be operated (on, off, push-to-trip);

■ Circuit breaker may be locked using 1 to 3 padlocks (diameter 0.19 to 0.31 inch (5 to 8 mm), to prevent connection;

■ The auxiliaries can be tested (with manual auxiliary connector).

Mounting

■ On a backplate, through a front panel or on rails;

■ Horizontally or vertically.

Accessories

■ Auxiliary switches for installation on the fixed part of the chassis, indicating the "connected" and "disconnected" positions;

■ Toggle collar for circuit breakers with toggle through front panel, intended to maintain the degree of protection whatever the position of the circuit breaker (supplied with a toggle extension);

■ Keylock which, depending on the bolt fitted, can be used to:

❑ prevent insertion for connection;

❑ lock the circuit breaker in connected or disconnected position;

■ Telescopic shaft for extended rotary handles.

Connection of auxiliaries:

■ Control voltage is provided through automatic secondary disconnects in the connected position only. See page 20 for more details.

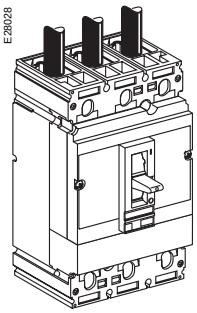
■ Electrical accessories can be tested in the disconnected position with an external wiring harness.

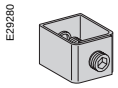
The drawout-mounted chassis is Listed under UL file E113555 and Certified under CSA file LR 69561.

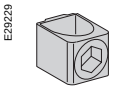
Connections

Front connection

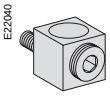
Connection to cables



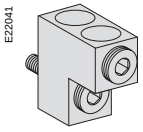




■ Cable connectors for COMPACT® NSF150 and NSF250 circuit breakers lay on top of the circuit breaker terminals. They are held in place by a plastic lug pack which is screwed into the circuit breaker case.



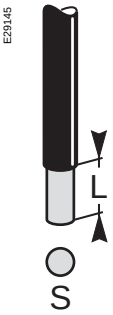
1 wire cable



2 wires cables

■ Cable connectors for COMPACT® NSJ400 and NSJ600 circuit breakers screw onto the circuit breaker terminals or the terminals of the plug-in base.

Copper or aluminum cable

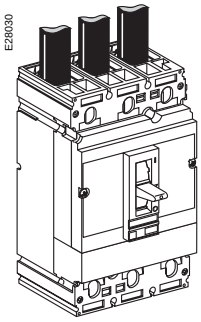


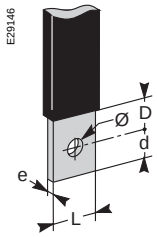
NSF150	NSF150/250
steel lug (15–60 A)	aluminum lug (70–250 A)
S #14 AWG–#10 AWG Cu (stranded conductor only) **#8 AWG–#6 AWG Cu** **#8 AWG–#4 AWG Al** *1.5–95 mm²*	**S #2/0 AWG–250 kcmil Cu** **#4/0 AWG–350 kcmil Al** *70–185 mm²*
L .79 in./*20 mm*	**L .79 in.**/*20 mm*

NSJ400	NSJ600
1 cable	1 to 2 cables
S #2 AWG–600 kcmil Cu **#2 AWG–500 kcmil Al** *35–300 mm²*	**S #2/0 AWG–350 kcmil Cu** **#2/0 AWG–500 kcmil Al** *70–240mm²*
L 1.2 in./*31 mm*	**L 1.2 in.**/*31 mm* **2.4 in.**/*61 mm*

Connection to bars

The COMPACT® NSF150 to NSJ600 circuit breakers are equipped as standard with captive nuts and screws for direct connection to bars:
■ COMPACT® NSF150/250 circuit breakers: M8 screws;
■ COMPACT® NSJ400/600 circuit breakers: M10 screws.





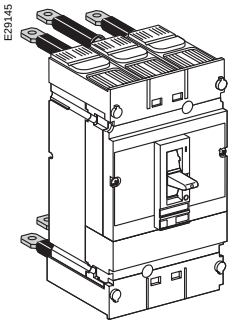
COMPACT® circuit breaker		NSF150/250	NSJ400/600
pole pitch	**(inch /** *mm***)**	**1.4**/*35*	**1.8**/*45*
L	**(inch /** *mm***)**	≤ **1**/*25*	≤ **1.3**/*32*
d	**(inch /** *mm***)**	≤ **0.4**/*10*	≤ **0.64**/*16*
D	**(inch /** *mm***)**	< **0.35**/*9*	< **0.51**/*13*
e	**(inch /** *mm***)**	≤ **0.23**/≤ *6*	**0.11–0.39**/*3–10*
f	**(inch /** *mm***)**	< **0.32**/*8*	< **0.4**/*10*

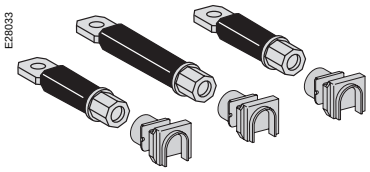
Connections

Rear connection

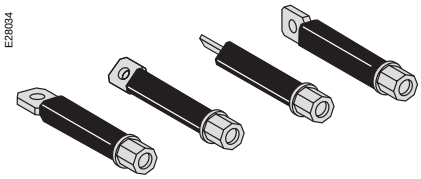
Fixed mounting

For connection of bars or cables with compression lugs.
Rear connections are easily installed on the circuit breaker terminals. The same connection may be installed flat, edgewise or at a 45° angle. All combinations are possible. The circuit breaker is mounted on a backplate.





one long + two short

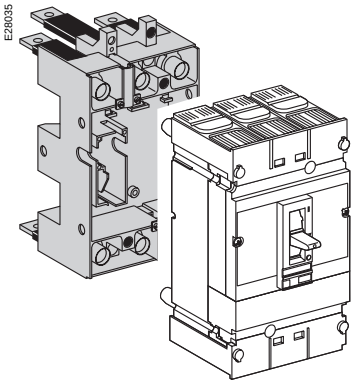


4 positions

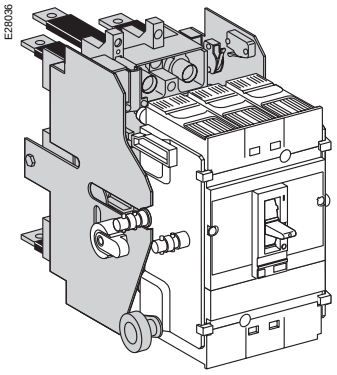
Plug-in mounting and drawout mounting

For connection of bars or cables with compression lugs.
Rear connections are installed flat.
The plug-in base or the chassis are mounted through a front panel.

Plug-in mounting



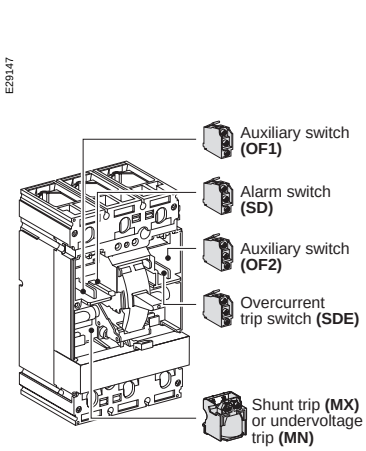
Drawout mounting



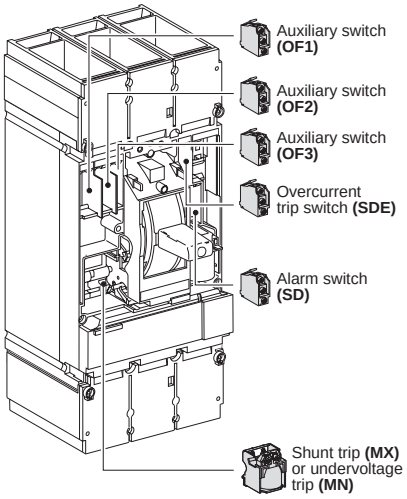
Accessories

Location

Internal accessories comply with requirements of Underwriters Laboratories Inc. UL 489 and Canadian Standard Association C22.2 No.5.1 Standards. All internal accessories are Listed for fixed installation per UL file E103955 and Certified under CSA file LR 69561.



NSF150/250



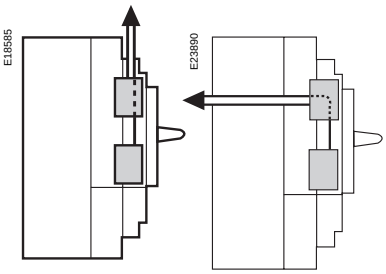
NSJ400/600

Connections

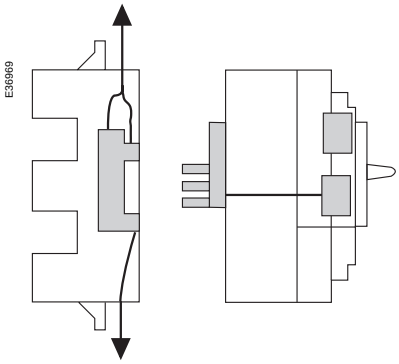
Each electrical accessory is fitted with numbered terminal blocks for wires with the following maximum size:
- #16 AWG (1.5 mm²) for auxiliary switches, undervoltage and shunt trip or undervoltage trip;
- #14 AWG (2.5 mm²) for the motor operator.

Fixed mounting

Auxiliary circuits exit the device through a knock-out in the accessory front cover.



Plug-in and drawout mounting



Accessories

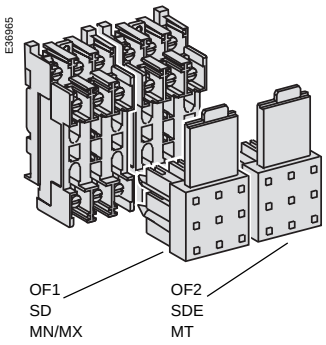
Automatic secondary disconnecting blocks

Accessory circuits exit the circuit breaker via one to three secondary disconnecting blocks (nine wires each). For COMPACT® NSJ400/600 circuit breakers connection wires for the options installed with trip unit STR53UP also exit via the automatic secondary disconnecting blocks. These are made up of:

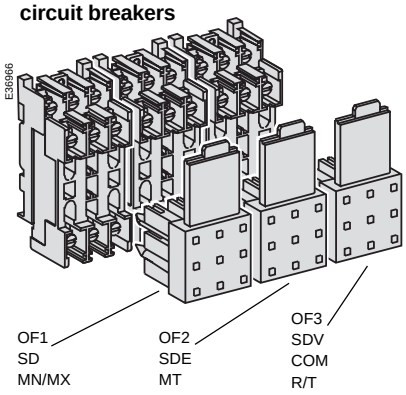
■ A moving part connected to the circuit breaker via a support (one support per circuit breaker);

■ A fixed part mounted on the plug-in base, equipped with connectors for wires up to #14 AWG (2.5 mm²).

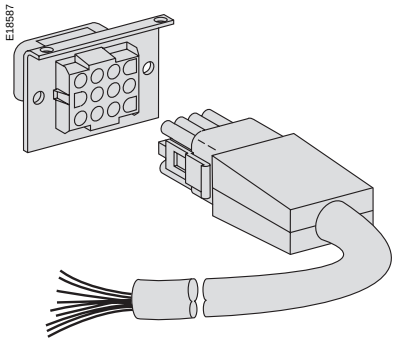
COMPACT® NSF150 and NSF250 circuit breakers



COMPACT® NSJ400 to NSJ600 circuit breakers



9-wire manual auxiliary connector



Accessories

Auxiliary and alarm switches

For COMPACT® NSF150 to NSJ600 circuit breakers

Changeover switches

Auxiliary switches provide remote information of the circuit breaker status and can thus be used for indications, electrical locking, relays, etc.

Functions

■ OF (open/closed): indicates the position of the circuit breaker contacts;
■ SD (trip indication): indicates that the circuit breaker has tripped due to:
❑ An overload;
❑ A short circuit;
❑ A ground fault;
❑ The operation of a shunt trip or undervoltage trip or the "push-to-trip" button which resets when the circuit breaker is reset;
❑ The operation of a plug-in base or chassis when attempting to withdraw the circuit breaker in ON position;
■ SDE (fault indication): indicates that the circuit breaker has tripped due to an overload, a short circuit or a ground fault. Resets when the circuit breaker is reset;
■ CAM (early-make or early-break function): indicates the position of the rotary handle. Used in particular for advanced-opening safety trip devices;
■ Connected/disconnected: indicates the position of a drawout circuit breaker;
■ Switching of very low loads: all above auxiliary switches are also available in low-level versions capable of switching very low loads (e.g., for the control of PLCs or electronic circuits).
"Low-level" switches are not UL Listed.

Standards

Auxiliary switches comply with UL 489, CSA C22.2 No. 5.1 and IEC 947-5 Standards.

Installation

■ Functions OF, SD and SDE:
❑ The switches snap into cavities under the front accessory cover of the circuit breaker;
❑ For COMPACT® NSF150 to NSJ600 circuit breakers, one model serves for all indication functions depending on where it is fitted in the circuit breaker.
The SDE function of a circuit breaker equipped with a thermal-magnetic trip unit requires the SDE actuator;
■ CAM: to be fitted in the rotary handle module. Depending on how it is installed, it ensures either the CAO (early-break) or the CAF (early-make) function;
■ "Connected/disconnected" function: 2 parts to be fitted on the chassis and the drawout circuit breaker.
Connections: See page 22.

Electrical ratings

UL 489 and CSA C22.2 No. 5.1 ratings

			Low-level switches	Regular switches
Minimum rating			1 mA—4 V	10 mA—24 V
Maximum rating	50/60 Hz	240 V	5	6
		480 V	5	6
		600 V	-	3
	DC	48 V	2.5	2.5
		125 V	0.8	0.8
		250 V	0.3	0.3

IEC 947 ratings

		Low-level switches				Regular switches			
Rated thermal current (A)		5				6			
Minimum rating		1 mA—4 V				10 mA—24 V			
		AC		DC		AC		DC	
Utilization category (IEC 947-4)		AC12	AC15	DC12	DC14	AC12	AC15	DC12	DC14
Operational current (A)	24 V	5	3	5	1	6	6	2.5	1
	48 V	5	3	2.5	0.2	6	6	2.5	0.2
	110 V	5	2.5	0.8	0.05	6	5	0.8	0.05
	220/240 V	5	2			6	4		
	250 V			0.3	0.03			0.3	0.03
	380/415 V	5	1.5			6	3		
	440 V	5	1.5			6	3		
	660/690 V					6	0.1		

Accessories

Shunt trip and undervoltage trip

044313

For COMPACT® NSF150 to NSJ600 circuit breakers

A voltage release can be used to trip the circuit breaker via a control signal.

Undervoltage trip (MN)

■ Trips the circuit breaker when the control voltage drops below a tripping threshold;
■ Drops out between 35% and 70% of the rated voltage;
■ Circuit breaker closing is possible only if the voltage exceeds 85% of the rated voltage;
■ Permanent type;
■ If an overvoltage condition exists, operation of the closing mechanism of the circuit breaker will not permit the main contacts to touch, even momentarily.

Shunt trip (MX)

Trips the circuit breaker when the control voltage rises above 70% of its rated voltage.
Impulse type ≥ 20ms or maintained control signals.
AC shunt trips can be operated at 55% of their rated voltage, making them suitable for ground-fault protection when combined with a Class I ground-fault sensing element.

Operation

■ The circuit breaker must be reset locally after being tripped by a shunt trip or undervoltage trip (MN or MX);
■ MN or MX tripping has priority over manual (or motor operator) closing. In the presence of a standing trip order, such an action does not result in any closing, even temporarily, of the main contacts;
■ Endurance:
❑ 50% of the rated mechanical endurance of the circuit breaker for COMPACT® NSF150 to NSJ600 circuit breakers.

Installation and connection

■ Accessories are common to NSF and NSJ circuit breakers. They are located within the circuit breaker behind the front accessory cover;
■ Each terminal may be connected by one #18–#14 AWG (1.0–2.5 mm^2) stranded copper wire.

Electrical characteristics

		AC	DC
Rated voltage (V)		24, 48, 110–130, 208–277,	12, 24, 30, 48,
		380–480, 525, 600	60, 125, 250
Consumption	pickup (MX)	< 10 VA	< 5 W
	seal-in (MN)	< 5 VA	< 5 W
Clearing time (ms)		< 50	< 50

Accessories

Motor operator

86012

COMPACT® NSJ400N circuit breaker with motor operator

The motor operator remotely operates the circuit breaker featuring easy and sure operation:
- All circuit breaker indications and information remain visible and accessible, including trip units settings and circuit breaker connection;
- Suitability for isolation is maintained and padlocking remains possible;
- Double insulation front face.

Applications

- Local motor-driven operation, centralized operation, automatic distribution control;
- Normal/standby source changeover or switching to a replacement source to optimize energy costs;
- Load shedding and reconnection to optimize energy costs;
- Synchrocoupling.

Automatic operation

- On and off by two impulse type or continuous control signals;
- Depending on the wiring, resetting can be done locally, remotely or automatically;
- Mandatory manual reset following tripping due to an electrical fault.

Manual operation

- Transfer to manual mode using switch (9) with possibility of remote mode indication;
- On and off by two push buttons;
- Recharging of stored-energy system by pumping the lever nine times;
- Padlocking in off position.

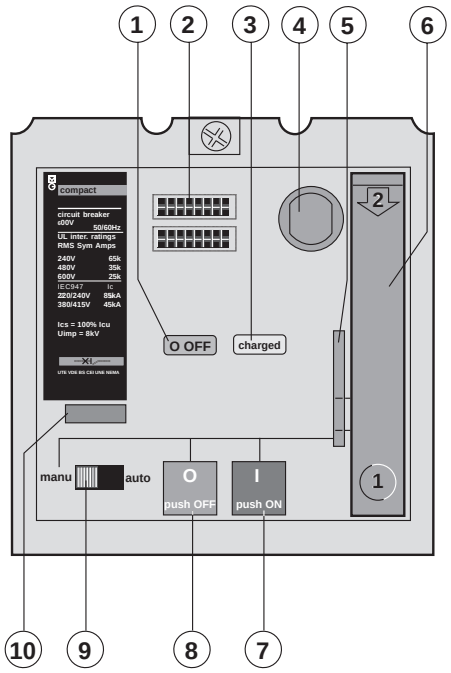
Installation and connection

- All installation (fixed, plug-in/drawout mounting) and connection capabilities are maintained;
- Connection of the motor operator module behind its front cover to a built-in terminal block, for stranded copper wire #14 AWG/2.5 mm^2.

Accessories for NSJ400/600

- Keylock for locking in OFF position;
- Operations counter, indicating the number of ON and OFF cycles. The counter must be installed on the front of the motor operator module.

E28037



1 Contact position indicator (suitability for isolation).
2 Outgoing circuit identification labels.
3 Spring status indicator (charged, discharged).
4 Locking device (keylock) on NSJ400/600.
5 Locking device (off position) using one to three padlocks, diameter 0.2 to 0.32 inches/5 to 8 mm, not supplied.
6 Manual spring charging handle.
7 I (ON) push button.
8 O (OFF) push button.
9 Manual/auto mode selection switch; the position of the switch can be indicated remotely.
10 Operations counter (COMPACT® NSJ400/600 circuit breaker).

Characteristics

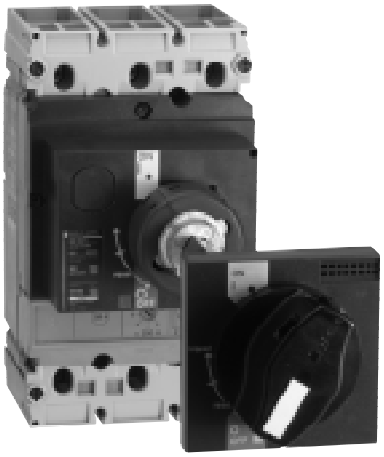
			NSF	NSJ
Response time (ms)		Opening	< 500	
		Closing	< 80	
Max. cycles frequency per minute			4	
Control voltage (V)	AC 50/60 Hz		48–60	48–60
			110–130	110–130
			208–277	208–277
			380–480	380–415
				440–480
	DC		24–30	24–30
			48–60	48–60
			110–130	110–130
			250	250
Consumption	AC (VA)	Opening	≤ 500	
		Closing	≤ 500	
	DC (W)	Opening	≤ 500	
		Closing	≤ 500	
Minimum operating order			700 ms	
Operating voltage			85–110 % rated voltage	

Accessories

Rotary operating handles


86037

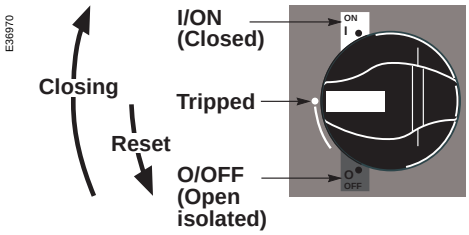
COMPACT® NS250N circuit breaker with direct rotary handle.


86039

COMPACT® NSF250N circuit breaker with extended rotary handle.

Operation

■ The direct rotary handle maintains:
❑ Suitability for isolation;
❑ Indication of three positions O (off), I (on) and tripped;
❑ Access to the "push-to-trip" button;
❑ Visibility of and access to trip unit settings;



■ The circuit breaker may be locked in the off position by using one to three padlocks, padlock shackle diameter 0.19 to 0.31 inch (5 to 8 mm) (padlocks are not supplied).

Directly mounted

Installation

Replaces the circuit breaker front accessory cover (secured by screws).

Models

■ Standard with black handle;
■ VDE type with red handle and yellow bezel for machine tool control.

Variations for COMPACT® NSF150 to NSJ600 circuit breakers

Accessories transform the standard direct rotary handle for the following situations:
■ Motor control centers (MCCs):
❑ Door opening prevented when circuit breaker is on;
❑ Circuit breaker closing inhibited when door is open;
■ Machine tool control, complies with CNOMO E03.81.501N, degree of protection IP54.
The directly-mounted rotary operating handle is Listed under UL file E103955 and Certified under CSA file LR 69561.

Door mounted

Makes it possible to operate circuit breakers installed inside an enclosure from the front. The handle mechanism can be used in NEMA 3R and 12 enclosure applications. Degree of protection: IP40 as per IEC 529.

Operation

■ The unit maintains:
❑ Suitability for isolation;
❑ Indication of the three positions O (off), I (on) and tripped;
❑ Visibility of and access to trip unit settings when the door is open;
■ Door opening prevented when circuit breaker is on;
■ The circuit breaker may be locked in the off position by using one to three padlocks, padlock shackle diameter 0.19 to 0.31 inch (5 to 8 mm) (padlocks are not supplied). Locking prevents opening of the switchboard door.

Models

■ Standard with black handle;
■ VDE type with red handle and yellow bezel for machine tool control.

Installation

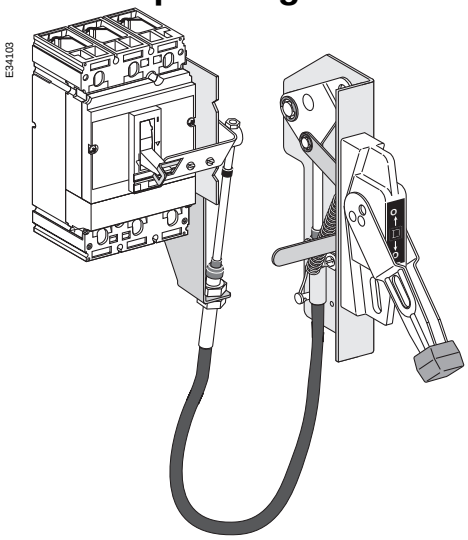
The extended rotary operating handle is made up of:
■ A unit that replaces the front accessory cover of the circuit breaker (secured by screws);
■ An assembly (handle and front plate) on the door that is always secured in the same position, whether the circuit breaker is installed vertically or horizontally;
■ An extension shaft that must be adjusted. The distances between back of circuit breaker and door are:
❑ COMPACT® NSF150/250 circuit breakers: 7.4 to 24 inches (185 to 600 mm),
❑ COMPACT® NSJ400/600 circuit breakers: 8.4 to 25 inches (210 to 625 mm).

Variation for COMPACT® NSF150 to NSJ600 circuit breakers

For withdrawable configurations, the extended rotary handle is also available with a telescopic shaft with two stable positions.
The extended rotary operating handle is Listed under UL file E103955 and Certified under CSA file LR 69561.

Accessories

Cable operating handle



Flange-mounted handle cable operating mechanism

Operation

■ The cable operator maintains:
- ❑ Suitability for isolation,
- ❑ Indication of three positions O (Off), I (On) and tripped,
- ❑ Access to push-to-test,
- ❑ The circuit breaker may be locked in the off position by one to three padlocks,
- ❑ Door can be locked closed due to interlocking features of the handle operator.

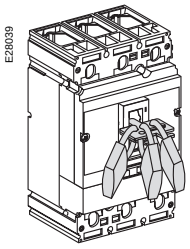
Installation

Handle is mounted on flange of enclosure using specified mounting dimensions while circuit breaker and operating mechanism are mounted to inside of enclosure using two screws.
Cable lengths available in 3-, 5- or 10-foot lengths to accommodate variety of mounting locations. Handles are available in painted Nema 1, 3, 3R, 4 (sheet steel) and 12 ratings or chrome (Nema 4, 4x).

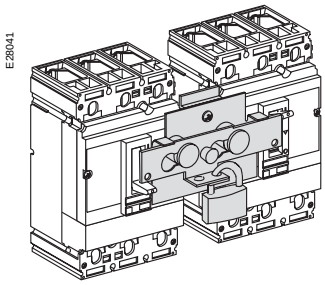
Locking systems

■ Padlocking systems can receive up to three padlocks with diameters ranging from 0.19 to 0.31 inch *(5 to 8 mm)* (padlocks not supplied).

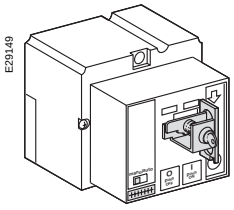
Locking in the off position



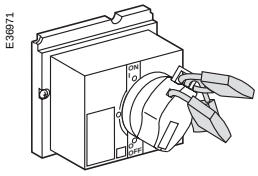
Locking of the toggle using a fixed device



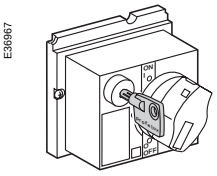
Locking of the toggle using a stationary device



Locking of the motor operator using a keylock



Locking of the rotary handle using a padlock or a keylock



Locking of the rotary handle using a keylock

Control device	Function	Means	Required accessories	NSF150/250	NSJ400/600
Toggle	Lock in off position	Padlock	Removable device	■	■
	Lock in off or on position	Padlock	Stationary device	■	■
Direct rotary Handle	Lock in off position	Padlock		■	■
		Keylock	Locking device + keylock		
MCC rotary operating Handle	Lock in off position	Padlock		■	■
Extended rotary Operating handle	Lock in off position, door opening prevented	Padlock		■	■
		Keylock	Keylock		
Motor operator	Lock in off position, motor mechanism locked out	Padlock		■	■
		Keylock	Locking device (keylock incorporated)	■	

Accessories

Interlocking systems

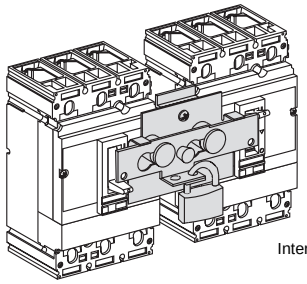
Interlocking prevents the simultaneous closing of two circuit breakers.

Control device	Means	NSF150–NSJ600
Toggle	Sliding bar interlocking mechanical device	■
Rotary handle (directly or door mounted)	Mechanical interlocking	■
	2 keylocks and 1 key	■

Interlocking of circuit breakers with toggle control

Two models:
■ For COMPACT® NSF150–NSF250 circuit breakers (three-pole or four-pole);
■ For COMPACT® NSJ400–NSJ600 circuit breakers (three-pole or four-pole).
Padlocking systems can receive one or two padlocks with diameters ranging from 0.19 to 0.31 inch *(5 to 8 mm)*.
Both interlocked circuit breakers should be fixed version or plug-in version.
■ Two sliding interlocking bars can be used to interlock three circuit breakers installed side-by-side, in which case one circuit breaker is in the ON position and the two others in the OFF position.

E28041

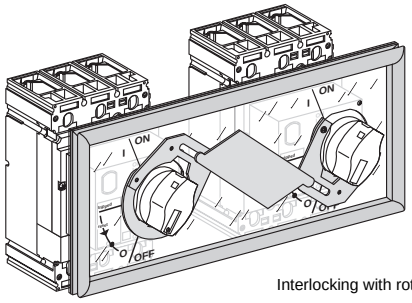


Interlocking with toggle control

Interlocking of circuit breakers with rotary handles

For COMPACT® NSF150–NSJ600 circuit breakers

E28042



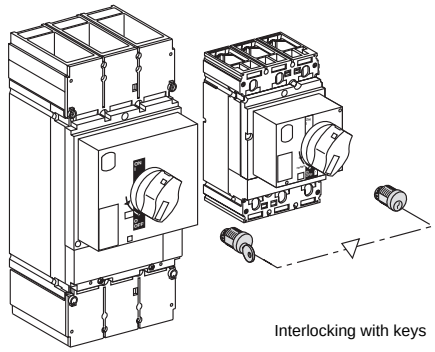
Interlocking with rotary handles

Interlocking with keys

For circuit breakers equipped with rotary handles or a motor mechanism.
■ Interlocking with keys may be easily implemented by equipping each of the COMPACT circuit breakers, either fixed or drawout mounted, with a directly mounted rotary operating handle and a standard keylock, but with only one key for the two keylocks. This solution enables interlocking between two circuit breakers that are geographically distant or that have significantly different characteristics.

Use:
■ A keylock adapter (different for each device);
■ Two identical keylocks with a single key.

E28046



Interlocking with keys

Accessories

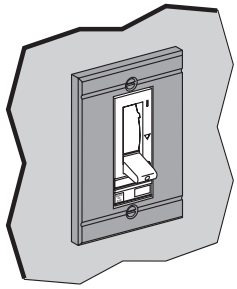
Front panel escutcheons

For fixed or plug-in mounting

Door escutcheon provides better appearance of the door contact.

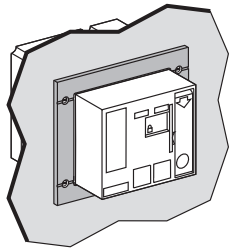
Front panel escutcheons for toggle
Secures to the panel, from the front.

E28043

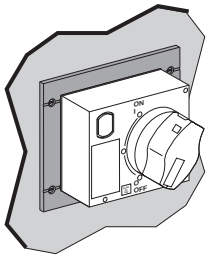


Front panel escutcheon for motor operator module or rotary operating handle
Secures to the panel by four screws, from the front.

E21265

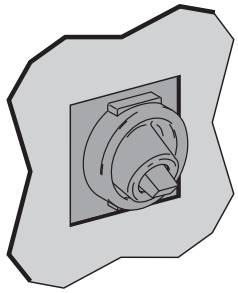


E23938



Toggle boot
- Protection up to NEMA 3M;
- Fits on the front of the circuit breaker.

E23936



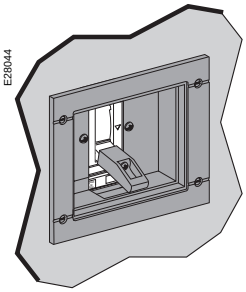
For drawout mounting

Toggle collars

The toggle collars make it possible to maintain degrees of protection regardless of the circuit breaker position (connected, disconnected);
- Front panel escutcheons are obligatory (identical to those for rotary handle and for ammeter module);
- Toggle collars secured by two screws on the circuit breaker;
- Front panel escutcheons secured on the switchboard;
- Toggle extension is supplied with the toggle collar.

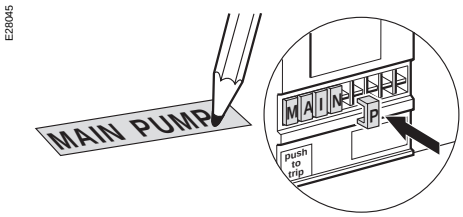
Front panel escutcheons for motor operator, rotary operating handles
Same as for the fixed-mounted circuit breaker with the same equipment (see above).

E28044



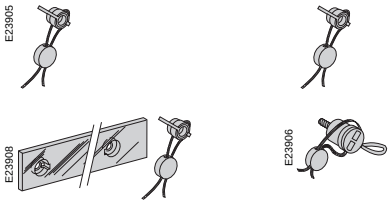
Accessories

Outgoing circuit identification



COMPACT® NS circuit breakers come with labels designed for handwritten indications.
It is also possible to use preprinted Telemecanique labels, catalog No. AB1:
- COMPACT® NSF150–NSF250 circuit breakers: eight characters;
- COMPACT® NSJ400–NSJ600 circuit breakers: sixteen characters.

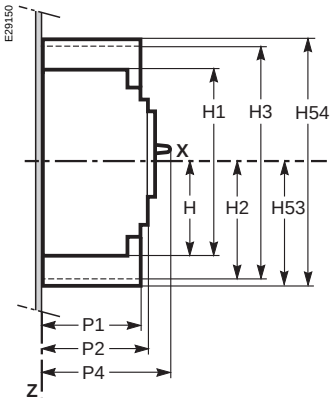
Sealing accessory

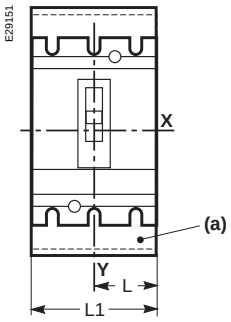


This accessory includes the elements required to fit lead seals to prevent:
- Front accessory cover removal;
- Rotary handle removal;
- Opening of the motor operator;
- Access to accessories;
- Access to trip unit settings;
- Access to ground-fault protection settings;
- Trip unit removal;
- Terminal cover removal;
- Access to power connections.

Fixed-mounted $\frac{\text{inch}}{mm}$

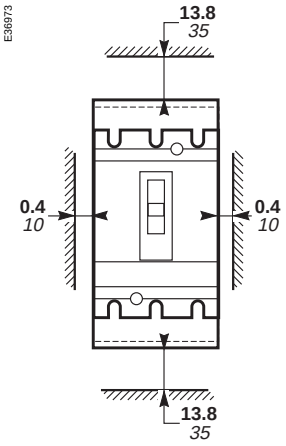
Dimensions





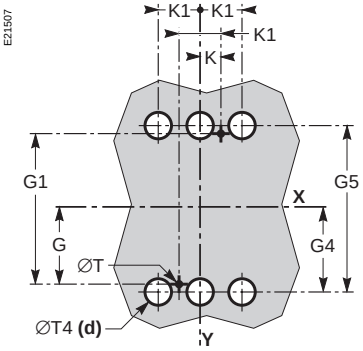
(a) short terminal covers for rear connection

Electrical clearances

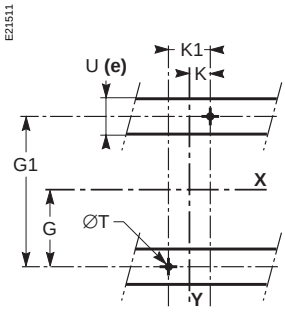


Mounting

Mounting on backplate



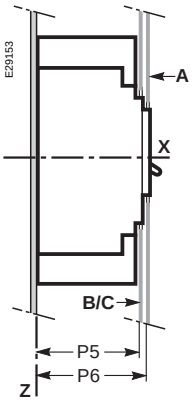
Mounting on rails



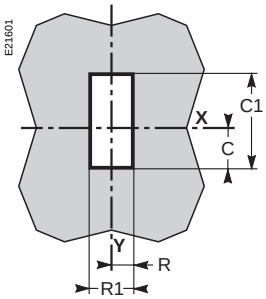
(d) only for rear connected circuit breakers.
(e) U ≤ **0.78**/*20* when using secondary disconnecting blocks (COMPACT® NSF150 and NSF250 circuit breakers).

Front panel cutouts

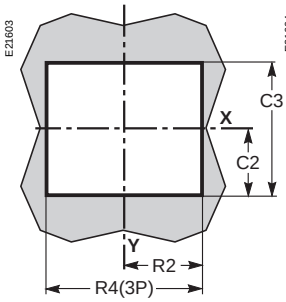
For fixed or plug-in circuit breakers



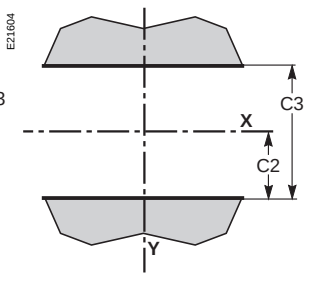
Cutout A



Cutout B



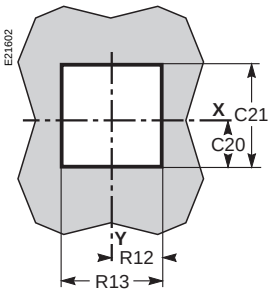
Cutout C



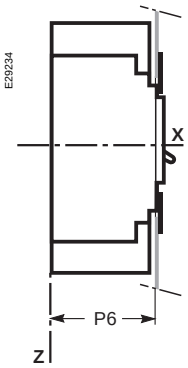
Fixed-mounted $\frac{\text{inch}}{mm}$

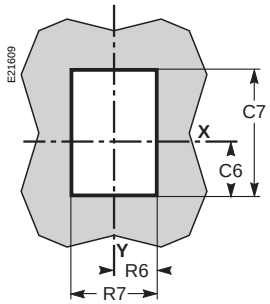
Front panel cutouts

With toggle boot



With escutcheon





Front accessories: see page 30

		C	C1	C2	C3	C6	C7	C20	C21	G	G1	G4
NSF150/250N/H/L	**(inch)**	**1.14**	**2.99**	**2.12**	**4.25**	**1.69**	**4.09**	**1.33**	**3.38**	**2.46**	**4.92**	**2.75**
	(mm)	*29*	*76*	*54*	*108*	*43*	*104*	*34*	*86*	*62,5*	*125*	*70*
NSJ400/600N/H/L	**(inch)**	**1.63**	**4.56**	**3.64**	**7.24**	**2.08**	**5.74**	**1.83**	**4.96**	**3.93**	**7.87**	**4.46**
	(mm)	*41.5*	*116*	*92.5*	*184*	*53*	*146*	*46.5*	*126*	*100*	*200*	*113.5*

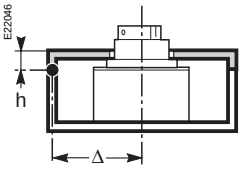
		G5	H	H1	H2	H3	H53	H54	K	K1	L	L1
NSF150/250N/H/L	**(inch)**	**5.51**	**3.16**	**6.33**	**3.70**	**7.40**	**3.74**	**7.48**	**0.68**	**1.37**	**2.06**	**4.13**
	(mm)	*140*	*80.5*	*161*	*94*	*188*	*95*	*190*	*17.5*	*35*	*52.5*	*105*
NSJ400/600N/H/L	**(inch)**	**8.93**	**5.01**	**10.03**	**5.61**	**11.22**	**6.69**	**13.38**	**0.88**	**1.77**	**2.75**	**5.51**
	(mm)	*227*	*127.5*	*255*	*142.5*	*285*	*170*	*340*	*22.5*	*45*	*70*	*140*

		P1	P2	P4	P5	P6	R	R1	R2	R4	R6	R7
NSF150/250N/H/L	**(inch)**	**3.18**	**3.38**	**4.37(*)**	**3.26**	**3.46**	**0.57**	**1.14**	**2.12**	**4.25**	**1.14**	**2.28**
	(mm)	*81*	*86*	*111(*)*	*83*	*88*	*14.5*	*29*	*54*	*108*	*29*	*58*
NSJ400/600N/H/L	**(inch)**	**3.75**	**4.33**	**6.61**	**4.21**	**4.40**	**1.24**	**2.48**	**2.81**	**5.62**	**1.83**	**3.66**
	(mm)	*95.5*	*110*	*168*	*107*	*112*	*31.5*	*63*	*71.5*	*143*	*46.5*	*93*

		R12	R13	ØT	ØT4	U(e)						
NSF150/250N/H/L	**(inch)**	**1.69**	**3.38**	**0.23**	**0.86**	≤ **1.25**						
	(mm)	*43*	*86*	*6*	*22*	≤ 32						
NSJ400/600N/H/L	**(inch)**	**2.48**	**4.96**	**0.23**	**1.25**	≤ **1.25**						
	(mm)	*63*	*126*	*6*	*32*	≤ 32						

(*) P4 = **4.96**/*126* for COMPACT® NSF250N/H/L circuit breaker.
(e) U ≤ **0.78**/*20* when using secondary disconnecting blocks (COMPACT® NSF150 and NSF250 circuit breakers).

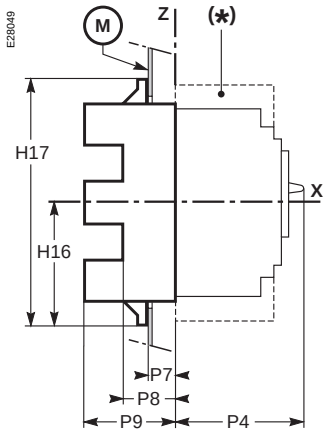
Note:
Door cutouts require a minimum distance between the center of the circuit breaker and the door hinge point Δ ≥ **3.93**/*100* + (h x 5).

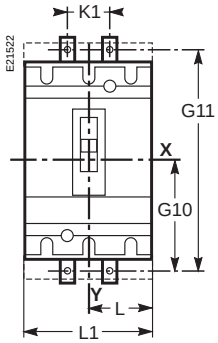


Plug-in and drawout mounting inch / mm

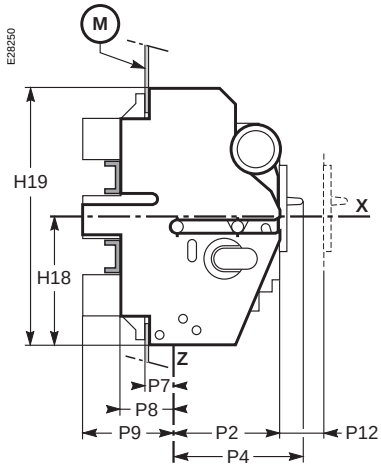
Dimensions

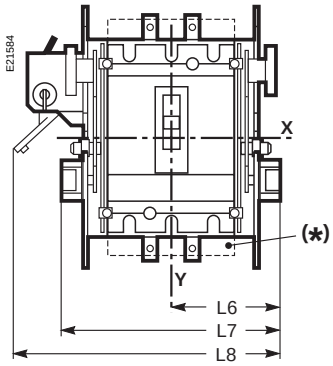
Plug-in (on base)





Drawout (on chassis)

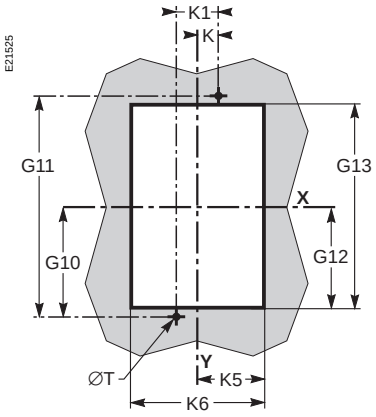




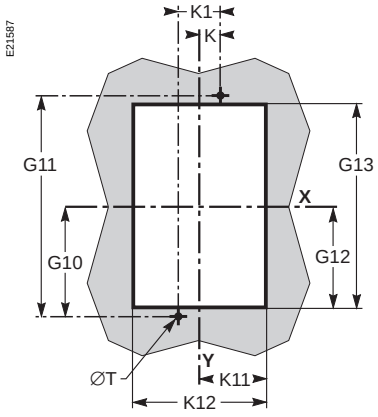
(*) Short terminal covers.

Mounting

Through a backplate (M) (plug-in base)



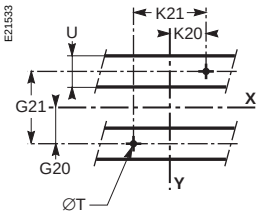
Through a backplate (M) (chassis)



Plug-in and drawout mounting inch / mm

Mounting

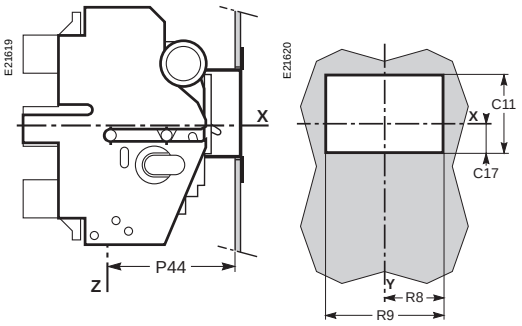
On rails (plug-in base or chassis)



Front panel cutouts

Plug-in mounting
See fixed-mounted installation page 32.

Drawout with extended front panel escutcheons



		C11	C17	G10	G11	G12	G13	G20	G21	H16	H17	H18	H19	K	K1
NSF150/250N/H/L	**(inch)**	**4.05**	**1.67**	**3.74**	**7.48**	**3.42**	**6.85**	**1.47**	**2.95**	**4.03**	**8.07**	**4.07**	**8.26**	**0.68**	**1.37**
	(mm)	*103*	*42.3*	*95*	*190*	*87*	*174*	*37.5*	*75*	*102.5*	*205*	*103.5*	*210*	*17.5*	*35*
NSJ400/600N/H/L	**(inch)**	**6.10**	**1.65**	**5.90**	**11.8**	**5.39**	**10.7**	**2.95**	**5.90**	**6.20**	**12.40**	**5.51**	**11.02**	**0.88**	**1.77**
	(mm)	*115*	*42*	*150*	*300*	*137*	*274*	*75*	*150*	*157.5*	*315*	*140*	*280*	*22.5*	*45*

		K5	K6	K11	K12	K13	K20	K21	L	L1	L6	L7	L8	L9	L10
NSF150/250N/H/L	**(inch)**	**2.14**	**4.29**	**2.91**	**5.82**	**7.20**	**1.37**	**2.75**	**2.06**	**4.13**	**3.64**	**7.28**	**8.50**	**8.66**	**9.88**
	(mm)	*54.5*	*109*	*74*	*148*	*183*	*35*	*70*	*52.5*	*105*	*92.5*	*185*	*216*	*220*	*251*
NSJ400/600N/H/L	**(inch)**		**2.81**	**7.40**	**3.60**	**7.20**	**8.97**	**1.96**	**5.70**	**2.75**	**4.33**	**8.66**	**98.46**	**10.43**	**11.61**
	(mm)	*71.5*	*143*	*91.5*	*183*	*228*	*50*	*100*	*70*	*140*	*110*	*220*	*250*	*265*	*295*

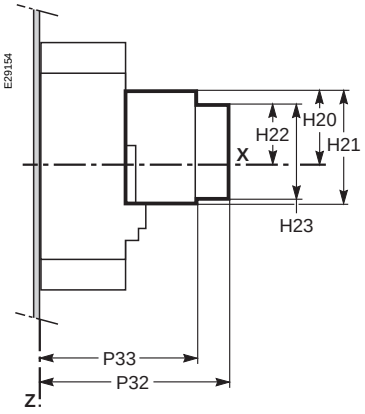
		P2	P4	P7	P8	P9	P12	P44	R8	R9	U(a)	ØT			
NSF150/250N/H/L	**(inch)**	**3.38**	**4.37(*)**	**1.06**	**1.77**	**2.95**	**1.25**	**4.84**	**2.91**	**5.82**	≤ **1.25**	**0.23**			
	(mm)	*86*	*111(*)*	*27*	*45*	*75*	*32*	*123*	*74*	*148*	≤ 32	6			
NSJ400/600N/H/L	**(inch)**	**4.33**	**6.61**	**1.06**	**1.77**	**3.93**	**1.25**	**5.78**	**3.54**	**7.08**	≤ **1.25**	**0.11**			
	(mm)	*110*	*168*	*27*	*45*	*100*	*32*	*147*	*90*	*180*	≤ 32	3			

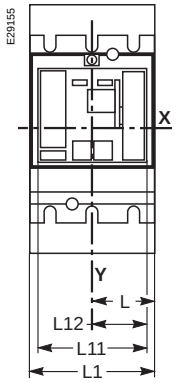
(*) P4 = **4.96**/*126* for COMPACT® NSF250N/H/L circuit breaker.
(a) U ≤ **0.78**/*20* when using automatic auxiliary connectors (NSF150 and NSF250 circuit breakers).

Dimensions

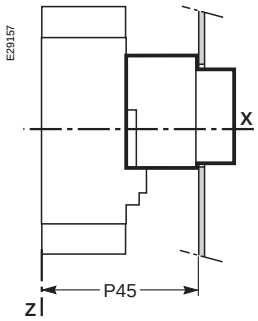
inch
mm

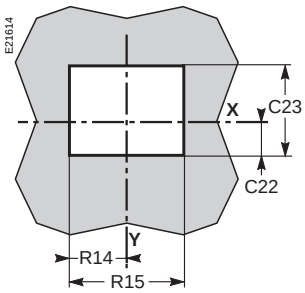
Motor operators





Front panel cutouts



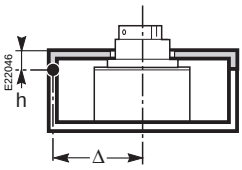


Dimension table

		C22	C23	H20	H21	H22	H23	L	L1	L11	L12	P32	P33	P45	R14
NSF150/250N/H/L	**(inch)**	**1.14**	**2.99**	**2.46**	**3.81**	**1.79**	**2.87**	**2.06**	**4.13**	**3.58**	**1.79**	**7.00**	**5.62**	**5.70**	**1.90**
	(mm)	*29*	*76*	*62.5*	*97*	*45.5*	*73*	*52.5*	*105*	*91*	*45.5*	*178*	*143*	*145*	*48.5*
NSJ400/600N/H/L	**(inch)**	**1.63**	**4.96**	**3.93**	**5.98**	**3.26**	**4.84**	**2.75**	**5.51**	**4.84**	**2.42**	**9.84**	**8.46**	**8.54**	**2.53**
	(mm)	*41.5*	*126*	*100*	*152*	*83*	*123*	*70*	*140*	*123*	*61.5*	*250*	*215*	*217*	*64.5*

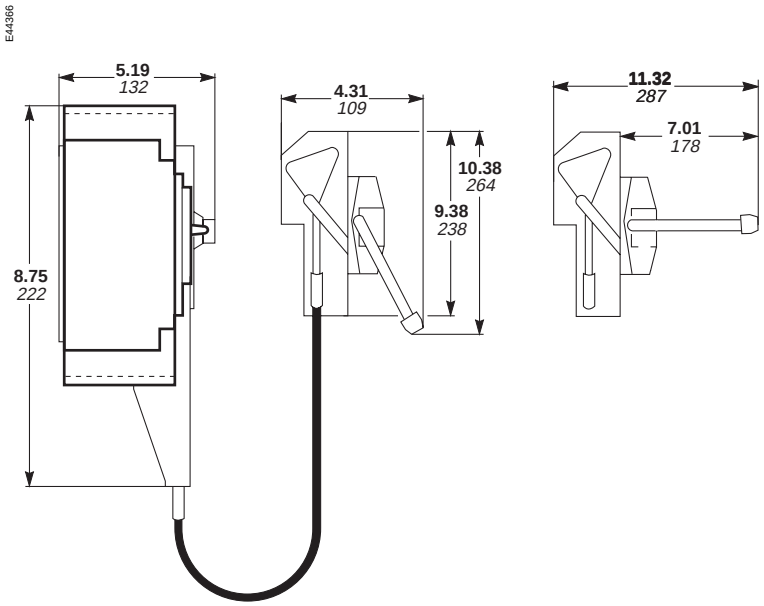
		R15	
NSF150/250N/H/L	**(inch)**	**3.81**	
	(mm)	*97*	
NSJ400/600N/H/L	**(inch)**	**5.07**	
	(mm)	*129*	

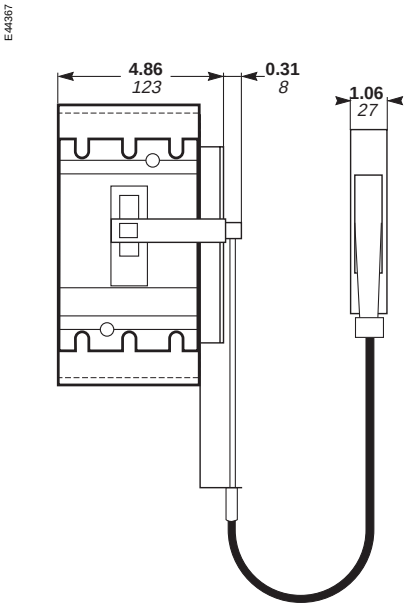
Note:
Door cutouts require a minimum distance between the center of the circuit breaker and the door hinge point $\Delta \geq$ **3.93**/*100* + (h x 5).



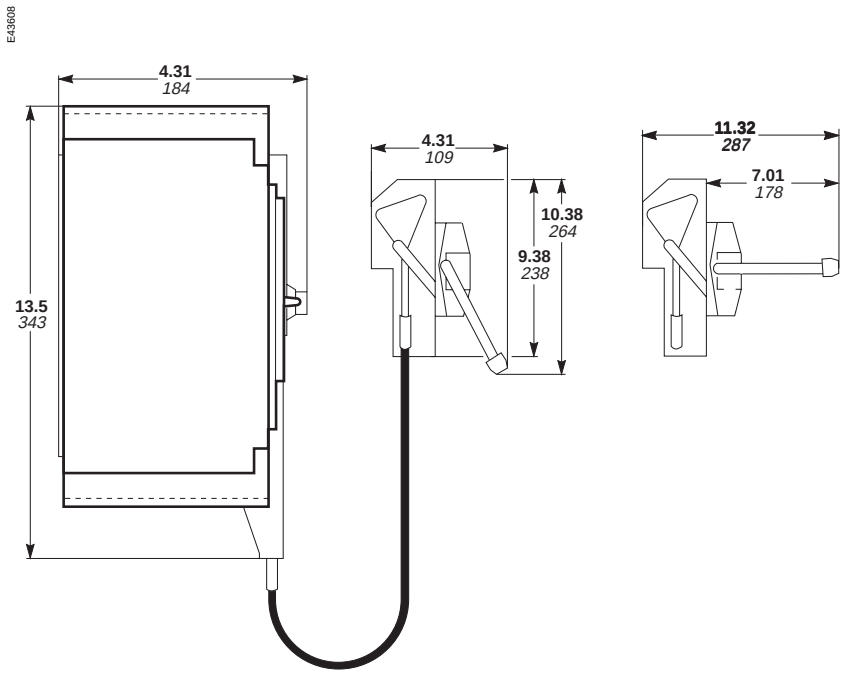
Cable operating handles inch / mm

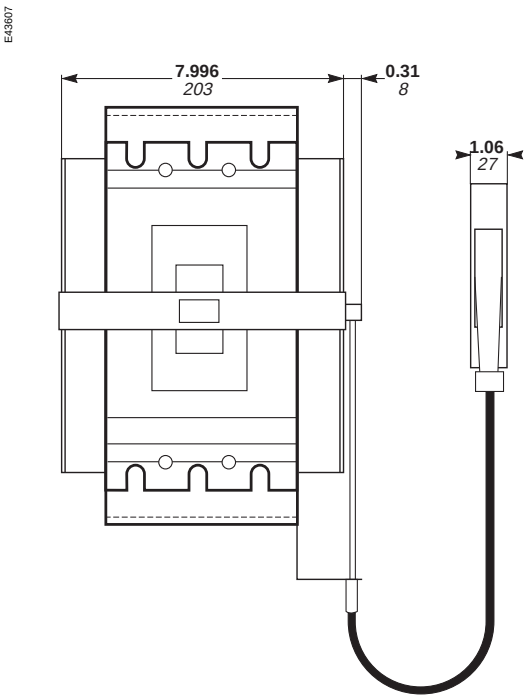
Compact NSF





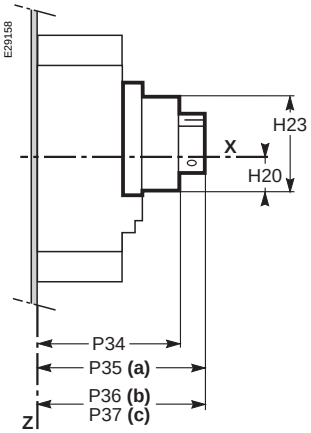
Compact NSJ

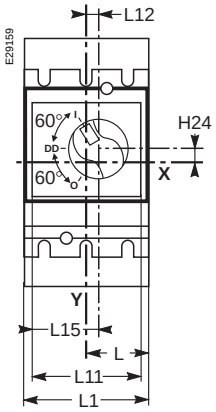




Rotary operating handles $\frac{\text{inch}}{mm}$

Dimensions



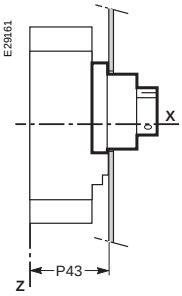


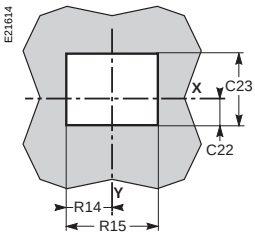
(a) Without keylock
(b) With Ronis™ keylock
(c) With Profalux™ keylock

Ronis and Profalux are trademarks of HF Sécurité

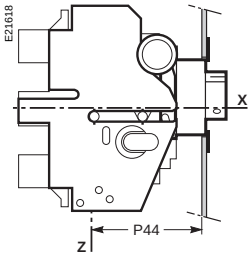
Front panel cutouts

Fixed or plug-in mounted

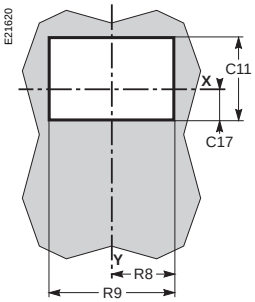




Drawout mounting

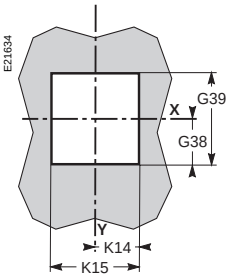


Mandatory to fit front panel escutcheon

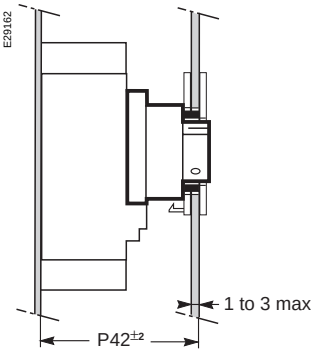


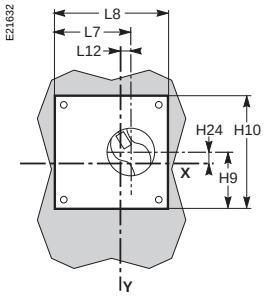
Motor control center type direct rotary operating handle

Front panel cutout



Dimensions

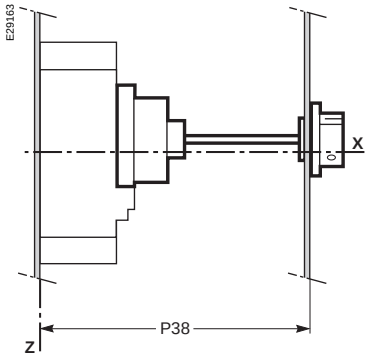




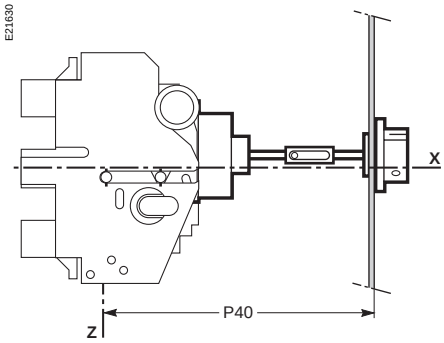
Rotary operating handles **inch** / *mm*

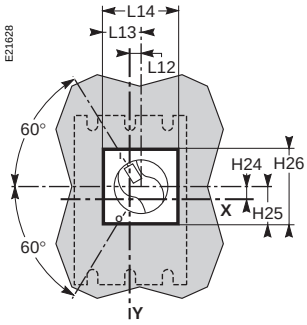
Dimensions

Fixed or plug-in mounted
Cut shaft at length:
P38-**4.96**/*126* (NSF150/250)
P38-**5.90**/*150* (NSJ400/600)

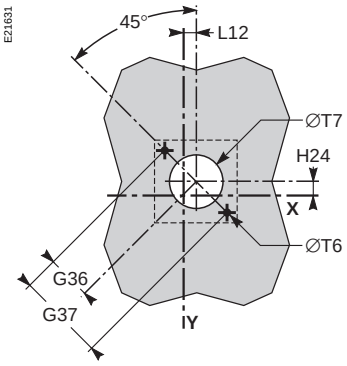


Drawout mounting (telescopic shaft)
Cut shaft at length:
P38-**4.80**/ *122* (NSF150/250)
P40-**5.90**/*150* (NSJ400/600)

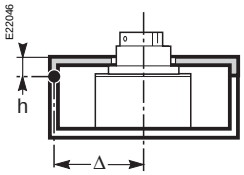




Front panel cutout



Note:
Door cutouts require a minimum distance between the center of the circuit breaker and the door hinge point Δ ≥ **3.93**/*100* + (h x 5).



		C11	C17	C22	C23	G36	G37	G38	G39	H9	H10	H20	H23	H24	H25
NSF150/250N/H	**(inch)**	**4.05**	**1.67**	**1.14**	**2.99**	**1.41**	**2.83**	**1.61**	**3.93**	**2.36**	**4.72**	**1.10**	**2.87**	**0.35**	**1.47**
	(mm)	*103*	*42.5*	*29*	*76*	*36*	*72*	*41*	*100*	*60*	*120*	*28*	*73*	*9*	*37.5*
NSJ400/600N/H/L	**(inch)**	**6.10**	**1.65**	**1.63**	**4.96**	**1.41**	**2.83**	**2.00**	**5.70**	**3.26**	**6.29**	**1.47**	**4.84**	**0.96**	**1.47**
	(mm)	*155*	*42*	*41.5*	*126*	*36*	*72*	*51*	*145*	*83*	*160*	*40*	*123*	*24.5*	*37.5*

		H26	K14	K15	L	L1	L7	L8	L11	L12	L13	L14	L15	P34	P35
NSF150/250N/H	**(inch)**	**2.95**	**1.96**	**3.93**	**2.06**	**4.13**	**2.71**	**4.72**	**3.58**	**0.36**	**1.47**	**2.95**	**2.16**	**4.76**	**6.10**
	(mm)	*75*	*50*	*100*	*52.5*	*105*	*69*	*120*	*91*	*9.25*	*37.5*	*75*	*55*	*121*	*155*
NSJ400/600N/H/L	**(inch)**	**2.95**	**2.85**	**5.70**	**2.75**	**5.51**	**3.34**	**6.29**	**4.84**	**0.19**	**1.47**	**2.95**	**2.61**	**5.70**	**7.04**
	(mm)	*75*	*72.5*	*145*	*70*	*140*	*85*	*160*	*123*	*5*	*37.5*	*75*	*66.5*	*145*	*179*

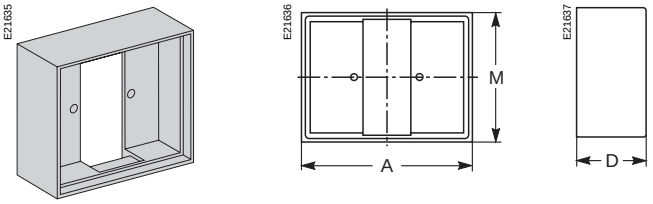
		P36	P37	P38	P40	P42	P43	P44	R8	R9	R14	R15	ØT6	ØT7	
NSF150/250N/H	**(inch)**	**6.14**	**6.45**	**7.28 min.**	**9.76 min.**	**4.92**	**3.50**	**4.84**	**2.91**	**5.82**	**1.90**	**3.81**	**0.16**	**1.96**	
				23.6 max.	**23.6 max.**										
	(mm)	*156*	*164*	*185 min.*	*248 min.*	*125*	*89*	*123*	*74*	*148*	*48.5*	*97*	*4.2*	*50*	
				600 max.	*600 max.*										
NSJ400/600N/H/L	**(inch)**	**7.08**	**7.40**	**8.22 min.**	**10.7 min.**	**5.86**	**4.40**	**5.78**	**3.54**	**7.08**	**2.53**	**5.07**	**0.16**	**1.96**	
				23.6 max.	**23.6 max.**										
	(mm)	*180*	*188*	*209 min.*	*272 min.*	*149*	*112*	*147*	*90*	*180*	*64.5*	*129*	*4.2*	*50*	
				600 max.	*600 max.*										

Front accessories

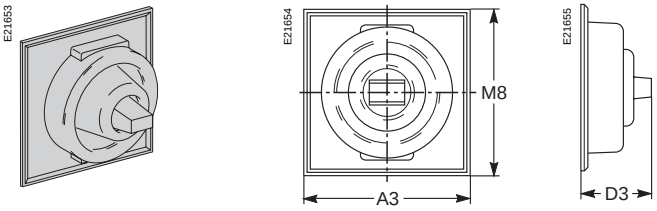
inch
mm

Extended escutcheons

For toggle

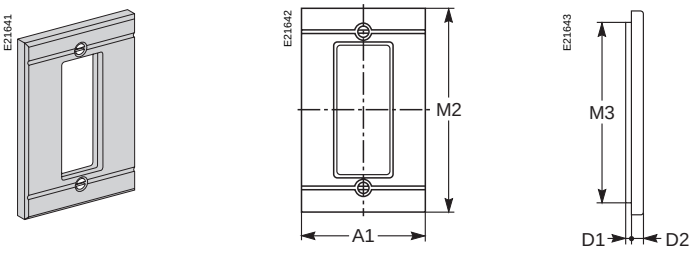


Toggle boot

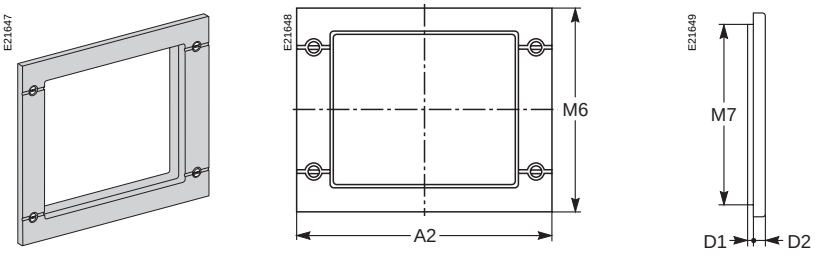


Front panel escutcheons

For toggle



For extended escutcheon, motor operator module or rotary handle

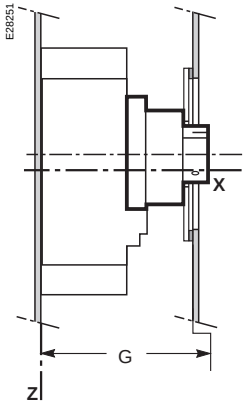


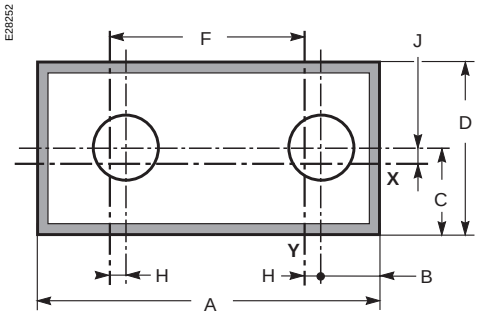
		A	A1	A2	A3	D	D1	D2	D3	M	M2	M3	M6	M7	M8
NSF150/250N/H	**(inch)**	**3.58**	**2.71**	**6.18**	**3.70**	**1.37**	**0.13**	**0.25**	**1.57**	**2.87**	**4.52**	**4.01**	**4.48**	**3.97**	**3.70**
	(mm)	*91*	*69*	*157*	*94*	*35*	*3.5*	*6.5*	*40*	*73*	*115*	*102*	*114*	*101*	*94*
NSJ400/600N/H/L	**(inch)**	**4.84**	**4.01**	**7.44**	**1.37**	**5.27**	**0.13**	**0.25**	**2.36**	**4.84**	**6.10**	**5.59**	**6.45**	**5.94**	**5.27**
	(mm)	*123*	*102*	*189*	*35*	*134*	*3.5*	*6.5*	*60*	*123*	*155*	*142*	*164*	*151*	*134*

Interlocking systems inch / mm

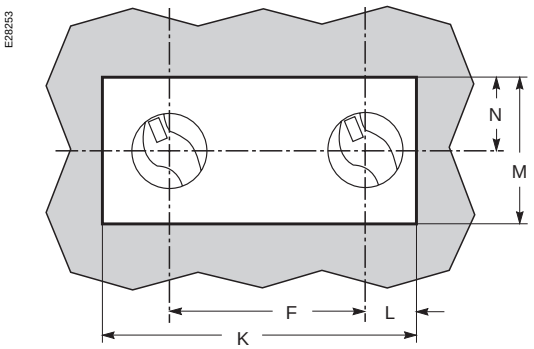
Interlocking systems with rotary operating handles

Dimensions





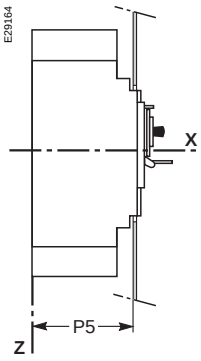
Front panel cutout



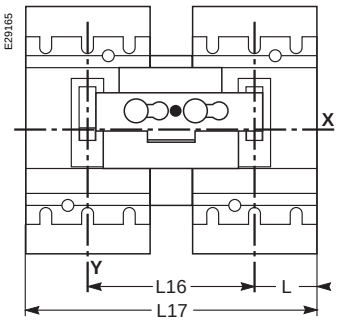
		A	B	C	D	F	G	H	J	K	L	M	N
NSF150/250	**(inch)**	**12.79**	**3.54**	**3.44**	**6.89**	**6.14**	**5.23**	**0.36**	**0.35**	**11.61**	**2.97**	**5.90**	**2.95**
	(mm)	*325*	*90*	*87.5*	*175*	*156*	*133*	*9.25*	*9*	*295*	*75.5*	*150*	*75*
NSJ400/600	**(inch)**	**16.38**	**4.53**	**3.94**	**7.87**	**8.27**	**6.18**	**0.20**	**0.97**	**15.20**	**3.94**	**6.89**	**2.93**
	(mm)	*416*	*115*	*100*	*200*	*210*	*157*	*5*	*24.6*	*386*	*100*	*175*	*74.5*

Interlocking systems with toggles

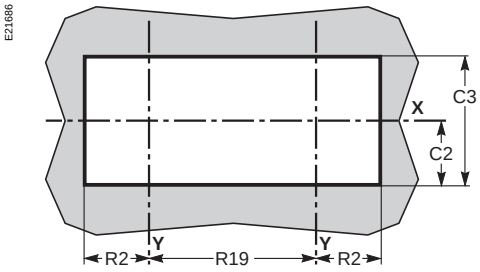
Dimensions



3-pole



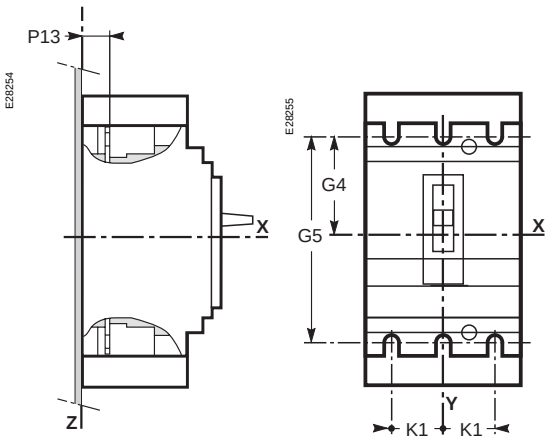
Front panel cutouts



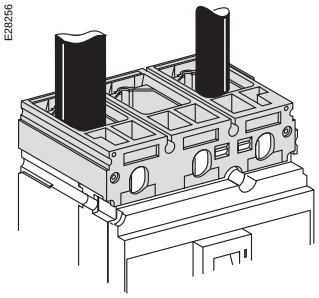
		C2	C3	L	L16	L17	R2	R19	P5	
NSF150/250N/H	**(inch)**	**2.12**	**4.25**	**2.06**	**5.51**	**9.64**	**2.12**	**5.51**	**3.26**	
	(mm)	*54*	*108*	*52.5*	*140*	*245*	*54*	*140*	*83*	
NSJ400/600N/H/L	**(inch)**	**3.64**	**7.24**	**2.75**	**7.28**	**12.79**	**2.81**	**7.28**	**4.21**	
	(mm)	*92.5*	*184*	*70*	*185*	*325*	*71.5*	*185*	*107*	

Connections **inch** / *mm*

Fixed mounted

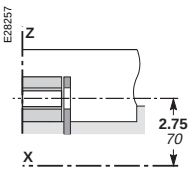


Front connections

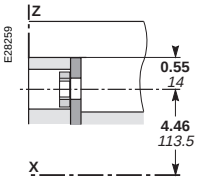


Bar connection

NSF150/250
(M8 screws)

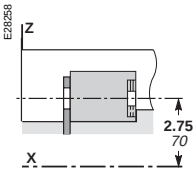


NSJ400/600
(M10 screws)

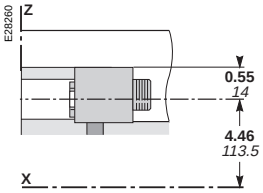


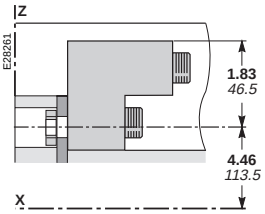
Cable connection

NSF150/250

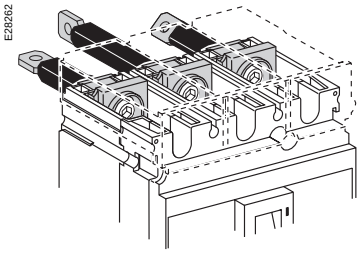


NSJ400/600

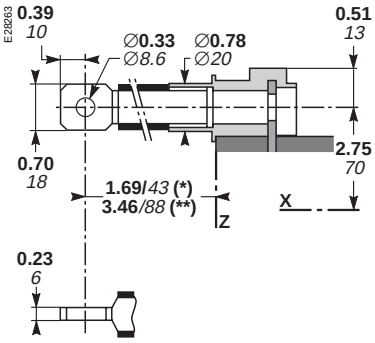




Rear connections

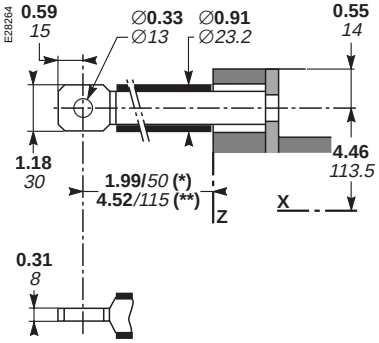


NSF150/250



(*) Short RC : 1.69/*43*
(**) Long RC : 3.46/*88*

NSJ400/600



(*) Short RC : 1.96/*50*
(**) Long RC : 4.52/*115*

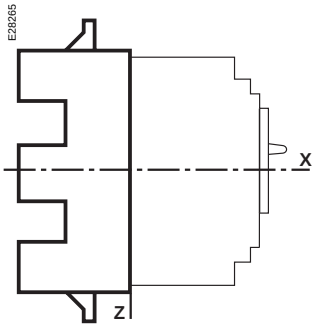
		G4	G5	K1	P13
NSF150/250N/H	**(inch)**	**2.75**	**5.51**	**1.37**	**0.76(*)**
	(mm)	*70*	*140*	*35*	*19.5(*)*
NSJ400/600N/H/L	**(inch)**	**4.46**	**8.93**	**1.77**	**1.02**
	(mm)	*113.5*	*227*	*45*	*526*

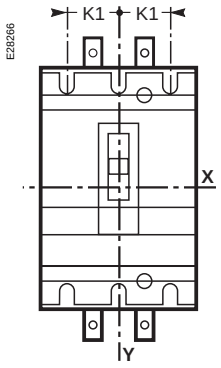
(*) P13 = **0.84**/*21.5* for NSF250N/H

Dimensions of energized parts: see page 20.

Connections **inch** / *mm*

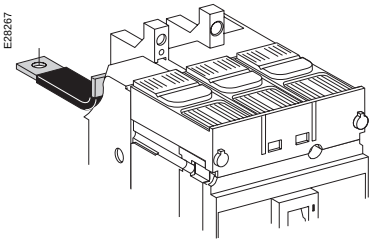
Plug-in or drawout mounting

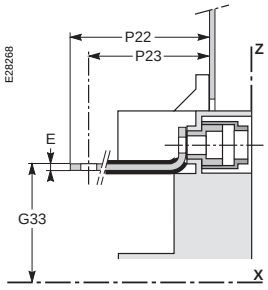




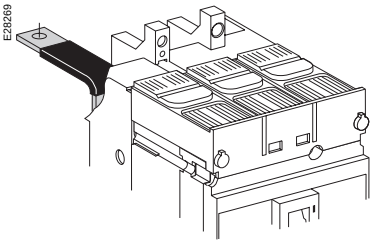
Rear connections

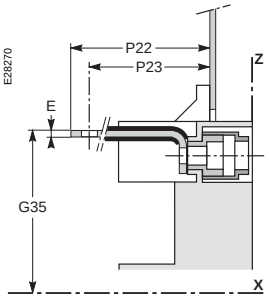
Rear connections fitted at lower limit





Rear connections fitted at upper limit



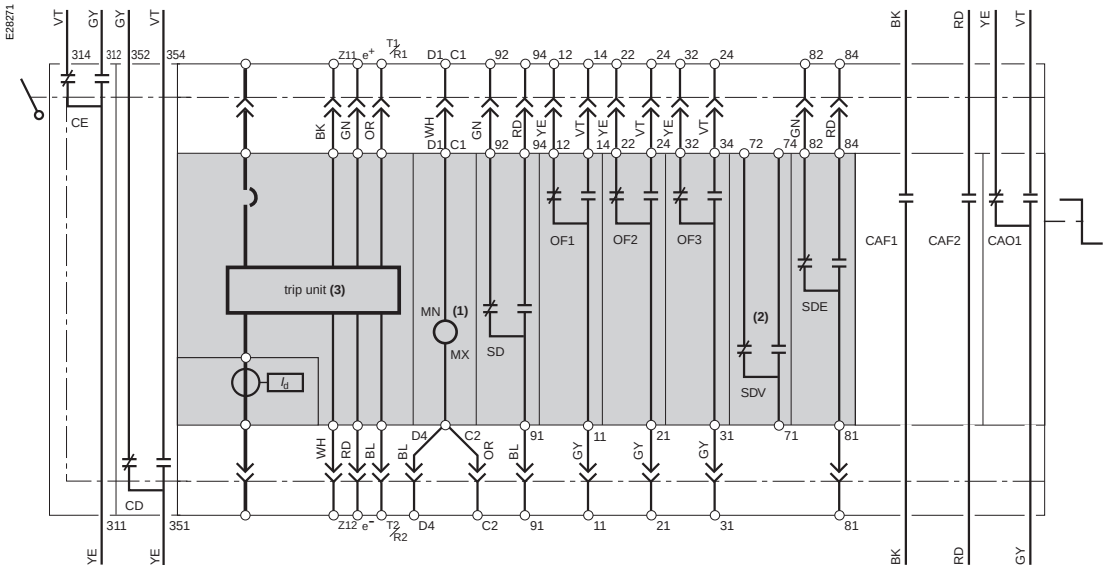


		E	G33	G35	K1	P22		P23	
NSF150/250N/H	**(inch)**	**0.15**	**2.5**	**3.16**	**1.37**	**2.93**	**4.86**	**2.59**	**4.52**
	(mm)	*4*	*63.5*	*80.5*	*35*	*74.5*	*123.5*	*66*	*115*
NSJ400/600N/H/L	**(inch)**	**0.23**	**4.09**	**5.07**	**1.77**	**4.50**	**7.14**	**3.93**	**6.57**
	(mm)	*6*	*104*	*129*	*45*	*114.5*	*181.5*	*100*	*167*

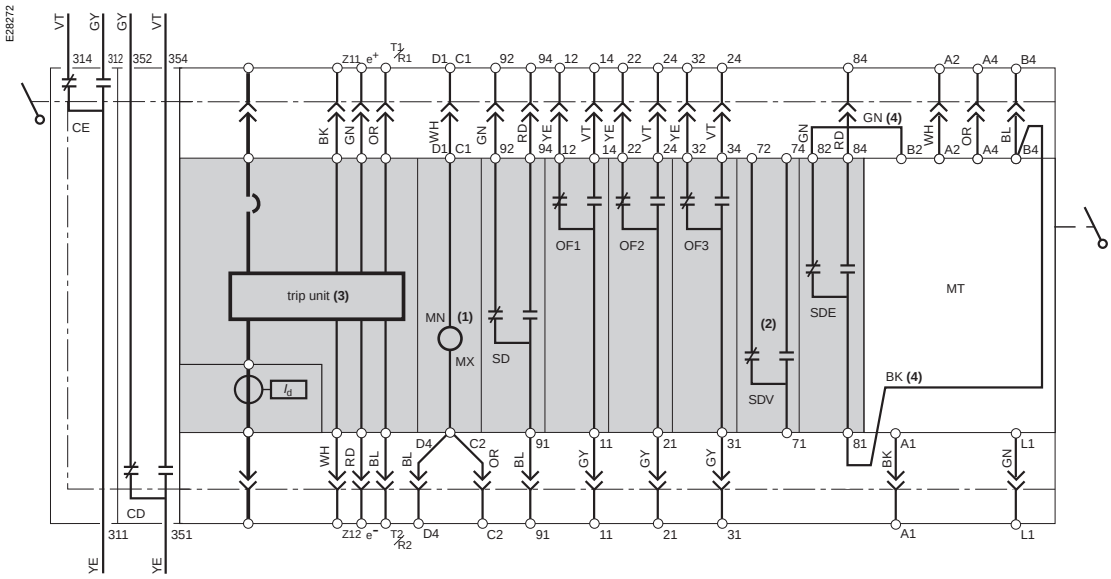
Auxiliary circuits

Wiring diagrams

Manually-operated circuit breaker



Motor-operated circuit breaker



All schemes are shown without the control voltage present, all devices open and relays in the de-energized position.
Switches CD, CE: on drawout chassis.
Switches CAO, CAF: on rotary handle.

Symbols
CAF = early-make switch
CAO = early-break switch
CE = "connected" position indication switch
CD = "disconnected" position indication switch
MN = undervoltage trip
MT = motor operator
MX = shunt trip
OF = position indication switch
SD = trip indication switch
SDE = overcurrent trip switch
SDV = ground-fault indication switch

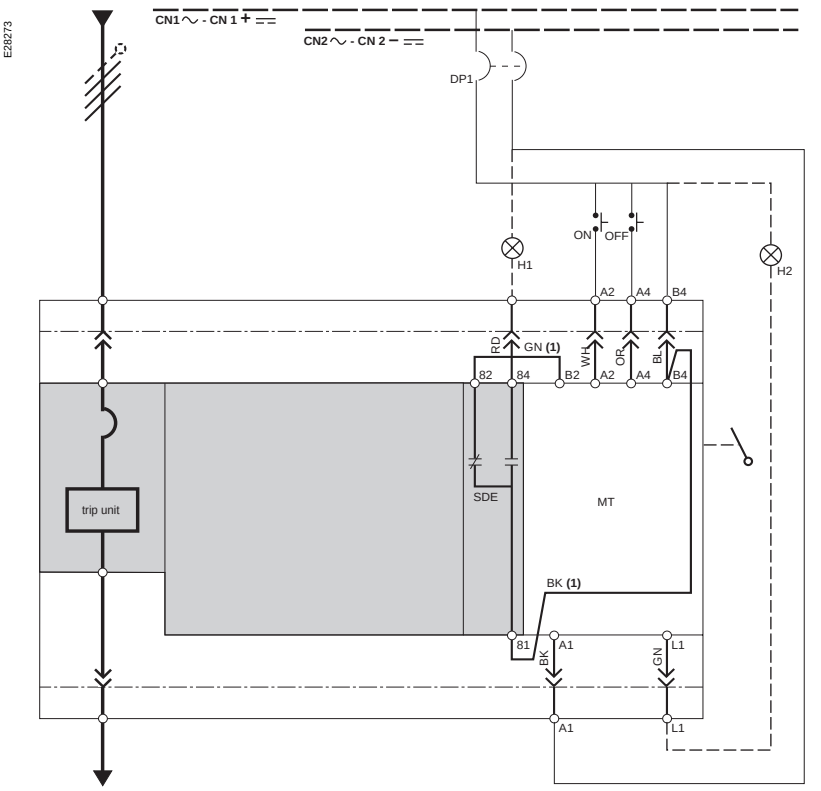
Legend
(1) Undervoltage or shunt trip
(2) For plug-in/drawout versions SDV and OF2 switches can be installed together, but only one of them will be connected through automatic secondary disconnecting blocks
(3) Options are only installed on trip unit STR53UP
(4) Wiring supplied, mandatory to connect

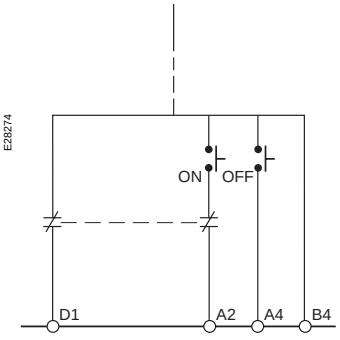
Color code
VT : purple
YE : yellow
RD : red
BK : black
GN : green
GY : grey
WH : white
OR : orange
BL : blue

Auxiliary circuits

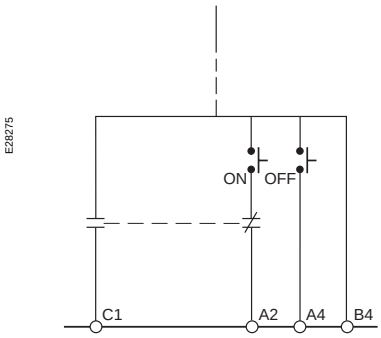
Motor operator: automatic resetting after tripping

Use of the motor operator (standard wiring diagram)





Motor operator + undervoltage trip



Motor operator + shunt trip

Mandatory manual reset after tripping due to an electrical fault.

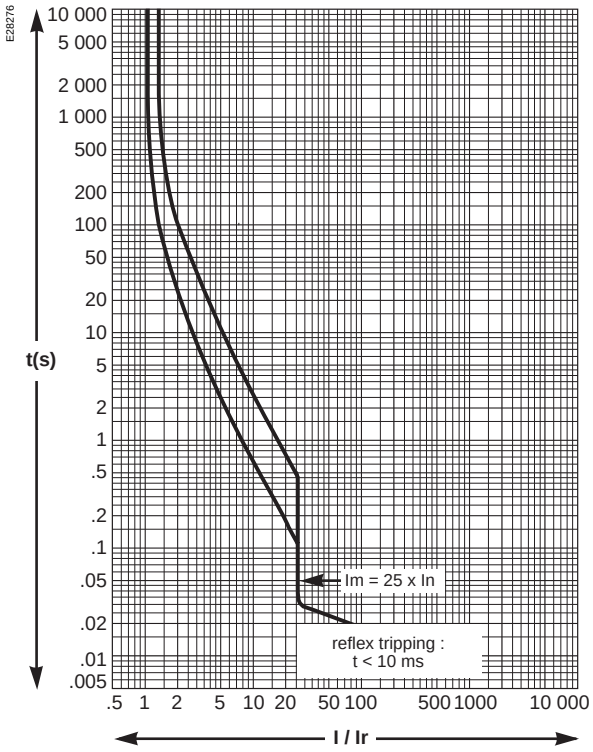
Symbols
DP1 = protection circuit breakers
OFF = opening push button
ON = closing push button
H2 = "manual" position indication
H1 = electrical fault indication
MT = motor operator
SDE = electrical fault indication switch

(1) Jumper is supplied and must be connected by the user. Overcurrent trip switch is strongly recommended to lock remote or automatic resetting after an overcurrent fault.

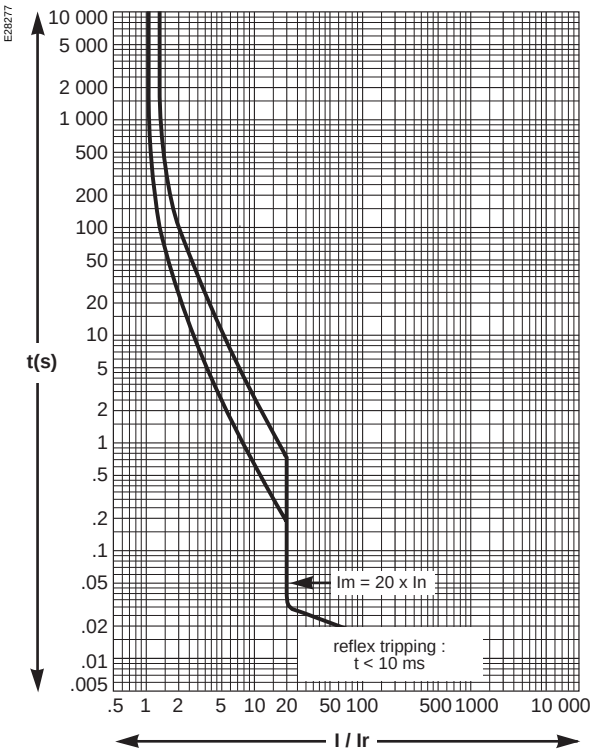
Trip curves

Trip units for COMPACT® NSF150–NSF250 circuit breakers

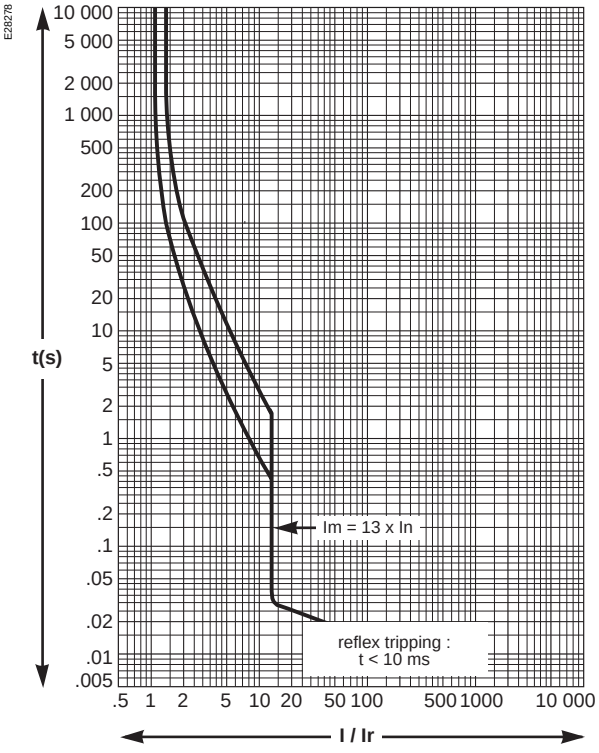
TM15DP



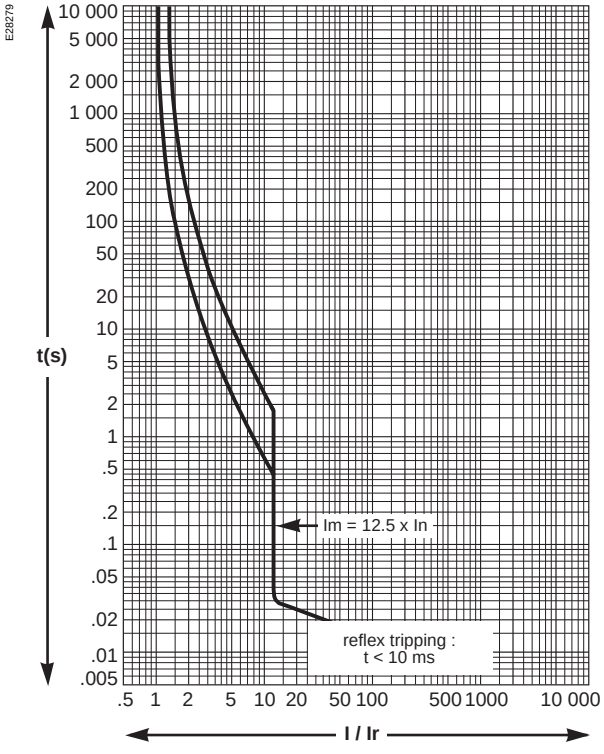
TM20DP



TM30DP



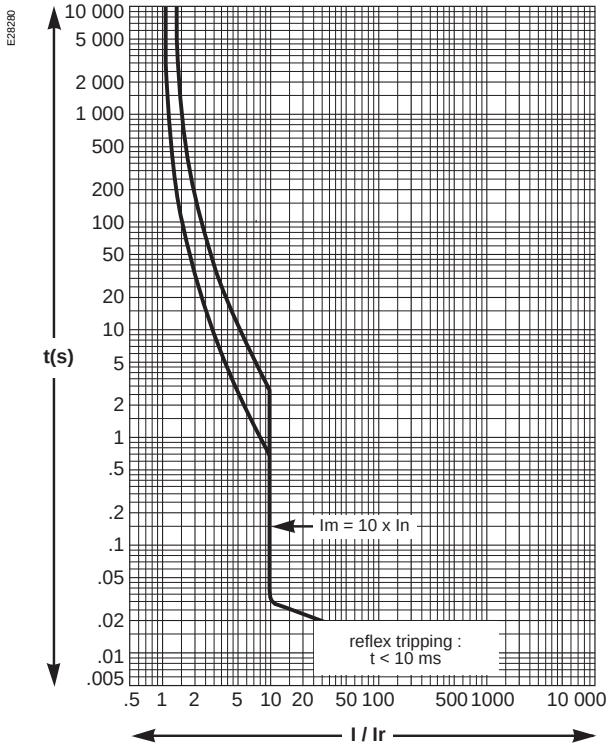
TM40DP



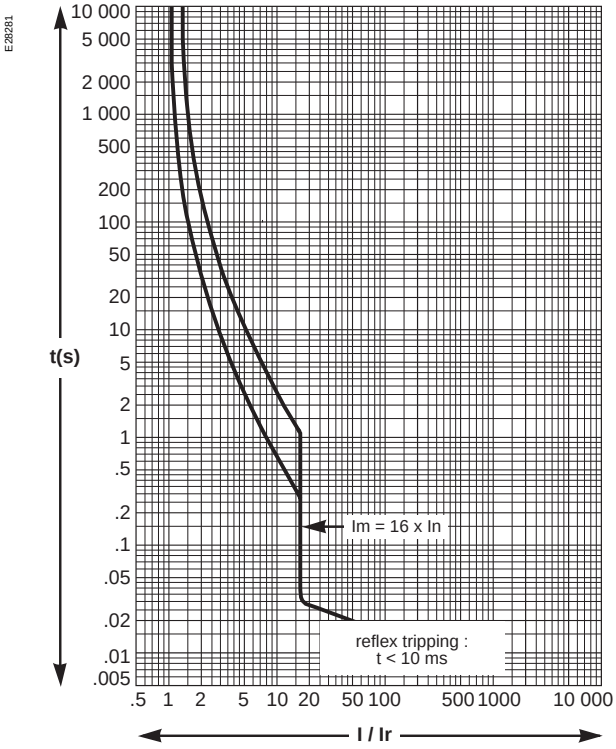
Reflex tripping: see page 51

Trip curves

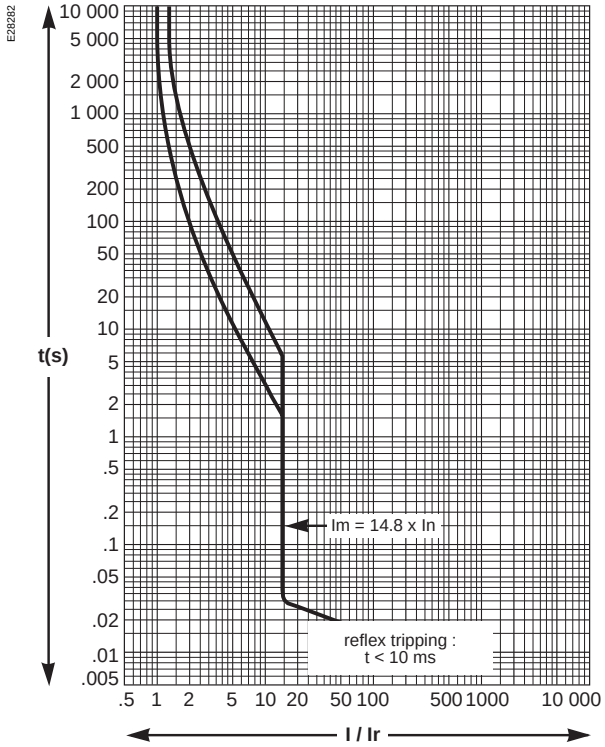
TM50DP



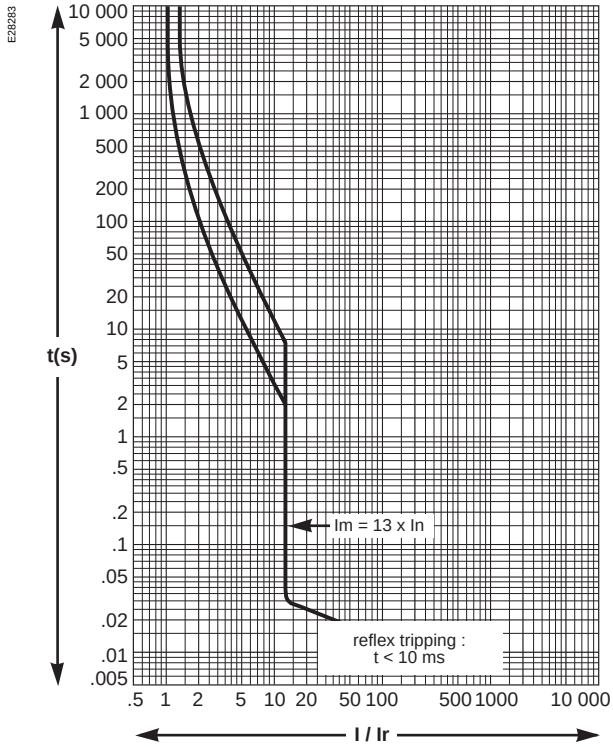
TM60DP



TM70DP



TM80DP

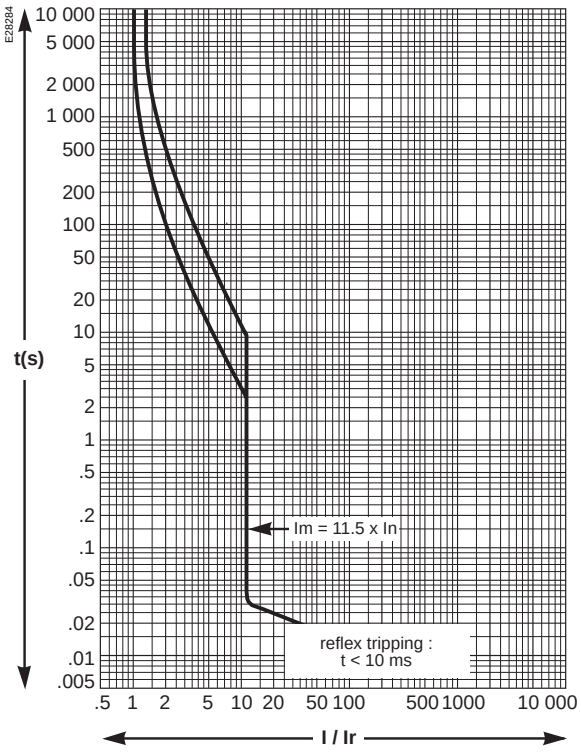


Reflex tripping: see page 51

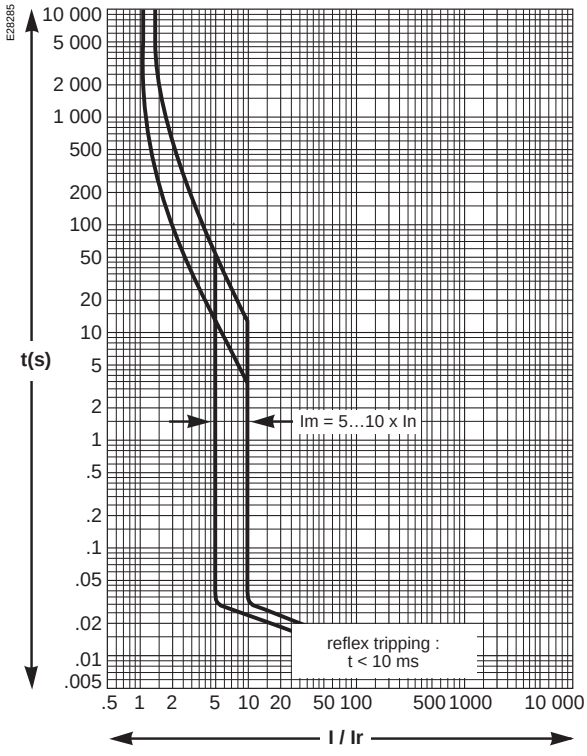
Trip curves

Trip units for COMPACT® NSF150–NSF250 circuit breakers

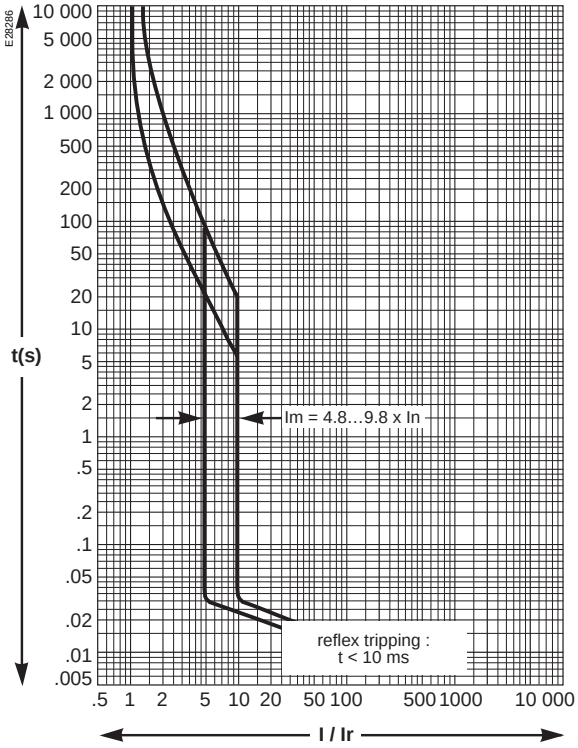
TM90DP



TM100–225DP



TM250DP



Reflex tripping: see page 51

Trip curves

Effect of high temperatures

When the ambient temperature is greater than 40°C, overload protection characteristics are slightly modified. When determining tripping times using time/current curves, the Ir values corresponding to the thermal setting on the circuit breaker must be reduced using the coefficients below:

45°C	50°C	55°C	60°C	65°C	70°C
0.975	0.95	0.925	0.90	0.875	0.85

Example
For a TM200DP circuit breaker, a 400 A fault current and an ambient temperature of 40°C. What is the tripping time?
- Ir = 200 A;
- I/Ir = 400/200 = 2.

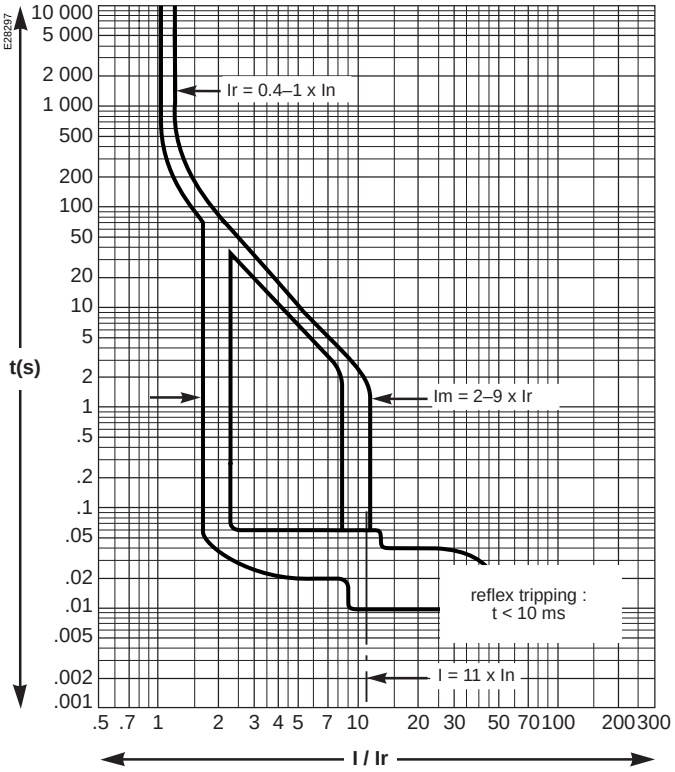
On the time/current curve, t = 100 s.
Consider the same conditions, except an ambient temperature of 65°C.
What is the tripping time?
- Ir = 200 x 0.875 = 175 A;
- I/Ir = 400/175 = 2.28.

On the time/current curve, ≈ 65 s.

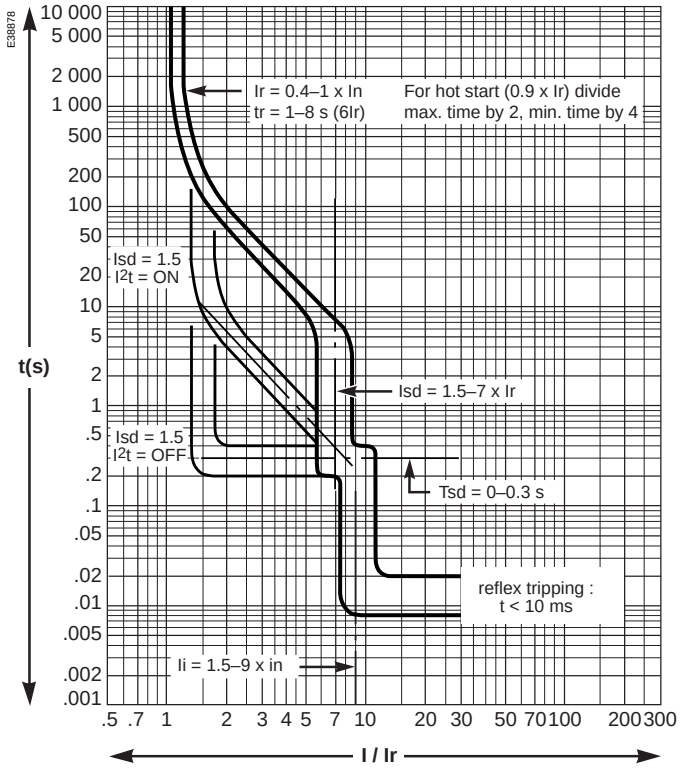
Trip curves

Trip units for COMPACT® NSJ400–NSJ600 circuit breakers

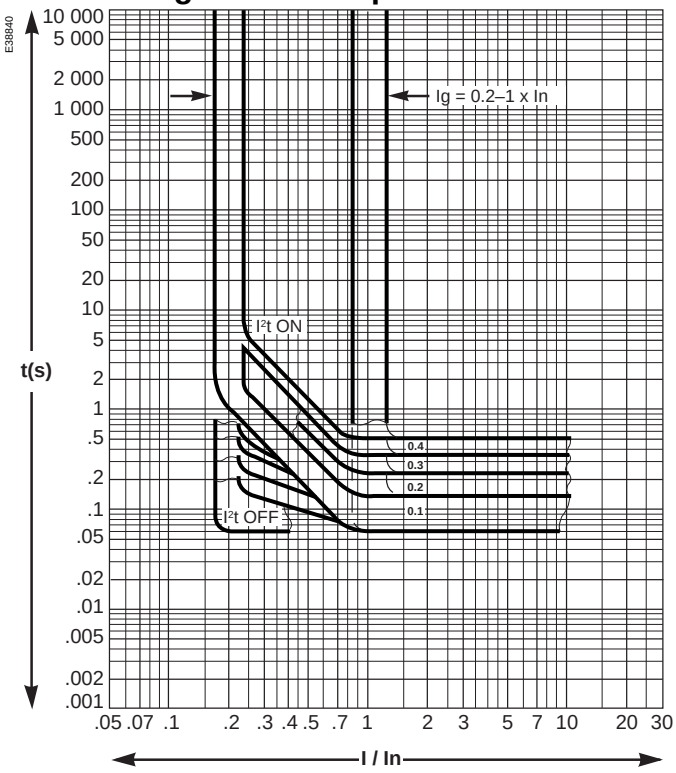
STR23SP



STR53UP



STR53UP ground-fault protection

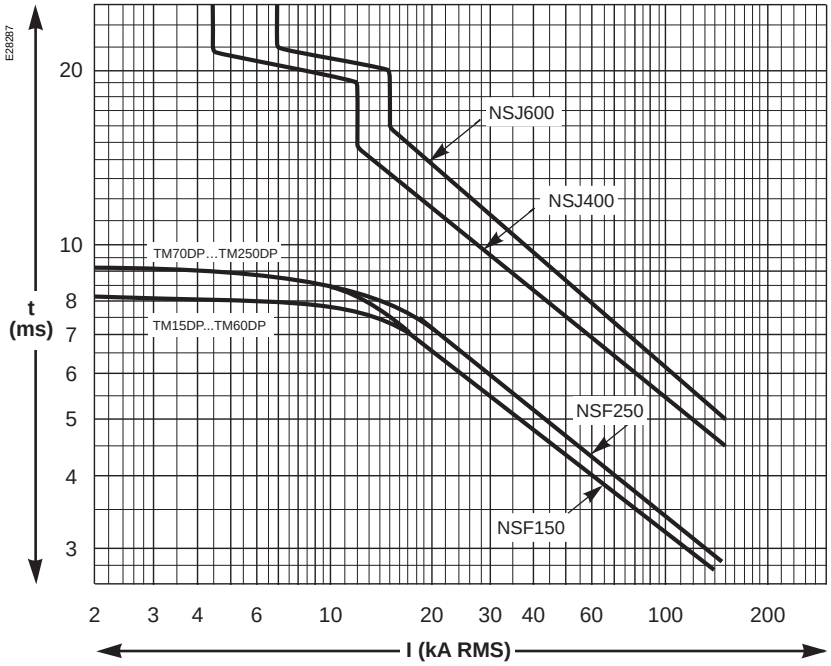


Reflex tripping: see page 51

Trip curves

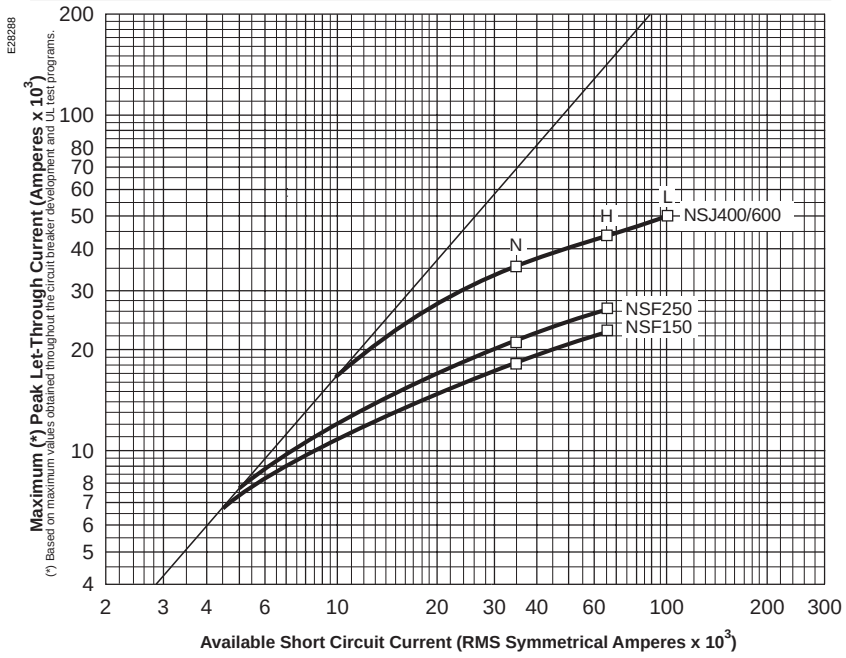
Reflex tripping

All COMPACT® NS circuit breakers and switches incorporate the exclusive reflex tripping system.
This extremely simple system breaks very high fault currents by mechanically tripping the device via a "piston" actuated directly by the pressure produced in the breaking units resulting from a short circuit.
For high short-circuit thermal withstand, this system provides a faster break.
Reflex tripping curves are exclusively a function of the circuit breaker rating.

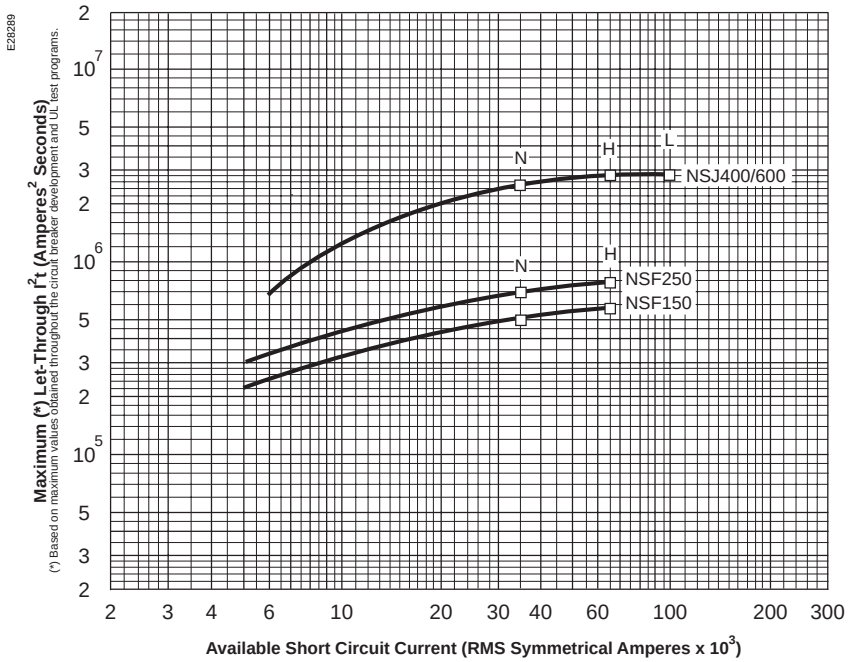


Let-through curves at 480 V

Maximum peak let-through current (Amperes)

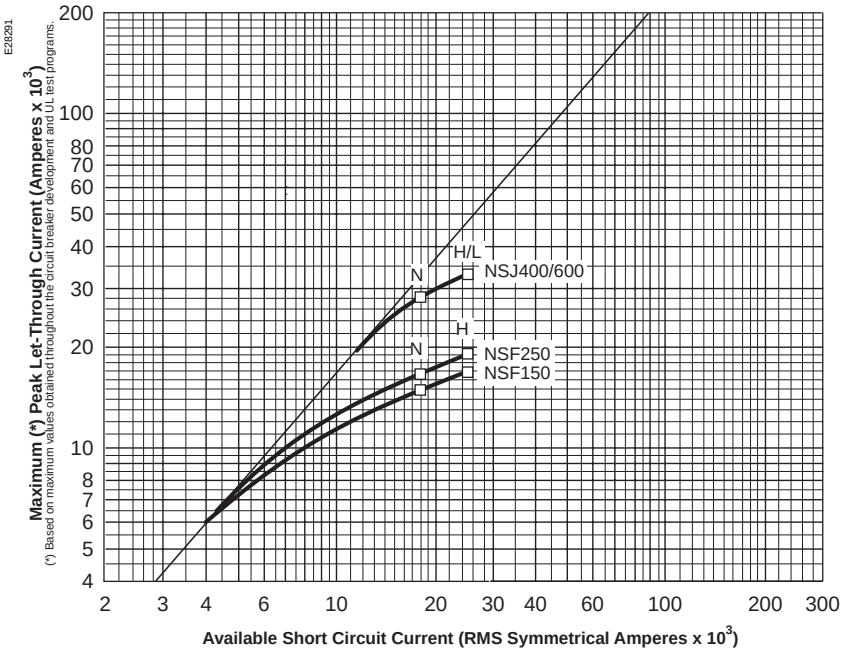


Maximum let-through I^2t (Amperes^2 Seconds)

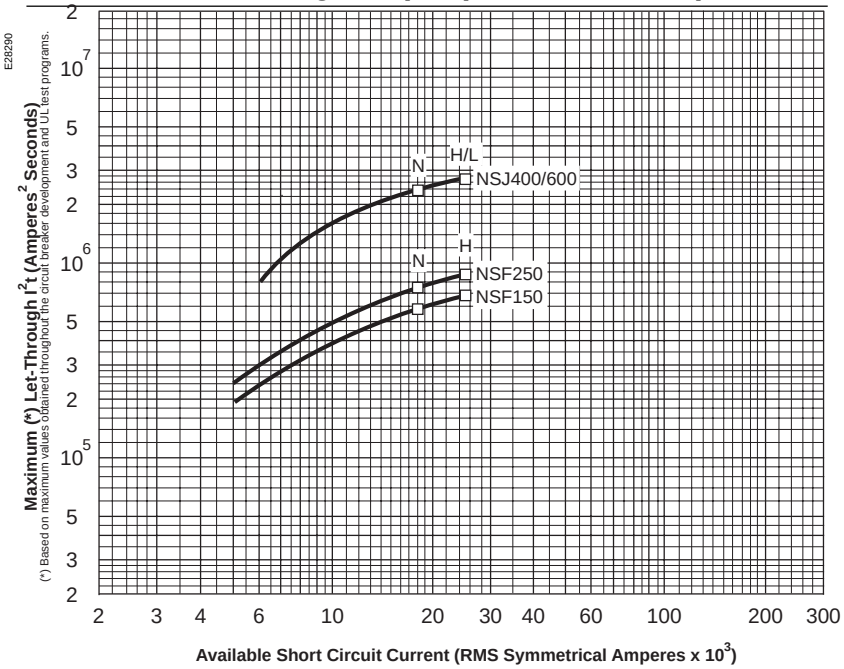


Let-through curves at 600 V

Maximum peak let-through current (Amperes)

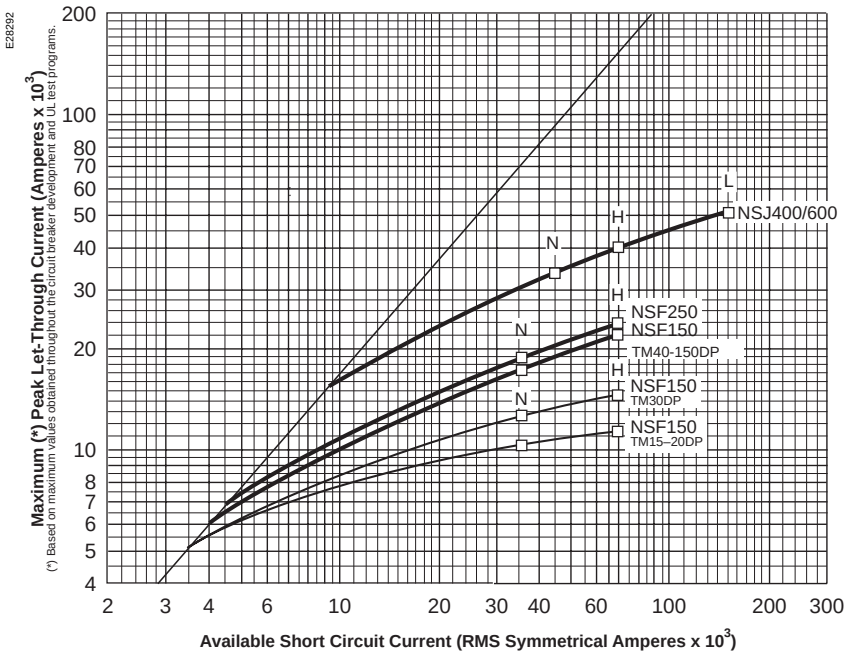


Maximum let-through I^2t (Amperes^2 Seconds)

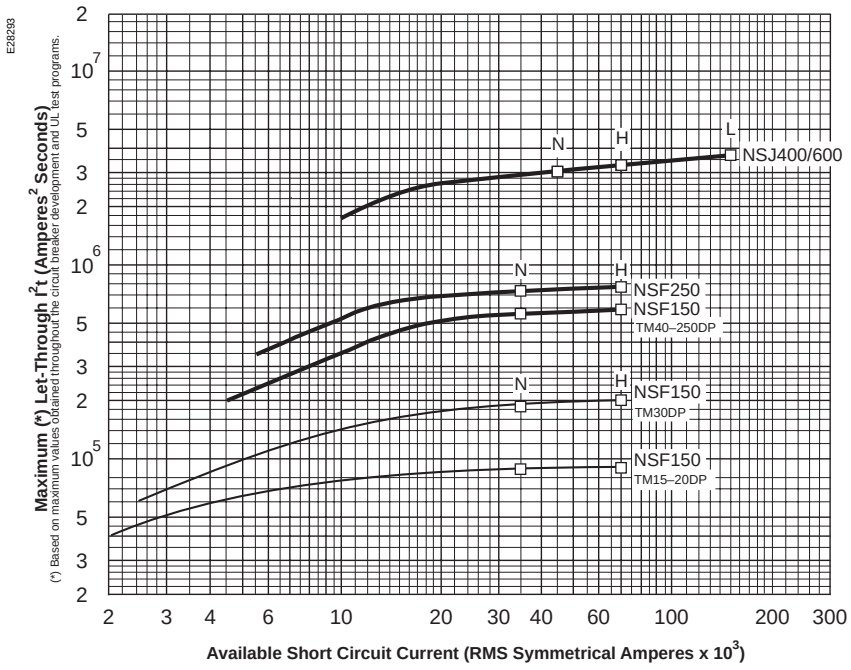


Current limiting curves at 380/415 V

Maximum peak let-through current (Amperes)

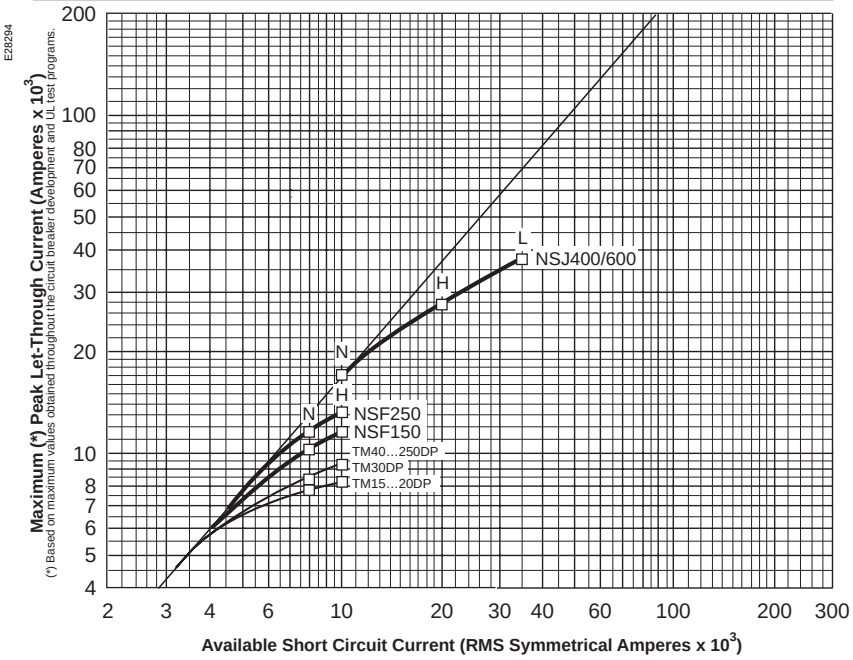


Maximum let-through I^2t (Amperes^2 Seconds)

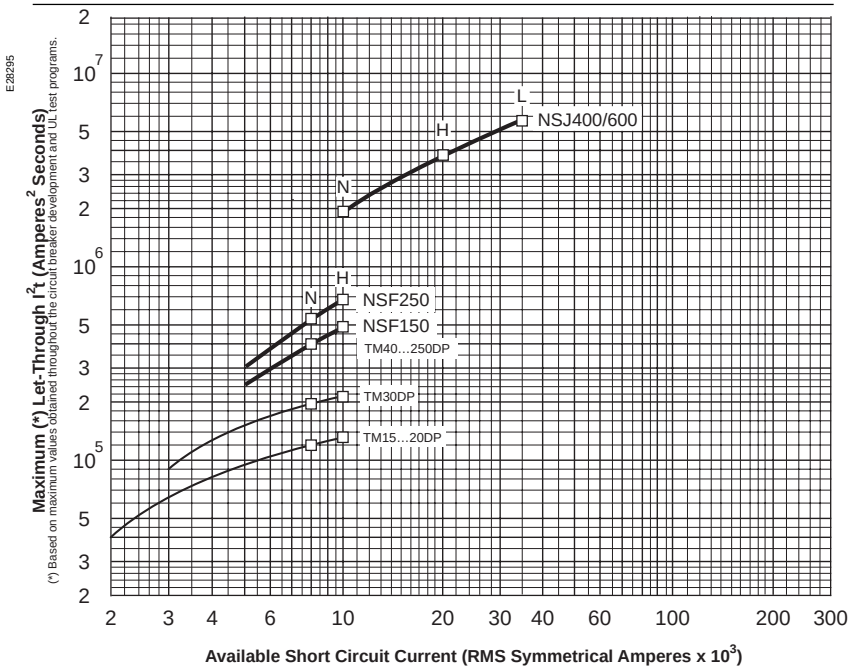


Current limiting curves at 690 V

Maximum peak let-through current (Amperes)



Maximum let-through I²t (Amperes² Seconds)



UL 489 test procedure

Standard tests

For electronic trip circuit breakers and uncompensated thermal-magnetic circuit breakers rated 40°C, the test sequences are as shown in the table:

Test	Sequence		
	X	Y	Z
200% calibration at 25°C (77°F)	■	■	■
135% calibration at 25°C (77°F)	■		
Calibration of adjustable instantaneous trip	■		
Overload	■		
Tungsten lamp load	①		
100% calibration at 40°C (104°F)	②		
Temperature and 100% calibration at 25°C (77°F)	■		
Endurance		■	
200% calibration at 25°C (77°F) repeated		■	
135% calibration at 25°C (77°F) repeated		■	
Interrupting ability (Y sequence)		■	
Interrupting ability (Z sequence)			■
200% trip out at 25°C (77°F)		■	■
Dielectric voltage withstand	■	■	■

① Applies only to circuit breakers rated 50 A or less, and 125 or 125/250 V or less.
② Applies only to thermal-magnetic breakers rated 40°C.

Standard specifications

Temperature

The temperature rise at the circuit breaker and at its terminals does not exceed specified limits when connected with specified cables or bus bars (see below) and at its rated current.

Examples of specified wires and bus

■ 75°C copper wire

Rating	Number	Size
100 A	1	#1 AWG (60°C)
	1	#3 AWG
250 A	1	250 kcmil
400 A	2	3/0 AWG
600 A	2	350 kcmil
800 A	3	300 kcmil
1000 A	3	400 kcmil
1200 A	4	350 kcmil

■ Copper busbar

Rating	Number	Size
1600 A	2	1/4 x 3
2000 A	2	1/4 x 4
2500 A	2	1/4 x 5
	4	1/4 x 2 - 1/2
3000 A	4	1/4 x4

(1200 A or less: 1000 A / in^2)

Calibration

200% calibration at 25°C

The circuit breaker must trip within time limits which depend on the rating from three minutes for a 30 A rated circuit breaker, up to 30 minutes over 2000 A.

135% calibration at 25°C

The circuit breaker must trip within two hours (for circuit breakers rated more than 50 A).

Calibration of adjustable instantaneous trip

The circuit breaker must trip within the range of 80-120% of the maximum marked tripping current and 75-125% of the minimum marked tripping current.

Overload

■ Up to 1600 A: 50 operations at 600% of rated current;
■ 2000 and 2500 A: 25 operations at 600% of rated current;
■ 3000 to 6000 A: three operations at 600% followed by 25 operations at 200% of rated current.
The power factor shall be from to 0.45 to 0.50 lagging.

Endurance

The circuit breaker must complete an endurance test:
■ Operations at rated current and rated voltage;
■ Followed by no load operation.
The power factor shall be 0.75 to 0.80 lagging.

Examples

Frame size	Number of cycles of operations		
	With current	Without current	Total
100 A	6,000	4,000	10,000
225 A	4,000	4,000	8,000
400 A	1,000	5,000	6,000
600 A	1,000	5,000	6,000
800 A	500	3,000	3,500
1200 A	500	2,000	2,500
1600 A	500	2,000	2,500
2000 A	500	2,000	2,500
2500 A	500	2,000	2,500
3000 A	400	1,100	1,500

UL 489 test procedure

Interrupting ability

Interrupting ability (Y sequence)
After endurance tests and calibrations are repeated, the circuit breaker completes an opening (O) followed by a close-open operation (O-t-CO), with specified current.

Examples for 3-pole breakers

Frame rating	RMS Sym. Amperes (3-pole O-and-CO)
100 A ①	3,000
225 A	3,000
400 A	5,000
600 A	6,000
800 A	10,000
1200 A	14,000
1600 A	20,000
2000 A	25,000
3000 A	35,000

① Above 250 V.

Interrupting ability (Z sequence)
A 3-pole circuit breaker rated 240, 480 or 600 V has to complete an opening operation (O) and a close-open operation (O-and-CO) on each pole, at rated voltage, followed by an opening operation (O) using all 3 poles.

Examples of 3-pole circuit breakers

Frame rating	RMS Sym. Amperes	
	Each pole	Common
	O-and-CO	O
100 to 800 A	8,660	10,000
1000 to 1200 A	12,120	14,000
1600 A	14,000	20,000
2000 A	14,000	25,000
3000 A	25,000	35,000

Dielectric

After testing, the circuit breaker must withstand for one minute a voltage of 1000 V plus twice the rated voltage between:
- Line and load terminals with circuit breaker in open, tripped and off positions;
- Terminals of opposite polarity with circuit breaker closed;
- Live parts and the overall enclosure with circuit breaker open and closed.

Optional tests

■ High available fault current
Circuit breakers having passed all the standard tests may have the UL Listing label applied at higher values than the standard.
Test sequence is as follows:
- ❑ 200% calibration,
- ❑ Interrupting capacity: an opening operation followed by a close-open operation (O-and-CO) on all poles are performed on the circuit breaker.

The power factor over 20000 A shall be 0.15 to 0.2 lagging:
- ❑ Trip out at 250%,
- ❑ Dielectric at twice the rated test voltage.

■ 100% rated
Circuit breakers having passed all the standard tests may have the UL Listing label applied to use the circuit breaker in an enclosure when carrying 100% of its maximum rating.
The circuit breaker is submitted to additional temperature tests performed as standard tests, except that the circuit breaker is installed in an enclosure.
The dimensions and possible ventilations shall be recorded and shall be marked on the circuit breaker.

Tests on accessories

Shunt trip and undervoltage trip
These devices are submitted to temperature, overvoltage, operation, endurance and dielectric tests.

■ Overvoltage test
The device must be capable of withstanding 110% of its rated voltage continuously without damage (this test does not apply to a shunt trip with an "a" contact connected in series).

■ Operation
The shunt trip must operate at 75% of its rated voltage (except shunt trip devices for use with ground-fault protection shall operate at 55%).
The undervoltage trip must trip the circuit breaker when the voltage is less than 35% and may trip the circuit breaker between 35 and 70% of its rated voltage and shall pick-up and seal when the voltage is at 85% or more of its rated voltage.

■ Endurance
The device must be capable of performing successfully for 10% of the number of "with current" operations of the circuit breaker.

Auxiliary and alarm switches
Auxiliary and alarm switches must be submitted to temperature, overload, endurance and dielectric tests.

■ Overload test
The test consists of fifty operations making and breaking 150% of rated current at rated voltage, with a 75-80% power factor in ac and non-inductive load in dc.

■ Endurance
The switch must make and break its rated current at rated voltage, with a 75-80% power factor in ac, and non-inductive load in dc for 100% of the number of operations "with current" for auxiliary switches, and 10% of this number for alarm switches.

Motor operator
The motor operator shall perform the number of "without current" operations indicated for the circuit breaker endurance tests. The first 25 operations shall be conducted at 85% of the motor operator voltage rating.
The circuit breaker is to be tripped during these tests.
The next 25 operations shall be conducted at 110% of the motor operator voltage rating. The balance shall be completed at rated voltage without tripping the circuit breaker.

IEC 947-2 test procedure

Standard tests

Consisting of seven parts, the IEC 947 Standard applies to all low-voltage equipment designed for industrial application.
Three documents are to be consulted for circuit breakers and switches.
- IEC 947-1: general regulations;
- IEC 947-2: circuit breakers;
- IEC 947-3: switches.

Two categories of devices

The IEC 947-1 standard defines two categories of devices.

Category A
Devices not specifically designed to carry out chronometric selectivity.

Category B
Devices specifically designed to carry out chronometric selectivity. These circuit breakers possess a compulsory additional characteristic: short-time withstand (Icw).

Breaking capacity

■ **Ultimate breaking capacity: Icu**
Icu is the value to be taken into account when calculating an installation.
The rule remains: Icu > Icc (maximum fault current of the installation).

■ **Breaking performance during operation: Ics**
This characteristic indicates the ability of the device to eliminate short-circuit currents less than Icc and with a greater likelihood of occurring, generally near the application. Ics is expressed in % of Icu (values retained by the standard IEC 25-50-75-100% of Icu).
This test sequence designed to check the Ics performance, groups together on the same device, following the breaking test (O-CO-CO, see page 59), certain checks such as:
❑ Temperature rise under In;
❑ Calibration at 1.45 In;
❑ Leakage current (for devices suitable for disconnection).
The leakage current should not exceed 2 mA under the application voltage (0.5 mA when new).

These checks ensure that the device is able to carry out all its functions after elimination of a fault of Ics value and to be put back in operation; hence the notion of breaking power performance during operation Ics.

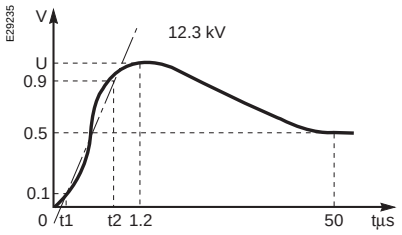
Isolation

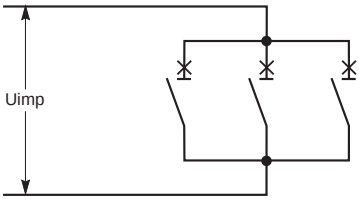
Function

Recognition and definition of the disconnection capacity for industrial low-voltage equipment
Until recently, circuit breaker standards have established no regulations concerning the isolation function.
Only the installation standards provided some rather vague information.
The IEC 947 standard takes this function into account.
In the "general regulations" section, it clearly states:
❑ The manufacturing regulation,
❑ The tests to be performed.
The circuit breaker standard should define the manner in which the tests are to be performed (under study).
The manufacturing regulations state, for example:
❑ Both the isolation and the inner contact distances (open > 8 mm),
❑ A device indicating the true position of the contacts (operating handle if representative of the state of all the contacts),
❑ When a "locked" position is provided, this should only be possible with "open" contacts.

The tests to be performed are as follow:

■ **Shock wave voltage strength (Uimp)**





1.2/50 µs - 12.3 kV plus 25% between open contacts in comparison with devices not fitted with the applied isolation function according to the figure below.
The test is validated if no triggering occurs between the contacts.

■ **Measurement of the leakage current**
Under 110% of the device application voltage
❑ Maximum leakage currents proposed per pole:
– 0.5 mA new device,
– 2 mA device after Ics,
– 6 mA device after Icu or after endurance tests, representative of the "end of service life."

IEC 947-2 test procedure

Test sequences

Sequence	Category of devices	Tests
1 - General characteristics	All circuit breakers	- trip unit control - dielectric properties - mechanical and electrical endurance - overload - dielectric voltage withstand - temperature rise - 145% calibration (3 phases test)
2 - Breaking capacity during operation	All circuit breakers	- breaking capacity during operation (Ot-CO-t-CO) - dielectric voltage withstand - temperature rise - 145% calibration (3 phases test)
3 - Ultimate breaking capacity (Icu)	A B if Icu > Icw	- 200% calibration (each pole separately) - ultimate breaking capacity (O-t-CO) - dielectric voltage withstand - 250% calibration (each pole separately)
4 - Admissible short duration current (Icw)	B	- 200% calibration (each pole separately) - short-time current withstand - temperature rise - breaking capacity at admissible short-time current (O-t-CO) - dielectric voltage withstand - 200% calibration (each pole separately)
Combined sequence	Icw = Ics replaces sequences 2 and 4 Icw = Ics = Icu replaces sequences 2, 3 and 4	- 200% calibration (each pole separately) - short-time current withstand Icw - breaking capacity at Ics (O-CO-CO) at maximum relay temp. - dielectric voltage withstand - temperature rise - 200% calibration (each pole separately)

Routine and maintenance guidelines

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN OR EXPLOSION

- This equipment must be installed and serviced only by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on power to this equipment.

Failure to follow these instructions will result in death or serious injury.

⚠ CAUTION

Molded case circuit breakers contain factory-sealed and calibrated elements. The seal must not be broken and the circuit breaker must not be tampered with. Molded case circuit breakers should not be field adjusted or repaired. In the case of a malfunction, the circuit breaker should be replaced or inspected at the Groupe Schneider factory, or by an authorized representative.

Recommended inspection intervals

Merlin Gerin circuit breakers are designed to be maintenance-free. However, all equipment with moving parts requires periodic inspection to ensure optimum performance and reliability. It is recommended that the circuit breakers be routinely inspected six months after installation, followed by annual inspection. Intervals can vary depending on particular usages and environments.

Inspection of terminals

■ Connections to circuit breaker terminals should be inspected. If there is discoloration due to overheating, the connections should be disassembled and the surface cleaned before reinstallation. It is essential that electrical connections be made carefully in order to prevent overheating;
■ Check for terminal tightness.

Cleaning

Remove the dust and dirt that have accumulated on the circuit breaker surface and terminals.

Mechanical checks

Even over long periods of time, circuit breakers are not often required to operate on overload or short-circuit conditions. Therefore it is essential to operate the circuit breaker periodically.
To trip the circuit breaker, push the push-to-trip button.

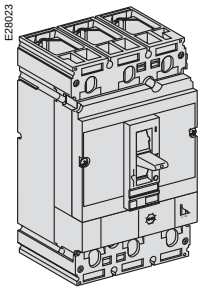
Insulation resistance tests

When a circuit breaker is subjected to severe operating conditions, an insulation resistance test should be performed as indicated in NEMA standard publication No. AB4-1996. An insulation resistance test is used to determine the quality of the insulation between phases and phase-to-ground. The resistance test is made with a dc voltage higher than the rated voltage to determine the actual resistance of the insulation.
The most common testing method employs a "megger" type instrument. A 1000 V instrument will provide a more reliable test because it is capable of detecting tracking on insulated surfaces. Resistance values below one megohm are unsafe and should be investigated. An insulation test should be made:
■ Between line and load terminals of individual poles with the circuit breaker contacts open;
■ Between adjacent poles and from poles to the metallic supporting structure with the circuit breaker contacts closed. The latter test may be done with the circuit breaker in place after the line and load conductors have been removed, or with the circuit breaker bolted to a metallic base which simulates the in-service mounting.

Electrical tests

These tests require equipment for conducting pole resistance, overcurrent and instantaneous tripping, in accordance with NEMA Standard publication No. AB4. They are not within the scope of normal field operation.

Catalog numbers



COMPACT NSF Circuit Breaker with Thermal-Magnetic Trip Unit

Rating (A)	Bus Bar Connection	Cable Connection
NSF150N — 600Y/347 Vac Max — 35 kA at 480 Vac		
15	NFNF36015	NFNL36015
20	NFNF36020	NFNL36020
30	NFNF36030	NFNL36030
40	NFNF36040	NFNL36040
50	NFNF36050	NFNL36050
60	NFNF36060	NFNL36060
70	NFNF36070	NFNL36070
80	NFNF36080	NFNL36080
90	NFNF36090	NFNL36090
100	NFNF36100	NFNL36100
125	NFNF36125	NFNL36125
150	NFNF36150	NFNL36150
NSF250N — 600Y/347 Vac Max — 35 kA at 480 Vac		
175	NFNF36175	NFNL36175
200	NFNF36200	NFNL36200
225	NFNF36225	NFNL36225
250	NFNF36250	NFNL36250
NSF150H — 600Y/347 Vac Max — 65 kA at 480 Vac		
15	NFHF36015	NFHL36015
20	NFHF36020	NFHL36020
30	NFHF36030	NFHL36030
40	NFHF36040	NFHL36040
50	NFHF36050	NFHL36050
60	NFHF36060	NFHL36060
70	NFHF36070	NFHL36070
80	NFHF36080	NFHL36080
90	NFHF36090	NFHL36090
100	NFHF36100	NFHL36100
125	NFHF36125	NFHL36125
150	NFHF36150	NFHL36150
NSF250H — 600Y/347 Vac Max — 65 kA at 480 Vac		
175	NFHF36175	NFHL36175
200	NFHF36200	NFHL36200
225	NFHF36225	NFHL36225
250	NFHF36250	NFHL36250

COMPACT NSF Molded Case Switch — Automatic — 600Y/347 Vac max

150	NFHF36000S15	NFHL36000S15
250	NFHF36000S25	NFHL36000S25

COMPACT NSF Circuit Breaker for Motor Circuit Protection

NSF150HC— 600Y/347 Vac Max			
150	Magnetic adjustable from 6 to 12 handle rating	NFHF36150M29	NFHL36150M29
NSF250HC— 600Y/347 Vac Max			
200	Magnetic adjustable from 5 to 10 handle rating	NFHF36200M30	NFHL36200M30
250	Magnetic adjustable from 5 to 10 handle rating	NFHF36250M32	NFHL36250M32

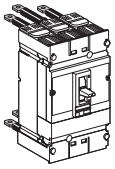
Cable range: Pressure terminals are suitable for copper and aluminum cables:
- 15–60 A terminal:
  1 cable: #14 AWG–#1/0 AWG Cu or
  1 cable: #12 AWG–#3/0 AWG Al
- 70–250 A terminal:
  1 cable: #4 AWG–250 kcmil Cu or
  1 cable: #3 AWG–350 kcmil Al

Other termination: page 62
Accessories: See page 63

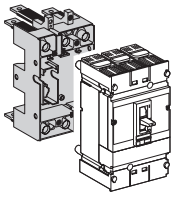
Catalog numbers

E29229

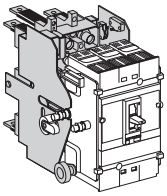
E28032



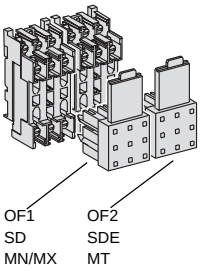
E28035



E28036



E36965



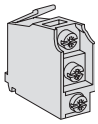
Installation and Connection

- For factory-installed connection accessories complete the circuit breaker catalog number by inserting the termination numbers in the appropriate block.
- For field-installable accessories order the 5-digit catalog number.

			Term. No.	Catalog No.
Bus Bar Connection				
Kit for COMPACT NSF Circuit Breaker (Terminal Cover Included)			F	37405
Field-installable	One side			29229
Field-installable	One side			29280
Cable Connection				
15 – 60 A Lugs (Terminal Cover Included)				
Factory-installed	Both sides		L	
	Line side only		M	
	Load side only		P	
70 – 250 A Lugs (Terminal Cover Included)				
Factory-installed	Both sides		L	
	Line side only		M	
	Load side only		P	
Voltage Takeoffs for 70-250 A Lugs (Set of Two)				29348
Rear Connection = Bus Bar Connection + Rear Connection Kit				
Mixed Rear Connection Kit			S	29239
Consisting of:	Rear connections (set of 2)	Short rear connections		29235 (qty. 2)
		Long rear connections		29236
	Short terminal covers	3P		29321
Plug-In Mounting = Bus Bar Connection + Plug-In Kit				
Kit for COMPACT NSF Circuit Breaker (Stationary and Moving Part)			N	29293
Consisting of:	**Stationary Part**			
	Plug-in base	3P		29278
	Moving Part		HJ00	
	Safety trip interlock			29270
	Short terminal covers	3P		29321
	Power connections	3P		29268 (qty. 3)
Drawout Mounting = Bus Bar Connection + Drawout Kit				
Kit for COMPACT NSF Circuit Breaker (Stationary and Moving Part)			D	29303
Consisting of:	**Stationary Part**			
	Plug-in base	3P		29278
	Fixed part of chassis			29282
	Moving Part		HJ00	
	Moving part of chassis			29283
	Safety trip interlock			29270
	Short terminal covers	3P		29321
	Power connections	3P		29268 (qty. 3)
Plug-in and Drawout Accessories				
Secondary Disconnecting Blocks				
Fixed part	9-wire connector			29273
Moving part	9-wire connector			29274
	Support for 2 moving connectors			29275
Shutters	Two shutters for plug-in base			29271
Chassis Accessories	Extended escutcheon for toggle			29284
	Locking device (key lock is not included)			29286
	Two position indicating switches (connected/disconnected)			29287

Catalog numbers

E10608



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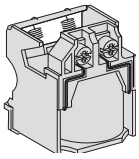

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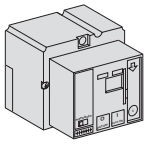


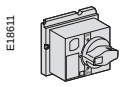
Electrical Accessories

■ For factory-installed accessories complete the circuit breaker catalog number by inserting the option number in the appropriate block.
■ For field-installable accessories order the 5-digit catalog number.

		Voltage (V)	Option No.	Catalog No.
Auxiliary Switch (SPDT Type)				
Standard	One auxiliary switch (OF)		AA	29450
	Two auxiliary switches (OF)		AB	29450 (qty. 2)
	Alarm switch (SD)		BC①	29450
	Overcurrent trip switch (SDE)		BD①	
	Consisting of: OF switch			29450
	SDE adapter			29451
Low level	One auxiliary switch (OF)		AE	29452
	Two auxiliary switches (OF)		AF	29452 (qty. 2)
	Alarm switch (SD)		BH③	29452
	Overcurrent trip switch (SDE)		BJ③	
	Consisting of: OF switch			29452
	SDE adapter②			29451
Shunt Trip and Undervoltage Trip				
MX (Shunt trip)	AC 50/60 Hz	24	SK	29384
		48	SL	29385
		110/130	SA	29386
		208/277	SD	29387
		380/480	SH	29388
		525/600	SJ	29389
	DC	12	SN	29382
		24	SO	29390
		30	SU	29391
		48	SP	29392
		60	SV	29383
		125	SR	29393
		250	SS	29394
MN (Undervoltage trip)	AC 50/60 Hz	24	UK	29404
		48	UL	29405
		110/130	UA	29406
		208/277	UD	29407
		380/480	UH	29408
		525/600	UJ	29409
	DC	12	UN	29402
		24	UO	29410
		30	UU	29411
		48	UP	29412
		60	UV	29403
		125	UR	29413
		250	US	29414
Motor Operator with SDE Adapter				
MT150 for NSF150	AC 50/60 Hz	48/60	ML	29440
		110/130	MA	29433
		208/277	MD	29434
		380/480	MH	29435
	DC	24/30	MO	29436
		48/60	MP	29437
		110/130	MR	29438
		250	MS	29439
MT250 for NSF250	AC 50/60 Hz	48/60	ML	31548
		10/130	MA	31540
		208/277	MD	31541
		380/480	MH	31542
	DC	24/30	MO	31543
		48/60	MP	31544
		110/130	MR	31545
		250	MS	31546
	Locking device with Ronis key lock			29449

①BE = BC + BD
②SDE adpater provided with motor operator
③BK = BH + BJ

Catalog numbers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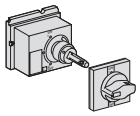
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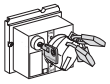
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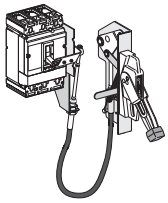
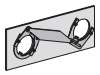

E34103

Operating Handles

			Option No.	Catalog No.
Directly Mounted				
	Standard black handle		RD12	29337
	Red handle on yellow bezel		RD22	29339
	MCC conversion accessory			29341
Door Mounted				
	Standard black handle		RE12	29338
	Red handle on yellow bezel		RE22	29340
	Telescopic handle for drawout mounting		RT12	29343
Accessories				
	Locking device			29344
	Key locks	Ronis 1351.500		41940
		Profalux KS5 B24 D4Z		42888
	Indication	One early-break switch		29345
	auxiliary switch	Two early-make switches		29346
Cable Operating Handle with A1 Handle				
	Cable length (in./mm)	36/914		9422CSF30
		60/1524		9422CSF50
		120/3048		9422CSF10
	A1 painted handle (order separately)			9422A1

Locks, Interlocking

Handle Padlocking Device			
	Removable		29370
	Fixed		29371
Interlocking (Not UL Listed)			
	Mechanical for circuit breakers with rotary operating handles		29369
	Mechanical for circuit breakers with toggles		29354
	Two locks (keyed alike)	Ronis 1351.500	41950
		Profalux KS5 B24 D4Z	42878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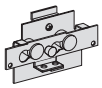
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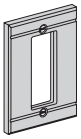
E23851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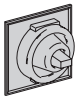

E21653

Installation Accessories

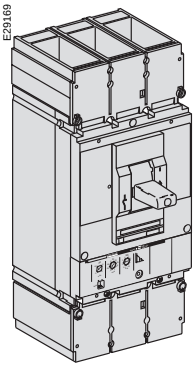
Front Panel Escutcheons			
	Toggle		29315
	Rotary operating handle, motor operator or extended escutcheon		29317
Phase Barriers		Set of 6	29329
Handle Rubber Boot			29319
Sealing Accessories			29375

Spare Parts

10 Toggle Extensions	29313
100 Identification Labels	29314
Voltage Takeoffs for the 70–250 A Aluminum Lug (Set of 2)	29348

Catalog numbers

E29169



Cable range: pressure terminals are suitable for copper and aluminum cables.

- 400 A terminal:
  1 cable: #2 AWG–600 kcmil Cu or
  1 cable: #2 AWG–500 kcmil Al
- 600 A terminal:
  2 cables: #2/0 AWG–350 kcmil Cu or
  2 cables: #2/0 AWG–500 kcmil Al

Other termination: page 66
Accessories: See page 67

COMPACT NSJ Circuit Breaker with STR23SP Electronic Trip Unit

Rating (A)	Bus Bar Connection	Cable Connection
NSJ400N—35 kA at 480 Vac		
150	NJNF36150E20	NJNL36150E20
250	NJNF36250E20	NJNL36250E20
400	NJNF36400E20	NJNL36400E20
NSJ600N—35 kA at 480 Vac		
600	NJNF36600E20	NJNL36600E20
NSJ400H—65 kA at 480 Vac		
150	NJHF36150E20	NJHL36150E20
250	NJHF36250E20	NJHL36250E20
400	NJHF36400E20	NJHL36400E20
NSJ600H—65 kA at 480 Vac		
600	NJHF36600E20	NJHL36600E20
NSJ400L—100 kA at 480 Vac		
400	NJLF36400E20	NJLL36400E20
NSJ600L—100 kA at 480 Vac		
600	NJLF36600E20	NJLL36600E20

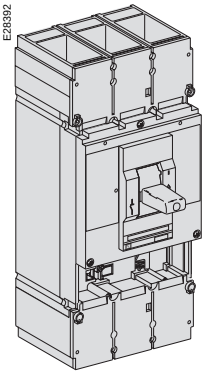
COMPACT NSJ Molded Case Switch — Automatic

NSJ400A		
400	NJHF36000S40	NJHL36000S40
NSJ600A		
600	NJHF36000S60	NJHL36000S60

COMPACT NSJ Circuit Breaker for Motor Circuit Protection

NSJ400HC		
400 Magnetic adjustable from 5 to 10 handle rating	NJHF36400M36	NJHL36400M36
NSJ600HC		
600 Magnetic adjustable from 5 to 10 handle rating	NJHF36600M42	NJHL36600M42

E28392



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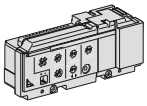

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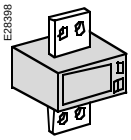


Consisting of:

COMPACT NSJ Circuit Breaker Basic Frame

Rating (A)	Bus Bar Connection
NSJ400/600N	
150	NJNF36150F40
250	NJNF36250F40
400	NJNF36400F40
600	NJNF36600F60
NSJ400/600H	
150	NJHF36150F40
250	NJHF36250F40
400	NJHF36400F40
600	NJHF36600F60
NSJ400/600L	
400	NJLF36400F40
600	NJLF36600F60

+ Electronic Trip Unit

	Trip function	Catalog No.
Long-time and Instantaneous Protection		
STR23SP	E20	36940
Long-time, Short-time, Instantaneous Protection and Options		
STR53UP-F	E53	36942
STR53UP-FT	E54	36943
STR53UP-FJ	E58	36944
STR53UP-FTJ	E59	36945
Communication wiring		32441
Replacement battery		32434

+ External Neutral Sensor

150	36950
250	36951
400	36952
600	36953

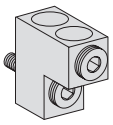
Summary of options:
F: Fault indicators
T: Residual type ground-fault protection
J: Ammeter

Catalog numbers

Installation and Connection

■ For factory-installed connection accessories complete the circuit breaker catalog number by inserting the termination numbers in the appropriate block.
■ For field-installable accessories order the 5-digit catalog number.


E22040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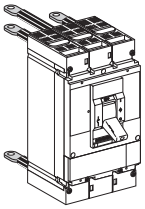
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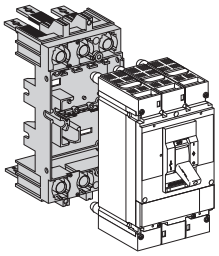
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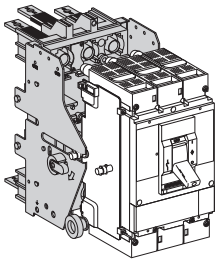
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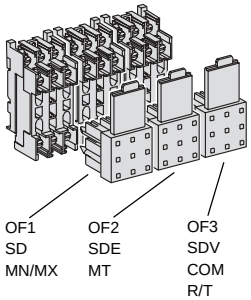
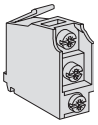


E36966

			Term. No.	Catalog No.
Bus Bar Connection				
Bus Bar Connection Hardware COMPACT NSJ Circuit Breaker — One Side (Three Per Set)				
			F	36966
Cable Connection				
400 A Lugs (Terminal Cover Included)				
Field installable	One side			32508
Factory installed	Both sides		L	
	Line side only		M	
	Load side only		P	
600 A Lugs (Terminal Cover Included)				
Field installable	One side			32510
Factory installed	Both sides		L	
	Line side only		M	
	Load side only		P	
Voltage Takeoffs for 400 and 600 A Lugs (Set of Two)				29348
Rear Connection = Bus Bar Connection + Rear Connection Kit				
Mixed Rear Connection Kit			S	32477
Consisting of:	Rear connections	Short rear connections		32475 (qty. 2)
	(set of 2)	Long rear connections		32476
	Short terminal covers	3P		32562
Plug-in Mounting = Bus Bar Connection + Plug-in Kit				
Kit for COMPACT NSJ Circuit Breaker (Stationary and Moving Part)			N	
Consisting of:	**Stationary Part**			
	Plug-in base	3P		32514
	Moving Part		HJ00	
	Safety trip interlock			32520
	Short terminal covers	3P		32562
	Power connections	3P		32518 (qty. 3)
Drawout Mounting = Fixed Front Connection + Drawout Kit				
Kit for COMPACT NSJ Circuit Breaker (Stationary and Moving Part)			D	
Consisting of:	**Stationary Part**			
	Plug-in base 3P			32514
	Fixed part of chassis			32532
	Moving Part		HJ00	
	Moving part of chassis			32533
	Safety trip interlock			32520
	Short terminal covers	3P		32562
	Power connections	3P		32518 (qty. 3)
Plug-in and Drawout Accessories				
Secondary Disconnecting Blocks				
Fixed part	9-wire connector			29273
Moving part	9-wire connector			32523
	Support for 3 moving connectors			32525
Shutters	Two shutters for plug-in base			32521
Chassis Accessories	Extended escutcheon for toggle			32534
	Locking device (key lock is not included)			29286
	Two position indicating switches (connected/disconnected)			29287

Catalog numbers

E18608



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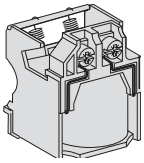

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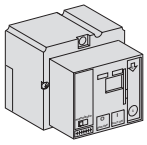

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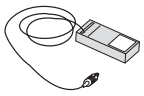

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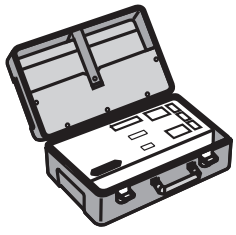


Electrical Accessories

■ For factory-installed accessories complete the circuit breaker catalog number by inserting the option number in the appropriate block.
■ For field-installable accessories order the 5-digit catalog number.

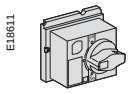
		Voltage (V)	Option No.	Catalog No.
Auxiliary Switch (SPDT Type)				
Standard	One auxiliary switch (OF)		AA	29450
	Two auxiliary switches (OF)		AB	29450 (qty. 2)
	Three auxiliary switches (OF)		AC	29450 (qty. 3)
	Alarm switch (SD)		BC①	29450
	Overcurrent trip switch (SDE)		BD①	29450
Low level	One auxiliary switch (OF)		AE	29452
	Two auxiliary switches (OF)		AF	29452 (qty. 2)
	Three auxiliary switches (OF)		AG	29452 (qty. 3)
	Alarm switch (SD)		BH②	29452
	Overcurrent trip switch (SDE)		BJ②	29452
Shunt Trip and Undervoltage Trip				
MX (Shunt trip)	AC 50/60 Hz	24	SK	29384
		48	SL	29385
		110/130	SA	29386
		208/277	SD	29387
		380/480	SH	29388
		525/600	SJ	29389
	DC	12	SN	29382
		24	SO	29390
		30	SU	29391
		48	SP	29392
		60	SV	29383
		125	SR	29393
		250	SS	29394
MN (Undervoltage trip)	AC 50/60 Hz	24	UK	29404
		48	UL	29405
		110/130	UA	29406
		208/277	UD	29407
		380/480	UH	29408
		525/600	UJ	29409
	DC	12	UN	29402
		24	UO	29410
		30	UU	29411
		48	UP	29412
		60	UV	29403
		125	UR	29413
		250	US	29414
Motor operator with SDE Adapter				
MT600	AC 50/60 Hz	48/60	ML	32839
		110/130	MA	32840
		208/277	MD	32841
		380/415	MF	32842
		440/480	MH	32847
	DC	24/30	MO	32843
		48/60	MP	32844
		110/130	MR	32845
		250	MS	32846
Locking device	Mounting hardware			32649
	Ronis lock			41940
	Profalux lock			42888
Operations counter				32648

Test Kits

Mini test kit (battery not supplied)				43362
Portable test kit		120		55391

①BE = BC + BD
②BK = BH + BJ

Catalog numbers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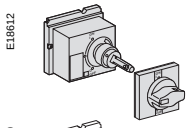
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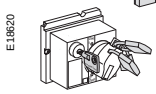
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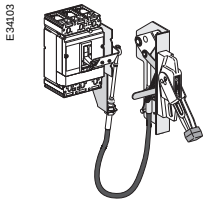
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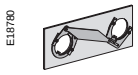
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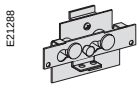
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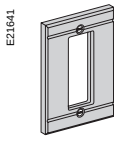
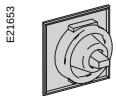

E21641


E21653

Operating Handles

			Option No.	Catalog No.
Directly Mounted				
	Standard black handle		RD12	32597
	Red handle on yellow bezel		RD22	32599
	MCC conversion accessory			32606
Door Mounted				
	Standard black handle			32598
	Red handle on yellow bezel			32600
	Telescopic handle for drawout mounting			32603
Accessories				
	Locking device			32604
	Key locks	Ronis 1351.500		41940
		Profalux KS5 B24 D4Z		42888
	Indication	One early-break switch		32605
	auxiliary switch	Two early-make switches		29346
Cable Operating Handle with A1 Handle				
	Cable length (in./mm)	36/914		9422CSJ30
		60/1524		9422CSJ50
		120/3048		9422CSJ10
	A1 painted handle (order separately)			9422A1

Locks, Interlocking

Handle Padlocking Device			
	Removable		29370
	Fixed		32631
Interlocking (Not UL Listed)			
	Mechanical for circuit breakers with rotary operating handles		32621
	Mechanical for circuit breakers with toggles		32614
	Two locks (keyed alike)	Ronis 1351.500	41950
		Profalux KS5 B24 D4Z	42878

Installation Accessories

Templates Front Panel Cut-outs			
	Toggle		32556
	Rotary operating handle, motor operator or extended escutcheon		32558
Phase Barriers		Set of 6	32570
Handle Rubber Boot			32560
Sealing Accessories			29375

Spare Parts

100 Identification Labels	29314
Extended Handle	32553
Voltage Takeoffs for the 70–250 A Aluminum Lug (Set of 2)	29348

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Cedar Rapids IA 52406-3069 USA
Field Services: 1-800-634-2003
www.squared.com

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