

# Low voltage switchgear

## Compact NR NR100F to NR630F

*The Compact NS range has revolutionised the world of moulded-case circuit breakers. For installations not requiring the high performance levels of the NS range, the Compact NR range offers the necessary basic characteristics at a more economical price.*

*It offers end-users lasting safety together with unsurpassed energy availability and convenient operational features:*

- compliance with most standards and certifications worldwide
- service breaking capacity  $I_{cs} = 75\% I_{cu}$  (according to IEC 60947-2)
- inherent discrimination of protection devices
- suitability for isolation with positive break indication.

045345SI-32



Compact NR250.

045285SI-38



Compact NR630.

### General characteristics

#### Compliance with standards

International	IEC 60947-1 to 5
Europe	EN 60947
Germany	VDE 0660
France	NF EN 60947
Great Britain	BS EN 60947
Italy	CEI EN 60947

#### Applications

For the protection of distribution systems, Compact NR circuit breakers may be equipped with either thermal-magnetic or electronic trip units, the latter offering higher accuracy and additional settings.

#### Suitability for isolation and safety of personnel

All Compact circuit breakers are suitable for isolation as defined in IEC standard 60947-2. The operating handle cannot indicate the "off" position unless the contacts are actually open. Fitting a rotary handle or a motor mechanism does not alter the reliability of the position indication system.

All Compact circuit breakers have a Class II front insulation as per standards IEC/EN 60664-1 and NF C 15100.

For protection against direct contact with live parts, Compact circuit breakers may be installed through the front panel of Class II switchboards.

#### Degree of pollution

The circuit breakers are capable of operating in the most severe industrial environments. They comply with pollution degree 3 protection as defined by IEC/EN 60664-1 and IEC/EN 60947-1 applicable to low voltage switchgear.

#### Tropicalisation

Compact NR circuit breakers have successfully passed the tests defined by the following standards:

- IEC/EN 60068-2-1: dry cold (-55 °C)
- IEC/EN 60068-2-2: dry heat (+85 °C)
- IEC/EN 60068-2-30: damp heat (95 % relative humidity at 55 °C)
- IEC/EN 60068-2-52: salt mist (severity level 2).

#### Environmental protection

Compact NR circuit breakers take into account important concerns for environmental protection. Most components are recyclable.

#### Degrees of protection

As per standards IEC/EN 60529 (IP degree of protection) and EN 50102 (IK degree of protection against external mechanical impacts):

- bare circuit breaker with terminal shields:
  - with toggle or direct rotary handle: IP40 and IK07
- circuit breaker installed in a switchboard:
  - with toggle or direct rotary handle: IP40 and IK07
  - with extended rotary handle: IP55 and IK08.

#### Accessories

- Direct or extended rotary handles.
- Padlocking or keylocking systems.
- Status indication auxiliary contacts (ON/OFF, tripped, fault trip, earth-fault)
- Undervoltage or shunt trip auxiliary releases
- Overload indication (on electronic trip units).



Merlin Gerin

## Characteristics

Electrical characteristics				NR100	NR160	NR250	NR400	NR630	
According to IEC 60947-2 and EN 60947-2									
Number of poles				3, 4	3, 4	3, 4	3, 4	3, 4	
Rated current (A) <b>In</b> 40 °C				100	160	250	400	630	
Rated insulation voltage (V) <b>Ui</b>				690	690	690	690	690	
Rated impulse withstand voltage (kV) <b>Uimp</b>				6	6	6	6	6	
Rated operational voltage (V) <b>Ue</b> AC 50/60 Hz				500	500	500	500	500	
<b>Type of circuit breaker</b>				<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	<b>F</b>	
Ultimate breaking capacity (kA rms) <b>Icu</b> AC 50/60 Hz				220/240 V	35	35	35	40	40
				380/415 V	25	25	25	36	36
				440 V	20	20	20	30	30
				500 V	15	15	15	25	25
Service breaking capacity <b>Ics</b> (% Icu)				75 %	75 %	75 %	75 %	75 %	
Durability (C-O cycles)				415 V / In 10000	10000	6000	3500	3000	

## Ambient temperatures

Operation temperature	-25 °C to +70 °C
Commissioning temperature	-25 °C to +70 °C
Storage temperature	-25 °C to +85 °C

## Trip units

Thermal magnetic trip units														
Ratings (A)	40 °C	<b>In</b>	<b>16</b>	<b>25</b>	<b>32</b>	<b>40</b>	<b>50</b>	<b>63</b>	<b>80</b>	<b>100</b>	<b>125</b>	<b>160</b>	<b>200</b>	<b>250</b>
Tripping thresholds (A)	Thermal	<b>Ir</b>	Adjustable 0.8...1 x In											
			Standard magnetic (TM-D)	<b>Im</b>	Fixed									
				<b>NR100</b>	190	300	400	500	500	500	640	800	-	-
			<b>NR160/250</b>	190	300	400	500	500	500	1000	1250	1250	1250	5... 10 x In
	Low magnetic (TM-G)	<b>Im</b>	Fixed											
			63	80	-	80	-	125	-	-	-	-	-	-
Electronic trip units (NR100/160/250)			STR22SE/STR22GE					STR22SE OSN						
Ratings (A)	40/60 °C	<b>In</b>	<b>40</b>	<b>80<sup>(1)</sup></b>	<b>100</b>	<b>160</b>	<b>250</b>	<b>160</b>	<b>250</b>					
Tripping thresholds (A)	Long-time	<b>Ir</b>	Adjustable (48 settings)					Adjustable (48 settings)						
			0.4...1 x In					0.25...0.63 x In						
	Tripping time at 1.5 Ir (s)	<b>Ist</b>	Fixed					Fixed						
			STR22SE: 90...180 - STR22GE: 12...15					90...180						
Short-time	<b>Ist</b>	Adjustable (8 settings)					Adjustable (8 settings)							
		2...10 x Ir					2...10 x Ir							
Instantaneous	<b>Ii</b>	Fixed					Fixed							
			≥ 11 x In					≥ 7 In						
Time delay (ms)	Short-time		Fixed					Fixed						
Overload indication			2 thresholds					2 thresholds						
			95 %, 105 % x Ir					95 %, 105 % x Ir						
Electronic trip units (NR400/630)			STR23SE			STR23SE OSN			STR53UE					
Tripping thresholds (A)	Long-time	<b>Ir</b>	Adjustable (48 settings)			Adjustable (48 settings)			Adjustable (48 settings)					
			0.4...1 x In			0.25...0.63 x In			0.4...1 x In					
	Tripping time at 1.5 Ir (s)	<b>Ist</b>	Fixed			Fixed			Adjustable (5 settings)					
			90...180			90...180			8...15, 34...50, 69...100, 138...200, 277...400					
Short-time	<b>Ist</b>	Adjustable (8 settings)			Adjustable (8 settings)			Adjustable (8 settings)						
		2...10 x Ir			2...10 x Ir			1.5...10 x Ir						
Instantaneous	<b>Ii</b>	Fixed			Fixed			Adjustable (8 settings)						
			≥ 11 x In			≥ 7 x In			1.5...11 x In					
Time delay (ms)	Short-time		Fixed			Fixed			Adjustable (4 settings with or without I <sup>2</sup> t constant)					
Overload indication			2 thresholds			2 thresholds			2 thresholds					
			95 %, 105 % x Ir			95 %, 105 % x Ir			95 %, 105 % x Ir					

(1) SE only.

## Protection discrimination

The Compact NR range provides, as standard, discrimination between two circuit breakers installed in series.

In this way, Compact NS offers unsurpassed continuity of service in the event of a fault.

The table below shows some circuit breaker combinations featuring, as standard, total discrimination between two circuit breakers.

Downstream breaker	Upstream breaker				
	NR100	NR160	NR250	NR400	NR630
C60		T	T	T	T
NR100			T	T	T
NR160				T	T
NR250					T

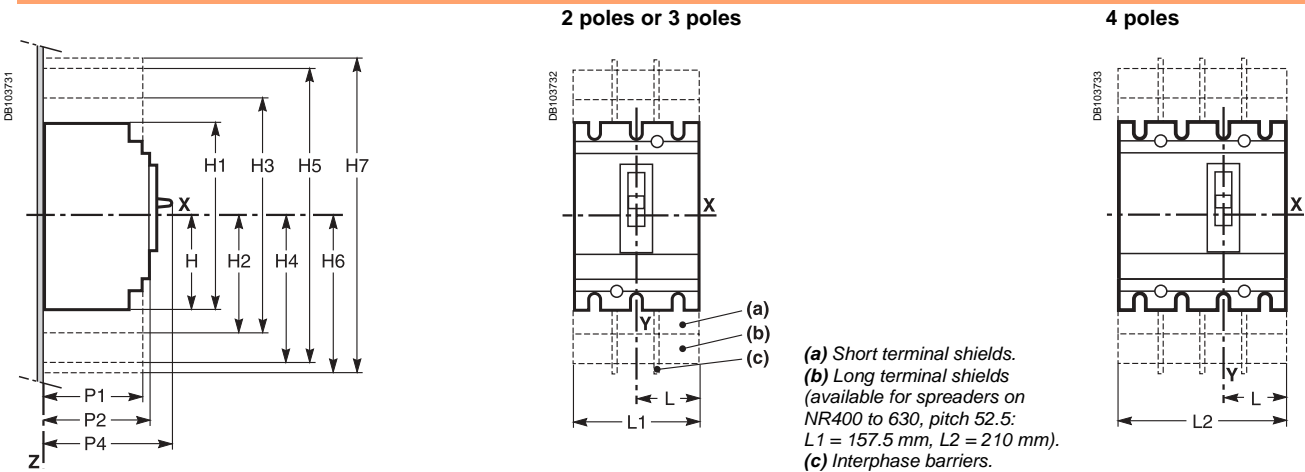
T: total discrimination.

# Earth fault protection

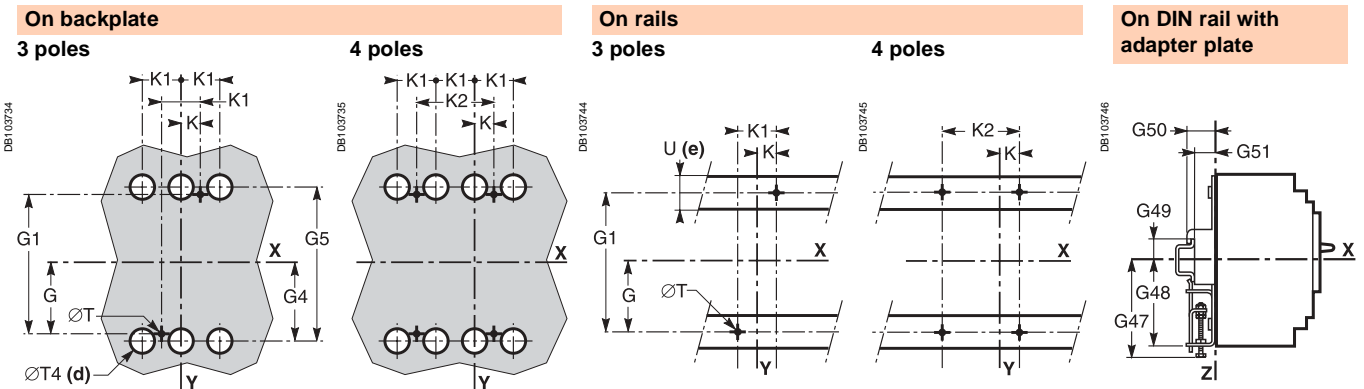
Add-on Vigi earth-fault protection module		Vigi MH (NR100-250F)	Vigi MB (NR400-630F)
Sensitivity	I $\Delta$ n (A)	Adjustable 0.03 - 0.3 - 1 - 3 - 10	Adjustable 0.3 - 1 - 3 - 10 - 30
Time delay	(ms)	Adjustable 0 - 60 - 150 - 310	Adjustable 0 - 60 - 150 - 310
Rated voltage	50/60 Hz min./max.	200/400 V 440/550 V	200/400 V 440/550 V

## Dimensions

### Dimensions

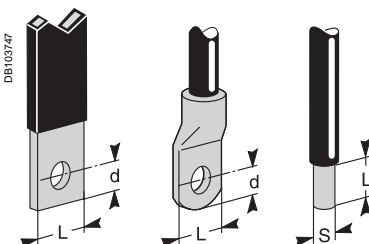


### Mounting



### Installation and connection

Users can easily adapt Compact NR circuit breakers for bare cable connection or rear connection.

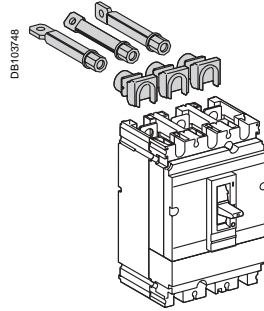


#### Connection of fixed front-connected circuit breakers

	NR100/160/250		NR400/630	
			Without spreader	With spreader
<b>Bars or cables with lugs</b>				
Pitch (mm)	35		45	52.5 or 70
L (mm)	≤ 25		≤ 32	≤ 40
d (mm)	≤ 10		≤ 15	≤ 20
Screws	M6 (NR100) M8 (NR160/250)		M10	M12
<b>Bare cables</b>				
Number of cables	1		1	2
L (mm)	20		20	30/60
S (mm <sup>2</sup> )	Min.	1.5	35	2 x 85
	Max.	95 (NR100/160) 185 (NR250)	300	2 x 240

# Dimensions (cont.)

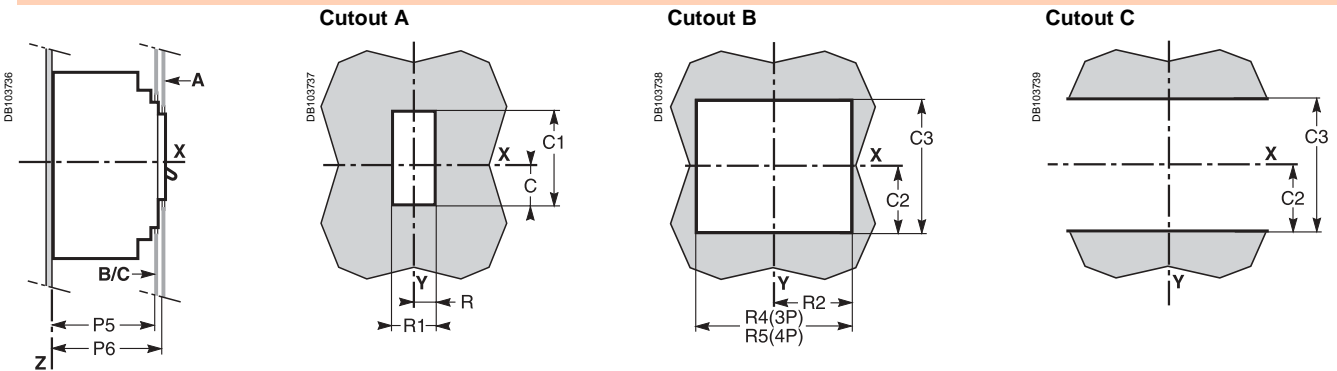
## Installation and connection (cont.)



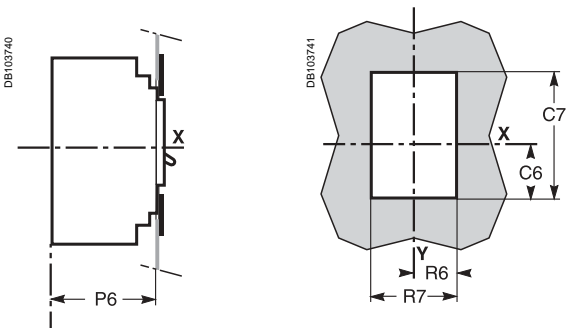
Rear-connected circuit breaker.

## Front-panel cutouts

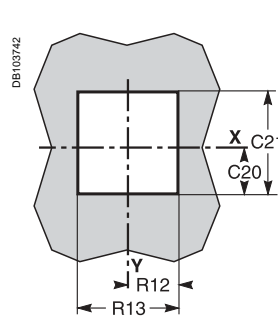
### Fixed circuit breaker



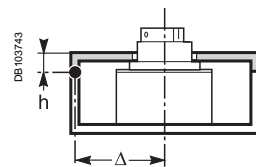
### With escutcheon



### With toggle cover



Note: door cutout dimensions are given for a device position in the enclosure where  $\Delta \geq 100 + (h \times 5)$  with respect to the door hinge.



### Dimensions (mm)

Type	C	C1	C2	C3	C6	C7	C20	C21	G	G1	G4
NR100/160/250	29	76	54	108	43	104	34	86	62.5	125	70
NR400/630	41.5	116	92.5	184	56.5	146	46.5	126	100	200	113.5

Type	G5	G47	G48	G49	G50	G51	H	H1	H2	H3	H4
NR100/160/250	140	95	75	13.5	23	17.5	80.5	161	94	188	160.5
NR400/630	227	-	-	-	-	-	127.5	255	142.5	285	240

Type	H5	H6	H7	K	K1	K2	L	L1	L2	P1	P2
NR100/160/250	321	178.5	357	17.5	35	70	52.5	105	140	81	86
NR400/630	480	237	474	22.5	45	90	70	140	185	95.5	110

Type	P4	P5	P6	R	R1	R2	R4	R5	R6	R7	R12
NR100/160/250	111 (1)	83	88	14.5	29	54	108	143	29	58	43
NR400/630	168	107	112	31.5	63	71.5	143	188	46.5	93	63

(1) P4 = 126 mm for Compact NR250.

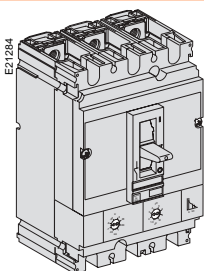
Type	R13	ØT	ØT4	U
NR100/160/250	86	6	22	≤ 32
NR400/630	126	6	32	≤ 32

## Catalogue numbers

### NR100F to NR630F: complete fixed/FC device

#### Compact NR100/160/250F

With thermal-magnetic trip unit TM-D



##### Compact NR100F (25 kA at 380/415 V)

Rating	3P 3d	4P 3d	4P 4d
TM16D	29069	29139	29199
TM25D	29068	29138	29198
TM32D	29067	29137	29197
TM40D	29066	29136	29196
TM50D	29065	29135	29195
TM63D	29064	29134	29194
TM80D	29063	29133	29193
TM100D	29062	29132	29192

##### Compact NR160F (25 kA at 380/415 V)

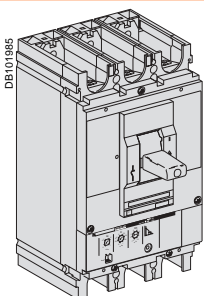
Rating	3P 3d	4P 3d	4P 4d
TM80D	30763	30753	30758
TM100D	30762	30752	30757
TM125D	30761	30751	30756
TM160D	30760	30750	30755

##### Compact NR250F (25 kA at 380/415 V)

Rating	3P 3d	4P 3d	4P 4d
TM125D	31763	31768	31778
TM160D	31762	31767	31777
TM200D	31761	31766	31776
TM250D	31760	31765	31775

#### Compact NR400/630F

With electronic trip unit STR23SE

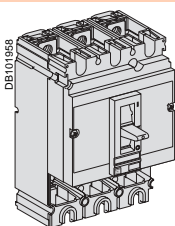


	3P 3d	4P 3d, 4d, 3d + N/2
Compact NR400F (36 kA at 380/415 V)	32740	32741
Compact NR630F (36 kA at 380/415 V)	32940	32941

### NR100F to NR630F: fixed/FC device based on separate components

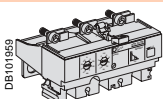
#### Compact NR100 to NR630F

Basic frame



	3P	4P
NR100F	29001	29002
NR160F	30401	30402
NR250F	31401	31412
NR400F	32873	32874
NR630F	32891	32892

+ Trip unit



##### Standard protection: trip unit TM-D for NR100-NR250

Rating	3P 3d	4P 3d	4P 4d	4P 3d + N/2
TM16D	29035	29045	29055	
TM25D	29034	29044	29054	
TM32D	29037	29047	29057	
TM40D	29033	29043	29053	
TM50D	29036	29046	29056	
TM63D	29032	29042	29052	
TM80D <sup>(1)</sup>	29031	29041	29051	29061
TM100D <sup>(1)</sup>	29030	29040	29050	29060
TM80D <sup>(2)</sup>	30433	30443	30453	30463
TM100D <sup>(2)</sup>	30432	30442	30452	30462
TM125D	30431	30441	30451	30461
TM160D <sup>(3)</sup>	30430	30440	30450	30460
TM160D <sup>(4)</sup>	31432	31442	31452	31462
TM200D	31431	31441	31451	31461
TM250D	31430	31440	31450	31460

(1) For NR100.  
(2) For NR160/250.

(3) For NR160.  
(4) For NR250.

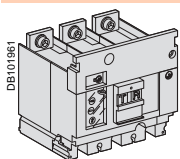
## Catalogue numbers (cont.)

### NR100F to NR630F: fixed/FC device based on separate components (cont.)

#### + Trip unit (cont.)

Standard protection: electronic trip unit for NR100-NR250				for NR400-NR630	
Rating	3P 3d	4P 3d, 4d, 3d + N/2	Rating (U ≤ 525 V)	3P, 4P 3d, 4d, 3d + N/2	
STR22SE - 40 A	29072	29082	STR23SE	32420	
STR22SE - 80 A <sup>(1)</sup>	30471	30481	STR53UE F	32424	
STR22SE - 100 A	29070	29080	STR53UE FTI	32425	
STR22SE - 160 A	30470	30480	STR53UE FI	32426	
STR22SE - 250 A	31470	31480	STR53UE FTI <sup>(2)</sup>	32429	
Standard protection with oversized neutral: electronic trip unit SE OSN for NR100-NR250				for NR400-NR630	
Rating		4P 3d, 3d + 1,6N	Rating (U ≤ 525 V)	4P 3d, 3d + 1,6N	
STR22SE OSN 160 A - 3 x φ 100 A <sup>(1)</sup>		30466	STR23SE OSN	32443	
STR22SE OSN 250 A - 3 x φ 160 A <sup>(3)</sup>		31481			
Type G protection: trip unit TM-G for NR100-NR250					
Rating	3P 3d	4P 4d			
TM16G	29155	29165			
TM25G	29154	29164			
TM40G	29153	29163			
TM63G	29152	29162			
Type G protection: electronic trip unit GE for NR100-NR250					
Rating	3P 3d	4P 3d, 4d, 3d + N/2			
STR22GE - 40 A	29076	29086			
STR22GE - 100 A	29075	29085			
STR22GE - 160 A	30475	30485			
STR22GE - 250 A	31475	31485			
STR53UE options					
COM wiring				32441	
ZSI wiring				32442	

#### + Vigi module



For NR100-250			3P	4P
ME type	for NR100/160 (220 to 440 V)		29212	29213
MH type	for NR100/160 (220 to 440 V)		29210	29211
	for NR250 (220 to 440 V)		31535	31536
	for NR100/160 (440 to 550 V)		29215	29216
	for NR250 (440 to 550 V)		31533	31534
Connection for a 4P Vigi on a 3P breaker				29214
For NR400-630			3P	4P
Type MB	200 to 440 V		32455	32456
	440 to 550 V		32453	32454
Connection for a 4P Vigi on a 3P breaker				32457

#### External CT for earth-fault protection T (NR400/NR630)



For earth fault protection (T) of STR53UE FTI		
Installation on outgoing neutral conductor outside the circuit-breaker		
400 A		36952
630 A		32440







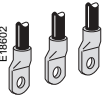
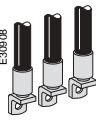
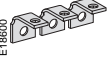

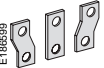

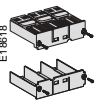

(1) For NR160/250.

(2) For external neutral CT: allows the connection of an external neutral CT for 3P breakers equipped with "earth fault" protection (T).

(3) For NR250.



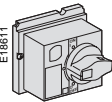
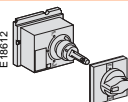
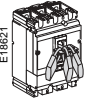
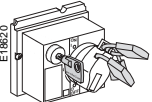

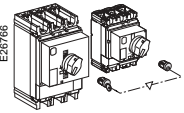

## Catalogue numbers (cont.)

### Accessories

Connection accessories (Cu or Al)			NR100-250F	NR400-630F
<b>Rear connections</b>				
	2 short		29235	32475
	2 long		29236	32476
<b>Bare cable connectors</b>				
	Snap-on, for cable	Steel: 1.5 to 95 mm <sup>2</sup> ; ≤ 160 A	Set of 3	29242
			Set of 4	29243
		Aluminium: 25 to 95 mm <sup>2</sup> ; ≤ 250 A	Set of 3	29227
			Set of 4	29228
		Aluminium: 120 to 185 mm <sup>2</sup> ; ≤ 250 A	Set of 3	29259
			Set of 4	29260
	Voltage plug for 185 mm <sup>2</sup> bare cable connector		Set of 2	29348
	Clips for bare-cable connector		Set of 10	29241
	Distribution connectors for six 1.5 to 35 mm <sup>2</sup> cables with interphase barriers		Set of 3	29248
			Set of 4	29249
	For 1 cable from 35 to 300 mm <sup>2</sup>		Set of 3	32479
			Set of 4	32480
	For 2 cable from 35 to 240 mm <sup>2</sup>		Set of 3	32481
			Set of 4	32482
	Voltage measurement input for bare cable connector		Set of 2	29348
<b>Crimp lugs for copper cable</b>				
	For cable 120 mm <sup>2</sup> for NR100-250F, 240 mm <sup>2</sup> for NR400-630F		Set of 3	29252
			Set of 4	29256
	For cable 150 mm <sup>2</sup> for NR100-250F, 300 mm <sup>2</sup> for NR400-630F		Set of 3	29253
			Set of 4	29257
	For cable 185 mm <sup>2</sup>		Set of 3	29254
			Set of 4	29258
	Supplied with 2 (or 3) interphase barriers			
<b>Crimp lugs for aluminium cable</b>				
	For cable 150 mm <sup>2</sup> for NR100-250F, 240 mm <sup>2</sup> for NR400-630F		Set of 3	29504
			Set of 4	29505
	For cable 185 mm <sup>2</sup> for NR100-250F, 300 mm <sup>2</sup> for NR400-630F		Set of 3	29506
			Set of 4	29507
	Supplied with 2 (or 3) interphase barriers			
<b>Terminal extensions</b>				
	Right-angle terminal extensions		Set of 3	29261
			Set of 4	29262
	Straight terminal extensions (NR100/250F) / Edgewise pads (NR400/630F)		Set of 3	29263
			Set of 4	29264
	Spreaders	45 mm	3P	31563
			4P	31564
		52.5 mm	3P	32490
			4P	32491
		70 mm	3P	32492
			4P	32493
	Supplied with 2 (or 3) interphase barriers			
<b>Terminal shields</b>				
	Short (1 pair)		3 P	29321
			4 P	29322
	Long (1 pair)		3 P	29323
			4 P	29324
Long for spreaders, 52.5 mm (supplied with insulating plate)		3 P	32582	
		4 P	32583	
	Interphase barriers		Set of 6	29329
				32570

## Catalogue numbers (cont.)

### Accessories (cont.)

Electrical auxiliaries		NR100 to 630 F		
<b>Auxiliary contacts (changeover)</b>				
	OF or SD or SDE or SDV	29450		
	OF or SD or SDE or SDV low level	29452		
	SDE adapter for trip unit TM (for NR100F to NR250F)	29451		
<b>Voltage releases</b>				
	AC	Voltage	MX	MN
		24 V 50/60 Hz	29384	29404
		48 V 50/60 Hz	29385	29405
		110-130 V 50/60 Hz	29386	29406
		220-240 V 50/60 Hz and 208-277 V 60 Hz	29387	29407
		380-415 V 50 Hz and 440-480 V 60 Hz	29388	29408
	DC	Voltage	MX	MN
		12 V	29382	29402
		24 V	29390	29410
		30 V	29391	29411
		48 V	29392	29412
		60 V	29383	29403
	125 V	29393	29413	
	250 V	29394	29414	
<b>Rotary handles</b>		<b>NR100-250F</b>	<b>NR400-630F</b>	
<b>Direct rotary handles</b>				
	Standard black handle	29337	32597	
	Red handle on yellow front	29339	32599	
<b>Standard extended rotary handle</b>				
	Standard extended rotary handle	29338	32598	
	Red handle on yellow front	29340	32600	
<b>Accessories</b>				
	Indication auxiliary	1 early-break contact	29345	32605
		2 early-make contacts	29346	29346
	Early-make wiring terminal		29336	
<b>Locks</b>		<b>NR100-250F</b>	<b>NR400-630F</b>	
<b>Toggle locking device for 1 to 3 padlocks</b>				
	By removable device	29370	29370	
	By fixed device	29371	32631	
	Keylock adapter (keylock not included)	29344	32604	
	Keylock (keylock adapter not included)	Ronis 1351B.500	41940	
		Profalux KS5 B24 D4Z	42888	
			42888	
<b>Interlocking</b>		<b>NR100-250F</b>	<b>NR400-630F</b>	
<b>Mechanical interlocking for circuit breakers</b>				
	With toggles	29354	32614	
	With rotary handle	29369	32621	
<b>Interlocking with key (2 keylocks / 1 key) for rotary handles</b>				
	Keylock kit (keylock not included)	(1)	29344	32604
	1 set of 2 keylocks	Ronis 1351B.500	41950	41950
	(1 key only, keylock kit not included)	Profalux KS5 B24 D4Z	42878	42878
	(1) For only 1 device.			
<b>Installation accessories</b>		<b>NR100-250F</b>	<b>NR400-630F</b>	
<b>Front-panel escutcheons</b>				
	Toggle	29315	32556	
	Rotary handle or escutcheon collar, IP40	29317	32558	