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Hydraulic Magnetic Circuit Breaker

2016 Edition

Nader

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Nader

1. Product Overview

				
Product Models	**NDB3-30**	**NDB3-50**	**NDB3-100**	**NDB5**
Operating Voltage	DC80V AC250V	DC80V AC230/400V	DC80V AC230/400V	DC80V AC230/400V
Product Certification	3C、CE、TUV、UL1077、UL489A	3C、CE、TUV、UL1077、UL489A、 UL1500	3C、CE、TUV、UL1077、UL489A、Korea KC	3C、CE、TUV、UL1077、UL489A

2. Product Features

● Scope of Application and Purpose

NDB3-30, 50 and 100 series of circuit breakers for equipment (hydraulic electromagnetic type) are applicable to electric power systems with rated current of up to 100A and rated voltages of AC480/277V (50/60Hz) and DC125V and below.

NDB5 circuit breakers for equipment are applicable to electric power systems with rated current of 0.5~63A and multi-pole parallel to 150A and rated voltages of AC230/400V, AC250V, AC480/277V (50/60Hz) or DC80V and below

The products can be used for overload and short circuit protection or non-frequent contact and breaking. They are widely used in computers and their peripheral equipment, industrial automation systems, telecommunication equipment, universal power supply systems, UPS equipment, railway locomotives, marine electrical systems, aerospace, control systems for elevators and mobile power equipment.

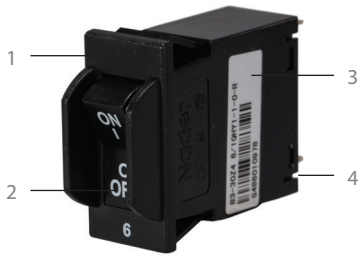
● Design Features

- Hydraulic electromagnetic tripping device is used, so that the overloaded tripping and short circuit tripping are integrated, and it is also called full electromagnetic circuit breaker;
- Tripping performance depends only on the magnetic flux generated from the current flowing through the coil and suffers little impact from the changes in environmental temperature; therefore, capacity reduction due to

high temperature may not be taken into account;

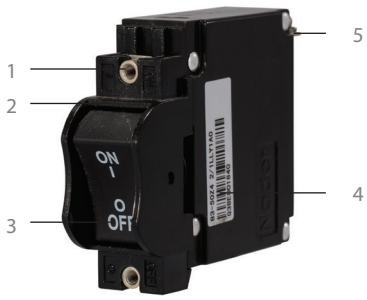
- The circuit breaker has no thermal element, does not require cooling time, and can immediately re-close as long as the fault current disappears;
- Hydraulic oil viscosity is affected by temperature changes: at a low temperature, the viscosity is high, and the delay time is long, so during the start-up of equipment at the cold status, it can provide sufficient additional time; at a high temperature, the viscosity is low, the delay time is short, and the circuit breaker can quickly trip to protect the heating load; therefore, this "inverse time lag" is conducive to overload protection;
- The opening distance of moving contact and stationary contact of circuit breaker is large (no less than 4.8mm for Model 30, no less than 8.5mm for Model 50, and no less than 10mm for Model 100), the shell is made of materials with excellent insulation performance, and it may also be used as safe switch isolator;
- The tripping characteristic of circuit breaker is determined by both coil and Hydraulic Magnetic, and the operating characteristic of circuit breaker may be changed by changing the parameters of Hydraulic Magnetic and coil. Therefore, the current specifications and tripping curves learned by users are derived conveniently;
- Current setting is precise and repetitive error of operation is low;
- Wiring modes are diversified, including screw-type, lug-type, plug-in wiring terminal, upturned lug screw type, bolt type and the like, which facilitate the selection by users according to the actual needs;
- Installation modes are diversified, including screw type installation and embedded-type installation, which can be easily integrated into the equipment;
- Operation modes are diversified, including long handle, short handle and rocker operation, which can be selected depending on different design situations to ensure the safe operation of the equipment;
- Compact, small and exquisite, space saving.

Structural Features



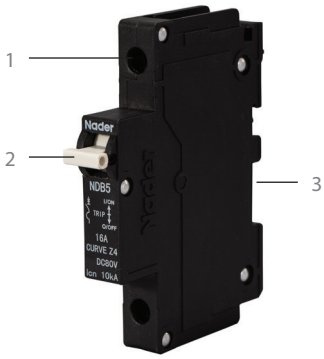
NDB3-30 mechanism features

1. Installation outer cover
2. Key
3. Nameplate
4. Wiring terminal



NDB3-50/100 mechanism features

1. Mounting nut
2. Installation seat
3. Button
4. Nameplate
5. Wiring terminal at the back



NDB5 mechanism features

1. Wiring nut
2. Operating handle
3. Installation guide rail

● Working Principle

Working principle of hydraulic electromagnetic tripper

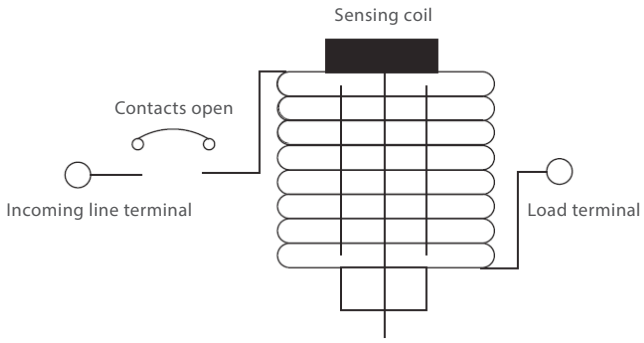


Figure 1

★ The circuit breaker uses a hydraulic electromagnetic tripper to realize short circuit and overload protection tripping. A "series tripping" mechanism is used and it consists of a current sensing coil and a set of contacts in series. (See Figure 1)

★ Inside the coil, there is a non-magnetic delay tube-Hydraulic Magnetic tube within which there are iron core, spring and damping liquid. The armature connects the contacts and coil mechanism; when the contacts are open, there is no current flowing through the circuit breaker, and the coil does not generate electromagnetic force. When the contacts are closed, there is a current flowing through.

◆ When it is less than or equal to the rated current

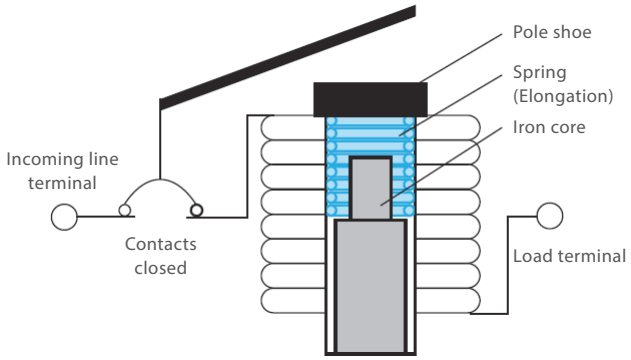


Figure 2

★ When the current is less than or equal to the rated value of the circuit breaker, the magnetic flux of coil is not sufficient to attract the iron core to the pole shoe. Iron core and armature stay still and all the contacts remain closed. (see Figure 2)

◆ Overload tripping

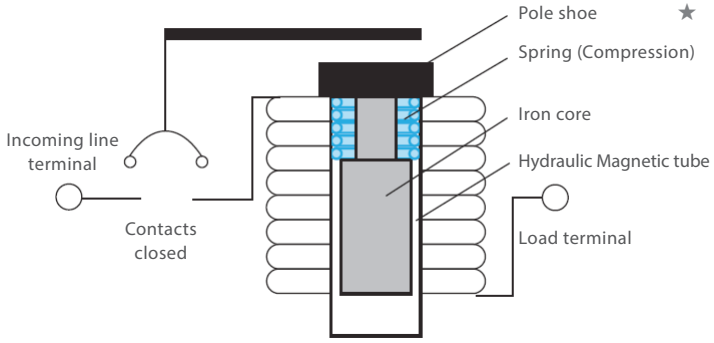


Figure 3

★ When overload occurs, i.e., the current is greater than the rated value of the circuit breaker, the coil's attraction increases so that the iron core begins to move toward the pole shoe, during which the reluctance in the Hydraulic Magnetic tube decreases and the magnetic force increases gradually, attracting the iron core to the pole shoe surface, and by virtue of the attraction, the armature is attracted to the pole shoe, releasing the lock catch, opening the contacts and operating the circuit breaker. (See Figure 3)

◆ Short-circuit tripping

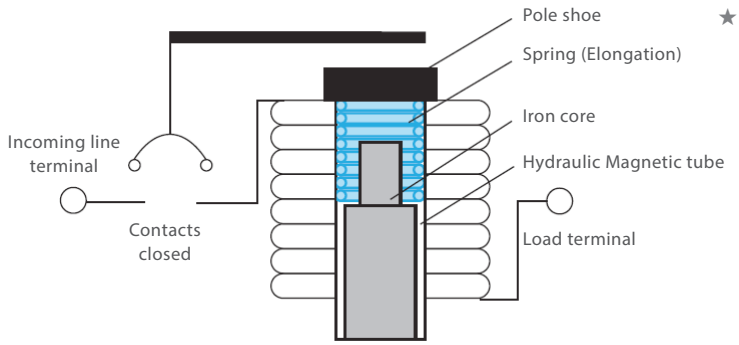


图4

★ In case of a large overload or short circuit current, the resulting force of electromagnetic energy increases rapidly, the coil generates sufficiently large magnetic flux, and before the iron core of Hydraulic Magnetic tube moves, the armature has already been quickly attracted to the pole shoe surface, leading to instantaneous tripping of circuit breaker. This safety device can result in faster tripping response speed in case of short circuit. (see Figure 4)

Hydraulic Magnetic tube action principle diagram

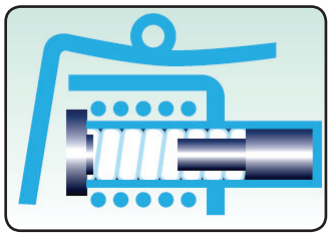


Figure 5

When it is less than or equal to the rated current

When the current is less than or equal to the rated value of the circuit breaker, the magnetic flux of coil is not sufficient to attract the iron core to the pole shoe, and the iron core and armature both stay still.

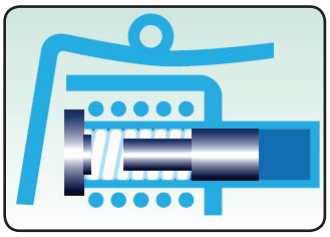


Figure 6

Overload

When the current is greater than the rated value of the circuit breaker and the circuit is overloaded, the electromagnetic force generated by the coil makes the iron core inside the Hydraulic Magnetic move toward the pole shoe, the spring is compressed, and the resistance generated by the damping fluid leads to time delay in movement of iron core, thus realizing the delay protection function.

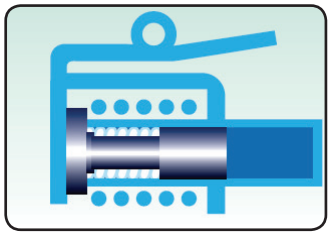


Figure 7

Overload tripping

When the electromagnetic force reaches the set value, the iron core moves to the pole shoe surface, and the armature is attracted to the pole shoe.

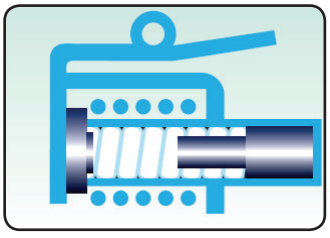


Figure 8

Short-circuit tripping

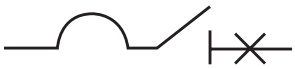
When a large short circuit current appears in a circuit, the coil instantaneously generates large enough magnetic flux that can quickly attract the armature to the pole shoe surface even if the iron core does not move.

● Meeting the following standards

- ◆ GB 17701： Circuit breaker for equipment
- ◆ GB14048.2 Low-voltage switchgear and controlgear Part 2: Circuit breaker
- ◆ IEC 60934： Circuit-Breaker for equipment
- ◆ IEC 60947-2 Low-voltage switchgear and controlgear-Part 2: Circuit-Breaker

3. Application Scope

● Electrical Symbols



● Applicable Environment

- ◆ Temperature of the working environment/storage temperature
  - ★ Temperature of the working environment: -40℃ ~ +85℃; the average value in 24h is not more than 35℃.
  - ★ Storage temperature: -40℃ ~ +85℃.
- ◆ Altitude

  Installation site altitude ≤ 2,000m.
- ◆ Relative humidity for operation/Relative humidity for storage

  The relative humidity of atmosphere is not more than 50% at the ambient air temperature of +40℃; at a lower temperature, a higher relative humidity is allowed, for example, 90% at 20℃. Special measures should be taken to deal with occasional condensation due to temperature change.

● Pollution Grade

2 poles

● Protection Grade

Product protection grade: IP20

● Anti-Vibration Requirements

- ◆ Vibration and shock parameters (without load):
- ◆ Vibration parameters: Carry out frequency sweep at the sine wave frequency range of 8Hz~500Hz~8Hz, with the acceleration of 3g;
- ◆ Shock: The shock pulse period is 30ms, and the shock is 30g

● Use Class

Class B

● Installation Category

Category III (power distribution and control level)

● Environmental Protection Requirements

Products meet the ROHS standard.

4. Technical Characteristics of The Product

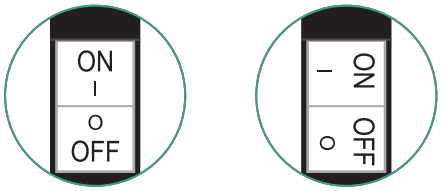
4.1 NDB3-30 Series

4.1.1 Description of Product Model and Its Meaning

ND	B	3-	□	□	□/□	□	□	□-□-□-□	□	□
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Serial No.	Serial No. Name	NDB3-30
1	Enterprise code	ND : Nader brand low-voltage apparatus
2	Product code	B : Circuit breaker for equipment
3	Design serial No.	3
4	Frame grade	30
5	Tripping curve code	Z2: DC short time delay; Z4: DC medium time delay; J2: AC short time delay; J4: AC medium time delay
6	Conventional product Rated current （A）	0.1 , 0.2 , 0.3 , 0.4 , 0.5 , 0.6 , 0.7 , 0.75 , 0.8 , 0.9 , 1 , 1.5 , 2 , 2.5 , 3 , 3.5 , 4 , 4.5 , 5 , 5.5 , 6 , 6.5 , 7 , 7.5 , 8 , 8.5 , 9 , 9.5 , 10 , 11 , 12 , 13 , 14 , 15 , 16 , 17 , 18 , 19 , 20 , 21 , 22 , 23 , 24 , 25 , 26 , 27 , 28 , 29 , 30
	Lightning protection product Rated current （A）	10 , 11 , 12 , 13 , 14 , 15 , 16 , 17 , 18 , 19 , 20 , 21 , 22 , 23 , 24 , 25 , 26 , 27 , 28 , 29 , 30
7	Number of poles	1: 1 pole; 2: 2 poles
8	Installation mode code	Q : Embedded type installation
9	Wiring mode code	H : Welded/Lug type wiring C : Plug-in wiring terminal for wiring E : 8-32UNC screw wiring J : 8-32UNC upturned lug screw wiring P : M4screw wiring R : M4 upturned lug screw wiring
10	Operation mode code	Y1 : Black rocker, vertical white ; Y2 : Black rocker, horizontal white Y3 : White rocker, vertical black; Y4 : White rocker, horizontal black; Y5 : Orange rocker, vertical black; Y6 : Orange rocker, horizontal black Y7 : Red rocker, vertical black; Y8 : Red rocker, horizontal black
11	Shell color code	1: Black; 2:Grey; 3: Black without operation protection; 4: Grey without operation protection
12	Accessory code	0: No accessories
13	Other certification codes	Blank: 3C, TUV, CE certification R: Passing 3C, CE, TUV, UL1077 certification L: Passing 3C, CE, TUV, UL489A certification
14	Categories of special functional accessories	FL: Lightning protection product (Unipolar)
15	Customer code	Customer code (Additional options)

Schematic diagram of operation mode:



4.1.2 Technical Parameters

- Rated operational voltage: AC250V(50/60Hz)，DC80V，DC65V
- Mechanical and electrical life: 10,000 times (Wherein electrical life is 6,000 times)，
  Operating frequency: 6 times/1min
- Power frequency withstand voltage: 2,500V
- Free tripping characteristic: Completely free tripping
- Lightning protection parameters: In an electrical system with the rated voltage of AC250V or DC80V and below, when the products meet their respective rated current specifications, the positive/negative is subject to 5 times of 8/20us lightning test waveform impact; during the whole process of lightning test, no product should be damaged, and normal tripping should follow the lightning test.

Rated current（A）	Lightning test parameters (kA)
10≤I < 15	10
15≤I < 20	12
20≤I ≤30	15

- Certification passed: CCC, CE, TUV, UL1077, UL489A
- Rated breaking capacity Icn: See the following table:

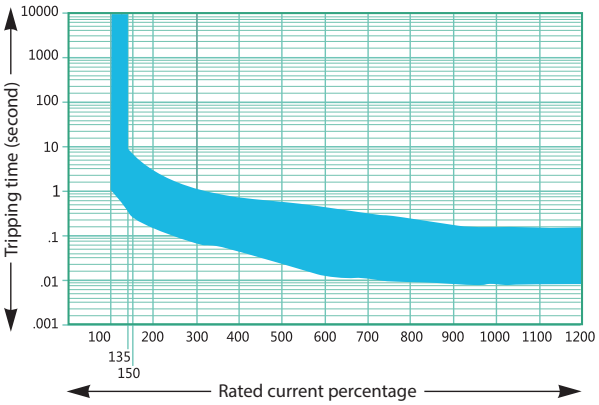
Rated voltage (V)	Frequency	Rated current (A)	Number of poles	Rated short-circuit breaking capacity (A)					
				3C(GB17701)		UL1077	UL489A	TUV/CE(EN60934)	
				Inc	Icn				Icn
AC250V	50/60Hz	0.1-30	1、2	1500	1000	1000，U1	/	1500	1000
DC80V	/	0.1-30	1、2	1000	600	1000，U1	/	1000	600
DC80V	/	0.1-30	1	/	/	/	600	/	/
DC65V	/	0.1-30	1	/	/	/	1000	/	/

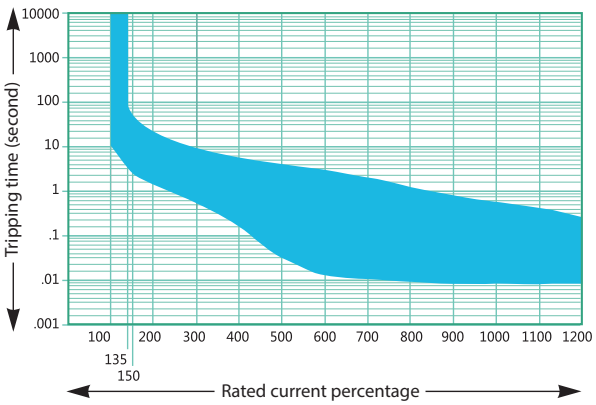
4.1.3 Product Tripping Curve

Tripping schedule

Current / Curve	In	135% In	200% In	600% In	1000% In
Z2/J2	No trip	0.3-7	0.1-2	0.008-0.3	0.005-0.1
Z4/J4	No trip	3-70	1-15	0.008-2	0.005-0.35

Tripping curve





4.2 NDB3-50 Series Products

4.2.1 Description of Product Model and Its Meaning

ND	B	3-	□	□	□/	□	□	□	□	□	□	□	□①□②□③□④	-□
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Serial No.	Serial No. Name	NDB3-50
1	Enterprise code	ND : Nader brand low-voltage apparatus
2	Product code	B : Circuit breaker for equipment
3	Design serial No.	3
4	Frame grade	50
5	Tripping curve code	Z2 DC short time delay Z4 DC medium time delay Z6 DC long time delay J2 AC short time delay J4 AC medium time delay J6 AC long time delay
6	Rated current （A）	0.5、1、2、2.5、3、4、5、6、7、8、9、10、12、 15、16、20、24、25、30、32、35、40、45、50
7	Number of poles	1 1pole ; 2 2 poles; 3 3 poles (only for AC products)
8	Installation mode code	L M3 screw installation Q embedded type installation M 6-32UNC screw installation
9	Wiring mode code	C plug-in wiring terminal (Conventional≤50A, UL489≤30A) E 8-32UNC screw terminal (Conventional≤30A, UL489≤20A) F M5 upturned lug screw terminal (Conventional≤50A, UL489≤30A) G 10-32UNF screw terminal (Conventional≤50A, UL489≤30A) H quick lug terminal (Conventional≤30A, UL489≤20A) J 8-32UNC upturned lug screw terminal (Conventional≤30A, UL489≤20A) K 10-32UNF upturned lug screw terminal (Conventional≤50A, UL489≤30A) L M5 screw terminal (Conventional≤50A) N vertical M5 screw wiring terminal (Conventional≤50A, UL489≤30A) P M4 screw terminal (Conventional≤30A, UL489≤20A) R M4 upturned lug screw terminal (Conventional≤30A, UL489≤20A)

10	Operation mode code	S1 black long handle, white: ON/OFF, with current specifications S2 black long handle, white: ON/OFF, I/O, with current specifications S3 white long handle, black: ON/OFF, with current specifications S4 white long handle, black: ON/OFF, I/O, with current specifications S5 yellow long handle, black: ON/OFF, with current specifications S6 yellow long handle, black: ON/OFF, I/O, with current specifications D1 black short handle, white: ON/OFF, with current specifications D2 black short handle, white: ON/OFF, I/O, with current specifications D3 white short handle, black: ON/OFF, with current specifications D4 white short handle, black: ON/OFF, I/O, with current specifications D5 yellow short handle, black: ON/OFF, with current specifications D6 yellow short handle, black: ON/OFF, I/O, with current specifications Y1 unicolor rocker, vertical white: ON/OFF, I/O, with current specifications Y2 unicolor rocker, horizontal white: ON/OFF, I/O, with current specifications Y3 unicolor rocker, vertical white: ON/OFF, I/O Y4 unicolor rocker, horizontal white: ON/OFF, I/O Y5 bicolor rocker, vertical white: ON/OFF, I/O, ON indicated, with current specifications Y6 bicolor rocker, horizontal white: ON/OFF, I/O, OFF indicated, with current specifications Y7 bicolor rocker, vertical white: ON/OFF, I/O, OFF indicated, with current specifications Y8 bicolor rocker, horizontal white: ON/OFF, I/O, OFF indicated, with current specifications A1 black button, white vertical double word: ON/OFF, I/O, OFF indicated, with current specifications, ☐ White indicates OFF, OFF position with protection A2 black button, white vertical double word: ON/OFF, I/O, OFF indicated, with current specifications, ☐ White indicates OFF A4 black button, white vertical double word: ON/OFF, I/O, OFF indicated, with current specifications, ☐ White indicates OFF	
11	Operator number code	A one per pole B one for multipole (two poles and above)	
12	Accessory code	0 No accessories 1 With auxiliary contacts (subject to installation direction and installed on the left-most pole)	
13	Shell code	0 Shell handle operating surface is convex 1 Shell handle operating surface is concave (only applicable to handle type)	
14	Certification code	No code	CCC、TUV、CE certification
		R	CCC、TUV、CE、UL1077
		L	CCC, TUV, CE, UL489A (only for DC products)
		I	UL1500 certification
		K	CCC, TUV, CE certification, UL489 (only for AC products)
		K1	CCC, TUV, CE certification, UL489 (only for AC products with 2 poles)
15	Categories of special functional accessories	Anti-surge	YL 1 ① ② Instructions: ① Indicates categories of special functional accessories: Anti-surge products; ② Indicates different multiples ; 1 : 12In Note: 1. Number of DC poles of an anti-surge product: 1~2 poles, number of AC poles: 1~3 poles; current specifications: ≤50A

15	Categories of special functional accessories	Double coils	MX 1 2 3 ① ② ③ ④ Instructions: ① Indicates categories of special functional accessories; double coil products ② Indicates different tripping methods and AC and DC; 1: relay tripping, AC; 2: relay tripping, DC; 3: shunt tripping, AC; 4: shunt tripping, DC; ③ Indicates the voltage coil wiring terminal code; 1: welded/quick lug wiring; 2: M4 screw wiring; ④ Indicates control voltage code: 1: 18V; 2: 24V; 3: 32V; 4: 36V; 5: 48V; 6: 65V; 7:110-220V (only for AC) □ Note: 1. Current specifications: ≤50A; number of poles: 1~2 poles; 2. Subject to the installation direction, the auxiliary contact of a product with double coils and two poles is always installed on the rightmost pole; unipolar products are without auxiliary contact;
16	Customer code	Customer code (Additional options)	

Note: 1

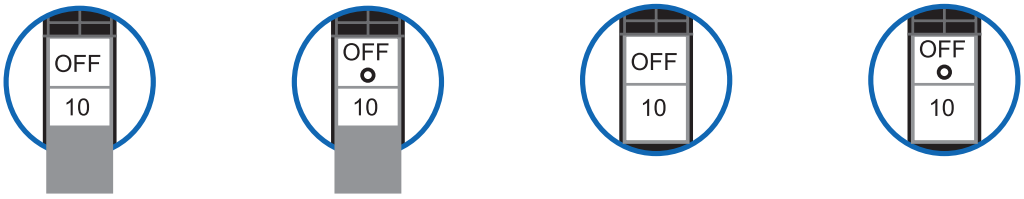
Product certification	3C /TUV/CE			UL1077			UL489A			UL489		
Current specifications (A)	1-30		31-50	1-30		31-50	1-30		31-50	1-20		21
Wiring mode	H、C、L、F、E、J、G、K、P、R		L、C、F、G、K	H、C、L、F、E、J、G、K、P、R		L、C、F、G、K	H、E、J、L、C、F、		L、C、F	H、C、F、E、J、G、K、P、R		C、F、G、K
Operation mode		YA	D	S	YA	D	S	YA	D	S	YA	D
Number of operators	AB	AB	A	AB	AB	A	AB	AB	A	AB	AB	A
Installation mode	LMQ	LM	LMQ	LMQ	LM	LMQ	LMQ	LM	LMQ	LMQ	LM	LMQ
Number of poles	123	123	1	123	123	1	123	123	1	123	123	1

2. The auxiliary contacts are installed on the leftmost pole (opposite to the operating surface).

3. If it is beyond the scope of selection in the table, follow the non-standard procedures.

Note: Graphical analysis of operation mode

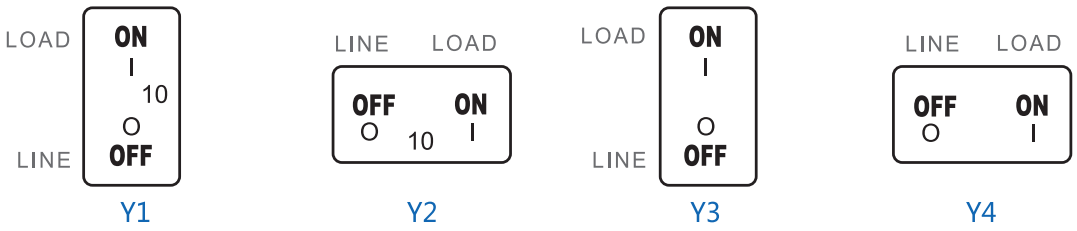
a. Long and short handle operations



S1 (Black)	S2 (Black)	D1 (Black)	D2 (Black)
S3 (White)	S4 (White)	D3 (White)	D4 (White)
S5 (Yellow)	S6 (Yellow)	D5 (Yellow)	D6 (Yellow)

White printing for black handle, black printing for white and yellow handles.

b. Rocker operation

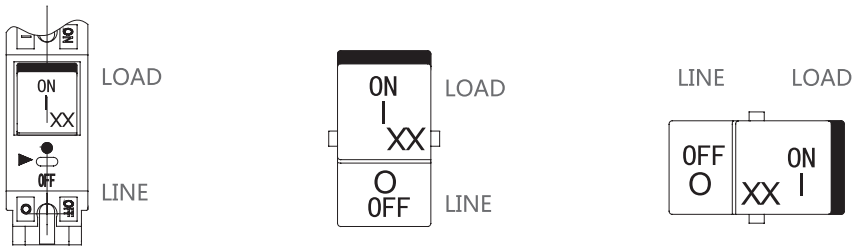


Y1 Y2 Y3 Y4

Y1~Y4 are black rockers with white printing
Y5~Y6 are bicolor rockers indicating "OFF" : Black button, white printing, white indication end face.
Y5~Y6 are bicolor rockers indicating "OFF" : Black button, white printing, white indication end face.

Y5 Y6 Y7 Y8

c. Button operation



A1 (Bicolor indicates OFF) A2 (Bicolor indicates OFF) A4 (Bicolor indicates OFF)

Black button, white printing, white indication end face.

4.2.2 Main Technical Parameters

- Rated operational voltage: DC80V、AC230/400V、AC125/250、AC120/240
- Mechanical and electrical life: 10,000 times (wherein electrical life is 6,000 times)
- Power frequency withstand voltage: 3,000V for main circuit, 1,000V for auxiliary circuit
- Certification passed: CCC, CE, TUV, UL1077, UL489A, UL489, CRCC
- Auxiliary contact parameters: AC250V5A
- Technical parameters of anti-surge (YL) product

  Anti-surge capacity: The product neither trips at 60Hz 12In within 8.33ms nor trips at 50Hz 12In within 10ms;

Rated breaking capacity :

Model	Voltage (V)	Rated current (A)	Number of poles	Rated short-circuit breaking capacity (A)				
				3C (GB17701)	UL1077	UL489A	UL489	TUV/CE (EN60934)
NDB3-50	DC80	1≤In≤30	1、2	3000	3000,U1a	3000	/	3000
		30<In≤50		1500	1500,U1a			1500
	DC65	1≤In≤50	1、2	/	3000,U1a	/	/	/
	DC32	1≤In≤50	1、2	/	5000,U3	/	/	/
	AC240	1≤In≤30	1	4000(L、K) 3000(R、I)	/	/	/	/
		30<In≤50		3000(L、K) 1500(R、I)	/	/	/	/
	AC415	1≤In≤30	2、3	4000(L、K) 3000(R、I)	/	/	/	/
		30<In≤50		3000(L、K) 1500(R、I)	/	/	/	/
	AC250	1≤In≤30	1	/	5000,C1a 3000,U1a	/	/	/
		30<In≤50			1000,U1a			
	AC 125/250	1≤In≤30	2	/	3000,U1a	/	/	/
		30<In≤50			2000,U3			
	AC250 3Φ	1≤In≤30	3	/	5000,U1a	/	/	/
		30<In≤50			1000,U3			
	AC120	1≤In≤30	1	/	/	/	5000	/
	AC120/240	1≤In≤30	2、3	/	/	/	5000	/

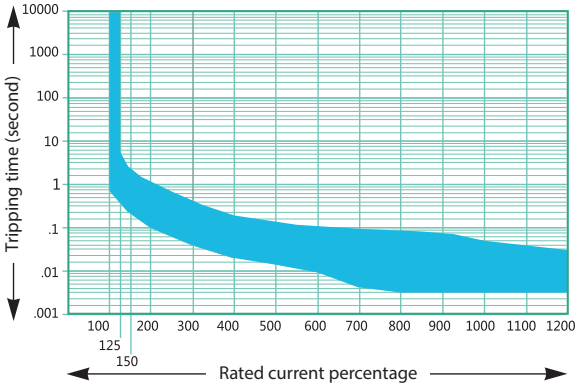
Note: “L, K, R and I” indicate certification codes; see No.13 in the description of specifications and models for details

4.2.3 Product Tripping Curve

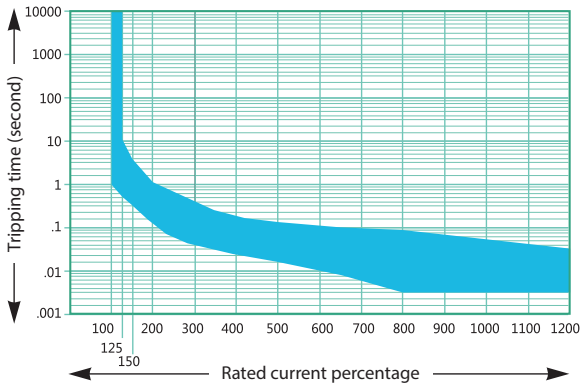
◆ Tripping schedule (unit of time: s)

Current / Curve	In	1.25 In	2 In	6 In	10 In
Z2	No tripping	0.5-6.5	0.13-1.2	0.008-0.12	0.004-0.06
Z4	No tripping	2-60	0.6-20	0.011-1.3	0.004-0.1
Z6	No tripping	45-345	9-60	0.15-5.8	0.005-1.7
J2	No tripping	0.7-12	0.13-1.3	0.008-0.13	0.004-0.055
J4	No tripping	10-160	2.2-20	0.02-1.3	0.005-0.065
J6	No tripping	50-700	10-90	0.1-7	0.006-2

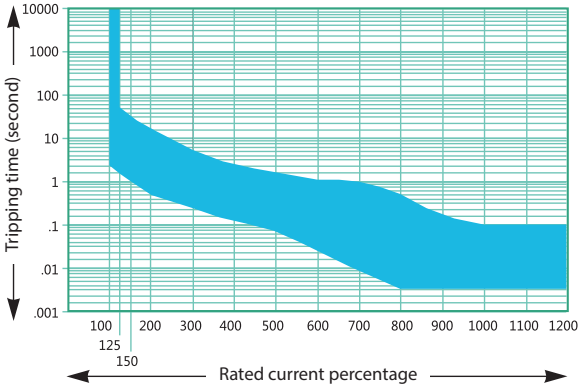
◆ Characteristic curves (10) and (11)



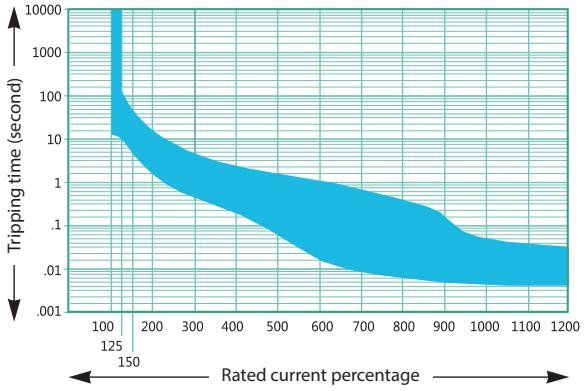
DC Z2 curve



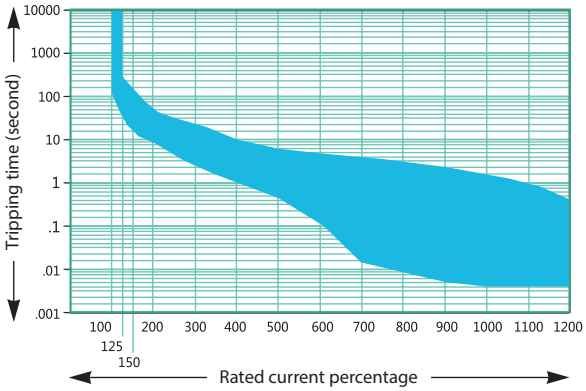
AC J2 curve



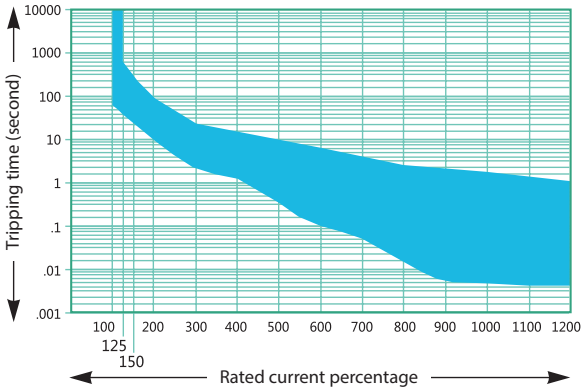
DC Z4 curve



AC J4 curve



DC Z6 curve



AC J6 curve

4.3 NDB3-100 Series Products

4.3.1 Description of Specifications and Models

ND	B	3-	□	□	□/□	□	□	□	□	□	□-□	①□ ②□ ③□ ④□	□
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Serial No.	Serial No. Name	NDB3-100	
1	Enterprise code	ND： Nader brand low-voltage apparatus	
2	Product code	B: Circuit breaker for equipment	
3	Design serial No.	3	
4	Frame grade	100	
5	Tripping curve code	Z2 DC short time delay Z4 DC medium time delay Z6 DC long time delay	J2 AC short time delay J4 AC medium time delay J6 AC long time delay
6	Rated current (A)	Conventional use current specifications	1、2、3、4、5、6、8、10、12、15、16、20、24、25、30、32、35、36、40、45、50、60、70、80、90、100
		Multipole parallel use specifications (only for DC products)	B+ Current specifications: Indicates parallel wiring (3P, 4P) F+ Current specifications: Indicates parallel split wiring (2P, 3P, 4P) P+ Current specifications: Indicates a product with multipole parallel use but without parallel sheet (2P, 3P, 4P) Current Specifications： 2P： 100A、125A、150A、160A、175A、200A 3P： 175A、200A、225A、250A、275A、300A 4P： 275A、300A、325A、350A、375A、400A
		Parallel single coil current specifications	2P： 125A、150A、160A、175A、200A 3P： 200A、225A、250A Note: 1. The auxiliary switches of parallel single coil are subject to the installation direction of the product and are installed on the rightmost side; 2. When the operation mode is Type L, and the number of operators is “A”, Type S/U wiring terminals should be used; 3. For parallel one-coil selection, ① in No. 14 is represented by “DX”.

7	Number of poles	1 1pole ; 2 2 poles; 3 3 poles (For applicable current specifications, see “3.9 Rated breaking capacity table”) 4 4 poles (Current≥275A and only for DC products and for S/L operation mode)
8	Installation mode code	L M3 screw installation; M 6-32 UNC screw installation;
9	Wiring mode code	S: M6 Bolt wiring (Double-nut) T: M5 bolt wiring (Double-nut) (Conventional≤50A, UL489≤30A) V: M5 bolt wiring (Single-nut) (Conventional≤50A, UL489≤30A) L: M5 screw (Conventional≤50A, UL489≤30A) U: M5 bolt wiring (Single-nut) C: Plug-in wiring (Conventional≤100A, UL489≤50A) B: Plug-in wiring (Conventional≤100A, UL489≤50A) H: 1/4-20 UNC bolt wiring (Double-nut) P: 10-32 UNF bolt wiring (Double-nut) (Conventional≤50A, UL489≤30A) W: 10-32 UNF bolt wiring (Single-nut) (Conventional≤50A, UL489≤30A) K: 10-32 UNF Screw (Conventional≤50A, UL489≤30A)
10	Operation mode code	S1 black long handle, white: ON/OFF, with current specifications S2 black long handle, white: ON/OFF, I/O, with current specifications S3 white long handle, black: ON/OFF, with current specifications S4 white long handle, black: ON/OFF, I/O, with current specifications S5 yellow long handle, black: ON/OFF, with current specifications S6 yellow long handle, black: ON/OFF, I/O, with current specifications Y1 unicolor rocker, vertical white: ON/OFF, I/O, with current specifications Y2 unicolor rocker, horizontal white: ON/OFF, I/O, with current specifications Y3 unicolor rocker, vertical white: ON/OFF, I/O Y4 unicolor rocker, horizontal white: ON/OFF, I/O Y5 bicolor rocker, vertical white: ON/OFF, I/O, ON indicated, with current specifications Y6 bicolor rocker, horizontal white: ON/OFF, I/O, OFF indicated, with current specifications Y7 bicolor rocker, vertical white: ON/OFF, I/O, OFF indicated, with current specifications Y8 bicolor rocker, horizontal white: ON/OFF, I/O, OFF indicated, with current specifications A1 black button, white vertical double word: ON/OFF, I/O, ON indicated, with current specifications White indicates OFF, OFF position with protection A2 black button, white vertical double word: ON/OFF, I/O, OFF indicated, with current specifications, ☐ White indicates OFF A4 black button, white vertical double word: ON/OFF, I/O, OFF indicated, with current specifications, ☐ White indicates OFF L1 black long handle, white: ON/OFF L2 black long handle, white: ON/OFF,I/O L3 white long handle, black: ON/OFF L4 white long handle, black: ON/OFF,I/O L5 yellow long handle, black: ON/OFF L6 yellow long handle, black: ON/OFF,I/O
11	Operator number code	A one per pole B one for multipole

12	Accessory code	0 No accessories 1 with auxiliary contacts (subject to the installation direction, auxiliary contacts are installed in the far left)	
13	Certification code	Blank CCC, TUV, CE certification RCCC, TUV, CE, UL1077 certification (only for AC products) LCCC, TUV, CE certification, UL489A listing (only for DC products) KCCC, TUV, CE certification, UL489 Note: AC current specifications are 1~70A, and DC current specifications are 1~100A C South Korea KC certification, CCC, TUV, CE, UL1077 certification (only S/T terminal is used for wiring)	
14	Categories of special functional accessories	Double coils	MX 1 1 1 ① ② ③ ④ Instructions: ① Indicates categories of special functional accessories: Double coil products ② Indicates different tripping methods and AC and DC; 1: Relay tripping, AC; 2: Relay tripping, DC; 3: Shunt tripping, AC; 4: Shunt tripping, DC; ③ Indicates the voltage coil wiring terminal code; 1: M5 Bolt wiring ④ Indicates control voltage code: 1: 18V; 2: 24V; 3: 32V; 4: 36V; 5: 48V; 6: 65V; 7:110V~220V (only for AC); Note: 1. Current specifications: ≤50A; Number of poles is 1 to 2; 2. Auxiliary contacts of a double-coil 2-pole product are subject to the installation direction and are installed in the far right; 3. A unipolar product has no auxiliary contacts.
		Remote control	RB 1 2 ① ② ③ Instructions: ① Indicates categories of special functional accessories: Remote control "product" ② Indicates different control voltages: 1: DC12V; 2: DC24V; 3: DC48V; ③ Indicates different outgoing lines: 0: None; 1: Outgoing line 200mm; 2: Special outgoing line. Note: 1. Current specifications: ≤50A; Number of poles is 1 to 2; 2. Auxiliary contacts of a double-coil 2-pole product are subject to the installation direction and are installed in the far right; 3. A unipolar product has no auxiliary contacts.
		Anti-surge	YL 1 ① ② Instructions: ① Indicates categories of special functional accessories: Anti-surge products; ② Indicates different multiples: 1:12In. Note: 1. The number of DC poles of an anti-surge product is 1~2; ① Indicates categories of special functional accessories: Anti-surge products; ② Indicates different multiples: 1:12In.
		Intermed-iate trigger	MT 1 ① ② Instructions: ① Indicates categories of special functional accessories: Intermediate trigger product; ② Indicates different alarm contacts: 0: Without alarm contact; 1: With alarm contact. Note: 1. The number of poles of an intermediate trigger product is 1~3; current specifications: ≤100A; 2. If the product has no alarm contact, it is subject to the installation direction and the auxiliary contacts are installed in the far left; 3. If the product has alarm contacts, it is subject to the installation direction and the alarm contacts are installed in the far left; the auxiliary contacts are installed at the second leftmost pole;
		Parallel single coil	DX: Parallel single-coil products (only for the use of DC parallel products)

15	Customer code	Customer code (Additional options)

Note: 1

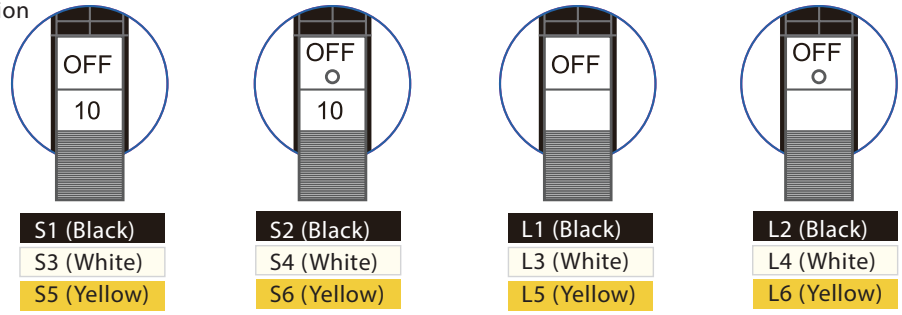
Current specifications（A）	1~100		> 100	
Operation mode		S/Y/A	L	L/Y/A
Wiring mode	S/T/C/U/V/B/L/H/P/W/K	U/V/B/L/W/K	S/U/H/	U
Number of poles	1,2,3	1,2,3	2,3,4	2,3
Number of operators	A	B	A	B

2. If it is beyond the scope of selection in the table, the non-standard procedures shall prevail.

Note: Graphical analysis of operation mode

a. Long handle operation

White printing for black handle, black printing for white and yellow handles.

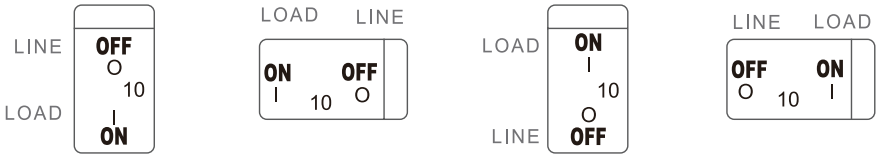


The current specifications of L-shaped handle are imprinted on the shell

b. Rocker operation

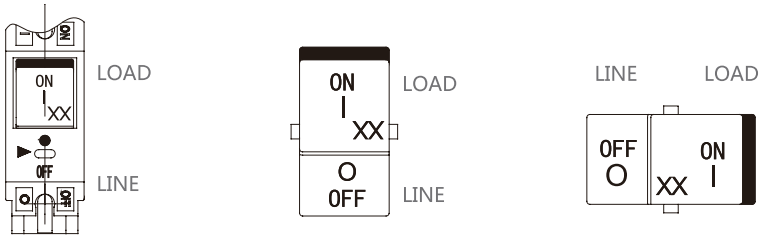
Y1~Y4 are black rockers with white printing

Y5~Y6 are bicolor rockers indicating "OFF": Black button, white printing, white indication end face. Y7~Y8 are bicolor rockers indicating "OFF": Black button, white printing, white indication end face.



c. Button operation

Black button, white printing, white indication end face. Bicolor indicates OFF



4.3.2 Main Technical Parameters

- Rated operational voltage: DC80V、AC230/400V、DC125V
- Mechanical and electrical life: 10,000 times (wherein electrical life is 6,000 times)
- Power frequency withstand voltage: 3,000V for main circuit, 1,000V for auxiliary circuit
- Certification passed: CCC, CE, TUV, UL1077, UL489A, UL489, KC, CRCC
- Parameters of auxiliary contacts/intermediate trigger alarm contacts: AC250V5A
- Technical parameters of remote control (RB) products:

Rated operating voltage and current of remote controller

Specification and model	Rated voltage	Voltage tolerance	Maximum starting current (A)	Maximum running current (A)
RB1	12V	± 20%	1.75	0.60
RB2	24V	± 20%	1.20	0.30
RB3	48V	± 20%	0.5	0.25

- Mechanical and electrical life: Circuit breaker operation times are 4,000;
- Automatic operation rate of remote controller: ≥2s.

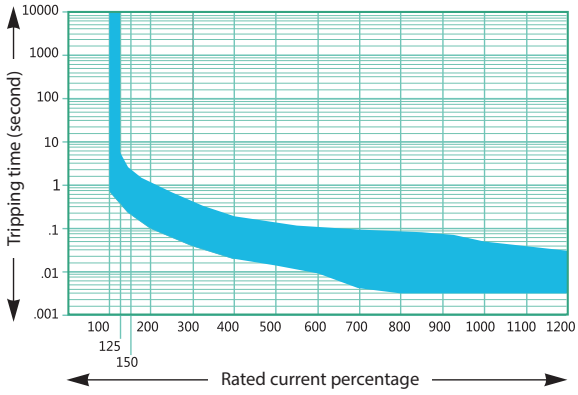
  Namely: During the use, to ensure reliable operation, the power-on time of controller should be at least 2s.
- Technical parameters of anti-surge (YL) product
- Anti-surge capacity: When the frequency is 60Hz, the product withstands 12In within 8.33ms without tripping; when the frequency is 50Hz, the product withstands 12In within 10ms without tripping.

4.3.3 Product Tripping Curve

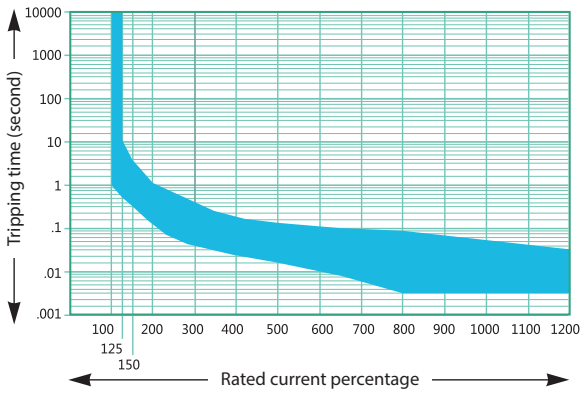
- Tripping schedule (unit of time: s)

Current / Curve	In	1.25 In	2 In	6 In	10 In
Z2	No tripping	0.5-6.5	0.13-1.2	0.008-0.12	0.004-0.06
Z4	No tripping	2-60	0.6-20	0.011-1.3	0.004-0.1
Z6	No tripping	45-345	9-60	0.15-5.8	0.005-1.7
J2	No tripping	0.7-12	0.13-1.3	0.008-0.13	0.004-0.055
J4	No tripping	10-160	2.2-20	0.02-1.3	0.005-0.065
J6	No tripping	50-700	10-90	0.1-7	0.006-2

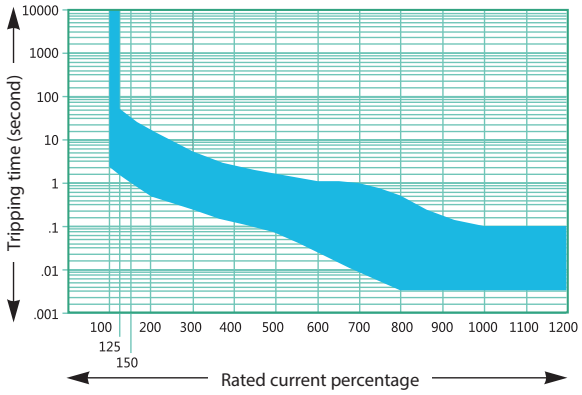
◆ Characteristic curves (10) and (11)



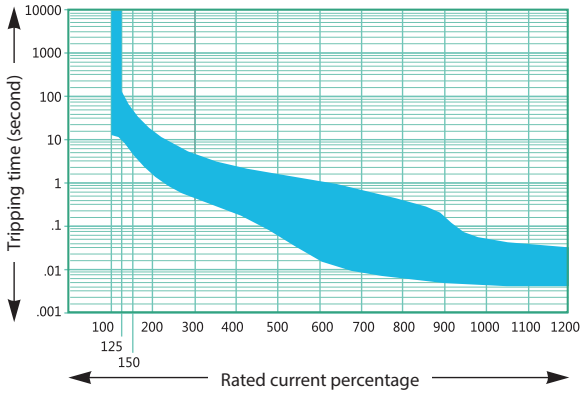
DC Z2 curve



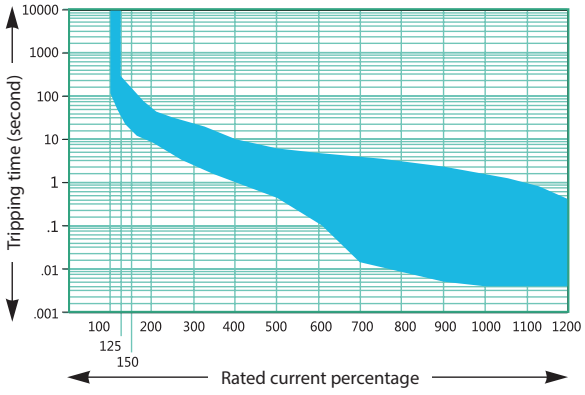
AC J2 curve



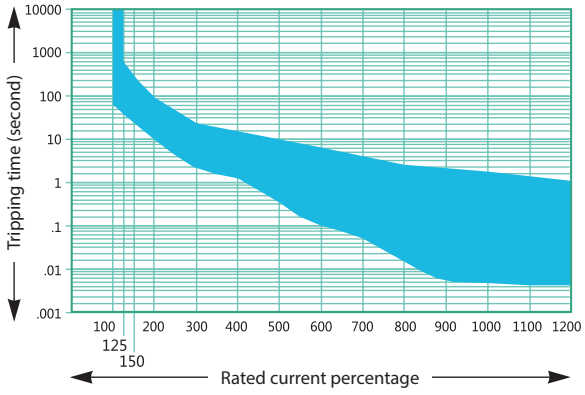
DC Z4 curve



AC J4 curve



DC Z6 curve



AC J6 curve

4.4 NDB5 Series Products

4.4.1 Description of Specifications and Models

ND	B	5	□	□/□	□	□	□-□-□
1	2	3	4	5 6	7	8	9 10 11

Serial No.	Serial No. Name	NDB5
1	Enterprise code	ND : Nader brand low-voltage apparatus
2	Product code	B : Circuit breaker for equipment
3	Design serial No.	5
4	Tripping curve code	Z2 DC short time delay J2 AC short time delay Z4 DC medium time delay J4 AC medium time delay Z6 DC long time delay J6 AC long time delay
5	Rated current （A）	0.5, 0.6, 0.7, 0.8, 0.9, 1, 1.5, 2, 2.5, 3 ,3.5, 4, 4.5, 5, 5.5 6, 6.5, 7, 7.5, 8, 8.5, 9, 9.5, 10, 12, 15, 16, 20, 24, 25, 30, 32, 35, 40, 45, 50, 55, 60, 63, 70, 80, 90, 100, 105,110, 120, 125, 150
6	Number of poles	1 - 1pole 2 - 2poles 3 - 3poles
7	Pole type	P - Indicates that it is without neutral pole; N - Indicates that it is with neutral pole (only 1N or 3N)
8	Connection mode	Blank - Indicates non-parallel products; U - Indicates parallel products (two-pole or three-pole parallel)
9	Accessory code	0 - No accessories
10	Operating surface dimension	Blank - Indicates that the operating surface dimension is 45mm; W- Indicates that the operating surface dimension is 57mm
11	Certification code	R - represents that it is in line with CCC, TUV, UL1077, CE certification L - represents that it is in line with CCC, TUV, UL489A, CE certification
12	Customer code	Add according to specific needs

Note:

1) Unipolar maximum rated current up to 63A;
2) One-pole + N pole(s), three-pole and three-pole + N pole(s) products are only AC products;
3) With parallel blocks for only DC products, minimum 20A and maximum 100A for two poles in parallel, minimum 105A and maximum 150A for three poles in parallel;
4) Models listed in the table are conventional models; tripping curve, current specifications, etc. may be changed for the product according to the user's requirements; the changed models are specially supplied models, and are not included in the scope listed in the table above.

4.4.2 Main Technical Parameters

Type of product	1P		1N	2P		3P	3N	2PU	3PU
Rated voltage	AC230V AC250V	DC80V	AC230V AC250V	AC230/400V AC480/277V	DC80V	AC230/400V AC480/277V		DC80V	
Rated current (A)	0.5, 0.6, 0.7, 0.8, 0.9, 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7, 7.5, 8, 8.5, 9, 9.5, 10, 12, 15, 16, 20, 24, 25, 30, 32, 35, 40, 45, 50, 55, 60, 63		0.5, 0.6, 0.7, 0.8, 0.9, 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7, 7.5, 8, 8.5, 9, 9.5, 10, 12, 15, 16, 20, 24, 25, 30, 32, 35, 40, 45, 50					20, 30, 40, 50, 60, 63, 70, 80, 90, 100	105, 110, 120, 125, 135, 150
Installation mode	35mm standard guide rail, mini-guide rail								
Tripping curve	J2, J4, J6	Z2, Z4, Z6	J2, J4, J6	J2, J4, J6	Z2, Z4, Z6	J2, J4, J6		Z2, Z4, Z6	

- Standards met: IEC60934, EN60934, IEC60947-2, EN60947-2, GB17701, GB14048.2, UL1077, UL489A;
- Rated operational voltage: DC80V、AC230/400V、AC250V、AC480/277V;
- Frequency: 50/60Hz;
- Mechanical and electrical life: 10,000 times (Wherein electrical life is 6,000 times)
- Certification passed: CCC, UL1077, UL489A, TUV, CE;
- Wiring capacity: 0.5~25mm2, two poles in parallel: 35mm^2 and below, three poles in parallel: 70mm^2 and below;
- Breaking capacity (kA)

Rated current (A)	Voltage (V)	Breaking capacity (kA)				
		CCC	UL		TUV/CE	
		GB17701	UL 1077	UL 489A	EN60934	EN60947-2
0.5 ~ 63	DC80	10	10, U1	10	10	10
	AC230/400	3	/	/	3	6
	AC277/480	/	6, U1	/	/	/
	AC250	/	6, U1	/	/	/
20 ~ 150 (Parallel products)	DC80	/	10, U1	10	/	/

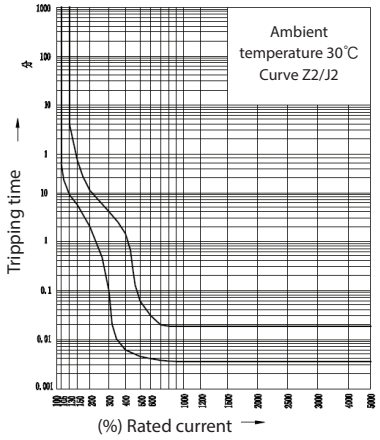
4.4.3 Product Tripping Curve

◆ Tripping schedule (unit of time: s)

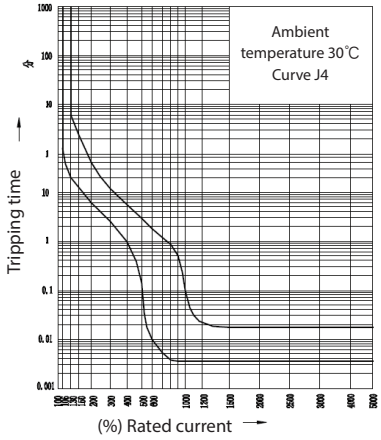
Curve \ Current	1.05In	1.3 In	2 In	6 In	10 In
Z2/J2	No tripping	9-240	2-12	0.004-0.03	0.0035-0.018
Z4	No tripping	15-240	4-20	0.01-1	0.0035-0.1
J4	No tripping	20-360	6-40	0.01-1.8	0.0035-0.1
Z6/J6	No tripping	60-1200	20-100	1.2-7	0.0055-2.2
J4	No tripping	10-160	2.2-20	0.02-1.3	0.005-0.065
J6	No tripping	50-700	10-90	0.1-7	0.006-2

Note: 1) Tripping time is in s;
2) The above tripping time is obtained by testing the product at the cold state;
3) The said non-tripping time is 1h.

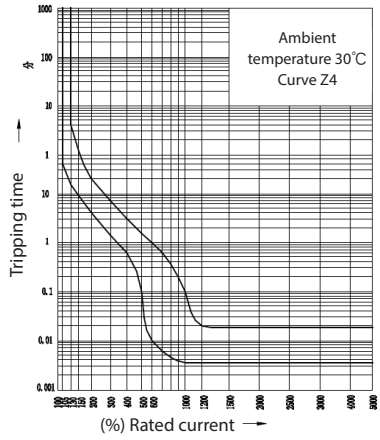
◆ Characteristic curves (10) and (11)



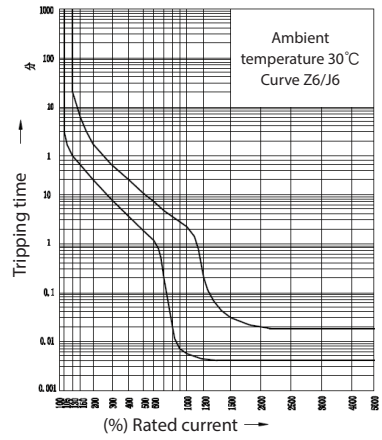
DC Z2 curve



AC J2 curve



DC Z4 curve

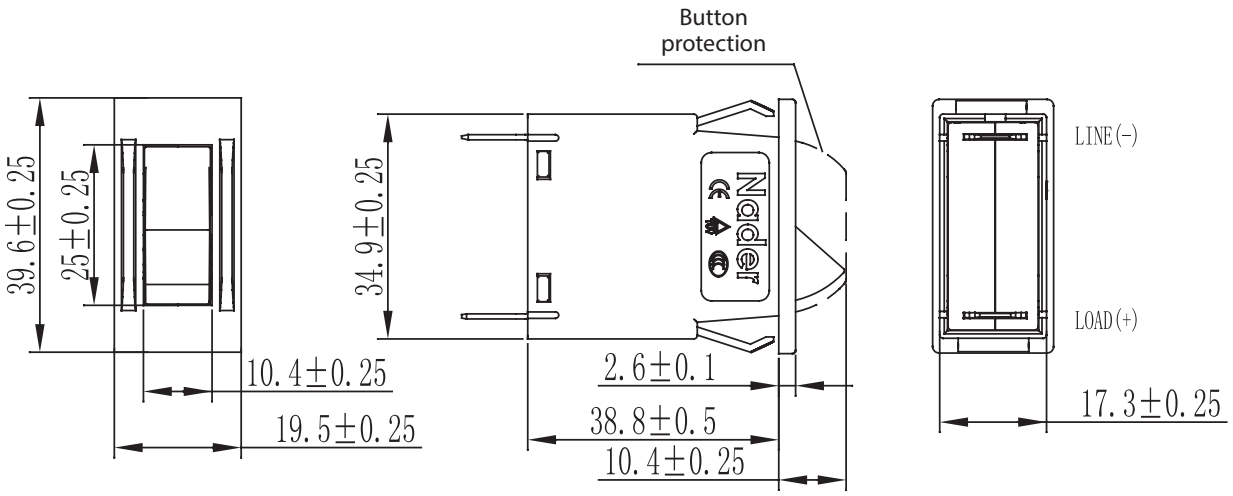


AC J4 curve

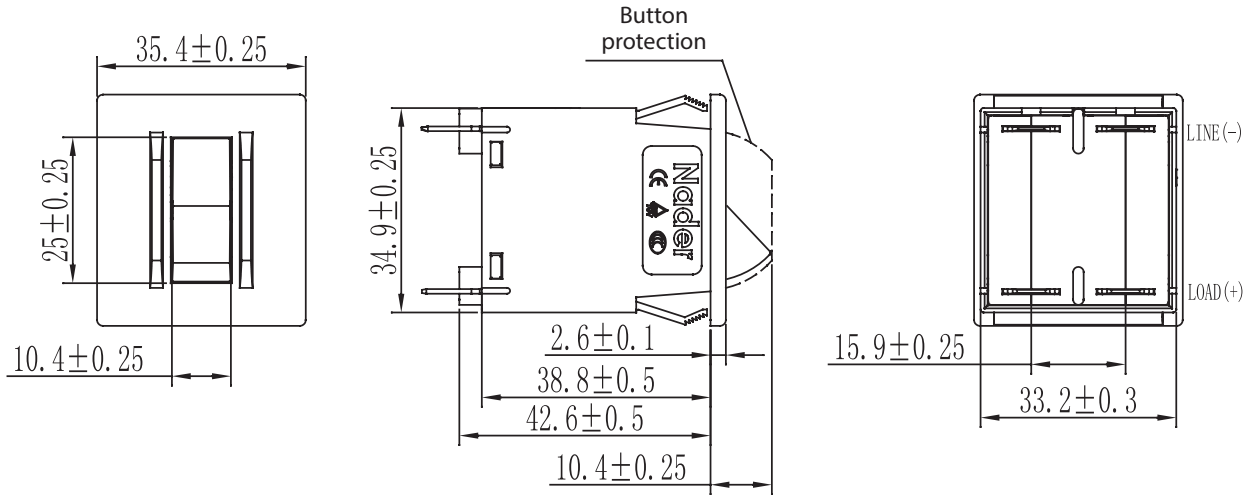
5. Outline and Installation Dimension

5.1 NDB3-30 Outline Dimensional Drawing

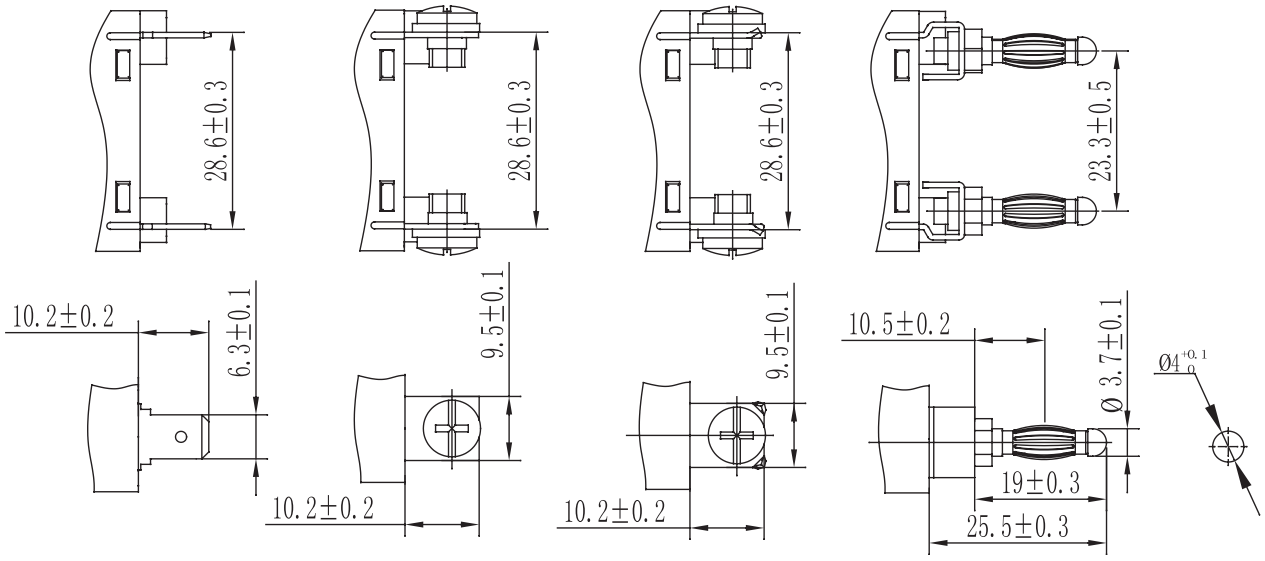
5.1.1 Unipolar products



Bipolar products



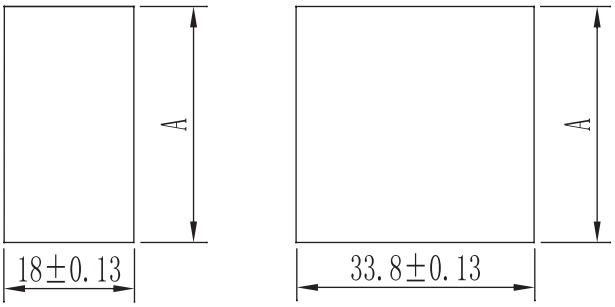
5.1.2 Wiring Terminal Dimensional Drawing



Welded/Lug wiring | Screw wiring | Upturned screw wiring | Plug-in wiring terminal

Note: Screws with the nominal diameter of thread of M4 (8-32UNC)mm, and the applied torque of 1.2N.m

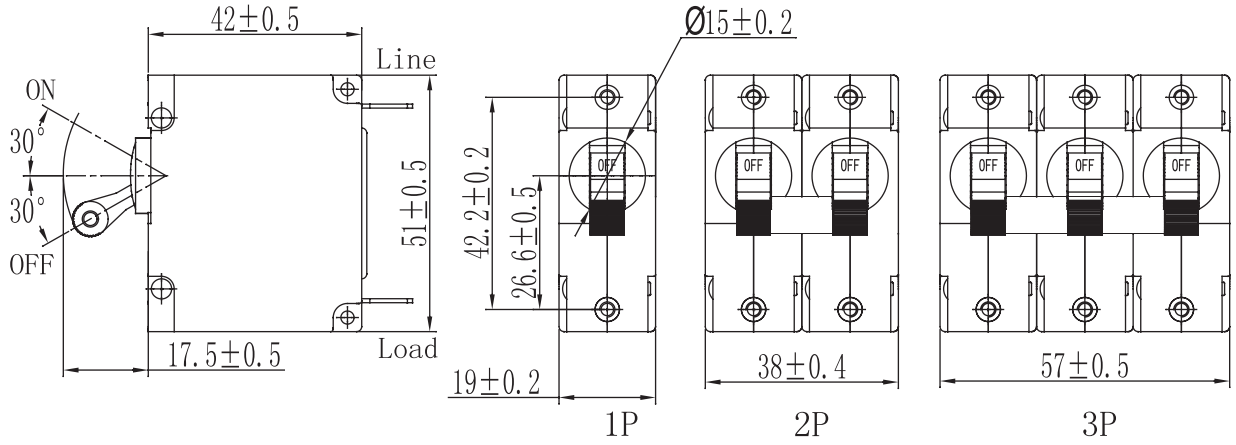
5.1.3 Installation Hole Dimensional Drawing



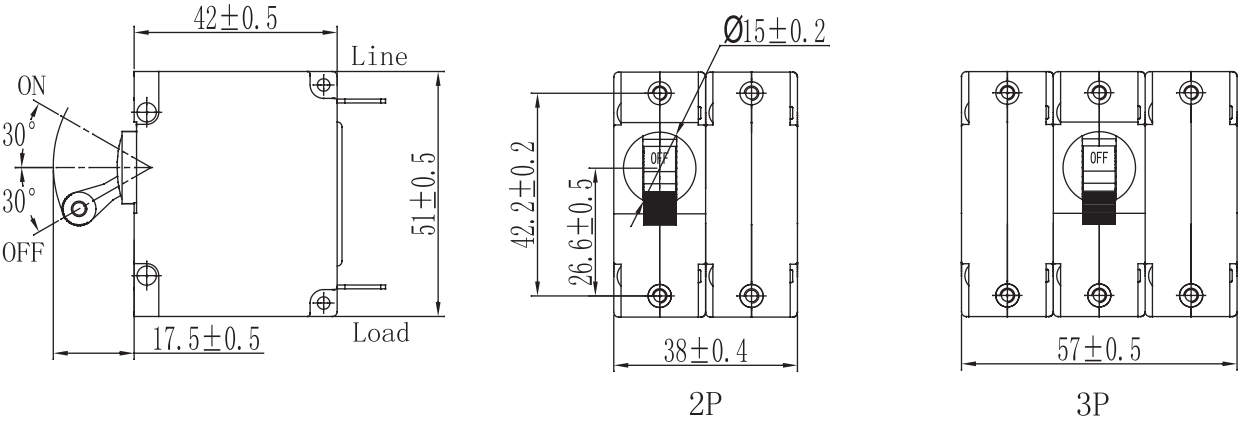
Mounting plate thickness	A +0.13 0
1.6	35.2
2.4	36.1
3.2	37.1

5.2 NDB3-50 Outline Dimensional Drawing

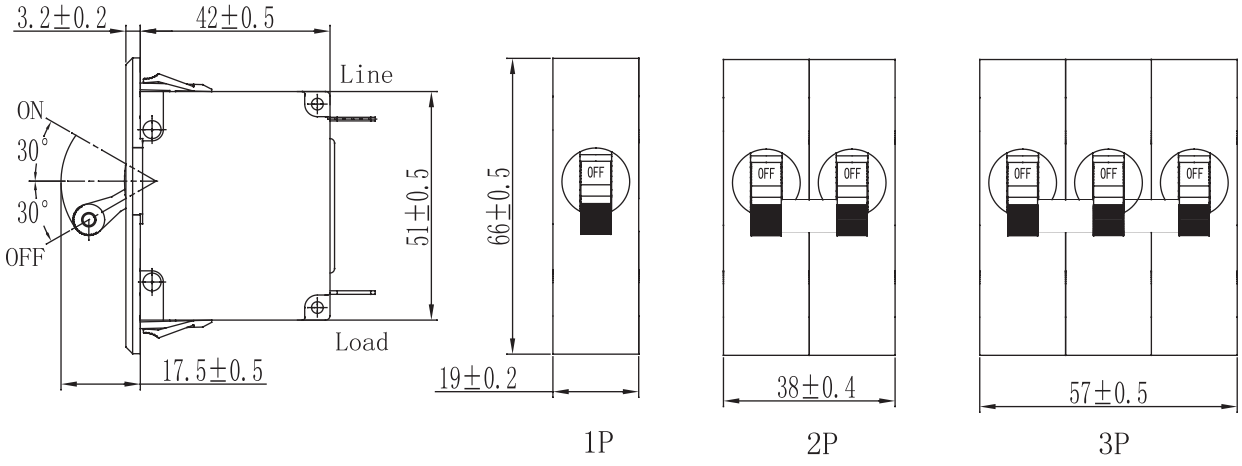
5.2.1 Operation mode is Type S; the number of operation is Type A; installation mode is L/M



5.2.2 Operation mode is Type S; the number of operation is Type B; installation mode is L/M

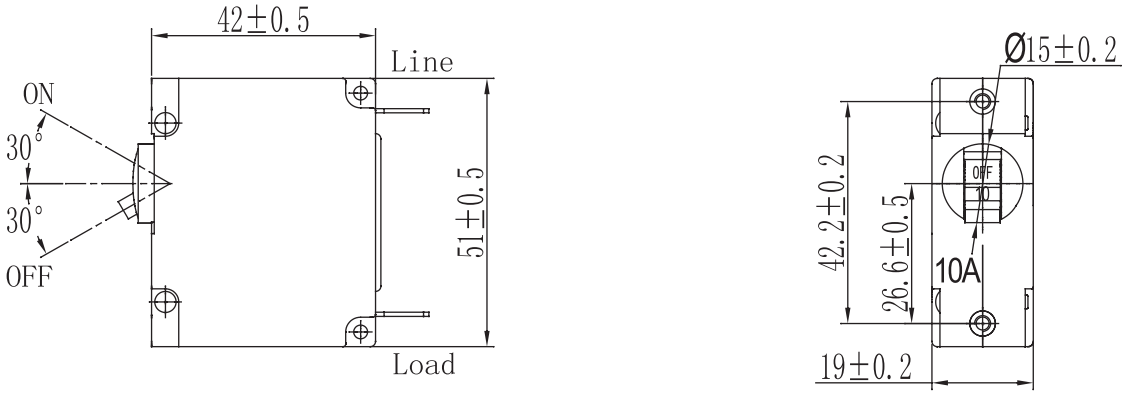


5.2.3 Operation mode is Type S; the number of operation is Type A; installation mode is Q

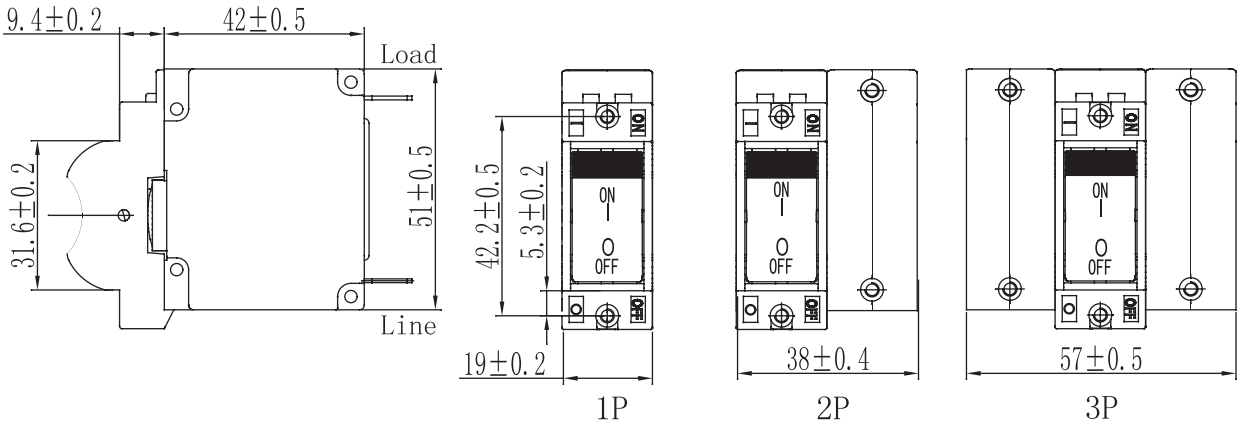


5.2.4 Operation mode is Type D; when the shell code is 0, the number of operation is Type A (when the shell code is 1, the number of operators may be Type A/B)

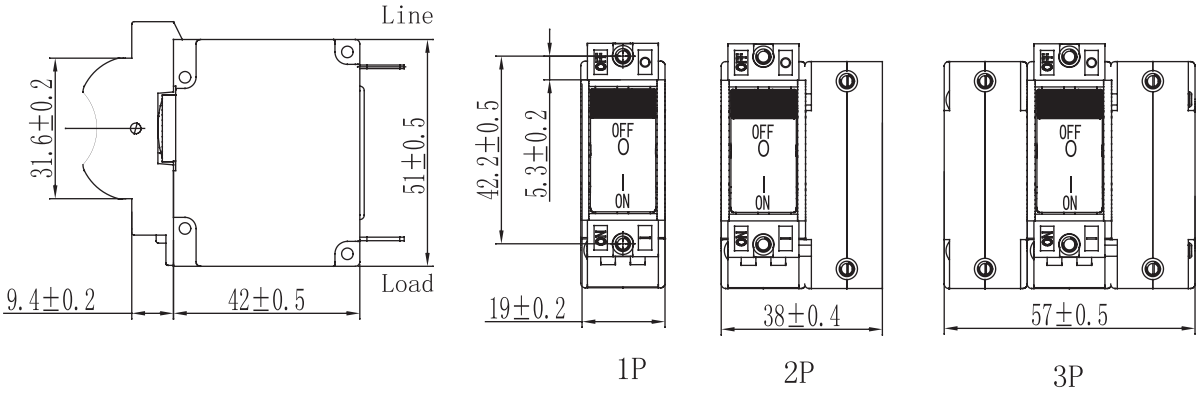
● **When the shell code is 0, the number of operators is Type A**



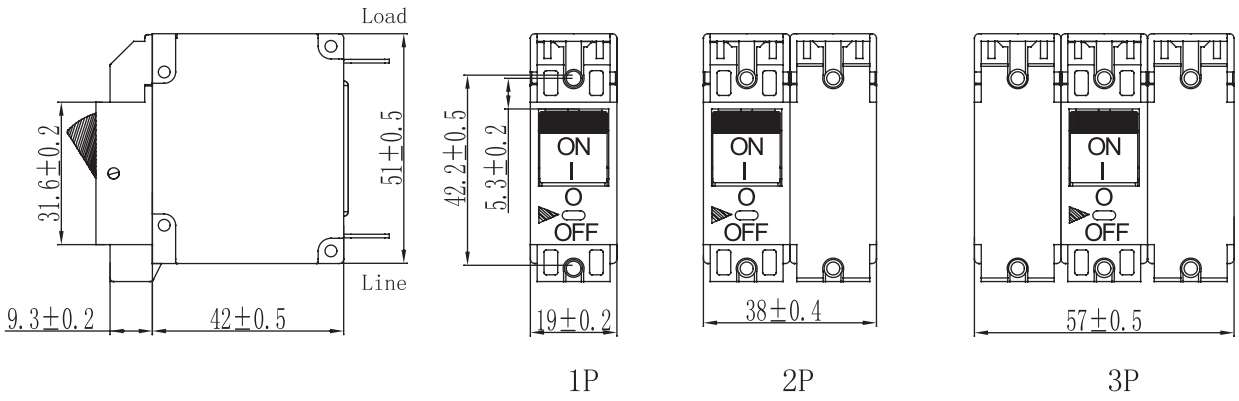
5.2.5 Operation mode is Type Y (Y1-Y4, Y7-Y8); the number of operation is Type B;



5.2.6 Operation mode is Type Y (Y5-Y6); the number of operation is Type B;

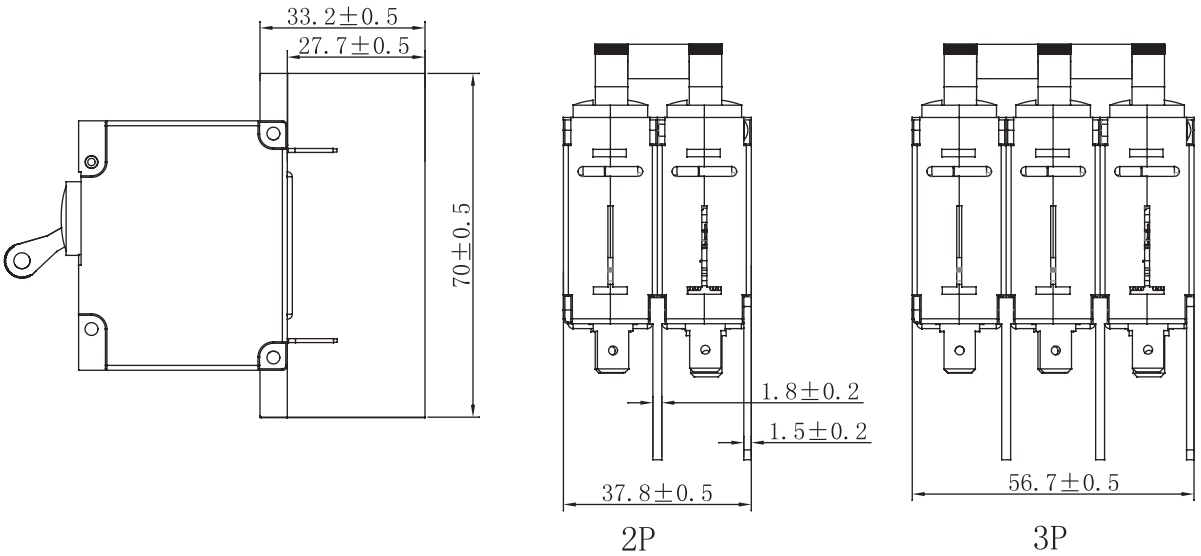


5.2.7 Operation mode is Type A (A1-A4); the number of operation is Type B;



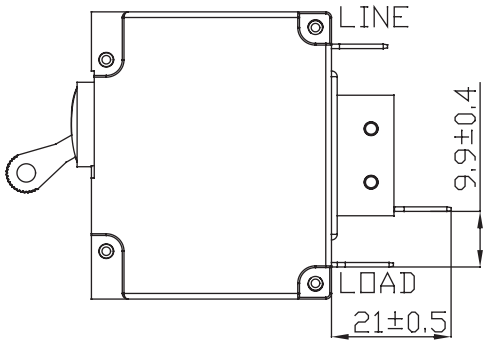
Note: Operation modes are A and Y, the number of operators is Type B conventional products without flat mounting base, and the products with flat mounting base are controlled according to the non-standard requirements.

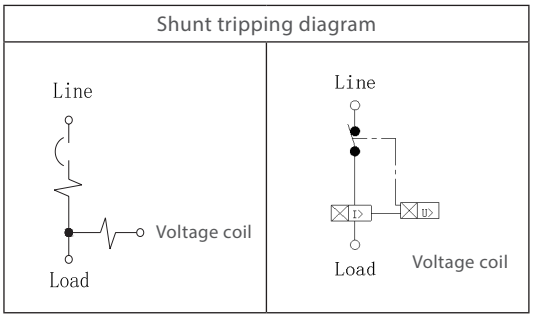
5.2.8 Dimensional drawings of two-pole and three-pole AC products having passed UL489 certification (certification code is K)



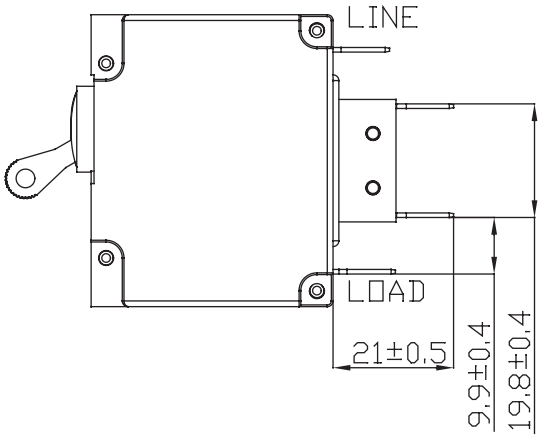
5.2.9 Double-coil products, operation mode is Type S/Y/A/L and code of number of operation is Type A/B;

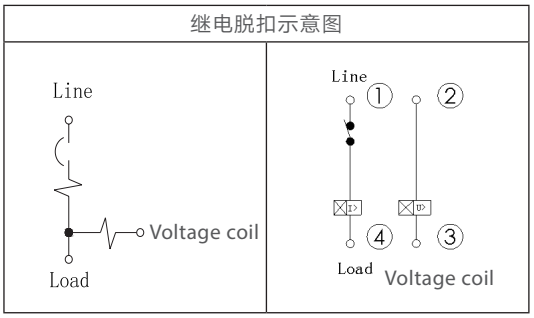
● Shunt tripping



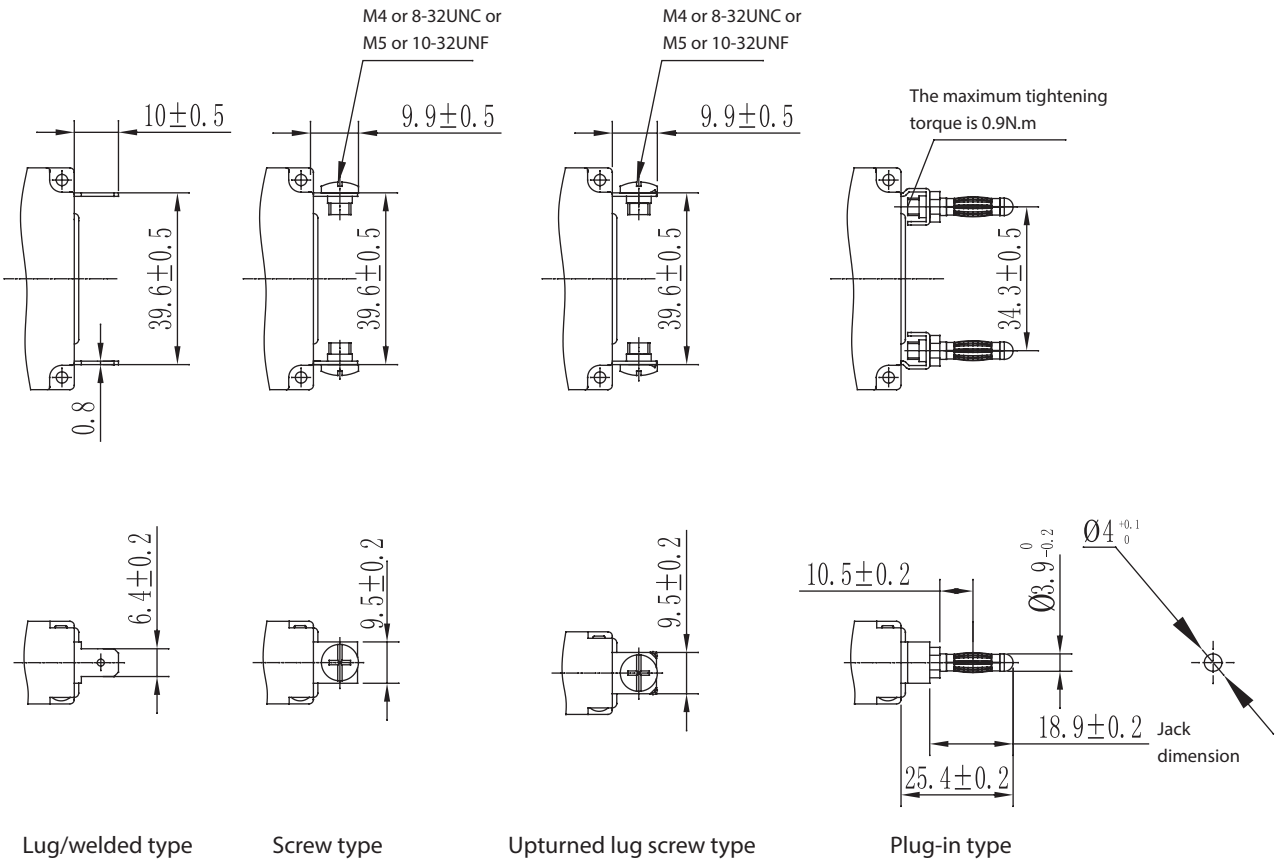


● Relay tripping





5.2.10 Wiring Terminal Dimensional Drawing

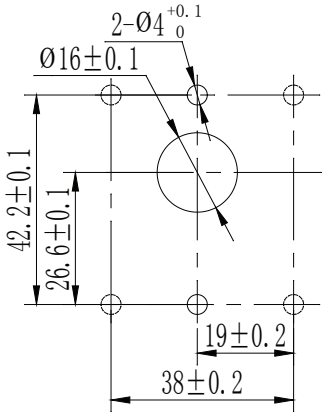


Lug/welded type | Screw type | Upturned lug screw type | Plug-in type

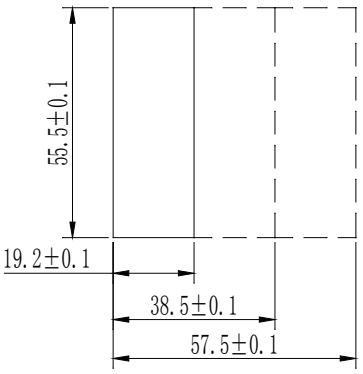
Note: Torque applied to each dimension of thread is shown below:

Nominal diameter of thread (mm)	Applied torque (N.m)
M3（6-32UNC）mounting nut	0.5
M4（8-32 UNC）screw	1.2
M5（10-32 UNF）screw	2.0

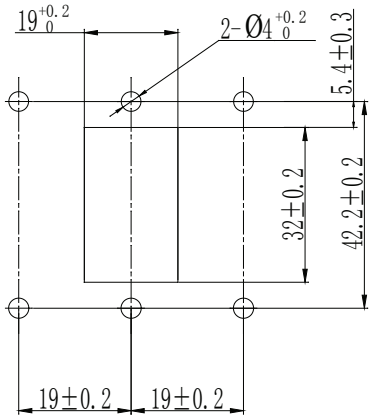
5.2.11 Installation dimension



Handle type

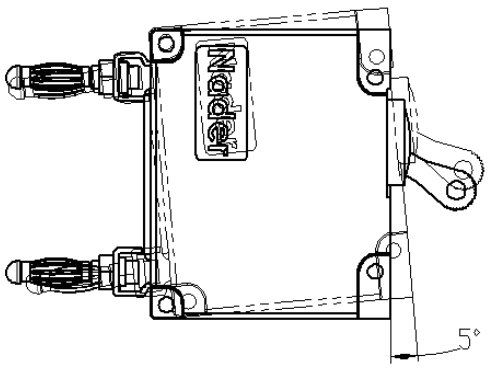


Embedded type



Rocker/button type

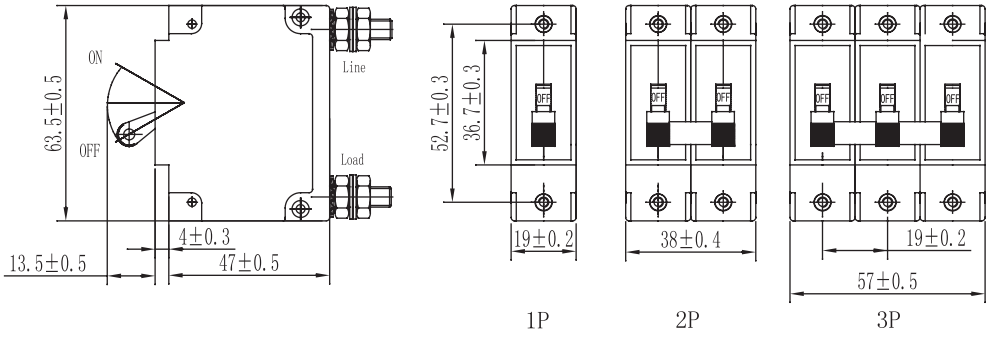
Note: The inclination angle between the product ' s installation surface and vertical installation surface should not exceed 5 °



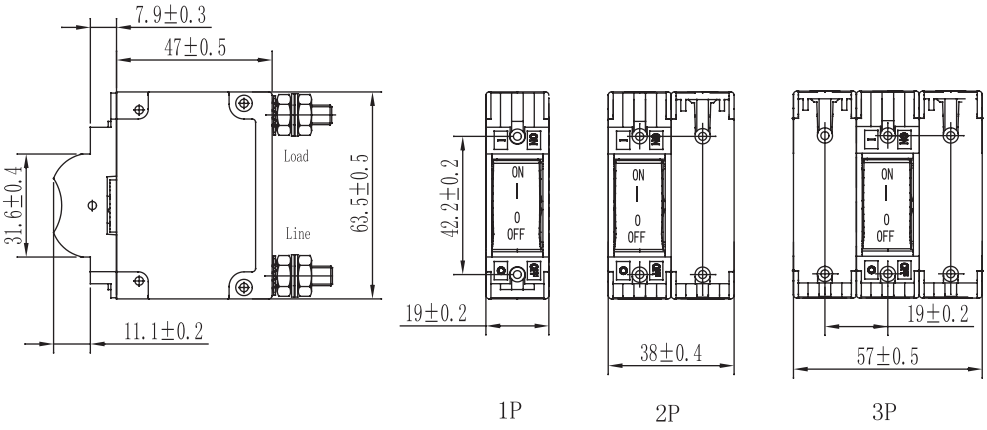
5.3 NDB3-100 Outline and Installation Dimension

5.3.1 Outline Dimensional Drawing

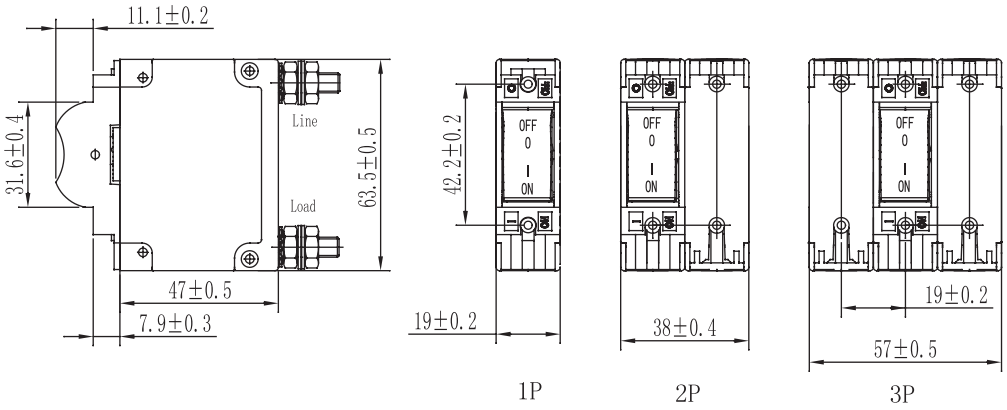
- Operation mode is Type S, and code of number of operation is Type A: Wiring mode may be S/T/C/U/V/B/L/H/P/W/K. (also applicable to anti-surge and intermediate trigger products).



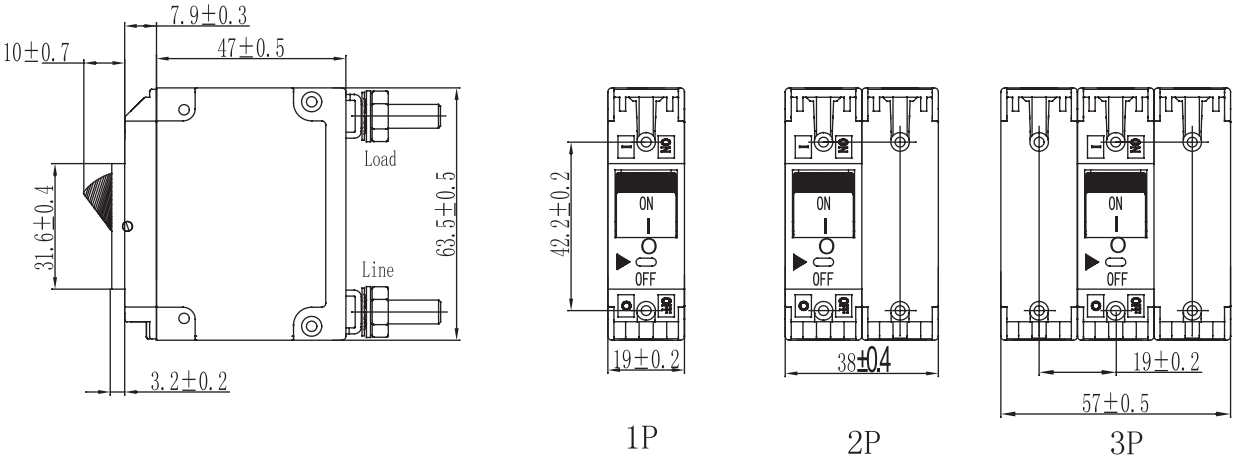
- Operation mode is Type Y (Y1-Y4, Y7-Y8), code of number of operation is Type B (Type A for one-pole). For unipolar products, the wiring mode may be S/T/C/U/V/L/B/H/P/W/K; for multi-polar products, the wiring mode may be U/V/L/B/W/K (also applicable to anti-surge products).



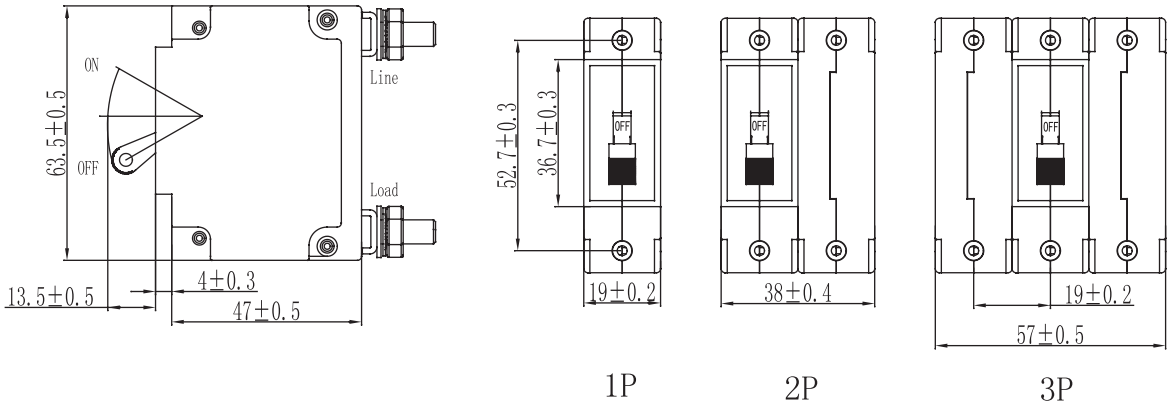
- Operation mode is Type Y (Y5-Y6), code of number of operation is Type B (Type A for one-pole). For unipolar products, the wiring mode may be S/T/C/U/V/L/B/H/P/W/K; for multi-polar products, the wiring mode may be U/V/L/B/W/K (also applicable to anti-surge products).



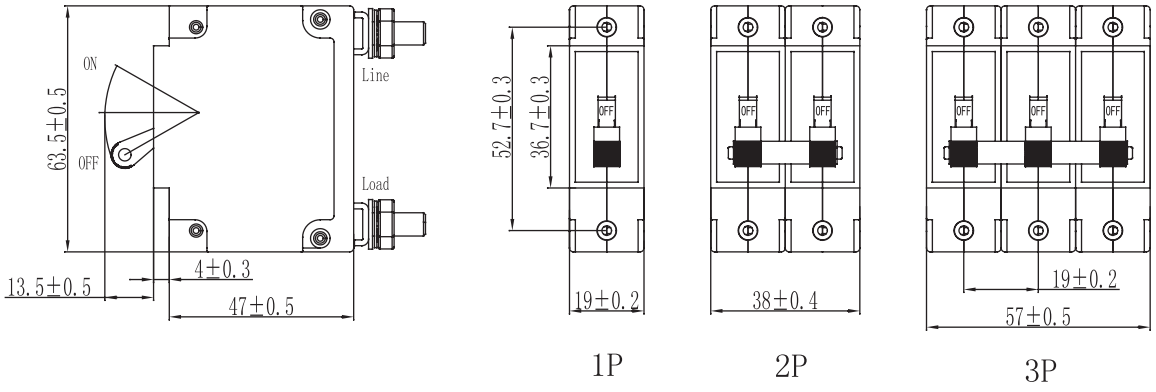
- Operation mode is Type A, code of number of operation is Type B (Type A for one-pole). For unipolar products, the wiring mode may be S/T/C/U/V/L/B/H/P/W/K; for multi-polar products, the wiring mode may be U/V/L/B/W/K (also applicable to anti-surge products).



- Operation mode is Type S/L, and code of number of operation is Type B (Type A for one-pole): The wiring mode may be U/V/L/B/N/W/K (also applicable to anti-surge products).

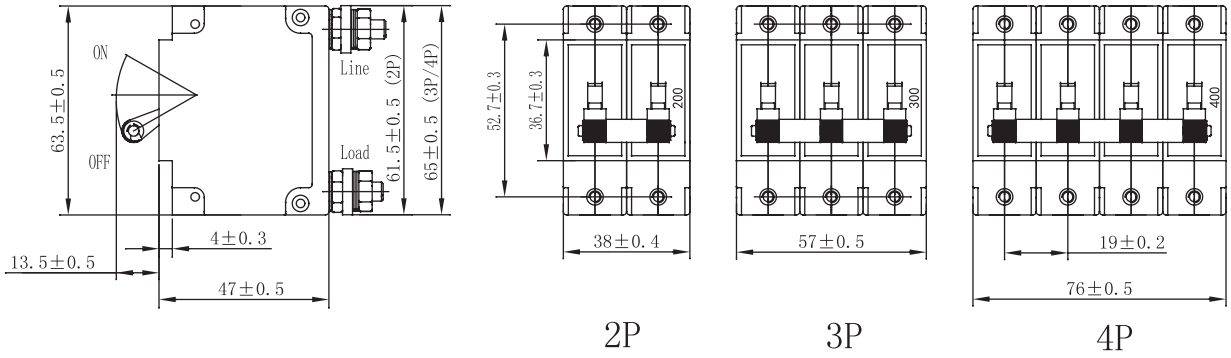


- Operation mode is Type S/L, and code of number of operation is Type A: The wiring mode may be U/V/L/B/N/W/K (also applicable to anti-surge and intermediate trigger products).

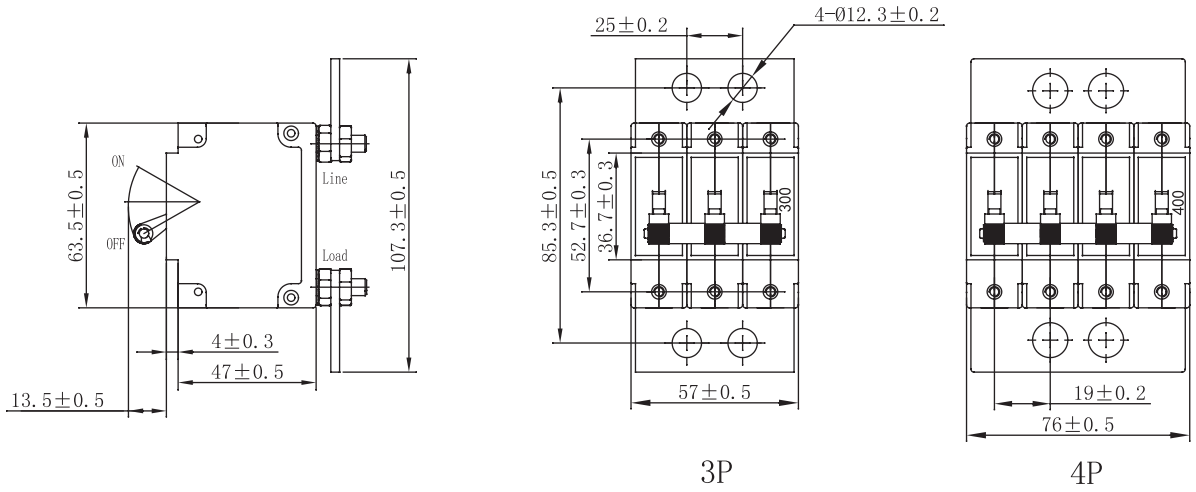


◆ For parallel multi-polar products, operation mode is Type L, and code of number of operation is Type A: Wiring mode may be S/U/H.

★ Split wiring (Type L operation mode is also applicable to 2P and 3P parallel one-coil products)

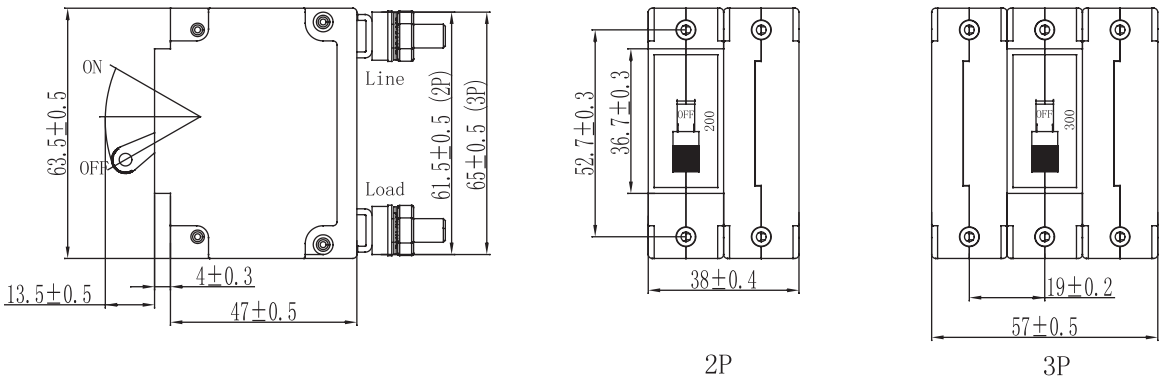


◆ Parallel wiring (Type L operation mode is also applicable to 3P parallel one-coil products)

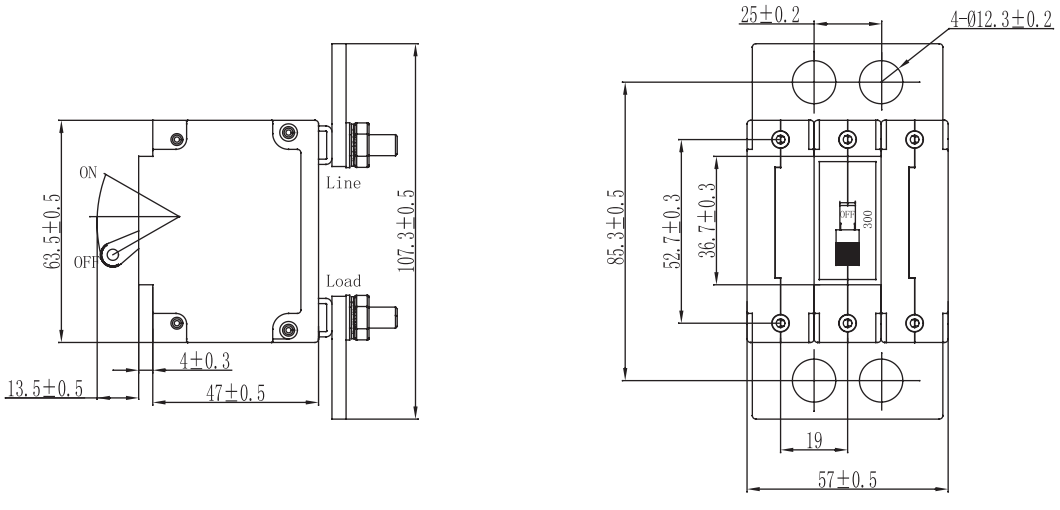


◆ For parallel multi-polar products, operation mode is Type L, and code of number of operation is Type B: Wiring mode may be U

★ Split wiring (Type L operation mode is also applicable to parallel one-coil products)



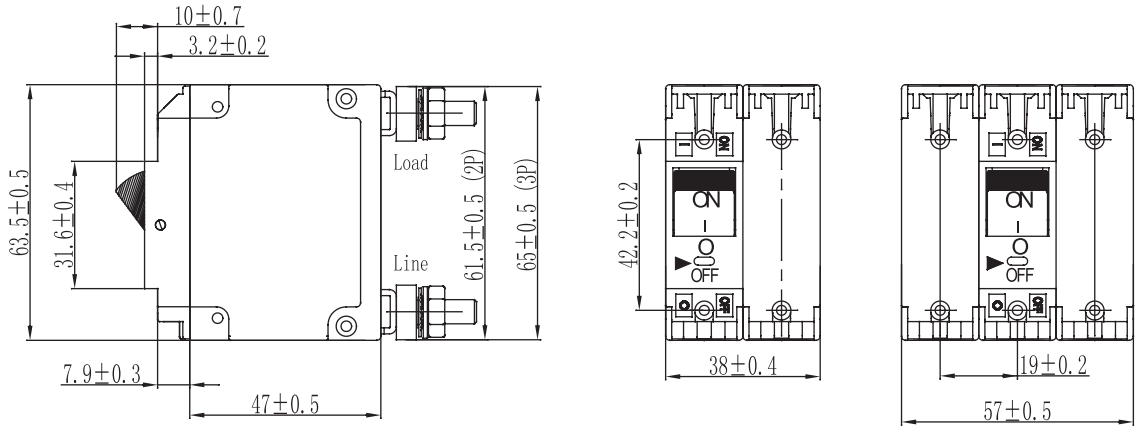
★ Parallel wiring (Type L operation mode is also applicable to parallel one-coil products)



3P

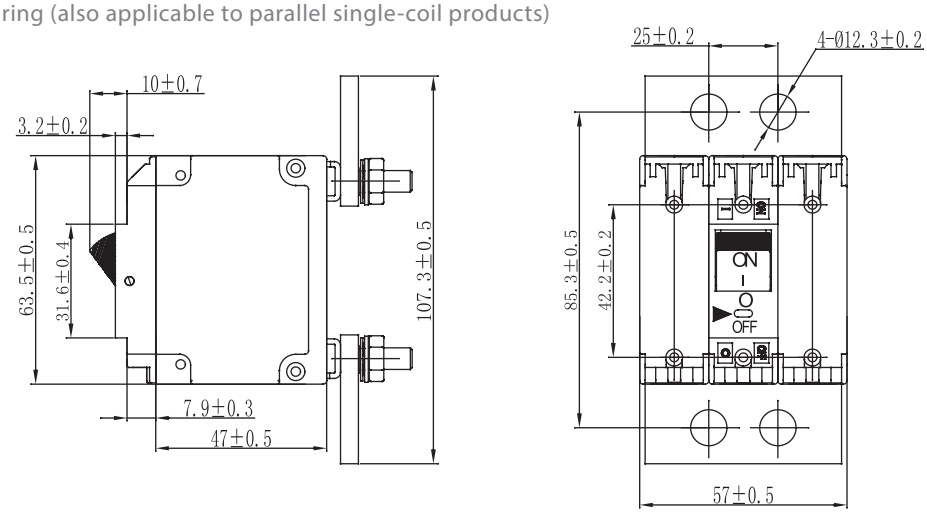
◆ For parallel multi-polar products, operation mode is Type A/Y, and code of number of operation is Type B: Wiring mode may be U

★ Split wiring (also applicable to parallel single-coil products)



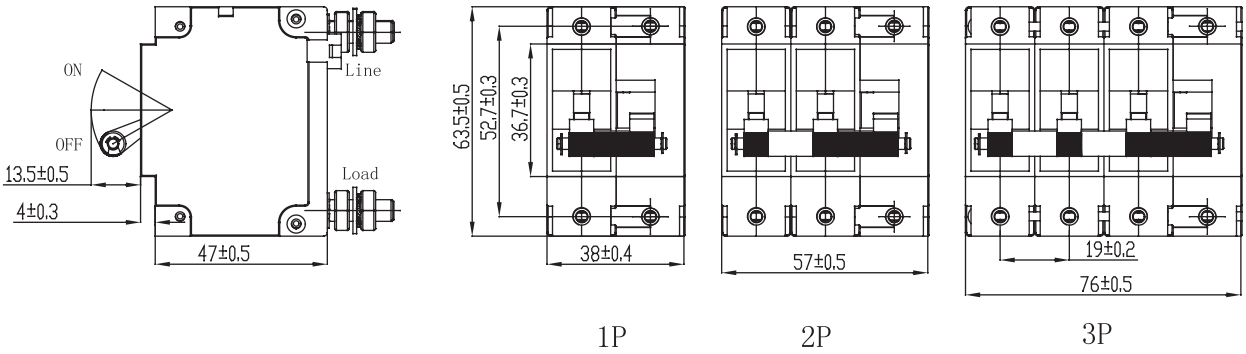
2P 3P

★ Parallel wiring (also applicable to parallel single-coil products)



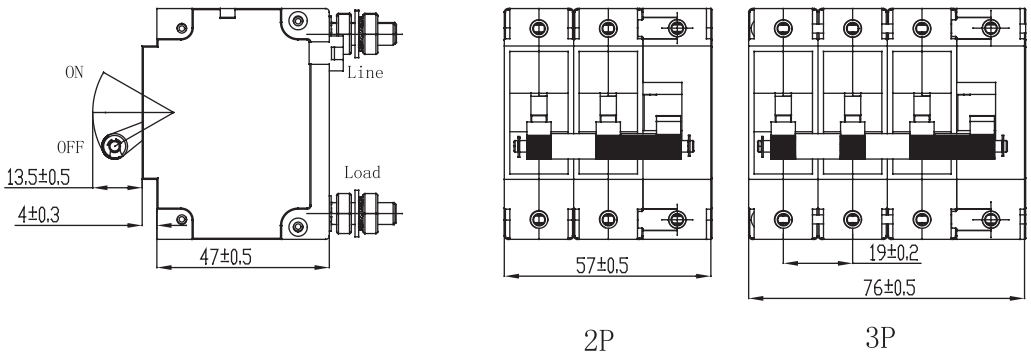
3P

- For remote control products, operation mode is Type S/L, and code of number of operation is Type A: Wiring mode may be S/T/V/U/C/B/L/H/P/W/K

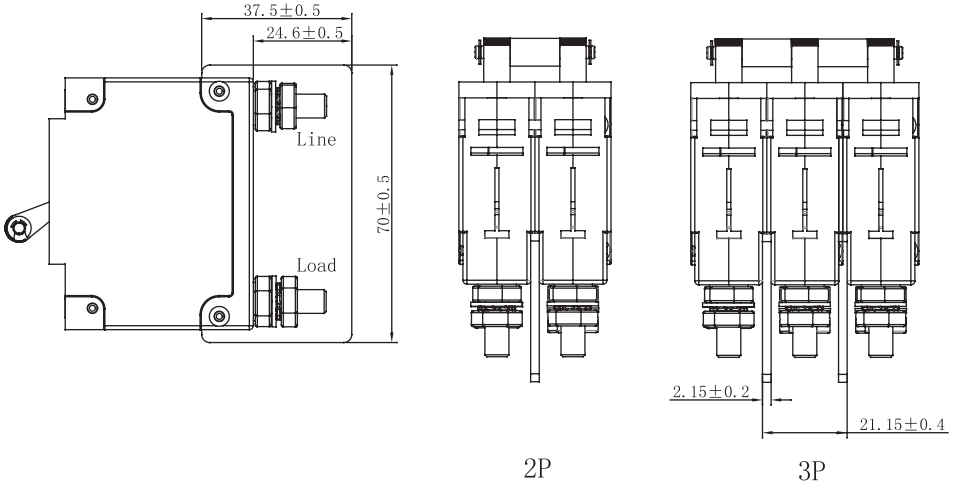


- For intermediate trigger/remote control (MT/RB) products, operation mode is Type S/L, and operator number code is Type A: Wiring mode may be S/T/C/U/V/B/L/H/P/W/K

(Note: Intermediate trigger + remote control products are subject to the installation direction. 1. The alarm contacts are installed in the far left; 2. The auxiliary contacts are installed at the second leftmost pole; 3. If there are only auxiliary contacts, the auxiliary contacts are installed in the far left)



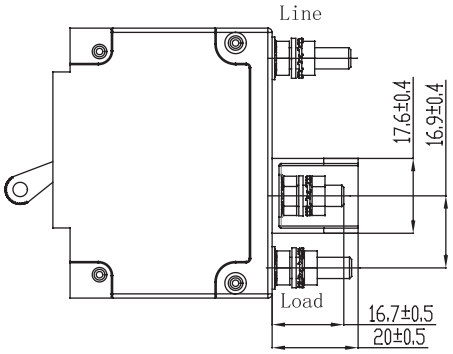
- For UL489 products, operation mode is Type S/L, and code of number of operation is Type A: Wiring mode may be S/T/V/U/C/B/L/H/P/W/K; Code of number of operation of unipolar product is Type B: Wiring mode may be U/B/L/K

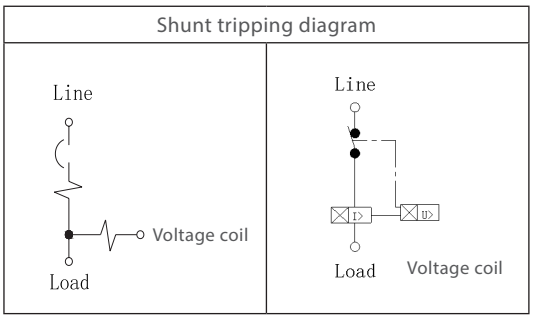


◆ For double-coil products, operation mode is Type S/Y/A/L and code of number of operation is Type A; Wiring mode may be S/T/V/U/C/B/L/H/P/W/K; Code of number of operation is Type B: Wiring mode may be U/V/B/L/W/K;

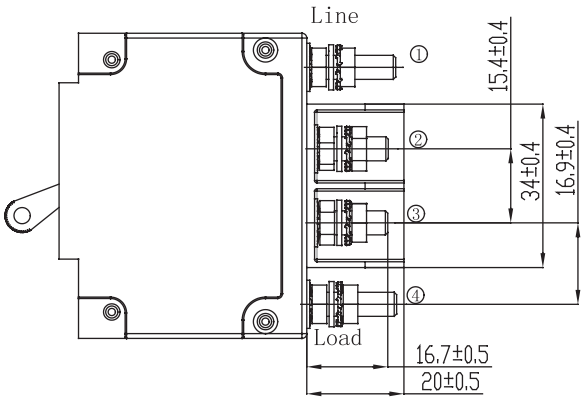
(Note: Current specifications: ≤50A; subject to the installation direction, the auxiliary contacts are installed in the far right; unipolar products are without auxiliary contacts;)

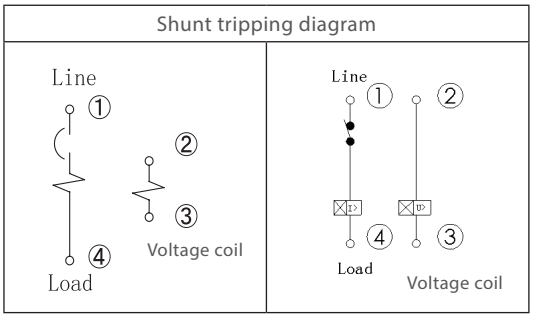
★ Shunt tripping



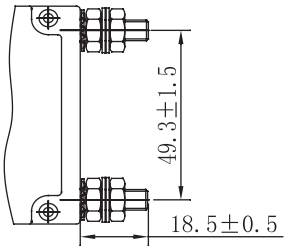


★ Relay tripping

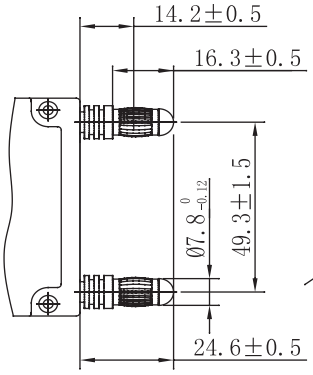




5.3.2 Wiring Terminal Dimensional Drawing

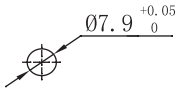


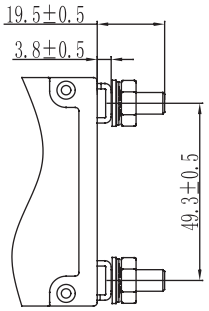
Type S: M6(≤100A)
Type T: M5(≤50A)
Type H: 1/4-20 UNC(≤100A)
Type P: 10-32 UNF(≤50A)



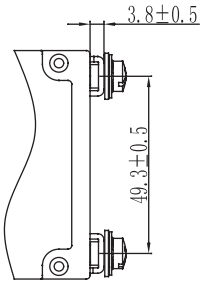
Type C: (≤100A)

Supporting hole dimension:

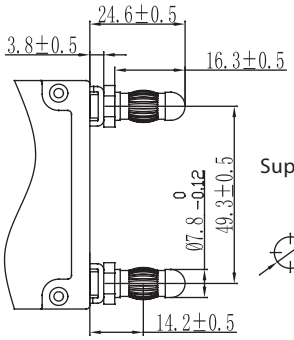




Type U: M6(≤100A)
Type V: M5(≤50A)
Type N: 1/4-20 UNC(≤100A)
Type W: 10-32 UNF(≤50A)

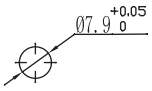


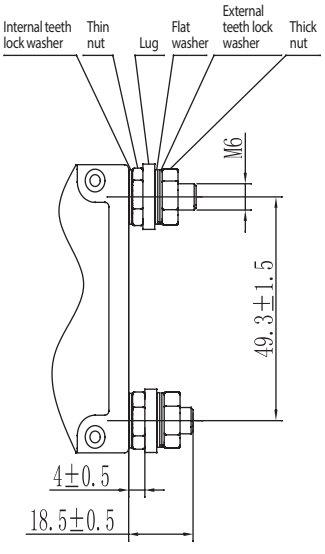
Type L: M5(≤50A)
Type K: 10-32 UNF(≤50A)



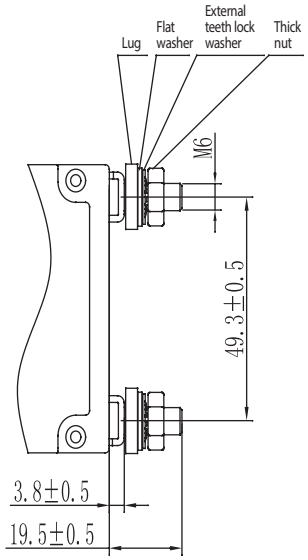
Type B: (≤100A)

Supporting hole dimension:





S/H terminal wiring mode of parallel products



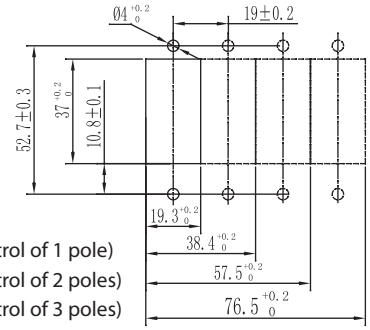
U/N terminal wiring mode of parallel products

Note: Torque applied to each dimension of thread is shown below:

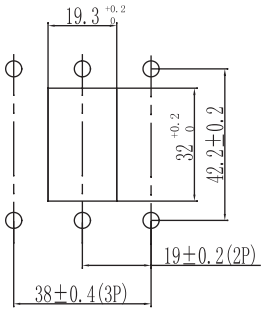
Nominal diameter of thread (mm)	Applied torque (N.m)
M3(6-32 UNC) mounting nut	0.5
M6 bolts or 1/4-20 bolts	3.0
M5 bolts or 10-32 bolts	2.0
M5（10-32 UNF）bolts	2.0
Parallel product Type F tapped type M6 bolts or 1/4-20 bolts	5.0

5.3.3 Installation Dimension

1 pole
2 poles (Remote control of 1 pole)
3 poles (Remote control of 2 poles)
4 poles (Remote control of 3 poles)

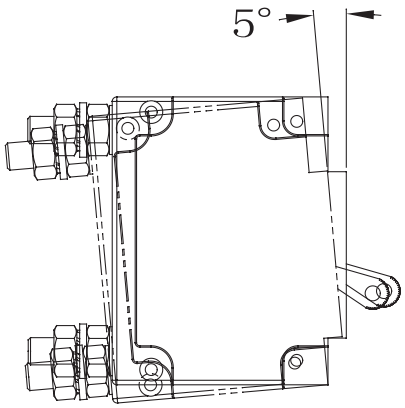


Handle type

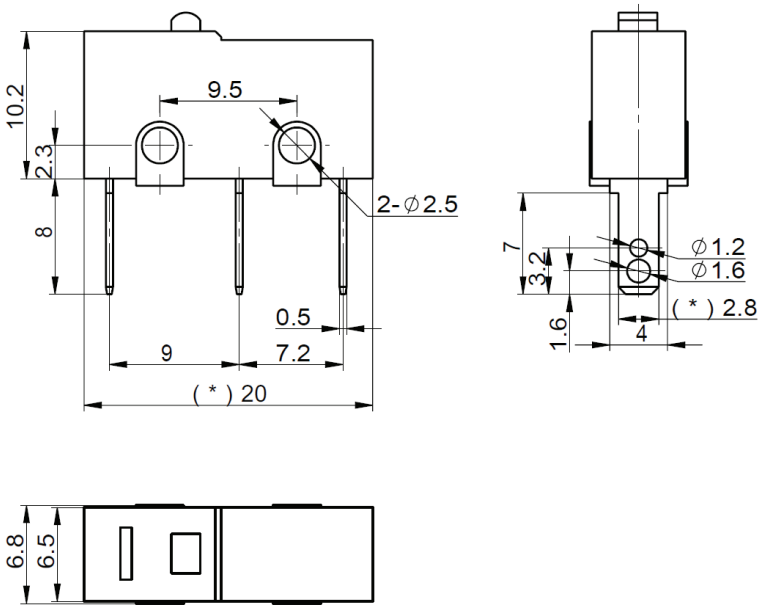


Rocker/flat key type

Note: The inclination angle between the product ' s installation surface and vertical installation surface should not exceed 5 °

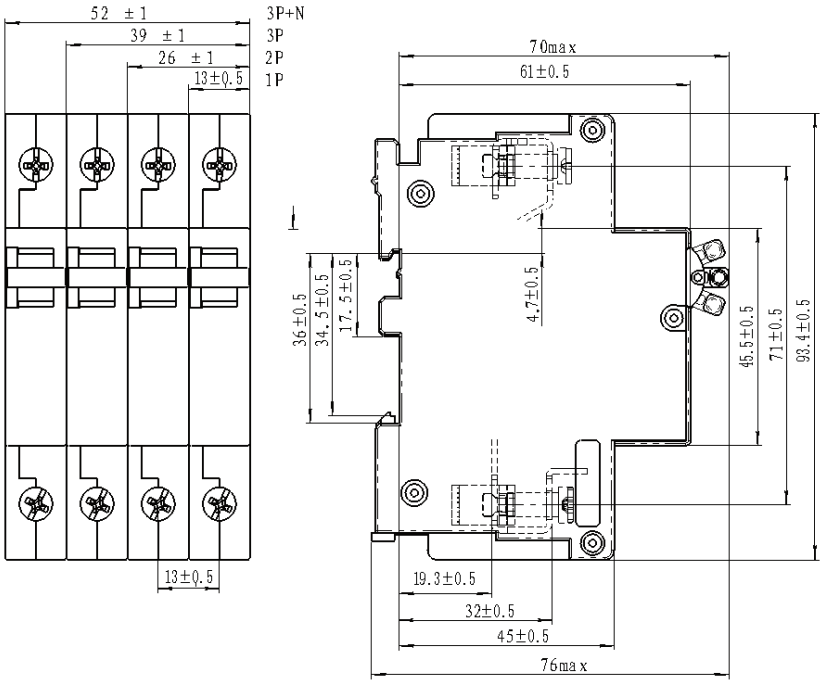


5.3.4 NDB3-50/100 Outline Dimension of Auxiliary Contact



5.4 NDB5 Outline and Installation Dimension

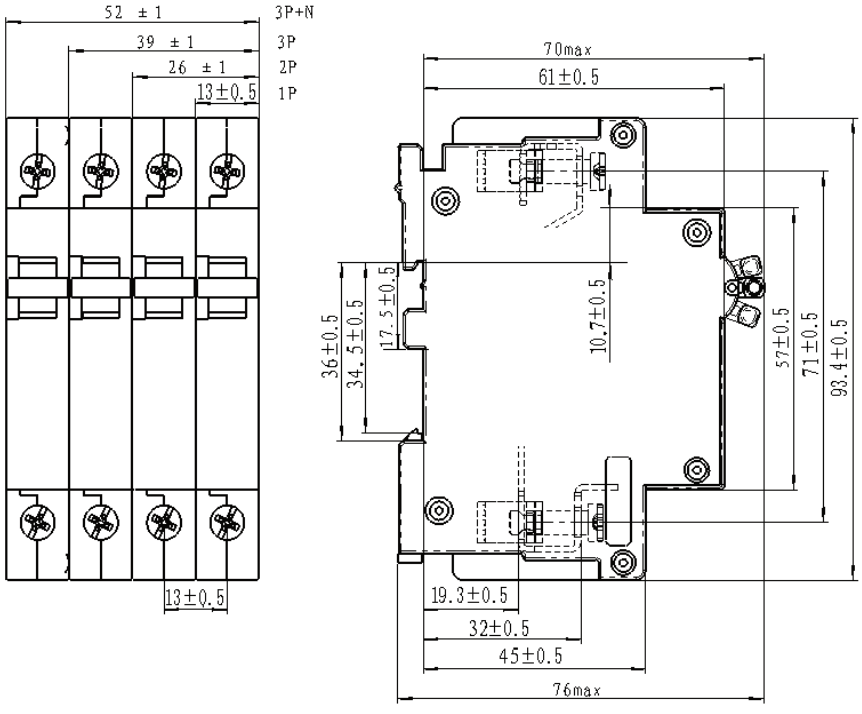
5.4.1 Outline and installation dimension of products with the operating surface height of 45mm



LINE side

LOAD side

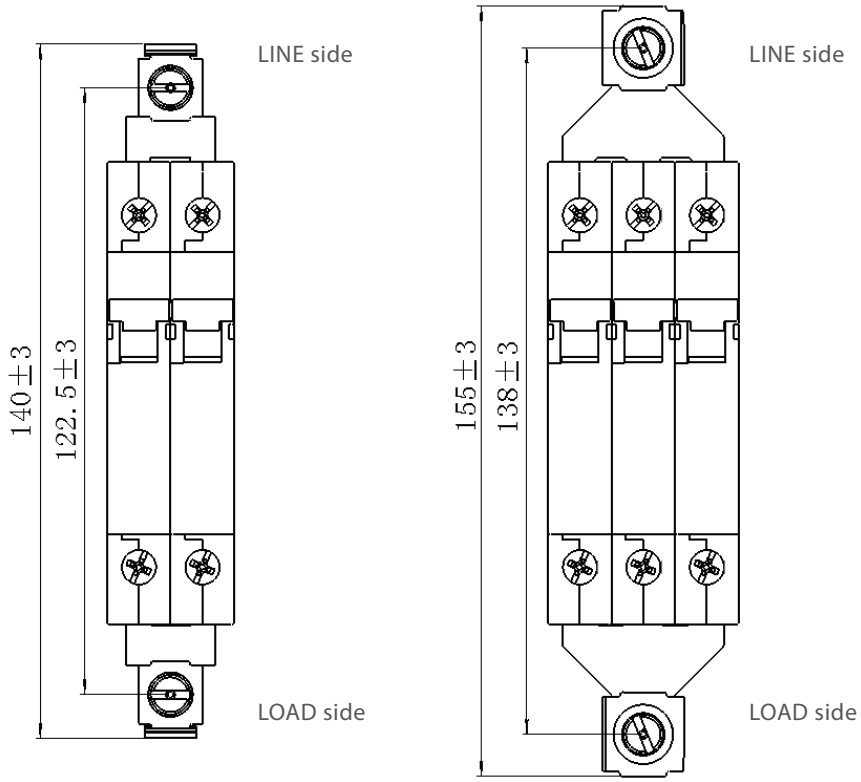
5.4.2 Outline and installation dimension of products with the operating surface height of 57mm



LINE side

LOAD side

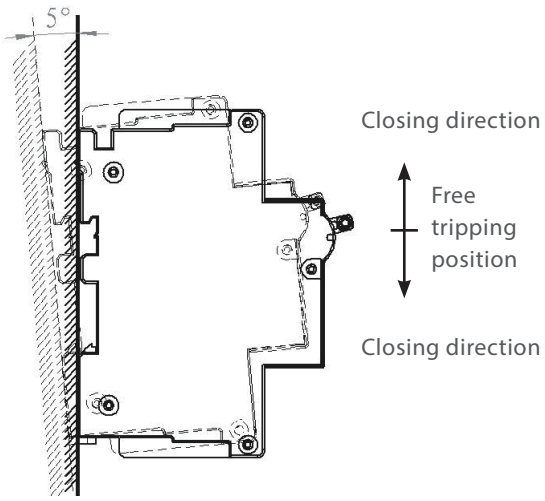
5.4.3 Outline Dimension of Parallel Products



Note: For DC products, terminal position is without LINE and LOAD marks.

5.4.4 Installation and Operation Modes

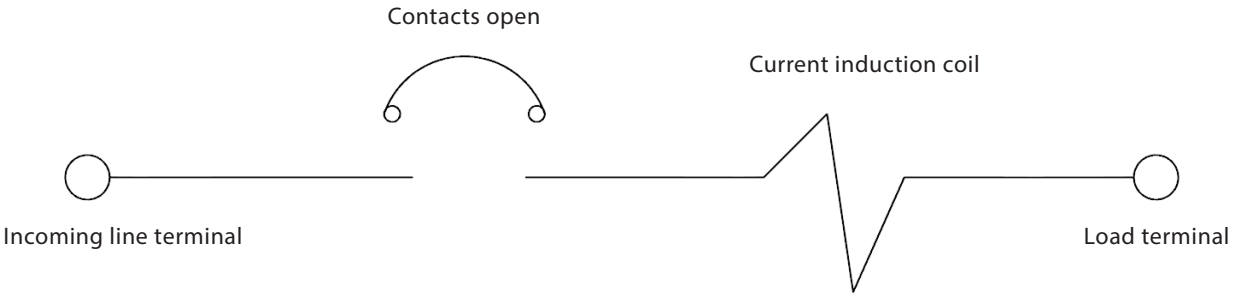
- Installation mode: In terms of installation of guide rails, 35mm standard guide rails or mini-guide rails may be used to install the product; in terms of installation position requirements, the inclination of the vertical installation surface of the product is required to be not more than 5 ° .
- Operation mode: The product has three position status, and the positional relationship is shown in the figure below. When the product is in the free tripping position: First, rotate the product ' s handle towards the opening direction to realize "re-trip" and keep 1s to ensure the product can be reliably re-tripped, then push the handle to the closing direction to realize product closing so as to connect and protect the circuit. When the product is in the opening position: Directly push the handle towards the closing direction to realize product closing so as to connect and protect the circuit. When the product is in the closing position: Directly push the handle towards the opening direction to realize product opening and to disconnect the circuit. When the current signal flowing through the product reaches the agreed tripping current value, the product will trip due to fault within the agreed time frame; in this case, the product will return to the free tripping position; after circuit troubleshooting, the above operations may be carried out to realize product closing.



6. Electric Circuit Diagram

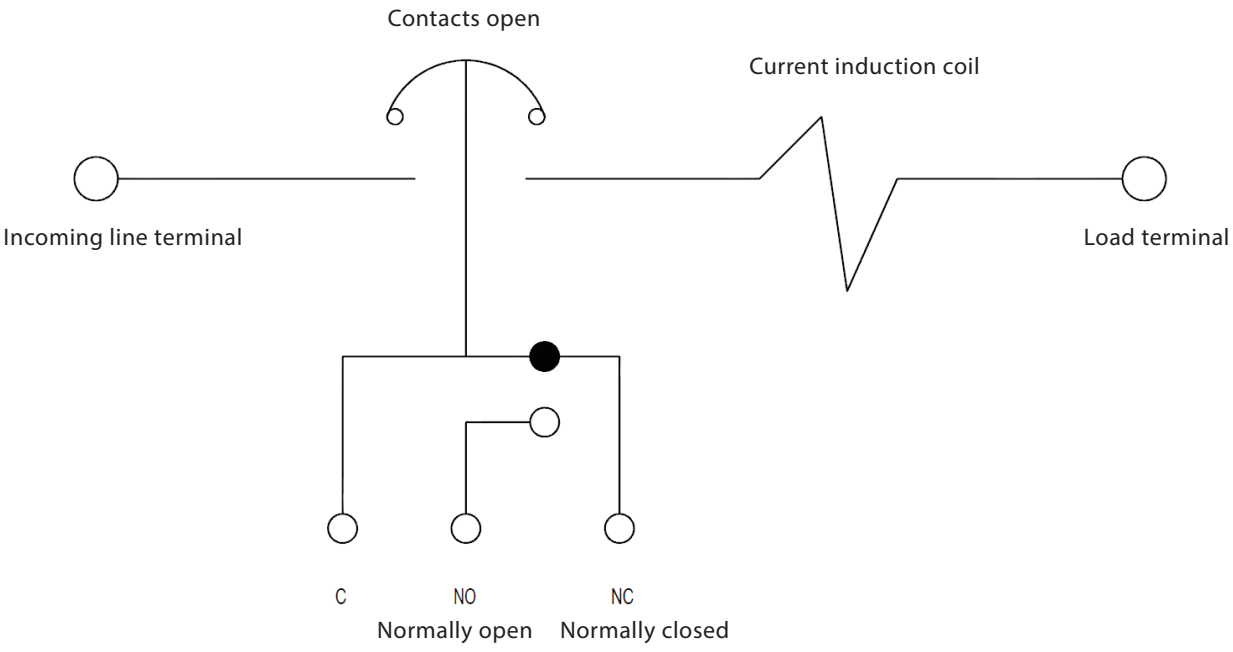
● Product Wiring Diagram

● NDB3-50/100 tripping in series of a product without auxiliary contacts



A complete circuit consists of incoming and outgoing line terminals, contacts, and electromagnetic coils.

● NDB3-50/100 产品带辅助触头的串联脱扣



Compared with basic serial mechanism, a circuit with auxiliary contacts is additionally provided with an electrically insulating S.P.D.T (single-pole double-throw) micro switch on the mechanical structure to connect with the main contacts of circuit breaker, and this switch is usually used as remote signal of circuit breaker status (ON/OFF).

Nader

7. Specifications for Ordering and Selection (Tick √ in □)

7.1 NDB3-30 Series Product Selection Table

NDB3-30	Z4	20 /	2	Q	H	Y1 -	2 -	0 -	R	FL
1	2	3	4	5	6	7	8	9	10	11

Serial No.	Serial No. Name	NDB3-30
1	Product models	NDB3-30□
2	Tripping curve code	Z2 DC short time delay □ Z4 DC medium time delay □ J2 AC short time delay □ J4 AC medium time delay □
3	Rated current of conventional products（A）	0.1，0.2，0.3，0.4，0.5，0.6，0.7，0.75，0.8，0.9，1，1.5，2，2.5，3，3.5，4，4.5，5，5.5，6，6.5，7，7.5，8，8.5，9，9.5，10，11，12，13，14，15，16，17，18，19，20，21，22，23，24，25，26，27，28，29，30
	Rated current of lightning protection products（A）	10，11，12，13，14，15，16，17，18，19，20，21，22，23，24，25，26，27，28，29，30
4	Number of poles	1 1pole □ ； 2 2poles □
5	Installation mode code	Q Embedded-type installation □
6	Wiring mode code	H Welded/Lug wiring □ C Plug-in wiring terminal for wiring □ E 8-32UNC Screw wiring □ J 8-32UNC upturned lug screw wiring □ P M4 screw wiring □ R M4 upturned lug screw wiring □
7	Operation mode code	Y1 black rocker, vertical white □ Y2 black rocker, horizontal white □ Y3 white rocker, vertical black □ Y4 white rocker, horizontal black □ Y5 Orange rocker, vertical black □ Y6 Orange rocker, horizontal black □ Y7 red rocker, vertical black □ Y8 red rocker, horizontal black □
8	Shell color code	1 Black □ 2 Gray □ 3 Black without operation protection □ 4 Grey without operation protection □
9	Accessory code	0 No accessories □
10	Other certification codes	Blank: 3C, TUV, CE certification □ R： Passing 3C, CE, TUV, UL1077 certification □ L: 3C, CE, TUV, UL489A certification passed □
11	Categories of special functional accessories	FL: Lightning protection product (unipolar) □
12	Finally selected model	
13	Quantity	

Notes for filling:

- Please tick □ behind the corresponding option, and directly mark the current specifications on the numbers.
- For special product requirements, please attach a written explanation.

7.2 NDB3-50 Series Product Selection Table

NDB3-50	Z4	40 /	1	L	L	A1	A	0	0 -	L
1	2	3	4	5	6	7	8	9	10	11

Serial No.	Serial No. Name	NDB3-50
1	Product models	NDB3-50 ☐
2	Tripping curve code	Z2 DC short time delay ☐ J2 AC short time delay ☐ Z4 DC medium time delay ☐ J4 AC medium time delay ☐ Z6 DC long time delay ☐ J6 AC long time delay ☐
3	Rated current (A)	0.5、1、2、2.5、3、4、5、6、7、8、9、10、12、 15、16、20、24、25、30、32、35、40、45、50
4	Number of poles	1 1 pole ☐ 2 2 poles ☐ 3 3 poles (only for AC products) ☐
5	Installation mode code	L M3 Screw installation ☐ Q Embedded-type installation ☐ M 6-32UNC screw installation ☐
6	Wiring mode code	C Plug-in wiring terminal ☐ E 8-32UNC screw terminal ☐ F M5 upturned lug screw terminal ☐ G 10-32UNF screw terminal ☐ H Quick lug terminal ☐ J 8-32UNC upturned lug screw terminal ☐ K 10-32UNF upturned lug screw terminal ☐ L M5 screw terminal ☐ N Vertical M5 screw wiring terminal ☐ P M4 screw terminal ☐ R M4 upturned lug screw terminal ☐
7	Operation mode code	S1 black long handle, white: ON/OFF, with current specifications ☐ S2 black long handle, white: ON/OFF, I/O, with current specifications ☐ S3 white long handle, black: ON/OFF, with current specifications ☐ S4 white long handle, black: ON/OFF, I/O, with current specifications ☐ S5 yellow long handle, black: ON/OFF, with current specifications ☐ S6 yellow long handle, black: ON/OFF, I/O, with current specifications ☐ D1 black short handle, white: ON/OFF, with current specifications ☐ D2 black short handle, white: ON/OFF, I/O, with current specifications ☐ D3 white short handle, black: ON/OFF, with current specifications ☐ D4 white short handle, black: ON/OFF, I/O, with current specifications ☐ D5 yellow short handle, black: ON/OFF, with current specification ☐ D6 yellow short handle, black: ON/OFF, I/O, with current specifications ☐ Y1 unicolor rocker, vertical white: ON/OFF, I/O, with current specifications ☐ Y2 unicolor rocker, horizontal white: ON/OFF, I/O, with current specifications ☐ Y3 unicolor rocker, vertical white: ON/OFF , I/O ☐ Y4 unicolor rocker, horizontal white: ON/OFF , I/O ☐ Y5 bicolor rocker, vertical white: ON/OFF, I/O, ON indicated, with current specifications ☐

<table>
<tr><td>7</td><td>Operation mode code</td><td colspan="5">Y6 bicolor rocker, horizontal white: ON/OFF, I/O, OFF indicated, with current specifications ☐
Y7 bicolor rocker, vertical white: ON/OFF, I/O, OFF indicated, with current specifications ☐
Y8 bicolor rocker, horizontal white: ON/OFF, I/O, OFF indicated, with current specifications ☐
A1 black button, white vertical double word: ON/OFF, I/O, OFF indicated, with current specifications, ☐ White indicates OFF, OFF position with protection ☐
A2 black button, white vertical double word: ON/OFF, I/O, OFF indicated, with current specifications, ☐ White indicates OFF ☐
A4 black button, white vertical double word: ON/OFF, I/O, OFF indicated, with current specifications, ☐ White indicates OFF ☐</td></tr>
<tr><td>8</td><td>Operator number code</td><td colspan="5">A One per pole ☐
B one for multipole (two poles and above) ☐</td></tr>
<tr><td>9</td><td>Accessory code</td><td colspan="5">0 No accessories ☐
1 With auxiliary contacts (subject to installation direction and installed on the left-most pole) ☐</td></tr>
<tr><td>10</td><td>Shell code</td><td colspan="5">0 Shell handle operating surface is convex ☐
1 Shell handle operating surface is concave (only applicable to handle type) ☐</td></tr>
<tr><td>11</td><td>Certification code</td><td colspan="5">No code CCC, TUV, CE certification ☐
R CCC、TUV、CE、UL1077 ☐
LCCC, TUV, CE, UL489A (only for DC products) ☐
IUL1500 Certification ☐
KCCC, TUV, CE certification, UL489 (only for AC products) ☐
KCCC, TUV, CE certification, UL489 (only for 2-pole AC products) ☐</td></tr>
<tr><td rowspan="2">12</td><td rowspan="2">Special functional accessories</td><td colspan="5">Anti-surge YL1: 12In anti-surge ☐</td></tr>
<tr><td>Double coils</td><td>MX☐</td><td>1: Relay tripping, AC ☐
2: Relay tripping, DC☐
3: Shunt tripping, AC ☐
4: Shunt tripping, DC ☐</td><td>Voltage coil wiring terminal code
1: Welded/Quick lug wiring ☐
2: M4 screw wiring ☐
3: 8-32 screw wiring ☐</td><td>Control voltage code
1: 18V☐
2: 24V ☐
3: 32V ☐
4: 36V ☐
5: 48V ☐
6: 65V ☐
7: 110-220V (only for AC) ☐</td></tr>
<tr><td>13</td><td>Finally selected model</td><td colspan="5"></td></tr>
<tr><td>14</td><td>Quantity</td><td colspan="5"></td></tr>
</table>

Notes for filling:

● Please tick ☐ behind the corresponding option, and directly mark the current specifications on the numbers.

● For a product with the operation mode of Y, the type of the number of operators of a multipolar product is only Type B: For a product with Type D operation mode, there are no multipolar products.

● For a multipolar product with the number of operators being Type B, the 2-pole operator is in the left pole, the 3-pole operator is in the middle pole, and the auxiliary contacts are in the leftmost pole.

7.3 NDB3-100 Series Product Selection Table

NDB3-100	XX	X	/	X	X	X	XX	X	X	-	X
1	2	3		4	5	6	7	8	9		10

Serial No.	Serial No. Name	NDB3-100	
1	Product models	NDB3-100 ☐	
2	Tripping curve code	Z2 DC short time delay ☐ Z4 DC medium time delay ☐ Z6 DC long time delay ☐	J2 AC short time delay ☐ J4 AC medium time delay ☐ J6 AC long time delay ☐
3	Rated current (A)	Conventional use current specifications	1、2、3、4、5、6、8、10、12、15、16、20、24、25、30、32、35、36、40、45、50、60、70、80、90、100
		Multipole parallel use specifications (only for DC products)	B+ Current specifications: Indicates parallel wiring (3P, 4P) F+ Current specifications: Indicates parallel split wiring (2P, 3P, 4P) P+ Current specifications: Indicates a product with multipole parallel use but without parallel sheet (2P, 3P, 4P) Current Specifications ： 2P: 100A、125A、150A、160A、175A、200A 3P: 175A、200A、225A、250A、275A、300A 4P: 275A、300A、325A、350A、375A、400A
		Parallel single coil current specifications	2P: 125A、150A、160A、175A、200A 3P: 200A、225A、250A Note: 1. The auxiliary switches of parallel single coil are subject to the installation direction of the product and are installed on the rightmost side; 2. When the operation mode is Type L, and the number of operators is "A", Type S/U wiring terminals should be used; 3. For parallel one-coil selection, ① in No. 14 is represented by "DX".
4	Number of poles	1 1pole ; ☐ 2 2poles ; ☐ 3 3 poles (For applicable current specifications, see "3.9 Rated breaking capacity table") ☐ 4 4 poles (Current≥275A and only for DC products, only for Type S/L operation mode) ☐	
5	Installation mode code	L M3 screw installation ☐ M 6-32UNC screw installation ☐	
6	Wiring mode code	S: M6 bolt wiring (double-nut) ☐ T: M5 bolt wiring (double-nut) ☐ V: M5 bolt wiring (Single-nut) ☐ L: M5 screw ☐ U: M6 bolt wiring (dingle-nut) ☐ C: Plug-in wiring ☐ B: Plug-in wiring ☐ H: 1/4-20 UNC bolt wiring (Double-nut) ☐ N: 1/4-20UNC bolt wiring (single-nut) ☐ P: 10-32UNF bolt wiring (double-nut) ☐ W: 10-32 UNF bolt wiring (Single-nut) ☐ K: 10-32UNF screw ☐	

7	Operation mode code	S1 black long handle, white: ON/OFF, with current specifications ☐ S2 black long handle, white: ON/OFF, I/O, with current specifications ☐ S3 white long handle, black: ON/OFF, with current specifications ☐ S4 white long handle, black: ON/OFF, I/O, with current specifications ☐ S5 yellow long handle, black: ON/OFF, with current specifications ☐ S6 yellow long handle, black: ON/OFF, I/O, with current specifications ☐ Y1 unicolor rocker, vertical white: ON/OFF, I/O, with current specifications ☐ Y2 unicolor rocker, horizontal white: ON/OFF, I/O, with current specifications ☐ Y3 unicolor rocker, vertical white: ON/OFF , I/O ☐ Y4 unicolor rocker, horizontal white: ON/OFF , I/O ☐ Y5 bicolor rocker, vertical white: ON/OFF, I/O, ON indicated, with current specifications ☐ Y6 bicolor rocker, horizontal white: ON/OFF, I/O, OFF indicated, with current specifications ☐ Y7 bicolor rocker, vertical white: ON/OFF, I/O, OFF indicated, with current specifications ☐ Y8 bicolor rocker, horizontal white: ON/OFF, I/O, OFF indicated, with current specifications ☐ A1 black button, white vertical double word: ON/OFF, I/O, OFF indicated, with current specifications, ☐ White indicates OFF, OFF position with protection ☐ A2 black button, white vertical double word: ON/OFF, I/O, OFF indicated, with current specifications, ☐ White indicates OFF ☐ A4 black button, white vertical double word: ON/OFF, I/O, OFF indicated, with current specifications, ☐ White indicates OFF ☐ L1 black long handle, white: ON/OFF ☐ L2 black long handle, white: ON/OFF , I/O ☐ L3 white long handle, black: ON/OFF ☐ L4 white long handle, black: ON/OFF,I/O ☐ L5 yellow long handle, black: ON/OFF ☐ L6 yellow long handle, black: ON/OFF, I/O ☐
8	Operator number code	A One per pole ☐ B one for multipole ☐
9	Accessory code	0 No accessories ☐ 1 with auxiliary contacts (subject to the installation direction, auxiliary contacts are installed in the far left) ☐
10	Certification code	Blank CCC, TUV, CE certification ☐ RCCC, TUV, CE, UL1077 certification (only for AC products) ☐ LCCC, TUV, CE certification, UL489A column name (only for DC products) ☐ KCCC, TUV, CE certification, UL489 ☐ Note: AC current specifications are 1~70A, and DC current specifications are 1~100A C South Korea KC certification, CCC, TUV, CE, UL1077 certification (only S/T terminal is used for wiring) ☐

11	Categories of special functional accessories	MX: Double-coil product ☐	1: Relay tripping, AC ☐ 2: Relay tripping, DC☐ 3: Shunt tripping, AC ☐ 4: Shunt tripping, DC ☐	Voltage coil wiring terminal code 1: Welded/Quick lug wiring ☐ 2: M4 screw wiring ☐	Control voltage code 1: 18V ☐ 2: 24V ☐ 3: 32V ☐ 4: 36V ☐ 5: 48V ☐ 6: 65V ☐ 7: 110-220V (only for AC) ☐
12	Special functional accessories	RB: Remote control product☐	Control voltage 1 : DC12V ☐ 2 : DC24V ☐ 3 : DC36V ☐	Outgoing line 0: None ☐ 1: Outgoing line 200mm ☐ 2: Special outgoing line ☐	
		YL1: 12In anti-surge product ☐			
		MT: Intermediate trigger product ☐ 0: Without alarm contacts ☐ 1: With alarm contacts ☐			
		DX: Parallel single-coil product (only for DC parallel use) ☐			
13	Finally selected model				
14	Quantity				

Notes for filling:

● Please tick ☐ behind the corresponding option, and directly mark the current specifications on the numbers.

7.4 NDB5 Series Product Selection Table

NDB5	Z4	80 /	2	P	U	0	- W -	R
1	2	3	4	5	6	7	8	9

Serial No.	Serial No. Name	NDB5
1	Product models	NDB5 ☐
2	Tripping curve code	Z2 DC short time delay ☐ Z4 DC medium time delay ☐ Z6 DC long time delay ☐ J2 AC short time delay ☐ J4 AC medium time delay ☐ J6 AC long time delay ☐
3	Rated current (A)	0.5 , 0.6 , 0.7 , 0.8 , 0.9 , 1 , 1.5 , 2 , 2.5 , 3 , 3.5 , 4 , 4.5 , 5 , 5.5 , 6 , 6.5 , 7 , 7.5 , 8 , 8.5 , 9 , 9.5 , 10 , 12 , 15 , 16 , 20 , 24 , 25 , 30 , 32 , 35 , 40 , 45 , 50 , 55 , 60 , 63 , 70 , 80 , 90 , 100 , 105 , 110 , 120 , 125 , 150
4	Number of poles	1 - 1pole ☐ ; 2 - 2poles ☐ ; 3 - 3poles ☐
5	Pole type	P - Indicates that it is without neutral pole ☐; N - Indicates that it is with neutral pole (only 1N or 3N) ☐
6	Connection mode	Blank - Indicates non-parallel products ☐; U - Indicates parallel products (two-pole or three-pole in parallel) ☐
7	Accessory code	0 No accessories ☐
8	Operating surface dimension	Blank - Indicates that the operating surface dimension is 45mm ☐; W-Indicates that the operating surface dimension is 57mm ☐
9	Certification code	R - represents that it is in line with CCC, TUV, UL1077, CE certification ☐ L - Represents that it is in line with CCC, TUV, UL1077, CE certification ☐
10	Finally selected model	
11	Quantity	

Notes for filling:

● Please tick ☐ behind the corresponding option, and directly mark the current specifications on the numbers.