

# Industrial Protection Products

2016 Edition

## Nader

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**Nader**



# NDR1

## Electronic overload relay

2016 Edition

**Nader**

## 1. Product overview

		
Product models	NDR1-38	NDR1-95
Setting current scope (A)	0.1~40	23~95
Product certification	CCC、CE、TUV	

## 2. Product features

### Scope of application and purpose

NDR1 electronic overload relay is used to protect overload of three-phase AC circuit and motor, overtime of starting period, phase loss and phase current unbalance. 3-stage thermal overload relay, used for motor protection, adjustable at 0.1~95A.

### Design features

- ◆ Internal current transformer;
- ◆ With temperature compensation;
- ◆ High tripping precision, tripping directives and overload warning function;
- ◆ With bistable function output actuator;
- ◆ Tripping grade is 10;
- ◆ With setting current regulation;
- ◆ There is a mechanism detection button on the panel (also used as tripping button);
- ◆ There is a normally closed contact disconnection button on the panel (for self-inspection of the circuit)
- ◆ With manual/automatic reset functions;
- ◆ With one normally closed auxiliary contact and one normally open auxiliary contact;
- ◆ Take power directly from the power grid, convenient and quick.

### Meeting the following standards

- ◆ GB 14048.4 Low-voltage switchgear and control equipment Part 4-1:
- ◆ GB 14048.5 Low-voltage switchgear and control equipment Part 5-1:
- ◆ IEC 60947-1 Low-voltage switchgear and controlgear-Part 1: General rules
- ◆ IEC 60947-4 Low-voltage switchgear and controlgear-Part 4-2

## 3. Application scope

### Applicable environment

- ◆ Temperature of the working environment/storage temperature  
Temperature of the working environment:  $-25^{\circ}\text{C}\sim+60^{\circ}\text{C}$ , the average temperature in 24h shall not exceed  $+35^{\circ}\text{C}$ ; when using the product at the ambient temperature of below  $-25^{\circ}\text{C}$ , the user should consult with the manufacturer.  
Storage temperature:  $-40^{\circ}\text{C} \sim +70^{\circ}\text{C}$ .
- ◆ Altitude  
Installation site altitude  $\leq 2,000\text{m}$ .
- ◆ Relative humidity for operation/relative humidity for storage  
The relative humidity of atmosphere is not more than 50% at the ambient air temperature of  $+40^{\circ}\text{C}$ ; at a lower temperature, a higher relative humidity is allowed, for example, 90% at the ambient temperature of  $20^{\circ}\text{C}$ ; as the temperature change will cause condensation occasionally, the user should take special measures.

### Pollution grade

Grade 3.

### Protection grade

Product protection grade: IP20

### Installation conditions

- ◆ The overload relay is directly plugged to the NDC1 contactor and is provided with an independent mounting base that can be screw mounted and 35mm rail mounted;
- ◆ Overload relay should be installed at a place with no obvious vibration and shock.

### Installation category

Category III (power distribution and control level)

### Installation direction

Any angle

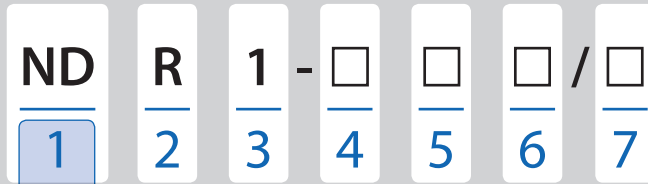
### Environmental protection requirements

Products meet the ROHS standard



## 4. Technical characteristics of the product

### 4.1 Description of specifications and models



Serial No.	Serial No. name	NDR1
1	Enterprise code	ND : <b>Nader</b> brand low-voltage apparatus
2	Product code	R : Electronic overload relay
3	Design serial No.	1
4	Product basic type code	38、95
5	Reset model code	A : Automatic reset M : Manual reset
6	Specification code of setting current	See Serial No. 4 in Table 4.2
7	Auxiliary supply voltage	50Hz/60Hz, 110 V, 220V, 380V

## 4.2 Technical parameters

### ● Parameter selection

Serial No. 1 Overload relay setting current /A	Serial No. 2 Type of fuse used in conjunction with fuse		Serial No. 3 Recommended model of supporting contact model (For direct plugging under the contactor)	Serial No. 4 Overload relay model
	aM/A	gG/A		
			NDC1-	
0.1 ~ 0.16	0.25	2	09 ~ 38	NDR1-38A11 or NDR1-38M11
0.16 ~ 0.25	0.5	2	09 ~ 38	NDR1-38A12 or NDR1-38M12
0.25 ~ 0.40	1	2	09 ~ 38	NDR1-38A13 or NDR1-38M13
0.40 ~ 0.63	1	2	09 ~ 38	NDR1-38A14 or NDR1-38M14
0.63 ~ 1	2	4	09 ~ 38	NDR1-38A15 or NDR1-38M15
1 ~ 1.6	2	4	09 ~ 38	NDR1-38A16 or NDR1-38M16
1.6 ~ 2.5	4	6	09 ~ 38	NDR1-38A17 or NDR1-38M17
2.5 ~ 4	6	10	09 ~ 38	NDR1-38A18 or NDR1-38M18
4 ~ 6	8	16	09 ~ 38	NDR1-38A21 or NDR1-38M21
5.5 ~ 8	12	20	09 ~ 38	NDR1-38A22 or NDR1-38M22
7 ~ 10	12	20	09 ~ 38	NDR1-38A23 or NDR1-38M23
9 ~ 13	16	25	09 ~ 38	NDR1-38A24 or NDR1-38M24
12 ~ 18	20	35	12 ~ 38	NDR1-38A25 or NDR1-38M25
17 ~ 25	25	50	18 ~ 38	NDR1-38A26 or NDR1-38M26
23 ~ 32	40	63	25 ~ 38	NDR1-38A27 or NDR1-38M27
30 ~ 40	40	80	32 ~ 38	NDR1-38A28 or NDR1-38M28
23 ~ 32	40	63	40 ~ 95	NDR1-38A31 or NDR1-38M31
30 ~ 40	40	100	40 ~ 95	NDR1-38A32 or NDR1-38M32
37 ~ 50	63	100	40 ~ 95	NDR1-38A33 or NDR1-38M33
48 ~ 65	63	100	50 ~ 95	NDR1-38A34 or NDR1-38M34
55 ~ 70	80	125	65 ~ 95	NDR1-38A35 or NDR1-38M35
63 ~ 80	80	125	65 ~ 95	NDR1-38A36 or NDR1-38M36
80 ~ 95	100	160	80 ~ 95	NDR1-38A37 or NDR1-38M37

## ● Main performance indicators

Type		NDR1-38	NDR1-95	
Setting range	By product model	0.1 ~ 40A	23 ~ 95A	
Rated insulation voltage (Ui)	Consistent with GB14048.4	690V	690V	
Operating voltage Frequency		50Hz/60Hz	50Hz/60Hz	
Tripping grade	Consistent with GB14048.4	10	10	
Reset	By product model	Manual or automatic	Manual or automatic	
	Reset time	Manual reset: Press the reset button to reset immediately Automatic reset: Reset 1min after fault tripping		
Indication		Green LED indicator: 1) Normal operation: Operating power connected, circuit not overloaded, and LED normally on. 2) Overload tripping alarm (>105%le): LED flashing. 3) Tripping indication: When the operating power is connected, LED is off after tripping.		
Default phase protection		If phase loss rate is more than 70%, tripping occurs within 2s		
Unbalanced phase protection		When the phase unbalance rate is more than 50%, tripping occurs within 4s		
"Stop" function		Press Stop button: Cause the NC contact to operate and have no impact on NO contact		
"Test" function		Use a screwdriver to press the knob and rotate it to the tripping position in order to perform the following functions: 1) Simulate the overload relay tripping to cause the NC and NO contacts to operate 2) Check the control circuit wiring		
Wiring	One flexible circuit conductor without wiring terminal	Min/max cross-section area	1.5/10 mm <sup>2</sup>	4/35 mm <sup>2</sup>
	One flexible conductor without wiring terminal		1/4 mm <sup>2</sup>	4/35 mm <sup>2</sup>
	One flexible conductor with wiring terminal		1/6 mm <sup>2</sup>	4/35 mm <sup>2</sup>
Tightening torque		1.85N.m	9N.m	
Tripping curve		Indicate the relationship between the average trip time and the setting current value multiple		
EMC radiation level	Conduction radiofrequency radiation	Consistent with GB14048.4,GB4824		
	Radioactive radiation	Consistent with GB14048.4 ,GB4824		
EMC anti-interference level	Electrostatic discharge	Consistent with GB14048.4,GB17626.2		
	Infinite power frequency of electromagnetic field	Consistent with GB14048.4,GB17626.3		
	Fast transient	Consistent with GB14048.4,GB/T 17626.4		
	Surge transient	Consistent with GB14048.4,GB/T 17626.5		

### ● Auxiliary contact Characteristics

Conventional heating current I <sub>th</sub>			5A
Category and control capacity			AC-15 400V/360VA DC-13 220V/33W
Gg and Bs fuse protection, maximum specifications			5A
Wiring	One flexible circuit conductor without wiring terminal	Min/max cross-section area	1/2.5 mm <sup>2</sup>
	One flexible conductor without wiring terminal		1/2.5 mm <sup>2</sup>
	One flexible conductor with wiring terminal		1/2.5 mm <sup>2</sup>
Tightening torque			1.2 N.m

### ● Auxiliary power supply characteristic

Auxiliary supply voltage			50Hz/60Hz, 110V, 220V, 380V
Wiring	One flexible circuit conductor without wiring terminal	Min/max cross-section area	1/2.5 mm <sup>2</sup>
	One flexible conductor without wiring terminal		1/2.5 mm <sup>2</sup>
	One flexible conductor with wiring terminal		1/2.5 mm <sup>2</sup>
Tightening torque			1.2 N.m

## ● Special features of electronic overload relay

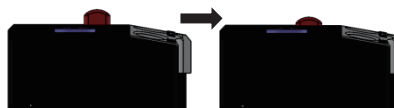
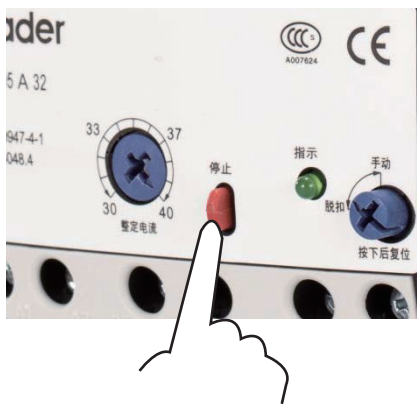
"Current setting" function



- Rotate the dial 1 in A for adjustment

Note: ○ Limit the knob to the effective angle range indicated by the arrow, otherwise it may cause damage to the knob

○ To prevent incorrect adjustment of setting current during the operation of motor, the relay only memorizes the setting value before the auxiliary power is connected. If adjustment of setting current value is still required after the operation of product, disconnect the auxiliary power, readjust the setting value, reconnect the auxiliary power, and then the relay will rememorize the setting current after adjustment



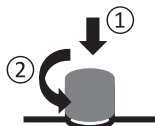
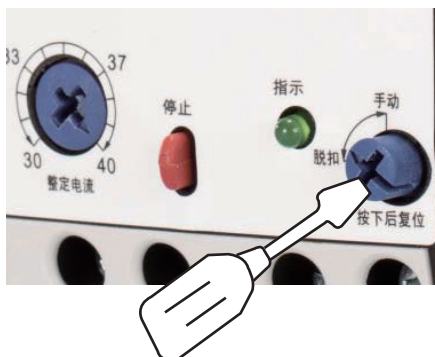
- Press the red button 2 to perform the "stop" function

Note: ○ Press "stop" button.

NC The contact operates;  
NO The contact is not affected.

- Release the hands:

NC The contact returns to its original status;  
NO The contact is still not affected.



- The green LED3 can indicate normal operation, overload and tripping of relay

Note: ○ LED is always on:

Normal operation (and the current is not more than 105% of the rated value);

- LED is flashing: Overload (and the current is more than 105% of the rated value);

- LED is off: When the operating power is connected, LED is not displayed after tripping.

- Knob 4 can provide a combine function of "test" and "manual reset"

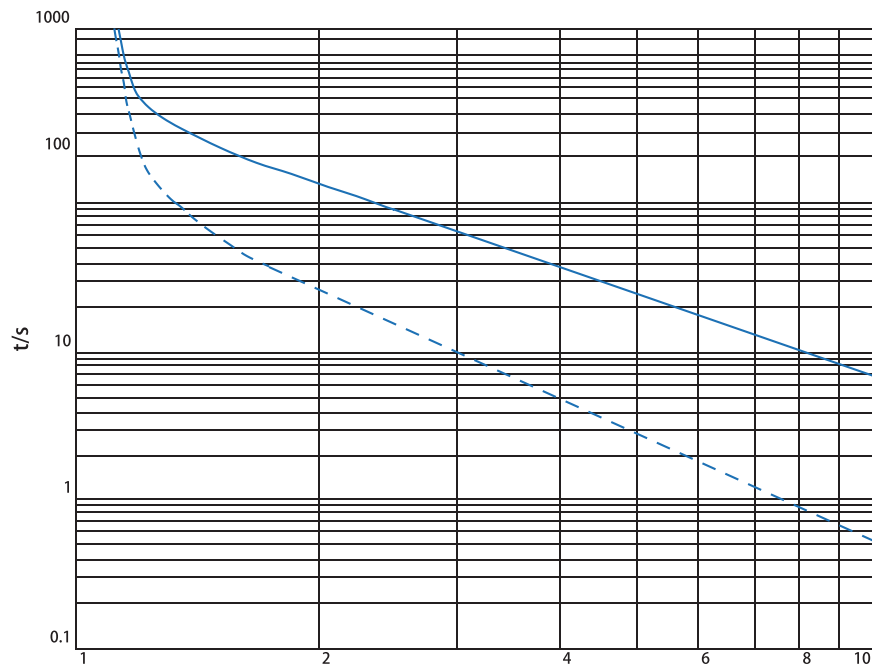
Note: ○ When the knob arrow points at the manual state, press "manual reset" with hand;

- Use a screwdriver to press the knob, rotate it counterclockwise to the tripping position and release it to simulate relay tripping and operation of NC and NO contacts; after tripping, press the manual reset button to operate the operation mechanism;

- During automatic resetting period, an automatic resetting product could still be manually reset by pressing it with hand.

## 4.3 Product tripping curve

### ● Level 10 (Class 10) protection curve



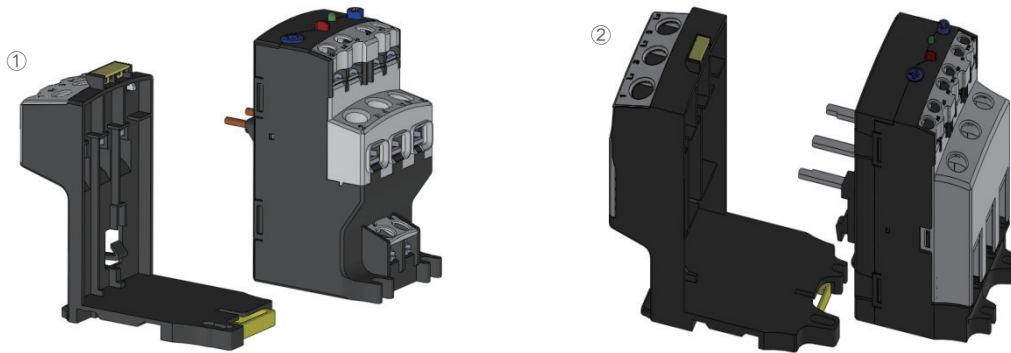
Full load current multiple

Tripping grade 10

- Tripping time from cold state under the 3 phase equilibrium condition
- - - - - Tripping time from hot state under the 3 phase equilibrium condition

## 5. Accessories

### 5.1 List of accessories



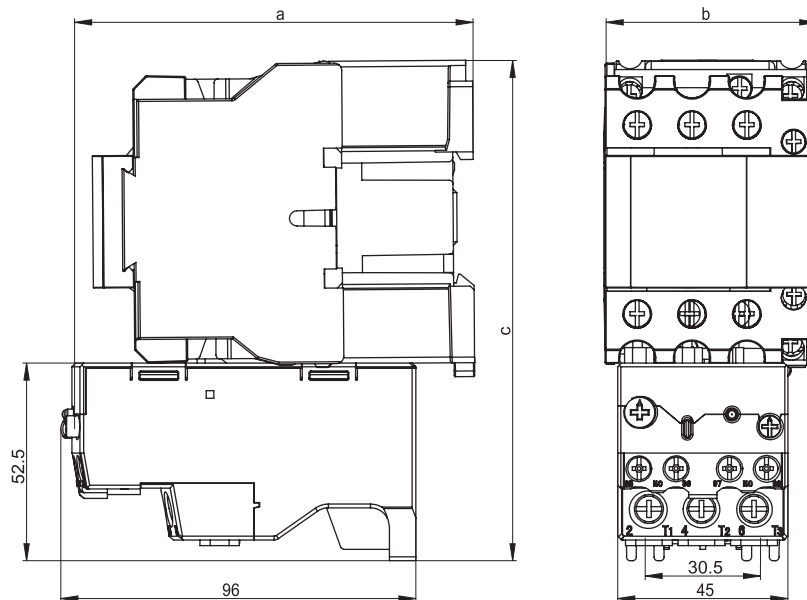
Serial No.	Name	Model	Installation mode
①	Independent mounting base	NA1-38	Socketing
②	Independent mounting base	NA1-95	Socketing

### 5.2 Function description

Component	Function
Independent mounting base	After NDR1 is additionally equipped with NA1 mounting base, screw mounting or TH35 standard mounting rail may be used for mounting

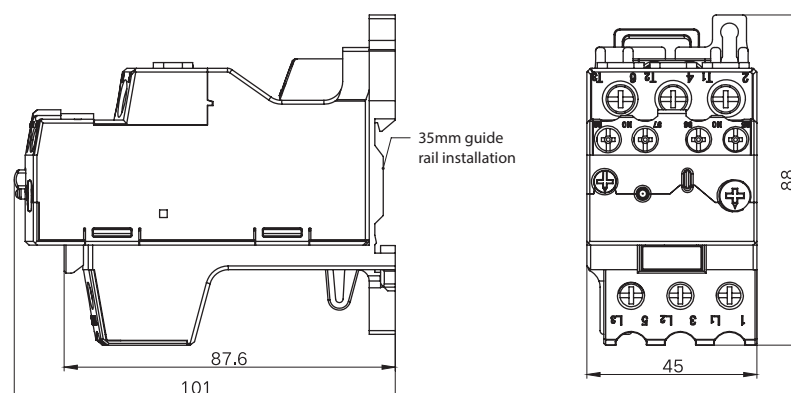
## 6. Outline and installation dimension

### ● NDR1-38 support contactor installation



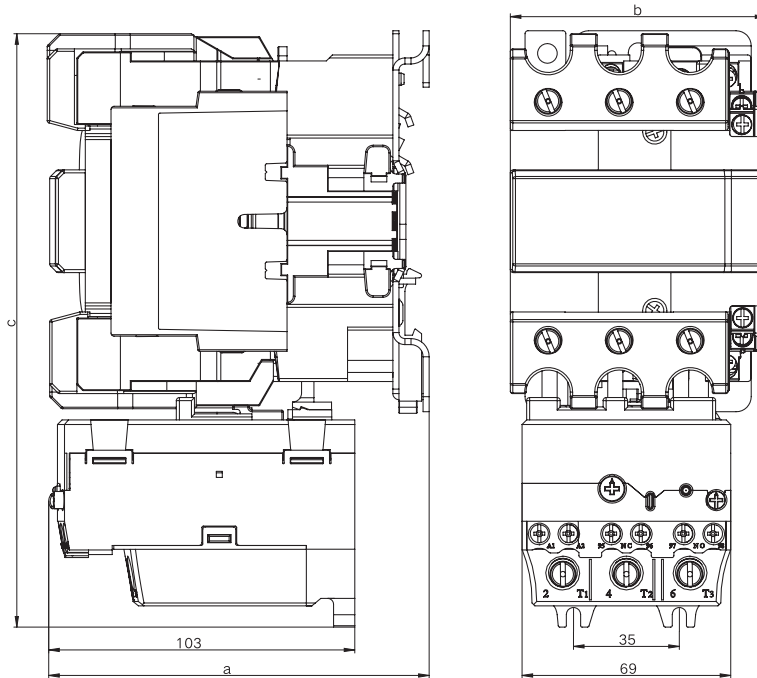
Contactors model	a	b	c
NDC1-09/12	103	45	127
NDC1-18	103	45.5	127
NDC1-25	115	57	136
NDC1-32	115	57	136
NDC1-38	115	57	136

### ● NDR1-38+NA1-38 rail and screw mounted



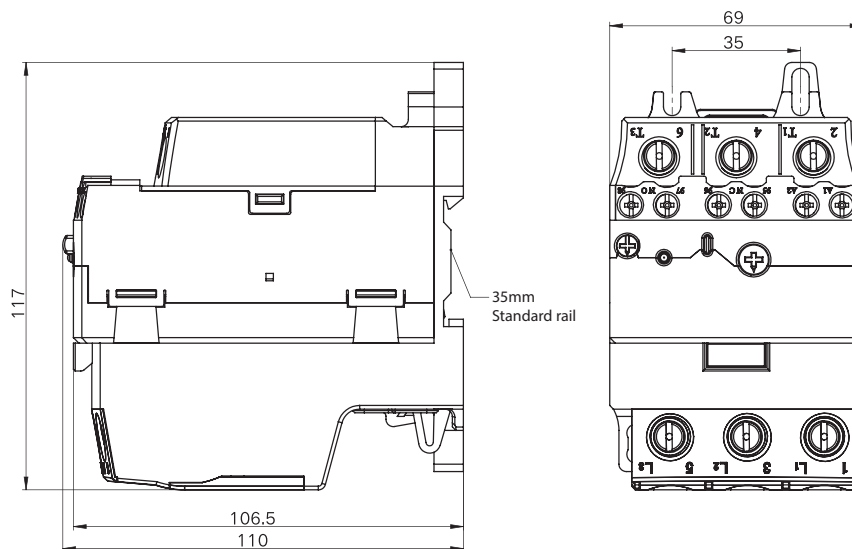


## ● NDR1-95 support contactor installation

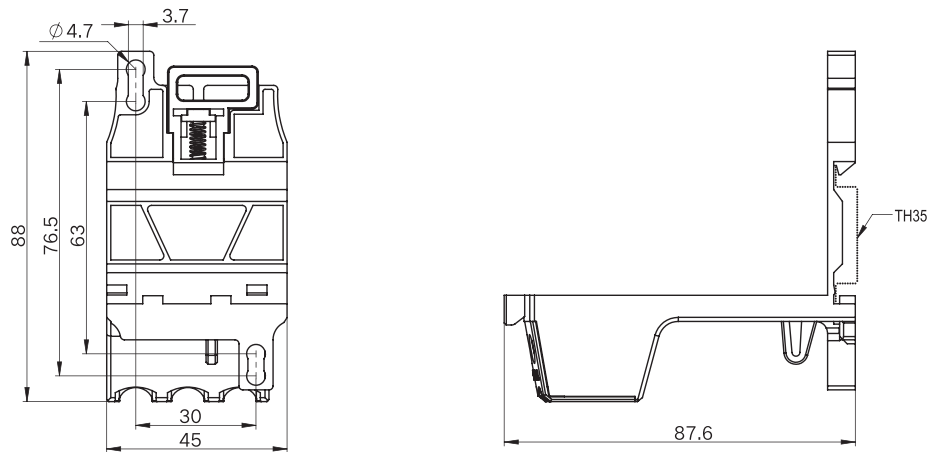


Contactors model	a	b	c
NDC1-40/50/65	128	74.5	195
NDC1-80/95	134	84.5	200

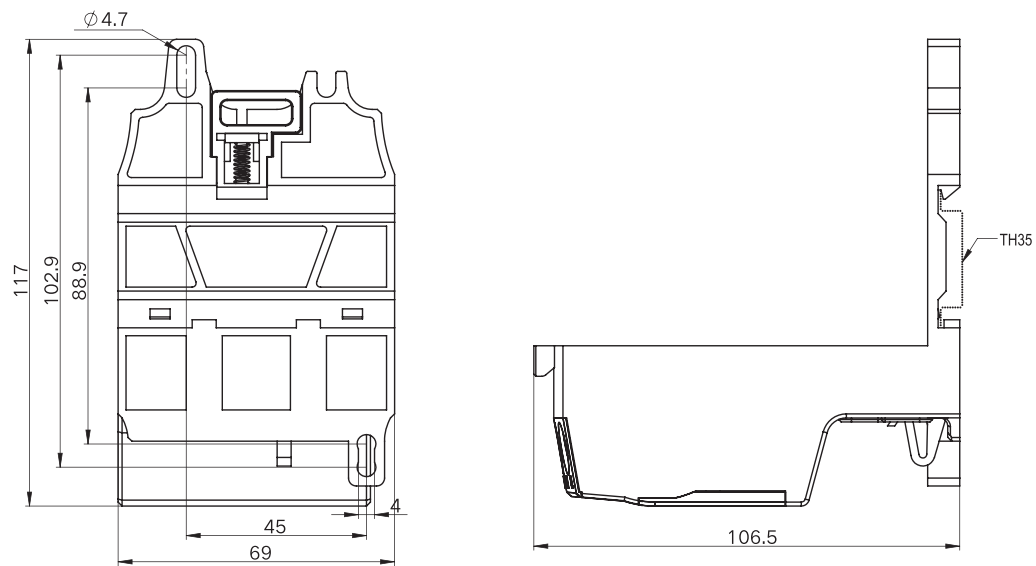
## ● NDR1-95+NA1-95 rail and screw mounted



● Outline and installation dimension of NA1 independent mounting base



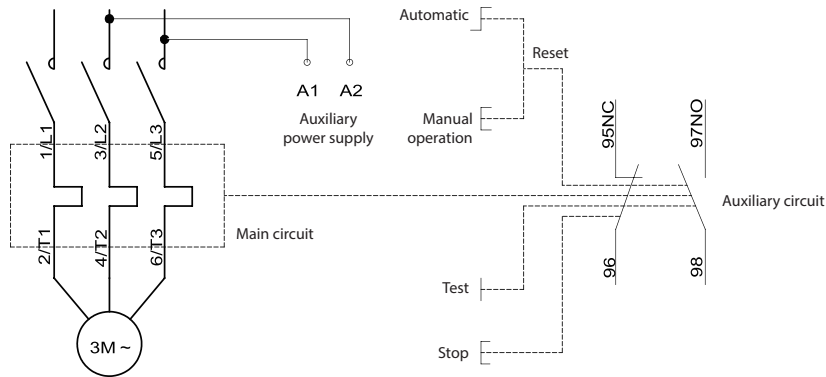
NA1-38 Outline and installation dimension



NA1-95 outline and installation dimension

Note: All installation and outline dimensions are in "mm", and those not marked with tolerance are subject to "X.X  $\pm$  0.5, X  $\pm$  1".

## 7. Electric circuit diagram



## 8. Specifications for ordering or selection

User unit		Number of units ordered:	Date of order:
Type of product	<input type="checkbox"/> NDR1-38 ( 0.1~40A ) <input type="checkbox"/> NDR1-95 ( 23~95A )		
Setting current (A)	<input type="checkbox"/> 0.1~0.16 <input type="checkbox"/> 0.16~0.25 <input type="checkbox"/> 0.25~0.40 <input type="checkbox"/> 0.40~0.63 <input type="checkbox"/> 0.63~1 <input type="checkbox"/> 1~1.6 <input type="checkbox"/> 1.6~2.5 <input type="checkbox"/> 2.5~4 <input type="checkbox"/> 4~6 <input type="checkbox"/> 5.5~8 <input type="checkbox"/> 7~10 <input type="checkbox"/> 9~13 <input type="checkbox"/> 12~18 <input type="checkbox"/> 17~25 <input type="checkbox"/> 23~32 <input type="checkbox"/> 30~40 <input type="checkbox"/> 37~50 <input type="checkbox"/> 48~65 <input type="checkbox"/> 55~70 <input type="checkbox"/> 63~80 <input type="checkbox"/> 80~95		
Reset mode	<input type="checkbox"/> Automatic reset (A) <input type="checkbox"/> Manual reset (M)		
Auxiliary supply voltage (V)	<input type="checkbox"/> AC220 <input type="checkbox"/> AC380		



# NDR2

## Thermal overload relay

2016 Edition

## 1. Product overview

		
Product models	NDR2-38	NDR2-38E
Setting current scope	0.1A ~ 38A	0.1A ~ 38A
Product certification	CCC	
		
Product models	NDR2-95	NDR2-140
Setting current scope	17A ~ 104A	80A ~ 140A
Product certification	CCC	

## 2. Product features

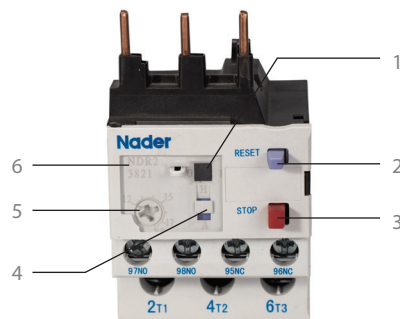
### Scope of application and purpose

NDR2 thermal overload relay (referred to as thermal relay) is used to provide overload and phase failure protection for three-phase AC motor in a circuit with AC frequency of 50Hz (60Hz), rated voltage of up to 690V and current of 0.1A~140A.

### Design features

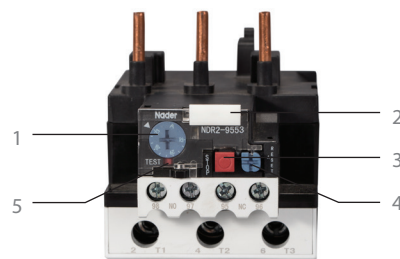
- ◆ With manual/automatic reset functions;
- ◆ With stop function
- ◆ With temperature compensation
- ◆ With tripping indication
- ◆ With normally closed contact disconnection button

### Structural features



NDR2-38 Structural features

1. Test button
2. Reset button
3. Stopping button
4. Manual or automatic changeover switch
5. Current setting adjusting disc
6. With lead seal hook and visualized window



NDR2-95/140 Structural features

1. Current setting adjusting disc
2. Tripping indication window
3. Stopping button
4. Manual/automatic reset selection button
5. Test button

### Meeting the following standards

- ◆ GB 14048.4 Low-voltage switchgear and control equipment Part 4-1
- ◆ GB 14048.5 Low-voltage switchgear and control equipment Part 5-1
- ◆ IEC 60947-1 Low-voltage switchgear and controlgear-Part 1: General rules
- ◆ IEC 60947-4 Low-voltage switchgear and controlgear-Part 4-2

## 3. Application scope

### Applicable environment

- ◆ Temperature of the working environment/storage temperature  
Temperature of the working environment:  $-5^{\circ}\text{C}\sim+40^{\circ}\text{C}$ , the average value in 24h is not more than  $+35^{\circ}\text{C}$ .  
Storage temperature:  $-25^{\circ}\text{C}\sim+55^{\circ}\text{C}$
- ◆ Altitude  
Installation site altitude  $\leq 2,000\text{m}$ .
- ◆ Relative humidity for operation/relative humidity for storage  
The relative humidity at the installation site is not more than 50% at the ambient air temperature of  $+40^{\circ}\text{C}$ ; at a low temperature, a higher relative humidity is allowed, for example, 90% at  $20^{\circ}\text{C}$ . As the temperature change will cause condensation occasionally, special measures should be taken.

### Pollution grade

Grade 3.

### Protection grade

Product protection grade: IP20

### Installation category

Category III (power distribution and control level)

### Installation direction

Product is installed vertically, with the  $\pm 30^{\circ}$  inclination between the installation surface and the vertical surface. Any angle on the right and left is allowed.

### Installation mode

- ◆ Combined type:  
NDR2-38 thermal relay is installed directly on NDC1-09-38 AC contactor;  
NDR2-95 thermal relay is installed directly on NDC1-60-95 AC contactor;  
NDR2-140 thermal relay is installed directly on the NDC2-115-170 AC contactor.
- ◆ Separate type:  
After NDR2-38 thermal relay is provided with NA2-38 mounting base, use screw mounting or rail mounting in line with A.1 TH35 in GB/T19334-2003;  
After NDR2-95 thermal relay is provided with NA2-95 mounting base, use screw mounting or rail mounting in line with A.1 TH35 in GB/T19334-2003;

### Environmental protection requirements

Products meet the ROHS standard.

## 4. Technical characteristics of the product

### 4.1 Description of specifications and models

Serial No.	Serial No. name	NDR2
1	Enterprise code	ND: <b>Nader</b> brand low-voltage apparatus
2	Product code	R: Thermal overload relay
3	Design serial No.	2
4	Product basic type code	38, 95, 140
5	Current Specifications Code	See the Model Explanation Form
6	Optimized product code	No code: Standard (for 38) E: Optimized (for 38)
7	Separated mounting of card track or screw	No code: Combined (for 38) G: Separated mounting of card track or screw (for 38)



## ● Model Explanation Form

Serial No.	Current Specifications Code	Setting current scope (A)	Use (SCPD) fuse (A)		Product basic type code	Installed contactor	
			aM	gG			
1	01	0.1 ~ 0.16	0.25	2	38	NDC1-09 ~ 38	
2	02	0.16 ~ 0.25	0.5	2			
3	03	0.25 ~ 0.4	1	2			
4	04	0.4 ~ 0.63	1	2			
5	05	0.63 ~ 1	2	4			
6	06	1 ~ 1.6	2	4			
7	07	1.6 ~ 2.5	4	6			
8	08	2.5 ~ 4	6	10			
9	10	4 ~ 6	8	16			
10	12	5.5 ~ 8	12	20			
11	14	7 ~ 10	12	20			
12	16	9 ~ 13	16	25			NDC1-12 ~ 38
13	21	12 ~ 18	20	35			NDC1-18 ~ 38
14	22	16 ~ 24	25	50			NDC1-25 ~ 38
15	32	23 ~ 32	40	63			NDC1-32 ~ 38
16	35	30 ~ 38	50	80			
17	22	17 ~ 25	25	50	95	NDC1-40 ~ 95	
18	53	23 ~ 32	40	63			
19	55	30 ~ 40	40	100			
20	57	37 ~ 50	63	100			
21	59	48 ~ 65	63	100			
22	61	55 ~ 70	80	125			NDC1-50 ~ 95
23	63	63 ~ 80	80	125			NDC1-65 ~ 95
24	65	80 ~ 104	100	160			NDC1-80 ~ 95
25	65	80 ~ 104	125	200	140	NDC2-115 ~ 170	
24	67	95 ~ 120	125	224			
25	69	110 ~ 140	160	250			

## 4.2 Technical parameters

### ● Normal Characteristics

Type		NDR2-38		NDR2-95/140		
Setting current scope $I_e$ /A		0.1~38		17 ~ 140		
Rated insulation voltage $U_i$ /V		690				
Rated operational voltage $U_e$ /V		690				
Rated impulse withstand voltage $U_{imp}$ /kV		6				
Tripping grade		10A				
Compensating temperature $^{\circ}\text{C}$		-5 $^{\circ}\text{C}$ ~+40 $^{\circ}\text{C}$				
Auxiliary contact	Type	1NO+1NC				
	Conventional heating current $I_{th}$ /A		5			
	AC-15	Rated operational voltage $U_e$ /V	220	380	220	380
		Rated operating current $I_e$ /A	1.63	0.94	2.73	1.58
	DC-13	Rated operational voltage $U_e$ /V	110	220	110	220
		Rated operating current $I_e$ /A	0.25	0.12	0.46	0.21
Wiring capacity Min/Max ( $\text{mm}^2$ )	Basic model of product		3801-3821	3822-3835	95	140
	Main circuit	One flexible wire (without precast terminal) 1	1.5/10	1.5/10	4/35	4/50
		One flexible wire (with precast terminal) 1	1/4	1/6	4/35	4/50
		Hardwire 1 piece	1/6	1.5/10	4/35	4/50
		Tightening torque N.m	1.7	2.5	6 ~ 7	
	Auxiliary circuit	One flexible wire (without precast terminal) 1 or 2	1/2.5			
		One flexible wire (with precast terminal) 1 or 2				
		Hardwire 1 or 2				
Tightening torque N.m		0.6 ~ 0.8				

## ● Tripping characteristic

Tripping features at the three-phase balance

Serial No.	Rated current multiple	Operation time	Initial condition	Ambient air temperature
1	1.05	>2h	Cold state	+20°C ± 5°C
2	1.2	<2h	Start immediately after test in serial No. 1	
3	1.5	<2min	Start immediately after test in serial No. 1	
4	7.2	2s<Tp≤10s	Cold state	

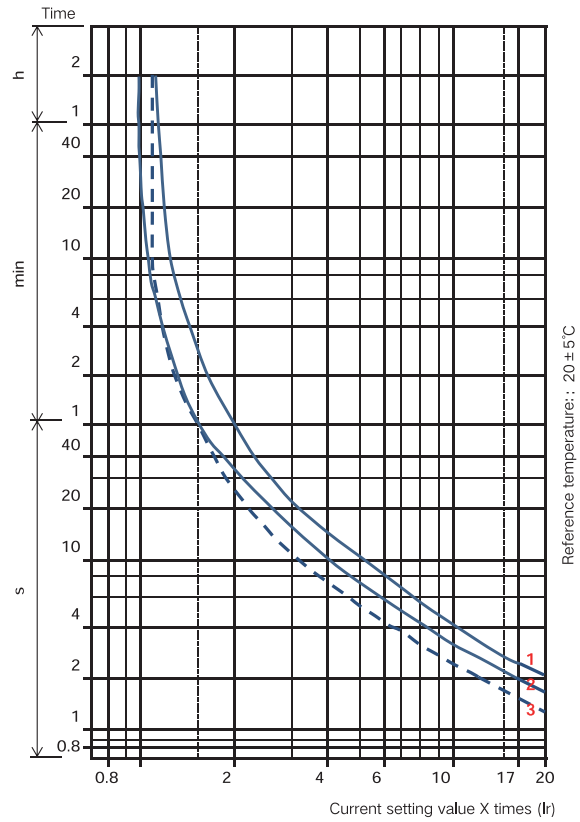
Tripping features at the three-phase unbalance

Serial No.	Rated current multiple		Operation time	Initial condition	Ambient air temperature
	Any two poles	The other pole			
1	1.00	0.9	>2h	Cold state	+20°C ± 5°C
2	1.15	0	<2h	Start immediately after test in serial No. 1	

Function of temperature compensation.

Serial No.	Rated current multiple	Operation time	Initial condition	Ambient air temperature
1	1.00	>2h	Cold state	+40°C ± 2°C
2	1.20	<2h	Start immediately after test in serial No. 1	
3	1.50	<2min	Start immediately after test in serial No. 1	
4	1.05	>2h	Cold state	-5°C ± 2°C
5	1.3	<2h	Start immediately after test in serial No. 4	
6	1.50	<4min	Start immediately after test in serial No. 4	

● Product tripping curve

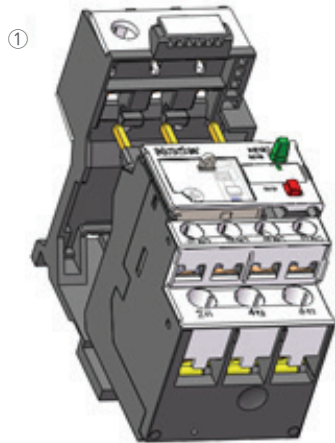


1. Balance operation, 3-phase, starting from the cold state.
2. Balance operation, 2-phase, starting from the cold state.
3. Balance operation, 3-phase, after a long period of time of setting value (hot state).

## 5. Accessories

### 5.1 List of accessories

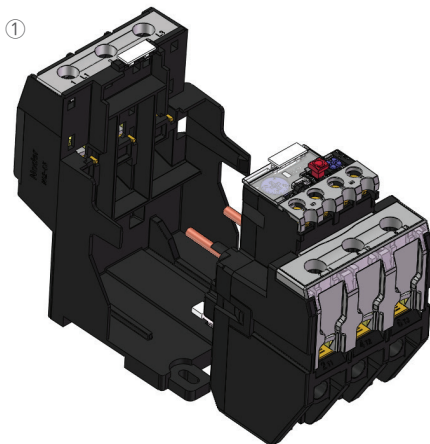
#### ● NDR2-38 accessories forms



NDR2-38 is equipped with mounting base

Serial No.	Name	Model	Mounting mode with body
①	Independent mounting base	NA2-38	Socketing

#### ● NDR2-95 accessories forms



NDR2-95 is equipped with mounting base

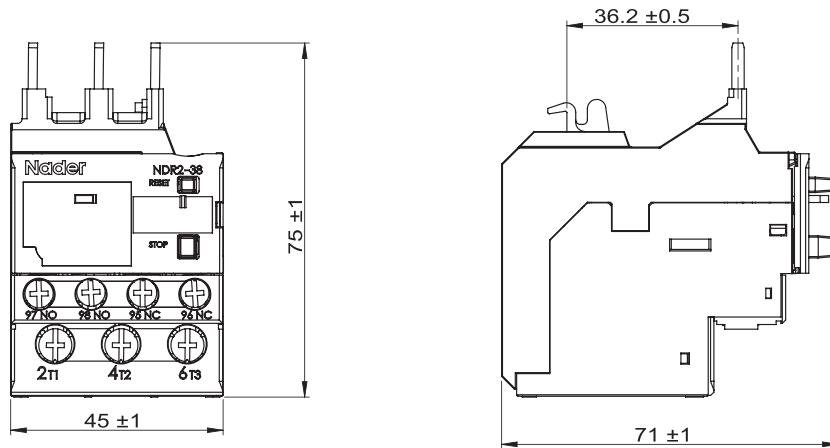
Serial No.	Name	Model	Mounting mode with body
①	Independent mounting base	NA2-95	Socketing

### 5.2 Function description

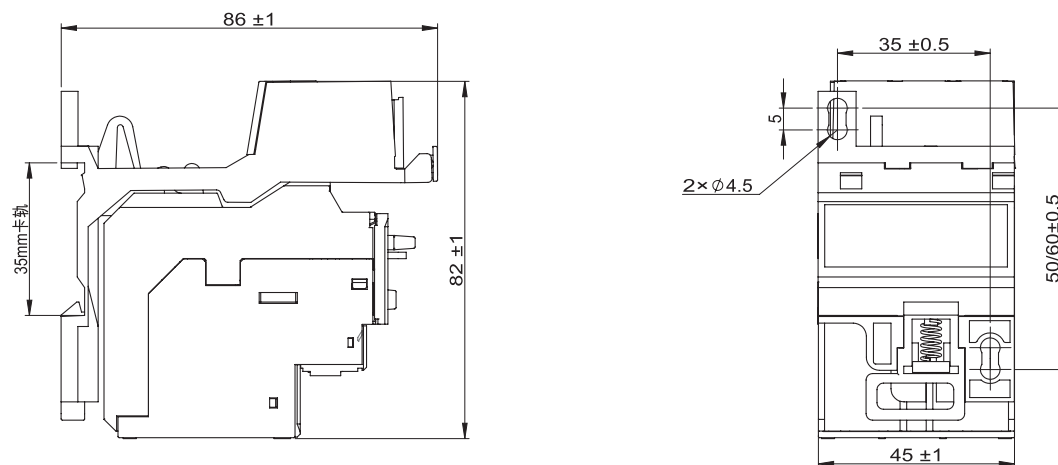
Component	Function
Independent mounting base	After NDR2-38 is additionally installed with NA2-38 mounting base, screw mounting or TH35 standard mounting rail may be used for mounting
	After NDR2-95 is additionally installed with NA2-95 mounting base, screw mounting or TH35 standard mounting rail may be used for mounting

## 6. Outline and installation dimension

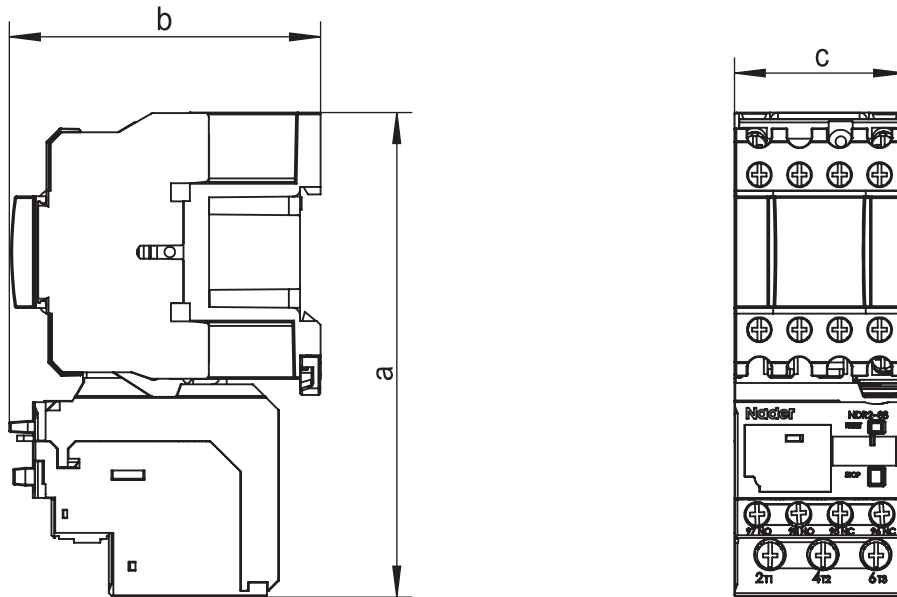
### ● NDR2-38 Outline dimension



### ● NDR2-38+NA2-38 Mounting dimensions of guide rails and screws

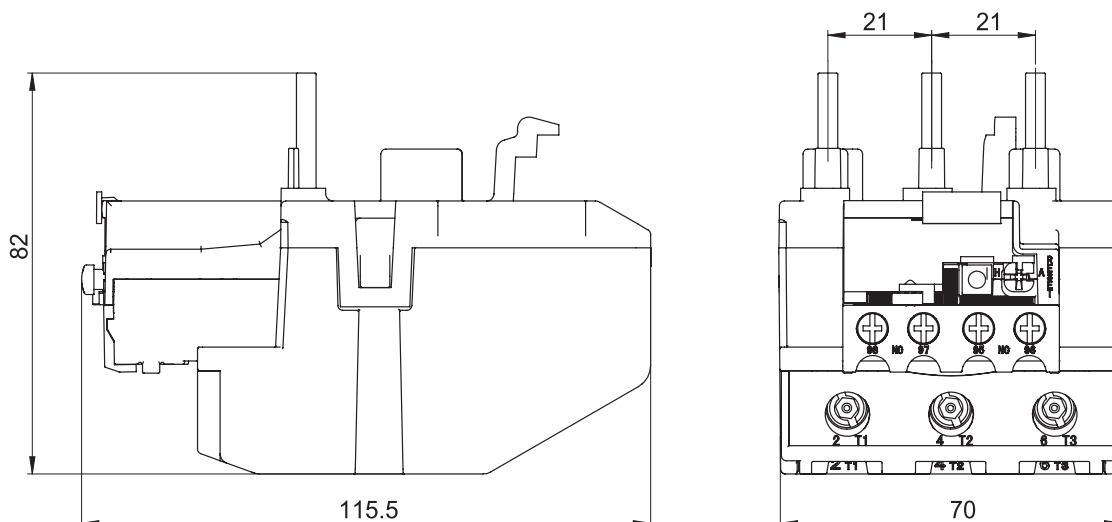


## ● NDR2-38 support contactor installation

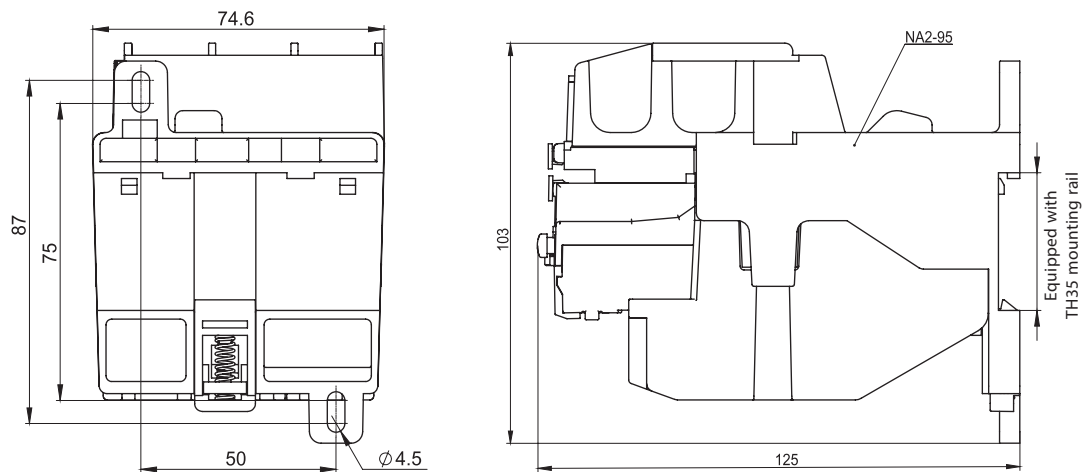


Contactors model	a	b	c
NDC1-09/12	128	83.5	45
NDC1-18	128	88.5	45
NDC1-25	138	97.5	57
NDC1-32/38	138	102.5	57

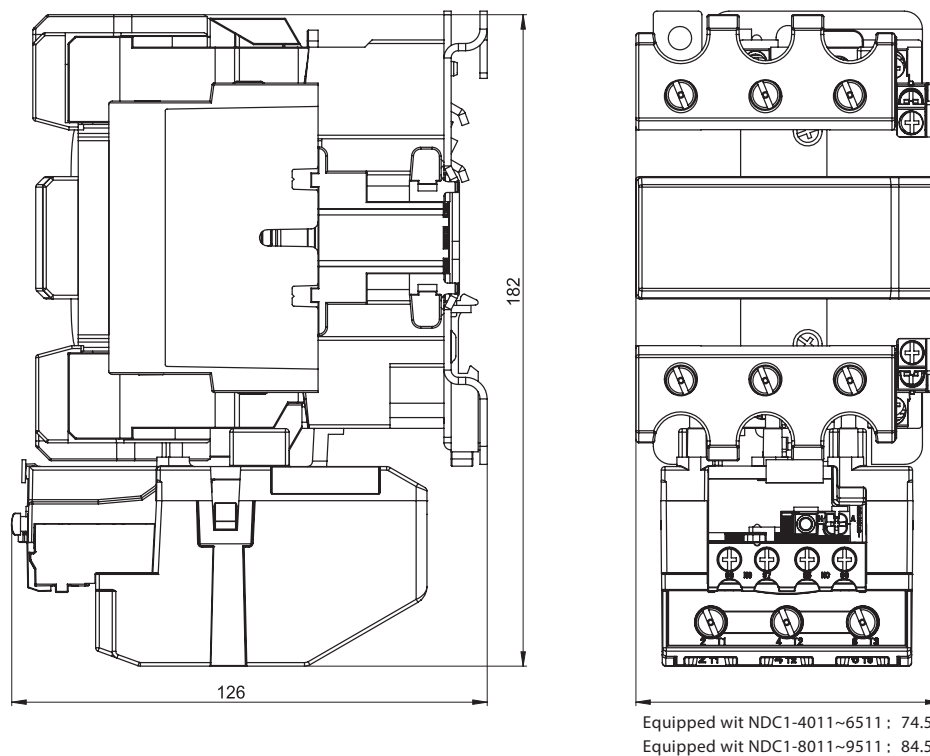
## ● NDR2-95 Outline dimension



● NDR2-95+NA2-95 rail and screw mounted dimension

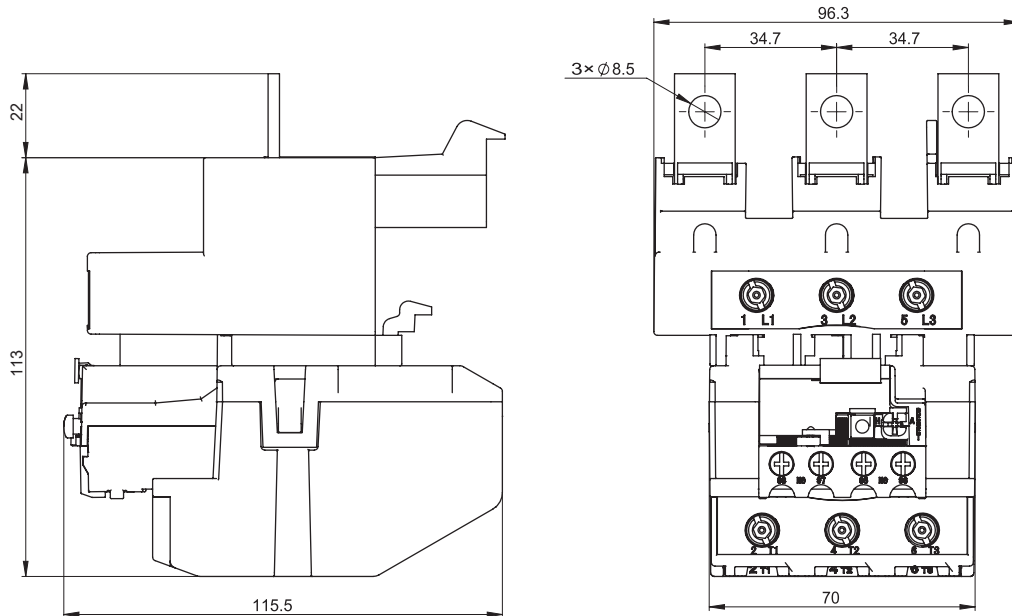


● NDR2-95 support contactor installation

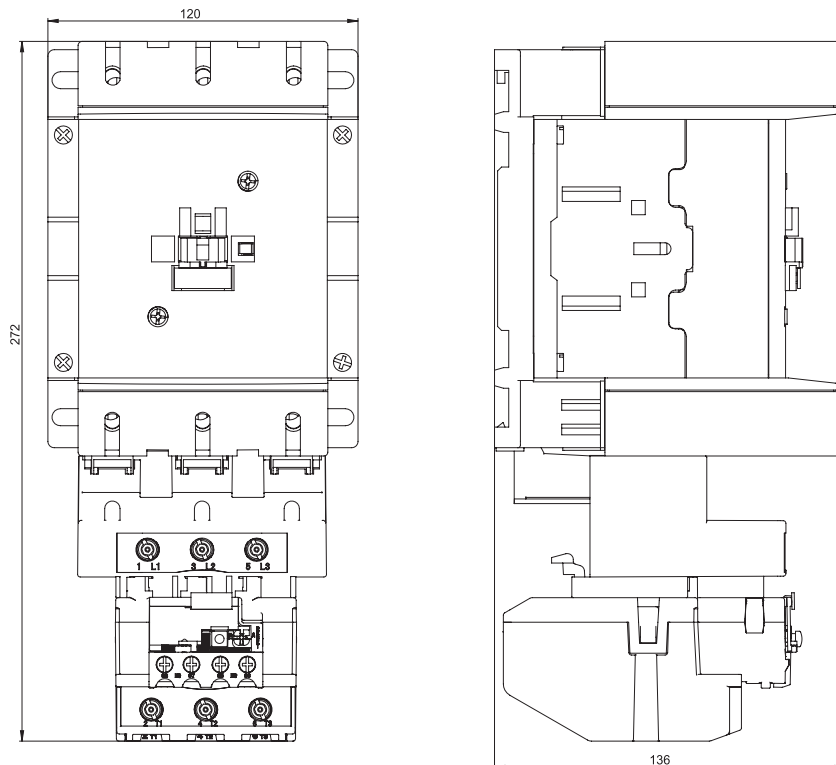




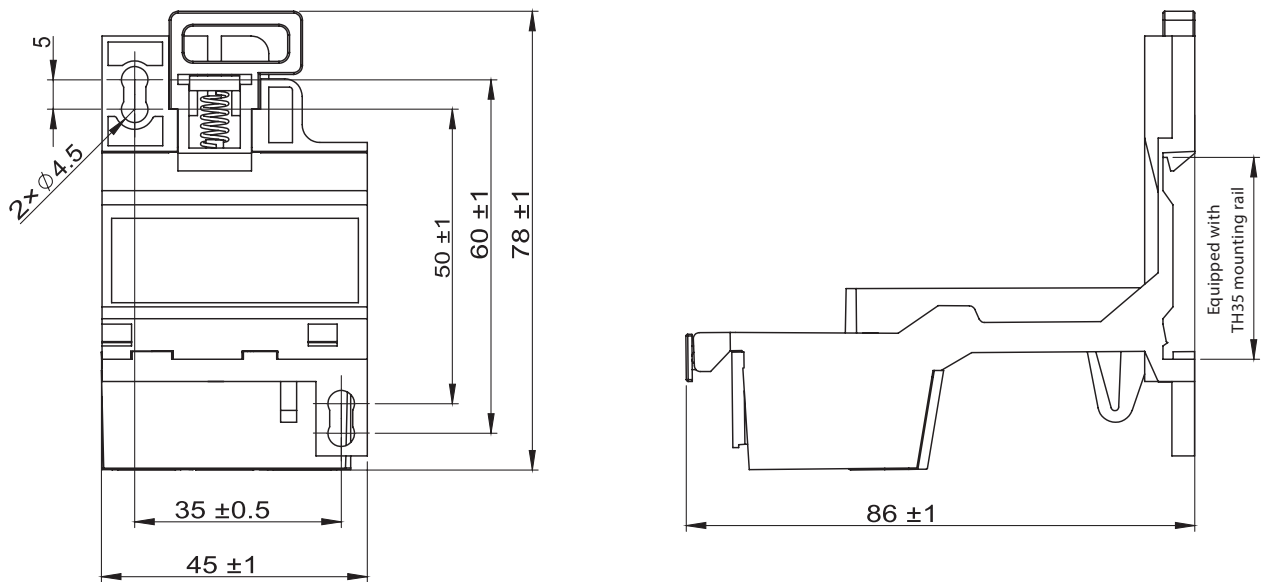
## ● NDR2-140 Outline dimension



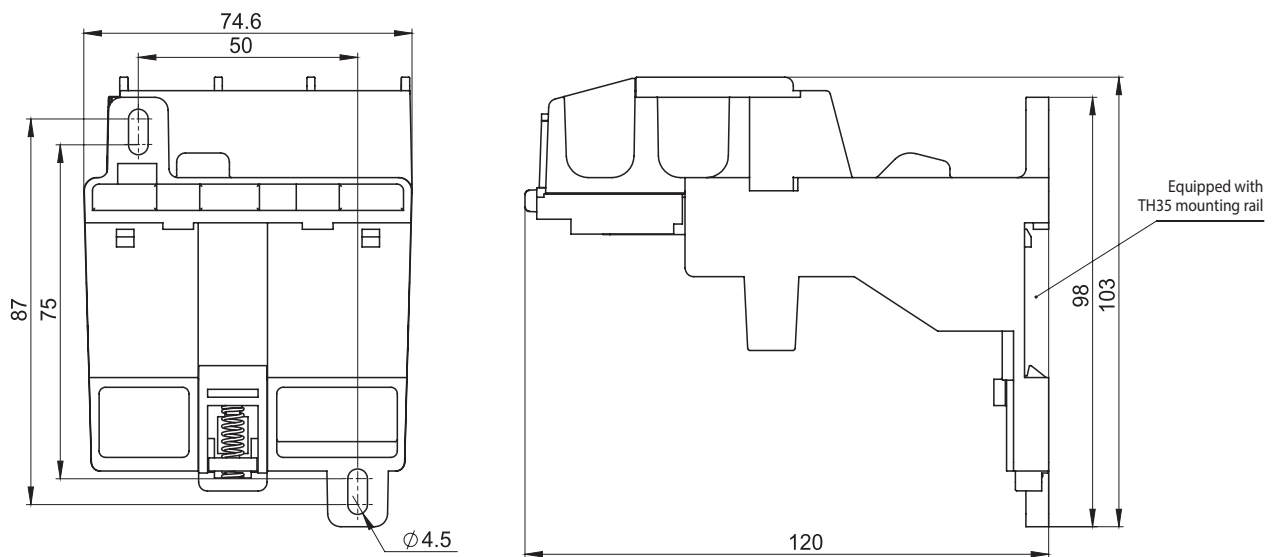
## ● NDR2-140 support contactor installation



● NA2-38 Outline and installation dimension

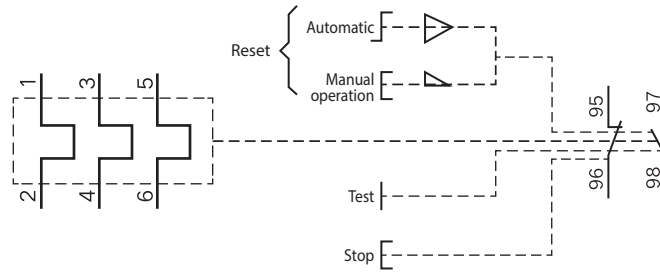


● NA2-95 Outline and installation dimension



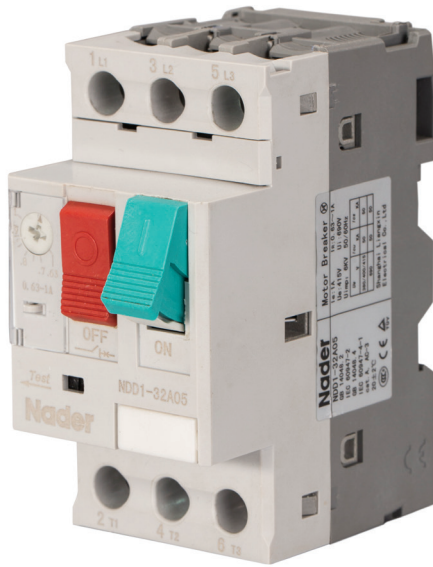
Note: All installation and outline dimensions are in "mm", and those not marked with tolerance are subject to "X.X  $\pm$  0.5, X  $\pm$  1".

## 7. Electric circuit diagram



## 8. Specifications for ordering or selection

User unit			Number of units ordered:	Date of order:
Type of product	<input type="checkbox"/> NDR2-38(0.1 ~ 38) <input type="checkbox"/> NDR2-95 ( 17 ~ 104 ) <input type="checkbox"/> NDR2-140 ( 80 ~ 140 )			
Setting current (A)	38 shell frame	<input type="checkbox"/> 0.1~0.16 <input type="checkbox"/> 0.16~0.25 <input type="checkbox"/> 0.25~0.40 <input type="checkbox"/> 0.40~0.63 <input type="checkbox"/> 0.63~1 <input type="checkbox"/> 1~1.6		
		<input type="checkbox"/> 1.6~2.5 <input type="checkbox"/> 2.5~4 <input type="checkbox"/> 4~6 <input type="checkbox"/> 5.5~8 <input type="checkbox"/> 7~10 <input type="checkbox"/> 9~13		
	95 shell frame	<input type="checkbox"/> 12~18 <input type="checkbox"/> 16 ~ 24 <input type="checkbox"/> 23~32 <input type="checkbox"/> 30~38		
	140 shell frame	<input type="checkbox"/> 17~25 <input type="checkbox"/> 23~32 <input type="checkbox"/> 30~40 <input type="checkbox"/> 37~50 <input type="checkbox"/> 48~65 <input type="checkbox"/> 55~70		
	<input type="checkbox"/> 63~80 <input type="checkbox"/> 80~104			
Installation mode	<input type="checkbox"/> Directly mounted to the contactor <input type="checkbox"/> Individual mounting (only for NDR2-38 and NDR2-95)			
Accessories optional	<input type="checkbox"/> NA2-38 <input type="checkbox"/> NA2-95			



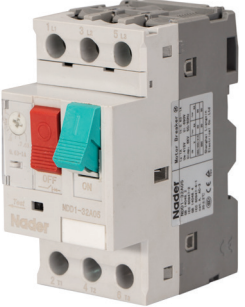

# NDD1 series

## Motor protection circuit breaker

2016 Edition

**Nader**

## 1. Product overview

		
Product models	NDD1-32	NDD1-80
Current Specifications Code	01/02/03/04/05/06/07/08 /10/14/16/20/21/22/32	40/63/80
Product certification	CCC	

## 2. Product features

### Scope of application and purpose

NDD1 motor protection circuit breaker (hereinafter referred to as the circuit breaker) is used to control overload, short circuit, broken phase, three-phase unbalance protection and infrequent starting of three-phase squirrel cage induction motor in an circuit with AC frequency of 50/60Hz, rated voltage of up to 690V, and rated current of up to 80A, and can be used for distribution line protection and infrequent load switching and as isolator. The circuit breaker can also be used in conjunction with alarm contact, auxiliary contact, shunt tripper, and under-voltage tripper accessories.

### Design features

- ◆ Current setting value is adjustable: During the use, it can be adjusted to the appropriate current setting value indicating position according to the actual operating current.
- ◆ Portable design of accessories: It can be installed with multiple auxiliary accessories outside in a simple, reliable insertion and locking manner.
- ◆ It can simulate the mechanism tripping design: It enables the mechanism to trip by Test to facilitate the simulation and test of supporting alarm accessories.
- ◆ Positive laser engraving: The content of engraved mark is clear and durable.

### Structural features

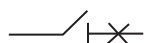
- ◆ Double break points structure: The contact has double break points, and can inhibit and disperse the arc energy, enhance the arc extinguishing effect, improve the breaking capacity, reduce the electrical loss of contact, and effectively improve the electrical life of the product.
- ◆ Thermal magnetic integrated protection structure: The product is provided with overload, short circuit, and three-phase unbalance protection, and the differential technology provides NDD1-32A products with more accurate and sensitive fault phase protection.
- ◆ Temperature compensation structure: The compensation double metal structure in the tripping mechanism provides accurate protection features for thermal tripping of the product and enables the product to adapt to the operating environment of a wide temperature zone.

### Meeting the following standards

- ◆ GB 14048.1 Low-voltage switchgear and control equipment Part 1: General rules
- ◆ GB14048.2 Low-voltage switchgear and controlgear Circuit breaker
- ◆ GB 14048.4 Low-voltage switchgear and control equipment Part 4-1: Contactor and motor starter Electromechanical contactor and motor starter (including motor protector)
- ◆ GB 14048.5 Low-voltage switchgear and control equipment Part 5-1: Control circuit devices and switching elements Electromechanical control circuit devices
- ◆ IEC60947-1 Low-voltage switchgear and controlgear-Part 1:General rules.

## 3. Application scope

### Electrical symbols



### Applicable environment

- ◆ Temperature of the working environment and storage temperature  
Temperature of the working environment:  $-30^{\circ}\text{C}\sim+70^{\circ}\text{C}$ , the product tripping feature setting reference temperature is  $20 \pm 2^{\circ}\text{C}$ ; at the temperature of less than  $-5^{\circ}\text{C}$  or higher than  $+40^{\circ}\text{C}$ , it should be operated by reference to 4.2.4.  
Storage temperature:  $-40^{\circ}\text{C} \sim +80^{\circ}\text{C}$ .
- ◆ Altitude  
Altitude of the installation site  $\leq 3000\text{m}$ .
- ◆ Relative humidity for operation/relative humidity for storage  
The relative humidity of atmosphere is not more than 50% at the ambient air temperature of  $+40^{\circ}\text{C}$ ; at a lower temperature, a higher relative humidity is allowed, for example: 90% at  $20^{\circ}\text{C}$ . Special measures should be taken to deal with occasional condensation due to temperature change.

### Pollution grade

Grade 3.

### Protection grade

IP20

### Installation category

Class III (power distribution and control level)

### Installation direction

The product can be installed vertically or horizontally and is mounted with TH35-7.5 standard mounting rail.

## 4. Technical characteristics of the product

### 4.1 Description of specifications and models

<b>ND</b>	<b>D</b>	<b>1</b> - □	□	□	□
1	2	3	4	5	6
Serial No.	Serial No. name	NDD1			
1	Enterprise code	ND: <b>Nader</b> brand low-voltage apparatus			
2	Product code	D: Motor protection circuit breaker			
3	Design serial No.	1			
4	Frame grade Rated current A	32, 80			
5	Operation mode code	A indicates button type operation			
6	Current Specifications Code	A total of 18 specifications, as shown in 4.2.2			

### 4.2 Main technical parameters

#### 4.2.1 Main performance indicators

Type	Model	NDD1-32A	NDD1-80A
Use class	GB14048.2	A	A
	GB14048.4	AC-3	AC-3
Rated operational voltage(V)		380、400、415、690	380、400、415、690
Rated insulation voltage (V)		690	690
Rated operating frequency (Hz)		50/60	50/60
Rated impulse withstand voltage (KV)		6	6
Unipolar power consumption (W)		2.5	8
Operating performance	Power-on operation frequency	60000	10000
	Power-off operation frequency	60000	17000
Operation frequency (time(s)/hour)		120	120
Tripping level		10A	10A
Terminal wiring capacity mm <sup>2</sup> (min/max)	Hard wire	2 × 1/2 × 6	1 × 2.5/1 × 35
	Flexible cord without wiring terminal	2 × 1.5/2 × 6	1 × 2.5/2 × 16
	Flexible cord with wiring terminal	2 × 1/2 × 4	
Wiring torsion (N.m)		1.5	6

## 4.2.2 Short circuit breaking capacity

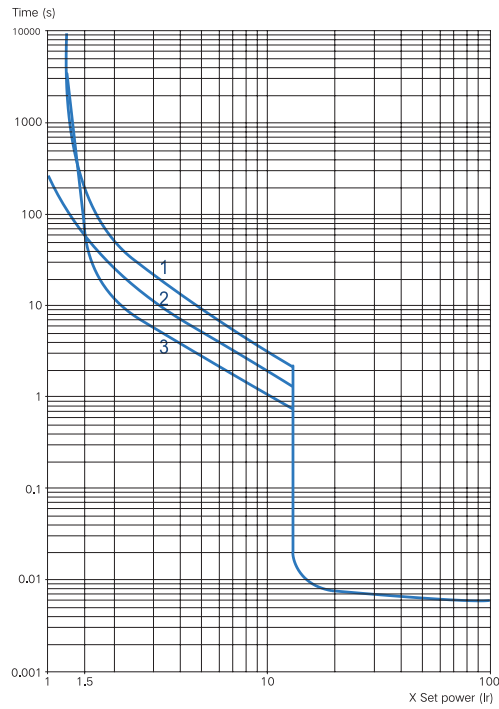
Product models	Current setting range	Breaking capacity (KA) 380V/400V/415V		Breaking capacity (KA) 690V	
		Rated ultimate short-circuit breaking capacity Icu	Rated running short-circuit breaking capacity Ics	Rated ultimate short-circuit breaking capacity Icu	Rated running short-circuit breaking capacity Ics
NDD1-32A01	0.1 ~ 0.16A	50	50	50	50
NDD1-32A02	0.16 ~ 0.25A	50	50	50	50
NDD1-32A03	0.25 ~ 0.4A	50	50	50	50
NDD1-32A04	0.4 ~ 0.63A	50	50	50	50
NDD1-32A05	0.63 ~ 1A	50	50	50	50
NDD1-32A06	1 ~ 1.6A	50	50	50	50
NDD1-32A07	1.6 ~ 2.5A	50	50	3	2.25
NDD1-32A08	2.5 ~ 4A	50	50	3	2.25
NDD1-32A10	4 ~ 6.3A	50	50	3	2.25
NDD1-32A14	6 ~ 10A	50	50	3	2.25
NDD1-32A16	9 ~ 14A	15	7.5	3	2.25
NDD1-32A20	13 ~ 18A	15	7.5	3	2.25
NDD1-32A21	17 ~ 23A	15	6	3	2.25
NDD1-32A22	20 ~ 25A	15	6	3	2.25
NDD1-32A32	24 ~ 32A	10	5	3	2.25
NDD1-80A40	25 ~ 40A	35	18	4	3
NDD1-80A63	40 ~ 63 A	35	18	4	3
NDD1-80A80	56 ~ 80 A	15	8	2	2

## 4.2.3 Tripping feature and tripping curve

Characteristic item	Serial No.	Test current	Predetermined time	Initial state	Expected results	Notes
Delay Protection Characteristics 20 ± 2°C	a	1.05I <sub>n</sub>	t ≤ 2h	Cold state	No tripping	No
	b	1.2I <sub>n</sub>	t < 2h	Hot state	Tripping	The current is raised to the specified value within 5s immediately following a tests
	c	1.5I <sub>n</sub>	t ≤ 4min	Hot state	Tripping	Start after 1 time setting current reaches the thermal equilibrium
	d	7.2I <sub>n</sub>	2s < t ≤ 10s	Cold state	Tripping	Tripping grade is 10A
Instantaneous protection feature	e	7.68I <sub>n</sub>	t ≤ 0.2s	Cold state	No tripping	I <sub>n</sub> < 0.25A
		11.52I <sub>n</sub>	t < 0.2s	Cold state	Tripping	
	f	9.6I <sub>n</sub>	t ≤ 0.2s	Cold state	No tripping	I <sub>n</sub> ≥ 0.25A
		14.4I <sub>n</sub>	t < 0.2s	Cold state	Tripping	
Phase failure protection 20 ± 2°C	g	1.0 I <sub>n</sub> for two-pole, 0.9I <sub>n</sub> for one-pole	t ≤ 2h	Cold state	No tripping	No
	h	1.15 I <sub>n</sub> for two-stage, not energized for one-pole	t < 2h	Hot state	Tripping	The current is raised to the specified value within 5s immediately following 9 tests

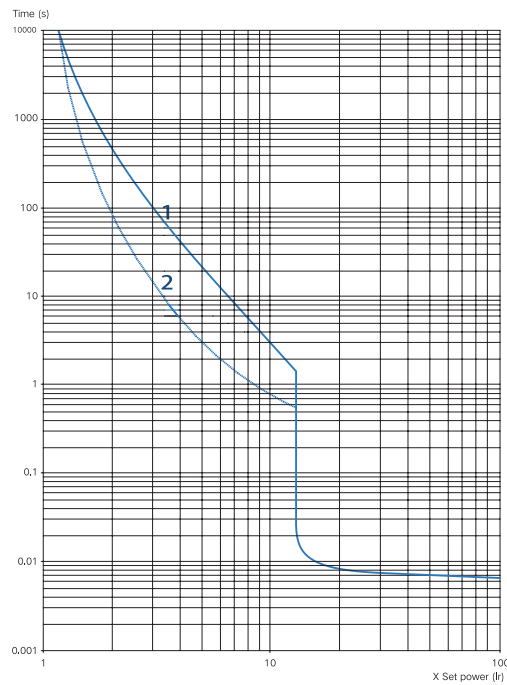


● NDD1-32 time-current characteristic curve at the reference temperature of  $20 \pm 2^\circ\text{C}$



- 1. 3 poles from the cold state
- 2. 2 poles from the cold state
- 3. 3 poles from the thermal state

● NDD1-80 time-current characteristic curve at the reference temperature of  $20 \pm 2^\circ\text{C}$



- 1. 3 poles from the cold state
- 2. 3 poles from the cold state

#### 4.2.4 Temperature compensation parameters of circuit breaker

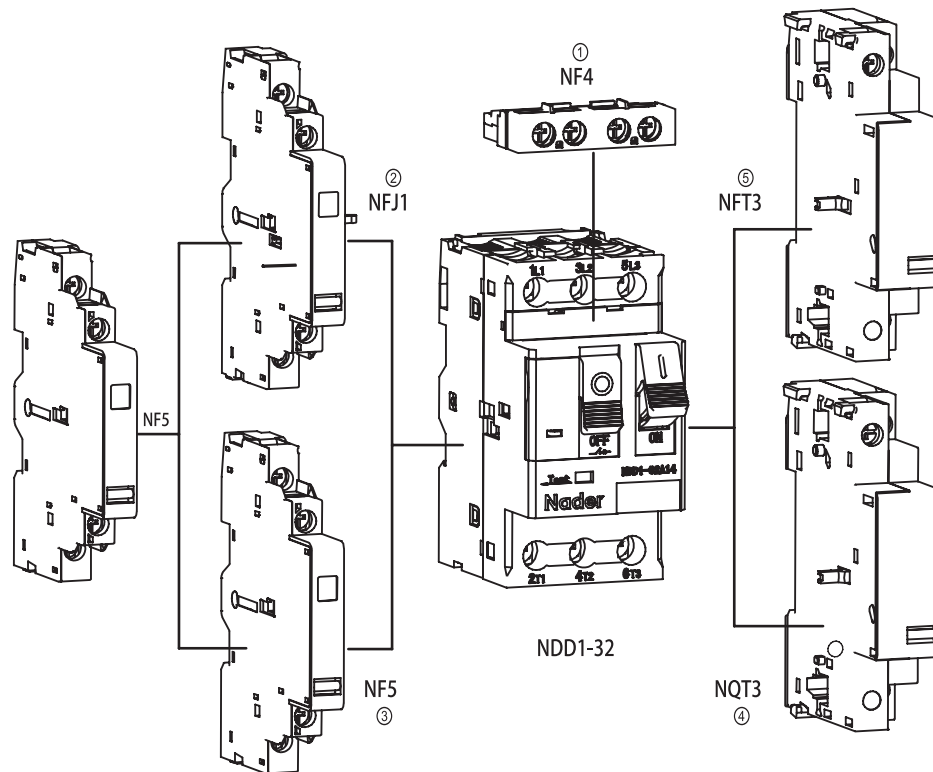
°C	-35	-30	-25	-20	-15	-10	-5 ~ +20 ~ +40
A80	84.59	84.04	83.50	82.96	82.42	81.88	80.00
A63	66.61	66.19	65.76	65.33	64.90	64.48	63.00
A40	42.29	42.02	41.75	41.48	41.21	40.94	40.00
A32	33.84	33.62	33.40	33.18	32.97	32.75	32.00
A22	26.43	26.26	26.10	25.93	25.76	25.59	25.00
A21	24.32	24.16	24.01	23.85	23.70	23.54	23.00
A20	19.03	18.91	18.79	18.67	18.54	18.42	18.00
A16	14.80	14.71	14.61	14.52	14.42	14.33	14.00
A14	10.57	10.51	10.44	10.37	10.30	10.23	10.00
A10	6.66	6.62	6.58	6.53	6.49	6.45	6.30
A08	4.23	4.20	4.18	4.15	4.12	4.09	4.00
A07	2.643	2.262	2.609	2.592	2.575	2.558	2.500
A06	1.692	1.681	1.670	1.659	1.648	1.637	1.600
A05	1.057	1.051	1.044	1.037	1.030	1.023	1.000
A04	0.666	0.662	0.658	0.654	0.650	0.646	0.630
A03	0.423	0.420	0.417	0.414	0.411	0.408	0.400
A02	0.264	0.263	0.261	0.259	0.257	0.255	0.250
A01	0.169	0.168	0.167	0.166	0.165	0.164	0.160

°C	45	50	55	60	65	70
A80	76.42	75.12	73.83	72.53	71.24	69.94
A63	60.18	59.16	58.14	57.12	56.10	55.08
A40	38.21	37.56	36.91	36.27	35.62	34.97
A32	30.57	30.05	29.52	29.01	28.50	28.00
A22	23.88	23.48	23.07	22.67	22.26	21.86
A21	21.97	21.60	21.23	20.85	20.48	20.12
A20	17.20	16.90	16.61	16.32	16.03	15.74
A16	13.37	13.15	12.92	12.69	12.47	12.24
A14	9.55	9.39	9.23	9.07	8.91	8.74
A10	6.02	5.92	5.81	5.71	5.61	5.51
A08	3.82	3.76	3.69	3.63	3.56	3.05
A07	2.389	2.349	2.309	2.267	2.226	2.186
A06	1.528	1.502	1.476	1.451	1.425	1.399
A05	0.955	0.939	0.923	0.907	0.890	0.874
A04	0.602	0.592	0.582	0.571	0.561	0.551
A03	0.383	0.377	0.371	0.363	0.356	0.350
A02	0.239	0.235	0.231	0.227	0.223	0.219
A01	0.153	0.150	0.148	0.145	0.142	0.140

## 5. Accessories

### 5.1 List of accessories

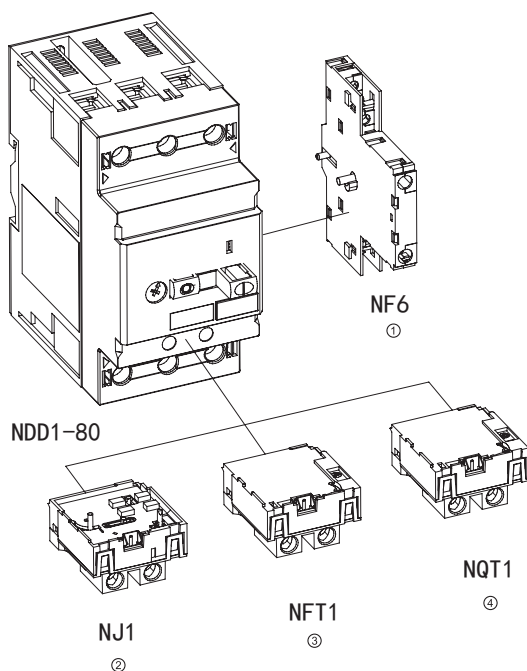
#### ● NDD1-32 Accessories Installation schematic diagram



Serial No.	Name	Model	Installation mode
①	Internal auxiliary	NF4	Installed at the top of NDD1-32, inserted to the inside, and only 1 can be installed
②	Alarm Auxiliary contact	NFJ1	Installed on the left of NDD1-32, and only 1 can be installed, as shown in the note.
③	External auxiliary	NF5	Installed on the left of NDD1-32, and at most 2 can be installed, as shown in the note.
④	Under-voltage tripper	NQT3	Installed on the right of NDD1-32, and only 1 can be installed
⑤	Shunt tripper	NFT3	Installed on the right of NDD1-32, and only 1 can be installed

Note: 1 NFJ1 and 1 NF5 can be installed on the left of NDD1-32 circuit breaker, but it is required that NFJ1 be installed before NF5

● NDD1-80 Accessories Installation schematic diagram





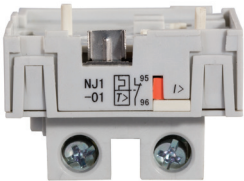


Serial No.	Name	Model	Installation mode
①	External auxiliary	NF6	Installed on the right of NDD1-80, and only 1 can be installed
②	Built-in Alarm contact	NJ1	Installed inside of NDD1-80, and only 1 can be installed
③	Shunt tripper	NFT1	Installed inside of NDD1-80, and only 1 can be installed
④	Under-voltage tripper	NQT1	Installed inside of NDD1-80, and only 1 can be installed

## 5.2 Function description

Accessories Type	Function Purpose
Auxiliary contact	The connection indicator can be used to indicate the connection and breaking of circuit breaker.
Alarm contact	Used to indicate the breaking of circuit breaker at a fault current.
Alarm Auxiliary contact	The product is provided with an alarm contact and an auxiliary contact to provide assistant and alarm functions and save the space.
Shunt tripper	At 70%~110% of the rated operating voltage, it can cause the circuit breaker to break and can be used for remote control.
Under-voltage tripper	At 70%~110% of the rated operating voltage, it can cause the circuit breaker to break and can be used for remote control. When lower than 35% of rated operating voltage, the circuit breaker can be prevented from closing. At 110%~85% of the rated working voltage, the circuit breaker closing will not be affected.

### 5.3 Configuration of standard accessories

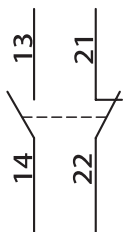
Product images	Accessories Name	Accessories Model	Structure and parameter instructions
	Internal auxiliary	NF4-11	1NO, 1NC
		NF4-20	2NO
	External auxiliary	NF5-11	1NO, 1NC
		NF5-20	2NO
	Alarm Auxiliary contact	NFJ1-1010	1NC for alarm, 1NO for supplementary
		NFJ1-1001	1NC for alarm, 1NO for supplementary
		NFJ1-0110	1NC for alarm, 1NO for supplementary
		NFJ1-0101	1NC for alarm, 1NO for supplementary
	External auxiliary	NF6-11	1NO, 1NC
		NF6-21	2NO, 1NC
		NF6-20	2NO
	Built-in Alarm contact	NJ1-10	1NO
		NJ1-01	1NC

Product images	Accessories Name	Accessories Model	Structure and parameter instructions
	Shunt tripper	NFT3-11	110~127V
		NFT3-22	220~240V
		NFT3-38	380~415V
	Under-voltage tripper	NQT3-11	110~127V
		NQT3-22	220~240V
		NQT3-38	380~415V
		NQT3-20	200V 50Hz or 200~220V 60Hz
		NQT3-41	415~440V 50Hz or 480V 60Hz
		NQT3-46	400V 50Hz or 460V 60Hz
	Shunt tripper	NFT1-22	380~415V
		NFT1-38	200V 50Hz or 200~220V 60Hz
	Under-voltage tripper	NQT1-22	415~440V 50Hz or 480V 60Hz
		NQT1-38	400V 50Hz or 460V 60Hz
	Waterproof box	NdZ1	IP55 Outline dimension : 148.5 × 93.5 × 85.5
	Indicator light	NdXH1-23	Green 220/240V
		NdXH1-33	Green 380/440V

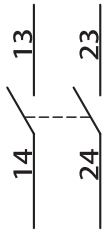
## 5.4 Accessories Technical parameters

Contact type	Rated operational voltage Ue V AC-15	Rated operating current Ie A AC-15	Rated operational voltage Ue V DC-13	Rated operating current Ie A DC-13	Conventional heating current A Ith	Rated insulation voltage Ui V	Mechanical / Electrical life	Limited short circuit current cooperation SCPD
Auxiliary contact NF5 NFJ1	48	6	24	6	6	690	60000/60000	RT16-6
	110/127	4.5	48	5				
	230/240	3.3	60	3				
	380/415	2.2	110	1.3				
	440	1.5	220	0.5				
	500	1	-	-				
	690	0.6	-	-				
Alarm signaling Contact NFJ1	24	1.5	24	1	2.5	690	1000/1000	RT16-2.5
	48	1	48	0.3				
	110/127	0.5	60	0.15				
	220/240	0.3	-	-				
Auxiliary contact NF4	24	2	24	1	2.5	250	60000/60000	RT16-2.5
	48	1.25	48	0.3				
	110/127	1	60	0.15				
	220/240	0.5	-	-				
Adjuvant NF6	48	6	24	6	6	690	10000/17000	RT16-6
	220/240	3.5	48	5				
	380/415	2	110	1.5				
Alarm NJ1	48	6	24	6	6	690	1000/1000	RT16-6
	220/240	3.5	48	5				
	380/415	2	110	1.5				
Accessory terminal wiring capacity mm <sup>2</sup> (min/max)	Hard wire				1 or 2		1/2.5	
	Flexible cord without wiring terminal				1 or 2		0.75/2.5	
	Flexible cord with wiring terminal				1 or 2		0.75/1.5	

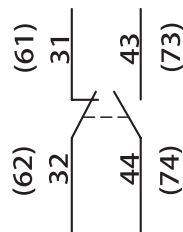
## 5.5 Accessory wiring diagram



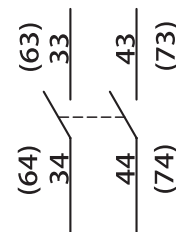
NF4-11



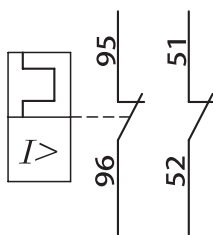
NF4-20



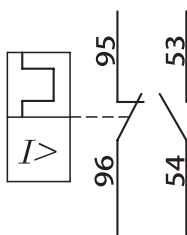
NF5-11



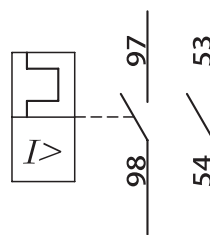
NF5-20



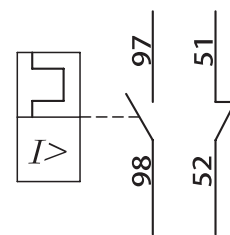
NFJ1-0101



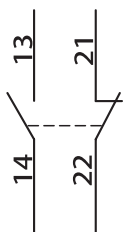
NFJ1-0110



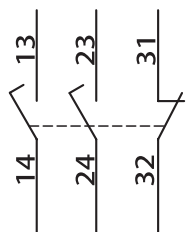
NFJ1-1010



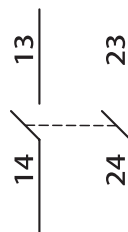
NFJ1-1001



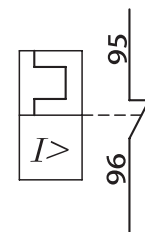
NF6-11



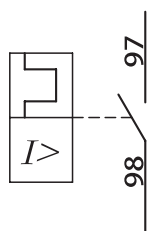
NF6-21



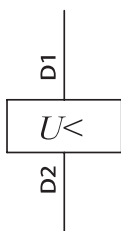
NF6-20



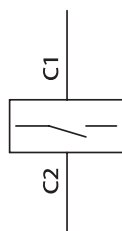
NJ1-01



NJ1-10



NQT1、NQT3

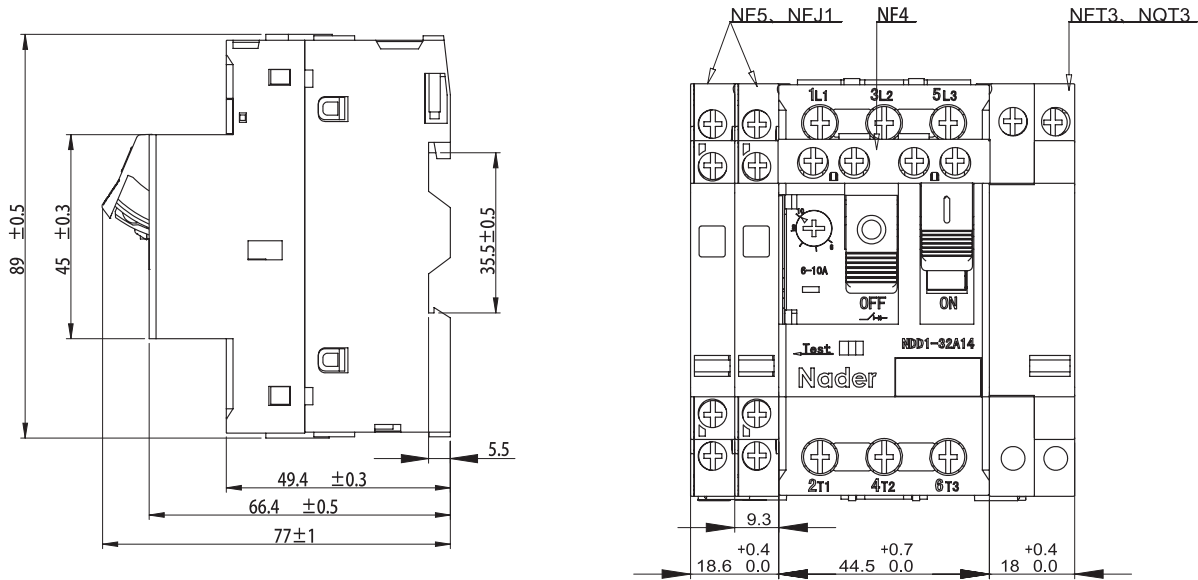


NFT1、NFT3

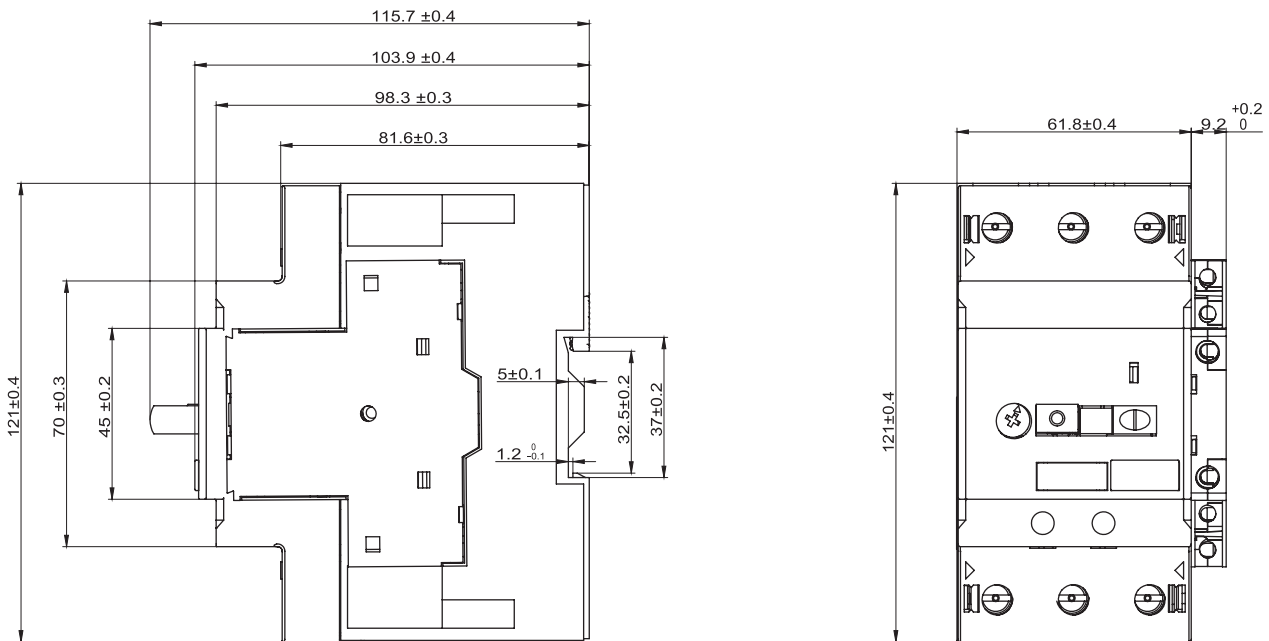


## 6. Outline and installation dimension

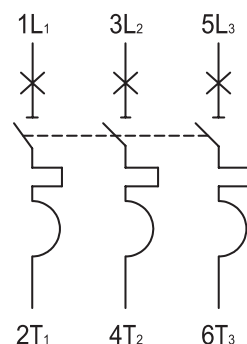
- Outline and installation dimension of NDD1-32 circuit breaker and its supporting lateral hanging accessories



- Outline and installation dimension of NDD1-80 circuit breaker and its supporting lateral hanging accessories



## 7. Electric circuit diagram



## 8. Specifications for ordering or selection

User unit				Number of units ordered:	Date of order:	
Type of product	<input type="checkbox"/> NDD1 <input type="checkbox"/> NDD1+ accessories					
NDD1 Rated current (A)	<input type="checkbox"/> 01 (0.1-0.16A) <input type="checkbox"/> 05 (0.63-1A) <input type="checkbox"/> 10 (4-6.3A) <input type="checkbox"/> 21 (17-23A) <input type="checkbox"/> 40 (25-40A)	<input type="checkbox"/> 02 (0.16-0.25A) <input type="checkbox"/> 06 (1-1.6A) <input type="checkbox"/> 14 (6-10A) <input type="checkbox"/> 22 (20-25A) <input type="checkbox"/> 63 (40-63A)	<input type="checkbox"/> 03 (0.25-0.4A) <input type="checkbox"/> 07 (1.6-2.5A) <input type="checkbox"/> 16 (9-14A) <input type="checkbox"/> 32 (24-32A) <input type="checkbox"/> 80 (56-80A)	<input type="checkbox"/> 04 (0.4-0.63A) <input type="checkbox"/> 08 (2.5-4A) <input type="checkbox"/> 20 (13-18A)		
NDD1-32 accessories	Auxiliary contact group	<input type="checkbox"/> NF4-11 <input type="checkbox"/> NF4-20 <input type="checkbox"/> NF5-11 <input type="checkbox"/> NF5-20	Two digits: The single-digit represents the number of normally closed terminals, and the ten-digit represents the number of normally open terminals.			
	Alarm Auxiliary contact	<input type="checkbox"/> NFJ1-0101 <input type="checkbox"/> NFJ1-0110 <input type="checkbox"/> NFJ1-1001 <input type="checkbox"/> NFJ1-1010	Four digits: The thousand-digit and hundred-digit represent alarm and the single-digit and ten-digit represent auxiliary; The single-digit and hundred-digit represent the number of normally closed terminals, and the ten-digit and thousand-digit represent the number of normally open terminals.			
	Shunt tripper	<input type="checkbox"/> NFT3-11 (110~127V) <input type="checkbox"/> NFT3-22 (220~240V) <input type="checkbox"/> NFT3-38 (380~415V)				
	Under-voltage tripper	<input type="checkbox"/> NQT3-11 (110~127V) <input type="checkbox"/> NQT3-22 (220~240V) <input type="checkbox"/> NQT3-38 (380~415V) <input type="checkbox"/> NQT3-20 (200V 50Hz or 200~220V 60Hz) <input type="checkbox"/> NQT3-41 (415~440V 50Hz or 480V 60Hz) <input type="checkbox"/> NQT3-46 (400V 50Hz or 460V 60Hz)				
	Waterproof box	<input type="checkbox"/> NdZ1 IP55				
	Indicator light	<input type="checkbox"/> NdXH1-23 Green 220/240V <input type="checkbox"/> NdXH1-33 Green 380/440V				
NDD1-80 accessories	Auxiliary contact group	<input type="checkbox"/> NF6-11 <input type="checkbox"/> NF6-20 <input type="checkbox"/> NF6-21		Two digits: The single-digit represents the number of normally closed terminals, and the ten-digit represents the number of normally open terminals.		
	Alarm contact	<input type="checkbox"/> NJ1-01 <input type="checkbox"/> NJ1-10				
	Shunt tripper	<input type="checkbox"/> NFT3-22 (220~240V) <input type="checkbox"/> NFT3-38 (380~415V)				
	Under-voltage tripper	<input type="checkbox"/> NQT3-22 (220~240V) <input type="checkbox"/> NQT3-38 (380~415V)				

Note: Accessories cannot be supplied separately, and are integrated with the appropriate body for use or delivery.