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# NDM2 Serie

Edition 2016

**Nader** 良信电器

# CONTENTS

<b>NDM2 Moulded Case Circuit Breaker</b>	<b>1-1</b>
■ <b>Product overview</b>	<b>1-2</b>
■ <b>Product features</b>	<b>1-4</b>
■ <b>Application scope</b>	<b>1-5</b>
■ <b>Technical characteristics of the product</b>	<b>1-7</b>
Description of specifications and models	1-7
Technical parameters	1-8
Comparison table of accessory codes	1-12
Product tripping curve	1-14
■ <b>Accessories</b>	<b>1-16</b>
List of accessories	1-16
Accessories Function description	1-16
Functions and sizes of external accessories	1-20
■ <b>Product outline dimension</b>	<b>1-27</b>
NDM2-63 outline dimension, mounting dimension and wiring method	1-27
NDM2-100, 125, NDM2X-125 outline dimension, mounting dimension and wiring method	1-29
NDM2-225, 250 outline dimension, mounting dimension and wiring method	1-31
NDM2-400 outline dimension, mounting dimension and wiring method	1-34
NDM2-630 outline dimension, mounting dimension and wiring method	1-36
NDM2-800 outline dimension, mounting dimension and wiring method	1-38
NDM2-(100-800)Z3 series plug-in mounting dimension and wiring method	1-40
Selection of cross-sectional areas of connecting busbars and cables	1-42
Safe distance for the installation of circuit breaker	1-42
■ <b>Usage and maintenance</b>	<b>1-45</b>
■ <b>Ordering instructions</b>	<b>1-45</b>

## CONTENTS

<b>NDM2E electronic molded case circuit breaker</b>	<b>2-1</b>
■ <b>Product overview</b>	<b>2-2</b>
■ <b>Product features</b>	<b>2-3</b>
■ <b>Application scope</b>	<b>2-4</b>
■ <b>Technical characteristics of the product</b>	<b>2-6</b>
Description of specifications and models	2-6
Technical parameters	2-7
Comparison table of accessory codes	2-9
Intelligent controller	2-10
Product tripping curve	2-12
■ <b>Accessories</b>	<b>2-13</b>
List of accessories	2-13
Accessories Function description	2-14
Functions and sizes of external accessories	2-20
■ <b>Product outline dimension</b>	<b>2-25</b>
NDM2E-100H outline dimension, mounting dimension and wiring method	2-25
NDM2E-250H outline dimension, mounting dimension and wiring method	2-26
NDM2E-400H outline dimension, mounting dimension and wiring method	2-28
NDM2E-630H, NDM2E-800H outline dimension, mounting dimension and wiring method	2-30
NDM2E-(100-800)Z3 series plug-in mounting dimension and wiring method	2-33
Selection of cross-sectional areas of connecting busbars and cables	2-35
Safe distance for the installation of circuit breaker	2-35
■ <b>Usage and maintenance</b>	<b>2-37</b>
■ <b>Ordering instructions</b>	<b>2-38</b>

# CONTENTS

NDM2Z DC moulded case circuit breaker	3-1
■ Product overview	3-2
■ Product features	3-3
■ Application scope	3-4
■ Technical characteristics of the product	3-6
Description of specifications and models	3-6
Technical parameters	3-7
Comparison table of accessory codes	3-10
Product tripping curve	3-11
■ Accessories	3-12
List of accessories	3-12
Accessories Function description	3-13
Functions and sizes of external accessories	3-17
■ Product outline dimension	3-24
NDM2Z-63 outline dimension, mounting dimension and wiring method	3-24
NDM2ZX-125 (small housing) outline dimension, mounting dimension and wiring method	3-26
NDM2Z-125 outline dimension, mounting dimension and wiring method	3-26
NDM2Z-250 outline dimension, mounting dimension and wiring method	3-28
NDM2Z-400 outline dimension, mounting dimension and wiring method	3-30
NDM2Z-630 outline dimension, mounting dimension and wiring method	3-32
Selection of cross-sectional areas of connecting busbars and cables	3-34
Safe distance for the installation of circuit breaker	3-34
■ Usage and maintenance	3-37
■ Ordering instructions	3-37



CONTENTS

NDM2ZB DC three-stage moulded case circuit breaker	4-1
■ Product overview	4-2
■ Product features	4-3
■ Application scope	4-4
■ Technical characteristics of the product	4-6
Description of specifications and models	4-6
Technical parameters	4-7
Comparison table of accessory codes	4-9
Product tripping curve	4-9
■ Accessories	4-11
List of accessories	4-11
Accessories Function description	4-12
Functions and sizes of external accessories	4-16
■ Product outline dimension	4-23
NDM2ZB-63 outline dimension, mounting dimension and wiring method	4-23
NDM2ZB-125 outline dimension, mounting dimension and wiring method	4-25
NDM2ZB-250 outline dimension, mounting dimension and wiring method	4-27
NDM2ZB-400 outline dimension, mounting dimension and wiring method	4-29
NDM2ZB-630 outline dimension, mounting dimension and wiring method	4-31
Wiring mode	4-33
Selection of cross-sectional areas of connecting busbars and cables	4-33
Safe distance for the installation of circuit breaker	4-34
■ Usage and maintenance	4-36
■ Ordering instructions	4-36



# NDM2

## Moulded Case Circuit Breakers

Edition 2016

1. Product Overview

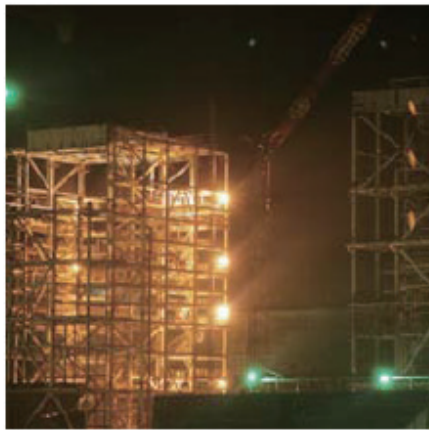
															
Model	NDM2-63			NDM2-100/125					NDM2X-125		NDM2-225/250				
Rated operating current In (A)	10、12.5、16、 20、25、32、 40、50、63			16、20、25、32、40、 50、63、80、100、125					16、20、25、 32、40、50、 63、80、100、 125		100、125、140、160、 180、200、225、250				
Number of poles	3	3	4	3	3	3	3	4	2	3	3	3	3	4	
Rated limit short-circuit breaking capacity level	L	M		C	L	M	H		/	C	L	M	H		
Rated ultimate short-circuit breaking capacity Icu (kA) 400V	25	50	50	25	35	50	85	50	35	25	35	50	85	50	
Rated running short-circuit breaking capacity Ics (kA) 400V	19	38	38	19	26	38	64	38	26	19	26	38	64	38	
N-pole type of four-pole product	4A、4B、4C			4A、4B、4C					/		4A、4B、4C				
Certification	CCC、TUV、CE														

													
Model	NDM2-400					NDM2-630					NDM2-800		
Rated operating current In (A)	225、250、315、350、400					400、500、630					630、700、800		
Number of poles	3	3	3	3	4	3	3	3	3	4	3	3	4
Rated limit short-circuit breaking capacity level	C	L	M	H		C	L	M	H		M	H	
Rated ultimate short-cir- cuit breaking capacity Icu (kA) 400V	35	50	65	100	65	35	50	65	100	65	75	100	75
Rated running short-cir- cuit breaking capacity Ics (kA) 400V	26	38	49	75	49	26	38	49	75	49	56	75	56
N-pole type of four-pole product	4A、4B、4C					4A、4B、4C					4A、4B、4C		
Certification	CCC、TUV、CE												

## 2. Product Features

### Scope of application and purpose

NDM2 moulded case circuit breakers (hereinafter referred to as breakers) are applicable to work in the AC circuits with AC frequency of 50/60Hz, rated operating voltage of up to AC690V, and rated current of up to 800A, for the use of infrequent conversion and infrequent start of motor. The circuit-breakers provide overload, short circuit and undervoltage protection, and can protect the circuit and power supply device from damage. The products have been widely used in new energy, electric power, industrial control, real estate, electric and power supply, telecommunication, rail transportation, industrial (public) construction and other industries.



### Structural features

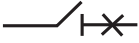
The circuit breakers are divided into four types: C type (basic), L type (standard), M type (higher breaking) and H type (high breaking type) by the rated limit short-circuit breaking capability. The circuit breakers feature small size, high breaking capability, short arcing, vibration resistance, etc.

### Meeting the following standards

- ◆ GB 14048.1 Low-voltage switchgear and controlgear - Part 1: General rules.
- ◆ GB 14048.2 Low-voltage switchgear and controlgear - Part 2: Circuit breakers.
- ◆ IEC 60947-1 Low-voltage switchgear and controlgear-Part 1: General rules.
- ◆ IEC 60947-2 Low-voltage switchgear and controlgear-Part 2: Circuit-breakers.

## 3. Application Scope

### 3.1 Electrical Symbols

The circuit breaker provides isolation function, whose corresponding symbol is: 

### 3.2 Applicable Environment

#### ● Temperature of the working environment

-35°C ~ +70°C, the average value in 24h is not more than +35°C. At +40°C and above, the user needs to run with less load. For derating factors, see “ NDM2 MCCB derating factor table ” .

#### ● Storage temperature:

-40°C ~ +75°C .

#### ● Altitude

The altitude of installation site is ≤2000m, and the derating factors under varied altitudes are shown in “ Table of derating factors of NDM2 moulded case circuit breaker under varied altitudes ” .

#### ● Relative humidity for operation/Relative humidity for storage

At the ambient temperature of +40°C, the relative humidity shall not be more than 50%; for a lower temperature, the humidity may be higher, for example: The relative humidity could be up to 90% at 20°C. Appropriate measures should be taken against frost due to temperature variation.

#### ● Pollution grade

Grade 3.

#### ● Installation category

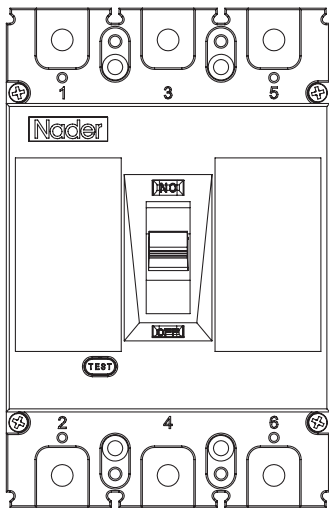
- ◆ Mounting categories of circuit breaker connecting to the main circuit: Category III (power distribution and control level).
- ◆ Mounting categories of circuit breaker not connecting to the main circuit: Class II (load level) .

#### ● Installation environment

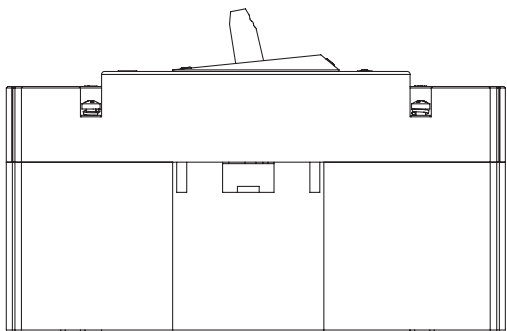
The product shall be installed in a medium without explosive danger, and the medium is not enough to corrode metal and damage the place where the insulating gas and conducting gas are located, so as to avoid any use in a rainy or snowy place.

● Installation direction

- ◆ Vertical mounting, the gradient between the mounting plane and the vertical plane should be  $\leq \pm 22.5^\circ$ .
- ◆ Horizontal mounting.



Vertical installation



Horizontal installation

3.3 NDM2 Breaker Power Loss Table

Model	Current (A)	Total power loss (W)		
		Before-panel/ behind-panel wiring	Plug-in type before- panel wiring	Plug-in type behind- panel wiring
NDM2-63 direct heating type (10-25A)	25	28	-	32
NDM2-100 direct heating type (16-25A)	25	40	42	45
NDM2-125 direct heating type (125A)	25	40	42	45
NDM2-63 intermittent heating type (32-63A)	63	20	-	24
NDM2-100 intermittent heating type (32-100A)	100	35	37	40
NDM2-125 intermittent heating type (32-125A)	125	39	42	43
NDM2-225 intermittent heating type (125-225A)	225	62	66	70
NDM2-250 intermittent heating type (250A)	250	67	73	73
NDM2-400 intermittent heating type (225-400)	400	115	120	125
NDM2-630 intermittent heating type (400-630A)	630	187	-	200
NDM2-800 intermittent heating type (630-800A)	800	262	-	-

## 4. Technical Characteristics of the Product

### 4.1 Description of Specifications and Models

Serial No.	Serial No. name	NDM2
1	Enterprise code	ND: <b>Nader</b> brand low-voltage apparatus
2	Product code	M : Moulded case circuit breakers
3	Design serial No.	2
4	Type code	X : Small housings of two-pole (only for 125 )
5	Frame grade Rated current	See Table 1
6	Rated ultimate short-circuit breaking capacity	Type C : Basic type Type L : Standard type Type M : Relevant high breaking type Type H : High breaking type
7	Operation mode	No code: Direct operation by handle P : Electrically operated Z : Turning handle
8	Number of poles	2 , 3 , 4
9	Overload tripper code	0 : Without tripper 2 : Instantaneous tripper only 3 : Complex tripper
10	Accessory code	See Table 2
11	Usage code	No code : Power distribution type 2 : Motor protection type
12	N-pole (neutral pole) type of four-pole product	Type A : N pole is not be equipped with over-current tripper, and shall be always connected Type B : N pole is not be equipped with over-current tripper, and is switched on or off together with other three poles Type C : N pole is equipped with over-current tripper, and is switched on or off together with other three poles
13	Wiring pattern code (See Table 1)	No code : Normal P : Extended busbar Type JK : Incoming line terminal Wiring : Wiring box type, wiring at the outgoing line end : Before-panel wiring type Type CK : Incoming line terminal Wiring : Before-panel wiring type, wiring at the outgoing line end : Wiring frame type Type K : Wiring at the incoming/outgoing line end : Wiring frame type Z1 : Behind-panel wiring Z2Q : Plug-in type before-panel wiring Z2H : Plug-in type behind-panel wiring Z3Q : Plug-in before-panel wiring integrated type Z3H : Plug-in behind-panel wiring integrated type (Please specify the wiring scheme)
14	Rated current	See Table 1



## 4.2 Technical Parameters

Table 1 Table of main performance parameters of circuit breaker

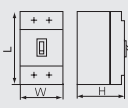
Model		NDM2-63			NDM2-100					NDM2-125				
Frame grade Current Inm (A)		63			100					125				
Rated current In (A)		10、12.5、16、20、25、32、40、50、63			16、20、25、32、40、50、63、80、100					16、20、25、32、40、50、63、80、100、125				
Rated insulation voltage Ui (V)		1000			1000					1000				
Rated impulse withstand voltage Uimp (V)		8000			8000					8000				
Power frequency withstand voltage U: (1 minute) (V)		3000			3000					3000				
Use class		A			A					A				
Number of poles		3	3	4	3	3	3	3	4	3	3	3	3	4
Rated limit short-circuit breaking capacity level		L	M		C	L	M	H		C	L	M	H	
Rated ultimate short-circuit breaking capacity Icu (kA)	AC 400V	25	50	50	25	35	50	85	50	25	35	50	85	50
	AC 690V						10					10		
Rated running short-circuit breaking capacity Ics (kA)	AC 400V	19	38	38	19	26	38	64	38	19	26	38	64	38
	AC 690V						8					8		
Operating performance (time)	Electrical life	8000			8000					8000				
	Mechanical life	20000			20000					20000				
Outline dimension 	L	135	135	135	150	150	150	150	150	150	150	150	150	150
	W	78	78	103	92	92	92	92	122	92	92	92	92	122
	H	73.5	81.5	81.5	69	69	87	87	87	69	69	87	87	87
Flashover distance (mm)		≤50			≤50					≤50				
Wiring mode		Conventional, P,Z1,Z2Q,Z2H			Conventional, P,JK,CK,K,Z1,Z2Q,Z2H,Z3Q,Z3H					Conventional, P,JK,CK,K,Z1,Z2Q,Z2H,Z3Q,Z3H				

Table 1 Main performance and technology parameters of circuit breaker (continued)

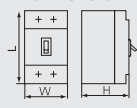
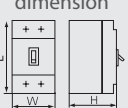
Model		NDM2X-125	NDM2-225					NDM2-250				
Frame grade Current $I_{nm}$ (A)		125	225					250				
Rated current $I_n$ (A)		16、20、25、32、40、 50、63、80、100、125	100、125、140、160、 180、200、225					125、140、160、180、 200、225、250				
Rated insulation voltage $U_i$ (V)		1000	1000					1000				
Rated impulse withstand voltage $U_{imp}$ (V)		8000	8000					8000				
Power frequency withstand voltage $U$ : (1 minute) (V)		3000	3000					3000				
Use class		A	A					A				
Number of poles		2	3	3	3	3	4	3	3	3	3	4
Rated limit short-circuit breaking capacity level			C	L	M	H		C	L	M	H	
Rated ultimate short-circuit breaking capacity $I_{cu}$ (kA)	AC 400V	35	25	35	50	85	50	25	35	50	85	50
	AC 690V				10							
Rated running short-circuit breaking capacity $I_{cs}$ (kA)	AC 400V	26	19	26	38	64	38	19	26	38	64	38
	AC 690V				8							
Operating performance (time)	Electrical life	8000	8000					8000				
	Mechanical life	20000	20000					20000				
Outline dimension 	L	150	165	165	165	165	165	165	165	165	165	165
	W	64	107	107	107	107	142	107	107	107	107	142
	H	69	86	86	103	103	103	86	86	103	103	103
Flashover distance (mm)		≤50	≤50					≤50				
Wiring mode		Conventional, P,JK,CK,K	Conventional, P,JK,CK,K,Z1,Z2Q,Z2H,Z3Q,Z3H					Conventional, P,JK,CK,K,Z1,Z2Q,Z2H,Z3Q,Z3H				

Table 1 Main performance and technology parameters of circuit breaker (continued)

Model		NDM2-400					NDM2-630					NDM2-800		
Frame grade Current Inm (A)		400					630					800		
Rated current In (A)		225、250、315、350、400					400、500、630					630、700、800		
Rated insulation voltage Ui (V)		1000					1000					1000		
Rated impulse withstand voltage Uimp (V)		8000					8000					8000		
Power frequency withstand voltage U: (1 minute) (V)		3000					3000					3000		
Use class		A					A					A		
Number of poles		3	3	3	3	4	3	3	3	3	4	3	3	4
Rated limit short-circuit breaking capacity level		C	L	M	H		C	L	M	H		M	H	
Rated ultimate short-circuit breaking capacity Icu (kA)	AC 415V	35	50	65	100	65	35	50	65	100	65	75	100	75
	AC 690V			15					15			20		
Rated running short-circuit breaking capacity Ics (kA)	AC 415V	26	38	49	75	49	26	38	49	75	49	56	56	75
	AC 690V			11					11			15		
Operating performance (time)	Electrical life	7500					7500					7500		
	Mechanical life	10000					10000					10000		
Outline dimension 	L	257	257	257	257	257	270	270	270	270	270	280	280	280
	W	150	150	150	150	198	182	182	182	182	240	210	210	280
	H	106.5	106.5	106.5	106.5	106.5	110	110	110	110	110	115.5	115.5	115.5
Flashover distance (mm)		≤100					≤100					≤100		
Wiring mode		Conventional, P,Z1,Z2Q,Z2H,Z3Q,Z3H					Conventional, P,Z1,Z2Q,Z2H,Z3Q,Z3H					Conventional, P,Z1,Z2Q,Z2H,Z3Q,Z3H		

● Table of derating factors of NDM2 series moulded case circuit breaker under varied temperatures

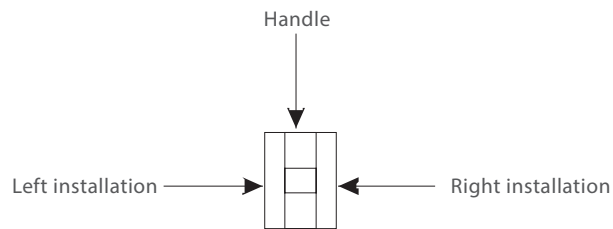
Serial No.	Frame grade Rated current (A)	Derating factors corresponding to temperatures						
		40°C	45°C	50°C	55°C	60°C	65°C	70°C
1	63	1	0.979	0.958	0.937	0.915	0.893	0.871
2	100/125	1	0.977	0.954	0.931	0.907	0.883	0.858
3	225/250	1	0.982	0.963	0.944	0.924	0.904	0.882
4	400	1	0.981	0.962	0.942	0.922	0.901	0.879
5	630	1	0.979	0.958	0.937	0.915	0.893	0.871
6	800	1	0.980	0.960	0.939	0.918	0.897	0.877

Note : When the ambient temperature is below 40°C, the product can be used normally, with no derating capacity.

● Table of derating factors of NDM2 moulded case circuit breaker under varied altitudes

Altitude (m)	2000	2500	3000	3500	4000	4500	5000
Operating current correction factor	$I_n$	$I_n$	$0.98I_n$	$0.97I_n$	$0.96I_n$	$0.95I_n$	$0.94I_n$
Operating current correction factor	$U_e$	$U_e$	$0.83U_e$	$0.77U_e$	$0.71U_e$	$0.67U_e$	$0.63U_e$
Power frequency withstand voltage correction factor	$U$	$U$	$0.89U$	$0.85U$	$0.80U$	$0.77U$	$0.73U$

### 4.3 Comparison Table of Accessory Codes

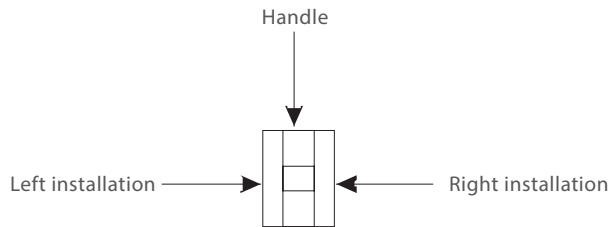


#### Legend:

- Single auxiliary contact
- Double auxiliary contacts
- Alarm contact
- Shunt tripper
- Under-voltage tripper
- Auxiliary contact (Single accessory integrates auxiliary and alarm functions)

Table 2 Comparison table of tripping method accessory codes

Accessory code	Accessories Name	Installation location	Model	Number of poles		NDM2-63		NDM2-100		NDM2-125		NDM2X-1 25		NDM2-225	
				3	4	3	4	3	4	2	3	4			
00	No			—	—	—	—	—	—	—	—	—	—	—	—
10	Shunt tripper														
20	Double auxiliary contacts														
21	Single auxiliary contact														
30	Under-voltage tripper														
40	Shunt tripper, double auxiliary contacts														
41	Shunt tripper, single auxiliary contact														
50	Shunt tripper, under-voltage tripper														
60	Two groups of double auxiliary contacts			—											
61	Two groups of single auxiliary contacts														
62	Double auxiliary contacts, single auxiliary contact														
70	Under-voltage tripper, double auxiliary contacts														
71	Under-voltage tripper, single auxiliary contact														
08	Alarm contact														
18	Shunt tripper Alarm contact														
28	Double auxiliary contacts, alarm contact														
38	Under-voltage tripper, alarm contact			—											
48	Shunt tripper, auxiliary alarm contact														
58	Auxiliary alarm contact														
68	Double auxiliary contacts, auxiliary alarm contact			—											
78	Under-voltage tripper, auxiliary alarm contact			—											



Legend:

- Single auxiliary contact
- Double auxiliary contacts
- Alarm contact
- Shunt tripper
- Under-voltage tripper
- Auxiliary contact (Single accessory integrates auxiliary and alarm functions)

Table 2 Comparison table of tripping method accessory codes (continued)

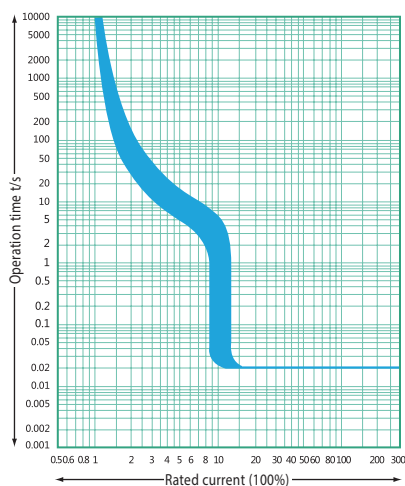
Accessory code	Accessories Name	Installation location		Model		NDM2-250		NDM2-400		NDM2-630		NDM2-800	
		Number of poles				3	4	3	4	3	4	3	4
00	No					—	—	—	—	—	—	—	—
10	Shunt tripper												
20	Double auxiliary contacts												
21	Single auxiliary contact												
30	Under-voltage tripper												
40	Shunt tripper, double auxiliary contacts												
41	Shunt tripper, single auxiliary contact												
50	Shunt tripper, under-voltage tripper												
60	Two groups of double auxiliary contacts												
61	Two groups of single auxiliary contacts												
62	Double auxiliary contacts, single auxiliary contact												
70	Under-voltage tripper, double auxiliary contacts												
71	Under-voltage tripper, single auxiliary contact												
08	Alarm contact												
18	Shunt tripper Alarm contact												
28	Double auxiliary contacts, alarm contact												
38	Under-voltage tripper, alarm contact												
48	Shunt tripper, auxiliary alarm contact												
58	Auxiliary alarm contact												
68	Double auxiliary contacts, auxiliary alarm contact												
78	Under-voltage tripper, auxiliary alarm contact												

4.4 Product Tripping Curve

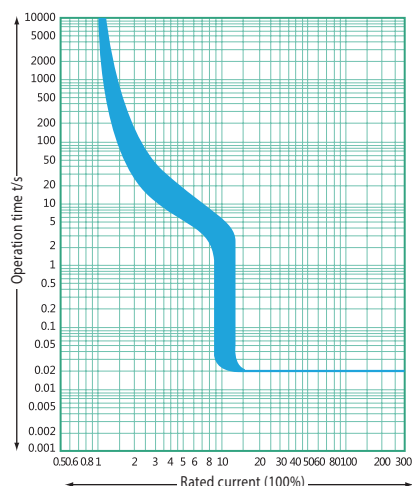
● Protection requirements for the products:

Tripper rated current (A)	Thermal tripper (ambient temperature is +40℃)		Operating current for the electromagnetic tripper (A)	Remarks
	1.05In (cold state) non- operating time (h)	1.3In (thermal state) operating time (h)		
10≤In≤63	1	1	10In × ( 1 ± 20% )	Power distribution type
63≤In≤800	2	2	10In × ( 1 ± 20% )	
10≤In≤800	1.0In (cold state) non- operating time (h)	1.2In (thermal state) operating time (h)	12In × ( 1 ± 20% )	Motor protection type
	2	2		

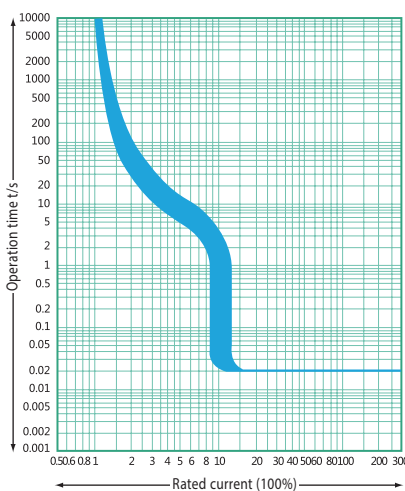
● Product short circuit overload protection characteristic curve



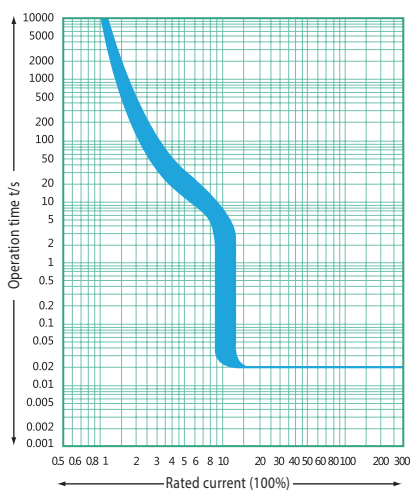
NDM2-63 L.M Time/current characteristic curve



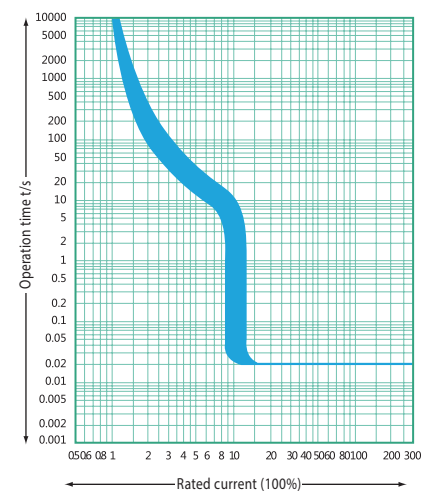
NDM2-100, 125 C.L.M.H NDM2X-125 Time/  
current characteristic curve



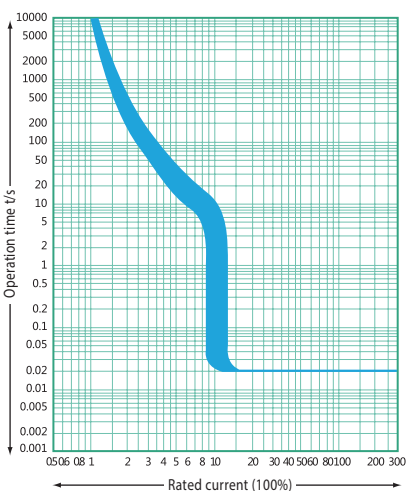
NDM2-225, 250 C.L.M.H Time/current characteristic curve



NDM2-400 C.L.M.H Time/current characteristic curve



NDM2-630 C.L.M.H Time/current characteristic curve

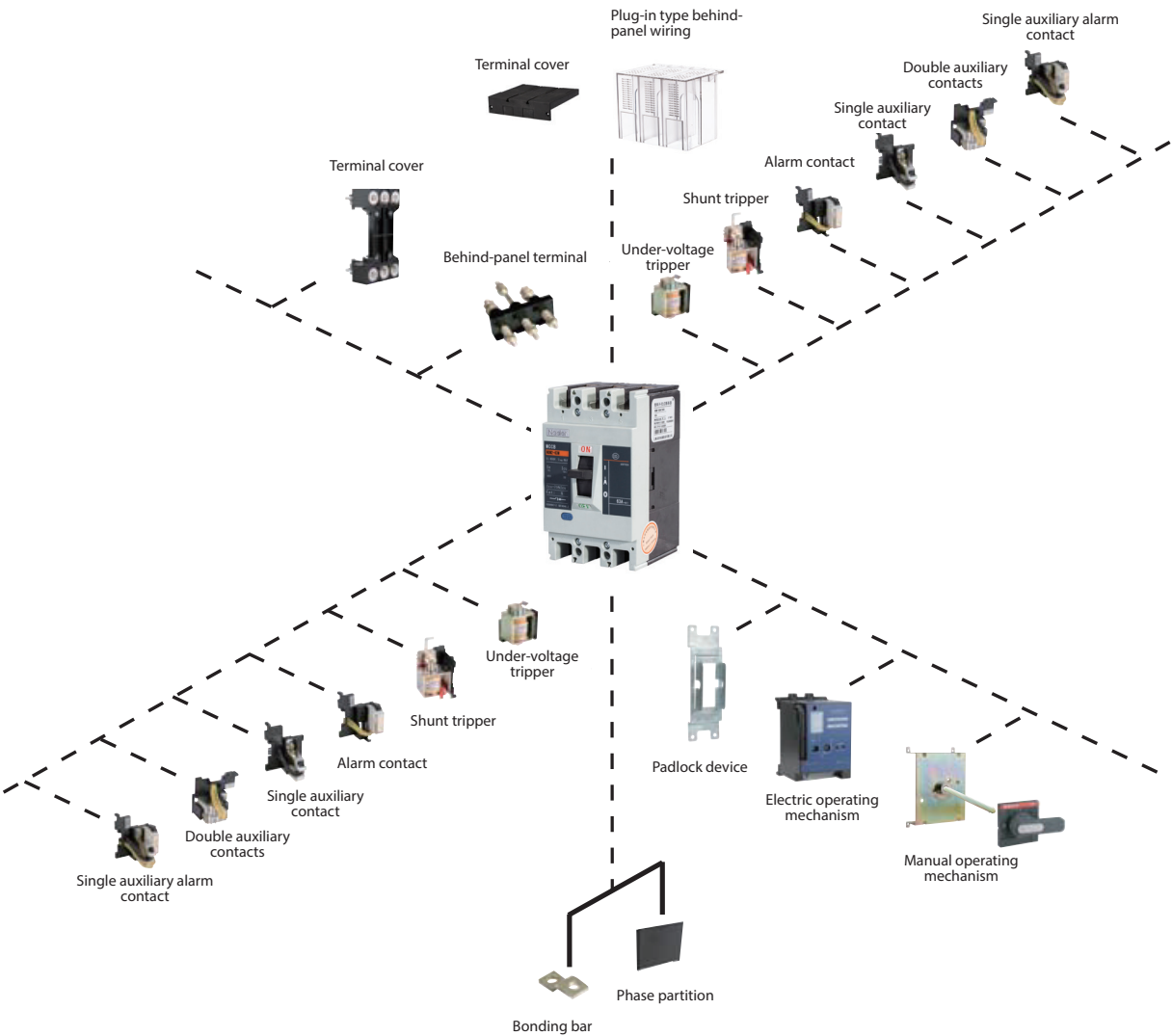


NDM2-800 M.H Time/current characteristic curve



5. Accessories

5.1 List of Accessories



5.2 Accessories Function Description

5.2.1 Auxiliary contact Technical parameters

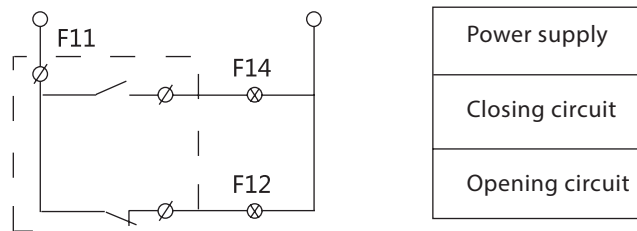
● Auxiliary contacts and combinations

The breaker is at the "opening" or "free tripping" position	Double auxiliary contacts	F14 _____ F12 _____ F11 F24 _____ F22 _____ F21
	Single auxiliary contact	F14 _____ F12 _____ F11
The breaker is at the "closing" position	"Closing" switches to "opening", "opening" switches to "closing"	

★ Auxiliary contact current parameters

Frame grade Rated current	Conventional heating current 1th	Rated operational current at AC 400V
$I_{nm} \leq 225$	3A	0.30A
$I_{nm} > 225$	3A	0.40A

Auxiliary contact wiring diagram



★ Electrical life of auxiliary contact

Use class	Switch on			Breaking			Frequency	Operation frequency (time(s)/hour)	Conduction time
	I/le	I/le	cos φ	I/le	U/Le	cos φ			
AC-15	10	1	0.3	1	1	0.3	6050	360	≥0.05s
DC-13	1	1	6Pe	1	1	6Pe			≥T0.95

★ Connection and breaking capacity of auxiliary contact

Use class	Switch on			Breaking			Frequency	Operation frequency (time(s)/hour)	Conduction time
	I/le	I/le	cos φ	I/le	U/Le	cos φ			
AC-15	10	1	0.3	1	1	0.3	10	120	≥0.05s
DC-13	1	1	6Pe	1	1	6Pe			≥T0.95

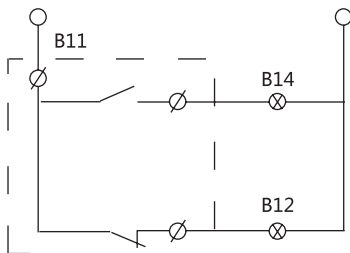
## 5.2.2 Alarm contact

★ Alarm contact  $U_e=220V$ ,  $I_{th}=3A$

When the circuit breaker is at the position of "opening" or "closing"	
The circuit breaker is at the "free tripping" position	

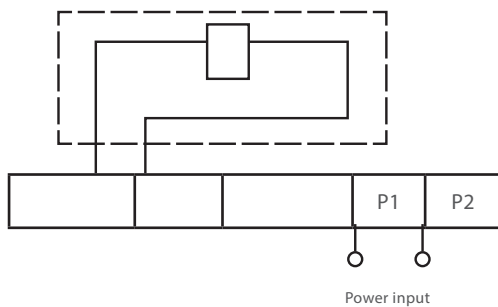
★ Alarm contact wiring diagram

In the case of proper closing or opening of circuit breaker, the contact does not operate; only after free tripping (or fault tripping) will the original state of contact be changed, which means normally open switches to closed and normally closed switches to open; after re-buckle of the circuit breaker, the contact is restored to the original position.



5.2.3 Under-voltage tripper

- ◆ At 35%~70% of rated control power voltage, the under-voltage tripper should operate reliably to disconnect the circuit breaker. When it is less than 35% of the rated voltage, closing of circuit breaker should be reliably prevented. When the power supply voltage is equal to or greater than 85% of rated voltage, it should be ensured that the circuit breaker is closed.
- ◆ Control voltage : AC 50Hz 230V 400V  
DC 110V 220V
- ◆ Note : The under-voltage tripper must be energized first in order to re-buckle and close the circuit breaker, otherwise it will damage the circuit breaker.



Under-voltage tripper wiring diagram

Instantaneous current and power consumption of under-voltage tripper

Product models	Instantaneous current value (mA)		Power consumption (W)	
	AC 400V	AC 230V	AC 400V	AC 230V
NDM2-63	10	13.5	4	3.105
NDM2-100/125	9.75	14.25	3.95	3.2275
NDM2-225/250	10.88	14.75	4.352	3.392
NDM2-400	9	11	3.6	2.53
NDM2-630	8.5	11	3.4	2.53
NDM2-800	5	7.25	2	1.6675

## 5.2.4 Shunt tripper

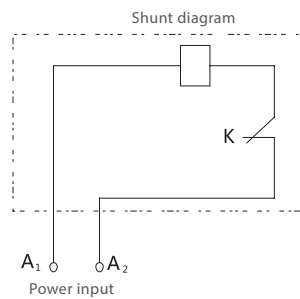
★ Generally installed at Phase A of circuit breaker; the shunt tripper should enable the circuit breaker to trip reliably at 70%~110% of rated control voltage under all operation conditions.

★ Control voltage : AC 50 Hz 230 V 400 V

DC [1]24V Low power consumption, 24, 220V

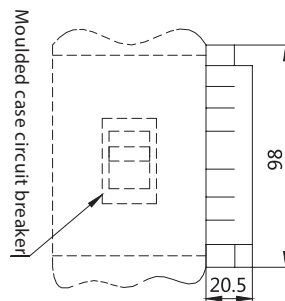
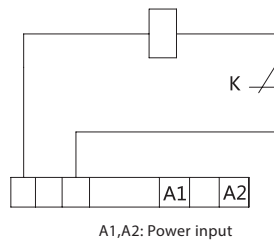
★ Shunt tripper wiring diagram

When the control circuit power supply is DC24V and the power is lower than 80W, it is possible to use low power shunt tripper or add intermediate relay.

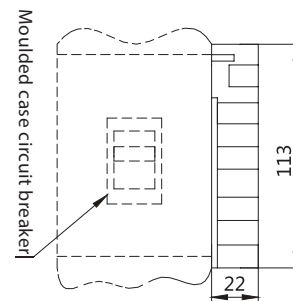


★ DC24V low power shunt tripper wiring diagram and outline dimension of external ceiling rose

The normal operating power of DV24V low power shunt tripper is as low as 15W, which substantially meet the requirements of all DC24V control circuits. The low power shunt has a plug-in junction box, whose outline dimension is shown below.

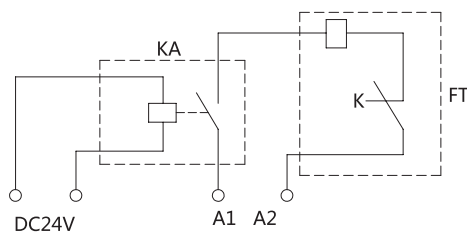


NDM2-63~250



NDM2-400~800

★ DC24V control power wiring diagram



KA : DC24V relay with electric shock capacity of 1A

FT : AC220V/380V Shunt tripper

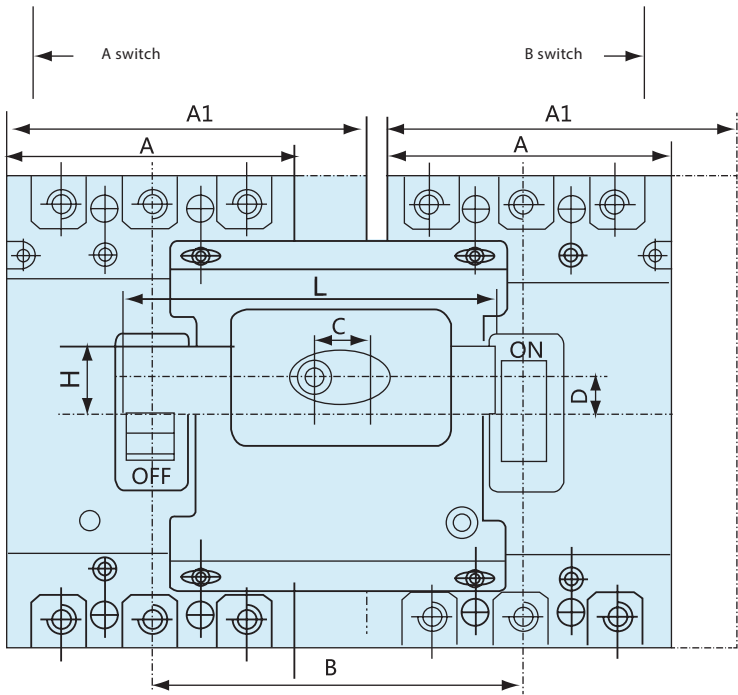
The rated voltage of FT is the power input voltage of A1 and A2

★ Instantaneous current and power consumption of shunt tripper

Product models	Instantaneous current value (A)				Power consumption (W)				
	AC 400V	AC 230V	DC220V	DC 24V	AC 400V	AC 230V	DC 220V	DC 24V	DC 24V (Low power consumption)
NDM2-63	0.28	0.434	0.341	4	91.6	76.1	90.7	96.2	15
NDM2-100/125	0.288	0.425	0.341	4	96.8	73	90.7	91.2	15
NDM2-225/250	0.313	0.412	0.341	3.87	112	68.8	90.7	85.3	15
NDM2-400	0.197	0.325	0.4	3.87	67	62.3	94.4	1000	15
NDM2-630	0.199	0.314	0.4	3.87	68	58.2	94.4	100	15
NDM2-800	0.538	0.898	1.134	5.22	163	153		120	15

5.3 Functions and Sizes of External Accessories

5.3.1 Mechanical interlock



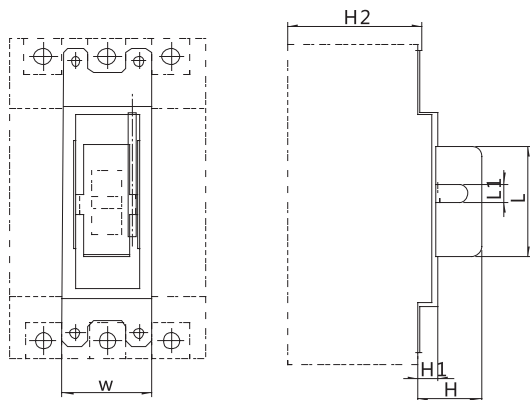
Mechanical interlocking and related dimensions

Product models	A	A1	B	C	D	L	H	Remarks
NDM2-63	78		102	38	13	118	22	For NDM2-63L,M
NDM2-100	92		120	50	11.5	118	22	For NDM2-100C,L,M,H

Product models	A	A1	B	C	D	L	H	Remarks
NDM2-125	92		120	50	11.5	118	22	For NDM2-125C,L,M
NDM2-225	107		135	50	14	135	22	For NDM2-225C,L,M,H
NDM2-250	107		135	50	14	135	22	For NDM2-250C,L,M
NDM2-400	150		180	60	18	175	30	For NDM2-400C,L,M,H
NDM2-630	182		235	60	16	198	28	For NDM2-630C,L,M,H
NDM2-800	210		243	60	18	230	30	For NDM2-800M, H
NDM2-63/4P		103	132	38	13	125	22	For NDM2-63, four-pole
NDM2-100/4P		122	152	50	11.5	150	22	For NDM2-100, four-pole
NDM2-125/4P		122	152	50	11.5	150	22	For NDM2-125, four-pole
NDM2-225/4P		142	173	50	9	168	22	For NDM2-225, four-pole
NDM2-250/4P		142	173	50	9	168	22	For NDM2-250, four-pole
NDM2-400/4P		198	230	60	16	188	28	For NDM2-400, four-pole
NDM2-630/4P		240	295	60	12	240	30	For NDM2-630, four-pole
NDM2-800/4P		280	310	60	29.5	300	30	For NDM2-800M, four-pole

### 5.3.2 Locking Device

#### ● MS1 locking mechanism installation diagram

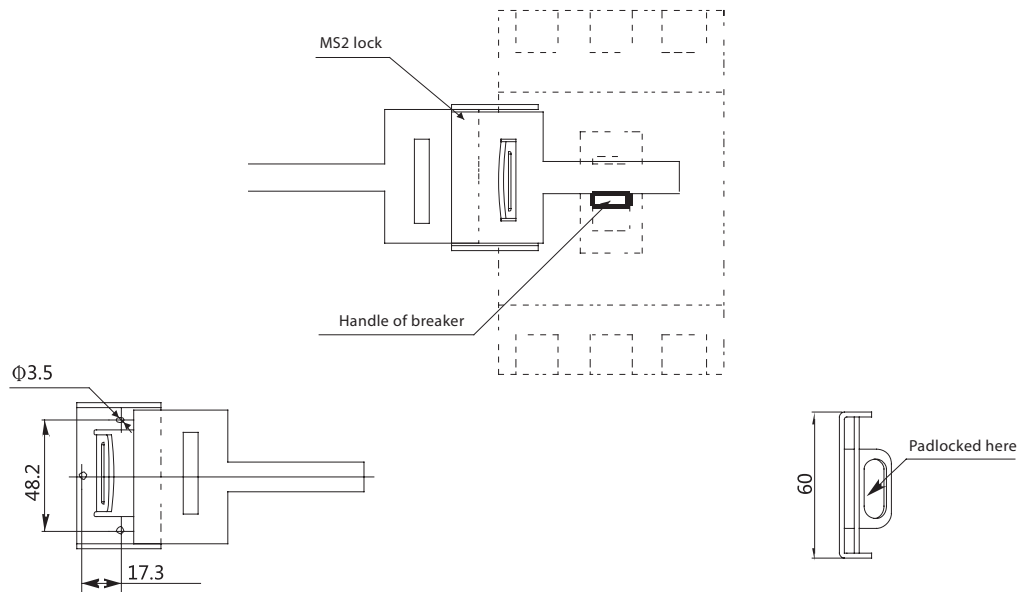


MS1 is an integral lock device (which means that the locking device and the circuit breaker share the mounting screws during the co-installation), which is aimed at preventing closing and opening operations due to human error; at present, there are only NDM2-100, 125, 225 and 250 available; the installation dimensions are shown in the following figures and tables (The dotted part in the figure is the circuit breaker part)

Product models	W	L	L1	H	H1	H2
NDM2-63(L)	42	55	9	24	4	68
NDM2-63 (M) and four-pole	42	55	9	24	4	76
NDM2-100/125(C,L)	42	55	9	24	4	63.5
NDM2-100/125 (M, H) and four-pole	42	55	9	24	4	81.5
NDM2-225/250(C,L)	52	66	9	26	4	82
NDM2-100/125 (M, H) and four-pole	52	66	9	26	4	99

## ● MS2 Locking device

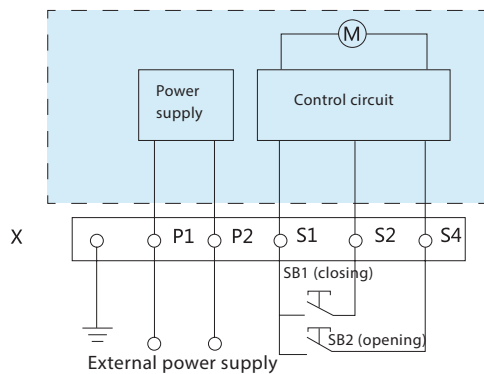
MS2 is a split lock device (which means that the device is installed on the left or right of the front cover of circuit breaker) and is used for products of NDM2 series, which is aimed at preventing closing and opening operation due to human error (the dotted part is the circuit breaker part).



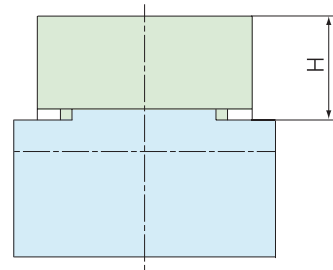
MS2 locking mechanism installation diagram

## ● Electric operating mechanism

★ CD2 motor operating mechanism (equipped with NDM2-63-800 series)



Wiring diagram (The circuit breaker external accessory wiring diagram is within the dotted box)



CD2 Electric operating mechanism

Explanation of notation:

SB1, SB2: Operating button (prepared by users)

X: Terminal block

P1, P2: External power supply

Voltage Specification:

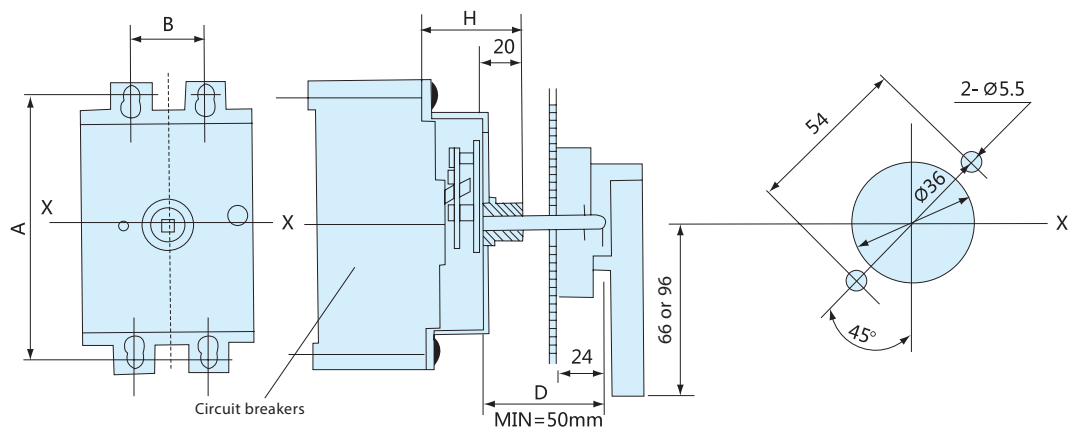
AC50Hz 110V,230V,400V,DC24V,110V,220V

★ Technical parameters of CD2 motor operating mechanism

Power distribution breaker	Operating current (A)	Electric power (W)	Life/times	Operating mechanism height H (mm)
NDM2-63 (L、M、4P)	$\leq 0.5$	14	14000	90.5
NDM2-100、125 (C、L、M、H、4P)	$\leq 0.5$	14	14000	92
NDM2-225、250 (C、L、M、H、4P)	$\leq 0.5$	14	10000	92
NDM2-400 (C、L、M、H、4P)	$\leq 2$	35	5000	142
NDM2-630 (C、L、M、H、4P)	$\leq 2$	35	5000	153
NDM2-800 (M、H、4P)	$\leq 2$	35	5000	146

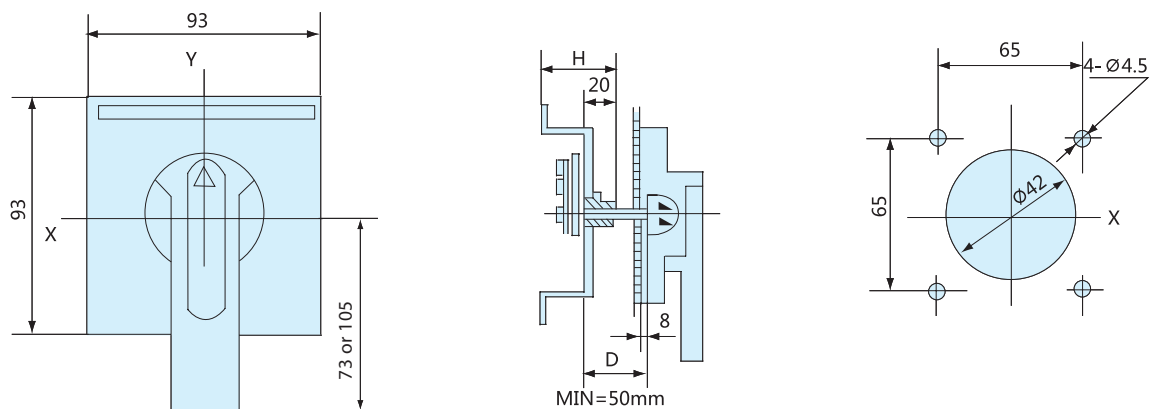
● Manual operating mechanism

★ CS1-A type handle mounting opening diagram



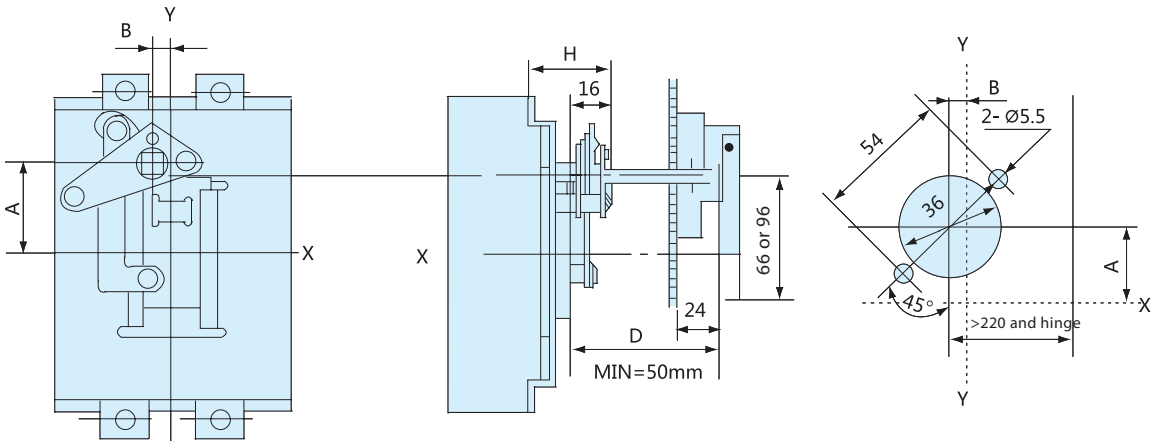
Note: A type is a round handle F type is a square handle

★ CS1-F type handle mounting opening diagram

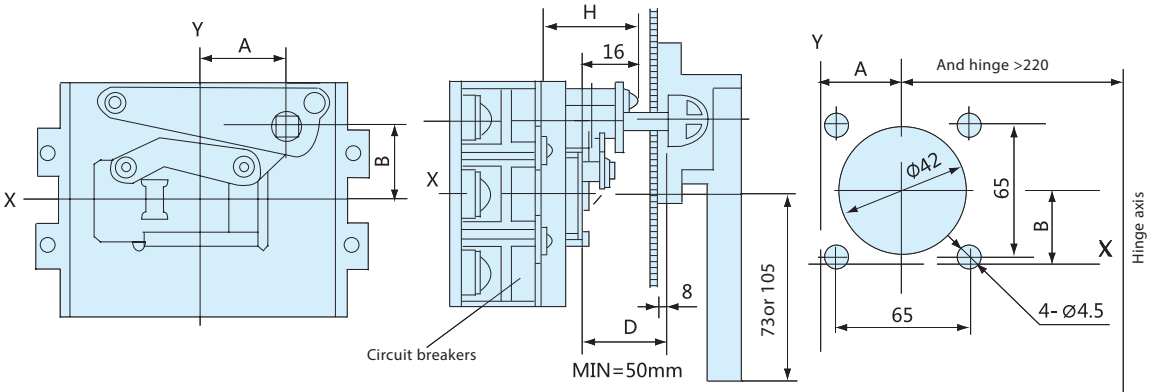




★ CS2-F type handle mounting opening diagram



★ CS2-A type handle mounting opening diagram

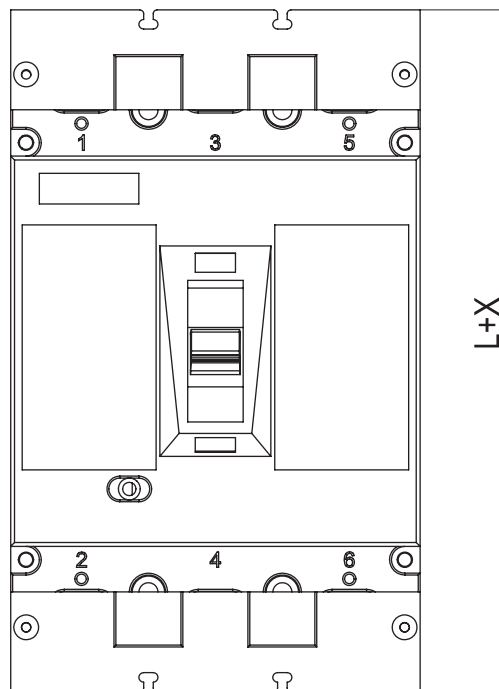


★ Mounting method and outline dimension of manual operating mechanism

External accessories	External accessory model	Equipped with circuit breaker	Manual installation dimensions: mm			Installation mode
			H	A	B	
Manual operating mechanism	CS1-63	NDM2-63L/M	49	100	25	Vertical mounting
	CS1-100	NDM2-100、125 C/L/M/H	49	104	30	
	CS1-225	NDM2-225、250 C/L/M/H	55	143	35	
	CS1-400	NDM2-400 C/L/M/H	76	194	138	
	CS1-630	NDM2-630 C/L/M/H	83	81	171	Horizontal mounting
	CS1-800	NDM2-800 M/H	63	87.5	198	Horizontal mounting
	CS2-100	NDM2-100、125C/L/M/H	46	35	11.5	Vertical mounting
	CS2-100	NDM2-100、125C/L/M/H	46	37	11.5	Horizontal mounting
	CS2-225	NDM2-225、250C/L/M/H	48	35	31	Vertical mounting
	CS2-225	NDM2-225、250C/L/M/H	48	45	32	Horizontal mounting
	CS2-400	NDM2-400 C/L/M/H	61	65	15	Vertical mounting
	CS2-630	NDM2-630 C/L/M/H	61	67.5	15	Horizontal mounting
	CS2-800	NDM2-800 M/H	66	63	15	

Note: In the figure, size D is 150mm by default, and can be customized according to the customer requirements.

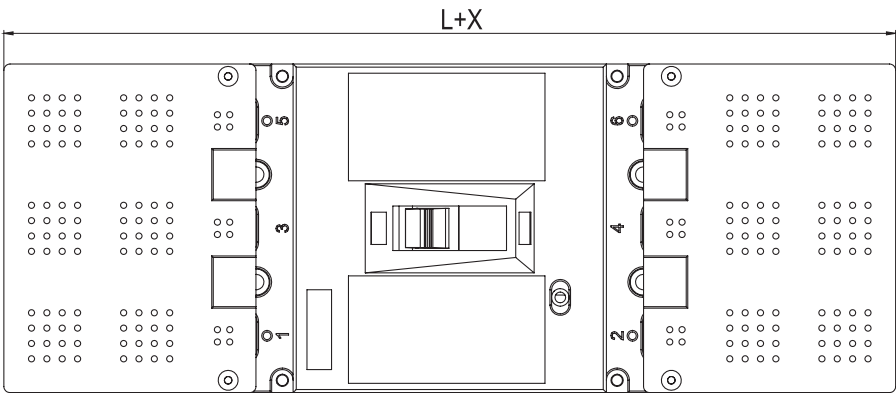
### 5.3.3 Zero flashover cover



Product series	Model	Body length L	Increased length of terminal cover X	Length after addition of terminal cover Lx
NDM2	NDM2-100/125	150	12	162
	NDM2-225/250	165	19	184
	NDM2-400	257	19	276
	NDM2-630	270	19	289
	NDM2-800	280	19	299

5.3.4 Extended terminal cover

The extended terminal cover is mainly used for bare cable installation to protect the cable.



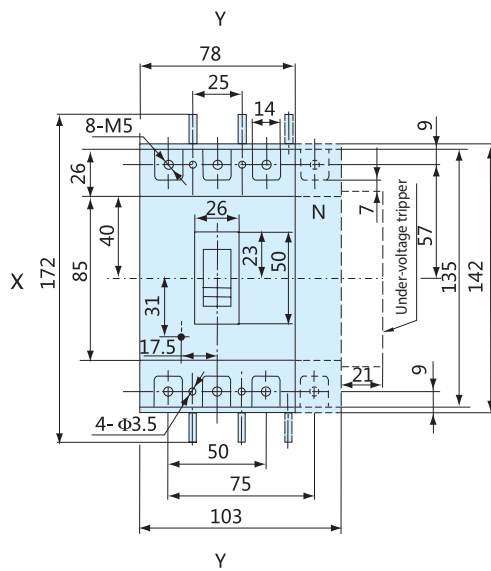
Product series	Model	Body length L (mm)	Increased length of extended terminal cover X(mm)	Total length Lx (mm)
NDM2	NDM2-100L/125L	150	130	280
	NDM2-225L/250L	165	126	291
	NDM2-400L	257	144	401
	NDM2-630L	270	130	400
	NDM2-800L	280	150	430

## 6. Product Outline Dimension

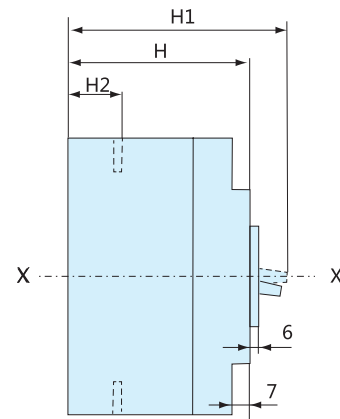
## 6.1 NDM2-63 (L, M) Outline Dimension, Mounting Dimension and Wiring Method

## Before-panel wiring (three-pole, four-pole)

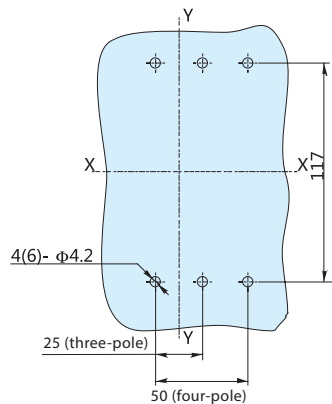
X-X, Y-Y represents the size of opening of before-panel wiring mounting panel of the center of three-pole circuit breaker



\* The size of additional terminal cover (optional piece) is 142, and a four-pole product is not provided with terminal cover.



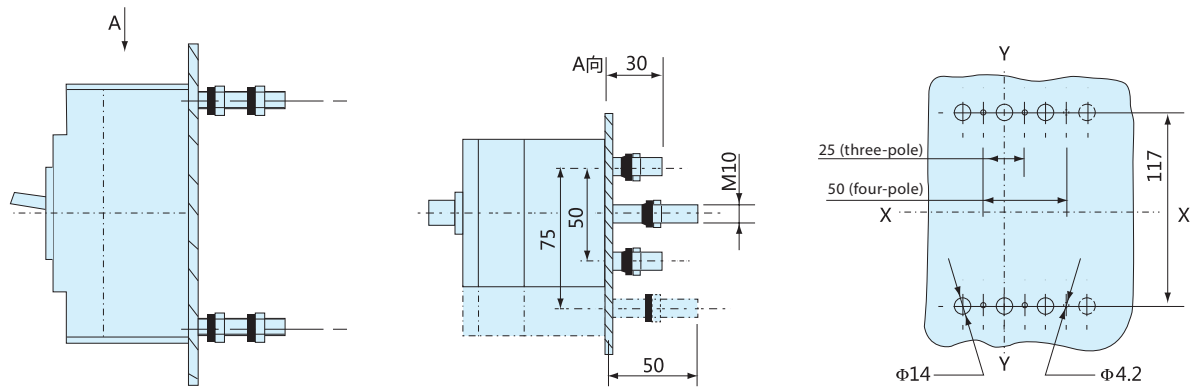
the size of opening of before-panel  
wiring mounting panel



Model	H	H1	H2
NDM2-63L	73.5	90.5	20.5
NDM2-63M	81.5	98.5	28.5
NDM2-63 four-pole			

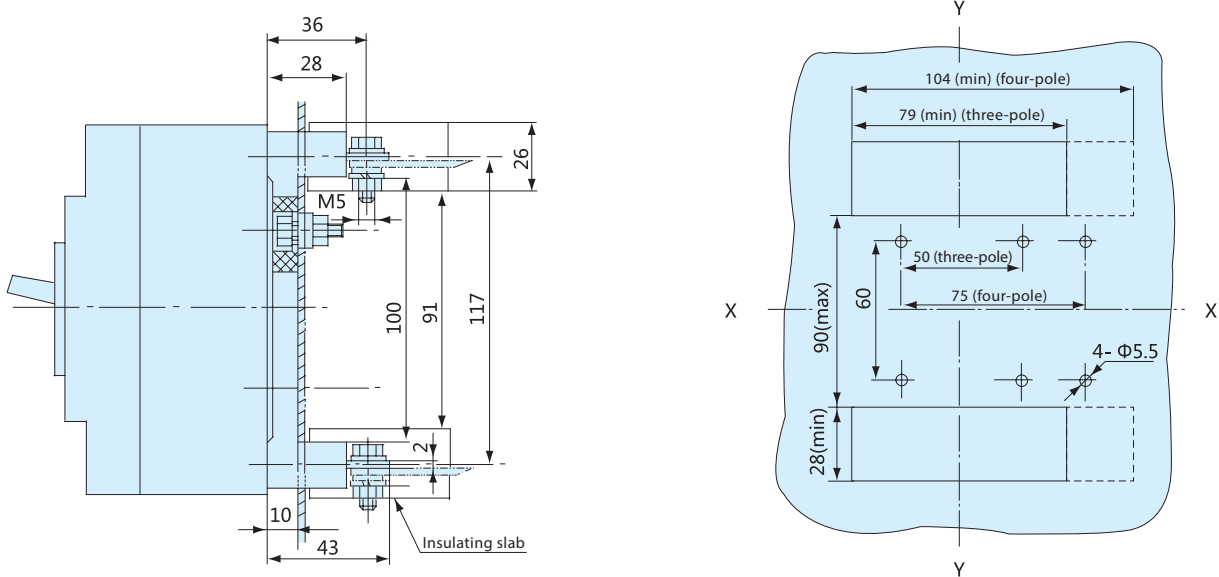
Z1: Behind-panel wiring  
(three-pole, four-pole)

X-X, Y-Y represents the size of opening  
of behind-panel wiring mounting panel  
at the center of circuit breaker



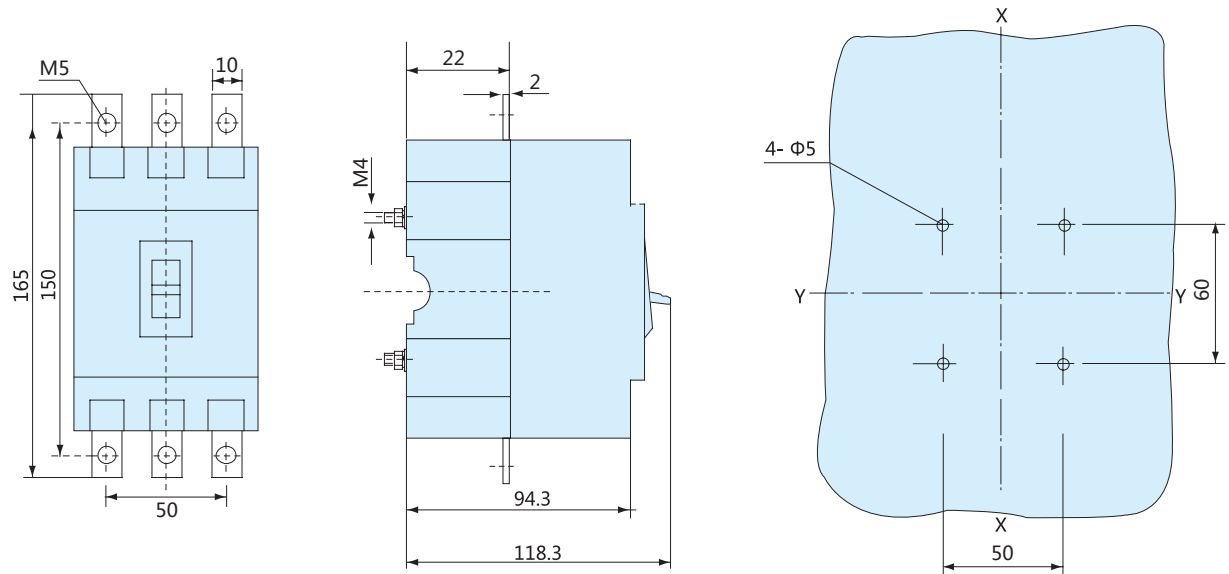
Z2H: Plug-in type behind-panel wiring  
(three-pole, four-pole)

X-X, Y-Y represents the size of plug-in type  
mounting panel at the center of circuit breaker



## Z2Q: Plug-in type before-panel wiring (three-pole)

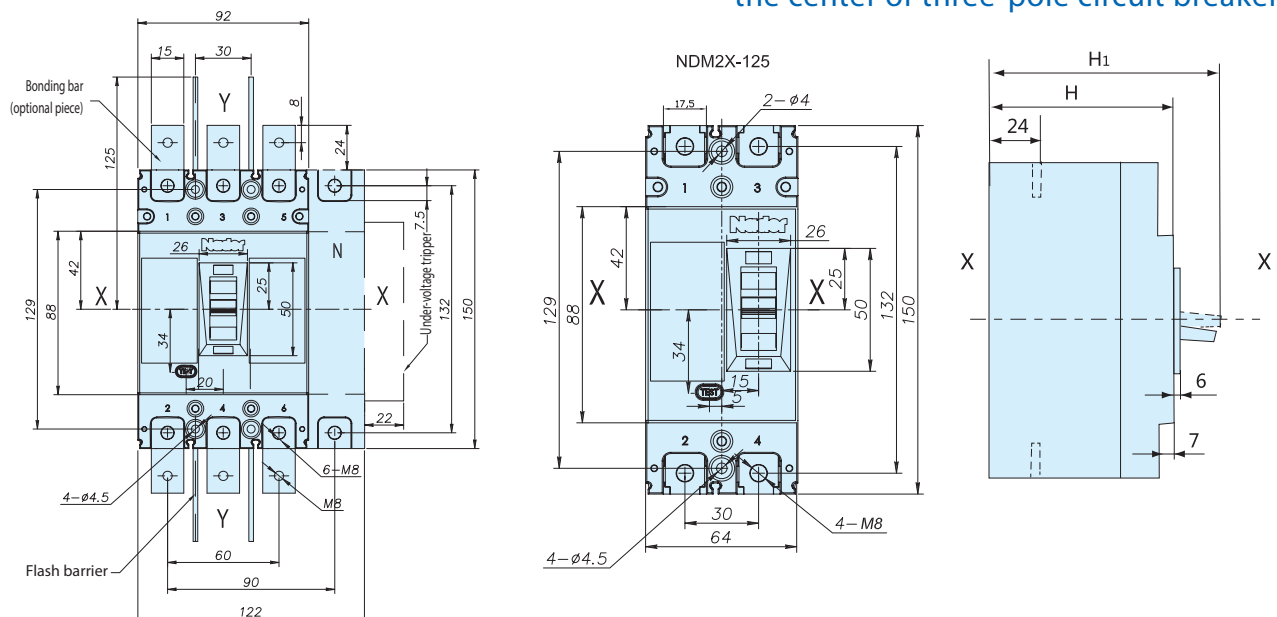
X-X, Y-Y represents the size of plug-in type mounting panel at the center of circuit breaker



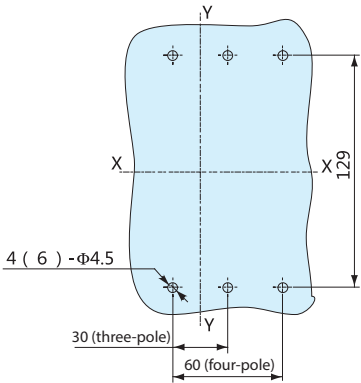
## 6.2 NDM2-100 (C, L, M, H) 125 (C, L, M, H) NDM2X-125 Outline Dimension, Mounting Dimension and Wiring Method

### Before-panel wiring (two-pole, three-pole, four-pole)

X-X, Y-Y represents the size of opening of before-panel wiring mounting panel of the center of three-pole circuit breaker

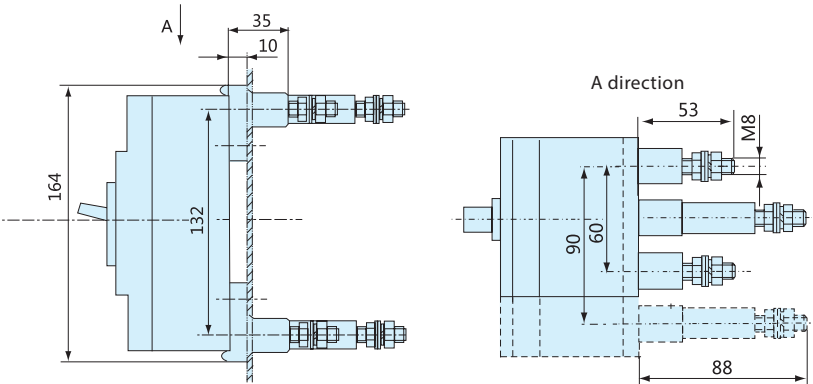


the size of opening of before-panel wiring mounting panel

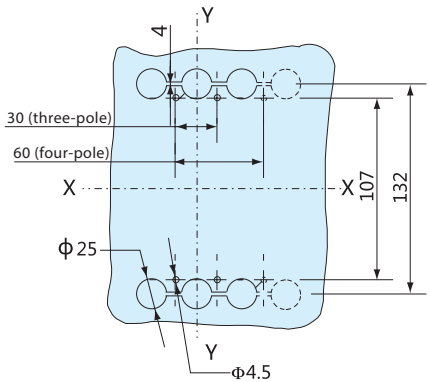


Model	H	H1
NDM2-100C、L	69	86
NDM2-125C、L		
NDM2X-125		
NDM2-100M、H	87	104
NDM2-125M		
NDM2-100 four-pole		
NDM2-125 four-pole		

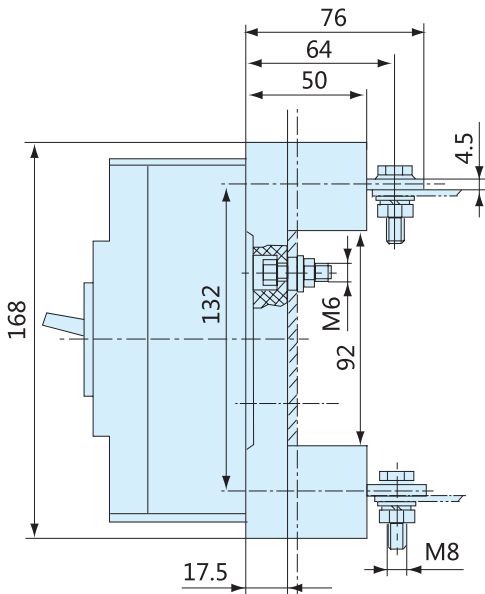
Z1: Behind-panel wiring (three-pole, four-pole)



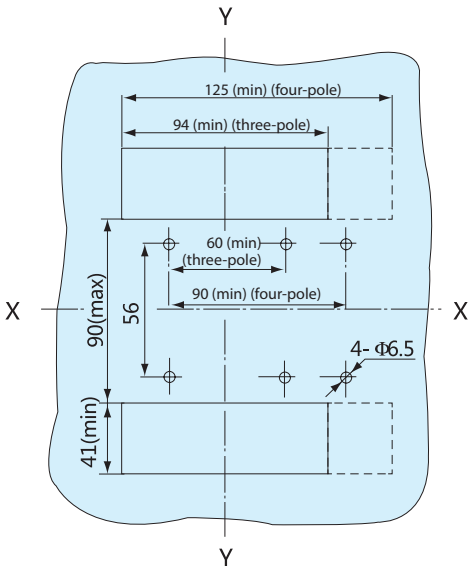
X-X, Y-Y represents the size of opening of behind-panel wiring mounting panel at the center of three-pole circuit breaker



Z2H: Plug-in type behind-panel wiring (three-pole, four-pole)

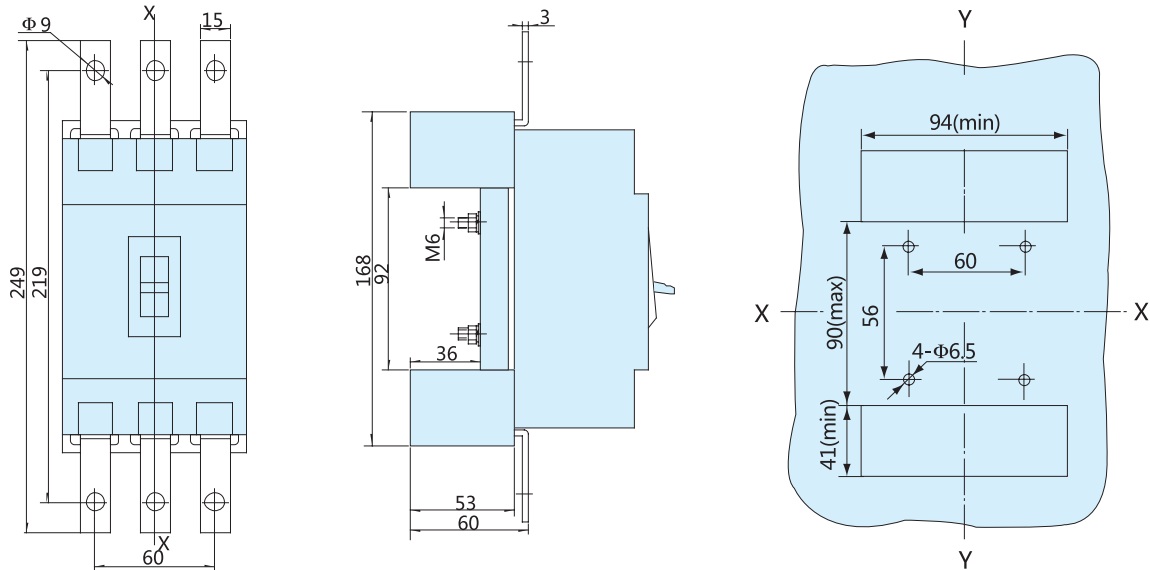


X-X, Y-Y represents the size of plug-in type mounting panel at the center of three-pole circuit breaker



### Z2Q: Plug-in type before-panel wiring (three-pole)

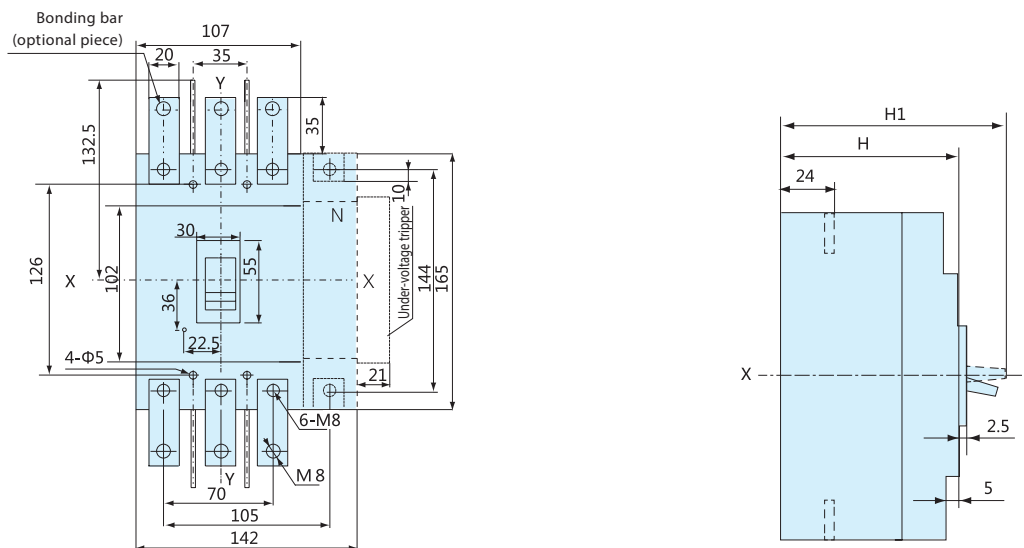
X-X, Y-Y represents the size of plug-in type mounting panel at the center of three-pole circuit breaker



## 6.3 NDM2-225 (C, L, M, H) 250 (C, L, M, H) Outline Dimension, Mounting Dimension and Wiring Method

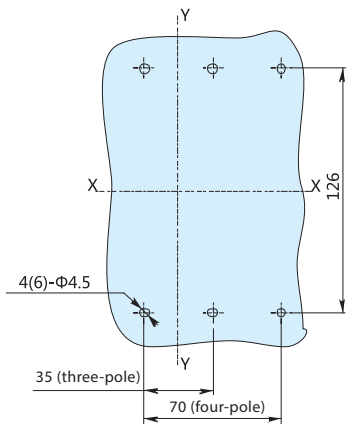
### Before-panel wiring (three-pole, four-pole)

X-X, Y-Y represents the size of opening of before-panel wiring mounting panel of the center of three-pole circuit breaker



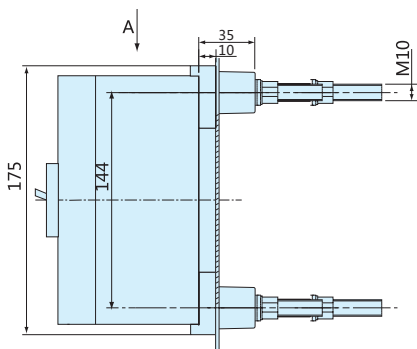


the size of opening of before-panel  
wiring mounting panel

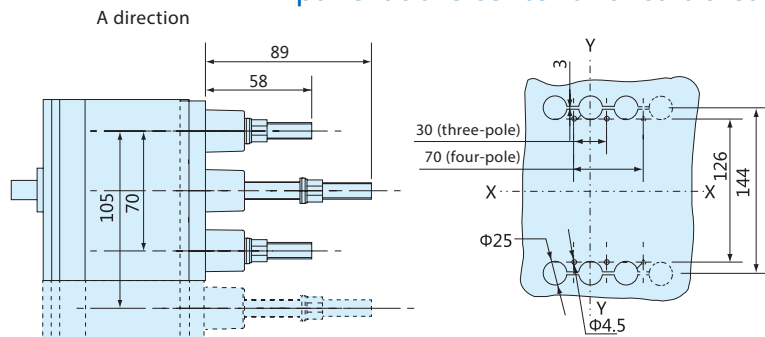


Model	H	H1
NDM2-225C、L	86	110
NDM2-250C、L		
NDM2-250M、H	103	127
NDM2-250M		
NDM2-225 four-pole		
NDM2-250 four-pole		

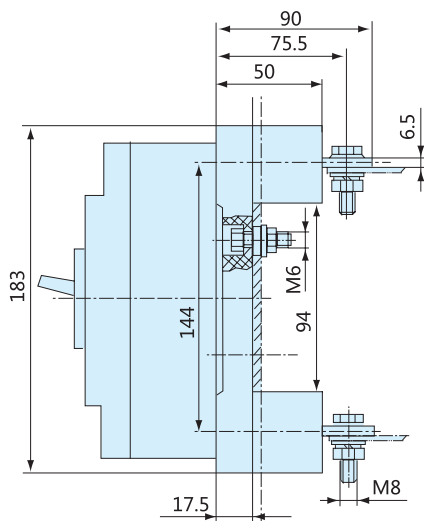
## Z1: Behind-panel wiring (three-pole, four-pole)



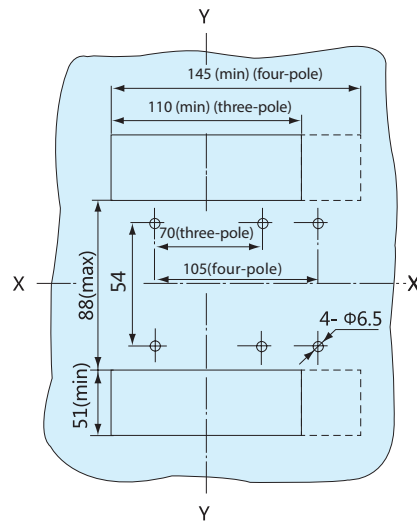
X-X, Y-Y represents the size of opening of behind-panel wiring mounting panel at the center of circuit breaker



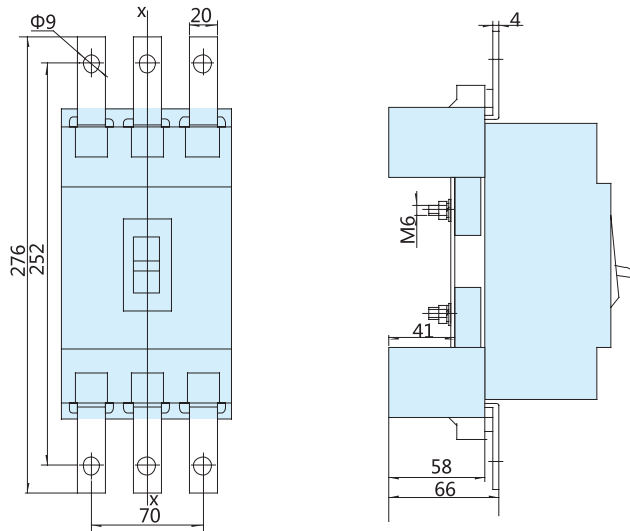
## Z2H: Plug-in type behind-panel wiring (three-pole, four-pole)



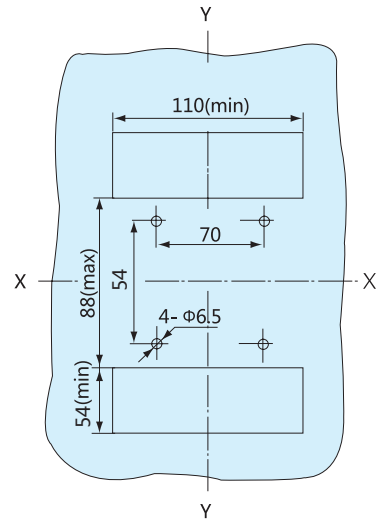
X-X, Y-Y represents the size of plug-in type mounting panel at the center of circuit breaker



**Z2Q: Plug-in type before-panel wiring  
(three-pole)**

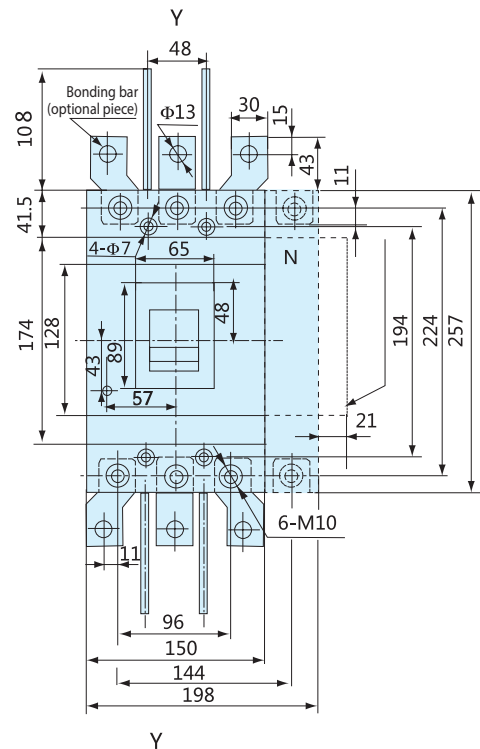


**X-X, Y-Y represents the size of  
plug-in type mounting panel at  
the center of circuit breaker**

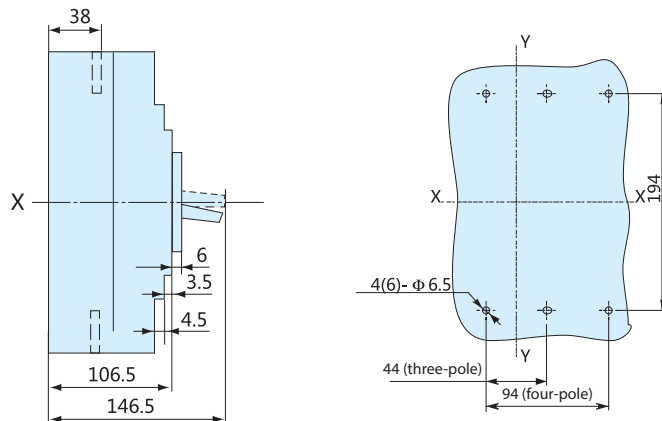


## 6.4 NDM2-400(C, L, M, H) Outline Dimension, Mounting Dimension and Wiring Method

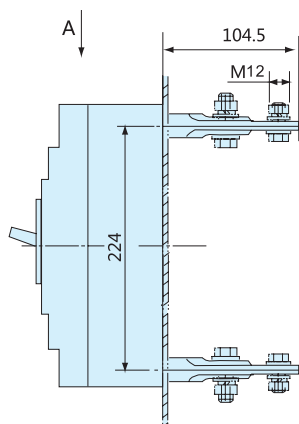
Before-panel wiring (three-pole, four-pole)



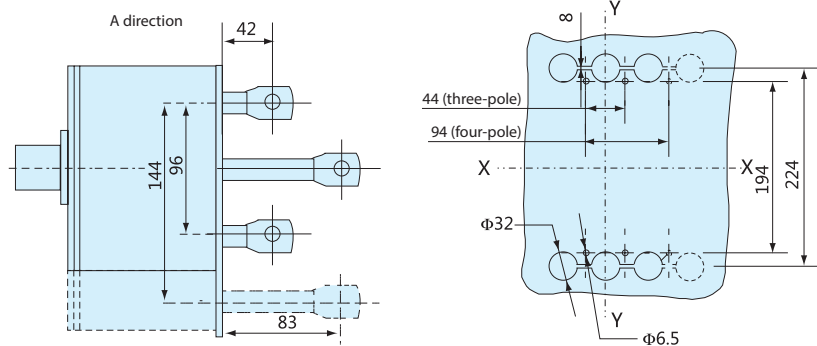
X-X, Y-Y represents the size of opening of before-panel wiring mounting panel at the center of three-pole circuit breaker



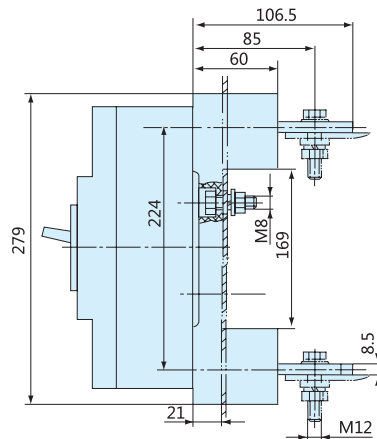
Z1: Behind-panel wiring (three-pole, four-pole)



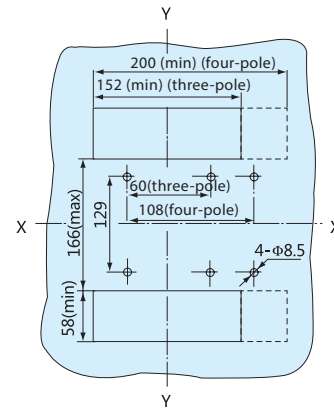
X-X, Y-Y represents the size of opening of behind-panel wiring mounting panel at the center of circuit breaker



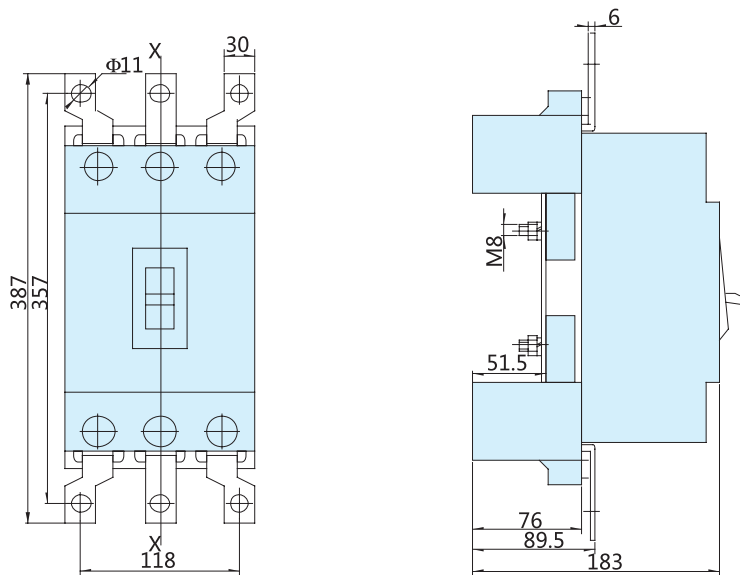
Z2H: Plug-in type behind-panel wiring  
(three-pole, four-pole)



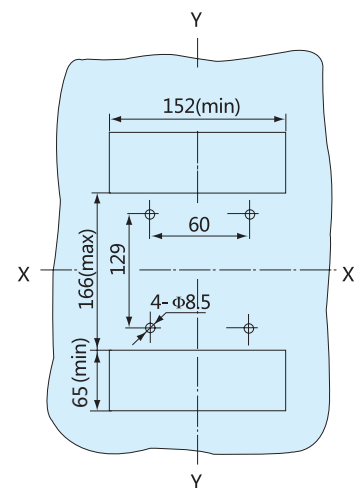
X-X, Y-Y represents the size of  
plug-in type mounting panel at  
the center of circuit breaker



Z2Q: Plug-in type before-panel wiring  
(three-pole)

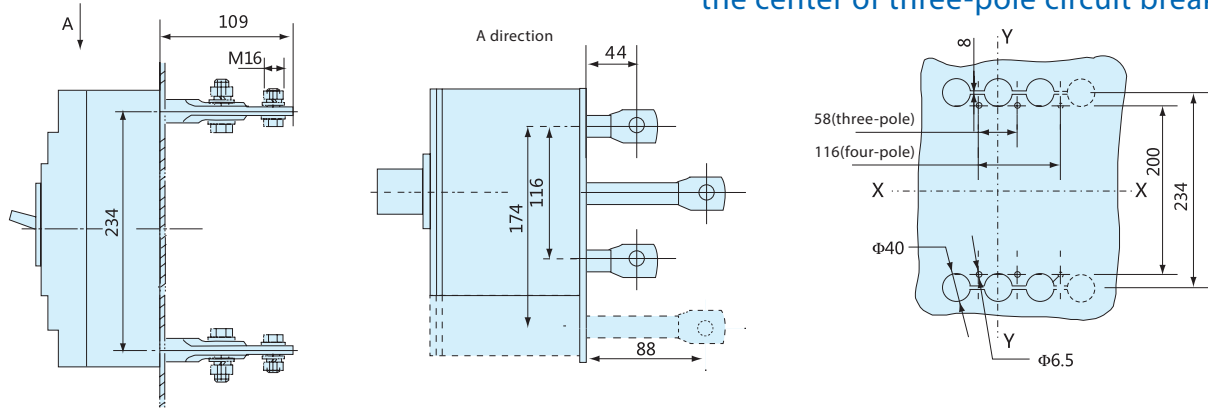


X-X, Y-Y represents the size of  
plug-in type mounting panel at  
the center of circuit breaker



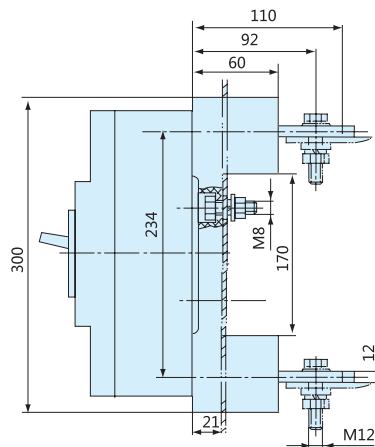


**Z1: Behind-panel wiring**  
(three-pole, four-pole)

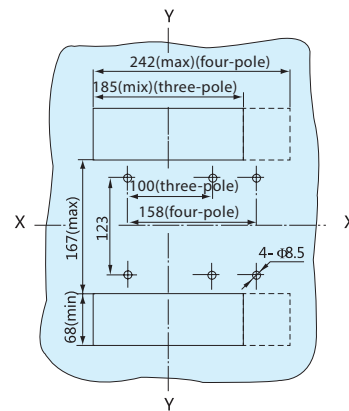


X-X, Y-Y represents the size of opening of behind-panel wiring mounting panel at the center of three-pole circuit breaker

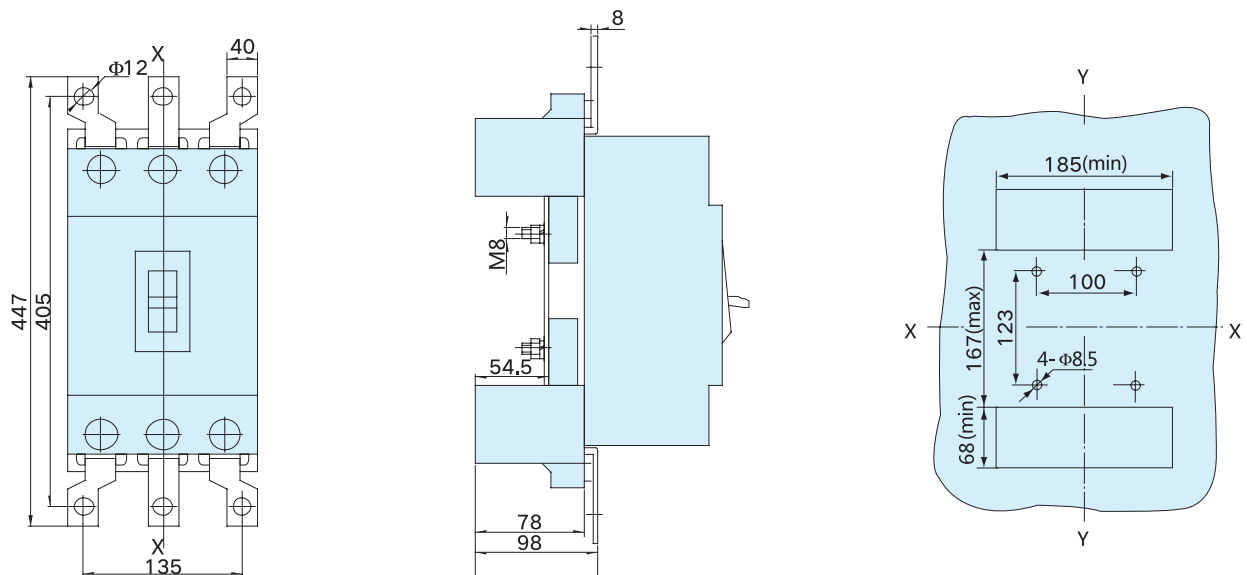
**Z2H: Plug-in type behind-panel wiring**  
(three-pole, four-pole)



X-X, Y-Y represents the size of plug-in type mounting panel at the center of three-pole circuit breaker

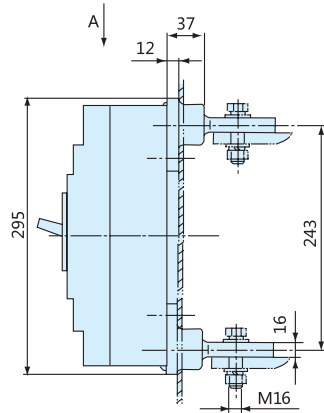


**Z2Q: Plug-in type before-panel wiring (three-pole)**

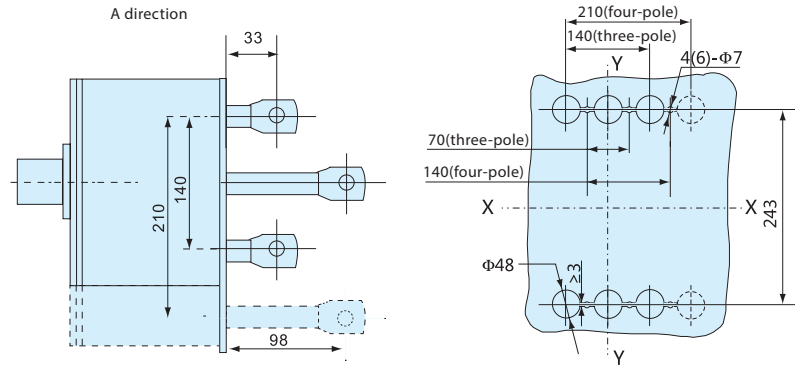




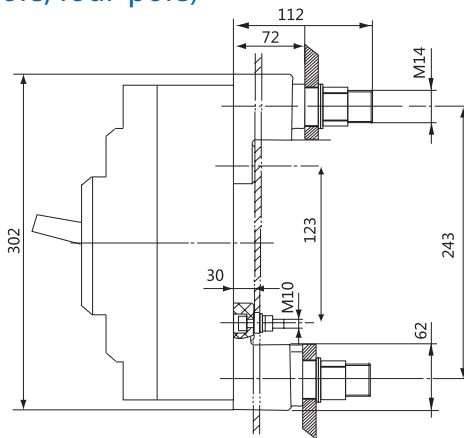
Z1: Behind-panel wiring  
(three-pole, four-pole)



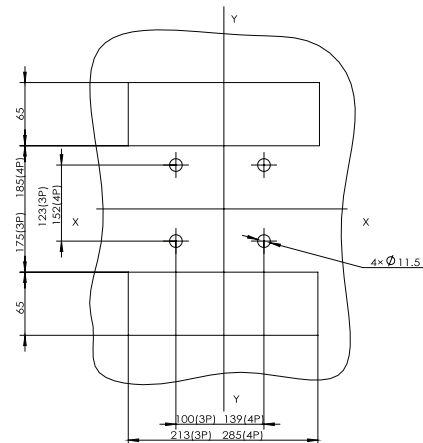
X-X, Y-Y represents the size of opening  
of behind-panel wiring mounting  
panel at the center of circuit breaker



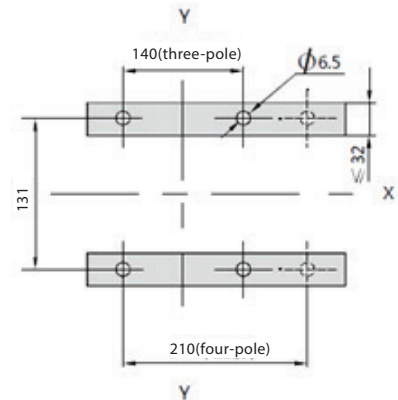
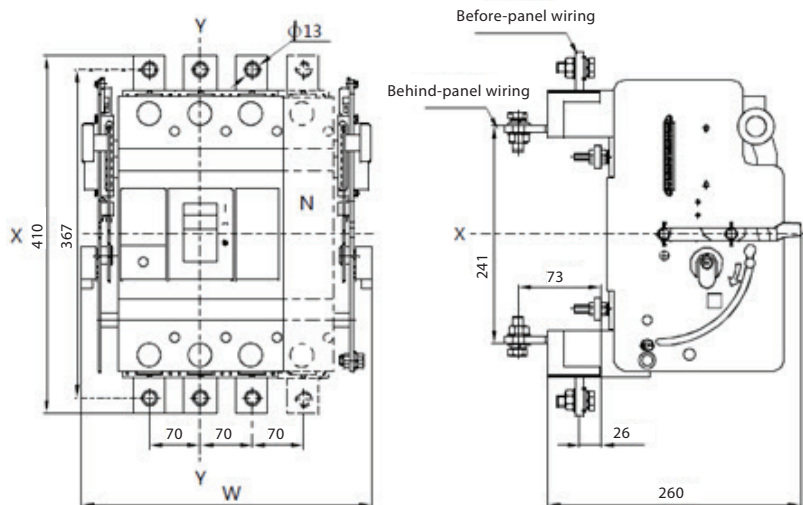
Z2H: Plug-in type behind-panel wiring  
(three-pole, four-pole)



X-X, Y-Y represents the size of  
plug-in type mounting panel at  
the center of circuit breaker



Drawer wiring (three-pole, four-pole)

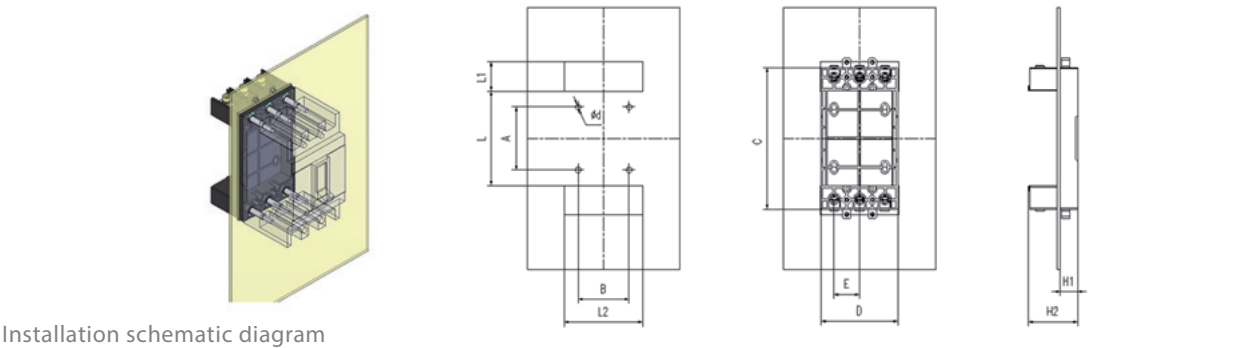


Number of poles	W
Three-pole	289
Four-pole	359



6.7 NDM2-(100-800)Z3 Plug-in Type Mounting Dimension and Wiring Method

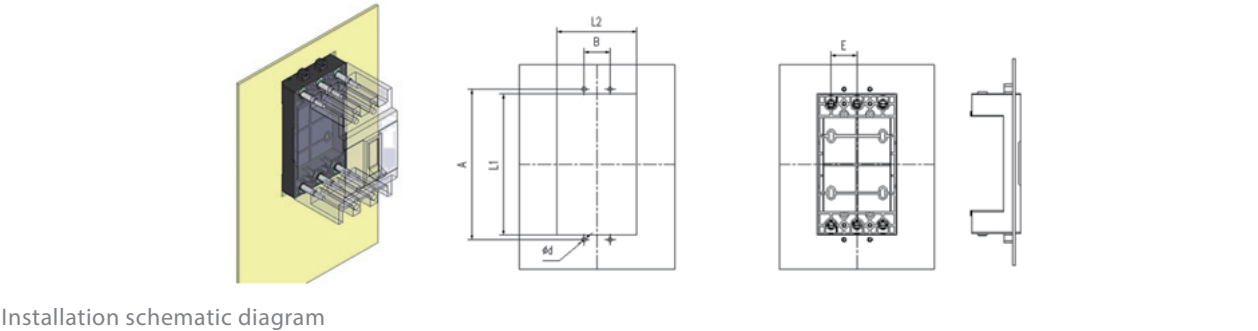
● Z3H (Scheme 1): Behind-panel mounting



Typical product model	Breaker model	A	B	L	L1	L2	d	C	D	E	H1	H2	Remarks
MZ3-100	NDM2-100/125	65	60	90	51	94	6.5	160	90	30	18	56.2	
MZ3-225	NDM2-225/250	74	70	100	55	110	6.5	179	105	35	20	73.2	
MZ3-400	NDM2-400	140	96	178	70	150	7	274	148	48	45	85	
MZ3-630	NDM2-630	140	116	178	83	177	7	300	232	58	44	120	
MZ3-800	NDM2-800	143	140	181	87	213	7	311	210	70	44	125	

Note 1: When the product is 4-pole, phase distance E is increased for sizes B, L2 and D.  
Note 2: When the product is 4-pole and the frame degree is  $\leq 250A$ , phase distance E should be increased for sizes B and L2; when the product is 4-pole and the frame degree is  $\geq 400A$ , size B remains unchanged and phase distance E is increased for N pole distance of L2.

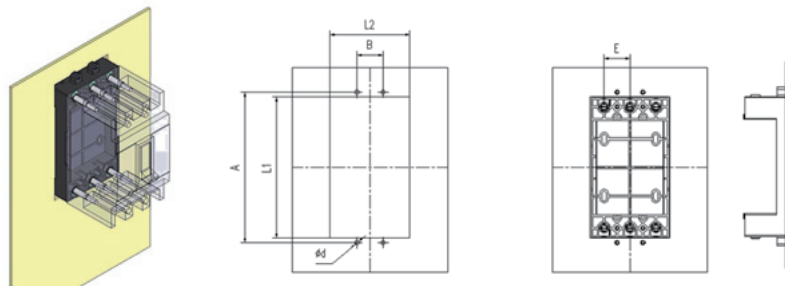
● Z3H (Scheme 2): Large opening behind-panel mounting



Typical product model	Breaker model	A	B	L1	L2	d	E	Remarks
MZ3-100	NDM2-100/125	170	30	161	92	5	30	
MZ3-225	NDM2-225/250	191	35	180	107	5	35	
MZ3-400	NDM2-400	290	48	276	150	6	48	
MZ3-630	NDM2-630	316	58	302	176	6	58	
MZ3-800	NDM2-800	327	70	313	212	6	70	

Note: When the product is 4-pole and the frame degree is  $\leq 250A$ , phase distance E shall be increased for sizes B and L2; when the product is 4-pole and the frame degree is  $\geq 400A$ , size B remains unchanged and phase distance E is increased for N pole distance of L2.

● Z3H (Scheme 3): Frame behind-panel mounting

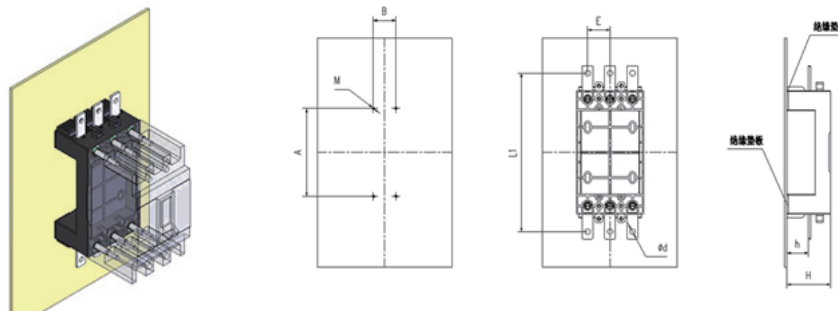


Installation schematic diagram

Typical product model	Breaker model	A	B	E	Remarks
MZ3-100	NDM2-100/125	65	60	30	
MZ3-225	NDM2-225/250	74	70	35	
MZ3-400	NDM2-400	140	96	48	
MZ3-630	NDM2-630	140	116	58	
MZ3-800	NDM2-800	143	140	70	

Note: When the product is 4-pole, phase distance E is increased for size B.

● Z3Q : Before-panel mounting



Installation schematic diagram

Typical product model	Breaker model	A	B	L1	E	d	M	H	h	Remarks
MZ3-100	NDM2-100/125	110	30	198	30	6.5	M4	57	28	
MZ3-225	NDM2-225/250	150	35	223	35	8.5	M4	74	32	
MZ3-400	NDM2-400	244	48	326	48	10.5	M5	85	36	
MZ3-630	NDM2-630	264	58	352	58	12.5	M6	120	64	
MZ3-800	NDM2-800	283	70	363	70	12.5	M6	125	67	

Warning: Insulation pad must be placed for before-panel mounting

6.8 Selection of Cross-sectional Areas of Connecting Busbars and Cables

● Selection of busbars

Rated current A	10 12.5	16 20	25	32	40 50	63	80	100	125 140	160	180 200 225	250	315 350	400
Cross-sectional area of conductor mm²	1.5	2.5	4.0	6.0	10	16	25	35	50	70	95	120	185	240

● Selection of Cable

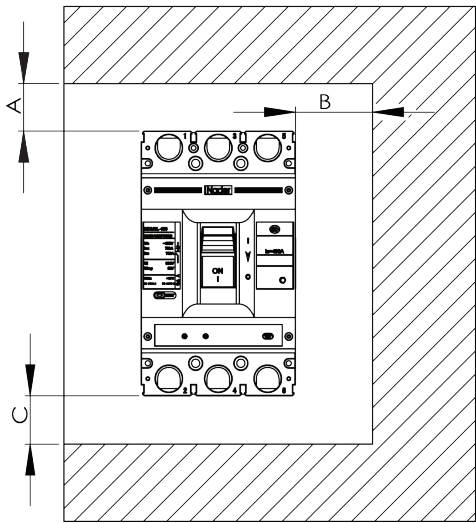
Rated current A	Cross-sectional areas of cables		Copper busbar size	
	Quantity	Sectional area mm²	Quantity	Dimensions mm × mm
500	2	150	2	30 × 5
630	2	185	2	40 × 5
700, 800	2	240	2	50 × 5

Note 1: Connect to the circuit breaker, and select the appropriate wiring method according to Outline Dimension, Mounting Dimension and Wiring Method;

Note 2: If copper bar is selected for connection, the copper bar cannot be directly connected to the circuit breaker body and extended busbar accessories are required.

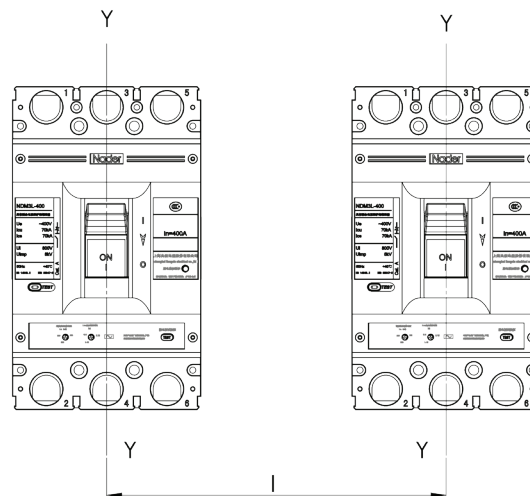
6.9 Safe Distance for Circuit Breaker Mounting

● Insulation distances for installation in a small metal cabinet (unit: mm)



Mounting distance	A (From incoming line end to cabinet surface)		B (Distance from the side to the cabinet)	C (From incoming line end to cabinet surface)
Specifications	With zero flashover cover	Without zero flashover cover		
NDM2-63	25	65	30	30
NDM2-100	25	65	30	30
NDM2-125	25	65	30	30
NDM2X-125	/	65	30	30
NDM2-225	25	65	30	30
NDM2-250	25	65	30	30
NDM2-400	25	120	35	35
NDM2-630	25	120	35	35
NDM2-800	25	120	35	35

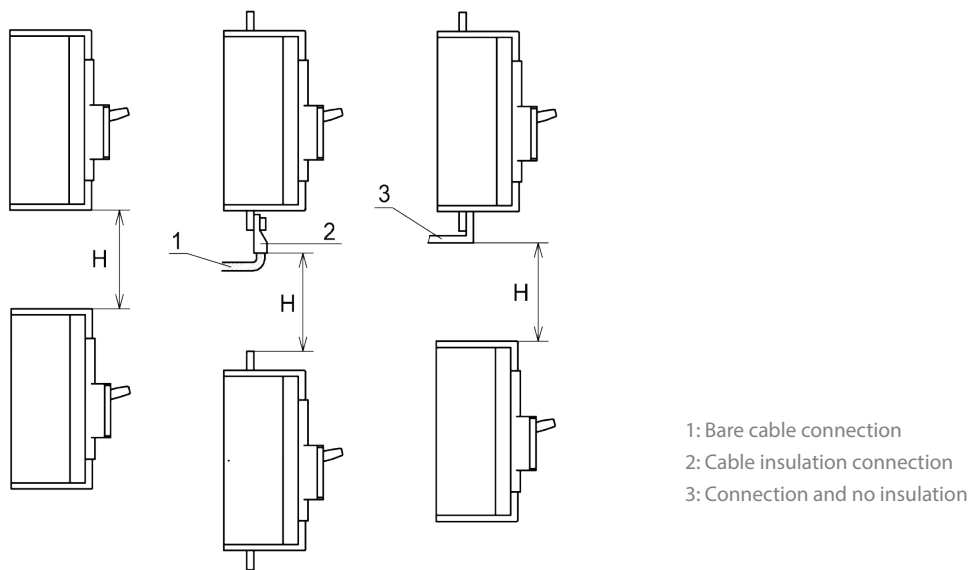
● Minimum center distance of row installation room of the circuit breakers



Specifications	Circuit breaker width (mm)			Center distance I (mm)		
	Two-pole	Three-pole	Four-pole	Two-pole	Three-pole	Four-pole
NDM2-63	25	65	25	65	30	30
NDM2-100	25	65	25	65	30	30
NDM2-125	25	65	25	65	30	30
NDM2X-125	/	65	/	65	30	30
NDM2-225	25	65	25	65	30	30
NDM2-250	25	65	25	65	30	30
NDM2-400	25	120	25	120	35	35
NDM2-630	25	120	25	120	35	35
NDM2-800	25	120	25	120	35	35

Note: For installation of circuit breakers in a row or stack, check the connection busbars or cables to ensure the air insulation distance will not be reduced.

● Minimum distance between circuit breakers installed in stack



Specifications	H (distance between the bottom and top of circuit breaker)	
	With zero flashover cover	Without zero flashover cover
NDM2-63	90	90
NDM2-100	90	91
NDM2-125	90	91
NDM2X-125	/	91
NDM2-225	90	93
NDM2-250	90	93
NDM2-400	155	155
NDM2-630	155	155
NDM2-800	155	155

Note: Check whether the zero flashover cover or the interphase barrier is installed in place before energizing.

## 7. Usage and Maintenance

- The characteristics of circuit breaker and accessories are set by the manufacturer; only the trained or certified professional personnel can adjust, install and maintain the circuit breaker, tripping unit and other accessories referring to the circuit design parameters;
- Ensure the power is in the inactive state before installation and removal of any device.
- The handle of circuit breaker can be located at three positions respectively representing the three conditions of closing, disconnection and free tripping. When the handle is at the free tripping position, the handle should be pulled in the disconnection direction. At this time, the circuit breaker could re-buckle and then the switch could be closed.
- Please observe the conditions for storage and use; if the product is damaged or cannot be normally used due to quality problem within 36 months from the date of delivery by the manufacturer, the manufacturer is responsible for free repair or replacement.

## 8. Ordering Instructions

- Please specify the models, specifications and ordering quantity of circuit breakers; when under-voltage tripper, shunt tripper or electrically operated mechanism are used, please indicate the voltage values of operating voltage and control power.
- For example: NDM2-100L with under-voltage protection and behind-panel wiring of the single auxiliary contact plate, with rated current of 80A and control power voltage of AC220, 10 sets.





# NDM2E

## Electronic Moulded Case Circuit Breaker

Edition 2016



1. Product Overview

					
Model	NDM2E-100	NDM2E-250	NDM2E-400	NDM2E-630	NDM2E-800
Frame current Inm (A)	100	250	400	630	800
Rated current In (A)	40、50、63、 70、80、90、100	100、125、160、 180、200、225、 250	200、225、250、 280、315、350、 400	280、315、350、 400、450、500、 550、600、630	400、450、500、 550、600、630、 700、750、800
Number of poles	3	3	3	3	3
Rated limit short circuit breaking capacity level	H	H	H	H	H
Rated ultimate short-circuit breaking capaci- ty Icu (kA) 400V	85	85	100	100	100
Rated running short-circuit breaking capaci- ty Ics (kA) 400V	50	50	65	65	65
Certification	CCC、TUV、CE				

## 2. Product Features

### Scope of application and purpose

NDM2E series moulded case circuit breakers (hereinafter referred to as breakers) are applicable to work in the circuits with AC frequency of 50Hz, rated operating voltage of up to AC400V, and rated current of up to 800A for infrequent conversion and infrequent start of motor. The circuit-breakers provide overload, short circuit and undervoltage protection, and can protect the circuit and power supply device from damage. NDM2E circuit breaker may be optionally added with a module capable of communication. In this way, the original circuit breaker is easy to upgrade to a communication circuit breaker. It provides “four-remote” function, namely remote control, remote adjustment, telemetry, and telecommand. The products have been widely used in new energy, electric power, industrial control, real estate, electric and power supply, telecommunication, rail transportation, industrial (public) construction and other industries.



### Structural features


The circuit breakers are characterized by strong breaking capability, short flashover, vibration resistance, etc.

### Meeting the following standards

- ◆ GB 14048.1 Low-voltage switchgear and controlgear - Part 1: General rules
- ◆ GB 14048.2 Low-voltage switchgear and controlgear - Part 2: Circuit breakers
- ◆ IEC 60947-1 Low-voltage switchgear and controlgear-Part 1:General rules
- ◆ IEC 60947-2 Low-voltage switchgear and controlgear-Part 2:Circuit-breakers

### 3. Application Scope

#### 3.1 Electrical Symbols

The circuit breaker provides isolation function, whose corresponding symbol is: 

#### 3.2 Applicable Environment

- **Temperature of the working environment**

-35°C ~ +70°C, the average value in 24h is not more than +35°C. At +40°C and above, the user needs to run with less load. For derating factors, see “ NDM2E MCCB derating factor table ” .

- **Storage temperature**

-40°C ~ +75°C.

- **Altitude**

The altitude of installation site is ≤2000m, and the derating factors under varied altitudes are shown in “ Table of derating factors of NDM2E moulded case circuit breaker under varied altitudes ” .

- **Relative humidity for operation/Relative humidity for storage**

At the ambient temperature of +40°C, the relative humidity shall not be more than 50%; for a lower temperature, the humidity may be higher, for example: The relative humidity could be up to 90% at 20°C. Appropriate measures should be taken against frost due to temperature variation.

- **Pollution grade**

Grade 3.

- **Installation category**

Mounting category of circuit breaker connected to the main circuit is: Category III (power distribution and control level).

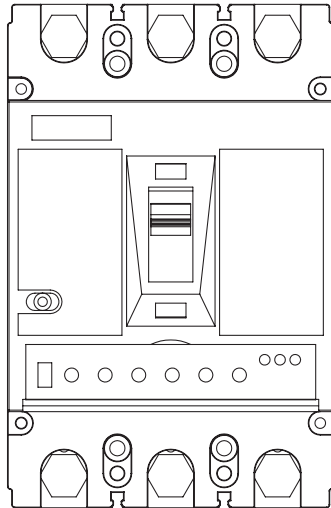
Mounting category of circuit breaker not connected to the main circuit is: Class II (load level) .

- **Installation environment**

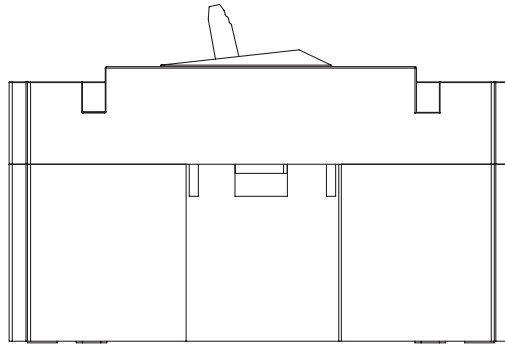
The product shall be installed in a medium without explosive danger, and the medium is not enough to corrode metal and damage the place where the insulating gas and conducting gas are located, so as to avoid any use in a rainy or snowy place.

### ● Installation direction

- ◆ Vertical mounting, the gradient between the mounting plane and the vertical plane should be  $\leq \pm 22.5^\circ$ .
- ◆ Horizontal mounting.



Vertical installation



Horizontal installation

## 3.3 NDM2E Breaker Power Loss Table

Model	Current (A)	Three-phase total power loss (W)		
		Before-panel wiring	Behind-panel wiring	Plug-in type Wiring
NDM2E-100	100	35	35	40
NDM2E-250	250	62	62	70
NDM2E-400	400	115	115	125
NDM2E-630	630	190	190	210
NDM2E-800	800	262	262	294

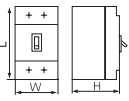
4. Technical Characteristics of the Product

4.1 Description of Specifications and Models

<div>ND</div>	<div>M</div>	<div>2</div>	<div>E</div>	<div>-</div>	<div></div>	<div></div>	<div>/</div>	<div>/</div>	<div></div>	<div></div>	<div>-</div>	<div></div>
<div>1</div>	<div>2</div>	<div>3</div>	<div>4</div>	<div>5</div>	<div>6</div>	<div>7</div>	<div>8</div>	<div>9</div>	<div>10</div>	<div>11</div>	<div>12</div>	<div>13</div>
Serial No.	Serial No. name		NDM2E									
1	Product code		ND : <b>Nader</b> brand low-voltage apparatus									
2	Product code		M									
3	Design serial No.		2									
4	Derived code		E : Electronic type									
5	Frame grade		See Table 1									
6	Breaking capability level		H									
7	Operation mode		No code : Direct operation by handle									
			P : Electrically operated									
			Z : Turning handle									
8	Derived code of telligent tripper		No code: Basic type									
			G : Grounding protection type									
			T : Communication type									
			GT : Grounding protection communication type									
9	Number of poles		3									
10	Accessory code		See Table 2									
11	Usage code		No code: Power distribution type									
			2 : Motor protection type									
12	Wiring form		No code: Conventional product									
			P : Extended busbar									
			Z1 : Behind-panel wiring									
			Z2Q : Plug-in type before-panel wiring									
			Z2H : Plug-in type behind-panel wiring									
			Z3Q : Plug-in before-panel wiring integrated type									
Z3H : Plug-in behind-panel wiring integrated type (Please specify the wiring scheme)												
13	Setting current I <sub>r</sub>		Refer to Table 1 for details.									

## 4.2 Technical Parameters

Table 1 Table of main performance parameters of circuit breaker

Model		NDM2E-100	NDM2E-250	NDM2E-400	NDM2E-630	NDM2E-800
Frame grade Current $I_{nm}$ (A)		100	250	400	630	800
Rated current $I_n$ (A)		40、50、63、70、80、90、100	100、125、160、180、200、225、250	200、225、250、280、315、350、400	280、315、350、400、450、500、550、600、630	400、450、500、550、600、630、700、750、800
Rated insulation voltage $U_i$ (V)		800	800	800	800	800
Rated impulse withstand voltage $U_{imp}$ (V)		8000	8000	8000	8000	8000
Power frequency withstand voltage $U$ (1 minute) (V)		3000	3000	3000	3000	3000
Use class		A	A	B	B	B
Short time withstand current $I_{cw}$ (kA/1s)		1	2.5	5	8	10
Number of poles		3	3	3	3	3
Rated limit short-circuit breaking capacity level		H	H	H	H	H
Rated ultimate short-circuit breaking capacity $I_{cu}$ (kA)	AC 400V	85	85	100	100	100
Rated running short-circuit breaking capacity $I_{cs}$ (kA)	AC 400V	50	50	65	65	65
Operating performance	Electrical life	8000	8000	7500	7500	7500
	Mechanical life	20000	20000	10000	10000	10000
Outline dimension 	L	150	165	257	280	280
	W	92	107	150	210	210
	H	92	90	106.5	123.5	123.5
Flashover distance (mm)		≤50	≤50	≤100	≤100	≤100
Wiring mode		Conventional、P、Z1、Z2Q、Z2H、Z3Q、Z3H	Conventional、P、Z1、Z2Q、Z2H、Z3Q、Z3H	Conventional、P、Z1、Z2Q、Z2H、Z3Q、Z3H	Conventional、P、Z1、Z2Q、Z2H、Z3Q、Z3H	Conventional、P、Z1、Z2Q、Z2H、Z3Q、Z3H

● Table of Derating Factors of NDM2E Series Moulded Case Circuit Breaker Under Varied Temperatures

Serial No.	Frame grade Rated current (A )	Table of derating factors corresponding to temperatures						
		40℃	45℃	50℃	55℃	60℃	65℃	70℃
1	100	1	1	1	0.973	0.945	0.918	0.891
2	250	1	1	1	0.976	0.952	0.927	0.902
3	400	1	1	1	0.978	0.957	0.934	0.911
4	630	1	1	1	1	1	0.979	0.957
5	800	1	1	1	0.980	0.958	0.936	0.913
6	800	1	0.980	0.960	0.939	0.918	0.897	0.877

Note: When the ambient temperature is below 40℃, the product can be used normally, with no derating capacity.

● Table of Derating Factors of NDM2E Moulded Case Circuit Breaker Under Varied Altitudes

Altitude (m)	2000	2500	3000	3500	4000	4500	5000
Operating current correction factor	In	In	0.98In	0.97In	0.96In	0.95In	0.94In
Operating current correction factor	Ue	Ue	0.83Ue	0.77Ue	0.71Ue	0.67Ue	0.63Ue
Power frequency withstand voltage correction factor	U	U	0.89U	0.85U	0.80U	0.77U	0.73U

### 4.3 Comparison Table of Accessory Codes

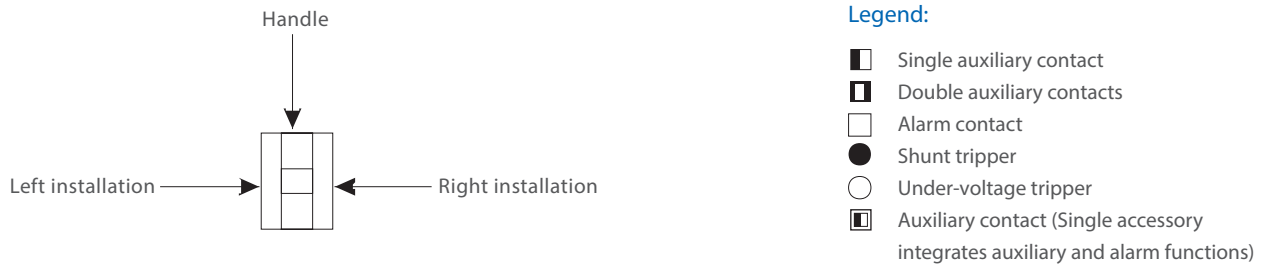


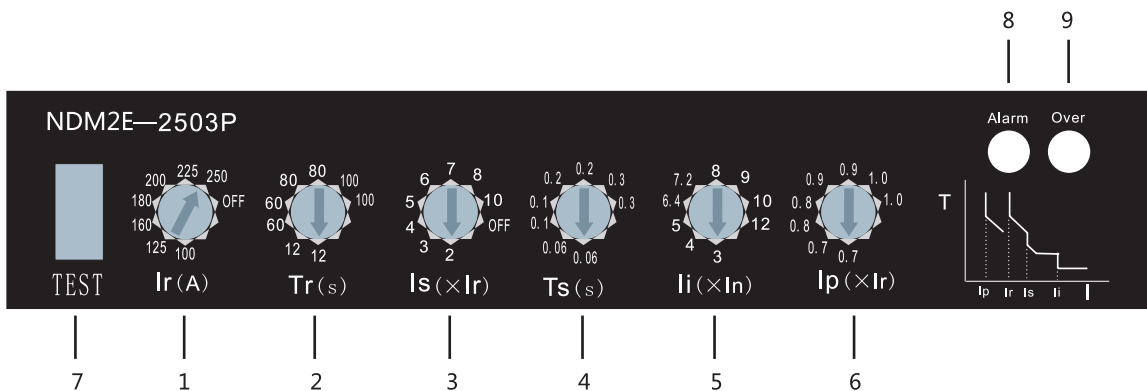
Table 2 Comparison table of tripping method accessory codes

Accessory code	Accessories Name	Installation location		Model		NDM2E -100	NDM2E -250	NDM2E-400	NDM2E -630	NDM2E -800
		Number of poles				3	3	3	3	3
300	No					—	—	—	—	—
310	Shunt tripper					●	●	●	●	●
320	Double auxiliary contacts					□	□	□	□	□
321	Single auxiliary contact					□	□	□	□	□
330	Under-voltage tripper					○	○	○	○	○
340	Shunt tripper, double auxiliary contacts					—	●	●	●	●
341	Shunt tripper, single auxiliary contact					●	●	●	●	●
350	Shunt tripper, under-voltage tripper					—	—	—	○	○
360	Two groups of double auxiliary contacts					—	□	□	□	□
361	Two groups of single auxiliary contacts					□	□	□	□	□
362	Double auxiliary contacts, single auxiliary contact					—	□	□	□	□
370	Undervoltage tripper, double auxiliary contacts					○	○	○	○	○
371	Undervoltage tripper, single auxiliary contact					○	○	○	○	○
308	Alarm contact					□	□	□	□	□
318	Shunt tripper, Alarm contact					●	●	●	●	●
328	Double auxiliary contacts, alarm contact					□	□	□	□	□
338	Under-voltage tripper, alarm contact					○	○	○	○	○
348	Shunt tripper, auxiliary alarm contact					●	●	●	●	●
358	Auxiliary alarm contact					□	□	□	□	□
368	Double auxiliary contacts, auxiliary alarm contact					—	□	□	□	□
378	Under-voltage tripper, auxiliary alarm contact					○	○	○	○	○

Note: The first digit “3” in the code of tripper method indicates the intelligent controller with three-stage protection and the latter two digits indicate the code of internal accessory.

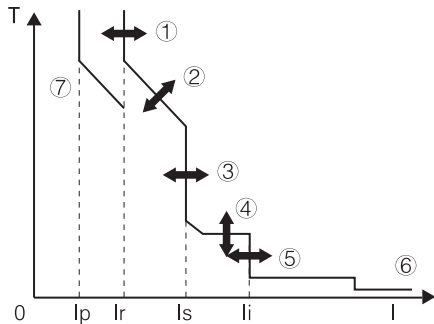


4.4 Intelligent Controller



Note : The figure only shows the NDM2E-250H panel setting values, and the panel setting values of NDM2E-100, 400, 630 and 800 are shown in Table 3.

● Intelligent controller



- ① Overload long-time delay operating current
- ② Long-time delay operating time
- ③ Short circuit short time delay operating current
- ④ Short time delay operating time
- ⑤ Instantaneous short-circuit operating current
- ⑥ Instantaneous override tripping current
- ⑦ Pre-alarm setting current

Protection

- 1 - Overload long-time delay setting current Ir may be adjusted at 10 levels according to the requirements of the users.
- 2- Overload long-time delay setting time Tr may be adjusted at 4 levels.
- 3 - Short circuit short time delay setting current Is may be adjusted at 10 levels.
- 4 - Short circuit short time delay setting time Ts may be adjusted at 4 levels.
- 5 - Instantaneous short-circuit setting current Ii may be adjusted at 10 levels.
- 6 - Pre-alarm setting current Ip may be adjusted at 4 levels.

Other functions

- 7 - The test port, connected to NDM2E special tester, could be used to conduct test and debugging operation, and could also be connected to a PC to provide real-time test of current changes.
- 8 - Pre-alarm indication. When the yellow light flashes, it indicates that the actual current exceeds the setting value Ip, and after a certain time, the flashing yellow light becomes constantly on.
- 9 - Overload indicator. When the red light is constantly on, it indicates that the actual current exceeds 1.15 times of the Ir and is at the overload state, and after a certain period of time, the circuit breaker will break the trip.

Table 3 Intelligent controller control panel details

Product models	Rated current	Setting current, time parameters	
		$I_r$ ( A )	$T_r$ ( s )
NDM2E-100	100	40、50、63、70、80、90、100、OFF	12、60、80、100
NDM2E-250	250	100、125、160、180、200、225、250、OFF	12、60、80、100
NDM2E-400	400	200、225、250、280、315、350、400、OFF	12、60、100、150
NDM2E-630	630	280、315、350、400、450、500、550、600、630、OFF	12、60、100、150
NDM2E-800	800	400、450、500、550、600、630、700、750、800、OFF	12、60、100、150

Table 3 Intelligent controller control panel details 1

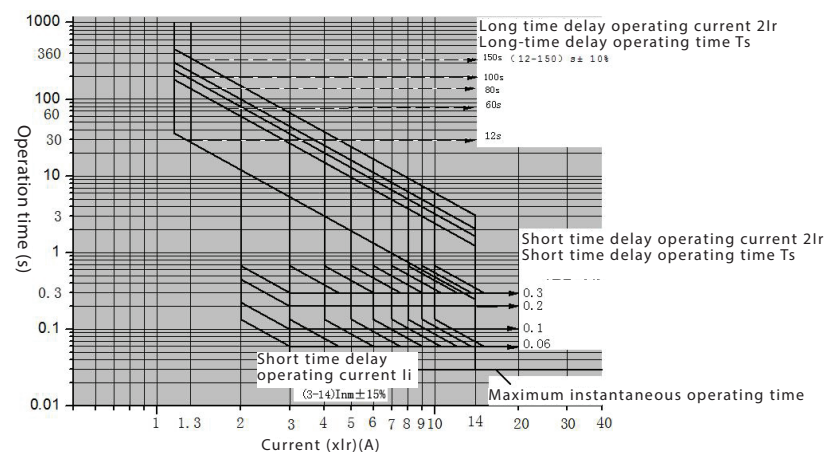
Product models	Rated current	Setting current, time parameters	
		$I_s$ ( x $I_r$ )	$T_s$ ( s )
NDM2E-100	100	2、3、4、5、6、7、8、10、OFF	0.06、0.1、0.2、0.3
NDM2E-250	250	2、3、4、5、6、7、8、10、OFF	0.06、0.1、0.2、0.3
NDM2E-400	400	2、3、4、5、6、7、8、10、OFF	0.06、0.1、0.2、0.3
NDM2E-630	630	2、3、4、5、6、7、8、10、OFF	0.06、0.1、0.2、0.3
NDM2E-800	800	400、450、500、550、600、630、700、750、800、OFF	0.06、0.1、0.2、0.3

Table 3 Intelligent controller control panel details 2

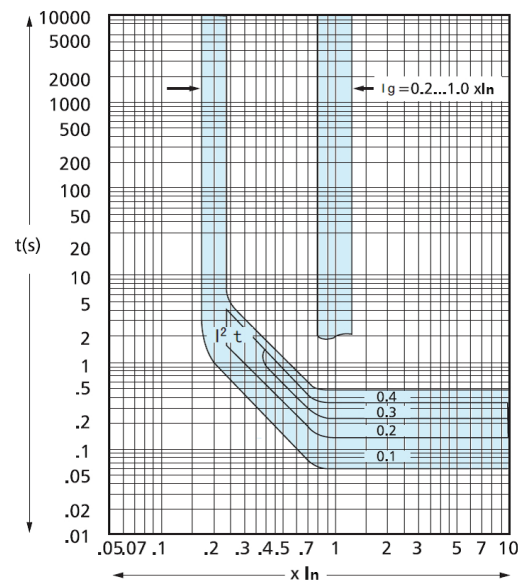
Product models	Rated current	Setting current, time parameters	
		$I_i$ ( x $I_n$ )	$L_p$ ( x $I_r$ )
NDM2E-100	100	3、4、5、6.3、7、8、9、10、12	0.7、0.8、0.9、1.0
NDM2E-250	250	3、4、5、6.3、7、8、9、10、12	0.7、0.8、0.9、1.0
NDM2E-400	400	3、4、5、6、7、8、9、10、12、14	0.7、0.8、0.9、1.0
NDM2E-630	630	3、4、5、6、7、8、9、10、12、14	0.7、0.8、0.9、1.0
NDM2E-800	800	3、4、5、6、7、8、9、10、12、14	0.7、0.8、0.9、1.0

4.5 Product Tripping Curve

4.5.1 Over-current controller characteristic curves



4.5.2 Grounding protection characteristic curves and parameters

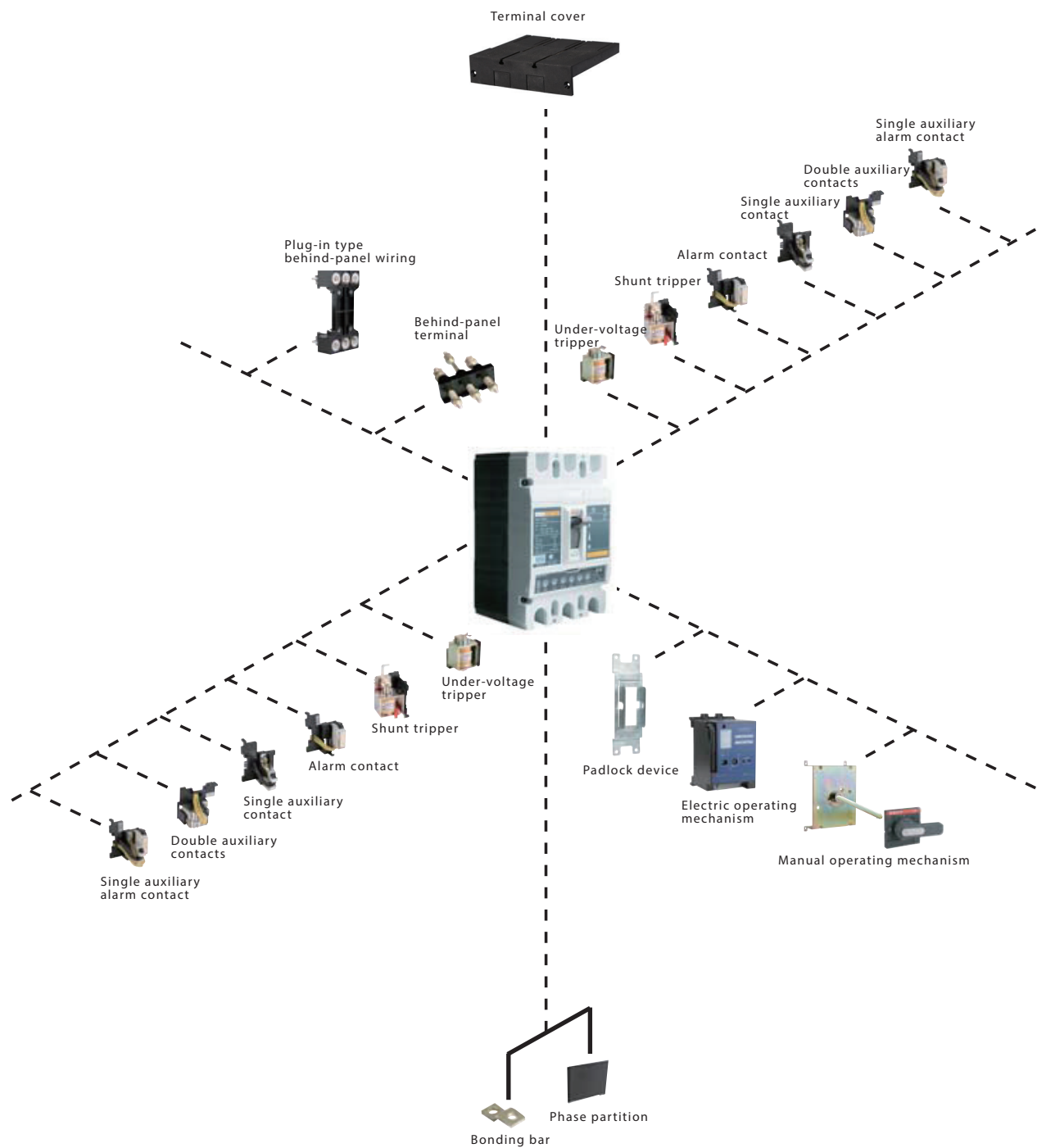


Ground fault protection IgTg						
Setting current Ig			( 0.2、0.3、0.4、0.5、0.6、0.8、1.0 ) × In + OFF			
Actuation characteristics	Inverse time limit Ig·IΔ<2Ig	Tg setting value (s)	0.1	0.2	0.3	0.4
		t Actuation time (s)	t=(2Ig)²×Tg / I²			
	Definite time IΔ_2Ig	t Actuation time (s)	0.1	0.2	0.3	0.4
		Accuracy (%)	± 10			

Note: IΔ is the three-phase current vector of circuit breaker and/or the vector sum of three-phase current vector and N phase current vector.

## 5. Accessories

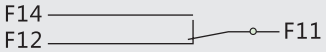
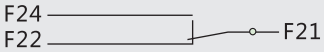
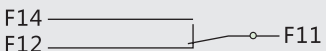
### 5.1 List of Accessories



5.2 Accessories Function Description

5.2.1 Auxiliary contact Technical parameters

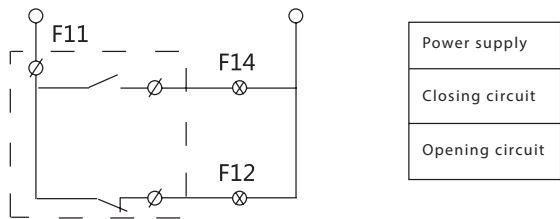
● Auxiliary contacts and combinations

The breaker is at the “opening” or “free tripping” position	Double auxiliary contacts	F14 F12  F11	F24 F22  F21
	Single auxiliary contact	F14 F12  F11	
The breaker is at the “closing” position	“Closing” switches to “opening”, “opening” switches to “closing”		

★ Auxiliary contact current parameters

Classification	Frame current (A)	Conventional heating current Ith (A)	Rated operating current (A)	
			AC400V	DC220V
Auxiliary contact	100、250	3	0.3	0.15
	400、630、800	3	0.4	0.15

★ Auxiliary contact wiring diagram





★ Electrical life of auxiliary contact

Use class	Switch on			Breaking			Frequency	Operation frequency (time(s)/hour)	Conduction time
	I/Ie	I/Ie	cos ϕ	I/Ie	U/Ue	cos ϕ			
AC-15	10	1	0.3	1	1	0.3	6050	360	≥0.05s
DC-13	1	1	6Pe	1	1	6Pe			≥T0.95

★ Connection and breaking capacity of auxiliary contact

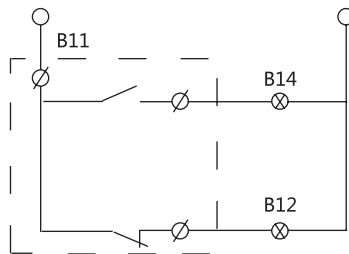
Use class	Switch on			Breaking			Frequency	Operation frequency (time(s)/hour)	Conduction time
	I/Ie	I/Ie	cos ϕ	I/Ie	U/Ue	cos ϕ			
AC-15	10	1	0.3	1	1	0.3	10	120	≥0.05s
DC-13	1	1	6Pe	1	1	6Pe			≥T0.95

## ● Alarm contacts and their combinations (Alarm contacts $U_e=220V$ , $I_{th}=3A$ )

The circuit breaker is at the position of "opening" or "closing"	NDM2E-100 , 250 , 400 , 630 , 800	B14  B11
The circuit breaker is at the "free tripping" position		B14  B11

### ★ Alarm contact wiring diagram

In the case of proper closing or opening of circuit breaker, the contact does not operate; only after free tripping (or fault tripping) will the original state of contact be changed, which means normally open switches to closed and normally closed switches to open; after re-buckle of the circuit breaker, the contact is restored to the original position.

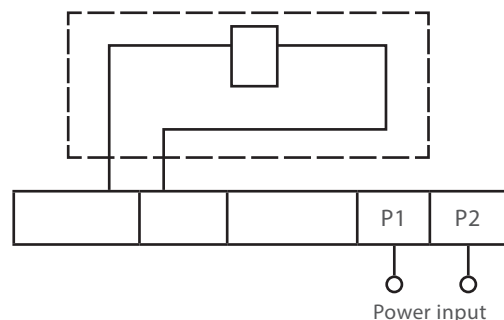


### ★ Connection and breaking capacity of alarm contact

Classification	Frame current (A)	Conventional heating current $I_{th}$ (A)	Rated operating current (A)	
			AC400V	DC220V
Alarm contact	100、250	3	0.3	0.15
	400、630	3	0.4	0.15
	800	3	0.4	0.15

## 5.2.2 Under-voltage tripper

- ◆ At 35%~70% of rated control power voltage, the under-voltage tripper should operate reliably to disconnect the circuit breaker. When it is less than 35% of the rated voltage, closing of circuit breaker should be reliably prevented. When the power supply voltage is equal to or greater than 85% of rated voltage, it should be ensured that the circuit breaker is closed.
- ◆ Control voltage : AC 50 Hz 230 V 400 V  
DC 110 V 220 V
- ◆ Note: The under-voltage tripper must be energized first in order to re-buckle and close the circuit breaker, otherwise it will damage the circuit breaker.



Under-voltage tripper wiring diagram

Instantaneous current and power consumption of under-voltage tripper

Product models	Instantaneous current value (mA)		Power consumption (W)	
	AC 400V	AC 230V	AC 400V	AC 230V
NDM2E-100	9.75	14.25	3.95	3.2275
NDM2E-250	10.88	14.75	4.352	3.392
NDM2E-400	9	11	3.6	2.53
NDM2E-630	8.5	11	3.4	2.53
NDM2E-800	5	7.25	2	1.6675

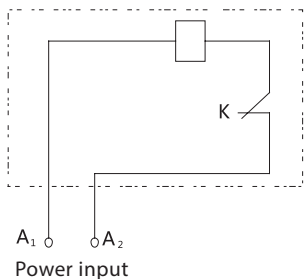
5.2.3 Shunt tripper

★ Generally installed at Phase A of circuit breaker; the shunt tripper should enable the circuit breaker to trip reliably at 70%~110% of rated control voltage under all operation conditions.

★ Control voltage : AC 50Hz 230V 400V

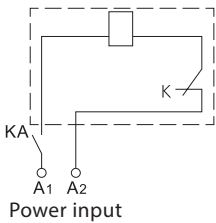
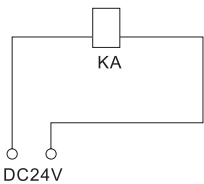
DC 24V 220V

★ Shunt tripper wiring diagram



★ Note : When DC24V is used as control circuit power supply, the shunt control circuit design is recommended according to the figure above.

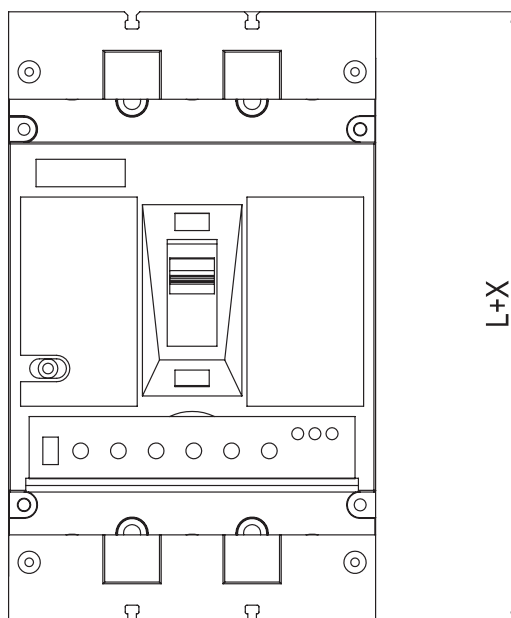
kA: It is DC24V intermediate relay, and the contact current capacity is 1A.



★ Instantaneous current and power consumption of shunt tripper

Product models	Instantaneous current value (A)				Power consumption (W)			
	AC 400V	AC 230V	DC220V	DC 24V	AC 400V	AC 230V	DC 220V	DC 24V
NDM2E-100	0.288	0.425	0.341	4	96.8	73	90.7	15
NDM2E-250	0.313	0.412	0.341	3.87	112	68.8	90.7	15
NDM2E-400	0.197	0.325	0.4	3.87	67	62.3	94.4	15
NDM2E-630	0.199	0.314	0.4	3.87	68	58.2	94.4	15
NDM2E-800	0.538	0.898	1.134	5.22	163	153		120

## 5.2.4 Zero flashover cover



Product series	Model	Body length L	Increased length of terminal cover X	Length after addition of terminal cover Lx
NDM2E	NDM2E-100	150	12	162
	NDM2E-250	165	13	178
	NDM2E-400	257	19	276
	NDM2E-630	280	19	299
	NDM2E-800	280	19	299

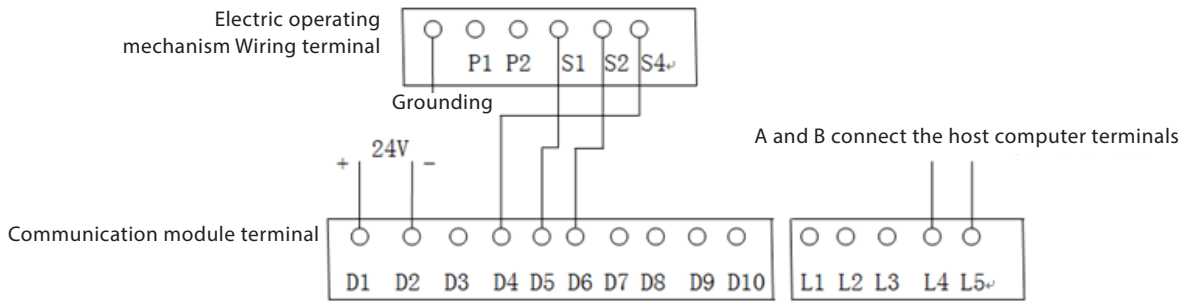


5.2.5 Communications function

Cooperating with the upper electrically operation mechanism, NDM2E circuit breaker connects with the host computer to provide “four-remote” functions (with communication module).



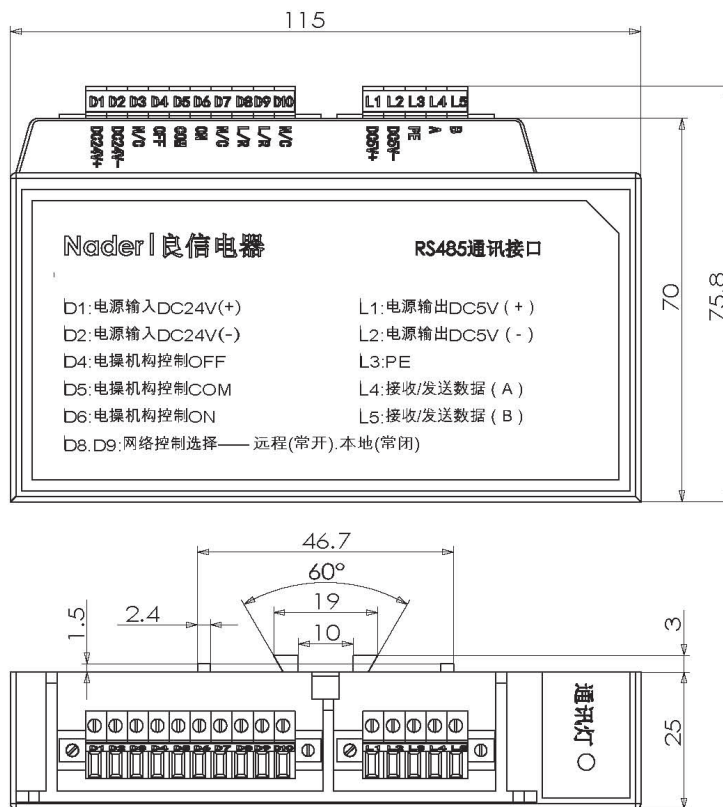
Circuit breaker identification	Breaker model	●
	Mailing address	●
	Baud rate	●
Status indication	Switching on / Switching off	●
	Network control	●
Breaker control	Switching on / Switching off	● (Electrically operated mechanism to be installed)
Reading and modification of setting protection value	Overload long-time delay setting protection current $I_r$ , setting protection time $T_r$	●
	Short circuit short-time delay setting protection current $I_s$ , setting protection time $T_s$	●
	Short circuit instantaneous setting protection current $I_i$	●
	Neutral pole setting current $I_{RN}$	● (Four-pole circuit breaker)
	Grounding fault operating setting protection current $I_g$ , setting protection time $T_g$	●
Reading of operating parameters	Three-phase current $I_a, I_b, I_c$	●
	Value of grounding fault current $I_g$	●
	N phase current $I_{RN}$	● (Four-pole circuit breaker)
	Fault phase	●
	Fault type	●
	Fault time	●
	Fault current	●
	Alarm type	●
	The last fault record	●



Connection diagram of communication module and electrically operated mechanism

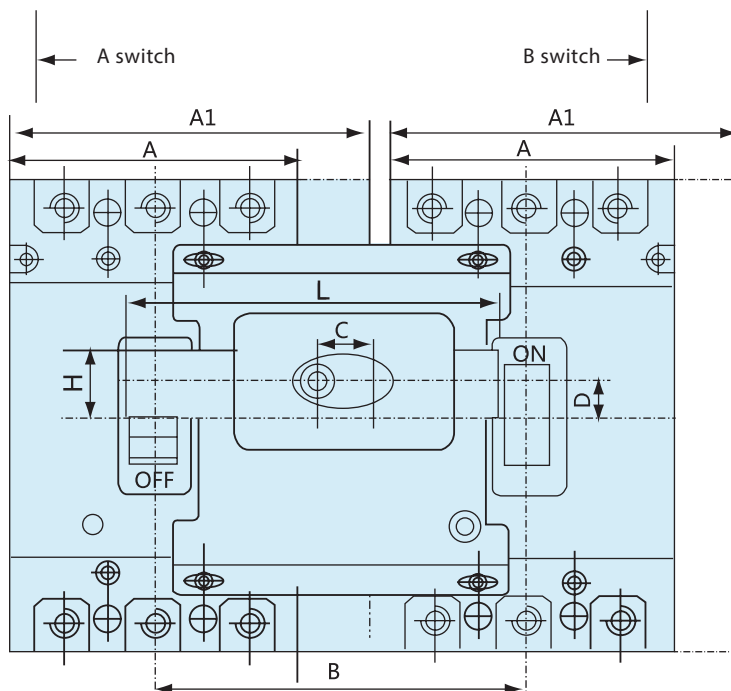
Terminal designation	Connection position	Input output (IO)
D1	Power input DC24V(+)	Input
D2	Power input DC24V(-)	
D3	Empty	
D4	Electrically operated mechanism controls the “OFF” end	Output (DO)
D5	Electrically operated mechanism controls the “COM” end	
D6	Electrically operated mechanism controls the “ON” end	
D7	Empty	
D8、D9	Network control selection	Input (DI)
D10	Empty	
L1	Power supply DC5V(+)	Output
L2	Power supply DC5V(-)	
L3	PE	
L4	Receive/Transmit data ( A )	Input output
L5	Receive/Transmit data ( B )	

- ★ DC 24V, allowable range:  $\pm 15\%$ , power:  $\pm 15\%$ ,  $\leq 2W$ ; if the communication is normal, the communication light will flash.
- ★ With this module, “telemetry”, “remote adjustment”, “remote control”, and “telecommand” can be provided; furthermore, it is a must to add the electrically operated mechanism to realize the remote control.
- ★ External communication: Standard RS485 interface, ModBus-RTU protocol, shielded twisted pair cable; each communication line connects up to 32 devices, the maximum distance is 1,200m, and the communication distance can be extended through the repeater.
- ★ Baud rate: 1.2K, 2.4K, 4.8K, 7.2K, 9.6K, 19.2K (Unit: bps).
- ★ DI, switching value input: Including circuit breaker closing and opening state, and remote/local status, all dry contact signals, input impedance:  $\leq 100\Omega$ .
- ★ Network control selection, i.e. selecting local or remote working mode; remote is for normally open and local is for normally closed. If D8 and D9 are short connection, then it is local operating mode, and operation of circuit breaker by the host computer cannot be carried out; otherwise, it is remote operating mode, and operation of circuit breaker by the host computer can be carried out.
- ★ DO, switching value output: Opening and closing control signals convert the level signals from the circuit breaker controller to dry contact signals; contact rating: Resistive load DC 30V/5A, AC 270V/3A.
- ★ PE: Can be directly through terminals and peripherals can be direct grounding.



### 5.3 Functions and Sizes of External Accessories

#### 5.3.1 Mechanical interlock

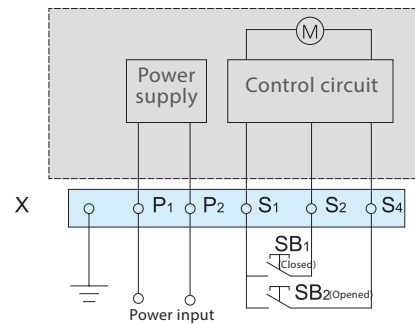


Code \ Specifications	NDM2E-100	NDM2E-250	NDM2E-400	NDM2E-630/800
A	92	107	150	210
B	120	135	180	243
C	48.5	50	60	60
D	115	14	18	18
L	118	135	175	230
H	22	22	30	30

### 5.3.2 CD2<sub>M2E</sub> Electric operating mechanism



CD2<sub>M2E</sub> Electric operating mechanism



CD2M2E motor operating mechanism wiring diagram  
(The dotted box shows the internal wiring diagram of motor operating mechanism)

★ Power input Voltage specification :

AC 50Hz 110V、220V、380V、

DC 24V、110V、220V、380V

★ The electrically operated mechanism module has a very long mechanical life, and is easy to operate.

★ Can operate automatically and manually.

### ● Operating current, motor power and life of motor operating mechanism

Equipped with circuit breaker	Operating current (A)	Motor power (W)	Service life (times)
NDM2E-100	0.5	14	10000
NDM2E-250	0.5	14	8000
NDM2E-400	2	35	5000
NDM2E-630	2	35	5000
NDM2E-800	2	35	3000

Note: After tripping of the circuit breaker, the electrically operated mechanism must cause the circuit breaker to re-buckle before closing.

- CS<sub>M2E</sub> rotary handle operating mechanism

CS	/	<input type="checkbox"/>	M2E	-	<input type="checkbox"/>	<input type="checkbox"/>
1		2	3		4	5

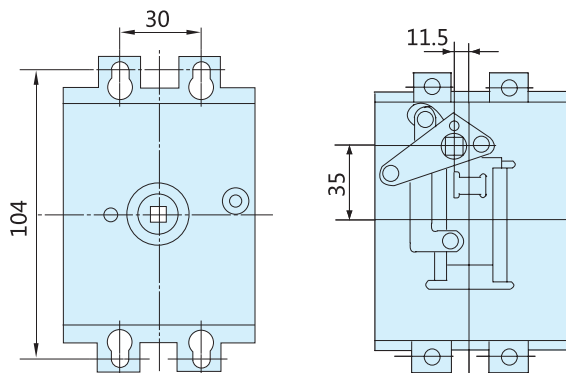
  

Serial No.	Serial No. name	
1	Hand-operated mechanism	CS <sub>M2E</sub>
2	Installation mode	1: Centric type 2: Eccentric type
3	Products equipped	NDM2E
4	Frame grade Rated current	100、250、400、630、800、1600
5	Rotary handle model	F: Represent square handle A: Represent rounded handle

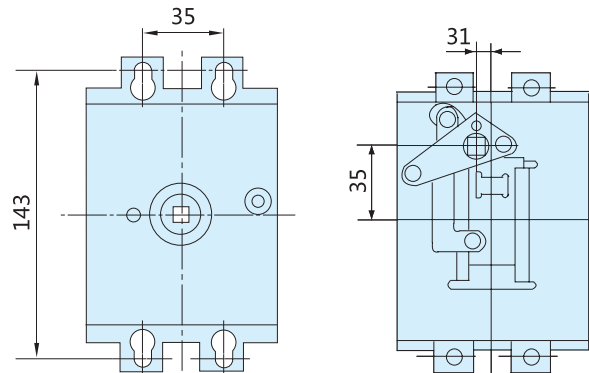
- ★ The circuit breaker installed in the switch cabinet can be operated by the front rotary handle.
- ★ CSM2E manually operated mechanism can be equipped with “F” type square handle or “A” type round handle and the corresponding extension handle.
- ★ When the circuit breaker is at the closing state, the cabinet door cannot be opened.
- ★ If there is any fault when the operating handle or manual operating mechanism is at the closing state, the cabinet door can be opened by operating the emergency unlocking device on the handle.
- ★ As for operating handles corresponding to different specifications of manual operating mechanisms, the door panel tapping should be consistent.

Attention: If a customer purchases the electrically and manually operating mechanisms by himself/herself, he/she must confirm the model with the company to ensure it matches the circuit breaker. Otherwise, all adverse consequences due to matching problems are not the responsibilities of the company.

### NDM2E-100 three-pole manually operated mechanism

CS1<sub>M2E</sub>-100CS2<sub>M2E</sub>-100

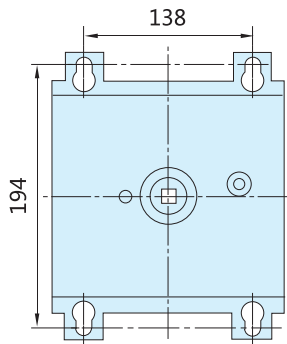
### NDM2E-250 three-pole manually operated mechanism



CS1M2E-250

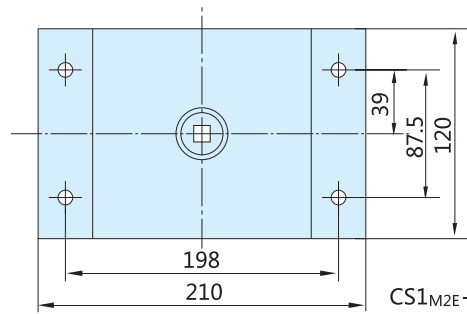
CS2M2E-250

NDM2E-400 three-pole manually operated mechanism

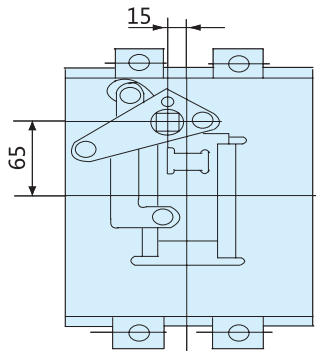


CS1<sub>M2E</sub>-400

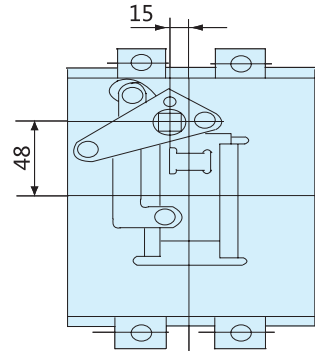
NDM2E-630, 800 three-pole manually operated mechanism



CS1<sub>M2E</sub>-630, CS1<sub>M2E</sub>-800

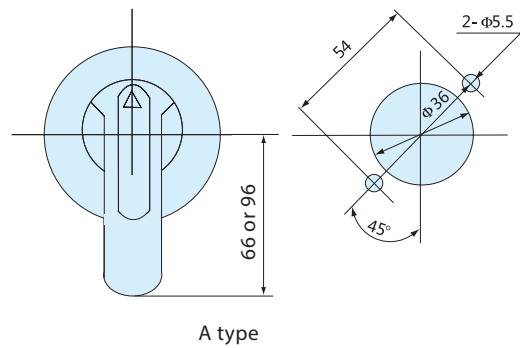
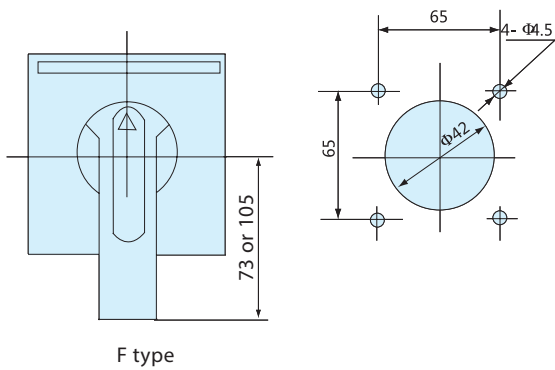


CS2<sub>M2E</sub>-400

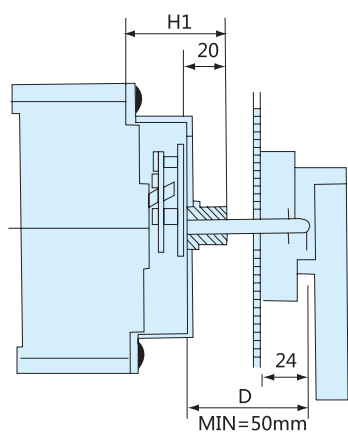


CS2<sub>M2E</sub>-630, CS2<sub>M2E</sub>-800

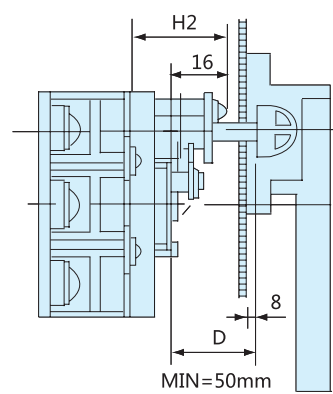
CSM2E hole size for manually operated mechanism handle mounting



CS<sub>M2E</sub> manual operating mechanism installation diagram



CS1 installation diagram



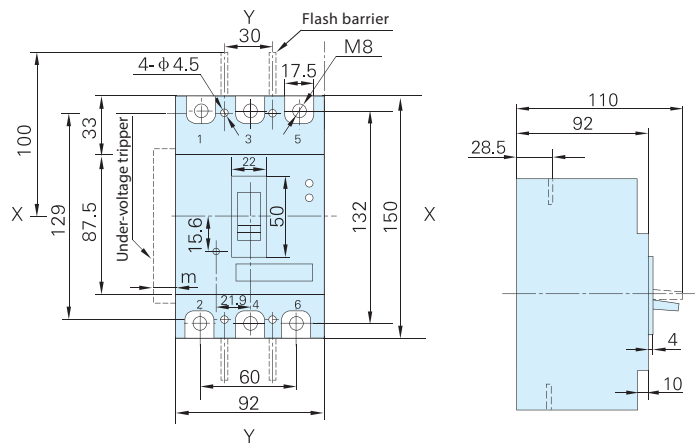
CS2 installation diagram

Specifications Code	NDM2E-100	NDM2E-250	NDM2E-400	NDM2E-630/800
H1	49	55	76	63
H2	46	48	61	66
D	150mm by default, which can be customized according to the requirements			

## 6. Product outline Dimension

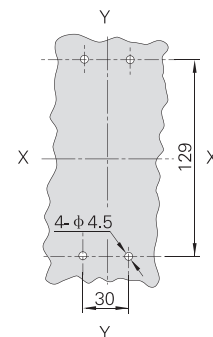
## 6.1 NDM2E-100H Outline Dimension, Mounting Dimension and Wiring Method

## Before-panel wiring

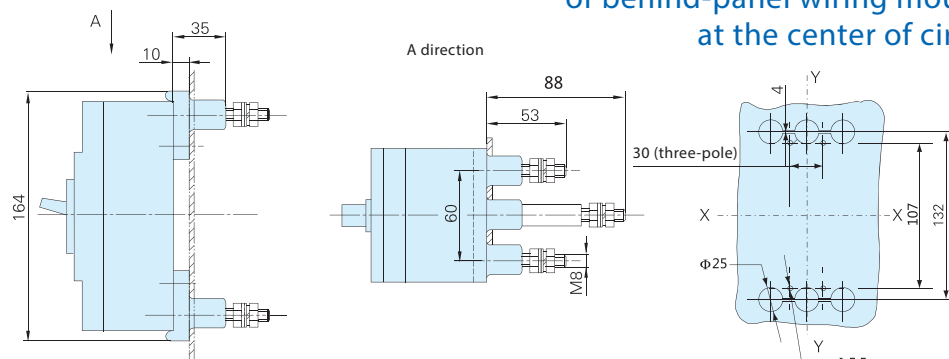


The thickness of under-voltage tripper is 21mm

X-X, Y-Y represents the size of opening of before-panel wiring mounting panel at the center of three-pole circuit breaker

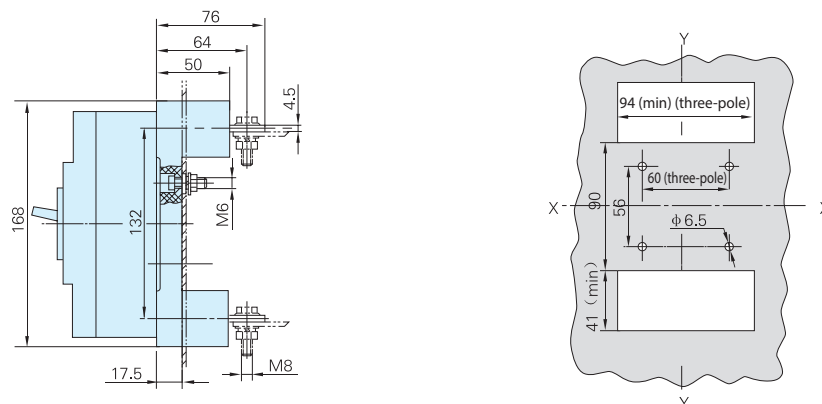


## Z1: Behind-panel wiring



X-X, Y-Y represents the size of opening  
of behind-panel wiring mounting panel  
at the center of circuit breaker

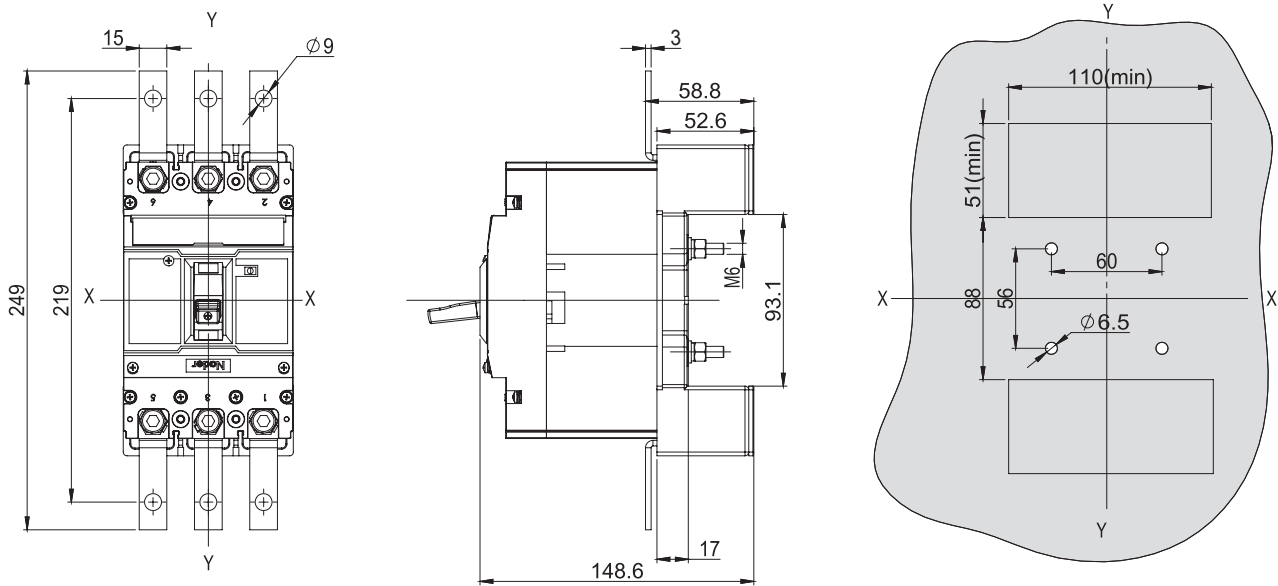
## Z2H:Plug-in type behind-panel wiring (three-pole)





## Z2Q: Plug-in type before-panel wiring (three-pole)

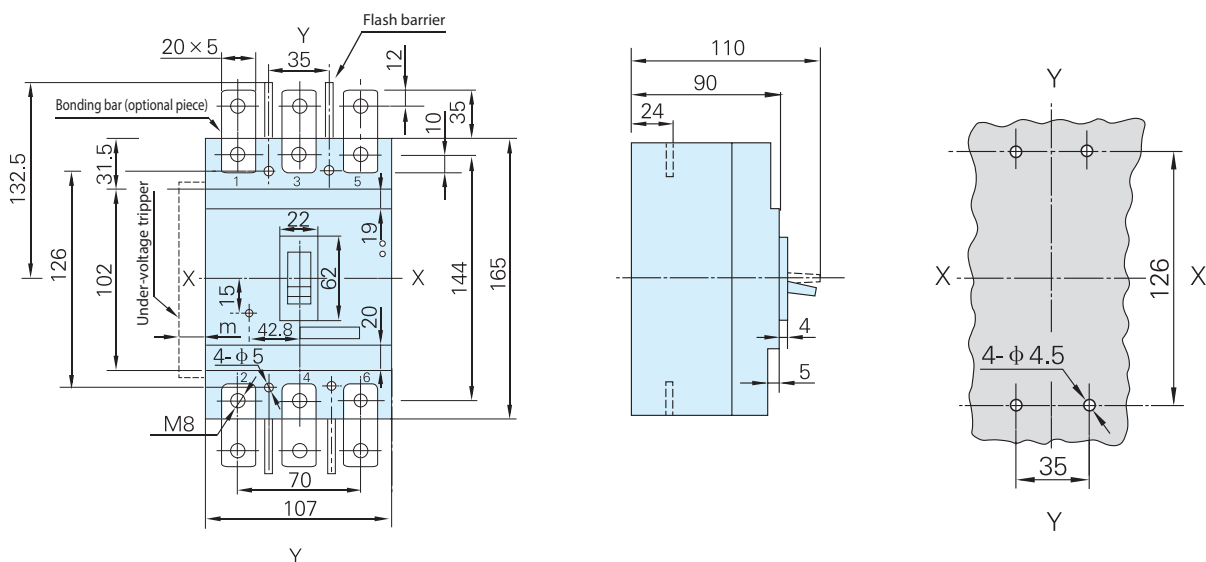
X-X, Y-Y represents the size of plug-in type mounting panel at the center of circuit breaker



## 6.2 NDM2-100 (C, L, M, H) 125 (C, L, M, H) NDM2X-125 Outline Dimension, Mounting Dimension and Wiring Method

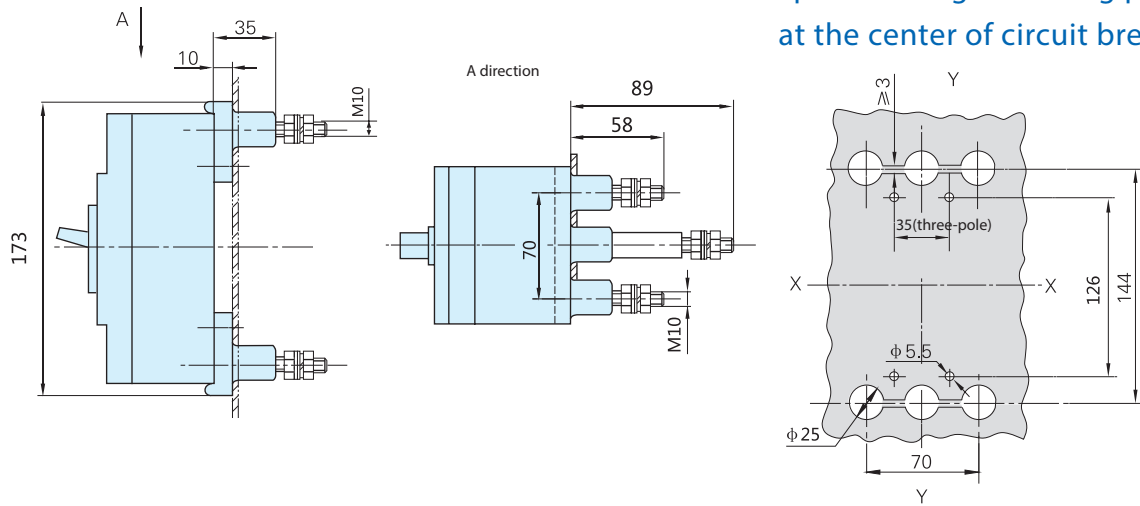
### Bonding bar

Before-panel wiring (two-pole, three-pole, four-pole)



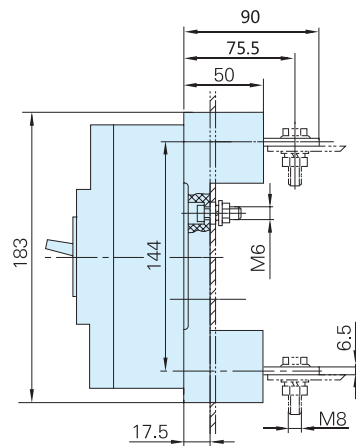
欠压脱扣器厚度为21mm

**Z1: Behind-panel wiring (three-pole)**

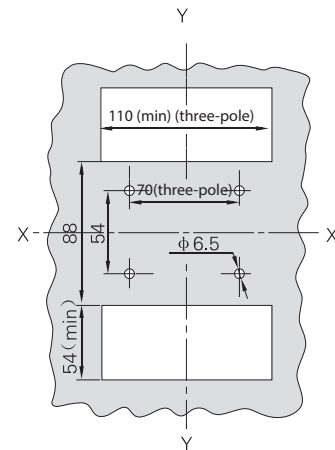


X-X, Y-Y represents the size of opening of behind-panel wiring mounting panel at the center of circuit breaker

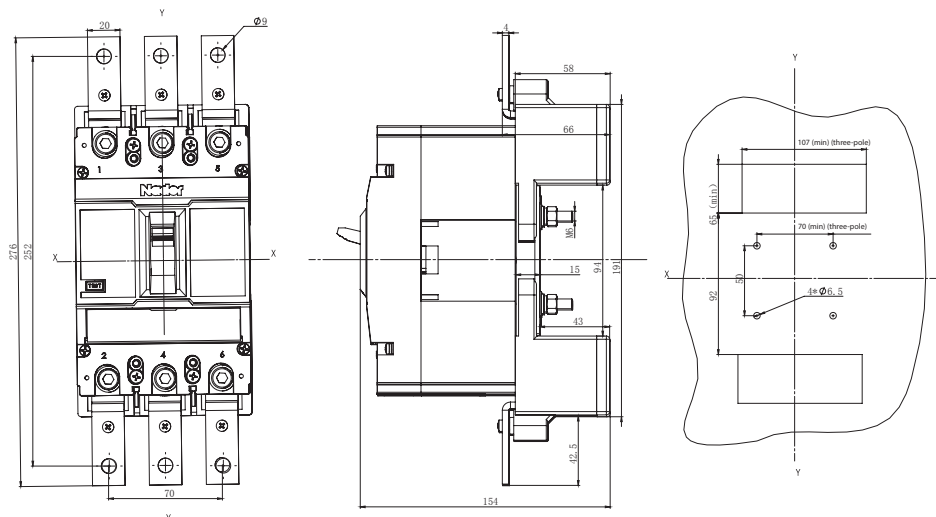
**Z2H: Plug-in type behind-panel wiring (three-pole)**



X-X, Y-Y represents the size of plug-in type mounting panel at the center of circuit breaker

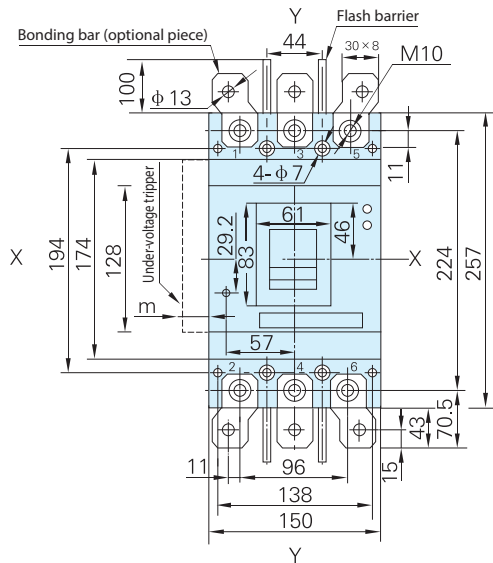


**Z2Q: Plug-in type before-panel wiring (three-pole)**



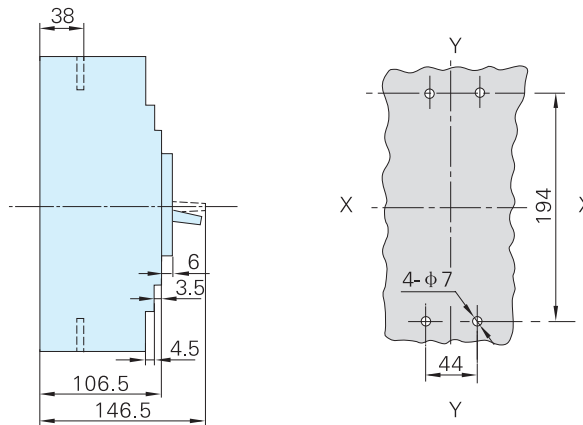
### 6.3 NDM2E-400H Outline Dimension, Mounting Dimension and Wiring Method

#### Before-panel wiring

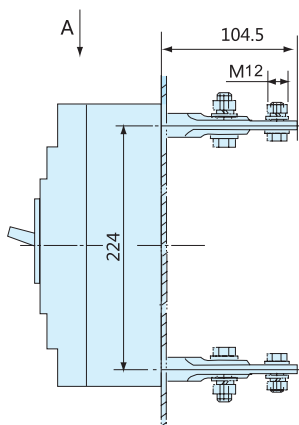


The thickness of under-voltage tripper is 21mm

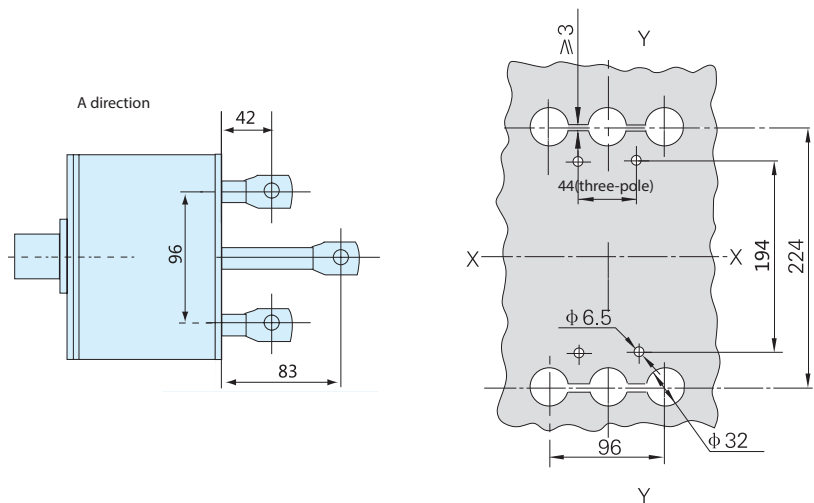
X-X, Y-Y represents the size of opening of before-panel wiring mounting panel at the center of three-pole circuit breaker



#### Z1: Behind-panel wiring (three-pole, four-pole)

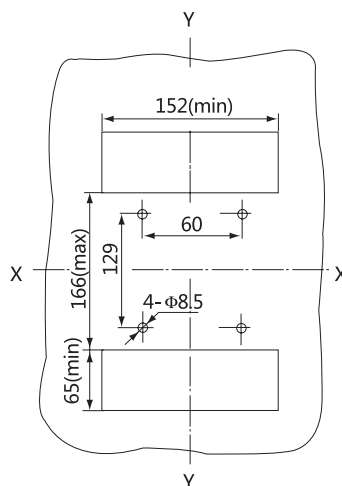
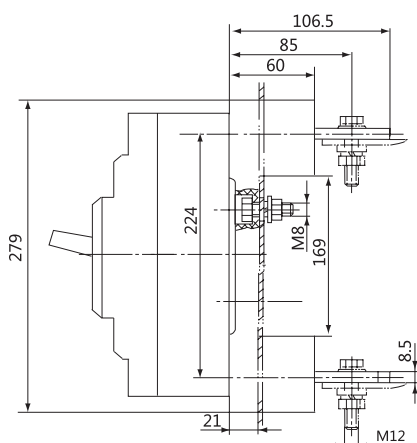


X-X, Y-Y represents the size of opening of behind-panel wiring mounting panel at the center of circuit breaker



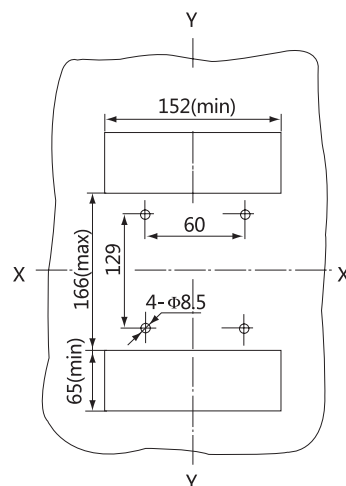
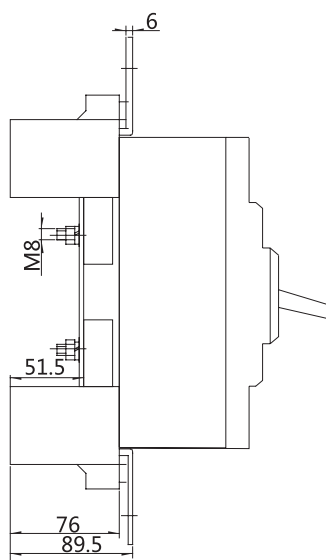
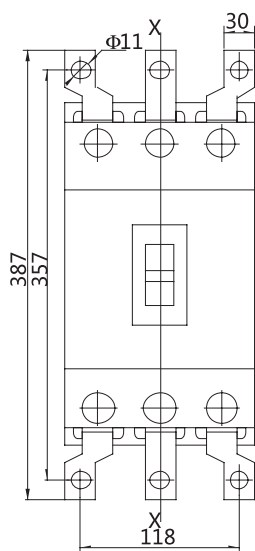
Z2H: Plug-in type behind-panel wiring  
(three-pole)

X-X, Y-Y represents the size of plug-in type  
mounting panel at the center of circuit breaker



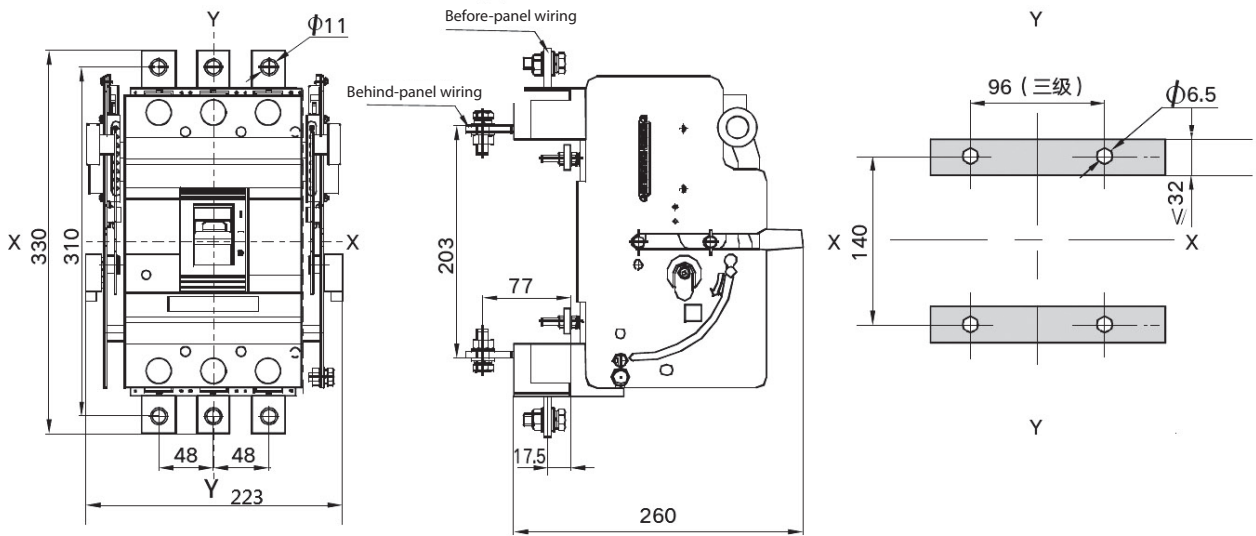
Z2Q: Plug-in type before-panel wiring  
(three-pole)

X-X, Y-Y represents the size of plug-in type  
mounting panel at the center of circuit breaker



Drawer type wiring

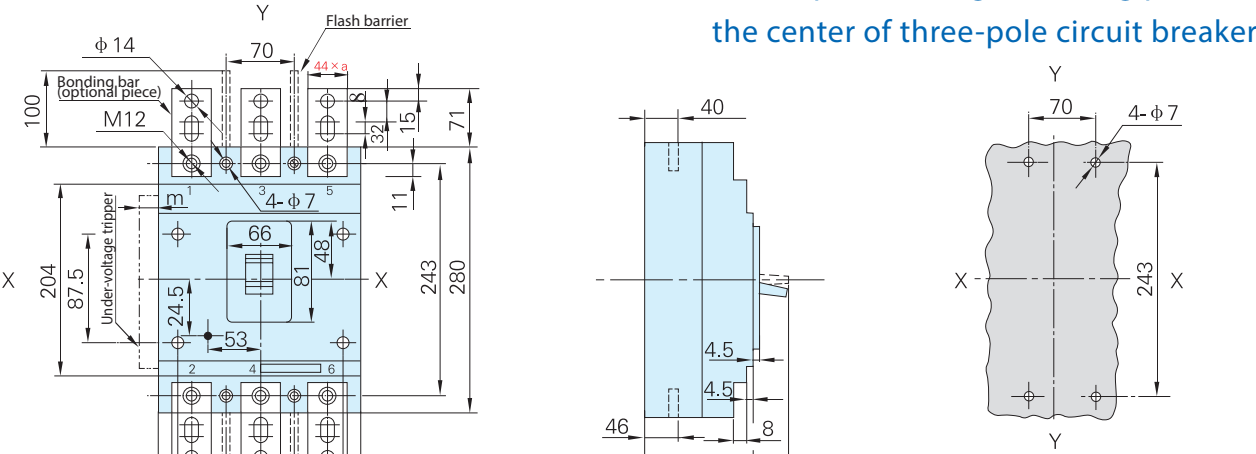
X-X, Y-Y represents the size of opening of drawer type wiring mounting panel at



6.4 NDM2E-630H, NDM2E-800H Outline Dimension, Mounting Dimension and Wiring Method

Before-panel wiring

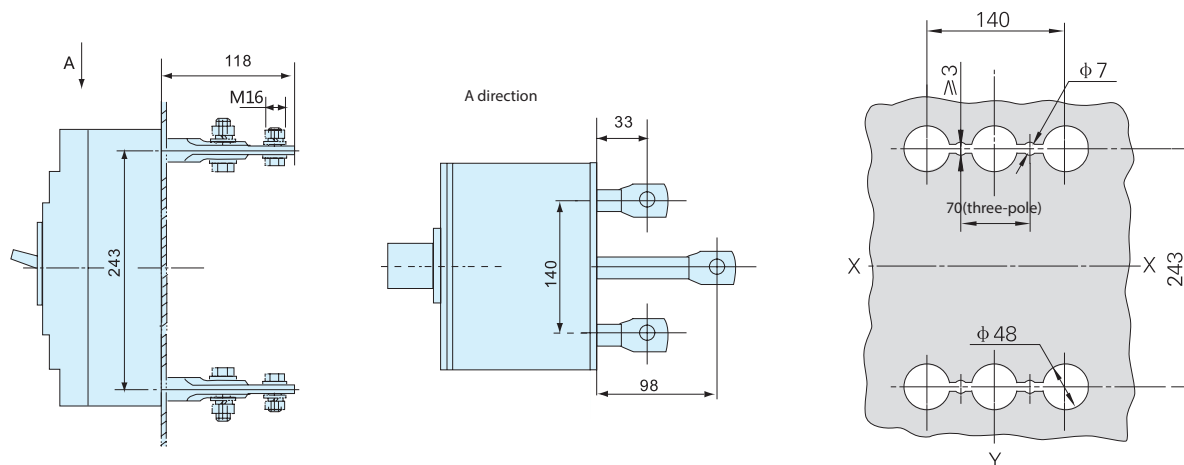
X-X, Y-Y represents the size of opening of before-panel wiring mounting panel at the center of three-pole circuit breaker



The thickness of under-voltage tripper is 21mm

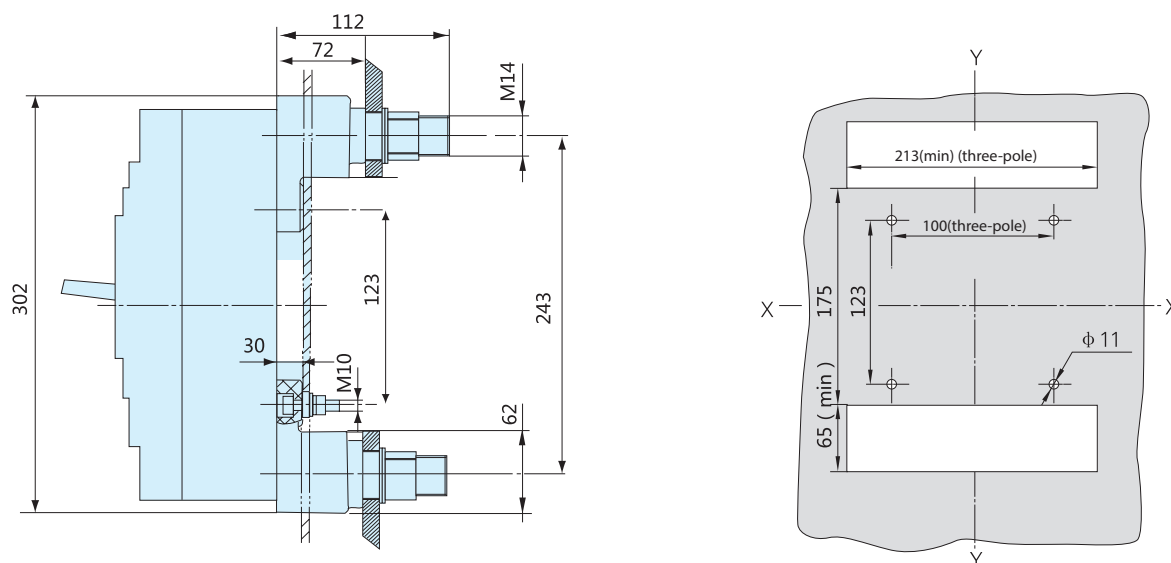
### Z1: Behind-panel wiring (three-pole)

X-X, Y-Y represents the size of opening of behind-panel wiring mounting panel at the center of circuit breaker



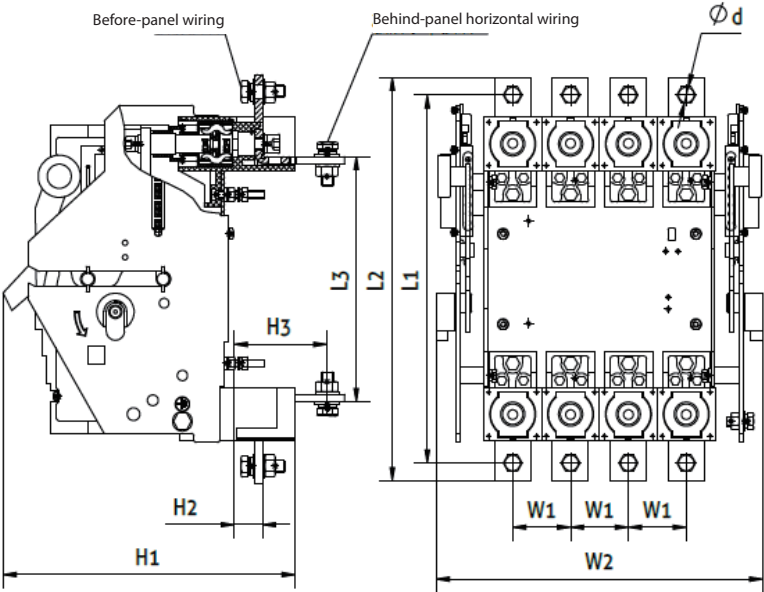
### Z2H: Plug-in type behind-panel wiring (three-pole)

X-X, Y-Y represents the size of plug-in type mounting panel at the center of three-pole circuit breaker

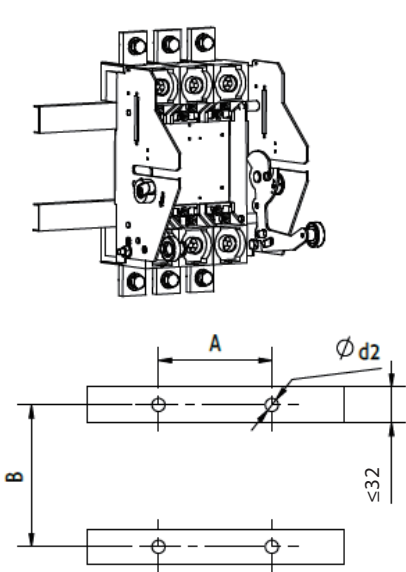


Drawer type wiring

X-X, Y-Y represents the size of opening of drawer type wiring mounting panel at the center of three-pole circuit breaker



Outline and installation dimension

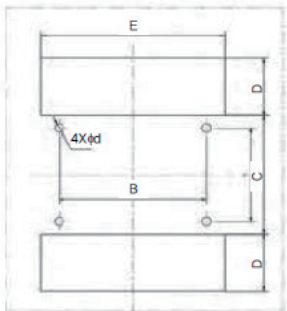


Beam and installation sizes

Note : In NDM2E-800, products with 700A and 800A current standard cannot provide plug-in wiring.

Drawer type behind-panel wiring opening diagram and related dimensions

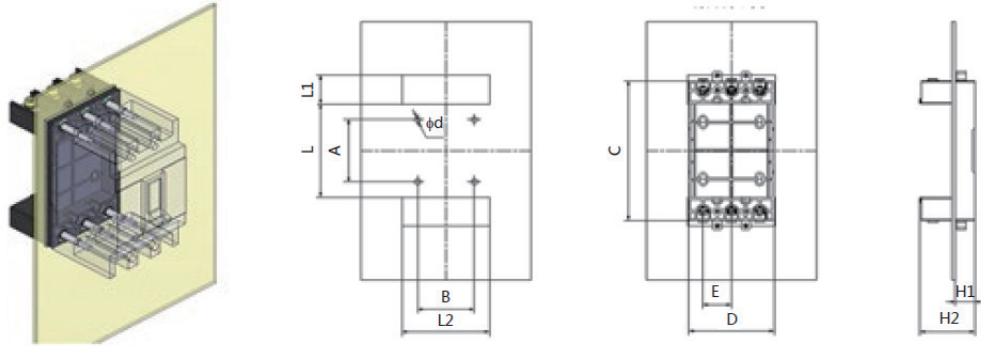
Model	Distributor breaker model	Number of poles	Outline dimension									Installation dimension		
			L1	L2	L3	H1	H2	H3	W1	W2	Φd1	A	B	Φd2
CH2-800/M	NDM2E-630/800	3P	367	410	241	260	26	73	70	289	13	140	131	6.5
		4P	367	410	241	260	26	73	70	289	13	210	131	6.5



Model and specification	Chamber behind-panel opening size (applicable to behind-panel outgoing line only)							
	A	B		C	D	E		d
		At three-pole	At four-pole			At three-pole	At four-pole	
CH2-800/M	131	140	210	170	77	213	283	7

## 6.5 NDM2E-(100-800)Z3 Plug-in Type Mounting Dimension and Wiring Method

### ● Z3H (Scheme 1): Behind-panel mounting

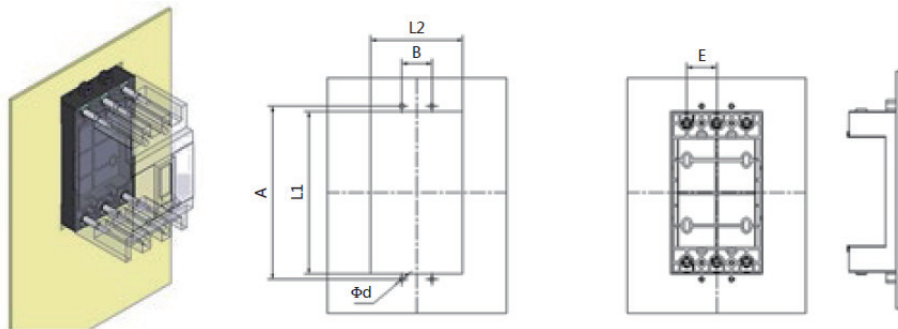


Installation schematic diagram:

Typical product model	Breaker model	A	B	L1	L2	d	E	Remarks
MZ3-125	NDM2E-100	170	30	161	92	5	30	
MZ3-250	NDM2E-250	191	35	180	107	5	35	
MZ3-400	NDM2E-400	290	48	276	150	6	48	
MZ3-800	NDM2E-630/800	327	70	313	212	6	70	

Note: When the product is 4-pole and the frame degree is  $\leq 250A$ , phase distance E is increased for sizes B and L2; when the product is 4-pole and the frame degree is  $\geq 400A$ , size B remains unchanged and phase distance E is increased for L2.

### ● Z3H (Scheme 2): Large opening behind-panel mounting



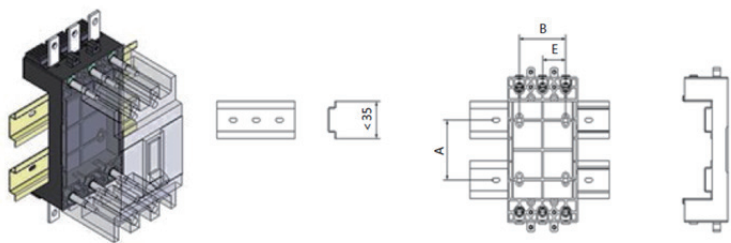
Installation schematic diagram:

Typical product model	Breaker model	A	B	L1	L2	d	E	Remarks
MZ3-125	NDM2E-100	170	30	161	92	5	30	
MZ3-250	NDM2E-250	191	35	180	107	5	35	
MZ3-400	NDM2E-400	290	48	276	150	6	48	
MZ3-800	NDM2E-630/800	327	70	313	212	6	70	

Note: When the product is 4-pole and the frame degree is  $\leq 250A$ , phase distance E is increased for sizes B and L2; when the product is 4-pole and the frame degree is  $\geq 400A$ , size B remains unchanged and phase distance E is increased for N pole direction of L2.



● Z3H (Scheme 3): Frame behind-panel mounting

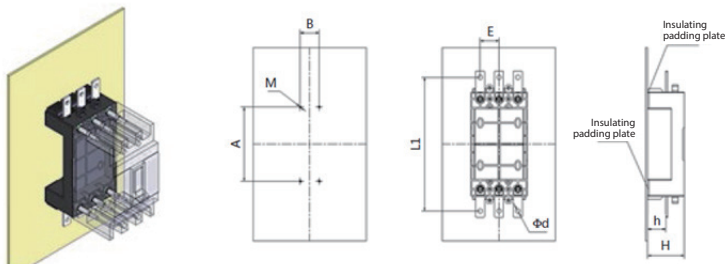


Installation schematic diagram:

Typical product model	Breaker model	A	B	E	Remarks
MZ3-125	NDM2E-100	65	50	25	
MZ3-250	NDM2E-250	74	70	35	
MZ3-400	NDM2E-400	140	96	48	
MZ3-800	NDM2E-630/800	143	140	70	

Note: When the product is 4-pole, phase distance E is increased for size B.

● Z3Q: Before-panel mounting



Installation schematic diagram:

Typical product model	Breaker model	A	B	L1	E	d	M	H	h	Remarks
MZ3-125	NDM2E-100	110	30	198	30	6.5	M4	55	28	
MZ3-250	NDM2E-250	150	35	223	35	8.5	M4	74	32	
MZ3-400	NDM2E-400	244	48	326	48	10.5	M5	85	36	
MZ3-800	NDM2E-630/800	283	70	363	70	12.5	M6	125	67	

## 6.6 Selection of Cross-sectional Areas of Connecting Busbars and Cables

### ● Selection of busbars

Rated current A	10 12.5	16 20	25	32	40 50	63	80	100	125 140	160	180 200 225	250	315 350	400
Cross-sectional area of conductor mm <sup>2</sup>	1.5	2.5	4.0	6.0	10	16	25	35	50	70	95	120	185	240

### ● Selection of cable

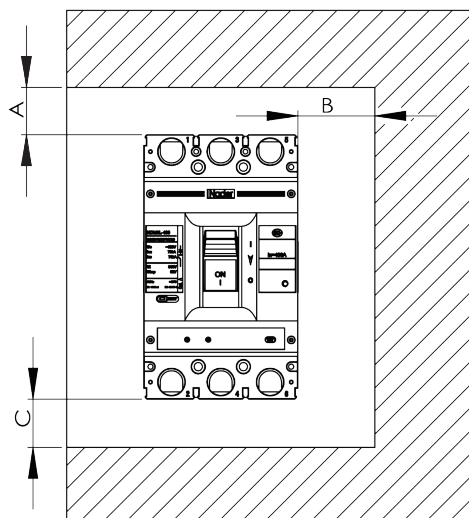
Rated current A	Cross-sectional areas of cables		Copper busbar size	
	Quantity	Sectional area mm <sup>2</sup>	Quantity	Dimensions mm × mm
500	2	150	2	30 × 5
630	2	185	2	40 × 5
700, 800	2	240	2	50 × 5

Note 1: Connect to the circuit breaker, and select the appropriate wiring method according to Outline Dimension, Mounting Dimension and Wiring Method;

Note 2: If copper bar is selected for connection, the copper bar cannot be directly connected to the circuit breaker body and extended busbar accessories are required.

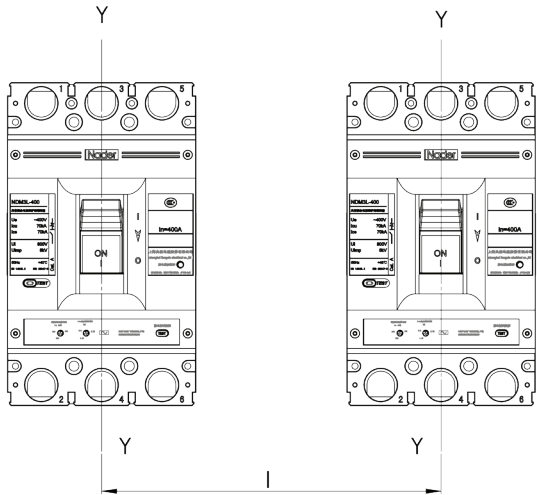
## 6.7 Safe Mounting Distance of Circuit Breaker

### ● Insulation distances for installation in a small metal cabinet (unit: mm)



Mounting distance	A (From incoming line end to cabinet surface)		B (Distance from the side to the cabinet)	C (From incoming line end to cabinet surface)
Specifications	With zero flashover cover	Without zero flashover cover		
NDM2E-100	25	65	30	30
NDM2E-250	25	65	30	30
NDM2E-400	25	120	35	35
NDM2E-630	25	120	35	35
NDM2E-800	25	120	35	35

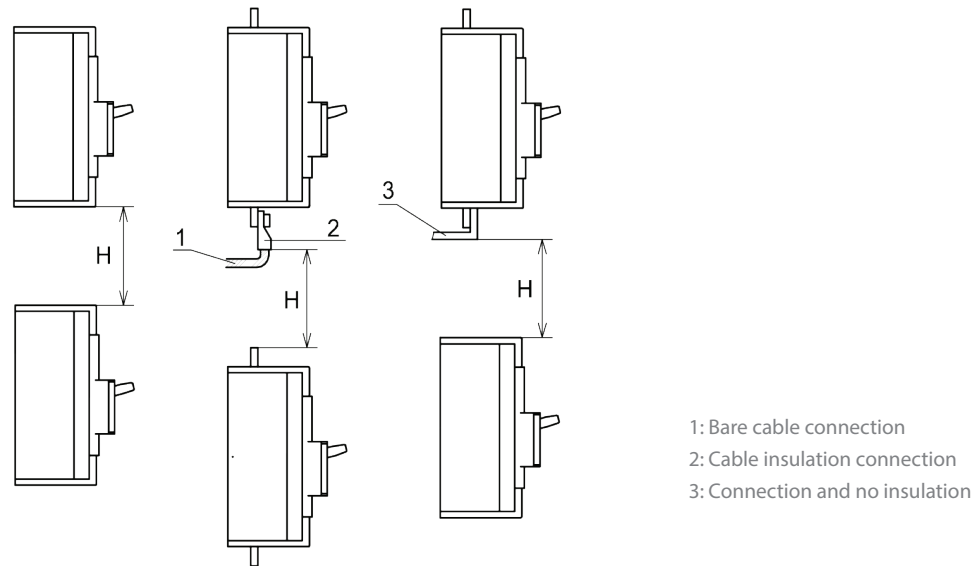
● Minimum center distance of the stacking room of the circuit breaker



Specifications	Circuit breaker width (mm)	Center distance I (mm)
	Three-pole	Three-pole
NDM2E-100	92	122
NDM2E-250	107	137
NDM2E-400	150	190
NDM2E-630	210	250
NDM2E-800	210	250

Note: For installation of circuit breakers in a row or stack, check the connection busbars or cables to ensure the air insulation distance will not be reduced.

## ● Minimum distance between circuit breakers installed in stack



Specifications	H (distance between the bottom and top of circuit breaker)	
	With zero flashover cover	Without zero flashover cover
NDM2E-100	90	91
NDM2E-250	90	93
NDM2E-400	155	155
NDM2E-630	155	155
NDM2E-800	155	155

## 7. Usage and Maintenance

- The characteristics of circuit breaker and accessories are set by the manufacturer; only the trained or certified professional personnel can adjust, install and maintain the circuit breaker, tripping unit and other accessories referring to the circuit design parameters;
- Ensure the power is in the inactive state before installation and removal of any device.
- The handle of circuit breaker can be located at three positions respectively representing the three conditions of closing, disconnection and free tripping. When the handle is at the free tripping position, the handle should be pulled in the disconnection direction. At this time, the circuit breaker could re-buckle and then the switch could be closed.
- Please observe the conditions for storage and use; if the product is damaged or cannot be normally used due to quality problem within 36 months from the date of delivery by the manufacturer, the manufacturer is responsible for free repair or replacement.

Note: Check whether the zero flashover cover or the interphase barrier is installed in place before energizing.

## 8. Ordering Instructions

- Please specify the models, specifications and ordering quantity of circuit breakers; when under-voltage tripper, shunt tripper or electrically operated mechanism are used, please indicate the voltage values of operating voltage and control power.

User unit:		Number of units ordered:		Date of order:	
Model NDM2E-- <input type="text"/> <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/>					
Rated current $I_n$ = <input type="text"/> A		Wiring mode		Before-panel wiring <input type="checkbox"/>	
				Behind-panel wiring <input type="checkbox"/>	
				Plug-in type behind-panel <input type="checkbox"/>	
				Plug-in type before-panel <input type="checkbox"/>	
Setting of intelligent controller	Overload long-time delay operating current $I_r$ <input type="text"/> A		Long time delay operating time $T_r$ <input type="text"/> S		
	Short circuit short-time delay operating current $I_s$ <input type="text"/> $\times I_r$		Short time delay operating time $T_s$ <input type="text"/> S		
	Instantaneous short-circuit operating current $I_i$ <input type="text"/> $\times I_{nm}$				
	Pre-alarm operating current $I_p$ <input type="text"/> $\times I_r$				
Derivatives of intelligent tripper	<input type="checkbox"/> Basic type <input type="checkbox"/> Grounding protection type <input type="checkbox"/> Communication type <input type="checkbox"/> Grounding protection communication type (added to the top of under-voltage tripper)				
Accessories	Under-voltage tripper	AC380V <input type="checkbox"/>	AC220V <input type="checkbox"/>		
	Shunt tripper	AC380V <input type="checkbox"/>	AC220V <input type="checkbox"/>	DC220V <input type="checkbox"/>	DC24V <input type="checkbox"/>
		Left <input type="checkbox"/>	Right <input type="checkbox"/>		
	Electric operating mechanism	AC380V <input type="checkbox"/>	AC220V <input type="checkbox"/>	AC110V <input type="checkbox"/>	
		DC220V <input type="checkbox"/>	DC110V <input type="checkbox"/>	DC24V <input type="checkbox"/>	
	Turning handle operating mechanism	CS__M2E-F <input type="checkbox"/>	CS__M2E-A <input type="checkbox"/>		
Other accessories	Bonding ba <input type="checkbox"/>	Interlocking mechanism <input type="checkbox"/>			
Remarks					

### ● Setting value of intelligent controller leaving the factory

Setting item		Distribution circuit breaker	Moto type circuit breakers
Overload long-time delay	Setting current $I_r$	$I_n$	$I_n$
	Setting time $T_r$	100s	100s
Short circuit short-time delay	Setting current $I_s$	$6I_r$	$8I_r$
	Setting time $T_s$	0.3s	0.3s
Instantaneous short-circuit	Setting current $I_i$	$10I_{nm}$	$12I_{nm}$
Pre-alarm	Setting current $I_p$	$0.9I_r$	$0.9I_r$



# NDM2Z

## DC Moulded Case Circuit Breaker

Edition 2016

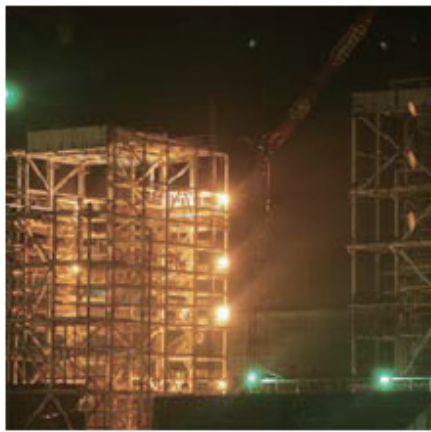
1. Product Overview

					
Model	NDM2Z-63	NDM2Z ( X ) -125	NDM2Z-250	NDM2Z-400	NDM2Z-630
Rated operating current In (A)	10、12.5、16、20、25、32、40、50、63	16、20、25、32、40、50、63、80、100、125	125、160、180、200、225、250	225、250、315、350、400	400、500、630
Rated operational voltage Ue (DC V)	250	250	250	250	250
Number of poles	2、3	2、3	2、3	2、3	2、3
Rated ultimate short-circuit breaking capacity Icu (kA)	25	35	35	50	50
Rated running short-circuit breaking capacity Ics (kA)	25	35	35	50	50
Certification	CCC、TUV、CE				

## 2. Product Features

### Scope of application and purpose

NDM2Z series DC moulded case circuit breakers (hereinafter referred to as breakers) are applicable to work in the circuits with rated operating voltage of DC250V and the rated operating current of up to 630A in the DC system application environment. The circuit breaker provides overload and short circuit protection function, and can protect the circuit and power equipment from damage. The products have been widely used in new energy, electric power, industrial control, real estate, electric and power supply, telecommunication, rail transportation, industrial (public) construction and other industries.



### Structural features

The circuit breaker is characterized by high breaking capability, short arcing, vibration resistance, etc.


### Meeting the following standards

- ◆ GB 14048.1 Low-voltage switchgear and controlgear - Part 1:General rules
- ◆ GB 14048.2 Low-voltage switchgear and controlgear - Part 2:Circuit breakers
- ◆ IEC 60947-1 Low-voltage switchgear and controlgear-Part 1:General rules
- ◆ IEC 60947-2 Low-voltage switchgear and controlgear-Part 2:Circuit-breakers



## 3. Application Scope

### 3.1 Electrical symbols

The circuit breaker provides isolation function, whose corresponding symbol is: 

### 3.2 Applicable Environment

#### ● Temperature of the working environment

-35°C~+70°C, the average value in 24h is not more than +35°C. At +40°C and above, the user needs to run with less load. For derating factors, see “ NDM2Z MCCB derating factor table ” .

#### ● Storage temperature:

-40°C ~ +75°C。

#### ● Altitude

The altitude of installation site is  $\leq 2000\text{m}$ , and the derating factors under varied altitudes are shown in “ Table of derating factors of NDM2Z moulded case circuit breaker under varied altitudes ” ;

#### ● Relative humidity for operation/Relative humidity for storage

At the ambient temperature of +40°C, the relative humidity shall not be more than 50%; for a lower temperature, the humidity may be higher, for example: The relative humidity could be up to 90% at 20°C. Appropriate measures should be taken against frost due to temperature variation.

#### ● Pollution grade

Grade 3.

#### ● Installation category

Mounting category of circuit breaker connected to the main circuit is: Category III (power distribution and control level).

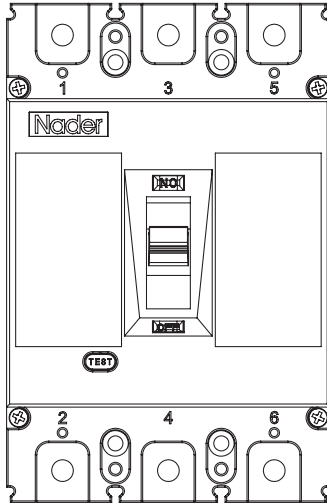
Mounting category of circuit breaker not connected to the main circuit is: Class II (load level) .

#### ● Installation environment

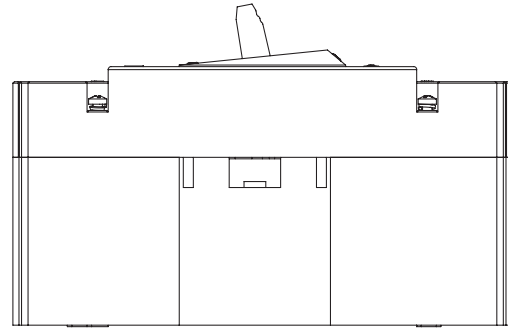
The product shall be installed in a medium without explosive danger, and the medium is not enough to corrode metal and damage the place where the insulating gas and conducting gas are located, so as to avoid any use in a rainy or snowy place.

### ● Installation direction

- ◆ Vertical mounting, the gradient between the mounting plane and the vertical plane should be  $\leq \pm 22.5^\circ$ .
- ◆ Horizontal mounting.



Vertical installation



Horizontal installation

## 3.3 NDM2Z Breaker Power Loss Table

Model	Current (A)	Two-pole total power loss (W)			Three-pole total power loss (W)		
		Before-panel/ behind-panel wiring	Plug-in type before-panel wiring	Plug-in type behind-panel wiring	Before-panel/ behind-panel wiring	Plug-in type before-panel wiring	Plug-in type behind-panel wiring
NDM2Z-63 direct heating type (10~25A)	25	19	--	21	28	--	32
NDM2Z(X)-125 direct heating type (16~25A)	25	27	28	30	40	42	45
NDM2Z-63 intermittent heating type (32~63A)	63	13	--	16	20	--	24
NDM2Z(X)-125 intermittent heating type (32~100A)	100	23	25	27	35	37	40
NDM2Z(X)-125 intermittent heating type (125A)	125	26	28	29	39	42	43
NDM2Z-250 intermittent heating type (125~225A)	225	41	44	47	62	66	70
NDM2Z-250 intermittent heating type (250A)	250	45	49	49	67	73	73
NDM2Z-400 intermittent heating type (225~400A)	400	77	80	83	115	120	125
NDM2Z-630 intermittent heating type (400~630A)	630	125	--	133	187	--	200

4. Technical Characteristics of the Product

4.1 Description of Specifications and Models

<div><div>ND</div><div>M</div><div>2</div><div><div></div><div>-</div><div></div></div><div><div></div><div>/</div><div></div></div><div><div></div></div><div><div></div><div>-</div><div></div></div><div><div></div></div></div>										
<div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>10</div><div>11</div></div>										
Serial No.	Serial No. name		NDM2							
1	Enterprise code		ND: <b>Nader</b> brand low-voltage apparatus							
2	Product code		M: Moulded case circuit breakers							
3	Design serial No.		2							
4	Code of Use class		Z: Dc molded case circuit breaker ZX: Small housing DC circuit breaker (only for 125)							
5	Frame grade Rated current		See Table 1							
6	Operation mode		No code: Direct operation by handle							
			P: Electrically operated							
			Z: Turning handle							
7	Number of poles		2, 3							
8	Overload tripper code		0: Without tripper							
			2: Instantaneous tripper only							
			3: Complex tripper							
9	Accessory code		See Table 2							
10	Wiring method code		No code: Normal							
			P: Extended busbar							
			Type JK: Incoming line terminal Wiring:Wiring box type, wiring at the outgoing line end: Before-panel wiring type							
			Type CK:Incoming line terminal Wiring:Before-panel wiring type, wiring at the outgoing line end: Wiring frame							
			Type K: Wiring at the incoming/outgoing line end: Wiring frame							
			Z1 : Behind-panel wiring							
			Z2Q : Plug-in type before-panel wiring.							
			Z2H : Plug-in type behind-panel wiring							
11	Rated current		See Table 1							

## 4.2 Technical Parameters

Table 1 Table of main performance parameters of circuit breaker

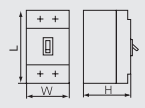
Model		NDM2Z-63	NDM2Z-125	NDM2ZX-125
Frame grade Current $I_{nm}$ (A)		63	125	125
Rated current $I_n$ (A)		10、12.5、16、20、 25、32、40、50、63	16、20、25、32、40、 50、63、80、100、125	16、20、25、32、40、 50、63、80、100、125
Rated insulation voltage $U_i$ (V)		1000	1000	1000
Rated impulse withstand voltage $U_{imp}$ (V)		8000	8000	8000
Power frequency withstand voltage $U$ (1 minute) (V)		3500	3500	3500
Use class		A	A	A
Number of poles		2、3	2、3	2
Rated operational voltage $U_e$ DC (V)		250	250	250
Rated ultimate short-circuit breaking capacity $I_{cu}$ (kA)		25	35	35
Rated running short-circuit breaking capacity $I_{cs}$ (kA)		25	35	35
Operating performance	Electrical life	2000	1500	1500
	Mechanical life	10000	8500	8500
Outline dimension 	L	135	150	150
	W	78	92	64
	H	73.5	69	69
Flashover distance (mm)		≤50	≤50	≤50
Wiring mode		Conventional、 P、Z1、Z2Q、Z2H	Conventional、P、JK、CK、 K、Z1、Z2Q、Z2H	Conventional、P、JK、CK、K

Table 1 Main performance and technology parameters of circuit breaker (continued)

Model		NDM2Z-250	NDM2Z-400	NDM2Z-630
Frame grade Current Inm (A)		250	400	630
Rated current In (A)		125、140、160、180、 200、225、250	225、250、315、350、400	400、500、630
Rated insulation voltage Ui (V)		1000	1000	1000
Rated impulse withstand voltage Uimp (V)		8000	8000	8000
Power frequency withstand voltage U (1 minute) (V)		3500	3500	3500
Use class		A	A	A
Number of poles		2、3	2、3	2、3
Rated operational voltage Ue DC (V)		250	250	250
Rated ultimate short-circuit breaking capacity Icu (kA)		35	50	50
Rated running short-circuit breaking capacity Ics (kA)		35	50	50
Operating performance	Electrical life	1500	1000	1000
	Mechanical life	8500	4000	4000
Outline dimension	L	165	257	270
	W	107	150	182
	H	86	106.5	110
Flashover distance (mm)		≤50	≤100	≤100
Wiring mode		Conventional、P、JK、CK、 K、Z1、Z2Q、Z2H	Conventional、P、Z1、 Z2Q、Z2H	Conventional、P、Z1、 Z2Q、Z2H

● Table of derating factors of NDM2Z series moulded case circuit breaker under varied temperatures

Serial No.	Frame grade Rated current (A)	Derating factors corresponding to temperatures						
		40°C	45°C	50°C	55°C	60°C	65°C	70°C
1	63	1	0.979	0.958	0.937	0.915	0.893	0.871
2	125	1	0.977	0.954	0.931	0.907	0.883	0.858
3	250	1	0.982	0.963	0.944	0.924	0.904	0.882
4	400	1	0.981	0.962	0.942	0.922	0.901	0.879
5	630	1	0.979	0.958	0.937	0.915	0.893	0.871
6	800	1	0.980	0.960	0.939	0.918	0.897	0.877

Note: When the ambient temperature is below 40°C, the product can be used normally, with no derating capacity.

● Table of derating factors of NDM2Z moulded case circuit breaker under varied altitudes

Altitude (m)	2000	2500	3000	3500	4000	4500	5000
Operating current correction factor	$I_n$	$I_n$	$0.98I_n$	$0.97I_n$	$0.96I_n$	$0.95I_n$	$0.94I_n$
Operating current correction factor	$U_e$	$U_e$	$0.83U_e$	$0.77U_e$	$0.71U_e$	$0.67U_e$	$0.63U_e$
Power frequency withstand voltage correction factor	$U$	$U$	$0.89U$	$0.85U$	$0.80U$	$0.77U$	$0.73U$

4.3 Comparison Table of Accessory Codes

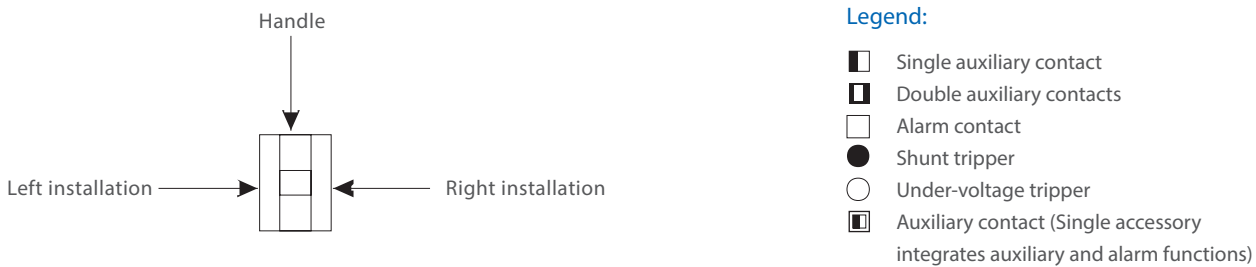




























































































































































































































































































Table 2 Comparison table of tripping method accessory codes

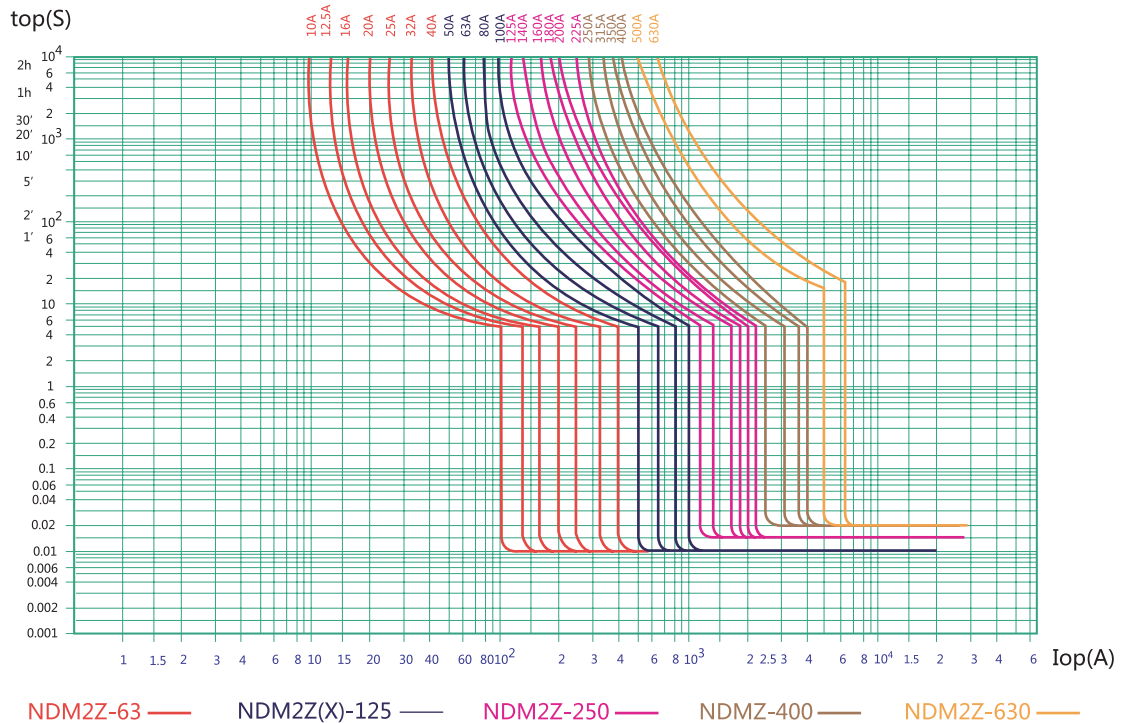
Accessory code	Accessories Name	Installation location		Model		NDM2Z -63		NDM2Z -125		NDM2ZX -125		NDM2Z -250		NDM2Z -400		NDM2Z -630	
		Number of poles															
		2	3	2	3	2	3	2	3	2	3	2	3	2	3	2	3
00	No	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10	Shunt tripper																
20	Double auxiliary contacts																
21	Single auxiliary contact																
30	Under-voltage tripper					—	—										
40	Shunt tripper, double auxiliary contacts					—	—										
41	Shunt tripper, single auxiliary contact					—	—										
50	Shunt tripper, under-voltage tripper					—	—										
60	Two groups of double auxiliary contacts	—				—	—										
61	Two groups of single auxiliary contacts					—	—										
62	Double auxiliary contacts, single auxiliary contact					—	—										
70	Under-voltage tripper, double auxiliary contacts					—	—										
71	Under-voltage tripper, single auxiliary contact					—	—										
08	Alarm contact					—	—										
18	Shunt tripper Alarm contact					—	—										
28	Double auxiliary contacts, alarm contact					—	—										
38	Under-voltage tripper, alarm contact	—				—	—										
48	Shunt tripper, auxiliary alarm contact					—	—										
58	Auxiliary alarm contact					—	—										
68	Double auxiliary contacts, auxiliary alarm contact	—				—	—										
78	Under-voltage tripper, auxiliary alarm contact	—				—	—										

## 4.4 Product Tripping Curve

### ● Protection requirements for the products:

Rated current of tripper (A)	Thermal tripper (ambient temperature is +40°C)		Operating current for the electromagnetic tripper (A)	Remarks
	1.05In (cold state) non-operating time (h)	1.3In (thermal state) operating time (h)		
$10 \leq I_n \leq 63$	1	1	$10I_n \times (1 \pm 20\%)$	Power distribution type
$63 \leq I_n \leq 630$	2	2	$10I_n \times (1 \pm 20\%)$	

### ● Product tripping curve NDM2Z

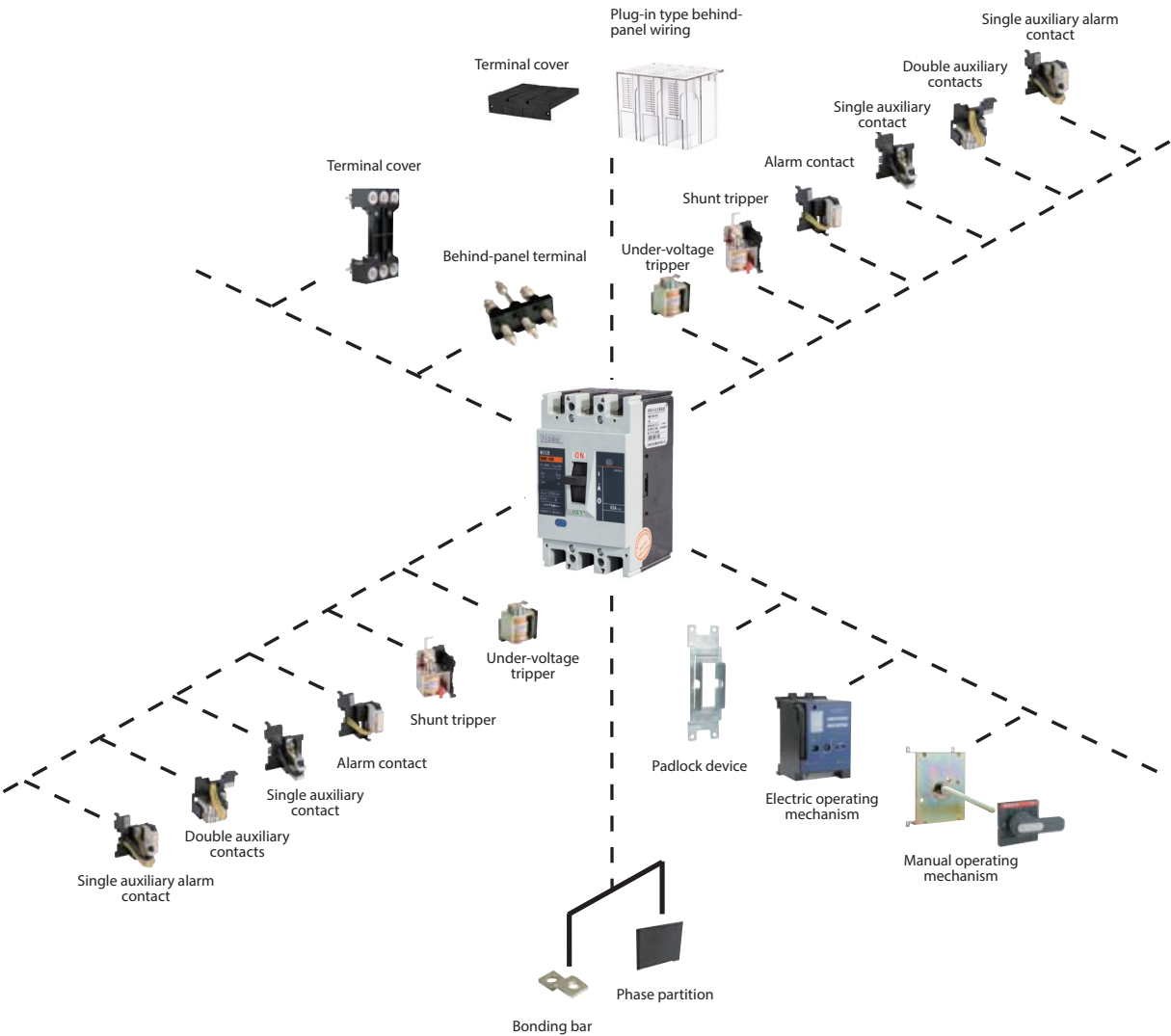


Note: Iop - Operating current of tripper top - Operating time of tripper



5. Accessories

5.1 List of Accessories



## 5.2 Accessories Function Description

### 5.2.1 Auxiliary contact

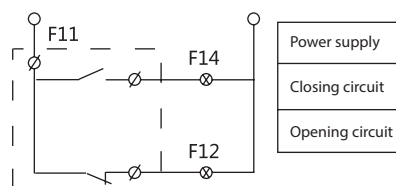
#### ● Auxiliary contacts and combinations

The breaker is at the "opening" or "free tripping" position	Double auxiliary contacts	
	Single auxiliary contact	
The breaker is at the "closing" position	"Closing" switches to "opening", "opening" switches to "closing"	

#### ● Auxiliary contact current parameters

Frame grade Rated current	Conventional heating current 1th	Rated operational current at AC 400V
$I_{nm} \leq 225$	3A	0.30A
$I_{nm} > 225$	3A	0.40A

#### ● Electrical life of auxiliary contact



#### ● Auxiliary contact wiring diagram

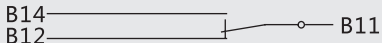
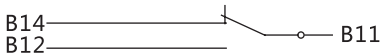
Use class	Switch on			Breaking			Frequency	Operation frequency (time(s)/hour)	Conduction time
	I/Ie	I/Ie	cos φ	I/Ie	U/Ue	cos φ			
AC-15	10	1	0.3	1	1	0.3	6050	360	≥0.05s
DC-13	1	1	6Pe	1	1	6Pe			≥T0.95

#### ● Connection and breaking capacity of auxiliary contact

Use class	Switch on			Breaking			Frequency	Operation frequency (time(s)/hour)	Conduction time
	I/Ie	I/Ie	cos φ	I/Ie	U/Ue	cos φ			
AC-15	10	1	0.3	1	1	0.3	10	120	≥0.05s
DC-13	1	1	6Pe	1	1	6Pe			≥T0.95

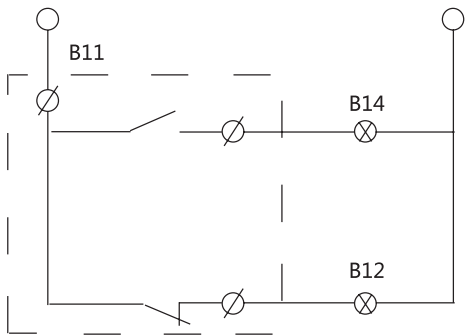
5.2.2 Alarm contact

● Alarm contacts and their combinations (alarm contacts  $U_e = 220V$ ,  $I_{th} = 3A$ )

The circuit breaker is at the position of “opening” or “closing”	
The circuit breaker is at the “free tripping” position	

● Auxiliary contact wiring diagram

In the case of proper closing or opening of circuit breaker, the contact does not operate; only after free tripping (or fault tripping) will the original state of contact be changed, which means normally open switches to closed and normally closed switches to open; after re-buckle of the circuit breaker, the contact is restored to the original position.



5.2.3 Under-voltage tripper

★ At 35%~70% of rated control power voltage, the under-voltage tripper should operate reliably to disconnect the circuit breaker. When it is less than 35% of the rated voltage, closing of circuit breaker should be reliably prevented. When the power supply voltage is equal to or greater than 85% of rated voltage, it should be ensured that the circuit breaker is closed.

- ★ Control voltage: AC 50Hz 230V 400V  
DC 110V 220V

★ Note: The under-voltage tripper must be energized first in order to re-buckle and close the circuit breaker, otherwise it will damage the circuit breaker.

- ★ Instantaneous current and power consumption of shunt tripper

Product models	Instantaneous current value (A)		Power consumption (W)	
	AC 400V	AC 230V	AC 400V	AC 230V
NDM2Z-63	10	13.5	4	3.105
NDM2Z-125	9.75	14.25	3.95	3.2275
NDM2Z-250	10.88	14.75	4.352	3.392
NDM2Z-400	9	11	3.6	2.53
NDM2Z-630	8.5	11	3.4	2.53

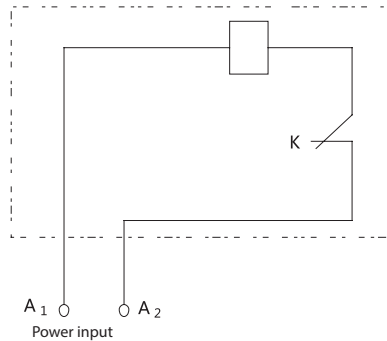
## 5.2.4 Shunt tripper

Usually installed at Phase A of circuit breaker; at 70%~110% of rated control voltage, the shunt tripper should enable the circuit breaker to trip reliably under all operations.

Control voltage: AC 50 Hz 230 V 400 V

DC 24V low power consumption, 24V, 220V

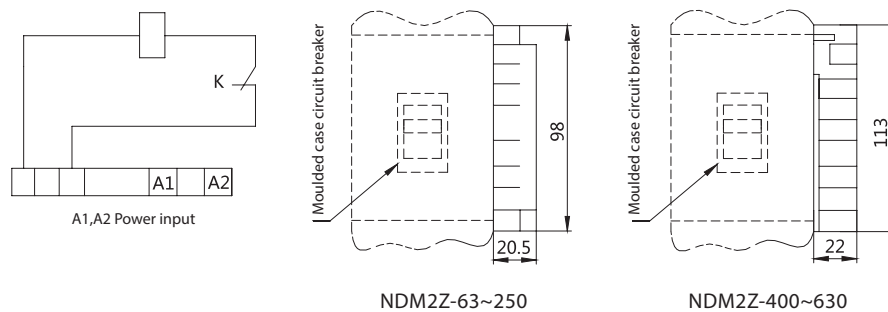
### ● Shunt tripper wiring diagram



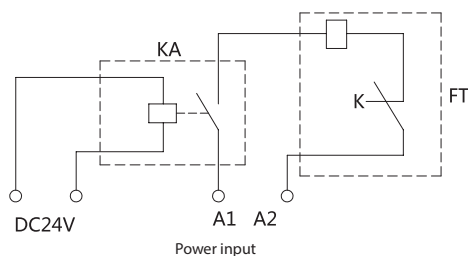
When the control circuit power supply is DC24V and the power is lower than 80W, it is possible to use low power shunt tripper or add intermediate relay.

### ● DC24V low power shunt tripper wiring diagram and outline dimension of external ceiling rose

The normal operating power of DV24V low power shunt tripper is as low as 15W, which substantially meet the requirements of all DC24V control circuits. The low power shunt has a plug-in junction box, whose outline dimension is shown below.



### ● DC24V control power wiring diagram



KA : DC24V relay with electric shock capacity of 1A

FT : AC220V/380V Shunt tripper

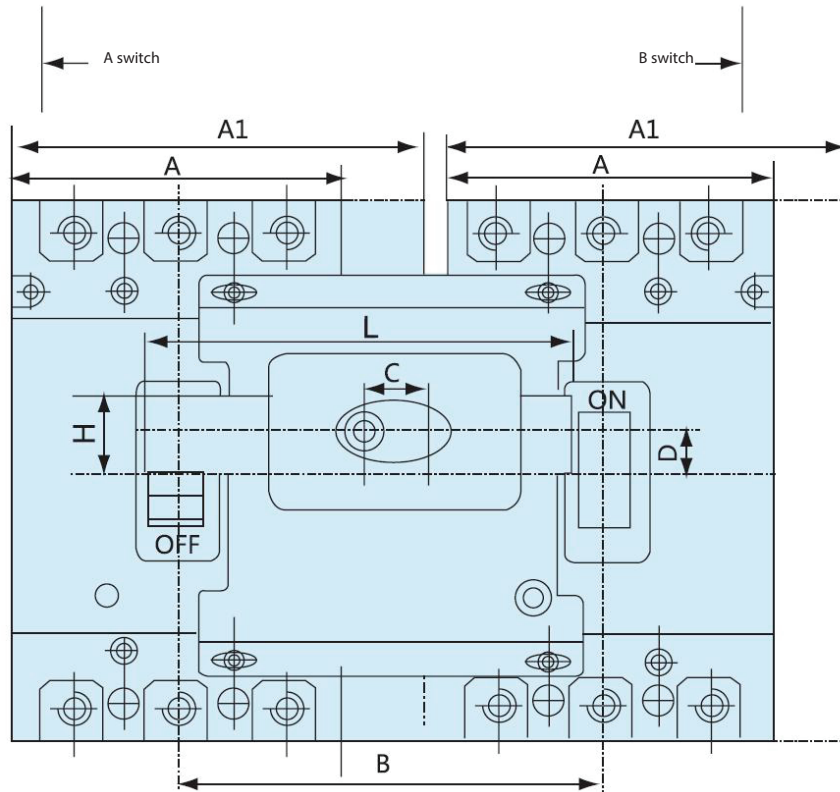
The rated voltage of FT is the power input voltage of A1 and A2

● Instantaneous current and power consumption of shunt tripper

Product models	Instantaneous current value (mA)				Power consumption (W)				
	AC400V	AC230V	DC220V	DC24V	AC400V	AC230V	DC220V	DC24V	DC24V (Low power consumption)
NDM2Z-63	0.28	0.434	0.341	4	91.6	76.1	90.7	96.2	15
NDM2Z-125	0.288	0.425	0.341	4	96.8	73	90.7	91.2	15
NDM2Z-250	0.313	0.412	0.341	3.87	112	68.8	90.7	85.3	15
NDM2Z-400	0.197	0.325	0.4	3.87	67	62.3	94.4	100	15
NDM2Z-630	0.199	0.314	0.4	3.87	68	58.2	94.4	100	15

## 5.3 Functions and Sizes of External Accessories

### 5.3.1 Mechanical interlock

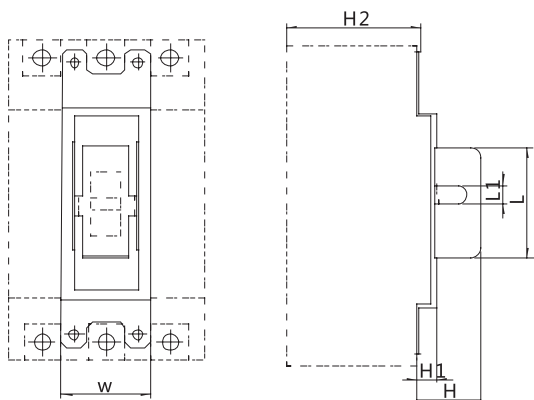


#### ● Mechanical interlocking mechanism and related dimensions

Product models	A	A1	B	C	D	L	H
NDM2Z-63	78	—	102	38	13	118	22
NDM2Z-125	92	—	120	50	12	118	22
NDM2Z-250	107	—	135	50	14	135	22
NDM2Z-400	150	—	180	60	18	188	30
NDM2Z-630	182	—	235	60	16	240	28

5.3.2 Locking device

● MS1 locking mechanism installation diagram

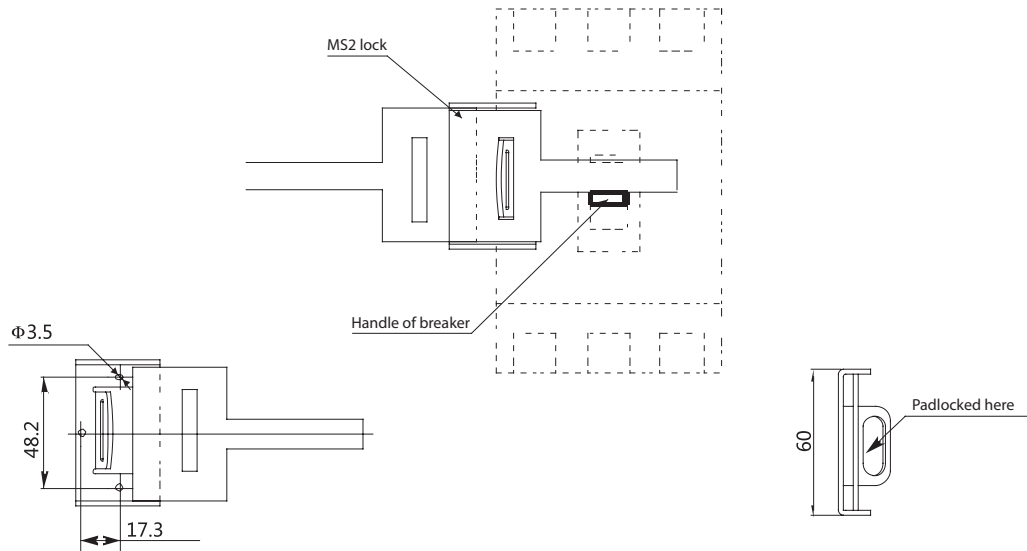


MS1 is an integral lock device (which means the locking device and the circuit breaker share the mounting screws during the co-installation), aiming at preventing closing and opening operations due to human error; at present, there are only 125 and 250 available; the installation dimensions are shown in the following figure and table (the dotted part in the figure is the circuit breaker part).

Product models	W	L	L1	H	H1	H2
NDM2Z-63	42	55	9	24	4	68
NDM2Z-125	42	55	9	24	4	63.5
NDM2Z-250	52	66	9	26	4	82

● MS2 lock installation diagram

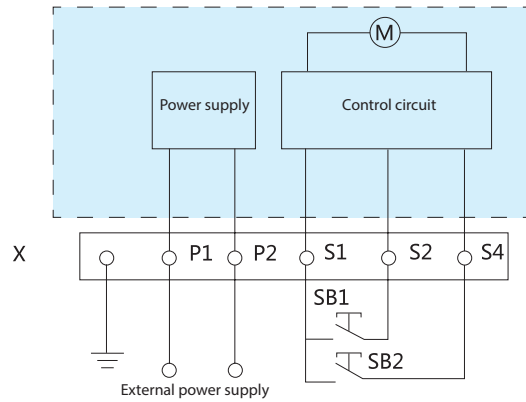
MS2 is a split lock (which means the device is installed on the left or right of the front cover of circuit breaker) and is used for NDM2, aiming at preventing closing and opening operations due to human error (the dotted part is the circuit breaker part).



### 5.3.3 Electric operating mechanism

#### ● CD2 electric operating mechanism (equipped with NDM2Z-63-630 series)

◆ Wiring diagram (The circuit breaker external accessory wiring diagram is in the dotted box)



Explanation of notation:

SB1, SB2 operating button (prepared by users)

X terminal block

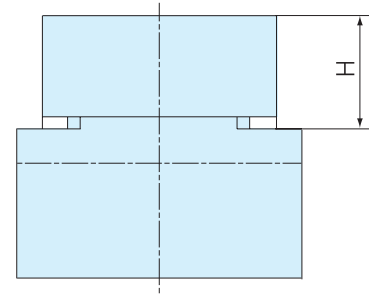
P1 and P2 are external power supply

◆ Voltage specification:

AC 50Hz 110V、230V、400V

DC24V、110V、220V

◆ CD2 Electric operating mechanism



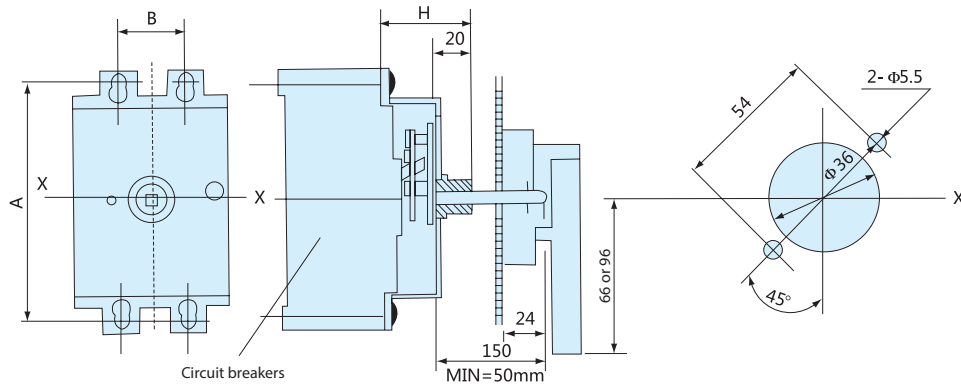
#### ● Technical parameters of CD2 motor operating mechanism

Equipped with circuit breaker	Operating current (A)	Electric power (W)	Life/times	Operating mechanism height (mm)
NDM2Z-63	≤ 0.5	14	14000	90.5
NDM2Z-125	≤ 0.5	14	14000	92
NDM2Z-250	≤ 0.5	14	10000	92
NDM2Z-400	≤ 2	35	5000	142
NDM2Z-630	≤ 2	35	5000	153



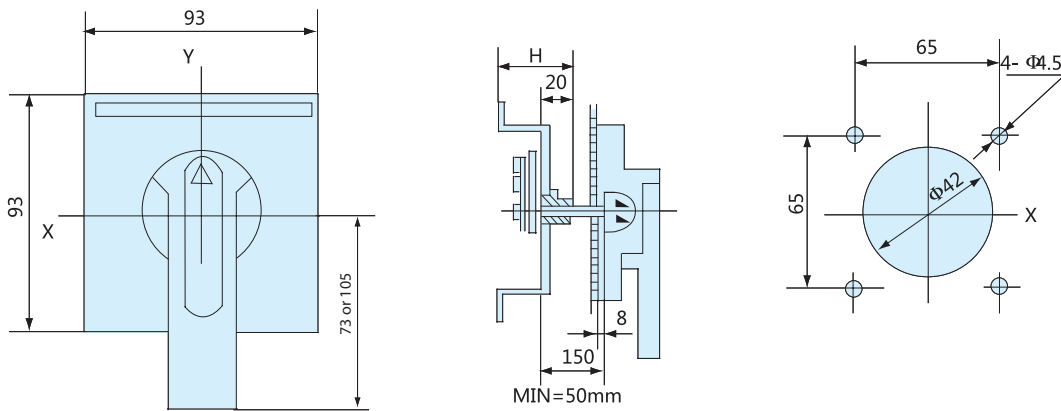
### 5.3.4 Manual operating mechanism

CS1-A type handle mounting opening diagram

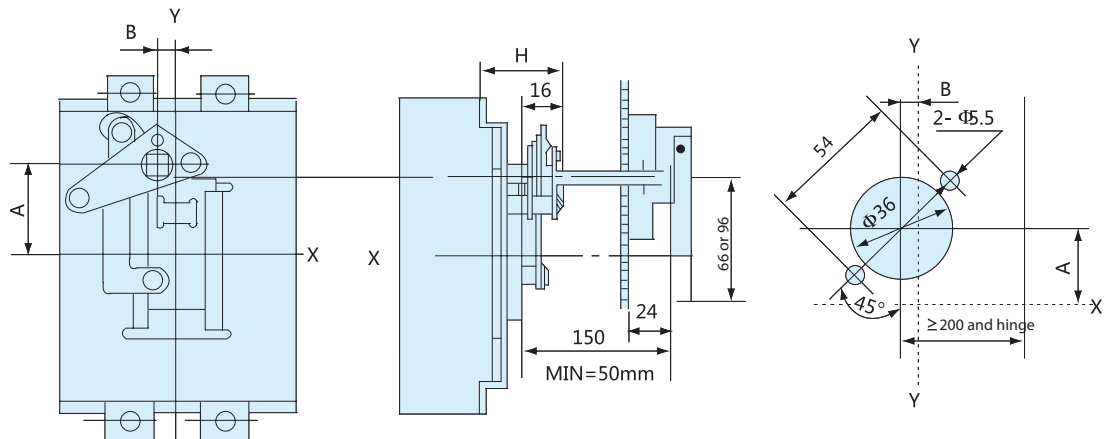


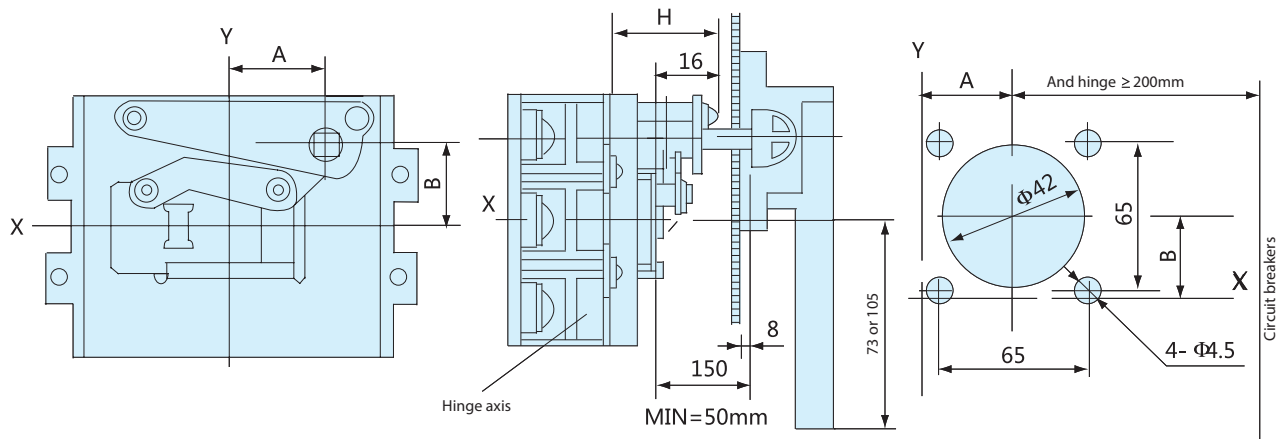
Note: A type is round handle and F type is square handle

#### ● CS1-F type handle mounting opening diagram



#### ● CS2-A type handle mounting opening diagram





● Installation method and outline dimension of shape accessories

External accessories	External accessory model	Equipped with circuit breaker	Manual installation dimensions: mm				Installation mode
			H	A	B		
					2P	3P	
Manual operating mechanism	CS1-63	NDM2Z-63	49	100	25		Vertical mounting
	CS1-100	NDM2Z-125	49	104	30		
	CS1-225	NDM2Z-250	55	143	35		
	CS1-400	NDM2Z-400	76	194	137		
	CS1-630	NDM2Z-630	83	81	171		Horizontal mounting
	CS2-100	NDM2Z-125	46	35	11.5		Vertical mounting
	CS2-100	NDM2Z-125	46	37	11.5		Horizontal mounting
	CS2-225	NDM2Z-250	48	35	31		Vertical mounting
	CS2-225	NDM2Z-250	48	45	32		Horizontal mounting
	CS2-400	NDM2Z-400	61	65	15		Vertical mounting
	CS2-630	NDM2Z-630	61	67.5	15		Horizontal mounting

5.3.5 Interlocking mechanism

● Definition and characteristics

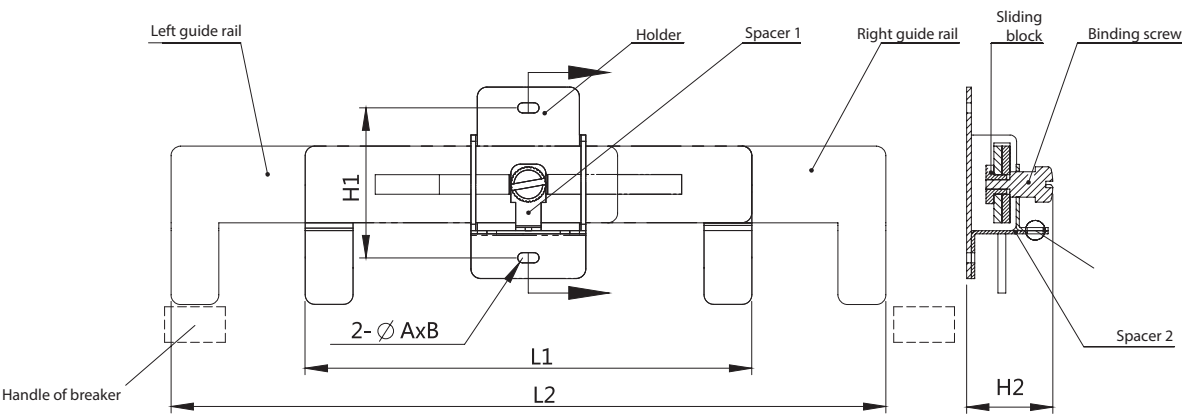
The interlocking mechanism can provide reliable interlocking of two circuit breakers. It features simple structure, easily operation and reliable interlocking, and can provide reliable interlocking of two circuit breakers with frame size current of 63~630A. It can also ensure one of the two circuit breakers is at the closing position and the other is at the opening position, and provide padlock function.

● Operating instructions

- ★ Adjust the position of the guide rail of the mechanism based on the center distance of two circuit breaker handles so that the left (right) guide rail is stopped on the handle of one circuit breaker to ensure the circuit breaker is at the closing position and the right (left) rail could not affect the closing and opening of the other circuit breaker. Tighten the fastening screws so that the positions of right and left guide rails are fixed.
- ★ Adjust the guide rail of the mechanism to the position for locking the circuit breaker handle and use the padlock to lock the spacers 1 and 2 when necessary.
- ★ Use bolts through two mounting holes on the bracket to fix the interlocking mechanism on the installation panel or cabinet bracket.

( Note: The padlock spacer is an accessory, which may be specified in the order if necessary; the padlock is prepared by use )

● Outline dimension

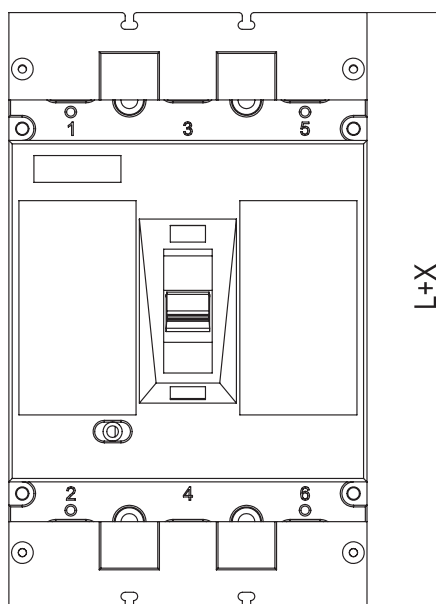


Outline dimension	L1	L2	H1	H2	A	B	Remarks
Type 250	140	225	47	25	6.5	10	Applicable to NDM2Z-63, 125, 250
Type 630	210	320	75	33	9	12.5	Applicable to NDM2Z-400 and 630

### 5.3.6 Terminal cover

#### Zero flashover cover

The terminal covers are mounted on both sides of the product to provide zero flashover function for the product, whose heights and widths are consistent with the product and lengths are shown in the following table.



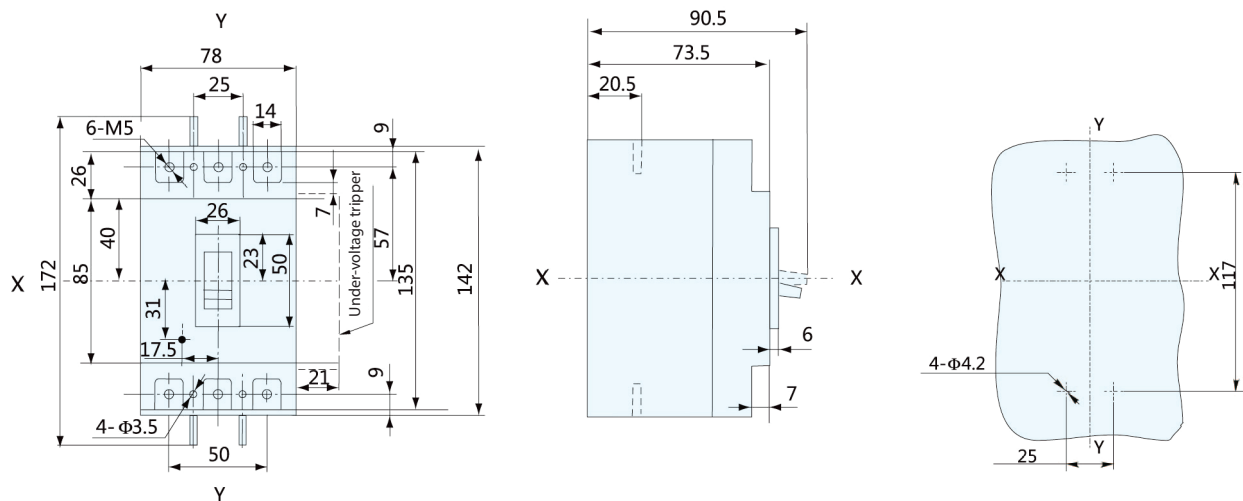
Product series	Model	Body length L	Increased length of terminal cover X	Length after addition of terminal cover Lx
NDM2Z	NDM2Z-125	150	12	162
	NDM2Z-250	165	19	184
	NDM2Z-400	257	19	276
	NDM2Z-630	270	19	289

## 6. Product Outline Dimension

### 6.1 NDM2Z-63 Outline Dimension, Mounting Dimension and Wiring Method

Before-panel wiring  
(two-pole, three-pole)

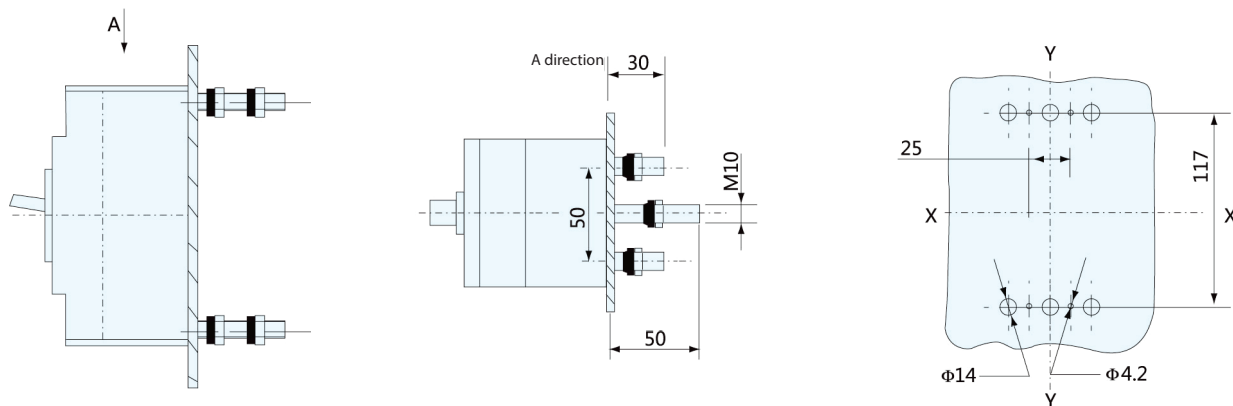
X-X, Y-Y represents the size of opening of  
before-panel wiring mounting panel at  
the center of three-pole circuit breaker



\*The size of additional terminal cover (optional piece) is 142, and the three-pole product is not provided with terminal cover.

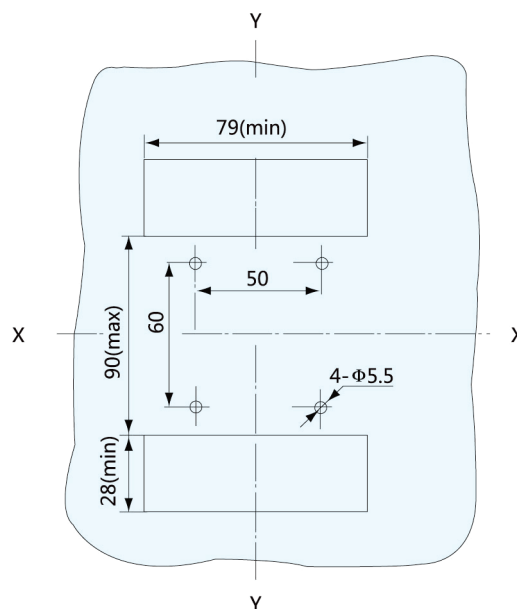
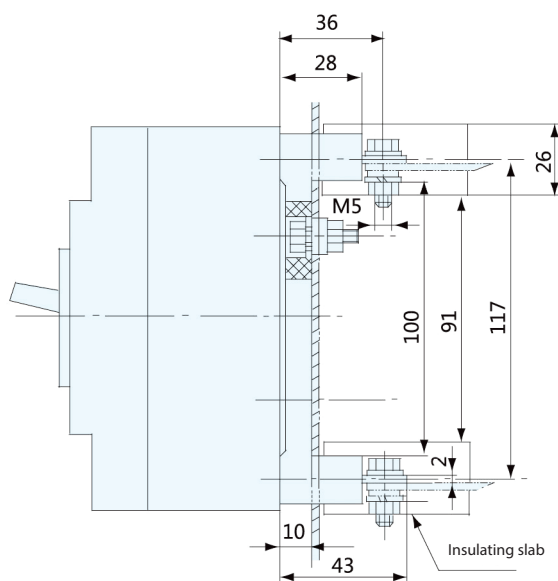
Z1: Behind-panel wiring  
(two-pole or three-pole)

X-X, Y-Y represents the size of opening of  
behind-panel wiring mounting panel at  
the center of circuit breaker



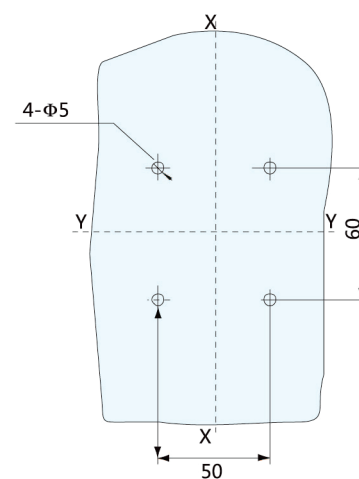
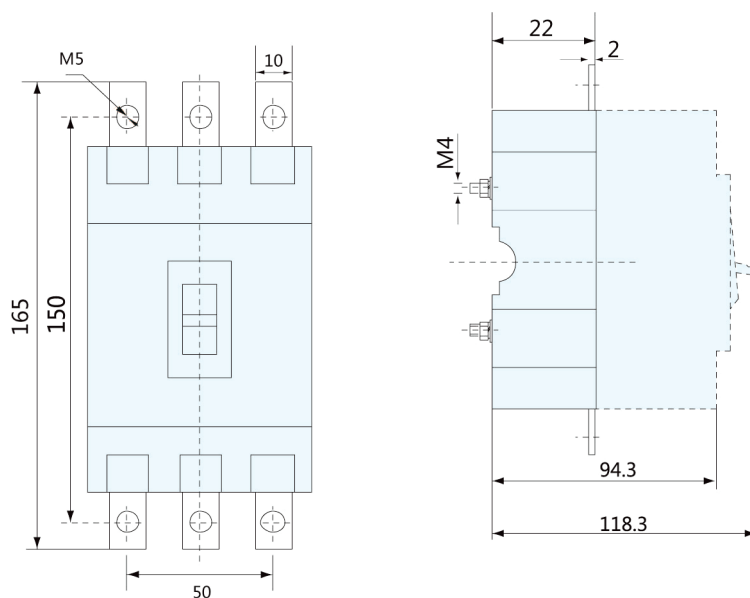
Z2H: Plug-in type behind-panel wiring  
(two-pole or three-pole)

X-X, Y-Y represents the size of plug-in type mounting panel at the center of three-pole circuit breaker



Z2Q: Plug-in type before-panel wiring  
(two-pole, three-pole)

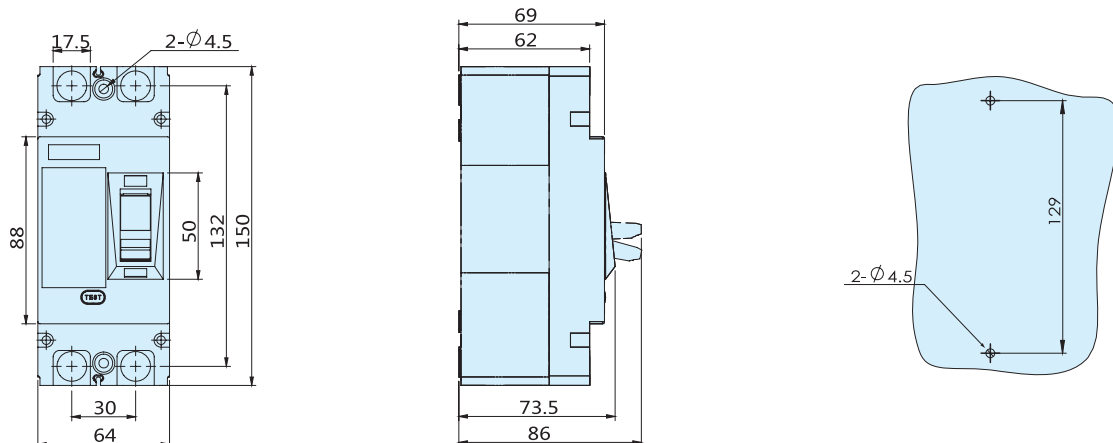
X-X, Y-Y represents the size of plug-in type mounting panel at the center of circuit breaker



## 6.2 NDM2ZX-125 (small housing) Outline Dimension, Mounting Dimension and Wiring Method

Before-panel wiring (two-pole)

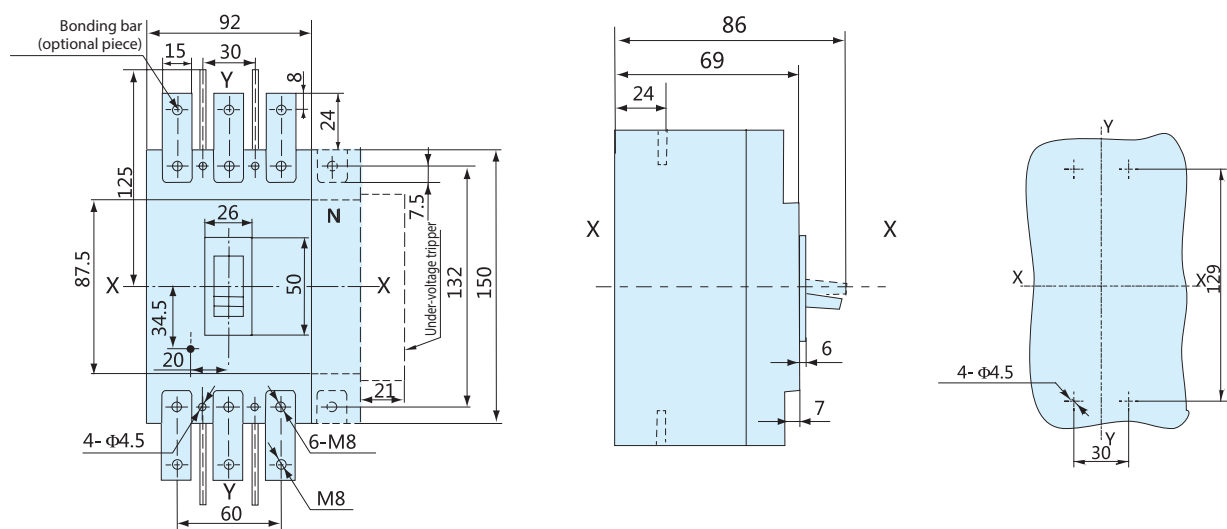
the size of opening of before-panel wiring mounting panel



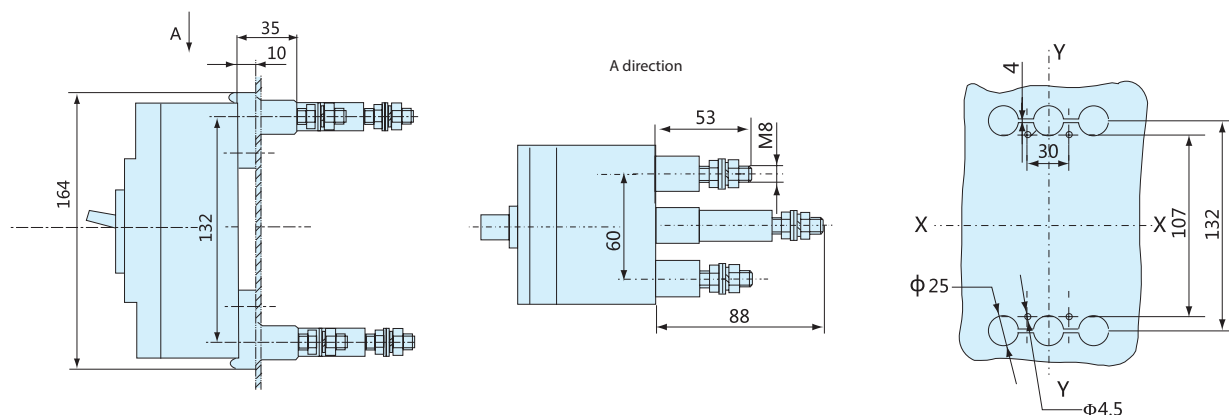
## 6.3 NDM2Z-125 Outline Dimension, Mounting Dimension and Wiring Method

Before-panel wiring  
(two-pole,three-pole)

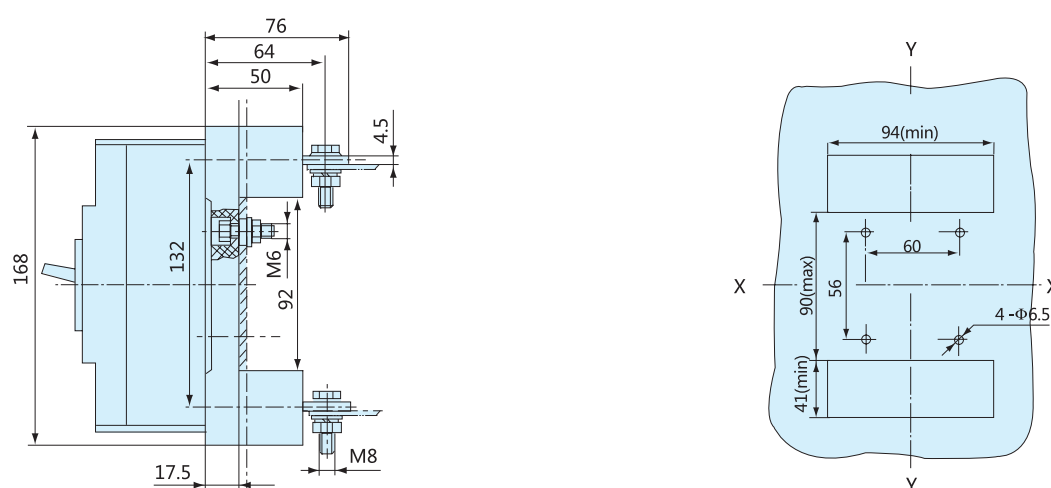
X-X, Y-Y represents the size of opening of before-panel wiring mounting panel at the center of three-pole circuit breaker



X-X, Y-Y represents the size of opening of behind-panel wiring mounting panel at the center of circuit breaker



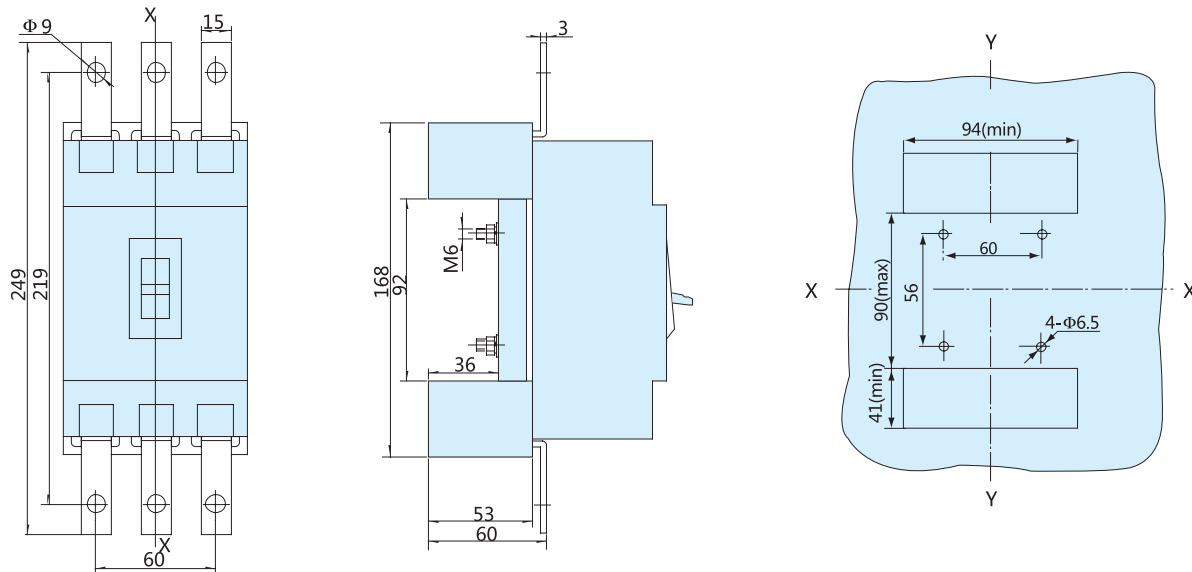
X-X, Y-Y represents the size of plug-in type mounting panel at the center of circuit breaker





Z2Q: Plug-in type before-panel wiring  
(two-pole, three-pole)

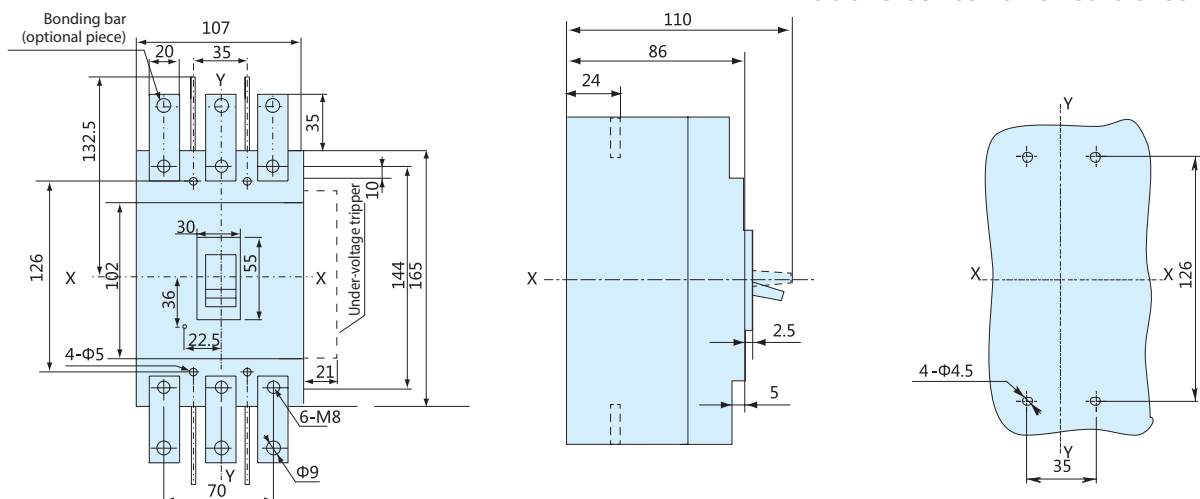
X-X, Y-Y represents the size of plug-in type  
mounting panel at the center of circuit breaker



## 6.4 NDM2Z-250 Outline Dimension, Mounting Dimension and Wiring Method

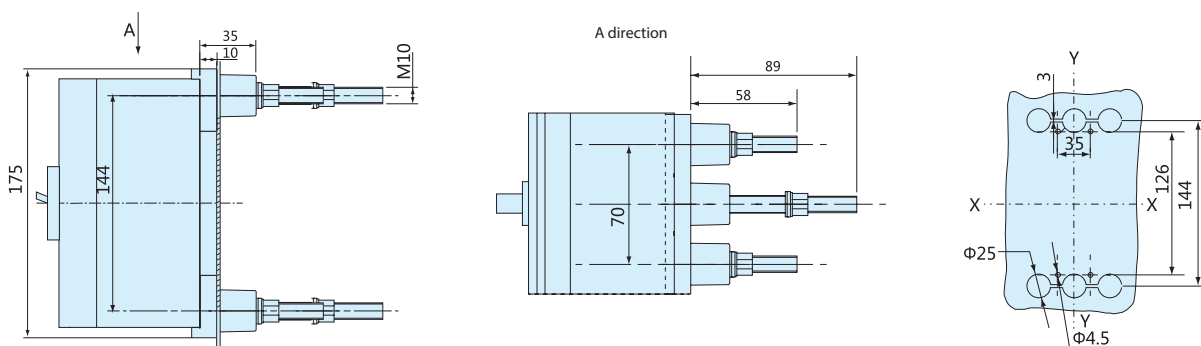
Before-panel wiring  
(two-pole, three-pole)

X-X, Y-Y represents the size of opening  
of before-panel wiring mounting panel  
at the center of circuit breaker



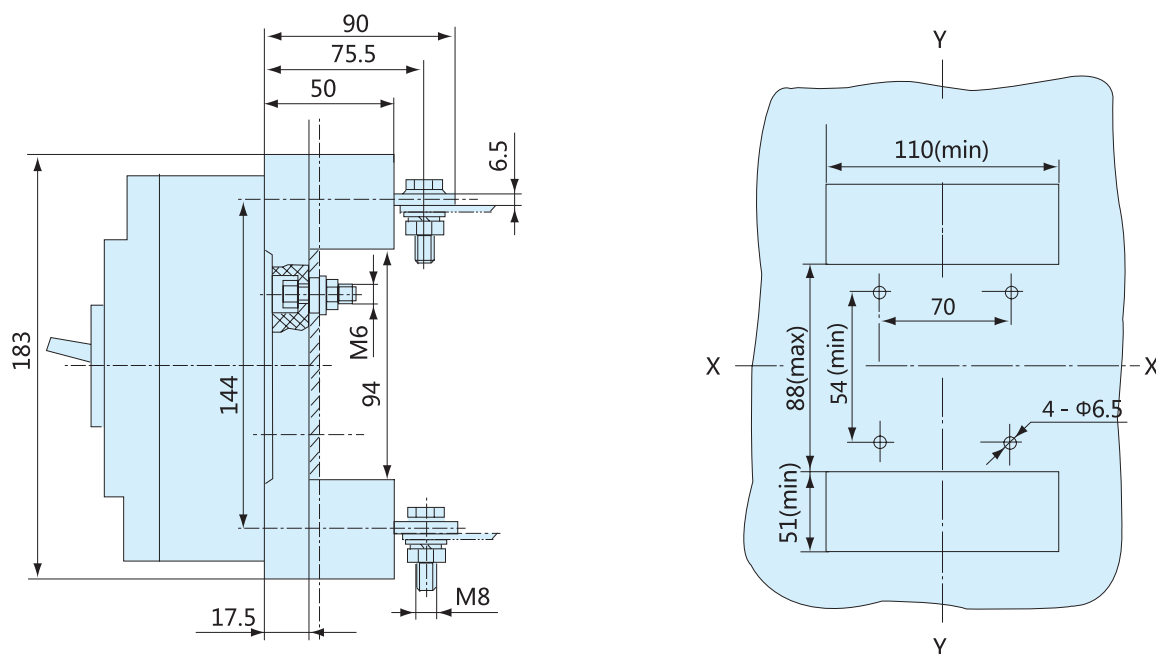
Z1: Behind-panel wiring  
(two-pole or three-pole)

X-X, Y-Y represents the size of opening  
of behind-panel wiring mounting  
panel at the center of circuit breaker

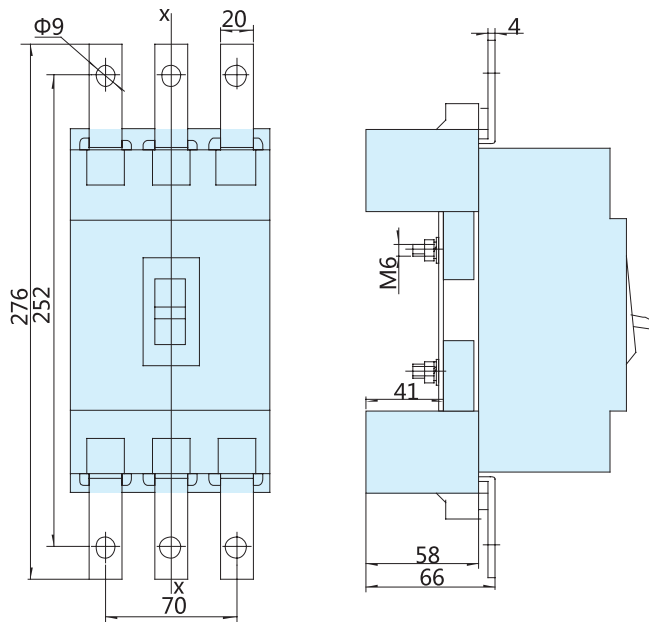


Z2H: Plug-in type behind-panel wiring  
(two-pole or three-pole)

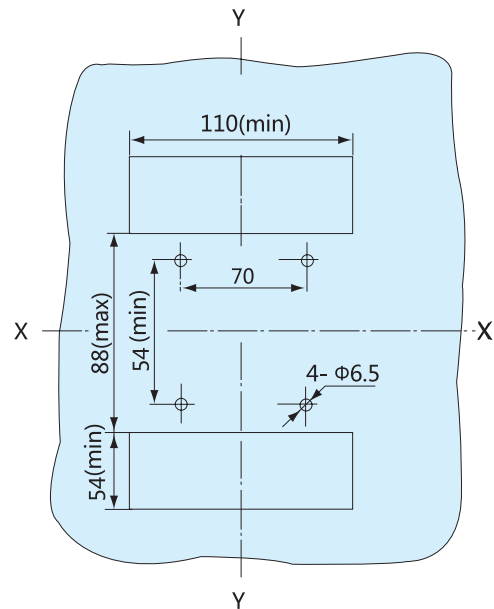
X-X, Y-Y represents the size of plug-in type  
mounting panel at the center of circuit breaker



## Z2Q: Plug-in type before-panel wiring (two-pole, three-pole)

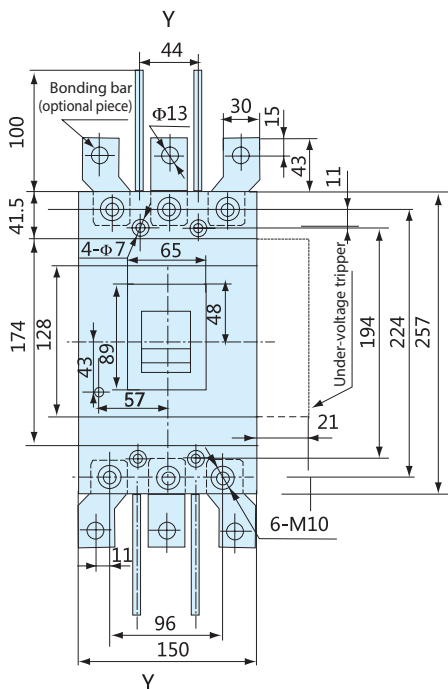


X-X, Y-Y represents the size of plug-in type mounting panel at the center of circuit breaker

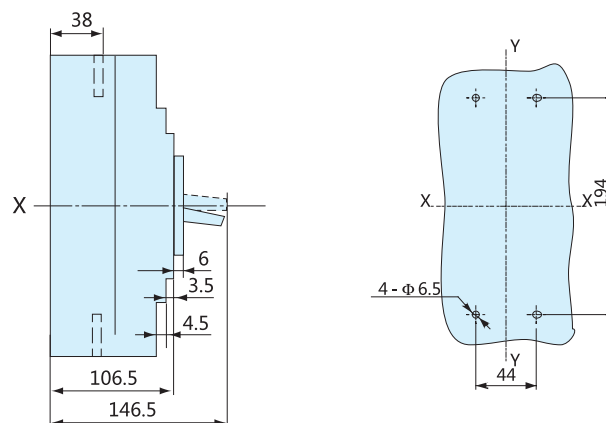


## 6.5 NDM2Z-400 Outline Dimension, Mounting Dimension and Wiring Method

### Before-panel wiring (two-pole,three-pole)

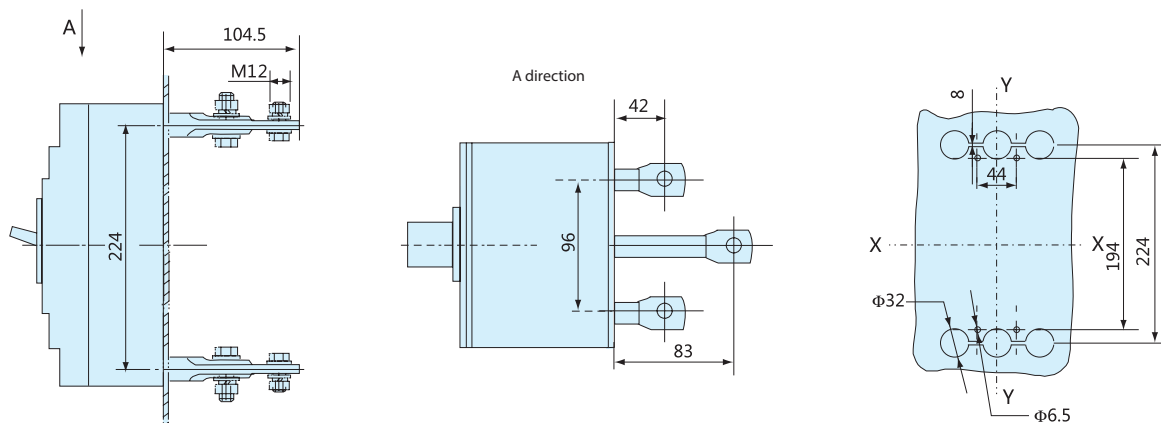


X-X, Y-Y represents the size of opening of before-panel wiring mounting panel at the center of circuit breaker



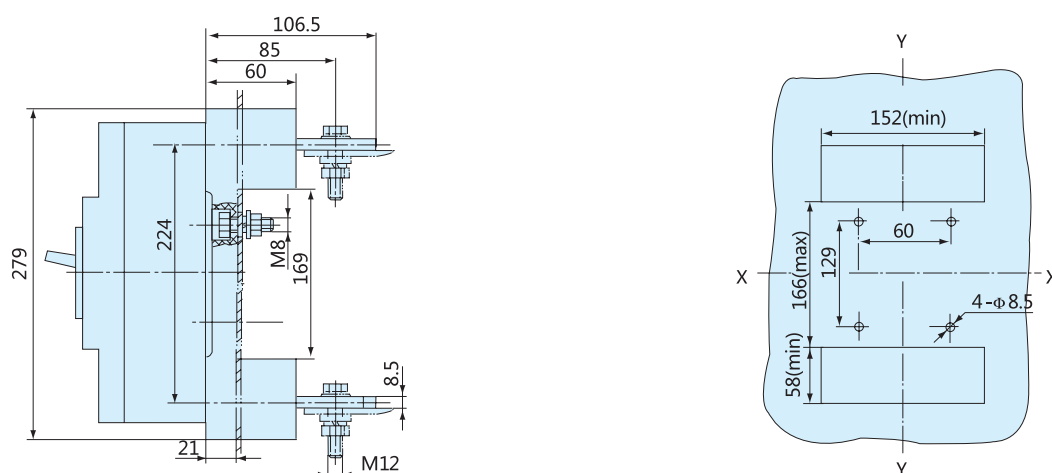
Z1: Behind-panel wiring  
(two-pole or three-pole)

X-X, Y-Y represents the size of opening  
of behind-panel wiring mounting  
panel at the center of circuit breaker



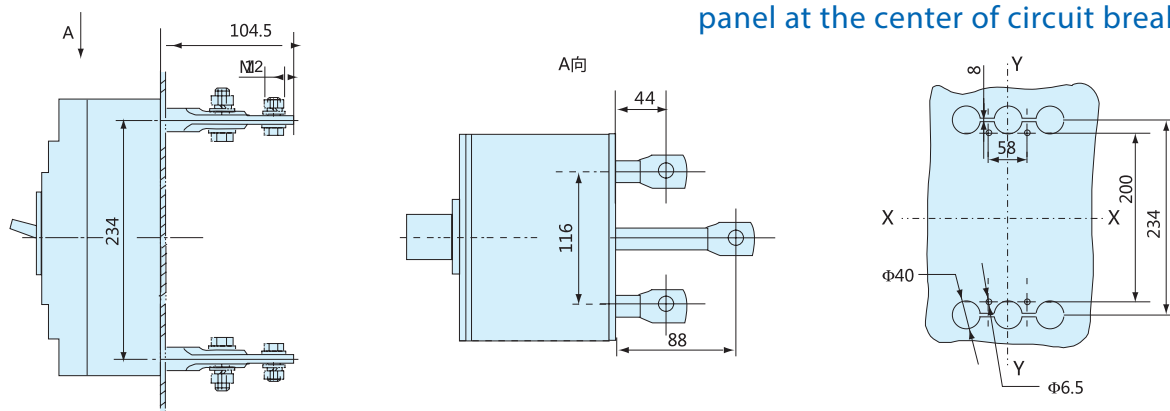
Z2H: Plug-in type behind-panel wiring  
(two-pole or three-pole)

X-X, Y-Y represents the size of plug-in type  
mounting panel at the center of circuit breaker

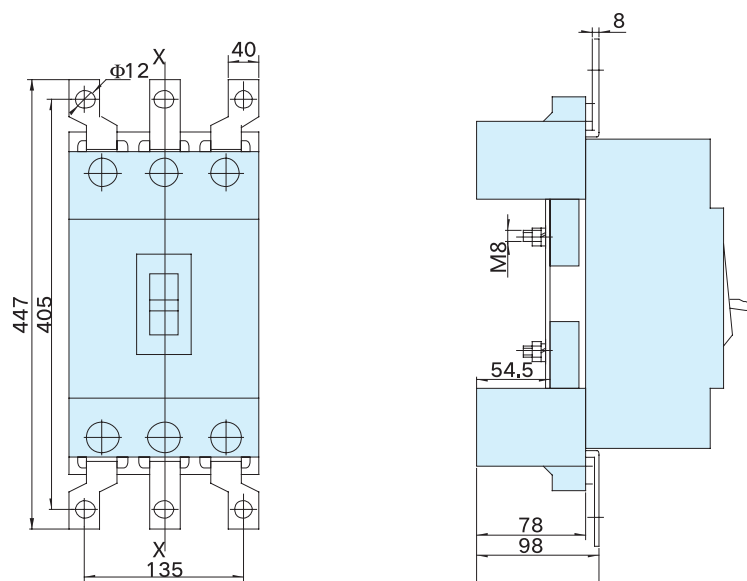
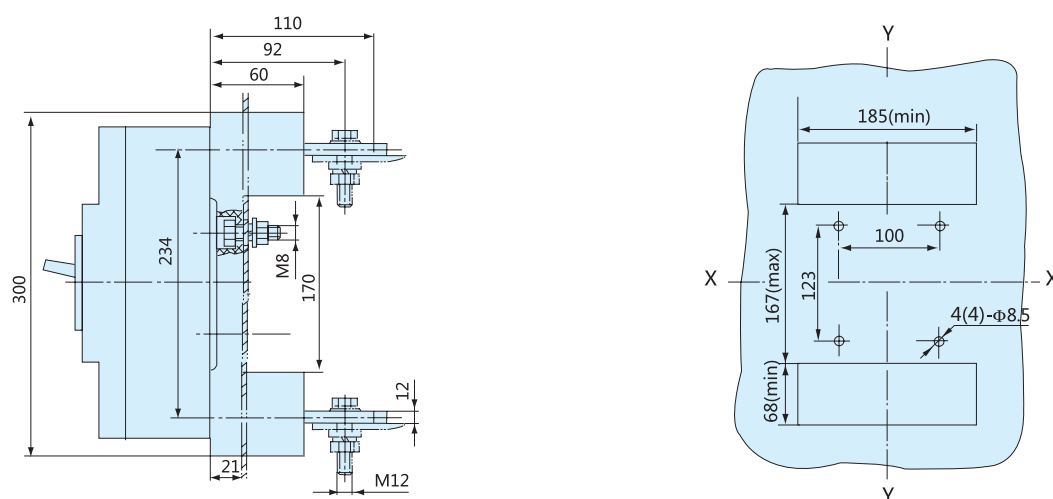




X-X, Y-Y represents the size of opening of behind-panel wiring mounting panel at the center of circuit breaker



X-X, Y-Y represents the size of plug-in type mounting panel at the center of circuit breaker



6.7 Selection of Cross-sectional Areas of Connecting Busbars and Cables

● Selection of busbars

Rated current A	16 20	25	32	40 50	63	80	100	125 140	160	180 200 225	250	315 350	400
Cross-sectional area of conductor mm²	2.5	4.0	6.0	10	16	25	35	50	70	95	120	185	240

● Selection of cable

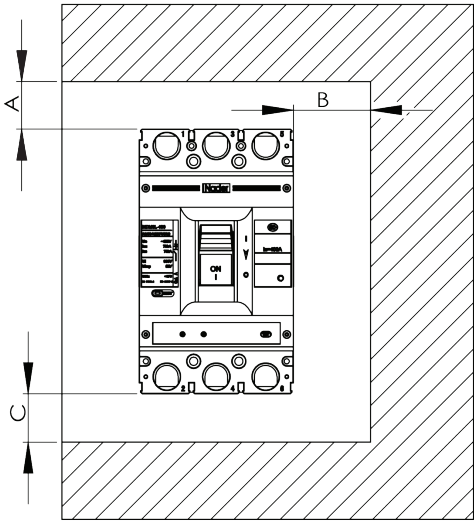
Rated current A	Cross-sectional areas of cables		Copper busbar size	
	Quantity	Sectional area mm²	Quantity	Dimensions mm × mm
500	2	150	2	30 × 5
630	2	185	2	40 × 5

Note 1: Connect to the circuit breaker, and select the appropriate wiring method according to Outline Dimension, Mounting Dimension and Wiring Method;

Note 2: If copper bar is selected for connection, the copper bar cannot be directly connected to the circuit breaker body and extended busbar accessories are required.

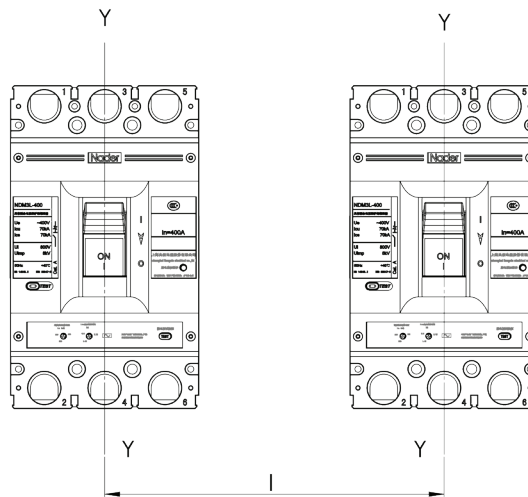
6.8 Safe Distance of Circuit Breaker Mounting

● Insulation distances for installation in a small metal cabinet (unit: mm)



Mounting distance	A (From incoming line end to cabinet surface)		B (Distance from the side to the cabinet)	C (From incoming line end to cabinet surface)
Specifications	With zero flashover cover	Without zero flashover cover		
NDM2Z-63	25	65	30	30
NDM2Z-125	25	65	30	30
NDM2ZX-125	25	65	30	30
NDM2Z-250	25	65	30	30
NDM2Z-400	25	120	35	35
NDM2Z-630	25	120	35	35

● Minimum center distance of row installation room of the circuit breakers

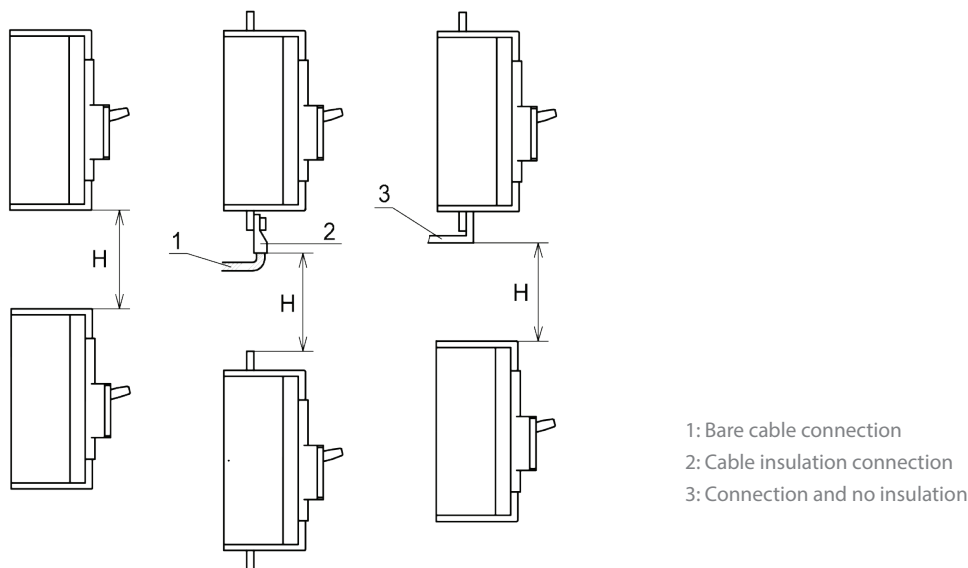


Specifications	Circuit breaker width (mm)		Center distance I (mm)	
	Two-pole	Three-pole	Two-pole	Three-pole
NDM2Z-63	78	78	108	108
NDM2Z-125	92	92	122	122
NDM2ZX-125	64	/	108	/
NDM2Z-250	107	107	137	137
NDM2Z-400	150	150	190	190
NDM2Z-630	182	182	222	222

Note: For installation of circuit breakers in a row or stack, check the connection busbars or cables to ensure the air insulation distance will not be reduced.



● Minimum distance between circuit breakers installed in stack



Specifications	H (distance between the bottom and top of circuit breaker)	
	With zero flashover cover	Without zero flashover cover
NDM2Z-63	90	90
NDM2Z-125	90	91
NDM2ZX-125	90	91
NDM2Z-250	90	93
NDM2Z-400	155	155
NDM2Z-630	155	155

Note: Check whether the zero flashover cover or the interphase barrier is installed in place before energizing.

## 7. Usage and Maintenance

- The characteristics of circuit breaker and accessories are set by the manufacturer; only the trained or certified professional personnel can adjust, install and maintain the circuit breaker, tripping unit and other accessories referring to the circuit design parameters;
- Ensure the power is in the inactive state before installation and removal of any device.
- The handle of circuit breaker can be located at three positions respectively representing the three conditions of closing, disconnection and free tripping. When the handle is at the free tripping position, the handle should be pulled in the disconnection direction. At this time, the circuit breaker could re-buckle and then the switch could be closed.
- Please observe the conditions for storage and use; if the product is damaged or cannot be normally used due to quality problem within 36 months from the date of delivery by the manufacturer, the manufacturer is responsible for free repair or replacement.

## 8. Ordering Instructions

- Please specify the models, specifications and ordering quantity of circuit breakers; when under-voltage tripper, shunt tripper or electrically operated mechanism are used, please indicate the voltage values of operation.
- For example: NDM2Z-125 behind-panel wiring with auxiliary contacts Rated current 80A 10 sets.










# NDM2ZB DC three-stage Moulded case circuit breakers

Edition 2016

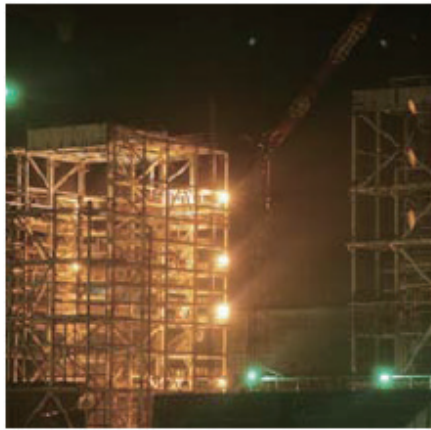
1. Product Overview

						
Frame grade		NDM2ZB-63	NDM2ZB-125	NDM2ZB-250	NDM2ZB-400	NDM2ZB-630
Rated operating current In (A)		40、50、63	40、50、63、 80、100、125	125、160、180 、 200、225、250	225、250、315 、 350、400	400、500、630
Rated operational voltage Ue (DCV)		250	250	250	250	250
Number of poles		2、3	2、3	2、3	2、3	2、3
Rated ultimate short-circuit breaking capacity Icu (kA)	Two-pole string	25	35	35	50	50
	Three-pole string	35	50	50	75	75
Rated running short-circuit breaking capacity Ics (kA)	Two-pole string	25	35	35	50	50
	Three-pole string	35	50	50	75	75
Certification		CCC				

## 2. Product Features

### Scope of application and purpose

NDM2Z series DC moulded case circuit breakers (hereinafter referred to as breakers) are applicable to the circuits with rated operating voltage of DC250V and rated operating current of up to 630A in the DC system application environment. The circuit breakers provide protection function of overload long time delay, short circuit short time delay, short circuit instantaneous protection function, and can protect the circuit and power supply device from damage. The products have been widely used in new energy, electric power, industrial control, real estate, electric and power supply, telecommunication, rail transportation, industrial (public) construction and other industries.



### Structural features


- ◆ The circuit breaker is characterized by high breaking capability, short arcing, vibration resistance, etc.
- ◆ The circuit breaker provides short circuit short time delay function.

### Meeting the following standards

- ◆ GB 14048.1 Low-voltage switchgear and controlgear - Part 1:General rules
- ◆ GB 14048.2 Low-voltage switchgear and controlgear - Part 2:Circuit breakers
- ◆ IEC 60947-1 Low-voltage switchgear and controlgear-Part 1:General rules
- ◆ IEC 60947-2 Low-voltage switchgear and controlgear-Part 2:Circuit-breakers

## 3. Application Scope

### 3.1 Electrical Symbols

The circuit breaker provides isolation function, whose corresponding symbol is: 

### 3.2 Applicable Environment

#### ● Temperature of the working environment

-35°C ~ +70°C, the average value in 24h is not more than +35°C. At +40°C and above, the user needs to run with less load. For derating factors, see “ NDM2ZB MCCB derating factor table ” .

#### ● Storage temperature:

-40°C ~ +75°C 。

#### ● Altitude

The altitude of installation site is  $\leq 2000\text{m}$ , and the derating factors under varied altitudes are shown in “ Table of derating factors of NDM2ZB moulded case circuit breaker under varied altitudes ” ;

#### ● Relative humidity for operation/Relative humidity for storage

At the ambient temperature of +40°C, the relative humidity shall not be more than 50%; for a lower temperature, the humidity may be higher, for example: The relative humidity could be up to 90% at 20°C. Appropriate measures should be taken against frost due to temperature variation.

#### ● Pollution grade

Grade 3

#### ● Installation category

Mounting category of circuit breaker connected to the main circuit is: Category III (power distribution and control level).

Mounting category of circuit breaker not connected to the main circuit is: Class II (load level) .

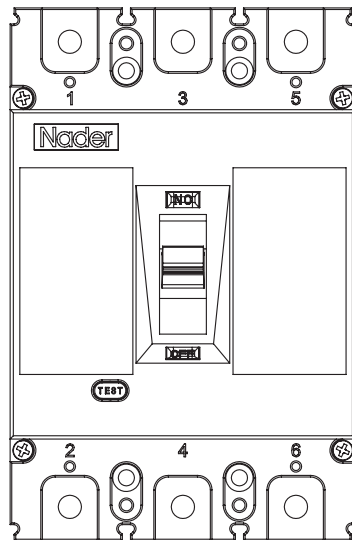
#### ● Installation environment

The product shall be installed in a medium without explosive danger, and the medium is not enough to corrode metal and damage the place where the insulating gas and conducting gas are located, so as to avoid any use in a rainy or snowy place.

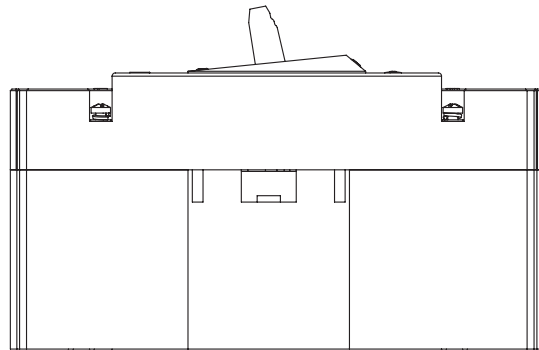
## ● Installation direction

Vertical mounting, the gradient between the mounting plane and the vertical plane should be  $\leq \pm 22.5^\circ$ .

Horizontal mounting.



Vertical installation



Horizontal installation

## 3.3 NDM2ZB Breaker Power Loss Table

Model	Universal current (A)	Three-pole total power loss (W)		
		Before-panel/ behind-panel wiring	Plug-in type before- panel wiring	Plug-in type behind- panel wiring
NDM2ZB-63 Intermittent heating type ( 40~63A )	63	20	-	24
NDM2ZB-125 Intermittent heating type ( 40~100A )	100	35	37	40
NDM2ZB-125 Intermittent heating type ( 125A )	125	39	42	43
NDM2ZB-250 Intermittent heating type (125~225A)	225	62	66	70
NDM2ZB-250 Intermittent heating type ( 250A )	250	67	73	73
NDM2ZB-400 Intermittent heating type ( 225~400A )	400	115	120	125
NDM2ZB-630 Intermittent heating type ( 400~630A )	630	187	-	200



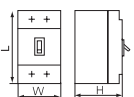
## 4. Technical Characteristics of the Product

## 4.1 Description of Specifications and Models

ND	M	2	<div><div></div></div> - <div><div></div></div>	<div><div></div></div> / <div><div></div></div>	<div><div></div></div>	<div><div></div></div> - <div><div></div></div> - <div><div></div></div>	<div><div></div></div>				
1	2	3	4	5	6	7	8	9	10	11	12
Serial No.	Serial No. name		NDM2								
1	Enterprise code		ND: <b>Nader</b> brand low-voltage apparatus								
2	Product code		M: Moulded case circuit breakers								
3	Design serial No.		2								
4	Code of Use class		ZB: DC moulded case circuit breaker with short circuit short time delay protection								
5	Frame grade Rated current		See Table 1								
6	Operation mode		No code: Direct operation by handle								
			P: Electrically operated								
			Z: Turning handle								
7	Number of poles		2, 3								
8	Overload tripper code		2: Instantaneous tripper + short time delay tripper								
			3: Instantaneous tripper + short time delay tripper								
9	Accessory code		See Table 2								
10	Wiring method code		No code: Normal								
			P: Extended busbar								
			Type JK:Incoming line terminal Wiring:Wiring box type, wiring at the outgoing line end:Before-panel wiring type								
			Type CK: Incoming line terminal Wiring: Before-panel wiring type, wiring at the outgoing line end: Wiring frame								
			Type K: Wiring at the incoming/outgoing line end: Wiring frame								
			Z1: Behind-panel wiring								
			Z2Q: Plug-in type before-panel wiring								
			Z2H: Plug-in type behind-panel wiring								
			J: Mechanical interlock								
11	Short time delay time		10: 10ms 30: 30ms 60: 60ms								
12	Rated current		See Table 1								

## 4.2 Technical Parameters

Table 1 Table of main performance parameters of circuit breaker

Model		NDM2ZB-63		NDM2ZB-125		NDM2ZB-250		NDM2ZB-400		NDM2ZB-630	
Frame grade Current $I_{nm}$ (A)		63		125		250		400		630	
Rated current $I_n$ (A)		40、50、63		40、50、63、80、100、125		125、160、180、200、225、250		225、250、315、350、400		400、500、630	
Rated insulation voltage $U_i$ (V)		1000		1000		1000		1000		1000	
Rated impulse withstand voltage $U_{imp}$ (V)		8000		8000		8000		8000		8000	
Power frequency withstand voltage $U$ (1 minute) (V)		3500		3500		3500		3500		3500	
Use class		A		A		B		B		B	
Short time withstand current $I_{cw}$		1.5		2.5		5		5		8	
Pole string		2	3	2	3	2	3	2	3	2	3
Rated operational voltage $U_e$ DC (V)		250	250	250	250	250	250	250	250	250	250
Rated ultimate short-circuit breaking capacity $I_{cu}$ (kA)		25	35	35	50	35	50	50	75	50	75
Rated running short-circuit breaking capacity $I_{cs}$ (kA)		25	35	35	50	35	50	50	75	50	75
Operating performance	Electrical life	2000	2000	1500	1500	1500	1500	1000	1000	1000	1000
	Mechanical life	10000	10000	8500	8500	8500	8500	4000	4000	4000	4000
Outline dimension 	L	135	135	150	150	165	165	257	257	270	270
	W	78	78	92	92	107	107	150	150	182	182
	H	81.5	81.5	87	87	103	103	106.5	106.5	110	110
Flashover distance (mm)		≤50		≤50		≤50		≤100		≤100	
Wiring mode		Conventional、P、Z1、Z2Q、Z2H		Conventional、P、JK、CK、K、Z1、Z2Q、Z2H		Conventional、P、JK、CK、K、Z1、Z2Q、Z2H		Conventional、P、Z1、Z2Q、Z2H		Conventional、P、Z1、Z2Q、Z2H	

● Table of derating factors of NMD2ZB series moulded case circuit breaker under varied temperatures

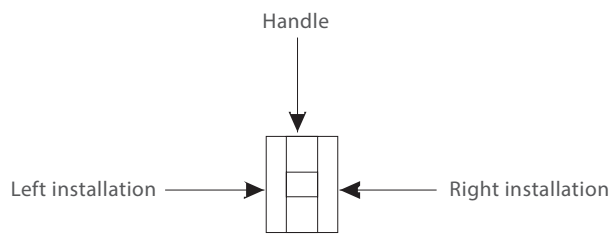
Serial No.	Frame grade Rated current (A)	Derating factors corresponding to temperatures						
		40°C	45°C	50°C	55°C	60°C	65°C	70°C
1	63	1	0.979	0.958	0.937	0.915	0.893	0.871
2	125	1	0.977	0.954	0.931	0.907	0.883	0.858
3	250	1	0.982	0.963	0.944	0.924	0.904	0.882
4	400	1	0.981	0.962	0.942	0.922	0.901	0.879
5	630	1	0.979	0.958	0.937	0.915	0.893	0.871

Note: When the ambient temperature is below 40°C, the product can be used normally, with no derating capacity.

● Table of derating factors of NDM2ZB moulded case circuit breaker under varied altitudes

Altitude (m)	2000	2500	3000	3500	4000	4500	5000
Operating current correction factor	$I_n$	$I_n$	$0.98I_n$	$0.97I_n$	$0.96I_n$	$0.95I_n$	$0.94I_n$
Operating current correction factor	$U_e$	$U_e$	$0.83U_e$	$0.77U_e$	$0.71U_e$	$0.67U_e$	$0.63U_e$
Power frequency withstand voltage correction factor	$U$	$U$	$0.89U$	$0.85U$	$0.80U$	$0.77U$	$0.73U$

## 4.3 Comparison Table of Accessory Codes



### Legend:
































-  Single auxiliary contact
-  Double auxiliary contacts
-  Alarm contact
-  Shunt tripper
-  Under-voltage tripper
-  Auxiliary contact (Single accessory integrates auxiliary and alarm functions)

Table 2 Comparison table of tripping method accessory codes

Accessory code	Accessories Name	Installation location		Model		NDM2ZB-63		DM2ZB-125		DM2ZB-250		DM2ZB-400		DM2ZB-630	
		Number of poles				2	3	2	3	2	3	2	3	2	3
00	No					—		—		—		—		—	
10	Shunt tripper														
20	Double auxiliary contacts														
21	Single auxiliary contact														
08	Alarm contact														
58	Auxiliary alarm contact														

## 4.4 Product Tripping Curve

### ● NDM2ZB product overload protection characteristics

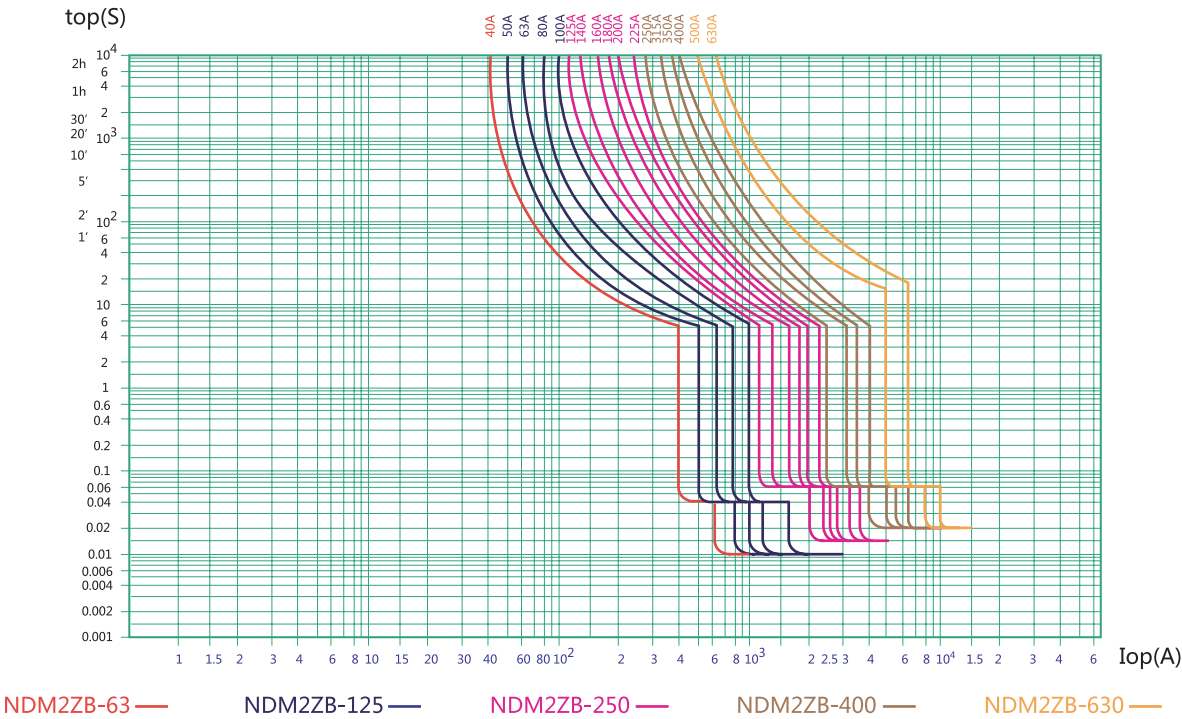
Rated current of tripper (A)	Thermal tripper (ambient temperature is +40°C)	
	1.05I <sub>n</sub> (cold state) non-operating time (h)	1.3I <sub>n</sub> (thermal state) operating time (h)
10≤I <sub>n</sub> ≤63	1	1
63≤I <sub>n</sub> ≤630	2	2

● NDM2ZB product short circuit protection characteristics

Model	NDM2ZB-63	NDM2ZB-125	NDM2ZB-250	NDM2ZB-400	NDM2ZB-630
Short time delay operating current Factory setting value	18In +6.5% -20%	18In +6.5% -20%	18In +6.5% -20%	18In +6.5% -20%	18In +6.5% -20%
Short time short circuit current	10In ± 20%	10In ± 20%	10In ± 20%	10In ± 20%	10In ± 20%
Short circuit short time delay operating time setting time t ms	10、30、60	10、30、60	10、30、60	30、60	30、60
Allowable shortage of short circuit short time delay operating time setting t ms	5%	5%	5%	5%	5%

Note 1: Short circuit time delay operating time does not mean full breaking time of circuit breaker. It only means increased delay time based on the instantaneous full breaking to reliably provide selective protection.

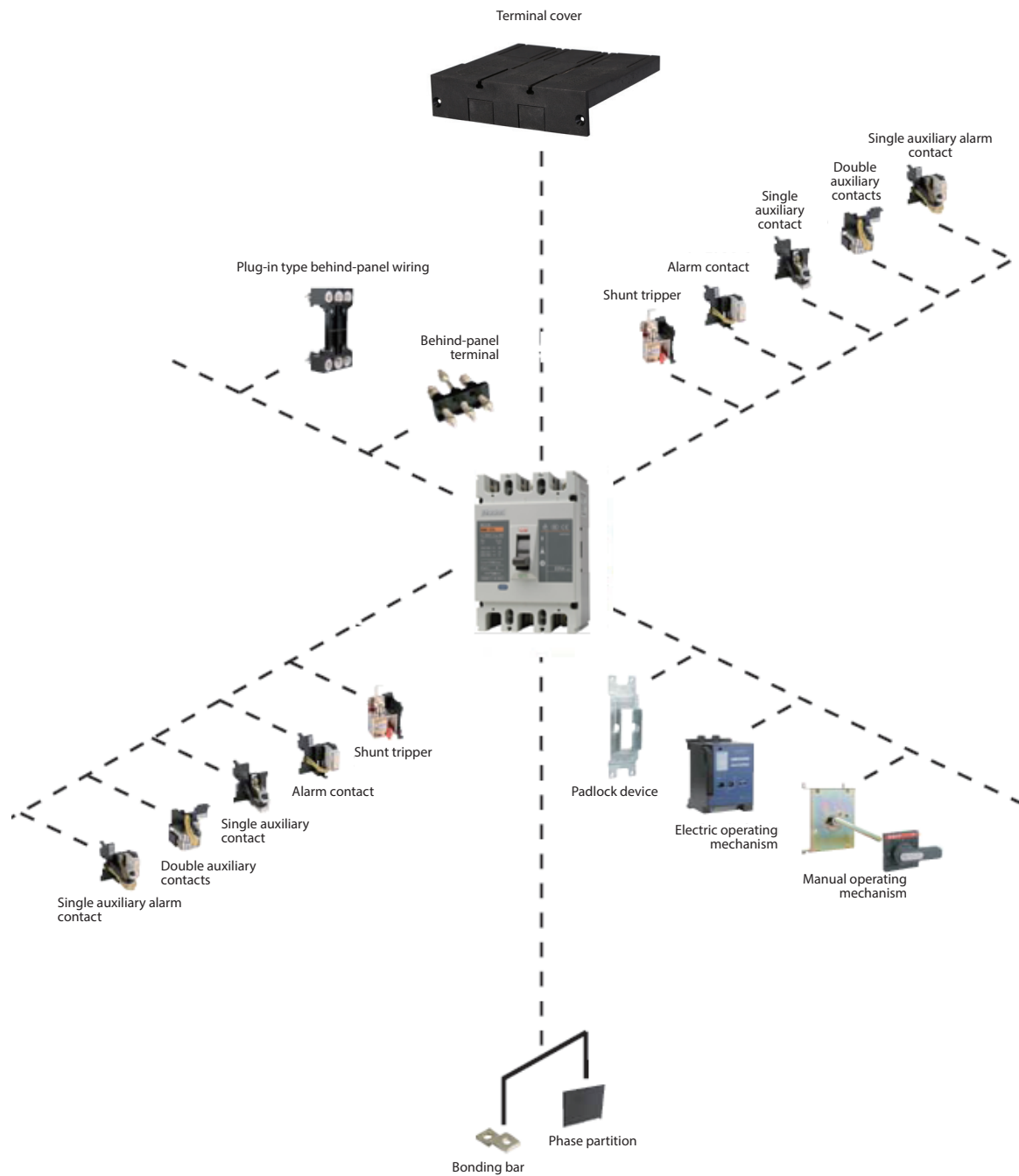
● NDM2ZB actuation characteristic curves



Note: Iop: Operating current of tripper top: Operating time of tripper

## 5. Accessories

### 5.1 List of Accessories



5.2 Accessories Function Description

5.2.1 Auxiliary contact

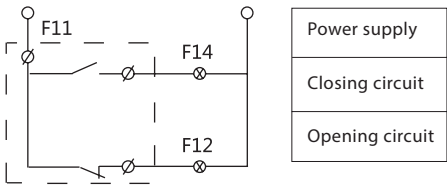
● Auxiliary contacts and combinations

The breaker is at the “opening” or “free tripping” position	Double auxiliary contacts	F14 F12 F11 F24 F22 F21
	Single auxiliary contact	F14 F12 F11
The breaker is at the “closing” position		
“Closing” switches to “opening”, “opening” switches to “closing”		

● Auxiliary contact current parameters

Frame grade Rated current	Conventional heating current 1th	Rated operational current at AC 400V
Inm≤225	3A	0.30A
Inm>225	3A	0.40A

● Electrical life of auxiliary contact



● Auxiliary contact wiring diagram

Use class	Switch on			Breaking			Frequency	Operation frequency (time(s)/hour)	Conduction time
	I/Ie	I/Ie	cos φ	I/Ie	U/Ue	cos φ			
AC-15	10	1	0.3	1	1	0.3	6050	360	≥0.05s
DC-13	1	1	6Pe	1	1	6Pe			≥T0.95

● Connection and breaking capacity of auxiliary contact

Use class	Switch on			Breaking			Frequency	Operation frequency (time(s)/hour)	Conduction time
	I/Ie	I/Ie	cos φ	I/Ie	U/Ue	cos φ			
AC-15	10	1	0.3	1	1	0.3	10	120	≥0.05s
DC-13	1	1	6Pe	1	1	6Pe			

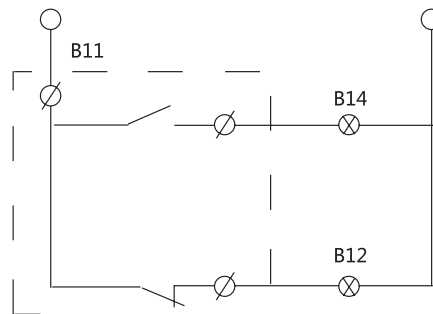
## 5.2.2 Alarm contact

### ● Alarm contacts and their combinations (alarm contacts $U_e = 220V$ , $I_{th} = 3A$ )

The circuit breaker is at the position of “opening” or “closing”	
The circuit breaker is at the “free tripping” position	

### ● Auxiliary contact wiring diagram

In the case of proper closing or opening of circuit breaker, the contact does not operate; only after free tripping (or fault tripping) will the original state of contact be changed, which means normally open switches to closed and normally closed switches to open; after re-buckle of the circuit breaker, the contact is restored to the original position.



## 5.2.3 Under-voltage tripper

★ At 35%~70% of rated control power voltage, the under-voltage tripper should operate reliably to disconnect the circuit breaker. When it is less than 35% of the rated voltage, closing of circuit breaker should be reliably prevented. When the power supply voltage is equal to or greater than 85% of rated voltage, it should be ensured that the circuit breaker is closed.

★ Control voltage: AC 50Hz 230V 400V  
DC 110V 220V

★ Note: The under-voltage tripper must be energized first in order to re-buckle and close the circuit breaker, otherwise it will damage the circuit breaker.

★ Instantaneous current and power consumption of shunt tripper

Product models	Instantaneous current value (A)		Power consumption (W)	
	AC 400V	AC 230V	AC 400V	AC 230V
NDM2ZB-63	10	13.5	4	3.105
NDM2ZB-125	9.75	14.25	3.95	3.2275
NDM2ZB-250	10.88	14.75	4.352	3.392
NDM2ZB-400	9	11	3.6	2.53
NDM2ZB-630	8.5	11	3.4	2.53



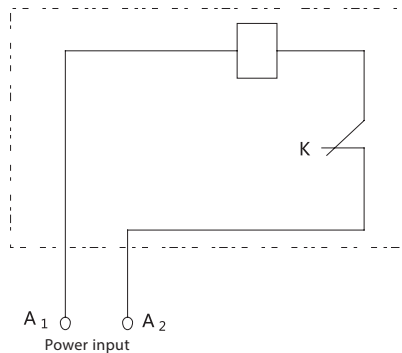
## 5.2.4 Shunt tripper

Usually installed at Phase A of circuit breaker; at 70%~110% of rated control voltage, the shunt tripper should enable the circuit breaker to trip reliably under all operations.

Control voltage: AC 50Hz 230V 400V

DC DC 24V low power consumption, 24V, 220V

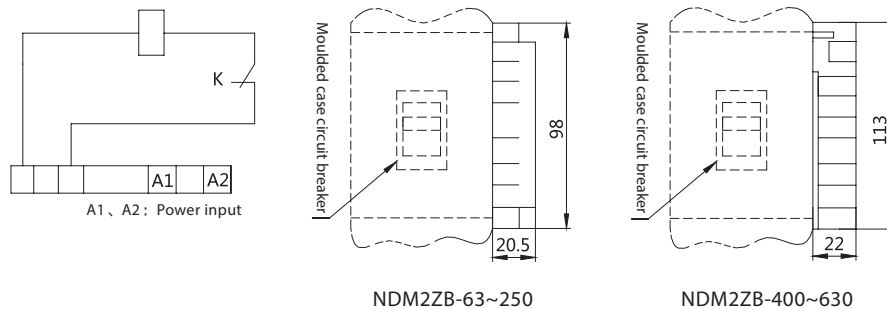
### ● Shunt tripper wiring diagram



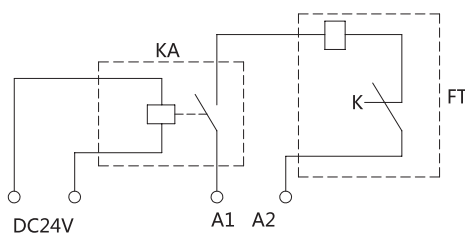
When the control circuit power supply is DC24V and the power is lower than 80W, it is possible to use low power shunt tripper or add intermediate relay.

### ● DC24V low power shunt tripper wiring diagram and outline dimension of external ceiling rose

The normal operating power of DV24V low power shunt tripper is as low as 15W, which substantially meet the requirements of all DC24V control circuits. The low power shunt has a plug-in junction box, whose outline dimension is shown below.



### ● DC24V control power wiring diagram



KA : DC24V relay with electric shock capacity of 1A

FT : AC220V/380V Shunt tripper

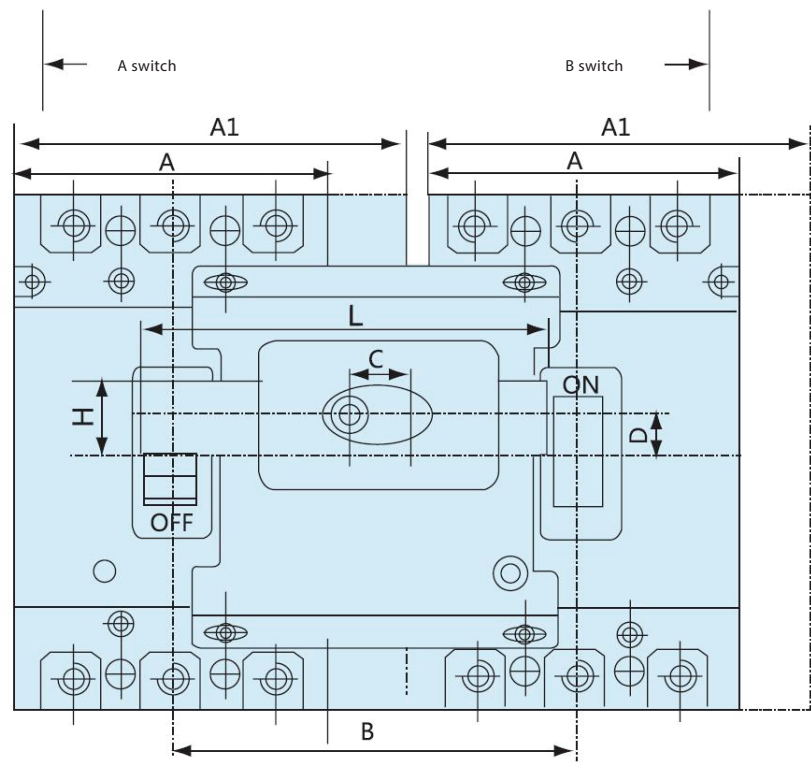
The rated voltage of FT is the power input voltage of A1 and A2

● Instantaneous current and power consumption of shunt tripper

Product models	Instantaneous current value (mA)				Power consumption (W)				
	AC400V	AC230V	DC220V	DC24V	AC400V	AC230V	DC220V	DC24V	DC24V (Low power consumption)
NDM2ZB-63	0.28	0.434	0.341	4	91.6	76.1	90.7	96.2	15
NDM2ZB-125	0.288	0.425	0.341	4	96.8	73	90.7	91.2	15
NDM2ZB-250	0.313	0.412	0.341	3.87	112	68.8	90.7	85.3	15
NDM2ZB-400	0.197	0.325	0.4	3.87	67	62.3	94.4	100	15
NDM2ZB-630	0.199	0.314	0.4	3.87	68	58.2	94.4	100	15

5.3 Mechanical Interlock

5.3.1 Functions and sizes of external accessories

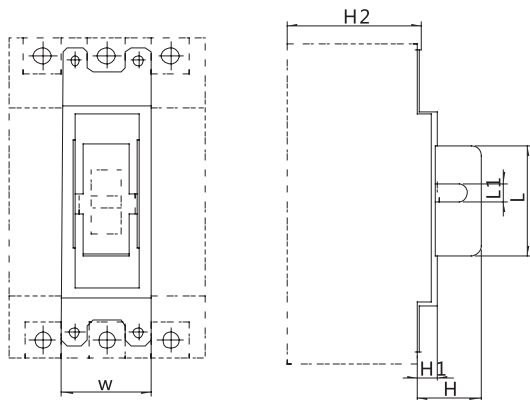


● Mechanical interlocking mechanism and related dimensions

Product models	A	A1	B	C	D	L	H
NDM2ZB-63/2P	78	—	102	38	13	118	22
NDM2ZB-125/2P	92	—	120	50	12	118	22
NDM2ZB-250/2P	107	—	135	50	14	135	22
NDM2ZB-400/2P	150	—	180	60	18	188	30
NDM2ZB-630/2P	182	—	235	60	16	240	28
NDM2ZB-63/3P	—	103	132	38	13	118	22
NDM2ZB-125/3P	—	122	152	50	12	118	22
NDM2ZB-250/3P	—	142	173	50	14	135	22
NDM2ZB-400/3P	—	198	230	60	18	188	30
NDM2ZB-630/3P	—	240	295	60	16	240	28

### 5.3.2 Locking device

#### ● MS1 locking mechanism installation diagram

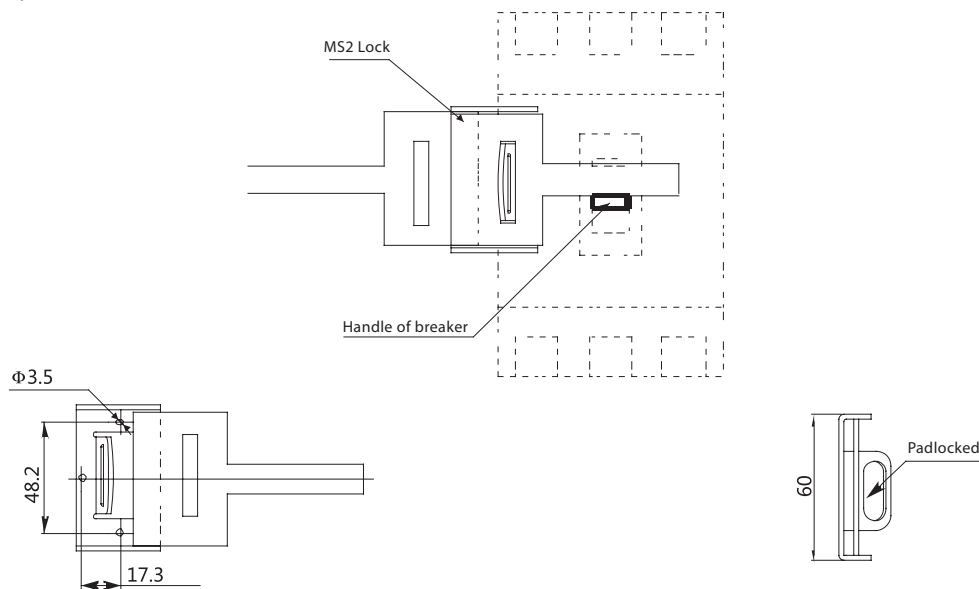


MS1 is an integral lock device (which means the locking device and the circuit breaker share the mounting screws during the co-installation), aiming at preventing closing and opening operations due to human error; at present, there are only 125 and 250 available; the installation dimensions are shown in the following figure and table (the dotted part in the figure is the circuit breaker part).

Product models	W	L	L1	H	H1	H2
NDM2ZB-125	42	55	9	24	4	62
						81.5
NDM2ZB-250	52	66	9	26	4	82
						99

#### ● MS2 lock installation diagram

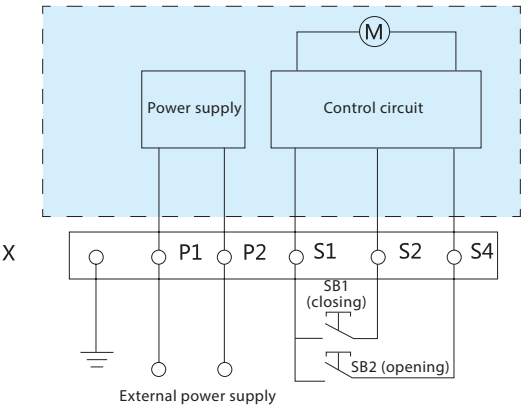
MS2 is a split lock (which means the device is installed on the left or right of the front cover of circuit breaker) and is used for NDM2, aiming at preventing closing and opening operations due to human error (the dotted part is the circuit breaker part).



5.3.3 Electric operating mechanism

● CD2 electric operating mechanism (equipped with NDM2ZB-63~630 series)

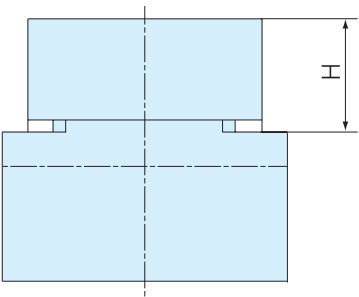
- ◆ Wiring diagram (The circuit breaker external accessory wiring diagram is in the dotted box)



Symbol instruction:  
SB1, SB2 operating button (prepared by users)  
X terminal block  
P1 and P2 are external power supply

- ◆ Voltage specification:  
AC 50Hz 110V、230V、400V  
DC24V、110V、220V

CD2 Electric operating mechanism

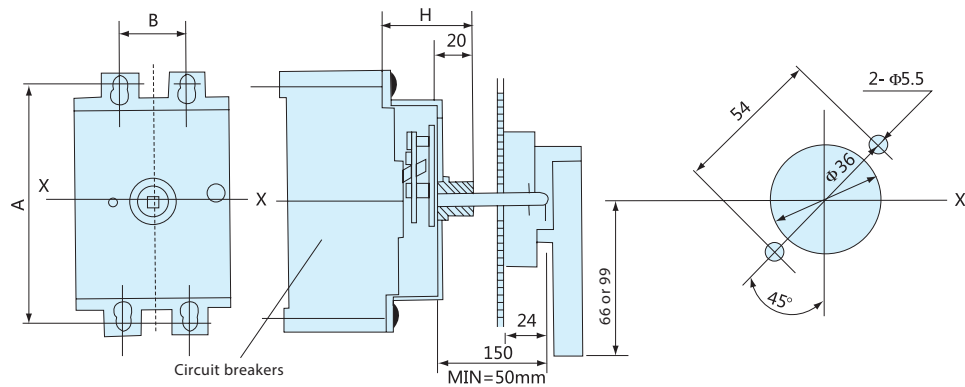


● Technical parameters of CD2 electrically operated mechanism

Working current	auxiliary breakers (A)	Electric power (W)	Life/times	Operating mechanism height (mm)
NDM2ZB-63	≤ 0.5	14	14000	90.5
NDM2ZB-125	≤ 0.5	14	14000	92
NDM2ZB-250	≤ 0.5	14	10000	92
NDM2ZB-400	≤ 2	35	5000	142
NDM2ZB-630	≤ 2	35	5000	153

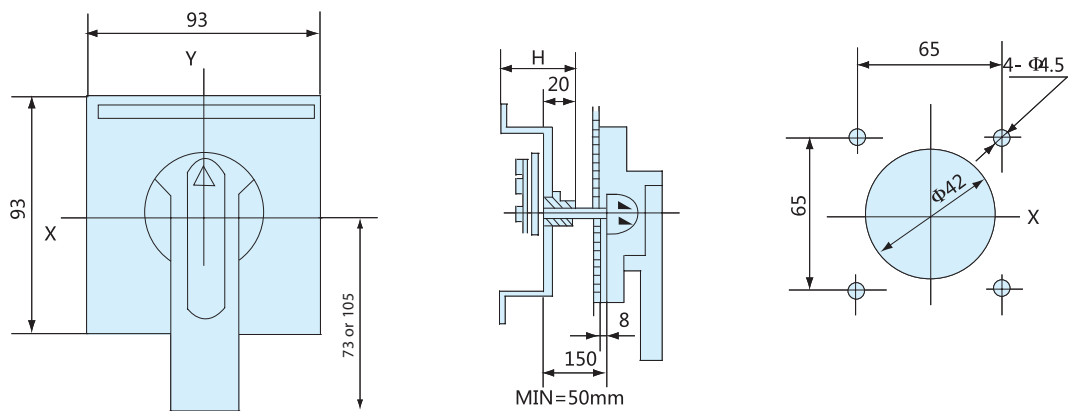
### 5.3.4 Manual operating mechanism

#### ● CS1-A type handle mounting opening diagram

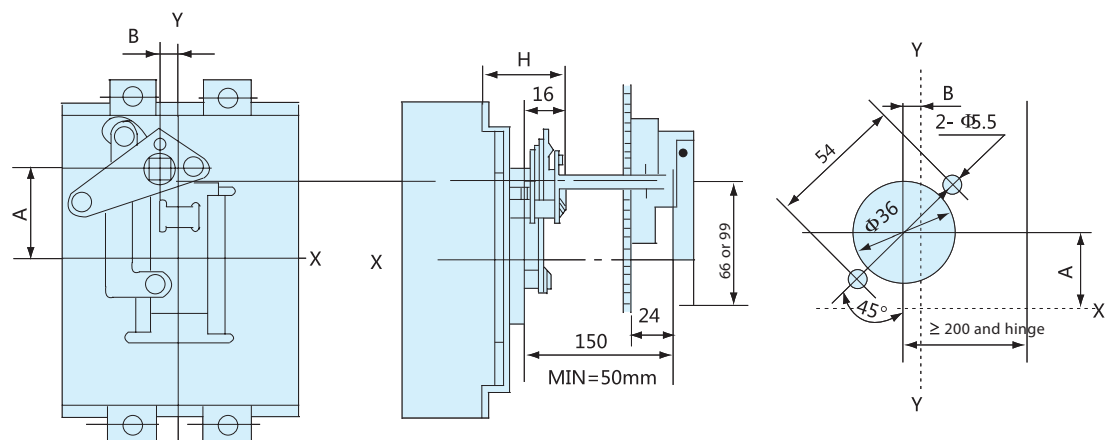


Note: A type is a round handle F type is a square handle

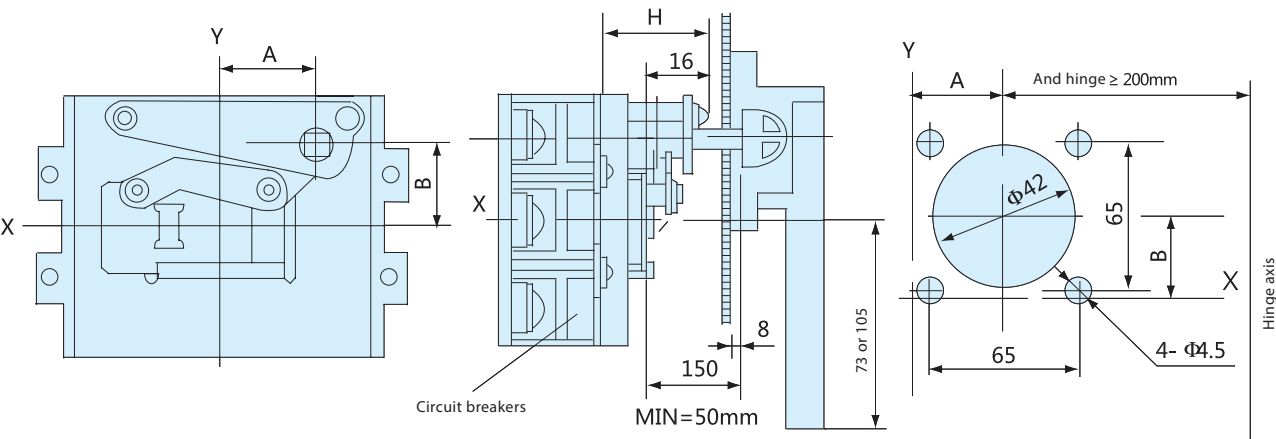
#### ● CS1-F type handle mounting opening diagram



#### ● CS2-A type handle mounting opening diagram



CS2-F type handle mounting opening diagram



Installation method and outline dimension of shape accessories

External accessories	External accessory model	Equipped with circuit breaker	Manual installation dimensions: mm				Installation mode
			H	A	B		
					2P	3P	
Manual operating mechanism	CS1-63	NDM2ZB-63	49	100	25		Vertical mounting
	CS1-100	NDM2ZB-125	49	104	30		
	CS1-225	NDM2ZB-250	55	143	35		
	CS1-400	NDM2ZB-400	76	194	137	185	
	CS1-630	NDM2ZB-630	83	81	171	229	Horizontal mounting
	CS2-100	NDM2ZB-125	46	35	11.5		Vertical mounting
	CS2-100	NDM2ZB-125	46	37	11.5		Horizontal mounting
	CS2-225	NDM2ZB-250	48	35	31		Vertical mounting
	CS2-225	NDM2ZB-250	48	45	32		Horizontal mounting
	CS2-400	NDM2ZB-400	61	65	15		Vertical mounting
	CS2-630	NDM2ZB-630	61	67.5	15		Horizontal mounting

### 5.3.5 Interlocking mechanism

#### ● Definition and characteristics

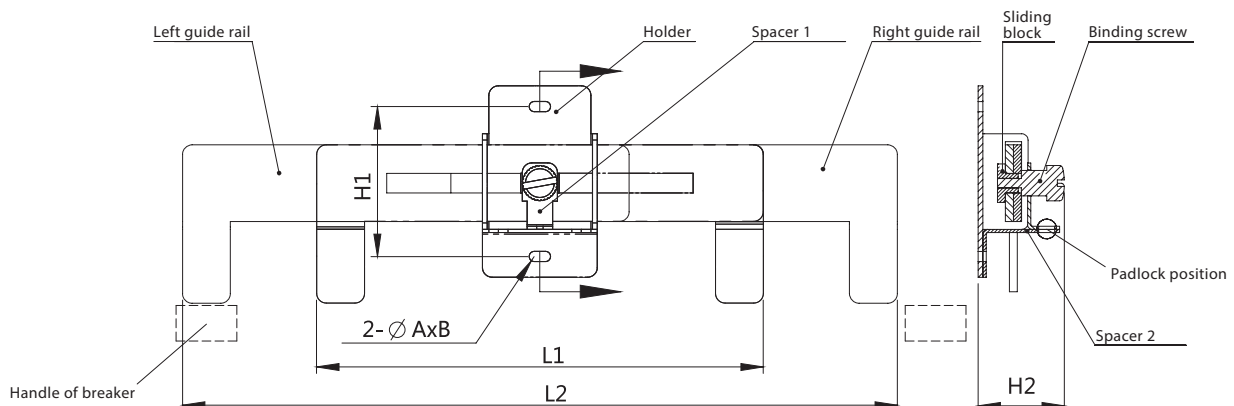
The interlocking mechanism can provide reliable interlocking of two circuit breakers. It features simple structure, easily operation and reliable interlocking, and can provide reliable interlocking of two circuit breakers with frame size current of 63~630A. It can also ensure one of the two circuit breakers is at the closing position and the other is at the opening position, and provide padlock function.

#### ● Operating instructions

- ★ Adjust the position of the guide rail of the mechanism based on the center distance of two circuit breaker handles so that the left (right) guide rail is stopped on the handle of one circuit breaker to ensure the circuit breaker is at the closing position and the right (left) rail could not affect the closing and opening of the other circuit breaker. Tighten the fastening screws so that the positions of right and left guide rails are fixed.
- ★ Adjust the guide rail of the mechanism to the position for locking the circuit breaker handle and use the padlock to lock the spacers 1 and 2 when necessary.
- ★ Use bolts through two mounting holes on the bracket to fix the interlocking mechanism on the installation panel or cabinet bracket.

( Note: The padlock spacer is an accessory, which may be specified in the order if necessary; the padlock is prepared by user )

#### ● Outline dimension



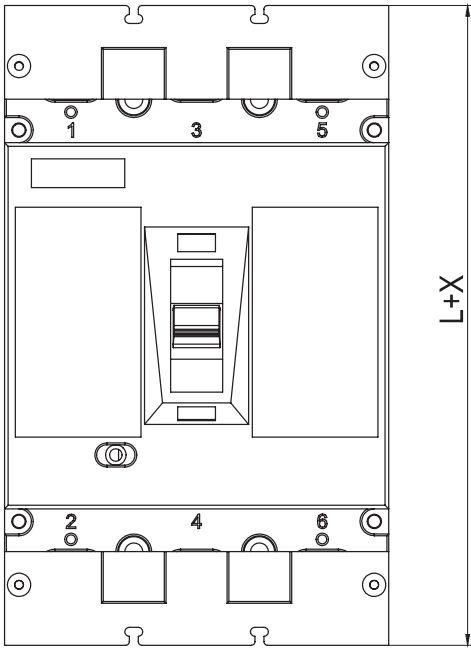
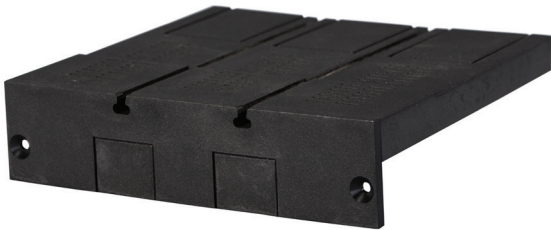
Outline dimension	L1	L2	H1	H2	A	B	Remarks
Type 250	140	225	47	25	6.5	10	Applicable to NDM2ZB-63, 125, 250
Type 630	210	320	75	33	9	12.5	Applicable to NDM2ZB-400, 630



5.3.6 Terminal cover

● Zero flashover cover

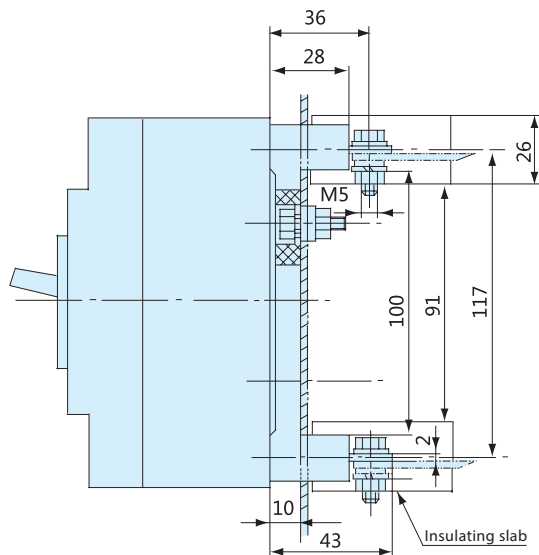
The terminal covers are mounted on both sides of the product to provide zero flashover function for the product, whose heights and widths are consistent with the product and lengths are shown in the following table.



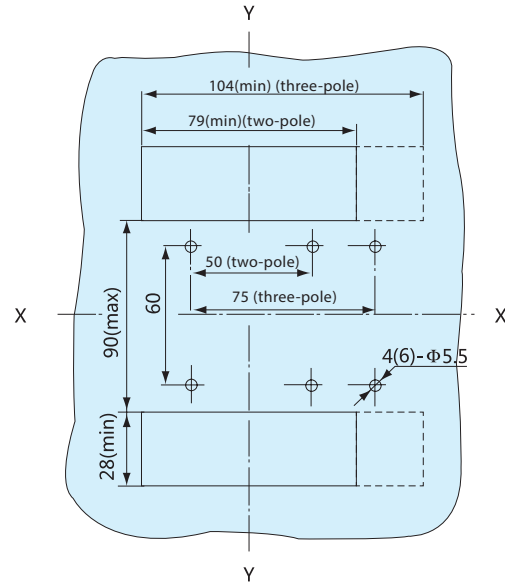
Product series	Model	Body length L	Increased length of terminal cover X	Length after addition of terminal cover Lx
NDM2ZB	NDM2ZB-125	150	12	162
	NDM2ZB-250	165	19	184
	NDM2ZB-400	257	19	276
	NDM2ZB-630	270	19	289



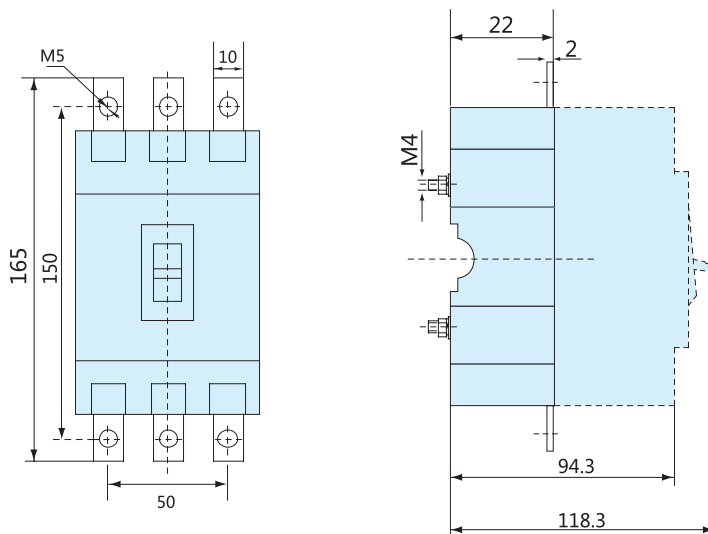
**Z2H: Plug-in type behind-panel wiring**  
(two-pole or three-pole)



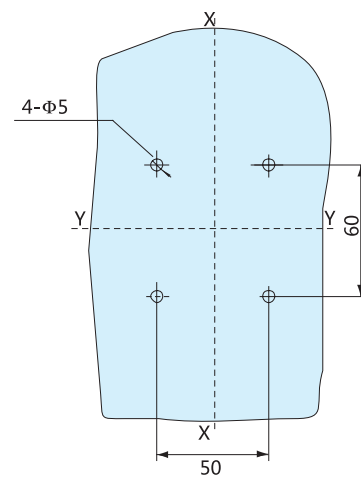
X-X, Y-Y represents the size of plug-in type mounting panel at the center of three-pole circuit breaker



**Z2Q: Plug-in type before-panel wiring**  
(two-pole)

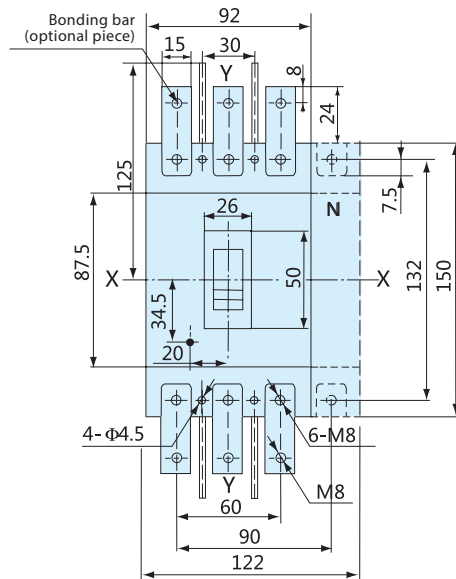


X-X, Y-Y represents the size of plug-in type mounting panel at the center of circuit breaker

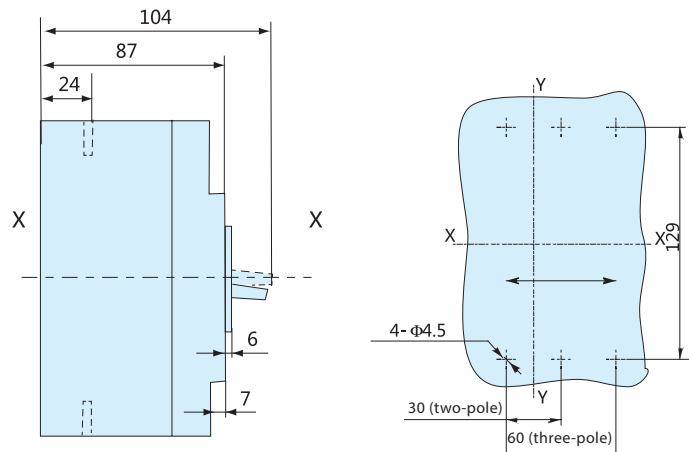


## 6.2 NDM2ZB-125 Outline Dimension, Mounting Dimension and Wiring Method

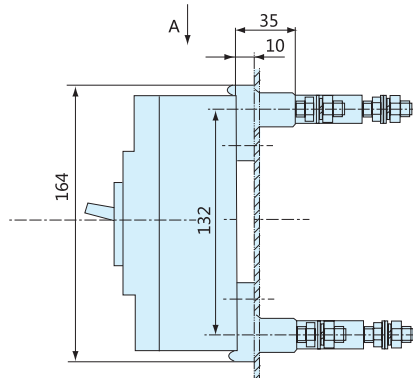
Before-panel wiring  
(two-pole, three-pole)



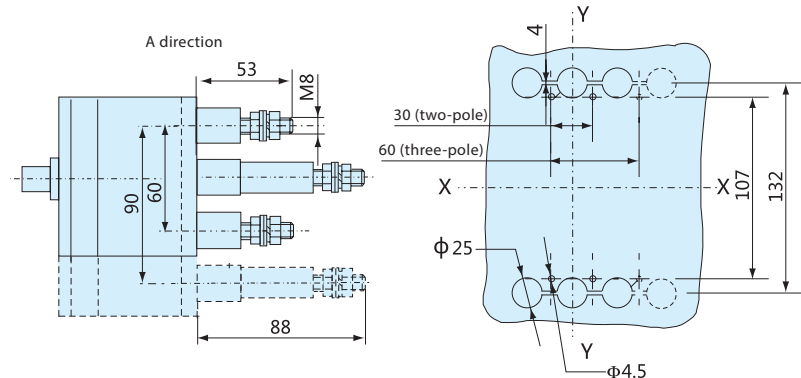
X-X, Y-Y represents the size of opening of  
before-panel wiring mounting panel at  
the center of three-pole circuit breaker



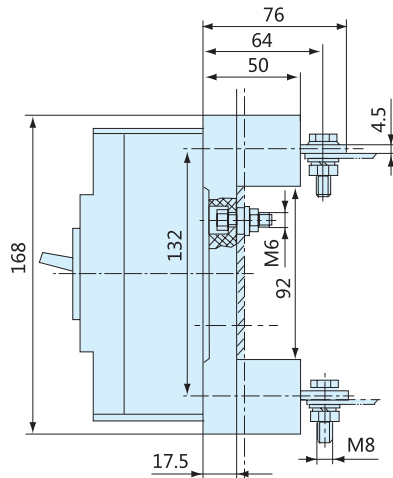
Z1: Behind-panel wiring  
(two-pole or three-pole)



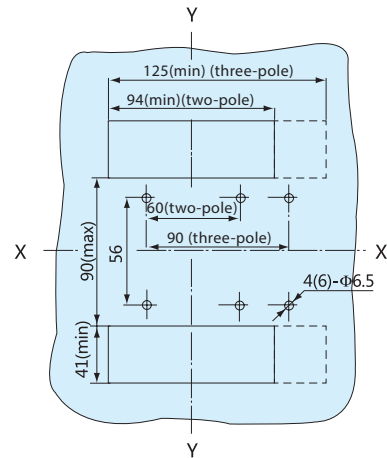
X-X, Y-Y represents the size of opening of  
of behind-panel wiring mounting panel  
at the center of circuit breaker



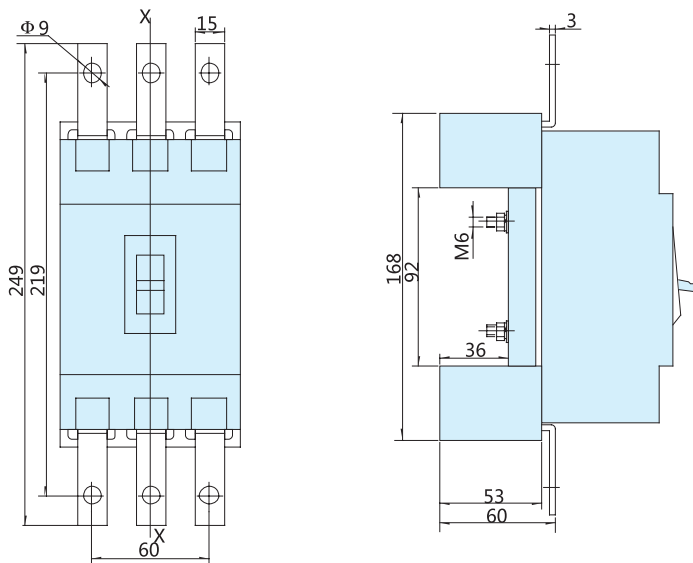
**Z2H: Plug-in type behind-panel wiring  
(two-pole or three-pole)**



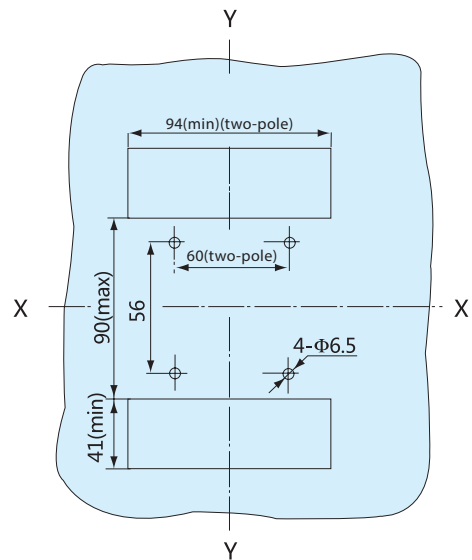
**X-X, Y-Y represents the size of plug-in type mounting panel at the center of three-pole circuit breaker**



**Z2Q: Plug-in type before-panel wiring  
(two-pole)**



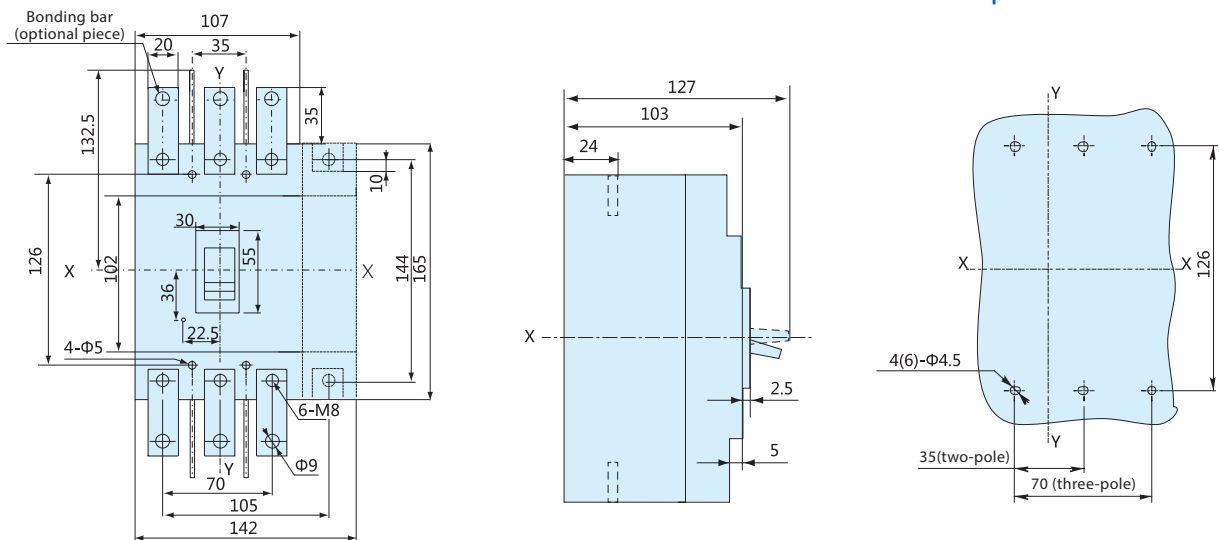
**X-X, Y-Y represents the size of plug-in type mounting panel at the center of circuit breaker**



## 6.3 NDM2ZB-125 Outline Dimension, Mounting Dimension and Wiring Method

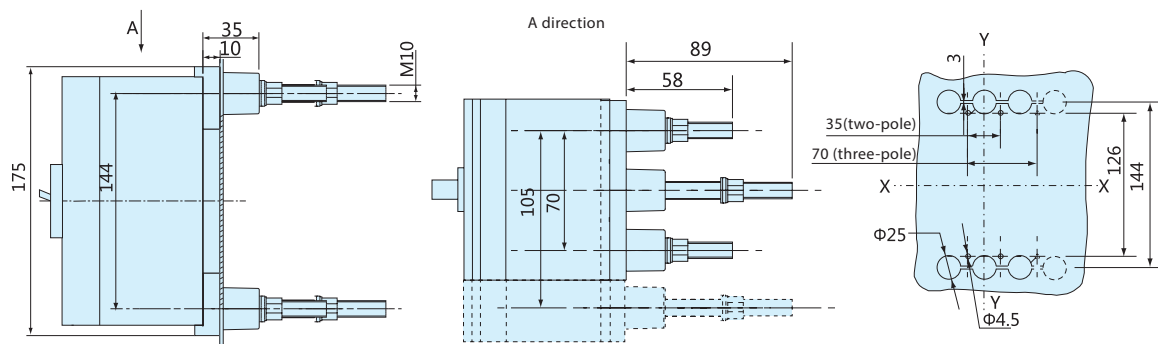
Before-panel wiring (two-pole,three-pole)

X-X, Y-Y represents the size of opening of  
before-panel wiring mounting panel at  
the center of three-pole circuit breaker

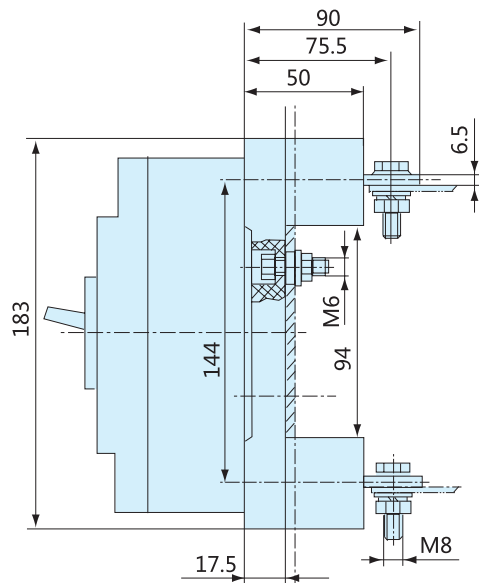


Z1: Behind-panel wiring  
(two-pole or three-pole)

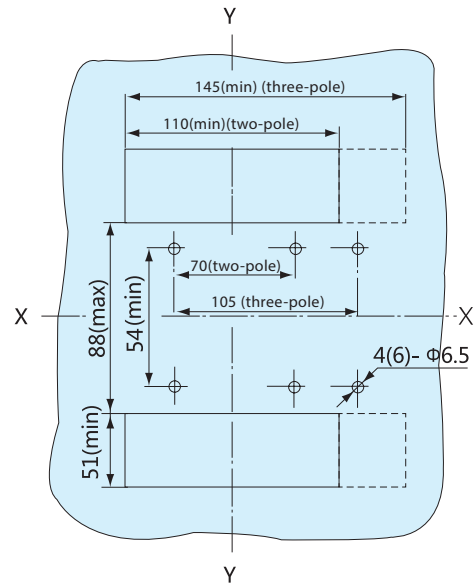
X-X, Y-Y represents the size of opening of  
behind-panel wiring mounting  
panel at the center of circuit breaker



Z2H: Plug-in type behind-panel wiring  
(two-pole or three-pole)

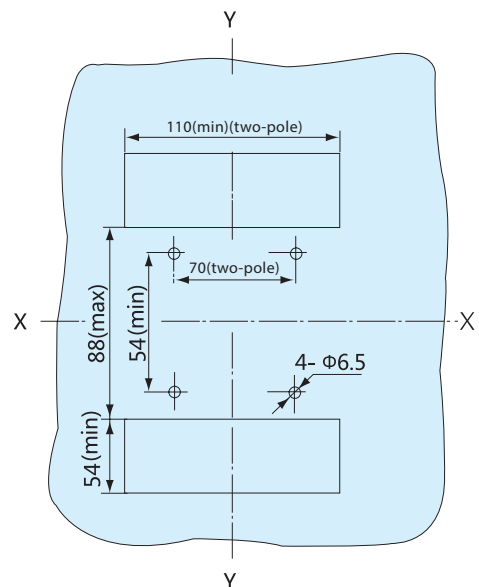
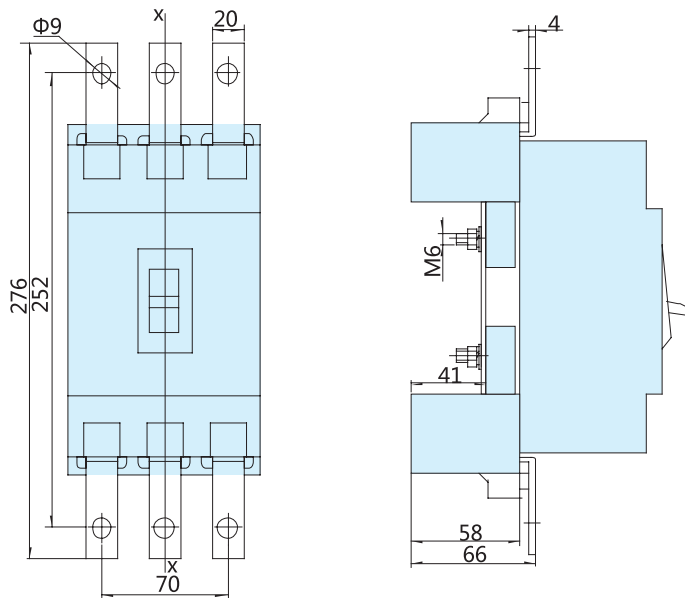


X-X, Y-Y represents the size of  
plug-in type mounting panel at  
the center of circuit breaker



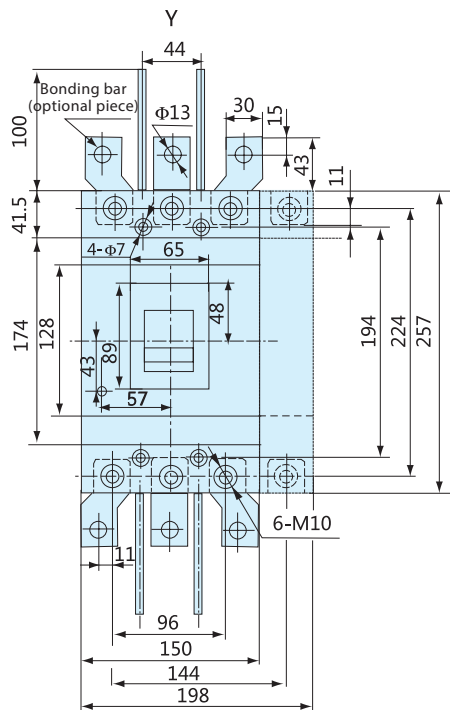
Z2Q: Plug-in type before-panel wiring  
(two-pole)

X-X, Y-Y represents the size of plug-in type  
mounting panel at the center of circuit breaker

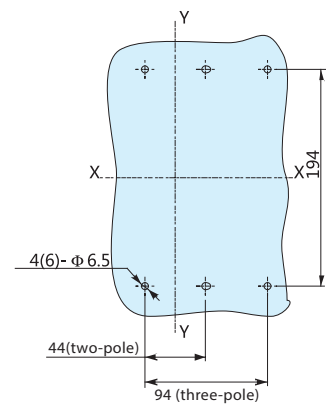
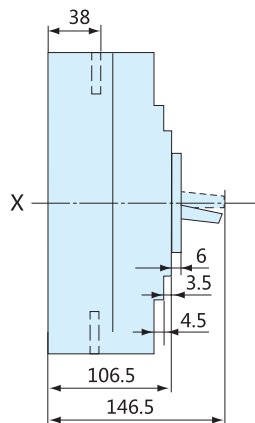


## 6.4 NDM2ZB-250 Outline Dimension, Mounting Dimension and Wiring Method

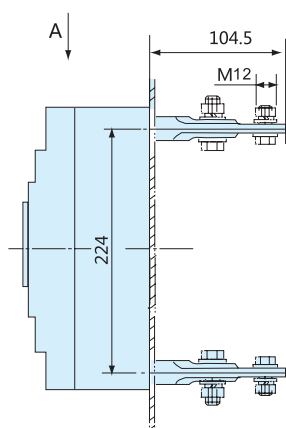
Before-panel wiring (two-pole,three-pole)



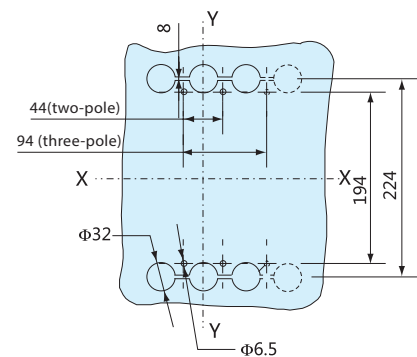
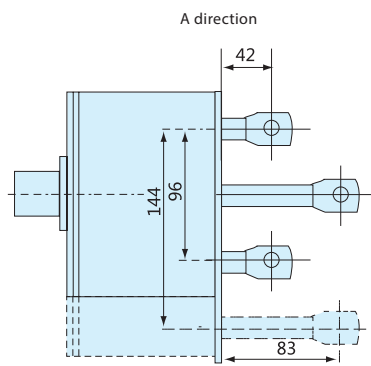
X-X, Y-Y represents the size of opening of before-panel wiring mounting panel at the center of three-pole circuit breaker



Z1: Behind-panel wiring  
(two-pole or three-pole)

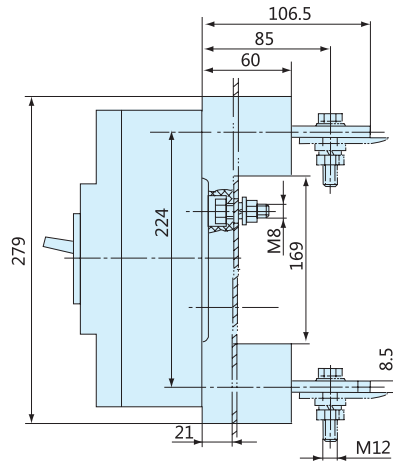


X-X, Y-Y represents the size of opening of behind-panel wiring mounting panel at the center of circuit breaker

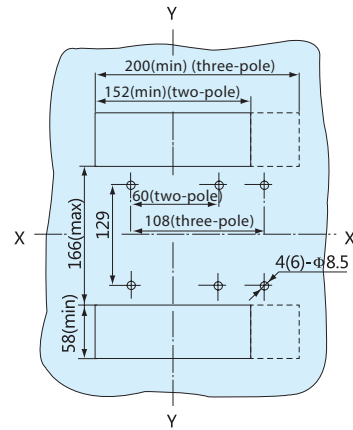




**Z2H: Plug-in type behind-panel wiring  
(two-pole or three-pole)**

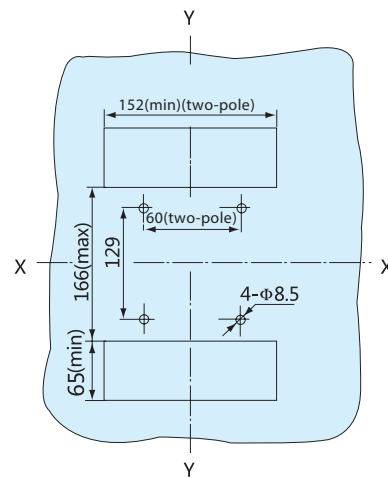
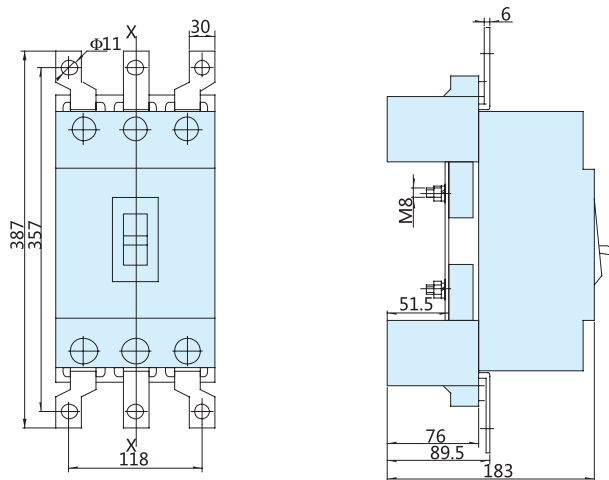


X-X, Y-Y represents the size of plug-in type mounting panel at the center of circuit breaker



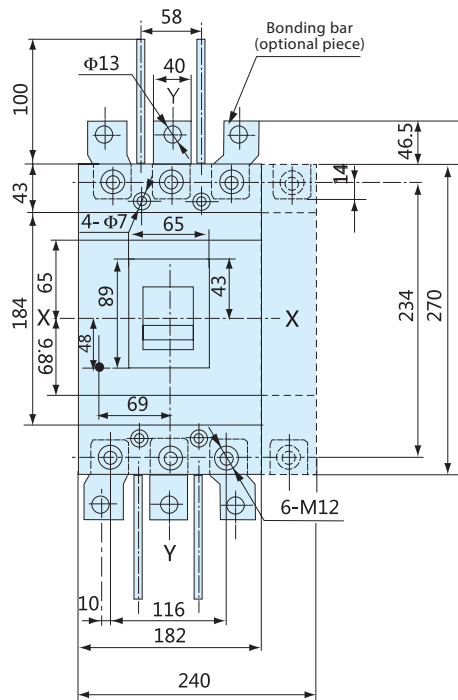
**Z2Q: Plug-in type before-panel wiring  
(two-pole)**

X-X, Y-Y represents the size of plug-in type mounting panel at the center of circuit breaker

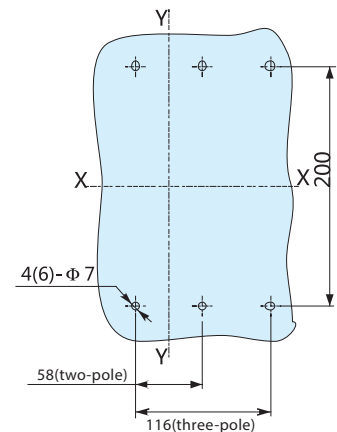
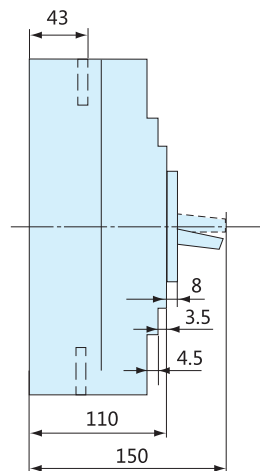


## 6.5 NDM2ZB-250 Outline Dimension, Mounting Dimension and Wiring Method

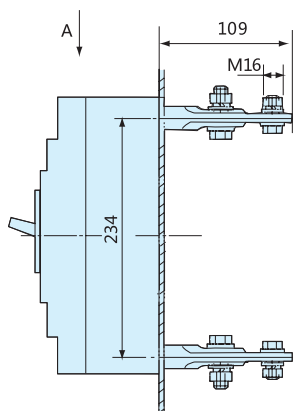
Before-panel wiring (two-pole,three-pole)



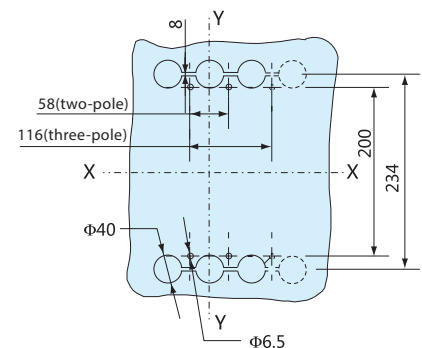
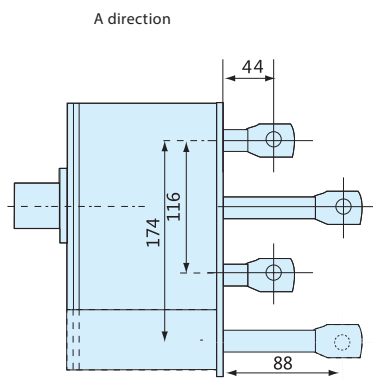
X-X, Y-Y represents the size of opening of before-panel wiring mounting panel at the center of three-pole circuit breaker



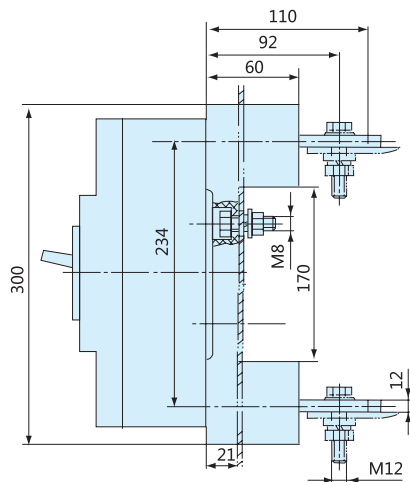
Z1: Behind-panel wiring  
(two-pole or three-pole)



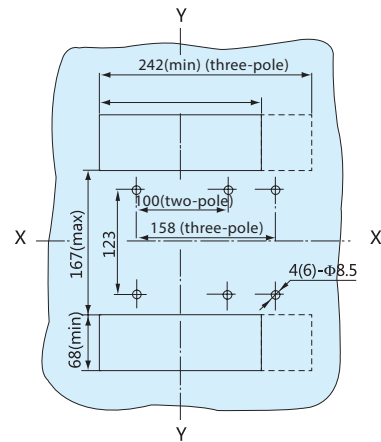
X-X, Y-Y represents the size of opening of behind-panel wiring mounting panel at the center of circuit breaker



**Z2H: Plug-in type behind-panel wiring**  
(two-pole or three-pole)

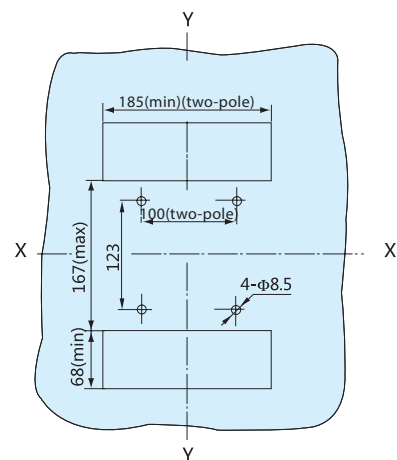
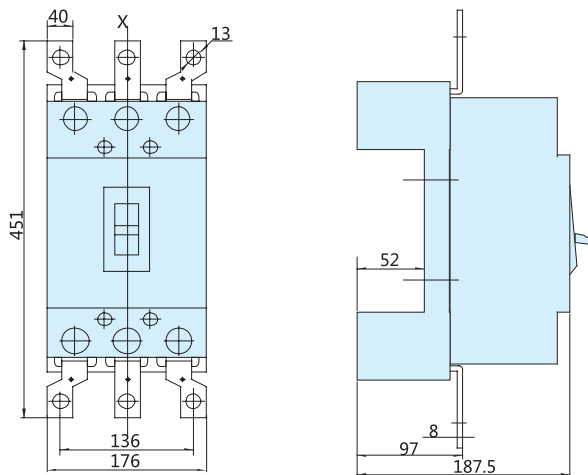


X-X, Y-Y represents the size of plug-in type mounting panel at the center of circuit breaker



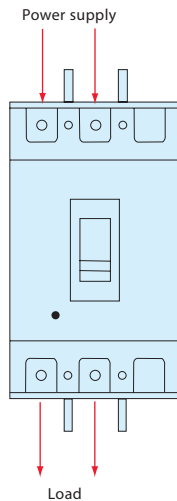
**Z2Q: Plug-in type before-panel wiring**  
(two-pole)

X-X, Y-Y represents the size of plug-in type mounting panel at the center of circuit breaker

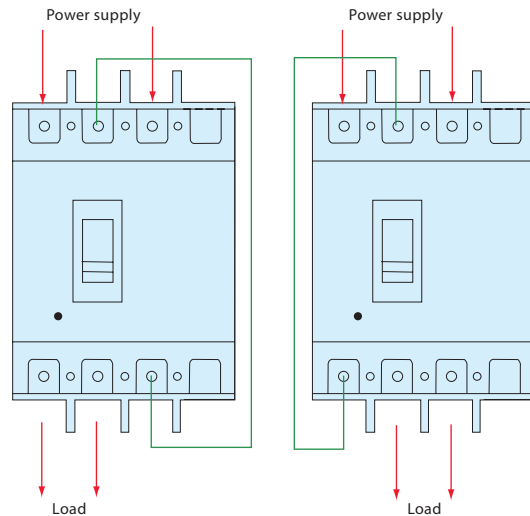


## 6.6 Wiring Mode

### ● Two-pole wiring



### ● Three-pole wiring



If other wiring methods are used, contact with the manufacturer

## 6.7 Selection of Cross-sectional Areas of Connecting Busbars and Cables

### ● Selection of busbars

Rated current A	16 20	25	32	40 50	63	80	100	125 140	160	180 200 225	250	315 350	400
Cross-sectional area of conductor mm <sup>2</sup>	2.5	4.0	6.0	10	16	25	35	50	70	95	120	185	240

### ● Selection of cable

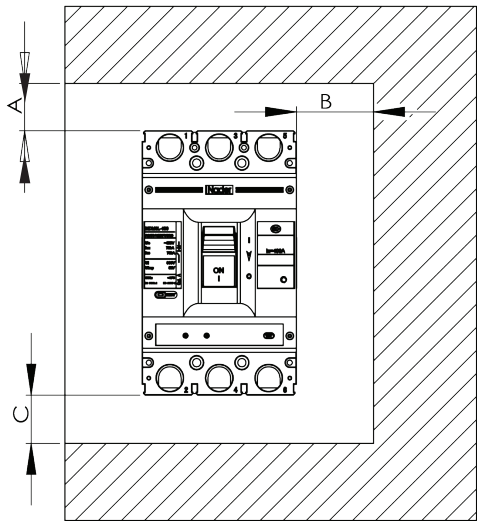
Rated current A	Cross-sectional areas of cables		Copper busbar size	
	Quantity	Sectional area mm <sup>2</sup>	Quantity	Dimensions mm × mm
500	2	150	2	30 × 5
630	2	185	2	40 × 5

Note 1: Connect to the circuit breaker, and select the appropriate wiring method according to Outline Dimension, Mounting Dimension and Wiring Method;

Note 2: If copper bar is selected for connection, the copper bar cannot be directly connected to the circuit breaker body and extended busbar accessories are required.

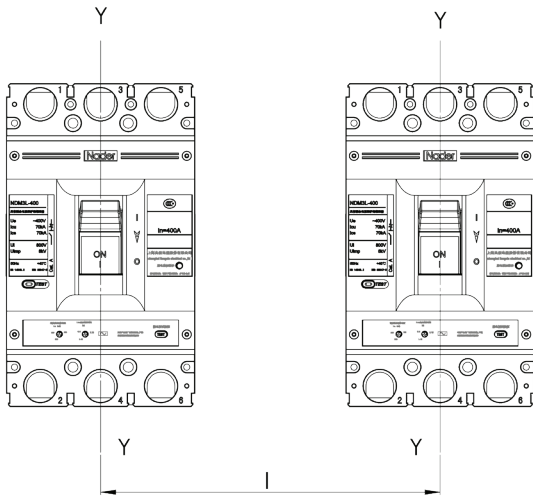
6.8 Safe Distance of Circuit Breaker Mounting

- Insulation distances for installation in a small metal cabinet (unit: mm)



Mounting distance	A (From incoming line end to cabinet surface)		B (Distance from the side to the cabinet)	C (From incoming line end to cabinet surface)
Specifications	With zero flashover cover	Without zero flashover cover		
NDM2ZB-63	25	65	30	30
NDM2ZB-125	25	65	30	30
NDM2ZB-250	25	65	30	30
NDM2ZB-400	25	120	35	35
NDM2ZB-630	25	120	35	35

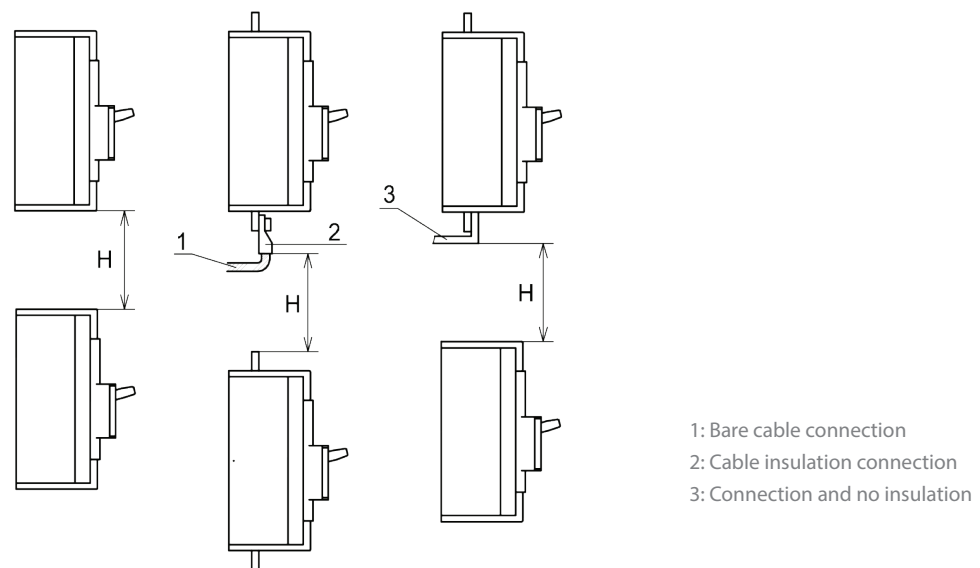
- Minimum center distance of row installation room of the circuit breakers



Specifications	Circuit breaker width (mm)		Center distance I (mm)	
	Two-pole	Three-pole	Two-pole	Three-pole
NDM2ZB-63	78	78	108	108
NDM2ZB-125	92	92	122	122
NDM2ZB-250	107	107	137	137
NDM2ZB-400	150	150	190	190
NDM2ZB-630	182	182	222	222

Note: For installation of circuit breakers in a row or stack, check the connection busbars or cables to ensure the air insulation distance will not be reduced.

### ● Minimum distance between circuit breakers installed in stack



Specifications	H (distance between the bottom and top of circuit breaker)	
	With zero flashover cover	Without zero flashover cover
NDM2ZB-63	90	90
NDM2ZB-125	90	91
NDM2ZB-250	90	93
NDM2ZB-400	155	155
NDM2ZB-630	155	155

Note: Check whether the zero flashover cover or the interphase barrier is installed in place before energizing.

## 7. Usage and Maintenance

- The characteristics of circuit breaker and accessories are set by the manufacturer; only the trained or certified professional personnel can adjust, install and maintain the circuit breaker, tripping unit and other accessories referring to the circuit design parameters;
- Ensure the power is in the inactive state before installation and removal of any device.
- The handle of circuit breaker can be located at three positions respectively representing the three conditions of closing, disconnection and free tripping. When the handle is at the free tripping position, the handle should be pulled in the disconnection direction. At this time, the circuit breaker could re-buckle and then the switch could be closed.
- Please observe the conditions for storage and use; if the product is damaged or cannot be normally used due to quality problem within 36 months from the date of delivery by the manufacturer, the manufacturer is responsible for free repair or replacement.

## 8. Ordering Instructions

- Please specify the models, specifications and ordering quantity of circuit breakers; when under-voltage tripper, shunt tripper or electrically operated mechanism are used, please indicate the voltage values of operating voltage and control power.