

Shanghai Liangxin Electrical Co., Ltd.

NDM2E-400 Product Specification

(IPD-ENG-DEV-T20 A1 2016-09-23)

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Revision History					
Version	Revision Reason/Content	Implementation Date	Prepared by	Reviewed by	Approved by
0	Newly added	5/8/2020	Wang Hu	Peng Haorang	Hu Qi
1	Update the product appearance picture and product dimension outline drawing	30/9/2021	Sun Lanping	Chen Xinming	Ding Fei
2	Add attachment information	2	Yang rongrong	Chen Xinming	Ding Fei

1. Applicable Scope and Purpose of Circuit Breaker

The NDM2E-400 series of electronic molded case circuit breakers (hereinafter referred to as circuit breakers) apply to infrequent switching of circuits with the AC 50Hz, the working voltage of AC400V and working current of 400A as well as infrequent motor starting. With the overload, short circuit and under-voltage protection functions, the circuit breaker can protect lines and power equipment from damage. The NDM2E circuit breaker can provide modules with the communication function, which can make the original circuit breaker upgrade to the communication circuit breaker conveniently, thus realizing "Four remotes" functions, namely, remote control, remote adjustment, remote measuring and remote measurement.

The circuit breaker has an isolating function with the corresponding symbol of $\text{---} \diagup \diagdown \text{---}$;

Comply with standards: IEC60947-2, GB/T 14048.2.

Products comply with CCC、CE、TUV and CB certification.

2. Product Picture of Circuit Breaker (The picture is for reference only; the specific kind prevail)



Picture of the Product

3. Specification and Model Description of Circuit Breaker

ND	M	2	E	-	400			/		/					
1	2	3	4	5	6	7	8	9	10	11	12	13	14		
SN	SN name		NDM2E												
1	Enterprise code		ND: "Nader" low-voltage apparatus												
2	Product code		M: Molded case circuit breaker (MCCB)												
3	Design SN		2												
4	Derived code of the series		E: Electronic												
5	Shell frame level		400												
6	Breaking capacity level		M: Relatively high breaking type												
			H: High breaking type												
7	Operation mode		No code: Direct handle-operated mode												
			P: Motor-operated												
			Z: Rotary operation												
8	Derived code of the function		No code: Basic type intelligent release												
			G: Ground protection type intelligent release												
			T: Communication type intelligent release												
			GT: Ground protection communication type intelligent release												
9	Number of poles		3												
10	Accessory code		See Table 1												
11	Application code		No code: Power distribution type												
			2: Motor protection type												
12	Rated current		See Table 2												
13	Cabling type		No code: Normal product												
			P: Connection busbar												
			Z1: Rear-plate connection												
			Z2H: Plug-in rear-plate connection												
			Z2Q: Plug-in front-plate connection												
			Z3H: Integrated plug-in rear-plate connection												
			Z3Q: Integrated plug-in front-plate connection												
14	Other codes		DT: Dedicated for power grid												
			Codes of internal and external accessories: Such as manual operation: CS1-A, electric operation: DC1 220V, shunt: AC230V, undervoltage: DC220V												

Table 1: Comparison Table of Accessory Code:

Diagram illustrating the handle and installation positions (Left installation and Right installation) for the accessory code table.

Legend

- Single auxiliary contact
- Dual-auxiliary contact
- Alarm contact
- Shunt release
- Under-voltage release
- Auxiliary alarm contact (a single accessory features the auxiliary and alarm functions)

Accessory code	Accessory name	Installation Position		Model	Number of poles	NDM2E-400 (Non-communication type)
300	N/A				—	3
310	Shunt release					
320	Dual-auxiliary contact					
321	Single auxiliary contact					
330	Under-voltage release					
340	Shunt release, dual-auxiliary contact					
341	Shunt release, single auxiliary contact					
350	Shunt release, under-voltage release				—	
360	Two sets of dual-auxiliary contacts					
361	Two sets of single auxiliary contacts					
362	Dual-auxiliary contact, single auxiliary contact					
370	Under-voltage release, dual-auxiliary contact					
371	Under-voltage release, single auxiliary contact					
308	Alarm contact					
318	Shunt release, alarm contact					
328	Dual-auxiliary contact, alarm contact					
338	Under-voltage release, alarm contact					
348	Shunt release, auxiliary alarm contact					
358	Auxiliary alarm contact					
368	Dual-auxiliary contact, auxiliary alarm contact					
378	Under-voltage release, auxiliary alarm contact					

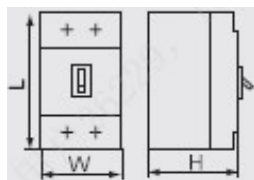
Accessory code	Accessory name	Installation Position		Model	Number of poles	NDM2E-400 (Communication type)
300	None/communication type				—	1
310	Shunt release/communication type					
320	Dual-auxiliary contact/communication type					
321	Single auxiliary contact/communication type					
330	Undervoltage release/communication type					
341	Shunt release single auxiliary/communication type					
308	Alarm contact/communication type					
358	Auxiliary alarm contact/communication type					
361	Single auxiliary contact, single auxiliary contact/communication type					
362	Dual-auxiliary contact, single auxiliary contact/communication type					
371	Under-voltage release, single auxiliary contact/communication type					

Note :

- 1) The first number "3" of the release accessory code represents the intelligent controller with the three-section protection while the last two numbers represent the inner accessory code;
- 2) Since the communication type requires to use a set of right-side auxiliary contacts, the single auxiliary or no contact output is only located on the right side of the above accessory mode.

4. Main Technical Parameters of Circuit Breaker

Table 2 Main Technical Parameters of Circuit Breaker

Model			NDM2E-400	
Rated current of frame Inm (A)			400	
Rated current In (A)			400	
Setting current Ir(A)			160, 200, 225, 250, 280, 315, 350, 400	
Rated insulation voltage Ui (AC V)			800	
Rated impulse withstand voltage Uimp (V)			8000	
Rated working voltage Ue (AC V)			400	
Power frequency withstand voltage U (1min) (V)			3500	
Utilization category			B	
Rated short-time withstand current Icw (kA/1s)			5	
Number of poles			3	
Breaking capacity level			M	H
Rated limit short-circuit breaking capacity Icu (kA)		AC400V	65	100
Rated operating short-circuit breaking capacity Ics (kA)		AC400V	65	65
Operating performance (times)	Electrical life		7500	
	Mechanical life	Maintainable free life	10000	
		Maintainable life	20000	
Boundary dimension			L (mm)	257
			W (mm)	150
			H (mm)	106.5
Flashover distance(mm)			≤100	

Note1: The overall dimension does not include the dimension of terminal cover.

2: The setting current is factory set to the rated current by default. If you need to set to other settings, please contact the sales person.

4.1 Selection of the circuit breaker connecting bus or cable cross-section area

Table 3 Selection of the NDM2E-400 Connecting Bus or Cable Cross-section Area

Rated current (A)	160	200, 225	250	280, 315, 350	400
Wire cross-section area (mm ²)	70	95	120	185	240

4.2 Tightening Torque of the Circuit Breaker Terminal and Mounting Screw

Table 4 Tightening Torque of the Circuit Breaker Terminal and Mounting Screw

Model	Thread specification	Torque (N·m)
NDM2E-400	M10	20
	M6	6

4.3 Derating factor of temperature change for the circuit breaker

Table 5 Derating Factor Table of Temperature Change for the Circuit Breaker

Model	Derating factor of product temperature change							
NDM2E-400	Temperature(°C)	40	45	50	55	60	65	70
	Derating factor	1	1	1	0.978	0.957	0.934	0.911

Note: 1) When the operating ambient temperature is below + 50°C, the product can be used normally without derating capacity.

2) The above derating factors are measured at the frame current.

4.4 High-altitude derating factor of the circuit breaker

Table 6 High-altitude Derating Factor Table of Circuit Breaker

Elevation (m)	Working current correction coefficient	Power frequency withstand voltage correction coefficient	Isolation voltage correction coefficient
2000	1	3500	800
2500	1	3500	800
3000	0.98	3150	720
3500	0.97	3000	680
4000	0.95	2800	630
4500	0.94	2650	600
5000	0.93	2500	560

4.5 Power loss coefficient of circuit breaker

Table 7 Power loss coefficient table of circuit breaker

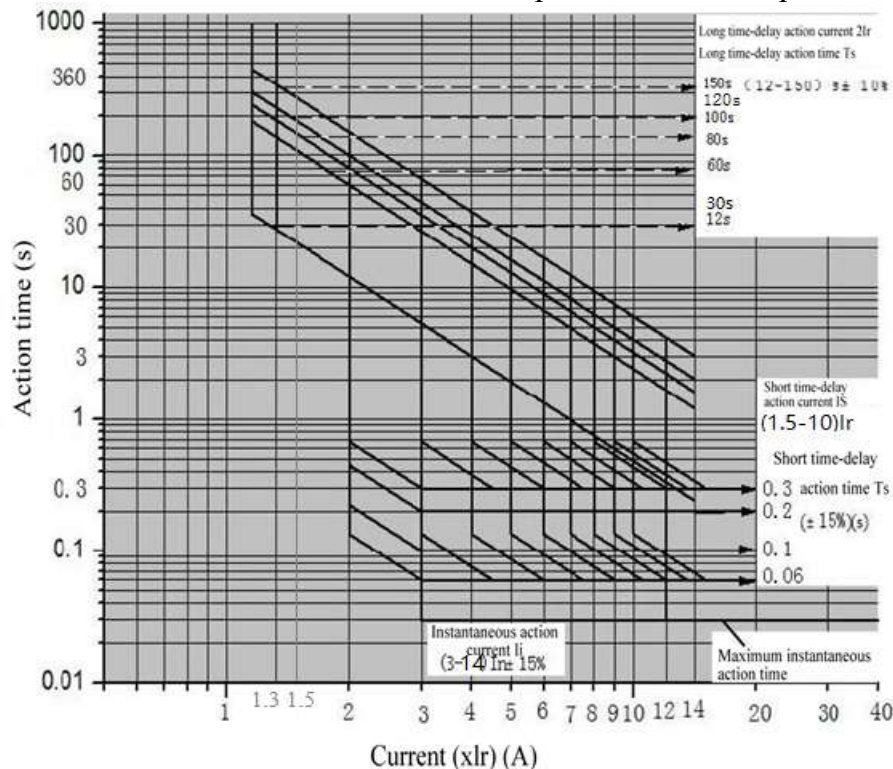
Model	Energizing current(A)	Total power loss(W)		
		Wiring before and after board	Plug in board front wiring	Plug in bear board wiring
NDM2E-400	400	115	115	125

5. Normal Working Environment of Circuit Breaker

- 1) The altitude of the installation site doesn't exceed 2,500m. See the "High-altitude Derating Factor Table of Circuit Breaker" for the derating factor at the altitude;
- 2) The ambient temperature is $-35^{\circ}\text{C} \sim +70^{\circ}\text{C}$; the average within 24h shall not be more than $+35^{\circ}\text{C}$. If the ambient temperature is higher than $+50^{\circ}\text{C}$, the user needs to reduce the capacity. See the "Derating Factor Table of Temperature Change for the Circuit Breaker" for the derating factor;
- 3) Its relative humidity at an ambient temperature of $+40^{\circ}\text{C}$ should not exceed 50%. A higher relative humidity is allowed at a lower temperature. For example, the relative humidity at 20°C can reach 90%; for frost due to temperature change, the corresponding measures should be taken;
- 4) The product can withstand the effects of wet air, salt mist, oil mist and mould;
- 5) The installation category of the circuit breaker connected to the main loop is: Category III (power distribution and control level), The installation category of the circuit breaker not connected to the main loop is: Category II (load level);
- 6) The pollution level is Level 3;
- 7) The product should be installed in places that are free from explosive media, media corrosive to metal, insulation damaging gas, and conductive dust, which should be also avoided from snow and rain;
- 8) In case of stricter user conditions than the above description, negotiate with the manufacturer.

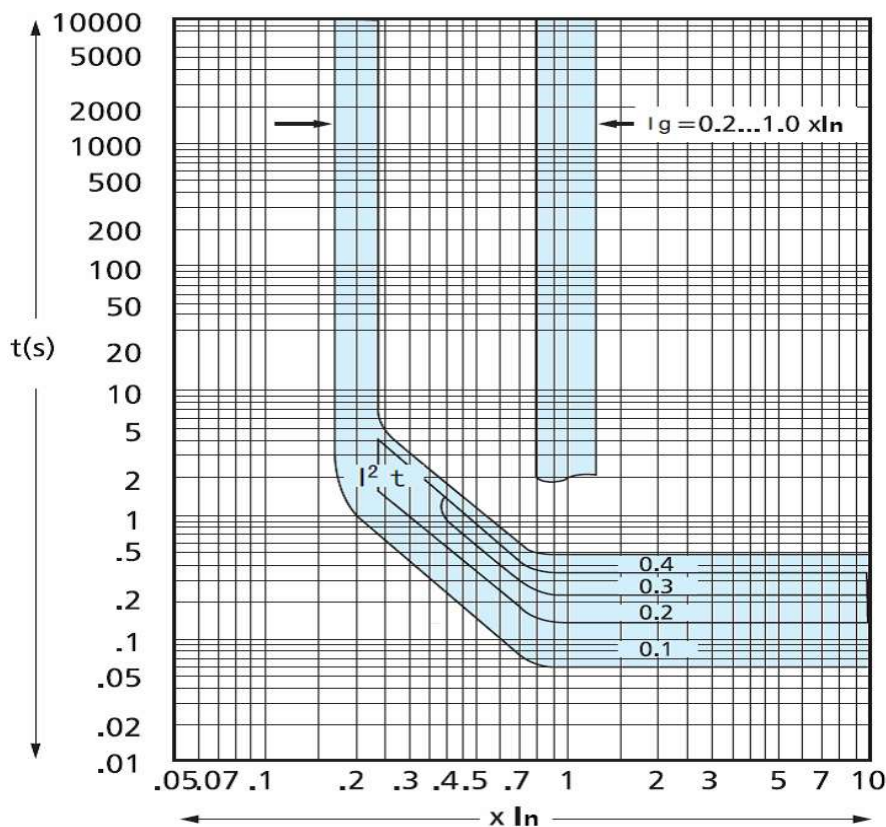
6. Short-circuit Overload Protection Characteristic Curve of Circuit Breaker

6.1. Time/current characteristic curve of power distribution protection type



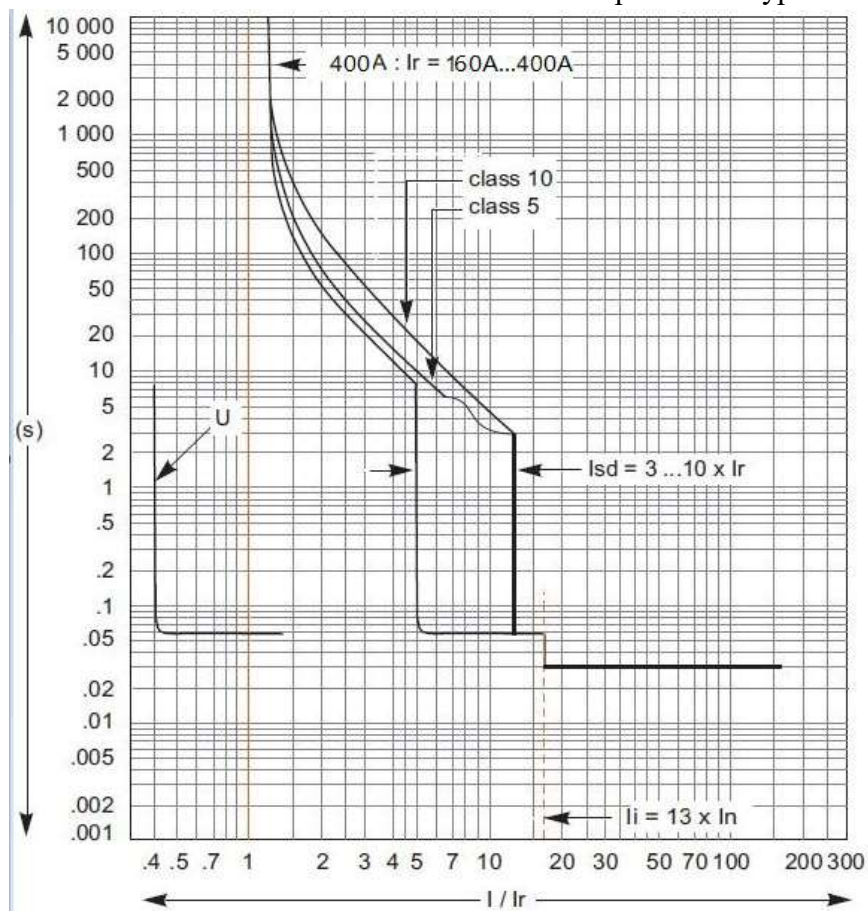
Time/Current Characteristic Curve

6.2. Time/current characteristic curve of ground protection type



Time/Current Characteristic Curve

6.3. Time/current characteristic curve of motor protection type



Time/Current Characteristic Curve

6.4. Setting value of the intelligent controller

6.4.1. Communication-type intelligent controller

Table 8 Communication-type Intelligent Controller

Model	Rated current of frame $I_n(A)$	Current and time parameters							
		$I_r(A)$	$T_r(s)$	$I_{sd}(\times I_r)$	$T_{sd}(s)$	$I_i(\times I_n)$	$I_p(\times I_r)$	$I_g(\times I_n)$	$T_g(s)$
NDM2E-400	400	160-400、 OFF Step by step 0.1A	12-150、 OFF Step by step 1s	240-400 0、OFF Step by step 1A	0.06 0.1 0.2 0.3	1200-560 0、OFF Step by step 1A	112-40 0、OFF Step by step 0.1A	80-400、 OFF Step by step 0.1A	0.1、 0.2、 0.3、 0.4

Note:1. When I_{sd} is in the OFF position, the short time-delay is closed.

2. The upper computer is required to set the gear of communication products. It is not displayed on the control panel. see 《NDT-01598 Modbus RTU communication protocol for NDM2E & 3E & 5E molded case circuit breaker》 for communication parameter adjustment.

3. If it is overloaded for a long time, it is not recommended to close T_r .

4. If reliable tripping is required, the single-phase current of the main circuit shall not be less than $0.4I_n$ and the three-phase current shall not be less than $0.2I_n$.

6.4.2. Non-communication type intelligent controller

Table 9 Non communication-type intelligent controller

Model	Rated current of frame In(A)	Current and time parameters							
		Ir(A)	Tr(s)	Isd($\times$ Ir)	Tsd(s)	Ii($\times$ In)	Ip($\times$ Ir)	Ig($\times$ In)	Tg(s)
NDM2E-400	400	160、200、225、250、280、315、350、400、OFF	12、30、60、80、100、120、150、OFF	1.5、2、3、4、5、6、7、8、10、OFF	0.06、0.1、0.2、0.3	3、4、5、6、7、8、10、12、14、OFF	0.7、0.8、0.9、1.0、OFF	0.2、0.3、0.4、0.5、0.6、0.8、1.0、OFF	0.1、0.2、0.3、0.4

Note: 1. When Ir is in the OFF position, the long and short time-delay is closed at the same time; when Isd is in the OFF position, the short time-delay is closed.

2. When the product is grounding type, Tsd can't be set, if there isn't requirement in the order, the default value is 0.3s.

3. When the product is grounding type, Ip can't be set, if there isn't requirement in the order, the default value is 0.9Ir.

4. The upper computer is required to set the gear of communication products. It is not displayed on the control panel. see 《NDT-01598 Modbus RTU communication protocol for NDM2E & 3E & 5E molded case circuit breaker》 for communication parameter adjustment.

5. If it is overloaded for a long time, it is not recommended to close Tr.

6. If reliable tripping is required, the single-phase current of the main circuit shall not be less than 0.4In and the three-phase current shall not be less than 0.2In.

7. When the product is overload alarm and does not trip, Tr needs to be closed. In this case, the following conditions should be noted:

- 1) Avoid setting Isd too high to prevent the product from being damaged by overload for a long time.
- 2) Within a certain time after the alarm output, it is necessary to timely check the power consumption of the load to prevent the circuit breaker from burning under heavy load.

6.4.3. Motor protection-type intelligent controller

Table 10 Motor Protection-type Intelligent Controller

Model	Shell frame level Rated current In(A)	Current and time parameters			
		Ir($\times$ In)	Class(s)	Isd($\times$ Ir)	Iunbl(%)
NDM2E-400	400	0.4-1.0	4-10	3, 4, 5, 6, 7, 8, 9, 10, OFF	10, 20, 30, 40, OFF

Note: 1) When Isd is in the OFF position, the short time-delay is closed;

2) When Iunbl is in the OFF position, the current imbalance protection is off;

3) The short circuit instantaneous Ii has built-in 13In.

6.5. Protection characteristics of power distribution-type circuit breaker

Table 11 Protection Characteristics of Intelligent Release

Overload long time-delay protection Ir, Tr								
Setting current Ir		See Table 8 or 9						
Action features (reverse time limit)	Tr setting value (s)	In = 400A						
		12	30	60	80	100	120	150
	≤1.05Ir	> 2h inaction						
	> 1.30Ir	< 1h action						
	t(s) at 1.5Ir	21. 3	53. 3	106. 7	142. 2	177. 8	213. 3	266. 6
	t(s) at 2.0Ir	12	30	60	80	100	120	150
	t(s) at 7.2Ir	0. 93	2. 31	4. 63	6. 17	7. 72	9. 26	11. 57
	Accuracy	±10% (Inherent error ± 20ms)						
Note: The action curve conforms to $t=(2I_r/I)^2\times Tr$ t: overload long time-delay action time Tr: setting value of the overload long time-delay action time I: Actual running current Ir: setting value of the overload long time-delay action current								
Short circuit short-time delay protection Isd, Tsd								
Setting current Isd			See Table 8 or 9					
Action characteristics	Reverse time limit $I_{sd}\leq I<1.5I_{sd}$	Tsd setting value (s)	0.06	0.1	0.2	0.3		
		t action time (s)	$t=(1.5I_{sd}/I)^2\times Tsd$					
	Fixed time limit $1.5I_{sd}\leq I<I_i$	t action time (s)	0.06	0.1	0.2	0.3		
		Returnable time (s)	/	/	0.14	0.21		
		Accuracy	±10% (Inherent error ± 20ms)					
Note: The inverse time limit action curve conforms to $t=(1.5I_{sd}/I)^2\times Tsd$ The reverse time limit is ON while the fixed time limit is OFF t: short-circuit short time-delay action time Tsd: setting value of the short-circuit short time-delay action time I: Actual running current Isd: setting value of the short-circuit short time-delay action current								

Table 11 (Continued) Protection Characteristics of Intelligent Release

Short circuit instantaneous protection Ii						
Action characteristics	Setting current Ii		See Table 8 or 9			
	Action time		<50ms			
Pre-alarm Ip						
Setting current Ip			See Table 8 or 9			
characteristics	Alarm indicator		The indicator changes to be constantly on from flashing			
	Accuracy		±10% (Inherent error ± 20ms)			
Overload indicator (maximum load)						
characteristics	Current value range		1.15×Ir			
	Overload indicator		Constantly on			
	Accuracy		±10% (Inherent error ± 20ms)			
Ground fault protection Ig, Tg						
Setting current Ig			(0.2, 0.3, 0.4, 0.5, 0.6, 0.8, 1.0)×In+OFF			
Action characteristics	Reverse time limit Ig≤IΔ<2Ig	Tg setting value (s)	0.1	0.2	0.3	0.4
		t action time (s)	t =(2Ig/I) ² ×Tg			
	Fixed time limit IΔ≥2Ig	t action time (s)	0.1	0.2	0.3	0.4
		Accuracy	±10% (Inherent error ± 20ms)			
Note: I: 3P products are A/B/C three-phase current vector sum.						

6.6. Protection characteristics of the motor protection-type intelligent release

Table 12 Protection characteristics of the motor protection-type intelligent release

Overload protection Ir, Class								
Setting current Ir		See Table 10						
Action features (reverse time limit)	Class setting value (s)	4	5	6	7	8	9	10
	≤1.05 Ir	>2h inaction						
	>1.20 Ir	<1h action						
	tr(s) at 1.5 Ir	92.2	115.2	138.2	161.3	184.3	207.4	230.4
	tr(s) at 6.0 Ir	5.8	7.2	8.6	10.1	11.5	12.9	14.4
	tr(s) at 7.2 Ir	4	5	6	7	8	9	10
	Accuracy	±10% (Inherent error ±20ms)						
Note: 1)The action curve conforms to $t=(7.2)^2\times(Ir)^2\times Class/I^2$ t: Overload protection action time Class: Setting value of the tripping level time I: Actual running current Ir: Setting value of the overload protection action current 2) Action time calculation ➤ Within the tripping level (when the starting current is always greater than 1.5ir after power on) ● When it is greater than 7.2ir, the action time is calculated according to the actual current ● When it is less than or equal to 7.2ir and operates to the trip level time point, the trip level time is used. ➤ Besides tripping level, the action time shall be calculated according to the actual current.								
Short circuit short-time delay protection Isd								
Setting current Isd					See Table 10			
Action characteristics	Fixed time limit Isd<I	t action time (s)			0.06			
		Accuracy			±15% (Inherent error ±20ms)			
Note: short circuit short time delay protection can only be protected after the time of tripping level, and the action characteristic is fixed time limit.								
Current unbalance protection Iunbl								
Setting value Iunbl(%)							See Table 10	
Action characteristics	δ≥Iunbl(%)	During startup (<Class)			t action time (s)	0.7		
		During normal operation (≥Class)				4		

	$\delta<I_{unbl}(\%)$	Inaction		
Note: The actual current imbalance calculation is in accordance with $\delta=(E_{max})\times 100\% / I_{avg}$ $\frac{\sum_{k=1}^3 I_k}{I_{avg}}$ $I_{avg}=\frac{I_1+I_2+I_3}{3}$ δ : Percentage value of the actual current unbalance of the three-phase electricity E_{max} : Is the maximum difference between each phase current and I_{avg} , I : three-phase current I_{avg} : three-phase average current value, K is the serial number of three-phase current.				
Open-phase protection				
Action characteristics	$I<0.4I_r$	During startup ($<Class$)	t action time (s)	0.7
		During normal operation ($\geq Class$)		4
Short circuit instantaneous protection I i				
Setting current I_i	See Table 10			
Action time	$<50ms$			

6. 7、Communication Adaptor DF-MB/C3

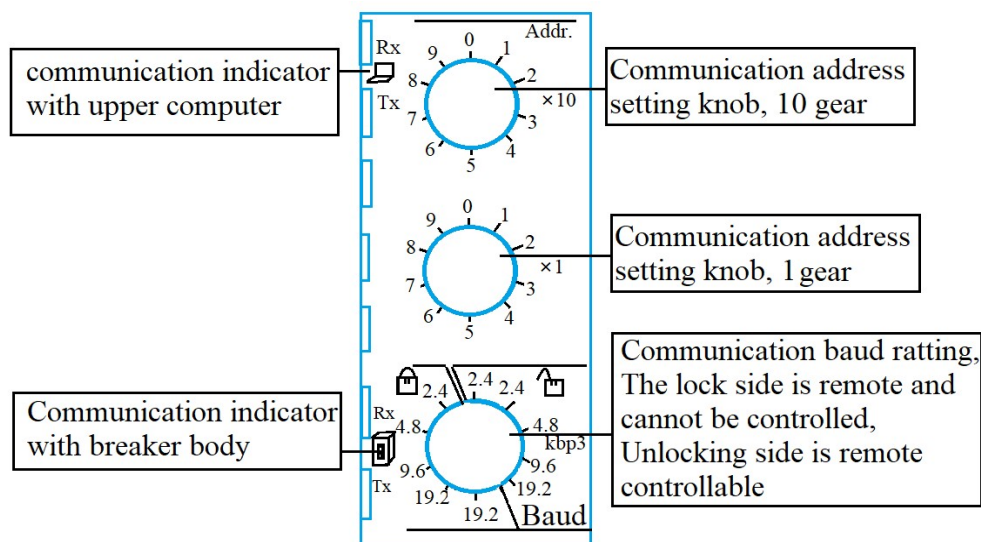
The communication adapter is DF-MB/C3, and the model of circuit breaker release is communication or alarm without tripping, including this module.

The main parameters are as follows:

Communication adaptor common parameter		
Electrical characteristic	Power supply	24VDC(19.2~28.8VDC)
	Power dissipation	40mA
Communication	Port	RS485, 2 Modbus RTU
	Optional address	1~99
	Baud rate	2400/4800/9600/19200bps
	Check bit	CRC check odd-even check not supported
	Maximum number of single unibus	32
Physical characteristic	Demension	90×71.7×22.5mm(terminal not included)
		109.5×71.7×22.5mm(terminal included)

	Weight	0.075kg
Environmental characteristic	Working temperature	-25℃～70℃
	Restoring temperature	-40℃～75℃
	Ambient condition	surrounding temperature 40℃, relative humidity 95%
	Pollution	3
	Fire resistance	UL94-V0
	Protection level	IP20

The definition of the front knob and indicator light of the communication adapter



Gear Adjustment of Communication Adaptor

1) Before communication, the address and baud rate shall be set first.

The address setting is set by two knobs (one is ten times gear and the other is one time gear). For example, the ten times gear is set to 2, the one time gear is set to 3, and the address is 23.

The baud rate has 8 gears in total as follows

- 19200 / lock: baud rate 19200, control command disabled
- 19200 / no lock: baud rate 19200, control command enabled
- 9600 / lock: baud rate 9600, control command disabled
- 9600 / no lock: baud rate 9600, control command enabled
- 4800 / lock: baud rate 4800, control command disabled
- 4800 / no lock: baud rate 4800, control command enabled
- 2400 / lock: baud rate 2400, control command disabled
- 2400 / no lock: baud rate 2400, control command enabled

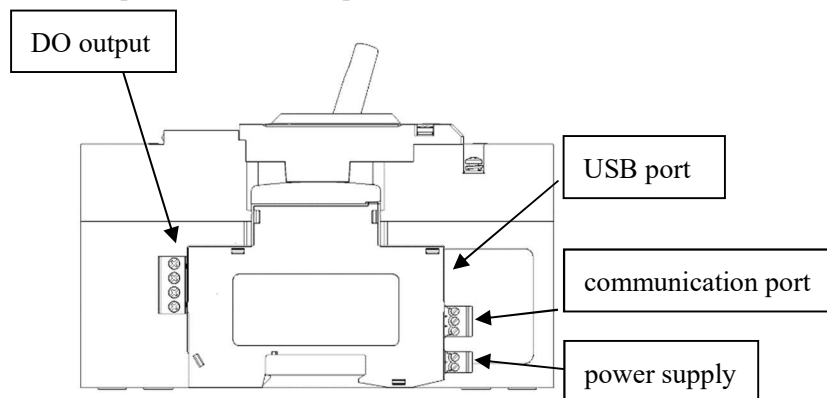
2) Indicator definition

- Internal communication - receiving lamp: the adapter communicates with the device. If data is received, the indicator flashes;
- Internal communication - sending light: the adapter communicates with the device. If data is sent, the

indicator light flashes; otherwise, the indicator light does not light up.

- External communication - receiving light: the adapter communicates with the upper computer. If data is received, the indicator light flashes; otherwise, the indicator light does not light up
- External communication - sending light: the adapter communicates with the upper computer. If data is sent, the indicator light flashes; otherwise, the indicator light does not light up.

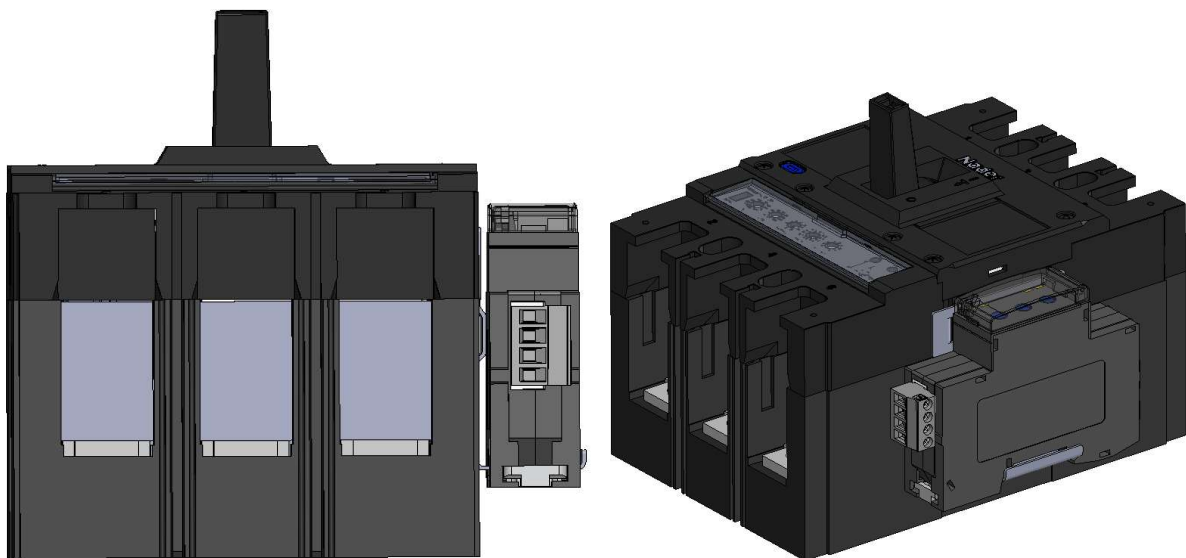
Communication adapter interface description



Note1:DO1~DO3 are three-way do output control. If there is no special requirement, all three-way d0 are alarm output (any one of them is selected to connect with com during wiring), and the output function (RS485 communication configuration) can be customized, such as opening and closing control of electric operating mechanism.

Note 2.Multiple numbers of adapters can be cascade installed (maximum 32). Each MCCB can set address (1~99), there are 2400, 4800, 9600, 19200bps, four option for baud rate set.

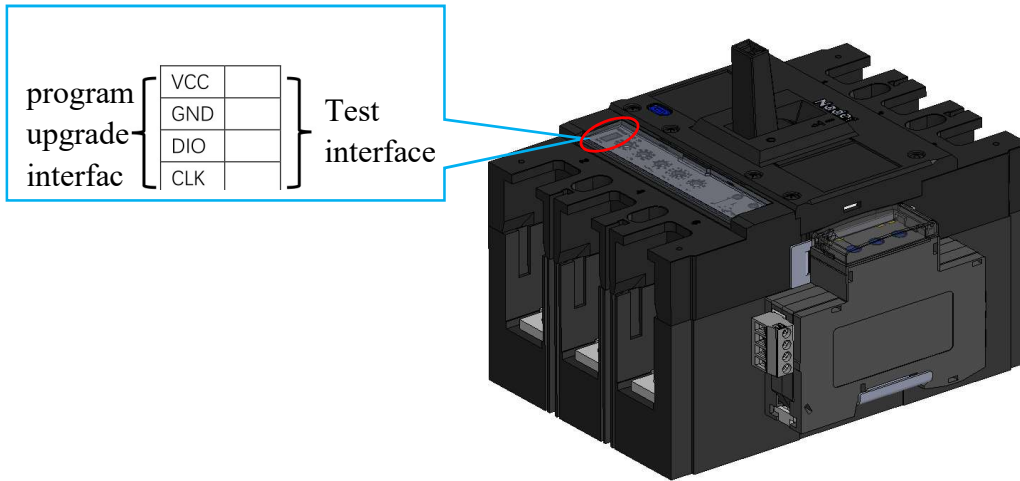
Note 3. The communication type circuit breaker and the adapter can be connected through the communication line extending from the side of the circuit breaker.



Communication type circuit breaker and communication adapter (the communication adapter has external communication function and overload non tripping function)

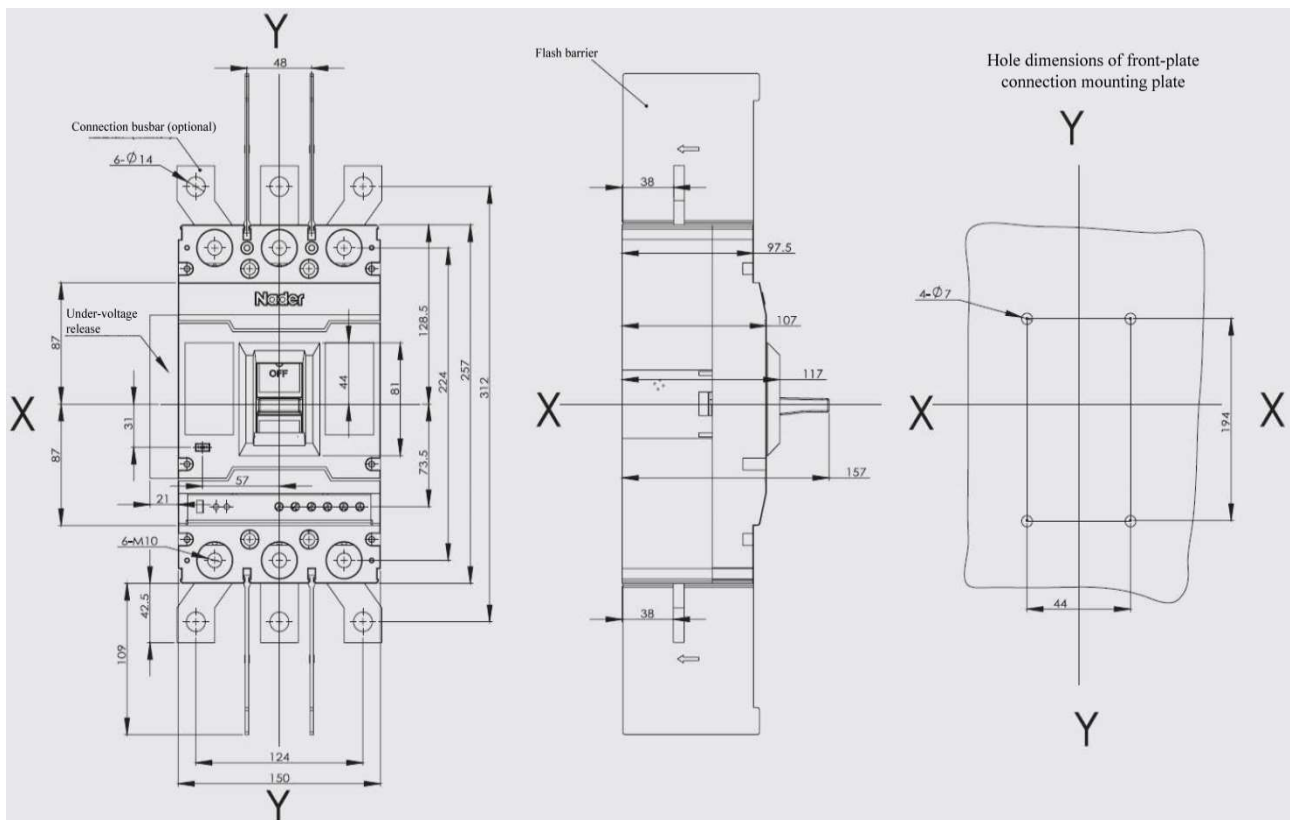
6.8 Program upgrade

The product supports maintenance or upgrade of disassembly free program. The interface is as follows:



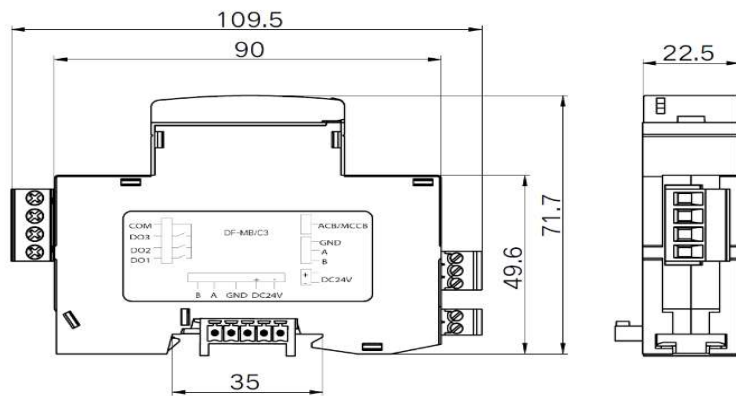
7. Outline and Mounting Hole Dimensions of Circuit Breaker

7.1 Outline and mounting hole dimensions of circuit breaker (Unit: mm)



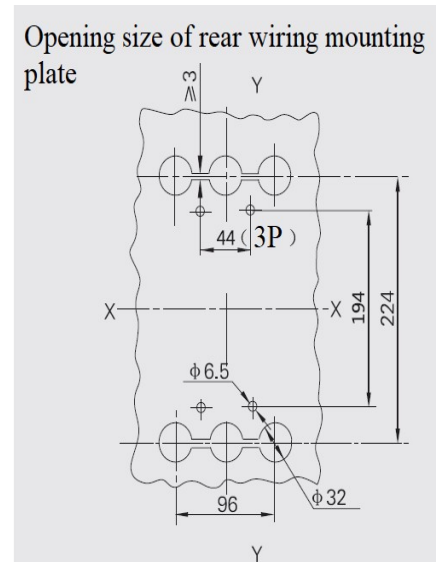
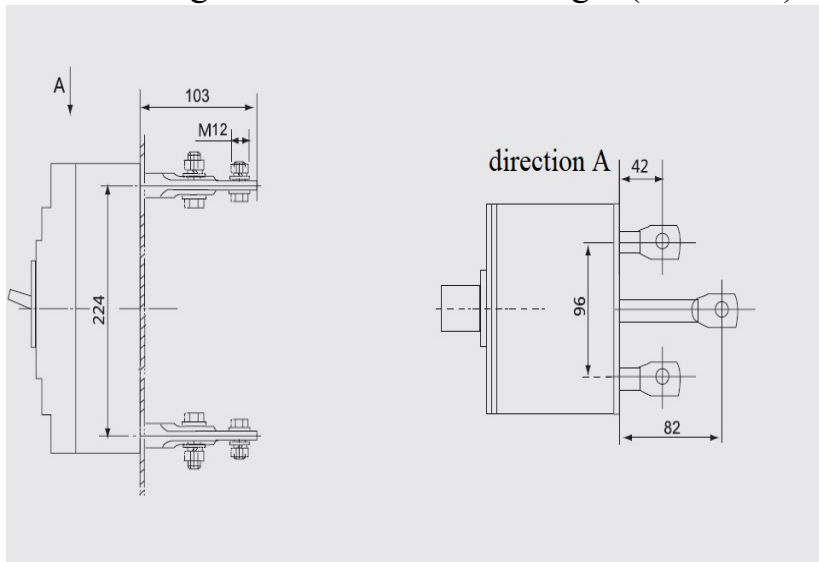
Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.2 Installation dimensions of communication module (Unit: mm)



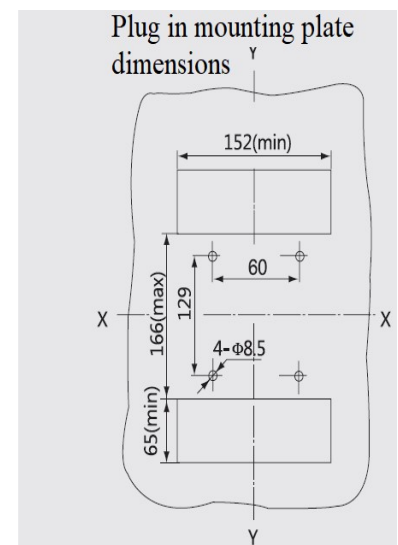
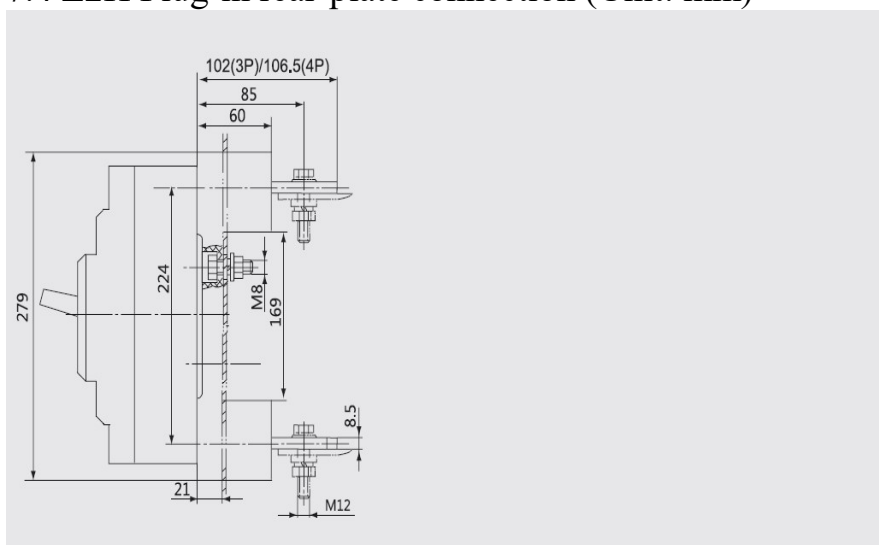
Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.3 Z1 Plug in board (rear mounting) (Unit: mm)



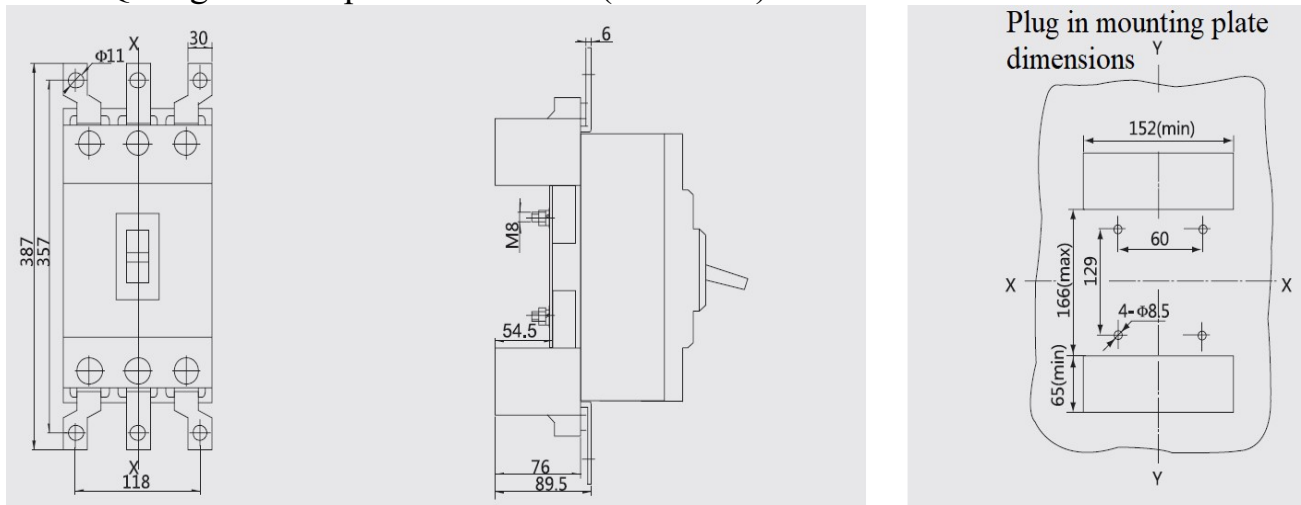
Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.4 Z2H Plug-in rear-plate connection (Unit: mm)



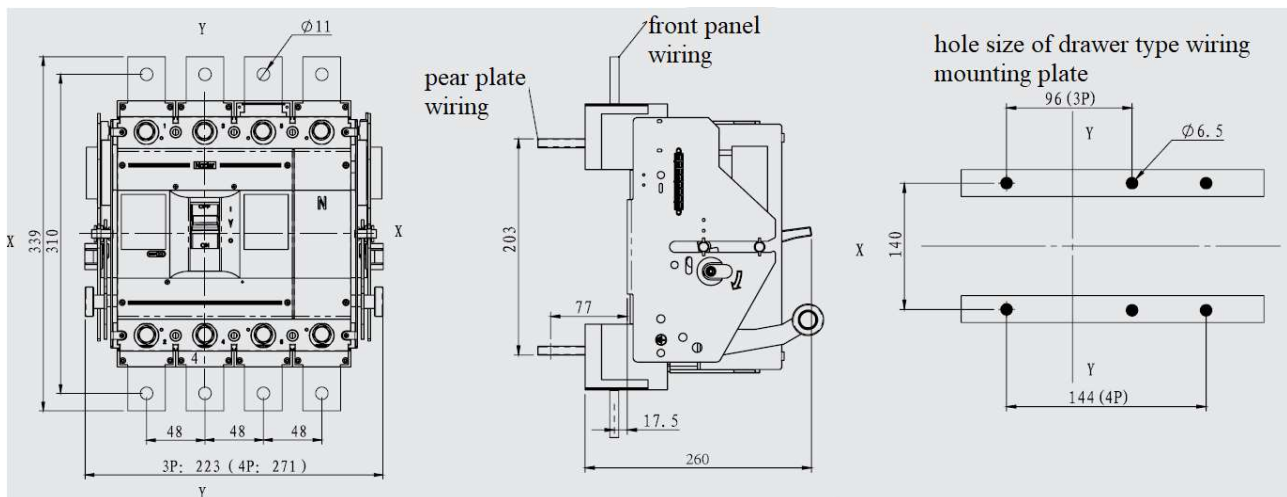
Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.5 Z2Q Plug-in front-plate connection (Unit: mm)



Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.6 Drawer type wiring



Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.6 Mechanical interlocking

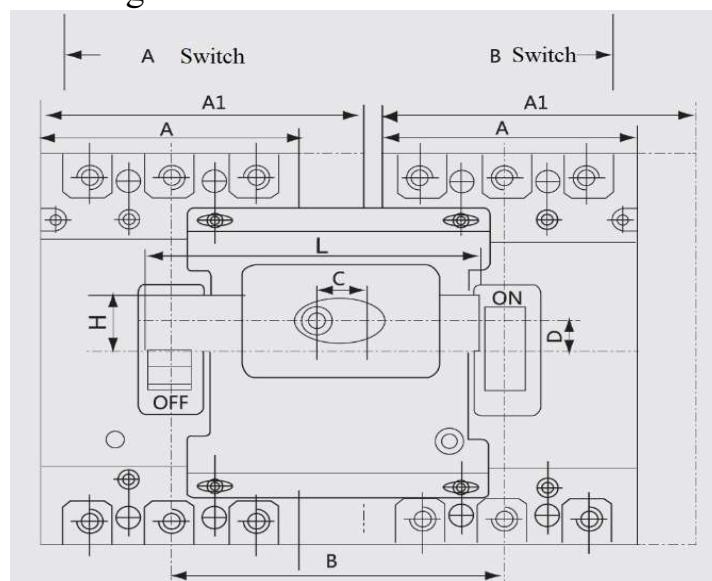
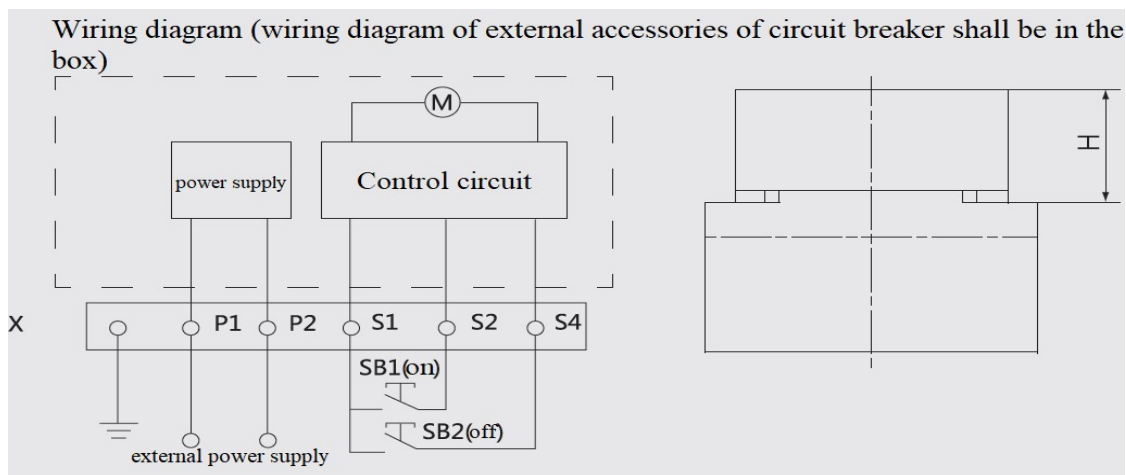


Table 13 Installation dimension of mechanical interlocking (Unit: mm)

Model	A	B	C	D	L	H
NDM2E-400	150	180	57	10	190	30

Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.7 Electric operating mechanism



Symbol description: SB1、SB2: Operation button (provided by the customer)

X: Terminal block

P1、P2: External power supply

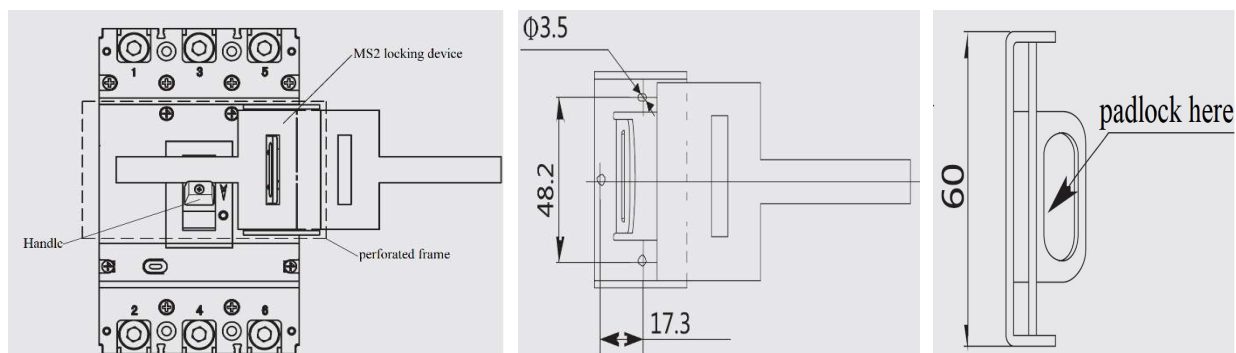
Voltage specification: AC110V、AC220V、AC400V、DC24V、DC110V、DC220V

Table 9 Main technical parameters of electric operating mechanism

Equipped with circuit breaker	Action current(A)	Electric power(W)				service life / time	Operating mechanism height H(mm)
		AC/DC220V	AC/DC110V	AC400V	DC24V		
NDM2E-400	≤ 2	≤ 350	≤ 250	≤ 600	160	10000	149 $\pm$ 1

7.8 MS2 locking device

MS2 is a split locking device (i.e. the device is installed on the left or right side of the circuit breaker cover, and the default is installed on the right side if there are no special requirements). It is used for NDM2E series products to prevent manual closing and opening (the dotted line part is the circuit breaker part).



Installation diagram of MS2 lock mechanism (Unit: mm)

Note 1: After MS2 accessories are selected, other internal and external accessories cannot be installed on the same side;

2: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.9 Manual operating mechanism

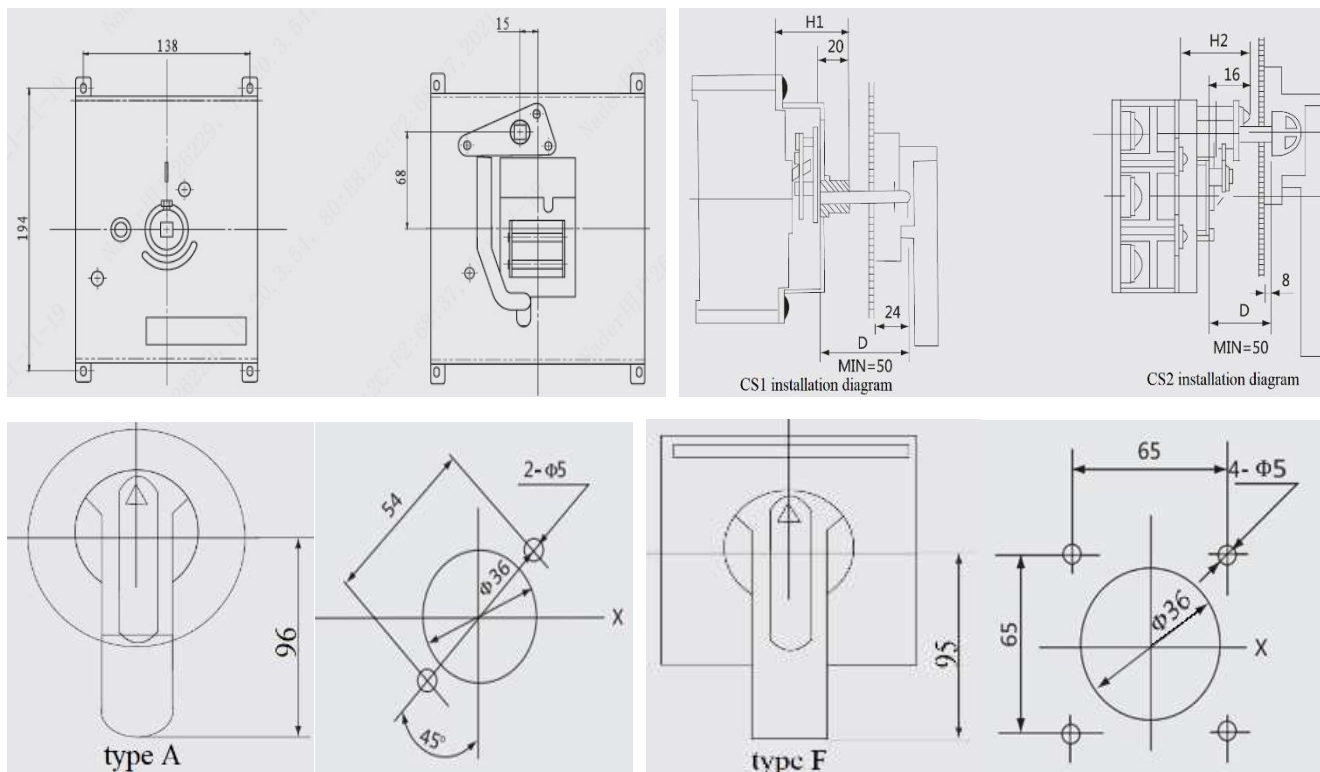


Table 15 Installation dimension of manual operating mechanism (Unit: mm)

Manual operation type	Model	Installation dimension of manual operating mechanism	
		H1	H2
CS1	NDM2E-400	85	/
CS2	NDM2E-400	/	61

Note: 1) A type is round handle, F type is square handle;

2) The length of A-type handle is 96mm and that of F-type handle is 95mm;

3) The D dimension in the drawing is 150mm by default, and the customizable length is 200 / 300 / 350 / 650mm;

4) The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.10 Safe mounting distance of circuit breaker

Table 16 Insulation Distance Mounted in the Metal Cabinet (Unit: mm)

Mounting distance	A (inlet wire end to the cabinet face)		B (distance from side to the cabinet face)	C (outlet wire end to the cabinet face)
Model	With a terminal cover	Without a terminal cover		
NDM2E-400	25	120	35	35

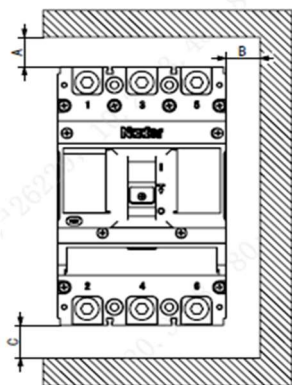


Table 17 Minimum Center Distance between Rowed Circuit Breakers (Unit: mm)

Model	Width of circuit breaker	I Center distance
	3 poles	3 poles
NDM2E-400	150	190

Note: Check the connected busbar or cable during rowing or stacking of the circuit breaker to ensure that the air insulation distance won't be reduced.

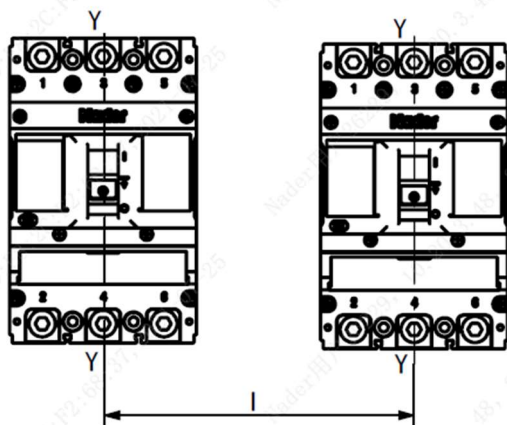


Table 18 Minimum Distance between Stacked Circuit Breakers (Unit: mm)

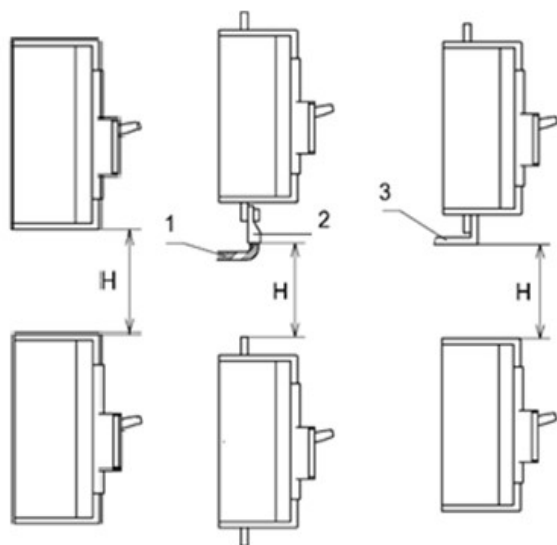
Model	H (distance of circuit breaker from bottom)	
	With a terminal cover	Without a terminal cover
NDM2E-400	155	155

Note: 1) Insulated cable

2) Cable terminal

3) Connection without insulation

Requirements: Check whether the terminal cover or phase partition is assembled properly before products are energized.



8、Attachment function description

8.1 Under-voltage release

When the power voltage drops to the range (35%~70%) of the under-voltage release, the release can break the circuit breaker reliably; when the power voltage is 35% lower than the rated working voltage of the under-voltage release, the release can prevent closing of the circuit breaker; when the power voltage is 85% higher than the rated working voltage of the under-voltage release, the release can guarantee reliable closing of the circuit breaker.

Table 19 Voltage Specifications and Power Consumption of Under-voltage Release

Model	Instantaneous current value(A)		Power waste (W)			
			Pull in power consumption		maintain power consumption	
	AC230V	AC380V	AC230V	AC380V	AC230V	AC380V
NDM2E-400	0.8	0.5	190	223	0.8	0.9

Note: The under-voltage release must be energized before the circuit breaker can be switched on and closed again, otherwise the circuit breaker will be damaged.

8.2 Shunt release

When the external voltage of the shunt release is between 70% and 110% of the rated control

power voltage, the release can break the circuit breaker reliably.

Table 20 Voltage Specifications and Power Consumption of shunt release

Model	Shunt release	DC24V	AC230V	DC220V	AC380V
NDM2E-400	Instantaneous current value(A)	3.4	0.5	0.3	0.26
	Power waste (W)	82.3	110.6	62	105

8.3 Auxiliary contact

The circuit breaker is in the "open" and "free tripping" positions	Dual-auxiliary contact		
	Single auxiliary contact		
the circuit breaker is in the "close" position	"close" to "open"、" open " to " close "		

8.3.1 Current parameters of auxiliary contact

Table 21 Current parameters of auxiliary contact

Category	Frame current (A)	Conventional thermal current Ith (A)	Rated working current Ie(A)	
			AC400V	DC220V
Auxiliary contact	400	3	1.5	0.15

8.3.2 Electrical life of auxiliary contact

Table 22 Electrical life of auxiliary contact

Ues category	On			Off			Times	Frequency	Power on time
	I/Ie	U/Ue	cosφ	I/Ie	U/Ue	cosφ			
AC-15	10	1	0.3	1	1	0.3	6050	360	≥0.05s
DC-13	1	1	6Pe	1	1	6Pe			≥T0.95ms

8.3.3 Making and breaking capacity of auxiliary contact

Table 23 Making and breaking capacity of auxiliary contact

Ues category	On			Off			Times	Frequency	Power on time
	I/Ie	U/Ue	cosφ	I/Ie	U/Ue	cosφ			
AC-15	10	1.1	0.3	10	1.1	0.3	10	360	≥0.05s
DC-13	1.1	1.1	6Pe	1.1	1.1	6Pe			≥T0.95ms

8.4 Alarm contact

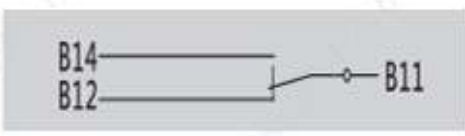
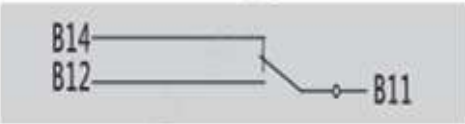
The circuit breaker is in the position of "opening" and "closing"	
The circuit breaker is in the position of "free tripping"	

Table 24 Current parameters of alarm contact

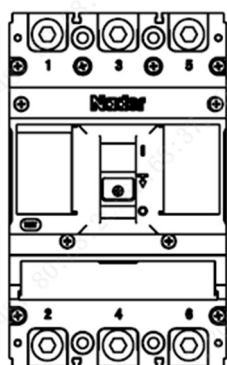
Category	Frame current (A)	Conventional thermal current I _{th} (A)	Rated working current I _e (A)	
			AC400V	DC220V
Alarm contact	400	3	0.4	0.15

Note: Shunt release, auxiliary contact and alarm contact wiring standard wire length is 0.7m, 1m, 2m, 4m can be customized according to demand.

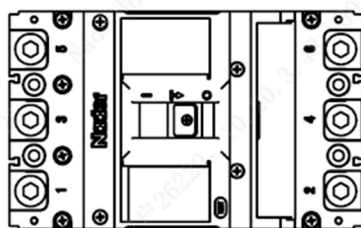
9. Installation Direction of Circuit Breaker

For vertical installation of the product, the gradient between the installation surface and the vertical plane is no more than $\pm 22.5^\circ$.

Horizontal installation of the product.



Vertical Installation



Horizontal Installation

10. Packaging and Storage of Circuit Breaker

Minimum packaging quantity: 1 piece/box. The packaged products should be stored in a warehouse with the air ventilation and the relative humidity no more than 80% when the ambient temperature is $-40^\circ\text{C} \sim +75^\circ\text{C}$. No acidic alkaline or other corrosive gas exists in the ambient air in the warehouse. Under the conditions above, the storage period shall be no more

than three years since the manufacturing date.

11. Installation Direction of Circuit Breaker

SN	Name	Specification	3P Quantity/Set
1	Cross small pan-head screw	M6×70	4
2	Hexagon nut	M6	4
3	Spring washer	6	4
4	Plain washer	6	8
5	Phase partition	——	4
6	Hexagon head combination bolt	M10×35	6

12. Circuit Breaker Notes

- 1) Various characteristics and accessories of the circuit breaker are set in the factory. The circuit breaker, tripping unit or other accessories can only be adjusted, installed and maintained by the trained or qualified professionals according to the parameter requirements of the line design;
- 2) Ensure that the power supply is off before installing or removing any device;
- 3) The circuit breaker handle can be located in three positions, indicating three states: on, off and free tripping. When the handle is in the free tripping position, pull the handle in the off direction when the circuit breaker is connected and on.