

Shanghai Liangxin Electrical Co., Ltd.

NDM3E-250 Product Specification

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

Prepared by	杨荣荣	Date	2022-12-21
Reviewed by	徐富平	Date	2022-12-30
Countersigned by	孙兰萍	Date	2022-12-30
Approved by	丁飞	Date	2022-12-30

Revision History					
Version	Revision Reason/Content	Implementat ion Date	Prepared by	Reviewe d by	Approve d by
0	Newly added	2020/10/28	Sun Lanping	Xun Funping	Ding Fei
1	Update the product appearance picture and product dimension outline drawing	2021/09/30	Sun Lanping	Xun Funping	Ding Fei
2	Add attachment information	2022/12/15	Yang rongrong	Xun Funping	Ding Fei

3. Specification and Model Description of Circuit Breaker

ND	M	3	E	-	250	□	□	/	□	/	□	□	□	□	□	□	□
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
SN	SN name					NDM3E											
1	Enterprise code					ND: “Nader” low-voltage apparatus											
2	Product code					M: Molded case circuit breaker (MCCB)											
3	Design SN					3											
4	Derived code of the series					E: Electronic											
5	Shell frame level					250											
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: Rotation handle											
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, 4											
10	Accessory code					See Table 1											
11	Application code					No code: Power distribution type											
						2: Motor protection type											
12	N-pole (neutral pole) type of the 4P product					C: The N-pole is installed with an overcurrent tripper, and on-off with the other three poles											
						D: The N-pole is installed with an overcurrent tripper, but always connected											
13	Special use					Q: Voltage-check self-reset											
14	Special function code					I: Non-tripping at the time of alarming											
15	Setting current					See Table 2											
16	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（only 3P）											
17	Other code					CS1-A/150: Circular center hole rotary handle + shaft length 150mm											
						CS1-A/200: Circular center hole rotary handle + shaft length 200mm											
						CS1-A/300: Circular center hole rotary handle + shaft length 300mm											
						CS1-A/350: Circular center hole rotary handle + shaft length											

	350mm
	CS1-A/650: Circular center hole rotary handle + shaft length 650mm
	CS1-F/150: Square center hole rotary handle + shaft length 150mm
	CS1-F/200: Square center hole rotary handle + shaft length 200mm
	CS1-F/300: Square center hole rotary handle + shaft length 300mm
	CS1-F/350: Square center hole rotary handle + shaft length 350mm
	CS1-F/650: Square center hole rotary handle + shaft length 650mm
	CS2-A/150: Circular eccentric hole rotary handle + shaft length 150mm
	CS2-A/200: Circular eccentric hole rotary handle + shaft length 200mm
	CS2-A/300: Circular eccentric hole rotary handle + shaft length 300mm
	CS2-A/350: Circular eccentric hole rotary handle + shaft length 350mm
	CS2-A/650: Circular eccentric hole rotary handle + shaft length 650mm
	CS2-F/150: Square eccentric hole rotary handle + shaft length 150mm
	CS2-F/200: Square eccentric hole rotary handle + shaft length 200mm
	CS2-F/300: Square eccentric hole rotary handle + shaft length 300mm
	CS2-F/350: Square eccentric hole rotary handle + shaft length 350mm
	CS2-F/650: Square eccentric hole rotary handle + shaft length 650mm
	DC1 24V: Electric operation voltage DC24V
	DC1 110V: Electric operation voltage AC/DC110V
	DC1 220V: Electric operation voltage AC230V/DC220V
	DC1 380V: Electric operation voltage AC380/400/415V
	AC230V: Shunt release/Under-voltage release operation voltage AC220/230V
	AC380V: Shunt release/Under-voltage release operation voltage AC380/400V/415V
	DC24V: Shunt release operation voltage DC24V
	DC220V: Shunt release operation voltage DC220V
	Z: Terminal housing
	J: Mechanical interlocking
	MS2: MS2 lock

Note: 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.

Table 1: Comparison Table of Accessory Code:

Legend

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

Accessory code	Accessory name	Installation Position	Model	Number of poles	NDM3E-250 (Non-communication type)	
					3	4
300	N/A				—	
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 single auxiliary contacts					
361	Two sets of dual-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					

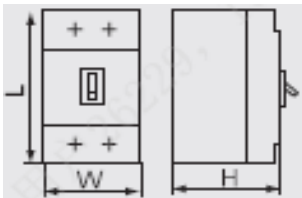
Accessory code	Accessory name	Installation Position	Model	Number of poles	NDM3E-250 (Communication type)	
					3	4
300	No internal accessories/communication type				—	
310	Shunt release (left)/communication type					
320	Dual-auxiliary contact (left)/communication type					
321	Single auxiliary contact (left)/communication type					
330	Undervoltage release (left)/communication type					
341	Shunt release (left)/single auxiliary (right)/communication type					
308	Alarm contact (left)/communication type					
318	Shunt release (left)/alarm contact (right)/communication type					
328	Dual-auxiliary contact (left)/alarm contact (right)/communication type					
338	Undervoltage release (left)/alarm contact (right)/communication type					
358	Auxiliary alarm contact (left)/communication type					
361	Single auxiliary contact (left)/single auxiliary contact (right)/communication type					
371	Undervoltage release (left)/single auxiliary contact (right)/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.
- 3) "I" in "32**I" identifies overload alarm without tripping, with output function, and the last two digits ** identify internal accessory code.

4. Main Technical Parameters of Circuit Breaker

Table 2 Main Technical Parameters of Circuit Breaker

Model			NDM3E-250			
Rated current of frame Inm (A)			250			
Rated current In (A)			160	250		
Setting current Ir(A)			63, 80, 90, 100, 125,140,160	100,125,160,180, 200,225,250		
Rated insulation voltage Ui (AC V)			1000			
Rated impulse withstand voltage Uimp (V)			8000			
Rated working voltage Ue (AC V)			380/400/415, 660/690			
Power frequency withstand voltage U (1min) (V)			3500			
Utilization category			A			
Rated short-time withstand current Icw (kA/1s)			1.6(160A), 2.5(250A)			
Number of poles			3		4	
Breaking capacity level			M	H	/	
Rated limit short-circuit breaking capacity Icu (kA)	AC380/400/415V		70	85	70	
	AC660/690V		20	/	20	
Rated operating short-circuit breaking capacity Ics (kA)	AC380/400/415V		50	65	50	
	AC660/690V		15	/	15	
Operating performance (times)	Electrical life		8000			
	Mechanical life	Maintainable free life	20000			
		Maintainable life	40000			
Boundary dimension			L(mm)	165	165	165
			W(mm)	107	107	142
			H(mm)	92. 4	92. 4	92. 4
Flashover distance(mm)			≤50			

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 NDM3E-250 Connecting Bus or Cable Cross-section Area

Setting current (A)	63	80	90, 100	125, 140	160	180, 200, 225	250
Cross-section area of conductor copper (mm ²)	16	25	35	50	70	95	120

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)
NDM3E-250	M8	12
	M4	2.4

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							
NDM3E-250	Temperature (°C)	40	45	50	55	60	65	70
	Derating factor	1	1	1	0.976	0.952	0.927	0.902

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	Maximum working current correction coefficient	Power frequency withstand voltage correction coefficient	Isolation voltage correction coefficient
2000	1	690	3500	1000
2500	1	690	3500	1000
3000	0.98	620	3150	900
3500	0.97	580	3000	850
4000	0.95	550	2800	810
4500	0.94	520	2650	770
5000	0.93	500	2500	730

4.5 Power loss coefficient of Circuit breaker

Table 7 Power loss coefficient table of Circuit breaker

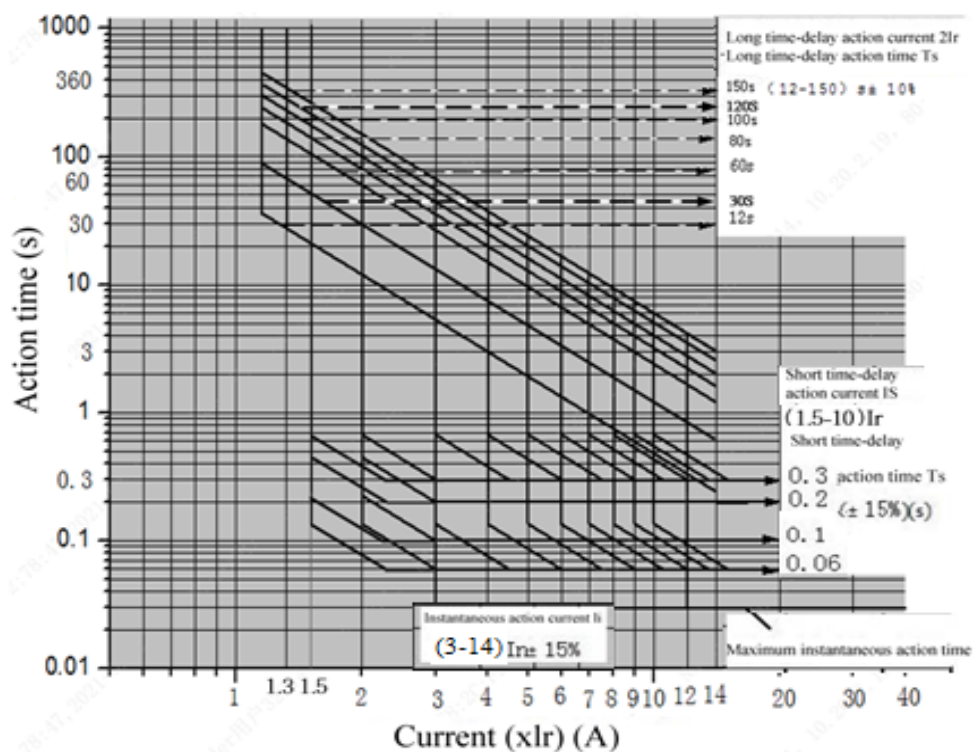
Model	Energizing current(A)	Total power loss(W)		
		Wiring before and after board	Plug in board front Wiring	Plug in bear board Wiring
NDM3E-250	250	62	62	70

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.

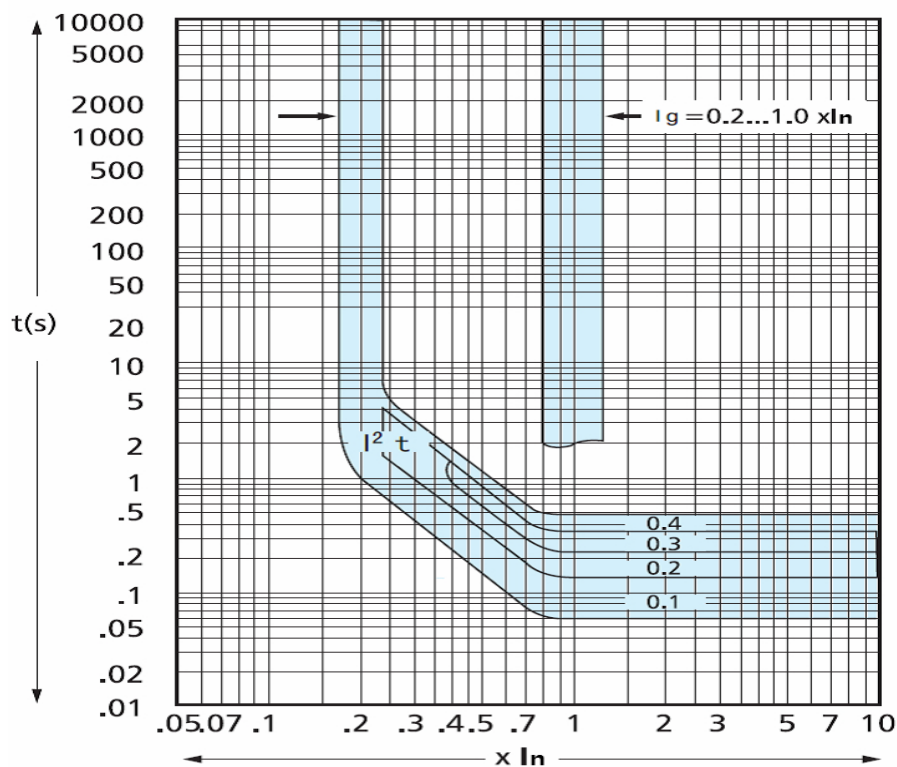
6. Short-circuit Overload Protection Characteristic Curve of Circuit Breaker

6.1 Long time-delay, short time-delay and instantaneous protection characteristic curve of power distribution type



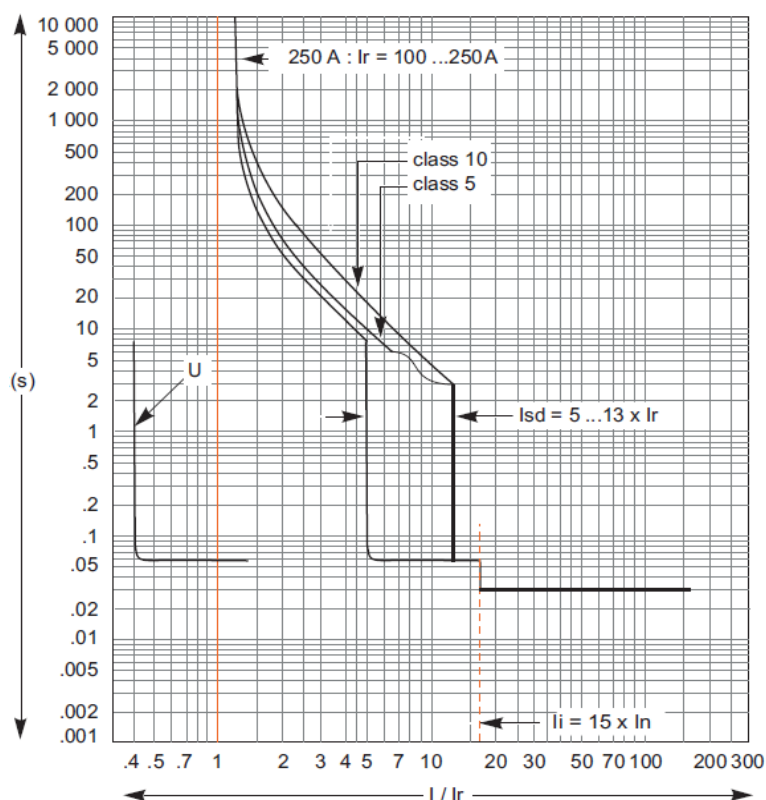
Time/Current Characteristic Curve

6.2 Ground protection characteristic curve of power distribution type



Ground protection characteristic curve

6.3、Time/current characteristic curve of motor protection type



Motor protection Characteristic Curve

6.4 Setting value of the intelligent controller

Table 8: Communication Type

Model	Rated current of frame In (A)	Current and time parameters					
		Ir(A)	Tr(s)	Isd($\times$ Ir)	Tsd(s)	Ii(A)	Ip($\times$ Ir)
NDM3E-250	160	63-160、OFF In step of 0.1A	12-150、OFF In step of 1s	94-1600、OFF In step of 1A	0.06、0.1、0.2、0.3	480-2240、OFF In step of 1A	44-160、OFF In step of 0.1A
	250	100-250、OFF In step of 0.1A		150-2500、OFF In step of 1A		750-3500、OFF In step of 1A	70-250、OFF In step of 0.1A

Table 8 (Continued): Communication Type

Model	Rated current of frame In (A)	Current and time parameters	
		IrN ($\times$ Ir)	TrN (s)
NDM3E-250	160	0.5, 1.0, OFF	Tr
	250		

Notes: 1. When Ir gear is OFF, it is closed with long delay and short delay at the same time; when Isd gear is OFF, it is closed with short delay;

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 Tr.

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 $0.2I_n$.

Table 9: Non-Communication Type

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)
NDM3E-250	160	63、80	12、30、60、80、100	1.5、2、3、4、5、6、7、8、10、12	0.06、0.1、0.2、0.3	3、4、5、6、7、8、10、12	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
		90、100							
		125、140							
		160、OFF							
NDM3E-250	250	100、125	100、120、150、OFF	6、7、8、10、OFF	0.06、0.1、0.2、0.3	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
		160、180							
		200、225							
		250、OFF							

Table 9 (Continued): Non-communication Type

Model	Rated current of frame I_n (A)	Current and time parameters	
		I_{rN} ($\times I_r$)	T_{rN} (s)
NDM3E-250	160	0.5, 1.0, OFF	T_r
	250		

Notes: 1. When I_r gear is OFF, it is closed with long delay and short delay at the same time; when I_{sd} gear is OFF, it is closed with short delay;

2. When the 4P product is basic type, I_p can't be set, if there isn't requirement in the order, the default value is $0.9I_r$.

3. When the product is grounding type, T_{sd} can't be set, if there isn't requirement in the order, the default value is 0.3s.

4. When the product is grounding type, I_p can't be set, if there isn't requirement in the order, the default value is $0.9I_r$.

5. When the 4P product is grounding type, I_{rN} can't be set, if there isn't requirement in the order, the default value is $1.0I_r$.

6. 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。

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

8. 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 $0.2I_n$.

9. 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.

Table 10 Motor Protection-type Intelligent Controller

Model	Shell frame level Rated current $I_n(A)$	Current and time parameters			
		$I_r(\times I_n)$	Class(s)	$I_{sd}(\times I_r)$	$I_{unbl}(\%)$
NDM3E-250	250	0.4-1.0	4-10	5、6、7、8、9 10、11、12、13 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 I_i has built-in $15I_n$.

6.4 Intelligent release protection features

Table 11: Ground Protection Characteristics

Overload long time-delay protection I _r , T _r								
Setting current I _r		See Table 8 or 9						
Action features (reverse time limit)	T _R setting value (s)	I _n =160, 250						
		12	30	60	80	100	120	150
	≤1.05I _r	>2h inaction						
	> 1.30I _r	< 1h action						
	t(s) at 1.5I _r	21. 3	53. 3	106. 7	142. 2	177. 8	213. 3	266. 6
	t(s) at 2.0I _r	12	30	60	80	100	120	150
	t(s) at 7.2I _r	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 ×T _r t: overload long time-delay action time T _r : setting value of the overload long time-delay action time I: Actual running current I _r : setting value of the overload long time-delay action current								
Short circuit short-time delay protection I _{sd} , T _{sd}								
Setting current I _{sd}			See Table 8 or 9					
Action characteristics	Reverse time limit I _{sd} ≤I<1.5I _{sd}	T _{sd} setting value (s)	0.06	0.1	0.2	0.3		
		t action time (s)	t=(1.5I _{sd} /I) ² ×T _{sd}					
	Fixed time limit 1.5I _{sd} ≤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 ×T _{sd} t: short-circuit short time-delay action time T _{sd} : setting value of the short-circuit short time-delay action time I: Actual running current I _{sd} : setting value of the short-circuit short time-delay action current								

Table 11 (Continued): Overload Long Time-delay Protection Features

Short circuit instantaneous protection Ii						
Action characteristics		Setting current Ii		See Table 8 or 9		
		Action time		<50ms		
Neutral wire protection IrN TrN						
Setting current Ip			See Table 8 or 9			
Action characteristics		TrN action time		Tr		
		Accuracy		±10% (Inherent error±20ms)		
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 product is A/B/C three-phase current vector sum, 4P product is A/B/C/N four-phase current vector sum.						
Note: The inverse time limit action curve conforms to t =(2Ig / I) ² ×Tg						
t: Action time			Tg: Setting time of ground protection			
I: Actual operating current			Ig: Setting current of ground protection			

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 1.5 Ir after power on) ● When it is greater than 7.2 Ir, the action time is calculated according to the actual current ● When it is less than or equal to 7.2 Ir 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		
	δ < Iunbl (%)		Inaction					

Note:

The actual current imbalance calculation is in accordance with $\delta = (I_{\max}) \times 100\% / I_{\text{avg}}$

$$\sum_{k=1}^3 I_k$$

$$I_{\text{avg}} = \frac{1}{3} \sum_{k=1}^3 I_k$$

δ : Percentage value of the actual current unbalance of the three-phase electricity

$I_{\max}$: 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	$I < 0.4 I_r$	During startup ($< \text{Class}$)	t action time (s)	0.7
		During normal operation ($\geq \text{Class}$)		4

Short circuit instantaneous protection I i

Setting current I_i	$15 I_n$
Action time	$< 50 \text{ ms}$

6. 7、Communication Adaptor DF-MB/C3

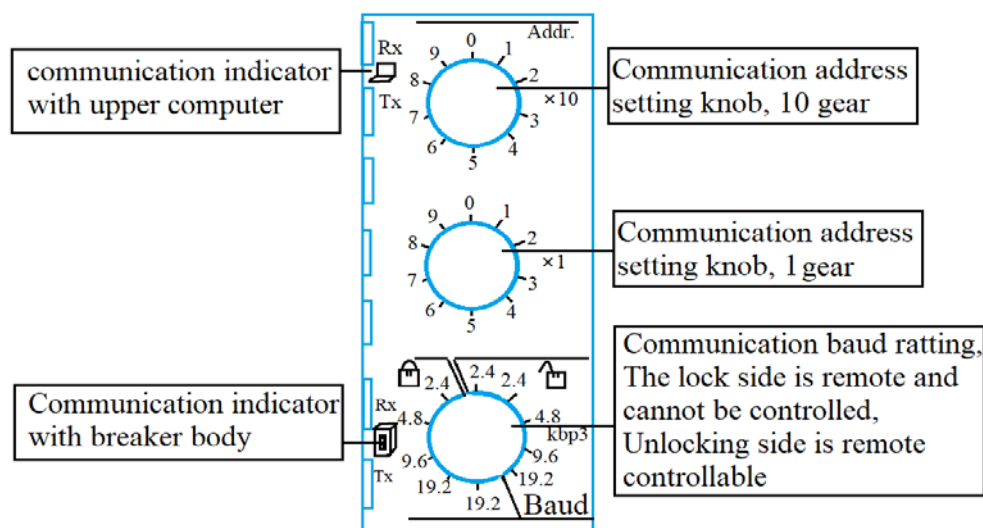
The communication adapter is DF-MB/C3, and the model of Circuit breaker release is communication or alarm without tripping, including this module.

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	Working temperature	-25℃~70℃

characteristic	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



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

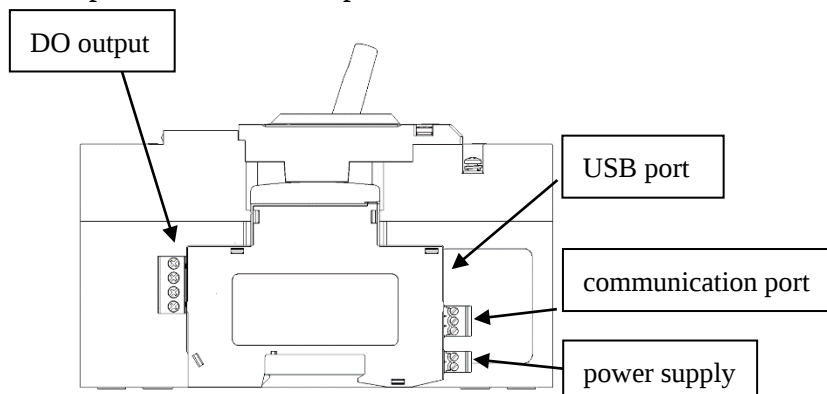
- 19200 / lock: baud rate 19200, control command disabled
- 19200 / no lock: baud rate 19200, control command enabled
- 9600 / lock: baud rate 9600, control command disabled
- 9600 / no lock: baud rate 9600, control command enabled
- 4800 / lock: baud rate 4800, control command disabled
- 4800 / no lock: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

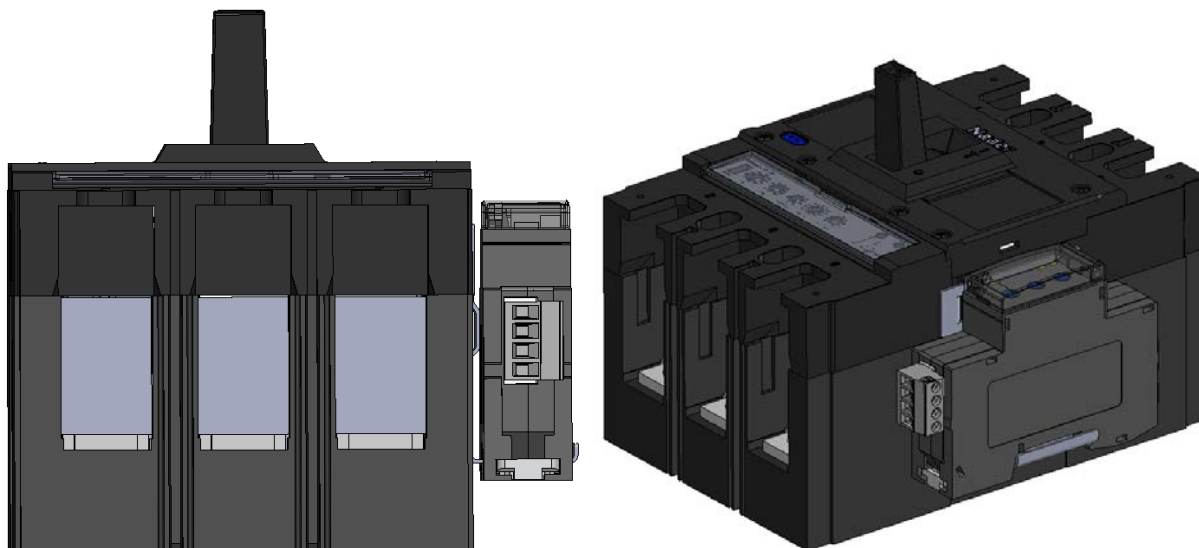
Communication adapter interface description



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.

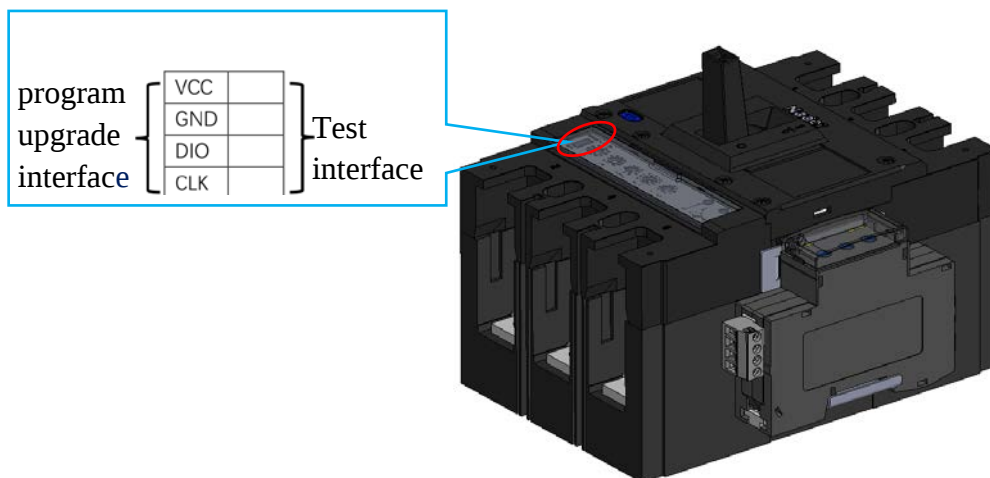
Note 3. The communication type Circuit breaker and the adapter can be connected through the communication line extending from the side of the Circuit breaker.



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

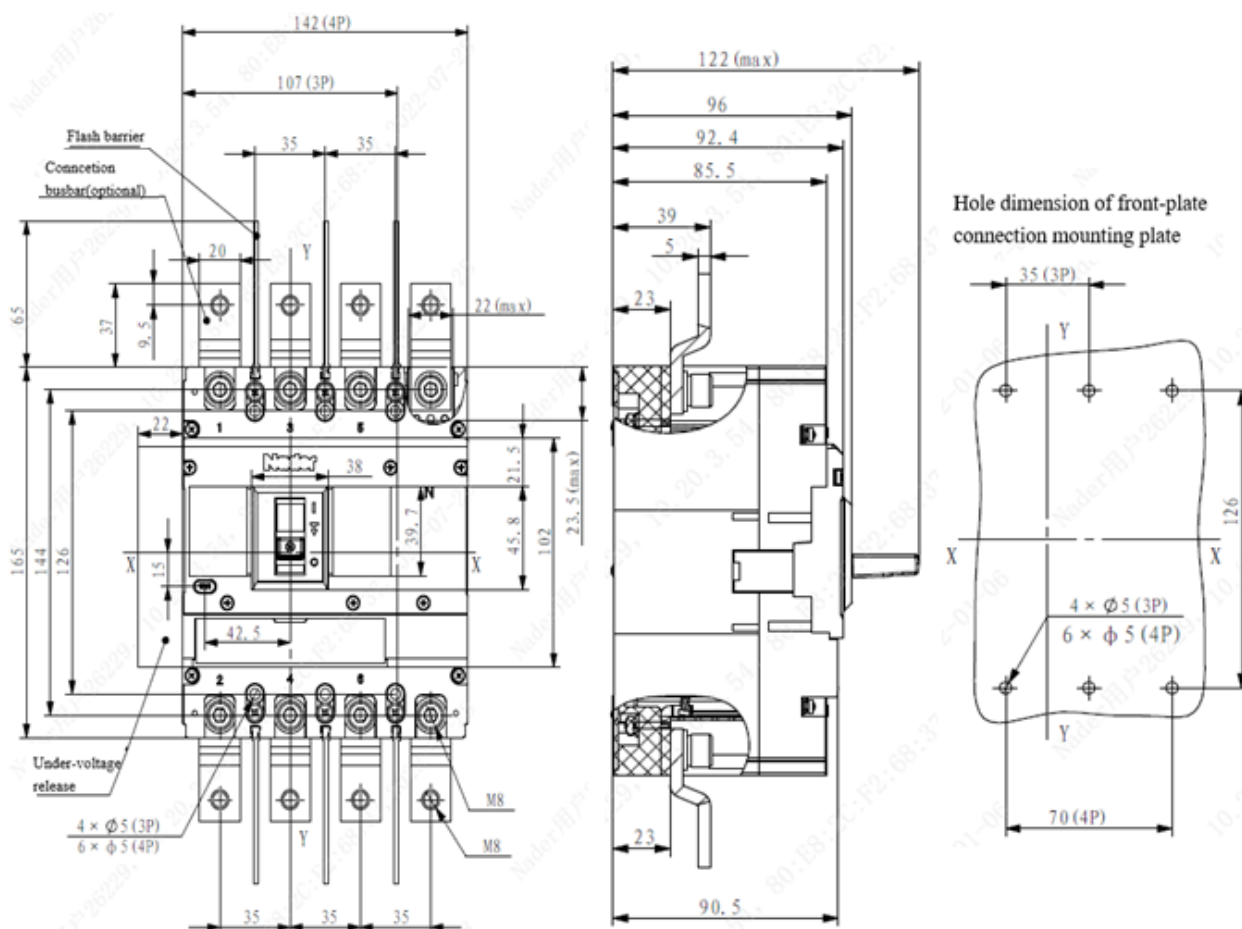
6.8 Program upgrade

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



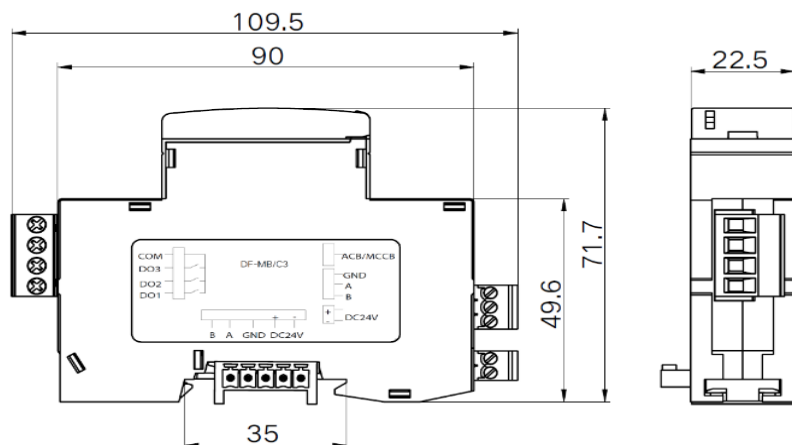
7. Outline, Mounting Hole Dimensions and Safety Distance of Circuit Breaker

7.1 Outline and Installation Dimensions of Circuit Breaker



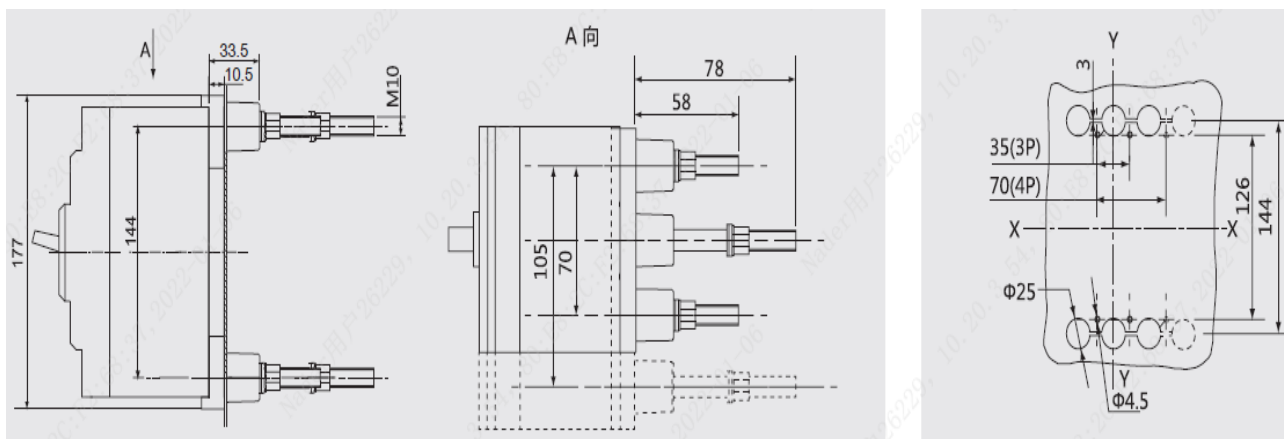
Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.2 Installation dimensions of communication adapter (Unit: mm)



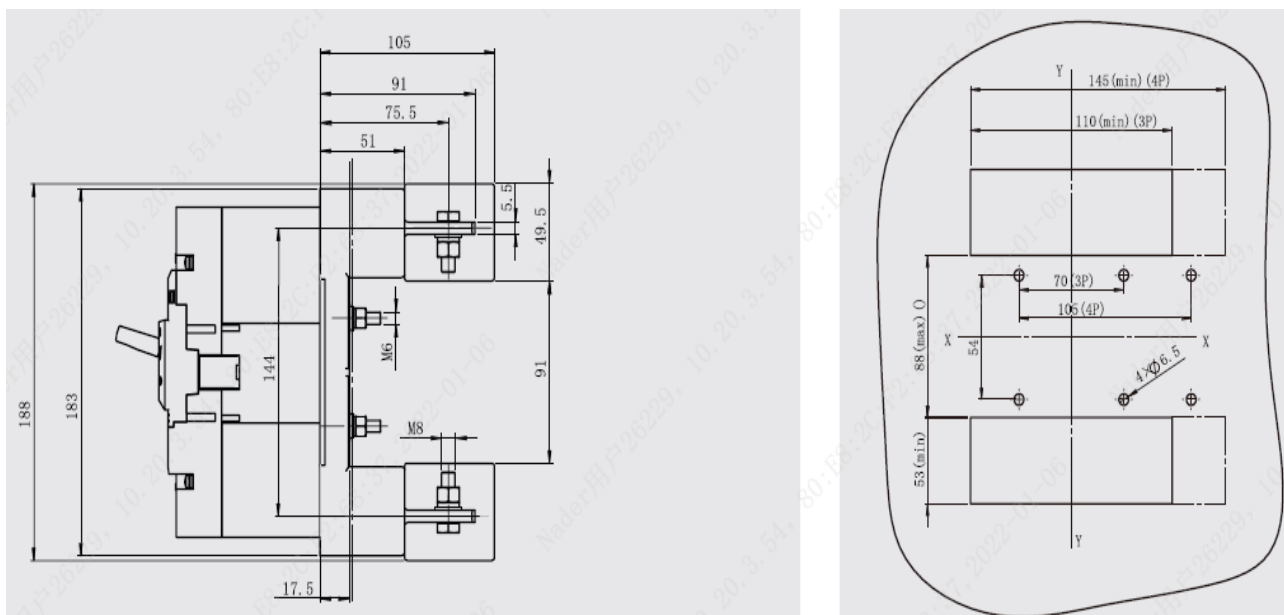
Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.3 Z1: opening size of rear wiring mounting plate



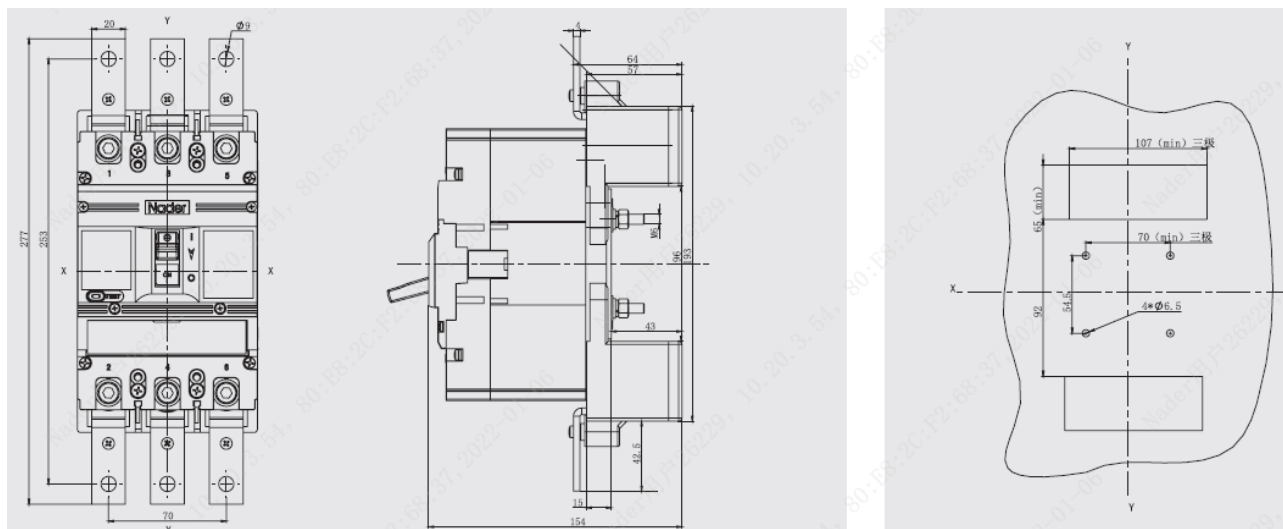
Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-c.

7.4 Z2H: plug in rear plate wiring



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

7.5 Z2Q Plug in front plate wiring (3P)



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

7.6 Manual operating mechanism

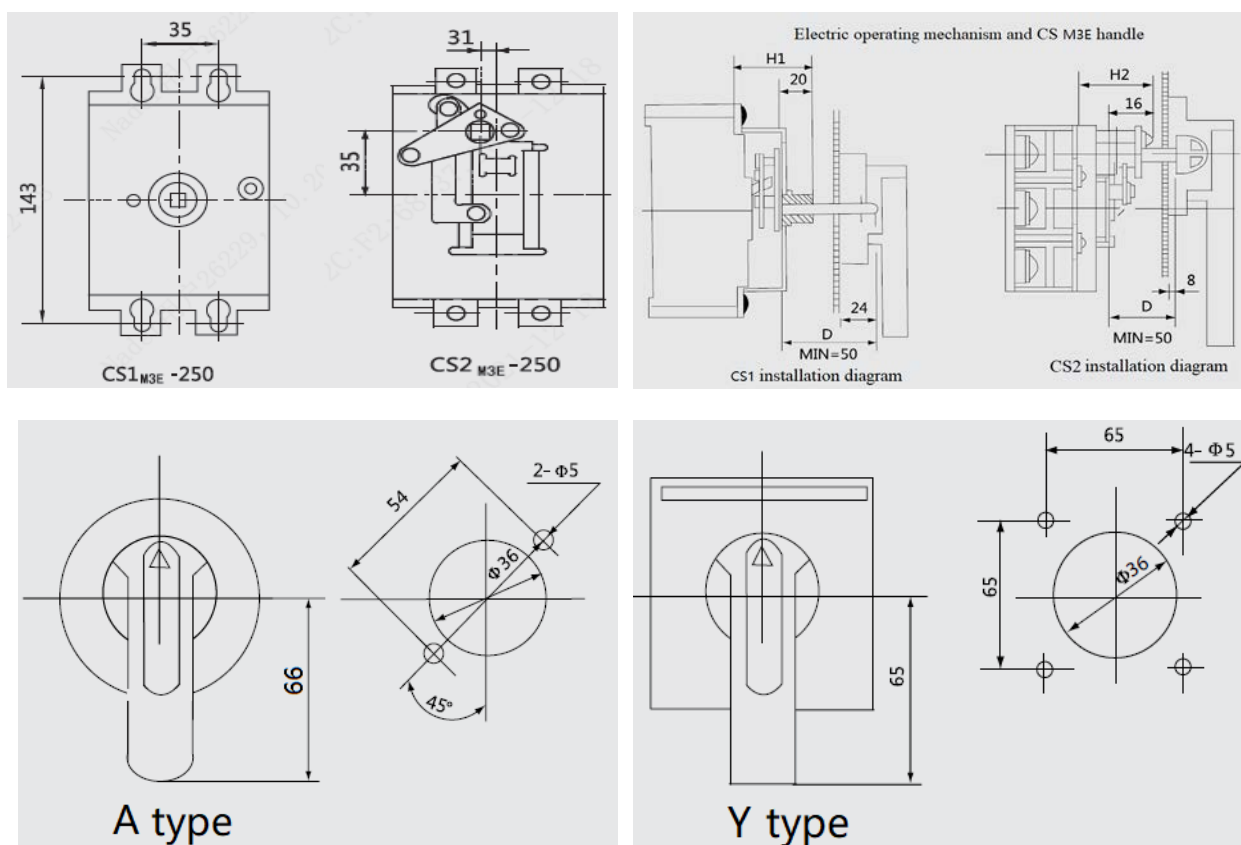
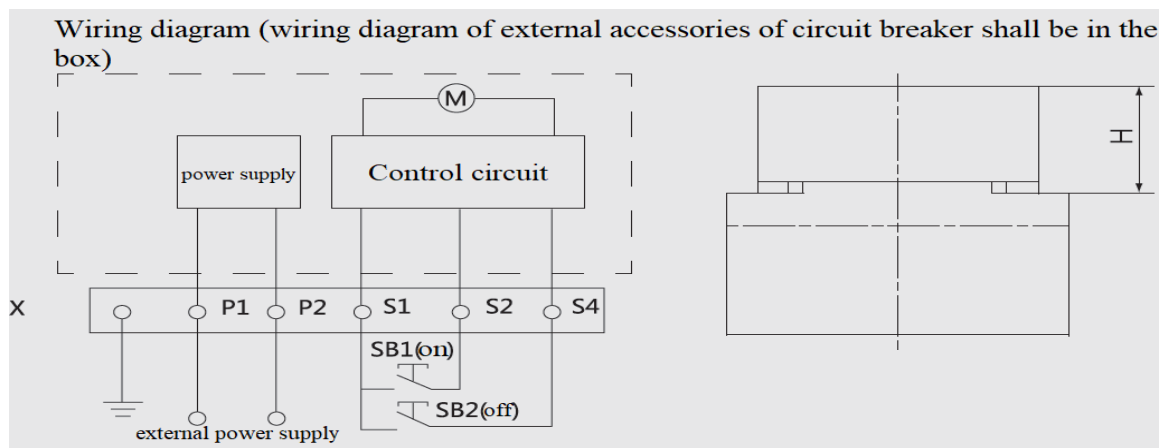


Table 13 Installation dimension of manual operating mechanism (Unit: mm)

Manual operation type	Model	Installation dimension of manual operating mechanism		Installation mode
		H1	H2	
CS1	NDM3E-250	49	/	Vertical installation
CS2	NDM3E-250	/	46	

- Note:1) A type is round handle, F type is square handle;
 2) The length of A-type handle is 66mm and that of F-type handle is 65mm;
 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.

7.7 Electric operating mechanism



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

X: Terminal block P1、P2: External power supply

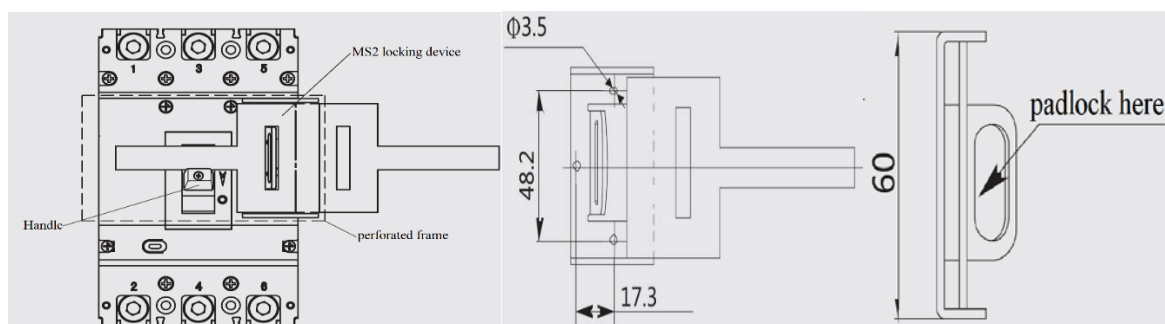
Voltage specification: AC110V、AC230V、AC380V、DC24V、DC110V、DC220V

Table 14 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	AC380V	DC24V		
NDM3E-250	≤ 0.5	≤ 180	≤ 180	≤ 350	80	20000	93

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 NDM3E 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;

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

7.9 Mechanical interlocking

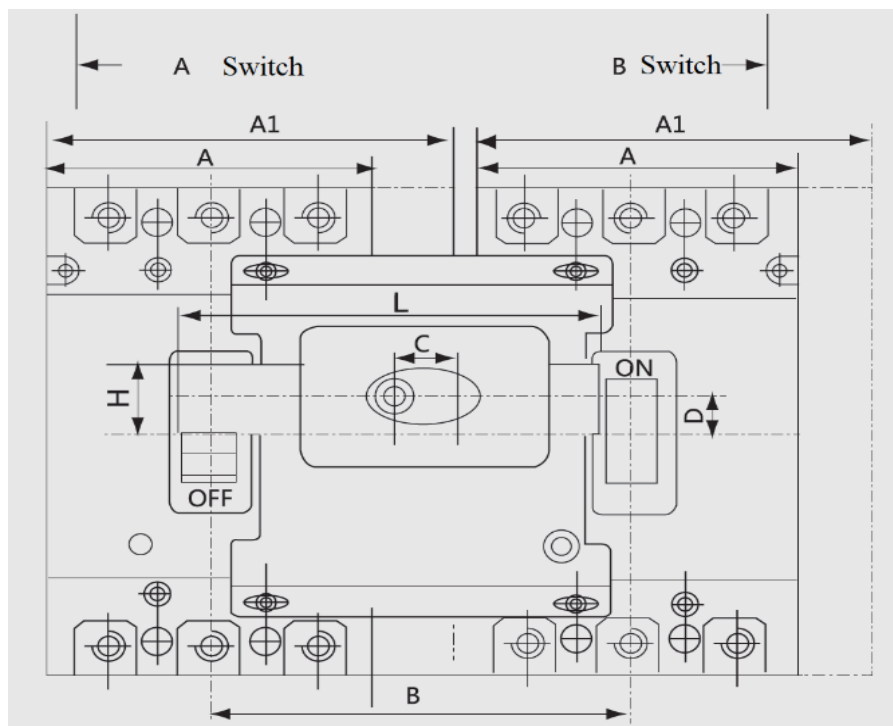


Table 15 Installation dimension of mechanical interlocking (Unit: mm)

Model	A	A1	B	C	D	L	H
NDM3E-250	107	/	132	44	16.5	142.5	22
NDM3E-250 (4P)	/	142	173	44	16.5	235	22

Note: 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		
NDM3E-250	25	65	30	30

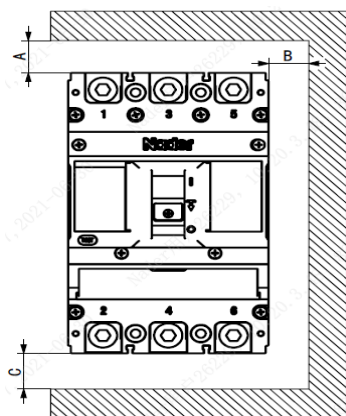


Table 17 Minimum Center Distance between Rowed Circuit Breakers (Unit: mm)

Model	Width of circuit breaker		Center distance	
	3 poles	4 poles	3 poles	4 poles
NDM3E-250	107	142	137	172

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.

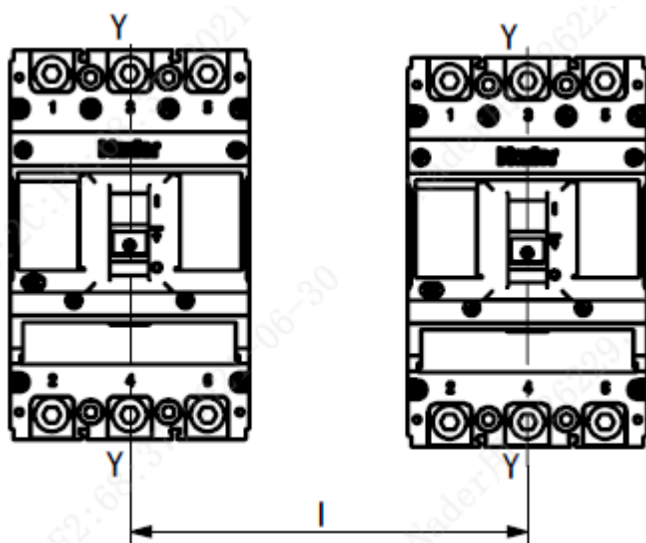


Table 18 Minimum Center Distance between Stacked Circuit Breakers (Unit: mm)

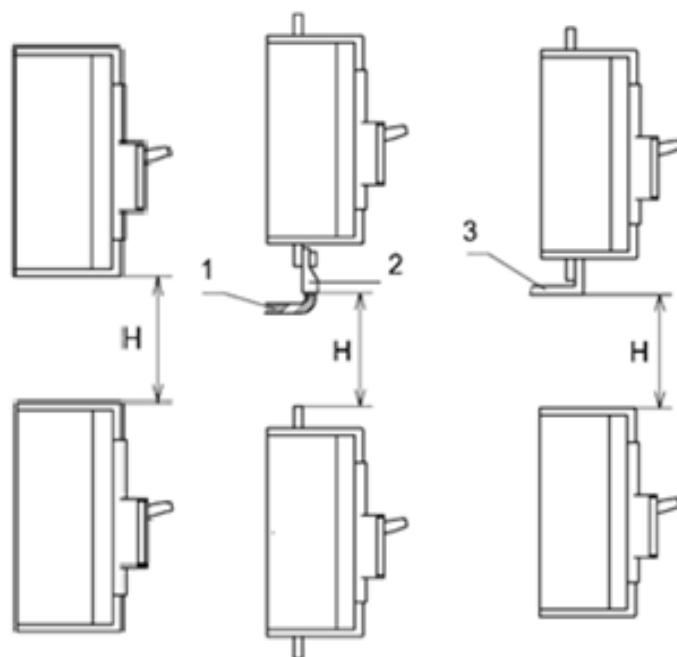
Model	H (distance of circuit breaker from bottom)	
	With a terminal cover	Without a terminal cover
NDM3E-250	90	93

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)	
	AC380V	AC230V	AC380V	AC230V
NDM3E-250	0.01	0.006	0.3	0.3

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.

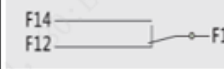
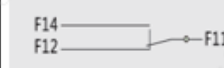
8.2 Shunt release

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
NDM3E-250	Instantaneous current value(A)	6.8	0.7	0.7	0.32
	Power waste (W)	163.2	154	154	128

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 (AC-15)	DC220V (DC-13)
Auxiliary contact	250	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

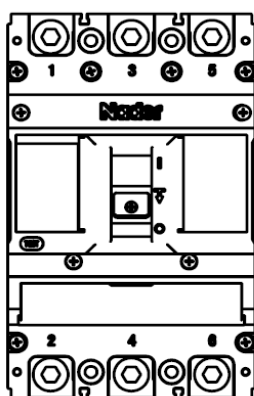
Category	Frame current (A)	Conventional thermal current Ith(A)	Rated working current Ie(A)	
			AC400V	DC220V
Alarm contact	250	3	0.3	0.15

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

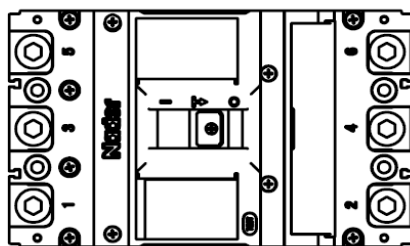
9. Installation Direction of Circuit Breaker

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	4P Quantity/Set
1	Cross small pan-head screw	M4×45	4	6
2	Hexagon nut	M4	4	6
3	Spring washer	4	4	6
4	Plain washer	4	4	6
5	Phase partition	——	4	6
6	Hexagon head combination bolt	M8×22	6	8

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.