Shanghai Liangxin Electrical Co., Ltd.

NDM5E-125 Moulded Case Circuit Breaker

Product Specification

（IPD-ENG-DEV-T22 A1 2016-09-23）

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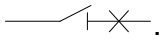
Approved	丁飞	Date	2022-12-13

Revision information					
Version	Revised contents and reasons	Date	Prepared	Reviewed	Approved
0	Newly added	2020/04/29	Wu Yali	Xu Tao	Cao Jian
1	The release plate is changed,and the tolerance level requirement of product outline dimension is added.	2020/07/02	Wu Yali	Xu Tao	Cao Jian
2	Appearance changes	2020/07/23	Wu Yali	Xu Tao	Cao Jian
3	Increase maintainable life	13/07/2022	Yang rong rong	Xu jun cheng	Ding fei
4	Add the terminal pin to the accessory package	05/12/2022	Yang rong rong	Xu jun cheng	Ding fei

1. Application

NDM5E-125 Series Moulded Case circuit breaker, with rated in sulation voltage of 800V, is applied to a circuit with alternate current of 50Hz or 60Hz.In the circuit with rated working voltage to AC380V/AC400V/AC415V, and rated working current of 32A to 125A.It is used to distribute electric energy, in addition to the functions of long-time delay inverse time limit of overload, short-circuit short-time delay definite time limit, short-circuit short-time delay inverse time limit, short-circuit instantaneous, overload and alarm, alarm non tripping, which can protect lines and power equipment from damage. It also has the current, voltage, power, electric energy, frequency, service life, opening and closing status, operation times and other information fed back to the upper computer or other energy efficiency management system, which is used to detect and monitor the circuit breaker, reduce the operation and maintenance cost of the power grid, and provide necessary data for the future energy efficiency system.

Separation function with related mark：  .

Meet the criterion：IEC60947-2、GB/T 14048.2.

Each voltage level and short-circuit section capacity of the circuit breaker can be connected with the lower incoming line.

2. Product Pictures

Fig. 1 Picture of Product

3. Model and Implication

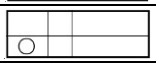
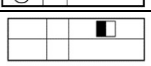
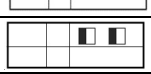
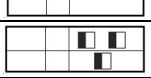
Table 1 Model Interpretation

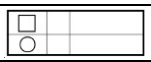
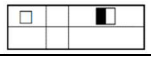
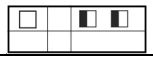
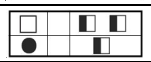
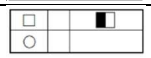
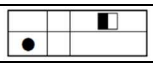
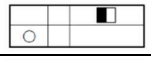
ND	M	5	E – 125	□	□ / □ / □ /	□	□	□	□
1	2	3	4	5	6	7 8 9	10	11	12	13

S.N.	Name of S.N.	Interpretation
1	Enterprise characteristic code	ND：Nader low-voltage apparatus
2	Product type code	M：Moulded case circuit breaker (MCCB)
3	Design S.N.	5
4	Series derived code	E: Electronic
5	Shell grade	125
6	Breaking capacity level	L:standard
		M:medium-high
		H:high
7	Rated current	32,63,125
8	Pole	3:3 poles
		4A: N-pole is without the over-current protection and always connect
		4B: N-pole is without the over-current protection and acts together with other three poles(N-pole close first and open last)
		4C: N-pole is with the over-current protection and acts together with other three poles(N-pole close first and open last)
		4D: N-pole is without the over-current protection and always connect
9	Trip release code	ETB: electronic release
		ETB-T: communication electronic release,
		ETB-PT：communication energy efficiency electronic release
10	Installation code+ Wiring method	Null: Stationary connector + front panel wiring
		ES：Stationary connector+ front extension wiring board
		R0：Stationary connector + screw connector +on after terminal
		Fcu：Stationary connector +front bare copper cable wiring
		G：Guide rail type+ front panel wiring
		GES：Guide rail type+ front extension wiring board
		GFcu：Guide rail type+ front bare copper cable wiring
		P0FH：plug-in without secondary connector +horizontal wiring in front of board
		P0RH：plug-in without secondary connector + horizontal wiring behind the board
		P0RV：plug-in without secondary connector +rear vertical wiring
		P1FH：plug-in with secondary connector + horizontal wiring in front of board
		P1RH：plug-in with secondary connector + horizontal wiring behind the board

		P1RV：plug-in with secondary connector + rear vertical wiring
11	Operation method	Null: directly handle operation
		Z1A150:rotary handle with round center hole and square axis length 150mm
		Z1A200: rotary handle with round center hole and square axis length 200mm
		Z1A300:rotary handle with round center hole and square axis length 300mm
		Z1A350:rotary handle with round center hole and square axis length 350mm
		Z1A650:rotary handle with round center hole and square axis length 650mm
		Z1F150:rotary handle with round square hole and square axis length 150mm
		Z1F200:rotary handle with round square hole and square axis length 200mm
		Z1F300:rotary handle with round square hole and square axis length 300mm
		Z1F350:rotary handle with round square hole and square axis length 350mm
		Z1F650:rotary handle with round square hole and square axis length 650mm
		M02:motor operation DC24V
		M11:motor operation AC110V/DC110V
		M22:motor operation AC230V/DC220V
		M40:motor operation AC400V
12	Accessory code	See table 2
13	Other codes	J:Mechanical interlocking
		MS2：MS2 lock

Table 2 Accessory Code

Accessory code	Accessory name	Installation position
		3P、4P
-	None	—
08	Alarm contact	
10	Shunt release	
30	Under-voltage release	
21	Single auxiliary contact	
61	Two sets of single auxiliary contacts	
23	Three sets of single auxiliary contacts	
18	Shunt release, alarm contact	

38	Under-voltage release, alarm contact	
22	Single auxiliary contact, alarm contact	
88	Two sets of single auxiliary contacts, alarm contact	
26	Three sets of single auxiliary contacts, alarm contact	
42	Shunt release, single auxiliary contact, alarm contact	
44	Shunt release, two sets of single auxiliary contacts, alarm contact	
46	Shunt release, three sets of single auxiliary contacts, alarm contact	
75	Under-voltage□Release, single auxiliary contact, alarm contact	
77	Under-voltage release, two sets of single auxiliary contacts, alarm contact	
81	Under-voltage release, three sets of single auxiliary contacts, alarm contact	
41	Shunt release, single auxiliary contact	
11	Shunt release, two sets of single auxiliary contacts	
12	Shunt release, three sets of single auxiliary contacts	
71	Under-voltage release, single auxiliary contact	
72	Under-voltage release, two sets of single auxiliary contacts	
73	Under-voltage release, three sets of single auxiliary contacts	

Note: ◧Single auxiliary contact; □ Alarm contact; ●Shunt release; ○Under-voltage release

The ETB-T /ETB-PT in NDM5E-125 has no three auxiliary codes.

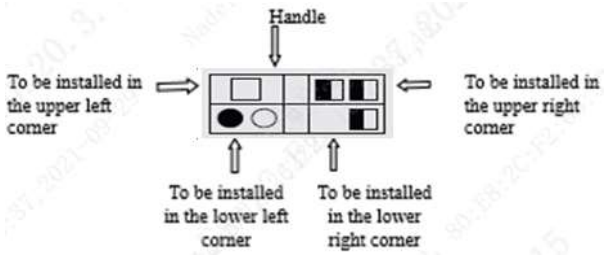
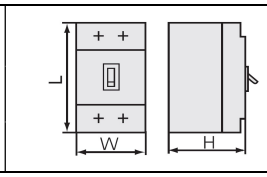


Fig2. Diagram for Accessory Installation

4. Main Technical Parameters

Table 3 Main Technical Parameters

Shell rating current Inm	125
Rated current In (A)	32,63,125
Rated operating voltage Ue (V)	AC380/AC400/AC415
Rated impulse withstand voltage Uimp(V)	8000
Rated insulation voltage Ui(V)	800
Power frequency withstand voltage (1min)(V)	3000

Pole			3			4		
Rated limit short circuit breaking capacity level Icu (kA)	Model	Breaking capacity level	L	M	H	L	M	H
	NDM5E -125	AC380/AC400/AC415V	70	100	150	70	100	150
Rated short circuit Breaking capacity level Ics (kA)			Ics=100%Icu					
Life	Mechanical life	Maintainable free life	20000					
		Maintainable life	40000					
	Electrical life		10000					
External dimension		L（mm）	135					
		M（mm）	90			120		
		H（mm）	80					
Flashover distance(mm)			≤50					

Note：The overall dimension does not include the dimension of terminal cover。

4. 1 sectional area and applicable rated current adopted in wiring

Table 4 Wiring Wire Parameters

Rated current(A)	32	63	125
Sectional area of conductor(mm^2)	6	16	50

4.2 Tightening Torque of the Circuit Breaker Terminal and Mounting Screw

Table 5 Screw Parameter

Rated current of frame level	Thread specification	Torque value(N.m)
125	M6	12
	M4	1.2

4.3 Temperature variation deration coefficient of circuit breaker

Table 6 Temperature variation deration coefficient of circuit breaker

Model	Deration factor of product temperature change							
NDM5E-125	Temperature(℃)	40	45	50	55	60	65	70
	Deration factor	1	1	1	1	1	0.9	0.9

Note: 1)When the operating ambient temperature is below +60℃, and do not need to reduce capacity.

2)The above deration factors are measured under the rated current of the shell frame.

4.4 High altitude deration factor of circuit breaker

Table 7 Altitude drop correction factor

Altitude (m)	2000	2500	3000	3500	4000	4500	5000
Working current correction coefficient	1	1	0.98	0.97	0.95	0.94	0.93
Power frequency withstand voltage (V)	3000	3000	2700	2550	2400	2300	2200
Average insulation class (V)	800	800	720	670	630	600	560

4.5 Power consumption of circuit breaker

Table 8 NDM5E-125 Product current specification single phase power consumption able

Model	Current specification	Single phase power consumption (W)		
		Front and rear wiring	Plug in front of plate、rear board wiring	Extended row wiring
NDM5E-125	125A	7.2	8.5	7.7
Note：The above data are the single-phase loss measured under the rated current of the circuit breaker when the ring temperature is 40℃。				

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℃~ +70℃; the average within 24h shall not be more than +35℃. If the ambient temperature is higher than +60℃, 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℃ should not exceed 50%. A higher relative humidity is allowed at a lower temperature. For example, the relative humidity at 20℃ 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）Degree of protection : IP 20;

8）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;

9）In case of stricter user conditions than the above description, negotiate with the manufacturer.

6. Time-Current Curves

6.1 Tripping characteristics curve under normal environment (ambient air temperature: +40℃)

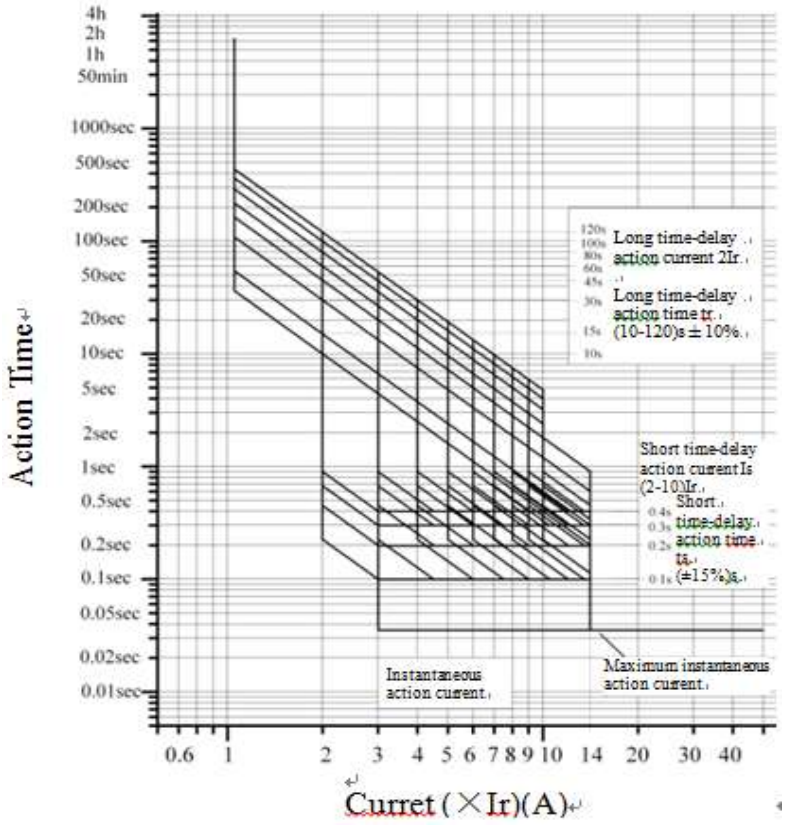


Fig.3 Tripping Curve Plot

Note：When the current is （1-1.5）Is, the short time-delay tripping time Ts is inverse time limit, and the accuracy is ±10%. And there is 20ms fixed error.

When the current >1.5Is, the short time-delay tripping time Ts is fixed time limit, and the accuracy is ±10%. And there is 20ms fixed error as well.

6.2 Current limiting and permissive characteristic curve

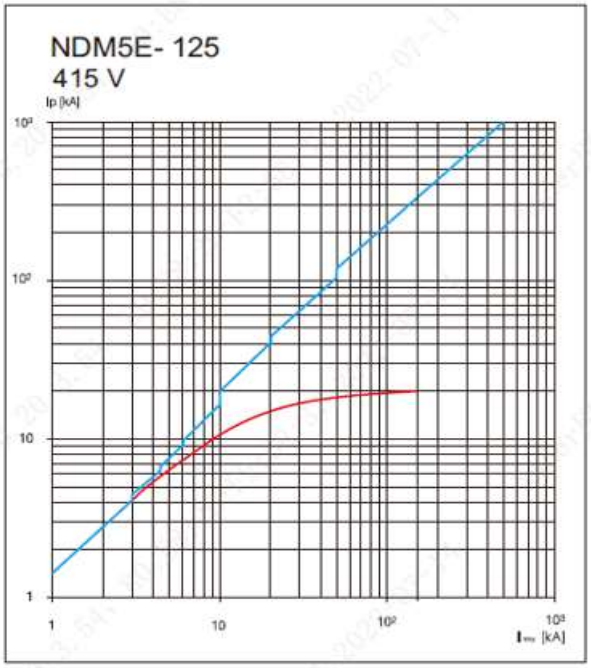


Fig.4 Current limiting characteristic curve chart

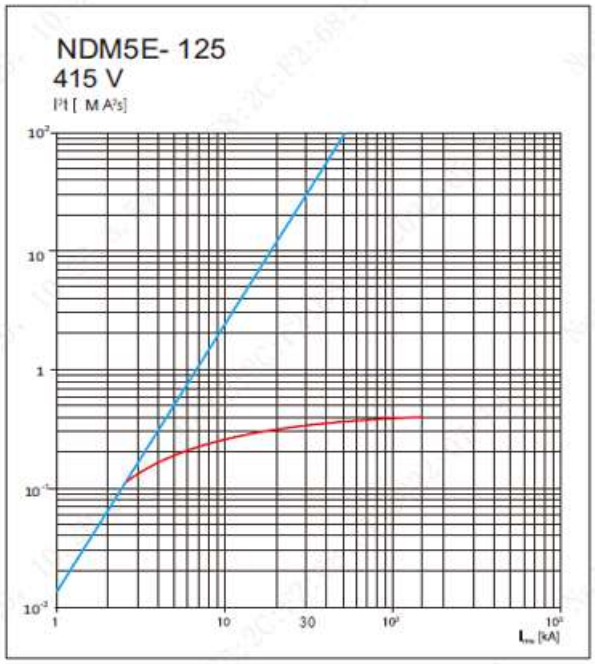
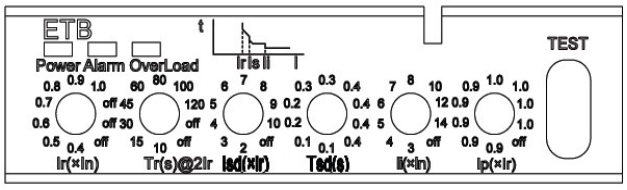
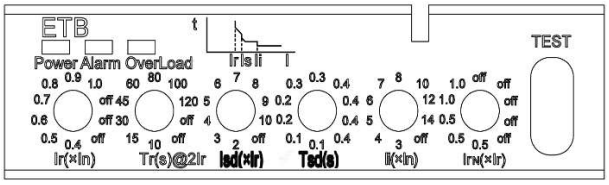


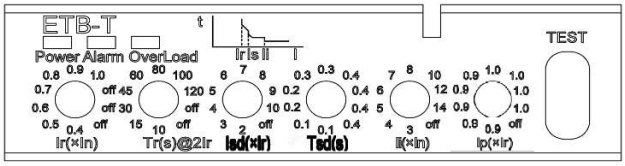
Fig.5 Permissive characteristic curve chart

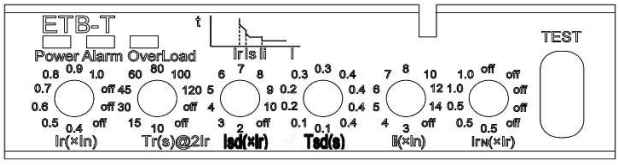
6.3 Operation of controller for NDM5E-125



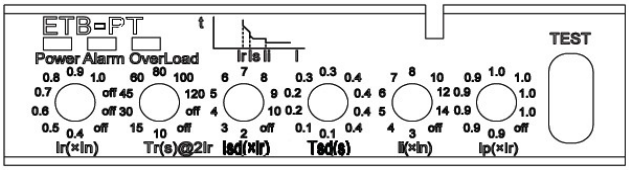


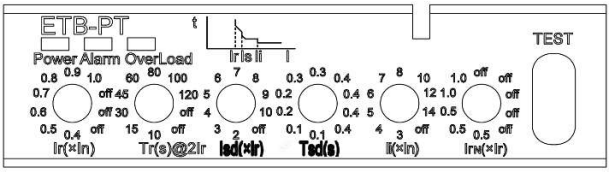
Electronic Release





Communication Electronic Release





Communication Energy Efficiency Electronic Release

3P 4P

Fig. 6 Gear for Electronic Release

6.3.1 Controller panel component of circuit breaker

6.3.1.1 Circuit breaker control panel components

1) Ir Overload long delay current setting

2) Tr Overload long delay time setting

3) Isd Short circuit short delay current setting

4) Tsd Short circuit short delay time setting

5) Ii Short circuit instantaneous current setting

6) Ip Pre-alarm current setting

7) IrN N phase protection current setting

8) In rated current

9) TEST test port

10) Power power indicator

11) Alarm Pre-alarm indicator

12) OverLoad Overload indicator

6.3.1.2 Functions of each part of controller control panel

1) Test port

Special test equipment can be connected to via this port to test and adjust.

Meanwhile the port is also used to communication connection.

2) Current and time knob

Rotating to set up the current and time. Good combination of these parameters can give protection to cable and device. This must be operated by professionals.

Note: When Ir is set to 1.0, Tr@2Ir to 10s and the main loop is powered on at the current of I=2×125A, the circuit breaker will break the main loop after lasting 10s with an accuracy of the action time ±10%.

At the overload current, the breaking time of the main loop performed by the circuit breaker depends on the formula below: t=(2×Ir/I)2×Tr@2Ir.

I: Indicates the actual current value in main circuit when overload.

6.3.1.3 Indicators

1) Power indicates Power

Indicator is on when working

2) Pre-alarm indicates Alarm

Indicator flashes when actual working current is over the set Ip and turns constant on after certain time.

3) Overload indicates over

Indicator is on when actual working current is over 1.15 times of the set Ir. The breaker trips after certain time.

6.3.2 Setting of Controller Parameters

Table 9 Parameter Setting Gear Table of the 3P Electronic Controller

Rated current In（A）	Current and time parameters					
	Ir(×In)	Tr（s）	Is(×Ir)	Ts(s)	Ii(×In)	Ip(×Ir)
32 63 125	0.4,0.5, 0.6,0.7, 0.8,0.9, 1.0,off	10,15,30,45 ,60,80,100, 120, off	2,3,4,5,6,7,8 ,9,10,off	0.1, 0.2, 0.3, 0.4	3,4,5, 6,7,8, 9,10, 12,14,off	0.9, 1.0, off

Table 10 Parameter Setting Gear Table of the 4P Electronic Controller

Rated current In（A）	Current and time parameters					
	Ir(×In)	Tr（s）	Is(×Ir)	Ts(s)	Ii(×In)	IrN(×Ir)
32 63 125	0.4,0.5, 0.6,0.7, 0.8,0.9, 1.0,off	10,15,30,45,60, 80,100, 120, off	2,3,4,5,6, 7,8,9,10, off	0.1, 0.2, 0.3, 0.4	3,4,5,6,7, 8,9,10, 12,14,off	0.5, 1.0, off

Note: For 4P products, Ip=0.9Ir

For ETB-T/ETB-PT products, the P and T in release derived code are displayed in side label of the products.

6.3.3 Detail demonstration of controller function

6.3.3.1 Basic function table

Table 11 Comparison Table for Basic Function

Release code			ETB	ETB-T	ETB-PT
Protection alarm	Long-delay protection		√	√	√
	Short-delay protection		√	√	√
	Instant protection for short circuit		√	√	√
	Neutral pole protection(4C/4D)		√	√	√
	Ground protection		—	—	—
	Over/under-voltage protection		—	—	√
	Pre-alarm for overload		√	√	√
	Heat simulation(heat memory)		√	√	√
Measurement	Current measurement		—	√	√
	Voltage	Line/phase voltage	—	—	√
	Power	Active Reactive Apparent PF	—	—	√
	Energy	Active Reactive Apparent	—	—	√
	Frequency		—	—	√
Maintenance	Setting	Knob	√	√	√
		Menu	—	—	—

	Storage for Fault memory	Overload, short-delay for short circuit, instant for short circuit, action time, fault phase	1 note1	20	20
		Over/under voltage, action time, fault phase	—	—	
	Operation time with electricity		—	√	√
	Contact wearing		—	√	√
	Storage for log		—	20	20
Display	Real-time current		—	√	√
	Real-time voltage		—	—	√
	Power, energy, frequency		—	—	√
	Setting value		—	—	√
	Last fault type, fault current and voltage, action time length, occurrence time		—	√note2	√note2
Extended module	Diplay module note3		○	○	○
	Temperature testing module note3		○	○	○

Note1：Communication adaptor DF-MB/C3 or display module DF-XS1 need to be deployed；

Note 2：Displayed by the upper system

Note 3：○Means optional function

All protections must meet the power supply requirements of the circuit breaker, with three-phase energization of 0.2In and single-phase energization of 0.4In.

6.3.3.2 Setting value for controller

1) Setting value of the overload long time-delay protection

The overload long time-delay protection is based on the true RMS value for protecting the load.

Table 12 Overload Long-Delay Protection Parameter Setting

Setting gear of the current Ir		(0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0,off) ×In tolerence±3%							
Action characteristics	Tr@2Ir setting gear (s)	Inm=32,63,125A							
		10	15	30	45	60	80	100	120
	≤1.05Ir	＞2h (no action)							
	＞1.30Ir	＜1h (action)							
	At 1.5Ir, tr (s)	17.78	26.67	53.33	80.00	106.67	142.22	177.78	213.33
	At 2.0Ir, tr (s)	10	15	30	45	60	80	100	120
	At 7.2Ir, tr (s)	0.77	1.16	2.31	3.47	4.63	6.17	7.72	9.26
	Accuracy (%)	±10							

Note: The action curve complies with tr=(2Ir)2×Tr@2Ir /I2

tr: overload long time-delay action time

Tr@2Ir: 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

When Tr is off, MCCB will not trip if overloaded.

2) Setting value of the short-circuit short time-delay protection

The short time-delay protection prevents the impedance short-circuit of the distribution system. Divided into two segments: reverse time limit and fixed time limit.

Table 13 Short Circuit Short Delay Protection Parameter Setting

Setting gear of the current Is		(2, 3, 4, 5, 6, 7, 8, 9, 10,off)×Ir				
Action characteristics	Reverse time limit Is≤I＜1.5Is	Ts setting gear (s)	0.1	0.2	0.3	0.4
		ts action time (s)	ts=(1.5Is)2×Ts/I2			
	Fixed time limit 1.5Is≤I＜Ii	ts action time (s)	0.1	0.2	0.3	0.4
		Accuracy (%)	±20	±10		
	I＜0.9 Is	no action				

Note: The action curve of the reverse time limit complies with ts=(1.5Is)2×Ts/I2, while the action time of the fixed time limit tracks the Ts setting value.

ts: short-circuit short time-delay action time

Ts: setting value of the short-circuit short time-delay action time

I: Actual running current

Is: setting value of the short-circuit short time-delay action current

There is an additional fixed error 20ms except from the time accuracy in table above.

When Ir is ture off, Isd will turn off synchronously.

3) Setting Value of the Short-Circuit Instant Protection:

The instantaneous protection function can prevent short circuit of metal solids of the distribution system. Due to larger short-circuit current of the fault, the system requires being disconnected rapidly.

Table 14 Short-Circuit Instant Protection Parameter Setting

Action characteristic	setting current gear Ii(×In)	3	4	5	6	7	8	10	12	14
	Current accuracy (%)	±15								
	I≥1.15Ii action time	＜50ms								
	I≤0.85Ii	no action								

4) Setting Value of The N-Phase Protection:

The 4-pole controller features the N-phase overload long time-delay protection.

Table15 N-Phase Protection Setting Value

N-phase protection type	Description
0.5Ir	The protective action point is half of the setting value in case of a N-phase overload fault
1.0Ir	The protective action point equals to the setting value in case of a N-phase overload fault
off	N-phase protection turned off

Note: The N-phase overload long time-delay protection time tracks the Tr setting value.

5) Setting value of the overload pre-alarm:

Table 16 Controller with Pre-Alarm Function

Setting current Ip		(0.9,1.0,OFF)×Ir tolerence±3%	Tolerence	Note
Action characteristic	＜ 0.9 IP	Change from flashing to keeping on	±3	The overload alarm of the 4P controller is fixed in the controller Ip=0.9Ir.
	＞1.1 IP	Change from flashing to keeping on		
	Off	Off	Off	
Function Description		when I ≥ IP, the warning indicator (yellow light) flashes. After t = t / 2, the indicator turns to be on continuously		

6) Measurement accuracy

Table 17 Measurement Accuracy Parameter

		Measurement range	Accuracy
Current	Ia, Ib, Ic, In	（0.2～2）In	±1%;
Voltage	Line voltage	（0.5～1.5）Ue	±0.5%
	Phase volatge	（0.5～1.5）Ue/1.732	±0.5%
Power	Active power	（0.2～2）In, （0.5～1.5）Ue	±1%
	Reactive power		
	Apparent power		
	Power function	-0.5～-1，0.5～1；	±1 %
Energy	Active energy	（0.2～2）In, （0.5～1.5）Ue	±1%
	Reactive energy		
	Apparent energy		
Frequency		/	±0.1Hz

6.3.4 Health management

The indication of circuit breaker health is expressed by 0 to 100%，and the superposition management id carried out form the three dimensions of production date, operation times and contact wear。

Note: It can only be read through communication 。

7. Product outline and installation dimensions

7.1 Overall dimension and installation dimension of front board wiring products

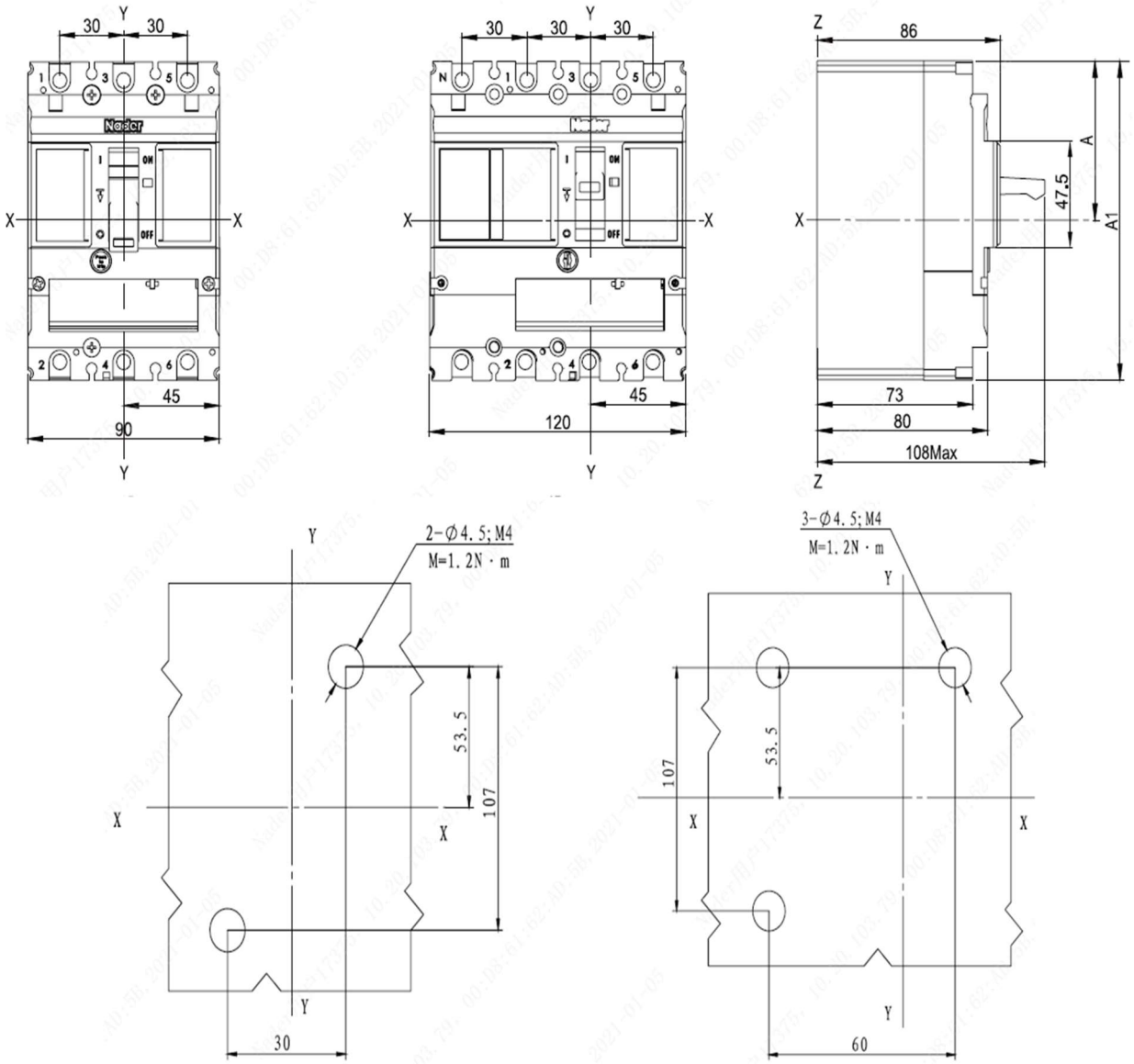


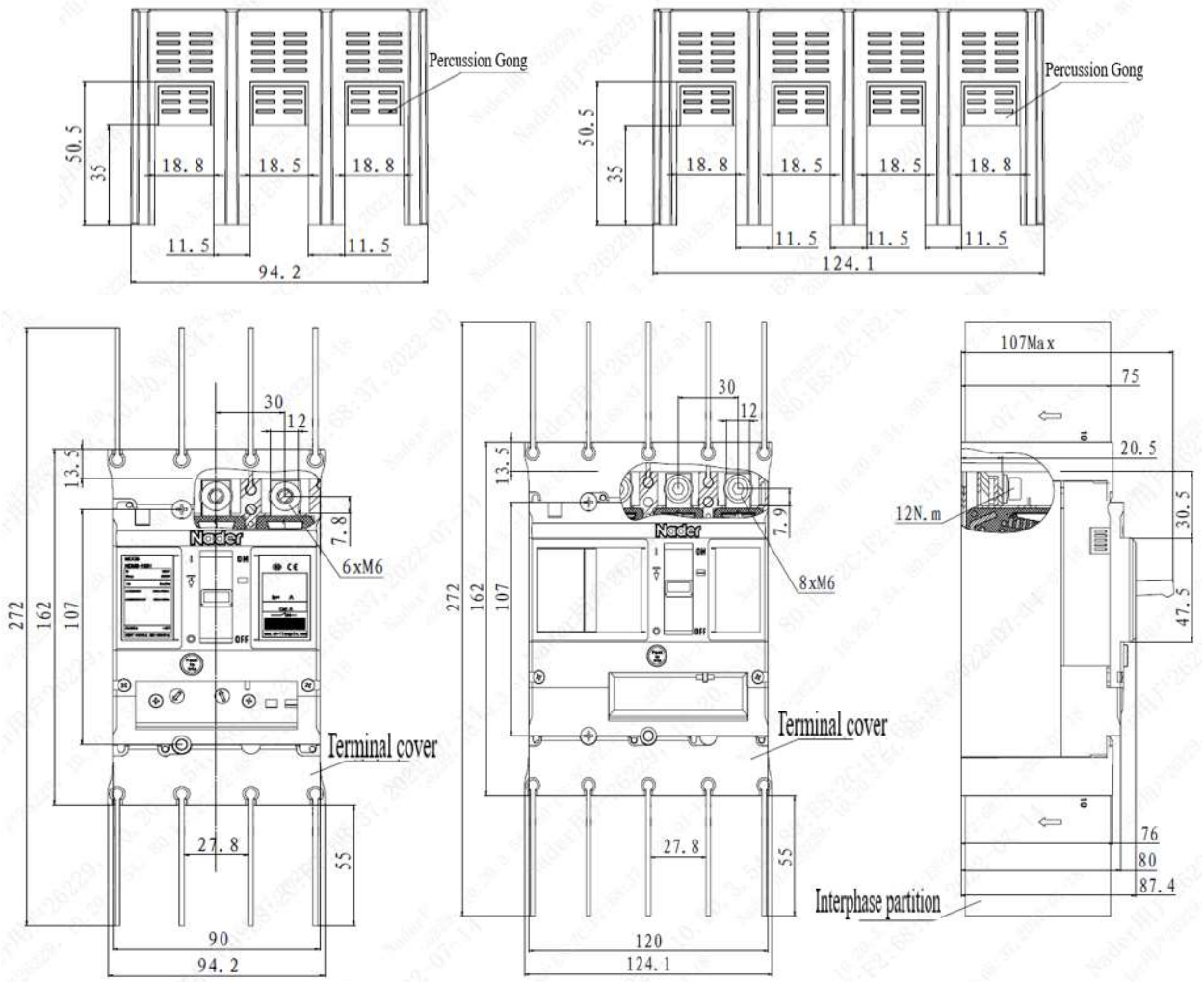
Fig.7 External Dimensions Of Front-Panel Connection Products

Note1): Dimensions of copper bar front-Panel connection products: A=67.5, A1=135;

Dimensions of cable front-Panel connection products (Fcu): A=77.5, A1=155;

2) Unmarked tolerance level should follow GB/T 1804-c.

7.2 Outline and installation dimension of terminal cover



Note: Unmarked tolerance level should follow GB/T 1804-c.

7.2 External Dimensions of Extended Front-Panel Connection Products

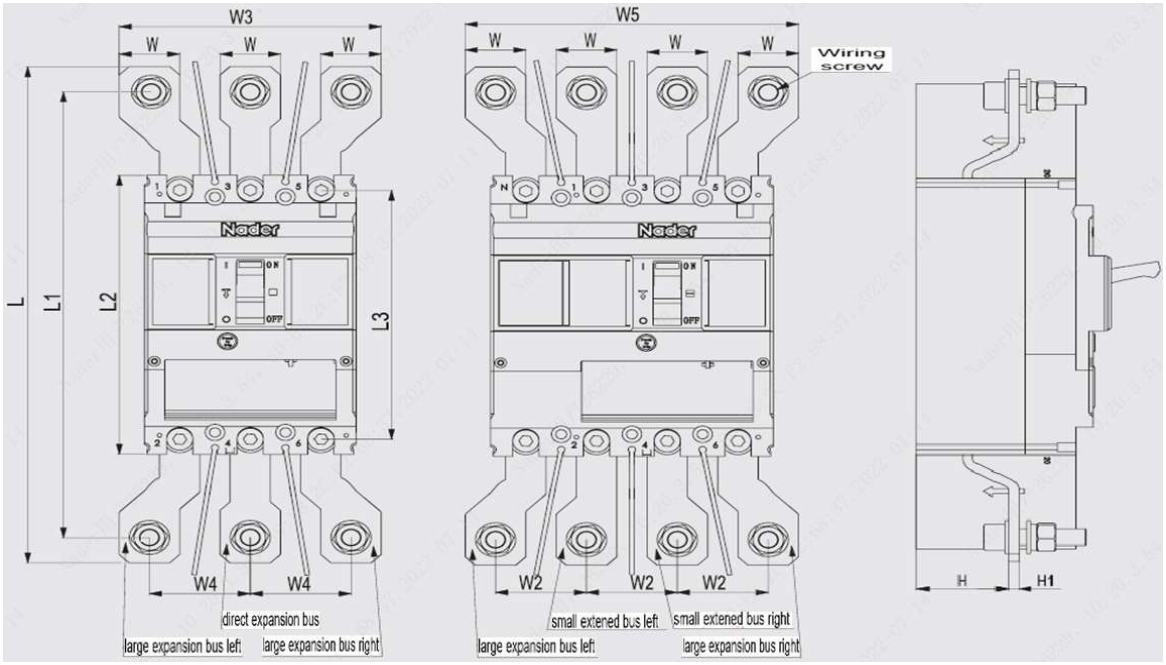


Fig.8 3P、4P Outline and installation dimensions of expansion wiring in front of the board

Table 18 The overall dimensions of the front wiring expansion bar and the circuit breaker after combined installation are shown in the figure below (unit: mm)：

Extended bus	L	L1	L2	L3	W	W2	W3	W4	W5	H	H1	Wiring screw
KM1/M5-160	244.5	214.5	135	119	30	45	130	52.5	160	25	5	M10×40

Note 1:3p Extended bus combination mode：large expansion bus（2 pieces on the left、 right）+2 –piece direct expansion busbar；

2:4p Extended bus combination mode：small expansion bus（2 pieces on the left、 right）large expansion bus（2 pieces on the left、 right）；

3: Unmarked tolerance level should follow GB/T 1804-c.

7.3 3P、4P、Outline and installation dimension of rear wiring board

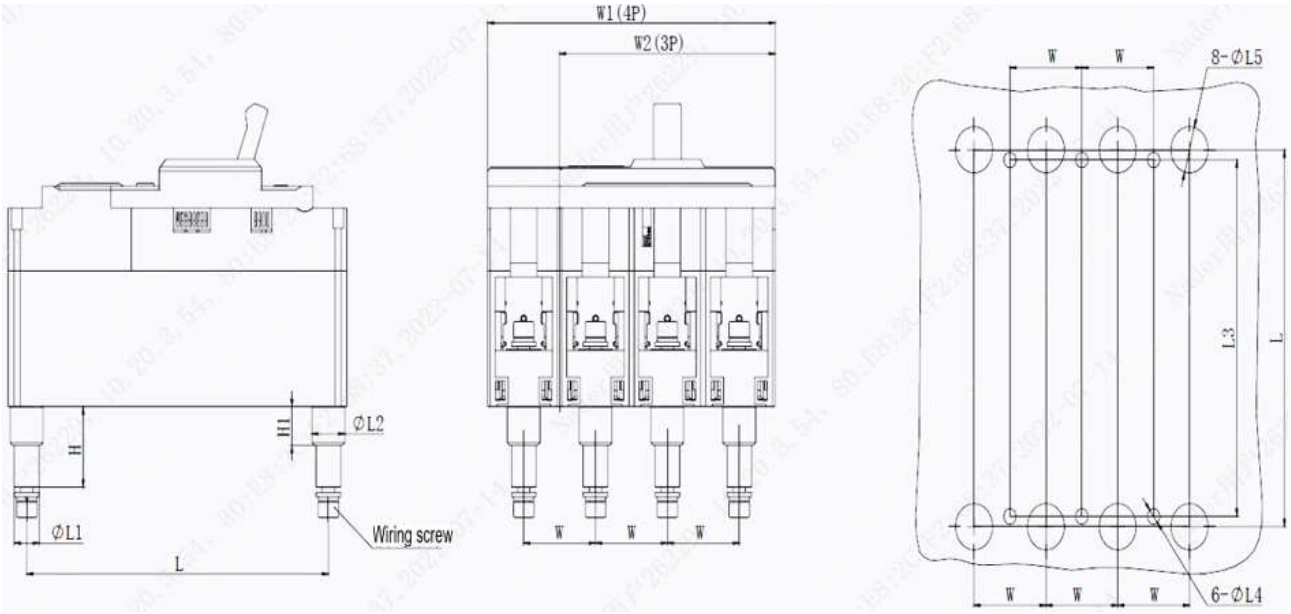


Fig.9 3P、4P outline dimension drawing of rear wiring board

Table 19 3P、4P the installation dimensions of wiring products behind the board are shown in the table below (unit: mm)

Pear panel wiring	L	L1	L2	L3	L4	L5	H	H1	H2	W	W1	W2	Wiring screw(provided by the user)
BH1/M5-160	119	10	13.5	107	5	15	33.5	10	25	30	120	90	M6×16

Note: Unmarked tolerance level should follow GB/T 1804-c.

7.4 3P、4P Outline and installation dimensions of plug-in board front wiring

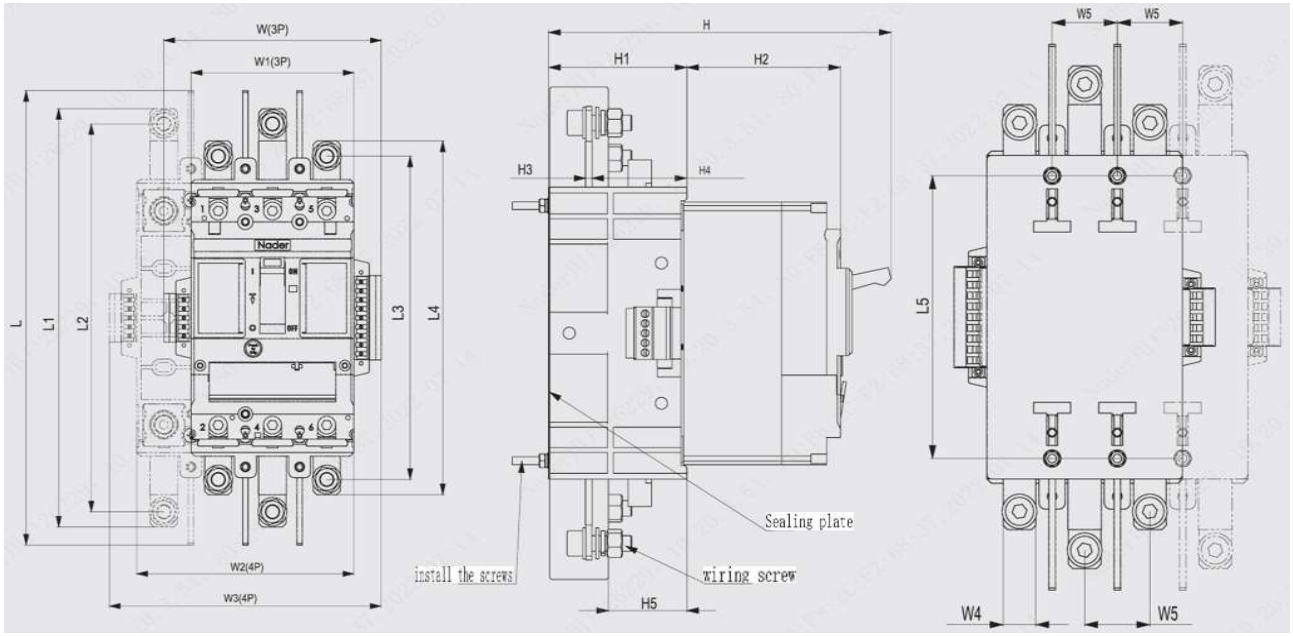


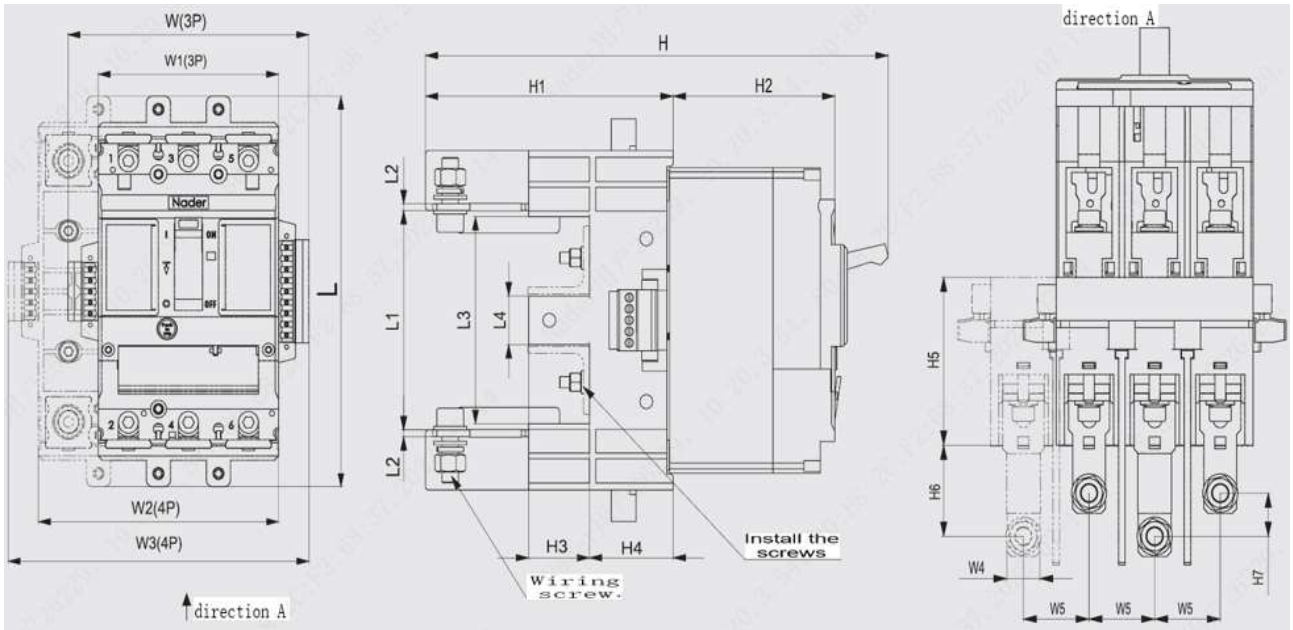
Fig.10 3P、4P Outline and installation dimensions of plug-in board front wiring

Table 20 3P、4P The overall dimensions of plug-in board front wiring (horizontal) and circuit breaker after installation are shown in the figure below (unit: mm)

Plug in specification	W	W1	W2	W3	W4	W5	L	L1	L2	Wiring screw
CR1-Q/M5-160	121	90	120	151	15	30	253	233	216	M8×25
Plug in specification	L3	L4	L5	H	H1	H2	H3	H4	H5	Install the screws
CR1-Q/M5-160	180	197	131	175	71	79	3	49	40	M4×75

Note: Unmarked tolerance level should follow GB/T 1804-c.

7.5 3P、4P Mounting hole dimensions of plug-in connections



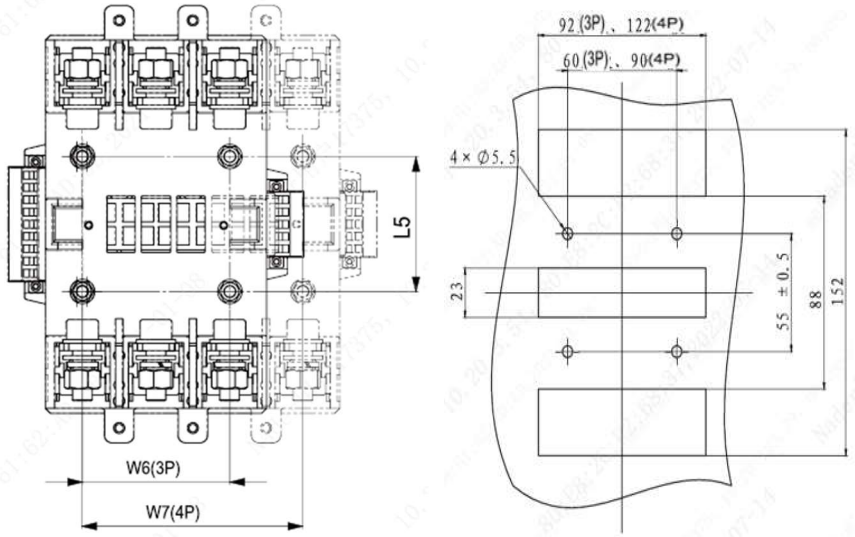


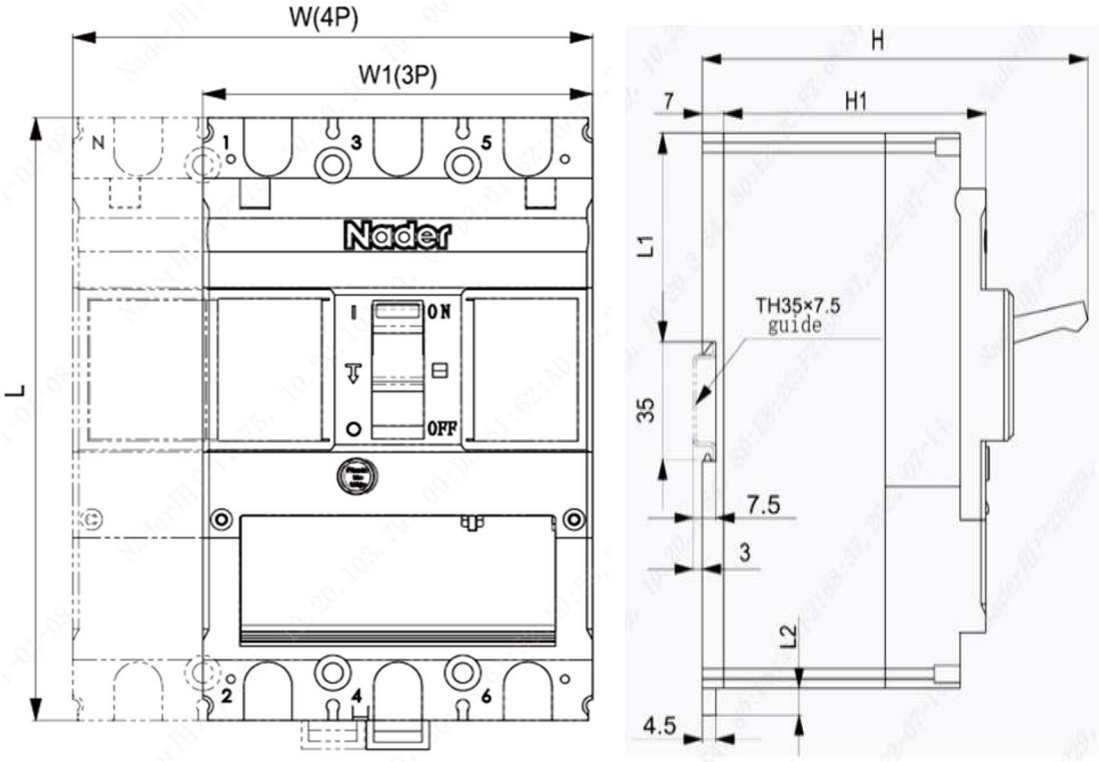
Fig.11 3P、4P Mounting hole dimensions of plug-in connections

Table 21 The overall dimensions of plug-in device (horizontal wiring behind the board) and circuit breaker after installation are shown in the table below (unit: mm)

Plug in board rear wiring	W	W1	W2	W3	W4	W5	W6	W7	L	L1	L2	Wiring screw
CR1-H/M5-160	121	90	120	151	15	30	60	90	178	97	3	M8×25
Plug in board rear wiring	L3	L4	L5	H	H1	H2	H3	H4	H5	H6	H7	Install the screws
CR1-H/M5-160	91	22	55	225	120	79	29	41	70	38	18	M5×35

Note: Unmarked tolerance level should follow GB/T 1804-c.

7.6 Installation Dimensions Of Guide Rails



Note: Unmarked tolerance level should follow GB/T 1804-c.

Fig.12 Overall dimension of guide rail installation

Table 22 Overall dimension of guide rail installation table (unit: mm)

Model	W	W1	L	L1	L2	H	H1	Series
NDM5E-125	120	90	135	50	5.3	106	80	3P/4P

Note: Unmarked tolerance level should follow GB/T 1804-c.

7.7 Rotary handle operating mechanism

Manual operation-the schematic diagram of handle installation and opening and the outline dimension diagram of manual operation are shown below respectively：

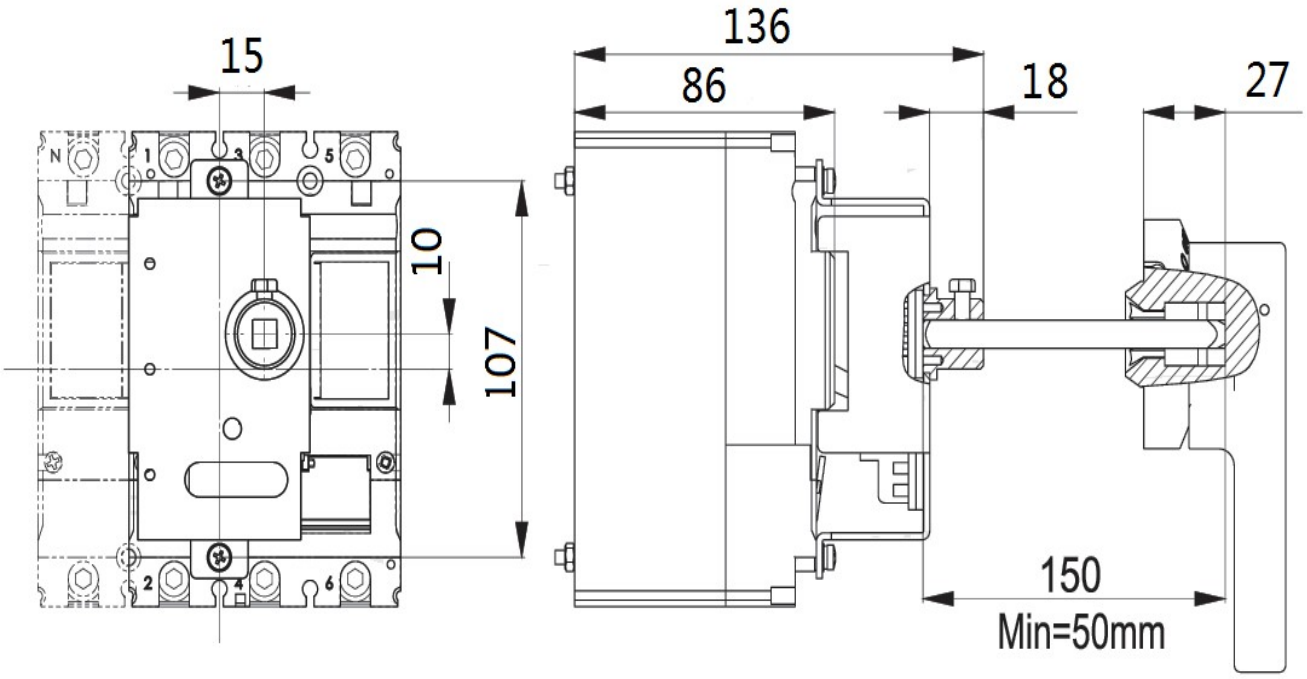


Fig.13 External Dimension Diagram of Manual Operation

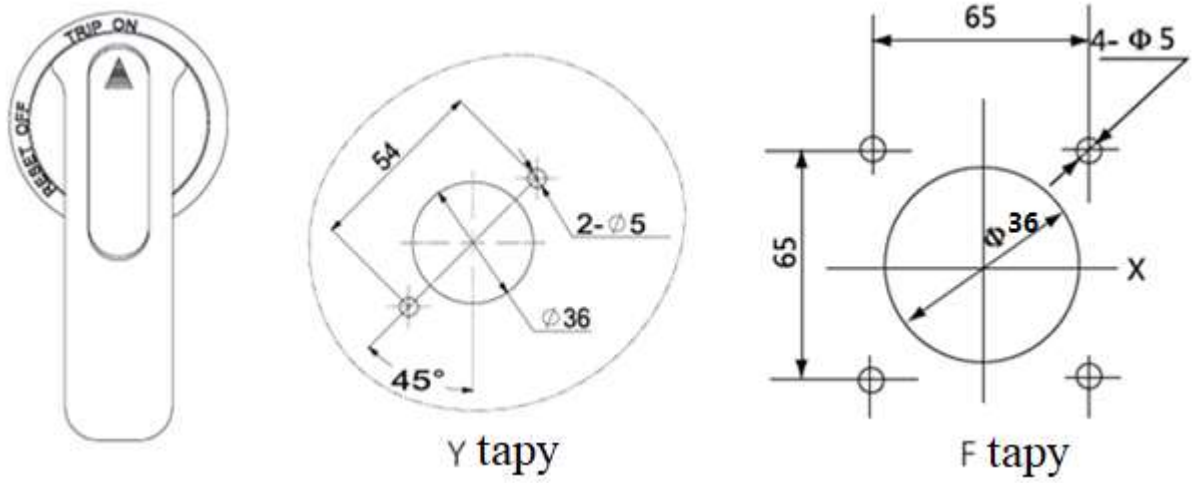


Fig.14 Handle Mounting Hole Diagram

Note:1)During manual operation, it shall rotate 180° clockwise，and counterclockwise operation is prohibited.

2) Unmarked tolerance level should follow GB/T 1804-c.

7.8 Electric operation

Electric operation-overall dimension of circuit breaker and its electric operating mechanism after installation：

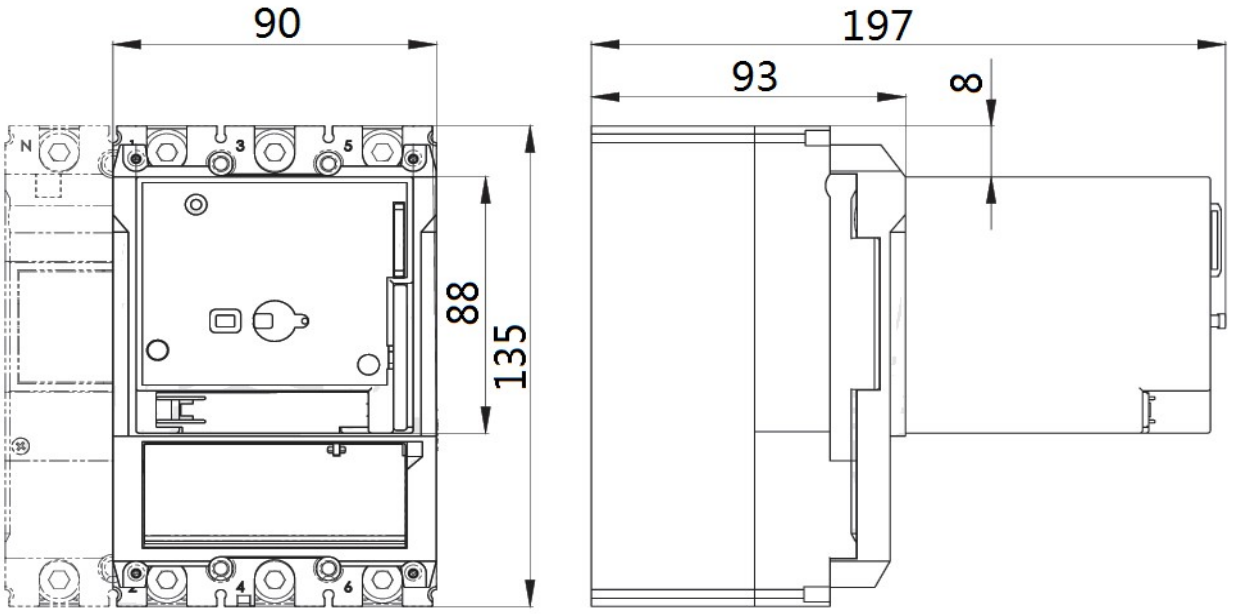


Fig.15 External Dimension Diagram of Electric Operation

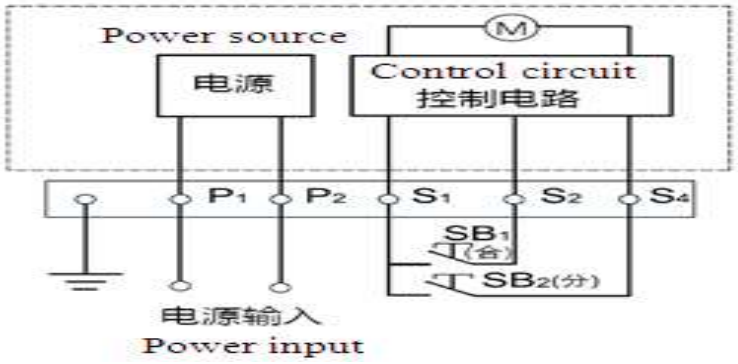


Fig.16 Electric operation wiring diagram

Note：1）During manual operation,180° shall be operated clockwise ,and counterclockwise operation is prohibited

2）P1 and P2 shall not be connected with S1 and S2 and S4 during electric operation wiring

3）Unmarked tolerance level should follow GB/T 1804-c.

Table 23 Voltage specification and power of electric operation

Attachment Name	Electric operation			
Voltage specification	DC24V	AC110V/DC110V	AC230V/DC220V	AC400V
power (W)	80	150	150	200

7.9 Copper bar in front of board or copper cable with wiring terminal

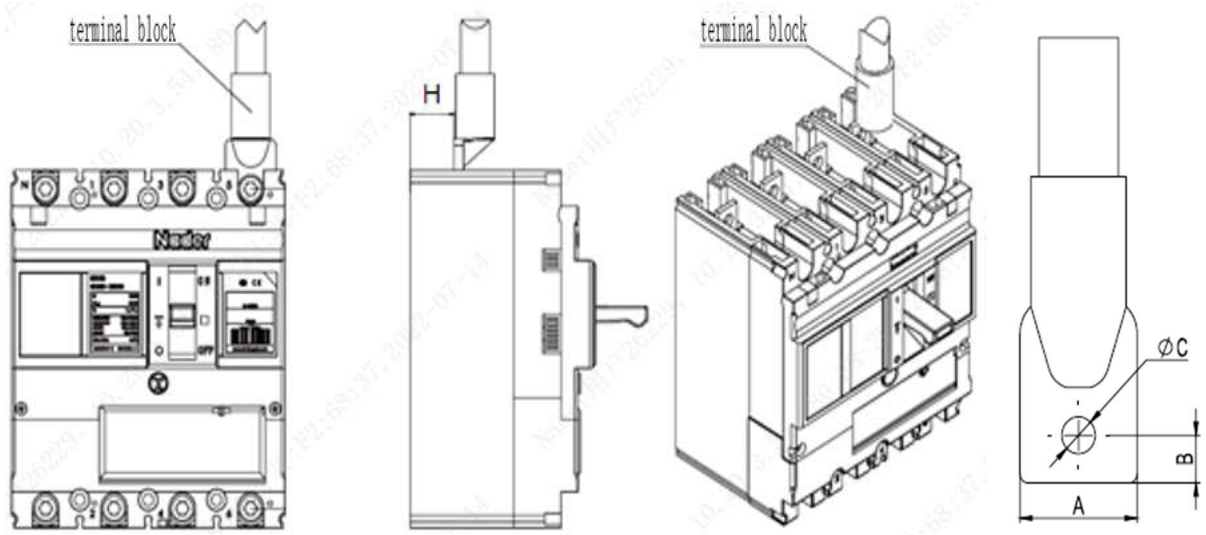


Fig.17 Connection diagram of copper bar in front of board or copper cable with wiring terminal

Note 1：Connect with the circuit breaker and select the appropriate wiring mode according to (appearance, installation dimension and wiring method)；

Note 2：If the copper connecting bar is selected, the copper with bar cannot be directly connected with the circuit breaker body, and it is necessary to purchase extended busbar accessories；

Note 3: Unmarked tolerance level should follow GB/T 1804-c.

Table 24 Connection size of copper bar in front of board or copper cable with wiring terminal

Model	A(mm)	B(mm)	ΦC(mm)	H(mm)
NDM5E-125	≤12	≤8.5	6.5	21

7.10 Safety distance

The minimum safety distance between the top, bottom, side and front panel when installing the circuit breaker, see the figure below。

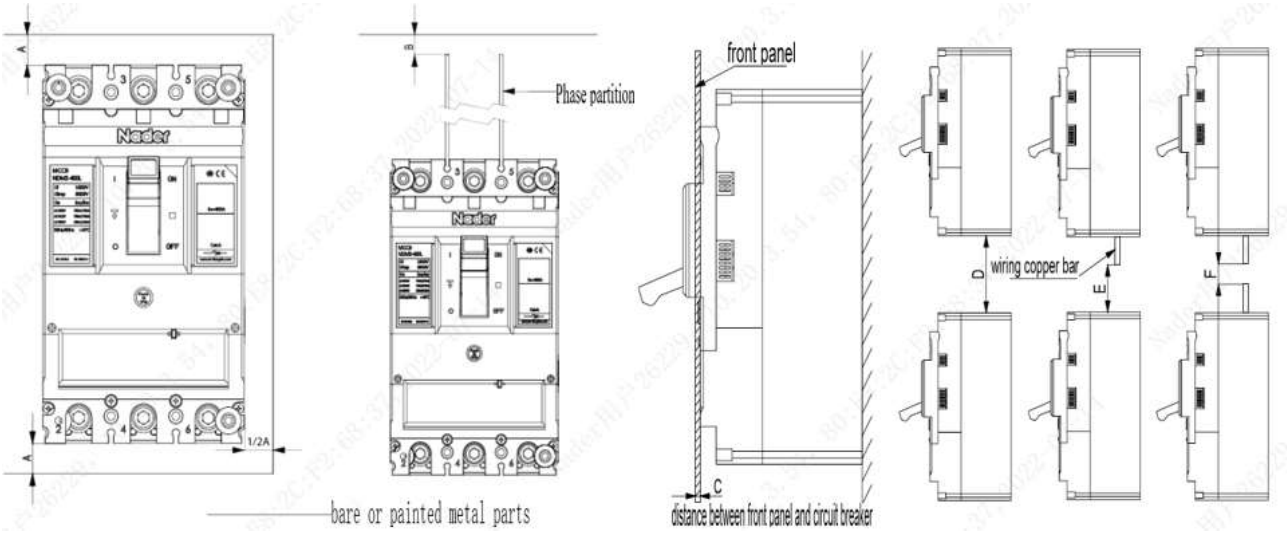


Fig.18 Insulation distance mounted in the metal cabinet

Table 25 Insulation distance mounted in the metal cabinet (unit: mm)

Model	Spacing A	Spacing B	Spacing C	Spacing D	Spacing E	Spacing F
NDM5E-125	≥50	≥0	≥0	≥100	≥65	≥35

Note: 1）Front panel wiring（Standard Phase partition）unit: mm

2) Unmarked tolerance level should follow GB/T 1804-c.

7. 11 Wiring diagram of circuit breaker

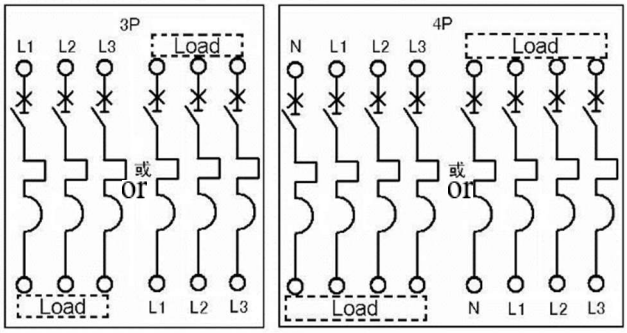


Fig.19 Main circuit wiring mode of AC products

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 26 Rated Parameters of the Under-voltage Release

Accessory name	voltage release		Tightening torque value of wiring screw
Voltage specifications (V)	AC110/DC110	AC230/DC250	
Maintain power consumption (W)	0.5	1.0	
Code name	Q11	Q22	1.2N.m

Fig. 20 Working diagram of under-voltage release

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 27 Rated Parameters of the Shunt Release

Accessory name	Shunt release				Tightening torque value of wiring screw
Voltage specifications	AC/DC24	AC/DC48	AC/DC110	AC230/DC250	
Power waste(W)	20	13	8	19	1.2N.m
Code name	FT02	FT04	FT11	FT22	

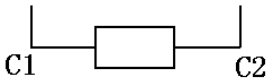


Fig.21 Working diagram of shunt release

Note：shunt tripper is working principle：it is a single pulse action。If it needs to act again, the shunt release must be power on before it can act again.

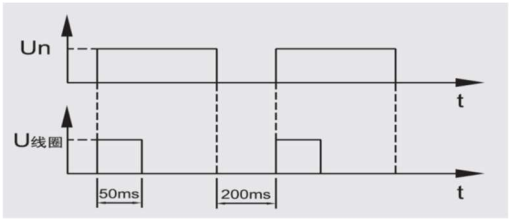
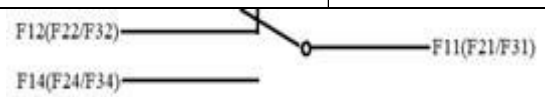
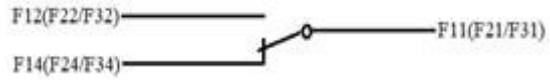


Fig.22 Working principle diagram of shunt tripper

If long-term power supply is required so that the circuit breaker cannot be closed normally, one auxiliary contact can be connected in series as shown in the figure below.

8.3 Rated parameters of the auxiliary contact

Table 28 Parameter of auxiliary contact

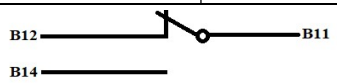
Accessory name		Auxiliary contact(conventional)	Auxiliary contact(low power consumption)
Voltage specifications (V)/conventional thermal current (Ith)		AC250V/10A、AC400V/3A、DC220V/0.2A	DC30V/0.1A
Wiring diagram	Off		
	On		
Internal resistance		＜30mΩ	＜50mΩ

Note 1：If need DC30V/0.1A Auxiliary contact，please explain when ordering。

2: The first auxiliary harness is identified as F11 (red), F12 (white), F14 (yellow), and the second auxiliary harness is identified as F21 (red), F22(white), F24 (yellow), and so on. At most three groups of auxiliary harness are installed.

8.4 Rated parameters of the alarm contact

Table 29 Rated parameters of the alarm contact

Accessory name		Alarm contact(conventional)	Alarm contact(low power consumption)
Voltage specifications (V)/conventional (Ith)		AC250V/10A 、 AC400V/3A 、 DC220V/0.2A	DC30V/0.1A
Wiring diagram	On, off		
	Free tripping		
Internal resistance		＜30mΩ	＜50mΩ

Note： 1)If need DC30V/0.1A Alarm contact， please explain when ordering。

2): Alarm harness is identified as B11 (red), B12 (white), B14 (yellow).

Under-voltage release、Shunt Release、Auxiliary contact、Alarm contact ，the standard wiring line is 0.7m long , 1m、2m、4m can be customized according to requirements。

8.5 Communication Adaptor DF-MB/C3

Installing by DIN35 standard slide rail, the dimension of single product is shown as below. If there is a T in the MCCB release code, this unit is contained NDT2570020.

The main parameters are as follows：

Table 30 Main Parameter of Communication Adaptor

Communication adaptor common parameter		
Electrical characteristic	Power supply	24V DC(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
	Installation method	2*35mm standard DIN35 slide rail
Environment 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

Outline and installation dimensions and terminal signal definition：

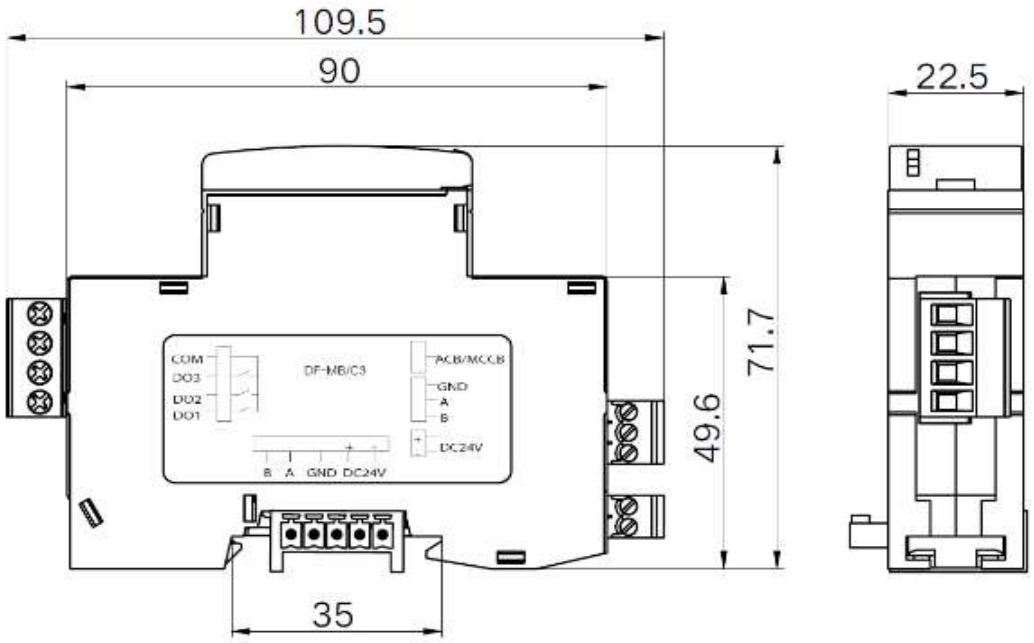


Fig.23 External Dimension of Communication Adaptor

Definition of front knob and indicator light of communication adapter：

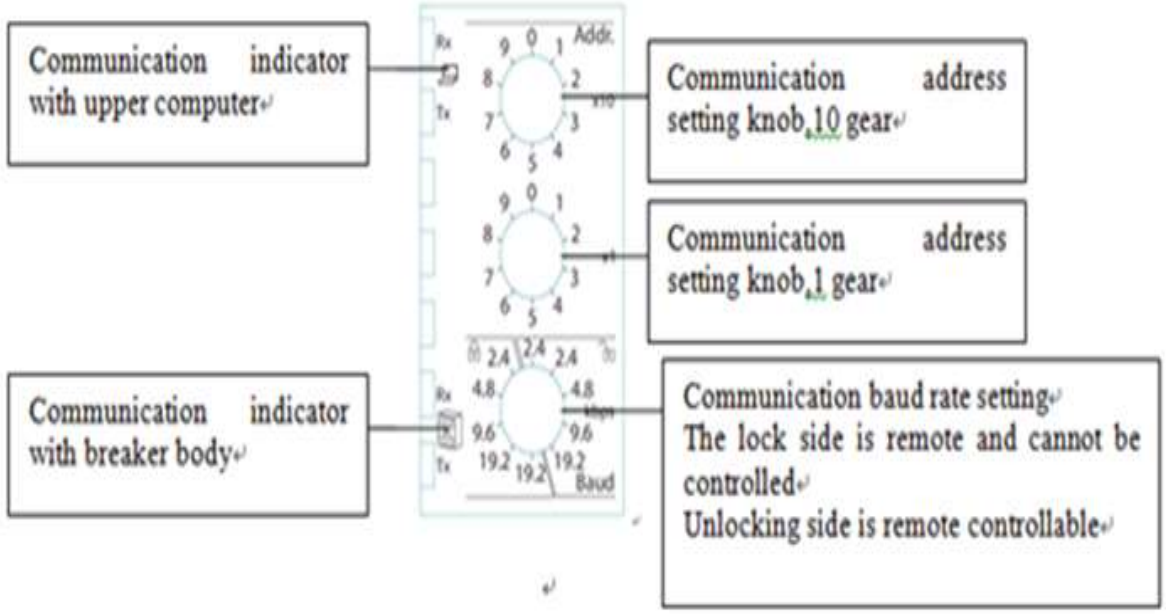


Fig. 22 Gear Adjustment of Communication Adaptor

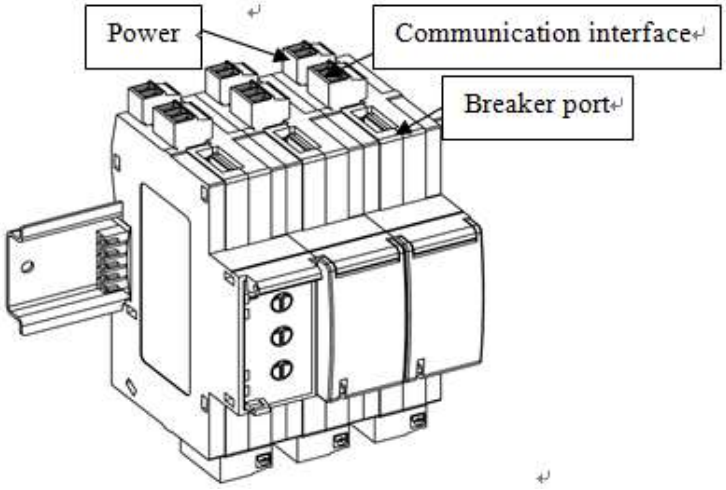


Fig.24 Terminal Ports of Communication Adaptor

Note: 1. DO1~DO3 are three ways output control and can be customized the output functions. For example, the on/off control singal for motor operator.

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.

3. When communication adaptor in temperature -35℃~-25℃, we suggest to decline baud rate to increase communication reliability.

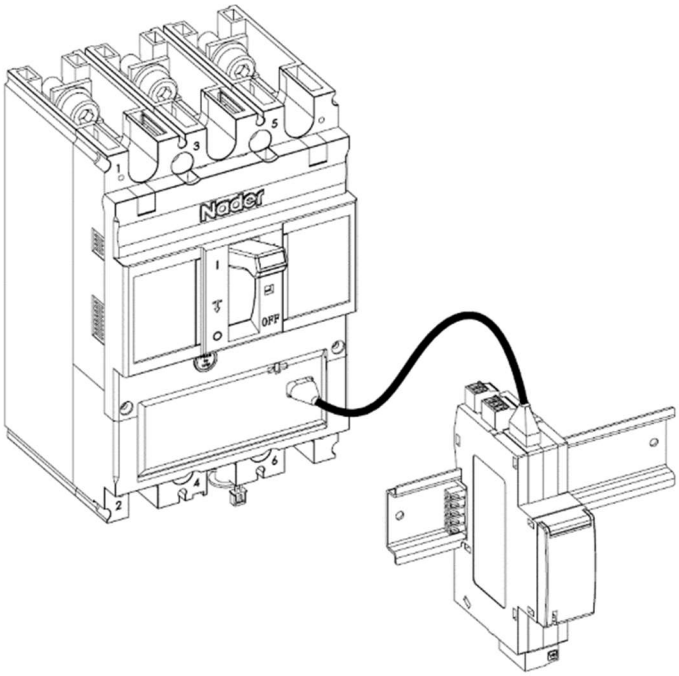


Fig.25 Terminal Ports of Communication Adaptor

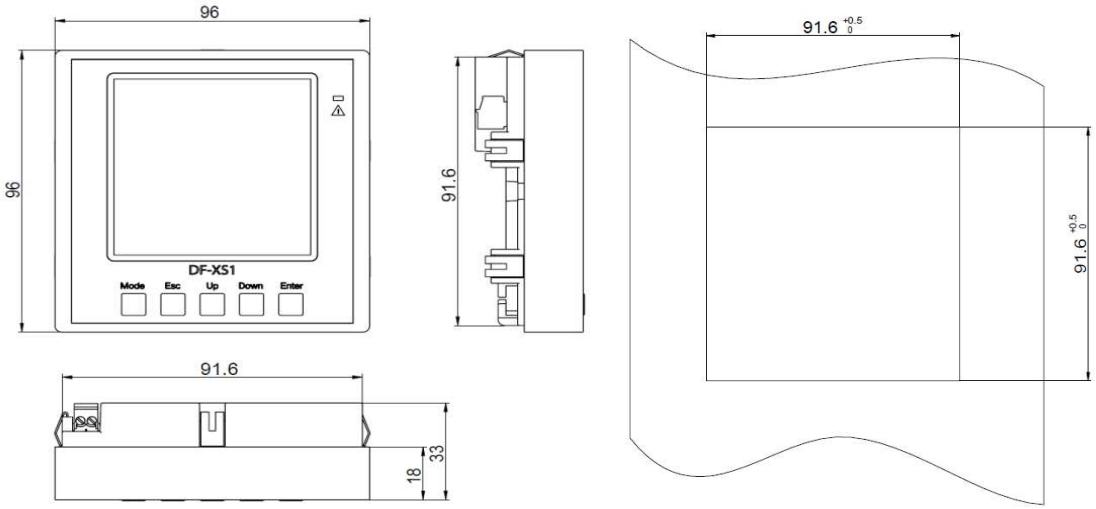
8.6 DF-XS1 Display Module

This module installs in the cabinet door. The opening of cabinet should be $91.6_{0}^{+0.5}\times91.6_{0}^{+0.5}$.

Detailed operation should follow the instruction book if DF-XS1 display module

Table 31 Main parameters of Display Module

Electrical characteristic	Power supply	24VDC(19.2～28.8VDC)
	Power dissipation	40mA
Physical characteristic	Dimension	96×96×33mm
	Weight	0.22kg
	Display	160*160 pixel ,white back light
	Installation method	Horizontal installation (surface installation)
Environment characteristic	Working temperature	-25℃～70℃
	Restoring temperature	-40℃～75℃
	Ambient condition	Surrounding temperature40℃， relative humidity 95%
	Pollution	3
	Fire resistance	UL94-V0
	Protection level	IP20



Outline dimension drawing Schematic diagram of opening size

Fig.26 External dimension for display module

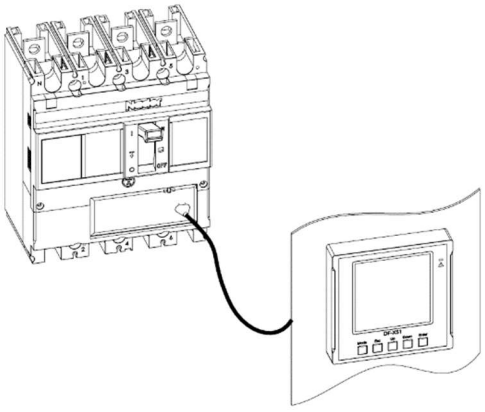


Fig.27 Display Module Connected to Product

Note: this module has four ports, can connect to four MCCB in the same time in order to set and display MCCB parameter. Display module can't be selected with ETB-T,ETB-PT circuit breaker at this stage.

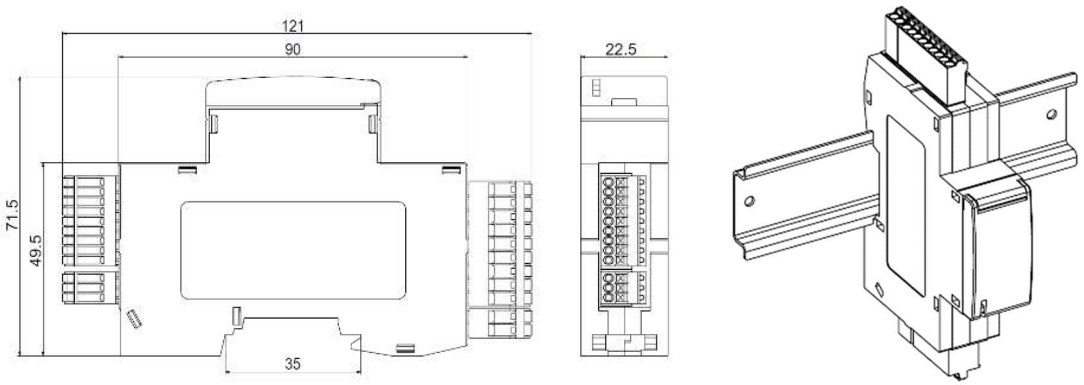
8.7 DF-WK6 Temperature Module

Installing with standard DIN35 slide rail, outside dimension and installation dimension of single product shows as below. can be cascade installed. Temperature sampling points can be optional from 1 to 6 according to need. Each point can be monitored and have alarm output.

Table 32 Parameter of Temperature Module

Temperature alarm module common parameter		
Electrical characteristic	Power supply	20～55V(Wide voltage)
	Static power consumption	2.4W
	DO static power dissipation	250VAC/30VDC 2.5A Resistive load
	Measurable temperature range	0℃-150℃
	Temperature resolution	1℃
	Temperature accuracy	±3℃
Communication	Port	RS485，2 Modbus RTU
	Optional address	1~9
	Baud rate	2400/4800/9600/19200bps
	Check bit	CRC check odd-even check not supported
Physical characteristic	Dimension	90×71.5×22.5mm(without extended terminal)
		121×71.5×22.5mm(with extended terminal)
	Weight	0.25kg
	Installation method	35mm standard DIN slide rail
Environment characteristic	Working temperature	-35℃～70℃
	Restoring temperature	-40℃～75℃
	Ambient temperature	Surrounding temperature 40 relative hunmiduty 95%
	Pollution	3
	Fire resistance	UL94-V0
	Protection level	IP20

Note: When communication adaptor in temperature -35 ℃ ~-25 ℃ , we suggest to declinebaud rate to increase communication reliability.



Outline dimension drawing Installation diagram

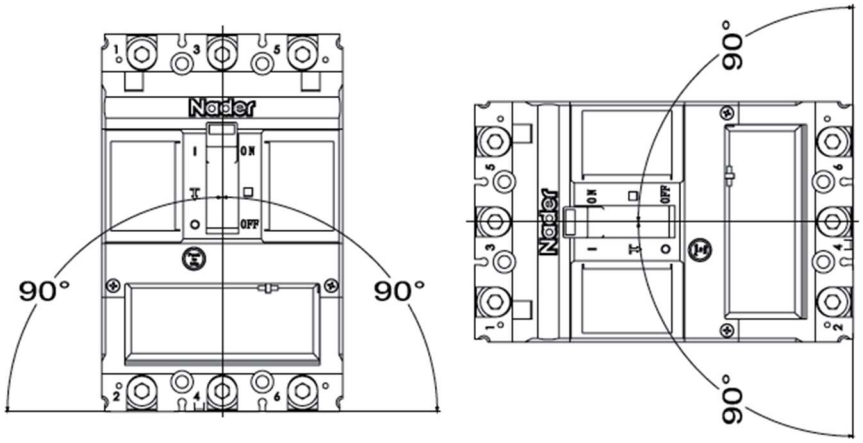
Fig.28 External Dimension of Temperature Module

Note: Unmarked tolerance level should follow GB/T 1804-c.

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 ±22.5°.

Horizontal installation of the product.



Vertical installation Horizontal installation

Fig.29 Mounting method of product

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℃~+75℃. 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、Environment

The environment that comply with RoHS instruction.

12、Installation direction of circuit breaker

Table 33 Accessories list form

SN	Name	Specification	3P Quantity/Set	4P Quantity/Set
1	Cross small pan-head screw	M4×75	2	3
2	Hexagon nut	M4	2	3
3	Spring washer	4	2	3
4	Plain washer	4	2	3
5	Phase partition	——	4	6
6	Terminal screw	M6×18	6	8

13、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.