



Where there is electricity, there is Nader
有电有良信

www.sh-liangxin.com

Where there is electricity, there is Nader
有电有良信

NDM3E系列塑料外壳式断路器 产品说明书 NDM3E Series Moulded Case Circuit Breaker Product Manual

Nader 良信

上海良信电器股份有限公司
Shanghai Liangxin Electrical CO., LTD.
上海市浦东新区申江南路2000号
No.2000, South ShenJiang Road, Pudong New District
Shanghai, 201315
T/021-68586699 F/021-23025796
E/liangxin@sh-liangxin.com

V2.0

Nader 良信

目 录 Contents

1.适用范围与用途/ Application scope	2
2.型号说明/ Model and implication	2
3.技术参数/ Main technical parameters	6
4.正常工作环境/ Stand working conditions	18
5.接线方式 (接线图) / Wiring Method	21
6.产品外形及安装尺寸/ Shape dimension & Dimension	21
7.安装方式/ Mounting Method	24
8.附件说明书/ Accessory	25
9.使用和维护/ Application & Maintenance	26
10.注意事项/ Notices	29
11.通讯地址/ Communication address	31
12.注意事项/ Notes	31
13.订货须知/ Accessory list and installation	32

1. 适用范围与用途/ Application scope

本断路器主要应用于交流 50/60Hz, 工作电压至 AC 660/690V, 工作电流至 800A 的电路中作不频繁转换之用。具有过载长延时反时限、短路短延时反时限、短路短延时定时限、短路瞬时、预报警、接地故障保护、“四遥”功能、过载报警不脱扣及欠电压保护功能, 能保护线路和电源设备不受损坏。

The breaker is mainly used in the circuit of AC 50/60Hz, rated working voltage AC 660/690V and rated working current up to 800A. Provided with overload long-delay inverse time, short circuit short-delay inverse time, short circuit short-delay definite time and instantaneous short circuit grounding fault protection and “Four remoteness” function, overload alarm without tripping and under voltage protection functions, the breaker can protect the circuit and electric power unit from being damaged.

2. 型号说明/ Model and implication

ND 1	M 2	3 3	E 4	□ 5	□ 6	□ 7	/ 8	□ 9	□ 10	□ 11	□ 12	□ 13	□ 14	□ 15	□ 16
序号 No.	序号名称 Description						NDM3E								
1	企业代号 Enterprise code						ND Nader 牌 低压电器 ND Nader low-voltage electric appliance								
2	产品代号 Product code						M :塑料外壳式断路器 M:Molded case circuit breaker								
3	设计序号 Design code						3								
4	系列派生代号 Derived code						E : 电子式 E:Electronic type								
5	壳架等级 Rated frame current						125、250、400、630、800								
6	分断能力级别 Breaking class code						M: 较高分断 M:moderate breaking class H: 高分断 H:high breaking class								
7	操作方式 Operation mode						无代号: 手柄直接操作 Without code: operation directly P : 电动操作 P:motorized operation Z: 转动手柄 Z:operation with rotary handle								
8	功能派生代号 Release type						无代号: 基本型 Without code: basic type G: 接地保护型 G:grounding type T: 通讯型 T: communication type GT: 接地保护通讯型 GT: grounding and communication type								
9	极数 Numbers of Poles						3、4								
10	附件代号 Accessory code						见表 4 See table 4								
11	用途代号 Usage code						无代号: 配电用 Without code: power distribution 2: 电动机保护型 2:mqtor protection								

12	4 极产品中 N 极 (中性极) 形式 The pattern of neutral (N) for 4 poles breaker	C: N 极安装过电流脱扣器, 且 N 极与其他三极一起合分 C : over-current release in N pole and N pole combines with other three poles D: N 极安装过电流脱扣器, 且 N 极始终接通 D : over-current release in N pole and N pole always connected
13	特殊用途 Special purpose	Q: 检有压自复式功能 Q : Self-compound function with pressure detection
14	特殊功能代号 Special function code	I: 过载报警不脱扣功能 I : The overload alarm not tripped
15	整定电流 Ir Setting current	见表 4 See table 4
16	接线方式 Wiring form	无代号: 常规产品 No code: Normal product P: 联接排 P: Connection busbar Z1: 板后接线 Z1 : rear connected Z2Q: 插入式板前接线 Z2Q: plug-in front connected Z2H: 插入式板后接线 Z2H: plug-in rear connected

表 1: 附件代号(不带通讯功能)

Table1: Accessories Code (without communication function)

附件名称 Accessory Name	代号 Code
无 None	300
分励脱扣器 Shunt release	310
双辅助触头 Double auxiliary contact	320
欠电压脱扣器 Under-voltage release	330
分励脱扣器、双辅助触头 Shunt release, double auxiliary contact	340
分励脱扣器、欠电压脱扣器 Shunt release, Under-voltage release	350
二组双辅助触头 Two groups of double auxiliary contact	360
欠电压脱扣器、双辅助触头 Under-voltage release, double auxiliary contact	370
单辅助触头 Single auxiliary contact	321
分励脱扣器、单辅助触头 Shunt release, single auxiliary contact	341
欠电压脱扣器、单辅助触头 Under-voltage release, single auxiliary contact	371
报警触头 Alarm contact	308
分励脱扣器、报警触头 Shunt release, alarm contact	318
双辅助触头、报警触头 Double auxiliary contact, alarm contact	328
欠电压脱扣器、报警触头 Under-voltage release, alarm contact	338
分励脱扣器、辅助触头 Shunt release, auxiliary & alarm contact	348
辅助触头 Auxiliary & alarm contact	358
双辅助触头、辅助触头 Double auxiliary contact, auxiliary & alarm contact	368
欠电压脱扣器、辅助触头 Under-voltage release, auxiliary & alarm contact	378
二组单辅助触头 Two groups of single auxiliary contact	361
双辅助触头、单辅助触头 Double and single auxiliary contact	362

表 1 (续): 附件代号(带通讯功能)

Table 1 (continued) Accessory Code (with communication function)

附件名称 Accessory Name	代号 Code	壳架等级 (A) Frame level (A)				
		125	250	400	630	800
左分励、右双辅助 Left shunt, right double auxiliary	340	✓	✓	×	×	×
左欠压、右双辅助 Left Under-voltage, right double auxiliary	370	✓	✓	✓	✓	✓
左双辅助、右双辅助 Left double auxiliary, right double auxiliary	360	✓	✓	✓	✓	✓
左报警、右双辅助 Left alarm, right double auxiliary	328	✓	✓	✓	✓	✓
左辅助报警、右双辅助 Left auxiliary alarm, right double auxiliary	368	✓	✓	✓	✓	✓
左分励、右单辅助 Left shunt, right single auxiliary	341	✓	✓	×	×	×
左欠压、右单辅助 Left Under-voltage, right single auxiliary	371	✓	✓	✓	✓	✓
左单辅助、右单辅助 Left single auxiliary, right single auxiliary	361	✓	✓	✓	✓	✓
左双辅助、右单辅助 Left double auxiliary, right single auxiliary	360	✓	✓	✓	✓	✓
左分励、右辅助报警 Left shunt, right auxiliary alarm	348	✓	✓	×	×	×
左欠压、右辅助报警 Left Under-voltage, right auxiliary alarm	378	✓	✓	✓	×	×

注: 1、“✓”为可选,“×”为不可选。

2、脱扣器方式附件代号首位数字“3”表示具有三段保护的智能控制器,后两位表示内部附件代号

3、“”通讯型及接地保护通讯型”附件选型请咨询我司

4、“32**1”中的“2”和“1”表示过脱扣报警不脱扣带输出功能,后两位数字“**”表示内部附件。

Notes: 1、“✓” stands for optional, and “×” stands for not optional.

2、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;

3、Since the communication type requires to use a set of right-side auxiliary contacts, the single auxiliary or alarm contact output is only located on the right side of the above accessory mode.

4、“1” in “32**1” identifies overload alarm without tripping, with output function, and the last two digits ** identify internal accessory code.

3. 技术参数/ Main technical parameters

3.1 NDM3E 主要技术参数 Main technical parameters of NDM3E

表 2: NDM3E 主要技术参数

Table 2: Main technical parameters of NDM3E

型号、规格 Model and specification		NDM3E-125			NDM3E-250		
极数 Number of poles		3	4		3	4	
电气性能符合标准 Applicable standard to electrical performances		GB/T14048.2, GB/T14048.4					
额定电流 (A) I_n Rated current (A) I_n		32、63、125			160、250		
额定绝缘电压 (V) U_i Rated insulation voltage (V) U_i		1000			1000		
额定冲击耐压 (kV) U_{imp} Rated impulse withstand voltage (kV) U_{imp}		8			8		
额定工作电压 (V) U_e Rated working voltage(V) U_e		380/400/415、660/690					
分断能力级别 Breaking capacity		H	M	4P	H	M	4P
额定极限短路分断能力 (kA) I_{cu} Rated ultimate breaking capacity(kA) I_{cu}	AC380/400/415V	85	70		85	70	
	AC660/690V	/	20		/	20	
额定运行短路分断能力 (kA) I_{cs} Rated service breaking capacity(kA) I_{cs}	AC380/400/415V	65	50		65	50	
	AC660/690V	/	15		/	15	
使用类别 Usage category		A			A		
额定短时耐受电流 (kA /1s) I_{cw} Short-time withstand current(kA /1s) I_{cw}		1			1.6、2.5		
操作性能寿命 (次) Operational performance life (times)	电气寿命 Electrical life		8000		8000		
	机械寿 命 Mechan ical life	免维护寿命 Maintainable free life		20000		20000	
		可维护寿命 Maintainable life		40000		40000	
飞弧距离 (mm) Flashover distance		≤50			≤50		

表 2 (续): NDM3E 主要技术参数
Table 2 (continued): Main technical parameters of NDM3E

型号、规格 Model and specification		NDM3E-400			NDM3E-630			NDM3E-800		
极数		3	4		3	4		3	4	
Number of poles										
电气性能符合标准		GB/T14048.2, GB/T14048.4								
Applicable standard to electrical										
壳架额定电流 (A) I_n Frame rated current (A) I_n		400			630			800		
额定绝缘电压 (V) U_i Rated insulation voltage (V) U_i		1000			1000			1000		
额定冲击耐压 (kV) U_{imp} Rated impulse withstand voltage (kV) U_{imp}		8			8			8		
额定工作电压 (V) U_n Rated working voltage (V) U_n		380/400/415、660/690								
分断能力级别 Breaking capacity		H	M	4P	H	M	4P	H	M	4P
额定极限短路分断能力 (kA) I_{cu} Rated ultimate breaking capacity (kA) I_{cu}	AC380/400/415V	100	70	100	70	100	70	100	70	
	AC660/690V	/	20	/	20	/	20	/	20	
额定运行短路分断能力 (kA) I_{cs} Rated service breaking capacity (kA) I_{cs}	AC380/400/415V	70	65	70	65	70	65	70	65	
	AC660/690V	/	15	/	15	/	15	/	15	
使用类别 Utilization category		A			B			B		
额定短时耐受电流 (kA /1s) I_{cw} Short-time withstand current (kA /1s) I_{cw}		5			8			10		
电气寿命 Electrical life		7500			7500			7500		
操作性能寿命 (次) Operational performance life (times)	机械寿命 Mechanical life	免维护寿命 Maintainable free life			15000			10000		
	life	可维护寿命 Maintainable life			30000			20000		
飞弧距离 (mm) Flashover distance		≤100			≤100			≤100		

3.2 NDM3E 控制器电流、时间调整 Current and time adjustment of NDM3E controller

◆控制器电流、时间的调整必须由专业技术人员负责。

Adjustment of current and time of the controller should be carried out by specialized technical personnel!

3.2.1 NDM3E 控制器控制面板图及参数组成

Components of the control panel figure and parameter of NDM3E controller

断路器控制面板组成部分: Components of the breaker's control panel:

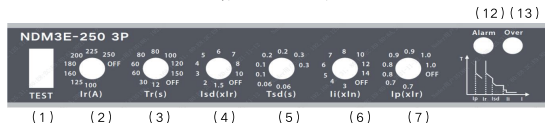
- (1) 测试端口 TEST Test port
- (2) 过载长延时整定电流 I_r Setting current of overload long-time delay
- (3) 长延时整定时间 T_r Setting time of long-time delay
- (4) 短路短延时整定电流 I_{sd}/I_n Setting current of short-circuit short-time delay
- (5) 短路短延时整定时间 T_{sd}/T_n Setting time of short-circuit short-time delay
- (6) 短路瞬时整定电流 I_i Setting current of short-circuit instant
- (7) 预报警整定电流 I_p Setting current of pre-alarm
- (8) 中性线保护电流 I_o Protection current of neutral line
- (9) 接地故障保护整定电流 I_g Setting current for grounding failure protection
- (10) 接地整定时间 T_g Grounding setting time
- (11) 电源指示灯 Power Power light
- (12) 预报警指示灯 Alarm Pre-alarm light
- (13) 过载指示灯 Over Overload light
- (14) 脱扣等级整定 Class Tripping rating adjustment
- (15) 短路短延时整定电流 I_{sd} Short-circuit short-time setting current
- (16) 电流不平衡率 I_{unb} Current unbalance rate

NDM3E 控制器控制面板如下图 (125A 壳架至 800A 壳架以 NDM3E-250 为例): Control panel of

NDM3E controller is as the following figure (125A shell rack to 800A shell rack take

NDM3E-250 as an example)

基本型 3P 控制器面板图: The basic type 3P controller panel:



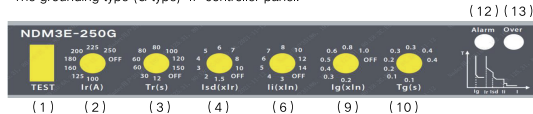
基本型 4P 控制器面板图: The basic 4P controller panel:

(12) (13)



接地型 (G 型) 4P 控制器面板图:

The grounding type (G type) 4P controller panel:



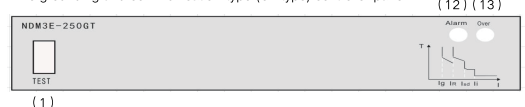
通讯型 (T 型) 控制器面板图:

The communication type (T type) controller panel:



接地、通讯型 (GT) 控制器面板图:

The grounding and communication-type (GT type) controller panel:



电动机保护型面板如下图:

The motor protection type panel is below

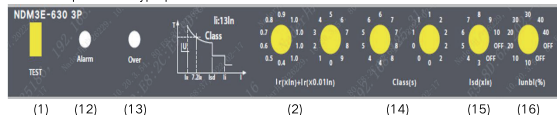


图 1: NDM3E 控制器控制面板图

Fig. 1: NDM3E controller panel figure

3.2.2 NDM3E 控制器控制面板各部分功能 Functions of each part in control panel of NDM3E controller

3.2.2.1 测试端口 Test port

“TEST” 端口, NDM3E 专用测试仪通过该端口与控制器相连, 进行测试及调试等操作。

Through this “TEST” terminal, special tester for NDM3E is connected to the controller to

conduct testing and debugging etc.

3.2.2.2 整定电流、整定时间、脱扣等级等调节按钮 Adjusting knob for setting current、setting time and tripping rating

可通过电流、时间、脱扣等级按钮的调节, 选择适当的组合以达到保护线路、保护设备的作用, 此项操作应由专业技术人员负责。

Suitable combinations of current tripping rating and time are adjusted by this knob, so as to protect circuits and devices. This operation should be done by specialized technical personnel.

注: 1.Tr 表示当实际电流为 Ir 整定值的 2 倍时, 断路器动作时间。

如: 当 I 整定为 100s、Tr 整定为 100s 时, 当主回路电流为 2 × 250A 时, 断路器将持续 100s 后时断开主回路。动作时间精度为 ±10%。在过电流下, 断路器断开主回路的时间遵循以下公式:

$$t = (2 \times I_r / I)^2 \times T_r \quad (\text{其中 } I \text{ 表示过载情况下, 主回路实际电流值})$$

2. T 型、GT 型只能通过电脑上机通讯软件调整整定值。

3. 电动机保护型面板, (2) 整定是与其他类型的控制器的整定方法不同, 两旋钮相加后的值作为最后整定的值, 若相加的和超过 In, 则直接按 1 倍的 In 来计算。

4. 电动机保护型断路器, 如在脱扣等级规定的时间范围内, 若累积的能量超过 $(7.2 \times I_r)^2 \times \text{Class}$, 则提前脱扣, 若小于前面约定的值, 且至脱扣等级时间到时, 电流仍未降至 1.5 I_n 以下, 则在脱扣等级规定的时间到时, 立即脱扣; 在脱扣等级时间外, 断路器脱扣的动作时间按公式 $t = (7.2 \times I_r / I)^2 \times \text{Class}$ 计算。

5. 电流不平衡率选择 OFF 时, 控制器同时也关闭了断相保护功能, 电流不平衡率的计算是, 三相电流的最大值与三相电流最小值的差值, 与三相电流的平均值之间的比值, 即为三相电流的不平衡率。

6. 短路短延时功能, 在脱扣等级规定的时间内是关闭的, 在脱扣等级规定的时间过后, 短路短延时功能才被打开。电流不平衡的计算是: 每一相与电流平均值的最大值, 与三相电流平均值的比值。

Notes: 1.Tr indicates the operating time of the breaker when actual current is twice of I_r setting.

E.g.: when I_r and T_r are set as 250A and 100s respectively, when the current in main circuit reaches 2 × 250A, the breaker will disconnect the main circuit after lasting for 100s. The time precision of action is ±10%. Under the overcurrent, the time that the breaker disconnects the main circuit shall follow the following format: $t = (2 \times I_r / I)^2 \times T_r$ (Of which, I stands for the actual current in the main circuit under overcurrent.)

2. The setting values of T type and GT type breakers can only be adjusted through communication software of the upper computer.

3. The motor protection type panel, (2) settings are not the same as those of other types of controllers. The values of the two buttons are added as the final setting value. If the sum is more than In, Then directly by 1 times the In to calculate.

4. If the accumulated energy exceeds $(7.2 \times I_r)^2 \times \text{Class}$ for a period of time specified in the tripping rating, the motor-protective circuit-breaker shall be tripped in advance. If it is less than the value specified in the previous paragraph and the time until the tripping time. The current is not reduced to 1.5 I_n or less, then the time specified in the tripping rating to the time, immediately tripping; outside the tripping time, the circuit breaker tripping time according to the formula $t = (7.2 \times I_r / I)^2 \times \text{Class}$.

5. When the current unbalance rate is OFF, the controller also turns off the phase failure protection function. The calculation of current unbalance rate is the ratio between the maximum value of three-phase current and the minimum value of three-phase current and the average value of three-phase current, that is, the unbalance rate of three-phase current.

6. Short-circuit Short delay function, which is switched off within the time specified in the tripping rating, after the time specified in the tripping rating has elapsed, the short-circuit short delay function is switched on. The calculation of current imbalance is the ratio of the maximum value of each phase to the average value of current and the average value of three-phase current.

3.2.2.3 指示灯 Indicator light

(1) 预报警指示灯 Pre-alarm light

预报警指示灯黄灯闪亮时, 表示实际电流超过了预报警电流 I_p 的整定值, 经特定时间后黄灯将由闪亮转为恒亮。

(2) 过载指示灯 Overload light

过载指示灯红灯恒亮时, 表示实际电流超过了过载长延时整定电流值 I 的 1.15 倍, 处于过载状态, 并经一定的时间后断路器将断开。

(1) Flashes of pre-alarm indicator light indicate that actual current has exceeded setting value for pre-alarm current I_p . After certain duration, the flashes will turn into constant illumination.

(2) Constant light of overload indicator indicates that actual current is more than 1.5 times of overload long-time delay current setting I . The breaker will break the circuit after certain duration.

3.2.2.4 NDM3E 控制器通讯功能 Communication function of NDM3E controller

NDM3E 通讯功能通过外挂式通讯模块来实现“四遥”功能。该通讯模块可将断路器的相关信息经现场总线传至上位机, 上位机通过通讯模块下发指令操作电动操作机构, 从而控制断路器的合、分。

The communication function of NDM3E can achieve “Four-remoteness” functions through the external hanging communication modules. The communication module can transfer relevant information of the breaker to upper computer through on-site bus, and then the upper computer can use the instructions released by the communication module to operate the motor-operated mechanism, and achieve closing and opening of the control breaker.

通讯模块上传的信息包括: Information uploaded by the communication module includes:

- 断路器设备代码; Equipment code of the breaker;
 - 断路器各参数设定值; Setting values of the breaker's parameters;
 - 断路器的合、分状态; Closing and opening state of the breaker;
 - 通过断路器每极的实时电流。Real-time current passing through each pole of the breaker
- NDM3E 断路器通讯接口的现场总线规约为: Modbus—RTU。

The on-site bus protocol of NDM3E breaker's communication port: Modbus—RTU

注: 通讯型断路器 (T 型、GT 型) 默认波特率为 9600、通讯地址为 3。

Notes: The default baud rate of the communication breaker (T type and GT type) is 9600, and the communication address is 3.

3.2.2.4.1 通信适配器 DF-MB/C3 Communication Adaptor DF-MB/C3

采用标准 DIN35 导轨安装, 单个外形尺寸及安装尺寸如下。断路器脱扣器型号含 T 的包含此模块。通讯参数调节详见《NDT-01598 NDM2E & 3E & 5E 塑料断路器 Modbus-RTU 通讯协议》。

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, see 《NDT-01598 Modbus RTU communication protocol for NDM2E & 3E & 5E molded case circuit breaker》 for communication parameter adjustment.

主要参数如下: The main parameters are as follows:

表3 通信适配器 Table 3 Main Parameter of Communication Adaptor

通信适配器通用参数 Communication adaptor common parameter		
电 气 特 性 Electrical characteristic	工作电源 Power supply	24VDC(19.2 ~ 28.8VDC)
	功耗 Power dissipation	0.96W
通 信 Communication	接口 Port	RS485, 2 线 Modbus RTU RS485, 2 Modbus RTU
	可选地址 Optional address	1 ~ 99
	波特率 Baud rate	2400/4800/9600/19200bps
	校验位 Check bit	CRC 校验 不支持奇偶校验 CRC check odd-even check not supported
	单总线最大模块数量 Maximum number of single unibus	32
物 理 特 性 Physical characteristic	尺寸 Demension	90 × 71.7 × 22.5mm(不含外端子 terminal not included) 109.5 × 71.7 × 22.5mm(含外端子 terminal included)
	重量 Weight	0.075kg
	安装方式 Installation method	采用两条 35mm 标准 DIN 导轨安装 2×35mm standard DIN35 slide rail
环 境 特 性 Environment characteristic	运行环境温度 Working temperature	-25℃ ~ 70℃
	储存温度 Restoring temperature	-40℃ ~ 75℃
	大气条件 Ambient condition	周围空气为 40℃, 相对湿度为 95% surrounding temperature 40℃, relative humidity 95%
	污染 Pollution	3
	阻燃性 Fire resistance	UL94-V0
	防护等级 Protection level	IP20

3.2.2.4.2 外形及安装尺寸及端子信号定义: The outline and installation dimensions and the definition of the terminal signal.

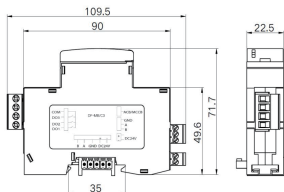


图2 通信适配器外形尺寸图 Fig.2 External Dimension of Communication Adaptor

注: 未注尺寸公差按照 GB/T 1804-C。

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

3.2.2.4.3 通信适配器正面旋钮及指示灯定义: The definition of the front knob and indicator light of the communication adapter

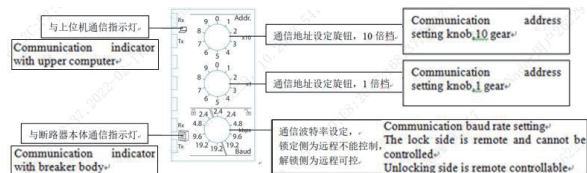


图3 通信适配器调节档位图 Fig. 3 Gear Adjustment of Communication

注 1: DO1-DO3 为三路 DO 输出控制, 可以自定义输出功能, 例如: 电动操作机构的分合闸控制;

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

注 2: 多台通信适配器可级联安装(最大级联数 32), 可对每台断路器设置通信地址(1~99), 有 2400, 4800, 9600, 19200bps 四档通信波特率设置。

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.

注 3: 通信适配器在-35℃~25℃环境时, 建议降低波特率, 提高通信可靠性。

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

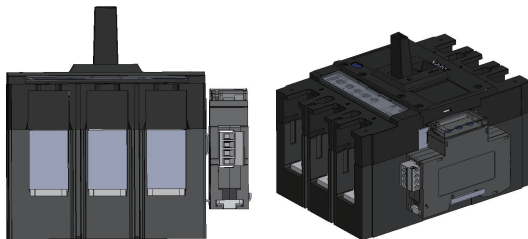


图5. 通讯型断路器与通讯适配器连接图

Fig. The connection diagram between the communication circuit breaker and the communication adapter

3.2.2.5 NDM3E 专用测试仪 Special tester for NDM3E

使用 NDM3E 专用测试仪通过控制器上的“TEST”端口与断路器本体相连。可对控制器进行故障测定、数据记录、脱扣试验等操作。

When connecting “TEST” terminal on the controller and breaker by using special tester for NDM3E. The tester can be used for testing failures of the controller, recording data, and tripping tests etc.

3.2.2.6 NDM3E 控制器过载报警不脱扣功能 Alarm without trip for overload of NDM3E controller

当 NDM3E 控制器上的 T₁ 档位设置为“OFF”时, 断路器具有过载报警不脱扣功能。即在线路过负荷的情况下, 断路器不跳闸仅输出过负荷信号。保障了供电的连续性, 满足 GB 50054 中第 4.3.3 条“突然断电比过负荷造成的损失更大的线路, 其过负荷保护应作用于信号而不应作用于切断电路”的要求。该功能可有效替代热继电器报警, 节约成本。

When T₁ shift on the NDM3E is set as “OFF”, the breaker has the function of alarm without tripping for overload, namely in the case of overload on the circuit, the breaker only outputs overload signals with tripping, which can ensure continuity of power supply, meeting requirements of Section 4.3.3 in GB 50054: In the circuit where the sudden disconnect of power supply can bring larger losses than overload, and the overload protection shall act on the signals other than disconnecting the circuit. The function can effectively substitute thermo-relay alarm for saving costs.

3.2.3 NDM3E 系列断路器控制器面板明细表 List of the controller panel of the NDM3E series breakers

表 4：控制器面板明细表（基本型、G 型）

Table 4: List of the controller panels (Basic type and G type)

产品规格 Product specification	额定电流 Rated current	电流、时间参数 Parameters of current and time					
		I_n (A)	Tr (s)	$I_{ad} (\times I_n)$	T_{ad} (s)	$I_t (\times I_n)$	$t_p (\times t_n)$
NDM3E-125	$I_n=32$	12、16、20、25、32、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
	$I_n=63$	25、32、40、45、50、56、63、OFF					
	$I_n=125$	40、50、63、70、80、90、100、125、OFF					
NDM3E-250	$I_n=160$	63、80、90、100、125、140、160、OFF					
	$I_n=250$	100、125、160、180、200、225、250、OFF					
NDM3E-400	$I_n=400$	160、200、225、250、280、315、325、400、OFF					
NDM3E-630	$I_n=630$	252、315、350、400、450、500、550、600、630、OFF					
	$I_n=800$	320、400、450、500、550、630、700、750、800、OFF					

表 4（续）：控制器面板明细表（基本型、G 型）

Table 4 (Continued): List of the controller panels (Basic type and G type)

产品规格 Product specification	额定电流 Rated current	电流、时间参数 Parameters of current and time			
		$I_n (\times I_n)$	T_n (s)	$I_g (\times I_n)$	T_g (s)
NDM3E-125	$I_n=32$	0.5、1.0、OFF	TrN = Tr 无显示，不需整定 No display, need no setting	0.2、0.3、0.4、0.5、0.6、0.8、1.0、OFF	0.1、0.2、0.3、0.4
	$I_n=63$				
	$I_n=125$				
NDM3E-250	$I_n=160$				
NDM3E-400	$I_n=250$				
NDM3E-630	$I_n=400$				
NDM3E-800	$I_n=630$				
NDM3E-800	$I_n=800$				

注：1. 产品为接地型时 T_{ad} 无法整定，订单无要求出厂默认为 0.3s。

2. 产品为接地型时 I_{ad} 无法整定，订单无要求出厂默认为 0.9 I_n 。

3. 4P 产品为基本型时 I_t 无法整定，订单无要求出厂默认为 0.9 I_n 。

4. 4P 产品为接地型时 I_{ad} 无法整定，订单无要求出厂默认为 1.0 I_n 。

Notes: 1. When the product is grounding type, T_{ad} can't be set, if there isn't requirement in the order, the default value is 0.3s.

2. When the product is grounding type, I_{ad} can't be set, if there isn't requirement in the order, the default value is 0.9 I_n .

3. When the 4P product is basic type, I_t can't be set, if there isn't requirement in the order, the default value is 0.9 I_n .

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

表 5：智能控制器整定明细表（T 型、G 型）

Table 5: Setting value list of the intelligent controller (T type)

产品规格 Product specification	额定电流 Rated current	电流、时间参数 Parameters of current and time					
		I_n (A)	T_n (s)	$I_{ad} (\times I_n)$	T_{ad} (s)	$I_t (\times I_n)$	$t_p (\times I_n)$
NDM3E-125	$I_n=32$	12 ~ 32+OFF	12 ~ 150、OFF	1.5 ~ 10、OFF	0.06、0.1、0.2、0.3	3 ~ 14、OFF	0.7 ~ 1.0、OFF
	$I_n=63$	25 ~ 63+OFF					
	$I_n=125$	40 ~ 125+OFF					
NDM3E-250	$I_n=160$	63 ~ 160+OFF					
	$I_n=250$	100 ~ 250+OFF					
NDM3E-400	$I_n=400$	160 ~ 400+OFF					
NDM3E-630	$I_n=630$	252 ~ 630+OFF					
NDM3E-800	$I_n=800$	320 ~ 800+OFF					

表 5（续）：智能控制器整定明细表（GT 型）

Table 5: Setting value list of the intelligent controller (GT type)

产品规格 Product specification	额定电流 Rated current	电流、时间参数 Parameters of current and time					
		I_n (A)	T_n (s)	$I_{ad} (\times I_n)$	T_{ad} (s)	$I_t (\times I_n)$	$t_p (\times I_n)$
NDM3E-125	$I_n=32$	12 ~ 32、OFF	12 ~ 150、OFF	1.5 ~ 10、OFF	0.06、0.1、0.2、0.3	3 ~ 14、OFF	0.7 ~ 1.0、OFF
	$I_n=63$	25 ~ 63、OFF					
	$I_n=125$	40 ~ 125、OFF					
NDM3E-250	$I_n=160$	63 ~ 160、OFF					
	$I_n=250$	100 ~ 250、OFF					
NDM3E-400	$I_n=400$	160 ~ 400、OFF					
NDM3E-630	$I_n=630$	252 ~ 630、OFF					
NDM3E-800	$I_n=800$	320 ~ 800、OFF					

表 5（续）：智能控制器整定明细表（T 型、GT 型）

Table 5 (continued): Setting value list of the intelligent controller (T type and GT type)

产品规格 Product specification	额定电流 Rated current	电流、时间参数 Parameters of current and time			
		$I_n (\times I_n)$	T_n (s)	$I_g (\times I_n)$	T_g (s)
NDM3E-125	$I_n=32$	0.5、1.0、OFF	TrN = Tr 无显示，不需要整定 No display, need no setting	0.2 ~ 1.0、OFF	0.1、0.2、0.3、0.4
	$I_n=63$				
	$I_n=125$				
NDM3E-250	$I_n=160$				
	$I_n=250$				
NDM3E-400	$I_n=400$				
NDM3E-630	$I_n=630$				
NDM3E-800	$I_n=800$				

- 注：1、智能控制器（T型、GT型）整定电流最小步长为Ir、Ig、Ip为0.1A Isd和II为1A；
2、非通讯产品为接地（G）型时Ts无法整定，订单无要求出厂默认为0.3s。
3、非通讯产品为接地（G）型时Ip无法整定，订单无要求出厂默认为0.9I。

Notes: 1. The minimum step of setting current of intelligent controller (T-type and GT type) is Ir, Ig and Ip is 0.1A, and Isd and II are 1A;

2. When the non-communication product is grounding-type (G type), Ts can't be set, if there isn't requirement in the order, the default value is 0.3s.

3. When the non-communication product is grounding-type (G type), Ip can't be set, if there isn't requirement in the order, the default value is 0.9 I.

表 6：电动机保护型 Table 6: The motor protection type panel

产品规格 Product specification	额定电流 In (A) Rated current In (A)	电流及时间参数 Parameters of current and time			
		I (A)	Class (s)	Isd (×I)	Iunbl(%)
NDM3E-125	125	50 ~ 125	4 ~ 10	5、6、7、8、9、10、11、12、13、OFF	10%、20%、30%、40%、OFF
NDM3E-250	250	100 ~ 250	4 ~ 10	5、6、7、8、9、10、11、12、13、OFF	10%、20%、30%、40%、OFF
NDM3E-630	630	252 ~ 630	4 ~ 10	3、4、5、6、7、8、9、10、OFF	10%、20%、30%、40%、OFF
NDM3E-800	800	320 ~ 800	4 ~ 10	3、4、5、6、7、8、9、10、OFF	10%、20%、30%、40%、OFF

注：1. 当 Isd 为 OFF 档时为短延时关闭。

2. 当 Iunbl 为 OFF 档时为电流不平衡保护、断相保护功能关闭。

3. NDM3E-125/250 短路瞬时 II 内置 15In, NDM3E-630/800 短路瞬时 II 内置 13In。

4. 电动机保护断路器仅有 NDM3E-125/250/630/800。

Notes: 1. When Isd is OFF, it will turn off for short delay protection.

2. When Iunbl is OFF, The current unbalance protection, lack phase protection is off.

3. Short-circuit instantaneous II to 15In of NDM3E-125/250, Short-circuit instantaneous II to 13In of NDM3E-630/800.

4. Motor protection circuit breaker only for NDM3E-125/250/630/800.

3.2.4 控制器的整定电流、整定时间调节 (通讯型)

通讯型控制器的电流、时间调节需要通过通讯用上位机电脑来调节，需要客户配置的相关设备如下：

Setting current and time adjustment of controller (communication)

The adjustment of setting current and time of communication controller can be completed with the upper computer used for communication, relevant equipments needed are as follows:

(1) 电脑一台（台式机或笔记本，电脑需要有 RS-232 接口）；

One computer (Desktop or laptop with RS-232 interface);

(2) RS-232 转 RS-485 转换模块；Conversion module of RS-232 to RS-485;

(3) RS-485 通讯用通讯屏蔽线（也可以用双绞线替代，正常产品连接时只能用通讯屏蔽线）。

RS-485 communication shielded cable (It can be replaced by twisted pair, but only communication shielded cable can be used for normal product connection)

3.2.4.1 通讯连接接线 Communication connection wiring

通讯型断路器与电脑连接方式如下：

Connection of communication breaker and the computer are shown as follows:

将产品的通讯适配器的电源和通讯线接好，通讯适配器的通讯线接到“RS-232 转 RS-485 转换模块”的 RS-485 端（注意极性不可接错），再将 RS-232 转 RS-485 转换模块“配套提供的”串口线“将”RS-232 转 RS-485 转换模块”的 RS-232 端和电脑的“RS-232 接口”连接好，如“RS-232 转 RS-485 转换模块”有电源请将电源线接好，请见图 5，最后接电源。

Connect the communication adapter's power supply and communication adapter, with the latter one connecting to RS-485 terminal of “RS-232 to RS-485 module” (poles can't be wrongly connected), and then using the serial port line provided accompanying with “RS-232 to RS-485 module” to connect RS-232 terminal of “RS-232 to RS-485 module” and “RS-232 interface” of the computer. If the “RS-232 to RS-485 module” is provided with a power supply, please connect the power line (see Fig. 5), and plug in the power supply at last.

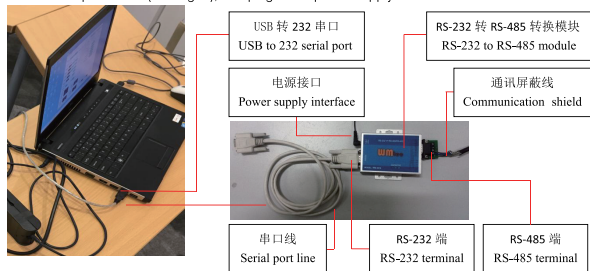


图 6：通讯连接示意图

Fig. 6: Communication Connection Diagram

3.2.4.2 整定电流、整定时间调节 Adjustment of setting current and setting time

通讯参数调节详见《NDT-01598 NDM2E & 3E & 5E 塑壳断路器 Modbus-RTU 通讯协议》See 《ndt-01598 Modbus RTU communication protocol for ndm2e & 3E & 5E molded case circuit breaker》for communication parameter adjustment.

4. 正常工作环境/ Stand working conditions

- 海拔 ≤ 2500 m;
- 使用环境温度 -35 ~ +70°C;
- 环境温度 +40°C 时相对湿度不超过 50%，较低温度可以有较高湿度，如：20°C 时相对湿度可达 90%;
- 对于因温度变化所产生的凝霜应采取相应的措施；
- 能耐受潮湿空气的影响；
- 能耐受盐雾、油雾的影响；
- 能耐受霉菌的影响；

8)断路器接至主回路的安装类别为Ⅲ类，断路器不接至主回路的安装类别为：Ⅱ类；

9)污染等级：3级；

10)防护等级：IP20；

11)无爆炸危险的介质中，且介质无足以腐蚀金属和破坏绝缘的气体与导电尘埃的地方；

12)在没有雨雪侵袭的地方；

13)当用户使用条件较上述严酷时应与制造商协商；

14)储存环境 见表3；

15)产品降容系数表 见表8；

16)高海拔降容系数 见表9；

17)导体部分接线端子/安装螺钉拧紧扭矩 见表10；

1) Altitude ≤ 2500 m；

2) Ambient temperature: -35 ~ +70°C；

3) The relative humidity of the air does not exceed 50% at 40°C. Higher relative humidity is permitted at lower temperature, such as 90% relative humidity at 20°C；

4) The protective actions should be taken for frost which formed by variation of temperature；

5) Resisting the effects by humid air；

6) Resisting effects by salt mist and oil mist；

7) Resisting the effects by mould；

8) Installation category for the breaker which is connected to main circuit: Ⅲ， Installation category for the breaker which is not connected to main circuit: Ⅱ；

9) Pollution degree: 3；

10) Protection degree: IP20；

11) Service place without explosive media, gas and dust which are corrosive and conductive；

12) Be mounted free from rain and snow；

13) Should consult with the manufacturer when the working conditions are harsher；

14) Storage environment 见表3；

15) Product derating coefficient table 8；

16) Derating coefficient in high altitude place table 9；

17) Terminal torsion value for wiring thread hole in conductor section table 10；

表 7/ table7

项目 Item	规范 Description
周围温度 Ambient temperature	-40°C ~ +75°C
相对湿度 Relative humidity	(Ambient temperature at 25°C) ≤ 95%

表 8/ table8

塑壳式断路器降容系数表 Molded Case Circuit Breaker Derating Coefficient Table

序号 No.	壳架等级额定电流 Frame size rated current	温度对应产品降容系数表 Derating coefficient table						
		40°C	45°C	50°C	55°C	60°C	65°C	70°C
1	125A	1	1	1	0.973	0.945	0.918	0.891
2	250A	1	1	1	0.976	0.952	0.927	0.902
3	400A	1	1	1	0.978	0.957	0.934	0.911
4	630A	1	1	1	1	1	0.979	0.957
5	800A	1	1	1	0.980	0.958	0.936	0.913

表 9/ Table 9 塑壳断路器高海拔降容系数表

Table of capacity reduction coefficient of molded case circuit breaker at high altitude

海拔高度(m) Altitude(m)	2000	2500	3000	3500	4000	4500	5000
工作电流修正系数 Rated working current	1	1	0.98	0.97	0.95	0.94	0.93
最大工作电压(V) Maximum working voltage(V)	690	690	620	580	550	520	500
工频耐压(V) Power frequency withstand voltage(V)	3500	3500	3150	3000	2800	2650	2500
绝缘电压(V) Isolation voltage(V)	1000	1000	900	850	810	770	730

表 10/ table 10 接线端子/安装螺钉拧紧扭矩

Torsion value for wiring terminal

序号 No.	壳架等级额定电流(A) Frame size rated current	螺纹直径(mm) Thread diameter	扭矩值(N.m) Torsion value
2	125	M8	12
		M4	1.5
3	250	M8	12
		M4	2.4
3	400	M10	20
		M6	6
4	630/800	M12	28
		M6	6

5. 接线方式 (接线图) / Wiring Method

连接导线采用的截面积和相应的额定电流见表 11

Table 11 of sectional area and applicable rated current adopted in wiring

额定电流 (A) Rated current	12	16	25	32	40	63	70	90	125	160	180	200	250	280	400
		20			50		80	100	140		225		315	350	
导线截面积(mm ²) Sectional areas of the wires	1.5	2.5	4	6	10	16	25	35	50	70	95	120	185	240	

额定电流(A) Rated current(A)	电缆线截面积 Cable cross-sectional area		铜排尺寸 Copper bar size	
	数量 Quantity	截面积(mm ²) Cross-section area(mm ²)	数量 Quantity	尺寸(mm×mm) Cross-section area(mm×mm)
450、500	2	150	2	30×5
550、600、630	2	185	2	40×5
700、750、800	2	240	2	50×5

6. 产品外形及安装尺寸/ Shape dimension & Dimension

6.1 外形尺寸 Overall dimensions

6.1.1 外形尺寸 (不带通讯背包和电操) Overall dimensions (Without communication backpack and electric operation)

表 12: 外形尺寸表 Table 12: Overall dimensions

型号 Type	外形尺寸 Overall dimensions					
	长(mm) L		宽(mm) W		高(mm) H	
	3P	4P	3P	4P	3P	4P
NDM3E-125	150	150	92	122	92.5	92.5
NDM3E-250	165	165	107	142	92.4	92.4
NDM3E-400	257	257	150	198	107	107
NDM3E-630	280	280	210	280	113.5	113.5
NDM3E-800	280	280	210	280	113.5	113.5

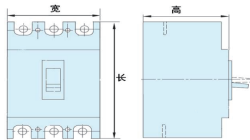


图 7: 不带通讯背包和电操外形尺寸
Fig.7: Overall dimensions (Without communication backpack and electric operation)

6.1.2 外形尺寸 (带通讯背包和电操) Overall dimensions (With communication backpack and electric operation)

表 13: 带电操、带通讯背包外形尺寸表

Table 13: Overall dimensions (With communication backpack and electric operation)

型号 Model	外形尺寸 Overall dimensions					
	长(mm) L		宽(mm) W		高(mm) H	
	3P	4P	3P	4P	3P	4P
NDM3E-125	150	150	117	147	176	176
NDM3E-250	165	165	132	167	178.5	178.5
NDM3E-400	257	257	175	223	246	246
NDM3E-630	280	280	235	305	254	254
NDM3E-800	280	280	235	305	254	254

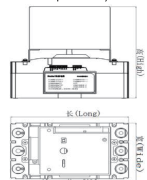


图 8: 带通讯背包和电操外形尺寸
Fig. 8: Overall dimensions (With communication backpack and electric operation)

6.2 安装尺寸 Installation dimensions

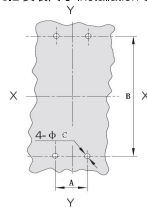


图 13-1

Fig. 13-1

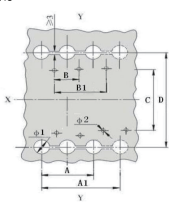


图 13-2

Fig. 13-2

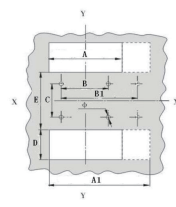


图 13-3

Fig. 13-3

图 9/ Fig.9-1

图 9/ Fig.9-2

图 9/ Fig.9-3

图 9: 安装尺寸图 Fig.9: Installation dimensions

6.2.1 板前接线 (X-X, Y-Y 的为三极断路器中心) 见图 9-1

Front connected (X-X, Y-Y center for three poles breaker) please refer to Fig. 9-1.

表 14: 板前接线安装尺寸表

Table 14: Installation dimensions for front connected

断路器型号 Types of the breaker	NDM3E-125		NDM3E-250		NDM3E-400		NDM3E-630		NDM3E-800	
极数 Number of poles	3	4	3	4	3	4	3	4	3	4
安装板 开孔尺寸 (mm) Mounting plate cutout dimensions(mm)	A		B		C		D		E	
	30	60	35	70	44	94	70	140	70	140
	B		C		D		E		F	
	129		126		194		243		243	
	C		D		E		F		G	
	4.5		5		7		7		7	

6.2.2 板后接线 (X-X, Y-Y 的为三级断路器中心) 见图 9-2

Rear connected (X-X, Y-Y center for three poles breaker) please refer to Fig.9-2.

表 15: 板后接线安装尺寸表 Table 15: Installation dimensions for rear connected

断路器型号 Types of the breaker		NDM3E-125		NDM3E-250		NDM3E-400		NDM3E-630		NDM3E-800	
极数 Number of poles		3	4	3	4	3	4	3	4	3	4
安装板 开孔尺寸 (mm)	A	60	-	70	-	96	-	140	-	140	-
	A1	-	90	-	105	-	144	-	210	-	210
	B	30	-	35	-	44	-	70	-	70	-
	B1	-	60	-	70	-	94	-	140	-	140
Mounting plate cutout dimensions	C	107		126		194		243		243	
	D	132		144		224		243		243	
	Ø1	25		25		32		42		42	
	Ø2	4.5		5		6.5		7		7	

6.2.3 插入式接线 (X-X, Y-Y 的为三级断路器中心) 见图 9-3

Plug-in front connected (X-X, Y-Y center for three poles breaker) please refer to Fig.9-3

表 16: 插入式板后接线安装尺寸表

Table 16: Installation dimensions for plug-in front connected

断路器型号 Types of the breaker		NDM3E-125		NDM3E-250		NDM3E-400		NDM3E-630 NDM3E-800			
		5						类型 I		类型 II	
极数 Number of poles		3	4	3	4	3	4	3	4	3	4
安装板 开孔尺寸 (mm)	A (最小) (Minimum)	94	-	110	-	152	-	213	-	213	-
	A1 (最小) (Minimum)	-	125	-	145	-	200	-	283	-	283
	B	60	-	70	-	60	-	100	-	140	-
	B1	-	90	-	105	-	108	-	140	-	210
Mounting plate cutout dimension s	C	56		54		129		123	153	142	
	D(最小) (Minimum)	41-46		51-53		65		65		56	
	E	90		88		166		180	185	184	
	Ø	6.5		6.5		8.5		11		11	

注: 未注公差尺寸的极限偏差按 GB/T 1804-C。

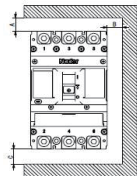
Note: The limit deviation not indicated with the tolerance dimensions is as per GB/T 1804-C.

7. 安装方式/ Mounting Method

7.1 安装在金属小柜中的绝缘距离 (单位: mm), 如下图:

7.1 Insulation distance mounted in the metal cabinet (unit: mm), as shown below:

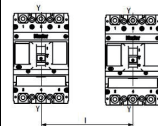
安装距离 Mounting distance	A(进线端到柜面)A (inlet wire end to the cabinet face)		B (侧面到 柜面距离) B (distance	C(出线端 到柜面距 离)C (outlet
规格 Specification	带端子罩 With a terminal cover	不带端子罩 Without a terminal cover	from side to cabinet)	wire end to the cabinet face)
NDM3E-125	25	65	30	30
NDM3E-250	25	65	30	30
NDM3E-400	25	120	35	35
NDM3E-630	25	120	35	35
NDM3E-800	25	120	35	35



7.2 断路器排装之间的最小中心距离

7.2 Minimum center distance between rowed circuit breakers

规格 Specification	断路器宽度 (mm) Width of circuit breaker (mm)		中心距离 (mm) Center distance (mm)	
	3 极 3P	4 极 4P	3 极 3P	4 极 4P
NDM3E-125	92	122	122	152
NDM3E-250	107	142	137	172
NDM3E-400	150	198	190	238
NDM3E-630	210	280	250	320
NDM3E-800	210	280	250	320

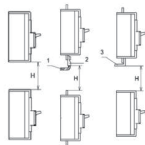


注: 断路器排装或叠装时, 检查联接母排或电缆保证空气绝缘距离不会减少
Note: Check the connected busbar or cable during rowing or stacking of

7.3 断路器叠装之间最小距离

7.3 Minimum center distance between stacked circuit breakers

规格 Specification	H(断路器上下距离) H (distance of circuit breaker from bottom)	
	带端子罩 With a terminal cover	不带端子罩 Without a terminal cover
NDM3E-125	90	91
NDM3E-250	90	93
NDM3E-400	155	155
NDM3E-630	155	155
NDM3E-800	155	155



注：1、绝缘电缆

2、电缆端子

3、联接-无绝缘

产品通电前检查端子罩或相间隔板装配到位。

Note: 1、Insulated cable

2、cable terminal

3、connection – uninsulated

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

8. 附件说明书/ Accessory

8.1 绝缘测试 Insulation test

本断路器出厂前已按标准规定绝缘测试。因断路器带有电子线路板，安装前如进行复测，必须按如下步骤：

The breaker has gone through specified standard insulation test before factory delivery. Because many PCBs are installed in the breaker, for re-testing, please conduct tests according to following procedures:

(1) 用 500VDC 兆欧表。

(2) 在断路器处于断开状态，对进出连接板 1-2、3-4、5-6 之间，和 1、3、5 连接板（3 个连接板用导线相连）与外壳之间（外壳用金属箔覆盖）分别进行。

(3) 对接至主电路的欠电压脱扣器，在进线与断路器外壳间。

(4) 绝缘电阻不小于 20MΩ。

(1) Use a 500VDC megameter.

(2) Place the breaker in open status, carry out test between 1-2, 3-4 and 5-6 connection boards, as well as between the 1, 3 and 5 connection boards (connected with wires) and the breaker shell (covered by metal foil).

(3) Test should be done in position between incoming wire and breaker shell to test Under-voltage release in the main circuit.

(4) Insulation resistance should not be lower than 20MΩ.

注：也可分离电子线路板后进行绝缘测试。

Notes: Insulation test can also be done after separation of PCBs.

8.2 安装 Installation

请安装于金属等阻燃物上。断路器可垂直安装，也可以水平安装。Please install the breaker on flame retardants such as metal, etc. It can be installed vertically or horizontally.

产品垂直安装时，安装面与垂直面的倾斜角度 $\leq 22.5^\circ$ 。When the product is installed vertically, the angle of inclination between the installation surface and vertical surface shall be $\leq 22.5^\circ$.

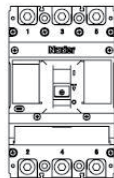


图 10.1：垂直安装

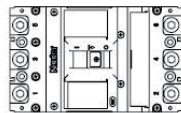


图 10.2：水平安装

Fig.10.1 Vertical installation

Fig.10.2 Horizontal installation

9. 使用和维护/ Application & Maintenance

9.1 欠压脱扣器 Under-voltage release

断路器带有欠压脱扣器时，应使欠压脱扣器先通电，断路器才允许合闸。

If the breaker has the Under-voltage release, the Under-voltage release should be electrified before breakers can be closed.

(1) 根据外挂欠电压模块上的接线端子编号接入电源（直流电源不必区分正负极）。

(2) 在额定控制电源电压的 35%~70% 时，欠压脱扣器应可靠使断路器脱扣；

(3) 在额定控制电源电压的 85%~110% 时，欠压脱扣器应保证断路器能合闸；

(4) 在额定控制电源电压低于 35% 时，欠压脱扣器应防止断路器合闸。

(1) Power supply is connected to the release according to wiring terminal number of the add-on Under-voltage module (no need to distinguish positive and negative for direct current).

(2) At rated control supply voltage of 35%~70%, Under-voltage release should be reliable to trip breakers.

(3) At rated control supply voltage of 85%~110%, Under-voltage release should be able to close breakers.

(4) At rated control supply voltage less than 35%, Under-voltage release should prevent breakers from closing.

9.2 分励脱扣器 Shunt release

根据引出的导线编号接入电源（直流电源不必区分正负极）。当分励脱扣器的外加电压介于额定控制电源电压的 70%~110% 之间时，能可靠分断断路器。

Power supply is connected to the shunt release according to outlet wire number (no need to distinguish positive and negative for direct current). At rated control supply voltage of 70%~110%, shunt release should be reliable to trip breakers.

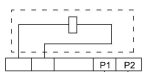


图 11-1: 欠压脱扣器接线图
Fig.11-1 Wiring diagram of Under-voltage release

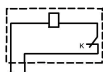


图 11-2: 分励脱扣器接线图
Fig.11-2 Wiring diagram of shunt release

9.3 辅助触头、报警触头 Auxiliary contact and alarm contact

9.3.1 辅助、报警触头接入相应外围控制电路 Peripheral control circuits of connection of auxiliary and alarm contacts

表 17: 辅助开关电气特性表

Table 17: Electrical characteristics of auxiliary switch

分 类 Category	壳架电流 (A) Frame current (A)	约定发热电流 I _{th} (A) Conventional thermal current (A)	额定工作电流 I _e (A) Rated working current I _e (A)
辅助触头 Auxiliary contact	125、250	3	0.3(AC400V)/0.15(DC220V)
	400 ~ 800		0.4(AC400V)/0.15(DC220V)
报警触头 Alarm contact	125、250	3	0.3(AC400V)/0.15(DC220V)
	400、630		0.3(AC400V)/0.15(DC220V)

9.3.2 辅助、报警触头状态指示图 Status indication of auxiliary contact and alarm contact

表 18: 辅助、报警触头状态指示表

Table 18 Status indication of auxiliary contact and alarm contact

附件名称 Accessory name	断路器状态 Status of the breaker	线路接通状态 Connection status of the circuit
辅助触头 Auxiliary contact	“分”或“自由脱扣” “Open” or “free tripping”	
	“合” “Close”	“接通”与“断开”相互转换 Mutual transferring between “On” and “Off”
报警触头 Alarm contact	“分”或“合” “Open” or “closing”	
	“自由脱扣” “free tripping”	“接通”与“断开”相互转换 Mutual transferring between “On” and “Off”

9.4 电动操作机构 Motor-operated mechanism



图 12-1: 电动操作机构实物图

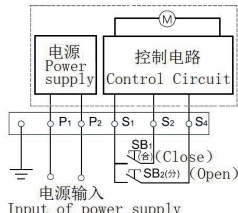


图 12-2: 电动操作机构接线图

Fig.12-1: Entity figure of motor-operated mechanism

Fig.12-2 Wiring diagram of the motor-operated mechanism

在外加电源情况下，可通过电动操作机构对断路器进行合、分操作。
Closing and opening of breaker can be realized through motor-operated mechanism with additional power supply.

电源输入电压规格：AC 50Hz 220V、380V，DC110V、220V。

Input voltages of the power supply: AC 50Hz 220V, 380V, DC110V, 220V.

电动操作机构模块具有很高的机械寿命，操作简便，可自动操作，也可手动操作。

The motor-operated mechanism's module has high mechanical life, easy to operate automatically and manually.

表 19: 电动操作机构的动作电流、电机功率及寿命表

Table 19: Action current, motor power and life of the motor-operated mechanism

配电断路器 Supporting breaker	电动机功率 (W) Power of the motor (W)	寿命 (次数) Life (times)
NDM3E-125	AC/DC220V≤180 AC/DC110V≤180	20000
NDM3E-250	AC380V≤350 DC24V:80	20000
NDM3E-400	AC/DC220V≤350 AC/DC110V≤250	10000
NDM3E-630	AC380V≤600 DC24V:160	10000
NDM3E-800		10000

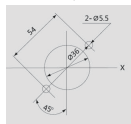
注：断路器脱扣跳闸后，电动操作机构必须先使断路器再扣，然后才能合闸。

Notes: When the breaker is tripped, the motor-operated mechanism must trip the breaker first, and then close.

9.5 手动操作机构 Manual operating mechanism

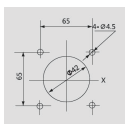
- 安装前，安装操作手柄的开关柜门按图开好孔，开孔中心离铰链距离大于 100 mm。
- 把已在面盖上固定好操作机构的断路器安置于安装板上，并稍作固定。
- 把操纵杆转轴固定于操作机构上安置方轴的方孔内。
- 关上开好孔的门板，调整断路器的位置，使方轴中心与手柄开孔中心一致。
- 打开开关柜门板，当转动手柄“OFF”指示在水平位置时固定好手柄。
- 合上安装好转动手柄的开关柜门板，试着操作手柄，转动应灵活自如，并且手柄在水平位置时，断路器应分闸，手柄在垂直位置时，断路器应合闸。

- (1) Before installing the mechanism, first open holes at installation position of the operation handle in switch cabinet door. The distance between hole center and hinge should not exceed 100mm.
- (2) Install the breaker which has been fixed with the operating mechanism on surface cover on the installation board and fasten it slightly.
- (3) Fasten the square shaft of the operation lever in square holes of the operating mechanism.
- (4) Close the door panel with holes, adjust position of breaker to align the shaft center with handle hole center.
- (5) Open the door panel of switch cabinet. Rotate the handle to horizontal OFF position and fasten it there.
- (6) Close the door panel after installing the handle. Try to rotate the handle to see if it can rotate freely and if the breaker opens when it is in horizontal position and close when in vertical position.



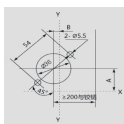
CS1-A 型手柄开孔图

CS1-A type holeing diagram of handle



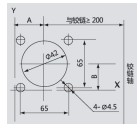
CS1-F 型手柄开孔图

CS1-F type holeing diagram of handle



CS2-A 型手柄开孔图

CS2-A type holeing diagram of handle



CS2-F 型手柄开孔图

CS2-F type holeing diagram of handle

10. 注意事项/ Notices

10.1 运行前检查和准备 Checks and preparation before operation

运行前应检查以下各项 Check following items before operation:

- (1) 核对接线是否正确。Check for correct wiring
特别是检查断路器的输入端子（1、3、5）应接入电源线，输出端子（2、4、6）应接至负载线。
- (2) 确认端子间或暴露的带电部分没有短路或对地短路情况。
- (3) 确认端子连接和固定螺钉均应紧固无松动。
- (4) 断路器带有欠电压脱扣器，应使脱扣器先通电，断路器才允许合闸。
- (1) Check that the inlet terminals (1, 3 and 5) of the breaker are connected with power wires, while outlet terminals (2, 4 and 6) are connected with load wires.
- (2) Check that no short circuit or short to ground occurs between terminals or in exposes live parts.
- (3) Check that terminal connection and fixing bolts are fastened without looseness.
- (4) If the breaker has the Under-voltage release, the Under-voltage release should be electrified before breakers can be closed.

10.2 试运行 Commissioning

按 9.1 条各项全部确认无异常情况后，可以进行试运行。

After confirming that all items in Section 9.1 are normal, then start the commissioning.

- (1) 用户根据需要在调节面板上调整好 I_n 、 I_r 、 I_{sd} 、 I_{sd} 、 I_n 、 I_r 等。
- (2) 扳动操作手柄，投入电源。
- (3) 断路器主电路带电后，按紧急脱扣按钮，断路器应脱扣，操作手柄处于脱扣位置。
- (4) 如果试运行都能满足，可投入运行。
- (1) Adjust values of I_n , I_r , I_{sd} , I_{sd} , I_n and I_r etc. in panel as needed.

- (2) Operate the handle and connect power supply.
- (3) After the main circuit of the breaker is electrified, press the emergency tripping button with the handle in tripping position to trip the breaker.
- (4) If commissioning is satisfactory, the breaker can be put in operation.

10.3 维护 Maintenance

◆ 维护检查必须有专业技术人员负责。

Maintenance checks should be done by specialized technical personnel.

用户如需选用内、外附件，按所订型号由本公司提供，以保证质量。如用户自行选购或改装，本公司不能负责。

User should use internal and external accessories provided by Nader so as to endure their quality; Nader should not be held reliable for purchase of accessories from other companies or authorized modifications.

在执行维护操作前，必须先完成下列操作：

Follow following steps before conducting maintenance:

- (1) 使断路器分闸；
Open the breaker;
- (2) 断开电源与断路器的连接（包括主电路、辅助电路）；
Disconnect power supply and breaker (including main circuit and auxiliary circuits)
- (3) 将断路器从安装位置上卸下（一般用于插入式，固定式最好也如此）
Remove the breaker from its installation position (normally for plug-in installation; it is recommended to do so for a fixing one).

断路器维护在正常操作条件下每年一次，在非正常条件下每半年一次，以下为维护内容：

Maintenance of breaker is carried out yearly under normal use and every six months under abnormal use. The maintenance includes following procedures:

- (1) 再扣断路器，合、分断路器，在断路器合闸时用脱扣按钮使断路器脱扣，往复操作 5 次，断路器应能可靠进行再扣、合、分、脱扣动作；
- (2) 清除断路器表面及连接处的灰尘（用清洁、干燥的抹布擦拭）；
- (3) 清洁隔隔板，如必要则需要更换隔隔板；
- (4) 绝缘测试（见 7.1）
- (5) 检查所有连接情况，用砂布擦除氧化物，用可溶解剂清洁，拧紧螺栓和螺母；
- (6) 控制器整定值测试：应使用我公司的 NDM3E 专用测试仪器与断路器的 TEST 端口连接，检验各个设定参数，以保证参数设定与旋钮指示一致；
- (7) 如果断路器还装有其它内、外部附件，应逐一检查各个附件，以确保其处于正常工作状态。
(按照 8 附件说明 详细内容进行测试)
- (1) Re-trip the breaker, close and open the breaker, use tripping button to trip the breaker when it is closed; repeat for 5 times to check that the breaker can reliably re-trip, open, close and trip.
- (2) Clean dust on breaker surface and connections (wipe with clean and dry cloth).
- (3) Clean the flash barrier; replace it if necessary.
- (4) Carry out insulation test (see Section 7.1).
- (5) Check condition of all connections. Wipe away oxidations with abrasive cloth and clean with soluble agent. Screw bolts and nuts tight.
- (6) Test of controller setting values: use a tester specialized for NDM3E provided by Nader to

connect with TEST terminal of the breaker. Check setting of each parameter to ensure that parameter setting is consistent with knob indication.

(7) If other internal or external accessories are installed in the breaker, check them one by one to ensure they are in normal working condition (carry out test according to Section 8: Detailed accessory descriptions).

11. 通讯地址/ Communication address

通讯参数调节详见《NDT-01598 NDM2E & 3E & 5E 塑壳断路器 Modbus-RTU 通讯协议》

See 《NDT-01598 Modbus RTU communication protocol for NDM2E & 3E & 5E molded case circuit breaker》 for communication parameter adjustment.

12. 注意事项/ Notes

12.1 安装注意事项 Precautions in installation

- (1) 断路器本体、底板（板后接线用）、底座（插入式接线用）固定在安装板上。
- (2) 与主电路连接必须由具有专业资格的人员进行配线作业。
- (3) 确认输入电源处在完全断开的情况下，才能进行配线作业。
- (4) 必须安装本体后再进行配线。
- (1) Breaker body, bottom plate (for wiring behind the plate) and base (for plug-in wiring) are mounted on the installation board.
- (2) For connection with the main circuit, the wiring should be done by professional qualified personnel.
- (3) Wiring should be done after confirmation of complete disconnection of input power supply.
- (4) Wiring should be done after installation of breaker body.

12.2 运行注意事项 Precautions in operation

- (1) 湿手不能操作断路器，否则可能发生电击事故。
- (2) 断路器不能频繁操作，否则会缩短断路器的使用寿命。
- (3) 带电动操作机构的断路器脱扣跳闸后，电操机构必须使断路器再扣，然后才能合闸。
- (1) Do not operate the breaker with wet hands, or electric shock would be resulted.
- (2) Frequent operation will shorten service life of the breaker.
- (3) For breaker with motor-operated mechanism, after it trips, the motor-operated mechanism should re-trip the breaker before it can be closed.

12.3 保修期与售后服务 After-sales service and warranty

本产品是在完善的品质管理体系下制造的，当万一发生故障时，对保修期与售后服务特作如下说明：

This product is manufactured in a sophisticated quality management system. In case of fault, following warranty and after services clauses are applicable:

保修期/ Warranty period

在用户遵守保管和使用条件下，从本公司发货之日起，不超过 36 个月，断路器封印完好，产品如因制造质量问题而发生损坏或不能正常使用时，本公司负责无偿修理或更换。但是，如由于下述原因引起的故障，即使在保修期内亦作有偿修理或更换。

On the premise of user's compliance with reservation and use specifications of the breaker, for

breakers whose delivery date is within 36 months from now and whose seals are intact, Nader will repair or replace any of these breakers which are damaged or cannot work normally due to manufacture quality. However, as for faults caused by following reasons, Nader would repair or replace the breaker with a charge even it is still in warranty.

- (1) 由于使用错误、自行改装及不适当的维修等原因。
- (2) 超过标准规范的要求使用。
- (3) 购买后由于掉落及安装过程中发生损坏等原因。
- (4) 地震、火灾、雷击、异常电压、其他天灾及二次灾害等原因。
- (1) Misuse, unauthorized modifications and improper repair, etc
- (2) Use during which standards and specifications are violated
- (3) Damages caused by falling or improper installation, etc.
- (4) Natural disasters and secondary disasters such as earthquake, fire, thunder and abnormal voltage, etc

售后服务/ After-sales service

- (1) 出现故障时，请与供货商或本公司售后服务部门联系。
- (2) 保修期内的修理或更换：由于本公司制造上的问题所造成的故障，作无偿修理，以至更换。
- (3) 超过保修期后的修理或更换：在修理后能维持功能的场合下，作有偿修理，否则可作有偿更换。
- (1) Contact distributor or Nader after-sales department in case of breaker fault.
- (2) Breakers in warranty will be repaired or replaces; for faults caused by manufacture of Nader, product will be repaired for free or even replace with a new one.
- (3) Repair or replacement of breaker with expired warranty: paid repair will be done after which breaker can functions normally, or the breaker will be replaced with a charge.

13. 订货须知/ Accessory list and installation

1、用户务必确认对本产品技术资料已有详细了解，并应根据断路器将来使用的场合，按“订货规范”表订货。

2、如用户订货时对智能控制器保护参数不作要求，本公司将按规格型号默认配置。

1. Customer should confirm that he or she is familiar with technical files of this product, and place order by the “Ordering Specifications” form according to future application of breaker.

2. If customer has not put forward any requirement on protection parameters of the intelligent controller upon ordering, Nader will deliver the product in default configurations of the model and specification.

