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NDM2E系列塑壳断路器 产品说明书 NDM2E Series MCCB Product Manual

Nader 良信

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1. 适用范围与用途/ Application scope

NDM2E 系列塑料外壳式断路器(以下简称断路器)主要应用于交流 50 Hz,额定工作电压 AC400V,额定工作电流至 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、接地故障保护、电流不平衡保护、断相保护、“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免受损坏。

本断路器可垂直安装(即竖装),亦可水平安装(即横装)。

断路器具有隔离功能,相应符号为: 。

本产品符合标准 IEC 60947-2、GB/T14048.2。

The breaker isd mainly used in in-frequency switching of the circuit of AC 50Hz, rated working voltage of AC400V 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, current unbalance protection, lack phase 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.

The breaker can be installed vertically(upright),as well as horizontally(crosswise).

The symbol of isolation is: 。

The breaker meeTsd the criterions: IEC 60947-2、GB/T14048.2。

2. 规格型号说明/ Model and implication

ND	M	2	E	-	□	□	/	□	/	□	□	□	□	□
1	2	3	4	5	6	7	8	9	10	11	12	13		
序号 SN	序号名称 SN Name													NDM2E
1	企业代号 Enterprisde code					ND: "Nader" 牌低压电器 Nader low-voltage apparatus								
2	产品代号 Product code					M:塑料外壳式断路器 Molder case circuit breaker								
3	设计序号 Design SN					2								
4	系列派生代号 Series derived code					E: 电子式 E: Electronic formula								
5	壳架等级 Shell frame level					100、250、400、630、800								
6	分断能力级别 Breaking level code					M: 较高分断型 M:Less high breaking type								
						H: 高分断型 type H: High breaking type								
7	操作方式 Operation mode					无代号: 手柄直接操作 no code represTsd direct handle operation								
						P:电动操作 P: represTsd motor operation								
						Z:转动手柄 Z: represTsd rotary handle operation								
8	功能派生代号 Function derivation code					无代号: 基本型智能脱扣器 None: for Basic type								
						G: 接地保护型智能脱扣器 G: for grounding type								

		T:通讯型智能脱扣器 T: for communication type
		GT: 接地保护通讯型智能脱扣器 GT: for grounding and communication type
9	极数 Pole number	3
10	附件代号 Accessory code	参见表 1 see table 1
11	用途代号 For Application code	无代号:配电型 no code represent Power distribution 2: 电动机保护型 2: represent motor protection
12	整定电流 Setting current	参见表 2 see table 2
13	接线方式 Cabling type	无代号: 常规产品 No code: Normal product
		P: 联接排 P: Extended busbar
		Z1: 板后接线 Z1: Rear-plate connection
		Z2H: 插入式板后接线 Z2H: plug-in rear-plate connection
		Z2Q: 插入式板前接线 Z2Q: plug-in front-plate connection
		Z3H: 插入式板后接线一体式 Z3H: Integrated plug-in rear-plate connection
		Z3Q: 插入式板前接线一体式 Z3Q: Integrated plug-in front-plate connection

表 1-1 附件代号(非通讯型)
Table 1-1 Accessory Code (Non-communication)

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

表 1-2 附件代号(通讯型)
Table 1-2 Accessory Code(communication type)

附件名称 Accessory name	代号 Code	壳架等级 (A) Frame level (A)				
		100	250	400	630	800
无 None	300	√	√	√	√	√
报警触头 Alarm contact	308	√	√	√	√	√
分励脱扣器 Shunt release	310	√	√	√	√	√
双辅助触头 Double auxiliary contact	320	×	√	√	√	√
单辅助触头 Single auxiliary contact	321	√	√	√	√	√
欠电压脱扣器 Undervoltage release	330	√	√	√	√	√
分励脱扣器、单辅助触头 Shunt release and single auxiliary contact	341	√	√	√	√	√
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 auxiliary contact, single auxiliary contact	362	×	√	√	√	√
欠电压脱扣器、单辅助触头 Undervoltage release, single auxiliary contact	371	√	√	√	√	√
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 Undervoltage release, alarm contact	338	√	√	√	√	√
辅助触头 auxiliary alarm contact	358	√	√	√	√	√

注：1. “√”为可选，“×”为不可选。

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

2. 由于通讯型需使用一组右侧辅助触头，因此以上附件形式的右侧都会少一组辅助触头输出。

2. Because the communication type breaker needs to use a group of right auxiliary contact output, therefore, right side of the accessories above will be lack of a group of auxiliary contact output.

3. 主要技术参数/ Main technical parameters

3.1 NDM2E 主要技术参数 Main technical parameters of NDM2E

表 2 NDM2E 主要技术参数

Table 2 Main technical parameters of NDM2E

型号 Model	NDM2E-100		NDM2E-250	
壳架等级额定电流 Inm (A) Frame rated current Inm(A)	100		250	
整定电流 Ir(A) Setting current Ir(A)	40、50、63、70、80、90、100		100、125、160、180、200、225、250	
额定绝缘电压 Ui (V) Rated insulation voltage Ui(V)	800		800	
额定冲击耐受电压 Uimp(kV) Rated impulse withstand voltage Uimp(kV)	8		8	
额定工作电压 Ue(V) Rated working voltage Ue(V)	400		400	
工频耐受电压 U(1 分钟)(V) Power frequency withstand voltage U(1min)(V)	3500		3500	
使用类别 Usage category	A		A	
额定短时耐受电流 Icw(kA /1s) Short-time withstand current Icw(kA /1s)	1		2.5	
极数 Number of poles	3		3	
分断能力级别 Breaking capacity	M	H	M	H
额定极限短路分断能力 Icu(kA) Rated ultimate breaking capacity Icu(kA)	50	85	50	85
额定运行短路分断能力 Ics(kA) Rated service breaking capacity Ics(kA)	50	50	50	50
电气寿命 Electrical life	8000		8000	
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	20000	
		可维护寿命 Maintainable life	40000	
飞弧距离(mm) Flashover distance(mm)	≤50		≤50	

表 2 (续) NDM2E 主要技术参数
Table 2 (Continued) Main technical parameters of NDM2E

型号 Model	NDM2E-400	NDM2E-630	NDM2E-800
壳架等级额定电流 Inm (A) Frame rated current Inm(A)	400	630	800
整定电流 Ir(A) Setting current Ir(A)	200、225、 250、280、 315、350、 400	280、315、 350、400、 450、500、 550、600、 630	400、450、 500、550、 600、630、 700、750、 800
额定绝缘电压 Ui (V) Rated insulation voltage Ui(V)	800	800	800
额定冲击耐受电压 Uimp(kV) Rated impulse withstand voltage Uimp(kV)	8	8	8
额定工作电压 Ue(V) Rated working voltage Ue(V)	400	400	400
工频耐受电压 U(1 分钟)(V) Power frequency withstand voltage U(1min)(V)	3500	3500	3500
使用类别 Usage category	B	B	B
额定短时耐受电流 Icw(kA / 1s) Short-time withstand current Icw(kA / 1s)	5	8	10
极数 Number of poles	3	3	3
分断能力级别 Breaking capacity	M	H	M
额定极限短路分断能力 Icu(kA) Rated ultimate breaking capacity Icu(kA)	65	100	65
额定运行短路分断能力 Ics(kA) Rated service breaking capacity Ics(kA)	65	65	65
操作性寿命 (次) Operational performance life (times)	7500	7500	7500
机械寿命 Mechanical life (times)	先维护寿命 Maintainable free life	10000	10000
	可维护寿命 Maintainable life	20000	20000
飞弧距离 (mm) Flashover distance (mm)	≤100	≤100	≤100

注: Notes:

Ir 整定值在 T 型、GT 型、电动机保护型时, 大小为原整定值范围内的任意整数倍。In case of T type and GT type, motor protection type panel the Ir setting value Isd any integral value within limitTsd of original setting values.

3.2 NDM2E 控制器电流、时间调整 Current and time adjustment of NDM2E controller

注意: 控制器电流、时间的调整必须由专业技术人员负责。

Notes: Adjustment of current and time of the controller should be carried out by specialized technical personnel.

3.2.1 NDM2E 控制器控制面板图及参数组成

ComponentTsd of the control panel figure and parameter of NDM2E controller

断路器控制面板由十五部分组成:

Control panel of the breaker Isd conslstd of 15 below:

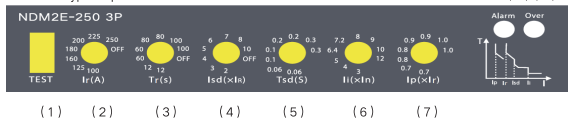
- (1) 测试端口 TEST Test port
- (2) 过载长延时整定电流 Ir Setting current of overload long-time delay Ir
- (3) 长延时整定时间 Tr Setting time of long-time delay Tr
- (4) 短路短延时整定电流 Isd Setting current of short circuit short-time delay Isd
- (5) 短路短延时整定时间 Tsd Setting time of short circuit short-time delay Tsd
- (6) 短路瞬时整定电流 Ii Setting current short circuit instantaneous Ii
- (7) 预报警整定电流 Ip Setting current of pre-alarm Ip
- (8) 预报警指示灯 Alarm Pre-alarm light
- (9) 过载指示灯 Over Overload light
- (10) 电源指示灯 Power Power light
- (11) 接地整定电流 Ig Grounding setting current Ig
- (12) 接地整定时间 Tg Grounding setting time Tg
- (13) 脱扣等级整定 Class Tripping rating adjustment
- (14) 短路短延时整定电流 Isdd Short-circuit short-time setting current
- (15) 电流不平衡率 Iunb Current unbalance rate

NDM2E 控制器控制面板如下图 (以 NDM2E-250 为例)

Control panel of NDM2E controller Isd shown as follows: (with NDM2E-250 as the example)

基本型面板如下图:

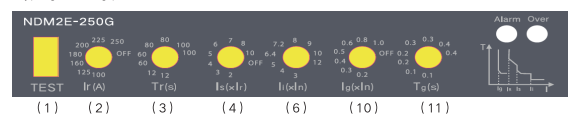
The basic type of panel Isd shown as follows:



(1) (2) (3) (4) (5) (6) (7)

接地 (G) 型面板如下图:

G type grounding panel Isd shown as follows:



(1) (2) (3) (4) (6) (10) (11)

通讯 (T) 型面板如下图:

The communication (T) type panel Isd shown as follows:



(1)

接地、通讯 (GT) 型面板如下图所示:

The grounding, communication (GT) type panel isd as the following figure:

(8) (9)



(1)

电动机保护型面板如下图所示:

The motor protection type panel isd below:

(10) (8) (9)



(1)

(2)

(13)

(14)

(15)

3.2.2 NDM2E 控制器控制面板各部分功能 Functions of each part in control panel of NDM2 controller

3.2.2.1 测试端口 Test port

“TEST”端口, NDM2E 专用测试仪器通过该端口与断路器控制器相连, 进行测试及调试操作。此项操作应由专业技术人员负责。

Through thisd “TEST” terminal, special tester for NDM2E isd connected to the breaker’s controller to conduct testing and debugging, etc. Such operations shall be completed by professional technical personnel.

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

可通过电流、时间、脱扣等级旋钮的调节, 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 thisd knob, so as to protect circuitIsd and devices. Thisd 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。

Notes: 1. TR indicates the operating time of the breaker when actual current Isd twice of IR setting.

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

$t = (2 \times Ir) / 2 \times Tr$ (其中 I 表示过载情况下, 主回路实际电流值)

E.g.: when Ir and Tr 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 Isd ±10%. Under the overcurrent, the time that the breaker dislconnectIsd the main circuit shall follow the following format:

$t = (2 \times Ir) / 2 \times Tr$ (Of which, I stands for the actual current in the main circuit under overcurrent.)

2. T 型、GT 型只能通过电脑上位机通讯软件调整整定值。

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

software of the upper computer.

3. 电动机保护型面板, (2) 与 (3) 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 Ir, 则直接按 1 倍的 Ir 来计算。

3.The motor protection type panel , (2) and (3) 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 Isd more than Ir, Then directly by 1 times the Ir to calculate.

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 $(7.2 \times Ir) / 2 \times \text{Class}$, 则提前脱扣, 若小于前面约定的值, 且至脱扣等级时间到, 电流仍未降至 1.5 Ir 以下, 则在脱扣等级规定的时间到, 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 $t = (7.2 \times Ir) / 2 \times \text{Class}$ 计算。

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

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。

5. When the current unbalance rate Isd OFF, the controller also shuTsdf off the phase protection function. The calculation of the current unbalance rate Isd the difference between the maximum value of the three-phase current and the minimum value of the three-phase current and the average value of the three-phase current between three-phase current unbalance.

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。

6. Short-circuit Short delay function, which Isd 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 Isd switched on.

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 Ip 的整定值, 经一定时间后黄灯将由闪亮转为恒亮。

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

(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 Ir 的 1.15 倍, 处于过载状态, 并经一定的时间后断路器将断开。

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

(3) 电源指示灯 Power light

电源指示灯, 在控制器得电后, 开始闪烁, 闪烁频率约为 1Hz, 表明当前控制器处于有电状态, 也可以表明控制器处于正常工作状态。

When the controller Isd powered on, the power indicator light starTsdf flashing. The flashing frequency Isd about 1Hz, indicating that the controller Isd in the active state. It also indicates that the controller Isd in the normal working state.

3.2.3 NDM2E 控制器通讯功能 Communication function of NDM2E controller

NDM2E 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 NDM2E 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

NDM2E 断路器通讯接口的现场总线规约为：Modbus—RTU。

The on-site bus protocol of NDM2E 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 communication breaker (T type, GT type) is 9600, and the communication address is 3.

3.2.3.1 通讯模块 Communication module

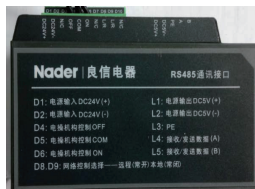


图 2：通讯模块实物图

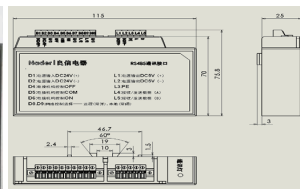


图 3：通讯背包安装尺寸图

Fig. 2: Entity figure of the communication module
Fig. 3: Dimension figure for installation of the communication backpack

表 3：通讯模块端子定义及功能表

Table 3: Communication module terminal and I/Tsd function

端子代号 Terminal code	连接位置 Connection position	输入输出 (IO) Input and output (I/O)
D1	电源输入 DC24V (+) Power supply DC24V (+)	输入 Input
D2	电源输入 DC24V (-) Power supply DC24V (-)	
D3	/	/
D4	“OFF” terminal controlled by the motor-operated mechanism	输出 (DO) Output (DO)
D5	“COM” terminal controlled by the motor-operated mechanism	
D6	“ON” terminal controlled by the motor-operated mechanism	
D7	/	/
D8、D9	网络控制选择 Selection of network control	输入 (DI) Input (DI)
D10	/	/
L1	电源 DC5V (+) Power supply: DC5V (+)	输出 Output
L2	电源 DC5V (-) Power supply: DC5V (-)	
L3	PE	输入输出 Input/output
L4	接收/发送数据 (A) Receive/send data (A)	
L5	接收/发送数据 (B) Receive/send data (B)	

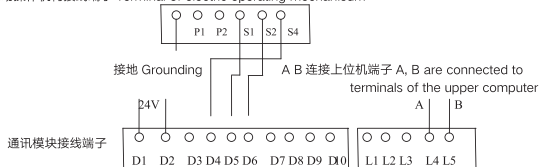
- 额定工作电压规格：DC 24V，允许范围： $\pm 15\%$ ，功耗： $\leq 2W$ 。
Specification of rated working voltage: DC 24V, allowed range: $\pm 15\%$, power consumption: $\leq 2W$.
- 通过此模块，可以实现“遥测”、“遥调”、“遥控”、“通信”等四遥功能；要实现遥控，必须加电操方可实现。
- Four remote functions such as “telemetry”, “remote adjustment”, “remote control” and “remote communication” can be realized through this module. Remote control can be realized unless motor operator is installed.
- 对外通信：RS485，采用双绞屏蔽线，每一通信线最多连接 32 台设备，最长距离 1200 米，可以通过添加中继器延长通信距离。
- External communication: RS485, equipped with twisted shielded pair, each communication cable can connect 32 devices at most. The longest line could be 1200 meters, and the communication distance can be lengthened by adding repeaters.
- 波特率：1.2K、2.4K、4.8K、7.2K、9.6K、19.2K(单位：bps)。
- Baud rate: 1.2K, 2.4K, 4.8K, 7.2K, 9.6K, and 19.2K (Unit: bps).
- DI (开关量输入)：包括断路器的分合闸状态，以及远程/本地的状态，皆为干接点信号，输入阻抗： $\leq 100\Omega$ 。
- DI, (digital input): Including on and off status of the breakers, remote/local statuses, all of them

are dry contact signals, Input impedance: $\leq 100\Omega$

- 网络控制选择, 即选择远程或本地工作方式, 常开为远程, 常闭为本地。
- Network control selection, namely, selection of remote or local working mode, with normal open for the remote and normal close for the local.
- DO (开关量输出): 分闸的控制信号, 将来自断路器控制器的电平信号转为干接点信号, 触点容量: 阻性负载 DC 30V/5A、AC 270V/3A。
- DO (On-off output): Control signal for switching on and off the breaker, transferring the level signal from the breaker controller into dry contact signal. Contact capacity: resistive load DC 30V/5A, AC 270V/3A.
- DC 5V 输出功率: 50mW。
- DC5V output power: 50mW.

3.2.3.2 通讯模块与电操机构的连接图 Connection figure of communication module and motor-operated mechanism

电动操作机构接线端子 Terminal of electric operating mechanism



Terminals of communication module

图 4: 通讯模块与电操机构的连接图

Fig. 4: Connection figure of communication module and motor-operated mechanism

3.2.3.3 NDM2E 专用测试仪 Special tester for NDM2E

NDM2E 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。

Special tester for NDM2E is connected to the breaker through “TEST” terminal on the controller. The tester can be used for testing failures of the controller, recording data, and tripping test etc.

3.2.4 NDM2E 系列控制器参数整定明细表 Parameter Setting Value List of NDM2E Series Controller

表 4: 控制器面板明细表 (基本型)

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

产品规格 Product specification	额定电流 In (A) Rated current In (A)	电流、时间参数 Parameters of current and time					
		Ir (A)	Tr (S)	I _{sd} (*Ir)	T _{sd} (S)	I _i (*I _{nm})	I _p (*I _n)
NDM2E-100	100	40、50、63、70、80、90、100、OFF	12、60、80、100、OFF	2、3、4、5、6、7、8、10、OFF	0.06、0.1、0.2、0.3	3、4、5、6.3、7、8、9、10、12	0.7、0.8、0.9、1.0
NDM2E-250	250	100、125、160、180、200、225、250、OFF	OFF			3、4、5、6.4、7.2、8、9、10、12	
NDM2E-400	400	200、225、250、280、315、350、400、OFF					
NDM2E-630	630	280、315、350、400、450、500、550、600、630、OFF	12、60、100、150、OFF			3、4、5、6、7、8、9、10、12、14	
NDM2E-800	800	400、450、500、550、600、630、700、750、800、OFF					

注: 1. 产品为接地 (G) 型时 Tsd 无法整定, 订单无要求出厂默认 0.3S;

Notes: 1. When the product adopt Tsd grounding (G) type: Tsd can't be set, if there is I_{sdn}'t requirement in the order, the factory default value I_{sd} 0.3S;

2. 产品为接地 (G) 型时 I_p 无法整定, 订单无要求出厂默认 0.9I_r。

2. When the product adopt Tsd grounding (G) type, I_p can't be set, if there is I_{sdn}'t requirement in the order, the factory default value I_{sd} 0.9I_r.

表 5: 智能控制器参数整定明细表 (G 型、GT 型)

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

产品规格 Product specification	额定电流 In (A) Rated current In (A)	电流、时间参数 Parameters of current and time							
		Ir (A)	Tr (S)	I _{sd} (A)	Tsd (S)	Ii (A)	I _p (A)	I _g (*I _n)	T _g (S)
NDM2E-100	100	40~100、OFF	12、60、80、100、OFF	80~1000、OFF		300~1200	28~100	20~100	
NDM2E-250	250	100~250、OFF	200~2500、OFF	200~2500、OFF		750~3000	70~250	50~250	
NDM2E-400	400	200~400、OFF	400~4000、OFF	400~4000、OFF	0.06、0.1、0.2、0.3	1200~5600	140~400	80~400	0.1、0.2、0.3、0.4
NDM2E-630	630	280~630、OFF	12、60、100、150、OFF	560~6300、OFF		1890~8820	196~630	126~630	
NDM2E-800	800	400~800、OFF	800~8000、OFF	800~8000、OFF		2400~11200	280~800	160~800	

注: 1. 当 I_{sd} 为 OFF 档时为短延时关闭。Notes: 1. When I_{sd} is OFF shift, the controller short-time delay close.

2. 电流整定最小步进为 1A。Notes: 2. The smallest stepping of current setting I_{sd} 1A.

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			
		Ir (A)	Class (s)	Istd (*Ir)	Iunbl(%)
NDM2E-100	100	40-100	4-10	5、6、7、8、9、10、11、12、13、OFF	10%、20%、30%、40%、OFF
NDM2E-250	250	100-250	4-10	5、6、7、8、9、10、11、12、13、OFF	10%、20%、30%、40%、OFF
NDM2E-400	400	160-400	4-10	3、4、5、6、7、8、9、10、OFF	10%、20%、30%、40%、OFF
NDM2E-630	630	252-630	4-10	3、4、5、6、7、8、9、10、OFF	10%、20%、30%、40%、OFF
NDM2E-800	800	320-800	4-10	3、4、5、6、7、8、9、10、OFF	10%、20%、30%、40%、OFF

注: 1. 当 Istd 为 OFF 档时为短延时关闭。

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

2. 当 Iunbl 为 OFF 档时为电流不平衡保护、断相保护功能关闭。

2. When Iunbl for the OFF, The current unbalance protection, lack phase protection Istd off.

3. NDM2E-100/250 短路瞬时 II 内置 15In。NDM2E-400/630/800 短路瞬时 II 内置 13In

3. Short-circuit instantaneous II to 15In of NDM2E-100/250. Short-circuit instantaneous II to 13In of NDM2E-400/630/800

4. 通讯型控制器的整定调节

Setting Adjustment of Communication Controller

通讯型控制器的电流、时间调节需要通过通讯上位机电脑来调节, 需要的相关设备如下:

The adjustment of setting current and time of communication controller can be completed with the upper computer used for communication, relevant equipment 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 notebook, with RS-232 interface);

(2) DC24V 电源(给附件通讯模块提供电源, 详细要求请见第 3.2.3.1 条); DC24V power supply (Provide power for the accessory communication module, see Section 3.2.3.1 for detailed requirement);

(3) RS-232 转 RS-485 转换模块(电脑市场可以购买); Conversion module of RS-232 to RS-485 (Available in computer market);

(4) 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 shield line (It can be replaced by twisted pairs; but only communication shielded cable can be used for normal product connection).

4.1 通讯联接接线 Communication connection wiring

通讯模块与电操机构的连接图请见第 3.2.3.2 条。

For connection figure of communication module and motor-operated mechanism, see Section 3.2.3.2.

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:

将产品的通讯模块的电源和通讯线接好, 通讯模块的通讯线接到“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, 最后接通电源。

Connect the communication module's power supply and communication wires, 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.

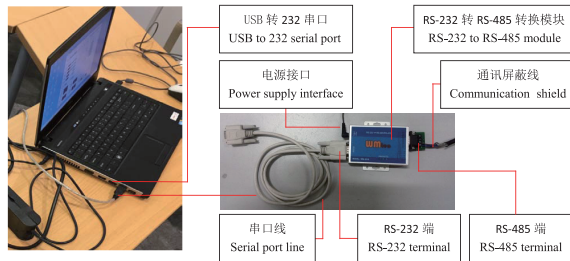


图 5: 通讯连接示意图

Fig. 5: Communication Connection Diagram

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

运行上海良信“MCCB 通讯系统.exe”软件(见图 6), 设置好配套的参数; COM 端口、波特率、子站地址(波特率和子站地址参数需要和连接的断路器一致, 产品出厂默认设置为: 波特率 9600、子站地址 3)。设置好配套参数后用鼠标点击软件界面的“连接”按钮。如产品通讯连接正常(见图 7), 通讯状态灯点亮。如连接不正常则请用鼠标点击软件界面的“断开连接”按钮后重新设置好配套参数或检查接线是否正确后再次连接, 直到通讯连接正常。

Run "MCCB communication system.exe" software provided by Shanghai Nader Electrical Co., Ltd. (see Fig. 6) and set the parameters: COM port, baud rate, sub-station address (The parameters include baud rate and sub-station address need to be the same with the connected breaker. Factory default settings: baud rate 9600 and sub-station address 3). After setting the parameters, click the "Connect" button on software interface, if communication link is working correctly (see Fig. 7), communication status light will be on; if not, please click the "Disconnect" button on software interface, reset parameters and connect again after you make sure wiring is correct until the communication link is working correctly.



图 6：“MCCB 通讯系统.exe”软件运行界面

Fig. 6: “MCCB communication system.exe” software running interface



图 7：通讯连接正常界面

Fig. 7: Interface for normal communication link

通讯连接正常后将需要调节的电流或时间输入或选择好 (例如: Ir 调节为 200A, Tr 调节为 60s, Isdd 调节为 1000A, Tsdd 调节为 0.1s, li 调节为 2000A), 后将需要调节的电流或时间前面的方框点击打勾 (见图 8), 再点击软件界面的“设定”按键, 参数调节成功软件出现成功界面 (见图 9)。

Input setting current and select setting time after communication link Isd working correctly. (Example: Ir=200A, Tr=60s, Isdd=1000A, Tsdd=0.1s, li=2000A), and tick on box in front of the setting current or setting time which you want to adjust (see Fig. 8). Click the “Setting” button on the software interface again, successful interface will emerge (see Fig. 9).



图 8：电流或时间调节界面

Fig. 8: Adjustment interface of current or time

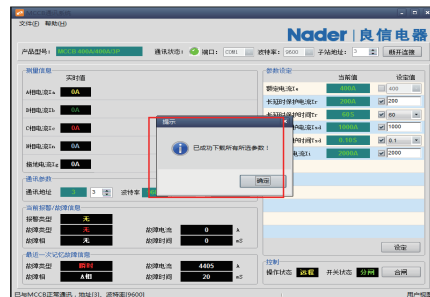


图 9：电流或时间调节成功界面

Fig.9: Successful interface of current or time adjustment

5. 正常工作环境/ Stand working conditions

- 1)海拔 ≤ 2500m;
- 2)环境温度-35 ~ +70℃;
- 3)环境温度+40℃时相对湿度不超过 50%，较低温度可以有较高湿度，如：20℃时相对湿度可达 90%；
- 4)对于因温度变化所产生的凝霜应采取相应的措施；
- 5)耐受潮湿空气的影响；
- 6)耐受盐雾、油雾的影响；
- 7)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 2；
- 15)产品降容系数表 见表 3；
- 16)高海拔降容系数 见表 4；
- 17)导体部分接线端子/安装螺钉拧紧扭矩 见表 5；
- 1) Altitude ≤ 2500 m;
- 2) Ambient temperature: -35 ~ +70℃;
- 3) The relative humidity of the air does not exceed 50% at 40℃. Higher relative humidity is permitted at lower temperature, such as 90% relative humidity at 20℃;
- 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 table 7;
- 15) Product derating coefficient table 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℃ ~ +75℃
相对湿度 Relative humidity	(Ambient temperature at 25℃) ≤ 95%

表 8/ table8

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

降容系数 Derating Coefficient	壳架等级额定电流 Frame size rated current	温度 temperature						
		40℃	45℃	50℃	55℃	60℃	65℃	70℃
	100A	1	1	1	0.973	0.945	0.918	0.891
降容系数 Derating Coefficient	250A	1	1	1	0.976	0.952	0.927	0.902
	400A	1	1	1	0.978	0.957	0.934	0.911
	630A	1	1	1	1	1	0.979	0.957
	800A	1	1	1	0.980	0.958	0.936	0.913

表 9/ table9

塑壳断路器高海拔降容系数表

Molded Case Circuit Breaker Derating Coefficient Table in High altitude Place

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
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)	800	800	720	670	630	600	560

表 10/ table10

接线端子/安装螺钉拧紧扭矩 Torsion value for wiring terminal

壳架等级额定电流(A) Frame size rated current	螺纹直径(mm) Thread diameter	扭矩(N·m) Torsion value(N·m)
100、250	M8	12
	M4	2.4
400	M10	20
	M6	6
630、800	M12	28
	M6	6

6. 接线方式(接线图)/ Wiring Method

表 9-1: 400A 额定电流以下连接导线采用的截面积和相适应的额定电流见表

Table 9-1: Under the rated current of 400A, sectional areas of connecting wires and corresponding rated current, see the following table

额定电流 (A) Rated current (A)	40 50	63	70 80	90 100	125	160	180 200 225	250	280	315 350	400
导线截面积 (mm ²) Sectional areas of the wires (mm ²)	10	16	25	35	50	70	95	120	150	185	240

表 9-2: 400A 额定电流以上连接导线采用的截面积和相适应的额定电流表

Table 9-2: When the rated current Isd 400A and above, sectional areas of connecting wires and corresponding rated current, see the following table

额定电流 (A) Rated current (A)	电 缆 Cables		铜 排 Copper busbar	
	数量 Quantity	截面积 (mm ²) Cross-section (mm ²)	数量 Quantity	尺寸 (mm) Size
450、500	2	150	2	30×5
550、600、630	2	185	2	40×5
700、750、800	2	240	2	50×5

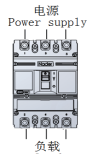


图 10: 进出线示意图

Fig.10: Diagram of ingoing and outgoing

注: 1) 同断断路器的连接, 按照《外形、安装尺寸及接线方式》选择适合的接线方式;

Notes: 1) Connect to the breaker, select proper wiring methods according to the Appearance, Installation Dimensions and Wiring Methods;

2) 此尺寸的铜排不能与本体直接连接, 需要选购联排附件。

2) The copper busbar in such dimensions can't be directly connected to the noumenon, connecting line accessories shall be purchased.

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

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

表 11: 外形尺寸表

Table 11: Overall dimensions

型号 Model	外形尺寸 Overall dimensions		
	长 L(mm)	宽 W(mm)	高 H(mm)
NDM2E-100	150	92	92
NDM2E-250	165	107	92
NDM2E-400	257	150	106.5
NDM2E-630	280	210	116.5
NDM2E-800	280	210	116.5

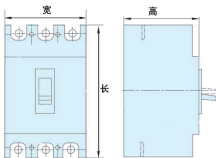


图 11: 不带通讯背包和电操外形尺寸图

Fig.11: Overall dimensions (Without communication backpack and electric operation)

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

表 12: 带电操、带通讯背包外形尺寸表

Table 12: Overall dimensions (With communication backpack and electric operation)

型号 Model	外形尺寸 Overall dimensions		
	长 L(mm)	宽 W(mm)	高 H(mm)
NDM2E-100	150	117	171.5
NDM2E-250	165	132	177.5
NDM2E-400	257	175	246.5
NDM2E-630	280	235	255
NDM2E-800	280	235	255

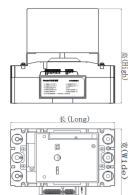


图 12: 带通讯背包和电操外形尺寸图

Fig. 12: Overall dimensions (With communication backpack and electric operation)

7.2 安装尺寸 Installation dimensions

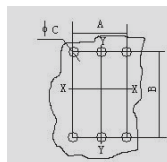


图 13-1

Fig. 13-1

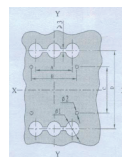


图 13-2

Fig. 13-2

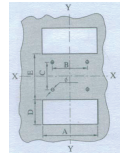


图 13-3

Fig. 13-3

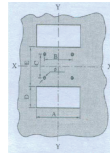


图 13-4

Fig. 13-4

图 13: 安装尺寸图

Fig.13: Installation dimensions

7.2.1 板前接线 (X-X, Y-Y 的为三极断路器中心) 见图 13-1

Front connected (X-X, Y-Y center for three poles breaker) please refer to Fig. 13-1.

表 13: 板前接线安装尺寸表

Table 13: Installation dimensions for front connected

型号 Model	NDM2E-100	NDM2E-250	NDM2E-400	NDM2E-630	NDM2E-800
极数 Number of poles	3	3	3	3	3
安装板开孔尺寸 (mm) Mounting plate cutout dimensions	A 30 B 129 C 4.5	35 126 4.5	44 194 7	70 243 7	70 243 7

7.2.2 板后接线 (X-X, Y-Y 的为三极断路器中心) 见图 13-2

Rear connected (X-X, Y-Y center for three poles breaker) please refer to Fig. 13-2.

表 14: 板后接线安装尺寸表

Table 14: Installation dimensions for rear connected

型号 Model	NDM2E-100	NDM2E-250	NDM2E-400	NDM2E-630	NDM2E-800
极数 Number of poles	3	3	3	3	3
安装板开孔尺寸 (mm) Mounting plate cutout dimensions	A 60 B 30 C 107 D 132 Ø1 25 Ø2 5.5	70 35 126 144 25 5.5	96 44 194 224 32 6.5	140 70 243 243 48 7	140 70 243 243 48 7

7.2.3 插入式板前接线 (X-X, Y-Y 的为三极断路器中心) 见图 13-3

Plug-in front connected (X-X, Y-Y center for three poles breaker) please refer to Fig. 13-3

表 15: 插入式板前接线安装尺寸表

Table 15: Installation dimensions for plug-in front connected

断路器型号 Model of the breaker	NDM2E-100	NDM2E-250	NDM2E-400
极数 Number of poles	3	3	3
安装板开孔尺寸 (mm) Mounting plate cutout dimensions (mm)	A (最小) A (Minimum) B C D (最小) D (Minimum) E (最大) E (Maximum) Ø	110 107 60 54.5 51 65 88 6.5	152 129 60 129 65 166 8.5

7.2.4 插入式板后接线 (X-X, Y-Y 的为三极断路器中心) 见图 13-4

Plug-in rear connected (X-X, Y-Y center for three poles breaker) please refer to Fig. 13-4

表 16: 插入式板后接线安装尺寸表

Table 16: Installation dimensions for plug-in rear connected

型号 Model	NDM2E-100	NDM2E-250	NDM2E-400	NDM2E-630	NDM2E-800
极数 Number of poles	3	3	3	3	3
安装板开孔尺寸 (mm) Mounting plate cutout dimensions	A (Min) B C D (Min) E (Max) Ø	94 60 56 46 90 6.5	110 70 54 53 88 6.5	152 100 123 65 175 11	213 100 123 65 175 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 Isd as per GB/T 1804-c.

8. 安装方式 / Mounting Method

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 test according to following procedures:

(1) 用 500VDC 兆欧表。Use a 500VDC megameter.

(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。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) 对接至主电路的欠电压脱扣器, 在进线及断路器外壳间。Test should be done in position between incoming wire and breaker shell to test undervoltage release in the main circuit.

(4) 绝缘电阻不小于 20 MΩ。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 retardant material 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 ≤ 22.5°。When the product is installed vertically, the angle of inclination between the installation surface and vertical surface shall be ≤ 22.5°.

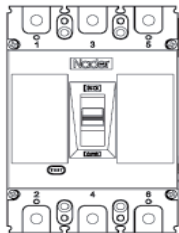


图 14.1：垂直安装
Fig.14.1 Vertical installation

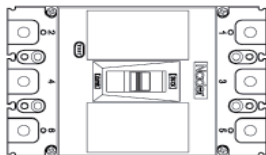


图 14.2：水平安装
Fig.14.2 Horizontal installation

9. 附件说明书/ Accessory

9.1 欠压脱扣器

断路器带有欠压脱扣器时，应使欠电脱扣器先通电，断路器才允许合闸。

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)

当电源电压下降到欠压脱扣器额定工作电压的 70% ~ 35%

范围内时，欠压脱扣器能可靠的分断断路器；当电源电压

低于欠压脱扣器额定工作电压的 35%时，欠压脱扣器能防

止断路器闭合；当电源电压高于欠压脱扣器额定工作电压

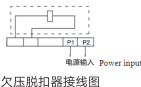
的 85%时，欠压脱扣器能保证断路器可靠闭合。

9.1.1 Undervoltage tripper

When the breaker has an undervoltage tripper, the undervoltage tripper should be electrified, and then the breaker allows switch on.

Power supply Isd accessed according to wiring connector number on the external undervoltage module (anode and cathode of DC power supply are not differentiated).

When power voltage declines to 70% ~ 35% of the rated working Voltage of undervoltage tripper, the undervoltage tripper can reliably break the breaker up; when power voltage Isd lower than the rated working voltage of undervoltage tripper by 35%, the undervoltage tripper can prevent the breaker from closing; when power voltage Isd higher than the rated working voltage of undervoltage tripper by 85%, the undervoltage tripper can guarantee the reliable closure of breaker.



欠压脱扣器接线图

Wiring diagram of under-voltage release

9.2 分励脱扣器

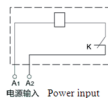
根据引出的导线编号接入电源(直流电源不必区分正

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。

9.2 Shunt tripper

Power supply Isd accessed according to wiring connector number on the external undervoltage module (anode and cathode of DC power supply are not differentiated).When impressed voltage of shunt tripper Isd between

70% and 110% of rated control power voltage, the breaker can be reliably broken.



分励脱扣器接线图

Wiring diagram of shunt tripper

9.3 辅助触头、报警触头

9.3.1 辅助、报警触头接入相应外围控制电路

9.3.1 Auxiliary contact, alarm contact

9.3.1 Auxiliary and alarm contactTsd accessed into relative external control circuit/

表 17：辅助开关电气特性

Table 17: Electrical characteristics of auxiliary switch

分 类 Category	壳架电流 (A) Frame current (A)	约定发热电流 Ith (A) Conventional thermal current (A)	额定工作电流 Ie (A) Rated working current for Ie (A)
辅助触头 Auxiliary contact	100、250、400、 630、800	3	1.5 (AC400V)
报警触头 Alarm contact			0.15(DC220V)
		3	1.5 (AC400V)
			0.15(DC220V)

9.3.2 辅助、报警触头状态指示图

9.3.2 Status indicator diagrams of auxiliary and alarm contactTsd

附件名称 Accessory Name	断路器状态 Status of breaker	线路接通状态 Connection status of circuitTsd
辅助触头 Auxiliary contact	“分”或“自由脱扣” Breaking or free tripping	
	“合” Closing	“接通”与“断开”相互转换 Switchover between closing and opening
报警触头 Alarm contact	“分”或“合” Breaking or closing	
	“自由脱扣” Free tripping	“接通”与“断开”相互转换 Switchover between closing and opening

9.4 电动操作机构 Motor-operated mechanism



图 16-1：电动操作机构实物图

Fig.16-1: Entity figure of motor-operated mechanism

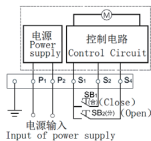


图 16-2：电动操作机构接线图

Fig.16-2 Wiring diagram of 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。

The breaker can be closed and opened by the motor-operated mechanism in the condition of external power supply.

电源输入电压规格：AC 50Hz 110V、220V、380V，DC24V、110V、220V、380V。

Input voltages of the power supply: AC 50Hz 110V, 220V, 380V, DC24V, 110V, 220V, and 380V

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

配用断路器 Supporting breaker	动作电流 (A) Action current (A)	电动机功率 (W) Power of the motor(W)	寿命 (次数) Life (times)
NDM2E-100	≤0.5	14	20000
NDM2E-250	≤0.5	14	20000
NDM2E-400	≤2	35	10000
NDM2E-630	≤2	35	10000
NDM2E-800	≤2	35	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

9.5.1 安装前，安装操作手柄的开关柜门按图开孔好，开孔

中心离铰链距离大于 200 mm。

9.5.2 把已安装在面盖上固定好操作机构的断路器安装于安装板上，并稍作固定。

9.5.3 把操纵杆方轴固定于操作机构上安装方轴的方孔内。

9.5.4 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。

9.5.5 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。

9.5.6 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。

9.5 Manual operating mechanism

9.5.1 Before installation, a switch cabinet door for installing

operating handle is drilled in accordance with the diagram.

Distance between the hole part and the hinge is greater than 100 mm.

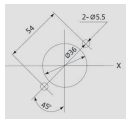
9.5.2 The breaker with an operating mechanism fixed on cover is installed on the installation panel and slightly fixed then.

9.5.3 The square shaft of an operating rod is fixed in a square hole on the operating mechanism.

9.5.4 The holed door plank is closed and position of the breaker is adjusted so that centers of the square shaft and the handle hole are aligned.

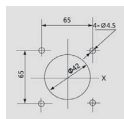
9.5.5 The switch cabinet door is opened. The rotary handle is fixed until “OFF” is at the horizontal position.

9.5.6 The switch cabinet door equipped with rotary handle is closed. The handle should be operated freely. The breaker should be opened when the handle is at the horizontal position, and it should be closed when the handle is at the vertical position.



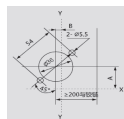
CS1-A 型手柄开孔图

CS1-A type hole diagram of handle



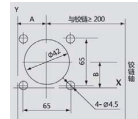
CS1-F 型手柄开孔图

CS1-F type hole diagram of handle



CS2-A 型手柄开孔图

CS2-A type hole diagram of handle



CS2-F 型手柄开孔图

CS2-F type hole diagram of handle

10. 使用和维护/ Application & Maintenance

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

运行前检查以下各项 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。

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) 确认端子间或暴露的带电部分没有短路或对地短路情况。

Check that no short circuit or short to ground occurs between terminals or in exposed live part.

(3) 确认端子连接和固定螺钉均应紧固无松动。

Check that terminal connection and fixing bolt is fastened without looseness.

(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。

If the breaker has the undervoltage release, the undervoltage 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) 用户根据需要在调整好 Ir、Tr、Isd、Tsd、Ii、Ip。

Adjust values of Ir, Tr, Isd, Tsd, Ii and Ip, etc. as needed.

(2) 扳动操作手柄，投入电源。

Operate the handle and connect power supply.

(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。

After the main circuit of the breaker is electrified, press the emergency tripping button with the handle in tripping position to trip the breaker.

如果试运行都能满足，可投入运行。

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 ensure 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 circuit);

(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 fixed 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；

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) 清除断路器表面及连接处的灰尘（用清洁、干燥的抹布擦拭）

Clean dust on breaker surface and connections (wipe with clean and dry cloth).

(3) 清洁隔弧板，如必要则需要更换隔弧板；

Clean the flash barrier; replace it if necessary.

(4) 绝缘测试（见 8.1）

Carry out insulation test (see Section 8.1).

(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；

Check condition of all connections. Wipe away oxidations with abrasive cloth and clean with soluble agent. Screw bolts and nuts tight.

(6) 控制器整定值测试：应使用我公司的 NDM2E 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；

Test of controller setting values: use a tester specialized for NDM2E 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) 如果断路器还装有其它内、外附件，应逐一检查各个附件，以确保其处于正常工作状态。

(按照 9 附件说明 详细内容进行测试)

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 9: Detailed accessory descriptions).

11. 通讯地址 Communication address

表 20：通讯地址参量表

Table 20: Parameters for addresses

序号 No.	变量代号 Code of variables	变量名称 Variable name	变量类型 Variable type	单位 Unit	访问规则 Access rules	数据地址 Data address	备注 Remark
1	Ia	L1 相电流 L1 Phase current	UINT	A	R	0x0001	
2	Ib	L2 相电流 L2 Phase current	UINT	A	R	0x0002	
3	Ic	L3 相电流 L3 Phase current	UINT	A	R	0x0003	
4	In	N 相电流 N phase current	UINT	A	R	0x0004	
5	Ig	剩余电流 Remaining current	UINT	A	R	0x0005	
6	I _{max}	最大电流 Maximum current	UINT	A	R	0x0006	
7	P _{max}	最大电流相 Maximum current phase	UINT	/	R	0x0007	见表 21 See Table 21
8	F_Type	故障类型 Failure type	UINT	/	R	0x0008	见表 22 See Table 22
9	F_I _{max}	故障最大电流 Maximum failure current	UINT	/	R	0x0009	
10	F_P _{max}	故障相 Failure phase	UINT	/	R	0x000A	见表 21 See Table 21
11	F_Time	故障脱扣时间 Time of failure tripping	UINT	/	R	0x000B	x20ms
12	F_Ia	A 相故障电流 Failure current of phase A	UINT	A	R	0x000C	
13	F_Ib	B 相故障电流	UINT	A	R	0x000D	

		Failure current of phase B					
14	F _{lc}	C 相故障电流 Failure current of phase C	UINT	A	R	0x000E	
15	F _{ln}	N 相故障电流 Failure current of phase N	UINT	A	R	0x000F	
16	F _{lg}	接地相故障电流 Failure current of grounding phase	UINT	A	R	0x0010	
17	R _{AT}	故障报警类型 Type of failure alarm	UINT	/	R	0x0011	见表 23 See Table 23
18	R _{ST}	自诊断故障类型 Automatic diagnosis of failure type	UINT	/	R	0x0012	见表 24 See Table 24
19	R _{BS}	分合闸状态 Status of on-off	UINT	/	R	0x0015	注 1 Note 1
20	P _{lr}	长延时电流整定值 Current setting value of long-time delay	UINT	A	R/W	0x0016	
21	P _{LT}	长延时时间整定值 Time setting value of long-time delay	UINT	/	R/W	0x0017	见表 25 See Table 25
22	P _{lsd}	短延时电流整定值 Current setting value of short-time delay	UINT	A	R/W	0x0018	
23	P _{ST}	短延时时间整定值 Time setting value of short-time delay	UINT	/	R/W	0x0019	见表 26 See Table 26
24	P _{Li}	瞬动电流整定值 Setting value of instantaneous current	UINT	A	R/W	0x001A	
25	P _{lg}	接地保护电流整定值 Setting value of grounding protection current	UINT	A	R/W	0x001B	
26	P _{GT}	接地保护时间整定值 Setting value of grounding protection time	UINT	/	R/W	0x001C	见表 27 See Table 27

27	P _{In}	N 相电流整定值 Current setting value of phase N	UINT	A	R/W	0x001D	注 2 Note 2
28	P _{lp}	预报警电流整定值 Setting value of pre-alarm current	UINT	A	R/W	0x001F	
29	FnS	功能选择 Function selection	UINT	/	R/W	0x0020	见表 28 See Table 28
30	FnAd	通讯地址 Communication address	UCHAR	/	R/W	0x0022	
31	Baud	波特率 Baud rate	UCHAR	/	R/W	0x002E	见表 29 See Table 29
32	TestTrip	脱扣试验 Tripping test	UINT	/	W	0x002F	0xffaa->脱扣 0xffaa->tripping
33	K _{CO}	分合闸控制 On-off control	UINT	/	W	0x0030	见表 30 See Table 30
34	P _{FT}	最近一次记忆故障类型 Memory failure type of the last time	UINT	/	R	0x0066	同表 22 Same with Table 22
35	P _{FA}	最近一次记忆故障电流 Memory failure current of the last time	UINT	A	R	0x0067	
36	P _{FP}	最近一次记忆故障相 Memory failure phase of the last time	UINT	/	R	0x0068	同表 21 Same with Table 21
37	P _{FT}	最近一次记忆故障时间 Memory failure time of the last time	UINT	/	R	0x0069	x 20ms

注 1：分闸为 0x0000，合闸为 0x0800

Note 1: 0x0000 for opening, 0x0800 for closing

注 2：N 相电流最小不小于长延时整定电流的 1/2，最大等同于长延时整定电流

Note 2: The minimum of phase-N current shall be not less than 1/2 of setting current of long-time delay, and the maximum value shall be equal to the setting current of long-time delay.

表 21: 电流相说明

Table 21: Descriptions of current phase

1	2	3	4
A 相 Phase A	B 相 Phase B	C 相 Phase C	N 相 Phase N

表 22: 故障类型说明 (位变量)

Table 22: Descriptions of failure type (bit variable)

bit0	bit1	bit2	bit3	bit4			
瞬时 Instantaneous	漏电 Leakage	接地 Grounding	短延时 Short-time delay	长延时 Long-time delay			

表 23: 故障报警类型 (位变量)

Table 23: Type of failure alarm (bit variable)

bit0	bit1	bit2	bit3				
接地 Grounding	过载预报警 Pre-alarm of overload	短延时 Short-time delay	长延时 Long-time delay				

表 24: 自诊断故障 (位变量)

Table 24: Self-diagnosis of failures (bit variable)

bit0	bit1	bit2					
Eeprom 故障 Eeprom failure	超温故障 Over-temperature failure	触头磨损 Contact wear					

表 25: 长延时时间整定值

Table 25: Time setting value of long-time delay

0	1	2	3	4	5
12s	60s	80s	100s	150s	50s

表 26: 短延时时间整定值

Table 26: Time setting value of short-time delay

0	1	2	3
0.06s	0.1s	0.2s	0.3s

表 27: 接地保护时间整定值

Table 27: Setting value of grounding protection time

0	1	2	3
0.1s	0.2s	0.3s	0.4s

表 28: 功能选择 (位变量)

Table 28: Function selection (bit variable)

bit0	bit1	bit2	bit3	bit4	bit5	bit6	bit7
长延时热记忆 1: OFF, 0: ON Thermal memory of long-time delay 1: OFF, 0: ON	短延时热记忆 1: OFF, 0: ON Thermal memory of short-time delay 1: OFF, 0: ON	短延时反时开关 1: 关闭, 0: 打开 Inverse time on-off of short-time delay 1: OFF, 0: ON					操作状态 1: 远程, 0: 本地 Operation state 1: remote, 0: local

表 29: 波特率设置表 (bps)

Table 29: Setting table of Baud rate (bps)

3	4	5	6	7	8
1.2k	2.4k	4.8k	7.2k	9.6k	19.2k

表 30: 分合闸控制

Table 30: On-off control

0xff00	0x00ff
分闸 Opening	合闸 Closing

错误返回信息说明:

Descriptions of error return information:

功能码 06 (数据错误, 或无权限)

Function code 06 (data error or no permissions)

设备地址 Equipment address	0x86	0x03	CRC_L	CRC_H
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功能码 16 (数据错误, 或无权限)

Function code 16 (data error or no permissions)

设备地址 Equipment address	0x90	0x03	CRC_L	CRC_H
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地址超出范围

Address is out of the range

设备地址 Equipment address	功能码+0x80 Function code+0x80	0x02	CRC_L	CRC_H
---------------------------	--------------------------------	------	-------	-------

设备类型定义: (地址: 0)

Definition of the equipment type: (Address: 0)

A	B	C	D
---	---	---	---

字节说明:

Byte descriptions:

A: 大类分列 Arrangement of large class

0x03 MCCB 塑壳断路器 Moulded case circuit breaker

B: 壳架分列 (MCCB 为例) Arrangement of frame (for example: MCCB)

0x08 800A 壳架 800A frame

0x04 400A 壳架 400A frame

0x02 250A 壳架 250A frame

0x01 100A 壳架 100A frame

C: 额定电流分列 (MCCB 为例) Arrangement of rated current (for example: MCCB)

0 /

1 100A

2 250A

3 400A

4 630A

5 800A

D: 极数描述 3: 3P 4: 4P Descriptions of poles 3: 3P 4: 4P

12. 注意事项/ Notices

12.1 安装注意事项

(1) 断路器本体、底座(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

2.1. 必须由具有专业资格的人员进行配线作业。

2.2. 确认输入电源处在完全断开(的情况下), 才能进行配线作业。

2.3. 必须安装本体后再进行配线。

2.4. 断路器配线必须符合上进下出, 即 1,3,5 端子接电源线, 2,4,6 端子接负载线, 不允许倒进线

12.1 Installation precautions

(1) Main body, baseboard (for back-panel wire connection), base (for insertion wire connection) of the breaker are fixed on an installation panel.

(2) Connected to main circuit.

2.1. Wiring operation should be carried out by professional technicians.

2.2. Wiring operation should be carried out only when input power supply is assured completely broken.

2.3. Wiring operation should be carried out after the main body is installed.

2.4. In wiring operation of the breaker, wire should be inserted from the top and pulled out from the bottom; that is to say, terminals 1,3,5 are connected to power wire, and terminals 2,4,6 are connected to load wire; wiring sequence is not allowed to be exchanged.

12.2 运行注意事项

(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。

12.2 Running precautions

(1) Wet hand is forbidden to operate the breaker, otherwise there is electric shock hazard.

(2) The breaker cannot be operated frequently, otherwise its service life is shortened.

(3) If there are release and tripping operation occurred on the breaker with an motor-operated mechanism, the breaker only can be closed after the motor-operated mechanism fastened it again.

12.3 保修期与售后服务

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

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 18 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。

(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) 购买后由于摔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。

售后服务

(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。

12.3 Warranty period and after-sales service

This product is manufactured in a fine quality management system. In case of error, warranty period and after-sales service are explained in the followings:

Warranty period

The company is responsible for free maintenance or exchange within 18 months from the delivery date at the following premises: the user abides by preservation and use rules; seal on the breaker is complete; the product is damaged or cannot be used normally by reason of quality problem. However, maintenance or exchange should be paid in warranty period if the error is caused by any one of the following reasons:

(1) Improper use, self repair, improper maintenance and so on.

(2) Use out of the standard specification.

(3) Damage caused by falling off or installation after purchase.

(4) Earthquake, fire disaster, lightning stroke, abnormal voltage, other natural disaster, second disaster and so on.

After-sales service

(1) Please contact the supplier or the after-sales service department of company if there is an error.

(2) Maintenance or exchange in warranty period: free maintenance or exchange is allowed if the error is up to manufacture technique.

(3) Maintenance or exchange out of warranty period: paid maintenance is operated if the function can be recovered, otherwise paid exchange is operated.

13. 订货须知/ Accessory list and installation

13.1 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。

13.1 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.

13.2 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“9.8 智能控制器出厂整定值”表配置。

13.2 If customer has not put forward any requirement for protection parameters of intelligent controller, Nader will deliver the product in configurations specified in “9.8 Intelligent Controller Factory Settings”.