

8.5 Modes of connection

8.5.1 Cable connection plug and Copper busbar

a. Screw is used to connect with copper (aluminum) cable connection plug or copper busbar

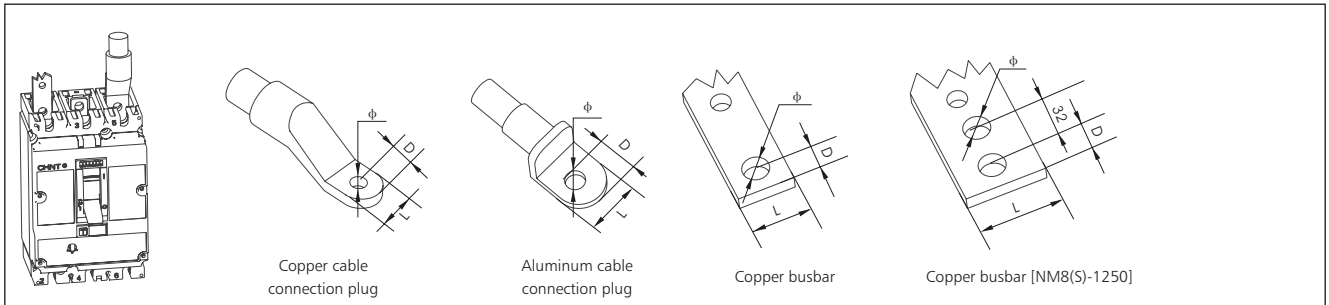
Size of connection screw

NM8-125: M6

NM8S-125、NM8-250、NM8S-250: M8

NM8-400, 630、NM8S-400, 630: M10

NM8-800, 1250、NM8S-800, 1250: M10



| Dimension                            | NM8-125 | NM8S-125<br>NM8-250<br>NM8S-250 | NM8-400, 630<br>NM8S-400, 630 | NM8-800, 1250<br>NM8S-800, 1250 |
|--------------------------------------|---------|---------------------------------|-------------------------------|---------------------------------|
| Distance between different poles(mm) | 30      | 35                              | 45                            | 70                              |
| L(mm)                                | ≤ 15    | ≤ 25                            | ≤ 32                          | ≤ 50                            |
| D(mm)                                | ≤ 7     | ≤ 10                            | ≤ 16                          | ≤ 16                            |
| φ (mm)                               | >6      | >8                              | >10                           | >11                             |

b. With front connection and use screw to connect with copper (aluminum) cable connection plate or copper busbar

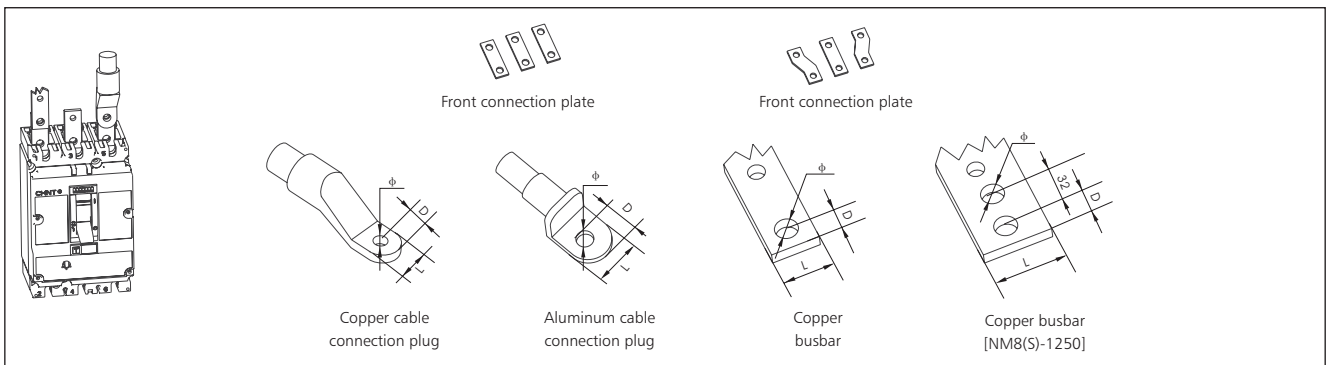
Size of connection screw

NM8-125: M6

NM8S-125, NM8-250、NM8S-250: M8

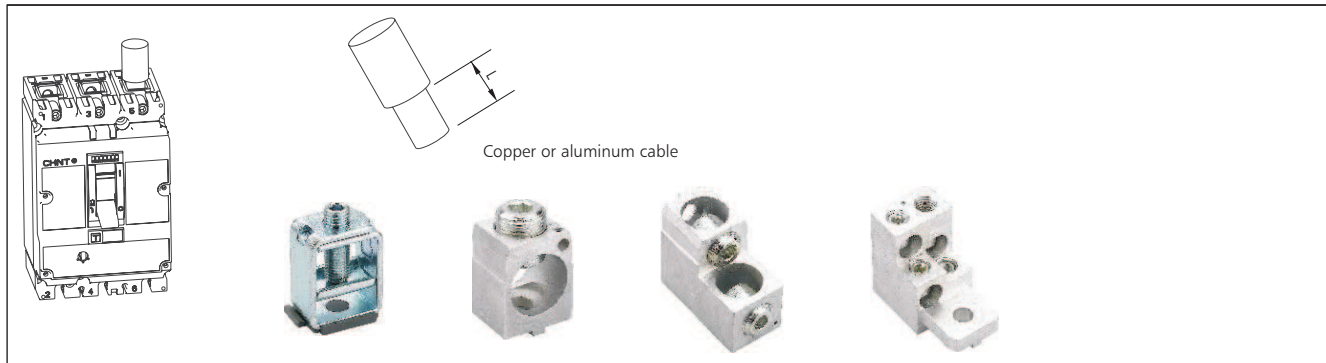
NM8-400, 630, NM8S-400, 630: M12

NM8-800, 1250, NM8S-800, 1250: M10



| Dimension                            | NM8-125 | NM8S-125<br>NM8-250<br>NM8S-250 | NM8-400, 630<br>NM8S-400, 630 |      | NM8-800, 1250<br>NM8S-800, 1250 |
|--------------------------------------|---------|---------------------------------|-------------------------------|------|---------------------------------|
|                                      |         |                                 |                               |      |                                 |
| Distance between different poles(mm) | 30      | 35                              | 52.5                          | 70   | 70                              |
| L(mm)                                | ≤ 15    | ≤ 25                            | ≤ 40                          | ≤ 60 | ≤ 50                            |
| D(mm)                                | ≤ 7     | ≤ 10                            | ≤ 20                          | ≤ 20 | ≤ 16                            |
| φ (mm)                               | >6      | >8                              | >12                           | >12  | >11                             |

8.5.2 Connection of bare cable



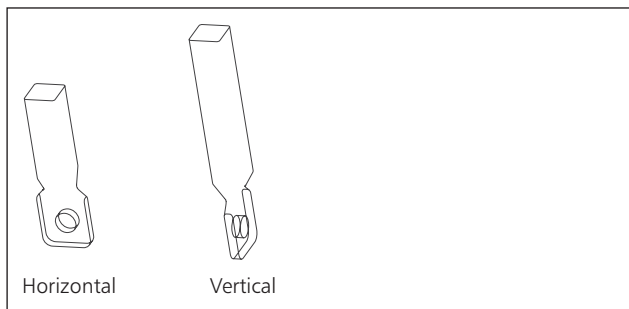
| Dimension             | NM8-125 | NM8S-125<br>NM8-250<br>NM8S-250 |
|-----------------------|---------|---------------------------------|
| L(mm)                 | 16      | 20                              |
| CSA(mm <sup>2</sup> ) | 2.5~70  | 2.5~185                         |

| Dimension             | NM8-400, 630<br>NM8S-400, 630 |        |        |
|-----------------------|-------------------------------|--------|--------|
|                       | 1                             | 2      | 4      |
| Number of cable       | 1                             | 2      | 4      |
| L(mm)                 | 26                            | 30, 60 | 30     |
| CSA(mm <sup>2</sup> ) | 35~370                        | 35~185 | 35~125 |

8.5.3 Rear connection

For rear connection, cable connection plug should be used for connection with copper busbar.

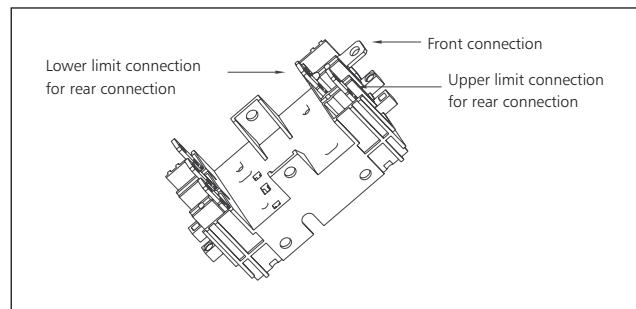
Rear connection



8.5.4 Plug-in type connection

Two modes of front and rear connection are available; for rear connection, upper limit or lower limit connection is used.

Plug-in type



8.5.5 Standard CSA of copper cable or busbar used for connection

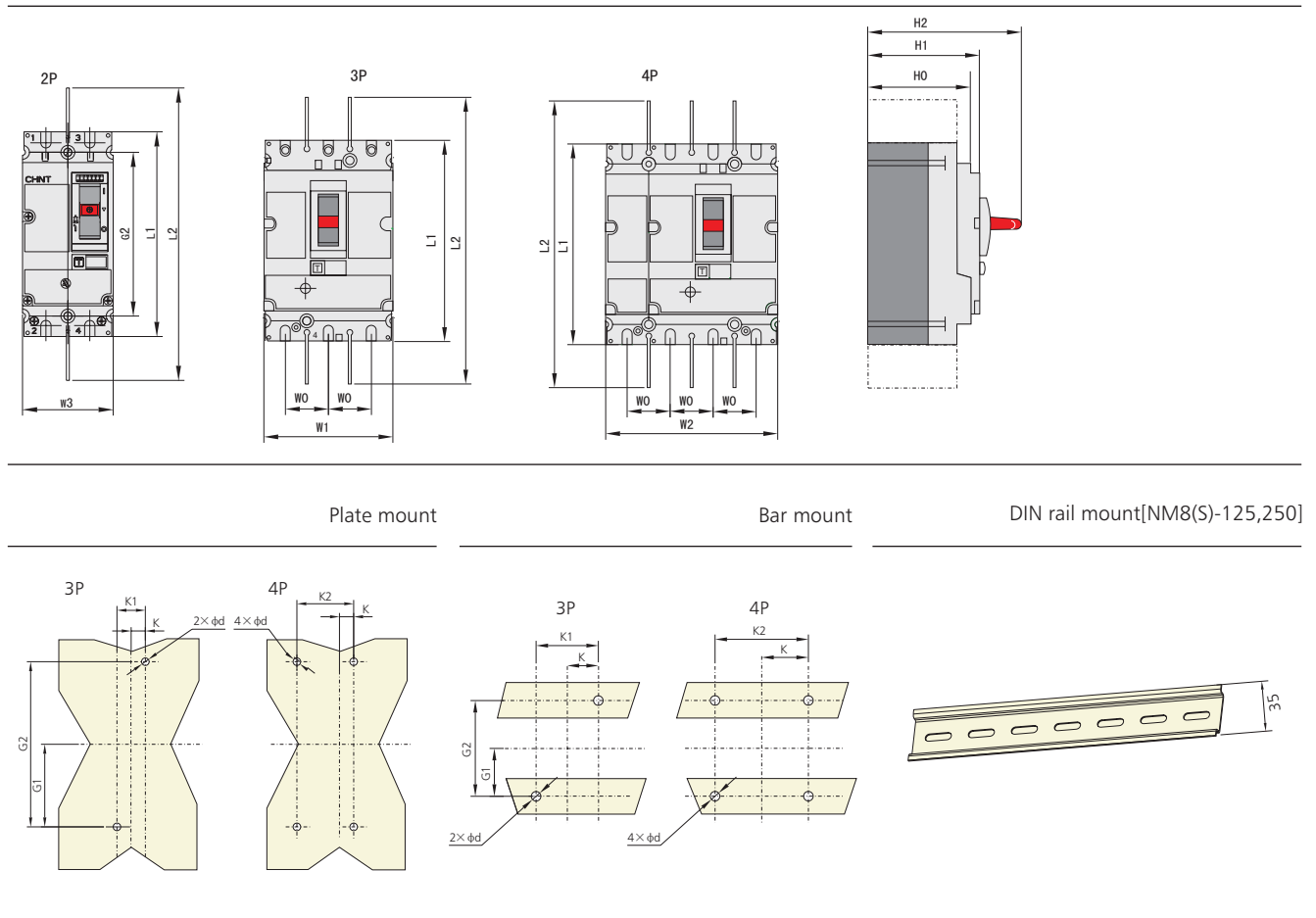
| Rated current(A)                      |               | 16  | 20  | 25  | 32  | 40 | 50 | 63 | 80 | 100 | 125 | 160 | 200 | 250 | 315 | 350 | 400 | 500    | 630    | 700    | 800    | 1000   | 1250   |
|---------------------------------------|---------------|-----|-----|-----|-----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|--------|--------|--------|--------|--------|--------|
| Cross section area (mm <sup>2</sup> ) | Copper cable  | 2.5 | 2.5 | 4.0 | 6.0 | 10 | 10 | 16 | 25 | 35  | 50  | 70  | 95  | 120 | 185 | 185 | 240 | 2×150  | 2×185  | 2×240  | 2×240  | -      | -      |
|                                       | Copper busbar | -   | -   | -   | -   | -  | -  | -  | -  | -   | -   | -   | -   | -   | -   | -   | -   | 2×30×5 | 2×40×5 | 2×50×5 | 2×50×5 | 2×60×5 | 2×70×5 |

8.5.6 Usual cross sections for conductors according intensity

| In(A) | Copper conductors                     | Copper bar                         |
|-------|---------------------------------------|------------------------------------|
|       | Cross Section Area (mm <sup>2</sup> ) | Dimensions Area (mm <sup>2</sup> ) |
| 10    | 1.5                                   | —                                  |
| 16    | 2.5                                   | —                                  |
| 20    | 2.5                                   | —                                  |
| 25    | 4                                     | —                                  |
| 32    | 6                                     | —                                  |
| 40    | 10                                    | —                                  |
| 63    | 16                                    | —                                  |
| 80    | 25                                    | —                                  |
| 100   | 35                                    | —                                  |
| 125   | 50                                    | —                                  |
| 160   | 70                                    | —                                  |
| 200   | 95                                    | —                                  |
| 250   | 120                                   | —                                  |
| 315   | 185                                   | —                                  |
| 400   | 240                                   | —                                  |
| 500   | 2×150                                 | 2×30×5                             |
| 630   | 2×185                                 | 2×40×5                             |
| 800   | 2×240                                 | 2×50×5                             |
| 1000  | —                                     | 2×60×5                             |
| 1250  | —                                     | 2×80×5                             |

8.6 Overall and Mounting Dimensions

8.6.1 Overall and mounting dimensions of fixed type for front connection

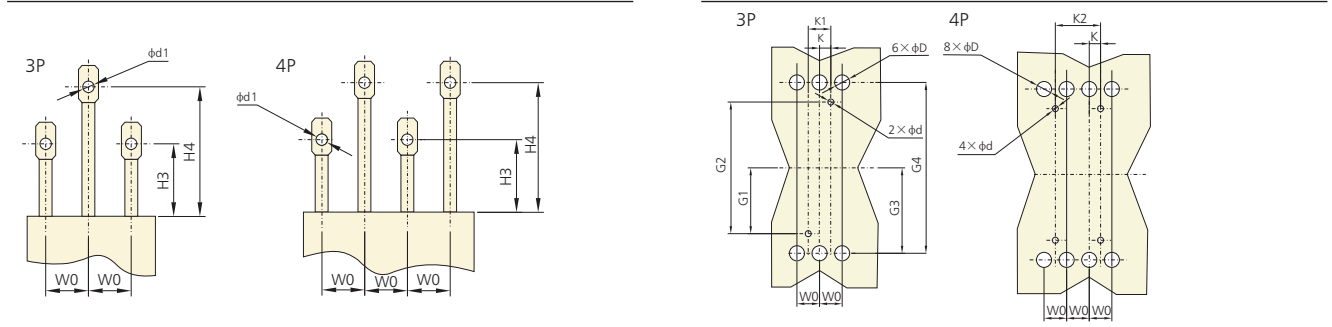


(mm)

| Model                        | L1  | L2  | H0  | H1  | H2  | K    | K1 | K2  | G1   | G2  | W0 | W1  | W2  | W3 | d |
|------------------------------|-----|-----|-----|-----|-----|------|----|-----|------|-----|----|-----|-----|----|---|
| NM8-125                      | 140 | 240 | 72  | 79  | 103 | 15   | 30 | 60  | 56   | 112 | 30 | 90  | 120 | 62 | 6 |
| NM8S-125/NM8-250/NM8S-250    | 157 | 357 | 82  | 88  | 126 | 17.5 | 35 | 70  | 62.5 | 125 | 35 | 105 | 140 | 70 | 6 |
| NM8-400, 630/NM8S-400, 630   | 255 | 474 | 95  | 113 | 168 | 22.5 | 45 | 90  | 100  | 200 | 45 | 140 | 185 | -  | 6 |
| NM8-800, 1250/NM8S-800, 1250 | 370 | 570 | 132 | 144 | 206 | 35   | 70 | 140 | 120  | 240 | 70 | 210 | 280 | -  | 7 |

8.6.2 Overall and mounting dimensions of fixed type for rear connection

Plate mount



(mm)

| Model                     | H3 | H4  | W0 | K    | K1 | K2 | G1   | G2  | G3    | G4  | d | d1 | D  |
|---------------------------|----|-----|----|------|----|----|------|-----|-------|-----|---|----|----|
| NM8-125                   | 47 | 87  | 30 | 15   | 30 | 60 | 56   | 112 | 62.5  | 125 | 6 | 6  | 15 |
| NM8S-125/NM8-250/NM8S-250 | 57 | 97  | 35 | 17.5 | 35 | 70 | 62.5 | 125 | 72    | 144 | 6 | 8  | 20 |
| NM8-400/NM8S-400          | 56 | 100 | 45 | 22.5 | 45 | 90 | 100  | 200 | 113.5 | 227 | 6 | 13 | 32 |
| NM8-630/NM8S-630          | 56 | 100 | 45 | 22.5 | 45 | 90 | 100  | 200 | 113.5 | 227 | 6 | 13 | 32 |

8.6.3 Overall and mounting dimension of plug-in type

Plate mount

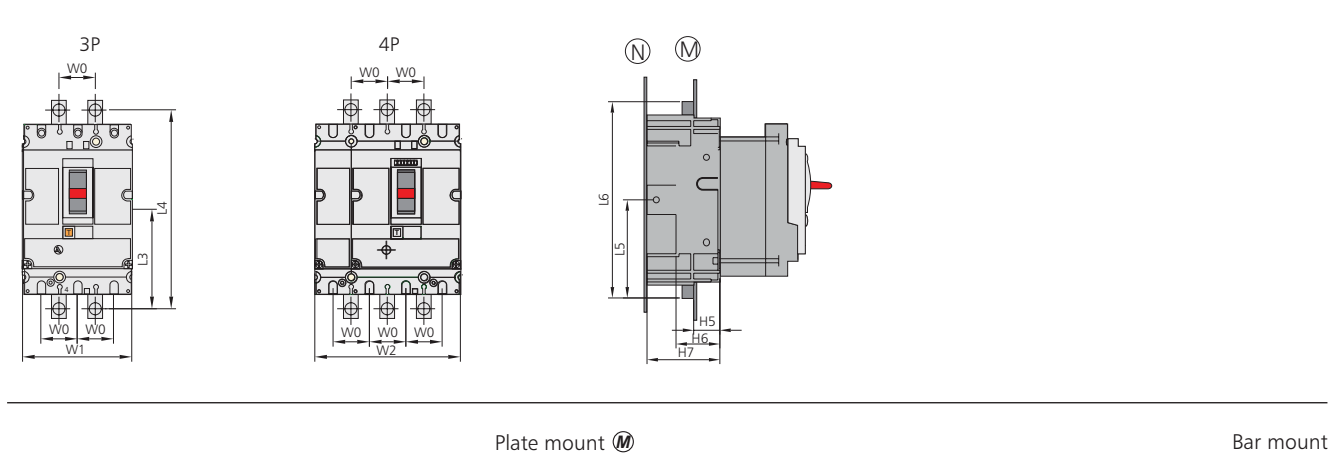
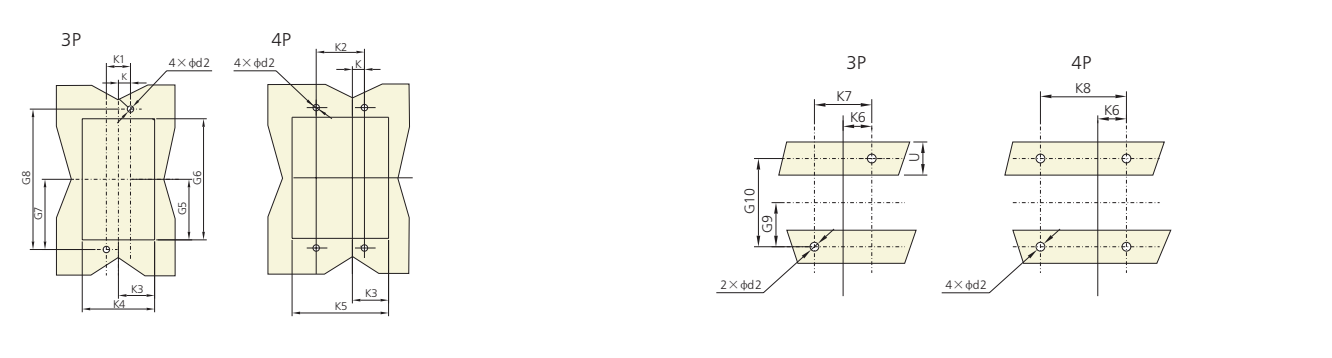


Plate mount

Bar mount

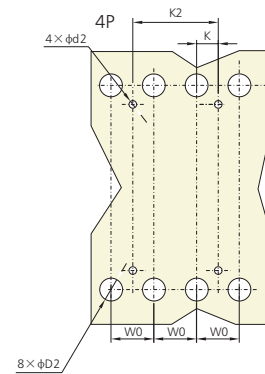
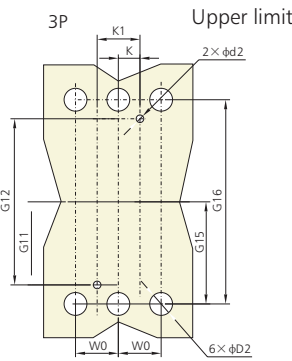
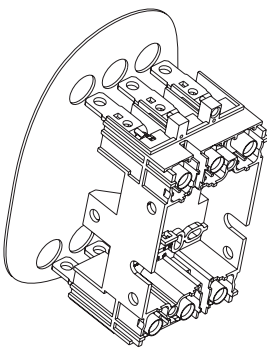
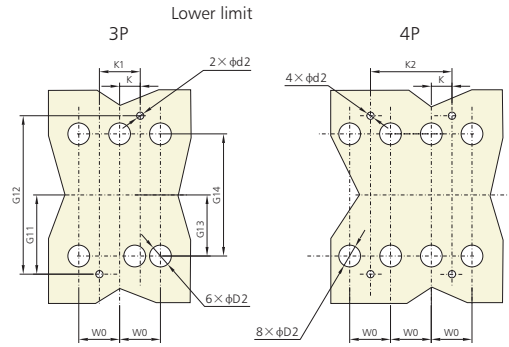
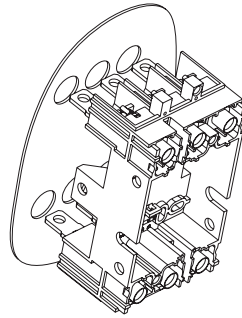
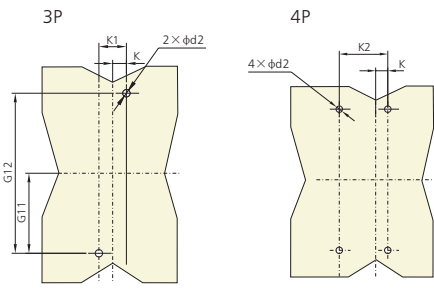


# Moulded Case Circuit Breakers NM8, NM8S



Plate mount (M) front connection  
Insulation barrier must be mounted  
between mounting plate and breaker base

Plate mount (M) rear connection  
Insulation barrier must be mounted  
between mounting plate and breaker base

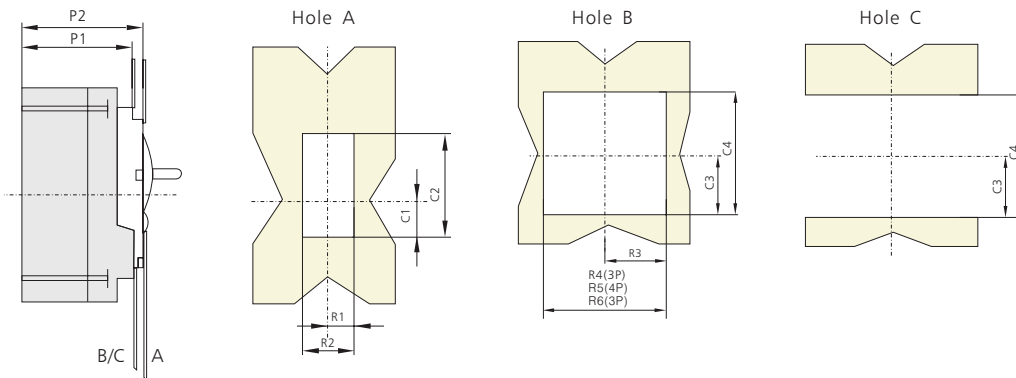


(mm)

| Model                      | W0 | W1  | W2  | L5    | L6  | H5 | H6 | H7 | K    | K1 | K2 | K3   | K4  | K5  | K6 | K7 |
|----------------------------|----|-----|-----|-------|-----|----|----|----|------|----|----|------|-----|-----|----|----|
| NM8-125                    | 30 | 90  | 120 | 90    | 180 | 24 | 40 | 67 | 15   | 30 | 60 | 47   | 94  | 124 | 30 | 60 |
| NM8S-125/NM8-250/NM8S-250  | 35 | 105 | 140 | 102.5 | 205 | 27 | 45 | 75 | 17.5 | 35 | 70 | 54.5 | 109 | 144 | 35 | 70 |
| NM8-400, 630/NM8S-400, 630 | 45 | 140 | 185 | 157.5 | 315 | 27 | 45 | 45 | 22.5 | 45 | 90 | 71.5 | 143 | 188 | 45 | 90 |

| Model                      | K8  | G5  | G6  | G7   | G8    | G9   | G10 | G11  | G12 | G13  | G14 | G15  | G16 | d2 | D2 | U    |
|----------------------------|-----|-----|-----|------|-------|------|-----|------|-----|------|-----|------|-----|----|----|------|
| NM8-125                    | 90  | 77  | 154 | 85.2 | 170.4 | 32.5 | 65  | 68   | 136 | 54.5 | 109 | 70.5 | 141 | 6  | 26 | ≤ 32 |
| NM8S-125/NM8-250/NM8S-250  | 105 | 87  | 174 | 95   | 190   | 37.5 | 75  | 77.5 | 155 | 61   | 122 | 79   | 158 | 6  | 30 | ≤ 32 |
| NM8-400, 630/NM8S-400, 630 | 140 | 137 | 274 | 150  | 300   | 75   | 150 | 125  | 250 | 100  | 200 | 126  | 252 | 6  | 33 | ≤ 32 |

## 8.6.4 Flush type (for fixed or plug-in type)



(mm)

| Model                      | P1  | P2  | R1   | R2 | R3   | R4  | R5  | R6 | C1   | C2  | C3   | C4  |
|----------------------------|-----|-----|------|----|------|-----|-----|----|------|-----|------|-----|
| NM8-125                    | 73  | 80  | 13   | 26 | 46.5 | 93  | 123 | 65 | 26   | 68  | 50.5 | 101 |
| NM8S-125/NM8-250/NM8S-250  | 83  | 90  | 14.5 | 29 | 54   | 108 | 143 | 73 | 33   | 78  | 56.5 | 113 |
| NM8-400, 630/NM8S-400, 630 | 109 | 114 | 26.5 | 53 | 71.5 | 143 | 188 | -  | 41.5 | 116 | 108  | 205 |

9. Accessories

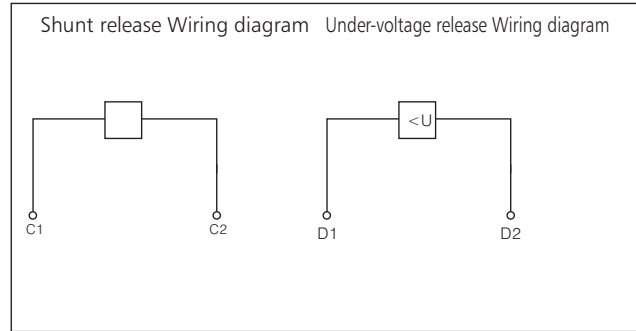
9.1 Inner accessories

9.1.1 Shunt release

$U_s = 70 \sim 110\%U_n$ , circuit breaker reliably operates  
Long-time electrification is prohibited  
Time of response: pulsive type  $\geq 20ms$ ,  $\leq 60ms$

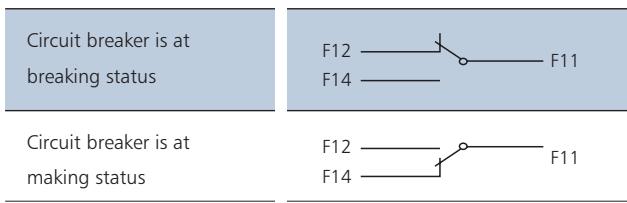
9.1.2 Under-voltage release

$U_s = 35 \sim 70\%U_n$ , circuit breaker reliably breaks  
 $U_s \geq 85\%U_n$ , circuit breaker reliably closes  
 $U_s < 35\%U_n$ , prevent circuit breaker from making  
Note: With under-voltage release,  $U_s \geq 85\%U_n$ , circuit breaker normally makes and breaks

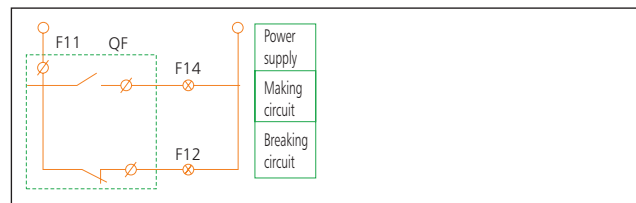


9.1.3 Auxiliary contact

Function: Indication of contacting status



Wiring diagram



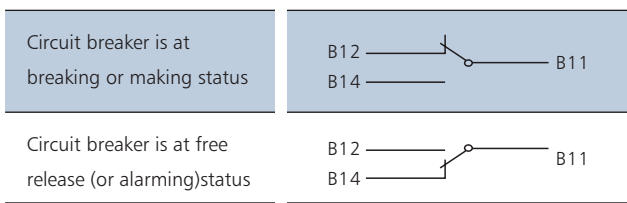
9.1.4 Alarm contact

Function: indication of reason for circuit breaker releasing;

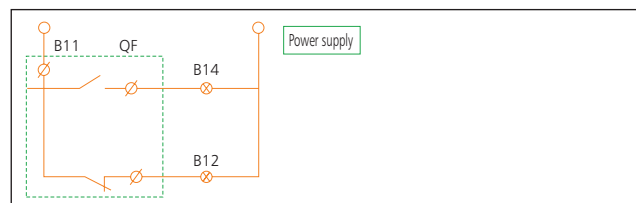
- \* Over-load
- \* Short-circuit
- \* Grounding fault
- \* Operation of under-voltage releasing or free tripping

When circuit breaker normally makes and breaks, alarm contact not operates.

After free tripping (or tripping due to failure), alarm contact operates and after the circuit breaker again normally operates, alarm contact recovers original status.



Wiring diagram



| Accessory  | Code  | Mounting and wiring mode      |                               |                                 |
|--|---|-------------------------------|-------------------------------|---------------------------------|
|  |   |                               |                               |                                 |
|  |   | NM8-125, 250<br>NM8S-125, 250 | NM8-400, 630<br>NM8S-400, 630 | NM8-800, 1250<br>NM8S-800, 1250 |
|  |   | 3P, 4P                        | 3P, 4P                        | 3P, 4P                          |
| No accessory   |   |                               |                               |                                 |
| Alarm contact  | AL  |                               |                               |                                 |
| Shunt release  | SM: AC220V, SQ: AC380V<br>SB: DC24V         |                               |                               |                                 |
| Auxiliary contact  | AX  |                               |                               |                                 |
| Under-voltage release  | UM: AC220V<br>UQ: AC380V                    |                               |                               |                                 |
| Shunt release<br>Auxiliary contact   | SM: AC220V, SQ: AC380V, SB: DC24V<br>AX     |                               |                               |                                 |
| Two groups of auxiliary contact  | AX, AX                                      |                               |                               |                                 |
| Auxiliary contact<br>Under-voltage release                                 | AX<br>UM: AC220V, UQ: AC380V                |                               |                               |                                 |
| Shunt release<br>Alarm contact   | SM: AC220V, SQ: AC380V, SB: DC24V<br>AL     |                               |                               |                                 |
| Auxiliary contact<br>Alarm contact   | AX<br>AL                                    |                               |                               |                                 |
| Under-voltage release<br>Alarm contact                                     | AL<br>AL                                    |                               |                               |                                 |
| Shunt release<br>Auxiliary contact, alarm                                  | SM: AC220V, SQ: AC380V, SB: DC24V<br>AX, AL |                               |                               |                                 |
| Two groups of auxiliary contact  | AX, AX<br>AL                                |                               |                               |                                 |
| Alarm contact<br>Auxiliary contact, alarm contact<br>Under-voltage release | AX, AL<br>(UM: AC220V, UQ: AC380V)          |                               |                               |                                 |

■-Shunt release      ▲-Under-voltage release      ○-Auxiliary contact      ●-Alarm contact

Note: 1: For NM8-125, 250, 400, 630, NM8S-125, 250, 400, 630, under-voltage and shunt release couldn't be simultaneously equipped on one breaker.

2: For NM8-800, 1250, NM8S-800, 1250, at most three auxiliary contacts could be equipped, under-voltage and shunt release could be simultaneously equipped on one breaker, in addition, their positions could be exchanged.

### 9.2 External accessories

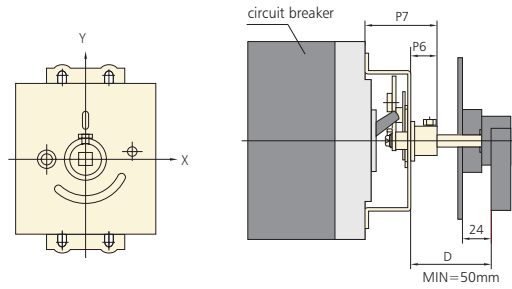
#### 9.2.1 Economic extended rotary handle

Protection degree: IP30

Functions: Isolation function indication;

0(breaking), 1(making)and free tripping indication;

At "OFF" status, the breaker can be fitted with 1-3 padlocks with a diameter of 5-8mm(by customer), This prevents the door of switchgear being opened unwantedly.



(mm)

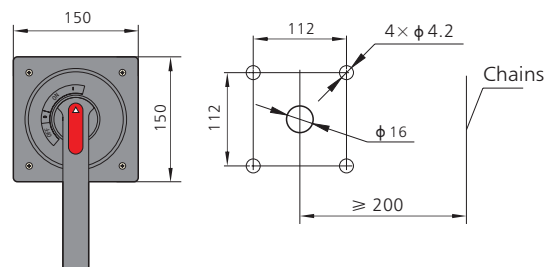
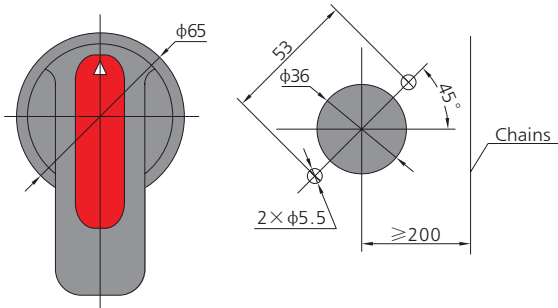
| Dimension | NM8-125 | NM8S-125, NM8-250, NM8S-250 | NM8-400, NM8S-400 | NM8-630, NM8S-630 | NM8(S)-800 | NM8(S)-1250 |
|-----------|---------|-----------------------------|-------------------|-------------------|------------|-------------|
| P6        | 14      | 14                          | 20                | 20                | 21         | 21          |
| P7        | 56      | 56                          | 60                | 60                | 103        | 103         |



Handle mounting (mm)

NM8(S)-125,250,400,630

NM8(S)-800,1250





9.2.2 Direct rotary handle

Protection degree: IP40

Functions:

Reliable insulation;

Isolation function indication;

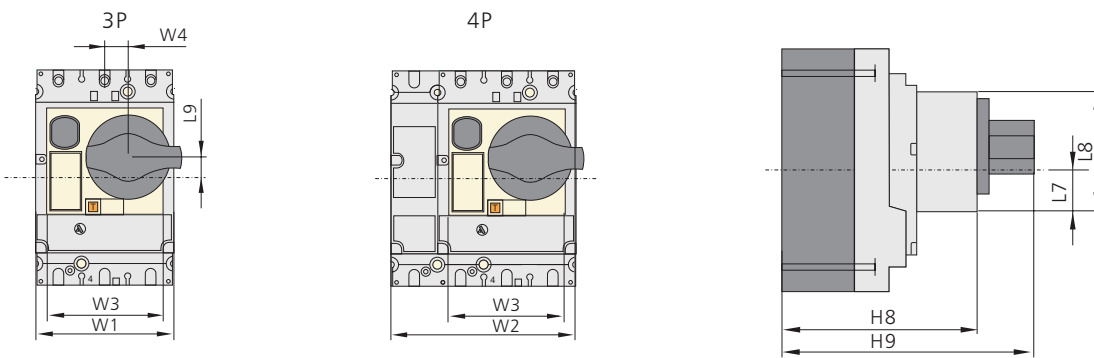
0(breaking), 1(making) and free tripping indication;

Realize free tripping of circuit breaker;

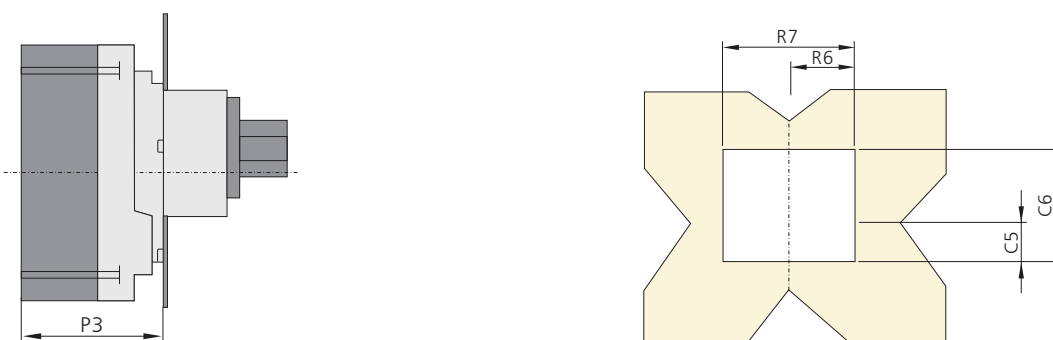
At "OFF" status, the breaker can be fitted with 1-3 padlocks with a diameter of 5~8mm (by customer).



Direct rotary handle



Front boring(fixed or plug-in circuit breaker)



9.2.3 Extended rotary handle

Protection degree: IP55

Functions:

Reliable insulation;

Isolation function indication;

0(breaking), 1(making) and free tripping indication;

When the door is open, the release can be set

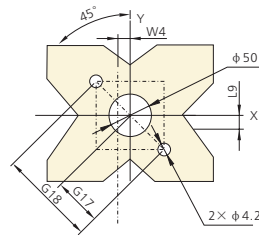
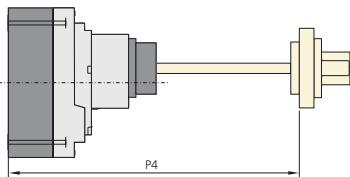
and the breaker will not make;

At "OFF" status, the breaker can be fitted with 1~3 padlocks with a diameter of 5~8mm (by customer).

Then door of the switchgear can be opened.



Front boring(fixed or plug-in circuit breaker)(mm)



(mm)

| Model    | W1 | W2  | W3  | W4    | L7 | L8  | L9   | H8  | H9  | P3  | P4             | R6 | R7  | C5   | C6  | G17 | G18 |
|----------|----|-----|-----|-------|----|-----|------|-----|-----|-----|----------------|----|-----|------|-----|-----|-----|
| NM8-125  | 30 | 90  | 76  | 15.25 | 37 | 70  | 13.3 | 114 | 148 | 80  | ≥ 175<br>≤ 600 | 39 | 78  | 38   | 72  | 36  | 72  |
| NM8S-125 |    |     |     |       |    |     |      |     |     |     |                |    |     |      |     |     |     |
| NM8-250  | 35 | 105 | 93  | 9.25  | 39 | 73  | 9    | 125 | 159 | 90  | ≥ 175<br>≤ 600 | 48 | 96  | 40.5 | 76  | 36  | 72  |
| NM8S-250 |    |     |     |       |    |     |      |     |     |     |                |    |     |      |     |     |     |
| NM8-400  | 45 | 140 | 122 | 5     | 69 | 121 | 24.5 | 148 | 198 | 115 | ≥ 175<br>≤ 600 | 62 | 124 | 70.5 | 124 | 36  | 72  |
| NM8S-400 |    |     |     |       |    |     |      |     |     |     |                |    |     |      |     |     |     |
| NM8-630  | 45 | 140 | 122 | 5     | 69 | 121 | 24.5 | 148 | 198 | 115 | ≥ 175<br>≤ 600 | 62 | 124 | 70.5 | 124 | 36  | 72  |
| NM8S-630 |    |     |     |       |    |     |      |     |     |     |                |    |     |      |     |     |     |

9.2.4 Motor-driven mechanism

Protection degree: IP40

Functions:

Reliable insulation;

Isolation function indication;

0(breaking), 1(making) and free tripping indication;

Free releasing of circuit breaker;

Making and breaking the breaker manually or automatically

Manual operation

Turn "manual/auto" switch to "auto" position and then turn the handle to make and break the breaker.

Automatic operation:

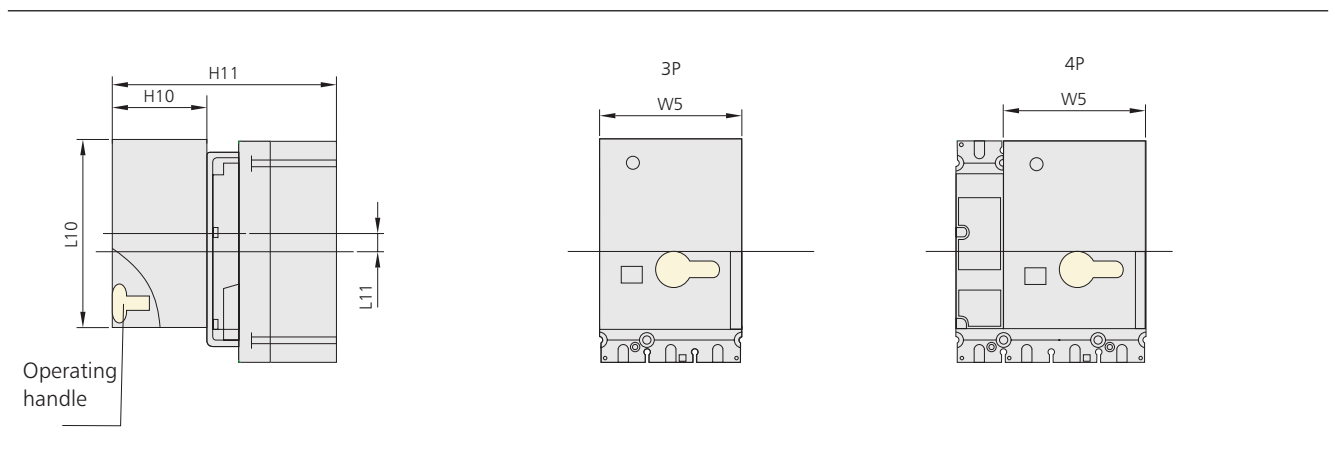
Turn "manual/auto" switch to "manual" position and then push the button to make and break the breaker remotely.

The make/break operation is carried out via pulse or self-retaining type signal control.

Operational range: 85%Un~110%Un.

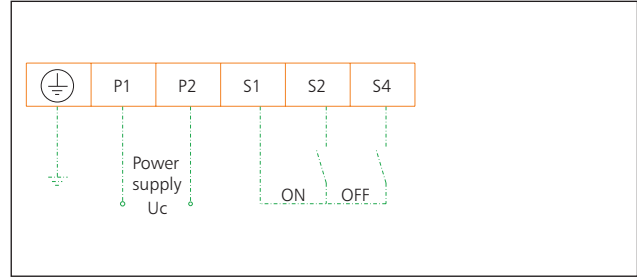
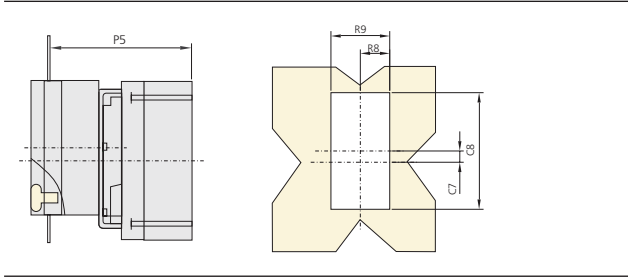


| NM8 circuit breaker | Rated control voltage | Electrical life   | Operational current | Power consumption |  |
|---------------------|-----------------------|-------------------|---------------------|-------------------|--|
| NM8-125             | 100-240V AC           | 10,000 operations | ≤0.5 A              | 14VA              |  |
|                     | 100-220V DC           |                   |                     | 14W               |  |
|                     | 24V DC                |                   |                     | 14W               |  |
| NM8S-125            | 100-240V AC           | 10,000 operations | ≤0.5 A              | 14VA              |  |
|                     | 100-220V DC           |                   |                     | 14W               |  |
|                     | 24V DC                |                   |                     | 14W               |  |
| NM8-400             | 230V AC               | 5,000 operations  | ≤2 A                | 35VA              |  |
|                     | 110V AC               |                   |                     | 35VA              |  |
|                     | 220V DC               |                   |                     | 35W               |  |
| NM8-630             | 110V DC               | 5,000 operations  | ≤2 A                | 35W               |  |
|                     | 24V DC                |                   |                     | 35W               |  |
|                     | 24V DC                |                   |                     | 35W               |  |
| NM8-800             | 230V/400V AC          | 3,000 operations  | ≤7.5 A              | 200W              |  |
|                     |                       |                   |                     | NM8S-800          |  |
|                     |                       |                   |                     | NM8-1250          |  |
|                     |                       |                   |                     | NM8S-1250         |  |



Front boring(fixed or plug-in circuit breaker)

Wiring diagram



(mm)

| Model                       | W5  | H10 | H11 | L10 | L11  | R8   | R9  | P5  | C7   | C8  |
|-----------------------------|-----|-----|-----|-----|------|------|-----|-----|------|-----|
| NM8-125                     | 90  | 77  | 164 | 117 | 17.3 | 46.5 | 93  | 144 | 17.3 | 120 |
| NM8S-125, NM8-250, NM8S-250 | 90  | 77  | 175 | 117 | 14.5 | 46.5 | 93  | 155 | 14.5 | 120 |
| NM8-400, NM8S-400           | 107 | 115 | 250 | 174 | 19   | 64   | 128 | 225 | 19   | 177 |
| NM8-630, NM8S-630           | 107 | 115 | 250 | 174 | 19   | 64   | 128 | 225 | 19   | 177 |
| NM8-800, NM8S-800           | -   | -   | -   | -   | -    | -    | -   | -   | -    | -   |
| NM8-1250, NM8S-1250         | -   | -   | -   | -   | -    | -    | -   | -   | -    | -   |

9.3 Locking system

Locking the breaker at status of making or breaking.  
The system can be fitted with 1~3 padlocks with a diameter of 5~8mm (by customer).

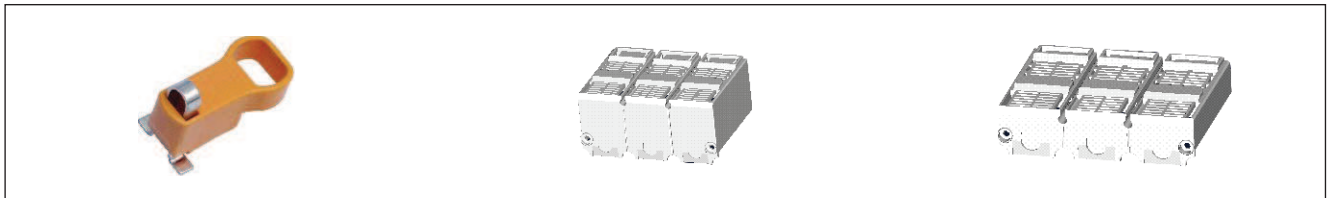
9.4 Terminal cover

Protection degree: IP40  
Protect from being contacted with main circuit.  
Selection of terminal cover:  
Fixed breaker (front connection): Long terminal cover;  
Fixed breaker (rear connection): Short terminal cover;  
Plug-in breaker: short terminal cover;  
When voltage is  $\geq 500V$ , terminal cover selected for definite connection mode

Locking system

Long terminal cover

Short terminal cover



10. Complementary technical information

10.1 Isolation function

Isolation functions of all the circuit breakers as per IEC60947/EN60947-2; Isolating position of contactors is at 0 (OFF) status. The operating handle will correctly indicate the status of 0(OFF), only if the contactor breaks;

Padlocks could be mounted after the contacts breaks;  
Operation of isolation functions will realize following points:

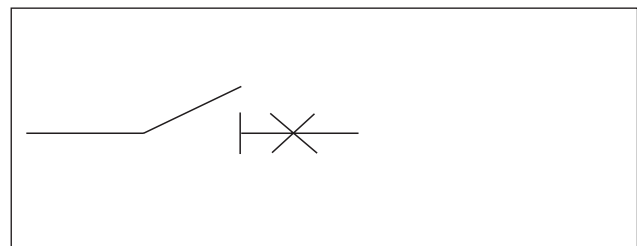
- Contacts operation correctly indicates:
  - operating reliability of interior mechanism;
- No residual current;
- Higher impulse withstands voltage for terminals at the power supply side and on-load side.

10.2 Current-limiting

10.2.1 Current-limiting capacity

The current-limiting capacity of a circuit breaker is its aptitude to limit short-circuits current. By occurring of short-circuit, the breaker is able to limit  $I^2t$  in time so as to protect circuits and switchgear at downstream.

The exceptional limiting capacity of NM8 series is due to the rotating double-break technique, which is characterized by very rapid natural repulsion of contacts and the appearance of two arc voltages in series with a very steep wave front.

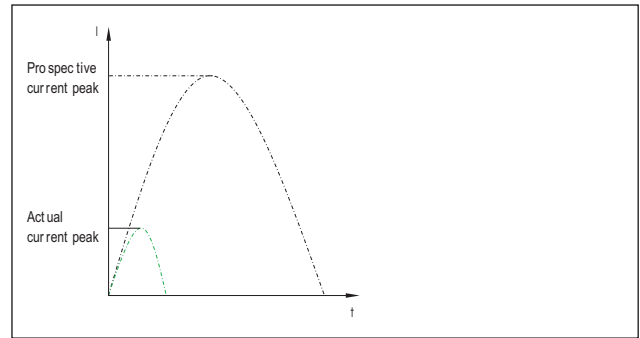


- a. Exceptional current-limiting capacity is able to greatly reduce power caused by fault current so as to enhance breaking capacity of breaker to  $I_{cs}=100\%I_{cu}$ ;
- b. The capacity has greatly released damages, which short-circuit current lay to apparatus;
- c. The capacity has greatly lowered temperature-rise so as to lengthen service life of the cable;
- d. The capacity has greatly reduced power so as to lessen distortion of contacts and bus bar;
- e. The capacity has greatly decreased interruptions to apparatus nearby.

10.2.2 Current-limiting curves

The current-limiting capacity of a circuit breaker is expressed by two curves which are the prospective current and the actual short-circuit current.

Thermal stress ( $A^2S$ ), i.e. the energy dissipated by the short-circuit current in a conductor with a resistance of  $1 \Omega$ . The table below indicates the maximum permissible thermal stresses for cables depending on their insulation, conductor (Cu or Al) and cross section area (CSA). CSA values are given in  $mm^2$  and thermal stresses in  $A^2S$ .



| CSA(mm <sup>2</sup> ) |          | 1.5                | 2.5                | 4                  | 6                  | 10                 | 16                 | 25                 | 35                 |
|-----------------------|----------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| PVC                   | Cu K=115 | $2.97 \times 10^4$ | $8.26 \times 10^4$ | $2.12 \times 10^5$ | $4.76 \times 10^5$ | $1.32 \times 10^6$ | $3.40 \times 10^6$ | $8.26 \times 10^6$ | $1.62 \times 10^7$ |
|                       | Al K=76  | $1.30 \times 10^4$ | $3.61 \times 10^4$ | $9.26 \times 10^4$ | $2.08 \times 10^5$ | $5.78 \times 10^5$ | $1.48 \times 10^6$ | $3.16 \times 10^6$ | $7.08 \times 10^6$ |
| Butyl                 | Cu K=131 | $3.86 \times 10^4$ | $1.07 \times 10^5$ | $2.75 \times 10^5$ | $6.18 \times 10^5$ | $1.72 \times 10^6$ | $4.39 \times 10^6$ | $1.07 \times 10^7$ | $2.10 \times 10^7$ |
|                       | Al K=87  | $1.70 \times 10^4$ | $4.73 \times 10^4$ | $1.21 \times 10^5$ | $2.72 \times 10^5$ | $7.57 \times 10^5$ | $1.94 \times 10^6$ | $4.73 \times 10^6$ | $9.27 \times 10^6$ |
| EPR                   | Cu K=143 | $4.60 \times 10^4$ | $1.28 \times 10^5$ | $3.27 \times 10^5$ | $7.36 \times 10^5$ | $2.04 \times 10^6$ | $5.23 \times 10^6$ | $1.28 \times 10^7$ | $2.51 \times 10^7$ |
|                       | Al K=94  | $1.99 \times 10^4$ | $5.52 \times 10^4$ | $1.41 \times 10^5$ | $3.18 \times 10^5$ | $8.84 \times 10^5$ | $2.26 \times 10^6$ | $5.52 \times 10^6$ | $1.08 \times 10^7$ |

| CSA(mm <sup>2</sup> ) |          | 50                 | 70                 | 95                 | 120                | 150                | 185                | 240                |
|-----------------------|----------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| PVC                   | Cu K=115 | $3.31 \times 10^4$ | $6.48 \times 10^4$ | $1.19 \times 10^5$ | $1.90 \times 10^5$ | $2.98 \times 10^6$ | $4.53 \times 10^6$ | $7.62 \times 10^6$ |
|                       | Al K=76  | $1.44 \times 10^4$ | $2.83 \times 10^4$ | $5.21 \times 10^4$ | $8.32 \times 10^4$ | $1.30 \times 10^6$ | $1.98 \times 10^6$ | $3.33 \times 10^6$ |
| Butyl                 | Cu K=131 | $4.29 \times 10^4$ | $8.41 \times 10^4$ | $1.55 \times 10^5$ | $2.47 \times 10^5$ | $3.86 \times 10^6$ | $5.87 \times 10^6$ | $9.88 \times 10^6$ |
|                       | Al K=87  | $1.89 \times 10^4$ | $3.71 \times 10^4$ | $6.83 \times 10^4$ | $1.09 \times 10^5$ | $1.70 \times 10^6$ | $2.59 \times 10^6$ | $4.36 \times 10^6$ |
| EPR                   | Cu K=143 | $5.11 \times 10^4$ | $1.00 \times 10^5$ | $1.85 \times 10^5$ | $2.94 \times 10^5$ | $4.60 \times 10^6$ | $7.00 \times 10^6$ | $1.18 \times 10^7$ |
|                       | Al K=94  | $2.21 \times 10^4$ | $4.33 \times 10^4$ | $7.97 \times 10^4$ | $1.27 \times 10^5$ | $1.99 \times 10^6$ | $3.02 \times 10^6$ | $5.09 \times 10^6$ |

K is quoted from GB-50054 code for design of low voltage electrical installations.

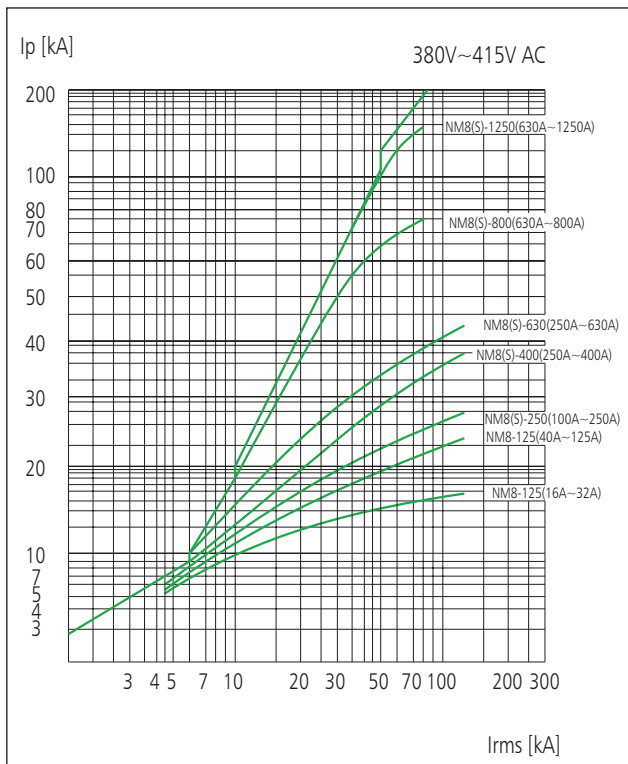
Example:

a. What is the actual current when a prospective short-circuit current of 125kA rms (peak value=275kA) comes through the current-limiting operation circuit breaker at upstream of NM8-125R  
 Answer: the peak value=23kA; (for details, refer to current-limiting curves)

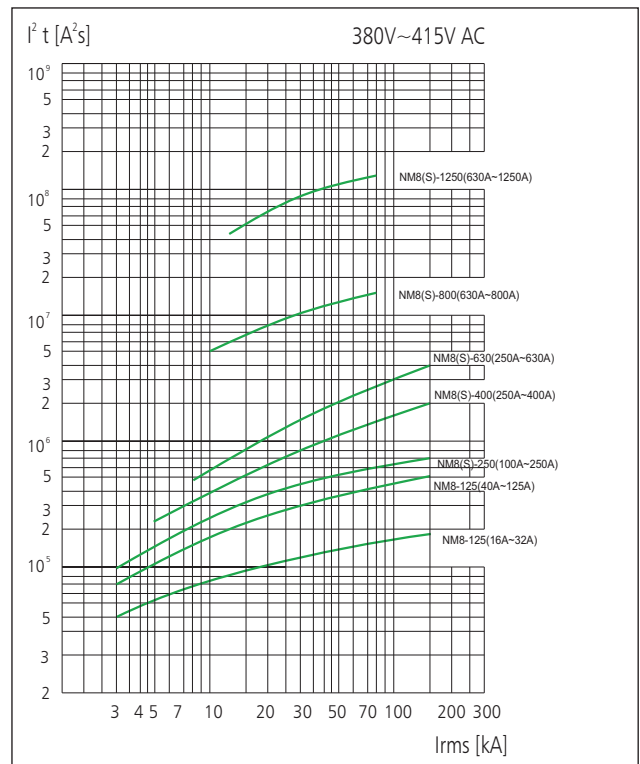
b. Is a Cu/PVC cable with a CSA of 10mm<sup>2</sup> adequately protected by a NM8-125S circuit breaker

Answer: the table above indicates that the permissible thermal stress is  $1.32 \times 10^6 A^2S$  at the point where a NM8-125S ( $I_{cu}=50kA$ ) is installed, and the short-circuit current is limited within the range of  $1.32 \times 10^6 A^2S$ , therefore the cable could be protected.

$I^2 t$  Curve

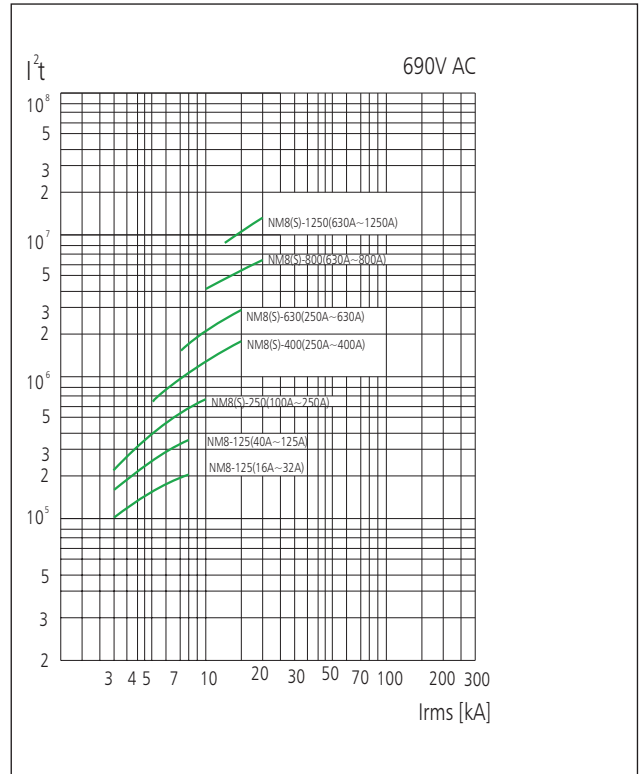
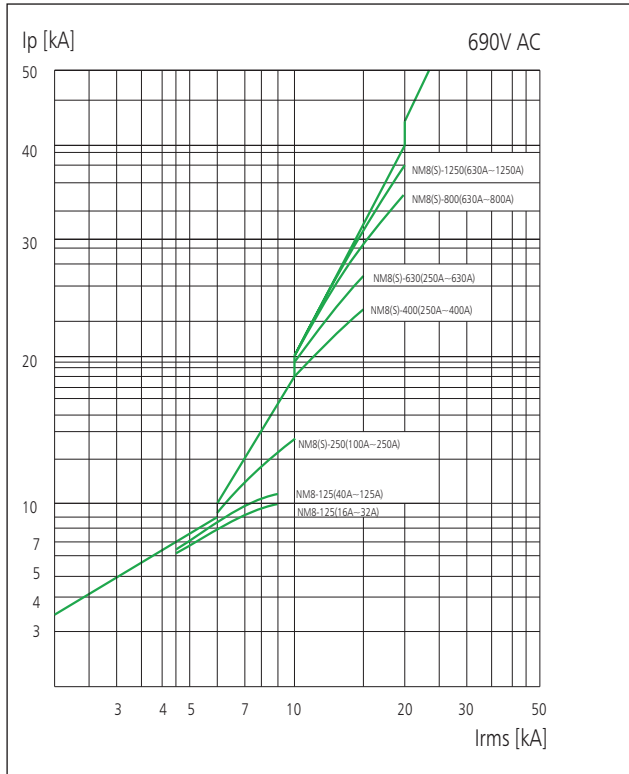


$A^2s$  curve



I<sup>2</sup> t Curve

A<sup>2</sup>s curve



10.3 Power loss per pole

| Resistance/ power loss mΩ/W | NM8-125   | NM8S-125 | NM8-250   | NM8S-250  | NM8-400   | NM8S-400  | NM8-630   | NM8S-630  | NM8-800   | NM8S-800  | NM8-1250  | NM8S-1250 |
|-----------------------------|-----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 16                          | 7.1/1.8   |          |           |           |           |           |           |           |           |           |           |           |
| 20                          | 6.2/2.5   |          |           |           |           |           |           |           |           |           |           |           |
| 25                          | 4.8/3     |          |           |           |           |           |           |           |           |           |           |           |
| 32                          | 3.7/3.8   |          |           |           |           |           |           |           |           |           |           |           |
| 40                          | 2.6/4.2   | 0.85/1.4 |           |           |           |           |           |           |           |           |           |           |
| 50                          | 2.7/6.8   | 0.7/1.8  |           |           |           |           |           |           |           |           |           |           |
| 63                          | 1.7/6.7   | 0.7/2.8  |           |           |           |           |           |           |           |           |           |           |
| 80                          | 1.3/8.3   | 0.7/4.5  |           |           |           |           |           |           |           |           |           |           |
| 100                         | 0.85/8.5  | 0.5/5    | 1.0/10    | 0.5/5     |           |           |           |           |           |           |           |           |
| 125                         | 0.71/11.1 | 0.5/7.8  | 1.0/15.6  | 0.5/7.8   |           |           |           |           |           |           |           |           |
| 160                         |           |          | 0.55/14   | 0.36/9.2  |           |           |           |           |           |           |           |           |
| 180                         |           |          | 0.55/17.8 | 0.36/11.7 |           |           |           |           |           |           |           |           |
| 200                         |           |          | 0.55/22   | 0.36/14.4 |           |           |           |           |           |           |           |           |
| 225                         |           |          | 0.55/27.8 | 0.28/14.2 |           |           |           |           |           |           |           |           |
| 250                         |           |          | 0.55/34.4 | 0.28/17.5 | 0.3/18.8  | 0.15/9.4  | 0.3/18.8  | 0.13/8.1  |           |           |           |           |
| 315                         |           |          |           |           | 0.28/27.8 | 0.15/14.9 | 0.28/27.8 | 0.13/12.9 |           |           |           |           |
| 350                         |           |          |           |           | 0.28/34.3 | 0.15/18.4 | 0.28/34.3 | 0.13/15.9 |           |           |           |           |
| 400                         |           |          |           |           | 0.24/38.4 | 0.15/24   | 0.24/38.4 | 0.13/20.8 |           |           |           |           |
| 500                         |           |          |           |           |           |           | 0.2/50    | 0.13/32.5 |           |           |           |           |
| 630                         |           |          |           |           |           |           |           | 0.13/51.6 | 0.04/15.9 | 0.04/15.9 | 0.04/15.9 | 0.04/15.9 |
| 700                         |           |          |           |           |           |           |           |           | 0.04/19.6 | 0.04/19.6 | 0.04/19.6 | 0.04/19.6 |
| 800                         |           |          |           |           |           |           |           |           | 0.04/25.6 | 0.04/25.6 | 0.04/25.6 | 0.04/25.6 |
| 1000                        |           |          |           |           |           |           |           |           |           |           | 0.04/40   | 0.04/40   |
| 1250                        |           |          |           |           |           |           |           |           |           |           | 0.04/62.5 | 0.04/62.5 |

10.4 Influences which altitude lay to tripping characteristics

To tripping characteristics of circuit breaker, it is no obvious influence, when the altitude does not exceed 2000m. Once the altitude exceeds the level of 2000m, factors of dielectric stress lowering and cooled air should be taken into consideration.

| Altitude (m)                 | 2000 | 3000   | 4000   | 5000  |
|------------------------------|------|--------|--------|-------|
| Dielectric stress (V)        | 3000 | 2500   | 2100   | 1800  |
| Max. operational voltage (V) | 690  | 550    | 480    | 420   |
| Ratings at 40°C (A)          | 1In  | 0.96In | 0.93In | 0.9In |

10.5 Cascading

Definition of Cascading

Current-limiting technique has been adopted for cascading to install downstream circuit breaker with lower breaking capacity (cheaper circuit breakers) at the given point of circuit, and upstream NM8(S) circuit breaker operates to limit short-circuit current. Under the operation of cascading network, circuit breaker with lower breaking capacity compared with prospective short-circuit current at the given point could operate under normal short-circuit status. As the short-circuit current will be limited by upstream circuit breaker with current-limiting operation, cascading network is applicable to all the power distribution apparatus protection at downstream.

In addition, cascading operation is not restricted to operation of two switches in serial, but is applicable in various electric networks, as well.

Application of cascading

Through the application of cascading, connected apparatuses could be installed in different switchgears to realize normal operation. Therefore, cascading, in common, refers to various combination of circuit breakers installed at the given point of which the breaking capacity is lower than prospective short-circuit current. And breaking capacity of upstream circuit breakers should be equal to or higher than prospective short-circuit current at the installed point to protect apparatus at downstream. Cascading application is in conformity with IEC60947-2 standards.

Cascading (220/230/240V)

Upstream: NM8-125~1250

Downstream: DZ47, eB, UB, DZ158, DZ267, NB1, NBH8, NM8 (S)-125~1250

| Upstream<br>Breaking capacity<br>(kA rms) → | NM8-125S<br>85                          | NM8-125H<br>100 | NM8-125R<br>150 | NM8-250S<br>85 | NM8-250H<br>100 | NM8-250R<br>150 | NM8-400S<br>85 |  |
|---|---|-----------------|-----------------|----------------|-----------------|-----------------|----------------|--|
|   | Downstream ↓ Breaking capacity (kA rms) |                 |                 |                |                 |                 |                |  |
| DZ267                                       | 30                                      | 80              | 80              | 30             | 40              | 40              |                |  |
| DZ47, eB, UB                                | 30                                      | 80              | 80              | 30             | 40              | 40              |                |  |
| NBH8  | 30                                      | 80              | 80              | 30             | 40              | 40              |                |  |
| NB1(Icn=6000A)                              | 40                                      | 100             | 100             | 40             | 50              | 50              |                |  |
| NB1-63(Icn=10000A)                          | 50                                      | 100             | 100             | 50             | 65              | 65              |                |  |
| DZ158-100                                   | 50                                      | 100             | 100             | 50             | 65              | 65              | 50             |  |
| NM8-125S                                    |   | 100             | 150             |                | 100             | 150             |                |  |
| NM8-125H                                    |   |                 | 150             |                |                 | 150             |                |  |
| NM8-250S                                    |   |                 |                 |                | 100             | 150             |                |  |
| NM8-250H                                    |   |                 |                 |                |                 | 150             |                |  |
| NM8-400S                                    |   |                 |                 |                |                 |                 |                |  |
| NM8-400H                                    |   |                 |                 |                |                 |                 |                |  |
| NM8-630S                                    |   |                 |                 |                |                 |                 |                |  |
| NM8-630H                                    |   |                 |                 |                |                 |                 |                |  |
| NM8-800S                                    |   |                 |                 |                |                 |                 |                |  |
| NM8-800H                                    |   |                 |                 |                |                 |                 |                |  |
| NM8-1250S                                   |   |                 |                 |                |                 |                 |                |  |
| NM8-1250H                                   |   |                 |                 |                |                 |                 |                |  |
| NM8S-125S                                   |   | 100             | 150             |                | 100             | 150             |                |  |
| NM8S-125H                                   |   |                 | 150             |                |                 | 150             |                |  |
| NM8S-250S                                   |   |                 |                 |                | 100             | 150             |                |  |
| NM8S-250H                                   |   |                 |                 |                |                 | 150             |                |  |
| NM8S-400S                                   |   |                 |                 |                |                 |                 |                |  |
| NM8S-400H                                   |   |                 |                 |                |                 |                 |                |  |
| NM8S-630S                                   |   |                 |                 |                |                 |                 |                |  |
| NM8S-630H                                   |   |                 |                 |                |                 |                 |                |  |
| NM8S-800S                                   |   |                 |                 |                |                 |                 |                |  |
| NM8S-800H                                   |   |                 |                 |                |                 |                 |                |  |
| NM8S-1250S                                  |   |                 |                 |                |                 |                 |                |  |
| NM8S-1250H                                  |   |                 |                 |                |                 |                 |                |  |



| NM8-400H<br>100 | NM8-400R<br>150 | NM8-630S<br>85 | NM8-630H<br>100 | NM8-630R<br>150 | NM8-800S<br>65 | NM8-800H<br>100 | NM8-1250S<br>65 | NM8-1250H<br>100 |
|-----------------|-----------------|----------------|-----------------|-----------------|----------------|-----------------|-----------------|------------------|
|                 |                 |                |                 |                 |                |                 |                 |                  |
|                 |                 |                |                 |                 |                |                 |                 |                  |
|                 |                 |                |                 |                 |                |                 |                 |                  |
|                 |                 |                |                 |                 |                |                 |                 |                  |
| 65              | 65              |                |                 |                 |                |                 |                 |                  |
| 100             | 150             |                | 100             | 150             |                | 100             |                 | 100              |
|                 | 150             |                |                 | 150             |                |                 |                 |                  |
| 100             | 150             |                | 100             | 150             |                | 100             |                 | 100              |
|                 | 150             |                |                 | 150             |                |                 |                 |                  |
| 100             | 150             |                | 100             | 150             |                | 100             |                 | 100              |
|                 | 150             |                |                 | 150             |                |                 |                 |                  |
|                 |                 |                | 100             | 150             |                | 100             |                 | 100              |
|                 |                 |                |                 | 150             |                |                 |                 |                  |
|                 |                 |                |                 |                 |                | 100             |                 | 100              |
|                 |                 |                |                 |                 |                |                 |                 |                  |
|                 |                 |                |                 |                 |                | 100             |                 | 100              |
| 100             | 150             |                | 100             | 150             |                | 100             |                 | 100              |
|                 | 150             |                |                 | 150             |                |                 |                 |                  |
| 100             | 150             |                | 100             | 150             |                | 100             |                 | 100              |
|                 | 150             |                |                 | 150             |                |                 |                 |                  |
| 100             | 150             |                | 100             | 150             |                | 100             |                 | 100              |
|                 | 150             |                |                 | 150             |                |                 |                 |                  |
|                 |                 |                | 100             | 150             |                | 100             |                 | 100              |
|                 |                 |                |                 | 150             |                |                 |                 |                  |
|                 |                 |                |                 |                 |                | 100             |                 | 100              |
|                 |                 |                |                 |                 |                | 100             |                 | 100              |

Upstream: NM8S-125~1250

Downstream: DZ267, DZ47, eB, UB, NBH8, NB1, DZ158, NM8(S)-125~1250

| Upstream<br>Breaking capacity<br>(kA rms) → | NM8S-125S<br>85                         | NM8S-125H<br>100 | NM8S-250S<br>85 | NM8S-250H<br>100 | NM8S-400S<br>85 | NM8S-400H<br>100 |  |
|---|---|------------------|-----------------|------------------|-----------------|------------------|--|
|   | Downstream ↓ Breaking capacity (kA rms) |                  |                 |                  |                 |                  |  |
| DZ267                                       | 30                                      | 80               | 30              | 40               |                 |                  |  |
| DZ47, eB, UB                                | 30                                      | 80               | 30              | 40               |                 |                  |  |
| NBH8  | 30                                      | 80               | 30              | 40               |                 |                  |  |
| NB1 (Icn=6000A)                             | 40                                      | 100              | 40              | 50               |                 |                  |  |
| NB1 (Icn=10000A)                            | 50                                      | 100              | 50              | 65               |                 |                  |  |
| DZ158-100                                   | 50                                      | 100              | 50              | 65               | 50              | 65               |  |
| NM8-125S                                    |   | 100              |                 | 100              |                 | 100              |  |
| NM8-125H                                    |   |                  |                 |                  |                 |                  |  |
| NM8-250S                                    |   |                  |                 | 100              |                 | 100              |  |
| NM8-250H                                    |   |                  |                 |                  |                 |                  |  |
| NM8-400S                                    |   |                  |                 |                  |                 | 100              |  |
| NM8-400H                                    |   |                  |                 |                  |                 |                  |  |
| NM8-630S                                    |   |                  |                 |                  |                 |                  |  |
| NM8-630H                                    |   |                  |                 |                  |                 |                  |  |
| NM8-800S                                    |   |                  |                 |                  |                 |                  |  |
| NM8-800H                                    |   |                  |                 |                  |                 |                  |  |
| NM8-1250S                                   |   |                  |                 |                  |                 |                  |  |
| NM8-1250H                                   |   |                  |                 |                  |                 |                  |  |
| NM8S-125S                                   |   | 100              |                 | 100              |                 | 100              |  |
| NM8S-125H                                   |   |                  |                 |                  |                 |                  |  |
| NM8S-250S                                   |   |                  |                 | 100              |                 | 100              |  |
| NM8S-250H                                   |   |                  |                 |                  |                 |                  |  |
| NM8S-400S                                   |   |                  |                 |                  |                 | 100              |  |
| NM8S-400H                                   |   |                  |                 |                  |                 |                  |  |
| NM8S-630S                                   |   |                  |                 |                  |                 |                  |  |
| NM8S-630H                                   |   |                  |                 |                  |                 |                  |  |
| NM8S-800S                                   |   |                  |                 |                  |                 |                  |  |
| NM8S-800H                                   |   |                  |                 |                  |                 |                  |  |
| NM8S-1250S                                  |   |                  |                 |                  |                 |                  |  |
| NM8S-1250H                                  |   |                  |                 |                  |                 |                  |  |

| NM8S-400R<br>150 | NM8S-630S<br>85 | NM8S-630H<br>100 | NM8S-630R<br>150 | NM8S-800S<br>65 | NM8S-800H<br>100 | NM8S-1250S<br>65 | NM8S-1250H<br>100 |
|------------------|-----------------|------------------|------------------|-----------------|------------------|------------------|-------------------|
|                  |                 |                  |                  |                 |                  |                  |                   |
|                  |                 |                  |                  |                 |                  |                  |                   |
|                  |                 |                  |                  |                 |                  |                  |                   |
| 65               |                 |                  |                  |                 |                  |                  |                   |
| 150              |                 |                  |                  |                 |                  |                  |                   |
| 150              |                 | 100              | 150              |                 | 100              |                  | 100               |
| 150              |                 |                  | 150              |                 |                  |                  |                   |
| 150              |                 | 100              | 150              |                 | 100              |                  | 100               |
| 150              |                 |                  | 150              |                 |                  |                  |                   |
| 150              |                 | 100              | 150              |                 | 100              |                  | 100               |
|                  |                 |                  | 150              |                 |                  |                  |                   |
|                  |                 | 100              | 150              |                 | 100              |                  | 100               |
|                  |                 |                  | 150              |                 |                  |                  |                   |
|                  |                 |                  |                  |                 | 100              |                  | 100               |
|                  |                 |                  |                  |                 |                  |                  |                   |
|                  |                 |                  |                  |                 | 100              |                  | 100               |
| 150              |                 |                  |                  |                 |                  |                  |                   |
| 150              |                 | 100              | 150              |                 | 100              |                  | 100               |
| 150              |                 |                  | 150              |                 |                  |                  |                   |
| 150              |                 | 100              | 150              |                 | 100              |                  | 100               |
| 150              |                 |                  | 150              |                 |                  |                  |                   |
| 150              |                 | 100              | 150              |                 | 100              |                  | 100               |
|                  |                 |                  | 150              |                 |                  |                  |                   |
|                  |                 | 100              | 150              |                 | 100              |                  | 100               |
|                  |                 |                  | 150              |                 |                  |                  |                   |
|                  |                 |                  |                  |                 | 100              |                  | 100               |
|                  |                 |                  |                  |                 |                  |                  |                   |
|                  |                 |                  |                  |                 | 100              |                  | 100               |

Cascading (380/400/415V)

Upstream: NM8-125~1250;

Downstream: DZ47,eB, UB, DZ158, DZ267, NB1, NBH8, NM8(S)-125~1250

| Upstream<br>Breaking capacity<br>(kA rms) → | NM8-125S<br>50                             | NM8-125H<br>100 | NM8-125R<br>150 | NM8-250S<br>50 | NM8-250H<br>100 | NM8-250R<br>150 | NM8-400S<br>70 |
|---|--|-----------------|-----------------|----------------|-----------------|-----------------|----------------|
|   | Downstream ↓<br>Breaking capacity (kA rms) |                 |                 |                |                 |                 |                |
| DZ47, eB, UB                                | 15   | 20              | 20              | 15             | 20              | 20              |                |
| NB1(Icn=6000A)                              | 25   | 30              | 30              | 25             | 30              | 30              |                |
| NB1-63(Icn=10000A)                          | 25   | 40              | 40              | 25             | 40              | 40              |                |
| DZ158-100                                   | 25   | 40              | 40              | 25             | 40              | 40              | 25             |
| NM8-125S                                    |  | 100             | 150             |                | 100             | 150             | 70             |
| NM8-125H                                    |  |                 | 150             |                |                 | 150             |                |
| NM8-250S                                    |  |                 |                 |                | 100             | 150             | 70             |
| NM8-250H                                    |  |                 |                 |                |                 | 150             |                |
| NM8-400S                                    |  |                 |                 |                |                 |                 |                |
| NM8-400H                                    |  |                 |                 |                |                 |                 |                |
| NM8-630S                                    |  |                 |                 |                |                 |                 |                |
| NM8-630H                                    |  |                 |                 |                |                 |                 |                |
| NM8-800S                                    |  |                 |                 |                |                 |                 |                |
| NM8-800H                                    |  |                 |                 |                |                 |                 |                |
| NM8-1250S                                   |  |                 |                 |                |                 |                 |                |
| NM8-1250H                                   |  |                 |                 |                |                 |                 |                |
| NM8S-125S                                   |  | 100             | 150             |                | 100             | 150             | 70             |
| NM8S-125H                                   |  |                 | 150             |                |                 | 150             |                |
| NM8S-250S                                   |  |                 |                 |                | 100             | 150             | 70             |
| NM8S-250H                                   |  |                 |                 |                |                 | 150             |                |
| NM8S-400S                                   |  |                 |                 |                |                 |                 |                |
| NM8S-400H                                   |  |                 |                 |                |                 |                 |                |
| NM8S-630S                                   |  |                 |                 |                |                 |                 |                |
| NM8S-630H                                   |  |                 |                 |                |                 |                 |                |
| NM8S-800S                                   |  |                 |                 |                |                 |                 |                |
| NM8S-800H                                   |  |                 |                 |                |                 |                 |                |
| NM8S-1250S                                  |  |                 |                 |                |                 |                 |                |
| NM8S-1250H                                  |  |                 |                 |                |                 |                 |                |

| NM8-400H<br>100 | NM8-400R<br>150 | NM8-630S<br>70 | NM8-630H<br>100 | NM8-630R<br>150 | NM8-800S<br>50 | NM8-800H<br>70 | NM8-1250S<br>50 | NM8-1250H<br>70 |
|-----------------|-----------------|----------------|-----------------|-----------------|----------------|----------------|-----------------|-----------------|
|                 |                 |                |                 |                 |                |                |                 |                 |
|                 |                 |                |                 |                 |                |                |                 |                 |
| 40              | 40              |                |                 |                 |                |                |                 |                 |
| 100             | 150             |                |                 |                 |                |                |                 |                 |
|                 | 150             | 70             | 100             | 150             |                | 70             |                 | 70              |
| 100             | 150             |                |                 | 150             |                |                |                 |                 |
|                 | 150             | 70             | 100             | 150             |                | 70             |                 | 70              |
| 100             | 150             |                |                 | 150             |                |                |                 |                 |
|                 | 150             |                | 100             | 150             |                | 70             |                 | 70              |
|                 |                 |                |                 | 150             |                |                |                 |                 |
|                 |                 |                | 100             | 150             |                | 70             |                 | 70              |
|                 |                 |                |                 | 150             |                |                |                 |                 |
|                 |                 |                |                 |                 |                | 70             |                 | 70              |
|                 |                 |                |                 |                 |                |                |                 |                 |
| 100             | 150             |                |                 |                 |                | 70             |                 | 70              |
|                 | 150             | 70             | 100             | 150             |                | 70             |                 | 70              |
| 100             | 150             |                |                 | 150             |                |                |                 |                 |
|                 | 150             | 70             | 100             | 150             |                | 70             |                 | 70              |
| 100             | 150             |                |                 | 150             |                |                |                 |                 |
|                 | 150             |                | 100             | 150             |                | 70             |                 | 70              |
|                 |                 |                |                 | 150             |                |                |                 |                 |
|                 |                 |                | 100             | 150             |                | 70             |                 | 70              |
|                 |                 |                |                 | 150             |                |                |                 |                 |
|                 |                 |                |                 |                 |                | 70             |                 | 70              |
|                 |                 |                |                 |                 |                |                |                 |                 |
|                 |                 |                |                 |                 |                | 70             |                 | 70              |

Upstream: NM8S-125~1250

Downstream: DZ267, DZ47, eB, UB, NBH8, NB1, DZ158, NM8 (S) -125~1250

| Upstream<br>Breaking capacity<br>(kA rms) | NM8S-125S<br>50            | NM8S-125H<br>100 | NM8S-250S<br>50 | NM8S-250H<br>100 | NM8S-400S<br>70 | NM8S-400H<br>100 |
|---|----------------------------|------------------|-----------------|------------------|-----------------|------------------|
| Downstream                                | Breaking capacity (kA rms) |                  |                 |                  |                 |                  |
| DZ47, eB, UB                              | 15                         | 20               | 15              | 20               |                 |                  |
| NB1(Icn=6000A)                            | 25                         | 30               | 25              | 30               |                 |                  |
| NB1-63(Icn=10000A)                        | 25                         | 40               | 25              | 40               |                 |                  |
| DZ158                                     | 25                         | 40               | 25              | 40               | 25              | 40               |
| NM8-125S                                  |                            | 100              |                 | 100              |                 | 100              |
| NM8-125H                                  |                            |                  |                 | 100              |                 | 100              |
| NM8-250S                                  |                            |                  |                 | 100              |                 | 100              |
| NM8-250H                                  |                            |                  |                 |                  |                 | 100              |
| NM8-400S                                  |                            |                  |                 |                  |                 | 100              |
| NM8-400H                                  |                            |                  |                 |                  |                 |                  |
| NM8-630S                                  |                            |                  |                 |                  |                 |                  |
| NM8-630H                                  |                            |                  |                 |                  |                 |                  |
| NM8-800S                                  |                            |                  |                 |                  |                 |                  |
| NM8-800H                                  |                            |                  |                 |                  |                 |                  |
| NM8-1250S                                 |                            |                  |                 |                  |                 |                  |
| NM8-1250H                                 |                            |                  |                 |                  |                 |                  |
| NM8S-125S                                 |                            | 100              |                 | 100              |                 | 100              |
| NM8S-125H                                 |                            |                  |                 | 100              |                 | 100              |
| NM8S-250S                                 |                            |                  |                 | 100              |                 | 100              |
| NM8S-250H                                 |                            |                  |                 |                  |                 | 100              |
| NM8S-400S                                 |                            |                  |                 |                  |                 | 100              |
| NM8S-400H                                 |                            |                  |                 |                  |                 |                  |
| NM8S-630S                                 |                            |                  |                 |                  |                 |                  |
| NM8S-630H                                 |                            |                  |                 |                  |                 |                  |
| NM8S-800S                                 |                            |                  |                 |                  |                 |                  |
| NM8S-800H                                 |                            |                  |                 |                  |                 |                  |
| NM8S-1250S                                |                            |                  |                 |                  |                 |                  |
| NM8S-1250H                                |                            |                  |                 |                  |                 |                  |

| NM8S-400R<br>150 | NM8S-630S<br>70 | NM8S-630H<br>100 | NM8S-630R<br>150 | NM8S-800S<br>50 | NM8S-800H<br>70 | NM8S-1250S<br>50 | NM8S-1250H<br>70 |
|------------------|-----------------|------------------|------------------|-----------------|-----------------|------------------|------------------|
|                  |                 |                  |                  |                 |                 |                  |                  |
|                  |                 |                  |                  |                 |                 |                  |                  |
| 40               |                 |                  |                  |                 |                 |                  |                  |
| 150              |                 | 100              | 150              |                 | 70              |                  | 70               |
| 150              |                 | 100              | 150              |                 | 70              |                  | 70               |
| 150              |                 | 100              | 150              |                 | 70              |                  | 70               |
| 150              |                 | 100              | 150              |                 | 70              |                  | 70               |
| 150              |                 | 100              | 150              |                 | 70              |                  | 70               |
| 150              |                 | 100              | 150              |                 | 70              |                  | 70               |
|                  |                 | 100              | 150              |                 | 70              |                  | 70               |
|                  |                 |                  | 150              |                 | 70              |                  | 70               |
|                  |                 |                  |                  |                 | 70              |                  | 70               |
|                  |                 |                  |                  |                 | 70              |                  | 70               |
|                  |                 |                  |                  |                 | 70              |                  | 70               |
| 150              |                 | 100              | 150              |                 | 70              |                  | 70               |
| 150              |                 | 100              | 150              |                 | 70              |                  | 70               |
| 150              |                 | 100              | 150              |                 | 70              |                  | 70               |
| 150              |                 | 100              | 150              |                 | 70              |                  | 70               |
| 150              |                 | 100              | 150              |                 | 70              |                  | 70               |
| 150              |                 | 100              | 150              |                 | 70              |                  | 70               |
|                  |                 | 100              | 150              |                 | 70              |                  | 70               |
|                  |                 |                  | 150              |                 | 70              |                  | 70               |
|                  |                 |                  |                  |                 | 70              |                  | 70               |
|                  |                 |                  |                  |                 | 70              |                  | 70               |
|                  |                 |                  |                  |                 | 70              |                  | 70               |
|                  |                 |                  |                  |                 | 70              |                  | 70               |

10.6 Protection discrimination(selectivity)

Protection discrimination is a must factor in low-voltage power distribution design so as to ensure reliability and continuity for users' electricity utilization.

Whenever there is fault occurring in the electric network, the upstream breaker where the fault is occurring breaks.

Protection discrimination could be clarified into 3 kinds: Total protection discrimination, partial protection discrimination and no protection discrimination(refer to fig aside):

Total protection discrimination: For all kinds of current where the faults occurred, including the overload current and nonresistance current, breaker D2 breaks and breaker D1 keeps making status.

Partial protection discrimination: For a much lower current compared with where the fault occurred (the limit value of protection discrimination), breaker D2 breaks and breaker D1 keeps making status (total protection discrimination).

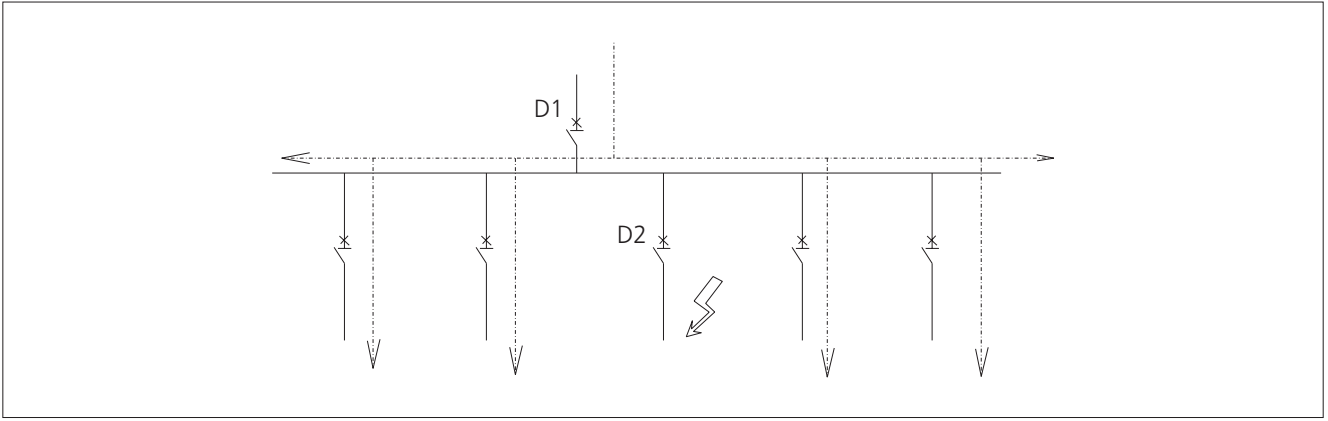
When the fault current is lower than limit value of protection discrimination, the upstream and downstream breakers are applicable to protection discrimination; when the fault current exceeds limit value of protection discrimination, the upstream and downstream breakers are not applicable to protection discrimination (no protection discrimination). And both of the breakers of D1 and D2 break.

Upstream: NM8-125~1250

Downstream: DZ267, DZ47, eB, UB, NBH8, NB1, DZ158

|                          |     | NM8-125 S/H/R |      |     |     |     |     |     |      |     |     | NM8-250 S/H/R |     |     |     |
|--------------------------|-----|---------------|------|-----|-----|-----|-----|-----|------|-----|-----|---------------|-----|-----|-----|
|                          |     | 16            | 20   | 25  | 32  | 40  | 50  | 63  | 80   | 100 | 125 | 100           | 160 | 200 | 250 |
| DZ267<br>C Curves        | ≤10 | 0.19          | 0.25 | 0.3 | 0.4 | 0.5 | 0.5 | 0.5 | 0.63 | 0.8 | 1.0 | T             | T   | T   | T   |
|                          | 16  |               |      | 0.3 | 0.4 | 0.5 | 0.5 | 0.5 | 0.63 | 0.8 | 1.0 | T             | T   | T   | T   |
|                          | 20  |               |      |     |     | 0.5 | 0.5 | 0.5 | 0.63 | 0.8 | 1.0 | T             | T   | T   | T   |
|                          | 25  |               |      |     |     |     | 0.5 | 0.5 | 0.63 | 0.8 | 1.0 | T             | T   | T   | T   |
|                          | 32  |               |      |     |     |     |     | 0.5 | 0.63 | 0.8 | 1.0 | T             | T   | T   | T   |
| DZ47, eB, UB<br>C Curves | ≤10 | 0.19          | 0.25 | 0.3 | 0.4 | 0.5 | 0.5 | 0.5 | 0.63 | 0.8 | 1.0 | T             | T   | T   | T   |
|                          | 16  |               |      | 0.3 | 0.4 | 0.5 | 0.5 | 0.5 | 0.63 | 0.8 | 1.0 | T             | T   | T   | T   |
|                          | 20  |               |      |     |     | 0.5 | 0.5 | 0.5 | 0.63 | 0.8 | 1.0 | T             | T   | T   | T   |
|                          | 25  |               |      |     |     |     | 0.5 | 0.5 | 0.63 | 0.8 | 1.0 | T             | T   | T   | T   |
|                          | 32  |               |      |     |     |     |     | 0.5 | 0.63 | 0.8 | 1.0 | T             | T   | T   | T   |
|                          | 40  |               |      |     |     |     |     |     | 0.63 | 0.8 | 1.0 | T             | T   | T   | T   |
|                          | 50  |               |      |     |     |     |     |     |      | 0.8 | 1.0 | T             | T   | T   | T   |
| 60                       |     |               |      |     |     |     |     |     |      | 1.0 | T   | T             | T   | T   |     |
| NBH8<br>B C Curves       | ≤10 | 0.19          | 0.25 | 0.3 | 0.4 | 0.5 | 0.5 | 0.5 | 0.63 | 0.8 | 1.0 | T             | T   | T   | T   |
|                          | 16  |               |      | 0.3 | 0.4 | 0.5 | 0.5 | 0.5 | 0.63 | 0.8 | 1.0 | T             | T   | T   | T   |
|                          | 20  |               |      |     |     | 0.5 | 0.5 | 0.5 | 0.63 | 0.8 | 1.0 | T             | T   | T   | T   |
|                          | 25  |               |      |     |     |     | 0.5 | 0.5 | 0.63 | 0.8 | 1.0 | T             | T   | T   | T   |
|                          | 32  |               |      |     |     |     |     | 0.5 | 0.63 | 0.8 | 1.0 | T             | T   | T   | T   |
| NB1<br>B C D Curves      | ≤10 | 0.19          | 0.25 | 0.3 | 0.4 | 0.5 | 0.5 | 0.5 | 0.63 | 0.8 | 1.0 | T             | T   | T   | T   |
|                          | 16  |               |      | 0.3 | 0.4 | 0.5 | 0.5 | 0.5 | 0.63 | 0.8 | 1.0 | T             | T   | T   | T   |
|                          | 20  |               |      |     |     | 0.5 | 0.5 | 0.5 | 0.63 | 0.8 | 1.0 | T             | T   | T   | T   |
|                          | 25  |               |      |     |     |     | 0.5 | 0.5 | 0.63 | 0.8 | 1.0 | T             | T   | T   | T   |
|                          | 32  |               |      |     |     |     |     | 0.5 | 0.63 | 0.8 | 1.0 | T             | T   | T   | T   |
|                          | 40  |               |      |     |     |     |     |     | 0.63 | 0.8 | 1.0 | T             | T   | T   | T   |
|                          | 50  |               |      |     |     |     |     |     |      | 0.8 | 1.0 | T             | T   | T   | T   |
| 63                       |     |               |      |     |     |     |     |     | 0.8  | 1.0 | T   | T             | T   | T   |     |
| DZ158                    | 63  |               |      |     |     |     |     |     |      | 0.8 | 1.0 | T             | T   | T   | T   |
|                          | 80  |               |      |     |     |     |     |     |      |     | 1.0 | T             | T   | T   | T   |
|                          | 100 |               |      |     |     |     |     |     |      |     |     | T             | T   | T   | T   |





| NM8-400 S/H/R |     |     |     | NM8-630 S/H/R |     |     |     |     | NM8-800 S/H |     |     | NM8-1250 S/H |     |     |      |      |
|---------------|-----|-----|-----|---------------|-----|-----|-----|-----|-------------|-----|-----|--------------|-----|-----|------|------|
| 250           | 315 | 350 | 400 | 250           | 315 | 350 | 400 | 500 | 630         | 700 | 800 | 630          | 700 | 800 | 1000 | 1250 |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |

Upstream: NM8S-125~1250

Downstream: DZ267, DZ47, eB, UB, NBH8, NB1, DZ158


|                          |     | NM8S-125 S/H |     |     | NM8S-250 S/H |     |     |     | NM8S-400 S/H/R |     |     |     |
|--------------------------|-----|--------------|-----|-----|--------------|-----|-----|-----|----------------|-----|-----|-----|
|                          |     | 40           | 100 | 125 | 100          | 160 | 200 | 250 | 250            | 315 | 350 | 400 |
| DZ267<br>C Curves        | ≤10 | 0.5          | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 16  | 0.5          | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 20  | 0.5          | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 25  |              | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 32  |              | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
| DZ47, eB, UB<br>C Curves | ≤10 | 0.5          | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 16  | 0.5          | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 20  | 0.5          | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 25  |              | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 32  |              | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 40  |              | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 50  |              | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
| NBH8<br>B C Curves       | ≤10 | 0.5          | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 16  | 0.5          | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 20  | 0.5          | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 25  |              | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 32  |              | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
| NB1<br>B C D Curves      | ≤10 | 0.5          | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 16  | 0.5          | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 20  | 0.5          | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 25  |              | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 32  |              | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 40  |              | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 50  |              | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 63  |              | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
| DZ158                    | 63  |              | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 80  |              |     | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 100 |              |     |     |              | T   | T   | T   | T              | T   | T   | T   |
|                          | 63  |              | 0.8 | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 80  |              |     | 1.0 | T            | T   | T   | T   | T              | T   | T   | T   |
|                          | 100 |              |     |     |              | T   | T   | T   | T              | T   | T   | T   |
|                          | 125 |              |     |     |              | T   | T   | T   | T              | T   | T   | T   |

| NM8S-630 S/H/R |     |     |     |     |     | NM8S-800 S/H |     |     | NM8S-1250 S/H |     |     |      |      |
|----------------|-----|-----|-----|-----|-----|--------------|-----|-----|---------------|-----|-----|------|------|
| 250            | 315 | 350 | 400 | 500 | 630 | 630          | 700 | 800 | 630           | 700 | 800 | 1000 | 1250 |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |


Upstream: NM8-125~1250  
Downstream: NM8(S)-125~1250

|                | ↑ Upstream<br>↓ Downstream In (A)<br>I <sub>n</sub> (kA) | NM8-125 S/H/R |    |    |     |     |     |     |      |     |     | NM8-250 S/H/R |      |     |     |
|----------------|--|---------------|----|----|-----|-----|-----|-----|------|-----|-----|---------------|------|-----|-----|
|                |  | 16            | 20 | 25 | 32  | 40  | 50  | 63  | 80   | 100 | 125 | 100           | 160  | 200 | 250 |
| NM8-125 S      | 16   |               |    |    | 0.4 | 0.5 | 0.5 | 0.5 | 0.63 | 0.8 | 1.0 | 2.0           | T    | T   | T   |
|                | 20   |               |    |    |     | 0.5 | 0.5 | 0.5 | 0.63 | 0.8 | 1.0 | 2.0           | T    | T   | T   |
|                | 25   |               |    |    |     |     | 0.5 | 0.5 | 0.63 | 0.8 | 1.0 | 2.0           | T    | T   | T   |
|                | 32   |               |    |    |     |     |     | 0.5 | 0.63 | 0.8 | 1.0 | 2.0           | T    | T   | T   |
|                | 40   |               |    |    |     |     |     |     | 0.63 | 0.8 | 1.0 | 2.0           | T    | T   | T   |
|                | 50   |               |    |    |     |     |     |     |      | 0.8 | 1.0 | 2.0           | T    | T   | T   |
|                | 63   |               |    |    |     |     |     |     |      |     | 1.0 | 2.0           | T    | T   | T   |
|                | 80   |               |    |    |     |     |     |     |      |     |     |               | 1.25 | T   | T   |
|                | 100  |               |    |    |     |     |     |     |      |     |     |               | 1.25 | T   | T   |
|                | 125  |               |    |    |     |     |     |     |      |     |     |               |      |     | T   |
| NM8-125 H/R    | 16   |               |    |    | 0.4 | 0.5 | 0.5 | 0.5 | 0.63 | 0.8 | 1.0 | 2.0           | T    | T   | T   |
|                | 20   |               |    |    |     | 0.5 | 0.5 | 0.5 | 0.63 | 0.8 | 1.0 | 2.0           | T    | T   | T   |
|                | 25   |               |    |    |     |     | 0.5 | 0.5 | 0.63 | 0.8 | 1.0 | 2.0           | T    | T   | T   |
|                | 32   |               |    |    |     |     |     | 0.5 | 0.63 | 0.8 | 1.0 | 2.0           | T    | T   | T   |
|                | 40   |               |    |    |     |     |     |     | 0.63 | 0.8 | 1.0 | 2.0           | 3.6  | 3.6 | 3.6 |
|                | 50   |               |    |    |     |     |     |     |      | 0.8 | 1.0 | 2.0           | 3.6  | 3.6 | 3.6 |
|                | 63   |               |    |    |     |     |     |     |      |     | 1.0 | 2.0           | 3.6  | 3.6 | 3.6 |
|                | 80   |               |    |    |     |     |     |     |      |     |     |               | 3.6  | 3.6 | 3.6 |
|                | 100  |               |    |    |     |     |     |     |      |     |     |               | 3.6  | 3.6 | 3.6 |
|                | 125  |               |    |    |     |     |     |     |      |     |     |               |      |     | 3.6 |
| NM8S-125 S/H   | 40   |               |    |    |     |     |     |     | 0.63 | 0.8 | 1.0 | 1.25          | T    | T   | T   |
|                | 100  |               |    |    |     |     |     |     |      |     |     | 1.25          | T    | T   |     |
|                | 125  |               |    |    |     |     |     |     |      |     |     |               |      | 2.5 |     |
| NM8-250 S      | 100  |               |    |    |     |     |     |     |      |     |     |               |      |     | 3   |
|                | 160  |               |    |    |     |     |     |     |      |     |     |               |      |     |     |
|                | 200  |               |    |    |     |     |     |     |      |     |     |               |      |     |     |
|                | 250  |               |    |    |     |     |     |     |      |     |     |               |      |     |     |
| NM8-250 H/R    | 100  |               |    |    |     |     |     |     |      |     |     |               |      |     | 3   |
|                | 160  |               |    |    |     |     |     |     |      |     |     |               |      |     |     |
|                | 200  |               |    |    |     |     |     |     |      |     |     |               |      |     |     |
|                | 250  |               |    |    |     |     |     |     |      |     |     |               |      |     |     |
| NM8S-250 S/H   | 100  |               |    |    |     |     |     |     |      |     |     |               | 1.6  | 2   | 2.5 |
|                | 160  |               |    |    |     |     |     |     |      |     |     |               |      |     | 2.5 |
|                | 200  |               |    |    |     |     |     |     |      |     |     |               |      |     |     |
|                | 250  |               |    |    |     |     |     |     |      |     |     |               |      |     |     |
| NM8-400 S/H/R  | 250  |               |    |    |     |     |     |     |      |     |     |               |      |     |     |
|                | 315  |               |    |    |     |     |     |     |      |     |     |               |      |     |     |
|                | 350  |               |    |    |     |     |     |     |      |     |     |               |      |     |     |
|                | 400  |               |    |    |     |     |     |     |      |     |     |               |      |     |     |
| NM8S-400 S/H/R | 250  |               |    |    |     |     |     |     |      |     |     |               |      |     |     |
|                | 315  |               |    |    |     |     |     |     |      |     |     |               |      |     |     |
|                | 350  |               |    |    |     |     |     |     |      |     |     |               |      |     |     |
|                | 400  |               |    |    |     |     |     |     |      |     |     |               |      |     |     |
| NM8-630 S/H/R  | 250  |               |    |    |     |     |     |     |      |     |     |               |      |     |     |
|                | 315  |               |    |    |     |     |     |     |      |     |     |               |      |     |     |
|                | 350  |               |    |    |     |     |     |     |      |     |     |               |      |     |     |
|                | 400  |               |    |    |     |     |     |     |      |     |     |               |      |     |     |
| 500            |  |               |    |    |     |     |     |     |      |     |     |               |      |     |     |

| NM8-400 S/H/R |     |     |     | NM8-630 S/H/R |     |     |     |     | NM8-800 S/H |     |     | NM8-1250 S/H |     |     |      |      |    |
|---------------|-----|-----|-----|---------------|-----|-----|-----|-----|-------------|-----|-----|--------------|-----|-----|------|------|----|
| 250           | 315 | 350 | 400 | 250           | 315 | 350 | 400 | 500 | 630         | 700 | 800 | 630          | 700 | 800 | 1000 | 1250 |    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    |    |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | 50          | 50  | 50  | 50           | 50  | 50  | 50   | T    | T  |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | 50          | 50  | 50  | 50           | 50  | 50  | 50   | T    | T  |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | 50          | 50  | 50  | 50           | 50  | 50  | 50   | T    | T  |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | 50          | 50  | 50  | 50           | 50  | 50  | 50   | T    | T  |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | 50          | 50  | 50  | 50           | 50  | 50  | 50   | T    | T  |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | 50          | 50  | 50  | 50           | 50  | 50  | 50   | T    | T  |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | 50          | 50  | 50  | 50           | 50  | 50  | 50   | T    | T  |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | 50          | 50  | 50  | 50           | 50  | 50  | 50   | T    | T  |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | 50          | 50  | 50  | 50           | 50  | 50  | 50   | T    | T  |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | 50          | 50  | 50  | 50           | 50  | 50  | 50   | T    | T  |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | 50          | 50  | 50  | 50           | 50  | 50  | 50   | T    | T  |
| T             | T   | T   | T   | T             | T   | T   | T   | T   | 50          | 50  | 50  | 50           | 50  | 50  | 50   | T    | T  |
| 5             | T   | T   | T   | 3             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    | T  |
|               | 5   | T   | T   |               | 5   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    | T  |
|               |     | 5   | T   |               |     | 5   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    | T  |
|               |     |     | 5   |               |     |     | 5   | T   | T           | T   | T   | T            | T   | T   | T    | T    | T  |
| 5             |     | T   | T   | 3             | T   | T   | T   | T   | 40          | 40  | 40  | 40           | 40  | 40  | 40   | T    | T  |
|               |     | T   | T   |               | 5   | T   | T   | T   | 40          | 40  | 40  | 40           | 40  | 40  | 40   | T    | T  |
|               |     | 5   | T   |               |     | 5   | T   | T   | 40          | 40  | 40  | 40           | 40  | 40  | 40   | T    | T  |
|               |     |     | 5   |               |     |     | 5   | T   | 40          | 40  | 40  | 40           | 40  | 40  | 40   | T    | T  |
| 5             |     | 5   | 5   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    | T  |
| 5             |     | 5   | 5   | T             | T   | T   | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    | T  |
|               |     | 5   | 5   |               |     |     | T   | T   | T           | T   | T   | T            | T   | T   | T    | T    | T  |
|               |     |     | 5   |               |     |     |     | T   | T           | T   | T   | T            | T   | T   | T    | T    | T  |
|               |     |     |     |               |     |     | 8   | 8   | 30          | 30  | 30  | 30           | 30  | 30  | 30   | T    | T  |
|               |     |     |     |               |     |     |     | 8   | 30          | 30  | 30  | 30           | 30  | 30  | 30   | T    | T  |
|               |     |     |     |               |     |     |     |     | 30          | 30  | 30  | 30           | 30  | 30  | 30   | T    | T  |
|               |     |     |     |               |     |     |     |     | 30          | 30  | 30  | 30           | 30  | 30  | 30   | T    | T  |
|               |     |     |     |               |     |     | 8   | 8   | 12          | 12  | 12  | 12           | 12  | 12  | 12   | 15   | 15 |
|               |     |     |     |               |     |     |     | 8   | 12          | 12  | 12  | 12           | 12  | 12  | 12   | 15   | 15 |
|               |     |     |     |               |     |     |     |     | 12          | 12  | 12  | 12           | 12  | 12  | 12   | 15   | 15 |
|               |     |     |     |               |     |     |     |     | 12          | 12  | 12  | 12           | 12  | 12  | 12   | 15   | 15 |
|               |     |     |     |               |     |     | 8   | 8   | 30          | 30  | 30  | 30           | 30  | 30  | 30   | T    | T  |
|               |     |     |     |               |     |     |     | 8   | 30          | 30  | 30  | 30           | 30  | 30  | 30   | T    | T  |
|               |     |     |     |               |     |     |     |     | 30          | 30  | 30  | 30           | 30  | 30  | 30   | T    | T  |
|               |     |     |     |               |     |     |     |     | 30          | 30  | 30  | 30           | 30  | 30  | 30   | T    | T  |
|               |     |     |     |               |     |     |     |     |             | 30  | 30  | 30           | 30  | 30  | 30   | T    | T  |

| <br>Upstream<br>Downstream In (A)<br>Ii (kA) |      | NM8-125 S/H/R |    |    |    |    |    |    |    |     |     | NM8-250 S/H/R |     |     |     |
|---|------|---------------|----|----|----|----|----|----|----|-----|-----|---------------|-----|-----|-----|
|   |      | 16            | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 100           | 160 | 200 | 250 |
| NM8S-630 S/H/R  | 250  |               |    |    |    |    |    |    |    |     |     |               |     |     |     |
|   | 315  |               |    |    |    |    |    |    |    |     |     |               |     |     |     |
|   | 350  |               |    |    |    |    |    |    |    |     |     |               |     |     |     |
|   | 400  |               |    |    |    |    |    |    |    |     |     |               |     |     |     |
|   | 500  |               |    |    |    |    |    |    |    |     |     |               |     |     |     |
| NM8-800 S/H   | 630  |               |    |    |    |    |    |    |    |     |     |               |     |     |     |
|   | 700  |               |    |    |    |    |    |    |    |     |     |               |     |     |     |
|   | 800  |               |    |    |    |    |    |    |    |     |     |               |     |     |     |
| NM8S-800 S/H  | 630  |               |    |    |    |    |    |    |    |     |     |               |     |     |     |
|   | 700  |               |    |    |    |    |    |    |    |     |     |               |     |     |     |
|   | 800  |               |    |    |    |    |    |    |    |     |     |               |     |     |     |
| NM8-1250 S/H  | 630  |               |    |    |    |    |    |    |    |     |     |               |     |     |     |
|   | 700  |               |    |    |    |    |    |    |    |     |     |               |     |     |     |
|   | 800  |               |    |    |    |    |    |    |    |     |     |               |     |     |     |
|   | 1000 |               |    |    |    |    |    |    |    |     |     |               |     |     |     |
|   | 1250 |               |    |    |    |    |    |    |    |     |     |               |     |     |     |
| NM8S-1250 S/H   | 630  |               |    |    |    |    |    |    |    |     |     |               |     |     |     |
|   | 700  |               |    |    |    |    |    |    |    |     |     |               |     |     |     |
|   | 800  |               |    |    |    |    |    |    |    |     |     |               |     |     |     |
|   | 1000 |               |    |    |    |    |    |    |    |     |     |               |     |     |     |
|   | 1250 |               |    |    |    |    |    |    |    |     |     |               |     |     |     |

Upstream: NM8S-125~1250  
Downstream: NM8(S)-125~1250

| <br>Upstream<br>Downstream In (A)<br>Ii (kA) |     | NM8S-125 S/H |     |     | NM8S-250 S/H |     |     |     | NM8S-400 S/H/R |     |     |     |
|---|-----|--------------|-----|-----|--------------|-----|-----|-----|----------------|-----|-----|-----|
|   |     | 40           | 100 | 125 | 100          | 160 | 200 | 250 | 250            | 315 | 350 | 400 |
| NM8-125 S   | 16  |              | 1.2 | 1.2 | 1.2          | T   | T   | T   | T              | T   | T   | T   |
|   | 20  |              | 1.2 | 1.2 | 1.2          | T   | T   | T   | T              | T   | T   | T   |
|   | 25  |              | 1.2 | 1.2 | 1.2          | T   | T   | T   | T              | T   | T   | T   |
|   | 32  |              | 1.2 | 1.2 | 1.2          | T   | T   | T   | T              | T   | T   | T   |
|   | 40  |              | 1.2 | 1.2 | 1.2          | T   | T   | T   | T              | T   | T   | T   |
|   | 50  |              | 1.2 | 1.2 | 1.2          | T   | T   | T   | T              | T   | T   | T   |
|   | 63  |              |     | 1.2 | 1.2          | T   | T   | T   | T              | T   | T   | T   |
|   | 80  |              |     |     |              | T   | T   | T   | T              | T   | T   | T   |
|   | 100 |              |     |     |              |     | T   | T   | T              | T   | T   | T   |
|   | 125 |              |     |     |              |     |     | T   | T              | T   | T   | T   |
| NM8-125 H/R   | 16  |              | 1.2 | 1.2 | 1.2          | T   | T   | T   | T              | T   | T   | T   |
|   | 20  |              | 1.2 | 1.2 | 1.2          | T   | T   | T   | T              | T   | T   | T   |
|   | 25  |              | 1.2 | 1.2 | 1.2          | T   | T   | T   | T              | T   | T   | T   |
|   | 32  |              | 1.2 | 1.2 | 1.2          | T   | T   | T   | T              | T   | T   | T   |
|   | 40  |              | 1.2 | 1.2 | 1.2          | T   | T   | T   | T              | T   | T   | T   |
|   | 50  |              | 1.2 | 1.2 | 1.2          | 2   | 36  | 36  | T              | T   | T   | T   |
|   | 63  |              |     | 1.2 | 1.2          | 2   | 36  | 36  | T              | T   | T   | T   |
|   | 80  |              |     |     |              | 2   | 36  | 36  | T              | T   | T   | T   |
|   | 100 |              |     |     |              |     |     | 36  | T              | T   | T   | T   |
|   | 125 |              |     |     |              |     |     | 36  | T              | T   | T   | T   |
| NM8S-125 S/H  | 40  |              | 1.2 | 1.2 | 2            | 2   | T   | T   | T              | T   | T   | T   |
|   | 100 |              |     |     |              | 2   | T   | T   | T              | T   | T   | T   |
|   | 125 |              |     |     |              |     |     | T   | T              | T   | T   | T   |

| NM8-400 S/H/R |     |     |     | NM8-630 S/H/R |     |     |     |     | NM8-800 S/H |     |     | NM8-1250 S/H |     |     |      |      |
|---------------|-----|-----|-----|---------------|-----|-----|-----|-----|-------------|-----|-----|--------------|-----|-----|------|------|
| 250           | 315 | 350 | 400 | 250           | 315 | 350 | 400 | 500 | 630         | 700 | 800 | 630          | 700 | 800 | 1000 | 1250 |
|               |     |     |     |               |     |     | 8   | 8   | 12          | 12  | 12  | 12           | 12  | 12  | 15   | 15   |
|               |     |     |     |               |     |     |     | 8   | 12          | 12  | 12  | 12           | 12  | 12  | 15   | 15   |
|               |     |     |     |               |     |     |     |     | 12          | 12  | 12  | 12           | 12  | 12  | 15   | 15   |
|               |     |     |     |               |     |     |     |     | 12          | 12  | 12  | 12           | 12  | 12  | 15   | 15   |
|               |     |     |     |               |     |     |     |     |             | 12  | 12  | 12           | 12  | 12  | 15   | 15   |
|               |     |     |     |               |     |     |     |     |             |     | 12  |              |     | 12  | 15   | 15   |
|               |     |     |     |               |     |     |     |     |             |     |     |              |     |     | 15   | 15   |
|               |     |     |     |               |     |     |     |     |             |     |     |              |     |     |      |      |
|               |     |     |     |               |     |     |     |     |             |     |     |              |     |     | 15   | 15   |
|               |     |     |     |               |     |     |     |     |             |     |     |              |     |     |      |      |
|               |     |     |     |               |     |     |     |     |             |     |     |              |     |     | 15   | 15   |
|               |     |     |     |               |     |     |     |     |             |     |     |              |     |     |      |      |
|               |     |     |     |               |     |     |     |     |             |     |     |              |     |     |      |      |
|               |     |     |     |               |     |     |     |     |             |     |     |              |     |     |      |      |
|               |     |     |     |               |     |     |     |     |             |     |     |              |     |     |      |      |
|               |     |     |     |               |     |     |     |     |             |     |     |              |     |     |      |      |
|               |     |     |     |               |     |     |     |     |             |     |     |              |     |     |      |      |
|               |     |     |     |               |     |     |     |     |             |     |     |              |     |     |      |      |
|               |     |     |     |               |     |     |     |     |             |     |     |              |     |     |      |      |

| NM8S-630 S/H/R |     |     |     |     |     | NM8S-800 S/H |     |     | NM8S-1250 S/H |     |     |      |      |
|----------------|-----|-----|-----|-----|-----|--------------|-----|-----|---------------|-----|-----|------|------|
| 250            | 315 | 350 | 400 | 500 | 630 | 630          | 700 | 800 | 630           | 700 | 800 | 1000 | 1250 |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |
| T              | T   | T   | T   | T   | T   | 50           | 50  | 50  | 50            | 50  | 50  | T    | T    |

|                |      | NM8S-125 S/H |     |     | NM8S-250 S/H |     |     |     | NM8S-400 S/H/R |     |     |     |
|----------------|------|--------------|-----|-----|--------------|-----|-----|-----|----------------|-----|-----|-----|
|                |      | 40           | 100 | 125 | 100          | 160 | 200 | 250 | 250            | 315 | 350 | 400 |
|                | 40   |              | 1.2 | 1.2 | 2            | 2   | T   | T   | T              | T   | T   | T   |
|                | 100  |              |     |     |              | 2   | T   | T   | T              | T   | T   | T   |
|                | 125  |              |     |     |              |     |     | T   | T              | T   | T   | T   |
| NM8-250 S      | 100  |              |     |     |              |     |     | 3   | 5              | 5   | 5   | 5   |
|                | 160  |              |     |     |              |     |     |     |                | 5   | 5   |     |
|                | 200  |              |     |     |              |     |     |     |                |     |     |     |
|                | 250  |              |     |     |              |     |     |     |                |     |     |     |
| NM8-250 H/R    | 100  |              |     |     |              |     |     | 3   | 5              | 5   | 5   | 5   |
|                | 160  |              |     |     |              |     |     |     |                | 5   | 5   |     |
|                | 200  |              |     |     |              |     |     |     |                |     |     |     |
|                | 250  |              |     |     |              |     |     |     |                |     |     |     |
| NM8S-250 S/H   | 100  |              |     |     |              |     |     | 5   | 5              | 5   | 5   | 5   |
|                | 160  |              |     |     |              |     |     | 5   | 5              | 5   | 5   | 5   |
|                | 200  |              |     |     |              |     |     |     |                | 5   | 5   |     |
|                | 250  |              |     |     |              |     |     |     |                |     | 5   |     |
| NM8-400 S/H/R  | 250  |              |     |     |              |     |     |     |                |     |     |     |
|                | 315  |              |     |     |              |     |     |     |                |     |     |     |
|                | 350  |              |     |     |              |     |     |     |                |     |     |     |
|                | 400  |              |     |     |              |     |     |     |                |     |     |     |
| NM8S-400 S/H/R | 250  |              |     |     |              |     |     |     |                |     |     |     |
|                | 315  |              |     |     |              |     |     |     |                |     |     |     |
|                | 350  |              |     |     |              |     |     |     |                |     |     |     |
|                | 400  |              |     |     |              |     |     |     |                |     |     |     |
| NM8-630 S/H/R  | 250  |              |     |     |              |     |     |     |                |     |     |     |
|                | 315  |              |     |     |              |     |     |     |                |     |     |     |
|                | 350  |              |     |     |              |     |     |     |                |     |     |     |
|                | 400  |              |     |     |              |     |     |     |                |     |     |     |
|                | 500  |              |     |     |              |     |     |     |                |     |     |     |
| NM8S-630 S/H/R | 250  |              |     |     |              |     |     |     |                |     |     |     |
|                | 315  |              |     |     |              |     |     |     |                |     |     |     |
|                | 350  |              |     |     |              |     |     |     |                |     |     |     |
|                | 400  |              |     |     |              |     |     |     |                |     |     |     |
|                | 500  |              |     |     |              |     |     |     |                |     |     |     |
| NM8-800 S/H    | 630  |              |     |     |              |     |     |     |                |     |     |     |
|                | 700  |              |     |     |              |     |     |     |                |     |     |     |
|                | 800  |              |     |     |              |     |     |     |                |     |     |     |
| NM8S-800 S/H   | 630  |              |     |     |              |     |     |     |                |     |     |     |
|                | 700  |              |     |     |              |     |     |     |                |     |     |     |
|                | 800  |              |     |     |              |     |     |     |                |     |     |     |
| NM8-1250 S/H   | 630  |              |     |     |              |     |     |     |                |     |     |     |
|                | 700  |              |     |     |              |     |     |     |                |     |     |     |
|                | 800  |              |     |     |              |     |     |     |                |     |     |     |
|                | 1000 |              |     |     |              |     |     |     |                |     |     |     |
|                | 1250 |              |     |     |              |     |     |     |                |     |     |     |
| NM8S-1250 S/H  | 630  |              |     |     |              |     |     |     |                |     |     |     |
|                | 700  |              |     |     |              |     |     |     |                |     |     |     |
|                | 800  |              |     |     |              |     |     |     |                |     |     |     |
|                | 1000 |              |     |     |              |     |     |     |                |     |     |     |
|                | 1250 |              |     |     |              |     |     |     |                |     |     |     |

Note:

- a. The area with T indication clarifies total protection discrimination between upstream and downstream circuit breakers;
- b. The area with numbers clarifies partial protection discrimination between upstream and downstream circuit breakers;
- c. For partial protection discrimination, the Max. fault current values to ensure time discrimination performance are given in the table; when fault current exceeds this value, upstream and downstream circuit breakers may operate at the same time.



| NM8S-630 S/H/R |     |     |     |     |     | NM8S-800 S/H |     |     | NM8S-1250 S/H |     |     |      |      |
|----------------|-----|-----|-----|-----|-----|--------------|-----|-----|---------------|-----|-----|------|------|
| 250            | 315 | 350 | 400 | 500 | 630 | 630          | 700 | 800 | 630           | 700 | 800 | 1000 | 1250 |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
|                |     |     | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
|                |     |     |     | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
|                |     |     |     |     | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | 40           | 40  | 40  | 40            | 40  | 40  | T    | T    |
|                |     |     | T   | T   | T   | 40           | 40  | 40  | 40            | 40  | 40  | T    | T    |
|                |     |     |     | T   | T   | 40           | 40  | 40  | 40            | 40  | 40  | T    | T    |
|                |     |     |     |     | T   | 40           | 40  | 40  | 40            | 40  | 40  | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
| T              | T   | T   | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
|                |     |     | T   | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
|                |     |     |     | T   | T   | T            | T   | T   | T             | T   | T   | T    | T    |
|                |     |     | 8   | 8   | 8   | 30           | 30  | 30  | 30            | 30  | 30  | T    | T    |
|                |     |     |     | 8   | 8   | 30           | 30  | 30  | 30            | 30  | 30  | T    | T    |
|                |     |     |     |     | 8   | 30           | 30  | 30  | 30            | 30  | 30  | T    | T    |
|                |     |     |     |     | 8   | 30           | 30  | 30  | 30            | 30  | 30  | T    | T    |
|                |     |     | 8   | 8   | 8   | 12           | 12  | 12  | 12            | 12  | 12  | 15   | 15   |
|                |     |     |     | 8   | 8   | 12           | 12  | 12  | 12            | 12  | 12  | 15   | 15   |
|                |     |     |     |     | 8   | 12           | 12  | 12  | 12            | 12  | 12  | 15   | 15   |
|                |     |     |     |     | 8   | 12           | 12  | 12  | 12            | 12  | 12  | 15   | 15   |
|                |     |     |     | 8   | 8   | 30           | 30  | 30  | 30            | 30  | 30  | T    | T    |
|                |     |     |     | 8   | 8   | 30           | 30  | 30  | 30            | 30  | 30  | T    | T    |
|                |     |     |     |     | 8   | 30           | 30  | 30  | 30            | 30  | 30  | T    | T    |
|                |     |     |     |     | 8   | 30           | 30  | 30  | 30            | 30  | 30  | T    | T    |
|                |     |     |     |     |     |              | 30  | 30  |               | 30  | 30  | T    | T    |
|                |     |     |     | 8   | 8   | 12           | 12  | 12  | 12            | 12  | 12  | 15   | 15   |
|                |     |     |     | 8   | 8   | 12           | 12  | 12  | 12            | 12  | 12  | 15   | 15   |
|                |     |     |     |     | 8   | 12           | 12  | 12  | 12            | 12  | 12  | 15   | 15   |
|                |     |     |     |     |     |              | 12  | 12  | 12            | 12  | 12  | 15   | 15   |
|                |     |     |     |     |     |              |     | 12  |               |     | 12  | 15   | 15   |
|                |     |     |     |     |     |              |     |     |               |     |     | 20   | 20   |
|                |     |     |     |     |     |              |     |     |               |     |     |      |      |
|                |     |     |     |     |     |              |     |     |               |     |     | 15   | 15   |
|                |     |     |     |     |     |              |     |     |               |     |     |      |      |
|                |     |     |     |     |     |              |     |     |               |     |     | 20   | 20   |
|                |     |     |     |     |     |              |     |     |               |     |     |      |      |
|                |     |     |     |     |     |              |     |     |               |     |     |      |      |
|                |     |     |     |     |     |              |     |     |               |     |     | 15   | 15   |
|                |     |     |     |     |     |              |     |     |               |     |     |      |      |
|                |     |     |     |     |     |              |     |     |               |     |     |      |      |

10.7 Selection table of components for motor control or protection  
 400V, 50kA, type2, MCCB normal load start-up

| Motor parameters |                   | Circuit breaker parameters |                                    | Contactor parameters |                           | Thermal relay parameters |                   |
|------------------|-------------------|----------------------------|------------------------------------|----------------------|---------------------------|--------------------------|-------------------|
| Rated power (kW) | Rated current (A) | Model                      | Setting of magnetic protection (A) | Model                | Rated heating current (A) | Model                    | Rated current (A) |
| 5.5              | 10.9              | NM8-125S/16M               | 192                                | NC1-12               | 20                        | NR2-25                   | 9~13              |
| 7.5              | 14.4              | NM8-125S/20M               | 240                                | NC1-18               | 32                        | NR2-25                   | 12~18             |
| 11               | 20.9              | NM8-125S/25M               | 300                                | NC1-25               | 40                        | NR2-25                   | 17~25             |
| 15               | 28                | NM8-125S/32M               | 384                                | NC1-32               | 50                        | NR2-36                   | 23~32             |
| 18.5             | 34.1              | NM8-125S/40M               | 480                                | NC1-40               | 60                        | NR2-36                   | 28~36             |
| 22               | 39.4              | NM8-125S/50M               | 600                                | NC1-50               | 80                        | NR2-93                   | 30~40             |
| 30               | 53.4              | NM8-125S/63M               | 756                                | NC1-65               | 80                        | NR2-93                   | 48~65             |
| 37               | 67.9              | NM8-125S/80M               | 960                                | NC1-80               | 110                       | NR2-93                   | 55~70             |
| 45               | 80.5              | NM8-125S/100M              | 1200                               | NC1-95               | 110                       | NR2-93                   | 80~93             |
| 55               | 98.5              | NM8-125S/125M              | 1500                               | NC2-115              | 200                       | NR2-200                  | 80~125            |
| 75               | 133               | NM8-250S/160M              | 1920                               | NC2-150              | 200                       | NR2-200                  | 100~160           |
| 90               | 158.7             | NM8-250S/200M              | 2400                               | NC2-185              | 275                       | NR2-200                  | 100~160           |
| 110              | 192               | NM8-250S/250M              | 3000                               | NC2-225              | 275                       | NR2-200                  | 125~200           |
| 132              | 229               | NM8-400S/315M              | 3780                               | NC2-265              | 315                       | NR2-630                  | 160~250           |
| 160              | 275               | NM8-400S/350M              | 4200                               | NC2-330              | 380                       | NR2-630                  | 200~315           |
| 200              | 343               | NM8-400S/400M              | 4800                               | NC2-400              | 450                       | NR2-630                  | 250~400           |
| 250              | 445               | NM8-630S/500M              | 6000                               | NC2-500              | 630                       | NR2-630                  | 315~500           |
| 290              | 520               | NM8S-630S/630M             | 7560                               | NC2-630              | 800                       | NR2-630                  | 400~630           |
| 315              | 560               | NM8S-630S/630M             | 7560                               | NC2-630              | 800                       | NR2-630                  | 400~630           |

Note:

1. NM8 and NM8S breakers can replace each other with the same capacity in the table above .
2. NRE8 electronic relays and NR2 thermal relays can replace each other with the same capacity in the table above.

400V, 50kA, type2, MCCB heavy-load start-up

| Motor parameters |                   | Circuit breaker parameters |                                    | Contactor parameters |                           | Thermal relay parameters |                   |
|------------------|-------------------|----------------------------|------------------------------------|----------------------|---------------------------|--------------------------|-------------------|
| Rated power (kW) | Rated current (A) | Model                      | Setting of magnetic protection (A) | Model                | Rated heating current (A) | Model                    | Rated current (A) |
| 5.5              | 10.9              | NM8-125S/16M               | 192                                | NC1-18               | 32                        | NR2-25                   | 9~13              |
| 7.5              | 14.4              | NM8-125S/20M               | 240                                | NC1-25               | 40                        | NR2-25                   | 12~18             |
| 11               | 20.9              | NM8-125S/25M               | 300                                | NC1-32               | 50                        | NR2-25                   | 17~25             |
| 15               | 28                | NM8-125S/32M               | 384                                | NC1-40               | 60                        | NR2-36                   | 23~32             |
| 18.5             | 34.1              | NM8-125S/40M               | 480                                | NC1-50               | 80                        | NR2-36                   | 28~36             |
| 22               | 39.4              | NM8-125S/50M               | 600                                | NC1-65               | 80                        | NR2-93                   | 30~40             |
| 30               | 53.4              | NM8-125S/63M               | 756                                | NC1-80               | 110                       | NR2-93                   | 48~65             |
| 37               | 67.9              | NM8-125S/80M               | 960                                | NC1-95               | 110                       | NR2-93                   | 55~70             |
| 45               | 80.5              | NM8-125S/100M              | 1200                               | NC2-115              | 200                       | NR2-93                   | 80~93             |
| 55               | 98.5              | NM8-125S/125M              | 1500                               | NC2-150              | 200                       | NR2-200                  | 80~125            |
| 75               | 133               | NM8-250S/160M              | 1920                               | NC2-185              | 275                       | NR2-200                  | 100~160           |
| 90               | 158.7             | NM8-250S/200M              | 2400                               | NC2-225              | 275                       | NR2-200                  | 100~160           |
| 110              | 192               | NM8-250S/250M              | 3000                               | NC2-265              | 315                       | NR2-200                  | 125~200           |
| 132              | 229               | NM8-400S/315M              | 3780                               | NC2-330              | 380                       | NR2-630                  | 160~250           |
| 160              | 275               | NM8-400S/350M              | 4200                               | NC2-400              | 450                       | NR2-630                  | 200~315           |
| 200              | 343               | NM8-400S/400M              | 4800                               | NC2-500              | 630                       | NR2-630                  | 250~400           |
| 250              | 445               | NM8-630S/500M              | 6000                               | NC2-630              | 800                       | NR2-630                  | 315~500           |
| 290              | 520               | NM8S-630S/630M             | 7560                               | NC2-630              | 800                       | NR2-630                  | 400~630           |

Note:

1. NM8 and NM8S breakers can replace each other with the same capacity in the table above .
2. NRE8 electronic relays and NR2 thermal relays can replace each other with the same capacity in the table above.

400V, 50kA, type2, MCCB star-delta start-up

| Motor parameters |                   | Circuit breaker parameters |                                    | Contactor parameters |                 |                | Thermal relay parameters |                   |
|------------------|-------------------|----------------------------|------------------------------------|----------------------|-----------------|----------------|--------------------------|-------------------|
| Rated power (kW) | Rated current (A) | Model                      | Setting of magnetic protection (A) | Feedback contactor   | Delta contactor | Star contactor | Model                    | Rated current (A) |
| 5.5              | 10.9              | NM8-125S/16M               | 192                                | NC1-09               | NC1-09          | NC1-09         | NR2-11.5                 | 5.5~8             |
| 7.5              | 14.4              | NM8-125S/20M               | 240                                | NC1-12               | NC1-12          | NC1-09         | NR2-11.5                 | 7~10              |
| 11               | 20.9              | NM8-125S/25M               | 300                                | NC1-18               | NC1-18          | NC1-09         | NR2-25                   | 9~13              |
| 15               | 28                | NM8-125S/32M               | 384                                | NC1-25               | NC1-25          | NC1-12         | NR2-25                   | 12~18             |
| 18.5             | 34.1              | NM8-125S/40M               | 480                                | NC1-25               | NC1-25          | NC1-18         | NR2-25                   | 17~25             |
| 22               | 39.4              | NM8-125S/50M               | 600                                | NC1-32               | NC1-32          | NC1-18         | NR2-36                   | 23~32             |
| 30               | 53.4              | NM8-125S/63M               | 756                                | NC1-40               | NC1-40          | NC1-25         | NR2-36                   | 28~36             |
| 37               | 67.9              | NM8-125S/80M               | 960                                | NC1-50               | NC1-50          | NC1-32         | NR2-93                   | 30~40             |
| 45               | 80.5              | NM8-125S/100M              | 1200                               | NC1-65               | NC1-65          | NC1-32         | NR2-93                   | 37~50             |
| 55               | 98.5              | NM8-125S/125M              | 1500                               | NC1-80               | NC1-80          | NC1-40         | NR2-93                   | 48~65             |
| 75               | 133               | NM8-250S/160M              | 1920                               | NC1-95               | NC1-95          | NC1-50         | NR2-93                   | 63~80             |
| 90               | 158.7             | NM8-250S/200M              | 2400                               | NC2-115              | NC2-115         | NC2-65         | NR2-93                   | 80~93             |
| 110              | 192               | NM8-250S/250M              | 3000                               | NC2-150              | NC2-150         | NC2-80         | NR2-200                  | 80~125            |
| 132              | 229               | NM8-400S/315M              | 3780                               | NC2-150              | NC2-150         | NC2-95         | NR2-200                  | 80~125            |
| 160              | 275               | NM8-400S/350M              | 4200                               | NC2-185              | NC2-185         | NC2-115        | NR2-200                  | 100~160           |
| 200              | 343               | NM8-400S/400M              | 4800                               | NC2-225              | NC2-225         | NC2-150        | NR2-200                  | 125~200           |
| 250              | 445               | NM8-630S/500M              | 6000                               | NC2-330              | NC2-330         | NC2-185        | NR2-630                  | 200~315           |
| 290              | 520               | NM8S-630S/630M             | 7560                               | NC2-400              | NC2-400         | NC2-185        | NR2-630                  | 200~315           |
| 315              | 560               | NM8S-630S/630M             | 7560                               | NC2-400              | NC2-400         | NC2-225        | NR2-630                  | 250~400           |

Note:

1. NM8 and NM8S breakers can replace each other with the same capacity in the table above .
2. NRE8 electronic relays and NR2 thermal relays can replace each other with the same capacity in the table above.
3. Breaker is at the power supply side
4. In the delta connection circuit of thermal relay, the setting value is 0.58Ie;
5. The max. start-up time is 20s;
6. When Star type connection is changed into delta connection, the following connection modes of motor are recommended: L1, U1 to V2; L2, V1 to W2; L3, W1 to U2 to lower the impulse current;
7. The interval of star type connection changing into delta connection is 0.1s.