1. Application

HSM2E series Intelligent Molded Case Circuit Breakers (MCCB in brief hereinafter) are suitably applied in AC 50Hz electric grids with rated insulation voltage 800V, rated working voltage 400V, rated current 32A ~ 800A for electric power distribution and for infrequent switchover under normal conditions as well as for protection of circuits and equipment against overload, short circuit and undervoltage.

Apart from three-stage protection, the back up protection with short circuit instantaneous feature in magnetic trip, make the product more reliable.

The installation mode of the MCCB may be both vertical and horizontal.

The MCCB can not reverse wiring, NO.1, NO.3 and NO.5 for power supply, NO.2, NO.4 and NO.6 for the load.

The MCCB has isolated function with a corresponding symbol of

The MCCB complies with standards:
- IEC 60947-1 and GB 14048.1
- IEC 60947-2 and GB 14048.2
- IEC 60947-4-1 and GB 14048.4

2. The MCCB works competently under the following working conditions:

2.1 Installation location not over an altitude of 2000 meters above sea level.

2.2 Ambient temperature
- a. Not higher than +40 °C, not less than -5 °C
- b. The average temperature of 24h is not more than 35 °C.

2.3 Atmosphere condition
- Relative humidity not over 50% at an ambient temperature of +40 °C, yet higher humidity is permissible at lower temperature, e.g. 90% at 20 °C.

Particular measures should be taken to deal with the condensation due to temperature changes.

2.4 Pollution grade
- Pollution grade: 3.

2.5 Installation category:
- Installation category: III

2.6 Installation mode of the MCCB
- The installation mode of the MCCB may be both vertical and horizontal.

3. Classification

3.1 In term of application: a. Distribution protection, b. Motor protection

3.2 In term of pole number: a--3 pole, b--4 pole

3.3 In term of operation mode: a--Direct handle, b--Motor_driven(code:D), c--External rotary handle(code: Z)

3.4 In term of connection mode:
- a--Front wiring(code:Q), b--Rear wiring(code: H)
4. Type and meaning

- **Operation mode:**
  - Direct handle operation: Blank
  - Motor operation: D
  - External rotating handle operation: Z

- **Application code:**
  - Distribution protection: Blank
  - Motor protection: 2

- **Accessories code:**
  - Shown in Table 3

5. Main performances and indexes of MCCB

The main performances and indexes of MCCB are shown in Table 1.

<table>
<thead>
<tr>
<th>Type and Inm</th>
<th>HSM2E-100</th>
<th>HSM2E-250</th>
<th>HSM2E-400</th>
<th>HSM2E-800</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated current In(A)</td>
<td>32</td>
<td>63</td>
<td>100</td>
<td>250</td>
</tr>
<tr>
<td>Long_delay protection for overload Ir1(A)</td>
<td>16,20</td>
<td>32,35</td>
<td>50,55</td>
<td>60,63</td>
</tr>
<tr>
<td>Rated working voltage Ue(V)</td>
<td>400</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated insulation voltage Uli(V)</td>
<td>800</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uimp(V)</td>
<td>8000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poles</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Icu (kA)</td>
<td>AC400V</td>
<td>50</td>
<td>50</td>
<td>65</td>
</tr>
<tr>
<td>Ics (kA)</td>
<td>AC400V</td>
<td>35</td>
<td>35</td>
<td>42</td>
</tr>
<tr>
<td>Icw (kA).1s</td>
<td>—</td>
<td>5</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Usage class</td>
<td>A</td>
<td>A</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>Flashover distance(mm)</td>
<td>&lt;50</td>
<td>&lt;100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Endurance With load</td>
<td>8000</td>
<td>8000</td>
<td>7500</td>
<td>7500</td>
</tr>
<tr>
<td>No load With maintenance</td>
<td>20000</td>
<td>20000</td>
<td>10000</td>
<td>10000</td>
</tr>
<tr>
<td>With maintenance</td>
<td>400000</td>
<td>400000</td>
<td>200000</td>
<td>200000</td>
</tr>
<tr>
<td>Overall dimensions (mm)</td>
<td>W</td>
<td>92</td>
<td>122</td>
<td>167</td>
</tr>
<tr>
<td>L</td>
<td>150</td>
<td>165</td>
<td>257</td>
<td>280</td>
</tr>
<tr>
<td>H</td>
<td>92</td>
<td>90</td>
<td>106.5</td>
<td>115.5</td>
</tr>
</tbody>
</table>
6. The main characteristics of electronic release

6.1 Selectivity coordination: The MCCB have 3-stage protection. The breaker of B-usage class can realize selectivity coordination with other breaker, which connected in the same circuit in short-circuit condition.

6.2 The protection current and delay-time value can be adjusted on the spot.

6.3 Self powered: The release can be supplied by the breaker itself, without external power supply.

6.4 Have pre-warning indicator: When the current reaches or exceeds Ir0, the pre-warning light is lighted. This light is yellow.

6.5 Overload indication: When the current reaches or exceeds Ir1, the red light will be lighted.

6.6 Instantaneous tripping function of short-circuit current.

6.7 Characteristics of electronic release, shown in Table 2.

<table>
<thead>
<tr>
<th>Current</th>
<th>Tripping time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.05Ir1</td>
<td>Not acting within 2 hour</td>
</tr>
<tr>
<td>1.3Ir1</td>
<td>&lt;2h</td>
</tr>
</tbody>
</table>

Distribution protection

<table>
<thead>
<tr>
<th>Current</th>
<th>Setting time t1(s)</th>
<th>Acting time T1(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2Ir1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current</th>
<th>Setting time t1(s)</th>
<th>Acting time T1(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2Ir1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.2Ir1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Motor protection

<table>
<thead>
<tr>
<th>Current</th>
<th>Inverse time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.05Ir1</td>
<td></td>
</tr>
<tr>
<td>1.2Ir1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current</th>
<th>Definite time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5Ir1</td>
<td>Setting time t2(s)</td>
</tr>
<tr>
<td>2Ir1</td>
<td>Tolerance (s)</td>
</tr>
<tr>
<td></td>
<td>Returnable time (s)</td>
</tr>
</tbody>
</table>

Table 2

<table>
<thead>
<tr>
<th>Short circuit short time delay trip</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>Ir2 ≤ i &lt; 1.5Ir2</td>
</tr>
<tr>
<td>1.5Ir2 ≤ i &lt; Ir3</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Note: Acting time tolerance of inverse: ±15%
6.8 HSM2E has 3-stage protection, i.e., overload shut off in long time delay, short circuit breaking in short time delay and short circuit breaking instantaneously, and further more, the protected current and time may be set.

![Graph showing protection stages](image)

**Figure 1**

- **Acting current**
  - Acting current of long-time: $2\times I_{r1}$
  - Acting time of long-time: 20%
  - Acting current of short-time delay: $I_{r2}$ ± 10%
  - Acting time of short-time delay: $(2-12)I_{r1}$
  - Instantaneous acting current: $I_{r3}$
  - Maximum instantaneous action time: $0.06 \pm 0.02$ seconds

7. Structure introduction

7.1 The electronic release of HSM2E-100/32A is shown in Figure 2 and Figure 3

![Diagram of electronic release](image)

**Figure 2**

![Characteristics curves for MCCB](image)

**Figure 3**

The characteristic curves for MCCB
7.2 The electronic release of HSM2E-100/63A is shown in Figure 4 and Figure 5.

7.3 The electronic release of HSM2E-100/100A is shown in Figure 6 and Figure 7.

7.4 The electronic release of HSM2E-250 is shown in Figure 8 and Figure 9.

7.5 The electronic release of HSM2E-400 is shown in Figure 10 and Figure 11.

7.6 The electronic release of HSM2E-630 is shown in Figure 12 and Figure 13.
7.7 The electronic release of HSM2E-800 is shown in Figure 14 and Figure 15.

Figure 14

![Characteristic curves for MCCB](image)

7.8 Overload long-time delay action current-Ir1 adjustment range depending on the frame current: 4–10 levels

7.9 Overload long-time delay action time-tr1 adjustment range: 4 levels

7.10 Short-time delay action current-Ir2 adjustment range: 10 levels

7.11 Short-time delay action time-t2 adjustment range: 4 levels

7.12 Instantaneous action current-I3 adjustment range: 8–10 levels

7.13 Adjustment range of pre-warning action current: 7 levels

8. Release pattern and accessories code

![Release pattern and accessories code](image)

Table 3

<table>
<thead>
<tr>
<th>Accessories name</th>
<th>Accessories code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm contact</td>
<td>308</td>
</tr>
<tr>
<td>Shunt release</td>
<td>310</td>
</tr>
<tr>
<td>Auxiliary contact</td>
<td>320</td>
</tr>
<tr>
<td>Under-voltage release</td>
<td>330</td>
</tr>
<tr>
<td>Shunt release + Auxiliary contact</td>
<td>340</td>
</tr>
<tr>
<td>Two group of auxiliary contact</td>
<td>360</td>
</tr>
<tr>
<td>Auxiliary contact + Under-voltage release</td>
<td>370</td>
</tr>
<tr>
<td>Shunt release + Alarm contact</td>
<td>318</td>
</tr>
<tr>
<td>Auxiliary contact + Alarm contact</td>
<td>328</td>
</tr>
<tr>
<td>Under-voltage release + Alarm contact</td>
<td>338</td>
</tr>
<tr>
<td>Shunt release + Alarm contact + auxiliary contact</td>
<td>348</td>
</tr>
<tr>
<td>Two group of auxiliary contact + Alarm contact</td>
<td>368</td>
</tr>
<tr>
<td>Under-voltage + Alarm contact + auxiliary contact</td>
<td>378</td>
</tr>
</tbody>
</table>

Note: For HSM2E-400, code 328 only have one pair of auxiliary contact (a normal opened, a normal closed)
9. Rotary operating handle mechanism

![Illustration of a rotary operating handle mechanism.]

<table>
<thead>
<tr>
<th>Code</th>
<th>HSM2E - 100</th>
<th>HSM2E - 250</th>
<th>HSM2E - 400</th>
<th>HSM2E - 630</th>
<th>HSM2E - 800</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation size H (mm)</td>
<td>49</td>
<td>55</td>
<td>74</td>
<td>68</td>
<td>66</td>
</tr>
</tbody>
</table>

10. Motor-driven operating Mechanism

CD4 type Motor-driven operating mechanism

CD4 type motor-driven operating mechanism is a new series mechanism specially developed and coordinated for HSM2E MCCBs. With a permanent magnetic DC motor, it can drive the MCCB for closing, opening and reset (re-latch) operations, featuring compact structure, smaller volume, easy installation, reliable operation, DC or AC powered, wide range control circuit voltage, low working current among others. It can also indicate closed open and trip status of MCCB.

Wiring diagram of the mechanism
(wiring diagram of external accessories of MCCB in dotted lines)

Symbolic description:
SB1, SB2: Operation button (Self-prepared by users)
X: Connection terminal
P1, P2: External power supply
### 11. Overall dimensions and installation dimensions

11.1 Overall, installation and opening piercing dimensions for HSM2E-100 panel front wiring shown in Figure 17

Note: The 22mm width of the terminal shall be increased on the left or right side of the breaker, when equipped with accessory.

Figure 17
11.2 Overall, installation and opening piercing dimensions for HSM2E-100 wiring on back of the board be shown in Figure 18

Note: The 22mm width of the terminal shall be increased on the left or right side of the breaker, when equipped with accessory.

11.3 Overall, installation and opening piercing dimensions for HSM2E-100 plug-in panel rear wiring shown in Figure 19

Note: The 22mm width of the terminal shall be increased on the left or right side of the breaker, when equipped with accessory.
11.4 Overall, installation and opening piercing dimensions for HSM2E-250 panel front wiring shown in Figure 20

Note: The 22mm width of the terminal shall be increased on the left or right side of the breaker, when equipped with accessory.

Figure 20

11.5 Overall, installation and opening piercing dimensions for HSM2E-250 wiring on back of the board be shown in Figure 21

Note: The 22mm width of the terminal shall be increased on the left or right side of the breaker, when equipped with accessory.

Figure 21
11.6 Overall, installation and opening piercing dimensions for HSM2E-250 plug-in panel rear wiring shown in Figure 22

![Diagram of HSM2E-250 rear wiring](image1.png)

Aperture dimensions

Note: The 22mm width of the terminal shall be increased on the left or right side of the breaker, when equipped with accessory.

Figure 22

11.7 Overall, installation and opening piercing dimensions for HSM2E-400 panel front wiring shown in Figure 23

![Diagram of HSM2E-400 front wiring](image2.png)

Aperture dimensions

Note: The 22mm width of the terminal shall be increased on the left or right side of the breaker, when equipped with accessory.

Figure 23
11.8 Overall, installation and opening piercing dimensions for HSM2E-400 wiring on back of the board be shown in Figure 24

![Figure 24](image)

Aperture dimensions

Note: The 22mm width of the terminal shall be increased on the left or right side of the breaker, when equipped with accessory.

11.9 Overall, installation and opening piercing dimensions for HSM2E-400 plug-in panel rear wiring shown in Figure 25

![Figure 25](image)

Aperture dimensions

Note: The 22mm width of the terminal shall be increased on the left or right side of the breaker, when equipped with accessory.
11.10 Overall, installation and opening piercing dimensions for HSM2E-800 panel front wiring shown in Figure 26

![Diagram of installation and opening piercing dimensions for HSM2E-800 panel front wiring.]

Note: The 22mm width of the terminal shall be increased on the left or right side of the breaker, when equipped with accessory.

Figure 26

11.11 Overall, installation and opening piercing dimensions for HSM2E-800 wiring on back of the board be shown in Figure 27

![Diagram of installation and opening piercing dimensions for HSM2E-800 wiring on back of the board.]

Note: The 22mm width of the terminal shall be increased on the left or right side of the breaker, when equipped with accessory.

Figure 27
11.12 Overall installation and opening piercing dimensions for HSM2E-800 plug-in panel rear wiring shown in Figure 28

**Dimension of external link plate**

- **Link plate for HSM2E-100/3P**
  - 39
  - 39
  - 46
  - 30
  - 30
  - 4

- **Link plate for HSM2E-100/4P**
  - 36
  - 36
  - 36
  - 30
  - 30
  - 4

- **Link plate for HSM2E-250**
  - 45
  - 45
  - 45
  - 20
  - 20
  - 12.5

- **Link plate for HSM2E-400/3P**
  - 54.5
  - 54.5
  - 54.5
  - 44
  - 44
  - 70

Note: The 22mm width of the terminal shall be increased on the left or right side of the breaker, when equipped with accessory.
12. Information needed for ordering

When ordering, following information should be given:

1. Type and name of MCCB
2. Rated current of trip
3. Set current of trip
4. Name, specification and combination code of accessory devices
5. Wiring mode: No note for panel front wiring. Other kinds of wiring such as panel rear wiring, plug-in, withdrawable, horizontal and vertical wiring at panel rear should be noted.
6. Quantity

For example:

If you want to order 10 sets of 4-pole HSM2E-100 MCCBs with shunt release (AC400V) and one auxiliary contact, and rated current is 100A, you may write as:

HSM2E-100/100A 4340 AC400V shunt release, Quantity 10.
### 13. Order Form

1) Customers must confirm that detailed knowledge of the product technical information has been learned. Then as per actual operation application, order product as per the Ordering specification sheet;

2) If there is no special requirement in protection parameter, the manufacture will set a normal way. The setting value are:
   \[ I_{r1} = 1 \times I_n, I_{r2} = 8 I_{r1}, I_{r3} = 10 I_{r1}, t_{1} = 60s, t_{2} = 0.3s, I_{ro} = 1 \times I_{r1} \]

### Order Form

(Please filled figure in \( \square \) or sign \( \checkmark \) in \( \square \))

<table>
<thead>
<tr>
<th>Client</th>
<th>Quantity</th>
<th>Type</th>
<th>Rating current In</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>HSM2(\text{2E})</td>
<td>32A (\square) 63A (\square) 100A (\square)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>HSM2(\text{E}) - 250</td>
<td>250A (\square)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>HSM2(\text{E}) - 400</td>
<td>400A (\square)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>HSM2(\text{E}) - 800</td>
<td>630A (\square) 800A (\square)</td>
<td></td>
</tr>
</tbody>
</table>

**Rated current In**

<table>
<thead>
<tr>
<th>Performance</th>
<th>Panel front (\square)</th>
<th>Panel rear (\square)</th>
<th>Plug-in panel front (\square)</th>
<th>Plug-in panel rear (\square)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under-voltage trip</td>
<td>AC230V (\square), AC400V (\square), DC220V (\square)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shunt trip</td>
<td>AC230V (\square), AC400V (\square), DC220V (\square), DC110V (\square)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor-driven operating mechanism</td>
<td>AC230V (\square), AC400V (\square)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotary operating mechanism</td>
<td>A type (\square) B type (\square)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Panel front link plate</td>
<td>(\square)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:**