	L1(mm)	L2(mm)
1P+N 32A	27	45
1P+N 63A	36	54
2P 32A	27	63
2P 63A	36	72
3P 32A	54	108
3P 63A	63	117
3P+N 32A	54	108
3P+N 63A	63	117
4P 32A	54	126
4P 63A	63	135

Fig. 2

Installation, use and maintenance

● Installation and use

(1)Check whether the technical parameters on the nameplate conform to use conditions.
(2)Before it is electrified, you should operate the RCBO for several times to check flexibility, reliability of the mechanism as well as no jam.
(3)The input terminal should be connected to power side and the output should be connected to load side.
(4)Cross-sectional area of conductor refers to Table 3.

Table 3 Cross-sectional area and rated current of conductor

Rated current, A	6	10	16、20	25	32	40、50	63
Cross-sectional area of conductor, mm^2	1	1.5	2.5	4	6	10	16

(5) After it is electrified, you should operate the test button of RCBO for several times to check whether the mechanism can work reliably.
(6) Indicating ON when move handle upwards, means the circuit is connecting; indicating OFF when move handle downwards, means the circuit is disconnecting.
(7) You should fasten the RCBO into the rail without loosening and falling off when installation; and just pull out the fastening part when remove the RCBO intendedly.
(8) The reference working temperature of RCBO is +30 $^{+5}_{0}$ ℃, and the relevant rated values should be corrected once ambient temperature

current and temperature; the temperature in the cabinet could be higher accordingly and the rated current should be multiplied by the capacity-reducing factor of 0.8, if several RCBOs are installed in one sealed cabinet.

Table 4 Table of correction factor rated current and temperature

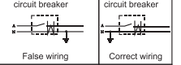
Temp (℃) / Rated Current (A)	-5	0	10	20	30	40
6	6.98	6.84	6.57	6.29	6	5.69
10	12.24	11.95	11.34	10.69	10	9.26
16	18.77	18.35	17.60	16.82	16	15.13
20	23.23	22.80	21.91	20.98	20	18.97
25	29.12	28.57	27.43	26.24	25	23.69
32	37.16	36.49	35.05	33.56	32	30.36
40	47.14	45.77	43.93	42.01	40	37.88
50	59.10	57.43	55.06	52.59	50	47.27
63	74.76	73.17	69.94	66.56	63	59.22

● Maintanance

After the RCBO is operated for period of time, it should go through a regular check on a monthly basis. The check will be conducted as follows: under the status of electrified (i.e. making), press test button to check whether the RCBO is working reliably. If not, should stop using and replace immediately.Troubleshooting

Troubleshooting of RCBO refers to Table 5.

Table 5 Troubleshooting

Failure		Causion	Solution
Mis-operation	Mis-operation arose from earthing of zero line at load side of residual current circuit breaker	The earthing of zero line at load side of residual current circuit breaker will cause mis-operation due to normal operation current escaping through earthing point. Residual current circuit breaker  False wiring	Connect earthing line to zero line at power side of residual current circuit breaker Residual current circuit breaker Correct wiring
	Mis-operation arose from residual current and conductor to capacitance current	The wiring of conductor closing to ground at load side is too long.	Replace residual current circuit breaker with larger residual operating current
		Residual current to ground is increased due to insulation of conductor at load side is decreased.	Replace conductor.
Operation rejecting	Operation rejecting arose from residual current circuit breaker not connecting to zero line	The power side of residual current circuit breaker only connects to the upper phase conductor but not to zero line.	Connect to zero line at power side.

Unpacking inspection

After opening the box, the user must check whether the product is intact, whether there is rust on the exposed metal parts, and whether there is any defect that may be caused by improper transportation or storage. Once any of the aforesaid phenomena is found, the product cannot be used, please contact the supplier in a timely manner to solve.

HIMEL
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HDB9LE

Residual Current Circuit Breaker with Overcurrent Protection (RCBO)

User Manual

Applicable Standard: IEC 61009-1
□ Please carefully read the user manual before the installation and use of the products, and then keep it properly as backup.

Safety Notice

Please read this Instruction for Use before installation, operation, running, maintenance and inspection, as well as install and use this product correctly according to the contents contained in this Instruction for Use.

Danger:

- Never operate circuit breakers with wet hands.
- Never touch conducting parts during use.
- Ensure products are not electrified during maintenance.
- Never test products in the method of short circuit.

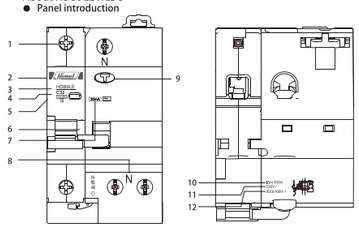
Caution:

- Only the operator with professional competence is allowed to carry out maintenance and installation.
- The characteristics of product have been set before ex-work, and no furtive disassembly and adjustment is allowed during product use.
- Please verify whether the working voltage, rated current, frequency and characteristics of product is in accordance with the operation requirements.
- When you're making wiring, the lead-in conductor should be connected from the top and the lead-out conductor should be connected from the bottom; attention should be paid to phase sequence while you're making wiring for multi-phase circuit. Insert conductor into terminal post, fasten the binding screw with torque moment larger than 2.0 N • m. No loosening can be detected and no conductor can be pulled out, as well as the bare copper conductor can't be exposed out of terminal post.
- This product will not provide protection to the electric shocking arose from touching two conductors of protective circuit.
- The protection level of this product is IP20 without function of anti -dust. Please install in well-sealed terminal cabinet when it is used in a dusty environment.
- Should stop use and contact supplier immediately if any damage or abnormal noise is found to the product after unpacking.
- Should switch on only after failure removed once this product is under breaking, overcurrent or short-circuit current, otherwise the

lifetime of the product will be affected.
- Insulation resistance megameter can't be used to test the insulation resistance between two phases of product's electrified circuit board.
- This product should be prevented from raining and falling down during use or storage and transportation.
- Please properly handle industrial wastes after the product is disused. Thanks for your cooperation.

About HDB9LE RCBO

● Panel introduction



Designation:

1 Terminal post (input) 2 Brand logo 3 Product model
4 Tripping curve and rated current (see Table 1) 5 Breaking capacity
6 Contact indication
7 Rated residual operating current (mA): 30, 100, 300
and alternative current mark 8 Terminal post (output)
9 Test button 10 Rated residual making/breaking capacity
11 Rated voltage and frequency (see Table 1) 12 Applied standard

Conditions of normal use, installation and transportation:

● Conditions of normal use and installation

(1)Ambient temperature
The limited ambient temperature shall be -5℃ ~ +40℃, as well as the average temperature within 24 hrs. should not exceed +35℃.
Note: You should discuss with manufacturer before use if the RCBO will be used in the environment with ambient temperature is higher than +40℃ or lower than -5℃.
(2) Altitude
The altitude of installation place should not exceed 2000 m;
(3) Atmosphere
The relative humidity should not exceed 50% under the maximum temperature of +40℃; the relative humidity is allowed to increase while under lower temperature, for instance 90% for temperature +20℃, and specific action should be taken for condensation which may happen when temperature varies.
(4) Installation
The external magnetic field around the installation site of RCBO should not exceed 5 times of geomagnetic field in any direction. Installation position should be uprightness and gradient should not exceed 10° in any direction.
Equipments should be installed in the place without shocking, vibration as well as rain & snow.
Adopt TH35-7.5 DIN rail to install.
(5)Pollution level: Level 2
(6)Installation category : III
(7)Protection level: IP20 (IP40, if installed in distribution cabinet or distribution box).

● Conditions for normal storage and transportation

(1)-25℃~ +55℃
(2)Relative humidity（at 25℃）: ≤95%;
(3)The product should be handled properly, no upside down and should avoid violent collision.

Main Technical Data

Table 1 Main technical data

Model	Pole No.	Added neutral conductor	Frequency Hz	Rated current In, A	Rated voltage Un, V	Rated short-circuit breaking capacity, Icn, A	Rated residual operating current, I△n, mA	Rated residual non-operating current, I△no, mA	Breaking time at I△n, s	Rated residual making/ breaking capacity I△m, A	Type of overcurrent instantaneous release
HDB9LE	1	N	50	6 10 16 20 25 32 40 50 63	230 400	6000	30 100 300	15 50 150	＜0.1	630	C
	2										
	3										
	3	N									
	4										

Protection characteristics of over current release refer to Table 2.

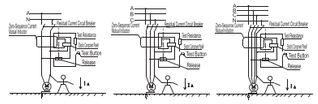
Table 2 Protection characteristics of over current release

Type of overcurrent instantaneous release	In A Rated current, In, A	Test current, A	Initial state	Test time	Estimated result	Remark	Reference temp.
C	≤ 63	1.13In	Cold	t≤1h	No tripping	——	+30 $^{+5}_{0}$ ℃
C		1.45In	Immediately following test	t＜1h	Tripping	Current rises to set value within 5s	
C		2.55In	Cold	1h＜t≤120s（In≤32A） 1h＜t≤120s（In＞32A）	Tripping	——	
C		5In	Cold	t≤0.1s	No tripping	Switch off auxiliary switch and switch on power supply	
C		10In	Cold	t＜0.1s	Tripping	Switch off auxiliary switch and switch on power supply	

● Operation cycles of M&E service life is 4000 times, of which 2000 times for load operation.

Structure Characteristics and working principle

This RCBO consists of the zero-sequence current mutual inductor, the electric components panel, the release, the contact operating mechanism and the plastic case etc.
The working principle refers to Fig. 1.Once there is leakage or electric shocking to human, as long as the residual operating current reaching the set value of operating current, the secondary coil of zero-sequence current mutual inductor will generate a signal (inducting voltage), after amplified by electric circuit, such signal will enable RCBO to cut off the power supply and delivering protection of leakage.



a) One pole with neutral conductor Two poles and two conductors b) Three poles c) Three poles and four conductors four poles and four conductors

Fig. 1 Diagram of RCBO working principle

Overall dimensions of installation