Overall dimensions of installation

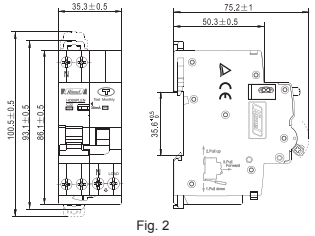


Fig. 2

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 t 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
Cross-sectional area of conductor mm²	1	1.5	2.5	4	6	10

(5) After it is electrified, you should operate the test button of RCBO for several time 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 varies, whcih may refer to te Table 4 Table of correction factor of rated 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 of rated current and temperature

Temp (℃) / Rated Current (A)	-25	-20	-10	0	10	20	30	40	50	60	70
6	7.47	7.35	7.10	6.84	6.57	6.29	6	5.69	5.37	5.02	4.65
10	13.33	13.06	12.51	11.93	11.34	10.68	10	9.27	8.47	7.59	6.60
16	19.96	19.64	18.97	17.55	17.06	16.79	16	15.16	14.28	13.33	12.31
20	24.68	24.30	23.50	22.67	21.83	20.94	20	18.99	17.97	16.87	15.71
25	31.06	30.56	29.53	28.47	27.36	26.20	25	23.73	22.38	20.95	19.4
32	39.16	38.63	37.41	36.15	34.79	33.42	32	30.50	28.91	27.20	25.39
40	49.06	48.32	46.78	45.17	43.53	41.8	40	38.11	36.12	34.00	31.73

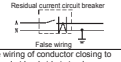
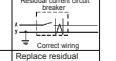
● Maintanance

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 4.

Troubleshooting of RCBO refers to Table 4.

Failure	Cause	Solution
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. 	Connect earthing line to zero line at power side of residual current circuit breaker 
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.

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Nov. 2013

HDB9PLE

Residual Current Circuit Breaker with Overcurrent Protection (RCBO)

User Manual

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

Himel
The Right Choice!

Safety Notice

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

⚠Danger:

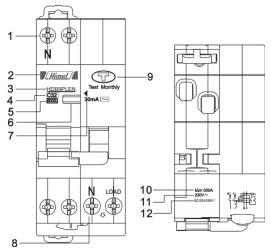
- Never operate circuit breaker with wet hands.
- Never touch conducting part during operation.
- Ensure product is not electrified during maintenance.
- Never test product through method of short circuit.

⚠Caution:

- Only the operator with professional competence is allowed to maintain and install this product.
- The characteristics of product have been set before ex-work, and no private 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 working requirements.
- Should make insulation treatment to naked conductor and copper busbar at terminal port in order to prevent phase-to-phase short circuit.
- Should stop use and contact supplier immediately if any damage or abnormal noise is found to the product after unpacking.
- Please properly handle industrial wastes after the product is disused. Thanks for your cooperation.

About HDB9PLE RCBO

● Panel introduction



Designation:

1 Terminal post 2 Brand logo
3 Product type (HDB9PLEN Icn=6000A, HDB9PLEa Icn=4500A)
4 Tripping curve and rated current (refer to Table 1)
5 Breaking capacity 6 Contact indication
7 Rated residual operating current 8 Terminal post (output)
9 Test button 10 Rated residual making/ breaking capacity
11 Rated voltage (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 -25℃~+70℃, 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 +70℃ or lower than -25℃.
(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) Insrallation
The exrernal magnetic field around the installation site of RCBO shoule not exceed 5 times of geomagnetic field in any direction. Installation position should be uprightness and gradient should not exceed 10° in any direction.
Adopt TH35-7.5 DIN rail to install.
(5) Pollution level: Level 2
(6) Installation category: Ⅲ
(7) Protection level: IP20 (IP40, if insralled in distribution cabinet or distribution box).

● Conditions for normal storage and transportation

(1) -40℃~+85℃
(2) Relative humidity (at 25℃): ≤95%;
(3) The product shoule be handled properly, no upside down and should avoid violent collision.

Main Technical Data

Main technical data refers to Table 1

Table 1 Main technical data

Type	Pole Nr.	Rated Current In A	Rated Voltage Ue 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△mA	Type of overcurrent instantaneous release
HDB9PLEN	1P+N	6 10 16 20 25 32 40	240	6000	10 30 100	5 15 50	<0.1	500	C
HDB9PLEa	1P+N	6 10 16 20 25 32 40	240	4500	30 100	15 50	<0.1	500	C

Protection characteristics of over current release refer to Table 2.

Table 2 Protection characteristics of over current release

Test procedure	Type of overcurrent instantaneous release	Test current, A	Initial state	Test time	Estimated resule	Remark	Reference temp.
a	C	1.13In	Cold	t<1h	No tripping	——	+30℃
b		1.45In	Immediately following test	t<1h	Tripping	Current rises to set value within 5s	
c		2.55In	Cold	1s<t<60s(for In<=32A) 5s<t<120s(for In>32A)	Tripping	——	
d		5In	Cold	t<0.1s	Tripping	Switch off auxiliary switch and switch on power supply	
e		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 zero-sequence current mutual transformer, 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 electriv circuit, such signal will enable RCBO to cut off the power supply and delivering protection of leakage.

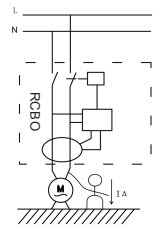


Fig. 1 Diagram of RCBO working principle