

**PRODUCT MANUAL FOR
RESIDUAL CURRENT OPERATED CIRCUIT BREAKERS WITH
INTEGRAL OVERCURRENT PROTECTION FOR HOUSEHOLD
AND SIMILAR USES (RCBOs)
ACCORDING TO IS 12640(Part 2):2016/IEC 61009-1:2012**

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification licence/certificate.

1.	Product	:	IS 12640(Part 2):2016/IEC 61009-1:2012
	Title	:	Residual Current Operated Circuit Breakers With Integral Overcurrent Protection for Household & Similar Uses (RCBOs)
	No. of Amendments	:	3
2.	Sampling Guidelines:		
a)	Raw material	:	-
b)	Grouping guidelines	:	Each and every rating of RCBO is to be tested for GOL and Inclusion.
c)	Sample Size	:	15 Nos.
3.	List of Test Equipment	:	Please refer ANNEX – A .
4.	Scheme of Inspection and Testing	:	Please refer ANNEX – B .
5.	Possible tests in a day :	:	Please refer ANNEX – C .
6.	Scope of the Licence :		
	“Licence is granted to use Standard Mark as per IS 12640(Part 2):2016/IEC 61009-1 with the following scope:”		
	Name of the product	Residual Current Operated Circuit Breakers With Integral Overcurrent Protection for Household & Similar Uses(RCBO)	
	Classification	As applicable according to IS 12640(Part 2):2016/IEC 61009-1:2012	

ANNEX A**List Of Test Equipment***Major test equipment required to test as per the Indian Standard*

S. No.	Test Equipment	Tests used in with Clause Reference
1.	28 Day Test Panel	Cl. 9.8, Cl. 9.22.2
2.	Endurance Panel	Cl. 9.10
3.	HV Test Panel	Cl. 9.7.2, Cl. 9.7.3, Cl. 9.7.7.3
4.	Leakage Current Test	Cl. 9.7.7.3
5.	Glow Wire Test	Cl. 9.14
6.	Climatic Chamber	Cl. 9.7.1, Cl. 9.13, 9.22.1
7.	Data logger & thermometer for temperature measurement	Cl. 9.8, Cl. 9.22.2, Cl. 9.9.3, Cl. 9.9.4
8.	Digital Multi meter	Cl. 9.8, Cl. 9.16
9.	AC/DC Clamp Meter	Cl. 9.8, Cl. 9.9, Cl. 9.10
10.	Insulation Tester	Cl. 9.7.2
11.	RCBO Test Panel – D0 sequence	Cl. 8.5

The above list is indicative only and may not be treated as exhaustive.

ANNEX B

Scheme Of Inspection And Testing

1. LABORATORY- A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

1.1 The manufacturer shall prepare a calibration plan for the test equipment.

2. TEST RECORDS - The manufacturer shall maintain test records for the tests carried out to establish conformity.

3. LABELLING AND MARKING - As per the requirements of IS 12640 (PART 2):2016/ IEC 61009-1:2012. In addition, each RCBO or the carton in which the RCBOs are packed shall carry the identification mark in code or otherwise for traceability.

4. CONTROL UNIT - All the RCBOs of the same fundamental design manufactured in a shift shall constitute a control unit.

5. LEVELS OF CONTROL - The tests as indicated in column 1 of Table 1 and the levels of control in column 3 of Table 1, shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

6. REJECTIONS - Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016

TABLE 1

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or) S: Sub-contracting permitted	Levels of Control		
Cl.	Requirement	Test Methods			No. of Sample	Frequency	Remarks
		Clause	Reference				
9.1.3	Routine Tests						
D.2	Tripping test	D.2	IS 12640 (Part 2)	R	Each Piece	—	RCBOs which fail in any of the routine test shall not be marked. A separate record of such failures shall be maintained with adequate traceability.
D.3	Electric Strength Test	D.3	IS 12640 (Part 2)	R	Each Piece	—	
D.4	Performance of the test device	D.4	IS 12640 (Part 2)	R	Each Piece	—	
Test Sequence A							
6	Marking (except indelibility of marking)	6	IS 12640 (Part 2)	R	One	Every Control Unit	For compliance to tests as per Cl. 9.12.12.1 & Cl.9.12.12.2 the frequency of once in five years on RCBOs of the same fundamental design shall be applicable
8.1.1	Mechanical Design (General)	8.1.1	IS 12640 (Part 2)	R	One		
8.1.2	Mechanical Design (Mechanism)	8.1.2	IS 12640 (Part 2)	R/S (for Cl. 9.11)	One		
6	Indelibility of marking	6,9.3	IS 12640 (Part 2)	R	One	Once in six months on RCBOs of the same fundamental design	—
8.1.3	Clearance & creepage distances (external parts)	8.1.3, 9.7.7.4.1, 9.7.7.4.2	IS 12640 (Part 2)	R	One		

TABLE 1

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or) S: Sub-contracting permitted	Levels of Control		
Cl.	Requirement	Test Methods			No. of Sample	Frequency	Remarks
		Clause	Reference				
8.1.6	Non-interchangeability	8.1.6	IS 12640(Part 2)	R	One	Once in six months on RCBOs of the same fundamental design	
8.1.2	Trip-free mechanism	8.1.2,9.11	IS 12640 (Part 2)	R	One		
8.1.4	Reliability of Screws, current-carrying parts and connections	8.1.4, 9.25, 9.4	IS 12640 (Part 2)	R	One		
8.1.5	Reliability of Terminals for external conductors	8.1.5, 9.4 & 9.5, Annex-J,K or L	IS 12640 (Part 2)	R	One		
8.2	Protection against electric shock	8.2, 9.6	IS 12640 (Part 2)	R	One		
8.9	Resistance to heat	8.9, 9.14	IS 12640 (Part 2)	S	One		
8.1.3	Clearance & Creepage distances (internal parts)	8.1.3, 9.7.7.4.1, 9.7.7.4.2	IS 12640 (Part 2)	R	One		
8.1.4.4	Resistance to rusting	8.1.4.4, 9.25	IS 12640 (Part 2)	S	One		
8.10	Resistance to abnormal heat and to fire	8.10, 9.15	IS 12640 (Part 2)	S	Three		

TABLE 1

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or) S: Sub-contracting permitted	Levels of Control		
Cl.	Requirement	Test Methods			No. of Sample	Frequency	Remarks
		Clause	Reference				
Test Sequence B							
8.1.3	Resistance of the insulation of open contacts and basic insulation against an impulse voltage in normal conditions	8.1.3, 9.7.7.4	IS 12640 (Part 2)	R	Three	Once in six months on RCBOs of the same fundamental design	—
9.7.7.5	Verification of the behavior of components bridging the basic insulation	9.7.7.5	IS 12640 (Part 2)	R	Three		
8.1.3, 8.3	Resistance to humidity	8.3, 9.7.1	IS 12640 (Part 2)	R	Three		
8.1.3, 8.3	Insulation resistance of the main circuit	8.3, 9.7.2	IS 12640 (Part 2)	R	Three		
8.1.3, 8.3	Dielectric Strength of the main circuit	8.3, 9.7.3	IS 12640 (Part 2)	R	Three		
8.1.3, 8.3	Insulation resistance and dielectric strength of auxiliary circuits	8.3, 9.7.4	IS 12640 (Part 2)	R	Three		
8.1.3, 8.3	Verification of clearances with the impulse withstand voltage	8.3, 9.7.7.2	IS 12640 (Part 2)	R	Three		

TABLE 1

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or) S: Sub-contracting permitted	Levels of Control		
Cl.	Requirement	Test Methods			No. of Sample	Frequency	Remarks
		Clause	Reference				
8.1.3, 8.3	Secondary circuit of detection transformers	8.3, 9.7.5	IS 12640 (Part 2)	R	Three	Once in six months on RCBOs of the same fundamental design	—
8.1.3, 8.3	Capability of control circuits connected to the main circuits	8.3, 9.7.6	IS 12640 (Part 2)	R	Three		
8.4	Temperature rise	8.4, 9.8	IS 12640 (Part 2)	R	Three		
8.16	Reliability at 40°C	8.16, 9.22.2	IS 12640 (Part 2)	R	Three	Once in a year on RCBOs of the same fundamental design	
8.16	Ageing of electronic components	8.16, 9.23	IS 12640 (Part 2)	R	Three		
Test Sequence C							
8.6	Mechanical and electrical endurance	8.6, 9.10	IS 12640 (Part 2)	R	Three	Once in a year on RCBOs of the same fundamental design	—
8.7	Performance at reduced short-circuit currents(Verification of the RCBO after the short circuit test)	8.7, 9.12.11.2.1, 9.12.12	IS 12640 (Part 2)	S	Three	Once in five years on RCBOs of the same fundamental design	

TABLE 1

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or) S: Sub-contracting permitted	Levels of Control		
Cl.	Requirement	Test Methods			No. of Sample	Frequency	Remarks
		Clause	Reference				
8.7	Short circuit test for verifying the suitability of RCBOs for use in IT systems (Verification of the RCBO after short circuit tests)	8.7, 9.12.11.2.2 9.12.12	IS 12640 (Part 2)	S	Three	Once in five years on RCBOs of the same fundamental design	—
Test Sequence D							
8.5, 8.15	Operating characteristics under Residual current conditions	8.5, 9.9.1	IS 12640 (Part 2)	R	Three	Once in six months on RCBOs of the same fundamental design	—
8.12	Behavior in the case of failure of line voltages	8.12, 9.17	IS 12640 (Part 2)	R	Three		
8.14	Behavior in case of surge currents	8.14, 9.19	IS 12640 (Part 2)	S	Three		
8.7	Performance at $I_{\Delta m}$	8.7, 9.12.13	IS 12640 (Part 2)	S	Three		
8.11	Test Device	8.11, 9.16	IS 12640 (Part 2)	R	Three		

TABLE 1

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or) S: Sub-contracting permitted	Levels of Control		
Cl.	Requirement	Test Methods			No. of Sample	Frequency	Remarks
		Clause	Reference				
Test Sequence E							
8.5.2	Overcurrent operating characteristics	8.5.2, 9.9.2	IS 12640 (Part 2)	S	Three	Once in five years on RCBOs of the same fundamental design	—
8.8	Resistance to mechanical shock and impact	8.8, 9.13	IS 12640 (Part 2)	R	Three	Once in a year on RCBOs of the same fundamental design	
8.7	Short-circuit performance at 1500A	9.12.11.3, 9.12.12	IS 12640 (Part 2)	S	Three	Once in five years on RCBOs of the same fundamental design	
Test Sequence F							
8.7	Performance at service short-circuit capacity	8.7, 9.12.11.4(b) 9.12.12	IS 12640 (Part 2)	S	Three	Once in five years on RCBOs of the same fundamental design	—
8.7	Performance at rated short-circuit capacity	8.7, 9.12.11.4(c) 9.12.12.2	IS 12640 (Part 2)	S	Three		

TABLE 1

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or) S: Sub-contracting permitted	Levels of Control		
Cl.	Requirement	Test Methods			No. of Sample	Frequency	Remarks
		Clause	Reference				
Test Sequence G							
8.16	Reliability (climatic test)	8.16, 9.22.1	IS 12640 (Part 2)	S	Three	Once in a year on RCBOs of the same fundamental design	—
Test Sequence H,I,J							
9.24	Electromagnetic Compatibility	9.24	IS 12640 (Part 2)	S	Three	Once in five years on RCBOs of the same fundamental design	—

Note-1: Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note-2: Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification for approval by BO Head.

ANNEX C

Possible Tests in a day

- Tripping Test
- Electric Strength Test
- Performance of the test device
- Indelibility of Marking
- Clearance & Creepage distance (only for item 1 & 3 of Table 7 of IS 12640(Part 2):2016)
- Trip free mechanism
- Reliability of screws, current carrying parts and connections
- Reliability of terminals for external conductors
- Protection against electric shock