

**PRODUCT MANUAL FOR
ELECTRICAL ACCESSORIES- CIRCUIT-BREAKERS FOR
OVERCURRENT PROTECTION FOR HOUSEHOLD AND SIMILAR
INSTALLATIONS- CIRCUIT BREAKERS FOR a.c. OPERATION
ACCORDING TO IS/IEC 60898-1:2015**

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.

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|----|--|--|--|
| 1. | Product | : | IS/IEC 60898-1:2015 |
| | Title | : | Electrical Accessories- Circuit-Breakers for Overcurrent Protection for Household and Similar Installations- Circuit Breakers for a.c. Operation |
| | No. of Amendments | : | 0 |
| 2. | Sampling Guidelines: | | |
| a) | Raw material | : | - |
| b) | Grouping guidelines | : | As per Annex-C of IS/IEC 60898-1:2015 |
| c) | Sample Size | : | As per Annex-C of IS/IEC 60898-1:2015 |
| 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/IEC 60898-1:2015 with the following scope:” | | |
| | Name of the product | Electrical Accessories- Circuit-Breakers for Overcurrent Protection for Household and Similar Installations- Circuit Breakers for a.c. Operation | |
| | Classification | As applicable according to Cl. 4 of IS/IEC 60898-1:2015 | |
| | Material Group | | |
| | Degree of Protection | | |

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. | Vernier Caliper | Cl. 8.1.3 |
| 2. | Screw driver/Spanner | Cl. 9.4, Cl. 9.5 |
| 3. | Standard Test Finger | Cl. 9.6 |
| 4. | Heating Cabinet, Ball & Pressure Test Apparatus | Cl. 9.14 |
| 5. | Glow Wire Test Apparatus | Cl. 9.15 |
| 6. | Humidity Chamber | Cl. 8.12 |
| 7. | Humidity Chamber, IR Tester, Impulse generator | Cl. 9.7 |
| 8. | Thermocouple | Cl. 9.8 |
| 9. | 28 day Test Apparatus | Cl. 9.9 |
| 10. | Endurance Test Apparatus | Cl. 9.11 |
| 11. | Grid Arrangement | Cl. 9.12 |
| 12. | Tripping Test Apparatus | Cl. 9.10 |
| 13. | Mechanical Shock & Impact Apparatus | Cl. 9.13 |

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/IEC 60898-1:2015. In addition, each Circuit Breaker shall carry the identification mark in code or otherwise to enable the date and control unit of manufacture to be traced back to factory records.

4. CONTROL UNIT - All the Circuit Breakers of the same fundamental design manufactured in a day 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 | | | | |
| Annex-I | Routine Tests | | | | | | |
| I.2 | Tripping test | I.2 | IS/IEC 60898-1 | R | Each Piece | — | — |
| I.3 | Verification of clearances between open contacts | I.3 | IS/IEC 60898-1 | R | Each Piece | | |
| Test Sequence A₁ | | | | | | | |
| 6 | Marking (except indelibility of marking) | 6 | IS/IEC 60898-1 | R | * | Every Control Unit | — |
| 8.1.1 | Mechanical Design (General) | 8.1.1 | IS/IEC 60898-1 | R | * | Every Control Unit | |
| 8.1.2 | Mechanical Design (Mechanism) | 8.1.2 | IS/IEC 60898-1 | R | * | Every Control Unit | |
| 6 | Indelibility of marking | 6,9.3 | IS/IEC 60898-1 | R | * | Once in six months on CBs of the same fundamental design | |
| 8.1.3 | Clearance & creepage distances (external parts) | 8.1.3, 9.7.2 to 9.7.4, 9.7.5.2, 9.7.5.4.1, 9.7.5.4.2 | IS/IEC 60898-1 | R | * | | |

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/IEC 60898-1 | R | * | Once in six months on CBs of the same fundamental design | — |
| 8.1.4 | Reliability of Screws, current-carrying parts and connections | 8.1.4, 9.4 | IS/IEC 60898-1 | R | * | | |
| 8.1.5 | Reliability of screw-type terminals for external conductors | 8.1.5, 9.4 & 9.5, Annex- J,K | IS/IEC 60898-1 | R | * | | |
| 8.2 | Protection against electric shock | 8.2, 9.6 | IS/IEC 60898-1 | R | * | | |
| 8.1.3 | Clearance & Creepage distances (internal parts) | 8.1.3, 9.7.2 to 9.7.4, 9.7.5.2, 9.7.5.4.1, 9.7.7.4.2 | IS/IEC 60898-1 | R | * | | |
| 8.10 | Resistance to Heat | 9.14 | IS/IEC 60898-1 | S | * | | |
| 8.12 | Resistance to rusting | 8.12, 9.16 | IS/IEC 60898-1 | S | * | | |
| Test Sequence A₂ | | | | | | | |
| 8.11 | Resistance to abnormal heat and to fire | 8.11, 9.15 | IS/IEC 60898-1 | S | * | Once in six months on CBs 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 | | | | |
| Test Sequence B | | | | | | | |
| 8.1.3 | Resistance of the insulation of open contacts and basic insulation against an impulse voltage in normal conditions | 9.7.5.4 | IS/IEC 60898-1 | S | * | Once in six months on CBs of the same fundamental design | — |
| 8.1.3, 8.3.2 | Resistance to humidity | 9.7.1 | IS/IEC 60898-1 | S | * | | |
| 8.1.3, 8.3.2 | Insulation resistance of the main circuit | 9.7.2 | IS/IEC 60898-1 | R | * | | |
| 8.1.3, 8.3.2 | Dielectric Strength of the main circuit | 9.7.3 | IS/IEC 60898-1 | R | * | | |
| 8.1.3 | Insulation resistance and dielectric strength of auxiliary circuits | 9.7.4 | IS/IEC 60898-1 | R | * | | |
| 8.1.3, 8.3.4 | Clearances with the impulse withstand voltage | 9.7.5.2 | IS/IEC 60898-1 | S | * | | |
| 8.1.3, 8.4 | Temperature Rise and Power Loss | 8.4, 9.8 | IS/IEC 60898-1 | S | * | | |
| 8.5 | 28- day Test | 8.5, 9.9 | IS/IEC 60898-1 | S | * | Once in three years on CBs 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 | | | | |
| Test Sequence C₁ | | | | | | | |
| 8.7 | Mechanical and electrical endurance | 8.7, 9.11 | IS/IEC 60898-1 | S | * | Once in a year on CBs of the same fundamental design | — |
| 9.12.11.2.1, 8.3.3 | Performance at reduced short-circuit currents | 9.12.11.2.1 | IS/IEC 60898-1 | S | * | Once in 5 years on CBs of the same fundamental design | |
| 9.12.12 | Verification of the circuit breaker after short-circuit tests | 9.12.12 | IS/IEC 60898-1 | S | * | | |
| Test Sequence C₂ | | | | | | | |
| 8.8, 8.3.3 | Suitability of Circuit Breakers for use in IT Systems | 9.12.11.2.2 | IS/IEC 60898-1 | S | * | Once in 5 years on CBs of the same fundamental design | — |
| 8.8 | Verification of circuit breaker after short-circuit tests | 9.12.12 | IS/IEC 60898-1 | S | * | | |

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 D₀ | | | | | | | |
| 8.6.2 | Tripping Characteristic | 9.10.2.1, 9.10.2.2 | IS/IEC 60898-1 | R | * | Daily for each type & rating | — |
| 8.6.3 | Tripping Characteristic | 9.10.3.2 to 9.10.3.4, 9.10.4 & 9.10.5 | IS/IEC 60898-1 | R | * | Once in a month on CBs of the same fundamental design | |
| 8.6 | Tripping Characteristic | 9.10.3.1 | IS/IEC 60898-1 | R | * | Once in six months on CBs of the same fundamental design | |
| Test Sequence D₁ | | | | | | | |
| 8.9, 8.1.7 | Resistance to mechanical shock & impact | 8.9, 9.13 | IS/IEC 60898-1 | S | * | Once in a year on CBs of the same fundamental design | — |
| 8.8, 8.3.3 | Short-circuit performance at 1500 A | 9.12.11.3 | IS/IEC 60898-1 | S | *^ | Once in 5 years on CBs of the same fundamental design | |
| 8.8, 8.3.3 | Verification of circuit breaker after short circuit tests | 9.12.12 | IS/IEC 60898-1 | S | * | | |

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 E₁ | | | | | | | |
| 8.8, 8.3.3 | Service short-circuit capacity (I_{cs}) | 9.12.11.4.2 | IS/IEC 60898-1 | S | * | Once in 5 years on CBs of the same fundamental design | — |
| 8.8, 8.3.3 | Verification of circuit-breaker after short-circuit tests | 9.12.12 | IS/IEC 60898-1 | S | * | | |
| Test Sequence E₂ | | | | | | | |
| 8.8, 8.3.3 | Performance at rated short circuit capacity (I_{cn}) | 9.12.11.4.3 | IS/IEC 60898-1 | S | * | Once in 5 years on CBs of the same fundamental design | — |
| 8.8, 8.3.3 | Verification of circuit-breaker after short-circuit tests | 9.12.12 | IS/IEC 60898-1 | S | * | | |
| Test Sequence E₃ | | | | | | | |
| 8.8, 8.3.3 | Performance at rated making & breaking capacity (I_{cn1}) on an individual pole of multi pole circuit breakers | 9.12.11.4.4, 9.12.12 | IS/IEC 60898-1 | S | * | Once in 5 years on CBs of the same fundamental design | — |

* The number of samples for these tests shall be as given in Table C.2, C.3 & C.4 of IS/IEC 60898-1 as applicable

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 (Cl. I.2 of Annex-I of IS/IEC 60898-1)
- Verification of clearances between open contacts (I.3 of Annex-I of IS/IEC 60898-1)
- Tests as per Test Sequence A₁ and A₂ of Table C.1 of Annexure-C of IS/IEC 60898-1
- Verification of clearances with the impulse withstand voltage (Cl. 9.7.5 – Sequence B of Table C.1 of Annex-C of IS/IEC 60898-1)
- Temperature Rise (Cl. 9.8 – Sequence B of Table C.1 of Annex-C of IS/IEC 60898-1)
- Tripping Characteristic (Cl. 9.10.2.1 & Cl. 9.10.2.2 – Sequence D0 of Table C.1 of Annex-C of IS/IEC 60898-1)
- Resistance to Mechanical Shock and Impact (Cl. 9.13 – Sequence D1 of Table C.1 of Annex-C of IS/IEC 60898-1)