



उत्पाद मैनुअल
आई एस/आई इ सी 60947-2 : 2016 के अनुसार
निम्न- वोल्टेज के स्विचगियर और नियंत्रणगियर भाग 2
परिपथ-वियोजक (पहला पुनरीक्षण) के लिए
दस्तावेज संख्या – पीएम/आईएस/ आई इ सी 60947-2 /1/ अगस्त 2023
भारतीय मानक ब्यूरो की स्कीम-X (अनुरूपता मूल्यांकन) विनियम, 2018 के तहत यह उत्पाद
मैनुअल प्रमाणीकरण के प्रचालन में रीति और पारिश्रिता की सुसंगतता सुनिश्चित करने के लिए सभी
क्षेत्रीय/शाखा कार्यालयों और लाइसेंसी द्वारा संदर्भ सामग्री के रूप में उपयोग किया जाएगा।
बीआईएस प्रमाणीकरण लाइसेंस/ प्रमाणपत्र प्राप्त करने के इच्छुक भावी आवेदकों द्वारा भी इस
दस्तावेज का उपयोग किया जा सकता है।

PRODUCT MANUAL FOR
Low-Voltage Switchgear and Controlgear
Part 2 Circuit-Breakers (First Revision)
ACCORDING TO IS/IEC 60947-2: 2016
Document No - PM/IS/ IEC 60947-2 /1/August 2023
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-X 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 60947-2 : 2016
	Title	:	Low-Voltage Switchgear and Controlgear Part 2 Circuit-Breakers (First Revision)
	No. of Amendments	:	1
2.	Grouping guidelines	:	Please refer ANNEX – A
3.	Processing of application	:	As per CMD circular CMD-I/2:17:1 dated 02 June 2023
4.	Technical File	:	Please refer ANNEX – B
5.	Product Compliance Report	:	As per Cl. 4 of CMD circular CMD-I/2:17:1 dated 02 June 2023
6.	Labelling and Marking Requirements	:	Please refer ANNEX – C
7.	Scope of the License	:	As per table placed below

Scope of Licence

“Licence is granted to use Standard Mark as per IS/IEC 60947-2 : 2016 with the following scope:”	
Name of the product:	Low-Voltage Switchgear and Controlgear Part 2 Circuit-Breakers
Model No.	
Rated Voltages (Cl. 4.3.2)	Rated operational voltage (U_e) Rated insulation voltage (U_i) Rated impulse withstand voltage (U_{imp})
Rated Currents (Cl. 4.3.3)	Conventional free-air thermal current (I_{th}) Conventional enclosed thermal current (I_{the}) Rated current (I_n) Current rating for circuit-breakers (I_{cs} , I_{cu})
Rated Frequency (Cl. 4.3.4)	
Rated duty (Cl. 4.3.5)	1) eight-hour duty; 2) uninterrupted duty
Selectivity (Cl. 4.4)	1) Category type, A; 2) Category type, B
Interrupting Medium (Cl. 3.2)	1) Air-break 2) Vacuum break 3) Gas-break 4) Any other variety (as per declaration of firm)
Method of installation (Cl. 3.7)	1) Fixed 2) Plug-in 3) Withdrawable 4) Any other variety (as per declaration of firm)
Method of controlling the operating mechanism (Operation) (Cl. 3.4)	1) Dependent manual 2) Independent manual 3) Dependent power 4) Independent Power 5) Stored Energy
Design / Construction Type (Cl. 3.3)	1) Open construction 2) Moulded case 3) Any other variety (as per declaration of firm)
Suitability for isolation (Cl. 3.5)	1) Suitable for isolation 2) Not suitable for isolation

Provision for maintenance (Cl. 3.6)	1) Maintainable 2) Non-maintainable
Type of Releases (Cl. 4.7)	1) shunt release; 2) over-current release: a) instantaneous; b) definite time delay; c) inverse time delay – independent of previous load; – dependent on previous load 3) undervoltage release (for opening); 4) closing releases; 5) other releases.
Type of Supply (ac / dc) (Cl. 4.2)	1) Single Phase AC 2) Three phase AC 3) Direct Current
Number of Pole (Cl. 4.2)	One Pole / Two Pole/ Three Pole/ Four Pole
Pollution Degree (Cl. 6)	Pollution Degree 1/ Pollution Degree 2/ Pollution Degree 3/ Pollution Degree 4
Control Circuits (Cl. 4.5)	1) Electrical control circuits 2) Air-supply control circuits (pneumatic or electro-pneumatic)
Auxiliary circuits (Cl. 4.6)	(To be declared by the firm)
Integral fuses (Cl. 4.8)	With / without integrally fused circuit-breakers
Degree of Protection (Cl. 3.8)	(To be declared by the firm)

ANNEX A**Grouping Guidelines**

(As per Gazette Notification F. No. 8(1)/2018-HEI-Part(1) dated 09th May 2023)

1. Product Series of circuit-breaker(s)-

1.1 A group of circuit breakers having a common frame size¹ used for a range of current ratings with a unique combination of feature(s) under classification mention in Table at Annexure-I subjected to allowable construction break ².

1.2 For each product series type test report, a circuit breaker with maximum current rating and maximum features satisfying all operational performance criteria shall be tested. The test and number of sample(s) must be in accordance with the clause 8.3, Table 9, 9a and Table 10 of IS/IEC 60947-2: 2016.

1.3 Type tests are grouped together in a number of sequences, the test shall be done as per sequence and applicability defined in clause 8.3 and Table 9 of IS/IEC 60947-2 :2016..

Note- 1) For each sequence, tests shall be made in the order listed unless otherwise specified in the IS/IEC 60947-2:2016.

2)Spares, accessories and sub-assemblies are integral part of product series. They shall be tested as far as possible with the equipment. (Spares and sub-assemblies being the integral part of the device, separate testing is not envisaged; Accessories may please be used while testing. Any one of the representative test voltages can be used for accessory.)

2. List of allowable construction breaks (as per clause 7.1.6 of IS/IEC 60947-2:2016)

¹ **Frame size (as per clause 2.1.1 of IS/IEC 60947-2:2016)** - a term designating a group of circuit-breakers, the external physical dimensions of which are common to a range of current ratings.

Note 1 to entry: Frame size is expressed in amperes corresponding to the highest current rating of the group.

Note 2 to entry: Within a frame size, the width OR height may vary according to the number of poles OR types of termination e.g. spreader links, prepared conductors, unprepared conductors, phase separators.

Note 3 to entry: This definition does not imply dimensional standardization.

² **Construction Break (as per clause 2.2.1 of IS/IEC 60947-2:2016)**- a significant difference in construction between circuit-breakers of a given frame size, requiring additional type testing.

2.1 Circuit-breakers of a given frame size are considered to have a construction break, if any one of the following features are not the same:

- i. material, finish and dimensions of internal current-carrying parts, admitting, however, the variations listed in a), b), c), f) and g) below;
- ii. size, material, configuration and method of attachment of the main contacts;
- iii. any integral manual operating mechanism, its materials and physical characteristics;
- iv. moulding and insulating materials;
- v. the principle of operation, materials and construction of the arc extinction device;
- vi. the principle of operation, materials and construction of the arc extinction device;
- vii. the basic design of the over-current tripping devices, admitting, however, the variations detailed in a), b) and c) below.

Variations in the following do not constitute a construction break:

- a) dimensions of terminals, provided that creepage and clearance distances are not reduced;
- b) in the case of thermal and magnetic releases those dimensions and materials of the release components, including flexible connections, which determine the current rating;
- c) secondary windings of current transformer operated releases;
- d) external operating means, additional to the integral operating means;
- e) type designation and/or purely aesthetic features (e.g. labels);
- f) in the case of the 2-pole and 4-pole variants, replacement of the trip unit in one pole by a link, to provide an unprotected neutral;
- g) creating a 2-pole breaker from a 3-pole breaker by removing the centre current path;
- h) difference in embedded software (firmware) in electronic trip units, which has no impact on the required performance, in particular the tripping function;
- i) addition / deletion / types of communication ports OR visual display OR visual indications OR setting means (touch Vs dip switch Vs membrane soft key pad) in electronic trip units, which has no impact on the required performance, in particular the tripping function;
- j) electronic trip unit hardware, due to omitted components on identical printed circuit board layout (e.g. rotary knobs, display, etc.).

Annexure-I

Table A. Classification of Circuit Breaker (physical and operational parameter)

S. No.	Classification based on	Types of Circuit Breaker
	Classification as per Clause 3	
1	<i>Selectivity</i>	a) Category type, A; b) Category type, B
2	<i>Interrupting Medium</i>	a) Air-break; b) Vacuum break; c) Gas-break.
3	<i>Method of installation</i>	a) Fixed; b) Plug-in; c) Withdrawable.
4	<i>By controlling the operating mechanism (Operation)</i>	a) Dependent manual; b) Independent manual; c) Dependent power; d) Independent Power; e) Stored Energy
5	<i>Design / Construction Type</i>	a) Open construction; b) Moulded case
6	<i>Suitability for isolation</i>	a) Suitable; b) Not suitable
7	<i>Provision for maintenance</i>	a) Maintainable; b) Non-maintainable
	Operational Characteristic	
8	<i>Type of Supply</i>	a) 1 Phase AC; b) 3 phase AC; c) Direct Current
9	<i>Number of Pole</i>	a) One Pole; b) Two Pole; c) Three Pole; d) Four Pole
	Additional Features	
10	<i>Release type</i>	a) Thermal, b) Electromagnetic, c) Electronic, etc.
11	<i>Degree of protection</i>	With maximum Ingress Protection code/rating ³

For Example-

Product Series 1- Air-break Type- Fixed installation -Dependent manual operation-Open construction- Selectivity Type A, **suitable for isolation**; maintainable, IP68D- having a common frame size for a range of current ratings subjected to allowable construction break.

Product Series 2- Air-break Type- Fixed installation -Dependent manual operation-Open construction- Selectivity Type A, **not suitable for isolation**; maintainable, IP68D having a common frame size for a range of current ratings with to allowable construction break.

³ Degree of protection provided by the enclosure as per 7.1.12 and Annex C of IEC 60947-1:2007

Annex – A.1

Table. Circuit breaker can be added under the scope of license without additional type testing.
(vice versa condition is not applicable)

Case	Circuit Breaker Type	Condition
A	circuit breaker not-suitable for isolation	if product series is tested for circuit breaker suitable for isolation.
B	circuit breaker with trip releases having different features/settings	if product series is tested, with trip releases with maximum or higher settings, then all other variants will be covered.
C	Fixed, plug in, withdrawable circuit breaker	If product series is tested, with highest complexity will cover the lower complexity breaker , i.e.- a) if withdrawable breaker is tested it will cover plug in and fixed variants. b) if plug in breaker is tested it will cover fixed variants
D	One, two, three and four poles	If the higher Pole Combination device is tested then lower Pole Combination will be covered subject to identical pole designs. e.g. 4 Pole or 3P+N testing covered 3 Pole Circuit breaker test, 2 Pole testing covered 1 Pole test.
E	Circuit breaker with different types of releases (Shunt, UV, Closing etc.)	If a product series is tested with a representative release(s), it will cover the other variants. However, declaration to be provided for all such releases by Manufacturer.
F	Circuit breaker with Multiple Ue rated voltage ratings	If product is tested for highest Ue all range of operational voltages are covered
G	Multiple Short Circuit Breaking capacity (at same Ue)	Highest Breaking capacity if tested, lower breaking capacity are covered

ANNEX B
Technical File

1. TECHNICAL FILE - Manufacturer shall maintain a Technical File for each model manufactured with documents as specified in BIS circular Ref: CMD-I/2:17:1 dated 02 June 2023 ‘Guidelines for Grant of Licence (GoL) as per the conformity assessment Scheme – X of Schedule – II of BIS (Conformity Assessment) Regulations, 2018’.

1.1 In addition to the documents indicated in above circular, following documents are also to be submitted in the Technical File:

- a) Declaration of technical parameters of each model applied for BIS licence. The declaration shall be in line with scope of licence specified in this Product Manual;
- b) Technical data for the purpose of testing of each of the model (Annex B.1 given for guidance).
- c) Declaration with respect to applicable special test as per Cl. 8.5 of the Indian Standard.

1.2 The technical File shall be maintained by the manufacturer till the End of Life of each model.

ANNEX B.1**Format for Technical Data***Name of the product:**Model No.:**Technical description of the product:*

Classification		
3.1	Selectivity category: (A or B)	
3.2	Interruption medium: (air, vacuum, gas Break)	
3.3	Design: (open construction, moulded case)	
3.4	Method of controlling the operation mechanism: (dependent manual, independent manual, dependent power, independent power)	
3.5	Suitability for insulation: (suitable, not -suitable)	
3.6	Provision for maintenance: (maintainable, non- maintainable)	
3.7	Method of installation: (fixed, plug in, withdrawable)	
3.8	Degree of protection: (IP code)	
4.7	Type of release (thermo-magnetic / electronic)	
4.8	. Integral fuses (integrally fused circuit-breakers) Type and characteristics of SCPD	
7.3	Electromagnetic compatibility (EMC) Environment A or B	
	Circuit-breaker for use on phase-earthed systems	
	Circuit-breaker for use in IT systems	
Rated and limiting values, main circuit		
	rated operational voltage: U_e (V)	
	rated insulation voltage: U_i (V)	
	rated impulse withstand voltage: U_{imp} (kV)	
	rated operational current: I_e (A)	
	kind of current	
	conventional free air thermal current: I_{th} (A)	
	conventional enclosed thermal current: I_{the} (A)	
	current rating for four-pole circuit-breakers: (A)	
	number of poles	
	rated frequency: (Hz)	
	integral fuses (rated values)	
Rated duty		
	eight-hour duty	
	uninterrupted duty: I_u (A)	
Short-circuit characteristic		
	rated short-time making capacity: I_{cm} (kA)	
	rated ultimate short-circuit breaking capacity: I_{cu} (kA)	
	rated service short-circuit breaking capacity: I_{cs} (kA)	
	rated short-time withstand current: I_{cw} (kA/s)	
Control circuits		
Electrical control circuits		
	kind of current: (AC, DC)	
	rated frequency: (Hz)	
	rated control circuit voltage: U_c (nature, frequency, V)	
	rated control supply voltage: U_s (nature, frequency V)	

Air supply control circuits: (pneumatic or electro-pneumatic)		
	rated pressure and its limit	
	volumes of air, at atmospheric pressure, required for each closing and each opening operation	
Auxiliary circuits		
Rated and limiting values, auxiliary circuits		
	rated operational voltage U_e (V)	
	rated insulation voltage: U_i (V)	
	rated operational current: I_e (A)	
	kind of current	
	rated frequency: (Hz)	
	number of circuits	
	number and kind of contact elements	
	rated uninterrupted current: I_u (A)	
	utilization category: (AC, DC, current and voltage)	
Short-circuit characteristic		
	Rated conditional short-circuit current (kA)	
	kind of protective device	
Releases		
	shunt release	
	Over-current release	
	Instantaneous / definite time delay / inverse time delay	
	independent of previous load	
	dependent on previous load; (for example thermal type release)	
	Undervoltage release (for opening)	
	Other releases	
Characteristics		
Shunt release and undervoltage release (for opening)		
	rated control circuit voltage: U_c (nature, frequency, V)	
	kind of current	
	rated frequency: (if AC)	
Over-current release		
	rated current	
	kind of current	
	rated frequency: (if AC)	
	current setting (or range of settings)	
	time settings (or range of settings)	

Auth Sign.**Firm Seal**

ANNEX C

Labelling and Marking Requirements

1. Labelling and Marking Requirements- Labelling and Marking of Circuit – Breakers shall be as per Cl. 5.2, Table 13 of IS/IEC 60947-2: 2016 (with Amendment No. 1).

1.1 Each Circuit-Breaker and its packaging shall be marked with the Standard Mark, as specified in Scheme –X in Schedule –II of the BIS (Conformity Assessment) Regulations, 2018. The Standard Mark shall carry the licence number in a visible manner and shall be as specified in the licence document.

1.2 In addition, details of BIS website shall be marked on the package as follows: For details of BIS certification please visit www.bis.gov.in.