



**PRODUCT MANUAL FOR
AUTOMATIC LINE VOLTAGE CORRECTORS (STEP TYPE)
FOR DOMESTIC USE
ACCORDING TO IS 8448:1989**

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 8448:1989
	Title	:	Automatic Line Voltage Correctors (Step type) for domestic use
	No. of Amendments	:	2
2.	Sampling Guidelines:		
a)	Raw material	:	a. Fuse, MCB – IS/IEC 60898/ Relevant fuse standard b. Plugs and socket outlets- IS 1293 c. Voltmeter- IS 1248 (Part 2) d. Cord- IS 694/ IS 9968 (Part 1)
b)	Grouping guidelines	:	Please refer Annex- A
c)	Sample Size	:	3 Nos.
3.	List of Test Equipment	:	Please refer ANNEX –B
4.	Scheme of Inspection and Testing	:	Please refer ANNEX –C
5.	Possible tests in a day	:	Please refer Annex-D
6.	Scope of the Licence :		
	“Licence is granted to use Standard Mark as per IS 8448:1989 with the following scope:		
	Name of the product	Automatic Line Voltage Correctors (Step type) for domestic use	
	Type	Rated kVA ____, Input voltage range ____, Output voltage range ____, Tolerance __%, Rated frequency 50Hz, Insulation Class - A/E/B/F/H/C, Protective device - MCB/Fuse, Display- digital/ analog	

ANNEX A**Grouping Guidelines**

1. The parameters as given below shall be considered for grouping of “Automatic Line Voltage Correctors (Step type) for Domestic use” as per IS 8448 for GOL/ CSoL:

- a. Rated kVA

Group I	Correctors of rating up to and including 2.5 kVA
Group II	Correctors of rating above 2.5 kVA

- b. Input Voltage range
 - c. Output Voltage range
 - d. Insulation class - A/E/B/F/H/C
 - e. Protective device- Fuse/ MCB
 - f. Display- Digital/ Analog
2. Input voltage range and output voltage range remaining the same, Correctors with the lowest and highest rating kVA within a group shall be tested for covering the entire range of Correctors in that group.
 3. To cover all varieties in the scope of the Licence with respect to type of insulation, at least one of each insulation types shall be tested.
 4. To cover both varieties in the scope of the Licence with respect to type of protective device, at least one with each type of device shall be tested.
 5. To cover both varieties in the scope of the Licence with respect to type of display, at least one with each type of display shall be tested.
 6. The Firm shall declare the varieties of Correctors they intend to cover in the Licence. The Scope of Licence may be restricted based on the Manufacturing and Testing capabilities of the Manufacturer.
 7. During the operation of the Licence, BO shall ensure that all the varieties covered in the Licence are tested in rotation, to the extent possible.

ANNEX-B**List of Test Equipment***Major test equipment required to test as per the Indian Standard*

Sl. No.	Tests used	Clause / Reference		Test Equipment
1	Physical examination	12.2	of IS 8448	
2	Output Voltage	12.3		Output Voltage Test
3	Insulation Resistance	12.4		Insulation Resistance
4	High Voltage	12.5		High Voltage Tester
5	No-load current	12.6		No Load Current
6	Protection against electric shock	7.1		Finger Test
7	Provision for earthing	7.5	of IS 302-1	E.C.R. Tester
8	Leakage Current	7.2		Leakage Current
9	Induced Voltage	12.8		Induced Voltage Tester
10	Stability	7.3	of IS 8448	Inclined Plain
11	Mechanical Strength	7.4	of IS 302-1	Impact Tester
12	Screws & connections	7.6		Torque Screw Driver
13	Temperature Rise	12.7		Clamp Meter; Milli Ohm Meter
14	Creepage distances and clearances	7.7	of IS 8448	
15	Damp heat	12.9	of IS 302-1	Environment Chamber
16	Stability test for relay operation	12.10	of IS 9000 (Pt 5)	Continuous Operation
17	Test for continuous operation	12.11	of IS 8448	

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

ANNEX C

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 requirements of IS 8448:1989.

4. CONTROL UNIT- All Automatic Line Voltage Correctors of the same type and design produced in one week 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.

5.1 All the production which conforms to the Indian Standard and covered by the licence should be marked with Standard Mark.

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 Method			No. of Sample	Frequency	Remarks
		Clause	Ref				
6	Construction	6	IS 8448	R	Each Line voltage corrector		
12.2	Physical examination	5,9,10	IS 8448	R	Each Line voltage corrector		
12.3	Output Voltage	12.3	IS 8448	R	Each Line voltage corrector		
12.4	Insulation Resistance	12.4	IS 8448	R	Each Line voltage corrector		
12.5	High Voltage (routine test)	12.5.1.a	IS 8448	R	Each Line voltage corrector		
12.6	No-load current	12.6	IS 8448	R	Each Line voltage corrector		
7.1	Protection against electric shock	8	IS 302-1	R	5 percent with minimum 3	Every control unit	Please see Note 1
7.5	Provision for earthing	27	IS 302-1	R			
7.2	Leakage Current	13.2	IS 302-1	R			
12.8	Induced Voltage	12.8	IS 8448	R			
7.3	Stability	20.1	IS 302-1	R	One	Every three months for each type and design	Please see Note 2
7.4	Mechanical Strength	21	IS 302-1	R			
7.6	Screws & connections	28	IS 302-1	R			
12.7	Temperature Rise	12.7	IS 8448	R			
12.5	High Voltage (type test)	12.5.1.b	IS 8448	R			
7.7	Creepage distances and clearances	29	IS 302-1	R			
12.9	Damp heat	12.9	IS 8448	S			
12.10	Stability test for relay operation	12.10	IS 8448	S			
12.11	Test for continuous operation	12.11	IS 8448	R			

6.5	Fuse/MCB	-	IS/IEC 60898 for MCB or relevant IS for fuse	S	Each Consignment	Any component under mandatory certification of BIS shall be ISI marked. For others, further testing is not necessary if it is accompanied with supplier's TC or ISI marked.
6.6	Plugs & Sockets	-	IS 1293	-		
6.6	Flexible Cord	-	IS 694/ IS 9968-1	-		
6.2	Voltmeter	-	IS 1248-2	S		

Note-1: In case of failure, all units in the control unit shall be tested and those found failing shall be rejected. Twice the original number shall be tested in subsequent control units for these requirements till samples from five consecutive control units pass. The original frequency may then be restored.

Note-2: In case of failure in any type and rating, a thorough investigation of the cause of failure shall be made and defects rectified. The original frequency may be restored when five samples of that type and design from the improved lot tested for these requirements pass.

Note-3: Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note-4: 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-D

Possible tests in a day

- i) Physical examination Cl. 12.2
- ii) Output Voltage Cl. 12.3
- iii) Insulation Resistance Cl. 12.4
- iv) High Voltage Cl. 12.5
- v) No-load current Cl. 12.6
- vi) Protection against electric shock Cl. 7.1
- vii) Provision for earthing Cl. 7.5
- viii) Leakage Current Cl. 7.2
- ix) Mechanical Strength Cl. 7.4
- x) Creepage distance and clearance Cl 7.7