



PRODUCT MANUAL FOR
a.c. WATTHOUR METERS CLASS 0.5, 1 AND 2
ACCORDING TO IS 13010:2002

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 license/certificate.

1.	Product	:	IS 13010:2002
	Title	:	a.c. Watthour Meters Class 0.5, 1 and 2
	No. of Amendments	:	2
2.	Sampling Guidelines:		
a)	Raw material	:	_____
b)	Grouping guidelines	:	Please refer ANNEX – A
c)	Sample Size	:	Three Meters
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 13010:2002 with the following scope:		
	Name of the Product	a.c. Watthour Meters	
	Class 0.5 / Class 1 / Class 2, Type, Single phase 2-wire/ Three phase 3-wire / Three phase 4-wire, Voltage.....V, Basic current (I_b)A, Maximum current (I_{max})A, Frequency ...Hz, Transformer Operated (Connection through Voltage Transformer)/ Transformer Operated (Connection through Current Transformer only)/ Whole Current (Direct Connection), Insulating Encased Meter of Protective Class I/ Insulating Encased Meter of Protective Class II.		

ANNEX AGrouping Guidelines

1. Samples of each variety of meters shall be tested considering the following:
 - i. Accuracy Class – 0.5, 1 and 2
 - ii. Number of phases and wires - Single phase 2-wire, Three phase 3-wire, Three phase 4-wire
 - iii. Transformer Operated (Connection through Voltage Transformer), Transformer Operated (Connection through Current Transformer only) and Whole Current (Direct Connection)
 - iv. Insulating Encased Meter of Protective Class I and Insulating Encased Meter of Protective Class II

2. The following relaxation may be given when a variety is tested for all the requirements:
 - i. Same basic current (I_b) and different current ratio (I_{max}/I_b) – One sample of maximum current ratio (I_{max}/I_b) out of the range offered be subjected to all tests.
 - ii. Different basic current (I_b) but same (I_{max}/I_b) – One sample with highest (I_b) and another sample with lowest (I_b) be subjected to all tests.
 - iii. Different basic current (I_b) and different (I_{max}/I_b) – One sample with lowest (I_b) and lowest (I_{max}/I_b) and another sample with highest (I_b) and highest (I_{max}/I_b) be subjected to all tests.
 - iv. For CSoL – If same (I_b) with different (I_{max}/I_b) is to be included in the licence, the varieties offered be subjected to tests applicable at I_{max} only.

3. If the license covers only ‘Insulating Encased Meter of Protective Class II’ and CSoL for ‘Insulating Encased Meter of Protective Class I’ is to be considered, then any one sample of ‘Insulating Encased Meter of Protective Class I’ from any one variety already covered in the license or any new variety intended to be covered in the licence be subjected to all tests or vice-versa.

4. The Firm shall declare the varieties of a.c. watt-hour meters intended to be covered in the Licence. An undertaking shall also be taken from the applicant/ licensee in respect of construction and design similarity as per Cl. 3.38 of IS 13010:2002 for the range of varieties which they intend to cover in the licence. One set of drawings representing each of these varieties be sealed and kept in the factory for reference whenever required. The Scope of Licence may be restricted based on the Manufacturing and Testing capabilities of the Manufacturer.

5. 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.	Test Equipment	Tests used in with Clause Reference
1	Vernier Caliper, Micrometer	Cl. 6.1, 6.2, 6.3, 6.5 & 6.7
2	a.c. High Voltage Tester	Cl. 11.10.3
3	Insulation Tester	Cl. 11.2
4	Power Meter	Cl. 11.8
5	Protection against penetration of dust and water equipment	Cl. 11.24
6	Shock Test Device	Cl. 11.21
7	Vibration Test Device	Cl. 11.20
8	Mechanical Strength of Meter Case	Cl. 11.25
9	Impulse Voltage Tester	Cl. 11.10.2
10	Short time overcurrent tester	Cl. 11.12

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 the requirements of IS 13010:2002.

4. CONTROL UNIT – Meters of the same 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						
6.1 to 6.3, 6.4.1, 6.4.2, 6.4.4	General & Constructional requirement	6.1, 6.2, 6.3, 6.4.1, 6.4.2, 6.4.4	IS 13010	R	Each Meter	In case of failure of any meter, cause of failure shall be identified and corrective action shall be taken to remove the non-conformity.			
6.4, 6.5, 6.6	Terminal Blocks, Terminal Cover & Non-Flammability	6.4,6.5, 6.6,6.7		S			Three	Every consignment of insulating material received	No further testing is required if accompanied with Test Certificate.
6.8	Resistance to Heat and Fire	6.8, 11.23		S	Once in six months for each type and rating	In case of failure of any sample, double the number of samples shall be tested and no failure in those samples shall be permitted. After corrective actions samples from two consecutive control units shall be tested and the original frequency may be restored if all the samples pass.			
6.4.3	Clearances & Creepage Distances	6.6							
6.9	Protection against penetration of dust and water	6.9, 11.24							
11.10.3	a.c voltage test	11.10.3		R	Each Meter produced	In case of failure of any meter, cause of failure shall be identified and corrective action shall be taken to remove the non-conformity.			
11.2	Insulation Resistance	11.2		R					
11.5	Limits of Error due to variation of current	11.5,11.7		R					
11.4	Starting	11.4		R					
11.3	Running with no-load	11.3		R					
6.11	Direction of Rotation, Marking of Rotor	6.11	R						

6.11	Requirement of Prevention of reverse rotation, if provided	6.11		S	Three	Once in six months for each type and rating	In case of failure of any sample, double the number of samples shall be tested and no failure in those samples shall be permitted. After corrective actions samples from two consecutive control units shall be tested and the original frequency may be restored if all the samples pass.
6.10	Register (Counting Mechanism)	6.10		S			
11.8	Power Loss	11.8		R			
11.13	Effect of Self Heating	11.13		S			
11.9	Heating	11.9		S			
11.6	Meter Constant	11.6		R			
11.19	Repeatability of Error Test	11.19		S			
11.14	Range of Adjustment	11.14		S			
11.15	Independence of Adjustment	11.15		S			
11.16	Sustained Accuracy Test	11.16		S			
11.17	Running at Low Load	11.17		R			
11.18	Test of Material used in Dial	11.18		S			
11.12	Short-Time Over Currents	11.12		S			
7.1, 11.22	Torque/ Speed Ratio Driving Torque Measurement Test	7.1, 11.22		S	Five		

11.21	Shock Test	11.21		S	Three	Once in a year for each type and rating	In case of failure of any sample, double the number of samples shall be tested and no failure in those samples shall be permitted. After corrective actions samples from two consecutive control units shall be tested and the original frequency may be restored if all the samples pass
11.20	Vibration Test	11.20		S			
11.25	Mechanical Strength of meter case	11.25		S			
11.10.2	Impulse Voltage Test	11.10.2		S			
11.11	Effect of influence quantities	11.11		S			

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

Note-2: Levels of control given in column 3 are obligatory 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

1. General and Constructional Requirements
2. a.c. High Voltage Test
3. Insulation Test
4. Running with no-load
5. Starting
6. Limits of Error
7. Power Consumption
8. Direction of Rotation, Marking of Rotor