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भारतीय मानक का मसौदा
ऑटोमोबाइल के लिए स्व-रद्द दिशा संकेतक स्विच — विशिष्टि
(IS 4815 का दूसरा पुंनरीक्षण)

Draft Indian Standard

**SELF- CANCELLING DIRECTION INDICATOR SWITCHES FOR
AUTOMOBILES — SPECIFICATION**
(Second Revision of IS 4815)

ICS 43.040.30

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Automotive Electrical Equipment and Instruments Sectional Committee, TED 11

FOREWORD

This draft Indian Standard (Second Revision) shall be adopted by Bureau of Indian Standards, after the draft finalized by the Automotive Electrical Equipment and Instruments Sectional Committee is approved by the Transport Engineering Division Council.

This Indian standard was first published in 1968. The first revision of the standard was undertaken in 1982. This second revision is being undertaken to update the standard and to incorporate latest technological advancement/ development that has taken place. The salient features of this second revision are:

- a) Reference of latest Indian Standard has been given.
- b) The Indian Standard has been drafted as per latest grafting guidelines.
- c) Lever Strength Test has been specified separately for passenger vehicle and commercial vehicle respectively.
- d) Requirements of Lever Operating Force, Voltage Drop Test, Insulation Resistance Test, Drop Test and Cold Test have been modified.
- e) Test for corrosion resistance has been made optional.

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Self-cancelling switches are provided in automobiles with manually operated shift lever and automatic cancellation when the steering wheel is brought back to straight ahead drive position. This standard deals with such types of self-cancelling direction indicator switches.

The composition of the Committee responsible for the formulation of this standard is given at Annex C (Will be added later).

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of test or analysis, shall be rounded off in accordance with IS 2:1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1 SCOPE

This standard covers the basic mechanical and electrical requirements and methods of test for self-cancelling directing indicator switches for automobiles.

2 REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
IS 2465-1984	Specification for cables for motor vehicles (First Revision).
IS 4060-1994	Automotive vehicles — Flashers for direction indicators Specification (Second Revision).
IS 4905:2015	Random sampling and randomization procedures (First Revision)
IS 9000 (Part II/ Section 3):1977	Specification for basic environmental testing procedures for electronic and electrical items: Part II Cold test Section 3 Cold test for non-heat dissipating items with gradual change of temperature.

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<i>IS No.</i>	<i>Title</i>
IS 9000 (Part III/ Section 3):1977	Specification for basic environmental testing procedures for electronic and electrical items: Part III Dry heat test, Section 3 Dry heat test for non-heat dissipating items with gradual change of Temperature
IS 9000 (Part V/ Section 2):1981	Specification for basic environmental testing procedures for electronic and electrical items: Part V Damp heat (cyclic) test, Section 2 12 + 12 h cycle.
IS 9000 (Part 7/ Section 3):2019	Environmental testing — Part 7 Tests : Section 3 Test Ec: Rough handling shocks, primarily for equipment - types specimens (First Revision)
IS 10250 : 1982	Specification for severities for environmental tests for automotive electrical equipment

3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

3.1 Acceptance Tests — Tests carried out on samples taken from a lot for the purpose of acceptance of the lot.

3.2 Direction Indicator — A lighting device to show in which direction the driver intends to turn by giving a flashing light on the side of the vehicle towards which the turn will be made. The definition not include:

- a) The switchgear;
- b) Semaphore type indicators; and
- c) Additional indicators.

3.3 Routine Tests — Tests carried out on each switch to check requirements which are likely to vary during production.

3.4 Type Tests — Tests carried out to prove conformity with the specification. These are intended to prove the general qualities and design of a given type of switch.

4 DESIGN AND CONSTRUCTION

The mechanism of self-cancelling direction indicator switch shall be so arranged that if the lever is shifted manually in particular position for turning the vehicle, the lever comes automatically to the normal position when the steering wheel is brought back to straight-ahead

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drive position. When the level is wrongly shifted and the turn signal is opposite to the one being negotiated, the steering wheel rotation shall interrupt the circuit erroneously closed. It shall be possible to manually return the lever to zero even without turning the steering wheel.

5 TESTS

5.1 Visual Examination

The switch shall be examined for finish and workmanship and shall be free from injurious flaws or other defects.

5.2 Test for Smooth Operation

The switch shall operate smoothly with positive location in each position.

5.3 Mechanical Performance Test

5.3.1 The neutral point of the control lever (angular amplitude within which the control lever remain balanced between two adjacent positions) shall not have an angular amplitude greater than 10°.

5.3.2 The knob grip and the lever, if screw assembled, shall withstand a torque of 1 Nm without unscrewing or slackening.

5.3.3 The lever shall withstand, without permanent deformation, the flexural stress imposed by load as given below, applied at the knob grip end:

- a) For Passenger vehicle – 100 N
- b) For commercial vehicle – 150 N

5.3.4 If the self-cancelling direction indicator switch is supplied complete with connection cables, the cables shall conform to IS 2465.

5.3.5 The movement of the lever shall be possible with a force of 5 to 10 N applied at the end of the lever. The switch shall not operate when subjected to an acceleration of 3 g.

5.3.6 If the lever is held in the indicating position, in spite of the steering wheel being turned through the cancelling position, the force required to restrain the lever shall not exceed 15 N.

5.3.7 If the self-cancelling mechanism is in the cancelling position it should still be possible with a force not greater than 15 N at the lever end to complete the flasher circuit.

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5.3.8 While keeping the steering wheel in straight ahead drive position and shifting the lever to right and left, wheel rotation angle (in the same direction as the lever), starting from the said position which is necessary to perform the automatic release shall be as agreed between the manufacturer and the purchaser.

5.4 Voltage Drop Test

5.4.1 Drop in-voltage at the contacts on each self-cancelling direction indicator switch circuit (not including that due to connecting cables), with a current of 10A shall be not more than 500 mV.

5.4.2 Where direct access to the contacts is not possible, the measurements may be made at the switch terminals or at the ends of permanently attached cables normally supplied with the switch. To prevent opening and tempering of the switch unit, which generally is required in order to run the test as in **5.4.1** the millivolt drop measurements may be made on cable ends instead of directly on contacts. In this case, the following values shall be added for current value of 10 A to the voltage drop values specified in **5.4.1**

For cables of 0.5 mm² section - Not more than 30 mV for each 10 cm length of cable

For cables of 1.0 mm² section - Not more than 20 mV for each 10 cm length of cable

5.5 Insulation Resistance Test

Insulation resistance between the insulated terminals and between the terminal and metallic main body shall not be less than 1 MΩ when measured with 500 V d.c.

5.6 High Voltage (Flash) Test

The switch shall be subjected to a flash test with 240 V a.c. rms for 5 s at any convenient frequency between 40 to 60 Hz, applied between each of the live terminals and the body.

The switch shall withstand this test satisfactorily without arcing or puncture of the dielectric material.

5.7 Endurance Test

5.7.1 The ambient temperature shall not be more than 40°C.

5.7.2 The switch shall be operated with the electrical load specified for each circuit (*see* IS 4060) with the flasher not included in circuit. Failed bulbs shall be replaced during the test.

5.7.3 The test equipment shall be provided with such an arrangement that the switch can be turned off by the self-cancelling mechanism. Provision shall also be made for manual cancelling.

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5.7.4 Each cycle shall consist of the following sequence of positions:

Off, Left turn, Off, Right turn, Off.

5.7.5 The test shall be conducted at the rate of 12 to 20 cycles per min. The travel time (from one position to the next position) shall be not less than 0.1 s and not more than 0.5 s. The dwell time in each position shall be not less than 0.4 s.

5.7.6 With lamp load as specified in **5.7.2** the direction indicator switch shall be subjected to 80 000 cycles. Each cycle consisting of the unit being actuated to an opening position through the switch lever and then returned to the centre position through engagement of cancelling cam, repeating this procedure on the opposite side to complete the cycle.

This shall be followed by 10 000 cycles of manual cancelling (cancelling performed with the lever itself). The switch shall then be subjected to 1 000 'ante-jam' operations per side, carried out alternately until a total of 10 000 operations have been completed.

On completion of the test the unit shall function satisfactorily and the voltage drop when checked as given in **5.4** shall not exceed 600 mV.

5.8 Corrosion Resistance Test (Optional Test)

5.8.1 The test shall be carried out as per procedure 1, specified in **7.3** of IS 9000 (Part 11).

5.8.2 The salt solution shall be a 5 percent solution of sodium chloride in water.

5.8.3 The device shall be sprayed at a temperature of $35 \pm 3^\circ\text{C}$, for a cycle of 50 h consisting of two periods of 24 h each and one h draining period.

5.8.4 After removal from the chamber, the parts shall not show any sign of corrosion which will adversely affect the functioning of any part of the device.

NOTE — This is an optional test and is to be required to be carried out only when the switch is intended to be exposed directly to open air conditions in actual usage.

5.9 Vibration Test

The switch with the mounting after being rigidly mounted on a suitable vibrating machine constructed to produce a simple harmonic motion, shall be subjected to vibration (a total lift of 0.7 mm) through a frequency range of 10-55-10 Hz in a period of one min. With continuously varying frequencies vibration shall be applied for not less than one hour in each of the three major axes of the switch. At the end of the vibration test the switch shall be examined for any evidence of damage and shall pass the requirements of tests in **5.2**, **5.4** and **5.5**.

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5.10 Drop Test

5.10.1 The test shall be conducted as specified in IS 9000 (Part VII/ Sec 3) under the following conditions:

- | | |
|--------------------|----------|
| a) Number of drops | 2 |
| b) Drop height | 1 000 mm |

5.10.2 First fall of device can be at any dimensional axis. The second fall shall be on the same axis but on the opposite side of the housing.

5.10.3 At the end of the test the switch shall comply with the requirements of tests in **5.1**, **5.2**, **5.4** and **5.5**.

5.11 Contamination Resistance Test

5.11.1 The switch with any drain holes or openings closed shall be sprayed with contaminant fluids such as paraffin oil, petrol or diesel oil and lubricating oil for 60 s each. After each fluid has been sprayed the switch shall be stored in the dry heat chamber maintained at $50 \pm 3^\circ\text{C}$ for one h. At the end of the above period the chamber shall be switched off and the chamber temperature shall be allowed to attain the ambient temperature.

The switch shall then be removed from the chamber and allowed to remain under the following standard atmospheric conditions:

- | | |
|----------------------|--------------------------|
| a) Temperature | 15 to 35°C |
| b) Relative humidity | 45 to 75 percent |
| c) Air pressure | 86 to 106 kPa |

5.11.2 After the test, the switch shall pass the requirements of tests in **5.2**, **5.4** and **5.5**.

5.12 Cold Test

5.12.1 The test shall be conducted as specified in IS 9000 (Part II/ Sec 3). The switch shall be exposed to low temperature under the following conditions:

- | | |
|-------------------------|---------------------|
| a) Temperature | -30°C |
| b) Duration of exposure | 72 h |

5.12.2 At the end of the test, while the switch is still at the low temperature, the switch shall be subjected to and pass the tests specified in **5.2**, **5.4** and **5.5**.

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5.13 Dry Heat Test

5.13.1 The test shall be conducted as specified in IS 9000 (Part III/ Sec 3). The switch shall be exposed to high temperature at the following conditions:

- a) Temperature 70°C
- b) Duration of exposure 4 h

5.13.2 At the end of the test, while the switch is still at the high temperature, the switch shall be subjected to pass the requirements of tests specified in **5.2, 5.4** and **5.5**.

5.14 Damp Heat (Cycling) Test

The test shall be conducted as specified in IS 9000 (Part V/ Sec 2). The number of conditioning cycles shall be 7.

5.14.1 After the test the switch shall pass the requirements of tests specified in **5.2, 5.4** and **5.5**.

5.15 Test for Weather-Proofness (Optional Test)

The switch shall be subjected to this test, in accordance with **4.13** of IS 10250 as applicable to group 2 equipment, in vehicle mounted condition.

The switch shall be sprayed with water, for one hour three times a day, from above by a sprinkler for ten continuous days.

5.15.1 At the end of the test, the switch shall be dried and visually examined for any evidence of rust formation. The switch shall then be subjected to and pass the tests in **5.2, 5.4** and **5.5**.

NOTE - This is an optional test and is to be required only when the switches are intended to be exposed directly to open air conditions in actual usage.

6 TESTS

6.1 Type Tests — The following shall constitute type tests:

- a) Visual examination (*see 5.1*);
- b) Test for smooth operation (*see 5.2*);
- c) Mechanical performance test (*see 5.3*);
- d) Voltage drop test (*see 5.4*);
- e) Insulation resistance test (*see 5.5*);
- f) High voltage (flash) test (*see 5.6*);

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- g) Endurance test (*see 5.7*);
- h) Corrosion resistance test (*see 5.8*);
- j) Vibration test (*see 5.9*);
- k) Drop test (*see 5.10*);
- m) Contamination resistance test (*see 5.11*);
- n) Cold test (*see 5.12*);
- p) Dry heat test (*see 5.13*);
- q) Damp heat (cycling) test (*see 5.14*); and
- r) Test for weather proof ness (*see 5.15*).

6.1.1 Criteria for Approval

6.1.1.1 Eight samples shall be submitted for testing together with the relevant data. These shall be tested according to the sequence of tests given in Annex A.

6.1.1.2 In case of failure in one or more type tests, fresh samples not exceeding twice the number of original samples may be called and subjected to test(s) in which failure occurred. If in repeat test(s) no failure occurs, the tests may be considered to have been satisfied.

6.2 Acceptance Tests

6.2.1 The following shall constitute acceptance tests:

- a) Visual examination (*see 5.1*);
- b) Test for smooth operation (*see 5.2*);
- c) Mechanical performance test (*see 5.3*);
- d) Voltage drop test (*see 5.4*);
- e) Insulation resistance test (*see 5.5*); and
- f) High voltage (flash) test (*see 5.6*).

6.2.2 The number of samples for acceptance tests shall be as agreed upon between the manufacturer and the purchaser. However a recommended plan of sampling is given in Annex B.

6.3 Routine Tests

The following shall constitute routine tests:

- a) Visual examination (*see 5.1*); and
- b) Test for smooth operation (*see 5.2*).

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7 MARKING

7.1 The self-cancelling direction indicator switch shall be indelibly marked with the following information:

- a) Name of the manufacturer or trade-mark;
- b) Month and year of manufacture; and
- c) Country of manufacture.

7.2 BIS Certification Marking

The headlight switch may also be marked with the Standard Mark.

7.2.1 The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act 2016* and the Rules and Regulations framed thereunder, and the product(s) may be marked with the Standard Mark.

ANNEX B
(Clause 6.2.2)

RECOMMENDED SAMPLING PLAN FOR ACCEPTANCE TESTS

B-1 LOT

B-1.1 In a consignment the switches of the same type and rating manufactured under similar conditions of production in the same factory shall be grouped together to constitute a lot.

B-1.2 The number of switches to be selected from each lot shall depend upon the size of the lot and shall be in accordance with col 1 and 2 of Table 1.

B-1.2.1 The switches shall be selected from the lot at random. In order to ensure the randomness of selection, procedure given in IS 4905 may be followed.

Table 1 Sample Size and Acceptance Number
(Clauses B-1.2 and B-2.1)

Sl. No.	LOT SIZE	SAMPLE SIZE	PERMISSIBLE NUMBER OF DEFECTIVES
(1)	(2)	(3)	(4)
i)	Up to 100	8	0
ii)	101 ,, 300	13	0
iii)	301 ,, 500	20	1
iv)	501 ,, 1000	32	2
v)	1 001 and above	50	3

B-2 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

B-2.1 All switches selected from the lot at random according to col 1 and 2 of Table 1 shall be subjected to acceptance tests. A switch failing to meet the requirements of any of the acceptance tests shall be termed as defective. The lot shall be considered as conforming to the requirements of the acceptance tests if the number of defectives is less than or equal to corresponding acceptance number given in col 3 of Table 1, otherwise the lot shall be rejected.

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ANNEX C
(Forward)

COMMITTEE COMPOSITION

To be added