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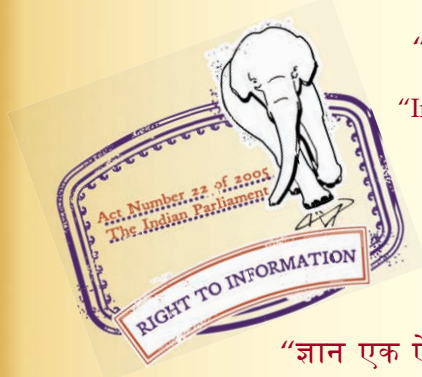
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IS 4815 (1982): Self-Cancelling Direction Indicator Switches for Automobiles [TED 11: Automotive Electrical Equipment]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”



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Indian Standard

SPECIFICATION FOR
SELF-CANCELLING DIRECTION INDICATOR
SWITCHES FOR AUTOMOBILES

(First Revision)

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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Indian Standard

SPECIFICATION FOR SELF-CANCELLING DIRECTION INDICATOR SWITCHES FOR AUTOMOBILES

(*First Revision*)

Automotive Electrical Equipment Sectional Committee, ETDC 14

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Indian Standard

SPECIFICATION FOR SELF-CANCELLING DIRECTION INDICATOR SWITCHES FOR AUTOMOBILES

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 13 September 1982, after the draft finalized by the Automotive Electrical Equipment Sectional Committee had been approved by the Electrotechnical Division Council

0.2 This standard was first issued in 1968. This revision has been undertaken with a view to update the contents and bring in line with the international practice.

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

0.4 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 a test, shall be rounded off in accordance with IS : 2-1960*. 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

1.1 This standard covers the basic mechanical and electrical requirements and methods of tests for self-cancelling direction indicator switches for automobiles.

2. TERMINOLOGY

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

*Rules for rounding off numerical values (*revised*).

2.1 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 does not include:

- a) the switchgear,
- b) semaphore type indicators, and
- c) additional indicators.

2.2 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.

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

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

3. DESIGN AND CONSTRUCTION

3.1 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 straightahead drive position; when the lever 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.

4. MARKING

4.1 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.

4.1.1 The switches may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

5. TESTS

5.0 Classification of Tests

5.0.1 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) Millivolt drop test (see 5.4),
- e) Insulation resistance test (see 5.5),
- f) High voltage (flash) test (see 5.6),
- 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 proofness (see 5.15).

5.0.1.1 Criteria for approval — Eight samples shall be submitted for testing together with the relevant data. These shall be tested according to the sequence of tests given in Appendix A. The testing authority shall issue a type approval certificate if the self cancelling direction indicator switches are found to comply with the requirements of tests given in 5.0.1.

5.0.1.2 In case of failure in one or more type tests, the testing authority may call for fresh samples not exceeding twice the number of original samples and subject them to test(s) in which failure occurred. If in repeat test(s) no failure occurs, the tests may be considered to have been satisfied.

5.0.2 Acceptance Tests — 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) Millivolt drop test (see 5.4),
- e) Insulation resistance test (see 5.5), and
- f) High voltage (flash) test (see 5.6).

5.0.2.1 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 Appendix B.

5.0.3 Routine Tests — The following shall constitute routine tests:

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

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 a load of 50 N applied at the knob grip end.

5.3.4 If the self-cancelling direction indicator switch is supplied complete with connection cables, the cables shall conform to IS: 2465-1963*.

5.3.5 The movement of the lever shall be possible with a force of 5 to 15 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.

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.

*Specification for cables for motor vehicles (*first revision*).

5.4 Millivolt 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 100 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.

5.4.2.1 In this case, the following values to the drop specified in **5.4.1** shall be added for current value of 10A:

For cables of 0.5 mm ² section	Not more than 30 mV for each 10 cm length of cable
For cables of 1.0 mm ² section	Not more than 20 mV for each 10 cm length of cable

5.5 Insulation Resistance Test — The insulation resistance between the insulated terminals and between the terminals and metallic main body, when measured with a dc voltage of 100 V at the prevailing atmospheric temperature and humidity shall be not less than 1 megohm.

5.6 High Voltage (Flash) Test — The switch shall be subjected to a flash test with 240 V ac rms for 5 seconds at any convenient frequency between 40 to 60 Hz, between each of the live terminals and the body. The switch shall withstand this test satisfactorily without arcing or puncture.

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 : 4060-1978*) 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.

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

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

*Specification for flashers for direction indicators for automobiles (*first revision*).

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

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 millivolt drop when checked as given in 5.4 shall not exceed 150 mV.

5.8 Corrosion Resistance Test — The test for corrosion resistance of the switches shall be conducted as specified in Appendix C.

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 minute. 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.

5.10 Drop Test — The test shall be conducted as specified in IS : 9000 (Part VII/Sec 3)-1979* under the following conditions:

- | | |
|--------------------|--------|
| a) Number of drops | 6 |
| b) Drop height | 200 mm |

5.10.1 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 — 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 seconds 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 hour. At the end of the

*Specification for basic environmental testing procedures for electronic and electrical items; Part VII Impact test, Section 3 Drop and topple.

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 |

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

5.12 Cold Test — The test shall be conducted as specified in IS : 9000 (Part II/Sec 3)-1977*. The switch shall be exposed to low temperature under the following conditions:

- | | |
|-------------------------|---------|
| a) Temperature | – 10°C |
| b) Duration of exposure | 2 hours |

5.12.1 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.

5.13 Dry Heat Test — The test shall be conducted as specified in IS : 9000 (Part III/Sec 3)-1977†. The switch shall be exposed to high temperature at the following conditions:

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

5.13.1 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)-1981‡. 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.

*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.

†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.

‡Specification for basic environmental testing procedures for electronic and electrical items: Part V Damp heat (cyclic) test, Section 2 12 ± 12 h cycle.

5.15 Test for Weather-Proofness — The switch shall be fitted in normal working conditions, sprayed with water from above at the rate of three times a day (one hour each time) by a sprinkler, and subjected to this test for 10 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.

APPENDIX A

(Clause 5.0.1.1)

SEQUENCE OF TESTS FOR TYPE APPROVAL

Clause No.	Test	Sequence							
		1	2	3	4	5	6	7	8
5.1	Visual examination	×	×	×	×	×	×	×	×
5.2	Test for smooth operation	×	×	×	×	×	×	×	×
5.3	Mechanical performance test	×	×	×	×	×	×	×	×
5.4	Millivolt drop test	×	×	×	×	×	×	×	×
5.5	Insulation resistance test	×	×	×	×	×	×	×	×
5.6	High voltage (flash) test	×	×	×	×	×	×	×	×
5.7	Endurance test	×	×						
5.8	Corrosion resistance test			×					
5.9	Vibration test				×				
5.10	Drop test					×			
5.11	Contamination resistance test					×			
5.12	Cold test						×		
5.13	Dry heat test						×		
5.14	Damp heat (cycling) test							×	
*5.15	Test for weather-proofness								×

× Sample to be tested.

*Optional.

APPENDIX B

(Clause 5.0.2.1)

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 : 4905-1968* may be followed.

TABLE 1 SAMPLE SIZE AND ACCEPTANCE NUMBER

(Clauses B-1.2 and B-2.1)

LOT SIZE	SAMPLE SIZE	ACCEPTANCE NUMBER
(1)	(2)	(3)
Up to 100	8	0
101 ,, 300	13	0
301 ,, 500	20	1
501 ,, 1 000	32	2
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.

*Methods for random sampling.

APPENDIX C

(Clause 5.8)

TEST FOR CORROSION RESISTANCE TESTS

C-1. PROCEDURE

C-1.0 The ability of the switch with its cover and terminal compartments in position, to withstand corrosion due to atmospheric conditions, shall be assessed by the following test.

C-1.1 The chamber for this test shall be so constructed that the salt spray is produced in the lower part of the chamber, in the upper part of which the samples to be exposed are suspended.

C-1.2 The spray shall be produced by an atomizer employing compressed air free from all impurities.

C-1.3 The ceiling, the walls and all other parts of the chamber shall be so constructed and the parts under test so arranged that no condensate can drip on the test specimen.

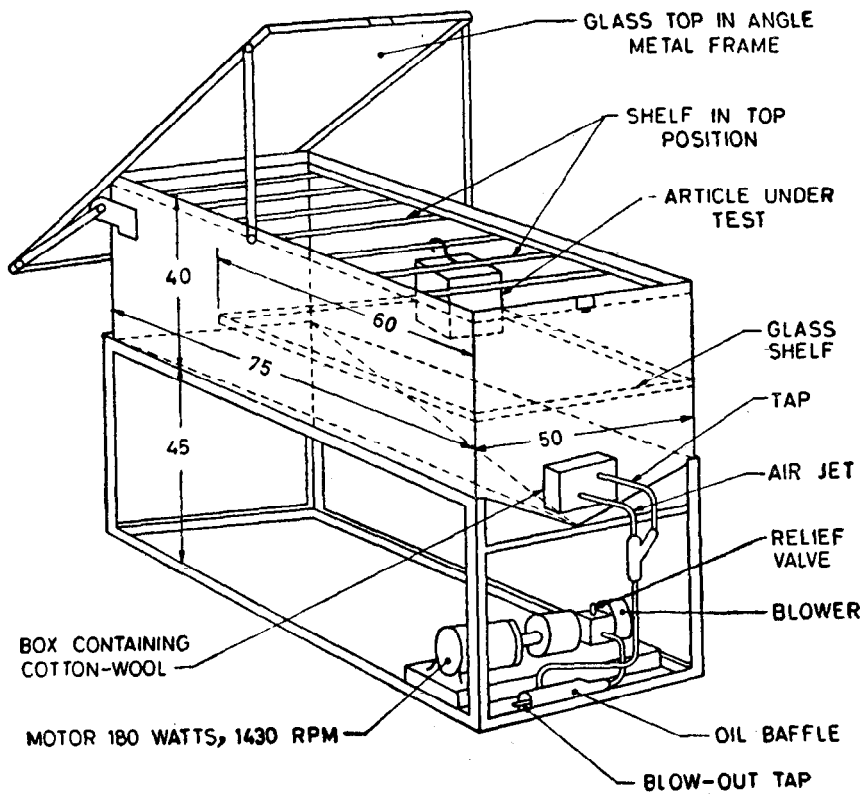
C-1.4 The salt solution shall be a 5 percent solution of sodium chloride in water.

C-1.5 The switch shall be sprayed in such a chamber at the standard temperature 27°C, for a cycle of 50 hours consisting of two periods of 24 hours each and one hour draining period.

C-1.6 After removal from the salt spray chamber, the switch shall not show any sign of corrosion or electrolytic action which will adversely affect the functioning of any part of the device.

C-1.7 In general, a salt spray chamber described as follows would be suitable. Details of such chamber and the spraying mechanism are shown in Fig. 1 and 2 respectively.

- a) The cabinet should approximately be of the dimension shown and the cabinet and its internal fittings should be made of monel metal or other suitable material. A shelf capable of being fitted in the upper or lower part of the cabinet; shall be provided;
- b) The air used for atomizing the salt solution shall be clean. The pressure during the tests shall be between 25 kPa and 35 kPa. The pressure may be adjusted by a relief valve or by the pressure outlet of the blower;



All dimensions in centimetres.

FIG. 1 SALT SPRAY CHAMBER

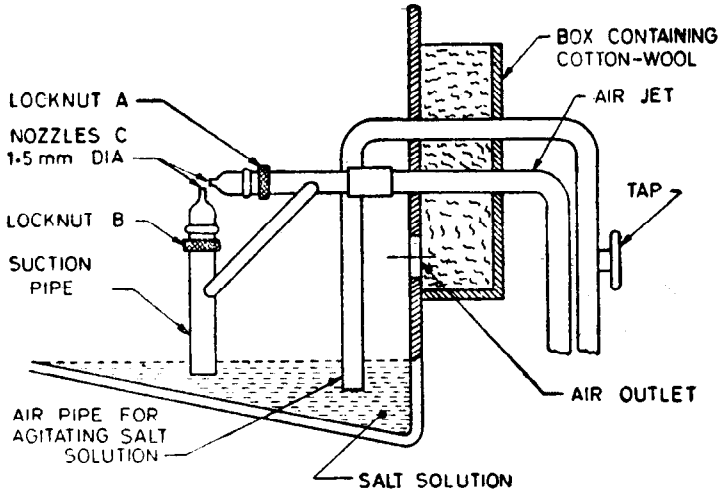


FIG. 2 DETAILS OF SPRAYING ARRANGEMENT

- c) The nozzle for atomizing the salt solution shall be adjusted for maximum amount of spray. This adjustment may be carried out by unscrewing the bottom locknut *B*, on the lower nozzle *C*, and adjusting this nozzle into position until maximum spray occurs. The diameter of the nozzles shall be 1.5 mm. A tap and second branch in the air line is available for agitating the salt solution as required;
- d) The spraying apparatus shall be capable of atomizing not less than 1 450 ml salt solution per hour. The quantity of solution sprayed per cubic metre capacity of the test chamber shall be approximately 175 ml per minute; and
- e) A container filled with cotton-wool acts as a breather and provides an outlet for the air which is constantly being pumped into the chamber, the cotton-wool acting as a filter and preventing salt mist from being discharged into the atmosphere.

INDIAN STANDARDS

ON

AUTOMOTIVE ELECTRICAL EQUIPMENT

IS:

- 1062-1963 Methods of test for sparking plugs (*revised*)
- 1063-1963 14-mm sparking plugs (*revised*)
- 1884-1981 Electric horns for automobiles (*second revision*)
- 2077-1962 Automobile electric horn relays
- 2081 (Part I)-1976 Taper terminal cable connectors for automobile batteries: Part I
Brass type connectors (*first revision*)
- 2325-1981 Ignition coils for battery coil ignition systems for automobiles (*first revision*)
- 2577-1974 Cartridge fuse-links for automobiles (*first revision*)
- 2646-1964 Generators (dynamos) for automobiles
- 3105-1980 General requirements for automobiles lighting and signalling devices (*first revision*)
- 3141-1965 Starters for automobiles
- 3563-1974 Automobile headlights (replaceable lamp type) (*first revision*)
- 3628-1966 Sidelights, tail-lights, parking lights, stop lights and direction indicators
for automobile use
- 4050-1976 Methods of tests for horn switches for automobiles (*first revision*)
- 4060-1978 Flashers for direction indicators for automobiles (*first revision*)
- 4061-1967 Headlight switches for automobiles
- 4062-1967 Foot-operated headlight dip switches for automobiles
- 4063-1967 Fuse box for automobiles
- 4086-1967 Methods of test for distributors
- 4362-1979 Number plate lighting devices for automobiles (*first revision*)
- 4370-1967 Code of practice for the use of lighting and signalling devices on cars and
commercial vehicles
- 4373-1967 Hydraulically operated stop light switches for automobiles
- 4815-1968 Self-cancelling direction indicator switches for automobiles
- 5439-1978 Oil pressure switches for automobiles (*first revision*)
- 5545-1977 Fog lights for automobiles (*first revision*)
- 5546-1981 Distribution caps and rotor arms for automobiles (*first revision*)
- 5562-1970 Fuel gauges for automobiles
- 5577-1970 Ammeters for automobiles
- 5977-1981 Regulators for automobile dc generators (dynamos) (*first revision*)
- 7471-1974 Recommendation for polarity of earth connections and marking of electrical
equipment for automobiles
- 7528-1974 Porcelain (moulded) fuse links for automobiles
- 7827 (Part I)-1975 Electrical wind screen wipers: Part I Wiper system
- 7827 (Part II)-1975 Electrical wind screen wipers: Part II Wiper motors
- 7953-1976 Horn rings for automobiles
- 7998-1976 Contact breakers for two wheelers, three wheelers and stationary spark
ignition engines

is:

- 8395 (Part I)-1978 Cable terminations for automobile wiring: Part I Blade type connectors (male and female)
- 8395 (Part II)-1977 Cable terminations for automobile wirings: Part II Bullet and tube type connectors
- 8415-1977 Mounting dimensions of head lights for automobiles
- 8416-1977 Mounting dimensions of fog lights for automobiles
- 8925-1978 Alternators for automobiles
- 9264 (Part I)-1979 Motor vehicle interior lighting: Part I General requirements and recommendations
- 9432-1980 Ignition switches for automobiles
- 9433-1980 Piano key type switches for use in automobiles
- 9500-1980 316 rotary emergency warning lights
- 9521-1980 Push button type switches for automotive vehicles
- 9961-1981 Reversing lights for automobiles