
Specification for
**Microswitches (sensitive switches) of
assessed quality: generic data and methods
of test: general rules for the preparation of
detail specifications. Basic and full
assessment levels**

Spécification pour les microrupteurs (interrupteurs sensibles) de qualité assurée: données génériques et méthodes d'essai: règles générales pour la préparation de feuilles particulières. Niveaux d'assurance de base et complètes

Spezifikation für Mikroschalter (Fühlerschalter) bestätigter Güte: Fachgrunddaten und Prüfverfahren: Allgemeine Regeln für die Zubereitung von Bauartspezifikationen. Niedrige und hohe Bestätigungspegel

Contents

Foreword

Cooperating organizations

Specification

Section one. Principles and mandatory procedures

- 1.1 General matters
 - 1.1.1 Scope
 - 1.1.2 Related documents
 - 1.1.3 Terminology
 - 1.1.4 Letter symbols, signs and abbreviations
 - 1.1.5 Graphical symbols
 - 1.1.6 Marking of the component and package
 - 1.1.7 Eligibility for qualification approval
 - 1.1.8 Structurally similar components
 - 1.1.9 Delayed delivery
 - 1.1.10 Certified test records
 - 1.1.11 Standard values of ratings and characteristics
 - 1.1.12 Unchecked parameters
 - 1.1.13 Procedure to be followed in the event of failures at group C or D inspection
 - 1.1.14 Sampling procedure for small lots
- 1.2 Test procedures
 - 1.2.1 Test and measurement conditions
 - 1.2.2 Visual inspection
 - 1.2.3 Dimensions
 - 1.2.4 Electrical test procedures
 - 1.2.5 Mechanical test procedures
 - 1.2.6 Environmental test procedures
 - 1.2.7 Endurance test procedures
 - 1.2.8 Resistance to solvents
 - 1.2.9 Resistance to contaminating fluids
 - 1.2.10 Flammability

Section two. Rules for the preparation of detail specifications

- 2.1 Basic information
 - 2.1.1 Originator of the detail specification
 - 2.1.2 Detail specification number
 - 2.1.3 Description of the component and level of assessment
 - 2.1.4 Outline drawing
 - 2.1.5 Ratings
 - 2.1.6 Characteristics
 - 2.1.7 Related documents
 - 2.1.8 Ordering information
 - 2.1.9 Additional information
- 2.2 Inspection requirements
 - 2.2.1 Group A inspection
 - 2.2.2 Group B inspection
 - 2.2.3 Group C inspection
 - 2.2.4 Group D inspection
- 2.3 Certified test records
 - 2.3.1 General information
 - 2.3.2 Attributes information
 - 2.3.3 Measurements information
 - 2.3.4 Explanatory information

Appendix

A. Example of certified test record

Tables

1. Inspection requirements for basic assessment level
2. Inspection requirements for alternative procedures for qualification approval at basic assessment level
3. Inspection requirements for full assessment level
4. Requirements for alternative procedure for qualification approval at full assessment level

Figure

1. Positions and movements of actuator or auxiliary actuator

Foreword

This revised British Standard has been prepared under the direction of the Electronic Components Standards Committee. It is the generic specification for microswitches (sensitive switches) in the system of standards for electronic components of assessed quality. This British Standard supersedes BS 9562 : 1970 which is now withdrawn.

The revision is necessary to update the generic in the light of changes in test requirements for switches for electronic equipment.

This standard calls for the use of substances and/or test procedures that may be injurious to health if adequate precautions are not taken. It refers only to technical suitability and in no way absolves either the supplier or the user from statutory obligations relating to health and safety at any stage of manufacture or use.



Amendment No. 1
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to BS 9562 : 1982

**Specification for microswitches (sensitive switches)
of assessed quality: generic data and methods of test;
general rules for the preparation of detail specifications.
Basic and full assessment levels**

Revised text

AMD 4712
April 1989

Contents

After the reference to 1.1.14 insert '1.1.15 Procedure for qualification approval'.

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Clause 1.1.9 Delayed delivery

In line 1 delete 'Switches' and substitute 'Unless otherwise stated in the detail specification, switches'.

At the end of the clause insert 'The maximum allowable period specified in the detail specification shall be 3 years.'

AMD 4712
April 1989

New clause 1.1.15

After clause 1.1.14 insert the following.

'1.1.15 Procedure for qualification approval

The procedure to be used for qualification approval shall be either that given in clause 14 of BS 9000 : Part 1 : 1981 or alternatively, subject to the agreement of the supervising inspectorate, by using a prescribed series of tests and a fixed sample size as given in tables 2 and 4 of this standard.'

AMD 4712
April 1989

Clause 1.2.1.10 Cycle of operation

In line 4 delete '8 %' and substitute '80 %'.

AMD 4712
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Clause 1.2.4.3 Voltage proof

Delete the existing clause including 1.2.4.3.1 and 1.2.4.3.2 and substitute the following.

'1.2.4.3 Voltage proof

1.2.4.3.1 Method of test. The specimen shall be securely mounted on a rigid metal plate or printed wiring board using its normal fixing device. The dimensions of the metal plate shall be such that the contour of the switch in the mounting plate is exceeded.

The a.c. test voltage, calculated from the working voltage given in the detail specification by formulae 1 and 2 given below shall be applied sequentially for 60 s between the following.

(a) The two terminations forming the circuit which has the smallest contact separation on opening. The switch actuator shall be in a position which causes these contacts to be open at the time of the test.

(b) All terminations connected together and any exposed metal part not intended to be electrically connected.

All parts accessible from the front panel and made from an insulating material shall be wrapped with metal foil and included as part of the 'exposed metal part' test



point. The proof voltage E shall be determined in relation to maximum switched voltage U by one of the following formulae, unless otherwise stated by the detail specification.

For switches intended to meet the requirements of IEC 65 formula 1 shall be applied; in all other cases formula 2 shall be applied.

(1) $E = 2 U + 1500$: minimum value of $E = 2000$ V d.c. or a.c. peak

(2) $E = 3 U$: minimum value of $E = 500$ V d.c. or a.c. peak

1.2.4.3.2 Requirements. The switch shall withstand the applied voltage. There shall be no evidence of breakdown or flashover.

1.2.4.3.3 Details to be specified in the detail specification. When this test is required by the detail specification the following details shall be specified.

- (a) Preparation of the specimen.
- (b) The basis for determining the proof voltage E .
- (c) Any deviations from the standard test method.'

AMD 4712
April 1989

New clause 1.2.4.9

After clause 1.2.4.8.3 insert the following.

'1.2.4.9 Intermittency of contact resistance

1.2.4.9.1 Method of test. Appropriate pairs of terminations whose related internal contacts complete a circuit shall be connected to a suitable measuring apparatus capable of measuring contact intermittency. The number of pairs of terminations and their selection shall be those pairs previously selected for test (see 1.2.4.1).

1.2.4.9.2 Requirements. For contacts normally closed, there shall be no intermittency corresponding to a change of contact resistance of more than $10\,000\ \Omega$ of duration greater than $10\ \mu\text{s}$, unless otherwise stated in the detail specification.

For contacts normally open, there shall be no intermittency corresponding to closure of the circuit by an equivalent resistance of less than $100\,000\ \Omega$ of duration greater than $10\ \mu\text{s}$, unless otherwise stated in the detail specification.'

AMD 4712
April 1989

Clause 1.2.6.1 Soldering

Delete this clause including 1.2.6.1.1 and 1.2.6.1.2 and substitute the following.

'1.2.6.1 Soldering

1.2.6.1.1 Method of test. Terminations shall be soldered in accordance with tests Ta and Tb of BS 2011 : Part 2.1 T : 1981 unless otherwise stated in the detail specification.

Two methods are regarded as standard, the solder bath method and the soldering iron method. Where the test is prescribed after conditioning, the detail specification shall specify the number of terminations to be left unwired with a minimum of two terminations.

1.2.6.1.2 Solderability test Ta. The detail specification shall specify whether method A or method B is to be used.
Requirements. As in test Ta of BS 2011 : Part 2.1 T : 1981.

1.2.6.1.3 Resistance to soldering heat test Tb. The detail specification shall specify whether method 1a, 1b or 2 is to be used.

Requirements. There shall be no signs of fracture, loosening of parts or other damage such as would impair the operation and performance of the switch.'

Clause 1.2.6.3 Vibration

Delete this clause including 1.2.6.3.1 and 1.2.6.3.2 and substitute the following.

'1.2.6.3 Vibration

1.2.6.3.1 Method of test. The test shall be carried out in accordance with test BS 2011 : Part 2.1Fc : 1983.

The test procedure and the severity of the test shall be given in the detail specification. The switch shall be mounted as specified in **1.2.1.7** and shall be vibrated in each of three mutually perpendicular directions.

The switch shall then be subjected to the tests described in **1.2.2.2**, **1.2.4.1**, **1.2.4.8** and, if applicable, **1.2.6.10** (operational seals only).

When measurement of change in the value of contact resistance during the test is called for in the detail specification, the switch shall be connected in a circuit with a suitable monitor.

1.2.6.3.2 Requirements. The switch shall meet the requirements of **1.2.2.2**, **1.2.4.1.2**, **1.2.4.8.3** and, if applicable, **1.2.6.10.1** (operational seals only).

If monitored, there shall be no change of contact resistance greater than that stated in the detail specification.'

Clause 1.2.6.4 Acceleration

Delete this clause including 1.2.6.4.1, 1.2.6.4.2 and 1.2.6.4.3 and substitute the following.

'1.2.6.4 Acceleration

1.2.6.4.1 Method of test. The test shall be carried out in accordance with BS 2011 : Part 2.1 Ga : 1984.

The switch shall be mounted as specified in **1.2.1.7** and shall be subjected to acceleration for the duration and at the severity given in the detail specification in each of three mutually perpendicular directions.

The switch shall then be subjected to tests **1.2.2.2**, **1.2.4.1**, **1.2.4.8** and, if applicable, **1.2.6.10.1** (operational seals only).

When measurement of change in the value of contact resistance is called for in the detail specification the switch shall be connected in a circuit with a suitable monitor.

1.2.6.4.2 Requirements. The switch shall meet the requirements of **1.2.2.2**, **1.2.4.1.2**, **1.2.4.8.3** and, if applicable, **1.2.6.10.1** (operational seals only).

If monitored, there shall be no change of contact resistance greater than that stated in the detail specification.'

Clause 1.2.6.5 Shock

Delete this clause including 1.2.6.5.1, 1.2.6.5.2 and 1.2.6.5.3 and substitute the following.

'1.2.6.5 Shock

1.2.6.5.1 Method of test. The test shall be carried out in accordance with BS 2011 : Part 2.1Ea : 1988.

The switch shall be mounted as specified in **1.2.1.7**. When measurement of intermittency of contact resistance during the test is called for in the detail specification, it shall be carried out in accordance with **1.2.4.9**.

The switch shall then be subjected to tests **1.2.2.2**, **1.2.4.1**, **1.2.4.8** and, if applicable, **1.2.6.10** (operational seals only).

Detail specifications shall include the following conditions of test.

- (a) The severity of the shock pulse.
- (b) The method of application.
- (c) The temperature at which the test is to be carried out.
- (d) Whether intermittency is to be monitored and for what period.

1.2.6.5.2 Requirements. The switch shall meet the requirements of **1.2.2.2**, **1.2.4.1.2**, **1.2.4.8.3** and, if applicable, **1.2.6.10.1** (operational seals only).'

AMD 4712
April 1989

Clause 1.2.6.7.2 Climatic sequence

Delete the text of paragraph 1 and substitute the following.

'The test shall be carried out in accordance with test Z/ABDM of BS 2011 : Part 2.1 Z/ABDM : 1983 using the procedures and degrees of severities given in the detail specification. Tests shall be carried out as specified below during each conditioning cycle and requirements shall be satisfied as follows.'

Under '(a) *Test 2.1 Ba : 1977 Dry heat*' in line 7, delete 'sealing (see **1.2.6.10**)'.

After line 15 insert 'sealing (see **1.2.6.10**) (if applicable) (operational seals only)'.

Delete '(b) *Test 2.1 Da : 1977 Accelerated damp heat*' and substitute '(b) *Test 2.1 Db : 1981 Damp heat cyclic*'.

In the text delete 'Da' and substitute 'Db'.

Under '(c) *Test 2.1 Aa : 1977 Cold*' in line 11, after (sealing (see **1.2.6.10**)' insert '(if applicable) (operational seals only)'.

In line 1 of (d) delete '1977' and substitute '1984'.

Delete '(e) *Test 2.1 Da : 1977 Accelerated damp heat or 2.1 Db : 1981 Damp heat, cyclic*' and substitute '(e) *Test 2.1 Db : 1981 Damp heat cyclic*' and in the text delete 'Da or'.

In line 20, after 'sealing (see **1.2.6.10**)' insert '(if applicable) (operational seals only)'.

AMD 4712
April 1989

Clause 1.2.7.5.2 Measurement

In line 9, after 'sealing (see **1.2.6.10**) (if applicable)' insert '(operational seals only)'.

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Table 1. Inspection requirements for basic assessment

In the title of Group B delete 'Non-destructive' and substitute 'Destructive'.

In subgroup B1 insert the following test.

'Solderability* **1.2.6.1.2**'.

Under the table insert '*This test to be carried out on two unwired terminations.'

In subgroup D3(ii) insert as first test 'Resistance to soldering heat **1.2.6.1.3**' and insert as final test 'Solderability* **1.2.6.1.2**'.

Under the table insert '*This test to be carried out on two unwired terminations.'

AMD 4712
April 1989

Table 2. Inspection requirements for alternative procedure for qualification approval at basic assessment level

In test group 0, insert as final test 'Solderability* **1.2.6.1.2**'.

In test group 2, insert as first test 'Resistance to soldering heat **1.2.6.1.3**' and insert as final test 'Solderability* **1.2.6.1.2**'.

Under the table insert '*This test to be carried out on two unwired terminations.'

AMD 4712
April 1989

Table 3. Inspection requirements for full assessment level

In subgroup B2 delete 'Soldering **1.2.6.1**' and substitute 'Solderability* **1.2.6.1.2**'.

Under the table insert '*This test to be carried out on two unwired terminations.'

In subgroup D1(iii) insert as first test 'Resistance to soldering heat **1.2.6.1.3**' and insert as the final test 'Solderability* **1.2.6.1.2**'.

Under the table insert '*This test to be carried out on two unwired terminations.'