

Specification for

**Harmonized system of  
quality assessment for  
electronic  
components —  
Electrical relays —  
Blank detail  
specification —**

**Electromechanical all-or-nothing  
relays — Test schedules 1, 2 and 3**

Amendments issued since publication

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# National foreword

This British Standard has been prepared under the direction of the Electronic Components Standards Committee. It is identical with IEC Publication 255-19-1 (QC 160101) “*Electrical relays — Part 19: Blank detail specification: Electromechanical all-or-nothing relays of assessed quality. Test schedules 1, 2 and 3*”, published in 1983 by the International Electrotechnical Commission (IEC).

This standard is a harmonized specification within the IECQ system of quality assessment for electronic components.

**Terminology and conventions.** The text of the International Standard has been approved as suitable for publication as a British Standard without deviation. Some terminology and certain conventions are not identical with those used in British Standards; attention is drawn especially to the following.

## Cross-references

| International Standards*       | Corresponding British Standards                                                                                                         |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
|                                | BS 2011 <i>Basic environmental testing procedures</i>                                                                                   |
| IEC 68-1:1982                  | Part 1.1:1983 <i>General and guidance</i><br>(Identical)                                                                                |
| IEC 68-2-10:1984               | Part 2.1J:1985 <i>Test J. Mould growth</i><br>(Identical)                                                                               |
|                                | BS 5992 <i>Electrical relays</i>                                                                                                        |
| IEC 255-0-20:1974              | Part 1:1980 <i>Specification for contact performance of electrical relays</i><br>(Identical)                                            |
| IEC 255-1-00:1975              | Part 2:1980 <i>Specification for all-or-nothing relays</i><br>(Identical)                                                               |
|                                | BS QC 160000 <i>Harmonized system of quality assessment for electronic components.</i>                                                  |
|                                | <i>Electrical relays. Generic specification:</i>                                                                                        |
|                                | Electromechanical all-or-nothing relays                                                                                                 |
| IEC 255-7:1978                 | Part 1:1987 <i>Test and measurement procedures</i><br>(Identical)                                                                       |
| IEC 255-10:1979                | Part 2:1987 <i>Quality assessment procedures</i><br>(Identical)                                                                         |
| IEC 255-19:1983<br>(QC 160100) | BS QC 160100:1987 <i>Harmonized system of quality assessment for electronic components. Electrical relays. Sectional specification:</i> |
|                                | <i>Electromechanical all-or-nothing relays</i><br>(Identical)                                                                           |
| IEC 443:1974                   | BS 5148:1975 <i>Method for specifying the performance of stabilized power supply apparatus</i><br>(Technically equivalent)              |
| ISO 2015:1976                  | BS 4760:1971 <i>Specification for numbering of weeks</i><br>(Technically equivalent)                                                    |

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

**Compliance with a British Standard does not of itself confer immunity from legal obligations.**

#### **Summary of pages**

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 30 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.



## Section 1. General

### 1 Scope

This blank detail specification applies to electromechanical all-or-nothing relays, test schedules 1, 2 and 3 of assessed quality.

### 2 Object

This blank detail specification gives the tests to be used and the layout to be followed when preparing detail specifications for electromechanical all-or-nothing relays. The test schedules are defined, and the relationship to each other is described in the sectional specification for such relays in IEC Publication 255-19 which selects appropriate tests from IEC Publication 255-7 in accordance with IEC Publication 255-10.

### 3 Related documents

IEC Publication 68-1, *Basic Environmental Testing Procedures — Part 1: General and Guidance*.

IEC Publication 255-7, *Electrical Relays — Part 7: Test and Measurement Procedures for Electromechanical All-or-nothing Relays (Generic specification)*.

IEC Publication 255-10-10, *Application of the IEC Quality Assessment System to All-or-nothing Relays*.

IEC Publication 255-19-19, *Sectional Specification for All-or-nothing Relays of Assessed Quality*.

IEC Publication 443, *Stabilized Supply Apparatus for Measurement*.

ISO Standard 2015, *Numbering of weeks*.

Any document to which direct reference is needed and which is not quoted elsewhere.

### 4 Diversity of detail specifications

One detail specification shall only cover structurally similar relays (see IEC Publication 255-19).

### 5 Identification of detail specifications

Identification of each detail specification shall be provided by an IEC number, date of issue and, regarding the test schedules, in accordance with IEC Publication 255-10.

### 6 Test schedules in detail specifications

Test schedules shall, as a minimum, contain the tests marked as mandatory (M) in Section 2 of this specification, considering the properties of the relay concerned, its contact category, and the notes in Appendix B of IEC Publication 255-10 and Appendix A of IEC Publication 255-19. The test procedures may be extended, and tests marked as recommended (R) may be added. Tests not listed in Appendix B of IEC Publication 255-10 may be added either from, or in addition to the generic specification, and such tests may be altered if necessary, under the conditions of Clauses 7 and 8.

Any test or test procedure laid down in a detail specification shall be mandatory for the relay(s) covered by that specification.

### 7 Non-harmonized test procedures

At the discretion of National Committees or other standards-issuing authorities, detail specifications may contain tests beyond those specified in IEC Publication 255-7 (generic specification).

Such tests shall be clearly indicated as non-harmonized and their description and layout shall follow those of the harmonized tests.

### 8 Altered test procedures

If the technical requirements of the generic specification relative to inspection are not entirely suitable (either for technical reasons or because of special application) to the relay described in the detail specification, the latter shall set out clearly the various amendments which are to be made to these requirements.

## 9 Quality conformance inspection

Test schedules 1, 2 and 3 for quality conformance inspection are contained in Table I, Table III and Table V respectively. The order of the tests within the sub-groups of these tables should, in general, be appropriate for their sequence when performed, but the detail specification shall specify the mandatory order considering the nature of the relays to be tested. Tests to be added to those listed in Table I, Table III and Table V shall be arranged in the suitable group and sub-group, and at the appropriate place within such sub-group.

When assigning IL- and AQL-notations, the IL values given under the heading of each sub-group shall be used, and the AQL values shall be within the given range.

## 10 Qualification approval tests

When Method 1 of Clause 4 of IEC Publication 255-10 applies, the test schedules shall be as shown in Table II, Table IV and Table VI of the present specification and shall be consistent with that used for quality conformance inspection.

The detail specification shall also state the sample size and the associated permissible number of defectives. The entries in Table II, Table IV and Table VI indicate minimum sample sizes, taking into account that the confidence in the results of the qualification approval tests cannot only be derived from statistical considerations but should also pay regard to the overall technical information and the cost involved in the tests. A minimum sample size of five specimens per test group plus one specimen for replacement of one defective relay, i.e. acceptance on one defective relay, may be appropriate in most cases to form sample groups, while the total of all samples will be subject to some basic tests on a miss-free basis. For example in Table 11, Table 18 specimens will be required for the “all samples” test which are divided into five plus one specimens each in three sample groups.

If this minimum sample size is not deemed sufficient, sampling plans from IEC Publication 410 shall preferably be used, and the limiting quality of the sampling plan shall be considered for agreement between manufacturer and purchaser.

Other relations between the sample size and allowed number of defectives of qualification approval tests versus the criteria of quality conformance inspection may be considered and specified in the detail specification.

## Section 2. Contents of detail specifications

### 11 General requirements

Detail specifications shall comply with the requirements given below and the tables in them shall be completed in accordance with the entries in the tables in this specification. Where relevant, the entries should take account of Section 1 of this specification and the appropriate clauses of IEC Publications 255-7 and 255-10. It should be understood that writing a detail specification is the task of an engineer who is well aware of these specifications and of the relays he has to specify.

### 12 Symbols

The symbols in front of the lines of the columns for conditions of test and performance requirements denote, in accordance with IEC Publications 255-7 and 255-10:

- M: mandatory test
- R: recommended test
- M, R: as above, but see restrictions in IEC Publications 255-7 and 255-10
- +: state if required
- ×: state if applicable

### 13 Front page

The entries on the front page shall be as follows. The circled numbers correspond to those in the layout of Sub-clause 13.4.

#### 13.1 Identification of the detail specification

- ① The name of the National Standards Organization under whose authority the detail specification is drafted.
- ② The IEC number of the relevant blank detail specification.
- ③ The number and issue of the national generic specification.
- ④ The national number of the detail specification, date of issue and further information required by the national system.

#### 13.2 Identification of the component

- ⑤ A short description of the type of relay as necessary for its identification.
- ⑥ Information on its particular construction (where applicable).
- ⑦ Outline drawing and/or reference to the relevant document for outlines. Alternatively, this drawing may be given in an appendix to the detail specification.
- ⑧ Application and test schedule.

NOTE The order of ranking of the test schedules is as given in Clause A.1 of Appendix A of the sectional specification, IEC Publication 255-19.

- ⑨ Reference data of the most important properties.

#### 13.3 Example of reference data, presentation is optional

##### Reference data

This information is not for inspection purposes.

##### 1) Coil

| Coil voltage<br>(V d.c.) | Number of turns | Resistance at 20 °C<br>(Ω) | Test voltage<br>(kV) | Coil variant code |
|--------------------------|-----------------|----------------------------|----------------------|-------------------|
| 6                        | 545             | 3.1                        | 2.5                  | 70                |
| 12                       | 1 090           | 14.7                       |                      | 71                |
| 24                       | 2 180           | 58                         |                      | 72                |
| 220                      | 20 000          | 5 000                      |                      | 78                |

##### 2) Contacts

| Type          | Continuous<br>contact current<br>(A) | Open-circuit<br>voltage<br>(V) | Make/break power<br>(W) | Test voltage<br>(kV) | Contact code |
|---------------|--------------------------------------|--------------------------------|-------------------------|----------------------|--------------|
| 1 make        | 15                                   | 440 = /<br>380 ~               | 1 000 = /2 200 ~        | 2.5                  | 1A           |
| 2 make        | 10                                   |                                |                         |                      | 2A           |
| 1 change-over | 10                                   |                                |                         |                      | 1C           |
| 2 change-over | 10                                   |                                | 600 = /1 500 ~          |                      | 2C           |

##### 3) Temperature range: 0 °C ... + 40 °C

**13.4 Layout of the front page of detail specifications**

|                                                                                                  |                                                              |                |   |
|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------|----------------|---|
| ①                                                                                                | Page:<br>Of:                                                 | IEC<br>Issue 1 | ② |
| ③                                                                                                | ④                                                            |                |   |
| <b>DETAIL SPECIFICATION FOR: ALL-OR-NOTHING RELAY</b><br><b>TYPE(S):</b><br><b>CONSTRUCTION:</b> |                                                              |                | ⑤ |
|                                                                                                  |                                                              |                | ⑥ |
| ⑦                                                                                                | Application: ⑧<br><br>Test schedule: × (or × with additions) |                |   |
| (Outline drawing)                                                                                |                                                              |                |   |
| <i>Reference data</i><br>This information is not for inspection purposes.                        |                                                              |                | ⑨ |

**14 Related documents**

**14.1** IEC Publication 255-7, and further publications referenced therein (state, as appropriate, further related documents).

**15 Characteristic values**

(state in accordance with IEC Publication 255-1-00)

**16 Formation of inspection lots**

(state as applicable)

**17 Intervals between tests**

(state for Group C)

**18 Qualification approval**

(state Method 1 or 2 of Clause 4 of IEC Publication 255-10 and, in the first case, refer to Table II, Table IV or Table VI respectively)

**19 Quality conformance inspection**

**19.1** With the exception of Sub-group A0, where a sub-group contains more than one test, the order of tests is mandatory.

**19.2** Samples subjected to destructive tests (D) shall not be released for delivery.

## 20 Marking of relays and packages

Relays and their packages supplied in accordance with this detail specification shall be marked as follows:

### 20.1 Relay

- trade mark or manufacturer's name
- relay type code
- coded date of manufacture, at least to the nearest month, in accordance with ISO Standard 2015 if appropriate
- (any further necessary marking)

### 20.2 Packages

- detail specification reference
- trade mark or manufacturer's name
- relay type code
- manufacturer batch identification code
- quantity
- (any further necessary marking)

## 21 Test schedules

Table I — Test schedule 1 Quality conformance inspection requirements

| Test No.                                                                                     | Examination or test        | Conditions of test<br>Refer to clause or<br>sub-clause of IEC Publication 255-7                                                                                                                                                                  | IL                           | AQL | Performance requirements                                                    |
|----------------------------------------------------------------------------------------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-----|-----------------------------------------------------------------------------|
| <i>Quality conformance inspection Requirements</i>                                           |                            |                                                                                                                                                                                                                                                  |                              |     |                                                                             |
| <i>Standard conditions for testing</i><br>Applicable to all tests unless otherwise specified |                            |                                                                                                                                                                                                                                                  |                              |     |                                                                             |
|                                                                                              |                            | From Sub-clause 16.7 of IEC Publication 255-7 state<br>+ 1) Atmospheric conditions<br>+ 2) Properties of supply and connections<br>+ 3) Cleaning and/or adjustment before test<br>4) Fixing instructions<br>+ 5) Application of these conditions |                              |     | 1) See IEC Publication 68-1<br>2) See IEC Publication 443                   |
| <b>Group A inspection</b> <div> <i>General case</i> <i>Special case</i> </div>               |                            |                                                                                                                                                                                                                                                  |                              |     |                                                                             |
| <b>Sub-group A0</b>                                                                          |                            | 100 %-test                                                                                                                                                                                                                                       | IL:                          | II  |                                                                             |
| For all tests in this sub-group                                                              |                            |                                                                                                                                                                                                                                                  | AQL: 0.065 ... 0.25 ... 0.65 |     |                                                                             |
| 1                                                                                            | Visual inspection, marking | M 17.4 1) and 2)                                                                                                                                                                                                                                 | ...                          | ... | Present and legible                                                         |
| 2                                                                                            | Functional tests           | M State from 24.3:<br>1) operate and release value, preconditioning, polarity<br>5) test on new relays<br>+ 6) magnetic orientation<br>× 7) details of monitoring                                                                                | ...                          | ... | Correct functioning                                                         |
| 3                                                                                            | Dielectric test            | M State from 20.2:<br>1) terminals<br>2) voltage parameters<br>3) duration                                                                                                                                                                       | ...                          | ... | No breakdown, no flashover<br>+ maximum leakage current                     |
| 4                                                                                            | Sealing                    | M State from 31.2.2:<br>1) method<br>3) pressurizing and cleaning<br>× 4) details of Method 3                                                                                                                                                    | ...                          | ... | Method 1:<br>no visible leakage<br>Methods 2 and 3:<br>maximum leakage rate |
| <b>Sub-group A1</b> <div> IL: I<br/>AQL: 0.4 ... 1.0 ... 4 </div>                            |                            |                                                                                                                                                                                                                                                  |                              |     |                                                                             |
| For all tests in this sub-group                                                              |                            |                                                                                                                                                                                                                                                  |                              |     |                                                                             |
| 5                                                                                            | D.C. coil resistance       | M State from 19.1.3:<br>+ 2) reference temperature<br>× 3) temperature coefficient<br>× 4) precautions                                                                                                                                           | I                            | ... | Resistance limit(s) of the coil(s)                                          |
| 6                                                                                            | Coil impedance             | M State from 19.3.3:<br>1) method<br>3) energization value(s)<br>+ 4) test voltage<br>+ 5) alternative procedure                                                                                                                                 | I                            | ... | Impedance or burden limits                                                  |
| 7                                                                                            | Functional tests           | M State from 24.3:<br>Test No. ②                                                                                                                                                                                                                 | I                            | ... | Correct functioning                                                         |
| <b>Sub-group A2</b> <div> IL: S 4<br/>AQL: 0.4 ... 1.0 ... 4 </div>                          |                            |                                                                                                                                                                                                                                                  |                              |     |                                                                             |
| For all tests in this sub-group                                                              |                            |                                                                                                                                                                                                                                                  |                              |     |                                                                             |
| 8                                                                                            | Check of dimensions        | R State from 17.7:<br>1) dimensions<br>+ 2) creepage distances and clearances                                                                                                                                                                    | S 4                          | ... | Tolerances                                                                  |
| Symbols and circled numbers, see Clauses 12 and 13.                                          |                            |                                                                                                                                                                                                                                                  |                              |     |                                                                             |