LOVAG

Test Instruction for IEC/EN 61812-1

Conditions for Testing

of Specified-time Relays

This Test Instruction is based on the following standards:

Specified-time relays: IEC 61812-1 / 10.1996
EN 61812-1 + A11 / 8.1999

This Test Instruction provides additional information ensuring a suitable degree of repeatability of the tests between the different test laboratories.

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M. J. Swan

Chairman of LOVAG Technical Committee

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Author: ALPHA
Co-author: SEMKO

Foreword

All tests described here are type tests according to clause 6 of the standard.

The text of the standard is not reproduced unless necessary.

This test instruction cannot be used by itself, but only in conjunction with the standards.
It contains only details on particular items. Therefore, the tests are to be carried out only after carefully working through the corresponding standards.

To facilitate the use of this test instruction the sections are numbered according to
IEC 61812-1 / 10.1996; EN 61812-1 + A11 / 8.1999.

6. Tests

6.1.2 and 6.1.2.1 Tests within a type family

The arrangement of different specified-time relays within one single type family makes the tests more effective, but has to be carried out with care.

The manufacturer is competent enough to decide if a test result depends on the variable equipment features. He is therefore responsible for the test extents.

It can be useful to draw up the corresponding type family in a matrix. This matrix can give an survey of the units under test and their characteristics which have to be tested.

Specified-time relays are manufactured in type families with one ore more identical and one or more varying features. Examples for varying features are:

- Nominal input voltages
- Time ranges
- Sort of output contacts
- Timing characteristics

Within one type family separate test steps may be skipped if these are included in previous tests. In an addendum to the test report the realized tests and the appropriate types of specified-time relays shall be documented.

6.2 Test of mechanical strength, vibration and shock

6.2.1 Vibration
The specified-time relays shall be tested both with applied minimum supply voltage and without supply voltage.
Refer to 3.6.1.6 and to IEC 60068-2-6, test Fc: Vibration, sinusoidal.
Evaluation shall be in accordance with 3.6.1.6.

6.2.2 Shock
Refer to 3.6.1.5 and to IEC 60068-2-27, Test Ea: Shock.
Evaluation shall be in accordance with manufacturers specifications; specified in the test report.

5.3 Resistance to fire hazard
Insulation materials and plastics to be used shall meet the requirements according to IEC 60695-2-1. The glow-wire test according to IEC 60695-2-1 shall be applied.

6.3 Test of protection against direct contact

Refer to 3.8.
The degree of protection as given in the manufacturer's specification, according to IEC 60529 shall be tested.

6.4.1 Dielectric strength test

The test voltage is sinusoidal with a frequency of 50 or 60 Hz, or a surge voltage. Test voltage in accordance with 3.7.5 and table IV.
In addition to the voltage test with alternating current:
The source impedance of the test voltage must be dimensioned in such a way that the voltage does not break down during test. During testing the tripping current must not exceed 10 mA. The voltages must be switched on and off during testing in such a way, that no transient voltages result.

6.4.2 Checking of creepage distances and clearances

Refer to point 3.9.
Due to direct environment refer to IEC 60664, due to protection class refer to IEC 60529.

Creeping distances must fulfill table 5 . If case B - homogenous field - is declared, then the corresponding requirement shall be tested.
Clearances must fulfill table 6. If there are overvoltage control components, the creeping distances must only fulfill table 7.

The creepage distances and clearances in accordance with 3.9 do not apply over open contacts (in case of operating relays or electronic components) or over their electrical terminals and soldered joints. These creepage distances and clearances over the switching element and on the electrical terminals are regarded as paralleled; the obtainable isolation is determined by the smallest creepage distance. This consideration is legal, because it is not allowed to use specified-time relays for switching mains power voltage.
Criteria: sufficient / not sufficient.

6.5 Checking of resistance to heat

The limited continuous current of the output during this test shall be declared in the test report. All contacts are charged at the same time, apart there is a limitation in the data sheet, which shall be declared in the test report.

6.6 Checking of making and breaking capacity of output circuit

Refer to IEC 60947-5-1, sub-clause 8.3.3.5 for mechanical, IEC 60947-5-2, sub-clause 8.3.3.5 for static output circuits.
If there is a component in the output circuit with known switching capacity values coming from an accredited laboratory, so it is permitted to quote this value.

6.7 Checking of conditional short-circuit current

Refer to IEC 60947-5-1, sub-clause 8.3.4 for mechanical, IEC 60947-5-2, sub-clause 8.3.4 for static output circuits.

6.8 Checking of limiting continuous current

To get an usefull test result, this test shall be carried out with the maximum allowable ambient temperature.
If there is an valuation made during and after test 6.5, this test can be skipped.

6.9 Functional tests

Determination of number of tests in accordance with sub-clause 6.9.6. Manufacturers specifications shall be compared with the test values.

6.9.1 Functional test at reference conditions

Table 9 shows possible influence effects. This standard contains the important remark, that at routine tests a single test may be sufficient.
The test is passed if the data sheet specifications are met within the specified tolerances.

6.9.2 Checking of influencing effects

Manufacturers specifications in comparison with the test results.
The influence of input voltage alterations and ambient temperature alterations to the specified time is meant.

6.9.3 Checking of repeatability

6.9.4 Preferred values under 4.1.3.

6.9.4 Checking of recovery time and minimum control pulse

6.9.5 Checking of the disengaging value of the input quantity

6.10 Tests for checking the endurance of relays

See footnote at 3.5.
The endurance of electronic specified-time relays (static input and output) is depending from the lifetime of all components. A statistical evaluation of endurance may be given as an MTTF (Mean Time To Failure) value.
If there is a component in the output circuit with known values coming from an accredited laboratory, so it is permitted to quote this value in case of no negative influence effects due to the construction.

6.10.1 Mechanical endurance

Not applicable for specified-time relays with static output circuit.
The unit under test shall carry through the complete switching movements, therefore the operating frequency is limited. The applicated operating frequency shall be specified in the test report.

Criteria: meets / meets not manufacturers specifications.

6.10.2 Electrical endurance

The load of the output circuit shall be specified in the test report with

- Number of Operating cycles
- Operating frequency
- Nominal current
- Sort of current, power factor.

Criteria: meets / meets not manufacturers specifications.

6.11 EMC test

3.10 Immunity Requirements

For the use of specified-time relays there are two application classes:
Application class 1: the specified-time relays are used in protected environment.
For this application class the severity class 2 of the corresponding part of IEC 61000-4 is sufficient.

Application class 2: the specified-time relays are used in unprotected environment.
For this application class the severity class 3 of the corresponding part of IEC 61000-4 is necessary.

The manufacturer shall indicate the permissible application class and / or the reached test level in the specifications.

3.10.1 Immunity against electrostatic discharge (ESD)
IEC 61000-4-2

3.10.2 Immunity against electromagnetic fields
IEC 61000-4-3

3.10.3 Immunity against fast transients (bursts)
IEC 61000-4-4

3.10.4 Immunity against surge voltages
IEC 61000-4-5

3.11 EMC emission

in accordance with EN 55011, valid for “industrial environment”

3.11.1 Radiated emission
in accordance with EN 55011, class A or B.

3.11.2 Conducted emission
in accordance with EN 55011, class A or B.

6.12 Humidity test

Refer to IEC 60068-2-3.
After the humidity test the specified-time relais shall pass the high voltage test. Afterwards it has to carry out the specified functions.

6.13 Other tests

6.13.1 Markings and operating documents

7.1 Markings at the specified-time relays
7.2 Markings in the operating documents

Criteria: sufficient / not sufficient.

6.13.2 Optical test of conducting paths of the Printed Circuit Board

There are no criteria given. For creepage distances and clearances see sub-clause 6.4.3. Insufficient cross-sections can show alterations after checking of resistance to heat according to 6.5 or after checking of limiting continuous current according to 6.8. Calculation of conducting paths in accordance with DIN IEC 60326-3 sub-clause 6.2.

Criteria: sufficient / not sufficient.

6.13.3 Rated Power Consumption

See sub-clause 3.3. Checking of rated power consumption with measurement equipment, which is suitable for measuring of nonsinusoidal values.