

KS

KOREAN INDUSTRIAL STANDARD

Hinge Type Electromagnetic Relays

KS C 4520 : 1992

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Hinge Type Electromagnetic Relays

1. Scope

This Korean Industrial Standard specifies hinge type electromagnetic relays (hereafter referred to as "relays") for use in an electric circuit of a voltage not exceeding 250 V a.c. at a frequency 60 Hz or d.c., and of a current 30 A or under, designed mainly for signal transmission of electronic appliance or industrial control.

Note Hinge type electromagnetic relay means a relay of a mechanism in which the armature of the electromagnet turns about its fulcrum by application or removal of the operating input to its coil, and this motion opens or closes the contacts directly or indirectly.

2. Definitions

For the purposes of this Standard, the following definitions apply.

(1) coil

A part of the relay for supplying electromagnetic force to make the relay into the operated condition or to keep it in the holding condition. It consists mainly of a winding of wire.

(2) operation

The action whereby the relay goes from the reset condition to the operated condition.

(3) return

The action whereby the relay goes from the operated condition to the reset condition.

(4) operated condition

The mechanically stable condition in which all the closed contacts are in open position or the condition in which all the open contacts are in closed position.

(5) reset condition

The mechanically stable condition in which all the open contacts are in position and/or all the closed contacts are in closed position.

Normative References See page 25.

(6) hold condition

The condition after a relay has been operated, in which no contact returns under a coil voltage or current within a specified fluctuation range.

(7) rated voltage

The standard voltage to be applied on the coil in ordinary use of the relay.

(8) rated current

The standard current to be applied on the coil in ordinary use of the relay.

(9) operating voltage

The minimum voltage to operate the relay.

(10) operating current

The minimum current to operate the relay.

(11) rated contact current

The standard current of the load which is capable of being opened and closed by the contact of a relay in its normal service.

(12) rated contact voltage

The standard voltage of the load which is capable of being opened and closed by the contact of a relay in its normal service.

(13) rated thermal current

Current which can be passed continuously through the switching part without exceeding the temperature rise limit with the contact closed.

(14) rated insulation voltage

The voltage used as the standard for insulation design.

(15) switching device

The entire conduction part of the relay which opens and closes the external electric circuits. It is composed of contacts, contact springs, internal wiring, terminations, etc.

(16) contact

Electric contact having the function of connecting or switching the electric circuit. Generally it is called "conduct".

(17) normally-open contacts

A contact which is open in the reset condition and closed in the operated condition and the hold condition. It is also called "make contact", or "a contact".

(18) normally-closed contacts

A contact which is open in the reset condition and closed in the operated condition and the hold condition. It is also called "break contact", or "b contact".

(19) changeover contacts

A contact set comprising both "normally-open contacts" and "normally-closed contacts", with "normally-open contact" being closed, and "normally-closed contact" being open.

(20) number of poles

Number of circuit changeover parts capable of carrying out changeover by one operation.

(21) switching frequency

The number of operations of the relay per unit time.

(22) insulation distance

The minimum distance between the parts which are to be insulated each other. The insulation distance consists of clearance and creepage distance.

(23) clearance

The minimum distance through air between two bare live parts insulated each other.

(24) creepage distance

The minimum distance between two bare live parts along the surface of an insulating material.

3. Standard Service Conditions

The standard service conditions shall be as follows, provided that it does not freeze up the relay nor cause dew condensation on the relay.

(1) Ambient Temperature

-5°C to +40°C

(2) Relative Humidity

45% to 85%

(3) Altitude

2000 m or under

4. Classification

The relays shall be classified by the dimensions as follows.

- (1) Type A relay
- (2) Type B-I relay
- (3) Type B-II relay
- (4) Type C relay
- (5) Type D relay

5. Ratings

5.1 Rated Voltage

The rated voltage of coil shall be as given in Table 1.

Table 1 Rated Voltage

Unit : V

Rated voltage													
1.5	3	4.5	5	6	9	12	18	24	48	50	100	110	200 220

5.2 Rated Insulation Voltage

The rated insulation voltage shall be as given in Table 2.

Table 2 Rated Insulation Voltage

Unit : V

Rated insulation voltage			
30	60	125	250

5.3. Rated Contact Voltage

The rated contact voltage shall be as given in Table 3.

Table 3 Rated Contact Voltage

Unit : V

Distinction between a.c. and d.c.	Rated contact voltage						
A.C.	50	100	110	120	200	220	250
D.C.	24	30	48	100	200		

5.4. Rated Frequency

The rated frequency of a.c. relay shall be as given in Table 4.

Table 4 Rated Frequency

Unit : Hz

Rated frequency
60

5.5 Rated Thermal Current

The rated thermal current shall be as given in Table 5.

Table 5 Rated Thermal Current

Unit : A

Rated thermal current											
0.5	1	2	3	5	7	10	15	20	25	30	

5.6 Rated Contact Current

The rated contact current shall be as given in Table 6.

Table 6 Rated Contact Current

Unit : A

Rated contact current														
0.1	0.3	0.5	0.7	1	2	3	4	5	7	10	15	20	25	30

6. Performances**6.1 Operation and Return**

When the test of 8.2.2 is carried out, the operation and return shall be excellent at every part.

6.2 Contact Resistance

When the test of 8.2.3 is carried out, the contact resistance shall be not more than 100 mΩ.

If the resistance of the conductor itself excluding the contact is large, it shall be subtracted from the resistance measured in the said test.

6.3 Insulation Resistance

When the test of 8.2.4 is carried out, the insulation resistance shall be not less than 20 MΩ.

6.4 Dielectric Withstand Voltage

When the test of 8.2.5 is carried out, the relay shall withstand the test voltage.

6.5 Temperature Rise

When the test of 8.2.6 is carried out, the temperature rise of the individual parts shall not exceed the appropriate value of temperature rise limits given in Table 7 and Table 8. The limit of reference ambient temperature shall be 30°C.

Table 7 Temperature Rise Limit

Part	Temperature rise limit (thermometer method)
Contact part in air (including contact)	A temperature which does not damage adjacent part
Metal part which performs spring action	A temperature which does not destroy elasticity of materials
metal part which is in contact with insulating material	A temperature which does not damage insulating material. For example, the temperature rise of the contacting part to phenolic resins castings shall be 100°C.
Termination used for connection with external insulated conductor	70°C

Table 8 Temperature Rise Limit of Coil

Unit : °C

Insulation class		Temperature rise limit (resistance method)
In air	Class A insulated coil	100
	Class E insulated coil	115
	Class B insulated coil	125

6.6 Resistance to Cold

Resistance to cold shall comply with the following.

(1) Operation at Cold

When the relay is tested by the method of 8.2.7 (1), its individual parts shall operate without any trouble.

(2) Storage at Cold

When the relay is tested by the method of 8.2.7 (2), it shall satisfy the provisions of 6.1, 6.4 and 7.1, and further, the insulation resistance shall be not less than 5 MΩ.

6.7 Resistance to Heat

Resistance to heat shall comply with the following.

(1) Operation at Dry Heat

When the relay is tested by the method of 8.2.8 (1), its individual parts shall operate without any trouble.

(2) Storage at Dry Heat

When the relay is tested by the method of 8.2.8 (2), it shall satisfy the provisions of 6.1, 7.4 and 7.1, and further, the insulation resistance shall be not less than 5 M Ω .

6.8 Resistance to Damp Heat

When the relay is tested by the method of 8.2.9, it shall satisfy the provisions of 6.1, 6.4 and 7.1, and further, the insulation resistance shall be not less than 5 M Ω .

6.9 Resistance to Vibration

Resistance to vibration shall comply with the following.

(1) Misoperation due to Vibration

When the relay is tested by the method of 8.2.10 (1), there shall be no harmful effect due to resonance, and the opening time of the contact shall be not more than 1 ms.

(2) Endurance to Vibration

When the relay is tested by the method of 8.2.10 (2), there shall be no damage in any part, and also the provisions of 6.1 shall be satisfied.

6.10 Resistance to Shock

Resistance to shock shall comply with the following.

(1) Misoperation due to Shock

When the relay is tested by the method of 8.2.11 (2), the opening time of contact shall be not more than 1 ms.

(2) Endurance to Shock

When the relay is tested by the method of 8.2.11 (1), there shall be no damage in any part, and it shall satisfy the provisions of 6.1.

6.11 Endurance

The endurance of relay shall comply with the following.

(1) Mechanical Endurance

When the relay is tested by the method of 8.2.12 (1), there shall be no harmful degradation of performance and also it shall satisfy the provisions of 6.1.

(2) Electrical Endurance

When the relay is tested by the method of 8.2.12 (2), there shall be no damage such as mal-separation of the contacts in any part, it shall satisfy the provisions of 6.1, and the insulation resistance shall be not less than 2 M Ω .