INTERPLANT STANDARD - STEEL INDUSTRY		
IPSS	**SPECIFICATION FOR MAGNETIC OVER-CURRENT RELAYS FOR ac AND dc MOTORS PROTECTION UP TO 650 V** *(FIRST REVISION)*	**IPSS:1-04-008-11**
	CORRESPONDING INDIAN STANDARD DOES NOT EXIST	Formerly: IPSS:1-04-008-84

0. FOREWORD

0.1 This Interplant Standard has been prepared by the Standards Committee on Electrical Components, IPSS 1:4, with the active participation of the representatives of the steel plants and established manufacturers of relays & was adopted in March 2011.

0.2 Interplant Standards for steel industry primarily aim at achieving rationalization and unification of parts and sub-assemblies used in steel plant equipment and accessories, and provide guidance in indenting store or equipment for existing or new installations by individual steel plants. For exercising effective control on inventories, it is advisable to select a fewer of sizes (or types) from among those mentioned in this standard for the purpose of company standards of individual steel plants. It is not desirable to make deviations in technical requirements.

1. SCOPE

This Interplant Standard covers performance requirements of magnetic over-current relays used for protection of ac and dc motors against excessive currents.

2. TERMINOLOGY

For the purpose of this standard, definitions given in IS 1885 (Part 9):1992 `Electrotechnical vocabulary: Part 9 Electrical relays (first revision)', IS 5834 (Part 1):1994 `Specification for electrical timer relays for industrial purposes: Part 1 Pneumatic (first revision)', and IS 5834 (Part 2):1993 `Specification for electrical timber relays for industrial purposes': Part 2 Motorized (first revision)' shall apply.

3. APPLICATION

This relay in general should be applied under the following conditions, where as thermal relay will cause nuisance tripping:

a) For the protection of continuous duty motors which have been chosen for 15 or more starts per hour.

b) For the protection of 40 percent CDF motors which have been chosen for 50 or more starts per hour.

4. SERVICE CONDITIONS

4.1 **Ambient Temperature**- The reference ambient temperature shall be 50^{o}C.

4.2 **Altitude** - The altitude shall not exceed 1000m.

4.2.1 For installations higher than 1000m, it is necessary to take into account the reduction of the dielectric strength and the cooling effect of the air. The relay so used shall be designed or used according to an agreement between the supplier and the purchaser.

4.3 **Ambient Air** - The ambient air may contain fair amount of conductive dust.

4.4 **Humidity** - Maximum relative humidity shall be 100 percent. However, both maximum ambient temperature and maximum relative humidity may not occur simultaneously.

4.5 The relay shall be suitable for mounting without any enclosure and shall operate satisfactorily in an industrial atmosphere. (For special application, customer has to specify the enclosure required.)

4.6 The relay shall be suitable for service on EOT cranes, transfer cars and such other mobile equipment; and shall be able to withstand vertical impact 2g, and horizontal impact 1g.

5. RATING

5.1 **Rated Insulation Voltage** - The rated insulation voltage of the relays shall be 650 V.

5.2 **Preferred Rated Current Range** - The preferred current ranges of the relays shall be as follows:

0.5-1 A, 1-2 A, 4-8 A, 8-15-A, 15-30 A, 30-63 A, 63-100 A, 100-200 A, 200-350 A, 350-500 A, 500-1000 A and 1000-1600 A.

6. CONSTRUCTION

6.1 The relay shall be of direct acting type; with or without oil dashpot time delay arrangements.

6.2 The relay shall be convertible to self resetting and manual resetting type with minor changes of components only.

6.3 The dc relays shall be of single-pole type and ac relays shall be of single - or three-pole design.

6.4 There shall be a tray underneath the relay assembly in order to collect dashpot oil splashings on heavy duty operation.

6.5 The safety factor in design shall be such that the relay can sustain short circuit stresses for currents as high as 30 kA for five cycles, for rated currents of 100 A and above. (The verification of this requirement shall be done on the basis of calculations, pending development of indigenous test facilities.)

6.6 The operating coils may be of bare conductor or insulated coil design. Coils shall be able to withstand electro-magnetic stresses due to short circuit currents at the time of fault condition.

6.7 There shall be a calibrated scale with a pointer indicating relay setting range according to the nominal rating of the relay. Arrangement shall be made for proper locking and sealing of the relay after it has been given a specific setting. The calibration scale shall refer to the tripping current of the relay.

7. OPERATIONAL CHARACTERISTICS AND ACCURACY

7.1 The input value at which the relay starts functioning, that is, the armature is pulled in (pick-up value) Xp and the input value at which the relay armature drops out (Dropout value) Xd, shall be such that the Resetting Ratio Xd is between 0.8 to 0.9. In case of dashpot relays, the operating Xp time shall be more than 0.25 second.

7.2 The relay shall be able to withstand 600 starting and plugging operations per hour of motors and shall operate within + 5 percent repeat accuracy of calibrated values.

8. CONTACT RATINGS

8.1 **For ac Application** - The contacts shall be rated for not less than 6 A, 415 V, 50 Hz for a rated duty of ac-11 [see IS 60947-1:2004]

8.2 **For dc Application** - The contacts shall be rated for not less than 1 A, 230 V for a rated duty of dc-11[see IS 60947-1:2004]

8.3 The preferred rated thermal current shall be 10 A.

9. DASHPOT OIL

The oil shall be of such characteristics that the relay operation is stable between 40-60^{0}C. Any other better medium, such as silicon fluid shall also be acceptable.

10. TERMINATIONS

10.1 The termination of the auxiliary contact of the relay shall be suitable for connecting cable of 2.5 mm^2 and 4 mm^2 stranded conductors.

10.2 The coil connection shall be suitable for bus bar or cable connection with sockets of appropriate current ratings. Extension leads shall be according to customers specification but shall not exceed 100 mm in length.

10.3 The relay shall have provision for both the front and the rear connections.

11. CONTACTS

This standard stipulates one normally closed (NC) contact. However, an additional normally open (NO) contact may be provided if asked for by the purchaser.

12. DUTY CLASS AND ENDURANCE

12.1 Minimum permissible frequency of operation shall be 60 per hour.

12.2 Mechanical service life (number of on-load operation cycles) shall be 0.25×10^6 minimum.

12.3 Electrical endurance is resistance to electrical wear characterized by the number of no-load operating cycles. This shall not be less than 1/10 of mechanical service life.

13. TEMPERATURE RISE OF PARTS

The limits of temperature rise of various parts of the relay shall be according to IS 13947 : part 4: Sec 1.

14. TESTS

14.1 Type Tests

a) General inspection,

b) Verification of temperature-rise limits IS 13947 : part 4: Sec 1.

c) Verification of dielectric properties IS 13947 : part 4: Sec 1.
and

d) Verification of performance at 30 kA for five cycles

14.2 Routine Test

a) General inspection,

b) Dielectric test IS 13947 : part 4: Sec 1.
and

c) Accuracy and calibration test.

14.3 Special Tests

a) Mechanical endurance test ,

b) Verification of mechanical duty class , and

c) Electrical endurance test

14.4 A certificate shall be provided for the calibration marked on the scale.

15. MARKING

Each relay shall be provided with a name-plate marked within the following information in a durable manner and located such that it is clearly visible in mounted position:

a) Manufacturer's name;

b) Manufacturer's type reference'

c) Rated insulation voltage, rated current, ac/dc;

d) Setting indication;

e) Serial number/year of manufacturer; and

f) Reference to IPSS.

16. All the technical details of the relay shall be given in a separate leaflet which shall include the following details:

a) Overall dimensions and mounting details;

b) Pick up value and drop off value of currents;

c) List of all components with parts numbered;

d) Internal wiring diagram;

e) Calibration curve showing operating current versus operating time characteristic at rated ambient temperature;

f) Specification of oil use, in case of oil dashpot relays;

g) Procedure for overhauling, maintenance, reassembly and adjustment of contact gap and pressure;

h) Storage and periodicity of checking when in use; and

j) Weight of the relay.
