

SIGNALLING RELAY

Relay is a device which controls electrical circuit according to change in its own energisation circuit. It relays information electrically.

Classification of signalling relays

Relays may be classified into various ways depending upon the following factors.

- | | |
|----------------------|---|
| 1. Mounting of Relay | Shelf type
Plug in type |
| 2. Supply used | DC relay
AC relay |
| 3. Contacts provided | Metal to Metal contact
Metal to Carbon contact |
| 4. Application | Line relays
Track relays
Special relays |

Note: Now a days electronic relays are also used in Signalling circuit to achieve time delay. Relays directly connected across the track circuit are called track relays. Relays used for any other purpose are called line relays.

Shelf type relay

DC shelf type relay can be further classified as under:

- Neutral
- Polar
- Neutral polar

Note: Neutral Polar relays are obsolete now.

Plug in type relays

Some of the commonly used relays are:

- Style "Q" relay
- Style "G" relay
- Siemen's relay
- Sundaram Clayton relay

Common Features

Standard plug boards are used for each type of relays for mounting the same. Pre-wiring facilities are available for each type of relay. Facilities are available for terminating the wiring on plug board connectors both by crimping or soldering. All relays are provided with registration devices with specified coding combination to prevent plugging in wrong relay. Unless code pins are correctly engaged no electrical connection between the relay and the plug board connector is possible.

Non Proved Type Plug In Relay

Following two styles of relays are in use under this group:

- Style "Q"
- Style "G"

Proved Type Plug In Relay

These relays are manufactured by M/s Siemens India Ltd. under the manufacturing code K-50 with the following characteristics:

- Power consumption
 - 1.3 W to 2.5 W for neutral relays.
 - 5 W for interlocked relays
- Life 20,000,000 switching.
- Pick up time 25 to 60 m sec.
- Drop away time 7 to 15 m sec.

Salient Features

- All movable contacts are rigidly coupled to ensure simultaneous making and breaking of "NO" and "NC" contacts respectively.
- Double break series contact arrangement provided ensures high switching speed and more gap between the contacts.
- Contacts are designed to have "Self Cleaning" features.
- All contacts are silver to silver contacts.
- These relays are provided with 8 contacts having following combinations:
 - 6F/2B
 - 5F/3B
 - 4F/4B
- The resistance of these relays varies from 1260 to 1840 ohms.

- Rated voltages are 24 V and 60 V DC.
- Rated continuous load per contact is 5 amp.
- The length of separating pin is 0.35 mm for K-50A relay, whereas it is 0.15 mm for K-50 B relay and this is the basic difference between the two.

Definitions

Dependent contact

The condition in which a movable arm contact connects to a front contact when the relay is energised and the same arm contact connects to a back contact when the relay is de-energised.

Independent contact

The condition in which the movable arm contact connects to either a front or a back contact, but not to both.

Pickup value

The value of the current or ampere turns which is just sufficient to close all the front contacts of a relay under specified conditions.

Drop away (release) value

The value of the current or ampere turns at which all the front contacts of the relay get open under specified conditions.

Front contact

It is that contact which is made with the arm contact when the relay is energised.

Back contact

It is that contact which is made when the relay is de-energised.

Arm Contact

The contact which is the movable part of the pair of contacts and makes with front contact when the relay is energized and with back contact when the relay is de-energised.

Percentage release

It is the ratio between the drop away value and pick up value of a relay and is given by

$$\% \text{ release} = \frac{\text{Drop away value}}{\text{Pickup value}} \times 100$$

Proved type relays

Means a relay having Metal to Metal contacts. They are used for controlling NON VITAL circuits and hence also called as NON VITAL relays.

Non proved type relays

Means a relay having Metal to Carbon contacts as front contact. They are used for controlling vital circuits and

Abbreviations used

- "A" denotes Arm contact of relay.
- "B" denotes Back contact of relay.
- "F" denotes Front contact of relay.
- "N" denotes Normal contact of relay.
- "R" denotes Reverse contact of relay.
- "D" denotes De-energized contact of relay.

Salient features and important data

Particulars	Line Relay	Track Relay
Coil resistance (in)	1000 when connected in series 250 when connected in parallel	when connected in series 2.25 when connected in parallel.
No. of windings	Two each of 500	2 each of 4.5
Contacts	2 F/B 4 F/B 6 F/B	2 F/B 2 F.2F/B
Contact resistance		
i. M to C	0.2	0.20
ii. M to M	0.05	0.05
% Release	Not less than 50%	Not less than 68%

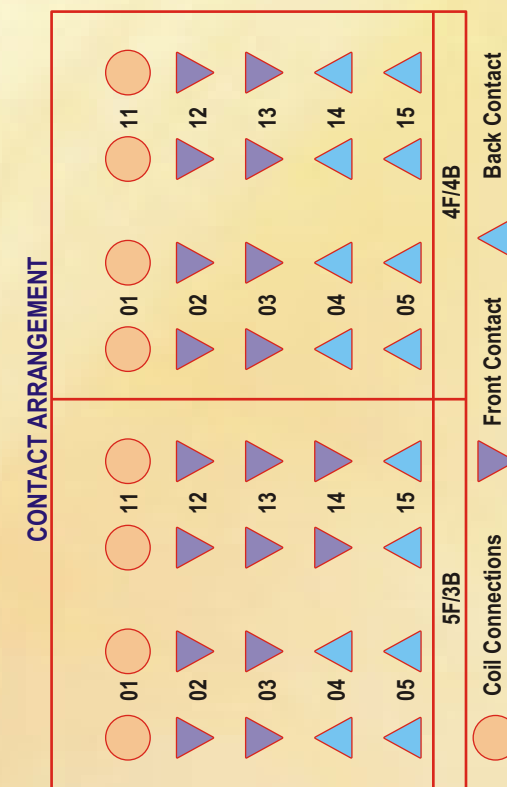
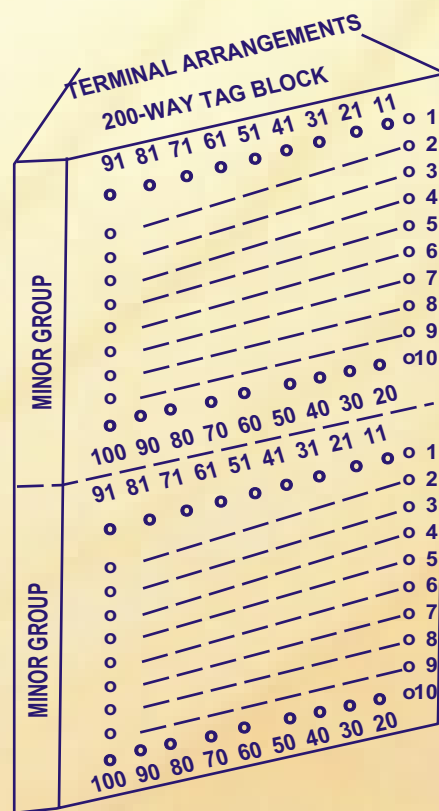
Maintenance Check

During maintenance visit relays should be checked visually for the following:

- There is no loose connection on the terminals. Plug in relays are fitted tightly & the sealing is intact.
- Metal contacts are not blackened due to arching.
- There is no pitting of carbon contacts.
- No foreign materials are inside the relay.
- There is no rusting or sulphation on the parts.
- Removing the transit lock screw, hole has been closed by dummy screw fitting before connecting a shelf type relay in the circuit
- Relays are not due to for POH.
- Track relay drops properly with 0.5 ohms shunt.
- Over energisation is not more than 250% and 300% of its pickup value for shelf type and plug in type relays respectively.

Overhauling

Type of relay	Schedule
Track relay of all types	After every 10 to 12 years.
Shelf type line relays	After every 15 years.
All other non proved mini plug in relay	When removed from service after failure.



GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

(For Official Use)

SIGNALLING RELAYS

CAMTECH/2000/S/SIG.RELAY/1.0
November' 2000

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Advanced
Maintenance
Technology



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