APPLICATION NOTE

BASIC RELAY TERMINOLOGY

The primary purpose of a relay is to switch electrical circuits on and off in an instant. Essentially, relays are electromagnetic switches that are activated by a signal or current in one circuit to open or close another circuit.

A necessity in numerous machines and electrical appliances, relays are used all over the world, regarded for their high reliability and long life. From everyday applications such as refrigerators and garage doors, to signaling and protecting electrical power systems, relays are in use every second of every day.

When choosing a relay, having a basic knowledge of relay terms is key to understanding how they work and which type best fits the needs of your specific application.

Common Terms

AC Operated Relays - Relay that is operated from an AC Voltage source. These type of relays incorporate a shading ring on the pole face. A shading ring is a shorted turn surrounding a portion of the pole of an AC electromagnet. This delays the change of the magnetic field in that part of electromagnet, thereby tending to prevent chatter and reduce hum.

Armature - The moving magnetic member of an electromagnetic relay structure.

Break - The opening of closed contacts to interrupt an electric circuit.

Coil - An assembly consisting of one or more windings with terminals and any other required parts such as a sleeve or slug. The windings may be self-supporting but usually are wound around an insulated iron core or on a bobbin.

Contact

1. A conductive connection of two elements.
2. A contact piece designed to ensure reliable current passage either in the form of a rivet or welded assembly.

Contact Bounce - The uncontrolled opening and closing of the contacts due to forces within the relay/contactor. Contact bounce is dependent on, and an inherent part of, the design of the relay/contactor. The closing velocity of the contacts, the initial contact force, the mass of the contacts, and mechanical resonances in the contact system all impact the level of contact bounce.

Contact Chatter - The uncontrolled opening and closing of contacts due to external forces. Contact chatter is extended contact bounce that is not an inherent part of the relay. Contact chatter usually occurs because of either shock or vibration to the relay or an improper control signal to the relay.

Contact Force - The force which two contacts exert against each other in the closed position.

Contact Forms - Denotes the contact mechanism and number of contacts in the contact circuit.

Contact Gap - The gap between two contacts when the contact circuit is open.

Contact Life - The number of operations for a given contact load under specified conditions (e.g. duty cycle, maximum operating rate) without leading to permanent contact failure (e.g. contact welding, excessive contact wear/resistance or contact locking when switching DC loads).

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Contact Operate Time - Time from initial energization of the coil to first opening of closed contact or first closing of open contact, prior to contact bounce.

Contact Rating - The electrical load handling capability of the contacts under specified conditions and for a prescribed number of operations.

Contact Release Time - Time from initial de-energization of the coil to the first opening of a closed contact, prior to contact bounce.

Contact Resistance - The electrical resistance of closed contacts.

Contact Weld - A contact failure due to fusing of the contacting surfaces to the extent that the contacts fail to separate when intended.

Continuous Current - The maximum current a relay may continuously carry without exceeding temperature limits.

DC Relays - A relay with coils designed for operation from a DC voltage source.

Dielectric Strength - The voltage which may be applied to two adjacent metal parts insulated from each other without causing electrical breakdown.

Drop Out (Release) Voltage - The voltage at which the relay returns safely to its un-operated position.

Duty Cycle - The ratio of operated time to the total cycle time expressed as a percentage.

Holding Current - Minimum coil current required to hold the armature in the operated position.

Inrush Current - The current draw on the coil when the armature is in the fully open position and the nominal rated voltage is applied to the coil.

Insulation Resistance - The resistance value between mutually isolated conducting sections of the relay (e.g. between coil and contacts, across open contacts, and between coil or contacts to any core or frame at ground potential). This value is usually expressed as "initial insulation resistance" and may decrease with time, due to material degradation and the accumulation of contaminants.

Mechanical Life - The guaranteed number of operating cycles without load.

Make - The closure of an open contact to complete an electric circuit.

MBB Contacts - Abbreviation for make-before-break contacts. Contact mechanism where Form "A" contacts (normally open contacts) close before Form "B" contacts open (normally closed contacts).

Nominal Coil Resistance - The DC coil resistance measured at its terminals at a winding temperature of +23 °C.

Normal Position -

1. The de-energized, un-operated position of contacts (open or closed) due to spring tension, gravity, or magnetic polarity.
2. The home position for a stepping switch.

Pull In (Operate) Power - The power consumed by the relay coil in order to operate the relay.

Pull In (Operate) Voltage - The minimum voltage required to operate the relay.

Rated Voltage - The reference voltage for the definition of other relay data.

Relay Pole - A term applied to a contact arrangement to denote that it includes the number of separate contact combinations. For example, a 1 Pole would have a single contact arrangement and a 2 pole would have two separate contact arrangements or two single pole contact assemblies.

Seal Current - The current draw on the coil when the armature is in the fully seated position and the nominal rated voltage is applied to the coil.

Switching Cycle - One cycle of energization and release of a relay.

Switching Rate - Operating cycles per hour or per second.

Switching Voltage - The voltage which appears on the contacts before their closing or after their opening after transients have disappeared.

Total Contact Resistance - The sum of relay contact resistance plus resistance of connecting elements as measured on the relay terminals.

Winding - An electrically continuous length of insulated wire wound on a bobbin.

For more information on relays visit HartlandControls.com

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