2R7 & 2R9 Relay Operational Summary

Magnetically Latched Relays

2R7C Relay

2R9C Relay
(Status feedback capable)

2R7 and 2R9 split coil relay's unique construction has only one movable part (the contacts). This reliable relay design has a proven failure rate of less than .001 percent. It offers both the popular GE RR7 relay footprint and functionality (3 wire control) along with extreme reliability.

The following describes the actual internal operation of the 2R7 and 2R9 relay. To understand the proven durability of this product, we offer the following explanation of its simple magnetic latching operation.

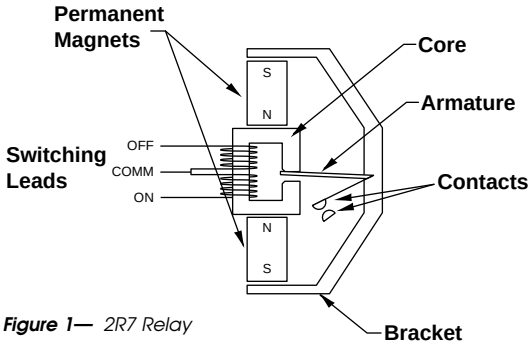

Figure 1— *2R7 Relay*

Figure 1 is a drawing of the 2R7 showing the basic parts of the magnetic circuit. The leads of the split coil are color coordinated: Red (ON), Black (OFF), and Blue (COMMON).

The relay section of the 2R7 consists of two permanent magnets, a split coil switching winding, a steel bracket, a moving armature that supports the moving contacts, and a set of stationary contacts (90% silver, 10% cadmium).

Figures 2 and 3 show the magnetic activity when no switching is being applied. As can be observed, the contacts are held in a steady state condition by the permanent magnets (during a power failure the relays will maintain their state).

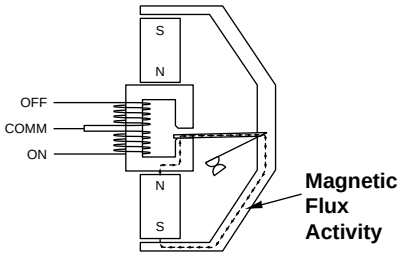

Figure 2— *Magnets holding the contacts closed*

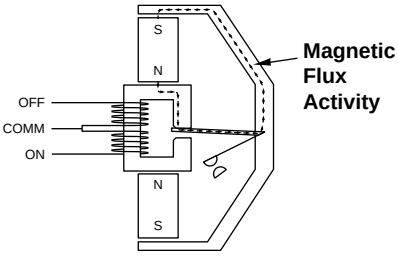

Figure 3— *Magnets holding the contacts open*

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Magnetically Latched Relays

Magnetism Theory

By convention, magnetism "flows" FROM the north pole TO the south pole. When a diode is placed between the switching leads, an electromagnet is created across the gap. By using two coils in opposite directions to each other, the 2R Relay is able to create two magnetic polarities opposite to each other.

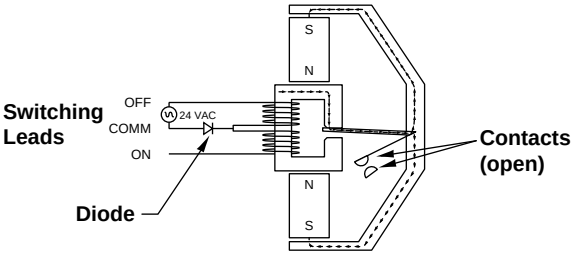

Figure 4— *The electromagnet and the permanent magnets combine to switch the contacts to the closed position.*

Figure 4 shows the magnetism that is applied to the gap of the core to CLOSE the contacts.

When a half wave rectified source is placed between the switching leads (current from the Red wire towards the Blue wire), the flux that is produced sets up a magnetic field on both surfaces of the gap (top North and bottom South). Because the flipper arm is always connected to the North sides of the permanent magnets, the flipper arm is repelled from the North surface and is attracted to the South surface. The contact arm is connected to the flipper arm and, therefore, the contacts will close.

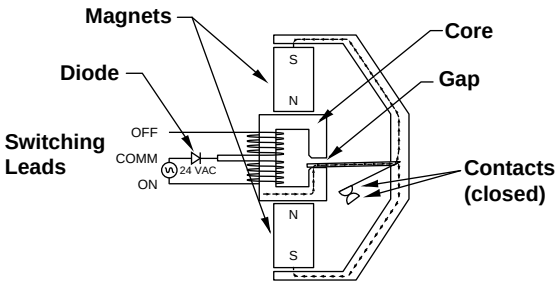

Figure 5— *The electromagnet and the permanent magnets combine to switch the contacts to the open position.*

Figure 5 shows the magnetism that is applied to the gap of the core to OPEN the contacts.

When a half wave rectified source is placed between the switching leads (current from the Black wire towards the Blue wire), the flux that is produced sets up a magnetic field on both surfaces of the gap (top North and bottom South). Because the flipper arm is always connected to the North sides of the permanent magnets, the flipper arm is repelled from the North surface and is attracted to the South surface. The contact arm is connected to the flipper arm and, therefore, the contacts will open.

As can be seen by examining Figure 4 and 5, the electromagnet reverses its polarity to switch the relay ON and OFF.

Performance

The 2R7 and 2R9 relays have been proven in both the test lab and field applications. Intelligent Lighting Controls has over a decade of proven products and service to the commercial building industry with thousands of installations nationwide. To discuss your application requirements, call 1-800-922-8004 to talk with one of our applications engineers.

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