

Standex-Meder Electronics

Custom Engineered Solutions for Tomorrow



Latching & Form B Reed Relays & Sensors

Product Training



Introduction

Purpose

- Explore the technology involved in the use and operation of Form B and Latching Reed Sensors & Relays

Objectives

- Define key terms of Form B and Latching sensors and relays
- Describe the structure and function of a Form B and Latching Reed Relay
- Describe the structure and function of a Form B and Latching Reed Sensor



Key Terms

Contact - Contact blades making up a Reed Switch or Electromechanical Relay

Contact, Form A - A single pole single throw (SPST) normally open (N.O.) switch

Contact, Form B - A single pole single throw (SPST) normally closed (N.C.) switch

Contact, Form E - A latching contact that can exist in either the N.O. or N.C. state controlled by reversing the magnetic field



Key Terms

Bias or Permanent Magnet

- ❑ Steady magnetic field
- ❑ Applied to the magnetic circuit of a relay or sensor
- ❑ Aids or impedes operation of the switch contacts

Coil

- ❑ Electromagnetic assembly made of copper insulated wire
- ❑ When current is applied to the coil, a magnetic field is generated
- ❑ When energized, its magnetic field operates the contacts

De-energize

- ❑ The act of removing power from a relay coil

Energization

- ❑ The application of power to a coil winding of a relay



Key Terms

Reed Switch or Reed Sensor

- A bare or encased switch containing glass sealed magnetic reeds as the contact members including mercury-wetted and dry contact types

Reed Relay

- A relay containing one or more internal reed switches

Latching Relay

- A relay that maintains its contacts in the last assumed position without needing to maintain coil energization. To change the state of the contacts, the magnetic field must be reversed.

Normally Open (N.O.) Contacts (Form A)

- The contact state before any magnetic field is applied to them in which they exist in the open state

Normally Closed (N.C.) Contacts (Form B)

- The contact state before any magnetic field is applied to them in which they exist in the closed state.



FORM B NORMALLY CLOSED REED RELAYS



Overview of Form B Normally Closed Reed Relays

- The normally open Form A reed relay's internal reed switches exist in the normally open state
- Applying coil power closes the contacts
- The relay contacts may remain closed for long periods of time supplying continuous power such as in safety circuits
- The Form B reed relay allows contact closure for extended periods without continuous power draw



Form B Normally Closed Reed Relays

- Normally Closed (Form B) Reed Relays require the use of a permanent magnet
- This magnet is adjusted such that the reed switch changes from its normally open state to a normally closed contact state
- In this case, no current or external energy is expended maintaining the reed switch in the closed position



Form B Normally Closed Reed Relays

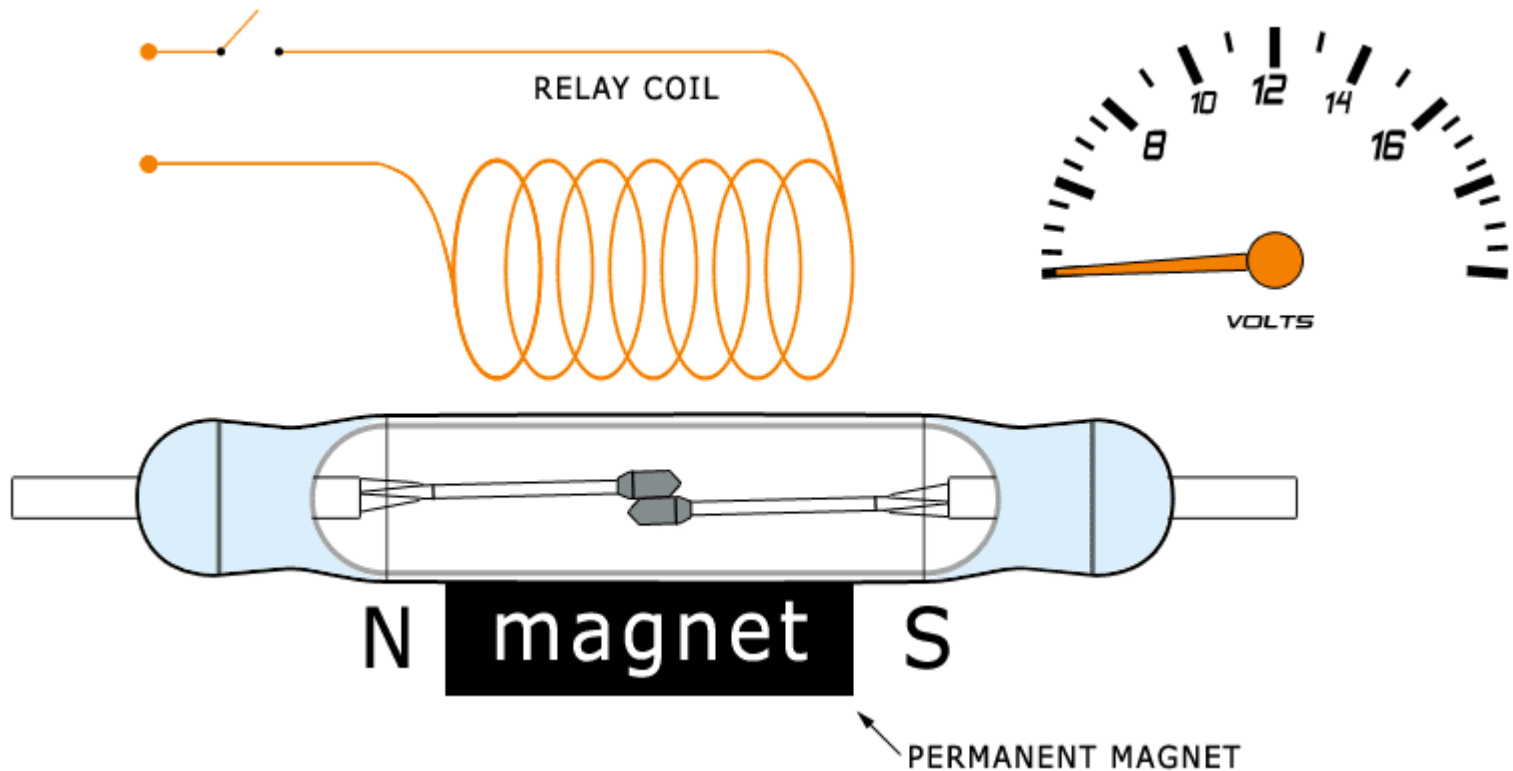


- A relay coil of equal strength and opposite polarity is needed to open the Reed Switch in the reed relay
- To open the contacts the relay coil is energized with the relay's nominal voltage

Form B Normally Closed Reed Relays

Permanent Magnet

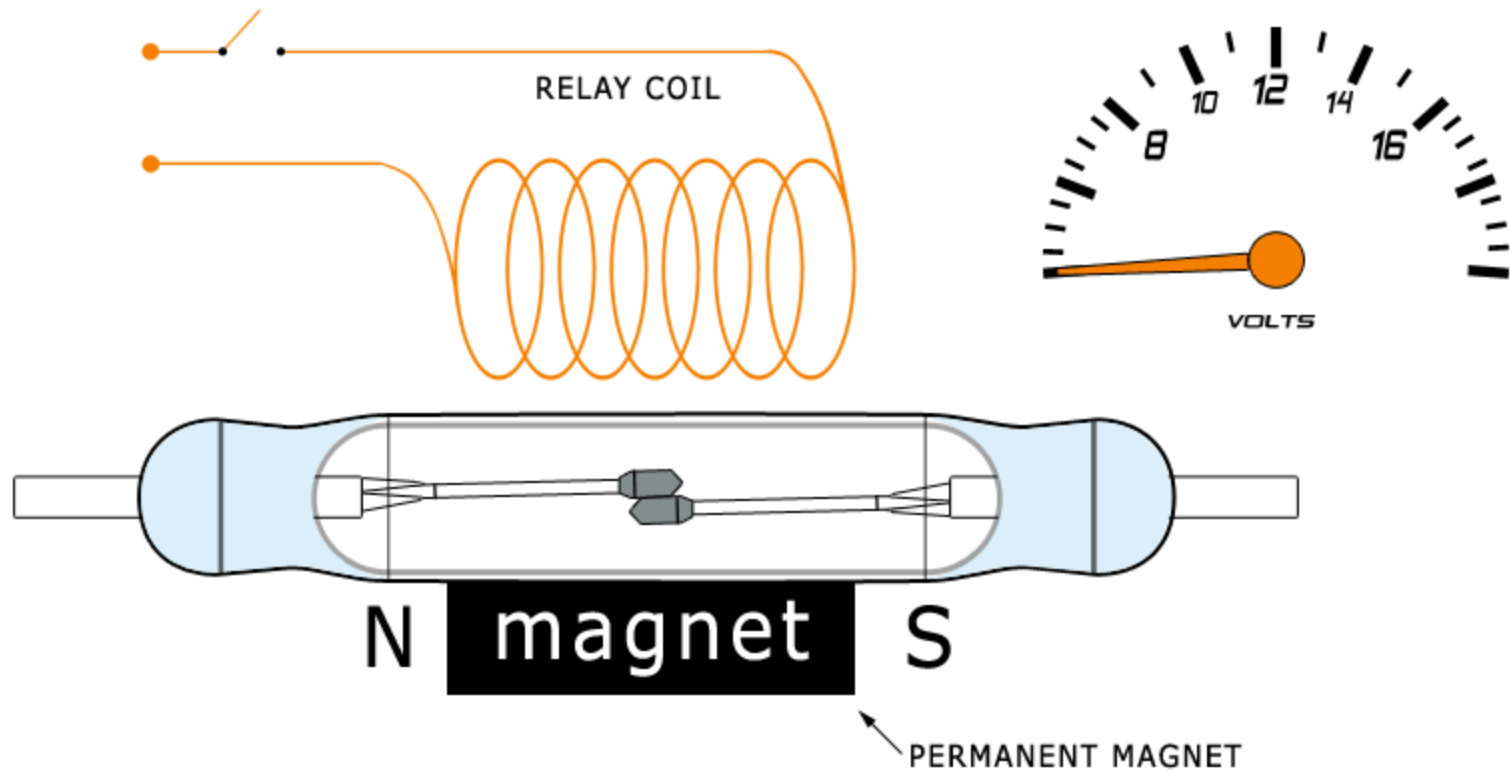
- A permanent magnet keeps the contacts closed
- No power is required



Form B Normally Closed Reed Relays

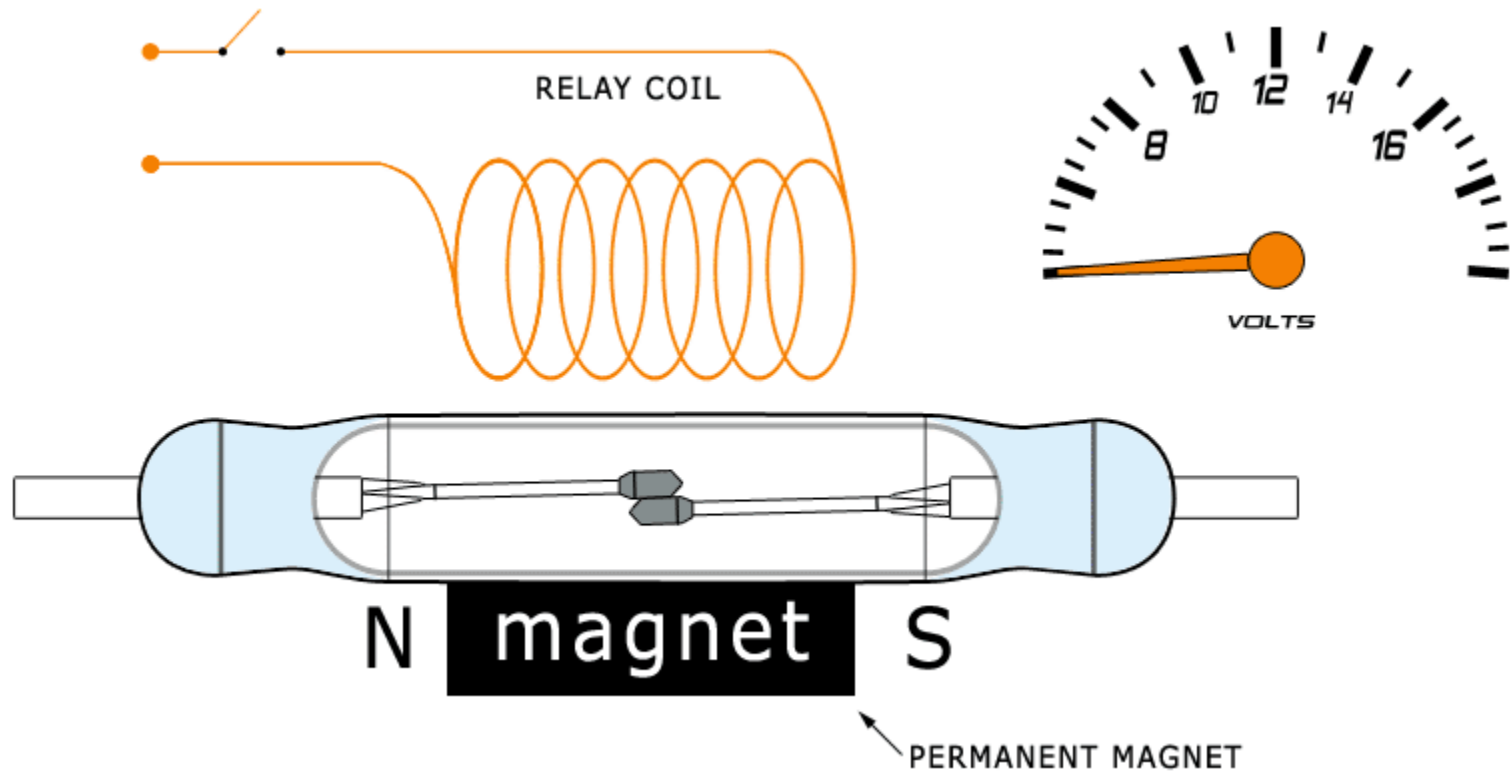
Applying power to the Coil

- Apply the relay's nominal coil power to open the contacts
- The correct coil voltage polarity is important



Form B Normally Closed Reed Relays

- De-energizing the coil returns the contacts to their normally closed contact state provided by the permanent magnet





LATCHING REED RELAYS

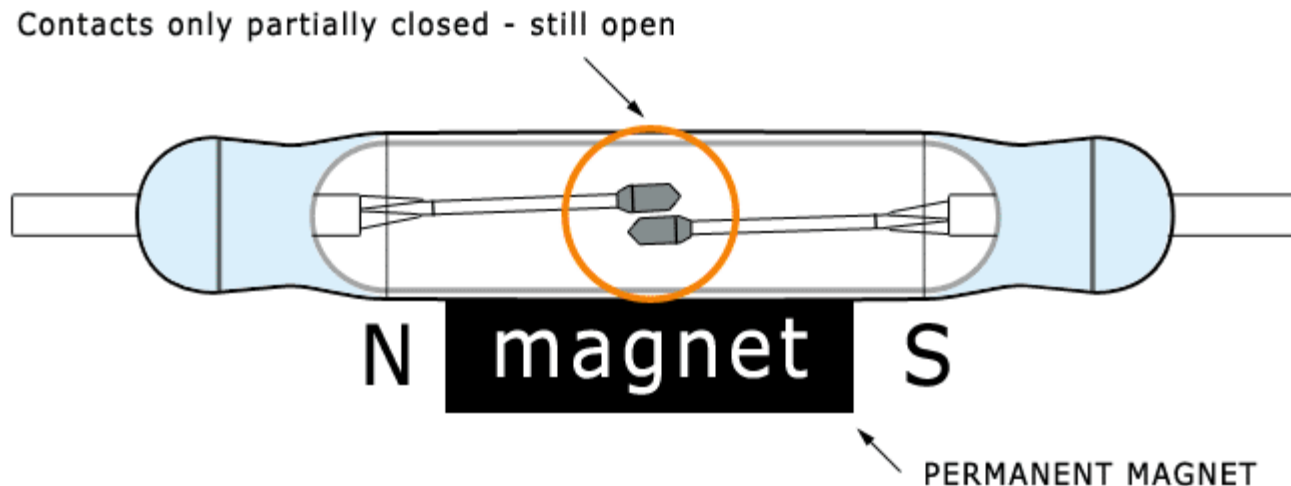


Overview of Latching Reed Relays

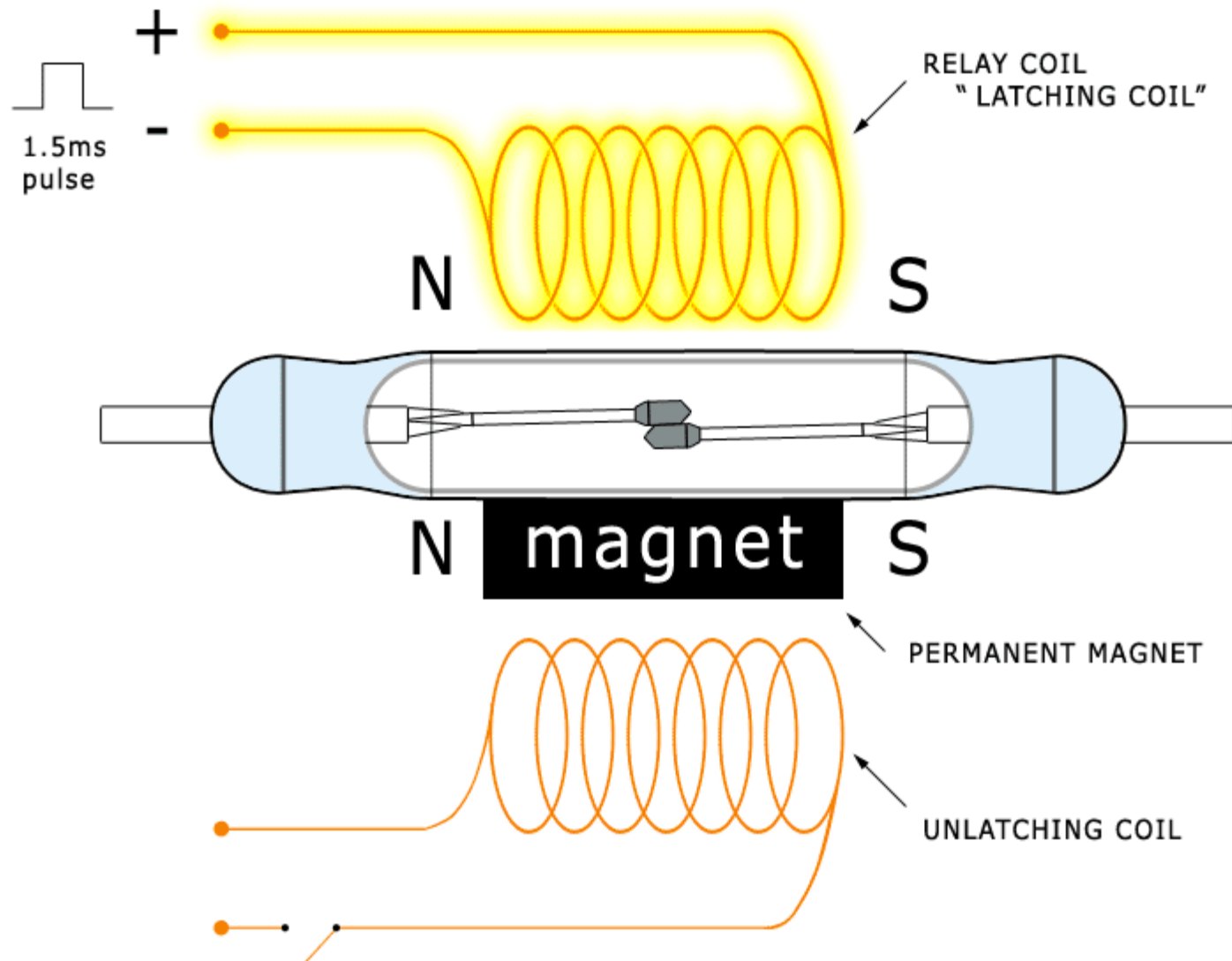
- A latching reed relay has two bi-stable states
 1. Open contact state
 2. Closed contact state
- In either state it draws no coil power
- Generally the latching relay will have two coils
 1. A latching coil that closes the contacts
 2. An unlatching coil which will open the contacts

Overview of Latching Reed Relays

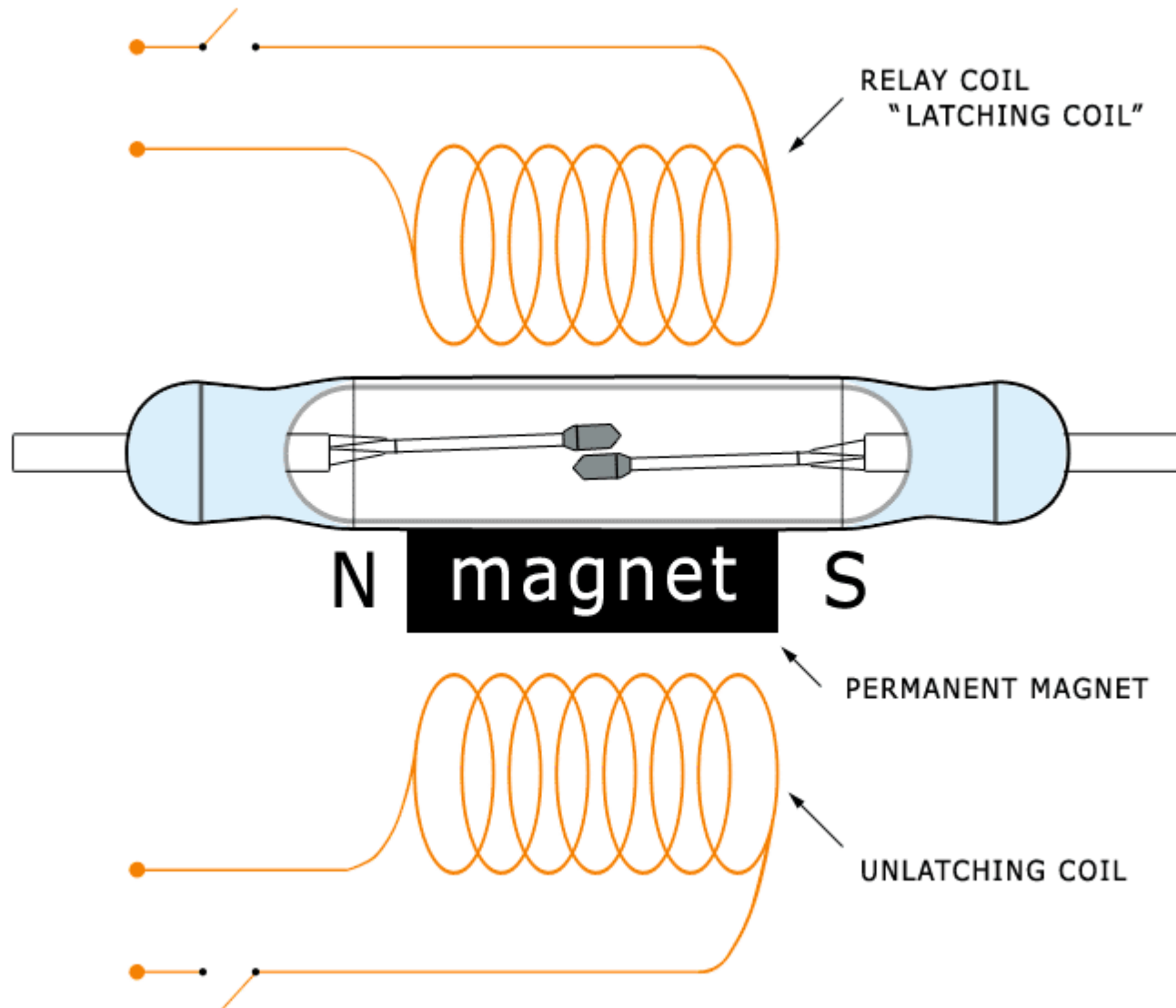
- The latching relay also requires an internal magnet for proper operation
- The latching relay magnet is partially magnetized such that the reed switch contacts do not fully close



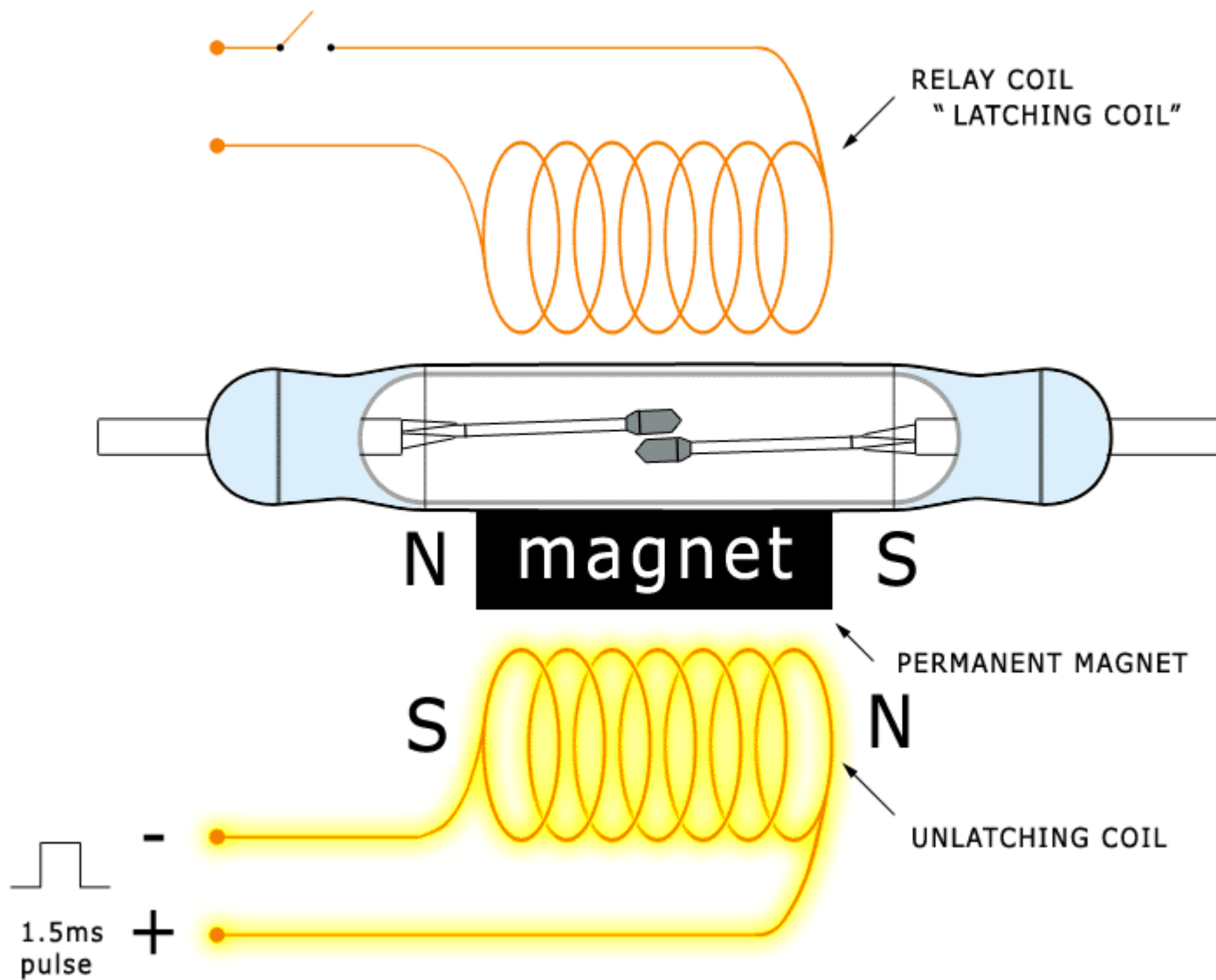
Latching Reed Relays



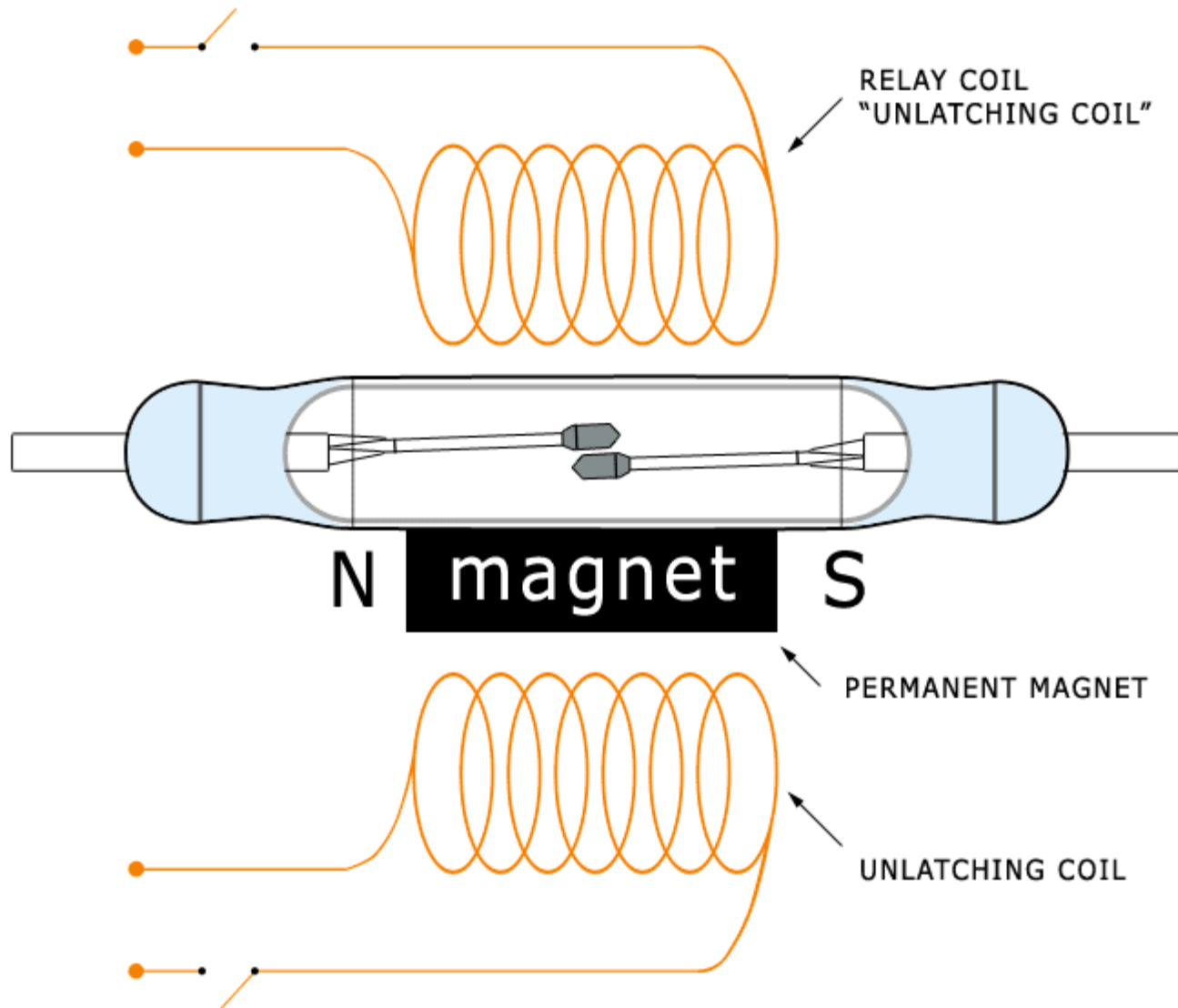
Latching Reed Relays



Latching Reed Relays



Latching Reed Relays





FORM B NORMALLY CLOSED REED SENSOR

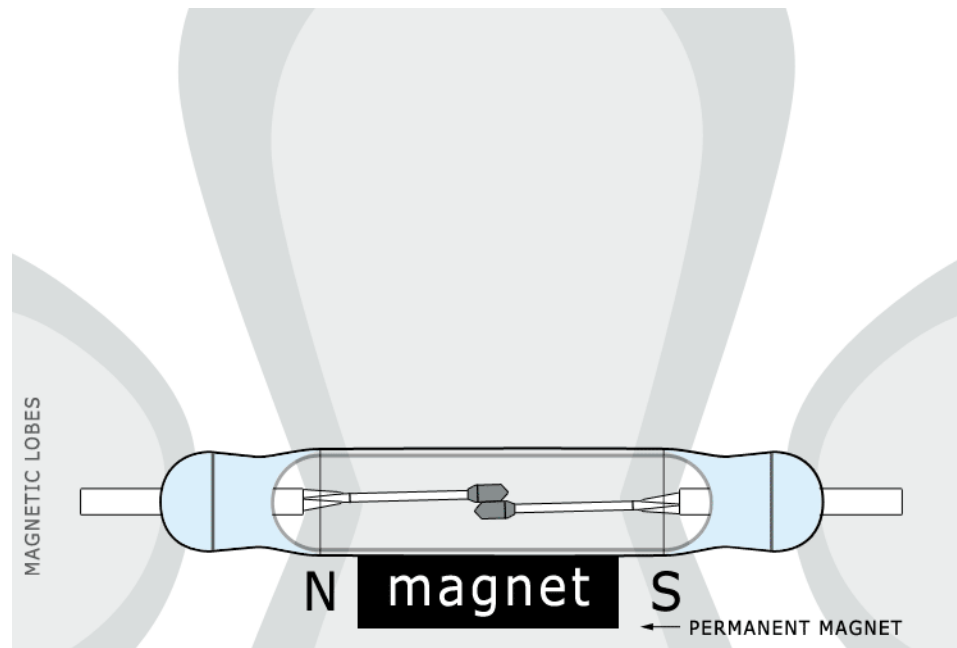


Form B Normally Closed Reed Sensor

- Reed sensors also have a reed switch as their main switching element
- These reed switches exist in their normally open state
- Reed sensors generally exist in the normally open state
- The reed sensor can consist of simply a bare reed switch or a packaged device having one or more reed switches and/or magnets

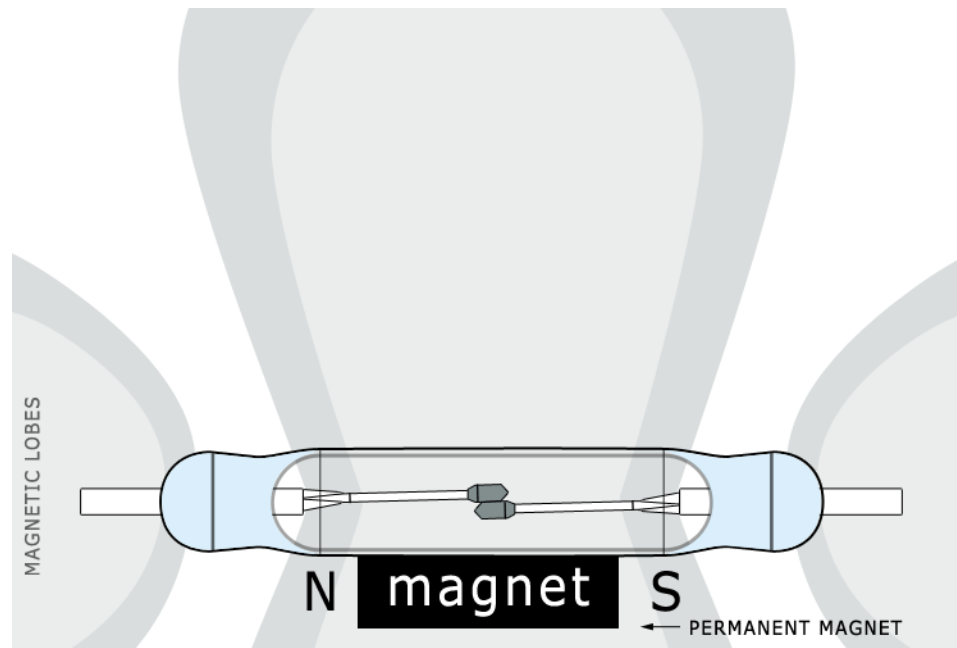
Form B Normally Closed Reed Sensor

- Form B reed sensors follow the same rules as with the Form B reed relays
- A magnet that has been magnetized to a suitable level closes the contacts



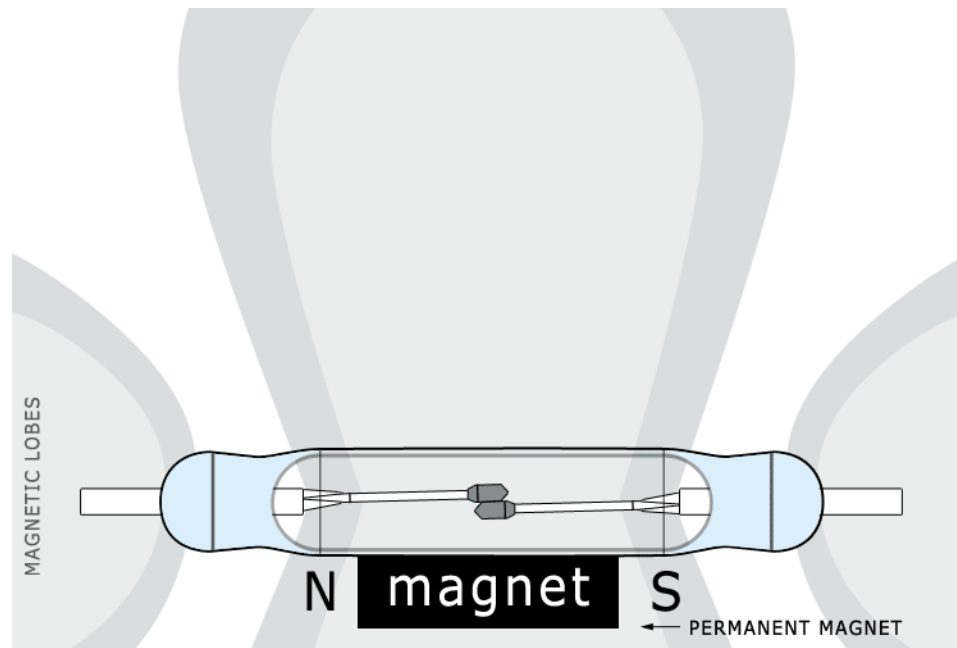
Form B Normally Closed Reed Sensor

- A magnet of opposite polarity cancels out the magnetic field thereby opening the contacts
- Too strong a magnet may reclose the contacts
- Proper operation requires the correct use magnetic lobe



Form B Normally Closed Reed Sensor

- Once the magnet is removed the contacts will reclose and stay in that state until a magnet is brought into its influence

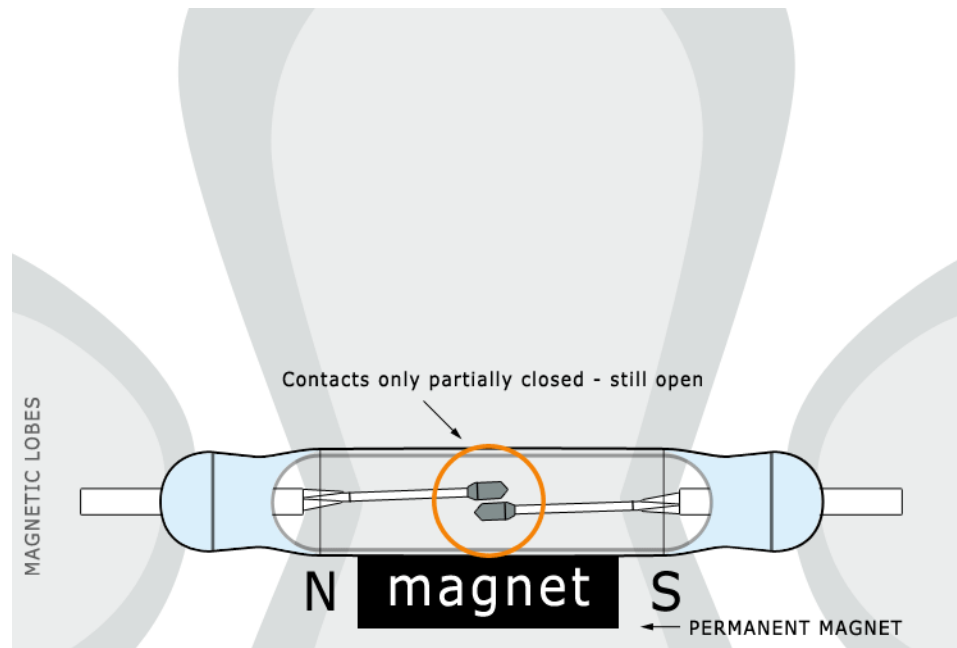




LATCHING REED SENSOR

Latching Reed Sensor

- A partially magnetized permanent magnet keeps the reed switch open
- A second magnet with an aiding field will close the contacts
- Removing the second magnet, the contacts remain in the closed state
- Applying the second magnet again with its field reversed opens the contacts





Summary

- The reed relay can be configured as a normally closed reed relay to conserve power when the requirement calls for extended use in the normally closed state
- The reed sensor can be configured in the normally closed state as well for requirements calling for extended use in the normally closed state.
- For applications calling for extremely small power requirements, a latching reed relay can be the best selection, particularly in battery powered devices.
- Reed sensors can be used in a latching manner for specific design requirements



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