

Relay Protection Coil Connection Method



Article Overview

Relay coils are typically protected by connecting suppression devices in parallel with the coil, such as diodes, Transil diodes, or RC snubbers, to safely dissipate back EMF and prevent damage to the driving circuit.

Basic Principle

When a relay coil is de-energized, the collapsing magnetic field generates a back electromotive force (Back EMF), which can reach hundreds or thousands of volts in DC relays and potentially damage the driving electronics or cause arcing at contacts. To prevent this, a protection device is connected across the coil to safely dissipate the stored energy.

Common Protection Methods

- Flyback Diode (DC Relays)
 - A diode is connected in parallel with the coil, oriented to block normal operating current but conduct when the coil is switched off.
 - This allows the back EMF to circulate through the coil and diode, preventing voltage spikes from reaching the driver circuit.
 - Common diodes include 1N4007 or similar, placed as close to the coil as possible.
 - Limitation: The coil current decays slowly, which can delay contact release and reduce the opening force.
- Zener Diode or Diode + Transil Combination
 - A Zener diode in series with a standard diode or a Transil (avalanche) diode can be used to accelerate current decay....

Article Content

Sep 10, 2025

Protection Relay Tripping Circuit

A protection relay tripping circuit connects relays to breakers for fast fault isolation. Key components include trip/close

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Do all relays need a diode in parallel with the coil?

I often see circuits with relays and diodes like this: Note the diode D1 in parallel with RLY1, at reverse polarity to the

Jul 04, 2026

Component Options for Relay Coil Surge Suppression

Sections: Basics of Relay Coil Surge Suppression Using General Purpose Diodes
Adding Zener Diodes Relays with

Jul 22, 2026

Coil Suppression Can Reduce Relay Life | TE Connectivity

Read guidance from TE engineers on how to maximize relay performance and reliability while providing protection to the control

Jan 05, 2026

Relay control and protection guides

Protection Relays The relay is a well known and widely used component. Applications range from classic panel built

Jun 20, 2026

Using Rogowski Coils Inside Protective Relays

These advantages, and others, make a Rogowski coil something to consider for the input of microprocessor-based relays, where the

Aug 10, 2025

Relay Protection Using Inductive Coils: A Resource-Saving Approach

The Results section presents the results of the conducted experiments, an evaluation of the use of inductive coils in

Apr 24, 2026

Protective Relaying Principles and Applications

Protective Relaying Principles and Applications The article provides an overview of protective relaying principles and their

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Operation, maintenance, and field test procedures for protective relays

The protection circuits include all low-voltage devices and wiring connected to: instrument transformer secondaries,

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Protection diodes for various relay types?

I'm choosing between various relays for the sake of input/signal switching. I'm attempting to get my head around the

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A Layman's Guide to Coil Suppression

The downside is that the resistor + relay coil takes more current to operate but the relay coil terminals are not polarised and can be

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Relay Technical Information

If the set coil or reset coil is to be connected in parallel with an inductive load (e.g. another electromagnetic relay coil, motor,

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How a Relay Works – How to Connect N/O, N/C Pins

Introduction How a Relay Works How to identify Relay Pinouts and Connect a Relay The identification of a typical

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Explanation Of Current Transformer Wiring Diagram

There are various ways to connect current transformers, which are applied to relay protection in different power supply systems. The

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Types of Electrical Protection Relays or Protective Relays

Definition of Protective Relay A protective relay is an automatic device that detects abnormalities in an electrical

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coil has been de-energised. This induced coil current is enough to keep the relay in the operated state, slow down the contact

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What protection is most suitable for a relay circuit with an ...

The best results are always achieved by some system integrator/designer knowing what kind of relay board will be

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Protective Relaying

Typical Relay and Circuit Breaker Connections Protective relays using electrical quantities are connected to the power

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RELAY DRIVE PROTECTION

The Transil is a must in relay drive circuits. It guarantees a reliable and efficient protection while reducing the delay between the coil

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Introduction to Protective Relaying | Electric Power Measurement and ...

Protective relays often use DC coils supplied by batteries to allow operation even in total AC power failure. Older induction disk

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Relay Coil Suppression with DC Relays | TE Connectivity

Learn about basic techniques for relay coil suppression with DC relays and avoid application problems.

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The resulting Back EMF can, if it appears across the electronic circuit driving the relay coil, be enough to damage the relay coil driver

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Relay Protection Using Inductive Coils: A Resource-Saving Approach

In this paper, a resilient protection scheme is proposed employing adaptive zone-1 setting, thereby preventing relay

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Fundamentals of Modern Protective Relaying

A primary motor protective element of the motor protection relay is the thermal overload element and this is accomplished through

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