

Article Overview

Thermal relay protectors are selected based on motor current, overload type, heating technology, and reset mechanism to ensure reliable motor protection.

Understanding Thermal Overload Relays

Thermal overload relays are protective devices designed to cut power when a motor draws excessive current for an extended period, preventing overheating and equipment damage . Unlike circuit breakers, which respond instantly to overcurrent, thermal relays measure the motor's heating profile and trip only after sustained overloads . They are widely used in motors, transformers, and other electrical equipment.

Types of Thermal Relays

- o Bimetallic Thermal Relays: Use a bimetallic strip that bends when heated by motor current, mechanically opening contacts to interrupt the circuit. They have thermal memory, allowing faster response to repeated overloads .
- o Eutectic Alloy Relays: Contain a tin-lead alloy that melts at a specific temperature, releasing a ratchet mechanism to trip the circuit. These provide precise trip points for high-accuracy applications .
- o Solid-State Relays: Electronic devices without moving parts that calculate motor temperature from current monitoring. They offer adjustable trip times, faster response, and suitability for explosive environments .

Key Selection Criteria

- o Motor Current Rating: Choose a relay rated for the motor's full-load current to ensure proper protection .
- o Trip Class: Defines the relay's response time to overloads. IEC motors commonly use Class 10, while NEMA motors often use Class 20 .
- o Heating Technology: Determines accuracy and thermal memory. Bimetallic relays are standard for industrial loads, while eutectic alloys are used for precise trip requirements .
- o Reset Mode: Manual reset is common for standard applications; automatic reset may be used where continuous operation is critical .
- o Ambient Conditions: Consider temperature, ventilation, and installation environment, as these affect relay performance .
- o Additional Features: Some relays offer phase loss protection, remote reset, diagnostics, and integration with control systems .

Practical Considerations

- o For standard industrial motors, bimetallic relays with manual reset provide reliable protection.
- o For high-precision or sensitive applications, eutectic alloy relays ensure consistent trip points.

How to Select a Thermal Relay Protector

o For advanced monitoring and hazardous environments, solid-state relays offer flexibility, faster response, and remote diagnostics . Selecting the right thermal relay protector involves matching the relay type, trip class, and reset mode to the motor's operational profile and environmental conditions, ensuring both safety and longevity of the equipment.

Protect critical components in your power system with a wide range of SEL protective relays covering applications and use cases

Discover the thermal protection relay function: operating principle, types, tripping classes and selection criteria to

Understanding Thermal Relays: An Essential Guide Thermal relays are critical components

Learn how thermal relays function to protect electrical devices from overloads by monitoring and responding to

Thermal switches and thermal protectors are thermally-actuated electro-mechanical on/off switches. They differ from thermal fuses

This guide provides a detailed overview of overload relays, including their role in protecting motors from

A thermal overload relay protects motor windings and main circuits from the effects of

Transformer Protection Application Guide This guide focuses primarily on application of protective relays for the protection of power

Principle of operation Thermal motor protection relays contain three bimetal strips together

It is essential for relays to trip quickly enough to protect the motor against thermal damage, while waiting long enough to account for

Learn what a thermal overload relay does, how bimetallic and melting alloy overload relays

Key learnings: Thermal Relay Definition: A thermal relay is defined as a device that uses the unequal expansion rates

Thermal Relay Types Thermal overload relays are mainly categorized based on their working principle. Other

Ease of Installation and Maintenance: Look for relays that are easy to install and maintain, particularly if

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frequent servicing or

An overload relay (OLR) protects an electric motor against overloads and phase failures. Thermal and

Thermal Relay is an electrical device that automatically switches off the contacts when heat

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