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Square D B45

Instruction Manual

SQUARE D THERMAL OVERLOAD HEATER ELEMENT UNIT

Model: B45

Introduction

This manual provides essential information for the proper installation, operation, and maintenance of the Square D B45 Thermal Overload Heater Element Unit. This component is designed to protect electric motors from damage due to sustained overcurrent conditions by sensing motor current and tripping a motor starter when an overload occurs. Please read this manual thoroughly before installation and use.

Product Overview

The Square D B45 Thermal Overload Heater Element is a critical component in motor control applications, specifically designed for use with compatible motor starters. It functions by converting motor current into heat, which then acts upon a bimetallic strip or eutectic alloy to cause a trip when the current exceeds a safe limit for a prolonged period. This prevents overheating and potential damage to the motor.



Figure 1: The Square D B45 Thermal Overload Heater Element Unit shown alongside its original packaging. The packaging indicates "Overload Relay Thermal Unit" and "Made in Mexico."

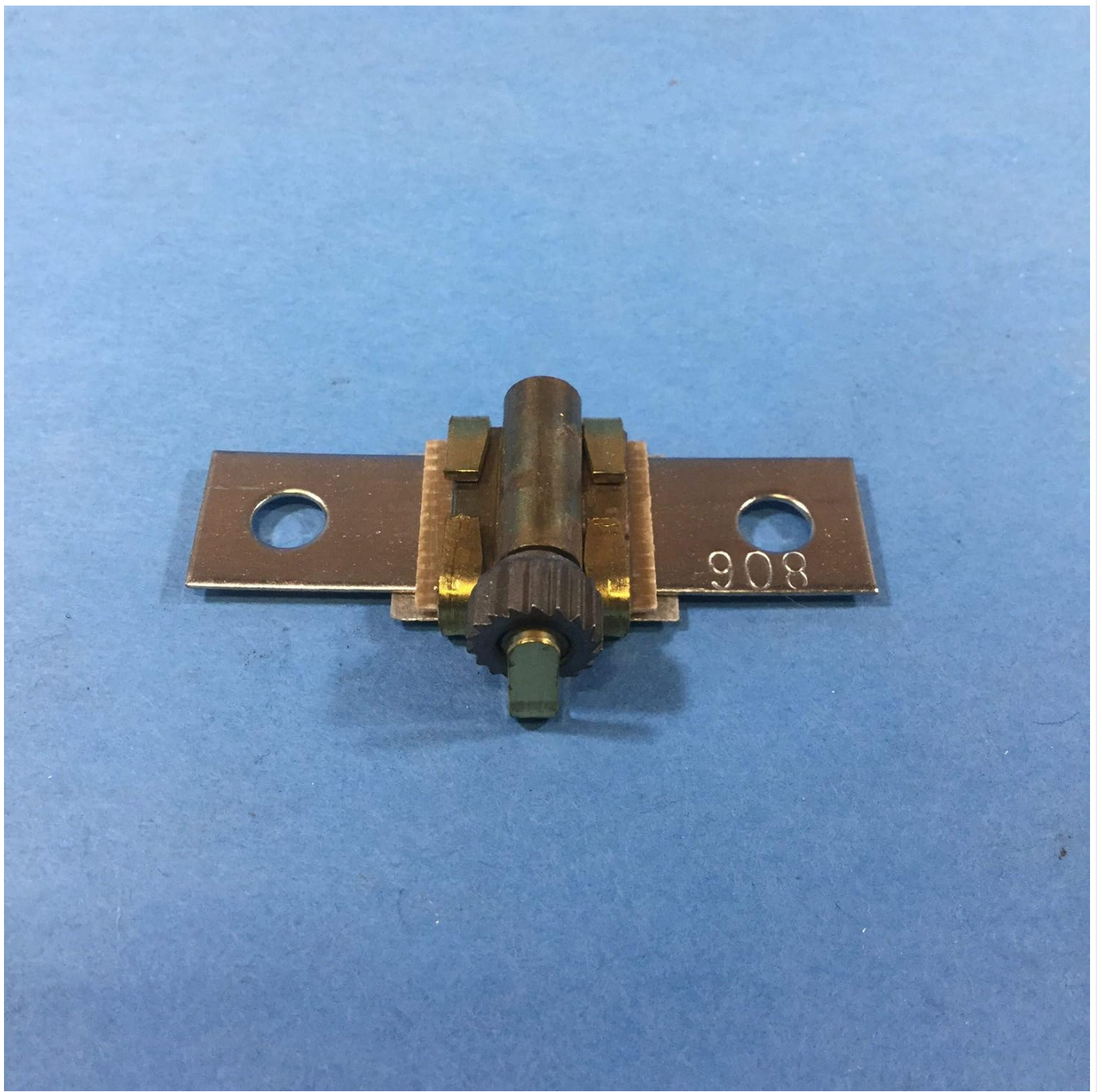


Figure 2: A top-down view of the B45 thermal overload heater element, highlighting its metallic construction and the central heating element.



Figure 3: The underside of the B45 element, clearly showing the "B 45" model designation stamped on the component.



Figure 4: A side view of the B45 thermal overload heater element, showing its compact design and connection points.

Setup and Installation

Installation of the B45 Thermal Overload Heater Element should only be performed by qualified personnel in accordance with all local and national electrical codes. Ensure power is disconnected before beginning any installation work.

1. **Safety First:** De-energize the motor control circuit and verify zero voltage using appropriate testing equipment.
2. **Compatibility Check:** Confirm that the B45 heater element is the correct size and type for your specific motor starter and motor full-load current (FLC). Refer to the motor starter's documentation for compatible heater element types.
3. **Mounting:** Insert the B45 heater element into the designated slots or terminals of the thermal overload relay assembly within the motor starter. Ensure it is seated firmly and correctly.
4. **Connections:** Verify all electrical connections are secure and tightened to the manufacturer's specified torque settings.
5. **Re-energize:** Once installation is complete and verified, re-energize the circuit and test the motor starter's operation.

Important: Incorrect installation can lead to equipment damage, fire, or personal injury. Consult a licensed electrician if you are unsure about any step.

Operating Principles

The B45 Thermal Overload Heater Element operates as a protective device. When the current drawn by the motor exceeds the rated current for a period that could cause motor damage, the heat generated by the element will cause the overload relay to trip, opening the motor starter's control circuit and stopping the motor. This protects the motor from sustained overloads, phase loss, or locked rotor conditions.

- **Normal Operation:** During normal motor operation, the current flowing through the heater element generates a small amount of heat, but not enough to trip the relay.
- **Overload Condition:** If the motor draws excessive current, the heater element generates more heat. After a specific time delay (inverse time characteristic), this heat causes the overload relay to trip.
- **Reset:** After a trip, the overload relay typically requires a manual or automatic reset once the heater element has cooled down. This ensures the motor is not immediately restarted into an overload condition.

Maintenance

Regular inspection of the thermal overload heater element and its associated relay is recommended to ensure continued reliable operation.

- **Visual Inspection:** Periodically inspect the heater element for signs of discoloration, corrosion, or physical damage. Ensure connections are tight.
- **Dust and Debris:** Keep the area around the heater element and overload relay free from dust, dirt, and other debris that could impede heat dissipation or cause electrical issues.
- **Testing:** Functional testing of the overload relay (including the heater element) should be performed periodically as part of a preventative maintenance schedule, following the motor starter manufacturer's guidelines.
- **Replacement:** If the heater element shows signs of damage or if the overload relay consistently trips without an apparent motor overload, the heater element may need replacement. Always replace with an identical Square D B45 unit or an equivalent specified by the manufacturer.

Troubleshooting

If the motor starter trips, or if the motor is not receiving power, consider the following troubleshooting steps related to the thermal overload heater element:

Problem	Possible Cause	Solution
Overload relay trips frequently	• Motor drawing excessive current (actual overload) • Incorrect heater element size • Heater element or relay damage • Poor ventilation around element	• Investigate motor load, bearings, or mechanical issues. • Verify heater element matches motor FLC. • Inspect and replace if damaged. • Ensure adequate airflow.
Motor does not start (overload tripped)	• Overload relay is tripped and needs reset • Heater element has not cooled down	• Manually reset the overload relay. • Allow sufficient time for the element to cool before resetting.
Heater element appears discolored or burnt	• Sustained severe overload • Loose connections	• Replace the heater element. • Inspect and tighten all connections. • Investigate root cause of overload.

Note: Always de-energize the circuit before performing any inspection or maintenance. If the problem persists, consult a qualified electrician or the manufacturer.

Specifications

Attribute	Value
Brand	Square D
Model Number	B45
Description	Thermal Overload Heater Element Unit
Material	Metal
Item Weight	1 Pounds (approx. 0.45 kg)
Product Dimensions (L x W x H)	4 x 3 x 1 inches (approx. 10.16 x 7.62 x 2.54 cm)
Amperage	50 Amps
Wattage	1.4 KW
Manufacturer	Square D

Note: The B45 designation refers to a specific heater element size, which corresponds to a particular motor full-load current range when used with a compatible Square D overload relay. The Amperage and Wattage listed may refer to the general capabilities of the motor control system this element is designed for, rather than the element's direct electrical rating. Always consult Square D's official documentation for precise selection and application data.

Warranty and Support

Specific warranty information for the Square D B45 Thermal Overload Heater Element Unit is not provided in this document. For detailed warranty terms, technical support, or service inquiries, please contact Square D (a brand of Schneider Electric) directly through their official website or customer service channels. You may find additional resources and contact information on the [Schneider Electric Store on Amazon](#) or their corporate website.

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