Understanding Three-Phase Heater Wiring

SHADOW Infrared Heating

A guide to the electrical connections used in Shadow Industrial three-phase infrared heaters

Introduction

Shadow Industrial three-phase infrared heaters use three individual 230V heating circuits connected to a three-phase electrical supply.

Each heating circuit has its own live and neutral wire. The three live wires connect to separate terminals, while the neutral wires are brought together at a common neutral terminal.

This guide explains how the connections are arranged, why a shared neutral is used and what electricians need to know when installing the heater.

How Does the Wiring Work?

The heater uses three separate 230V heating circuits designed to operate from a 400/230V three-phase electrical supply.

Each heating circuit has its own live and neutral connection. These wires are brought together at a terminal block to provide a straightforward external connection.

The terminal block is arranged as follows:

- **Three live wires (L1, L2 and L3)**: Each live wire connects to its own individual terminal, keeping the three phases separate.
- **Three neutral wires (N)**: The neutral wires from the heating circuits connect to a common neutral terminal.
- **One earth wire (PE)**: The protective earth connection is provided through a dedicated terminal.

This provides five external connections: L1, L2, L3, N and PE.

Why Is the Heater Wired This Way?

Although the heater operates from a three-phase electrical supply, each individual heating circuit is designed to operate at 230V.

A standard UK three-phase electrical supply provides approximately 400V between phases and 230V between each phase and neutral. By distributing the heating circuits across the three phases and using a common neutral connection, each circuit receives the appropriate operating voltage.

The three live connections remain separate, while the neutral wires share a common connection.

This allows the heater to operate using three-phase power while maintaining the correct voltage across the individual heating circuits.

Understanding the Terminal Block

The terminal block provides the connection point between the heater's internal wiring and the external electrical supply.

Terminal	Internal Heater Wiring	Function
L1	One live wire	Supplies heating circuit 1
L2	One live wire	Supplies heating circuit 2
L3	One live wire	Supplies heating circuit 3
N	Three neutral wires	Common neutral connection
PE	One earth wire	Protective earth connection

Each live wire is connected to an individual terminal, with a corresponding connection on the opposite side for the incoming electrical supply.

The three internal neutral wires are connected together at the common neutral terminal, which provides a single external neutral connection.

The protective earth connection is provided separately.

Important Installation Information

All electrical connections must be carried out by a suitably qualified electrician in accordance with the manufacturer's instructions and applicable electrical regulations.

Before installation, the electrician must verify:

- The electrical supply voltage and compatibility with the heater.
- The correct identification of the live, neutral and earth terminals.
- The manufacturer's specified wiring configuration.
- The suitability and ratings of the terminal block and conductors, including the common neutral connection.
- The required circuit protection, isolation and earthing arrangements.

The three live connections must remain separate and must not be linked together.

The neutral and protective earth connections must also remain separate.

The heater must not be energised until all connections and electrical safety requirements have been checked.

Further Information

For further information on wiring and installation requirements, please refer to the relevant product manual supplied with your heater.

Wiring configurations and requirements may vary between models.