

POWER SUPPLY COMPATIBILITY

Description

Half-wave rectified and full-wave rectified or bridge rectified power supplies take incoming AC power from a transformer and convert it to DC power. Half-wave and full-wave rectified or bridge rectified power supplies are used when an electronic control is receiving AC power, but the internal components require DC power.

Half-Wave Rectified Power Supply

A half-wave rectified power supply uses fewer electronic components and produces a half-wave DC output. Figure 1 shows the AC wave changed to DC through a half-wave rectifier.

Full-Wave Rectified or Bridge Rectified Power Supply

A full-wave rectified or bridge rectified power supply produces a full-wave DC output and converts the entire AC wave into usable DC power. Figure 2 shows the AC wave changed to DC through a full-wave rectifier.

Connecting Half-Wave Rectified and Full-Wave Bridge Rectified Power Supplies

1. Half-wave rectified and Full-wave bridge rectified power supplies typically cannot be powered with the same AC transformer.

A full-wave bridge rectified power supply connected to a half-wave rectified power supply, both powered by a single transformer, creates a ground path (short) every half AC cycle. The short across the transformer terminals will likely destroy either the bridge rectifier, the transformer or the pcb. (See Figure 3)

NOTE: Electronics with full-wave bridge rectified power supplies must use a separate transformer unless the half-wave rectified DC load is isolated from the control signal and the AC transformer powering both is not connected to ground (floating). If unsure, use a separate transformer.

2. Full-wave bridge rectified power supplies connected to a grounded DC load cannot be powered with an AC transformer secondary that has either side grounded.

A full-wave bridge rectified power supply powered with an AC transformer having one side grounded and powering a grounded DC load creates a ground path (short) every half AC cycle. The short across the transformer terminals will likely destroy either the bridge rectifier, the transformer or the pcb. (See Figure 4)

NOTE: Electronics and valves with full-wave bridge rectified power supplies that require an external control signal cannot have either side of the AC transformer secondary connected to ground.

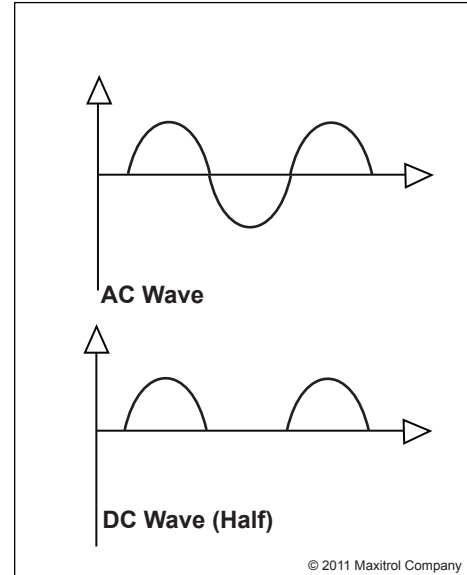


Figure 1: Half-Wave Rectification

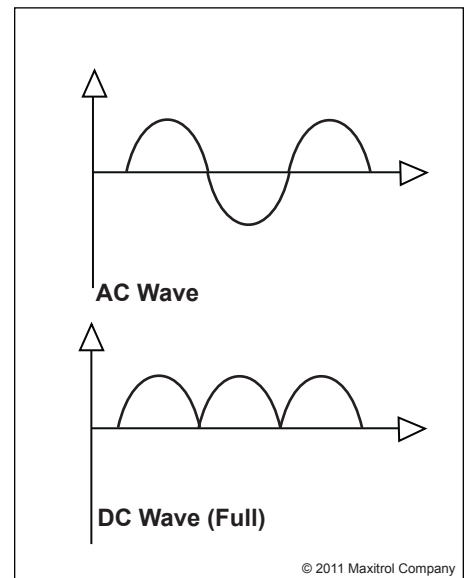


Figure 2: Full-Wave Rectification

⚠ WARNING

DO NOT CONNECT POWER SUPPLIES AS SHOWN IN FIGURES 3 & 4.

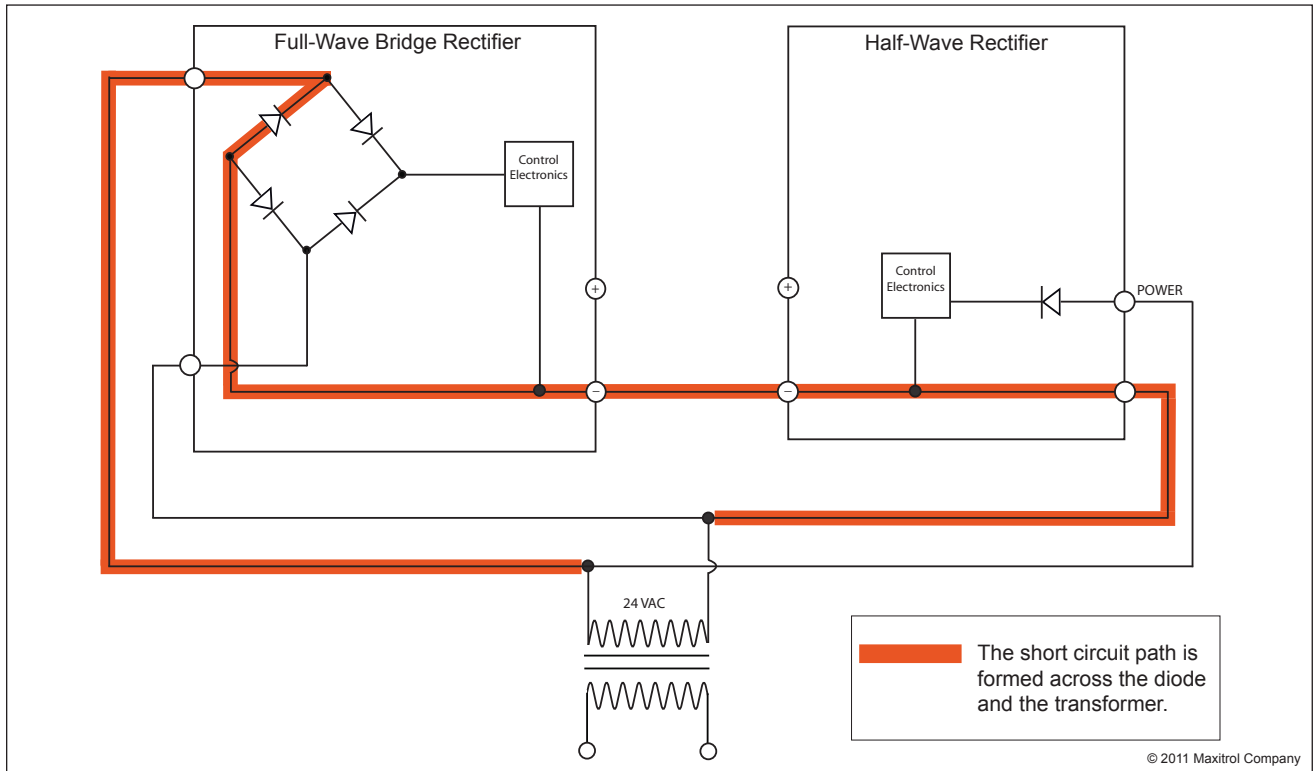


Figure 3: Full-wave and half-wave power supplies connected to same transformer.

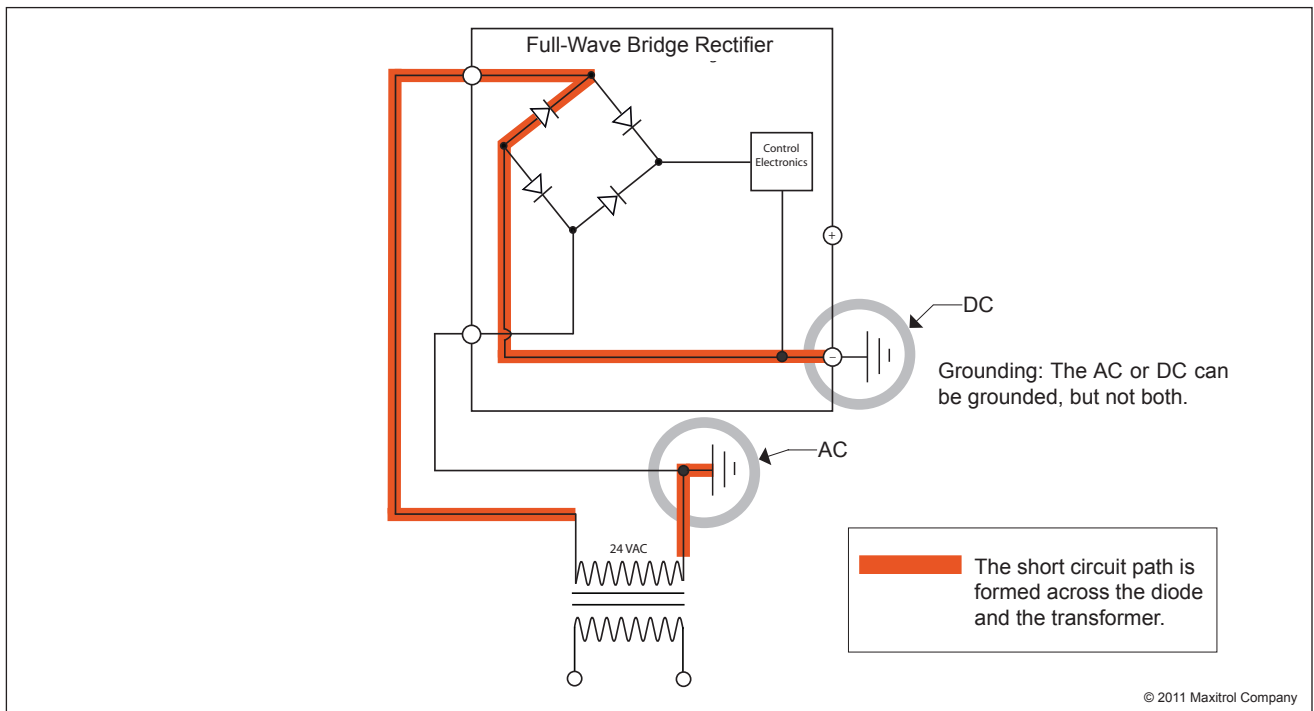


Figure 4: Full-wave bridge power supply connected to separate transformer.
Either the input (transformer secondary – AC) or the output (control electronics – DC) may be grounded, but not both.