



FOTEK SOLID-STATE RELAY , 25 A, 30 V

## 1

## Maintenance

SOLID-STATE RELAYS ARE SENSITIVE TO VOLTAGE SPIKES AND SURGES

## SOLID-STATE RELAYS PROBLEM

The blimp power delivery system uses a number of solid state relays. Some series relays are used in conjunction with each battery cell and act as switches. Fotek solid state relays are used in the <off> position, when the battery is removed from the circuit.

Solid-state relays are the preferred choice for protecting electrical systems. They are less affected by contact wear, dirt, vibration, humidity, and other environmental factors. As solid state relays have no moving parts, they require less maintenance and are less likely to fail at critical times.

### Problem:

However, solid-state relays are inherently sensitive to voltage spikes and surges.

This means you must keep in mind a number of warnings when working with solid-state relays.

### Warnings:

#### No insulation resistance

It is not recommended to apply DC voltages (500V or higher) to solid-state circuits. While the components may withstand the steady-state voltage level, the spikes induced by the sudden application of the voltage can damage the relay.

#### Less frequent maintenance

Treat solid-state relays with caution since they often employ a greater number of protection features.

#### Spike suppression

Avoid spikes on DC and AC test circuits. Sudden applications of DC

voltage can damage some solid-state relays.

#### Magnetic flag (target) assemblies

Magnetic flag (target) assemblies can cause permanent damage to the unit, if operated manually.

#### Tap plugs

Remove the connection plugs before you change taps. Removing the tap plug will ensure that current circuits are not opened when the tap plugs are changed.

#### Static electricity damage

1. Work on a grounded, conductive rubber mat or other suitable static protection system to avoid electricity damage.
2. Don't handle circuit boards with your bare hands.
3. Where possible, use the "differential" input mode for measuring instruments to avoid ground loops and the potential for damage to solid-state components.

## Testing solid-state relays:

When testing solid-state relays, it is necessary to take the following precautions:

1. Verify that the actual wiring matches the connection diagram.
2. Make sure that control power to the solid-state relay is applied with the proper polarity.
3. Apply only the rated control voltage. If a relay has a dual-voltage capability, make sure that the setting agrees with the supplied voltage.
4. Never apply a high-voltage test to a solid-state relay.
5. Never force a board into place or bend it. Circuit boards can be easily damaged, when mishandled.
6. Ensure that all required components (ex., the case) are grounded when the relay is in service.

# Wiring a solid-state relays

## Step 1

Connect either the positive control lead to the positive source, or the negative control lead to the negative source that is going to operate your relay.



## WARNING

Observe polarity when connecting your control leads in order not to damage the solid-state relay.

**X: Wiring DC Solid-state relay, 25A, 120V**

## Step 2

Connect either the positive control lead to the positive source, or the negative control lead to the negative source that is going to operate your relay.

## Step 3

Connect one load lead to the power source that is going to turn on your load when the relay operates.

## Step 4

Connect the other load lead to the power input connection of the equipment with your relay to turn on.

If you have difficulty wiring a solid-state relays, consult the following website.

## SOLID-STATE RELAYS WEBSITES

- [Omega.ca](http://Omega.ca)
- [Newark.com](http://Newark.com)
- [Cylex.ca](http://Cylex.ca)

# Switching a solid-state relay

## Step 1

Use the electrical pliers to cut 6 pieces of wire approximately 4 inches long.

## Step 2

Strip off ½ inch of insulation from the ends of each piece of wire.

## Step 3

Place one end of the first wire segment on one of the motor terminals.

## Step 4

Place the heated tip of the soldering iron to both the terminal and the wire end, and melt a drop of solder to both the terminal and the wire.

## Step 5

Smooth the solder over the electrical joint until the solder is shiny and free of lumps.

## Step 6

Solder one end of the second wire to the unoccupied motor electrical terminal.

## Step 7

Solder the free end of the first wire segment to the "1" terminal on the relay.

## Step 8

Solder one end of the third wire segment to the "2" terminal on the relay.

## Step 9

Solder one end of the fourth wire to one of the switch terminals.

## Step 10

Solder one end of the fifth wire to the unoccupied switch terminal.

## WARNING

Make sure the switch is in the "off" position.

## Step 11

Solder one end of the sixth wire to the terminal labeled "-" on the relay.

## Step 12

Solder the unoccupied end of the fifth wire to the relay terminal labeled "+".

## Step 13

Attach the free end of the third wire segment to the positive terminal on the 24-volt battery.

## Step 14

Attach the free end of the second wire segment to the negative terminal on the 24-volt battery.

## Step 15

Connect the free end of the fourth wire segment to the positive terminal on the 12-volt battery.

## Step 16

Connect the free end of the sixth wire to the negative terminal on the 12-volt battery.



**X: Solid-state relay switch and inline power control120V**