



This circuit protects step motor and servo motor drives from damage during periods of energy return when operating near maximum rated voltage.

Energy return occurs when a large inertial load is rapidly decelerated from a high speed. The energy stored in the moment of inertia (kinetic energy) must be removed and dissipated. The drive will return this energy back to the power supply as a current, which will cause a voltage rise of the power supply voltage. If the power supply voltage is already near the drive's maximum rated voltage, this additional voltage will destroy the drive.

This circuit senses the direction of current flow. When it is from the supply to the drive, it does nothing. If it reverses, then the current is shunted to ground.

CIRCUIT DESCRIPTION:

Normally power supply current flows thru rectifier D1, biasing Q1 off via R2. If the direction of current reverses, D1 shuts off and a reverse voltage develops across R1. This voltage now turns Q1 on. The returned current now flows from the drive, thru Q1 and to ground via R3. The main purpose of R3 is to keep Q1 within its secondary-breakdown limits (SOA).