

AN011 - Over/Under Voltage Time Delay Protector

Abstract

Over/Under voltage time delay protector has two main operation modes: protected mode and normal operation. During the protected mode, the power consumption is very low since only the controller needs to be powered. During the ON mode, the power consumption is higher since, in addition to the controller, the relay needs to be powered.

A typical power supply for this application is a capacitive power supply. The serial voltage drop capacitor of this power supply has a high capacitance value, which leads to large size, high price and high VAR consumption.

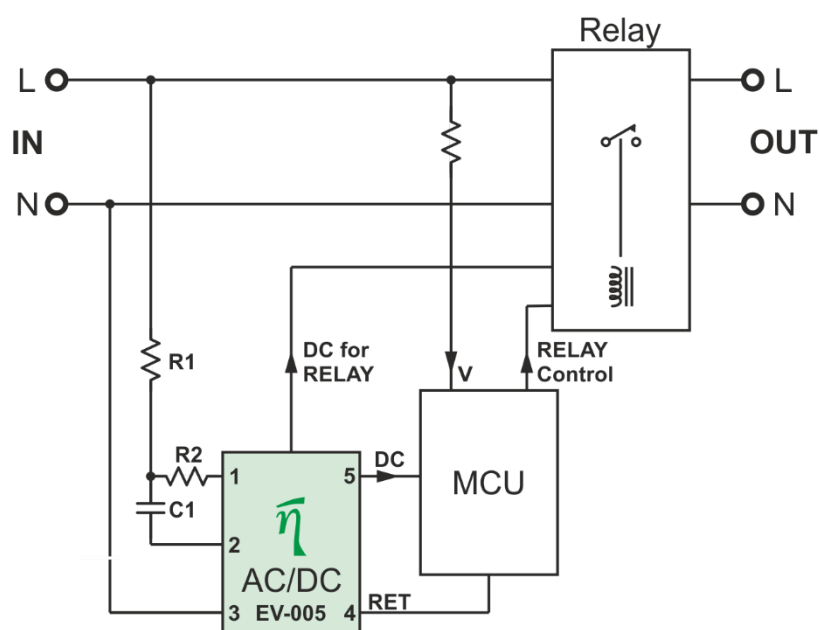
The DC output voltage regulation of this power supply is based on a Zener diode, which dissipates heat. A wide operation voltage range increases the heat dissipation. The heat dissipation effects are: large size (to cool the diode) and high standby power.

Eta-Bar's EV-005 is an AC to DC power supply for Over/Under voltage time delay protector. Its main features are: **Zero-Standby***, non-isolated, high efficiency, inductor-less AC to DC converter with two DC outputs:

- DC output voltage capable of driving the controller (low power)
- DC for relay. This output reduces the relay power consumption by providing the “pickup” voltage level during the “release” to “hold” relay transition and the “hold” voltage level during the steady state ON mode of the relay

The capacitance of the serial capacitor (C1) on the EV-005 is much lower compared to any existing solution.

EV-005 does not require any EMI (Electro-Magnetic-Interference) filter. EV005 operates in wide temperature range and wide AC input voltage range.



*Zero-Standby - According to the IEC 62301 Clause 4.5 regards measurements of less than 5 mW as zero power

Main Features:

- Topology : Capacitive power supply (inductor-less),
Non-isolated power supply.
- Input voltage range : Range A: 85 to 140 VAC ; 50 to 60 Hz
Range B: 185 to 265 VAC ; 50 to 60 Hz
- Series capacitor(C1): Less than 0.33 μ F for input voltage range A
Less than 0.15 μ F for input voltage range B
- DC outputs:
 - DC : Regulated voltage : adjustable 0.7 to 5 V DC
Output current capabilities : up to 5 mA
 - DC for relay: Pickup voltage range : adjustable from DC output to 50 V DC
Hold voltage range : adjustable from DC output to 50 V DC
Pickup max current : 100 mA
Hold max current : 8 mA
- Standby power : less than 5 mWatt (Conditions: $R1 < 1\Omega$)
- EMI filters : Not required