

USING A LIGHT DIMMER IC FOR AC MOTOR SPEED CONTROL

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An electronic speed control for an AC Motor can be designed with a Light Dimmer IC by limiting the minimum firing angle of the triac so that the motor won't stall. This can be done effectively for high volume applications by making a minor change to the IC. An alternative to modifying the IC is illustrated in Figure 2.

The Figure 2 schematic shows how to control the Minimum Triac Firing Angle (See Figure 1) so that it is greater than that determined by the LS7231 Light Dimmer IC. The desired value of Minimum Firing Angle is set by an Auxiliary Resistor-Capacitor-Diac Circuit. When the IC produces trigger pulses at lower values of firing angle, the Auxiliary Circuit fires the Triac. When the IC produces trigger pulses at greater values of firing angle, the IC trigger pulse fires the Triac. When the IC is off, the Auxiliary Circuit is also off and the Triac does not fire. The major components required to implement this function are the MPS8599 Transistor, MPSA13 Darlington, L201E5 Triac and the HT-32 Diac.

When the LS7231 is producing output trigger pulses, the MPS8599 transistor is turned on and develops a DC voltage on the .02 μ F capacitor in the base of the MPSA13 Darlington. This DC voltage is maintained as long as the IC output is producing pulses. This DC voltage turns on the Darlington which causes current to flow through the MT1 and Gate of the L201E5 Triac. This turns the Triac on and enables the Auxiliary Resistor (500K Pot.) - Capacitor (.047 μ F) - Diac (HT-32) Circuitry at the Gate of the Q4008L4 Load Triac. The Load Triac is triggered by either the IC Trigger Pulse or the Diac breakover, whichever occurs first. When the LS7231 is turned off the DC voltage across the .02 μ F capacitor discharges through the 1M resistor, turning off the Darlington and the L201E5 Triac.

This technique may be applied to other Light Dimmer ICs: LS7231-LS7234, LS7237 and LS7534-LS7535. The basic technique may also be used with a modified schematic for LS7538-LS7539 and LS7631-LS7632.

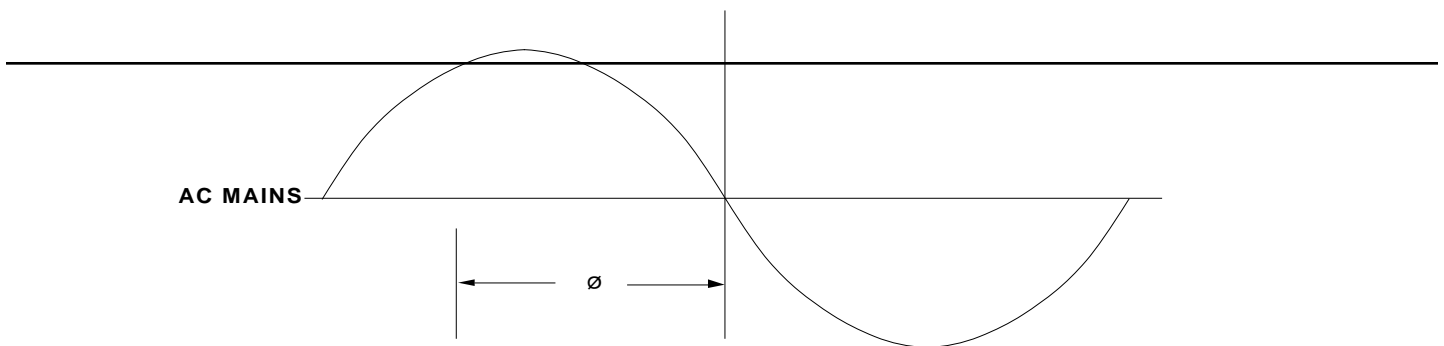
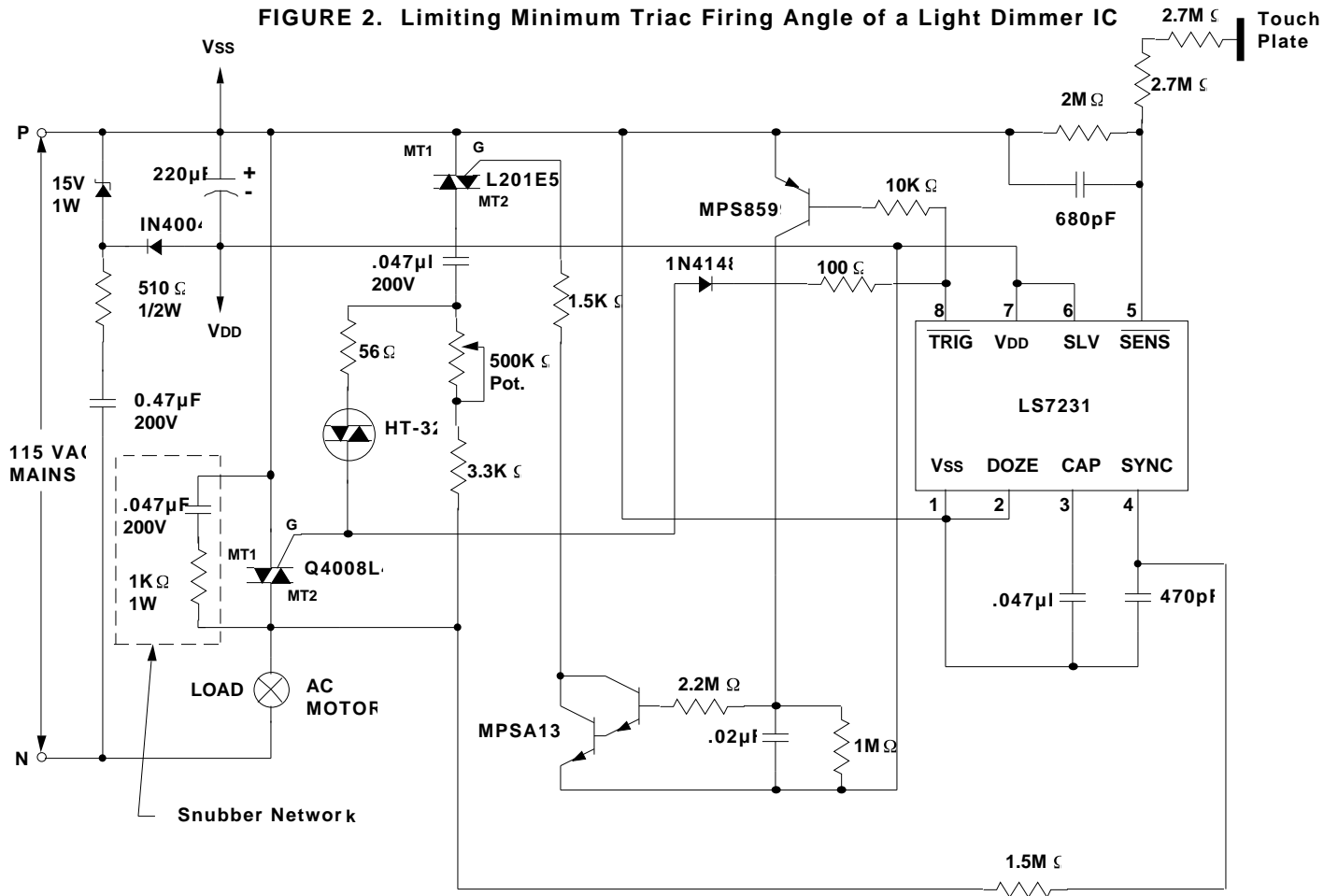


FIGURE 1. TRIAC FIRING ANGLE, ϕ

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FIGURE 2. Limiting Minimum Triac Firing Angle of a Light Dimmer IC



NOTE: All Resistors 1/4W and all Capacitors 25V Minimum, unless otherwise shown.