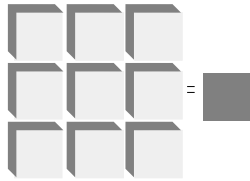


# LSI/CSI



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## HEAVY DUTY AC POWER CONTROL WITH AUTOMATIC VARIABLE TIMED OPERATION AND OVERLOAD SHUTDOWN

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A method is described herein for simple electronic control of large current inductive loads such as AC motors in heavy duty appliances. The control provides manual ON and OFF selects as well as automatic timed operation and overload shutdown.

The circuit shown in Figure 1 uses an LS7339 to drive a large current inductive load. The large current required by the load is provided by the two triac network. The IC output is applied to triac T1 which can be a low current triac. The output current of T1 is used to trigger triac T2 which delivers the required load current. T2 can be any size triac and supply currents of up to 300A and more if desired. Triacs delivering 300A need 500mA gate current. Triac T1 need only be rated for 1A in this case. Resistors R1 and R2 are used to provide the gate current for triac T2 at the required gate voltage. Since the AC voltage will reach 60V when the LS7339 output occurs and T1 turns on, then a value of R1 = 75 ohms and R2 = 15 ohms will provide a T2 gate current of 500mA at a gate to MT1 voltage of 3V. R1 and R2 can be 1/4W resistors since T1, R1 and R2 are immediately shorted out when T2 turns on.

The circuit shown in Figure 1 also includes controls for Automatic Variable Timed Operation and Overload Shutdown. A network consisting of a 5 megohm potentiometer, a 390K ohm resistor and a .1uF capacitor is used to achieve a

timed operation range of 12 to 135 seconds. The Overload Shutdown control uses a fractional ohm resistor, RF, in MT2 of T2 which senses the output current. If the current becomes too large, the AC voltage across the fractional ohm resistor increases. This is converted to DC using a half wave rectifier and applied to one end of a LM311 comparator. Resistors R3 and R4 are used to adjust the comparator trip level and thereby the current level at which Overload Shutdown occurs. A CMOS NOR gate, such as CD4001, is used to combine the comparator output with the Momentary OFF Control. Overload Shutdown must be blocked during Turn-on because the initial surge of current through triac T2 could generate a false Shutdown signal. A network consisting of a 10 Megohm resistor, a .1uF capacitor and a diode is used to block false Shutdown when the Momentary ON Switch is pressed. The diode provides the immediate block and the RC Network causes the block to remain for a short time after the ON Switch is released.

The information included herein is believed to be accurate and reliable. However, LSI Computer Systems, Inc. assumes no responsibilities for inaccuracies, nor for any infringements of patent rights of others which may result from its use.

\* NOTE: Indicates resistor wattage rating higher than 1/4W

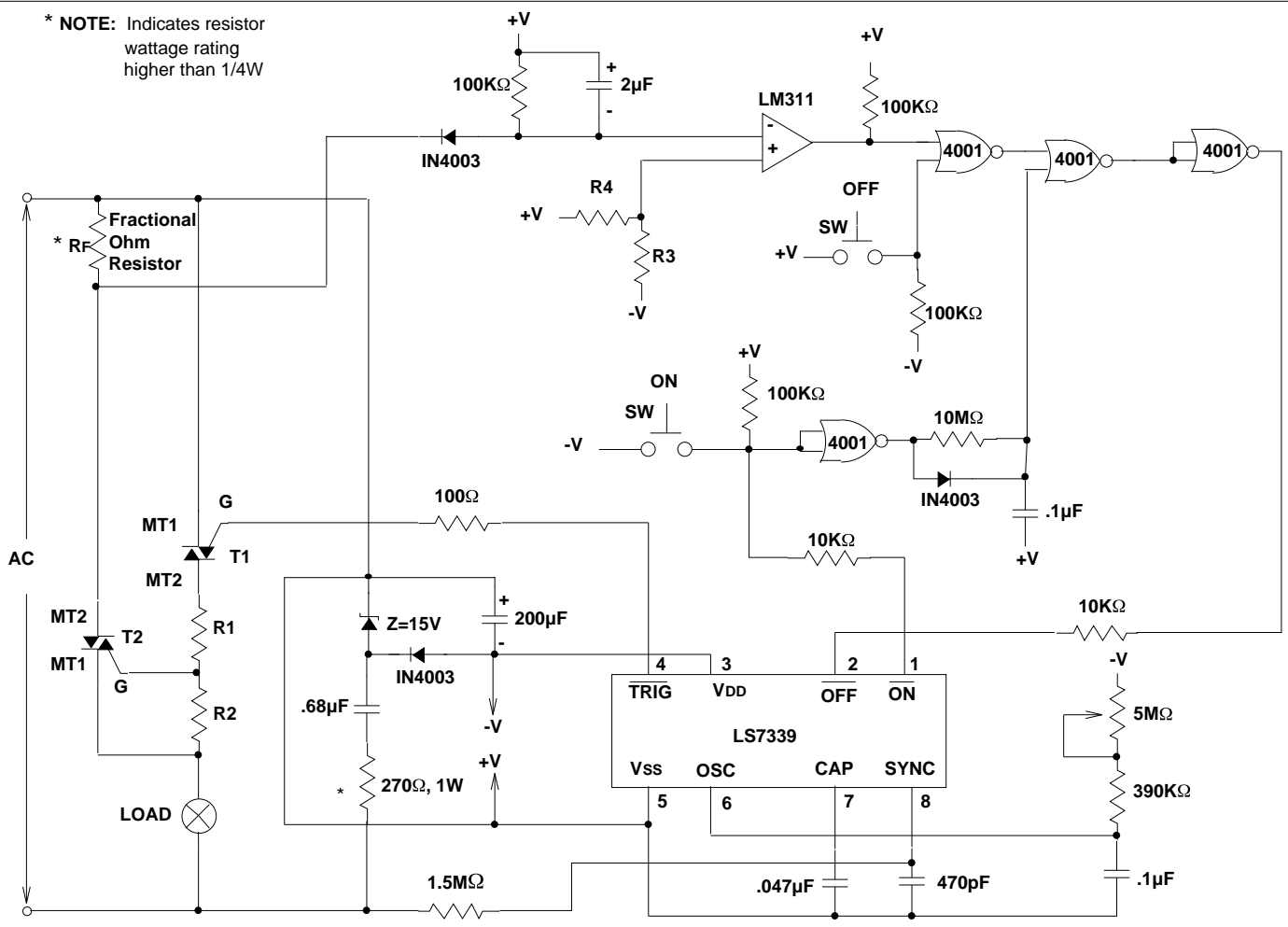


FIGURE 1. LARGE CURRENT AC MOTOR CONTROL WITH AUTOMATIC VARIABLE TIMED OPERATION AND OVERLOAD SHUTDOWN.