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Crossover

WARRANTY AND DISCLAIMER

DIGITAL DELAY INC. WARRANTS THE PRODUCTS IT MANUFACTURES AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP FOR A PERIOD LIMITED TO 1 YEAR FROM THE DATE OF SHIPMENT, PROVIDED THE PRODUCTS HAVE BEEN STORED, HANDLED, INSTALLED, AND USED UNDER PROPER CONDITIONS.

The company's liability under this limited warranty shall extend only to the repair or replacement of a defective product, at the company's option. DIGITAL DELAY INC. disclaims all liability for any affirmation, promise, or representation with respect to the products.

The customer agrees to hold DIGITAL DELAY INCORPORATED harmless from, defend, and indemnify DIGITAL DELAY INC. against damages, claims, and expenses arising out of subsequent sales of or use of DIGITAL DELAY INC. products, or products containing components manufactured by DIGITAL DELAY INC. and based upon personal injuries, deaths, property damage, lost profits, and other matters which BUYER, its employees, or sub-contractors are or may be to any extent liable, including without limitation, penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.

No warranties expressed or implied, are created with respect to the company's products except those expressly contained herein. The customer acknowledges the disclaimers and limitations contained and relies on no other warranties or affirmations.

SPECIFICATIONS

Input Voltage Range: 10.5 to 15.0 VDC

Voltage Drop through Delay Box: 0.2 VDC at 6 Amp. load
0.45 VDC at 20 Amp load

Output Current Range: 20 Amps. continuous-25 Amps for
30 seconds. If higher current is
needed in your car call **Digital Delay INC. 1-563**
324-1046

Standby Current Draw: 0.17 Amps.(Would take over 1 year to
discharge an average racing battery if left turned
on)

Operating Temperature Range: -45 to +150 degrees F.
internal temperature.

Timing Range: 0.001 to 9.999 seconds. on delay
thumbwheels. The crossover (dial-in) thumbwheels allow for
up to an additional 90 seconds delay for running on slower opponents side of
the tree.

Output Current: switched by a Field Effect Transistor that is best
protected against short circuits in customer wiring by a 15
amp. fuse. If output is
turned off by a short, the red power LED also turns off, telling you that the
box is in short circuit. Pressing the pushbutton resets the internal protection. If
the short is still there the red LED will stay off and only the yellow LED
will be on.

Pushbutton Contact Current: 0.100 amps. at 12 VDC.

INSTRUCTIONS FOR CROSSOVER DELAY TIMERS

BENEFITS

Quartz Crystal Timing

All Solid State--no relays-30 Amp. output{for 30 seconds)-no scattering of the .001 second position due to relay variations.

Time delays may be set to 0.001second resolution. Instant restart of cycle every time the push button is pushed.

Crossover feature allows for starting on opponents yellow. **No calculation mistakes--no calculator needed!** Opponents dial-in can be dialed in any time before staging. (thumbwheel switches)

Only **0.001 (1 one thousandth)** of a second delay due to the timer. .

The case is heavy industrial type die-cast aluminum.

The Delay Timer is electronically protected against a direct short on the brake line. Due to the fact so many Transbrake solenoids are getting minor shorts on the inside causing AMP draws over 80 Amps. A 20 AMP fuse and holder has been supplied, use is recommended to protect the box.

Led panel indicators to indicate box status.

Red---power on when lit-**If not lit** when the power switch is on, the output is short-circuited. The red led will flash on and off if voltage to the Transbrake is below **11.5** volts when the Transbrake is engaged.

Yellow--turns on when pushbutton is pushed. It tells you that the pushbutton is working . It goes out when the button is released.

Green--delay output turned on-Transbrake on

OPERATION NOTES

The red LED on indicates the box is turned on, has power and is not in the short circuit protection mode. When the red LED is not on, and the yellow LED comes on when the button is pushed, the transbrake wires or the transbrake solenoid is possibly shorted. The red LED will flash on and off if voltage to the transbrake is below 11.5 volts when the transbrake is engaged.

The yellow LED turns on any time that the pushbutton is pushed. This tells you that the pushbutton circuit is working. The pushbutton terminal on the terminal strip must go to ground to turn this led on. This is done when the pushbutton switch is pressed. The timer will not operate if the yellow LED is not turning on. If it does not turn on and the red LED is on, check the button wiring. The yellow LED turns off when the pushbutton is released.

The green LED turns on whenever the transbrake output is turned on. It stays on for the duration of the delay cycle. The transbrake should be engaged whenever the green LED is on. If the green LED is on and the transbrake is not engaged, check the wiring for an open circuit. If the green LED does not turn on when the pushbutton is pushed, there may be a short in the wiring. Turn the timer off. Disconnect the wire from the transbrake point on the terminal strip and turn the timer back on. If the green led turns on when the button is pushed, there is a short in the wiring or in the transbrake solenoid. Please check the wiring and the transbrake before calling so that we have enough information to get the problem worked out.

One very important feature of the *Crossover* timer is the ability to restart your delay cycle if you slip off the button while you are staged. Every time you press the pushbutton, the timer resets to the beginning of the timing cycle. This means that you can instantly recover without having to complete the timing sequence.

USING THE CROSSOVER FEATURES

To use the **CROSSOVER** feature, set your dial-in on YOUR DIAL-IN thumbwheel switches and set your opponents dial-in on THEIR DIAL-IN thumbwheel switches. This is true even if you are the slower car. If you are the faster car, your total delay will be the difference between the dial-ins plus your dialed in delay. You will release the pushbutton on your opponents' yellow. If you are the slower car, set the dial-ins as usual or set them the same. The **CROSSOVER** timer will function as a straight delay box when the times are set the same or with YOUR DIAL-IN set slower. You will release on your yellow when using as a straight delay box.

WHAT THE FLASHING RED LIGHT MEANS

THE RED LIGHT WILL FLASH WHEN THE TRANSBRAKE IS ENGAGED AND THE BATTERY VOLTAGE IS BELOW 11.5 VOLTS. THIS IS WARNING YOU THAT YOU COULD BE STARTING TO HAVE PROBLEMS DUE TO LOW VOLTAGE. YOU SHOULD CHECK THE BATTERY VOLTAGE AT THE **CROSSOVER** BOX WITH A VOLTMETER. PUT THE BLACK (-) METER LEAD ON THE GROUND TERMINAL SCREW AND THE RED (+) METER LEAD ON THE TRANSBRAKE TERMINAL SCREW, ENGAGE THE TRANSBRAKE AND READ THE VOLTAGE. IF IT IS BELOW 11.5 VOLTS, YOU SHOULD FIND THE REASON AND CORRECT IT BEFORE PROBLEMS DEVELOP IN **CROSSOVER** OPERATION.

SOME REASONS FOR LOW VOLTAGE AT THE **CROSSOVER** BOX ARE:

1. Discharged or bad battery
2. Loose or broken wires
3. Wires too small for the current draw
4. Defective electrical component in race car drawing too many Amps.
5. The **CROSSOVER** may be defective. Check by disconnecting all the wires from the Transbrake terminal on the terminal strip. Apply and hold pushbutton, if the measured voltage is below 9 volts at the Transbrake terminal and above 11.5 volts at the battery terminal, you will need to send the box back for repair.

INSTALLATION INSTRUCTIONS

READ THE WARRANTY AND THE DISCLAIMER FIRST

The crossover delay timer may be located in any position . It is suggested that the box be mounted at least 12 inches from the ignition system. Test the operation of the timer with the engine running. If operation of the timer is incorrect, contact **DIGITAL DELAY INC.** at 563-324-1046. The **CROSSOVER DELAY TIMER** has been designed to operate with all ignition systems, but it is impossible to cover all situations. Please call if you have a problem.

The **CROSSOVER DELAY TIMER** must be operated with a negative ground 12 volt system only. **THE GROUND WIRE MUST BE CONNECTED BEFORE ANY OTHER WIRES.** THE WIRES SHOULD BE AT LEAST 14 GA. FOR THE, +12 volts, AND THE TRANSBRAKE WIRES. **Increase the wire size to 10 Ga.** if you are using a Transbrake with more that **10 amps.** current draw. The pushbutton wire may be any size that is convenient(at least 20 Ga.), and it does not need to be shielded wire.

The Timer ground must be to the battery or to the Chassis. The ground must not be made to aluminum parts. The **CROSSOVER** can be mounted by putting glue-on Velcro on the back of the box and on the car's mount. Mounting can also be done by first removing the 6 outer Phillips screws on the front panel. Then carefully lift the complete TIMER out of the box. You may now drill the back of the box for mounting bolts. Be very careful that the heads of the mounting bolts do not touch the back of the circuit board when you reinstall the timer.

THERE ARE NO USER SERVICEABLE PARTS IN THE TIMER. ALL REPAIRS WILL BE MADE BY THE MANUFACTURER.

Wiring Diagram

CROSSOVER DELAY TIMER CONNECTIONS

