



T2 DUAL SHUTDOWN TIMER

Vehicle Battery Protection Unit

The Lind T2 Shutdown Timer protects your vehicle battery from over-discharge, and protects communications and other sensitive equipment from low voltage and high voltage damage. This device turns OFF electrical loads at a preset time after the car engine is shut down. The timers start when the ignition is turned OFF. This unit has two outputs; each has its own time delay.



For assistance call Lind Technical Support at (800) 659-5956 or (952) 927-6303.

OVERVIEW

The T2 Shutdown Timer protects the automobile battery from over-discharge by shutting OFF up to 50 amp loads at a preset time after the engine is shutdown or when the battery is discharged to a low voltage level. The timer also protects radio or computer equipment from damage due to low or high input voltage as experienced with alternator failure or improper voltage jump-starts.

An emergency switch allows 15 minutes of operation after the timer shuts down the equipment. An ignition switch input is provided as an optional activation method, but is not necessary. The T2 Shutdown Timer is normally activated by sensing the alternator charge voltage level applied to the battery. When the alternator goes OFF the timed sequence is started.

A unique feature of the T2 Shutdown Timer is that it allows full testing of the system after installation. Momentary closure of the test switch reduces the delay time by a factor of 100 to allow a quick test of the system timing.

FEATURES

- Adjustable Shutdown Delay Time (0 seconds—4 hours), other possible delay times available-consult factory
- Low Voltage Shutdown (10.5 VDC)
- High Voltage Shutdown (18 VDC with auto reset)
- Loads up to 50 Amps Total (30 amps max each output)
- Reverse Polarity Protected
- Automatic Battery Voltage Sensing Activation (battery not charging = timer ON)
- Optional Ignition Switch (IGN) Activation (ignition OFF = timer ON)
- LED Indicators for ON, OFF and Timing
- Speed-up Time Test Switch (set delay divided by 100)
- Over-ride Switch - 15 minute emergency operation after time out or failure of the engine to start
- Automotive Load Dump Protection

TIMER START (BOTH OUPUTS)

The timer contacts will close when the engine is started and the alternator is charging the battery (battery voltage exceeds 13.5 volts). The timing will start when the engine is turned OFF and the battery voltage decreases below 13 volts.

Optional connection of the IGN terminal will result in the timer starting when the ignition switch is opened. If the IGN terminal is connected to the accessories position the loads will be energized with the key in the accessories position.

NOTE: If the vehicle electrical system does not exceed 13.5 VDC with the vehicle running, the IGN terminal connection must be used or incorrect shutdown timer operation will occur.

TIMER SETTING (BOTH OUTPUTS)

The ON time after engine shut OFF is set for each output with a potentiometer on the top of the T2 Shutdown Timer unit. A small screwdriver or key can be used to set the potentiometers. Point the arrow on the potentiometer to the desired delay.

TECHNICAL INFORMATION

Battery Voltage Sensing Turn-on Threshold:	>13.5 V
Battery Voltage Sensing Timer Start Threshold:	<13.0 V
Ignition ON Threshold (if used):	>5 V
Ignition OFF Threshold (if used):	<2.5 V
LED Flash Rate In Timing Mode (Normal):	2 seconds
LED Flash Rate In Timing Mode (Test Mode):	0.6 seconds
High Battery Voltage Disconnect Threshold:	>18 V
Low Battery Voltage Disconnect Threshold:	<10.5 V
Low Battery Voltage Disconnect Delay:	>30 seconds
Input Voltage Range:	9-18 V
Max. Output Current (50 amp max total) - Out 1:	30 amps
Max. Output Current (50 amp max total) - Out 2:	30 amps
Current Draw in OFF Mode:	18 mAmps
Current Draw in ON/TIMING Mode:	80 mAmps
Time Delay Adjustment Range:	0 seconds—4 hours
Override Mode Time Setting:	15 minutes
Test Mode Speed-Up Rate:	x 100

INSTALLATION

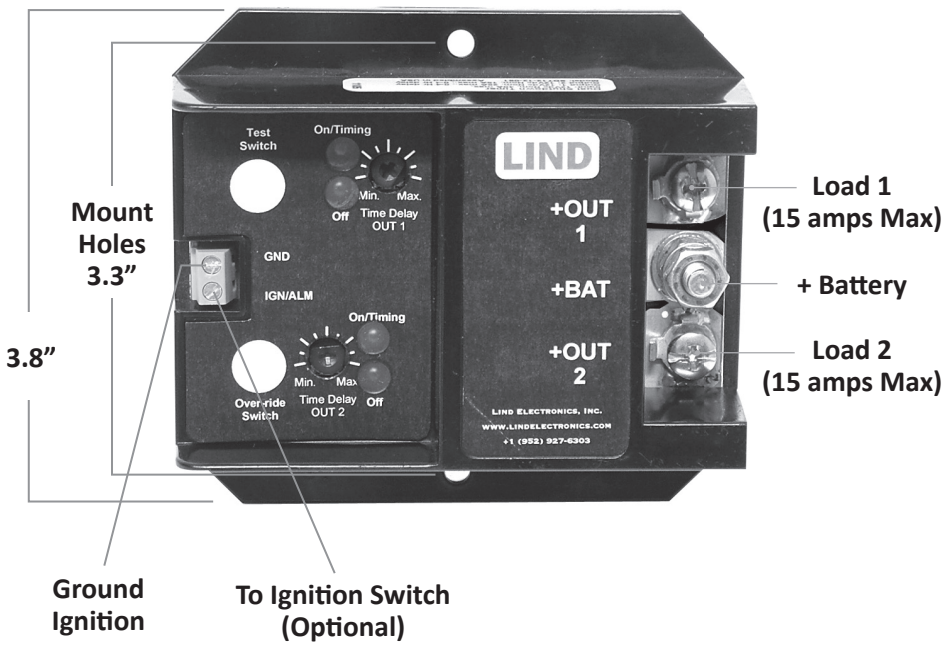
- Mount the T2 Shutdown Timer in a cool, dry place using #10 bolts, nuts, washers and lock washers. The timer is connected between the +12 volt of the vehicle electrical system and the loads to be controlled. The loads may be radios and computers or other electrical loads (lights and flashers).
- The input wire must be connected to the system +12 volts through a fuse with a value of 50 amps or less. This connection can be made to a fuse panel or directly to the battery. If the T2 Shutdown Timer is connected directly to the battery the fuse must be located within 5 inches of the battery’s positive terminal. Use the table below to select the appropriate wire gauge.

AMPS	LENGTH (FT)				
	5	10	15	20	
10	16	14	12	10	MINIMUM WIRE GAUGE (AWG)
20	14	10	8	8	
30	10	8	6	6	
40	8	8	6	6	
50	6	6	4	4	

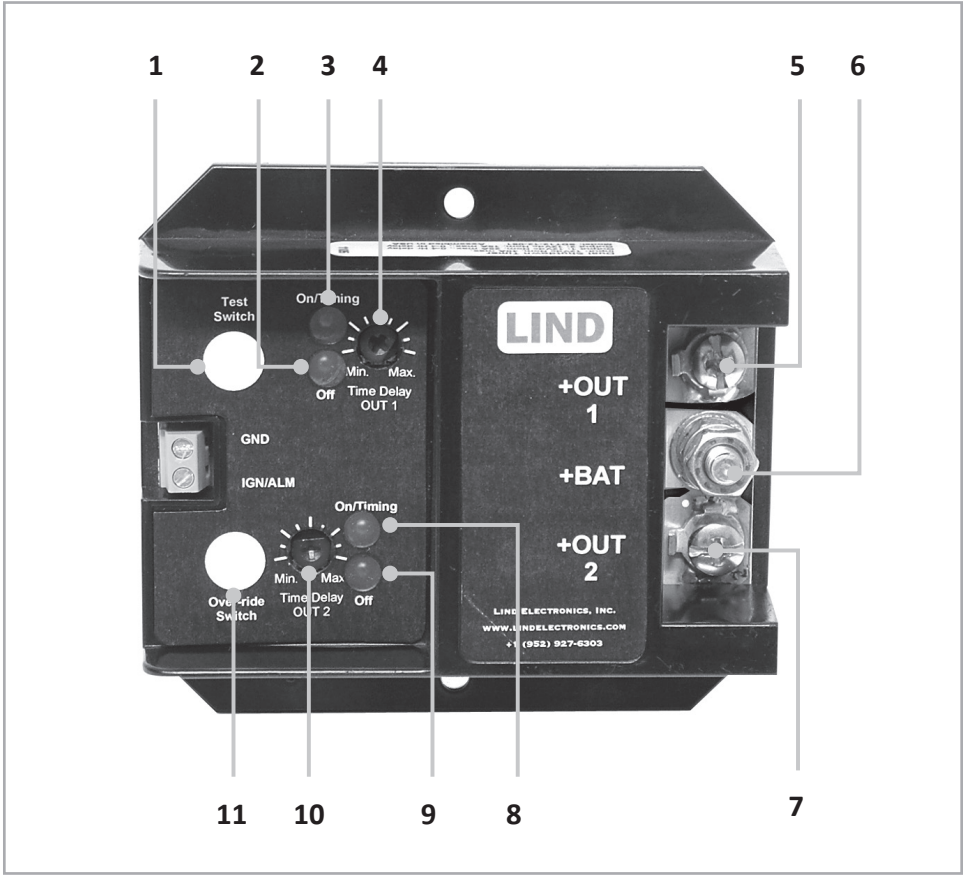
- Loads are connected to either or both of the +OUT terminals. Additional protection can be provided by inserting manufacture recommended fuses for each load connected to the +OUT terminals.
- On models with the high current terminal block, strip back the wire 0.35” prior to insertion.
- Connect the GND terminal to a good, clean chassis ground. The T2 Shutdown Timer is powered from the +BAT input and this ground.
- Activation of the timer’s timing period may be automatic by sensing the battery voltage drop when the engine is turned OFF or by the optional IGN connection to the ignition switch.
- For the ignition switch activation option, connect the IGN terminal of the timer to the ignition switch terminal that goes to zero volts when the engine is turned OFF.
- The GND and IGN connections carry very little current (< 0.1 amp). Wire gauge is determined by mechanical suitability. Strip back wires 0.25” prior to installation.

NOTE: When using the ignition switch option, the T2 Shutdown Timer period will not start if the engine dies.

T2 DUAL SHUTDOWN TIMER



T2 DUAL SHUTDOWN TIMER DIAGRAM



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|----|---------------------------------------|-----|---------------------------------------|
| 1. | Test Switch | 7. | Output Terminal 2 |
| 2. | Off Timing LED (Out 1) | 8. | On Timing LED (Out 2) |
| 3. | On Timing LED (Out 1) | 9. | Off Timing LED (Out 2) |
| 4. | Adjustable Time Potentiometer (Out 1) | 10. | Adjustable Time Potentiometer (Out 2) |
| 5. | Output Terminal 1 | 11. | Over-ride Switch |
| 6. | +12 VDC Input Stud | | |

TO TEST

- With the engine running the green LEDs will be ON and power is applied to the loads.
- Turn the engine OFF and the green LEDs will flash at a 2 second rate to indicate normal timing.
- Momentarily close the Test Switch. The green LEDs will flash rapidly indicating fast test timing. Shutdown will occur in 1/100 of the normal time set. With a 2 hour setting the T2 Shutdown Timer will time out in 72 seconds. The red LED will come ON when its output turns OFF.
- Momentarily close the over-ride switch. The green LEDs will flash at the normal rate indicating normal timing in OVER-RIDE mode. The over-ride switch will provide 15 minutes of additional operation after the normal time period has been completed even with battery voltage lower than 10.5 volts. The over-ride switch will cause output to stay on for a minimum of 15 minutes if the output is already on.
- Momentarily close the Test Switch. The green LEDs will blink rapidly indicating fast test timing. Shut down will occur in about 9 seconds. The red LED will come ON.

Notes:

1. The T2 Shutdown Timer outputs will turn ON if the automobile battery is charged from an external source. The output loads should be turned OFF when externally charging.
2. The low voltage detection circuit has a 30 second delay to avoid load disconnection when starting the automobile.
3. This product has not been evaluated for its effects on equipment within emergency vehicles.

LIMITED WARRANTY

Lind Electronics, Inc. (LIND) warrants the circuit assembly portion of products manufactured by it to be free of defects in material and workmanship for a period of 3 years from the date of purchase under normal use. During this warranty period, LIND will, at its option, repair or replace the product at no charge for parts or labor when the product is returned postage paid as a complete unit to LIND. Proof of purchase and a letter explaining the problem must accompany the returned unit.

This warranty does not apply if any part of the adapter, its cables or connection jacks have been altered, subjected to abuse, accident or misuse. This warranty excludes incidental or consequential damage resulting from the product or the use of the product. This warranty is in lieu of all other warranties expressed or implied and no person is authorized to assume for LIND any other liability in conjunction with this product. The warranty gives you, the purchaser, specific legal rights and you may have other rights which may vary from state to state and country to country.

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