



POWER SPECIALISTS FOR MOBILE COMPUTING

LIND ELECTRONICS, INC.

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**FORKLIFTS &  
WAREHOUSING**

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MOBILE POWER SOLUTIONS  
CATALOG

AUTO & AUTO/AIR ADAPTERS

AUTO/AIR AC POWER ADAPTER

REPLACEMENT AC ADAPTERS

SHUT DOWN TIMERS

STOCK & CUSTOM CABLES

12 - 32 VDC EXPANDED INPUT  
VDC RANGE ADAPTERS



# LIND ELECTRONICS PROFILE

## ABOUT LIND ELECTRONICS

Lind Electronics, Inc. is a leading manufacturer of power adapters, auxiliary power packs, Shut Down Timers, battery chargers and other laptop accessories designed to meet the needs of mobile computer users.

Lind Electronics is a direct support OEM supplier for leading mobile computer manufacturers including Panasonic, Dell, Motion Computer, General Dynamics/Itronix, Trimble and others. Established in 1975, Lind Electronics engineers and manufactures power products available for all leading brands of laptop and notebook computers.

Lind Electronics is located in Minneapolis, MN. Our Engineering, Sales, Production and Design teams are dedicated to solve your mobile power application needs.

Lind Electronics' product lines include but are not limited to:

## AUTO & AUTO/AIR ADAPTERS

Lind's automobile and airline power adapters charge your laptop's internal battery by providing the proper voltage to your specific computer from any 11 to 16 VDC source. Output filtering, tight regulation and short circuit protection keep your computer safe from power fluctuations which can occur at the source.

Various adapters operate from an automobile's cigarette lighter or an airplane's in-seat adapter. Quality design, a durable enclosure and three year warranty ensure your complete satisfaction.

## AUTO/AIR AC POWER ADAPTER

The Lind Auto/Air AC Power Adapter will power your laptop from an AC wall outlet, automobile cigarette lighter socket, or airline in-seat adapter.

These adapters are made of quality components and are guaranteed to meet the power specifications of your computer. In addition, each adapter has a USB port that can be used to charge devices such as cell phones, PDAs, digital cameras and more.

## REPLACEMENT AC ADAPTERS

These AC Adapters from Lind Electronics are designed to replace the AC Adapters originally shipped with laptop and notebook computers. These replacement adapters provide all of the functionality provided by the original adapter.

## SHUT DOWN TIMERS

Also known as a delay timer, the Lind Shut Down Timer (SDT) is designed to protect your vehicle's battery and connected communications equipment from over-discharge, and low and/or high voltage fluctuations. The Shut Down Timer deactivates electrical loads up to 30 amps at an adjustable preset time after the vehicle ignition is turned off or if the vehicle's battery becomes over-discharged.

## STOCK AND CUSTOM CABLES

If you need a hard to find cable assembly it may be available from Lind Electronics. If it is not listed, contact Lind's Sales department to request how a custom cable assembly can be manufactured to suit your needs.

## 12 - 32 VDC EXPANDED INPUT VDC RANGE ADAPTERS

The DC/DC Adapters simultaneously power your laptop and charge the laptop's internal battery. Each adapter provides the proper voltage for your specific computer from any 12 to 32 VDC source. Output filtering, tight regulation and short circuit protection keep your computer safe from power fluctuations which can occur at the source.



# TABLE OF CONTENTS

## FORKLIFTS & WAREHOUSING

- Auto/Air Laptop Power Adapters .....6
- Auto/Air AC Power Adapter .....7
- 24 Watt DC/DC Power Adapters.....8
- 40 Watt DC/DC Power Adapters .....8
- Mountable Power Adapters (80 - 120 Watt Series) .....9
- Isolated Output Series DC/DC Power Adapter .....10
- Module DC/DC Power Adapter .....11
- Ruggedized AC/DC & AC/DC/DC Combo Adapters.....12
- Replacement AC Laptop Power Adapters .....13
- Mounting Bracket.....13
- Shut Down Timer .....14
- Low Profile Shut Down Timer .....15
- T2 Shut Down Timer .....16
- Ruggedized Shut Down Timer .....17
- Modified Sine Wave Inverters .....18
- Pure Sine Wave Inverters .....18

## TERMINOLOGY

- Overview & Lind Terminology.....19



# FORKLIFTS & WAREHOUSING

Lind Electronics provides power solutions designed to meet the unique needs of warehousing applications. Lind's mobile power products are designed to help forklift and warehouse personnel meet their daily operational and fulfillment needs. Custom specialized mobile power solutions may be engineered and manufactured for specific forklift and warehousing applications.



AUTO/AIR LAPTOP  
POWER ADAPTERS  
PAGE 6



AUTO/AIR AC POWER  
ADAPTERS  
PAGE 7



24 WATT DC/DC  
POWER ADAPTERS  
PAGE 8



40 WATT DC/DC  
POWER ADAPTERS  
PAGE 8



MOUNTABLE POWER  
ADAPTERS (80 - 120  
WATT SERIES)  
PAGE 9



ISOLATED OUTPUT  
SERIES DC/DC  
POWER ADAPTER  
PAGE 10



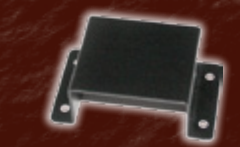
MODULE DC/DC POWER  
ADAPTER  
PAGE 11



RUGGEDIZED AC/DC &  
AC/DC/DC COMBO  
POWER ADAPTERS  
PAGE 12



REPLACEMENT AC  
LAPTOP POWER  
ADAPTERS  
PAGE 13



MOUNTING BRACKET  
PAGE 13



SHUT DOWN TIMER  
PAGE 14



LOW PROFILE SHUT  
DOWN TIMER  
PAGE 15



T2 SHUT DOWN TIMER  
PAGE 16



RUGGEDIZED SHUT  
DOWN TIMER  
PAGE 17



MODIFIED SINE  
WAVE INVERTERS  
PAGE 18



PURE SINE WAVE  
INVERTERS  
PAGE 18

## AUTO/AIR LAPTOP POWER ADAPTERS

**Maintain power while traveling in your car or on your flight so your laptop can work as long as you do.**

Lind's Auto/Air Laptop Power Adapters fit the full range of PC notebook models and your application needs. Ruggedized power adapters are available for many types of users, including Lind high output power series adapters for many desktop replacement notebooks requiring 80 to 200 watts of power.\*

All Lind adapters incorporate the highest degree of circuit protection for your laptop and the adapter itself. Most adapters feature field replaceable input/output cables with snap-in connections to make servicing easy and efficient.

The robust design of Lind's Auto/Air Laptop Power Adapters make them ideally suited for use in harsh mobile environments. The adapter's electronics are protected by a rugged case that is epoxy sealed to protect the internal circuits from damage caused by shock and/or vibration.

Efficient power conversion circuits with extensive protection circuitry provide reliable and continuous power to laptops in the most demanding warehouse environments.

\* The power requirements for 80 to 200 watt higher performance laptops exceed the power provided on commercial flights (airline in-seat power is limited to 75 watts and is further subject to availability on aircraft). As a result, 80 to 200 watt laptops cannot be powered via the in-seat power port on commercial flights. For laptops requiring 75 watts of power or less, contact your airline to find out if in-seat power is available for your flight.



AUTO/AIR LAPTOP POWER ADAPTER

### FEATURES: AUTO/AIR LAPTOP POWER ADAPTERS

- Low Input Voltage Cut Off
- Output Short Circuit Protection
- Internal Over Temperature Shut Down
- Automatic Fault Reset
- Ruggedized PC/ABS plastic or aluminum housing
- Low EMI
- Field replaceable cables

### TECHNICAL INFORMATION: AUTO/AIR LAPTOP POWER ADAPTERS

- POWER INPUT: Noted on label
- POWER OUTPUT: Noted on label
- INPUT FUSE: Auto Mini (noted on label)
- INDICATORS: LED on automobile plug (input present); LED on adapter (output present)

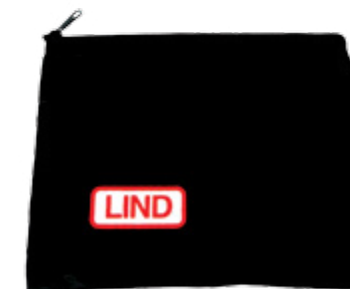
## AUTO/AIR AC POWER ADAPTER

**Charge several types of devices using either an AC or DC power source.**

The Lind Auto/Air AC Power Adapter can power your laptop from an automobile cigarette lighter socket, an AC wall outlet, or an airline in-seat power plug.\*

The Auto/Air AC Power Adapter is designed to meet the power specifications of your computer. The adapter has a USB port that can be used to charge devices such as cell phones, PDAs, digital cameras and more. The unit provides protection against over-voltage, over-temperature, over-current, and short circuits.

\* The power requirements for 80 to 200 watt higher performance laptops exceed the power provided on commercial flights (airline in-seat power is limited to 75 watts and is further subject to availability on aircraft). As a result, 80 to 200 watt laptops cannot be powered via the in-seat power port on commercial flights. For laptops requiring 75 watts of power or less, contact your airline to find out if in-seat power is available for your flight.



AUTO/AIR AC POWER ADAPTER

### FEATURES: AUTO/AIR AC POWER ADAPTER

- Provides protection against over-voltage, over-temperature, over-current, and short circuits
- Powers electronic devices from a standard auto cigarette lighter, airline seat, or AC wall outlet
- The USB port can charge additional devices using a USB cable (cable not included)
- Includes storage pouch and user guide

### TECHNICAL INFORMATION: AUTO/AIR AC POWER ADAPTER

- INPUT VOLTAGE: 100 - 240 VAC (50 - 60Hz @ 2.5a) or 11.5 - 16 VDC
- OUTPUT VOLTAGE: As required by laptop
- OUTPUT CURRENT: As required by laptop
- CONNECTORS: As used by laptop
- WEIGHT: 1.3 lbs.
- DIMENSIONS: 5.0 x 3.0 x 1.0 in (L x W x H)
- WARRANTY: 1 Year

## 24 WATT DC/DC POWER ADAPTERS

*Charge low-power devices using these compact mobile power adapters.*

The Lind 24 Watt DC/DC Power Adapters are designed to power devices requiring a maximum of 24 watts of power or less. These adapters offer the highest degree of circuit protection for low-powered devices and often includes field replaceable input/output cables with snap-in connections.

The robust design of Lind's 24 Watt DC/DC Power Adapters make them ideally suited for use in harsh mobile environments. The adapter's electronics are protected by a rugged case that is epoxy sealed to protect the adapter's internal circuits from damage caused by shock and/or vibration.

The adapters offer efficient power conversion circuits with extensive protection circuitry to provide reliable and continuous power to laptops in the most demanding warehouse environments.



24 WATT DC/DC POWER ADAPTER

## 40 WATT DC/DC POWER ADAPTERS

*Charge your ultra-portable netbook from a DC power source.*

Lind features ruggedized 40 Watt DC/DC Power Adapters that are designed to power your mobile netbook and other low to mid-powered devices. These adapters incorporate the highest degree of circuit protection and feature field replaceable input/output cables with snap-in connections.

The rugged design of Lind's 40 Watt DC/DC Power Adapters makes them ideally suited for use in harsh mobile environments. The adapter's electronics are protected by an aluminum extrusion that is epoxy sealed to protect the internal circuits from damage caused by shock and/or vibration.

The adapter offers efficient power conversion circuits with extensive protection circuitry to provide reliable and continuous power to laptops in the most demanding warehouse environments.



40 WATT DC/DC POWER ADAPTER

### FEATURES

#### 24 WATT DC/DC POWER ADAPTERS:

- Output Short Circuit Protection
- Input and Output Noise Filtering
- Output Current Limit
- Internal Over Temperature Shut Down

#### 40 WATT DC/DC POWER ADAPTERS:

- Output Short Circuit Protection
- Output Current Limit
- Internal Over-temperature Shut Down
- Low and/or High Input Voltage Cut Off
- Automatic Reset of Safety Shut Down

## MOUNTABLE POWER ADAPTERS (80 - 120 WATT SERIES)

*Molded extrusions make mounting this adapter to forklifts easy and efficient.*

Lind's Mountable Power Adapters (80 - 120 watt series) are designed to mount the adapter to a flat surface area without the use of clamps, brackets or tie wraps. Slotted screw holes are molded in each corner to make mounting the adapter to your forklift and other vehicles fast and easy.

Lind's Mountable Power Adapters adjust, condition and regulate the power from the input to the correct DC voltage required for proper operation of the laptop. The adapter filters voltage spikes or surges occurring on the voltage line, thus eliminating damage to the laptop caused by supply voltage variations.

The Mountable Power Adapter's electronics are protected by a rugged case that is epoxy sealed to protect the electronics from damage caused by shock and/or vibration. Efficient power conversion circuits with extensive protection circuitry provide reliable and continuous laptop power in the most demanding warehouse environments.

Interchangeable input/output cables are provided in standard lengths of 36" or can be supplied with user defined cable lengths and connector options. Field replaceable cables makes servicing easy and efficient.



MOUNTABLE POWER ADAPTER

### FEATURES: MOUNTABLE POWER ADAPTERS (80 - 120 WATT SERIES)

- Output Short Circuit Protection
- Output Current Limit
- Input & Output Noise Filter
- Internal Over Temperature Shut Down
- Low Input Voltage Cut Off
- High Input Voltage Cut Off
- Automatic Reset of Safety Shut Down
- Mountable extrusion using #8 screws (not included)

### TECHNICAL INFORMATION: MOUNTABLE POWER ADAPTERS (80 - 120 WATT SERIES)

- POWER INPUT: Noted on label
- POWER OUTPUT: Noted on label
- INPUT FUSE: Auto Mini - noted on label (replace with same fuse as in adapter)
- INDICATOR: LED on adapter (output power present)

## ISOLATED OUTPUT SERIES DC/DC POWER ADAPTER

**Electrical isolation protects your laptop from negative voltage spikes that are common in forklifts and other warehouse equipment.**

The Lind Isolated Output Series DC/DC Power Adapter provides a regulated DC output to power laptops and peripherals from a DC voltage source. Voltage spikes or surges occurring on the input voltage line are filtered by the adapter, thus eliminating potential damage to your powered device. Electrical isolation between input and output prevents ground loops and allows the negative voltage output from the power source to be used positively, when required.

The rugged design of the Isolated Output Series DC/DC Power Adapter makes it ideally suited for use in harsh warehouse conditions. The adapter's electronics are protected in a rugged aluminum case, filled and sealed with epoxy, that protects the electronics from damage caused by shock and/or vibration. Efficient power conversion circuits with extensive protection circuitry provide reliable and continuous power in the most demanding warehouse environments.

Special input voltage filtering is in place for input voltage ranges of 20 - 90 volts of DC power. Electric forklifts that are 24 VDC or higher commonly produce negative voltage spikes. The Lind Isolated Output Series DC/DC Power Adapter and special input filtering is designed for this highly unregulated power source.



ISOLATED OUTPUT SERIES DC/DC POWER ADAPTER

### TECHNICAL INFORMATION: ISOLATED OUTPUT SERIES DC/DC POWER ADAPTER

#### DC INPUT CHARACTERISTICS:

- Input Voltage noted on adapter label
- Low Input Voltage Shutdown: Auto Recovery
- High Input Voltage Shutdown: Auto Recovery
- Reverse Polarity: Auto Recovery

#### DC OUTPUT CHARACTERISTICS:

- Output Voltage noted on adapter label
- Short Circuit Protection: Auto Recovery
- Isolation Voltage: Input to Output Isolated
- 500 VDC Input/Output

#### DC OUTPUT CHARACTERISTICS (CONTINUED):

- 500 VDC Input - Chassis
- 100 VDC Output - Chassis

#### INDICATORS:

- LED on Adapter
- On Steady: Output Power OK
- 1 Flash: Over Temperature Shut Down
- 2 Flashes: Over Current Shut Down
- 3 Flashes: Over Voltage Shut Down

### PHYSICAL & ENVIRONMENTAL SPECIFICATIONS: ISOLATED OUTPUT SERIES DC/DC POWER ADAPTER

- OPERATING TEMPERATURE: -40° to +40° C (-40° to +104° F)
- STORAGE TEMPERATURE: -40° to +80° C (-40° to +176° F)
- ENCLOSURE: Extruded Aluminum
- FINISH: Black Anodized
- WEIGHT: 25 ounces (.7kg)
- DIMENSIONS: 9.18 x 2.98 x 1.14 in (L x W x H)
- MOUNTING HOLE SIZE: .20 inch (5.1 mm)

## MODULE DC/DC POWER ADAPTER

**Charge your laptop and other devices using any 9 - 42 VDC power source.**

The Lind Module DC/DC Power Adapter provides a regulated DC voltage output to power laptops and other devices from any 9 - 42 VDC power source. Voltage spikes or surges occurring on the input voltage line are filtered by the adapter to eliminate the possibility of damage to the laptop caused by supply voltage variations.

The Module DC/DC Power Adapter is housed in a rugged aluminum extrusion for durability and the internal components are epoxy sealed to resist shock, vibration and dust. The screw terminal input and output jacks allow you to connect each incoming and outgoing cable's bare wire leads directly to the adapter. The pre-drilled holes in each flanged end allow you to easily secure the adapter to a flat surface.

**NOTE:** There are a wide variety of cable combinations available from Lind Electronics for this adapter. Please contact your Lind Sales Representative for more information.



MODULE DC/DC POWER ADAPTER

### FEATURES: MODULE DC/DC POWER ADAPTER

- Thermal Protected to 84° C, Auto Reset
- Output Over Current Shut Down
- Internal Over Temperature Shut Down
- Input Under or Over Voltage Cut Off
- Automatic Reset of Safety Shut Downs, 9 - 11 sec.
- Reverse Input Protection, Fuse Trips
- Full load efficiency is approximately 86%

### TECHNICAL INFORMATION: MODULE DC/DC POWER ADAPTER

- POWER INPUT: noted on label
- POWER OUTPUT: noted on label
- INPUT FUSE: External 15 - 20 A required
- CONNECTORS: Screw terminals
- INSTALLATION: flanged ends with pre-drilled holes
- TEMPERATURE RANGE: -20° C to +40° C operating; -40° C to +85° C storage
- HUMIDITY: 0% to 95% non-condensing

## RUGGEDIZED AC/DC & AC/DC/DC COMBO POWER ADAPTERS

**Power your laptop using VAC or VDC sources.**

Lind's line of Ruggedized AC/DC and AC/DC/DC Combo Power Adapters allow you to power and charge your laptop from either an AC or DC voltage source.

Each ruggedized combo power adapter comes standard in a durable case or housing that is designed to withstand harsh operating conditions, making it an ideal choice to power your laptop in demanding physical environments.

Most of these ruggedized combo power adapters feature field replaceable input/output cables with snap-in connections to make servicing easy and efficient.



RUGGEDIZED AC/DC POWER ADAPTER

### FEATURES: RUGGEDIZED AC/DC & AC/DC/DC COMBO POWER ADAPTERS

- Withstands extreme shock and vibration
- Operation over wide temperature range
- Sealed and potted to resist moisture and high humidity
- Output over voltage and over current protection
- Replaceable input and output cables
- Short circuit protection
- The combo adapter can accept power from AC or DC voltage sources
- Optional 400 Hz AC adapters available

### AC INPUT VOLTAGE SPECIFICATIONS: RUGGEDIZED AC/DC & AC/DC/DC COMBO POWER ADAPTERS

- INPUT VOLTAGE: 90 - 264 volts AC
- FREQUENCY: 47 - 63 Hz (400 Hz AC adapters available)
- INPUT CURRENT: 1.5 amperes maximum
- OUTPUT VOLTAGE: Per user requirement
- OUTPUT POWER: Up to 80 watts
- RIPPLE & NOISE: 2% maximum
- LOAD REGULATION: +/- 5% maximum
- Various power levels and sizes available

### DC INPUT VOLTAGE SPECIFICATIONS: RUGGEDIZED AC/DC & AC/DC/DC COMBO POWER ADAPTERS

- INPUT VOLTAGE: Noted on adapter label.
- INPUT FUSE: Noted on input cable label; replace only with same type and rating of fuse
- INDICATORS: LED on automobile plug if equipped (input present); LED on adapter (output power present)

### DC INPUT VOLTAGE FEATURES: RUGGEDIZED AC/DC & AC/DC/DC COMBO POWER ADAPTERS

- Output Short Circuit Protected
- Output Current Limit
- Internal Overtemperature Shut Down (DC input only)
- Low Input Voltage Cut Off (DC input only)
- Automatic reset of safety Cut Offs

### ENVIRONMENTAL SPECIFICATIONS: RUGGEDIZED AC/DC & AC/DC/DC COMBO POWER ADAPTERS

- OPERATING AMBIENT TEMPERATURE: -40°\* to +40° C
- STORAGE TEMPERATURE: -40° to +85° C
- OPERATING REL. HUMIDITY: 5% - 95% non-condensing
- \* Operation below 0° C may result in higher ripple voltage until adapter has warmed

## REPLACEMENT AC LAPTOP ADAPTERS

**Replace missing or damaged power cords with a new AC power supply.**

Lind's Replacement AC Laptop Adapters meet or exceed the laptop manufacturer's original specifications. They feature a power-on LED and universal switching 100 - 240 VAC input voltage. Each replacement adapter has a 48 inch long attached output cable and is supplied with a 60 inch long AC input cord. Tips are available for most laptop models.

Optional molded connectors are available instead of replaceable tips.



REPLACEMENT AC LAPTOP ADAPTER

## MOUNTING BRACKET

**Keep your power adapter securely fastened to your forklift for extended mobile use.**

The Lind Mounting Bracket mounts Lind DC/DC Power Adapters to forklifts and other mobile installations. The Mounting Bracket is available as either an aluminum extrusion (for use with 70 watt Lind aluminum power adapters and 40 Watt Lind netbook power adapters) or a plastic extrusion (for use with Lind 70 watt plastic extruded power adapters or 80 - 120 watt power adapters).



MOUNTING BRACKET

### FEATURES: 90 WATT REPLACEMENT AC LAPTOP ADAPTERS

- WEIGHT: 16 ounces
- DIMENSIONS: 5.0 x 2.25 x 1.25 in (L x W x H)
- UP to 90 watts
- UL and CE listed

### FEATURES: 120 WATT REPLACEMENT AC LAPTOP ADAPTERS

- WEIGHT: 20.8 ounces
- DIMENSIONS: 6.875 x 2.375 x 1.5 in (L x W x H)
- UP to 120 watts
- UL and CE listed

### FEATURES: 150 WATT REPLACEMENT AC LAPTOP ADAPTERS

- WEIGHT: 17.63 ounces
- DIMENSIONS: 6.81 x 2.36 x 1.5 in (L x W x H)
- UP to 150 watts
- UL and CE listed

## SHUT DOWN TIMER

*Protect your vehicle's battery against over-discharge and prevent battery power drains at startup due to connected peripherals.*

The Lind Shut Down Timer protects your vehicle's battery from over discharge by shutting OFF up to 30 amp loads at a preset time after the engine is shut down or when the battery reaches a low voltage level.

An emergency switch allows 12 minutes of operation after the timer shuts down the equipment. The Shut Down Timer is normally activated by sensing the electrical system voltage. When the alternator goes OFF the timed sequence is started.

A unique feature of the Shut Down 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 function.



SHUT DOWN TIMER

### FEATURES: SHUT DOWN TIMER

- ADJUSTABLE SHUT DOWN TIMER DELAY SETTINGS: 0 seconds to 4 hours; 5 seconds to 2 hours; or 12 minutes to 18 hours (dependent on SDT model)
- Low voltage shutdown at 10.5 (21) VDC
- High voltage shut down at 18 (36) VDC with auto reset
- Loads up to 30 (20) amps at 12 (24) VDC. Two output connections (optionally fused at 15 amps each)
- Reverse polarity protected
- Automatic activation by sensing the battery voltage (battery not charging = Timer ON)
- Optional activation by ignition switch connection (ignition OFF = Timer ON)
- Optional alarm output if ignition option is not used (consult Lind for alarm options)
- LED indicators for ON, OFF and Timing
- Speed-up time test switch (set delay divided by 100)
- Override switch for 12 minute emergency operation after time out or failure of the engine to start
- Protected against automotive load dump
- OPERATING TEMPERATURE: -50° to 75° C

### TECHNICAL INFORMATION: SHUT DOWN TIMER

- BATTERY VOLTAGE SENSING TURN-ON THRESHOLD: > 13.5 (27) V
- BATTERY VOLTAGE SENSING TIMER START THRESHOLD: < 13.0 (26) V
- IGNITION ON THRESHOLD (IF USED): > 5 (10) volts
- IGNITION OFF THRESHOLD (IF USED): < 2.5 (5) volts
- LED FLASH RATE - NORMAL TIMING: 2 seconds
- LED FLASH RATE - TEST MODE TIMING: 0.5 seconds
- HIGH BATTERY VOLTAGE DISCONNECT THRESHOLD: > 18 (36) Volts
- LOW BATTERY VOLTAGE DISCONNECT THRESHOLD: < 10.5 (21) V
- LOW BATTERY VOLTAGE DISCONNECT DELAY: > 10 sec.
- INPUT VOLTAGE RANGE: 9 - 18 (18 - 36) V
- MAXIMUM LOAD (2 output connections): 30A {15A ea.} and 20A {10A ea.}
- CURRENT DRAW IN OFF MODE: 9 mA
- CURRENT DRAW IN ON/TIMING MODE: 95 mA
- TIME DELAY ADJUSTMENT RANGE: 0 sec. to 4 hrs.; 5 sec. to 2 hrs.; 12 min. to 18 hrs. (dependent on SDT model)
- OVER-RIDE MODE TIME SETTING: 12 minutes (overrides time adjustment setting)
- TEST MODE SPEED-UP RATE: x 100
- OPERATING TEMPERATURE: -50° to 75° C

## LOW PROFILE SHUT DOWN TIMER

*This timer's compact design allows for easy installation in vehicles.*

The Lind Low Profile Shut Down Timer protects your vehicle's battery from over discharge by shutting OFF up to 30 amp loads at a preset time after the engine is shut down or when the battery reaches a low voltage level.

An emergency switch allows 12 minutes of operation after the timer shuts down the equipment. The Low Profile Shut Down Timer is normally activated by sensing the electrical system voltage. When the alternator goes OFF the timed sequence is started.

A unique feature of the Low Profile Shut Down 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 function.



LOW PROFILE SHUT DOWN TIMER

### FEATURES: LOW PROFILE SHUT DOWN TIMER

- More compact design via reduced height profile
- Adjustable shut down delay time from 5 seconds to 4 hours (other delays possible, consult factory)
- Low voltage shut down at 10.5 VDC
- High voltage shut down at 18 VDC with auto reset
- Loads up to 30 amps
- Reverse polarity protection
- Automatic activation by sensing the battery voltage (battery not charging = Timer ON)
- Optional activation by ignition switch connection (ignition OFF = Timer ON)
- LED indicators for ON, OFF and Timing
- Speed-up time test switch (set delay divided by 100)
- Over-ride switch for 12 minute emergency operation after time out or engine fails to start
- Protected against automotive load dump

### TECHNICAL INFORMATION: LOW PROFILE SHUT DOWN TIMER

- BATTERY VOLTAGE SENSING TURN-ON THRESHOLD: > 13.5 volts
- BATTERY VOLTAGE SENSING TIMER START THRESHOLD: < 13.0 volts
- IGNITION ON THRESHOLD (IF USED): > 5 volts
- IGNITION OFF THRESHOLD (IF USED): < 2.5 volts
- LED FLASH RATE IN TIMING MODE: NORMAL TIMING: 2 seconds TEST MODE TIMING: .5 seconds
- HIGH BATTERY VOLTAGE DISCONNECT THRESHOLD: > 18 volts
- LOW BATTERY VOLTAGE DISCONNECT THRESHOLD: < 10.5 volts
- LOW BATTERY VOLTAGE DISCONNECT DELAY: > 10 seconds
- INPUT VOLTAGE RANGE: 9 - 18 volts
- MAXIMUM OUTPUT CURRENT: 30 amps
- CURRENT DRAW IN OFF MODE: 9 mAmps
- CURRENT DRAW IN ON/TIMING MODE: 95 mAmps
- TIME DELAY ADJUSTMENT RANGE: 5 seconds to 4 hours



## T2 SHUT DOWN TIMER

**Protect 2 separate electrical loads using 2 separate time delays.**

The T2 Shut Down Timer protects your vehicle's battery from over-discharge by shutting OFF up to 50 amp loads at a preset time after the engine is shut down or when the battery is discharged to a low voltage level. The T2 Shut Down 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 T2 Shut Down Timer shuts down the equipment. An ignition switch input is provided as an optional activation method but is not necessary. The T2 Shut Down Timer is normally activated by sensing the alternator charge voltage level applied to the battery. When the alternator goes OFF the timed sequences are started.

A unique feature of the T2 Shut Down 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 function.



T2 SHUT DOWN TIMER

### FEATURES: T2 SHUT DOWN TIMER

- Adjustable shut down delay time from 0 seconds to 4 hours (other delays possible, consult factory)
- Low voltage shut down at 10.5 VDC
- High voltage shut down at 18 VDC with auto reset
- Loads up to 50 amps total (30A max each output)
- Reverse polarity protection
- Automatic activation by sensing the battery voltage (battery not charging = Timer ON)
- Optional activation by ignition switch connection (ignition OFF = Timer ON)
- LED indicators for ON, OFF and Timing
- Speed-up time test switch (set delay divided by 100)
- Over-ride switch for 15 minute emergency operation after time out or engine fails to start
- Protected against automotive load dump

### TECHNICAL INFORMATION: T2 SHUT DOWN TIMER

BATTERY VOLTAGE SENSING TURN-ON THRESHOLD: > 13.5 volts	MAXIMUM OUTPUT CURRENT (50A MAX TOTAL LOAD):
BATTERY VOLTAGE SENSING TIMER START THRESHOLD: < 13.0 volts	OUT 1: 30 amps
IGNITION ON THRESHOLD (IF USED): > 5 volts	OUT 2: 30 amps
IGNITION OFF THRESHOLD (IF USED): < 2.5 volts	NOTE: Maximum load current limited to 30A on units with output terminal blocks.
LED FLASH RATE IN TIMING MODE:	CURRENT DRAW IN OFF MODE: 18 mAmps
NORMAL TIMING: 2 seconds	CURRENT DRAW IN ON/TIMING MODE: 80 mAmps
TEST MODE TIMING: .6 seconds	TIME DELAY ADJUSTMENT RANGE: 0 seconds to 4 hours
HIGH BATTERY VOLTAGE DISCONNECT THRESHOLD: > 18 volts	OVER-RIDE MODE TIME SETTING: 15 Minutes
LOW BATTERY VOLTAGE DISCONNECT THRESHOLD: < 10.5 volts	(over-rides time adjustment setting)
LOW BATTERY VOLTAGE DISCONNECT DELAY: > 30 seconds	TEST MODE SPEED UP RATE: x 100
INPUT VOLTAGE RANGE: 9-18 volts	

## RUGGEDIZED SHUT DOWN TIMER

**Protect your vehicle's battery from over-discharge and use as a driver relay for up to 200 amps.**

The Lind Ruggedized Shut Down Timer (RSDT) protects your vehicle's battery from over discharge by shutting OFF loads at a preset time after the engine is shut down or when the battery is discharged. The RSDT also protects radio or computer equipment from damage caused by low or high input voltage experienced with alternator failure or improper voltage jump-starts.

The RSDT is normally activated by sensing the voltage of the battery. When the alternator stops charging, the timed sequence is started. An ignition input switch is provided as an optional activation method.

Used as a Shut Down Timer, the RSDT can be used for loads up to 20A. As a Relay Driver, the RSDT will drive relays up to 200 Amps. The RSDT can be factory set to any desired delay from a few seconds to several hours.



RUGGEDIZED SHUT DOWN TIMER

### FEATURES: RUGGEDIZED SHUT DOWN TIMER

- Low voltage shut down at 10.5 [21] VDC
- High voltage shut down at 18 [36] VDC with auto reset
- Loads up to 20 amps at 12 [24] VDC (higher loads possible) with external relay
- Automatic activation by sensing the battery voltage (battery not charging = Timer ON)
- Optional activation by ignition switch connection (ignition OFF = Timer ON)
- LED indicator for Timing

### SOME SUGGESTED 12V EXTERNAL RELAYS: RUGGEDIZED SHUT DOWN TIMER

- 40A TYCO ELECTRONICS, #VF7-11F11 OMRON, #G8HE-1A7T-R-DC12
- 80A AMERICAN ZETTLER, #AZ979-1A-12D WHITE-RODGERS, #70-1112252
- 150A TYCO ELECTRONICS, #V23132-A2001-A100
- 200A WHITE-RODGERS, #586-10511

### SPECIFICATIONS: RUGGEDIZED SHUT DOWN TIMER (NOTE: CUSTOM DESIGNED UNITS MAY HAVE DIFFERENT SPECIFICATIONS)

- BATTERY VOLTAGE SENSING TURN-ON THRESHOLD: > 13.5 [27] V
- BATTERY VOLTAGE SENSING TIMER START THRESHOLD: < 13.0 [26] V
- IGNITION ON THRESHOLD (IF USED): > 5 [10] V
- IGNITION OFF THRESHOLD (IF USED): < 2.5 [5] V
- LED FLASH RATE IN TIMING MODE: 2 seconds
- HIGH BATTERY VOLTAGE DISCONNECT THRESHOLD: > 18 [36] V
- LOW BATTERY VOLTAGE DISCONNECT THRESHOLD: < 10.5 [21] V
- LOW BATTERY VOLTAGE DISCONNECT DELAY: > 10 seconds
- INPUT VOLTAGE RANGE: 9 - 18 [18 - 36] V
- MAXIMUM OUTPUT CURRENT: 20 A
- CURRENT DRAW IN OFF MODE: 6 mA
- CURRENT DRAW IN ON/TIMING MODE: 60 mA

## MODIFIED SINE WAVE INVERTERS

**Run basic AC-powered devices using a single DC power source.**

Modified Sine Wave Inverters convert power supplied from a 12 or 24 VDC power source to AC power for operating conventional AC-powered devices. Modified Sine Wave Inverters are well-suited for powering lights, televisions, power tools, microwave ovens, and other basic electrical devices.

Lind Electronics offers both 150 watt and 300 watt DC/AC versions of its Modified Sine Wave Inverters.



MODIFIED SINE WAVE INVERTERS

## PURE SINE WAVE INVERTERS

**Run select AC-powered devices using a single DC power source.**

Pure Sine Wave Inverters convert power supplied from a 12 or 24 VDC power source to AC power for operating sensitive AC-powered devices. Pure Sine Wave Inverters provide an output voltage wave form with very low distortion and clean power like that supplied by a utility. Pure Sine Wave Inverters are well suited to power sensitive electrical or electronic devices such as laptop computers, laser printers and specialized communications equipment.

Pure Sine Wave Inverters offer higher efficiency ratings than Modified Sine Wave Inverters. Lind Electronics offers both 150 watt and 300 watt DC/AC versions of its Pure Sine Wave Inverters.



PURE SINE WAVE INVERTERS

### SPECIFICATIONS: MODIFIED SINE WAVE INVERTERS

- ENERGY EFFICIENT OUTPUT: 120 VAC @ 60 Hz / 220 VAC @ 50 Hz
- CONVECTION-COOLED: 150 W; FAN-COOLED: 300 W
- LOW BATTERY ALARM: 10.5 VDC (12 VDC Input)
- LOW BATTERY ALARM: 21 VDC (24 VDC Input)
- LOW BATTERY SHUT DOWN: 10 VDC (12 VDC Input)
- LOW BATTERY SHUT DOWN: 20 VDC (24 VDC Input)
- ALARM & THERMAL SHUT DOWN: 55° C

### SPECIFICATIONS: PURE SINE WAVE INVERTERS

- 90% energy efficient under full load, 95% energy efficient under 1/3 load
- OUTPUT: 120 VAC @ 60 Hz / 220 VAC @ 50 Hz
- Fan cooled
- LOW BATTERY ALARM: 10.5 VDC (12 VDC Input)
- LOW BATTERY ALARM: 21 VDC (24 VDC Input)
- LOW BATTERY SHUT DOWN: 10 VDC (12 VDC Input)
- LOW BATTERY SHUT DOWN: 20 VDC (24 VDC Input)
- REGULATION: + or - 6%
- TOTAL HARMONIC DISTORTION (MAX.): 4%
- ALARM & THERMAL SHUT DOWN: 55° C

## TERMINOLOGY

The Lind DC/DC power adapters have many features that make each model a superior adapter. Here is a descriptive explanation of our model's features (features vary with model – consult factory for a particular model's features).

### AUTOMATIC RESTART OF ADAPTER

After approximately 10 seconds the adapter will restart if the fault is no longer present. No manual intervention is required to reset the adapter.

### EMI

Standard Lind adapters are designed to meet the radiated limits of EN55022 and susceptibility limits of EN55024, meeting E-mark and the EMC Directive.

### FLEXIBILITY

Many of the thresholds and features can be adjusted for individual customer needs. Shut down Timing Delay.

### HIGH INPUT VOLTAGE CUT OFF

If the input rises above a preset threshold the adapter will turn off to protect itself and its load from damage. It will automatically restart when the input voltage returns to its normal operating range.

### HIGH OUTPUT VOLTAGE LIMIT

The adapter will limit the output voltage to a safe level that will not damage the laptop in the rare case the adapter has an internal failure.

### INPUT POWER LIMIT

The input power is limited to reduce the stress on the input fuse and wiring. Soft-start circuitry will also reduce the stresses in the system at adapter start-up.

### ISOLATION

Some models have input to output isolation of 500 VDC for those customers who need this feature.

### LED INDICATOR

The adapter has an LED (light emitting diode) indicator that is lit when its output voltage is present. Certain models can also have the LED flash to indicate the fault condition when the adapter is in its shut down mode.

### LOW INPUT VOLTAGE CUT OFF (LIVCO)

The adapter will shut off if the input voltage goes too low. This will help prevent the vehicle battery from being discharged to a point where it will no longer start the vehicle. The adapter will automatically turn on again when the battery voltage rises back above a preset threshold such as after the car has started and the engine is running. The low voltage shut down feature has a delay to allow the adapter to ride through momentary dips that typically occur during vehicle starting and a quicker shutdown if there is a large dip in the battery voltage.

### OUTPUT OVERLOAD PROTECTION

The adapter has current limiting circuitry to limit the amount of power fed into a faulty load (faulty laptop, shorted output cable, etc). The adapter has a short delay to allow it to operate through a momentary fault or current pulse. If the overload persists the unit will turn the output off, wait 10 seconds and try to restart. If the fault is still present it will repeat the 10 second off period before trying to start up again.

### OVER-TEMPERATURE SHUTDOWN

If the adapter gets too hot it will shut down to prevent damage to itself and stay off until it has cooled down to a safe temperature and then automatically restart.

### REVERSE INPUT PROTECTION

Most of the adapters have a cigarette plug which prevents mis-wiring its input. In certain hard-wired applications, if the adapter input wiring is reversed, the unit will blow its input fuse to protect itself.

### RUGGED

The electronics in the adapter are sealed in a thermally conductive potting material which helps distribute the heat generated in the adapter and helps make them resistant to shock, vibration and moisture.

### SHUT DOWN TIMING DELAY

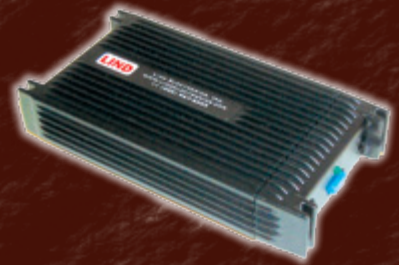
The Shut Down Timer or Timer Series (T) Laptop Power Adapters will detect the battery voltage and based on preset thresholds determine when the vehicle is running and turn on then. Once it determines the vehicle engine is off the adapter will wait a preset period of time and then turn off so it does not keep draining the battery in a vehicle left unattended.

### WIDE INPUT OPERATING RANGE

Many Lind adapters can operate from 12 VDC and 24 VDC battery systems allowing the customer to buy one unit to operate with either type of systems.



POWER SPECIALISTS FOR MOBILE COMPUTING



LIND ELECTRONICS, INC. USA OFFICE  
6414 Cambridge Street  
Minneapolis, MN 55426  
1.800.659.5956 • 1.952.927.6303  
1.952.927.7740 (Fax)  
www.lindelectronics.com  
info@lindelectronics.com

LIND ELECTRONICS, INC. EUROPEAN OFFICE  
Asterweg 4/2  
73765 Neuhausen, Germany  
+49 7158 987 5460  
+49 7158 987 5416 (Fax)  
www.lindelectronics.com  
meisele@lindelectronics.com

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