

## LIND ELECTRONICS, INC. PUBLIC SAFETY

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	These 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.

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Lind Electronics offers DC/DC power adapters, specialized cables, laptop accessories, Rugged and Low Profile Shut Down Timers and replacement AC power adapters for laptops. Custom mobile power and other product solutions may be engineered and manufactured for specific public safety applications.



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## **AUTO/AIR LAPTOP POWER ADAPTERS**

#### Maintain power while traveling in your car or on your flight so your laptop can work as long as vou 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.

#### 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
- ٠ 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 LAPTOP POWER ADAPTER

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### **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 overvoltage, 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.

#### FEATURES: AUTO/AIR AC POWER ADAPTER

- Provides protection against over-voltage, over-temperature, over-current, and short circuits
- 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
   CONNECTORS: As used by laptop 11.5 - 16 VDC
- OUTPUT VOLTAGE: As required by laptop
- OUTPUT CURRENT: As required by laptop





AUTO/AIR AC POWER ADAPTER

Powers electronic devices from a standard auto cigarette lighter, airline seat, or AC wall outlet

- WEIGHT: 1.3 lbs. • DIMENSIONS: 5.0 x 3.0 x 1.0 in (L x W x H)
  - WARRANTY: 1 Year

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### 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 lowpowered devices and often include field replaceable input/output cables with snap-in connections.

The robust design of Lind's 24 Watt DC/DC Power Adapters makes 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 public safety environments.

### 40 WATT DC/DC POWER **ADAPTERS**

#### Charge your ultra-portable netboook 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 midpowered 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 public safety environments.



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

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



24 WATT DC/DC POWER ADAPTER



40 WATT DC/DC POWER ADAPTER

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

Molded extrusions make the mounting of these adapters to public safety vehicles 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 public safety 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 public safety 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.

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

- Output Short Circuit Protection
- Output Current Limit
- Input & Output Noise Filter
- Internal Over Temperature Shut Down

#### 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)

#### 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

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- Low Input Voltage Cut Off
- High Input Voltage Cut Off
- Automatic Reset of Safety Shut Down
- Mountable extrusion using #8 screws (not included)
- INDICATOR: LED on adapter (output power present)



### **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 predrilled 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.



#### LIND ELECTRONICS, INC.

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### **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 long inch attached output cable and is supplied with a 60 inch long AC input cord. Tips are available for most laptop models.

### **MOUNTING BRACKET**

Keep your power adapter securely fastened to your public safety vehicle for extended mobile use.

The Lind Mounting Bracket mounts Lind DC/DC Power Adapters to public safety vehicles 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).

#### 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
- TECHNICAL INFORMATION: MODULE DC/DC POWER ADAPTER
- POWER INPUT: noted on label

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- POWER OUTPUT: noted on label
- INPUT FUSE: External 15 20 A required
- CONNECTORS: Screw terminals

- Automatic Reset of Safety Shut Downs, 9 11 sec. •
- Reverse Input Protection, Fuse Trips
- Full load efficiency is approximately 86% •
- 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

#### 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)

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)

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)





REPLACEMENT AC LAPTOP ADAPTER





MOUNTING BRACKET

- UP to 90 watts
- UL and CE listed

- UP to 120 watts
- UL and CE listed

- UP to 150 watts
- UL and CE listed



### **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

- Low Input Voltage Cut Off (DC input only) • Automatic reset of safety Cut Offs
- Internal Overtemperature Shut Down (DC input only)
- 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 O<sup>o</sup> C may result in higher ripple voltage until adapter has warmed

### LIND ELECTRONICS, INC.

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## **TIMER SERIES (T) LAPTOP POWER ADAPTERS**

### Protect your power sources using timer functionality built directly into the adapter.

The Lind Timer Series (T) of Laptop Power Adapters come with an integral protective vehicle battery Shut Down Timer built directly into the adapter.

Excessive drain on a vehicle battery can ultimately degrade or ruin it. This problem intensifies when installed mobile equipment such as laptops are left on and are not turned off. The Lind Timer Series (T) Laptop Power Adapters are ideal adapters for laptops that are permanently mounted in fleet or public safety vehicles.

The integral timer will shut off power to the laptop within a factory set time after the automobile has been turned off, thus protecting the vehicle battery from excessive current drain.

Many installations need a separate protective timer device wired into the input voltage circuit to shut off peripherals. When a timer is needed only to shut off power to the laptop adapter, this function being part of the adapter eliminates the need for additional wiring and the installation time of a separate voltage timer device.

#### TECHNICAL INFORMATION: TIMER SERIES (T) LAPTOP POWER ADAPTERS

- INPUT VOLTAGE: 11 16 VDC
- OUTPUT VOLTAGE: As required by laptop
- OUTPUT CURRENT: As required by laptop
- SHUT DOWN TIMER: Factory set 1 minute to 4 hours
- WEIGHT: 13 ounces

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TIMER SERIES (T) LAPTOP POWER ADAPTER

- DIMENSIONS: 5.0 x 3.0 x 1.15 in (L x W x H)
- AUTO INPUT CABLE: 36" lengths
- OUTPUT CABLES: 36" to 72" lengths
- INPUT FUSE: 15 Amp
- WARRANTY: 1 Year



### SHUT DOWN TIMER

Protect your vehicle's battery from overdischarge and shield your equipment from damage caused by low and/or high voltage.

The Lind Shut Down Timer protects your public safety 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: O 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 LED indicators for ON, OFF and Timing
- Loads up to 30 (20) amps at 12 (24) VDC. Two output 🔹 connections (optionally fused at 15 amps each)
- Reverse polarity protected

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Automatic activation by sensing the battery voltage (battery not charging = Timer ON)

#### 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

- Optional activation by ignition switch connection (ignition OFF = Timer ON)
- Optional alarm output if ignition option is not used (consult Lind for alarm options)
- 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
- 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 (over-
- rides time adjustment setting) TEST MODE SPEED-UP RATE: x 100
- OPERATING TEMPERATURE: -50° to 75° C

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### 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 public safety 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.

#### FEATURES: LOW PROFILE SHUT DOWN TIMER

- More compact design via reduced height profile Adjustable shut down delay time from 5 seconds
- hours (other delays possible, consult factory) Low voltage shut down at 10.5 VDC
- High voltage shut down at 18 VDC with auto rese
- Loads up to 30 amps
- Reverse polarity protection
- Automatic activation by sensing the battery vo (battery not charging = Timer ON)

#### TECHNICAL INFORMATION: LOW PROFILE SHU

- BATTERY VOLTAGE SENSING TURN-ON THRESH > 13.5 volts
- BATTERY VOLTAGE SENSING TIMER START THRESH < 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 THRESH > 18 volts





LOW PROFILE SHUT DOWN TIMER

t t t	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
IT DOWI	N TIMER
HOLD: •	LOW BATTERY VOLTAGE DISCONNECT THRESHOLD: < 10.5 volts LOW BATTERY VOLTAGE DISCONNECT DELAY;
• • • •	<ul> <li>&gt; 10 seconds</li> <li>INPUT VOLTAGE RANGE: 9 - 18 volts</li> <li>MAXIMUM OUTPUT CURRENT: 30 amps</li> <li>CURRENT DRAW IN OFF MODE: 9 mAmps</li> <li>CURRENT DRAW IN ON/TIMING MODE: 95 mAmps</li> <li>TIME DELAY ADJUSTMENT RANGE: 5 seconds to 4 hours</li> </ul>



### **T2 SHUT DOWN TIMER**

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

The T2 Shut Down Timer protects your public safety 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)

#### **TECHNICAL INFORMATION: T2 SHUT DOWN TIMER**

BATTERY VOLTAGE SENSING TURN-ON THREE	SHOLD: > 13.5 volts	MAXIMUM OUTPUT CURRENT (50A N	MAX TOTAL LOAD):
BATTERY VOLTAGE SENSING TIMER START THRE	ESHOLD: < 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 limite	d to 30A on units with
LED FLASH RATE IN TIMING MODE:		output terminal blocks.	
NORMAL TIMING:	2 seconds	CURRENT DRAW IN OFF MODE:	18 mAmps
TEST MODE TIMING:	.6 seconds	CURRENT DRAW IN ON/TIMING MC	DE: 80 mAmps
HIGH BATTERY VOLTAGE DISCONNECT THRE	SHOLD: > 18 volts	TIME DELAY ADJUSTMENT RANGE:	O seconds to 4 hours
LOW BATTERY VOLTAGE DISCONNECT THREE	SHOLD: < 10.5 volts	OVER-RIDE MODE TIME SETTING:	15 Minutes
LOW BATTERY VOLTAGE DISCONNECT DEL	_AY: > 30 seconds	(over-rides time adjustment setting)	
INPUT VOLTAGE RANGE:	9-18 volts	TEST MODE SPEED UP RATE:	x 100

- Optional activation by ignition switch connection (ignition OFF = Timer ON)
- •
- Over-ride switch for 15 minute emergency operation • after time out or engine fails to start
- Protected against automotive load dump

- LED indicators for ON, OFF and Timing
- Speed-up time test switch (set delay divided by 100)

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### RUGGEDIZED SHUT **DOWN TIMER**

#### Protect your vehicle's battery from overdischarge and use as a Relay Driver for up to 200 amps.

The Lind Ruggedized Shut Down Timer (RSDT) protects your public safety 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.

#### FEATURES: RUGGEDIZED SHUT DOWN TIMER

- Low voltage shut down at 10.5 [21] VDC
- High voltage shut down at 18 [36] VDC with auto
- Loads up to 20 amps at 12 [24] VDC (higher possible) with external relay

#### SOME SUGGESTED 12V EXTERNAL RELAYS: F

- 40A TYCO ELECTRONICS, #VF7-11F11 OMRON, # 1A7T-R-DC12
- 80A AMERICAN ZETTLER, #AZ979-1A-12D V RODGERS. #70-1112252

SPECIFICATIONS: RUGGEDIZED SHUT DOWN **DIFFERENT SPECIFICATIONS)** 

- BATTERY VOLTAGE SENSING TURN-ON THRESH > 13.5 [27] V
- BATTERY VOLTAGE SENSING TIMER START THRESH < 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 THRESH > 18 [36] V





#### RUGGEDIZED SHUT DOWN TIMER

reset loads	<ul> <li>Automatic activation by sensing the battery voltage (battery not charging = Timer ON)</li> <li>Optional activation by ignition switch connection (ignition OFF = Timer ON)</li> <li>LED indicator for Timing</li> </ul>
UGGE	DIZED SHUT DOWN TIMER
38HE- /HITE-	<ul> <li>150A TYCO ELECTRONICS, #V23132-A2001-A100</li> <li>200A WHITE-RODGERS, #586-10511</li> </ul>
TIMER	(NOTE: CUSTOM DESIGNED UNITS MAY HAVE
HOLD:	LOW BATTERY VOLTAGE DISCONNECT THRESHOLD:     < 10.5 (21) V
HOLD: HOLD:	<ul> <li>LOW BATTERY VOLTAGE DISCONNECT DELAY: &gt; 10 seconds</li> <li>INPUT VOLTAGE RANGE: 9 - 18 [18 - 36] V</li> <li>MAXIMUM OUTPUT CURRENT: 20 A</li> <li>CURRENT DRAW IN OFF MODE: 6 mA</li> <li>CURRENT DRAW IN ON/TIMING MODE: 60 mA</li> </ul>



Power Specialists for Mobile Computing

## SOLAR CHARGE SYSTEM

#### Use this alternative mobile power solution to power your mobile devices in different public safety environments.

The Lind Solar Charge System is used in conjunction with the BB-2590 (not included) rechargeable battery. The system consists of the combination charge/controller DC output module, a foldable solar panel and the related cabling for complete connection between the battery, laptop and solar panel.

The charge/controller uses power obtained from the solar panel to recharge the BB-2590 battery. Power is drawn from the battery to operate the laptop. A green LED is on when the DC output is on. The yellow LED flashes while the battery pack is being charged; is on continuously when the battery is charged; and is off when no input power is present.

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SOLAR CHARGE SYSTEM

### LIND ELECTRONICS, INC.

Power Specialists for Mobile Computing

### **12 VDC BATTERY BACKUP MODULE**

### Keep devices powered using external power.

The Lind 12 VDC Battery Back Up Module uses an external sealed lead acid battery (not included) to maintain 12 VDC power to sensitive electronic loads when the source 12 VDC drops too low or is lost entirely (as may occur when turning the key during vehicle starts).

The module can use a variety of sealed batteries, from small to large. The higher the amp-hour rating of the battery, the longer the module will keep the load backed up.

NOTE: This module is not shipped with an SLA battery (the user must provide this). This module can use a variety of sealed batteries ranging from small to large in size. The higher the amphour rating of the battery, the longer the module will keep the load backed up.

FEATURES: SOLAR CHARGE SYSTEM	
<ul> <li>Lightweight portable solar power solution for powering laptops</li> <li>Over-temperature shut down with auto reset</li> <li>Over current shut down with auto reset after 10 seconds if input is present</li> </ul>	<ul> <li>Low battery disconnect: At 12 VDC output turns off</li> <li>Low input voltage cutoff: At 10 VDC input battery stops charging</li> <li>Automatic Maximum Power Point Tracking gets the most power possible from the solar panel</li> </ul>
TECHNICAL INFORMATION: SOLAR CHARGE SYSTEM	Л
<ul> <li>INPUT VOLTAGE: From solar panel is 15.6 VDC @ 3.6 amps typical with full illumination</li> <li>OUTPUT VOLTAGE: As required by laptop</li> <li>OUTPUT CURRENT: As required by laptop</li> <li>CHARGE TIME: 5 hours from complete discharge, no load and full power from solar panel</li> <li>BATTERY CHARGE VOLTAGE: 16.3 - 16.4 VDC @ 3 amps, non-isolated; 90% efficient (typical)</li> </ul>	<ul> <li>DIMENSIONS (CHARGE MODULE): 9.25 x 3 x 1.25 in (L x W x H)</li> <li>SOLAR PANEL (TYPICAL): 60 x 42 x .06 inches open (L x W x H) and 10.3 x 8.9 x 2.8 inches folded (L x W x H)</li> <li>WEIGHT: Complete system weight approx. 5 lbs.</li> <li>WARRANTY: 1 Year</li> </ul>

#### FEATURES: 12 VDC BATTERY BACKUP MODULE Housed in a rugged aluminum case Very low loss in pass-through mode (normal operation) without over-charging LIVCO (Low Input Voltage Cut Off) circuitry protects Choice of jacks or terminal block connections ٠ the backup battery from being damaged due to overdischarge Can be used with Lind DC power adapters or other 12 VDC loads up to 8 Amps

# • Trickle charging keeps the battery backup charged • TECHNICAL INFORMATION: 12 VDC BATTERY BACKUP MODULE

- MAIN POWER INPUT: 12 16 VDC
- BATTERY INPUT: 11 16 VDC
- BATTERY CABLE FUSE: 10 A, 250 V, 3 AG





TYPICAL BACKUP MODULE CONNECTION

- Replace with same type fuse and rating
- Transfer at 11.5 VDC
- Backup battery disconnect at 10.4 VDC



## LOW INPUT VOLTAGE CUT OFF (LIVCO) MODULE

## Protect your public safety vehicle's battery and connected devices from over-discharge.

The Lind LIVCO Module provides protection for both sensitive loads and batteries in 12 VDC electrical systems. The module disconnects the attached loads when the system voltage drops below 10.5 volts, thus protecting your public safety vehicle's battery from becoming over-discharged.



VOLTAGE CORRECTION MODULE

#### LIND ELECTRONICS, INC.

Power Specialists for Mobile Computing

### LOW INPUT VOLTAGE (LIVCO) BOOSTER

## Maintain power to your connected devices in the event of low input voltage cut off.

The Low Input Voltage (LIVCO) Booster maintains 12 VDC to sensitive electronic loads when the power source voltage drops below 11 VDC, even during vehicle starts.

The voltage will boost to 12 VDC for up to 10 seconds to continue powering your device. The Low Input Voltage (LIVCO) Booster is designed to help you avoid unnecessary reboots or restarts (due to voltage drop) that take additional time to complete.

#### TECHNICAL INFORMATION: LOW INPUT VOLTAGE CUT OFF (LIVCO) MODULE

- INPUT VOLTAGE: 10 16 VDC
- OUTPUT VOLTAGE: Tracks input
- OUTPUT CURRENT: 30A Total

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- OUTPUT 1 (TERM. BLOCK): 15A Max.
- OUTPUT 2 (CIG. SOCKET): 15A Max.
- FUSE TYPE: 15A ATO Auto fuse (blue)

- DISCONNECT VOLTAGE\*: 10.1 10.5 VDC
- RECONNECT VOLTAGE: 11.8 12.2 VDC
- INDICATORS: Green LED
- \* This is the disconnect voltage as measured at the module. The actual battery voltage will be higher due to voltage drop in the wiring.

#### FEATURES: LOW INPUT VOLTAGE (LIVCO) BOO

- Maintains 12 VDC output at up to 8 amps, down
   VDC input voltage, for up to 10 seconds
- Available with DC power jacks or with terminal connections
- Can be used with Lind DC/DC power adapters or 12 VDC loads





#### TYPICAL LOW INPUT VOLTAGE (LIVCO) BOOSTER CONNECTION

STER		
to 6	•	Housed in a rugged aluminum case LIVCO (Low Input Voltage Cut Off) circuitry shuts the
block		adapter off if the input voltage is low for more than 10 seconds, thus protecting the source voltage and the
other		adapter



### DC BACKUP **UNINTERRUPTABLE POWER SUPPLY** (UPS) SYSTEM

#### Keep your mobile devices running continuously should unexpected power interruptions occur.

The Lind DC Backup Power Uninterruptable Power Supply (UPS) System is a reliable DC power source that will operate electronic equipment for a short time when emergency power is needed. When 12 or 24 VDC input power is unavailable, the internal battery in this backup system can provide DC output power for up to 1 hour depending on the power requirements of the load. This alternative power system will automatically provide backup power when the main power source is interrupted.

Ruggedized construction makes the DC UPS System well suited for most mobile public safety environments. The unit's compact design occupies minimal space so it is easy to install in a flight bag or public safety vehicle. The front mounted power jacks and switch allow easy access in any installation. These units are easily customized based on the available power source and devices requiring power, so please call Lind Electronics to find the right system for your specific application.



DC BACKUP UNINTERRUPTIBLE POWER SUPPLY (UPS) SYSTEM

#### LIND ELECTRONICS, INC.

Power Specialists for Mobile Computing

### 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.

### 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.

#### SPECIFICATIONS: MODIFIED SINE WAVE INVER

- ENERGY EFFICIENT OUTPUT: 120 VAC @ 60 Hz / VAC @ 50 Hz
- CONVECTION-COOLED: 150 W; FAN-COOLED: 300
- LOW BATTERY ALARM: 10.5 VDC (12 VDC Input)

#### SPECIFICATIONS: PURE SINE WAVE INVERTER

- 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)

#### FEATURES: DC BACKUP UNINTERRUPTABLE POWER SUPPLY (UPS) SYSTEM

- Up to 1 hour of backup time
- Automatically reverts to backup during input power loss
- Charges battery and powers output at the same time
- Charger will charge battery even when the output is off
- Regulated output with on/off switch
- Can be used with 12 VDC or 24 VDC input systems
- Charging and output status indicators •
- Includes battery, charger, transfer switch, DC regulator

#### TECHNICAL INFORMATION: DC BACKUP UNINTERRUPTABLE POWER SUPPLY (UPS) SYSTEM

- INPUT VOLTAGE: 12 32 VDC
- MAX. INPUT CURRENT: 10 amps
- OUTPUT VOLTAGE: 9 24 VDC factory set
- OUTPUT POWER: 60 watts maximum
- INPUT PROTECTION: 15 amp replaceable fuse
- OPERATING TEMPERATURE: +5° to +35°C
- HUMIDITY: 5% 100% non-condensing

- ALTITUDE: Sea level to 10,000 feet
- BATTERY TYPE: Internal NiMH (replaceable)
- BATTERY CAPACITY: Approx. 60 watt hours
- WEIGHT: 5.5 lbs.
- DIMENSIONS: 10 x 7.25 x 1.75 in (L x W x H) •
- WARRANTY: 1 year electronics, 6 months battery





#### MODIFIED SINE WAVE INVERTERS



PURE SINE WAVE INVERTERS

TERS		
220 W	• • •	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
S		
	• • •	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



### 150 - 180 WATT DC/DC **POWER ADAPTERS**

### Operate and charge laptops that require additional power for public safety applications.

Lind's 150 - 180 Watt DC/DC Power Adapters provide full power output to laptops requiring 12 - 32 VDC input power in public safety vehicle applications. The 150 -180 Watt DC/DC Power Adapters are hard-wired directly to the public safety vehicle's battery source.

NOTE: A cigarette lighter input cable option is not available because of the amount of amperage required by the laptop.



150 - 180 WATT DC/DC POWER ADAPTER

### LIND ELECTRONICS, INC.

Power Specialists for Mobile Computing

## SIREN DETECTOR CABLE

#### Use for triggering the Panasonic Arbitrator 360° to capture evidence on video.

The Lind Siren Detector Cable is used specifically for the Panasonic Arbitrator 360°, a video capture device used in the law enforcement field. The Lind Siren Detector Cable's specialized circuitry triggers the Panasonic Arbitrator 360° to begin video capture when the police vehicle siren is engaged.

#### FEATURES: 150 - 180 WATT DC/DC POWER ADAPTERS

- Adapters are housed in rugged ABS cases and are epoxy
   Under-voltage & over-voltage protection. sealed for durability and resistance to shock.
  - Output short circuit protection. Safety current limiting.
- 1 year warranty includes repair of damaged or broken plugs or cables.
- Internal temperature limit cut-off circuitry. Automatic • Reset after cut-off conditions return to normal.

#### TECHNICAL INFORMATION: 150 - 180 WATT DC/DC POWER ADAPTERS

- INPUT VOLTAGE: 12 32 VDC 24 28 24VDC 28VDC
- OUTPUT VOLTAGE: 20 VDC
- OUTPUT CURRENT: 7.5 amps (max)
- CONNECTOR: Special

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- AUTO INPUT CABLE: 36 Inches, stripped and tinned
- AIRLINE INPUT CABLE: N/A

• FUSE: 20 amps WEIGHT: 16 ounces

• OUTPUT CABLE: 36 Inches

- DIMENSIONS: 6.63 x 3.20 x 1.26 in (L x W x H)
- WARRANTY: 1 year

#### TECHNICAL INFORMATION: SIREN DETECTOR CABLE

- OVERALL LENGTH: 40 inches minimum, 18 AWG
- MAX INPUT VOLTAGE (SIREN LEADS TO ARBITRATOR OPERATING TEMPERATURE: 0°C to +65° C • RTN LEAD]: +/- 30V peak
- MINIMUM INPUT FREQUENCY: 400 Hz





SIREN DETECTOR CABLE

- MAXIMUM OUTPUT VOLTAGE: 15 VDC
- STORAGE TEMPERATURE: -40°C to +85° C



### LIND ELECTRONICS, INC.

**Power Specialists for Mobile Computing** 

### 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.

### LIND ELECTRONICS, INC.

Power Specialists for Mobile Computing

## **TERMINOLOGY (CONTINUED)**

#### **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.







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