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AT154896

Arrow Boards

Operating Manual



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Thank you for your business!

To Our Valued Customer,

K&K Systems, Inc. is excited that you have purchased our product.

Our company has been serving the traffic industry since 1997. Since that time we have risen to become a leader in the traffic industry. We offer a complete line of traffic safety products that include message boards, arrow boards, radar speed monitors, solar school zone flashers, solar 24-hour flashers and many other quality products that serve our industry today.

At K&K Systems, Inc., we strive to improve the quality of our products. We are dedicated to the concept that our customers are our most valuable resource. We strive to serve our customers as we would want to be served.

Tim Keith
President
K & K Systems, Inc.

INTRODUCTION

AT154896 Arrow Boards

This 15 lamp (LED) arrow board is solar powered with a charge controller. The sign dimensions are 48" x 96". It is fabricated from aluminum with a flat black powder coat finish to give a smooth look and prevent rust. It has 100 amps of battery backup power and (4)-four swivel type jacks – one on each corner of the trailer.

This arrow board comes with a 40 watt photovoltaic module in addition to the battery system. The solar panel provides a charge to the battery bank while exposed to the sun. It has LVD (low voltage disconnect). An optional 12-60 amp, fully automatic, battery charger can be used instead of the solar panels or when system is not exposed to direct sunlight for an extended period of time.

Battery Box

The battery box is steel fabricated with lockable rotary latches and hinged top, to protect batteries and controller.

Power Source

Our products incorporate a battery pack wired for 12V operation, depending on the requirements of the design. The battery bank is regulated by and protected by a solid-state charge controller/low voltage disconnect. This prevents gassing and over discharging of the batteries, which can result in premature failure. A thermal compensation and related circuitry adjusts the charge rate of the system with variances in temperature.

Trailer

The trailer is fabricated from tubular steel and coated with safety orange, black or white powder coat paint (other colors available upon request). The trailer is equipped with a tubular steel axle. Adjustable jacks are mounted at each corner of the trailer. The tail lights are dual combination reflective lights with stop, tail and turn signal. The wheels are five lug wheels and tires are sized appropriately.

SAFETY/ WARNINGS/ PRECAUTIONS

The following are recommendations for the safe and responsible use of the K&K Systems trailer units.

- Periodically inspect the trailer. This includes but is not limited to wheels, tongue, pins safety chains and taillights.
- Traffic cones or barricades should first be setup before radar speed monitor is erected.
- The trailer should always be properly set up and leveled with the jack stands before the radar speed monitor is erected, where applicable.
- Periodically check all nuts, bolts, cable clamps, etc. and tighten/ repair/ replace when necessary, where applicable.
- Always tow the unit in the down position, where applicable.
- Always use safety chains and properly sized hitch ball when towing unit.

Please remember that the best assurance against accidents is a careful and responsible operator.

BATTERY SAFETY

It is important that you know that, while 12 VDC is not likely to cause electrical shock, these batteries can produce unbelievable amounts of current that can instantly melt large tools, burn wires, and heat jewelry to skin searing temperatures. Batteries produce hydrogen gas in the course of normal operation and will explode under certain conditions with disfiguring consequences. One component of a battery, sulfuric acid, will permanently damage clothing, corrode metal, severely irritate your skin, and blind you if it gets into your eyes. You should become familiar with how batteries operate so that you will know how to avoid the dangerous characteristics of a battery.

BATTERY CHARGER SAFETY

The battery charger is preset in automatic position. **DO NOT CHANGE THESE SETTINGS** because of possible overcharging of batteries. Plug cord into a standard 120 volt AC for charging.

SOLAR SAFETY

To reduce the risk of shock or burn during maintenance, solar panels should be covered with an opaque material and power converter/battery charger should be disconnected from AC power supply.

TOWING AND LONG-TERM STORAGE

TOWING

Failure to follow instructions exactly can cause ball failure or loss of attachment resulting in vehicle crash and/or personal injury.

- Use this hitch ball only for towing trailers or vehicles connected to the ball with a socket-type coupler.
- Ball diameter must match coupler socket size.
- Do not exceed gross trailer weight shown on ball.

Improper tightening can cause ball failure or loss of attachment.

- Threaded shank must protrude beyond bottom of nut when tightened. If it does not, ball shank is too short for the application and loss of attachment may occur.
- Check nut tightness every time you hook up the trailer and at the beginning of each towing day, tow only if nut is tightened as specified.
- Replace any damaged or work part (except finish).
- Never attach a tow rope, chain or stretch type elastic rope to hitch ball.
- Do not fasten trailer safety chain or other type of attachment to or with, the ball.
- Lubricate ball and coupler to minimize wear and friction, coupler must not bind on ball.

This product complies with V.E.S.C. Regulation V-5, C.S.A. Standard D-264 and the Safety Specifications and Requirements for Connection Devices and Towing Systems.

Failure to follow instructions exactly can cause ball failure or loss of attachment resulting in vehicle crash and/or personal injury. Use this hitch ball only for towing trailers or vehicles connected to the ball with a socket-type coupler.

LONG TERM STORAGE

When the sign is to be stored for extended periods of time, the POWER switch should be turned off, and the solar charge controller should be left on, allowing the solar panel array to continuously charge the sign battery bank. If possible, place the unit in a sunny area to allow the unit to maintain the charge on the batteries. When the sign is to begin operation again, a thorough inspection of all systems is advised before the sign is towed to the job site. Check battery state of charge to confirm over 12 volts.

SETUP

The following is a step by step procedure for the setup and operation of the K&K Systems' trailer units:

Caution: If there is any portion of this instruction guide that is not understood, contact your local dealer or manufacturer.

Before beginning trailer setup:

1. Check charge controller/battery level.
2. Power on unit and set to desired arrow board pattern using controller inside battery compartment.
3. Make sure all bulbs are working properly in the pattern you chose.
4. Make sure light intensity switch is set to "auto".

Trailer Setup

1. Position trailer in desired location so that the unit is directed toward traffic.
2. Remove trailer from vehicle, blocking wheels first.
3. Use jacks to brace and level trailer.
4. Remove tongue from trailer (if desired).

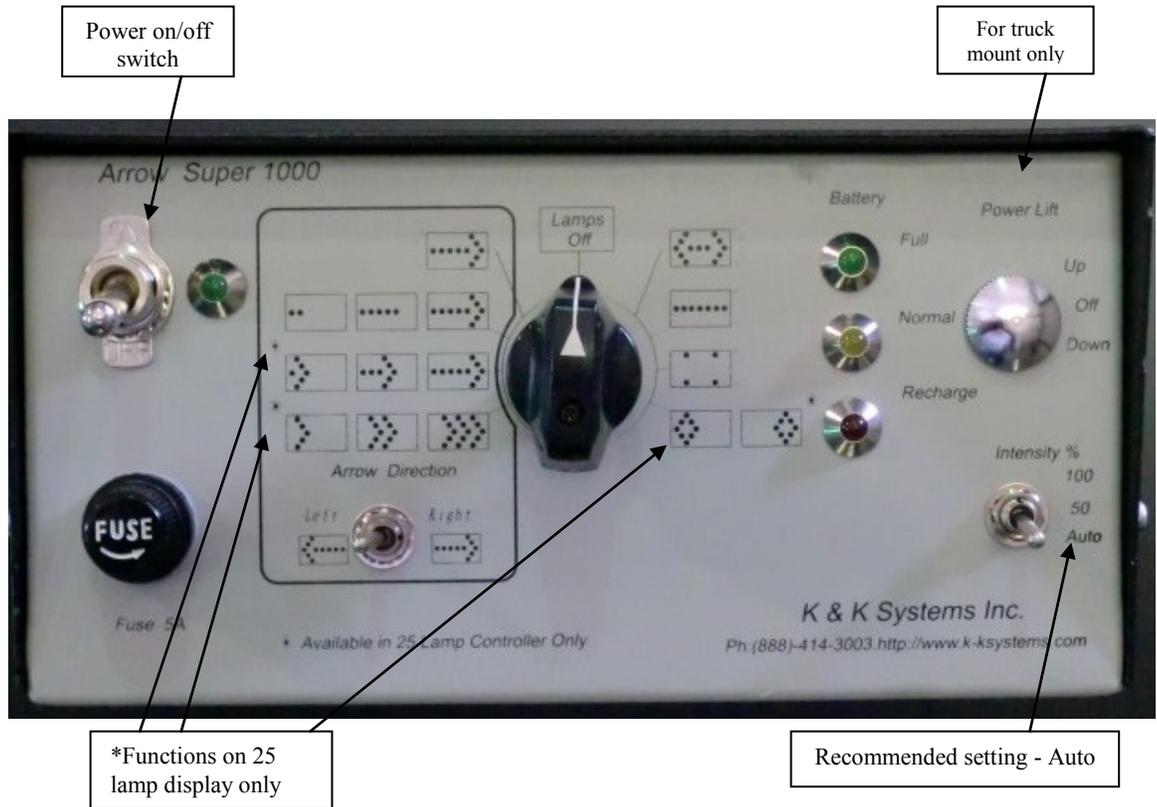
Elevating Sign (if applicable)

1. Verify that the sign is in proper position and that the entire unit is level.
2. Clear all unnecessary personnel from sign area to ensure safety.
3. Remove safety pin from support frame.
4. Locate crank winch located on support frame.
5. Remove transport chain before cranking winch to raise sign.
6. Rotate crank winch to raise sign until sign is in its full upright position.
7. Replace safety pin into the support frame.

Lowering Sign (if applicable)

1. Verify that the sign is in proper position and that the entire unit is level.
2. Clear all unnecessary personnel from sign area to ensure safety.
3. Remove safety pin from support frame.
4. Locate crank winch located on support frame.
5. Rotate crank winch to lower sign until sign is in its horizontal position.
6. Replace transport chain before transporting unit.
7. Replace safety pin into the support frame.

ARROW BOARD FUNCTIONS



Arrow Board Controller Functions

Flashing Modes

| | | | |
|----------------|--|--------------|--|
| Corner caution | | Left / Right | |
| Caution bar | | Double arrow | |

Flashing rate, all models 30 to 40 per minute.
 15 lamp: 7 functions
 25 lamp: 12 functions

Sequential Modes

| | First pulse | Second pulse | Third pulse |
|--|-------------|--------------|-------------|
| Sequential stem arrow, left / right | | | |
| Sequential arrow, left / right * | | | |
| Sequential chevron arrow, left / right * | | | |
| Alternating diamonds * | | | |

* Available only on 25-light models.

*Functions on 25 lamp display only

MAINTENANCE

Battery

The batteries hydrolyze some of the water in each cell in the normal course of operation. The rate at which water gets lost in this process increases with heavy usage. Depending on the usage of the sign, the water level of each 2V cell should be checked weekly or monthly. Use only distilled water to refill the cells, and be careful not to overfill. Refilling the cells of a battery will dilute the acid which causes it to act partly discharged. Water should be added before the batteries are put on the charger to ensure a full charge. Also, check all terminals for proper connection, tightness and corrosion. Check battery condition and charge when necessary or after storage. It is recommended that the batteries be charged every 3 to 6 months, regardless of weather conditions. Use an apron, gloves, and safety glasses when working on batteries.

SolarPanels

During operation, keep the module clean of excessive dirt and debris by using only soapy water and a soft cloth or sponge. Periodically check the integrity of wiring connections in the junction box. Inspect for signs of damage to module glass or frame.

Trailer

Periodically inspect wheels, tires, axle assembly, wheel bearings, taillights, tongue, safety chains and all components related to safe towing. Check tightness of all nuts and bolts; replace worn parts when necessary.

FREQUENTLY ASKED QUESTIONS

Please see FAQ's under specific model on website.

TROUBLESHOOTING

ARROW BOARD

- When the arrow board is first powered on, if the unit does not power on, then check the following:
 1. Fuse on Arrow Super 1000 controller.
 2. Power and data connection on back of Arrow Super 1000 controller.
 3. That the mode selection switch is not in “Lamps Off” position.
 4. Solar charge controller is “on”.
 5. Output voltage at load terminals of solar charge controller and polarity of all connections is correct.
 6. Battery voltage – low voltage will cause controller to shut off until battery is recharged.
 7. Broken or loose wires at connectors and terminal strips.

- **Lamp out (LED)**
 1. If lamp is not lit when it should be on, first suspect burned out lamp. **Disconnect control power cable.** Loosen the four screws holding the hood in place. Remove the lamp and loosen the two terminal screws. Remove the wires and connect the new lamp terminals. Fit lamp into the sign with the lamp tab properly seated in the notch in the sign panel. Only this orientation projects the light out toward the motorist at the correct viewing angles.

- **Steady Burn Lamp (Led)**
 1. **Disconnect control power cable.** Check for grounded or shorted wires and replace or repair where needed.

- **Many Lamps Out (Led)**
 1. Fuse on Arrow Super 1000 controller
 2. Suspect poor battery connections or poor pin and socket connections on back of Arrow Super 1000 controller. Inspect these.

- **Troubleshooting tools needed:**
 1. digital voltmeter
 2. Phillips head screwdriver
 3. straight screwdriver
 4. crescent wrench

Questions? Please email service@k-ksystems.com or call 888-414-3003.

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MANUFACTURER'S WARRANTY

1. The manufacturer warrants that all products manufactured by K & K Systems, Inc. will be free from defects in material and workmanship for a period of one (1) year from date of shipment, subject to the conditions and restrictions contained herein.
2. This warranty does not apply to a product that has not been installed or maintained in accordance with the manufacturer's instructions, has been subjected to damage in an accident, abused or neglected during operation, repaired or modified by persons other than manufacturer, its employees or authorized agents, or failed to have normal maintenance.
3. The buyer expressly agrees that the buyer's sole remedy and the manufacturer's sole responsibility, in respect to a warranty claim, is exclusively limited to repair or replacement at the manufacturer's option, of product or a portion thereof found by the manufacturer to be defective. The manufacturer is not responsible for labor or other expended charges by buyer including transportation charges, and shall not be liable for any incidental or consequential damages connected with repair of a product deemed to be defective or with installation or replacement of repaired product. Further, the manufacturer disclaims any liability for any incidental or consequential damages, including lost or duplicated time or expense accruing for any reason, to the owner or user of any products sold by the manufacturer, whether claim is made in contract or in tort or under any theory of warranty, negligence or otherwise.
4. The manufacturer reserves the right to make changes in its products from time to time, without incurring any obligation to incorporate such improvements in any products previously sold or in service.
5. The terms and conditions of the warranty cannot be altered without the written consent of the manufacturer.
6. The foregoing warranty is exclusive and in lieu of all other express, statutory and implied warranties **INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR ANY PARTICULAR PURPOSE.** There are no warranties which extend beyond the language in the previous six (6) paragraphs.

If you have any further questions, please feel free to call us at our toll-free number of 888-414-3003, email info@k-k-systems.com or look us up on the Internet at www.k-k-systems.com.

Disclaimer of Liability

We at K & K Systems have taken precautions to insure that the K&K Systems products are safe and reliable. However, we cannot be held responsible for any injuries or accidents as a result of the use or misuse of this product. It is the user's responsibility to insure that this product is used in a safe and responsible manner and to understand that he/ she is the only liable party. Any liability of K & K Systems is limited strictly to the Manufacturer's Warranty attached. K & K Systems, Inc., reserves the right to make any changes to this product, user guide or specifications without notice.